## Contents

### Important Safety Information
- Safety Definitions ................................................................. i-xi
- Safety Advice ........................................................................... i-xi

### Chapter 1 How the MCP110 Works
- MCP110 Overview ........................................................................ 1-2
- Why MCP110 Makes Companies More Efficient ....................... 1-2
- MCP110 Component Description .................................................. 1-3
- CDMA Wireless Network .............................................................. 1-4
- GPS Network ............................................................................... 1-4
- MCP110 Mobile Components ..................................................... 1-5

### Chapter 2 Component Overview
- Wireless Interface Box 110 (WIB110) ........................................... 2-3
- Display Interface Unit 110 (DIU110) ............................................. 2-3
- Mobile Application Server 110 (MAS110) .................................. 2-4
- Backup Battery ........................................................................... 2-4
- Optional Parts ............................................................................ 2-5
  - WIB200 ................................................................................. 2-5
  - DIU200 ................................................................................ 2-5
- Optional Accessories/Applications for the MCP110 .................. 2-5

### Chapter 3 General Wiring and Installation Guidelines
- Making Electrical Connections .................................................. 3-2
  - Approved Qualcomm Electrical Connectors ................................ 3-2
  - Wire Stripping ........................................................................ 3-2
  - Butt Splicing .......................................................................... 3-3
  - Crimping ................................................................................ 3-4
  - Ring Terminals ...................................................................... 3-10
- Proper Grounding ....................................................................... 3-10
- General Installation Guidelines .................................................. 3-11
- Routing and Protecting Cables .................................................... 3-11
Chapter 4 Installation Planning

Installation Guidelines ................................................................. 4-2
Safety, Reliability, and Accessibility ........................................... 4-2
Typical Installation Sequence ....................................................... 4-2
Typical Installation Locations for MCP110 Components ............... 4-3
Conventional Vehicle Types .......................................................... 4-4
Straight Truck Vehicle Types (All Makes) ...................................... 4-9
Cabover Engine Vehicle Types (All Makes) ................................. 4-10
Special Cable Ordering Instructions for Tilt Cabs ......................... 4-10
Tools and Supplies Recommended for Installations ..................... 4-11
Qualcomm Approved Sealants .................................................... 4-11

Chapter 5 Mobile Application Server 110 (MAS110) Installation

General Installation Guidelines ....................................................... 5-2
Installing the Backup Battery into the MAS110 ............................. 5-2
Installing the MAS110 ................................................................. 5-3
Selecting a Mounting Location ..................................................... 5-3
Securing the MAS110 ................................................................. 5-4
Installing the Power Cable ......................................................... 5-5
Low Voltage Disconnects (LVDs) .................................................. 5-5
Power Cable Run ................................................................. 5-5
Power Cable Routing ............................................................... 5-5
Power Cable Wire Connections .................................................. 5-5
Grounding Guidelines ................................................................. 5-6
Installing the Accessory Cable .................................................... 5-7
Cable Run .......................................................... 5-7
Connecting Cables to the MAS110 ................................................ 5-8

Chapter 6 Wireless Interface Box 110 (WIB110) Antenna Installation

General Installation Guidelines ....................................................... 6-2
WIB Antenna View-of-Sky Requirements ...................................... 6-2
Installation of WIB Mount .......................................................... 6-3
Option #1 ........................................................................ 6-3
Option #2 ........................................................................ 6-3
Mount the WIB Antenna ............................................................. 6-3
Routing the WIB Cable ............................................................. 6-5
Connecting the Antenna Cable to the MAS110 .............................. 6-5

Chapter 7 Display Interface Unit 110 (DIU110) Installation

General Installation Guidelines ....................................................... 7-2
Selecting a Mounting Location ..................................................... 7-2
Installing the Display Holster and Display .................................. 7-5
Display Cable Routing ............................................................. 7-5
Chapter 8 Text-to-Speech (TTS) Installation

General Installation Guidelines ................................................................. 8-2
Selecting a Speaker .................................................................................. 8-2
  Speaker Requirements ........................................................................... 8-2
  Choosing a Speaker .............................................................................. 8-2
Option 1—Connecting to an Existing or Shared Speaker ......................... 8-3
  Connecting Speaker Switch Cable to Accessory Cable ........................ 8-4
Option 2—Connecting to a Dedicated 8-ohm Speaker ............................. 8-6

Chapter 9 Vehicle Data Bus Connections

Vehicle Data Source Overview ................................................................. 9-2
  J1939 Data Bus .................................................................................... 9-2
  J1708/J1587 Data Bus ......................................................................... 9-2
  Traditional Sensors ............................................................................ 9-2
Vehicle Data Source Selection ................................................................. 9-3
Guidelines for Connecting to the J1939 Data Bus .................................. 9-3
J1939 Pre-installation Check Out .......................................................... 9-4
  Resistance Test (to Verify that J1939 Is Present) .................................. 9-4
Option 1—Connecting J1939 Using the Repeater Cable ......................... 9-5
  Making the Connection ...................................................................... 9-5
Option 2—Connecting J1939 Without Using the Repeater Cable ............. 9-8
  Making the Connection ...................................................................... 9-9
Connecting J1708 /J1587 ......................................................................... 9-10
Verifying Data Source Connectivity ....................................................... 9-12

Chapter 10 System Verification

What Is Basic MCP110 System Verification? .......................................... 10-2
How to Find the MCP110 Unit Address (UA)/Serial Number .................. 10-2
Performing System Verification .............................................................. 10-3
Flowchart—Basic MCP110 System Verification ...................................... 10-4
Basic MCP110 System Verification Procedure ...................................... 10-6
MCP System Screens ............................................................................ 10-10
  MCP110 System Screen ..................................................................... 10-10
  MCP110 Comm Screen .................................................................... 10-11
  MCP110 GPS Screen ....................................................................... 10-12
  MCP110 Performance Screen ............................................................. 10-13
  MCP110 Diag Screen ...................................................................... 10-14
VDS Screen - Summary ........................................................................ 10-15
VDS Screen - Details ........................................................................... 10-15
Contents

Qualcomm® MCP110 System Verification Form .......................................................... 10-15

Chapter 11 Performance Monitoring System Verification

Performance Monitoring System Overview .......................................................... 11-2
Performance Monitoring System Verification .................................................. 11-2
   Input Screen Example .............................................................................. 11-3
   Understanding Performance Monitoring Faults ...................................... 11-3
Other Performance Monitoring System Display Screens .............................. 11-6
   Summary Screen ................................................................................... 11-6
   Performance Screen ............................................................................. 11-7
   Violations Screen .................................................................................. 11-8
   Parameters Screen ............................................................................... 11-9
   PTO Screen ......................................................................................... 11-10
   Odometer Screen .................................................................................. 11-11
Special Alert Display Messages .................................................................... 11-12
Warning Messages .................................................................................... 11-12
Power Take-off (PTO) Overview .................................................................... 11-12
   PTOP (Power Take-off Pump)/PTOC (Power Take-off Compressor) .... 11-13
PTO Data Input Verification Procedure ......................................................... 11-14

Chapter 12 Vehicle Maintenance System Verification

Vehicle Maintenance Overview ........................................................................ 12-2
   Feature Requirements ........................................................................... 12-2
Connecting the J1939 Wires ........................................................................ 12-2
Vehicle Maintenance System Verification ...................................................... 12-3

Chapter 13 Critical Event Reporting System Verification

CER Overview ............................................................................................ 13-2
CER System Verification ............................................................................... 13-3
   Identify Configuration and Available CER Features ............................... 13-3
   Test System by Manually Reporting an Event ...................................... 13-7

Chapter 14 Trailer Management System Installation

Trailer Management System Overview ......................................................... 14-2
   Hardware Requirements .......................................................................... 14-2
Trailer Management System Wiring for the Truck ........................................... 14-2
   Fuse Kit Installation ............................................................................... 14-2
Trailer Management System Verification ..................................................... 14-3
   Enabling the Option for the Trailer Management System ...................... 14-3
   Trailer Connection/Disconnection .......................................................... 14-4
   Trailer Management Diagnostic Screen ............................................... 14-5
   Refrigeration Status Screen .................................................................. 14-6
Appendix D  Upgrading the MCP110 Using USB Memory Sticks

Checking the Software Versions Installed .........................................................D-2
USB Memory Stick Instructions .........................................................................D-3
Upgrading Only the MAS110 Software .............................................................D-3
Upgrading the MAS OS and MAS Software ....................................................D-4

Appendix E  Preventive Maintenance Inspection

How Often Should Inspections Be Performed? ..............................................E-2
Inspecting the Mobile Application Server 110 (MAS110) .............................E-2
Inspecting the Display Interface Unit 110 (DIU110) .....................................E-4
Inspecting the Antennas ................................................................................E-6
Verifying Trailer Management System Connections ....................................E-7

Appendix F  Component and Document Information

DCNs for Documents Referenced in this Guide ..............................................F-2
MCP110 System Component MCNs Referenced in this Guide .....................F-2
MCNs for Sealants and Lubricants Referenced in this Guide .......................F-6
MCN for other items ......................................................................................F-6

Appendix G  Feedback Form

Feedback Form ...............................................................................................G-1
Company Information ....................................................................................G-1
Documentation Content ...............................................................................G-2
Documentation Format ................................................................................G-3

Appendix H  Glossary
Important Safety Information

Safety Definitions

The following Caution and Warning definitions are intended to advise the driver when it is safe to use a display unit.

**CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

**WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

Safety Advice

The following Safety Advice is provided for drivers, installers, and application developers who use and/or locate all types of display units.

If you are a Driver, do not use a display unit when the vehicle is in motion.

If you are an Installer, do not locate the display unit, including third-party devices, where it obstructs the driver’s field of vision, distracts the driver from the driving task, or interferes with the driver’s operation of controls or instruments. The following is displayed when ignition is turned on.

If you are a Third-party Device Manufacturer or Application Developer, it is your responsibility to provide appropriate warnings regarding the safe use of your device(s) in conjunction with Qualcomm® equipment. Applications should not require the driver to divert his attention from the road while driving a vehicle.
1

How the MCP110 Works

Topics in this chapter provide a basic overview of the MCP 110 Series and how its components interact to deliver effective, two-way information processing and other value-added services.

MCP110 Overview ................................................................. 1-2
Why MCP110 Makes Companies More Efficient .............................. 1-2
MCP110 Component Description .............................................. 1-3
CDMA Wireless Network .................................................. 1-4
GPS Network ........................................................................ 1-4
MCP110 Mobile Components .............................................. 1-5

For technical questions, contact Qualcomm Enterprise Services (QES) Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
**MCP110 Overview**

MCP110 is a high bandwidth mobile computing platform designed to help increase customer service, reduce operating costs, enhance driver productivity, and ensure vehicle safety.

MCP110 offers multi-mode connectivity (terrestrial is standard, WiFi and satellite are optional); and delivers more processing power on the mobile unit, an increased number of hardware ports, and a Windows® Embedded Standard operating system.

Data processed through the MCP110 is backward compatible and interoperable with the host, so customers can access information across various Qualcomm platforms, such as MCP 100 Series, OmniTRACS® Mobile Computing System, OmniExpress® Mobile Computing System, and Untethered Asset Management Service.

**Why MCP110 Makes Companies More Efficient**

- Companies can maintain two-way contact with their vehicles and drivers 24 hours a day.
- Dispatchers can send pickup and delivery information directly to drivers, keeping vehicles on the road.
- Text-to-speech alerts drivers of incoming messages and their importance, so drivers can choose to immediately listen to messages without pulling off the road.
- Dispatchers know when vehicles are expected to arrive at locations, and can pass that information on to customers.
- Provides dispatchers with vehicle location and position history information by tracking the location of each MCP110 using latitude and longitude or distance and direction from landmarks (usually large towns and cities).
- Drivers can inform the dispatcher of road conditions or problems.
- Optional applications allow monitoring of driver performance, engine diagnostics, trailer locations, refrigeration status, and critical event reporting.
- Decision support software enables customers to optimize assets and inform shippers and consignees of load status.
- Over-the-air software upgrades allow drivers to remain on the road rather than having to stop at service centers.
- Display interface unit 110 (DIU110) provides a color graphical display that integrates touchscreen functionality, extended temperature range, and improved clarity for delivering critical information to drivers.
- Hours of service data ensures regulatory compliance.
- On-board navigation application provides truck-specific route mappings.
- Helps with safety and accident prevention.
- Optimizes fuel management.
MCP110 Component Description

Network Operations Center (NOC)
- Responsible for processing and managing information traffic between dispatch center and fleet.
- Within the NOC is the Network Management Computer (NMC), which receives and handles information traffic.
- Located at QUALCOMM Incorporated, in San Diego, CA.

Qualcomm Dispatch Software (QTRACS® software/Services Portal)
- Software on the trucking company’s dispatch computer and dispatcher’s interface with the MCP110.
- Allows dispatcher to send and receive information, request MCP110 location information, and perform other dispatch functions.
- QTRACS/400 customers connect with the NMC with the NOC.
### Code Division Multiple Access (CDMA) Wireless Network

- Radio frequency (RF) signals are received from the antenna by the MCP110 via the wireless interface box (WIB) from a wireless communication network.

### GPS Positioning Satellites

- Uses 24 satellites to provide vehicle positioning information.

### Mobile Computing Platform 110 (MCP110)

- Driver’s interface with the Qualcomm platform and the component that resides in the vehicle.
- Allows the driver to send and receive information.

- The MCP110 includes the MAS110, which consists primarily of a microprocessor, a wireless modem module, and data storage.
- The user interface device (DIU110) is the driver’s display terminal that enables the driver to read, write, and send information.
- The antenna (located inside the WIB) relays information between dispatch and the driver.
- The antenna receives and sends wireless information to and from the MAS110.
- The antenna interfaces with wireless networks. Information is passed through Qualcomm’s NOC where it is distributed to the dispatch center. Dispatchers respond by sending a message back to Qualcomm’s NOC, where it is relayed to the PCS gateway and broadcast out to the wireless network to be picked up by the vehicle’s antenna.

### CDMA Wireless Network

- MCP110 uses CDMA technology to connect dispatchers and vehicles over the wireless airwaves.
- Wherever a cellular/terrestrial wireless network exists, drivers can send messages to and receive messages from dispatchers while traveling.
- Utilizes wireless digital roaming to enable many cellular networks.

### GPS Network

- A worldwide radio-navigation system formed from a constellation of 24 satellites and their ground stations.
- Uses satellites as reference points to calculate positions accurate to a matter of meters.
- A standard feature of the MCP110 for positioning.
- MCP110 receives positioning data from the GPS receiver, which is integrated inside the antenna to determine location.
- Position data from the MCP110 is forwarded to dispatch whenever information is sent to a vehicle and acknowledged, and whenever a driver sends information.
- Position data is sent at regular intervals and is made available to dispatch.
MCP110 Mobile Components

- Mobile part of the Qualcomm platform is installed in a customer’s vehicle.
- Each MCP110 has its own unique unit address which is the serial number on the MAS110. This address is used to route messages to the correct vehicle.
- Standard components:
  - Wireless interface box (WIB)—Contains terrestrial (and WiFi modems if using WIB200), and antenna that provide CDMA/GSM/UMTS connectivity.
  - Mobile application server (MAS110)—Communication unit which contains the operating circuitry and memory for the MCP110. The “black box” of the platform.
  - Display interface unit (DIU110)—Standard display unit for the MCP110, which the driver uses to connect with the dispatcher. Consists of a color graphical display with touchscreen functionality, extended temperature range, and improved clarity for drivers.
2
Component Overview

Topics in this chapter provide information on the basic components of the MCP110.

• For planning and installation instructions, see Chapters 4–9.
• For optional accessory installation, refer to Optional Accessories/Applications for the MCP110 on page 2-5.

Wireless Interface Box 110 (WIB110) .................................................. 2-3
Display Interface Unit 110 (DIU110) ..................................................... 2-3
Mobile Application Server 110 (MAS110) .......................................... 2-4
Backup Battery ................................................................. 2-4
Optional Accessories/Applications for the MCP110 .......................... 2-5

For technical questions, contact Qualcomm Enterprise Services Customer Support.
Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
The MCP110 masterpack includes:

- Wireless Interface Box 110 (WIB110)
- Display Interface Unit 110 (DIU110)
- Mobile Application Server 110 (MAS110)
- Cables
- Backup battery
Wireless Interface Box 110 (WIB110)

The WIB110 includes a terrestrial modem and antennae that provide cellular connectivity. The hardware provides reliable transmission and GPS positioning.

- Dimensions: 6.5 x 6.5 x 3.4 inches
- Weight: 1.2 pounds
- Extended operating temperature range:
  - -30C to +70 C / -22F to +158F
- 802.11 compatible
- Lightweight housing for easy installation.
- Rugged design

Display Interface Unit 110 (DIU110)

A color graphical display that integrates touchscreen functionality, extended temperature range, and improved clarity for delivering critical information to drivers.

- Dimensions: 10.4 x 5.3 x 2.0 inches
- Weight: 1.7 pounds
- Screen size: 7-inch diagonal
- Resolution: 800 x 480
- Extended operating temperature range: -30C to +70C / -22F to +158F. Display brightness is reduced at temperatures above +60C / +140F to reduce internal heat generation.
- Three indicator LEDs alert drivers of incoming messages, connectivity, and other alerts.
- 16:9 aspect ratio color TFT LCD touchscreen includes stylus. Icon- and task-driven to maximize driver efficiency.
- Holstered dash mount and tethered display allows for use throughout the cab.
- Display is backlit, allowing the driver to work in the dark.
- USB 2.0 Host Port allows USB peripherals, such as handheld scanners, keyboards, and storage devices.
- Utilizes in-motion user interface to reduce driver distraction and increase safe driving.
- Touchscreen provides valid Cartesian touch coordinates for the entire active display surface.
Mobile Application Server 110 (MAS110)

The hardware component that leverages the Windows® Embedded Standard operating system to deliver computing intelligence, processing power, and expansion capability.

- Dimensions: 9.7 x 7.7 x 2.3 inches
- Weight: 4.3 pounds
- Extended operating temperature range: -40°C to +70°C / -40°F to +158°F
- Storage temperature range: -40°C to +85°C / -40°F to +185°F
- On-board memory: 4 GB of compact flash solid state memory and 1 GB RAM. Optional 4GB flash memory upgrade available.
- Rugged hardware is compliant to SAE xJ1455 vibration profiles.
- .NET framework version 3.5.
- Intel® Extended Temperature Atom 1.3 GHz.
- Backup battery for cold crank condition.
- Supports a wide range of port interfaces that allow connections to on-board equipment:
  - **J1708 Bus** connects to J1708 bus of older trucks.
  - **J1939/CAN Bus** connects to J1939 bus of newer trucks. Can be used to drive some serial tachographs.
  - **(2) USB 2.0 Host Ports** allow USB peripherals, such as handheld scanners, keyboards, and storage devices.
- Supports these other interfaces:
  - **Panic Button Input** allows connection of a panic button for emergency driver signaling.
  - **Tamper Detect Line** detects tampering with vehicle wiring.
  - **Tethered Asset Management Receiver** allows the MAS110 to determine what trailer is attached to the tractor.
  - **Audio Output** drives a truck’s speakers which allow for voice navigation and messaging prompts, i.e., text-to-speech.

Backup Battery

- When vehicle power is lost to the MCP110, the backup battery allows the MAS110 to shut down gracefully and properly store data.
Optional Parts

If desired, you can use a WIB200 or DIU200 with your MCP110 equipment.

**WIB200**

The WIB200 includes terrestrial and WiFi modems, and antennae that provide CDMA/GSM/UMTS connectivity. The hardware provides reliable transmission and GPS positioning.

**DIU200**

A color graphical display with sliding keyboard that integrates touchscreen functionality, extended temperature range, and improved clarity for delivering critical information to drivers.

Optional Accessories/Applications for the MCP110

<table>
<thead>
<tr>
<th>Accessory/Application</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance monitoring system</td>
<td>11</td>
</tr>
<tr>
<td>Vehicle maintenance</td>
<td>12</td>
</tr>
<tr>
<td>Critical event reporting</td>
<td>13</td>
</tr>
<tr>
<td>Trailer management system</td>
<td>14</td>
</tr>
<tr>
<td>Panic button</td>
<td>15</td>
</tr>
<tr>
<td>Wireless panic button</td>
<td>16</td>
</tr>
<tr>
<td>Scanner</td>
<td>17</td>
</tr>
</tbody>
</table>
General Wiring and Installation Guidelines

Topics in this chapter provide the Qualcomm-approved general methods for making connections to cables and wires and the proper connectors to use to avoid potential problems.

Making Electrical Connections .................................................. 3-2
Proper Grounding ................................................................. 3-10
General Installation Guidelines .................................................. 3-11
Routing and Protecting Cables .................................................. 3-11

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
Making Electrical Connections

Approved Qualcomm Electrical Connectors

The only Qualcomm-approved electrical connectors are crimp butt splices and crimp ring terminals. Qualcomm recommends Nylon insulated, seamless butt connectors with inspection windows. Heat-shrinkable butt connectors are preferred. When butt splicing multiple wires on one end of a butt splice and a different number of wires on the other end, step-down butt splices are recommended.

WARNING

Not following proper wiring guidelines and using improper crimps and butt splices may cause intermittent connections and may result in unexpected truck down time or system failure.

Wire Stripping

Caution

Use care in stripping wires. Vibration can cause nicked wires to fail. Using wire cutters, knives, or other tools can damage the conductor wire and/or insulation.

Knowing and following proper wire stripping techniques is essential for performing successful and safe electrical connections of all system components.

1. Using a wire stripper, strip approximately 1/4" off the end of an insulated wire.

2. After stripping the wire, verify that the wire is not severed, nicked, or damaged by the stripping tool. If the wire has been properly stripped, it is ready to be butt spliced. If the wire has been damaged, restrip the wire (see step 1.).
**Butt Splicing**

- Qualcomm recommends Nylon insulated, seamless butt connectors with inspection windows.
- Heat-shrinkable butt connectors are preferred.

**Butt splicing can be done inside and outside the cab or enclosure.** See *Butt Splicing Connections Done Inside the Vehicle (Out of the Weather)* on page 3-3 and *Moisture Protection for Connections Done Outside the Vehicle* on page 3-7.

Make sure the size of the butt splice is appropriate for the job. A good butt splice has these characteristics:

- The ends of the bare wires are visible through an inspection window.
- The ends of the wires “butt” up against the stop.
- The wires are not exposed beyond splice shielding.
- Crimping does not sever or damage the wires or insulation.

**Butt Splicing Connections Done Inside the Vehicle (Out of the Weather)**

1. Insert the stripped wires approximately half way into a butt splice, preferably one with an inspection window for verifying the wire is in the correct position.

2. Repeat this process for the wire on the opposite end of the butt splice. Once a proper butt splice is confirmed, it is important to properly crimp the butt splice to hold the connection.
**Crimping**

- When crimping a butt-spliced wire or cable, be sure the insulated butt splice is crimped using the insulated position on the crimp tool and not the crimping “tooth” of the tool.
- Crimping butt splices incorrectly can result in a severed wire and a failed wire connection.

---

**Caution**

⚠️ **DO NOT crimp on the crimp “tooth.”**

---

1. Using a crimping tool, crimp the butt splice one end at a time. **First,** crimp the inside crimp area where the wire has been stripped. Apply necessary pressure to this inside area.
**Note**

The objective is to apply only the necessary pressure to crimp the butt splice closed and hold the wire connections together. **Do not** apply so much pressure as to crush the butt splice and sever the wire or the insulation on the wire.

2. After crimping the inside of both ends of the butt splice on the “insulated” area of the crimping tool, next crimp the outside of both ends of the butt splice.
3. Verify that the crimps are good and the wires have not been damaged.

4. Do a pull test. Pull on both ends of the wires to ensure a solid butt-spliced connection exists. The crimped butt splice securely grips the insulated wires.

---

**WARNING**

*If using heat shrinkable crimps, DO NOT use a heat gun or open flame near combustible materials. Use a heat gun only when it is safe and appropriate to do so. Protect surrounding wiring and other components when using a heat gun.*
**Moisture Protection for Connections Done Outside the Vehicle**

1. For crimps done outside the vehicle, when the crimps are verified to be good, use plastic seal tape to wrap the entire connection. Use a minimum of two layers of seal tape to completely wrap the connection.

   - 3M industrial tape (tape sealant, vinyl/rubber mastic) is available in a 10’ roll from Qualcomm (MCN# 800-01788-0168). To find a local or nationwide supplier, visit http://www.3m.com (Mastic, Scotch® Vinyl).

---

**Diagram:**

- Peel Paper
- Backing Off
- Wrap two layers minimum
**Strain Relief With or Without Weather Protection Tape**

*If there is sufficient wire available for the Four-Finger Wrap Method:*

1. Wrap a wire around four fingers of a hand, one full loop, so that the wire loop is longer than the wrapped butt splice.

2. Pinch the loop tightly and center it against the wrapped butt splice.

3. Secure the wires together and place 4" tie wraps at the outside ends of the butt splice.

4. Cinch the tie wraps tight and cut them *flush* to the lock head.
5. Firmly tug on the butt-spliced wire connection to make sure the tie wraps do not pull loose.

If there is NOT sufficient wire available for the Four-Finger Wrap Method:

1. Securely tie wrap the butt spliced wires to existing wires or harnesses in the nearby vicinity.

**Note**

*It is good practice to tie wrap the newly installed wires to existing wires approximately every 15”–18”.*
Ring Terminals

When making electrical connections, crimp ring terminals onto the ends of the wires to ensure good contacts. A properly crimped ring terminal has these characteristics:

- The barrel crimping indent is well-formed and properly positioned.
- The insulated wire's grip impression is well-formed and provides proper support without crushing the insulation.
- The wire does not move independently of the lug. Firmly tug on the ring terminal to ensure it does not pull loose.
- The end of the bare wire protrudes through the crimp barrel approximately 0.03 to 0.125" depending on the lug size and crimp tool.

Install the ring terminal on the ground connection using one of the following options:

Proper Grounding

When establishing a good chassis ground, avoid areas that may be potentially isolated from ground by a hinge or bad welds. It is extremely important that you create clean, secure, tight, metal-to-metal grounds. If grounding terminals are not available, remove the paint from the surface of the metal connected to the chassis to make the ground. Make sure the wires are not strained or vulnerable to damage.

**WARNING**

Not following proper grounding guidelines may cause intermittent connections and may result in unexpected truck downtime or system failure.
General Wiring and Installation Guidelines

**General Installation Guidelines**

- Determine the most direct and protected route when routing cables to connect the components to each other and to the vehicle. Refer to Chapter 4.
- The standard cable length for the power, display, and accessory cables is 20 feet.
  - If you are working with a tilt cab, a longer cable may be necessary.
- Do not trim cable lengths to fit a specific vehicle.
- Keep protective caps in place or wrap connector with plastic/electrical tape until you’re ready to connect the cable to the component.
- Use only wire strippers for stripping wires.
- Use only the appropriate insulated crimping tool for crimping insulated connectors.
- Use existing holes for cable routing whenever possible.

**Routing and Protecting Cables**

PROTECT THE ENTIRE LENGTH of cabling with convoluted tubing when routing the cable:

- Limit the minimum bend diameter:
  - accessory cable to 5.0 inches
  - display cable to 1.5 inches
  - power cable to 2.5 inches
  - antenna cable to 2.5 inches
  - SDM cable (optional) to 2.5 inches
- Provide strain relief for all cables
- Use supplied grommets
- Use tie wraps
- Deburr any drilled holes

DO NOT route cables:

- Near audio system amplifiers
- Near exhaust pipes and other sources of heat
- Near the brake, clutch, or accelerator pedals, and linkage
- Near foot traffic areas
- Near the windshield wiper mechanism
- Near CB radio wires
- Over sharp edges
- Over moving parts
Special Exterior Routing Guidelines

- Always use convoluted tubing to protect the cables. Secure the cables to the vehicle with tie wraps at approximately 18’ intervals.
- Route away from exhaust pipes and moving parts. If an exhaust pipe or moving part must be crossed, use extra tie wraps and route the cable in such a manner that if the tie wrap fails, the cable will be caught or will rest on a safe part (not hot or moving).
- Seal all external holes for cables with refrigeration/tar tape or silicone sealant to keep moisture out.
- Route cables with any existing vehicle cables.

Special Interior Routing Guidelines

- Route cables under kick plates or carpets.
- Avoid high foot traffic areas.
- When reinstalling kick plates or carpets, be careful that screws do not penetrate cables.
- Route cables with any existing vehicle cables.
- Use convoluted tubing and refrigeration/tar tape when cables are routed through interior holes with sharp edges.

Storing Excess Cabling

- Secure excess cabling with tie wraps.
- Stow out of sight.

Service Loops (Drip Loops)

- Provide for all cables.
- Ensure that service loops do not cause any obstruction.
**Access Holes**

- Use existing holes for cable routing.
- If you drill, drill the smallest hole for the purpose:
  - 1-1/2” hole is recommended for cables with a 9-pin DSUB connector, e.g., SDM cable.
  - 1” hole is needed for the connectors on the antenna cable.
- Finish holes prior to routing cables:
  - Debur holes.
  - Use supplied grommet/convoluted tubing with internal holes.
  - Extend convoluted tubing beyond the hole.

**Stress Relief**

- At the MAS, tie-wrap cables to each other to reduce stress on any individual cable.
- Ensure cables have enough slack so connections are not being pulled.
4
Installation Planning

Topics in this chapter provide guidelines for planning a basic Qualcomm MCP110 installation.

Installation Guidelines .................................................. 4-2
Typical Installation Sequence. .......................................... 4-2
Typical Installation Locations for MCP110 Components ............. 4-3
Tools and Supplies Recommended for Installations .................. 4-11

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
Installation Guidelines

Safety, Reliability, and Accessibility

- Use eye protection when using a drill/performing work that may be hazardous to the eyes.
- Use ear protection in noisy work areas.
- Wear appropriate clothing/uniforms and safety shoes.
- Make sure you know what is behind the area before you drill.
- Use hood safety lanyards when the vehicle hood is open.
- Make sure ladders are in good working order.
- Place ladders in safe positions.
- Install equipment so it will not cause damage to the vehicle or work loose over time.
- Make sure there are no loose components/cables and no unsecured components.
- Use solid mounting surfaces.
- Do not modify or design your own mounts without first obtaining Qualcomm approval (applies domestically only).
- Mount the WIB in locations where the unit will receive uninterrupted and undegraded GPS satellite signals. Refer to Routing the WIB Cable on page 6-5.
- Install all components in locations where they will not be abused.
- Do not mount antennas on headache racks or exhaust stacks.
- Route all cables away from hot or abrasive areas.
- Ensure that electrical connections are solid and the system ground is a clean, secure, metal-to-metal chassis ground.
- Choose installation locations where future maintenance can be easily serviced.
- Choose installation locations where components are safe from tampering and damage.

Typical Installation Sequence

1. Determine component installation locations best-suited for your vehicle.
2. Locate the MAS110, see Chapter 5.
3. Install and route cables.
4. Locate and install the antenna, see Chapter 6.
5. Locate and install the display unit holster and DIU, see Chapter 7.
6. Accessories.
7. Perform a system verification.
Typical Installation Locations for MCP110 Components

- Wireless Interface Box (WIB)
- CB or Stereo Speaker
- Display Interface Unit (DIU110)
- Accessory Connections (e.g., J1708, TTS)
- Power Connections
- Display Cable
- Speaker Cable
- Accessory Cable
- MAS110
- DIU WIB
- PWR
Conventional Vehicle Types

International/Navistar ProStar Series

- MAS110—Install on side wall or under bunk.
  - Install so there is access to a USB port for the memory stick and access to backup battery.
- DIU110—Install on dash where space allows/customer preference.
- Cables—Route externally or internally.
  - Drill a 1" hole for antenna cable.
- Typical Connection Points
  - Power: red wire labeled A-15
  - Chassis ground: driver side firewall, ground post
  - Ignition: Ignition Switch. Pink wire A-13F
  - J1708: driver side, near driver's knee, Deutsch plug. Blue wire A3B (+), Grey wire A3B (-)
  - J1939: locate terminating resistors at engine block or transmission. Follow 1939 wires to backbone
  - TTRACS: outside driver side firewall, where 7-way blue # N94T wire enters cab

International/Navistar 9000i Series

- MAS110—Install on side wall or under bunk.
  - Install so there is access to a USB port for the memory stick and access to backup battery.
- DIU110—Install on dash where space allows/customer preference.
- Cables—Route externally or internally.
  - Drill a 1" hole for antenna cable.
- Typical Connection Points
  - Power: at key/ignition switch
  - Chassis ground: driver side firewall area
  - Ignition: ignition switch
  - J1708: wires are marked 98 DP+ and 98 DN- for data minus. Each connector is also tagged; one is labeled “D1 Data Link Pos” and the other is “D2 Data Link neg.” Recommend the use of Packard-style female terminals - International part #16612094.
  - J1939: driver side dash, 9-pin Deutsch connector. If autoshift or Eaton VORAD, connection at doghouse, center of dash. Green (+) and Yellow (-) wires
  - TTRACS: back of truck sleeper at 7-way receptacle. Aux wire #94F or 94L for post 03/07 trucks
**International/Navistar 8600 Series**

- MAS110—Install on side wall or under bunk.
  - Install so there is access to a USB port for the memory stick and access to backup battery.
- DIU110—Install on dash where space allows/customer preference.
- Cables—Route externally or internally.
  - Drill a 1" hole for antenna cable.

**Typical Connection Points**
- Power: passenger side fuse panel red wire A13AF A13 - fuse slot F38
- Chassis ground: driver side firewall post
- Ignition: passenger side fuse panel, pink wire A13F - fuse slot F28
- J1708: driver side steering column, wires A3C+, A3C-. Recommend the use of Packard style female terminals - International part #16612094.
- J1939: driver side kick panel, 9-pin Deutsh connector
- TTRACS: outside driver cab at 7-way harness to OEM harness junction

**Freightliner Cascadia**

- MAS110—Install on side wall or under bunk.
  - Install so there is access to a USB port for the memory stick and access to backup battery.
- DIU110—Install on dash where space allows/customer preference.
- Cables—Route internally.
  - Use existing 1" hole for antenna cable.

**Typical Connection Points**
- Power: center lower dash, main bus bar
- Chassis ground: center lower dash, main bus bracket
- Ignition: center lower dash, main bus bar, ignition terminal block
- J1708: 6-pin Deutsch connector (pin A+, pin B -), 9-pin Deutsch connector (pin F+, pin G-)
- J1939: 9-pin Deutsch connector Green (+) and Yellow (-) wires
- TTRACS: reference OEM wiring specs
Freightliner Century/Columbia

- MAS110—Install on side wall or under bunk.
  - Install so there is access to a USB port for the memory stick and access to backup battery.
- DIU110—Install on dash where space allows/customer preference.
- Cables—Route internally.
  - Power is at A pillar on passenger side.
  - Use existing 1.25" hole for antenna cable.
- Typical Connection Points
  - Power: passenger side fuse panel, under red cover, post labeled BATT+
  - Chassis ground: on metal at A Pillar, scrape paint from surface and use self drilling screw
  - Ignition: passenger side fuse panel, under red cover, post labeled IGN
  - J1708: passenger side below fuse panel Green (-) and Orange (+) wires
  - J1939: at or near the Diagnostic plug at B pillar Green (+) and Yellow (-) wires
  - TTRACS: passenger side firewall #45

Kenworth T300/T600/T800/W900

- MAS110—Install on side wall or under the bunk.
  - Install so there is access to a USB port for the memory stick and access to backup battery.
- DIU110—Install on dash where space allows/customer preference.
- Cables—Route externally.
  - Connect power cable to key switch.
  - Cables exit/enter sleeper floor near MAS110.
  - Cables enter/exit cab through firewall high on driver side. Look for rubber plugs.
  - Drill a 1" hole in floor of side box for antenna cable. A hole already exists in the firewall.
- Typical Connection Points
  - Power: behind left gauge dash panel, Red wire labeled BATT
  - Chassis ground: behind left gauge dash panel, White wire labeled Ground
  - Ignition Dash: behind the far left gauge dash panel, Orange wire labeled Ignition
  - J1708: Terminal block next to the Deutsch plug
  - J1939: at diagnostic connector/Deutsch connector
  - TTRACS: connect at ABS fuse slot in driver side main fuse panel
**Kenworth T2000**

- MAS110—Install on side wall or under the bunk.
  - Install so there is access to a USB port for the memory stick and access to backup battery.
- DIU110—Install on dash where space allows/customer preference.
- Cables—Route externally.
  - Connect power cable to key switch.
  - Cables exit/enter sleeper floor near MAS110.
  - Cables enter/exit cab through firewall high on passenger side. Look for rubber plugs.
  - Drill a 1” hole in floor of side box for antenna cable. A hole already exists in the firewall to route cables to the passenger side fuse panel.

**Typical Connection Points**
- Power: passenger side, main fuse panel, behind glove box, open fuse slot
- Chassis ground: passenger side below main fuse panel, remove kick panel for access
- Ignition: passenger side main fuse panel, behind glove box, open fuse slot for Ignition
- J1708: passenger side, terminal block left of fuse panel Blu/Blk E108DB (+) and Blue/Lt Blue E109DB (-) wires
  - J1939: Feb 2007 to present, behind diagnostic connector
  - TTRACS: passenger side firewall, purple with pink stripe wire labeled P154TR

**Volvo**

- MAS110—Install on side wall or under the bunk.
  - Install so there is access to a USB port for the memory stick and access to backup battery.
- DIU110—Install on dash where space allows/customer preference.
- Cables—Route internally.
  - Connect power cable to electrical panel in top center of dash.
  - Drill a 1” hole in floor of side box for antenna cable.

**Typical Connection Points**
- Power: open fuse positions B1 (1-3) VN 670 use F-14 for battery, VN 780 use F-13 for battery
- Chassis ground: main fuse panel bracket in center, top of dash
- Ignition: spare fuse position B1 (4). The primary fuse position for all VN models is F59
- J1708: at Deutsch connector (pin F+ pin G-), or attach to the J1708 pigtail at top of dash, the main fuse panel area, wire + # 400 and wire - # 401
- J1939: main fuse panel, top of dash 2 pin Deutsch connector between the fuse panel and the windshield. Yellow (+) and Green(-) wires
- TTRACS: driver side firewall, or floorboard behind driver seat, connect to wire labeled “AUX”

**Peterbilt 378/379**

- MAS110—Install on side wall or under the bunk.
  - Install so there is access to a USB port for the memory stick and access to backup battery.
- DIU110—Install on dash where space allows/customer preference.
- Cables—Route display cables internally or externally.
  - Connect power cable to solenoid behind pyrometer panel.
  - Cables exit/enter the sleeper floor near MAS110.
  - Cables enter/exit cab through firewall, high on passenger side. Use existing cable path. Remove map box.
  - Drill a 1” hole in floor of side box for antenna cable.
- Typical Connection Points
  - Chassis ground: main frame just below the solenoid
  - Ignition: ignition switch or solenoid mounted behind speedometer
  - J1708: dash, behind speedometer/tach. Purple (+) and White (-) wires
    Post March 2005 trucks - Purple (+) and Green (-)
  - J1939: behind A pillar or ignition switch, Blue AMP connection
  - TTRACS: behind driver side fuse panel, Black wire labeled AUX

**Peterbilt 387**

- MAS110—Hang under the bunk.
  - Install so there is access to a USB port for the memory stick and access to backup battery.
- DIU110—Install on dash where space allows/customer preference.
- Cables—Route externally.
  - Drill a 1” hole in floor of side box for antenna cable.
- Typical Connection Points
  - Power: passenger side main fuse panel, behind glove box, 3rd row open fuses
  - Chassis ground: passenger side main fuse panel - belting support bracket
  - Ignition: passenger side main fuse panel, behind glove box, 2nd row open fuses
Installation Planning

- J1708: passenger side main fuse panel, behind glove box. Purple (+) and White (-) wires
- J1939: behind A pillar or ignition switch. Connectors are AMP 282080-1 & 282104-1.
- TTRACS: outside Cab, driver side frame rail PDM (Power Distribution Module), Aux line

**Mack**

- MAS110—Install on side wall or under the bunk.
  - Install so there is access to a USB port for the memory stick and access to backup battery.
- DIU110—Install on dash where space allows/customer preference.
- Cables—Route externally.
  - Drill a 1” hole in floor of side box for antenna cable.

- Typical Connection Points
  - Power: passenger side dash, behind glove box, BAT post
  - Chassis ground: passenger side dash, behind glove box, GND post
  - Ignition: passenger side dash, behind glove box, IGN post
  - J1708: passenger side dash, behind glove box, J1708 + post = A, J1708 - post = B
  - J1939: top of dash, below triangular cover, 2-pin Deutsch connector. Yellow (+) and Green (-) wires.
  - TTRACS: outside driver side firewall, 7-way terminal block, Aux Post # 7 blue wire

**Straight Truck Vehicle Types (All Makes)**

- MAS110—Install on back wall or under seat.
  - Install so there is access to a USB port for the memory stick and access to backup battery.
- DIU110—Install on dash where space allows/customer preference.
- Cables—Route externally or internally.
  - Tilt cabs may require longer cables.
  - Drill a 1” hole in floor of side box for antenna cable.
**Cabover Engine Vehicle Types (All Makes)**

- MAS110—Install on side wall or under bunk.
  - Install so there is always access to a USB port for the memory stick.
- DIU110—Install on dash where space allows/customer preference.
- WIB100—30 foot WIB cable will be needed.
- Cables—Route internally.
  - Connect power cable to main bus or keyswitch.
  - Drill a 1" hole in floor of side box for antenna cable.

**Special Cable Ordering Instructions for Tilt Cabs**

- Typically, the antenna cable must be routed through the cab pivot point to allow for the tilt.
- In most tilt cab vehicles, this routing requires a longer cable than the standard cable. 30 foot max.
- When ordering the MCP110, specify the length of the cable(s) you need.
# Tools and Supplies Recommended for Installations

<table>
<thead>
<tr>
<th>Essential Tools</th>
<th>Miscellaneous Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Standard Combination Wrench Set</td>
<td>Measuring Tape</td>
</tr>
<tr>
<td>• Diagonal Wire Cutters</td>
<td>Rachet/Sockets</td>
</tr>
<tr>
<td>• Wire Strippers</td>
<td>Adjustable Wrench</td>
</tr>
<tr>
<td>• 3/8&quot; Drive Standard Deep Well Socket Set with rachet</td>
<td>Level</td>
</tr>
<tr>
<td>• Butt Splice Crimping Tool</td>
<td>Debur Tool</td>
</tr>
<tr>
<td>• Screwdrivers: Phillips #2 and Slotted</td>
<td>Flush Cutters</td>
</tr>
<tr>
<td>• Torx Drivers: #10, #20, #25</td>
<td>Hacksaw</td>
</tr>
<tr>
<td>• Volt/ohm Meter</td>
<td>Hammer</td>
</tr>
<tr>
<td>• 1/4&quot; Drill Bit and assorted size bits</td>
<td>Utility Knife</td>
</tr>
<tr>
<td>• 1&quot; Hole Saw</td>
<td>Files (flat, round)</td>
</tr>
<tr>
<td>• 3/8&quot; Cordless Drill (this will speed up installation time)</td>
<td>Channel Locks</td>
</tr>
<tr>
<td>• Radio Removal Tool &quot;U&quot;</td>
<td>Straight Awl</td>
</tr>
<tr>
<td>• 1/4&quot; Drive Standard Deep Well Socket Set with rachet</td>
<td></td>
</tr>
</tbody>
</table>

## Miscellaneous Supplies

- Silicone Sealant or Refrigeration/Tar Tape
- Assorted Ring Terminals
- Assorted Butt Splices
- Electrical Tape

Items marked with a bullet (*) are considered necessary, must-have tools and supplies required to perform an installation. Additional tools may be required to facilitate certain installations and for maintenance.

### Qualcomm Approved Sealants

<table>
<thead>
<tr>
<th>Sealant, Lubricant, or Liquid</th>
<th>Acceptable For</th>
<th>Required For</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigeration/tar tape</td>
<td>Sealing exterior to interior holes.</td>
<td>Sealing 1&quot; hole for antenna cable.</td>
</tr>
<tr>
<td>(supplied)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicone sealant</td>
<td>Sealing exterior to interior holes.</td>
<td>Sealing bolt holes for antenna mounting brackets.</td>
</tr>
</tbody>
</table>
Mobile Application Server 110 (MAS110) Installation

Topics in this chapter provide general guidelines and instructions for installing the MAS110 and connecting the cables to the MAS110.

General Installation Guidelines ........................................................................................................ 5-2
Installing the Backup Battery into the MAS110 .............................................................................. 5-2
Installing the MAS110 ..................................................................................................................... 5-3
Installing the Power Cable ............................................................................................................... 5-5
Grounding Guidelines ....................................................................................................................... 5-6
Installing the Accessory Cable ......................................................................................................... 5-7

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
General Installation Guidelines

1. Install the backup battery into the MAS110.
2. Install the MAS110.
3. Connect cables to the MAS110.

Installing the Backup Battery into the MAS110

Install the backup battery before installing the MAS110.

1. Open the battery door on the MAS110 using a Torx #10 driver. Remove battery door if necessary.
2. Hold the backup battery in a vertical position with the connector facing down.
3. Insert the backup battery connector into the keyed mating connector in the MAS110.
4. Rotate the backup battery into a horizontal position and place in the MAS110.

5. Close door and tighten the T10 Torx screws using a hand tool. Do not overtighten the door screws.

**Installing the MAS110**

**Selecting a Mounting Location**

---

**Caution**

*The MAS110 is not watertight. DO NOT get it wet. Do not locate the MAS110 where it could come into contact with liquids or solvents.*

---

**Adequate Clearance**

The minimum requirements for adequate clearance around the MAS110 for ventilation, cooling, and easy access are:

- Sides and back of unit—1”.
- Top of unit—1”.
- Top of unit—3” to open the battery door and access the battery.
- Front of unit (cable side)—6” to allow for proper cable bend diameter exiting the unit.
Location and Orientation

- When possible, do not install the MAS110 on the floor of the vehicle.
- Preferably, install the MAS110 on the vertical side wall with cable exiting to the side.

- If possible, install the MAS110 in a storage compartment.
- Choose a location that provides easy access to the USB port you are using for the memory stick.
- Choose a location where the MAS110 will not come into contact with liquids or solvents.
- Choose a location where tire chains or other tools will not likely be stowed on top of the unit or cables. Do not mount the unit near items that may fall on it or bump cable connections.
- Choose a location for the MAS110 that is structurally sound. The surface must support the full weight of the MAS110 under all circumstances.
- Choose a location that provides for the various cable lengths.
- In cabover vehicles, install the MAS110 in the rear of the storage compartment. In this location, tools or tire chains will not fall on top of the unit when the cab is tilted up.
- Be sure to provide enough room for cable bends or the removal of cables for servicing (4" to 6" is recommended).
- Install the MAS110 so that the unit, cables, and backup battery can be serviced in the future.

Securing the MAS110

- Use four self-drilling screws or well nuts and screws to mount and secure the MAS to a solid surface.
Installing the Power Cable

Low Voltage Disconnects (LVDs)
An LVD is circuitry in some trucks that remove “non-critical” loads, such as TVs, radios, and microwaves from the truck battery when operating these items without the vehicle running. This ensures that there will be enough battery power left to start and run the vehicle.

Do not wire the MCP110 through any LVD device as this will affect the normal operation of the system. When the LVD is engaged:
• MCP110 will not send or receive information
• Panic button will not operate
• Tamper detection will not work
• Vehicle position will be missed
• Backup battery life will be significantly reduced

Power Cable Run
• Run direction—Route the power cable from the MAS110 to the power connection points.
• Routing location—Route internally or externally. If routed externally, use the supplied convoluted tubing.
• Cable dressing—Store and secure excess cable.

Power Cable Routing
1. If needed, temporarily remove the two fuses from the fuse holders on the end of the cable.
2. Route the fuse end of the power cable from the MAS110 location to the power connection points in the cab.
3. Re-install the fuses onto the appropriate wires.
4. Power on the MAS110 when ready. Powering up the MAS110 should be the last step of the installation.

Power Cable Wire Connections
• The three required connections that you must make at the fuse end of the power cable:
  - Chassis ground - labeled “BAT RTN”
  - +12/24 VDC Battery (Main) (unswitched) - labeled “BAT+
  - +12/24 VDC Ignition (switched) - labeled “Ignition”
• Never wire the constant BAT+ connection or the IGNITION connection to the Accessory position. See Appendix A for detailed pin and wire callouts.
1. Connect the black BAT RTN wires to a good grounding surface on the vehicle chassis or one that is connected to the chassis. Refer to *Grounding Guidelines* on page 5-6 for more information.

2. Connect the yellow BAT+ wire to an unswitched (Main) +12/24 VDC power source, such as the hot side of the vehicle main wiring bus, the battery side of the ignition switch, or the battery side of the fuse block (not the load side). This bus provides constant +12/24 VDC to the MCP110 and must not be connected to the accessory bus or any other switched bus.

3. Connect the white IGNITION wire to the switched (ignition) +12/24 VDC power source, such as the ignition side of the ignition (key) switch or the ignition side of the fuse block.
   • +12/24 VDC should be present on the IGNITION wire only when the ignition switch is in the ON position, not in the OFF or Accessory position.

4. Lastly, connect the power cable to the MAS after all other connections have been made.

**Grounding Guidelines**

- Create clean, secure, tight, metal-to-metal grounds.
- If grounding terminals are not available, remove the paint from the surface of the firewall or other metal connected to the chassis to make the ground.
- Remove the paint from the metal and tighten the bolt for a good metal-to-metal, chassis ground connection.
Installing the Accessory Cable

- Connects the MCP110 to the truck’s audio for text-to-speech, the J1708/1587 and J1939 data links, and other vehicle inputs and optional system devices.
- Typically, the accessory cable is routed to the vehicle’s dash area where accessory connections are made.
- Provides necessary wiring for optional system features, such as Performance Monitoring system, Trailer Management system, panic button, and other security devices.
- Standard length of accessory cable is 20 feet
- See Appendix A for detailed wiring diagrams.

MCP110 Accessory Cable.
Cable Run

- Run direction—Run the loose conductor end of the cable from the MAS110 to the dash area. (The connector is too large to pass through most access holes.)
- Routing location—Route internally or externally. Use existing cable runs.
- Cable dressing—Stow and secure any loose wires. Use convoluted tubing for cables run externally.
- Installation instructions for optional accessories which use the accessory cable are provided in later chapters of this guide.
- Before connecting the accessory cable to the MCP110, inspect the connectors to make sure they are not damaged and the pins are not bent. Do not attempt to straighten bent pins. This further weakens the pins and results in cable failure.

Connecting Cables to the MAS110

1. Inspect all connectors for bent pins.
2. Align the connector so it is straight before sliding into position and connect the accessory cable into the I/O 1 slot.
3. Only hand-tighten the thumb screws on the connector.
4. Stress relief all cables by tie-wrapping them together.
Wireless Interface Box 110 (WIB110) Antenna Installation

Topics in this chapter provide general guidelines and instructions for installing the wireless interface box 110 (WIB110) antenna.

- General Installation Guidelines .............................................. 6-2
- Installation of WIB Mount .................................................. 6-3
- Routing the WIB Cable ....................................................... 6-5
- Connecting the Antenna Cable to the MAS110 ...................... 6-5

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
General Installation Guidelines

1. Install the WIB mount (not always needed).
2. Mount the WIB antenna.
3. Connect cable to WIB.
4. Route and connect the antenna cable to the MAS110.

**Note**

*For vehicles with flat roofs, the WIB antenna can be mounted directly to a clean roof surface. If this preferred, there is no WIB mount needed.*

WIB Antenna View-of-Sky Requirements

**Caution**

*Failure to comply with the view-of-sky requirements and installation guidelines sections of this document could degrade the performance of the MCP system.*

The antenna should have a clear, unobstructed line-of-sight view of the sky for optimum antenna operation. The WIB antenna sends and receives GPS, cellular, and WiFi signals. Normally, the signals can pass through a single layer of glass, fiberglass, or plastic with minimal signal loss. However, other obstructions, such as metallic paint, may degrade performance or completely block the signals. Commonly encountered obstructions on vehicles include:

- metallic paint
- metal canopies
- metal cages
Installation of WIB Mount

The WIB mount attaches to the backside of the vehicle - it should be placed as high up on the vehicle as possible. Be sure to consider the WIB cable routing distance is no more than 17 feet between the WIB antenna and the MAS110.

**Caution**

*Do not locate the WIB near an exhaust stack where there is possible exposure to excessive heat.*

**Option #1**

For MCP1100 systems installed that do not have an optional satellite antenna, the WIB mount plate is typically attached directly to the factory installed antenna mount. The two studs on the bottom of the WIB mount are designed to fit through the hole pattern of a factory installed antenna mount. The WIB is then attached to the plate using the attached VHB tape.

**Option #2**

1. Align mount on any rigid surface between .035 and .232 inches thick. It should be located as high as possible.

2. Use the mount as a template to mark two diagonal mounting holes prior to drilling.

3. Drill four .375 (3/8”) holes in the positions marked in step 2.

4. Place the well-nut inserts all the way into each .375 hole until the flanges fit firmly against the mounting surface.

5. Place the mount over the mounting holes.
6. Add a small bead of silicone on the 10-32 machine screws before passing them through the mounting holes and tighten until snug.
Mount the WIB Antenna

1. Use alcohol pad to ensure that the surface is free of dirt and wax.

2. Peel protective plastic from VHB tape on the WIB antenna and attach squarely to the mount with cable connector facing the appropriate side of the mount. The WIB connector should be routed to the side and not directly off the back to avoid being hit by the trailer or load locks.

Routing the WIB Cable

The antenna cable connects the WIB to the MAS110. The standard length is 17 feet.

• Run direction—Start at the WIB and run the cable down to the MAS110.

Caution

Do not route the cable where it will be in excessive heat.

Connecting the Antenna Cable to the MAS110

1. Inspect the antenna cable connectors for damaged or bent pins.

2. Connect the antenna cable into the MAS’s WIB slot.

Caution

The WIB cable connector should slide in easily to the MAS and a slight click will occur when it’s fully mated. There is a release tab on the bottom side of the connector. Be careful not to use too much force when connecting or disconnecting the cable.
Connecting the Antenna Cable to the MAS110 Wireless Interface Box 110 (WIB110) Antenna Installation
7

Display Interface Unit 110 (DIU110) Installation

Topics in this chapter provide guidelines and instructions for installing the DIU110.

- General Installation Guidelines ............................................. 7-2
- Installing the Display Holster and Display ................................ 7-5
- Connecting the Display Cable to the DIU110 ............................ 7-6
- Inserting the DIU110 into the Holster ...................................... 7-7
- Connecting the Display Cable to the MAS110 ............................ 7-7

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
General Installation Guidelines

1. Install the holster and DIU110.
2. Route and connect the cable to the DIU110.
3. Connect the display cable to the MAS.

Selecting a Mounting Location

IMPORTANT SAFETY INFORMATION

Do not locate the display unit where it obstructs the driver's field of vision, distracts the driver from the driving task, or interferes with the driver's operation of controls or displays.

DO NOT locate the DIU where it:
• obstructs the driver's field of vision
• distracts the driver from the driving task
• interferes with the driver’s operation of controls or displays
• obstructs the area swept by the windshield wipers
• blocks the deployment of an airbag

DO locate the DIU where:
• it can be safely installed on a secured bracket that is robust enough to minimize any vibration and sustain the weight of the DIU. Permanently affix the DIU to the:
  - front dash area
  - top of dash area
• the mounting surface is strong enough to support the mounting hardware
• the mounting surface is flat
• it is in the driver's line-of-sight, easy to touch, but does not block the view of the road or mirrors
• the surrounding area is clear of dash controls and gauges
• the display cable is long enough to reach the mating connector on the accessory cable
• it is not mounted in constant, direct sunlight
• it does not limit a passenger’s leg room or block access to any other compartments
• it does not interfere with anyone entering or exiting the vehicle cab
• it is not likely to impact the driver or passenger in case of an accident or collision
Example of Volvo truck and DIU placement

Example of Freightliner truck and DIU placement

Example of International truck and DIU placement
Additional information for selecting an installation location:

- Nothing should be installed on the windshield that obstructs the area swept by the windshield wipers or obstructs the driver’s sight to the road and highway signs and signals. (FMCSA document 49 CFR 393)

- No devices should be mounted more than 6 inches below the upper edge of the windshield, or extend more than 4.5 inches above the bottom of the windshield. (FMCSA document 498 CFR 393)

- Before installing the device, be aware of and follow all state laws and driving codes.
  
  California Driving Code Section 26708(a)(1) states: No person shall drive any motor vehicle with any object or material placed, displayed, installed, affixed, or applied upon the windshield or side or rear windows.

- Consider the owner’s preference in selecting the installation location and whether there is a team or a single driver.
Installing the Display Holster and Display

Qualcomm recommends using RAM Mounting Systems mounting hardware. (Refer to Appendix F.) Always use a backing plate to strengthen the area.

1. Verify that there is nothing behind the mounting surface that might be damaged by drilling holes.

2. Drill holes for the mounting bracket and backing plate.

3. If applicable, follow installation instructions from the third-party bracket mount manufacturer.

4. Attach the holster to the third-party bracket mount using four 8x24 screws.

   To attach the RAM mount ball-joint to the holster, the screws should be 1/2 inch long. Do not use screws that are too long or they will protrude through the holster.

Display Cable Routing

- Run direction—In most vehicles, the display is mounted on the dash. Route the cable from the DIU110 to the MAS110 with the coiled end of the cable at the DIU110 and the uncoiled end routed to the MAS110.

- Cable dressing—For strain relief, the base of the coil should be secured with tie wraps. The strain-relief tie wrap is normally positioned at the point where the cable transitions from a straight cable to a coiled cable.
Connecting the Display Cable to the DIU110

1. Use a #10 Torx driver to remove the DIU110’s back housing.
2. Remove the protective cap on the connector.
3. Plug connector into DIU110. This provides strain relief.
   • Make sure the rubber grommet fits in the grooves of the DIU110.
   • Make sure the flat side of the grommet is facing up.
4. Route the display cable through a channel on the back of the DIU110.
5. Insert a small tie-wrap near the tie-wrap connection.
6. Reinstall the back housing and install the small bracket over the cable.
Inserting the DIU110 into the Holster

1. Push bottom of display into lower holster tabs.
2. Push top of display into upper holster tabs.

Connecting the Display Cable to the MAS110

1. Align the connector so it is straight before sliding into position.
2. Connect the display cable into the DIU slot. The latch faces down.
Text-to-Speech (TTS) Installation

Topics in this chapter provide guidelines for installing the speaker switch cable for the MCP110 text-to-speech (TTS) feature.

General Installation Guidelines .................................................. 8-2
Selecting a Speaker ................................................................. 8-2
Option 1—Connecting to an Existing or Shared Speaker ..................... 8-3
Option 2—Connecting to a Dedicated 8-ohm Speaker ......................... 8-6

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
General Installation Guidelines

1. Select a speaker (either dedicated or shared/existing truck speaker).

2. Route and connect speaker switch cable to speaker and accessory cable.

Selecting a Speaker

Speaker Requirements

There are two basic speaker requirements for TTS:

- Only one speaker can be connected to the MCP110 for text-to-speech play, otherwise the volume will be very low.
- An 8-ohm speaker, such as a standard CB speaker or standard truck audio speaker, should be used for text-to-speech play.

Some 6-ohm and 4-ohm speakers may work. We recommend testing prior to performing installation.

Choosing a Speaker

Text-to-speech works with either an existing speaker (typically, the driver’s side door speaker) that is part of the vehicle’s audio system, or a speaker that can be added for text-to-speech.

- If you are using a vehicle’s audio system 8-ohm speaker, see Option 1—Connecting to an Existing or Shared Speaker on page 8-3.
- If you are adding a dedicated speaker for TTS, see Option 2—Connecting to a Dedicated 8-ohm Speaker on page 8-6.
Option 1—Connecting to an Existing or Shared Speaker

1. Test the audio system prior to installation.

2. Remove audio/radio.

3. Locate the speaker wires to be used for message playback. Refer to Radio Connector Pin Callouts on page A-11.

4. Find a good location on the speaker wires where they can be cut and where there will be enough room to work on either side of the cut.

5. Cut the speaker wires.
Example of common radio harness with the two driver-side speaker wires identified.

6. Butt splice the yellow SPKR OUT+ wire on the speaker switch cable to the positive (+) wire that leads from the speaker.

7. Butt splice the black SPKR OUT- wire on the speaker switch cable to the negative (-) wire that leads from the speaker.

8. Butt splice the orange VEH AUDIO IN + wire on the speaker switch cable to the positive (+) speaker wire that leads from the audio.

9. Butt splice the black VEH AUDIO IN - wire on the speaker switch cable to the negative (-) speaker wire that leads from the audio.

10. Tie wrap loose cabling and reconnect/replace the radio.

**Connecting Speaker Switch Cable to Accessory Cable**

1. Butt splice the yellow MAS SPKR + wire on the speaker switch cable to the blue/yellow SPKR + wire on the accessory cable.

2. Butt splice the black MAS SPKR - wire on the speaker switch cable to the blue/violet SPKR - wire on the accessory cable.
3. Butt splice the green GND wire on the speaker switch cable to the violet/orange Accessory/GND on the accessory cable.
Option 2—Connecting to a Dedicated 8-ohm Speaker

Connect the dedicated speaker for text-to-speech play directly to the accessory cable:

1. Butt splice the blue/yellow SPKR + wire on the accessory cable to the positive (+) wire that leads from the speaker.

2. Butt splice the blue/violet SPKR - wire on the accessory cable to the negative (-) wire that leads from the speaker.

*Note*

The speaker switch cable is not used if you are adding an external, dedicated speaker.
Topics in this chapter provide the procedures for performing J1939, J1708/J1587, and traditional sensors (standard speed and RPM) installations.

Vehicle Data Source Overview ................................................................. 9-2
Vehicle Data Source Selection ................................................................. 9-3
Guidelines for Connecting to the J1939 Data Bus ..................................... 9-3
J1939 Pre-installation Check Out .............................................................. 9-4
Option 1—Connecting J1939 Using the Repeater Cable ................................ 9-5
Option 2—Connecting J1939 Without Using the Repeater Cable ................. 9-8
Connecting J1708/J1587 ............................................................................ 9-10
Verifying Data Source Connectivity ......................................................... 9-12

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
Vehicle Data Source Overview

Qualcomm’s mobile computing platform can use the J1708/J1587 and J1939 data buses, as well as traditional sensors to monitor critical vehicle data:

• Traditional sensors are used on most pre-1992 trucks (limited application use).
• J1708/J1587 data bus is used on most 1992–2009 trucks.
• J1708/J1587 and J1939 data buses are available on 2007–2010 trucks.
• J1939 will be the only data bus used on some trucks built after 2010.

These data inputs can be monitored on the vehicle data services (VDS) screens. The vehicle data source makes this data available to specific applications on the MCP110.

J1939 Data Bus

Qualcomm applications only support 2007 and newer trucks with ECMs that support the SAE J1939-71, Rev. Nov 2006 standard.

• High speed (250 Kb/sec) data bus.
• Uses a two-wire differential serial bus, which is a network backbone running throughout the vehicle with several stubs connecting each ECM to the backbone.

J1708/J1587 Data Bus

• Low speed (9.6 Kb/sec), bi-directional data bus.
• Uses a two-wire differential serial bus, which runs throughout the vehicle.

Traditional Sensors

• Use traditional sensors if the truck does not have the J1708/J1587 or J1939 data bus. For information on connecting traditional sensors and calibration, contact Qualcomm Enterprise Services (QES) Customer Support.
Vehicle Data Source Selection

When making data source connections, there are two possible data buses available: the J1708 /J1587 low-speed data bus and the J1939 high-speed data bus. The truck year, make, and model, as well as the Qualcomm applications used determine which data bus to use. If both the J1708/J1587 and J1939 are available, we recommend connecting to both.

If you do not know which data source to use, contact your Qualcomm representative for assistance.

Guidelines for Connecting to the J1939 Data Bus

- Choose Option 1 or Option 2 according to these specifications:
  - **Option 1**: Use the repeater cable when the distance between the MAS110 and the J1939 bus connection point exceeds 10 feet. Also use Option 1 for any after market installation.
  - **Option 2**: Use the direct connection method (no repeater cable) when the distance between the MAS110 and the J1939 bus connection point does not exceed 10 feet. Option 2 is not typically used in an after market installation.

- DO NOT extend factory wires.
- Maximum stub length is 10 feet.
- Minimum stub spacing is 4 inches.
- Never have more than one ECM device on the same stub.
J1939 Pre-installation Check Out

Prior to beginning any installation, start the vehicle and verify that the vehicle is in good working order, has no faults, and no check engine lights display.

**Resistance Test (to Verify that J1939 Is Present)**

1. Turn ignition OFF.

2. Verify that J1939 is present on vehicle. Locate the 9-pin diagnostic (Deutsch) connector.

   **Note**

   *If you have a 6-pin connector, you have J1708/J1587 only. See Connecting J1708 / J1587 on page 9-10.*

3. Using an ohmmeter, place the positive lead on pin C and the negative lead on pin D of the diagnostic connector. Verify that the resistance is 55–65 ohms.

   - If the resistance is not 55–65 ohms, there is a problem with your J1939 data bus. Fix the problem before proceeding.

   **Note**

   *On some vehicles, open doors and/or cabin lights on may cause CAN/J1939 bus activity which may interfere with diagnostic connector resistance measurements.*

Pin C  CAN High (tractor bus) YELLOW

Pin D  CAN Low (tractor bus) GREEN
Option 1—Connecting J1939 Using the Repeater Cable

Use the repeater cable when the distance between the MAS110 and the J1939 bus connection point exceeds 10 feet. Also use Option 1 for any aftermarket installation.

Connect the MCP110 accessory cable to the CAN repeater. A CAN repeater cable is required for this procedure (see Appendix A for detailed pin and wire callouts of the CAN repeater cable).

In order for the MCP110 to receive J1939 data, the MAS110 CAN/J1939 wires must be connected to the truck’s J1939 CAN bus in the vehicle.

Follow all SAE guidelines when connecting to the vehicle’s J1939 data bus.

Making the Connection

1. Start the vehicle and verify that the truck is in good working order and displays no dash faults.

2. Turn OFF the truck and ensure that no dash lights are on.

   Note

   Some trucks may have activity on the J1939 bus with the door open or if an accessory is active. This can cause a faulty resistance reading on the CAN bus.

3. Measure the J1939 bus resistance at the diagnostic connector. It should read 60 ohms. (Refer to Resistance Test (to Verify that J1939 Is Present) on page 9-4.)
4. Locate the J1939 bus wires.
   • The J1939 wires are a twisted pair
   • CAN high (J1939+) (yellow)
   • CAN low (J1939-) (green)

5. Determine a suitable J1939 location point. In many vehicles you can connect behind the truck diagnostic connector. Be aware that only one electronic device should be connected to the J1939 stub at the back of the diagnostic connector at a time. If another device is already present you will need to splice directly into the vehicle’s J1939 backbone. When splicing directly to the J1939 backbone bus, you will need to Ohm out (0 Ohms) CAN + and CAN - wires to Pin C (CAN high) and Pin D (CAN low) on the diagnostic connector. Contact Qualcomm Enterprise Services Customer Support for assistance if needed.

6. Splice the yellow CAN high J1939+ wire from the repeater cable to the yellow CAN high J1939+ wire from the truck’s J1939 bus. (Refer to the illustration on page 9-5.)

7. Splice the green CAN low J1939- wire from the repeater cable to the green CAN low J1939- wire from the truck’s J1939 bus. (Refer to the illustration on page 9-5.)

8. Measure the J1939 bus resistance from Pin C to Pin D at the diagnostic connector. It should read 60 ohms.

9. Locate the CAN 6-pin Molex connector on the MCP110 accessory cable.
10. Connect the CAN repeater cable to the 6-pin Molex plug on the MCP110 accessory cable.

11. Start the vehicle and verify that the truck is in good working order and displays no dash faults.

12. Verify that the J1939 data is being passed to the MAS110 from the data bus by monitoring the VDS screen on the MAS110. (Refer to Verifying Data Source Connectivity on page 9-12.)

13. Stow and secure any loose wires, making sure to keep the wires clear of sharp edges and away from panels and moving parts.
Option 2—Connecting J1939 Without Using the Repeater Cable

Use the direct connection method (no repeater cable) when the distance between the MAS110 and the J1939 bus connection point does not exceed 10 feet. Typically, this option can be used if a special OEM accessory cable is supplied that has a distance of less than 10 feet.

Connect the MCP110 accessory cable to the OEM-supplied stub connector only.

In order for the MCP110 to receive J1939 data, the MAS110 CAN/J1939 wires must be connected to the truck’s J1939 CAN bus in the vehicle.

Follow all SAE guidelines when connecting to the J1939 data source.

Note
If you are doing an installation on an OEM prewired truck with a CAN MCP110 accessory cable and a repeater cable is not included as part of the prewire, go to Option 1—Connecting J1939 Using the Repeater Cable on page 9-5.
Making the Connection

1. Start the vehicle and verify that the truck is in good working order and displays no dash faults.

2. Turn OFF the truck and ensure that no dash lights are on.

3. Measure the J1939 bus resistance at the diagnostic connector. It should read 60 ohms.

   **Note**

   Some trucks may have activity on the J1939 bus with the door open or if an accessory is active. This can cause a faulty resistance reading on the CAN bus.

4. Locate the OEM J1939 stub connector and the CAN mating connector on the MCP110 accessory cable. These are usually located either in the truck’s B pillar or in the center of the dash.

5. Connect the two J1939 connectors. If a stub does not exist, splice directly into the J1939 backbone. Locate a connector point and Ohm out (0 Ohms) CAN + and CAN - wires to Pin C (CAN high) and Pin D (CAN low) on the diagnostic connector.

6. Measure the J1939 bus resistance at the diagnostic connector. It should read 60 ohms.

7. Start the vehicle and verify that the truck is in good working order and displays no dash faults.

8. Verify that the J1939 data is being passed to the MAS110 from the data bus by monitoring the VDS screen on the MAS110. (Refer to Verifying Data Source Connectivity on page 9-12.)

9. Stow and secure any loose wires, making sure to keep the wires clear of sharp edges and away from panels and moving parts.
Connecting J1708/J1587

1. Start the vehicle and verify that the truck is in good working order and displays no dash faults.

2. Verify that the engine ignition switch is OFF.

3. Locate the engine data diagnostic connector.

See Nine-pin Data Link Connector Pin Callouts on page A-10 for more info.

- The data source wires to the engine data diagnostic connector are a twisted pair that should remain twisted after the installation is complete.
- Consult the manufacturer’s wiring diagrams to identify the wires (some are marked DATA+ and DATA- or D/L+ and D/L-, and some are marked with numbers or colors).
- Note which wire is plus (+) and which is minus (-).
- To avoid confusion, cut and splice the positive wires first and then the negative wires. Because there usually is not much slack in the engine data diagnostic connector wires, be careful in cutting and splicing to them.

4. Splice the brown J1708+ wire from the accessory cable to the DATA+ wire of the engine diagnostic connector. Reconnect the wires.
5. Splice the red J1708- wire from the accessory cable to the DATA- wire of the engine diagnostic connector.

6. Start the vehicle and verify that the truck is in good working order and displays no dash faults.

7. Go to Verifying Data Source Connectivity on page 9-12.

8. Stow and secure any loose wires, making sure to keep the wires clear of sharp edges and away from panels and moving parts such as throttle and brake linkage.
   • Dress any bare-ended wires to prevent a short.
   • Maintain wire twists as close to the splice as possible.
Verifying Data Source Connectivity

1. Turn ignition ON.

2. Verifying Data Bus Connectivity

Check the VDS (Status) screen and verify that the MAS110 is enabled for J1708/1587, and or J1939. The associated indicator lights will be:

- Green, if configured and receiving active vehicle data.
- Red, if configured but the vehicle data is stale.
- Black, if not configured/no data.

![Indicator lights](image)

If data is not being passed, check connections to the data bus.

Proceed to the VDS detail screen to verify specific data sources.
3. **Verify Data Source**

Tap the second icon at the bottom of the screen to display the details of the data being received.

a. **Verifying Data Is Present**

Verify the following data fields are showing green to confirm that J1708/J1587 or J1939 data is present:

- Speed
- Distance LTD
- Engine Time LTD
- RPM
- Fuel LTD

If connections are made to both the J1708/1587 and the J1939 data buses, the source column will indicate which data bus is supplying the data. If the data needed is not provided, reference the MCP110 Diagnostic Guide.
System Verification

Topics in this chapter provide information and procedures for performing a basic system verification.

What Is Basic MCP110 System Verification? ............................ 10-2
How to Find the MCP110 Unit Address (UA)/Serial Number .......... 10-2
Performing System Verification ............................................. 10-3
Basic MCP110 System Verification Procedure ...................... 10-6
MCP System Screens ......................................................... 10-10
Qualcomm® MCP110 System Verification Form ...................... 10-15

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191

For verifying the Performance Monitoring system, the Trailer Management system, and other accessories, see the appropriate chapter in this manual.

Note

GPS is required for both satellite and terrestrial networks.
What Is Basic MCP110 System Verification?

- A functional system check that should be performed after installation or service to verify that the MCP110 is operating properly.

How to Find the MCP110 Unit Address (UA)/Serial Number

Before you call QES Customer Support for assistance, write down the serial number of the mobile application server 110 (MAS110).

1. To view the MCP110 unit address on the display interface unit 110 (DIU110), use the right and left arrows to get to the System button, then tap the button.

2. Tap the System tab.

3. The MCP110 Unit Address is at the top of the page. The MAS also has the Unit Address written on the yellow label.
Performing System Verification

- Shortly after you power up the MCP110, the MCP110 Home screen displays.

- System verification information has been stored on screens/buttons under the **System** button.

- Tap the left or right arrow to get to the **System** button. Tap the button to access the display screens shown on the following pages.

- Tap the **Run All** button.
Flowchart—Basic MCP110 System Verification

Step 1
Turn ignition ON

Step 2
Move unit to acquire network signal

Step 3
Display Diag screen. Run ALL tests.

Step 4
Check for appropriate green checkmarks

Step 5
Good
Display Message screen. Send test message to dispatcher

Step 6
Was message acknowledged by dispatcher?

Step 7
Yes
Have dispatcher send test message to MCP110

Step 8
No
See Chapter 6 Communication Problem Troubleshooting

Chapters below refer to MCP110 Diagnostic Guide

See the appropriate chapter:
- Cellular refer to Chapter 6
- CDD refer to Chapter 13
- GPS refer to Chapter 7
- J1587 refer to Chapter 14
- J1939 refer to Chapter 14
- Battery refer to Chapter 12

Red X

Chapters below refer to MCP110 Diagnostic Guide

See the appropriate chapter:
- Cellular refer to Chapter 6
- CDD refer to Chapter 13
- GPS refer to Chapter 7
- J1587 refer to Chapter 14
- J1939 refer to Chapter 14
- Battery refer to Chapter 12

Red X
System Verification

Flowchart—Basic MCP110 System Verification

Step 8
Was test message received at MCP110?

Step 9
Yes
Tap Home button. Does TTS play?

Step 9
No
See Chapter 6 Communication Problem Troubleshooting

Step 8
No
See Chapter 11 Text-to-Speech Problem Troubleshooting

Step 9
Yes
Verify Vehicle Data Service OK?

Step 10
Yes
Turn ignition OFF

Step 11
Yes
Does Status change to Ignition Off within 10 minutes?

Verification complete

System OK
For verification procedures for optional accessories, see the appropriate chapter.

Chapters refer to MCP110 Diagnostic Guide

See Chapter 8
Communication Problem Troubleshooting

See Chapter 10
Text-to-Speech Problem Troubleshooting

See Chapter 11
Vehicle Data Link Diagnostics/Verification

See Chapter 12
Miscellaneous Problem Troubleshooting

Steps refer to MCP110 Diagnostic Guide

System_Flow_2_MCP110
Basic MCP110 System Verification Procedure

The steps in this procedure match the steps on the flowcharts on the previous pages. The steps are not always sequential—you may be instructed to skip steps.

1. Turn the vehicle ignition ON; the engine does not have to be running.

2. Make sure the vehicle is in a good location.
   - The vehicle should be in a location where the antenna is able to acquire a cellular network signal. Additionally, a clear view of the sky is needed for GPS when the unit is brought on the air for the first time, or after any reset.

3. Go to the Home screen and tap the Diag tab. Tap Run All button.

4. Check for appropriate green checkmarks (✔).
   - At minimum, Cellular, CDD database, GPS, and Battery Backup should show green checkmarks.
   - If the MCP110 passed all the tests, go to step 5.
   - If the MCP110 failed any necessary tests, go to the appropriate diagnostic procedure for the failed item in this guide.
   - See MCP110 Diag Screen on page 10-14 for definitions of each name.
5. Send a test message to the dispatcher. Go to the Home screen and tap the **Messaging** button.
   - Tap the **Compose** tab.
   - Type the message text including the truck number.
   - **Send the message?**
   - Tap **Yes** to send the message.

6. Tap the **Outbox** tab to display the message that was just sent. Orange "⇒" (arrows) indicate the message is in transit; a green "✓" (check mark) indicates the message has been acknowledged.
   - If the message is acknowledged, go to **step 7**.
   - If the message is not acknowledged, see *Chapter 6: Connectivity Problem Troubleshooting* in the MCP110 Diagnostic Guide.
7. Have the dispatcher send a test message to the MCP110. If the dispatcher is not available, call QES Customer Support (800-541-7490) to have the message sent.

8. After a few minutes, the display’s Message Waiting Light should come on, and a voice notification will tell you the message has been received. Tap the **Inbox** tab to display the dispatcher’s message.
   - If the MCP110 received the message, go to step 9.
   - If the MCP110 did not receive the message, see Chapter 6: Connectivity Problem Troubleshooting in the MCP110 Diagnostic Guide.

9. Verify that the message can be played using the center button on the 5-way key on the DIU110.
   - If the message can be played, go to step 10.
   - If the message cannot be played through TTS, see Chapter 11: Text-to-Speech Problem Troubleshooting in the MCP110 Diagnostic Guide.
10. Turn the vehicle ignition OFF.

11. Make sure the display unit stays on with the ignition OFF.
   - If the display unit stays on, go to step 12.
   - If the display unit does not stay on, see Chapter 5: Display Problem Troubleshooting in the MCP110 Diagnostic Guide.

12. Tap the System button. Tap the System tab and verify that the STATUS field changes from Good to Ignition Off within one minute.
   - If the Status changes to Ignition Off, System Verification is complete.
   - If the Status does not change to Ignition Off, see Chapter 9: Miscellaneous Problem Troubleshooting in the MCP110 Diagnostic Guide.

For verifying the Performance Monitoring system, the Trailer Management system, and other accessories, see the appropriate chapter in this manual.
**MCP System Screens**

**MCP110 System Screen**

- Tap the **System** tab to access system information about the MCP110.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit Address</td>
<td>Also called the UNIT SERIAL NUMBER. This number is linked to the truck number in the dispatch software.</td>
</tr>
<tr>
<td>Account</td>
<td>The NOC account number the unit is assigned. Currently not available.</td>
</tr>
<tr>
<td>Connection</td>
<td>Connected or Disconnected. Indicates whether the logical PPP link between MAS and antenna is up and passing data.</td>
</tr>
<tr>
<td>System Status</td>
<td>Good, Quiet, or an Error indication.</td>
</tr>
<tr>
<td>Ignition</td>
<td>On or Off. Off displays within seconds after you turn the ignition OFF.</td>
</tr>
<tr>
<td>Database State</td>
<td>Out of Sync or Sync Complete. Indicates the MCP110’s database status:</td>
</tr>
<tr>
<td></td>
<td>- Sync complete is displayed if customer and mobile unit (MCP110) information has been received by the MCP110 and is up-to-date. This is the desired state.</td>
</tr>
<tr>
<td></td>
<td>- Out of sync is displayed if the mobile unit (MCP110) information has not been received by the MCP110 and is waiting to be updated.</td>
</tr>
<tr>
<td>Last Sync</td>
<td>Indicates the date and time of the most recent Sync complete status for the MCP110.</td>
</tr>
<tr>
<td>Last Boot</td>
<td>Indicates the date and time of the most recent bootup for the MCP110.</td>
</tr>
<tr>
<td>Up Time</td>
<td>The amount of time the unit has been awake since the last boot up.</td>
</tr>
<tr>
<td>Time Remaining</td>
<td>The time in hh:mm before the unit is scheduled to go to sleep. If ignition is on, N/A will be displayed.</td>
</tr>
</tbody>
</table>
MCP110 Comm Screen

- Tap the **Comm** tab to access antenna information about the MCP110.
- This screen displays antenna information on the WIB110 (cellular and optional WiFi).

### Field Description

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Terrestrial</strong></td>
<td></td>
</tr>
<tr>
<td>Active/In Use</td>
<td>Green light shown when mode type is available. Black light means not Active/not In Use.</td>
</tr>
<tr>
<td>Session</td>
<td>Date and time the unit used that mode.</td>
</tr>
<tr>
<td>Duration</td>
<td>Duration of last in use session.</td>
</tr>
<tr>
<td>IP</td>
<td>The IP address that the unit has been given by the terrestrial network for the last/most recent terrestrial communication session.</td>
</tr>
<tr>
<td>RSSI</td>
<td>Received Signal Strength Indication—The strength of a wireless network signal being received by the antenna. RSSI should be less than 110.</td>
</tr>
<tr>
<td>Registered</td>
<td>Home network or Registered roaming.</td>
</tr>
<tr>
<td>SID</td>
<td>System identification number of the cellular network.</td>
</tr>
<tr>
<td><strong>WiFi (optional)</strong></td>
<td></td>
</tr>
<tr>
<td>Active/In Use</td>
<td>Green light shown when mode type is available. Black light means not Active/not In Use.</td>
</tr>
<tr>
<td>Session</td>
<td>Date and time the unit used that mode.</td>
</tr>
<tr>
<td>Duration</td>
<td>Duration of last in use session.</td>
</tr>
<tr>
<td>State</td>
<td>Indicates the physical state of the antenna.</td>
</tr>
<tr>
<td>Signal</td>
<td>The signal strength of the associated/authenticated WiFi access point.</td>
</tr>
<tr>
<td>SSID</td>
<td>Service Set IDentifier—The IEEE 802.11 wireless networking access point name.</td>
</tr>
</tbody>
</table>
MCP110 GPS Screen

- Tap the GPS tab whenever you want to see basic GPS information.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last Update</td>
<td>The time of the last GPS update. This value should update every second.</td>
</tr>
<tr>
<td>Latitude</td>
<td>The last received latitude value.</td>
</tr>
<tr>
<td>Longitude</td>
<td>The last received longitude value.</td>
</tr>
<tr>
<td>Altitude</td>
<td>The last received altitude value.</td>
</tr>
<tr>
<td>Mode</td>
<td>Indicates the MCP110’s GPS status:</td>
</tr>
<tr>
<td></td>
<td>• 3-D is displayed if the receiver is able to view three or more GPS</td>
</tr>
<tr>
<td></td>
<td>satellites. Under normal performance, a 3-D mode will be displayed.</td>
</tr>
<tr>
<td></td>
<td>• 2-D is displayed if the receiver is able to calculate a position, but</td>
</tr>
<tr>
<td></td>
<td>has a limited view to the GPS satellites.</td>
</tr>
<tr>
<td></td>
<td>• NO FIX is displayed when the GPS satellites cannot be viewed.</td>
</tr>
<tr>
<td>Ground Speed</td>
<td>Speed calculated by GPS through a change in vehicle location.</td>
</tr>
<tr>
<td>Precision</td>
<td>Measure of how accurate the GPS signals are that are being received. Values</td>
</tr>
<tr>
<td></td>
<td>less than 4 gives best accuracy.</td>
</tr>
<tr>
<td>Satellites</td>
<td>Number of GPS satellites the receiver is viewing at any given time.</td>
</tr>
<tr>
<td>Messages</td>
<td>GPS statements received by the unit from a GPS source.</td>
</tr>
</tbody>
</table>
MCP110 Performance Screen

- Tap the **Performance** tab whenever you want to see the basic configuration of the unit.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Shows MAS110 CPU usage.</td>
</tr>
<tr>
<td>Memory</td>
<td>Amount of memory used.</td>
</tr>
<tr>
<td>Disk</td>
<td>Amount of flash memory space used.</td>
</tr>
<tr>
<td>Other</td>
<td>Not currently used.</td>
</tr>
</tbody>
</table>
**MCP110 Diag Screen**

- The Run All button, located at the bottom right of the screen. The system runs tests of all possible connections to the MCP110 and then displays whether the connection is found (green ✓), or not found (red X).

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellular signal strength test</td>
<td>Will show a green checkmark when in good cellular network coverage. See Chapter 6: Connectivity Problem Troubleshooting in the MCP110 Diagnostic Guide.</td>
</tr>
<tr>
<td>WiFi signal strength test</td>
<td>Will show a green checkmark when in good WiFi network coverage. Note: WiFi is optional. See Chapter 8: WiFi Problem Troubleshooting (Optional) MCP110 Diagnostic Guide.</td>
</tr>
<tr>
<td>SDM detection test</td>
<td>Will show a red X. NOTE: The SDM Satellite Date Modem is not optional at this time.</td>
</tr>
<tr>
<td>CDD database sync test</td>
<td>Will show a green checkmark when database has been synchronized with NOC (usually takes 3–5 minutes after unit is first powered up). See Chapter 13: Database Out of Sync in the MCP110 Diagnostic Guide.</td>
</tr>
<tr>
<td>GPS fix test</td>
<td>Will show a green checkmark if GPS network is detected. See Chapter 7: GPS Positioning Problem Troubleshooting in the MCP110 Diagnostic Guide.</td>
</tr>
<tr>
<td>J1587 packet detection test</td>
<td>Will show a green checkmark if accessory cable leads are connected to the J1587 databus, the vehicle's ignition is ON, and its getting data. See Chapter 14: Vehicle Data Link Diagnostic/Verification Procedures in the MCP110 Diagnostic Guide.</td>
</tr>
<tr>
<td>J1939 packet detection test</td>
<td>Will show a green checkmark if accessory cable/CAN bus repeater cable is connected to the J1939 databus, the vehicle’s ignition is ON, and its getting data. See Chapter 14: Vehicle Data Link Diagnostic/Verification Procedures in the MCP110 Diagnostic Guide.</td>
</tr>
<tr>
<td>Backup battery test</td>
<td>Will show a green checkmark if the battery is installed in the MAS and has acceptable voltage (3.6VDC). See Chapter 12: Backup Battery Troubleshooting in the MCP110 Diagnostic Guide.</td>
</tr>
<tr>
<td>Truck battery test</td>
<td>Will show a green checkmark if the truck's voltage is &gt; 12VDC.</td>
</tr>
</tbody>
</table>
**VDS Screen - Summary**

See Chapter 14: Vehicle Data Link Diagnostic/Verification Procedures in the *MCP110 Diagnostic Guide* for detailed information on the VDS screen.

- Tap the **VDS** tab to access vehicle data services information.

![VDS Screen - Summary](image)

**Green dot:** Configured and getting data  
**Red dot:** Configured but data is stale  
**Black dot:** Not configured

---

**VDS Screen - Details**

- Tap the **VDS details** icon at the bottom of the screen to access vehicle data services information.

![VDS Screen - Details](image)

---

**Qualcomm® MCP110 System Verification Form**

You can make copies of the System Verification Form on the following page and record important information you may want to keep concerning the vehicle and the MCP110.
Qualcomm® MCP110 System Verification Form

Installation Verification Form

Company Name: ____________________________ Installation Date: ____________________________
Installer #1: ____________________________ Installer #2: ____________________________

Driver Name: ____________________________ Truck #: ____________________________ Year: _______ MFG/Model: ____________________________
Driver ID: ____________________________ Driver Contact #: ____________________________

Unit Address (MAS S/N): ____________________________ MAS SAW Version: ____________________________ WIB S/N: ____________________________
Display (MDU/DIU S/N): ____________________________

Options:  
☐ Panic Button  ☐ Buzzer ☐ TTRACS (tractor)
☐ Scanner ☐ Other ____________________________

Communication Signals:

<table>
<thead>
<tr>
<th>Cellular signal</th>
<th>WiFi</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSSI:</td>
<td>SSID:</td>
</tr>
</tbody>
</table>

Database State:
Sync Completed?: Yes ___ No ___

Positioning:
GPS Fix Test passed?: Yes ___ No ___

Vehicle Data Source Verification:
Databus Connections: ☐ J1708 (J1587) and/or ☐ J1939
Packets Detected for J1587?: Yes ___ No ___  Packets Detected for J1939?: Yes ___ No ___

Backup Battery Test:
MAS Battery test passed? Yes ___ No ___  Backup Battery Voltage: ________ Volts

Text to Speech Verification:
TTS responds to HOME button? Yes ___ No ___  TTS volume control works? Yes ___ No ___

Message Verification:
Send test message with truck number - Message Acknowledged (shows green checkmark)? Yes ___ No ___

Ignition status: Does the ignition status correctly show ON/OFF key positions? Yes ___ No ___

I find the service rendered and materials installed in connection with the above mentioned work to have been completed in a satisfactory manner.

Driver/Customer Signature: ____________________________ Date: ____________________________
11

Performance Monitoring System Verification

Topics in this chapter provide the procedures for conducting Performance Monitoring system installations.

Performance Monitoring System Overview . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 11-2
Performance Monitoring System Verification . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 11-2
Other Performance Monitoring System Display Screens. . . . . . . . . . . . . . . . . . . . 11-6
Special Alert Display Messages. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 11-12
Power Take-off (PTO) Overview . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 11-12
PTO Data Input Verification Procedure . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 11-14

For technical questions, contact Qualcomm Enterprise Services Customer Support.
Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
**Performance Monitoring System Overview**

The Performance Monitoring system is an optional Qualcomm® MCP110 application that records vehicle and driver performance data. The data is then retrieved from the MCP110 by the host computer either manually or automatically at preset intervals.

The hardware installation on the vehicle consists of:

1. Connecting the MCP110 to the data link (see Chapter 9).
2. Sending performance monitoring parameters from the host computer.
3. Performing system verification.

**Performance Monitoring System Verification**

First verify that performance monitoring parameters have been sent to the unit and received. Use the Parameters tab within the Performance Monitoring application and verify the tag field is not “0.”
A tag of “0” indicates that the unit has not received its parameters. Call your company dispatch administrator and ask for the parameters to be sent. A non-zero tag indicates that the unit has received parameters.

Next, with ignition in the ON position, use the Input Tab within the Performance Monitoring application to understand what data is being provided. Review data that is available listed under the Data Item column. Notice indicator lights.

- **Green** indicator light means that those items are being received (this is good).
- **Red** indicator light means the data is stale and not currently available.
- **Black** indicator light means no data has been received for that item.

### Input Screen Example

At a minimum, Performance Monitoring needs current data from Speed, EngineRPM, and DistanceLTD. If these show green, the verification is complete.

If ignition is on and all the data items have a black indicator light, recheck your data link installation. See Chapter 9.

### Understanding Performance Monitoring Faults

Certain types of conditions or faults can be monitored using performance monitoring. A table of those faults follows. Which faults are monitored is determined by the configuration a customer sends to a unit with the performance monitoring parameters.
Consult with your company’s dispatch administrator with questions concerning monitoring faults.

- **Green** indicator light means that those items are being monitored.
- **Red** indicator light means the fault is active.
- **Orange** indicator light means that the fault item was active but the condition cleared.
- **Gray** indicator light means that the condition is not being monitored (turned off).
# Performance Monitoring Faults and Descriptions

<table>
<thead>
<tr>
<th>Display Shows</th>
<th>Associated Fault</th>
<th>Description/Symptom</th>
<th>Possible Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No Power (MCP110)</td>
<td>Power detected OFF for more than the wake-up time.</td>
<td>Main power was lost, causing the MCP to stay asleep longer than its wake-up interval.</td>
</tr>
</tbody>
</table>
| 1             | RPM Zero (MCP110)| RPM zero when speed is non-zero. | -RPM sensor or connection problem.  
  -J1708 selection parameter set wrong.  
  -In rare cases, no idle can be caused by faulty axle sensor input (e.g., wires reversed) causing a positive reading for speed while the vehicle is stationary. |
| 2             | Bad Ignition (MCP110)| Ignition OFF and speed or RPM non-zero. | Problem with MCP110’s ignition line wiring or fuse. |
| 3             | RPM Sensor (MCP110)| Engine posted PID (194) and PID (190). | RPM sensor or connection problem to the engine, detected by the engine’s diagnostics. |
| 4             | Speed Sensor (MCP110)| Engine posted PID (194) and PID (84). | Speed sensor or connection problem to engine, detected by the engine’s diagnostics. |
| 9             | LTD Mismatch (MCP110)| LTD mismatch with stored MCP110 data. | -Engine run with main power disconnected.  
  -Engine run with data link disconnected.  
  -Engine run with ignition line disconnected. |
| A             | Bad Speed (MCP110)| More than 2 hrs IGN = ON with Spd = 0, RPM greater than 1300. | -Speed sensor or connection problem—MCP110.  
  -Speed sensor or connection problem—engine.  
  -Engine speed sensor parameter not enabled. |
| B             | 0 Spd and RPM (MCP110)| More than 2 hrs with IGN = ON with Spd = 0, RPM = 0. | -Disconnect of entire accessory cable.  
  -J1708 selection parameter set wrong.  
  -Data link connection problem.  
  -Driver using ignition position for accessory operation.  
  -MCP110 ignition line wired to accessory position. |
| D             | MCP110 Speed (MCP)| Speed signal constant for more than 5 minutes. | A pulse generator may have been connected to either the MCP110 or the engine. |
| E             | Hard Braking Event| Speed is suddenly decreased by more than 9 MPH/second (speed must be above 20 MPH for this fault to occur. | Driver is braking too quickly (hard braked). |
**Summary Screen**

Data associated with the active driver since the last data extract.

![Performance Monitoring System Display Screens](image)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver</td>
<td>Active driver name. If no driver is currently logged on as the active driver, &quot;UNIDENTIFIED&quot; is displayed.</td>
</tr>
<tr>
<td>Engine Time</td>
<td>Engine time in minutes and seconds.</td>
</tr>
<tr>
<td>PTO</td>
<td>Indicates if PTO configuration is using Pump or Compressor.</td>
</tr>
<tr>
<td>Trip State</td>
<td>Current trip state. Possible values are: WARMING IDLE; WARM IDLE; PRE-INTERTRIP IDLE; PRE-TRIP RUN; PRE-TRIP IDLE; TRIP RUN; TRIP IDLE; COOL IDLE; POST-INTERTRIP IDLE; ENGINE STOP; PTO COMP; PTO PUMP; PTO ENGN.</td>
</tr>
<tr>
<td>Over RPM</td>
<td>Computed over RPM percentage. Based on company configurations.</td>
</tr>
<tr>
<td>Over Idle</td>
<td>Over idle percentage.</td>
</tr>
<tr>
<td>Over Speed</td>
<td>Computed overspeed percentage.</td>
</tr>
<tr>
<td>Distance</td>
<td>Total distance since beginning of trip detected.</td>
</tr>
<tr>
<td>Fuel</td>
<td>Total fuel consumed for trip.</td>
</tr>
<tr>
<td>MPG</td>
<td>Computed fuel mileage in miles/gallon (or km/gal).</td>
</tr>
</tbody>
</table>
Performance Screen

Data associated with the active driver since the last data extract.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver</td>
<td>Active driver name. If no driver is currently logged on as the active driver, “UNIDENTIFIED” is displayed.</td>
</tr>
<tr>
<td>Trip #</td>
<td>Current trip number.</td>
</tr>
<tr>
<td>Engine Time</td>
<td>Total elapsed time the engine has been running.</td>
</tr>
<tr>
<td>Drive Time</td>
<td>Driving (road) time.</td>
</tr>
<tr>
<td>Distance</td>
<td>Total miles accumulated.</td>
</tr>
<tr>
<td>Trip State</td>
<td>Current trip state.</td>
</tr>
<tr>
<td>Speed</td>
<td>Current vehicle speed.</td>
</tr>
<tr>
<td>RPM</td>
<td>Current engine RPM.</td>
</tr>
<tr>
<td>Park Fuel</td>
<td>Current value of the amount of fuel used while parked.</td>
</tr>
<tr>
<td>Idle Fuel</td>
<td>Current value of the idle fuel.</td>
</tr>
<tr>
<td>Coast OOG</td>
<td>Coasting out-of-gear time (displayed in minutes and seconds).</td>
</tr>
<tr>
<td>Gear</td>
<td>Current gear ratio based on the current speed and RPM.</td>
</tr>
</tbody>
</table>
## Violations Screen

Data associated with the active driver since the last data extract.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver</td>
<td>Active driver name. If no driver is currently logged on as the active driver, “UNIDENTIFIED” is displayed.</td>
</tr>
<tr>
<td>Over RPM</td>
<td>Displays while RPM time is accumulating.</td>
</tr>
<tr>
<td>Count</td>
<td>Accumulates by one each time vehicle exceeds RPM threshold for longer than one minute.</td>
</tr>
<tr>
<td>Longest Time</td>
<td>Longest single period of time spent over RPM threshold.</td>
</tr>
<tr>
<td>Over Speed</td>
<td>Displays while overspeed time is accumulating.</td>
</tr>
<tr>
<td>Count</td>
<td>Accumulates by one each time vehicle exceeds speed threshold for longer than one minute.</td>
</tr>
<tr>
<td>Longest Time</td>
<td>Longest single period of time spent over speed threshold.</td>
</tr>
<tr>
<td>Excess Speed</td>
<td>Displays while excessive speed time is accumulating.</td>
</tr>
<tr>
<td>Warm Up</td>
<td>Minimum amount of idle time engine is allowed to warm up.</td>
</tr>
<tr>
<td>Cool Down</td>
<td>Minimum amount of idle time engine is allowed to cool down.</td>
</tr>
<tr>
<td>Inter-Trip Idle</td>
<td>Displays every 60 seconds for up to five times while intertrip idle time is accumulating.</td>
</tr>
<tr>
<td>Ignition</td>
<td>Ignition violation count.</td>
</tr>
</tbody>
</table>
### Parameters Screen

![Parameters Screen Image]

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver</td>
<td>Active driver name. If no driver is currently logged on as the active driver, &quot;UNIDENTIFIED&quot; is displayed.</td>
</tr>
<tr>
<td>Beep</td>
<td>Unidentified driver beep period in minutes.</td>
</tr>
<tr>
<td>BOT</td>
<td>Distance vehicle must travel before the MCP110 declares the Beginning of Trip and starts Trip_Run recording.</td>
</tr>
<tr>
<td>EOT</td>
<td>End of Trip time threshold in minutes.</td>
</tr>
<tr>
<td>Speed Calibration</td>
<td>Speed calibration parameter.</td>
</tr>
<tr>
<td>RPM Calibration</td>
<td>RPM calibration parameter.</td>
</tr>
<tr>
<td>Tag</td>
<td>Parameter version indicator.</td>
</tr>
<tr>
<td>Auto Extract</td>
<td>Dispatch-configured extract frequency (in days).</td>
</tr>
<tr>
<td>Extract</td>
<td>Unit extract frequency.</td>
</tr>
</tbody>
</table>
# PTO Screen

![Performance Monitoring System](image)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver</td>
<td>Active driver name. If no driver is logged on as the active driver, “UNIDENTIFIED” is displayed.</td>
</tr>
<tr>
<td>PTO</td>
<td>Current state of the PTO (enabled or disabled).</td>
</tr>
<tr>
<td>Delay</td>
<td>Dispatch-configured time-to-start for PTO time.</td>
</tr>
<tr>
<td>PTO Fuel</td>
<td>PTO fuel data in gallons.</td>
</tr>
<tr>
<td>PTO Time</td>
<td>Total time logged as PTO data. (Displayed in minutes and seconds until the elapsed time exceeds 1 hour; then it is displayed in hours and minutes.)</td>
</tr>
<tr>
<td>Compressor Revs</td>
<td>Current value of PTOC revolutions.</td>
</tr>
<tr>
<td>Pump Revs</td>
<td>Current value of PTOP (pump output shaft) revolutions.</td>
</tr>
<tr>
<td>Eng/1708 Revs</td>
<td>Current value of PTOE (engine crankshaft) revolutions.</td>
</tr>
<tr>
<td>Compressor</td>
<td>Displays “Y” if the PTOC input is active.</td>
</tr>
<tr>
<td>Pump</td>
<td>Displays “Y” if the PTOP input is active.</td>
</tr>
<tr>
<td>Engine</td>
<td>Displays “Y” if the PTOE input is active.</td>
</tr>
</tbody>
</table>

**Note**

If the PTO is Disabled or if the Vehicle Is In Motion (<20 MPH), the inputs will always read “N.” If both the PTOP and PTOC inputs are active, then only the PTOP input will read “Y.”
Odometer Screen

**Field** | **Description**
---|---
Driver | Active driver name. If no driver is currently logged on as the active driver, “UNDENTIFIED” is displayed.
Life to Date Distance | Total distance the vehicle has traveled in its lifetime if data is provided by the ECM, otherwise it is Life To Date Performance Monitoring system miles only.
Source | Indicates that the signal source for the vehicle’s distance is the standard speed sensor (AXLE) or the J1708/1587 data link (J1708).
Axle Sensor Calibration | Speed or distance calibration value. Number should be the same as the Speed Calibration value displayed on the performance monitoring Parameters screen.
RPM Sensor Calibration | Speed or distance calibration value. Number should be the same as the RPM Calibration value displayed on the performance monitoring Parameters screen.
Special Alert Display Messages

Certain notifications can be configured to show when the MCP110 needs to warn or remind the driver of certain pending conditions.

Warning Messages

Warning messages are accompanied by an audible chirping beep sound from the display unit speaker.

COASTING OUT OF GEAR. Displays while coasting-out-of-gear time is accumulating.

EXCESSIVE OVERSPEED. Displays while excessive speed time is accumulating.

OVERSPEED. Displays while overspeed time is accumulating.

OVERRPM. Displays while over RPM time is accumulating.

INTERTRIP IDLE IN 60 SECONDS. Displays only once 60 seconds before intertrip idle accumulation begins.

INTERTRIP IDLE. Displays every 60 seconds for up to five times while intertrip idle time is accumulating.

Power Take-off (PTO) Overview

• This option provides customers with the ability to log the time the vehicle engine is used for non-transportation purposes, such as when it is powering auxiliary devices.

• In order to log PTO time, one of the two PTO wires must be connected to the pump or compressor input.

• Typically, there are two types of switching methods, those switched to +12 VDC and those switched to ground.
PTOP (Power Take-off Pump)/PTOC (Power Take-off Compressor)

Use your multi-meter to determine which circuit you are connecting to by engaging the PTOP/PTOC and measuring for voltage.

A. Switched +12VDC Circuits

Connect to PTOP or PTOC Wires (Accessory Cable)
To PTO indicator light on dash

B. Switched to Ground Circuits

If you only have a switched circuit that is activated to the ground to detect PTO time, a relay must be used, as shown in the configuration below.
PTO Data Input Verification Procedure

1. Start the vehicle.

2. Turn the PTO device ON.

3. Navigate to the PTO screen.
   
   **Note**
   If performance monitoring is grayed out, Performance Monitoring system is not enabled. Call your company dispatch to have this application enabled.

4. Verify that PTO is Enabled and the Compressor, Pump, or Engine field displays a $Y$ according to what is active.
   
   • You should see the green indicator light.

5. Check that the PTO Time field is incrementing. Is this field incrementing?
   
   **Note**
   In order for PTO time to be recorded, RPM must be $>0$, speed $<20$ mph, and the PTO time delay must be reached.
   
   • If yes, PTO verification is complete.
   • If no, check the wire connections, see Power Take-off (PTO) Overview on page 11-12. Go to step 6.

6. Turn off PTO device. PTO time should now stop incrementing.
Topics in this chapter provide a basic overview of the vehicle maintenance application. This is a vehicle diagnostics tool that alerts the driver and the fleet of active vehicle diagnostics’ conditions.

Vehicle Maintenance Overview .................................................. 12-2
Connecting the J1939 Wires ....................................................... 12-2
Vehicle Maintenance System Verification ................................. 12-3

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
Vehicle Maintenance Overview

Vehicle maintenance is a vehicle diagnostics tool that alerts the driver and the fleet of active vehicle diagnostics’ conditions. When a configured engine condition becomes active, the driver is alerted via the Vehicle Maintenance button by displaying in orange the number of active conditions. An e-mail notification is also sent to a pre-subscribed list notifying fleet personnel of the active condition.

Feature Requirements

- Connection to the J1939 datalink is required.
- The vehicle maintenance service only supports conditions from the J1939 datalink.
- The following conditions are monitored at this time:

<table>
<thead>
<tr>
<th>Description</th>
<th>Source</th>
<th>PGN</th>
<th>SPN</th>
<th>FMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine power supply voltage (low)</td>
<td>0</td>
<td>65226</td>
<td>627</td>
<td>004</td>
</tr>
<tr>
<td>Auxiliary water pump pressure (high)</td>
<td>0</td>
<td>65226</td>
<td>073</td>
<td>003</td>
</tr>
<tr>
<td>Auxiliary water pump pressure (low)</td>
<td>0</td>
<td>65226</td>
<td>073</td>
<td>001</td>
</tr>
<tr>
<td>Fuel delivery pressure (high)</td>
<td>0</td>
<td>65226</td>
<td>094</td>
<td>003</td>
</tr>
<tr>
<td>Engine oil pressure (high)</td>
<td>0</td>
<td>65226</td>
<td>100</td>
<td>003</td>
</tr>
<tr>
<td>Engine oil pressure (low)</td>
<td>0</td>
<td>65226</td>
<td>100</td>
<td>001</td>
</tr>
<tr>
<td>Engine coolant temperature (high)</td>
<td>0</td>
<td>65226</td>
<td>110</td>
<td>000</td>
</tr>
<tr>
<td>Engine coolant temperature (low)</td>
<td>0</td>
<td>65226</td>
<td>110</td>
<td>004</td>
</tr>
<tr>
<td>Engine coolant level (high)</td>
<td>0</td>
<td>65226</td>
<td>111</td>
<td>003</td>
</tr>
<tr>
<td>Engine coolant level (low)</td>
<td>0</td>
<td>65226</td>
<td>111</td>
<td>001</td>
</tr>
<tr>
<td>Engine fuel temperature (high)</td>
<td>0</td>
<td>65226</td>
<td>174</td>
<td>003</td>
</tr>
<tr>
<td>Engine oil temperature (high)</td>
<td>0</td>
<td>65226</td>
<td>175</td>
<td>003</td>
</tr>
<tr>
<td>Engine oil temperature (above normal)</td>
<td>0</td>
<td>65226</td>
<td>175</td>
<td>000</td>
</tr>
<tr>
<td>Brake ABS valve (high)</td>
<td>11</td>
<td>65226</td>
<td>795</td>
<td>003</td>
</tr>
<tr>
<td>Brake ABS valve (low)</td>
<td>11</td>
<td>65226</td>
<td>798</td>
<td>004</td>
</tr>
</tbody>
</table>

Connecting the J1939 Wires

See Chapter 9 in this guide for detailed information.
Vehicle Maintenance System Verification

Refer to the following DIU110 screens to verify Vehicle Maintenance:

1. Go to the Vehicle Data Service (VDS) status screen. Tap the Home key and use the right and left arrows to get to the System button. Tap the System button and tap the VDS tab.

With the ignition ON, verify the following on the VDS (Status) screen:

• The J1939 light is green. This confirms that the J1939 is enabled for the unit. The Rcv value should be constantly increasing.
  - If the J1939 light is red, the data is stale.
  - If the J1939 light is dark, the unit is not enabled for J1939.

2. Tap the Home button and scroll down to the Vehicle Maintenance button.

Note

If the Vehicle Maintenance button is not highlighted blue, the service is not enabled for the unit and must be turned on via iQ.

3. Simulate an engine condition. The number of conditions you create should appear in orange on the Vehicle Maintenance button.
4. Tap the Vehicle Maintenance button and select the Conditions tab to view the current Active and Inactive Conditions.

- Conditions with red dots are active conditions.
- Conditions with gray dots are inactive conditions.
- The simulated condition should have a red dot.
- Conditions must be active 40 seconds before they are reported on the DIU110.
- 40 seconds after a condition becomes inactive the dot for that condition turns gray.
- 40 minutes after the condition has been inactive, it is removed from the list.

5. Select the Monitor List tab to view the complete list of Monitored Conditions (also listed on page 12-2).

<table>
<thead>
<tr>
<th>Monitored Conditions</th>
<th>Source</th>
<th>SPN</th>
<th>FMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine power supply voltage (low)</td>
<td>0</td>
<td>627</td>
<td>004</td>
</tr>
<tr>
<td>Auxiliary water pump pressure (high)</td>
<td>0</td>
<td>073</td>
<td>003</td>
</tr>
<tr>
<td>Auxiliary water pump pressure (low)</td>
<td>0</td>
<td>073</td>
<td>001</td>
</tr>
<tr>
<td>Fuel delivery pressure (high)</td>
<td>0</td>
<td>094</td>
<td>003</td>
</tr>
<tr>
<td>Engine oil pressure (high)</td>
<td>0</td>
<td>100</td>
<td>003</td>
</tr>
<tr>
<td>Engine oil pressure (low)</td>
<td>0</td>
<td>100</td>
<td>001</td>
</tr>
<tr>
<td>Engine coolant temperature (high)</td>
<td>0</td>
<td>110</td>
<td>000</td>
</tr>
</tbody>
</table>

6. Verify that e-mail notification goes out upon detection of condition. If you do not receive e-mail notification, contact QES Customer Support at (800) 541-7490.
13

Critical Event Reporting System Verification

This chapter contains information regarding Critical Event Reporting (CER) requirements, installation, and system verification. The topics include:

CER Overview ......................................................... 13-2
CER System Verification ......................................... 13-3

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
CER Overview

CER captures and reports critical event information such as:

- hard braking events
- stability control/roll stability events
- lane departure warning (LDW) events
- panic button events
- manually triggered events

The CER feature records a set of predefined data for the five minute period before a critical event occurs and the two minute period after a critical event is triggered. The event information is sent from the mobile unit over the air where it is made available to the customer for analysis via a web application.

Text-to-speech (TTS) can be enabled so CER events can be audibly conveyed to the driver. Performance Monitoring is not required for CER. The “hard brake” feature in Performance Monitoring does not have to be enabled for the hard brake CER trigger to operate.

For the CER feature to function, the datalink wires must be connected. Please refer to Chapter 9: Vehicle Data Bus Connections.

Some CER features are dependent on connection to both J1708/J1587 and J1939 data links and rely on the vehicle’s ECM to supply needed information.
CER System Verification

1. Identify configuration and available CER features
2. Test system by manually reporting an event

*Identify Configuration and Available CER Features*

1. To access CER information, go to the **Home** screen and tap the **CER** button.

![CER button on Home screen]

If the CER button is grayed out, then the CER service for the unit is not enabled. It will need to be enabled from iQ by assigning the unit to the correct operational profile. The Main CER screen will show.

![Main CER screen with a hand on the CER button]

2. From the Main CER screen shown above, press the “d” key and go to the **General** tab.

![Screen with options to initiate a Critical Event Report]

"Would you like to initiate a Critical Event Report?"

- [Yes]
- [Cancel]
## General Features

![Critical Event Reporting System Verification](image.png)

**General Screen field definitions**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CER Enabled</td>
<td>True or False. If true, the MCP110 captures CER events.</td>
</tr>
<tr>
<td>Hard Braking Min Speed</td>
<td>The minimum speed at which mobile unit will start to detect hard brake events.</td>
</tr>
<tr>
<td>Hard Braking Decel Rate</td>
<td>The rate of deceleration that triggers a hard brake event (Default = 9 MPH/SEC).</td>
</tr>
<tr>
<td>Speech Enabled</td>
<td>True or False. If true, the text in the alert pop-ups are spoken.</td>
</tr>
<tr>
<td>Stability Control Enabled</td>
<td>True or False. If true, stability control is enabled.</td>
</tr>
<tr>
<td>Lane Departure Enabled</td>
<td>True or False. If true, lane departure warning is enabled.</td>
</tr>
</tbody>
</table>
**Stability Control**

For stability control critical event reporting to work, the vehicle must be equipped and configured with Eaton Vorad’s stability control product or other similar product.

To see if Stability Control is enabled and configured properly, tap the Stability Control tab.

---

**Stability Control Screen field definitions**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger Enabled</td>
<td>True or False. If true, stability control events are configured to be recorded. If false, VDC is Not Seen.</td>
</tr>
<tr>
<td>VDC Data</td>
<td>Available or Not Seen. If stability control information is provided by the anti-lock brake system (ABS), it shows Available. If it is not provided, shows Not Seen. If stability control is enabled and the truck has ABS, but it shows Not Seen, contact your administrator to apply the correct configurations.</td>
</tr>
<tr>
<td>Min Speed</td>
<td>Minimum speed at which mobile unit detects events.</td>
</tr>
<tr>
<td>On Threshold</td>
<td>Number of messages from the ABS indicating brake or engine being modulated in a row before an event is considered to be in progress.</td>
</tr>
<tr>
<td>Off Threshold</td>
<td>Number of messages from the ABS indicating brake or engine not being modulated in a row before an event is considered to be no longer in progress.</td>
</tr>
</tbody>
</table>
| Bits Tracked    | Indicates which bits the mobile unit tracks to monitor stability control events mentioned above:  
• Brake only  
• Engine only  
• Brake or Engine (Default)  
• Brake and Engine |
**Lane Departure**

For LDW to function, the vehicle must be equipped with an LDW system. To access LDW information, tap the Lane Departure tab.

### Lane Departure Screen field definitions

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger Enabled</td>
<td>True or False. If true, LDW is being recorded.</td>
</tr>
<tr>
<td>Bus</td>
<td>J1587 or J1939. Should be J1939 unless a converter box is installed for using J1587)</td>
</tr>
<tr>
<td>LDW Data</td>
<td>Available or Not Seen. If LDW data information is provided, it shows available. If it is not provided, shows Not Seen. If LDW is enabled and the truck has an LDW system, but it shows Not Seen, contact your administrator to apply the correct configurations</td>
</tr>
<tr>
<td>Min Speed</td>
<td>Minimum speed at which mobile unit detects events.</td>
</tr>
<tr>
<td>On Threshold</td>
<td>Number of messages from LDW that indicate a departure that must be seen in a row before an event is considered to be in progress.</td>
</tr>
<tr>
<td>Off Threshold</td>
<td>Number of messages from LDW that do not indicate a departure that must be seen in a row before an event is considered to be not in progress.</td>
</tr>
<tr>
<td>Events Count</td>
<td>[Events Count] LDW events within [Events Time (min)] that will result in notifications by CER.</td>
</tr>
<tr>
<td>Events Time (min)</td>
<td></td>
</tr>
</tbody>
</table>
Test System by Manually Reporting an Event

1. With the MCP110 powered on, create a CER event by doing one of the following:
   - From the Home screen, press the Ctrl and t keys on the DIU. When the screen appears, tap the Yes button.
   - From the Home screen, tap the Critical Event Reporting icon. When the screen appears, tap the Yes button.

2. Verify that the CER web application receives the CER event message and the data surrounding the event is present. If the message is not received at the CER web application then the NOC account could be set up incorrectly. Call QES Customer Support at 800-541-7490.

3. Clear the event by pressing the Exclamation icon and then the Clear button.
Trailer Management System Installation

Topics in this chapter provide how to install Trailer Management system hardware on tractors and trailers and how to verify that the system is working properly.

Trailer Management System Overview . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 14-2
Trailer Management System Wiring for the Truck . . . . . . . . . . . . . . . . . . . . . . . . . 14-2
Trailer Management System Verification . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 14-3

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
**Trailer Management System Overview**

- Monitors trailer connects and disconnects and passes the information on to dispatch via the wireless communication network with the date, time, and location.
- Monitors the refrigeration unit of a trailer.

**Hardware Requirements**

- The MCP110 accessory cable must be installed (see Chapter 5) on the mobile application server 110 (MAS110).

---

**Trailer Management System Wiring for the Truck**

**Fuse Kit Installation**

Fuse kits are needed for all Trailer Management system installations.

1. Locate the blue AUX wire in the 7-way trailer harness. With ignition turned ON, determine if +12/24 VDC is present on this wire.
   - If +12/24 VDC is present, proceed to step 2.
• If +12/24 VDC is not present, first verify that the main aux fuse is not blown. If no circuit exists, then connect ignition-switched +12/24 VDC from the fuse panel to the trailer auxiliary line. The trailer auxiliary wire must be protected by a 30-amp fuse or a circuit breaker. Proceed to step 2.

2. Locate the trailer auxiliary wire connection point, usually where the trailer auxiliary wire enters the truck cab.

3. Install the 5-amp fuse on the accessory cable’s blue TTRACS wire.

4. Butt splice the protected end of 5-amp fuse to trailer auxiliary wire connection point.

---

**Caution**

*Filters:* Filtering of the 7-way AUX wire to stop the vehicle’s ABS PLC signal (SAE 2497) from getting into the vehicle electrical system, will also filter the Trailer Management system signal. The TTRACS wire should be connected so it does not go through the PLC filter.

*ABS Interoperability:* The Trailer Management system product has been tested by Qualcomm for interoperability with the SAE standard PLC4Trucks ABS signal. These tests resulted in no adverse impact on the ABS warning function. Furthermore, Qualcomm is not aware of any interoperability issues in actual operation on vehicles in the marketplace.

---

**Trailer Management System Verification**

*Enabling the Option for the Trailer Management System*

• If the Trailer Management button is grayed out, Trailer Management is not enabled.

• Call your company dispatch to have the correct operational profile selected so this application is enabled.
Trailer Connection/Disconnection

Connection

1. Connect an MCP110-equipped tractor to the trailer, connect the tractor/7-way pigtail.
2. Touch the Trailer Management button.

If a trailer is not currently connected, the status is None Connected.

After the trailer is connected and the TrailerTRACS transmitter sends its ID to the MCP110, the trailer ID is updated on the display.

Disconnection

1. Remove 7-way pigtail.
2. Leave ignition ON.
3. Wait for disconnect message (approximately 2 to 3 minutes).

A disconnect message is sent when the tractor’s ignition is on and there has been no signal from the Trailer Management transmitter for a preset time period. This usually occurs within five minutes.


**Trailer Management Diagnostic Screen**

1. Touch the **Trailer Management** button. The Trailer IDs screen displays.

![MCP200 Home Screen](image1)

![Trailer Management Screen](image2)

2. Tap the “D” key and the Diagnostics screen will display.

3. When a trailer is connected, the Trailer Management Diagnostic screen displays. The Trailer Management transmitter ID shows on the Trailer IDs screen.

A Trailer Management ID number displays, as well as other numerical information.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Line Trailer Diag</td>
<td>Number of seconds since the ignition was turned ON.</td>
</tr>
<tr>
<td>Second Line First Number</td>
<td>Trailer Management ID number.</td>
</tr>
<tr>
<td>Second Line Second Number</td>
<td>Number of ID packets from the TrailerTRACS transmitter since the ignition was turned ON.</td>
</tr>
<tr>
<td>Second Line Third Number</td>
<td>Number of seconds since the last ID packet was received from the TrailerTRACS transmitter by the MCP110.</td>
</tr>
</tbody>
</table>
Refrigeration Status Screen

1. Touch the Trailer Management button.

2. If a refrigeration unit is detected, it will say Reefer in the ID box.

3. Refrigeration Status screen appears. To send the information to dispatch, touch the Send button.
# Refrigeration Status Screen

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trailer ID</td>
<td>The trailer’s TrailerTRACS transmitter ID.</td>
</tr>
</tbody>
</table>
| Refrigerator Stat # | Number of refrigeration status messages sent from the refrigeration unit to the MCP110. When this number is incrementing regularly, your data is being sent from the refrigeration unit. The number is followed by a code that identifies the refrigeration unit’s manufacturer:  
  • T—Thermo King  
  • C—Carrier |
| Mode           | Refrigeration unit’s operating mode.                                         |
| SET PT         | Trailer’s set point. Shown in Celsius (C) or Fahrenheit (F).                  |
| RTN            | Temperature of air coming out of the trailer register.                       |
| SUP            | Temperature of air going into the trailer.                                   |
15

Wired Panic Button Installation

Wired Panic Button Overview

The wired panic button meets all Defense Transportation Tracking System (DTTS) requirements and can be used for vehicles hauling U.S. Department of Defense loads or hazardous materials.

It can be configured at the NMC to function as a non-DTTS panic button. When this configuration is used, the panic button sends an alert to the NMC and an Emergency notification to the dispatcher, but DTTS is not notified.

For information on installing the wireless panic button, see chapter Chapter 16: Wireless Panic Button Installation.

Installing the Panic Button ................................................. 15-2
Installation Verification .................................................... 15-4

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
Installing the Panic Button

1. Install the accessory cable according to the guidelines in Chapter 5.

2. Remove the pre-installed ring terminal and replace with the supplied butt connector.

3. Select a suitable location for the panic button.

**Caution**

⚠️ Check behind the dash to ensure that the area is clear of obstructions before drilling.

4. Drill a 5/8" hole in the vehicle dash.

**Caution**

⚠️ Always deburr holes before routing the cables.

5. Insert the button assembly into the dash and secure it in place using the lock washer and nut provided.

**WARNING**

⚠️ When routing the cable, avoid any moving parts or sharp edges.

6. Route the cable to where you make the accessory cable connections on the MCP110.
7. Locate and separate the blue/red PANIC_LOW and blue/black PANIC_HIGH wires from the other accessory wires on the accessory cable.

**Caution**

Always use the appropriate crimping tool for insulated terminals.

8. Connect the blue/red PANIC_LOW and blue/black PANIC_HIGH wires to the two wires of the PANIC button.

9. Once you have completed all connections, cover all wires with convoluted tubing, secure all loose or unsecured wires with wire ties, and stow away cabling.
Installation Verification

Automated Panic Button Test System Dial-in Procedure

Before you begin, you need the following:

• The MCP110 serial numbers you are testing.
• Your customer ID.
• Your authorization ID.

If you don’t have this information, contact QES Customer Support at 800-541-7490 before dialing in to test the procedure.

1. Call QES Customer Support at 800-541-7490.
2. When prompted, press the 0 key for AUTOMATED SERVICES.
3. Press the 7 key for PANIC TESTING.
4. When prompted, enter your customer ID and press the # key.
5. Confirm or re-enter your customer ID.
6. When prompted, enter your authorization ID and press the # key.
7. Confirm or re-enter your authorization ID.
8. If more than one location has been set up for your company, you will hear a list of locations. Press the number key that corresponds with your current location and press the # key.
9. When prompted, enter the MCP110 serial number and press the # key.
10. When the serial number is accepted, the number is read back and you receive a confirmation number.
11. Press the 2 key to enter another MCP110 number or hang up to end the call.

If this process is unsuccessful, hang up and call QES Customer Support at 800-541-7490 to speak with a representative.

12. You can now press the panic button. You will have an hour to perform the test.

When the test is complete, Qualcomm sends a fax and/or an e-mail to your designated contact confirming the MCP110s you tested and the number of times you pressed the panic button for each MCP110 during the test.
16

In-Cab Scanner Installation

The in-cab scanner is a product of BCS Solutions.

- Installation Guidelines ........................................... 16-2
- Mounting the Scanner ............................................. 16-2
- Installing the Scanner ............................................. 16-3
- Calibrating the Scanner .......................................... 16-3
- Sending a Scan ..................................................... 16-4
- Cleaning the Scanner ............................................. 16-5
- Return Material Authorization (RMA) Process for Scanners ........................................ 16-5
- BCS Solutions Scanner Parts List .............................. 16-6

For technical support for the in-cab scanner, contact BCS Solutions:

In the United States and Canada, call 800-555-5555

For initial support only, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
   In Canada, call 800-863-9191
Installation Guidelines

Install the scanner in the cab of the vehicle in a location that is convenient and safe. This can be on a vertical or horizontal surface. The scanner cannot obscure the driver’s view of the road.

Mounting the Scanner

The scanner can be mounted in one of two ways, with or without the holster.

Scanner Mounting Option (without the holster)

1. Cut the dual-lock tape into four 2.5” sections.
2. Clean the scanner bottom with an alcohol pad, remove protective film and apply two dual-lock pieces to the bottom ends of the scanner.
3. Clean the vehicle’s mounting surface with an alcohol pad.
4. Remove protective film and apply two dual-lock pieces to the desired mounting surface.
Holster Mounting Option

1. Select holster location.
2. Clean the location with an alcohol pad and let dry.
3. Carefully remove film from VHB adhesive locations on holster.
4. Position holster onto desired location and firmly press down to ensure contact with the surface.

Installing the Scanner

1. Connect smaller end of scanner cable to the USB port on the end of the scanner.
2. Connect the scanner cable to the MAS110 using any of the 4 USB ports.
3. Store excess scanner cable where it will not be damaged and is out of harm’s way and will not obstruct the driver or hinder truck performance. Keep cable away from sharp metal edges to avoid damage.

Calibrating the Scanner

1. From the Scanning Home screen, touch the Options tab.
2. Insert the black and white calibration page or plain white paper into the slot.
3. Touch the **Calibrate** button. Wait a few minutes for the calibration to complete.

   ![](image)

4. Touch the **Scan** tab to return to the scanning home screen.

**Sending a Scan**

1. On the Home screen, touch the **Scanning** button.
2. Insert the paper, face down.
   - It will go in about 1/2".
   - If it’s not 8-1/2" wide, line it up with the right edge.

   *Note*

   _The small tooth in the slot must be covered._

3. Touch the **Scan Page** button.

   *Note*

   _If the preview box is checked, a preview page appears. Touch the Accept button._

4. Touch the **Done** button.

   ![](image)

5. Identify what you’re sending and touch the **Send** button.

6. When asked to confirm, touch the **OK** button.
7. Touch the **Outbox** tab and confirm a green check mark is displayed next to the scan.

![Outbox Tab Example](image)

### Cleaning the Scanner

1. Touch the **Options** tab.
2. Insert the cleaning paper.
3. Touch the **Clean** button. Wait a few minutes while the scanner draws through the cleaning paper and cleans the scanner.

### Return Material Authorization (RMA) Process for Scanners

1. Request an RMA from BCS Solutions.
2. BCS Solutions arranges shipment of a replacement component to you.
3. Return the failed component to the address specified by BCS Solutions.
## BCS Solutions Scanner Parts List

<table>
<thead>
<tr>
<th>Part</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCS Scanner Kit contains: scanner, scanner cable, and holster</td>
<td>65-J9630-P3</td>
</tr>
<tr>
<td>BCS Scanner Kit contains: scanner and scanner cable</td>
<td>65-J9630-P4</td>
</tr>
<tr>
<td>BSC Scanner</td>
<td>825-53392-0000</td>
</tr>
<tr>
<td>Scanner Cable</td>
<td>764-18579-3000</td>
</tr>
<tr>
<td>Optional Holster</td>
<td>65-J9631-1</td>
</tr>
</tbody>
</table>

Order parts directly from BCS Solutions:

- Call: 800-555-5555.
- Website: www.bcssolutions.com
A

Wiring Diagrams and Charts

Topics in this appendix provide wiring diagrams and pin description charts for the MCP110 and accessories.

MCP110 Electrical Diagram .......................................................... A-2
MCP110 Wiring Diagram ................................................................. A-3
Power Cable Connector Pin Callouts ............................................. A-4
Wireless Interface Box (WIB110) Cable Connector Pin Callouts .... A-5
Primary Accessory Cable Connector Pin Callouts ....................... A-6
MCP100 to MCP200 Accessory Adapter Cable ......................... A-7
Display Interface Unit 110 (DIU110) Cable Connector Pin Callouts . . A-8
Six-pin Data Link Connector Pin Callouts ................................. A-9
Nine-pin Data Link Connector Pin Callouts .............................. A-10
Radio Connector Pin Callouts ......................................................... A-11
CAN Repeater Cable Pin Callouts ............................................... A-12
Speaker Switch Cable ................................................................. A-13

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
MCP110 Electrical Diagram

WIB Antenna

DIU110

Power Cable

Vehicle Battery
+9 VDC to +32 VDC

Chassis Gnd

Ignition Switch

10 AMP

3 AMP

30 AMP

Speaker

Switch

Truck Spkr

Speaker +

Speaker -

Panic Switch

Panic High

Panic Low

Relay Harness

Pump

Compressor

Primary Accessory Cable

Can Converter Cable

7-Way AUX

Mounted on Trailer

PWR

10' min.

30 AMP

7-Way AUX

Mounted on Trailer

09AAA_022

MAY CONTAIN U.S. AND INTERNATIONAL EXPORT CONTROLLED INFORMATION
MCP110 Wiring Diagram

Wireless Interface Box (WIB) Antenna

Display Interface Unit (DIU110) and Holster

Mobile Application Server (MAS110)

Vehicle Dash/Electrical Center

Wireless Interface Box (WIB) Antenna

Display Interface Unit (DIU110) and Holster

Mobile Application Server (MAS110)

Vehicle Dash/Electrical Center

MAY CONTAIN U.S. AND INTERNATIONAL EXPORT CONTROLLED INFORMATION
**Power Cable Connector Pin Callouts**

<table>
<thead>
<tr>
<th>PIN</th>
<th>SIGNAL</th>
<th>COLOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(BAT+) 12 VDC</td>
<td>YELLOW</td>
</tr>
<tr>
<td>2</td>
<td>(BAT+) 12 VDC</td>
<td>YELLOW</td>
</tr>
<tr>
<td>3</td>
<td>(IGNITION)</td>
<td>WHITE</td>
</tr>
<tr>
<td>5</td>
<td>(IGNITION)</td>
<td>BLACK</td>
</tr>
<tr>
<td>6</td>
<td>(ID)</td>
<td>BLACK</td>
</tr>
<tr>
<td>8</td>
<td>(BAT RTN)</td>
<td>BLACK</td>
</tr>
<tr>
<td>9</td>
<td>(BAT+) 12 VDC</td>
<td>YELLOW</td>
</tr>
<tr>
<td>10</td>
<td>(BAT+) 12 VDC</td>
<td>YELLOW</td>
</tr>
</tbody>
</table>

**Notes:**
- May contain U.S. and international export controlled information.
- 80-JB400-1 Rev. A
Wireless Interface Box (WIB110) Cable Connector Pin Callouts

<table>
<thead>
<tr>
<th>COLOR</th>
<th>SIGNAL</th>
<th>PIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>WIB TEMPER_1</td>
<td>8</td>
</tr>
<tr>
<td>Black</td>
<td>WIB TEMPER_2</td>
<td>7</td>
</tr>
<tr>
<td>Gray</td>
<td>WIB Gnd</td>
<td>6</td>
</tr>
<tr>
<td>Blue</td>
<td>WIB 9 V</td>
<td>5</td>
</tr>
<tr>
<td>Green</td>
<td>WIB Gnd</td>
<td>4</td>
</tr>
<tr>
<td>Violet</td>
<td>WIB DATA_P</td>
<td>3</td>
</tr>
<tr>
<td>Yellow</td>
<td>WIB DATA_M</td>
<td>2</td>
</tr>
<tr>
<td>Orange</td>
<td>USB VCC</td>
<td>1</td>
</tr>
</tbody>
</table>

09AAA_016
MCP100 to MCP200 Accessory Adapter Cable

- If the MCP100 accessory cable uses the CAN1 converter cable to connect to the MCP200, this cable can be re-used in conjunction with a MCP100 to MCP200 accessory adapter cable, however the J1939 connectivity will be lost.

- If the MCP100 accessory cable is connected directly into the J1939 data link (common with most printers), or uses the CAN repeater cable, this cable can be reused and will retain connectivity to the J1939 data link.
Display Interface Unit 110 (DIU110) Cable Connector Pin Callouts

<table>
<thead>
<tr>
<th>COLOR</th>
<th>SIGNAL</th>
<th>PIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>(LVDS+)</td>
<td>1</td>
</tr>
<tr>
<td>Black</td>
<td>(LVDS+)</td>
<td>2</td>
</tr>
<tr>
<td>Gray</td>
<td>(GND)</td>
<td>3</td>
</tr>
<tr>
<td>Violet</td>
<td>(GND)</td>
<td>4</td>
</tr>
<tr>
<td>Blue</td>
<td>(V+)</td>
<td>5</td>
</tr>
<tr>
<td>Green</td>
<td>(V+)</td>
<td>6</td>
</tr>
<tr>
<td>Yellow</td>
<td>(USB+)</td>
<td>7</td>
</tr>
<tr>
<td>Orange</td>
<td>(USB-)</td>
<td>8</td>
</tr>
</tbody>
</table>

USB Repeater

COLOR | SIGNAL | PIN |
-------|--------|-----|
Orange | (USB+) | 6   |
Yellow | (USB+) | 7   |
Green  | (V+)   | 6   |
Blue   | (V+)   | 5   |
Violet | (GND)  | 4   |
Gray   | (GND)  | 3   |
Black  | (LVDS-) | 2   |
Red    | (LVDS+) | 1   |
Six-pin Data Link Connector Pin Callouts

<table>
<thead>
<tr>
<th>SIGNAL</th>
<th>PIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>J1708/J1587 DATA LINK+</td>
<td>A</td>
</tr>
<tr>
<td>J1708/J1587 DATA LINK-</td>
<td>B</td>
</tr>
<tr>
<td>+12VDC</td>
<td>C</td>
</tr>
<tr>
<td>PLUG P/N:23507136</td>
<td>D</td>
</tr>
<tr>
<td>BATTERY GROUND</td>
<td>E</td>
</tr>
<tr>
<td>PLUG P/N:23507136</td>
<td>F</td>
</tr>
</tbody>
</table>
## Nine-pin Data Link Connector Pin Callouts

<table>
<thead>
<tr>
<th>SIGNAL</th>
<th>PIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>BATTERY GROUND</td>
<td>A</td>
</tr>
<tr>
<td>+12VDC</td>
<td>B</td>
</tr>
<tr>
<td>J1939 DATA LINK+</td>
<td>C</td>
</tr>
<tr>
<td>J1939 DATA LINK-</td>
<td>D</td>
</tr>
<tr>
<td>J1939 SHIELD</td>
<td>E</td>
</tr>
<tr>
<td>J1708/J1587 DATA LINK+</td>
<td>F</td>
</tr>
<tr>
<td>J1708/J1587 DATA LINK-</td>
<td>G</td>
</tr>
<tr>
<td>PLUG</td>
<td>H</td>
</tr>
<tr>
<td>PLUG</td>
<td>J</td>
</tr>
</tbody>
</table>
## Radio Connector Pin Callouts

### Common Radio and Harness

![Diagram of radio connector with pin callouts](image)

- **Front Drivers Side Speaker Wire (B5)**
- **Front Drivers Side Speaker Wire (B6)**
- **Notches**

### Table of Pin Callouts

<table>
<thead>
<tr>
<th>PIN</th>
<th>SIGNAL</th>
<th>PIN</th>
<th>SIGNAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>N/C</td>
<td>B1</td>
<td>RR + SPEAKER</td>
</tr>
<tr>
<td>A2</td>
<td>N/C</td>
<td>B2</td>
<td>RR - SPEAKER</td>
</tr>
<tr>
<td>A3</td>
<td>PARK LIGHTS</td>
<td>B3</td>
<td>RF + SPEAKER</td>
</tr>
<tr>
<td>A4</td>
<td>IGN CONTACT</td>
<td>B4</td>
<td>RF - SPEAKER</td>
</tr>
<tr>
<td>A5</td>
<td>PWR ANT OUTPUT</td>
<td>B5</td>
<td>LF + SPEAKER</td>
</tr>
<tr>
<td>A6</td>
<td>PWM/ANALOG DIM</td>
<td>B6</td>
<td>LF - SPEAKER</td>
</tr>
<tr>
<td>A7</td>
<td>BATTERY - MAIN</td>
<td>B7</td>
<td>LR + SPEAKER</td>
</tr>
<tr>
<td>A8</td>
<td>GROUND</td>
<td>B8</td>
<td>LR - SPEAKER</td>
</tr>
</tbody>
</table>
CAN Repeater Cable Pin Callouts

<table>
<thead>
<tr>
<th>COLOR</th>
<th>SIGNAL</th>
<th>PIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHT/BLU 20</td>
<td>(CAN1_H)</td>
<td>1</td>
</tr>
<tr>
<td>BLU/WHT 20</td>
<td>(CAN1_LO)</td>
<td>2</td>
</tr>
<tr>
<td>WHT/BRN 22</td>
<td>(CAN_PWR)</td>
<td>3</td>
</tr>
<tr>
<td>BRN/WHT 22</td>
<td>(CAN_GND)</td>
<td>4</td>
</tr>
<tr>
<td>WHT/BRN 22</td>
<td>(SHIELD)</td>
<td>5</td>
</tr>
</tbody>
</table>

PIN 6
PIN 4
PIN 3
PIN 1

J1939 CAN REPEATER-R

J1939 CAN BUS

WHT/BLU 20 (CAN1_HI)
BLU/WHT 20 (CAN1_LO)

YEL 20

09AAA_043
Speaker Switch Cable
Environmental and Power Requirements

Topics in this appendix provide environmental and power requirements for the MCP110 and accessories.

MCP110 Environmental and Power Requirements . . . . . . . . . . . . . . . . . . . . . . . . . B-2

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
## MCP110 Environmental and Power Requirements

<table>
<thead>
<tr>
<th>Condition</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extended Operating Temperature</td>
<td>-40° C to 70° C (-40° F to 158° F)</td>
</tr>
<tr>
<td>Vibration/Shock</td>
<td>Mobile application server 110 (MAS110) does not have a shock tray. Neither the wireless data box 110 (WIB110) nor optional satellite data modem (SDM) should be mounted to any member/support directly connected to the chassis, such as a headache rack.</td>
</tr>
<tr>
<td>Humidity</td>
<td>Weatherproof. Not watertight. DO NOT get wet. Not watertight. Turn over immediately if liquids are spilled on it.</td>
</tr>
<tr>
<td>WIB110</td>
<td>Weatherproof.</td>
</tr>
<tr>
<td>MAS110</td>
<td>Not watertight. DO NOT get wet.</td>
</tr>
<tr>
<td>Display interface unit 110 (DIU110)</td>
<td>Not watertight. Turn over immediately if liquids are spilled on it.</td>
</tr>
<tr>
<td>Power</td>
<td>+12 to +32 Volts DC</td>
</tr>
<tr>
<td>Operating at +12V (WIB and DIU)</td>
<td>MCP110 draws a maximum of 1.5 amps.</td>
</tr>
<tr>
<td>Asleep</td>
<td>MCP110 draws 20 mA.</td>
</tr>
</tbody>
</table>
Standard RMA Procedure

Topics in this appendix provide Qualcomm's standard Return Material Authorization (RMA) procedure and policies for use in the United States only. It applies to current Qualcomm Enterprise Services (QES) products that need to be returned for replacement. For information on the GlobalTRACS® RMA procedure, refer to GlobalTRACS® Standard RMA Procedure, 80-J5638-1.

The Return Material Authorization Process ........................................... C-1
How to Obtain an RMA Number .......................................................... C-2
RMA Policies ...................................................................................... C-4

This document does not cover equipment problem diagnosis. For technical assistance, please refer to the current diagnostic or installation guide. Listings of manuals and ordering information may be obtained at our web site at qes.qualcomm.com.

The Return Material Authorization Process

RMAs are used whenever equipment must be returned. They authorize, schedule, and track the return, repair or replacement, and shipment of equipment.

The RMA process involves three separate events:

• You request an RMA number.
• Qualcomm arranges shipment of a replacement component to you.
• You return a failed component to the address specified by Qualcomm.

The RMA process is started when you request an RMA number. The RMA number is a reference number that is used to track the status of each part as it moves through the RMA process. After you are issued the RMA number, a replacement part will be shipped to you. You are responsible for returning the defective equipment to the address specified by Qualcomm within 14 days.
How to Obtain an RMA Number

There are two ways to obtain an RMA number:

• Visit our web site at qes.qualcomm.com and then log into iQ. See Creating an RMA On-line on page C-4. Access for customers only.

• Call Qualcomm Enterprise Services Customer Support at (800) 541-7490 and request an RMA number.

Our web site provides customers with forms and the option for RMAs on-line. If you call QES Customer Support between 6:00 a.m. and 5:00 p.m. Pacific Time, Monday through Friday, you can be issued an RMA number over the phone.

Required Information

Before the RMA number can be issued, you need to provide Qualcomm with the following information.

Date. The date that you are sending the form to Qualcomm.

Customer Name and Contact. The name of the company that is requesting the RMA and the name of the person making the RMA request.

“Ship to:” Address. The complete address where the replacement component is to be shipped, plus the name of the person to whose attention the package should be addressed.

Delivery Priority. All replacements are typically shipped via ground service within two business days. If you require expedited delivery, you will need to include your shipper account number (this is your FedEx or UPS account number) when requesting the RMA. The cost of expedited shipping will be billed to your account number directly. If express delivery is critical, please call 1-800-541-7490, Option 4 to confirm inventory availability.

Return Code. The code that best describes the reason you are returning the unit. Frequently used codes include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD</td>
<td><strong>Customer Damage.</strong> Any damage that occurred due to improper or negligent use of the equipment by the customer. Customer damage may be caused by an accident, incorrect installation, mishandling, or intentional abuse. A purchase order number is required in order to process a customer damage RMA.</td>
</tr>
<tr>
<td>DOA</td>
<td><strong>Dead on Arrival.</strong> A component is considered DOA if it fails to function when taken out of the box at installation.</td>
</tr>
<tr>
<td>FF</td>
<td><strong>Field Failure.</strong> A working unit that has failed in the field after installation.</td>
</tr>
<tr>
<td>OE</td>
<td><strong>Order Error.</strong> Receipt of wrong parts or of parts not ordered.</td>
</tr>
<tr>
<td>SE</td>
<td><strong>Shipping Error.</strong> The correct part was ordered but the wrong part was received.</td>
</tr>
<tr>
<td>UP</td>
<td><strong>Upgrade.</strong> The return of a working unit for an upgraded model. Upgrades can be made to software or hardware. Use of this return code requires a contractual amendment and a purchase order number.</td>
</tr>
</tbody>
</table>
Truck or Vehicle Number. The number of the truck, tractor, or item on which the component was installed.

Unit ID (System Serial Number). The identification number of the mobile system which is required to verify correct ownership of the system. To find the number, press the Down Arrow key on the display screen and look for the Unit Serial Number, or read the serial number on the main communication unit. This number is also used to determine warranty status of the unit.

Part Number (Product ID/MCN). Due to the multiple variations of Qualcomm equipment, the part number—Material Control Number (MCN)—must be provided to ensure that the correct replacement part is shipped. Be sure to verify the part number by looking at the actual part being returned, not by checking a pre-defined parts list. If the unit is an MVPc, use the model number.

Failed Serial Number. A serial number (S/N) is required for each serialized component on an RMA. The major serialized components include:

- MCT Communication Unit, IMCT Antenna Communication Unit, TruckMAIL Mobile Messaging Terminal, OmniExpress® Terrestrial Communication Unit, T2™ Unit, Qualcomm MAS, MAS110
- Outdoor Unit, Qualcomm SDM, WIB110
- MVPc unit, DU/EDU, Qualcomm MDU, DIU110
- Some PC components

The serial number decal is affixed to the component chassis. (Always include the leading zeros in a serial number.)

Replacement Serial Number. The serial number (S/N) of the unit that was installed to replace the failed part listed on the RMA. (Always include leading zeros in a serial number.)

Purchase Order. A purchase order (P.O.) number may be required when an item is customer damaged or when you are requesting an upgrade. Companies may also require a P.O. when products have an RMA at an authorized Qualcomm Service Center.

Failure Description. A complete description of the problem associated with the failed component. Please be specific. Qualcomm needs as much information as possible to effectively duplicate the failure, diagnose the problem, and repair the failed unit. It is better to give too much information than not enough information. Descriptions such as “Unit not operating” or “Not working” do not provide enough information.

Work Order (WO) Number (for Service Centers only). This number only applies if the repair is being performed at an authorized Qualcomm Service Center. If the repair is done at a service center, the shipped replacement unit will be sent to the service center instead of to the customer.
Creating an RMA On-line

Depending on the program you are using, you may create an RMA on-line. You can cancel the RMA at anytime during the procedure. You can also see a list of tips in various parts of the web site. This is for customers only.

1. Log on to qes.qualcomm.com. You will see the iQ web site.
2. Enter your name and password then click Log in.
3. Click the Returns and Warranties tab.
4. Click Create an RMA.
5. Follow the instructions provided on this web site.

RMA Policies

What to Return/Not Return

Normally, all failed equipment must be returned for repair or replacement. The following major system components need to be returned:

- MCT Communication Unit (Comm Unit)
- IMCT Antenna Communication Unit (ACU)
- TruckMAIL Mobile Messaging Terminal (MMT)
- OmniExpress Terrestrial Communication Unit (TCU)
- Qualcomm Mobile Application Server (MAS)
- Mobile Application Server 110 (MAS110)
- Outdoor Unit (ODU)
- Qualcomm Satellite Data Modem (SDM)
- Wireless Interface Box 110 (WIB110)
- MVPc unit
- Display Unit/Enhanced Display Unit (DU/EDU)
- Qualcomm Media Display Unit (MDU)
- Display Interface Unit (DIU110)
- T2 Unit
- 7-Way tool
- Major PC components
- Any Dead on Arrival (DOA) component
There are a few **exceptions** to this policy. You are **not required to return** the following components **unless** they are Dead on Arrival.

- All cables
- Pager System Components (receiver, transmitter, and antenna)
- Panic Button
- Remote Message Waiting Light (RMWL)
- Buzzer/Switch Kit
- Antennas (i.e., GPS, cellular, or Loran)
- Dual Signal Multiplier
- MPG Display
- Tethered Transmitter
- T2 external battery—DO NOT return to Qualcomm unless specifically requested by a Qualcomm representative. Proper disposal of defective or dead lead-acid batteries is the responsibility of the T2 owner/customer. Please dispose of defective or dead batteries at a local lead-acid battery recycling center.
- Qualcomm Remote Control Device (RCD)
- Qualcomm MAS/MAS/110/MAS200 battery—DO NOT return to Qualcomm unless specifically requested by a Qualcomm representative. Proper disposal of defective or dead lead-acid batteries is the responsibility of the Qualcomm MCP owner/customer. Please dispose of defective or dead batteries at a local lead-acid battery recycling center.

Any components that are found to be Dead on Arrival (DOA) within 90 days of shipment, including cables and antennas, must be returned to Qualcomm for failure analysis. If available, please provide the Lot Date Code for the defective component when you request the RMA. If possible, return the defective component in its original packaging.

**Where to Return Equipment**

Please return equipment to Qualcomm at the following address. Make sure that the RMA number is marked clearly on the outside of the box.

QUALCOMM Incorporated - RMA Receiving  
C/O Baja Freight Forwarders, Inc.  
8662 Siempre Viva Road  
San Diego, CA 92154

RMA #: ________________

(800) 541-7490

To prevent damage during shipment and handling, carefully package all equipment being returned. If the original shipping container and packing material are available, please use them to return the equipment.
"Past Due" Equipment

Qualcomm's standard policy is to “advance replace” equipment when the RMA number is issued. This means that a replacement component will be shipped before the defective component is received at Qualcomm. Customers are responsible for returning the failed equipment to Qualcomm within fourteen (14) days after receiving the RMA number.

If the failed items are not received within this time period, Qualcomm may invoice the customer for the higher of the current price or the applicable spare part price for the component. In addition, customers with “past due” equipment will be notified that Qualcomm will discontinue its “advance replace” RMA policy and future RMAs will be considered “no advance replace.” This means that a replacement component will not be shipped until the defective component is received at Qualcomm. When all the past due components are received by Qualcomm or paid in full, Qualcomm may resume advance replacement of failed equipment. Certain upgrade programs may be structured as no advance replace.

Customer-Damaged Equipment

Customer-damaged items are those which have been damaged as a result of improper or negligent use of the equipment. This can include accidental damage, incorrect installation, mishandling, or intentional abuse. Customer-damaged equipment must be identified at the time the RMA is requested.

If an RMA item cannot be repaired, it will be declared “scrap.” The “scrap” determination will be made if the cost of repairing the item exceeds the cost of replacing it.

Types of damage that usually result in major system components being scrapped are crushed components; internal corrosion of components; fire damage to components; and cracked housing of components.

Caution

Never open the Communication Unit; MAS; MAS110; MAS200; or ODU, ACU, SDM, and WIB antennas. Breaking the seal on these components voids their warranties, causing them to be treated as customer-damaged items.
(Except this includes opening the Antenna radome for maintenance; opening the Communication Unit for EPROM upgrades; and opening the MAS, MAS110, and MAS200 to test or replace the battery.)

Missing, Lost, Stolen, or Destroyed Equipment

It is not necessary to obtain an RMA number for missing, lost, stolen, or destroyed equipment since nothing will be returned to Qualcomm. Replacements for missing, lost, stolen, or destroyed equipment should be ordered through Sales Administration as spare parts. P.O. numbers are required for all spare parts orders.

If the missing, lost, stolen, or destroyed equipment includes an MCT Communication Unit, IMCT Antenna Communication Unit, TruckMAIL Mobile Messaging Terminal, OmniExpress
Terrestrial Communication Unit, or Qualcomm Mobile Application Server, or Mobile Application Server and a replacement is not required, you should submit a “Fleet Size Reduction Request Form.” This form is shown on the next page.

For Service Centers only: If equipment is missing at the time of installation, indicate this when you request equipment and you will be issued a Sale number instead of an RMA number.

**Permanent Fleet Size Reduction Request Form**

This form (shown on the following page) should be used to permanently decrease the size of your OmniTRACs® fleet in the event that a Comm. Unit is permanently lost, stolen, or destroyed. Submitting this form will ensure that your base message charges and extended maintenance billing (if applicable) are adjusted appropriately.
**Permanent Fleet Size Reduction Request Form**

To: Customer Support AdministrationFacsimile: (858) 658-1598

From:___________________________________________(Print Customer Name)

Phone number:___________________Fax number:___________________

____________________________________________________________________

This form should be used only if you would like to PERMANENTLY** decrease your delivered fleet size. Your delivered fleet size is determined based on the number of complete systems, i.e., MCT, IMCT, TruckMAIL, OmniExpress, or Qualcomm MCP, or MCP110 (collectively referred to as “Unit”), purchased and automatically increases incrementally with the purchase of each new Unit. The shipment of spare components, such as the shipment of an IMCT Antenna Communication Unit or a MCT Communication Unit (collectively referred to as “Hardware Messaging Units”), will not increase your delivered fleet size value. Your delivered fleet size value is used to calculate base message charges and extended maintenance charges (if applicable). If a customer does not notify Qualcomm by completing and signing this “Permanent Fleet Size Reduction Request Form,” these charges per Unit will continue.

You may reduce your fleet size if one of the following occurs:

A Hardware Messaging Unit (i.e., an MCT Communication Unit, an IMCT Antenna Communication Unit, a TruckMAIL Mobil Messaging Terminal, an OmniExpress Terrestrial Communication Unit, or an Qualcomm Mobile Application Server) is destroyed, stolen, or lost and you elect not to replace it via an RMA or a sales order for a spare Hardware Messaging Unit. In this situation, the salvageable components are put into spares stock.

A Unit (i.e., a complete system) is destroyed, stolen, or lost, and you elect to purchase a replacement Unit via a sales order, since the shipment of a Unit will automatically increase your delivered fleet size value.

A Component of a Unit (other than the Hardware Messaging Unit, i.e., Outdoor Unit, or MVPC) is destroyed, stolen, or lost and you want to accurately reflect the components currently existing in your fleet for warranty and/or extended maintenance purposes.

** NOTE: ONCE A FLEET SIZE REDUCTION REQUEST FORM IS SIGNED BY CUSTOMER AND RECEIVED BY QUALCOMM, THE COMPONENT(S) SET FORTH WILL BE PERMANENTLY REMOVED FROM QUALCOMM’s NETWORK MANAGEMENT FACILITY COMPUTER AND WILL NOT BE RECREATED.

To PERMANENTLY decrease your fleet size, fill in the lower part of this worksheet and fax copies to Customer Support Administration using the above fax number. Qualcomm will contact you upon completion.

Customer:________________________________ Truck Number:____________

Communication Unit Serial Number (IMCT ID):_____________________________

Equipment was ___stolen ___lost ___destroyed ___other (please check one).
Upgrading the MCP110 Using USB Memory Sticks

An MCP110 is normally upgraded with software by sending it over-the-air using satellite connectivity. However, there may be occasions when upgrades are necessary using USB memory sticks.

Topics in this document provide specific instructions for checking the software versions installed on the MCP110 and upgrading the MCP110 using USB memory sticks.

*Checking the Software Versions Installed* .................................................. D-2
*USB Memory Stick Instructions* ............................................................. D-3
*Upgrading Only the MAS110 Software* .................................................. D-3
*Upgrading the MAS OS and MAS Software* .......................................... D-4

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
Checking the Software Versions Installed

Shortly after you power up the MCP110, the user interface screen displays.

1. Use the left arrow to get to the **System** button. Tap the **System** button.

2. Touch the **System** tab. Touch the **Version** button at the bottom right to access system information about the MCP110.
   - MCP, Win OS, and Display firmware version numbers are listed here.
**USB Memory Stick Instructions**

- Most brands of USB memory sticks work with the MCP110. However, if the USB memory stick is formatted with a boot sector, extra steps will be required.

- If you are loading the OS and the software, you will need two separate USB memory sticks (software application and OS).

- The USB memory stick can be inserted into any of the two USB ports in the MAS110 or into the memory stick slot on the side of the DIU110.

**Upgrading Only the MAS110 Software**

MAS110 should be powered ON, ignition ON.

1. Insert the MAS110 Software Application USB memory stick into a USB port on the MAS110 or the DIU110.
   - Soon after the MAS110 software USB memory stick is installed, the DIU110 screen will display a listing of components.
   - Approximately one minute after the USB memory stick is inserted, the process writes data to memory and reboots itself.
   - Once the unit comes back up after the reboot, the DIU110 screen shows “Upgrading” This takes about five minutes.
2. After the upgrade process finishes and the DIU110 screen shows the application icons or the driver warning screen, remove the USB memory stick and confirm the upgrade is complete by checking the MCP110 software version on the Version screen.

3. If the display shows only a blinking cursor in the top left, the USB memory stick most likely has a separate boot sector. Remove the USB memory stick, disconnect power until all of the MAS lights are out, and then power up again. The unit will upgrade normally.

4. Perform system verification.

**Upgrading the MAS OS and MAS Software**

An MCP110 unit is normally OS ready and software is fully installed at the factory. However, in some circumstances it is necessary to update the OS and the software applications while the unit is in the field. This section describes the steps necessary to complete this installation using USB memory sticks. Note that this procedure will take approximately 50 minutes to complete.

**Upgrading the OS**

1. Make sure power is disconnected. No MAS LEDs should be showing.

2. Insert the MAS110 OS USB memory stick into a USB port on the MAS110 or the DIU110.

3. Before powering up the unit, make sure you have a USB keyboard connected.

4. Be ready to press the F11 key on the USB keyboard.

5. Turn ON the truck ignition.

6. Connect power to the MCP110 unit.

7. Immediately, press the F11 key about once per second until you see the popup dialog “Please select boot device.”
Note
If this popup does not display, and a blue Qualcomm screen shows, you will need to start over. Remove the power cord and the battery, wait until all MAS LEDs are off, then start back at step 1.

If the display locks up at any time during the procedures, remove all power and then restart again.

8. Using the up/down arrow keys at the bottom right of the USB keyboard, select the USB device.

9. Press the USB keyboard Enter.

10. The DIU110 screen will then display a list of components as they are copied and installed from the USB memory stick to the MCP110. This step will take approximately 40 minutes to complete.

You will see a lot of text scrolling down the screen as this step is in progress.

Note
If prompted to restart or reboot during this process, DO NOT do so. These messages will disappear on their own.

11. You may see a message similar to: Windows has finished installing new devices...Do you want to restart? Yes or No. DO NOT press any button at this time.

12. The unit will reboot on its own and show that it's installing the SQL server components. You will see a screen that shows the progress and status as the SQL server components are installed.

13. After the operating system has been installed, you will see a screen similar to the one below. After a few moments, the two colored boxes (SQL Server, and Message Queuing) should both turn from a gold color to a green color indicating that they are properly configured.
If the Message Queuing box turns red, then you will need to click on the Fix Message Queuing button and wait for the background to turn from red to green. If needed do this multiple times. (you will need to do step 14. first though)

**Note**

*Because the unit has not been calibrated yet, it can be challenging to get accurate touches on the screen. Sometimes the calibrate option becomes deselected and you will have to calibrate at a later time.*

14. Hide the display’s virtual keyboard by clicking on the red power button on the bottom left hand side of the screen.

**Note**

*If you only see the keyboard, close the keyboard then click back to the windows box at the bottom of the screen to open.*
Calibrating the Touchscreen

15. Tap on the Calibrate Touchscreen button in the screen above to calibrate.

16. Using the stylus (located on the right underside of the DIU110 unit), touch the tip of the stylus in the exact center of each target as they appear. Keep the stylus held down in the center of the target until the target shrinks completely and the words “TOUCH” are replaced with “RELEASE.”

- Once all of the targets have been calibrated, then a screen will indicate that you can now move your finger across the screen to verify a successful calibration.
- Upon acceptance, tap the Accept button on the screen shown below.

- To accept the calibration settings, tap on the OK button shown on the calibration screen shown below.
17. At this point, the OS is fully installed and you can tap the Press ESC to Close button on the screen that is shown below.

18. Remove the OS USB memory stick.

**Upgrading the Software**

19. Insert the Software Application USB memory stick.

20. Click on the Windows Start button shown below and then click on the My Computer menu item to launch the Windows Explorer application.

21. Select the “removable disk” drive that contains the application software in the USB memory stick. In most cases, it will be the only removable disk and will typically be either drive D: or E::
22. Tap on the **Setup.bat** file in the Windows Explorer as shown below.

![Windows Explorer window showing Setup.bat file](image)

This will launch the application installation and will take approximately 5 minutes. During this time, files will be copied and installed to the MCP110 unit. The MCP110 may go through one or more system reboots.

**Note**

If at any time you see an option to reboot or restart, ignore and do nothing. This message will automatically close.

If you see the message “Invalid Disk,” remove the USB drive, press any key on the keyboard, wait until you see the Qualcomm logo, then put the USB drive back in.

23. Upon successful completion of the application installation, you will see the MCP110 application **Warning** screen. If you do not see this or the application fails to install for any reason, you can simply start back at step 1. and try again.

![Warning screen](image)

24. Remove the application software USB memory stick from the USB port.

25. Tap the **OK** button.

Preventive Maintenance Inspection

Topics in this appendix provide steps for inspecting the mobile application server 110 (MAS110), the display interface unit 110 (DIU110), the wireless interface box 110 (WIB110), the optional satellite data modem (SDM), and the Trailer Management system.

How Often Should Inspections Be Performed? ................................................. E-2
Inspecting the Mobile Application Server 110 (MAS110) ............................ E-2
Inspecting the Display Interface Unit 110 (DIU110) ................................. E-4
Inspecting the Antennas ........................................................................... E-6
Verifying Trailer Management System Connections .................................. E-7

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
How Often Should Inspections Be Performed?

- Qualcomm® recommends inspections be performed at least **once every 90 days**.
- During normally scheduled vehicle preventive maintenance inspections.

**Inspecting the Mobile Application Server 110 (MAS110)**

1. Make sure the compartment where the MAS110 is installed has at least 1 inch of air space on each side for cooling and at least 3 inches of space for servicing the backup battery.

2. Make sure there are 4 to 6 inches of air space on the connector side to allow for cable bends and servicing.

3. Make sure tire chains, tools, and other equipment are not stored on top of the MAS110.

4. Make sure the mounting hardware holding the MAS110 in place is tight and does not allow the MAS110 to vibrate.

   **Caution**

   *Do not use a pneumatic tool as this could damage the hardware. Use extreme caution when working with power tools.*

5. Make sure the MCP110 display unit, antenna, power, and accessory cables coming into the compartment have enough slack and are not pulling on the MAS110 connectors. Make sure the cables are not being chafed or cut by sharp edges.
6. Make sure the cable connectors have not worked themselves loose from the MAS110. Hand tighten any loose connectors.

Ensure the strain relief bracket is in place and all cables are secure in the appropriate channel.

7. Check to make sure the cables are stored securely with tie wraps and are stored out of the way.

8. Check the power connections, such as at the power distribution panel, to ensure they are tight and the wiring is secure.

Check all ground connections to make sure there is a good metal-to-metal contact and the wires are not strained or damaged. Ground wires should be attached to vehicle or sleeper surfaces connected to chassis ground.

**Caution**

*Ground wires should not be connected to the MAS110 or mounting hardware.*

Make sure there is no corrosion around the ground connection. If there is corrosion, take the connection apart, clean the connector and surface with a wire brush, and reconnect the parts.
Inspecting the Display Interface Unit 110 (DIU110)

1. Verify proper DIU110 operation. From the Home screen, tap the Diag tab. Tap Run All button.
   - Verify at a minimum that CELLULAR, CDD, GPS, Battery Backup, and J1587 or J1939 show green check marks.
   - Turn IGN to the ON position and verify that the System Status is Good.
   - Turn the IGN to the OFF position and verify that the status goes to Ignition Off.

2. Verify the DIU110 screen is clean.
   Qualcomm recommends that you use a soft cloth and either plain water, glass cleaner, or mild soap to gently clean the surfaces of the DIU110 as well as the display screen.

   **Caution**
   The MDU is not watertight. Do not spray any liquid directly on the display screen.

   Heavily soiled DIU110s should be returned to Qualcomm using the RMA process for proper cleaning.

   **Note**
   Use the PDA stylus, provided with the unit, or your fingers to navigate the DIU110.

   Do not use pencils, pens, metal objects, or any other devices which could possibly scratch the touchscreen.

3. Verify the display screen is readable in any lighting condition.
4. Make sure the display cable has enough slack and is not being rubbed or cut by anything inside the cab.

5. Remove the DIU110 from the holster and make sure the screws holding the holster in place are secure.

6. Inspect the underside of the DIU110 to make sure the tie wrap is securely tightened and the cable is not damaged.

   The illustration to the left is the underside of the DIU110 showing the tie wraps.
# Inspecting the Antennas

1. Make sure all cables are protected with convoluted tubing and are in good condition. Make sure cables have no kinks or bends and are not being pulled tightly against metal edges that can rub or cut the cables.  

2. Make sure there are adequate service (drip) loops in the cables at the antenna and where they enter the vehicle.

3. Make sure grommets are in place around any holes the cables pass through. Make sure RTV sealant or refrigeration/tar tape is intact and provides a good seal on any holes that lead to the exterior of the vehicle. Go to step 4. if you are inspecting a terrestrial unit.

4. Make sure the antenna is securely attached to the mount. Check the mount hardware to make sure it is secure and does not show any signs of loosening.

5. Check that the antenna cable connectors have not worked themselves loose from the MAS110.
Verifying Trailer Management System Connections

6. Visually inspect all tie wraps to make sure they are not brittle and do not break. If a tie wrap is damaged or brittle, replace it.

1. Make sure all 7-way connection points have been cleaned, inspected, and greased.

   Qualcomm recommends that you use dielectric grease on the connection points.

2. Check the 7-way coil cord for nicks, cuts, or abrasions. Replace the cord as necessary.
3. Make sure there is voltage (12–24V) on pin 7 at all 7-way connection points (on the tractor and trailer).

Make sure you connect to ground (pin 1) as well when performing this step.

The illustrations at left show the connection at the tractor and at the trailer.
4. Connect a test transmitter to the truck.

5. Turn IGN to ON.

6. Touch the **Trailer Management** button to access the Trailer IDs screen and verify that the transmitter’s ID displays.

7. **For refrigeration customers**, do the following:
   - Inspect both ends of the refrigeration cable for corrosion and clean if necessary.
   - Turn IGN to ON.

   Verify the refrigeration connection and data transfer by accessing the Refrigeration Status screen.
   - With the refrigeration switch in the ON position, verify the REFRIGERATOR STAT# field is incrementing approximately once a minute. The manufacturer code for the unit should appear at the end of the refrigerator status number: “T” for Thermo King, or “C” for Carrier.
Component and Document Information

Topics in this appendix provide document control numbers (DCNs) and material control numbers (MCNs) for the different documents and Qualcomm MCP110 components referred to in this guide.

DCNs for Documents Referenced in this Guide................................. F-2
MCP110 System Component MCNs Referenced in this Guide.............. F-2
MCNs for Sealants and Lubricants Referenced in this Guide............... F-6
MCN for other items............................................................. F-6

For technical questions, contact Qualcomm Enterprise Services Customer Support. Customer Support is staffed 24 hours a day, 365 days a year:

In the United States, call 800-541-7490
In Canada, call 800-863-9191
### DCNs for Documents Referenced in this Guide

<table>
<thead>
<tr>
<th>Document Name</th>
<th>DCN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor Unit Mount Installation Guide</td>
<td>TL80-6270-1</td>
</tr>
<tr>
<td>MCP110 Diagnostic Guide</td>
<td>80-J9969-1</td>
</tr>
<tr>
<td>How to Use the Wireless Panic Button Remote Transmitter (Visor Card)</td>
<td>80-J6060-1</td>
</tr>
</tbody>
</table>

### MCP110 System Component MCNs Referenced in this Guide

<table>
<thead>
<tr>
<th>System component</th>
<th>Illustration</th>
<th>Latest MCN</th>
<th>Alternate MCNs</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless interface box 110 (WIB110)</td>
<td></td>
<td>CV90-J9938-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical antenna mount for flat antenna</td>
<td></td>
<td>50-JB015</td>
<td></td>
<td>OPTIONAL</td>
</tr>
<tr>
<td>Display interface unit 110 (DIU110)</td>
<td></td>
<td>CV90-J9855-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display interface unit (DIU110) holster</td>
<td></td>
<td>CV90-J9855-710</td>
<td></td>
<td></td>
</tr>
<tr>
<td>System component</td>
<td>Illustration</td>
<td>Latest MCN</td>
<td>Alternate MCNs</td>
<td>Notes</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------</td>
<td>------------</td>
<td>----------------</td>
<td>-------</td>
</tr>
<tr>
<td>DIU Mounting Kit with Nut plate, RAM mount</td>
<td><img src="image1" alt="Illustration" /></td>
<td>65-JB313-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIU Mounting Kit: bracket, RAM mount</td>
<td><img src="image2" alt="Illustration" /></td>
<td>65-JB292-1</td>
<td></td>
<td>Specifically for Freightliner Columbia or Century</td>
</tr>
<tr>
<td>Mobile application server 110 (MAS110)</td>
<td><img src="image3" alt="Illustration" /></td>
<td>CV90-J9937-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backup battery</td>
<td><img src="image4" alt="Illustration" /></td>
<td>CV90-J4341-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wireless interface box cable</td>
<td><img src="image5" alt="Illustration" /></td>
<td>45-J9864-17</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>System component</strong></td>
<td><strong>Illustration</strong></td>
<td><strong>Latest MCN</strong></td>
<td><strong>Alternate MCNs</strong></td>
<td><strong>Notes</strong></td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>------------------</td>
<td>------------------------------</td>
<td>--------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Display interface unit cable</td>
<td><img src="image1" alt="Image" /></td>
<td>CV90-JB415-17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power cable</td>
<td><img src="image2" alt="Image" /></td>
<td>45-J9992-20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessory cable (primary)</td>
<td><img src="image3" alt="Image" /></td>
<td>45-J9970-20</td>
<td></td>
<td>This cable is the standard cable.</td>
</tr>
<tr>
<td>Accessory cable (secondary)</td>
<td><img src="image4" alt="Image" /></td>
<td>45-J9890-20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speaker switch cable</td>
<td><img src="image5" alt="Image" /></td>
<td>CV90-J9204-8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAN repeater cable</td>
<td><img src="image6" alt="Image" /></td>
<td>CV90-J9954-A42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 amp fuse (for Trailer Management®)</td>
<td><img src="image7" alt="Image" /></td>
<td>65-53011-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>System component</td>
<td>Illustration</td>
<td>Latest MCN</td>
<td>Alternate MCNs</td>
<td>Notes</td>
</tr>
<tr>
<td>-------------------------------------------------------</td>
<td>--------------</td>
<td>------------</td>
<td>----------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>Reefer cable assembly with 6-pin Deutsch connector</td>
<td>N/A</td>
<td>45-J7857-6</td>
<td></td>
<td>For use with Thermo King refrigeration trailers</td>
</tr>
<tr>
<td>Reefer Cable Packard cable assembly with 3-pin connector</td>
<td>N/A</td>
<td>45-J7856-6</td>
<td></td>
<td>For use with Carrier refrigeration trailers</td>
</tr>
<tr>
<td>Reefer cable assembly with 5-pin Deutsch connector</td>
<td>N/A</td>
<td>45-J7854-6</td>
<td></td>
<td>For use with Carrier refrigeration trailers</td>
</tr>
<tr>
<td>Panic button and cable</td>
<td>CV90-J1377-5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kit, Wireless Panic Button</td>
<td>CV90-J6057-1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kit, Wireless Panic Spare XMTR Upgrade</td>
<td>N/A</td>
<td>65-J6070-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relay Harness Assembly</td>
<td>45-J6061-1A</td>
<td></td>
<td></td>
<td>for WPB</td>
</tr>
<tr>
<td>Trailer Management system for reefer</td>
<td>10-53481-2</td>
<td>10-52525-6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trailer Management system for dry van</td>
<td>10-53481-1</td>
<td>10-52525-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scanner</td>
<td>65-J9630-P4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### MCNs for Sealants and Lubricants Referenced in this Guide

<table>
<thead>
<tr>
<th>System component</th>
<th>Illustration</th>
<th>Latest MCN</th>
<th>Alternate MCNs</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scanner with holster</td>
<td></td>
<td>65-J9630-P3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCP100 to MCP200 accessory adapter cable</td>
<td></td>
<td>45-JB353-1A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### MCNs for Sealants and Lubricants Referenced in this Guide

<table>
<thead>
<tr>
<th>Sealant</th>
<th>MCN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealant, Mastic Butyl Rubber .125&quot; x 2&quot; x 12&quot; Black</td>
<td>755-12528-0003</td>
</tr>
<tr>
<td>Seal, Coax Plastic 1/2&quot; x 3/32&quot; x 10&quot; Strips OEM Pkg</td>
<td>755-01910-0001</td>
</tr>
</tbody>
</table>

### MCN for other items

<table>
<thead>
<tr>
<th>Item</th>
<th>MCN</th>
</tr>
</thead>
<tbody>
<tr>
<td>KIT, PROTECTIVE LINER, 10 PACK, DIU110</td>
<td>CV90-J9855-910 65-J9630-P3</td>
</tr>
<tr>
<td>T CLAMP</td>
<td>65-JB366-P1</td>
</tr>
</tbody>
</table>
Feedback Form

Your comments are important to us as we evaluate the best way to provide you with quality documentation. Thank you for taking the time to complete this survey.

After completing this form, please fax a copy to: QES Information Design and Training (858) 845-6478.

Feedback Form

Company Information

*Please provide this information or attach your business card.*

Company: 
Your Name: 
Your title: 
Phone: 

Your primary job: (check one)
mechanic o
shop foreman o
service writer o

How often do you use a Qualcomm® manual? 
o Daily o Weekly o Monthly 
 o Never o Only when I have questions

If you don’t use a Qualcomm manual on a regular basis, please indicate the reason: (check all that apply) 
o Prefer calling customer service 
o Too busy to look in manual 
o Don’t have a copy 
o Other ____________________________________________________________

If you haven’t used a Qualcomm manual, stop here and return the survey.
1. Please indicate your opinion of the information included in the *MCP110 Installation Guide*:
   - Too detailed
   - Right amount of information
   - Not detailed enough

2. How often do you find what you’re looking for in the manual?
   - Always
   - Frequently
   - Sometimes
   - Rarely
   - Never

3. What is the reason you cannot find information in the manual?
   - Information was omitted
   - Not in the Table of Contents
   - Not in the Index
   - Manual is poorly organized
   - Other ______________________________________________________________

4. Please rate your level of satisfaction with the following areas in the manual:
   (5=Very satisfied 4=Satisfied 3=Neither Satisfied nor Dissatisfied
   2=Dissatisfied 1=Very Dissatisfied)
   - Diagnostic Procedures 5 4 3 2 1
   - Flowchart Information 5 4 3 2 1
   - Graphics/pictures 5 4 3 2 1

5. Please rate your level of satisfaction in how the manual assists your company in each of the following areas:
   (5=very satisfied 4=Satisfied 3=Neither Satisfied nor Dissatisfied
   2=Dissatisfied 1=Very Dissatisfied)
   - Training for new staff 5 4 3 2 1
   - Step-by-step procedures 5 4 3 2 1
   - As a reference manual 5 4 3 2 1
   - Overall usefulness 5 4 3 2 1

6. Is the writing style in the manual easy to understand:
   - Yes
   - No
**Documentation Format**

1. Please indicate how you like the size of the manual:
   - Manual is too small
   - Manual is OK as it is
   - Manual is too large

2. Please rate your level of agreement with the layout of pages in the manual:
   (5=Very satisfied 4=Satisfied 3=Neither Satisfied nor Dissatisfied 2=Dissatisfied 1=Very Dissatisfied)
   - Pages are uncluttered
   - Steps are easily identified
   - Print is easy to read

3. Would documentation from Qualcomm be more useful to you if it were delivered online?
   - Yes
   - No

4. How important is it for you to receive a paper copy of the documentation from Qualcomm?
   - Very important
   - Important
   - Not important

5. What would be the best way for you to learn about the MCP110?
   - Product training manual
   - Computer-based training
   - Video tape
   - Other ______________________________________________________________

6. What do you like best about our manuals?
   ______________________________________________________________
   ______________________________________________________________

7. If there is one thing you could change about our manuals, what would it be?
   ______________________________________________________________
   ______________________________________________________________

8. Other comments:
   ______________________________________________________________
   ______________________________________________________________

We may want to contact you to ask some additional questions about the documentation from Qualcomm. Would you be willing to talk to a Qualcomm representative about these manuals?
   - Yes, the best time to reach me is ___________
   - No

Thank you! Your comments are appreciated.
Glossary

Accessory Cable. See Primary Accessory Cable and Secondary Accessory Cable.

Black Box. See Mobile Application Server 110.

Buzzer. An indicator typically mounted behind the dash that buzzes if a message has been received. See Message Waiting Light, Remote Message Waiting Light.

Calibration. Calibration is performed when the MCP110 cannot use the J1708/1587 data link for Performance Monitoring input. After sensor calibrations have been determined, the dispatch computer operator needs to send the calibration numbers to the MCP110. See RPM Calibration and Speed/Distance Calibration.

Comm Screen. This screen shows the signal strength being received by the satellite (if using the optional SDM), and the terrestrial and WiFi modems. To get to the Comm screen, touch the System button, then press the Comm tab.

Display Cable. The display cable connects the display interface unit 110 (DIU110) to the mobile application server 110 (MAS110).

Display Interface Unit 110 (DIU110). The standard display unit for the MCP110. It consists of a color TFT LCD display.

DIU110. See Display Interface Unit 110.

Global Positioning System (GPS). Provides current vehicle positioning with latitude and longitude updates displayed on the MCP110.

GPS. See Global Positioning System.

GPS Screen. This display unit screen shows the status of the mobile computing platform 110 (MCP110) satellite positioning. To get to the GPS screen, touch the System button, then press the GPS tab.

Holster. The container that holds the DIU110 when it is not in use.

Input Screen. MCP110 screen that displays information you will need to check the performance monitoring data items. To get to the Input screen, touch the Performance Monitoring button, then press the Input tab.

Installation Planning Worksheet. A worksheet on which you can plan your installations.
**J1708/1587 Network.** The MCP110 is able to monitor critical vehicle data from this low speed, bi-directional data bus. The data posted to this bus are provided by a single electronic control unit (ECU). See J1939 Network and Traditional Sensors Network.

**J1708 Enabled.** “J1708 enabled” means that the MCP110 has been set up to look at J1708 data via the J1708/1587 data link. The dispatch computer operator must send a message to the MCP110 that “tells” it to understand input from the J1708/1587 bus and define driving thresholds.

**J1939 Network.** The MCP110 is able to monitor critical vehicle data from this high speed data bus. The data posted to this bus are provided by multiple electronic control units (ECUs). SAE J1939 message protocol and controller area network (CAN) bus represent the prevalent on-vehicle networking for most construction equipment manufacturers. See J1708/1587 Network and Traditional Sensors Network.

**J1939 Enabled.** “J1939 enabled” means that the MCP110 has been set up to look at J1939 data via the J1939 data link. The dispatch computer operator must send a message to the MCP110 that “tells” it to understand input from the J1939 bus and define driving thresholds.

**MAS110.** See Mobile Application Server 110.

**Material Control Number (MCN).** The Qualcomm part number.

**MCN.** See Material Control Number.

**MCP110.** See Mobile Computing Platform 110.

**MCP110 Serial Number (Unit Address).** Located on the connector plate of the mobile application server 110 (MAS110). The MCP110 System screen also has this information.

**Memory Stick.** A small card that allows the driver to upgrade the MCP110 over-the-air and load applications. It fits into any of the three USB ports on the mobile application server and a slot on the side of the display interface unit.

**Mobile Application Server 110 (MAS110).** The mobile application server contains the operating circuitry and memory for the MCP110 system. The unit does not require operator access. The MAS110 is commonly referred to as the black box.

**Mobile Computing Platform 110 (MCP110).** A two-way, mobile information system that allows dispatchers and drivers to send and receive text messages, and also provides vehicle location and performance data. The MCP110 is mounted in the vehicle and consists of the following components:

- Mobile application server 110 (MAS110)
- Display interface unit 110 (DIU110) and its holster
- Wireless interface box 110 (WIB110)
- Cables

**Network Management Computer (NMC).** Computer at the Network Management Facility that receives and handles the message traffic between the dispatch center and the fleet.
Network Operations Center (NOC). This facility is responsible for processing and managing the message traffic between the dispatch center and the fleet. Within the NOC is the Network Management Computer (NMC), which actually receives and handles the message traffic. In the continental United States, the NOC is located at QUALCOMM, Inc., in San Diego, CA.

NMC. See Network Management Computer.

NOC. See Network Operations Center.

NO SIGNAL Light. An indicator light on the display that comes on if the mobile computing platform 110 (MCP110) has lost contact with the data satellite and is searching for the satellite signal.

Odometer Screen. The mobile computing platform 110 (MCP110) display unit screen that displays the life-to-date (LTD) value and sensor calibration information. To get to the Odometer screen, touch the Performance Monitoring button, then press the Odometer tab.

Optional Accessories. Any of these may be installed for the MCP110:
• Panic button
• Printer (product of O’Neil Product Development, Inc.)
• Remote control device (RCD)
• Remote message waiting light
• Remote message buzzer
• Scanner (product of BCS Solutions)
• Vehicle information systems (Performance Monitoring system and Trailer Management system)

Panic Button. Allows the driver to notify the Qualcomm Network Management Computer and the company dispatcher when an emergency situation exists.

Parameters Screen. The screen that displays information you will need to verify the speed and RPM calibrations. To get to the Parameters screen, touch the Performance Monitoring button, then press the Parameters tab.

Performance Monitoring System. An accessory of the MCP110 that allows companies to collect vehicle trip and performance data.

Positioning System. See Global Positioning System.

Power Cable. Connects the vehicle 12/24 volt power source and system ground to the mobile application server 110.

Primary Accessory Cable. Connects the mobile computing platform 110 (MCP110) to the J1708/1587 data link and the J1939 data link, as well as other vehicle inputs and optional system devices. This cable provides the necessary wiring for all optional system features such as display screen disabling, Performance Monitoring system, Trailer Management system, panic button, TTS, RCD, Printer, Scanner, Axle, RPM, and PTOP/PTOC. See Appendix A for details on pinouts.
**Printer.** Provides the driver with a hard copy of the MCP110 forward or return message screen display.

**Qualcomm Dispatch Software (QTRACS® system).** The software on the trucking company’s dispatcher computer. This is the dispatcher’s interface with the MCP110. It allows the dispatcher to send and receive information, request MCP110 location information, and perform other dispatcher functions. The dispatch computer communicates with the NMC via a modem over a commercial or leased telephone line.

**Qualcomm Enterprise Services (QES) Customer Support.** Call 24-hour Customer Support for information and additional help at any time, including holidays. In the United States, call 800-541-7490; in Canada, call 800-863-9191.

**Received Signal Strength Indication (RSSI).** The strength of the wireless communication network signal being received by the antenna during forward link acquisition to the wireless network provider. The RSSI should be less than 105.

**Repeater Cable.** Connects the J1939 to the primary accessory cable.

**Return Material Authorization (RMA).** An order used to authorize, schedule, and track the return, repair or replacement, and shipment of equipment.

**RL C/No Value.** Measures the energy from the mobile application server 110 (MAS110) to the satellite.

**RPM Calibration.** Used to determine the engine RPM when RPM data comes from the RPM sensor instead of the J1708/1587 data link.

**RSSI.** See Received Signal Strength Indication.

**Scanner.** Provides drivers a way to send documents to their home office for back office processing without having to leave their truck.

**Secondary Accessory Cable.** Connects the mobile computing platform 110 (MCP110) to the J1708/1587 data link, as well as other vehicle inputs and optional system devices. This cable provides the necessary wiring for optional system features such as display screen disabling, Performance Monitoring system, Trailer Management system, panic button, TTS, RCD, Printer, and Scanner. It does not support J1939 wiring. See Appendix A for details on pinouts.

**SensorTRACS® System.** See Performance Monitoring System.

**Software Version.** See MCP110 Comm Screen.

**Speed/Distance Calibration.** Used to determine the road speed and/or distance when the speed or distance data comes from the speed sensor instead of the J1708/1587 data link.

**System Screen.** The System screen displays MCP110 unit information. To get to the System screen, touch the System button, then press the System tab.

**System Verification.** A functional system check that should be performed after installation and periodically to verify that the MCP110 is operating properly.
Text-to-Speech (TTS). A feature of the MCP110 that converts text messages or alerts to spoken words which are then played through an audio speaker.

Total Distance. The accumulated distance traveled by a vehicle during its operation. The MCP110 collects distance data in one of three ways:

• Modern electronic truck engines provide distance data via the engine controller module (ECM).
• In some older electronic engines, total distance is not available through the ECM and the MCP110 uses input from the speed sensor and the available J1708/1587 data to calculate distance.
• In non-electronic trucks, the speed sensor provides both speed and distance data.

Traditional Sensors Network. The MCP110 monitors speed directly via the speed transducer on the transmission and RPM via the transmission fly wheel. See J1708/1587 Network and J1939 Network.

Traditional Sensors Enabled. “Traditional sensors enabled” means that the MCP110 has been set up to look at traditional sensors via the traditional sensors data link. The dispatch computer operator must send a message to the MCP110 that “tells” it to understand input from the traditional sensors and define speed and RPM.

Trailer Management System. An optional MCP110 feature that allows dispatch to monitor trailer connects and disconnects. The Trailer Management system can also monitor the refrigeration unit of the trailer.

TrailerTRACS® System. See Trailer Management System.

TTS. See Text-to-Speech.

Unit Address. See MCP110 Serial Number (Unit Address).


WIB110. See Wireless Interface Box 110.

WIB110 Cable. The WIB110 cable connects the WIB110 to the mobile application server 110.

Wireless Interface Box 110 (WIB110). Communicates with the PCS receiver for data transmission and the GPS receiver for positioning information.