



Locator Installation Guide

onBoard™ Locator



SIERRA
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1. Introduction

This document provides instructions on provisioning, testing, and troubleshooting Locator LD and Locator devices as well as the recommended deployment practices.

1.1. Who Should Read This Guide

This document should be read by advanced users and Sierra Wireless staff or authorized contractors responsible for installation, deployment and maintenance.

1.2. What are the Locator Devices?

The Locator LD (shown in Figure 1) is a GPS locator unit which sends a vehicle's location to a remote server over a cellular network. The Locator LD is a light duty unit designed for installation underneath the dashboard of a light duty vehicle such as a car or truck. This unit is hard wired to the vehicle's battery and to an external antenna mounted on or within the vehicle.



Figure 1 – Locator LD

The Locator (shown below in Figure 2) is the battery-powered equivalent device designed for external mounting on heavy duty equipment such as a trailer or freight container. This unit is completely self contained with its own built in GPS antenna and relies on its internal battery as a power source. The heavy duty casing makes the unit suitable for rugged, outdoor conditions.



Figure 2 – Locator

1.3. Requirements

The following items are required in order to provision and configure the unit:

- Anti-static mat and wrist strap
- DC power supply (output from 6V to 32V is acceptable)
- Serial cable and adaptor pigtails
- Pre activated SIM card (required only for HSPA version only)
- APN, username, and password for the wireless operator
- # 2 Phillips head screwdriver
- Host serial devices (e.g. laptop)
- Locator LD components:
 - Input and output cables
 - Relays
 - Locator LD peripherals

1.4. Handling Precautions

When handling the internal components of a locator device, care must be taken to ensure the unit is not subjected to electrostatic discharge.

Be sure to adhere to the following additional requirements when handling a Locator LD device:

1. The GPS module of the device is very sensitive to electrostatic discharge so do not touch the circuit board during installation.
2. The GPS receiver can be damaged if exposed to an RF level that exceeds its maximum input rating. This can happen if a nearby source transmits an RF signal at a sufficiently high level (i.e. more than one watt). Use only approved antennas from InMotion Solutions.

1.5. Related Publications

Title	Description
onBoard Locator LD Installation and Operation Guide	Describes how to install a Locator LD device within a vehicle including all wiring connections.
onBoard Locator Installation and Operation Guide	Describes how to mount a Locator device on a chassis.



2. SERVER SIDE FUNCTIONALITY

2.1. PULS Server Support

The locator units communicate information both to the device's PULS server and to an oMM. The PULS server is used for device level administration of Locators. The PULS server is used for device management, configuration and troubleshooting by Sierra Wireless personnel only. The tool is not intended for use by end customers. Customers may contact Support for assistance.

2.2. oMM Support

Locator devices report their location and information about their device health and status to the oMM.

Note: locators must report directly to an oMM (i.e. an oMM behind a firewall) and cannot report to an oMM that is behind an oCM.

Locator devices can be viewed along with other oMGs. Since Locators are much more basic than oMGs, only the following oMM features are available with the Locator:

- Gateway tree. Right clicking on a locator device in the gateway tree provides access to the following menu items:
 - Delete
 - Details
 - Browse Log files
- Dashboard
- Map
- Tracker
- Events
- Stats - Table 1 lists the supported stats for the two device types:

Table 1 – Summary of Supported Stats

Stat	Locator LD	Locator
BatteryCharge		✓
BoardInputVoltage	✓	✓
GPS AntennaStatus	✓	✓
GPS Location-latitude	✓	✓
GPS Location-longitude	✓	✓
INPUT-ttyS1	✓	
MiniPCle2-IPAddress	✓	✓
LinkX-IPAddress	✓	✓
ReportIdleTime	✓	✓

- Gateway Trips report
- Admin->Gateways configuration
- GPIO: the Locator LD sends four GPIO input signals via the INPUT-ttyS1 stat as listed in Table 2:

Table 2 - GPIO Signals

Input	oMM Stat Position	Molex Connector Pinout
IN-1	Bit 0 of INPUT-ttyS1	Pin 3 blue
IN-2	Bit 1 of INPUT-ttyS1	Pin 12 orange
IN-3	Bit 2 of INPUT-ttyS1	Pin 6 violet
IN-4	Bit 3 of INPUT-ttyS1	Pin 7 grey

The value of the INPUT-ttyS1 stat is interpreted as follows:

- 15 (0xF): all four pins are off
- 14 (0xE): IN-1 is ON
- 13 (0xD): IN-2 is ON
- 11 (0xB): IN-3 is ON
- 7 (0x7): IN-4 is ON

Note: by default, the pins are biased high which means a bit value of 1 indicates that a pin is inactive. If GPIO devices are wired to emit a high signal to indicate they are active, then all unused GPIO devices connected to the Locator LD should be tied to ground.



3. SIM Card Installation

The following subsections describe how to open the locator units, install a SIM card, and close the units back up prior to installation.

3.1. Locator LD SIM Card Installation

This section only applies to the HSPA/GSM version of the Locator LD. CDMA-based versions will need to be pre-configured at the factory or by the technician to set the required carrier credentials. The following steps describe how to install a pre-activated SIM card into the Locator LD unit.

Note: be sure to wear an anti-static wrist strap before opening the unit.

1. Remove the top as shown in Figure 3. Note that the top is the surface which doesn't have the serial number sticker.



Figure 3 - Removing the Top Cover of the Locator LD

2. Open the case which is held together by four clips:
 - a. Pinch the clips near the end that has the 20 pin header and pull the top upwards.
 - b. Repeat on the clips near the SIM cover.

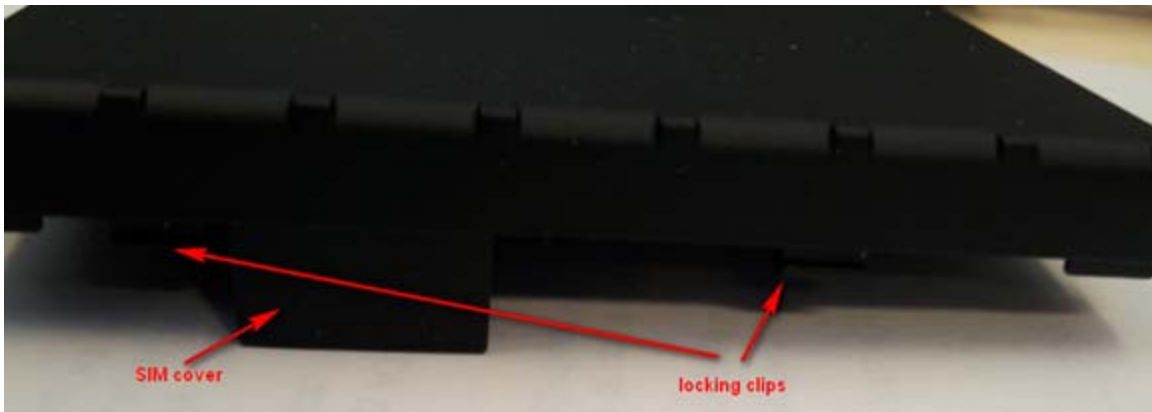


Figure 4 - Location of SIM Cover and Locking Clips

3. Insert the SIM card into the SIM slot:

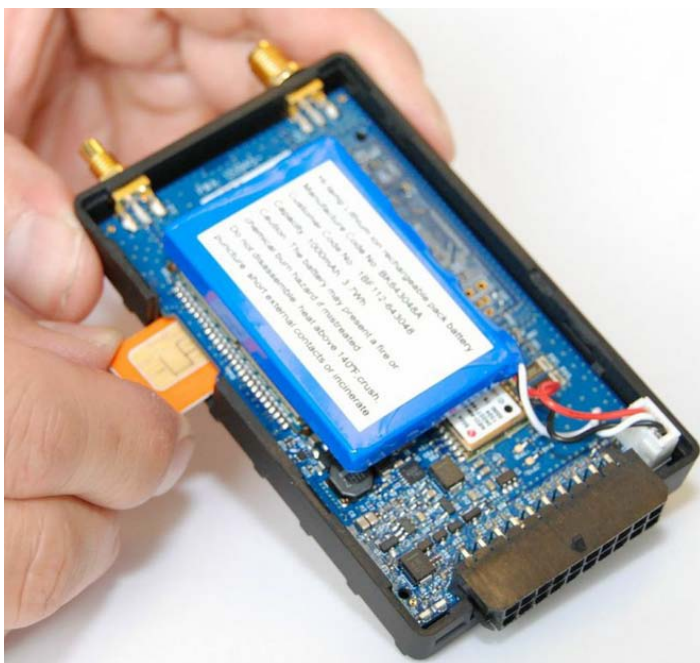


Figure 5 - Inserting the SIM Card into the SIM Slot



Figure 6 - SIM card Partially Inserted

4. Replace the top cover; it should snap back into place.

3.2. Locator SIM Installation

This section describes how to install a provisioned SIM card onto a Locator's main board (HSPA version). Note that CDMA-based Locator devices will need to be pre configured at the factory or by the technician to set the required carrier credentials.

3.2.1. Opening the Unit

In order to install the SIM card and test the Locator, the unit must first be opened using the following steps.

Note: be sure to wear an antistatic wrist strap before opening the unit.

1. Remove the small magnetic tape from the top of the device and save it for future use. Note: when applied, the magnetic tape prevents the device from waking due to motion or timer expiration.

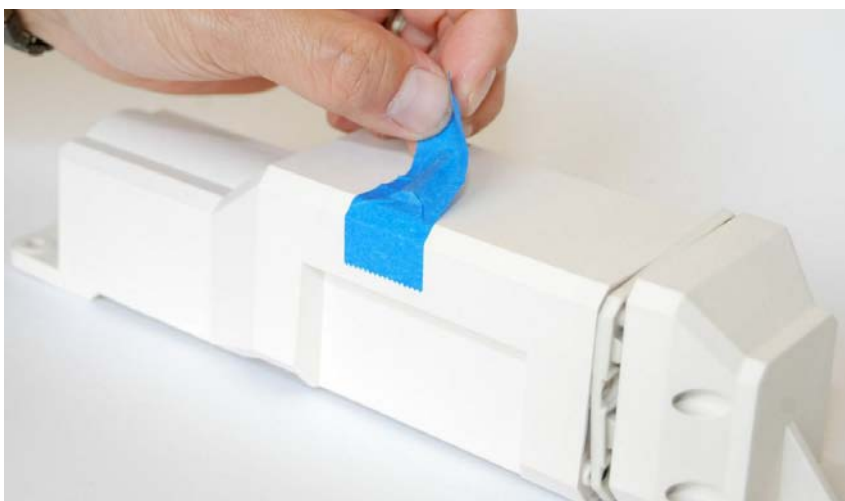


Figure 7 - Removal of Magnetic Tape

2. Use a Phillips head screwdriver to remove the four screws that are holding the cap housing:



Figure 8 - Removing the Four Screws from the Cap Housing

3. Disconnect the red and black power cable by pulling the two connector halves apart, and remove the rubber gasket:

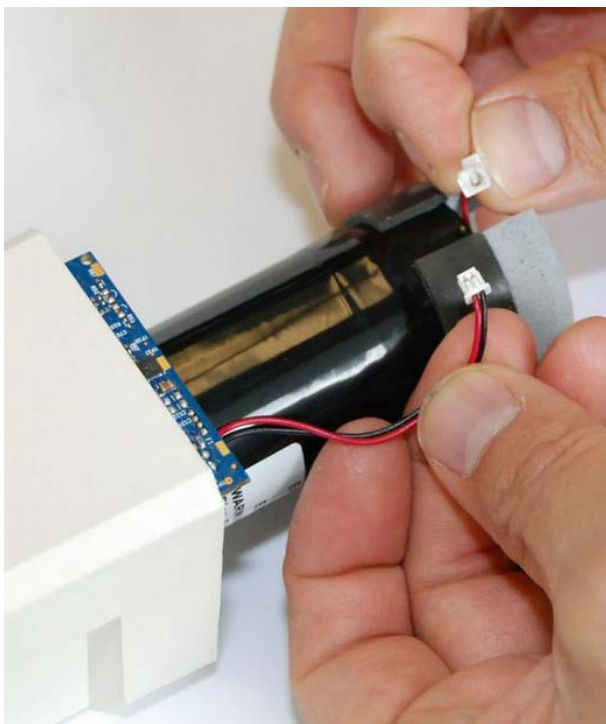


Figure 9 - Disconnecting the Power Cable

Note: disconnect the power cable by pulling apart the connectors; do not pull on the power wires.

4. Place the device on an anti-static mat.
5. Slide the main board out of the case and place it flat on a mat:

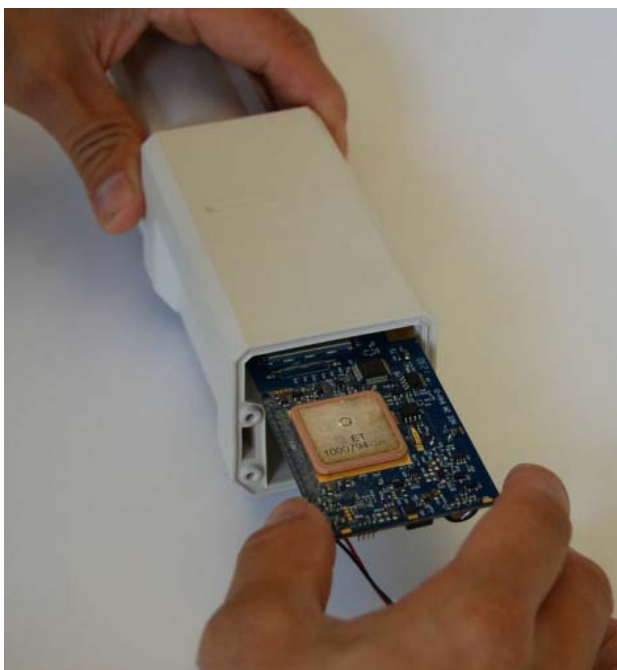


Figure 10 - Main Board Removal

Note: be careful not to touch the GPS antenna segment of the main board as that area is VERY sensitive to electrostatic discharge (ESD). The area is comprised of the yellow colored section identified below in Figure 11:



Figure 11 - GPS Antenna Segment of the Main Board

3.2.2. Installing the SIM Card

Install a pre activated SIM card by inserting it into the SIM slot:

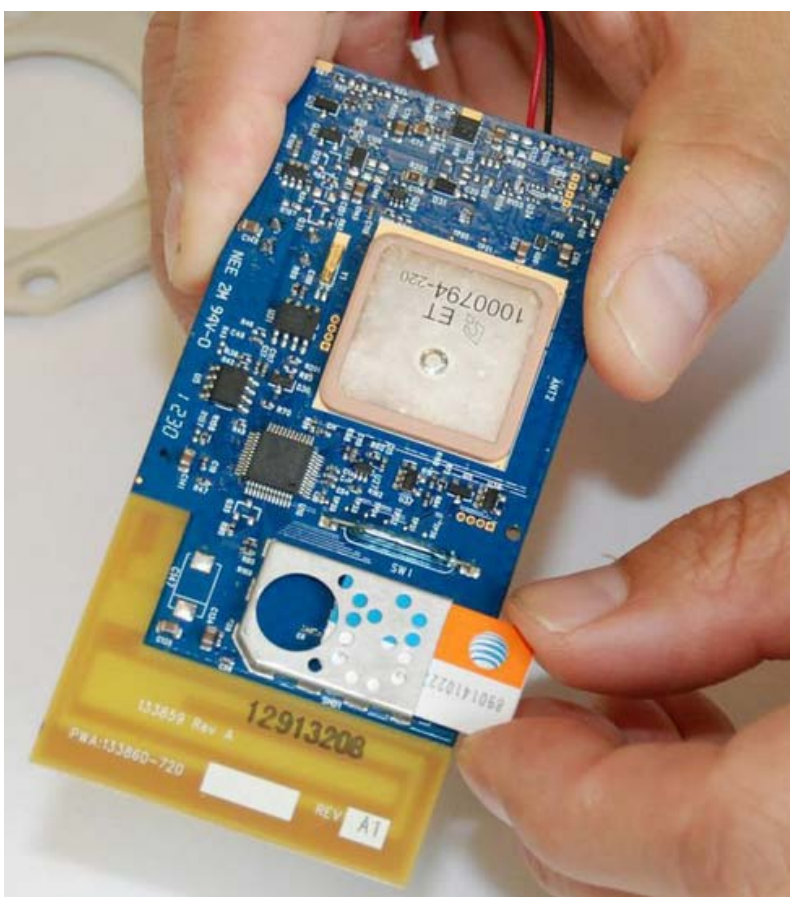


Figure 12 - Inserting the SIM card into the SIM slot

3.2.3. Closing up the Unit

Once the SIM card has been installed, use the following steps to reinstall the unit's cover. Note: before closing the unit, be sure to test it as described below in Section 4 - Device Testing and Troubleshooting.

1. Slide the main board back into the case.
2. Reconnect the power cable to the battery.
3. Replace the gasket:



Figure 13 - Replacing the Gasket

4. Replace the battery cap and seat the cap housing to the gasket to ensure a tight fit:



Figure 14 - Cap Replacement

5. Reinstall the screws using a Phillips head screwdriver and turn clockwise until hand tight:



Figure 15 - Tightening the Fasteners on the Cap Housing



4. Device Testing and Troubleshooting

Testing and troubleshooting can be performed using the following methods:

- Verifying the magnetic tape has been removed (applies only to Locator devices).
- Attaching a laptop to the device's motherboard and issuing AT commands using a terminal program.
- Examining the Comm and GPS LEDs on the unit (only available on Locator LD devices).

The following subsections outline the requirements and procedures for testing and troubleshooting using these methods.

4.1. Locator Magnetic Tape Removal (Locator Only)

If a Locator is not sending information, ensure that the magnetic tape has been removed from the top of the device. When applied, the magnetic tape prevents the device from waking due to motion or timer expiration.

Note: this applies to Locator units only.

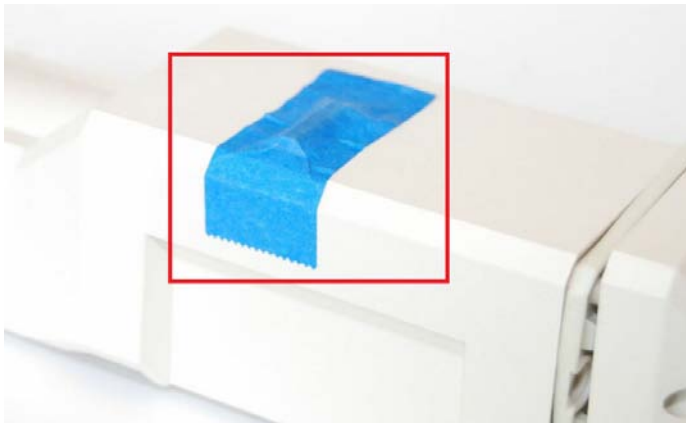


Figure 16 - Magnetic tape to be Removed Prior to Mounting

4.2. Preparing the Device for AT Commands

Diagnostics can be performed on either type of locator by physically connecting a laptop to the device's main board using a serial port adaptor to establish communications:

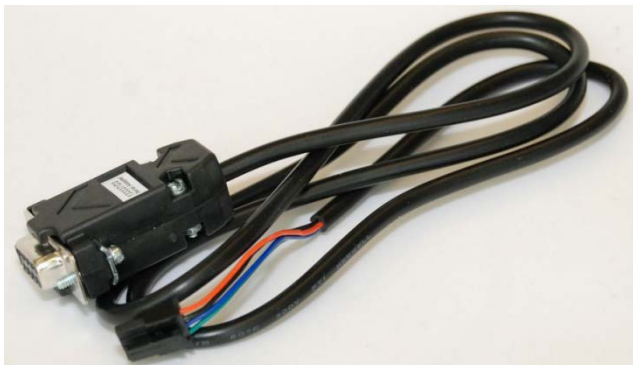


Figure 17 - Serial Port Adaptor

The part number's for the serial port adaptors are IMTKIT1004 for the Locator LD, and IMTKIT1005 for the Locator. These kits also include the respective pigtail adaptors shown in Figure 18 which are necessary to complete the connections to the devices:

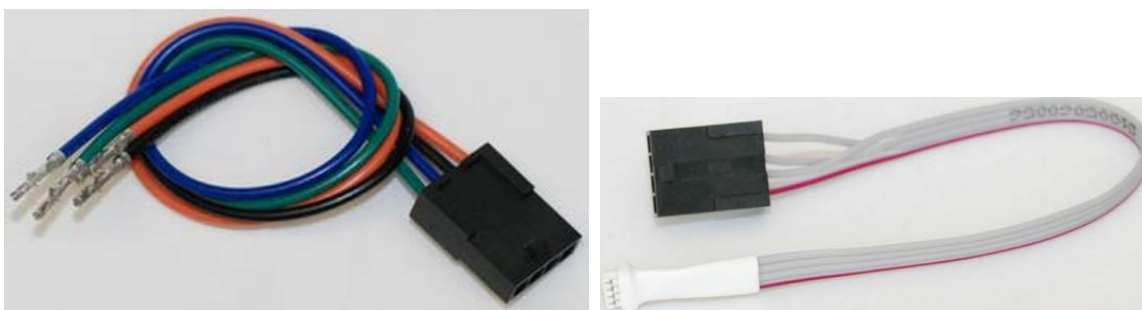


Figure 18 - Pigtail Adaptors for the Locator LD (left) and Locator (right) Included with the Serial Adaptor

Once connected to a locator, this kit allows AT commands to be issued directly to the device using a terminal program (e.g. Putty or HyperTerminal) running on the laptop.

Testing using AT commands should be done prior to closing up the unit such as after inserting a SIM card. For information on opening locator devices to gain access to the motherboard see Section 3 - SIM Card Installation.

Connecting to a Locator LD

1. Place the antenna where it can obtain a good GPS signal.
2. Plug the Molex connector end of the serial port adaptor into the pigtail adaptor:

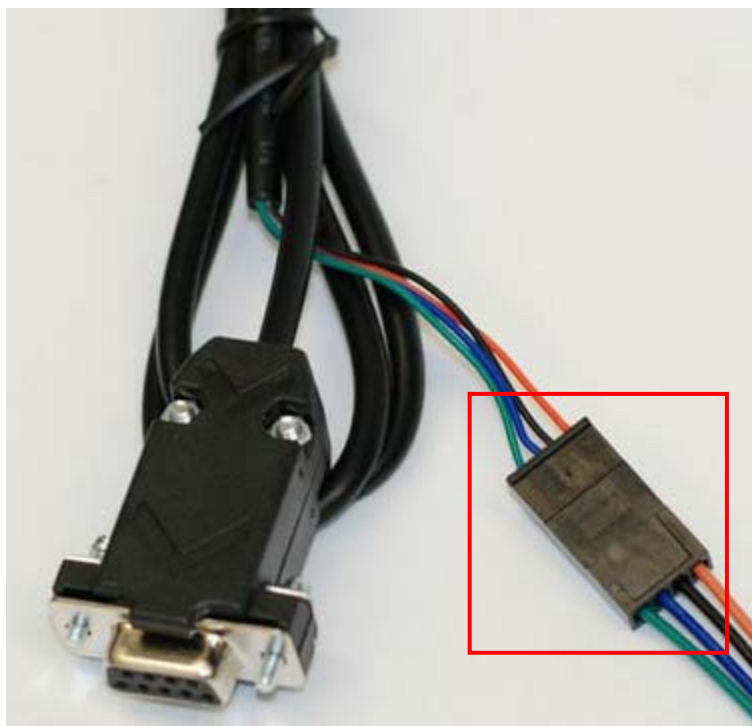


Figure 19 - Connecting the Serial Port Adaptor into the Pigtail

3. Plug the four un terminated crimp pins from the other end of the pigtail adaptor into the designated slots of the Locator LD's Molex wiring harness. The pins of the color coded wires must be inserted into the Molex slots as follows:

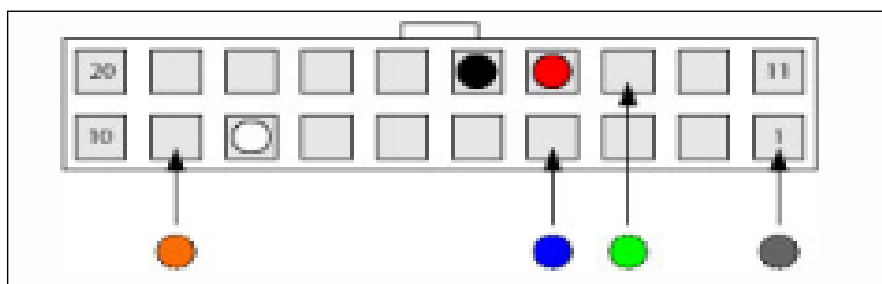


Figure 20 - Designated Slots for Pigtail Pins on Molex Wiring Harness

4. Using a DC power supply (6V to 32V), connect both the red (power) and white (ignition) wires to the positive terminal and the black (ground) wire to the negative terminal:

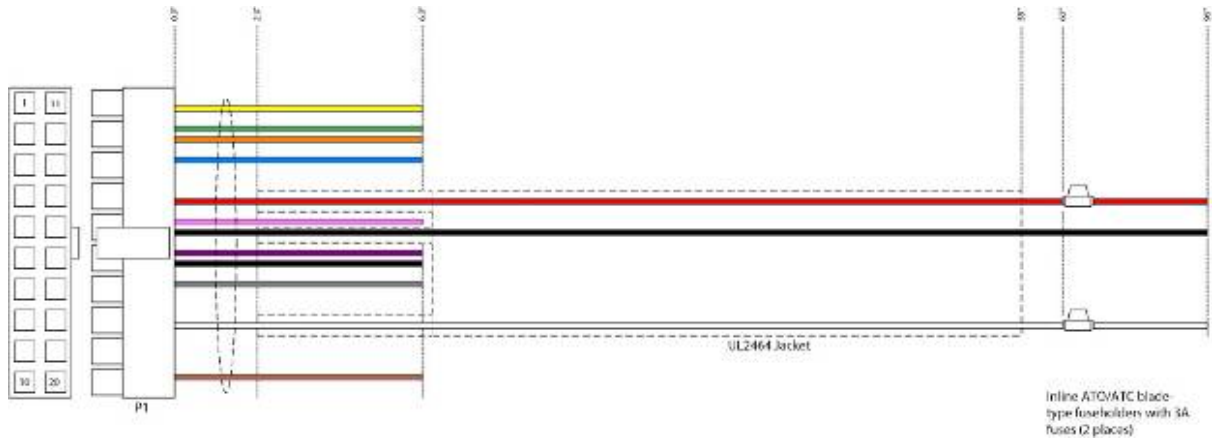


Figure 21 - Wiring Harness Schematic

Connecting to a Locator's motherboard

In order to send AT commands to a Locator, the pigtail adaptor must be directly connected to the unit's main board. Remove the main board as described Section 3.2.1 and then commence the following steps:

1. Place the device where it can obtain a good GPS signal.
2. Plug the pigtail mate to the four-pin connector on the main board. Orient the pigtail such that its red wire is on the same side as where the power cable is located:

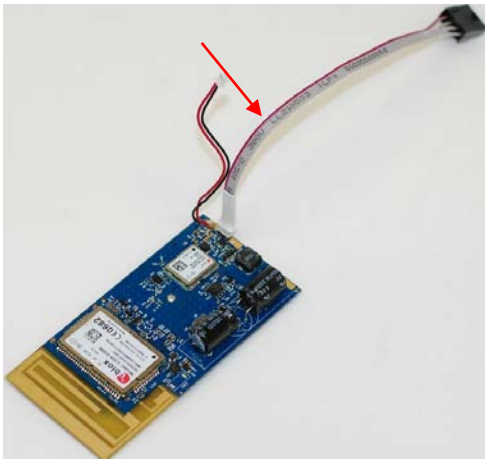


Figure 22 - Location of Connectors on the Main Board. Note the Pigtail Adaptor's Orientation with the Red Wire near the Power Connector

3. Connect the serial port adaptor to the pig tail connector:

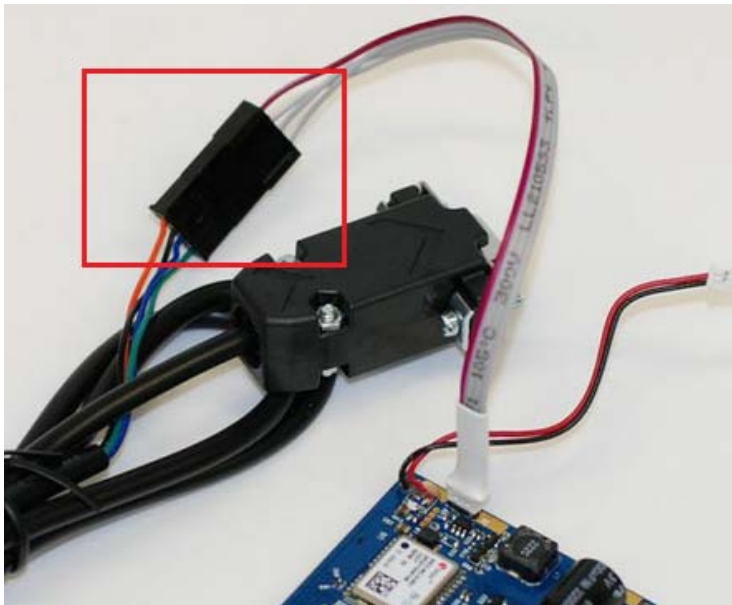


Figure 23 - Connecting the Serial Adaptor to the Pigtail Adaptor

Connecting the Laptop

Connect the serial adaptor to your computer's serial port and run a terminal program (e.g. Putty or HyperTerminal). The serial port settings are as follows:

- 115200 baud
- 8 data bits
- 1 stop bit
- No Parity
- No flow control

Test the serial connection by entering AT and pressing **Enter**. The device should respond with *OK*.

4.2.1. AT Command Summary

Table 3 lists the common AT commands for diagnostic and troubleshooting purposes used in the following sections:

Table 3 - AT Command Summary

AT Commands	Comment
Setup GPRS context 0. Not needed for AT&T	
ATS155=1	Disable auto GPRS context provisioning
AT\$APP PARAM 2306,0,"internet.com"	APN name
AT\$APP PARAM 2314,0,"wapuser1"	APN userid. "" if empty
AT\$APP PARAM 2315,0,"wap"	Passwd, "" if empty
AT\$APP PARAM 2307,0,0	Use GPRS context 0
oMM address and port. IP address does not need quotation marks	
AT\$APP PARAM 2319,0,"eng.inmotionnetworks.ca"	
AT\$APP PARAM 769,0,20500	
Useful when you need to monitor Comm and config script download status	
ATS125=1	Turn on debug mode

AT Commands	Comment
Commands to check status. Run them repeatedly until the Comm is up and the GPS is fixed	
ATIC	Comm status: network registration, APN, oMM address. But no IP addr of the device !
ATI5	Query IP address of the Locator
AT\$APP ADDR?	Query IP address of the Locator LD
ATIG	Check GPS status
When both comm and GPS up, send a test message to the oMM and check the oMM dashboard and stats	
AT\$APP PEG SDRPT 1	

4.2.2. How to configure unit to report to oMM

```

ATS125=1
ATIC - to see comm status, if OK
ATIG - check GPS
AT$APP PARAM 2319,0,"eng.inmotionnetworks.ca"
AT$APP PARAM 769,0,20500
ATIC - to see comm status, if OK
ATS125=0 turn of debug mode
    
```

4.2.3. Test on oMM

```

ATIG - verify you have GPS satellite
AT$APP PEG SDRPT 1 - send test message to oMM
    
```

Verify message received on oMM

4.3. SIM Card Verification

The following AT commands can be executed to test the provisioning of the SIM cards from Verizon, Bell Mobility, and Sprint.

Verizon

Enter the following AT command to verify that the device has registered to the CDMA network:

```
AT$APP COMM STATUS?
```

The response should be similar to the following:

```
CDMA Service:      IS-2000
Connection:        Yes
RSSI:              -80 dBm
Channel:           0
Band:Side:         800:B
Base Station ID:   0
Network ID:        0
System ID:         4
ESN (Modem S/N:    2676319948 [9F8566CC]
Phone Number:     1234567890
IMSI:              310001234567890
CarrierConfig:     5
```

Sprint

Enter the following AT command to verify that the device has registered to the CDMA network:

```
AT$APP COMM STATUS?
```

The response should be similar to the following:

```
CDMA Service:      IS-2000
Connection:        Yes
RSSI:              -80 dBm
Channel:           0
Band:Side:         800:B
Base Station ID:   0
Network ID:        0
System ID:         4145
ESN (Modem S/N:    2676319948 [9F8566CC]
Phone Number:     1234567890
IMSI:              310001234567890
CarrierConfig:     1
```

Bell Mobility

Enter the following AT command to verify the settings:

```
AT$APP PPP?
```

This should produce output similar to the following:

```
PPP 0 USER <Phone Number>@1x.bell.ca *
PPP 0 PASSWORD <Bell Password> *
PPP 1 USER
PPP 1 PASSWORD
```

OK

Enter the following AT command to verify that the device has registered to the CDMA network:

```
AT$APP COMM STATUS?
```

The response should be similar to the following:

```
CDMA Service : IS-2000
Connection: Yes
RSSI : -80 dBm
Channel: 0
Band:Side: 800:B
Base Station ID: 0
Network ID: 0
System ID: 16410
ESN (Modem S/N: 2676319948 [9F8566CC]
Phone Number : 1234567890
IMSI : 310001234567890
CarrierConfig: 13
```

4.4. Comm Verification

If testing a Locator device, Comm verification can only be performed by issuing the AT commands below. If testing a Locator LD device, Comm verification can be performed by either checking the *Comm* LED or by issuing the AT commands below.

The Locator LD's *Comm* and GPS LEDs are shown in Figure 24 below. For a summary of the LED status indicators, see Appendix A. When troubleshooting a Locator LD, start by having a user verify the state of the Comm LED:

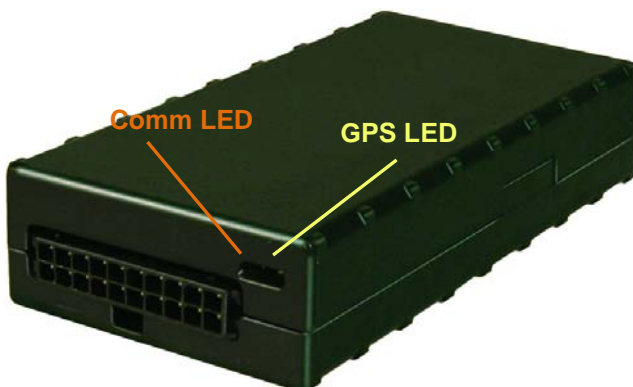


Figure 24 - Location of Comm and GPS LEDs on the Locator LD

If the LED is not visible, or testing is being performed on a Locator device, issue the following AT command to test the device's Comm connection:

```
ATIC
```

Depending on the wireless network in use, output similar to that shown below will be displayed. It is important to verify that a value of Yes is displayed at the top for Data Reg. and Network Reg. and that the correct APN is displayed:

```
Radio Access : GSM
Network Reg. : Yes, Home
Data Reg. : Yes, Home
Connection : Yes
RSSI : -97 dBm
```

```
BER : 99
Channel : 737
Cell ID : 3441
Base Station ID : 40
Local Area Code : 31003
Network Code : 410
Country Code : 310
IMEI (Modem S/N): <IMEI removed from example ...>
IMSI (SIM ID) : <IMSI removed from example ...>
ICC-ID (SIM S/N): <ICC-ID removed from example ...>
Phone Number :
GPRS APN : ISP.CINGULAR
Maint. Server : maint.vehicle-location.com(216.177.93.246):20500
Inbound Server : (0.0.0.0):20500
Dual Comm : routing id=0, log cid=0, modem type=21, inbnd
index=0
OK
```

4.4.1. GPS Verification

If testing a Locator device, GPS verification can only be performed by issuing the AT commands below. If testing a Locator LD device, GPS verification can be performed by either checking the GPS LED (see Figure 24 above) or by issuing the AT commands below.

Verify that the GPS receiver is seeing enough satellites to obtain a valid GPS position. Begin by verifying that the GPS status LED (i.e. the one closest to the SMA connector — see Figure 24 above) is solid. If this LED is solid, then the Locator LD has found GPS service. For a summary of the LED status indicators, see Appendix A.

If the LED is not visible or testing is being performed on a Locator device, then GPS service may be verified by issuing the following command:

```
AT$APP GPS?
```

The response should be similar to:

```
Lat=3304713, Lon=-11727730, Alt=0
Hdg=113 Spd=0 3D-RTIME HDOP=130 nSats=7
```

Look for the *3D-RTIME* setting along with a valid Lat/Long pair (i.e. something other than 0). If the GPS receiver does not have a valid lock within two to three minutes, check antenna placement, the antenna connector, and that the antenna has a clear view of the sky for a Locator LD device, and device placement for a Locator device. See Section 5 for information on antenna placement or consult the Installation and Operation Guide for the device.

4.4.2. Inbound Verification

This section describes how to verify if the device is sending data to the correct server. In general, this is a two step process that will need the aid of an observer on the back end. That is, a technician will have to be logged in so they can monitor data coming into the backend mapping/vehicle management application.

First, verify that the device is using the correct inbound IP address by issuing the following command:

```
AT$APP INBOUND?
```

The response should be similar to:

```
INBOUND LMD
INBOUND 0 ADDR ddd.ddd.ddd.ddd:ppppp *
INBOUND 0 URL myURL.myCompany.com
INBOUND 1 ADDR 0.0.0.0:20500
INBOUND 1 URL
INBOUND 2 ADDR 0.0.0.0:20500
INBOUND 3 ADDR 0.0.0.0:20500
```

Verify that the company's URL, IP address (*ddd.ddd.ddd.ddd*) and port (*<ppppp>*) are correct.

4.4.3. Outbound Verification

The second step is to verify that the device is sending data. The best way to do this is to force the unit to send in an unacknowledged event report (i.e. its current GPS location) using the following command:

```
AT$APP PEG SUNRPT 255
```

The device will respond with *OK*.

On the server side, confirm that an event report with event code *255* was received.

Table 4 lists additional commands that can be used to test the *Comm* and *GPS* status.

Table 4 - Additional Commands for Testing

Command	Description
AT\$APP ADDR?	Query the IP address of the locator
ATIG	Check the GPS status

4.5. Ensuring that a Locator has been Provisioned

The locator device contains a config script that governs which events will cause the device to send a location report to the oMM. Refer to Section 4 for more details on modifying the script.

When a locator device is started or rebooted and it establishes Comm (communications), the device will check into the PULS server to determine if a newer version of the device's config script exists. If a newer version of the script exists, the PULS server will push the script to the device.

4.5.1. Manually Provisioning

If the device has not been pre-provisioned at the factory, use the following steps if a manual provision or update to the config script is required:

1. Turn on debug mode on the device using the following command:

```
ATS125=1
```

2. Log in to the PULS server at <https://puls.calamp.com/devicemgr/config.php>.
3. Enter the ESN of the device in the input box to the left of the *View Device* button and click the **View Device** button:

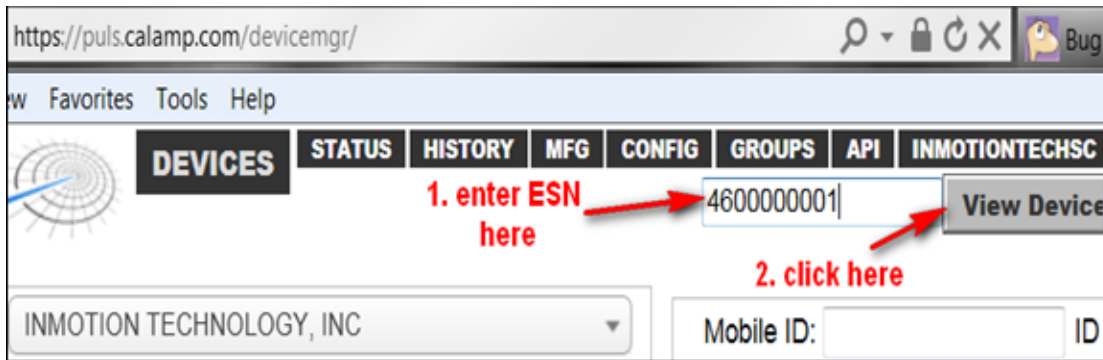


Figure 25 - Entering the Device to Locate

4. Click the **Config** tab when the information for the device appears:

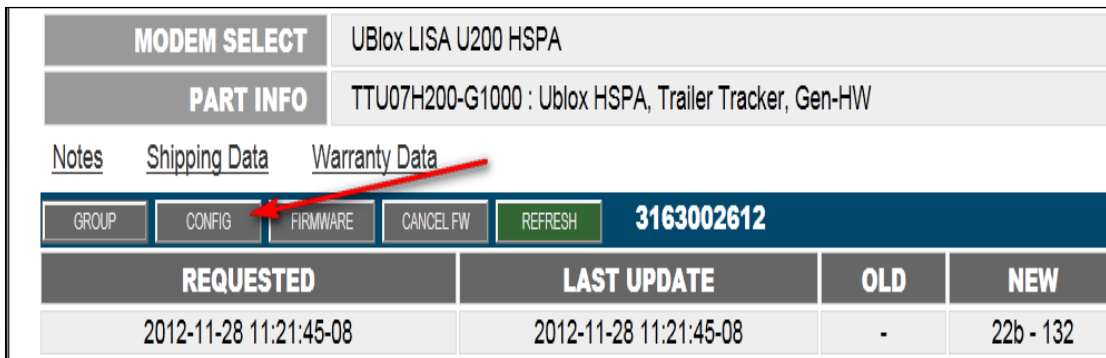


Figure 26 - Clicking the Config tab

5. Select the appropriate script for the model (i.e. *2.1 LMU-2720 Config Script* for a Locator LD or select *7.2 TTU-720 Config Script* for a Locator):



Figure 27 - Selecting a Script to Update the Device with

6. Click **NEXT** and then click **CONTINUE** to complete the process.
7. Verify that the download was successful as described in the next section.
8. After verifying that the device has successfully downloaded the config script from PULS, execute the following *AT* commands:

Turn off debug mode:

```
ATS125=0
```

Reboot the device to run the script:

```
AT$APP REBOOT
```

4.5.2. Checking that a Script has been Downloaded to the Device

The following are two methods to check if a script has been downloaded to a locator device.

AT Commands to Check the Script's Status

When in debug mode, there will be a series of log messages on the serial terminal screen indicating parameter writes.

- For a Locator LD, look for the following:

```
Parsed 1 Records <256,0,00>
Parsed 2 Records <256,1,00>
Parsed 3 Records <256,2,00>
Parsed 4 Records <256,3,00>
Parsed 5 Records <257,0,162D>
Parsed 6 Records <257,1,162D>
Parsed 7 Records <257,2,162D>
Parsed 8 Records <257,3,162D>
Parsed 9 Records <258,0,0A>
. . .
. . .
Parsed 587 Records <3329,10,00>
Parsed 588 Records <3329,11,00>
Parsed 589 Records <3329,12,00>
Parsed 140 Records per Batch
write all params to FLASH
..Resetting CommitFlag to true..
Parsed 5 Records per Batch
app[0:0:28:51] PCFG: PEG Param Save Success
app[0:0:28:58] PCFG: Event List Save Success
app[0:0:28:62] CFG: Config Save Success
app[0:0:28:66] CFG: ProvConfig Save Success
app[0:0:28:77] CFG: Serial Text Save Success
app[0:0:28:83] ACCEL: Config Save Success
app[0:.:2.:R7] VBeS: Cosfie tave Stccessi ng CommitFlag to true..
```

- For a Locator, look for the following:

```
[16:44:52] LMD: ID Rpt
[16:44:55] LMD: Param (Update Begin)
[16:44:55] LMD: Ack (Type6,Ack0)
[16:44:55] LMD: Param (Write Req)
[16:44:55] LMD: Param (Write Resp)
[16:44:56] LMD: Param (Write Resp)
[16:44:57] LMD: Param (Write Req)
[16:44:57] LMD: Param (Write Resp)
[16:44:58] LMD: Param (Write Req)
[16:44:58] LMD: Param (Write Resp)
[16:44:59] LMD: Param (Write Req)
[16:44:59] LMD: Param (Write Resp)
[16:45:00] LMD: Param (Write Req)
[16:45:01] LMD: Param (Write Resp)
[16:45:01] LMD: Param (Write Req)
```

```
[16:45:02] LMD:      Param (Write Resp)
[16:45:02] LMD:      Param (Write Req)
[16:45:03] LMD:      Param (Write Resp)
[16:45:04] LMD:      Param (Write Req)
[16:45:04] LMD:      Param (Write Resp)
[16:45:05] LMD:      Param (Write Req)
[16:45:05] LMD:      Param (Write Resp)
[16:45:05] LMD:      Param (Write Req)
[16:45:06] LMD:      Param (Write Resp)
[16:45:06] LMD:      Param (Write Req)
[16:45:06] LMD:      Param (Write Resp)
[16:45:07] LMD:      Param (Write Req)
[16:45:07] LMD:      Param (Write Resp)
[16:45:08] LMD:      Param (Write Req)
[16:45:08] LMD:      Param (Write Resp)
[16:45:08] LMD:      Param (Write Req)
[16:45:08] LMD:      Param (Write Resp)
[16:45:09] LMD:      Param (Update End)
[16:45:09] LMD:      Ack (Type6,Ack0)
```

```
[16:45:55] APP:App Rebooting.....
COMM DISCONNECTED
```

If these strings are missing from the logs of the respective devices, then the script has not been downloaded.

Using the PULS Server to Check the Script's Status

The script's status can be checked from the PULS server at <https://puls.calamp.com/devicemgr/>. Note that the state reported on the webpage lags behind by a couple of minutes. Use the REFRESH button provided on the webpage to update the status.

When a configuration download is completed, the *LAST CONFIG UPDATE* field should show the current time, and the *CONFIG STATUS* should be set to Current. Figure 28 - Viewing the Download Status via the PULS Server shows where to locate these fields:

ESN	3163002612	CUSTOMER
MOBILE ID	ESN: 3163002612	GROUP
FIRST ID REPORT	2013-02-25 16:47:44-08	FIRMWARE
LAST ID REPORT	2013-03-12 14:56:25-07	STATUS 1
LAST CONFIG UPDATE	2013-03-12 14:56:45-07	GPS ANTENNA STATUS
LAST IP	24.114.107.139-53905	SELF-TEST
PHONE NUMBER	last checkin	GPS RECEIVER TRACKING
IMSI	302720227016985	MODEM STATUS
IMEI	358901042424249	CONFIG ERROR
ICC-ID	89302720304039749535	PROCESSOR EXCEPTION
VEHICLE CLASS	0	STATUS 2
SCRIPT VERSION	7 update status	
CONFIG VERSION		
CONFIG STATUS	Pending	

Figure 28 - Viewing the Download Status via the PULS Server

4.5.3. Forcing a Check In

If there are no signs of a script download on the serial terminal, use the following AT command to force the unit to check in with the PULS server:

```
AT$APP PEG ACTION 49 129
```



5. Locator Configuration Scripts

This section is intended for advanced users and may only be done by authorized Sierra Wireless personnel. It is not intended for customers.

The locator device contains a *config* script that governs which events will cause the device to send a location report to the oMM.

5.1. Configuration Scripts

The locator devices have numerous configuration options. The only configuration changes that are supported are:

- Hostname or IP address of reporting server (oMM)
- Reporting Interval

Changes to other settings must be tested and approved by Sierra Wireless.

5.2. Updating Config Script

To modify the CalAmp config scripts:

1. Download the following files from */home/public/CALAMP/exe*:
 - LMUMgr 8.3.3.13 PATCH.EXE
 - ttu720.lms
 - lmu2720.lms
2. Run *LMUMgr 8.3.3.13 PATCH.EXE* which is a Windows program.
3. Navigate to *File -> Open Session...* and select **ttu720.lms** or **lmu2720.lms** depending on the Calamp model to be programmed.
4. Navigate to *File -> Import -> Configuration...* and select the script to be modified. Sample scripts can be found in */home/public/CALAMP/config-scripts*.

To specify which oMM the CalAmp Locator will report to, open the CalAmp LMU Manager, navigate to the Report Delivery tab, and enter the oMM's IP address into the InBound URL field, as shown in Figure 29 - Specifying the oMM's IP address:

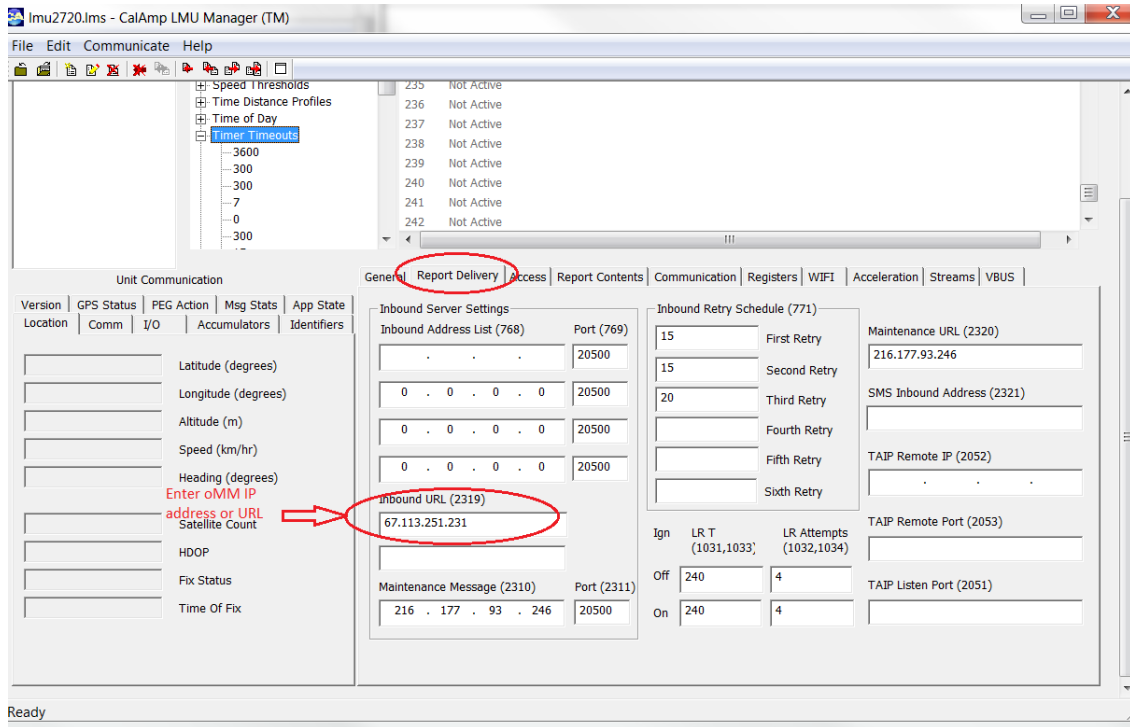


Figure 29 - Specifying the oMM's IP address

To adjust the timeout interval for which the CalAmp Locator will report to the oMM, double click on **Timer Timeouts**, enter the desired reporting frequency (in seconds), and click **OK**, as shown in Figure 30 - Setting the Timer Timeout:

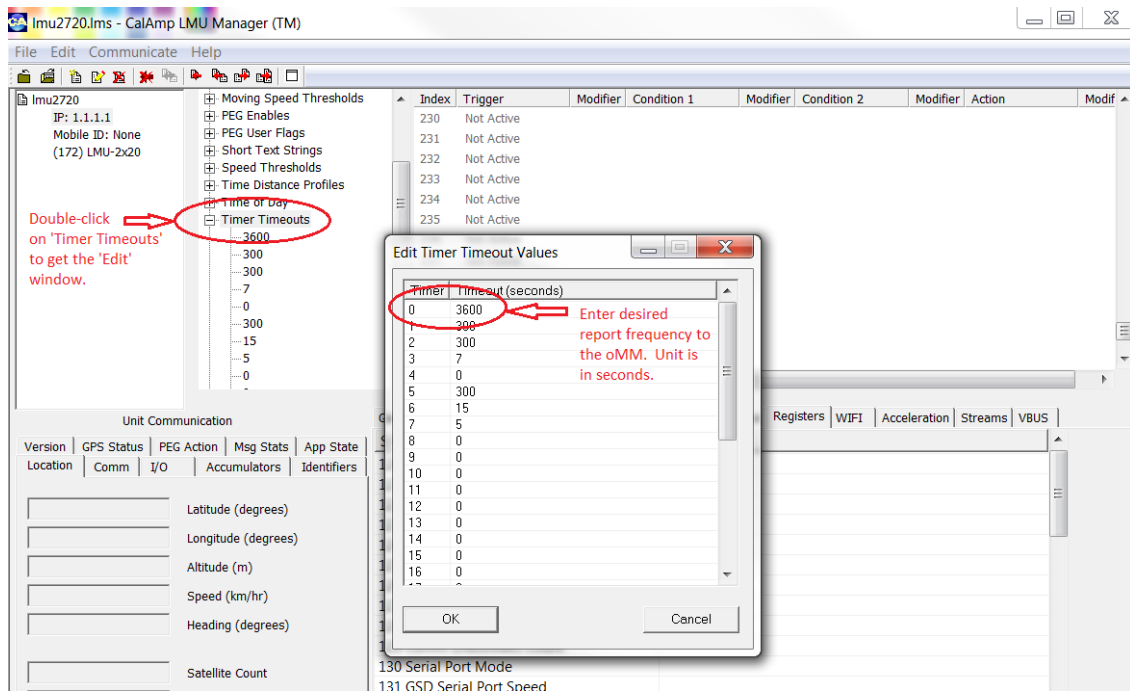


Figure 30 - Setting the Timer Timeout

The PEG Script ID and Configuration Version uniquely identifies the current config version. If the config script is updated, one of the two numbers must be changed, otherwise the CalAmp PULS server will not send the new script to the device.

These can be set by navigating to the Registers tag and modifying the respective fields, as shown in Figure 31:

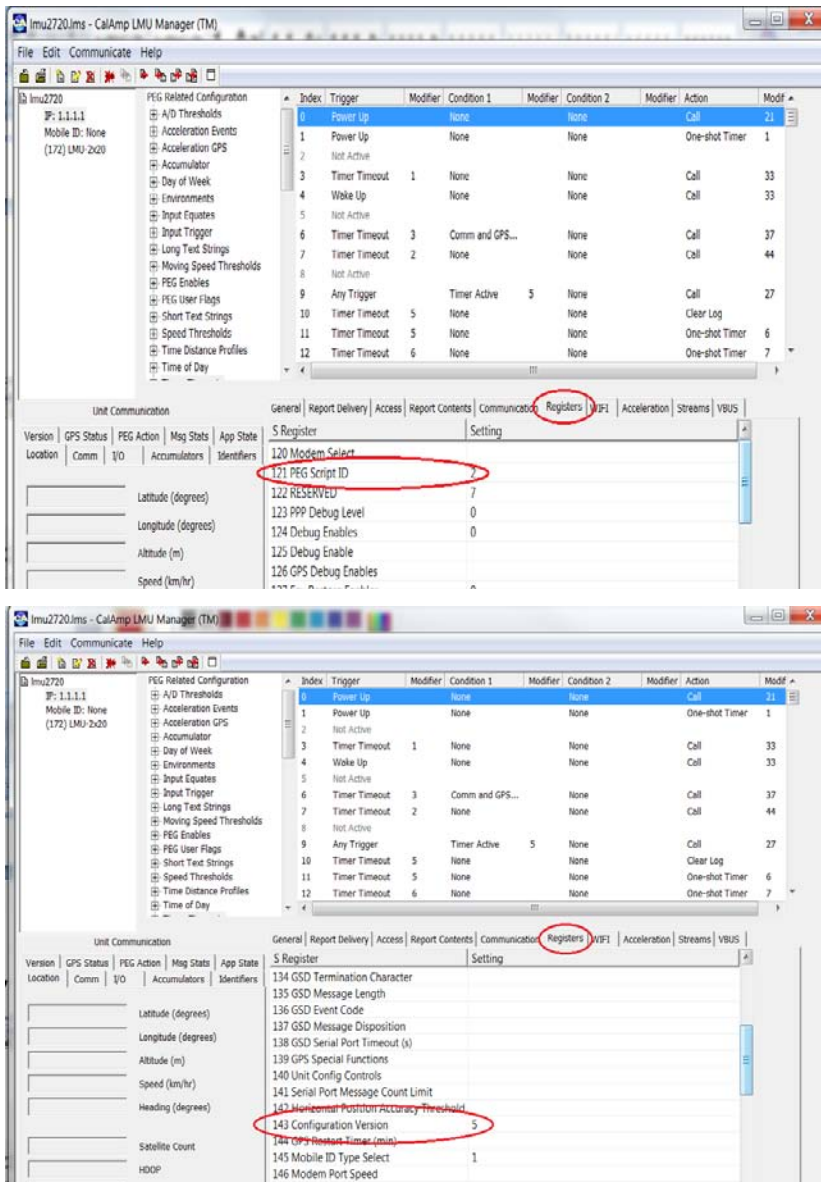


Figure 31 - Setting Register Values

After modifications are completed, select **File -> Export -> Configuration...** to export the updated script.

To upload the new script to PULS:

Log in to <https://puls.calamp.com/devicemgr/config.php>, click **Browse**, select your updated script, and click **Import CSV**.

After uploading the script to PULS, it will be disabled and will have no textual name. Click the **Disable** button and the script will change to the enabled state. To assign a name to the script click **Edit**, click the **Advanced** button, and look for the *Name* field. Enter a descriptive name such as “LMU2720 Config for Busytown Utilities”.

Note that if this is over-the-air update of an existing customer, it will be necessary to assign the new script to each Locator one-by-one. See Section 4.5 for information on provisioning.



6. Troubleshooting Poor Signal Quality

The following subsections describe the mounting and positioning necessary to obtain the optimum signal quality required by locator units. If a unit is experiencing poor signal quality, ensure that the Locator LD antenna or Locator unit mounting and placement adhere to the following recommendations.

6.1. Verifying Locator LD Antenna Positioning

The antennas used with the Locator LD must have a clear view of the sky and must be oriented properly.

Antennas can be placed on the passenger side corner of window. The adhesive side must be facing out as indicated on the antenna's sticker:



Figure 32 - Sticker on the Locator LD Antenna Indicating Correct Orientation

The following diagrams show good and poor positioning for the various types of antennas which can be used with the Locator LD. If a unit is experiencing poor signal quality, ensure correct antenna placement based on these diagrams.

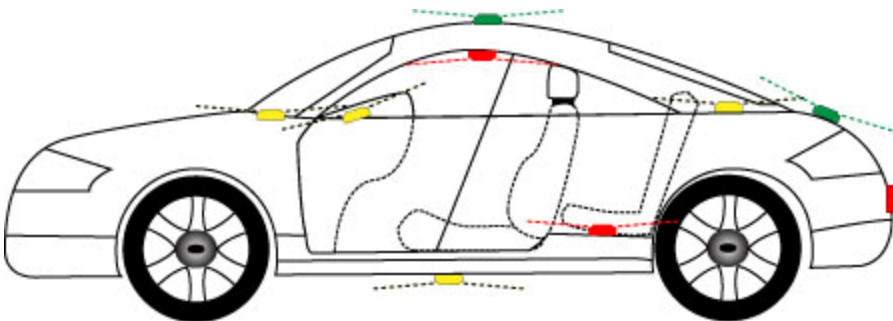


Figure 33 - Examples of Good (green), OK (yellow) and Poor (red) Combo Antenna Placements

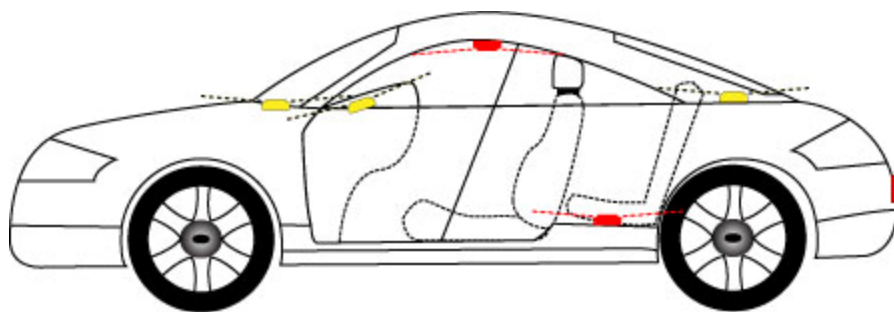


Figure 34 - Examples OK (yellow) and Poor (red) Internal Antenna Placements
Comm Antennas

Ensure that Comm antennas are placed at least 3 feet away from GPS antennas.

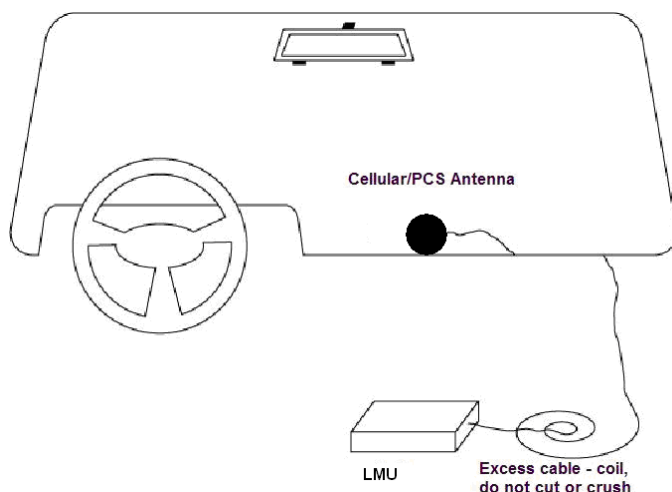


Figure 35 - Placement of Comm Antenna on a Dashboard

6.2. Verifying Locator Placement

The Locator uses a built in antenna for GPS tracking and for broadcasting information. For optimum signal quality, the device must be placed as follows.

Chassis Placement

When mounted on a chassis the device must be mounted in the upwards or downwards position:



Figure 36 - Chassis Mounting with the Device Facing up



Figure 37 - Chassis mounting with the Device Facing down
Nose Mount and Intermodal Container Placement

When mounted on the side of a container, the label on the unit must face downwards:





Figure 38 - Examples of Correct unit Mounting Location on an Intermodal Container

7. oMM Configuration

Locator devices require oMM version 2.11 or higher. Contact Support for assistance in determining if the correct version of oMM is installed.

7.1. Adding a Device to the oMM

A locator must be added to an oMM before it can be accessed through the oMM interface. If a known locator device does not appear in an oMM, ensure it has been added by using the following steps:

1. Log in to the oMM and navigate to *Admin>Gateways*.
2. Click **Add** and enter the serial number of the locator device in the ID field of the form. All the other fields: *Name, Group, Contact, etc.* are optional.

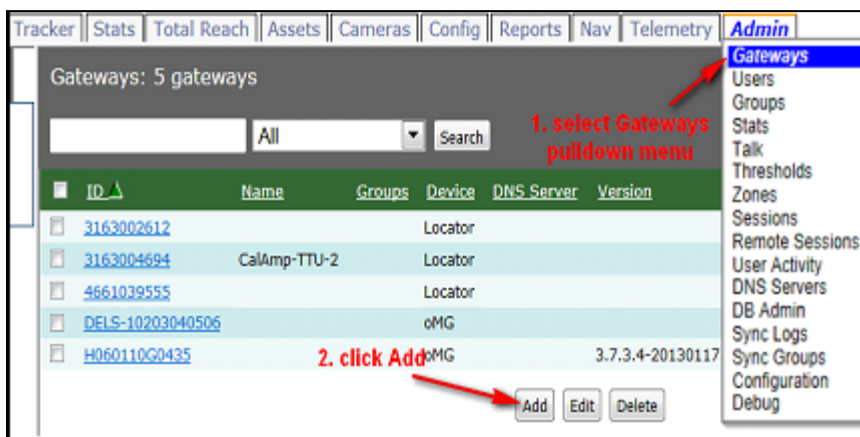


Figure 39 - Adding a Locator to an oMM

3. Click **Save**. Note that initially, the newly added device will show up as an oMG. It will later be updated to *Locator/Locator LD* automatically when the device establishes first contact with the oMM.

When diagnosing a locator remotely, first check to ensure that it's available on the oMM by looking for the device in the Dashboard. This can be done for both types of locators. If the device is present, display the Stats page for the device and check that the stats listed in Table 1 have been created.

If the device cannot be located or is not configured correctly, use the following subsections to further troubleshoot.

7.2. Ensuring that the oMM can listen for Locator Messages

By default the oMM does not listen for locator messages. Perform the following steps to verify that the oMM is listening to the locator devices:

1. Ensure that the following block in */opt/tomcat/webapps/inmotion/WEB-INF/web.xml* file has been uncommented.

Change the following if necessary from:

```
<!--context-param>
  <param-name>GPSDEVICE_PORT</param-name>
  <param-value>0:20500</param-value>
</context-param-->
```

To

```
<context-param>  
  <param-name>GPSDEVICE_PORT</param-name>  
  <param-value>0:20500</param-value>  
</context-param>
```

2. Stop and start *imtdbloader* service.
3. Add UDP port 20500 to the firewall rules by executing the following on the command line:

```
Execute "iptables -I INPUT -p udp --dport 20500 -j ACCEPT"
```

4. Add the following rule to */etc/sysconfig/iptables*, just before the *REJECT* rule:

```
"-A RH-Firewall-1-INPUT -p udp --dport 20500 -j ACCEPT"
```

Note: *it's recommended that these steps be performed by Support.*



8. Locator Battery Replacement

The following procedure describes how to remove and replace the Locator lithium battery pack.

Note: *this only applies to Locator devices. Locator LD devices do not feature a battery.*

Note: *the battery pack lifespan should last around 5000 messages or up to seven years with one location update every eight hours. The battery pack is not rechargeable.*

Note: *Locator batteries that are not installed within a four week period from the time of delivery must be stored in a cool (below 30° C (86° F)), dry, and well ventilated area which is subject to little temperature change. Do not place the battery near heating equipment, do not expose it to direct sunlight for long periods, and do not transport it by aircraft. Elevated temperatures can result in shortened battery life and degrade performance. All lithium batteries whether recycled or disposed must be done in accordance with applicable local, State and Federal regulations.*

Caution: *CAUTION: failure to properly store batteries will void the warranty.*

1. Insert a Phillips head screwdriver and remove the four screws. Remove the end cap and set aside.



Figure 40 - Removing the Four Screws from the Cap Housing

2. Disconnect the red and black power cable by pulling the two connector halves apart, and remove the rubber gasket:

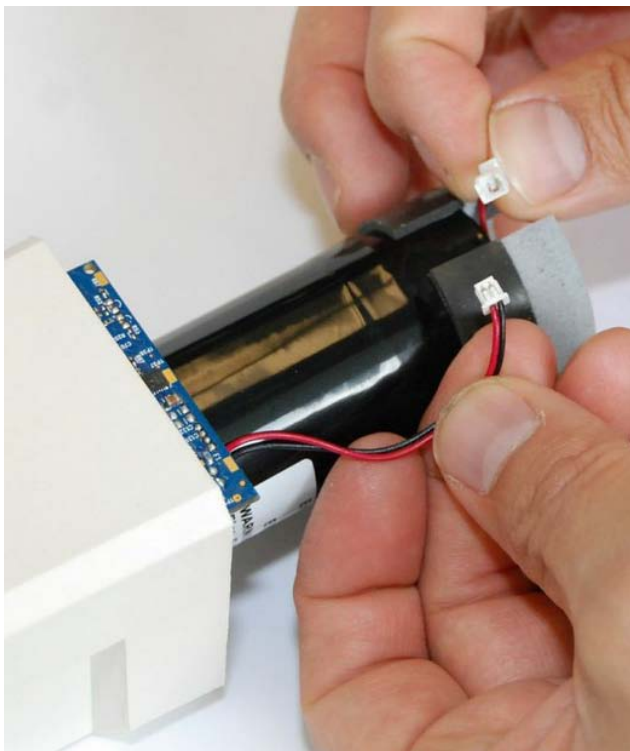


Figure 41 - Disconnecting the Power Cable

Note: disconnect the power cable by pulling apart the connectors; do not pull on the power wires.

3. Remove the battery pack by ensuring that the gap in the battery pack foam is aligned with the device power cable and then slide the battery pack out of the enclosure:



Figure 42 - Removing the Battery Pack

4. Replace the battery pack by sliding the replacement battery pack into the enclosure.
5. Slide the replacement battery pack into the enclosure, replace the gasket, and reconnect the white power cable connectors:



Figure 43 - The Power Cables Reconnected

6. Replace the battery cap by first seating the cap housing to the gasket to ensure a tight fit. Insert the screws using a Phillips head screwdriver and turn clockwise until hand tight:



Figure 44 - Tightening the Battery Cap



9. Recommended Deployment Procedure

Since Locator and Locator LD devices are not remotely configurable via an oMM, it's recommended that a pilot phase first be completed before a mass deployment of locators. Therefore the oMM should be installed and verified to be working first, before installing and deploying locator devices.

The recommended sequence for this deployment procedure in a mixed fleet is as follows:

1. Deploy and configure the oMM appliance or configure the hosted oMM server with the oMGs.
2. Confirm that the oMGs are reporting into the oMM.
3. Perform the cellular configuration and activation of locators:
 - a. **CDMA/1xRTT Version**
 - i. Sierra Wireless will supply customers with a table showing the ESN and MSN-D.
 - ii. Customers must provide a carrier table of MSN-Ds of units that need activation.
 - iii. Customers must obtain confirmation from the carrier that data services are activated prior to installation and testing.
 - b. **GSM/HSPA Versions**
 - i. Customers must supply SIM cards (2FF) from their carriers and confirmation that the SIM cards have been activated.
 - ii. Customers must obtain confirmation from their carriers that data services are activated prior to installation and testing.
 - c. Install the SIM card if using the GSM/HSPA version.
 - d. Follow the configuration and activation steps from this document.
4. Configure the locators to report to the oMM:
 - a. Configure the IP address and port number of the oMM on the locator unit. See the commands under *oMM address and port* in Table 3.
 - b. Register each unit with the PULS server.

Note: every time the unit powers up, the unit checks into the PULS server to check for any changes to its configuration (specifically reporting interval settings, not oMM addresses).

- c. Install and test the locator in the vehicle or asset (see the Installation and Operation guide).
5. Confirm the pilot unit operation of the oMGs and locators.
6. If the pilot is successful continue the mass deployment of the remaining locator units.



Appendix A. Status LEDs

The Locator LD is equipped with two status LEDs, one for GPS and one for Comm (wireless network status). The LEDs use the following blink patterns to indicate service:

Table 5 - Orange Comm LED (LED # 1) Definitions

Condition	LED State
Modem Off	Off
Comm On - Searching	Slow Blinking
Network Available	Fast Blinking
Registered but no Inbound Acknowledgement	Alternates from Solid to Fast Blink every 1 second
Registered and Received Inbound Acknowledgement	Solid

Table 6 - Green GPS LED (LED # 2) Definitions

Condition	LED State
GPS Off	Off
GPS On	Slow Blinking
GPS Time Sync	Fast Blinking
GPS Fix	Solid