



## LMU-26xx™ Install Guide

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## CalAmp | LMU-26xx™ Install Guide

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Revision History:			
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1.1	5/7/2011	Marketing	Unit information revised
1.2	3/27/2012	Product	Instruction for install in weather exposed environments
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3.3	11/4/2014	Product	Revised and updated jPOD and vPOD Added Privacy switch wiring

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# 1 REGULATORY INFORMATION

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## 1.1 HUMAN EXPOSURE COMPLIANCE STATEMENT

Pursuant to 47 CFR § 24.52 of the FCC Rules and Regulations, personal communications services (PCS) equipment is subject to the radio frequency radiation exposure requirements specified in § 1.1307(b), § 2.1091 and § 2.1093, as appropriate.

CalAmp certifies that it has determined that the LMU-26xx complies with the RF hazard requirements applicable to broadband PCS equipment operating under the authority of 47 CFR Part 24, Subpart E of the FCC Rules and Regulations. This determination is dependent upon installation, operation and use of the equipment in accordance with all instructions provided.

The LMU-26xx is designed for and intended to be used in fixed and mobile applications. “Fixed” means that the device is physically secured at one location and is not able to be easily moved to another location. “Mobile” means that the device is designed to be used in other than fixed locations and generally in such a way that a separation distance of at least 20 cm is normally maintained between the transmitter’s antenna and the body of the user or nearby persons. The LMU-26xx is not designed for or intended to be used in portable applications (within 20 cm of the body of the user) and such uses are strictly prohibited.

To ensure that the LMU-26xx complies with current FCC regulations limiting both maximum RF output power and human exposure to radio frequency radiation, a separation distance of at least 20 cm must be maintained between the unit’s antenna and the body of the user and any nearby persons at all times and in all applications and uses. Additionally, in mobile applications, maximum antenna gain must not exceed 3 dBi.

## 1.2 HARDWARE PRECAUTIONS

### Electrical Over-Stress (EOS)

The LMU-26xx GPS receiver can be damaged if exposed to an RF level that exceeds its maximum input rating. Such exposure can happen if a nearby source transmits an RF signal at sufficiently high level to cause damage.

### Storage and Shipping

One potential source of EOS is proximity of one LMU-26xx GPS Antenna to another LMU-26xx GSM Antenna. Should one of the units be in a transmit mode, the potential exists for the other unit to become damaged. Therefore, any LMU-26xx should be kept at least four inches apart from any active LMU-26xx or any other active high power RF transmitter with power greater than 1 Watt.

## 2 INTRODUCTION

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The LMU-26xx Install Guide provides important electrical safety and radio-frequency compliance information, environmental specifications and installation procedures for the CalAmp LMU-26xx and optional serial cables.

### 2.1 GUIDE PREREQUISITES

In order to limit the size and scope of this guide, the following assumptions have been made about the user:

- Working knowledge of GPS concepts and terminology.
- Experience with installing equipment in vehicles.



### 3 LMU-26XX OVERVIEW

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The CalAmp LMU-26xx is an integrated Cellular/GPS communications device for use in-vehicle tracking. It provides communications for vehicle position and operating information as part of an overall vehicle tracking solution. It is installed within the vehicle in order to provide this information, and is wired into and powered by the vehicle's power supply.

The device features integrated cellular and GPS antennas in order to provide the vehicle with a compact and full-function platform for capturing vehicle position and operational information and transmitting it for use by dispatchers and other back-office personnel.



**Figure 1: CalAmp LMU-26xx Device**

### 3.1 AVAILABLE WIRING HARNESS

The LMU-26XX ships with the 5C908 wiring harness. This harness requires hard wiring of the power, ground and ignition wire.

The 5C260 is an optional cable with multiple connectors for standard I/O devices, such as buzzer, light and driver ID sensor. This enables hard wiring of the power, ground and ignition wire except when using a vPOD or jPOD. Both vPOD and jPOD provide power to the device without the need for hard wiring. See installation instructions for proper wiring.

The 5C261 is an optional cable with same connectors as the 5C260; however, it is a short harness and provides power, ground and ignition from the vehicle's Jbus or OBD port. This **must** be used with either the vPOD or jPOD to work properly.

Wire Harness P/N	Description	No JPOD or VPOD	JPOD or VPOD	Buzzer	Switch/LED
5C908	Power Harness (No JPOD or VPOD, No Connectors For Accessories)	X			
5C260	Power Harness (No JPOD or VPOD, with/without Buzzer and/or Switch LED)	X	X*	X	X
5C261	Power Harness (JPOD or VPOD, with/without Buzzer and/or Switch LED)		X*	X	X

\* For Installations using jPOD or vPOD, the 5C261 optional cable is recommended for an easier install.

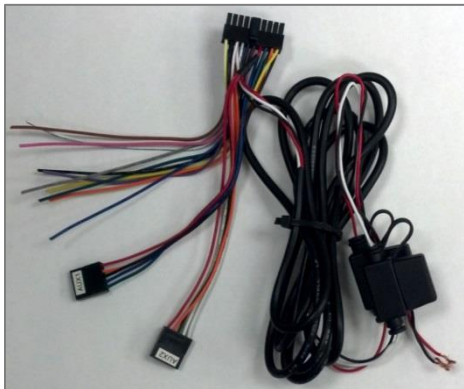


Figure 3: P/N 5C908  
No jPOD/vPOD Accessories



Figure 2: P/N 5C260  
No jPOD/vPOD Accessories

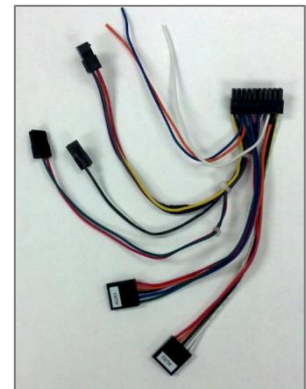


Figure 4: P/N 5C261  
jPOD or vPOD

## 3.2 ACCESSORIES

Accessories	Description
4C764	CABLE ASSY, SWITCH/LED
4C765	CABLE ASSY, BUZZER
133337-5	DB9 Serial Cable (typically used on Aux1 serial port)
133688	Garmin Serial Cable (Aux2 serial port)
133917-VPOD	ACCESSORY, VPOD (Aux2 serial port)
134152-JPOD	ACCESSORY, JPOD (Aux2 serial port)
5C909-2	jPOD Y Cable (connects D9 pin DIN connector on vehicle to the jPOD 9 pin port)
8973002002	6-pin j1708 Y Cable (substitute for the 6C909-2 cable in older vehicles)
8973002001	9 PIN JBUS J1936 TO 6 PIN J1708 ADAPTER CABLE (Converts a 6 pin J1708 connector vehicle to 9 pin ready for use with 5C909-2 cable.

### 3.3 ENVIRONMENTAL SPECIFICATIONS

The LMU-26xx is designed to operate in environments typically encountered by fleet vehicles, including wide temperature extremes, voltage transients and potential interference from other vehicle equipment.

To ensure proper operation in such an environment, the LMU-26xx was subjected to standard tests defined by the Society of Automotive Engineers (SAE). The specific tests included temperature, shock, vibration and EMI/EMC. These tests were performed by independent labs and documented in a detailed test report. In accordance with Appendix A of SAE J1113 Part 1, the Unit is considered a “Functional Status Class B, Performance Region II” system that requires Threat Level 3 Testing.

The following shows the environmental conditions the LMU-26xx is designed to operate in and the relevant SAE tests that were performed. No formal altitude tests were conducted.

<b>Size</b>	4.0" long x 2.0" wide x 0.85" high 10.2 cm long x 5.1 cm wide x 2.2 cm high
<b>Weight</b>	2.61 ounces / 75g (external antenna) 3.0 ounces / 85g (internal antenna)
<b>Operating Temperature</b>	-30° C to 75° C
<b>Storage Temperature</b>	-40° C to 85° C
<b>Humidity</b>	0% to 95% relative humidity, non-condensing
<b>Shock and Vibration</b>	SAE Test: SAE J1455 Compliant Mil Standard 202G and 810F Compliant Ground vehicle environment with associated shock and vibration
<b>Electromagnetic Compatibility (EMC/EMI)</b>	SAE Test: SAE J1113 Parts 2, 12, 21 and 41 Compliant FCC Part 15B Compliant Industry Canada Compliant EMC compliant for a ground vehicle environment
<b>Operating Voltage Range</b>	6 – 32VDC
<b>Power Consumption</b>	Active Standby :70mA at 12VDC Sleep on Network (SMS): 10mA Sleep on Network (GPRS): 20mA Deep Sleep: 3mA
<b>GPS</b>	50 channel (with SBAS, DGPS) GPS Receiver 2m CEP (with SA off) -160 dBm tracking sensitivity
<b>Communications (Comm)</b>	Quad Band Class 12 GPRS Modem 850 MHz (Class 4) – 2W 900 MHz (Class 4) – 2W 1800 MHz (Class 1) – 1W 1900 MHz (Class 1) -1 W GPRS Packet Data (UDP) SMS
<b>RoHS Compliant</b>	

## 4 PRE-INSTALLATION CONSIDERATIONS

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The installation of the LMU-26xx and its antennas can have a major impact on device performance. It is recommended that installers be familiar with the installation of GPS and cellular devices and are comfortable in a vehicle environment.

### 4.1 PLAN THE INSTALLATION

Verify Power, Ground and Ignition. Be sure to check each source (power, ground and ignition) to ensure that the proper signaling exists. This is typically accomplished with a multi-meter.

Before drilling any holes or running any wires, decide where each hardware component will be installed (LMU-26xx, antennas, peripherals, etc.). Verify that all cables running to the LMU-26xx will not be bent or constricted. Verify that the LMU-26xx install location is free from direct exposure to the elements (e.g., sun, heat, rain, moisture etc.).

Be advised that an installation that violates the environmental specifications of the LMU-26xx will void the warranty.

The best way to ensure a trouble-free installation is to consider your options and make appropriate decisions before you start. Review the vehicle and determine the best install approach for the LMU-26xx for the following purposes:

- Accurate data gathering and simulation of how customers actually use your solution.
- Ongoing monitoring and maintenance of LMU-26xx equipment
- Accidental or intentional alteration of the equipment or cable connections.

### 4.2 SIZE AND PLACEMENT OF LMU-26XX

When planning device installation in a vehicle, take in account the dimensions of the LMU-26xx before actual installation. Typical installations place the LMU-26xx under the vehicle dashboard, or in the A Pillar. Verify that you can access to the device, as under some circumstances it may be necessary to add additional wiring or connections to the LMU-26xx.

Refer to [Section 3.3: Environmental Specifications](#) for the exact measurements and specifications of the LMU-26xx.

- Verify the LMU-26xx will fit before drilling any holes or running cable.
- Ensure that all cables running to the LMU-26xx will not be bent or constricted. Damage to the cables may impede the LMU-26xx's performance.
- Verify that the installation point will not violate any of the LMU-26xx's environmental specification. Improper installation of the LMU-26xx may void the warranty.

### 4.3 PROTECTION FROM HEAT

We recommend that you do not place the LMU-26xx in an unusually warm location such as directly near heater vents, hot engine components or in direct sunlight.

Refer to [Section 3.3: Environmental Specifications](#) for the maximum temperature tolerated by the LMU-26xx.

### 4.4 VISIBILITY OF DIAGNOSTIC LEDS

Status LED lights on the front of the LMU-26xx provide valuable information about the operation of the device. When feasible, attempt to install the LMU-26xx in such a way that the lights are visible with reasonable ease.

You may find it useful to be able to view the LEDs periodically to make sure that the LMU-26xx is operating properly. If you encounter a problem or poor performance with the LMU-26xx, you may need to read the LEDs to troubleshoot the issue. If you cannot resolve the issue, you will need to provide the LED information to the CalAmp Customer Support Team.

Refer to [Section 5.7.2: Status LEDs](#) for information on how to interpret the lights.

### 4.5 CABLE LENGTH

The harness cables, which are provided for connecting to the LMU-26xx to the vehicle or other auxiliary device, should be used at the length provided. Do not cut cables. Instead, coil any excess cable length, making sure not to crimp or flatten the cables.



**Figure 5: Coil Excess Cable**

## 4.6 MOISTURE AND WEATHER PROTECTION

The LMU-26xx is not a weatherproof device and must be kept dry. The mounting location should be inside the passenger compartment of the vehicle safe from physical damage and where it is not exposed to moisture or water. In a typical inside-vehicle installation, this is not a common concern; however, avoid installing the device below the vehicle's cup holders, or where rain might easily splash into the compartment when a door is opened.

If the LMU-26xx is installed in a vehicle with a cab exposed to the weather, additional protection is required to avoid damage to the device, which could void the warranty. There are numerous alternatives for protecting the device. One of the best options is to use an Otterbox 2000. You can purchase from Amazon.com or directly from Otterbox:

[http://www.otterbox.com/OtterBox-2000-Clear/OTR3-2000S-01,default.pd.html?dwvar\\_OTR3-2000S-01\\_color=01&start=3&cgid=otterbox-2000-cases](http://www.otterbox.com/OtterBox-2000-Clear/OTR3-2000S-01,default.pd.html?dwvar_OTR3-2000S-01_color=01&start=3&cgid=otterbox-2000-cases).

**Note:** For environmentally challenging conditions, consider utilizing the CalAmp TTU-2820.

## 4.7 PREVENTING ACCIDENTAL OR UNAUTHORIZED MODIFICATION

If you anticipate that fleet drivers or others might tamper with the devices once installed, take steps to ensure that it is not easy to disconnect the wiring or remove the device from its power source. A tamper resistant installation couples a zip-tie secured around the device with a tamper seal applied to protect against potential interference and to deter intentional tampering. When the tamper seal is removed, the seal self-destructs to indicate removal and leaves behind a dot-pattern residue on the device.



Figure 6: Tamper Resistant Materials

## 5 LMU-26XX INSTALLATION

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Installing the LMU-26xx is not difficult, but you must consider the variables involved, such as the vehicle type and location of existing equipment. Installation time can vary depending upon the installer's experience and the vehicle design. The average time for installation is approximately 45 minutes. A single individual can perform most installation operations. CalAmp offers an installation training program or can supply a list of recommended installation vendors in your area.

Prior to beginning the installation, verify that you have the parts and tools necessary to complete the installation. Additionally, read entire installation procedure before beginning. Some of the procedures require a choice between several installation options.

### **To install the LMU-26xx:**

1. Select location for mounting the device and install it.
  - For ease of installation, the LMU-26xx has internal GPS and Cellular antennas. Assess cable routes while considering placement.
2. Install the power, ignition, and ground connections.
3. Install optional buzzer and/or LED button.
4. Install optional I/O connections.
5. Install optional serial cables.
6. Secure all cables to rigid mounts with cable restraints.
7. Verify operation of the LMU-26xx.



## 5.1 SELECT THE LOCATION FOR THE LMU-26XX AND INSTALL IT

Determine the desired mounting location. The most common locations are under the dash or on the front windshield. We recommend under the dash.

For an exposed location, refer to [Section 5.1.2: Installation in an Exposed Area](#).

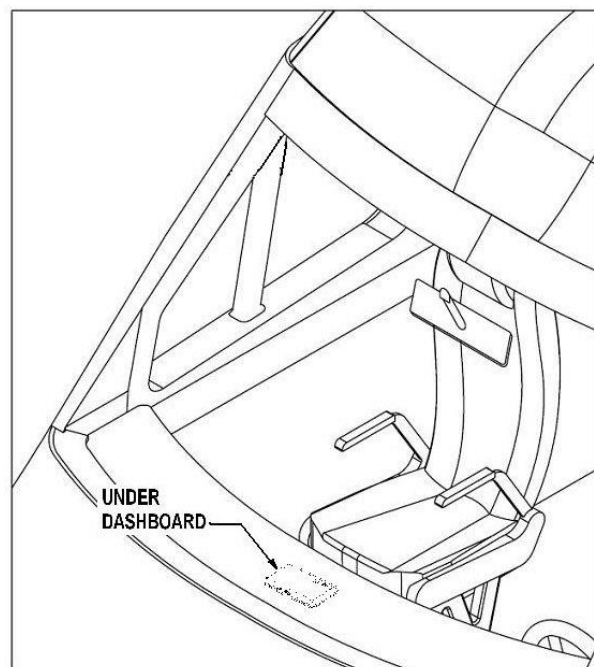
When determining mounting location, the primary consideration is GPS satellite visibility by the device. The required installation orientation of the LMU-26xx is label side up. The label should face the sky or toward windshield.

**Note:** When performing installation tasks requiring the operation of power, follow recommended safety procedures, including use of safety eye-wear. In addition, avoid drilling through wires, mounted fixtures or equipment.

### 5.1.1 UNDER DASH INSTALLATION

If the LMU-260 is mounted under the dashboard of the vehicle (Figure 6), ensure the device is mounted with the “label side” facing up. Do not install the device where it will be obstructed by metal components. Common install locations are in the void above the glove box (if no airbag present) or above the vents.

You may need to remove part of the dash facing for access. Typically, the dash facing is attached with just clips. Do not use excessive force wedging the device into a location under the dash. Use the provided ‘re-closable fastener tape’ to attach the device to the underside of the dash as described in the steps below.



**Figure 7: LMU-26xx Under Dash Mount**

1. Under dash mounting may or may not require the use of the re-closable fastener tape. If the tape is required, follow instructions below:
  - Clean and prepare the mounting surface and the device before attaching the provided re-closable fastener tape.
  - One at a time, remove the backing from two pieces of the re-closable fastener tape.
  - Firmly press on the sticky-side of the re-closable fastener tape onto the device on both sides of the device, front or back of device depending on installation requirements (Figure 7).

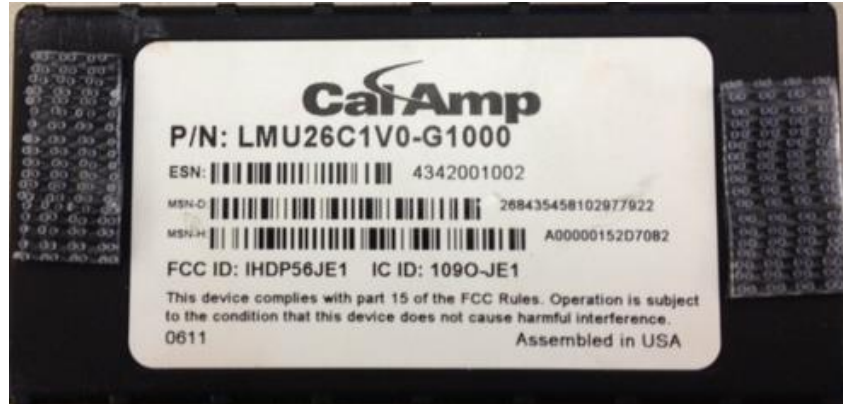


Figure 8: Re-closable Fastener Tape on LMU-26xx

- Press the other pieces of re-closable fastener tape, bumpy sides together, onto the device. Do not remove backing (Figure 8).



Figure 9: Re-closable Fastener Tape - Prior to Mounting

2. Depending on install location, you may need to attach the wiring harnessed to the device prior to installation. After the wiring harness is inserted into the device, gently pull on the connector to ensure the harness is locked in place.
3. Remove the backing from the re-closable fastener tape.
4. Firmly press the device with the re-closable fastener tape onto the mounting surface in the previously selected and cleaned location, wait several seconds before releasing pressure.

5. Route the power cable to the source of 12 Volts continuous and 12 Volts ignition switched.
  - Refer to [Section 5.2: Install Power Connections](#) for detailed instructions on installing the power cable.
6. Carefully remove any panels required for access as needed. Ensure there are no sharp edges that may abrade the wire. Use a suitable means to protect the cable from the sharp edge to eliminate possible wear or reroute the wire if possible.
7. If applicable, connect Buzzer and/or Switch with LED Cables.
  - Refer to Section [5.3: Optional Buzzer Assembly Cable](#) instructions and/or [Section 5.4: Optional Switch with LED Cable](#) instructions.
8. If applicable, route the I/O Cable to the source of the I/O signals.
  - Refer to [Section 5.5: Connect Optional Inputs](#) for detailed instructions on installing the I/O Cable.
9. If applicable, connect the optional serial cables (e.g., NMEA or Garmin).
  - Refer to Section [5.6: Install Optional Serial Cables](#) for detailed instructions on install the serial cables.
10. Follow the steps outlined in [Section 5.5: Verify LMU-26xx Operations](#) to verify successful installation.

### 5.1.2 INSTALLATION IN EXPOSED AREA

If the LMU-26xx is installed in a vehicle with an open cab exposed to the weather, a NEMA rated enclosure suitable for the application must be used to seal out moisture. A recommended alternative is a TTU-2820 sealed device available from CalAmp.

## 5.2 INSTALL POWER CONNECTIONS

The LMU-26xx requires a continuous 12 Volts and an ignition switched 12 Volt signal to operate correctly.

For Harness 5C908 and 5C260, the LMU-26xx power leads with in line fuses are supplied as part of the wiring harness.

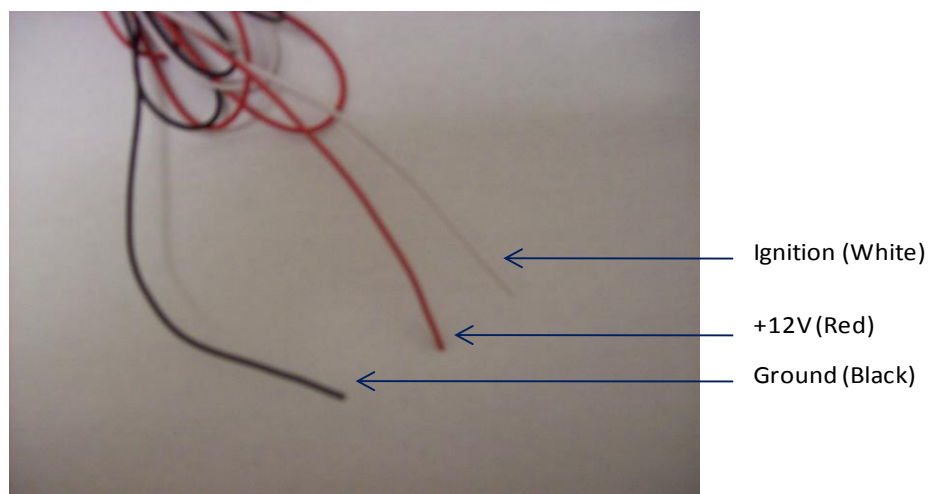
For harness 5C261, the power and ground are an integral part of the harness, but **must be** installed with the vPOD or jPOD.



Figure 10: LMU-26xx Standard Wiring Harness (P/N: 5C908)

If hard wiring the device, the LMU-26xx power cable has 3 wires: 12 Volts continuous, 12 Volts ignition switched, and ground.

- All power connections must be insulated with electrical tape.
- Use care to prevent accidentally shorting any connections. Power Connections should meet aftermarket electronics industry installation practices.
- **Power connections, both Constant and Ignition, must be fused using the supplied in line 3A fuses and holders.**
- All power connections must be made using manufacturer approved methods for adding accessories to vehicles.



**Figure 11: Power Leads**

**The connection method must be applied to all installations:**

1. Install a ring connector on the Ground wire (Black) as shown below.



**Figure 12: Ring Connector on Ground Wire**

2. Select a common grounding point and connect the negative, grounding-wire lead (black lead) to its ground, the negative battery lead can be used.
  - The common ground is through the vehicle's chassis and connected using a Ring Terminal, Star Washer and a ½-inch self-tapping screw or using a provided vehicle ground under the dash.



**Figure 13: Ground Connection**

3. Identify the main harness for the vehicle's key. Use a DVOM (Multimeter) or test light to verify the constant +12VDC and Ignition sense wires.
  - Ignition sensor wire refers to a Key controlled power source that has +12VDC in both the Run and Start positions. Under no circumstance will the "Accessory Position" produce +12VDC on the Ignition sensor wire.



**Figure 14: Main Vehicle Wire Harness**

4. Remove insulation from the correct factory ignition wires using T-Strippers. Use care to remove only the insulation. Do not damage any of the strands. Using a pick or multi-meter probe, separate the strands.



**Figure 15: Ignition Wires**

5. Wrap the Fuse Holder Lead.
  - Strip about 1½" to 2" of insulation from the Fuse Holder lead. Feed the exposed fuse holder lead through the hole in the factory wire. Pinch the factory wire back together and wrap the fuse lead around source wire at least 3 times.





**Figure 16: Wrapped Fuse Lead**

6. Insulate and secure the power connections:
- Using electrical tape insulate the power connection.
  - To ensure a tamper resistant connection, apply zip-ties over the tape at the connection point and apply Torque Seal to the zip-ties.



**Figure 17: Applied Torque Seal**

### 5.2.1 SECURE ALL CABLES

Verify that all cables are secured with proper connections to components. Coil and secure loose or excess cable and ensure that it is out of the way of normal vehicle operations. Additionally, verify that cables are not stretched and do not rub on vehicle components, which could cause unexpected wear.



Figure 18: Secured Cables

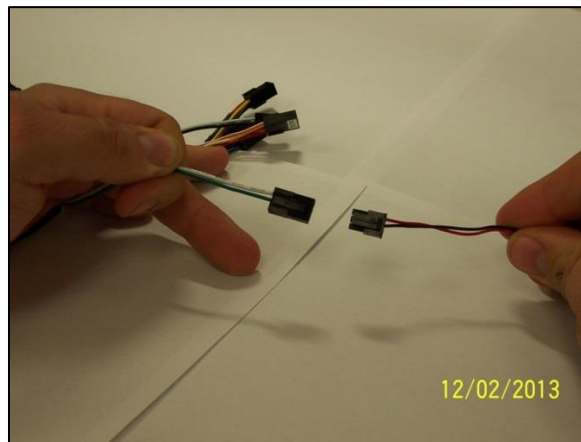
### 5.3 OPTIONAL BUZZER ASSEMBLY CABLE

The LMU-26xx can be used to provide a connection to an in-cab buzzer to provide driver behavior feedback for specific conditions, such as hard braking, hard acceleration and exceeding a defined speed threshold. You must connect the Buzzer Assembly Cable (P/N 4C765) to the LMU-26xx Power Accessory Cable (P/N 5C260 or 5C261) and mount the buzzer to a metal or plastic surface of the vehicle. This cable can be used in combination with the Switch with LED Button Cable (P/N 4C764).

**Note:** To install the Buzzer Assembly Cable with the LMU-26xx, you must order the Power Accessory Cable P/N 5C260 or 5C261 – See Section 3.1 “Available Wiring Harness”.

#### To Connect the Buzzer Assembly Cable:

1. Plug in the 3-pin connector on the Buzzer Assembly Cable to the 3-pin connector on the LMU26xx Power Accessory cable: (P/N:5C260 or 5C261 – See Section 3.1 “Available Wiring Harness”).



**Figure 19: Connect Buzzer Assembly to the LMU-26xx Power Accessory Cable 5C260 or 5C261**

2. Mount the buzzer using zip-ties to the secured wiring harness or surface of the vehicle.
  - You reduce the buzzer noise level by applying heavy tape over the buzzer opening or reduce even further by wrapping the buzzer in high density foam or plastic.



**Figure 20: LMU-26xx Buzzer Assembly Connected**

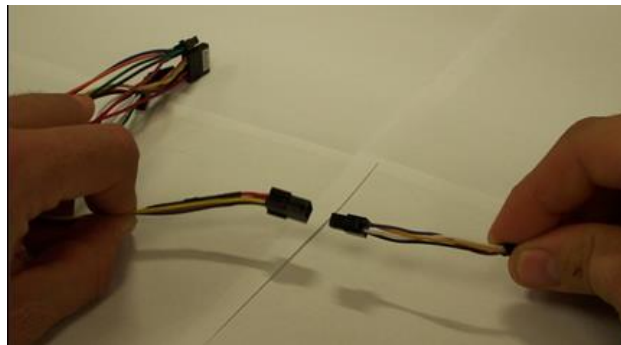
## 5.4 OPTIONAL SWITCH WITH LED CABLE WITH BUZZER

The LMU-26xx can be used to provide a connection to an LED light to provide driver behavior feedback for specific conditions, such as hard braking, hard acceleration and exceeding a defined speed threshold. You must connect the Switch with LED Cable (P/N 4C764) to the LMU-26xx Power Accessory Cable (P/N 5C260 or 5C261) and mount the LED light on the dashboard. The Switch with LED Button Cable can be used in combination with the Buzzer Assembly Cable (P/N 4C765).

**Note:** To install the Switch/LED Cable with the LMU-26xx, you must order the Power Accessory Cable (P/N 5C260 or 5C261 – See Section 3.1 “Available Wiring Harness”), which is sold separately.

### To Install the LED Button Switch:

1. Determine best placement for LED button on dashboard, and then drill a ½” hole in the dashboard.
2. Remove the nut and washer from the cable, and then feed the wire through the hole until the LED button is seated in place.
3. Feed the washer and nut up the cable and secure to the back of the LED button in place.



**Figure 21: Connect Switch with LED cable to LMU-26xx Power Accessory Cable**

4. Plug the 4-pin square connector on the Switch with LED Cable in the 4-pin square connector on the LMU-26xx Power Accessory Cable (5C260 or 5C261).
5. As an option to drilling a hole in the dashboard, you can purchase a mounting bracket to secure the LED button in place, such as P/N 55205K2 available from [www.McMaster.com](http://www.McMaster.com).

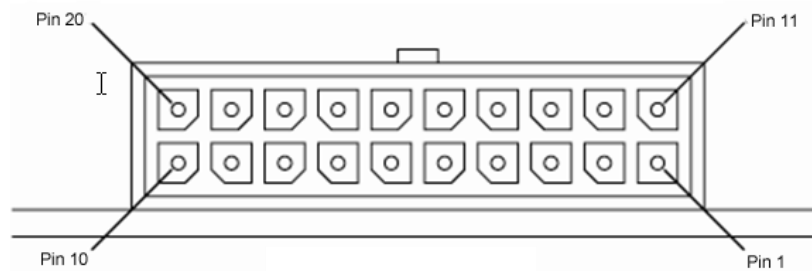


**Figure 22: LMU-26xx Switch/LED Assembly Connected**

## 5.5 CONNECT OPTIONAL INPUTS

The LMU-26xx wiring harness comes populated with 4-digital input leads. Use these leads to monitor status changes for a particular auxiliary device. For example, a boom switch or Power Take Off (PTO). You can extend these leads using a splice butt and the appropriate length 22AWG wire commonly available at an automotive parts store or Home Depot.

Standard Wiring Harness (P/N 5C908) Inputs:	Buzzer/LED Wiring Harness Inputs (P/N 5C260 and 5C261)
Input 1 – Pin 3 (Blue)	Input 1 – Pin 3 (Blue)
Input 2 – Pin 12 (Orange)	Input 2 – Pin 12 (Orange)
Input 3 – Pin 6 (Violet)	
Input 4 – Pin 7 (Grey)	



**Figure 23: LMU-26xx Connectors**

## 5.6 INSTALL OPTIONAL SERIAL CABLES

The LMU-26xx Power Accessory Cables have two serial ports: AUX1 and AUX2. Each wiring harness comes with both ports pinned out to individual 5-pin Molex pigtail connectors.

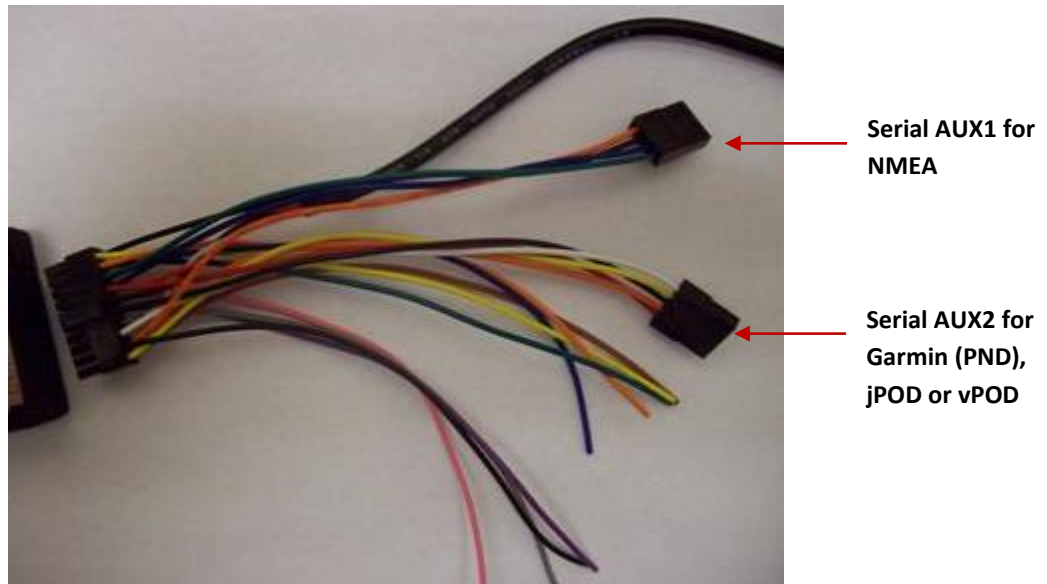


Figure 24: LMU-26xx Standard Wiring Harness and Connectors

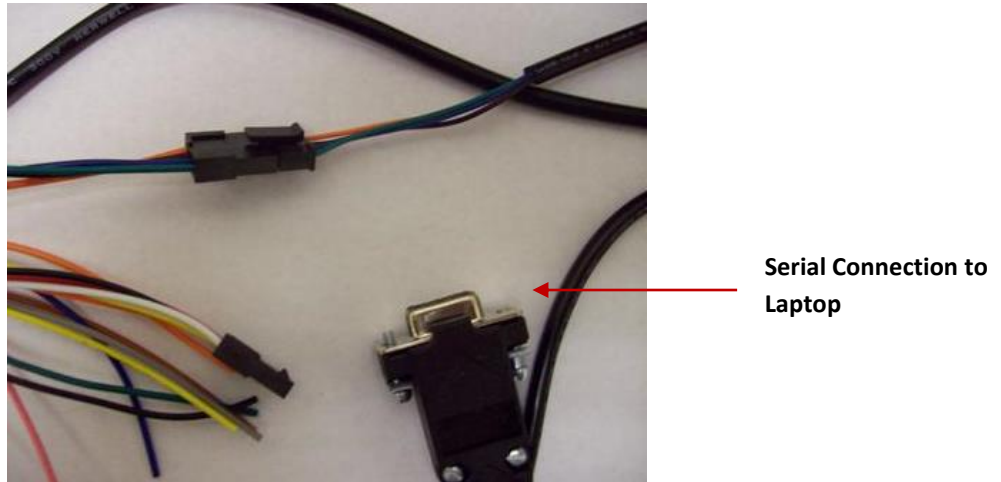
**IMPORTANT:** The wire colors used on the vPOD and jPOD are confusing in this application. The colors match those of the AUX1 port on the harness, however the devices actually go to AUX2 port.

### 5.6.1 SERIAL/HOST/AUX 1

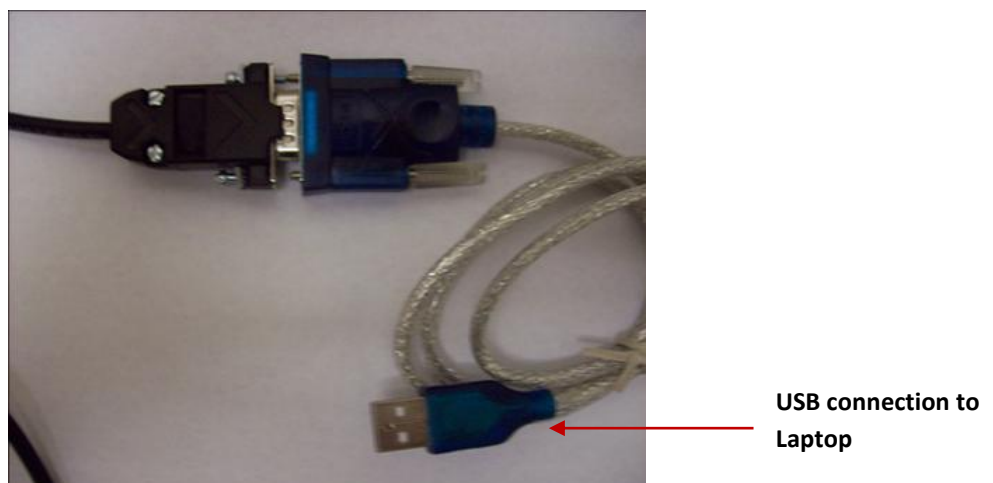
The Serial AUX1 port provides a standard serial NMEA stream to an in-vehicle computing device, such as a laptop. This port is identified by the blue and green wires pinned to one of the Molex connectors. In order for the LMU-26xx to provide NMEA, you must install the CalAmp DB9 Cable (P/N 133337-5). This cable comes with the correct Molex connector mate.

#### **To Install the DB9 Cable via AUX1 Serial Port:**

1. Connect the DB9 Cable to the LMU-26xx AUX1 serial port, and then connect the DB9 serial connector to an available serial port on the laptop (Figure 25).
- Choose the appropriate COM port on the laptop device. If there is no available serial port, use a serial to USB adapter (Figure 26). These are readily available for purchase either online or in retail electronic product stores.
2. Secure the DB9 connection by wrapping it with electrical tape. If the LMU-26xx is powered up, NMEA will begin working without further configuration.



**Figure 25: LMU-26xx DB9 Serial Connection**



**Figure 26: LMU-26xx DB9 Serial Connection**

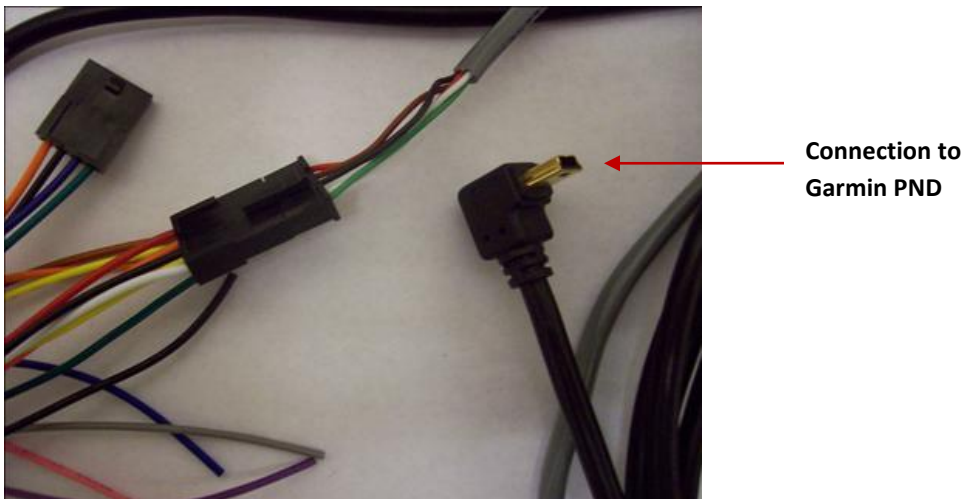


### 5.6.2 SERIAL/AUX 2 – GARMIN SERIAL CABLE

The Serial/AUX2 port can be used to provide a connection to a CalAmp certified Garmin Personal Navigation Device (PND). You must install the Garmin Serial Cable (P/N 133688) to establish the connection between the LMU-26xx and the Garmin PND. This cable comes with the correct Molex connector mate.

#### **To Install the Garmin Cable via AUX2 Serial Port:**

1. Connect the Garmin Serial Cable's 5-pin serial to the LMU-26xx AUX2 serial port.
  - You can identify the LMU-26xx AUX2 serial port by the white/orange and white/yellow wires pinned to one of the Molex connectors.



**Figure 27: LMU-26xx and Garmin PND Cable Connection**

2. Connect the Garmin Serial Cable to the certified Garmin PND.
3. If the LMU-26xx is powered on, communications between the LMU-26xx and the Garmin PND will begin working without further configuration.



### 5.6.3 SERIAL/AUX2 – jPOD ADAPTER AND jPOD CABLE

The Serial/AUX2 port provides a connection to the vehicle's diagnostic port to read and report heavy-duty engine condition and performance data, such as engine temperature and fault codes. You must install the jPOD Adapter (P/N 134152) and jPOD Cable (5C909-2) to access the vehicle bus data. The cable typically is made up of a 9-Pin Deutsch connector to a male DE-15 connector.



Figure 28: jPOD Adapter (PN: 134152)



Figure 29: jPOD Cable (PN: 5C909-2)



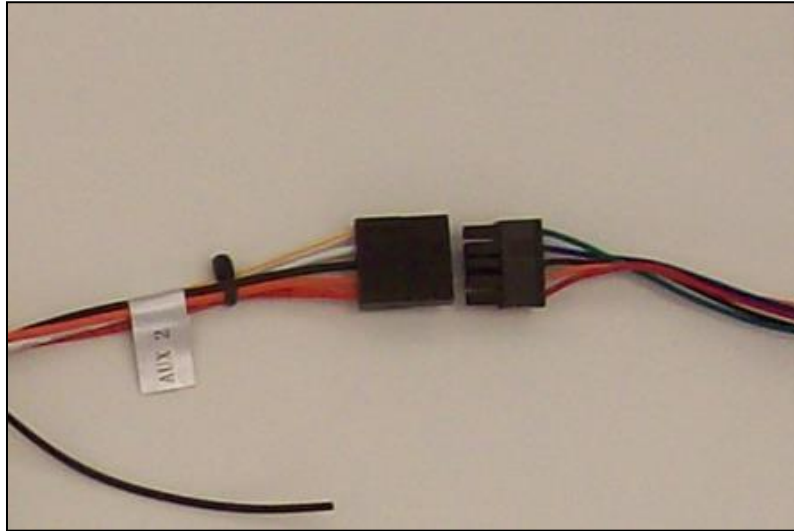
Figure 30: 6-pin j1708 Cable. (PN: 8973002002)



Figure 31: 9 PIN JBUS J1936 TO 6 PIN J1708  
ADAPTER CABLE (PN:8973002001)

**To Install the jPOD Adapter and jPOD Cable via AUX2 Serial Port:**

1. Contact Customer Support, select the Installation option (#1), and then request the Over-the-Air (OTA) LMU-26xx device update before installing the jPOD Adapter and jPOD Cable.
  - a. It's recommended to use Wiring Harness 5C261 for JPOD installations – see section 3.1. When the device is installed with the JPOD, the device receives power through the JPOD connection so the 6ft of power cord as part of harness 5C260 is not needed. 5C261 has the unnecessary power cable removed.



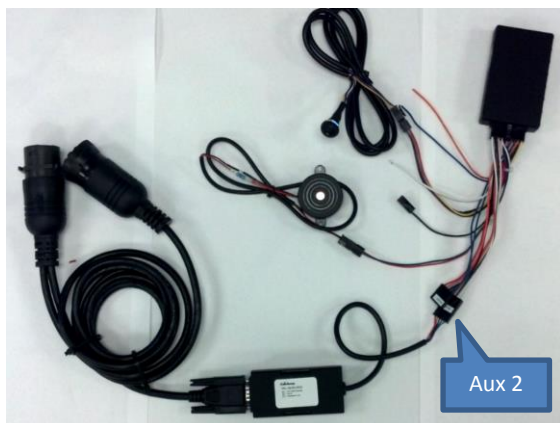
**Figure 32: AUX2 Connection**

2. Connect the jPOD Adapter's 5-pin serial to the LMU-26xx AUX2 connector of wiring harness 5C260 or 5C261, see section 3.1 "Available Wiring Harness" (Figure 32).
- You can identify the LMU-26xx AUX2 serial port by the white/orange and white/yellow wires pinned to one of the Molex connectors. **Note the AUX1 port will have wire colors matching the jPOD, but this is coincidental and should be ignored.**

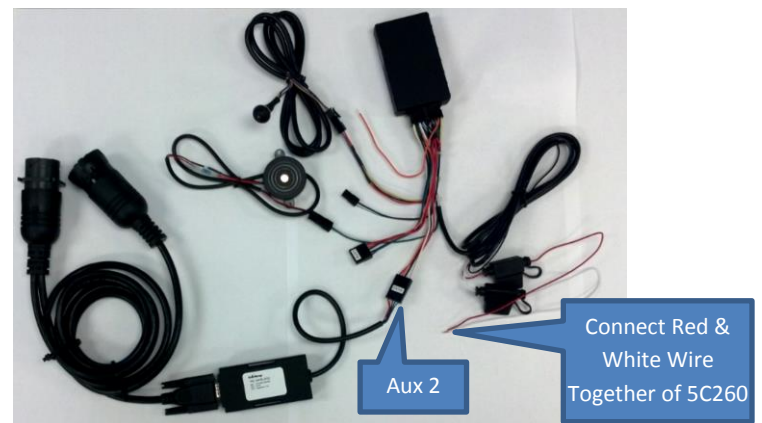


**Figure 33: Connect jPOD Cable and jPOD Adapter Using Serial Connector**

3. Detach the vehicle's existing Jbus port by removing the retaining screws (save screws for next step). If the vehicle has a 6 pin DIN connector, either use the 8973002002 Y cable instead of the 5C909-2 9 pin Jbus cable, OR use the 6 pin to 9 pin adapter cable 8973002001.
4. Using the retaining screws, attach the jPOD Adapter in place of the vehicle's Jbus port.
5. Plug the Jbus male connector of the jPOD Cable into the jPOD Adapter seated in the vehicle's OBD-II port.
6. Connect the jPOD Cable to the serial connector of the jPOD Adapter.
7. Ensure that all cables are secured with proper connections to the components. Coil and secure loose or excess cable, and ensure it is out of the way of normal vehicle operations. Verify that cables are not stretched and do not rub on vehicle components, which could cause unexpected wear.
8. **If using the Buzzer and JPOD with the 5C260 harness you must connect the Red and White wires together.**



LMU-26xx with 5C261 Cable and jPOD Assembly



LMU-26xx with 5C260 Cable and jPOD Assembly

**Figure 34: LMU-26xx and jPOD Assembly**

#### 5.6.4 SERIAL/AUX 2 – vPOD ADAPTER

The vPOD Adapter (133917-VPOD) enables the LMU-26xx device to connect to the vehicle bus data. This cable reports on-board diagnostic computer data (Diagnostic Trouble Codes – DTCs), fuel efficiency reporting, true speed, true ignition-on and true odometer values. The vPOD supplies power to the LMU-26xx when connected to the vehicle's OBD-II port so wiring harness 5C261 is the preferred harness for a cleaner install. vPOD white wire is the "Ignition" wire and is used to provide true ignition by connecting it to the white wire of harness 5C261, 5C260 or 5C908.

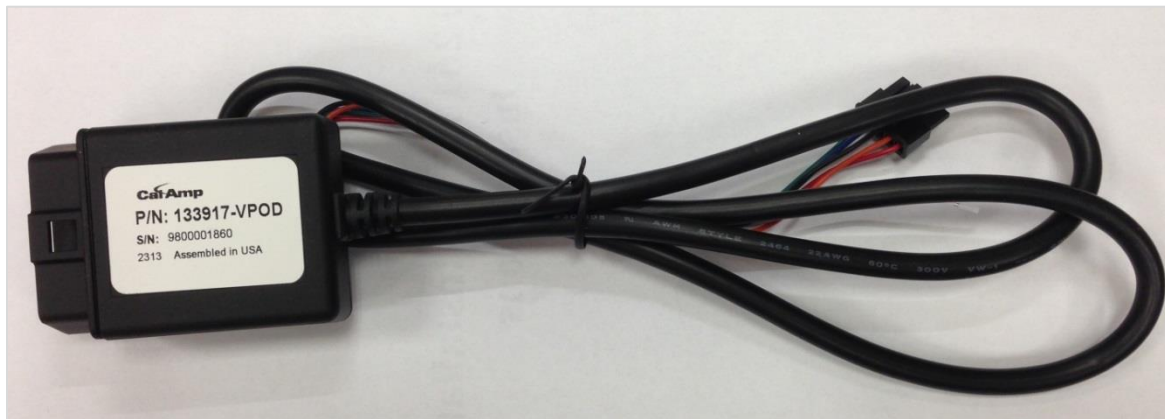


Figure 35: vPOD Adapter (133917-VPOD)

### 5.6.4.1 Install vPOD VIA AUX2 SERIAL PORT

1. Contact Customer Support, select the Installation option (#1), and then request the Over-the-Air (OTA) LMU-26xx device update before installing the vPOD Adapter.

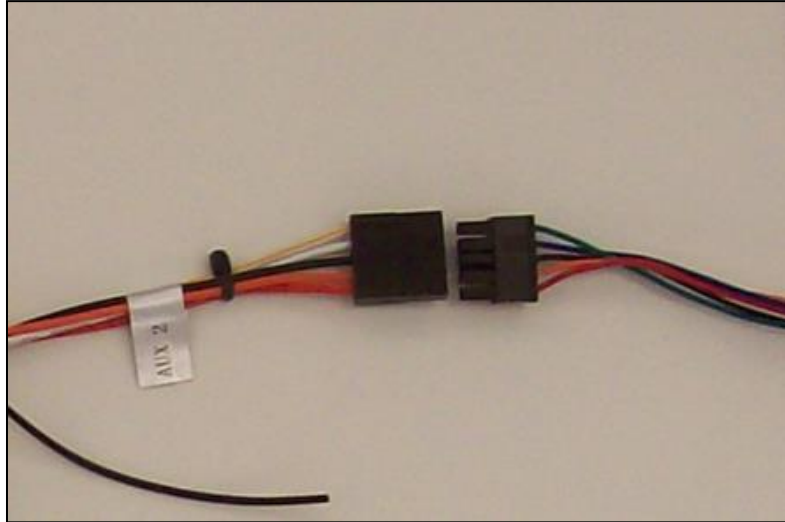
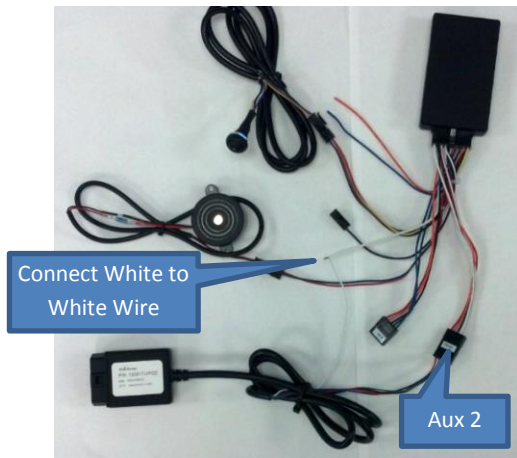


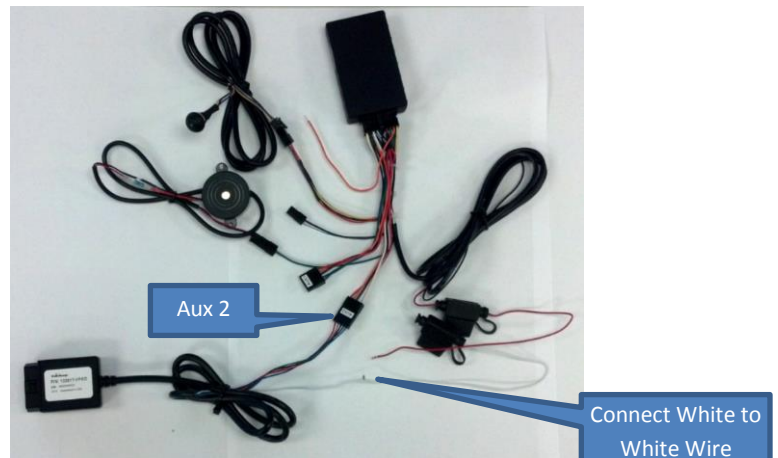
Figure 36: AUX2 Connection

2. Connect the vPOD Adapter's 5-pin serial connector to the LMU-26xx AUX2 connector of wiring harness 5C908, 5C260 or 5C261, see section 3.1 "Available Wiring Harness" (Figure 36).
3. You can identify the LMU-26xx AUX2 serial port by the white/orange and white/yellow wires pinned to one of the Molex connectors. All 3 Wiring Harness options have the AUX2 connector. **Note the AUX1 port will have wire colors matching the jPOD, but this is coincidental and should be ignored.**
4. Ignition sense Connection
  - a. Connect the LMU-26xx White Ignition Wire of 5C260 or 5C261 to the vPOD Adapter's (133917-VPOD) White Ignition Wire using a Butt Splicer (Figure 38 or 39):
    - i. Strip the Ignition Wire of the vPOD Adapter, place in one end of the Butt Splice and then crimp the end.
    - ii. Strip the Ignition Wire of the LMU-26xx device wire harness 5C260 or 5C261, place in the other end of the Butt Splice and then crimp the end.
  - b. Insulate and secure the power connections:
    - i. Using electrical tape insulate the power connection.
    - ii. To ensure a tamper resistant connection, apply wire ties over the tape at the connection point and torque seal applied to the wire ties.

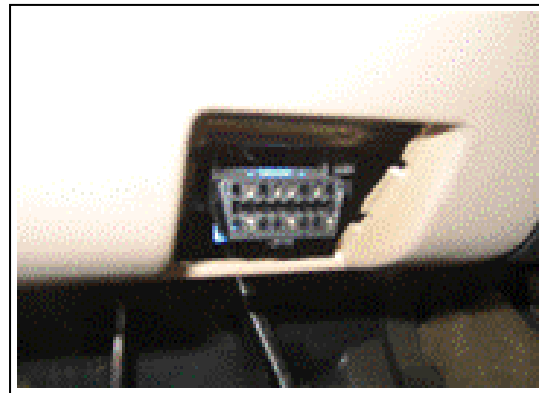
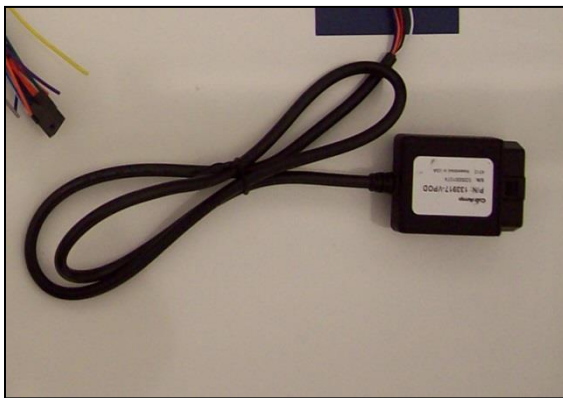
- iii. Use care to prevent accidentally shorting any connections. Power Connections should meet aftermarket electronics industry installation practices



**Figure 37:** vPOD With Harness 5C261



**Figure 38:** vPOD With Harness 5C260 or 5C908



**Figure 39:** vPOD Adapter and Vehicle OBD-II Port

1. Plug the vPOD Adapter directly into the vehicle's OBD-II port (Figure 40).
  - The vehicle's OBD-II port is located within three feet of the steering column. Consult the vehicle owner's manual if you have trouble finding the port.
2. Ensure that all cables are secured with proper connections to components. Coil and secure loose or excess cable, and ensure it is out of the way of normal vehicle operations. Verify that cables are not stretched and do not rub on vehicle components, which could cause unexpected wear.

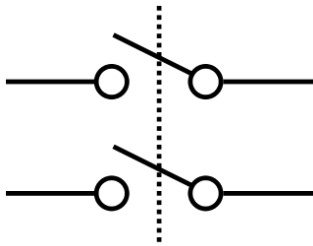


### 5.6.5 PRIVACY SWITCH

A privacy switch can be used to prevent the unit from reporting any location information. To do this, select a DPST switch for mounting on the vehicle dash, preferably with an illumination lamp indicating it is on. The more typical switch will light up in the “on” condition and indicate a closed circuit, so unless you select a Normally Closed (NC) switch, the switch will be lit when in the reporting condition. Turning the switch and light off will cause it to stop reporting.

One pole should be wired between the ignition wire of the vehicle/vpod and the white wire input of the device harness. This will normally be wired such that the privacy switch disconnects these two wires when in the “OFF” position, thus preventing the device from receiving an ignition on event from the vehicle. An “ON” condition, when the switch is lit, will indicate the device is getting the ignition on message and is reporting normally.

Additionally, we recommend the use of one digital input to send a message that will appear in FleetOutlook when privacy mode is on. To do this, splice a wire into the red power wire and connect it to the second pole of the privacy switch. The other end of that switch pole should be wired to an input on the device. The switch will open the circuit when the privacy switch is in the “OFF” position. Set an alert to appear in the breadcrumb detail by creating a Device Condition Change alert in FO. Note that you need to define the input on the device so that Privacy mode will be active when power is removed from the input.



**Figure 40 - DPST switch diagram**



**Figure 41 – Example illuminated rocker switch**

**Figure 42 - Setup in Device Admin**

### **5.6.6 SECURE ALL CABLES**

Verify that all cables are secured with proper connections to components. Coil and secure loose or excess cable and ensure that it is out of the way of normal vehicle operations. Additionally, verify that cables are not stretched and do not rub on vehicle components, which could cause unexpected wear.



## 5.7 VERIFY LMU-26XX OPERATIONS

Installers should verify that the GPS and communications functions of the LMU-26xx are working properly before departing the installation site. Installation is complete and successful when you have tested the three sections listed below against the device:

- **5.2.3 COMM VERIFICATION**
- **5.2.4 GPS VERIFICATION**
- **5.2.5 INBOUND VERIFICATION**

### 5.7.2 STATUS LEDS

The LMU-26xx is equipped with two Status LEDs: one for COMM (wireless network status) and one for GPS. The LEDs use the following blink patterns to indicate service:

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

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

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

Condition	LED 2
GPS Off	Off
GPS On	Slow Blinking
GPS Time Sync	Fast Blinking
GPS Fix	Solid

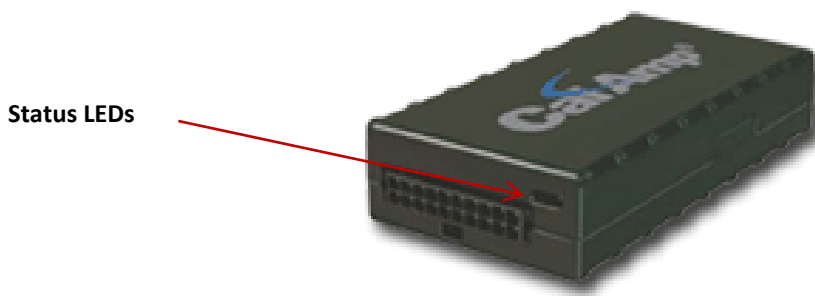


Figure 43: Location of Status LEDs

### 5.7.3 COMM VERIFICATION

Installers should first verify that the device has acquired a cellular signal and has registered to the wireless network before completing installation. If this LED is solid, then the device has registered to the network and established a data session. Acquiring the wireless network and establishing communication can take several minutes.

### 5.7.4 GPS VERIFICATION

Next, verify that the GPS receiver is seeing enough satellites to obtain a valid GPS position. If the green LED is solid, then the device has found GPS service.

### 5.7.5 INBOUND VERIFICATION

Lastly, verify that the device is sending data to the correct server. This is a two-step process and requires a user to be logged in FleetOutlook. First, force the device to send in an Ignition On event by turning the ignition key to the forward position. Second, open the breadcrumb detail for the corresponding vehicle in FleetOutlook. If the device is reporting properly, you should see an Ignition On event on the Tracking | Breadcrumb Detail tab.


Map	Vehicle Summary	Asset Summary	Breadcrumb Detail			
Breadcrumb Detail: VN-308 - Anton Desraili (04/24/2013 12:00 AM - 04/25/2013 12:00 AM)						
Time	Status	Latest Event	Location	Odometer	Alert Detail	
08:03 AM EDT		IGN On(0hr 2min)	[110 County Road 202 / County Road 203 Falfurrias TX 78355] Falfurrias Office	46,904 ...		

Figure 44: FleetOutlook Reporting Verification

## 5.8 GUIDELINES FOR TROUBLESHOOTING COMMON PROBLEMS

The most common problems with the LMU-26xx installations are power connections and installation location. The following table outlines potential problems with the LMU-26xx installation and suggestions to resolve the issues.

**Note:** If you cannot resolve the problem, request a Return Material Authorization (RMA) by calling 1.866.456.7522.

Symptom	Suggestions
No COMM or GPS LED's	<ul style="list-style-type: none"><li>Recheck power connections. Be sure the red wire is connected to constant +12V.</li><li>Be sure the inline fuse holders contain fuses.</li></ul>
COMM LED continues to blink beyond an acceptable amount of time.	<ul style="list-style-type: none"><li>Note the device ESN and IMEI numbers on the device label. Call 1-866-456-7522 to verify the unit has been activated on the cellular network.</li></ul>
GPS LED is mostly off, but blinks on.	<ul style="list-style-type: none"><li>Verify the device has good visibility of the sky. If metal objects shadow the device, the device may have difficulty acquiring a valid position fix or work intermittently.</li><li>Verify the device is installed with the "label-side up" facing towards the sky.</li></ul>

## 6 DE-INSTALLATION INSTRUCTIONS

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Follow the instructions below for field de-installation of the LMU-26xx.

1. Identify the location of the installed device.
2. If re-closable fastener tape holds the LMU-26xx in position, remove the LMU-26xx from the vehicle by separating the re-closable fastener tape.
3. If necessary, cut any zip-ties and discard.
  - To install a new device, you will need new zip-ties.
4. Disconnect the primary 20-pin wiring harness from the device.
5. Ensure the wiring harness is in an available position for new device installation.

## 7 WARRANTY

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CalAmp Corp. warrants that upon shipment to Customer from supplier's facility and for the Warranty Period, hereinafter defined, the Equipment shall be free from defective materials and faulty workmanship and capable of accessing the Service ("Good Working Order"). The warranty provided herein shall not apply to (i) hardware normally consumed in operation such as fuses, cables, or mounting brackets, (ii) defects which, due to no fault of CalAmp Corp, are the result of improper use or maintenance of the Equipment, (iii) improper operation of the Equipment used with other equipment, (iv) Equipment which, due to no fault of CalAmp, has been subjected to any kind of detrimental exposure or has been involved in any accident, fire, explosion, Act of God, or any other cause not attributable to CalAmp, (v) any Equipment which has been altered or repaired by any party other than CalAmp without CalAmp's prior consent, (vi) any Equipment sealed against the weather whereby the seal has been broken without CalAmp's prior consent, or (vii) any Equipment hardware or software, including any revisions provided by CalAmp, which has been improperly stored, installed or implemented. Customer shall de-install and return (unless otherwise directed by CalAmp) the failed Equipment to CalAmp. CalAmp shall return the Equipment, or a new or reconditioned unit, at CalAmp's option, free of charge to Customer via best way ground, unless otherwise specified by Customer (with additional costs thereof to Customer's account), during the one year from shipment ("Warranty Period"). CalAmp's warranty obligation is limited to restoring the Equipment to Good Working Order. The repaired or replacement Equipment is warranted for the remainder of the original Warranty Period.

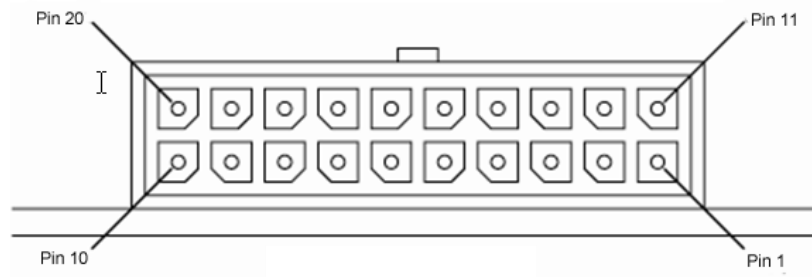
## APPENDIX A – LMU-26XX ACCESSORY CABLES AND PIGTAIL WIRING INSTRUCTIONS

### PRIMARY CONNECTOR

The LMU-26xx uses a Male (pin) Molex Micro-Fit 3.0TM Dual Row, 20 circuit header to receive power, ground and supply input and output signals. The pin out is as follows:

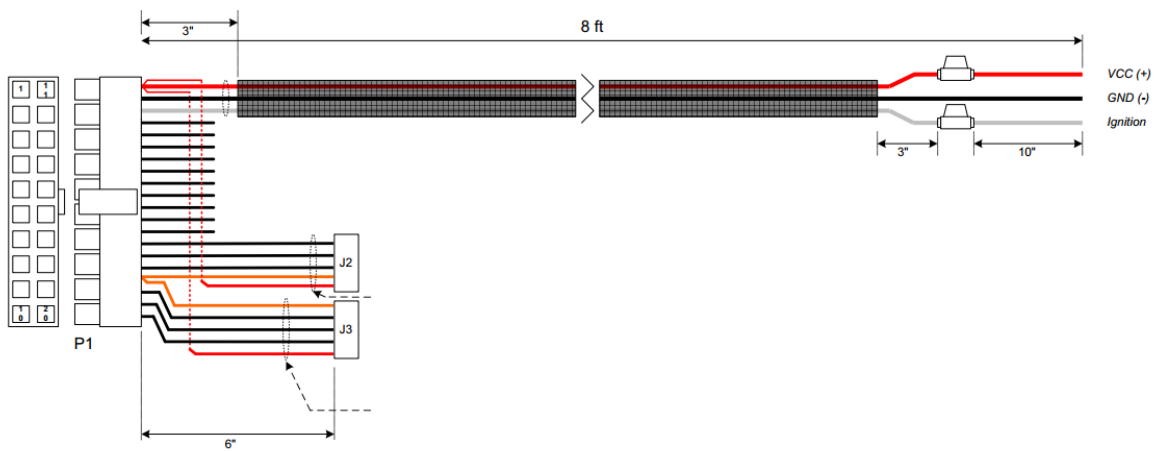
Wire	Signal Name	Description	Color	Input or Output	Usage
1	GND	Ground	Black (22 AWG)	Ground	AUX1
2	OUT-0	Output 0 –Started Disable Relay Driver	Green (22 AWG)	Output	Not Used
3	IN-1	Input 1 – Digital Input	Blue	Input	Optional
4	TXD	Host TxD	Blue	Input	AUX1
5	ADC-1	Analog to Digital Input 1	Pink	Input	Not Used
6	IN-3	Input 3 – Digital Input	Violet	Input	Optional
7	IN-4	Input 4 – Digital Input	Grey	Input	Optional
8	IN-0	Input 0	White	Ignition Input	Required
9	V <sub>DD</sub>	VDD Reference Output (20-25mA Max)	Orange (22 AWG)	Output	AUX1/AUX2
10	OUT-1/BOOT	Output 1 – Digital Output (Open Collector)/BOOT Input	Brown (22 AWG)	Input/Output	Not Used
11	OUT-2	Output – 2 Digital Output (Open Collector)	Yellow (22 AWG)	Output	Not Used
12	IN-2	Input 2 – Digital Input	Orange (22 AWG)	Input	Optional
13	RxD	Host RxD	Green (22 AWG)	Output	AUX1
14	V <sub>CC</sub>	Primary Power Input	Red (20 AWG)	Power	Required
15	GND	Primary Ground	Black (20 AWG)	Ground	Required
16	1BB-GND	1 Bit Bus Ground	Black (22 AWG)	Ground	Not Used
17	1BB-D	1-Bit Bus Data	White/Blue	Input/Output	Not Used
18	AUX-TxD	Aux Port – Transmit Data	White/Orange	Input	AUX2

Wire	Signal Name	Description	Color	Input or Output	Usage
19	AUX- GND	Aux Port - Ground	Black	Ground	AUX2
20	AUX-RxD	Aux Port – Receive Data	White/Yellow	Output	AUX2

**Figure 45: LMU-26xx Connectors**

**LMU-26XX – FULL I/O WIRING HARNESS – P/N 5C908**

This harness provides the complete set of I/O connectors including fused Power and Ignition lines.



**Figure 46: Full I/O Wiring Harness**



## LMU-26XX - SERIAL ADAPTER

Two additional parts are required to add a host serial adapter to the LMU-26xx:

- **Part Number 133360:** Serial Pigtail Adapter. This is connected to 5C908 to provide a connection for the Serial Adapter itself.
- **Part Number 133337-5:** Serial Adapter.

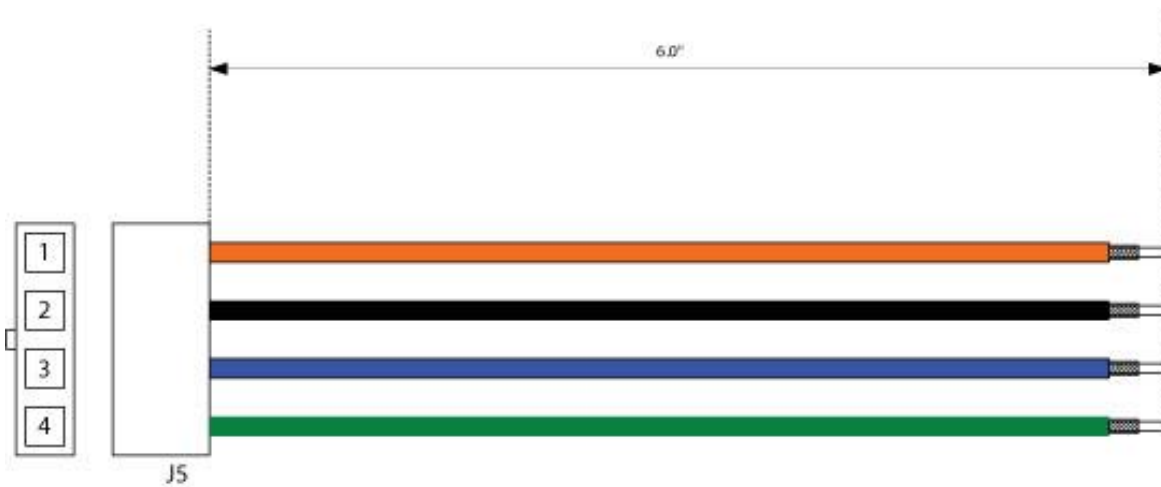


Figure 47: LMU-26xx Serial Pigtail Adapter

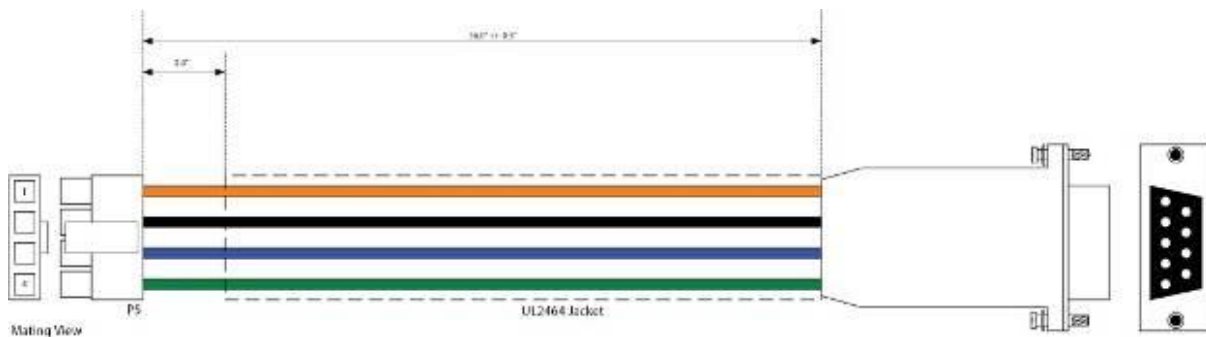


Figure 48: LMU-26xx DB9 Serial Cable

## 7.1 BUZZER AND CABLE ASSEMBLY – P/N 4C765

This cable is used to connect an in-cab buzzer to the LMU-26xx. The ground wire must be connected to the desired output line on the LMU-26xx. The power wire of the buzzer must be installed to the main power line for the LMU-26xx. When the LMU-26xx sets the output to ground the buzzer will sound.

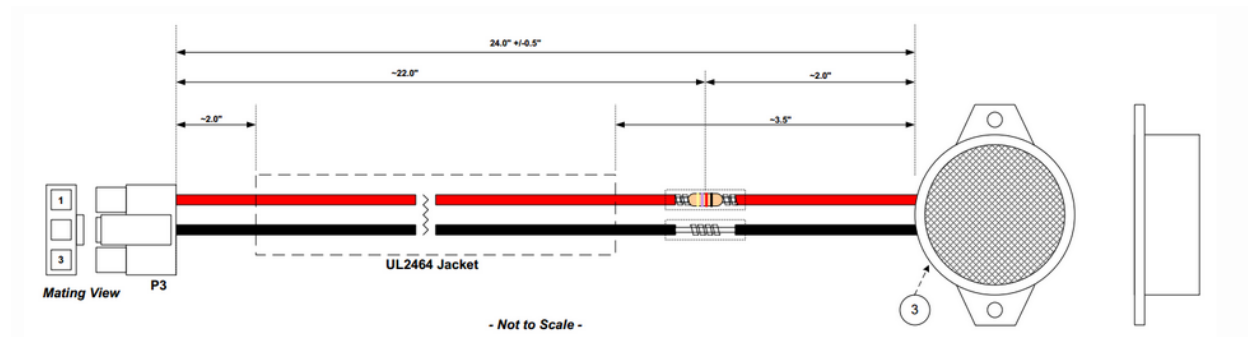


Figure 49: Buzzer and Cable Assembly

## 7.2 GARMIN TO 5-PIN SERIAL CABLE – P/N 133688

This cable is used to connect a certified Garmin PND to the LMU-26xx. The Garmin 5-pin connector plugs into the serial AUX2 cable on the LMU-26xx. The Garmin connector must be plugged into the back of the certified Garmin PND.

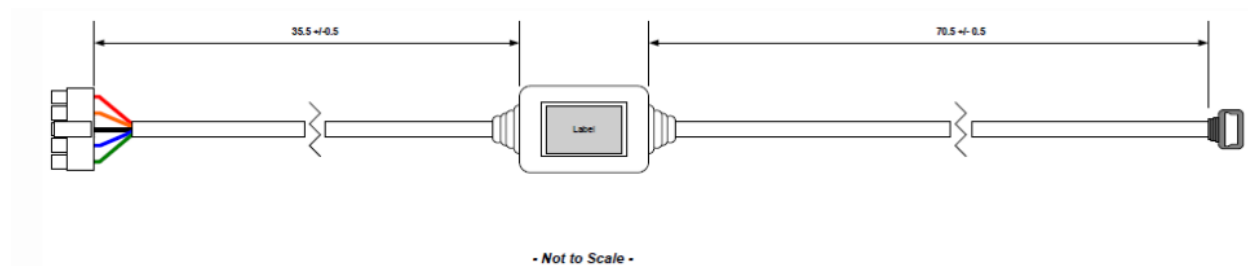


Figure 50: Garmin to 5-Pin Serial Cable

### 7.3 jPOD ADAPTER – P/N 134152-JPOD

The jPod Adapter connects to the jPOD Cable, enabling the LMU-26xx to report vehicle diagnostic data. The jPOD Adapter must be installed with the jPOD Cable (P/N 5C909).

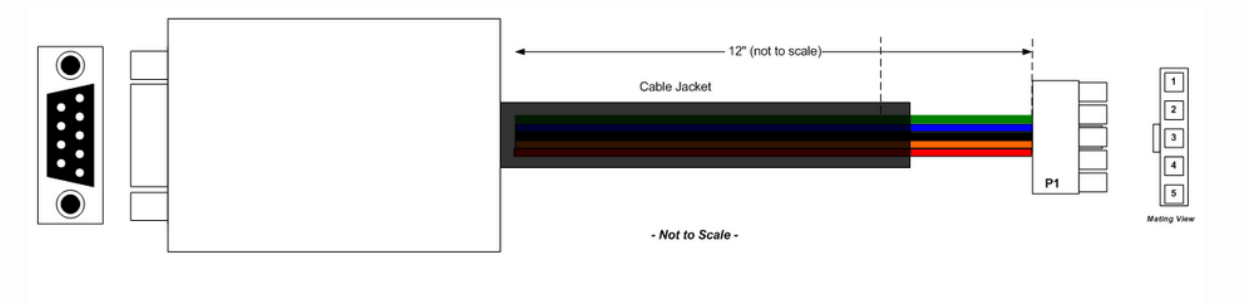


Figure 51: jPOD Adapter

### 7.4 vPOD 5-PIN SERIAL OBD-II ADAPTER – P/N 133917

The vPOD Connector enables the LMU-26xx to read the OBD-II information from the vehicle, and can be used to provide the LMU-26xx with power, ground and ignition, in a quick installation.

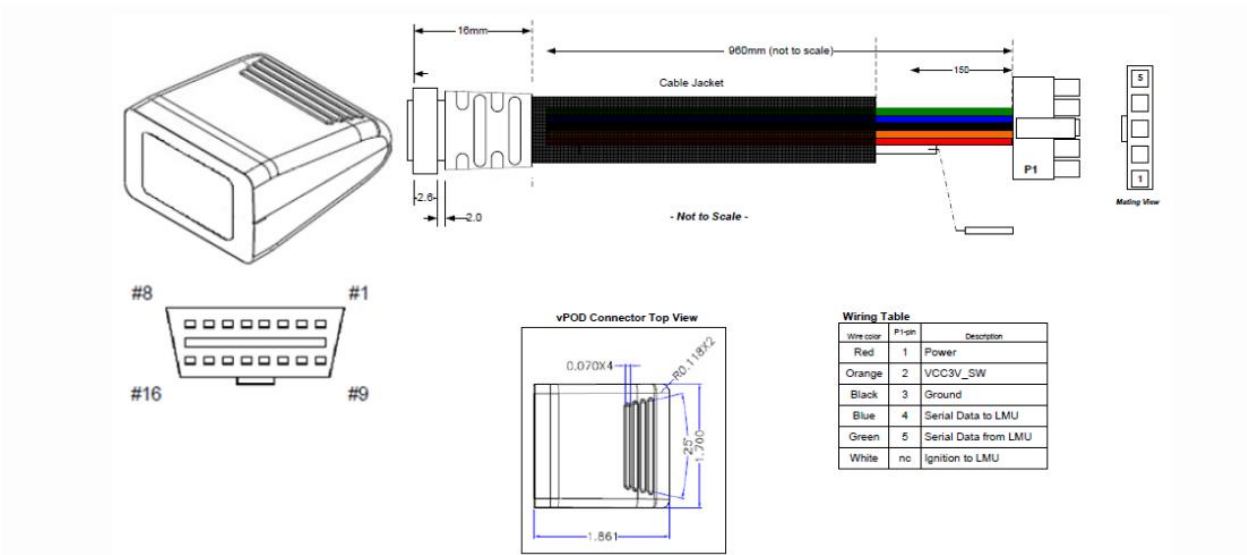


Figure 52: vPOD 5-Pin Serial OBD-II Adapter

## 8 CUSTOMER SUPPORT CONTACT INFORMATION

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CalAmp's Customer Support team stands beside you to ensure any concerns you have with any element of your solution – application, hardware or operations – are addressed quickly and completely.

- U.S.-based 24x7x365 via toll-free number or email.
- Fully trained representatives with multiple tiers of escalation.
- E-mail acknowledgment and status visibility of your issue 100% of the time.

Contacting Customer Support	
Phone:	866.456.7522 – Select #1 for Installation Support
Support Email:	<a href="mailto:solutionsupport@calamp.com">solutionsupport@calamp.com</a>