LMU-3240

CalAmp LMU-3240 Hardware and Installation Guide – Rev. 1.0

CALIFORNIA PROPOSITION 65

WARNING: This product can expose you to chemicals including Carbon black and Nickel, which are known to the State of California to cause cancer, and including Bisphenol A and 1,3-Butadiene, which are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

Table of Contents

1 Introduction 4
1.1 About This Manual 4
1.2 About The Reader 4
1.3 About CalAmp 4
1.4 About the CalAmp Location Messaging Unit-LMU-3240™ 5
2 System Overview 6
2.1 Overview 6
2.2 Component Descriptions 7
2.2.1 Wireless Data Network 7
2.2.2 LMU-3240™ 7
2.2.3 LM Direct™ Server 7
2.2.4 Backend Software 7
2.2.5 PULS™ 8
2.2.6 LMU Manager™ 8
2.2.7 Wireless Data Network 8
2.2.8 LMU-3240™ 8
3 Hardware Overview 9
3.1 Location Messaging Unit-LMU-3240™ 10
3.1.1 LMU-3240™ Handling Precautions 10
3.1.2 Battery Back-up devices 11
3.1.3 Environmental Specifications 12
3.2 LMU-3240™ Connectors 14
3.2.1 Primary Connector 14
3.2.2 Serial Adapter 16
3.2.3 Accessories 16
3.3 I/O Descriptions 16
3.3.1 3-Axis Accelerometer + 3-Axis Gyroscope 17
3.3.2 Status LEDs 17

4 Installing the LMU 18
4.1 Preventing Accidental or Unauthorized Modification 18
4.2 Installing the LMU in a vehicle 18
4.3 Installation Verification 20
4.3.1 Comm Verification 20
4.3.2 GPS Verification 21
4.3.3 Inbound Verification 22
4.3.4 Verification via SMS 23
5 CalAmp Locations 26
6 License Agreement 27
7 Limited Warranty 32
8 Regulatory Information 35

IMPORTANT: DO NOT INSTALL OR USE THE SOFTWARE OR DOCUMENTATION UNTIL YOU HAVE READ AND AGREED TO THE LICENSE AGREEMENT AND REVIEWED THE LIMITED WARRANTY AND REGULATORY INFORMATION.

1 Introduction

Welcome to the LMU-3240™ Hardware and Installation Guide. This manual is intended to give you information on the basic setup and installation of the CalAmp LMU-3240™ product(s) including hardware descriptions, environmental specifications, wireless network overviews and device installation.

1.1 About This Manual

The LMU-3240™ is a full featured OBD vehicle tracking device that is optimized for a diverse range of applications including driver behavior management, car rental and automotive applications. Best suited for accessing the vehicle diagnostics interface (OBD-II) in passenger or light-duty vehicles. In order to accurately describe the functionality of these units we have broken this manual into the following sections:

- System Overview – A basic description of a CalAmp LMU-3240™ based tracking system. This includes a description of roles and responsibilities of each of the CalAmp components as well as a brief overview of the wireless data technologies used by the LMU-3240™.
- Hardware Overview – Describes the physical characteristics and interfaces of the LMU-3240™.
- Installation and Verification – Provides guidance for the installation of the LMU-3240™ in a vehicle and instructions on how to verify the installation is performing adequately.

1.2 About The Reader

In order to limit the size and scope of this manual, the following assumptions have been made about the reader.

- You are familiar with GPS concepts and terminology
- You have some experience with installing equipment in vehicles
- You are familiar with the use of AT Commands
- You are familiar with the use of terminal programs such as HyperTerminal or PuTTY

1.3 About CalAmp

CalAmp is a leading provider of wireless communications products that enable anytime/anywhere access to critical information, data and entertainment content. With comprehensive capabilities ranging from product design and development through volume production, CalAmp delivers cost-effective high quality solutions to a broad array of customers and end markets. CalAmp is the leading supplier of Direct Broadcast Satellite (DBS) outdoor customer premise equipment to the U.S. satellite television market. The Company also provides wireless data communication solutions for

the telemetry and asset tracking markets, private wireless networks, public safety communications and critical infrastructure and process control applications. For additional information, please visit the Company's website at www.calamp.com.

1.4 About the CalAmp Location Messaging Unit-LMU-3240™

The CalAmp Location and Messaging Unit-LMU-3240™ (LMU-3240™) is a mobile device that resides in private, commercial or government vehicles. The LMU-3240™ is a single box enclosure incorporating a processor, a GPS receiver, a wireless data modem, and a vehicle-rated power supply. The LMU-3240™ also supports inputs and outputs to monitor and react to the vehicular environment and/or driver actions.

Flexibility

The LMU-3240™ features CalAmp's industry leading advanced on-board alert engine that monitors vehicle conditions giving you the most flexible tracking device in its class. The next generation PEG (Programmable Event Generator) script engine application supports hundreds of customized exception based rules to help meet customers' dynamic requirements.

This product & platform consists of a revamped hardware, smaller form factor, a powerful Linux based embedded software environment, along with many more capabilities to-come.

Customers can modify the behavior of the device to meet with a range of applications preprogrammed before shipment or in the field. Combining affordability and device intelligence with your unique application can give you distinct advantages over your competition. Seamlessly convert previous generation PEG script and upgrade to a more efficient, cost effective and robust platform, while greatly reducing maintenance efforts.

Over-the-Air Serviceability

The LMU-3240™ also incorporates CalAmp's industry leading over-the-air device management and maintenance system software, PULS™ (Programming, Updates, and Logistics System). Configuration parameters, PEG rules, and firmware can all be updated over the air. Our web-based maintenance server, PULS™ scripts, and firmware, can all be updated over-the-air. PULS™ offers out-of-the-box hands free configuration and automatic post-installation upgrades. You can also monitor unit health status across your customers' fleets to quickly identify issues before they become expensive problems.

2 System Overview

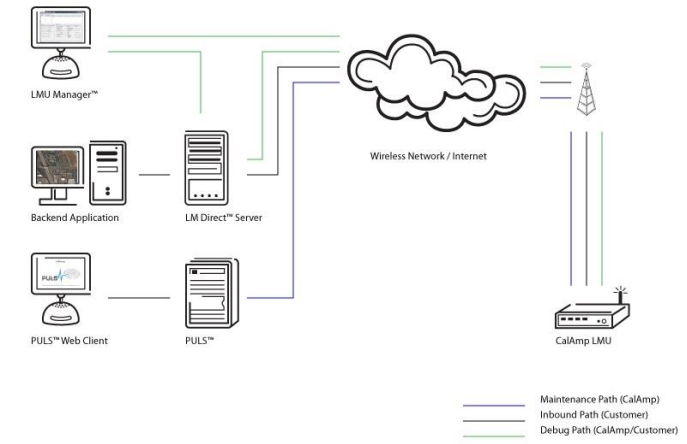
2.1 Overview

The entire purpose behind a fleet management system is to be able to remotely contact a vehicle, determine its location or status, and do something meaningful with that information. This could include displaying the vehicle location on a map, performing an address look-up, providing real-time driving directions, updating the vehicles ETA, monitoring vehicle and driver status or dispatching the vehicle to its next pick up.

These functions, of course, are completely dependent on the capabilities of the vehicle management application. The role of the CalAmp LMU-3240™ is to deliver the location information when and where it is needed.

A typical fleet management system based on a CalAmp device includes the following components:

- A wireless data network
- An LMU-3240™
- Host Device An LM Direct™ communications server
- Backend mapping and reporting software which typically includes mapping and fleet reporting functions
- PULS™
- LMU Manager™ version 8.9.0.2 or greater



2.2 Component Descriptions

2.2.1 Wireless Data Network

The Wireless Data Network provides the information bridge between the LM Direct™ server and the LMU3240™. Wireless data networks can take a variety of forms, such as cellular networks, satellite systems or local area networks. Contact the CalAmp sales team for the networks available to the LMU-3240™.

2.2.2 LMU-3240™

The LMU-3240™ is responsible for delivering the location and status information when and where it is needed. Data requests mainly come from the following sources:

- Converted PEG™ script within the LMU-3240™
- A location or status request from the LM Direct™ server
- A location or status request from LMU Manager
- An SMS request made from a mobile device such as a customer's cell-phone

In some cases, it is necessary to run an application in the vehicle while it is being tracked by the backend software. Such examples could include instant messaging between vehicles or a central office, in-vehicle mapping or driving directions, email or database access. In most of these cases you will be using the LMU-3240™ as a wireless modem as well as a vehicle-location device.

2.2.3 LM Direct™ Server

LM Direct™ is a CalAmp proprietary message interface specification detailing the various messages and their contents the LMU-3240™ is capable of sending and receiving. This interface allows System Integrators to communicate directly with LMU-3240's™. Please refer to the LM Direct Reference Guide for details.

2.2.4 Backend Software

Backend software is a customer provided software application. Regardless of its purpose, one of its primary functions is to parse and present data obtained from the LM Direct™ server. This allows the application to do any of the following:

- Display location database on reports received from the LMU-3240™ in a variety of formats
- Present historic information received from the LMU-3240™, typically in a report/chart style format
- Request location updates from one or more LMU-3240s™
- Update and change the configuration of one or more LMU-3240s™

2.2.5 PULS™

PULS™ (Programming, Update and Logistics System) is CalAmp's web-based maintenance server offering out-of-the-box hands free configuration and automatic post-installation upgrades. PULS™ provides a means for configuration parameters, PEG scripts, and firmware to be updated Over-The-Air (OTA) and allows CalAmp customers to monitor unit health status across your customers' fleets to quickly identify issues before they become expensive problems.

2.2.6 LMU Manager™

LMU Manager is the primary configuration tool in the CalAmp system. It allows access to almost every feature available to the LMU-3240™. Unlike the backend software, it has the option of talking directly to an LMU3240™ or making a request forwarded by the LM Direct™ server.

For further details on using LMU Manager, please refer to the LMU Manager Users Guide.

2.2.7 Wireless Data Network

The Wireless Data Network provides the information bridge between the LM Direct server and the LMU3240™s. Wireless data networks can take a variety of forms, such as cellular networks, satellite systems or local area networks. At this point in time, the networks available to the LMU-3240™ are:

LTE (Long-Term Evolution)

Long-term evolution (LTE) is the latest and rapidly growing global data transmission technology. Based on GSM and UMTS/HSPA standards, LTE is a standard of high-speed wireless data transmission and communication. Continuously evolving, LTE advancements continue to push data capacity and user experience on a global scale. With a peak downlink rate of 300 mbps, uplink rate of 75 mbps, LTE sits in 1.4 MHz to 20 MHz bands, while also supporting FDD, TDD, and not sacrificing data capability.

2.2.8 LMU-3240™

The LMU-3240™ is responsible for delivering the location and status information when and where it is needed. Data requests can come from any of the following sources:

- PEG™ script within the LMU-3240™
- A location or status request from the LM Direct server
- A location or status request from LMU Manager
- A request made from a host device such as a laptop, PDA or MDT

3 PEG Conversion

Reference the PEG to **PEG Script conversion guide** to integrate existing script into the next generation format. Note that only LMU-3240 device script is currently supported by the conversion process – other device script may not function as intended. Consult with your FAE support regarding PEG to PEG Conversion inquiries.

3.1 Getting Started

It is recommended to conduct testing and validation on one unit before deploying on to a larger fleet.

1. Select a script (use case) based on PEG support available in LMU-3240
2. We highly encourage you to share the following information with your FAE to get timely support on possible issues
    - Script to be used.
    - YMM of chosen vehicles.
    - List of vehicle parameters (PIDs)
3. Convert your current PEG script to PEG2 format using LMU Manager 8.9 or later. Refer to conversion guide for help. You may have to make some changes manually in PEG1 format to get your conversion right.
4. Assign PEG2 (.pg2) script through PULS –
    - Go to “Other Files” under “Firmware” drop-down
    - Choose “Device Type” as “LMU”, and “File type” as “PEG2”
5. Install SIM cards and install the devices in your vehicles.

3.2 Setup & Equipment

To properly set up the LMU-3240, users will need access to and have knowledge of the following items;

- Device Sims: 4ff (Nano) AT&T Sim
- Device Management: https://puls.calamp.com/devicemgr/

3.2.1 Serial Communication

- Serial Cable: Micro USB B cable (male). Example: *StarTech P/N: UUSBHAUB3*
- Windows PC or Linux
- SSH tool: E.g. Putty (see login instructions below)
- Power Supply
- OBD Power cable

3.2.2 Login (SSH) Instructions:

- Open a SSH program (e.g. Putty)
- Enter in Host: 192.168.225.1

- Enter Port: 22
- Username: calamp
- Password: welcome123
- Type “atcon” to start the debug session

4 Hardware Overview

4.1 Location Messaging Unit-LMU-3240™

4.1.1 LMU-3240™ Handling Precautions

Electrostatic Discharge (ESD)

Electrostatic discharge (ESD) is the sudden and momentary electric current that flows between two objects at different electrical potentials caused by direct contact or induced by an electrostatic field. The term is usually used in the electronics and other industries to describe momentary unwanted currents that may cause damage to electronic equipment.

ESD Handling Precautions

ESD prevention is based on establishing an Electrostatic Protective Area (EPA). The EPA can be a small working station or a large manufacturing area. The main principle of an EPA is that there are no highly charging materials in the vicinity of ESD sensitive electronics, all conductive materials are grounded, workers are grounded, and charge build-up on ESD sensitive electronics is prevented. International standards are used to define typical EPA and can be obtained for example from International Electro-technical Commission (IEC) or American National Standards Institute (ANSI).

This ESD classification of the sub assembly will be defined for the most sensitive component, therefore the following classifications apply:

- Class 1B – Human Model (< 1 kV)
- Class M1 – Machine Model (< 100V)

When handling the LMU-3240’s™ main-board (i.e. sub assembly) by itself or in a partial housing proper ESD precautions should be taken. The handler should be in an ESD safe area and be properly grounded.

GPS Ceramic Patch Handling

When handling the sub assembly it may be natural to pick it up by sides and make contact with the antenna boards. In an uncontrolled ESD environment contact with the center pin of ceramic patch antenna can create a path for electrostatic discharge directly to the GPS Module. The GPS Module is very sensitive to ESD and can be damaged and rendered non-functional at low levels of ESD. One should avoid contact with the center pin of the patch during handling.

Packaging

Anytime the sub assembly is shipped and it is not fully packaged in its final housing it must be sealed in an ESD safe bag.

Electrical Over-Stress (EOS)

The 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-3240™ GPS Antenna to another LMU-3240™ 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-3240™ GPS Antenna should be kept at least four inches apart from any active LMU-3240™ GSM Antenna or any other active high power RF transmitter with power greater than 1 Watt.

4.1.2 Battery Back-up devices

Please properly dispose of the battery in any of the CalAmp products that utilize one, do not just throw used batteries, replaced batteries, or units containing a back-up battery into the trash. Consult your local waste management facility for proper disposal instructions.

4.1.3 Environmental Specifications

The LMU-3240™ 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-3240™ 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 is designed to operate in and the relevant SAE tests that were performed. No formal altitude tests were conducted.

Dimensions

1.88 x 2.50 x 1.14" (48 x 63.25 x 29 mm)

Weight

2.54 oz. (72 g)

Temperature

-30° to +60° C (connected to primary power)

-10° to +60° C (operating on internal battery)

-20° to +25° C ≤ 6 months (long term storage)

Humidity

0% to 95% relative humidity, at 50° C non-condensing

Shock and Vibration

SAE Test: SAE J1455 Compliant

Mil Standard 202G and 810F Compliant

Ground vehicle environment with associated shock and vibration

Electromagnetic Compatibility (EMC/EMI)

IEC 61000-4-2 (4KV Test)

Operating Voltage Range

12-24 VDC Vehicle Systems

9-30 VDC (start-up, operating)

7-32 VDC (momentary)

Power Consumption

Typical 1 mA @ 12V (deep sleep)

Typical 10 mA @ 12V (sleep on active network)

Typical 70 mA @ 12V (active tracking with GPS and cell enabled)

Satellite Location (GNSS)

Hybrid GPS, GLONASS, SBAS Engine (WAAS, EGNOS, MSAS)

55 channel GPS Receiver

~2.0m CEP Open Sky (GPS SBAS 24 hours static)

Tracking Sensitivity

-157 dBm (hot start)

-148 dBm (cold start)

Acquisition Sensitivity

-167 dBm tracking sensitivity

Communications (Comm) – Operating Bands (MHz)

North America Variant I:

LTE Cat1: 1900 (B2)/AWS 1700 (B4)/850 (B5)/700 (B12) MHz

HSPA/UMTS: 850 (V)/1900 (II) MHz

North America Variant II:

LTE Cat1: AWS 1700 (B4)/700 (B13) MHz

Data Support

SMS, UDP Packet Data, TCP, TLS, CalAmp Telematics Cloud API

4.2 LMU-3240™ Connectors

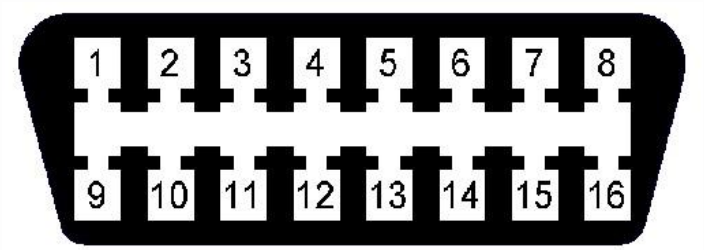
4.2.1 Primary Connector

The LMU-3240 equips a 16-Pin J1962 Compliant OBD-II Plug that also supports the following OBD-II physical layer interfaces:

1. ISO 15765 CAN

2. ISO 9141-2 K-Line
3. ISO 14230 KWP2000]
4. J1850 PWM
5. J1850 VPW

Connector on Vehicle side



Connector on LMU-3040 side

Please note that only 13 out of the 16 connector pins are actually populated on the connector.

Pin	Signal Name	Description
1	Make/Model Specific	Vendor Option
2	Bus+ Line	SAE-J1850 PWM and SAE-1850 VPW
3	Make/Model Specific	Vendor Option
4	Chassis Ground	Ground
5	Signal Ground	Ground
6	Can High	ISO 15765-4 and SAE-J2284
7	K line	ISO 9141-2 and ISO 14230-4

8	Make/Model Specific	Vendor Option
10	Bus- Line	SAE-J1850 PWM and SAE-1850 VPW
11	Make/Model Specific	Vendor Option
14	Can Low	ISO 15765-4 and SAE-J2284
15	L line	ISO 9141-2 and ISO 14230-4
16	Battery Power	Power

4.2.2 Serial Adapter

Depending on the variant of the LMU3240, the LMU-3240 may or may not have an external serial connector. If it does not have a serial connector as shipped, the LMU 3240 requires additional steps in order to use a serial connector. Please contact your FAE for steps on how to do this.

4.2.3 Accessories

See the Harness Diagrams page for more information on LMU accessories, and supported products table

4.3 I/O Descriptions

The LMU-3240™ provides the following Inputs for scripting purposes, but there are no selectable inputs on the device

Digital Inputs

- Input 0: Engine ON
- Input 1: Motion Sensor (low = no motion, high = motion)
- Input 2: Power State (low = main power, high = battery power)
- Input 3: Vbatt Low
- Input 4: Vin Active (On LMU-3240 use Input 4 for Ignition Input Wake Up Monitor instead of Input 0)

Analog to Digital Inputs

- A/D 0: Vin

- A/D 1: uP Temp
- A/D 2: Vref
- A/D 3: Battery
- A/D 4: Impact

Outputs

- Output 4: Power Supply Switch (cleared = switch to external power, set = switch to internal power)
- Output 5: Enable/Disable Battery charging (cleared = enable battery charging, set = disable battery charging)

4.3.1 3-Axis Accelerometer + 3-Axis Gyroscope

The LMU-3240™ supports an internal 3 Axis Precision Accelerometer as one of its discreet inputs. When the LMU is moved in any direction, the associated input will be in the High state. If the LMU's accelerometer does not detect motion, then the input will be in the Low state. No external connections are required for this functionality to be operational.

Accelerometer	Gyroscope
Acquisition rate: >1600Hz	Acquisition rate: >1600Hz
Sampling rate - output data rate: 100, 200, 400 Hz	Sampling rate - output data rate: 100, 200, 400 Hz
Resolution: <= 0.01G	Resolution: <= 0.01G
Full Scale: 15-24G	Full Scale: 15-24G

4.3.2 Status LEDs

The LMU-3240™ contains one programmable dual-color status LED (amber and green). Please note that there are PEG configuration parameters that can change the factory default behavior of all LEDs. LED behavior detail can be reviewed in the table below:

LED Definitions and Behavior

Condition Order	LED Color	LED Frequency
Power On 1	Amber/Green	Fast
GPS On 2	Green	Slow blinking
GPS Time Sync 2	Green	Fast blinking
GPS Fix 2	Green	Solid for 10 s
Comms On & Searching 3	Amber	Slow blinking
Network Available 3	Amber	Fast blinking
Registered but no inbound acknowledgement 3	Amber	Solid & Fast Blink every 1 s
Registered and received inbound acknowledgement 3	Amber	Solid for 10 s
Vehicle Not Compatible 4	Amber/Green	Slow
Install Successful 5	Green	Solid

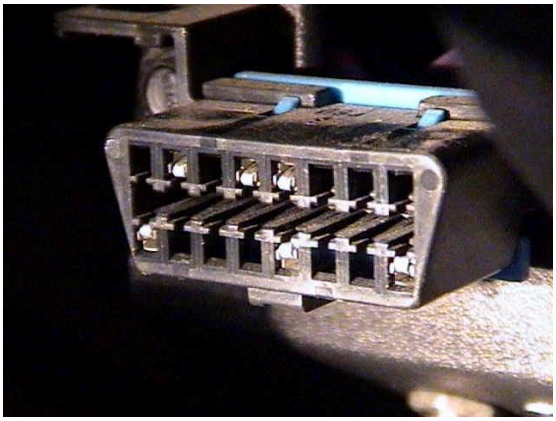
5 Installing the LMU

5.1 Preventing Accidental or Unauthorized Modification

If you anticipate that fleet drivers or others might interfere with the LMUs once they are installed, take steps to be sure that it is not easy to remove the LMU from its power source, etc. Two common methods are the use of Tamper Proof Sealant or creation of PEG Script to detect power loss or GPS antenna disconnections.

5.2 Installing the LMU in a vehicle

1. Make sure the vehicle is turned on/running when plugging in the unit. If the unit is plugged in while the vehicle is off it will need to complete the detection process on the next ignition on cycle in order to operate correctly.
2. Plug the unit into the OBD2 connector of the vehicle while it is running, and do NOT turn off the ignition.



3. Leave the unit plugged in with vehicle ignition on until the detection process has completed. Vehicle detection status can be checked through SMS over the air or with AT Commands using the CalAmp serial connection cable.

The AT Command to check vehicle detection status.

```
ATIV
```

The vehicle detection complete response will look like:

```
-Vehicle Detection-
Detection Complete
VIN: <Vehicle Vin Number>
OBDII Protocol:5
Params:0,1,4,7,8,11,12
Indicators:0(000000000011),1(11111111111)
```

The SMS command to check vehicle detection status:

```
!VV
```

The vehicle detection complete response will look like:

```
-Veh Det-
Yes
VIN:<Vehicle Vin Number>
Proto:5
Params:0,1,4,7,8,11,12
```

```
Inds:0(000000000011),1(11111111111)
DTCs Cnt:7
Flt Mtch:1
```

4. Once the vehicle detection has completed the vehicle ignition can then be turned off.

5.3 Installation Verification

In many cases it is desirable to verify that an installed LMU-3240™ is working properly. That is, installers should verify that the GPS and communications functions of the LMU-3240™ are working properly before departing the installation site. In more robust cases, some key configuration settings such as the Inbound Address and URL should also be verified.

Note that these processes are all based on issuing AT Commands to the LMU-3240™. It is expected that installers will have access to a serial port expansion cable and a laptop or PDA capable of a terminal connection. Alternatively, an SMS message can be sent to an LMU-3240™ to obtain its current status.

5.3.1 Comm Verification

Installers should first verify that the LMU-3240™ has been acquired and has registered to the wireless network. This may be verified in one of two ways. First, installers may look at the LED. If this LED is solid, then the LMU has registered to the network and established a data session.

If the LED is not visible, then Comm may be verified using an AT Command:

```
ATIC
```

Depending on the wireless network being used something similar to what is shown below will be displayed. It is important to verify that 'Yes' values are displayed at the top for Data and Network registration and the correct APN is displayed.

```
    Radio Access    : LTE
    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): 351802055396182
      IMSI (SIM ID)   : 310410202524377       ICC-ID (SIM S/N):
8901410221202524377 8
      Phone Number    :
      GPRS APN       : ISP.CINGULAR       Maint. Server   :
maint.vehiclelocation.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
```

If any of the responses return Not-Acquired or Not-Registered (and the APN is correct), the wireless network operator should be contacted for further troubleshooting.

Please note that it may take several seconds (or longer) for the LMU-3240™ to communicate with the modem and acquire the wireless network.

5.3.2 GPS Verification

The next step is to verify that the GPS receiver is seeing enough satellites to obtain a valid GPS position. Again, installers have two choices on how to perform this verification. First, like the Comm Verification, there is a GPS status LED (i.e., the one closest to the SMA connector). If this LED is solid, then the LMU has found GPS service.

If the LED is not visible then GPS service may be verified using an AT 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
```

Installers are looking 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 2-3 minutes, installers should check antenna placement (see the Installation Notes section for placement suggestions), the antenna connector and that the antenna has a clear view of the sky. For further troubleshooting, installers should contact CalAmp Support (productsupport@CalAmp.com)

5.3.3 Inbound Verification

The last item to verify is that the LMU-3240™ 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 LMU-3240™ is using the correct Inbound IP address by using:

```
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
```

The installer will need to verify with a backend technician that the, URL (myURL.myCompany.com), IP address (ddd.ddd.ddd.ddd) and port (<ppppp>) are correct.

The second step is to verify that the LMU-3240™ is sending data. The best way to do this is to force the LMU-3240™ to send in an unacknowledged Event Report (i.e., its current GPS location) with the following command:

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

The LMU-3240™ will respond with: OK

The backend monitor must then be contacted to confirm that they received an Event Report with Event Code 255.

Assuming that all three sections have passed, the installation can be considered to be complete.

5.3.4 Verification via SMS

The current Comm, GPS and Inbound status of a LMU can be obtained via SMS provided you have access to an SMS capable phone or PDA.

Using your handset, send the following SMS Message to the LMU:

```
!R0
```

Within a few minutes, the LMU should return a response in the following format:

```
APP: <App ID> <Firmware Version>
COM:<RSSI> [./d/D][./a/A][./L][IP address] [<APN>]
GPS:[Antenna <Short/Open/Off>] | [No Time Sync] | [<FixStatus> <Sat
Count>]
INP:<inputs states> <vehicle voltage>
MID:<mobile ID> <mobile ID type>
INB:<inbound IP address>:<inbound port> <Inbound Protocol (LMD/LMX)>
```

- **APP:** o **<App ID>:**

The Application ID value of the LMU indicating the host platform and the wireless networking technology of the LMU.

- o **<Firmware Version>:**

The current firmware version in use by the LMU

- **COM:**

o **<RSSI>:**

This is the signal strength the wireless modem sees from the network. In general the LMU is at least scanning for the network if the RSSI is not -113.

- [./d/D]:

If the character 'D' is present, it indicates the LMU had a data session established when it responded to the status request. For the 8-Bit product line an upper case 'D' indicates both the Inbound and Maintenance sockets are ready. The lower case 'd' indicates that only the Maintenance socket is ready. A '.' indicates no sockets are ready.

- [./a/A]:

This field indicates if the LMU has received an Acknowledgement from the Inbound server. This field will be empty if the LMU has never received an ACK. The lower case 'a' will be present if it has received an ACK since the last cold boot (i.e. power cycle) but not the last warm boot (App Restart or Sleep). The upper case 'A' will be present if the LMU has received an ACK since the last warm boot. A '.' Indicates no acknowledgement has been received.

- [./L]:

This field indicates if the LMU's log is currently active. An 'L' indicates that the log is currently in use (i.e. one or more records have been stored) where a '.' indicates the log is inactive.

- [IP Address]:

This is an optional field if and is only present if the LMU has established a valid data session. This field will contain the current IP address of the LMU as assigned by the wireless network. Note that if you see a value of 192.168.0.0, this is an indication that the LMU has not been able to establish a data session.

- [<APN>]

The current Access Point Name in use by a GSM LMU.

- GPS:
- [Antenna <Short/Open/Off>]:

This field, if present, indicates a problem with the LMU's GPS antenna. A value of Short indicates that the antenna cable has likely been crushed. A value of Open indicates that the antenna cable is either cut or disconnected. A value of Off indicates that the LMU' GPS receiver is off.

- [No Time Sync]:

If this field is present, it indicates that the LMU's GPS receiver has not been able to find even a single GPS satellite. This would likely been seen in conjunction with the above antenna error, or if the LMU GPS antenna is otherwise blocked.

- [<FixStatus> <Sat Count>]:

If these fields are present it indicates that the LMU has, or had a valid GPS solution. The <Sat Count> field indicates how many GPS satellites are currently in use by the LMU. The <FixStatus> field indicates the type of fix. The Fix Status types are detailed in the LM Direct Reference Guide.

- **INP:**
  - **<input states>:**

This field details the current state of each of the LMU's discreet inputs. This field is always 8 characters long. The left most character represents the state of input 7 where the right most represents the state of input 0 (i.e. the ignition). A value of 1 indicates the input is currently in the high state. A value of 0 indicates it is currently in the low state.

  - **<vehicle voltage>:**

This field will contain the current reading of the LMU's internal A/D. This will be the supply voltage provided to the LMU in mV.

- **MID:**
  - **<mobile ID>:**

This will be the current mobile ID in use by the LMU.

  - **<mobile ID type>:**

This will be the type of Mobile ID in use by the LMU. The available types are, Off, ESN, IMEI, IMSI, USER, MIN and IP ADDRESS.

- **INB:**
  - **<inbound IP address>:**

This is the current IP address in use by the LMU. This value should match the IP address of your LM Direct™ server.

  - **<inbound port>:**

This is the current UDP port the LMU will use to deliver its LM Direct™ data. This value should match UDP port you are using on your LM Direct™ server. It is typically 20500.

  - **<Inbound Protocol (LMD/LMX)>:**

This is the current UDP/IP messaging protocol in use by the LMU. In general it should be LMD.

Example Response

```
APP:081 8.3d
COM:0
GPS:No Time Sync
INP:11100111 13.7V
MID:4141000100 ESN
```

INB:207.7.101.227:20500 LMD

6 CalAmp Locations

CalAmp's corporate headquarters is located in Irvine, CA, with many divisional and satellite locations across the United States as well as internationally.

Corporate Headquarters
15635 Alton Parkway, Suite 250 Irvine, CA 92618
Additional Locations
1401 North Rice Avenue Oxnard, CA 93240
6551 City West Parkway Eden Prairie, MN 55344
2177 Salk Avenue, Suite 200 Carlsbad, CA 92008
40 Pequot Way Canton, MA 02021
13655 Dulles Technology Drive, Suite 200 Herndon, VA 20171
5th Floor Five Lamps Place 77-80 Amiens, Street Dublin 1 D01 A7V2 Republic of Ireland

7 License Agreement

FOR SOFTWARE, APPLICATION PROGRAMING INTERFACES (APIs) & DOCUMENTATION

IMPORTANT: DO NOT INSTALL OR USE THE SOFTWARE OR DOCUMENTATION UNTIL YOU HAVE READ AND AGREED TO THIS LICENSE AGREEMENT.

This is a legal agreement between you, the Customer, and CalAmp DataCom Incorporated ("CalAmp"). By installing and/or using the software or documentation, you are consenting to the terms of this License. If you do not agree to the terms of this non-exclusive License Agreement, DO NOT INSTALL OR USE THE SOFTWARE, APIs OR DOCUMENTATION. For a full refund, return the unused media package and all accompanying materials within seven (7) days to CalAmp. Where there is no packaging or media, use of the software and/or documentation constitutes acceptance.

Definitions: As used in this License Agreement, "Software" means CalAmp's LM Direct ™, LMU Manager™, LapTop Locator™, LMU Application/Programmable Event Generator™, CDMA LMU Provisioning Tool, GPRS LMU Provisioning Tool, iDEN™ Provisioning Tool, LMU Status, Clone Config, Hex Dump, LM Exchange™ Traffic Monitor, Freewave Base Station Config, Remote Serial Port, App Watcher Service and/or other software products licensed by CalAmp for use in computer applications development or integration including the computer programs, libraries and related materials either contained on the media provided to you by or from CalAmp, or which you have received or downloaded electronically. "Application" means a compiled or executable software program created by Developer that uses some or all of the functionality of the Software. "Software Copies" means the actual copies of all or any portion of the Software including backups, updates, merged or partial copies permitted hereunder or subsequently licensed to you. "Documentation" means the non-Software information contained on the media provided with this package or downloaded and which is used with and describes the operation and use of the Software. "Documentation Copies" means the actual copies of all or any portion of the Documentation including backups, updates, merged or partial copies permitted

hereunder or subsequently provided to you. "Related Materials" means all other materials and whatever is provided by or from CalAmp, and the non-Software and non-Documentation contained on the media supplied, downloaded, or otherwise supplied by or from CalAmp for use with the Software and Documentation. "Server" means a single, networked computer that is accessible to other client machines on the network. "User" means (i) a single person using an Application for his/her internal, use or (ii) a single terminal or a single workstation of a computer used only by a person (and not accessed otherwise) for accessing an Application. "Use License" means limited rights granted by CalAmp for deployment of a single Application to a User. "Developer" means a single programmer developing an Application. "Developer License" means the grant of certain limited rights to use and maintain the Software, Software Copies, Documentation, Documentation Copies and Related Materials in development of Applications.

Background: A Developer License is required for each Developer who uses the Software in building Application(s). A Use License is required and must be purchased by Customer for each User to which Customer provides access to an Application (unless a Server or Site license for unlimited or a specified number of users has been purchased). Each Use License is specific to one client-side Application only and may not be used for any other client-side Application. Each Server license is limited to Server-based Applications deployed on that Server for which the license has been purchased as specified in a CalAmp License Certificate. The Software is licensed on a per Developer, and on a per User, per Application basis. In order to preserve and protect its rights under applicable law, CalAmp is not selling you ownership rights to Software or Documentation (owned by or licensed to CalAmp). CalAmp specifically retains title to all CalAmp Software, Documentation and Related Materials and CalAmp licensors retain title to items owned by them.

Duration: This License Agreement is effective from the day you install or start using the Software, or receive or download it electronically, and continues until terminated. If you fail to comply with any provision of the License, termination is automatic, without notice from CalAmp and without the necessity for recourse to any judicial authority. Upon termination, you must destroy the Related Materials, the Software, Documentation and all Software and Documentation copies. CalAmp can also enforce its other legal and equitable rights.

Developer License Only—Uses Permitted: Software and Documentation may be used for the sole purpose of developing Applications and only by a licensed Developer. Software and Documentation may be installed onto a hard disk drive or a Server, access to which is restricted to Developers for which a Developer License has been purchased and may also be stored or installed on a storage device such as a network server, used only to install or access the Software or

Documentation on your other computers over an internal network; however, you must have acquired a license for each separate computer on which the Software or

Documentation is installed or accessed from the storage device. A Developer License may not be shared or

used concurrently on different computers. One backup copy may be made for each legally obtained media copy or electronic copy you have received, provided that all CalAmp and third party licensor information — including copyright notices — are maintained and possession of the copy is retained in a secure location. In addition, you agree to use reasonable efforts to protect the Software and Documentation from unauthorized use, reproduction, distribution or publication. All rights not specifically granted in this License are reserved by CalAmp.

Customer agrees to include the notice "Copyright © 1999 – 2009 CalAmp DataCom Inc., All Rights Reserved" in Applications developed with the Software. Customer agrees to include the following CalAmp Copyright and Government Restricted Use notice in all documentation and in any Application on-line help or readme file.

"Portions of this computer program are owned by CalAmp DataCom Inc., Copyright © l999 – 2009, CalAmp DataCom Inc., All Rights Reserved. Use, duplication or disclosure by the Government is subject to restrictions as set forth in subparagraph ©(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013 or subparagraphs ©(l) and (2) of the Commercial Computer Software-Restricted Rights at 48

CFR 52.227-19, as applicable. Manufacturer is CalAmp DataCom Inc., 1401 North Rice Ave. Oxnard, CA 93240. Rights are reserved under copyright laws of the United States with respect to unpublished portions of the Software."

Developer(s) License—Uses Not Permitted: Unless Otherwise Agreed To In Writing with CalAmp, You May Not (1) Make derivative works including but not limited to translations, adaptations, arrangements or any other alteration (each of which would become the property of CalAmp or its licensors, as applicable) or make copies of the Software or Documentation except as permitted above; (2) Make copies of the Related Materials; (3) Use any CalAmp product to translate the product of another licensor unless you have the legal right to do so; (4) Allow a greater number of Developers to access the Software at any one time than the total number of

Developer licenses for which you have paid; (5) Rent, lease, sublicense or lend the Software, Software Copies, Documentation, Documentation Copies, Related Materials or your rights under this License or allow access to the Software for unlicensed users; (6) Alter, decompile (except to the limited extent that decompilation by the licensed Developer only is necessary as the only available way to achieve interoperability with other programs and, in that situation, any resulting information cannot be used in developing, producing or marketing any software substantially similar in expression to the Software), disassemble or reverse engineer the Software; (7) Make any attempt to unlock or bypass any initialization system or encryption techniques utilized by the Software or Documentation; (8) Alter, remove or obscure any proprietary legend, copyright or trademark notice contained in or on Software, Documentation or Related Materials; or (9) use the Software to create an Application intended solely to duplicate functionality of an existing CalAmp end user software product.

Use Licenses: For each Server or Site License purchased, CalAmp grants the Customer the right to distribute Applications on a single Server or at a single Site, as the case may be, accessible to the number of individual users (not concurrent users) for which the Server or Site License has been purchased as evidenced by a CalAmp License Certificate. For each Use License purchased, as evidenced by a CalAmp License Certificate, CalAmp grants the Customer the right to distribute a single Application to a single User. In no circumstance may Customer distribute an Application under a site license or concurrent use license unless a comparable license has been purchased for the Software as evidenced by a CalAmp License Certificate. Customer agrees that distribution of an Application to a User will in all cases be accompanied by a license agreement containing at a minimum terms and conditions substantially similar to and at least as restrictive as the following:

The User may not (1) Make derivative works including but not limited to translations, adaptations, arrangements or any other alteration of the Application or make copies of the Application, except one backup copy may be made for each legally obtained copy of the Application, provided that all CalAmp and third party licensor information — including copyright notices — are maintained and possession of the copy is retained in a secure location; (2) Allow access to the Application for unlicensed users; (3) Rent, lease, sublicense or lend the Application or its rights under the license; (4) Alter, decompile, disassemble or reverse engineer the Application; (5) Make any attempt to unlock or bypass any initialization system or encryption technique utilized by the Application; or (6) Alter, remove or obscure any proprietary legend, copyright or trademark notice contained in or on the Application.

The User agrees to use reasonable efforts to protect the Application from unauthorized use, reproduction, distribution or publication.

Audit: Customer shall keep records of all transactions involving Software for five (5) years after the transaction. CalAmp shall have the right upon written notice to audit Customer's records to verify compliance with this License including the number of Use Licenses granted by Customer. Audit may take place at Customer's place or business during normal working hours. In the event that there is a discrepancy in excess of five percent (5%) between the number of Use Licenses granted and the number paid for, Customer shall pay all costs related to performing the audit in addition to remitting payment for those licenses granted in excess of those paid for as evidenced by a CalAmp License Certificate.

General: This Agreement represents our entire understanding and agreement regarding the Software,

Software Copies, Documentation, Documentation Copies and Related Materials and supersedes any prior purchase order, communication, advertising or representation and may only be modified in a written amendment signed by an authorized CalAmp representative or by a specific prior or subsequent written agreement between the parties. If any provision of this Agreement shall be unlawful, void or for any reason unenforceable, that provision shall be deemed severable from, and shall in no way affect the validity or enforceability of, the remaining provisions.

8 Limited Warranty

Covering the Physical Media and Printed Materials: CalAmp warrants to you, the original licensee, that the media on which the Software is recorded are free from defects in materials and workmanship under normal use and service FOR A PERIOD OF NINETY (90) DAYS FROM THE DATE OF DEVELOPER LICENSE
PURCHASE. CalAmp's entire liability and your exclusive remedy as to defective media, Documentation or Related Material(s) shall be replacement of the media, Documentation or Related Material(s) by CalAmp. Each defective item, along with proof of license purchase and date, must be sent in a traceable manner to: CalAmp DataCom Inc., 1401 North Rice Ave. Oxnard, CA 93240.

Disclaimer Regarding the Software, Documentations and Related Materials: THE SOFTWARE, DOCUMENTATION AND RELATED MATERIALS ARE PROVIDED "AS IS." EXCEPT AS MAY OTHERWISE BE EXPRESSLY SET FORTH HEREIN, CALAMP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO THE SOFTWARE, DOCUMENTATION OR RELATED MATERIALS INCLUDING BY WAY OF EXAMPLE, AND NOT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. BY WAY OF FURTHER EXAMPLE AND NOT LIMITATION, CALAMP MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO THE ACCURACY, RELIABILITY OR COMPLETENESS OF THE DOCUMENTATION OR THE RELATED MATERIALS. THE ENTIRE RISK AS TO THE USE OF THE SOFTWARE, DOCUMENTATION AND RELATED MATERIALS IS ASSUMED BY YOU. IN NO EVENT SHALL CALAMP BE LIABLE TO YOU OR ANY OTHER PERSON, REGARDLESS OF THE CAUSE, FOR THE EFFECTIVENESS OR ACCURACY OF THE SOFTWARE, DOCUMENTATION OR RELATED MATERIALS OR FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING FROM OR OCCASIONED BY YOUR USE OF THE SOFTWARE, DOCUMENTATION OR RELATED MATERIALS, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN THE EVENT THE FOREGOING IS FOUND BY A COURT OF COMPETENT JURISDICTION TO BE INEFFECTIVE, YOU HEREBY AGREE THAT CALAMP'S

MAXIMUM LIABILITY FOR ANY CLAIM ARISING IN CONNECTION WITH THE SOFTWARE, DOCUMENTATION AND/OR RELATED MATERIALS (WHETHER IN CONTRACT, TORT, INCLUDING NEGLIGENCE, PRODUCT LIABILITY OR OTHERWISE) SHALL NOT EXCEED THE LICENSE FEES PAID

BY YOU WITH RESPECT TO THE SOFTWARE, DOCUMENTATION AND/OR RELATED MATERIALS AT ISSUE. SOME STATES DO NOT ALLOW THE LIMITATION OR EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE FOREGOING PROVISION, WITH RESPECT TO EXCLUDING OR LIMITING SUCH DAMAGES, MAY NOT APPLY TO YOU.

Acknowledgement: You acknowledge that you have read this LIMITED WARRANTY, understand it and agree to be bound by its terms and conditions. You also agree that: (1) No oral or written information or advice given by CalAmp, its dealers, distributors, agents or employees shall in any way increase the scope of this Limited Warranty and you may not rely on any such information or advice; (2) Unless a written governing agreement signed by you and CalAmp exists, this License Agreement is the complete and exclusive statement of agreement between CalAmp and you regarding the licensing of the Software, Documentation and Related Materials and supersedes all proposals, oral or written, and any other communications you may have had prior to purchasing your license; (3) Except for the price and delivery terms agreed upon by both parties, the terms and conditions of this License Agreement shall supersede those set forth in any purchase order where the purchase order conflicts or is inconsistent with or adds to the terms and conditions of this License and those superseded purchase order terms and conditions shall be null and void; (4) You agree to assure that copies of this License Agreement are distributed, read and agreed to by each Developer using the Software and/or Documentation.

Governing Law: This Agreement shall be governed by the laws of the State of California, United States, excluding its conflicts of law principles and excluding the United Nations Convention on Contracts for the International Sale of Goods. You agree to exclusive jurisdiction of California State federal and state courts, Ventura County, for resolution of any dispute related to this Agreement.

U.S. Government Protected Rights: The Software Documentation and Related Materials are provided with RESTRICTED RIGHTS. Use, duplication or disclosure by the Government is subject to restrictions as set forth in subparagraph ©(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013 or subparagraphs ©(1) and (2) of the Commercial Computer Software-Restricted Rights at 48 CFR 52.227-19, as applicable. Manufacturer is CalAmp DataCom Inc., 1401 North Rice Ave. Oxnard, CA 93240. Rights are reserved under copyright laws of the United States with respect to unpublished portions of the Software.

9 Regulatory Information

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 DataCom Inc. certifies that it has determined that the LMU-3240™ 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-3240™ 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-3240™ is not designed for or intended to be used in mobile applications (within 20 cm of the body of the user) and such uses are strictly prohibited.

To ensure that the LMU-3240™ 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 3.2 dBi.

FCC Rules and Industry Canada (IC) regulatory information

Compliance Statement (Part 15.19)

The equipment device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received including interference that may cause undesired operation.

Warning (Part 15.21)

Changes or modifications not expressly approved by TransCore Amtech Systems could void the user's authority to operate the equipment. Manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment.

Compliance Statement (Part 15.105(b))

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Class B digital device notice

"CAN ICES-3 (B)/NMB-3(B)"

RF Radiation Exposure Statement

This equipment complies with the FCC/IC radiation exposure limits set fourth for mobile transmitting devices operation in an uncontrolled environment. End users must follow the specific operating instructions to satisfy RF exposure compliance.

The equipment should only be used where there is normally at least 20cm separation between the antenna and all person/user.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter, except tested built-in radios.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé.

Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Cet appareil et son antenne ne doivent pas être situés ou fonctionner en conjonction avec une autre antenne ou un autre émetteur, exception faites des radios intégrées qui ont été testées.