1 Introduction

1.1 Scope

This document describes the technical differences between the LMU-3030 and the LMU-3035 and also includes the migration considerations both technical and operational to ease in the transition.

1.2 Legal Notice

Note that an international version of the LMU-3030 will remain available to CalAmp customers with ship-to and bill-to addresses outside of the U.S. These devices will not be allowed to be imported to the U.S. Any customer found to be doing so, or allowing their customers to do so, without written consent of CalAmp will have access to this product immediately revoked. CalAmp customers assume 100% responsibility for all IP related costs incurred as a result of unauthorized shipments of the product into the U.S. Any questions or concerns related to this legal notice should be directed to your CalAmp sales representative.

1.3 Revision History

Rev	Date	Description of Change	Author
1.00	8 May 2017	Initial App Note	J. Eiberger
1.10	9 May 2017	Added 3.3 for Best Practices	J. Eiberger
1.20	16 May 2017	Updated API and added PEG caveats in 3.3	J. Eiberger
1.21	17 May 2017	Minor corrections to YMM[E] and VIN insertion	J. Eiberger
1.22	17 May 2017	Minor additions to legal notice	S. Hall

2 Technical

2.1 LMU-3030 vs. LMU-3035

The LMU-3035 is the replacement product for the U.S.-based LMU-3030 and will release for orders starting May 19th, 2017. Except for a few features called out in the table below, it is feature compatible with the LMU-3030 in PEG and LMDirect Messaging.

Feature	LMU-3030	LMU-3035
PEG Scriptable	yes	yes
LMDirect Message Protocol	yes	yes
Automatic Bus Discovery	yes	no
Discovery w/ CAN 11/500	yes	yes
Discovery w/ other CAN	yes	no
Discovery w/ J1850	yes	no
Discovery w/ K-Line	yes	no
OEM Bus Support	yes	yes
OEM Parameter Support	yes	yes
GPS Speed Parameters and Triggers	yes	yes
OBD Speed-related Parameters*	yes	no
Other OBD Params (See PULS Wiki at VBUS Appendix A)	yes	yes

*****_Note: Because OBD-sourced speed data is not included with the LMU-3035, any parameter that depends on these will be replaced with GPS-sourced speed. This could impact VBUS ID #0, VBUS ID #11, VBUS ID #19, VBUS ID #45, Motion Logs containing OBD speed, OBD-based Acceleration (S-Reg 182 Bit-3), or any other OBD-sourced speed function. In all cases, an automatic replacement is made in firmware, avoiding any need to make PEG script modifications._

2.2 LMU-3035 Firmware

The first firmware release for the LMU-3035 will coincide with the validated release of 6.0b. This is expected on or before May 19th, 2017. Release notes will be supplied at that time.

2.3 Hardware Specifications

The physical hardware layer is unchanged between the LMU-3030 and LMU-3035.

3 Using the LMU-3035

3.1 PEG Script

Because the PEG architecture is unchanged and because the LMU-3035 firmware will replace any OBD-sourced speed parameters with GPS-source speed data, no changes are required to an LMU-3030 certified script. Customers are nevertheless advised to validate their solution.

3.2 Protocol Discovery

Most vehicles manufactured after 2006 utilize the CAN 11bit/500kbps protocol. This is the default protocol used by the LMU-3035.

If the LMU-3035 is to be used in a non-CAN 11/500 vehicle, there are multiple options to set the protocol correctly in the device. Each of these require some knowledge of the vehicle to arrive at the correct protocol.

3.2.1 VIN Insertion via AT Command

In some cases, it may be desirable to pre-assign the VIN via a serial connection at provisioning or in the field using installation software tools. This can be accomplished with CalAmp AT Commands.

To save a VIN:

```
AT$APP VBUS VININSERT <17-byte VIN string>
```

To query the VIN:

```
AT$APP VBUS VININSERT?
```

To erase the VIN:

```
AT$APP VBUS CLEAR VININSERT
```

3.2.2 VIN Insertion via SMS

Using an SMS to the device, programming the VIN will allow the unit to perform a vehicle lookup to PULS and the correct protocol will be provided to the device in return. The requires the knowledge of the VIN, the phone number to SMS the device, and an ID Report will be subsequently sent from the LMU to PULS.

`'!VV <17-byte VIN>'` (no quotes) saves a VIN to the LMU. The LMU responds that the VIN has been saved and the device reports to PULS if a data session is active.

Example:

Command :!vv abcdefg0123456789

Response:VIN: ABCDEFG0123456789 saved

`'!VV CLEAR'` (no quotes) clears any previously saved VIN. The LMU responds that the VIN has been cleared.

Example:

Command :!vv clear

Response:Insertion VIN cleared from Flash

3.2.3 VIN Insertion via LMDirect from Customer Portal

Much like sending a VIN over SMS, it can be sent over UDP using an Application Message of type 145 in LMDirect format. This too, will force the LMU to send an ID Report to PULS and protocol discovery ensues.

It uses the generic format:

REQ:<string request><NULL>

PARAM:<string param values related to request><NULL>

Example1 : Insert VIN 12345678901234567

REQ:INSERT-VIN<NULL>

PARAM:12345678901234567<NULL>

Example2 : Clear the VIN that was inserted earlier.

REQ:CLR-INSRTN-VIN<NULL>

3.2.4 VIN Insertion via a PULS API

CalAmp is exposing a PULS API that can be called in order to perform VIN insertion and protocol discovery. This API is in development and expected to go into production early June 2017. The API will pass the device ESN and VIN of the target vehicle to PULS and at the next ID Report the VIN is inserted into the device. A subsequent ID Report to PULS will generate a protocol lookup and the unit will be protocol aware. The format below requires all of the values listed. All PULS API calls require basic authentication with a username and password.

```
Request Type : POST
URL: https://puls.calamp.com/service2/vbus/vin/
Request Content Type : application/json
Post Body:
{
 customerKey:”string”,
 esn:1234567890,
 vin: “string",
}
```

A response for error handling will look like:

```
{ message: ‘<success or failure verbiage>’, result:{Object}}
```

3.2.5 YMM Insertion via a PULS API

CalAmp is exposing a PULS API that can be called to perform a protocol discovery by using Year, Make, and the Model of the vehicle (YMM). This API is in development and expected to go into production early June 2017. The API will pass the device ESN and YMM of the target vehicle to PULS and, at the next ID Report, the device will be instructed of the protocol to utilize. The format below requires all of the values listed to arrive at the correct protocol. All PULS API calls require basic authentication with a username and password.

```
Request Type : POST
URL: https://puls.calamp.com/service2/vbus/vin/
Request Content Type : application/json
Post Body:
{
 customerKey:”string”,
 esn:1234567890,
 year:2011,
 make:”string",
 model:”string",
}
```

A response for error handling will look like:

```
{ message: ‘<success or failure verbiage>’, result:{Object}}
```

Because there is a relationship between Make and Model, as well as the need to provide a properly formatted Make and Model, we provide an API to retrieve these. A best practice would be to perform a retrieval of all of these periodically as model years add new model types.

To retrieve a list of all Makes:

```
GET     /service2/vbus/vin/vehicleinfo/make
```

To retrieve a list of all Models for a specific Make:

```
GET     /service2/vbus/vin/vehicleinfo/model?make=<Make>
```

3.3 Discovery Not Complete

The LMU-3035 will not perform automatic bus discovery. If the LMU-3035 is inserted into a non-CAN 11/500 vehicle the protocol will need to be set manually. Methods to set the protocol using VIN or YMME are discussed above in sections 3.2.1 through 3.2.5.

A best practice to get notification that the LMU-3035 is installed in a non-CAN 11/500 vehicle might be to send a report to the Inbound Server. CalAmp recommends sending a report if Trigger #67, Modifier 0 occurs. This represents VBUS STATE – VEHICLE NOT DETECTED.

Until the protocol is set with one of the methods described in Section 3.2, the device will not be generating Ignition state changes. This is one area where some PEG Script mitigation may be required to prevent undesirable behavior such as aggressive sleep, lack of trips, or other logic associated to ignition transitions.