TTU-7xx™ Install Guide

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CalAmp | TTU-7xx™ Install Guide

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1.0	12/5/2012	Product	Baseline release
2.0	01/30/2014	Product	Revised to CalAmp
3.0	02/14/2017	Product	Added magnetic mount installation

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1 REGULATORY INFORMATION

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 and its supplier certify that it has determined that the TTU-7xx 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 TTU-7xx 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 TTU-7xx 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 TTU-7xx 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 TTU-7xx 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 TTU-7xx device to another TTU-7xx device. Should one of the units be in a transmit mode, the potential exists for the other unit to become damaged. Therefore, any TTU-7xx should be kept at least four inches apart from any active TTU-7xx or any other active high power RF transmitter with power greater than 1 Watt.

2 SAFETY INFORMATION

The Safety Information section contains safety information related to the CalAmp TTU-7xx device and installation.

2.1 Secure/Stabilize Equipment

Installers should follow OSHA regulatory requirements for working on equipment, or parts thereof, which are suspended or held aloft by use of slings, hoists or jacks.

Whenever the equipment is parked, set the parking brake. For equipment parked on inclines, chock the wheels and set the parking brake.

Equipment, or parts thereof, which are suspended or held aloft by use of slings, hoists, or jacks should be substantially blocked or cribbed to prevent falling or shifting working under or between them.

2.2 Working on Elevated Surfaces

Installers should follow OSHA regulatory requirements for working on elevated surfaces. When installers are on the tops or roofs of equipment, they should employ a fall protection system consistent with OSHA regulations.

2.3 Handling Lithium Batteries

The CalAmp TTU-7xx uses a lithium battery.

Storage

CalAmp TTU-7xx batteries not installed within a 4-week period from the time of delivery must be stored in a cool, dry place. Store in a cool (below 30° C (86° F)), dry and ventilated area, which is subject to little temperature change. Do not place the battery near heating equipment, nor expose to direct sunlight for long periods. Elevated temperatures can result in shortened battery life and degrade performance.

CAUTION: Failure to properly store batteries will void the warranty.

Disposal/Recycling Batteries

All lithium batteries whether recycled or disposed must be done in accordance with applicable local, State and Federal regulations.

NOTE: Battery must be removed from the TTU-7xx before return shipment.

Waste Management

Any solid or hazardous waste or refuse generated as a result of the installation process shall be managed, stored, transported, and disposed of in accordance with any and all applicable federal, state, and local regulations. In addition, verify all processes or procedures used to handle, store, transport and dispose of any generated waste.

The following waste may be generated after an installation:

- Cloths or Paper Towels
- Cloths or Paper Towels with Adhesive or Degreaser
- Empty Adhesive and Degreaser Containers
- Batteries
- Cardboard
- Metal Shavings
- General Waste or Garbage

3 INTRODUCTION

This manual provides information on the basic setup and installation of the TTU-7xx device including hardware descriptions, environmental specifications and device installation.

Before installing any TTU-7xx components, you must:

- Read this document thoroughly
- Collect all required materials and tools

This guide provides qualified technicians the steps required to install the TTU-7xx device. The device collects critical asset location and operational data and transmits that data to the CalAmp FleetOutlook application, where end-users can review the data through the application interface and generated reports.

This document provides the installation steps for the following asset configurations:

- Dry Van and Reefer Nose Mount Installation
- Intermodal Container Door Screw Mount Installation
- Flatbed Screw Mount Installation
- Battery Replacement Procedures

4 TTU-7xx OVERVIEW

The TTU-7xx is a battery-operated product with a field-replaceable battery designed for multi-year deployments. It features a small size, superior GPS performance and an internal 57 Ah battery. The TTU-7xx is a complete asset tracking and communication device incorporating next-generation, super-sensitive GPS technology for installation in any mobile asset. Superior internal antennas for both cellular and GPS eliminate the need for wired antennas and make the TTU-7xx mountable virtually anywhere on the asset for easy, inexpensive installations. The TTU-7xx is designed to dramatically reduce cost, power and size while providing excellent field reliability. The TTU-7xx is an ideal solution for managing assets deployed for long periods without maintenance needs.

Figure 1: TTU-7xx

4.1 Environmental Specifications

The TTU-7xx is designed to operate in environments specified below:

SPECIFICATIONS
General Specifications
▪ Location technology: 50 channel GPS ▪ Operating voltage: 3.6 volt internal battery pack
GPS Specifications
▪ Location technology: 50 channel GPS (with SBAS: WAAS, EGNDS, MSAS, GAGAN) ▪ Location accuracy: 2.0 meter CEP (with SBAS) ▪ Tracking sensitivity: -162 dBm ▪ Acquisition sensitivity: -147 dBm
Battery Pack Specification
▪ Battery capacity: 57 amp hour ▪ Battery operating voltage: 3.6 volts ▪ Battery technology: Lithium ▪ Field replaceable battery pack
Certifications
▪ Fully certified FCC, CE, IC, PTCRB, applicable carriers
Electrical Specifications
▪ Operating voltage: 3.6V internal battery ▪ Power consumption: - Deep sleep: 1 mA - Sleep on network: 10 mA - Active standby: 70 mA
Physical Specifications
▪ Dimensions 2.25" x 2.25" x10.5" (55 x 55 x 260 mm)
Environmental Specifications
▪ Operating temperature: -22° to + 167° F (-30° to +75° C) ▪ Storage temperature: -40° to 185° F (-40° to +85° C) ▪ Humidity: 95%RH @ 50° C non-condensing ▪ Shock and vibration: U.S. Military standards 202G and 810F, SAE J1455 ▪ EMC/EMI: SAE J1113; FCC–Part 15B; Industry Canada ▪ RoHS compliant

5 TTU-7xx INSTALLATION CONSIDERATIONS

Proper installation of the TTU-7xx can have a major impact on the device's performance. It is recommended that installers be familiar with the installation process prior to installing the device.

5.1 Plan the Installation

Before drilling any holes, determine the location of each hardware component will be. Be advised that an installation that violates the environmental specifications of the TTU-7xx will void the warranty.

The best way to ensure a trouble-free installation is to consider your options and make some decisions before you start:

- Verify that the TTU-7xx will fit in desired location before drilling any holes.
- Accurate data gathering and simulation of how the solution will be used
- Ongoing monitoring and maintenance of the device
- Accidental or intentional alteration of the equipment

5.2 Activation Magnet

The TTU-7xx is shipped with the activation magnet in place. The activation magnet interrupts power to the device. After proper installation of the device, remove the activation magnet. Retain the activation magnet to disable power to the device upon de-installation.

6 DRY VAN AND REEFER NOSE MOUNT INSTALLATION

The following steps outline the procedure for Dry Van and Reefer Nose Mount Installation. Prior to beginning the installation, verify that you have the proper tools and materials.

Tools and Materials:

- Cordless Drill
- 9/64” Drill Bit
- Magnetic Apex Driver Bit – 5/16”
- Scratch Awl
- Safety

To Install the Dry Van and Reefer Nose Mount:

1. Tag equipment with appropriate signage to indicate Lockout/Tagout procedure is in process.

- Installers should be properly trained in LOTO procedures in accordance with OSHA regulations.

2. Set the parking brake.
3. If the equipment is parked on an incline, chock the wheels.
4. Block or crib equipment that is suspended on jacks in order to prevent falling or shifting.

- **Note:** If Reefer, follow Steps # 5-8; otherwise skip to Step # 9.

5. Verify that the Main Power switch is set to the Off position.
6. Set the Disconnect Switch to the Off position.
7. Turn the Main Power switch to the On position, and then verify that the LOTO was successful.
8. Return the Main Power switch to the Off position.

Figure 2: TTU-7xx Device Label

9. Record the Electronic Serial Number (ESN) located on the device label (Figure 2) and the Trailer Number.

- You will need both numbers to associate the device with the correct trailer in FleetOutlook.

10. Select a center, or roadside, device mounting location on the trailer top rail.

Figure 3: Nose Mount

11. Place the mounting flanges against the trailer's top rail so that round battery access panel is on the left.

12. Using the device mounting flanges as a template, mark the location for each of the four (4) mounting screws on the trailer's top rail.
13. At each marked location, drill a 9/64" hole.
14. Install the four (4) mounting screws through the mounting flanges and into the trailer's top rail.
15. Tighten the screws to secure device installation.
16. Remove the activation magnet from the front of the device.

- The activation magnet interrupts power to the device. In order to activate device reporting, you must remove the activation magnet.
- Retain the activation magnet in order to disable reporting unit upon de-installation of device.

17. Contact Customer Support, select the Installation option (#1), and then request device to asset (trailer) pairing in FleetOutlook.
18. Provide your name, company name, device ESN from label and Trailer Number to the Customer Support Representative.
19. If Reefer, follow Step #20; otherwise end of procedure.
20. Set the Disconnect Switch to the On position.

- End of Installation Procedure.

7 CHASSIS MAGENTIC MOUNT INSTALLATION

The following tools and materials are needed to perform this installation

Tools and Materials:

- Two (2) 10” Adjustable Crescent® Wrenches
- Wire Brush or Scuff Pad
- Acetone
- Loctite Threadlocker Blue 242
- Rust Preventative Spray Paint

Safety

Follow all safety procedures as listed in the Safety chapter

To Install the Chassis Magnetic Mount

1. Tag equipment with appropriate signage to indicate Lockout/Tagout procedure is in process.

   NOTE: installers and contractors must be properly trained in LOTO procedures in accordance with OSHA regulations.
2. Set the parking brake.
3. If the equipment is parked on an incline chock the wheels.
4. Block or crib equipment that is suspended on jacks in order to prevent falling or shifting.
5. Record the Module Serial Number (MSN) located on the device label and the trailer/equipment number.

Figure 5: Device MSN

6. Identify Mounting Location

   - Middle of chassis centered front-to-back
   - Chassis cross member facing down, or
   - Chassis cross member facing up
   - Ensure mounting surface is rust free and level
   - Ensure lanyard can wrap around or through cross member
   - Ensure no damage when stacking or operating chassis
     CAUTION: Device must be mounted facing up or down for optimum GPS reception and accuracy

Figure 6: Device Tethered (Frontal View)

Figure 7: Center Device Side-to-Side and Front-to-Back

7. Clean mounting surface where magnets will contact frame member.
    - For dirt and crease use acetone

- For rust or loose paint use a wire crush and acetone

8. Mount device and ensure all four (4) magnets are engaged.
9. If required, drill ¼" hole in frame member and pass lanyard through; otherwise, loop lanyard around the frame member.
10. If required, deburr hole and remove metal shavings from cross member surfaces.
11. Paint all exposed metal surfaces in and around holes with a rust preventative paint. Allow paint to dry 10 minutes.
12. Feed threaded link through lanyard loops and lanyard clip.
13. Apply blue Loctite to threaded link threads.
14. Tighten threaded link with two Crescent wrenches.

Figure 8: Tighten Threaded Link with Two Crescent Wrenches

Figure 9: Lanyard connected

15. Remove the activation magnet from the front of the device enclosure in order to activate device reporting.

8 INTERMODAL CONTAINER DOOR SCREW MOUNT INSTALLATION

The following steps outline the procedure for Intermodal Container Door Screw Mount Installation. Prior to beginning the installation, verify that you have the proper tools and materials.

Tools and Materials:

- Cordless Drill
- 3/16” Drill Bit
- 3/8” Open-End Wrench
- Cross Tip Drill Attachment (or 1/8” Hex Allen Wrench)
- Scratch Awl
- RTV Sealant

To Install Intermodal Container Door Screw Mount:

1. Tag equipment with appropriate signage to indicate Lockout/Tagout procedure is in process.

- Installers should be properly trained in LOTO procedures in accordance with OSHA regulations.

2. Set the parking brake.
3. If the equipment is parked on an incline, chock the wheels.
4. Block or crib equipment that is suspended on jacks in order to prevent falling or shifting.

Figure 4: TTU-7xx Device Label

5. Record the Electronic Serial Number (ESN) located on the device label and the Trailer Number.
6. Identify mounting location:
    - Top of the left or right door.
    - Between locking rods.
    - In the bottom of corrugation well.
7. Ensure mounting surface is level, rust and dirt free.

Figure 5: Top Left Container Door – Device Mounted in Corrugation Well Between Locking Rods

8. Level device in mounting area with label facing down so that that battery access panel is on the left.
9. Mark all four (4) mounting holes with scratch awl.
10. Drill all four (4) mounting holes.

Figure 6: Sealant Applied to Backside

11. Apply RTV sealant inside the mounting holes.
12. Feed mounting screws from inside container door.
13. Mount device on screws and tighten nuts.

- Caution: Drive screws at low speed to avoid seizing.

Figure 7: Final Installation with Label Facing Down

14. Remove the activation magnet from the front of the device.

- The activation magnet interrupts power to the device. In order to activate device reporting, you must remove the activation magnet.
- Retain the activation magnet in order to disable reporting unit upon de-installation of device.

15. Contact Customer Support, select the Installation option (#1), and then request device to asset (trailer) pairing in FleetOutlook.
16. Provide your name, company name, device ESN from label and trailer number to the Customer Support Representative.
17. Complete Installation Worksheet.

- End of installation procedure.

9 FLATBED SCREW MOUNT INSTALLATION

The following steps outline the procedure for Flatbed Screw Mount Installation. Prior to beginning the installation, verify that you have the proper tools and materials.

Tools and Materials:

- Cordless Drill
- 3/16” Drill Bit
- 3/8” Open-End Wrench
- 5/16” Socket – ¼” Drive
- Scratch Awl
- Rust Preventative Spray Paint (Black or Primer Color)

To Install Flatbed Screw Mount:

1. Tag equipment with appropriate signage to indicate Lockout/Tagout procedure is in process.

- Installers should be properly trained in LOTO procedures in accordance with OSHA regulations.

2. Set the parking brake.
3. If the equipment is parked on an incline, chock the wheels.
4. Block or crib equipment that is suspended on jacks in order to prevent falling or shifting.

Figure 8: TTU-7xx Device Label

5. Record the Electronic Serial Number (ESN) located on the device label and the Trailer Number.

6. Select a mounting location on the nose rail centered from side-to-side and where device is safe from damage.
7. Place the mounting flanges against the trailer's nose rail so that round battery access panel is on the left.

Figure 9: Flatbed Nose Rail Device Mount – Mount Device Where It Will Not Be Damaged

8. Using the device mounting flanges as a template, mark the location for each of the four (4) mounting screws on the trailer nose rail.
9. At each marked location, drill a 9/64" hole.
10. Install the mounting screws (4) through the mounting flanges and into the trailer's top rail.
11. Tighten the screws to secure device installation.
12. Remove the activation magnet from the front of the device.

- The activation magnet interrupts power to the device. In order to activate device reporting, you must remove the activation magnet.
- Retain the activation magnet in order to disable reporting unit upon de-installation of device.

13. Contact Customer Support, select the Installation option (#1), and then request device to asset (trailer) pairing in FleetOutlook.
14. Provide your name, company name, device ESN from label and Trailer Number to the Customer Support Representative.

- End of installation procedure.

10 BATTERY REPLACEMENT PROCEDURE

The following steps outline the procedure to remove and replace the TTU-7xx battery pack. Prior to beginning the installation, verify that you have the proper tools and materials.

NOTE: If the TTU-7xx is being returned for repair, the battery must be removed and properly stored prior to shipment.

Tools and Materials:

- Philips Head Screw Driver
- Replacement Battery

To Replace the TTU-7xx Battery:

1. Remove Battery Cap.

Figure 10: Remove Battery Cap

2. Insert Phillips head screw driver and remove the four (4) screws.
3. Remove the end cap and set aside.
4. Disconnect power cable.
5. Remove the rubber gasket and set aside.

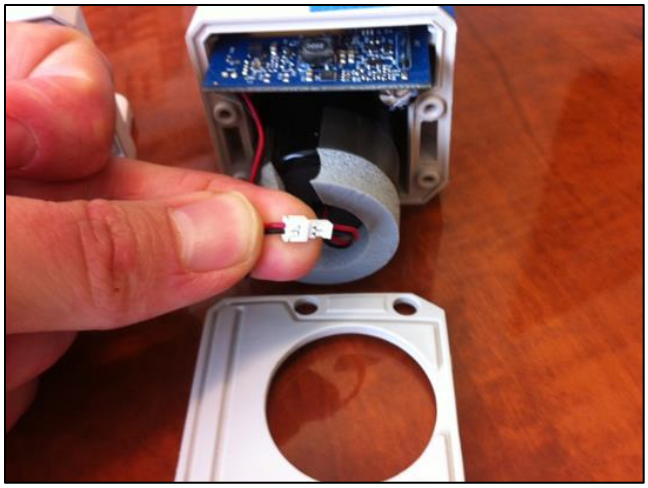

Figure 11: Disconnect the Battery Connector

6. Disconnect the red and black power cable by pulling two connectors apart.

- Do not pull on the power wires.

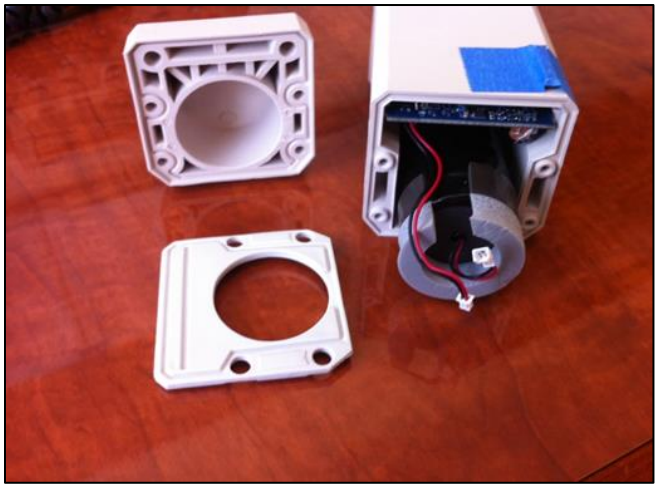

Figure 12: Power Disconnected

7. Remove the battery pack.

Figure 13: Proper Alignment to Slide Battery Out and In of Enclosure

8. Ensure the gap in battery pack foam is aligned with device power cable.
9. Slide the battery pack out of the enclosure.
10. Slide replacement battery pack into the enclosure and replace gasket.

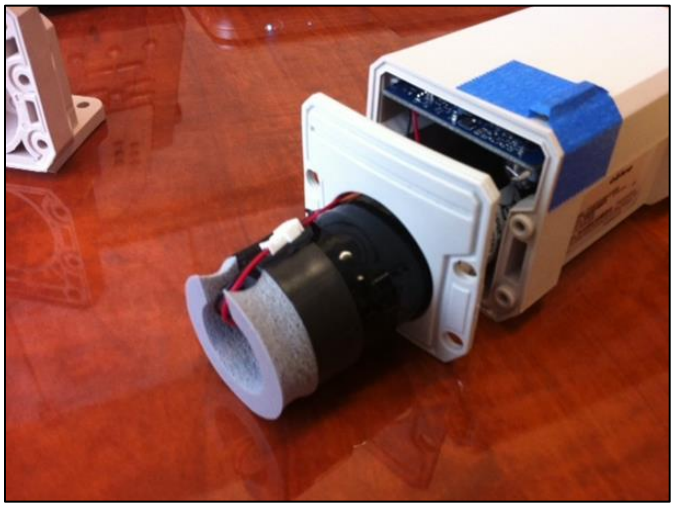

Figure 14: Reconnect Power Cables

11. Reconnect the white connectors.
12. To replace the battery cap, seat the cap housing to the gasket to ensure a tight fit.
13. Insert the screws, use a Phillips head screw driver and turn clockwise until hand tight.

- All lithium batteries whether recycled or disposed must be done in accordance with applicable local, State and Federal regulations
- End of replacement procedure.

NOTE: If the TTU-7xx is being returned for repair, the battery must be removed and properly stored prior to shipment.

11 DE-INSTALLATION INSTRUCTIONS

Use the following instructions to de-install the TTU-7xx:

1. Identify the location of the installed device.
2. Unscrew mounting screws and remove device from trailer.
3. Position the activation magnet back on the front of the device.

12 WARRANTY

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.

13 CUSTOMER SUPPORT CONTACT INFORMATION

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:	solutionsupport@calamp.com