TTU-720™
Hardware and Installation Guide

1 About This Manual

Welcome to the TTU-720™ Hardware and Installation Guide. This manual is intended to give you information on the basic setup and installation of the CalAmp TTU-720™ product(s) including hardware descriptions, environmental specifications, wireless network overviews and device installation.

1.1 Before You Begin

To use this document effectively, you should:

- Have a general understanding of the different types of trailers and intermodal equipment
- Have all necessary tools available to perform the installation
- Follow all standard safety precautions

Before installing any CalAmp TTU-720 components, you must:

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

1.2 Manual and Product Overview

The TTU-720™ is one of the most flexible economy mobile tracking hardware products available. In order to accurately describe the functionality of these units we have broken this manual into the following sections:

- **Hardware Overview** – Describes the physical characteristics and interfaces of the TTU-720™.
- **Installation and Verification** – Provides guidance for the installation of the TTU-720™ in a vehicle and instructions on how to verify the installation is performing adequately.

2 Safety

2.1 Working on Elevated Surfaces

Installers and contractors must follow OSHA regulatory requirements for working on elevated surfaces. When installers are on the tops or roofs of equipment, they must employ a fall protection system consistent with OSHA regulations.
Installers must also check with the customer or third-party persons, who are in charge of safety at the installation site, for any further requirements.

Precautions
Proper safety precautions must be followed. Because Loctite Threadlock 242 is a solvent, read the MSDS sheet and wear the proper PPE as specified in the MSDS. The MSDS sheet is available from the website:
http://www.henkelcamsds.com

2.2 Handling Isopropyl Alcohol (IPA)

Precautions
Proper safety precautions must be followed. Because Isopropyl Alcohol is a solvent, read the MSDS sheet and wear the proper PPE as specified in the MSDS.
CAUTION: All solvents must be used in a well-ventilated area. Avoid open flames and other ignition sources.

2.3 Handling Lithium Batteries

CalAmp TTU-720 System Battery
The CalAmp TTU-720 uses a lithium battery.

Storage
CalAmp TTU-720 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 CalAmp TTU-720 before return shipment.

3 Getting Started

3.1 Overview

These installation instructions guide you through the steps required to install CalAmp TTU-720 Track & Trace devices. Devices collect critical asset location and operational data and transmit that data to the CalAmp TTU-720 web site, where users can review the data in selected reports.

4 Dry Van and Reefer Nose Mount Installation

4.1 Tools and Materials

- Cordless Drill
- 9/64" Drill Bit
- Magnetic Apex Driver Bit - 5/16"
- Scratch Awl

4.2 Procedures

1. Tag equipment with appropriate signage to indicate Lockout/Tag-out 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.

   NOTE: If reefer follow steps 5 through 8; otherwise skip to step 9.

5. If reefer: Verify that the Main Power Switch is set to the OFF position.
6. If reefer: Set the Disconnect Switch to the OFF position.
7. If reefer: Turn the Main Power Switch to the ON position to verify that the LOTO was successful.
8. If reefer: Return the Main Power Switch to the OFF position.
9. Record the Module Serial Number (MSN) located on the device label and the trailer number.
10. Select a center, or roadside, device mounting location on the trailer top rail.

Figure 2-1: 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 mounting screws (4) onto 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.
16. Remove the activation magnet from the front of the device enclosure in order to activate device reporting.

NOTE: Retain the activation magnet - in order to disable reporting upon de-installation of device.
NOTE: If reefer follow step 18; otherwise end of procedure.

17. If reefer: Set the Disconnect Switch to the ON position.

5 Dry Van and Reefer Under Trailer Installation

5.1 Tools and Materials

The following tools and materials are needed to perform this installation:

- Cordless Drill
- 3/16" Drill Bit
- 3/8" Open-End Wrench
- 5/16" Socket – 1/4" drive
- Ratchet - 1/4" drive
- Scratch Awl
- Rust Preventative Spray Paint (black or primer color)

5.2 Safety

Follow all safety procedures as listed in the Safety chapter.

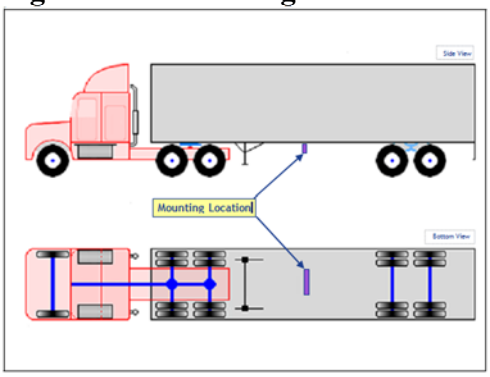
5.3 Procedures

1. Tag equipment with appropriate signage to indicate Lockout/Tag-out 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 Module Serial Number (MSN) from device label and customer's trailer number.
6. Select a cross member located approximately half way between front and rear of trailer. Cross member must be in front of and clear of tandem axle slide rails.

Figure 3-2: Mounting Location - Center Mount



7. At center of selected cross member, choose mounting location for device.

Figure 3-3: Cross Member - Center Mount

8. Using the device mounting flanges as a template, mark the location for each of the four (4) mounting screws on the trailer cross member.
9. At each marked location, drill a 3/16" hole.
10. **Figure 3-4: Drill at Marked Locations**

11. Deburr hole and remove metal shavings from cross member surfaces.
12. Paint all exposed metal surfaces in and around holes with a rust preventative paint. Allow paint to dry 10 minutes.

13. Mount device on cross member using screws (4), flat washers (4) and self-locking nuts (4). Ensure flat washer is between screw head and plastic device housing.
14. Tighten each screw using 5/16" socket, ratchet and 3/8" open-end wrench.

Figure 3-5: Tighten Screws

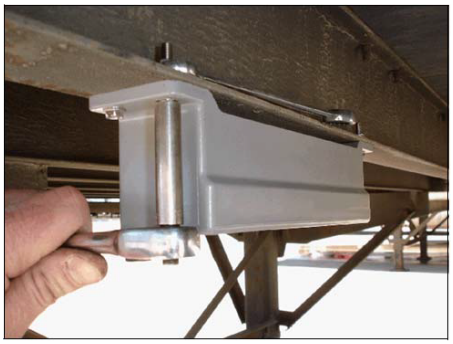


Figure 3-6: Device Mounted

15. Remove magnet from front of device enclosure to activate device reporting.

    NOTE: Retain the activation magnet - in order to disable reporting upon de-installation of device.

6 Chassis Screw Mount Installation

6.1 Tools and Materials

The following tools and materials are needed to perform this installation:

- Cordless Drill
- 3/16" Drill Bit
- 3/8" Open-End Wrench
- 5/16" Socket – 1/4" drive
- Ratchet - 1/4" drive
- Scratch Awl
- Rust Preventative Spray Paint (black or primer color)

6.2 Safety

6.3 Procedures

1. Tag equipment with appropriate signage to indicate Lockout/Tag-out procedure is in process.
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 Module Serial Number (MSN) from device label and customer's trailer number.

Figure 4-1: Device Label

6. Identify Mounting Location
    - Facing Up, or
    - Facing Down
        - Ensure no damage when stacking or operating chassis.

CAUTION: Device must be mounted facing up or down for optimum GPS reception and accuracy

Figure 4-2: Chassis Mount (Device facing up)

Figure 4-3: Chassis Mount (Device facing down)

7. Using the device mounting flanges as a template, mark the location for each of the four (4) mounting screws on the trailer cross member.
8. At each marked location, drill a 3/16" hole.
9. Deburr hole and remove metal shavings from cross member surfaces.
10. Paint all exposed metal surfaces in and around holes with a rust preventative paint. Allow paint to dry 10 minutes.
11. Mount device using screws (4), flat washers (4) and self-locking nuts (4). Ensure flat washer is between screw head and plastic device housing.
12. Tighten each screw using 5/16" socket, ratchet and 3/8" open-end wrench.
13. Remove magnet from front of device enclosure to activate device in Sky View.

    NOTE: Retain the activation magnet - in order to disable reporting upon de-installation of device.

14. Process Installation Worksheet.

7 Chassis Magnetic Mount Installation

7.1 Tools and Materials

The following tools and materials are needed to perform this installation:

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

7.2 Safety

Follow all safety procedures as listed in the Safety chapter.

7.3 Procedures

1. Tag equipment with appropriate signage to indicate Lockout/Tag-out 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 number.
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 5-2: Device Tethered (Frontal View)

Figure 5-3: Center Device Side-to-Side and Front-to-Back

7. Clean mounting surface where magnets will contact frame member.
    - For dirt and grease use acetone
    - For rust or loose paint use a wire brush and acetone
8. Mount device and ensure all four (4) magnets are engaged.
9. If required, drill 1/4" 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.

Figure 5-4: Feed threaded link through lanyard loops and tab (Loctite applied to threads)

13. Apply blue Loctite to threaded link threads.
14. Tighten threaded link with two Crescent wrenches.

Figure 5-5: Tighten Threaded Link with Two Crescent Wrenches

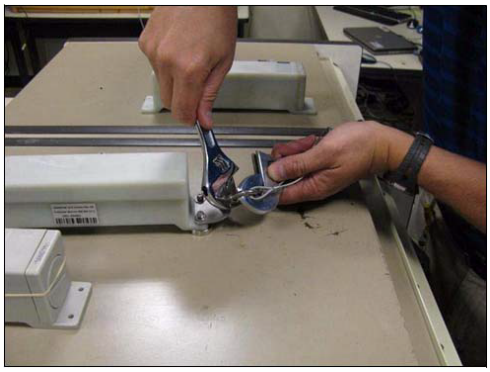


Figure 5-6: Lanyard connected

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

8 Intermodal Container Door Screw Mount Installation

8.1 Tools and Materials

The following tools and materials are needed to perform this installation:

- 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

8.2 Safety

Follow all safety procedures as listed in the Safety chapter.

8.3 Procedures

1. Tag equipment with appropriate signage to indicate Lockout/Tag-out 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 number.
6. Identify mounting location
   - Top of the left or right door
   - Between locking rods
   - In the bottom of corrugation well
   - Ensure mounting surface is level and rust free

Figure 6-1: Top Left Container Door

(Device mounted in corrugation well between locking rods)

7. Level device in mounting area with label facing down
8. Mark all four (4) mounting holes with scratch awl
9. Drill all four (4) mounting holes
10. Apply RTV sealant inside the mounting holes

Figure 6-2: Sealant Applied to Backside

11. Feed mounting screws from inside container door
12. Mount device on screws and tighten nuts

CAUTION: Drive screws at low speed to avoid seizing

Figure 6-3: Final Installation with Label Facing Down

13. Remove the activation magnet from the front of the device enclosure in order to activate device reporting.
14. Complete Installation Worksheet

9 Intermodal Container Door Magnetic Mount Installation

9.1 Tools and Materials

The following tools and materials are needed to perform this installation:

- Two (2) 10” Adjustable Crescent® Wrenches
- Wire Brush or Scuff Pad
- Acetone
- Rags
- Loctite Thread locker Blue 242

9.2 Safety

Follow all safety procedures as listed in the Safety chapter.

9.3 Procedures

1. Tag equipment with appropriate signage to indicate Lockout/Tag-out 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 number.

   Figure 7-1: Device Label

6. Identify Mounting Location
   - Top of left or right door
   - Between locking rods
   - In the bottom of corrugation well
   - Ensure mounting surface is level and rust free

   Figure 7-2: Device Mounted at Top of Left Door between Locking Rods

7. Clean mounting surface where magnets will contact door.
   - For dirt and grease use acetone
   - For rust or loose paint use a wire brush and acetone
8. Mount device within 8" of locking rod and ensure all four magnets Are engaged
9. Route lanyard around locking rod
10. Feed threaded link through lanyard loops and lanyard clip.
11. Apply blue Loctite to threaded link threads.

Figure 7-3: Wrap Lanyard around Locking Rod and Secure with Threaded Link

12. Tighten threaded link with two Crescent wrenches.

Figure 7-4: Tighten Threaded Link with Two Crescent Wrenches

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

10 Flatbed Screw Mount Installation

10.1 Tools and Materials

The following tools and materials are needed to perform this installation:

- Cordless Drill
- 3/16" Drill Bit
- 3/8" Open-End Wrench
- 5/16" Socket – 1/4" drive
- Ratchet - 1/4" drive
- Scratch Awl
- Rust Preventative Spray Paint (black or primer color)

10.2 Procedures

1. Tag equipment with appropriate signage to indicate Lockout/Tag-out 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 Module Serial Number (MSN) from device label and customer's trailer number.

   Figure 8-1: Device Label

6. Select a mounting location:

   - Under Trailer Screw Mount

   OR

   - Nose Rail Screw Mount

10.3. Under Trailer Screw Mount

2. Mount on cross member located approximately half way between front and rear of trailer. Cross member must be in front of and clear of tandem axel slide and rails. Identify Mounting Location
   - Facing Up, or
   - Facing Down
     - Ensure no damage when stacking or operating trailer.

Figure 8-2: Under Trailer Screw Mount (Graphic Illustration)

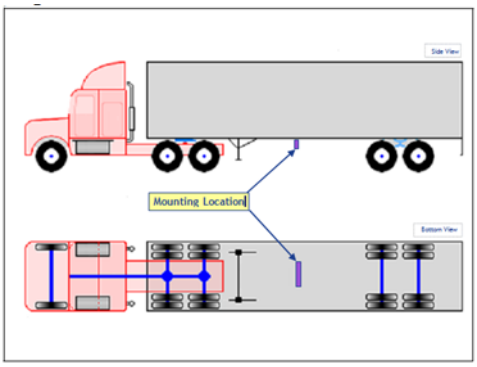
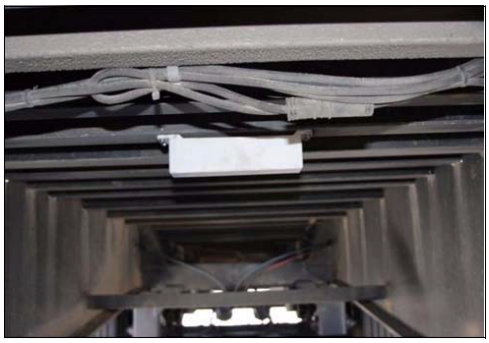


Figure 8-3: Under Trailer Screw Mount (Pictorial Illustration)



3. Using the device mounting flanges as a template, mark the location for each of the four (4) mounting screws on the trailer cross member.
4. At each marked location, drill a 3/16" hole.
5. Deburr hole and remove metal shavings from cross member surfaces.
6. Paint all exposed metal surfaces in and around holes with a rust preventative paint. Allow paint to dry 10 minutes.
7. Mount device using screws (4), flat washers (4) and self-locking nuts (4). Ensure flat washer is between screw head and plastic device housing.
8. Tighten each screw using 5/16" socket, ratchet and 3/8" open-end wrench.
9. Remove the activation magnet from the front of the device enclosure in order to activate device reporting.

   NOTE: Retain the activation magnet - in order to disable reporting upon de-installation of device.

10.3 Nose Rail Screw Mount

1. Select a mounting location on the nose rail centered from side-to-side where device will not be damaged.

Figure 8-4: Flatbed Nose Rail Device Mount

Figure 8-5: Mount Device Where It Will Not Be Damaged

2. Using the device mounting flanges as a template, mark the location for each of the four (4) mounting screws on the trailer nose rail.
3. At each marked location, drill a 9/64" hole.
4. Install the mounting screws (4) through the mounting flanges and into the trailer's top rail.
5. Tighten screws (4).
6. Remove the activation magnet from the front of the device enclosure in order to activate device reporting.

NOTE: Retain the activation magnet - in order to disable reporting upon de-installation of device.