Mobile Messaging System Installation Manual

UM20-100111B

Upon receipt of this manual, log on to
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Customer Service
United States 1-877-283-7466 **Canada 1-877-483-8466**

FM0014QS Rev. F

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NOTE

The installation of a Terion system in a manner inconsistent with Terion's requirements may void the customer warranty. All installations must be conducted by a Terion-certified installer in conformance with Terion's application information (i.e., the right system and kit for the vehicle) and to Terion's installation instructions.

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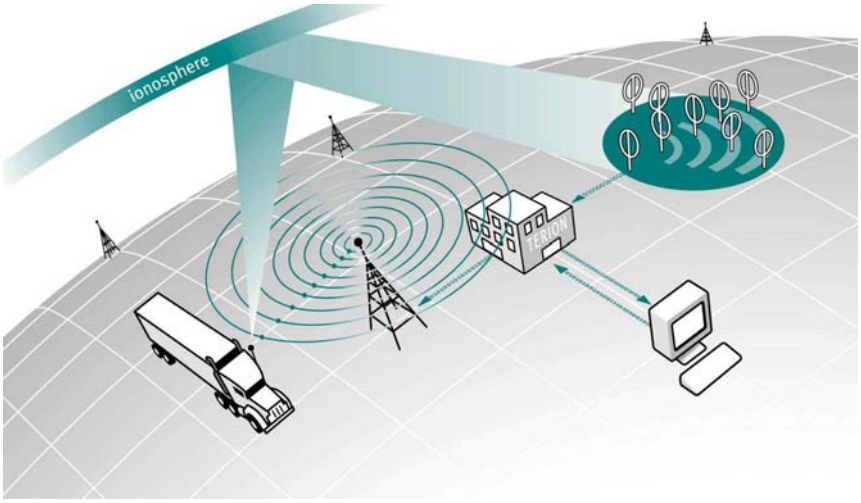
Contents

1 Introduction

The Terion Mobile Messaging System is a two-way mobile data system that provides wireless wide area messaging services, and thus, the ability for trucking companies to maintain communication with their truck drivers.

1.1 Scope

This installation manual provides instructions on how to install the Terion Mobile Messaging System in a truck tractor.



1.2 Contents

The Mobile Messaging System Installation Manual is intended to be a guide for installing the Mobile Messaging System hardware, and for calibrating and activating the system. The following is a description of how the manual is organized:

- **Section 1, Introduction.** Describes the scope, contents, safety, related publications, web available manuals, and conventions used in this manual.
- **Section 2, Installation Overview**. Describes installation kit and major hardware components.
- **Section 3, Before You Begin**. Describes verification, inspection, and selection criteria prior to an installation.
- **Section 4, FM/DHF Antenna Installation.** Describes the procedures for FM/DHF antenna installation.
- **Section 5, GPS Antenna Installation**. Describes the procedures for GPS antenna installation, including side and rear mount installations.
- **Section 6, Intelligent Transceiver Unit (ITU) Installation**. Describes the procedures for ITU installation.

- **Section 7, Power Connections**. Describes considerations and procedures for connecting to the truck's electrical power system.
- **Section 8, Driver Terminal (DT) Installation**. Describes the procedures for Journeyman-I/Journeyman-II mmc Driver Terminal (DT) installation.
- **Section 9, Software Versions**. Describes how to check for the latest software, and where to find the latest software.
- **Section 10, Calibration**. Describes the procedures for unit calibration.
- **Section 11, Activation**. Describes the procedures for unit activation.
- **Section 12, Address Setup**. Describes the procedures for adding and modifying an address, and setting an address as default.
- **Section 13, Troubleshooting**. Describes the procedures for troubleshooting a system.
- **Appendix A, Replacement Kits**. Describes considerations when using a Terion Replacement Kit.
- **Appendix B, Automotive Adhesion Promoter 4298**. A copy of the MSDN information.
- **Appendix C, Installation Checklist**.
- **Appendix D, Post-Installation Data Sheet**.

1.3 Safety

Proper installation of the Mobile Messaging System is essential for the safety of the installer, the driver, the public, as well as the correct functioning of the unit. For your safety, as well as the safety of others, please follow these safety guidelines:

- Be sure that the truck is in a safe and secure area. It should be on ground that will support the weight of the truck, in a low traffic area to avoid the risk of injury to personnel, and not be exposed to temperature extremes.
- Be sure that the truck brakes are set and the wheels are blocked.

Be sure to read and understand all instructions before beginning the installation. Follow the instructions carefully during the installation, paying close attention to all Warnings, Cautions, and Notes.

NOTE

The installation of a Terion system in a manner inconsistent with Terion's requirements may void the customer warranty. All installations must be conducted by a Terion-certified installer in conformance with Terion's application information (i.e., the right system and kit for the vehicle) and to Terion's installation instructions.

1.4 Related Publications

The following publications provide additional information that may assist the reader in gaining a better understanding of the Terion Mobile Messaging System:

- *Journeyman-I/II mmc Mobile Messenger/Mobile Workstation User Manual*, UM10-100107
- *DT, ITU and Antenna Troubleshooting Manual*, UM10-100109
- *Webdownload Site User Manual*, UM20-100112
- *Mobile Messaging System Overview*, UM10-100113

1.5 Web Available Manuals

This manual and others are available to Terion's customers on the Terion web site. Log on to www.terion.com/webdownload and click on **Documentation**.

1.6 Conventions

Terion documentation employs a system of standard conventions, such as the usage of bold or underlined text, to convey certain information, and to assist you in actively responding to prompts and dialog screens. The table below outlines the conventions.

Convention	Usage
Click	Point the mouse pointer at a button on a toolbar and press the left, or primary, mouse button once.
Double-click	Point the mouse pointer at a screen object and quickly press the left, or primary, mouse button twice.
Right-click	Point the mouse pointer at a screen object and press the right, or secondary, mouse button once. A context-sensitive pop-up menu appears.
Drag	Point the mouse pointer at a screen object, then press and hold the left mouse button. While holding the mouse button down, move the mouse pointer to the object's new location, then release the mouse button.
Select	Point the mouse pointer at an icon or menu choice, then press the left or primary mouse button once. When an icon is selected it will appear as highlighted. When a menu choice is selected the command that the menu choice represents is executed.

Convention	Usage
SIMULTANEOUS + KEYS	Often one key must be held down while another key is pressed. In such cases the keys are shown side-by-side like this: **ALT + A**. In this example, the **ALT** key is pressed first and held down while the **A** key is pressed.
 **WARNING!**	**A WARNING INDICATES THE POTENTIAL FOR BODILY HARM AND TELLS YOU HOW TO AVOID THE PROBLEM.**
 ***CAUTION!***	***A Caution indicates potential damage to the system, and tells you how to avoid the problem.***
 **Note:**	A Note indicates important information that helps you better understand a function, feature, or instruction.

2 Installation Overview

2.1 Installation Kit

The major components and the necessary mounting hardware of the Mobile Messaging System are contained in an installation kit. Before installing, check the contents of the kit against the packing list to verify that you have everything needed. For rear-mounted antennas, a rear-mount supplemental kit is also required.

2.2 Major Components

There are three major components of the Mobile Messaging System. They are the antenna system, the intelligent transceiver unit (ITU), and the driver terminal (DT).

2.2.1 Antenna System

The antenna system consists of a frequency modulation/digital high frequency (FM/DHF) antenna, a global positioning system (GPS) antenna, and the cabling and mounting hardware. The FM/DHF antennas are typically mounted on the side of the cab or on the outside of the rear cab wall, and the GPS antenna is typically mounted on top of the cab or roof structure with the ability to look upward.

2.2.2 Intelligent Transceiver Unit (ITU)

The intelligent transceiver unit (ITU) is the "black box" that accepts messages from the dispatcher, performs actions according to their instructions, and then automatically responds by transmitting data or messages back to the dispatcher. Power, antenna, and DT cables are connected to the ITU. The ITU is mounted in an inconspicuous location, typically under the sleeper berth, or behind the seat.

2.2.3 Driver Terminal (DT)

The driver terminal (DT) provides the interface between the driver and Terion's Mobile Messaging System. Messages are viewed on the screen and entered on the keyboard. The DT is mounted inside the truck cab. Two DT models exist: the Journeyman-I, and the Journeyman-II mmc. The model name is found on the front of the driver terminal in white letters. Both driver terminals handle email messages and forms; the only difference is that the Journeyman-II mmc contains an internal cellular phone and modem, and has a headset jack on the rear.

3 Before You Begin

Correct installation will insure equipment integrity, reliable operation, and ease of maintenance. The key to a correct installation is planning. Identify where on the truck you plan to install each component and the routing of each cable. This way you can resolve any potential deviations before you drill the first hole.

CAUTION! In order to function properly and insure a long operating life, the Mobile Messaging System must be properly located and securely mounted.

Note: Devising an optimum location plan is critical for a successful installation.

3.1 Verification of Hardware

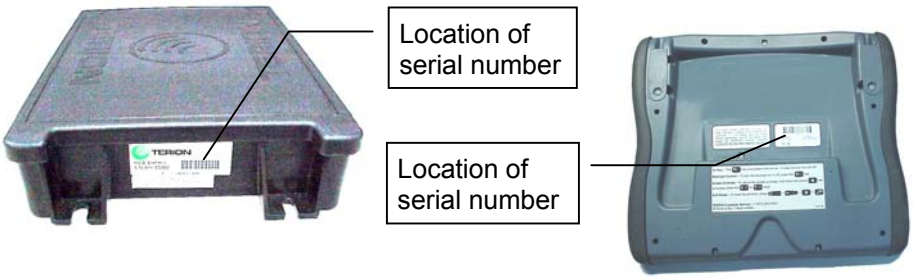
Before installation, check the contents of the kit against the packing list to verify that you have everything needed. If a rear-mounted antenna is planned, verify that the rear-mount supplemental kit is also available and complete. If either kit is incomplete, contact Customer Service.

3.2 Verification of Power Source

There are several considerations regarding how the power cord is connected to the tractor's power source. Late model tractors have a different style of fuse panels from early model tractors. See Section 7, Power Connections, for a detailed discussion.

3.3 Verification of Serial Numbers

Immediately after removing the ITU and DT from the carton, verify that the serial numbers match the Kit Contents section. Record these numbers for future use – during the activation process, the ITU number must be typed into the DT *Unit Activation* Screen.



3.4 Verification of Software Versions

DT and ITU functions are controlled by computer software. Terion releases new versions of these software programs from time to time to improve performance and add functionality. Visit the Terion web site at www.terion.com/webdownload/ and install the latest DT and ITU software versions to a personal computer. Make a note of the versions that you are downloading. After a system is installed, refer to Section 9, Software Versions, to see if the

DT and ITU software running on the installed equipment is the latest version. If not, you will have the latest versions readily available on your PC for upgrading the software.

3.5 Inspection for Non-Standard Modifications or Protrusions

A visual inspection of the truck is required to assess any modifications or changes to the factory-built vehicle. Changes include additional fairing, modified exhaust, additional antennas, or any other additional hardware that may interfere with the installation and operation of the system.

3.6 Selection of FM/DHF Antenna Location

Terion has performed extensive testing of the Antenna System; **side mount installations are preferred to rear mount installations because they perform better**. The installation kit contains the necessary parts for an FM/DHF side-mount assembly, and a rear-mount supplemental kit is available for rear-mount assemblies. Before performing a rear-mount installation, please review the criteria below to verify the appropriateness of the selection.

CAUTION! System performance requires that antenna locations be mounted away from sources of interference.

- **Proximity of existing antenna.** Citizens Band (CB) or any other type of antennas up to 3' in length must remain as far as possible from the FM/DHF antenna.
- **Is an acceptable side-mount location available?** Be sure the side mount antenna base mount bracket will fit around external air cleaners.
- **Is the side mount location too tall?** The overall height of the FM/DHF antenna must be 13'6" or less. The antenna is 7' 3" (87") tall. Make sure the antenna base mount, when attached to the side bracket, is no higher than 75" from the ground.

> **Note:** The higher the antenna is mounted, the better it works. Make sure the antenna is mounted such that the overall height is as close as possible to 13' 6", without going over.

WARNING! FEDERAL MOTOR CARRIER SAFETY REGULATIONS PROHIBIT THE OVERALL HEIGHT FROM EXCEEDING 13' 6". BE SURE THE ANTENNA HEIGHT IS 13' 6" OR LESS.

- **Is a driver side mount possible?** If a side mount is determined to be the best option, select the driver side, if possible. This will prevent the antenna from getting hit repeatedly by hanging branches on the side of the road.
- **Length of antenna coaxial cable.** The provided antenna cable is a fixed length; this length has been pre-configured and may not be modified.
- **Rear mounted antenna should not interfere.** If rear mounted, will the antenna interfere with the trailer or other obstacles such as refrigeration units, hydraulic tanks, vertically mounted load bars, or other accessories? Rear mounted antennas are

required to be a minimum of 14" from the rear wall of the cab structure and as far away from the exhaust stack as possible.

Note: Rear mount antenna installation should only be done when a side mount is not feasible.

3.7 Selection of GPS Antenna Mount Location

Before selecting the GPS antenna location, the following items must be considered:

- **Preferred location**. The preferred GPS antenna location is the top of the cab or roof structure with the ability to look upward.
- **Flat surface mount**. The GPS antenna should be mounted on a flat horizontal surface with no metallic overhead obstacles.
- **Mount near FM/DHF antenna**. If possible, mount the GPS antenna near the FM/DHF antenna so that the antenna cables can share a common route to the ITU.
- **Air dam.** The GPS antenna can be mounted under the roof-mounted air dam if the air dam is constructed of either fiberglass or other non-metallic composite material.
- **Cable length.** Upon determination of a suitable mounting location, verify that there will be an adequate length of cable to reach the ITU. The GPS antenna is packaged with a pre-configured length of cable and may not be modified.

3.8 Selection of Driver Terminal (DT) Location

The DT location must be far enough away from the driver so that the driver cannot attempt to drive and use the DT at the same time; yet, it must remain within easy access. Proximity to the driver, cable length from the DT to the ITU, and sturdiness of the desired DT cradle attachment points are all important considerations.

Typical locations are on the passenger side dash, behind either seat, on a closet, or on a bunk wall. On day cabs, locate the DT between seats or on the back wall. Select a location where the DT will not be subjected to direct sunlight. Avoid placing the DT on top of the dash or in rear seat windows. The customer should also be consulted when choosing a DT location.

3.9 Selection of Intelligent Transceiver Unit (ITU) Location

After the mounting locations for the FM/DHF and GPS antennas have been determined, a suitable location for the ITU must be determined. As the FM/DHF and GPS antennas have a fixed length of cable, the location of the ITU will be determined by the proximity of the cable ends. Similar to the FM/DHF and GPS antennas, the location of the ITU needs to be considered as this unit also has a fixed non-adjustable length cable.

Note: Cable routing usually takes more wire length than expected.

Preferred ITU locations within the cab are behind the driver or passenger seat, in a storage compartment, in the living area, or under the bunk. For day cab tractors, install the ITU on the rear bulkhead, or under the seat.

CAUTION! Air ride seats have a wide range of motion; ITUs and DTs mounted within the range of motion of air ride seats can cause damage, both to the seat and to the Terion equipment. If you are planning to mount the ITU or DT near an air ride seat, check the seat's full range of motion – forward, back, up and down.

4 FM/DHF Antenna Installation

4.1 Side Mount Instructions

4.2 Identification of Best Antenna Ground Point

This paragraph addresses the antenna ground. It does not address the battery/power ground. For information on the battery/ground, see Section 7, Power Connections.

Note: Very Important—The key to reliable FM reception and HF transmission is a well-grounded antenna. Use a Volt-Ohm meter (VOM) to verify the antenna ground quality.

Note: The ideal antenna ground is the truck's frame rail.

Note: For this measurement, make sure the power is not plugged into the ITU, and the coax cable is not connected to the antenna. The truck must be off, and everything using the truck's batteries must be off (e.g., turn off lights, keep the doors closed so the cab light does not come on, turn off any appliances like refrigerators, etc.).

1. Set the Volt-Ohm meter (VOM) to the resistance (ohms) position.
2. With the two test leads connected to the inputs of a OVM, hold the probes of the two test leads together and adjust the meter to read zero (0) ohms.

   Adjusting (zeroing) the meter this way compensates for the resistance present in the test leads, themselves, so that subsequent measurements will be more accurate.

   Note: Some meters, particularly digital ones, cannot be manually adjusted to zero. If the meter cannot be zeroed, make a note of the resistance reading with just the two test leads touching and subtract that value form your other readings as you look for a point of low resistance.
3. Remove a small area of paint from the truck frame rail.
4. Attach a long test lead from the negative VOM input, to the frame rail where the paint was removed.
5. Use the test lead connected to the positive meter input to measure the resistance to ground at bolt heads on the fire wall for a side mount installation, or to bolt head on the truck frame rails. When performing the measurements, make sure there is good contact between the metal and the probe (e.g., no paint, dirt, or grease on the surfaces being measured). Look for connection points that have a very low resistance. **The resistance must be less than 1.0 ohm.** The bolt(s) where the resistance to the frame rail is the least (and less than 1.0 ohm) is the point where the antenna ground braid will be attached.

4.3 Side Mount Instructions

Side mount antenna base mounts are fastened to three different styles of truck bodies. The differences in styles are fender or body construction materials, and accessibility to the fender backsides. These body styles are:

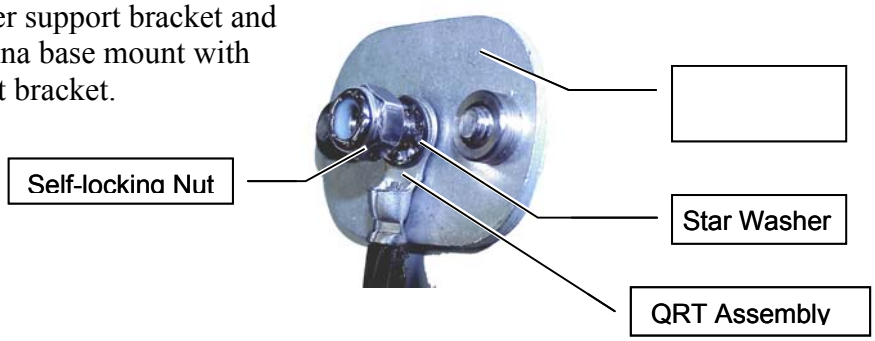
- Composite or fiberglass reinforced plastic bodies
- Aluminum or steel bodies with inaccessible backsides
- Aluminum or steel bodies with accessible backsides

4.3.1 Attaching Antenna Base Mount to Composite Body Panels

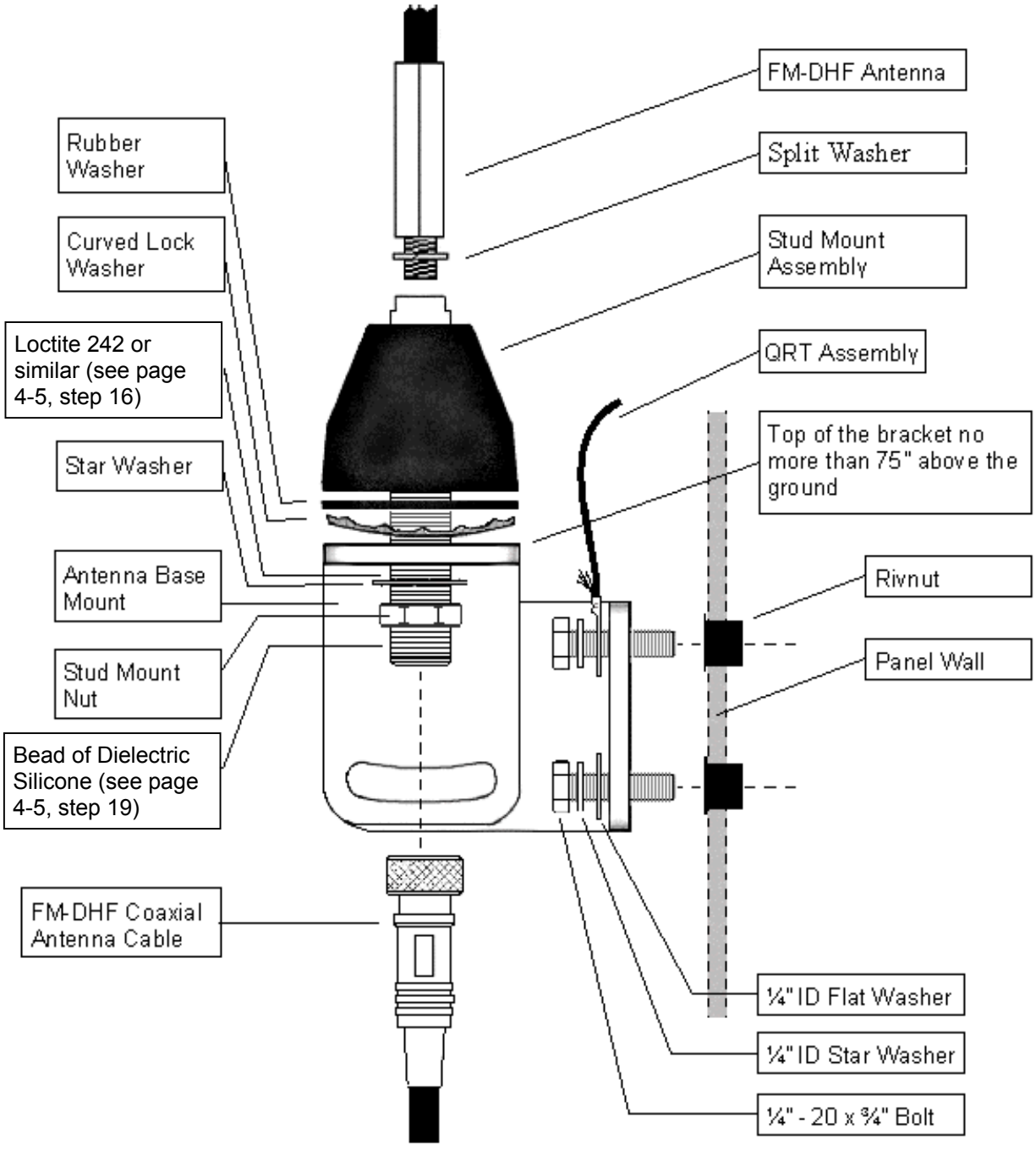
1. Determine where to fasten the antenna base mount bracket to the side of the truck. On most side mount installations, the antenna base mount is attached to the panel between the front door jamb and the motor cowl. Be sure the height of the bracket is as close as possible to, but no more than, 75", measured from the ground. (See the diagram on the following page).

   Note: The antenna performance improves as its height above the ground increases.

2. Using the antenna base mount bracket, mark the mounting holes on the truck.
3. If you cannot easily reach behind the body panel to which the antenna base mount is being attached, loosen it or completely remove it so that you have access to the backside of the fender.
4. Drill two 1/4" bolt holes in the fender.
5. Attach the quad-radial technology (QRT) assembly to the antenna base mount nut plate. The nut plate has a 1/4" - 20 stud to fasten the QRT assembly. Fasten the QRT to the nut plate by first putting a 1/4" inside diameter (ID) star washer on the stud, followed by the QRT ring terminal and another star washer, and then securing it with a self-locking nut.
6. Put a 1/4" ID star washer, and then a 1/4" ID flat washer, on each of the 1/4" - 20 x 3/4" bolts. Place the bolts through the antenna base mount, then through the bolt holes in the fender. Hold the nut-plate behind the fender so that the 1/4" bolts can be attached. Thread the bolts into the nut-plate but Do Not tighten them until you have attached the upper support bracket and aligned the antenna base mount with the upper support bracket.



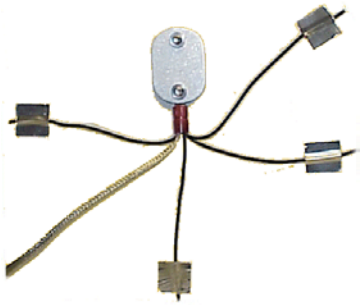
Side-mount Antenna Bracket



7. Clean the best ground point, identified by performing the measurements in Section 4.2, so that the ground strap terminal will contact clan, paint-free metal. Cut the braided ground strap to length and crimp the correct ring terminal to the strap. Remove the bolt found in Section 4.2. Place the ground bolt through a star washer, followed by the ground strap terminal, and then through another star washer. Put the assembly through the bolt hole, and then add a flat washer and a self-locking nut. Apply conductive (copper-colored) grease and tighten the nut.

8. With QRT ground strap assembly attached to the antenna base mount nut plate inside the fender, extend the individual black wires in three horizontal directions–forward, backward, and inward (The fourth wire, since it cannot extend outward, should go down). Make sure the radials don't interfere with any moving parts or access ways.

Note: The ideal placement of the radials would be for them to be spaced equally apart and in the plane perpendicular to the antenna. In most cases, this won't be possible with one of the radials.



9. Identify the four ends of the radial locations inside the fender or other lamination points. These areas are the bonding points.
10. At these bonding points, clean an area with degreaser. Then follow up by thoroughly cleaning with isopropyl alcohol wipes. **Do not use denatured alcohol**, as it will not clean the bonding points properly.

WARNING! THE 3M AUTOMOTIVE ADHESION PROMOTOR 4298, USED IN THE NEXT STEP, IS HIGHLY FLAMMABLE, HARMFUL BY INHALATION, AND IRRITATING TO EYES AND SKIN. SEE THE MSDS FOR SAFETY AND HANDLING IN APPENDIX B OF THIS MANUAL.

11. Apply the adhesive promoter in a thin, uniform coating to the bonding surface using the minimum amount to fully coat the surface. Allow the primer to dry thoroughly before applying tape (usually five minutes at room temperature). Be sure the primed surface remains free from contaminants prior to laminating the tape.
12. Peel the backing off a piece of foil tape and laminate a QRT radial end to the cleaned and primed bonding surface. Use a plastic "Bondo" spreader or putty knife to press the tape firmly in place and remove any trapped air bubbles. Repeat until all four radials are secured.

Note: On most installations you will need to apply additional pieces of foil tape to completely secure radial wires in place.

13. Attach the upper support bracket to the tractor. Typically, the upper support attaches to the tractor's sun visor using an existing fastener. Position the upper support bracket so that the antenna hole will align with the antenna base mount.

    - If you are using an existing bolt, remove the bolt. Place the bolt through a fender washer, and then through the upper support. Peel the back off the foam tape and reattach the bolt to the tractor.
    - If there is no existing bolt (or hole), drill a 1/4" hole in the sun visor and bolt the upper support to it with a fender washer and 1/4" self-locking nut on the inside of the visor.

      ➡ **Note:** In the next option, the rivnut, 1/4" bolt, and fender washer are very important. Do not try to simplify this step by using a sheet-metal screw.

    - On some trucks, there is no sun visor to install the upper support. In that case, drill a 25/64" hole on the truck and install a 1/4" rivnut in the hole. Fasten the upper support with a 1/4" bolt and a fender washer.

14. Place the rubber washer, and then the curved lock washer, on the stud mount bolt.

    ➡ **Note:** It is ESSENTIAL that the curved lock washer be placed so that it curves towards the rubber washer (refer to the illustration on page 4-3).

15. Place the stud mount assembly into the base mount bracket, put the star washer on the stud mount shaft, and then thread the stud mount nut about half way up the shaft.

    ➡ **Note:** When applying Loctite, only a small amount is required.

16. Apply a small amount of Loctite 242, or similar locking compound, to the threads that will be covered by the stud mount nut when it is fully tightened.

17. Tighten the stud mount nut finger tight, and then use a wrench to tighten it another **3/4 turn to 1 turn**. This should result in a torque of approximately 10 foot-pounds.

18. Verify the resistance from the antenna mount to the frame rail is less than 1 ohm.

    ➡ **Note:** For this measurement, make sure the power is not plugged into the ITU, and the coax cable is not connected to the antenna. The truck must be off, and everything using the truck's batteries must be off (e.g., turn off lights, keep the doors closed so the cab light does not come on, turn off any appliances like refrigerators, etc.).

19. Place a bead of dielectric silicone grease (clear grease) around the base of the antenna stud mount where the upper portion of the coaxial cable connector will be connected. Leave the last three to four threads clean. This will prevent moisture from getting into the assembly and still maintain good metal-to-metal contact with at least three threads.

    ➡ **Note:** The easiest way to determine where the upper part of the connector will be connected is to connect it and examine how high

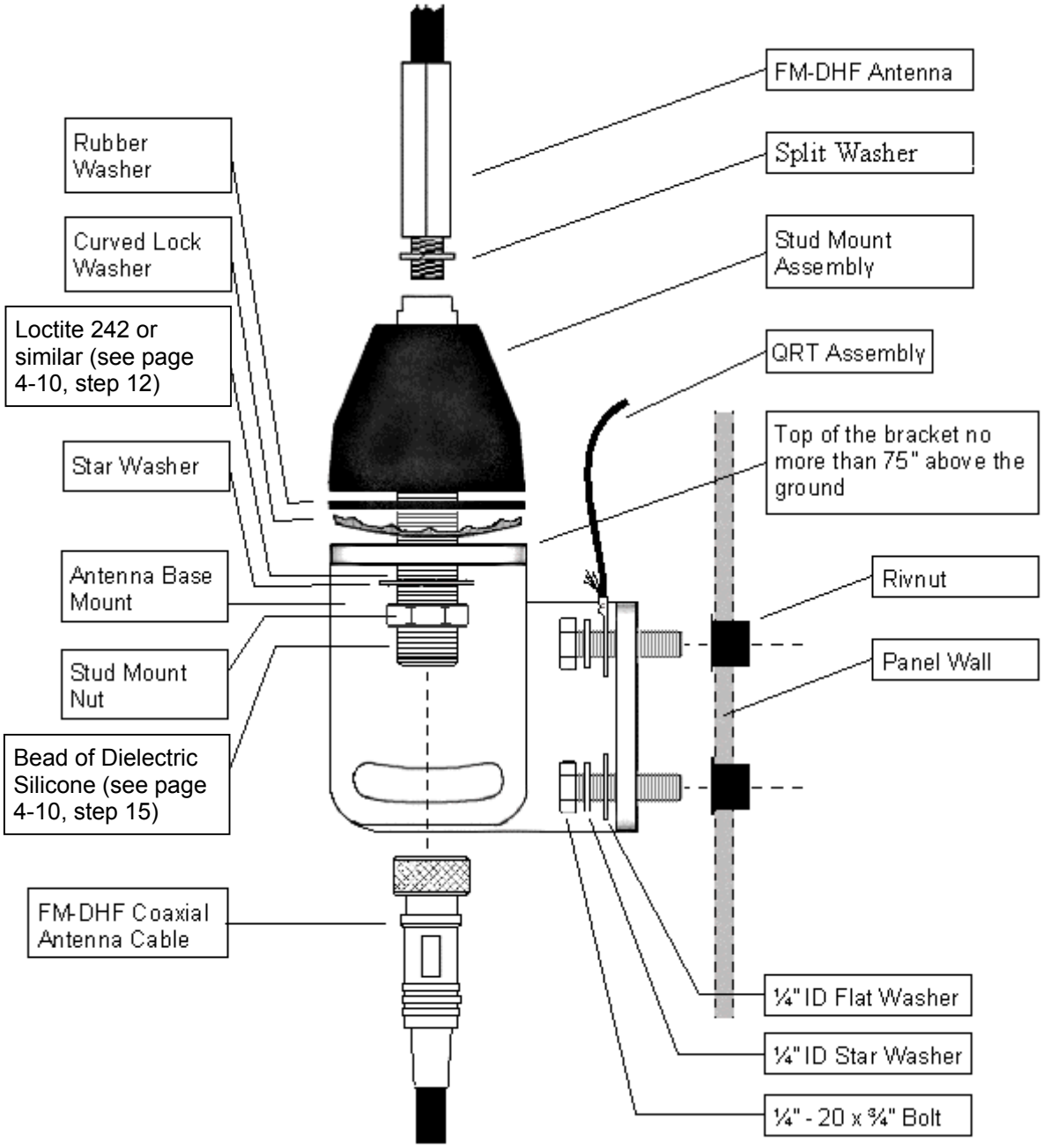
on the stud mount the connector sits. Don't use too much silicone grease.

20. Attach the FM-DHF coaxial cable to the antenna stud mount and tighten the connection.
21. Determine the best place for the coax cable to enter the truck cab. The cables should enter through the fender near the antenna base mount. Drill the cable entry hole, starting the hole with a center punch, drilling a 1/8" pilot hole, and then drilling a 3/4" hole. Use a de-burring tool to smooth the edges of the hole.
22. Pass the coaxial cable through the hole. Place a 3/4" grommet around the cable and into the entry hole.

    Note: If the GPS antenna cable can share the entry hole, then place the GPS antenna cable through the hole along with the FM/DHF antenna cable.

    Note: Use the grommet most appropriate for the wall thickness; the installation kit comes with two grommet sizes for either a 1/16" or a 1/8" wall thickness.
23. Guide the top end of the antenna through the antenna upper support bracket. Install a split lock washer onto the stud, and then fasten the antenna to the stud mount assembly. Use wrenches to tighten the connection.
24. Now that the antenna is aligned between the mount and the upper support, complete tightening the bolts on the antenna base mount bracket.
25. With everything tightened, test the installation by grabbing the antenna by hand and trying to turn it. **If the antenna Stud Mount Assembly turns in the mounting bracket, it is too loose and needs to be tightened (see step 17)**.
26. Place the coax into split tubing, secure the coax cable with tie wraps, and seal the entry hole.

4.3.2 Attaching Antenna Base Mount to Aluminum or Steel Body Panels with Inaccessible Backsides

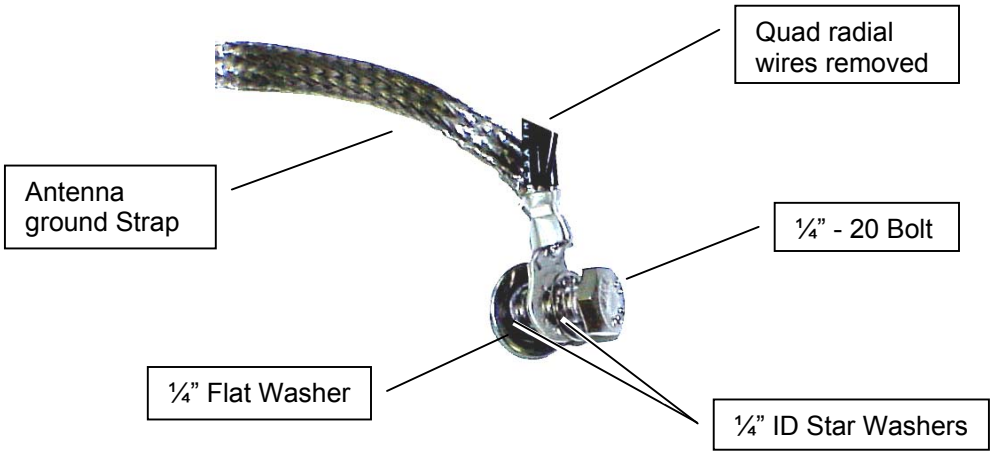


1. Determine where to fasten the antenna base mount bracket to the side of the truck. On most side mount installations, the antenna base mount is attached to the panel between the front door jamb and the motor cowl. Be sure the height of the bracket is no more than 75", measured from the ground. (See the diagram on the previous page).
2. Using the antenna base mount bracket, mark the mounting holes on the truck.

> **Note:** The antenna performance improves as its height above the ground increases.

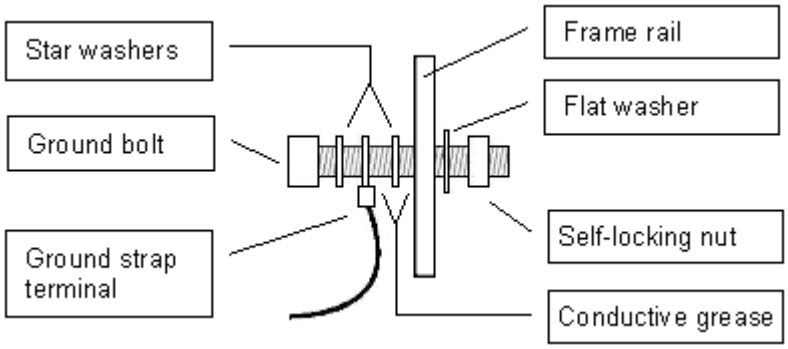
3. Drill two 25/64" rivnut holes in the fender.

4. Insert 1/4" - 20 rivnuts into the holes and cinch tight with a rivnut tool.
5. Cut the four radial wires off the quad radial assembly, leaving only the ground strap, and apply dielectric grease to the ends of the cut wires.



6. Put a 1/4" inside diameter (ID) star washer, and then a 1/4" ID flat washer on one of the 1/4" - 20 x 1" bolts. On the other bolt, place a 1/4" ID star washer, and then the QRT terminal. Place the bolts through the antenna base mount and thread the bolts into the rivnuts. Do Not tighten the bolts until you have attached the upper support bracket and aligned the antenna base mount with the upper support bracket.

7. Clean the best ground point, identified by performing the measurements in Section 4.2, so that the ground strap terminal will contact clan, paint-free metal. Cut the braided ground strap to length and crimp the correct ring terminal to the strap. Remove the bolt found in Section 4.2. Place the ground bolt through a star washer, followed by the ground strap terminal, and then through another star washer. Put the assembly through the bolt hole, and then add a flat washer and a self-locking nut. Apply conductive (copper-colored) grease and tighten the nut.



8. Place a 9/16" grommet in the antenna guide hole in the upper support bracket.
9. Attach the upper support bracket to the tractor. Typically, the upper support attaches to the tractor's sun visor using an existing fastener. Position the upper support bracket so that the antenna hole will align with the antenna base mount.
   - If you are using an existing bolt, remove the bolt. Place the bolt through a fender washer, and then through the upper support. Peel the back off the foam tape and reattach the bolt to the tractor.
   - If there is no existing bolt (or hole), drill a 1/4" hole in the sun visor and bolt the upper support to it with a fender washer and 1/4" self-locking nut on the inside of the visor.

     Note: In the next option, the rivnut, 1/4" bolt, and fender washer are very important. Do not try to simplify this step by using a sheet-metal screw.

   - On some trucks, there is no sun visor to install the upper support. In that case, drill a 25/64" hole on the truck and install a 1/4" rivnut in the hole. Fasten the upper support with a 1/4" bolt and a fender washer.
10. Place the rubber washer, and then the curved lock washer, on the stud mount bolt.

    Note: It is ESSENTIAL that the curved lock washer be placed so that it curves towards the rubber washer (refer to the illustration on page 4-7).
11. Place the stud mount assembly into the base mount bracket, put the star washer on the stud mount shaft, and then thread the stud mount nut about half way up the shaft.

Note: When applying Loctite, only a small amount is required.

12. Apply a small amount of Loctite 242, or similar locking compound, to the threads that will be covered by the stud mount nut when it is fully tightened.
13. Tighten the stud mount nut finger tight, and then use a wrench to tighten it another **3/4 turn to 1 turn**. This should result in a torque of approximately 10 foot-pounds.
14. Verify the resistance from the antenna mount to the frame rail is less than 1 ohm.

    Note: For this measurement, make sure the power is not plugged into the ITU, and the coax cable is not connected to the antenna. The truck must be off, and everything using the truck's batteries must be off (e.g., turn off lights, keep the doors closed so the cab light does not come on, turn off any appliances like refrigerators, etc.).
15. Place a bead of dielectric silicone grease (clear grease) around the base of the antenna stud mount where the upper portion of the coaxial cable connector will be connected. Leave the last three to four threads clean. This will prevent moisture from getting into the assembly and still maintain good metal-to-metal contact with at least three threads.

    Note: The easiest way to determine where the upper part of the connector will be connected is to connect it and examine how high on the stud mount the connector sits. Don't use too much silicone grease.
16. Attach the FM-DHF coaxial cable to the antenna stud mount and tighten the connection.
17. Determine the best place for the coax cable to enter the truck cab. The cables should enter through the fender near the antenna base mount. Drill the cable entry hole, starting the hole with a center punch, drilling a 1/8" pilot hole, and then drilling a 3/4" hole. Use a de-burring tool to smooth the edges of the hole.
18. Pass the coaxial cable through the hole. Place a 3/4" grommet around the cable and into the entry hole.

    Note: If the GPS antenna cable can share the entry hole, then place the GPS antenna cable through the hole along with the FM/DHF antenna cable.

    Note: Use the grommet most appropriate for the wall thickness; the installation kit comes with two grommet sizes for either a 1/16" or a 1/8" wall thickness.
19. Guide the top end of the antenna through the antenna upper support bracket. Install a split lock washer onto the stud, and then fasten the antenna to the stud mount assembly. Use wrenches to tighten the connection.
20. Now that the antenna is aligned between the mount and the upper support, complete tightening the bolts on the antenna base mount bracket.

21. With everything tightened, test the installation by grabbing the antenna by hand and trying to turn it. **If the antenna Stud Mount Assembly turns in the mounting bracket, it is too loose and needs to be tightened (see step 13)**.
22. Place the coax into split tubing, secure the coax cable with tie wraps, and seal the entry hole.

4.3.3 Attaching Antenna Base Mount to Aluminum or Steel Bodies with Accessible Backsides

Side mount antenna base mounts are fastened to tractor metal fenders the same way as the installation for attaching antennas to composite body panels **except** that the quad radial wires are removed from the quad radial assembly (the quad radial wires degrade FM reception when the antenna base mount is fastened to an aluminum or steel truck body panel).

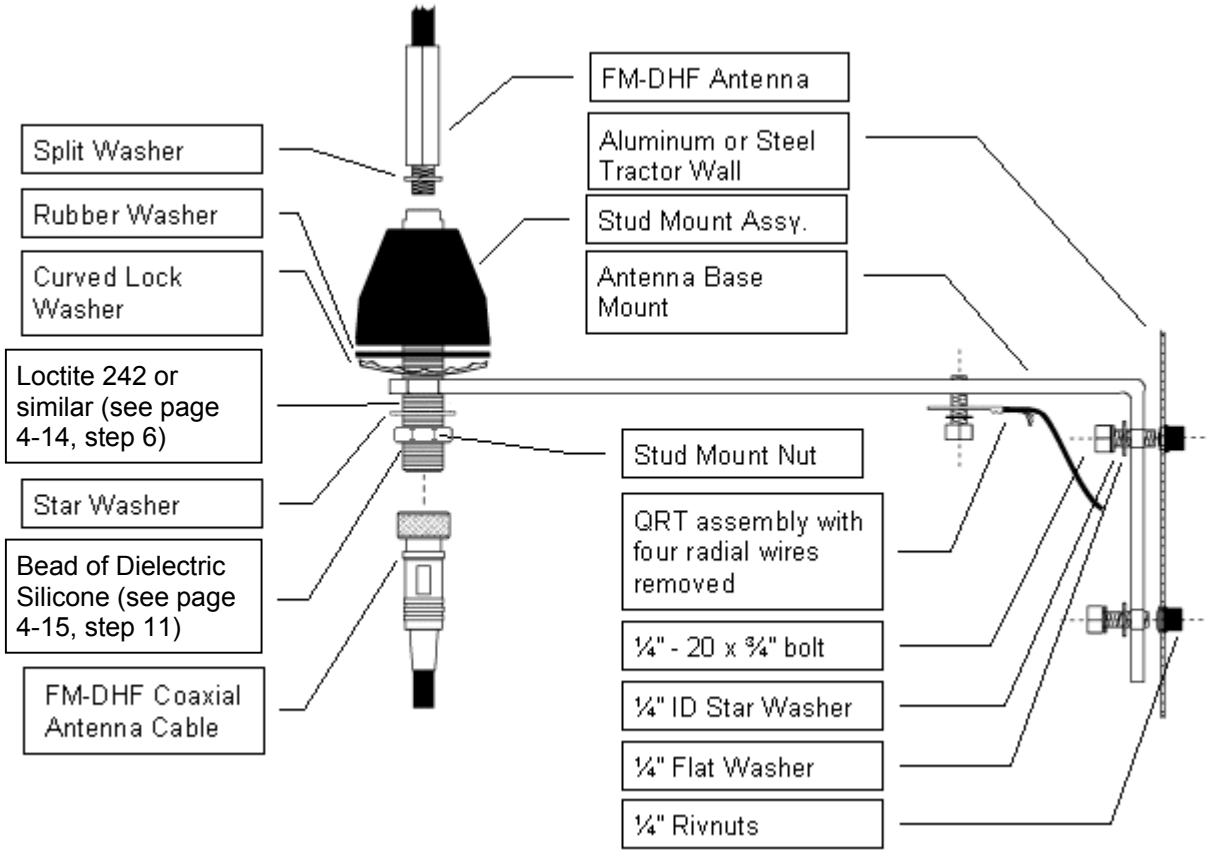
The quad radial wires are cut so that approximately 1/8" or less remains, and dielectric grease is applied to the cut ends.

CAUTION! The quad radial wires MUST be removed from the assembly in order to obtain maximum FM reception on aluminum or steel bodies where side mount is attached.

4.4 Rear Mount Instructions

Most FM/DHF antennas are side-mounted because they perform better than rear-mounted antennas. In a few instances, it is not physically possible to install FM/DHF antennas on the side of the trucks. In these cases, a rear-mount configuration is called for. However, do not rear-mount an FM/DHF antenna simply because the truck owner has the perception that it looks better.

Note: Do NOT rear-mount an FM/DHF antenna simply because the truck owner has the perception that it looks better. Instead, explain to the owner that the system works significantly better with a side-mounted antenna.



To install a rear-mounted antenna:

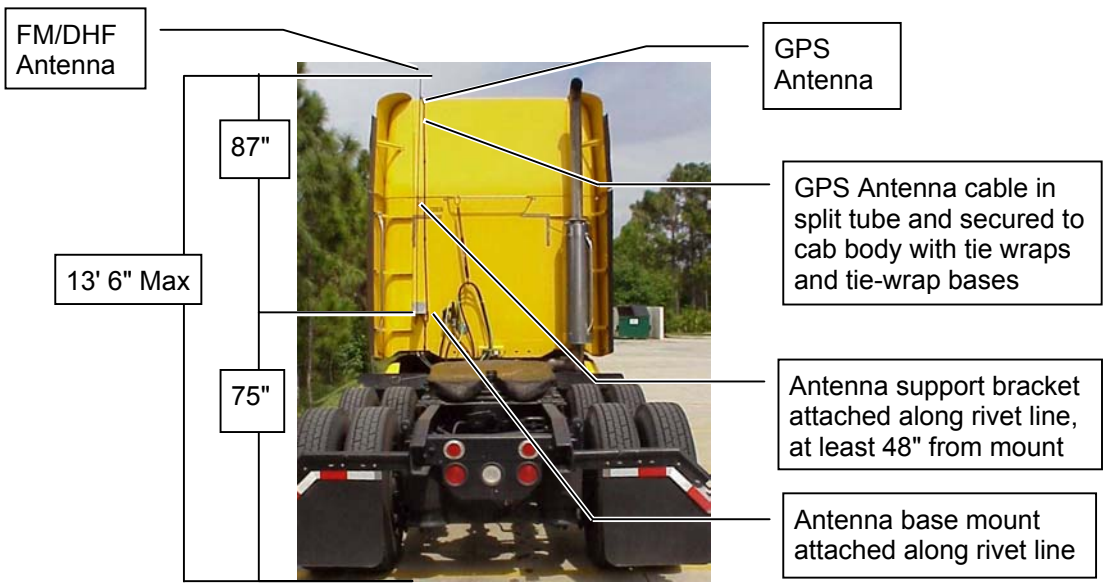
1. Determine the antenna base mount and support bracket attachment points. **You will NOT be able to re-align the base plate mount or upper support bracket once they are in place.** Make sure there is a minimum of 48" between the antenna base mount and the upper support bracket. Draw a vertical centerline on the truck extending from the base plate location through the upper support bracket location. The brackets will be mounted along this centerline at the intersection of a cab support framing rivet line, with the antenna base mount as close as possible to, but no more than, 75" above the ground.

Note: The antenna performance improves as its height above the ground increases.

WARNING! FEDERAL MOTOR CARRIER SAFETY REGULATIONS PROHIBIT THE OVERALL HEIGHT FROM EXCEEDING 13' 6". BE SURE THAT THE OVERALL ANTENNA HEIGHT IS LESS THAN 13' 6".

CAUTION! Rear Base Mount and antenna support must be attached where rear cab skin is supported. Attach them to locations where there is framing behind the cab skin. This is the intersection of the centerline and a rivet line.

WARNING! CHECK BOTH SIDES BEFORE DRILLING. DRILLING INTO A WIRE CAN CAUSE A FIRE. DRILLING INTO AN AIR LINE CAN CAUSE BRAKE FAILURE.

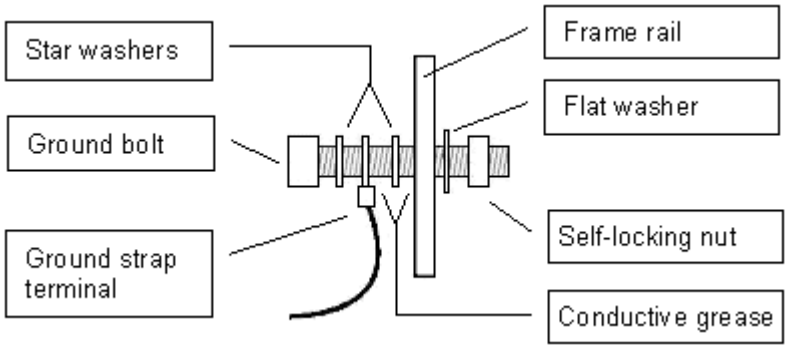


2. Use the antenna base plate and the support bracket as guides to mark hole locations. Start the holes with a center punch and then drill four 25/64" holes. Insert 1/4" - 20 rivnuts into the holes and cinch tight with a rivnut tool.
3. Attach the antenna base plate and upper support bracket using rivnuts and 1/4" - 20 x 1" bolts, 1/4" internal diameter (ID) star washers and 1/4" ID flat washers. Place a 9/16" grommet in the antenna guide hole in the support bracket, then hold the bracket, and secure it in place. Be sure to use a fender washer on the upper support attachment fastener.
4. Place the rubber washer, and then the curved lock washer, on the stud mount bolt.

   Note: It is ESSENTIAL that the curved lock washer be placed so that it curves towards the rubber washer (refer to the illustration on page 4-12).
5. Place the stud mount assembly into the base mount bracket, put the star washer on the stud mount shaft, and then thread the stud mount nut about half way up the shaft.

   Note: When applying Loctite, only a small amount is required.
6. Apply a small amount of Loctite 242, or similar locking compound, to the threads that will be covered by the stud mount nut when it is fully tightened.
7. Tighten the stud mount nut finger tight, and then use a wrench to tighten it another **3/4 turn to 1 turn**. This should result in a torque of approximately 10 foot-pounds.
8. Guide the top end of the antenna through the antenna upper support bracket. Install a split lock washer onto the stud, and then fasten the antenna to the stud mount assembly. Use wrenches to tighten the connection. When secure, grab the antenna by hand and try to turn it. If the antenna stud mount turns, **it is too loose and needs to be tightened** (see the previous step).

9. Clean the best ground point, identified by performing the measurements in Section 4.2, so that the ground strap terminal will contact clan, paint-free metal. Cut the braided ground strap to length and crimp the correct ring terminal to the strap. Remove the bolt found in Section 4.2. Place the ground bolt through a star washer, followed by the ground strap terminal, and then through another star washer. Put the assembly through the bolt hole, and then add a flat washer and a self-locking nut. Apply conductive (copper-colored) grease and tighten the nut.



10. Verify the resistance from the antenna mount to the frame rail is less than 1 ohm.

    Note: For this measurement, make sure the power is not plugged into the ITU, and the coax cable is not connected to the antenna. The truck must be off, and everything using the truck's batteries must be off (e.g., turn off lights, keep the doors closed so the cab light does not come on, turn off any appliances like refrigerators, etc.).

11. Place a bead of dielectric silicone grease (clear grease) around the base of the antenna stud mount where the upper portion of the coaxial cable connector will be connected. Leave the last three to four threads clean. This will prevent moisture from getting into the assembly and still maintain good metal-to-metal contact with at least three threads.

    Note: The easiest way to determine where the upper part of the connector will be connected is to connect it and examine how high on the stud mount the connector sits. Don't use too much silicone grease.

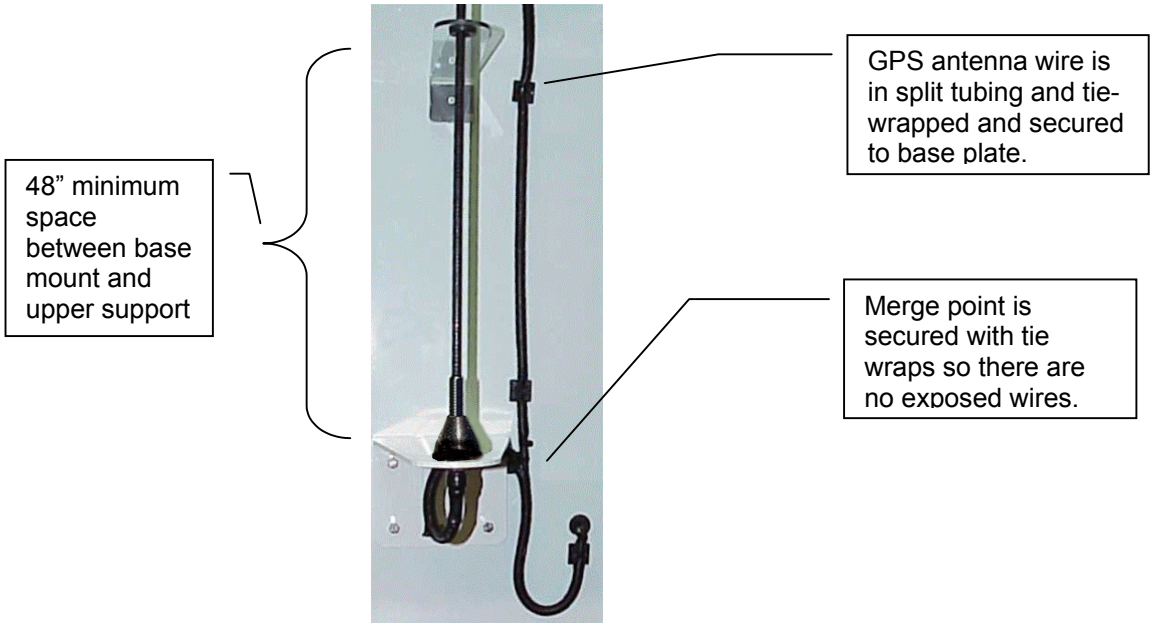
12. Attach the FM/DHF coaxial cable to the antenna stud mount and tighten the connection.

13. Determine the best point for the FM/DHF and GPS antenna cables to enter the truck cab. It should, preferably, be under the cab. Look for an existing hole that may have a plug in it. Use the existing hole if there is one. Otherwise, you will have to drill through the cab skin. Start the hole with a center punch, drill a 1/8" pilot hole, and then drill a 3/4" hole. Use a de-burring tool to smooth the edges of the hole.

14. Run the FM/DHF antenna cable from the antenna base mount to the cab entry point.
15. Tie-wrap the coaxial cable to the ground strap. At the tie-wrap holes in the antenna base mount, place the FM/DHF antenna cable and ground wire into the split tube, and tie-wrap them together. Be sure to include a service loop in the coaxial cable.
16. Run the cable(s) through the hole, and then place a 3/4" grommet around the cable(s) and into the hole. Near the point where the cables are entering the truck body, fasten the coaxial cable to the ground strap with a tie wrap.

    Note: Use the grommet most appropriate for the wall thickness; the installation kit comes with two grommet sizes for either a 1/16" or a 1/8" wall thickness.

17. Place cables in the path that they will follow from the base mount to the entry hole. Join the GPS cable near the antenna-mounting bracket so that all cables can be placed in the same split tubing. Measure the required length and cut the split tubing. Place the cables in the split tubing. At the place where the coax cable and the ground strap are tie-wrapped together near the cab entry point, the ground strap should exit the split tubing. Secure the ground strap exit point with tie wraps.
18. Secure the split tubing, with cables running through it, to the truck cab body with tie wraps. Use tie-wrap bases on the truck cab body. Be sure the first and last tie-wrap base plates are also screwed to the cab body. Additionally, service loops should have tie-wrap base plates screwed on at the beginning and end of the service loop.



5 GPS Antenna Installation

1. Determine the best location for the GPS antenna. The GPS antenna should be mounted flat on the cab top, or other similar location, pointing skyward. There should be no metal obstructions above the antenna. The antenna may be mounted under the roof-mounted air dam if the air dam is constructed of fiberglass or some other non-metallic composite material.
2. Thoroughly clean the cab-mounting surface **and** antenna base with **isopropyl** alcohol wipes provided. **Do not use denatured alcohol**, as it will not clean the bonding points properly.

   WARNING! THE 3M AUTOMOTIVE ADHESION PROMOTOR 4298, USED IN THE NEXT STEP, IS HIGHLY FLAMMABLE, HARMFUL BY INHALATION, AND IRRITATING TO EYES AND SKIN. SEE THE MSDS FOR SAFETY AND HANDLING IN APPENDIX B OF THIS MANUAL.
3. Apply the adhesive promoter in a thin, uniform coating to the bonding surfaces using the minimum amount to fully coat the surface. Allow the primer to dry thoroughly before applying tape (usually five minutes at room temperature). Be sure the primed surfaces remain free from contaminants.

4. Peel the backing off one side of the adhesive foam tape, and stick the tape to the cleaned surface. Peel the top backing off the adhesive foam tape, stick the cleaned GPS antenna in position, and press firmly.

   Note: If possible, avoid the next step by using a common route and entry point with the FM/DHF antenna cable.

   WARNING! CHECK BOTH SIDES BEFORE DRILLING. DRILLING INTO A WIRE CAN CAUSE A FIRE. DRILLING INTO AN AIR LINE CAN CAUSE BRAKE FAILURE.
5. Drill an entry hole for the GPS antenna cable. Determine the best entry point and check both sides to make sure they're clear. Start the hole with a center punch, drill the hole, and then smooth the edges with a de-burring tool.
6. Run the GPS antenna cable from the antenna base mount to the cab entry point, joining up with the FM/DHF antenna cable, if possible, to use the same entry hole.
7. Place the GPS antenna wire in split tubing.
8. Pass the cables through the hole, and then place a 3/4" grommet around the cables and into the hole.

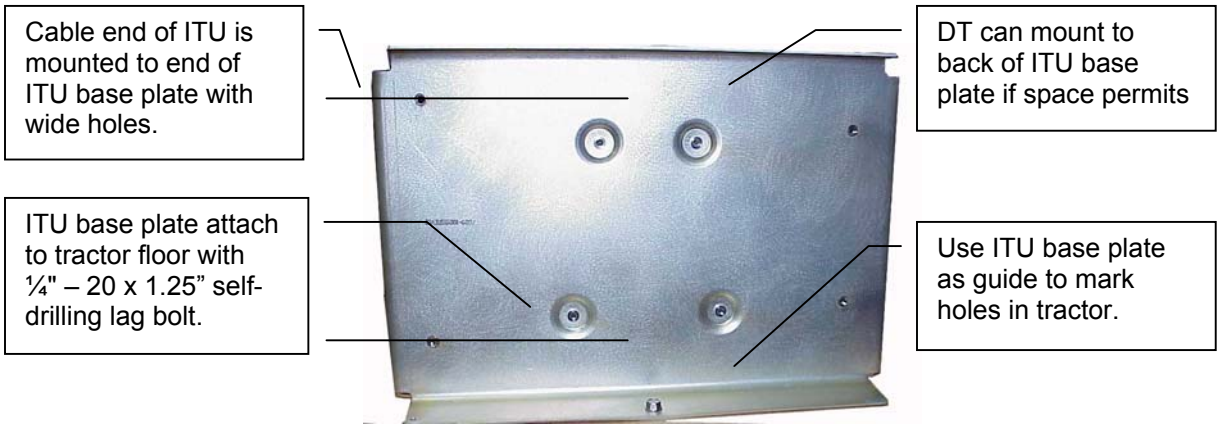
   Note: Use the grommet most appropriate for the wall thickness; the installation kit comes with two grommet sizes for either a 1/16" or a 1/8" wall thickness.

9. Use tie wraps and tie-wrap bases to secure the split tubing, with the GPS cable running through it, to the truck cab body.
    - Make sure to leave a drip loop before the cabling enters the cab skin.
    - Use the tie-wrap bases on the truck cab body.
    - Be sure the first and last tie-wrap base plates are also screwed to the cab body.
    - Service loops should have tie-wrap base plates screwed on at the beginning and end of the service loop.
    - Remember to end the split-tubing 1 - 2 inches before the grommet to prevent leakage and ensure a tight seal in the grommet.
10. Seal the entry point with silicone.

6 Intelligent Transceiver Unit (ITU) Installation

1. Determine the best location for the ITU. It should be mounted such that the ITU cable attachment panel is located away from the driver. The ITU must also be within reach of the FM/DHF and GPS antenna cables and power cables.

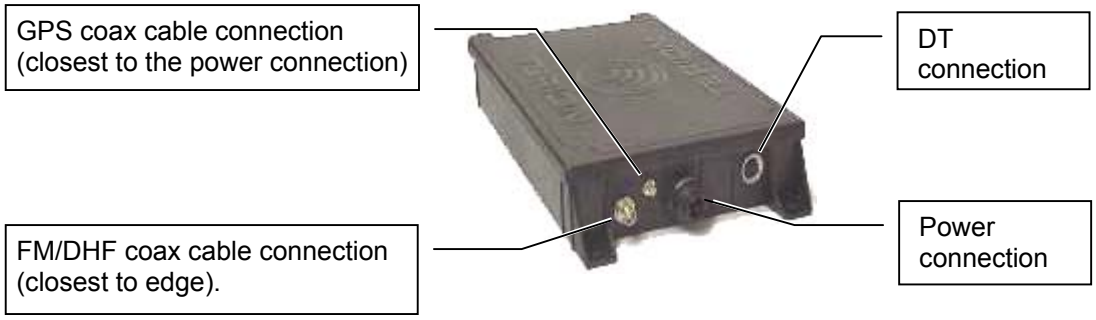
   CAUTION! The ITU must be orientated so that the cables attach away from driver access. This will prevent cables from becoming entangled with other equipment.



2. Install the ITU base plate. Use the ITU base plate as a guide to mark the holes. The 1/4" - 20 x 1.25" lag bolts are self-drilling, but will self-drill much faster if a 1/8" pilot hole is drilled first.
3. Attach the ITU to the base plate. Mount the ITU to the ITU base plate using four 1/4" - 20 x 3/4" cap screws, flat washers, and star washers.

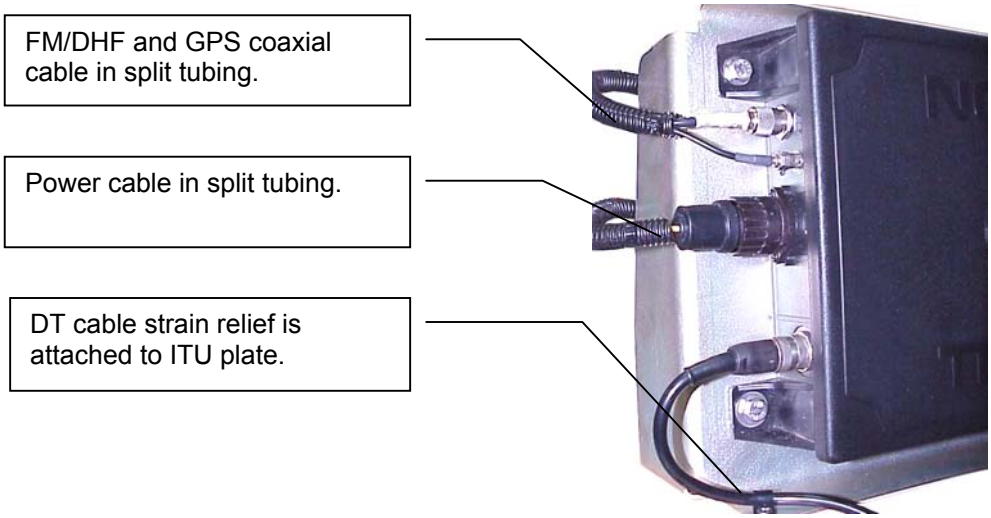
   CAUTION! Do not over-tighten. Excessive torque will damage the ITU case. Tighten only enough to secure the ITU to the base plate.

4. Attach cables. Plug the FM/DHF, GPS and data cables into the ITU. Wait until you

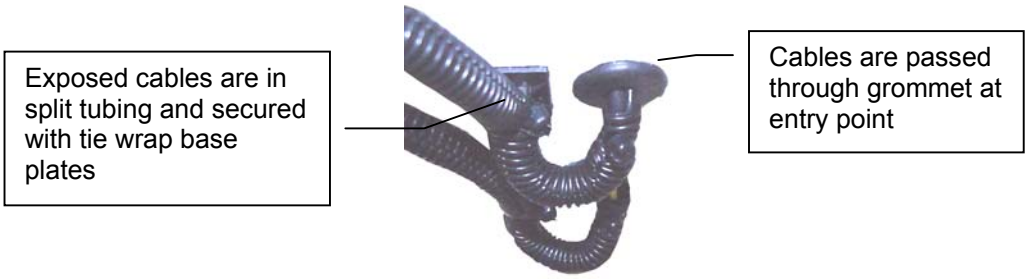


   are ready to calibrate the ITU before plugging the power cable into the ITU.

5. Secure cables. Place all exposed cables in split tubing and secure the tubing to the tractor with tie wraps and tie-wrap base plates.



6. Attach strain relief. Place a strain relief on the DT cable and screw it directly to the ITU pedestal.



7 Power Connections

7.1 Connection Considerations

There are several considerations regarding how the power cord is connected to the tractor's power source. Early and late model tractors have different styles of fuse panels.

The power panels on late model tractors have fuses bussed according to the kinds of circuits, and use ATO type of fuses. The power connection coming into the bus is connected through a stud. Typically, there are accessory, ignition, battery, and other busses, each with their own stud. Use a meter to identify the ignition (switched by key), and the continuously (non-switched) hot busses. Fuse slots have a hot side, where the power comes from, and a cold side, where the power goes. This way, the power passes through the fuse on its way to the device. Some panels do not have a fuse in every slot. Use a meter to identify the hot and cold sides of the fuse slots.

Attach fused links to the switched and non-switched hot leads. If possible, attach ring terminals to ends of the fused links. Carefully remove the stud nuts and attach the ring terminals to the studs. An alternate method is to attach male spade connectors to the end of the power cord and plug the spade connectors into the hot side of open fuse slots.

WARNING! THE CONTINUOUSLY HOT BUS STUD WILL SHORT CIRCUIT IF YOU TOUCH THE HOT STUD AND A GROUND POINT AT THE SAME TIME WITH YOUR WRENCH. AVOID TOUCHING ANY OTHER METAL POINTS WITH YOUR WRENCH WHILE WORKING ON A HOT STUD.

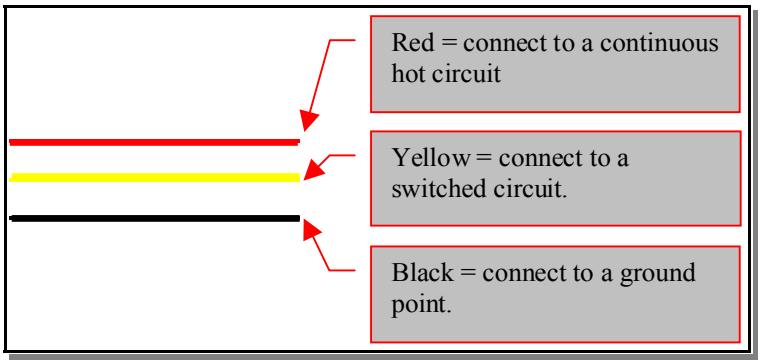
CAUTION! Use extreme care when removing the stud nuts. If you drop the nut, it may be very difficult to recover it.

Some late model tractors with deluxe sleeper berths have secondary power panels located near the sleeper berths. These panels have switched and non-switched fuse busses. If there is a secondary power panel, the run from the ITU to the power source may be shorter; however, care must still be taken to find low resistance ground points.

Power connections on early model tractors are easier as you can simply crimp ring terminals on the power cables and attach them to the terminal block.

7.2 Connection to Power Source

1. Run the power cable from the ITU to the tractor's fuse box. The power cable is a three-wire ribbon with the round ITU plug attached to one end. All exposed ribbon wire must be placed in split tubing. Whenever possible, run all exposed wires under the flooring or behind the various cab moldings and cover plates.



WARNING! PANEL AND COVER SCREWS CAN PENETRATE WIRES AND CAUSE A SHORT CIRCUIT. WHEN REATTACHING PANELS AND COVERS, MAKE SURE SCREWS DO NOT TOUCH WIRES.

2. Identify the ground, switched, and non-switched circuits. Locate the fuse panel and remove the cover. Use a Volt-Ohm meter (VOM) to verify the switched (with key), non-switched, and ground points.

   a. a. To identify a negative or ground point in a tractor, disconnect the cover to the truck battery compartment. Switch the VOM to the resistance or ohms position. Attach a long test lead from the negative VOM input to the negative battery cable. Using a test lead connected to the positive input of the meter, touch the test lead to the same point on the battery cable and adjust the meter to read zero (0) ohms. Adjust (zeroing) the meter this way compensates for the resistance present in the test leads, themselves, so that subsequent measurements will be more accurate. Now, use the test lead connected to the positive meter input to measure the resistance to measure resistance at various points until you find one with very low resistance. **The resistance must be less than 1.0 ohm.** This point will be used to connect the black wire.

   Note: Some meters, particularly digital ones, cannot be manually adjusted to zero. If the meter cannot be zeroed, make a note of the resistance reading with just the two test leads touching and subtract that value from your other readings as you look for a good ground point.

   b. b. Identify a non-switched or primary positive power source. Leave the ground lead connected. Switch the VOM to the DC Volts position. With the **ignition**

key off, probe the "battery" fuse bus. Look for a lug or a spare fuse circuit with 12 VDC on it. This will be used for non-switched connection (red wire).

c. c. Identify a switched power source. Switch the VOM to the DC volts position. With the **ignition key on**, probe the "switched" fuse bus to find a lug or a spare fuse circuit with 12 VDC on it. Turn the **ignition key off** and verify the power source turns off when the key is turned off. This will be used for the switched connection (yellow wire).

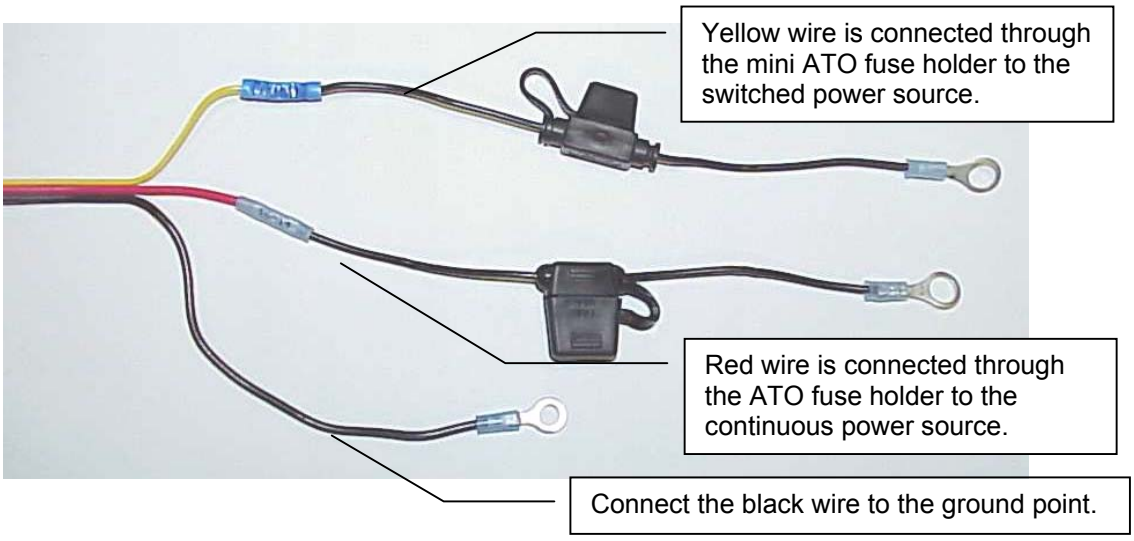
Note: When cutting the wires in the next step, there are two things to keep in mind:

- The ground wire may require additional length. Since many tractors are equipped with insulated fuse boxes mounted on plastic, the ground location may be farther away from the fuse box. Split the ground (black) wire away from red and yellow wires before cutting the red and yellow wires to length.
- Be sure to leave enough extra wire for a service loop.

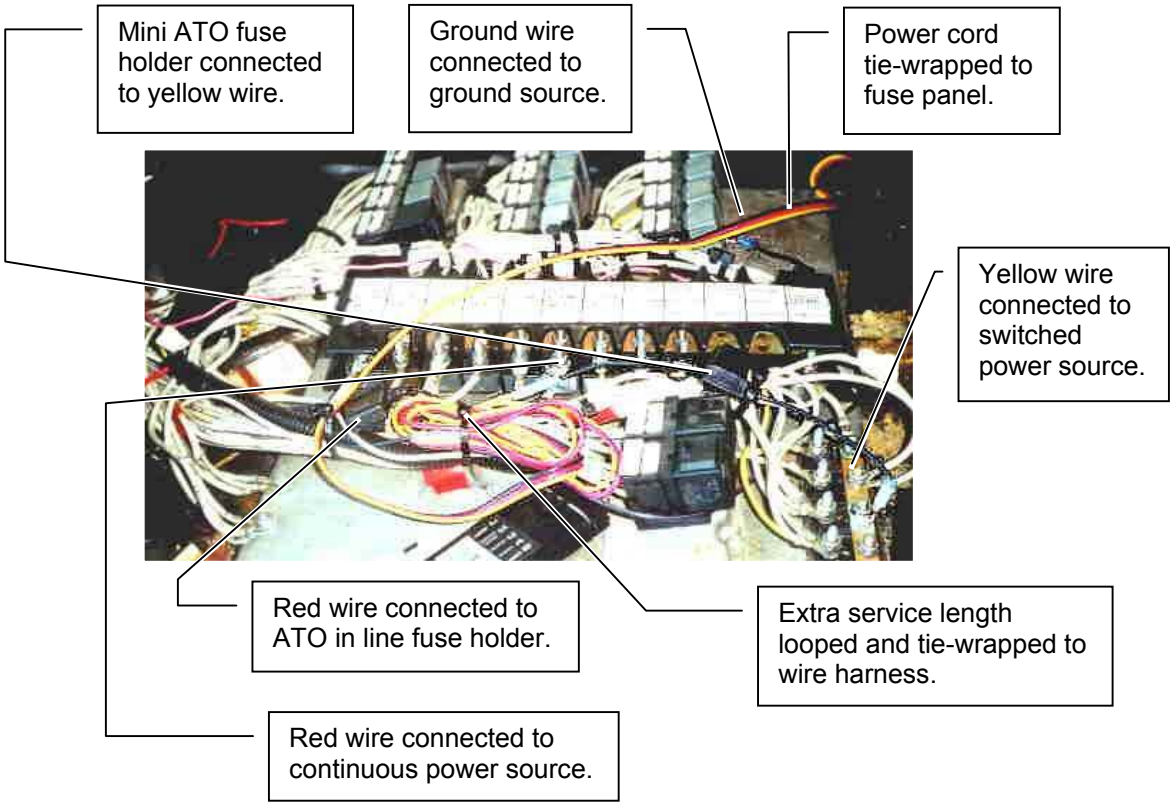
3. Cut the wires to length.
4. Secure the power cable. Attach the power cable to the tractor with tie wraps to prevent the power cable from being pulled out.

Note: Due to the numerous types of terminals, an assortment of terminal ends is included in the installation kit. Use only the approved parts contained in the installation kit to connect to the terminal lugs and/or the fuse panel.

5. Install an in-line fuse to the yellow (**switched**) line. Split the power cable ribbon into separate lines. Use a butt connector to crimp the yellow wire to the mini in-line fuse holder. Crimp a terminal connector to the other end of the in-line fuse holder. Use the proper terminal (i.e., ring or blade) for the type of connection required. Attach the terminal to the switched power source. Insert a mini ATO 2-amp fuse into the fuse holder.
6. Install an in-line fuse to the red (**continuous hot**) line. Use a butt connector to crimp the red wire to the in-line fuse holder. Crimp a terminal connector to the other end of the in-line fuse holder. Use the proper terminal (i.e., ring or blade) for the type of connection required. Attach the terminal to the non-switched circuit. Insert an ATO 7.5-amp fuse into the fuse holder.
7. Connect the ground wire to ground. Crimp a ring terminal connector to the end of the black wire and connect it to the ground source found in step 2a.



8. Loop the extra service length and tie-wrap it to the tractor's wire harness. Example: Freightliner cab-over fuse panel.



8 Driver Terminal (DT) Installation

There are two methods for installing the DT. The DT cradle can be attached to an existing wall in the truck, or it can be attached to the backside of the ITU pedestal mount bracket.

8.1 DT Installation on Truck Wall

1. Determine the best location for the DT. The DT should be located within easy reach of the driver, but far enough away so that the driver will have to pull over and stop to respond to a message. Typical locations are on the passenger side dash, behind either seat, or on the walls of the closet or bunk. On day cabs, install the DT between seats or on the back wall. The customer should also be consulted when choosing a DT location.

   CAUTION! The DT must be mounted in a sturdy location. The DT cradle must be attached to a place sturdy enough to hold the DT in place, even through the roughest driving conditions.

   Note: In cab-over-engine tractors, mount the DT on the dash in front of the doghouse, if possible. Mounting the DT on the back wall would require the driver to crawl over the motor box (doghouse) to reach the DT, and mounting it on the doghouse would require the driver to crawl over the DT to get in and out of the sleeper.

2. Drill holes. Place the DT cradle at the desired location and mark the mounting holes. Drill four 19/64" holes for the rivnuts. Use a rivnut tool to install four #10 - 32 rivnuts.

   Note: If space permits, the DT cradle can be attached directly to the ITU pedestal-mounting bracket.

3. Attach the DT cradle with #10 x 32 screws.

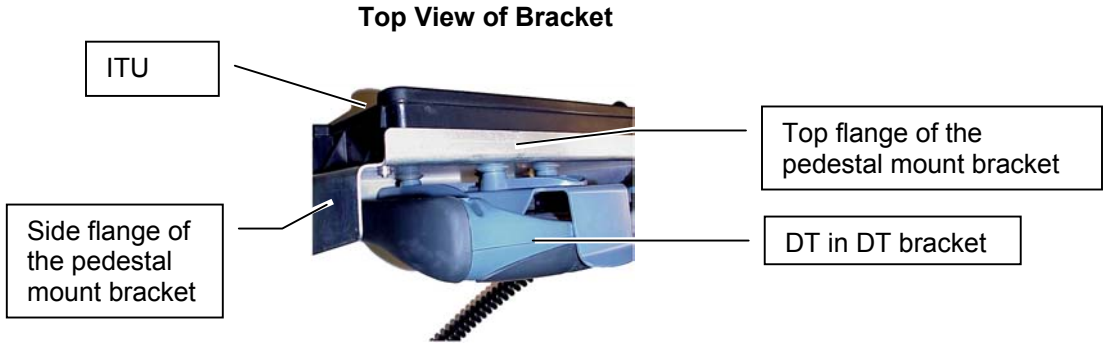
4. Run the DT cable from the DT cradle to the ITU location. The wide connector on the cable attaches to the DT and the round connector attaches to the ITU. It is normally easier to start at the DT and run the cable from the DT cradle to the ITU. Whenever the cabling passes through holes between sections of the cab, use a grommet to prevent wire chaffing.

WARNING! ROUTE THE WIRES AND CABLES SO THAT DRIVERS AND PASSENGERS WILL NOT BECOME ENTANGLED IN THEM. MAKE SURE ALL WIRES AND CABLE ARE HIDDEN AND SECURE.

5. Attach the DT cable to the DT. Remove the top of the integrated cable clamp on the DT. Connect and secure the DT cable to the DT. Replace the top of integrated cable clamp and place the DT into the DT cradle.

8.2 DT Installation on a Pedestal Mount Bracket

The DT can be installed on the pedestal mount bracket shipped in the installation kit. The pedestal mount bracket is two sided – one side for the ITU and the other side for the DT. The DT attaches to the side of the pedestal mount bracket that has the side flanges pointing toward the DT, while the ITU is mounted on the side where the top and bottom flanges point toward the ITU.



1. Determine the best location for the pedestal mount bracket. The DT side should face toward the driver. If space and cable length allow, leave space to attach the ITU to the pedestal mount bracket.

2. Install the pedestal mount bracket. Use the pedestal mount bracket as a guide to mark the holes. The 1/4" - 20 x 1.25" lag bolt is self-drilling, but will self-drill much faster if a 1/8" pilot hole is drilled first.

3. Fasten the DT cradle to the bracket with #10 screws.
4. Attach the DT cable as described in the previous section.

9 Software Versions

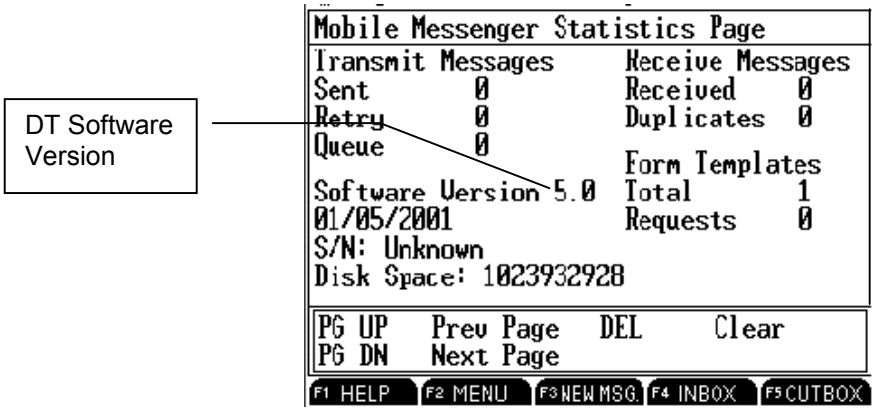
When the hardware is completely installed and the power connected, the system will turn on. The DT and ITU are controlled by computer software. As new and improved versions of the software are developed, they must be installed into the units in order to maintain optimum system performance. In addition, Mobile Workstation users need to have the correct set of forms installed on their DTs. This section describes how to determine if the DT and ITU are programmed with the latest software and forms, and how to upgrade them if necessary.

If the DT screen displays the message "Mobile Messenger/Mobile Workstation is not compatible with this RSU", then the DT is not compatible with the ITU software, and you need to load new DT software. Refer to UM20-100112, Webdownload Site User Manual, for the upgrade procedure.

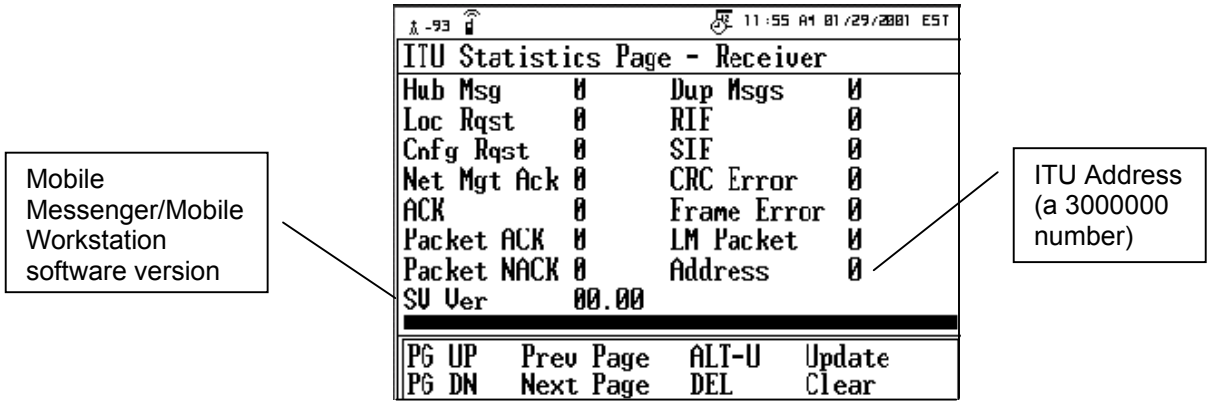
If the DT screen displays the message "Incompatible, must be 3.0 or later", then the ITU is not compatible with the DT software, and you need to load new ITU software. Refer to UM20-100112, Webdownload Site User Manual, for the upgrade procedure.

9.1 Determine Software Versions

When the Mobile Messaging System turns on, the first screen to appear is the Terion logo. As the DT "boots", it displays the *Inbox* screen. With the *Inbox* screen displayed, press the **F2** key and then the **6** key. The *Mobile Messenger Statistics Page* appears. The DT software version is listed on the left side of the message box, just below the center.



Next, determine the ITU software version. Press the **F2** key and then the **7** key, and the *ITU Statistics Page – Transmitter* page appears. Press the **YELLOW + PAGE DOWN** keys and the *ITU Statistics Page – Receiver* page appears. The ITU software version is listed in the lower left corner of the message box.



If **both** the DT and ITU software versions match those that you downloaded from the Terion Webdownload site prior to installation (see Verification of Software Versions on page 3-1), then proceed directly to Section 10, Calibration. Otherwise, begin upgrading the software.

The upgrade software and instructions are available at www.terion.com/webdownload/. Refer to the Webdownload Site User Manual, UM20-100115, by logging on to www.terion.com/webdownload/ and clicking on **Documentation**.

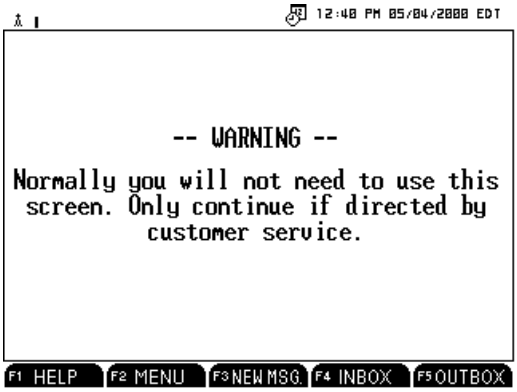
Note: If the ITU is upgraded to version 7.2, the ITU MUST be calibrated after the upgrade. This is necessary because a new calibration process was incorporated beginning with version 7.2.

10 Calibration

The system needs calibration when it is newly installed and anytime an ITU, DHF/FM antenna, or DHF/FM antenna cable is replaced. Additionally, if the ITU is upgraded to version 7.2, the ITU **must** be calibrated after the upgrade.

On the DT keyboard, press **F2**, then **7**, and then the **PAGE DOWN** key *twice*.

A Warning screen is displayed. To clear this screen, type the password. (No letters or numbers will appear while you are typing.)



Note: The *ITU Installer Controls* screen is password protected. Only trained personnel need to know the menu commands on this page.

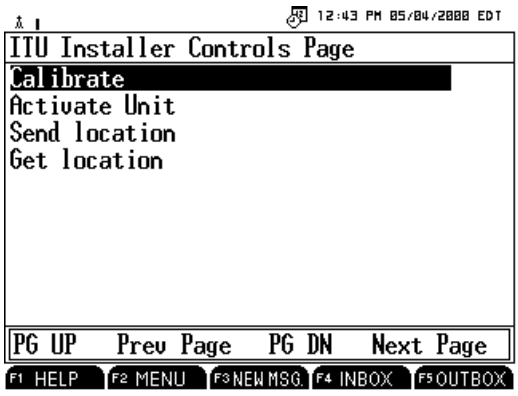
The password is KR28L.

CAUTION! Disclose the password to only those personnel who are trained and have a need to know.

Note: If you type the password and the screen does not clear, press the **ESC** key and try again. Note that if the DT keys are pressed too hard, characters will repeat. If they are not pressed hard enough, no characters will be input.

As soon as the password is typed, the *ITU Installer Controls* page appears.

To calibrate the system use the arrow keys to select the **Calibrate** command and press the **ENTER** key.



A calibration box appears with the **CALIBRATE** button highlighted. Wait until the question mark is replaced with an initial calibration value, and then press the **ENTER** key. The system begins the calibration process and continues until complete. This may take several minutes for ITUs versions 7.2 or higher, and 5-6 minutes for versions below 7.2. The user is unable to perform any other DT actions while the system calibrates.

Note: On versions below 7.2, the ITU makes a chattering sound while the system calibrates. This sound is normal. If the ITU does not make this chattering sound, something is wrong. Check the power source and connections. The ITU needs a minimum of 11 volts DC to function properly. If you experience a problem, call Customer Service.

When the calibration process is complete, the *Calibration Quality Index (CQI)* box displays a value between 1 and 100, with 100 being the best. A successful installation results in a CQI of 96 or higher. If the CQI is at least 96, continue to the activation process. If the CQI is less than 96, check the antenna, antenna cable, and cable connections, and recalibrate. If the CQI is still less than 96, refer to Calibration Quality Index (CQI) in Section 13, Troubleshooting.

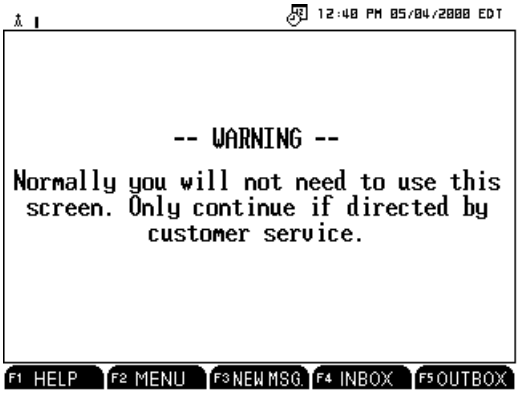
11 Activation

11.1 Network Activation

When a Mobile Messaging System is installed, it requires network activation.

1. On the DT keyboard, press **F2**, then **7**, and then the **PAGE DOWN** key *twice*.

   A *Warning* screen is displayed. To clear this screen, type the password. (No letters or numbers will appear while you are typing.)



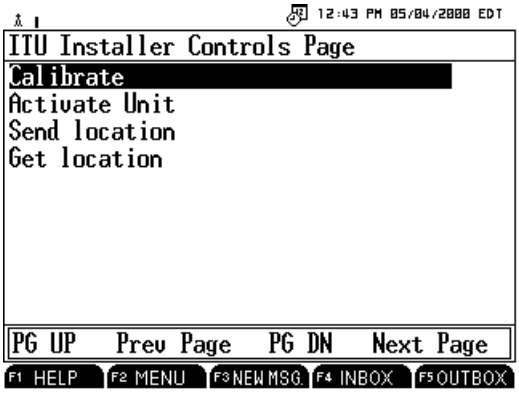
Note: The *ITU Installer Controls* screen is password protected. Only trained personnel need to know the menu commands on this page.

The password is KR28L.

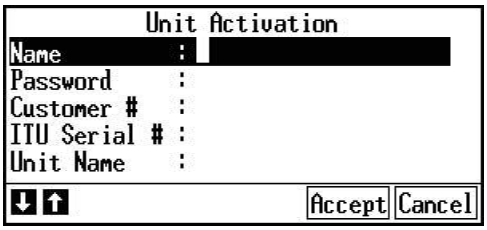
CAUTION! Disclose the password to only those personnel who are trained and have a need to know.

Note: If you type the password and the screen does not clear, press the ESC key and try again. Note that if the DT keys are pressed too hard, characters will repeat. If they are not pressed hard enough, no characters will be input.

As soon as the password is typed, the *ITU Installer Controls* page appears.



To activate a unit, use the down arrow key to select the **Activate Unit** command, then press the **ENTER** key. The *Unit Activation* dialog box appears. Fill out the form with the appropriate information using the steps below (Only trained installers are certified to utilize this screen).



2. **Name:** Type the installer's name that was assigned during installer training, and then press the **TAB** key.
3. **Password:** Type the installer's password that was assigned during installer training, and then press the **TAB** key.
4. **Customer #:** Obtain this number from Terion Customer Support.
5. **ITU Serial #:** Type the ITU serial number ***exactly*** as it appears, including the "DHF-" (i.e., DHF-001231), and press the **TAB** key.

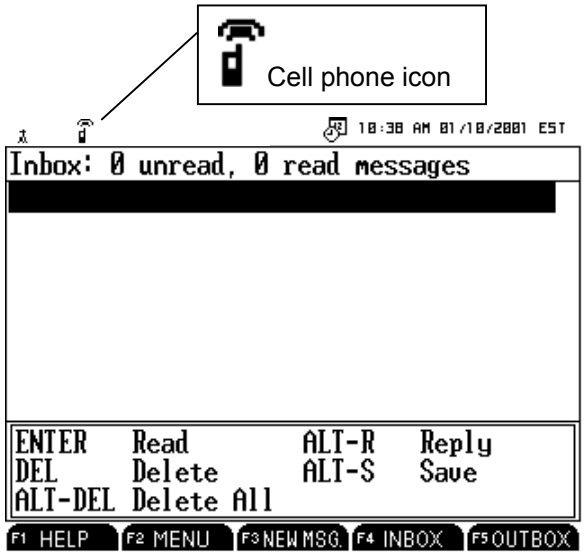
6. **Unit Name:** Type the truck's unit name (Get this information from the customer. Typically, it is the truck number), then press the **TAB** key.

7. With the **Accept** box highlighted, if you wish to continue, press **ENTER**. If not, press **TAB** to highlight the **Cancel** box, and then press **ENTER** to start over again.
8. When the Accept command is executed, the *Unit Activation* box is cleared of all the information. An activation request message is sent to the Terion Network Operations Center (NOC). When the activation request message is received at the NOC, the NOC automatically sends a return message. The message is either an activation success message or an activation failure message. If the message is an activation success, the installation is complete. Otherwise, it is an activation failure and you need to correct the problem and resend the activation request.

Note: It may take several minutes before the Activation Success or Fail message is returned from the NOC.

11.2 Cell Phone Activation

Journeyman-II mmc DTs have their cell phone and cell phone number activated (with the cell service provider) prior to installation. If the cell phone has been turned on (enabled), a cell phone icon is present at the top of a screen (e.g., the Inbox). If the cell phone icon is not present, contact Customer Service.



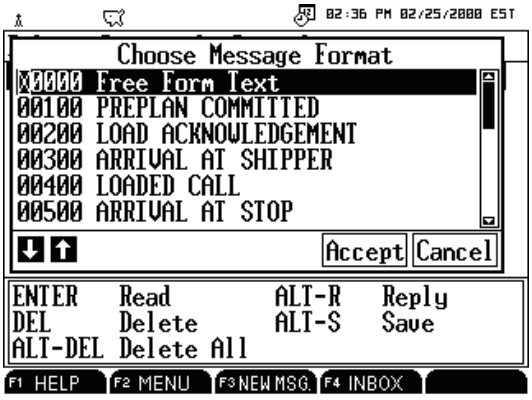
12 Address Setup

With calibration and activation complete, and the Mobile Messaging System activated, the addresses available on the Driver Terminal are Auto Route, and Terion Network Operations Center (NOC). For most installations, these two addresses are adequate; however, for others, it may be necessary to set up additional addresses or a different default address.

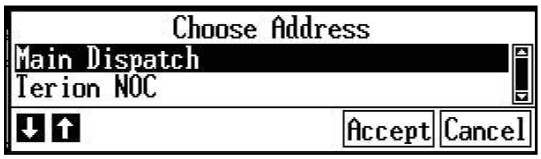
Note: Driver-to-driver messaging is not supported at this time. Addresses that start with a 3000000 are driver addresses – do not enter them into the Address list.

12.1 Add or Modify an Address

1. Press the **F3** key. The Edit Text Message display, or the Choose Message Format display, appears.



2. Press **ALT + A**. The *Choose Address* dialog box appears.



3. Press **ALT + N**. The *New Address* dialog box appears.
4. Type the address name on the *Description* line (This name will appear in the Address list in the *Create/Edit Message* screen and *Address Select* pop-up menu).
5. Press the **TAB** key, then type the address number on the Address line. (This is the address the Terion Network uses to find the message recipient – call Terion Customer Service at 877-283-7466 to get this number.)

   Note: You must type in the description and address exactly; otherwise, undeliverable or unrecognizable message files may impact your system. Do not enter any 3000000 addresses.

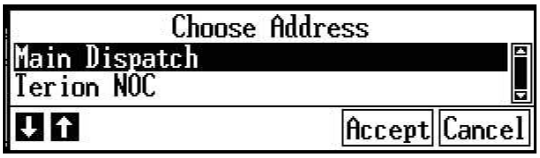
6. Send a test message to the new address to confirm that the message is delivered to the correct address.

7. Add any other addresses as requested by the customer.

12.2 Set Default Address

1. Press **F3**. The *Edit Text Message* display, or the *Choose Message Format* display, appears.
2. Press **ALT + A**.

   The *Choose Address* dialog box appears.

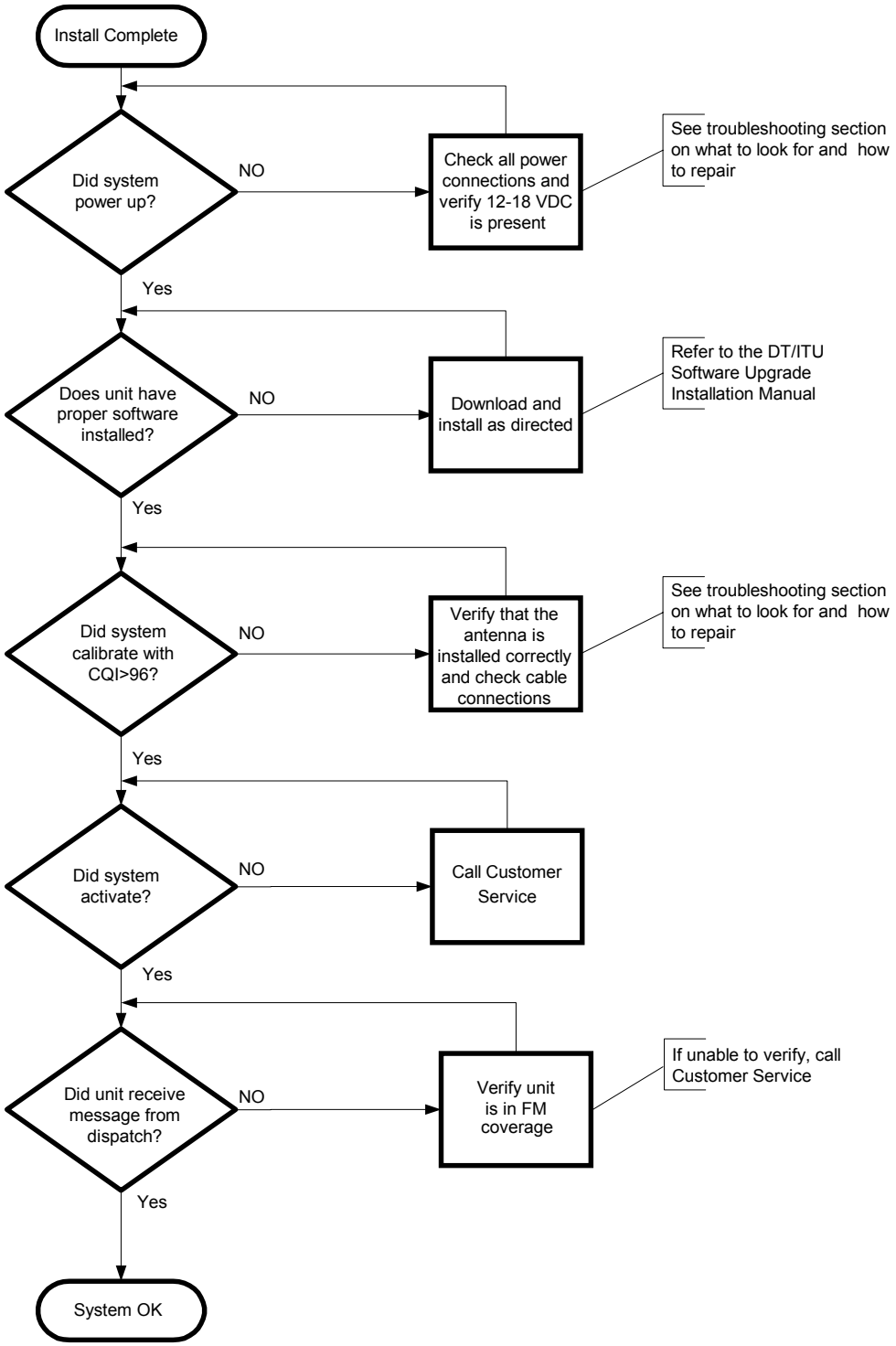


3. Using the up or down arrow keys, choose the address you wish to make the default.
4. Press the **YELLOW + PAGE UP** keys.

   Your selection is now the default; it should be highlighted on the top line.

13 Troubleshooting

This section describes procedures for troubleshooting a Mobile Messaging System. The System Troubleshooting Flow Diagram below will assist you in the troubleshooting process.



When troubleshooting a system it is very important that you approach it methodically. If some aspect of the Mobile Messaging System is not responding as anticipated, change that part or component and then retest the system. Do not make more than one change at a time, or it may mask other problems. Following the type of troubleshooting below will minimize guesswork, effort and rework.

13.1 12 VDC Power Connection

If the system fails to boot, it is usually caused by the power hook-up, or a short circuit. Below is a list of questions that should be asked and verified first.

1. Is the power cable connected to the ITU? If not, connect it.
2. Were all connections made to the fuse panel (power source)? If not, make the connections as described in this manual (see Section 7, Power Connections). Verify that you have connected the red wire to the non-switched (hot), and the yellow wire to the switched (key-controlled) points in the fuse panel. Verify that the black wire is connected to a good ground with less than 1.0 ohm resistance to the negative battery cable.
3. Did you place the proper size fuse into the fuse holder? If not, install the proper size fuse. Are fuses blown?
4. Using a voltmeter, check that there is approximately 12-18 VDC supplied to the connector. **Do this using the supplied ITU Power Test Adapter cable.** If not, look for a cut in the power cable. If no cut is found, verify that the truck has 12-18 VDC. If not, contact the operator.

13.2 Calibration Quality Index (CQI)

A CQI of 96 or better must be reached before an installation can be deemed successful. When a calibration is performed, and it is completed very quickly (in seconds), or in a very long time (more than 8 minutes), it usually indicates a problem, regardless of the CQI value eventually obtained. You should check the installation, reset the ITU by disconnecting the power cable for 10 seconds, and redo the Calibration as outlined in Section 10, Calibration. Below is a list of questions that should be asked and verified first.

1. Is the coaxial cable properly connected to the FM/DHF antenna connector?
2. Is the coax cable crimped or pinched in any way? If the cable has been damaged, replace it. **Do not attempt to modify or repair any coaxial cable.**
3. Is the antenna tightened onto the antenna connector? Is the lock washer installed and compressed? If not, tighten as instructed in Section 4, FM/DHF Antenna Installation.
4. Is the antenna connector installed correctly?
5. Is the FM/DHF antenna coaxial cable tightly connected to the ITU? It should be firmly hand-tightened.

If all of the above items are found to be okay, there could be an electrical short in the system. The following steps will check for these types of problems.

1. Check for continuity from the antenna, through the cable:

   a. Remove the FM/DHF connection from the ITU.

   b. Using an Ohmmeter, check the resistance between the center conductor (pin) in the cable and the chrome base on the antenna near the split lock washer.

   You should get a reading of 0.5 ohms or less.

   c. If you received a reading of 0.5 ohms or less, skip to step 2.

   d. If you did **not** get a reading of 0.5 ohms or less in step a, remove the other end of the cable from the antenna connector. Check the resistance between the center conductor of the antenna connector and the chrome base on the antenna near the split lock washer.

   You should get a reading of 0.5 ohms or less.

   e. If you **did** receive a reading of 0.5 ohms or less, the connector is good. Replace the coax cable. If the reading was more than 0.5 ohms, replace the antenna connector.

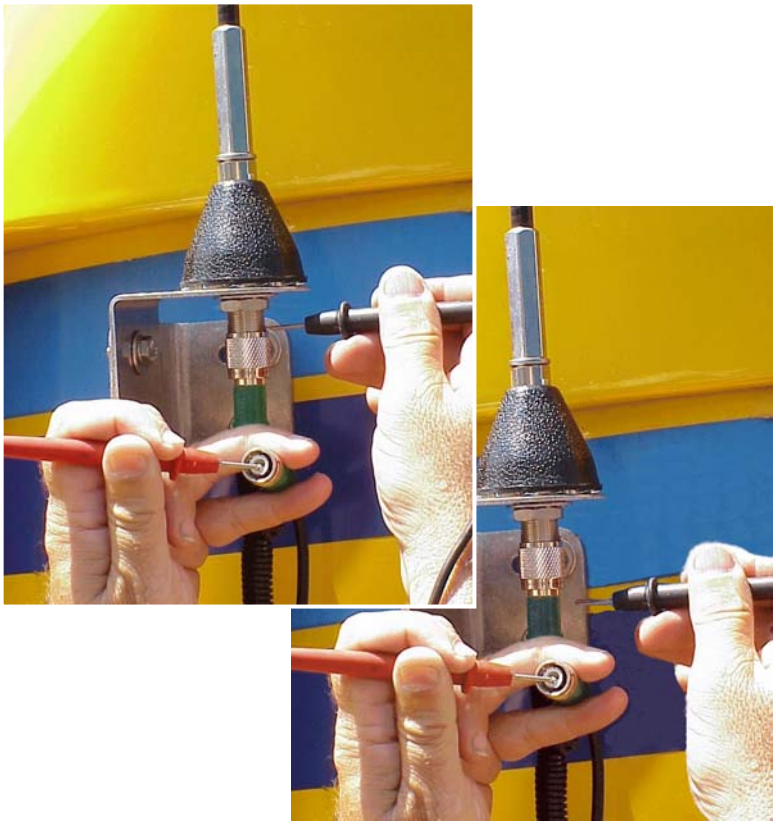
2. Check for shorts in the cable or antenna connector.

   a. Using a VOM, measure the resistance from the center conductor, to:

      1) the base of the antenna connector (opposite side of the antenna), and

      2) the antenna mounting bracket base.

   b. You **should not** get a reading on either measurement (circuit is open). If this is the case, and you did **not** receive a reading, skip to step 3.



   c. If you **did** receive a reading (circuit is not open), remove the other end of the cable from the antenna connector.

   d. Check the resistance between the center conductor of the antenna connector and the threaded area where the cable attaches.

   e. You **should not** get a reading (circuit is open). If this is the case, and you did **not** receive a reading, the connector is good. Replace the coax cable.

   f. If you **did** receive a measurable resistance reading, replace the antenna connector.

3. Verify that the antenna mounting bracket has a good connection to ground. Using a VOM, re-check the resistance between the antenna mounting bracket and the chassis ground. You should get a reading of 0.5 ohms or less. If the reading is larger, reinstall as instructed in Section 4, FM/DHF Antenna Installation, and recalibrate the CQI.

If all of the previous measurements are found to be okay, and the system still fails to calibrate, report this to Customer Service and replace the ITU.

Appendix A Replacement Kits

Whether a replacement is necessary due to damage or improved hardware, replacement parts must be ordered from Terion. Terion supplies replacement kits with all of the hardware necessary to replace a Mobile Messaging system, or any part of a Mobile Messaging system.

Follow the instructions provided with the replacement kit for the procedures best suited to your replacement installation.

When an antenna replacement installation is completed, any software or forms upgrades may be performed at this time (if applicable). See Section 9, Software Upgrades.

Calibration (Section 10) is necessary in several replacement installation cases.

When the replacement installation is complete, fill in the Truck Survey Sheet (Appendix D), and return it with any broken or worn-out components to Terion in Melbourne.

Appendix B Automotive Adhesion Promoter 4298

MATERIAL SAFETY DATA SHEET

3M
3M Center
St. Paul, Minnesota
55144-1000
1-800-364-3577 or (651) 737-6501 (24 hours)

DIVISION: AUTOMOTIVE DIVISION
AUTOMOTIVE AFTERMARKET

TRADE NAME:
3M Brand Adhesion Promoter #4298 and #6396

ID NUMBER/U.P.C.:

41-3700-9534-5	- - -	70-0705-3070-7	00-21200-64192-3
70-0705-3071-5	00-21200-64193-0	70-0705-3072-3	00-21200-64194-7
70-0705-3073-1	00-21200-64195-4	70-0705-3074-9	00-21200-64196-1
70-0705-7300-4	00-21200-64194-7	70-0706-9842-1	00-21200-27571-5
70-0706-9843-9	00-51131-06396-9	70-0706-9865-2	00-21200-27571-5
70-0706-9866-0	00-21200-27571-5	70-0706-9872-8	00-21200-31830-6

ISSUED: September 27, 1999
SUPERSEDES: November 26, 1997
DOCUMENT: 07-1193-7

1. INGREDIENT	C.A.S. NO.	PERCENT
CYCLOHEXANE	110-82-7	45 - 55
XYLENE	1330-20-7	25 - 35
ETHYL ALCOHOL	64-17-5	5 - 10
ETHYLBENZENE	100-41-4	3 - 7
ETHYL ACETATE	141-78-6	1 - 5
ACRYLATE POLYMER (NJTSRN 04499600-5984P)	TradeSecret	1 - 5
2,5-FURANDIONE, REACTION PRODUCTS WITH POLYPROPYLENE, CHLORINATED	68609-36-9	1 - 5
ISOPROPYL ALCOHOL	67-63-0	< 1
4,4'-ISOPROPYLIDENEDIPHENOL-EPICHLOROHYDRIN POLYMER	25068-38-6	< 0.5
METHYL ALCOHOL	67-56-1	< 0.5
CHLOROBENZENE	108-90-7	< 0.5
BENZENE	71-43-2	< 0.1

This product contains the following toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Emergency Planning and Community Right-To-Know Act of 1986 and 40 CFR Part 372:
CYCLOHEXANE
XYLENE
ETHYLBENZENE
METHYL ALCOHOL

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

1. INGREDIENT	C.A.S. NO.	PERCENT
CHLOROBENZENE		
BENZENE		

2. PHYSICAL DATA

BOILING POINT:..... 170 - 280 F
Estimated, based on composition
VAPOR PRESSURE:..... ca. 68 mmHg
calculated at 25 deg C
VAPOR DENSITY:..... ca. .0043 g/cc
calculated at 100 deg C
EVAPORATION RATE:..... ca. 6.4 xylene=1
calculated
SOLUBILITY IN WATER:..... ca. 10 %
SPECIFIC GRAVITY:..... ca. 0.82 g/ml
PERCENT VOLATILE:..... ca. 94 %
pH:..... ca. 5.5
VISCOSITY:..... 30 - 40 centipoise
MELTING POINT:..... N/A
APPEARANCE AND ODOR:
Liquid, yellow, solvent odor

3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:..... ca. -4 F OC
ASTM D92
FLAMMABLE LIMITS - LEL:..... ca. 1 %
calculated
FLAMMABLE LIMITS - UEL:..... ca. 6 %
calculated
AUTOIGNITION TEMPERATURE:..... N/D
EXTINGUISHING MEDIA:
Water spray, Carbon dioxide, Dry chemical, Foam
SPECIAL FIRE FIGHTING PROCEDURES:
Wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, bunker coat and pants, bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head. Water may not effectively extinguish fire; however, it should be used to keep fire-exposed containers and surfaces cool and prevent explosive rupture.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

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3. FIRE AND EXPLOSION HAZARD DATA (continued)

UNUSUAL FIRE AND EXPLOSION HAZARDS:
Vapors may travel long distances along the ground or floor to an ignition source and flash back.
NFPA HAZARD CODES: HEALTH: 2 FIRE: 3 REACTIVITY: 0
UNUSUAL REACTION HAZARD: none
OSHA FIRE HAZARD CLASS: Class IB Flammable Liquid

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4. REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY - MATERIALS/CONDITIONS TO AVOID:
Heat, Sparks and/or Flames.

HAZARDOUS POLYMERIZATION: Hazardous polymerization will not occur.

HAZARDOUS DECOMPOSITION PRODUCTS:
Carbon Monoxide and Carbon Dioxide.

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5. ENVIRONMENTAL INFORMATION

SPILL RESPONSE:
Refer to other sections of this MSDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment. Ventilate area. Extinguish all ignition sources. Contain spill. Evacuate unprotected personnel from hazard area. Cover with absorbent material. Cover spill area with Light Water Brand or other ATC foam. (For further information on ATC foam usage, contact 3M Fire Protection Systems.) Collect using non-sparking tools. Clean up residue with an appropriate organic solvent. Read and follow safety precautions on the solvent label and MSDS. Place in an approved metal container. Seal the container.

RECOMMENDED DISPOSAL:
Incinerate in a permitted hazardous waste incinerator. Combustion products will include HCl.

ENVIRONMENTAL DATA:
Not determined.

REGULATORY INFORMATION:
Volatile Organic Compounds: ca. 750 gms/liter South Coast Air Quality Mgmt Dist Method Calculated.
VOC Less H2O & Exempt Solvents: ca. 755 gms/liter South Coast Air Quality

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Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

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5. ENVIRONMENTAL INFORMATION (continued)

Mgmt Dist Method Calculated.
Since regulations vary, consult applicable regulations or authorities before disposal. In the event of an uncontrolled release of this material, the user should determine if the release qualifies as a reportable quantity. U.S. EPA Hazardous Waste Number = D001 (Ignitable)

EPCRA HAZARD CLASS:

FIRE HAZARD: Yes PRESSURE: No REACTIVITY: No ACUTE: Yes CHRONIC: Yes

---

6. SUGGESTED FIRST AID

EYE CONTACT:
Immediately flush eyes with large amounts of water. Get immediate medical attention.

SKIN CONTACT:
Immediately wash skin with soap and large amounts of water. Remove contaminated clothing. If signs/symptoms occur, call a physician. Wash contaminated clothing before reuse and dispose of contaminated shoes.

INHALATION:
Remove person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, get immediate medical attention.

IF SWALLOWED:
If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person.

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7. PRECAUTIONARY INFORMATION

EYE PROTECTION:
Avoid eye contact with vapor, spray, or mist. Wear safety glasses with side shields.

SKIN PROTECTION:
Avoid skin contact. Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: fluoroelastomer (Viton).

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

7. PRECAUTIONARY INFORMATION (continued)

RECOMMENDED VENTILATION:
Local exhaust is required for operations using large amounts of material. Use in a well-ventilated area. Provide sufficient ventilation to maintain emissions below recommended exposure limits. If exhaust ventilation is not adequate, use appropriate respiratory protection.

RESPIRATORY PROTECTION:
Avoid prolonged breathing of vapors. Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: half-mask organic vapor respirator, full-face organic vapor respirator.

PREVENTION OF ACCIDENTAL INGESTION:
Do not ingest.

RECOMMENDED STORAGE:
Store away from heat. Keep container closed when not in use.

FIRE AND EXPLOSION AVOIDANCE:
Keep container tightly closed. Flammable liquid and vapor. Keep away from heat, sparks, open flame, and other sources of ignition. No smoking while handling this material. Avoid static discharge.

OTHER PRECAUTIONARY INFORMATION:
For industrial or professional use only.

	EXPOSURE LIMITS				
INGREDIENT	VALUE	UNIT	TYPE	AUTH	SKIN*
CYCLOHEXANE	300	PPM	TWA	ACGIH	
CYCLOHEXANE	300	PPM	TWA	OSHA	
XYLENE	100	PPM	TWA	ACGIH	
XYLENE	150	PPM	STEL	ACGIH	
XYLENE	100	PPM	TWA	OSHA	
XYLENE	150	PPM	STEL	OSHA	
ETHYL ALCOHOL	1000	PPM	TWA	ACGIH	
ETHYL ALCOHOL	1000	PPM	TWA	OSHA	
ETHYLBENZENE	100	PPM	TWA	ACGIH	
ETHYLBENZENE	125	PPM	STEL	ACGIH	
ETHYLBENZENE	100	PPM	TWA	OSHA	
ETHYLBENZENE	125	PPM	STEL	OSHA	
ETHYL ACETATE	400	PPM	TWA	ACGIH	
ETHYL ACETATE	400	PPM	TWA	OSHA	
ACRYLATE POLYMER (NJTSRN 04499600-5984P)	NONE	NONE	NONE	NONE	
2,5-FURANDIONE, REACTION PRODUCTS WITH POLYPROPYLENE, CHLORINATED	NONE	NONE	NONE	NONE	

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

EXPOSURE LIMITS (continued)

INGREDIENT	VALUE	UNIT	TYPE	AUTH	SKIN*
ISOPROPYL ALCOHOL.....	400	PPM	TWA	ACGIH	
ISOPROPYL ALCOHOL.....	500	PPM	STEL	ACGIH	
ISOPROPYL ALCOHOL.....	400	PPM	TWA	OSHA	
ISOPROPYL ALCOHOL.....	500	PPM	STEL	OSHA	
4,4'-ISOPROPYLIDENEDIPHENOL-EPICHLOROHYDRIN POLYMER.....	NONE	NONE	NONE	NONE	
METHYL ALCOHOL.....	200	PPM	TWA	ACGIH	Y
METHYL ALCOHOL.....	250	PPM	STEL	ACGIH	Y
METHYL ALCOHOL.....	200	PPM	TWA	OSHA	Y
METHYL ALCOHOL.....	250	PPM	STEL	OSHA	Y
CHLOROBENZENE.....	10	PPM	TWA	ACGIH	
CHLOROBENZENE.....	75	PPM	TWA	OSHA	
BENZENE.....	2.5	PPM	STEL	ACGIH	Y
BENZENE.....	0.5	PPM	TWA	ACGIH	Y
BENZENE.....	1	PPM	TWA	OSHA	
BENZENE.....	5	PPM	STEL	OSHA	
BENZENE.....	0.5	PPM	TWA	OSHA	

OSHA ACTION LEVEL

* SKIN NOTATION: Listed substances indicated with 'Y' under SKIN refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:

- ACGIH: American Conference of Governmental Industrial Hygienists
- OSHA: Occupational Safety and Health Administration
- NONE: None Established

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8. HEALTH HAZARD DATA

EYE CONTACT:
Moderate Eye Irritation: signs/symptoms can include redness, swelling, pain, tearing, and hazy vision.

SKIN CONTACT:
Allergic Skin Reaction: signs/symptoms can include redness, swelling, blistering, and itching.
Moderate Skin Irritation (after prolonged or repeated contact): signs/symptoms can include redness, swelling, itching, and dryness.

INHALATION:
Central Nervous System Depression: signs/symptoms can include headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

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8. HEALTH HAZARD DATA (continued)

Irritation (upper respiratory): signs/symptoms can include soreness of the nose and throat, coughing and sneezing.

IF SWALLOWED:
Gastrointestinal Effects: signs/symptoms generally will include abdominal pain.
Central Nervous System Depression: signs/symptoms can include headache, dizziness, drowsiness, muscular weakness, incoordination, slowed reaction time, fatigue, blurred vision, slurred speech, giddiness, tremors and convulsions.
Aspiration Pneumonitis: signs/symptoms can include coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal.

CANCER:
WARNING: Contains a chemical which can cause cancer. (71-43-2) (NTP human carcinogen, IARC human carcinogen 1, OSHA listed carcinogen, ACGIH suspected human carcinogen A2, Calif. Proposition 65)

REPRODUCTIVE/DEVELOPMENTAL TOXINS:
WARNING: Contains a chemical which can cause birth defects and male reproductive harm. (71-43-2)

SECTION CHANGE DATES

HEADING SECTION CHANGED SINCE November 26, 1997 ISSUE

Abbreviations: N/D - Not Determined N/A - Not Applicable CA - Approximately

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Appendix C Installation Checklist

Kit Contents

- ❑ Kit contents match packing list

Type of Installation

- ❑ Side Mount
- ❑ Rear Mount

FM/DHF Antenna System

- ❑ Antenna base straight and secure
- ❑ Antenna ground wire secure
- ❑ Antenna support bracket straight and secure
- ❑ Antenna support bracket has grommet in place
- ❑ Exposed cables in split tubing
- ❑ Tie wraps installed tightly on both ends
- ❑ Tie-wrap bases secure
- ❑ Stud mount correct, tight, and secure
- ❑ Antenna correct, tight, and secure
- ❑ Coaxial cable secured tightly
- ❑ Entry hole has grommet and is sealed
- ❑ Antenna ground point secure to grounding point with less than 1.0-ohm resistance.

GPS Antenna System

- ❑ GPS antenna facing upright and secure
- ❑ GPS antenna wire in split tubing and secured with tie wraps and tie-wrap bases
- ❑ Entry hole has grommet and is sealed

DT System

- ❑ DT cable routed correctly
- ❑ DT cable strain relief in place
- ❑ DT cradle secure

Power Cable System

- ❑ Power connected to correct source and power cable is secure
- ❑ Power cable ground wire connected securely to ground point with less than 1.0 ohm resistance to negative battery terminal
- ❑ Power cable strain relief in place with service loop

ITU System

- ❑ ITU plate secure and tight
- ❑ ITU firmly attached to ITU plate
- ❑ Cables firmly attached
- ❑ Cables secured in split tubing with service loop
- ❑ Extra cable looped and secured at a place where it will not become entangled

Characterization and Activation

- ❑ Antenna Characterized with CQI > 96
- ❑ Unit activated
- ❑ Sent and received messages

Appendix D Post-Installation Data Sheet

If the Post-Installation Data Sheet is missing from the installation kit, or is not useable, the Post-Installation Data Sheet on the following page can be copied and used instead.

Mobile Messaging Post-Installation Data Sheet

TO INSTALLER: In addition to calling Terion Customer Service, this form must be filled in and Faxed to Terion Customer Service.

Installation Date: _____ **Truck Number/Name:** _____

CUSTOMER INFORMATION

Customer	Name: _____	Number: _____	Customer Contact: _____
Truck/Tractor	Year: _____	Make: _____	Model: _____

EQUIPMENT

DT	Serial No: _____	Software Version: _____	☐ Mobile Messenger
ITU	Serial No: _____	Software Version: _____	☐ Mobile Workstation

INSTALLATION DETAILS

Truck or Tractor:
- ☐ Tractor
- ☐ Straight Truck

Type of Tractor:
- ☐ Conventional
- ☐ Cab Over

Type of Air Cleaner:
- ☐ Internal
- ☐ External, One Side
- ☐ External, Two Sides

Head Ache Rack:
- ☐ Yes
- ☐ No

Exhaust:
- ☐ Single Side
- ☐ Dual Side
- ☐ Single Rear
- ☐ Dual Rear
- ☐ Bottom

Upgrade:
- ☐ Stud
- ☐ 8' Coax
- ☐ Dielectric Grease

Type of Install:
- ☐ Side Mount
- ☐ Composite Fender (w/ Quad Radials)
- ☐ Metal (w/o Quad Radials)
- ☐ Rear Mount
- ☐ Head Ache Rack Mount
- ☐ Rear Fairing Mount
- ☐ Composite Fairing
- ☐ Metal Fairing
- ☐ Deviation – Please describe:

_____

_____

ACTIVATION

CQI: _____ FM PI Code: _____ FM Signal Strength: _____ Driver Trained: ☐ Yes ☐ No

Comments/Deviations: _____

_____

_____

Installer Certification: *This certifies that all units were properly installed according to current Terion procedures.*

Installer: _____ Date: _____

Installer's Company: _____ Location of Installation: _____

City: _____ State/Province: _____ Phone: _____

Signature: _____ Release by Cust. Svc. Rep: _____

Terion Customer Service: 1- 877-283-7466 in U.S., 1-877-483-8466 in Canada.
Fax: 1- 321-752-9567 in U.S., 1-416-640-4886 in Canada
customerservice@terion.com

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