

# Terrestrial Mobile Communications Terminal Installation Instructions



80-53184-1 Rev. A

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4,928,274; 4,926,130; 4,979,170; 4,876,554; 5,017,926; 5,126,748; 5,142,278; 5,239,685; 5,442,810; 5,586,130; 5,434,548. Other patents pending.

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# ***Contents***

## **Product Overview 1**

Tools and Supplies Needed for Installation 1

## **Installation Overview 2**

Typical TMCT System Installation Sequence 3

Typical Installation Location 4

## **TCU Antennae Installation 4**

Orienting and Installing the TCU Antennae on the Tractor Roof 4

GPS Antenna Mounting Procedures 6

PCS Antenna Mounting Procedures 6

## **EDU and Holster Installation Procedures 7**

Selecting a Location 7

Installing the EDU Holster 7

Inspecting Cables 9

Connecting the EDU Cable to the EDU 9

Inserting the EDU into the Holster 10

## **Handset Installation 11**

Selecting a Location 11

Installing the Hand-set and Cradle 11

## **TCU Installation 12**

Selecting a Mounting Location 12

Installing the TCU 14

Connecting Cables to the TCU 14

Checking All TCU Cable Connections 15

Securing Cables 15

## **Cable Installation 15**

Installing the Antennae Cables 15

Installing the EDU Cable 16

Installing the Handset Cable 16

Installing the Power/Accessory Cable 17



# ***Terrestrial Mobile Communications Terminal Installation Instructions***

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## ***Product Overview***

The Terrestrial Mobile Communications Terminal (TMCT) is the complete cost-effective mobile information management solution for vehicles operating in metropolitan areas and major highway corridors. The system provides two-way communications, automatic position reports, and collects and records powerful management data.

Should questions arise while performing these procedures, please contact the QUALCOMM Wireless Business Solutions (QWBS) Hotline at (800) 541-7490 for technical support.

## ***Tools and Supplies Needed for Installation***

The following tools and supplies are recommended for performing installations. Those marked with a bullet (•) are considered the essential tools and supplies required to perform an installation. Tools other than these may be required to facilitate certain installations and maintenance.

<b><i>Wrenches</i></b>	<b><i>Misc. Tools</i></b>
• Standard Combination Wrench Set	• Diagonal Wire Cutters
Adjustable Wrench	• Wire Strippers
• 3/16" Hex (Allen) Wrench	• Butt Splice Crimping Tool
<b><i>Ratchet/Sockets</i></b>	• Level
• 3/8" Drive Standard Deep Well Socket Set	Vise Grips
1/4" Drive Standard Deep Well Socket Set	• Volt/ohm Meter
1/4" Ratchet	Hacksaw
3/8" Ratchet	Hammer
3/8" Drive Socket Set	Utility Knife
9/16" Deep Socket	Files (flat, round)
<b><i>Screwdrivers</i></b>	Channel Locks
• Phillips #2	Straight Awl
Power Screwdriver (speeds installation time)	Measuring Tape
Slotted Screwdriver	
Torx Bit Set	<b><i>Misc. Supplies</i></b>

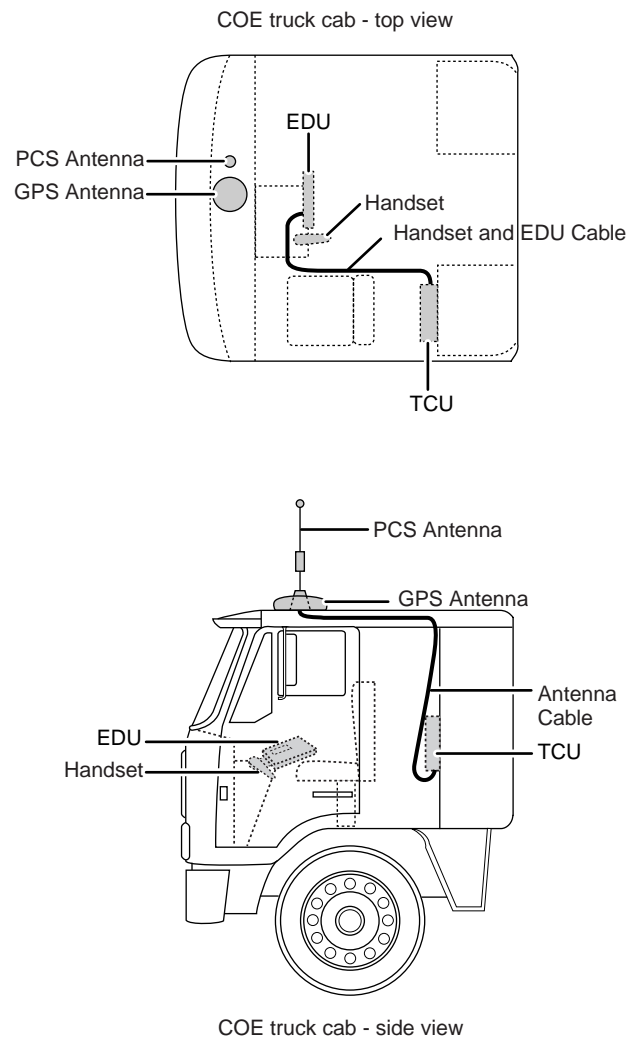
<b>Drill Bits</b>	• Silicone Sealant
• 3/8" Bit	• Loctite 242 (blue)
• 5/16" Bit	• Assorted Ring Terminals
5/8" Bit and 3/4" Bit (both are available on 1/4-3/4 step/index drill bit)	• Red, Blue, & Yellow Butt Splices
• 1-1/2" Hole Saw	• Electrical Tape
<b>Air Tools</b>	Test Light
• 3/8" Drill	Flash/Drop Light
3/8" Ratchet	<b>Power Tools</b>
Note: The tools marked with a bullet (•) are considered essential.	14" Chop Saw (or tool capable of cutting stock aluminum channel)
	Cordless Drill

**Note**

*If available, a combination wire stripper/cutter/crimper is acceptable.*

**Installation Overview**

The Terrestrial Communications Unit (TCU) mounts on the interior cabin wall, behind the driver's seat approximately two feet above the floor. The Enhanced Display Unit (EDU) mounts on the interior cabin, usually on the dashboard. The Handset also mounts on the interior cabin dashboard. The TCU Antennae (GPS and PCS) are mounted on the truck's exterior, typically on the front portion of the tractor roof.



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### ***Typical TMCT System Installation Sequence***

Before beginning the installation, plan the order in which you will install the TMCT System.

Every installation is different. The following is a typical installation sequence:

- 1.** TCU Antennae (GPS and PCS)
- 2.** EDU and Holster
- 3.** Hand-set with cradle
- 4.** TCU
- 5.** Cables

### ***Typical Installation Location***

Depending on the type of vehicle, installation locations for the components will vary (see illustration on page 3).

- The TCU Antennae (GPS and PCS) should be mounted securely to the exterior tractor roof.
- The EDU is usually installed in the cab on the dashboard or where space allows (according to customer preference) and where the driver can easily see the message waiting light from his seat.
- The Handset is mounted on the dashboard within easy access for the driver.
- The TCU typically installs on the interior cabin wall behind the driver's seat about two feet from the floor with the cable connectors facing down.
- Cable wires route internally. Make power wire connections at the main bus or key switch for easy access.

### ***TCU Antennae Installation***

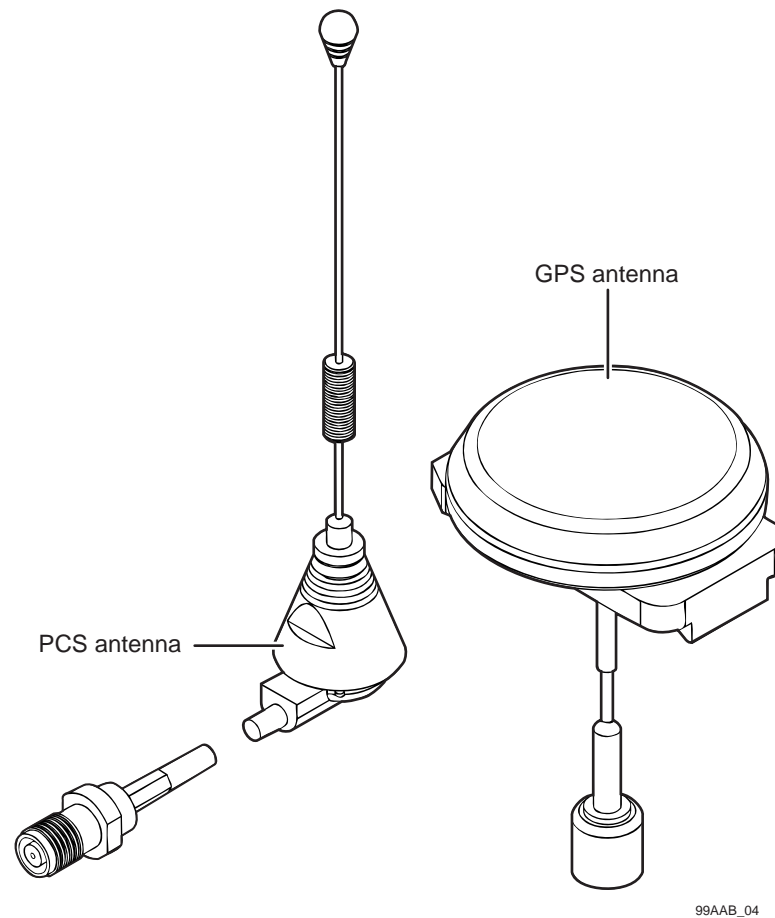
Installing the TCU Antennae (GPS and PCS) involves the following three basic steps:

1. Orienting the antennae on the exterior tractor roof
2. Drilling holes, tightening nuts and bolts, and fastening supplied hardware
3. Connecting and routing the cables

### ***Orienting and Installing the TCU Antennae on the Tractor Roof***

The TCU Antennae include both a GPS and a PCS antenna.





Follow these steps to orient and install the antennae:

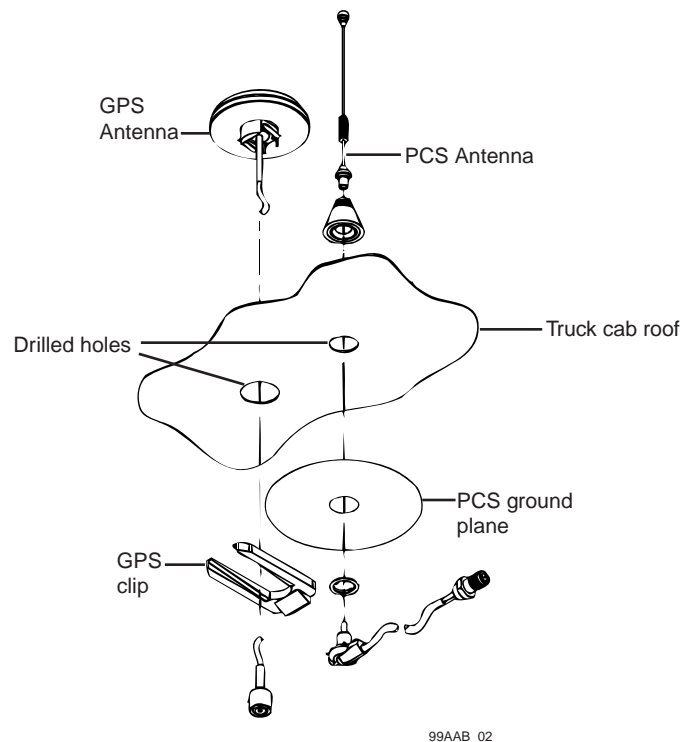
1. The location of the GPS and PCS antennae should be along the front outer edge of the trailer roof as close to the center nose as possible.
2. Before drilling holes, verify that cable routing will adequately reach the bottom of the TCU where the connection is required.
3. Drill a 1-inch diameter hole where the GPS antenna will be mounted and a .748-inch hole where the PCS antenna will mount. The holes should be 3 inches apart center-to-center.
4. Using rubbing alcohol, clean and prepare the inside and outside surface areas of the trailer roof where the antennae will be mounted. Remove all dirt and grease to provide a good clean mounting surface for the antennae.

**Note**

*If the roof is made of fiberglass, use the ground plane provided for the PCS antenna. Remove the adhesive backing and apply to the underside interior hole where the PCS antenna will be mounted.*

### ***GPS Antenna Mounting Procedures***

1. After orienting the antenna, drilling the 1-inch diameter hole, and cleaning the surface with alcohol, remove the liner from the bottom of the antenna.
2. Route the cable through the mounting hole.
3. Position the GPS antenna over the mounting hole and adhere. Ensure that the adhesive mates to the top surface.
4. Attach the provided clip retainer over the exposed antenna base.



### ***PCS Antenna Mounting Procedures***

1. After orienting the antenna, drilling the .748-inch diameter hole, and cleaning the surface with alcohol, insert the antenna base from the inside of the tractor roof. Make sure the base is properly centered in the hole.
2. Make sure that the rubber seal is in the groove of the nut.
3. Tighten the nut 3-35 Nm with the supplied wrench.
4. Attach the PCS radiator, whip antenna.

## EDU and Holster Installation Procedures

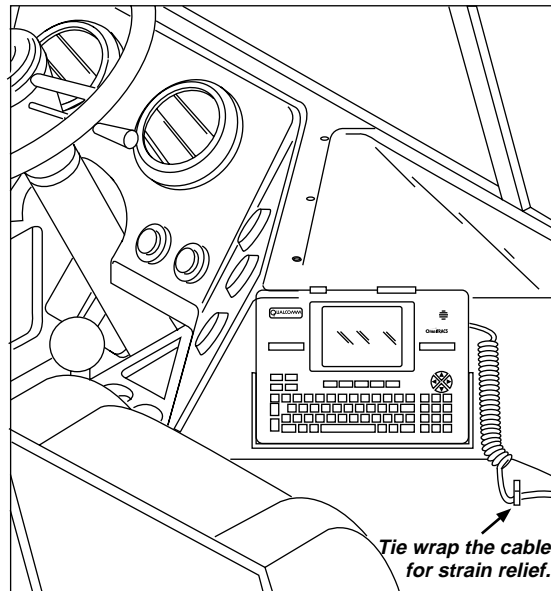
### Selecting a Location

The EDU has a 15-line LCD screen and a holster that holds and protects the unit when it's not in use. The most common holster installation location is the dashboard, closer to the passenger-side seat (see the following illustration). Consider the following when choosing an exact installation location:

- The owner's preference
- Whether there is a team or a single driver
- Whether there is enough clearance to easily lift the unit out of the holster

#### Note

*If the map box or glove compartment is the chosen holster location, measure to make sure that the driver can open the compartment after the unit is installed.*



Enhanced Display Unit (EDU)  
10-8575-1

### Installing the EDU Holster

Follow these steps to install the EDU Holster:

1. Decide if you need to use the holster backing plate.

#### Note

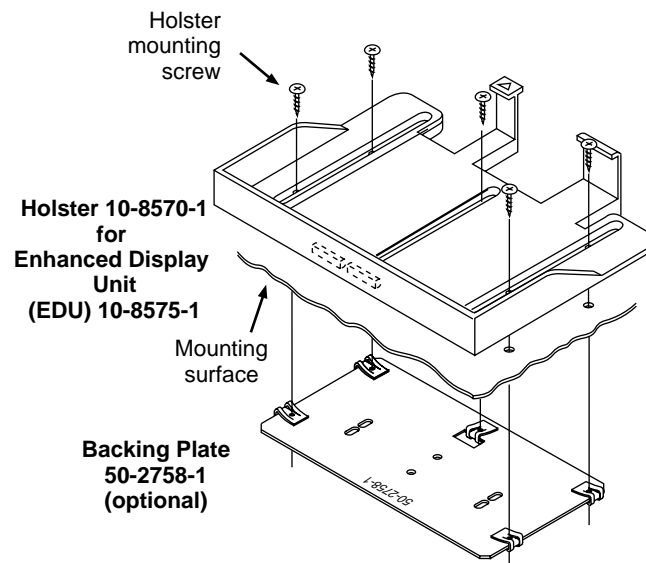
*The holster comes with an optional backing plate (MCN 50-2758) that can be mounted on the back side of the mounting surface. If the mounting surface is not strong enough to support the weight of the EDU (total weight 3.06 lbs.), use the backing plate.*

***If you do not use the backing plate:***

- a. Verify that there is nothing behind the mounting surface that might be damaged by the screws.
- b. Install the screws. Be careful not to damage the holster or mounting surface by over-tightening the screws.

***If you do use the backing plate:***

- c. Verify that the rear of the mounting surface is accessible and that there is enough space for the backing plate.
- d. Using the holster as a guide, carefully drill the five 1/8" holes in the mounting surface.
- e. Place the backing plate behind the mounting surface, and insert the screws through the holster and into the plate.
- f. Tighten the screws. Be careful not to damage the holster, mounting surface, or backing plate by over-tightening them.

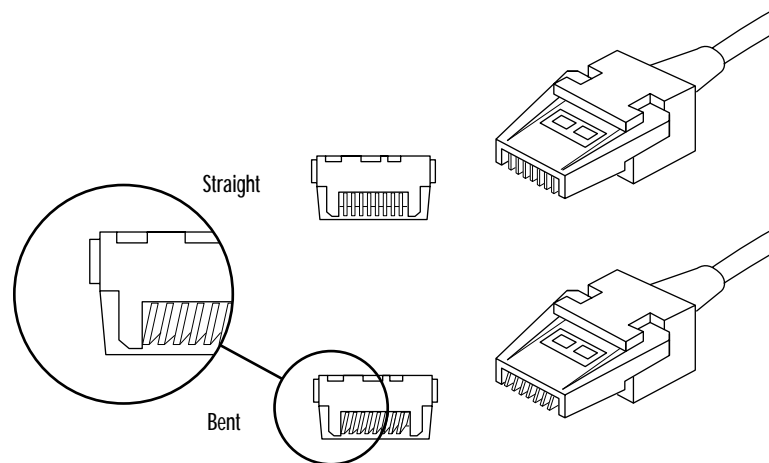


2. Remove any protruding sharp ends of the Holster mounting screws that might cut into wiring or other objects behind the mounting surface.

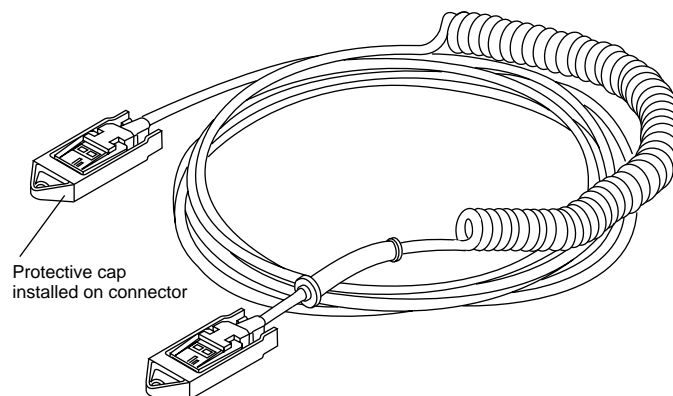
***Inspecting Cables***

Inspect the EDU Cable as follows:

1. Inspect the EDU Cable connectors to make sure they are not damaged and the pins are not bent. Do not attempt to straighten bent pins. This further weakens the pins and results in cable failure. (See the following illustration.)



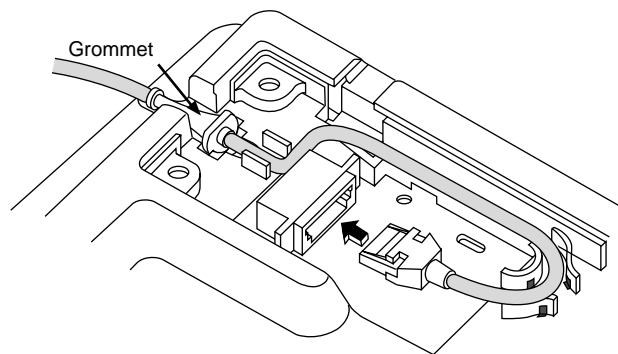
2. Remove the protective caps on the connectors only when you are ready to connect the cable to the TCU and the display unit.



### ***Connecting the EDU Cable to the EDU***

Follow these steps to connect the EDU Cable to the EDU:

1. To open the access door at the back of the EDU, press the two snaps that hold the door in place and lift the door. Remove the bag of hardware.
2. Route the cable through the appropriate channel on the back of the unit. The cable can be routed so that it emerges from the right or left side of the unit. Usually it is routed so that the unit can be pulled to the driver's side without interference from the loose, coiled cable.

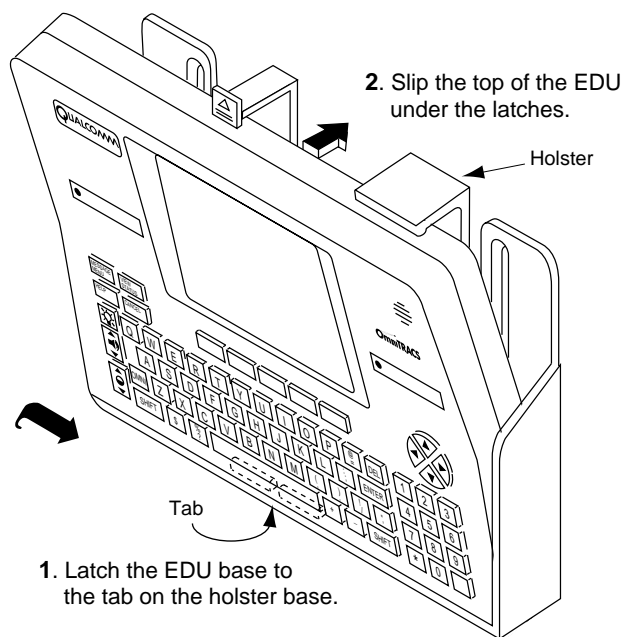


**Enhanced Display Unit  
(EDU) 10-8575-1**

3. Make sure the rubber grommet fits in the grooves of the unit and that the flat side of the grommet on the cable is facing up.
4. To secure the cable, close the access door, inserting the tabs at the bottom first. Use the provided hardware to fasten the door shut.

### ***Inserting the EDU into the Holster***

The following illustrations show how the EDU is inserted into the holster.



**Enhanced Display Unit (EDU)**

## ***Handset Installation***

### ***Selecting a Location***

The Handset includes a cradle that holds and protects the phone when not in use. The most common installation location is on the dashboard, closer to the driver's side of the cab. Consider the following when choosing an exact installation location:

- The owner's preference
- Whether there is a team or a single driver
- Whether there is enough clearance to easily lift the unit out of the cradle

### ***Installing the Hand-set and Cradle***

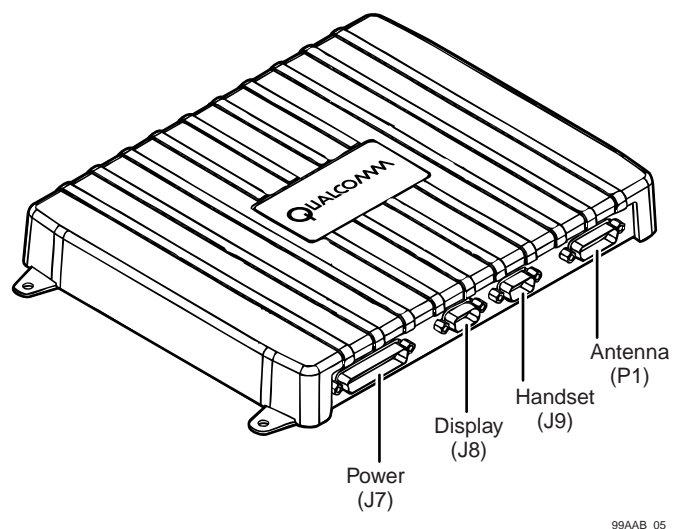
Follow these steps to install the Handset:

1. Verify that there is nothing behind the mounting surface that might be damaged by the screws.
2. Mount the cradle into position and install the screws. Be careful not to damage the cradle or mounting surface by over-tightening the screws.
3. Place the phone into the cradle and route the cable back toward the TCU mount location.

## ***TCU Installation***

The TCU is installed in three basic steps:

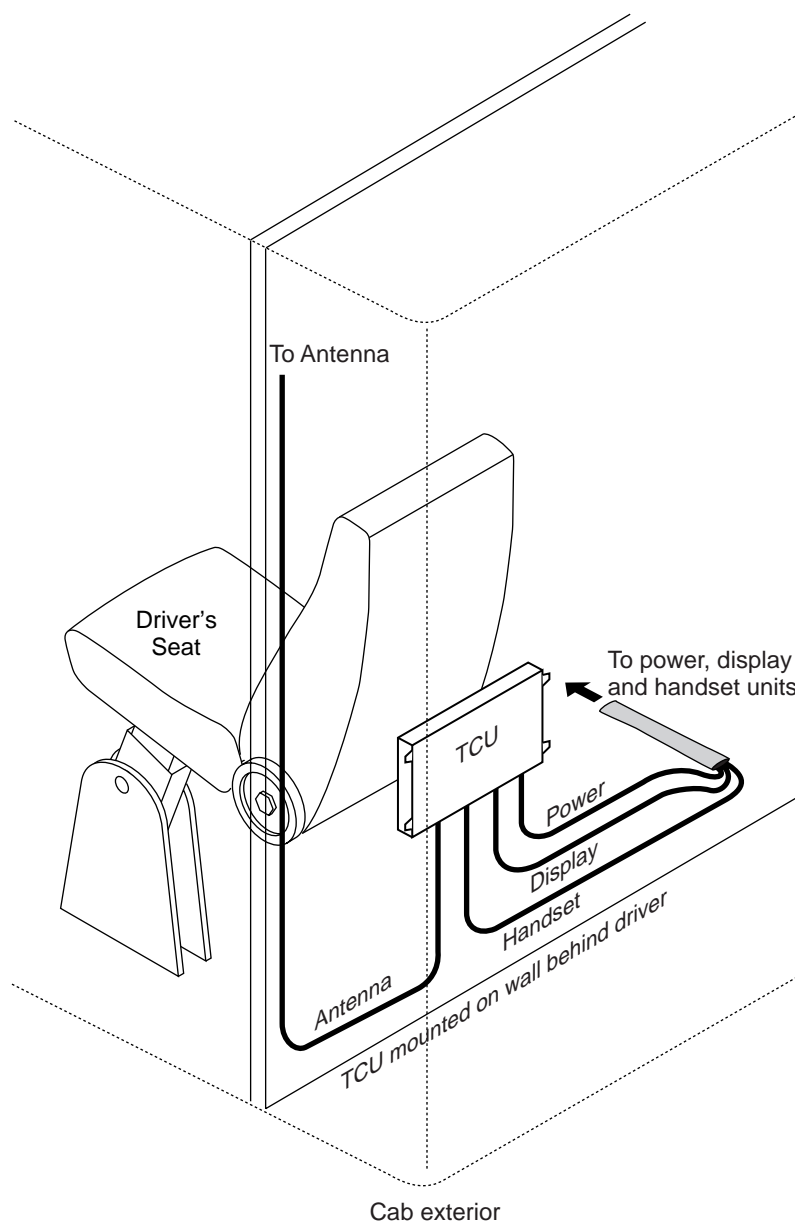
1. Selecting and marking an installation location
2. Attaching the TCU to the cab wall
3. Connecting all cables to the TCU



### ***Selecting a Mounting Location***

If possible, install the TCU behind the driver's seat on the cab wall.





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### ***Location and Orientation***

- Choose a location where the unit will not come into contact with liquids or solvents.
- Choose a location where tire chains or other tools will not likely be stowed on top of the unit or cables. Do not mount the unit near items that may fall on it or bump cable connections.
- Choose a location that is structurally sound. The surface must support the full weight of the TCU (total weight for TCU is approximately 2 lbs.) under all circumstances.
- Install the TCU so that the connector panel is facing down towards the floor. This will protect cable connections from accidental damage and will discourage tampering. Be sure to provide enough room for cable bends or the removal of cables for servicing (4" to 6" is recommended).
- Install the TCU so that the unit, cables, and any accessories can be serviced in the future.

### ***Installing the TCU***

To install the TCU follow these steps:

1. Mark the exact TCU installation location (usually on the cab wall behind the driver's seat about two feet from the floor).
2. Mount the TCU into proper position (with cable connectors facing down) and drill holes in the appropriate spots.
3. Secure the TCU in place using the supplied self-drilling mounting hardware.
4. Connect all the cables to the appropriate TCU connectors.

### ***Connecting Cables to the TCU***

Inspect all cables for bent pins or other damage before connecting them to the TCU.

The TCU should be oriented so that the connector panel is facing away from accessible areas. This will protect the cables from accidental damage and will discourage tampering.

### ***Connecting the Antennae Connector to the TCU***

Plug the GPS/PCS Antenna connector into the appropriate slot. Tighten the screwlocks on the connector securely.

### ***Connecting the EDU Connector to the TCU***

Plug the EDU Cable connector into the appropriate slot. Tighten the screwlocks on the connector securely.

### ***Connecting the Handset Connector to the TCU***

Plug the Handset Cable connector into the appropriate slot. Tighten the screwlocks on the connector securely.

### ***Connecting the Power/Accessory Connector to the TCU***

After you have installed all other connectors, plug the Power/Accessory connector into the appropriate slot. Tighten the screwlocks on the connector securely.

### ***Checking All TCU Cable Connections***

- Check to make sure all cable connections are securely tightened. Check that all cables have service loops and that they are free from interference.
- Cables should not be pulled tight.
- Cables should have enough slack for easy removal.
- Connectors should emerge straight out from the TCU and not be pulled to the side or weighted down by any items.

### ***Securing Cables***

After installing all TMCT components, provide a professional, finished layout with cables securely fastened out of the way and out of sight, if possible.

Secure any excess cabling with cable ties and stow them under the driver's seat.

## ***Cable Installation***

Because vehicles differ widely, cables can be installed in many different ways.

By now you already know where you have installed the antennae, the EDU, and the Handset. Now you need to determine where you will mount the TCU. The space behind the driver's seat is the most typical location. Determine the most direct and protected route you can follow in routing cables to connect these units to each other and to the vehicle.

### ***Installing the Antennae Cables***

The GPS Cable and the PCS Cable are joined together with black heat-shrink adhesive sleeving and routed to the appropriate connector on the TCU.

### ***Cable Run***

Run Direction - Start at the antennae mount area and run the cable down through the tractor roof to the TCU.

Routing Location - Route the Antenna Cable internally.

### ***Cable Installation***

1. Starting at the antennae mount area, run the cables down through the tractor roof toward the TCU mount location. If possible, route the cable using existing brackets as tie points.

2. Excess cable can be stored neatly coiled near the TCU, usually under the driver's seat.

### ***Installing the EDU Cable***

The EDU Cable connects the EDU to the TCU.

#### ***Cable Run***

**Run Direction** - In most vehicles, the EDU is mounted on the dashboard. The cable is routed from the front of the vehicle toward the back to the TCU (usually mounted behind the driver's seat). Leave the coiled end of the EDU Cable at the front and route the uncoiled end to the TCU.

**Routing Location** - Route the EDU Cable internally.

**Cable Dressing** - For strain relief, the base of the coil should be secured with tie-wraps. The strain-relief tie-wrap is normally positioned at the point where the cable transitions from a straight cable to a coiled cable.

1. If possible, route the EDU Cable with other cables from the front of the vehicle toward the back to the TCU. Be careful that you do not damage the connectors when pulling them through holes or under carpeting.
2. Provide strain relief to the cable.
3. Plug the EDU connector into the appropriate slot of the TCU.
4. Plug the EDU connector into the appropriate socket of the EDU.

### ***Installing the Handset Cable***

The Handset Cable connects the TCU to the vehicle's voice communication device.

#### ***Cable Run***

**Run Direction** - The Handset is mounted on the dashboard. The cable is routed from the front of the vehicle toward the back to the TCU (usually mounted behind the driver's seat). Leave the coiled end of the Handset Cable at the front and route the uncoiled end to the TCU.

**Routing Location** - Route the Handset Cable internally.

**Cable Dressing** - For strain relief, the base of the coil should be secured with tie-wraps. The strain-relief tie-wrap is normally positioned at the point where the cable transitions from a straight cable to a coiled cable.

1. If possible, route the Handset Cable with other cables from the front of the vehicle toward the back to the TCU. Be careful that you do not damage the connectors when pulling them through holes or under carpeting.
2. Provide strain relief to the cable.

3. Plug the Handset connector into the appropriate slot of the TCU.

### ***Installing the Power/Accessory Cable***

The Power/Accessory Cable connects the TCU to the vehicle's electrical power source.

#### ***Cable Run***

Run Direction - The Power/Accessory Cable can be routed from front to back or back to front. The direction depends on whether the access hole is big enough for the connector (1-1/4 inches). If you route the cable internally, route it from the TCU to the dash area.

Routing Location - The cable can be routed internally or externally. Use existing cable routes, if possible.

Cable Dressing - Store excess cable underneath the driver's seat and secure with tie wraps. Do not cut the Power/Accessory Cable to fit the vehicle.

#### ***Power/Accessory Cable Routing***

Follow these steps to route the Power/Accessory Cable:

1. Select one of the following electrical power interface locations on the vehicle:
  - Key switch
  - Fuse panel
  - Bus bar
  - Circuit breakers
2. To make the Power/Accessory Cable easier to route through holes, temporarily remove the fuse from the fuse holder on the end of the cable.
3. Route the fuse end of the Power/Accessory Cable from the TCU location into the cab of the vehicle. Route the cable with other cables, if possible. Make sure the fuse end reaches the power interface location and that you have enough cable in the cab to work with.
4. After the Power/Accessory Cable is in the vehicle cab, re-install the fuse onto the appropriate wires.

#### ***Power/Accessory Cable Wire Connections***

The vehicle battery supplies the power to the TCU. There are three required connections that you must make at the fuse end of the Power/Accessory Cable:

- +12 VDC Battery (Main) (unswitched)
- +12 VDC Ignition (switched)
- Chassis Ground

You may connect the accessory wire (green wire labeled “lights”) if you install an optional accessory such as the Remote Message Waiting Light, Buzzer, or Pager.

Follow these steps to connect the Power/Accessory Cable wires:

- 5.** The yellow wire labeled +12 VDC BTRY (pins A & B) is for the unswitched (main) 12 VDC connection. Connect this wire to an unswitched +12 VDC power source, such as the hot side of the vehicle main wiring bus, the battery side of the ignition switch, or the battery side of the fuse block (not the load side). This line provides constant +12 VDC to the MCT and must not be connected to the accessory bus or any other switched line.
- 6.** The black wire labeled +12 VDC IGNITION (pin E) is for the switched (ignition) connection. Connect this wire to the switched +12 VDC power source, such as the ignition side of the ignition (key) switch or the ignition side of the fuse block. Do not use accessory power.
- 7.** The green wire labeled LIGHTS (pin F) is for the Remote Message Waiting Light, Buzzer, and/or Pager accessories. Install these accessories according to the instructions in the appropriate chapter of this manual.
- 8.** Do not leave unused wires dangling loose behind the dashboard. Exposed ends should be tied back neatly with tie-wraps.
- 9.** The black wires (pins C & D) should be connected to a good grounding surface on the chassis or one that is connected to the chassis (vehicle frame).