

# mobiletrace

GPS Vehicle Tracking & Theft Recovery System

## Installation Guide

No part of this publication may be reproduced or used in any form without permission in writing from Telematics Systems. This includes electronic or mechanical means, such as photocopying, recording, or information storage and retrieval systems. The material in this manual is subject to change without notice. Telematics Systems reserves the right to make changes to any software or product to improve reliability, function or design. Mobiletrace is a trademark of Telematics Systems. Other product names mentioned in this manual may be trademarks or registered trademarks of their respective companies and are hereby acknowledged.

Revision 3 070107 © 2007 TSI

# TABLE OF CONTENTS

- Before Installing ..... 1**
  - Tools Needed For Installation ..... 1**
  - GPS Fundamentals ..... 2**
  - Checking the Contents of the Box..... 3**
- Installing and Mounting the GPS Unit..... 4**
  - 12 VDC Power Connection ..... 6**
  - Ground Connection ..... 7**
  - Switched 12 Volt Connection..... 8**
  - Optional Starter Disable/Enable Connections ..... 8**
  - Alarm Monitor Connection ..... 9**
  - Remote Start or Door Lock Output..... 9**
  - Door Unlock Pulse Select..... 9**
  - Ground When Armed (GWA) Connection ..... 10**
  - Optional GPS Antenna..... 10**
- Testing the Mobiletrace Mobile Unit ..... 11**
  - Troubleshooting Chart ..... 13**

## BEFORE INSTALLING

Prior to the installation process, thoroughly review and adhere to the following:

- Read the Installation Manual
- Use only a Digital or Analog Volt Meter - DO NOT USE TEST LIGHT!
- Check for possible installation locations for the GPS unit prior to permanent installation.
- ALWAYS LOOK BEFORE DRILLING. Make sure that the installation process does not cause damage to any vehicle hose, electrical loom, or physical damage to the vehicle.
- Make note of the unit serial number prior to installation.
- Prior to working on any part of the dashboard (instrument cluster, center console, glove box, etc.), remove the negative and positive terminal from the battery to deactivate the sensors for the airbags. Refer to the Owners Manual and to a Shop Manual of the vehicle for specific instructions in the temporary deactivation process.
- DO NOT place objects, including communication equipment, in the area over the airbag or near the airbag deployment area.
- Refer to the Owners Manual and to a Shop Manual of the vehicle for specific information related to the electrical wiring, interior disassembly, and any other mechanical aspects of the vehicle.

## TOOLS NEEDED FOR INSTALLATION

- Metric and standard socket set
- Screwdriver set
- Side cutters, wire cutters
- Wire strippers
- Pliers
- Terminal crimpers
- Digital multimeter
- Electrical tape
- Flashlight

**WARNING** It is highly recommended that a Digital Multimeter be used when probing electrical systems in the vehicle to prevent damage to factory components.

## GPS FUNDAMENTALS

There is a minimum of 24 operational GPS satellites at all times. The satellites, operated by the U.S. Air Force, orbit the earth every 12 hours. Each GPS satellite transmits data that indicates its location and the current time. All GPS satellites synchronize operations so that these repeating signals are transmitted at the same instant. The signals, moving at the speed of light, arrive at a GPS receiver at slightly different times because some satellites are farther away than others. The distance to the GPS satellites can be determined by determining the amount of time it takes for their signals to reach the receiver. When the receiver determines the distance to at least four GPS satellites it can, by triangulation, calculate its position in three dimensions. To ensure the GPS unit receives enough satellite signals at an acceptable signal strength, it must be mounted so that it has a clear view of the sky. In hidden locations, such as under the dash, a clear view can be challenging. In these locations, it is important to keep any metal interference as far as possible from the top portion of the GPS unit so that the most accurate position can be calculated.

While GPS data collection has improved in ease and speed, some obstacles remain. Solid or dense objects can block GPS signals. Wet trees with heavy branches and leaves can mask or attenuate GPS signals. Mountains and buildings can block satellite transmission. Multipath signals can corrupt GPS data. Multipath is a reflected signal from some nearby objects. The resulting propagation delay can affect measurement accuracy. GPS electronics advancements have reduced the multipath threat but GPS field operators and users should be aware of obvious multipath environments.

## CHECKING THE CONTENTS OF THE BOX

- (1) Mobiletrace Mobile Unit
- (1) Cable Harness with Fuse Holder
- (1) Relay and Relay Socket
- (1) GPS Antenna

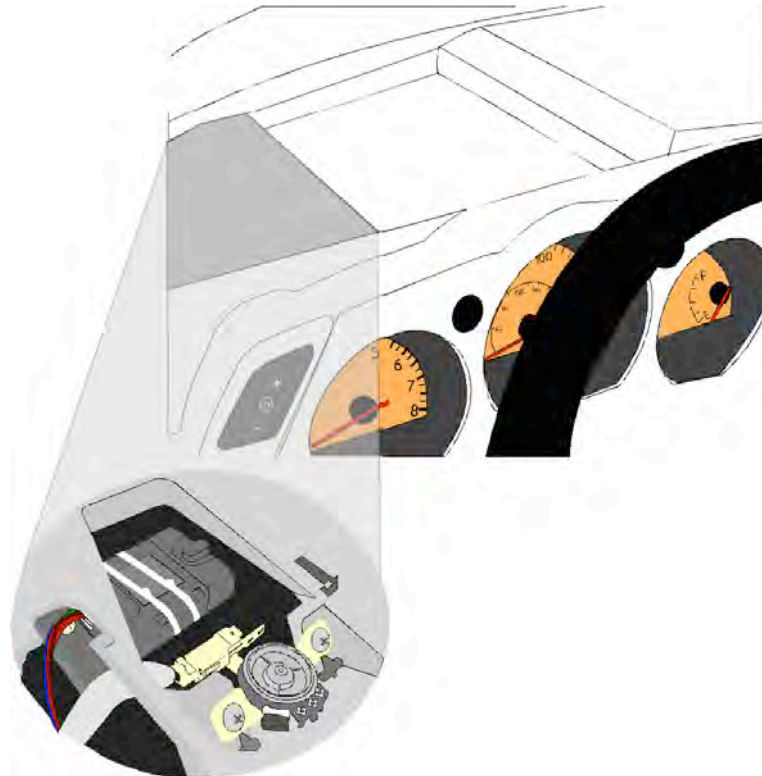
## INSTALLING AND MOUNTING THE GPS UNIT

The best location for a stealth installation is beneath the front dash behind the instrument cluster at the highest point possible (see Figure 1). The GPS and GSM antennas are internally located within the GPS unit. The GPS unit will work best if it has a clear view of the sky and as much of the horizon as possible. Any metallic objects between the GPS unit and the satellites will degrade the signal and reduce the overall performance. Some installs might require the use of the optional GPS antenna to achieve a better line of site.

For the MT515, all circuit connections need to be completed before plugging the cable harness into the Mobiletrace Mobile unit. This will prevent the unit from determining an incorrect alarm sense. If the alarm sense is incorrect, please see the Troubleshooting Chart in this manual assistance in correcting this issue.

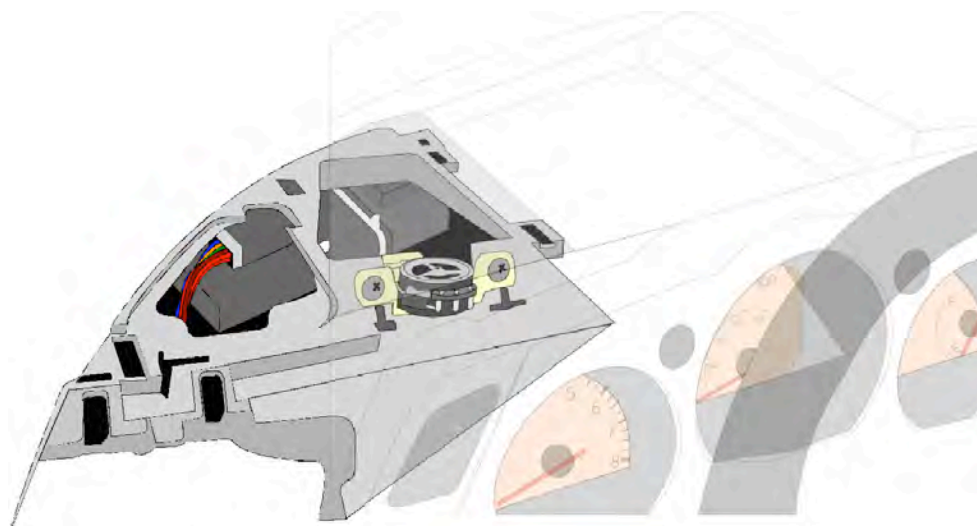
**WARNING** The body of the car or any other metal structure can affect the accuracy of the GPS signals and prevent normal operation. Location of the GPS unit is critical to the operation.

**WARNING** Most modern electronic equipment is shielded from RF signals. However, certain electronic equipment may not be shielded against the RF signals generated by the Mobiletrace Mobile device. The Mobiletrace Mobile must be mounted at least 12 inches from AM/FM radio amplifiers and any other transmitting devices within the vehicle.



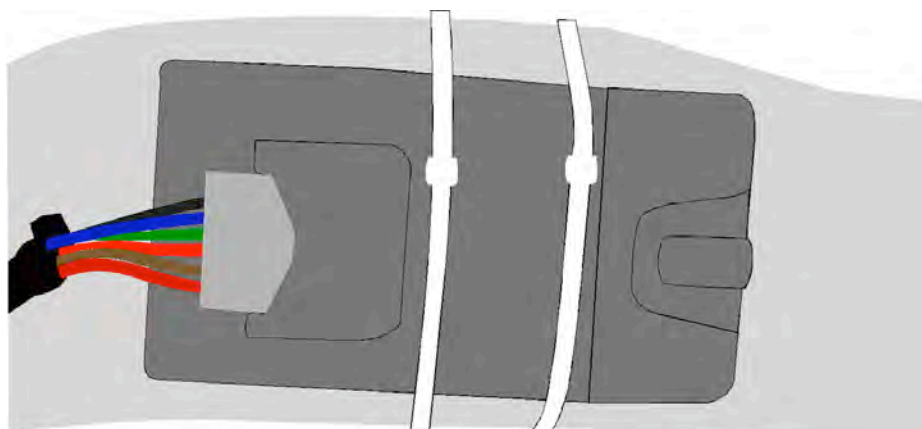
**Figure 1: Beneath front dash**

Ensure that the unit is mounted so that the connector is on top as pictured above. This ensures that the internally mounted antenna is in the correct position.



**Figure 2: GPS unit securely mounted inside dash**

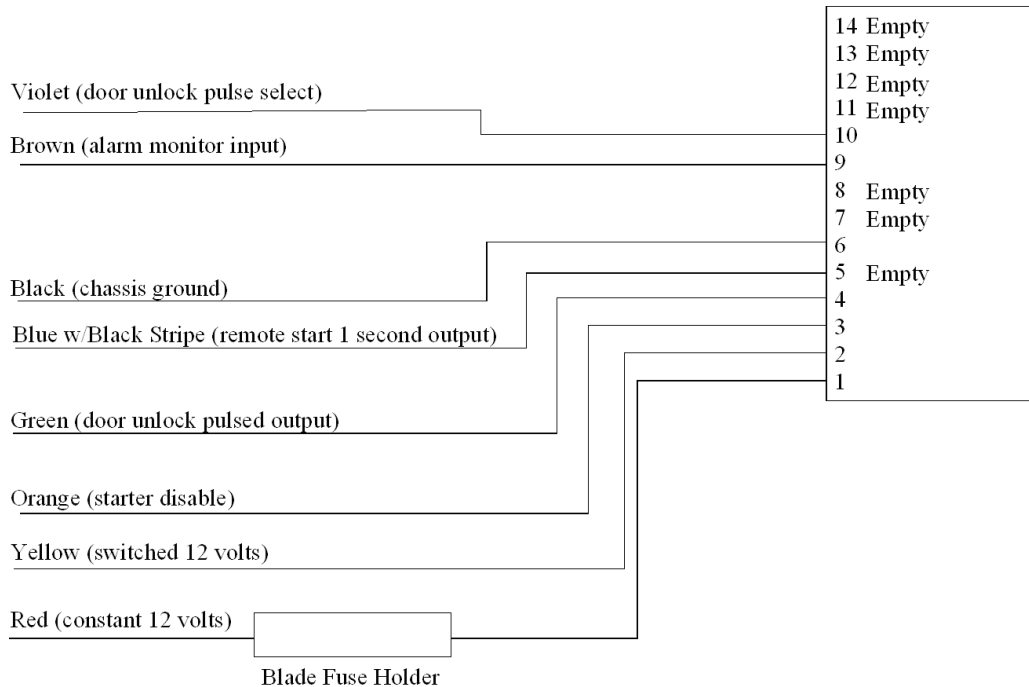
The GPS unit can be installed in any type of vehicle. The unit should be mounted so it will not be exposed to damage from people or objects. The GPS unit has four tie strap slots. Use nylon tie straps (see Figure 3) to firmly mount the GPS unit.



**Figure 3: GPS unit tie-strapped to vehicle metal frame**

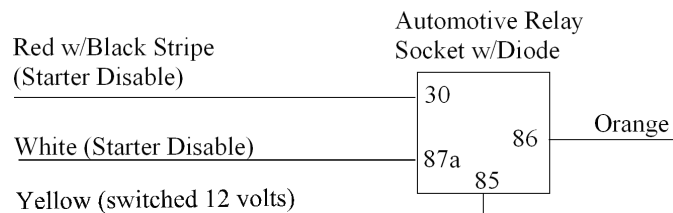
## 12 VDC POWER CONNECTION (RED WIRE)

### MT515 WIRE HARNESS



Locate the RED wire found either on the 14-pin connector supplied with the GPS unit or as a pigtail from the unit. For the pigtail, attach the supplied fuse holder to the red wire from the unit. The red wire must be connected to a constant 12 volt source from the vehicle to power the GPS unit. It is important that the 12 volt power source maintains 12 volts at all times.

**Figure 4: Wiring Diagram**



**Figure 5: Relay Socket**

## GROUND CONNECTION (BLACK WIRE)

Locate the BLACK wire found on either the 14-pin connector supplied with the GPS unit, or as a pigtail from the unit.

The black wire must be connected to a solid chassis ground uninhibited by paint or plastics. It is important that you do not use any floating grounds from the vehicles electrical system. Always connect the ground directly to the chassis body and secure with a factory bolt or aftermarket screw. (See Figure 6 for proper connection method.)

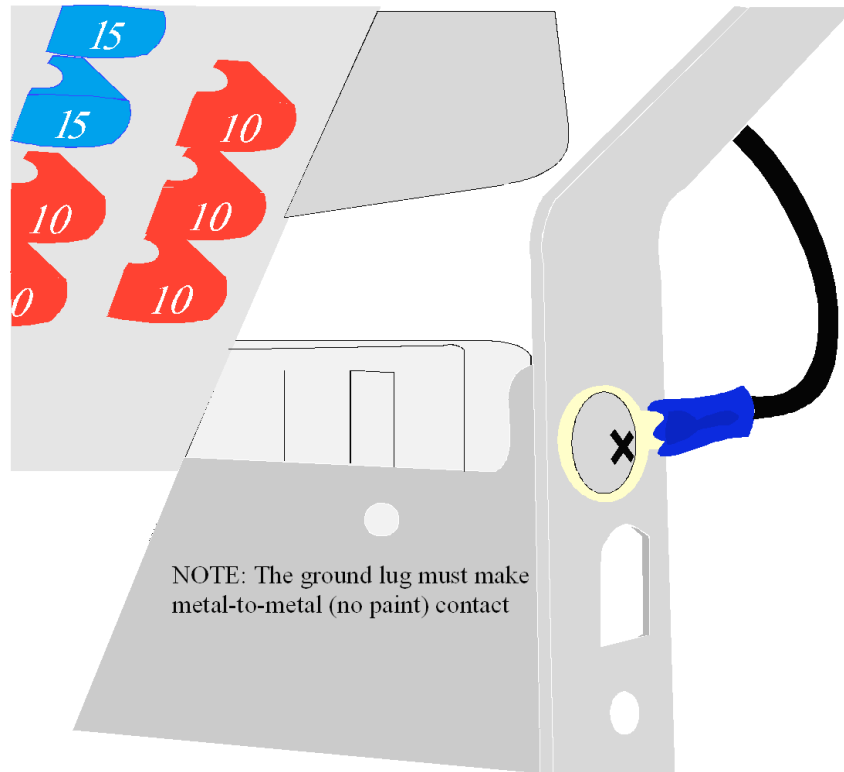


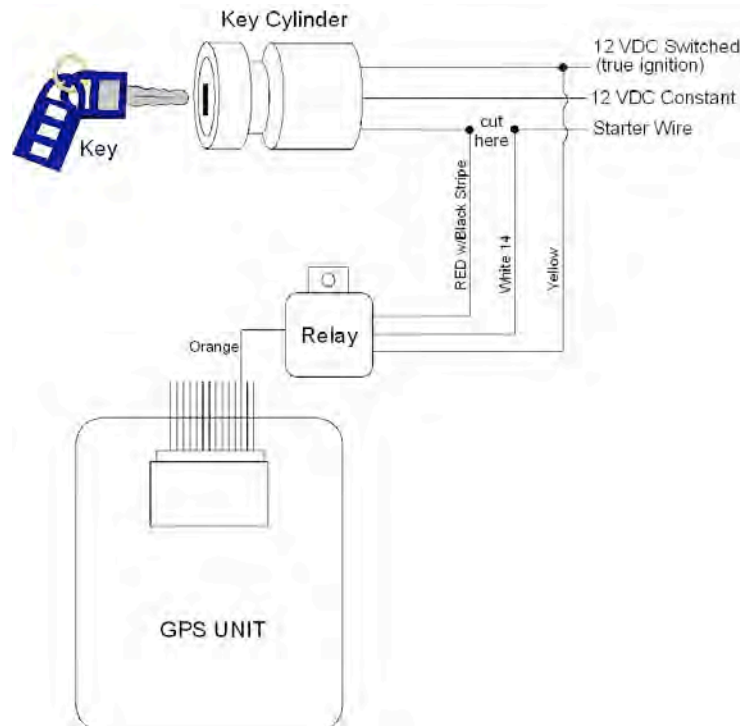
Figure 6: Ground Connection

## SWITCHED 12 VOLT CONNECTION (YELLOW WIRE)

Locate the YELLOW wire found on the 14-pin connector supplied with GPS unit.

The yellow wire must be connected to a switched 12-volt source from the vehicle. This connection is used to monitor the engines on/off state. It is important that the switched 12 volt source drops to (0) zero with the ignition off and restores 12 volts with ignition on.

## OPTIONAL STARTER DISABLE/ENABLE (4 WIRES)



**Figure 7: Starter Enable/Disable Connections**

Locate the ORANGE wire on the relay socket supplied with the GPS unit. Connect this ORANGE wire to the ORANGE wire found on the 14 pin connector supplied with the GPS unit.

Locate the RED W/BLACK wire found on the relay socket supplied with the GPS unit. This wire must be connected to the vehicles starter wire. After cutting the starter wire completely in half, connect the red w/black wire to either side of the vehicles starter wire.

Locate the WHITE wire found on the relay socket supplied with the GPS unit. This wire must be connected to the vehicles starter wire. Connect the white wire to the remaining side of the vehicles starter wire that was cut in half during the previous connection.

Locate the YELLOW wire found on the relay socket supplied with the GPS unit. The YELLOW wire must be connected to a switched 12 volt (true ignition) source to energize the vehicle disable relay.

A true ignition source will have 12 volts during the entire cranking cycle.

## **ALARM MONITOR CONNECTION (BROWN WIRE)**

Locate the BROWN wire on the 14-pin connector supplied with the GPS unit.

The brown wire can be connected to a pulsing circuit, such as a horn (or) a continuous signal circuit, such as a siren. When the unit (brown wire) senses a constant signal for 15 seconds or seven consecutive pulses, a message will be sent from the unit to indicate that an alarm condition exists with the vehicle.

**WARNING** The brown alarm wire must be connected to the vehicle's alarm source prior to plugging the cable harness into the Mobiletrace Mobile unit. This allows the Mobiletrace Mobile to adequately determine the alarm circuit's rest state.

## **REMOTE START OR DOOR LOCK OUTPUT (BLUE/BLACK WIRE)**

Locate the BLUE/BLACK wire found on the 14-pin connector supplied with GPS unit.

The blue/black wire can be connected directly to either an after-market remote start system or to a single pulse negative door lock circuit on the vehicle. The blue/black wire generates a one second ground pulse to activate the remote start system or to the lock switch in the vehicle.

## **DOOR UNLOCK OUTPUT (GREEN WIRE)**

Locate the GREEN wire found on the 14-pin connector supplied with GPS unit. The green wire can be connected directly to a single pulse negative door unlock circuit on the vehicle. The green wire generates either a single 3.5 second ground pulse or two 800 millisecond ground pulses spaced by 1 second to activate the unlock switch in the vehicle.

**WARNING** Do not attempt to connect the green wire to any circuit without first determining its operating specifications. Damage can occur to factory components if improperly connected. Some vehicles will require external relay configurations and other electrical components, such as diodes and resistors, that are not supplied with the GPS unit.

## **DOOR UNLOCK PULSE SELECT (VIOLET WIRE)**

Locate the VIOLET wire found on the 14-pin connector supplied with GPS unit.

The door unlock output is capable of generating two different pulse types. With violet wire connected to a source of constant 12 VDC, the Door Unlock Output will generate a 3.5 second ground switched pulse. With the violet wire connected to ground, the Door Unlock Output will generate two 800 millisecond ground switched pulses spaced by 1 second.

## **GROUND WHEN ARMED (GWA) CONNECTION**

This is currently not available. Reserved for future enhancements.

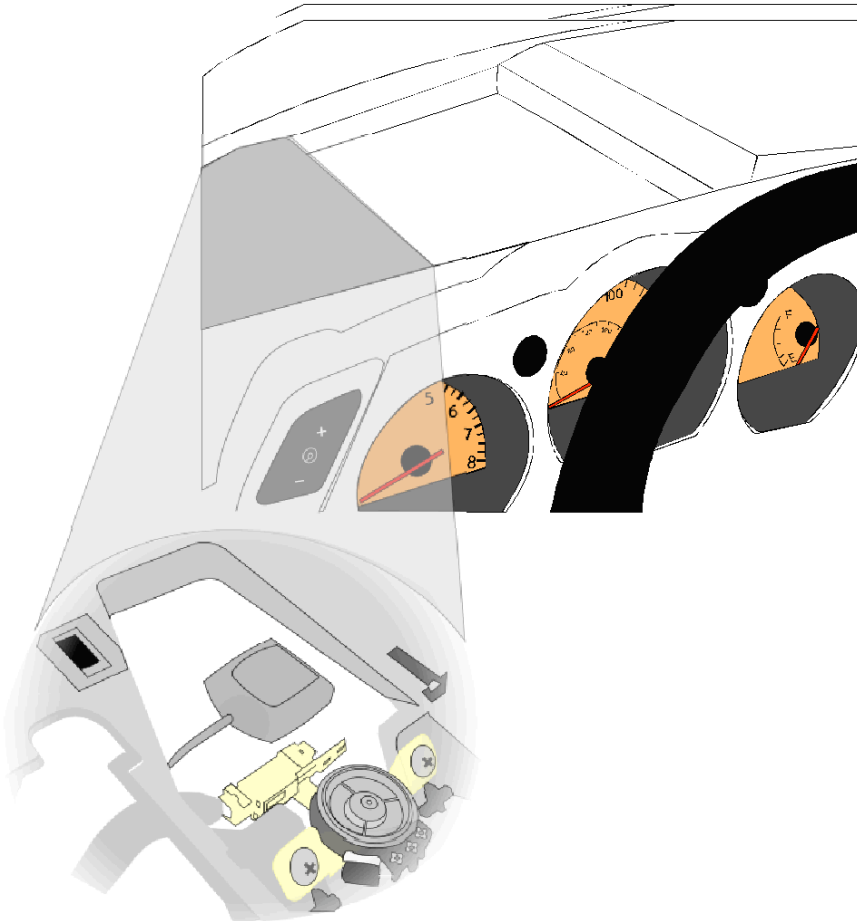
The GWA (Ground When Armed) connection senses an output from an alarm system indicating that the alarm system is armed (ground) or disarmed (floating).

## **GPS ANTENNA**

The optional GPS antenna is available for installations that are difficult or impossible to achieve a direct line of sight using the GPS unit's internal antenna.

The GPS antenna will work best if it has a clear view of the sky and as much of the horizon as possible. It is important to keep any metal interference as far as possible from the top of the GPS antenna so that the most accurate position can be calculated.

While GPS data collection has improved in ease and speed, some obstacles remain. Solid or dense objects can block GPS signals. Wet trees with heavy branches and leaves can mask or attenuate GPS signals. Mountains and buildings can block satellite transmission. Multipath signals can corrupt GPS data. Multipath is a reflected signal from some nearby objects. The resulting propagation delay can affect measurement accuracy. GPS electronics advancements have reduced the multipath threat but GPS field operators and users should be aware of obvious multipath environments.



**Figure 8: External GPS antenna mounted under dash**

## TESTING THE MOBILETRACE UNIT

Prior to the initial powering of the Mobiletrace Mobile Unit, move the vehicle outside, so that the GPS receiver can receive signals from the GPS satellites.

Upon initial power up of the Mobiletrace Mobile observe the LEDs located on the front side of the unit to determine if the unit is powered on. If the LED is not flashing, check the power connections.

Synchronization with the GPS satellites from the initial power-on can take a maximum of 5 minutes. In the mean time, collect the following information before calling in to test the unit:

- Unit Serial Number
- Customer Name
- Vehicle Model
- Vehicle VIN
- Vehicle State and Tag Number

**Call in to test the unit: 888-404-3133 (Option 2)**

You will hear the following voice prompt...If you are a field technician calling to complete the testing of a unit installation, press 2

The following features will need to be tested:

- Alarm
- Starter Disable
- Verification of Position
- Door Unlock (if installed)
- Remote Start (if installed)

If no GPS fix has been acquired by the time the tests are complete, verify that the unit is installed correctly, there is no metallic structure blocking the GPS signal from the unit, and that the vehicle is outside. If all of these conditions exist, then the optional external GPS antenna will need to be installed. Reset the unit after the external antenna is connected. Uninstall the unit from the vehicle (remove the tie wraps) and shake the unit for 10 seconds. The LED should start flashing once every 2 seconds, which indicates the GPS receiver is acquiring the GPS satellites. Call in and retest the verification of position.

## TROUBLESHOOTING CHART

Symptom	Possible Causes
Unit Does Not Power-up; the LED is not flashing	Power is not connected to the unit. With a Digital Volt Meter, measure the voltage at the input to the unit. A positive voltage should be measured on the + terminal of the unit when measuring between the + terminal and the - terminal or chassis ground. This voltage should also measure 12 VDC. Correct the wiring to assure the correct polarity and the correct voltage level.
Unit Does Not Find Cellular Service; an ABSENT_SUBSCRIBER error message is received on the web site under Transaction Log	The unit is not receiving the local cellular system. The main cause of this is poor signal strength due to shielding. Move the vehicle outside the building and re-apply power to the unit.
Unit Does Not Receive a GPS Signal; no position is received on the web site when the request is sent to the unit	The reason is that the GPS receiver is not locking into the satellites. The main cause is due to the receiver not receiving the signal from the satellites. Move the vehicle outside of any building/garage to allow the internal GPS antenna in the unit to have a clear view of the sky. If the antenna has a clear view of the sky, but still does not acquire the GPS signal, install the external GPS antenna as specified in this manual.
Unit Does Not Send Alarm Message	<p>There are three potential causes for this:</p> <ol style="list-style-type: none"> <li>1. An alarm has already been sent and the 3 minute reset timer has not expired. If an alarm signal was received you must wait three (3) minutes before sending/receiving another signal.</li> <li>2. An alarm signal was not received. You should verify the installer allowed at least 8 pulses or 15 seconds for a continuous signal OR have the installer check for proper wire connection by testing the circuit that it was connected to.</li> <li>3. The unit did not receive the auto generated "Clear Alerts" MT. Manually send a "Clear All Alerts" to re-set the alarm circuit.</li> </ol>