# *210 SERIES GPS TRACKING INSTALLATION GUIDE*

driven to excel

Directed® ELECTRONICS



INS210 03-06

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For the purpose of this document, reference to GPS 210 Series shall mean and include Directed Electronics, including its subsidiaries and affiliates. Directed is a trademark of Directed Electronics.

## *Responsibility*

Directed assumes no responsibility or liability for the improper installation, operation or maintenance of GPS 210 Series Onboard, including, without limitation, the installation or removal thereof by personnel who have not successfully completed the GPS 210 Series Installation Training and Certification program.

# *Table of Contents*

# *Introduction*

Satellites are in a 12-hour orbit at 12,000 miles above the earth. There are 24 satellites in the system and generally there are at least 5 satellites orbiting overhead at any one time. The GPS 210 Series relies on the signal from multiple satellites to determine its location on earth. The satellite signal is received via the combination GPS / Cellular antenna supplied with the GPS 210 Series. This antenna must be installed in a location with an unobstructed view to the outside of the vehicle to receive signals from these satellites. This network covers virtually the entire population of U.S, Canada,and Mexico that is within reach of a cellular network.

# *General Safety*

This installation manual covers the installation of the GPS 210 Series. This manual is for the professional and novice installer and should be used to ensure a safe and functional install of the GPS 210 Series. The following information should be noted with respect to operating the GPS 210 Series in various environments, since the cellular transceiver component works through RF (Radio Frequency).

## *Vehicles Equipped with AirBags*

- DO NOT place objects, including communication equipment, in the area over the airbag or in the air bag deployment area.
- If the communications equipment is improperly installed and the airbag inflates, this could cause serious injury.
- Contact the vehicle manufacturer's corporate headquarters, if necessary, for specific airbag information for the vehicle.
- DO NOT run cables under the area reserved for the driver’s feet.

### *Damage to equipment*

- DO NOT install components that have been dropped, even if they appear to be functional.
- Internal damage is likely to occur.

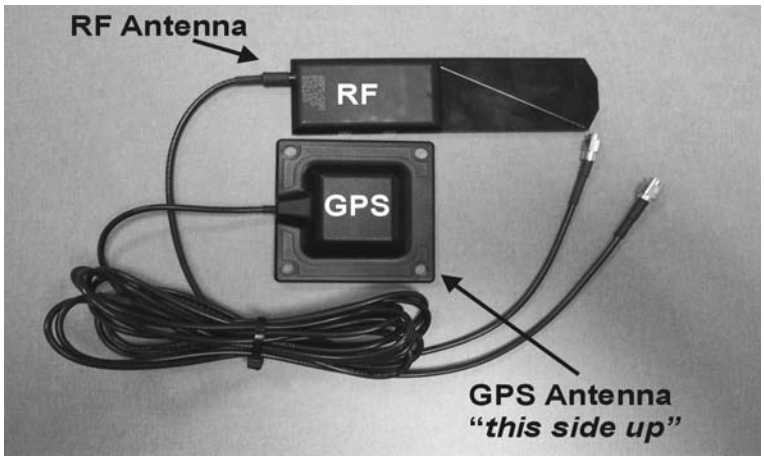
## *Basic Tools Needed for Installation*

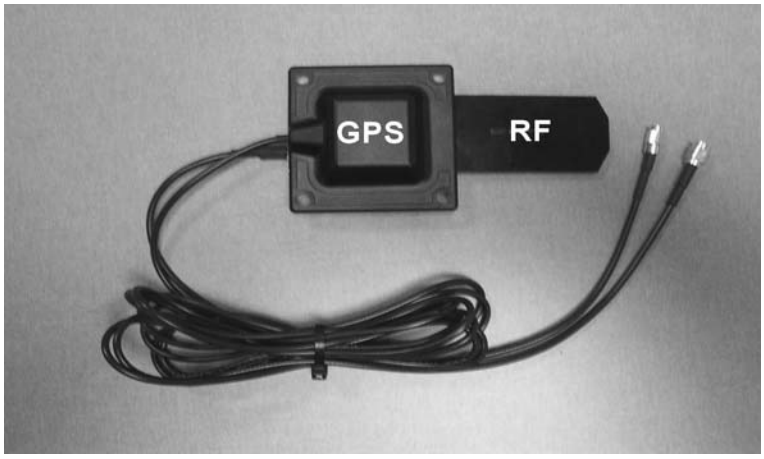
- Metric and standard socket set
- Screwdriver set
- Side cutters, wire cutters
- Knife or box cutter
- Wire strippers
- Hand Crimper for insulated terminals
- Pliers
- Electrical tape
- Automotive upholstery or trim remover
- Flashlight or trouble light
- Cordless drill with accessories
- Assorted common bit set
- Pocket PC, Palm or Desktop PC with Serial Cable
- Digital Multimeter (recommended), or 12 volt test light

It is strongly recommended that a Digital Multimeter be used when probing electrical systems in the vehicle to avoid any damage to computers or airbag systems.

# *Antenna*

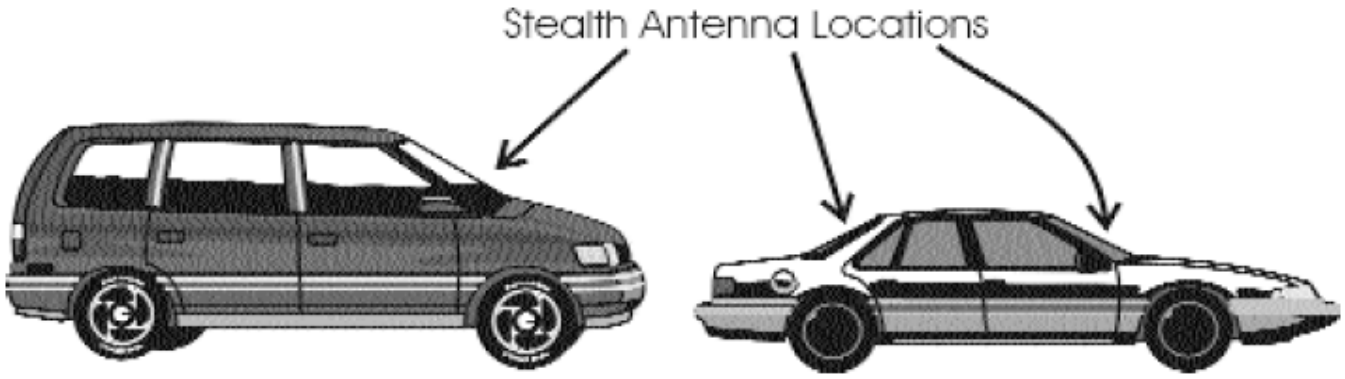
Antenna location is critical to the operation of the system. The antenna provided is a combined GPS/RF antenna. The GPS/RF combined antenna must be mounted flat with the GPS receiver facing up (square portion on antenna). The antenna does not require a ground plane to function properly.



## *Stealth Antenna Mounting*

The best location for a stealth installation is beneath the rear speaker deck panel or below the front window concealed in the dash of the vehicle. The GPS/RF combination antenna will work best if it has a clear view to the sky and as much of the horizon as possible. Any metallic objects between the antenna and the satellites will degrade the signal and reduce the overall performance.




- The GPS signals will travel through the clear glass but will be reduced if the window has any metallic coating or tint applied.
- The antenna must be mounted securely so that it does not become a projectile in an accident or move during normal operation.

## *The GPS 210 Series Device*

The GPS 210 Series may be installed in any type of 12-volt vehicle. The unit should be mounted so it will not be exposed to damage from people or objects. The GPS 210 Series has four mounting holes. Use nylon tie straps to firmly mount the GPS 210 Series. Some examples of mounting locations include under the dash above the knee bolster, under the centre console, side kick panel and behind the glove compartment. The backup battery should be mounted in the same manner, close to the GPS 210 Series.

## *Connecting the Power Harness*

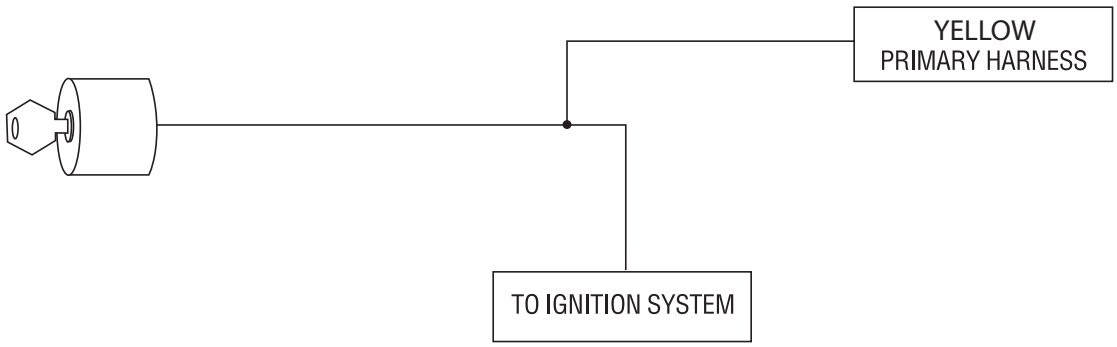
| Main Harness | |
|---|---|
| Red | 12 Volts Constant |
| Yellow | 12 Volts Ignition |
| Black (X2) | Ground |
| Green | Door Lock (-) Output |
| White/Blue | Remote Start (-) Output |
| Green/Yellow | Test (not used) |

The following wires require connection to the vehicle wiring harness.

- Constant Power Wires (red) +12VDC when the key is removed from the

ignition.

- Ignition Sense Wire (yellow) +12VDC when the key is in the “Run/On” position only.
- Ground Wire (Black) to a metal surface on the vehicle frame or kick panel.
- A good ground connection must be established for the GPS 210 Series to operate properly. Resistance to ground is the main cause of failure.
- Ensure the location you choose for your ground connection is made of metal, not plastic.
- Scrape away any paint on the vehicle ground to make a clean mounting surface.



## *ESP2 Connectivity Feature*

Please note that this system comes with Directed ESP2 port (Bitwriter port) connectivity feature. This allows for easy interconnection between the GPS 210 Series system and Directed's vehicle security or remote car starter system that has this part.

This connection enables the control of such features as remote engine start, door unlock/disarm, door lock/arm, starter enable/disable and receive security system trigger notifications. When using this connection, and if your vehicle's security system and/or remote car starter is wired up to control these features, you can skip the following sections of this manual:

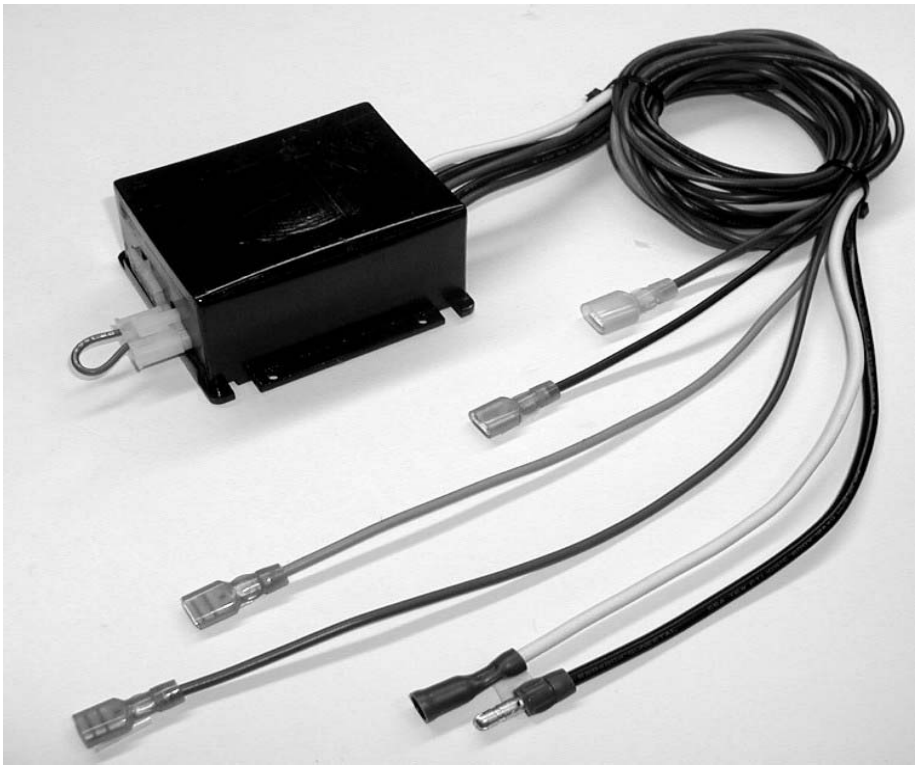
Connecting Starter Enable/Disable Feature
Connecting Door Unlock Feature
Connecting Door Lock Feature
Connecting the Alarm Feature
Connecting the Start Engine Feature

## *Feature Module*

The GPS 210 uses a feature module to control external features such as:

- Starter Disable
- Door Unlock
- Alarm Trigger Notification

If you have a vehicle security system or remote car starter that is already equipped with an ESP2 port, you will not need to use this module and can simply use ESP2 connection instead.



## *Feature Module Wiring Color Coding*

*Starter Disable*

- Green (key)
- Green/Black (motor)

*Unlock*

- Blue/Black (motor)
- Brown/Black (switch)

*Alarm*

- Brown (12 volt positive siren input)

*Not Used*

- Orange

# *Connecting the Starter Disable Feature*

The Started Disable feature requires connecting the starter wire through the Feature Module. The Feature Module has a internal starter disable relay.

> Note: You do not have to use this connection if your vehicle security system already has this feature and you are using the ESP2 connection.

The wire harness containing the starter wire may be located on either side of the steering column.

Using a Digital Multimeter probe the wire you suspect to be the starter wire. This wire will have a +12VDC present only when the ignition switch is in the (ENGINE CRANKING) position.

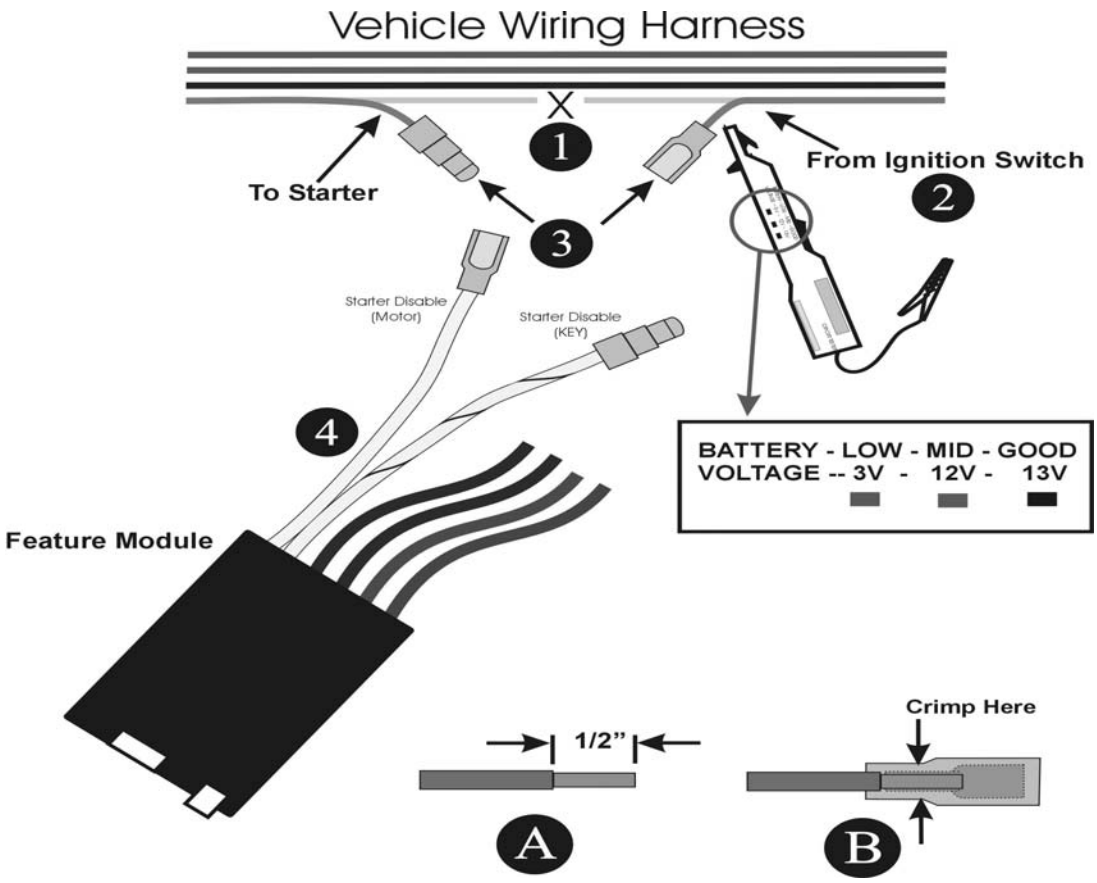
1. Cut the starter wire in a location that allows easy access to both ends for stripping and adding a crimp connector. Strip each end with wire strippers.

2. Place the key in the ignition switch and rotate to the start position. If the correct wire has been cut the motor will not crank. Use a digital multime-

ter to determine which of the two stripped wires has a +12VDC present in the start position (normally the wire that leads to the ignition switch)

3. Using a crimper, crimp the female bullet connector onto one the wire with +12VDC; crimp another male bullet connector to the other end.

4. Attach the Feature Module at the bullet connectors.

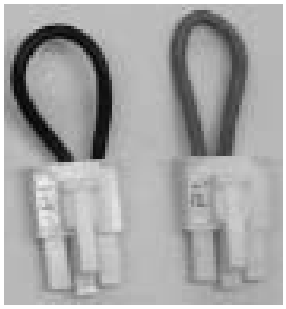


## *Connecting the Door Unlock Feature (if option available)*

Refer to *TechTip Doc 1041* for information regarding door lock interface wiring. This document can be obtained from: www.directechs.com, DirectFax 800-999-1329, or Technical Support 800-753-0800.

When the door unlock feature is activated the GPS 210 system supplies two one second pluses from the feature module. This will allow systems that require a double pulse to be connected. Not all systems in every vehicle will allow for the door unlock feature to be connected. If an ESP2 type car starter or alarm system is installed you will not hook up this feature but will use ESP2 connection instead.

The feature module can produce a double pulse positive or negative unlock output. The GPS210 comes with 2 jumpers (see illustration below), one Red and one Black. When the Red jumper is plugged in the feature module will produce a positive unlock output. When the Black jumper is plugged in the feature module will produce a negative unlock output.



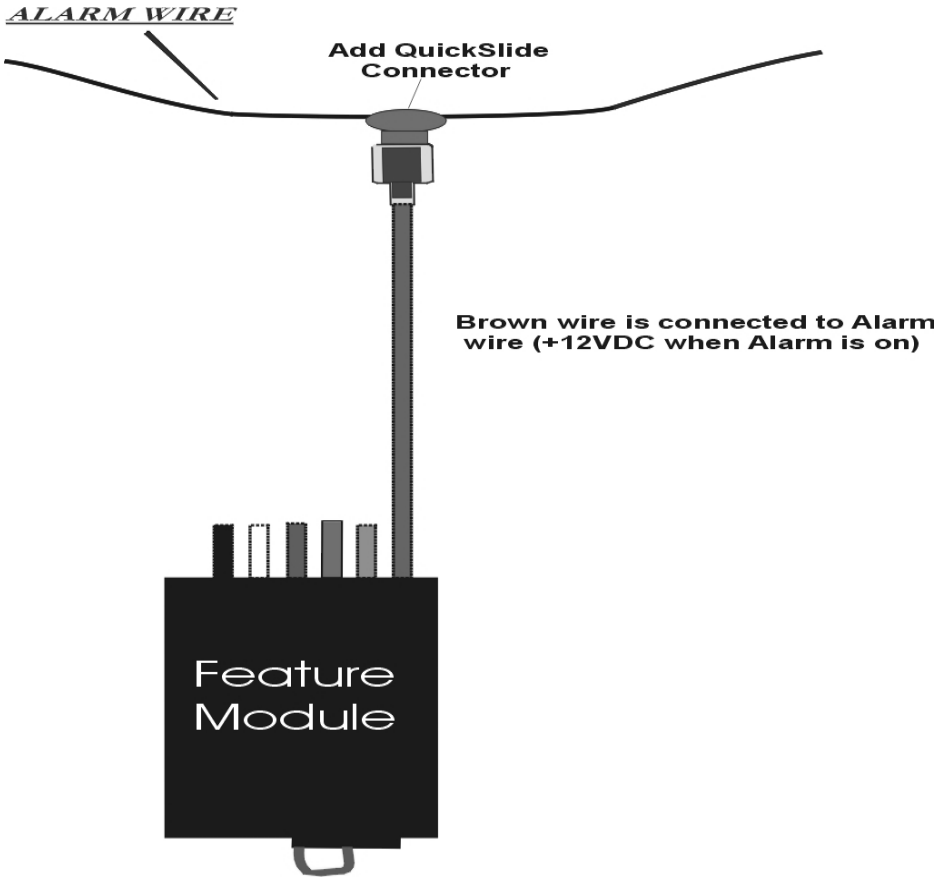
## *Connecting the Door Lock Feature (if option available)*

A green wire from the main connector on the GPS 210 series is used for the Door Lock feature. When the door lock feature is activated the GPS 210 supplies two one second negative pulses (400mA) from the lock wire. To operate other types of door lock systems, (i) positive, (ii) reverse polarity, (iii) one wire, and external relay is required. If an ESP2 type car starter or alarm system is installed you will not hook up this feature but will use ESP2 connection instead.

# *Connecting the Alarm Feature*

The GPS 210 Series can connect to most vehicle's alarm system to detect when the alarm system is triggered.

The "Alarm wire" (BROWN) connects to a 12 V positive siren trigger. When the Alarm is triggered for more than 15 seconds the GPS210 will send an alert to notify the user that the alarm has been triggered.



## *Connecting the Start Engine Feature (if option available)*

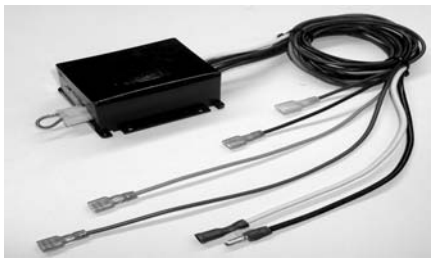
The GPS 210 can connect to most aftermarket remote starters. If an ESP2 type alarm system is installed you will not hook up this feature.

NOTE: The Remote Start wire (white/blue) supplies a 1 second negative pulse when triggered. The remote starter may need to be reconfigured.

# *Powering the GPS 210 Series*

In order for the GPS 210 Series to function properly, it needs to be connected in the following sequence. If using ESP2 connection, ESP2 module can be connected at any time.

Connection Sequence



1. When power, ignition, and ground as well as the wired features from the feature module have been connected plug the feature module into the main wiring harness.

2. Connect the two coax cables from the combination GPS/RF antenna to the GPS 210 Series. Twist on firmly with your fingers. Do NOT tighten with any tools as overtightening can cause damage to the main board.

3. Plug the main harness into the GPS 210 Series.

4. Plug the back-up battery into the main wiring harness.

**NOTE:** The GPS 210 Series should now be powered. There is a LED on the GPS 210 Series that should now be flashing Red and between 2 to 5 minutes later the LED should flash Green once every second. If this does not happen please refer to the *Troubleshooting section*.

## *Testing*

Once the installation is completed the system will need to be tested and registered with the network. There are 3 testing options available:

1. Pocket PC with serial cable. Testing instructions and system requirements are enclosed in this kit. Software can be downloaded for free from www.directechs.com under the “Downloads” section.

2. Desktop or laptop PC with serial cable. Please visit www.directechs.com and click on the “Downloads” section for testing and system requirements instructions and downloading the application.

3. Palm handheld device with serial cable. Please visit www.directechs.com to download the application and installation instructions. Palms that are compatible with this application are Palm III, Palm IIIx, Palm V, Palm Vx and you have to have a 4.1 operating system.

When using any of the testing solutions you will need to purchase a serial adapter (p/n LS210) that will allow your testing equipment to interface with 210

series GPS system's 6-pin connector.

Please note and inform your customers that once tested these systems must have to be activated within 30 days from the date of installation. If the system is not activated within 30 days from the date of installation, Directed reserves the right to permanently disable it without any further claims or liabilities whatsoever.

# *Troubleshooting*

## *General Considerations*

**Wireless Coverage Area:**
Wireless technology is required to access the 210 Series GPS vehicle tracking system. The 210 Series GPS vehicle tracking system utilizes the broadest coverage area networks.

There are areas within North America that have not yet been included in the wireless coverage area. If a vehicle travels out of coverage, or is in a poor coverage area, communication with that vehicle is unavailable until it returns to the coverage zone. From time to time, poor coverage areas (“holes”) occur even in fully developed areas, thereby limiting system performance.

**Wireless Network Service Problem:**
Wireless network service problems may affect the communications link between the vehicle and 210 Series GPS vehicle tracking system OnLine. Service problems include, service interruptions and network congestion, a busy network, or cellular roaming issues.

**GPS Drift, Urban Canyon:**
GPS is a satellite based positioning system providing the greatest coverage available, but there are still some circumstances that can hinder the performance of the system. The GPS antenna must have a direct line of sight to the satellites. If the path is blocked or obstructed by underground parking lots, or the shadow of tall buildings, it can affect the GPS receiver. What typically occurs in this case is the system will recognize that it is not receiving a clear GPS signal, and will report the last known clear location of that vehicle.

**Tampering with the Unit - Human Intervention:**
If the unit is tampered with - antennas (GPS or cellular) or wires disconnected,

or the unit completely removed, the functionality of the system will be jeopardized. However, steps can be taken to prevent this from occurring. Upon installation, the components should be hidden, making the system difficult to detect and tamper with.

**Defective Units:**
All 210 Series GPS vehicle tracking systems are tested at the manufacturing facility prior to being shipped and installed. The 210 Series GPS vehicle tracking system has a built-in diagnostic test that initiates each time the unit is powered on. If the 210 Series GPS vehicle tracking system detects an irregularity, it has the ability to send notification of the problem and the vehicle's location, (if power and a communication link are present) so that the situation can be rectified immediately.

## *Hardware*

This section provides detailed instructions to assist in identifying the root cause of issues related to the 210 Series GPS vehicle tracking system or associated accessories. If you are unable to identify the root cause of the problem after following the steps in sequence, contact Directed Electronics Tech support at phone number: 1 (800) 753-0800.

- The 210 Series GPS vehicle tracking system equipment has no serviceable parts.
- Service is based solely on the substitution method; a faulty unit is replaced by a working one.

The following lists potential issues that may be encountered when testing the 210 Series GPS vehicle tracking system equipment, and provides recommendations on resolution.

*Vehicle starts when "Disabled":*

If the vehicle engine starts when the "Vehicle Disabled" feature is selected, the wrong wire may have been chosen in the vehicle . Comfirm the right wiring in the vehicle has been selected. Ensure the disable wires have been connected with the (green) wire to the key side of the starter and the (green/black) to the starter solenoid side.

*Vehicle engine shuts off when "Disabled":*

If the vehicle engine shuts off when the "Vehicle Disabled" feature is selected, the Ignition wire has been chosen instead of the Starter wire for the "Starter Disable" feature.

*Starter Disable relay buzzes or chatters:*

The “Starter Disable” relay may buzz or chatter if the GREEN and GREEN/BLACK starter disable wires are reversed. When installing the starter disable feature, make sure that the GREEN wire is connected to the key side (power) and the GREEN/BLACK wire is connected to the starter side (no power).

*Vehicle engine will not start:*

If the vehicle engine cranks over, or the starter solenoid makes a clicking sound, the issue is normally related to the vehicle and not the 210 Series GPS vehicle tracking system product.

| Possible Cause | Action Required |
|---|---|
| Starter wires not connected properly. | Check the GREEN and GREEN/BLACK “Starter Disable” wires and ensure that the connections are solid. Ensure that the crimp on bullet connectors are crimping the wire strands and not the outer insulation. |
| Defective feature module | Unplug the wiring harness from the Feature Module. Start the engine. If the vehicle does not start, replace the Feature Module. |
| Constant and Ignition power wires reversed. | Plug the wiring harness into the Feature Module and unplug the 210 Series GPS system. Start the vehicle engine. If the vehicle does not start, replace the wiring harness. If the vehicle engine starts, plug in the 210 Series GPS system. |

*LED Operation:*

Bi-Colored 210 Series GPS vehicle tracking system LED

Each 210 Series GPS vehicle tracking system is equipped with one bi-colored LED.

**Blinking LED Color:**

- Blinking Green: Communication Service is fully available.
- Blinking Orange: A Communication Service has been detected, but is not usable.
- Blinking Red: No Communication Service has been detected.

**Blinking LED Timing:**

- Off for 1 second: GPS Module is powered and signal is Valid, Cell Module is powered.
- Off for 5 second: GPS Module is powered and signal is Invalid, Cell Module is powered.
- Off for 10 seconds: GPS Module is turned off, Cell Module is powered.
- Off for 21 seconds: GPS Module is powered and signal is Valid, Cell Module is turned off.
- Off for 25 seconds: GPS Module is powered and signal is Invalid, Cell Module is turned off.
- Off for 30 seconds: GPS Module is turned off, Cell Module is turned off.