

USER GUIDE

**GeoExplorer® 6000 series**





# USER GUIDE

## **GeoExplorer® 6000 series**

Version 1.00  
Revision A  
February 2011



Trimble Navigation Limited  
10355 Westmoor Drive  
Suite #100  
Westminster, CO 80021  
USA  
[www.trimble.com](http://www.trimble.com)

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However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission rules.

The radios in this device have been designed and manufactured to not exceed stipulated emission limits for exposure to radio frequency (RF) energy as required by the Federal Communications Commission of the U.S. Government 47 C.F.R. § 2.1091 and 2.1093.

The FCC limits for Specific Absorption Rate (SAR) for general population / uncontrolled exposure for partial-body and extremities such as hands/wrists/feet and ankles are 1.6W/kg and 4W/kg respectively.

The greatest recorded FCC 10-g SAR value as determined at the highest certified power level of this device measured adjacent to the antenna was measured at 1.653 W/Kg; the applicable FCC 10-g SAR limit for handheld portable device is 4W/Kg.

Devices operating close to a base station operate at SAR levels well below the maximum value specified above.

The external antenna connector provided in this device is for GNSS antennas only.

## Accessories

The following optional accessories have been approved for use with this device:

P/N 88014-00 GeoExplorer 6000 series AC Power Kit

P/N 88056-00 GeoExplorer 6000 Series Vehicle Power Supply

P/N 88049-03 USB to Serial Converter Cable

## Canada

This Class B digital apparatus complies with Canadian ICES-003.

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

Cet appareil numérique de la classe B est conforme à la norme NNB-003 du Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe B prescrites dans le règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

## Europe

This product has been tested and found to comply with all requirements for CE Marking and sale within the European Economic Area (EEA). It is classified and marked as being Class 2 Radio Equipment under 2000/299/EC, as Bluetooth and wireless LAN approvals are country specific. Please consult your local distributor for more information.



### EU – Restrictions for Use in the 2.4GHz band

This device may be operated indoors or outdoors in all countries of the European Community using the 2.4GHz band: Channels 1 – 13, except where noted below.

- In France outdoor operation is only permitted using the 2.4 – 2.454 GHz band: Channels 1 – 7.
- In Italy the end-user must apply for a license from the national spectrum authority to operate this device outdoors.
- In Norway, this unit may not be operated within 20 km of Ny Alesund

The Trimble GeoExplorer 6000 series has Bluetooth and wireless LAN approval in most EU countries and satisfies the requirements for Radio and Telecommunication Terminal Equipment specified by European Council Directive 1999/5/EC. These requirements provide reasonable protection against harmful interference when the equipment is operated appropriately in a residential or commercial environment.

GeoExplorer 6000 series handhelds equipped with wireless cellular modem radios are intended for connection to European Networks operating with GSM 900, or GSM 1800. A copy of the CE Declaration of Conformity for the GeoExplorer 6000 series can be accessed from <http://www.trimble.com/support.shtml>.

### Australia and New Zealand

This product conforms with the regulatory requirements of the Australian Communications Authority (ACA) EMC and Radiocommunications framework, thus satisfying the requirements for C-Tick Marking and sale within Australia and New Zealand.

Additionally, GeoExplorer 6000 3.5G products that incorporate a modem also comply with the requirements for A-Tick Marking and sale in Australia.

### Taiwan – Battery Recycling Requirements

The product contains an internal Lithium-ion battery. Taiwanese regulations require that waste batteries are recycled.

廢電池請回收

### Notice to Our European Union Customers

For product recycling instructions and more information, please go to [www.trimble.com/ev.shtml](http://www.trimble.com/ev.shtml).

Recycling in Europe: To recycle Trimble WEEE (Waste Electrical and Electronic Equipment, products that run on electrical power), Call +31 497 53 24 30, and ask for the "WEEE Associate". Or, mail a request for recycling instructions to:

Trimble Europe BV  
c/o Menlo Worldwide Logistics  
Meerheide 45  
5521 DZ Eersel, NL







# Safety Information

## Radio use

The Trimble® GeoExplorer® 6000 series handheld contains a Bluetooth® radio and Wi-Fi radio. Some models also include a cellular modem radio. In some situations, you may be required to turn off the radios. For example, aviation authority regulations restrict the use of wireless transmission devices on board aircraft.

To prevent the handheld from emitting radio signals, do one of the following:

- To turn off the handheld, press the **Power** button to display the Power menu then tap Shutdown.
- To turn off the Bluetooth, Wi-Fi, and wireless cellular modem radios only:
  - a. Tap the title bar on the *Home* or *Start* screen, and then on the pull-down list, tap the  or  icon.
  - b. In the *Connectivity* or the *Phone* dialog, select *Wireless Manager*.
  - c. Tap **All** to turn off all radios. The status fields below the Wi-Fi, Bluetooth, and Phone buttons change to *Off*.

## Deactivating the integrated Wi-Fi and Bluetooth radios

The GeoExplorer 6000 series handheld is shipped with Wi-Fi and Bluetooth wireless technology activated. To use the Wi-Fi or Bluetooth radio, you need to turn it on (see [Turning on and turning off the integrated radios, page 80](#)).

**Note** – *You may need to deactivate the Wi-Fi and/or Bluetooth radio in the handheld if the country in which you are working does not approve the use of Wi-Fi and/or Bluetooth wireless technology. If you are unsure about whether the GeoExplorer 6000 series handheld's radios are approved for use in your country, check with your Trimble reseller.*

Use the Radio Activation Manager software to deactivate the integrated Wi-Fi and/or Bluetooth radio, or to reactivate the radios if they have been deactivated. The Radio Activation Manager software runs on an office computer.

The latest copy of the software is available for download from the Trimble website. Go to [www.trimble.com/support.shtml](http://www.trimble.com/support.shtml), click the link for your receiver type (*GeoXH*, or *GeoXT*), click *Downloads*, click *GeoExplorer 6000 Series* and then click *Radio Activation Manager*.

## Exposure to radio frequency radiation from Bluetooth and Wi-Fi transmitters

This device is approved as a portable device with respect to Radio Frequency (RF) exposure compliance. The radiated output power of the internal wireless radio transmitters is less than 100 milliwatt, which results in exposure levels far below the FCC radio frequency exposure limits, even when operated in close proximity to the body. The internal wireless radios operate within guidelines found in international radio frequency safety standards and recommendations, which reflect the consensus of the international scientific community. Trimble therefore believes the internal wireless radios are safe for use by users. The level of electromagnetic energy emitted is hundreds of times lower than the electromagnetic energy emitted by wireless devices such as mobile phones. However, the use of wireless radios may be restricted in some situations or environments, such as on aircraft. If you are unsure of restrictions, you are encouraged to ask for authorization before turning on the wireless radios.

## Exposure to radio frequency radiation from cellular wireless transmitters

GeoExplorer 6000 series handhelds equipped with wireless cellular modem radios have been designed and manufactured to meet safety requirements for limiting exposure to radio waves. When used in accordance with the instructions set forth in this manual, the equipment has been independently verified to not exceed the emission limits for safe exposure to radio frequency (RF) energy as specified by the Federal Communications Commission of the U.S. Government in 47 CFR §2.1093.

These limits are part of comprehensive guidelines and establish permitted levels of RF energy for the general population. The guidelines are based on standards that were developed by independent scientific organization through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons, regardless of age and health.

The exposure standard for all wireless devices employs a unit of measurement known as the Specific Absorption Rate, or SAR; the FCC limits for SAR for general population/uncontrolled exposure for partial-body and hands/wrists/feet and ankles are 1.6W/kg and 4W/kg respectively<sup>1</sup>. Devices operating close to a base station operate at SAR levels well below the maximum value specified above. Tests for SAR on the GeoExplorer 6000 series have been undertaken using the standard operating positions adopted by the FCC that test the device for SAR while it is transmitting at the highest certified power level in all tested frequency bands.

The FCC has granted an Equipment Authorization for this device on the basis that all reported SAR levels have been evaluated to be compliant with the FCC RF exposure guidelines.

<sup>1</sup>. In the United States and Canada, the SAR limit for mobile phones used by the public is 1.6 watts/kg (W/kg) averaged over one gram of tissue. The standard incorporates a substantial margin of safety .

SAR information on this device is on file with the FCC and can be found under the Display Grant section of <http://www.fcc.gov/oet/fccid>; search on FCC IDs:

- JUP 615 - for the GeoExplorer 6000 series standard edition handhelds
- JUP 616 - for the GeoExplorer 6000 series 3.5G edition handhelds

## AC adaptor safety

To charge the handheld's battery, use the international adaptor kit provided with the GeoExplorer 6000 series handheld (see [Powering the handheld, page 25](#)).



**WARNING** – To use AC adaptors safely:

- Use only the AC adaptor intended for the GeoExplorer 6000 series handheld. Using any other AC adaptor can damage the handheld and may void your warranty. Do not use the AC adaptor with any other product.
- Make certain that the input voltage on the adaptor matches the voltage and frequency in your location.
- Make certain that the adaptor has prongs compatible with your outlets.
- Do not use the AC adaptor in wet outdoor areas; it is designed for indoor use only.
- Unplug the AC adaptor from power when not in use.
- Do not short the output connector.
- Be aware that there are no user-serviceable parts in this product.
- If the AC adaptor becomes damaged, replace it with a new Trimble AC adaptor.

## Electrostatic discharge



**WARNING** – Static electricity can harm electronic components inside your handheld. To prevent static damage:

- Discharge static electricity from your body before you touch any of the electronic components inside your device, such as a memory module. You can do so by touching an unpainted metal surface.

The GeoExplorer 6000 series is designed for outdoor conditions; however under conditions of low humidity extremely high voltage discharge events are possible. Users are advised that the risk of causing discharge to sensitive electronics can be minimised by avoiding finger contact to the recessed connectors at the sides of the unit.



## Battery safety

The removable rechargeable Lithium-ion battery is supplied partially charged. Charge the battery completely before using it for the first time (see [Powering the handheld, page 25](#)). If the battery has been stored for longer than six months, charge it before use.



**WARNING** – Do not damage the rechargeable Lithium-ion battery. A damaged battery can cause an explosion or fire, and can result in personal injury and/or property damage. To prevent injury or damage:

- Do not use or charge the battery if it appears to be damaged. Signs of damage include,

but are not limited to, discoloration, warping, and leaking battery fluid.

- Do not store or leave your device near a heat source such as near a fireplace or other heat-generating appliance, or otherwise expose it to temperatures in excess of 70 °C (158 °F) such as on a vehicle dashboard. When heated to excessive temperatures, battery cells could explode or vent, posing a risk of fire.
  - Do not immerse the battery in water.
  - Do not use or store the battery inside a vehicle during hot weather.
  - Do not drop or puncture the battery.
  - Do not open the battery or short-circuit its contacts.
- 
- 



**WARNING** – Avoid contact with the rechargeable Lithium-ion battery if it appears to be leaking. Battery fluid is corrosive, and contact with it can result in personal injury and/or property damage.

- To prevent injury or damage:
- If the battery leaks, avoid contact with the battery fluid.
  - If battery fluid gets into your eyes, immediately rinse your eyes with clean water and seek medical attention. Do not rub your eyes!
  - If battery fluid gets onto your skin or clothing, immediately use clean water to wash off the battery fluid.
  - Do not open the battery or short-circuit its contacts.
- 
- 



**WARNING** – Charge and use the rechargeable Lithium-ion battery only in strict accordance with the instructions. Charging or using the battery in unauthorized equipment can cause an explosion or fire, and can result in personal injury and/or equipment damage.

- To prevent injury or damage:
- Do not charge or use the battery if it appears to be damaged or leaking.
  - Charge the Lithium-ion battery only in a Trimble product that is specified to charge it. Be sure to follow all instructions that are provided with the battery charger.
  - Discontinue charging a battery that gives off extreme heat or a burning odor.
  - Use the battery only in Trimble equipment that is specified to use it.
  - Use the battery only for its intended use and according to the instructions in the product documentation.
- 
- 

## Storage card use

The GeoExplorer 6000 series handheld provides a storage card slot, providing an alternative storage location to the storage memory in the handheld.



**WARNING** – Static electricity can harm electronic components inside your handheld. To prevent static damage:

- Discharge static electricity from your body before you touch any of the electronic components inside your device, such as a memory module. You can do so by touching an unpainted metal surface.
- 
- 



**WARNING** – The presence of any dust or moisture in the storage card slot may adversely affect the device and void your Trimble warranty. To prevent dust or moisture entering the storage card slot:

- Make certain that the storage card slot door is attached correctly when you are using the handheld outdoors.
  - When inserting or removing a storage card, place the handheld on a dust-free indoor surface.
- 
-

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# Introduction

## In this chapter:

- About the GeoExplorer 6000 series handheld
- What's in the box?
- Accessories
- Use and care of the handheld
- Technical assistance
- Your comments

The *GeoExplorer 6000 Series User Guide* describes how to set up and use the Trimble® GeoExplorer® 6000 series handheld. The information in this guide supplements the information in the *GeoExplorer 6000 Series Quick Start Guide*, which you received with the handheld.

This guide describes how to:

- use the Microsoft® Windows Mobile® version 6.5 operating system.
- use the handheld's integrated GNSS receiver.
- synchronize information between a computer and the handheld.
- exchange information between the handheld and other devices.
- connect to the Internet or to a computer network.
- use the integrated camera.

Even if you have used other Global Navigation Satellite System (GNSS) products before, Trimble recommends that you spend some time reading this guide to learn about the special features of the product. If you are not familiar with GNSS, go to the Trimble website ([www.trimble.com](http://www.trimble.com)) for more information.

## About the GeoExplorer 6000 series handheld

The GeoExplorer 6000 series includes the GeoXH™ and GeoXT™ handhelds. These handhelds combine a Trimble GNSS receiver with a field computer powered by Microsoft Windows Mobile version 6.5 operating system.

The GeoExplorer 6000 series handheld has built-in Bluetooth® wireless technology for cable-free connection to other devices, and Wi-Fi connectivity for connections to networks. In addition, some GeoExplorer 6000 series handheld editions are equipped with a wireless cellular modem for downloading and transmitting data over the Internet.

The GeoXT handheld uses EVEREST™ multipath rejection technology to provide submeter accuracy. The GeoXH handheld uses both EVEREST and H-Star™ technology to provide decimeter (10 cm) accuracy, either in real time or after postprocessing. In addition, both the GeoXH and GeoXT handhelds are compatible with Trimble Floodlight™ satellite shadow reduction technology for improved productivity in conditions where sky view is obstructed by buildings, trees, or landscape features. For more information, see [Chapter 5, Using the GNSS Receiver](#).



### Supported GNSS field software

To collect GNSS data with the GeoExplorer 6000 series handheld, you must install GNSS field software onto the handheld. You can use the GeoExplorer 6000 series handheld with the following GNSS field software:

- Trimble TerraSync™ software, for configuring real-time differential correction options and for productive GIS data collection and maintenance.
- The Trimble GPScorrect™ extension for Esri ArcPad software, for configuring real-time differential correction options and for productive GIS data collection and maintenance.
- Trimble GPS Controller software, for configuring real-time differential correction options and NMEA output settings.
- Other GNSS field software that accepts NMEA messages. To use NMEA Output messages, you must purchase and activate the NMEA output option. See [Activating the Floodlight technology and the NMEA output options, page 74](#)

For more information, see [Chapter 5, Using the GNSS Receiver](#).

## What's in the box?

When you unpack the GeoExplorer 6000 series handheld, check that you have received all the components:

- GeoExplorer 6000 series handheld
- Carry pouch
- AC adaptor kit
- Microsoft Getting Started CD and licence
- Anti-reflection screen protector kit
- USB data cable
- Hand strap kit
- Spare stylus and lanyard
- A sheet of device ID labels
- Rechargeable battery pack

Inspect all contents for visible damage (scratches, dents) and if any components appear damaged, notify the shipping carrier. Keep the shipping and packaging material for the carrier's inspection.

## Accessories

The following optional accessories are available:

- USB to serial converter cable
- Null modem cable<sup>1</sup>
- Hard carry case
- Range pole
- Range pole bracket
- Vehicle mounting bracket
- Tempest™ antenna<sup>2</sup>
- Tornado™ antenna<sup>3</sup>
- Pole-mountable ground plane
- Backpack kit
- Screen protectors (2 pack)
- Stylus kit
- GeoBeacon™ receiver (receives differential corrections from a beacon network)
- Replacement battery pack
- Replacement international AC adaptor
- Replacement carry pouch
- Replacement hand strap kit

<sup>1</sup>Requires USB to serial converter (sold separately)

<sup>2</sup>Compatible with GeoXH/XT handhelds for improved yield. Also improves accuracy for the GeoXT handheld only.

<sup>3</sup>Compatible with the GeoXH handheld for improved accuracy.

For more information, go to [www.trimble.com/geoxh.shtml](http://www.trimble.com/geoxh.shtml), or [www.trimble.com/geoxt.shtml](http://www.trimble.com/geoxt.shtml).

## Use and care of the handheld

To protect the GeoExplorer 6000 series handheld when not in use, Trimble recommends storing the handheld in the pouch provided.

When using the handheld:

- To protect the touch screen from pressure and abrasive objects, Trimble recommends that you apply one of the screen protectors provided with the GeoExplorer 6000 series handheld.
- Protect the touch screen by using your finger or the stylus provided, and avoid using excessive pressure and sharp or abrasive objects.
- Keep the outer surface free of dirt and dust.
- Ensure that protective covers and doors are appropriately fitted to the external antenna port, SIM, and storage card areas, so that they are kept free from dirt, dust, fluid ingress & electrostatic discharge (see [Storage cards, page 35](#)).
- Protect the handheld from extreme temperatures. For example, do not leave the handheld on the dashboard of a vehicle.
- When the battery is removed, the handheld is not waterproof. Avoid exposing the internals of the handheld to dust and moisture when removing the battery. Trimble recommends that you only swap the battery indoors or from inside a vehicle.
- Use the handstrap provided with the GeoExplorer 6000 series handheld.

To clean the handheld, wipe it with a clean dry cloth. Do **not** immerse the handheld in water.

## Storing the handheld

If you are not going to use the handheld for three months or more, Trimble recommends that you do not leave the handheld in Suspend mode (see [page 31](#)). Instead, partially charge the battery and then turn off the handheld.

To prepare the GeoExplorer 6000 series handheld for storage:

1. Transfer any data that you need to an office computer.
2. Charge the battery to approximately 30%.
3. Press the **Power** key for one second until the *Power* menu appears and then tap **Shutdown**.
4. Store the handheld at room temperature.

To use the GeoExplorer 6000 series handheld after storage:

1. Press the **Power** key to turn on the handheld.
2. Recharge the battery (see [Charging the battery, page 27](#)).

---

## Technical assistance

### Technical support

Go to the GeoExplorer 6000 series handheld technical support page ([www.trimble.com/geoxh\\_ts.asp](http://www.trimble.com/geoxh_ts.asp), or [www.trimble.com/geoxt\\_ts.asp](http://www.trimble.com/geoxt_ts.asp)) on the Trimble website for the latest support information about the software, including:

- support notes detailing support issues
- documentation
- the latest files available for download

### Additional help

If you still cannot find the information that you need, contact your Trimble reseller.

### Windows error reporting

If for any reason a Microsoft Windows Error Reporting dialog appears, indicating that the handheld or Trimble GNSS field software has encountered a problem and needs to close, you are prompted to send an error report to Microsoft.

Trimble recommends that you click **Send** and then click any subsequent links that are used to obtain additional information.

Trimble can access the report that is sent to Microsoft and use it to improve the GeoExplorer 6000 series handheld.

### Your comments

Your feedback about the supporting documentation helps Trimble to improve it with each revision. Email your comments to [ReaderFeedback@trimble.com](mailto:ReaderFeedback@trimble.com).



# Getting Started

## In this chapter:

- Parts of the GeoExplorer 6000 series handheld
- Keypad buttons
- Powering the handheld
- Turning on and turning off the handheld
- Resetting the handheld
- Storing data
- Installing and removing a SIM card
- Fitting the hand strap

This chapter describes the main features of the GeoExplorer 6000 series handheld, and provides the information you need to get up and running with the handheld.

## Parts of the GeoExplorer 6000 series handheld

The following diagrams show the main parts of the handheld.



Figure 2.1 Parts of the GeoExplorer 6000 series handheld

## Keypad buttons

The GeoExplorer 6000 series handheld has a keypad for fast, easy access to common actions. LEDs provide visual notifications of system events.



Figure 2.2 GeoExplorer 6000 series handheld keypad area



The function of each key is described below:

Key	Description
Power key	Press briefly (less than one second) to turn on the handheld, or to turn off the handheld (put it into Suspend mode). To access other power options, or to reset the handheld, press and hold for one second until the <i>Power</i> menu appears (see <a href="#">Turning on and turning off the handheld, page 31</a> , or see <a href="#">Resetting the handheld, page 33</a> ).
Left and right soft keys	By default these keys perform the same action as the left and right softkeys in the tile bar. Alternatively, program these keys to perform a selected action. To program the keys, use the Buttons control (see <a href="#">Buttons, page 46</a> ).
Camera Control key	Press to activate and operate the camera (see <a href="#">Chapter 7, Using the Camera</a> ).



**Tip** – To lock the screen and handheld keys without turning off the handheld, use the device lock option (see [Device lock, page 49](#)).

The function of each LED is described below:

Key	LED	Description
Battery status		Battery charging is complete.
		Battery is charging.
	...	Battery level is critically low (<5% remaining).
		Battery fault.
GNSS receiver status	...	Receiver is on, and GNSS positions are available.
	...	Receiver is on, but GNSS positions are not available.
Wireless radio status	...	A wireless radio is turned on.

## Powering the handheld

The GeoExplorer 6000 series handheld contains a removable rechargeable Lithium-ion battery.

**Note** – Charge the battery completely before using the handheld for the first time. If the battery has been stored for longer than six months, charge it before use. Trimble recommends charging the battery for five hours to recharge it fully.

When fully charged, the handheld battery provides enough power for a full working day (10 hours) using the internal GNSS antenna and with the backlight on at the default settings.

**Note** – Cold temperatures, or using Bluetooth wireless technology, Wi-Fi, or the wireless cellular modem consumes additional battery power and so shortens battery life between charges.

## AC adaptor safety



**WARNING** – To use AC adaptors safely:

- Use only the AC adaptor intended for the GeoExplorer 6000 series handheld. Using any other AC adaptor can damage the handheld and may void your warranty. Do not use the AC adaptor with any other product.
  - Make certain that the input voltage on the adaptor matches the voltage and frequency in your location.
  - Make certain that the adaptor has prongs compatible with your outlets.
  - Do not use the AC adaptor in wet outdoor areas; it is designed for indoor use only.
  - Unplug the AC adaptor from power when not in use.
  - Do not short the output connector.
  - Be aware that there are no user-serviceable parts in this product.
  - If the AC adaptor becomes damaged, replace it with a new Trimble AC adaptor.
- 

## Battery safety



**WARNING** – Do not damage the rechargeable Lithium-ion battery. A damaged battery can cause an explosion or fire, and can result in personal injury and/or property damage.

To prevent injury or damage:

- Do not use or charge the battery if it appears to be damaged. Signs of damage include, but are not limited to, discoloration, warping, and leaking battery fluid.
  - Do not store or leave your device near a heat source such as near a fireplace or other heat-generating appliance, or otherwise expose it to temperatures in excess of 70 °C (158 °F) such as on a vehicle dashboard. When heated to excessive temperatures, battery cells could explode or vent, posing a risk of fire.
  - Do not immerse the battery in water.
  - Do not use or store the battery inside a vehicle during hot weather.
  - Do not drop or puncture the battery.
  - Do not open the battery or short-circuit its contacts.
- 



**WARNING** – Avoid contact with the rechargeable Lithium-ion battery if it appears to be leaking. Battery fluid is corrosive, and contact with it can result in personal injury and/or property damage.

To prevent injury or damage:

- If the battery leaks, avoid contact with the battery fluid.
  - If battery fluid gets into your eyes, immediately rinse your eyes with clean water and seek medical attention. Do not rub your eyes!
  - If battery fluid gets onto your skin or clothing, immediately use clean water to wash off the battery fluid.
  - Do not open the battery or short-circuit its contacts.
- 



**WARNING** – Charge and use the rechargeable Lithium-ion battery only in strict accordance with the instructions. Charging or using the battery in unauthorized equipment can cause an explosion or fire, and can result in personal injury and/or equipment damage.

To prevent injury or damage:

- Do not charge or use the battery if it appears to be damaged or leaking.
- Charge the Lithium-ion battery only in a Trimble product that is specified to charge it. Be sure to follow all instructions that are provided with the battery charger.
- Discontinue charging a battery that gives off extreme heat or a burning odor.

- Use the battery only in Trimble equipment that is specified to use it.
- Use the battery only for its intended use and according to the instructions in the product documentation.

## Inserting the battery

To insert the battery into the handheld:

1. Slide the battery into the cavity with the label facing upwards (as shown in [Figure 2.3](#)).
2. Push the battery in until it clicks into place.



**CAUTION** – Make sure that the battery is fully inserted and that both the left and right latches are fully engaged. If the battery is not properly inserted, it may fall out if the device is dropped.



Figure 2.3 Inserting the battery

**Note** – Charge the battery completely before using the handheld for the first time. If the battery has been stored for longer than six months, charge it before use. Trimble recommends charging the battery for five hours to recharge it fully.

## Charging the battery

Charge the battery in the handheld, or, if you have a spare battery, you can charge it outside the handheld.

To charge the battery:

1. Connect one end of the AC adaptor cable to the battery and the other to an AC power outlet. An international adaptor kit is provided with the handheld.
2. Turn off the handheld or put the handheld in Suspend mode (see [page 31](#)).





**Note** – Trimble recommends that you charge the handheld at or below normal room temperature (0 to 30 °C / 32 to 86 °F).


3. Leave the battery to charge. It may take up to five hours for the handheld to charge completely.

When the handheld is charging, the Power LED on the handheld is solid orange. If the Power LED changes to red, a battery charging fault has occurred. For more information, see [page 28](#).

When fully charged, the Power LED is green.

The Power LED on the keypad on the handheld indicates the battery power or charging status, as shown below:


Power source	LED state	Handheld/battery state
Battery power	Off	Handheld is turned off or is in Suspend mode.
	Off	Handheld is turned on and battery level is good.
		Flashing red: Handheld is turned on and battery level is critically low (<5%).
External power		Solid orange: Battery is charging.
		Solid red: Charging fault - for example, there is a problem with the battery, or the temperature of the battery has exceeded the acceptable temperature range.
		Solid green: Charging is complete.

**Note** – During normal charging, the battery may become hotter than the maximum temperature allowed (40 °C or 104 °F). If this happens, charging is automatically suspended until the battery cools and then charging automatically restarts. During this time the battery icon in the title bar shows , to indicate that the handheld is running on external power. It may take about one hour for the battery to cool.


Avoid keeping the battery at full charge at high temperatures. For more information, see [Storing the handheld, page 20](#).


**Note** – The life of the battery can be significantly shortened if power is constantly supplied to the handheld. To avoid this issue, connect the handheld to an external power source only when the battery requires charging. Once fully charged, disconnect the external power source and allow the battery to discharge through normal use.

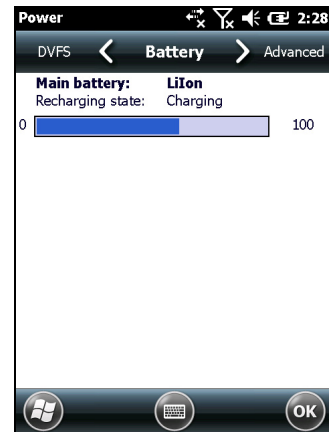
### Checking the level of battery power

To check the level of battery power remaining at any time while the device is running, tap the battery icon in the title bar of the *Home* screen and then tap  in the pull-down list.

The Power control appears, displaying the *Battery* tab.


When the handheld battery is recharging from an external power source, the battery icon in the *Home* screen changes to . You can still tap the icon to view the level of battery power.

To check the level of battery power remaining on a spare battery or one that is not inside the handheld, press the battery icon  on the battery pack label. The level of charge indicator will light up with the approximate level of battery power remaining on the battery. Each LED represents a 20% increment in battery capacity.



### Low battery indicators

When the battery level reaches:

- 15%, the battery icon in the title bar of the *Home* screen changes to .
- 10%, the Power LED on the handheld flashes red and the **Main battery low** message appears on the handheld.
- 5%, the **Main battery very low** message appears on the handheld.

Trimble recommends that you recharge the battery when any of these indicators appear.

### Swapping the battery

If the battery runs low while you are working, you can swap the battery without the need to close files and shut down the handheld, and can resume working straight away.

1. Save any open files.
2. Ensure that you have a spare battery close by with sufficient charge to keep working (see [Checking the level of battery power, page 28](#)).
3. Turn off the handheld or put the handheld in *Swap Battery* mode (see [page 32](#)).



**CAUTION** – In Swap Battery mode, the battery LED shows as a red warning. When the device is ready, the red LED turns off, and the battery can be safely swapped. Generally the red LED will only display for half a second or less, but it may display for three seconds or so. Do not remove the existing battery until the red LED turns off. Removing the battery when the red LED warning light is still on will make the device reboot when the battery is swapped. Do not remove the existing battery until the red LED turns off.

4. Remove the old battery by pinching the battery latches together until the battery is ejected. Slide the battery out.



**CAUTION** – The handheld is not sealed from water and dust when the battery is removed. Trimble recommends only removing the battery for short periods of time and only removing the battery indoors or from inside the protection of a vehicle.

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5. Insert the new battery (see [Inserting the battery, page 27](#)).



**CAUTION** – The handheld has enough power to keep the device running for approximately 30 seconds with the battery removed. If the power drains before the battery is restored the device will shut down. Trimble recommends saving open files before swapping the battery.

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6. Press the **Power** key to resume your session.

## Conserving power

Although the handheld battery can operate for a full day without recharging, Trimble recommends that you do the following to reduce power consumption:

- Set the handheld to automatically turn off when idle. For more information, see [Suspend mode, page 31](#).
- Set the backlight to automatically turn off when the handheld is idle for a specified time. For more information, see [Backlight, page 51](#).
- Turn off the integrated Bluetooth, Wi-Fi, and wireless cellular modem radios whenever you are not using them. For more information, see [Turning on and turning off the integrated radios, page 80](#).
- Disconnect from the integrated GNSS receiver when GNSS data is not required, using the application's Disconnect or Deactivate GNSS command. When you disconnect from GNSS, the integrated GNSS receiver switches off and stops drawing power.

**Note** – Do not disconnect from GNSS if you will be reconnecting within about five minutes. A GNSS application can take up to 30 seconds to reactivate the integrated GNSS receiver, so disconnecting to save power can cost time.


## Turning on and turning off the handheld

If the screen on the handheld is blank, the handheld is in Suspend mode or *Battery Change* mode (see [page 31](#)) or has been shut down. To turn on the handheld, press the **Power** key briefly (less than one second).

To turn off the handheld and put the handheld into Suspend mode, press the **Power** key briefly (less than one second). The handheld is placed in a very low power state, but the Bluetooth and wireless cellular modem radios may remain active (see [Suspend mode, page 31](#))


To completely shut down the handheld, press the **Power** key for one second until the *Power* menu appears and then tap **Shutdown**. All running applications are shut down, and the handheld is completely turned off.

The options available from the *Power* menu are as follows:

Button	Used to...
Power Settings	quickly access the Power Settings menus.
Backlight Settings	quickly access the Backlight Settings menus.
Swap Battery	put the handheld into <i>Swap Battery</i> mode. This is a low-power mode. The handheld, the integrated receiver, and all wireless radios are turned off, and you cannot operate the handheld.
Shutdown	put the handheld into Shutdown mode. Applications are shut down and the handheld is completely turned off.
Reset	restart the handheld. If the handheld stops responding to the stylus, or if it does not respond when you press any of the keypad buttons, try a soft reset. For more information, see <a href="#">Resetting the handheld, page 33</a> .
	access the Align Screen Sequence. You can also press the left application key to access the Align Screen Sequence. If at any time the touch screen does not respond correctly to stylus taps, start the screen alignment sequence and follow the on-screen instructions.

## Suspend mode

When you press the **Power** key to turn off the handheld, the handheld goes into Suspend mode. This is a low-power mode that maintains the main memory contents and keeps applications running but does not allow you to operate any of the handheld's functions. The handheld appears to be turned off. The integrated GNSS receiver is turned off and any application using GNSS is disconnected.

If a wireless radio is turned on (the  LED is flashing), the Wi-Fi radio will be turned off, and the Bluetooth and wireless cellular modem radios will remain turned on. The handheld is capable of receiving data via Bluetooth or the cellular modem radio while it is in Suspend mode. The handheld is able to automatically wake up to calendar alarms if it is in Suspend mode.




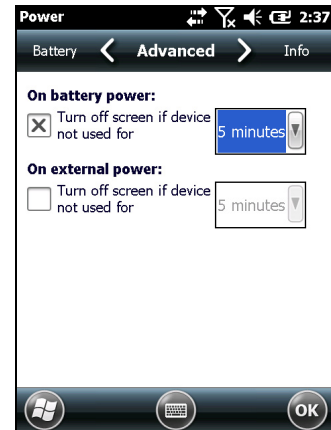
**CAUTION** – To save battery power, use the Wireless Manager to turn off the wireless radios before you place the handheld into Suspend mode.

To turn on the handheld when it is in Suspend mode, press the **Power** key. The handheld is immediately ready for operation. There may be a delay of up to 30 seconds while the integrated GNSS receiver and the Wi-Fi radio automatically reactivate.

You can configure the handheld to automatically enter Suspend mode when it has been idle for a specified time. By default, the handheld is set to enter Suspend mode if it is not used for one minutes.

To change the time before the handheld enters Suspend mode:

1. Tap the title bar of the *Home* or the *Start* screen and then tap . The Power control appears, displaying the *Battery* tab.
2. Tap the *Advanced* tab.
3. From the *On battery power* option, select the *Turn off screen if device not used for* check box and then select the idle time from the drop-down list.
4. Tap **OK**.



## Swap Battery mode

Swap Battery mode is a low power mode that allows you to remove an empty battery and replace it with a fresh battery without closing files and applications; it maintains the main memory contents and keeps applications running but does not allow you to operate any of the handheld's functions. The handheld appears to be turned off. The integrated GNSS receiver is turned off and any application using GNSS is disconnected. All wireless radios are powered down and the device is unable to be automatically woken up.

When in Swap Battery mode, the handheld operates on backup power with the battery removed. From the time that the battery is removed, you have approximately 45 seconds to replace the battery before the backup power supply is consumed and the handheld shuts down.

To switch to Swap Battery mode, press and hold the **Power** key and then tap **Swap Battery** on the *Power* menu. The battery LED shows as a red warning. When the device is ready, the red LED turns off, and the battery can be safely swapped. Generally the red LED will only display for half a second or less, but it may display for three seconds or so. Do not remove the existing battery until the red LED turns off.




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**CAUTION** – Removing the battery when the red LED warning light is still on will make the device reboot when the battery is swapped. Do not remove the existing battery until the red LED turns off.

---



To turn on the handheld when it is in Swap Battery mode, ensure that the battery is correctly installed and then press the **Power** key. The handheld is immediately ready for operation. There may be a delay of up to 30 seconds while the integrated GNSS receiver automatically reactivates.

The wireless radios will not automatically reactivate; use the Wireless Manager to manually turn on the wireless radios.

## Resetting the handheld

If the screen on the handheld is blank, the handheld has turned off. Press the **Power** button to turn on the handheld.

If the handheld stops responding to the stylus, or if it does not respond when you press any of the keypad buttons, you may need to reset it by performing a soft or hard reset.

You can also reset the handheld to its factory default settings by performing a factory reset.

### Performing a soft reset

A soft reset is similar to restarting a computer. A soft reset retains all settings and device data that you have previously saved on the handheld. The handheld saves any unsaved data, closes all open applications, and then restarts.

To perform a soft reset, press the **Power** key for one second until the *Power* menu appears and then tap the **Reset** button.



### Performing a hard reset

A hard reset retains settings and data that you have previously saved on the handheld. However, any unsaved data may be lost.

*Note – Perform a hard reset only if a soft reset does not resolve the problem.*

To perform a hard reset, press and hold the **Power** key until the boot screen appears and then release the **Power** key.

## Resetting to factory default settings

Reset the handheld to factory default settings to restore the handheld to its original state, or only if a soft reset and then a hard reset does not resolve the problem.



**CAUTION** – Resetting the handheld to factory default settings erases **all** data, installed applications, and settings stored in the handheld, except for any data or applications that were pre-installed on the handheld or are stored on a storage card. It does not change the language of the operating system used on the handheld.



**CAUTION** – If you have encrypted files on a storage card and you reset the handheld to factory default settings, the encryption key on the handheld is deleted. This means that any files you have encrypted on a storage card are permanently locked and unreadable by any device. For more information, see [Encrypting files on storage cards, page 36](#).



**Tip** – To quickly and easily restore data deleted by performing a factory reset, synchronize the handheld with a computer **before** you reset the handheld to the factory default settings. Once the handheld is reset then resynchronize the handheld with the computer.

To reset the handheld to the factory default settings:

1. Press and hold the two application keys on the handheld.
2. While holding the application keys, press and hold the **Power** key until the device reboots.




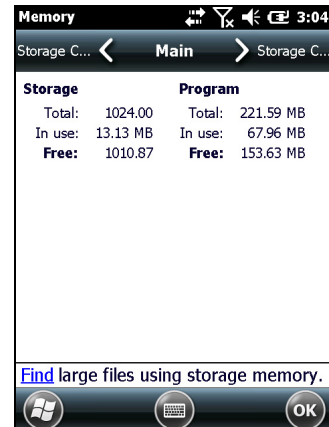
3. Keep holding the two application keys until the factory reset screen appears.
4. Follow the on-screen instructions to continue the factory reset.

## Storing data

The handheld has two types of memory:

- Storage memory is similar to the hard disk in a computer, and is used for storing programs and data.
- Program memory is similar to the RAM in a computer, and is used for running programs. You cannot use it to save data.

To check the storage capacity on the handheld, tap  / *Settings* / *System* / *Memory*. The Storage and Program columns show the current memory available, and the memory that is already in use.



Storage	Program
Total: 1024.00	Total: 221.59 MB
In use: 13.13 MB	In use: 67.96 MB
Free: 1010.87	Free: 153.63 MB

[Find large files using storage memory.](#)

Pre-installed documents and program files are not affected by power loss or resetting. However, you can still lose data if you accidentally delete or overwrite it.



**CAUTION** – The Windows Mobile version 6.5 operating system does not include a Recycle Bin. When you delete files from the handheld, they are deleted permanently.

Trimble recommends that you regularly copy important data to an office computer. For more information, see [Connecting to an Office Computer, page 55](#).

## Storage cards

As an alternative to internal storage, you can save data to a removable card. Use either an SD or SDHC (high capacity SD) card to securely transfer data to and from another device that supports SD or SDHC cards.

**Note** – *The GeoExplorer 6000 series handheld does not support SDIO (Secure Digital Input/Output) or SDXC (Secure Digital Extended Capacity) cards.*



**WARNING** – The presence of any dust or moisture in the storage card slot may adversely affect the device and void your Trimble warranty. To prevent dust or moisture entering the storage card slot:

- Make certain that the storage card slot door is attached correctly when you are using the handheld outdoors.
- When inserting or removing a storage card, place the handheld on a dust-free indoor surface.



**WARNING** – Static electricity can harm electronic components inside the handheld. To prevent static damage:

- Discharge static electricity from your body before you touch any of the electronic components inside your device, such as a memory module. You can do so by touching an unpainted metal surface.

To insert an SD or SDHC card:

1. Place the handheld on a dust-free indoor surface.
2. Flip open the storage card slot door on the side of the handheld.

3. Insert the storage card into the storage card slot with the gold contacts facing down. Gently press the card until you hear a click, and the card is locked into place.
4. Close the storage card slot door.

When you select the *Save As* option in an application, the storage card appears in the list of available storage locations.

**Note** – Do not store required data or applications to a storage card if the card will be removed. Data saved to a storage card is available only when the card is inserted in the handheld.

To remove the storage card from the storage card slot, gently press the card in and then let go. The card pops out.

### Encrypting files on storage cards

To prevent sensitive data on an SD or SDHC card from being used if the card is lost or stolen, files can be encrypted as they are placed on the card.

When encryption is enabled, an encryption key is stored on the handheld. Files are encrypted as they are copied or written to the storage card. Files already saved on storage cards before enabling encryption are not automatically encrypted.

**Note** – Because the encryption key is stored on the handheld, encrypted files are only readable on the handheld on which they are initially encrypted. It is not possible to read encrypted files on the storage card with any other device, including another GeoExplorer 6000 series handheld or an office computer.




---

**CAUTION** – If you reset the handheld to the factory default settings, the encryption key is deleted and the handheld is no longer able to read any encrypted files on a storage card. This means that any files you have encrypted are permanently locked and unreadable by any device. To avoid being unable to read previously encrypted files, Trimble recommends that you use another device, such as an office computer, as the primary location for storing important data and to control the encryption of important files.

---

To enable encryption of files as they are written to a storage card:

1. Tap  / *Settings* / *System* / *Encryption*.
2. Select the *Encrypt files when placed on a storage cards* check-box.

**Note** – Encrypted files appear as ordinary files on the handheld they were encrypted on. If the storage card is inserted in another device, the files appear with a *.menc* file extension and cannot be opened.

To disable encryption, clear the *Encrypt files when placed on a storage cards* check-box.

**Note** – Disabling encryption does not remove encryption from any existing files on the storage card, but ensures that new files placed onto the storage card are not encrypted.

To encrypt files that are already stored on a storage card:

1. Copy the files to the handheld's internal storage or to an office computer.
2. Ensure encryption is enabled on the handheld.

3. Copy the files back to the storage card. The files are encrypted as they are written to the storage card.

To remove encryption from files so they can be read by other devices:

1. Insert the storage card in the handheld and then connect the handheld to an office computer using Microsoft ActiveSync® technology or the WMDC.
2. Copy the encrypted files from the storage card to the office computer.
3. To use the decrypted files on the handheld, copy the files from the office computer to the handheld's internal storage.
4. To store the decrypted files on a storage card, ensure encryption is not enabled on the handheld and then copy the decrypted files from the office computer to the storage card.

## Installing and removing a SIM card

The GeoExplorer 6000 series 3.5G edition handhelds are equipped with a cellular modem. To use the integrated modem, the 3.5G edition handhelds require a SIM card.



**CAUTION** – The SIM card and its contents can be easily damaged by scratches or bending.



**CAUTION** – The presence of any dust or moisture in the SIM card slot may adversely affect the device and void your Trimble warranty. To prevent dust or moisture entering the SIM card slot:

- Make certain that the SIM card slot door is attached correctly when you are using the handheld outdoors.
- When inserting or removing a SIM card, place the handheld on a dust-free indoor surface.



**CAUTION** – Static electricity can harm electronic components inside the handheld. To prevent static damage, discharge static electricity from your body before you touch any of the electronic components inside your device, such as a memory module. You can do so by touching an unpainted metal surface.

To insert a SIM card:

1. Turn off the handheld.
2. Place the handheld on a dust-free indoor surface.
3. Flip open the SIM card slot door on the side of the handheld.
4. Insert the card into the SIM card slot with the gold contacts facing down. Gently press the card until you hear a click, and the card is locked into place.
5. Close the SIM card slot door.

To remove the SIM card:

1. Follow steps 1 to 3 above.
2. Gently press the card in and then let go. The card pops out.

3. Gently slide the card out of the slot.

## Fitting the hand strap

The hand strap and screws are provided in the box with the handheld. To fit the hand strap:

1. Align the upper hand strap bracket with the two mounting holes and then use a coin or screwdriver to tighten the screws.
2. Stretch the hand strap to align the bottom hand strap bracket with the mounting hole and then use a coin or screwdriver to tighten the screw.

# Using the Windows Mobile Operating System

## In this chapter:

- Parts of the screen
- Interacting with the handheld
- Status indicators
- Pre-installed programs
- Entering information
- Personalizing the handheld
- Messaging

The GeoExplorer 6000 series handheld is powered by the Windows Mobile 6.5 operating system.

This chapter describes the main features of this generation of the Windows Mobile operating system.

## Parts of the screen

The main parts of the *Home* screen and the *Start* screen are shown below.

**Home screen**  
Provides access to the key functions on your device. Scroll, and tap any item to open it.



**Title bar**  
Contains status icons for important system functions.

**Start button**  
Tap to open the Start screen, where you can access programs and system controls.



**Tile bar**  
Contains touchable tiles providing access to applications, menus, and notifications.

**Start screen**  
Tap any item on the menu to open it.



**Connectivity icons**  
Tap either icon to access the Wireless Manager.

**Lock device**  
Tap to lock the screen. Once locked, you have multiple points of unlock entry depending on the current status.









**Pull-down list**  
Tap anywhere on the title bar to open the title bar pull-down list, where you can access connectivity controls (the Wireless Manager), battery information, time and date settings, and volume.




## Status indicators



Status indicators that appear in the title bar at the top of the screen are as follows:


### Battery status indicators

Icon	Description
	Battery has full charge
	Battery has high charge
	Battery has medium charge
	Battery has low charge
	Battery has very low charge (20% or less)
	Battery charging/using external power

The battery status icon on the title bar of the *Home* screen or the *Start* screen shows the status of the battery charge. Tap the title bar and then on the pull-down list tap the  icon to access the Power control dialog. See [Checking the level of battery power](#), page 28.

### Speaker status indicators

Icon	Description
	Speaker is on
	Speaker is off

The speaker status icon on the title bar of the *Home* screen or the *Start* screen shows the status of the speaker. Tap the title bar and then on the pull-down list tap the  icon to adjust the volume and to turn the speaker on or off.



















## Network and modem status indicators

Icon	
	Connected to ActiveSync or the Windows Mobile Device Center (WMDC) on a computer
	Connected to a Bluetooth-enabled phone
	Disconnected from ActiveSync or WMDC
	Disconnected from a Bluetooth-enabled phone
	Wi-Fi radio is on
	Wi-Fi is detected
	Connected to a wireless network
	Maximum cellular modem signal strength
	No cellular modem signal
	Cellular modem is turned off
	No cellular service
	Searching for cellular modem service
	Data is transferring using the cellular modem
	No SIM card
	UMTS network is available
	UMTS network is connecting
	UMTS connection is active
	3G+ network is available
	Analog network is available
	EDGE network is available
	EDGE network is connecting
	EDGE connection is active
	GPRS network is available
	GPRS network is connecting
	GPRS connection is active
	HSDPA network is available
	HSDPA network is connecting
	HSDPA connection is active

The network and modem status icons on the title bar of the *Home* screen or the *Start* screen show the status of each radio. Tap the title bar and then on the pull-down list tap the or icon. In the Connectivity or Phone dialog, select Wireless Manager and turn on or turn off the radio.

## Pre-installed programs

Programs that are pre-installed on the GeoExplorer 6000 series handheld are as follows:

Program	Function
 ActiveSync	Synchronize information between the handheld and a computer.
 Adobe Reader LE	Read PDF documents.
 Alarms	Set alarms.
 Calculator	Perform basic arithmetic functions.
 Calendar	Keep track of appointments and arrange meetings.
 Contacts	Keep track of your friends and colleagues.
 File Explorer	View and manage files.
 Internet Explorer	Browse the World Wide Web.
 Email	Write, send, and receive email messages.
 Messenger	Send instant messages using Windows Live™ Messenger.
 Notes	Create handwritten, typed, or recorded notes.
 Office Mobile 2010	Provides access to these Office Mobile applications: Excel® Mobile 2010, PowerPoint® Mobile 2010, OneNote® Mobile 2010, SharePoint Workspace Mobile 2010, and Word Mobile.
 Pictures and Videos	Take, view, and edit pictures, or record and launch video clips.
 Search Device	Search for a file or item stored on the handheld.
 Tasks	Keep track of your tasks.
 Text	Send, receive, and organize text messages
 Windows Live	Access Windows Live services, including email, instant messenger and Internet search.
 Windows Media	Play Windows Media® or MP3 audio and video files.

## Interacting with the handheld

To interact with the handheld, use the stylus or your finger to tap items on the touch screen, or to scroll up or down.

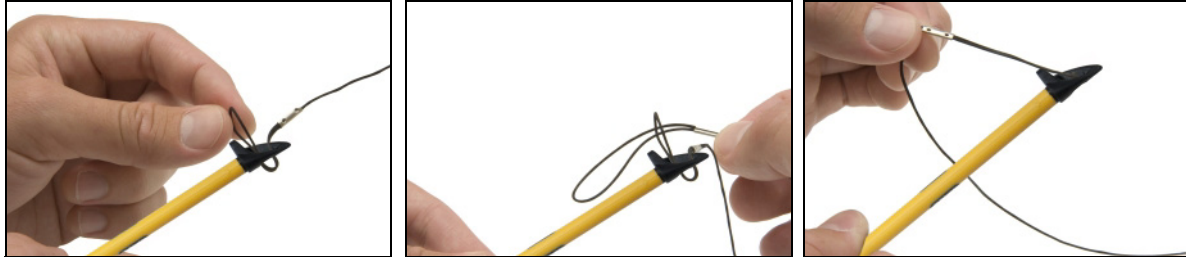
Action	Definition
Tap	Touch the screen once to open items and select options.
Tap and hold	Tap and hold the stylus on an item to see a list of actions available for that item. On the pop-up menu that appears, tap the action you want to perform.
Drag	Hold the stylus on the screen and drag across the screen to select text and images. Drag in a list to select multiple items.
Flick	Flick the stylus or you finger over the screen to scroll a page or a list up or down.

If at any time the touch screen does not respond correctly to stylus taps or your finger, realign it. For more information, see [Screen, page 50](#).

The stylus is located on the rear of the handheld. To remove the stylus from its holder, slide the stylus downwards.

To attach a tether to the stylus:

1. Hold the stylus with the Trimble logo facing upwards and insert the end of the tether down through one of the two holes in the top of the stylus and then back up through the other hole.



2. Insert the other end of the tether through the loop and pull until the knot in the tether is tight.
3. Attach the tethered stylus to the handheld as described below.

To attach a tethered stylus to the handheld, feed the end of the tether through the top of the stylus retainer on the rear of the handheld and then feed the end of the stylus through the loop until the knot in the tether is tight.

## Entering information

Depending on the program you are using, you can enter information in several ways, as described below:

Input method	Description
Synchronizing	Use Microsoft connection management software to exchange information between the handheld and an office computer. For more information, see <a href="#">Chapter 4, Connecting to an Office Computer</a> .
Typing	Use the Keyboard input panel to enter typed text by tapping keys on the on-screen keyboard.
Drawing	Use the stylus like a pen to draw (or write) directly on the screen.
Recording	Create a stand-alone recording or embed a recording into a note.

## Using the on-screen keyboard

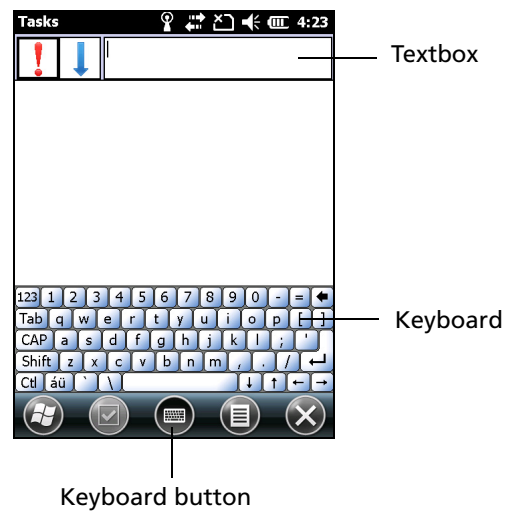
The keyboard button automatically appears in the tile bar of any application.

To display the keyboard, tap the keyboard button, or tap a text box in the application.

To enter characters, use your finger or the stylus to tap the keys on the keyboard. When you finish entering text in a field, tap **Tab** to accept the text you have entered and then move to the next field.

To enter special characters, tap **123** to display keyboards containing numbers and symbols. To switch back to the main keyboard, tap **123** again.

To hide the keyboard, tap the keyboard icon again.

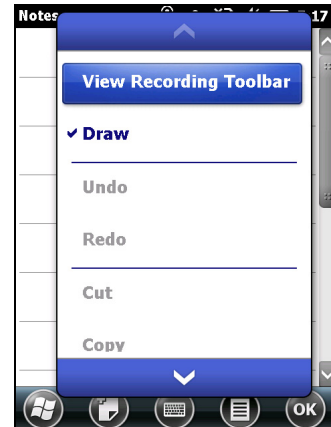


**Tip** – To make the keys larger, tap **Windows** / Settings / Personal / Input. In the *Input method* list, select Keyboard and then tap **Large Keys**.

## Drawing and writing directly on screen

In some applications, for example Notes, you can draw (or write directly) on the screen using the stylus.





1. Tap **Windows** and then tap the Notes icon.
2. Tap the Menu **Menu** icon.
3. Select Draw.
4. Use the stylus to write or draw on the screen.

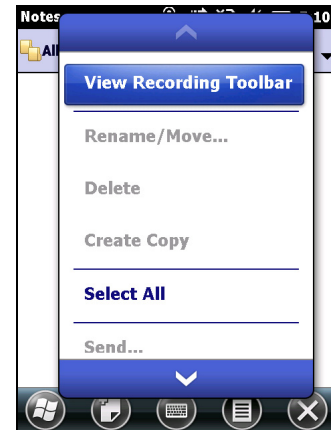


## Making a recording

You can create a stand-alone voice note or you can add a recording to a note. Then you can work with voice notes in the same way that you work with notes.

To make a recording:

1. Tap  and then tap the Notes icon.
2. Tap the Menu  icon.
3. Do one of the following:
  - To create a stand-alone recording, in the screen displaying the list of notes, tap the Record button  to begin recording.
  - To add a recording to a note, create or open a note and then tap the Record button  to begin recording.




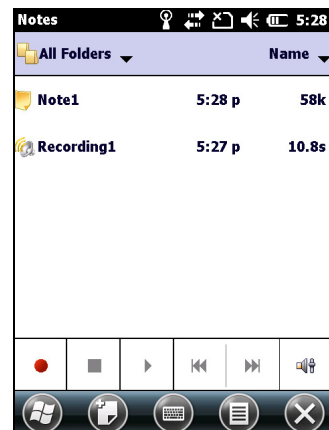
**Note** – The GeoExplorer 6000 series handheld microphone is on the front of the handheld, in the keypad area. The microphone will capture voice notes when you are holding the handheld in front of you. In noisy environments, you may need to move the handheld closer to you or to the source of the sounds you want to record.

4. When you finish recording, tap the Stop button .

If you are creating a stand-alone recording, an icon appears in the note list.

If you are recording in an open note, an icon appears in the note. Tap **OK** to return to the note list.

To play a recording, tap the recording in the note list or open the note and then tap the  icon in the note.



## Personalizing the handheld

Use the controls in the *Settings* area to customize the handheld. The following examples describe controls that are available.

### Buttons


Use the *Buttons* control under *Personal* settings to assign the action you want to be performed when you press the left or right application key.

By default, these keys perform the same action as the left and right tiles in the tile bar. Alternatively, program these keys to perform a selected action.

Application buttons can be programmed to perform one of the following types of actions:

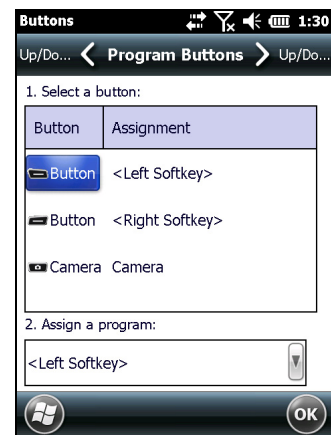
- Run a selected application, for example Messaging or Calendar.
- Act as a software button, for example an OK/Close button or a scroll button.
- View a selected screen, or part of a screen, for example return to the *Home* screen or launch the Context menu or Input panel.

To open the *Buttons* control:

- Tap  / *Settings* / *Personal* / *Buttons*.

To specify an action for the button:

1. Tap the *Program Buttons* tab.
2. Tap a button in the list to select it.
3. From the *Assign a program* drop-down list, select the action you want to occur when you press the button or tap the softkey.
4. Tap **OK**.




## Home

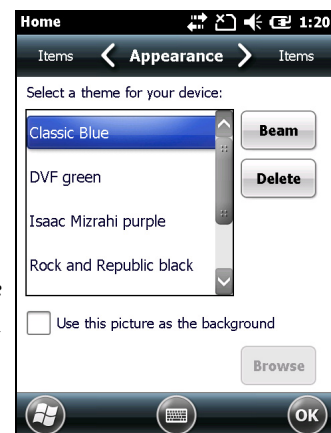
Use the *Home* settings to change the display theme that controls the appearance of the *Home* screen, and to customize how items appear on the *Home* screen.

### Appearance

You can use a theme to customize the background picture on the *Home* screen, the color of the title and tile bars, menus, and messages.

To change the display theme:

1. Tap  / *Settings* / *Home*.
2. Tap the *Appearance* tab.
3. Do one of the following:
  - To use a predefined theme, select it from the list.
  - To select the picture that you want to display in the *Home* screen background, select the *Use this picture as the background* check box. Then tap **Browse** to search for a file on the handheld.
4. Tap **OK**.




## Items


You can choose between:

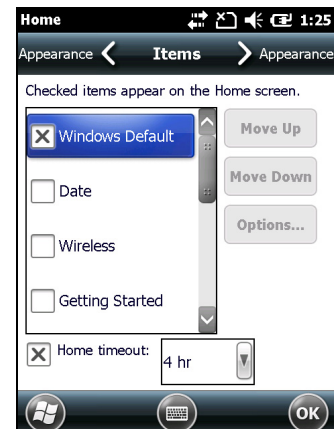
- the Windows default *Home* screen view, which allows you to flick through the list of entries, giving access to functions such as email, text messaging, current time, and Internet Explorer.
- customising which items appear on the *Home* screen and the order in which they appear.

To use the default *Home* screen view:


1. Tap  / *Settings* / *Home*.
2. Tap the *Items* tab.
3. Select the *Windows Default* check box.
4. Tap **OK**.

To customise the items which appear on the *Home* screen:

1. Tap  / *Settings* / *Home*.
2. Tap the *Items* tab.
3. Select or clear the check boxes to show or hide the *Home* screen items.
4. Use the **Move Up** and **Move Down** buttons to change where the selected item appears on the *Home* screen.
5. Tap **OK**.

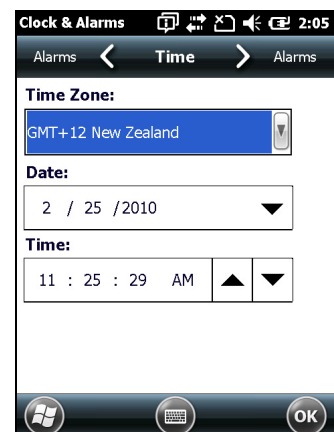


## Set the time and date

1. On the *Home* screen, tap the clock item, or tap the title bar and then on the pull-down list, tap the clock icon . The *Clock & Alarms* screen appears.
2. Tap the *Time* tab.
3. In the *Time Zone* field, select the required time zone from the dropdown list.
4. In the *Date* field, tap the down arrow and then select the correct date.

**Tip** – On the calendar which appears, tap on the month or year to select the required value.

5. In the *Time* field, tap in turn the hour, minute, and second values and then tap the up or down arrows to set the correct time.





## Device lock

Tap the *Device Lock* icon on the *Start* screen to lock the screen and keypad while the handheld remains turned on.


Once the handheld is locked, the screen and most of the keys do not respond until the handheld is unlocked. The exception is the **Power** key, which always respond when pressed.

Communication with external devices such as a GNSS receiver, or external sensors used by GNSS field software, is not interrupted by locking the handheld. This means that you can keep using the GNSS field software when the handheld is locked. For example, you could lock the device so that you can safely transport it between features, while keeping the software connected to the GNSS receiver so that you can continue recording GNSS positions.

The lock screen provides multiple unlock sliders for different applications, when there are new notifications. For example, if a new email has arrived, an email unlock slider takes you straight to the email.



To unlock the device, slide the *Unlock* icon for the required application to take you straight to that application.



You can help to keep your data secure by requiring a password each time the handheld is turned on. Tap  / *Settings* / *Lock* to set a password or to change password settings.

## Power

To open the *Power* control, do one of the following:


- Tap the title bar of the *Home* screen or the *Start* screen, and then tap .
- Tap  / *Settings* / *Power*.

Tap the *Battery* tab to check the battery level (see [Checking the level of battery power, page 28](#)).

Tap the *Advanced* tab to set the time before the handheld turns off when idle (see [Suspend mode, page 31](#)).

## Sounds and notifications

Use the *Sounds & Notifications* control to set preferences for the speaker volume and system sounds. To open the *Sounds & Notifications* control:

- Tap  / *Settings* / *Sounds & Notifications*.

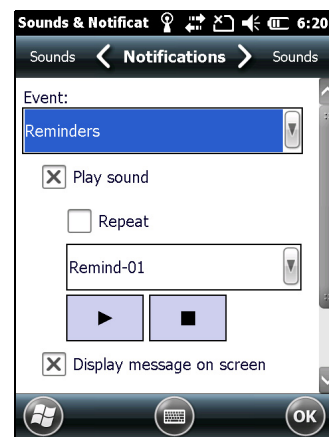
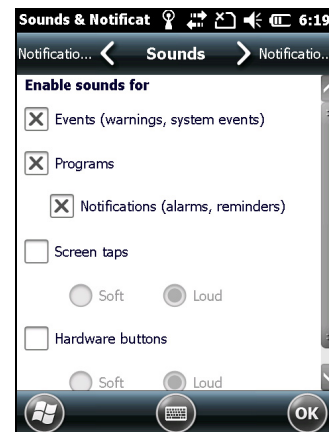
To turn on or turn off sounds:

1. Tap the *Sounds* tab.
2. Select or clear the check boxes to enable or disable categories of sounds.
3. If you select the *Screen taps* or *Hardware buttons* check boxes, select the *Soft* or *Loud* option to control the volume of the sounds.
4. Tap **OK**.

You can use predefined schemes to customize sounds, or you can create your own sound schemes.


To specify a sound scheme:

1. Tap the *Notifications* tab.
2. From the *Event* drop-down list, select an event.
3. Select the type of notification you want to receive for that event.
4. Tap **OK**.





## Screen

Use the Screen control to align the touch screen or to change the appearance of text on the screen. To open the *Screen* control:

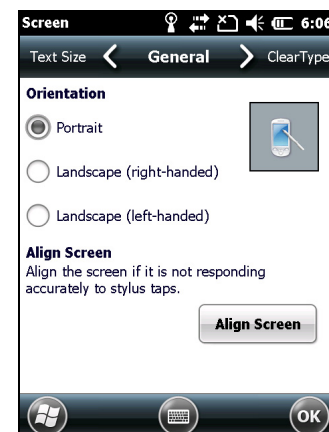
- Tap  / *Settings* / *System* / *Screen*.

To change the screen settings:

1. Tap the *General* tab.
2. To change the orientation of the screen, select an option in the *Orientation* group.
3. To start the alignment sequence for the touch screen, tap  **Align Screen**.
4. Tap **OK**.

**Note** – To align the screen at any time, press and hold the **Power** button for 1 second until the Power menu appears and then tap .

Using ClearType font smoothing can make text easier to read on the screen.



To enable ClearType:

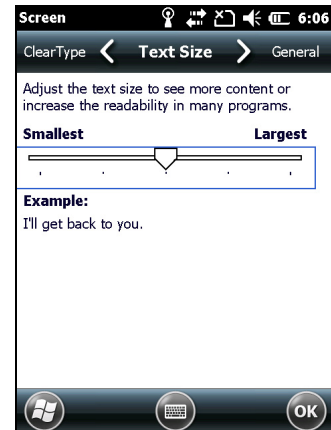
1. Tap the *ClearType* tab and then select the *Enable ClearType* check box.
2. Tap **OK**.

To change the size of text on screen:

1. Tap the *Text Size* tab.
2. Tap and drag the slider control to the left to make text smaller, or to the right to make text larger.

The example text below the slider shows how the text will appear on screen.

3. Tap **OK**.



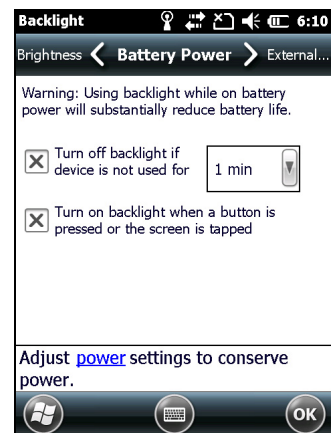
## Backlight

The backlight makes the screen easier to read in low light, but uses extra power. Use the *Backlight* control to configure power-saving settings for the backlight. To open the *Backlight* control:

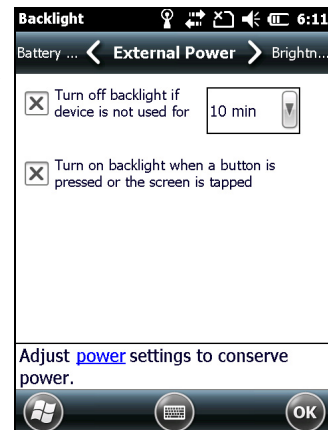
- Tap  / *Settings* / *System* / *Backlight*.

To set the backlight to automatically turn off:

1. To automatically turn off the backlight when the handheld is idle and is using **battery power**, tap the *Battery Power* tab. Select the *Turn off backlight* check box and then select a time from the drop-down list.

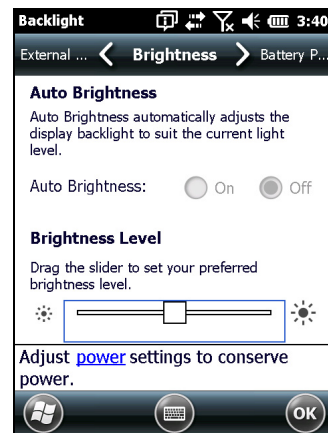


2. To automatically turn off the backlight when the handheld is idle and is using *external power*, tap the *External Power* tab. Select the *Turn off backlight* check box and then select a time from the drop-down list.
3. Tap **OK**.



To change the brightness:

1. Tap the *Brightness* tab.
2. Tap and drag the Brightness Level slider control to the left to make the backlight darker, or to the right to make the backlight brighter.
3. Tap **OK**.



## Messaging

Use Messaging to send and receive email messages using the GeoExplorer 6000 series handheld. Messaging is the equivalent of your email Inbox.

To use email, you can do one of the following:

- Synchronize email messages with Microsoft Exchange or Microsoft Outlook® on an office computer.
- Send and receive email messages by connecting directly to an email server through an ISP or a network.

### Synchronizing email messages

You can synchronize email messages on the handheld and the computer.



**CAUTION** – When you delete a message on the handheld, it is deleted from the office computer the next time you synchronize the devices.

To synchronize email, you must enable Inbox synchronization in the Microsoft ActiveSync technology ( for Windows XP) or the WMDC ( for Windows Vista or Windows 7). For more information, refer to the *ActiveSync Help* or the *WMDC Help* on the office computer.

During synchronization:

- Messages are copied from the mail folders of Exchange or Outlook on the office computer to the Messaging folder on the handheld. By default, you will receive messages from the past 3 days only, the first 100 lines of each message, and file attachments of less than 100 KB in size.
- Email messages in the Outbox folder on the handheld are transferred to Exchange or Outlook, and then sent from those programs.
- Email messages in subfolders in other email folders in Outlook are synchronized only if they were selected for synchronization (using ActiveSync technology or the WMDC).

To send and receive email for a synchronized Exchange or Outlook account, connect the handheld to the office computer. Synchronization automatically begins, and the handheld sends and receives email.

## Connecting directly to an email server

In addition to synchronizing email messages with an office computer, you can send and receive email messages by connecting to an email server.


Before you can send and receive email, you must create an email account in the Messaging software.

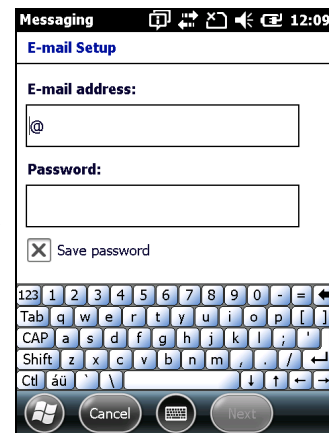
**Note** – You must set up an Internet connection on the handheld before you can set up and use your email account. For more information, see [Connecting to a Wi-Fi access point, page 85](#), [Connecting to a Bluetooth-enabled device, page 87](#), or [Connecting to a Bluetooth-enabled phone for Internet access or real-time corrections \(including VRS networks\), page 94](#).

If you need to connect to different mailboxes, set up and name a different service for each connection.

**Note** – The Messaging software supports only the POP3 and IMAP4 protocols for incoming mail, and SMTP for outgoing mail.

To set up a mail service:

1. Tap  / *E-mail*.
2. Tap *Setup E-mail*.
3. Enter the email address for your account.
4. Enter a password. Select *Save password* if you want the device to remember your password.
5. Tap **Next**.
6. To automatically get connection settings for your email account from the Internet, select the check box.
7. Tap **Next**.
8. Follow the steps in the Setup wizard. If the connection settings are not automatically downloaded from the Internet, you must enter them using the connection details supplied by your ISP or network administrator.



**Note** – You cannot change the account name later.

9. Tap **Finish**.
10. Tap **OK** to download mail immediately.



**Tip** – To receive TerraSync data files by email, edit the settings for the email account you have set up. To do this, tap **Menu** and then select *Options*. In the *Accounts* tab, tap the e-mail account you want to use to receive TerraSync files. The *Email Setup* wizard appears. Tap **Next** until you reach the last page of the wizard. From the *Message download limit* drop-down list, select **Entire message**.

When you connect the handheld to the email server, new messages are downloaded to the Messaging folder, messages in the Outbox folder are sent, and messages that have been deleted on the email server are removed from the Messaging folder.

Messages received directly from an email server are linked to the email server rather than an office computer. When you delete a message on the handheld, it is also deleted from the email server the next time you connect the handheld to the email server.

You can work online or offline. When working online, you read and respond to messages while connected to the email server. Messages are sent as soon as you tap **Send**, which saves space on the handheld.

When working offline, you can disconnect from the email server after you download new message headers or partial messages and then decide which messages to download completely. The next time you connect, Messaging downloads the complete messages you have marked for retrieval and sends any messages that you have written.

## Connecting to an Office Computer

### In this chapter:

- [Connection management software](#)
- [Connecting the handheld to a computer](#)
- [Managing the connection using the Windows Mobile Device Center](#)
- [Managing the connection using ActiveSync technology](#)
- [Installing software onto the handheld](#)

Connect the GeoExplorer 6000 series handheld to an office computer to transfer information, settings, and files from one device to the other, or to install software onto the handheld.

You can connect the handheld to a computer using the USB cable or a Bluetooth wireless link.

To protect your data, Trimble recommends that you regularly copy important data to an office computer.

## Connection management software

To install software onto a device powered by the Windows Mobile operating system, or to copy files between the handheld and a computer, you must connect the device to an office computer. If the computer is running:

- the Windows 7 or Windows Vista® operating system, use the Windows Mobile Device Center (WMDC) to manage the connection.
- the Windows® XP or 2000 operating system, use ActiveSync technology to manage the connection.

**Note** – You must install the Windows Mobile Device Center or ActiveSync technology onto the computer **before** you connect the handheld.

This connection management software also enables you to synchronize office applications on an office computer with the handheld.



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**CAUTION** – The available space on the handheld is small compared to an office computer. To avoid accidentally synchronizing the handheld with a large amount of data on the office computer, Trimble recommends that you either connect to the handheld **without forming a partnership**, or that you limit the information types and amount of data that is synchronized.

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**CAUTION** – Synchronizing data is designed to keep the same data on both the office computer and the handheld. Exercise care when resynchronizing applications after deleting data from one computer, as resynchronizing will delete the same information from the other computer.

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For more information see one of the following:

- [Managing the connection using the Windows Mobile Device Center, page 57](#)
- [Managing the connection using ActiveSync technology, page 59.](#)

## Installing the Windows Mobile Device Center

The Windows 7 and the Windows Vista operating system include a basic connectivity driver for devices powered by a Windows Mobile operating system. This driver allows you to transfer files from the handheld to an office computer.

To install software onto a device powered by a Windows Mobile operating system, you must install Windows Mobile Device Center 6.1 onto an office computer.

A copy of the Windows Mobile Device Center is provided on the *GeoExplorer 6000 Series Getting Started Disc*. Alternatively, go to [www.microsoft.com/windowsmobile/devicecenter.mspx](http://www.microsoft.com/windowsmobile/devicecenter.mspx) to download the latest version from the Microsoft website.



## Installing ActiveSync technology

A copy of ActiveSync technology is provided on the *GeoExplorer 6000 Series Getting Started Disc*. Alternatively, go to [www.microsoft.com/windowsmobile/activesync/default.aspx](http://www.microsoft.com/windowsmobile/activesync/default.aspx) to download the latest version from the Microsoft website.

## Connecting the handheld to a computer

To connect the GeoExplorer 6000 series handheld to a computer:

1. Make sure that the handheld and the computer are switched on.
2. Make sure you have installed the appropriate connection management software onto the computer (see [Connection management software, page 56](#)).
3. To form a connection, do one of the following:
  - Use the handheld's integrated Bluetooth radio to establish a wireless serial link to a Bluetooth-enabled computer. For more information, see [Connecting to an office computer using Bluetooth wireless technology, page 104](#).
  - Use a USB connection:
    - a. Connect the USB data cable to the USB port on the handheld.
    - b. Connect the other end of the USB data cable to a USB port on the computer.

When the handheld and the computer are connected, you can manage the connection through a window that appears on the office computer. See one of the following:

- [Managing the connection using the Windows Mobile Device Center, page 57](#)
- [Managing the connection using ActiveSync technology, page 59](#)

## Managing the connection using the Windows Mobile Device Center

1. Connect the handheld to the computer (see [page 57](#)).
2. If the Autoplay window appears, close the window.

3. The *Windows Mobile Device Center* window displays the message **Connected**:



**Note** – If the connection is not made automatically, check that the connection is enabled in the *Windows Mobile Device Center* software and on the handheld. For more information, see [Troubleshooting, page 117](#).

4. Do one of the following:
  - To synchronize files and data between the handheld and a computer, click *Set up your device* and then follow the instructions on screen.
  - To transfer data between the handheld and the computer without synchronizing the devices, click *Connect without setting up your device*.
5. To transfer files between the computer and the handheld, click *File Management*. A Windows Explorer-type window appears, displaying files stored on the handheld. Copy and paste files to other locations on the computer, or from the computer to the handheld.
6. To install software onto the handheld, see [Installing software onto the handheld, page 60](#).
7. To uninstall software from the handheld, click *Programs and Services* and then click *Add/Remove Programs*.



**Tip** – If the *Add/Remove Programs* option does not appear below *Programs and Services*, click *More*. The *Add/Remove Programs* option appears.

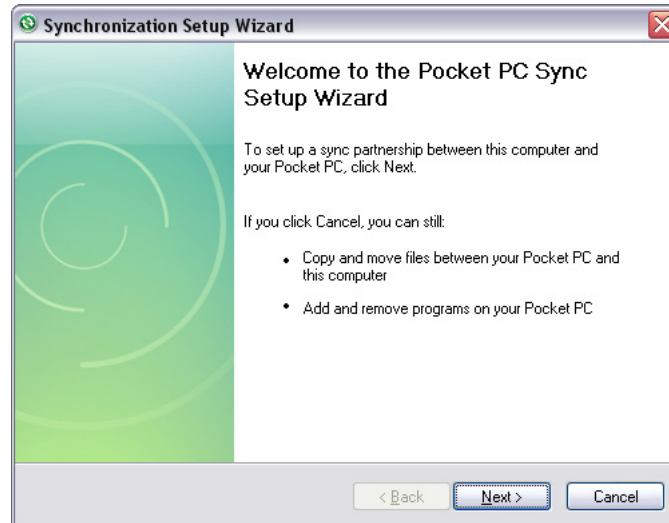
For more information, refer to the *Windows Mobile Device Center Help*.



**Tip** – If the *GPS Pathfinder® Office* software is installed on the office computer, you can configure the *Connection Manager* utility in the *GPS Pathfinder Office* software to automatically detect when you connect a *GeoExplorer 6000* series handheld to the computer. This enables you to automatically transfer data from the *TerraSync* software, differentially correct the data, and then export it to a GIS. For more information, refer to the *GPS Pathfinder Office Software Help*.

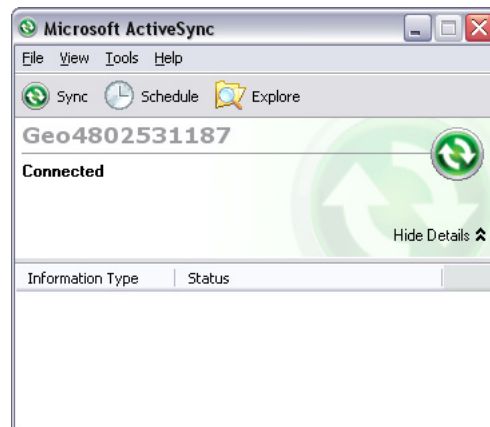
## Managing the connection using ActiveSync technology

1. Connect the handheld to the computer (see [page 57](#)). The *Synchronization Setup Wizard* appears:



**Note** – If the connection is not made automatically, check that the connection is enabled in the ActiveSync technology and on the handheld. For more information, see [Troubleshooting, page 117](#).

2. Do one of the following:
  - To synchronize files and data between the handheld and a computer, click **Next** and then follow the instructions in the *Synchronization Setup Wizard*.
  - To transfer data between the handheld and the computer without synchronizing the devices, click **Cancel** to close the wizard.
3. The *Microsoft ActiveSync* window displays the message **Connected**:



4. To transfer files between the computer and the handheld, click **Explore**. A Windows Explorer-type window appears, displaying files stored on the handheld. Copy and paste files to other locations on the computer, or from the computer to the handheld.
5. To install software onto the handheld, see [Installing software onto the handheld, page 60](#).
6. To uninstall software from the handheld, select *Add/Remove Programs* from the *Tools* menu. Clear the check box beside the program you want to remove and then click **OK**.

For more information, refer to the *ActiveSync Help*.



**Tip** – If the GPS Pathfinder Office software is installed on the office computer, you can configure the Connection Manager utility in the GPS Pathfinder Office software to automatically detect when you connect a GeoExplorer 6000 series handheld to the computer. This enables you to automatically transfer data from the TerraSync software, differentially correct the data, and then export it to a GIS. For more information, refer to the *GPS Pathfinder Office Software Help*.

## Installing software onto the handheld

Before you begin, refer to the installation instructions provided with the software.

Some software installations are specifically designed to run on a device powered by a Windows Mobile operating system. To install software that has a Windows Mobile installation setup:

1. Connect the handheld to a computer (see [page 57](#)).
2. Copy the installation files to a folder on the handheld.
3. Browse to the folder on the handheld. Tap and hold the installation setup file and then select Run.
4. If prompted after installation, perform a soft reset of the handheld (see [page 33](#)).

To install software that is provided on a CD, or as an installation setup that runs on an office computer:

1. Connect the handheld to a computer (see [page 57](#)).
2. If the software is provided on a CD, insert the software CD into the office computer.
3. Run the installation setup.
4. If prompted, select the install option for a device powered by a Windows Mobile operating system. Once the software is installed on the computer, it is automatically transferred to the handheld.

**Note** – *If a storage card is inserted in the handheld, the card appears as an installation location option. Trimble recommends that you install software to the handheld's internal storage, not to a storage card. If you install software to a card and then remove the card from the handheld, the software will not be available for use.*

5. If prompted after installation, perform a soft reset of the handheld (see [page 33](#)).

## Using the GNSS Receiver

### In this chapter:

- Supported GNSS field software
- Configuring the GNSS field software to connect to the receiver
- Using the GNSS field software
- Improving GNSS productivity using Floodlight satellite shadow reduction technology
- Ensuring the accuracy of your GNSS data
- Activating the Floodlight technology and the NMEA output options
- Differential GNSS explained
- Outputting NMEA data to external equipment
- Configuring NMEA output

The GeoExplorer 6000 series handheld includes an integrated GNSS receiver that enables you to collect GPS and GLONASS data for incorporating into a GIS or for managing assets.

GPS (Global Positioning System) and GLONASS (GLObal NAVigation Satellite System) are Global Navigation Satellite Systems (GNSS). Each system consists of a constellation of satellites that orbit the earth. GNSS provides worldwide, all-weather, 24-hour time and position information.

***Note** – To receive signals from GPS or GLONASS satellites, the handheld must have a clear view of the sky. GPS or GLONASS positions may not always be available, particularly in or near buildings, in vehicles, or under tree canopy.*

With the addition of the Trimble Floodlight satellite shadow reduction technology option, the GeoExplorer 6000 series handheld's integrated GNSS receiver can improve accuracy and productivity in difficult environments.

***Note** – To track GLONASS satellites, you must have the Trimble Floodlight technology option installed and activated.*

## Supported GNSS field software

You can use the GeoExplorer 6000 series handheld with any of the software products described below.

### TerraSync software

You can install version 5.10 or later of the TerraSync software on a GeoExplorer 6000 series handheld. Use the software to collect and maintain GIS and GNSS data.

To install the TerraSync software, run the downloaded setup file. To obtain an installation code for installation, you must register the Proof-of-Purchase Number (POP) that you received when you purchased the software. Detailed installation instructions are provided in the *TerraSync Software Getting Started Guide*.

### Esri ArcPad software and the Trimble GPSCorrect extension

You can install the Esri ArcPad software version 10 on a GeoExplorer 6000 series handheld. Use the software to collect and maintain GIS and GNSS data. Detailed installation instructions for Esri ArcPad software are provided in the ArcPad documentation.

To be able to differentially correct ArcPad GNSS data, install version 3.20 or later of the Trimble GPSCorrect extension for Esri ArcPad software on a GeoExplorer 6000 series handheld.

You must install the ArcPad software *before* you install the GPSCorrect extension.

**Note** – Make sure your version of the GPSCorrect extension is compatible with the version of ArcPad software you are using. For more information, go to [www.trimble.com/gpsccorrect\\_ts.asp](http://www.trimble.com/gpsccorrect_ts.asp), click Support Notes and then search for the Mapping and GIS Product Compatibility List Support Note.

To install the GPSCorrect extension, run the downloaded setup file. Detailed installation instructions are provided in the *Trimble GPSCorrect Extension Getting Started Guide*.

### GPS Controller software

You can install version 2.40 or later of the GPS Controller software on a GeoExplorer 6000 series handheld. Use the software to configure and monitor the status of the internal GNSS receiver, and to configure GNSS output settings for third party GNSS applications.

To install the GPS Controller software, go to [www.trimble.com/support.shtml](http://www.trimble.com/support.shtml). Click GPS Controller and then click Downloads. Click the link for the version you want to install and then follow the instructions in the Installation wizard.

## GNSS Connector software

You can install the GNSS Connector software on a GeoExplorer 6000 series handheld. Use the software to specify how the integrated GNSS receiver communicates with equipment that is connected to one of the handheld's external communications ports.

To install the GNSS Connector software, go to [www.trimble.com/support.shtml](http://www.trimble.com/support.shtml). Click GNSS Connector and then click Downloads. Follow the instructions in the Installation wizard.

## Other GNSS field applications

If you have purchased and activated the NMEA Output option, you can also use the GeoExplorer 6000 series handheld with any GNSS field software that accepts NMEA messages.

## Configuring the GNSS field software to connect to the receiver

The first time you use GNSS field software on the handheld, you may need to specify which GNSS COM port to connect to.

## GNSS COM ports

The integrated GNSS receiver has three COM ports for communicating with software on the handheld and with external devices. Two ports are for outputting GNSS data, and one port is for receiving real-time corrections into the receiver.

To use GNSS, open the appropriate GNSS COM port. The type of communication used for each port is described below:




Port	Function	Description
COM2	NMEA	Outputs NMEA-0183 messages. NMEA is a standard GNSS communication protocol used by many GNSS applications. The handheld outputs the following NMEA messages by default: GGA, GLL, GSA, GSV, RMC, VTG, ZDA. All messages are output at a one-second interval.
COM3	TSIP	Outputs and receives TSIP messages. TSIP (Trimble Standard Interface Protocol) is used by Trimble GNSS applications, and is also supported by some other GNSS applications.
COM4	Real-time corrections	Receives real-time correction messages. If you are using an external correction source connected to COM1 or a Bluetooth port, the corrections must be redirected to COM4. For more information, see <a href="#">Using real-time corrections from an external correction source, page 70</a> .

**Note** – NMEA messages can only be output if you have purchased and activated the NMEA Output option.

**Note** – COM1 is a standard serial port that connects to external devices. For more information, see [Connecting to other devices using the USB to serial converter, page 111](#).

## Connecting to the COM port

Details of how to configure different types of GNSS field software to connect to the GNSS COM port are as follows:

GPS field software	Configuration details
GPS Controller	Run GPS Controller. The software automatically activates the integrated GNSS receiver on COM3.
TerraSync	Run Terrasync. The software automatically activates the integrated GNSS receiver on COM3.
ArcPad with the GPSCorrect extension	When the Trimble GPSCorrect extension is installed, the extension automatically configures the ArcPad software to use the integrated GNSS receiver on COM3 using the Trimble GPSCorrect protocol. To connect to the receiver, tap the <b>GPS</b> button  and then tap <b>Yes</b> . To configure a real-time Differential GNSS source, or to view status information, run the GPSCorrect extension. To do this, tap the <b>GPSCorrect</b> button in the Trimble toolbar.
ArcPad without the GPSCorrect extension	<ol style="list-style-type: none"> <li>1. In ArcPad, tap the <b>GPS</b> drop-down menu  and then select <b>GPS Preferences</b> from the drop-down menu. Tap the <b>GPS</b> tab.</li> <li>2. In the <i>Protocol</i> field, select NMEA 0183.</li> <li>3. In the <i>Port</i> field, select COM2.</li> <li>4. Tap <b>OK</b>.</li> <li>5. Tap the <b>GPS</b> button  and then tap <b>Yes</b>.</li> </ol>
NMEA application	Configure the software to connect to GNSS on COM2 and then use the Connect or Activate GNSS command.
TSIP application	Configure the software to connect to GNSS on COM3 and then use the Connect or Activate GNSS command.

## Using the GNSS field software

Depending on the GNSS field software you have installed, the default GNSS field software will be GPS Controller, TerraSync, or the Trimble GPSCorrect extension for Esri ArcPad software.

The GPS Controller software enables you to check the current GNSS status, or to configure the integrated GNSS receiver.


**Note** – You must first install the GPS Controller software. See [GPS Controller software, page 62](#) for details.

Depending on the GNSS field software you have installed, you can use the software to configure settings such as GNSS, real-time correction, and antenna settings. You may also be able to use the software to connect to a real-time correction source, configure logging settings, and collect features. For more information, refer to the rest of this chapter and the documentation for the GNSS field software.



## Starting the GNSS field software

Do one of the following:

- From the *Home* screen, tap the GeoXH (or GeoXT) item, then tap the GNSS Application Launcher item to launch the default GNSS field application.
- Tap  / *Programs* and then select the GNSS field software, for example *TerraSync*.

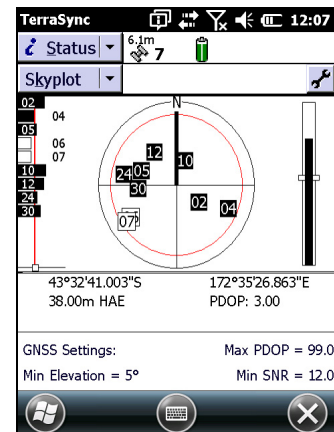
When you first open any Trimble GNSS field software, the Skyplot section is displayed.

## Viewing available GNSS satellites

Use the graphical Skyplot section or the Satellite Info section in the installed Trimble GNSS field software to view detailed GPS and GLONASS information.

**Note** – To receive signals from GNSS satellites, the handheld must have a clear view of the sky. GNSS positions may not always be available, particularly in or near buildings, in vehicles, or under tree canopy.

Filled (black) boxes represent satellites that the receiver is using to compute its current GNSS position. Unfilled (white) boxes represent satellites that the receiver is getting signals from but is not using because the signals are too weak. In the example shown here, eight satellites are being tracked and seven of these satellites are being used to compute GNSS positions.



**Note** – Numbers with no box represent satellites that are available, but that the TerraSync software is not receiving signals from. Satellites that have an "R" prefix are GLONASS satellites. GLONASS satellites appear only if the receiver has the Trimble Floodlight satellite shadow reduction technology option activated. For more information, see [Activating the Floodlight technology and the NMEA output options](#).

Your current GNSS position is displayed at the bottom of the screen.



**Tip** – For detailed information on satellite positions and signal strengths, use the Satellite information screen in the Status section.

## Resetting the GNSS receiver

Trimble GNSS field applications all have options to reset the receiver to:

- delete the almanac
- delete information stored on the last known position
- restart the receiver
- reset the GNSS receiver to factory default settings

## Improving GNSS productivity using Floodlight satellite shadow reduction technology

The productivity of high-accuracy GNSS receivers can be affected by satellite shadow. Satellite shadow occurs when the line of sight between a GNSS receiver and GNSS satellites is partially or fully blocked by obstructions such as buildings, trees, or even the landscape itself. The effect of satellite shadow is a reduction in the number of satellites that the receiver can track. In general, the quality of your data decreases when the number of satellites which is used to calculate the position is low, and in many cases when large portions of the sky are obstructed, it is impossible to generate any positions at all.

The Floodlight satellite shadow reduction technology option for the GeoExplorer 6000 series reduces the effects of satellite shadow to help deliver more positions and better accuracy in conditions affected by satellite shadow.

The Floodlight technology option improves GNSS productivity using three key technologies:

- it enables GLONASS satellite tracking, which greatly increases the number of satellites that the GNSS receiver can track. Tracking more satellites can help to improve satellite geometry and thereby improve accuracy.
- it utilizes barometric measurements to assist the GNSS receiver. The barometer measurements can assist by improving both the vertical and horizontal accuracy of positions, particularly in conditions where the satellite count is very low, for example under tree canopy.
- it improves the ability of the receiver to track weaker satellite signals which are common when working in the shadows of trees and buildings.

To achieve optimum Floodlight technology performance, it is important that the barometer is kept free of obstructions. Make sure that the Barometer seal located on the underside of the device is kept clear and is not covered by your fingers or any other covering.

**Note** – If you are using Trimble field software, for example, the TerraSync software, make sure that you have selected the correct option for postprocessing data—if your base station(s) provide corrections for GPS and GLONASS satellites, select GPS + GLONASS. This affects the accuracy of the Predicted Postprocessed Accuracy (PPA). See [Accuracy settings and using accuracy-based logging, page 68](#).



To purchase the Floodlight technology option, contact your Trimble reseller.

After purchase, you must activate the Floodlight technology option on the receiver. See [Activating the Floodlight technology and the NMEA output options, page 74](#).

## Ensuring the accuracy of your GNSS data

GeoExplorer 6000 series handhelds are high performance GNSS receivers that calculate very accurate GNSS positions.

To correct errors in the collected data and to further improve the accuracy of the GNSS positions, use differential GNSS. Differential GNSS (DGNSS) requires one or more additional receivers, called **base stations** or reference stations, which are located at known points. Data collected at the base stations is used to determine GNSS measurement errors and compute corrections to these errors. These corrections are then applied to data collected in the field either in real time or during postprocessing. For more information, see [Differential GNSS explained, page 75](#).

The different models in the GeoExplorer 6000 series offer two levels of DGNSS accuracy:

- The GeoXT handheld uses EVEREST multipath rejection technology to provide < 1 meter accuracy with real-time or < 0.5 meters postprocessed differential correction.
- The GeoXH handheld uses EVEREST multipath rejection technology as well as H-Star technology to provide 10 cm accuracy with real-time or postprocessed differential correction.

For more information, refer to the datasheet for your model of handheld.

Where the DGNSS infrastructure does not meet 10 cm accuracy requirements (for example, the base station provides L1 corrections only, or is at a distance greater than recommended), the GeoXH handheld typically achieves submeter accuracy.

The list below identifies the most important settings and techniques that you can use in the field to improve the accuracy of your data:

**Note** – *This list assumes that you are using Trimble GNSS field software, and lists items in order of most important to less important.*


1. If you are using the TerraSync software to collect data, use accuracy-based logging. For more information, see [page 68](#).
2. Use real-time differential corrections. If you are using a GeoXH handheld and have access to dual-frequency corrections from a VRS™ network, use the corrections from the VRS network. For more information, see [page 69](#).
3. Configure the GNSS settings for the receiver to use Smart Settings to increase the precision of your data, and to minimize the effect of atmospheric interference and poor satellite geometry. For more information, see [Using Smart Settings, page 71](#).
4. Connect to an external antenna, if you have one. For more information, see [page 73](#).
5. Plan GNSS data collection around the times of the day when satellite geometry is best. For more information, see [page 74](#).

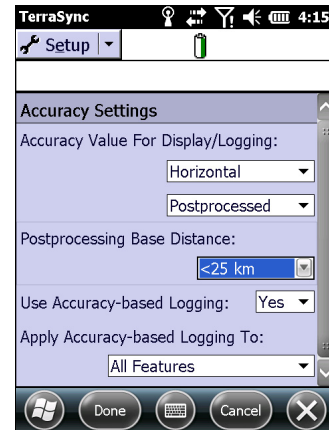
## Accuracy settings and using accuracy-based logging

If you are using the TerraSync software, use accuracy-based logging to ensure that only GNSS positions that meet the specified estimated accuracy are logged. GNSS positions that do not meet your accuracy requirements are not logged.

**Note** – *Accuracy estimates for streaming (dynamic) GNSS positions may not be as good as those for static GNSS positions.*

To configure accuracy-based logging in the TerraSync software:

1. In the Setup section of the TerraSync software, tap **Logging Settings**. The *Logging Settings* form appears.
2. Tap the **Setup** button  below the *Accuracy Settings* field. The *Accuracy Settings* form appears.
3. In the *Accuracy Value For Display/Logging* fields, select the parameters that will be used to determine the estimated accuracy:
  - Select whether to use the horizontal or vertical accuracy of the current GNSS position.
  - Select *In the field* to use the current estimated accuracy (recommended if you are using a real-time correction source), or select *Postprocessed* to use the predicted estimated accuracy that will be achieved after the field data has been postprocessed.
4. If you selected *Postprocessed*:
  - a. select the estimated distance to the base station that will be used for postprocessing from the *Postprocessing Base Distance* field. If you will use more than one base station (during H-Star processing), specify the estimated distance to the closest base station.
  - b. select the type of data that your base station(s) will provide to ensure that PPA (Predicted Postprocessed Accuracy) values can be predicted accurately:
    - If your base station(s) are providing corrections for GPS and GLONASS satellites, select GPS + GLONASS.
    - For base stations with only GPS satellite corrections, select GPS.
    - If you don't know what base station data you will use, or what base data is provided by your base stations, select GPS.
5. Set the *Use Accuracy-based Logging* field to *Yes*. The settings fields for accuracy-based logging appear.
6. In the *Apply Accuracy-based Logging To* field, select the feature types that you want to log only if the GNSS positions meet your required accuracy.



7. In the *Required Accuracy* field, select the estimated accuracy that is required before GPS positions are logged.
8. Tap **Done**.

*Note* – Accuracy settings do not affect GNSS positions that are used for navigation. GNSS positions are still calculated by the GNSS receiver and are available for navigation.

## Connecting to a real-time differential correction source

Use a real-time differential GNSS (DGNSS) source to give you better accuracy as you collect data. For more information about how real-time differential GNSS works, see [Differential GNSS explained, page 75](#).

### Using real-time corrections from an Internet source

DGNSS corrections are often broadcast over the Internet. For example, corrections generated by a VRS network are commonly broadcast over an Internet server. A VRS network uses data from several base stations to provide rover receivers with corrections that are generally more accurate than corrections from a single base station. Alternatively, you can connect to a server that provides DGNSS corrections from a single base station.

For information on how to connect to the Internet and receive real-time corrections from an Internet server, see [Connecting to a Bluetooth-enabled device, page 87](#) or [Connecting to a Bluetooth-enabled phone for Internet access or real-time corrections \(including VRS networks\), page 94](#).

### Using SBAS corrections

The GeoExplorer 6000 series handheld has an integrated receiver that uses Satellite Based Augmentation Systems (SBAS) correction messages to improve the accuracy and integrity of GNSS data.

The default SBAS tracking mode is Auto. In Auto mode, the receiver tracks or locks onto the most powerful satellite signal. The GNSS receiver can track two SBAS satellites at the same time in Auto or Custom mode. It uses corrections from only one SBAS satellite at a time, but tracking two satellites can improve the availability of SBAS real-time corrections. For example, if you are working in environments where obstacles may block the direct line of sight to the SBAS satellite, there is less chance of signal loss if you are tracking more than one SBAS satellite.


*Note* – To turn off multiple SBAS satellite tracking, select Custom mode and then deselect all other SBAS satellites except for the satellite you want to track.

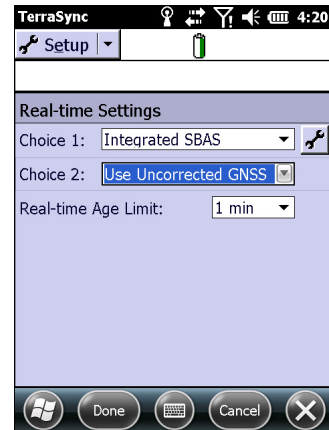
The receiver tracks SBAS satellites according to your geographical location:

- Wide Area Augmentation System (WAAS) satellites are tracked in the Continental United States including Alaska, and parts of Canada and Mexico.
- European Geostationary Navigation Overlay Service (EGNOS) satellites are tracked in Europe.

- MTSAT Satellite-based Augmentation System (MSAS) satellites are tracked in Japan.

To use SBAS corrections:

1. In the Setup section of the GNSS software, tap **Real-time Settings**. The *Real-time Settings* form appears.
2. In the *Choice 1* field, select Integrated SBAS.
3. To select particular satellites, tap the **Setup** button  next to the *Choice 1* field. Select Custom tracking mode and then enable or disable tracking of particular satellites. Tap **OK** to return to the *Real-time Settings* screen.
4. In the *Choice 2* field, specify whether to use uncorrected positions, or to stop using GNSS positions, if corrections are not available.
5. Tap **Done**.




### Using real-time corrections from an external correction source

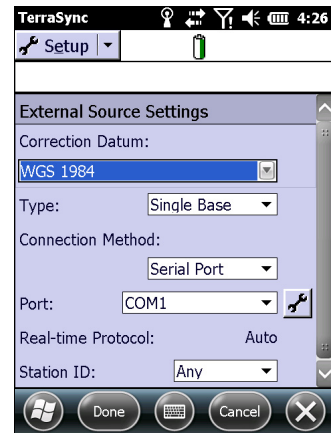
You can improve the accuracy of your data by using real-time corrections from an external correction source, such as a GeoBeacon receiver or a DGNSS radio. Connect the external correction source to a Bluetooth port (see [page 93](#)). Use the GNSS field software to set up and monitor the real-time input source that you want to use.

The integrated GNSS receiver communicates only through its GNSS COM ports (COM2, COM3, and COM4). Trimble GNSS field software, such as TerraSync and GPS Controller, automatically redirects input from an external correction source connected to COM1 or to a Bluetooth port to the real-time GNSS COM port (COM4).

**Note** – For information on configuring the GNSS field software to use corrections from a VRS network or single base station that transmits corrections over the Internet, see [Step 3: Configuring the GNSS field software to use data received from the Internet source, page 97](#).

To set up an external correction source—such as a GeoBeacon receiver or a DGNSS radio—in the Trimble GNSS field software:

1. In the Setup section of the GNSS software, tap **Real-time Settings**. The *Real-time Settings* form appears.
2. In the *Choice 1* field, select External Source.
3. Tap the **Setup** button  next to the *Choice 1* field.
4. In the *Connection Method* field, select Serial Port.
5. In the *Port* field, select the COM port to use. If you are using:
  - the USB to serial converter, select COM 1.
  - a Bluetooth wireless connection, select the COM port you configured for the Bluetooth connection in the *COM Ports* tab of the Bluetooth manager.
6. Tap **Done**.



To set up an external correction source for use with non-Trimble GNSS field software:

1. In the Trimble GPS Controller software, configure the GNSS receiver to use real-time corrections on COM4. For more information, see the steps above.

**Note** – You must first install the GPS Controller software. See [GPS Controller software, page 62](#) for details.

2. In the GNSS Connector software, manually redirect the real-time correction source to COM4 by tapping **Setup** then select the real-time source from the drop down list.

**Note** – You must first install the GNSS Connector software. See [GNSS Connector software, page 63](#) for details.

3. Configure your data collection software to monitor and use real-time corrections as required.

**Note** – To receive real-time corrections, the GNSS Connector software must remain running on the handheld.

## Using Smart Settings


**Note** – Trimble recommends that you use accuracy-based logging (see [Accuracy settings and using accuracy-based logging, page 68](#)) and Smart Settings to control the quality of the GNSS positions logged and let the TerraSync software manage the logging of positions based on your required accuracy.

Using Smart Settings, the GNSS receiver generates the best possible position for any given environment, without the need for you to adjust receiver settings to match the conditions. Regardless of whether you are working under canopy, in wide open spaces, or somewhere in between, Smart Settings automatically generates the best solution possible.

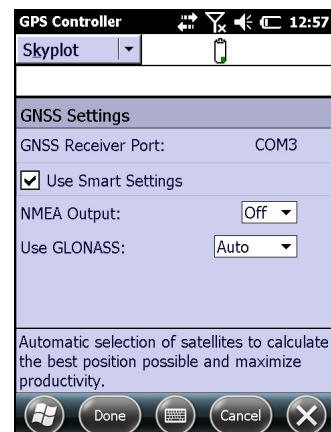
Using traditional mask techniques in open conditions, weak signals can accidentally degrade the accuracy of the position if masks are too relaxed, whereas in obstructed conditions, more satellites are needed to help maintain optimum accuracy if masks are set too strictly. Using Smart Settings, the receiver uses all available GNSS information to determine which combination of satellites to use to deliver the best position. Once you set the receiver to use Smart Settings, the receiver does the rest.

By default, the receiver is configured to use Smart Settings. In this mode, the receiver will track all visible satellites, and determine which to use in the position solution to automatically generate the most accurate position possible.

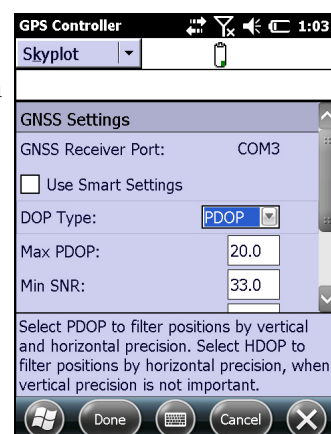
To open the *GNSS Settings* form, do one of the following:

- Tap **GNSS Settings** in the Setup section.
- Tap  in the Skyplot, Satellite Info, or Plan section.

To enable Smart Settings, select the *Use Smart Settings* check box.



To define custom GNSS settings, clear the *Use Smart Settings* check box. Editable fields appear enabling you to specify the required GNSS quality settings. Enter values in these fields.





## Connecting to an external antenna


The GeoExplorer 6000 series handheld has an internal antenna, which is suitable for use in most conditions.

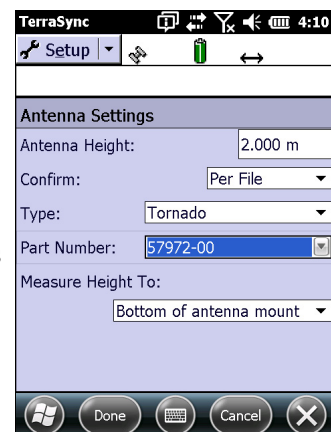
If you have a GeoXT handheld, you can also connect a Tempest or an external patch antenna for when you work in a vehicle. For improved yield under canopy, you can use a Tempest antenna, or a patch antenna with a ground plane.

If you have a GeoXH handheld, you can connect an external Tornado antenna for improved accuracy when you collect data for postprocessing using H-Star technology.

Configure antenna settings in the GNSS field software, once you have connected the external antenna to the handheld.

To configure antenna settings in the TerraSync software:

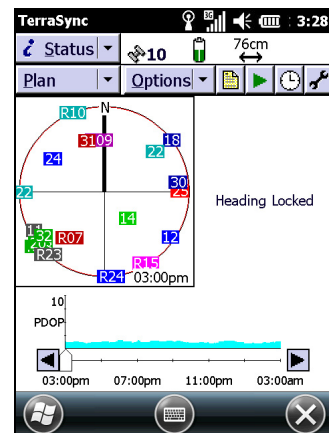
1. In the Setup section of the TerraSync software, tap **Logging Settings**. The *Logging Settings* form appears.
2. Tap the **Setup** button  next to the *Antenna Height* field. The *Antenna Settings* form appears.
3. In the *Height* field, specify the height of the GNSS antenna that is connected to the GNSS position.
4. In the *Confirm* field, select how often the software will ask you to confirm the configured antenna height during data collection.
5. In the *Type* field, select the type of antenna that is connected. The number in the *Part Number* field is automatically updated when you select the antenna type.
6. In the *Measure Height To* field, select the point on the antenna that you have measured the height to.
7. Tap **OK** to return to the *Logging Settings* form.



## Planning a data collection session

To maximize productivity, plan GNSS data collection around the times of the day when satellite geometry is best. The TerraSync software and the GPS Controller software both include a Plan section with an animated skyplot and DOP (satellite geometry) graph for your position for the next 12 hours.

In the Plan section, you can check the planning skyplot as you play a session, then use the timeline to zoom in on times when geometry is poor. As you adjust GNSS settings, the Plan section is updated, so you can see the effect of different quality control settings.



## Activating the Floodlight technology and the NMEA output options

Two options are available for use with the GeoExplorer 6000 series handhelds:

- the Trimble Floodlight satellite shadow reduction technology, which can increase the accuracy and likelihood of generating positions in environments affected by satellite shadow including canopy and near buildings.
- the NMEA Output option, which enables you to use the GeoExplorer 6000 series handheld's integrated GNSS receiver with any GNSS field software that accepts NMEA messages.


The Floodlight satellite shadow reduction technology is provided as standard with the GeoXH handheld.

For the GeoXT handheld, you will need to purchase the Floodlight satellite shadow reduction technology option.

The NMEA option must be purchased for both the GeoXH handheld and the GeoXT handheld if required. Contact your Trimble reseller for more information.

Both the Floodlight satellite shadow reduction technology option and the NMEA Output option must be activated on your handheld using the Option Activation Wizard. The wizard can either automatically retrieve an activation file over the Internet, or you can copy the file manually to the device using an external storage card or a USB cable. The activation wizard uses the file to determine which options to activate on the handheld.

To activate these options using the Option Activation wizard, do the following:

1. Tap  / *Settings* / *System* / *System Information*, the *System Information* screen appears.
2. Select the *Options* tab and then tap **Activate Options**.
3. If you have received an activation file from your Trimble reseller, select *Manually activate purchased options*. Otherwise select *Automatically check and activate purchased options*.

4. Do one of the following:
  - If you selected *Automatically check and activate purchased options*:
    - a. Ensure that the device is connected to the Internet (using a USB cable and the ActiveSync technology, or a Wi-Fi connection or Bluetooth wireless connection using the modem—see [Chapter 6, Getting Connected](#)).
    - b. Tap **Get Updates**.
    - c. The Option Activation Wizard will run. When the wizard finishes, restart your device to complete the activate process.
  - If you selected *Manually activate purchased options*:
    - a. Copy the activation XML file that you received from your Trimble reseller to a folder on the device.
    - b. Tap **Get Updates**.
    - c. Browse to the folder that contains the activation file.
    - d. Tap the file to initiate the activation process.
    - e. The Option Activation Wizard will run. When the wizard finishes, restart your device to complete the activate process.

## Differential GNSS explained

Use differential GNSS to correct errors in your collected data. Differential GNSS (DGNSS) requires one or more additional receivers, called **base stations** or reference stations, which are located at known points. Data collected at the base stations is used to determine GNSS measurement errors and compute corrections to these errors. An unlimited number of mobile GNSS receivers, called **rovers**, collect GNSS data at unknown locations within the vicinity of the base station. Errors common at both the base station and the rover receiver are corrected with DGNSS either in real time or during postprocessing.

### Real-time DGNSS

In real-time DGNSS, the base station calculates and broadcasts the error for each satellite as each measurement is received, enabling you to apply corrections while in the field and collect accurate GNSS data. DGNSS corrections are available from a variety of public and commercial sources. They can be generated and broadcast in real-time by privately or self-owned GNSS base stations, or by a wide range of government agencies.

Real-time DGNSS sources include external beacon and radio sources, as well as Satellite Based Augmentation Systems (SBAS) such as WAAS in the US, EGNOS in Europe, MSAS in Japan, and VRS networks. SBAS and VRS networks use multiple base stations to calculate the DGNSS corrections that are then delivered to the user from a Geostationary satellite (SBAS) or from a radio or cellular phone (VRS networks).

Factors that affect real-time DGNSS accuracy include how often the corrections are updated, how far you are from the base station, and whether the coordinate system used by the correction source matches the coordinate system used by the GNSS receiver.

## Postprocessed DGNSS

In postprocessed DGNSS, the collected GNSS data is transferred to an office computer, and measurements from the base station are downloaded. You can postprocess GNSS data collected with Trimble GNSS field software using:

- the GPS Pathfinder Office software version 5.10 (with the latest updates) or later.
- the Trimble GPS Analyst™ extension for Esri ArcGIS Desktop software version 2.40 (with the latest updates) or later.

Typically, postprocessed DGNSS uses only one base station. However, when differentially correcting data collected with GeoXH receivers using H-Star technology, you can select multiple base stations to correct the file against for improved accuracy.

Factors that affect the accuracy of postprocessed DGNSS include the type of receiver and antenna used at the base station, the distance between the base station and the location where the rover data was collected, the accuracy of the base station position, and the logging interval at the base station.

For more information, refer to the documentation provided with the postprocessing software.

## Postprocessed real-time DGNSS

If you collected data with 10 cm accuracy in real time, you do not need to postprocess the data.


However, if your data files contain autonomous (uncorrected) positions as well as real-time corrected positions, Trimble recommends that you postprocess the data. During postprocessing, you can choose whether to correct only autonomous positions, or all positions.

If you collected data with submeter accuracy in real time, Trimble recommends that you postprocess the data, as postprocessed data is usually more accurate than data corrected in real time.

## Outputting NMEA data to external equipment

Use the GNSS Connector software to specify how the integrated GNSS receiver communicates with equipment that is connected to one of the handheld's external communications ports.

**Note** – You must first install the GNSS Connector software. See [GNSS Connector software, page 63](#) for details.

To open GNSS Connector, tap  / GNSS Connector.

The GNSS Connector software lets you connect the NMEA GNSS COM port to COM1 or Bluetooth ports and configure port settings such as the baud rate for COM1.

Use the GNSS Connector software to output NMEA messages from the integrated GNSS receiver to another device, such as an external data collector.

**Note** – If you are using a Bluetooth port, ensure that the Bluetooth radio is on and the handheld is visible to other devices. Use the GNSS Connector software to configure NMEA output to Bluetooth - COM9, which is the pre-defined Bluetooth Host Serial Port. For more information, see [Providing Bluetooth services as a host, page 89](#).

The connections that you create in the GNSS Connector software are active only while the software is running. Connections created by the GNSS Connector end when you exit the software.


For more information, go to [www.trimble.com/support.shtml](http://www.trimble.com/support.shtml) and refer to the GNSS Connector Help. Click GNSS Connector and then click Help.

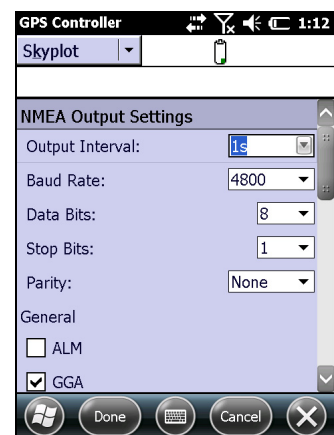
## Configuring NMEA output

You can use the GeoExplorer 6000 series handheld's integrated GNSS receiver with any GNSS field software that accepts NMEA messages, if you have purchased the NMEA output option and it has been activated on the handheld.

To configure the NMEA data output settings, use the GPS Controller software. The software is provided free from the Trimble website. For more information, see [GPS Controller software, page 62](#).

To configure NMEA data output:

1. In the *GNSS Settings* form, set the *NMEA Output* field to **On**.
2. Tap the **Setup** button  that appears next to the *NMEA Output* field. The *NMEA Output Settings* appears.
3. Configure the NMEA message output settings.



**CAUTION** – NMEA standard dictates that a baud rate of 4800bps should be used for NMEA messages. Depending on the number of satellites being tracked (for example, if you are tracking GLONASS and GPS satellites) the amount of data being captured at once may often cause the 4800 bit limit to be exceeded.

Buffers have been added which allow the data to be stored and then sent when it is able to. This avoids data corruption, but may delay delivery of data, and positions may take as long as 8 seconds to be sent from the time at which they were originally recorded.

If you need 4800bps output, Trimble suggests that you try to minimise the effect by reducing the amount of NMEA data being sent, for example, by dropping out NMEA sentences from the NMEA stream.

4. Tap **Done**.

For more information, refer to the *GPS Controller Help*.



# Getting Connected

## In this chapter:

- [Wireless connection information](#)
- [Connecting to a cellular network from the modem](#)
- [Connecting to a Wi-Fi access point](#)
- [Connecting to a Bluetooth-enabled device](#)
- [Connecting to other devices using the USB to serial converter](#)

The GeoExplorer 6000 series handhelds include a number of options for connecting to other devices. For wireless connections to networks or other devices, the options are:

- a 3.5G capable cellular modem (available on 3.5G editions only)
- an 802.11 b/g compatible Wi-Fi radio
- a Bluetooth radio

You can also connect to other devices using the USB to serial converter.

This chapter describes how to enable the wireless radios, and the main connectivity options available.

Use the table on [page 83](#) to identify the wireless connection type you want to make and then follow the steps provided to connect to that device.

## Wireless connection information

The GeoExplorer 6000 series handheld has an integrated Wi-Fi radio compliant with IEEE 802.11 b/g, and an integrated Bluetooth radio. 3.5G editions are also equipped with an integrated cellular modem. The handheld is shipped with Wi-Fi and Bluetooth wireless technology activated. To use Wi-Fi, the Bluetooth radio, or the cellular modem you need to turn it on (see [Turning on and turning off the integrated radios](#) below).

**Note** – *The integrated cellular modem is only installed on handheld models 88951-00 and 88951-20.*

**Note** – *You may need to deactivate the Wi-Fi and/or Bluetooth radio in the handheld (see below) if the country in which you are working does not approve the use of Wi-Fi and/or Bluetooth wireless technology.*

Using a data connection from your local cellular provider, the GeoExplorer 6000 series handheld's integrated cellular modem can be used to connect to the Internet to receive real-time corrections from a VRS network, send and receive messages (including email, SMS, or instant messages), or to send and receive files and other data to and from the office directly in the field.

You can also use the handheld's integrated Wi-Fi radio to connect to the Internet or a corporate network using a Wi-Fi connection.

Alternatively, you can use Bluetooth wireless technology to connect to the Internet using a cellular phone. You can also connect directly to other Bluetooth-enabled devices such as a GeoBeacon receiver, a laser rangefinder, or a barcode scanner.

You can also use the optional USB to serial converter to connect to a range of external devices using a cabled serial connection.

### Deactivating the integrated radios

**Note** – *If you are unsure about whether the GeoExplorer 6000 series handheld radios are approved for use in your country, check with your Trimble reseller.*

Use the Radio Activation Manager software to deactivate the integrated Wi-Fi and/or Bluetooth radio, or to reactivate the radios if they have been deactivated. The Radio Activation Manager software runs on an office computer.

The latest copy of the software is available for download from the Trimble website. Go to [www.trimble.com/support.shtml](http://www.trimble.com/support.shtml), click the link for your receiver type (*GeoXH*, or *GeoXT*), click *Downloads*, click *GeoExplorer 6000 Series* and then click *Radio Activation Manager*.

### Turning on and turning off the integrated radios

You can use the Wireless Manager application to turn on and turn off the GeoExplorer 6000 series handheld's Wi-Fi, Bluetooth, and / or cellular modem radio (see [Using the Wireless Manager](#), page 81).




You can also turn on or turn off the Bluetooth radio from within the Bluetooth application (see [Turning on and turning off the Bluetooth radio from within the Bluetooth application, page 82](#)).

To make the GeoExplorer 6000 series handheld visible to other Bluetooth-enabled devices and enable them to connect, see [Making the handheld visible \(discoverable\) to other Bluetooth devices, page 82](#).

### Using the Wireless Manager

You can use the Wireless Manager application to turn on and turn off the GeoExplorer 6000 series handheld's Wi-Fi, Bluetooth, and / or cellular modem radio. You can turn on and turn off all radios at the same time, or control each radio individually.

To open the Wireless Manager, do one of the following:

- Tap the title bar, tap any of the radio icons and then tap **Wireless Manager**.
- Tap  / *Settings* / *Connections* / *Wireless Manager*.

Turn on the Wi-Fi, Bluetooth, and / or cellular modem radio to be able to connect to other devices or networks.

Turn off the Wi-Fi, Bluetooth, and / or cellular modem radio to prevent the handheld from sending or receiving wireless signals.



**Tip** – To conserve power, turn off the Wi-Fi, Bluetooth, and / or cellular modem radio when not in use.

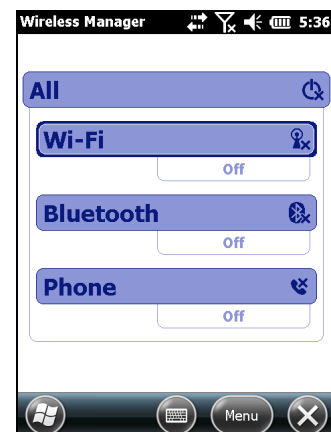



**CAUTION** – The Bluetooth and cellular modem radios remain active even when the device is in Suspend mode. Turn off the radios when they are not in use.

### To turn on or turn off the radios using the Wireless Manager

1. Open the Wireless Manager (see above).
2. Do one of the following:
  - Tap **All** at the top of the screen to turn on all radios, or to turn off all radios if they are already on.
  - Tap **Wi-Fi**, **Bluetooth**, or **Phone** to turn on the radio that you want to use, or to turn off the radio if it is already on.


The status fields below the **Wi-Fi** button, the **Bluetooth** button, and the **Phone** button change from *Off* when the radios are turned on and show the current state of the radio. The Wi-Fi status field shows *Connecting* or *Available*, the Bluetooth status field shows *On* or *Visible*, and the **Phone** status field shows *On* or the name of the cellular network that you are connected to.



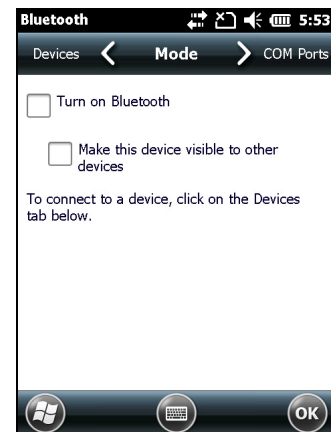
3. Tap  to exit the Wireless Manager.

After you turn on the Wi-Fi radio, the Wi-Fi icon  appears in the title bar to indicate that the Wi-Fi radio is enabled. A second icon  appears if a Wi-Fi network is detected, and a notification for the detected network may appear in the left softkey.

### Turning on and turning off the Bluetooth radio from within the Bluetooth application

1. Tap  / *Settings* / *Bluetooth*.
2. Tap the *Mode* tab.
3. Select the *Turn on Bluetooth* check box to turn on the radio, or clear this check box to turn off the radio.
4. Tap **OK**.


**Note** – *If the integrated Bluetooth radio is deactivated, the message **Problem with Bluetooth hardware** may appear when you try to turn on the Bluetooth radio or discover devices.*



### Making the handheld visible (discoverable) to other Bluetooth devices

To allow other Bluetooth-enabled devices to connect to the GeoExplorer 6000 series handheld, or if the handheld will not connect to or pair with another device you are attempting to connect to, you must make the handheld visible (this is sometimes referred to as “discoverable”).

To make the handheld **visible** to other devices:

1. Tap  / *Settings* / *Bluetooth*.
2. Tap the *Mode* tab.
3. Select the *Turn on Bluetooth* check box, if it is not already selected. This enables the integrated Bluetooth radio.
4. Select the *Make this device visible to other devices* check box.
5. Tap **OK**.

### Connecting wirelessly to other devices and networks

You can use a connection to a cellular network using the integrated cellular modem, or a connection to a Wi-Fi access point using the integrated Wi-Fi radio, to connect to the Internet (at broadband speeds) or a corporate network to:

- browse the Internet or an Intranet and send and receive data (for example, to obtain real-time corrections from a VRS network)

- send and receive messages ( for example, email, instant messages, or SMS messages)
- access files on the network

Wi-Fi access points are also known as “hotspots”.

You can use Bluetooth wireless technology to connect to other Bluetooth-enabled devices that are within range (typically within 5 m to 10 m of the handheld). You can connect to:

- Bluetooth-enabled devices such as cellular phones to access the Internet and receive data ( for example, to obtain real-time corrections from a VRS network)
- computers and other handheld devices to exchange files
- other devices such as a GeoBeacon receiver, laser rangefinder, or barcode scanner

**Note** – For information on connecting to external devices using the optional USB to serial converter, see [Connecting to other devices using the USB to serial converter; page 111](#)

The following table lists devices you can connect to using the handheld, and where to find detailed information on how to achieve these connections.

Connection method	To...	See...
Cellular modem	Connect to a cellular network	<a href="#">page 84</a>
Wi-Fi	Connect to a Wi-Fi access point	<a href="#">page 85</a>
Bluetooth wireless technology	Connect to another Bluetooth-enabled device (paired and non-paired connections)	<a href="#">page 87</a>
	Connect to a Bluetooth-enabled phone for Internet access or real-time corrections (including VRS networks)	<a href="#">page 94</a>
	Connect to a Bluetooth-enabled serial device	<a href="#">page 101</a>
	Connect to an office computer to use ActiveSync technology / WMDC	<a href="#">page 104</a>
	Output GNSS data to other devices using Bluetooth wireless technology	<a href="#">page 107</a>
	Enable other devices to transfer files using Bluetooth wireless technology	<a href="#">page 108</a>
	Beam files to or from another device	<a href="#">page 109</a>
Wi-Fi, Bluetooth wireless technology, or cellular modem	Access a corporate network through your Internet connection	<a href="#">page 110</a>

## Connecting to a cellular network from the modem

If your handheld is fitted with the optional cellular modem, use it to establish a connection to a cellular network.

Use this type of connection to browse the Internet or an Intranet and send and receive data (for example, to obtain real-time corrections from a VRS network), send and receive messages (for example, email, instant messages, or SMS messages), or access files on a corporate network.

**Note** – *The GeoExplorer 6000 series' cellular modem can only be used to send and receive data or text SMS messages. It does not support voice call functionality or sending and receiving MMS messages. Trimble recommends that you request a data-only plan from your cellular service provider and have a 'voice-restriction' placed on your line.*

To connect to a cellular network:



1. Configure the connection to the network. This can be Automatic or Manual.
2. Connect to the cellular network.

Before you begin the steps below, Trimble recommends that you:

- make sure that a SIM card is inserted in the handheld. See [Installing and removing a SIM card, page 37](#).
- confirm that the modem can access the Internet directly. If necessary, contact your service provider and confirm whether you must enter a user name, password, and domain details when connecting.
- make sure that you have the correct APN (Access Point Name) from your cellular provider.

### Step 1: Configure the connection

#### To set up an automatic configuration



1. Tap  / *Settings* / *Connections* / *Wireless Manager*. If the Phone is Off, tap Phone to turn it on.
2. Tap  / *Settings* / *Connections* / *Connections*.
3. On the Connections screen, on the Tasks tab, tap *Automatically configure connection*.

The device holds a database of the most common cellular providers and the correct connection settings. The handheld will attempt to identify the SIM vendor.



4. If the SIM vendor is recognised correctly, tap **Next** to continue. The connection settings are set up automatically. The process takes about 30 seconds.



If the SIM is not automatically detected, or the vendor settings are not known you will need to set up the configuration manually. Go to [To set up a manual configuration](#) below.

### To set up a manual configuration

1. Tap  / *Settings / Connections / Wireless Manager*. If the Phone is Off, tap Phone to turn it on.
2. Tap  / *Settings / Connections / Connections*.
3. Under Tasks, tap *Add a new modem connection*.
4. Enter a name for the connection, for example **My Connection**.
5. In the *Select a modem* field, select **Cellular Line (WWAN)** and then tap **Next**.
6. Enter the APN provided by your cellular provider (check with your provider first for correct settings, some providers have multiple APN settings).
7. Tap **Next**.
8. Enter a username password and domain if required (check with your provider, these are often not required). If not required, leave these fields empty.
9. Tap **Finished**.

### Step 2: Connect to the cellular network:

1. Tap  / *Settings / Connections / Wireless Manager*. If the Phone is Off, tap Phone to turn it on.
2. Tap  / *Settings / Connections / Connections*.
3. Under Tasks, tap *Manage existing connections*. The configured connections are listed.
4. Tap and hold the connection that you want to use. Tap *Connect* from the pop-up menu.

The task bar shows the “connecting” icon, for example . When the connection is open/established, the task bar shows the “connected” icon, for example . The icons shown depend on the network—see [Network and modem status indicators, page 42](#) for full details.

Once connected, open an application, for example, Internet Explorer, to test the connection. Some applications automatically launch the connection when you start the application, if a current connection is not already established.


## Connecting to a Wi-Fi access point

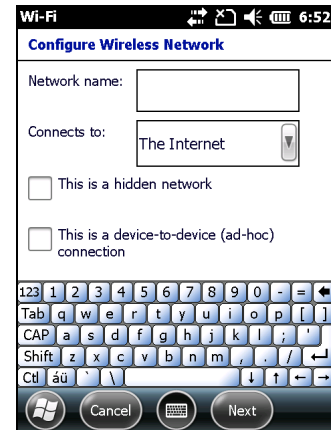
To connect to a Wi-Fi access point, you must:

1. Set up the Wi-Fi connection.
2. Connect to the Wi-Fi network or access point.


**Note** – *If you have installed a personal certificate on the handheld, you do not need to set up the wireless connection manually as described in Step 1. To connect to the network or access point go to [Step 2: Connecting to the network or access point](#).*

### Step 1: Setting up the Wi-Fi connection


1. Make sure that the GeoExplorer 6000 series handheld's Wi-Fi radio is enabled (see [page 80](#)).
2. Tap  / *Settings* / *Connections* / *Wireless Manager*.
3. Tap **Menu** and then select *Wi-Fi Settings*.  
Any networks that you have already configured are displayed in the list of preferred networks.
4. To add a new network, tap *Add New*. To change the settings for an existing network, tap the network.
5. Enter the name of the network and other connection details and then tap **Next**.
6. Do one of the following
  - To use authentication, select the authentication method from the *Authentication* list.
  - To use data encryption, select an encryption method from the *Data encryption* list.
  - To automatically use a network key, select the check box for *The key is automatically provided*. Otherwise, enter the *Network key* and the *Key index*.
7. Tap **Next**.
8. For increased security, select the *Use IEEE 802.1x network access control* check box and then configure additional authentication information.
9. Tap **Finish**.




### Step 2: Connecting to the network or access point

1. Disconnect the USB data cable, as the handheld prioritizes a USB connection over a Wi-Fi connection.
2. Bring the handheld within range of the network or access point.  
When a Wi-Fi connection is detected, the access point icon  appears on the title bar, and a notification message appears on the left softkey.  
If the access point icon or the notification does not appear, use the Wireless Manager to turn off and then turn back on the Wi-Fi radio. When the Wi-Fi radio is turned on, any networks or access points within range are detected and the icon and notification appear.
3. Tap the access point icon on the title bar or tap **Notification** on the left softkey. A popup message shows the available networks.
4. Select the network you want to connect to and then tap **OK** on the left softkey.

5. Select *The Internet (or work via a VPN)* or *Work* and then tap **Connect** on the left softkey.
6. If a *Network Log On* screen appears, enter your user name, password, and domain information and then tap **OK** on the left softkey.

When the handheld is connected to the network or access point, the Wi-Fi connected icon  appears in the title bar.

7. Start using the program you want to use, for example Windows Explorer Mobile or Internet Explorer.

**Note** – To disconnect from the network or an access point at any time, turn off the handheld's wireless radio. To do this, tap title bar, tap the Connectivity icon  on the pull-down list, select **Wireless Manager** and then tap the **Wi-Fi** button.



**Tip** – To delete a Wi-Fi connection, tap and hold the connection in the Wireless tab of the Wi-Fi Settings screen and then select Remove Settings.

## Connecting to a Bluetooth-enabled device

The GeoExplorer 6000 series handheld has an integrated Bluetooth radio that you can use to establish a wireless connection to other Bluetooth devices that are within range.

Using a Bluetooth connection, you can communicate with devices such as cellular phones, office computers, other handhelds, and Bluetooth-enabled laser rangefinders and barcode scanners. You can also communicate with peripheral devices that use Bluetooth adaptors instead of serial or USB connections.

The GeoExplorer 6000 series handheld can act as a Bluetooth client device or a Bluetooth host device, and can act as both at the same time. The concepts of client and host devices are explained in detail below.

### Connecting to a Bluetooth device as a client

You can use the GeoExplorer 6000 series handheld as a **client** device, which uses **services** offered by Bluetooth host devices that are within range. In general the **host** device provides information to the client device, but in some cases the client initiates the connection and also provides information to the host device.

The services used by a GeoExplorer 6000 series handheld when connecting as a Bluetooth client are:

Service	Description
Dialup Networking (DUN)	Connects the handheld to a cellular phone or modem for dial-up network or Internet access.
Personal Area Networking (PAN)	Connects to Bluetooth network access points or phones that support the Personal Area Network/Network Access (PAN) profile. The PAN service is only available on GeoExplorer 6000 series handheld models which do not have an integrated modem.
Serial Port	Emulates an RS-232 serial (COM) port on the handheld.

Service	Description
ActiveSync	Enables an ActiveSync connection to a computer. This service is also used for office computers which have the WMDC installed.
Input Device (HID)	Connects the handheld to a physical input device, such as a keyboard.
Wireless Stereo	Connects to Bluetooth A2DP (Advanced Audio Distribution Profile) headphones.

A client can connect to a number of different services provided by different hosts. The number of active connections at any one time affects the speed of the connections. Figure 6.1 shows the handheld connected to different types of host devices using Bluetooth wireless technology.



Figure 6.1 GeoExplorer 6000 series handheld Bluetooth client connections

In Figure 6.1, the dashed arrows indicate the client device—that is, the GeoExplorer 6000 series handheld—connecting to host devices. The Bluetooth profile (or service) used for the connection is shown between the arrows, for example, the *DUN* service is used for a connection to a cell phone, and the *Serial Port* service is used for a serial connection to a GeoBeacon receiver or laser rangefinder.

The solid arrows indicate the flow of information between devices. For example, when the GeoExplorer 6000 series handheld connects as a client to:

- a cellphone, the handheld uses the DUN or PAN host service provided by the phone to access the Internet and receive real-time differential corrections or background map data.



- a laptop computer or office computer, the devices use the ActiveSync technology to exchange information to and from either device.
- Bluetooth headphones, the handheld uses the Wireless Stereo host service provided by the headphones to play audio files and system sounds.

## Providing Bluetooth services as a host

You can use the GeoExplorer 6000 series handheld as a Bluetooth host device, which provides services to Bluetooth client devices that are within range.

Host services provided by the GeoExplorer 6000 series handheld are:

Service	Description
Serial Port	Emulates an RS-232 serial (COM) port on the handheld. For more information, see <a href="#">Outputting GNSS data to other devices using Bluetooth wireless technology</a> .
File Transfer	Allows a client to browse, copy, paste, and delete files and folders on the handheld.

**Note** – You cannot transfer files between two GeoExplorer 6000 series handhelds, as the client file transfer profile is not supported. The handheld supports file transfers as a host device only. To transfer files between handhelds, you can beam them (see [page 109](#)).

To provide a host service, you must turn on the Bluetooth radio and make both devices visible to other devices (see [page 80](#) and [page 82](#)).

[Figure 6.2](#) shows different client devices connecting to the handheld using Bluetooth wireless technology.

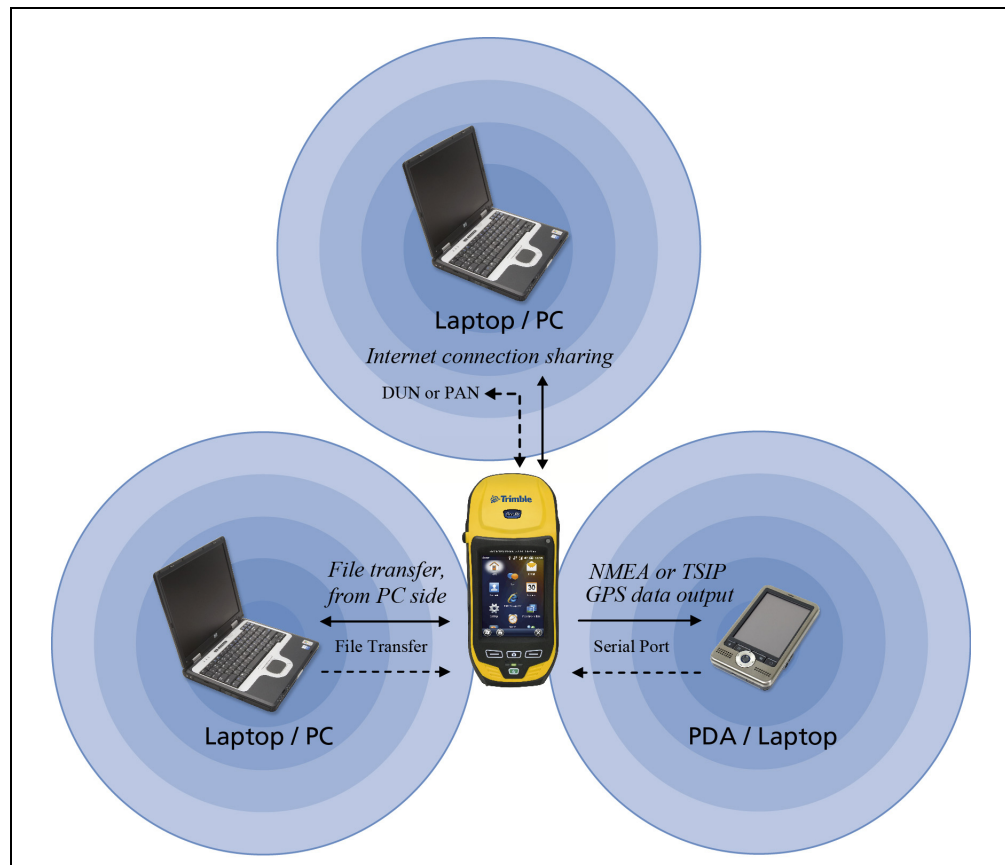


Figure 6.2 GeoExplorer 6000 series handheld Bluetooth host connections

In Figure 6.2 the dashed arrows indicate the client devices—for example, the laptop or PDA—connecting to the GeoExplorer 6000 series handheld, which is the host device. The Bluetooth profile (or service) used for the connection is shown between the arrows, for example the **Serial Port** service is used when outputting GPS data from the handheld to another device.

The solid arrows indicate the flow of information between devices. The GeoExplorer 6000 series handheld can output GNSS data to client devices that connect to the handheld using a Bluetooth serial port. When a laptop computer or office computer connects to the GeoExplorer 6000 series handheld and selects the File Transfer service, files and information can be exchanged to and from either device.

When a client device connects to the Serial Port service provided by the GeoExplorer 6000 series handheld, applications on the handheld can use the pre-defined host serial port on COM9 to provide host services to the client device. For example, to provide GNSS positions from the integrated GNSS receiver to another device, use the GNSS Connector software to redirect the NMEA output to COM9.

## Setting up a Bluetooth connection

To use another Bluetooth-enabled device with the GeoExplorer 6000 series handheld, you must form a Bluetooth connection between the two devices, during which you select the type of service to use for the connection. This defines how the devices will communicate with each other.

After forming the Bluetooth connection between the devices you may need to configure settings for the connection such as the COM port for the field software to use, or the number for the phone to dial. You must then connect to the other device using the appropriate software application.

To connect the GeoExplorer 6000 series handheld to another Bluetooth-enabled device, you can use either a paired connection or a non-paired connection.

**Note** – *If you are connecting to a phone, skip this section and go to [Connecting to a Bluetooth-enabled phone for Internet access or real-time corrections \(including VRS networks\)](#) on [page 94](#), where the pairing step is described as part of the procedure for connecting to a phone.*


Trimble recommends using a paired connection, if pairing is supported by the other device, as a paired connection creates a more secure connection and makes reconnecting to the device easier. For more information, see [Pairing with a Bluetooth-enabled device](#) below.

Some devices, such as a Trimble GeoBeacon receiver, do not support paired connections. Use a non-paired connection if the device does not have a keyboard, and if you know that the device does not automatically exchange a pre-programmed passkey during pairing. For more information, see [Setting up a connection to a non-paired device](#), [page 93](#).

### Pairing with a Bluetooth-enabled device

Pairing the handheld with another Bluetooth-enabled device creates a permanent security bond between the devices, which helps to exchange information securely between the devices. The paired relationship is established when two devices create and exchange a link key. Once the relationship is established, the handheld and the other Bluetooth device only need to have their Bluetooth radios turned on to exchange information; they do not need to be visible to other devices.

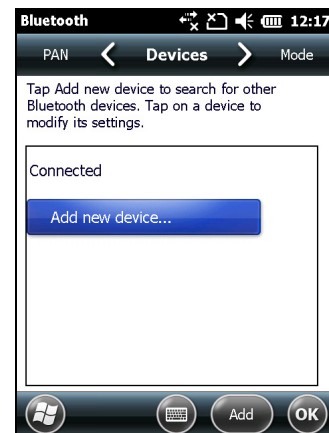
To pair with a Bluetooth device:

1. Make sure that the handheld and the Bluetooth device you want to pair with are within five meters of each other, and that the Bluetooth radio in each device is turned on.
2. On the GeoExplorer 6000 series handheld, tap  / *Settings* / *Bluetooth*.

3. In the *Devices* tab, tap *Add new device*. The handheld searches for other Bluetooth devices and displays them in the list.

If the device you are trying to connect is not displayed in the list, ensure that the device is on and within range and then tap **Retry** to search for devices again.

4. Tap the name of the device you want to pair with and then tap **Next**.
5. In the *Passcode* field, enter a passcode of between 1 and 16 characters. If you are connecting to:
  - a device with a keypad, enter a passcode of your choice.
  - a device without a keypad, but you know that the device has a pre-programmed passcode that will be exchanged, enter that passcode on the GeoExplorer 6000 series handheld.




**Note** – Trimble recommends that you enter only numbers, as some devices do not support passcodes that include letters.

6. Tap **Next**.
7. When prompted, enter the same passcode on the other device.
8. On the handheld, tap the name of other device. The *Partnership Settings* screen appears.
9. If required, change the name of the device in the *Display Name* field.
10. Select the service(s) you want to use with this device. For example, if you are connecting to:
  - a Bluetooth-enabled phone to connect to the Internet and receive real-time corrections or download background maps, select **Dialup Networking (DUN)**.
  - a serial device, such as a GeoBeacon receiver or a laser rangefinder, select **Serial Port**.
  - a computer to access ActiveSync technology (or WMDC), select **ActiveSync**.

**Note** – Only **ActiveSync** shows on the Windows Mobile device. Select **ActiveSync** even if you use the WMDC on the desktop computer.

**Note** – For more information on the types of devices that the GeoExplorer 6000 series handheld can connect to, and the supported Bluetooth services, see [Connecting to a Bluetooth device as a client, page 87](#).

11. Tap **Save**.
12. Tap **OK** to close the Bluetooth application.

13. Tap  to close the *Settings* screen.

You have now created a partnership between the GeoExplorer 6000 handheld and the other Bluetooth-enabled device so that they can communicate. To start using the connection, you must complete the configuration steps for that type of connection and then connect to the device. For more information, see:

- [Connecting to a Bluetooth-enabled phone for Internet access or real-time corrections \(including VRS networks\), page 94](#)
- [Connecting to a Bluetooth-enabled serial device, page 101](#)
- [Connecting to an office computer using Bluetooth wireless technology, page 104](#)




**Tip** – You only need to pair the handheld with a device before you connect to the device for the **first** time.

### Setting up a connection to a non-paired device

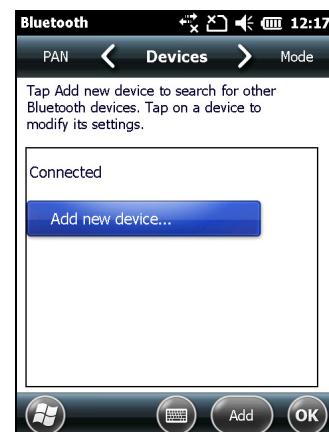
Setting up a connection to a non-paired device enables you to connect to a device that does not allow you to enter a passcode on the device, or that does not automatically exchange a pre-programmed passkey during pairing.

To set up a non-paired connection to a Bluetooth-enabled device:

1. Make sure that the handheld and the Bluetooth device you want to connect to are within five meters of each other, and that the Bluetooth radio in each device is turned on.
2. Tap  / *Settings* / *Bluetooth*.
3. In the *Devices* tab, tap *Add new device*. The handheld searches for other Bluetooth devices and displays them in the list.
4. Tap the name of the device you want to connect to and then tap **Next**.

The *Enter Passcode* screen appears.


5. Tap **Next** without entering a passcode.
6. If prompted to add the device to your device list, tap **No**.
7. On the handheld, tap the name of the other device. The *Partnership Settings* screen appears.
8. If required, change the name of the device in the *Display Name* field.
9. Select the service(s) you want to use with this device. For example, if you are connecting to:
  - a Bluetooth-enabled phone to connect to the Internet and receive real-time corrections or download background maps, select **Dialup Networking (DUN)**.



- a serial device, such as a GeoBeacon receiver or a laser rangefinder, select **Serial Port**.
- a computer to access ActiveSync (or WMDC), select **ActiveSync**.

**Note** – Only **ActiveSync** shows on the Windows Mobile device. Select **ActiveSync** even if you use the WMDC on the desktop computer.

**Note** – For more information on the types of devices that the GeoExplorer 6000 series handheld can connect to, and the supported Bluetooth services, see [Connecting to a Bluetooth device as a client, page 87](#).

10. Tap **Finish**.
11. Tap **OK** to close the Bluetooth application.
12. Tap  to close the *Settings* screen.

You have now created a partnership between the GeoExplorer 6000 handheld and the other Bluetooth-enabled device so that they can communicate. To start using the connection, you must complete the configuration steps for that type of connection and then connect to the device. For more information, see:

- [Connecting to a Bluetooth-enabled phone for Internet access or real-time corrections \(including VRS networks\), page 94](#)
- [Connecting to a Bluetooth-enabled serial device, page 101](#)
- [Connecting to an office computer using Bluetooth wireless technology, page 104](#)

## Connecting to a Bluetooth-enabled phone for Internet access or real-time corrections (including VRS networks)

If your GeoExplorer 6000 series handheld does not include the integrated cellular modem, you can still connect to a cellular network using the Bluetooth radio to connect to a Bluetooth-enabled cellular phone. Use this type of connection to access a VRS network or other correction source from the Internet, a background map server, or for Internet and email access.

**Note** – Some cellular phones support the Bluetooth PAN (Personal Area Networking) service as well as the Bluetooth DUN (Dialup Networking) service. Because DUN connections are more common, this section assumes you are making a dialup network connection with the Bluetooth-enabled phone. For information on setting up a PAN service, see [Connecting to the Internet through a Bluetooth-enabled phone using the Bluetooth PAN profile, page 100](#).


To connect to a Bluetooth-enabled phone using a Bluetooth DUN (Dialup Networking) connection, you must:

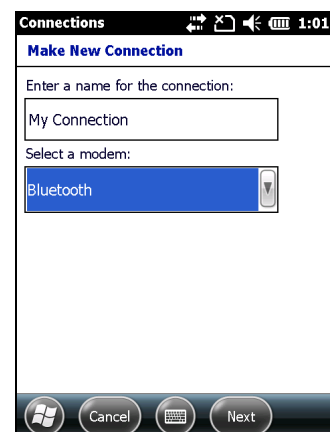
1. Connect the GeoExplorer 6000 series handheld to a Bluetooth-enabled phone and then configure the connection to the dialup network.
2. Connect to the Internet using the dialup network.

- Configure the software to use the connection. For example, you must configure the GNSS field software to use real-time corrections or map data received from the Internet source, or you must set up the Messaging application to send and receive email using the connection.

**Note** – Before you begin the steps below, Trimble recommends that you confirm that the phone can access the Internet directly. If necessary, contact the cellular phone provider and confirm whether you must enter a user name, password, and domain details when connecting an external device to the phone using Bluetooth dialup networking.

### Step 1: Connecting the handheld to the phone and configuring the connection to the dialup network

- Make sure that the handheld and the Bluetooth device you want to connect to are within five meters of each other, and that the Bluetooth radio in each device is turned on. For more information, see [Turning on and turning off the integrated radios, page 80](#).
- On the handheld, tap  / *Settings* / *Connections* / *Connections*.
- Below *My ISP*, tap *Add a new modem connection*.
- Enter the name for the connection. For example, enter the name of the phone or the VRS network that you will connect to.
- From the *Select a Modem* dropdown list, select **Bluetooth** and then tap **Next**.
- If the phone you want to connect to is:
  - listed, go to [Step 7](#) below.
  - not listed:



- Tap *Add new device*. The handheld searches for other Bluetooth devices and displays them in the list.

If the handheld's integrated Bluetooth radio is turned off, it is now automatically turned on.

- From the list of available devices, select the device you want to connect to and then tap **Next**.
- To pair with the phone, enter a passcode of your choice that you will easily remember onto the handheld and then tap **Next**.
- When prompted by the phone, enter the same password and then accept the connection.
- On the GeoExplorer 6000 series handheld, tap *Advanced* to open the Partnership Settings screen. Make sure that **Dialup Networking (DUN)** is selected and then tap **Save**.

You have now created a partnership between the GeoExplorer 6000 series handheld and the phone so that they can communicate.

7. From the *My Connections* list, select the phone that you want to configure the connection to.
8. Enter the GPRS access number for the Internet.

Two of the common GPRS access numbers for cellular phones on GSM networks are \*99\*\*\*1# and \*99#. If these access numbers do not work, contact the cellular phone provider to obtain the appropriate number to use.

**Note** – *You do not need to set up dialling rules or change the Internet connection settings on the phone. The connection settings you enter on the handheld are passed to the phone to use for this connection.*

9. Tap **Next**.
10. Unless the phone provider confirmed that you must enter user name, password, and domain settings to access the Internet, tap **Finish** without entering any information in this screen.


Otherwise:

- a. Enter the required information.
- b. If the phone provider has told you that you need to change the baud rate or other settings for the connection, tap **Advanced**, configure these settings and then tap **OK**.
- c. Tap **Finish**.

You are returned to the *Connections* screen.

You have now configured the dialup networking connection.

## Step 2: Connecting to the Internet using the dialup network

1. On the handheld, go to the *Connections* screen, if it is not already open (tap  / *Settings* / *Connections* / *Connections*).
2. Below *My ISP*, tap *Manage existing connections*.
3. Tap and hold the connection you want to use and then select *Connect*.
4. Unless the phone provider confirmed that you must enter user name, password, and domain settings to access the Internet, tap **OK** without entering any information in this screen. Otherwise, enter the required information and then tap **OK**.
5. If the phone prompts for confirmation to connect to the Internet, accept the connection.

The phone dials the configured GPRS access number and then connects to the Internet.





A Connectivity notification appears on the handheld as the connection is being made.

After the connection is made you are returned to the *My ISP* screen.

To confirm that the GeoExplorer series handheld is connected to the phone, or to check the status of the connection at any time, tap the title bar and then tap the Connectivity icon on the pull-down list. The notification shows the name of the current connection, and the time elapsed since the connection was made.

To hide the notification, tap **Hide**.

**Note** – *If you have an active Wi-Fi connection, the connectivity icon appears as  instead.*

6. Tap **OK** to close the *My ISP* screen.
7. Tap **OK** to close the *Connections / Tasks* screen.
8. Tap  to close the *Connections* screen.

To check the connection status at any time, tap the title bar and then tap the required status icon on the pull-down list.

To end the connection at any time, tap the title bar, tap the required status icon on the pull-down list and then tap **Disconnect**.

To connect to a corporate network or Intranet, see [page 110](#).

To send and receive email messages, see [Messaging, page 52](#).

### Step 3: Configuring the GNSS field software to use data received from the Internet source



Now that you have connected the GeoExplorer 6000 series handheld to the Internet, you must configure the software to use the connection to receive data.

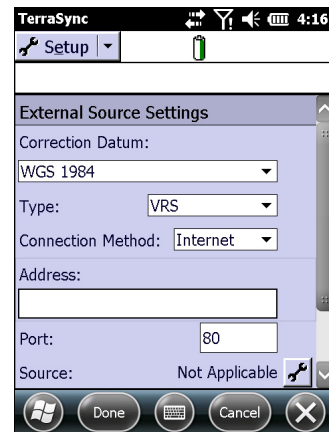
To use real-time corrections in Trimble field software, see [Using real-time corrections from the Internet](#) below.

To use background map data in the TerraSync software, see [Downloading background map files from an Internet map server, page 99](#)

#### Using real-time corrections from the Internet

1. Start the Trimble GNSS field software and then open the *Setup* section.
2. Tap **Real-time Settings**. The *Real-time Settings* form appears.
3. From the *Choice 1* field, select **External Source**.
4. Configure the external source:

- a. Tap the Setup button  beside the *Choice 1* field. The *External Source Settings* form appears.
  - b. From the *Correction Datum* field, select the same datum as the VRS network coordinate system.
  - c. From the *Type* field, select:
    - **VRS** if the real-time correction source is a VRS network.
    - **Single Base** if the real-time correction source is a single base station that broadcasts its corrections over the Internet.
  - d. From the *Connection Method* field, select **Internet**.  
Typically, the IP address or URL of a VRS network has the format 10.3.123.456:1234, where the digits before the colon (:) are the address, and the digits after the colon (:) are the port number.
  - e. In the *Address* field, enter the IP address or URL of the VRS network or the server that is supplying the corrections from the VRS network.
  - f. In the *Port* field, enter the port number that you will use to connect to the server.
  - g. If you are connecting to a VRS network through a broadcast server, tap the Setup button  beside the *Source* field. The GNSS field software attempts to establish a connection to the broadcast server. If the connection is successful, the *Select Server* form appears. Select the server that you want to use and then tap **Done** to return to the *External Source Settings* form.
  - h. If you selected a VRS network that requires authentication, the *Name* and *Password* fields appear. Enter the user name and password that you obtained from the service provider.
  - i. From the *Connection Control* field, select:
    - **Auto** if you want the GNSS field software to automatically establish and end connections to the VRS network as necessary.
    - **Manual** if you want to connect or disconnect only when you tap **Ext Source** in the *Setup* screen.
  - j. Tap **Done** to confirm the settings and return to the *Real-time Settings* form.
5. Tap **Done** to confirm the real-time settings and return to the main screen of the Setup section.



If you selected **Auto** in the *Connection Control* field, the **Ext Source** button is depressed and the software attempts to connect to the server.

- If you selected **Manual** in the *Connection Control* field, tap the **Ext Source** button that appears below the Status bar in the Setup section to connect the Trimble GNSS field software to the Internet correction source.




**Tip** – To disconnect or reconnect to the server at any time, tap **Ext Source**. To view the status of the real-time correction source, open the Status section, select the Real-time subsection and then select *External* from the **Summary** list button.

### Downloading background map files from an Internet map server

- Make sure that the coordinate system selected in the TerraSync software matches the coordinate system of the map server.
- In the Map section of the TerraSync software, pan or zoom to make sure that the area for which you want a background image is displayed on the map.

If the map server covers the area you are in, it will provide a background image that matches the current map extents.

- Tap **Layers** and then select *Background files*. The *Background Files* form appears.
- In the *Location* field select Internet and then use the fields that appear to specify the Map Server type, the URL of the server, the service, and the layers from that service that you want to download.
- Tap **Done** to close the *Background File* form and download the selected background map.

This may take some time. When a download is in progress, an icon  appears in the top left corner of the map. Once the background file is downloaded, the hourglass icon appears until the downloaded image is rendered and becomes visible.

If you pan or zoom beyond the extents of the downloaded image, new images are downloaded automatically and displayed in the background of the map.

To stop automatic downloading of background files, either clear the address of the map server from the *URL* field, or set the *Location* field to Default and then clear the check box next to any files.

### Reconnecting to the Internet

To reconnect to the Internet at any time after setting up the connection, repeat the steps listed under [Step 2: Connecting to the Internet using the dialup network](#) on [page 96](#).

If you selected Auto in the *Connection Control* field of the Trimble GNSS field software, the software automatically connects to the Internet source that is providing real-time differential corrections.

To *manually* reconnect the Trimble GNSS field software to the Internet source that is providing real-time differential corrections, open the software and then tap the **Ext Source** button that appears below the status bar in the Setup section.

## Connecting to the Internet through a Bluetooth-enabled phone using the Bluetooth PAN profile

This section describes how to set up a Bluetooth Personal Area Network (PAN) connection for Internet access, using Bluetooth-enabled cellular phone.

The PAN service is not available on GeoExplorer 6000 series handheld models which have an integrated modem.


Making a Bluetooth PAN connection with a Bluetooth-enabled cellular phone is similar to making a Bluetooth Dialup Networking (DUN) connection (see [Connecting to a Bluetooth-enabled phone for Internet access or real-time corrections \(including VRS networks\), page 94](#)), in that it enables the handheld to access the Internet. If PAN connections are supported by your cellular phone, the advantages of using a PAN connection rather than a DUN connection are:

- PAN connections are easier to set up.
- PAN connections automatically attempt to reconnect when the handheld is resumed from being suspended or shut down.

To access the Internet using a Bluetooth PAN connection to a Bluetooth-enabled cellular phone, you must:

1. Pair the GeoExplorer 6000 series handheld with a cellular phone that supports the Bluetooth PAN profile.
2. Enable the PAN connection on the handheld.

### Step 1: Pairing with the cellular phone

1. Make sure that the handheld and the Bluetooth device you want to pair with are within five meters of each other, and that the Bluetooth radio in each device is turned on.
2. On the GeoExplorer 6000 series handheld, tap  / *Settings* / *Bluetooth*.
3. In the *Devices* tab, tap *Add new device*. The handheld searches for other Bluetooth devices and displays them in the list.

If the device you are trying to connect is not displayed in the list, ensure that the device is on and within range and then tap Refresh to search for devices again.

4. Tap the name of the device you want to pair with and then tap **Next** on the right softkey.
5. In the *Passcode* field, enter a passcode of your choice (between 1 and 16 characters).

**Note** – Trimble recommends that you enter only numbers, as some devices do not support passcodes that include letters.

6. Tap **Next** on the right softkey.
7. When prompted, enter the same passcode on the other device.

On the handheld, the *Partnership Settings* screen appears.




8. If required, change the name of the device in the *Display Name* field.
9. Select the *Network Access Point* check box. The boxes for other Services offered by the phone can be unchecked.
10. Tap **Finish** on the right softkey.


## Step 2: Enabling the PAN connection

1. In the PAN tab of the Bluetooth application on the handheld, select the cellular phone you just connected to from the drop down list and then select the *Enable PAN connection* check box.

The status field in the PAN tab shows the progress of the connection. Wait until the Status field shows Connected.

2. Check the cellular phone and if prompted, allow the connection.

The  or  icon in the title bar changes to .

3. Tap **OK** to close the Bluetooth application.
4. Tap  to close the Settings screen.
5. If the *Establishing Connection* popup message appears on the handheld, select *The Internet (or work via a VPN)* or *Work* and then tap **Connect**, or dismiss the message.
6. Start using the program you want to use, for example Windows Explorer Mobile or Internet Explorer.

To check the connection status at any time, tap the title bar and then on the pull-down list tap the required connection icon. The Bluetooth PAN connection appears as "Network Card".

To end the connection at any time, tap  / *Settings* / *Bluetooth*. In the PAN tab, clear the *Enable PAN connection* check box.

## Connecting to a Bluetooth-enabled serial device

Use Bluetooth wireless technology to receive data from a Bluetooth-enabled serial device, such as a GeoBeacon receiver or a laser rangefinder.

To connect to a Bluetooth-enabled serial device, you must:


1. Connect to the Bluetooth-enabled serial device.
2. Configure the COM port on the handheld to use for the connection.

3. If necessary, configure the GNSS field software to use data received from the serial device.

### Step 1: Connecting to the Bluetooth-enabled serial device


Connect the handheld to the Bluetooth-enabled device, selecting the *Serial Port* service if it is not already selected (see [Connecting to a Bluetooth-enabled device](#), page 87).

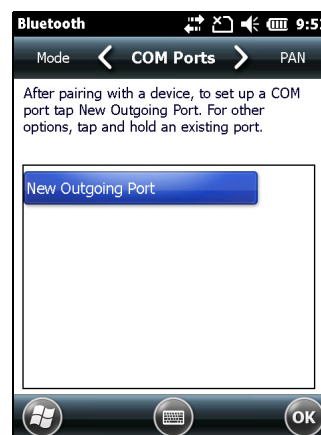
### Step 2: Configuring the COM port to use on the handheld

1. On the GeoExplorer 6000 series handheld, tap  / *Settings* / *Bluetooth*.
2. Tap the *COM Ports* tab.
3. Tap *New Outgoing Port*.
4. Select the device you want to set up the connection to and then tap **Next**.

5. Select the COM port on the GeoExplorer handheld to use for the connection.

The GeoExplorer 6000 series handheld has three COM ports (COM5, COM6, and COM7) available for connections out to Bluetooth-enabled serial devices.

6. Do one of the following:
  - To communicate with any device, for example if you have formed this connection without pairing to a device, clear the *Secure Connection* check box.
  - To communicate only with devices with which the handheld has a Bluetooth partnership, select the *Secure Connection* check box.
7. Tap **Finish**.
8. Tap **OK** to close the Bluetooth application.
9. Tap  to close the *Settings* screen.




### Step 3: Configuring the GNSS field software to use data from the serial device

Once you configure the connection between the GeoExplorer 6000 series handheld and the Bluetooth-enabled serial device, you must configure the software to use the connection to receive data.

To use real-time corrections in Trimble field software, see [Using real-time corrections from an external serial device](#) below.

To use an Bluetooth-enabled external sensor such as a laser rangefinder or a barcode scanner in TerraSync software, see [Using data from an external source in the TerraSync software, page 103](#).

### Using real-time corrections from an external serial device

1. Start the Trimble GNSS field software and then open the *Setup* section.
2. Tap **Real-time Settings**. The *Real-time Settings* form appears.
3. From the *Choice 1* field, select **External Source**.
4. Tap the Setup button  beside the *Choice 1* field. The *External Source Settings* form appears.

5. From the *Correction Datum* field, select the datum used by the correction source to calculate corrections.

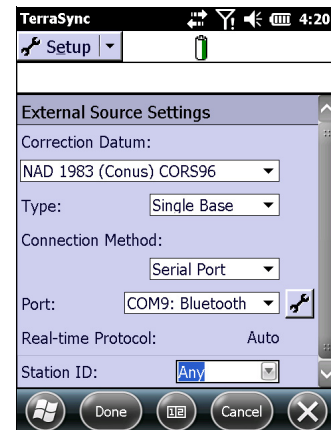
Trimble recommends that you select NAD 1983 (Conus) CORS96 if you are using a US Coast Guard beacon service, or WGS84 for any other beacon service.

6. From the *Type* field, select **Single Base**.
7. From the *Connection Method* field, select **Serial Port**.
8. From the *Port* field, select the name of the COM port that you selected in the Bluetooth application when you set up the connection to the serial device.
9. Tap **Done** to confirm the external source settings and return to the *Real-time Settings* form.
10. Tap **Done** to confirm the real-time settings and return to the main screen of the Setup section.

The real-time correction source is now set up for use. The TerraSync software automatically connects to the correction source when you run the software, and automatically disconnects from the source when you close the software.

To manually disconnect from the correction source at any time, go to the *Real-time Settings* form and from the *Choice 2* field select Use Uncorrected GNSS.

To view the status of the real-time correction source, open the Status section, select the Real-time subsection and then select *External* from the **Summary** list button.

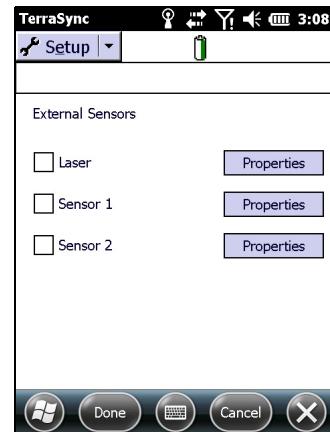


### Using data from an external source in the TerraSync software

To configure the TerraSync software to use data from an external source, for example, a laser rangefinder or barcode scanner:

1. Start the TerraSync software and then open a data file.
2. In the *Setup* section, tap **External Sensors**. The *External Sensors* form appears.
3. If you are connecting to:
  - a laser rangefinder, select the *Laser* check box and then tap the **Properties** button beside the *Laser* check box. The *Laser Properties* form appears.
  - a barcode scanner or other external sensor, select the *Sensor 1* or *Sensor 2* check box and then tap the **Properties** button beside the appropriate check box. The *Sensor Properties* form appears.
4. If you are connecting to a barcode scanner or other external sensor, enter a name for the connection in the *Name* field.
5. From the *Port* drop-down list, select the name of the COM port that you selected in the Bluetooth application when you set up the connection to the device.
6. Tap **Done** to confirm the sensor settings and return to the *External Sensors* form.
7. Tap **Done** to confirm the settings and return to the main screen of the Setup section.
8. The external sensor is now setup for use and can be used to add data as attributes into an open file in TerraSync. The device is automatically connected and disconnected when data files in TerraSync are opened and closed.
 

To check the status of the connection, select the Comms subsection in the Status section of the GNSS field software .



## Connecting to an office computer using Bluetooth wireless technology

Instead of using a USB or serial cable to physically connect to an office computer, you can use Bluetooth wireless technology to connect to ActiveSync technology or the Windows Mobile Device Center (WMDC) on a Bluetooth-enabled office computer.

**Note** – *Not all Bluetooth devices and Bluetooth management software support ActiveSync technology or WMDC connections. Check with the manufacturer of the office computer for compatibility.*

**Note** – *The exact steps required may vary depending on the office computer.*

To connect to an office computer to use ActiveSync technology or WMDC with a Bluetooth connection, you must:

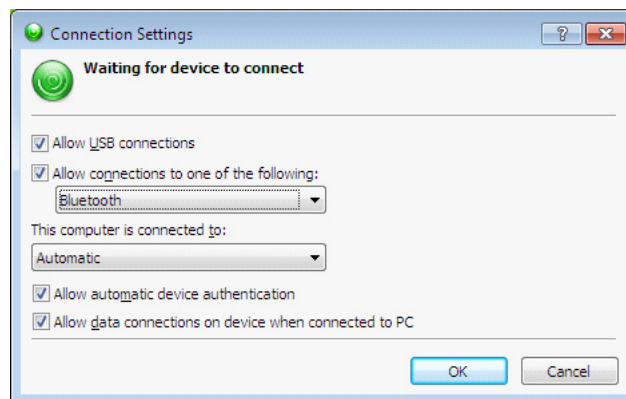
1. Set up the connection to the computer.
2. Connect to ActiveSync technology or WMDC using Bluetooth wireless technology.



### Step 1: Setting up the connection to the computer

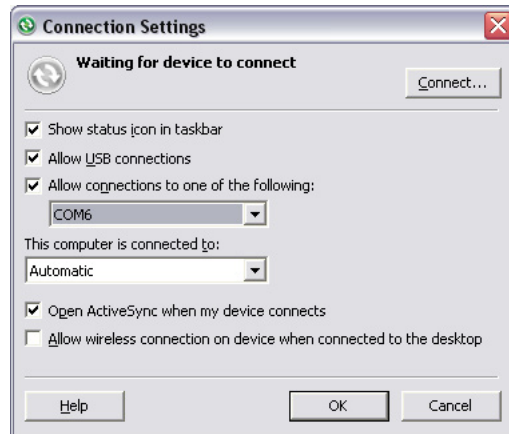
1. From the Bluetooth user interface on the office computer, make sure that the computer allows itself to be discovered by other Bluetooth devices.
2. Configure ActiveSync technology or WMDC on the office computer to connect to the correct Bluetooth port. The steps required depend on the operating system installed on the office computer. If the office computer is using:
  - the Windows 7 or Windows Vista operating system:
    - a. From the *Start* menu on the office computer, select *Control Panel / Windows Mobile Device Center*.

The *Connection Settings* dialog appears:




- b. Select the *Allow connections to one of the following* check box.
- c. From the list, select Bluetooth and then click **OK**.
- the Windows XP operating system:
  - a. From the Bluetooth user interface on the office computer, identify the virtual COM port of the of the host Bluetooth Serial Port or Local Service and ensure that this is enabled. In this example, the virtual COM port is COM5.
  - b. Start the ActiveSync technology on the office computer.
  - c. Select *File / Connection Settings*.

The *Connection Settings* dialog appears:




- d. Select the *Allow connections to one of the following* check box.
- e. From the list, select the COM port that you selected in [Step a](#) and then click **OK**.

**Note** – Before you try to form a Bluetooth connection from the GeoExplorer 6000 series handheld to the office computer, you must correctly configure the Bluetooth host serial port and ActiveSync technology on the office computer.

3. On the handheld, tap  / *Settings* / *Bluetooth*.
4. In the *Devices* tab, tap *Add new device*. The handheld searches for other Bluetooth devices and displays them in the list.
5. Tap the name of the computer you want to connect to and then tap **Next**.
6. When prompted, enter a passcode of your choice that you will easily remember on the handheld.
7. Enter the same passcode on the office computer.
8. On the handheld, select the **ActiveSync** check box in the list of services provided by the computer and then tap **Finish**.

**Note** – The checkbox on the handheld still shows **ActiveSync**, even if the office computer is running the Windows 7 or Windows Vista operating system and you are using the WMDC.

You have now created a partnership between the GeoExplorer 6000 series handheld and the office computer so that they can communicate.

9. Tap **OK** to close the Bluetooth application.
10. Tap  to close the *Settings* screen.
11. To connect, go to [Step 2](#) below. Note that the check box on the handheld shows **ActiveSync** even if the office computer is running the Windows 7 or Windows Vista operating system and you are using the WMDC.

## Step 2: Connecting to ActiveSync using Bluetooth wireless technology

1. On the GeoExplorer 6000 series handheld, tap  / *ActiveSync*.



**Note** – Only *ActiveSync* shows on the Windows Mobile device. Select *ActiveSync* even if you use the WMDC on the desktop computer.

2. Tap **Menu** and then select *Connect via Bluetooth*.

On the GeoExplorer handheld, a message box shows the status of the connection as it is made.

3. When the connection to the office computer is successful, you are returned to the ActiveSync application on the handheld.

4. Tap  to close.

The connectivity icon in the status bar shows , or  if WLAN is connected.

To check the status of the connection, tap the title bar and then tap the connectivity icon on the pull-down list.

To disconnect, tap  / *ActiveSync* on the handheld and then select *Menu / Disconnect*.

## Outputting GNSS data to other devices using Bluetooth wireless technology

To provide GNSS positions from the GeoExplorer 6000 series handheld to another device using a Bluetooth wireless connection, you must:


1. Connect the other device to the GeoExplorer 6000 series handheld.
2. Configure the handheld to output data to the other device. Make sure that the GNSS Connector software is installed on the handheld—see [GNSS Connector software, page 63](#).
3. Configure the other device to receive data from the handheld.

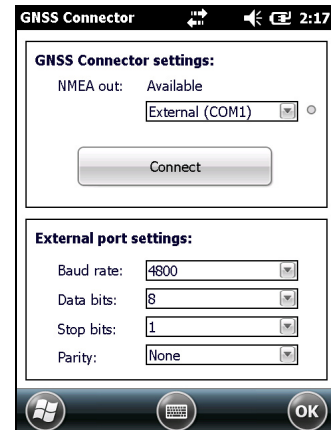
### Step 1: Connecting the other device to the GeoExplorer series handheld

1. Turn on the GeoExplorer 6000 series handheld's Bluetooth radio and make the handheld *visible* to other devices (see [page 82](#)).
2. On the other device, turn on the Bluetooth radio.
3. Use the Bluetooth management software on the other device to scan for other Bluetooth devices and then set up a serial port connection to the GeoExplorer 6000 series handheld.
4. If prompted to enter a passcode on the other device, enter a passcode of your choice that you will easily remember.
5. When prompted on the GeoExplorer 6000 series handheld, accept the connection to the other device.

6. Enter the same passcode on the GeoExplorer 6000 series handheld that you entered on the other device and then tap **Next** on the handheld.
7. On the handheld, tap **Finish**.

### Step 2: Configuring the handheld to output data to the other device

1. On the GeoExplorer 6000 series handheld, tap  *GNSS Connector* to open the GNSS Connector software.
2. Use the GNSS Connector software to output NMEA messages to **COM9**. This is the GeoExplorer 6000 series handheld's Host Bluetooth serial port.
3. Use the Trimble GNSS field software to ensure NMEA output is set to *On*, to configure the NMEA output settings (output rate and messages), and to configure the GNSS settings.



**CAUTION** – NMEA standard dictates that a baud rate of 4800bps should be used for NMEA messages. Depending on the number of satellites being tracked (for example, if you are tracking GLONASS and GPS satellites) the amount of data being captured at once may often cause the 4800 bit limit to be exceeded.

Buffers have been added which allow the data to be stored and then sent when it is able to. This avoids data corruption, but may delay delivery of data, and positions may take as long as 8 seconds to be sent from the time at which they were originally recorded. If you need 4800bps output, Trimble suggests that you try to minimise the effect by reducing the amount of NMEA data being sent, for example, by dropping out NMEA sentences from the NMEA stream.

### Step 3: Configuring the other device to receive data from the handheld

1. On the other device, run the application that will use the data from the handheld.
2. Configure the application to connect to the COM port on the other device that you selected (or was assigned) when you created the serial port connection to the handheld.

## Enabling other devices to transfer files using Bluetooth wireless technology

To transfer files to and from another device without connecting using ActiveSync technology or the WMDC, follow the general steps below:


**Note** – *The exact steps for transferring files will depend on the Bluetooth file management software that is installed on the other device.*

1. Turn on the GeoExplorer 6000 series handheld's Bluetooth radio and make the handheld **visible** to other devices (see [page 82](#)).
2. On the other device, turn on the Bluetooth radio.
3. On the other device, make sure that Bluetooth file transfer is enabled.
4. Use the Bluetooth management software on the other device to scan for devices and then set up a connection to the GeoExplorer 6000 series handheld.
5. Use the Bluetooth management software on the other device to locate the file and transfer it to the \My Documents folder on the handheld.

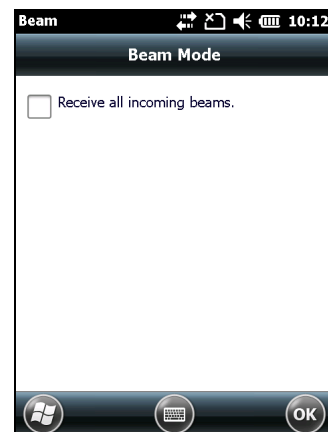
## Beaming files to or from another device

You can beam files, contacts, tasks, and appointments between the handheld and another device.

To **receive** beamed files from another device:

1. Make sure that the GeoExplorer 6000 series handheld's integrated Bluetooth radio is turned on (see [page 82](#)).
2. Tap  / *Settings* / *Connections* / *Beam*.
3. Select the *Receive all incoming beams* check box and then tap **OK**.
4. When another device attempts to beam a file, you are prompted to accept the file. To receive the file, tap **Yes**.

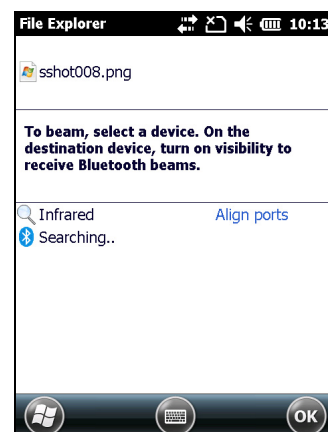
**Note** – All incoming files are automatically saved in the *My Documents* folder on the handheld.



To **send** beamed files to another device:

1. Make sure that the GeoExplorer 6000 series handheld's integrated Bluetooth radio is turned on (see [page 82](#)).
2. On the GeoExplorer 6000 series handheld, open File Explorer and go to the file you want to send.
3. Tap and hold the file and then select *Beam File*. The handheld scans for nearby devices.
4. Tap the device you want to send the file to. The file is sent to the device.

A message reports **Done** or **Failed**, depending on the outcome of the file transfer.



## Accessing a corporate network through your Internet connection

Use a Virtual Private Network (VPN) connection to access a corporate network or Intranet.

Before you begin, obtain the following information from your network administrator:

- user name and password
- domain name
- host name or IP address of the VPN server

To access a corporate network through your Internet connection, you must:


1. Set up an Internet connection on the handheld.
2. Set up a VPN connection.
3. Connect to the corporate network or Intranet.

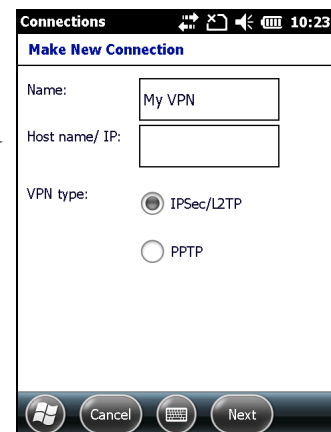
### Step 1: Setting up an Internet connection on the handheld

Do one of the following:

- Set up a Wi-Fi connection to an access point. For more information, see [page 85](#).
- Connect to the Internet using the internal cellular modem. For more information, see [page 87](#)
- Connect to the Internet using a Bluetooth-enabled phone. For more information, see [page 94](#).

### Step 2: Setting up a VPN connection

1. On the GeoExplorer 6000 series handheld, tap  / *Settings* / *Connections* / *Connections*.
2. From the *My Work Network* list, tap *Add a new VPN server connection*.
3. Follow the instructions in the *Make New Connection* wizard.
4. Tap **Finish**.





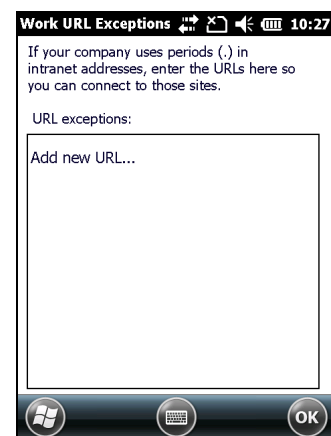
### Step 3: Connecting to the corporate network or Intranet

To connect to the corporate network or Intranet, simply start using Internet Explorer.

The Windows Mobile operating system automatically controls whether the VPN connection is used, depending on whether the URL contains a period. For example, the URL [www.trimble.com](http://www.trimble.com) contains periods, and so the connection to this web site is made without using the VPN connection. However, an address to a network computer or file server that does not contain periods automatically starts the VPN connection.

If you need to use the VPN connection to access URL addresses that contain periods, specify exceptions for the addresses that are within the corporate network. To do this:

1. Tap  / *Settings* / *Connections* / *Connections*.
2. Tap the *Advanced* tab.
3. Tap **Exceptions**. The *Work URL Exceptions* screen appears.
4. Tap *Add new URL*.
5. Enter the URL and then tap **OK**.
6. Repeat Step 4 and Step 5 as required.
7. Tap **OK** to return to the *Advanced* tab of the *Connections* screen.
8. Tap **OK** to close the *Connections* screen.
9. Tap  to close the *Settings* screen.



## Connecting to other devices using the USB to serial converter

The optional USB to serial converter attaches to the USB port on the bottom of the handheld. When the USB to serial converter is attached, it adds a serial port (COM1) to the GeoExplorer 6000 series handheld.

You can use the USB to serial converter to:

- receive differential corrections from an external real-time correction source, such as a Trimble GeoBeacon receiver, or a DGPS radio (see [Using real-time corrections from an external correction source, page 70](#))
- connect to other external devices, such as a laser rangefinder (see [Using data from an external source in the TerraSync software, page 103](#), and select COM1 instead of a Bluetooth COM port)
- connect to a computer to supply GNSS data (see [Outputting NMEA data to external equipment, page 76](#))

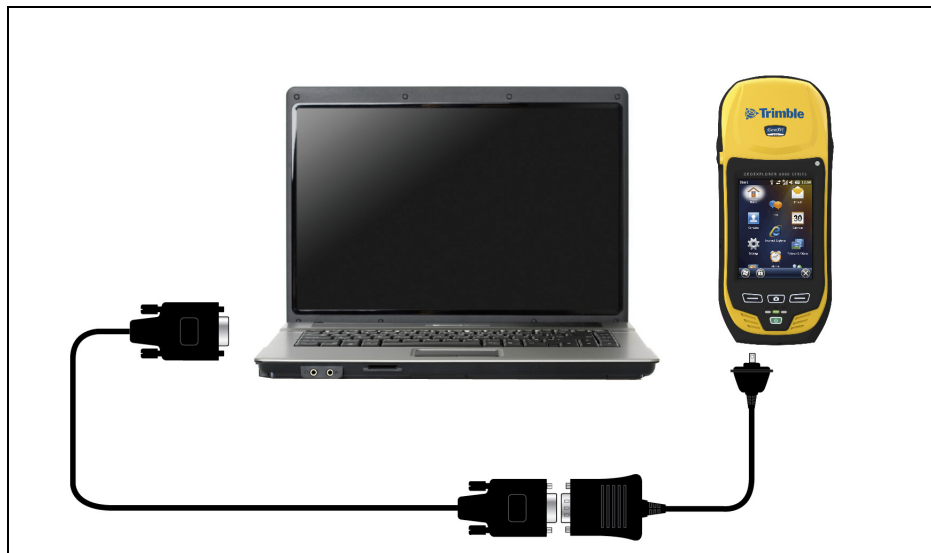
## Connecting to external devices

You can use the USB to serial converter to connect to an external device that has a serial port, such as a computer.

**Note** – When connecting to an office computer, you cannot use ActiveSync technology (or the WMDC) to establish the connection or synchronize data. To use ActiveSync (or the WMDC), you must use a USB cable or a Bluetooth connection (see [Connecting the handheld to a computer, page 57](#)).

To connect to an external device that has a serial port:

1. Attach the USB to serial converter to the handheld.
2. Plug the null modem cable into the serial (COM) port on the USB to serial converter.
3. Connect the other end of the cable to the serial port on the external device.



To connect to a serial device that does not have a standard 9-pin serial port, use a cable that has a DE9 connector on one end, and the appropriate connector for the other device on the other end. A suitable cable may be supplied with the external device.



## Using the Camera

### In this chapter:

- [Parts of the camera](#)
- [Starting the camera application and capturing photos or video](#)
- [Adjusting camera settings](#)

The GeoExplorer 6000 series handheld contains an integrated digital camera to capture photos or video.

## Parts of the camera




Figure 7.1 GeoExplorer 6000 series camera controls

Use the **Camera** button to:

- Start the camera application
- Lock focus (press and hold the button)
- Capture photos (release the button)
- Start and stop recording a video (in *Video* mode, press the button)

## Starting the camera application and capturing photos or video


To start the camera, do one of the following:

1. Press the **Camera** button in the center of the keypad.
2. Tap  / *Pictures & Videos* / *Camera*.

When the camera application is started, it is by default in *Still* (photo) mode.

3. Do one of the following:
  - a. To capture a photo:
    - Hold the handheld steady. Use the preview window to frame the subject in the centre of the frame.
    - To focus, press the **Camera** button down and hold. Focus and exposure are set and locked while the camera button is held in this position.
    - To capture the photo, release the **Camera** button and hold the camera steady until the review photo is shown.
  - b. To capture a video:
    - Tap the menu **Menu** button and then select *Video*.

- Use the preview window to frame the start of the video.
- To start recording, press the **Camera** button and then release. Move the handheld to record the video.
- To pause recording, tap the **Pause** button. To stop recording, tap the **Stop** button or press the **Camera** button.

**Note** – When the camera application displays the  icon, it is storing the photo or video file. Removing the battery or the memory card while recording may affect photos / videos or damage the memory card.

To switch to *Still* mode from *Video* mode, tap the menu **Menu** button and then select *Still*.

## Adjusting camera settings

To access the camera settings:

1. Start the camera application and then tap the **Menu** button.  
The available camera settings are displayed in a list.
2. Tap the required setting or change the current value. The list of available settings varies depending on whether you are in *Video* mode or *Still* mode.

Table 7.1 Camera settings

Mode	Setting	Options
Still & Video	Brightness	+3, +2, +1, 0*, -1, -2, -3
Video	Audio	On, Off
Video	Resolution	640x480, 320x240, 176x144
Still	Resolution	5MP, 3.2MP, 2MP, 1.3MP, 640x480, 320x240
Still & Video	Compression	Low quality, Medium quality, High quality
Still & Video	White Balance	Automatic*, Incandescent, Sunlight, Fluorescent
Still	DateStamp	On, Off
Still	Location	Off (no Geotagging), EXIF (Geotag in EXIF header of the file), WaterMark (Geotag on image), EXIF/WaterMark (both)
Still	Zoom	Varies according to resolution
Still & Video	Full Screen	Hides the tile bar
Still & Video	Options	Launches Camera and Video options

\* = default setting

**Note** – The larger the resolution, the larger the file size. Taking a photo with a larger resolution may take longer to capture; continue to hold the camera still until you see the photo review image (in *Still* mode) or until the preview screen reappears (in *Video* mode).

## Camera and Video options

To access the Camera options, tap  / *Pictures & Videos* / *Camera* / *Menu* / *Options*.

Use the camera options to customize where still photos and videos are stored, and to customize storage settings for still photos.

- **Save files to:** If you have a storage card installed you can choose to save photos in either the main memory of the device or to a folder on the storage card. Photos saved to the main memory are saved in the My Pictures folder.
- **Still filename prefix:** Use this option to give still photos a customized filename prefix.
- **Video filename prefix:** Use this option to give videos a customized filename prefix.
- **Time limit for videos:** To set the automatic time limit for videos, choose a suitable time limit from the list of options.


# Troubleshooting

## In this chapter:



- Power issues
- Backlight issues
- Touch screen issues
- Storage card issues
- Keypad issues
- Connection issues
- GNSS receiver issues
- Real-time DGNSS issues
- Recommended GNSS settings for maximum precision and productivity

Use this section to identify and solve common problems that may occur when using the GeoExplorer 6000 series handheld. Please read this section before you contact technical support.


## Power issues

Problem	Cause	Solution
The handheld does not turn on.	The battery is flat.	Recharge or swap the battery (see <a href="#">page 27</a> or <a href="#">page 29</a> ).
The screen is blank.	The handheld is turned off.	Press the <b>Power</b> button to turn on the handheld.
	The handheld has locked up.	Reset the handheld (see <a href="#">Resetting the handheld, page 33</a> ).
The handheld is not charging.	The internal temperature has risen above the allowed maximum (40 °C or 104 °F) for charging the battery.	Do one or all of the following: <ul style="list-style-type: none"> <li>• Turn off the integrated radios before charging the handheld.</li> <li>• Suspend the handheld before charging.</li> <li>• Remove the handheld from any external heat sources (for example, sunlight). The handheld will automatically start charging again when the internal temperature has dropped below the range for charging the battery.</li> </ul>
The battery power percentage bar does not appear in the Power control.	The battery has 0% power.	Recharge the battery (see <a href="#">page 25</a> ). Once the battery level is above 0%, the battery power percentage bar reappears. Tap  / <i>Settings</i> / <i>System</i> / <i>Power</i> / <i>Battery</i> to view the level of power remaining in the battery.
Under some circumstances the AC adapter may be faintly audible at close proximity.	The AC adapter is a highly efficient Energy Star V adapter which is required to operate at very low audible duty cycles when unloaded so as not to waste energy.	There is no safety issue related to the faint noise. In the event of a disconcerting noise, disconnect the mains adapter from the mains as soon as a battery charge is complete.
The charge level of the battery drops when the handheld is turned off.	The handheld was left in Suspend mode or was left fully charged for a long duration.	Before storing the handheld, completely shut down the handheld (see <a href="#">Turning on and turning off the handheld, page 31</a> ). Then store the handheld as recommended (see <a href="#">Storing the handheld, page 20</a> ).
	The handheld was left in suspend mode with a wireless radio turned on.	Before suspending the handheld, use the Wireless Manager to turn off all wireless radios. Make sure that all the radios are turned off after suspending the handheld. If a radio is still active, the Wireless LED will flash once every four seconds.

## Backlight issues

Problem	Cause	Solution
The backlight does not come on when you tap the screen or press a button.	The backlight is not set to turn on in the Backlight control.	Tap  / <i>Settings / System / Backlight</i> to view the Backlight control, and make sure that: <ul style="list-style-type: none"> <li>the <i>Turn on backlight when a button is pressed or the screen is tapped</i> check box is selected.</li> <li>the brightness is not set to <i>Dark</i> in the <i>Brightness</i> tab.</li> </ul>
The screen is blank or hard to see.	The backlight is off.	Tap the screen or press a button.
	The backlight level needs to be adjusted.	Tap  / <i>Settings / System / Backlight</i> to view the Backlight control and then adjust the slider in the <i>Brightness</i> tab.


## Touch screen issues

Problem	Cause	Solution
The touch screen does not respond to finger or stylus taps.	The touch screen is incorrectly aligned.	Realign the screen (see <a href="#">page 50</a> ).
	The touch screen is locked.	To unlock the touch screen, slide the <b>Unlock</b> icon.
	The handheld has locked up.	Reset the handheld (see <a href="#">Resetting the handheld, page 33</a> ).
The screen is blank.	The handheld is turned off.	Press the <b>Power</b> button to turn on the handheld.
	The battery is flat.	Recharge or swap the battery (see <a href="#">page 27</a> or <a href="#">page 29</a> ).
	The handheld has locked up.	Reset the handheld (see <a href="#">Resetting the handheld, page 33</a> ).
The screen is hard to see.	The backlight level needs to be adjusted.	Open the Backlight control and then adjust the backlight level (see <a href="#">Backlight, page 51</a> ).
	The backlight is off.	Tap the screen to turn on the backlight.
	You are unable to see parts of an application windows when the screen is in landscape orientation.	Some applications are designed for portrait orientation only. To view the entire application window, change the screen display to portrait. See <a href="#">Screen, page 50</a>
	The selected display theme does not have enough contrast.	Select the High-Contrast display theme. Tap  / <i>Settings / Personal / Home</i> , select the High-Contrast theme and then tap <b>OK</b> .

## Storage card issues



Problem	Cause	Solution
The handheld does not recognize a storage card.	The handheld does not support SDIO (SD input/output) cards.	Use an SD or SDHC card.
Files on the storage card are not visible or are not able to be opened.	Files have been encrypted on another device and have a .menc file extension.	Remove encryption from the files (see <a href="#">Encrypting files on storage cards, page 36</a> ).

## Keypad issues

Problem	Cause	Solution
Pressing the application key does not activate the function shown on the tile above it.	The hardware application key has been programmed to run another program or to perform another action.	Do one of the following: <ul style="list-style-type: none"> <li>• Tap the touchscreen tile to activate the function shown on the tile.</li> <li>• Re-program the application key to perform the same action as the touchscreen tile. To do this, tap  / <i>Settings / Personal / Buttons</i>, select the button to reprogram and then select &lt;Left Softkey&gt; or &lt;Right Softkey&gt;.</li> </ul>



## Connection issues

### ActiveSync technology

Problem	Cause	Solution
ActiveSync technology will not connect to the handheld.	The connection is not initiated automatically.	In the ActiveSync technology dialog on the office computer, select <i>File / Connection Settings</i> and then tap <b>Connect</b> .
	ActiveSync does not recognize the GeoExplorer 6000 series handheld.	Disconnect the handheld from the office computer. Restart the office computer. Reset the handheld (see <a href="#">Resetting the handheld, page 33</a> ) and then reconnect the handheld to the office computer.
	An incompatible version of ActiveSync technology is installed.	ActiveSync version 4.5 and later is compatible with the GeoExplorer 6000 series handheld. If version 4.5 or later of the ActiveSync software is not installed on the office computer, you can install it from the <i>GeoExplorer 6000 series Getting Started Disc</i> . You can also download the latest version from the Microsoft website at <a href="http://www.microsoft.com/windowsmobile/activesync/default.aspx">www.microsoft.com/windowsmobile/activesync/default.aspx</a> .
	The connection is not enabled in ActiveSync on the computer.	In the ActiveSync technology dialog on the office computer, click <i>File / Connection Settings</i> . If you are using: <ul style="list-style-type: none"> <li>• a USB cable, make sure that the <i>Allow USB connections</i> check box is selected from the drop-down list.</li> <li>• a Bluetooth connection, make sure that the correct port for Bluetooth is selected. Then open the Bluetooth control on the handheld. In the <i>Devices</i> tab, tap the partnership and in the services list make sure that the <i>ActiveSync</i> check box is selected.</li> </ul>
	The connection is not enabled in ActiveSync on the handheld.	On the handheld, tap  / <i>ActiveSync / Menu / Connections</i> . Make sure that the <i>Synchronize all PCs using this connection</i> check box is selected, and that the correct option is selected.
	The handheld connection settings conflict with network settings or VPN client software.	If you are using a USB cable, use the USB to PC utility to change the connection method the handheld uses to connect to ActiveSync on the computer. Tap  / <i>Settings / Connections / USB to PC Utility</i> . Clear the <i>Enable advanced network functionality</i> check box.  The handheld stops using the default RNDIS method to connect to the ActiveSync technology.



## Windows Mobile Device Center

Problem	Cause	Solution
Windows Mobile Device Center will not connect to the handheld.	The connection is not initiated automatically.	In the Windows Mobile Device Center software on the office computer, select <i>Mobile Device Settings / Connection Settings</i> .
	The Windows Mobile Device Center software does not recognize the GeoExplorer 6000 series handheld.	Restart the office computer. Disconnect the handheld from the office computer, reset it (see <a href="#">Resetting the handheld, page 33</a> ) and then reconnect it to the office computer.
	The connection is not enabled in Windows Mobile Device Center on the computer.	In the Windows Mobile Device Center software on the office computer, click <i>Mobile Device Settings / Connection Settings</i> . If you are using: <ul style="list-style-type: none"> <li>a USB cable, make sure that the <i>Allow USB connection</i> check box is selected from the drop-down list.</li> <li>a Bluetooth connection, make sure that the correct port for Bluetooth is selected. Then open the Bluetooth control on the handheld. In the <i>Devices</i> tab, tap the partnership and in the services list make sure that the <i>ActiveSync</i> check box is selected.</li> </ul>
	The connection is not enabled on the handheld.	On the handheld, tap  / <i>ActiveSync / Menu / Connections</i> . Make sure that the <i>Synchronize all PCs using this connection</i> check box is selected, and that the correct option is selected.
	The handheld connection settings conflict with network settings or VPN client software.	If you are using a USB cable, use the USB to PC utility to change the connection method the handheld uses to connect to the Windows Mobile Device Center on the computer. Tap  / <i>Settings / Connections / USB to PC Utility</i> . Clear the <i>Enable advanced network functionality</i> check box.  The handheld stops using the default RNDIS method to connect to the Windows Mobile Device Center.



## Network connections

Problem	Cause	Solution
The connection with the cellular phone suddenly ends.	If you change the proxy settings of the handheld while connected to a cellular phone, the cellular phone ends the connection.	Make any changes to proxy settings before connecting to a mobile device.
Unable to connect to another GeoExplorer 6000 series handheld.	Data encryption settings are set incorrectly.	When setting up a peer-to-peer ad-hoc network with a WEP encryption, set a Network Key, rather than leaving the key blank to be provided automatically.



## Bluetooth wireless technology

Problem	Cause	Solution
The handheld cannot discover a nearby Bluetooth device.	The integrated Bluetooth radio is not activated.	The handheld's Bluetooth radio has been deactivated. If Bluetooth wireless technology is allowed where you are working, use the Radio Activation Manager software to re-activate the radio (see <a href="#">Deactivating the integrated Wi-Fi and Bluetooth radios, page 9</a> ).
	The device is out of range.	Move the devices closer to each other and then scan again.
	Bluetooth wireless technology is not enabled on one or both devices.	Make sure that the Bluetooth radio is turned on, on both the handheld (see <a href="#">page 82</a> ) and the other Bluetooth device.
	The device has not been made Discoverable.	Make sure that the Bluetooth device has been made Discoverable.
The COM port that you assigned to a serial port service is not available in your application.	The application cannot recognize ports if they are added after the application opens.	Exit from the application, add the port and then run the application again.
The Bluetooth connection fails while in use.	The Bluetooth device has moved out of range.	Move the devices closer to each other. The devices should reconnect automatically. If they do not, select the Bluetooth device in the <i>Devices</i> tab. Tap and hold the device name and then select <i>Delete</i> . Tap <i>New</i> to discover the device again.
	The Bluetooth radio has lost the connection.	Turn off the Bluetooth radio on the handheld and then turn on the Bluetooth radio (see <a href="#">page 82</a> ).
	Bluetooth file transfer interrupts the connection.	When you transfer large image or data files, other Bluetooth connections may stop responding. To avoid problems, close other Bluetooth connections before transferring large files.
An error message reports "Problem with Bluetooth Hardware".	The integrated Bluetooth radio may have been deactivated.	Use the Radio Activation Manager to reactivate the Bluetooth radio (see <a href="#">Deactivating the integrated Wi-Fi and Bluetooth radios, page 9</a> ).


## Wi-Fi connections

Problem	Cause	Solution
The "New Network Detected" notification does not appear automatically.	The Wi-Fi radio is off.	Tap the wireless icon in the <i>Home</i> screen or go to the Wireless Manager and make sure Wi-Fi is on.
	The handheld is out of range of the network.	Move to within range of the network, then tap  / <i>Settings / Connections / Network Cards</i> and then set up the connection.
The handheld cannot connect to a secure site.	The date on the handheld is incorrect.	Check that the handheld has the date set correctly on the <i>Home</i> screen. If the date is incorrect, tap the clock icon on the <i>Home</i> screen and then adjust the date and time.
You cannot configure an Internet connection.		
Within range of more than one network, you are not connecting to the network you would prefer to use.	The radio is connecting to the first network signal it has received.	Tap  / <i>Settings / Connections / Network Cards</i> . Tap and hold the network you would prefer to use and then select <i>Connect</i> .
The "New Network Detected" notification appears but the tile bar and tile options are not displayed.	Some applications are not fully compatible with all features of the Windows Mobile 6.5 operating system.	Use the application buttons on the keypad, as they map to the tiles in the tile bar: <ul style="list-style-type: none"> <li>To dismiss the notification, press the right application button on the keypad.</li> <li>To connect to the network, press the left application button.</li> </ul> Alternatively, select a Windows Mobile application from the <i>Start</i> screen, such as the <i>Home</i> screen or File Explorer, and the tile bar and soft keys will be displayed correctly.
Wi-Fi is unavailable in the Wireless Manager.	The integrated Wi-Fi radio has been deactivated.	Use the Radio Activation Manager to reactivate the Wi-Fi radio (see <a href="#">Deactivating the integrated Wi-Fi and Bluetooth radios, page 9</a> ).

## Internal cellular modem connections

Problem	Cause	Solution
Can't download data.	Your account has no remaining credit.	Contact your cellular provider to ensure that your account has sufficient credit.
Can't connect.	The phone is turned off.	Turn on the phone using the Wireless Manager.
	The connection is incorrectly configured.	Check your APN and connection settings with your provider.
	Cellular service is unavailable.	Check that the phone is within range of receiving strong enough signals to connect. Move to a location with stronger cellular reception. Check with your cellular provider that coverage is available in your region.
Can't set up a connection.	SIM card is missing.	Insert SIM card.
	SIM card is locked.	Check the PIN security: tap  / Settings / Personal / Phone, and select the Security tab.
	3G/GSM selection is incorrect for your cellular provider.	Check your settings: tap  / Settings / Personal / Phone, and select the 3G tab. Set the 3G/GSM Selection to Auto.

## GNSS receiver issues

Problem	Cause	Solution
The handheld is not receiving GNSS positions.	The integrated GNSS receiver is not activated.	Use the Connect or Activate GNSS/GPS command in the field software to open the GNSS COM port and activate the integrated GNSS receiver. For more information, see <a href="#">Using the GNSS Receiver, page 61</a> .
	Incorrect configuration of serial COM port.	When supplying GNSS data to an external device using the COM1 USB to serial converter cable, set the baud rate to the high-speed TSIP setting: 38400, 8, 1, Odd.
	The GNSS COM port is already in use. Only one application at a time can have the port open.	Do the following <ul style="list-style-type: none"> <li>Exit the software that is using the GNSS COM port and then retry in your application.</li> <li>Check that a GNSS application is not running in the background. Tap  / Task Manager and then select and close (click <b>End Task</b>) any GNSS applications you are not using.</li> <li>Make sure that connections are not left in use by the GNSS Connector software; close the application when you are not using the connections.</li> </ul>
	The GNSS field software is using the wrong GNSS COM port.	Connect to COM2 if the GNSS field software uses NMEA messages, or COM3 for TSIP messages. For information on which protocol to use, check the documentation for the application.
	Not enough satellites are visible.	Move to a location where the receiver has a clear view of the sky and ensure the antenna is not obstructed. Alternatively, adjust the GNSS settings to increase productivity. For more information, refer to the Help provided with the GNSS field software. If you are using Trimble field software, use smart settings. See <a href="#">Using Smart Settings, page 71</a> .
	The DOP (Dilution of Precision) value for the current position is above the maximum DOP setting.	Wait until the DOP value falls below the maximum DOP specified. Alternatively, adjust the GNSS settings to increase productivity. For more information, refer to the Help provided with the GNSS field software. If you are using Trimble field software, use smart settings. See <a href="#">Using Smart Settings, page 71</a>
	<i>Wait for real-time</i> is selected in the GNSS field software and the integrated receiver is waiting to receive real-time corrections.	If you are collecting data for postprocessing, clear the wait for real-time selection. Check that the real-time correction source is setup correctly (see <a href="#">Connecting to a real-time differential correction source, page 69</a> ).
	External antenna connected but not receiving data.	The handheld can take up to two seconds to detect that an external antenna has been connected or disconnected.
NMEA data includes autonomous positions.	The integrated GNSS receiver outputs autonomous positions when real-time corrections are unavailable.	Configure the NMEA application to filter out non-DGNSS positions.

Problem	Cause	Solution
The GNSS Connector utility reports "Unknown".	The GNSS Connector software may report "Unknown" on COM3.	This should not interfere with operation of the handheld.
Error Code 5 appears.	A receiver timeout error has occurred, caused by issues with communications to the receiver, or when the receiver has taken too long to reconnect.	Close the dialog and if the handheld does not automatically connect to the receiver, try to connect to the receiver again. If repeated attempts to connect to the receiver fail, contact your Trimble reseller.

## Real-time DGNSS issues

Problem	Cause	Solution
The handheld is not receiving SBAS real-time corrections	The SBAS satellite is obstructed from view.	Check the location of the SBAS satellite in the Skyplot section of the GNSS field software, and if possible move to a different location.
	You are outside the WAAS, EGNOS, or MSAS coverage area.	Wide Area Augmentation System (WAAS) satellites are tracked in the Continental United States including Alaska, and in southern parts of Canada. European Geostationary Navigation Overlay Service (EGNOS) satellites are tracked in Europe. MTSAT Satellite-based Augmentation System (MSAS) satellites are tracked in Japan. If you have selected satellites that are not available at your location, you cannot use SBAS corrections.
The handheld is not able to track a new or a specific SBAS satellite	You are not using the latest SBAS configuration (.ini) file.	<ol style="list-style-type: none"> <li>To download the software, go to <a href="http://www.trimble.com/support.shtml">www.trimble.com/support.shtml</a>, click the link for your receiver type (<i>GeoXH</i>, or <i>GeoXT</i>), click <i>Downloads</i>, click <i>GeoExplorer 6000 Series</i> and then click <i>SBAS.INI</i>.</li> <li>To specify the satellites you want the receiver to track or to ignore, select the Custom option in the <i>Tracking Mode</i> field in the <i>Integrated SBAS Settings</i> form of the Trimble GNSS field software.</li> </ol>
The handheld is not receiving real-time corrections from the external real-time correction source	There is no physical connection to the external source.	Connect the external real-time correction source to COM1 using the optional USB to serial converter, or to a Bluetooth port on the handheld.
	There is no Bluetooth wireless connection to the external source.	The Bluetooth external correction source is more than ten meters from the handheld, or is obstructed. Move the devices closer together, in a direct line of sight, to re-connect.
	The external source is incorrectly connected to the real-time COM port.	In the Real-time Settings section of the GNSS field software, select the COM port that the real-time source is connected to.
	The port settings are incorrect.	Change the port settings to match those used by the external source.
	No GNSS positions are available.	You cannot use real-time corrections until the GNSS receiver is computing positions. In the GNSS field software, make sure that the integrated GNSS receiver is activated, enough satellites are available, and that the satellite geometry (PDOP) is good enough to compute positions.
	Integrated SBAS is selected as the second choice source of real-time corrections.	If the SBAS status is Waiting, the integrated GNSS receiver may incorrectly change the status of the preferred real-time choice to Waiting as well. To avoid this, select Wait for real-time or Use uncorrected GNSS as your second choice.

## Recommended GNSS settings for maximum precision and productivity

The following table lists some of the factors that affect the precision of your data, and describes how to minimize the effect of atmospheric interference and poor satellite geometry.

Factor	Description	To maximize precision and productivity
Satellite shadow	Satellite shadow is when the line of sight between the GNSS receiver and satellites is partially or fully blocked by obstructions such as buildings, trees, or land masses. The effect of satellite shadow is a reduction in the number of satellites that the receiver is able to track. In general, the quality of your data increases with the number of satellites being used to calculate the position.	Tracking more satellites can help to improve satellite geometry and thereby improve accuracy. Activate the Floodlight satellite shadow reduction technology option. See <a href="#">Activating the Floodlight technology and the NMEA output options, page 74</a> . Ensure the integrated GNSS receiver gets a clear view of the sky as possible. Keep your body mass as far from the receiver as practical and do not crowd over the handheld. Use an external antenna if needed to elevate the position of the antenna.
Multipath	Multipath is when GNSS satellite signals are reflected off nearby objects, such as buildings or cars, causing an erroneous signal to be received by the GNSS antenna. This can cause errors of several meters.	To reduce multipath, where possible collect data in an open environment away from large reflective surfaces and with a clear view of the sky. Activate the Floodlight technology option on your handheld to increase the total number of satellites visible to the receiver, and reduce the risk of multipath affecting your solution. See <a href="#">Activating the Floodlight technology and the NMEA output options, page 74</a>
Weak satellite signals	Signal-to-Noise Ratio (SNR) is a measure of the strength of the satellite signal relative to the background noise. GNSS quality degrades as the signal strength decreases. Weak signals may be caused by signals coming through vegetation, multipath signals, or low satellite elevation.	Use smart settings with Trimble field software to allow the receiver to determine maximum precision positions regardless of available satellite signal strength. See <a href="#">Using Smart Settings, page 71</a> . Activate the Floodlight technology option on your handheld to increase the total number of satellites visible to the receiver, and reduce the risk of weak satellite signal affecting your solution. See <a href="#">Activating the Floodlight technology and the NMEA output options, page 74</a> .
Poor satellite geometry	Dilution of Precision (DOP) is a measure of the quality of GNSS positions, based on the spread (geometry) of the satellites in the sky that are used to compute the positions. When satellites are widely spaced relative to each other, the DOP value is lower, and in general position accuracy is greater. If the view of the sky is partially affected by satellite shadow, or if all of the satellites are in one area of the sky, the geometry and DOP may be poor.	Use smart settings with Trimble field software to allow the receiver to determine maximum precision positions regardless of available satellite geometry. See <a href="#">Using Smart Settings, page 71</a> . Activate the Floodlight technology option on your handheld to increase the total number of satellites that the receiver can track, and reduce the risk of poor satellite geometry affecting your solution. See <a href="#">Activating the Floodlight technology and the NMEA output options, page 74</a> .



<b>Factor</b>	<b>Description</b>	<b>To maximize precision and productivity</b>
Satellite elevation	When a satellite is low on the horizon, satellite signals must travel farther through the atmosphere. This results in a lower signal strength and delayed reception by the GNSS receiver, which can cause errors in calculating the position.	<p>Use smart settings with Trimble field software to allow the receiver to determine maximum precision positions regardless of available satellite elevation. See <a href="#">Using Smart Settings, page 71</a>.</p> <p>Activate the Floodlight technology option on your handheld to increase the total number of satellites that the receiver can track, and the likelihood of being able to track more satellites at higher elevation. See <a href="#">Activating the Floodlight technology and the NMEA output options, page 74</a>.</p>
Occupation time at a point	Occupation time is the time spent at a point logging GNSS positions.	<p>For point features, remain at the feature and log a number of GNSS positions to obtain an averaged position.</p> <p>When collecting line and area features, collect them using averaged vertices.</p>





**NORTH & SOUTH AMERICA**

Trimble Navigation Limited  
10355 Westmoor Drive  
Suite #100  
Westminster, CO 80021  
USA

**EUROPE & AFRICA**

Trimble Germany GmbH  
Am Prime Parc 11  
65479 Raunheim  
GERMANY

**ASIA-PACIFIC & MIDDLE EAST**

Trimble Navigation  
Singapore PTE Limited  
80 Marine Parade Road  
#22-06 Parkway Parade  
Singapore, 449269  
SINGAPORE



[www.trimble.com](http://www.trimble.com)