USER GUIDE

GeoExplorer® 2008 series

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⊗·Trimble®

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Release Notice

This is the February 2009 release (Revision C) of the *GeoExplorer 2008 Series User Guide*. The GeoExplorer 2008 series handheld's operating system is based on the Microsoft Windows Mobile version 6 Classic operating system (5.2.1433).

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To receive information regarding updates and new products, please contact your local dealer or visit the Trimble website at www.trimble.com/register. Upon registration you may select the newsletter, upgrade, or new product information you desire.

Notices

Class B statement- Notice to users This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions may cause harmful interference to radio communication.

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 radio devices used by this equipment are classified under 47 CFR §15.247 as spread spectrum transmitter equipment. In accordance with OET Bulletin 65 supplement C Edition 1-01, the device operates at low power levels where there is a high likelihood of compliance with the RF exposure standards, is categorically excluded from routine environmental evaluation as set forth in CFR 47 section 2.1093. The radiated output power of this equipment produces a calculated SAR that is significantly below the FCC radio frequency exposure limits.

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

Accessories

The following accessories have been approved for use with this device: P/N 70970-00 GeoExplorer 2008 Series Support Module and P/N 70980-00 GeoExplorer 2008 Series Power/Serial Clip.

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.

CE 1313

The Trimble GeoExplorer 2008 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.

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.

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.

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

Korean Communications Commission (KCC)

This product conforms with the regulatory requirements of the Korean
Communications Commission (KCC), thus satisfying the requirements
for KCC Marking and sale within Korea

방송통신위원
이 제품은 한국 방송통신위원회 (KCC) 의 규제요건에 부합하므로
KCC 마크 표시 및 한국내 판매 요건을 충족합니다
1. 인증받은자의 상호: Trimble Navigation Ltd.
2. 모델명 :GeoXT / GeoXH
3. 제조사 : Flextronics
4. 송신주파수 :B/T 2402~2480 MHz, WLAN : 2412~2472 MHz
5. 수신주파수 :B/T 2402~2480 MHz, WLAN : 2412~2472 MHz
6. 출력 : B/T 0.02 mW, WLAN 10mW
7. 사용자 안내문구

기종별	사 용 자 안 내 문
B 급 기기 (가정용 방송통 신기기)	이 기기는 가정용 (B 급) 으로 전자파 적합등 록을 한 기기로서 주로 가정에서 사용하는 것 을 목적으로 하며 , 모든 지역에서 사용할 수 있습니다

8. 당해무선설비기기는 운용중 전파혼신 가능성이 있으므로 인명안
전과 관련된 서비스는 할수 없음.

Safety Information

Radio use

The Trimble® GeoExplorer® 2008 series handheld contains a Bluetooth® radio and a wireless LAN radio. In some situations, you may be required to turn off the radios. For example, aviation authority regulations restrict the use of radios 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 turn off the Bluetooth and wireless LAN radios only:

    a.   Tap the Wireless Connectivity icon (⊞ or ⊞) in the title bar of the *Today* screen and then tap *Wireless Manager*.

    b.   Tap **All** to turn off both radios. The status fields below the Wi-Fi and Bluetooth buttons change to *Off*.

Deactivating the integrated radios

The GeoExplorer 2008 series handheld is shipped with wireless LAN and Bluetooth wireless technology activated. To use the wireless LAN or Bluetooth radio, you need to turn it on (see Turning on and turning off the integrated radios, page 78).

Note – You may need to deactivate the wireless LAN and/or Bluetooth radio in the handheld if the country in which you are working does not approve the use of wireless LAN and/or Bluetooth wireless technology. If you are unsure about whether the GeoExplorer 2008 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 wireless LAN 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, click the link for your receiver type (*GeoXH, GeoXM*, or *GeoXT*), click *Downloads*, click *GeoExplorer 2008 Series* and then click *Radio Activation Manager*.

Exposure to radio frequency radiation (Bluetooth and WLAN 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 10 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.

AC adaptor safety

To charge the handheld's battery, use the international adaptor kit provided with the GeoExplorer 2008 series handheld (see Powering the handheld, page 24).

⚠ **WARNING –** To use AC adaptors safely:
– Use only the AC adaptor intended for the GeoExplorer 2008 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 2008 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 back of the unit.

Should such an event occur, the screen may be temporarily affected and become difficult to read. Under such circumstances, applying the suspend resume key will restore the unit to the original display, and there will be no accompanying loss of data or functionality.

Battery safety

The internal rechargeable Lithium-ion battery is supplied partially charged. Charge the battery completely before using it for the first time (see Powering the handheld, page 24). If the battery has been stored for longer than six months, charge it before use.

WARNING – The GeoExplorer 2008 series handheld is powered by an internal rechargable Lithium-ion battery. Charge and use the battery only in strict accordance with the instructions provided.
To prevent injury or damage:
– Never attempt to remove, replace, or repair the battery yourself.
– Do not damage the battery.
– Do not store or leave the handheld near a heat source such as 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 use the handheld if the battery appears to be leaking.
– If the battery requires attention, send the handheld to your local Trimble Service Center.
– Discharge the handheld before disposing of the battery. When disposing of the battery, be sure to do so in an environmentally sensitive manner. Adhere to any local and national regulations concerning battery disposal or recycling.

Storage card use

The GeoExplorer 2008 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.

Contents

Introduction

In this chapter:

- About the GeoExplorer 2008 series handheld
- What's in the box?
- Accessories
- Use and care of the handheld
- Technical assistance
- Your comments

The *GeoExplorer 2008 Series User Guide* describes how to set up and use the Trimble® GeoExplorer® 2008 series handheld. The information in this guide supplements the information in the *GeoExplorer 2008 Series Quick Start Guide*, which you received with the handheld.

This guide describes how to:

- use the Microsoft® Windows Mobile® version 6 operating system.
- use the handheld's integrated GPS 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.

Even if you have used other Global Positioning System (GPS) 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 GPS, go to the Trimble website (www.trimble.com) for an interactive look at Trimble and GPS.

About the GeoExplorer 2008 series handheld

The GeoExplorer 2008 series includes the GeoXH™, GeoXM™ and GeoXT™ handhelds. These handhelds combine a Trimble GPS receiver with a field computer powered by Microsoft Windows Mobile version 6 operating system.

The GeoExplorer 2008 series handheld has built-in Bluetooth® wireless technology for cable-free connection to other devices, and wireless LAN (Local Area Network) connectivity for connections to networks.

The GeoXM handheld provides reliable accuracy within 1 to 3 meters. The GeoXT handheld uses EVEREST™ multipath rejection technology to provide submeter accuracy. The GeoXH handheld uses both EVEREST and H-Star™ technology to provide subfoot (30 cm) accuracy, either in real time or after postprocessing. For more information, see Chapter 5, Using the GPS Receiver.

Supported GPS field software

To collect GPS data with the GeoExplorer 2008 series handheld, you must install GPS field software onto the handheld. You can use the GeoExplorer 2008 series handheld with the following GPS 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.

- The Trimble GPS Pathfinder® Tools Software Development Kit (SDK), for integrating GPS data and adding value to an existing mapping and GIS field software application.

- Trimble GPS Controller software, for configuring real-time differential correction options and NMEA output settings.

- Other GPS field software that accepts NMEA messages.

Note – Real-time subfoot capability is only available if you are using the TerraSync software. the GPScorrect extension, or an application based on the GPS Pathfinder Tools SDK.

For more information, see Chapter 5, Using the GPS Receiver.

What's in the box?

When you unpack the GeoExplorer 2008 series handheld, check that you have received all the components, as shown below.

Figure 1.1   Items included with the GeoExplorer 2008 series handheld

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:

- Power/serial clip
- Null modem cable[1]
- Vehicle power adaptor[1]
- External power kit
- Hard carry case
- Range pole
- Range pole bracket
- Hurricane antenna kit[2]
- Zephyr™ antenna kit[3]

- External patch antennas
- Pole-mountable ground plane
- Baseball cap with antenna sleeve
- Backpack kit
- Screen protectors (2 pack)
- Stylus kit
- GeoBeacon™ receiver (receives differential corrections from a beacon network)

[1]Requires power / serial clip (sold separately)

[2]Compatible with GeoXH/XM/XT handhelds for improved yield. Also improves accuracy for the GeoXM and GeoXT handhelds only.

[3]Compatible with the GeoXH handheld for improved accuracy.

For more information, go to www.trimble.com/geoxh.shtml, www.trimble.com/geoxm.shtml, or www.trimble.com/geoxt.shtml.

Use and care of the handheld

To protect the GeoExplorer 2008 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 2008 series handheld.

- Protect the touch screen by using 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 and storage card areas, so that they are kept free from dirt, dust, fluid ingress & electrostatic discharge (see Storage cards, page 31).

- Protect the handheld from extreme temperatures. For example, do not leave the handheld on the dashboard of a vehicle.

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 28). Instead, partially charge the battery and then turn off the handheld.

To prepare the GeoExplorer 2008 series handheld for storage:

1. Transfer any data that you need to an office computer.

2. Charge the battery to approximately 30% and then remove the handheld from the support module.

3. Press the **Power** key for one second until the *Power* menu appears and then tap the **Shutdown** button.

4. Store the handheld at room temperature.

To use the GeoExplorer 2008 series handheld after storage:

1. Press the **Power** key to turn on the handheld.

2. Recharge the internal battery using the support module (see Charging the battery, page 25).

Technical assistance

Technical support

Go to the GeoExplorer 2008 series handheld technical support page (www.trimble.com/geoxh_ts.asp, www.trimble.com/geoxm_ts.asp, or www.trimble.com/geoxt_ts.asp) on the Trimble website for the latest support information about the software, including:

- FAQs

- 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 GPS 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 2008 series handheld.

Your comments

Your feedback about the supporting documentation helps us to improve it with each revision. E-mail your comments to ReaderFeedback@trimble.com.

Getting Started

In this chapter:

- Parts of the GeoExplorer 2008 series handheld
- Keypad buttons
- Powering the handheld
- Turning on and turning off the handheld
- Resetting the handheld
- Storing data
- Fitting the handstrap

This chapter describes the main features of the GeoExplorer 2008 series handheld, and provides the information you need to get up and running with the handheld.

Parts of the GeoExplorer 2008 series handheld

The following pages show the main parts of the handheld.

Integrated GPS receiver

External antenna connector

Windows Mobile powered handheld

Touch screen

Reset button

Start menu key

Microphone

Thumb screws for storage card slot door

Stylus (pull out)

Application keys

Speaker

OK key

Power status LED

Power key

Storage card slot door

Navigation keys and Enter key

Figure 2.1   Parts of the GeoExplorer 2008 series handheld

Keypad buttons

The GeoExplorer 2008 series handheld provides ten keys and a Reset button for fast, easy access to common actions.
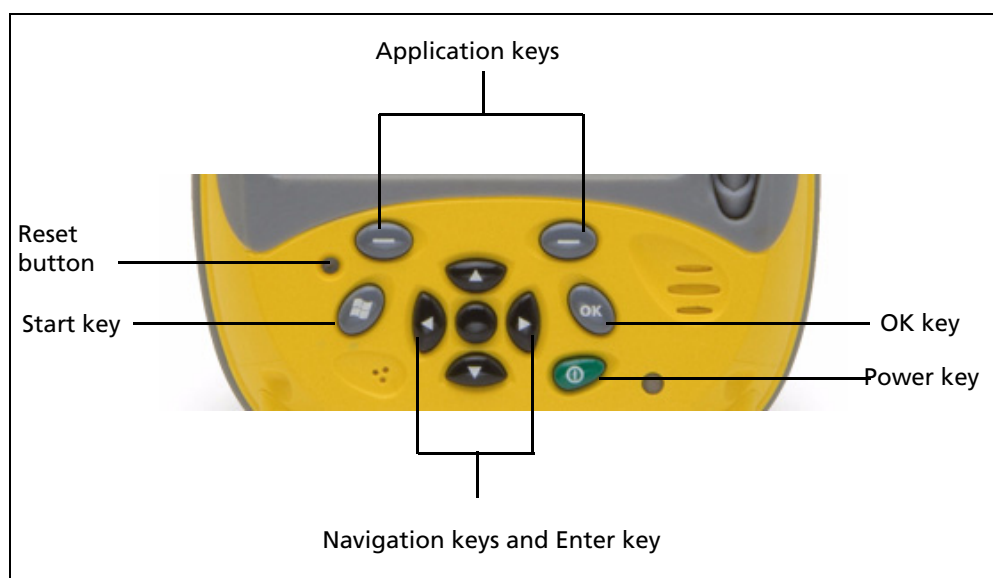
Figure 2.2   GeoExplorer 2008 series handheld keypad buttons

The function of each key is described below:

Key	Description
Power	Press briefly (less than one second) to turn on or to turn off the handheld (put it into Suspend mode). To access other power options, press and hold for one second until the *Power* menu appears (see Turning on and turning off the handheld, page 27).
Start	Press to display the Windows Mobile *Start* menu.
OK	Press to select OK or to close an application.
Navigation keys	Use these keys to navigate around the screen, scroll through menus, or to tab through options on windows and forms. Use the: • arrow keys to move up, down, left, and right. • action key (the center key) to perform an application-specific action, which is usually Enter.
Application keys	By default these keys perform the same action as the left and right softkeys in the menu bar. Alternatively, program these keys to perform a selected action. To program the keys, use the *Buttons* control (see Buttons, page 43).
Reset button	Use to reset the handheld (see Resetting the handheld, page 29). To activate this button, use the nib of the stylus.

Tip – To lock the screen and handheld keys without turning off the handheld, use the device lock option (see Device lock, page 45).

Powering the handheld

The GeoExplorer 2008 series handheld contains an internal 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 eight hours to recharge it fully.

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

Note – Cold temperatures, or using Bluetooth wireless technology or wireless LAN connectivity 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 2008 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 –** The GeoExplorer 2008 series handheld is powered by an internal rechargable Lithium-ion battery. Charge and use the battery only in strict accordance with the instructions provided.
> To prevent injury or damage:
> – Never attempt to remove, replace, or repair the battery yourself.
> – Do not damage the battery.
> – Do not store or leave the handheld near a heat source such as 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 use the handheld if the battery appears to be leaking.
> – If the battery requires attention, send the handheld to your local Trimble Service Center.
> – Discharge the handheld before disposing of the battery. When disposing of the battery, be sure to do so in an environmentally sensitive manner. Adhere to any local and national regulations concerning battery disposal or recycling.

Charging the battery

Charge the battery using the support module provided with the GeoExplorer 2008 series handheld. If you have the optional serial clip, you can also use it to charge the handheld. For more information, see Connecting to an external power source with the serial clip, page 111.

To charge the battery using the support module:

1. Connect one end of the AC adaptor cable to the support module 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 27) and then place the handheld in the support module as shown below:

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

3. Leave the battery to charge. It may take up to eight 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 flashing orange, a battery charging fault has occured. For more information, see page 26.

    When fully charged, the Power LED is green.

To remove the handheld from the support module, press the release button on the support module and then lift the bottom of the handheld upward, as shown below:

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

Power source	LED state	Handheld/battery state
Battery power	Off	Off (in Suspend mode or turned off).
	Off	On and battery level is good.
	Flashing red	On and battery is low (less than 15%).
External power	Solid orange	Charging.
	Flashing orange	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 19.

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 requries 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, tap the battery icon ⊡ in the title bar of the *Today* screen. The Power control appears, displaying the *Battery* tab.

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

Low battery indicators

When the battery level reaches:

- 20%, the battery icon in the title bar of the *Today* screen changes to ⊡.

- 15%, 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.
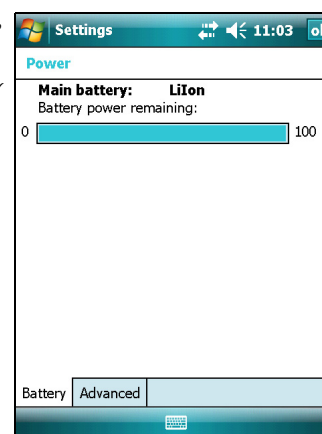
Conserving power

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 28.

- Set the backlight to automatically turn off when the handheld is idle for a specified time. For more information, see Backlight, page 48.

- Reduce the brightness setting for the backlight. For more information, see Backlight, page 48.

- Turn off the integrated Bluetooth or wireless LAN radios whenever you are not using them. For more information, see Bluetooth wireless connections explained, page 105 and Connecting to a wireless LAN access point, page 82.

- Disconnect from the integrated GPS receiver when GPS data is not required, using the application's Disconnect or Deactivate GPS command. When you disconnect from GPS, the integrated GPS receiver switches off and stops drawing power.

Note – Do not disconnect from GPS if you will be reconnecting within about five minutes. A GPS application can take up to 30 seconds to reactivate the integrated GPS 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 (see page 28) 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).

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

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

Button	Description
Align Screen	Starts the screen alignment 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	Puts the handheld into Suspend mode. This is a low-power mode. The handheld and the integrated receiver are turned off and you can not operate the handheld.
Shutdown	Puts the handheld into Shutdown mode. Applications are shut down and the handheld is completely turned off.
Soft Reset	Restarts 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 Resetting the handheld, page 29.

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 GPS receiver is turned off and any application using GPS is disconnected.

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 GPS receiver automatically reactivates.

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 three minutes.

To change the time before the handheld enters Suspend mode:

1. Tap the battery icon 🔋 in the title bar of the *Today* screen. The Power control appears.

2. Tap the *Advanced* tab.

3. From the *On battery power* option, select the *Turn off device if not used for* check box and then select the idle time from the drop-down list.

4. Tap **OK**.
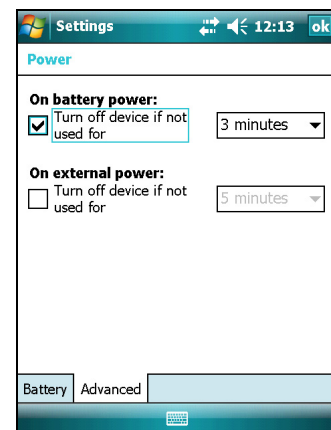
Resetting the handheld

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. First, try a soft reset. If the handheld does not respond, perform a hard reset.

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

Performing a soft reset

A soft reset is similar to restarting a computer. A soft reset saves data and closes all open applications and then restarts the handheld. All data and settings are retained after a soft reset.

To perform a soft reset, use the tip of the stylus to lightly press the **Reset** button.

Alternatively, press the **Power** key for one second until the *Power* menu appears and then tap the **Soft 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** button as you use the tip of the stylus to lightly press the **Reset** button.

Resetting to factory default settings

Reset the handheld to factory default settings to restore the handheld to it's 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 32.

🔅 **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 buttons on the handheld.

2. While holding the buttons, use the tip of the stylus to lightly press the **Reset** button.

3. Keep holding the two application buttons until the handheld restarts.

4. Follow the on-screen instruction 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.

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 6 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 53.

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 2008 series handheld does not support SDIO (SD input/output) 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. Use the thumb screws on the base of the handheld to remove the storage card slot door.

3. Insert the storage card into the storage card slot with the swipes facing down. Gently press the card until you hear a click, and the card is locked into place.

4. Reattach the storage card slot door to the handheld and then tighten the thumb screws.

   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 2008 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 placed on 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 placed on 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 ActiveSync technology.

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.

Fitting the handstrap

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

1. Align the straight bracket with the slots below the Microsoft Windows Mobile logo. Insert the bracket by pressing it down and into the slots.

2. Insert the first screw and then use a coin or screwdriver to tighten the screw.

3. Align the curved bracket with the slots above the communication swipes at the base of the handheld. Insert the bracket by pressing it down and into the slots.

4. Insert the second screw and then use a coin or screwdriver to tighten the screw.

Using the Windows Mobile Operating System

In this chapter:

■ Parts of the screen

■ Using the stylus

■ Status indicators

■ Pre-installed programs

■ Accessing help

■ Entering information

■ Personalizing the handheld

■ Messaging

The GeoExplorer 2008 series handheld is powered by the Windows Mobile 6 Classic operating system.

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

Parts of the screen

The main parts of the screen are shown below.

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

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

Title bar
Contains status icons for important system functions.

Wireless LAN and Bluetooth icons
Show status of integrated radios. Tap either icon to access the Wireless Manager.

Today screen
Summarizes your appointments, tasks, notes, and e-mails for the day. Tap any item to open it.

Menu bar
Contains softkeys providing access to applications, menus, and notifications.

Accessing help

To access help, tap ⊞ / *Help* or, if available, tap ❓ in the application window. If there is an application running, context-sensitive help for the current screen appears. To view the main Help Contents page, tap the *Contents* softkey in the menu bar.

Help files installed on the handheld work in the same way as a Web page. Tap hyperlinks to navigate around the help and use ⇦ ⇨ to retrace your steps. Tap *View* / *Contents* to return to the Contents page for the application, and tap *View* / *All Installed Help* to return to the main Contents page.

Status indicators

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

Icon		Tap icon to...
	Battery level	
	Low battery (20% or less remaining)	check battery level
	Battery charging/using external power	
	Speaker is on	change volume
	Speaker is off	
	Connected to ActiveSync or the Windows Mobile Device Center (WMDC) on a computer	
	Connected to a Bluetooth-enabled phone	
	Disconnected from ActiveSync or WMDC	configure the connection or access the Wireless Manager
	Disconnected from a Bluetooth-enabled phone	
	Wireless LAN radio is on	
	A wireless LAN is detected	
	Sending or receiving wireless signals	

The Wi-Fi and Bluetooth icons on the *Today* screen show the status of each radio. Tap the icon to access the Wireless Manager and turn on or turn off the radio.

Pre-installed programs

Programs that are pre-installed on the GeoExplorer 2008 series handheld are as follows:

Program	Function
ActiveSync	Synchronize information between the handheld and a computer.
Calculator	Perform basic arithmetic functions.
Calendar	Keep track of appointments and arrange meetings.
Contacts	Keep track of your friends and colleagues.
Excel Mobile	From the Start menu, tap *Office Mobile* and then tap *Excel Mobile*. Use Excel Mobile to create and edit Excel spreadsheets.
File Explorer	View and manage files.
GPS Connector	Located in *Settings* / *Connections*, it allows you to configure communications between the handheld's integrated GPS receiver and external devices.
GPS Controller	Configure and view status information for the integrated GPS receiver.
Help	View help. If there is an application running, context-sensitive help for the current screen appears. To view the main Help Contents page, tap the **Contents** softkey in the menu bar
Internet Explorer	Browse the World Wide Web.
Messaging	Write, send, and receive e-mail messages.
Messenger	Send instant messages using Windows Live™ Messenger.

Program	Function
Notes	Create handwritten, typed, or recorded notes.
Office Mobile	Provides access to these Office Mobile applications: Excel Mobile, PowerPoint Mobile, and Word Mobile.
Pictures and Videos	Take, view, and edit pictures, or record and launch video clips.
PowerPoint Mobile	From the Start menu, tap *Office Mobile* and then tap *PowerPoint Mobile*. Use PowerPoint® Mobile to view slide show presentations.
Search	Search for a file or item stored on the handheld.
Tasks	Keep track of your tasks.
Windows Live	Access Windows Live services, including e-mail, instant messenger and Internet search.
Windows Media	Play Windows Media® or MP3 audio and video files.
Word Mobile	From the Start menu, tap *Office Mobile* and then tap *Word Mobile*. Use Word Mobile to create and edit Word documents.

For more information about using any of this software, refer to the Help for the software. See Accessing help, page 36.

Using the stylus

Removing and replacing the stylus

To remove the stylus from its holder on the front of the handheld, press the spring on the stylus downwards and then lift the stylus forward, as shown.
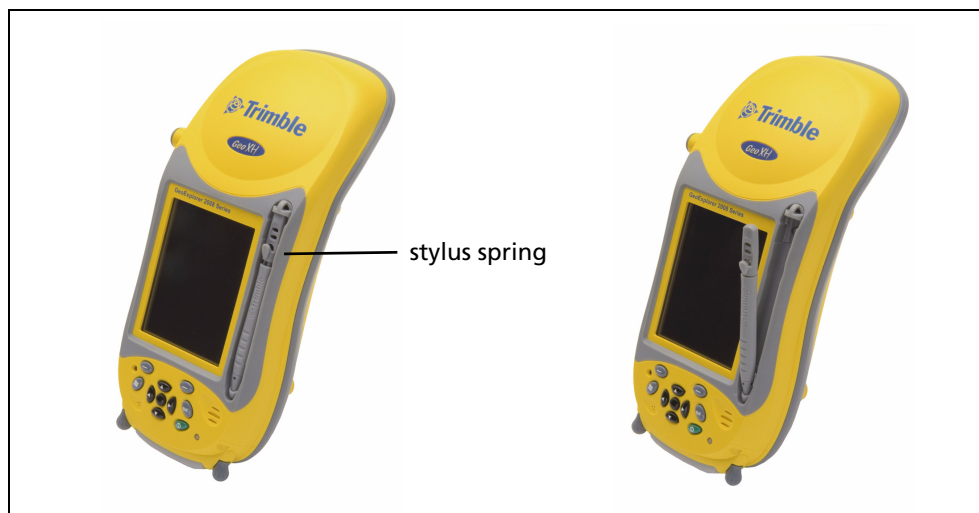
stylus spring

To insert the stylus into its holder on the front of the handheld, insert the tip of the stylus into the lower retainer with the Trimble logo on the stylus facing out. Then press the spring on the stylus downwards and insert the top of the stylus below the top retainer.

Interacting with the handheld

To interact with the handheld, use the stylus to tap on the touch screen.

Actions you can perform with the stylus are as follows:

Action	Definition
Tap	Touch the screen once with the stylus 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.

If at any time the touch screen does not respond correctly to stylus taps, realign it. For more information, see Screen, page 47.

Tethering the stylus to the handheld

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.
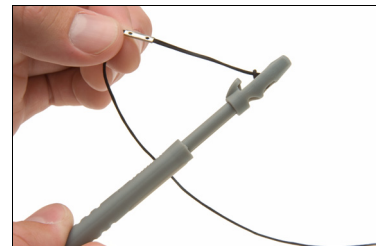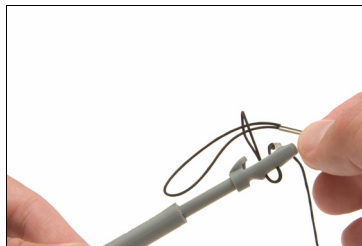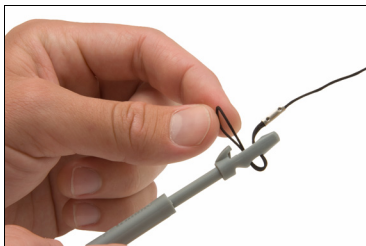
2. Insert the other end of the tether through the loop and pull until the knot in the tether is tight.

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 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 Chapter 4, Connecting to an Office Computer.
Typing	Use the Keyboard input panel to enter typed text by tapping keys on the on-screen keyboard.
Writing	Use the stylus like a pen to write directly on the screen.
Recording	Create a stand-alone recording or embed a recording into a note.

Selecting an input panel

Use an input panel to type or to write on the screen.

The Input Panel button automatically appears in the menu bar of any application.

To display the currently selected input panel, tap a text box in the application, or tap the Input Panel button.

To select an input panel, tap the Input Selector arrow next to the Input Panel button and then tap the input panel you want to use:

- To use the on-screen keyboard, tap *Keyboard*.

- To write directly onto the screen and have the handwritten words and symbols converted into typed characters, tap *Letter Recognizer* or another input panel that supports writing on the screen.

- To configure options for the selected input panel, tap *Options*.
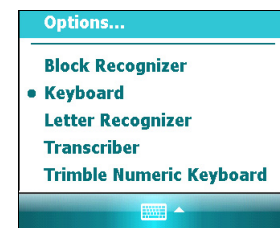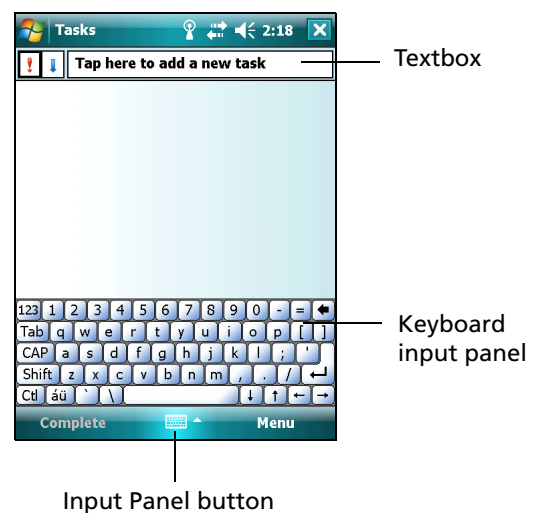
Using the on-screen keyboard

To enter characters, use 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 the Input Selector arrow and then tap *Options*. In the *Input method* list, select Keyboard and then tap **Large Keys**.

Writing directly on screen

When you select Letter Recognizer, you can write individual letters, numbers, and punctuation in the Letter Recognizer input panel and have them converted into typed text.

Tip – For help with writing characters with Letter Recognizer, tap the question mark near the writing area.

When you select Transcriber, you can write anywhere on the screen using the stylus. The Microsoft Transcriber software converts your handwriting to text. You can use it to enter notes in a text editor such as Notes.

Transcriber has a number of tools and modes that allow you to customize how it works. These tools and modes are controlled from the Transcriber keyboard.

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

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 ⊞ / *Programs* / *Notes*.

2. 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.

Tip – If you do not see the Recording toolbar, tap *Menu / View Recording Toolbar.*
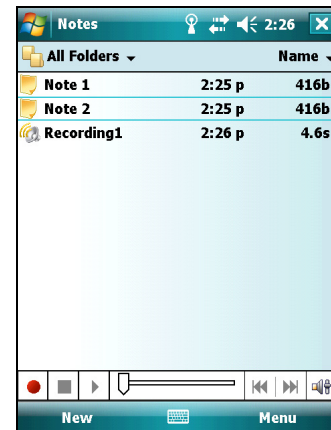
Note – The GeoExplorer 2008 series handheld's microphone is on the front of the handheld, in the keypad area. The microphone will capture voice notes when you are holding the handheld in front of you. In noisy environments, you may need to move the handheld closer to you or to the source of the sounds you want to record.

3. 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.
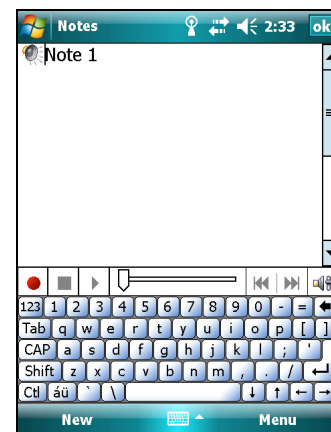
Personalizing the handheld

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

Buttons

Use the *Buttons* control 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 softkeys in the menu 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 *Today* 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.**
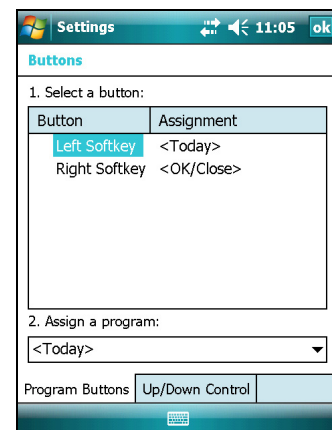
Today

Use the *Today* control to change the display theme that controls the appearance of the *Today* screen, and to customize which items appear on the *Today* screen.

Appearance

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

To change the display theme:

1. Tap ⊞ / *Settings* / *Personal* / *Today*.

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 *Today* 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**.
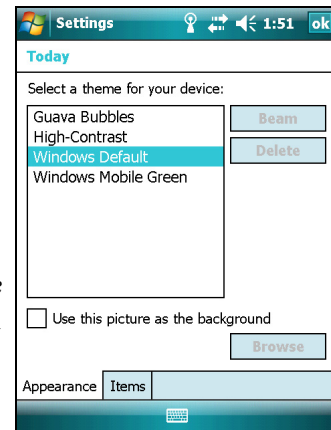
Items

You can choose the items that appear on the *Today* screen, and the order that they appear in.

To change the items that appear on the *Today* screen:

1. Tap ⊞ / *Settings* / *Personal* / *Today*.

2. Tap the *Items* tab.

3. Select or clear the check boxes to show or hide the *Today* screen items.

4. Use the **Move Up** and **Move Down** buttons to change where the selected item appears on the *Today* screen.

5. Tap **OK**.
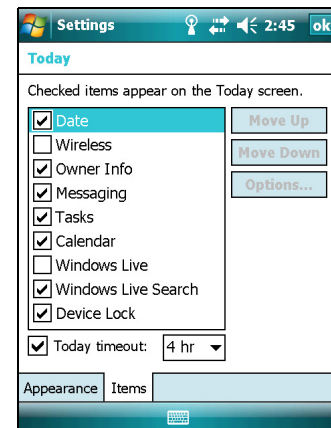
Set the time zone

In the *Today* screen, tap the clock icon ⏱. The *Clock Settings* screen appears. Tap the *Time* tab, select the *Home* option and then select the correct time zone.
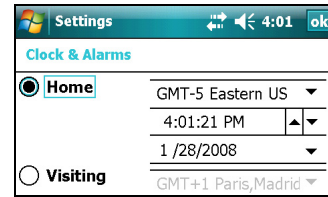
Device lock

Use the *Device Lock* option on the *Today* screen to lock the screen and keypad while the handheld remains turned on.

To lock the device, tap *Device unlocked* in the *Today* screen. The *Today* screen shows *Device locked*, and *Unlock* appears in the left corner of the menu bar.

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

Communication with external devices such as a GPS receiver, or external sensors used by GPS field software, is not interrupted by locking the handheld. This means that you can keep using the GPS 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 GPS receiver so that you can continue recording GPS positions.

To unlock the device, tap the *Unlock* notification in the left corner of the *Today* screen menu bar and then tap **Unlock**.

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

Power

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

- Tap the battery icon 🔋 in the title bar of the *Today* screen.

- Tap 🟦 / *Settings* / *System* / *Power*.

Tap the *Battery* tab to check the battery level (see Checking the level of battery power, page 26).

Tap the *Advanced* tab to set the time before the handheld turns off when idle (see Suspend mode, page 28).

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* / *Personal* / *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.
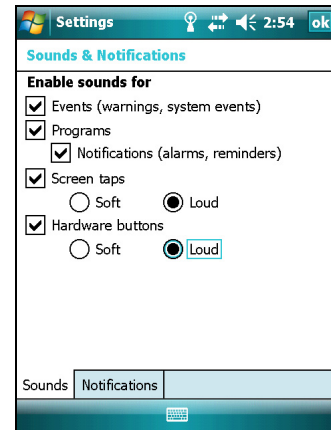
To specify a sound scheme:

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.**
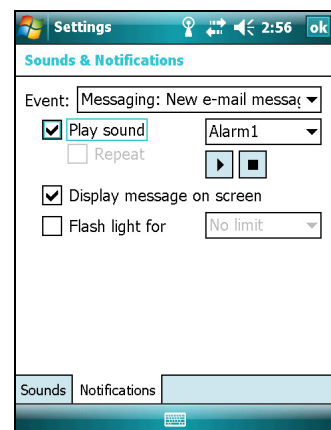
Screen

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* **Align Screen***.*

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.**
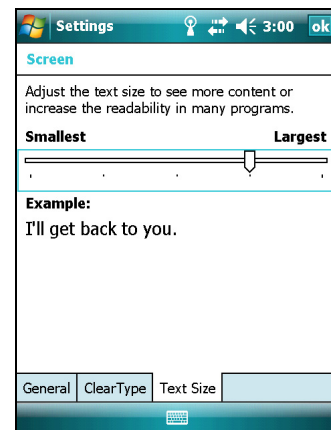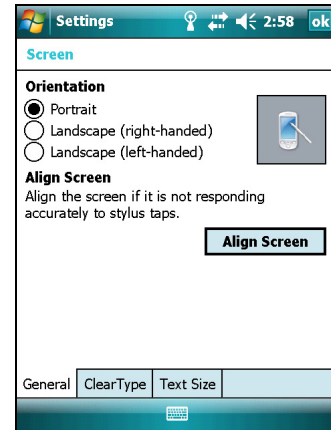
Backlight

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**.
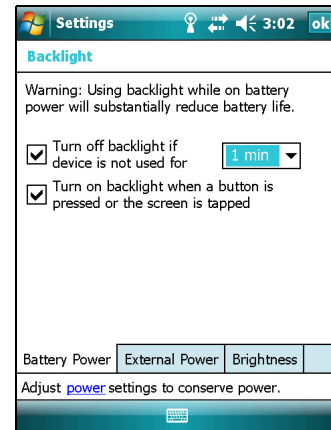
To change the brightness:

1. Tap the *Brightness* tab.

2. Tap and drag the slider control to the left to make the backlight darker, or to the right to make the backlight brighter.

3. Tap **OK**.
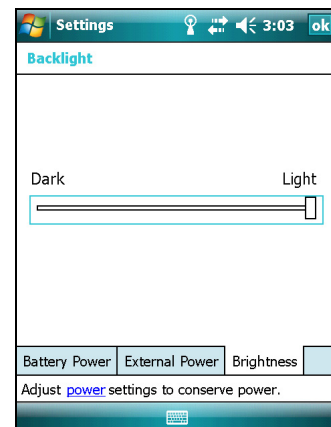
Messaging

Use Messaging to send and receive receive e-mail messages using the GeoExplorer 2008 series handheld. Messaging is the equivalent of your e-mail Inbox.

To use e-mail, you can do one of the following:

- Synchronize e-mail messages with Microsoft Exchange or Microsoft Outlook® on an office computer.

- Send and receive e-mail messages by connecting directly to an e-mail server through an ISP or a network.

Synchronizing e-mail messages

You can synchronize e-mail 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 e-mail, you must enable Inbox synchronization in the ActiveSync software. For more information, refer to the *ActiveSync 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.

- E-mail messages in the Outbox folder on the handheld are transferred to Exchange or Outlook, and then sent from those programs.

- E-mail messages in subfolders in other e-mail folders in Outlook are synchronized only if they were selected for synchronization in the ActiveSync software.

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

Connecting directly to an e-mail server

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

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

Note – *You must set up an Internet connection on the handheld before you can set up and use your e-mail account. For more information, see* Connecting to a wireless LAN access point, page 82 *or* Connecting to a Bluetooth-enabled phone for Internet access or real-time corrections (including VRS networks), page 88.

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 🎨 / *Messaging*.

2. Tap *New E-mail Account*.

3. Enter the e-mail address for your account.

4. To automatically get connection settings for your e-mail account from the Internet, select the check box.

5. Tap **Next**.

6. 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.
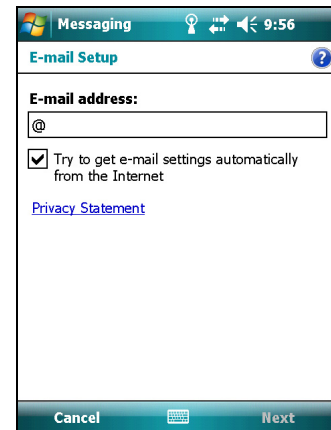
Note – *You cannot change the account name later.*

7. Tap **Finish**.

8. Tap **OK** to download mail immediately.

Tip – To receive TerraSync data files by e-mail, edit the settings for the e-mail 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 *E-mail 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 e-mail server, new messages are downloaded to the Messaging folder, messages in the Outbox folder are sent, and messages that have been deleted on the e-mail server are removed from the Messaging folder.

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

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

When working offline, you can disconnect from the e-mail 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 2008 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 Windows Mobile powered device, 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 Vista® operating system, use the Windows Mobile Device Center 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.

⚠ **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.

⚠ **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.

For more information see one of the following:

- Managing the connection using the Windows Mobile Device Center, page 56

- Managing the connection using ActiveSync technology, page 57.

Installing the Windows Mobile Device Center

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

To install software onto a Windows Mobile powered device, you must install Windows Mobile Device Center 6 onto an office computer.

A copy of the Windows Mobile Device Center is provided on the *GeoExplorer 2008 Series Getting Started Disc.* Alternatively, go to 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 2008 Series Getting Started Disc*. Alternatively, go to www.microsoft.com/windowsmobile/activesync/default.mspx to download the latest version from the Microsoft website.

Connecting the handheld to a computer

To connect the GeoExplorer 2008 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 54).

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 to use ActiveSync technology, page 97.

    – Use a USB connection:

        a. Connect the USB data cable to the USB port on the support module.

        b. Connect the other end of the USB data cable to a USB port on the computer.

        c. Place the handheld in the support module. For information about how to do this, see Getting Started, page 21.

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 56

– Managing the connection using ActiveSync technology, page 57

Managing the connection using the Windows Mobile Device Center

1. Connect the handheld to the computer (see page 55).

2. If the Autoplay window appears, close the window.

3. The *Windows Mobile Device Center* window displays the message **Connected:**
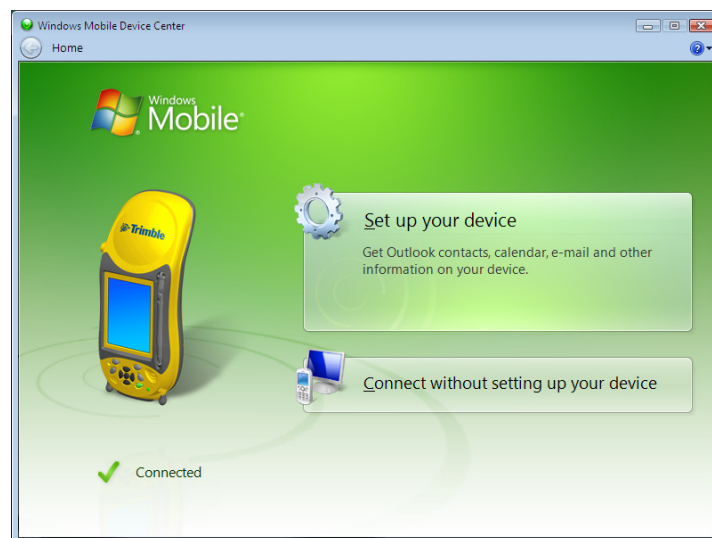
Note – If the connection is not made automatically, check that the connection is enabled in the Windows Mobile Device Center software and on the handheld. For more information, see Troubleshooting, page 113.

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 59.

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 2008 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 55). The *Synchronization Setup Wizard* appears:
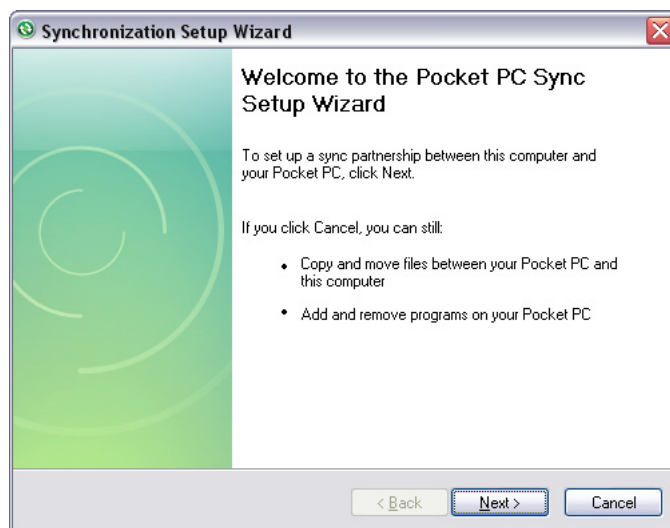
Note – If the connection is not made automatically, check that the connection is enabled in the ActiveSync software and on the handheld. For more information, see Troubleshooting, page 113.

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:**
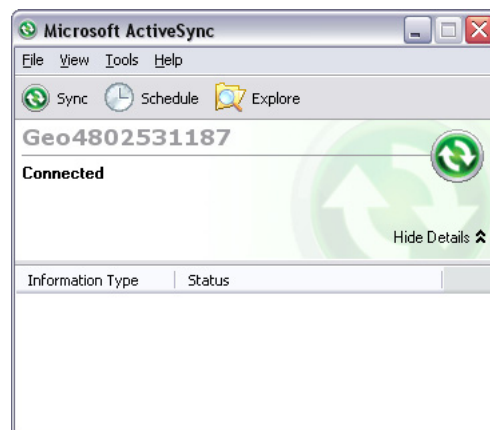
4. To transfer files between the computer and the handheld, click **Explore**. A Windows Explorer-type window appears, displaying files stored on the handheld. Copy and paste files to other locations on the computer, or from the computer to the handheld.

5. To install software onto the handheld, see Installing software onto the handheld, page 59.

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 2008 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 Windows Mobile powered device. To install software that has a Windows Mobile installation setup:

1. Connect the handheld to a computer (see page 55).

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 29).

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 55).

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 Windows Mobile powered device. 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 29).

Using the GPS Receiver

In this chapter:

- Supported GPS field software
- Configuring the GPS field software to connect to the receiver
- Using the GPS field software
- Ensuring the accuracy of your GPS data
- Differential GPS explained
- Outputting GPS data to external equipment

The GeoExplorer 2008 series handheld includes an integrated GPS receiver that enables you to collect GPS data for incorporating into a GIS or for managing assets.

The Global Positioning System (GPS) is a satellite-based positioning system consisting of a constellation of operational NAVSTAR satellites that orbit the earth every 12 hours. This system provides worldwide, all-weather, 24-hour time and position information.

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

Supported GPS field software

You can use the GeoExplorer 2008 series handheld with any of the software products described below.

TerraSync software

You can install version 3.21 or later of the TerraSync software on a GeoExplorer 2008 series handheld. Use the software to collect and maintain GIS and GPS data.

To install the TerraSync software, either insert the *TerraSync Software CD* in the CD-ROM drive of a computer and use the menus provided, or run the downloaded setup file. To obtain an installation code for installation, you must register your copy of the software online. Detailed installation instructions are provided in the *TerraSync Software Getting Started Guide.*

ESRI ArcPad software and the Trimble GPScorrect extension

You can install version 7.1.0 or later of the ESRI ArcPad software on a GeoExplorer 2008 series handheld. Use the software to collect and maintain GIS and GPS data. Detailed installation instructions for ESRI ArcPad software are provided in the ArcPad documentation.

To be able to differentially correct ArcPad GPS data, install version 2.41 or later of the Trimble GPScorrect extension for ESRI ArcPad software on a GeoExplorer 2008 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/gpscorrect_ts.asp, click Support Notes and then search for the Mapping and GIS Product Compatibility List Support Note.

To install the GPScorrect extension, either insert the *Trimble GPScorrect Extension for ESRI ArcPad Software CD* in the CD-ROM drive of a computer and use the menus provided, or run the downloaded setup file. Detailed installation instructions are provided in the *Trimble GPScorrect Extension Getting Started Guide.*

GPS Controller software

The GPS Controller software is pre-installed on the GeoExplorer 2008 series handheld. Use the software to configure and monitor the status of the internal GPS receiver.

Other GPS field applications

You can use the GeoExplorer 2008 series handheld with a custom application developed using version 2.31 or later of the Trimble GPS Pathfinder Tools Software Development Kit (SDK).

You can also use the GeoExplorer 2008 series handheld with any GPS field software that accepts NMEA messages.

TrimPix technology

You can install version 1.20 or later of the TrimPix™ technology on a GeoExplorer 2008 series handheld. Use TrimPix technology to quickly and easily add high quality digital photographs to your GIS data collection workflow.

Note – *To use TrimPix technology, you must have a compatible high resolution WiFi-capable Nikon digital camera.*

For more information, go to www.trimble.com/mgis_trimpix.shtml.

Configuring the GPS field software to connect to the receiver

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

GPS COM ports

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

To use GPS, open the appropriate GPS 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 GPS communication protocol used by many GPS applications.
		The handheld outputs the following NMEA messages: 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 GPS applications, and is also supported by some other GPS 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 Using real-time corrections from an external correction source, page 69.

Note – *COM1 is a standard serial port that connects to external devices. For more information, see Connecting to other devices using the serial clip, page 109.*

Connecting to the COM port

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

GPS field software	Configuration details
GPS Controller	Run GPS Controller. The software automatically activates the integrated GPS receiver on COM3.
TerraSync	Run Terrasync. The software automatically activates the integrated GPS 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 GPS receiver on COM3 using the Trimble GPScorrect protocol. To connect to GPS, tap the **GPS** button ![icon] and then tap **Yes**. To configure a real-time DGPS source, or to view status information, run the GPScorrect extension. To do this, tap the **GPScorrect** button in the Trimble toolbar.
ArcPad 7 without the GPScorrect extension	1. In ArcPad, tap the **GPS** drop-down menu ![icon] and then select *GPS Preferences* from the drop-down menu. Tap the *GPS* tab. 2. In the *Protocol* field, select NMEA 0183. 3. In the *Port* field, select COM2. 4. Tap **OK**. 5. Tap the **GPS** button ![icon] and then tap **Yes**.
NMEA application	Configure the software to connect to GPS on COM2 and then use the Connect or Activate GPS command.
TSIP application	Configure the software to connect to GPS on COM3 and then use the Connect or Activate GPS command.

Using the GPS field software

The GPS Controller software is pre-installed on all GeoExplorer 2008 series handhelds and enables you to check the current GPS status, or to configure the integrated GPS receiver.

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

Note – GPS Controller duplicates the status and setup features of TerraSync software and the Trimble GPScorrect extension for ESRI ArcPad software. If one of these applications is installed, it runs instead of GPS Controller when you tap the GPS softkey in the menu bar of the Today screen. For more information about these applications, refer to the documentation for the application.

Depending on the GPS field software you have installed, you can use the software to configure settings such as GPS, 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 GPS field software.

Starting the GPS field software

Do one of the following:

- From the *Today* screen, tap the *GPS* softkey in the menu bar.

- Tap 🗔 / *Programs* and then select the GPS field software, for example *GPS Controller*.

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

Viewing available GPS satellites

Use the graphical Skyplot section or the Satellite Info section in the Trimble GPS field software to view detailed GPS information, and to adjust the quality and yield of the GPS positions you are receiving.

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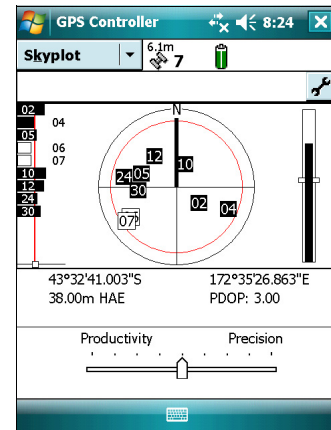
Resetting the GPS receiver

Trimble GPS 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 GPS receiver to factory default settings

Ensuring the accuracy of your GPS data

GeoExplorer 2008 series handhelds are high performance GPS receivers that calculate very accurate GPS positions.

To correct errors in the collected data and to further improve the accuracy of the GPS positions, use differential GPS. Differential GPS (DGPS) 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 GPS 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 GPS explained, page 73.

The three different models in the GeoExplorer 2008 series offer three levels of DGPS accuracy:

- The GeoXM handheld provides reliable accuracy to within 1 to 3 meters with real-time or postprocessed differential correction.

- The GeoXT handheld uses EVEREST multipath rejection technology to provide submeter accuracy with real-time or postprocessed differential correction.

- The GeoXH handheld uses EVEREST multipath rejection technology as well as H-Star technology to provide subfoot (30 cm) accuracy using the internal antenna, and 10 cm to 30 cm accuracy using the optional Zephyr antenna, with real-time or postprocessed differential correction.

Note – To achieve subfoot accuracy with a GeoXH handheld, data must be collected using Trimble field software (TerraSync software, the GPScorrect extension for ESRI ArcPad software, or a custom application developed using the GPS Pathfinder Tools Software Development Kit).

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

Where the DGPS infrastructure does not meet subfoot 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 GPS field software, and lists items in order of most important to less important.

1. If you are using TerraSync software to collect data, use accuracy-based logging. For more information, see page 67.

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 68.

3. Configure the GPS settings for the receiver to increase the precision of your data, and to minimize the effect of atmospheric interference and poor satellite geometry. For more information, see page 70.

4. Connect to an external antenna, if you have one. For more information, see page 71.

5. If you are using a GeoXT handheld, configure the data collection software to log carrier data. If you are using a GeoXH handheld, the data collection software logs H-Star data, by default. For more information, see page 72.

6. Plan GPS data collection around the times of the day when satellite geometry is best. For more information, see page 73.

Using accuracy-based logging

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

Note – Accuracy estimates for streaming (dynamic) GPS positions may not be as good as those for static GPS 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 [icon] 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 GPS 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*, 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.

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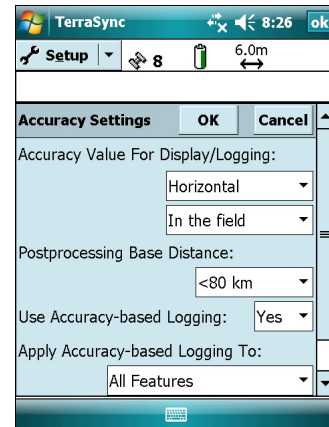
Note – Accuracy settings do not affect GPS positions that are used for navigation. GPS positions are still calculated by the GPS receiver and are available for navigation.

Connecting to a real-time differential correction source

Use a real-time differential GPS (DGPS) source to give you better accuracy as you collect data. For more information about how real-time differential GPS works, see Differential GPS explained, page 73.

Using real-time corrections from an Internet source

DGPS 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 DGPS 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 phone for Internet access or real-time corrections (including VRS networks), page 88.

Using SBAS corrections

The GeoExplorer 2008 series handheld has an integrated receiver that uses Satellite Based Augmentation Systems (SBAS) correction messages to improve the accuracy and integrity of GPS data.

The default SBAS tracking mode is Auto. In Auto mode, the receiver tracks or locks onto the most powerful satellite signal. The GPS 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.

You can configure the receiver to use particular SBAS satellites in the *Integrated SBAS Settings* form of the Trimble GPS field software. Select the Custom option in the *Tracking Mode* field and then enable or disable tracking for any specific satellite.

Note – If you have other Trimble GPS field software installed, configure real-time correction settings in that application instead of the GPS Controller software.

To use SBAS corrections:

1. In the GPS field software, open the Real-time section and tap the **Setup** button 🔧.

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 GPS positions, if corrections are not available.

5. Tap **OK.**
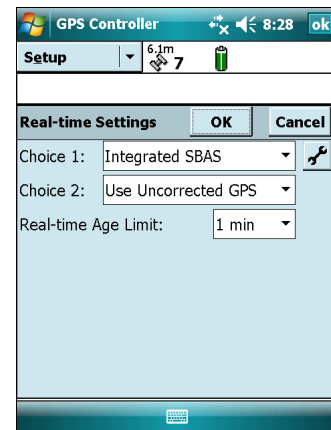
Using real-time corrections from an external correction source

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 DGPS radio. Connect the external correction source to a Bluetooth port (see page 86) or to the optional serial clip (see page 109). Use the GPS field software to set up and monitor the real-time input source that you want to use.

The integrated GPS receiver communicates only through its GPS COM ports (COM2, COM3, and COM4). Trimble GPS 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 GPS COM port (COM4).

To set up an external correction source in the Trimble GPS field software:

1. In the GPS field software, open the Real-time section and then tap the **Setup** button 🔧.

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 serial clip, 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 **OK.**
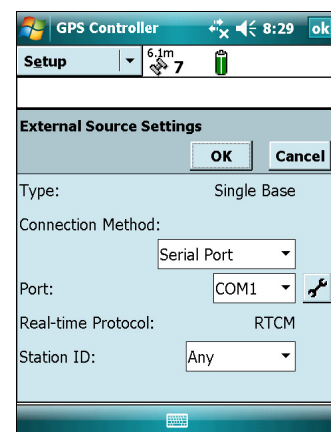
To set up an external correction source for use with non-Trimble GPS field software:

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

2. In the GPS 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.

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

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

Configuring GPS settings

Note – *This section describes the GPS Settings form in the GPS Controller software and the Trimble GPScorrect extension.*

Use the *GPS Settings* form in the Trimble GPS field software to configure the GPS quality settings you require. The lower the GPS quality settings, the more productive you are likely to be, as the GPS receiver will track more satellites and be better able to calculate a GPS position. The stricter the GPS quality settings, the more precise the GPS positions that are calculated.

Note – *If you are using the TerraSync software version 3.21 or later, Trimble recommends that you use accuracy-based logging (see page 67) to control the quality of the GPS positions logged. Use the default GPS quality settings and let the TerraSync software manage the logging of positions based on your required accuracy.*

By default, the handheld is configured to receive satellite signals in most conditions.

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

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

Selecting predefined settings using the GPS slider

Use the GPS slider to select predefined GPS quality settings.

Select the slider check box. The slider control appears on the GPS slider, and some fields in the form become read-only. The values in these fields change as the slider control position changes.

Drag the slider control to the *left* to *decrease* the GPS quality requirements and to include more satellites when calculating GPS positions. Drag it to the *right* to *improve* the GPS quality and exclude satellites that do not meet the precision requirements from GPS position calculations.
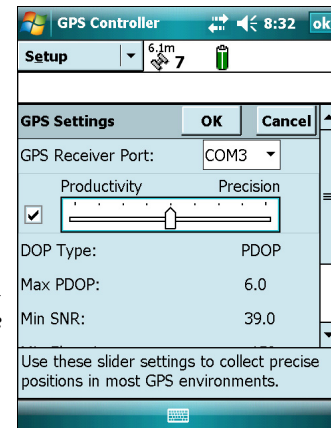
Selecting custom GPS settings

To select custom GPS quality settings, clear the slider check box. The slider control disappears from the GPS slider, and the remaining fields change to editable numeric fields. To specify the required GPS quality settings, enter values in these fields. For more information about each field, see Recommended GPS settings for maximum precision, page 124.

Connecting to an external antenna

The GeoExplorer 2008 series handheld has an internal antenna, which is suitable for use in most conditions.

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

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

Configure antenna settings in the GPS 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 GPS antenna that is connected to the GPS 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.

Logging carrier data

When you log carrier data, the GPS receiver logs additional data as well as GPS position records. The additional data is used during postprocessing to improve the accuracy of the GPS positions.

If you are using a GeoXH handheld, H-Star carrier data is logged by default. If you are using a GeoXT handheld, carrier data is not logged by default. If you want higher levels of accuracy and are willing to log data for 10 minutes or more while maintaining continuous lock on at least four satellites, you can configure the GPS field software to log carrier data.

To configure carrier data logging in the TerraSync software:

1. In the Setup section of the TerraSync software, tap **Logging Settings**. The *Logging Settings* form appears.

2. In the *Log Carrier Data* field, select the data logging option for the type of handheld you are using:

   – If you are using a GeoXT, select *Yes*.

   – If you are using a GeoXH, make sure *Auto* is selected.

3. Tap **OK**.

Planning a data collection session

To maximize productivity, plan GPS data collection around the times of the day when satellite geometry is best. The GPS Controller software includes 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 GPS settings, the Plan section is updated, so you can see the effect of different quality control settings.

Note – If you have other Trimble GPS field software installed, use the planning feature in that application instead of the GPS Controller software.
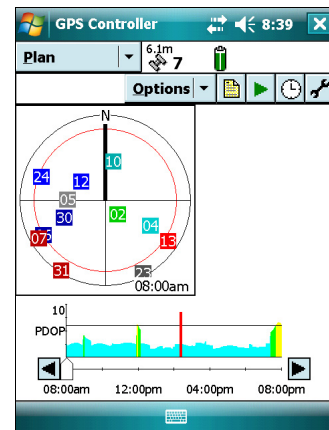
Differential GPS explained

Use differential GPS to correct errors in your collected data. Differential GPS (DGPS) 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 GPS measurement errors and compute corrections to these errors. An unlimited number of mobile GPS receivers, called *rovers*, collect GPS 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 DGPS either in real time or during postprocessing.

Real-time DGPS

In real-time DGPS, 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 GPS data. DGPS 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 GPS base stations, or by a wide range of government agencies.

Real-time DGPS sources include external beacon and radio sources, as well as Satellite Based Augmentation Systems (SBAS) such as WAAS in the US and EGNOS in Europe, and VRS networks. SBAS and VRS networks use multiple base stations to calculate the DGPS 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 DGPS 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 GPS receiver.

Postprocessed DGPS

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

- the GPS Pathfinder Office software version 4.10 (with the latest updates) or later.

- the Trimble GPS Analyst extension for ESRI ArcGIS software version 2.10 (with the latest updates) or later.

Typically, postprocessed DGPS 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 DGPS 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 DGPS

If you collected data with subfoot 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 often more accurate than data corrected in real time.

For more information about GPS and DGPS, go to www.trimble.com/gps and review the All About GPS tutorial.

Outputting GPS data to external equipment

The GPS Connector software is pre-installed on the GeoExplorer 2008 series handheld. Use the software to specify how the integrated GPS receiver communicates with equipment that is connected to one of the handheld's external communications ports.

To open GPS Connector, tap
 / *Settings* / *Connections* / *GPS Connector*.

The GPS Connector software lets you connect the GPS COM ports to COM1 or Bluetooth ports and configure port settings such as the baud rate. GPS Connector software has a graphical display that shows all active connections, and a text display that shows connection messages.
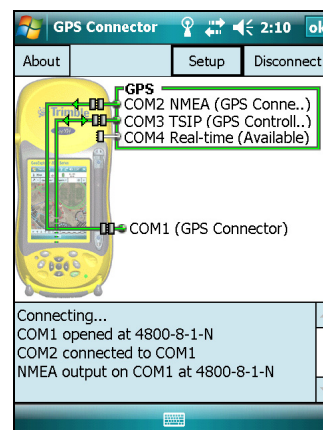
Use the GPS Connector software to output NMEA or TSIP messages from the integrated GPS receiver to another device, such as an external data collector.

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 GPS Connector software to configure NMEA or TSIP output to Bluetooth - COM9, which is the pre-defined Bluetooth Host Serial Port. For more information, see* Providing Bluetooth services as a host, page 107*.*

The connections that you create in the GPS Connector software are active only while the software is running. Connections created by the GPS Connector software are labeled GPS Connector in the status screen and end when you exit the software.

For more information, refer to the *GPS Connector Help*.
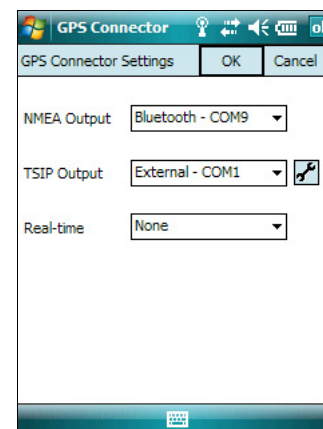
Getting Connected

In this chapter:

- General wireless connection information
- Options for connecting wirelessly to other devices and networks
- Bluetooth wireless connections explained
- Connecting to other devices using the serial clip

The GeoExplorer 2008 series handheld includes an integrated wireless LAN radio and an integrated Bluetooth radio, and provides a number of options for connecting to networks and other devices.

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

Use the table on page 81 to identify the wireless connection type you want to make and then follow the steps provided to connect to that device.

You can use the handheld's integrated wireless LAN radio to connect to the Internet or a corporate network using a wireless LAN (Local Area Network) connection.

Alternatively, you can use Bluetooth wireless technology to connect to the Internet using a cellular phone and then receive real-time corrections from a VRS network or download background map data. 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 serial clip to connect to external devices using a cabled serial connection.

General wireless connection information

The GeoExplorer 2008 series handheld has an integrated wireless LAN radio compliant with IEEE 802.11 b/g and an integrated Bluetooth radio. The handheld is shipped with the wireless LAN and Bluetooth wireless technology activated. To use the wireless LAN or Bluetooth radio,you need to turn it on (see Turning on and turning off the integrated radios below).

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

Deactivating the integrated radios

Note – If you are unsure about whether the GeoExplorer 2008 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 wireless LAN 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, click the link for your receiver type (*GeoXH*, *GeoXM*, or *GeoXT*), click *Downloads*, click *GeoExplorer 2008 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 2008 series handheld's wireless LAN radio and/or Bluetooth radio (see Using the Wireless Manager, page 79).

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 80).

To make the GeoExplorer 2008 series handheld visible to other Bluetooth-enabled devices and enable them to connect, see Making the handheld visible (discoverable) to other Bluetooth devices, page 80.

Using the Wireless Manager

You can use the Wireless Manager application to turn on and turn off the GeoExplorer 2008 series handheld's wireless LAN radio and/or Bluetooth radio. You can turn on and turn off both radios at the same time, or control each radio individually.

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

- Tap the Wi-Fi ⦿ icon or the Bluetooth icon ⓑ in the *Today* screen.

- Tap ▦, ▦, or ▦ in the title bar and then tap *Wireless Manager*.

- Tap ▦ / *Settings* / *Connections* / *Wireless Manager*.

Turn on the wireless LAN radio and/or Bluetooth radio to be able to connect to other devices or networks.

Turn off the wireless LAN radio and/or Bluetooth radio to prevent the handheld from sending or receiving wireless signals.

Tip – To conserve power, turn off the wireless LAN radio and/or the Bluetooth radio when 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 both radios, or to turn off both radios if they are already on.

   – Tap **Wi-Fi** or **Bluetooth** 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 and the **Bluetooth** 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*, and the Bluetooth status field shows *On* or *Visible*.
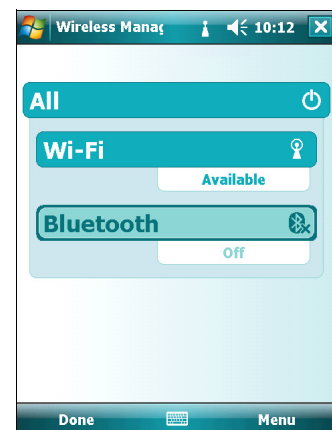
3. Tap **Done** to exit the Wireless Manager.

After you turn on the wireless LAN radio, the wireless LAN icon ▦ appears in the title bar to indicate that the wireless LAN radio is enabled. A second icon ▦ appears if a wireless LAN 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 [icon] / *Settings* / *Connections* / *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.*
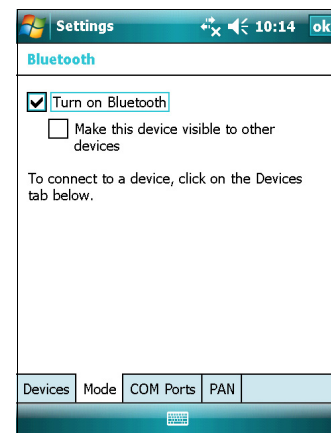
Making the handheld visible (discoverable) to other Bluetooth devices

To allow other Bluetooth-enabled devices to connect to the GeoExplorer 2008 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 [icon] / *Settings* / *Connections* / *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**.

Options for connecting wirelessly to other devices and networks

The GeoExplorer 2008 series handheld has an integrated wireless LAN radio and an integrated Bluetooth radio that you can use to connect to other devices and networks.

When you are within range of an available wireless LAN access point, you can use a wireless LAN connection to connect to the Internet (at broadband speeds) or a corporate network to:

- browse the Internet or an Intranet

- send and receive e-mail and instant messages

- access files on the network

Access points are also known as "hotspots". Wireless LAN is often referred to as *Wi-Fi*.

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

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...
Wireless LAN	Connect to a wireless LAN access point	page 82
Bluetooth wireless technology	Connect to another Bluetooth-enabled device (paired and non-paired connections)	page 84
	Connect to a Bluetooth-enabled phone for Internet access or real-time corrections (including VRS networks)	page 88
	Connect to a Bluetooth-enabled serial device	page 94
	Connect to an office computer to use ActiveSync technology	page 97
	Output GPS data to other devices using Bluetooth wireless technology	page 100
	Enable other devices to transfer files using Bluetooth wireless technology	page 101
	Beam files to or from another device	page 102
Wireless LAN or Bluetooth wireless technology	Access a corporate network through your Internet connection	page 103

Note – For information on connecting to external devices using the optional serial clip, see Connecting to other devices using the serial clip, page 109.

Connecting to a wireless LAN access point

To connect to a wireless LAN access point, you must:

1. Set up the wireless LAN connection

2. Connect to the wireless LAN 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 wireless LAN connection

1. Make sure that the GeoExplorer 2008 series handheld's wireless LAN radio is enabled (see page 78).

2. Tap 🪟 / *Settings* / *Connections* / *Network Cards.*

3. Select the *Wireless* tab.

   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. To use authentication, select the authentication method from the *Authentication* list.

7. To use data encryption, select an encryption method from the *Data encryption* list.

8. To automatically use a network key, select the check box for *The key is automatically provided.* Otherwise, enter the network key.

9. Tap **Next**.

10. For increased security, select the *Use IEEE 802.1x network access control* check box and then configure additional authentication information.

11. Tap **Finish**.
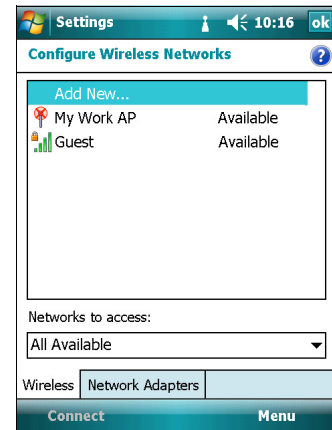
Step 2: Connecting to the network or access point

1. Remove the handheld from the support module, as the handheld prioritizes a USB connection over a wireless LAN connection.

2. Bring the handheld within range of the network or access point.

   When a wireless LAN is detected, the access point icon 📶 on the title bar is animated, 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 wireless LAN radio. When the wireless LAN 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 wireless LAN 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 the wireless LAN connected icon 📶 in the title bar, select **Wireless Manager** and then tap the **Wi-Fi** button.*

Tip – To delete a wireless LAN connection, tap and hold the connection in the *Wireless* tab of the *Network Cards* screen and then select *Delete*.

Connecting to a Bluetooth-enabled device

To use another Bluetooth-enabled device with the GeoExplorer 2008 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 2008 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 88, 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 86.

To connect the GeoExplorer 2008 handheld to the other device, do one of the following:

- Pair with a Bluetooth-enabled device (see below)

- Set up a connection to a non-paired device (see page 86)

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 2008 series handheld, tap 🪟 / *Settings* / *Connections* / *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 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 handheld.
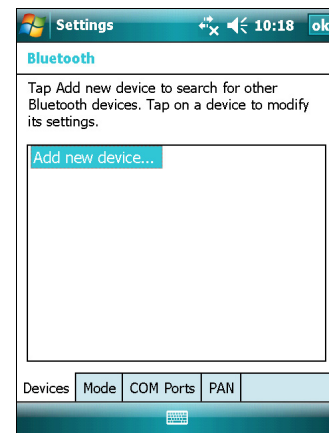
Note – Trimble recommends that you enter only numbers, as some devices do not support passcodes that include letters.

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 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, select ***ActiveSync***.

Note – For more information on the types of devices that the GeoExplorer 2008 series handheld can connect to, and the supported Bluetooth services, see Connecting to a Bluetooth device as a client, page 105.

10. Tap **Finish** on the right softkey.

11. Tap **OK** in the top right corner of the screen to close the Bluetooth application.

12. Tap ❌ in the top right corner to close the *Settings* screen.

You have now created a partnership between the GeoExplorer 2008 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 88

- Connecting to a Bluetooth-enabled serial device, page 94

- Connecting to an office computer to use ActiveSync technology, page 97

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* / *Connections* / *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** on the right softkey.

   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**.

   The *Partnership Settings* screen appears.

7. If required, change the name of the device in the *Display Name* field.

8. 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***.
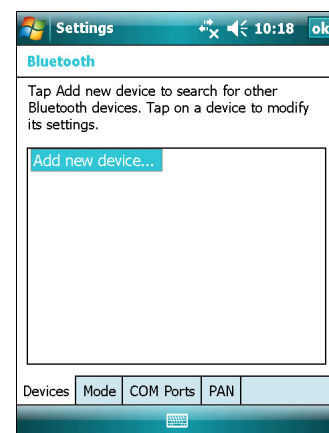
– a computer to access ActiveSync, select *ActiveSync*.

Note – For more information on the types of devices that the GeoExplorer 2008 series handheld can connect to, and the supported Bluetooth services, see Connecting to a Bluetooth device as a client, page 105.

9. Tap **Finish** on the right softkey.

10. Tap **OK** in the top right corner of the screen to close the Bluetooth application.

11. Tap ⊠ in the top right corner to close the *Settings* screen.

You have now created a partnership between the GeoExplorer 2008 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 88

- Connecting to a Bluetooth-enabled serial device, page 94

- Connecting to an office computer to use ActiveSync technology, page 97

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

Use the GeoExplorer series handheld's Bluetooth radio to connect to a Bluetooth-enabled cellular phone and then connect to the Internet. 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.

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

1. Connect the GeoExplorer 2008 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.

3. Configure the software to use the connection. For example, you must configure the GPS 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

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. For more information, see Turning on and turning off the integrated radios, page 78.

2. On the handheld, tap 🏁 / *Settings* / *Connections* / *Connections*.

3. Below **My ISP**, tap *Add a new modem connection*.

4. Enter the name for the connection. For example, enter the name of the phone or the VRS network that you will connect to.

5. From the *Select a Modem* dropdown list, select **Bluetooth** and then tap **Next** on the right softkey.

6. If the phone you want to connect to is:

   – listed, go to Step 7 below.

   – not listed:
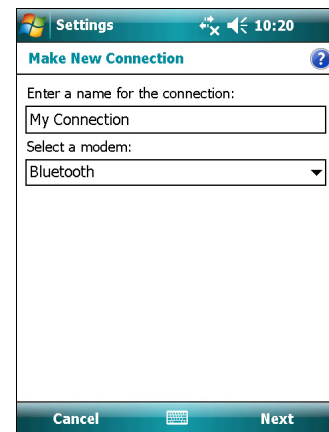
   a. Tap *Add new device*. The handheld searches for other Bluetooth devices and displays them in the list.

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

   b. From the list of available devices, select the device you want to connect to and then tap **Next** on the right softkey.

   c. To pair with the phone, enter a passcode of your choice that you will easily remember onto the handheld and then tap **Next** on the right softkey.

   d. When prompted by the phone, enter the same password and then accept the connection.

   e. On the GeoExplorer 2008 series handheld, in the *Partnership Settings* screen, make sure that **Dialup Networking (DUN)** is selected and then tap **Finish** on the right softkey.

   You have now created a partnership between the GeoExplorer 2008 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** on the right softkey.

10. Unless the phone provider confirmed that you must enter user name, password, and domain settings to access the Internet, tap **Finish** on the right softkey 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** in the top right corner of the screen.

    c. Tap **Finish** on the right softkey.

    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** on the left softkey without entering any information in this screen. Otherwise, enter the required information and then tap **OK** on the left softkey.

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 Connectivity icon 🔲 in the title bar. 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 wireless LAN connection, the connectivity icon appears as 🔲 instead.

6. Tap **OK** in the top right corner of the screen to close the *My ISP* screen.

7. Tap **OK** in the top right corner to close the *Connections* screen.

8. Tap ✖ in the top right corner to close the *Settings* screen.

To check the connection status at any time, tap the ⟷ or 📶 icon in the title bar.

To end the connection at any time, tap the ⟷ or 📶 icon in the title bar and then tap **Disconnect**.

To connect to a corporate network or Intranet, see page 103.

To send and receive email messages, see Messaging, page 49.

Step 3: Configuring the GPS field software to use data received from the Internet source
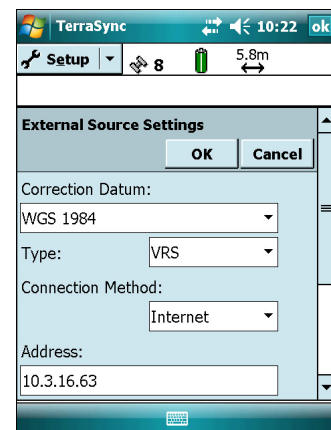
Now that you have connected the GeoExplorer 2008 series handheld to the Internet using a Bluetooth-enabled cellular phone, you must configure the software to use the connection to receive data.

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 93.

Using real-time corrections from the Internet

1. Start the Trimble GPS 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 GPS 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 **OK** 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 GPS 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 **OK** to confirm the settings and return to the *Real-time Settings* form.

5.   Tap **OK** 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.

6.   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 GPS 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

1. Make sure that the coordinate system selected in the TerraSync software matches the coordinate system of the map server.

2. 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.

3. Tap **Layers** and then select *Background files*. The *Background Files* form appears.

4. 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.

5. Tap **OK** 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

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

To ***manually*** reconnect the Trimble GPS 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 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 GPS 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 84).

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

1. On the GeoExplorer 2008 series handheld, tap / *Settings* / *Connections* / *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** on the right softkey.

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

   The GeoExplorer 2008 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** on the right softkey.

8. Tap **OK** in the top right corner to close the Bluetooth application.

9. Tap in the top right corner to close the *Settings* screen.
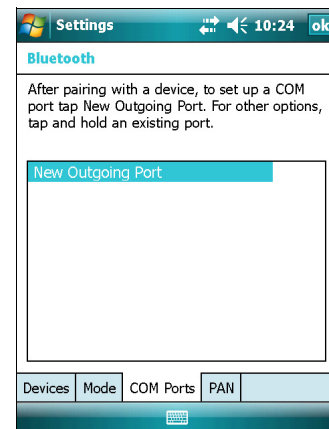
Step 3: Configuring the GPS field software to use data from the serial device

Once you configure the connection between the GeoExplorer 2008 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 96.

Using real-time corrections from an external serial device

1. Start the Trimble GPS 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 ![icon] 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 **OK** to confirm the external source settings and return to the *Real-time Settings* form.

10. Tap **OK** 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 GPS.

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.
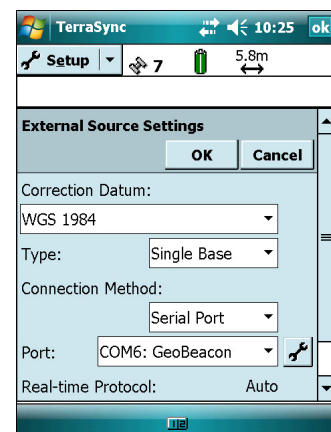
Using data from an external source in the TerraSync software

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 **OK** to confirm the sensor settings and return to the *External Sensors* form.

7. Tap **OK** 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.
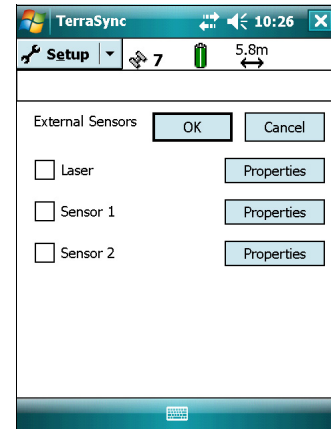
   To check the status of the connection, select the Comms subsection in the Status section of the GPS field software .

Connecting to an office computer to use ActiveSync 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 on a Bluetooth-enabled office computer.

Note – Not all Bluetooth devices and Bluetooth management software support ActiveSync 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 a office computer to use ActiveSync with a Bluetooth connection, you must:

1. Set up the connection to the computer.

2. Connect to ActiveSync 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 the ActiveSync software 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 Vista operating system:

    a. From the *Start* menu on the office computer, select *Control Panel / Hardware and Sound / Windows Mobile Device Center*.

    The *Connection Settings* dialog appears:
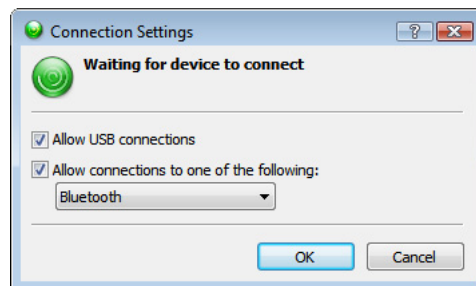
    b. Select the *Allow connections to one of the following* check box.

    c. From the list, select Bluetooth and then click **OK**.

- the Windows XP or 2000 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 software on the office computer.

c.   Select *File* / *Connection Settings*.

The *Connection Settings* dialog appears:
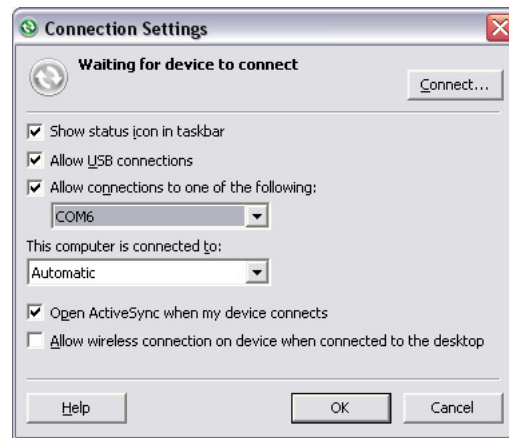
d.   Select the *Allow connections to one of the following* check box.

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 2008 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 [icon] / *Settings* / *Connections* / *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** on the right softkey.

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** on the right softkey.

You have now created a partnership between the GeoExplorer 2008 series handheld and the office computer so that they can communicate.

9.   Tap **OK** in the top right corner to close the Bluetooth application.

10. Tap [x] in the top right corner to close the *Settings* screen.

To connect to ActiveSync, see Step 2 on the following page.

Step 2: Connecting to ActiveSync using Bluetooth wireless technology

1. On the GeoExplorer 2008 series handheld, tap / *Programs* / *ActiveSync*.

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 ActiveSync connection, tap the connectivity icon in the title bar.

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

Outputting GPS data to other devices using Bluetooth wireless technology

To provide GPS positions from the GeoExplorer 2008 series handheld to another device using a Bluetooth wireless connection, you must:

1. Connect the other device to the GeoExplorer 2008 series handheld.

2. Configure the handheld to output data to the other device.

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 2008 series handheld's Bluetooth radio and make the handheld *visible* to other devices (see page 80).

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 2008 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 2008 series handheld, accept the connection to the other device.

6. Enter the same passcode on the GeoExplorer 2008 series handheld that you entered on the other device and then tap **Next** on the right softkey on the handheld.

7. On the handheld, tap **Finish** on the right softkey.

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

1. On the GeoExplorer 2008 series handheld, tap 🏁 / *Settings* / *Connections* / *GPS Connector* to open the GPS Connector software.

2. Use the GPS Connector software to output NMEA or TSIP messages to *COM9*. This is the GeoExplorer 2008 series handheld's Host Bluetooth serial port.

3. Use the Trimble GPS field software to ensure NMEA output is set to on, to configure the NMEA output settings (output rate and messages), and to configure the GPS settings.
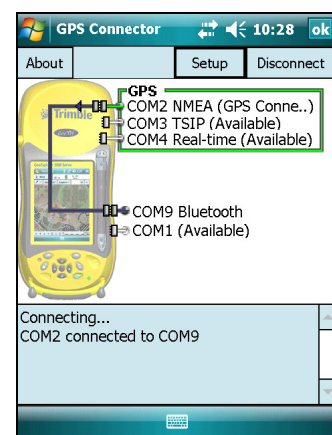
Step 3: Configuring the other device to receive data from the handheld

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, 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 2008 series handheld's Bluetooth radio and make the handheld *visible* to other devices (see page 80).

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 2008 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 2008 series handheld's integrated Bluetooth radio is turned on (see page 80).

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.
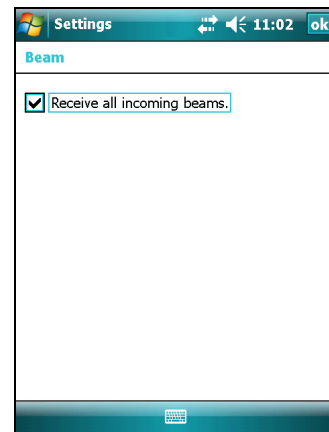
To *send* beamed files to another device:

1. Make sure that the GeoExplorer 2008 series handheld's integrated Bluetooth radio is turned on (see page 80).

2. On the GeoExplorer 2008 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.
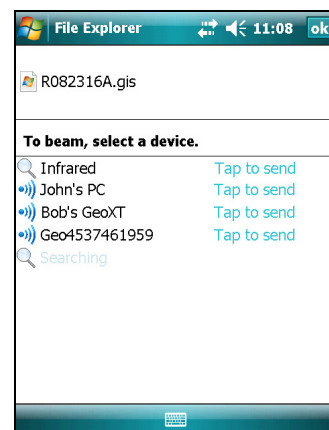
Accessing a corporate network through your Internet connection

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 wireless LAN connection to an access point. For more information, see page 82.
- Connect to the Internet using a Bluetooth-enabled phone. For more information, see page 88.

Step 2: Setting up a VPN connection

1. On the GeoExplorer 2008 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.

   To view additional information for any screen in the wizard, tap .
4. Tap **Finish**.
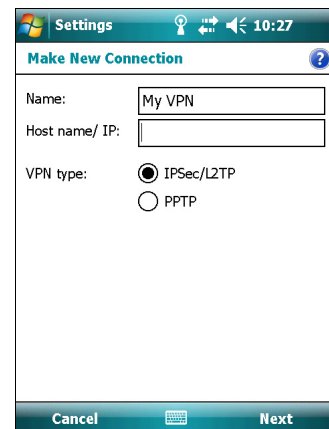
Step 3: Connecting to the corporate network or Intranet

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 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** in the top right corner of the screen.

6. Repeat steps 4 and 5 as required.

7. Tap **OK** in the top right corner of the screen to return to the *Advanced* tab of the *Connections* screen.

8. Tap **OK** in the top right corner of the screen to close the *Connections* screen.

9. Tap ✕ to close the *Settings* screen.
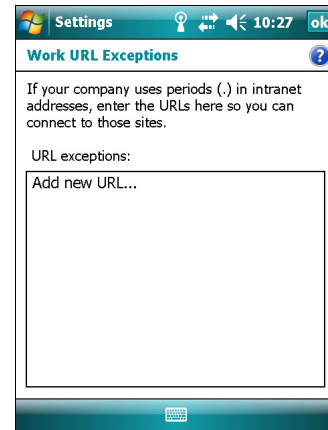
Bluetooth wireless connections explained

The GeoExplorer 2008 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 2008 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 2008 series handheld as *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 2008 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.
Serial Port	Emulates an RS-232 serial (COM) port on the handheld.
ActiveSync	Enables an ActiveSync connection to a computer.
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.
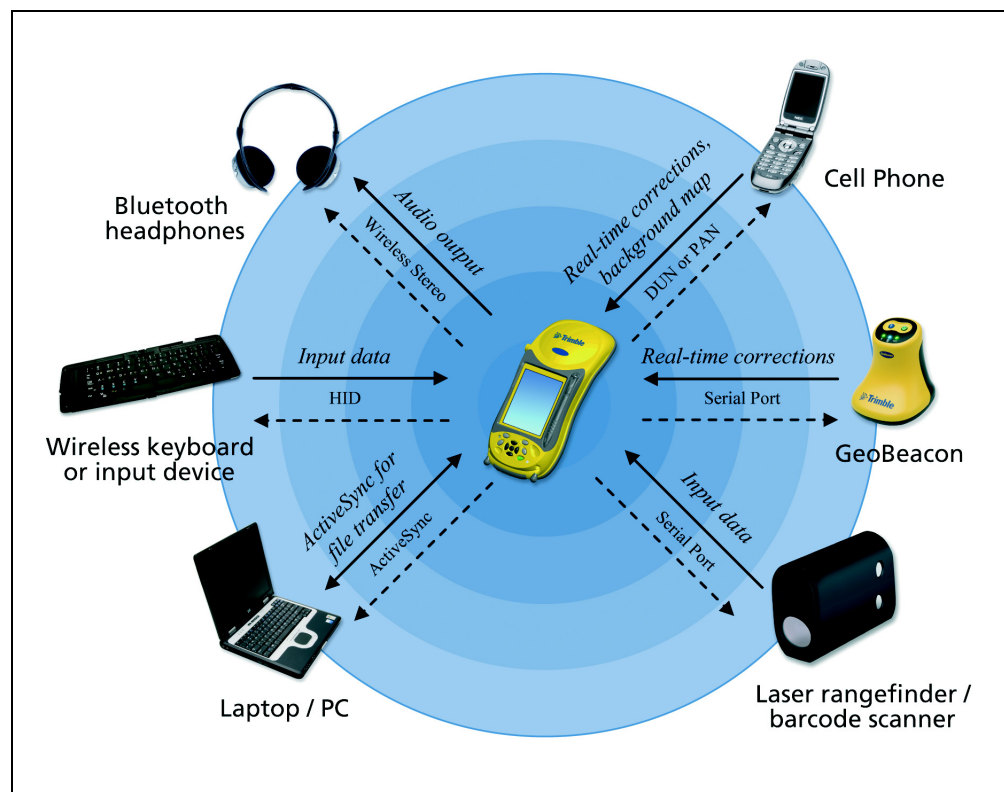
Figure 6.1   GeoExplorer 2008 series handheld Bluetooth client connections

In Figure 6.1, the dashed arrows indicate the client device—that is, the GeoExplorer 2008 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 2008 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 service 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 2008 series handheld as a Bluetooth host device, which provides services to Bluetooth client devices that are within range.

Host services provided by the GeoExplorer 2008 series handheld are:

Service	Description
Serial Port	Emulates an RS-232 serial (COM) port on the handheld. For more information, see Outputting GPS data to other devices using Bluetooth wireless technology below.
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 2008 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 102).

To provide a host service, you must turn on the Bluetooth radio and make both devices visible to other devices (see page 78 and page 80).

Figure 6.2 shows different client devices connecting to the handheld using Bluetooth wireless technology.
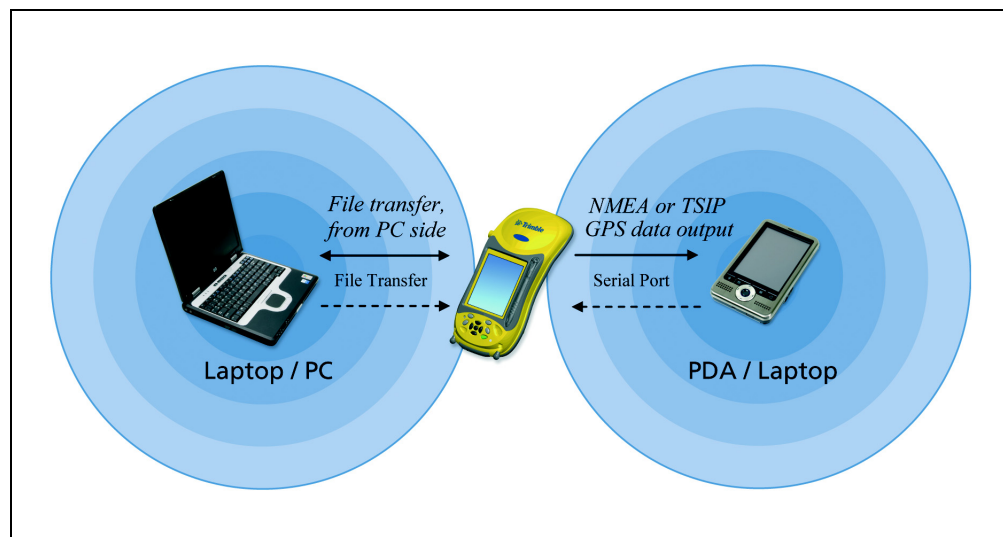
Figure 6.2   GeoExplorer 2008 series handheld Bluetooth host connections

In Figure 6.2 the dashed arrows indicate the client devices—for example, the laptop or PDA—connecting to the GeoExplorer 2008 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 2008 series handheld can output GPS 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 2008 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 2008 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 GPS positions from the integrated GPS receiver to another device, use the GPS Connector software to redirect the NMEA or TSIP output to COM9.

Connecting to other devices using the serial clip

The optional serial clip attaches to the communication swipes on the back of the handheld. When the serial clip is attached, it adds a serial port (COM1) to the GeoExplorer 2008 series handheld.

You can use the serial clip 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 69)

- receive GPS data from a Trimble GPS Pathfinder series or GPS Pathfinder Pro series receiver

- connect to other external devices, such as a laser rangefinder (see Using data from an external source in the TerraSync software, page 96, and select COM1 instead of a Bluetooth COM port)

- connect to a computer to supply GPS data (for example, when running the Trimble GPS Analyst extension for ESRI ArcGIS software on a laptop) (see Outputting GPS data to external equipment, page 75)

- supply external power from the external power kit or a vehicle's battery (see Connecting to an external power source with the serial clip, page 111)

- recharge the internal battery from an external power source (see Connecting to an external power source with the serial clip, page 111)

Attaching the serial clip

To attach the serial clip to the handheld:

1. Line up the communication swipes on the handheld with the pins on the serial clip.

2. Lower the handheld onto the serial clip.

3. Use the screws supplied with the serial clip to secure it to the handheld.

Note – *When the serial clip is attached, you cannot place the handheld in the support module.*

Connecting to external devices

You can use the serial clip instead of the support module to connect to an external device that has a serial port, such as a computer. The serial clip also provides a serial port to connect to other devices.

Note – When connecting to an office computer using the serial clip, you cannot use ActiveSync technology to establish the connection or synchronize data. To use ActiveSync, you must use a support module USB or a Bluetooth connection (see Connecting the handheld to a computer, page 55).

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

1. Attach the serial clip to the handheld.

2. Plug the null modem cable into the serial (COM) port on the serial clip.

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.

Connecting to an external power source with the serial clip

Use the optional serial clip to connect the GeoExplorer 2008 series handheld to an external power source. Depending on the optional accessories that you have purchased, you can use mains power, the external power kit, or a vehicle battery to supply power to the handheld.

To connect to an external power source:

1. Attach the serial clip to the handheld.

2. Plug the appropriate cable into the power port on the serial clip.

3. Connect the other end of the cable to the external power source. Details about each type of external power source are as follows:

To use power from…	connect the…	to the…
AC power source (mains power)	AC power adaptor supplied with the handheld	AC power outlet
external Lithium-ion power kit battery	adaptor cable from the optional external Lithium-ion power kit for GeoExplorer 2008 series handhelds	Lithium-ion battery provided as part of external power kit
vehicle battery	optional vehicle power adaptor for GeoExplorer 2008 series handhelds that supports 12–24 V inputs	cigarette lighter socket of the vehicle

Recharging from an external power source

By default, the GeoExplorer 2008 series handheld recharges its internal battery from any external power source that is connected. Recharging the battery draws more power from the external source than is used to power the handheld.

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 requries charging. Once fully charged, disconnect the external power source and allow the battery to discharge through normal use.*

Troubleshooting

In this chapter:

- Power issues
- Backlight issues
- Touch screen issues
- Keypad issues
- Storage card issues
- Connection issues
- GPS receiver issues
- Real-time DGPS issues
- Recommended GPS settings for maximum precision

Use this section to identify and solve common problems that may occur when using the GeoExplorer 2008 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 the battery (see page 24).
The screen is blank.	The handheld is turned off.	Press the **Power** button to turn on the handheld.
	The handheld has locked up.	Reset the handheld (see Resetting the handheld, page 29).
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: • Turn off the integrated radios before charging the handheld. • Suspend the handheld before charging. • 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.
The battery power percentage bar does not appear in the Power control.	The battery has 0% power.	Recharge the battery (see page 24). Once the battery level is above 0%, the battery power percentage bar reappears. Tap 🔳 / *Settings* / *System* / *Power* / *Battery* to view the level of power remaining in the battery.
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 Turning on and turning off the handheld, page 27). Then store the handheld as recommended (see Storing the handheld, page 19).

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 🔳 / *Settings* / *System* / *Backlight* to view the Backlight control, and make sure that: • the *Turn on backlight when a button is pressed or the screen is tapped* check box is selected. • the brightness is not set to *Dark* in the *Brightness* tab.
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 🔳 / *Settings* / *System* / *Backlight* to view the Backlight control and then adjust the slider in the *Brightness* tab.

Touch screen issues

Problem	Cause	Solution
The touch screen does not respond to stylus taps.	The touch screen is incorrectly aligned.	Realign the screen (see page 47).
	The touch screen is locked.	To unlock the touch screen, tap **Unlock** in the menu bar of the *Today* screen.
	The handheld has locked up.	Reset the handheld (see Resetting the handheld, page 29).
The screen is blank.	The handheld is turned off.	Press the **Power** button to turn on the handheld.
	The battery is flat.	Recharge the battery (see page 25).
	The handheld has locked up.	Reset the handheld (see Resetting the handheld, page 29).
The screen is hard to see.	The backlight level needs to be adjusted.	Open the Backlight control and then adjust the backlight level (see Backlight, page 48).
	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.
	The selected display theme does not have enough contrast.	Select the High-Contrast display theme. Tap 🪟 / *Settings* / *Personal* / *Today*, select the High-Contrast theme and then tap **OK**.
Images on the screen do not display correctly.	An electrostatic discharge has occurred to one of the recessed connector terminals at the rear of the handheld.	Press the **Power** button to turn off the handheld and then press the **Power** button again to turn on the handheld. This corrects the screen display without losing any data.

Keypad issues

Problem	Cause	Solution
Pressing the application key does not activate the function shown on the softkey above it.	The hardware application key has been programmed to run another program or to perform another action.	Do one of the following: • Tap the touchscreen softkey to activate the function shown on the softkey. • Re-program the application key to perform the same action as the touchscreen softkey. To do this, tap 🪟 / *Settings* / *Personal* / *Buttons*, select the button to reprogram and then select <Left Softkey> or <Right Softkey>.

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 Encrypting files on storage cards, page 32).

Connection issues

ActiveSync technology

Problem	Cause	Solution
ActiveSync technology will not connect to the handheld.	The connection is not initiated automatically.	Remove the handheld from the support module and then place it in the support module again. Alternatively, in the ActiveSync software on the office computer, select *File / Connection Settings* and then tap **Connect**.
	ActiveSync does not recognize the GeoExplorer 2008 series handheld.	Restart the office computer. Remove the handheld from the support module, reset it (see Resetting the handheld, page 29) and then replace it in the support module.
	An incompatible version of ActiveSync software is installed.	ActiveSync version 4.5 and later is compatible with the GeoExplorer 2008 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 *GeoExplorer 2008 Series Getting Started Disc*.You can also download the latest version from the Microsoft website at www.microsoft.com/windowsmobile/activesync/default.mspx.
	The connection is not enabled in ActiveSync on the computer.	In the ActiveSync software on the office computer, click *File / Connection Settings*. If you are using: • the support module, make sure that the *Allow USB connections* check box is selected from the drop-down list. • a Bluetooth connection, make sure that the correct port for Bluetooth is selected. Then open the Bluetooth control on the handheld. In the *Devices* tab, tap the partnership and in the services list make sure that the *ActiveSync* check box is selected.
	The connection is not enabled in ActiveSync on the handheld.	On the handheld, tap ⊞ / *Programs / ActiveSync / Menu / Connections*. Make sure that the *Synchronize all PCs using this connection* 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 the support module, use the USB to PC utility to change the connection method the handheld uses to connect to ActiveSync on the computer. Tap ⊞ / *Settings / Connections / USB to PC Utility*. Clear the *Enable advanced network functionality* check box. The handheld stops using the default RNDIS method to connect to the ActiveSync software.

Windows Mobile Device Center

Problem	Cause	Solution
Windows Mobile Device Center will not connect to the handheld.	The connection is not initiated automatically.	Remove the handheld from the support module and then place it in the support module again. Alternatively, in the Windows Mobile Device Center software on the office computer, select *Mobile Device Settings* / *Connection Settings*.
	The Windows Mobile Device Center software does not recognize the GeoExplorer 2008 series handheld.	Restart the office computer. Remove the handheld from the support module, reset it (see Resetting the handheld, page 29) and then replace it in the support module.
	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 *Mobile Device Settings* / *Connection Settings*. If you are using: • the support module, make sure that the *Allow USB connection* check box is selected from the drop-down list. • a Bluetooth connection, make sure that the correct port for Bluetooth is selected. Then open the Bluetooth control on the handheld. In the *Devices* tab, tap the partnership and in the services list make sure that the *ActiveSync* check box is selected.
	The connection is not enabled on the handheld.	On the handheld, tap ⊞ / *Programs* / *ActiveSync* / *Menu* / *Connections*. Make sure that the *Synchronize all PCs using this connection* 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 the support module, 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 ⊞ / *Settings* / *Connections* / *USB to PC Utility*. Clear the *Enable advanced network functionality* 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 2008 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 Deactivating the integrated radios, page 7).
	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 page 80) 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 *Devices* tab. Tap and hold the device name and then select *Delete*. Tap *New* 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 page 80).
	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 Deactivating the integrated radios, page 7).

Wireless LAN connections

Problem	Cause	Solution
The "New Network Detected" notification does not appear automatically.	The wireless LAN radio is off.	Tap the wireless icon in the Today screen or go to the Wireless Manager and make sure wireless LAN is on.
	The handheld is out of range of the network.	Move to within range of the network, then tap ⊞ / *Settings* /*Connections* /*Network Cards* and then setup 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 *Today* screen. If the date is incorrect, tap the clock icon on the *Today* 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 ⊞ / *Settings* /*Connections* /*Network Cards*. Tap and hold the network you would prefer to use and then select *Connect*.
The "New Network Detected" notification appears but the menu bar and soft key options are not displayed.	Some applications are not fully compatible with all features of the Windows Mobile 6 operating system.	Use the application buttons on the keypad, as they map to the soft keys in the menu bar: • To dismiss the notification, press the right application button on the keypad. • To connect to the network, press the left application button. Alternatively, select a Windows Mobile application from the *Start* menu, such as the *Today* screen or File Explorer, and the menu bar and soft keys will be displayed correctly.
Wireless LAN is unavailable in the Wireless Manager.	The integrated wireless LAN radio has been deactivated.	Use the Radio Activation Manager to reactivate the wireless LAN radio (see Deactivating the integrated radios, page 7).

Serial clip issues

Problem	Cause	Solution
Handheld does not recognize serial clip is attached.	The handheld needs to be reset.	Perform a soft reset of the handheld. To do this, either press the **Reset** button, or press the **Power** button to open the *Power* menu and then tap **Soft Reset**.
Unable to receive information from COM1.	The incorrect serial port settings have been selected on the handheld or on the other device.	Check that the serial port settings are the same on both devices and then try connecting to COM1 again.
	The incorrect data protocol is selected in the application on the handheld.	Select the data protocol supported by the device and then try connecting again.
	The serial cable used is not the correct type. Some serial cables, called null-modem cables, switch the data transmit and data receive lines, whereas other cables are 'straight through' and do not switch the pinouts.	Use the serial cable provided with the device.
A 'New Modem Detected' notification appears.	You have reset the handheld and then connected the serial clip.	Tap **Dismiss** to close the notification.
Handheld resumes when serial clip is removed.	The handheld was in Suspend mode.	To return the handheld to Suspend mode, press the **Power** button.
'Unidentified USB device' notification appears.	The serial clip is unevenly connected to the device.	To continue, cancel the notification and then reattach the serial clip correctly.

GPS receiver issues

Problem	Cause	Solution
The handheld is not receiving GPS positions.	The integrated GPS receiver is not activated.	Use the Connect or Activate GPS command in the GPS field software to open the GPS COM port and activate the integrated GPS receiver. For more information, see Using the GPS Receiver, page 61.
	Incorrect configuration of serial COM port.	When supplying GPS data to an external device using the COM1 serial clip, set the baud rate to the high-speed TSIP setting: 38400, 8, 1, Odd.
	The GPS COM port is already in use. Only one application at a time can have the port open.	Do the following: • Exit the software that is using the GPS COM port and then retry in your application. • Check that a GPS application is not running in the background. Tap 🪟 / *Settings* / *Memory*, select Running Programs, and then select and close any GPS applications you are not using. • Make sure that connections are not left setup in the GPS Connector application. Set NMEA to Internal - COM2 and TSIP to Internal - COM3, and then disconnect GPS Connector when you not using the connections.
	The GPS field software is using the wrong GPS COM port.	Connect to COM2 if the GPS 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 GPS settings to increase productivity. For more information, refer to the Help provided with the GPS field software.
	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 GPS settings to increase productivity. For more information, refer to the Help provided with the GPS field software.
	Wait for real-time is selected in the GPS 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 Connecting to a real-time differential correction source, page 68).
	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 GPS receiver outputs autonomous positions when real-time corrections are unavailable.	Configure the NMEA application to filter out non-DGPS positions.

Problem	Cause	Solution
The GPS Connector utility reports "Unknown".	The GPS 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 DGPS 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 GPS 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.	1. To download the software, go to www.trimble.com/support.shtml, click the link for your receiver type (*GeoXH*, *GeoXM*, or *GeoXT*), click *Downloads*, click *GeoExplorer 2008 Series* and then click *SBAS.INI*. 2. To specify the satellites you want the receiver to track or to ignore, select the Custom option in the *Tracking Mode* field in the *Integrated SBAS Settings* form of the Trimble GPS field software.
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 serial clip, 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 GPS field software, select the COM port that the real-time source is connected to. *Note – If you are using a non-Trimble application, use the GPS Connector software to create a connection between the COM port and the integrated GPS receiver's real-time GPS COM port (COM4). In the GPS Controller software, configure the receiver to use real-time corrections from an External Source using the handheld's "Receiver Port". For more information, see* Using real-time corrections from an external correction source, page 69.
	The port settings are incorrect.	Change the port settings to match those used by the external source.
	No GPS positions are available.	You cannot use real-time corrections until the GPS receiver is computing positions. In the GPS field software, make sure that the integrated GPS 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 GPS 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 GPS as your second choice.

Recommended GPS settings for maximum precision

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.

Tip – To quickly find the recommended values shown here, move the GPS slider in the *GPS Settings* form to the middle (default) setting.

Factor	Description	To Maximize Precision
Number of visible satellites	The quality of your data increases with the number of satellites being used to calculate the position.	You need at least four satellites to calculate an accurate 3-dimensional position. Trimble data collection software only logs GPS positions when four or more satellites are visible. Tracking more satellites can help to lower DOP values.
Multipath	Multipath is when GPS satellite signals are reflected off nearby objects, such as buildings or cars, causing an erroneous signal to be received by the GPS antenna. This can cause errors of several meters.	To reduce multipath, collect data in an open environment away from large reflective surfaces and with a clear view of the sky. In high multipath environments, record velocity data and use velocity filtering when postprocessing the data.
Weak satellite signals	Signal-to-Noise Ratio (SNR) is a measure of the strength of the satellite signal relative to the background noise. GPS quality degrades as the signal strength decreases. Weak signals may be caused by signals coming through vegetation, multipath signals, or low satellite elevation.	Set the GPS field software to ignore satellites with a weak SNR. Trimble recommends a minimum SNR setting of 39 dBHz.
Poor satellite geometry	Dilution of Precision (DOP) is a measure of the quality of GPS 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 PDOP value is lower, and position accuracy is greater. If the view of the sky is partially blocked, or if all of the satellites are in one area of the sky, the geometry and DOP may be poor.	Set the GPS field software to ignore positions with a poor DOP value. You can choose to filter positions based on PDOP (Position Dilution of Precision) or HDOP (Horizonal Dilution of Precision). PDOP is a measure of the horizontal and vertical quality of the GPS positions, whereas HDOP is just a measure of the horizontal precision (x and y coordinates). Select HDOP rather than PDOP if you want to ensure positions are accurate horizontally, and when vertical accuracy is less important Trimble recommends a maximum PDOP setting of 6, or a maximum HDOP setting of 4.
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 GPS receiver, which can cause errors in calculating the position.	Set the elevation field in the GPS field software to ignore satellites that are low in the sky. Trimble recommends a minimum elevation setting of 15°.
Occupation time at a point	Occupation time is the time spent at a point logging GPS positions.	For point features, remain at the feature and log a number of GPS positions to obtain an averaged position. When collecting line and area features, collect them using averaged vertices.

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