USER GUIDE

Trimble Geo 7X handheld

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Trimble

About this user guide

This user guide describes how to set up and use the Trimble® Geo 7X handheld. The information in this guide supplements the information in the Quick Start Guides, which you received with the Geo 7 series.

Even if you have used other Global Navigation Satellite System (GNSS) or 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 GNSS, go to the Trimble website (www.trimble.com) for more information.

WARNING- Before you use this product, make sure that you have read and understood all safety requirements. Failure to follow these safety instructions could result in fire, electric shock, or other injury, or damage to the Geo 7X handheld, laser rangefinder, or other property.

For safety information, see Important safety information, page 100.

Registration

To receive information regarding updates and new products, contact your local dealer or visit the Trimble customer registration website at www.trimble.com/register. When you have registered, you can select the newsletter, upgrade, or new product information.

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CHAPTER 1

About the Geo 7X handheld

In this chapter:

- Trimble Geo 7X handheld parts
- Keypad buttons
- Trimble Geo 7 rangefinder module parts
- LED status indicators
- Accessories

Trimble Geo 7X handheld parts

Geo 7 series functions and features may vary based on your model and configuration of device.

Geo 7X handheld - front

1. Antenna connector
2. Start screen
3. SIM slot
4. Application keys
5. Microphone
6. Home / Power
7. GNSS Antenna
8. Light sensor
9. SDHC slot
10. Speaker

Geo 7X handheld - back

1. Module connector
2. Stylus / stylus dock
3. 5 MP camera
4. Barometer vent
5. Removable battery

Keypad buttons

The front of the Geo 7X handheld has the following buttons:

❶ **Home/Power button**. Use the **Home/Power** button to:

- turn on the handheld. Press the **Home/Power** button briefly.
- go back to the *Home* screen, no matter what screen / application you are in. With the handheld already turned on, press the **Home/Power** button briefly.
- place the handheld in *Suspend* mode (see Using Suspend mode, page 36). With the handheld already turned on, press and hold the **Home/Power** for one second.
- wake the handheld from *Suspend* mode (see Using Suspend mode, page 36). If the handheld is in *Suspend* mode, press the **Home/Power** button briefly.
- reset the handheld. If the handheld stops responding to screen taps and the keypad buttons are not responding, press and hold the **Home/Power** button for eight seconds to soft-reset the handheld, or 10 seconds to hard-reset the handheld. See Restarting and resetting the Geo 7X handheld, page 107.

❷ **Camera/Rangefinder button**. Opens the camera or the Rangefinder utility, depending on what the button has been assigned to.
For information on assigning the button to an application, see Changing button assignments, page 46.
For information on using the Geo 7 series Rangefinder module, see Using the rangefinder and Flightwave technology, page 91.
For information on the the camera application, see Using the camera, page 86.

❸ **Left and right application buttons**. By default, these are set to be the same as the softkey in the tile bar above them. For information on how to customize keypad button behaviour, see Changing button assignments, page 46.

Trimble Geo 7 rangefinder module parts

1. Connector pins
2. Rangefinder laser receiver
3. Red targetting laser
4. Rangerfinder laser transmitter
5. Fitting tool

Note – *The Geo 7 series laser rangefinder module is not included with all handheld configurations.*

LED status indicators

The three LEDs on the front of the handheld denote the following:

Key	LED	Description
Battery status		Solid green. When connected to an external power source, the battery charging is complete.
		Solid orange. Battery is charging, connected to external power source.
		Solid red. Battery fault, for example, there is a problem with the battery, or the temperature of the battery has exceeded the acceptable temperature range when connected to an external power source.
		Flashing red. The handheld is not connected to an external power source, and the battery level is critically low.
	Off	The handheld is not connected to an external power source, and the handheld is turned off or is in Suspend mode, or handheld is turned on and battery level is good.

Key	LED	Description
 GNSS receiver status		Flashing green. Receiver is on, and GNSS positions are available.
		Flashing orange. Receiver is on, but GNSS positions are not available.
		Flashing blue. Receiver firmware loading / updating.
		Solid red. GNSS fault.
 Wireless radio status		Flashing green. A wireless radio is turned on.

For more information on:

- charging the battery, see Charging the battery, page 17.
- the battery status, see Battery status indicators, page 37.
- checking the level of charge, see Checking the level of battery power, page 36.
- using the GNSS receiver, see Using the GNSS receiver, page 77.
- using the wireless radios, see Choosing a connection option, page 57

Accessories

CAUTION - The Geo 7 series should be used with authorized Trimble accessories only. Use of non-approved accessories may void the product warranty, or cause damage to the handheld or other property.

The following Trimble authorized accessories are available for use with the Geo 7X handheld. Refer to the parts list label for your device for the accessories included with your handheld.

- Battery pack. Power the Geo 7X handheld.

- AC power adapter. Use the AC power adapter with the appropriate International plug adapter to charge the Geo 7 battery.

- Vehicle power adaptor

- USB data cable. Use the USB data cable (5m) to connect the Geo 7X handheld to an office computer to sync files and applications.

- USB to serial adaptor

- Pouch. Use the soft carry pouch to protect Geo 7X handheld when not in active use on the job site. Include room for one spare battery, and temporary storage for the Geo 7 series laser rangefinder module.

- AR screen protector kit. Use the AR screen protector kit to increase screen visibility outdoors, and prevent dust and particle abrasion of the touch panel surface.

The following accessories are also available:

- Range pole bracket and 2m carbon fiber range pole, for use with an external antenna.

- Monopole bracket and carbon fiber monopole

- Stylus kit. Use the stylus to interact with the touch panel.

- External antennas: Tornado, Tempest, and Zephyr

CHAPTER 2

Getting started

In this chapter:

- What you need
- Charging the battery
- Inserting and removing the battery
- Attaching the hand strap
- Attaching the Geo 7 rangefinder module
- Attaching the stylus
- Inserting and removing a SIM card
- Turning on the handheld for the first time
- Selecting the operating system language
- Calibrating the screen
- Setting the time and date
- Configuring the cellular connection
- Connecting and syncing to an office computer

WARNING- Before you use this product, make sure that you have read and understood all safety requirements. Failure to follow these safety instructions could result in fire, electric shock, or other injury, or damage to the Geo 7X handheld, laser rangefinder, or other property.

For safety information, see Important safety information, page 100.

What you need

To use the Geo 7X handheld with your computer, you need a computer with a USB port, and one of the following operating systems:

- Windows® 7, Windows Vista®, or Windows XP Home or Professional with Service Pack 3 or later
- Microsoft® ActiveSync® technology, or Windows Mobile® Device Center, available to download from www.microsoft.com/
- An Internet connection for your computer (broadband is recommended)

If you intend to use the cellular data capability of your Geo 7X handheld, you will also need:

- A wireless data plan with a carrier that provides service in your area
- For some carriers, you may also need network credentials such as an APN (Access Point Name), username, and password

Note – *Applications or services that send or receive data over a cellular network may incur additional fees. Contact your carrier for information about service plans and fees.*

Charging the battery

The Geo 7X handheld is powered by a removable rechargeable Lithium-ion battery pack. The battery can be charged inside or outside the handheld.

WARNING- Before you use this product, make sure that you have read and understood all safety requirements. Failure to follow these safety instructions could result in fire, electric shock, or other injury, or damage to the Geo 7X handheld, laser rangefinder, or other property.

For important safety information about the battery and charging the handheld, see Important safety information, page 100.

If the battery has been stored for longer than six months, charge it before use. Trimble recommends charging the battery for four hours to recharge it fully.

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

Avoid keeping the battery at full charge at high temperatures. For more information, see Important handling information, page 104.

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

If the Geo 7X handheld is very low on power, it displays a red flashing LED warning on the Power LED (see LED status indicators, page 12). If the device does not receive power before the battery charge drops below a minimum level, the device will auto-suspend to avoid data loss.

Charging the battery inside the handheld

Note – *The battery may charge slowly if the Geo 7X handheld is on and consuming power while the battery is being charged. To reduce the amount of time it takes to charge the battery, turn off unnecessary features and applications, or suspend the handheld while charging (see Using Suspend mode, page 36).*

1. With the battery inside the handheld (see Inserting and removing the battery, page 19) , connect the AC power adaptor to the power socket on the battery and then connect the adaptor to mains power. An international adaptor kit is provided with the handheld; select the adaptor suitable for your region.
2. Check that the notification LED on the handheld is solid orange, indicating that the handheld is properly connected to the power source and the battery is charging.

The notification LED on the handheld indicates the battery power or charging status. See LED status indicators, page 12.

Charging the battery outside of the handheld

1. Connect the AC power adaptor to the power socket on the battery and then connect the adaptor to mains power. An international adaptor kit is provided with the handheld; select the adaptor suitable for your region.
2. Check that the notification LED on the battery is solid orange, indicating that the battery is properly connected to the power source and the battery is charging.

The notification LED on the battery indicates the battery charging status:

LED	Description
	Solid orange: Battery is charging.
	Solid red: Charging fault - for example, there is a problem with the battery, or the temperature of the battery has exceeded the acceptable temperature range. See Power issues, page 110.
	Solid green: Battery charging is complete.

Checking the charge level of a battery outside of the handheld

To determine the state of charge of the battery outside the device, press the charge status button  on the battery.

The charge percentage LED panel lights up for a few seconds to indicate the current charge status:

○○○○○	Battery charge capacity is less than 5%
●○○○○	Battery charge capacity is ~20%
●●○○○	Battery charge capacity is ~40%
●●●○○	Battery charge capacity is ~60%
●●●●○	Battery charge capacity is ~80%
●●●●●	Battery charge capacity is ~100%

Inserting and removing the battery

WARNING- Before you use this product, make sure that you have read and understood all safety requirements. Failure to follow these safety instructions could result in fire, electric shock, or other injury, or damage to the Geo 7X handheld, laser rangefinder, or other property.

For important safety information about the battery and charging the handheld, see Important safety information, page 100.

WARNING- The handheld is not sealed from water and dust when the battery is removed. Only remove the battery for short periods of time and do not remove the battery in conditions where water or dust is likely to enter the handheld.

To insert the battery into the handheld:

1. Slide the battery into the cavity with the label facing upwards.
2. Push the battery in until it clicks into place.

To remove the battery:

1. Pinch the battery latches together until the battery is ejected.
2. Slide the battery out.

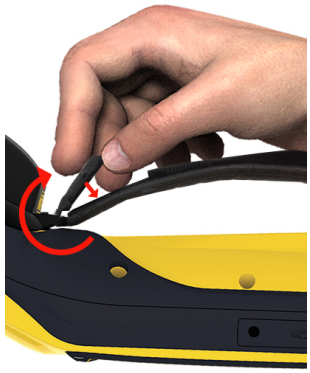
Replacing batteries

Rechargeable batteries have a limited number of charge cycles and may eventually need to be replaced. To purchase new batteries, contact your local Trimble GeoExplorer reseller (dealerlocator.trimble.com).

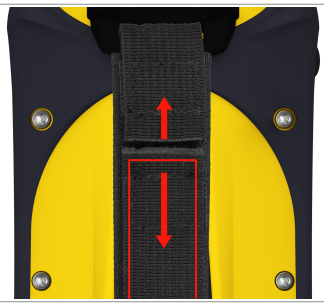
Attaching the hand strap

1. Using a coin or screw driver, attached the hand strap bracket to the bottom of the handheld.

2. Thread the top of the hand strap through the bracket near the top of the handheld.



3. Fasten the hand strap down with the Velcro, then adjust the hand strap length as required.



Attaching the Geo 7 rangefinder module

WARNING- Before you use this product, make sure that you have read and understood all safety requirements. Failure to follow these safety instructions could result in fire, electric shock, or other injury, or damage to the Geo 7X handheld, laser rangefinder, or other property.

For important safety information about the Rangefinder module, see Integrated Laser Rangefinder module safety information, page 103.

If you have purchased the Geo 7 rangefinder module, attach it to the handheld with the supplied fitting tool.

1. Clip the module into position.

2. Secure the module by tightening the attachment screws with the fitting tool provided with the rangefinder module.
   - Take care to insert the fitting tool into the screw heads at the correct angle, so as not to damage the fitting tool or the screw heads.
   - Take care not to over-tighten the screws.

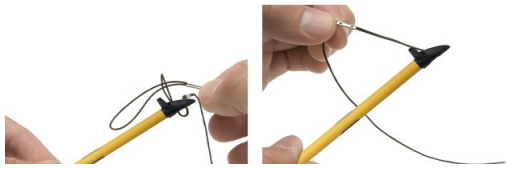
3. Replace the fitting tool in the integrated tool dock on the rangefinder module.

Attaching the stylus

The stylus is located on the back of the handheld. To tether the stylus to the handheld:

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

Inserting and removing a SIM card

CAUTION - The SIM card and its contents can be easily damaged by scratches or bending. Use caution when inserting or removing the card.

CAUTION - The presence of any dust or moisture in the SIM card slot may adversely affect the device and void your Trimble warranty. To prevent dust or moisture entering the SIM card slot:
– When inserting or removing a SIM card, place the handheld on a dust-free indoor surface.

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.

1. Turn off the handheld (see Turning on the handheld for the first time, page 23).
2. In a dust-free indoor environment, flip open the SIM card slot cover (on the left side of the handheld).
3. Insert the SIM card, with the gold contacts face down. Push the SIM all the way in until it clicks.
4. Close the SIM card slot cover.

When you turn on the handheld, it attempts to recognize the SIM vendor and automatically configure connection settings. If the SIM vendor settings can not be found, you may need to manually configure the connection settings. See Configuring the cellular connection, page 24.

To remove the SIM card:

1. Follow steps 1 to 2 above.
2. Gently press the card in and then let go. The card pops out.
3. Gently slide the card out of the slot.
4. Close the SIM card slot cover.

Turning on the handheld for the first time

To turn on the handheld, press the **Home/Power** button until the screen lights up.

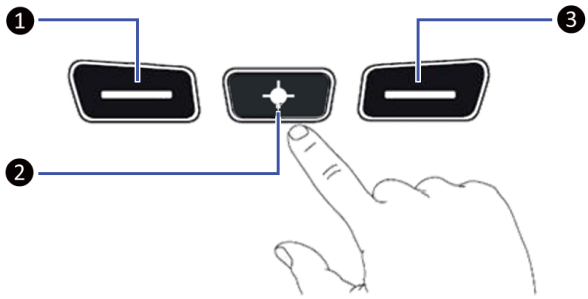
Selecting the operating system language

The first time you run the handheld, you need to select the operating system language.

WARNING- When you select the operating system language, the operating system is installed in the chosen language and all other languages are removed to free up storage for user files and applications. You cannot change the operating system language without completely reinstalling the Factory operating system. For more information, see .

To select the language:

1. Use the keypad buttons to navigate and choose the required language from the list of available languages:
   - Press the left application key (❶) to move up the list
   - press the Camera/Rangefinder button (❷) to move down the list
   - press the right application key (❸) to make your selection.



2. In the confirmation screen that appears:
   - To go back and choose a different language, make sure the **<Back** button is highlighted, then press the right application key to go back.
   - To confirm the selected language, press the left application key once to highlight the check box, and then press the right application key to confirm the selection. Then press the Camera/Rangefinder button twice move down and highlight the **Next>** button. Press the right application key to install the selected language onto the handheld.

Calibrating the screen

Calibrating the screen ensures that stylus and finger taps are correctly registered. To calibrate the screen, follow the on-screen instructions to tap on the + marks.

Note – *You can calibrate the screen at any time; on the Home screen, tap* 

, then tap  .

Setting the time and date

Time and date are automatically maintained whenever the GNSS receiver is used.

However, the first time you use the handheld, you may need to set the time zone date and time manually:

1. On the *Home* screen, tap the title bar and then on the pull-down list, tap  . Or, tap  / *Settings* / *Clocks & Alarms*. The *Clock & Alarms* screen appears.
2. Tap the *Time* tab.
3. In the *Time Zone* field, select the required time zone from the drop-down list.
4. In the *Date* field, tap the down arrow and then select the correct date from the calendar.
5. In the *Time* field, tap in turn the hour, minute, and second values and then tap the up or down arrows to set the correct time. Tap AM / PM to toggle between the two values to select as required.
6. Tap **OK**.

Configuring the cellular connection

Note – *Applications or services that send or receive data over a cellular network may incur additional fees. Contact your carrier for information about your service plan and fees.*

Using the Geo 7X handheld on GSM networks

If you are connecting to a GSM network, you will need a SIM card to use cellular services. Make sure the SIM card is inserted into the handheld before you turn on and set up the Geo 7X handheld. See Inserting and removing a SIM card, page 22.

A device that has been activated on the Verizon CDMA wireless network may also use a SIM card for connecting to a GSM network, primarily for international roaming. The Geo 7X handheld is subject to your wireless service provider's policies, which may include restrictions on switching service providers and roaming, even after conclusion of any required minimum service contract. Contact your wireless service provider for more details. Availability of cellular capabilities depends on the wireless network.

When you turn on the handheld, it attempts to recognize the SIM vendor and automatically configure connection settings. If the SIM vendor settings can not be found, you may need to manually configure the connection settings.

Configuring the connection settings automatically

1. Make sure the SIM is inserted in the handheld. See Inserting and removing a SIM card, page 22.
2. Tap / *Settings* / *Connections* / *Wireless Manager*. If the Phone is Off, tap *Phone* to turn it on.
3. Tap / *Settings* / *Connections*/ *Connections*/ *Tasks*.
4. Tap *Automatically configure connection*.
5. The device holds a database of the most common cellular providers and the correct connection settings. The handheld will attempt to identify the SIM vendor. If the SIM vendor is recognised correctly, tap **Next** tocontinue. The connection settings are set up automatically. The process takes about 30 seconds.

If the SIM is not automatically detected, or the vendor settings are not known you will need to set up the configuration manually.

Configuring the connection settings manually

1. Make sure the SIM is inserted in the handheld. See Inserting and removing a SIM card, page 22.
2. Tap / *Settings* / *Connections* / *Wireless Manager*. If the Phone is Off, tap *Phone* to turn it on.
3. Tap / *Settings* / *Connections*/ *Connections*/ *Tasks*.
4. Tap *Add a new modem connection*.
5. Enter a name for the connection, for example My Connection.
6. In the *Select a modem* field, select *Cellular Line (WWAN)* and then tap **Next**.
7. Enter the APN provided by your cellular provider (check with your provider first for correct settings, some providers have multiple APN settings), then tap **Next**.
8. Enter a username password and domain if required (check with your provider, these are often not required). If not required, leave these fields empty, then tap **Finish**.

For information on connecting to a cellular network to access the Internet or a company network, see Connecting to a cellular network from the modem, page 57.

Using the Geo 7X handheld on the Verizon™ networks (USA only)

By default, the integrated modem is set to connect to GSM/UMTS networks with a SIM card.

To use the Geo 7X handheld on the Verizon network, you must:

- have an account with Verizon.
- register the device with Verizon to enable it to connect to the network.

To register the the device with Verizon:

1. Provide the device's MEID (unique cell radio identifier) to your Verizon account contact. To find the MEID for your device:
   - look on the MEDI/IMEI label on the back of the Geo 7X handheld (the MEID is the first 14 digits), or
   - make sure the phone is turned on (see Using the Wireless Manager, page 56), then select  / *Settings* / *System* / *System Information* / *Modem*.
2. Once the device has been registered on the Verizon network (this can take a couple of days, check with your Verizon contact), enable and activate CDMA on the handheld.

To enable CDMA operation on the handheld:

1. Select  / *Settings* / *Personal* / *Cellular Network*.
2. From the *Network Type* dropdown list, select CDMA, then tap **OK**. The modem resets and reinitializes in CDMA mode.
3. To activate CDMA, make the phone is turned on, and connected to the Verizon network in an area of good coverage (the signal-strength indicator should show at least two bars). Tap  / *Settings* / *Personal* / *Cellular Network* and then click **Activate**.

A pop-up message will indicate that activation has been successful. This may take several minutes.

Connecting and syncing to an office computer

You may need to connect the Geo 7X handheld to an office computer to:

- install and activate software or receiver options.
- transfer information, settings, and files from one device to the other.
- synchronise data with an office computer.

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

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 Embedded Handheld 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 7 or Windows Vista operating system, use the Windows Mobile Device Center to manage the connection.

  Note: The Windows 7 and Windows Vista operating systems include a basic connectivity driver for Windows Embedded Handheld devices. This driver allows you to transfer files from the handheld to an office computer. The Windows Mobile Device Center enables you to synchronize office applications on an office computer with the handheld.

- the Windows XP 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.*

You can download the latest version of the Windows Mobile Device Center or ActiveSync technology from the Microsoft website.

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.

To connect the handheld to a computer:

1. Make sure the handheld and the computer are switched on.
2. Make sure you have installed the appropriate connection management software onto the computer.
3. To form a connection, do one of the following:

   - Use a USB connection:

     a. Connect the USB data cable to the USB connector on the handheld.

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

   - Use the handheld's integrated Bluetooth radio to establish a wireless link to a Bluetooth-enabled computer. For more information, see Connecting to an office computer using Bluetooth wireless technology , page 69.

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 28
- Managing the connection using ActiveSync technology, page 28

Managing the connection using the Windows Mobile Device Center

1. Connect the handheld to the computer Connecting and syncing to an office computer, page 26.
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* *Support and troubleshooting, page 106**.*
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 applications onto the handheld, page 48.
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 Microsoft *Windows Mobile Device Center Help*.

Managing the connection using ActiveSync technology

1. Connect the handheld to the computer (see Connecting and syncing to an office computer, page 26). The *Synchronization Setup Wizard* appears:

   Note – *If the connection is not made automatically, check that the connection is enabled in the ActiveSync technology and on the handheld. For more information, see* *Support and troubleshooting, page 106**.*

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 applications onto the handheld, page 48.
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 Microsoft *ActiveSync Help*.

CHAPTER 3

Using the Geo 7X handheld

In this chapter:

- The main screens
- Personalizing the Trimble Home screen
- Interacting with the handheld, opening applications
- Using the Power menu
- Using Suspend mode
- Checking the level of battery power
- Battery status indicators
- Using the Swap Battery function
- Speaker and network status indicators
- Pre-installed programs
- Changing screen settings
- Using the on-screen keyboard
- Writing or drawing on the screen
- Making a recording
- Changing button assignments
- Sounds and notifications
- Adjusting the display brightness
- Installing applications onto the handheld
- Using E-mail
- Collecting GNSS data

The Geo 7X handheld is powered by the Windows Embedded Handheld 6.5 Professional operating system. This chapter describes the main features of the handheld and this generation of the Windows Embedded Handheld operating system.

The main screens

The *Home* screen

The handheld is set to show the Trimble *Home* screen:

1. Tap to show information about your device, and to access the GNSS receiver options for your device. See Using the GNSS receiver, page 77.
2. Favorites bar: a side-scrolling list that you can customize with the applications that you use often. See Personalizing the Trimble Home screen, page 34.
3. Start button: tap to open the Start screen, where you can access programs and system controls. See Pre-installed programs, page 41, and Interacting with the handheld, opening applications, page 35.
4. Title bar: contains status icons for important system functions. See Speaker and network status indicators, page 39, and Battery status indicators, page 37.
5. Main application: a customizable shortcut to the application you use the most. See Personalizing the Trimble Home screen, page 34.
6. Tile bar: contains touchable tiles providing access to applications, menus, and notifications.

If required, you can change the *Home* screen to show the default Windows *Home* screen (see Personalizing the Trimble Home screen, page 34).

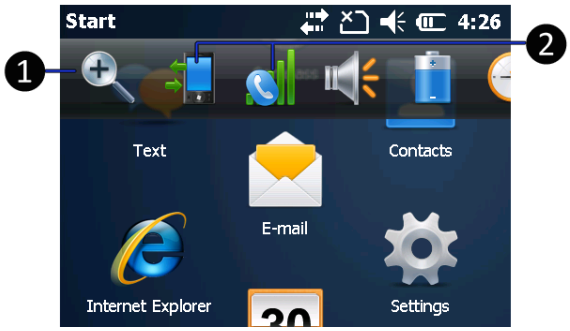
1. Home screen: provides access to the key functions on your handheld. Scroll, and tap any item to open it.
2. Title bar: contains status icons for important system functions.
3. Start button: tap to open the Start screen, where you can access programs and system controls.
4. Tile bar: contains touchable tiles providing access to applications, menus, and notifications.

The *Start* screen

1. Start screen: tap any item on the screen to open it.
2. Lock device: tap to lock the screen. See Locking the handheld, page 33.

The pull-down list

You can access the pull-down list from the *Home* screen or the *Start* screen.



1. Pull down list: tap anywhere on the title bar to open the title bar pull-down list, where you can access connectivity controls (the Wireless Manager), battery information, time and date settings, and volume.
2. Connectivity icons: tap either icon to access the Wireless Manager.

Locking the handheld

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

Once the handheld is locked, the screen and the buttons do not respond until the handheld is unlocked.

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

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

To unlock the device, slide the *Unlock* icon for the required application to take you straight to that application.
You can also help to keep your data secure by requiring a password each time the handheld is turned on. Tap / *Settings* / *Lock* to set a password or to change password settings.

Personalizing the Trimble Home screen

The *Home* screen provides fast access to the applications and device settings that you use the most frequently.

To open an application from the *Home* screen, tap it. See Interacting with the handheld, opening applications, page 35.

By default, the Geo 7 series *Home* screen is set to the Trimble *Home* screen. If required, you can change this to the Windows *Home* screen (see Using the Widows Home screen below).

The Trimble *Home* screen provides fast access to system information, your most-used application (the Main application), and other favorite applications. You can personalize the shortcuts that appear in the Main application and Favorites areas of the *Home* screen.

To choose a custom shortcut for the Main application and to set shortcuts on the Favorites bar:

1. Tap  / *Settings* / *Home*.
2. Select the *Items* tab. Trimble Home should be selected as the default *Home* screen.
3. Tap **Options...**. From the list of installed applications, select the application that you want to be the Main application. Only applications that are installed on the system memory can be used as the Main application. Tap **Next**.
4. Select as many shortcuts as required for the Favorites bar. Tap **Next**.
5. Tap the up and down arrows to customize the order of items in the Favorites bar.
6. Tap **Apply**, then tap **Ok** to close the *Items* tab.

Using the Widows Home screen

To use the Windows *Home* screen rather than the default Trimble *Home* screen:

1. Tap  / *Settings* / *Home*.
2. Select the *Items* tab. Select Windows Default as the default *Home* screen.

Interacting with the handheld, opening applications

Use the stylus or your finger to tap items on the touch screen, or to scroll up or down.

Action	Definition
Tap	Touch the screen once to open items and select options.
Tap and hold	Tap and hold the stylus or your finger 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 or your finger on the screen and drag across the screen to select text and images. Drag in a list to select multiple items.
Flick / swipe	Flick / swipe the stylus or your finger over the screen to scroll a page or a list up or down.

Using the Trimble Home screen and the Start menu

You can open applications from the *Home* screen or the *Start* menu. All applications installed on the handheld are accessible from the *Start* menu. The Trimble *Home* screen is a launcher for your most common applications and settings.

To go to the *Home* screen, press the **Home/Power** button. For more information, see The main screens, page 31, and Personalizing the Trimble Home screen, page 34.

To open an application, tap it.

To see other shortcuts on the *Home* screen Favorites bar, swipe the scrolling list left or right.

If at any time the touch screen does not respond correctly to stylus taps or your finger, realign it. For more information, see Changing screen settings, page 44.

Using the Power menu

To open the *Power menu*, on the *Home* screen, tap 

. From the Power menu you can:

- place the handheld in Swap Battery mode. See Using the Swap Battery function, page 38.
- shutdown the handheld to power it off completely. Tap **Shutdown**.
- reset the handheld. See Restarting and resetting the Geo 7X handheld, page 107.
- place the handheld in Suspend mode. See Using Suspend mode, page 36
- align the screen. Tap  . See Calibrating the screen, page 24.

Using Suspend mode

If you are not using the handheld for a short time, use *Suspend* mode to turn off the display and suspend running applications to save battery power.

When the handheld is in *Suspend* mode, nothing happens if you touch the display or the other keypad buttons. The handheld still maintains contact with cellular networks, and with Bluetooth accessories paired with the device. The integrated GNSS receiver is turned off and any application using GNSS is disconnected.

To place the handheld in *Suspend* mode, press and hold the **Home/Power** button until the display turns off (about 1 second). To resume working on the handheld, press the the **Home/Power** button briefly.

Alternatively, on the *Home* screen, tap 

and then tap **Suspend**.

To turn on the handheld when it is in *Suspend* mode, press the **Power** button briefly until the screen lights up. The handheld is immediately ready for operation. There may be a delay of up to 30 seconds while the integrated GNSS receiver automatically reactivates.

The handheld may go into *Suspend* mode automatically if you dismiss two consecutive low battery alerts. Charge the battery before you resume work.

Setting the handheld to auto-suspend

You can configure the handheld to automatically enter *Suspend* mode when it has been idle for a specified time. To change the time before the handheld enters *Suspend* mode:

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

Checking the level of battery power

To check the level of battery power remaining at any time while the device is running, on the *Home* screen, tap 

.

If the battery is charging, the *Power* screen displays the percentage of battery charge.

If the battery is not charging, it displays the percentage of charge and an estimate of the number of hours of life left (run time) based on your use of the product right now (averaged power use over the last two minutes of operation). The estimated remaining run time is affected by the current state of charge, how you are currently using the product (for example, use of GNSS, backlight), the

maximum capacity of the battery pack, and external factors such as signal strength from local cell towers when using the handheld's integrated modem.

Conserving power

Trimble recommends that you do the following to reduce power consumption:

- Set the handheld to automatically go into *Suspend* mode when idle. For more information, see Using Suspend mode, page 36.
- Set the backlight to automatically turn off when the handheld is idle for a specified time. For more information, see Adjusting the display brightness, page 47.
- Reduce the brightness setting for the backlight, or use the auto-brightness setting. For more information, see Adjusting the display brightness, page 47.
- Turn off the integrated Bluetooth and Wi-Fi radios, and the handheld's phone, whenever you are not using them. For more information, see Turning on and turning off the wireless radios, page 55.

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

Battery status indicators

The battery charging icon in the Title bar at the top of the screen shows one of the following icons to denote the battery charge status:

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

Using the Swap Battery function

The Geo 7 series has a function that allows a discharged battery to be replaced with a charged battery without completely shutting down the handheld. If the battery runs low while you are working, you can swap the battery without the need to close files and shut down the handheld, and can resume working straight away.

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

WARNING- The handheld is not sealed from water and dust when the battery is removed. Only remove the battery for short periods of time and do not remove the battery in conditions where water or dust is likely to enter the handheld.

To swap the battery in the handheld:

1. Save any open files.
2. Ensure that you have a spare battery close by with sufficient charge to keep working (see Checking the charge level of a battery outside of the handheld, page 19).
3. Do one of the following:
   - Turn off the handheld (see Using the Power menu, page 35).
   - Put the handheld in *Swap Battery* mode:
     a. Press the **Power/Home** button to go to the *Home* screen.
     b. Tap 

to open the *Power menu*.
     c. Tap **Swap Battery**.
     d. Wait for the handheld power LED to change from to off.
4. Remove the old battery, and replace it with a new freshly charged one (see Inserting and removing the battery, page 19).
5. Press the **Power/Home** button to resume working on the handheld.

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

Speaker and network status indicators

Status indicators that appear in the title bar at the top of the screen are as described below.

Speaker status indicator

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

Icon	Description
	Speaker is On
	Speaker is Off

Network and modem status indicators

The network and modem status icons on the title bar show the status of each radio. You can tap the title bar and then on the pull-down list tap the  or  icon to open the Wireless Manager (see Using the Wireless Manager, page 56).

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

Icon	Description
	Connected to ActiveSync or the Windows Mobile Device Center (WMDC) on a computer
	Connected to a Bluetooth-enabled phone
	Disconnected from ActiveSync or WMDC
	Disconnected from a Bluetooth-enabled phone
	Bluetooth radio is available
	Wi-Fi radio is on but not connected
	Wi-Fi is detected
	Connected to a wireless network
	Maximum cellular modem signal strength
	No cellular modem signal

Icon	Description
	Cellular modem is turned off
	No cellular service
	Searching for cellular modem service
	Data is transferring using the cellular modem
	No SIM card
	UMTS network is available
	UMTS network is connecting
	UMTS connection is active
	3G+ network is available
	Analog network is available
	EDGE network is available
	EDGE network is connecting
	EDGE connection is active
	GPRS network is available
	GPRS network is connecting
	GPSR connection is active
	HSDPA network is available
	HSDPA network is connecting
	HSDPA connection is active

Pre-installed programs

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

Icon	Program	Function
	About	Shows information about your device.
	ActiveSync	Synchronize information between the handheld and a computer.
	Adobe Reader LE	Read PDF documents.
	Alarms	Set alarms.
	Backlight	Manage backlight power settings.
	Beam	Manage Beam settings.
	Bluetooth	Manage Bluetooth connection settings and devices.
	Buttons	Customize keypad button assignment.
	Calculator	Perform basic arithmetic functions.
	Calendar	Keep track of appointments and arrange meetings.
	Camera	Capture photos and videos.
	Certificates	View and delete client-side certificates.
	Clocks & Alarms	Manage time zone and alarm settings.
	Compass	Basic compass and inclinometer.
	Connections	Manage network and internet connection settings.
	Contacts	Keep track of your friends and colleagues.

Icon	Program	Function
	Customer Feedback	Choose to participate in the Microsoft Customer Feedback program
	Domain Enroll	Enroll your device on a company network
	E-mail	Write, send, and receive e-mail messages.
	Encryption	Enable/disable external storage card file encryption.
	Error Reporting	Enable/disable automated error logging and reporting.
	File Explorer	View and manage files.
	GPS Controller	Configure GNSS receiver settings for third party applications.
	GNSS Connector	Configure COM port settings to output GNSS data to external devices.
	Home Settings	Configure how the Home screen appears.
	Input	Manage user input configuration settings.
	Internet Explorer	Browse the World Wide Web.
	Internet Sharing	Share an internet connection between devices.
	Lock	Lock the display.
	Managed Programs	Manage user-installed applications.
	Memory	View system internal and external memory status.
	Messenger	Send instant messages using Windows Live™ Messenger.
	Network Cards	Manage WiFi network connections and settings

Icon	Program	Function
	Notes	Create handwritten, typed, or recorded notes.
	Office Mobile 2010	Provides access to these Office Mobile applications: Excel® Mobile 2010, PowerPoint® Mobile 2010, OneNote® Mobile 2010, SharePoint WorkSpace Mobile 2010, and Word Mobile.
	Pictures and Videos	Take, view, and edit pictures, or record and launch video clips.
	Power	Manage device power settings.
	Rangefinder	Use the device laser rangefinder module (requires Geo 7 laser rangefinder module to be attached).
	Regional Settings	Manage regional settings for time, date, and numeric information display.
	Remove Programs	Uninstall user-installed applications.
	Screen	Text size and display settings.
	Search Device	Search for files and data.
	Sensor Calibration	Calibrate onboard orientation sensors to the local environment.
	Settings	Access the handheld's settings options, such as wireless connections, sounds and notifications, and power.
	Sounds & Notifications Settings	Adjust audio settings.
	System Information	Display device level system information.
	System Report	Generates and displays a report on system status.
	Task Manager	Display currently running tasks and applications.
	Tasks	Keep track of your tasks.

Icon	Program	Function
	Text	Send and receive text messages (requires cellular data service).
	USB to PC	Configure PC USB connections.
	Windows Live	
	Windows Media	Play audio and video files.
	Wireless Manager	Manage Bluetooth, Wi-Fi, and cellular radios.

Changing screen settings

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 align the touch screen, tap **Align Screen**, and then follow the on-screen instructions.
4. Tap **OK**.

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.
3. The example text below the slider shows how the text will appear on screen.
4. Tap **OK**.

Using the on-screen keyboard

The keyboard icon  automatically appears in the tile bar of any application requiring text or numeric input.

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

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 upper case characters, tap the Shift key Shift before tapping the letter you want, or tap the CAPS key CAP to type multiple capital letters.

To enter numbers and symbols, tap 123 to display a keyboards containing numbers and other symbols. To switch back to the main keyboard, tap 123 again.

To hide the keyboard, tap  again.

To change the size of the keypad, see Changing screen settings, page 44.

Editing text

If you need to edit text, tap on the screen to place the insertion point where you need it.

You can select text, and cut, copy, and paste text.

- To select text, double-tap the display at the point you want to select a word, or tap and hold then tap *Select All* to select all text.
- To cut or copy text, select the required text, then tap and hold, then select *Cut* or *Copy*.
- To paste text, tap the required insertion point, then tap and hold, then select *Paste* to insert the last text that you cut or copied. To replace text, select it before tapping *Paste*.

Using Auto-suggestion

The Geo 7 series uses the active dictionary to make word suggestions as you type. When the handheld suggests a word, tap the suggestion if you want to accept it. If the word you want to type is not displayed, you must type the whole word.

Writing or drawing on the screen

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

1. Tap and then tap Notes .
2. Open a note, tap Menu and select *Draw*.
3. Use the stylus to write or draw on the screen.

Making a recording

With the handheld's integrated microphone, you can create a stand-alone voice note or you can add a recording to a note. Then you can work with voice notes in the same way that you work with notes.

To make a recording:

1. Tap and then tap Notes .
2. Tap Menu and select *View Recording Toolbar*.
3. Do one of the following:
   - To create a stand-alone recording, in the screen displaying the list of notes, tap to begin recording.
   - To add a recording to a note, create or open a note and then tap to begin recording.
4. When you finish recording, tap . If you are creating a stand-alone recording, a new recorded item 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 in the note.

Changing button assignments

The left and right application buttons perform the same action as the left and right tiles in the tile bar. If required, you can program these buttons to perform a customized action, such as:

- Run a selected application, for example Messaging or Calendar.
- Act as a software button, for example an OK/Close button or a scroll button.

To assign a custom action to the left or right application button:

1. Tap / *Settings* / *Personal* / *Buttons*.
2. Specify an action for the button:
   a. Tap the *Program Buttons* tab.
   b. Tap a button in the list to select it.
   c. From the *Assign a program* drop-down list, select the action you want to occur when you press the button or tap the softkey.
   d. Tap **OK**.

Sounds and notifications

You can set the Geo 7X handheld to play a sound for system warnings and events, program notifications, screen taps, and hardware buttons presses.

To change sound settings:

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

You can also adjust the system volume to suit the ambient environment so that system and application sounds can be heard adequately.

To set the system volume, tap the status bar at the top of the screen, tap  in the pull-down list, then drag the volume sliders as required.

Adjusting the display brightness

You can manually adjust the brightness of the screen, or turn on Auto Brightness so that the handheld uses the built-in ambient light sensor to automatically adjust the brightness.

- To turn Auto Brightness on or off, select / *Settings* / *System* / *Backlight*, and select the *Brightness* tab. Turn Auto Brightness on or off as required.
- To manually adjust the screen brightness, select / *Settings* / *System* / *Backlight*, select the *Brightness* tab. Ensure Auto Brightness is off, then drag the Brightness Level slider as required.

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. Use the brightness sliders to adjust the display brightness.

To set the backlight to automatically turn off:

1. Tap  / *Settings* / *System* / *Backlight*.
2. 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 if device is not used for* check box and then select a time from the drop-down list.
3. 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 if device is not used for* check box and then select a time from the drop-down list.
4. Tap **OK**.

Installing applications 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 Embedded Handheld. To install software on a Windows Embedded Handheld:

1. Connect the handheld to a computer (see page 26).
2. Copy the installation files to a folder on the handheld.
3. Browse to the folder on the handheld. Tap the installation setup file to run it, or tap and hold the file and then select **Run**.
4. If prompted after installation, reset the handheld (see Restarting and resetting the Geo 7X handheld, page 107).

To install software that is provided as an installation setup that runs on an office computer, either from a CD or that you have downloaded:

1. Connect the handheld to a computer (see page 26).
2. If the software is provided on a CD, insert the software CD into the office computer. Otherwise, download the software onto the office computer.
3. Run the installation setup.
4. If prompted, select the install option for a Windows Embedded Handheld. Once the software is installed on the computer, it is automatically transferred to the handheld.

   Note – *If a memory card is inserted in the handheld, the card appears as an installation location option. Trimble recommends that you install software to the handheld's storage memory, not to a memory 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, restart the handheld.

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 memory 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.

CAUTION - The Windows Embedded Handheld 6.5 Professional operating system does not include a Recycle Bin. When you delete files from the handheld, they are deleted permanently.

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.

Trimble recommends that you regularly copy important data to an office computer. For more information, see Connecting and syncing to an office computer, page 26.

Using memory cards

As an alternative to storage memory, you can save data to a memory card. Use a MicroSD memory card to securely transfer data to and from another device that supports MicroSD memory cards.

To insert a memory card:

1. Turn off the handheld. See Turning on the handheld for the first time, page 23.
2. In a dust-free indoor environment, open the memory card slot cover (on the right side of the handheld).
3. Insert the memory card into the card slot.
4. Replace the cover, making sure it pushed back into place.
5. When you select the *Save As* option in an application, the memory card appears in the list of available storage locations.

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

Encrypting files on memory cards

To prevent sensitive data on a memory 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 memory card. Files already saved on memory 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 Geo 7X 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 memory 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 memory card:

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

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

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

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

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

1. Copy the files to the handheld's internal memory or to an office computer.
2. Ensure encryption is enabled on the handheld.
3. Copy the files back to the memory card. The files are encrypted as they are written to the memory card.

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

1. Insert the memory card in the handheld and then connect the handheld to an office computer (see Connecting and syncing to an office computer, page 26).
2. Copy the encrypted files from the memory 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 main memory.

4. To store the decrypted files on a memory card, ensure that encryption is not enabled on the handheld and then copy the decrypted files from the office computer to the memory card.

Using E-mail

You can send and receive e-mail messages using the Geo 7X handheld. 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 - 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.

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

During synchronization:

- Messages are copied from the mail folders of Exchange or Outlook on the office computer to the Messaging folder on the handheld. By default, you will receive messages from the past 3 days only, the first 100 lines of each message, and file attachments of less than 100 KB in size.
- 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 (using ActiveSync technology or the WMDC).

To send and receive e-mail for a synchronized Exchange or Outlook account, connect the handheld to the office computer (see Connecting and syncing to an office computer, page 26). Synchronization automatically begins, and the handheld sends and receives e-mail.

Connecting directly to an e-mail server

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 Wi-Fi access point, page 58**,*

Connecting to a Bluetooth-enabled device, page 59, or *Connecting to a Bluetooth-enabled phone for Internet access , page 65*

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

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

To set up a mail service:

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

   Note – *You cannot change the account name later.*
9. Tap **Finish**.
10. Tap **OK** to download mail immediately.

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.

Collecting GNSS data

To collect GNSS data with the Geo 7X handheld, you must install GNSS field software onto the handheld. You can use the Geo 7X handheld with compatible Trimble field and office software.

For version numbers and a complete list, see the Product Compatibility List on www.trimble.com.

For more information on using the integrated GNSS receiver, see Using the GNSS receiver, page 77.

CHAPTER 4

Connecting to other devices

In this chapter:

- Using the wireless radios to connect to other devices
- Deactivating the cellular, Wi-Fi, or Bluetooth radios
- Turning on and turning off the wireless radios
- Using the Wireless Manager
- Choosing a connection option
- Turning on and turning off the Bluetooth radio from within the Bluetooth application
- Making the handheld visible (discoverable) to other Bluetooth devices
- Connecting to a cellular network from the modem
- Connecting to a Wi-Fi access point
- Connecting to a Bluetooth-enabled device
- Setting up a Bluetooth connection
- Pairing with a Bluetooth-enabled device
- Setting up a Bluetooth connection to a non-paired device
- Connecting to a Bluetooth-enabled phone for Internet access
- Connecting to a Bluetooth-enabled serial device
- Connecting to an office computer using Bluetooth wireless technology
- Outputting GNSS data to other devices using Bluetooth wireless technology
- Enabling other devices to transfer files using Bluetooth wireless technology
- Beaming files to or from another device
- Accessing a corporate network through your Internet connection
- Cabled connections to other devices using the USB to serial converter

Using the wireless radios to connect to other devices

The Geo 7 series includes an integrated Bluetooth radio, a Wi-Fi radio, and an integrated cellular modem for sending and receiving data wirelessly.

To use the Wi-Fi or Bluetooth radio or the cellular modem, you need to turn it on (see Turning on and turning off the wireless radios below).

Using a data connection from your local cellular provider, the Geo 7 handheld's integrated cellular modem can be used to connect to the Internet to receive real-time corrections from a VRS™ network, send and receive messages (including e-mail, SMS, or instant messages), or to send and receive files and other data to and from the office directly in the field.

You can use the handheld's integrated Wi-Fi radio to connect to the Internet or a corporate network using a connection to a Wi-Fi access point (also known as "hotspots").

You can use Bluetooth wireless technology to connect to the Internet using a cellular phone. You can also connect directly to other Bluetooth-enabled devices, such as a barcode scanner, that are within range (typically within 5 m to 10 m of the handheld).

Note – *For information on creating cabled connections to external serial devices, use the USB to serial converter. See* *Cabled connections to other devices using the USB to serial converter, page 75**.*

Deactivating the cellular, Wi-Fi, or Bluetooth radios

The Geo 7X handheld is shipped with cellular, Wi-Fi, and Bluetooth wireless technology activated.

You may need to deactivate any of the wireless radios in the handheld if your organisation or the country in which you are working does not approve or permit the use of wireless communications technology. If you are unsure about whether the Geo 7X 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 radios, 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/Geo7, click *Technical Support* / *GeoExplorer Series Downloads* / *Geo 7 series*. Click *Radio Activation Manager* to install and run it.

Turning on and turning off the wireless radios

To save power and optimize battery life, turn off wireless radios when they are not in use.

You can use the Wireless Manager application to turn on and turn off the handheld's Bluetooth and Wi-Fi radios, and the handheld's cellular modem (see Using the Wireless Manager, page 56).

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 56).

To make the handheld visible to other Bluetooth-enabled devices and enable them to connect, see Making the handheld visible (discoverable) to other Bluetooth devices (page 62).

Using the Wireless Manager

You can use the Wireless Manager application to turn on and turn off the handheld's Wi-Fi and Bluetooth radios and the cellular modem. You can turn on and turn off any of the radios at the same time, or control each individually.

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

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

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

Turn on the Geo 7X handheld's cellular modem to be able to send and receive data, and send text messages.

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

To conserve power, turn off the radios when not in use.

To turn the radios on or off, do one of the following:

- Tap **All** at the top of the screen to turn on the radios, or to turn off all the radios if they are already on.
- Tap **Wi-Fi**, **Bluetooth**, or **Phone** to turn on the radio that you want to use, or to turn off the radio if it is already on.

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

To exit the Wireless Manager, tap .

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

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

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

Choosing a connection option

Use the table below to identify the connection type you want to make and then follow the steps provided.

Connection method	To...	See...
Geo 7 cellular modem	Connect to a cellular network	page 57
Wi-Fi	Connect to a Wi-Fi access point	page 58
Bluetooth wireless technology	Connect to another Bluetooth-enabled device (paired and non-paired connections)	page 59
	Connect to a Bluetooth-enabled phone for Internet access	page 65
	Connect to a Bluetooth-enabled serial device	page 68
	Connect to an office computer to use ActiveSync technology	page 69
	Beam files to or from another device	page 73
Wi-Fi, Bluetooth wireless technology, or Geo 7X cellular modem	Access a corporate network through your Internet connection	page 73
USB to serial converter	Connecting to external devices	page 75

Connecting to a cellular network from the modem

Use the integrated cellular modem in the Geo 7 handheld to connect to a cellular network and access the Internet or a company network. Use this type of connection to access a background map server, or for Internet and e-mail access.

Before you begin the steps below, make sure that a SIM is inserted and the cellular network is configured. See Configuring the cellular connection, page 24.

Some applications automatically launch the connection when you start the application, if a current connection is not already established. To manually connect:

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

5. The task bar shows the “connecting” icon. When the connection is open/established, the task bar shows the “connected” icon. The icons shown depend on the network—see Speaker and network status indicators, page 39 for full details.

Once connected, open an application, for example, Internet Explorer, to test the connection.

Connecting to a Wi-Fi access point

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

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

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

Step 1: Setting up the Wi-Fi connection

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

Step 2: Connecting to the network or access point

1. Make sure the handheld is not connected to any other device using a USB data cable, as the handheld prioritizes a USB connection over a Wi-Fi connection.

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

   When a Wi-Fi netwprk or access point is detected, the icon  appears on the title bar. If the access point icon does not appear, use the Wireless Manager to turn off and then turn back on the Wi-Fi radio. When the Wi-Fi radio is turned on, any networks or access points within range are detected and the icon appears.
3. Tap the access point icon on the title bar. A popup message shows the available networks.
4. Select the network you want to connect to and then tap **OK**.
5. Select *The Internet* or *Work* and then tap **Connect**.
6. If a *Network Log On* screen appears, enter your user name, password, and domain information and then tap **OK**.
7. When the handheld is connected to the network or access point, the Wi-Fi connected icon  appears in the title bar.
8. Start using the program you want to use, for example Internet Explorer.

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

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

Connecting to a Bluetooth-enabled device

The Geo 7X 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 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 handheld as a ***client*** device, which uses ***services*** offered by Bluetooth host devices that are within range. In general the host device provides information to the client device, but in some cases the client initiates the connection and also provides information to the host device.

The services used by the Geo 7X 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.
Serial Port	Emulates an RS-232 serial (COM) port on the handheld.
ActiveSync	Enables an ActiveSync connection to a computer. This service is also used for office computers which have the WMDC installed.
Input Device (HID)	Connects the handheld to a physical input device, such as a keyboard.
Wireless Stereo	Connects to Bluetooth A2DP (Advanced Audio Distribution Profile) headphones.

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

Client device	Data flow(s)	Host devices	Example data type or service	Bluetooth Profile(s)
	→	Bluetooth headphones	Audio output	A2DP
	←	Smartphone or Bluetooth modem	Any web delivered data stream (web map service data, real-time DGNSS corrections)	DUN
	←	Bluetooth Beacon receiver or radio	Real-time DGNSS correction	Serial Port
	↔	Personal computer	Files/data upload and download	ActiveSync
	←	Bluetooth keyboard or input device	User input data	HID
	←	Bluetooth rangefinder or external sensor	NMEA input data	Serial Port

For example, when the handheld connects as a client to:

- a cellphone, the handheld uses the DUN host service provided by the phone to access the Internet and 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 Geo 7X handheld as a Bluetooth host device, which provides services to Bluetooth client devices that are within range.

Host services provided by the Geo 7X handheld are:

Service	Description
Serial Port	Emulates an RS-232 serial (COM) port on the handheld. For more information, see Outputting GNSS data to other devices using Bluetooth wireless technology, page 71.
File Transfer	Allows a client to browse, copy, paste, and delete files and folders on the handheld.

Note – *You cannot transfer files between two Geo 7X 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 73).*

To provide a host service, you must turn on the Bluetooth radio and make both devices visible to other devices (see Turning on and turning off the wireless radios, page 55 and Making the handheld visible (discoverable) to other Bluetooth devices, page 62).

The table below shows different client devices connecting to the handheld using Bluetooth wireless technology.

Example client devices	Data flow(s)	Client device	Example data type or service	Bluetooth Profile(s)
Laptop or desktop computer	↔		Internet connection sharing	DUN
Laptop or Bluetooth-enabled mobile device	←		NMEA GNSS data output	Serial Port
Laptop or desktop computer	↔		File transfer	File transfer

The Geo 7X handheld can output GNSS data to client devices that connect to the handheld using a Bluetooth serial port. When a laptop computer or office computer connects to the Geo 7X 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 Geo 7X handheld, applications on the handheld can use the pre-defined host serial port on COM9 to provide host services to the client device. For example, to provide GNSS positions from the integrated GNSS receiver to another device, use the GNSS Connector software to redirect the NMEA output to COM9.

Making the handheld visible (discoverable) to other Bluetooth devices

To allow other Bluetooth-enabled devices to connect to the 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 (also referred to as “discoverable”).

To make the handheld visible to other devices:

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

Setting up a Bluetooth connection

To use another Bluetooth-enabled device with the Geo 7X 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 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 , page 65* *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 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 Bluetooth connection to a non-paired device, page 64.

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.

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

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 handheld, tap  / *Settings* / *Bluetooth*.
3. In the *Devices* tab, tap *Add new device*. The handheld searches for other Bluetooth devices and displays them in the list. If the device you are trying to connect is not displayed in the list, ensure that the device is on and within range and then tap **Refresh** to search for devices again.
4. Tap the name of the device you want to pair with and then tap **Next**.
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 handheld.

   Note – *Trimble recommends that you enter only numbers, as some devices do not support passcodes that include letters.*
6. Tap **Next**.
7. When prompted, enter the same passcode on the other device.
8. On the handheld, tap the name of other device. The *Partnership Settings* screen appears.
9. If required, change the name of the device in the *Display Name* field.
10. Select the service(s) you want to use with this device. For example, if you are connecting to:
    - a Bluetooth-enabled phone to connect to the Internet and receive real-time corrections or download background maps, select ***Dialup Networking (DUN)***.
    - a serial device, select ***Serial Port***.
    - a computer to access ActiveSync technology (or WMDC), select ***ActiveSync***.

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

Note – *For more information on the types of devices that the handheld can connect to, and the supported Bluetooth services, see* *Connecting to a Bluetooth-enabled device, page 59*.

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

You have now created a partnership between the 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 , page 65
- Connecting to a Bluetooth-enabled serial device, page 68
- Connecting to an office computer using Bluetooth wireless technology , page 69

Setting up a Bluetooth connection to a non-paired device

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

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

1. Make sure that the handheld and the Bluetooth device you want to connect to are within five meters of each other, and that the Bluetooth radio in each device is turned on.
2. Tap  / *Settings* / *Bluetooth*.
3. In the *Devices* tab, tap *Add new device*. The handheld searches for other Bluetooth devices and displays them in the list.
4. Tap the name of the device you want to connect to and then tap **Next**. The *Enter Passcode* screen appears.
5. Tap **Next** without entering a passcode.
6. If prompted to add the device to your device list, tap **No**.
7. On the handheld, tap the name of the other device. The *Partnership Settings* screen appears.
8. If required, change the name of the device in the *Display Name* field.
9. Select the service(s) you want to use with this device. For example, if you are connecting to:

- a Bluetooth-enabled phone to connect to the Internet and receive real-time corrections or download background maps, select ***Dialup Networking (DUN)***.
- a serial device, select ***Serial Port***.
- a computer to access ActiveSync (or WMDC), select ***ActiveSync***.

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

  Note – *For more information on the types of devices that the handheld can connect to, and the supported Bluetooth services, see* *Connecting to a Bluetooth-enabled device, page 59**.*

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

You have now created a partnership between the 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 , page 65
- Connecting to a Bluetooth-enabled serial device, page 68
- Connecting to an office computer using Bluetooth wireless technology , page 69

Connecting to a Bluetooth-enabled phone for Internet access

If you do not want to use the handheld's integrated cellular modem, you can use the Bluetooth radio to connect to a Bluetooth-enabled smartphone or Internet device and then connect to the Internet.

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

1. Connect the 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 GNSS field software to use map data received from the Internet source, or you must set up an e-mail account to send and receive e-mail 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 wireless radios, page 55.
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* drop-down list, select Bluetooth and then tap **Next**.
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**.
     c. To pair with the phone, enter a passcode of your choice that you will easily remember onto the handheld and then tap **Next**.
     d. When prompted by the phone, enter the same password and then accept the connection.
     e. On the handheld, tap *Advanced* to open the *Partnership Settings* screen. Make sure that ***Dialup Networking (DUN)*** is selected and then tap **Save**.

     You have now created a partnership between the handheld and the phone so that they can communicate.
7. From the *My Connections* list, select the phone that you want to configure the connection to.
8. Enter the GPRS access number for the Internet. Two of the common GPRS access numbers for cellular phones on GSM networks are *99***1# and *99#. If these access numbers do not work, contact the cellular phone provider to obtain the appropriate number to use.

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

9. Tap **Next**.
10. Unless the phone provider confirmed that you must enter user name, password, and domain settings to access the Internet, tap **Finish** without entering any information in this screen. Otherwise:
    a. Enter the required information.
    b. If the phone provider has told you that you need to change the baud rate or other settings for the connection, tap **Advanced**, configure these settings and then tap **OK**.
    c. Tap **Finish**.

You are returned to the *Connections* screen.

You have now configured the dialup networking connection.

Step 2: Connecting to the Internet using the dialup network

1. On the handheld, go to the *Connections* screen, if it is not already open (tap  / *Settings* / *Connections* / *Connections)*.
2. Below ***My ISP***, tap *Manage existing connections.*
3. Tap and hold the connection you want to use and then select *Connect*.
4. Unless the phone provider confirmed that you must enter user name, password, and domain settings to access the Internet, tap **OK** without entering any information in this screen. Otherwise, enter the required information and then tap **OK**.
5. If the phone prompts for confirmation to connect to the Internet, accept the connection.
    - The phone dials the configured GPRS access number and then connects to the Internet.
    - A Connectivity notification appears on the handheld as the connection is being made.
    - After the connection is made you are returned to the *My ISP* screen.
    - To confirm that the handheld is connected to the phone, or to check the status of the connection at any time, tap the title bar and then tap the Connectivity icon on the pull-down list. The notification shows the name of the current connection, and the time elapsed since the connection was made. To hide the notification, tap **Hide**.
6. Tap **OK** to close the *My ISP* screen.
7. Tap **OK** to close the *Connections* / *Tasks* screen.
8. Tap  to close the *Connections* screen.

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

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

To connect to a corporate network or Intranet, see Accessing a corporate network through your Internet connection, page 73.

To send and receive e-mail messages, see Using E-mail, page 51.

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

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

To use real-time corrections or background map data in Trimble field software, refer to the Trimble field software documentation on www.trimble.com:

- For the TerraSync software, go to http://www.trimble.com/mappingGIS/TerraSync.aspx?dtID=technical_support
- For the GPS Controller software, go to http://www.trimble.com/support_trl.asp?Nav=Collection-32054

Connecting to a Bluetooth-enabled serial device

Use Bluetooth wireless technology to receive data from a Bluetooth-enabled serial device.

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

1. Connect to the Bluetooth-enabled serial device.
2. Configure the COM port on the handheld to use for the connection.
3. If necessary, configure the GNSS field software to use data received from the serial device.

Step 1: Connecting to the Bluetooth-enabled serial device

Connect the handheld to the Bluetooth-enabled device, selecting the ***Serial Port*** service if it is not already selected (see Connecting to a Bluetooth-enabled device, page 59).

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

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

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

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

Once you configure the connection between the 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, or to use data from an external source such as a Bluetooth-enabled barcode scanner, refer to the relevant software documentation on www.trimble.com.

Connecting to an office computer using Bluetooth wireless technology

Instead of using a USB 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 or WMDC with a Bluetooth connection, you must:

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

Step 1: Setting up the connection to the computer

1. From the Bluetooth user interface on the office computer, make sure that the computer allows itself to be discovered by other Bluetooth devices.
2. Configure ActiveSync technology or WMDC on the office computer to connect to the correct Bluetooth port. The steps required depend on the operating system installed on the office

computer. If the office computer is using:

- the Windows 7 or Windows Vista operating system:

    a. From the *Start* menu on the office computer, select *Control Panel* / *Windows Mobile Device Center*. Under *Mobile Device Settings*, click *Connection Settings*. The *Connection Settings* dialog appears.

    b. Select the *Allow connections to one of the following* check box.

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

- the Windows XP operating system:

    a. From the Bluetooth user interface on the office computer, identify the virtual COM port of the host Bluetooth Serial Port or Local Service and ensure that this is enabled.

    b. Start the ActiveSync technology on the office computer.

    c. Select *File* / *Connection Settings*. The *Connection Settings* dialog appears.

    d. Select the *Allow connections to one of the following* check box.

    e. From the list, select the COM port that you selected in *Step a* and then click **OK**.

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

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

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

    You have now created a partnership between the handheld and the office computer so that they can communicate.
9. Tap **OK** to close the Bluetooth application.
10. Tap  to close the *Settings* screen.

11. To connect, go to *Step 2* below.

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

Step 2: Connecting to ActiveSync using Bluetooth wireless technology

1. On the handheld, tap  / *ActiveSync*.

   Note – *Only* ***ActiveSync*** *shows on the Windows embedded handheld. Select* ***ActiveSync*** *even if you use the WMDC on the desktop computer.*
2. Tap **Menu** and then select *Connect via Bluetooth*.
3. On the handheld, a message box shows the status of the connection as it is made.
4. When the connection to the office computer is successful, you are returned to the ActiveSync application on the handheld.
5. Tap  to close.

The connectivity icon in the status bar shows  , or  if Wi-Fi is connected.

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

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

Outputting GNSS data to other devices using Bluetooth wireless technology

To provide GNSS positions from the Geo 7X handheld to another device using a Bluetooth wireless connection, you must:

1. Connect the other device to the andheld.
2. Configure the handheld to output data to the other device. Make sure that the GNSS Connector software is installed on the handheld (see Supported GNSS field software, page 81).
3. Configure the other device to receive data from the handheld.

Step 1: Connecting the other device to the Geo 7X handheld

1. Turn on the handheld's Bluetooth radio and make the handheld visible to other devices (see Making the handheld visible (discoverable) to other Bluetooth devices, page 62).
2. On the other device, turn on the Bluetooth radio.

3. Use the Bluetooth management software on the other device to scan for Bluetooth devices and then set up a serial port connection to the 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 handheld, accept the connection to the other device.
6. Enter the same passcode on the handheld that you entered on the other device, and then tap **Next**.
7. On the handheld, tap **Finish**.

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

CAUTION - NMEA standard dictates that a baud rate of 4800bps should be used for NMEA messages. Depending on the number of satellites being tracked, the amount of data being captured at once may often cause the 4800 bit limit to be exceeded. Buffers have been added which allow the data to be stored and then sent when it is able to. This avoids data corruption, but may delay delivery of data, and positions may take as long as 8 seconds to be sent from the time at which they were originally recorded. If you need 4800bps output, Trimble suggests that you try to minimise the effect by reducing the amount of NMEA data being sent, for example, by dropping out NMEA sentences from the NMEA stream.

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

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

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

Enabling other devices to transfer files using Bluetooth wireless technology

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

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

1. Turn on the handheld's Bluetooth radio and make the handheld visible to other devices (see Making the handheld visible (discoverable) to other Bluetooth devices, page 62).
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 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 handheld's integrated Bluetooth radio is turned on (see Turning on and turning off the wireless radios, page 55).
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 handheld's integrated Bluetooth radio is turned on (see Turning on and turning off the wireless radios, page 55).
2. On the 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:

- username 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:

- Connect to the Internet using the cellular modem. For more information, see page 57.
- Connect to the Internet using a Bluetooth-enabled phone. For more information, see page 65.
- Set up a Wi-Fi connection access point. For more information, see page 58.

Step 2: Setting up a VPN connection

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

Step 3: Connecting to the corporate network or Intranet

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

The Windows Embedded Handheld 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 website is made without using the VPN connection. However, an address to a network computer or file server that does not contain periods automatically starts the VPN connection.

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

1. Tap  / *Settings* / *Connections* / *Connections*.
2. Tap the *Advanced* tab.
3. Tap **Exceptions...**. The *Work URL Exceptions* screen appears.
4. Tap *Add new URL*.

5. Enter the URL and then tap **OK**.
6. Repeat Step 4 and Step 5 as required.
7. Tap **OK** to return to the *Advanced* tab of the *Connections* screen.
8. Tap **OK** to close the *Connections* screen.
9. Tap  to close the *Settings* screen.

Cabled connections to other devices using the USB to serial converter

The USB to serial converter attaches to the USB port on the bottom of the handheld. When the USB to serial converter is attached, it adds a serial port (COM1) to the Geo 7X handheld.

You can use the USB to serial converter to:

- receive differential corrections from an external real-time correction source, such as a DGNSS radio. For more information, refer to the section *Real-time* in the *TerraSync Software Getting Started Guide*.
- connect to other external devices. For more information, refer to the section *External Sensors* in the *TerraSync Software Getting Started Guide*.
- connect to a computer to supply GNSS data (see Configuring NMEA output, page 79).

Connecting to external devices

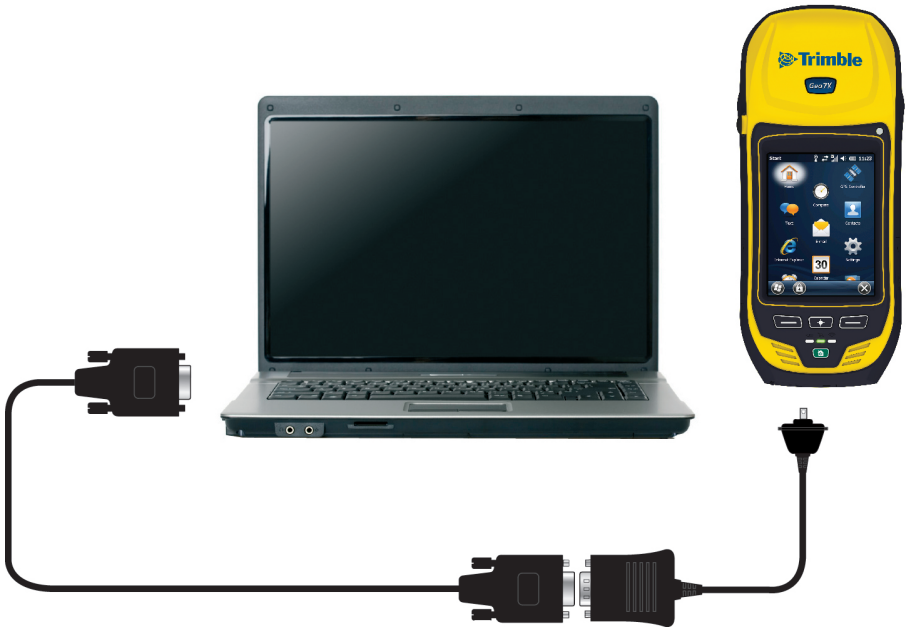
You can use the USB to serial converter to connect to an external device that has a serial port, such as a computer.

When connecting to an office computer using the USB to serial converter, you cannot use ActiveSync technology (or the WMDC) to establish the connection or synchronize data. To use ActiveSync (or the WMDC), you must use a USB cable or a Bluetooth connection (see Connecting and syncing to an office computer, page 26) .

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

1. Attach the USB to serial converter to the handheld.
2. Plug the null modem cable into the serial (COM) port on the USB to serial converter.

3. Connect the other end of the cable to the serial port on the external device.



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

CHAPTER 5

Using the GNSS receiver

In this chapter:

- Improving GNSS productivity using Floodlight satellite shadow reduction technology
- Using H-Star technology to improve accuracy
- Using the Centimeter Output option
- Configuring NMEA output
- Activating the GNSS receiver options on the handheld
- Supported GNSS field software
- Configuring the GNSS field software to connect to the receiver
- Using an external GNSS antenna
- Ensuring the accuracy of your GNSS data

Improving GNSS productivity using Floodlight satellite shadow reduction technology

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

The Floodlight satellite shadow reduction technology option for the Geo 7 series reduces the effects of satellite shadow to help deliver more positions and better accuracy in conditions affected by satellite shadow.

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

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

To achieve optimum Floodlight technology performance, it is important that the barometer is kept free of obstructions. Make sure that the Barometer seal located on the underside of the device (1 at right) is kept clear and is not covered by your fingers or any other covering.

If you are using Trimble field software, for example, the TerraSync software, make sure that you have selected the correct option for postprocessing data—if your base station(s) provide corrections for GPS and GLONASS satellites, select GPS + GLONASS. This affects the accuracy of the Predicted Postprocessed Accuracy (PPA). Refer to the *Terrasync Software Getting Started Guide* for more information.

If the option is not already activated on the handheld at the time of purchase, that is, you have purchased the option as an upgrade, you must activate the option. See Activating the GNSS receiver options on the handheld, page 80.

Using H-Star technology to improve accuracy

With the H-Star (Decimeter) option, the Geo 7X handheld uses EVEREST multipath rejection technology as well as H-Star technology to provide 10 cm or better accuracy with either real-time or postprocessed differential corrections.

Trimble H-Star technology combines advances in GNSS receiver design and innovative field and office software to achieve superior accuracy. H-Star data is recorded using Trimble software specifically designed for high-accuracy data collection. The software's status bar clearly shows the real-time accuracy or the predicted accuracy that will be achieved after postprocessing. With H-Star technology, decimeter accuracy can typically be achieved within just two minutes of continuous data collection. If lock on satellites is maintained, subsequent features will reach required accuracy level within seconds.

Working in real time, Trimble H-Star systems receive GNSS corrections from a VRS network or a dual-frequency reference station to achieve on-the-spot accuracy.

If the option is not already activated on the handheld at the time of purchase, that is, you have purchased the option as an upgrade, you must activate the option. See Activating the GNSS receiver options on the handheld, page 80.

Using the Centimeter Output option

The Centimeter Output option, available as a bundle with TerraSync Centimeter edition, increases the performance of the handheld to centimeter level positioning in both real-time or postprocessing with an appropriate dual frequency differential correction source.

If the option is not already activated on the handheld at the time of purchase, that is, you have purchased the option as an upgrade, you must activate the option. See Activating the GNSS receiver options on the handheld, page 80.

Configuring NMEA output

You can use the Geo 7X handheld's integrated GNSS receiver with any GNSS field software that accepts NMEA messages, if you have the NMEA output option on the handheld.

To configure the NMEA data output settings, use the GPS Controller software. The software is provided free from the Trimble website. For more information, see Supported GNSS field software, page 81.

To configure NMEA data output:

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

CAUTION - NMEA standard dictates that a baud rate of 4800bps should be used for NMEA messages. Depending on the number of satellites being tracked, the amount of data being captured at once may often cause the 4800 bit limit to be exceeded. Buffers have been added which allow the data to be stored and then sent when it is able to. This avoids data corruption, but may delay delivery of data, and positions may take as long as 8 seconds to be sent from the time at which they were originally recorded. If you need 4800bps output, Trimble suggests that you try to minimise the effect by reducing the amount of NMEA data being sent, for example, by dropping out NMEA sentences from the NMEA stream.

4. Tap **Done**.

For more information, refer to the GPS Controller Help.

Outputting NMEA data to external equipment

Use the GNSS Connector software (see Supported GNSS field software, page 81 to specify how the integrated GNSS receiver communicates with equipment that is connected to one of the handheld's external communications ports.

To open GNSS Connector, tap / *GNSS Connector*.

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

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

If you are using a Bluetooth port, ensure that the Bluetooth radio is on and the handheld is visible to other devices. Use the GNSS Connector software to configure NMEA output to Bluetooth - COM9, which is the pre-defined Bluetooth Host Serial Port. For more information, see Providing Bluetooth services as a host, page 61.

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

Activating the GNSS receiver options on the handheld

Most Geo 7X handhelds are shipped with options pre-activated on the device.

If your Geo 7X handheld does not have the option(s) you require, contact your Trimble reseller for information on how to purchase the option(s) as upgrades.

Once purchased, the options must be activated on your handheld using the *Activation Options...* wizard. The wizard can either automatically retrieve an activation file over the Internet, or you can copy the file manually to the device using an external storage card or a USB cable. The activation wizard uses the file to determine which options to activate on the handheld.

To activate options automatically over the Internet, do the following:

1. Tap the *Geo 7X* on the Trimble *Home* screen, or tap  / *Settings* / *System* / *System Information*. The *System Information* screen appears.
2. Select the *Options* tab, and then tap **Activate Options...**.
3. If you have received an activation file from your Trimble reseller, select *Manually activate purchased options*. Otherwise select *Automatically check and activate purchased options*.
4. If you selected *Automatically check and activate purchased options*:
   a. Ensure that the device is connected to the Internet (using a USB cable and the ActiveSync technology, or a Wi-Fi connection, Bluetooth wireless connection, or the modem—see Choosing a connection option, page 57).
   b. Tap **Get Updates**.
   c. The *Option Activation Wizard* will run. When the wizard finishes, restart your device to complete the activate process.

   If you selected *Manually activate purchased options*:
   a. Copy the activation XML file that you reecieved from your Trimble reseller to a folder on the device.
   b. Tap **Get Updates**.
   c. Browse to the folder that contains the activation file.
   d. Tap the file to initiate the activation process.
   e. The *Option Activation Wizard* will run. When the wizard finishes, restart your device to complete the activate process.

Supported GNSS field software

You can use the Geo 7X handheld with the following field software:

- Trimble TerraFlex software
- Trimble TerraSync software
- Esri ArcPad software and the Trimble Positions Mobile extension
- Trimble GNSS Connector software
- Trimble GPS Controller software / third party NMEA applications

For a list of supported software and versions, see the Mapping & GIS Product Compatibility List.

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

Using the Geo 7X handheld with the TerraFlex software

Use the Terraflex Mobile software to collect and maintain GIS and GNSS data. Use the TerraFlex Cloud service to deploy jobs to the field and to analyse and export data as it comes back.

Using the Geo 7X handheld with the TerraSync software

Use the TerraSync software to collect and maintain GIS and GNSS data.

Use an office application (for example, Trimble GPS Pathfinder Office software) to process data collected in the field and to perform quality analysis and quality checks on the field data.

For installation instructions, see the *TerraSync Software Getting Started Guide*.

A Geo 7X handheld with the Centimeter option can only be used with the TerraSync Centimeter edition software. Other Trimble field applications will not be able to connect to the receiver. For more information, see Using the Centimeter Output option, page 79.

Using the Geo 7X handheld with Esri ArcPad software and the Trimble Positions Mobile extension

Use the Esri ArcPad software and the Trimble Positions Mobile extension to collect and maintain GIS and GNSS data. Detailed installation instructions for Esri ArcPad software are provided in the ArcPad documentation.

You must install the ArcPad software before you install the Trimble Positions Mobile extension.

Make sure your version of the Trimble Positions Mobile extension is compatible with the version of ArcPad software you are using. For more information, see the Mapping & GIS Product Compatibility List.

For installation instructions, see the *Trimble Positions Mobile Extension Administrator's Guide*.

Using the Geo 7X handheld with the GNSS Connector utility

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

The GNSS Connector utility is pre-installed on the Geo 7X handheld. To access the utility, tap  / *Settings* / *Connections* / *GNSS Connector*.

Using the Geo 7X handheld with the GPS Controller software / third party NMEA applications

Use the GPS Controller software to configure and monitor the status of the internal GNSS receiver, and to configure GNSS output settings for third party GNSS applications.

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

If you have purchased and activated the NMEA Output option, you can also use the Geo 7X handheld with any GNSS field software that accepts NMEA messages.

Configuring the GNSS field software to connect to the receiver

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

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

GNSS COM ports

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

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

Note – *NMEA messages can only be output if you have purchased and activated the NMEA Output option.**See Configuring NMEA output, page 79.*

Note – *COM1 is a standard serial port that connects to external devices. For more information, see* *Cabled connections to other devices using the USB to serial converter, page 75.*

Connecting to the COM port

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

GNSS field software	Configuration details
GPS Controller	The software automatically connects to the integrated GNSS receiver on COM3.
TerraFlex	The software automatically connects to the integrated GNSS receiver on COM3.
TerraSync	The software automatically connects to the integrated GNSS receiver on COM3.
ArcPad with Trimble Positions	The software automatically connects to the integrated GNSS receiver on COM3.
ArcGIS Mobile with Trimble Position	The software automatically connects to the integrated GNSS receiver on COM3
Other TSIP applications	Configure the software to connect to the integrated GNSS receiver on COM3 using TSIP.
ArcPad	Configure the software to connect to the integrated GNSS receiver on COM2 using NMEA.
ArcGIS Mobile	Configure the software to connect to the integrated GNSS receiver on COM2 using NMEA.
Other NMEA applications	Configure the software to connect to the integrated GNSS receiver on COM2 using NMEA.

Using an external GNSS antenna

The Geo 7X handheld has an internal antenna, which is suitable for use in most conditions.

You can also connect an external antenna for scenarios when you are working from a vehicle, or for improving yield and accuracy, especially when working under tree canopy or near buildings.

The following external antennas are supported:

- Trimble mini-patch GNSS antenna, suitable for use as an in-vehicle antenna for low-accuracy navigation purposes.
- Trimble Tempest L1 GNSS antenna, suitable for submeter accuracy applications.
- Trimble Tornado L1/L2 GNSS antenna, suitable for decimeter accuracy applications.
- Trimble Zephyr Model 2 L1/L2 GNSS antenna, suitable for decimeter and centimeter accuracy applications.

Configure antenna settings (for example, setting the antenna type, and the antenna's height above ground) in the GNSS field software, once you have connected the external antenna to the handheld. Refer to the documentation for the relevant software for details.

Ensuring the accuracy of your GNSS data

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

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

- If you are using the TerraSync software to collect data, use accuracy-based logging. For more information, refer to the section *Accuracy Settings form* in the *TerraSync Software Getting Started Guide*.
- Use real-time differential corrections. If you have access to dual-frequency corrections from a VRS™ network, use the corrections from the VRS network. For more information, refer to the section *Real-time* in the *TerraSync Software Getting Started Guide*.
- Configure the GNSS settings for the receiver to use Smart Settings to increase the precision of your data, and to minimize the effect of atmospheric interference and poor satellite geometry. For more information, refer to the section *Using Smart Settings* in the *TerraSync Software Getting Started Guide*.
- Connect to an external antenna, if you have one. For more information, see Using an external GNSS antenna, page 84.
- Plan GNSS data collection around the times of the day when satellite geometry is best. Trimble planning tools are available online, or as a download:
  - http://www.trimble.com/GNSSPlanningOnline/#/Settings
  - http://ww2.trimble.com/planningsoftware.shtml

CHAPTER 6

Using the camera

In this chapter:

- Starting the camera application
- Taking a photo or recording a video
- Adjusting the camera settings
- Camera and video options
- Managing photos and videos

The Geo 7X handheld contains a forward facing 5 megapixel digital camera which you can use to capture photos or video.

Starting the camera application

To start the camera, press the Camera button in the center of the keypad. Or, if this button has been reassigned to another application, tap  / *Pictures & Videos* / *Camera*.

When the Camera application is open, use the Camera button to:

- Capture a photo.
- Start and stop recording a video.

Taking a photo or recording a video

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

To capture a photo:

1. Hold the handheld steady. Use the preview window to frame the subject in the centre of the frame.
2. To focus, tap the preview window. A white box appears, which then turns green. If you do not tap the preview window, the camera assumes that the distant focus (that is, targets > 1m or so away) is ok, and it does not autofocus.
3. To capture the photo, press and release the **Camera** button.

To capture a video:

1. Tap the **Menu** and then select *Video*.
2. Use the preview window to frame the start of the video.
3. To start recording, press and release the **Camera** button. Move the handheld to record the video.
4. To pause recording, tap **Pause**. To stop recording, tap **Stop** or press the **Camera** button.

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

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

Adjusting the camera settings

To access the camera settings:

1. Start the camera application and then tap **Menu**. The available camera settings are displayed in a list.

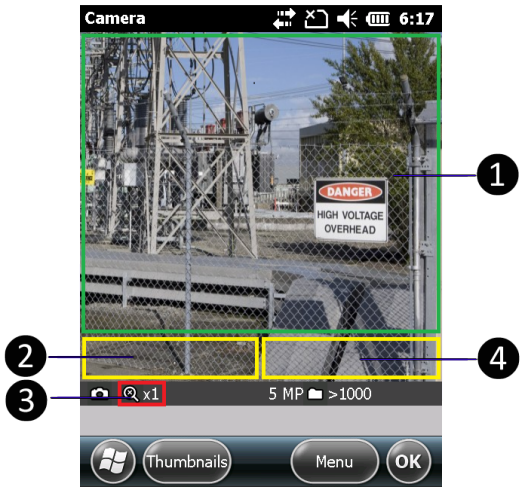
2. Tap the required setting or change the current value. The list of available settings varies depending on whether you are in Video mode or Still mode.

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

* = default setting

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

You can also tap the screen to set the following:



1. Tap anywhere here to focus.
2. Tap here to turn date stamp on or off.
3. Tap here to cycle through the zoom settings (available at lower resolutions).
4. Tap here to turn geotagging on or off.

Camera and video options

To access the camera and video options:

1. Tap / *Pictures & Videos* / *Camera*.
2. Tap **Menu** / *Options*.

Use the camera options to customize where still photos and videos are stored, and to customize storage settings for still photos.

- Save files to: If you have a storage card installed you can choose to save photos in either the main memory of the device or to a folder on the storage card. Photos saved to the main memory are saved in the My Pictures folder.
- Still filename prefix: Use this option to give still photos a customized filename prefix.
- Video filename prefix: Use this option to give videos a customized filename prefix.
- Time limit for videos: To set the automatic time limit for videos, choose a suitable time limit from the list of options.
- Position stamp format: Choose DD°MM'.ss" or DD°dddddd°.
- Compass Heading: Choose Magnetic or True North.

Managing photos and videos

To view and manage photos and videos, tap /*Pictures & Videos*. The *Pictures &Videos* screen appears.

To rename a photo or video:

1. Tap the required file top open it, tap **Menu**, then scroll down and select *Properties*. Alternatively, make sure the file is selected without opening it, and then tap **Menu**, and select *Tools*/ *Properties*.
2. Enter a name in the *Name* field and tap **OK**.

To delete a photo or video, tap and hold the required file, and then select *Delete* from the pop-up menu.

To copy a photo or video, tap and hold the required file, and then select *Copy* from the pop-up menu.

To send a photo or video using e-mail or SMS, tap and hold the required file, and then select *Send*from the pop-up menu.

To edit a photo:

1. Tap the required file, tap **Menu**, then scroll down and select *Edit*.
2. You can:
   - Tap **Rotate** to rotate the photo 90 degrees clockwise. Tap **Rotate** again if required until the photo has the desired orientation.
   - Tap **Menu**, and then select one of the following:

Option	
Crop	Drag a box around the area of the photo that you want to crop, and then tap inside the box to crop the photo.
Auto Correct	Auto correct the photo.
Undo	Undo the last action.
Revert to Saved	Reject any changes you have made since the last Save.
Save As...	Save the file with a new name.

CHAPTER 7

Using the rangefinder and Flightwave technology

In this chapter:

- Flightwave technology
- Using the Rangefinder utility
- Using the Rangefinder workflows
- Aligning the rangefinder module with the Geo 7X camera
- Calibrating the orientation sensors

The Geo 7X handheld contains a compass, accelerometer, and gyroscope, enabling you to determine orientation and tilt during data collection. The Geo 7 series rangefinder module that attaches to the handheld enables you to measure offsets (the distance to remote objects), and to measure features (for example, height or width).

WARNING- Before you use this product, make sure that you have read and understood all safety requirements. Failure to follow these safety instructions could result in fire, electric shock, or other injury, or damage to the Geo 7X handheld, laser rangefinder, or other property.

For laser rangefinder safety information, see Integrated Laser Rangefinder module safety information, page 103.

Flightwave technology

Trimble Flightwave™ technology fuses precise distance and orientation information directly on the Geo 7X handheld.

Flightwave technology eliminates the need for carrying and maintaining additional remote measurement equipment, eliminates workflow errors associated with having a sensor located external to the GNSS device itself, and simplifies the work of capturing remote information by allowing data to pass seamlessly from the sensors to WavePoint-enabled data collection applications.

Using the Rangefinder utility

Using Flightwave technology, the Rangefinder utility can be used standalone to measure distances and angles to remote objects, and to measure the size of remote objects.

The Rangefinder utility can also be used as a rangefinder sensor for applications (for example, the TerraSync software) that can be configured to receive distance and bearing data from external sensors via a serial connection.

Flightwave-enabled applications can use the rangefinder module directly in the software itself to provide measurement sensor data directly to the application without any additional setup, and streamlined workflows.

To start the rangefinder application, tap  / *Rangefinder*.

The first time you use the rangefinder, you are prompted to calibrate the orientation sensors (see Calibrating the orientation sensors, page 98) and to align it with the handheld's integrated camera (see Aligning the rangefinder module with the Geo 7X camera, page 98.)

Configuring rangefinder settings

To configure rangefinder settings, tap  , then tap the required item to set its value:

- Show Laser Pointer. Set to on or off.
- Device Height. Set the estimated height of the device during measurement. The height is shown in meters or feet according to what is selected for Distance Units. To exit this setting, tap  or tap another setting. This setting is used during the Height - 1 Shot workflow.
- North Reference. Set to True or Magnetic.
- Distance Units. Set to Meters or Feet.
- Angle Units. Set to Degrees or Gons.

To exit the *Settings* screen, tap  .

Orientation sensor accuracy

During normal operation when the orientation sensors are properly calibrated, the icon shows on the Rangefinder screen. If the orientation sensors are reporting conditions that may be affecting sensor accuracy, one of the following icons appears: (medium accuracy), (low accuracy), or (accuracy is unreliable). If this occurs, tap the icon. You are prompted to recalibrate. See Calibrating the orientation sensors, page 98.

Capturing rangefinder measurements

You can use the rangefinder to automatically output the rangefinder data to the any field software running on the handheld that can receive data from external sensors over a serial connection.

1. Tap to select a rangefinder workflow. See Using the Rangefinder workflows, page 96 for details of the different workflows available.
2. Aim the rangefinder at your target, aligning the crosshairs on the screen with the target. The cross-hairs shown on the screen vary according to the *Show Laser Pointer* setting (see above), as follows:
   - If the laser pointer is set to on, and the target is acquired, the cross-hairs show
   - If the laser pointer is set to on, and the target is not acquired, the cross-hairs show
   - If the laser pointer is set to off, and the target is acquired, the cross-hairs show
   - If the laser pointer is set to off, and the target is not acquired, the cross-hairs show
3. Do one of the following:
   - If you are shooting only one point, tap or tap the **Camera/Rangefinder** button on the keypad. The measurement displays on the screen. To accept the measurement, tap . To reject the measurement, tap , and shoot the point again.
   - If you are shooting multiple points, tap or tap the **Camera/Rangefinder** button on the keypad to shoot the first point. The measurement displays on the sceen, and the workflow prompts you to shoot the next point. Follow the instructions on the screen to shoot the points for your selected workflow. Then tap to use the measurements, or tap to shoot them again.
   - In all workflows except for Bearing and Inclination, you can hold down

or the **Camera/Rangefinder** button on the keypad and use the rangefinder to scan an area to record *Nearest*, *Farthest*, and *Last* measurements (Rapid Fire Measurements). The Rangefinder utility displays a nearest, farthest, and last measurement at the top of the screen. Tap the required measurement to use it. This workflow is particularly helpful when trying to find a thin cable against the sky (for example, a telephone cable).

Note – *When using the rangefinder, the laser measurements accuracies are lowered when your target is less than 3 meters away.*

Using rangefinder measurements

The Rangefinder utility outputs the results of its workflows in a visual display, and these measurements are also output over an internal serial port on the handheld. Field applications that can be configured to record information from external sensors treat the Rangefinder utility just like any other external sensor outputting NMEA data.

Refer to the user documentation for your field application for information on how to configure the applicaiton to use data from external sensors. Connect to the Rangefinder utility on COM6: Rangefinder Module.

Note – *The Rangefinder utility uses COM6, which is normally a Bluetooth port. If you need COM6, for example to connect to a phone and another external sensor, you must uninstall the Rangefinder utility and reboot the handheld.*

NMEA output strings

The NMEA string output by the rangefinder application is dependent on the workflow you are using (see Using the Rangefinder workflows, page 96).

The following settings (see Configuring rangefinder settings, above) also influence NMEA string content:

- Distance, in Meters, or Feet.
- Angle, in Degrees, or Gons (Degrees format 359.59.99 decimal minutes)

All strings are terminated by a checksum, carriage return and line feed.

The following types of NMEA string are output:

- The ‘A’ String. This string provides compatibility with the TerraSync software and is output by the Offset (simple and multiple) workflows.
  Its format is:
  $PTNLA,HV,2.94,M,288.1,D,8.6,D,2.98,M*5F

Field	Description	Range	
1	NMEA Sentence type	$PTNLA/CustomerSpec	
2	Horizontal Vector	HV	
3	Horizontal Distance	2.94-5000.00	002.94
4	Units of Measurement	M (meters) / F (feet)	
5	Horizontal Angle	0.01-3.59.99	288.1
6	Units of Measurement	D (degrees) / G (gons)	
7	Verticle Angle	-0.1-080.0	-08.6
8	Units of Measurement	D (degrees) / G (gons)	
9	Slope Distance	2.98-5000.00	002.98
10	Units of Measurement	M (meters) / F (feet)	
11	Check Sum	*67	

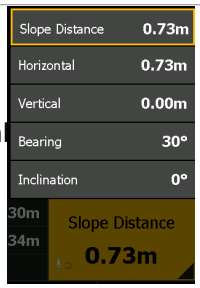
- The ‘C’ String. This string is workflow dependent. It's formats are:
  - for Height Workflows, $PTNLC, HT,10.99,M,checksum
  - for Width Workflows, $PTNLC, WI,5.75,M,checksum
  - for the Bearing workflow, $PTNLC, BG,100.55.30,D,checksum
  - for the Range workflow, PTNLC, SD,10.12,M,checksum
  - for the Inclination workflow, $PTNLC, VA,-10.5,D,checksum
  - for the Missing Line Workflow, values show geometry between the 2 observed points: $PTNLC, HD,100.75,M,HA,325.59,D,VA,1.2,D,SD,100.02,M,VD,1.6,M,checksum

Field	Description	Value
1	String Header	$PTNLC
2	Horizontal distance	HD
3	Calculated horizontal distance between points	100.75
4	Unit of measurement (metres)	M
5	Bearing between points	HA
6	Calculated bearing between points	325.59
7	Units of measure (degrees)	D
8	Vertical angle (inclination)	VA
9	Calculated vertical angle between points	1.2
10	Units of measure (degrees	D
11	Slope distance	SD
12	Calculated slope distance between points	100.02
13	Unit of measure (metres)	M
14	Vertical distance	VD
15	Calculated vertical difference between points	1.6
16	Unit of measure (metres)	M
17	Checksum	

Using the Rangefinder workflows

To select a Rangefinder workflow, tap  . You can select from the following:

Workflow	Description	
Position - Offset	Use this option to measure the horizontal distance to a target that is inaccessible, or the target is in a poor GNSS environment. Stand in a good GNSS environment, and use the rangefinder to record an offset GNSS position.	
Position - Multiple offset	This option enables you to shoot multiple offset measurements. This workflow is specifically aimed at users who wish to use features such as Quickpoints in the TerraSync software. When you tap ✓ to accept a new measurement, an NMEA string is output, and the rangefinder application remains open, enabling you to continue collecting consecutive offset points. To exit this workflow, tap the X in the upper left corner of the screen.	
Height - 1 Shot	Use this option to measure the height of an object when you have a clear view of the top of the object you are measuring. This mode is best used when you and the feature are on the same level, and is particularly suitable for urban features such as power poles. Make sure the device height is entered under *Settings*.	
Height - 2 Shot	Use this option to measure the height of an object when you have a clear view of the top and the bottom of the object you are measuring.	
Height - 3 Shot	Use this option to measure the height of an object if the object is obscured at the top or bottom in any way. This workflow is typically used for measuring the height of trees, buildings, and signs. The first measurement is a distance measurement to a point somewhere on the object. The second and third measurements are angle measurements to the approximate top and bottom of the object. The rangefinder application uses these results to calculate the height of the object.	

Workflow	Description	
Width - 2-Shot	Use this option to measure the width of an object when you have a clear view of the left and right extremities of the object you are measuring.	
Width - 3-Shot	Use this option to measure the width of an object. The first measurement is a distance measurement to a point somewhere on the object. The second and third measurements are angle measurements to the approximate left and right extremities of the object. You must be perpendicular to the object and have a clear view of the object with the laser. For example, to measure the width of a tree, the laser distance is measured to the trunk centre, and the left and right angles measure the canopy spread. The rangefinder application uses these results to calculate the width of the object.	
Measure - Bearing	Use this option to measure a bearing from True or Magnetic north (depending on what you have configured under *Settings*). This is calculated using the compass, in a clockwise direction.	
Measure - Range	Use this option to measure the distance from the rangefinder to a target object.	
Measure - Inclination	Use this option to measure an angle. When the handheld is held with the GNSS antenna parallel to the ground, the inclination angle is 0°.	
Measure - Missing Line	Use this option to record two separate points with the laser, and measure the distance between them in terms of horizontal, vertical and slope distances, or direction (azimuth, inclination). It can be used for finding the distance between two power poles (Horizontal Distance), the slope of a rooftop as well as the distance from the top of the roof to the edge (Vertical Distance and Slope Distance), the direction of a slope (Azimuth), and the angle of the slope (Inclination). Tap the small grey triangle in the bottom right corner of the screen to select the value that you want to use. 	

Aligning the rangefinder module with the Geo 7X camera

The first time you use the rangefinder on the Geo 7X handheld, you are prompted to align it with the handheld's integrated camera.

The alignment application automatically detects the position of the laser by 'seeing' the red pointer when it is projected against a flat surface, and measuring the distance to that surface. The alignment app detects the location of the red dot on the image sensor to determine the relative offset and angles of the camera and distance lasers.

Align the rangefinder:

- whenever it is attached or re-attached to the handheld.
- whenever the laser's pointer and targeting cross-hair appear to be misaligned.

You are prompted to align the rangefinder with the handheld the first time you run the Rangefinder utility. To align the rangefinder at any other time, tap  / *Settings* / *System*, then tap *Laser Alignment*. Follow the on-screen instructions.

1. Make sure the rangefinder is correctly and fully attached to the handheld. (See Attaching the Geo 7 rangefinder module, page 21.)
2. Make sure you stand still.
3. Aim the camera at a surface close enough to see the red laser pointer. The target surface should be at least 3 meters away, should not be too reflective, but reflective enough that the camera can still detect the red dot.
4. Tap **Begin**.
5. Hold the handheld steady and wait for the confirmation message Laser alignment was successful to appear. Tap **OK**.

Calibrating the orientation sensors

The first time you use the rangefinder on the Geo 7X handheld, you must calibrate the orientation sensors. Maintaining good and current calibration is important to ensure optimal output from orientation sensors and the rangefinder.

When correctly calibrated, the orientation sensors report the precise alignment of the planes of the internal GNSS antenna and camera relative to the earth in terms of X, Y and Z axes.

During manufacturing, great care is taken to establish a baseline calibration for all components, but due to environmental and use-case factors, each device must occasionally be field calibrated. There are a number of factors that can affect the accuracy and performance of sensors that can be accommodated for with calibration:

- Temperature. Orientation sensors are affected by temperature, and each sensors is unique.
- Location. The planet has a varied magnetic field and this affects the performance of magnetic sensors. Using magnetic declination values for a particular area, you can accommodate for coarse variations in magnetic field strength, but by calibrating in your environment, you can achieve greater accuracy.
- Environment. Local magnetic conditions can affect the device's own magnetic field.

The *Sensor Calibration* routine prompts you to calibrate the sensors, and recommends either a fast calibration or a full calibration, depending on location conditions, and the device state. A full calibration may be recommended:

- the first time you use the handheld
- the first time you use the handheld in particularly hot or cold conditions
- when you use the handheld in an area it has not been used in before
- after you attach a rangefinder module for the first time
- after changing the battery (each battery typically has different magnetic properties).

To calibrate the orientation sensors:

1. Tap  / *Settings* / *System*, then tap *Sensor Calibration*. Or, if you have been prompted to calibrate, tap the required calibration method (fast or full) as recommended.
2. Do one of the following:
   - To perform a fast calibration, tap **Fast Calibration**. Rotate the handheld in different directions as illustrated on the screen, until the progress bar is full.
   - To perform a full calibration:
     a. Tap **Full Calibration**.
     b. Full calibration requires capturing 24 data points. Each data point is collected by holding the device still in a specific orientation. The calibration applet guides you through these positions which are collected by rotating the device in one of three different axis, one axis at a time. Each axis has 8 points, so you need to rotate the device in a circle, pausing every 1/8th of a turn to collect a data point. When a point is collected the applet beeps to indicate to you to rotate again to the next position. After 8 positions in an axis, the application will show you the next axis of rotation to complete. For each rotation, hold the handheld **as still as possible** as illustrated on the screen, and tap **Begin**. After the tone, rotate the handheld 45 degrees in the direction illustrated. At each subsequent tone, rotate the handheld a further 45 degrees, until you return to the start position.
3. The message Calibration was successful appears on the screen. Tap **OK**.

If the calibration is not performed correctly, it will fail; no bad calibration data is stored, and the device reverts back to its original state. You must then go through the calibration process again.

CHAPTER 8

Important safety information

In this chapter:

- Geo 7X handheld safety information, page 101
- Integrated Laser Rangefinder module safety information, page 103
- Important handling information, page 104

WARNING- Before you use this product, make sure that you have read and understood all safety requirements. Failure to follow these safety instructions could result in fire, electric shock, or other injury, or damage to the Geo 7X handheld, laser rangefinder, or other property.

Geo 7X handheld safety information

Charging the battery

To charge the handheld's battery, use only the following authorized Trimble accessories:

- the Geo 7 series AC power adaptor (part number 88014-00) with the correct international plug converter for your region
- the Geo 7 series 12V DC power adapter when in a vehicle (part number 88056-00)
- another Trimble branded AC or DC power adaptor designed and approved to work the Geo 7X 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.

For more information, see Charging the battery, page 17.

WARNING - To use power adaptors safely:
- Ensure 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 adaptor in wet outdoor areas .
- 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 adaptor becomes damaged, replace it with a new Trimble adaptor.

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

The Geo 7 series is approved as a portable device with respect to Radio Frequency (RF) exposure compliance. The radiated output power of the internal wireless radio transmitters is less than 100 milliwatt, which results in exposure levels far below the FCC radio frequency exposure limits, even when operated in close proximity to the body. The internal wireless radios operate within guidelines found in international radio frequency safety standards and recommendations, which reflect the consensus of the international scientific community. Trimble therefore believes the internal wireless radios are safe for use by users. The level of electromagnetic energy emitted is hundreds of times lower than the electromagnetic energy emitted by wireless devices such as mobile phones. However, the use of wireless radios may be restricted in some situations or environments, such as on aircraft. If you are unsure of restrictions, you are encouraged to ask for authorization before turning on the wireless radios.

Exposure to radio frequency radiation from cellular wireless transmitters

The Geo 7 series handhelds are equipped with wireless cellular modem radios and have been designed and manufactured to meet safety requirements for limiting exposure to radio waves. When used in accordance with the instructions set forth in this manual, the equipment has been independently verified to not exceed the emission limits for safe exposure to radio frequency (RF) energy as specified by the Federal Communications Commission of the U.S. Government in 47 CFR §2.1093.

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

For body worn operation, ensure the device position is a minimum of 1.0 cm from your body when the device is switched on, with no metal structures contained in the carrying accessory.

Electrostatic discharge

The Geo 7 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 connectors on the sides of the unit.

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.

Battery

Charge the battery before using it for the first time. If the battery has been stored for longer than six months, charge it before use. See Charging the battery, page 17

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

– Do not use or charge the battery if it appears to be damaged. Signs of damage include, but are not limited to, discoloration, warping, and leaking battery fluid.

– Do not store or leave your device near a heat source such as near a fireplace or other heat-generating appliance, or otherwise expose it to temperatures in excess of 70 °C (158 °F) such as on a vehicle dashboard. When heated to excessive temperatures, battery cells could explode or vent, posing a risk of fire.

– Do not immerse the battery in water.

– Do not use or store the battery inside a vehicle during hot weather.

– Do not drop or puncture the battery.

– Do not open the battery or short-circuit its contacts.

WARNING -Avoid contact with the rechargeable Lithium-ion battery if it appears to be leaking. Battery fluid is corrosive, and contact with it can result in personal injury and/or property damage. To prevent injury or damage:
– If the battery leaks, avoid contact with the battery fluid.
– If battery fluid gets into your eyes, immediately rinse your eyes with clean water and seek medical attention. Do not rub your eyes!
– If battery fluid gets onto your skin or clothing, immediately use clean water to wash off the battery fluid.

WARNING -Charge and use the rechargeable Lithium-ion battery only in strict accordance with the instructions. Charging or using the battery in unauthorized equipment can cause an explosion or fire, and can result in personal injury and/or equipment damage. To prevent injury or damage:
– Do not charge or use the battery if it appears to be damaged or leaking.
– Charge the Lithium-ion battery only in a Trimble product that is specified to charge it. Be sure to follow all instructions that are provided with the battery charger.
– Discontinue charging a battery that gives off extreme heat or a burning odor.
– Use the battery only in Trimble equipment that is specified to use it.
– Use the battery only for its intended use and according to the instructions in the product documentation.

Distraction

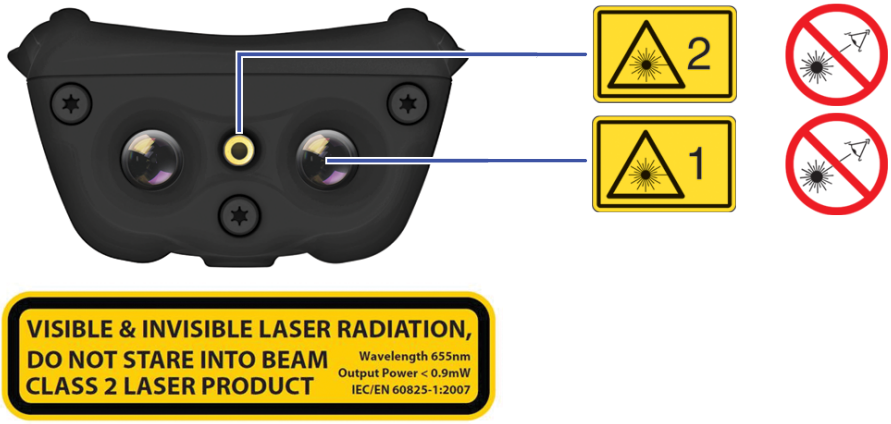
Using the Geo 7 series in some circumstances can distract you and may cause a dangerous situation. Observe rules that prohibit or restrict the use of mobile devices (for example, avoid operating the device while driving a vehicle).

Repairing

Don not attempt to repair the Geo 7 series yourself. Disassembling the product may cause injury to you or damage to the handheld. If the handheld is damaged or malfunctions, contact an Authorized Trimble Service Provider. You can find more information about getting service at www.trimble.com/Support/Protected.aspx.

Integrated Laser Rangefinder module safety information

The Geo 7X handheld may be fitted with an integrated Trimble Geo 7 series Laser Rangefinder module (model number 88185). The module produces visible and invisible laser beams, which are emitted from the instrument. It is a Class 2 laser product in accordance with IEC60825-1 : 2007 “Radiation safety of laser products”. Eye protection is normally afforded by aversion responses including the blink reflex.



Invisible laser radiation: 905 nm,0.35 µJ max per 8.6 ns pulse at 40Hz max.

Visible laser radiation: 655 nm, 0.7 mW max.

FDA Laser Notice No. 50 statement The device (model number 88185) complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.

WARNING- Do not stare into the laser beam or direct it towards other people unnecessarily.
- Looking directly into the beam with optical aids (for example, binoculars, telescopes) can be hazardous.
- Looking into the laser beam can be hazardous.

Important handling information

Geo 7 series handhelds are rugged and resistant to damage during operation in harsh environments and conditions. However, you should take care of your handheld to maximize its life and performance.

To protect the Geo 7X 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 Geo 7 series handheld.
- Protect the touch screen by using your finger or the stylus provided, and avoid using excessive pressure and sharp or abrasive objects.
- Keep the outer surface free of dirt and dust.
- Ensure that protective covers and doors are appropriately fitted to the external antenna port, SIM, and storage card areas, so that they are protected from dirt, dust, fluid ingress & electrostatic discharge.

- Protect the handheld from extreme temperatures. For example, do not leave the handheld on the dashboard of a vehicle.
- When the battery is removed, the handheld is not waterproof. Avoid exposing the internals of the handheld to dust and moisture when removing the battery. Trimble recommends that you only swap the battery indoors or from inside a vehicle.
- Use the hand strap provided with the Geo 7 series handheld.
- To clean the handheld, wipe it with a clean dry cloth. Do not immerse the handheld in water.

Extreme temperature environments

The Geo 7 series is designed to work in ambient temperatures between -20° and 60° C and stored in temperatures between -30° and 70° C. The Geo 7 series can be damaged and battery life shortened if stored or operated outside of these temperature ranges. Avoid exposing the handheld to dramatic changes in temperature or humidity. When you are using the Geo 7 series or charging the Geo 7 series battery pack, it is normal for the device to get warm.

If the interior temperature of the Geo 7 series exceeds normal operating temperatures (for example, in a hot car or in direct sunlight for extended periods of time), you may experience the following as it attempts to regulate its temperature automatically:

- The handheld stops charging
- If the handheld can’t regulate its internal temperature, it goes into sleep mode until it cools. Move the handheld to a cooler location out of direct sunlight and wait a few minutes before trying to use the device again.

CHAPTER 9

Support and troubleshooting

In this chapter:

- Restarting and resetting the Geo 7X handheld
- Updating the operating system, firmware, and software applications
- Finding service and support information
- Power issues
- Backlight issues, page 112
- Keypad issues, page 112
- Touch screen issues, page 113
- Speaker and microphone issues, page 113
- Storage card issues, page 114
- Connection issues, page 114
- GNSS receiver issues, page 120
- Real-time DGNSS issues, page 122
- Recommended GNSS settings for maximum precision and productivity, page 124

This chapter provides support contacts, and information on common problems that may occur when using the Geo 7 series handheld. Please read this section before you contact technical support.

Restarting and resetting the Geo 7X handheld

If something is not working as expected, try closing and reopening the application, or restarting or resetting the Geo 7X handheld.

To force an application to closem, tap  / *Settings* / *Task Manager*. Select the application you want to close, then tap **End Task**.

If you cannot force the application to close, or if closing and restarting the application does not fix the problem, try restarting the Geo 7X handheld.

To restart the handheld, press the **Power/Home** button to go to the *Home* screen, then press the **Power/Home** button again to launch the *Power* menu. Tap **Restart**.

If you cannot turn off or restart the handheld, you may need to perform a hard reset. This forces the operating system to reboot, but may cause unsaved data to become corrupted. A hard reset should be done only if the unit is otherwise unresponsive.

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

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

To hard reset the handheld, hold down the **Power/Home** button for at least 10 seconds until the Trimble logo screen appears.

Note – *You can also hard reset the Geo 7X handheld by removing the battery.*

If hard resetting the handheld does not help, you may need to completely restore your handheld back to its original settings by performing a factory reset. You should only restore your Geo 7X handheld to factory settings if all other attempts to solve the problem fail. Restoring to factory settings will erase all applications and data stored on the internal storage on the Geo 7X handheld.

To perform a factory reset, hold down the **Power/Home** button to reset the handheld. When the Trimble logo screen appears, press both the left and right application keys. The F*actory Reset* menu appears. Follow the instructions on the screen.

Updating the operating system, firmware, and software applications

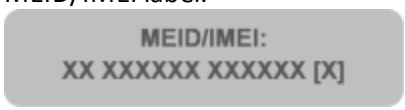
You can update the Geo 7X handheld's operating system, firmware, and software applications when updates are available by downloading them from www.trimble.com/Geo7.aspx. Usually updates are available as patches, but major updates may be available as complete operating system downloads.

For information about erasing all content and settings, and restoring your Geo 7X handheld to its factory state, see Restarting and resetting the Geo 7X handheld, page 107.

Finding service and support information

Comprehensive support information is available online at www.trimble.com/Geo7.aspx, Technical Support.

To contact Trimble for personalized support (not available in all areas), go to www.trimble.com/support/.

To learn about	Do this
Using the Geo 7X handheld safely	See Geo 7X handheld safety information, page 101
Registering your Geo 7X handheld	Contact your local dealer or go to www.trimble.com/register to receive information regarding updates and new products
Finding your Geo 7X serial number, UUID, IMEI or MEID	You can find your Geo 7X handheld's serial number, International Mobile Equipment Identity (IMEI), ICCD, or Mobile Equipment Identifier (MEID) on the Geo 7 device label. Or, go to Start > Settings > System > System Information. MEID/IMEI label:  The MEID ID number is the first 14 digits on the MEID/IMEI label. The IMEI number is all 15 digits on the label. For more information, go to www.trimble.com/Geo7.aspx.
Service and support from your carrier	Contact your carrier or go to your carrier's website.
Using TerraSync	Go to www.trimble.com/mappingGIS/TerraSync.aspx
Using TerraFlex	Go to www.trimble-terraflex.com/info
Geo 7X handheld service and support, tips, and downloads	Go to www.trimble.com/Geo7.aspx, Technical Support.
Technical support	Go to www.trimble.com/Geo7.aspx, Technical Support. If you cannot find the information that you need, contact your Trimble reseller (go to dealerlocator.trimble.com).

To learn about	Do this
The latest information about the GeoExplorer series	Go to www.trimble.com/Geo7.aspx
Obtaining warranty service	First, follow the advice in this User Guide, then go to www.trimble.com/Support/Protected.aspx
Geo 7 series compliance information	See Regional compliance information, page 128.
Purchasing replacement and additional accessories	Contact your local Trimble GeoExplorer reseller. Go to dealerlocator.trimble.com
Windows error reporting	If for any reason a Microsoft Windows Error Reporting dialog appears, indicating that the handheld or Trimble 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 Geo 7 series.

Power issues

Problem	Cause	Solution
The handheld turns on only when connected to a power source.	The battery is not charging or holding its charge.	Charge the battery for at least 15 minutes. If it still fails to turn on, reset the handheld. See Restarting and resetting the Geo 7X handheld, page 107. If this still fails, the battery may need replacing. See Replacing batteries, page 20.
The handheld is not charging.	The internal temperature has risen above the allowed maximum for charging the battery.	Do one or all of the following: • Turn off the integrated radios before charging the handheld. See Turning on and turning off the wireless radios, page 55, and Using the Wireless Manager, page 56. • Suspend the handheld before charging. See Using Suspend mode, page 36. • 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 handheld is connected to a computer which is turned off, or in sleep mode.	This may drain the handheld's battery, and the battery will not charge.
	The USB Power adaptor / cable is faulty.	Try another USB Power adaptor / cable.
The battery power percentage bar does not appear in the Power control.	The battery has 0% power.	Recharge the battery. See Charging the battery, page 17. Once the battery level is above 0%, the battery power percentage bar reappears. Tap / Settings / Power / Battery to view the level of power remaining in the battery.
Battery life is short.	The battery was not fully charged.	Make sure you fully charge the battery. Do not charge it from a keyboard, or connected to a computer which is turned off or in sleep mode. See Charging the battery, page 17.

Problem	Cause	Solution
Battery LED is not behaving as expected.		Reset the handheld. See Restarting and resetting the Geo 7X handheld, page 107.
The AC adapter may be faintly audible at close proximity.	The AC adapter is a highly efficient adapter which is required to operate at very low audible duty cycles when unloaded so as not to waste energy.	There is no safety issue related to the faint noise. In the event of a disconcerting noise, disconnect the mains adapter from the mains as soon as a battery charge is complete.
The charge level of the battery drops when the handheld is turned off.	The handheld was left in Suspend mode or was left fully charged for a long duration.	Before storing the handheld, completely shut down the handheld. See Using the Power menu, page 35.
	The handheld was left in suspend mode with a wireless radio turned on.	Before suspending the handheld, use the Wireless Manager to turn off all wireless radios. Make sure that all the radios are turned off after suspending the handheld. See Using the Wireless Manager, page 56.
The low-battery icon  is displayed and the handheld is unresponsive.	The battery charge is low.	Charge the handheld for at least 15 minutes. The Charging icon  should appear. If the low-battery icon is still displayed on the screen, turn off the handheld and then turn it on again. If the problem remains, reset the handheld (with the Power adaptor / cable still connected). See Using the Power menu, page 35, and Restarting and resetting the Geo 7X handheld, page 107.

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. Tap / *Settings* / *System*/ *Backlight*and then select the *Brightness* tab to view the Brightness control, and make sure that the brightness is not set to Dark (slider positioned far left).
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* and then select the *Brightness* tab to view the Brightness control and then adjust the slider.

Keypad issues

Problem	Cause	Solution
Pressing the application key does not activate the function shown on the tile above it.	The hardware application key has been programmed to run another program or to perform another action.	Do one of the following: • Tap the touch screen tile to activate the function shown on the tile. • Re-program the application key to perform the same action as the touch screen tile. See Changing button assignments, page 46.

Touch screen issues

Problem	Cause	Solution
The touch screen does not respond to finger or stylus taps.	The touch screen is incorrectly aligned.	Realign the screen. See Changing screen settings, page 44.
	The touch screen is locked.	To unlock the touch screen, slide the Unlock icon.
	The handheld has locked up.	Reset the handheld. See Restarting and resetting the Geo 7X handheld, page 107.
The screen is hard to see.	The brightness level needs to be adjusted.	Open the Brightness control and then adjust the brightness level (see Adjusting the display brightness, page 47).
	The backlight is off.	Tap the screen to turn on the backlight.
	You are unable to see parts of an application windows when the screen is in landscape orientation.	Some applications are designed for portrait orientation only. To view the entire application window, change the screen display to portrait. See Changing screen settings, page 44
There are bright or dark pixels, lines in videos, or sections of video missing.	It may be an issue with the content you are viewing.	Turn off the handheld, and turn it back on. Or reset the handheld. See Restarting and resetting the Geo 7X handheld, page 107.

Speaker and microphone issues

Problem	Cause	Solution
Poor sound through the speaker, or the microphone.	Water has pooled in the speaker.	If the handheld has been in rain or immersed in water, turn the handheld so that it is face-down, then shake it to expel the water from the speaker / microphone cavity. Allow it to dry.

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 memory cards, page 50.

Connection issues

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 Geo 7 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.

Windows Mobile Device Center

Problem	Cause	Solution
Windows Mobile Device Center will not connect to the handheld.	The connection is not initiated automatically.	In the Windows Mobile Device Center software on the office computer, select *Mobile Device Settings* / *Connection Settings*.

Problem	Cause	Solution
	The Windows Mobile Device Center software does not recognize the Geo 7X handheld.	Restart the office computer. Disconnect the handheld from the office computer, reset it (see Restarting and resetting the Geo 7X handheld, page 107) and then reconnect it to the office computer.
	The connection is not enabled in Windows Mobile Device Center on the computer.	In the Windows Mobile Device Center software on the office computer, click *Mobile Device Settings* / *Connection Settings*. If you are using: • a USB cable, 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 / 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 a USB cable, use the USB to PC utility to change the connection method the handheld uses to connect to the Windows Mobile Device Center on the computer. Tap / 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.

ActiveSync technology

Problem	Cause	Solution
ActiveSync technology will not connect to the handheld.	The connection is not initiated automatically.	In the ActiveSync technology dialog on the office computer, select *File/ Connection Settings* and then tap **Connect**.
	The ActiveSync technology does not recognize the Geo 7X handheld.	Disconnect the handheld from the office computer. Restart the office computer. Reset it (see Restarting and resetting the Geo 7X handheld, page 107) and then reconnect it to the office computer.
	An incompatible version of ActiveSync technology is installed.	ActiveSync version 4.5 (and later) is compatible with the Geo 7X handheld. If version 4.5 or later of the ActiveSync software is not installed on the office computer, you can download the latest version from the Microsoft website.
	The connection is not enabled in ActiveSync on the computer.	In the ActiveSync technology dialog on the office computer, click *File* / *Connection Settings*. If you are using: • a USB cable, 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 in ActiveSync on the handheld.	On the handheld, tap  / 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	If you are using a USB cable, use the USB to PC utility to change the connection method the

Problem	Cause	Solution
	settings conflict with network settings or VPN client software.	handheld uses to connect to ActiveSync technology 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 technology.

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 cellular, Wi-Fi, or Bluetooth radios, page 55).
	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 Turning on and turning off the Bluetooth radio from within the Bluetooth application, page 56) and the other Bluetooth device.
	The device has not been made Discoverable.	Make sure that the Bluetooth device has been made Discoverable. See Making the handheld visible (discoverable) to other Bluetooth devices, page 62.
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. See Connecting to a Bluetooth-enabled serial device, page 68.
The Bluetooth connection fails while in	The Bluetooth device has moved out of	Move the devices closer to each other. The devices should reconnect automatically. If they do not, select the Bluetooth device in

Problem	Cause	Solution
use.	range.	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 Turning on and turning off the Bluetooth radio from within the Bluetooth application, page 56) .
	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 cellular, Wi-Fi, or Bluetooth radios, page 55.

Wi-Fi connections

Problem	Cause	Solution
The "New Network Detected" notification does not appear automatically.	The Wi-Fi radio is off.	Go to the Wireless Manager and make sure Wi-Fi is on. See Using the Wireless Manager, page 56.
	The handheld is out of range of the network.	Move to within range of the network, and then set up the connection. See Connecting to a Wi-Fi access point, page 58.
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 *Home* screen. If the date is incorrect, tap the clock icon on the *Home* screen and then adjust the date and time.
You cannot configure an Internet connection.		
Within range of more than one network, you are not	The radio is connecting to the first network signal it has received	Tap  / *Settings* / *Connections* / *Wireless Manager*. Tap **Menu** and then select *Wi-Fi Settings*. Any networks that you have already

Problem	Cause	Solution
connecting to the network you would prefer to use.		configured are displayed in the list of preferred networks. 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 Embedded Handheld 6.5 Professional 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 Embedded Handheld application from the Start menu, such as the *Home* screen or File Explorer, and the menu bar and soft keys will be displayed correctly.
Wi-Fi is unavailable in the Wireless Manager.	The integrated Wi-Fi radio may have been deactivated.	Use the Radio Activation Manager to reactivate the Wi-Fi radio. See Deactivating the cellular, Wi-Fi, or Bluetooth radios, page 55.

Internal cellular modem connections

Problem	Cause	Solution
Can't download data.	Your account has no remaining credit.	Contact your cellular provider to ensure that your account has sufficient credit.
Can't connect.	The phone is turned off.	Turn on the phone using the Wireless Manager. See Using the Wireless Manager, page 56.
	The connection is incorrectly configured.	Check your APN and connection settings with your provider.
	Cellular service is unavailable.	Check that the phone is within range of receiving strong enough signals to connect. Move to a location with stronger cellular reception. Check with your cellular provider that coverage is available in your region.

Problem	Cause	Solution
Service is intermittent.	Cellular service is weak.	Move to a location with a stronger signal.
Can't set up a connection.	SIM card is missing.	Insert SIM card. See Inserting and removing a SIM card, page 22.
	SIM card is locked.	Check the PIN security: tap / Settings / Personal / Phone, and select the Security tab.
	3G/GSM selection is incorrect for your cellular provider.	Check your settings: tap / Settings / Personal / Phone, and select the 3G tab. Set the 3G/GSM Selection to Auto.

GNSS receiver issues

Problem	Cause	Solution
The handheld is not receiving GNSS positions.	The integrated GNSS receiver is not activated.	Use the Connect or Activate GNSS/GPS command in the field software to open the GNSS COM port and activate the integrated GNSS receiver. For more information, see Using the GNSS receiver, page 77.
	Incorrect configuration of serial COM port.	When supplying GNSS data to an external device using the COM1 USB to serial converter cable, set the baud rate to the high-speed TSIP setting: 38400, 8, 1, Odd.
	The GNSS COM port is already in use. Only one application at a time can have the port open.	Do the following: • Exit the software that is using the GNSS COM port and then retry in your application. • Check that a GNSS application is not running in the background. Tap / *Task Manager* and then select and close (click **End Task**) any GNSS applications you are not using. • Make sure that connections are not left in use by the GNSS Connector

Problem	Cause	Solution
		software; close the application when you are not using the connections.
	The GNSS field software is using the wrong GNSS COM port.	Connect to COM2 if the GNSS field software uses NMEA messages, or COM3 for TSIP messages. For information on which protocol to use, check the documentation for the application.
	Not enough satellites are visible.	Move to a location where the receiver has a clear view of the sky and ensure the antenna is not obstructed. Alternatively, adjust the GNSS settings to increase productivity. For more information, refer to the Help provided with the GNSS field software. If you are using the TerraSync software, use Smart Settings. For more information, refer to the *TerraSync Software Getting Started Guide*.
	The DOP (Dilution of Precision) value for the current position is above the maximum DOP setting.	Wait until the DOP value falls below the maximum DOP specified. Alternatively, adjust the GNSS settings to increase productivity. For more information, refer to the Help provided with the GNSS field software. If you are using the TerraSync software, use Smart Settings. For more information, refer to the *TerraSync Software Getting Started Guide*.
	Wait for real-time is selected in the GNSS field software and the integrated receiver is waiting to receive real-time corrections.	If you are collecting data for postprocessing, clear the wait for real-time selection. For more information, refer to the *TerraSync Software Getting Started Guide*.
	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	The integrated GNSS receiver outputs	Configure the NMEA application to filter out non-DGNSS positions.

Problem	Cause	Solution
positions.	autonomous positions when real-time corrections are unavailable.	
The GNSS Connector utility reports “Unknown”.	The GNSS Connector software may report “Unknown” on COM3.	This should not interfere with operation of the handheld.
The receiver will not connect, and the GNSS LED is solid red.	There is a GNSS receiver connection error.	Reset the receiver (see Restarting and resetting the Geo 7X handheld, page 107), then attempt to connect again. If repeated attempts to connect to the receiver fail, contact your Trimble reseller.

Real-time DGNSS issues

Problem	Cause	Solution
The handheld is not receiving SBAS real-time corrections.	The SBAS satellite is obstructed from view.	Check the location of the SBAS satellite in the Skyplot section of the GNSS field software, and if possible move to a different location.
	You are outside the WAAS, EGNOS, MSAS, GAGAN, BeiDou-GEO, or QZSS-SAIF 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) and QZSS-SAIF satellites are tracked in Japan. GPS aided geo augmented navigation (GAGAN) satellites are tracked in India. BeiDou satellites are tracked in China. If you have selected satellites that are not available at your location, you cannot use SBAS corrections.

Problem	Cause	Solution
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 latest configuration file, go to www.trimble.com/Geo7.aspx, click *Technical Support* / *GeoExplorer Series Downloads* / *Geo 7 series*. 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 GNSS 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 USB to serial converter, or to a Bluetooth port on the handheld.
	There is no Bluetooth wireless connection to the external source.	The Bluetooth external correction source is more than ten meters from the handheld, or is obstructed. Move the devices closer together, in a direct line of sight, to re-connect.
	The external source is incorrectly connected to the real-time COM port.	In the *Real-time Settings* section of the GNSS field software, select the COM port that the real-time source is connected to.
	The port settings are incorrect.	Change the port settings to match those used by the external source.
	No GNSS positions are available.	You cannot use real-time corrections until the GNSS receiver is computing positions. In the GNSS field software, make sure that the integrated GNSS receiver is activated, enough satellites are available, and that the satellite geometry (PDOP) is good enough to compute positions.
	Integrated SBAS is selected as the	If the SBAS status is Waiting, the integrated GNSS receiver may

Problem	Cause	Solution
	second choice source of real-time corrections.	incorrectly change the status of the preferred real-time choice to Waiting as well. To avoid this, select Wait for real-time or Use uncorrected GNSS as your second choice.

Recommended GNSS settings for maximum precision and productivity

The following table lists some of the factors that affect the precision of your data, and describes how to minimize the effect of atmospheric interference and poor satellite geometry.

Factor	Description	To maximize precision and productivity
Satellite shadow	Satellite shadow is when the line of sight between the GNSS receiver and satellites is partially or fully blocked by obstructions such as buildings, trees, or land masses. The effect of satellite shadow is a reduction in the number of satellites that the receiver is able to track. In general, the quality of your data increases with the number of satellites being used to calculate the position.	Tracking more satellites can help to improve satellite geometry and thereby improve accuracy. Use the Floodlight satellite shadow reduction technology option. See Improving GNSS productivity using Floodlight satellite shadow reduction technology, page 78. Ensure the integrated GNSS receiver gets a clear view of the sky as possible. Keep your body mass as far from the receiver as practical and do not crowd over the handheld. Use an external antenna if needed to elevate the position of the antenna.
Multipath	Multipath is when GNSS satellite signals are reflected off nearby objects, such as buildings or cars, causing an erroneous signal to be received by the GNSS antenna. This can cause errors of several meters.	To reduce multipath, where possible collect data in an open environment away from large reflective surfaces and with a clear view of the sky.
		Use the Floodlight technology option to increase the total number of satellites visible to the receiver, and reduce the risk of multipath affecting your solution. See Improving GNSS productivity using

Factor	Description	To maximize precision and productivity
		Floodlight satellite shadow reduction technology, page 78.
Weak satellite signals	Signal-to-Noise Ratio (SNR) is a measure of the strength of the satellite signal relative to the background noise. GNSS quality degrades as the signal strength decreases. Weak signals may be caused by signals coming through vegetation, multipath signals, or low satellite elevation.	Use smart settings with Trimble field software to allow the receiver to determine maximum precision positions regardless of available satellite signal strength. For more information, refer to the section *Using Smart Settings* in the *TerraSync Software Getting Started Guide*. Use the Floodlight technology option to increase the total number of satellites visible to the receiver, and reduce the risk of weak satellite signal affecting your solution. See Improving GNSS productivity using Floodlight satellite shadow reduction technology, page 78.
Poor satellite geometry	Dilution of Precision (DOP) is a measure of the quality of GNSS positions, based on the spread (geometry) of the satellites in the sky that are used to compute the positions. When satellites are widely spaced relative to each other, the DOP value is lower, and in general position accuracy is greater. If the view of the sky is partially affected by satellite shadow, or if all of the satellites are in one area of the sky, the geometry and DOP may be poor.	Use smart settings with Trimble field software to allow the receiver to determine maximum precision positions regardless of available satellite geometry. For more information, refer to the section *Using Smart Settings* in the *TerraSync Software Getting Started Guide*. Use the Floodlight technology option to increase the total number of satellites that the receiver can track, and reduce the risk of poor satellite geometry affecting your solution. See Improving GNSS productivity using Floodlight satellite shadow reduction technology, page 78.
Satellite elevation	When a satellite is low on the horizon, satellite signals must travel farther through the atmosphere. This results in a lower signal strength and delayed reception by the GNSS receiver, which can cause errors in calculating the position.	Use smart settings with Trimble field software to allow the receiver to determine maximum precision positions regardless of available satellite elevation. For more information, refer to the section *Using Smart Settings* in the *TerraSync Software Getting Started Guide*.

Factor	Description	To maximize precision and productivity
		Use the Floodlight technolgy option to increase the total number of satellites that the receiver can track, and the likelihood of being able to track more satellites at higher elevation. See Improving GNSS productivity using Floodlight satellite shadow reduction technology, page 78.

Legal notices

In this chapter:

- Recycling information
- Regional compliance information
- Warranty
- End User License Agreement for Product Software
- Corporate Office
- Copyright and Trademarks

Recycling information

You should dispose of Geo 7X handheld and accessories properly according to local laws and regulations. Because Geo 7 series contains electronic components, it must be disposed of separately from household waste. When the Geo 7X handheld reaches its end of life, contact your local Trimble reseller to learn about disposal and recycling options for your area.

Recycling in Europe

The symbol above means that according to local laws and regulations your product and/or its battery shall be disposed of separately from household waste. When this product reaches its end of life, take it to a collection point designated by local authorities. The separate collection and recycling of your product and/or its battery at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.
For information about recycling Trimble WEEE (Waste Electrical and Electronic Equipment) products that run on electrical power go to http://www.trimble.com/corporate/about_WEEE_ROHS_initiatives.aspx.
To recycle Trimble WEEE products call +31 497 53 24 30, and ask for the "WEEE Associate". or mail a request for recycling instructions to:
Trimble Europe B.V. WEEE Recycling
C/O Menlo logistics
Gate 19 to 26
Meerheide 43
5521 DZ
Eersel
The Netherlands

Taiwan Battery Recycling Requirements

The product includes a Lithium-ion battery. Taiwanese regulations require that waste batteries are recycled. 廢電池請回收

Regional compliance information

To view compliance on the Geo 7X handheld, go to  / *Settings* / *System* / *System Information* / *Compliance*.

Australia and New Zealand

This product conforms with the regulatory requirements of the Australian Communications and Media Authority (ACMA) Telecommunications, Radiocommunications and EMC Labelling Notices, thus satisfying the requirements for RCM marking and sale within Australia and New Zealand.

Europe

A copy of the EU declaration of conformity is available at: www.trimble.com/geo7/support/EU_DoC.pdf.

This Trimble Geo 7 series has been tested and found to comply with all requirements for CE Marking and sale within the European Economic Area (EEA).
The Geo 7 series has Bluetooth and wireless LAN approval 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.
The Geo 7 series is intended for connection to European Networks operating on GSM 900, or GSM 1800 MHz.

Canada

IC ID: 1756A-88161
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.
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.
Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Industry Canada rules.
Les changements et modifications non expressément approuvés par le fabricant ou le détenteur de cet équipement peuvent annuler votre droit à utiliser cet appareil en vertu des règles d'Industrie Canada.
Antenna Statement
Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.
Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.
Licence exempt

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.
Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le onctionnement.

U.S.

FCC ID: JUP88161

Korea

"해당무선설비는 운용 중 전파 혼신가능성이 있음"
인증번호: MSIP-CMM-TNZ-88161
기자재의 명칭 (모델명): 이동통신용 무선설비(88161)
적합성평가를 받은 자의 상호: Trimble Navigation Ltd.
제조자/제조국가: Trimble Navigation Ltd. / 멕시코

FCC Compliance Statement

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

Warranty

Product Limited Warranty

Subject to the terms and conditions set forth herein, Trimble Navigation Limited (“Trimble”) warrants that for a period of (1) year from date of purchase this Trimble product (the “Product”) will substantially conform to Trimble's publicly available specifications for the Product and that the hardware and any storage media components of the Product will be substantially free from defects in materials and workmanship.

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Product software, whether built into hardware circuitry as firmware, provided as a standalone computer software product, embedded in flash memory, or stored on magnetic or other media, is licensed solely for use with or as an integral part of the Product and is not sold. The terms of the end user license agreement, as included below, govern the use of the Product Software, including any differing limited warranty terms, exclusions and limitations, which shall control over the terms and conditions set forth in the limited Product warranty.

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If the Trimble Product fails during the warranty period for reasons covered by this limited warranty and you notify Trimble of such failure during the warranty period, Trimble will repair OR replace the nonconforming Product with new, equivalent to new, or reconditioned parts or Product, OR refund the Product purchase price paid by you, at Trimble’s option, upon your return of the Product in accordance with Trimble's product return procedures then in effect.

How to Obtain Warranty Service

To obtain warranty service for the Product, it is recommended you contact your Trimble dealer. Alternatively, you may contact Trimble to request warranty service by emailing Repair_Services@Trimble.com. Please be prepared to provide:
– your name, address, and telephone numbers;
– product name, Part Number and Serial Number
– proof of purchase; and
– an explanation of the problem.
The customer service representative may need additional information from you depending on the nature of the problem.

Warranty Exclusions and Disclaimer

This Product limited warranty shall only apply in the event and to the extent that (i) the Product is properly and correctly installed, configured, interfaced, maintained, stored, and operated in accordance with Trimble's applicable operator's manual and specifications, and; (ii) the Product is not modified or misused. This Product limited warranty shall not apply to, and Trimble shall not be responsible for, defects or performance problems resulting from (i) the combination or utilization of the Product with hardware or software products, information, data, systems, interfaces, or devices not made, supplied, or specified by Trimble; (ii) the operation of the Product under any specification other than, or in addition to, Trimble's standard specifications for its products; (iii) the unauthorized installation, modification, or use of the Product; (iv) damage caused by: accident, lightning or other electrical discharge, fresh or salt water immersion or spray (outside of Product specifications); or exposure to environmental conditions for which the Product is not intended;

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Official Language

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Corporate Office

10368 Westmoor Drive
Westminster, CO 80021
USA
www.trimble.com

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This is the November 2013 release (Revision A) of the Trimble Geo 7 series user guide.