

# SUPPORT NOTE

## TRIMBLE® GEO 7X HANDHELD: GETTING THE MOST OUT OF YOUR BATTERIES

Trimble uses removable, rechargeable lithium-based technology to provide the best performance for your Trimble® Geo 7X handheld. This document explains how to get the most out of Lithium-ion batteries in general, as well as tips for optimizing the battery life of your Geo 7 series handheld.

### WHY LITHIUM-ION TECHNOLOGY?

Lithium-ion batteries have a high power density that provides long battery life in a light package. You can recharge a Lithium-ion battery whenever convenient, without requiring a full charge or discharge cycle.

### STANDARD CHARGING TERMINOLOGY

To help you understand how to optimize the hours of use and life of your battery, first let's define some standard terms.

**Fast charge and trickle charge:** Most Lithium-ion batteries use a fast charge to charge your device to 80% battery capacity, then switch to trickle charging. That's about two hours of charge time to power your Geo 7 series battery to 80% capacity, then another two hours to fully charge it—if you are not using the device while charging. You can charge all Lithium-ion batteries a large but finite number of times, as defined by the number of “charge cycles”.

**Charge cycle:** A charge cycle means using all of the battery's power. Using and recharging 100% of battery capacity equals one full charge cycle. One charge cycle doesn't necessarily mean charging the battery a single time. For example, you could use your Geo 7X handheld for a few hours one day, using half its power, and then recharge it fully. If you did the same thing the next day, it would count as one charge cycle, not two, so you may take several days to complete a cycle.



This document is for informational purposes only and is not a legally binding agreement or offer. Trimble makes no warranties and assumes no obligations or liabilities hereunder.

Geospatial Division, 10368 Westmoor Drive, Westminster, CO 80021, USA

© 2013, Trimble Navigation Limited. All rights reserved. Trimble, the Globe & Triangle logo, and GeoExplorer are Trademarks of Trimble Navigation Limited registered in the United States and in other countries. TerraFlex, TerraSync, and VRS are trademarks of Trimble Navigation Limited. The Bluetooth word mark and logos are owned by the Bluetooth SIG, Inc. and any use of such marks by Trimble Navigation Limited is under license. All other trademarks are the property of their respective owners. 29014 (11/13)



Each time you complete a charge cycle, it diminishes battery capacity slightly, but you can put the Geo 7 series' battery packs through ~300 charge cycles before they will only hold 80% of original battery capacity. The exact number of charge cycles it will take for capacity to diminish to 80% depends on a number of factors relating to charging and discharging, including rate of charge/discharge temperature during charge/discharge, completeness of charge/discharge and how regularly the battery pack is charged/discharged.

**Battery life:** Means the time your handheld will run before it must be recharged.

**Battery lifespan:** Means the total amount of time your battery will last before it must be replaced.

## HOW TO MAXIMIZE HOURS OF USE

The length of time your battery will power your device depends on how you use it.

You can follow some easy steps to maximize battery life. Also depending on how they are configured, some features may decrease your Geo 7 series' battery life so it pays to optimize your settings. For example, leaving wireless radios connected while they are not in use will lower the battery life of your device. The tips below apply to a Geo 7X handheld and may help extend its battery life.

**Pay attention to how you are using your device:** Using 3G or using GNSS continuously will drain the battery's power more quickly than simple operation of the device.

**Store at the right temperature and conditions:** The Geo 7X handheld works best from -20° to +60° C. You should store it in environments of -30° to 70° C. Storing the handheld as near room temperature as possible (22° C) is ideal for battery life and lifespan. If you will not be using your device for some time, Trimble recommends storing Lithium-ion batteries in a partially charged state (for example, 30% to maximize battery life and lifetime).

**Adjust brightness:** Dimming the screen is one way to extend battery life. Go to *Settings / System / Backlight*, select the *Battery Power* tab and lower the duration that the device waits before turning off the backlight if the device is not used when on battery power. Under the *Brightness* tab, drag the slider to the left to lower the default screen brightness, or enable Auto Brightness. Auto Brightness enables the screen to adjust its brightness based on current lighting conditions.

**Disable wireless radios when not in active use, or in low- / no-coverage areas:** Because the Geo 7X handheld always tries to maintain a connection with the cellular network, it may use more power in low- or no-coverage areas. Disabling the modem can increase battery life in these situations; however, you will be unable to use mobile data. Similarly, leaving Wi-Fi on when you are not using it will unnecessarily use battery life. To turn off wireless radios, tap  / *Settings / Connections / Wireless Manager*, and tap the radios to toggle them on or off.

**Update to the latest software:** Always make sure the Geo 7X handheld has the latest operating system installed to optimize battery performance. To check the version currently on your device, go to  / *Settings / System / System Information*. Under the *Device* tab, you will see the operating system version currently installed. To check for the latest operating system version, go to [www.trimble.com/Geo7](http://www.trimble.com/Geo7), and select *Technical Support / Downloads*. Download and install the latest version if required.

**Suspend your device:** It may seem obvious, but you should place your Geo 7X handheld into Suspend mode when you are not using it. You will be able to receive data and text messages while it is in suspend mode, but nothing happens if you touch the screen.

To place the handheld into Suspend mode, press and hold the the **Power/Home** button for one second, or from the *Home* screen tap  / **Suspend**.

You can also set the handheld to auto-suspend so that it turns off more quickly after a period of inactivity. Go to  / *Settings / Power / Advanced* and set the interval to a short time, such as 1 minute.

**Note:** Some applications such as Trimble TerraSync™ software will over-ride this setting to avoid accidentally suspending the device in the middle of capturing data. To avoid this, make sure the application is fully closed when it is not in use.

## CHARGING AND CHECKING CHARGE LEVEL

Charge circuits are located inside the handheld's battery, so your battery can be charged inside or outside the device. The battery is equipped with notification LEDs so you can tell the status of charging as the battery charges.

The charging status LED indicates the current state of charging:

	Means that the battery is receiving charge.
	Means that the battery has completed charging and is ready to use.
	Means that a charge fault is detected. Refer to the <i>Geo 7 Series User Guide</i> for troubleshooting advice, or contact your Trimble Distribution Partner for support.

The current level of charge of the battery (outside of the handheld) can be checked at any time by pressing the button  (labeled PUSH) on the back of the battery pack. The charging status LEDs will light up for 3 seconds to indicate the current approximate level of charge. Each LED represents ~20% of the total battery life of the battery pack.

## VIEWING USAGE STATISTICS

Being aware of how your current usage of the device is consuming power can help you prolong battery life by seeing the effect of disabling functionality that is consuming power unnecessarily. You can view your Geo 7X handheld's expected remaining battery life in the Power menu. This provides an estimate of total capacity (%) remaining, as well as an estimate of the number of hours life remaining. The estimated hours remaining is affected by:

- the current state of charge
- how you are currently using the product (averaged power use over the last 2 minutes operation), for example, use of GNSS, backlight, and so on
- the maximum capacity of the battery pack
- external factors such as signal strength from local cell towers when using the handheld's integrated GSM/CDMA modem.

## USE YOUR GEO 7 REGULARLY

For proper maintenance of a lithium-based battery, it is important to keep the electrons in it moving occasionally. Be sure to go through at least one charge cycle per month (charging the battery to 100% and then running it down).

## How long will the battery last?

### BATTERY LIFESPAN

As a general guide, under ideal operating and storage conditions, the capacity of the Geo 7 series battery pack cells should hold 80% of their original capacity after 300 complete charge cycles. As described in this document, numerous independent factors affect the lifespan of the battery pack, and the lifespan observed will vary from one battery pack to another based on the environment and usage of the battery pack.

## BATTERY LIFE

The following table represents estimates of the battery life of the Geo 7X handheld in the described operating conditions. Actual battery life will depend on the specific environment the device is being used and this information is a guide only.

Device operation	Scenario description	Estimated expected battery life
GNSS data collection with Trimble VRS™ technology	Using a field data collection application such as Trimble TerraFlex™ software with the system GNSS active, and VRS corrections supplied to the device GNSS using the internal modem, or with a Bluetooth® connection to an external modem.	2G cellular networks: up to 7 hours 3G cellular networks: up to 6.5 hours When using the internal modem, expected battery life will vary with network configuration and distance to the nearest cell tower.
Autonomous GNSS data collection.	Using a field data collection application such as Trimble TerraFlex™ with the system GNSS active, but no external DGNSS corrections being applied. Unused wireless radios are turned off.	Up to 9.5 hours
Stand by	Suspended device with all radios and sensors inactive.	Up to 50 days

## FOR MORE INFORMATION

Contact your local Trimble Distribution Partner.

## GENERAL BATTERY INFORMATION

All battery claims depend on the use and availability of cellular networks, including location, signal strength, feature configuration, usage, storage conditions, and many other factors; actual results will vary. Each battery has limited recharge cycles and may eventually need to be replaced. Battery life and charge cycles vary by use and settings. Battery tests are conducted using specific Geo 7X handheld devices.

## BATTERY RUN TIME ESTIMATES

These battery run-time estimates are based on using Geo 7X handhelds and software, on GSM networks at 21° C ambient temperature and backlight slider at 50%. All other settings are assumed to be default with wireless radios active or inactive as described in the scenario description.

## BATTERY REPLACEMENT AND DISPOSAL

Rechargeable batteries have a limited number of charge cycles and may eventually need to be replaced. Contact your Trimble Reseller for information on how to best dispose of used Trimble batteries.