

2 Windows Mobile Handheld Basics

Section	Topic	Page
2.1	About Field Computers and Data Recorders	2-2
2.2	Powering ON/Off Shutdown.....	2-3
2.3	Batteries and Charging.....	2-3
2.4	Rebooting.....	2-6
2.5	Using the Stylus and Touchscreen	2-6
2.6	Accessing Programs and Settings.....	2-8
2.7	File Management and Memory.....	2-9
2.8	Ports.....	2-10
2.9	Onboard Services.....	2-10
2.10	Camera.....	2-11
2.11	Forge Ultrasound Distance.....	2-12
2.12	Forge F4 Distance Program.....	2-15
2.13	UBlox Internal GPS.....	2-17
2.14	Connecting to a PC.....	2-18
2.15	Other Means of Data Transfer.....	2-21
2.16	Warranty Info.....	2-21
2.17	Best Practices for Field Use.....	2-23

This introduction to your new field data collection equipment is not meant to be exhaustive, but rather a way to quickly access pertinent info without reading the manufacturer's full length user guide.

2.1 About Field Computers or Data Recorders

Field data recorders are really just rugged mini PC's that run a scaled down version of the Windows operating system called Windows Mobile. You'll find that many of the functions and features will be similar to your desktop Windows PC; however there are a few differences. Because of their size they don't have all of the horsepower or memory of a normal PC, but are designed with ergonomics in mind and the ability to handle tough environments. An on-screen keypad mimics a normal keyboard and a stylus pen (or sometimes a fingertip) takes the place of a mouse. Programs are launched from a Programs list rather than desktop shortcuts. The following sections will help introduce you to the operation and care of your Windows Mobile devices. Feel free to explore the programs and settings of the device on your own as this is a great way to get comfortable with its operation.



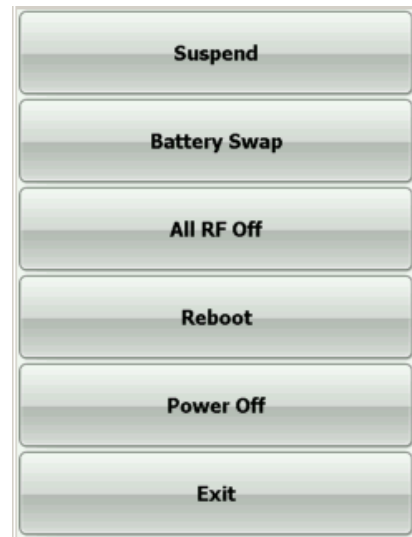
2.2 Powering ON/OFF and Shutdown

Most Handhelds:

- To turn most handhelds on, simply press the Power button for a second or two. To turn most handhelds off, you can quick press the Power button and put them in a low battery state or you can long press the Power button for about 3-4 seconds and then select the appropriate Shut down option.

Forge Power Options:

- A quick press of the Power button will turn the Forge ON.
- A quick press of the Power button while the unit is ON will launch the Power Menu as shown here:
 - **Suspend Mode** – Turns off the display and “suspends” the session. A quick press of the Power button will turn the unit back ON.
 - **Battery Swap Mode** – Temporarily suspends operation so the user can swap batteries.
 - **All RF Off Mode** – Turns off Radios (Bluetooth and 802.11) to conserve power.
 - **Reboot** – Performs a restart on the device.
 - **Power Off** – Performs a full Shutdown.
 - **Exit** – Closes out of the Power Menu.
- The Forge can also be Shutdown by holding the Power button through the countdown screen.



2.3 Batteries and Charging

Battery charging:

- The supplied AC charger is the preferred charger for all handhelds and will charge the fastest. Most Li-ion batteries take 3-4 hours for full charge.
- The mini USB cable will also charge the unit, but at a slower rate. Avoid using USB to charge a dead or nearly dead battery.

- Vehicle chargers can be used but are **not recommended** as the primary source for charging.
 - Do Not Start the vehicle while the handheld is connected to a vehicle charger. This can cause a power spike and potentially jeopardize the integrity of the handheld.
 - Aftermarket vehicle chargers are not recommended as they may not meet required specifications and void the warranty.
 - Inverters are the preferred method of in-vehicle charging over normal vehicle chargers.
- Devices using a lithium battery do **NOT** need to be fully discharged before next charging.
- **Do NOT** charge the battery in high temperatures (i.e. direct sunlight).
- Cold temperatures will decrease battery life.
- The battery should be fully charged at least once every two weeks even if the device is not in use. Over-discharge can decrease battery performance.
- Note that batteries are only warranted for 6 months.
- For most handhelds, the LED indicator light on the top right of the device will display the charging/battery status:

Blinking Green	Charging Battery
Solid Green	Full Battery
Blinking Red	Low Battery
Solid Red	Faulty Battery
Alternating Green & Amber	Charging w/Windows Notifications
Alternating Red & Amber	Low Battery w/Windows Notifications
Alternating Amber & Green	Full Battery w/Windows Notifications
Alternating Amber & Red	Faulty Battery w/Windows Notifications

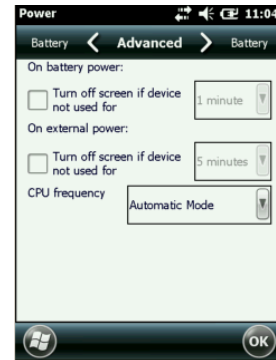
Power Management Tips

- The backlight and wireless radios are the main power users.

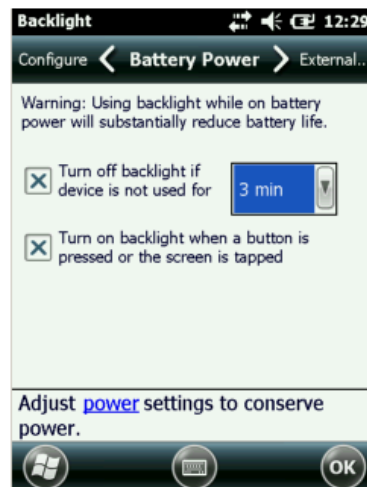
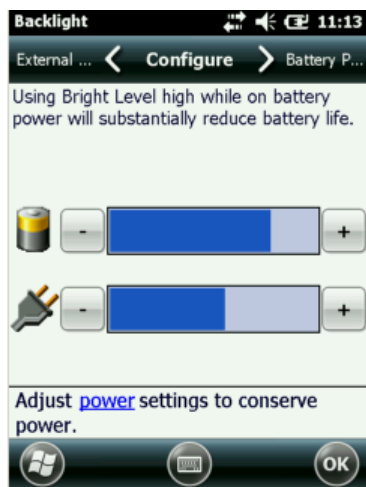


- Power settings can be adjusted by clicking the Battery icon on Navigation Bar at the top of the touchscreen.

- The screen shot here shows the recommended settings. Be aware that setting the CPU frequency to Max Battery will result in extremely sluggish performance.
- Don't allow the device to go into Suspend/Sleep mode in colder temps.



- The Backlight settings can be configured by clicking **Programs > Settings > System > Backlight**.
- The screenshots below show the Backlight Brightness and Backlight Auto Turn Off settings. The recommended brightness is 50-75%. Usually a 3 minute setting for auto backlight off setting works well. A touch of a button or screen tap will turn the backlight ON again.



- Keep the 802.11 WiFi turned OFF when you are not connected to a WiFi hotspot. If the wireless radio is continuously searching for a hotspot, a full battery may only last 5-6 hours! The Wireless Manager settings can be accessed on the Home screen.

2.4 Rebooting

Rebooting your desktop PC is something you should do often to ensure optimal performance and the same goes for your Windows Mobile device. Rebooting (also called restarting or resetting) closes all active programs and processes before

restarting. Simply powering your unit OFF and ON again does not shut down and reboot (see Section 2.3). You don't have to wait until your device locks up to perform a reset. Resetting your device often will hopefully minimize the chance of a lockup in the field. The reset procedure is simple and much faster than on your PC. Here's how:

- **Preferred Reboot Method:** Press the recessed Reset button on your handheld (if present) with your stylus pen.
- You can also Press and Hold the Power button thru the countdown to perform a Shutdown and then Power back ON to reboot.
- **Last Resort Method-** Should neither of the previous methods work to reboot a locked up device, remove the battery (very carefully) as a last resort.

2.5 Using the Stylus and Touchscreen

The stylus pen performs the function of a mouse on a Windows Mobile Device.

Basic Stylus functions:

- Single tap = Left click
- Tap/hold = Right click

Stylus Tips:

- Keep a spare stylus handy. Use the on-board stylus as your spare.
- Tie a stylus to your cruise vest or use a lanyard to prevent loss.
- Use a ball point pen with the ball point recessed as a backup.
- Unless you have a screen protector installed on your touchscreen, Do Not Use anything else as a stylus. You could damage the touchscreen, possibly to the extent it would need to be replaced.

Screen Protectors:

Screen protectors are thin, slightly adhesive plastic film covers that protect the touchscreen. Always keep one installed to protect from scratches and damage. They are cheap insurance and relatively easy to apply on a clean screen. Replace them every 2-3 months.

Touchscreen Care:

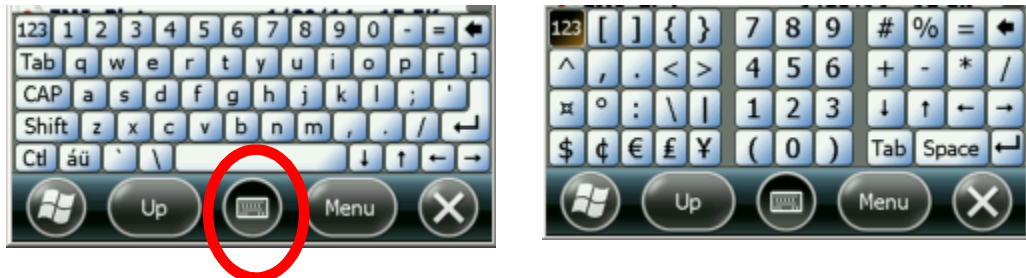
- Use water or rubbing alcohol and a clean soft cloth to clean your touchscreen.

- Dirt and debris can sometimes get on the crevice between the case and the touchscreen. This can cause the touchscreen to seem as if it is out of calibration or even be totally unresponsive to your stylus. You can use compressed air in a can to blow out the debris. Another safe method is to use the corners of a business card to go around the edges of the touchscreen and dislodge anything hidden.
- You may need to recalibrate your touchscreen if it seems like the screen does not respond to the exact location you touch with the stylus. This can be accessed by clicking **Programs > Settings > Systems > Screen > Align Screen**.

Keypad

The onscreen keypad (soft keypad) is the means for text input and numeric input if your device doesn't have a hard keypad like the Forge.

- Usually, if you are in an application where text should be input the keypad will automatically appear. You can minimize or maximize the keypad by clicking the keypad icon in the bottom center of the screen. You can toggle on a number pad by clicking the 123 button in the upper right.




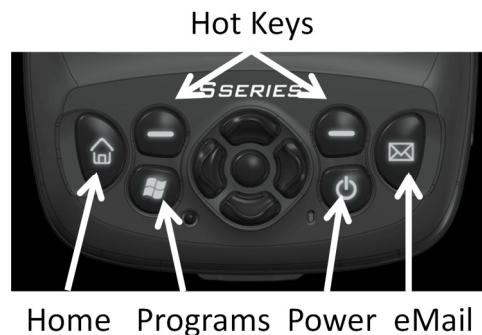
- On the **Forge** handheld you have the option to use the onscreen keypad or the hard keypad. For numeric entry on the hard keypad, don't forget to press NumLock button:



2.6 Accessing Programs and Settings

Windows Mobile allows users several ways to access programs.

- **Programs Button**  opens the list of installed programs. Tap on the program you wish to open. Note that you can re-arrange the order of applets in the programs list by tap/hold and dragging them to the desired location. Frequently used apps can be moved to the top of the list.
- **Hot Keys** are two shortcut keys on the hard keypad below the screen on the handheld that can be assigned to an application. These can be programmed to launch programs under ***Programs > Settings > Personal > Buttons***.




- **Soft Keys** are the two oval buttons on the bottom of the Today (Desktop) screen that will allow users to launch preset programs. The functions can be assigned by running the RemapSoftKeys utility in the My Device folder.




- The following keys on your X8 keyboard have been preprogrammed for your convenience:
 - F1 – Windows Menu
 - F2 – Windows Menu
 - F3 – Used for Ht. & Distance programs
 - F4 - Distance Program
 - F5 – Height Program
 - F6 – User assigned (Usually TCruise).
 - F7 – User assigned (Usually SoloForest)



- **Home button**  on most handhelds will return the user to the Desktop/Home screen. (See Hot Keys screenshot above).
- The following keys on your X8 keyboard have been preprogrammed for your convenience:



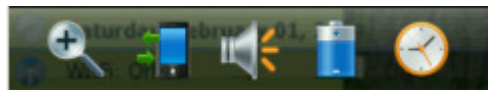
- **Green Phone = TAB (very useful in moving between cells in TCruise)**
- **F1 = TCruise (if you purchased that)**
- **F2 = Windows Start Menu Shortcut**
- **F3 = Solo Forest or ArcPad (if you purchased that)**
- **Red Phone = Backspace**
- **# = . and . = #** (so you do not have to swap to Blue keys for a decimal)
-  **+ F1 = Rain Mode** – use in light rain or sweat with finger or soft-tip stylus. Note: if you push the blue key button, you remain in that mode until you push it again.

- The following keys on your Archer 2 keyboard have been preprogrammed for your convenience:

- **P1 = TCruise (if you purchased that)**
- **P2 = Solo Forest**
- **↑P3 = Decrease Backlight**
- **↑P4 = Increase Backlight**
- **Start > Settings > System > Touch Water = Rain Mode**



- **Navigation Bar** can be accessed by clicking the top of the touchscreen located at the It displays active programs and tools such as, volume, battery, time, connectivity, and more.



2.7 File Management and Memory

On-board storage memory

- All our handhelds come standard with more than enough storage memory for most users. This memory is non-volatile so if batteries die or lockups occur, data is safe. No matter which folder the data is in.

Memory Cards

- All units come with a microSD card slot located under the battery for additional storage.
- microSD cards up to 32GB are supported.
- A locking mechanism ensures cards are secured

Memory Structure

- The internal memory is called the Main Memory. It is recommended that all programs such as TCruise, SoloForest, ArcPad, etc. be installed here.
- Storage cards should be used only for large datasets or basemaps.
- File structure is similar to a PC with a Programs Files and My Documents.
- File Explorer application similar to Windows Explorer for file management.
 - Create new Folders
 - Cut, copy, paste, delete, and rename files and folders.
- No Recycle Bin in Windows Mobile so be careful deleting files!
- Recommended storage locations for data are:
 - GPS Data - **My Documents/Solo**
 - Basemaps for use in Solo - **My Documents/Basemaps**
 - Exported shapefiles from Solo - **My Documents/Solo/Exports**
 - TCruise Data - **My Documents/TCruiseCE**

2.8 Ports

- All ports should be closed with the rubber stopper when not in use.

2.9 Onboard Services

- All handhelds come standard with Bluetooth v2.1 and 802.11b/g.
- The Wireless Manager can be accessed from the Home screen to allow users to setup connections and adjust configurations.

2.10 Camera

All units come standard with an internal 5-8 MP camera for normal digital photos and also geo-tagged photos. The camera on the Forge Ultrasound models is also used with the Tree Height application.

Taking photos:

- Press the Camera button on the keypad. Press and hold the Camera button half way down to auto-focus and press completely to snap the shot.

Known issue with the Camera in SoloForest:



There is an issue in SoloForest where pressing the camera button will cause the Menu bar and one of the toolbars to disappear. This forces the user to either reboot the handheld or close Solo via the Task Manager. This is operating system related and there is no fix yet. In the meantime users should disable the camera button on Flint (not on Forge) in the settings to prevent this from happening accidentally. Press **Programs > Settings > Personal > Buttons** and Re-assign button 5 to “None”.


Workaround: Minimize both toolbars first in Solo, take a picture, and then come back to Solo and expand both toolbars.

Taking Geo-tagged Photos

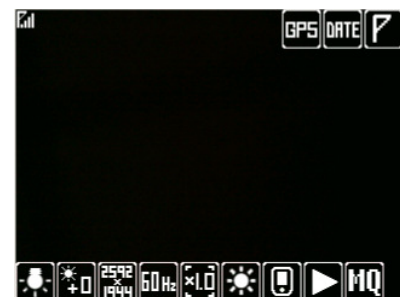
Geo-tagged photos are simply photos with the GPS coordinate embedded. Here are the procedures:

- Click **Programs > Pictures & Video > Camera**

- Click the Camera button  and then select the Settings button 

- Click the buttons at the top right on the screen to turn on the GPS coordinate and Data. It will look like this when setup properly: 

- Be sure you have a GPS fix as shown in the upper left corner of the screen before pressing the Camera button on the Flint to take a picture.



- When the picture is viewed you will see the GPS coordinates displayed in the upper left:

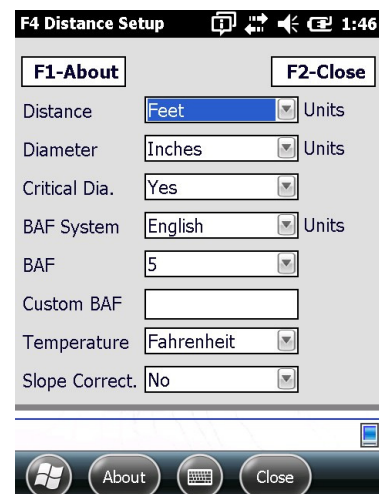
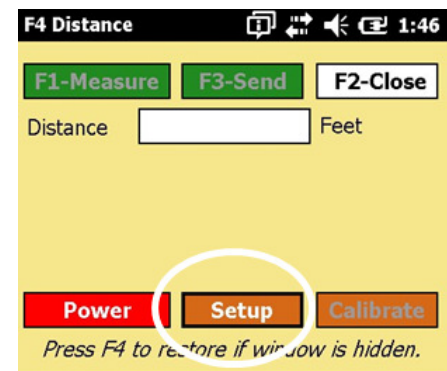
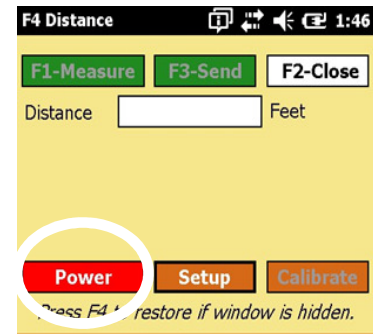


- Press the Enter Button to close the Camera and return to Pictures and Video Screen.

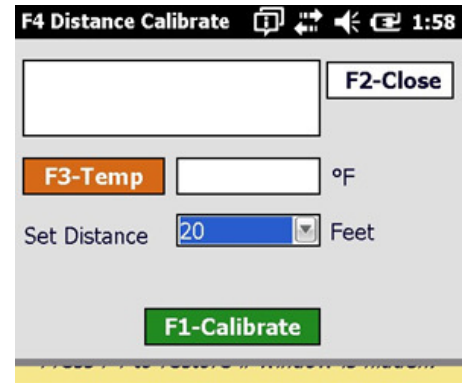
2.11 Forge Ultra-Sound Distance

F4 Distance Program Setup

1. **Launch the Distance Program** - Press the F4 function key.
2. **Open the Power Screen to** - Press the Power Button.
3. **Power ON the Internal Forge Transceiver** - Press **F1-Open** button or **F1** on the Forge Keypad.
4. **Power ON the Remote Transducer** - Remove the Ultrasound plug from the Forge and hold the Transducer speaker up to the Forge Ultrasound Port and press F3-Power.
5. **Return to Distance Window** - Press F2 to close Distance Power window and return to the Distance screen.
6. **Adjust Distance Mode Options** - Press the **Setup** Button to get to the Distance Mode Options. Adjust the parameters as desired and press **F2-Close** to return to the Distance Screen.
7. **Calibrate the ultrasound device:**



- Be sure the Forge and Transducer have acclimated to outside temperature before proceeding with calibration.
- Press the **Calibrate** button next to **Setup** on the F4-Distance Window to enter the Calibration screen.
- Set the distance to calibrate from. This should correspond to the average distance you will be measuring during the day.



Calibration Continued:

- Single person Calibration:
 - Place the Ultrasound Transponder on the Pole and put it beside tree.
 - Place the nail of your steel logger's tape in tree at center of transponder.
 - Pull the tape back the selected distance in the calibration screen.
 - Line up the front of the Forge housing with the distance on the tape.
 - Press **F1 key** to calibrate.



- Two person Calibration:
 - Have one person hold the end of a logger's tape at ground level with the transponder's "speaker" at zero.
 - Have the other person pull the tape back along the ground (flat ground) the desired calibration distance.

- Place the front of the Forge housing at the calibration distance on the tape and Press **F1** Calibrate.

- When successfully calibrated, the date, time, temperature, and calibration distance will appear in the dialog box at the top of the calibration screen.
- Calibrate a couple of times during the first hour. After that about every two hours as temperature changes.
- Press **F2-Close** to begin using the Distance function.

Using the F4 Distance Program:

- Hold the Forge at the center of the tree and press **F1-Measure** to get the distance from the transponder at plot center to the center of the tree.
- If you have chosen the Critical diameter to be calculated in the Settings earlier, you will see the minimum Diameter for an “in tree” based on the selected BA Factor.

Using F4 Distance with Slope Correction:

- Slope correction is usually not critical unless slopes are greater than 10 percent.
- If you had chosen the Slope Correction option in the Settings, the interface will look like the screen on the right.

- Press the **Start Angles** button. Hold the Forge at the same height off of the ground as the transponder (4.5 feet).

- Hold the handheld parallel with the ground and measure a distance as normal. Once the Angle in the slope field is stable, press **F1**. The horizontal distance and critical diameter will be displayed.
- Press **F2-Close** to exit the F4-Distance screen.

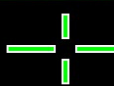


2.12 Forge F4 Height Function

- The F4 Height Function uses the Forge's internal camera, gyro, and ultrasound to measure heights using the same theory as your old clinometer.
- Baseline distances can be measured using a logger's tape or the F4 Distance Program. The F4 Distance program with ultrasound allows the advantage of measured heights from any baseline distance where there is good visibility to the desired target.
- The height function is limited only by the camera's resolution.
- Users should test the height function on some known heights to fine tune the Handheld Offset and procedure.
- It is a good practice to use the carrycase strap around your neck to keep the Forge at fixed distance as you aim at different height targets up the tree.

Height Measurement Procedures

1. Determine how baseline distances will be measured.




- Open the F4 Distance program before launching the Height Program if ultrasound will be used.
- If a steel logger's tape will be used, the baseline distance will need to be manually entered in the F1-Distance field.

About	Keyboard	F2-Close
Handheld Offset: <input type="text" value="0"/> Feet		
<div style="background-color: green; color: white; padding: 5px; display: inline-block;">Start Camera</div>		
		
Night:  		
Brightness: <input type="range"/>		
<i>Press F5 to restore window if hidden.</i>		
F1-Distance	<input type="text" value=""/>	Feet <input type="text" value="0"/>
Stop Cam	<input type="text" value="0"/>	<input type="text" value="0"/>
Clear All	<input type="text" value="0"/>	<input type="text" value="0"/>
F3-Height	<input type="text" value="0"/>	<input type="text" value="0"/>

2. **Open the Height Program** - Press **F5**
3. **Enter the Handheld Offset** – this is the distance you hold the handheld away from you face. Most users will find that somewhere between 1.5 and 2.0 are good values.
4. **Set the camera to mode and adjust brightness.** Night mode works well in dark timber stands.
5. **Start Camera** when you are ready to measure.
6. **Place the transponder on a tree** using the nail if you are using the F4 Distance for baseline measurements.
7. **Back away from tree** to baseline distance and enter it manually or press the **F1** button to automatically capture the distance.
8. **Aim at the base of the tree** and press **F3** when the image stabilizes.
9. **Measure multiple heights up the step** as you rotate your body and arms and press **F3** to capture height measurements. Up to 8 heights can be measured.



10. **Check the Distance Screen** – Here you will see the Angle and up to 8 heights.
11. **Copy/Paste heights** to Excel or a cruise program.

About	Keyboard	F2-Close
Handheld Offset: <input type="text" value="0"/> Feet		
Start Camera		
		
Night:  		
Brightness: <input type="range"/>		
<i>Press F5 to restore window if hidden.</i>		
F1-Distance	<input type="text" value=""/>	Feet <input type="text" value="0"/>
Stop Cam	<input type="text" value="0"/>	<input type="text" value="0"/>
Clear All	<input type="text" value="0"/>	<input type="text" value="0"/>
F3-Height	<input type="text" value="0"/>	<input type="text" value="0"/>

12. Press ***Clear All*** when finished with tree heights.
13. Press ***Stop Cam*** to turn off camera.
14. Press ***F2-Close*** to exit the Height Program.

2.13 UBlox Internal GPS

GPS Chip

All units, except the Nomad 1050, come standard with a built-in UBLOX GPS.

Accuracy Specs in open sky conditions:

- 1-3 meters Autonomous
- 1-2 meters with SBAS (WAAS)

GPS Receiver/antenna location

The antenna is located on the top of each unit. Because of this, it is recommended that the unit be carried perpendicular to the ground when using the GPS so that the antenna has a clear view of the sky.

External Antenna Port:

There is an external antenna port available but the internal GPS should provide excellent yield without it.

Special Canopy Filtering

The Forge GPS has been configured using some proprietary filtering that make it optimized for use in forest canopy. This special filtering helps maintain a tight position spread for static data collection and helps smooth dynamic data. Both contribute to better accuracy than the default configuration.

GPS COM Port and Baud Rate

- Forge = COM 9, 9600
- Nautiz X8 = Com 1, 9600
- Trimble T41G = Com 2, 38400
- Nomad 1050 = Com 2, 9600

- Archer 2 = Com 2, 115200
- Holux = 9600
- Geo 7 = Com 3, Smart Settings
- Geode = 115200
- PG200 = 19200
-

Data Output

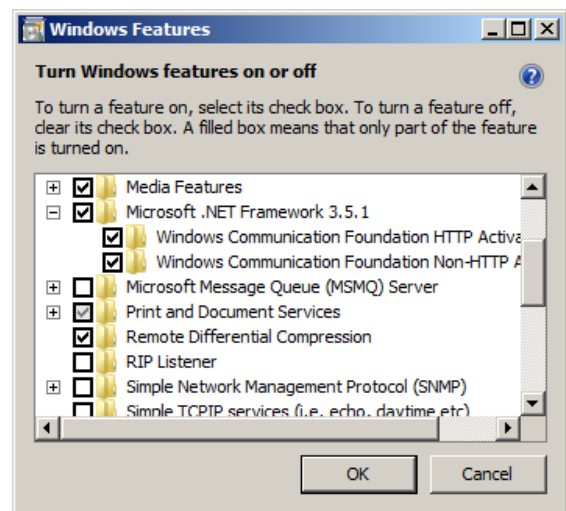
The GPS outputs standard NMEA 0183 and uses WAAS differential correction as the default.

2.14 Connecting to a PC

- All devices support connection to Windows PC's for file transfer.
- Windows XP machine will use Microsoft ActiveSync for connection while , Vista, Windows 7, and Windows 8 operating systems use the newer Windows Mobile Device Center (WMDC).
- Check your PC under Start > Programs to see the appropriate application is already installed. If not, the installers can be found on the LandMark Spatial Solutions website (<https://www.landmarkspatialsolutions.com>) under **Support > Software Downloads > Windows Desktop Utilities.**

Note for Windows 8 users – Prior to installing Windows Mobile Device Center you will need to enable the .NET 3.5 Framework on your PC.

- Open **Control Panel** and choose **Programs and Features > Turn Windows Features On or Off**. Expand the section Microsoft .NET Framework 3.5 and check both components as shown on the right.
- **OK out** when completed.
- Windows 8 users should also connect the handheld to the PC prior to running the WMDC installer.



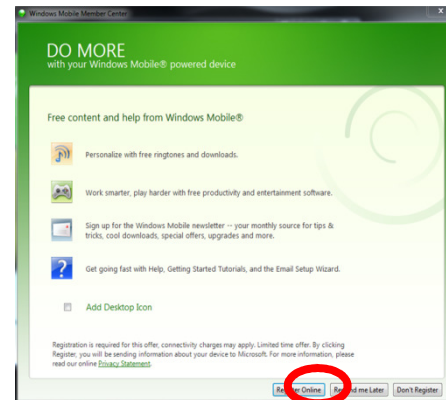
Connecting for the first time with WMDC

The first time connection will take a little longer than usual as some new drivers will be installed. For WMDC you will likely see the following dialog boxes:

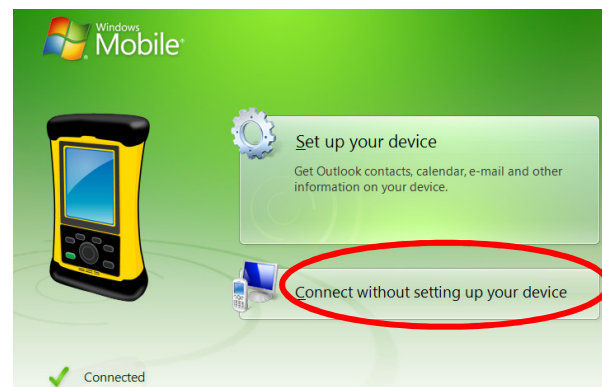
1. **Wait for the Installing device driver software window to finish.**
2. **Accept the license agreement.**



3. **Choose Don't Register** on the DO MORE window as this is not required and not critical for install.



4. **Choose connect without setting up your device** when prompted as shown in the screenshot on right. Always choose this option when connecting as the Setup your device option is intended for Smart Phone users. You are now ready to explore the files and folders on the handheld device.



5. **Select File Management > Browse the contents of your device.** This will open Windows Explorer and display the

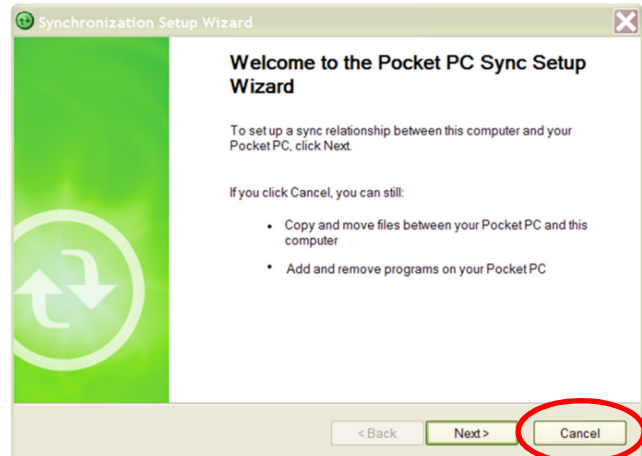


Mobile Device as if it were a separate Drive on your PC.

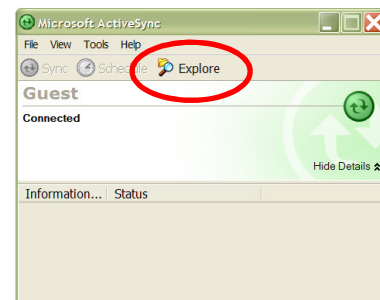
Connecting with Microsoft ActiveSync (for Win XP Users only)

Microsoft ActiveSync works similar to Windows Mobile Device Center but looks a little different. Upon connecting a Mobile Device to ActiveSync you will see a dialog box like the one here.

- **ALWAYS select Cancel on the Sync Setup Wizard.** This will still connect, but create a Guest Partnership. (Creating a Partnership and synchronization is designed for users with Smart Phones.)



- **Click the Explore button on the ActiveSync Toolbar** and view the files and folders on the Mobile Device.



Troubleshooting connection problems:

1. Try **adjusting the advanced network functionality setting** on the handheld by clicking **Programs > Settings > Connections > USB to PC**. Change the setting for “enable advanced network functionality” and OK back out. Unplug and reconnect device.
2. On Windows Vista, 7, and 8 machines, **Turn OFF User Account Control (UAC)**.
3. **Temporarily disable any personal firewall software** running on the PC.
4. **Reset/reboot** the handheld unit, then the PC.

5. Try connecting using a different USB port, a different USB cable, and a different PC to help isolate the cause of the problem. Try another device on your PC if possible.
6. Uninstall and then reinstall WMDC or ActiveSync on the PC.
7. Try restoring your PC to earlier restore point if you PC just recently started having connection problems. Sometimes a Windows Update can cause the problem.

2.15 Other means of Data Transfer

All units also offer several other ways to transfer data to a PC in the event you are unable to connect using WMDC or ActiveSync.

1. Copy/Paste data to a **microSD card**. You can then remove the card and plug into a PC using a card reader and transfer files.
2. Copy/Paste data to USB Flash Drive using optional **USB to Host cable**. You can then plug the Flash Drive into your PC and transfer files.
3. Transfer files between two Windows Mobile Devices by **Beaming files over Bluetooth**.

2.16 Warranty Info

What is covered?

- All units except the Nautiz X8 and the Nomad 1050 are warrantied for 2 years from the date of purchase against manufacturer defects from normal use and service.
- Batteries are warrantied for 6 months.
- All other accessories are warrantied for 1 year, except for the transponder Forge pole and transponder cone which are 3 months.
- Warranty is only valid on devices purchased directly from LandMark Spatial Solutions. Warranties are non-transferrable.

What's not covered?

- Damage from normal wear and tear.
- Damage by breakage of the LCD touchscreen.
- Damage caused by a user dismantling a unit.
- Damage from accidents, misuse, or abuse.
- Damage from fire, water, lightening, or other acts of nature.

- Cosmetic damage to the exterior finish.
- Damage from applications and uses for which the device was not intended.
- Damage as a result of virus infection, password setting, or resetting.
- Damage from unauthorized modification.
- Damage due to service from anyone other than an authorized repair center or their agents.
- Damage as a result of reconfiguration changes to the shipped product (hardware or software).
- Any damage to a device in which the serial number has been removed, defaced, or altered.
- Reception or display problems related to noise, echo, interference, or other signal transmission and delivery problems.
- Burned in images resulting from viewing an image on the display for an extended period of time.
- Minor imperfections within design specs that do not materially alter functionality.
- Adjustments and failure to follow operating instructions covered in users guide including incorrect installation of hardware and software.
- Damage caused by the use of non-authorized parts and services.
- Theft or loss.

What can the manufacturers do to correct problems?

For any product found to be defective and covered under warranty, the manufacturers will at their discretion:

1. Repair, or replace the device with new or refurbished parts or replace with a new or refurbished functionally equivalent product.
- OR
2. Provide a refund of the purchase price of the product.

How to obtain warranty service?

Go to <http://www.landmarkspatialsolutions.com/Repairs-and-RMAs/repairs-and-rmas.html>, and fill out the correct RMA form and then send your unit and the RMA form to the address on the form.

Are extended warranties available?

Yes, extended warranties can be purchased in 12 month intervals for coverage up to 4 years. Price depends on the handheld model.

2.17 Best Practices for Field Use

- Begin each day by resetting the handheld. This normal practice for most devices and will help with performance.
- Be sure the device has an adequate charge before leaving home/office. A 300watt vehicle power inverter is the preferred mobile charging method. These are inexpensive and versatile as well.
- Keep ports sealed in rain and high humidity. Water can get in and damage the circuit board, the most expensive component!
- Don't get bug spray with Deet on the unit. It can melt plastic and destroy touchscreens.
- Keep the unit in its carry case with screen covered when not in use. Many times damage occurs while not in the field (ie. rolling around in the floorboard of your truck).
- Keep a fresh clean screen protector on the touchscreen. Visibility will be better and data collection more accurate. Over time old protectors can become "baked on" and are difficult to remove without damaging the touchscreen.
- Protect the touchscreen; it is the most vulnerable parts of the device. Even though the Flint and Forge units are rugged, the touchscreen is not.
- Clean the unit with a damp cloth with warm water. Tree marking pain can be removed with Simple Green sprayed on a cloth. Neither the Flint nor Forge is dishwasher safe!
- Download important data often. No matter how careful you try to be Murphy's Law always applies. The USB Host cable is a great way to download data to a Flash Drive without connecting to a PC.

- A mini USB Power Pack charger by Energizer or Duracell is a good idea if you are concerned your battery won't last all day. These have been approved by BAP.
- Check your mini usb cable before plugging into the device. If a damaged or deformed usb connector is inserted into either device you can damage the USB port on the handhelds.
- Sets units to never go to Suspend mode in extreme cold. It is best to turn the unit on while still in a warm vehicle before stepping out as it takes more energy to boot the unit up when it is extremely cold. Units have been tested down to about -20 F. In these conditions if the unit is allowed to suspend it might not wake up until it was warmed up.