Carlson Surveyor2

User Manual

Carlson®

Since 1983

Juniper Systems® is a registered trademark of Juniper Systems, Inc. Allegro Field PC™ and JSNav™ are recognized trademarks of Juniper Systems, Inc.

ActiveSync, Excel, Hotmail, Internet Explorer, Microsoft, MSN, Outlook, PowerPoint, Visual Studio, Windows, Windows Media, Windows Mobile, Windows Mobile Device Center, Windows Vista, Windows Embedded Handheld, and the Windows logo are trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries.

The *Bluetooth*® word mark is owned by the Bluetooth SIG, Inc. and any use of such marks by Juniper Systems, Inc. is under license.

Adobe® Acrobat® and Adobe® Reader® are registered trademarks of Adobe Systems Incorporated in the United States and/or other countries.

Google Earth™ mapping service is a trademark of Google, Inc.

The names of other companies and products mentioned herein may be the trademarks of their respective owners.

▲**WARNING!** This symbol indicates that failure to follow directions could result in serious injury.

CAUTION: This symbol indicates that failure to follow directions could result in damage to equipment or loss of information.

Part Number 24533-00
Carlson Software
102 W Second Street
Maysville, KY
www.carlsonsw.com

CONTENTS

1

Getting Started

GETTING STARTED

The Carlson Surveyor2 Rugged Handheld™ data collector features Bluetooth, Wi-Fi and an alphanumeric keyboard. Standard accessories include a lithium-ion battery pack, AC wall charger, USB micro client sync cable, hand strap, capacitive stylus with tether and tripod hook. A camera, GPS/GNSS, and cellular data modem are options.

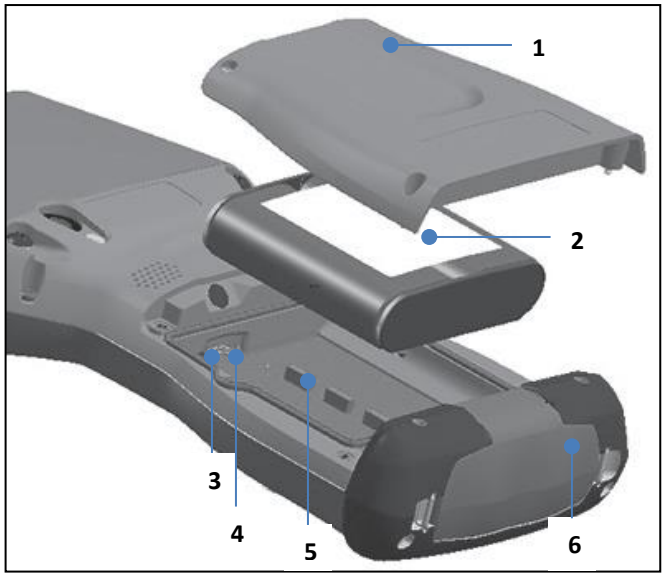
THE ANATOMY OF THE SURVEYOR2

FRONT AND BACK FEATURES

1 Bumper, Top
2 Touchscreen
3 LED Indicators
4 Numeric Keyboard
5 Qwerty Keyboard
6 Microphone
7 Power Key

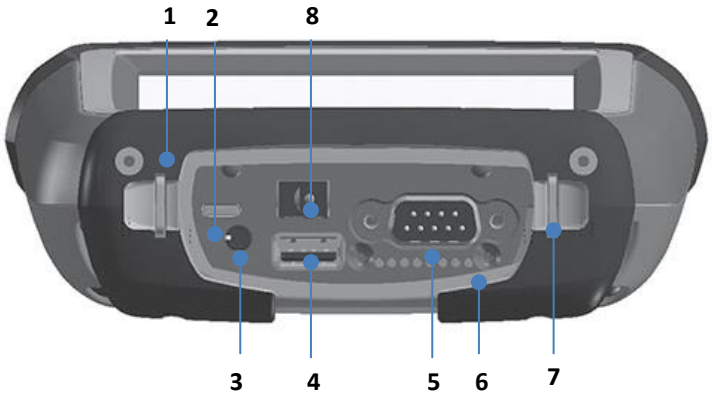
8 Stylus Attachment Point
9 Expansion Door
10 Camera Lens (Geo Models)
11 Camera Flash/Flashlight (Geo Models)
12 Speaker
13 Battery Door Screw (1 of 4)
14 Handstrap Attachment (1 of 2)
15 Tripod Hook

BATTERY COMPARTMENT AND CARD SLOTS



1. Battery Door, Screws
2. Battery Pack
3. Mini SIM Card Slot
4. Micro SD/SDHC Card Slot
5. Battery Compartment
6. Connector Protector

CONNECTOR MODULE



1. Connector Module
2. USB Client, Micro
3. Microphone/Speaker Jack
4. USB Host, Full Size
5. 9-pin Serial Port
6. Docking Pin Contacts
7. Hand strap Attachment Point
8. 12-24V DC Jack

PERFORM INITIAL TASKS

When you receive your Surveyor2, perform the tasks outlined in this section before first use.

REVIEW DOCUMENTATION

The owner's manual, quick start guide and Microsoft® License Agreement are available in multiple languages. Other documents like release notes are available in English. These documents are located on our website at: www.carlsonsw.com View, download, and print documents as desired. (Adobe Reader must be installed on your computer. It is available from Adobe's website at: www.adobe.com)

APPLY A SCREEN PROTECTOR (OPTIONAL)

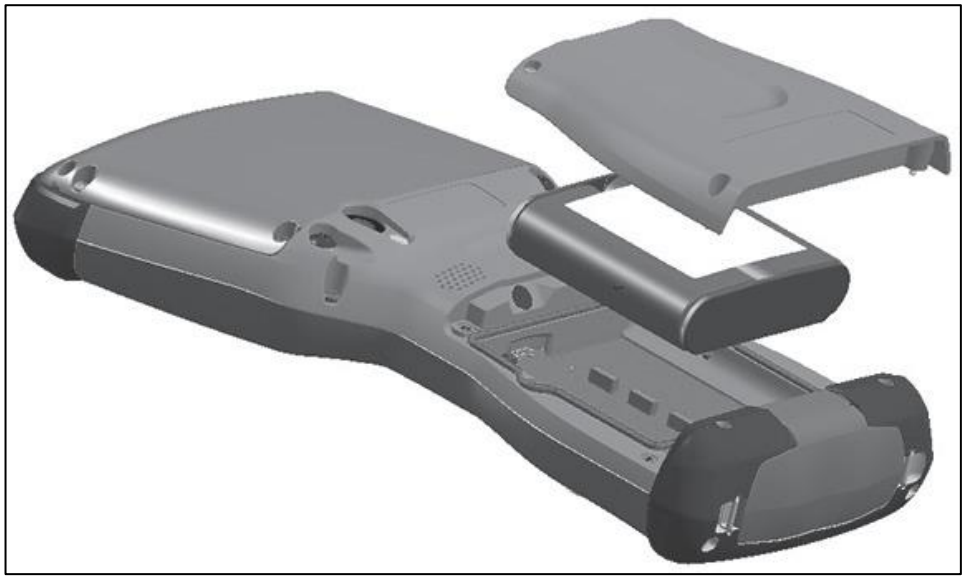
The touchscreen is extremely scratch resistant, so a screen protector is not included with the Surveyor2. If you decide to apply one, refer to the installation instructions included with the screen protector for specific details.

INSTALL THE BATTERY PACK, SD CARD, AND MINI SIM CARD

The Surveyor2 uses a rechargeable Li-Ion battery pack. Install and charge the battery pack as follows:

1. The battery compartment is accessed from the back of the handheld. Loosen the 4 captive screws holding the battery compartment door in place using a #1 Phillips screwdriver. Remove the door.

CAUTION: The Surveyor2 is not sealed against water and dust when the battery door is not installed.



2. If you are using a micro SD card for additional memory or a SIM card with the 3G Data Modem (optional only included on the Cell models of the Surveyor2), you can install them

now before you install the battery pack or at another time. See more details about these cards in Chapter 2, Hardware Components, Micro SD Cards and Chapter 8, 3G Data Modem, Install the Mini SIM Card.

3. Place the Li-Ion battery pack in the compartment. Make sure the + and - symbols on the battery pack label align with the symbols inside the compartment.

n

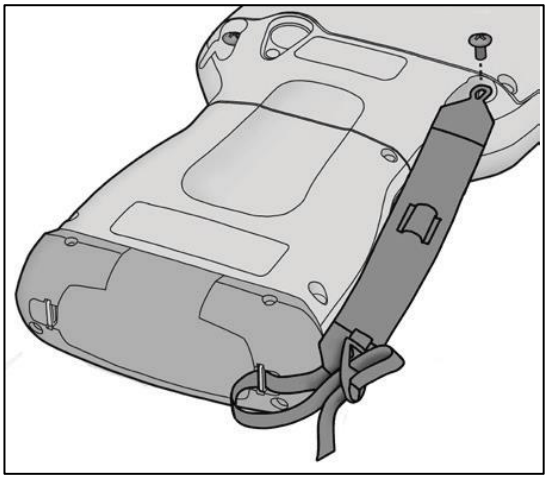
4. Replace the door and tighten the screws.
5. Plug the AC wall power charger that came with the Surveyor2 into a wall socket. Plug the other end into the DC power jack on the Surveyor2. The red LED on the keyboard blinks when the battery pack is charging.

ATTACH THE HAND STRAP AND STYLUS TETHER

A hand strap, capacitive stylus and tether are included with the handheld.

Note: A stylus is not required to use the touchscreen. The optimal way to make selections is by finger touch.

If the hand strap was not attached at the factory or you want to move it to the other side, follow the diagram below to attach it to the right or left side of the handheld:



One end of the stylus tether is attached to the stylus. To attach the tether to the handheld, follow these steps:

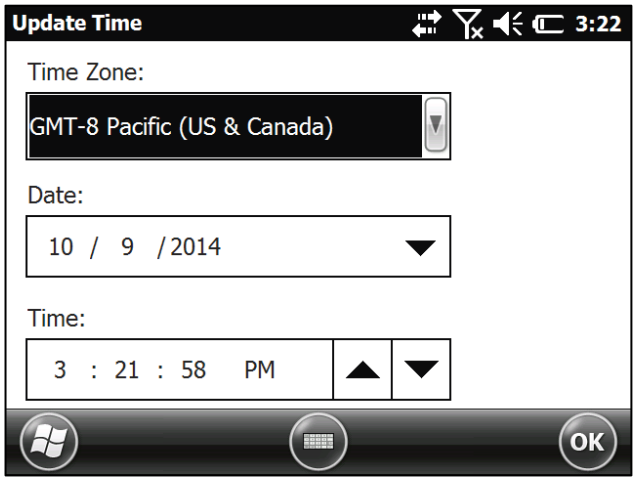
1. Push the free tether loop through one of the tether attachment points on the back of the handheld towards the top.

   Insert the stylus with the attached tether through this loop and tighten the loop.

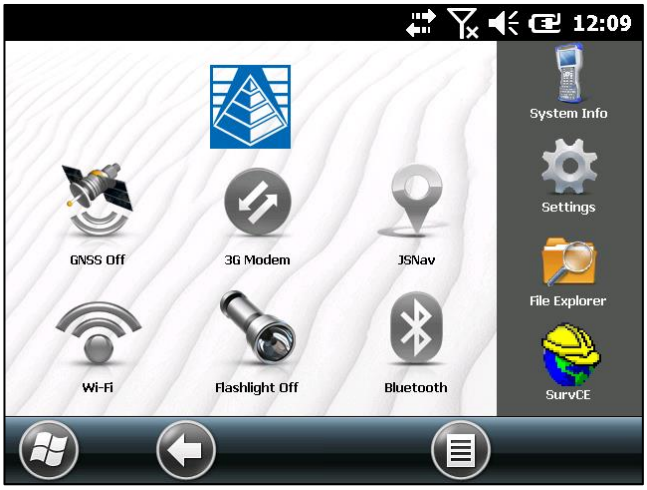
2. Place the stylus into the holder on the hand strap.

PERFORM SET UP

1. Press the power key ⏻. The handheld powers on and begins the startup process. A splash screen is shown that includes a progress indicator at the bottom.
2. A Microsoft® Windows Embedded Handheld screen is shown.
3. The Update Time screen appears. Adjust the time zone, date and time if necessary and tap OK.



4. You might be asked to restart the handheld to complete installation.
5. The Home screen appears (the layout varies by model).



6. Press the power key ⏻ to suspend the handheld. Charge the battery pack at room temperature (68° F or 20° C) for 4 to 5 hours. While the battery pack is charging, the red LED blinks. When it is fully charged, the red LED is solid.

INSTALL THE OPERATING SYSTEM IN OTHER LANGUAGES

The operating system is provided in English by default. It is also available in other languages. You can download the operating system in one of these languages from our website. Go to www.carlsonsw.com/support . Full installation instructions are also available here.

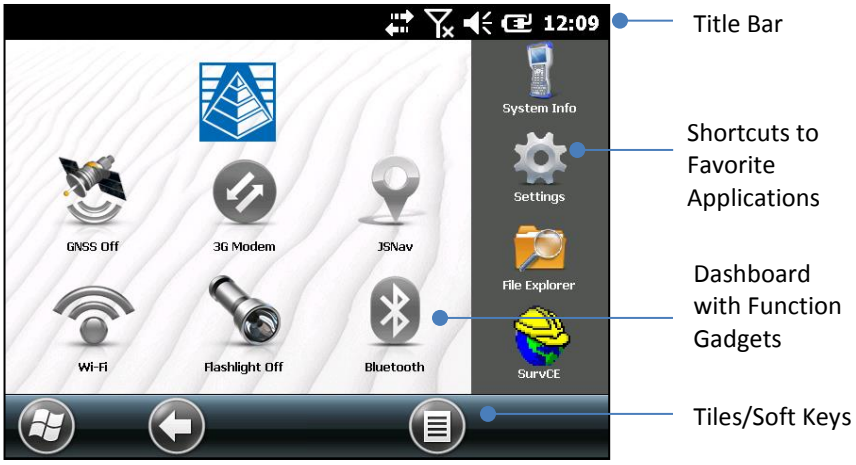
HOME SCREEN AND WINDOWS START MENU

You need to be familiar with two screens as you read this manual and use the Surveyor2: the Home screen and Windows Start menu.

Note: The control CTRL *then home* ⌂ *key sequence toggles back and forth between the Home screen and Windows Start menu. The home key* ⌂ *takes you to the Home screen. The Windows soft key* ⊞ *toggles between the Windows Start menu and the last screen shown.*

HOME SCREEN

The Home screen is the main control center for the Surveyor2. The content varies based on which model you have and can be customized.



This screen is automatically shown when the Surveyor2 is turned on. You can get to it from any other screen by pressing and releasing the Home screen key on the keyboard.

WINDOWS START MENU

The Windows Start menu gives you access to all of the applications on the Surveyor2.

You can get to it from any screen by tapping the Windows tile (soft key) on the display or pressing the CTRL + Home keys on the keyboard.

NAVIGATING AROUND YOUR SURVEYOR2

USING GESTURES AND MAKING SELECTIONS

The Windows® Embedded Handheld operating system enhances the ability of the handheld to recognize touch gestures, making it easy to use a finger to navigate. Use of the capacitive stylus is an option. The keyboard keys can also be used.

Navigation options vary depending on the screen you are viewing. Here is a partial list of options:

VERTICAL AND HORIZONTAL MOVEMENT

- Flick up, down or sideways on the touchscreen.
- For more precise positioning, touch, hold, and move the screen up or down.
- Use the scroll bar if it is available.
- Use the navpad to move around on a screen.
- A horizontal scrolling menu is located on control panel screens near the top.

MAKE A SELECTION

USING THE TOUCHSCREEN

- Press or tap the function gadget or application icon you want to select, turn on, activate, or turn off.
- Press and hold a function gadget to bring up a control panel, menu, or list.

USING THE KEYBOARD

Use the up down right and left arrow keys on the navpad to select (highlight) a gadget or icon on the screen. A ring appears around the selection. System Info has been selected below:

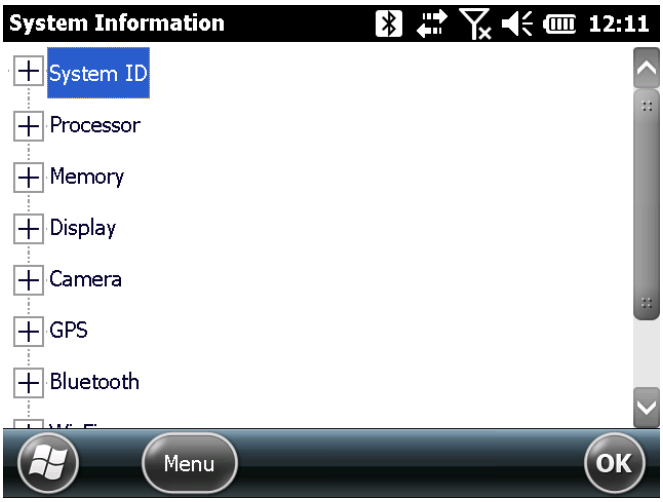
Perform the selected action by pressing the return key ↵ or the center action key ⊕. For dashboard gadgets like Wi-Fi, one press of the return key shows you which icon is selected; a second key press performs the action, and a third key press turns the action off. For application icons on the Start screen or in favorites, continue to use the arrow keys on the navpad and return ↵ or action keys ⊕ until you get to the screen or menu you want.

UPDATES TO THE OPERATING SYSTEM AND DOCUMENTS

Updates to the operating system and technical documents are located on our website at www.carlsonsw.com/support . Compare part numbers to see if you have the most recent version of the Owner's Manual and Quick Start Guide.

VIEW SYSTEM INFORMATION FOR YOUR SURVEYOR2

To view your operating system version number, press the System Info icon on the Home screen or go to Start > Settings > System > System Information. Expand System ID. Compare version numbers here and on our website to see if your OS is current. Full installation instructions to update the operating systems are also available at this website location.



2

Hardware Components

HARDWARE COMPONENTS

This chapter discusses the Surveyor2 Rugged Handheld hardware features and usage.

KEYBOARD FEATURES

The Surveyor2 has a numeric keyboard, function keys, and a QWERTY keyboard. The keys are sealed and have backlight illumination. Some keys and LEDs are programmable.

Key	Press and Release	Shift + KeyPress	CTRL + KeyPress	Blue + KeyPress
Helmet	Run SurvCE (may be programmable key)			
Soft Function	user programmable key			
Esc	Escape			Task Manager
Left Tab 	Left Tab		Keyboard brightness down	
Right Tab 	Right Tab		Keyboard brightness up	
Up Arrow 	Move up cursor			Turn backlight up
Left Arrow 	Move Left Cursor			Turn volume down
Right Arrow 	Move Right Cursor			Turn volume up
Down Arrow 	Move Down Cursor			Turn backlight down
Pyramid	OK (Action)			

Back Space 	Backspace (delete left of cursor)			Toggle Touchscreen (enable or disable)
Enter 	Enter (return)			
7	7	&		&
8	8	*		*
9	9	(		(
4	4	$		$
5	5	%		%
6	6	^		^
1	1	!		!
2	2	@		@
3	3	#		#
Alt	Alt Command (Sticky on 2nd press)			
- (minus)	_ (underscore)			
0	0	)		

. (period)	.			
	Blue Command (sticky on 2nd press)			
Q	q	Q		!
W	w	W	Wi-Fi Control Panel	@
E	e	E		#
R	r	R	Screen Grab	$
T	t	T	Task Manager	%
Y	y	Y		^
U	u	U		&
I	i	I		*
O	o	O		(
P	p	P	Power Control Panel	)

A	a	A	Record Audio Notes	~
S	s	S	Sensors Control Panel	|
D	d	D		\
F	f	F	Flashlight Toggle	{
G	g	G	GNSS Control Panel	}
H	h	H		<
	*Home screen*			*Start screen*
	*Shift command* • Shift, one key press • CAPS Lock, two key presses • Release CAPS Lock, three key presses			
Space	*Space*			
	*Control command (sticky on second press)*			
	*Power* *Suspend or resume, one key press* *Open Power Menu, press and hold*			

CTRL POWER SHORTCUT KEYS

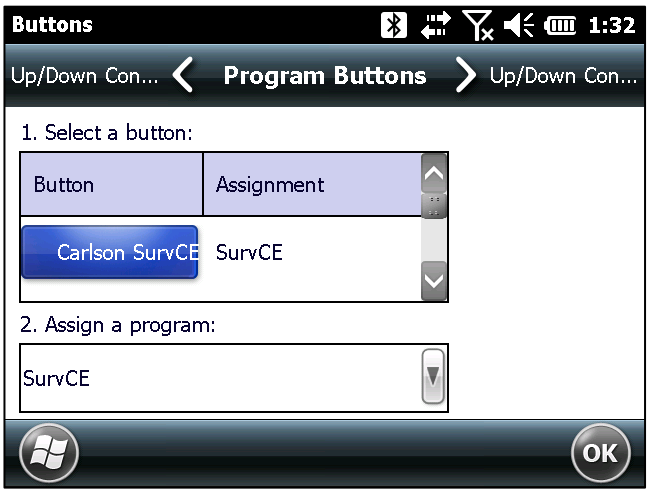
As mentioned in the keyboard table above, the Surveyor2 has the following Power Shortcut Keys:

CTRL + Keypress	Description
A	Record Audio Note
B	Bluetooth Control Panel
C	Camera
F	Toggle Flashlight
G	Internal GNSS Control Panel
L	Toggle Display & Keyboard Backlights On/OFF
P	Power Control Panel
R	Screen Grab – store image of current screen in My Pictures folder
S	Sensors Control Panel
T	Task Manager
W	WiFi Control Panel

PROGRAMMABLE KEYS

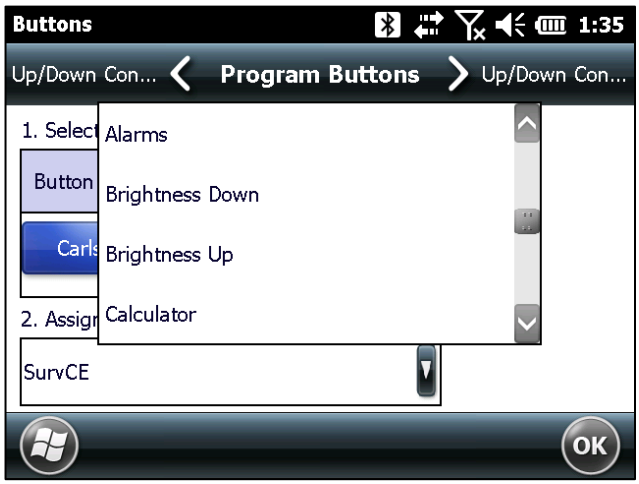
The helmet, right soft-key, and home keys can be set up programmatically. The helmet key is assigned by default to load SurvCE. These keys can also be selected to launch applications or functions from the Buttons menu as follows:

1. To bring up the Program Buttons menu, select the Settings icon on the Home screen, and then Personal > Buttons. Or, go to the Start screen by selecting the Windows soft key or pressing the CTRL+ home keys, then selecting Settings > Personal > Buttons. Under 1. Select a button, a list of the available programmable keys and their current assignments is shown.



2. Select the key you want to reassign.

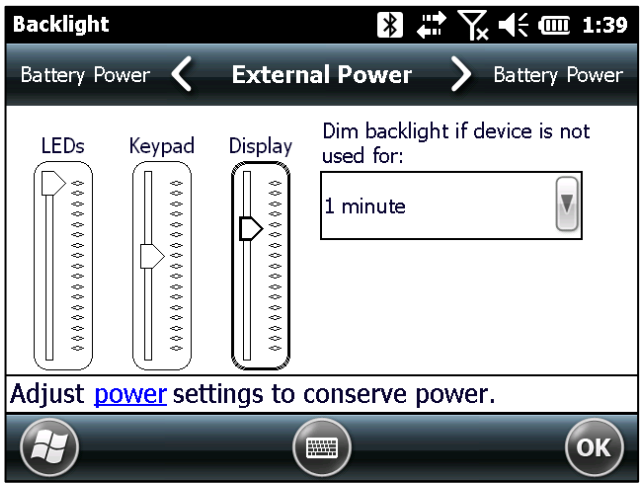
3. At the bottom of the screen under 2. Assign a program; select the down arrow key to display a list of programs and functions. Select the item you want to reassign to the selected key.



KEYBOARD BACKLIGHT

Make keyboard brightness adjustments by pressing the blue + forward tab or back tab keys to increase or decrease the keyboard brightness. You can also use the Backlight control panel located at Start > Settings > System > Backlight. Select the External Power screen or Battery Power screen from the horizontal menu near the top of the screen.

Move the Keyboard slider up to brighten the backlight or down to dim it. Dimming the keyboard backlight saves battery power when the Surveyor2 is in use.



Note: The keyboard backlight turns off when the display backlight dims or the Surveyor2 is suspended.

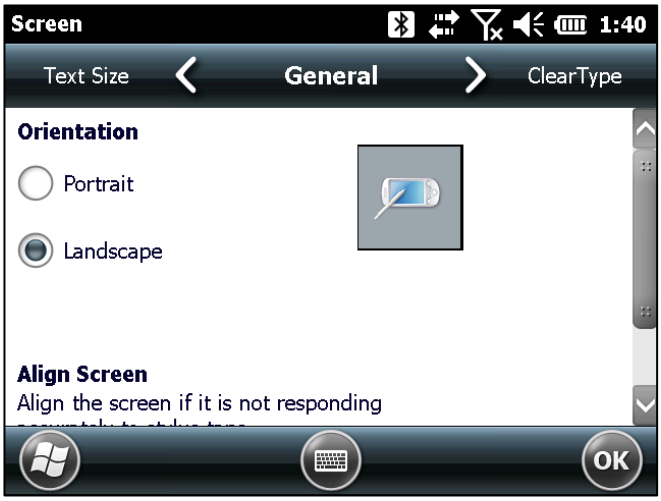
DISPLAY AND TOUCHSCREEN

The Surveyor2 has a bright color display and capacitive touchscreen with a diagonal viewing area of 4.2 inches (107 mm). It is easy to view outdoors and is sealed against water and dust. The Windows® Embedded Handheld operating system enhances the ability of the Surveyor2 to recognize touch gestures, making it easy to use a finger to make selections and navigate. You can also use a capacitive stylus.

DISPLAY AND TOUCHSCREEN SETTINGS

TYPE AND ORIENTATION

To adjust the display settings, including the text size and orientation, go to the Screen control panel by pressing Start > Settings> System > Screen.



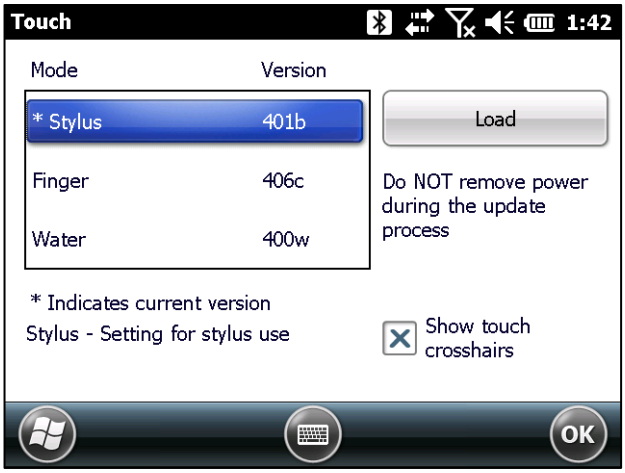
The screen is designed to be used in landscape orientation.

Note: Capacitive touchscreens do not need to be aligned.

TOUCHSCREEN MODES

The touchscreen is optimally designed for finger use. The default touchscreen mode can be adjusted to best match your application and environment, especially if you are using a capacitive stylus.

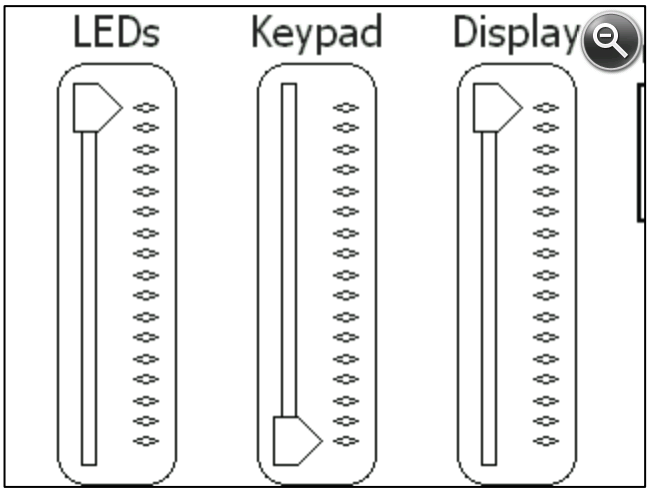
To adjust the touchscreen profile, go to the Touch control panel by pressing Start > Settings > System > Touch. Modes for finger, stylus or water use are shown.



Select the preferred mode, and tap Load. Do not interrupt the loading process. You can try different modes to see which one works best for you. The Stylus mode typically works best with a capacitive stylus, the Finger mode typically works best with a finger and the Water mode typically works best when using the Surveyor2 in the rainy or misty conditions when moisture will be present on the screen.

ZOOMING IN ON THE DISPLAY

Zooming in on the display increases the view by 50 percent and makes selecting content much easier.



Zoom options:

- Hold-to-Zoom - The Hold-To-Zoom feature allows a quick method to zoom into a small feature on the screen.

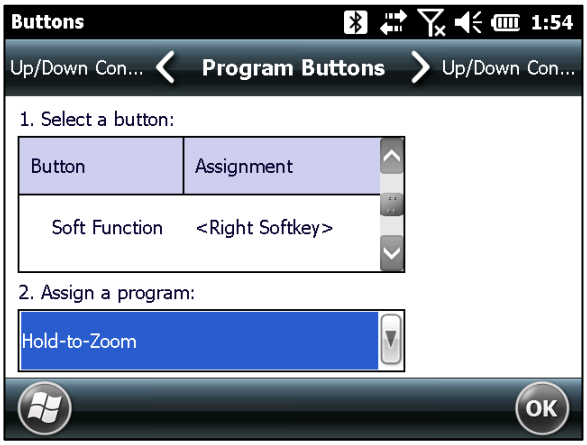
Note: A key is not set to launch this feature by default. To use this feature, go to the Buttons control panel, Program Buttons screen to assign a key to launch the function. Select the Windows soft key or press the CTRL+ home keys, then Settings > Personal > Buttons.

Press and hold the assigned key and tap on the screen in the area on which you want to zoom. The screen focuses on that location. Make selections as desired. Release the key to return to the regular screen size.

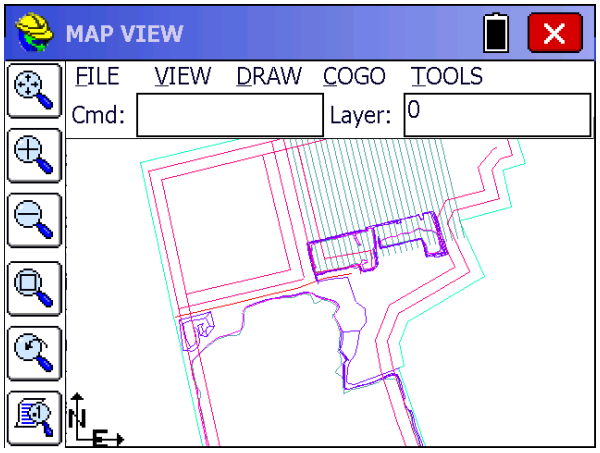
- Magnifying glass - Tap on the title bar at the top of the screen to display the pop-up icons. Select the magnifying glass on the left.

This zooms in on the content. Move the screen around with your finger until you find the information you want. Select the magnifying glass symbol in the upper right corner of the screen to return the view to the regular size.

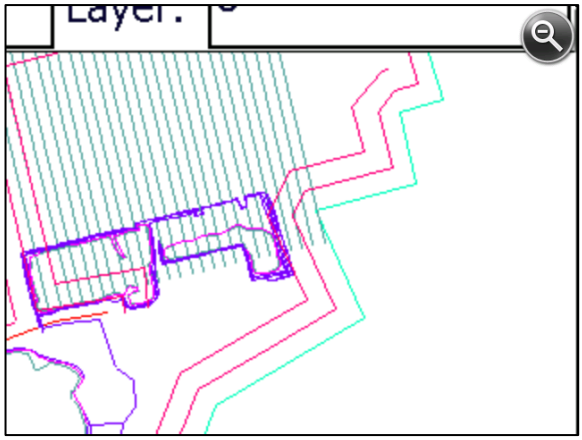
To use Display Zoom effectively in SurvCE, it is recommended that you assign the Hold-to-Zoom function to the Right Soft-key as shown below:



If the Map screen in SurvCE was displayed as shown:



Then holding the right soft key and tapping the display, would zoom the display by a factor of 2 as shown:



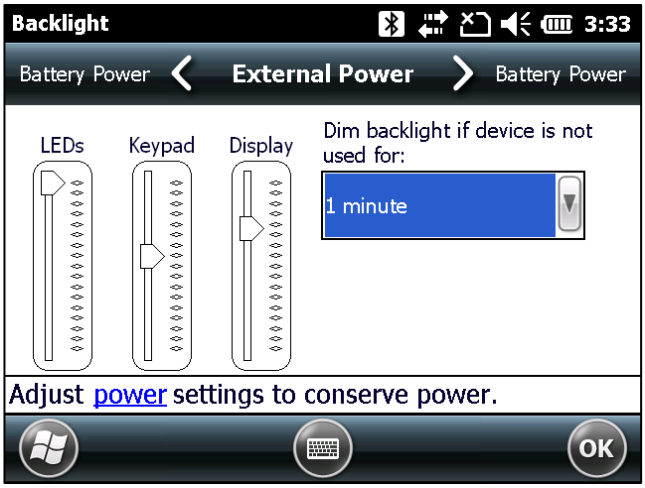
This makes it easier to select points on the touchscreen with the stylus or your finger. When you are finished releasing the right soft key returns the display to no zoom or the standard size.

DISPLAY BACKLIGHT SETTINGS

The display backlight can be toggled off and on by pressing the CTRL + L keys.

The default setting for the brightness of the display backlight is 80%. Adjust the display brightness by pressing a brightness down key sequence: Blue Key + Down Arrow or a brightness up key sequence: Blue Key + Up Arrow. You can also make brightness adjustments through the Backlight control panel by pressing Start > Settings > System > Backlight. External Power and Battery Power are adjusted on different screens. Select these screens from the horizontal scrolling menu near the top of the screen.

Move the Display slider up to brighten the backlight or down to dim it.



DIMMING THE DISPLAY AUTOMATICALLY

The display has a minimum brightness setting that it dims to when the Surveyor2 is idle for the time interval indicated. The display backlight dims by 50% or more, so the display is still partially visible. You can adjust the dim time interval (see the above screen image) for battery and/or external power by selecting Battery Power or External Power on the top menu bar. Dimming the display backlight saves battery power.

To bring the backlight back up to the full brightness setting, tap on the dimmed display.

Note: The Surveyor2 can be set up in subdued lighting (tactical) mode. Refer to Chapter 3 for instructions.

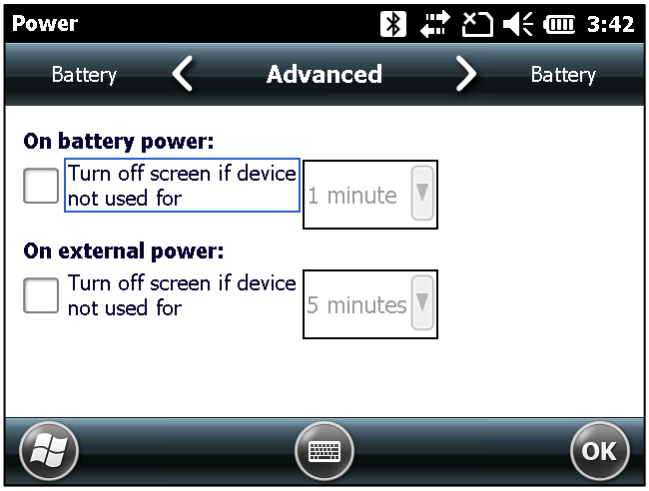
TURNING THE SCREEN OFF AUTOMATICALLY

You can set up the display backlight to turn off after set intervals. Tap on the top title bar from any screen, and select the battery icon from the list of applications that appears.

Alternately, type CTRL + P on the keyboard or go to the Power control panel by pressing Start > Settings > System > Power. The Power Control panel can also be accessed from the Battery Control panel by selecting the hyperlink **power** (see the previous Battery Power screen) near the bottom of the screen where it says “Adjust Power Settings to conserve power.”

When using any of these methods, the Power control panel appears. Select Advanced from the horizontal scrolling menu near the top of the screen. To enable this functionality, check the box

and then for battery and/or external power select how long the screen stays on when it is not in use. Shorter times save battery power.



When the "On battery power" or "On external power" boxes are checked and the Surveyor2 times out, not only is the display turned off, but the Surveyor goes into a suspend state. In the suspend state, SurvCE is no longer running. If you are using SurvCE, it is strongly recommended that you do not check the "On battery power" box.

DISABLING AND ENABLING THE TOUCHSCREEN

You can disable the touchscreen. This is useful when you are running an application and you want to see the screen while avoiding accidental touchscreen activation. You can move around and make selections using the keyboard. The touchscreen can also be disabled for cleaning purposes.

When the touchscreen is disabled, this icon is shown in the title bar until the touchscreen is enabled again. (Note: the title bar is not visible when SurvCE is running. If the Surveyor2 is not responding to screen touches, try toggling the touchscreen to see if that resolves the problem.)

- Press the + backspace keys to toggle the touchscreen on and off.
- Press and hold the power key to display the Power Key menu. Select Disable TS. To enable the touchscreen using this menu, use the down arrow key to highlight Enable TS, and press the enter key.

POWER MANAGEMENT

The Surveyor2 uses a Li-Ion rechargeable battery pack.

CAUTION: Only use batteries designed for the Surveyor2 from an approved vendor. Use of non-

approved batteries may void your product warranty.

CHARGING THE BATTERY PACK

To charge the battery pack, suspend the handheld, and then refer to the instructions in Chapter 1, Getting Started. It typically takes 4 to 5 hours to fully charge a battery pack.

We recommend that you keep the handheld battery pack charging when it is not in use for up to two weeks. When you plug the handheld into the wall charger that comes with it, the batteries are prevented from being overcharged.

The Li-Ion battery pack is charged most efficiently at room temperature (68°F or 20°C). The battery pack will not charge if it is too hot or too cold.

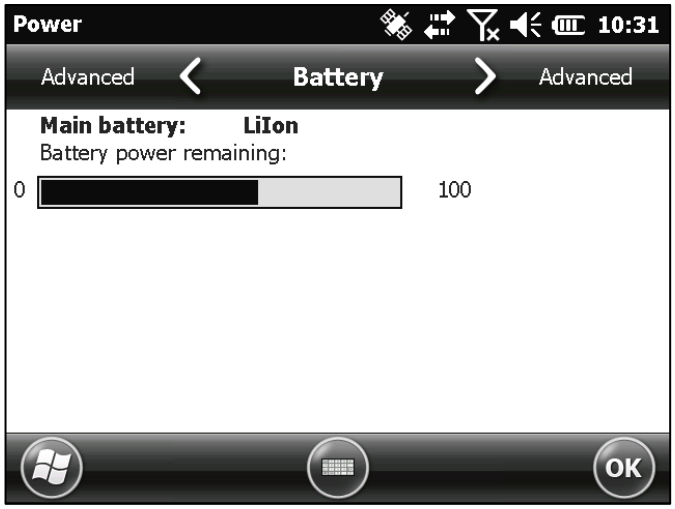
CAUTION: The Surveyor2 is not sealed against water and dust when the battery door is not installed properly.

BATTERY LIFE

Battery life on a full charge can be 20 hours or more. This varies depending on the applications used, backlight usage, and radio usage.

To see the remaining battery power, tap on the top title bar from any screen and select the battery icon from the list of applications that drops down.

The Power control panel appears, displaying the remaining battery power.

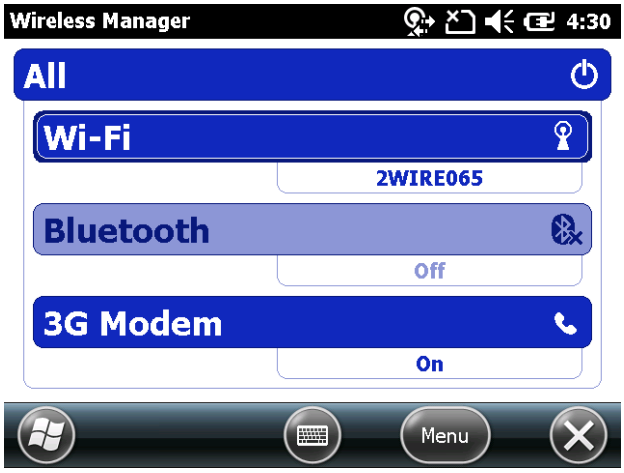


Battery packs last approximately 1,000 to 3,000 charging cycles before they need to be replaced. This is impacted by applications and environmental factors.

SUMMARY OF OPTIONS TO REDUCE POWER USAGE

You can adjust some settings to preserve power:

- Turn off the display (suspend) after a set interval. See **Display Backlight Suspend Interval** earlier in this chapter. Do not use this method if you are using SurvCE.
- Dim the backlight after a set interval. See **Adjusting the Keyboard Backlight** and **Adjusting the Display Backlight** earlier in this chapter.
- Disable radios when not in use. Turn radios off from the Home screen or press Start > Settings > Connections > Wireless Manager.



LED ACTIVITY INDICATORS

LED activity indicators are located on the top of the keyboard above the navigation wheel and between the helmet and right soft-key.

- Red LED on the left (associated with power adapter):

  Blinking - AC adapter is plugged in, and the battery is charging
  Solid - AC adapter is plugged in, and the battery is full (not charging)

- Green LED on the right (associated with notifications): When the operating system has something to notify you of, this LED behaves accordingly. For example, if you turn on the internal GPS/GNSS the green LED blinks periodically. You can set up some notification features. Go to Start > Settings > Sounds & Notifications > Notifications tab. Under Event: select Reminders. Scroll down to set up other notification features as desired, including Play sound (plus repeat and choice of sound), Display message on screen, and Flash light for (plus the desired minutes).
- Blue LED in the same location as the green LED (the blue and green LEDs cannot be shown simultaneously): The Blue LED is not tied to a key or a notification by default.

The green and blue LEDs can be programmed through the JS Application Programming Interface (JSAP). Please contact Carlson Software technical support for more information.

FLASHLIGHT

Surveyor2 Geo models (Geo and Geo Cell units) have a flash LED located underneath the camera window on the back of the Surveyor2. It can be used as a flashlight, although its primary purpose is as a flash for the camera.

To use the flashlight you can tap the flashlight gadget  if it is on the Home screen or press the CTRL+ **F** keys. Tap on the icon or press the keys once to turn on the brightest illumination, again for medium brightness, and a third time to turn it off.

SD CARDS

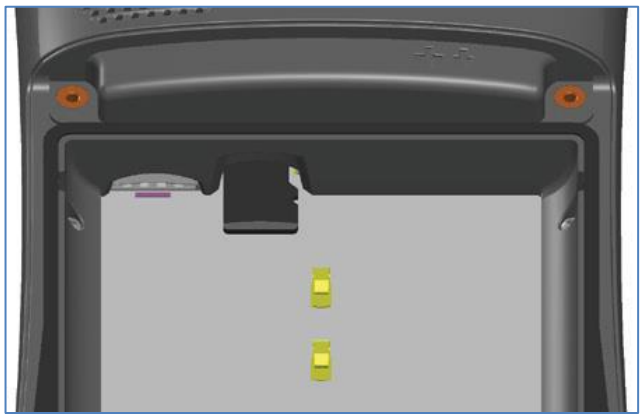
The Surveyor2 has a slot for a micro SD card located in the battery compartment. To insert or remove a SD card follow these steps:

1. Power off the handheld.

2. Loosen the screws to the battery compartment, and remove the door. The hand strap remains attached.

CAUTION: The Surveyor2 is not sealed against water and dust when the battery door is not installed properly.

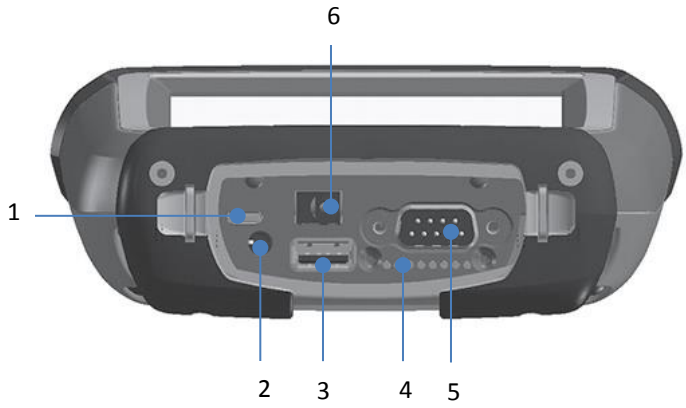
3. Remove the battery pack.
4. An image on the battery compartment label shows the correct location and orientation for the SD card (slot on the right). Push the card into the slot to insert it. To remove the SD card, pull it out.



5. Replace the battery pack, and attach the battery door.
6. Power up the handheld.

CONNECTOR I/O MODULE

The Surveyor2 connector I/O module has the following jacks and connectors:



1. USB client, micro B
2. Audio jack: 3.5mm; supports speaker, microphone or stereo output (pin detect)_
3. USB host, full size A
4. Docking pin contacts

5. COM1: RS-232C 9-pin D-sub connector, 5 V @500 mA available on pin 9 (ring in) under program control
6. Power input jack: 12 to 24 VDC for power input and battery charging

The connector I/O module is user-replaceable. Contact our sales department or your supplier for details.

Note: The connectors are sealed and do not require a connector protector to prevent water ingress.

AUDIO FEATURES

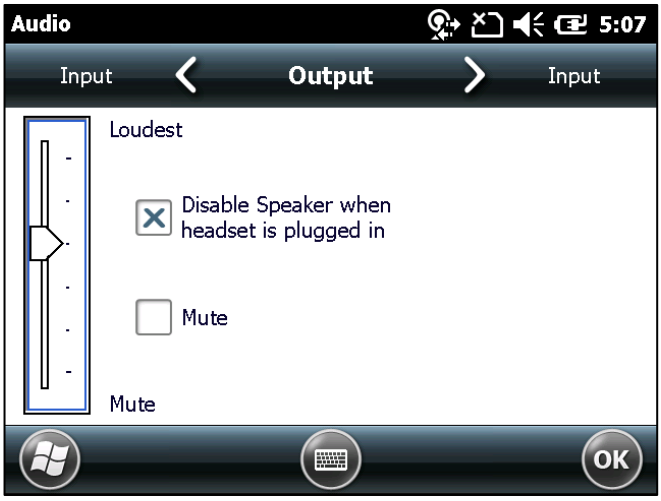
The Surveyor2 has the following audio features:

- Speaker - The speaker sound is loud and clear. Listen to audio notes, video sound, and music files.
- Microphone - Use the microphone to record audio notes or add sound to a video when using the camera (option).
- Audio Jack - The audio jack supports a stereo headset or headset/microphone combination with 3.5mm connections.

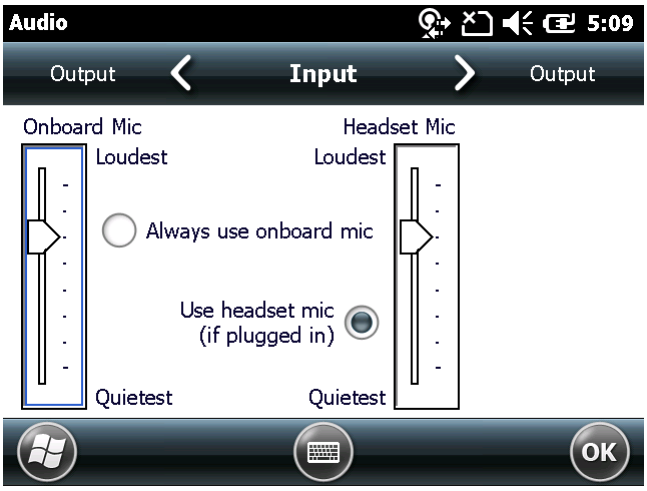
ADJUSTING AUDIO SETTINGS

To set audio options, tap on the top title bar and select the audio icon from the list of applications that drops down. Or, press Start > Settings > System > Audio.

The Audio control panel, Output screen, is shown:



From the Output screen you can adjust the speaker options. Select the Input screen from the horizontal menu near the top of the screen. You can adjust the onboard and headset microphones as desired.



3

Programs and Settings

PROGRAMS AND SETTINGS

This chapter discusses the Surveyor2 Rugged Handheld built-in programs and settings.

HOME SCREEN

The Home screen is your main control center for the Surveyor2. View vital system information and quickly access functions and applications that are frequently used. The default home screen for a basic unit is shown below. Different functions are shown depending on which model you have. You can customize the Home screen.

You can get to the Home screen from any screen by pressing the Home key on the keyboard. Tap on a gadget or icon to turn a function or application on or off. Tap and hold a gadget to go to the gadget control panel. From the keyboard you can use the up, down, right, and left arrow keys to select (highlight) a gadget or an icon on the screen. Perform the selected action by pressing the return key.

TITLE BAR AND POP-UP ICONS

The title bar is at the top of every screen. It identifies the page and shows status icons indicating functions like connectivity status, audio, power, and time. Tap the title bar to bring up larger, touchable icons in a horizontal-scrolling bar. Select an icon to use or to view the settings and adjust them as desired.

DASHBOARD

The dashboard consists of a background image and up to six dashboard gadgets that serve as functional indicators and control keys.

You can switch between two color schemes and select which gadgets are shown. Tap on the menu soft key and select Switch Color Scheme to change color schemes or Configure to select gadgets. The current gadgets are covered with a blue symbol as shown below.

Tap on the gadget you want to replace. A list of available dashboard gadgets is shown. Tap on your new selection. The dashboard icon changes when you make a selection. If “None” is selected, the space becomes blank.

DASHBOARD GADGET FUNCTIONS

	Wi-Fi: Shows the state of the Wi-Fi radio and provides the name of the wireless network to which it is attached.
	Bluetooth® wireless technology: Shows the state of the Bluetooth radio.
	Email: Shows the number of unread email messages. If there are multiple email accounts, the total number of unread messages is aggregated from all accounts.
	Calendar: Shows the next appointment.
	Tasks: Shows the current number of tasks.
	GPS/GNSS Status (Geo model): Shows the current state of GPS/GNSS reception and the state of the GPS/GNSS receiver. It also shows the number of satellites in view, the number of satellites used to calculate the fix (SV), the type of fix (2D, 3D, etc.), and the quality of the fix (PDOP).
	JSNav (Geo model): An application that lets you easily collect waypoint or track data and navigate back to any saved waypoint or track.

	3G Data Modem (Geo model with cell modem): Shows the on/off state of the optional cellular modem.
	Flashlight: Shows the on/dim/off state of flashlight feature (included with camera).

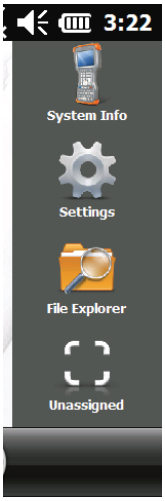
GADGET COLOR INDICATORS

Wi-Fi, Bluetooth, GPS and 3G data modem gadgets indicate status using these colors:

	Gray: Off or inactive
	Yellow: Partial state (getting satellite fix, etc.)
	Green: Active and available
	Blue: Notification state (on or connected)
	Red: Error state, powering up or down, no GPS/GNSS fix, or unavailable (3G data modem is red when power is changing from on/off. Wi-Fi is red when an access point is available but not connected.)

FAVORITES BAR

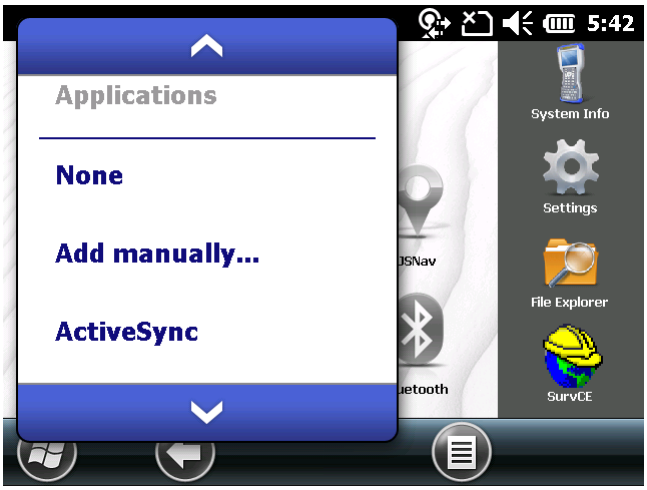
The favorites bar consists of shortcuts to specific applications. It is located below the dashboard when the screen is in portrait mode and to the side of the dashboard when it is in landscape mode. Tap on a shortcut icon to launch an application.



Note: When SurvCE is installed on the Surveyor2, it will automatically be placed in the bottom (landscape mode) shortcut.

You can use it to jump between the applications you use most. While running an application, press the Home key and select a different application from your favorites. To return to the first application, press the home key again, then tap on the first application you were running.

You can customize which application shortcuts are shown. Tap and hold on the shortcut you want to change to bring up a list of available applications.



Tap on your selection. The icon on the home screen changes to the icon associated with the new application.

TILE BAR

Touchable tiles (or soft keys) are shown in the tile bar at the bottom of each screen. Up to five tiles are shown, depending on which screen you are on.

For example, the Home screen tile bar (shown below) consists of: 1) the Microsoft® start tile that takes you to the Start menu, 2) the back tile that takes you to the last application running, and 3) the menu tile that lists options for customizing the dashboard. The third and fifth tile positions are empty.

Tap on a tile to perform the actions associated with it.

Tile examples:

	Start		Lock

	Minimize		Edit
	Navigate back		Delete
	Menu		On-screen keyboard

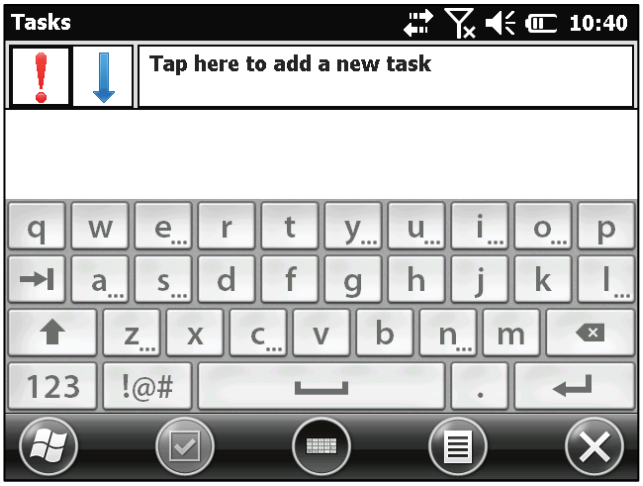
WINDOWS START MENU

The Windows Start menu gives you access to all of the applications on the Surveyor2.

You can get to the Start menu from any screen by tapping the Windows tile (soft key) on the display or pressing the CTRL+ Home keys on the keyboard. On the touchscreen, tap the application icon you want to select. From the keyboard you can use the up down right and left arrow keys to select (highlight) an icon on the screen. (Home is selected on the previous screen.) Perform the selected action by pressing the return key.

ON-SCREEN KEYBOARD

To activate the on-screen keyboard, select the keyboard tile located at the bottom of active applications like Tasks that use keyboard input.



The default keyboard is Mega Keys, featuring large keys and increased functionality.

To view and select other options including Block Recognizer, Letter Recognizer, and Mega Keys Night, press and hold the keyboard tile . To turn the on-screen keyboard off, press the keyboard tile.

MEGA KEYS (AND MEGA KEYS NIGHT) KEYBOARD FEATURES

Pressing on a character with a finger or stylus highlights it. Releasing the key prints the character on the screen.

If you accidentally press the wrong character and have not released the key yet, you can slide to the correct character before releasing the key.

There are four main keyboard screens: lowercase, uppercase, numeric, and symbols. To navigate to different screens, press the modifier keys in the lower left corner of each screen as shown in the following graphic for the lowercase keyboard. Press the up arrow to go to the uppercase keyboard, the number key to go to the numeric keyboard, and the symbol key to go to the symbols keyboard.

Tap on the shift key for a single uppercase letter. Tap on the shift key twice to lock the uppercase key. Tap once more to return to the lowercase keyboard.

To enter a character from another screen (such as a number or symbol), press and hold on the modifier key, slide to the character you want, then release the key. The character is printed, and you are returned to the screen you started from.

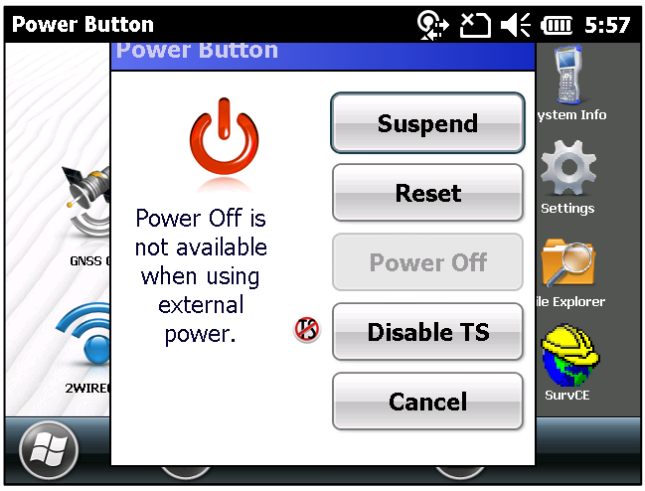
Some keys have an extra character bar that includes items like accented characters or additional symbols. These keys have three dots in the bottom right corner like the z key  . Press and hold the key to bring up the extra bar. Tap the desired item or dismiss the bar by tapping outside of the bar.

A calculator is available from the numeric screen. Press the Calc key to launch the calculator application.

The backspace and the space keys can be repeated by pressing and holding those keys.

Suspend, RESET, Power Off, and Restore Defaults

Use the power key ⏻ to suspend, reset, power off, or restore the Surveyor2 to its factory state. To access the Power Key menu, press and hold the power key.



SUSPENDING AND RESUMING THE SURVEYOR2

We recommend you suspend your handheld when it is not in use for a day or two.

Suspending the handheld is different from powering it off. When the device is suspended it goes into a low power mode. Some battery power is used during suspend.

1. Press and release the power ⏻ key or select the Suspend option on the Power Key menu. The backlight shuts off. It can take several seconds to fully suspend. When the cell modem is on, in can take up to 45 seconds.
2. The green LED turns on during the suspend process and goes off once it is completely suspended to let you know it has finished suspending.
3. To resume the device from suspend mode, press and release the power key again. When it is resumed, the handheld resumes where it was before it was suspended.

RESETTING THE SURVEYOR2

If the Surveyor2 is unresponsive, slow, or programs won't launch, performing a reset might solve the issue. You may be asked to perform a reset when an application is installed.

CAUTION: Be aware that during a reset, applications are closed and unsaved work may be lost.

Follow these steps to reset your Surveyor2:

1. Save open files, and close any running programs.
2. Press and hold the power key ⏻ until the Power Key menu appears.
3. Tap Reset.

You can also reset the handheld by pressing the power key for 10 seconds or until the screen goes dark. After a few seconds, the handheld automatically turns on. This method is useful if your Surveyor2 locks up.

POWERING OFF AND ON THE SURVEYOR2

To preserve battery power, we recommend you power off the Surveyor2 if it will not be used over a long weekend or several days. Remember that when a unit is suspended it is still operating, though at a very low power state, and this consumes battery power.

CAUTION: Be aware that when the Surveyor2 is powered off, it closes all programs and powers down all system components except for the real-time clock. Unlike suspend mode, the device resets when it is powered on again. Any unsaved data is lost.

1. Save open files, and close any running programs.
2. If you are using external power, unplug it.
3. Press and hold the power key ⏻ until the Power Key menu appears.
4. Tap Power Off. A warning dialog appears. Tap OK.

To power on your handheld, press the power key.

Note: If a Surveyor2 is stored for an extended period of time, the battery should be removed.

RESTORING THE SURVEYOR2 TO ITS FACTORY STATE (CLEAN BOOT)

Follow the steps below to restore user storage, settings, and icons on your Surveyor2 to their original factory defaults.

CAUTION: Restoring the Surveyor2 to its original factory state permanently erases data saved on the handheld, any software you installed, and any changes you made to the handheld, including changes to settings. SurvCE will have to be reinstalled after a clean boot.

1. Back up files and programs you want to keep onto another computer.
2. Save open files and close running programs on the handheld. Press and hold the power key ⏻ until the Power Key menu appears. Tap Reset.

3. When the screen turns black, press and hold the power key ⏻ again until the bios screen is shown.
4. Move the top slider on the screen to the right to set or clear factory defaults (this clean boots the handheld).
5. Tap Exit. The boot process continues. The Update Time screen is shown. Update the information as needed and press OK.

SUBDUED LIGHTING (TACTICAL) MODE

In some environments subdued lighting is preferred. The display backlight, LEDs, and keyboard illumination can be subdued during the startup process and normal operation.

SET UP DURING A RESET

1. Save open files and close running programs on the Surveyor2. Press and hold the power key ⏻ until the Power Key menu appears. Tap Reset.
2. When the screen turns black, press and hold the power key ⏻ again. The bios screen is shown.
3. Move the slider on the screen to the right to turn the tactical mode on.
4. Tap Exit. The boot process continues.

To restore the handheld to default lighting, follow the same steps outlined above.

ADJUST BRIGHTNESS USING THE KEYBOARD

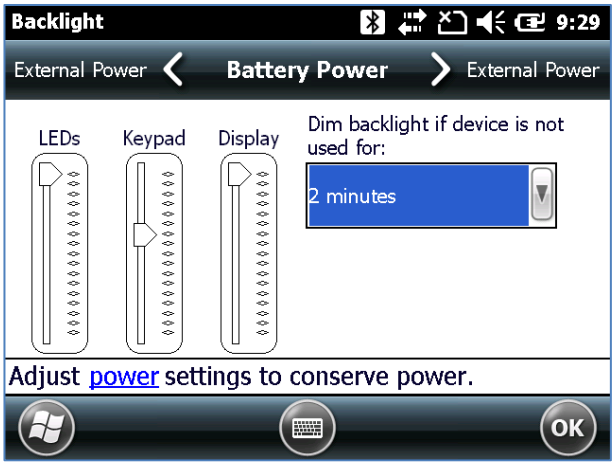
You can adjust the display and keyboard brightness any time from the keyboard.

For the display, brightness up is  +  and brightness down is  +  .

For the keyboard, brightness up is  + forward tab ⇥ and brightness down is  + back tab ⇤ .

ADJUST THE BACKLIGHT CONTROL PANEL

You can also subdue the keyboard and display brightness through the Backlight control panel. Press Start > Settings > System > Backlight and then External Power or Battery Power from the horizontal scrolling menu near the top of the screen. Adjust the sliders as needed for both power sources. Changes affect all operations.



COMPASS AND ACCELEROMETER

The Surveyor2 has a built-in compass and accelerometer. The compass is used for embossing GPS information on pictures taken with the camera, or embedding GPS information into jpg files. The compass is also used by the JSNav program. The accelerometer assists the compass in determining direction, even when the device is not resting flat. (See Chapter 6, GPS/GNSS, JSNav Application and Chapter 7, Camera, Geotagging.)

The compass and accelerometer can also be used by other user applications.

SENSORS CONTROL PANEL

The Sensors control panel lets you see the compass and accelerometer working, set the magnetic declination angle, and calibrate the sensors. Select Start > Settings > System > Sensors.

- The *Magnetic Declination* angle is the difference between True North and magnetic North. Applications that are using True North use this value to adjust the readings from the compass.
- To calibrate the compass, select *Calibrate Compass*. Rotate the handheld around all three axis several times in every orientation possible (for at least 10 seconds). Press Stop when you are done. Calibrating the compass is very important and needs to be done often. Changes in environment, added attachments to the handheld, and mounting options can affect the sensor readings. If you are mounting the handheld to a pole, mount it first and then calibrate the compass.
- When the accelerometer is calibrated, you are telling the handheld that *this is level, remember this*. It is important that the handheld is laying on its back on a level surface. When the handheld is level, select *Calibrate Accelerometer*, and then *Start*. Samples are averaged over the next five seconds and the result is saved. The accelerometer only needs to be calibrated once. (If you restore the handheld to its original factory defaults, you need to calibrate the accelerometer again.)

COMMUNICATING WITH A DESKTOP COMPUTER

The Surveyor2 can connect to a desktop or laptop computer, allowing you to synchronize information and download software and files.

INSTALLING THE SOFTWARE

Install free synchronization software from Microsoft® on your desktop computer.

1. Go to the Microsoft® website on your computer at **http://www.microsoft.com/en-us/download/**.
2. If your computer is running Windows® 2000 or Windows® XP, search for and select ActiveSync® software to download. If it is running Windows Vista™, Windows® 7, or Windows® 8, search for and select Windows Mobile® Device Center software.
3. Follow the download instructions on the website.

ESTABLISHING A PARTNERSHIP

1. Plug the USB Client end (micro B) of the USB communications cable into the Surveyor2.
2. Plug the USB Host end (full size A) of the USB communications cable into your computer.
3. Establish an ActiveSync® or Windows Mobile® Device Center partnership by following the instructions on the computer screen.
4. Once a partnership is established, the synchronization software automatically opens. Follow the steps on the screen.

GETTING STARTED APPLICATION

GETTING STARTED SCREEN

The Getting Started screen provides information on current settings, help for setting up features and applications, and shortcuts to set up screens. To see a list of topics press Start > Getting Started.

INFORMATION FOR SOFTWARE DEVELOPERS

For Surveyor2 SDK information, contact Carlson Software technical support.

4

Bluetooth Wireless Communication

BLUETOOTH® WIRELESS COMMUNICATION

The Surveyor2 has built-in Bluetooth® wireless technology, allowing you to connect it to other wireless devices with Bluetooth technology. Minimum performance between similar objects in an unobstructed environment is approximately 100 feet (30 meters). Line of sight ranges up to 1500 feet (450 meters) are possible when paired with Class I *Bluetooth* devices

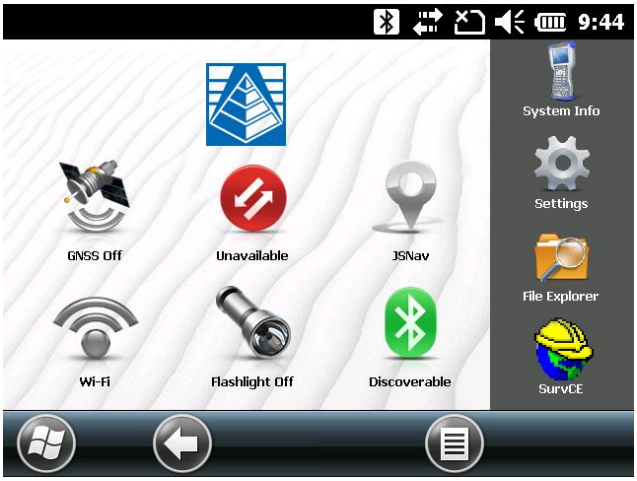
The handheld provides simple configuration options for the following types of Bluetooth devices:

- Devices such as headphones, keyboards, and modems (to connect to the Internet with an external cell phone).
- Serial devices that use a *Bluetooth* COM port, such as GPS receivers, bar code scanners, and other data collection devices.

CREATING A PARTNERSHIP

To create a partnership between the Surveyor2 and another device with Bluetooth technology:

1. Turn both devices on.
2. Place them within at least 100 feet (30 meters) of one another.
3. Make Bluetooth discoverable on both devices. Bluetooth on the Surveyor2 is off by default. To activate it from the Home screen, tap the Bluetooth gadget. It turns green when it is discoverable or blue when it is on.



You should now be connected to the COM device.

If the Bluetooth gadget is not on your Home screen, you can get to the desired control panel by selecting Getting Started and either Set up a Bluetooth device or Set up a Bluetooth COM Port. You can also press Start > Settings > Connections.

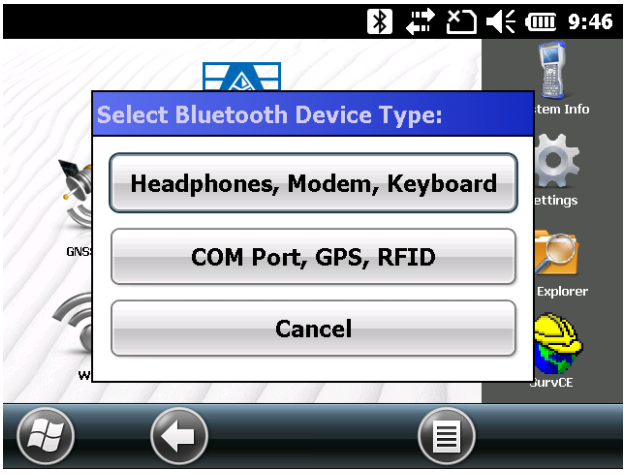
Note: If the Bluetooth radio is turned on and then the handheld is suspended, wireless Bluetooth turns off to save battery power. When the Surveyor2 resumes (turns on), the radio turns on automatically.

BLUETOOTH CONTROL PANEL

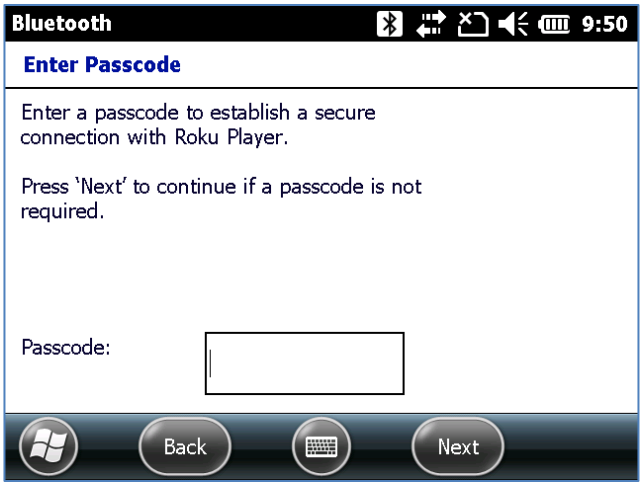
To create a partnership with and connect to other Bluetooth devices, such as headphones, keyboards, and modems, follow these steps:

1. Tap-hold the Bluetooth icon to bring up the dialog box shown below.

2. Select Headphones, Modem, Keyboard. The following Bluetooth control panel, Devices screen is shown:



3. Select Add New Device. The Surveyor2 searches for other devices with wireless Bluetooth technology and displays them in a list. Select the device you want to connect to, and tap Next.
4. A passcode screen is shown.



a) If the device has an assigned passcode, enter the number and press Next.
b) If a passcode is required but has not been assigned, enter an alphanumeric passcode between 1 and 16 characters in length. Press Next.
c) If a passcode is not required, leave the box blank and press Next.

Note: If you are unsure whether or not the device requires a passcode and if one has already been assigned to the device, see the user documentation that came with the device.

5. You can adjust the Bluetooth settings as needed.

SERIAL DEVICE (COM) CONTROL PANEL

To set up a Bluetooth COM port, follow these steps:

1. Select COM Port, GPS, RFID from the Bluetooth dialog box. The following Bluetooth COM configuration screen is shown. Select Discover Devices.

2. After the handheld searches, a list of discovered devices is shown. Select the device you want to connect to from the list and tap Connect. A COM port is automatically assigned for the device. You can change it to another COM port if desired.
3. The Surveyor2 automatically tries to discover the PIN. You might be required to enter a PIN.

You should now be connected to the COM device.

Note: SurvCE Users should use SurvCE to establish Bluetooth connections to devices.

5

Wi-Fi Wireless Networking

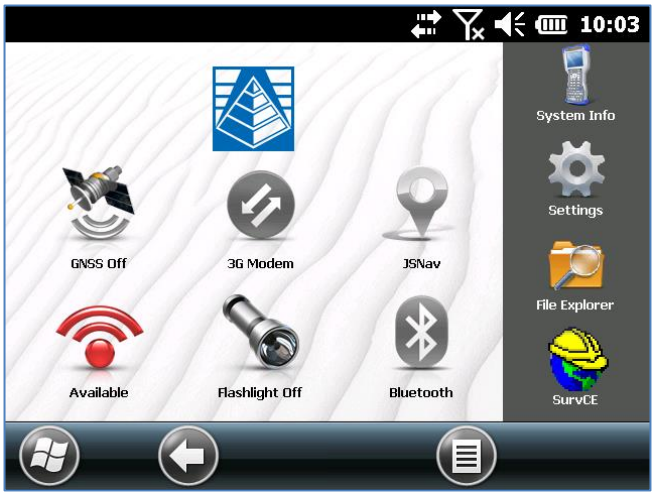
WI-FI WIRELESS NETWORKING

The Surveyor2 has built-in Wi-Fi wireless networking to connect to the Internet or a office network.

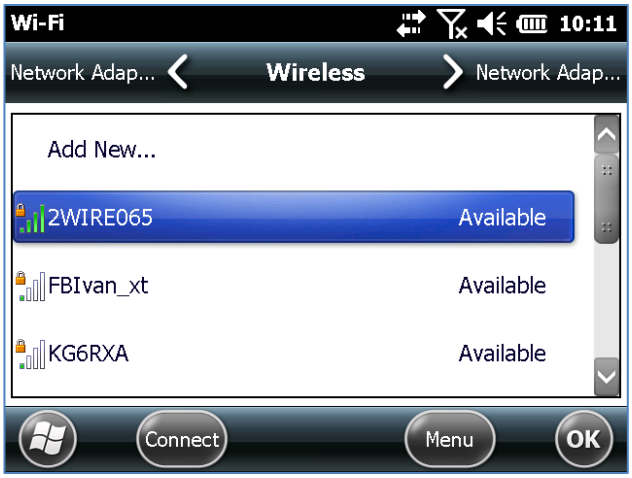
CONNECTING TO A WI-FI NETWORK

To use Wi-Fi, you need to be in range of a Wi-Fi access point to make a connection. To actively look for a network connection, complete the following steps:

1. From the Home screen, turn Wi-Fi on by selecting the Wi-Fi gadget . The Surveyor2 automatically starts scanning the area for available Wi-Fi networks. (If the Wi-Fi gadget is not on the Home screen, open the Start screen, and select Getting Started. Select Set up Wi-Fi or press Start > Settings > Connections > Wireless Manager.)



2. Tap-hold the Wi-Fi icon on the Home screen to go to the Wi-Fi control panel. When the handheld completes the scan, a list of available networks and their strengths appears on the Wi-Fi Wireless screen. Click on the Search for Networks button if none are automatically listed.



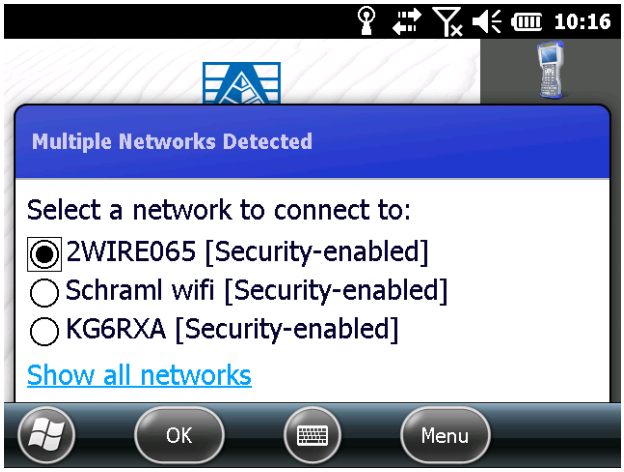
3. Select the network to which you want to connect. If you want to add a new network, select Add New from the top of the list.
4. Configuration and authentication setup screens are shown. Depending on the network you are connecting to, you may need to make some selections from pull down lists and enter information like a passkey. Some information may not be required or will appear automatically. When you are finished with the set up screens, press Finish.
5. Select Network Adapters from the horizontal scrolling menu near the top of the screen. For connection options, select The Internet or Work (for office networks). Other settings can be modified if necessary.
6. If you selected The Internet, you can open Internet Explorer and begin using the Internet.

Once a Wi-Fi network is set up, the icon on the Home Page turns blue and the name of the network is shown.

The Surveyor2 remembers the Wi-Fi network connections created.

WI-FI DIALOG BOX

Whenever Wi-Fi is turned on, a dialog box might appear at the bottom of the screen indicating the Wi-Fi networks the Surveyor2 has located. You can select a new network from this dialog box without opening the Wi-Fi control panel.



Tap on the screen outside of the dialog box to remove it temporarily. You can also disable it to keep it from appearing in the future. When this dialog box is shown, select the Menu soft key and select “Don’t show this message again” from the list.

ADJUSTING WI-FI SETTINGS

To add a new Wi-Fi network or edit settings, open the Wi-Fi control panel, select the Menu soft key and make desired selections from the pull-down list.


Carlson Surveyor2
STORE PTS
Fixed
6/17
10 ft
S
A
O
C
Pt: 2
Desc:
HT:
N:1923347.7951 E:6334416.1250 Z:789.0722
HSDV:0.062 VSDV:0.079 PDOP:2.28
ESC
ALT
DEL
CTRL

6

GPS/GNSS

GPS/GNSS

Surveyor2 Geo models have an internal GPS/GNSS receiver with 2 to 5 meter accuracy.

USING GPS/GNSS

To use the internal GPS/GNSS, tap on the GPS/GNSS status gadget  to turn it on. The GPS/GNSS starts looking for satellites to use for a fix. The green LED on the keyboard blinks periodically, and a satellite icon is placed on the title top bar.

Once enough satellites are found, information similar to the following is shown:

5 SV *The number of satellites used for the current position.*

3Diff *The type of fix you have. Three satellites are required for a 2D fix while four are required for a 3D fix. 3Diff means an SBAS (WAAS/EGNOS/MSAS) signal is being used for the GPS/GNSS solution.*

PDOP *A measure of accuracy. The lower the number, the more accurate the fix is.*

Note: *When you suspend the Surveyor2, the receiver is in a low power mode to retain its almanac. When you resume, it takes a few seconds to get a fix.*

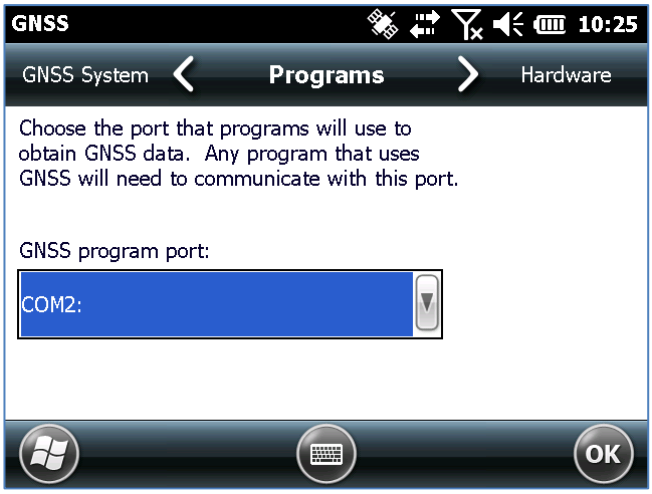
GPS/GNSS ACCURACY

The GPS/GNSS antenna is in the top of the Surveyor2. Do not put your hand or another object over the top bumper or display. This reduces accuracy. The more items between you and the satellites, the lower the accuracy.

Note: SurvCE configures the internal GPS/GNSS receiver when GPS Rover uses Carlson and the Manufacturer and Surveyor2 L1 as the Model. When using SurvCE there is typically no need to configure the GPS/GNSS settings from the control panel.

GPS/GNSS SETTINGS

To view or make changes to the GPS/GNSS settings or set up an external GPS/GNSS receiver, press and hold the GPS/GNSS status gadget on the Home screen to open the GNSS control panel.



Scroll through the menu and set up the desired parameters. Select from pull-down lists and enable or disable checkboxes and circles by selecting or deselecting them.

- Programs: Select the program port (COM2 is the default). Several applications can share the COM port setup as the GPS/GNSS program port using the GPS Intermediate Driver (GPSID). See the section on the GPS Intermediate Driver later in this chapter for details.
- Hardware: Specify the hardware port your GNSS device is connected to (COM8 is the default) and the baud rate (internal GNSS uses 115200 baud)
- Access: Multiple programs can obtain GPS data simultaneously (we recommend that you leave Manage GPS Automatically selected)
- Format: Select the data format you prefer
- NMEA Sentences: See the section on NMEA Sentences later in this chapter for details.
- GNSS System: Select the satellite systems you want to use (GPS, SBAS, GLONASS) and module settings (update rate, baud rate, filter). The GNSS receiver can be set to remain on during suspend. This reduces satellite reacquisition time, but also draws more battery

power when suspended. You might want to restart the GNSS receiver after changing settings.

GPS INTERMEDIATE DRIVER

The GPS Intermediate Driver (GPSID) is used to allow more than one program to use data from the GPS receiver. The GNSS control panel controls how the GPSID is used. The GPSID can output data on another COM port in a way that allows multiple programs to access the same COM port. This is called the GNSS program port and defaults to COM2. This can be set up on the Programs screen of the GNSS control panel.

Internal GPS is on COM8 and communicates at 115200 baud. These settings are found on the Hardware screen of the GPS Settings control panel. If another GPS receiver is to be used, this is where you connect that GPS receiver so that the GPSID can access it.

The camera, GPS function and JSNav application use the GPSID to obtain GPS information. Turning off the GPSID through the GPS hardware port disables these functions.

Note: If an application accesses the GPS module directly on COM8, the GPSID will not have access to the GPS, preventing camera geotagging and GPS from functioning.

Note: SurvCE accesses the GPS/GNSS module directly on the Surveyor2 and provides limited functionality when using the GPS Intermediate Driver.

NMEA SENTENCES

Descriptions of the NMEA Sentences shown on the GNSS control panel menu follow.

- *RMC - Recommended Minimum Specific GNSS Data.* Example of data output: $GPRMC,045824.00,A,4127.31350,N,11202.79015,W,00.03,022.9,160914,,,A*4C. The RMC message contains the time, date, position, course and speed data provided by the GNSS navigation receiver.
- *VTG - Course over Ground & Ground Speed.* The VTG message provides actual course (CoG) and speed (SoG) relative to the ground.
- *GGA – Global Positioning System Fix Data.* The GGA message outputs time, position and fix related data. The fix is based on all available GNSS. This message is similar to the GNS – GNSS Fix Data GNS message.
- *GSA – GNSS DOP and Active Satellites.* The GSA message contains the GNSS receiver's operating mode, satellites used for calculation of the PVT data transmitted by the GGA message and DOP values. The GPS satellites are identified by their PRN, which range from 1 to 32. The WAAS system has numbers 33 to 64 to identify its satellites. The numbers 65 to 95 are used for GLONASS satellites (64 + satellite slot number).
- *GSV – GNSS Satellites In View.* The GSV message identifies the number of satellites (SV) in view, satellites' PRN numbers, elevation, azimuth and SNR value. One GSV message may contain data for one to four satellites. If more than 4 satellites are in view then additional

GSV messages will be generated. Total number of messages being transmitted and the number of the current message are indicated in the first two fields of the message. If multiple GPS, GLONASS, etc. satellites are in view, then separate GSV messages with Talker ID GP for GPS satellites in view, GL for GLONASS and GA for GALILEO satellites will be generated.

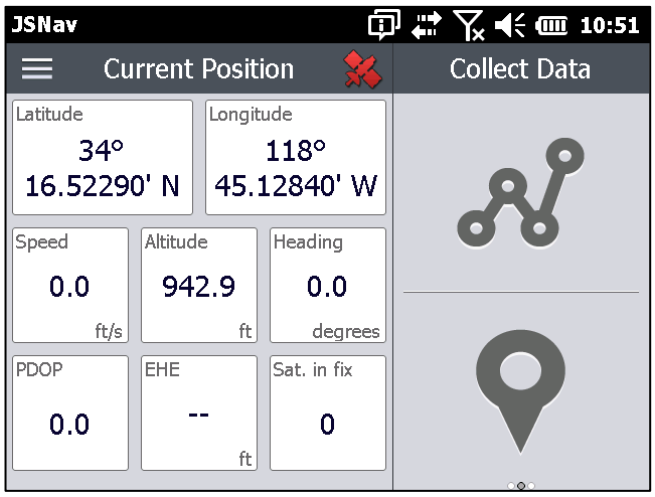
- *GLL – Geographic Position – Latitude/Longitude.* The GLL message contains the latitude and longitude of the present position, the time of the position fix and the status.
- *3.5 GNS – GNSS Fix Data.* The GNS message contains Time, Position Fix and related data for single or combined navigation satellite systems (GNSS). If the data is calculated from multiple satellite systems in differential mode then several GNS messages are generated. The first message with Talker ID "GN" will be followed by separate messages with Talker ID "GP", "GL" etc. to report the data calculated from the individual systems. Only one GNS message is generated in differential mode with SBAS.
- *ZDA – Time & Date.* The ZDA message provides UTC, day, month, year and local time zone. The Local time zone is presented by the number of hours and minutes that have to be added to local time in order to get the UTC time. Local zone is generally negative for East longitudes with local exceptions near the International Date Line.
- *GBS – RAIM GNSS Satellite Fault Detection.* The GBS message provides results of the Receiver Autonomous Integrity Monitoring (RAIM) function. Given that the GNSS receiver is tracking sufficient satellites to perform integrity checks on the positioning quality of the position solution, a message is required in order to report the output of this process to other systems and advise the system user. With the RAIM function in the GNSS receiver, the receiver can isolate faults to individual satellites and not use these in its position and velocity calculations. Also, the GNSS receiver can still track the satellite(s) and easily judge when returned within tolerance. This message is used for reporting such RAIM information. To perform this integrity function, the GNSS receiver must have at least two observables in addition to the minimum required for navigation. Normally these observables take the form of additional redundant satellites. If only GPS, GLONASS, etc. is used for the reported position solution the Talker ID is "GP", "GL", etc. and the errors pertain to the individual system. If satellites from multiple systems are used to obtain the reported position solution the Talker ID is "GN" and the errors pertain to the combined solution.
- *DTM – Datum Reference.* The DTM message provides the current local geodetic datum and datum offsets from the reference datum. The reference Datum cannot be changed and is always WGS 84 for the NV08C receiver.
- *GNSS System Compatibility Mode.* To allow you to use software developed for interfacing GPS-only receivers a Compatibility mode is included in the communication protocol. In this mode the Talker ID of GGA, RMC, DTM, GLL, VTG and ZDA messages is set to "GP" regardless of which system satellites are used for the reported position.

JSNAV APPLICATION

JSNav is a GPS/GNSS application that lets you easily collect waypoints or track data.

Note: Calibrate the compass and accelerometer before you use JSNav. Refer to Chapter 3, Programs and Settings, Compass and Accelerometer Calibration.

From the Home screen select the JSNav gadget . A splash screen appears while the application opens, and then the main JSNav screen appears. Select the satellite icon in the upper right corner to turn GPS on or off. (A gray icon means GPS is not connected, red means there is no fix, yellow means a 2D fix, and green means a 3D fix.)



Once there is a fix (this may take a few minutes) the left portion of the screen shows you information about the current position as well as PDOP (position dilution of precision), EHE (estimated horizontal error), and the number of satellites used for a fix. To view signal strength and NMEA strings, swipe this area to the right or left.

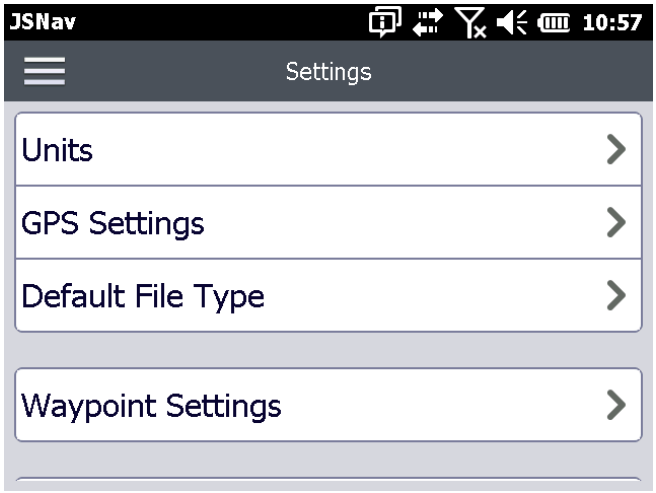
The right portion of the screen is used to collect and view waypoint or track data. Select the waypoint or track icon or swipe this portion of the screen to the right or left.

USE THE TOUCHSCREEN OR KEYBOARD WITH JSNAV

You can use the touchscreen or the keyboard to move around the JSNav screens and make selections. There are also shortcut key combinations unique to JSNav. To see them on the screen, select the menu icon , then ? Info or the CTRL+ I keys.

JSNAV SETTINGS

Tap on the menu icon in the upper left corner of the screen, and select Settings from the list. Go through the menu options to set up JSNav.



Note: These settings only impact the JSNav application. To set up GPS/GNSS go to the GNSS Settings control panel discussed earlier in this chapter.

- Units: Select English or metric units of measurement and the display format for latitude and longitude.
- GPS Settings: Select the maximum PDOP for collecting points, minimum navigation speed you need to be traveling for navigation to update properly, and the navigation distance threshold. This is the distance you can be from the point to which you are navigating to show that you have arrived.
- Default File Type: Select .kml (keyhole markup language used in Google Earth) or .csv (comma separated value). Note that tracks with more than 1000 points default to .csv due to memory limitations.

- Waypoint Settings: Set up the waypoint file naming scheme, including the waypoint prefix, increment step size, and current value. For example, if the waypoint prefix is Point, increment step size is 10, current value is 100, and default file type is .kml, file names would be Point110.kml, Point120.kml, Point130.kml, etc.) Also select the number of points to average. The default is 1.
- Track Settings: Set up the track file naming scheme (see Waypoint Settings). You can select a minimum time and minimum distance needed before a point is collected. If both are enabled, both conditions must be met before a point is added to a track. You can disable suspend when track points are being collected.
- Audio Notifications: You can turn on notifications for waypoint arrival, waypoint collected, and track point collected.

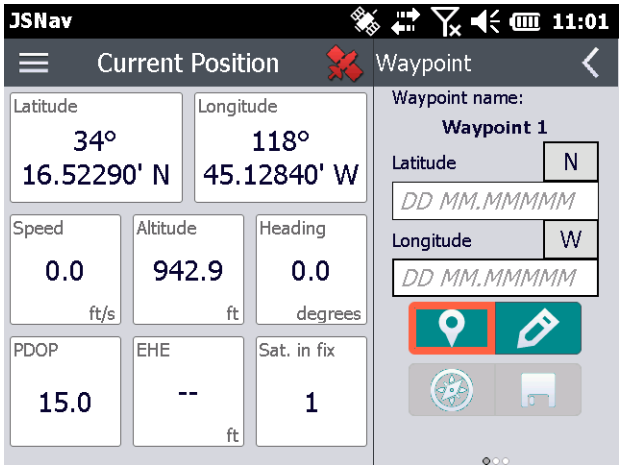
Some settings can be customized for a particular waypoint or track using edit on the data collection screens.

VIEW SIGNAL STRENGTH AND NMEA STRINGS

View the strength of satellites being used in a fix (shown in green) by swiping the left side of the display (where position is shown) on the JSNav Home screen to the right. View the NMEA strings that are coming in through the GNSS receiver by swiping the same area to the left. Strings can be saved to a file.

COLLECT WAYPOINT DATA

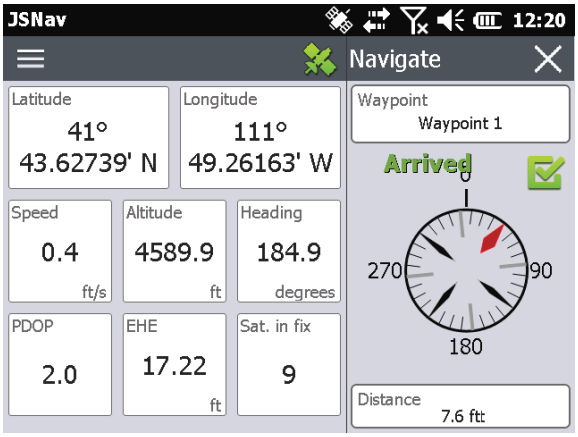
From the main JSNav screen select the waypoint icon to open the Collect Waypoint screen.



To collect a waypoint, select the waypoint icon at the bottom of the screen. Position information for the waypoint is recorded.

Select the edit icon to add or edit the name, description, notes, and file type for this waypoint.

To navigate back to the waypoint you just collected, select the compass icon. A rotating compass is shown.



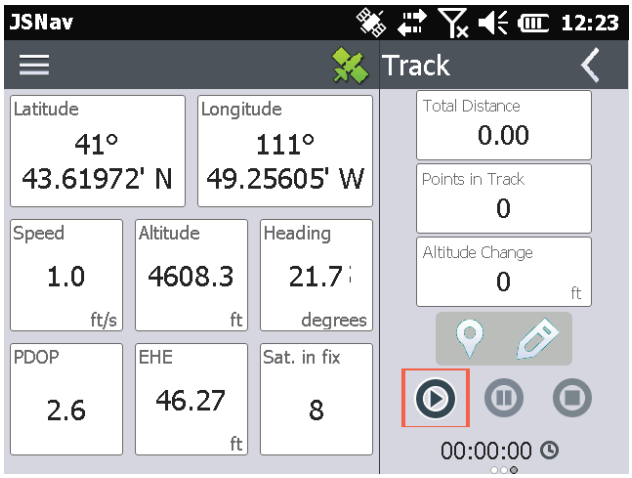
Walk in the direction of the red arrow. The distance shown decreases as you get closer. Text saying Arrived is shown and you hear a beep (if audio notifications are set up) when you reach the navigation distance threshold set up in GPS Settings.

Note: When moving, the compass shows the direction of travel to the target. When stationary, the compass displays a heading to the target, based on the internal compass. The internal compass can be calibrated from the Settings menu located at Start > Settings > System > Sensors.

Select the disc icon to save the waypoint to \My Documents\My Waypoints.

Collect TraCk Data

From the main JSNav screen select the track icon to open the Collect Track screen.



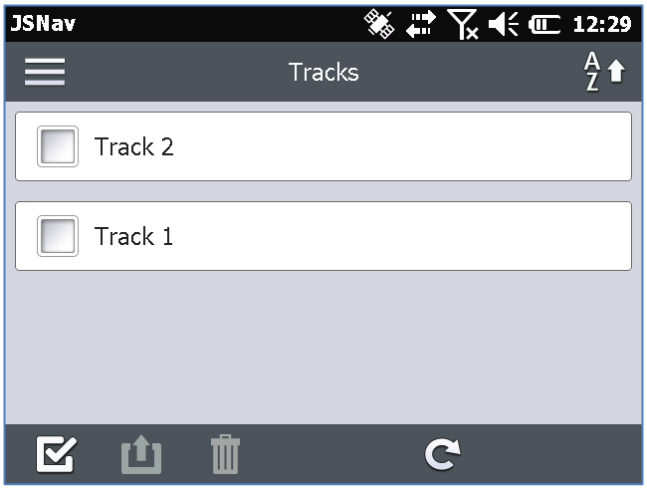
To collect points in a track, select the play key and start moving along the desired track. Select the pause key as needed and select play to start again. Current position information, total distance, altitude change, and points in the track are collected.

When you are finished, select the stop key. A dialogue box is shown with the track name. You can use that name or edit it. Select the check mark when you are finished. The track is saved in \My Documents\My Tracks.

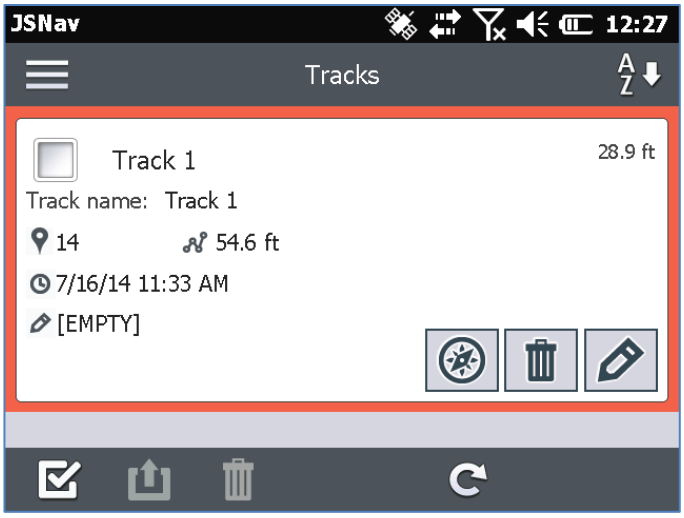
Select the edit icon to add or edit the name, description, notes, and file type for this track

MANAGE WAYPOINTS AND TRACKS

To view the waypoints and tracks you have saved, select the menu icon, then select Waypoints or Tracks from the menu. A list of waypoints or tracks is shown.



To open a file, select the name. You can view collected data, select the file for exporting or deletion by selecting the box to the left of the name, navigate back to the waypoint or track points , delete the file , or edit the file.



To select all of the files, tap the check box at the bottom of the screen. You can delete or export all selected files. Exported files are placed into a directory called Exports inside of your \My Documents folder.

IMPORTING WAYPOINTS AND TRACKS

Waypoint and track file formats must be .kml, .kmz or .csv. CSV files must contain a column for both latitude and longitude.

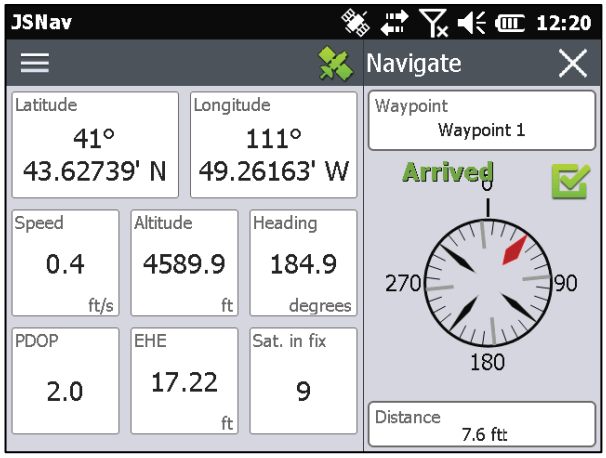
To import a waypoint or track file, place the file into the \My Documents\My Waypoints or \My Tracks directory. You can create subdirectories to organize your data if you want. Once you place a waypoint or track file into the proper directory or subdirectory it appears in the list of files.

An imported track file can only contain one track if you are going to navigate to a specific track. If a file contains multiple tracks, a key inside of JSNav is available to extract the tracks into separate files.

NAVIGATING TO A WAYPOINT OR TRACK

You can navigate back to any saved waypoint or track. Select the file you want to navigate to as described in the previous section, Managing Waypoints and Tracks. Select the compass icon.

A rotating compass is shown. Travel in the direction of the red arrow. The distance shown decreases as you get closer. When you reach the navigation distance threshold set up in the settings, text saying Arrived is shown and you hear a beep if audio notification has been set up.


JSNav
12:20
Navigate
Latitude
41°
43.62739' N
Longitude
111°
49.26163' W
Speed
0.4
ft/s
Altitude
4589.9
ft
Heading
184.9
degrees
PDOP
2.0
EHE
17.22
ft
Sat. in fix
9
Waypoint
Waypoint 1
Arrived
0
270
90
180
Distance
7.6 ft


Carlson Surveyor2
STORE PTS
Fixed
6/17
10 ft
S
A
O
C
Pt: 2
Desc:
HT: 6
N:1923347.7951 E:6334416.1250 Z:789.0722
HSDV:0.062 VSDV:0.079 PDOP:2.28
ESC
ALT
CTRL
DEL

7

Camera

CAMERA

Surveyor2 Geo models have a 5MP camera. Juniper Geotagging™ gives you the ability to embed and emboss photos with the date, time, and GPS position.

The camera window and flash are located on the back of the Surveyor2.

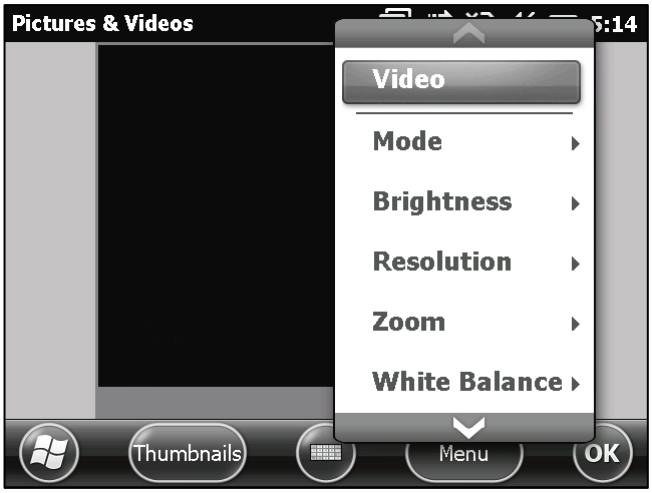
Note: *The flash can also be used as a flashlight. See Chapter 2, Hardware Components, Flashlight.*

CAMERA SETTINGS FOR STILL IMAGES

Press the CTRL + **C** keys to turn the camera on and open the Pictures and Videos application.

PICTURES MENU

Select the Menu soft key for a pull-down list of setting options. View or change the settings before you take photos. These settings will apply to all photos taken, but can be edited as needed.

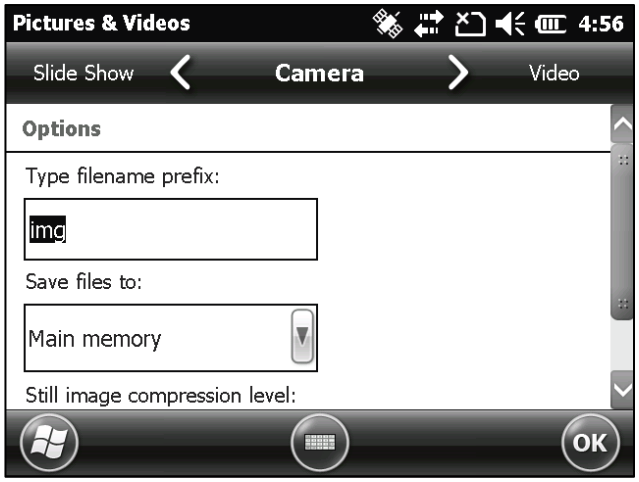


FLASH

To use the flash, select Flash from the Menu, then select On. The flash automatically turns on each time you take a photo. To turn it off, select Flash from the menu and select Off.

PICTURES & VIDEOS CONTROL PANEL

To view or change additional settings, select Options from the Menu soft key. The Camera control panel is shown. Use the horizontal scrolling menu near the top of the screen to see what the setting are and make changes as needed.



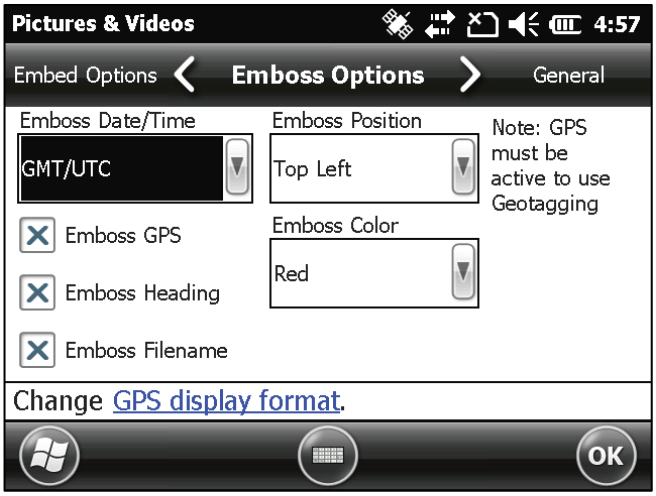
GEOTAGGING

When pictures are geotagged, the date, time, latitude, longitude, file name, and notes can be included with the pictures with the emboss and embed options.

Note: Calibrate the compass and accelerometer before you use Geotagging. Refer to Chapter 3, Programs and Settings, Compass and Accelerometer Calibration.

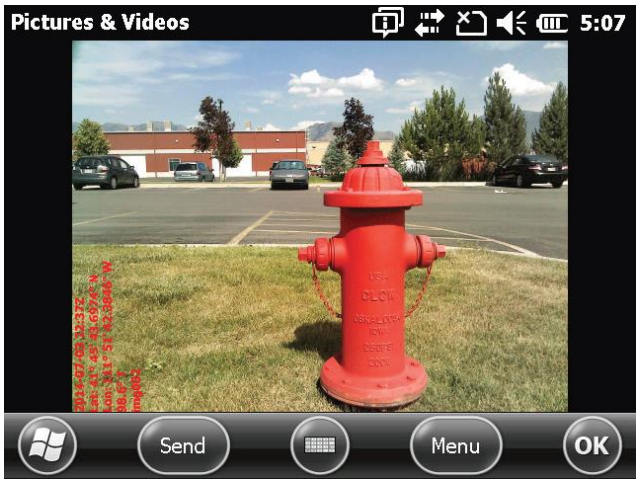
Follow these steps:

1. Turn on GPS by selecting the GPS gadget on the Home screen and waiting for a fix.
2. Select the Menu soft key, then select Geotag from the menu. The following Emboss Options screen is shown:

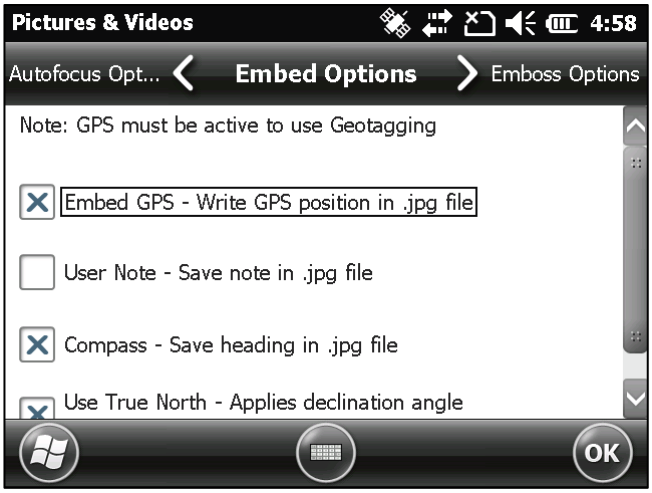


Select the information you want to emboss on pictures, the position, and the color.

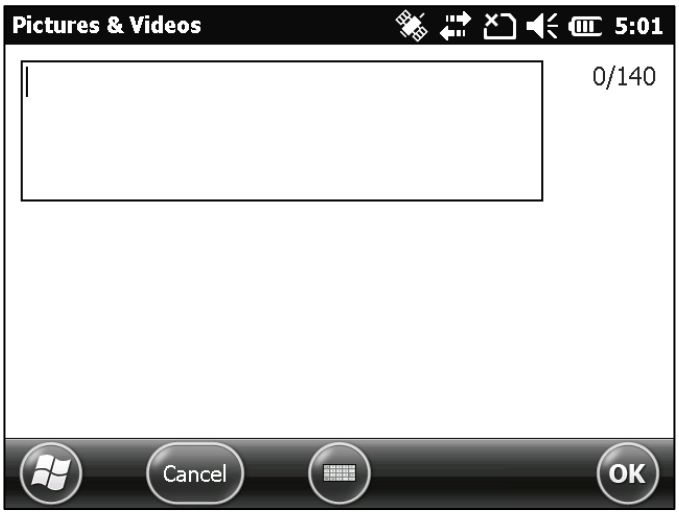
The selected information is embossed on pictures, making it part of the images.



3. You can build GPS information into jpg files from the Embed Options screen. (This information does not appear on the images.) You can select Use True North.

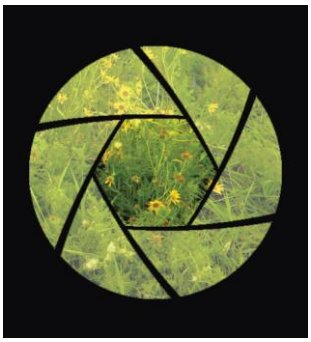


Embed GPS allows you to put images into programs like Google Earth™ and sort them by location, etc. If you select User Note, the note screen is shown after a photo is taken. Enter a note for the image and press OK.



TAKE PHOTOS AND SELECT PHOTO OPTIONS

Press the CTRL + **C** keys to turn the camera on. Frame the photo as desired and press the action key or the return key ↵. A square yellow box is shown indicating that the camera is focusing. Press enter when you are ready to take the picture. A screen like the following is shown for a few seconds. Hold the handheld steady until you hear a click, indicating that the photo has been taken.

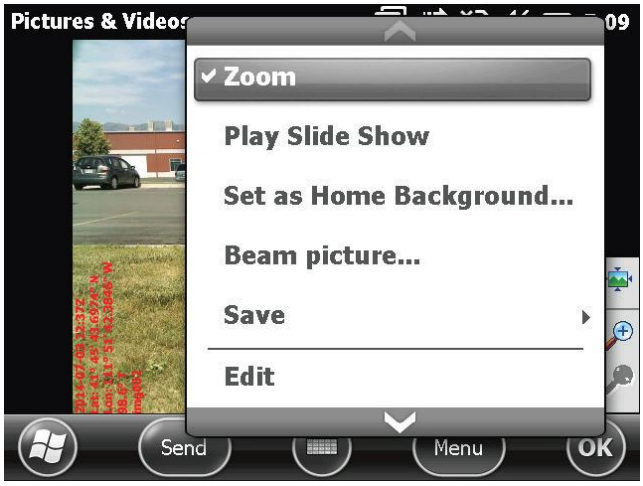


Note: The built-in accelerometer is used to detect the handheld orientation when the picture is snapped and save the image in the right orientation.

While the photo is being saved, a disk symbol is shown briefly. The full photo is then shown on the screen.

PHOTO OPTIONS

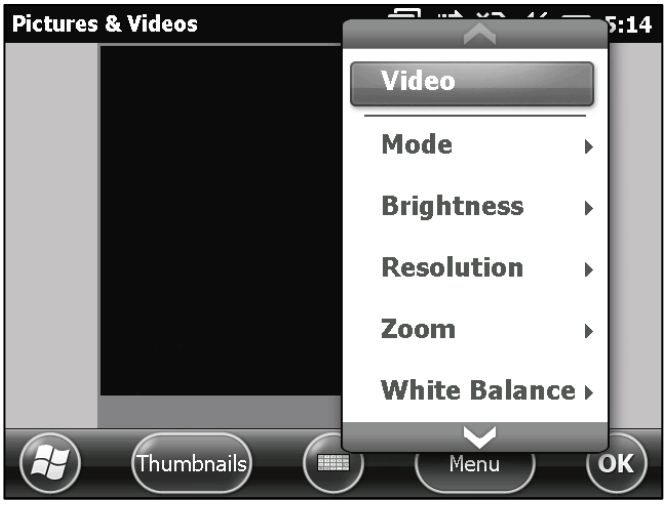
Select the Menu soft key to see a list of options for a particular photo. (The photo must appear on the screen.)



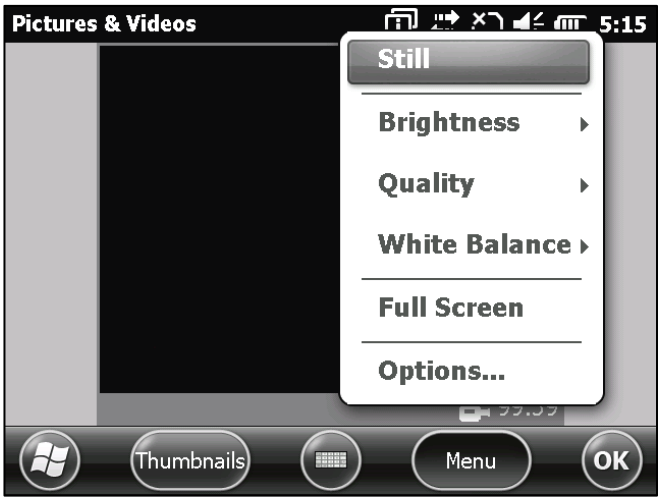
To take another photo, press the Camera soft key. To see a library of photos and pictures, press Thumbnails.

VIDEOS

Press the CTRL + **C** keys to turn the camera on. Select the Menu soft key, and select Video.



Select Menu again to view and adjust settings as desired.



Press the action key or the return key to start recording a video. Press the key again to end the video.

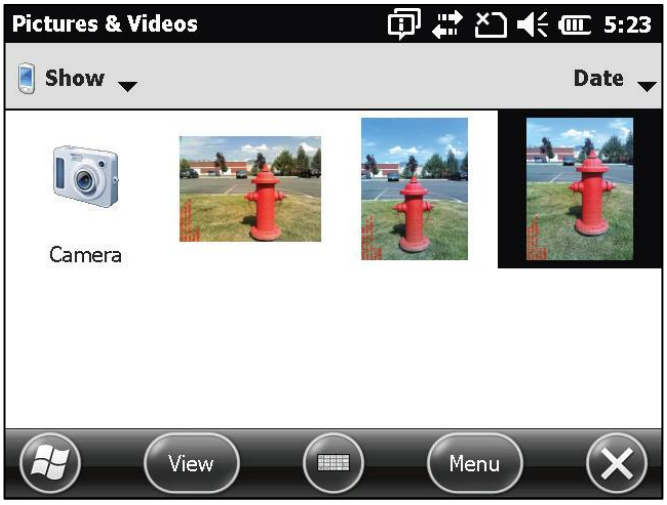
Note: To take photos instead of videos, select Menu and select Still (see previous screen).

AUDIO

You can record sound with videos. From the Pictures & Videos application screen, tap Menu > Video > Menu > Options. From the Video screen, tap Include audio when recording video files to turn audio on.

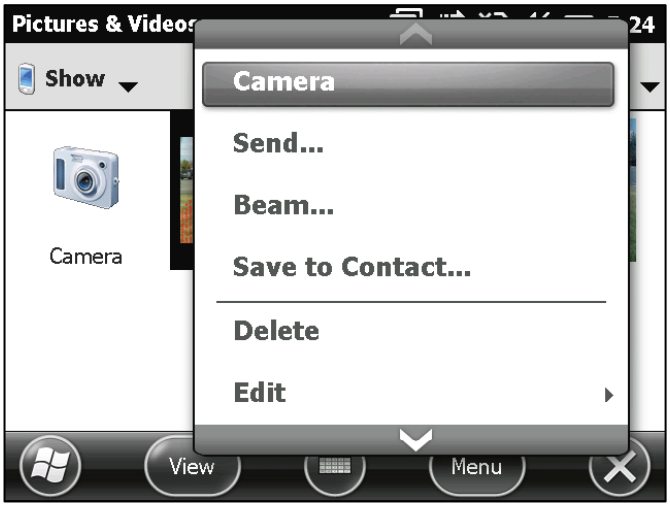
PHOTO AND VIDEO LIBRARY

To view your photo and video library, select the Thumbnails soft key from the Pictures and Videos application screen.



LIBRARY MENU OPTIONS

Select a photo or video, then the Menu soft key. You can send, delete, edit, etc. the selected photo or video.



8

3G Data Modem

3G DATA MODEM

The 3G data modem is included in the Surveyor2 Standard Cell and Surveyor2 Geo Cell models, adding Wide Area Network data modem capability. The modem is installed at the factory.

The modem is a cellular data modem, type GSM/UMTS. It is five band modem compatible. The modem operates in different modes, depending on the wireless provider and the signal strength. Data speeds vary anywhere from 10 or 20 Kbps when using GPRS to over 1 Mbps when using HSDPA.

SET UP A DATA ACCOUNT WITH A WIRELESS PROVIDER

Contact a wireless provider to set up data service for the cellular data modem and obtain an account and mini SIM card (purchased separately). You need to provide the following information when setting up an account:

1. Billing Information and business ID, such as your Federal Tax I.D. or VAT number.
2. The wireless services required. Specify that you need data service only. You do not need voice or messaging services.
3. You may be asked for the modem's IMEI number, which can be found here: Start > Settings > System > System Information > 3G Modem with the modem powered on.
4. You may be asked to provide the modem's model number. This number allows the carrier to verify this modem as one of its approved models. If asked for this by the carrier, it is a Juniper Systems Allegro2.

INSTALL THE SIM CARD

To insert or remove a SIM card follow these steps:

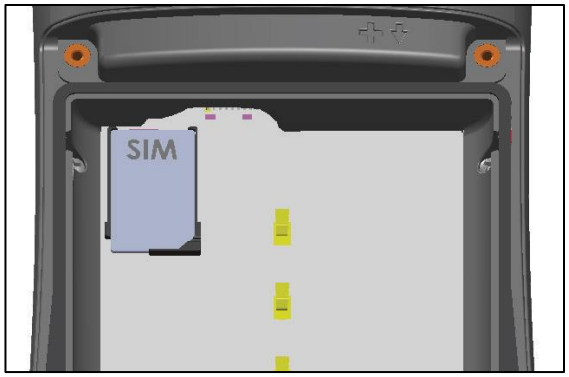
1. Power off the handheld.
2. The mini SIM card slot is located in the battery compartment. Loosen the screws to the door and remove it.

CAUTION: Do not use a micro SIM adapter. The adapter can get stuck and damage the slot.

3. Remove the battery pack.

CAUTION: The Surveyor2 is not sealed against water and dust when the battery door is not installed.

4. An image on the battery compartment label shows the correct location and orientation for the mini SIM card. Pull out the SIM card tray. Place the card onto the tray and push the tray in until it catches.



To remove the SIM card, pull the tray open and remove the card. Push the empty tray in until it catches.

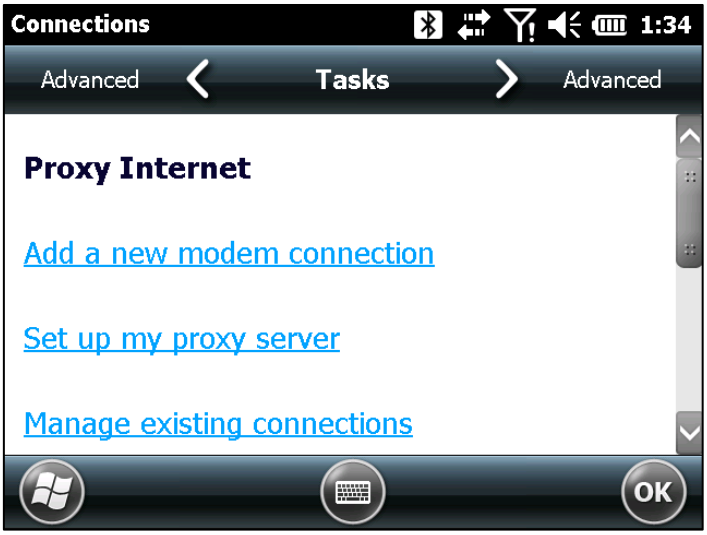
5. Replace the battery pack, and attach the battery door.
6. Power on the Surveyor2.

Note: If the modem was on before shutting the Surveyor2 down to insert the SIM card, you are prompted to configure the data connection when you reboot. See the instructions on the following pages.

SET UP THE CELL MODEM

Tap on the 3G modem gadget . After about 30 seconds it turns green, indicating that the modem is available.

Once the modem is available, configure it to make a connection. Tap and hold the modem gadget to open the Connections control panel.



Select Automatically configure connection. The name of your carrier appears. Select Next. A progress graphic is shown on the next screen while your Internet settings are configured.

You can now access the Internet. Open Internet Explorer to test your setup.

CONNECTION PROBLEMS

If the connection fails to automatically configure, there might not be a signal where you are located. You can try repeating the set up process.

WIRELESS SAFETY

RF INTERFERENCE ISSUES

It is important to follow any special regulations regarding the use of radio equipment due in particular to the possibility of radio frequency (RF), interference. Follow the safety advice given below carefully.

Switch OFF your cell modem when in an aircraft. The use of cellular telephones in an aircraft may endanger the operation of the aircraft, disrupt the cellular network and is illegal.

Switch OFF your cell modem in hospitals and any other place where medical equipment may be in use.

Respect restrictions on the use of radio equipment in fuel depots, chemical plants or where blasting operations are in progress.

Operating your cell modem close to inadequately protected personal medical devices, such as hearing aids and pacemakers, could be hazardous. Consult the manufacturers of the medical device to determine if it is adequately protected.

Operation of your cell modem close to other electronic equipment may also cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers' recommendations.

Do not place the cell modem alongside computer discs, credit or travel cards, or other magnetic media. The modem may affect the information contained on discs or cards.

MAINTENANCE OF YOUR MODEM

Do not attempt to disassemble the cell modem. No user serviceable parts exist inside the cell modem.

A

Storage, Maintenance and Recycling

STORAGE, MAINTENANCE, AND RECYCLING

Follow the instructions in this chapter to properly maintain and recycle the Surveyor2.

STORING THE SURVEYOR2 AND BATTERY PACK

When the handheld is not being charged and is suspended, it draws a small amount of power. This power draw is used to maintain the memory (RAM) of the handheld in the same state it was when it was suspended. We recommend charging the handheld each night or weekend when it is in suspend mode.

If the Surveyor2 is not charged while in suspend mode and the battery reaches a low charge, it automatically powers off to prevent further drain on the battery.

Note: Data and programs are secure as long as they have been saved, even if the battery pack becomes discharged. The handheld does not depend on the battery to store the data for extended periods.

STORING THE SURVEYOR2 FOR LESS THAN TWO WEEKS

To store the handheld for less than two weeks, complete the following steps:

1. Close all applications.
2. Plug the handheld into the AC wall adapter that was shipped with your unit.

STORING THE SURVEYOR2 FOR MORE THAN TWO WEEKS

To store the handheld for two weeks or more, complete the following steps:

1. Charge the battery pack 30 to 50 percent.
2. Close all running programs, and turn off the handheld.
3. Remove the battery pack.
4. Place the battery pack in a dry location.

PROTECTING THE TOUCHSCREEN

Protect the touchscreen from impact, pressure, or abrasive substances that could damage it. To further protect the touchscreen, apply a screen protector (optional accessory). To apply a screen protector, follow the directions that come with it in the package.

CAUTION: Be sure to replace the screen protector as often as the screen protector instructions recommend.

CLEANING THE SURVEYOR2

TOUCHSCREEN

1. Disable the touchscreen by pressing the power key ⏻ until the Power Key menu appears. Tap on Disable TS.
2. Remove the screen protector if you want to clean underneath it.
3. Apply warm water or a mild cleaning solution to a microfiber cloth and gently wipe off the touchscreen.

CAUTION: Do not use tissues, paper towels, soft bristle brushes, or harsh cleaning solutions on the touchscreen.

4. Rinse the touchscreen with water and dry it with a microfiber cloth.
5. Apply a screen protector if you want to (not included). To clean a screen protector, follow the instructions provided with the package.
6. To enable the touchscreen, press and hold the power key ⏻ to display the Power Key menu. Use the down arrow key to highlight Enable TS, and press enter ↵.

CASE, BUMPERS, AND CONNECTOR MODULE

Make sure the battery door is securely installed. Use warm water, a mild cleaning solution, and a soft bristle brush to clean the case, bumpers, and connector module.

CAUTION: Do not direct a high-pressure stream of water at the device to clean it. This action could break the seal, causing water to get inside the device and voiding the warranty.

SAFE CLEANERS TO USE

You can clean the Surveyor2 safely with the following cleaners:

- Windex® (S.C. Johnson & Son, Inc.)
- Formula 409® (Clorox)
- Citrus Wonder Cleaner (Mer-Maids)
- Citrus All Purpose Cleaner (Wonder Tablitz)
- Greased Lightening® Multi-Purpose Cleaner and Degreaser
- Orange Clean® (Orange Glo International)
- Fantastik® OxyPower® (S.C. Johnson @ Son, Inc.)
- Oil Eater Orange Cleaner Citrus Degreaser (Kafko Intl., Ltd.)

CAUTION: Exposure to some cleaning solutions may damage your device, including automotive brake cleaner, isopropyl alcohol, carburetor cleaner, and similar solutions. If you are uncertain about the strength or effect of a cleaner, apply a small amount to a less visible location as a test. If

any visual change becomes apparent, promptly rinse and wash with a known mild cleaning solution.

RECYCLING THE SURVEYOR2 AND BATTERIES

When the Surveyor2 reaches the end of its life, it must not be disposed of with municipal waste. It is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. If you cannot find a location, contact Carlson Software technical support for information about disposal.

The Li-Ion battery packs for your Surveyor2 are recyclable. Avoid placing them in the trash or municipal waste system. To find the nearest battery recycling center in the USA, you can contact the Rechargeable Battery Recycling Corporation's at 1-877-723-1297.

B

Warranty and Repair Information

LIMITED PRODUCT WARRANTY

Carlson Software (Carlson) warrants that the Surveyor2 handheld computer shall be free from defects in materials and workmanship, under normal intended use, for a period of 24 months from the date of shipment from the factory.

Carlson Software warrants any expansion packs (RTK GPS or Other) shall be free from defects in materials and workmanship, under normal intended use, for a period of 12 months from the date of shipment from the factory.

Carlson warrants that the following items shall be free from defects in materials and workmanship, under normal intended use, for a period of ninety (90) days from the date of shipment from the factory:

- battery packs,
- media containing the handheld computer programs,
- desktop computer programs,
- expansion packs, and
- any accessories.

WARRANTY EXCLUSIONS

This warranty shall not apply if:

i. the product has been set up improperly or has been improperly installed or calibrated,
ii. the product is operated in a manner that is not in accordance with the user documentation and/or users guide,
iii. the product is used for a purpose other than for which it was designed,
iv. the product has been used in environmental conditions outside of those specified for the product,
v. the product has been subject to any modification, alteration, or change by or on behalf of customer (except and unless modified, changed or altered by Carlson or under direct supervision of Carlson),
vi. the defect or malfunction results from misuse or accident,
vii. the serial number on the product has been tampered with or removed, or
viii. the product has been opened or tampered with in any way.

Parts that are excessively worn are not covered under warranty. These may include, but are not limited to, the keyboard elastomer and switch matrix, hand straps and the touchscreen (if applicable).

This warranty is exclusive and Carlson will not assume and hereby expressly disclaims any further warranties, whether express or implied, including, without limitation, any warranty as to

merchant-ability, fitness for a particular purpose, non-infringement or any warranties arising from the course of performance, dealing, or usage of trade.

Carlson makes no warranties that:

- its products will meet your requirements or will work in combination with any hardware or applications software products provided by third parties,
- the operation of its products will be uninterrupted or error free, or
- all defects in the product will be corrected.

Carlson shall not be responsible for software, firmware, information, or memory data contained in, stored on, or integrated with any products returned to Carlson for repair, whether under warranty or not.

REMEDY

In the event a defect in materials or workmanship is discovered and reported to Carlson or a Carlson certified repair center within the specified warranty period, Carlson will, at its option, repair the defect or replace the defective product. Replacement products may be new or reconditioned. Carlson warrants any replaced or repaired product for a period of ninety (90) days from the date of return shipment, or through the end of the original warranty period, whichever is longer.

LIMITATION OF LIABILITY

To the fullest extent allowed by law, the obligation of Carlson shall be limited to the repair or replacement of the product. Carlson shall in no event be liable for special, incidental, or consequential, indirect, special or punitive damages of any kind, or for loss of revenue or profits, loss of business, loss of information or data, or other financial loss arising out of or in connection with the sale, installation, maintenance, use performance, failure, or interruption of any product. Any responsibility and/or liability of Carlson shall, in connection with a warranted product, be limited in the maximum amount to the original purchase price.

GOVERNING LAW

This warranty is governed by the laws of Kentucky, and excluding the United Nations Convention on Contracts for the International Sale of Goods. The courts of Kentucky shall have exclusive personal jurisdiction in case of any disputes arising out of or in connection with this warranty.

SERVICES AND MATERIALS PROVIDED UNDER WARRANTY

- Analysis of problem by service technician
- Labor and materials required to fix defective parts

- Functional analysis performed after repair
- Repair turnaround within 10 working days of receipt unless special circumstances exist
- Shipping costs to return device to customer

EXTENDED WARRANTIES

The Surveyor2 can be warranted up to 5 years (including the standard warranty period) through the purchase of an extended warranty.

Extended warranties apply only to the Surveyor2, not battery packs, media containing the Surveyor2 programs, desktop computer programs, user documentation, and accessories. Parts that are excessively worn are not covered under all warranty plans. These may include, but are not limited to, the keyboard elastomer and switch matrix, hand straps, touchscreens, and connector modules.

WARRANTY INFORMATION

Warranty information for the Surveyor2 Rugged Handheld is located on our website at http://www.carlsonsw.com/products/hardware/surveyor2. You can evaluate and order warranty extensions, check warranty status, and view warranty terms and conditions.

REPAIRING THE SURVEYOR2

CAUTION: Do not attempt to repair the Surveyor2 yourself. This action voids the warranty.

Information about repairs, upgrades, and evaluations is located on our website at http://www.carlsonsw.com/products/hardware/surveyor2/ in the Repairs tab. You can locate a repair center, submit a repair order, check repair status, view terms and conditions, get shipping instructions, and view lead times.

Before returning a unit, please get permission by submitting a repair order from our website and waiting for confirmation or by contacting a repair center directly. Be prepared to provide the following information:

- Product serial number (inside the battery compartment; also found in System Information screen as described on the following page)
- Your name
- Name and shipping address of company/university/agency
- Best contact method (phone, fax, email, cell/mobile)
- Clear, highly-detailed description of the repair or upgrade
- Credit card/ purchase order number and billing address (for a repair or upgrade that is not covered by the standard warranty or an extended warranty policy)

SYSTEM INFORMATION FOR YOUR SURVEYOR2

When you contact a repair center you need some unique system ID information for your Surveyor2 (serial number, model number, etc.). Select the System Info icon from the favorites bar on the Home screen or tap Start > Settings > System > System Information to view the System Information menu. Select System ID.

Specifications on the processor, memory, display, camera (Geo models), GPS (Geo models), Bluetooth, Wi-Fi, and cell modem (optional accessory) are also located on the System Information screen.

You can also create a system information file to send to the repair center by pressing the Menu soft key and selecting Create Info File. The file is located at: \My Documents\JSInfo.txt.

C

Warnings and Regulatory Information

PRODUCT WARNINGS

Follow the warnings listed below to use the Surveyor2 and accessories safely.

BATTERY WARNINGS

▲**WARNING!** This device comes with a lithium ion rechargeable battery pack. To reduce the risk of fire or burns, do not disassemble, crush, puncture, short external contacts, or expose the battery pack to fire.

Do not disassemble or open, crush, bend or deform, puncture or shred.

Do not modify or remanufacture, attempt to insert foreign objects into the battery, immerse or expose to water or other liquids, expose to fire, explosion or other hazard.

Only use the battery for the system for which it is specified.

Only use the battery with a charging system that has been qualified with the system per this standard. Use of an unqualified battery or charger may present a risk of fire, explosion, leakage, or other hazard.

Do not short circuit a battery or allow metallic conductive objects to contact battery terminals.

Replace the battery only with another battery that has been qualified with the system.

Use of an unqualified battery may present a risk of fire, explosion, leakage or other hazard.

Promptly dispose of used batteries in accordance with local regulations.

Battery usage by children should be supervised.

Avoid dropping the battery. If the battery is dropped, especially on a hard surface, and the user suspects damage, take it to a service center for inspection.

Improper battery use may result in a fire, explosion or other hazard.

WALL CHARGER WARNINGS

▲**WARNING!** To reduce the risk of personal injury, electrical shock, fire or damage to the equipment:

Plug the wall charger into an electrical outlet that is easily accessible at all times.

Do not place anything on the wall charger cord or any of the other cables. Arrange them so that no one may accidentally step on or trip over them.

Do not pull on a cord or cable. When unplugging the wall charger from the electrical outlet, pull on the plug, not the cord.

Use only wall chargers intended for the Surveyor2. Using any other external power source can damage your product and void your warranty.

CERTIFICATIONS AND STANDARDS

FCC - UNITED STATES

In compliance with the FCC rules 47 CFR 15.19(a)(3), the statements that follow must appear on the device or in the user documentation.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. The device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

In compliance with the FCC rules, 47 CFR 15.105(b), the user must be notified that 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. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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 communications. 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 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.

In compliance with the FCC rules, 47 CFR 15.21, the user must be notified that changes or modifications to the Rugged Handheld that are not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Only approved accessories may be used with this equipment. In general, all cables must be high quality, shielded, correctly terminated, and normally restricted to two meters in length. Wall chargers approved for this product employ special provisions to avoid radio interference and should not be altered or substituted.

This device must not be co-located or operating in conjunction with any other antenna or transmitter.

This cell modem is compliant with FCC regulations when operated within the temperature range of -30°C to +50°C. Do not operate the cell modem outside of this temperature range.

INDUSTRY CANADA

In compliance with Industry Canada rules, the following statement must appear on the device or in the user documentation:

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

RADIO FREQUENCY SAFETY

This device has been evaluated for use in close proximity to the body. Use only accessories approved by Juniper Systems. The use of third party accessories may not comply with FCC and international RF exposure requirements. To comply with FCC and other national RF exposure requirements do not co-locate this device with other transmitters.

This device operates in compliance with the FCC radio frequency exposure limits for an uncontrolled environment. Users must follow instructions provided in the user documentation to satisfy compliance with FCC radio frequency exposure requirements.

There cannot be any alteration to the authorized antenna system.

CE MARKING (EUROPEAN UNION)

Products bearing the CE marking comply with the 2004/108/EC (EMC Directive), 1999/5/EC (R&TTE Directive), 2006/95/EC (Low Voltage Directive) issued by the Commission of the European Community.

CE compliance of this device is valid only if powered with/by a CE-marked wall charger provided by the manufacturer. Cables connecting to the USB host port must use a ferrite core/bead on the cable. The ferrite core must be placed on the cable near the end that connects to the Surveyor2. This device has been evaluated using the following standards to demonstrate compliance with applicable directives:

- EN 60950-1:2006
- IEC 62209-2 Ed. 1.0
- IEEE Std. C95.1-1999
- EN 301 489-1 V1.8.1
- EN 301 489-7 V1.3.1
- EN 301 489-17 V2.1.1

- EN 300 328 V1.7.1
- EN 301 511 V9.0.2
- EN 55022:2006 + A1:2007
- EN 55024:1998 + A1:2001 + A2:2003

The telecommunication functions of this device may be used in the following EU and EFTA countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovak Republic, Romania, Slovenia, Spain, Sweden, Switzerland, and United Kingdom.

Restrictions apply to the operation of the radio in this device.

FRANCE (RADIO RESTRICTIONS)

Restrictions apply to the operation of the Bluetooth radio in this device. This equipment may be used indoors. Due to the potential that this radio may transmit in excess of 10mW in the band 2454 to 2483.5 MHz, outdoor operation is restricted.

Restrictions apply to the operation of the 802.11b/g radio in this device. This equipment may be used indoors on channels 1 to 13. Outdoor operation is permitted on channels 1 to 8, as transmit power in the band 2454 to 2483.5 MHz is limited to 10 mW. The latest requirements may be found at: **http://www.art-telecom.fr**

DECLARATION OF CONFORMITY

The Declaration of Conformity for CE Marking is available by contacting Carlson Software technical support.

D

Specifications

SURVEYOR2 RUGGED HANDHELD SPECIFICATIONS

FEATURE	SPECIFICATION
Operating System	• Microsoft® Windows Embedded Handheld 6.5.3 (completely compatible with Microsoft® Windows Mobile® 6.5.3) • English, French, German, Spanish, Brazilian Portuguese
Processor	• 1GHz ARM Cortex A8 i.MX53
Memory	• 512 MB DDR2 RAM
Primary Data Storage	• 8 GB Flash storage
Micro SD/SDHC Card Slot	• SD/SDHC slot, user accessible up to 32GB of storage
Physical Features	• Dimensions, standard: 5,4" wide x 10.2" long x 1.6" thick (138 mm x 255 mm x 40 mm) • Weight: Standard - 2.01 lbs (910 g) Standard Cell - 2.13 lbs (964 g) GEO - 2.09 lbs (946 g) GEO Cell - 2.15 lbs (972 g) • Durable hardened plastic in a shear proof, shock resistant design • Shock resistant bumpers • Strong chemical resistance • Easy to grip ergonomic form factor • Comfortable, wide hand strap
Display	• Active viewing area: 4.2" (107 mm) color WVGA LCD TFT • 640 x 480 pixel resolution • LCD backlight • Outdoor viewable • Landscape orientation
Touchscreen	• Capacitive touch interface • Chemically-strengthened glass • Touchscreen disable function • Touchscreen profile options
Keyboard	• Alphanumeric QWERTY keyboard • Modifier keys • Multiple programmable keys and LEDs • Backlight • On-screen keyboard for atypical characters
Batteries	• Rechargeable Li-Ion battery pack, 3.7VDC 10600mAh, 38.16Whr • Run time of up to 20 hours • Charging time 4 to 5 hours • Quick charge • Built-in battery intelligence • User-replaceable
Connector I/O Module	• RS-232C 9-pin D-sub connector, +5V @ 500 mA available on ring in pin 9 via software configuration • USB Host (Full A) • USB Client (Micro B) • 12-24 VDC jack for power input and battery charging, +12V DC 1.67A • 3.5mm audio jack, supports speaker/microphone or stereo output (pin detect).

FEATURE	SPECIFICATION
Wireless Connectivity	• Bluetooth® wireless technology 2.1 +EDR Class 1, range greater than 100 feet (30 m) • Wi-Fi 802.11b/g/n with extended range. U.S. and international
Audio	• Speaker, loud and clear • Microphone, low noise • 3.5mm audio jack, supports stereo headset and microphone at the same time (speaker disable)
LED Activity Indicators	• Red: power applied/charging status • Green: notification, application programmable • Blue: application programmable
Temperature Specifications	• Operating Temperature: –22° to 140° F (–30° to 60° C). Note: Bluetooth® wireless technology is rated to –4° to 122° F (–20° to 50° C). • Storage Temperature: –22° to 158° F (–30° to 70° C) • Battery Charging Temperature: -4° to 140° F (-20° to 60° C)
Shock Resistance	• Withstands multiple 4 foot drops to concrete
Environmental Ratings and Standards	• IP68 rating, waterproof and dustproof • MIL-STD810G test procedures: Method 500.5 Low Pressure (Altitude); Method 501.5 High Temperature; Method 502.5 Low Temperature; Method 503.5 Temperature Shock; Method 506.5 Rain; Method 507.5 Humidity; Method 510.5 Sand and Dust; Method 512.5 Immersion; Method 514.6 Vibration; Method 516.6 Shock
Warranties	• 24 months for Surveyor2 • 90 days for accessories • Extended service and maintenance plans
Software Included	• ActiveSync • Adobe Reader LE • Alarms • Calculator • Calendar • Contacts • E-Mail • File Explorer • Getting Started • GNSS Stream • Help • Internet Explorer • Internet Sharing • JSNav • Carlson Home screen, customizable with selectable dashboard gadgets and program shortcuts • On-Screen Keyboards, Mega Keys and Mega Keys Night • Notes • Pictures & Videos • Remote Desktop Mobile • Search • Settings • Task Manager • Tasks • Windows Live • Windows Media Note: Software on individual units may vary from this list.
Configurations	• Standard with Wi-Fi, Bluetooth, 512MB RAM, 8GB Storage • Standard Cell with Standard features plus Camera and GPS

FEATURE	SPECIFICATION
	• Geo with Standard features plus Camera, and GPS • Geo Cell with Standard features plus Camera, GPS, and Cell, US/North America and CE/EU Models
Camera (Geo models)	• 5MP resolution • Autofocus • Video capture • JPEG image format • Juniper Geotagging; embed and/or emboss photo with date, time and GPS position • Flash and flashlight
GPS/GNSS (Geo models)	• High-sensitivity GPS/GLONASS/SBAS receiver • 2 to 5 meter typical accuracy • Post processing capability for enhanced accuracy beyond 2 to 5 meters, proprietary BINR protocol • Enhanced performance under heavy canopy • Integrated real-time SBAS capability, support for WAAS, MSAS, EGNOS • File format NMEA-0183 v2.3, default strings: RMC, GSA, GNS, GBS, VTG, GSV, ZDA, DTM, GGA, GLL • 32 GNSS tracking channels • GPS signal quality indicator on Home screen • JSNav application • GNSS Stream Application
3G Data Modem (Geo model option)	• Integrated Cinterion PH8P module (Pentaband Worldwide), 800/850/ 900/1800/1900/2100 MHz data speeds, UMTS/HSPA+3GPP • Does not support voice calls • Communicates on GSM-based networks • Supports mini-SIM card only
Certifications and Standards	• FCC Class B • CE Marking (applicable EMC, R&TTE, and LVD directives) • Industry Canada • EN60950 Safety • Bluetooth SIG qualification • USB client • IP68 waterproof and dustproof • Designed to MIL-STD 810G
Standard Accessories	• Li-Ion battery • Hand strap (pre-installed) • USB micro client sync cable • AC wall charger with international plug kit - Input: 100-240VAC, 50/60Hz, 0.5A - Output: 12VDC, 1.67A • Capacitive stylus and tether • Screwdriver • Quick Start Guide • Owner's Manual available on our website • 2-year warranty
Optional Accessories	• Shoulder strap • Serial cable • Vehicle charging adaptor • Holster case • Flip cover fitted case • 8GB micro SDHC memory card • Premium screen protectors • Desktop Cradle See your sales associate for more details on optional accessories.

Note: Specifications are subject to change without notice.