

Carlson Surveyor+ GPS System Quick Start Guide



The Carlson Surveyor+ GPS System incorporates a high accuracy NovAtel RTK GPS receiver and an EDGE class wireless GSM modem. This pack can be fitted on any Surveyor+ data collector. The system can operate by itself as a network rover where a cellular signal and a web based reference network correction is available. It can also operate as a traditional RTK rover with a GPS base receiver and a UHF radio system.

This guide will provide instructions for these steps to setup your new GPS Pack:

- 1) Set up a cellular service data account and receive a SIM card
- 2) Install the SIM card and Install the GPS Expansion Pack on the handheld
- 3) Install the 2nd battery pack and charge the system
- 4) Assemble the remaining System Components
- 5) Install SurvCE 2.52 or higher to complete the Configuration of the GPS pack and GSM cell modem

GSM Modem Activation Instructions

Thank you for purchasing an RTK GPS expansion pack containing a GSM cellular modem. Each enclosed modem has been pre-configured to operate on the GSM network. However, before you can begin to use the modem, you will need to set up a wireless account.

To set up a wireless account, contact your wireless provider/partner/reseller to obtain an account and/or SIM card. Since you already have the equipment, and all you need is to set up an account, it is best to work directly with a cellular service provider (i.e. AT&T, T-Mobile, Vodafone, etc.)

Carlson Software is not responsible for actual data usage on your device. Please consult with your cellphone provider for current rates and costs that may be incurred while using the Internal GSM modem.

When you contact the service agent of the cellular carrier, inform them that you have a cellular data modem and need to set up data service for this device. Your company may already have a business account with a cell carrier. If so, you can add the account you need for this device to your business account.

You will 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. You will need to specify that you need data only service. You do not need voice or messaging service.
3. You may be asked for the modem's 15-character IMEI number (*this can be found in Carlson SurvCE after the GPS pack is installed by completing all the steps then referring to Page 5 in this Guide*)
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.

IMPORTANT: The cell modem is a "MultiTech cellular modem" model **MRSMC-E1**

The cellular carrier will give you a plastic card that has a smaller break out SIM card.

Installing the SIM Card and GPS Expansion Pack

1. Power off the Surveyor+ data collector by holding down the power button for a few seconds and then tapping *Power Off* from the Power Menu.

2. Remove the rubber cover, it has SIM printed on it, from the pack.

3. Insert SIM card carefully making sure that the card is inserted in the correct orientation. The beveled corner on the card will line up with the outline on the socket with the gold electrical contacts facing towards the connector.



CAUTION: There is space between the case and the connector. When inserting the card make sure that the card is inserted into the connector and not into the space above or below the connector.

4. Replace the rubber cover. Run a finger around the outside edge to make sure the gasket is flush with the case. Note: The top portion of the gasket is not flush.



CAUTION: If the rubber cover is not replaced the unit is no longer sealed and the warranty is void.

5. Remove the four screws from the back of the handheld. **PLEASE NOTE:** They do not have to be completely removed from the back.

6. Remove the back of the handheld.

7. Slide the top of the handstrap up to detach it from the back. Remove the bottom of the handstrap and place the handstrap somewhere where you can find it in the future. *The handstrap is not used with the RTK GPS expansion pack.*

8. Place the RTK GPS expansion pack on the back of the handheld.

9. Tighten the four screws to attach the pack.

10. Attach the cell modem antenna to the RTK GPS expansion pack. Use the knurled ring at the bottom of the antenna to tighten the antenna. **Do not twist on the antenna rod to tighten the antenna.**



PLEASE NOTE: The RTK GPS expansion pack should not be operated without having both the cell modem antenna and the GPS antenna connected. !!!

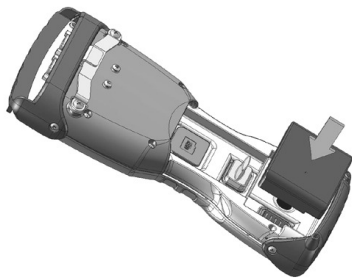
Installing the battery packs

The Surveyor is equipped to handle two battery packs at a time. Both batteries are needed for using the Carlson GPS pack.

1. Use the edge of a key or a flat point screwdriver to open the two quarter turn latches that release the battery door from the unit.



2. Remove the battery door.



3. Insert the battery packs so battery contacts match up (To install the top battery pack you will need to first remove the plastic plug on the upper battery contacts)



4. Insert the tab on the top of the battery door into the case slots
Close the battery door.

5. Reattach the battery door of the unit.

6. Charge the system by connecting the wall charger to the top of the data collector. A flashing red left led light indicates the batteries are charging and a solid red light indicates a fully charged system. It is recommended to charge the batteries overnight for 10 to 12 hours before the first use. The system batteries should provide 4-5 hours of continuous use. A cigarette lighter Travel Charger is provided with for field charging.

Your system comes with two External Battery pack chargers with 2 extra battery packs. The external chargers can be connected to either the included AC Wall Chargers or the Cigarette lighter travel charger.

Please Note: When charging two battery packs in the unit the bottom battery will charge first. The left LED light blinks while charging. When the unit is fully charged the left LED will be solid red. **The unit will not be damaged if left connected to the wall charger for extended periods of time.**

Charging temperatures

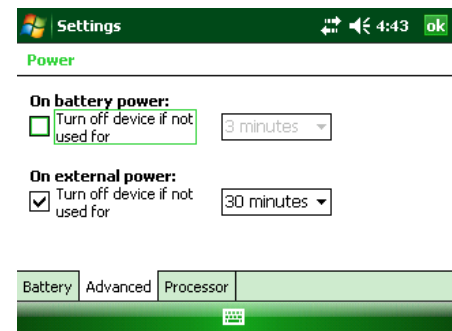
Only charge your battery pack in temperatures between 32° F and 104° F (0° C and 40° C). For best results, charge the battery pack at room temperature (68° F or 20° C).

System Setup


- 1) Attach the lower section of the 2 meter GPS pole (half with the point on one end and 5/8*11 thread at the other) to the upper section (half with the grip and slots) by screwing the two sections together.
- 2) Attach the data collector cradle/pole bracket to the GPS pole either just above or just below the lower cable slot depending on your height. It is not recommended to place the bracket on top of the cable slot because this is the weakest point of the rod. The cradle can be rotated 360 degrees and detached by depressing the button opposite the compass and can be fitted on the left or right side of the pole.
- 3) Screw the GPS dual frequency antenna on top of the pole. This is the disk shaped antenna with the blue bumper located underneath the tray in your system's case. The protrusion on the edge of the antenna is a measure down point in case the antenna is placed on something other than the 2 meter GPS pole provided with the system.
- 4) Feed the antenna cable (black approx. 5' cable with 90 degree TNC connectors on each end) through the GPS pole from either direction and attach it to the fitting on the bottom of the dual frequency antenna. Be careful not to cross thread the fitting on the bottom of the antenna.
- 5) Now place the Surveyor+ data collector, with installed GNSS receiver/GSM modem pack, in the cradle and tighten the knob on the back of the cradle.
- 6) Attach the GPS antenna cable from the lower pole slot to the TNC fitting on the top of the expansion pack. *This GPS antenna cable is intentionally 12" longer than necessary to accommodate in-line UHF Radio solutions.* **PLEASE NOTE:** the RTK GPS expansion pack should not be operated without having both the cell modem antenna and the GPS antenna connected.

Install SurvCE and modify Power settings

- 1) Download and install SurvCE 2.52 or higher from <http://tiny.cc/survce>
- 2) Exit out of the current version of SurvCE on the data collector and power off the Surveyor+ data collector by holding down the power button for a few seconds and then tapping *Power Off* from the Power Menu. Tap "OK" when it prompts you about an unsaved data being lost.
- 3) After about 5 seconds tap and release the power button to power the data collector back on and it will automatically reboot and return you to the Windows Mobile today screen.
- 4) Tap Start / tap Settings / tap the System tab in the bottom left
- 5) Scroll down and tap the **Power Icon** then tap the Advanced tab in the bottom left
- 6) **UNCHECK** "Turn off device if not used for" under the "On battery power". **CHECK** the box under "On External Power" and set it for 30minutes. Then tap OK in the upper right to save your settings and tap X to return to the Today screen.



SurvCE Initial Settings

- 1) Tap Start then tap the “SurvCE” helmet icon to launch Carlson SurvCE
- 2) Tap “Continue Last Job” after SurvCE opens
- 3) Tap the Equip tab then tap “GPS Rover”
- 4) Set the Manufacturer to “Carlson” and the Model name will be set to “Surveyor+ GPS” automatically.
- 5) Tap the RTK tab and set the Device to “Data Collector Internet” and leave the “Network:” set for “None”
- 6) Tap the  configure icon off to the right of “Device: Data Collector Internet”
- 7) Tap “YES” when it prompts you that “Configuring the modem will close SurvCE”. After a few seconds you will see the “Cell Modem Setup” window. Proceed to the steps below to setup the GSM cellphone modem.

PLEASE NOTE: If the *CellModemSetup* window doesn't open automatically you can tap the “Configure Internal GSM” button to open it manually after tapping the configure icon next to Data Collector Internet

Cell Modem Setup configuration

1) A popup box will display asking you to close any applications. Tap “YES” to continue.

2) The screen to the right will be displayed

PLEASE NOTE: The cellular provider may require the IMEI number from the modem. This will be displayed on this screen.

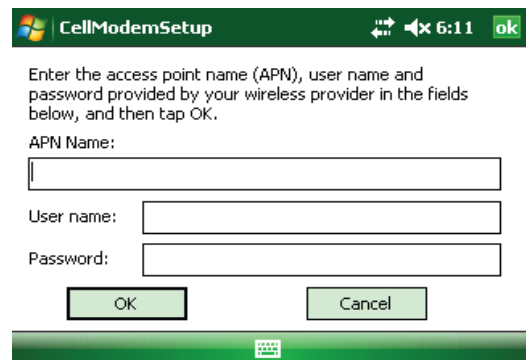
This screen allows you to select settings that are unique to every wireless provider and are required for the modem to connect to Internet. Depending on your wireless provider, there may only be one selection.

3) Select one of the choices presented on this screen and tap on the *Configure* button in the bottom left to configure the modem with the settings you selected.



4) Tap *OK* to close the application and reboot the data collector. The Surveyor+ will reboot and return to the main Windows Mobile screen.

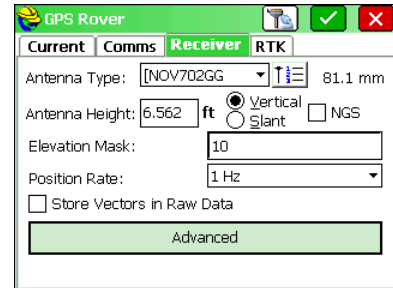
PLEASE NOTE: If the only selection in the list is “Other” tap on the *Configure* button in the bottom left.

The screen to the right is shown. You must obtain the information (APN, user name, and password) from the wireless provider and manually enter this information into each field specified and then tap *OK*. Now you can tap *Configure* and tap *Yes* to reboot the data collector and configure the modem.



Final SurvCE Settings and Connecting to the Network

- 1) Open SurvCE by tapping Start then tapping the SurvCE Helmet Icon. Tap “Continue Last Job” to open the last job.
 - 2) Tap “Connect” and after it starts the GPS go into the Equip tab and tap “GPS Rover”. Set the Manufacturer to “Carlson”
The Comms tab does not require any changes or input.
 - 3) Tap the Receiver tab. If you are using the GPS antenna and Pole provided with the system you can leave the Antenna Type set to “[NOV702GG” and type in **6.562 ft** {2 meters} into the Antenna Height box as shown in the screenshot to the right. The Position Rate can operate at 1hz, 2 Hz or 5 Hz. The “Store Vectors in Raw Data” box can be checked to store additional vector data in the RW5 raw file. (*Processing Vector data is not recommended in a VRS reference system*).
 - 4) Tap the RTK tab and set “Device:” to “Data Collector Internet” then tap the  button next to “Data Collector Internet”. Tap the “Connect” button to connect to the Internet. After the “Internet Status” says “Connected” tap the Green Check.
 - 5) Set the “Network:” to “NTRIP” then tap the  button next to NTRIP to configure your NTRIP reference network settings.
 - 6) Tap the down arrow to the right of “NtripInfoCaster” then tap <New> and hand enter the name of your Reference Network (*i.e. - “Kentucky VRS”*). After typing in the name of the Network fill out the IP Address, Port number, User name and Password. Tap the Green Check in the upper right to download your list of NTRIP Bases to choose from in your Reference Network. *This information is obtained from your Network Administrator who runs the NTRIP network.*
 - 7) You can browse the list of available bases on the reference network by hitting the drop down arrow on the right side of the Name box. Please contact your Network Administrator if you need help selecting the proper Base ID for your current location. After selecting the base you want to use tap the Green Check in the upper right.
- This returns you to the RTK tab where your Message Type, Base ID and the “Send Rover Position” options should all be automatically filled out.
- 8) Tap the Green Check in the Upper right to complete the process and connect to the GPS and the Reference Network. (*for this final step its recommended that you are outdoors with a good Cellphone signal and a good view of the Sky*)



GPS Rover

Current Comms Receiver RTK

Antenna Type: [NOV702GG] 81.1 mm

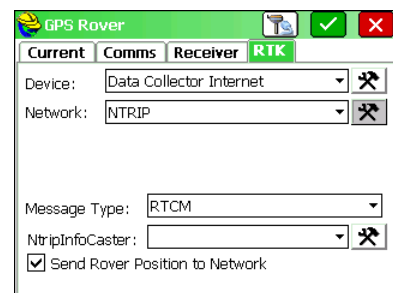
Antenna Height: 6.562 ft Vertical Slant NGS

Elevation Mask: 10

Position Rate: 1 Hz


Store Vectors in Raw Data


Advanced




GPS Rover

Current Comms Receiver RTK

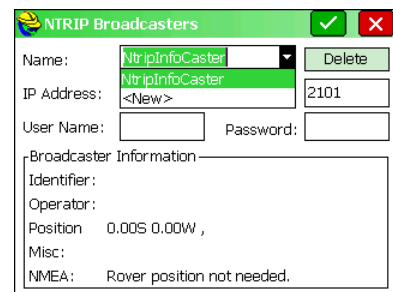
Device: Data Collector Internet 

Network: NTRIP 


Message Type: RTCM

NtripInfoCaster: 

Send Rover Position to Network



NTRIP Broadcasters

Name: NtripInfoCaster 

IP Address: <New> 2101

User Name: Password:

Broadcaster Information

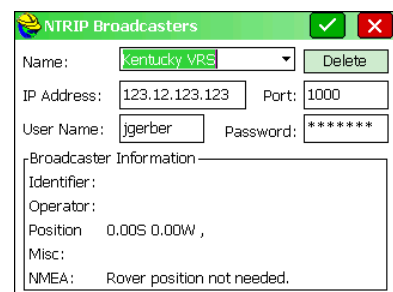
Identifier:

Operator:


Position: 0.00S 0.00W ,

Misc:

NMEA: Rover position not needed.



NTRIP Broadcasters

Name: Kentucky VRS 

IP Address: 123.12.123.123 Port: 1000

User Name: jgerber Password: *****

Broadcaster Information

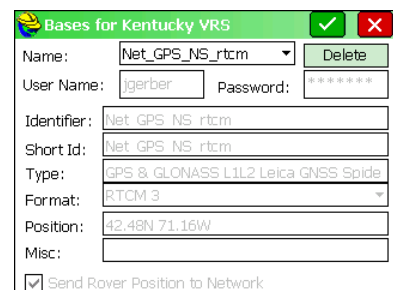
Identifier:

Operator:


Position: 0.00S 0.00W ,

Misc:

NMEA: Rover position not needed.



Bases for Kentucky VRS

Name: Net_GPS_NS_rtcn 

User Name: jgerber Password: *****

Identifier: Net_GPS_NS_rtcn

Short Id: Net_GPS_NS_rtcn

Type: GPS & GLONASS L1L2 Leica GNSS Solide

Format: RTCM 3

Position: 42.46N 71.16W

Misc:

Send Rover Position to Network

Powering On and Off the equipment


Before powering off the Surveyor+ it is recommended that you exit out of the Live Store Points or Stakeout routine to get back to the Main Menu of SurvCE with the File, Equip and Survey tabs.

PLEASE NOTE: *When you power on the Surveyor+ if you see a "Cannot Connect: Dialed *99..." window that pops up you can simply tap the "Dismiss" button to close it.*

If you are **connected to your GPS Antenna and outdoors** you can tap "**Surveyor+ GPS**" to power on your GPS and get connected to the Internet and login to the NTRIP Server to get a FIXED position.

If you are **not connected to your GPS Antenna or if you are inside** a vehicle or indoors in your Job Trailer or in your Office you can tap "**GPS Simulation**" which does not power on the GPS and it does not attempt to connect to your NTRIP server. When you go back outside and connect back to your GPS Antenna you can tap the Equip tab then tap "GPS Rover" and tap the Green Check in the upper right to reconnect to your GPS and log back into the Reference Network.

Troubleshooting Tips

- 1) Make sure the label on the top middle of the data collector has "Surveyor+" printed on it. If it only says "Surveyor" in the yellow text the GPS pack module will not be supported and it **will not function at all**.
- 2) Go into Start / Settings / System tab in the bottom left = scroll down and double-tap "System Config". If the OS Build Version is not 1.1.6 click the link below to update:
http://update.carlsonsw.com/kbase_main.php?action=display_topic&topic_id=696
- 3) Verify that 2 battery packs are installed in the unit and tap the  battery icon from the main Windows Mobile screen in the upper right to verify that the batteries have sufficient charge levels.
- 4) Verify that all 4 screws to attach the Carlson GPS pack are finger tight (it should not require heavy torque - just finger tight)
- 5) If your using a Surveyor+ and running OS 1.1.6 with 2 fully charged batteries and the equipment is still not functioning properly follow the steps below to clear the Windows Registry of your data collector:
 - a.) Exit SurvCE
 - b.) Hold On_Off button for a few seconds
 - c.) Tap the "Reset" button then immediately press and hold the "CTRL-ALT-R" keys on the keyboard
 - d.) Continue holding the Ctrl-Alt-R keys down for about 5 or 10 seconds after you see the blue Surveyor+ splash screen
 - e.) Release all the keys and follow the prompts for calibrating the touch screen and setting your time zone
 - f.) After it boots back up to the Windows Mobile screen you need to reconfigure your Power Settings using Page 4 then Re-install SurvCE 2.52 or higher from the link below:
<http://tiny.cc/survce>