



Getting Started with GPS
March 2011
© Carlson Software

About SurvCE

Carlson SurvCE is the first choice in data collection software with advanced, yet easy-to-use functionality. Carlson SurvCE combines superior functionality, ease-of-use, and sheer capability to make it the first choice in data collection software. Carlson SurvCE is a complete data collection system for Real Time (RTK) GPS and Total Stations with in-field coordinate geometry. It supports the widest range of popular and new release RTK GPS and conventional/ robotic total stations.

Scope of this Guide

This guide is designed to help you quickly familiarize yourself with SurvCE. For the sake of conciseness, only a selection of the many SurvCE functions are presented in this guide. For a full description of all SurvCE solutions, refer to the SurvCE v2.5 manual.

About Carlson Software

Carlson Software develops software solutions that bring the land development professional from concept to completion – the full cycle of a project. An independent company founded by Bruce Carlson in 1983, Carlson Software is well known for its comprehensive civil engineering, land surveying, machine control and positioning, and mining software solutions. Its dedication to customer service is unique in the industry.

Carlson Technical Support

Contact information for tech support for SurvCE is provided below:

Carlson Software, Inc.
Corporate Headquarters
Maysville, KY, USA
Tel (606) 564-5028
Fax (606) 564-6422
e-mail: support@carlsonsw.com

Carlson EMEA, BV
Corporate Headquarters
Almere, Netherlands
Tel: +31 36 750 1781
www.carlsonemea.com
e-mail: support@carlsonemea.com

Customer Service, Technical Support, Repair:

If you need assistance with your Carlson Software products, please send an e-mail to the address above. U.S. support hours are Monday through Friday, 8:00 A.M. to 6:00 P.M. (EST, GMT -5 hours). EMEA support hours are Monday through Friday, 8:00 A.M. to 6:00 P.M. (GMT +1).

Carlson Knowledge Base:

http://update.carlsonsw.com/kbase_main.php

Content

1	Register SurvCE.....	3
2	Create or Select a Job.....	4
3	Define Job Settings.....	5
3.1	New Job.....	5
3.2	System.....	5
3.2.1	Create a Geoid File.....	6
3.3	Format.....	6
3.4	Options.....	7
3.5	Stake.....	7
4	GPS Surveying.....	8
4.1	Base Setup - Unknown Autonomous Location.....	8
4.2	Base Setup - Published Known Location.....	8
4.3	Base Setup - Assumed or Local Coordinates.....	10
4.4	Base Setup - Read from Reference File.....	10
4.5	Base Setup - Previously Surveyed Rover Point.....	11
4.6	Rover Setup.....	11
4.6.1	Current.....	11
4.6.2	Comms.....	12
4.6.3	Receiver.....	12
4.6.4	RTK.....	12
4.7	Logging Raw Data.....	13
5	Localization.....	15
5.1	Store Data with Store Points.....	15
5.1.1	Recording Data.....	16
5.2	Stakeout Points.....	17
5.2.1	Defining the Point to Stake.....	17
5.2.2	Staking Out the Point.....	18
6	Feature Coding.....	20
6.1	Create a Feature Code.....	20
6.2	User Define the Special Codes.....	20
6.3	Carlson Line Coding Entry.....	21
6.4	Field-to-Finish.....	21

1 Register SurvCE

The first time you start SurvCE, you will be prompted to register your license of the software. If you do not register, SurvCE will remain in demo mode, limiting each job file to a maximum of 30 points.

SurvCE registration is done via the Internet at the following address: www.survce.com

You will be required to enter the following information:

- User Name
- Company Name
- Serial Number*
- Email Address
- Phone Number
- Fax Number
- Hardware ID#1*
- Hardware ID#2*
- Reason for Install
- Registration Code*

*: Select Equip>About SurvCE>Change Registration in SurvCE to read this information. After you submit this information, your change key will be displayed and emailed to the address that you submit. Keep this for your permanent records. You may then enter the manufacturer and model of your equipment.

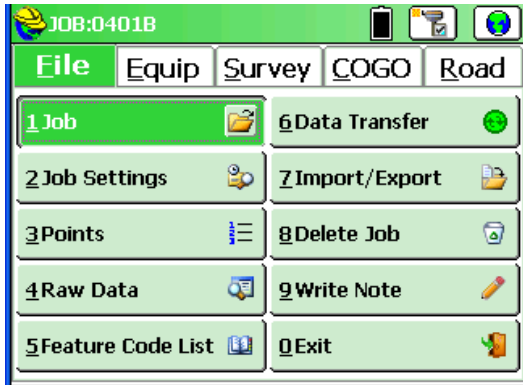
If you do not have access to the Internet, you may fax the above information to (+1) 606-564-9525. Your registration information will be faxed back to you within 48 hours. After you receive your Change Key, enter it and tap **OK**. You can then create a new SurvCE job.

2 Create or Select a Job

A job in Carlson SurvCE is made up of several files, however, the main two files are the coordinate file (*.crd) and the raw data file (*.rw5). To create a job:

1. Select the **File** tab and menu item 1, **Job**.
2. Enter the job name (e.g. "Tutorial1").

Note: Opening an existing job is performed the same way except you select a job name as opposed to entering one.

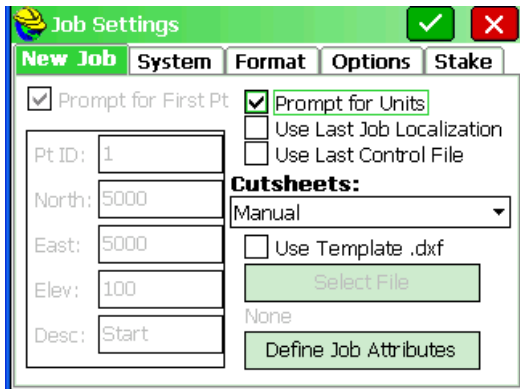


You can leave SurvCE from the **File** menu with item 0, **Exit**. To check your SurvCE version select **Equip** from the main menu and then item 0, **About SurvCE**.

3 Define Job Settings

By default the software will prompt for the job units upon job creation by presenting the **Job Settings** dialog. This setting is optional and can be found on the **New Job** tab.

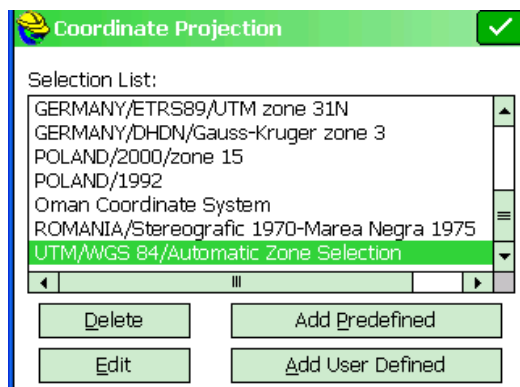
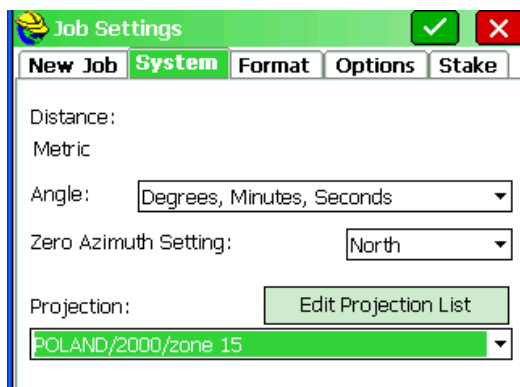
To access **Job Settings** after closing the dialog, select the **File** tab and menu item 2, **Job Settings**.



3.1 New Job

This tab allows you to configure how all new jobs will be created.

3.2 System

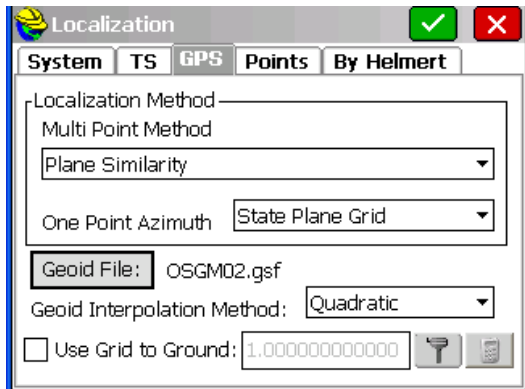


The **System** tab is where the initial job units must be specified. It also has several options for specifying how data will be presented to the user.

1. Select the **System** tab of **Job Settings** if not already there.
2. Set the job distance unit to Feet, US Feet or Meters and the Angle unit to DMS or GONS\Grads as required by the job. *You cannot change the job distance units once a point has been recorded (i.e. convert it from feet to meters).*
3. Select the Projection you are using in your job with the **Edit Projection List** button. Prior to localizing in any job you must select the proper projection. It is also recommended to select a geoid file (see 3.2.1).
Now you can either select a projection from the list or add a predefined projection with the **Add Predefined** button. You can also define your own projection and add datum transformation parameters with the **Add User Defined** button.

3.2.1 Create a Geoid File

Select your geoid file in **Equip**, item 6, **Localization**, go to the **GPS** tab and select the **Geoid File** button. You might want to finish **Job Settings** first and then enter the geoid file in **Localization**.



Geoid files are available for a number of countries. Place the geoid file (*.gsf) in the SurvCE\Data folder on the controller to make it ready for import. You can also use the global geoid model, e.g. the EGM2008 world geoid and select the proper zone for your area. Instead of selecting a complete geoid, it will often be more efficient to create a smaller file suited for your survey. This procedure is described below.

Carlson X-Port and Carlson Geoid Grids are installed separately. They are both located on the Carlson SurvCE CD or they can be downloaded from:

<http://update.carlsonsw.com/public/CarlsonGeoidGrids.exe>

1. Install Carlson X-port (XportSetup.exe). **Use the serial number listed in the back of your SurvCE manual** (it should be listed as X-port serial # and start out like this: "133..."). You can also use the Data Transfer option in Carlson Survey or Carlson SurvCadd in lieu of Carlson X-Port.
2. Install the Carlson Geoid Grids (CarlsonGeoidGrids.exe). Once you have finished installing Carlson X-port and the geoid grid files you can now create a geoid file and transfer it to the data collector as follows:
 1. Hook up the data collector to the computer with the 9pin or USB cable.
 2. Turn on the Explorer and launch SurvCE.
 3. On the data collector select menu item 6, **Data Transfer** from the **File** tab.
 4. Select Carlson **Transfer** (it should say awaiting connection).
 5. On the desktop computer, launch Carlson X-port and select menu item Data Transfer from the Tools menu.
 6. Select **Data Transfer** sub-menu item SurvCE/G2/FastSurvey... to launch the SurvCOM dialog.
 7. Select the **Geoid** button in the bottom right corner of the SurvCOM dialog.
 8. Click the select button and navigate to the directory you installed the Geoid Grids to.
 9. Key in the approximate Latitude and Longitude for the center of your project, the Grid Size and the File Name that you want store the geoid file as. Normally you would want to make a 150-200 km grid file or 1.5 - 2 degrees for best performance.
 10. Select OK to make the geoid file and copy it to the data collector.
 11. Once the transfer is complete, close X-Port and disconnect from the data collector.
 12. Close the Data Transfer dialog on the data collector and set the geoid file by selecting the **GPS** tab of **Localization** located as menu item 6 on the **Equip** tab.

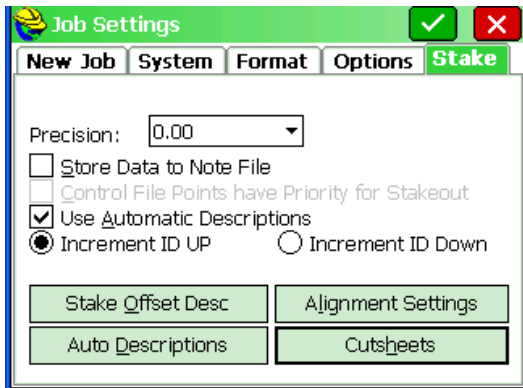
3.3 Format

This tab allows you to select the viewing format of the data displayed and entered

in the current job.

3.4 Options

This tab allows you to set configuration options for the current job.



3.5 Stake

The **Stake** tab is where you define the precision of the stakeout values that are reported during stakeout and where cutsheet (a.k.a. grade sheet) files can be setup:

1. Select the **Stake** tab of **Job Settings**.
2. Select the desired decimal precision.
3. Select the **Cutsheets** button.
4. Tic e.g. **Point Stakes** and select a file (e.g. "Tutorial_Pts").
5. Select the **Format** button to configure the cutsheet to your liking.
6. Select **OK** and setup remaining cutsheets if applicable.

4 GPS Surveying

Prior to starting a GPS survey, make sure you have selected the correct **Job Settings** such as units, coordinate system, options, etc. Operational settings must be defined using either menu item 2, **GPS Base** or menu item 3, **GPS Rover** on the **Equip** tab. For details about a specific instrument, see the SurvCE V2.5 Manual.

Menu item 2, **GPS Base** on the **Equip** tab allows the user to set the operational settings of the Base Station and also provides several options for starting the survey.

Menu item 3, **GPS Rover** simply established the operational settings of the rover. In case of a VRS survey, **GPS Base** can be skipped.

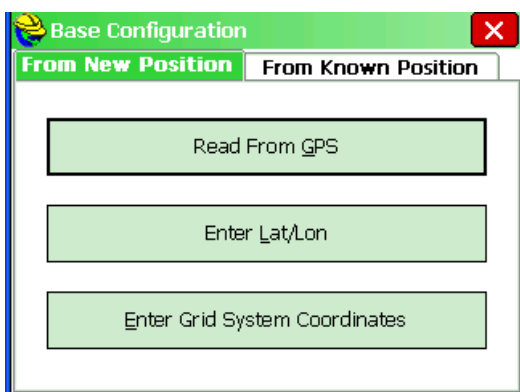
4.1 Base Setup - Unknown Autonomous Location

This section covers how to setup the base at an unknown location with the assumption that the site localization will be established using the rover.

1. Select menu item 2, **GPS Base** on the **Equip** tab.
2. Establish the operational settings.
3. Enter the **Base Antenna Height**.
4. Select **OK**.
5. At the **Base Configuration** dialog, select **Read from GPS** from the **From New Position** tab.
6. At the **Average GPS** dialog, enter the **Number of Samples (Epochs)** to measure and average.
7. Select **OK** to begin measuring.
8. Select **OK** to close the results dialog if the results are acceptable.
9. Enter the base reference ID if prompted. For Trimble users, this is the broadcast ID and should be between 0 and 31 for CMR and between 0 and 1023 for RTCM.
10. When prompted to save the reference file, answer **Yes** in case you need to set the base at this location again, i.e. the next day.
11. Unplug from the base station.

At this point the base has established a position based on averaging the autonomous readings taken in step 6 and should be broadcasting corrections from this location.

To setup at this location again: Use the **Read from Reference File** process.



4.2 Base Setup - Published Known Location

This section covers how to setup the base at a published known location (e.g. Government Control Point) with the assumption that the site is to be based on the published coordinate system.

If Published Values are Latitude and Longitude:

1. Select menu item 2, **GPS Base** on the **Equip** tab.
2. Establish the operational settings.
3. Enter the **Base Antenna Height**.
4. Select **OK**.

5. At the **Base Configuration** dialog, select **Enter Lat/Lon** from the From **New Position** tab.
6. At the **Enter Lat/Lon** dialog, enter the published latitude, longitude and ellipsoid or orthometric height. Note that if a geoid file was not applied in Job Settings that the ellipsoid height is the only option.
7. When prompted to continue, verify the coordinates and select **Yes**.
8. Enter the base reference ID if prompted. For Trimble users, this is the broadcast ID and should be between 0 and 31 for CMR and between 0 and 1023 for RTCM.
9. When prompted to save the reference file, answer **Yes** in case you need to set the base at this location again and do not have the coordinates handy.
10. Unplug from the base station.

At this point the entered published position was sent to the receiver and the base should be broadcasting corrections from this location.

To setup at this location again: Use the **Read from Reference File** process.

Enter Lat/Lon

Use dd.mmsssss format.

Latitude: 52.12091248

North South

Longitude: 5.59451633

West East

Height: 43 m

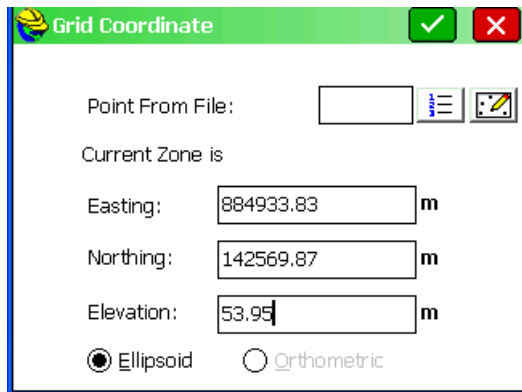
Ellipsoid Orthometric

If Published values are Grid System coordinates:

1. Select menu item 2, **GPS Base** on the **Equip** tab.
2. Establish the operational settings.
3. Enter the **Base Antenna Height**.
4. Select **OK**.
5. At the **Base Configuration** dialog, select **Enter Grid System Coordinates**.
6. At the **Grid Coordinate** dialog, enter the published coordinates and ellipsoid or orthometric height. Note that if a geoid file was not applied in Job Settings that the ellipsoid height is the only option.
7. When prompted to continue, verify the coordinates and select **Yes**.
8. Enter the base reference ID. For Trimble users, this is the broadcast ID and should be between 0 and 31 for CMR and between 0 and 1023 for RTCM.
9. When prompted to save the reference file, answer **Yes** in case you need to set the base at this location again and do not have the coordinates handy.
10. Unplug from the base station.

At this point the entered published position was sent to the receiver and the base should be broadcasting corrections from this location.

To setup at this location again: Use the **Read from Reference File** process.



4.3 Base Setup - Assumed or Local Coordinates

This section covers how to setup the base at a location where the coordinates are either assumed or have been established as a local system.

1. Select menu item 2, **GPS Base** on the **Equip** tab.
2. Establish the operational settings.
3. Enter the **Base Antenna Height**.
4. Select **OK**.
5. At the **Base Configuration** dialog, select **Use Local Coordinates** from the **From Known Position** tab.
6. At the **Local Point** dialog, enter the local coordinates or select the job point. Note that a geoid file should be applied in **Job Settings**.
7. When prompted to save a localization file, select **OK**.
8. When prompted to continue, select **Yes**.
9. Enter the base reference ID if prompted. For Trimble users, this is the broadcast ID and should be between 0 and 31 for CMR and between 0 and 1023 for RTCM.
10. When prompted to save the reference file, answer Yes in case you need to set the base at this location again.
11. Unplug from the base station.

At this point a localization was created by pairing the entered local coordinate and a GPS reading from the base station. The base should now be broadcasting corrections from this location.

To setup at this location again: Use the **Read from Reference File** process.

4.4 Base Setup - Read from Reference File

This section covers how to setup the base at a location that was previously occupied by the base station and the reference file was saved.

1. Select menu item 2, **GPS Base** on the **Equip** tab.
2. Establish the operational settings.
3. Enter the **Base Antenna Height**.
4. Select **OK**.
5. At the **Base Configuration** dialog, select **Read from File** from the **From Known Position** tab.
6. When prompted, select the previously saved reference file and select **OK**.
7. When prompted to continue, select **Yes**.
8. Enter the base reference ID if prompted. For Trimble users, this is the broadcast ID and should be between 0 and 31 for CMR and between 0 and 1023 for RTCM.
9. Select **OK** when presented with the Base Setup Successful message.
10. Unplug from the base station.

At this point the original GPS position in the reference file was sent to the receiver and the base should be broadcasting corrections from this location.

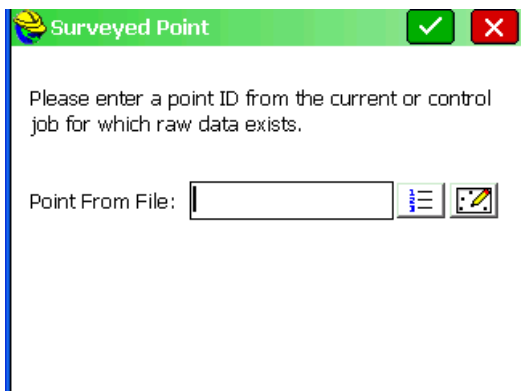
4.5 Base Setup - Previously Surveyed Rover Point

This section covers how to setup the base at a location that was previously surveyed by the rover and the GPS record exists in the raw data file.

1. Select menu item 2, **GPS Base** on the **Equip** tab.
2. Establish the operational settings.
3. Enter the **Base Antenna Height**.
4. Select **OK**.
5. At the **Base Configuration** dialog, select **Previously Surveyed Point** from the **From Known Position** tab.
6. When prompted, select the **Surveyed Point** and select **OK**.
7. When prompted to continue, select **Yes**.
8. Enter the base reference ID if prompted. For Trimble users, this is the broadcast ID and should be between 0 and 31 for CMR and between 0 and 1023 for RTCM.
9. When prompted to save the reference file, answer **Yes** in case you need to set the base at this location again and don't have the raw data file.
10. Unplug from the base station.

At this point the original GPS position was sent to the receiver and the base should be broadcasting corrections from this location.

To setup at this location again: Use this method or the **Read from Reference File** process if you no longer have the raw data file.



4.6 Rover Setup

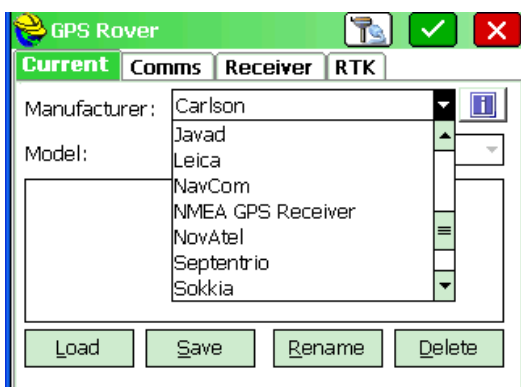
Select menu item 3, **GPS Rover** simply established the operational settings of the rover.

Tip:

Check that you have a fixed position before leaving the base station by selecting menu item 7, **Monitor/SkyPlot**. If you are autonomous, you are not getting base correction and likely have issues with the radio settings.

4.6.1 Current

Select the manufacturer and model of your GPS system. You can also save your rover settings in a configuration file and re-load them when necessary.

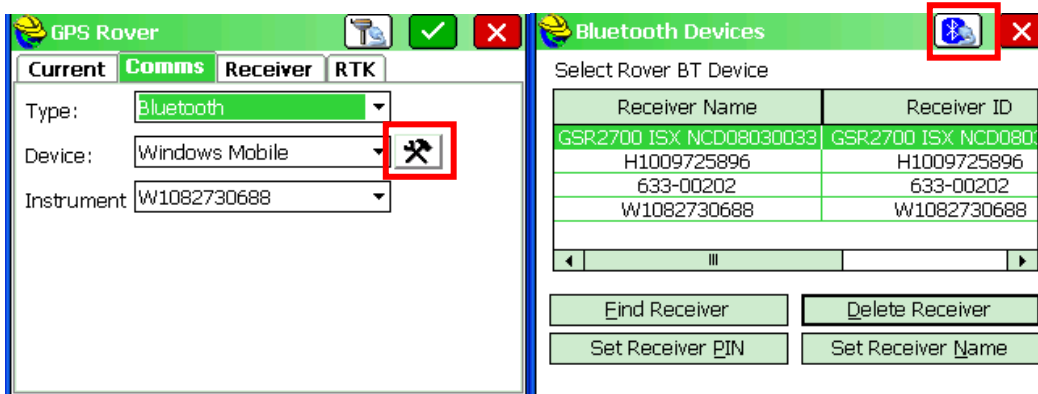


Tip:

You can select "GPS Simulation" as manufacturer which will bring you in a simulation mode so you can practice with storing points and stake out without having an instrument connected.

4.6.2 Comms

Select how the controller is connected to your GPS rover, either by cable or Bluetooth. When you select Bluetooth as type, clicking the tools icon next to the right of **Device** proceeds to the **Bluetooth Manager** screen. This screen gives you the option to choose which GPS receiver you would like to connect to via Bluetooth. If you click **Cancel**, no Bluetooth connection will be established. Select a receiver and click the Bluetooth icon at the top of the screen to connect.



4.6.3 Receiver

In this tab make the following settings:

1. Select the **antenna type** of your GPS rover. Often the antenna type is already set by SurvCE, but it is important to set the correct antenna type because of the antenna offset.
2. Select the **antenna height**. This is the pole height which you are using, SurvCE will automatically add the offset value to the phase center of the antenna. When the rover is on a pole, the antenna height is "Vertical". When the rover is on a tripod, the antenna height is "Slant".

Example: if you have a Carlson Surveyor+ GPS rover on a 2m pole then just enter 2m as the antenna height. You will notice that SurvCE will correct this to 2.0855m. The 0.0855 correction is the offset from the bottom of the receiver (top of the pole) to the antenna phase center which is the actual reference point for the GPS readings.

The American National Geodetic Survey (NGS) has calibrated most commercially available GPS antenna's. By selecting the NGS tic box you can use the NGS calibration. This will have an effect on the antenna offset.

3. Select the **elevation mask**. This specifies the cutoff vertical angle above the horizon. Any satellites below this angle will be left out of calculations. A suitable value is "13" or "15" degrees.
4. Select the **position rate**. For surveying applications 1 Hz is an appropriate value. In case of accurate stake out applications 2 Hz or 5 Hz is a useful rate (if your receiver allows this).
5. **Store Vectors in Raw data** is an option which is useful when you want export the GPS vectors (the GPS observation) to an office package for least squares adjustment.

4.6.4 RTK

Use this tab to connect to a base station or GPS RTK (VRS) network.

1. Select the modem **Device** which you will use to connect to the base or network. In case of a base – rover setup this will usually be a radio, in case of a network this will be a GSM (GPRS) modem. When you are using a GSM modem integrated in the data collector (e.g. the Surveyor+) then select "Data Collector Internet". You can select the configure button to the right to configure the modem. You only have to do this when you select a new modem. In case of a connection by GPRS (e.g. for "NTRIP", see below) you must enter the GPRS provider settings here: APN Server, userid and password.
2. In case you connect to a GPS RTK network you select the **Network type**. These are the main options:
 - "TCP/IP Direct": For connecting to a single modem at a base or to a VRS network or another network that doesn't require a special login.
 - "UDP/IP Direct": This works exactly like the TCP Direct option but uses UDP protocol instead of TCP. Most networks use TCP.

- "NTRIP": This option is for networks that support NTRIP protocol. Pressing the Configure button shows the NTRIP Broadcasters that have been previously connected to. In order to access a network by NTRIP you need the network's IP address and port, and a userid and password. When you are connected to a NTRIP caster you can select a mountpoint. SurvCE will read the settings from the source table so you don't have to enter the mountpoint parameters yourself.
- "Direct dial": This will create a GSM data connection. If you select this option you must enter the phone number by selecting the configure icon to the right of Base ID at the bottom of the screen.

4.7 Logging Raw Data

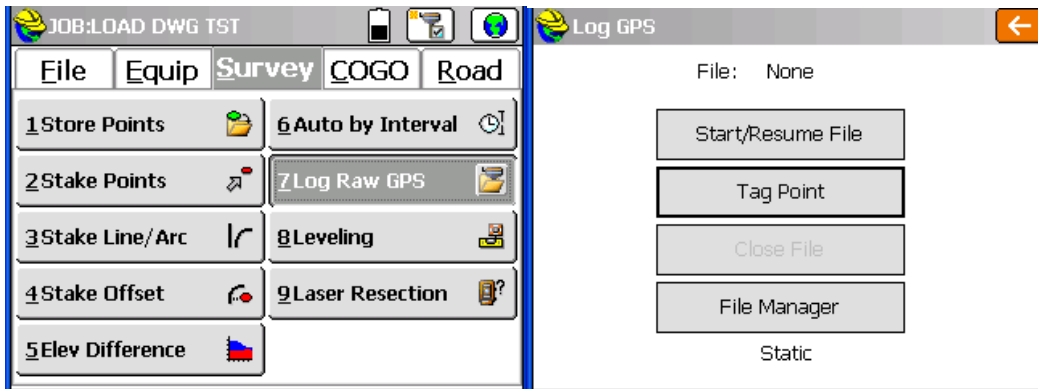
Logging raw data is required if you want to post-process your raw GPS observations with p-p office software such as Carlson's SurvGNSS. This can be useful as a backup method for RTK and also for performing sub-centimeter geodetic surveys.

You can log raw data in two basic ways: you can use the static mode option on your GNSS receiver (i.e. use a button combination on you receiver panel to commence the logging – see your Receiver Operation's Manual) or you can use the log raw data function in SurvCE. Note that this option is SurvCE is not available for all receiver brands.

Using SurvCE: the **Survey>Log Raw GPS** function allows you to fully control raw data logging. Using this method offers three advantages:.

1. Antenna reduction is automatically performed during post-processing because of the antenna height value (from the receiver properties) stored in the raw data files.
2. Ability to name the raw data file and insert time tags.
3. Ability to pause/resume data logging.

By default, raw data is logged to the receiver's internal memory.



To start logging:

1. Tap **Survey**>**Log Raw GPS**.
2. Tap **Start/Resume File**.
3. Set the following parameters:
 - Elevation Mask in degrees.
 - Check the antenna height value. If it's wrong, tap the **Change Antenna** button to set the new value.
 - Logging interval in seconds.

Confirm to start data logging. From the screen then displayed, you can do the following:

- Name the raw data file, mark a particular point or event (**Tag New Site**).
- Stop data logging (**Close File**).
- Access the File Manager window in read-only mode (**File Manager**).
- **Continue Logging / Pause Logging**. Pausing data logging means closing the currently open file. Continuing data logging means opening a new file. Data logging will start immediately based on the parameters set for the previous file.

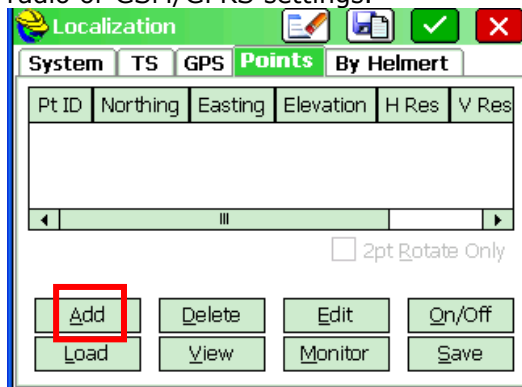
Data can be downloaded from the receiver to your PC for further processing, see your Receiver Operation's Manual for details.

5 Localization

Localization is a process that allows the user to shift the GPS measurements to a local coordinate system. Localization can be used to improve the local fit of your national coordinate system (so that your survey fits in with the local situation), or to create a complete arbitrary coordinate system (with new origin and axes).

To adjust to local control:

1. Select menu item 3, **Configure Rover** on the **Equip** tab and establish the operational settings of the rover.
2. Check that you have a fixed position by selecting menu item 7, **Monitor/SkyPlot**. If you are autonomous, you are not getting corrections and likely have issues with the radio or GSM/GPRS settings.



3. Select menu item 6, **Localization** on the **Equip** tab and select the **Points** tab.
4. Select the **Add** button.
5. Enter the local coordinates or select a local point from the job. Note that you cannot enter a point ID if the point does not exist in the current job (go to the **File** tab of the main menu and select item 3, **Points** to enter local points).
6. Select **Read from GPS** when prompted for the GPS Coordinates.
7. At the **Average GPS** dialog, enter the **Number of Samples (Epochs)** to measure and average.
8. Select **OK** to begin measuring.
9. At the **Average Results** dialog, select **OK** if all samples were OK. If not, cancel and measure again.
10. To add more than one point, repeat steps 1 through 9.
11. Select **OK** to save the localization file.

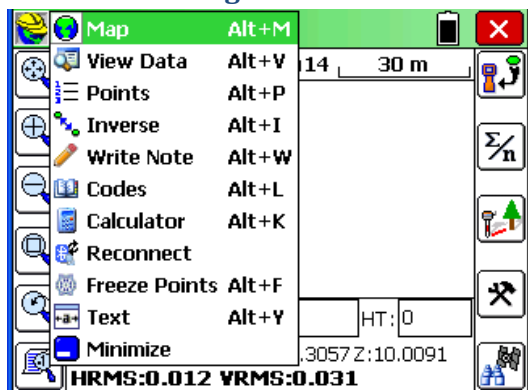
If the scale factor is 1.0 in **Job Settings**, then the coordinates will be Grid coordinates. If a value is entered, the vector distance from the first point in the localization file to the current position will be divided by the entered value.

If the localization determines a scale factor because more than one point is held horizontally, then the scale factor in **Job Settings** is grayed out and reflects the local to grid factor.

5.1 Store Data with Store Points

The routine used for collecting survey data using GPS is found on the **Survey** tab of the main menu, item 1, **Store Points**.

5.1.1 Recording Data



The graphic view of **Store Points** is shown below. Alternately, the user can select the **Text** option (**Alt+Y**) from the 'helmet' drop down menu in the top left of the screen.

On the left side of the screen you will find the zoom icons, from top to bottom:



Zoom Extents: This zooms the entire drawing to fit the screen.



Zoom In: Zooms in 25%.



Zoom Out: Zooms out 25%



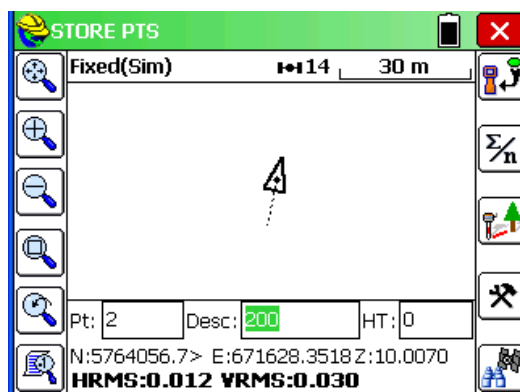
Zoom Window: Zooms into a rectangular area that you pick on the map screen.



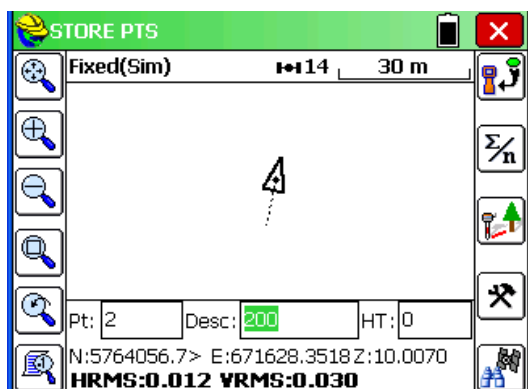
Zoom Previous: Zooms to the previous view. SurvCE remembers up to 50 views.



View Options: Displays the View Options dialog box, where you can control aspects of points such as the symbol, the style of the plot and the freezing or thawing of attributes such as descriptions and elevations. To avoid "point clutter", you can even set it to show only the last stored point along with setup and BS.



On the right side of the screen find these options:



This icon will **Store** a point. This function is also performed via the Enter key. (ALT-S).



This icon will lead to a dialog where the user can **Average** up to 999 epochs of GPS readings (ALT-A).



This icon leads to **Offset** reading screens with options for keyed-in offsets as well as offsets taken by laser and hydrographic devices that measure distance only, or distance and azimuth (ALT-O).



This icon will take you to the **Configure** dialog, also found on the **Equip** tab. Here you set many preferences in SurvCE such as the number of readings to average, function of the **Store** icon, and whether to display the Hgt/Desc prompt on Save (ALT-C).



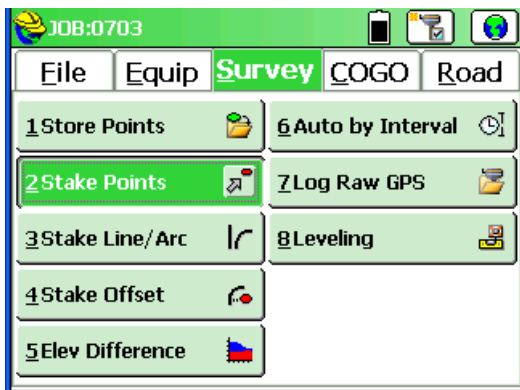
This icon will take you to **Monitor/Skyplot**, also found on the **Equip** tab.

ⓘ Tips:

1. The Enter button can be used to Read and Store.
2. To enter the description after the reading, turn on the Hgt/Desc Prompt on Save option using the Configure icon or by selecting menu item 4, **Configure Reading** from the **File** tab.
3. All off-center readings are accessed through the Offset icon.
4. To change the behavior of the Enter key, select the Configure icon.
5. To change the number of epochs that Enter and ALT-S will read, select Configure and change the Number of Readings to Average option.
6. To only view linework and the last measured point, select the View Options icon or ALT-F.
7. To draw linework you must have fieldcodes established in the item 5, **Feature Code List** found on the **File** tab of the main menu.

5.2 Stakeout Points

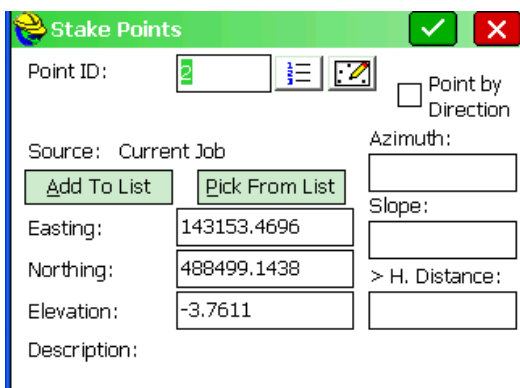
The routine used for staking out pre-calculated points is called **Stake Points** and is found on the **Survey** tab of the main menu.



5.2.1 Defining the Point to Stake

In order to stake a pre-calculated location you must enter the point ID or coordinates into the dialog that is presented when you enter **Stake Points**.

1. Enter the Stakeout Point ID.
2. Select **OK** to Stake the Point.



ⓘ Tips:

1. Point by Direction can be used to quickly enter an offset location from the stake Point ID.

2. Math functions can be performed in the direction input boxes to solve inverses, etc... (e.g. 1,2 in the azimuth field would return the azimuth between points 1 and 2). Math functions can also be used to quickly calculate distances in the distance input boxes (e.g. 1,2/2 would return 1/2 the distance between points 1 and 2).
3. Multiple points can be selected using the List icon to the right of the Point ID input box or by entering them separated by commas.
4. The Add to List button will add all points entered into the Point ID input box to the Stakeout Point List.

5.2.2 Staking Out the Point

The graphic view of **Stake Points** is shown below. Alternately, the user can select the TEXT button to use a non-graphical interface to stakeout the point.

On the left side of the screen you will find the zoom icons, from top to bottom:



Zoom Extents: This zooms the entire drawing to fit the screen.



Zoom In: Zooms in 25%.



Zoom Out: Zooms out 25%



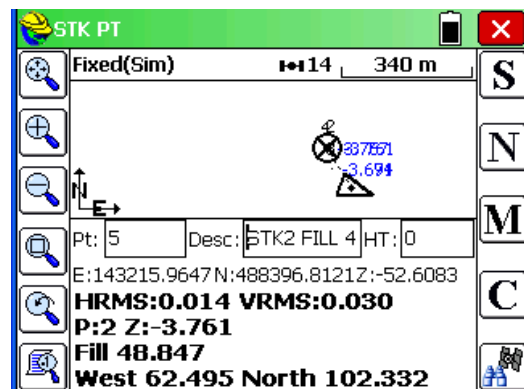
Zoom Window: Zooms into a rectangular area that you pick on the map screen.



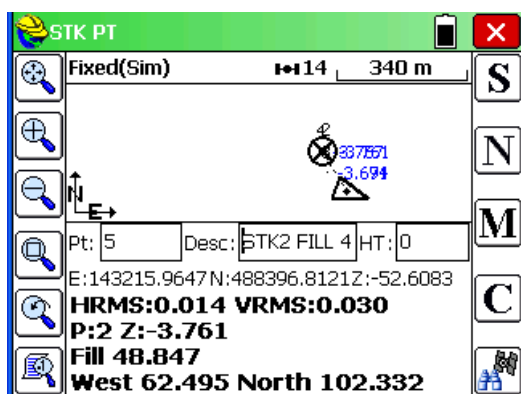
Zoom Previous: Zooms to the previous view. SurvCE remembers up to 50 views.



View Options: Displays the View Options dialog box, where you can control aspects of points such as the symbol, the style of the plot and the freezing or thawing of attributes such as descriptions and elevations. To avoid "point clutter", you can even set it to show only the last stored point along with setup and BS.



On the right side of the screen find these options:



Store

Next (point)

Modify

Configure

Monitor Skyplot

ⓘ Tips:

1. Use **M** for Modify to enter or adjust the stake location.
2. Use **N** for Next to advance to the next point ID.
3. To change the behavior of the Enter key, select the **C** for Configure icon.
4. To change the number of epochs that Enter and **S** will read, select **C** for Configure and

change the Number of Readings to Average option.

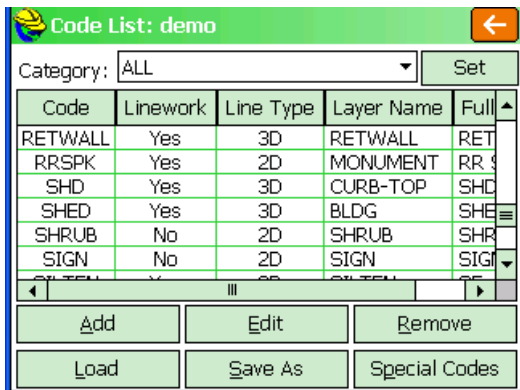
5. To only view linework and the last measured point, select the View Options icon or ALT-F.

6. To change the method that the navigation information is reported, select **C** for Configure and then the **Reference** tab. This is where the stakeout perspective can be changed from rod to instrument for example.

6 Feature Coding

Carlson SurvCE has the ability to draw lines live in the field based on the feature codes established in menu item 5, **Feature Code List** on the File tab. Each code can be defined as a point or a 2D or 3D line (polyline). In addition to the feature code, additional Special Codes can be used to specify how the line is to be drawn.

Feature codes can include one or more attributes for e.g. for GIS applications. Feature codes and attributes can be stored in a feature code list file (*.fcl).

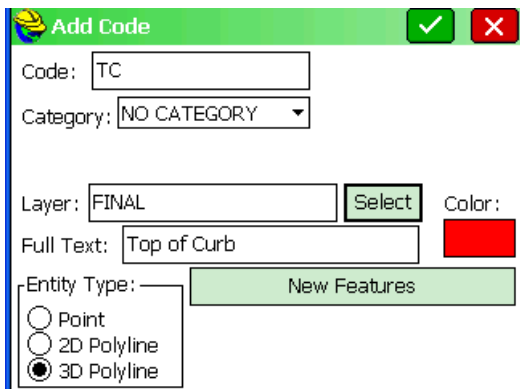


6.1 Create a Feature Code

To create a code:

1. Select the **Add** button from the **Code List** dialog.
2. Specify the short Code, layer for the line, full text for the list and whether or not the line is 2D or 3D. Note that the layer and 2D/3D options do not apply if the code is not a line (polyline).
3. Select **OK** to save the code to the library.

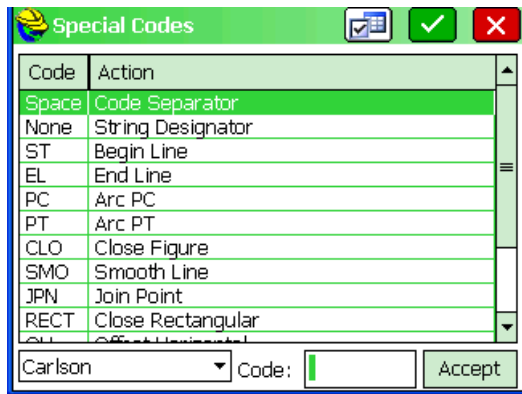
Note: The **New Features** button is where all GIS style prompting is defined per code.



6.2 User Define the Special Codes

To modify the Special Codes so that the line drawing commands fit your current codes:

1. Select the **Special Codes** button from the **Code List** dialog.
2. Select the Action that requires a different Code.
3. Enter the Code into the Code input box and select the **Accept** button.

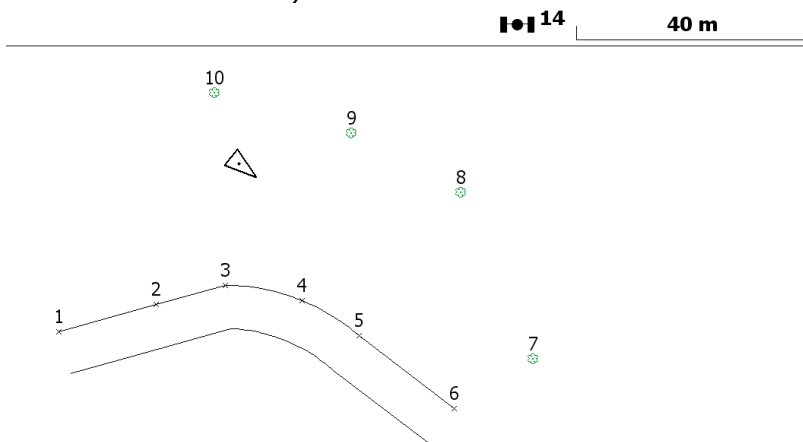


6.3 Carlson Line Coding Entry

Carlson SurvCE only requires a line code to be defined once and allows suffix numbers to determine what points get linked together. Example, code TC can be entered as TC1 or TC2 and so on. All TC1's will be linked together and the TC2's will be a separate line. Carlson SurvCE also allows the user to start and stop lines at any time which allows the user to re-use any line code after it has been ended.

ⓘ Tips:

1. All codes are entered into the description field.
2. All codes, including special codes, are separated by a space (e.g. TC PC).
3. All codes allow the use of numeric suffixes. Example, code TC can be used multiple times simultaneously by add a numeric suffix to the end (e.g. TC or TC1 or TC2). This comes in handy when cross-sectioning a road.
4. Multiple lines can be coded at a single point by simply entering the codes as FeatureCode space SpecialCode space FeatureCode space SpecialCode and so on (e.g. TC1 -7 EP1 +7).



6.4 Field-to-Finish

Carlson SurvCE has the Carlson Field-to-Finish line drawing routine for updating and reprocessing line codes that were entered in the description field. If the user makes an coding error, they can simply correct the description in the List Points dialog and run Field-to-Finish to correct the line work.

To redraw the lines and update the drawing:

1. Select the **MAP** button from the main menu (globe icon on the top right of the screen) or, if currently in a measurement screen, select ALT-M.
2. Select **Field-to-Finish** from the **Tools** menu.
3. Press Enter when the command line prompt shows Fld2Fin - Update/Select/reView/<Redraw>

ⓘ Tips:

1. While in a measurement screen, ALT-P will take you to the points list for editing the descriptions.

-
2. If only the description its edited, the raw data file description will also be corrected to ensure raw data processing will reflect your coding corrections.

Index

A

Antenna reduction, 16
antenna type, 14
attributes, 22
Autonomous, 10
averaging, 10
azimuth, 20

B

Bluetooth, 14
Bluetooth Manager, 14

C

Carlson X-Port, 8
change key, 5
CMR, 10, 12
Configure dialog, 18
Control Point, 10
corrections, 12
crd, 5
Cutsheets, 9

D

Data Transfer, 8
Direct dial, 15
DMS, 7

E

EGM2008, 8
elevation mask, 14
Epochs, 17

F

feature codes, 22
fieldcodes, 19
Field-to-Finish, 23

G

geoid file, 7, 8
GIS, 22
GONS\Grads, 7
GPRS, 15
GPS Simulation, 14

J

Job Settings, 7

L

line code, 23
linework, 19
local fit, 17
Localization, 17
log raw data, 16

M

modem, 15
mountpoint, 15

N

Network type, 15
Next (point), 20
NTRIP, 15

O

Offset, 18

P

position rate, 14

R

raw data, 15
registration, 5
rw5, 5

S

scale factor, 17
stake, 9
Stakeout Points, 19
Store Points, 18
Store Vectors, 15
SurvGNSS, 15

T

TCP/IP, 15
time tags, 16
Trimble, 11

U

UDP/IP, 15

V

VRS survey, 10

Z

Zoom, 18, 20