IMS Evidence Recorder 11 (2019-02-12)

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   - A searchable "Helpdesk" section with general user instructions and information about the Software.
   - A link to allow end users of the Software to download any bug fixes, error corrections or other updates to the Software that MICROSURVEY may make available through the Site.
   - "Contact MICROSURVEY" electronic response capability. MICROSURVEY will use reasonable commercial efforts to respond within two (2) business days to a customer inquiry received via this system. Answers to such inquires will be added to the FAQ's, as appropriate.

c. Contract Support. Upon mutual agreement in writing between Licensee and MICROSURVEY, or between Licensee and one of MICROSURVEY'S authorized resellers, MICROSURVEY will provide contracted support services to Licensee as may be agreed upon and related to the Software.

10. **Term and Termination.**

a. This Agreement is effective until terminated. Licensee may terminate this Agreement at any time, with or without cause, upon notice to MICROSURVEY. MICROSURVEY may terminate this Agreement for Licensee's breach of this Agreement.

b. Upon termination of this Agreement, Licensee shall immediately cease all use of the Software and Documentation and return to MICROSURVEY all copies of thereof within five (5) days after such termination. Upon MICROSURVEY'S request, Licensee will certify in writing to MICROSURVEY that all such copies have been returned to MICROSURVEY. The following provisions of this Agreement shall survive termination or expiration of this Agreement: Sections 2(b) (Restrictions), 3 (Ownership), 5 (Warranty Disclaimer), 6 (Exclusion of Damages), 7 (Limitation of Liability), 10 (Term and Termination), and 11 (General).

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    b. **Amendments;** Modifications. Notices of changes to this Agreement or other matters may be made to Licensee by displaying notices or links to notices to Licensee generally on the Site.
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    e. **Further Relationships.** Neither party is obligated by this Agreement to enter into any further business relationship after the termination or expiration of this Agreement.

f. **Notices.** All notices under this Agreement shall be in writing, and shall be deemed given when personally delivered, when received if by nationally recognized courier, or three days after being sent by postage prepaid, certified or registered Canadian Mail, as applicable, to MICROSURVEY at MICROSURVEY's address as set forth herein or to Licensee at the address that Licensee provided upon entering into this Agreement, or such other address as a party last provided to the other by written notice.

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TECHNICAL SUPPORT

MicroSurvey Software Technical Support is available to help you get the most out of your MicroSurvey program. The following information explains how to prepare for your call so that your inquiry can be answered promptly and accurately.

Please prepare yourself before you call for Technical Support

Take a few minutes before you place your call to check the printed documentation and the online help files to see if the answer is already at your disposal. Our Web site on the Internet can also save time. Please check it for assistance if you can. Please have the following information available if requested: Hardware model, version of the program, and your Technical Support Number.

Please make sure that you have all the steps you completed prior to your problem and can explain them to the technical support representative. We may ask that you forward a copy of your data to us if we cannot find the problem immediately.

MicroSurvey offers a 90-day complimentary support period to all of our registered users, starting the date of purchase. Introductory support is available weekdays between 8:00 am and 5:00 pm (Pacific Time) excluding holidays.

Yearly Support

For clients who have had their original 90-day complimentary support period expire and feel that they will need ongoing support over the next year, we have a Yearly Support Contact option available. This gives you the ability to contact us for technical support, as much as you require, and you pay a flat fee once a year. This option is not to be used in place of training but is to assist you on the occasions when you really need it. The charge for the Yearly Support Contract is to be billed and paid for prior to the support commencing. This rate is subject to change, call for current rates.

Electronic Support

MicroSurvey maintains and provides at no charge, our Internet Web site at the following address: http://ims.microsurvey.com

This web site has sections on frequently asked questions, Technical Notes, Technical Specifications, and as required, free updates and program fixes, along with a lot of other helpful information.

Training

MicroSurvey Software Inc. can provide training to you, in your office or in a classroom situation (where facilities and numbers allow. MicroSurvey has training staff that will travel to almost anywhere and provide you with the professional skills you require to operate your MicroSurvey program. Please feel free to call and ask for a quotation or inquire about potential classroom situations. Your local dealer may also be able to setup or arrange a training session for you. Contact our head office for more information about training.

MicroSurvey Contact Information

Corporate Head Office

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Internet

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Corporate Website: http://www.microsurvey.com/

Support Helpdesk: http://ims.microsurvey.com/

General Information E-Mail: info@microsurvey.com

TABLE OF CONTENTS

GETTING STARTED

Introduction

IMS Evidence Recorder is designed for the Crime Scene or Accident Reconstruction Professional to provide unequaled simplicity and on-scene mapping performance, seamlessly integrated with IMS Map360 desktop software.

An easy to use interface helps new and advanced users to quickly access all the tools they need to complete their scenes accurately and as efficient as possible.

A graphical interface is the heart of the product; it helps the user see in real time their scene being created. You can quickly visually inspect the data you've gathered and be confident that you have all you need before leaving the scene.

Superior instrument support is what Evidence Recorder is all about. Drivers are available for connection to most major total station manufacturers, including new reflectorless and robotic instruments.

Once you've completed your scene, you can download it directly into our IMS Map360 desktop program. Literally, you can have a drawing including all your measurements, points, lines, and symbols in a matter of seconds.

Hardware Requirements

Evidence Recorder can be installed on various Windows Mobile, WinCE, and Windows Tablet/PC devices. Please visit the Hardware Support page for a list of supported devices. If in doubt, please contact Technical Support.

Installing Evidence Recorder

If you purchased a new data collector with Evidence Recorder, Evidence Recorder will most likely come pre-loaded on it.

If you are installing Evidence Recorder yourself onto an existing data collector, please confirm that your hardware is supported by Evidence Recorder. If you're reading this topic then you probably already know if Evidence Recorder will run on your data collector. If you're not sure, you can refer to the hardware requirements topic or call our technical support department.

To install onto your data collector you need to make sure you have a Microsoft ActiveSync or Windows Mobile Device Center connection established between your computer and your data collector.

To install Evidence Recorder onto your device you will need to download the installation files from our website at http://ims.microsurvey.com/.

Starting Evidence Recorder

During install, shortcuts are created and will be located in either your Start Menu, or Start Menu | Programs, or directly on your desktop. Simply press the shortcut to start the program.

Auto Repair

Upon start-up Evidence Recorder checks the registry for corruption, and also checks to make sure important system files are where they need to be for Evidence Recorder to run properly. If it detects any problems, it will automatically fix them for you.

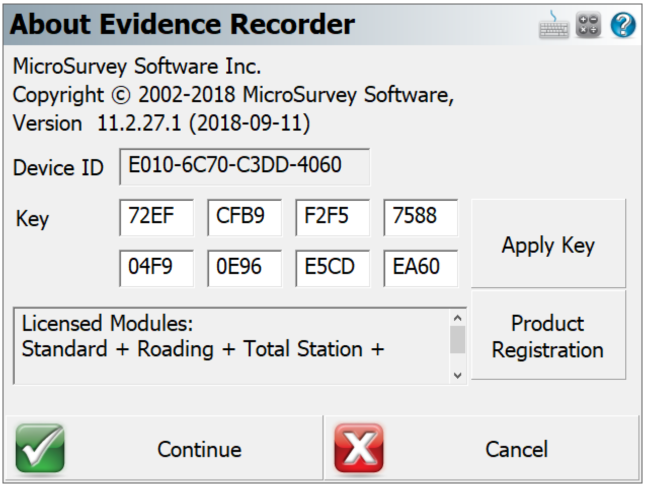
Hard Reset or Battery Drain

In these scenarios as with other software, you would usually have to re-install your software. However, because Evidence Recorder can repair itself all you need to do is use the File Explorer or My Computer program on your data collector to browse to where Evidence Recorder is installed and find the programs folder. In there, if you run the "splash" program it will automatically fix all problems and re-install your shortcuts for you.

The splash program will be an executable file and it will include the word "splash" in it. For example on a Windows Mobile device, the file is called **SplashWM6.exe**.

Registration & Demo Mode

When you start Evidence Recorder for the first time you will see the registration screen which will list the Device ID. This ID is unique for each device that Evidence Recorder is installed on.



Activation

To activate Evidence Recorder you need access to the Internet. With your purchase you should have received a serial number (also known as a Globally Unique ID, or GUID) that you will need along with the Device ID generated by Evidence Recorder.

A typical serial number will look something like the following:

D9C83164-FB0E-4713-B457-CE593EFEA296

A typical Device ID will look something like the following:

E010-F38C-4421-B482

Step 1

From a computer that has access to the internet, please visit the following web page:

www.microsurvey.com/register

Follow the instructions on the Evidence Recorder registration pages.

NOTE: Your GUID is valid for only one activation.

Step 2

Using the Key generated by the online registration system, enter the key values into Evidence Recorder.

When done, press the Apply Key. You will see the words "Activation Key Valid" and it will list the modules that were registered. The **Run Demo Mode** button will also change to say **Continue**.

More Help or Purchase

HELP: For online help, click here.

To purchase Evidence Recorder please call MicroSurvey Software at 1-800-668-3312.

Product Registration

To receive news and notifications about your product, please register your software at: www.microsurvey.com/reg

Available Modules

There are several modules available for use on a data collector and they're as follows:

- **Standard** - Real-time Automated Linework, COGO Calculations, Traverse Closure and Adjustments, ASCII/DXF Import/Export, MicroSurvey Transfer, and more!
- **Total Station** - Adds non-robotic total station control.
- **GNSS** - adds RTK GNSS control, Coordinate Calculator, GNSS Local Transformations.
- **Advanced** - adds Surface Modeling, Roading, LandXML, GIS Attribute Collection, Pre-determined Area Calculations
- **Robotic** - adds Robotic Total Station control.
- **MEP** - adds Auto-Locate capabilities.

Run Demo Mode

To run Evidence Recorder in demo mode press the **Run Demo Mode** button.

In Demo mode, Evidence Recorder is limited to storing only 30 points each time it is run, but otherwise it is fully functional.

Retrieve Lost Key Codes (passwords)

The key code that was generated for a serial number can be accessed from the online registration page www.microsurvey.com/register. Just enter the serial number you which to retrieve the key code for and the key code and the Device ID it is assigned to will be displayed.

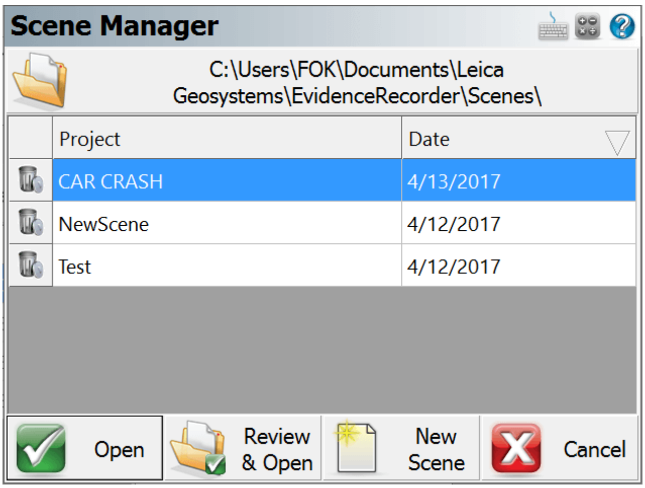
Technical Support

If you need help with Evidence Recorder please contact Technical Support.

Scene Manager

Main Menu | Scene Manager

The Scene Manager is used to create, open, or delete Scenes stored on your data collector. When you start Evidence Recorder this is always the first screen you will see.



You can sort the list by Scene name or date by tapping on the column's header.

Scenes Folder

Press this button to specify a different Scene folder than the default. The default is **...\Leica Geosystems\EvidenceRecorder\Scenes** (Windows CE/Mobile) or **...\Documents\Leica Geosystems\EvidenceRecorder\Scenes** (Windows Tablet/PC). Once you set the directory it is written to the MSurvey.ini file and is used for all subsequent Scenes.

Delete Scene

To delete a Scene, pick the **Delete** trash can icon next to the Scene Name. You will be asked to confirm that you really want to delete the Scene.

> **Notes:**
>
> - You cannot delete a Scene that is currently open
> - Scenes that have been deleted cannot be restored

Open Scene

To open an existing Scene, simply select it in the list and press the **Open** button.

Review & Open Scene

To review and open an existing Scene, simply select it in the list and press the **Review & Open** button. This option will display the Scene files used with the Scene.

New Scene

To create a new Scene, simply press the **New Scene** button. You will then see the New Scene screen which will allow you to enter a name, choose your AutoMap library and set the units for the Scene.

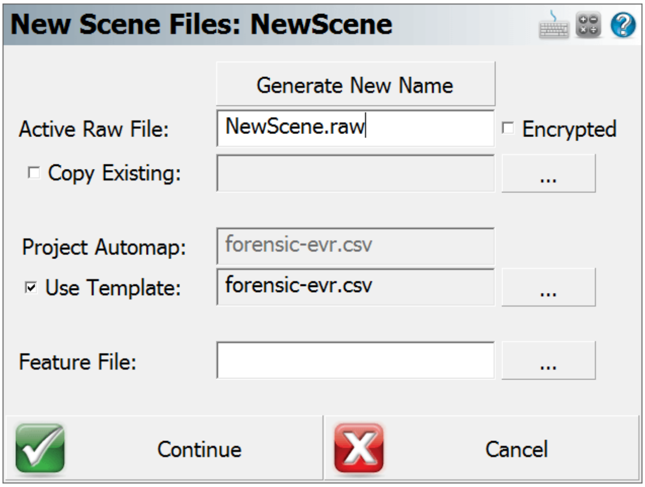
Exit

To exit from the Scene Manager press the **Exit** button.

Scene Review

When you create a new Scene or open an existing Scene; you will have the option to review the Scene Files screen.

Here you can confirm the files associated with the Scene and change or add files as needed.



Set Active Raw File

This indicates the name of the raw file that is going to be used. You can select a different one by pressing the button and either generate a new raw file name or choosing an existing raw file to open.

The Encrypted option indicates whether or not this raw file is encrypted. You can only change this option when creating a new Scene; once set, this option cannot be undone. Encrypting the raw file ensures that users cannot accidentally or intentionally edit their raw files with a text editor or other software. The state of the encryption toggle is retained for subsequent new Scenes.

Note:

At this time, no other applications besides Evidence Recorder 10 (or newer), MapScenes 2013 (or newer) and Leica IMS Map360 can read an encrypted raw file. Previous versions of Evidence Recorder and MapScenes will not be able to read Evidence Recorder encrypted raw files.

Set Scene AutoMap

This indicates the AutoMap Library Template that will be loaded into the Scene. You can change it by pressing the button and either choosing a different template library or creating a new blank library. AutoMap files contain pre-defined descriptions that can be used in Evidence Recorder. The template library that you select will be copied into the Scene's folder with a name of SceneName_ automap.csv, and any changes that you make to the AutoMap Library will affect only the Scene library, not the template library.

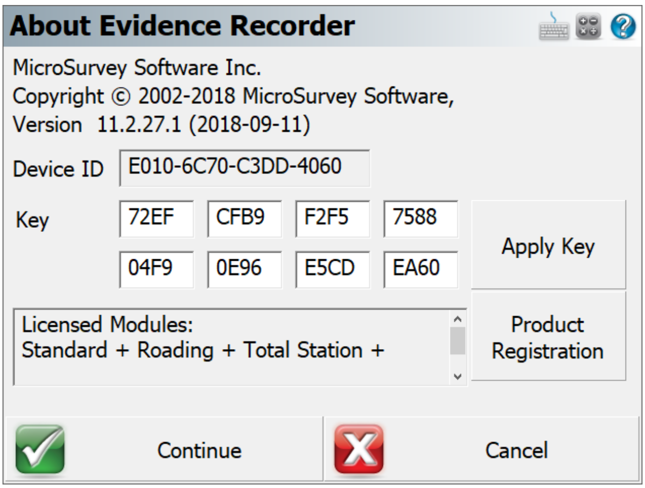
Set Feature File

Use this to select a feature list that you want to use with the Scene, for collecting GIS point attributes.

Quick Start: Open Existing Scene

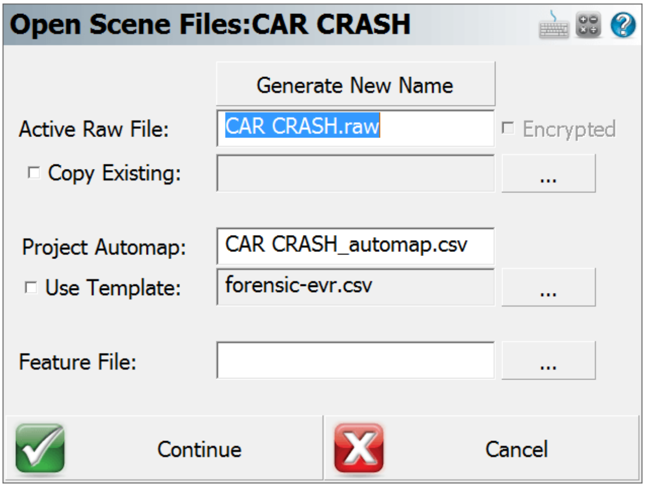
Start Evidence Recorder by running the icon contained either in your Start Menu or on the Desktop of your data collector.

If you start Evidence Recorder in demo mode, the first screen you will see is the About screen, where you can enter a registration code to license your copy of Evidence Recorder. Press the **Run Demo Mode** button if you see this screen.

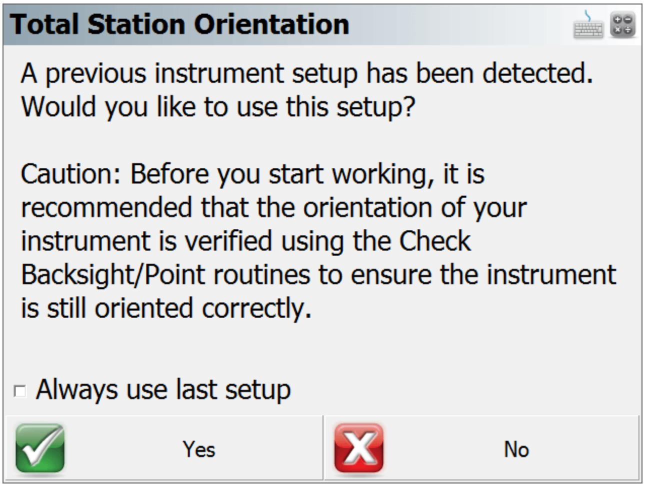


By default a Scene named **CAR CRASH** is installed. For this example let's open it by highlighting it and pressing the **Open** button. You can also double tap the file name which will also open it. Use the **Review & Open** button to also review the Scene files of the Scene.

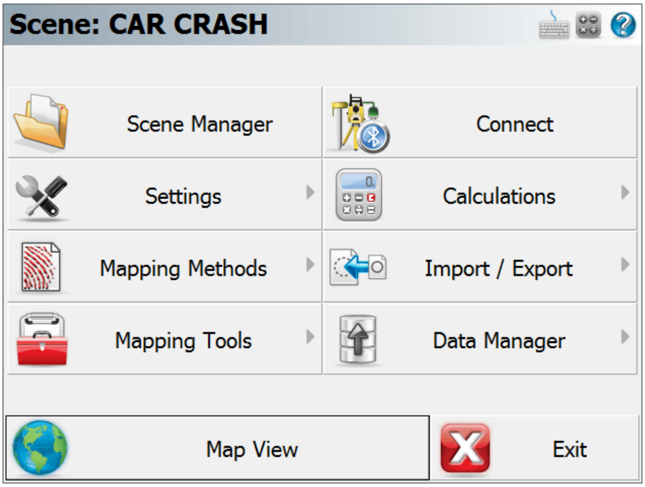
If you picked the **Review & Open** option; you will be able to review the Scene files associated with the Scene and make any changes if needed.



Evidence Recorder will then check to see if the Scene has a previous instrument setup. If one is found you will be asked if you would like to reuse it.

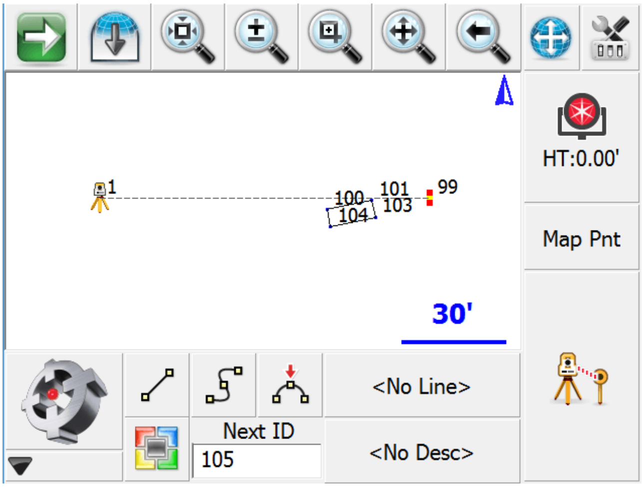


The main menu will then be displayed. Press the button to access the map screen, or use any of the available menu commands.



You may see an option to reconnect to the previous instruments on the instrument toolbar. If you are using the same equipment, press **Reconnect**.

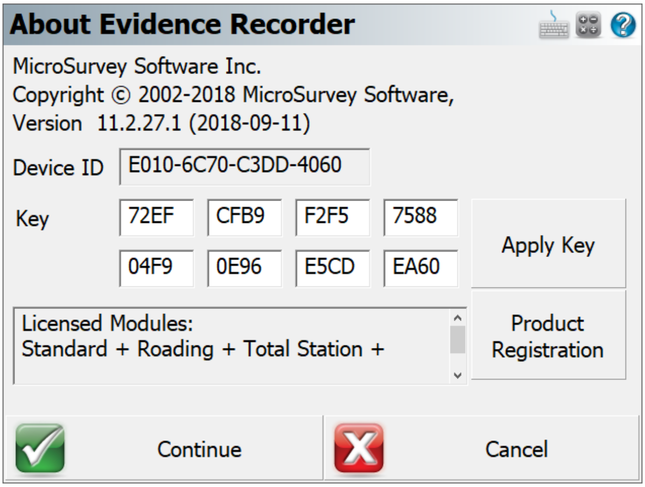
The Map screen will then be displayed. You should now see your Scene, here is what the CAR CRASH Scene should look like:



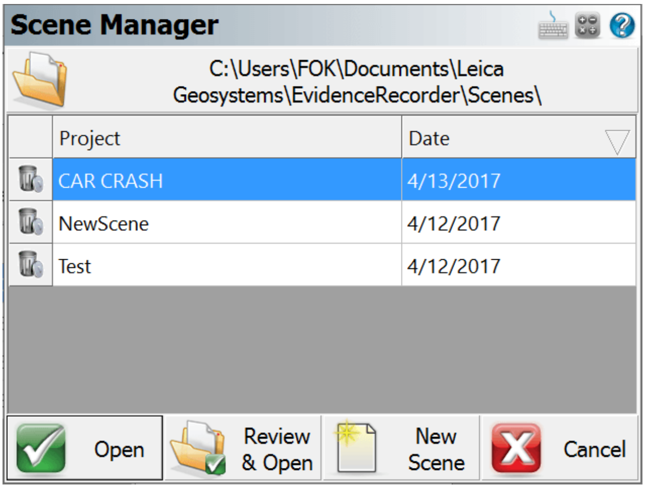
Quick Start: New Scene

Start Evidence Recorder by running the icon contained either in your Start Menu or on the Desktop of your data collector.

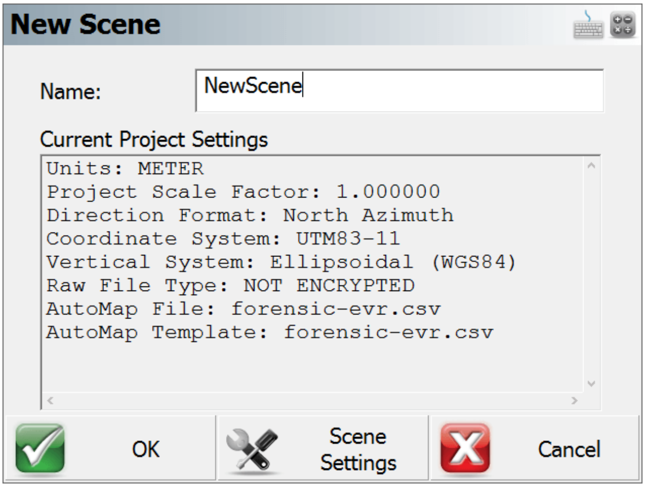
When you start Evidence Recorder in demo mode the first screen is the About screen, where you can enter a registration code to license your copy of Evidence Recorder. Press the **Run Demo Mode** button if you see this screen.



Next, the Scene Manager appears. Press the **New Scene** button to create a new Scene.

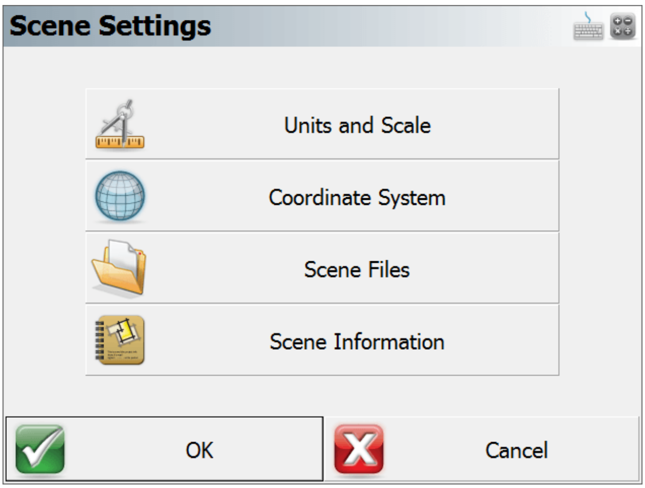


Enter a name for your new Scene. You can press **OK** to accept the settings and continue. If you need to change any of the settings, press the **Scene Settings** button.



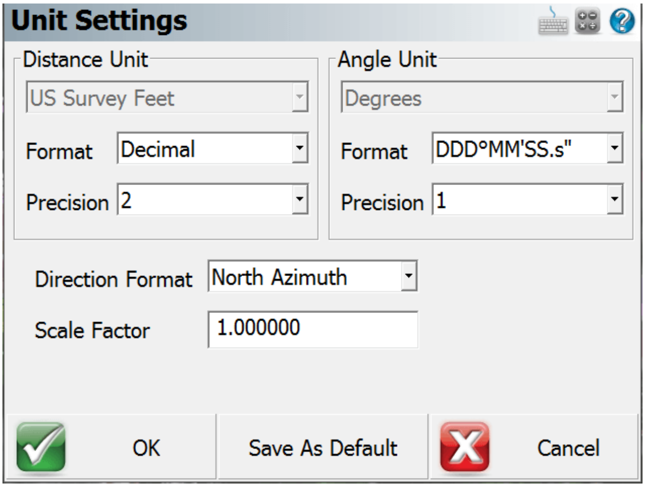
Scene Settings

The Scene Setting screen allows you to refine the various aspects of the Scene and save them as default for future Scenes if desired.



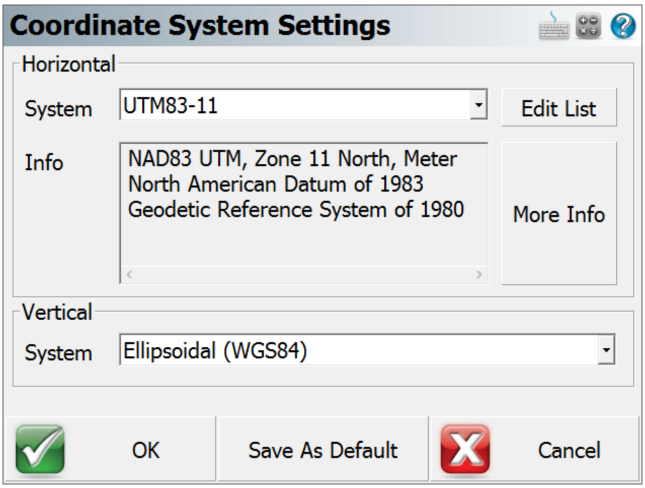
Units and Scale

In the Units and Scale screen, you can specify the units for your Scene. Set them as desired, then use the **Save As Default** button to set these settings as defaults for all subsequent new Scenes.



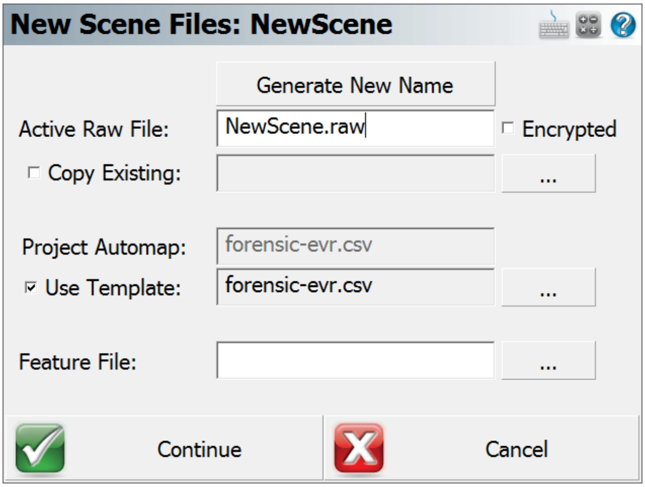
Coordinate System

The Coordinate System screen allows you to select Horizontal and Vertical coordinate systems. These settings are critical for working with GNSS equipment. Use the **Save As Default** button to set these settings as defaults for all subsequent new Scenes.

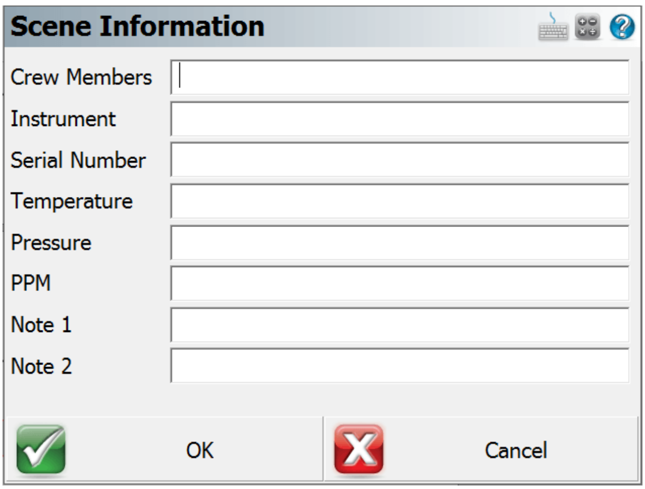


Scene Files

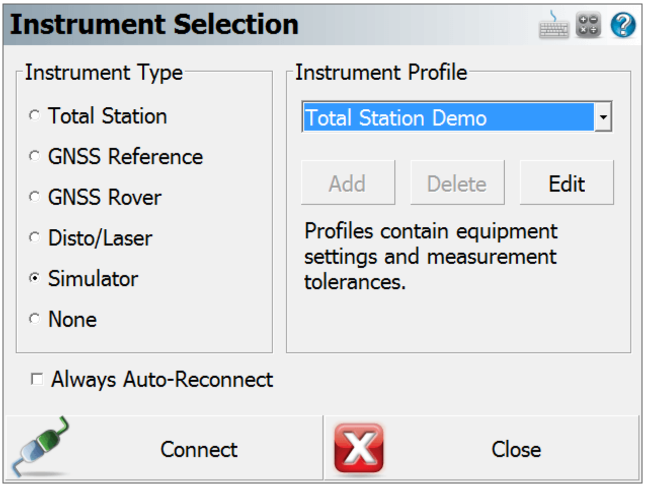
The Scene Files screen allows you to specify the Raw File, the AutoMap Library Template File, and Feature List File to use, and whether you want your raw file to be encrypted and/or appended.



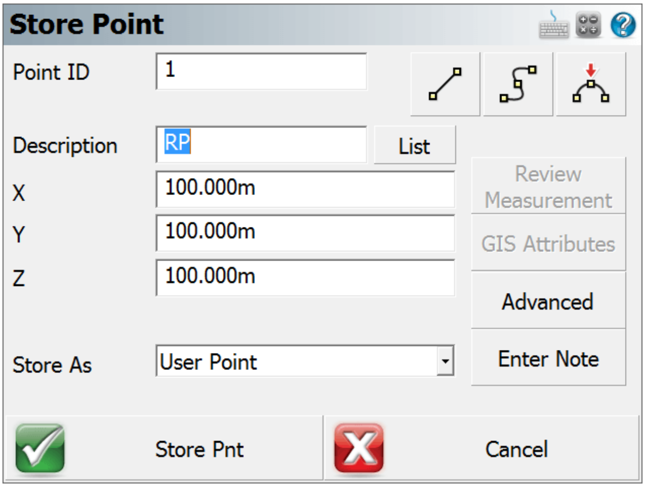
The Scene Information screen allows you to enter information about the Scene, crew and weather conditions.



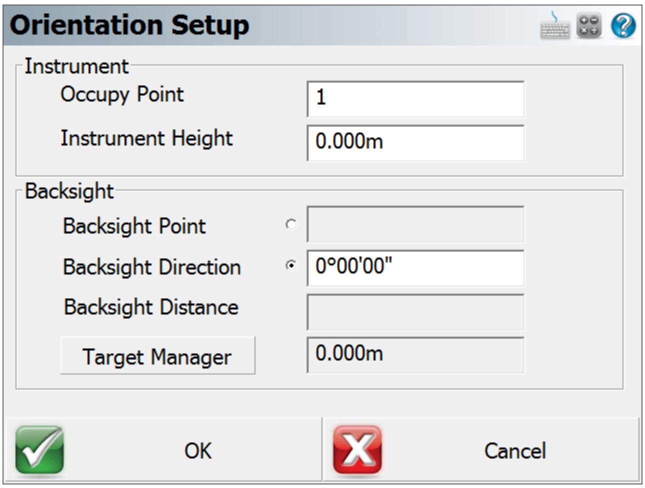
Press **OK** on the New Scene screen. You will then see the Instrument Selection screen where you are prompted to select the instrument that you want to connect to. Let's set it to **Simulator** and select **Total Station Demo** in the Instrument Profile drop down box. Then press **Connect** to continue. (Note, you will not see this screen if Evidence Recorder is running onboard your instrument.)



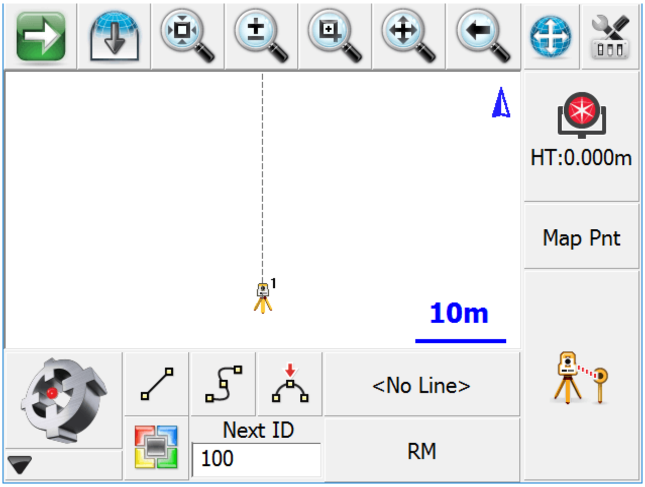
If you selected Total Station or Total Station Demo, you will then see a message asking "**Would you like to create a new point now?**" Press **Yes** to open the Store / Edit Points screen. The default coordinates that are displayed are retrieved from the MSurvey.ini file and if you change these coordinates they will be remembered for next time. Selecting **No** will take you to the main interface.



If you chose to create a reference point in the step above, you will be asked **"Would you like to setup the instrument at the new point?"** Press **Yes** to open the **Orientation Setup** screen for measuring your backsight.



Once you complete the setup routine and have measured your backsight, you will see your setup and backsight positions in the map view.



Common Evidence Recorder Buttons

The Evidence Recorder interface has a consistent structure and to use it effectively the user needs to become familiar with several commonly used buttons.

Clicking on this button will open up the keypad.

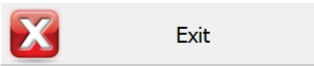
Clicking on this button will open up the Windows Start Menu. Available on Pocket PC and Windows Mobile devices only.

Clicking on this button will open up the RPN Calculator.

Clicking on this button will open up the help page for whatever topic you are currently at. The help page will open up in an Internet Explorer window.

This button will take you back to the previous menu until you are back at the main menu.

This button will take you back to the map screen.



This button will save your Scene and close Evidence Recorder.

This button will accept the input or changes, then continue to the next screen or finish the command.

This button will close the current screen and return you to the previous screen without saving any changes.

Pressing this will close the currently open toolbar and return you to the previous screen.

Pressing this will open the Point Chooser toolbar.

Evidence Recorder Scene Files

Every Evidence Recorder Scene will contain usually 7 files, but may contain more depending on what files you've exported or copied to the directory. Typically you will see that the file names will begin with the name of your Scene.

Filename.cdx	This is the index for the database file.
Filename.dbf	This is the database file that contains your coordinate information.
Filename.ini	This file contains information pertinent to your Scene.
Filename.raw or Filename.rae	This is the raw file that contains your observations. If the raw file is encrypted it will have a .rae extension. Note you can have more than one raw file.

Filename_figures.dbf	This is the database for your figures in your Scene.
Filename_figures.cdx	This is the index file for the figures database.
Filename_automap.csv	This is the AutoMap Library for your Scene.

When you create a new Scene, the Scene name that you use will become the "folder" for your Scene files. By default, your Scene will be stored in the ...\Leica Geosystems\EvidenceRecorder\Scenes\ (Windows CE/Mobile) or ...\Documents\Leica Geosystems\EvidenceRecorder\Scenes\ (Windows Tablet/PC) directory.

Note:

After creating a new Scene, do not later rename the folder containing your Scene's files or the actual files, doing so will cause Evidence Recorder to not recognize the folder as a valid Scene and you will not be able to open it.

Automatic Save

There are a few things to keep in mind when manually entering data in Evidence Recorder:

All stored data is automatically saved. There is no need for a Save function. Always close the program by going to the Main Menu and choose the Exit button to prevent loss of measurement data.

Input fields that are left blank are stored as undefined. For example, if you enter only a horizontal coordinate for a point and leave the elevation field blank, we do not automatically set the elevation as 0.000. The elevation remains undefined.

Data Entry (Extended Edit Fields)

Throughout Evidence Recorder you will see edit fields for entering various values. These types of fields are called Extended Edit Fields, and can be used not only for typing values, but can also launch related commands such as the keypad, calculator, point chooser, inverse tool, etc. This type of functionality is unique to Evidence Recorder.

You can control how these Extended Edit Fields will be triggered by changing the "Extended Edit Boxes" option in the Options screen to require a single tap, a double tap, or to disable them so that you can only type values into them.

Text Entry

For most text entry fields in the program, tapping in it will open up the keypad.

On Windows Mobile devices you can select which keypad to display by changing the "SIP Type" option in the Options screen.

Points

When you see an extended edit field for a Point ID, tapping in it will open the point chooser toolbar.

Distance and Angles

Tapping in other numeric fields such as those for directions and distances will open the RPN Calculator, and some distance fields will open the Inverse tool.

Multi-function Fields

Some fields will display a pop up menu if multiple functions can be opened from that field, just select the desired function from the list.

Keypad

The keypad can be opened from any extended edit entry field. This provides a method of easy text and numeric entry on devices that do not have a physical keypad but it can be used on any device.

Calculator

The RPN Scientific Calculator can be called up from the keypad by pressing the **Calculator** button. If you press the Calculator button, the value entered in the keypad entry field will be copied to the calculator's command line (Note, it must be a numeric value, alpha portions will be stripped off in the calculator) where it can be used for any calculations. When you are done with the calculator, pressing the **OK** button will return the result back into the keypad.

OK

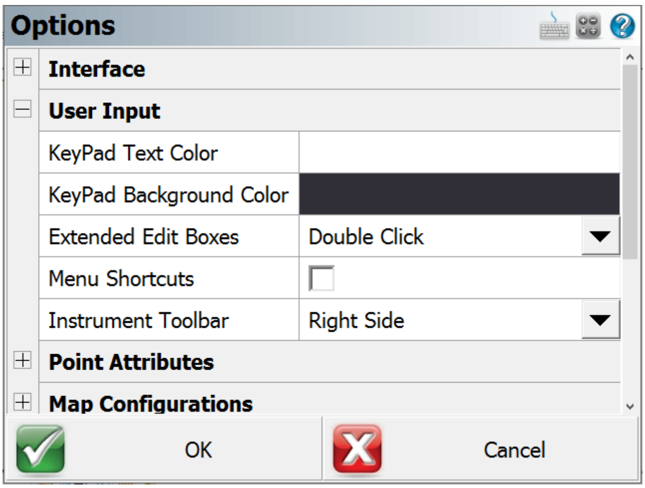
Pressing the **OK** button will close the keypad, and set the entered value into the text field from which the keypad was opened.

Cancel

Pressing the **Cancel** button will close the keypad without setting anything into the text field from which the keypad was opened.

Keypad Settings

There are five important settings related to the keypad, which are both found by to going to Settings and then the Options button that takes you to the Options screen.



Virtual Keyboard

Use this to specify which keypad type you want to use. Not all keyboard types are available on all data collectors.

Extended Edit Boxes

Use this to control how you want to bring up the selected keypad when tapping in an edit box: either with a single tap, a double tap, or off. Users of devices with a keyboard should leave this set to Single Click, and users of devices without a keyboard should set this to Double Click. Setting this to Off disables both the keypad and any other commands that may be started directly from the extended edit field, such as the Point Chooser or Inverse Tool, so that edit fields can only be used for typing values from your physical keypad.

KeyPad Text Color

Use this setting to customize what color the alphanumeric keyboard text will use. By adjusting the color of the keypad text, this can greatly increase the visibility and overall contrast of the onscreen keyboard in high and low light conditions.

KeyPad Background Color

Use this setting to customize what color the alphanumeric keyboard's background will use. By adjusting the color of the background, this can greatly increase the visibility and overall contrast of the onscreen keyboard in high and low light conditions.

Instrument Toolbar

Use this setting to customize what side of the map screen the instrument tool bar is displayed on.

Distance Entry & Recall

Distance Entry

You can customize Evidence Recorder to work with the direction input of your choice. See the Units & Scale topic for details.

The number you enter is assumed to be in the same units as your Scene, unless a unit modifier is specified (see below). So 5.25 would be interpreted as 5.25 feet, or 5.25 meters depending on your Scene's default unit setting.

Distance Recall

You can recall the distance between two points, by inputting in the form: **FromID..ToID** Example: 26..84 will be recognized as the distance computed between points 26 and 84. The distance will be returned in whichever format your units settings is set to.

Unit Modifiers

Recognition of the unit symbols m, ', ft, usft, ftus are supported, and can be used to override the Scene's unit settings.

Meters

You can specify that a distance is in meters by entering "m" after the value, for example 100m means 100 Meters, even if your Scene is in Feet. Therefore, if your Scene is in US Feet and you enter 100.00m in a distance field, you will see it automatically get converted to 328.08 feet.

Feet (International or US Survey)

The ' symbol will be interpreted as either International Feet or US Survey Feet, whichever units the current Scene is in. For example, entering 1000' will match the feet units that your Scene is in, so it can mean either 1000 International Feet or 1000 US Survey Feet. If your Scene is in meters, then the ' symbol is interpreted as International Feet.

Fractional Feet

When entering distances in a fractional format, use a ' symbol or a space between the feet and inches values to separate them. A " symbol is not required. For example, you can enter 10'6 or 10 6 which both mean 10'6". You can enter fractional inches by placing a space between the whole and fractional inches, and using a / symbol in the fraction. For example, 10'6 1/2 or 10 6 1/2 both mean 10'6.5". You can also enter decimal values, such as 10.5' to mean 10'6" or 10'6.5 (or just 10 6.5) to mean 10'6 ½".

International Feet

You can specify that a distance is in International Feet by entering ”ft” after the value, for example 1000ft means 1000 International Feet.

US Survey Feet

You can specify that a distance is in US Survey Feet by entering ”usft” or ”ftus” after the value, for example 1000usft and 1000ftus both mean 1000 US Survey Feet.

Distance Entry Examples

Scene Units:	International Feet	
Format:	Decimal	
User Entered Value:	**Interpreted As:**	**Result (always matches Scene units):**
1000.23	1000.23 in Scene units	1000.23'
1000.23'	1000.23 in Scene units	1000.23'
1000.23usft 1000.23 usft 1000.23ftus 1000.23 ftus	1000.23 US Survey Feet	1000.25'
20.117m	20.117 meters	66.00'

20.117 m		
10000m 10000 m	10000 meters	32808.40'
10 6 10'6 10'6"	10 feet 6 inches	10.50'
10 6 1/2 10'6 1/2	10 feet 6.5 inches	10.54'

Scene Units:	US Survey Feet	
Format:	Decimal	
User Entered Value:	**Interpreted As:**	**Result (always matches Scene units):**
1000.23	1000.23 in Scene units	1000.23'
1000.23'	1000.23 in Scene units	1000.23'
10000.23usft 10000.23 usft 10000.23ftus 10000.23 ftus	10000.23 US Survey Feet	10000.23'
10000.23ft 10000.23 ft	10000.23 International Feet	10000.21'
20.117m 20.117 m	20.117 meters	66.00'
10000m 10000 m	10000 meters	32808.33'
10 6 10'6 10'6"	10 feet 6 inches	10.50'
10 6 1/2 10'6 1/2	10 feet 6.5 inches	10.54'

Scene Units:	Meters
Format:	Decimal

User Entered Value:	Interpreted As:	Result (always matches Scene units):
1000.23	1000.23 in Scene units	1000.23m
1000.23'	1000.23 International Feet	304.870m
10000.23usft 10000.23 usft 10000.23ftus 10000.23 ftus	10000.23 US Survey Feet	3048.076m
10000.23ft 10000.23 ft	10000.23 International Feet	3048.070m
20.117m 20.117 m	20.117 meters	20.117m
10'6	10 feet 6 inches	3.200m
10'6 1/2	10 feet 6 1/2 inches	3.213m
10 6	Not allowed, must enter units for feet such as 10ft 6, or 10usft 6.	
10 6 1/2	Not allowed, must enter units for feet such as 10ft 6 ½, or 10usft 6 ½ .	

Using Math Operations

Math operators are now supported again. You are now permitted to use math operators in distance fields.

User Entered Value	Interpreted As	Result if Scene Units Set to Feet	Result if Scene Units set to Metric
3.5/2+1.2	3.5 divided by 2 plus 1.2	2.95 feet	2.950 metres
1..2/2+10 (assume 1..2 = 10)	((Distance from point 1 to 2) divided by 2) plus 10	15.00 feet	15.000 metres
8' + 3'	8 feet plus 3 feet	11.00'	3.353m
1'+2 3+1m	1 foot plus 2 feet 3 inches plus 1 metre	6.53'	1.991m

NOTE: If your Scene is set to feet and you enter 2 3 (2 space 3), this will be interpreted as 2 feet 3 inches. This occurs if your Scene is set to either decimal or fractional feet.

You can also use the RPN Calculator to further manipulate distance values. For example, if you want to find the distance halfway between points 1 and 2, enter 1..2 into the distance field to recall that distance. Then double tap on that extended edit field to pull that recalled distance into the calculator, where you can divide the distance by 2 (or perform any other calculations with it). Then press the **OK** button in the calculator to copy the result back into the field you started from.

Direction Entry & Recall

Direction Entry

You can customize Evidence Recorder to work with the direction input of your choice. See the Units & Scale Settings topic for details.

To enter an angle using the format selected in your units settings, simply enter the angle. For example, 120.4530 means 120°45'30" if your Scene is in Degrees/Minutes/Seconds, 120°45.3' if your Scene is in Degrees/Minutes, or 120.453° if your Scene is in decimal degrees.

Direction Recall

You can recall the direction between two points, by inputting in the form: **FromID..ToID** Example: 26..84 will be recognized as the direction computed between points 26 and 84. The direction will be returned in whichever format your units settings is set to.

Unit Modifiers

You can always override your Scene's units setting by entering the bearing with the cardinal quadrant indicated before or after the direction. If there is no quadrant specified, then the input direction will be interpreted as an Azimuth.

Decimal Degrees

You can always specify that an angle is in decimal degrees by entering "d" after the value, for example 45.5083d means 45.5083° or 45°30'30".

Degrees, Decimal Minutes

You can always specify that an angle is in degrees and decimal minutes by entering "dm" after the value, for example 45.305dm means 45°30.5' or 45°30'30".

Degrees, Minutes, Decimal Seconds

You can always specify that an angle is in degrees, minutes, and decimal seconds by entering "dms" after the value, for example 45.3030dms means 45°30'30".

Bearings

To enter a bearing, use the cardinal quadrant letters (N, E, S, and W) before or after the angle. For example: NE60.4530, 60.4530NE, or N60.4530E means NE 60°45'30” if your Scene is in DMS, NE 60°45.3' if your Scene is in DM, or NE 60.453° if your Scene is in decimal degrees. It does not matter if you have spaces between the quadrant designation and the angle. You can also separate the degrees, minutes, and seconds values with a space. For example, N 60 45 30 E or N60.4530E both mean NE 60°45'30". You can of course also use any of the "d", "dm", or "dms" (or "g" or "r", see below) designators with a bearing entry, such as NE45.305dm to mean N 45°30'30" E.

Gons (Gradients)

You can specify that an angle is in Gons/Gradients by entering "g" after the value, for example 100g means 100 Gradients (equals 90 degrees).

Radians

You can specify that an angle is in Radians by entering "r" after the value, for example 1.57r and means 1.57 Radians (approximately 90 degrees).

Scene set to Azimuth

Direction Entry Examples

Angle Units:	Degrees	
Format:	DDD°MM'SS.s"	
Format:	Azimuth	
User Entered Value:	**Interpreted As:**	**Result (always matches Scene units):**
90.5016	90 degrees, 50 minutes, 16 seconds	90°50'16"
NE45.3030 NE 45.3030 N45.3030E N 45.3030 E 45.3030NE 45.3030 NE	North East quadrant, 45 degrees, 30 minutes, 30 seconds	45°30'30"

SE45.3030 SE 45.3030 S45.3030E S 45.3030 E 45.3030SE 45.3030 SE	South East quadrant, 45 degrees, 30 minutes, 30 seconds	134°29'30"
SW45.3030 SW 45.3030 S45.3030W S 45.303 W 45.3030SW 45.3030 SW	South West quadrant, 45 degrees, 30 minutes, 30 seconds	225°30'30"
90.5016dm 90.5016 dm	90 degrees, 50.16 minutes	90°50'10"
90.5016d 90.5016 d	90.5016 degrees	90°30'06"
100g 100 g	100 gradians	90°00'00"
100.2345g 100.2345 g	100.2345 gradians	90°12'40"
3.141593r 3.141593 r	3.141593 radians	180°00'00"

Scene Set to Bearings

The angle codes below provide versatile direction input.

When your Scene is set to **Bearings**, you are permitted to use numeric and alpha character codes for angle and direction input.

1 or NE = North East bearing

2 or SE = South East bearing

3 or SW = South West bearing

4 of NW = North West bearing

Angle Units:	Degrees	
Format:	DDD°MM'SS.s"	
Format:	Bearing	
User Entered Value:	**Interpreted As:**	**Result (always matches Scene units):**
90.5016	90 degrees, 50 minutes, 16 seconds azimuth	S89°09'44"E
NE45.3030 NE 45.3030 N45.3030E N 45.3030 E 45.3030NE 45.3030 NE	North East quadrant, 45 degrees, 30 minutes, 30 seconds	N45°30'30"E
SE45.3030 SE 45.3030 S45.3030E S 45.3030 E 45.3030SE 45.3030 SE	South East quadrant, 45 degrees, 30 minutes, 30 seconds	S45°30'30"E
SW45.3030 SW 45.3030 S45.3030W S 45.303 W 45.3030SW 45.3030 SW	South West quadrant, 45 degrees, 30 minutes, 30 seconds	S45°30'30"W
90.5016dm 90.5016 dm	90 degrees, 50.16 minutes azimuth	S89°09'50"E
90.5016d 90.5016 d	90.5016 degrees azimuth	S89°29'54"E
100g 100 g	100 gradians	S90°00'00"E
100.2345g 100.2345 g	100.2345 gradians	S89°47'20"E

3.141593r 3.141593 r	3.141593 radians	S0°00'00"W

Using Math Operations

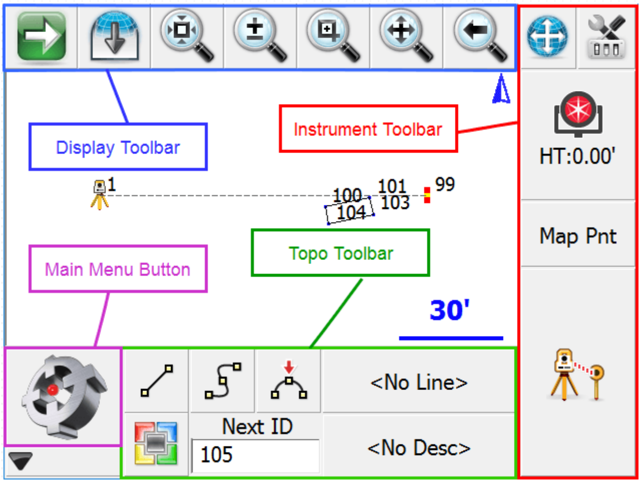
You can then use the calculator to further manipulate the angle. For example, if you want to determine 1..2 then add 90 degrees, enter 1..2 to recall that angle. Then double tap in the extended edit field to pull that recalled angle into the calculator, where you can add 90 to it (or perform any other calculations with it).

Note: You can perform advanced direction recall functions that include math operators directly in a direction field. For example, 1..2+90 is a valid entry. In this example the direction between points 1 and 2 will have 90 degrees added to it (if Scene is in degrees).

Math operations can also be done using the RPN calculator. Please refer to the Calculator section for more information on performing specific math operations.

MAIN INTERFACE

The Evidence Recorder interface is separated into various toolbars which contain common functions or tools that the user will use most often.



Display Toolbar

Instrument Toolbar

Topo Toolbar

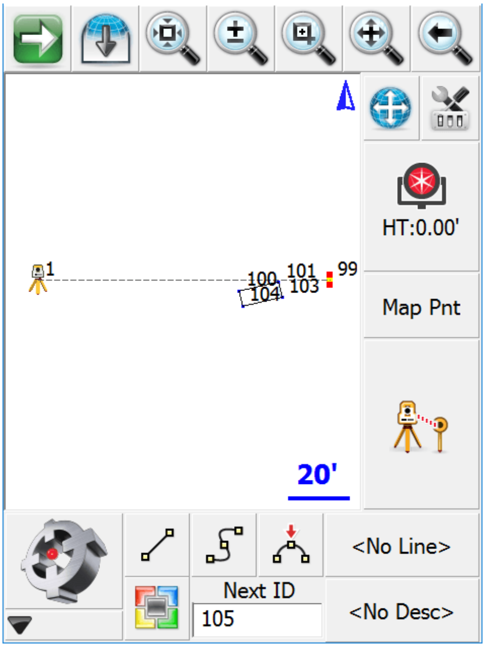
Mini Toolbar button

Main Menu button

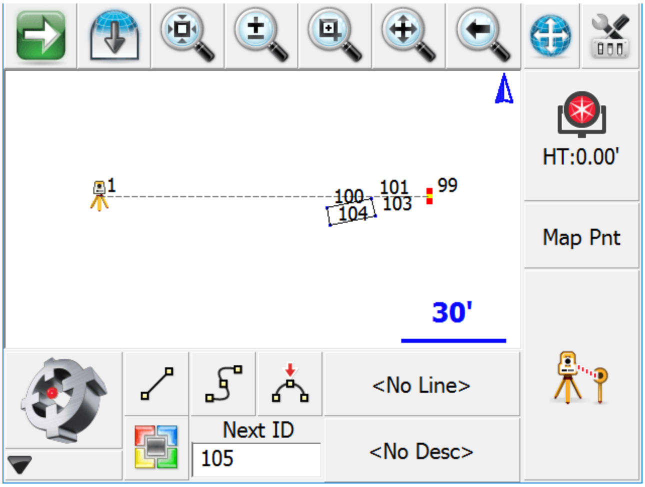
Two Versions of the User Interface

There are two versions of the user interface depending on which handheld device you're using. Some devices have a landscape screen orientation, and have the advantage of a physical keyboard. Others have a portrait screen orientation, and utilize a virtual on-screen keyboard. Note that the function of both versions is essentially the same.

Portrait Display



Landscape Display



Toolbars

Display Toolbar

The display toolbar, located at the top of the map screen, is used to zoom, pan, change 3D perspectives, and for displaying information.

Next, Previous

These switch to the next or previous set of buttons.

Observation

This opens or closes the Observation Toolbar. Many different functions in Evidence Recorder will display information in this toolbar, such as when you select a point on the screen, the point's coordinates are displayed in this toolbar.

Zoom Extents

This is a zoom extents which will zoom to the extents of your Scene.

Dynamic Zoom

This is a dynamic zoom. When enabled, drag from top to bottom of the screen to zoom out, or bottom to top of the screen to zoom in. Or, when enabled, you can also use the arrow keys on your keypad to zoom in and out in the map.

Zoom Window

This is a zoom window. When enabled, drag on the map screen to define a zoom window.

Dynamic Pan

This is a dynamic pan. When enabled, you can drag across your map screen to pan around your Scene. Or, when enabled, you can use the toggle or arrow keys on your keypad to pan around.

Zoom Previous

You can use this to zoom back up to 10 previous views. This includes zoom and pan changes.

World Button

It is used by the commands to hide unrelated points and lines in your map during stakeout.

3D View

This opens the 3D View Toolbar.

3D View - Full Screen

When using the full screen mode for Evidence Recorder this will allow you to rotate your Scene in a 3D perspective. To return to plan view, press the Zoom extents button.

Grid Display

When using the full screen mode for Evidence Recorder this will allow you to toggle the display of a grid on your map screen, and configure the grid settings..

Layers Manager

This opens the Layers Manager for managing visibility of layers in your database, DXF Layers, and Raster Images.

Surface Manager

This opens the Surface Manager for importing and displaying DTM surface models (TIN, TGRID, or Contours) and for computing Volume Calculations.

Options

This opens the Options screen, and will automatically expand the Map Configuration section for quickly turning on or off the ID, description, and elevation labels for your points.

Help

This opens the Help topic for the current toolbar(s) visible on your screen. If there are multiple toolbars visible, you are prompted to select the help file based on the position of the toolbar: Top, Side, or Bottom Toolbar. The help file will open up in your default web browser such as Internet Explorer .

Observation Toolbar

Display Toolbar | Observation Results button

You can access the Observation Toolbar by tapping on this icon in the Display Toolbar.

Total Station Observations

Total Station users can toggle through the following information:

- Horizontal Angle (HA), Vertical Angle (ZA), and Slope Distance (SD)
- Horizontal Angle (HA), Horizontal Distance (HD), and Vertical Distance (VD)
- Northing (N), Easting (E), and Elevation (H)

If using a conventional (non-robotic) total station, the observations displayed in the toolbar will be from the last measurement taken with Evidence Recorder.

If using a robotic total station, the observations displayed in the toolbar will continually update in real time.

GNSS Observations

GNSS users can toggle through the following information:

- Latitude (Lat), Longitude (Lon), and Geodetic Height (h)
- Northing (N), Easting (E), Orthometric Height (H)
- Standard Deviation Horizontal (SD H), Standard Deviation Vertical (SD V), and Positional Dilution of Precision (PDOP).
- Velocity (SOG) and Heading (COG) of the GNSS receiver as well as current UTC Time.

If using GNSS, the observations displayed in the toolbar will continually update in real time.

Display Size +/-

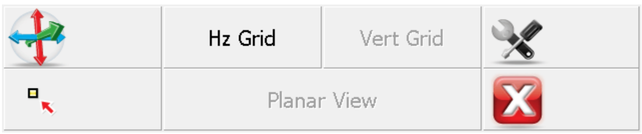
By tapping on the **+** and **-** buttons on the screen you can increase or decrease the displayed font size/-text for easier viewing.

Page Toggle

The **Page** button allows you to swap between pages changing the displayed observation information.

3D View Toolbar

The 3D View toolbar is used to help you view your Scene in a 3D perspective. You can also define a virtual grid that will displayed in the drawing and can be turned on and off.



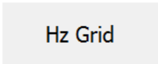
To turn this feature on select the 3D View button on the Display toolbar. When you do this the 3D View Toolbar will appear at the bottom of your screen. The buttons on the toolbar are described below.

3D View

When this is turned on you will be able to rotate your Scene in a 3D perspective. This tool is handy when used in conjunction with surfaces or vertical projections. To return to plan view, close the 3D View toolbar and press the Zoom Extents button. It can also help you find points that have incorrect elevations.

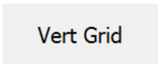
Center on Point

Use this to center the view on the selected point. This will not change your current view rotation or zoom depth.



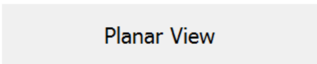
Hz Grid

Use this to turn on a horizontal grid that will be displayed in your drawing. You can set the grid spacing in the settings.



Vert Grid

Use this when using the Vertical Projection tool to turn on a vertical grid that will be displayed in your drawing. You can set the grid spacing in the settings.



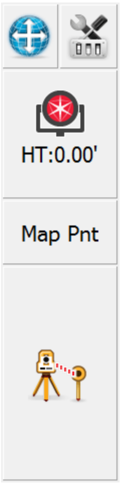
Planar View

Use this when using the Vertical Projection tool to set the view perpendicular to the vertical plane, so that the wall or other projected plane is displayed face-on in the map view.

Grid Settings

Use this to set parameters that affect the grid spacing and origin. You can select the grid origin using a point chooser and specify lengths for the sides. You can also specify the interval for each axis.

Total Station Toolbar



When Evidence Recorder is connected to a Total Station or the Total Station Demo profile, you will see this toolbar on the side of the map area. A User Input option determines which side of the map area the toolbar is on.

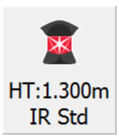
This toolbar allows you to control your instrument settings, target heights, and Mapping Methods, as well as initiating a measurement.

Auto-Center

This toggles the auto-center feature on or off. If turned on, whenever you take a measurement, the map screen will always re-center on the measured point.

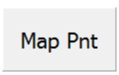
Instrument Settings

This opens the Total Station Settings screen where you can control specific settings for your total station such as EDM settings, Tolerance setting and Instrument Connect/Disconnect.



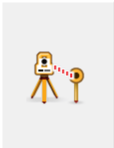
Target Manager

Press this button to access the Target Manager. Here you can set target heights and create, edit, copy, and delete targets.



Mapping Method

This opens the Mapping Methods screen where you can select what type of measurement you want to take. The current Mapping Method is always displayed on this button - for example if you're using the distance offset mode it will display "Dist Off".



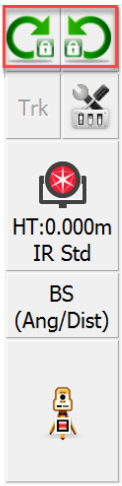
Measure Button

This triggers your total station to take a measurement.

See also:

- The Robotic Total Station Toolbar topic
- The GNSS Toolbar topic
- The Disto/Laser Toolbar topic

Robotic Total Station Toolbar



When you use Evidence Recorder in robotic total station mode, you will see this toolbar on the side of the map area. A User Input option determines which side of the map area the toolbar is on.

This toolbar allows you to control your instrument settings, target heights, and Mapping Methods, as well as initiating a measurement.

The current state of the instrument target aiming settings are displayed, and you are able to toggle the instrument target aiming settings between Manual and LOCK states. With LOCK enabled, **Search** and **Search Next** functionality is available for some instruments.

LOCK mode, not following a prism

These buttons indicate that the instrument is in LOCK mode, however not currently following a prism.

- **Single Tap** - Begin PowerSearch to search for prism. The left button starts a clockwise search, the right button starts a counterclockwise search.

Searching

This button indicates that a target search is in progress.

LOCK mode, following a prism

These buttons indicate that the instrument is in LOCK mode, and following a prism.

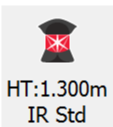
- **Single Tap** - Break Prism Lock
- **Double Tap** - Start search for next Prism. Same action on both buttons.

Cursor Tracking

Toggle Cursor Tracking. When enabled, the instrument makes continuous measurements and the current position of the target will be displayed on the screen in real time. When stationary, the cursor is a hollow triangle pointing towards the instrument. When moving, the cursor is a solid triangle pointing in the direction of travel.

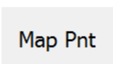
Instrument Settings

Opens the Total Station Settings screen, where you can control specific settings and features for your total station.



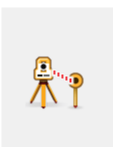
Target Manager

Opens the Target Manager where you can set the target, target height and EDM mode.



Mapping Method

Opens the Mapping Methods screen where you can select what type of measurement you want to take. The current Mapping Method is always displayed on this button - for example if you're using the distance offset mode it will display "Dist Off".



Measure Button

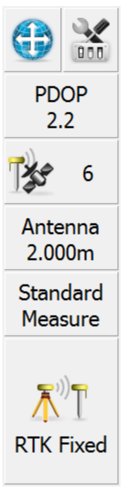
Measure and store distances and angles. The current state of Manual / ATR / LOCK mode determines the sequence of events:

- **Manual mode** - The instrument starts a measurement immediately.
- **LOCK mode, not following a prism** - The instrument first searches for a prism and takes a measurement only if a prism is found.
- **LOCK mode, following a prism** - The instrument starts a measurement immediately.
- **ATR mode** - The instrument first searches for a prism and takes a measurement only if a prism is found.

If you are using a conventional non-robotic total station, please see the Instrument Toolbar topic.

If you are using GPS, please see the GNSS Toolbar topic.

GNSS Toolbar



Once the user has selected a GNSS receiver and communication has been established, the GNSS toolbar will appear on the main interface.

NOTE: You will only see the GNSS toolbar if you selected GNSS Reference, GNSS Rover, or GNSS Rover Demo as your instrument type. If you have selected a GNSS Profile but are not yet connected to the receiver, most of these buttons will be disabled.

Auto-Center

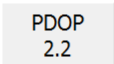
Single-tapping this button will re-center the display on the current position of your receiver.

Double-tapping this button will set the system into an auto-pan mode where the display will always be centered on the current position. When active, single-tapping this button once more will disable the auto-pan mode.

GNSS Settings

If you press this button while you are connected to a receiver, you will see the GNSS Settings screen. At any time this button can be used to adjust or stop your GNSS survey.

If you press this button without being connected to a receiver, you will see the Instrument Selection screen where you can edit your GNSS profiles or connect to your receiver.

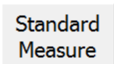


DOP Values

This displays the current DOP (Dilution of Precision) values. Pressing this button will cycle through the PDOP, HDOP and VDOP. The PDOP is the default setting as this is most often used to ascertain the quality of the satellite geometry.

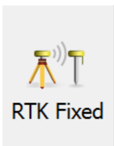
Satellite Plot/Satellite List

This shows the total number of satellites the receiver is currently using in its solution. Press this to view a sky plot of the current SVs visible to the rover, or to access the Satellite List.



Mapping Method

This opens the Mapping Methods screen where you can select what type of measurement you want to take. The current Mapping Method> is always displayed on this button.



Measure

This is the measure button.

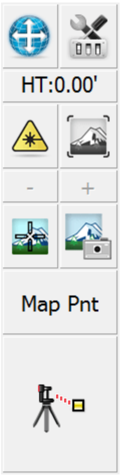
This button also indicates the current solution type. This tells the user if the solution is Fixed, Float, WAAS, DGPS or Autonomous. This button will also indicate to the user if the corrections from the reference station have been discontinued by denoting "No Link".

Please refer to the GNSS Measurement topic for more information.

See also:

- The Total Station Toolbar topic
- The Robotic Total Station Toolbar topic
- The Disto/Laser Toolbar topic

Disto/Laser Toolbar



When Evidence Recorder is connected to a Disto/Laser device, you will see this toolbar on the side of the map area. A User Input option determines which side of the map area the toolbar is on.

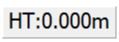
This toolbar allows you to control your instrument settings, target height, device toggles, and Mapping Methods, as well as initiating a measurement.

Auto-Center

This toggles the auto-center feature on or off. If turned on, whenever you take a measurement, the map screen will always re-center on the measured point.

Instrument Settings

This opens the instrument settings screen where you can control specific settings for your Disto/Laser.



Target Manager

Press this button to access the Target Manager. Here you can set the target height.

Laser Toggle

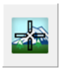
Press this button to toggle the state of the red laser pointer.

Map Toggle

Press this button to toggle between the map view or live video stream. NOTE: The live video stream is only available on supported devices, such as the Leica 3D Disto.

Zoom Controls

Zoom in and out on the live video stream view. NOTE: The live video stream is only available on supported devices, such as the Leica 3D Disto.

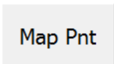


Crosshair Toggle

Press this button to toggle the crosshair presence on captured images that are stored.

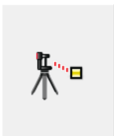
Photo Note Toggle

Press this button to toggle whether a photo note is automatically stored when a point is measured and stored. The photo can have a crosshair showing the measurement point, depending on the crosshair toggle.



Mapping Method

This opens the Mapping Method screen where you can select what type of measurement you want to take. The current Mapping Method is always displayed on this button - for example if you're using the distance offset mode it will display "Dist Off".



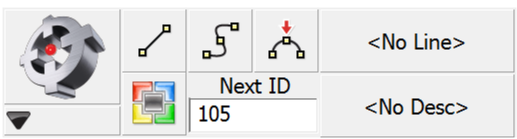
Measure Button

This triggers your device to take a measurement.

See also:

- The Total Station Toolbar topic
- The Robotic Total Station Toolbar topic
- The GNSS Toolbar topic

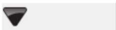
Topo Toolbar



The Topo Toolbar is used to help automate linework as well as show you the description and next point number for your shot. Just like previous versions of Evidence Recorder you can control your line-work by tuning on and off the line, arc and curvy toggles. There is also a user-programmable button that can be customized to start any command.

Main Menu Button

This button takes you into the Main Menu.



Mini Toolbar Button

This button opens the Mini Toolbar.

Draw Lines Button

This is used to toggle on and off the draw lines function. When turned on points will be connected with a line as you measure them.

Draw Curvy Lines Button

This is used to toggle on and off the draw curvy lines button. This function will draw a best-fit curve through your points as you shoot them.

Draw 3-Point Arc Button

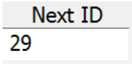
3-Point arcs can be started using the same method as for a Line or Curvy Line.

However, to switch to 3-Point arc within an ongoing Line, select the **Draw 3-Point Arc** button before shooting the second of the three points that will define the arc (POC: Point on Curve). (Note that this is not the radius point). After measuring to the 2nd point, a dashed line will appear to illustrate that a 3-Point arc is in progress. Shoot the 3rd point and the arc will appear. The current draw option will change from Draw 3-Pt Arc to Draw Line after the third shot and the arc is complete.

Compound 3-point arcs are supported. Simply re-select the **3-Point Arc** button before measuring the next POC.

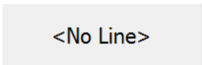
User Defined Button

This button can be customized to start any command. By default it opens the Coordinate Database, but this can be changed in the Keyboard Shortcuts settings.



Next ID Field

This field displays the point number that will be assigned to your next shot. You can change it at any time prior to recording your shot. In a new Scene this field will always start at 1. If you open an existing Scene, then we scan the raw file for the last sideshot or store point and if we find one, we'll set the point number accordingly. For example, if the last sideshot in the raw file was to point 58, then the next time the Scene is setup we will set the next id to 59.

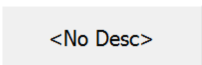


Active Line List Button

Much like the first line in the Scene, just select the desired description from the list and select the desired draw option before shooting the first point for the new line. When you press the button a screen will appear listing all your active lines. Selecting one of them and pressing the **OK** button will make it the current line.

The key to note is the display of -Start Line- in the Active Lines list. Once the first point for the new line has been measured, the Active Lines list will set and display the new line as current.

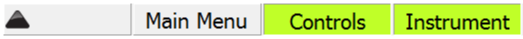
To change the current line, simply select the desired line from the Active Lines list and continue taking shots to add to the selected line. All settings are stored for each line so there is no need to re-select the Description or draw option.



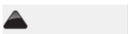
Description Selection Button

Use this button to set the current description that will be used when you shoot your points. When you press the description button you will see a screen listing all the descriptions read in from your AutoMap Library. Select the description you want to use and press the OK button. You can type in the letters of the description which will automatically scroll to the descriptions matching your entry.

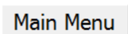
Mini Toolbar



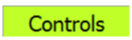
The mini toolbar control is found directly beneath the Main Menu button on the Topo Toolbar. It is used to help you maximize your screen space by allowing you to control which toolbars you need to keep active in the main interface. When you press the mini toolbar control you will see the mini toolbar appear toward the bottom of the main interface.



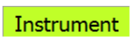
Use this to display the full Topo Toolbar.



Use this to display the Main Menu.



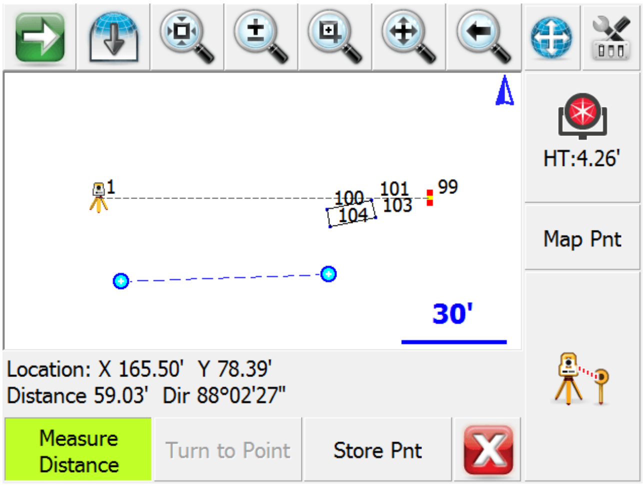
Use this show or hide the Display Toolbar.



Use this to show or hide the Instrument Toolbar.

Map Select Toolbar

When you tap on an empty spot in the map view, the selected point will be highlighted with a blue dot and the Map Select toolbar will appear along the bottom of the screen, showing the coordinate of the selected point.



Note, this toolbar functionality can be enabled or disabled via the Map Position Select check-box in the Options screen.

Measure Distance

When this is toggled on, subsequent taps will cause the blue dot to move to the new location, a second blue dot will appear at the previous location, and a dashed line will follow the entire path of the selected points. The total distance and the direction of the last segment will be displayed. To reset the measured distance, toggle this mode off then back on again.

Turn to Point

If you are using a motorized total station and have occupied a point in the Scene, this will cause your instrument to turn to the selected point (as indicated by the blue dot in the map).

Store Point

This will open the Store Point dialogue with the coordinates entered for the selected point, so you can store it into your Scene database.

POINTS & FIGURES

Points

Evidence Recorder Scenes typically are comprised of points that have been imported, calculated or measured. These points are always stored in a file made up of the Scene name and will have an extension of DBF. DBF files can be viewed using a DBF reader or with Microsoft Excel.

Point Labels

In the drawing area you will always see a node or dot that marks the coordinate location of the point. For each point you can control what is displayed on the screen such as the point's number, elevation, description and note. To control the visibility of the labels, use the Options button on the Display Toolbar.

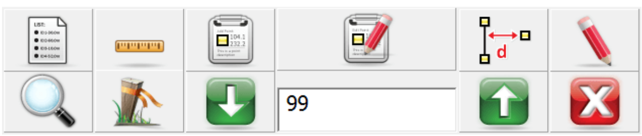
Editing Single Points

To edit a point you can tap on it which will open the Point Toolbar. Press the Edit button to open the Edit Points screen.

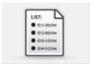
Working with Multiple Points

If you need to search, list, or edit multiple points at the same time you will use the Coordinate Database Editor. Please see the Coordinate Database topic for more information.

Point Toolbar



When you tap on an existing point in the drawing you will see the point toolbar appear near the bottom of your screen. The point toolbar contains functions that are frequently used on points in your Scene. Following is an explanation of what each button will do.



Points List

This will display the list of all points in your current Scene and you can sort the list by tapping on any of the column headings. When you find the point you want simply tap it and press the ok button.

Inverse Tool

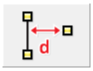
Use this to measure the inverse between points.

New Point

This will open the store and edit dialog and allow you to enter coordinates for a new point.

Edit Point

Use this to edit the coordinate value for the selected point.



Offset

This will open the Offset Tool.

Draw Figure

Use this to draw a line between points or use it to continue an existing figure you've already started.

Zoom to Point

This button when pressed for the first time will force the point to be centered on the screen. Subsequently, if you keep pressing it, it will continue to zoom in on the point.

Stake Point

Pressing this will help you stake the point that is currently selected and take you to the Stake Points screen.

Select Point

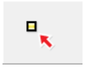
Use these two buttons to scroll up and down numerically through the points in your database.

Point ID

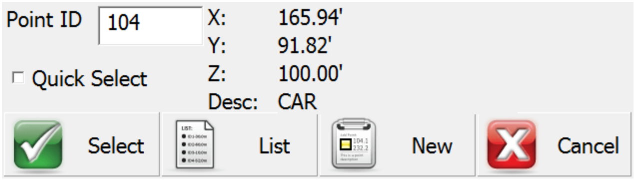
This displays the Point ID of the point you've currently selected.

Select Point Toolbar

The point chooser is a mechanism that is called by routines requiring a point number entry. You access it by selecting the point chooser icon next to point number fields, or by double-tapping in an extended edit point number field.



When select it you will see the point chooser toolbar open up towards the bottom of your screen.



Point ID

You can either type the Point ID into this field if you know what it is, or when you tap on a point in the map screen its point ID will be displayed here.

Quick Select

If Quick Select is turned on, then as soon as you tap on a point in the map screen you will be automatically returned to the routine you were selecting the point for. If Quick Select is turned off, then after you tap on a point in the map screen, the coordinate data of that point will be displayed, and you must press the Select button to get back to the previous routine.

Select

Pressing this will take you and your selected point back to the routine you were selecting the point for.

List

Use this to open a grid displaying all the points in your Scene database. From this list you can click on a point and when you press the OK button it will be inserted into the Point ID field.

New

Use this to open the Store / Edit Points screen. This will enable you to create a new point.

Cancel

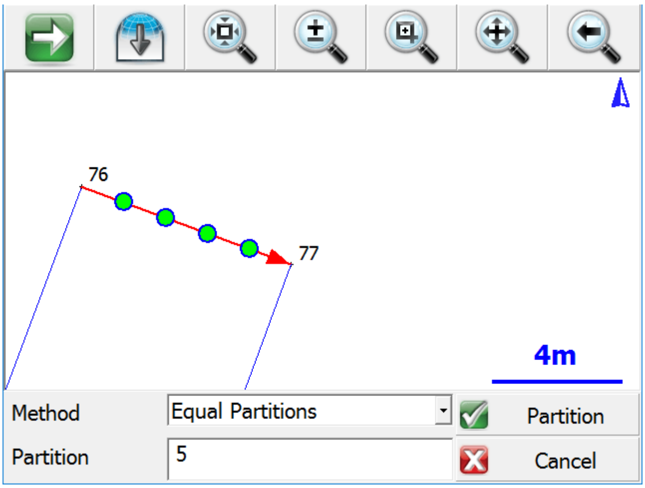
Pressing this will take you back to the routine you were selecting the point for, without selecting the selected Point.

Partition Lines/Arcs

Line Toolbar | Partition button

The Partition command is started by selecting a valid line or arc in the map screen, which will open the Line Toolbar where you can select the partition button. After you select the partition button you will see the partition toolbar.

The partition line and arc command allows you to compute points along objects in your Scene. You can partition figures that have line and arc segments that have a radius point defined. 3 point arcs cannot be partitioned. Straight lines in DXF files can be partitioned, all other DXF entities are not compatible with the partition command.



Equal Partitions

You can partition the segment by equal divisions. Simply select the partition number and press the Partition button. This will compute new points and split the object up into separate segments.

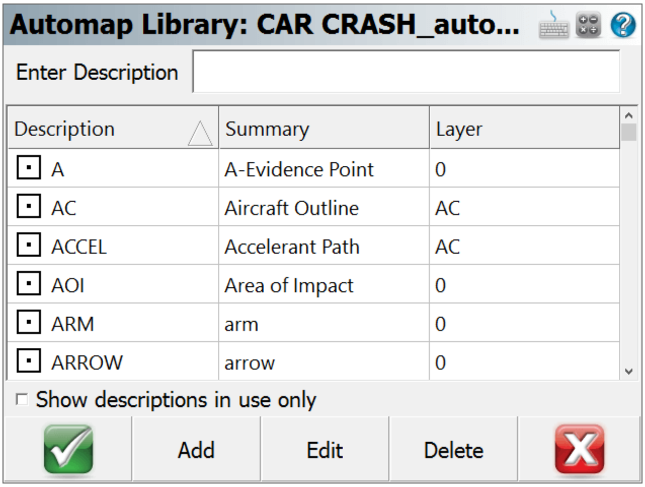
By Distance

You can partition the segment by specifying a distance between partitions. Simply define the partition distance, then press the Partition button. This will compute new points and split the object up into separate segments.

AutoMap Library

Main Menu | Settings | AutoMap Library

The AutoMap Library editor allows the user complete control over the visibility of points and lines based on the descriptions used to code the points. It also allows you to set attributes for the descriptions such as point and line colour.



Enter Description

Use this field to auto scroll to description in your list. For example, typing the letters EV will scroll down to the EVID description. If you type a unique description and press enter, you will be prompted for whether you want to add it into the AutoMap Library or not.

Show descriptions in use only

Use this to display only the descriptions found in your AutoMap Library that are used in the current Scene.

Adding Descriptions to the Library in Evidence Recorder

While you're working you can add descriptions to the AutoMap Library on the fly. When you enter a description that isn't in the library you will be prompted with a message asking you if you want to add it to your Scene's AutoMap Library file.

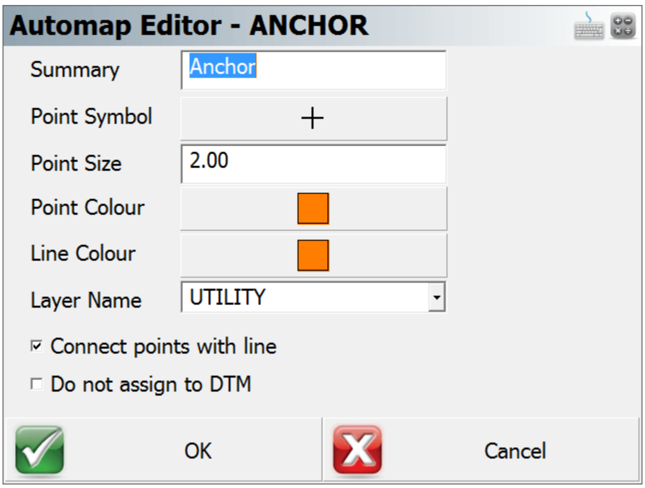
Note: This prompt can be turned off so Evidence Recorder always uses the new descriptions without adding them into the AutoMap Library file. To do this you need to make sure you have the **"Prompt New Descriptions"** toggle turned off in the Options menu.

If you answer **Yes**, then the description will be added into the Scene's AutoMap Library file (not to the AutoMap Template file).

If you answer **No**, then the description will be used without adding it into the AutoMap Library. If you do not add it to the AutoMap Library, then you will not be able to set options such as defining the layer and colour of points and lines with this description.

Editing Descriptions in the Library in Evidence Recorder

The AutoMap Library editor allows you to edit properties for each description in the library. Pressing the Edit button will bring up the menu shown below for the selected entry:



These properties are stored in the library in specific columns. Please refer to the topic below about editing the library for more information.

Summary

You can use this field to summarize your description. For example, a description IP may have a summary Iron Pin.

Point Symbol

You can define a marker for a point. These markers are not automatically transferred back to the desktop and are not similar to CAD blocks or parts. They are simply point nodes that will be displayed in the map view to help distinguish different points on the screen. There are 27 different marker types. The symbol for each description is also shown on the AutoMap Library screen.

Point Size

This allows you to change the size of the marker. You will find that using a number of 1 is a good starting point. Adjust from there as needed.

Point Colour

This allows you to set the colour of the markers. You can choose from a list of 255 colours.

Line Colour

This allows you to change the colour of lines in your drawing.

Layer Name

This specifies the layer that will be used for lines and points with this description.

Connect Points With Line

If this is checked, when you select the description from the topo toolbar on the main display, the connect lines toggle will be turned on automatically. Use this for descriptions that typically are connected by lines such as an edge of road or ditch center line.

Do not assign to DTM

This is very useful for the creation of real-time surface models. If you toggle this ON, then these points will not be included in any DTM created with Evidence Recorder. Use this for descriptions that are not at ground level.

Deleting Descriptions from the Library from Evidence Recorder

The AutoMap Editor allows you to delete descriptions from the library. Pressing the Delete button will prompt you to make sure that you want to delete the selected entry. This will delete that entry from the Scene's AutoMap Library file, it does not affect the AutoMap Template file.

Editing an Existing Library outside of Evidence Recorder

The AutoMap Library is a very powerful feature in Evidence Recorder. When combined with our desktop products, your downloaded files can literally be imported, layers and symbols placed in seconds. For this topic we will concentrate on helping you work with and edit the AutoMap library using Evidence Recorder.

The Evidence Recorder AutoMap library is a comma delimited file that can be edited with IMS Map360, with a text editor like Microsoft Notepad, or with a spreadsheet application like Microsoft Excel. Since not every Evidence Recorder user owns our desktop software we will discuss editing the file with Excel.

The first row in the file is reserved for the column header. Some of the columns are reserved for our desktop products, but the following columns are used in Evidence Recorder.

Column A = Description (String value)

Column B = Summary of Description (String value)

Column L = Connect Points with Line (1=Yes, 0=No)

Column M = Layer Name (String value)

Column O = Line Colour (Number 0-255)

Column Q = Line or Spline (0=Spline, 1=Line) *** This works in conjunction with Column L.

Column U = Marker Type (Number 0-26)

Column V = Marker Size (Number 0-10)

Column W = Marker Colour (Number 0-255)

Column X = Exclude from DTM (1=Yes/Exclude, 0=No/Include)

Column AF = Zone Number (Numeric Value)

Create New Library outside of Evidence Recorder

You can easily start a new library from scratch simply by creating a simple text file. In the first row add a header followed by your descriptions and summaries. You have to separate the values with a command and when you're done save the file with an extension of .CSV - an example filename might be CODES.CSV.

```
DESCRIPTION,SUMMARY
PIN,Iron Pin,
EC,Edge of Concrete,
EP,Edge of Pavement,
```

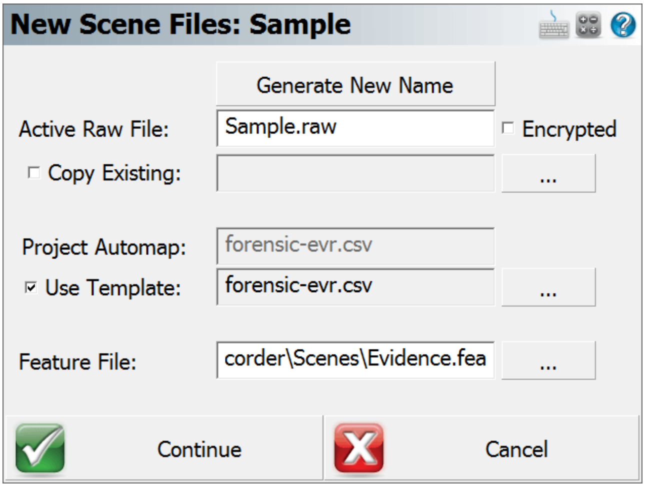
You can then copy the file to your **...\Leica Geosystems\EvidenceRecorder\Scenes** (Windows CE/Mobile) or **...\Documents\Leica Geosystems\EvidenceRecorder\Scenes** (Windows Tablet/PC) directory. When you create a new Scene or open an existing one, make sure to select it as the AutoMap Template File.

Feature List

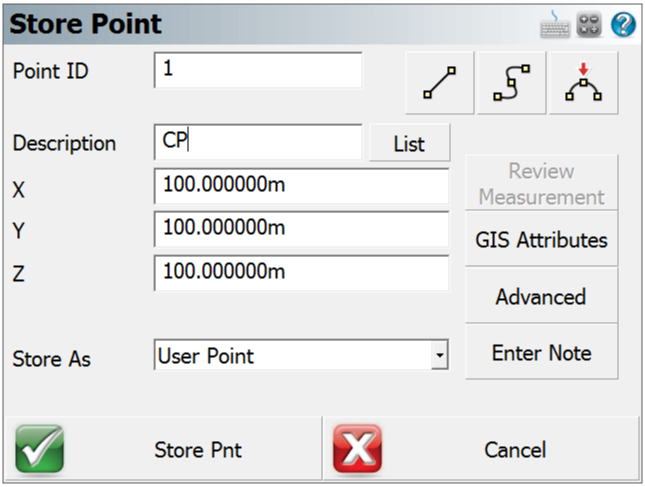
A feature list is a tool built into Evidence Recorder so you can collect attribute data for your points. Feature files allow you to define what data needs to be collected about a point's attributes. You can define mandatory fields, default values, true/false items and select from list options. First you need to create a feature list file using the Feature List Editor which can be installed from your Evidence Recorder CD. Please refer to the help menu in the editor for more information on how to create an effective feature file.

Feature files have a **FEA** extension and they should be copied to your **...\Leica Geo-systems\EvidenceRecorder\Scenes** (Windows CE/Mobile) or **...\Documents\Leica Geo-systems\EvidenceRecorder\Scenes** (Windows Tablet/PC) directory. There is no limitation to the number of feature files that can be stored on your data collector. Once you have created your file and copied it to the appropriate directory, you can set it at the Review Files Screen.

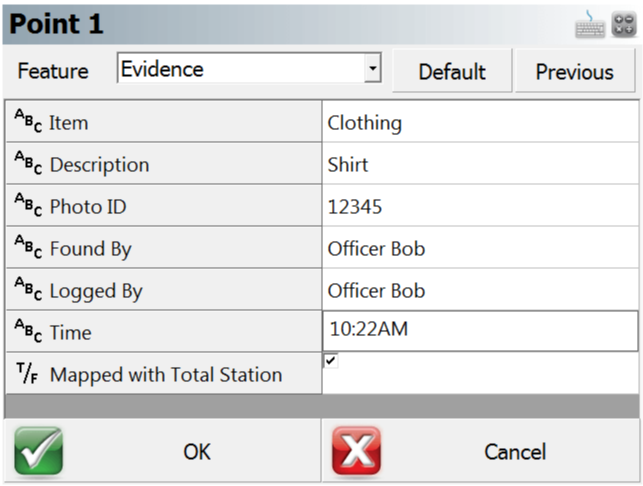
In this example we will open a Feature List File named Evidence.fea.



To collect attribute data for a point, you have to press the **GIS Attributes** button on the store and edit dialog.



When you store a point during a measurement or edit one afterwards, you will see that you can select the **GIS Attributes** button. When you press this button, it will look at the point's description and check to see if you have a feature defined that matches. If it does, it will open up that feature for you automatically, in our example you will see that the Power Pole feature was opened.



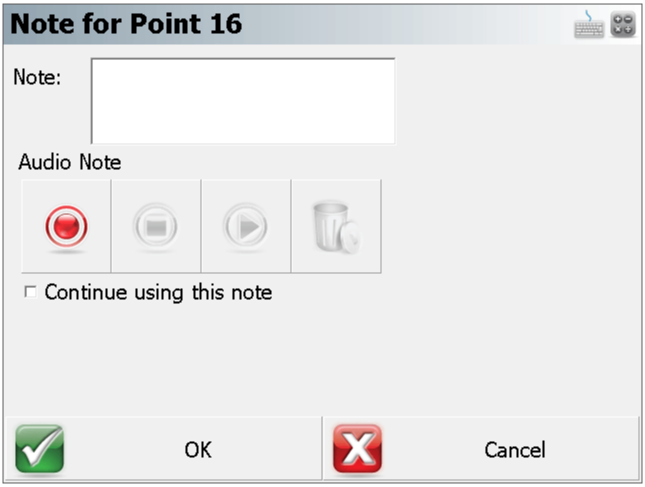
As you can see, feature files help you collect consistent and accurate notes about a point you measured.

When you store the point, a file will be created in the Scene directory. The file will have the same name as the feature and will have a DBF extension. In our example, the file would be named EVIDENCE.DBF. Each point will be appended to the same database file.

The DBF database file can be opened with Microsoft Excel.

Notes

Use this to enter or record audio notes for your points. You can access the notes screen by pressing the **Notes** button on the Store / Edit Points screen.



Text Notes

You can type a note up to 32 characters in length and it will be stored in the Scene's DBF file. You cannot enter more than this limit into the Note field.

When the file is imported into IMS Map360, the note will appear in its own field, or can be appended to the point's description field.

Continue using this note: Use this if you want to use the note you just entered automatically for future points that are stored.

Text notes can be written to the raw file as comments when the Option is enabled.

Audio Notes

Use this function to record and playback audio notes that are related to stored points. These notes will be transferred to IMS Map360 desktop software for playback in the office.

The notes will be stored in your Scene directory and will be automatically named for you. Example, if you recorded a note for point 2, a file would be created pnt2.wav. The file that is created is a standard windows WAV file that can be played by most audio players.

IMS Map360 desktop software will automatically link to any audio note you recorded. This allows you to easily see which points have audio notes.

Recording and Playback Controls

Circle = record

Square = stop

Triangle = playback

Trash = delete

Note that not all handheld devices support audio notes. You must have a record and playback functionality, which for some units requires optional accessories.

To Store an Audio Note:

1. Tap the red circle to activate recording. Speak into your microphone to record the desired information. "This post is bent" etc.
2. Press the square button to stop the recording
3. To confirm your note, press the playback arrow, now green on color displays, and listen to your note

To replace an Audio Note with a new note:

1. Delete the existing audio note. You will be prompted to confirm the deletion.
2. Record a new audio note.

Photo Notes (Not available on all devices)

Use this function to record photo notes for a point. **This option is only available on data collectors that have a Camera.**

Camera

The Camera button is used to take a picture. When you press it, it will start the onboard camera software and allow you to snap a picture. The picture will be saved in the current Scene folder with the filename **[point number].jpg**. The image quality and settings will be determined by the camera setup for the device. If the Camera button is greyed out, it means that a photo note already exists for this point, and you must delete it first if you would like to replace it. The photos will be automatically imported into your IMS Map360 desktop software for viewing in the office.

Delete Picture

The Delete Picture button will delete the photo stored for the point.

Lines and Figures

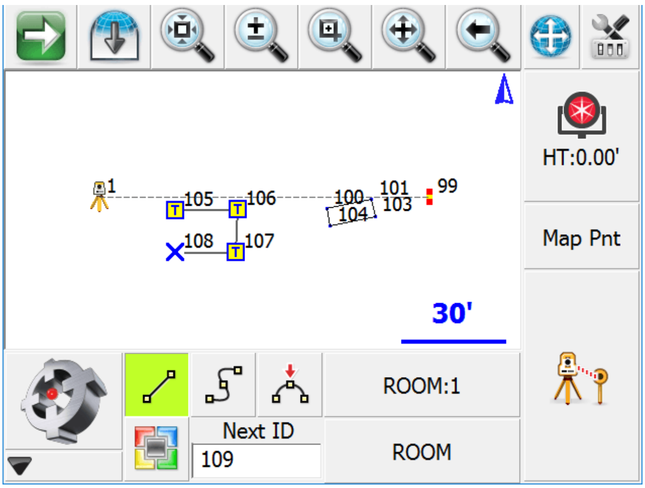
Active Linework

Evidence Recorder has Code-Free linework control in the field to eliminate the need to remember line codes. To activate linework on the fly while investigating the scene, you simply choose the description you want and start taking shots! For IMS Map360 desktop users, line connectivity codes setup in the desktop AutoMap library will be used by Evidence Recorder. For more information see the Draw Option Defaults section.

Evidence Recorder uses the concept of Figures for handling of linework. Some software packages refer to these as "Chains".

At the bottom of the Evidence Recorder interface, you will see the Active Lines List button on the second row. When a new Scene is started, it will display **[-No Line-]** as the current, active line.

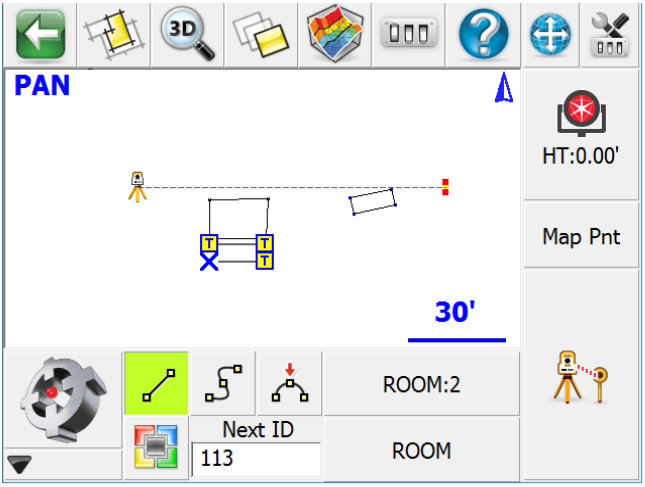
When a new line figure is about to be started, **[-Start line-]** will be displayed on the button. After the first point for a new line has been measured, the active line will be created, made current and displayed.



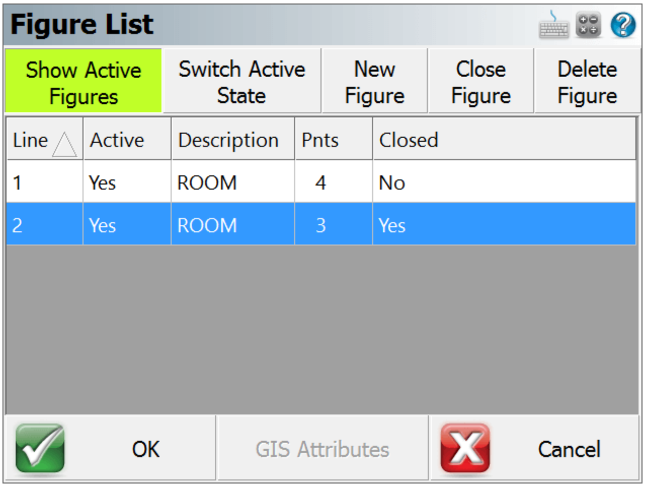
In the example shown, notice ROOM:1 on the button. This is the current Active Line. ROOM is the point description and 1 is the group number (added automatically). Since this is the first figure in the map, it is assigned group 1.

A Figure is a continuous series of Line, Curve and/or Arc segments. The Figure is identified by Point Description and a group number. Whenever a new line is started, a new Figure is created and added to the Active Lines list with an automatically assigned group number. The group number will increment by one when a previously used point description is used for a subsequent line. (Notice there are two E/ASPH lines in the example)

Furthermore, all linework in Evidence Recorder is handled in 3D.



When you press the ROOM:2 Active Line button you will see a list of the figures in your Scene.



Figures

Tangents, arcs and curvy lines in Evidence Recorder are also called figures. Figures are created automatically for you as soon as you connect points in the drawing.

Figures can be created while you investigate a scene in real-time using our active linework or you can manually create the figure using the pencil tool.

Evidence Recorder Figures

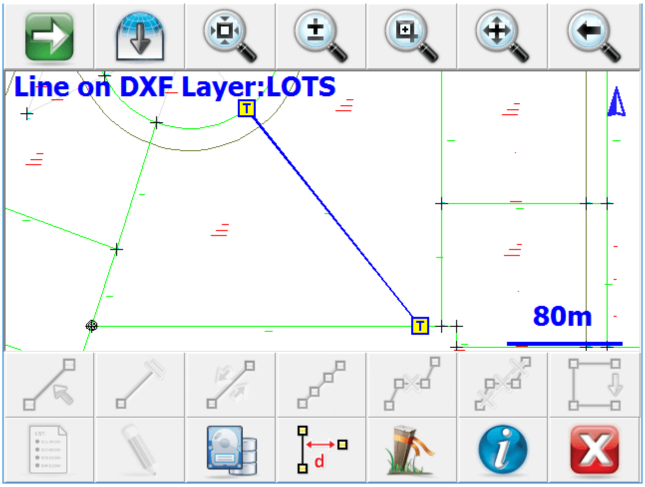
When you click on a figure the Line Toolbar will appear. You will also see bold text in the drawing area indicating what you selected.

DXF Linework

When you import a DXF drawing you will see all the linework that exists in the drawing. When you select a DXF line or arc you will see the Line Toolbar but everything will be greyed out except for the stake and perpendicular distance buttons. If you press the stake button or perpendicular offset to point button, they will open up their respective toolbars.

When you click on a DXF entity you will see bold text in the drawing area indicating that you picked a DXF line or arc, and it will display which layer it is on.

You can control the visibility of DXF layers through the Layers Manager screen.



Coordinate DXF Data

You can add coordinates to the DXF entity by pressing the Coordinate DXF Data button.

Information

You will see the inverse information based on the DXF entity you picked by pressing the Information button

Line Toolbar

When you tap on an existing line or arc you will see the line toolbar appear near the bottom of your screen. The line toolbar contains functions that are frequently used on line or arcs in your Scene. Following is an explanation of what each button will do.

Set Figure Current

Use this to make the current line or arc current in the Active Line List.

End Figure

Use this to mark a line as complete or finished.

Reverse Figure Direction

Use this to switch the direction of a figure so you can append to the opposite end.

Partition Line / Arc

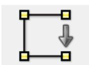
You can partition (split) a figure or DXF line into smaller segments using this command.

Delete Figure Segment

Use this to delete a segment from a figure.

Delete Entire Figure

Use the delete an entire figure.



Close Figure

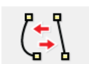
Use this to close a figure so it finishes at the same point it started at.

Open Figure List

Use this to display the Active Line List.

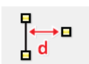
Draw Tool

Use this to draw lines, points, and connect line work between existing points. This will open the Draw Tool.



Convert Line to Spline

This will turn an existing figure that is comprised of straight lines into a curvy line, and vice-versa.



Offset Tool

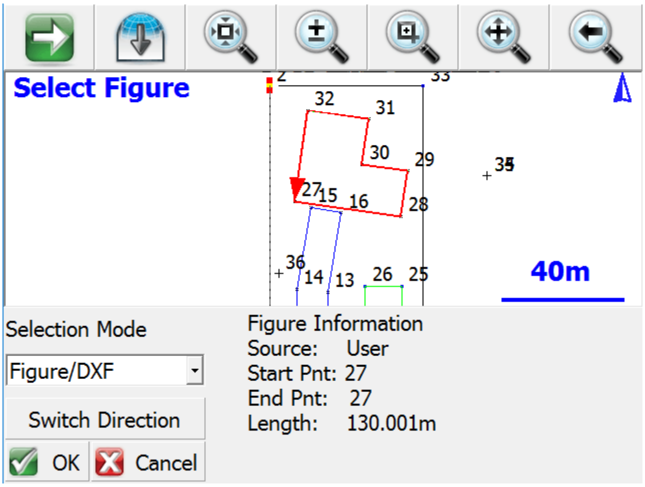
Use this to open the Offset Tool.

Information

This will display the inverse information of the segment you have selected, as well as the perimeter and area if it is part of a closed figure.

Select Line Toolbar

Various commands will use this toolbar to help you select a line.



Whichever Selection Mode you use, the selected line will be highlighted in red in the map screen along with a direction indicator. If necessary, you can press the **Switch Direction** button to reverse the start and end of the selected line. Press OK to accept the selected line and proceed to the next step.

Selection Mode: Figure/DXF

Pick this mode to select an existing figure or DXF entity by selecting the desired figure from the map screen. You can select any of the following:

- Figures containing lines and/or arcs (but not curvy splines)
- DXF lines, arcs, and/or polylines (but not splines, splined polylines, or fitted polylines)

Selection Mode: Figure Segment

Pick this mode to select an individual line or arc segment from a complex figure, by selecting the desired segment from the map screen. You can select any of the following:

- A line or arc segment from a Figure (but not a curvy segment)

Please Note: A line or arc segment from a DXF polyline cannot be selected.

Selection Mode: Define Points

Pick this mode to select points in your Scene to define a line or arc. You can define the following line types:

- Straight Line: select a Start Point and End Point
- Arc (CW): select a Start of Curve Point, Radial Point, and End of Curve Point
- Arc (CCW): select a Start of Curve Point, Radial Point, and End of Curve Point
- Arc (3Pnt): select a Start of Curve Point, Point on Curve, and End of Curve Point.

Switch Direction

The line direction will reverse, and the arrowhead shown in the map screen will show the current "forward" direction of the line.

OK

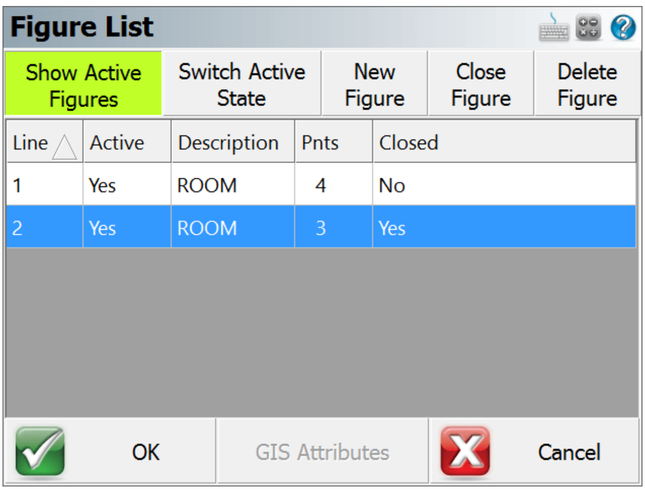
The highlighted line will be selected, and you will be returned to the appropriate command.

Cancel

You will return to the previous screen without selecting anything.

Figure List

The figure list contains a listing of all figures in your Scene.



Line Column

This is the group id assigned to the figure. Refer to the Active Linework topic for more information.

Active Column

If the figure is active, you will see the word **YES**. To make a figure not active, press the Switch Active State button.

Description Column

This is the name of your figure which will usually match the description of the first point that the figure is connected to.

Points Column

This is the total number of points that the figure is connected to.

Closed Column

If you closed the figure you will see the word **Yes**.

Show Active Figures

When this is selected (default setting) all of your active figures will be listed. You can select a figure that you would like to work on simply by selecting it in the list and pressing the OK button. If this is turned off, then all the figures in the Scene will be displayed.

Switch Active State

Use this to change the status of a figure to "finished". When this is done, it will no longer be displayed in the figure list of the Show Active Figures button is on. Once a figure is switched to a not active state, nothing can be added to it.

Figures that are not active, can be made active again simply by selecting the figure you want to use and pressing the Switch State button.

New Figure

Use this to create a new figure in the figure list.

Close Figure

Use this to close a figure so it will close back to the starting point.

Delete Figure

Use this to delete a figure that you have highlighted in the list. You can delete figures that are flagged as active, or not active. Review the delete figures topic for more info on deleting.

Using Active Figures

Active Linework Options

We have 3 Draw Options for Active Linework, selected from buttons that appear beside the Description and Active Lines drop down lists:

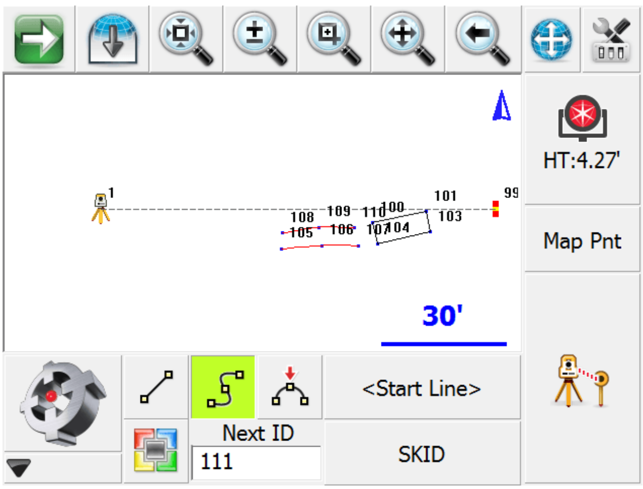
Draw Lines button = Connect points with straight lines

Draw Curvy Lines button = Connect Points with a best-fit curvy line.

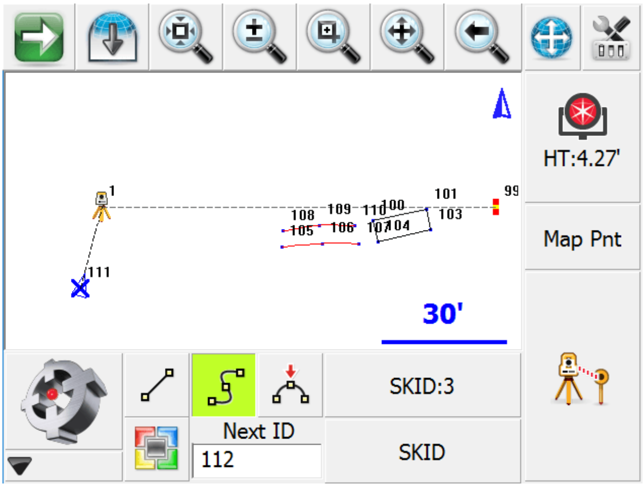
Draw 3-Point Arc button = Fit an arc through three measured points

Start the first Line in a Scene

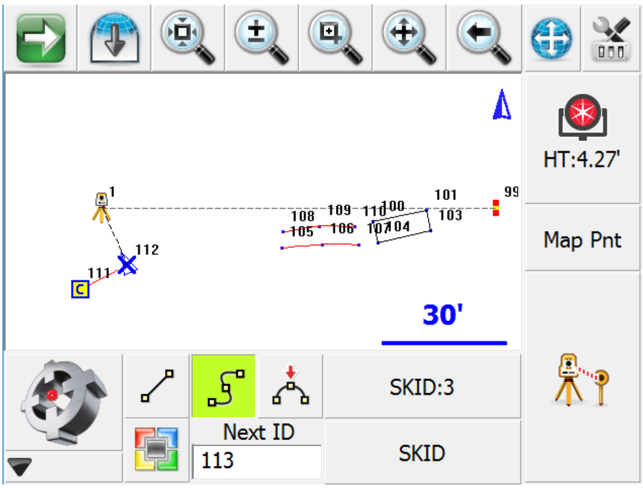
To start the first line in a new Scene, choose the desired point Description from the Description List and select the desired draw option before you start taking measurements. The Active Lines list will display -Start Line- as shown. At this point, the next point measured will be the first point of a new Active Line using the SKID Description. Use the measure button to measure the starting point for the new line.



After the measurement to the first point for the new line is complete, the line will be added to the Active Lines list, identified by the current point description and an automatically assigned group number: SKID:3. The group number is three, because this is the third figure using the description SKID.



After the second point for this line has been recorded, the first segment will be created. From this point forward, simply continue taking shots to add to the now current Active Line: SKID:3



Note the insertion of ":3", this is the group number. Re-use of the Description SKID for a new line series in the current Scene will automatically increment the group number by one. This allows you track and store multiple active lines of the same description without the need for multiple entries in your AutoMap Library. For example, SKID:2, SKID:3 ... SKID:n can now be replaced with a single SKID entry.

Stop adding to a Line

If you wish to stop adding to the current line, simply deselect the current draw option (Line, Curvy line) before taking any more shots. After turning off the draw option, -No line- will display in the Active Lines list button.

Start a subsequent New Line

Much like the first line in the Scene, just select the desired description from the list and select the desired draw option before shooting the first point for the new line.

The key to note is the display of -Start Line- in the Active Lines list. Once the first point for the new line has been measured, the Active Lines list will set and display the new line as current.

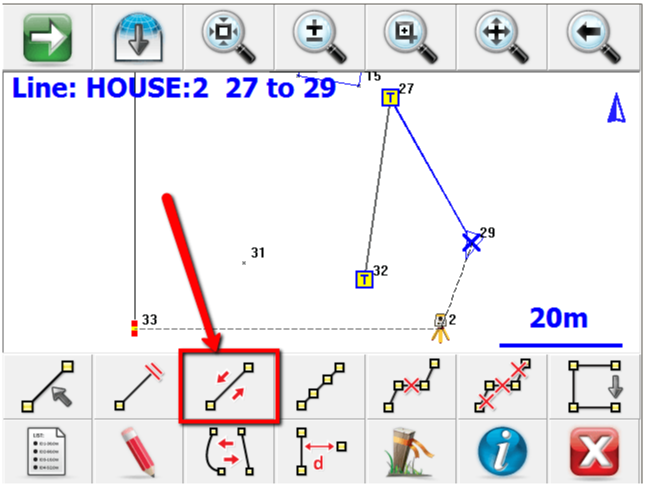
Change Description within an Active Line

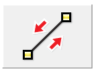
You may change the description within one ongoing line. Simply choose a different description and continue taking shots. The ID of the Active Line will not change.

Figure Direction Marker

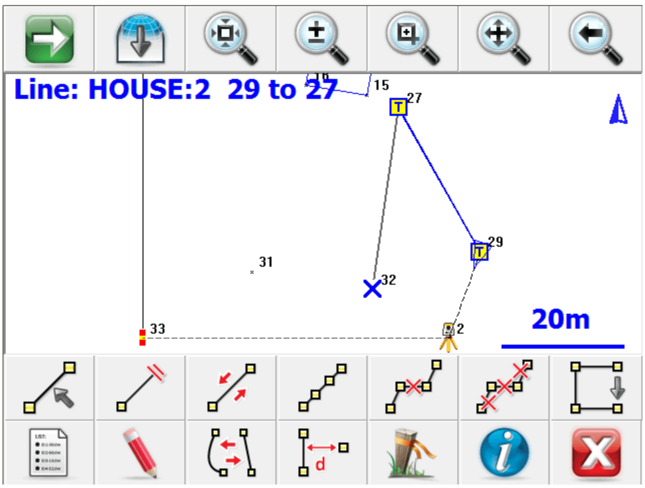
The current line in the map is always defined by a bold outline and a blue X at the end of the line. The blue X indicates the line direction so you know what end of the line the next measurement will be connected to.

You can see that the blue X is on point 29. After you take your next shot, it will be automatically connected to this point.





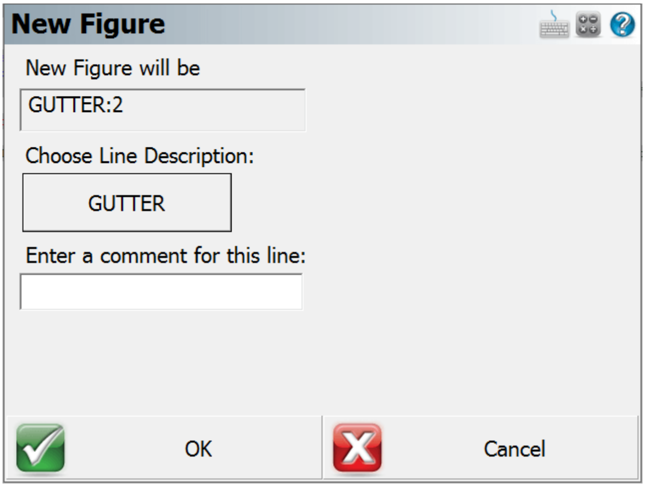
Once you select the figure, you will see the line toolbar. On this toolbar, select this button to reverse the direction. After you switch the direction, you will see the blue "X" move to the opposite end of the figure.



New Figure

Pre-selection of Line Descriptions

A list of Active Lines (Figures) may be pre-specified to aid in planning for a complicated Scene. Use the **New Figure** button on the Active Line List screen to specify a Line Description before taking any shots.

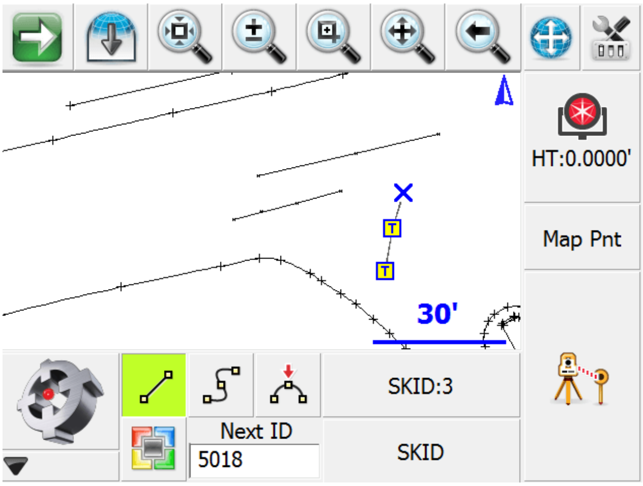


You have the opportunity to use a manually entered comment with this method but the new line will be linked to the selected Line Description. The comment will appear in the Active Lines list to aid correct selection of the line.

Switching Active Figures

You may work on several figures at once. As described, ongoing figures are listed in the Figure List.

You will notice that in this Scene there are three figures.

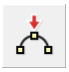


To change the current line, simply select the active line button which will open the Select Figure from List screen. In this example it is the SKID:3 button.

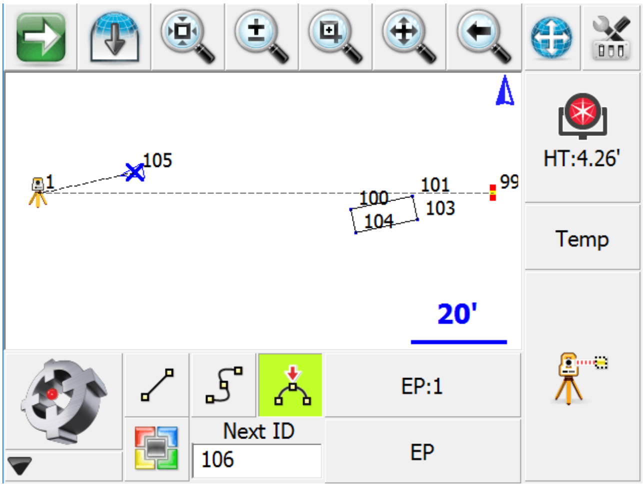
Select the desired figure from the list and continue taking shots to add to the selected line. All settings are stored for each line so there is no need to reselect the Description or draw option.

3-Point Arcs

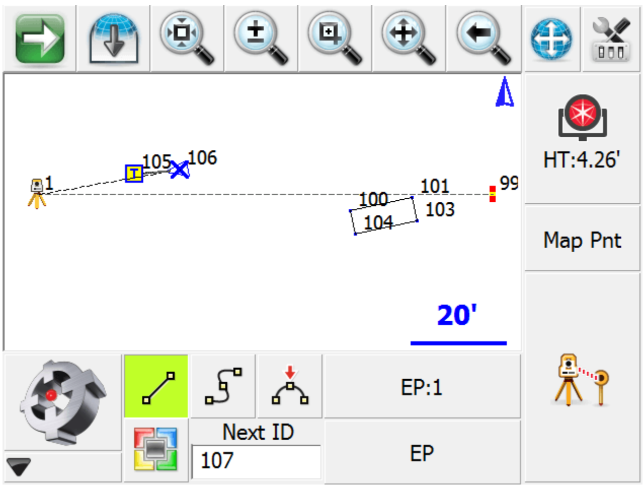
To draw a three point arc on an ongoing Line, select the Draw 3-Point Arc button before shooting the second of the three points that will define the arc (POC). (Note that this is not the radius point). After measuring to the 2nd point, a dashed line will appear to illustrate that a 3-Point arc is in progress. Shoot the 3rd point and the arc will appear. The current draw option will change from Draw 3-Pt Arc to Draw Line after the third observation and the arc is complete.



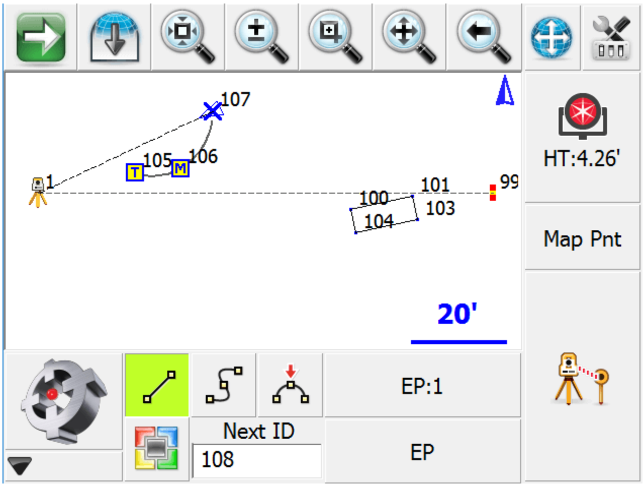
We are going to connect a three point arc to the E/ASPH figure. Since we are measuring the midpoint of the arc, you need to turn on the three point arc toggle.



After you complete the measurement, you will see the midpoint drawn on the screen.



Once you complete the third measurement, you will see the arc drawn in the map.



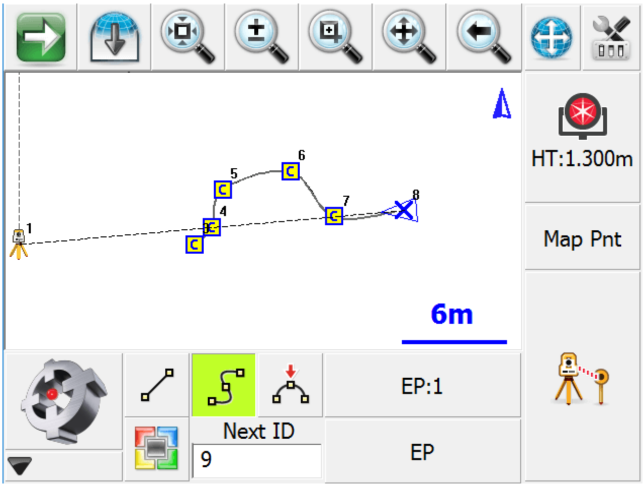
Tip: Multiple three point arcs can be connected in series if needed.

Splines (Curvy) Figures

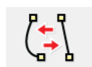
Figures can contain splines. Splines are "best fit arcs" that are forced to go through the points that define the figure.

Splines can be attached to straight or three point arc segments.

To draw a spline, simply choose the spline toggle.



Changing Active Lines to Curvy Lines



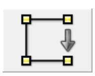
Any Active Line series (figure) can be changed from a series of straight segments to a best-fit curvy line. Select the figure in the drawing to open the line toolbar. On the toolbar press the **Line-Spline** button which will convert the line to a curvy line. If the line is already a curvy line, it will convert it to straight tangents between the points.

Note that any 3 point arcs or straight line segments will be lost when you use this function.

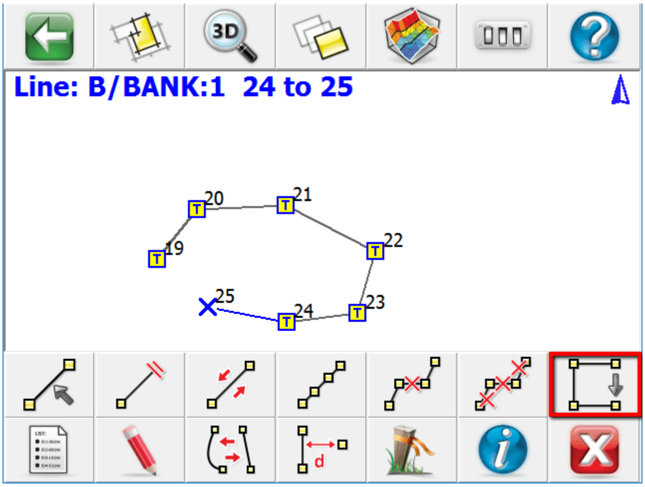
Complex Figure

Figures that contain straight segments, arcs and spline segments are said to be a complex figure.

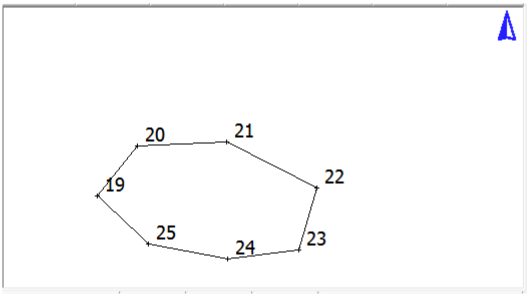
Closing Figures



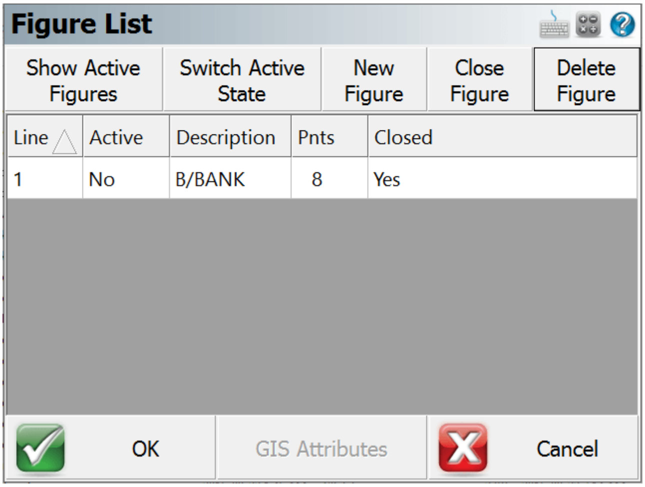
To make a closed figure with an Active Line, select the **Close Current Line** button on the line toolbar. This will draw a line from the last point to the first point shot in the figure. The Line will be removed from the Active Lines list as it is now considered complete.



You will see that the figure now is closed back to the original start point.



In the active lines list, if you turn off the **Show Active Figures** you will see that the figure is flagged as Active = NO and Closed = YES.



Alternatively, you can also close a figure in the Figure List screen by using the **Close Figure** button.

End (complete) a Figure

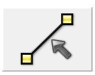
To mark a line as complete or finished, use the End Current Line button on the line toolbar. This will remove the line from the Active Lines list so that no more segments or arcs can be added.

This works similar to closing a figure, but differs in that the figure will not be forced to close back on to the original start point.

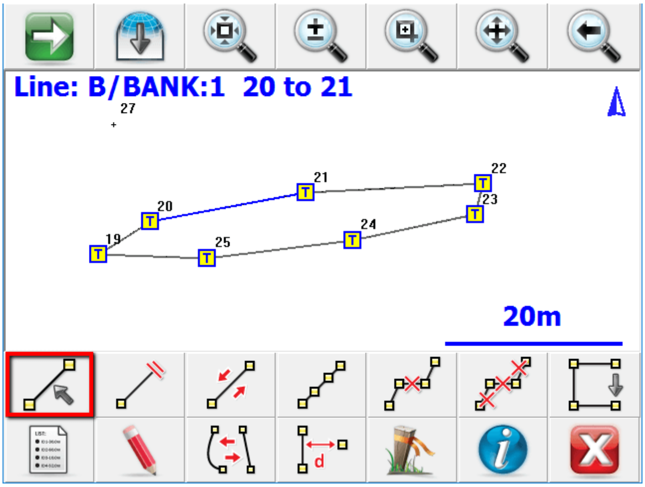
Re-Activating Figures

When a figure has been marked as complete, you can activate it again as follows:

From the Line Toolbar

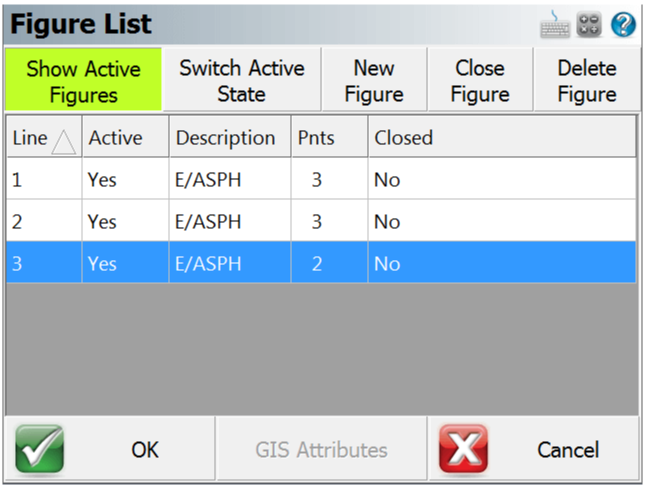


You can visually pick on the map view the figure that you would like to re-activate. On the line toolbar, select the activate button which will make the selected figure active.



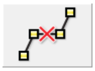
From the Figure List

You can also open the active lines list and if you turn off the **Show Active Figures** button you will see the figures that are marked as not active. Simply select the figure you want and press the **Switch Active State** button which will set it to active.



Deleting Figures

To delete linework in your Scene simply select the figure you want to delete. When you select the figure, the line toolbar will open.



Use this button on the line toolbar to delete an individual segment between two points or a three point arc.

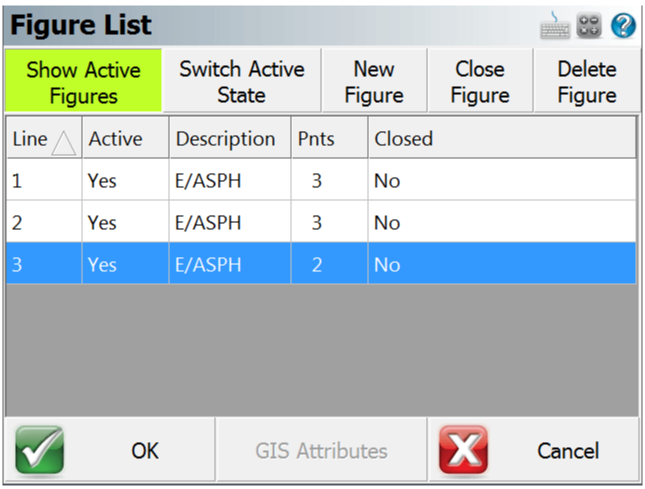
Use this to delete the entire figure that you have selected.

Notes:

Splines: Spline sections are considered to be one entity so using the delete entire figure, or delete segment, each will do the same thing. The entire spline will be deleted.

If a segment or arc is deleted from the middle of a figure, the figure will be broken into two pieces. Each new figure will be assigned a new group number. Closed or ended figures will be re-activated and added to the Active Lines list.

You can also delete a figure by selecting it in the active lines list, then pressing the Delete Figure button.

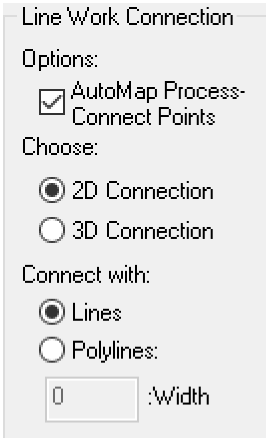


Draw Option Defaults

To setup draw option defaults you need to own a copy of IMS Map360. From within IMS Map360 you can use the AutoMap editor to set default draw settings for each Description in the IMS Map360 AutoMap Library. When this library is copied to your collector, selecting a Description will choose the correct Evidence Recorder Draw option for Active Linework in Evidence Recorder.

Lines

Choose the following in your desktop AutoMap library editor to set the draw default for Evidence Recorder to Lines.

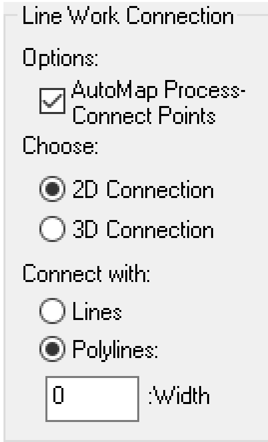


In Evidence Recorder when the description is selected, the line toggle will be automatically turned on.

As shown below, the line toggle has been automatically turned on when the E/ASPH description was selected from the list.

Curvy Lines

Choose the following to set the draw default for Evidence Recorder to Curvy Lines

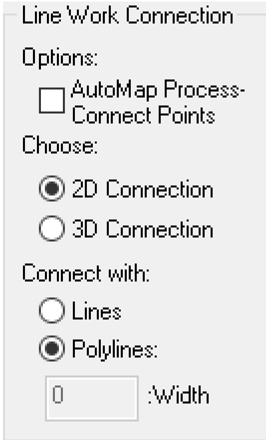


In Evidence Recorder when the description is selected, the curvy toggle will be automatically turned on.

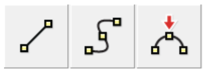
As shown below, the curvy toggle has been automatically turned on when the E/ASPH description was selected from the list.

None

Choose the following to set the draw default for Evidence Recorder to None



As shown below, when the HUB description was selected, all line connectivity toggles are turned off.



Notes:

The 2D Connection and 3D Connection settings do not affect Evidence Recorder, we only make use of these settings as defaults in IMS Map360. All Evidence Recorder figures are 3D. With Evidence Recorder data imported to IMS Map360, there is no need to process AutoMap connections as Evidence Recorder figures are drawn automatically. For more details on the AutoMap Library, see your IMS Map360 Help System.

Drawing Tool

Main Menu | Mapping Tools | Drawing Tool

Line Toolbar | Pencil button

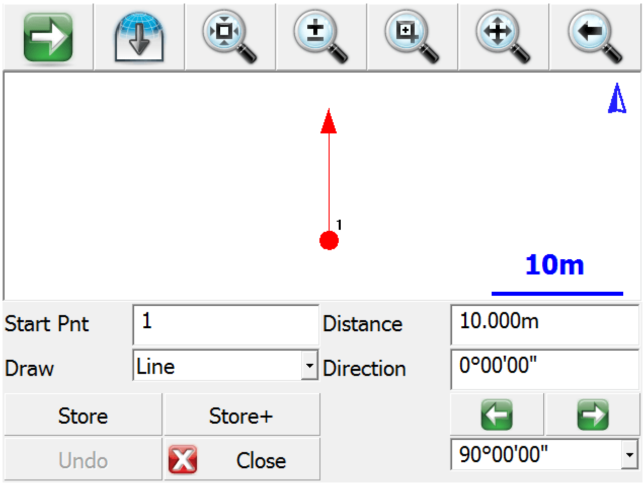
Point Toolbar | Pencil button

This tool allows you to quickly draw a plan such as a pad or a building footprint into your Scene, and is typically used to recreate plans from a paper hard-copy. You can use this to either calculate new points, or to connect existing points that are already in your Scene.

You must have at least one point in your Scene before you can start, to define the starting position for your plan. If a point does not yet exist (for example if this is the first command you run in a new Scene), you will be prompted to store a new point before you can proceed.

Line Mode

Use the Line draw mode to add straight line segments to your figure.



Start Point

Specify the start point for the new segment.

For starting a new plan, this should be set to an existing point in your Scene, typically a corner that you will begin drawing the plan from.

As you continue adding subsequent points/segments to your plan, you will see the Start Point field automatically advance for you.

Distance

Specify the length of the line segment you wish to draw.

Direction

Specify the direction (Azimuth or Bearing) of the line segment you wish to draw. The easiest way to do this is to use the right/left arrow buttons, which will increment/decrement the direction value by the amount shown in the pulldown list below the arrows. You can select a common angle from the choices in the list (90, 45, or 30 degrees), or you can type any value if you need to increment it by some other amount.

Store

After you have defined the segment to add, press this to store the new point and line segment into your Scene.

Store+

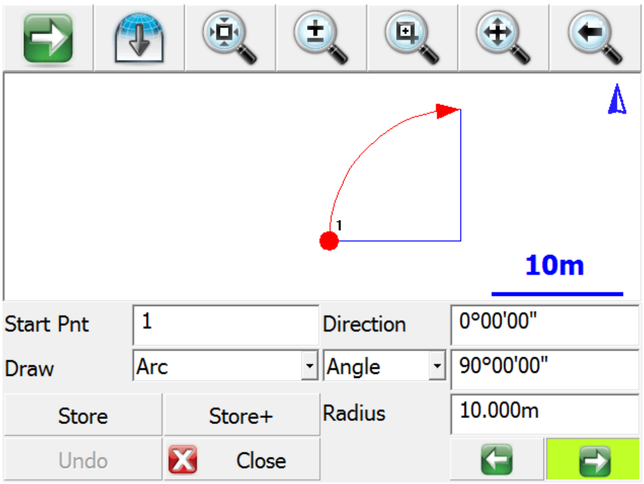
This does the same as the Store button, but you will see the Store/Edit Point screen. Use this to confirm or view the coordinates, or to specify a description.

Point by Line Mode

This is the same as the Line mode, except that when you press Store or Store+ it will only store the point, without drawing the line segment.

Arc Mode

Use the Arc draw mode to add arc segments to your figure.



Start Point

Specify the start point for the new segment.

For starting a new plan, this should be set to an existing point in your Scene, typically a corner that you will begin drawing the plan from.

As you continue adding subsequent points/segments to your plan, you will see the Start Point field automatically advance for you.

Direction

Specify the direction (Azimuth or Bearing) of the **tangent in** to the arc segment you wish to draw. This will default to either the direction of the previous line segment or the tangent out of the previous arc segment, so as long as your arc is tangential to the previous segment you will not need to change this value.

Angle / Chord Length / Arc Length

Specify one of the three available methods to define your arc:

- Angle: Enter the interior delta angle of the arc.
- Chord: Enter the chord length of the arc.
- Arc: Enter the arc length of the arc.

Radius

Specify the radius to define your arc.

Clockwise / Counter-Clockwise Arrows

Use the Right/Left arrow buttons to define whether the arc rotates clockwise or counter-clockwise.

Store

After you have defined the segment to add, press this to store the new end and radial points, and draw the arc segment into your Scene.

Store+

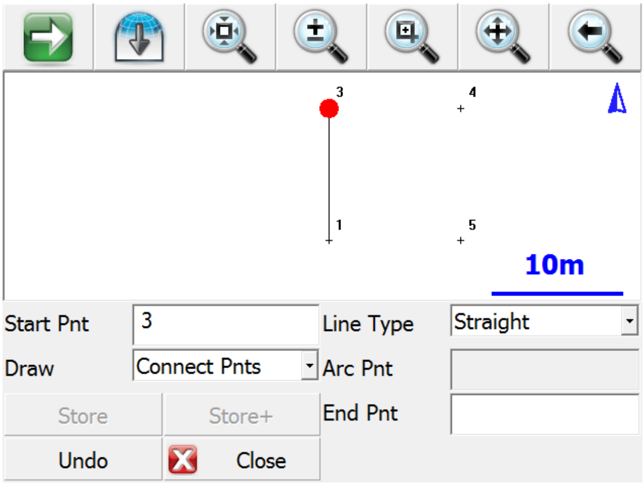
This does the same as the Store button, but you will see the Store/Edit Point screen. Use this to confirm or view the coordinates, or to specify a description.

Point by Arc Mode

This is the same as the Arc mode, except that when you press Store or Store+ it will only store the points, without drawing the arc segment.

Connect Points Mode

This mode lets you draw lines/arcs by connecting points that already exist in your Scene.



Start Point

Specify the start point for the new segment.

For starting a new plan, this should be set to an existing point in your Scene, typically a corner that you will begin drawing the plan from.

As you continue connecting subsequent points to your plan, you will see the Start Point field automatically advance for you.

Line Type

Specify one of the five available methods to define your next figure segment:

- Straight: this will draw a straight line between the specified Start Point and End Point.
- Arc (CW): this will draw a clockwise arc between the specified Start Point and End Point, with the specified Radial Point.
- Arc (CCW): this will draw a counter-clockwise arc between the specified Start Point and End Point, with the specified Radial Point.
- Arc (3Pnt): this will draw an arc (clockwise or counter-clockwise) between the specified Start Point and End Point, going through the specified intermediate Arc Point (any point directly on the arc, does not need to be the midpoint).
- Spline: this will draw a curvy line between the specified Start Point and End Point.

Store / Store+

The Store and Store+ buttons are disabled for this mode, because new points are not being calculated for your Scene. The line or arc segment will be automatically drawn into your Scene after you specify its parameters.

Undo

Press the **Undo** button to undo the last segment you computed, removing both the point and/or the line segment (as appropriate) from your Scene. You can undo multiple steps.

Note, there is no Redo function.

Close

Press the **Close** button to exit from the Draw Plan command, and you will be returned to the map screen.

Smart Tags

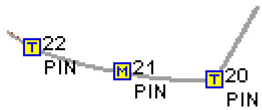
When you select an existing or create a figure in your drawing you will see smart tags appear on the points that make up the figure.

Smart Tag "T"

The T smart tag define points connected to straight line segments.

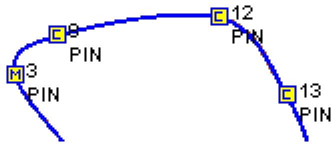
Smart Tag "M"

The M smart tag defines the midpoint of an arc.



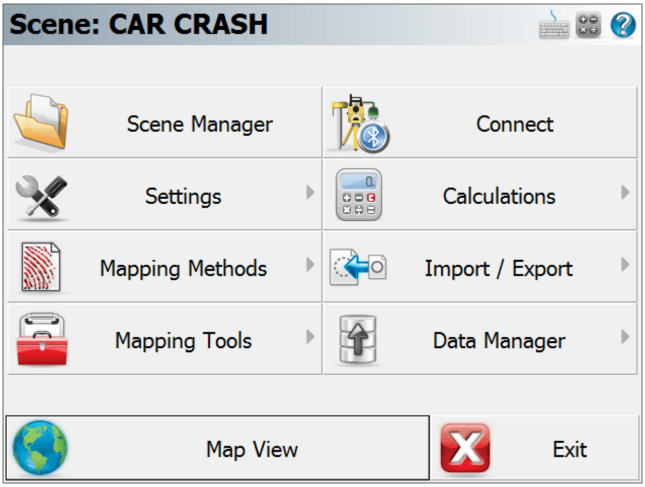
Smart Tag "C"

The C smart tag define points connected by a curvy line type.


12
PIN
8
PIN
3
PIN
13
PIN

MAIN MENU

On the main interface of Evidence Recorder you will see the Evidence Recorder **Start** icon which will always activate the main menu or display the previously viewed sub-menu. When the button is pressed you will see the main menu screen:



On the main menu, pressing any of the buttons will take you to its sub-menu.

From any sub-menu, pressing the **Menu Home** button will return you to this menu.

The **Map View** button will close the main menu and take you back to the map view.

The **Exit** button will close Evidence Recorder.

Scene Manager

Selecting this will allow you to create, open or delete Scene. Please see the Scene Manager topic for more information.

Settings

Select this to check or change settings for Evidence Recorder. Please see the Settings topic for more information.

Mapping Methods

Select this to choose a Mapping Method such as occupying a point, checking a point, or measuring an offset. Please see the Mapping Methods topics for more information.

Mapping Tools

Select this to execute tools such as manually storing new points, deleting/undoing the previously measured point, or viewing the raw file. Please see the Mapping Tools topic for more information.

Calculations

Select this to use our calculating functions such as COGO and inversing. Please see the Calculations topic for more information.

Import/Export

Select this to import or export ASCII files, and to export DXF, XML, and other files. Please see the Import/Export topic for more information.

Please note, additional file types can be imported from the Surface Manager and the Map Data Layers Manager, both located in the Data Manager menu.

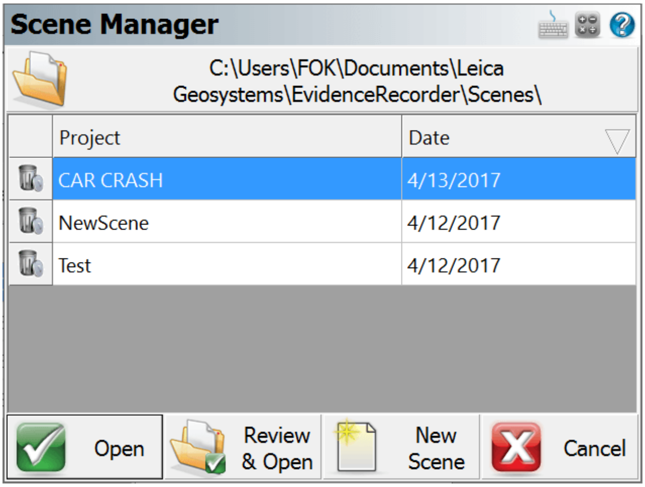
Data Manager

Use this to manage your points, DXF files, and surfaces. Please see the Data Manager topic for more information.

Scene Manager

Main Menu | Scene Manager

The Scene Manager is used to create, open, or delete Scenes stored on your data collector. When you start Evidence Recorder this is always the first screen you will see.



You can sort the list by Scene name or date by tapping on the column's header.

Scenes Folder

Press this button to specify a different Scene folder than the default. The default is **...\Leica Geosystems\EvidenceRecorder\Scenes** (Windows CE/Mobile) or **...\Documents\Leica Geosystems\EvidenceRecorder\Scenes** (Windows Tablet/PC). Once you set the directory it is written to the MSurvey.ini file and is used for all subsequent Scenes.

Delete Scene

To delete a Scene, pick the **Delete** trash can icon next to the Scene Name. You will be asked to confirm that you really want to delete the Scene.

Notes:

- You cannot delete a Scene that is currently open
- Scenes that have been deleted cannot be restored

Open Scene

To open an existing Scene, simply select it in the list and press the **Open** button.

Review & Open Scene

To review and open an existing Scene, simply select it in the list and press the **Review & Open** button. This option will display the Scene files used with the Scene.

New Scene

To create a new Scene, simply press the **New Scene** button. You will then see the New Scene screen which will allow you to enter a name, choose your AutoMap library and set the units for the Scene.

Exit

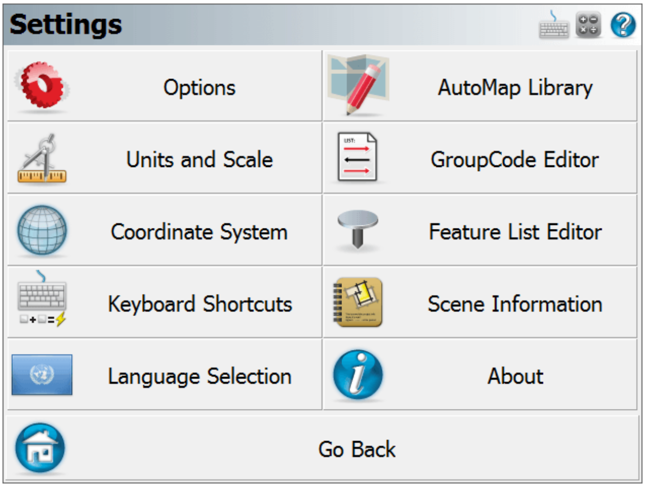
To exit from the Scene Manager press the **Exit** button.

Settings Menu

Main Menu | Settings

The settings menu is used to setup and review settings that have been set for your current Scene. You can also specify default settings for new Scenes that are created.

Most of these settings are stored in a file named **MSurvey.ini** which can be found in the **...\Leica Geosystems\EvidenceRecorder\Programs** (Windows CE/Mobile) or **...\ProgramData\Leica Geosystems\EvidenceRecorder\11** (Windows Tablet/PC) directory. It is recommended that once you have defined your settings, that you make a backup of this **MSurvey.ini** file.



Options

Use this to set or change settings that affect Evidence Recorder's functionality. Please see the Options topic for more information.

Units and Scale

Use this to set or change the units, bearings, distances and scale settings for your Scene. Please see the Units and Scale topic for more information.

Coordinate System

Use this to define the coordinate system for your Scene. Please see the Coordinate System Settings topic for more information.

Keyboard Shortcuts

Use this to define shortcuts to Evidence Recorder commands and assign them to your keys. Please see the Keyboard Shortcuts topic for more information.

Language Selection

Pick the Language for the program interface. Many options are available, see the Language Selection topic for more details.

AutoMap Library

The AutoMap Library editor, see the AutoMap Library topic for more details.

GroupCode Editor

The GroupCode editor, see the GroupCode Editor topic for more details.

Feature List Editor

Launch the external Feature List Editor (Windows Tablet/PC only). See the Feature List Editor topic for more information.

Scene Information

Use this to enter and save information about your Scene. Please see the Scene Information topic for more information.

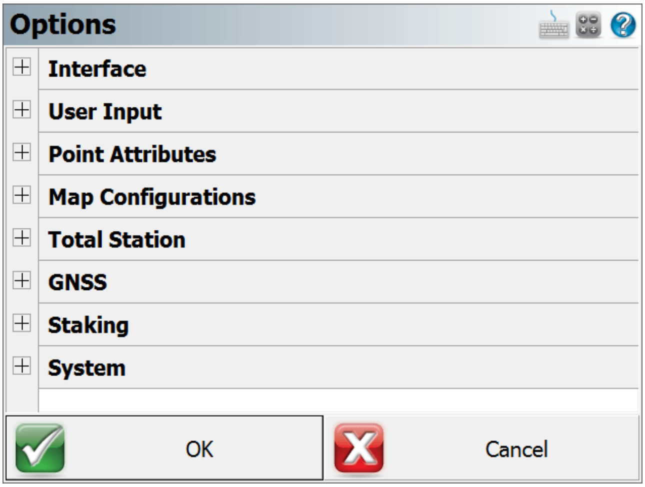
About

Opens the About screen.

Options

Main Menu | Settings | Options

The options screen helps you set settings that affect the look and feel of Evidence Recorder.



Press the [+] buttons along the left to expand (show) each section, and the [-] buttons to collapse (hide) it.

- Interface Options
- User Input Options
- Point Attributes Options
- Map Configurations Options
- Total Station Options
- GNSS Options
- Staking Options
- System Options

Interface Options

Map Colour

Use this to force the background color for the main drawing area to be white or black

Map Orientation

Using this will force the map screen to be oriented to the north or south. This is needed for coordinate systems that are referenced south, such as in South Africa. This is different from South Azimuth directions, as used in Hawaii.

Arc Resolution

This option determines the number of segments that will displayed in an arc on the screen. Reducing this number increases program speed; increasing this number slows down graphics display, but improves the quality of arcs and curvy lines displayed on the screen.

Text Size (Info/Grid)

Use this to force the text shown in the Information screens (such as the Observation toolbar and the COGO History screen) and grid screens (such as the Scene Manager and Angle Offset shots) to use a small or large sized text.

Show Scale Bar

Use this to turn the scale bar shown on the main map screen on or off.

Scrollbar Width

Use this to increase the width of the scroll bar on the map screen.

User Input Options

Keypad Text Color

Use this to turn change the keypad text color to show up better against the keypad background color.

Keypad Background Color

Use this to turn change the keypad background color so the text shows up better.

Extended Edit Boxes

Use this to control how you want to bring up the selected keypad when tapping in an edit box: either with a single tap, a double tap, or off. Users of devices with a keyboard should leave this set to Double Click, and users of devices without a keyboard should set this to Single Click. Setting this to Off disables both the keypad and any other commands that may be started directly from the edit field, such as the Point Chooser or Inverse Tool, so that edit fields can only be used for typing values from your physical keypad.

Menu Shortcuts

This will enable menu shortcuts so if you have a keyboard device you can press letter and number keys to navigate around the program.

Instrument Toolbar

You can define if the instrument toolbar is located on either the Right or Left Side of your map screen.

SIP Type

Use this to specify which SIP keypad type you want to use on a Windows Mobile device.

Point Attributes Options

Coordinate Order

Use this to control the display of coordinate values in Evidence Recorder. Options are NEH, ENH, XYZ, XYZ (South) and YXZ (South) affecting any area of the program where coordinates are displayed.

This option also affects whether the ASCII Import and ASCII Export commands use a N,E or E,N (X,Y) file format.

Alphanumeric IDs

When this is enabled you will be allowed to enter Alphanumeric Point IDs such as 21a, AB3, EV2. If this isn't turned on, then Evidence Recorder will not accept anything but integer numbers. Alphanumeric input of Point IDs can contain up to 31 characters.

Alphanumeric Case Sensitive

When this is enabled the Point ID that is used as a unique identifier will be case sensitive, points a1 and A1 will be recorded as 2 separate points.

Notes:

The Case Sensitive setting is applied when the user stores a measured, calculated, or manually entered point and Evidence Recorder needs to determine if the Point ID already exists. In other cases the setting is not used, specifically:
- **Importing Points:** When importing points the setting will not be applied. Evidence Recorder will treat the Point IDs as Case Sensitive, regardless of what the setting is.
- **Point Ranges:** Point ranges will be handled as Not Case Sensitive.
- **Sorting Points**: The Point Database and other sorting applications will always sort as Not Case Sensitive.
- **Point Query:** Specifying a Point ID as input will always require an exact match and is Case Sensitive.

Point ID Range - Minimum

Use this to force Evidence Recorder to limit the point numbers that are used to a specific range; here you would specify the minimum range value. If you try to use a point number that is less than this value, you will see a message that will ask you to select a different point number. **Note:** If you have the Alphanumeric IDs toggle turned on, a natural order sort algorithm determines if a Point ID falls within the range.

Point ID Range - Maximum

Use this to force Evidence Recorder to limit the point numbers that are used to a specific range; here you would specify the maximum range value. If you try to use a point number that is greater than this value, you will see a message that will ask you to select a different point number. **Note:** If you have the Alphanumeric IDs toggle turned on, a natural order sort algorithm determines if a Point ID falls within the range.

Alphanumeric Point ID's can have a maximum length of 31 characters.

New Description Prompt

This controls how Evidence Recorder deals with descriptions that don't match anything in your AutoMap library. If this is on, when you enter a description that isn't in the AutoMap library you will see a warning message asking you if you want to add it.

If it is off, any description that doesn't have a match in the AutoMap library will be automatically added to your Scene's AutoMap library.

Time Stamp Saved Points

This tells Evidence Recorder to write a timestamp into the raw file whenever a point is stored.

Write Notes to Raw File

When this option is enabled, the text note recorded for a specific point will be written to the Raw file as a comment.

Map Configurations

Show ID

This is used to show or hide the point number labels for your points.

Show Description

This is used to show or hide the point description labels for your points.

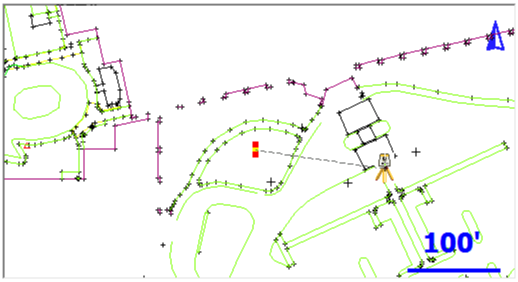
Show Elevation

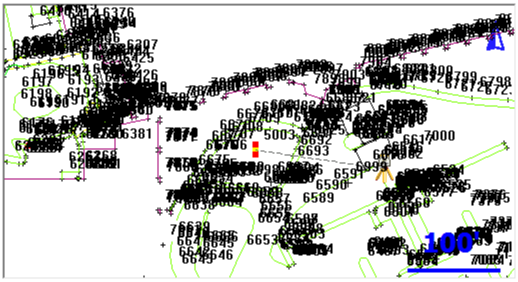
This is used to show or hide the point elevation labels for your points.

Level of Detail

The Level of Detail filter, when turned off, will force Evidence Recorder to show the point labels all the time, independent of your zoom level. If it is turned on, Evidence Recorder uses an algorithm to determine if displaying the point labels is necessary.

This is demonstrated in the following two images, the first has LOD turned on and the second has LOD turned off.





With LOD on, as soon as you zoom in to a reasonable level, the labels will appear automatically. Under normal circumstances you will keep the LOD feature active.

Text Size (Map View)

Use this to change the default text size that is used on the Map View.

Map Position Select

If this is turned on, tapping a blank part of the map screen will display the Map Select Toolbar.

Map Point Select

If this is turned on, then tapping on a point from the map screen will select the point tapped and show it as a blue circle and open the Point Toolbar. The point can then be saved as a recorded point in your Scene.

Map Line Select

If this is turned on, then tapping on a line from the map screen will select it and open the Line Toolbar.

Map DXF Entity Select

If this is turned on, then tapping on a DXF entity will highlight it. If turned off then the DXF file will behave like an underlay and is not selectable.

Total Station Options

Default Mapping Method

This specifies which Mapping Method Evidence Recorder will default to, either Map Point or Map Point (Auto).

Quick Measure Modes

When this is turned on, when you press the Measure button in routines such as the Horizontal Angle Offset or Resections screens, it will force the instrument to take a measurement instantly. If this is turned off, then pressing the Measure button will take you back to the map screen where you have to press the measure button on the instrument toolbar to take a measurement.

If you're using a robotic instrument you will probably want to keep this turned off.

Display Use Last Setup Screen

When this option is turned on, you will be offered to the choice to use the last instrument occupied point when for an existing Scene is opened. This is useful if the program is inadvertently closed in the middle of a Scene and the instrument has not moved from the last occupied point. You can start work again without having to backsight and reestablish the instrument location.

Use Assistant on Open

The Total Station Assistant suggests workflow shortcuts when opening a Scene.

GNSS Options

Allow Advanced Settings

When this option is selected, the **Local Transformation Point** Mapping Method becomes available, as well as the **GNSS Local Transformation** Mappiong Tool. This setting allows the user to perform multi-point localizations at the scene if they choose instead of using the simpler **Reference Point** method which is a one point localization. By default this setting is disabled.

EP+ Records

Toggle the format of the EP record written to the raw file. The standard EP record contains a combined horizontal RMS value, while the EP+ record contains RMS values for Northing and Easting. EP+ records are required when seeding positions with regards to L-band correction services.

Post Processing Tagging

Start and End times of GNSS measurements can be written to the raw file as comments. These values are required for post processing raw data with Effigis OnPOZ (EZSurv) software. **NOTE:** End times are captured when the user picks the **Store Position** button on the GNSS Measurement dialog.

Leap Seconds (GPS-UTC)

Some receivers report UTC time instead of GPS time. When writing Start and End times for GNSS measurements, the Leap Seconds value will be applied to the UTC time to ensure GPS time is recorded. **NOTE:** This value will change over time and is the responsibility of the user to ensure it is current. This value only applies to those receivers that report UTC time.

Prompt Raw Logging

Raw data logging on most receivers must be manually initialized. A prompt can be displayed at connection time to remind the user to start raw data logging on the receiver.

Test Incoming Data Stream

Some GNSS receivers automatically connect to the previous correction link. FieldGenius can test for incoming corrections at connection time to eliminate the Link Configure step.

Display GNSS Reference Setup

When connecting to a reference receiver, a prompt can be displayed to remind the user of the steps to take to complete a reference setup.

Staking Options

Tolerance

This is the error tolerance that the staking command will use. When your staking "move by" distances are equal to or less than this amount, your direction to a point will be indicated in green text in the Observation Toolbar at the top left hand corner of the screen. Green text will be displayed to notify you that you're meeting your tolerance; if you do not meet the tolerance, the text will switch to red.

Orientation Total Station

The user can set an orientation preference for a Total Station layout. Depending on the equipment currently in use, Evidence Recorder will automatically use the defined orientation.

Orientation North (Cardinal)

With the North orientation, North is the reference direction. The "move by" distances are standard cardinal directions.

North: This is the distance you need to move North.

South: This is the distance you need to move South.

East: This is the distance you need to move East.

West: This is the distance you need to move West.

Cut: This is the amount you have to go down from the current rod position to the stake point's elevation.

Fill: This is the amount you have to go up from the current rod position to the stake point's elevation.

Orientation North (Directional)

With the North orientation, North is the reference direction. The "move by" distances are indicated by arows showing the direction of the movement.

Up arrow: This is the distance you need to move North.

Down arrow: This is the distance you need to move South.

Right Arrow: This is the distance you need to move East.

Left Arrow: This is the distance you need to move West.

Cut: This is the amount you have to go down from the current rod position to the stake point's elevation.

Fill: This is the amount you have to go up from the current rod position to the stake point's elevation.

Instrument

With the staking reference set to Instrument the map view will be twisted so the instrument is centered towards the top of your screen. The "move by" distances are with respect to the rod position looking towards the instrument. This view is useful when using a robotic instrument.

In: This is the distance you need to move towards the instrument.

Out: This is the distance you need to move away from the instrument.

Right: Facing the instrument, move right by this amount.

Left: Facing the instrument, move left by this amount.

Cut: This is the amount you have to go down from the current rod position to the stake point's elevation.

Fill: This is the amount you have to go up from the current rod position to the stake point's elevation.

Prism

With the staking reference set to Prism the map view will be twisted so the prism is centered towards the top of your screen. The "move by" distances are with respect to the instrument man looking at the prism. This view is handy when using a non-robotic instrument.

In: This is the distance you need to move towards the instrument.

Out: This is the distance you need to move away from the instrument.

Right: Facing the prism, move right by this amount.

Left: Facing the prism, move left by this amount.

Cut: This is the amount you have to go down from the current rod position to the stake point's elevation.

Fill: This is the amount you have to go up from the current rod position to the stake point's elevation.

User Point

With the User Point orientation, you can use an existing point in your Scene as the reference. The view will be twisted so that the selected point is centered towards the top of your screen.

In: This is the distance you need to move towards your user reference point.

Out: This is the distance you need to move away from your user reference point.

Right: Facing your user reference point, move right by this amount.

Left: Facing your user reference point, move left by this amount.

Cut: This is the amount you have to go down from the current rod position to the stake point's elevation.

Fill: This is the amount you have to go up from the current rod position to the stake point's elevation.

Orientation GNSS

The user can set an orientation preference for a GNSS layout. Depending on the equipment currently in use, Evidence Recorder will automatically use the defined orientation.

Orientation North (Cardinal)

With the North orientation, North is the reference direction. The "move by" distances are standard cardinal directions.

North: This is the distance you need to move North.

South: This is the distance you need to move South.

East: This is the distance you need to move East.

West: This is the distance you need to move West.

Cut: This is the amount you have to go down from the current rod position to the stake point's elevation.

Fill: This is the amount you have to go up from the current rod position to the stake point's elevation.

Orientation North (Directional)

With the North orientation, North is the reference direction. The "move by" distances are indicated by arows showing the direction of the movement.

Up arrow: This is the distance you need to move North.

Down arrow: This is the distance you need to move South.

Right Arrow: This is the distance you need to move East.

Left Arrow: This is the distance you need to move West.

Cut: This is the amount you have to go down from the current rod position to the stake point's elevation.

Fill: This is the amount you have to go up from the current rod position to the stake point's elevation.

User Point

With the User Point orientation, you can use an existing point in your Scene as the reference. The view will be twisted so that the selected point is centered towards the top of your screen.

In: This is the distance you need to move towards your user reference point.

Out: This is the distance you need to move away from your user reference point.

Right: Facing your user reference point, move right by this amount.

Left: Facing your user reference point, move left by this amount.

Cut: This is the amount you have to go down from the current rod position to the stake point's elevation.

Fill: This is the amount you have to go up from the current rod position to the stake point's elevation.

Compass Switch Threshold

This allows a user to input a distance within which the compass on a Total Station.

Staked point ID Method

Use this drop down list to select the mode you want to use to number new staked points.

None: This options does not change the point ID number when a staked point is saved (e.g. the Point ID 5 is staked then the Staked point ID will be 5, since this point exists you will need to manually rename the staked Point ID).

Next: This increments the staked point ID number to the next available point number in the sequence (e.g. if you stake Point ID 5 and the last stored point on the project is 60 the Staked Point ID will be 61).

Additive: This adds a number defined in the Additive Number field to the Point ID number being staked (e.g additive number is 1000 and the Point ID is 5 the Staked Point ID will be 1005).

Prefix: This adds a Prefix number or letter defined in the Prefix value field to the Point ID number being staked. (e.g. Prefix value is set to S and the Point ID number is 5 the Staked Point ID will be S5).

Suffix: This adds a Suffix number or letter defined in the Suffix value field to the Point ID number being staked. (e.g. Suffix value is set to S and the Point ID number is 5 the Staked Point ID will be 5S).

Additive Number

The number entered into this field will be added to the Point ID number being staked to generate a Staked Point ID number.

Prefix Value

The number or letter entered into this field will be added before to the Point ID number being staked to generate a Staked Point ID number.

Suffix Value

The number or letter entered into this field will be added after to the Point ID number being staked to generate a Staked Point ID number.

Robotic Prism Tracking

When selected the robotic total station will track the prism as the user moves it across the scene site.

Turn Instrument Mode

If you have a motorized instrument, including robotics, you can control how Evidence Recorder turns the instrument during stakeouts. If you want Evidence Recorder to compute the horizontal and vertical angle needed to stake your point, use the **3D (HA + VA)** option. If all you want is the horizontal angle to be turned, and the vertical left alone, select the **2D (HA)** option.

Fade Staked-Out Points

Place a check mark in this box if you would like to see staked out points displayed differently to non-staked out points. A staked out point will appear as a slightly greyed out inverted triangle. This is for you to make quick assessments of what has been done and what remains to be finished.

Display Point Staking Screen

Place a check mark in this box if you would like to see the Point Staking screen displayed. This screen will always be displayed if there are values in the Design Point Offset fields. This was done to ensure that you never stake a point with a forgotten (and wrong) offset.

Display Stake Result Screen

Place a check mark in this box if you would like to see the Stake Result screen displayed after staking out a point. This screen will always be displayed if the staked out point exceeds the staking tolerances.

Store Stake Point

Place a check mark in this box if you would like the staked out point to be stored along with the raw data. If no check mark is in this box then only the raw data is stored, and the Store Point dialog will not be displayed.

By default this is checked. What will happen is when you store a staked position using the store button on the stake toolbar you will be prompted with a screen allowing you to assign a point number and description to the new point that will be created.

The point description will default to the current description from the AutoMap Library, as shown on your topo toolbar. If you choose a different description from the library, then it will be retained for all consecutive stakeout points.

Furthermore, when this feature is turned on it will use the value in the Add Id field to determine the point number for the recorded staked position. For example if you staked point 19 and you have an Attached User Id = 1000, then Evidence Recorder will automatically use 1019 as a point number. This can be changed by the user.

Show Staked-Stored Points

Place a check mark in this box if you would like to see the out point displayed on map. We provide you with the choice so that you can quickly see which points you have already staked out.

Use Stake List

Place a check mark in this box if you would to use the Staking list instead of staking out from the Points database. If you use a staking list, you will never have a measured point presented as a new point to stake out.

Find Next Nearest

Place a check mark in this box if you would like to search in the Points database (i.e. not in the list) for the nearest point from the current position, and present it as the next point to be out.

System Options

Show Tool Tips

When turned on, a "Tip of the Day" will be displayed when Evidence Recorder is started, and tooltips will be displayed when you hover over any button.

Turning this off will hide the "Tip of the Day" dialog and will disable tooltips on buttons.

Communication Trace File

When turned on it will create a log file of the communication between Evidence Recorder and your instrument, which can be used to diagnose communication problems and should only be used in this situation. The text file will be named **TraceTS.txt** or **TraceGNSS.txt** and will be created in the ...\Program Files (x86)\Leica Geosystems\EvidenceRecorder\11\ directory on your device.

Always Auto-Reconnect

When turned on it the program will always attempt to reconnect if communication drops between the device and the collector.

Datum Warning Dialog

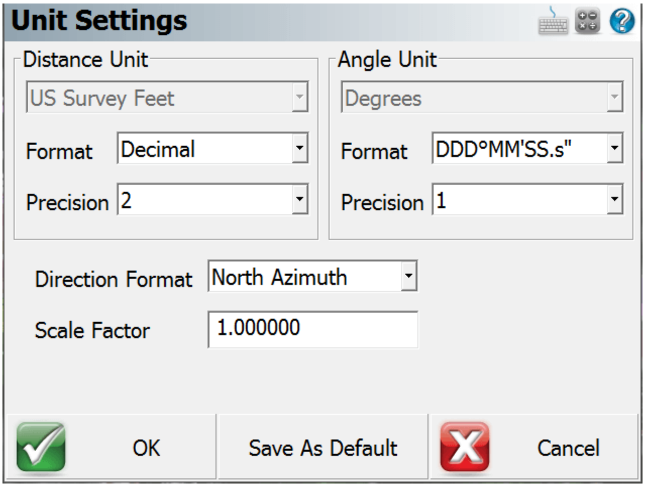
When turned on a warning will show up when the datum is changed so the user can move to use a new datum.

Unit Settings

Main Menu | Settings | Units and Scale

The units and scale menu allows you to specify settings for your Scene. Some of these settings are recorded in the raw file and the Scene's **INI** file, as well as recorded in the MSurvey.ini file.

> **Notes:**
>
> The Distance Unit (Meters or Feet) and Angle Unit (Degrees, Radians, or Gons) can only be set when creating a new Scene. After a Scene has been created, these will remain greyed-out and cannot be changed.



You can set these settings as defaults for new Scenes by pressing the **Save as Default Settings** button. The default settings can also be set in the Options screen.

Note: the actual precision on distances and angles returned from your instrument may be limited to less than the precision you select here. Selecting a higher precision here will not increase the precision of values queried from your instrument.

Distance Unit

Choose the distance unit that you will be using: Meters, International Feet, or US Survey Feet. All distances will be displayed in the selected format. All distances will be recorded to the raw file in decimal format. Database coordinates are always stored with 6 decimal places, and rounded to the desired precision for display.

Meters

If you choose Meters as your distance unit, you can also specify the number of decimal places to display within Evidence Recorder, from 0 to 6.

International Feet / US Survey Feet

If you choose International Feet or US Survey Feet, then you can specify to use either a decimal format with a precision from 0 to 6, or a Fractional format with feet and inches.

If you use the **decimal** format, distances will be displayed in decimal feet, such as 10.5' to indicate 10.5 feet or 10feet-6inches.

If you use the **fractional** format, distances will be displayed in feet and fractional inches, such as 10'6 1/2" to indicate 10feet-6.5inches or 10.54166667 feet.

Angle Unit

Choose the angular unit that you will be using: Degrees, Gons/Gradients, or Radians. All angular values written into the raw file will be recorded in the selected format.

Degrees

If you select Degrees, then you can also select which format to use, either DDD°MM'SS.s" for degrees-minutes-decimal seconds, DDD°MM.m' for degrees-decimal minutes, or DDD.d° for decimal degrees. You can also specify the number of decimal places to use, from 0 to 8.

Gons (Gradients)

If you select Gons (Gradients) then you can also specify the number of decimal places to use, from 0 to 8.

Radians

If you select Radians then you can also specify the number of decimal places to use, from 0 to 8.

Direction Format

Choose the direction format that you will be using: North Azimuth, South Azimuth, or Bearings. When entering a direction, you can always override this setting by entering the angle with the cardinal quadrant indicated before or after the angle. If there is no quadrant specified, then the input angle will be interpreted as an Azimuth.

Scale Factor

You can use a scale factor to adjust ground distances to grid distances.

Distances measured with a total station will be recorded in the raw file with the unscaled, true measured slope distance. This scale factor is applied to the computation of coordinates only.

Distances entered using the Traverse/Intersect tool (COGO) will be scaled by the scale factor.

Distances calculated using the Inverse tool, or recalled using the pt..pt format will be scaled by the inverse of this scale factor. The result will be the inversed grid distance times the inverse of the scale factor, so that the ground distance is returned.

This Scale Factor does not affect any GNSS measurements. Please see the GNSS Local Transformation topic for information on using a GNSS Scale Factor.

Save As Default

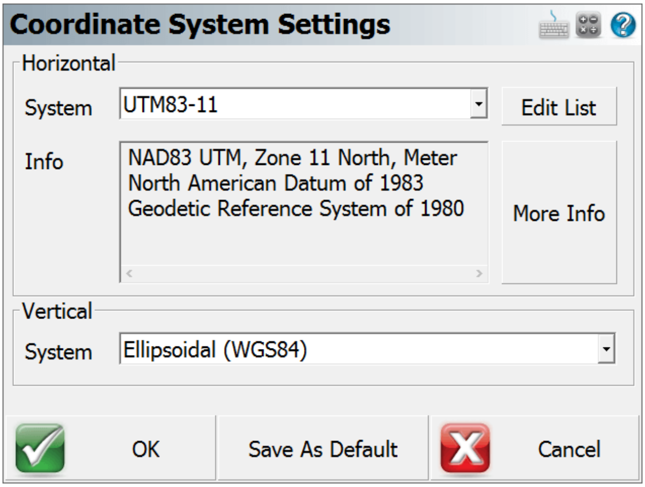
Use this to permanently write the current settings to the MSurvey.ini file. When you create a new Scene, it will use these settings. The default settings can also be set in the Options screen.

Coordinate Systems

Coordinate System Settings

Main Menu | Settings | Coordinate System

The coordinate system settings are used to transform GNSS derived curvilinear coordinates (latitude, longitude and ellipsoidal height) into Cartesian coordinates (northing/y, easting/x, and ellipsoid or orthometric height) for presentation on the drawing window and data storage.



Horizontal Group

Set the horizontal projected coordinate system for your Scene.

The default coordinate system in Evidence Recorder is set to **UTM83-11**. Change this coordinate system as appropriate for your region.

Edit List

The **Edit List** button opens the Coordinate System List dialog, which is used to add predefined or user-defined coordinate systems to the list of selectable systems, create new coordinate systems, copy predefined systems, and edit or delete existing systems.

A **predefined coordinate system** is one that is included with Evidence Recorder by default, a **user-defined system** is one that you have created.

More Info

Displays details about the selected coordinate system, including:

1. Ellipsoid parameters
2. The datum transformation method and parameters
3. The projection type and parameters

Vertical Group

Set the vertical system for your Scene.

The default vertical datum is set to **Ellipsoidal (WGS84)**, meaning that all GNSS derived heights will be referenced to the WGS84 ellipsoid. The list of available systems includes all valid geoid model files that are present within the Mapping directory of your Evidence Recorder installation. A geoid model is required to reference GNSS derived heights to a geodetic datum. Please review the Geoid Model topic for more details.

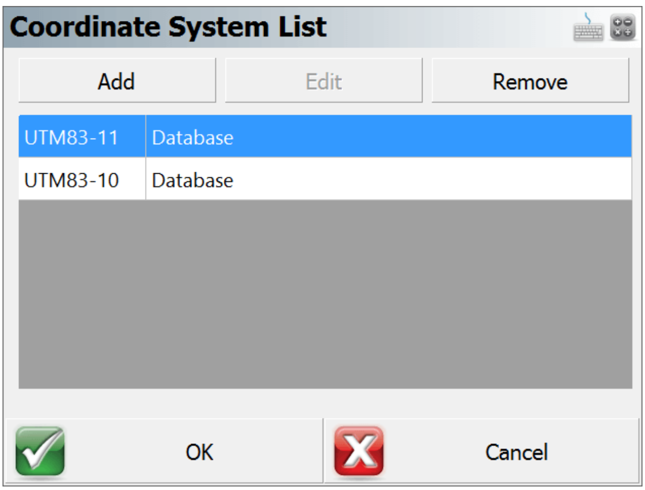
Save As Defaults

Saves the Horizontal and Vertical systems to the MSurvey.ini file as defaults to be used for all new Scenes.

Coordinate System List

The Coordinate System List dialog is where you can select an existing coordinate system or create a new user-defined coordinate system and add them to a "favourites" list.

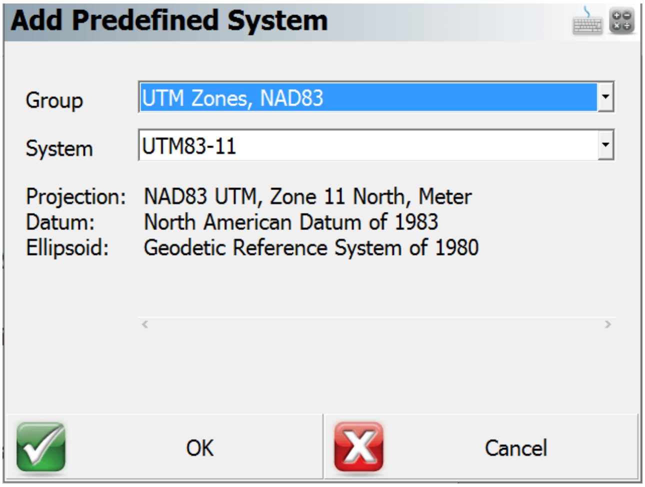
This list allows you to define the coordinate systems you uses most often for easy access from the Coordinate System Settings screen.



Add

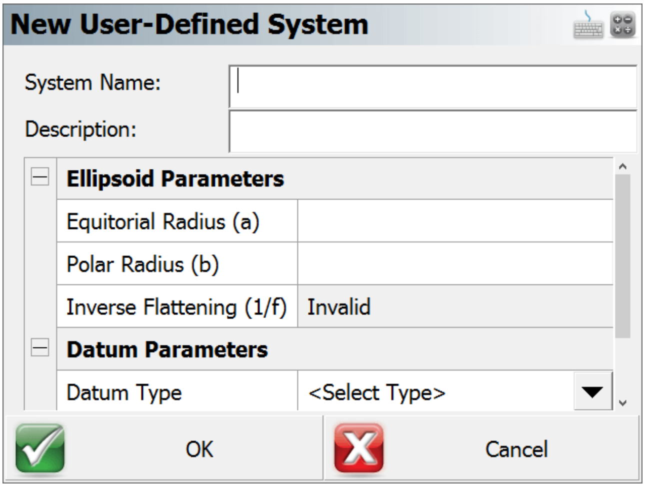
Add a new coordinate system to the list by one of three methods:

1. **Select Coordinate System From Database** - Select one of the predefined coordinate systems. Coordinate systems are grouped into countries or mapping systems. Select the country or system that you are surveying in and then choose the coordinate system in the System drop down list. The section below the System field displays the projection, datum, and ellipsoid information related to this coordinate system.



2. **Create New User Coordinate System** - Create a completely new coordinate system from scratch with known parameters. Enter a name for your coordinate system and optionally enter

a description. **NOTE: The system name must have colon in the name.**



3. **Create New User Coordinate System From Database Selection** - Choose a predefined coordinate system to populate parameters for a new coordinate system.

Edit

Edit a user-defined coordinate system. It is not possible to edit predefined coordinate systems.

Remove

Remove the selected coordinate system from the list. If the coordinate system is user-defined; you will have the option to permanently delete the coordinate system. You may want to use the User Coordinate System Export routine to save a backup copy of your user-defined coordinate system before removing it permanently.

OK Button

This will save the coordinate system favourites list to the MSurvey.ini file.

Cancel Button

This will exit the dialog and will save nothing. You will be automatically returned to the Coordinate System Settings dialog.

New / Edit user-defined Systems

Ellipsoid Parameters

To define the ellipsoid for the coordinate system you must enter the known equatorial and polar radiuses for the ellipsoid. The Inverse Flattening is not editable and will be computed automatically and can be used a check.

- Equatorial Radius (a)
- Polar Radius (b)
- Inverse Flattening (1/f) - Always a read only value, automatically computed from the two ellipsoid radiuses.

Datum Parameters

There are 7 datum types to select from:

- Three Parameter
- Four Parameter
- Six Parameter
- Seven Parameter
- Bursa / Wolf
- DMA Molodensky
- None

If none is selected then no transformation parameters will be applied to the coordinate system transformation.

If a datum other than none is selected then the user will be able to enter the following parameters:

- Delta X (m)
- Delta Y (m)
- Delta Z (m)
- X Rotation (“)
- Y Rotation (“)
- Z Rotation (“)
- Scale (PPM)

Projection Parameters

The user can select one of nineteen projections.

- Lambert Conformal Conic (One Standard Parallels)
- Lambert Conformal Conic (Two Standard Parallels
- Transverse Mercator or Gauss Kruger
- Universal Transverse Mercator
- Albers Equal Area Conic
- Rectified Skew Orthomorphic, Azimuth at Projection Center
- Mercator Cylindrical Projection with Standard Parallel
- Mercator Cylindrical Projection with Scale Reduction
- Lambert Azimuthal Equal Area
- Lambert Azimuthal Equidistant
- Miller Cylindrical
- Oblique Sterographic
- Polar Sterographic
- Sinusoidal Projection, Optionally Interrupted
- Equidistant Cylindrical
- Cassini
- Robinson Cylindrical
- Bonne Pseudoconical
- Krovac Oblique Conformal Conic, Czechoslovokia

Typical projection parameters for most cases are:

- Scale Factor
- Central Meridian
- Origin Latitude
- Origin Longitude
- False Northing
- False Easting

Automatic Backup

Whenever you add or edit a user-defined coordinate system, Evidence Recorder will automatically create and save your parameters to a file named **user-coordsys-backup.csmap** to the mapping directory.

This backup file stores your user-defined coordinate systems.

Localization (Site Calibration)

Further coordinate transformations can be accomplished with the use of the Local Transformation function of Evidence Recorder. See the GNSS Local Transformation section for more information.

These settings are stored in your Scene's **INI** file, allowing you to easily use different coordinate systems for different Scenes.

Geoid Models

Geoid models are used by Evidence Recorder to convert ellipsoid heights to orthometric heights. Evidence Recorder will by default use ellipsoid heights but you can define a geoid model to be used instead if orthometric heights are desired.

Geoid models are not installed by default and must be downloaded from the MicroSurvey website. Geoid models are available for most regions around the world.

Download Files and Instructions

Please review the following MicroSurvey Helpdesk article for instructions and country specific geoid models: http://helpdesk.microsurvey.com/index.php?/Knowledgebase/Article/View/479

Grid Shift Files

In some countries, or areas, the use of grid shift files are required to accurately compute a horizontal position. When projecting a dataset between two different datums, a transformation is required.

Both equation-based and grid-based transformation methods are supported by Evidence Recorder. An equation-based transformation can use either a 3-parameter (dX, dY, dZ) or a 7-parameter transformation (dX, dY, dZ, rX, rY, rZ, ds) to translate between coordinate systems. A grid-based transformation uses binary files and interpolations that calculate the differences between the two geographic coordinate systems.

We have created country specific grid shift files and these additional grid shift files are not installed by default and need to be downloaded from the MicroSurvey website.

Download Files and Instructions

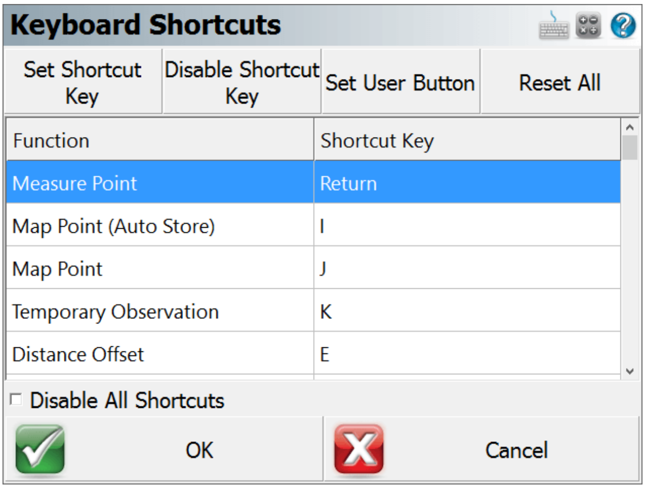
Please review the following MicroSurvey Helpdesk article for instructions and country specific grid shift files: http://helpdesk.microsurvey.com/index.php?/Knowledgebase/Article/View/499

Keyboard Shortcuts

Main Menu | Settings | Keyboard Shortcuts

You can now assign command shortcuts to keys on your data collector. This has been added to support our new keyboard layout on the newer Trackers but it also works with any device that has a keyboard.

The defaults for the shortcut keys are based on the MicroSurvey Tracker custom keyboard layout, but you can assign any key you want to the list of available commands. The shortcut definitions are stored in the MSurvey.ini file so they're portable to your other data collectors if you've defined a custom layout.



Another great feature is that the EDM mode for the current instrument you have selected can have shortcut keys assigned to them. For example if you refer to the list above, you would press the 1 key to set your EDM mode on the instrument to IR Standard.

The shortcut keys will only function from the map screen.

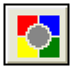
Set Shortcut Key

Use this to assign a command to a key on your keyboard. Highlight the command you want to modify, press the **Set Shortcut Key** button, then press the button on your keyboard to map the command to it. Your new key map will automatically be saved to the MSurvey.ini file.

Disable Shortcut Key

Use this to disable individual shortcuts.

Set User Button



Use this to set the currently selected command to the User Button found on the main interface. The command currently set with the user button is indicated in the Function list with the same icon.

Reset All

This resets all the shortcuts to the factory defaults and all customized settings will be lost.

Disable All Shortcuts

This is a toggle that controls if the shortcut keys are disabled or enabled.

Default Shortcut Keys

Function	Shortcut Key
Measure Point	Enter
Map Point (Auto Store)	I
Map Point	J
Temporary Observation	K
Distance offset	E
Horizontal Angle Offset	A
Resection	R
Set Target Heights	T
Occupy Point	O
Check Backsight	N
Check Point	Q
Stake Points	S
Inverse	B
Calculator	F
AutoMap Library	D
Figure List	L
Toggle GNSS Coordinates	G
Store Points	W
Undo Last Saved Point	Disabled

Point Database	P
Add Comment	X
Raw File Viewer	U
Menu Home	H
Map Data Layers	Backspace
SIP Enable/Disable	Disabled
EDM Mode 1	1
EDM Mode 2	2
EDM Mode 3	Disabled
EDM Mode 4	Disabled
EDM Mode 5	Disabled
EDM Mode 6	Disabled
EDM Mode 7	Disabled
EDM Mode 8	Disabled
Prism Search	Disabled
Prism Track	Disabled
Prism ATR	Disabled
Laser Pointer	Disabled
Guide Lights	Disabled
Robot Joystick	Disabled

Language Selection

Main Menu | Settings | Language Selection

This screen will allow the user to specify what language is to be used at first launching of the program. After the first run and selection, it will default to that language automatically. **Note:** The Language Selection screen appears after installation is completed when the program is first launched or the user can go into the Settings menu and choose Language Selection to switch to a different one is desired.

Evidence Recorder also allows the user to import in a Language Resource file (res*.dll) by scrolling down to the bottom of the list and selecting the button "Select a Language Resource File"

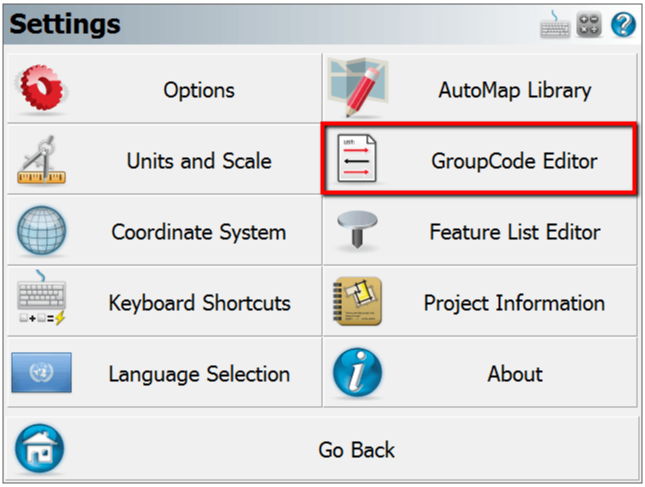
AutoMap Library

Please see the AutoMap Library topic for details.

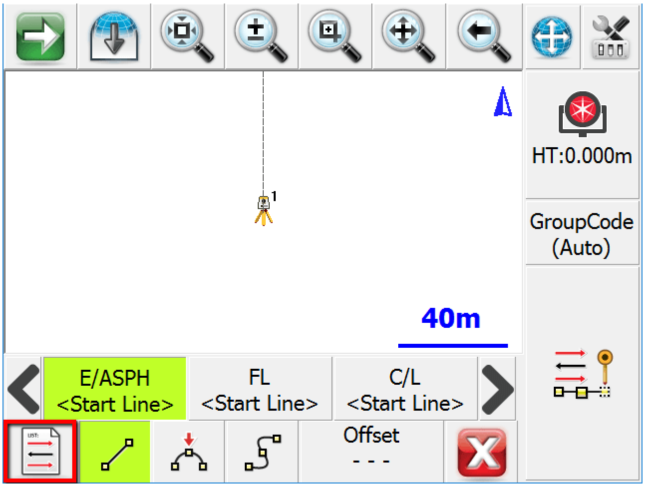
GroupCode Editor

Pre-defined groups are included with the default installation consisting of codes from the default AutoMap library. Default Groups are stored in the Settings.xml file, and those default groups will automatically be included when a new Scene is created. There are two ways to create and edit Groups.

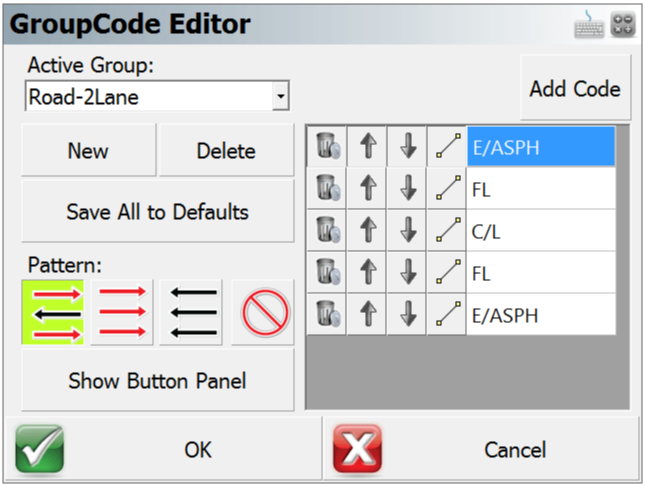
Main Menu | Settings | GroupCode Editor



From within the **GroupCode** Mapping Method:

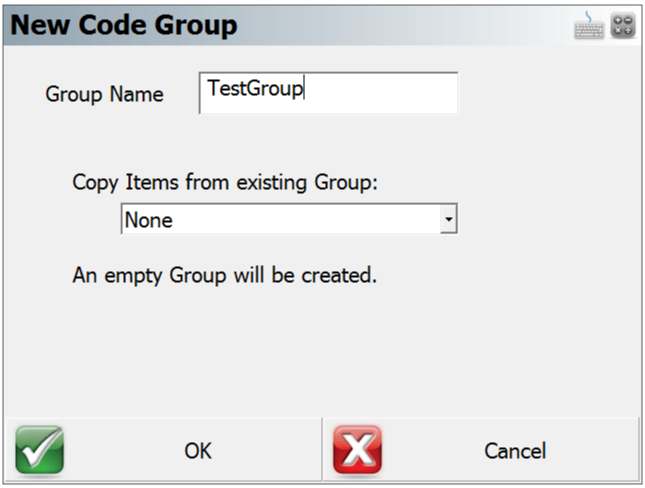


The editor shows the active group and the codes defined within the group. Toggles and options are also set from within the editor:

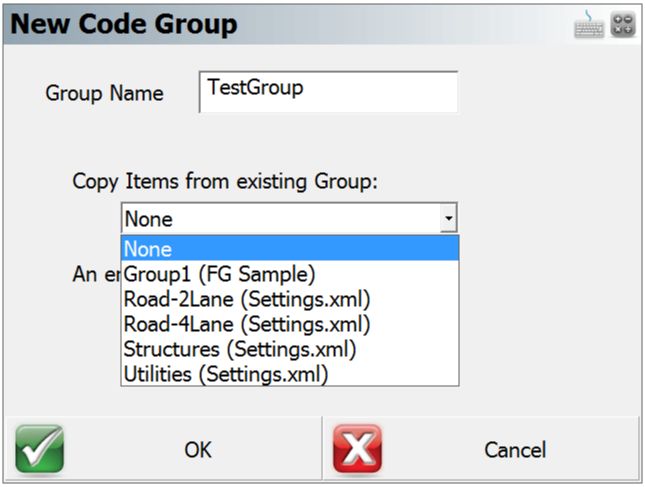


Creating a New Group

Pick “New” to create a new group. A dialog opens to enter a name for the group.

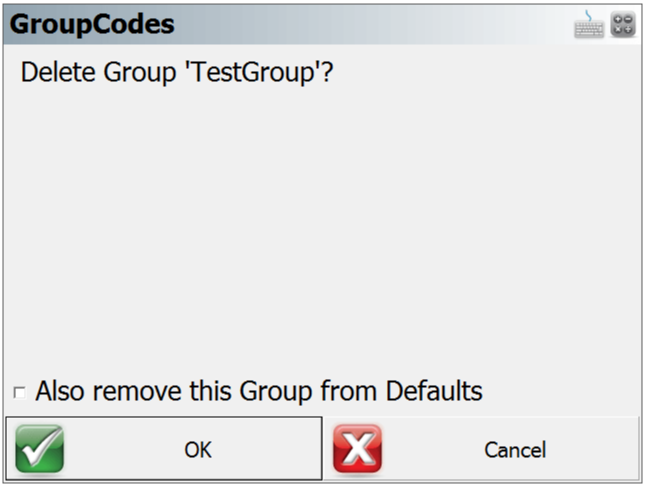


Optionally copy the group items from another group in the current Scene, or from the defaults stored in the Settings.xml file.



Deleting a Group

Pick “Delete” to delete the active group. A confirmation dialog is displayed.

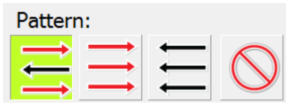


Saving a Group to Defaults

Pick “Save All to Defaults” to copy all groups from the current Scene to the Settings.xml file.

Setting an Automation Pattern

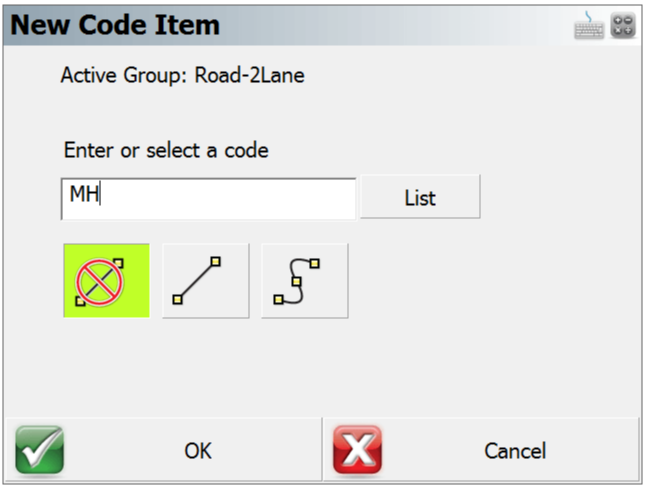
Pick the icon of the Automation Pattern to set for the group. The pattern controls the automatic setting of the next active code after a measurement has been stored. The options are “Zig-Zag”, “Left to Right”, “Right to Left” and “None”.



- Zig-Zag pattern will cycle through the group, then reverse back through, and repeat
- Left to Right pattern will cycle through the group in a forward direction
- Right to Left pattern will cycle through the group in a reversed direction
- None pattern does not auto-select the next code, it is up to the user to pick the code

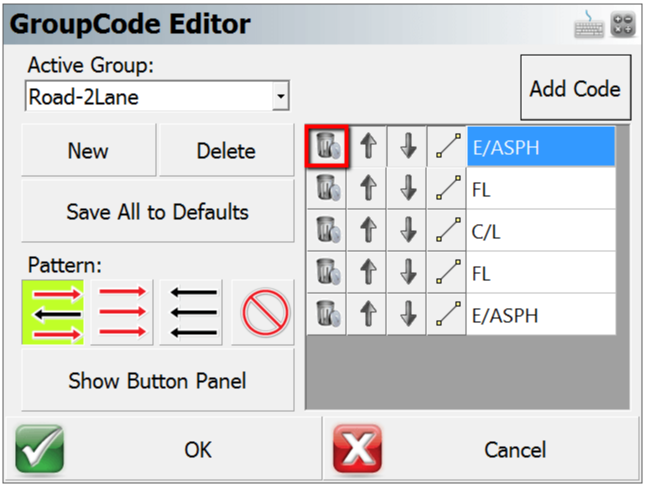
Adding Codes to a Group

Pick “Add Code” to enter a new code to the group. A dialog opens to enter the code (or pick from the AutoMap list) and to set the linework toggle for the code.

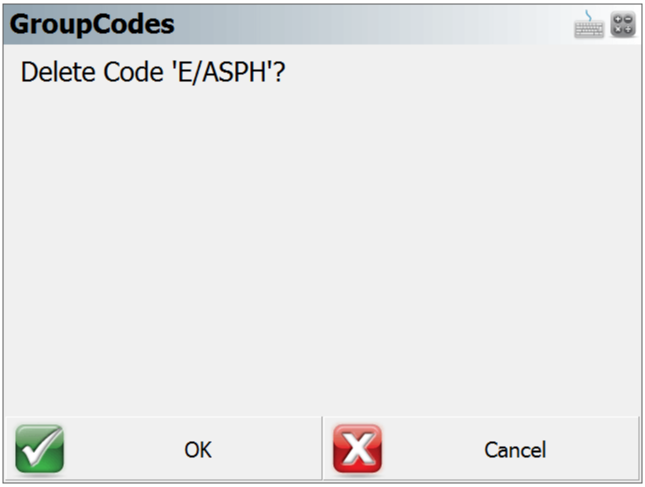


Deleting a Code from a Group

Pick the Delete icon of the code row to remove a code from the list.



A confirmation dialog appears.



Modify Code Order

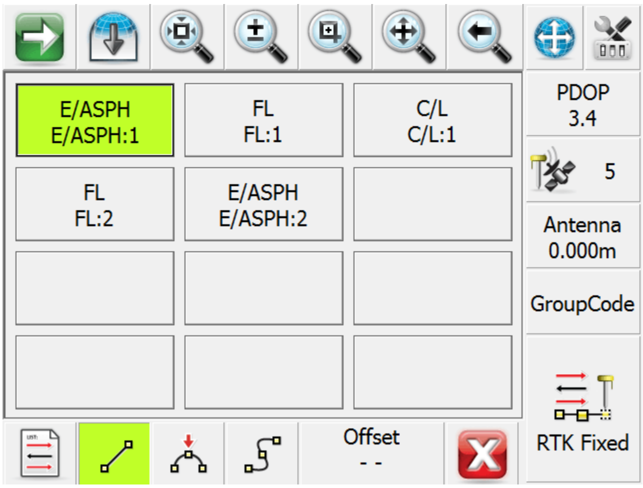
Use the Up and Down arrows to move the Code up or down within the group.

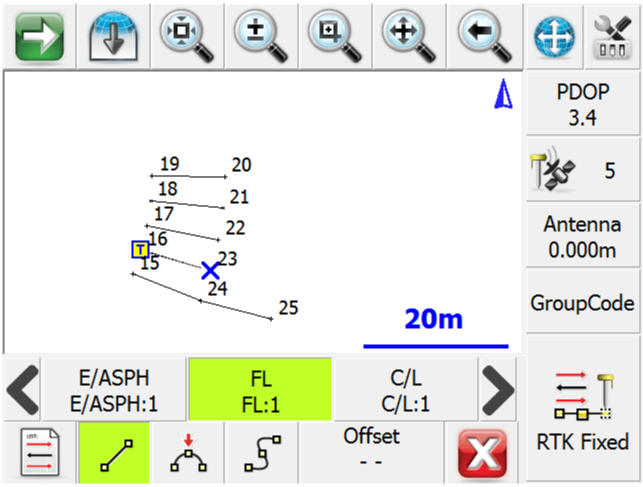
Toggle Linework

Use the Line Toggle to switch the current linework toggle for the code. The options of “straight line”, “second point on 3-point arc”, “spline”, and “none” are cycled.

Toggle Display

The “Show Button Panel” option can set the display mode to a grid of 12 buttons with the codes of the group. The default display mode is the code carousel with the Map Screen visible.





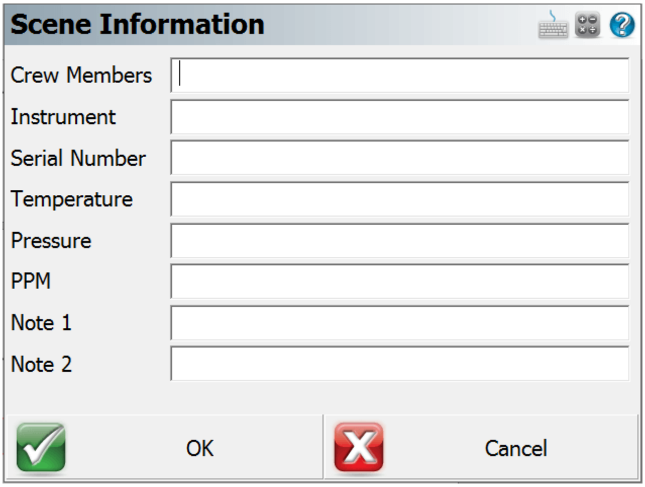
Feature List Editor

Main Menu | Settings | Feature List Editor

The Feature List Editor program is installed with the Tablet/PC version of the program and can be launched from the Settings menu. This program can be used to create feature list files for GIS attribute collection. Please visit the MicroSurvey Helpdesk for movies and more information.

Scene Information

Main Menu | Settings | Scene Information



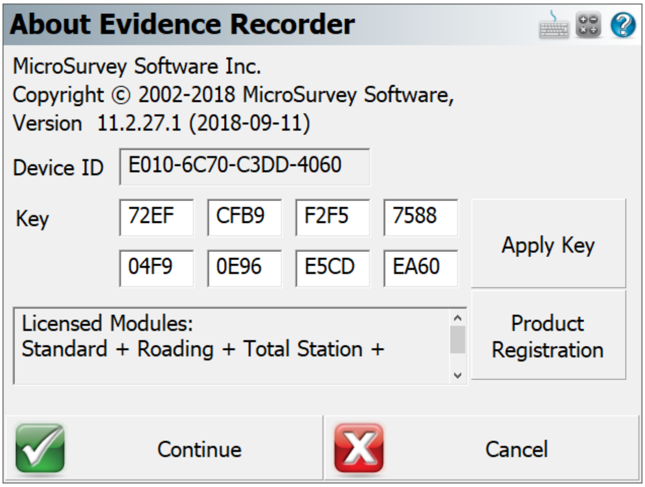
Use this option to record job information about your Scene.

Tap **OK** to save your information to the raw file, or **Cancel** to exit without saving your changes. Each entry field can accept up to 64 characters.

About Evidence Recorder

Main Menu | Settings | About

Use this to display information about the Evidence Recorder version you have installed or view what modules you have registered.



You will also see your Device ID and a series of fields where you can input the Key Code you received from IMS.

You will see an area that will show you the status of your license, including any modules that you currently have licensed. If you want to use Evidence Recorder in demo mode, press the **Run Demo Mode** button.

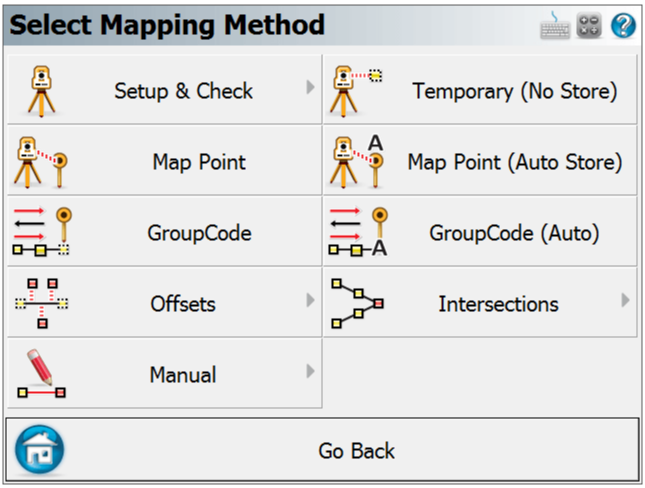
Please refer to the Registration & Demo Mode topic for further information.

Mapping Methods (Total Station)

Main Menu or Instrument Toolbar | Mapping Methods

These are commands built into Evidence Recorder that will help you measure and map your points. The desired method must be selected before you begin a measurement.

For a faster way to get to this screen, you can also press the Mapping Method button which is located on the instrument toolbar.



Use the vertical scroll bar along the side to access additional Mapping Methods if they cannot all fit on screen at the same time.

Note: Several of these Mapping Methods will not be available until you have completed a setup.

Setup and Check

Occupy Reference Point

Use this to define an instrument setup. Please see the Backsight Method topic for more information.

Occupy Baseline

Use this to define an instrument setup so that one wall in the room or a line/curb outside becomes a baseline where one end of it is at 0,0,0. Please see the Occupy Baseline topic for more information.

Move Instrument

This is a wizard that will help you establish a new reference point, and then will step you through moving your instrument. Please see the Move Instrument topic for more information.

Resection

This will start the multiple point resection routine to allow you to determine your current instrument position by measuring to known points. Please see the Resection topic for more information.

Check Backsight

Use this to compare your backsight to your previously measured values. Please see the Check Backsight topic for more information.

Check Point

Use this to display a check measurement to an existing point in your Scene. Please see the Check Point topic for more information.

Temporary (No Store)

This will allow you to take a measurement without storing it. Please see the Temporary (No Store) topic for more information.

Map Point

This mode allows you to measure a point. After the measurement, it will allow you to review your measurement data and allow you to make changes to the point ID and description before it is stored. Please see the Map Point topic for more information.

Map Point (Auto Store)

This mode allows you to measure a point using the next available point id, and the description and line toggles specified on the main map screen. Using this is a very fast method for recording your measurements. Please see the Map Point (Auto Store) topic for more information.

GroupCode

This mode allows you to set up a Group of Codes that have a common theme or purpose, and is ideal to increase productivity for repetitive feature collection. Please see the GroupCode topic for more information.

GroupCode (Auto)

The GroupCode mode with automatic point storing using the next available Point ID.

Offsets

Distance Offset

This will start the distance offset routine. Please see the Distance Offset topic for more information.

Horizontal Angle Offset

This will start the angle offset routine. Please see the Horizontal Angle Offset topic for more information.

Vertical Angle Offset

This will allow you to compute the height of an object. Please see the Vertical Angle Offset topic for more information.

Line - Distance Offset

This allows you to measure two points to define a baseline, then manually enter measured distances. These distances will be used to compute a new point based on the baseline. Please see the Line - Distance Offset topic for more information.

Baseline Offset

This will allow you to compute points offset from a baseline. Please see the Baseline Offset topic for more information.

Intersections

Two Line Intersection

This allows you to measure two baselines and Evidence Recorder will compute the intersection point. Please see the Two Line Intersection topic for more information.

Line - Angle Intersection

This allows you to measure two points to define a baseline, measure an angle, and Evidence Recorder will compute the intersection point. Please see the Line - Angle Intersection topic for more information.

Line - Perpendicular Point

This allows you to measure two points to define a baseline, then you can select an existing point which will be used to compute a perpendicular intersection. Please see the Line - Perpendicular Point topic for more information.

Trilateration

This will allow you to compute new points by observing their distances from two known existing points. Please see the Trilateration topic for more information.

Vertical Scene Projection

This will allow you to compute points on a user defined vertical plane. Please see the Vertical Scene Projection topic for more information.

Point Scanning

Use this to activate Point Scanning with your motorized reflectorless instrument. Please see the Point Scanning topic for more information.

Manual

Manual Distance

This will record a HA and VA for a shot, but the user can manually enter the distance. Please see the Manual Distance topic for more information.

Manual Entry

This will allow you to manually enter in a shot including HA, VA and SD. Please see the Manual Entry topic for more information

Setup & Check

Occupy Reference Point

Main Menu or Instrument Toolbar | Mapping Methods | Setup & Check | Occupy Reference Point

Use this command to specify the instrument location and orientation. You will be asked to specify the point your instrument is occupying, an instrument height and if you will be assuming a backsight direction or sighting an existing point. After you have established your setup and backsight, Evidence Recorder will graphically show you your setup points.

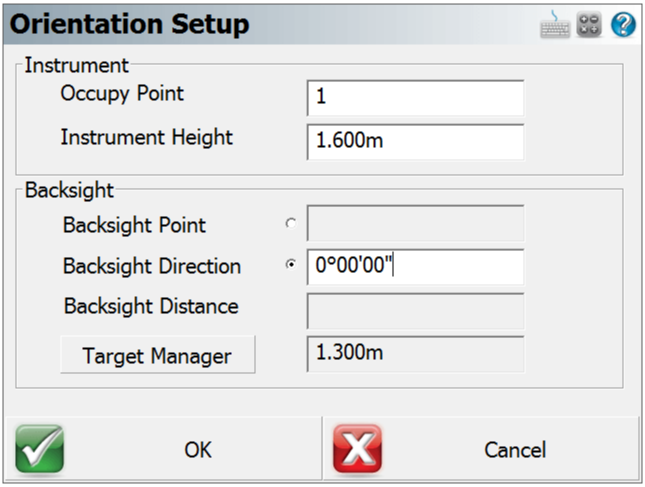
 Occupied Point Location

 Backsight Point Location

Backsight Method: Direction

With the backsight method set to Direction you will be able to specify the point you want to setup on and specify a backsight direction.

When you go to measure you have the option of recording an angle and distance to the backsight, or the option of just recording an angle. If a distance is measured to the backsight you will have the option of storing a point for the backsight after you press the measure button.



Occupy Point

Type in an existing point number, or double tap in this field to open the keypad or to select a point from the map. You will be able to create a new point, pick one from a list, or pick one from your drawing.

Instrument Height

Use this to enter your current instrument height.

Backsight Direction

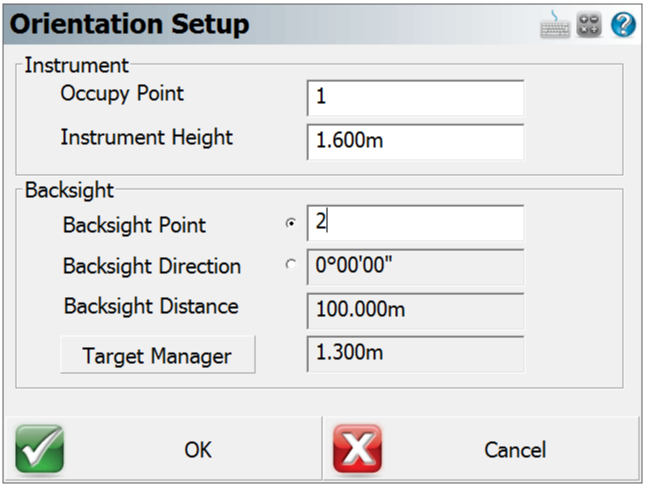
Use this to specify the direction that will be used by Evidence Recorder. You can enter an azimuth or a quadrant bearing.

Target Height

Use this to enter your current target height.

Backsight Method: Point

Use this method to specify the points that will be used for the current instrument location and back-sight.



Occupy Point

Type in an existing point number, or double tap in this field to open the keypad or to select a point from the map. You will be able to create a new point, pick one from a list, or pick one from your drawing.

Instrument Height

Use this to enter your current instrument height.

Backsight Point

Type in an existing point number, or double tap in this field to open the keypad or to select a point from the map. You will be able to create a new point, pick one from a list, or pick one from your drawing.

Backsight Direction & Distance

When you enter in your points Evidence Recorder will display the inversed horizontal distance and direction between the points you entered.

Target Height

Use this to enter your current target height.

Measuring to the Backsight

Once you've established the backsight method, entered your points and instrument height you can move on to the next step by pressing the **Observe Backsight** button. You will be taken back to the map view where you will see the graphical position of your setup and backsight points. There are a few things you should take note of:

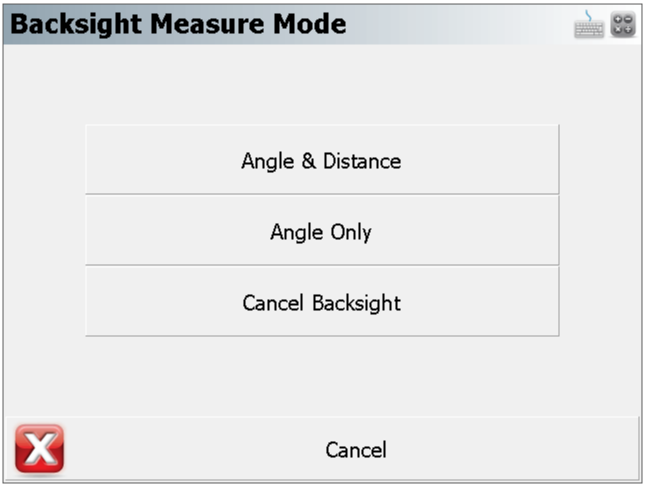
1. You can always tell what mode you're in by the "mode" text that appears near the top of your drawing. Since you're using the occupy point command you will see "Observe Backsight" near the top of the map area.
2. You have two measure modes available to you on the instrument toolbar. You can measure an angle and distance to the backsight, or measure only your current plate reading without measuring a distance. The two options are described in more detail in the Backsight Measure Mode topic.
3. You can cancel the setup by pressing the Mapping Method button and choosing "Cancel Backsight"
4. While in the backsight mode, you can use any of the controls from the information and display toolbar.
5. You can set the height of target by using the HT button on the instrument toolbar.
6. When you're ready to measure to the backsight, press the Measure button on the instrument toolbar.

Backsight Summary

After you have taken your measurement you will see a summary of your shot. From this screen you can choose to accept the shot or re-shoot it. You can also specify if you want the plate reading set to zero or a specific azimuth (if this is supported on your instrument). For more information see the Backsight Summary topic.

Backsight Measure Modes

Instrument Toolbar | Mapping Methods Button



When shooting to your backsight you have two options available and they can be accessed from the instrument toolbar using the Mapping Method button. The measure modes available are described as follows:

Angle & Distance

Specifying this will require you to measure a distance to the backsight either to a prism or reflectorless. It will also record the current plate reading on the instrument. Both the measure distance and plate reading will be used as the backsight reading in the raw file.

Angle Only

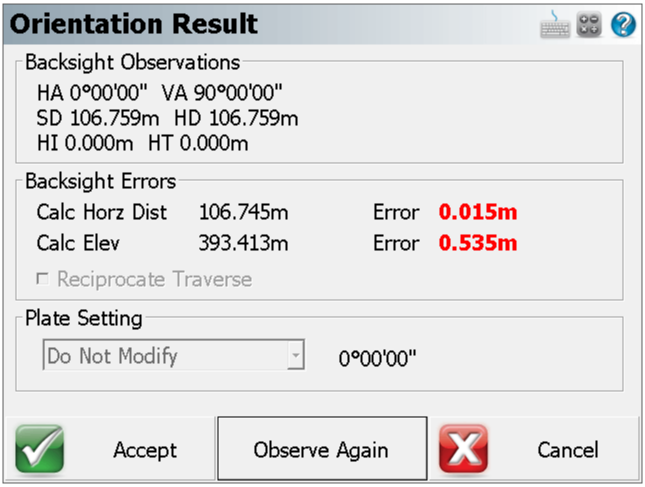
Specifying this will not require you to measure a distance to the backsight. All that will be recorded is the current plate reading on the instrument and this reading will be used as the backsight reading in the raw file.

Cancel Backsight

Use this to cancel your current backsight and occupy point command.

Backsight Summary

After you have taken your measurement you will see a summary of your shot. From this screen you can choose to accept the shot or measure again. You can also specify if you want the plate reading set to zero or a specific azimuth.



Backsight Observations and Errors

If you specified the point backsight method you will see a comparison between what you measured and the theoretical inverse. If you used the measure angle only mode, or defined a backsight direction you will not see a comparison as there isn't enough information available to compute the inverse.

Plate Setting

Finishing the Setup Routine

Accept

Once you've reviewed your backsight information you can complete it by pressing the **Accept** button. This will write a record to the raw file and exit the setup routine.

If you specified the direction backsight method you will be prompted to "Store the point observed at the backsight?" Press **Yes** to store a point for the backsight, or **No** to complete the setup without creating a new point at the backsight.

Observe Again

If you're not satisfied with the results or made a mistake you can re-shoot the backsight by using this button. Doing so will take you back to the main display where you can take another shot on the backsight.

Occupy Point Raw Records

When you accept your occupy point, points will be stored in the database for the setup and backsight if applicable. Also, the following records will be written to the raw file:

```
SP,PN2,N 918.0848,E 1057.3576,EL0.0000,--
```

```
--Orientation
LS,HI5.000,HR5.000
OC,OP1,N 1000.0000,E 1000.0000,EL0.0000,--
BK,OP1,BP2,BS145.00000,BC0.00000
BR,OP1,BP2,AR145.00000,ZE90.00000,SD100.00000
-- Orientation Notes (several comment lines)
```

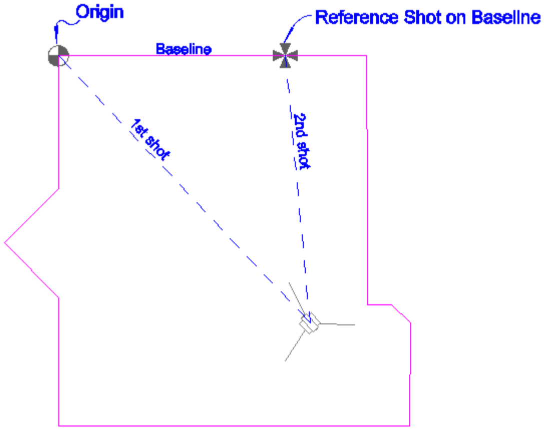
Occupy Baseline

Main Menu or Instrument Toolbar | Mapping Methods | Setup & Check | Occupy Baseline

When setting up a total station or Disto in a room or outside at a Scene, in certain circumstances it is advantageous to define one of the room's walls as a baseline for the scene. Or outside to select a linear feature like a Sidewalk or curb.

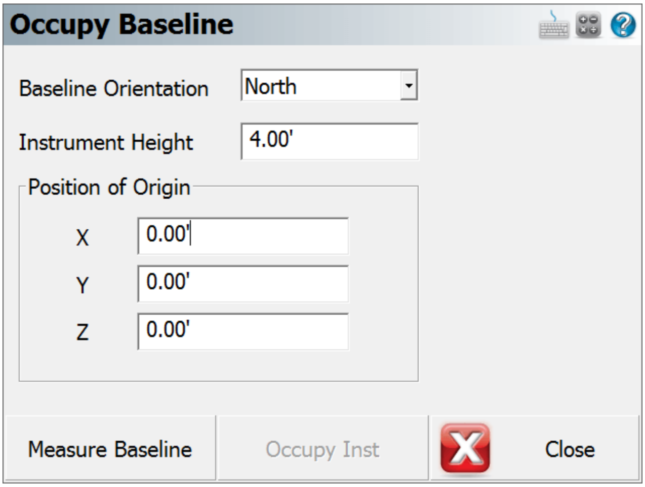
Using this method ensures that your room or outside Scene coordinate system is oriented to a baseline plane you are defining for the site. This makes the Scene easier to work in Evidence Recorder and when imported into your desktop drawing program.

Another benefit to using this feature is that all points mapped with the total station will be referenced to the origin and baseline.



Function

Usually this feature will be used in a new Scene, but it could be used in an existing scene if needed. In this example we will begin by creating a new scene.

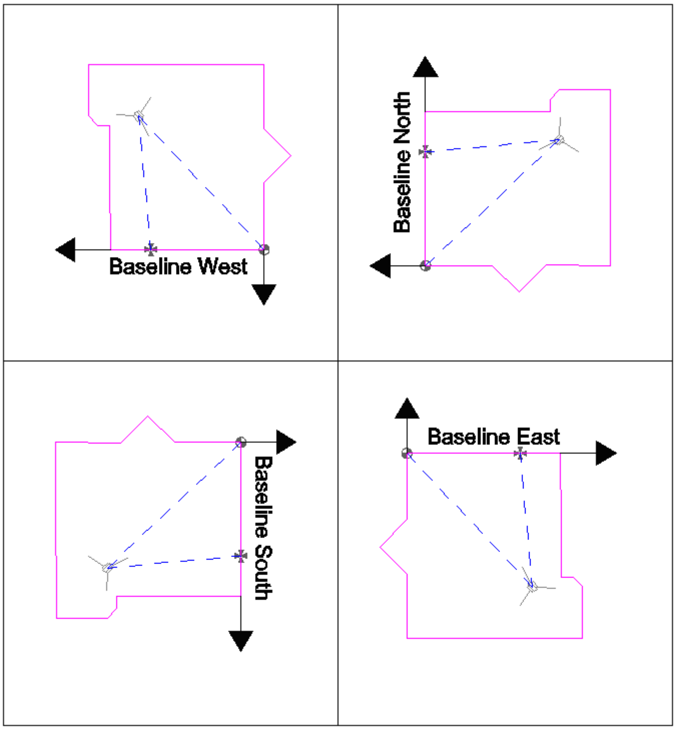


In the Occupy Baseline screen you need to specify the orientation of the baseline, your instrument height and the position that you want to use for the origin point.

Baseline Direction

This is the direction that you want the wall ”baseline” to face in your Scene. The direction that you use is totally up to you. You should pick a direction that will help you visually confirm that the points you're mapping are correct. If you refer to the image at the beginning of this document, the instrument was setup in the lower right corner of the room. From the instrument operator's perspective, it made sense to use a baseline set to East so the far wall would be horizontal along the X axis in the Scene. If you look at the image of the Tracker at the beginning of this topic, you will see that using this feature makes the room align with your scene's coordinate system.

In the examples below, the same origin coordinates and total station measurement were used. The only thing that was different, was the direction specified for the baseline.



Position of Origin

The default coordinates are 0, but any value could be used. The origin will be located and defined by your first measurement.

Usually you will want the bottom corner of the wall to be equal to the z value you define. Assuming you're using a reflectorless instrument, if you can't see the bottom corner directly with the instrument, you can measure up the wall and mark a point a known distance from the floor. Then sight this point with you instrument, but make sure you define the distance you measured as your new target height.

Otherwise, if no target height is specified, the location you measure at the corner will be the origin.

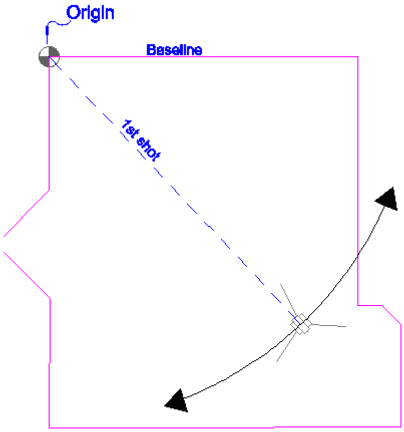
Measure Baseline

When you press this you will be required to measure two shots; one to define the origin and the other to define the location of the instrument in reference to the baseline.

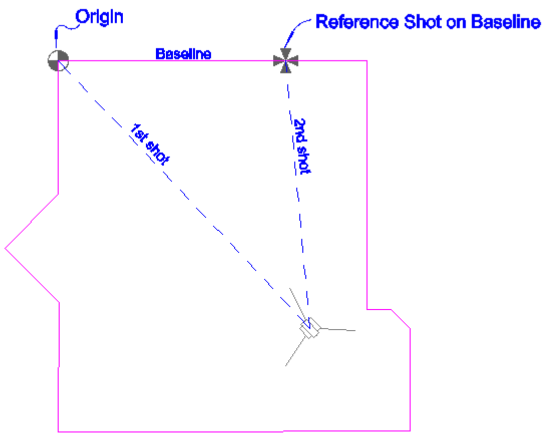
How it Works

Using the origin, and the baseline direction you specified, a ”baseline” is created.

Using the first shot, the instrument position cannot be accurate calculated yet. The instrument isn't referenced to the baseline yet, and hinges around the origin point.



Then using the second shot, the total station location in the room can be accurately computed.



Store Reference (Occupy) Position

After you finish measuring the necessary measurement, you will be taken back to the Occupy Baseline screen.

You will now see that the Occupy Inst screen is enabled. Press this to accept your measurements and Evidence Recorder will store a new point for the reference point. Also, in the raw file Occupy point records will be recorded along with the measurements made on the wall.

```
--Occupy Room
--Baseline Direction: East
--N 0.0000,E 0.0000,EL0.0000,--Origin Pnt
--HI1.310,HR1.514,AR25.16100,ZE88.26290,SD7.0790,--Pnt for Origin
--HI1.310,HR1.514,AR63.18170,ZE88.26220,SD5.1750,--Pnt on Baseline
OC,OP1,N -5.1514,E 4.8516,EL0.0115,--RP
BK,OP1,BP0,BS316.42594,BC25.16100
LS,HI1.310,HR1.514
```

You are now ready to continue mapping your scene.

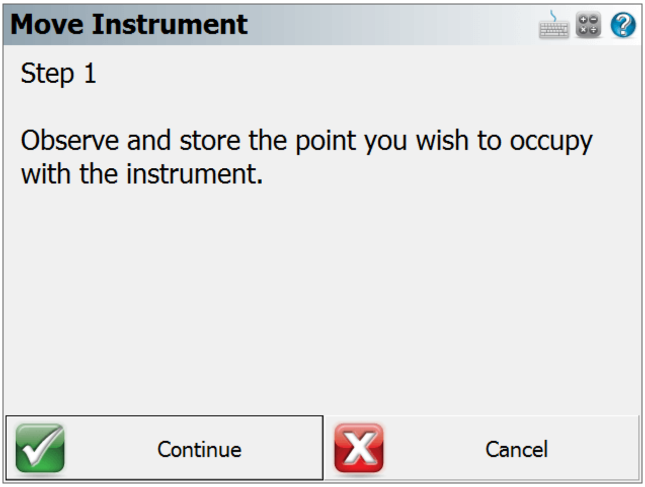
Move Instrument

Main Menu or Instrument Toolbar | Mapping Methods | Setup & Check | Move Instrument

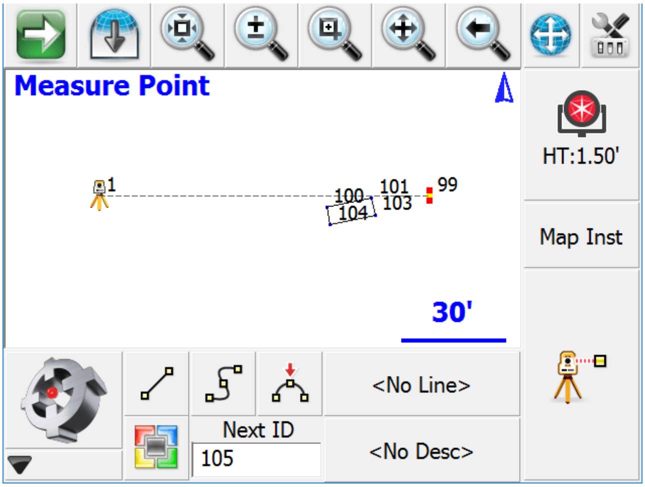
This is a wizard that will help you move your instrument to a new location in your scene. It steps you through the key procedures that need to be completed so you can successfully and accurately move your instrument.

Step 1 – Define new reference point

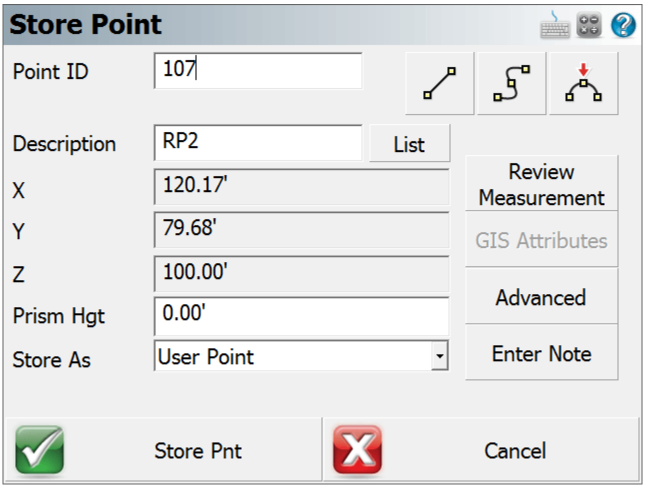
You need to establish the point you want to move your instrument to. You should mark the new reference point such that you can setup directly over top of it, such as placing a Pk-nail or a small paint mark on the ground.



Press **Continue** when ready. You can then sight your new point, and measure it's location.



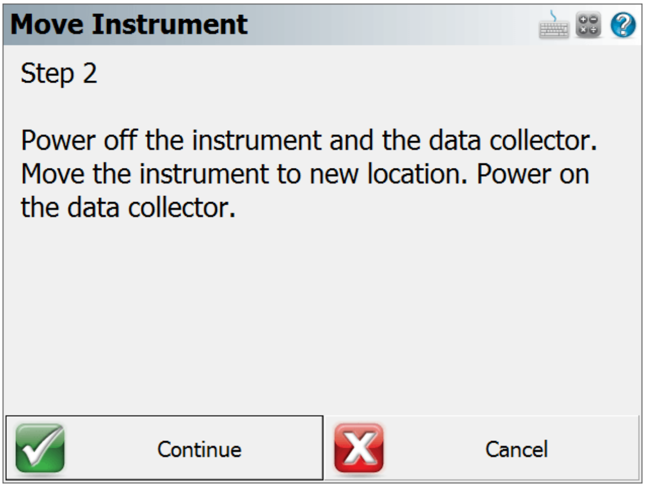
After you measure the point, you will be asked to store it. Choose the point number you want to use to identify the point and choose a description for it.



Press **Store Point** to complete this step.

Step 2 – Move Instrument

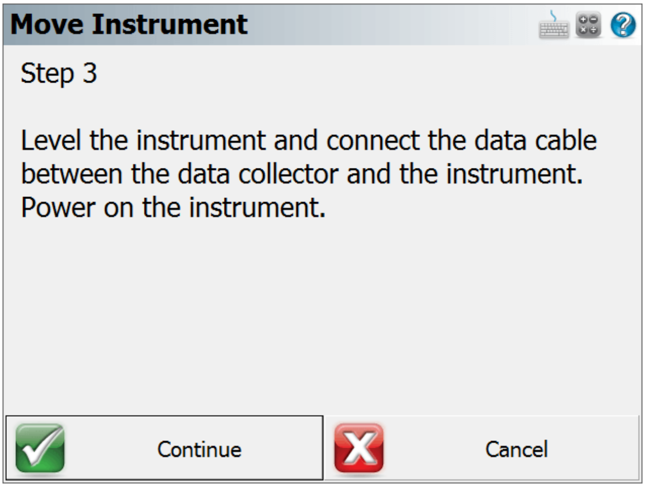
In step 2 all you do is move your instrument to the new location that was recorded in step 1.



Press **Continue**.

Step 3 – Connect to Instrument

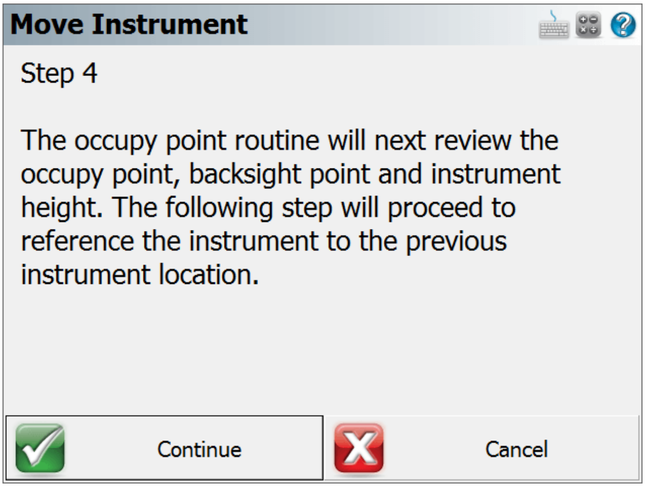
In Step 3, all you're doing is connecting to the instrument and powering everything back on.



Press **Continue**.

Step 4 – Complete Setup

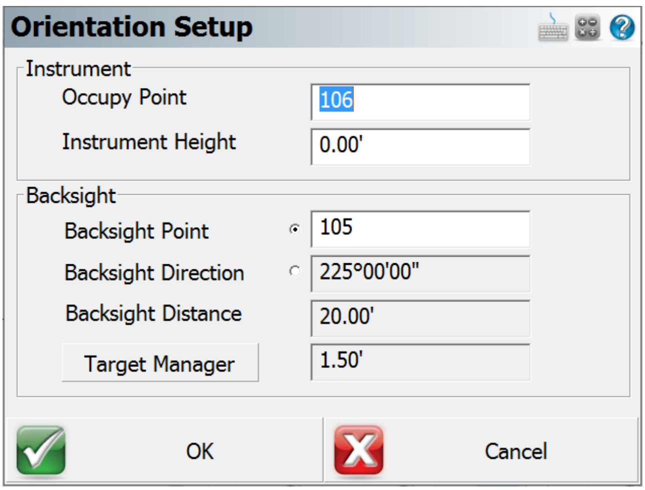
Once you've connected and moved on to step 4, you will be ready to backsight the point you were originally setup on.



Press **Continue**.

Evidence Recorder should automatically select the correct Occupy and Backsight points for you.

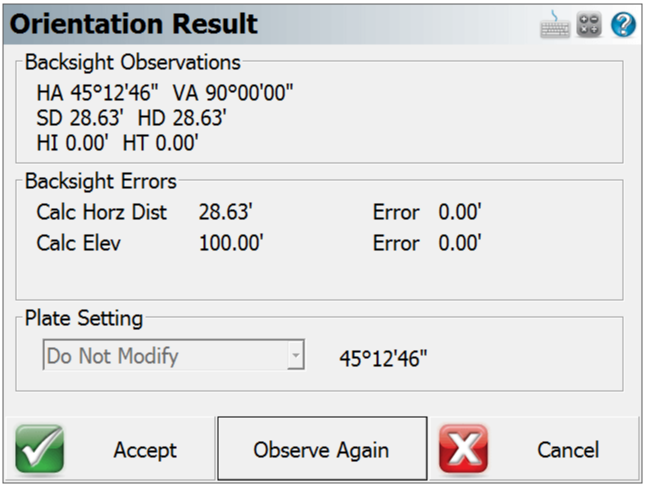
All you need to do is enter in your new instrument and target heights.



Press **Observe Backsight**.

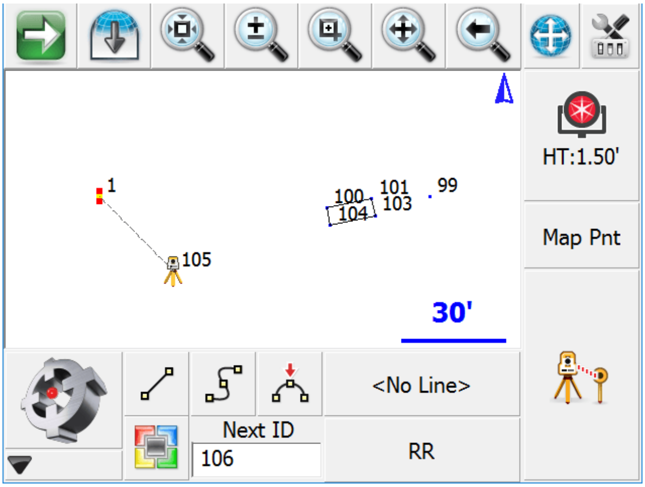
After you make a measurement to the backsight, you will see the reference measurement screen.

Confirm that you have the correct instrument and target heights. If you want to set a zero reading on the instrument, select the ”Set Zero” option in the Plate Setting pull-down menu.



Press **Accept** to finish.

You will now see your instrument icon on your new reference point (PN 34). The backsight icon should be located on the previous point you were setup on (PN 10).



Resection

Main Menu or Instrument Toolbar | Mapping Methods | Setup & Check | Resection

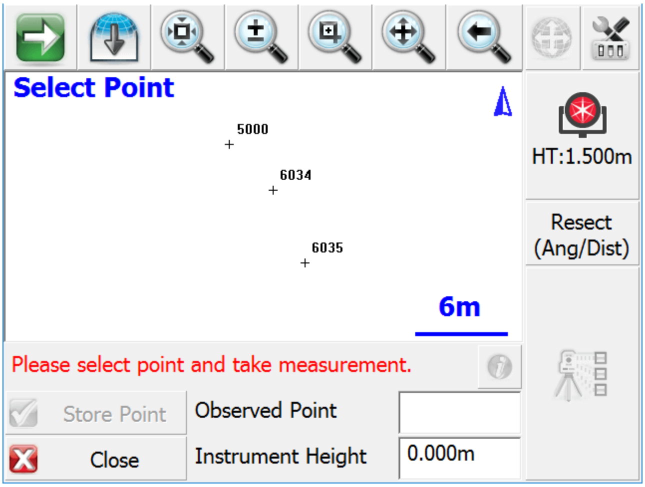
Evidence Recorder has a multi-point resection routine that can be used to compute a point for a setup. It will use a least squares solution to determine the coordinates from the measurements you make to your points. The goal at the end of a resection is to compute the unknown coordinates of the instrument's current location based on measurements made to other known points in the Scene.

- As a minimum you need to have two points to resect off.
- You can shoot the resection point in the direct or reverse face.
- You can take multiple shots to the same resection point.
- There is no limit to the amount of points you can resect off.
- When you store your resection point, an occupy record will be created for you automatically.

Specify the Resection Reference Points

First Shot

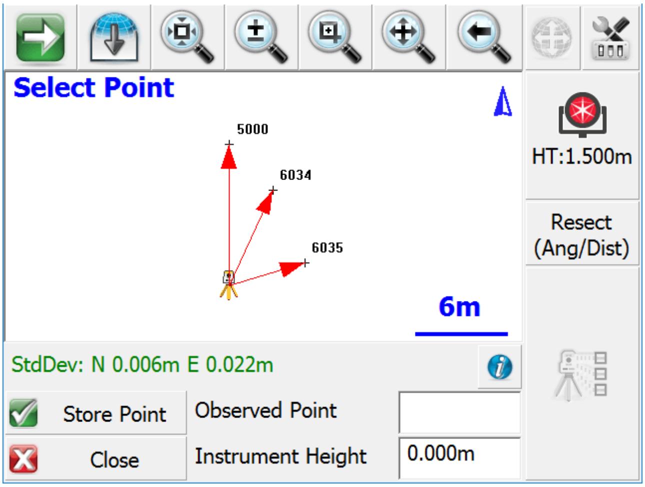
When you start the command you will see the reference point toolbar. Specify your instrument height and select a reference point to measure. After you select a point, you can press the **Measure** button to record a shot.



Second Shot

To record the second shot, simply select it from the map screen, then press the **Measure** button. A minimum of two points are needed to compute a position for the instrument, but you can shoot more points if needed to increase the accuracy of the instrument position. The estimated accuracy of the instrument location will be displayed for you on the toolbar. If the estimated error is within your own tolerances, then you can go ahead and store the point by pressing the **Store Point** button. All successful solutions will be displayed with green text starting with the characters *StdDev:*.

Press the **Close** button to cancel out of the routine. You may need to do this if the solution does not converge, and you need to restart the routine.



Three or More Shots

If you have more points to reference to you can continue measuring them using the same process as you did when you shot the second point. As you record more points you should notice that the standard deviations for the northing and easting will begin to get smaller.

Standard Deviation

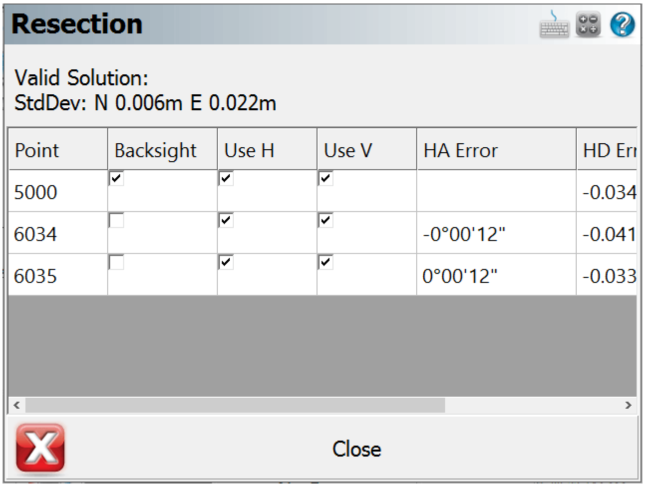
This is the computed precision for the overall geometry of the resection. Small errors indicate that the measured data "fits" very well with the geometry defined by the known points.

Large errors can indicate that bad measurements were recorded, either due to careless measurement practices such as not holding the prism pole straight or not carefully sighting the prism. Large errors can also happen if the geometry defined by the known points, is not "in the same place" as it was when the points were previously measured.

Please note that while the Standard Deviation relates to the quality of your resection, it is possible to have a low StdDev yet still have a high positional error. As such, it is important that you also look at the angle and distance errors shown in the Information screen when considering the overall accuracy of your resection.

Information (Horizontal and Vertical Filters)

You can enter this screen by pressing the **Information** button on the top right corner of the reference point toolbar. When you do, you will see a detailed summary of the measurements.



You can determine how each shot to the reference points should be used to compute the resection point. By default each observation you make will be used to compute both the horizontal and vertical position of the resection solution, but you can override this by setting the **Use H** and **Use V** options for each measurement.

Use H	Use V	Result
✓	✓	This shot will be used to compute both the horizontal and vertical position.
✓	✗	This shot will be used to compute only the horizontal position.
✗	✓	This shot will be used to compute only the vertical position.
✗	✗	The shot will be ignored in the computation.

You can also select which observation is to be your backsight point.

HA Error

The horizontal angle error is computed as follows. Using the computed resection point and the measured horizontal angle, a theoretical direction is computed to the reference point. This direction is then compared to the direction measured (plate reading) and the difference is noted in the HA Err column.

HD Error

The horizontal distance error is computed as follows. An inverse is made between the resection point and the reference point. This inversed distance is then compared to the measured distance and the difference is noted in the HD Err column.

VD Error

The vertical distance error is computed as follows. Using the resection elevation, and the observation to the reference point, a new elevation is computed for the reference point. This computed elevation is then compared to the reference point's original elevation and the difference is noted in the VD column.

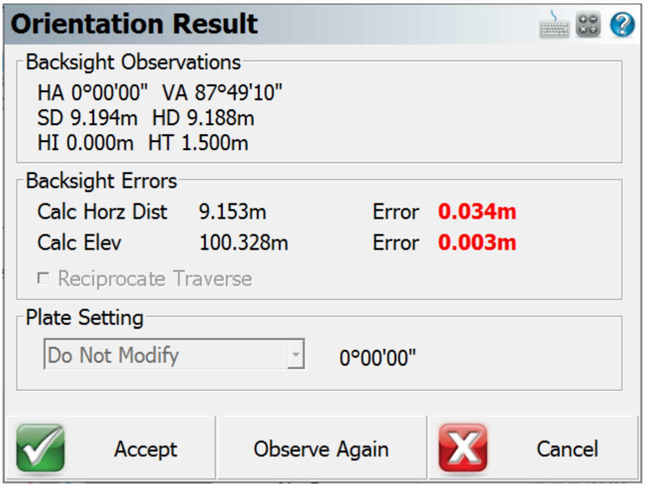
Resection Modes

At any time during the collection of your observations you can choose to shoot an **Angle & Distance** or **Angles Only** measurement. You can control this by pressing the Mapping Methods button on the instrument toolbar after you have started your resection.

Store the Resection Point

When you're satisfied with the resection point you can store its new position by pressing the **Store Pnt** button. This will then display the store / edit screen.

Finally you will see the backsight results screen.



The backsight point that will be stored will be based on which point you selected in the Information screen shown above, which by default is the first reference point you observed. You do not need to take another measurement to the backsight as it has the original measurement you made. At this point you can do the following:

- Confirm the instrument and target heights.
- Decide if you would like to sight it again and take another measurement.

Raw File Record

After you store the point, several records will be written to the raw file.

```
--Resection
SP,PN5000,N 1009.1534,E 1000.0000,EL100.3244,--
SP,PN6034,N 1006.1995,E 1002.8319,EL99.7321,--FS
SP,PN6035,N 1001.4706,E 1004.8775,EL99.7361,--FS
RS,PN5000,CR359.59590,ZE87.49010,SD9.1600
RS,PN6034,CR24.33000,ZE92.03450,SD6.8280
RS,PN6035,CR73.13080,ZE92.43050,SD5.1010
SP,PN6036,N 999.9998,E 999.9998,EL100.0011,--
OC,OP6036,N 999.9998,E 999.9998,EL100.0011,--
SP,PN5000,N 1009.1534,E 1000.0000,EL100.3244,--
BK,OP6036,BP5000,BS0.00039,BC0.00000
--Occupy Check
-- Observed Values: HA 0°00'00.0" VA 87°49'22.0" SD 9.160m HD 9.153m
-- Distance Calculated: 9.154m
-- Distance Error: -0.000m
-- BS Elevation: 100.324m
-- BS Elevation Error: 0.001m
```

Check Backsight

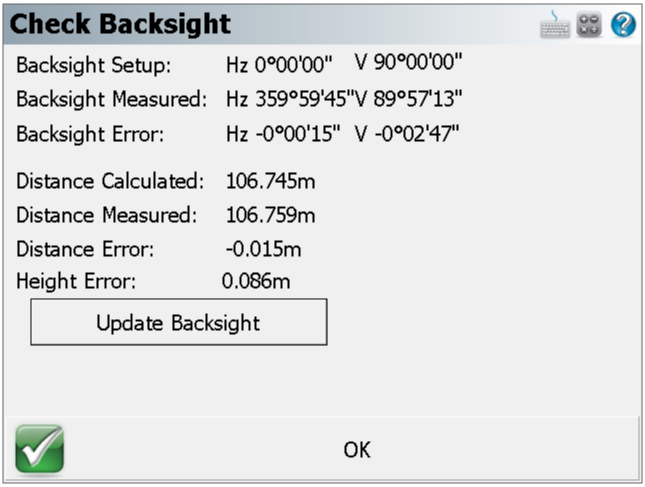
Main Menu or Instrument Toolbar | Mapping Methods | Setup & Check | Check Backsight

Use this to check your backsight. Evidence Recorder will compare your newly measured value to the one that was stored for your current setup. You will be able to review difference and optionally update your current setup with the new shot to the backsight.

When you start the command you will be taken back to the map screen and the Mapping Method will be set to **Check BS.** You have two measure modes available when taking a check shot to your backsight. Please see the Backsight Measure Mode topic for more information.

Check Backsight Summary

When you're ready to record the shot press the **Measure** button on the instrument toolbar. You will be presented with a screen that compares your measured values to the ones that were stored for the current backsight.



Update Backsight

Pressing this will create a record in the raw file updating your setup and backsight record with the shot information from your check shot. Several notes will also be written to the raw file summarizing your shot. When you choose to update the backsight, a new OC and BK record is saved as well as the shot information. You will also see the word (Updated) which indicates that the user selected the Update button.

```
OC,OP5,N 763.8748,E 1000.0000,EL0.0000,--
SP,PN1,N 1000.0000,E 1000.0000,EL100.0000,--start
BK,OP5,BP1,BS0.00000,BC0.00000
LS,HI0.000,HR5.000
--Backsight Check (Updated)
-- Observed Values: HA 0°00'00.0" VA 90°00'00.0" SD 163.12'
-- Backsight Setup: 0°00'00"
-- Backsight Measured: 0°00'00"
-- Backsight Error: 0°00'00"
-- Distance Calculated: 236.13'
-- Distance Measured: 163.12'
-- Distance Error: 73.01'
```

OK

Pressing this will exit the function and write several notes to the raw file summarizing your check shot.

```
--Backsight Check (Not Updated)
-- Observed Values: HA 0°00'00.0" VA 90°00'00.0" SD 236.10'
-- Backsight Setup: 0°00'00"
```

```
-- Backsight Measured: 0°00'00"
-- Backsight Error: 0°00'00"
-- Distance Calculated: 236.13'
-- Distance Measured: 236.10'
-- Distance Error: 0.03'
```

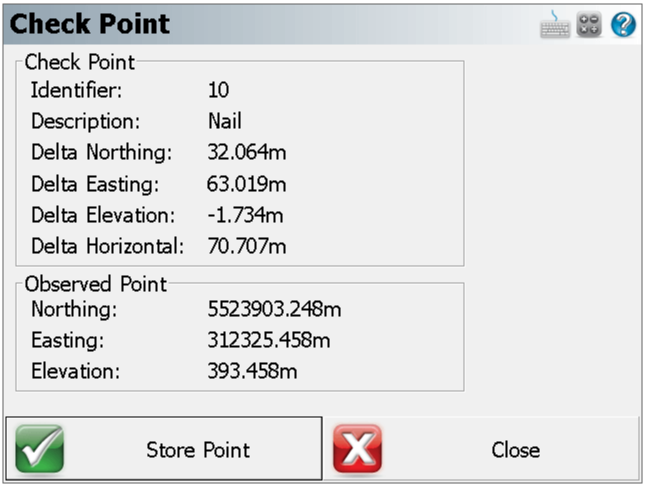
Check Point

Main Menu or Instrument Toolbar | Mapping Methods | Setup & Check | Check Point

Use this to measure a check shot to an existing point. When you start the command you will see the point chooser appear where you can create a new point or pick an existing one from a list or from the screen. After you choose your point you will be ready to measure. You will note the Mapping Method will be set to **Check Pnt** and if you need to cancel the operation you can do it by pressing the Mapping Method button and choose to cancel it.

Check Point Summary

When you're ready to record the shot press the **Measure** button on the instrument toolbar. You will be presented with a screen that compares your measured values to the ones that were computed for the check shot point.



The deltas that are displayed are computed by subtracting the shot coordinates from the known coordinates. In other works if you add the deltas to the shot point coordinates you will end up at the known point.

Store Point

Pressing this will exit the function and write several notes to the raw file summarizing your check shot, and allow you to store the shot using the Store/Edit Point screen.

```
--Check Point
-- Check Point ID: 110
-- Check Point dNorthing: -4.59'
-- Check Point dEasting: -1.82'
-- Check Point dElevation: -4.96'
-- Check Point dHorizontal: 4.94'
-- Observed Values: HA 45°00'00.0" VA 90°00'00.0" SD 23.00' HR 5.00'
-- Observed Point Northing: 5016.26'
-- Observed Point Easting: 5016.26'
-- Observed Point Elevation: 95.00'
```

Close

This will exit the check shot function and not write anything to the raw file or storing a new point.

Temporary (No Store)

Main Menu or Instrument Toolbar | Mapping Methods | Temporary (No Store)

The temporary mode will allow you to take a measurement with your instrument without storing a point or recording anything to the raw file. It also doesn't require you to have established a setup. It is the same as pressing the measure button on the instrument where all it does is report back to you the HA, ZA, SD, HD and VD.

When in this mode you will see the word **Temp** on the Mapping Method button.

No Setup Established

If you haven't established a setup and you use the temp mode, when you press the measure button you will see the results of your measurement.

Setup Established

If you have an instrument setup established when you use the temp mode and press the measure button you will see the measurement information as well as calculated coordinates in the observation toolbar. The coordinates will be based on the current setup and the reading from the temporary shot.

Note:

When measuring in temp mode, nothing will be recorded in the RAW file.

Map Point

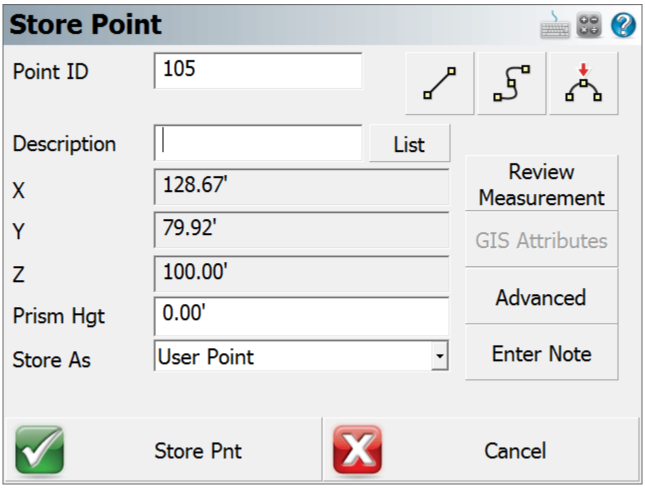
Main Menu or Instrument Toolbar | Mapping Methods | Map Point

If you like reviewing your shots prior to being stored in the database and raw file, then this is the mode you should use. When you press the measure button on the instrument toolbar, after the shot is measured you will see the store point screen prior to storing the point.

When you set this mode you will see the word **Map Pnt** on the Mapping Methods button.

When you complete the measurement using the measure button you will see the Store/Edit Point screen.

You can also confirm or change the Target Height used for this shot.




```
SS,OP350,FP3,AR0.00000,ZE94.50090,SD13.2700,--<No Desc>
```

Store Pnt

Press this to store the point in the coordinate database and update the raw file.

Cancel

Press this to cancel the shot and not store anything.

Note: For more information on the other buttons found on this screen please read the Store / Edit Points topic.

Map Point (Auto Store)

Main Menu or Instrument Toolbar | Mapping Methods | Map Point (Auto Store)

Use this when you have production in mind and you don't need to review your shots before they're recorded in the database and raw file. The Mapping Method allows you to press the measure button and it will store the point in the database and plot it in the drawing without asking you for any further information.

When in this mode you will see the words **Map Pnt (Auto)** on the Mapping Method button.

It will use the following settings from the main interface when storing the point:

Next Point Number ID

The current point ID on the topo toolbar will be assigned to the point.

Description

The current description on the topo toolbar will be assigned to the point.

Height of Target

The current HT on the instrument toolbar will be used to compute the elevation of the point.

> **Note:**
>
> When measuring in the Auto Store mode, a SS record will be recorded in the raw file.

GroupCode

Main Menu or Instrument Toolbar | Mapping Methods | GroupCode

Overview

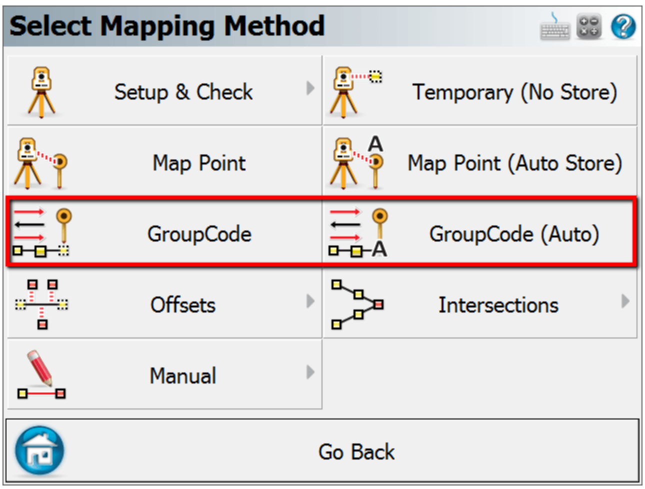
GroupCode is a Mapping Method that allows the user to set up a Group of Codes that have a common theme or purpose, and is ideal to increase productivity for repetitive feature collection.
GroupCode allows:

- Creating multiple groups of codes
- Setting a pattern to automate code selection for feature collection in a repetitive sequence (such as road cross sections)
- Linework toggles for each code in the group allowing linework to be automatically completed for each feature in the group as separate figures without any effort from the operator
- Switching between a carousel display combined with the Map screen, or a full-screen button panel with the codes in the group
- Fast switching between groups with settings retained for each group
- Fast switching between GroupCode and other Mapping Methods and being able to resume collection within GroupCode with no additional steps

Operation Notes

For Total Station operation there are two Mapping Methods:

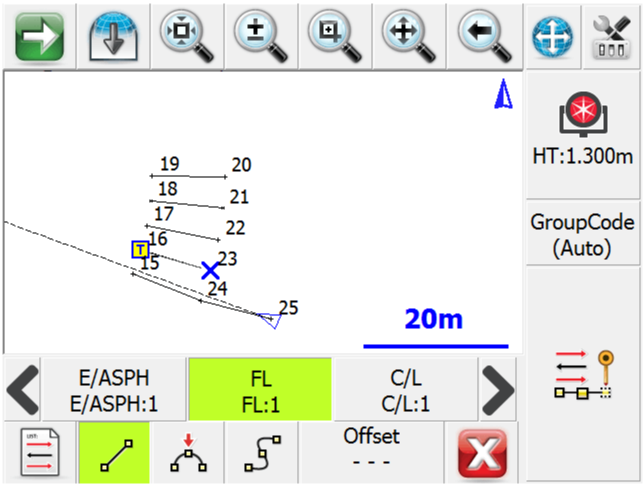
- **GroupCode** – This mode displays the “Store Point” screen to allow editing of Advanced Options or to confirm Code and Linework options
- **GroupCode (Auto)** – This mode is similar to “Sideshot (Auto Store)” where the observation is automatically stored after the measurement is completed



See the GroupCode Editor topic for information about setting up a group and changing its behaviours.

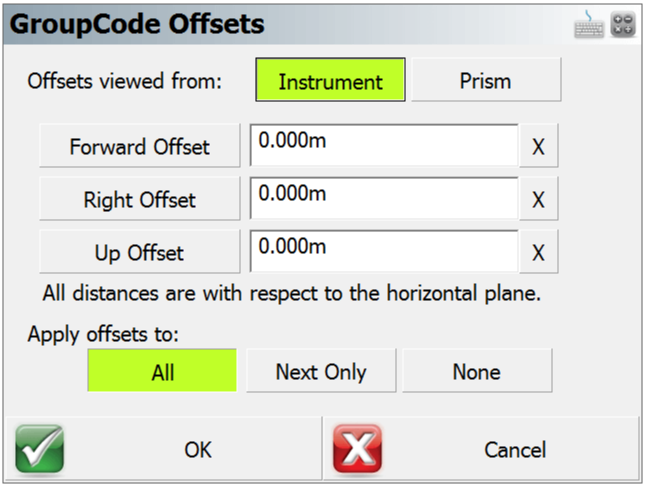
Workflow

The **GroupCode** feature is designed to allow fast measuring, and as such the automation of the code selection and multiple linework figures can reduce the task to a simple measurement button press. When no pattern is set, the user will manually need to select the next code to use, and line toggles will be necessary for drawing arcs.



Entering Offsets

It is possible to pre-enter distance offsets that will be applied to the next measurement. The Offset button will display the offset directions that will be applied if the offsets are set. Forward/Back, Left/Right, and Up/Down.



The offset entry screen has numerous toggles that can be used to set the values:

- Offsets viewed from Instrument or Prism
- Forward Offset / Back Offset – Right Offset / Left Offset – Up Offset / Down Offset
- Field Value Resets, X next to field
- Apply offsets to All Measurements, Next Measurement Only, or None

GroupCode (Auto)

Main Menu or Instrument Toolbar | Mapping Methods | GroupCode (Auto)

This Mapping Method automatically stores the observation with the selected code and the Next Point ID, otherwise identical to the main GroupCode feature.

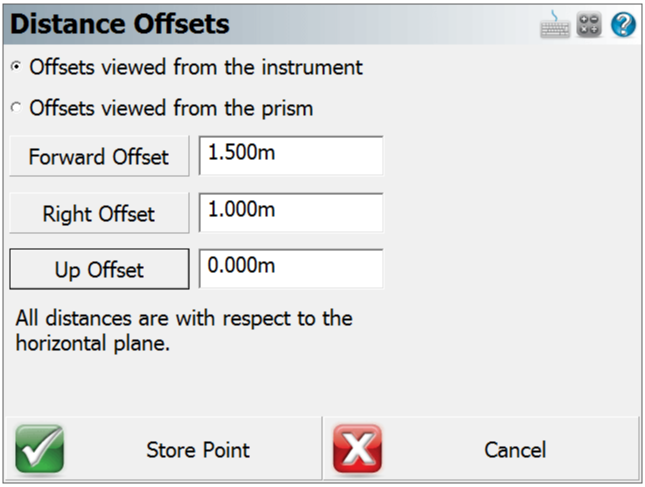
Offsets

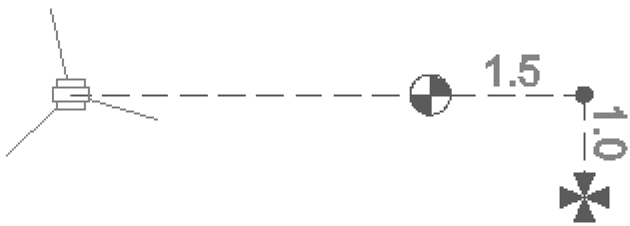
Distance Offset

Main Menu or Instrument Toolbar | Mapping Methods | Offsets | Distance Offset

Evidence Recorder allows you to do a distance offset to specify an offset forward or backward along the line of sight, left or right, and vertically up or down.

When you choose distance offset command and take a measurement, you will see the following screen:





From this screen you can specify if the offsets are with respect to the instrument or prism.

- Offset buttons act as toggles, which allow you to easily define the direction the offset should be applied.
- A negative offset will automatically be converted to a positive value.
- The elevation of the point will be computed from your shot. This elevation will remain unchanged unless you specify a vertical offset.
- The distance is assumed to be horizontal.

Forward / Back Offset

Enter the offset distance from the shot position to the new position.

Right / Left Offset

Enter the perpendicular offset distance from the shot position to the new position.

Up / Down Offset

Enter the vertical offset distance from the shot position to the new position.

Store Point

After you have entered your offsets you can press the **Store Point** button to save the point

Raw Record

A sideshot (SS) record will be computed to represent the shot. The new SS record will use the original observation plus any offsets defined in the distance offset screen.

```
OF,AR55.00000,ZE90.00000,SD12.0000
OF,HD1.5000,--Horizontal Distance Offset
OF,LR1.0000,--Left / Right Offset
OF,VD0.0000,--Elevation Offset
SS,OP1,FP6028,AR59.14110,ZE90.00000,SD13.5370,--
```

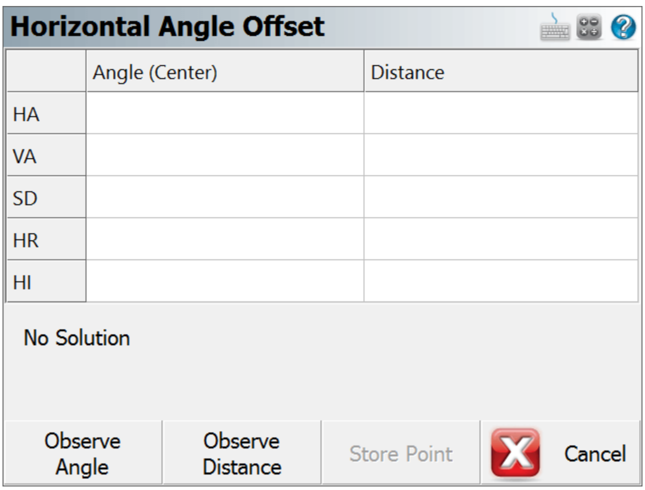
Note: Offsets that are to the left, back or down will be stored in the raw file with a negative value.

Horizontal Angle Offset

Main Menu or Instrument Toolbar | Mapping Method | Offsets | Horizontal Angle Offset

Evidence Recorder includes a flexible angle offset routine. It allows you to shoot the angle and distance to a point that cannot be occupied by the rod. An example of where you would use this is if you wanted to record the center of a large object, such as a tree.

When you choose the Horizontal Angle Offset Mapping Method you will see the following screen.

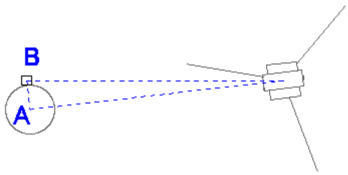


Two observations are required: one to record the angle to the point of interest, and a second to measure a distance perpendicular to the point.

On this screen you determine what order you will make these two measurements. All you need to do is press either the **Observe Angle** or **Observe Distance** button.

Note: You can increase the size of the text shown in the grid by setting the Text Size option in the Options screen.

Note: The Quick Measure Modes option in the Options screen will affect what happens when you press the Observe buttons when you are using the offset routines. If Quick Measure Modes is on, a measurement will automatically be taken. If it is off, the Observe button doesn't actually trigger your total station to take a measurement; it simply takes you to the map screen where you can press the measure button once you are ready to take the measurement.



Angle (Center)

This will record the total station's horizontal angle. When measuring the angle, you should point the total station towards the center of the new point that will be created. This would be measurement "A" in the diagram shown above.

Note: You do not need to sight a prism to record the angle, simply sight the new point and press the **Observe Angle** button.

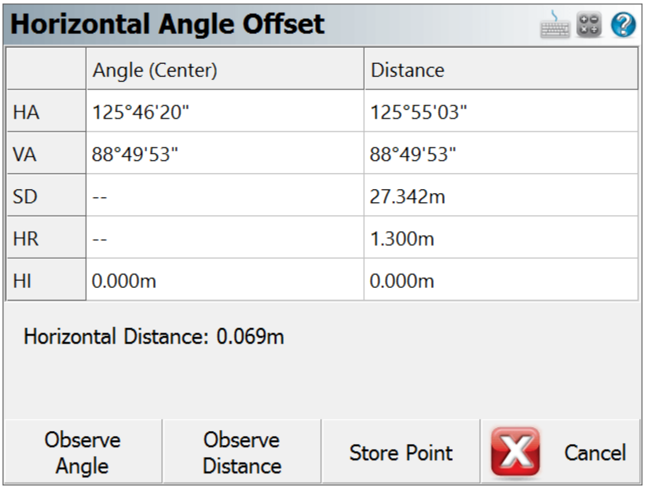
Distance

This will record a distance, measured to a prism which is located at the side of the object. You should try to locate the prism so that it is perpendicular to the center of the object and the line-of-sight from the total station. This is measurement "B" in the diagram shown above.

Note: The target height is important on this shot, because the new point will have the same elevation.

Storing the Shot

After you record your measurements you can store the new point by pressing the **Store Point** button.



After you store the point, you can continue using the offset command to record additional points, or exit it by pressing the **Cancel** button.

Raw File Record

In the raw file the OF records represent the measurements that were made and the SS record is derived using the two OF records

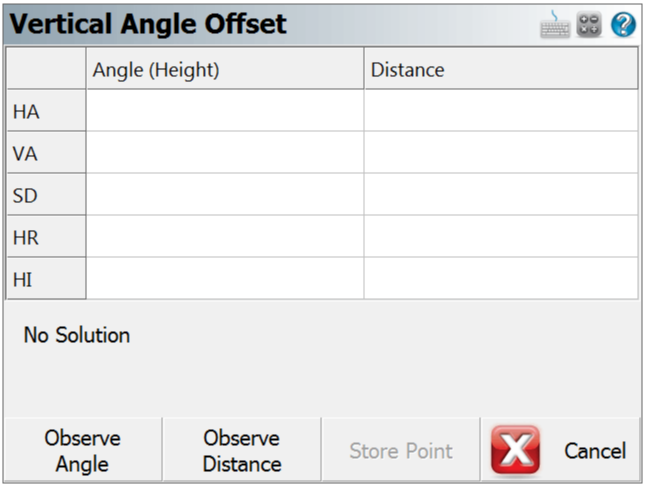
```
OF,AR94.49380,ZE88.41340,SD27.3163
OF,OL93.25450,--Right Angle Offset
SS,OP1,FP23,AR93.25450,ZE88.41340,SD27.3081,--ROAD
```

Vertical Angle Offset

Main Menu or Instrument Toolbar | Mapping Methods | Offsets | Vertical Angle Offset

When you begin the vertical angle offset routine, you will see the following screen.

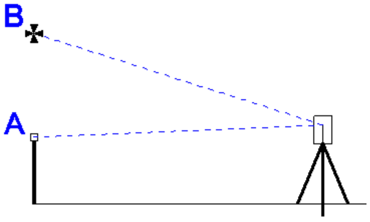
Two observations are required, one to record the top or bottom of the object, and a second to measure a distance that is directly underneath or above the new point.



On this screen you determine what order you will make these two measurements. All you need to do is press either the **Observe Angle** or **Observe Distance** button.

Note: You can increase the size of the text shown in the grid by setting the Text Size option in the Options screen.

Note: The Quick Measure Modes option in the Options screen will affect what happens when you press the Measure button when you are using the offset routines. If Quick Measure Modes is on, a measurement will automatically be taken. If it is off, the measure button doesn't actually trigger your total station to take a measurement; it simply takes you to the map screen where you can press the measure button once you are ready to take the measurement.



For example if point "B" was the bottom of an underpass, you could measure its height. Usually it is easier if you position the prism so it is directly beneath the point you want to shoot. You would then record a distance observation to this location which will also be the horizontal position for the new point. Then without turning your instrument, you could rotate the scope vertically so it is sighted on the bottom of the overpass. You could then record this observation which will be used to compute the elevation for the new point.

Once you've recorded these two measurements, you will be able to store the new position.

Storing the Shot

After you make your measurements, you will be able to store the new point. Press the **Store Point** button to store the point.

Raw File Record

In the raw file the OF records represent the measurements that were made. The SS record is the record that was used to compute the coordinate point for the angle offset and will be a compilation of your two shots.

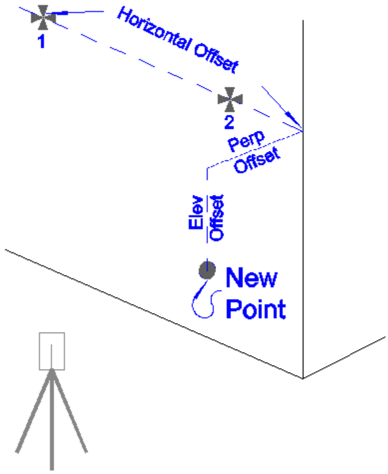
```
OF,AR52.53170,ZE91.12240,SD9.5616
OF,ZE91.12240,--Vert Angle Offset
SS,OP1,FP2,AR52.53170,ZE91.12240,SD9.5616,--<No Desc>
```

Line - Distance Offset

Main Menu or Instrument Toolbar | Mapping Methods | Offsets | Line - Distance Offset

The line distance offset command is used to define two points that will be used to establish a reference line. Once the reference line is established you can then specify offsets along the reference line to the new point.

This is a very powerful offsetting tool that can be used in a lot of different situations.



When you define your reference line, there are three types of offset that can be applied.

You can define a horizontal offset, a perpendicular offset and a vertical (elevation) offset. Each offset button is a toggle that allows you to toggle how the offset is to be applied in relation to the reference line.

When you define the offset direction, you can then enter in the value that you want to offset by.

If the horizontal offset remains set to zero, perpendicular or elevation offset will be applied in relation to point one on the reference line.

Offsets

Horizontal Offset

The horizontal offset can either be left or right of the first point on the reference line. From the total station's perspective, if the new point is to the right of point 1, then you would use the Horz Offset Right of Pnt 1. If it is to the left, then logically, it would be a left offset so you would use the Horz Offset Left of Pnt 1 setting.

Perpendicular Offset

The perpendicular offset is a horizontal distance applied perpendicular to the reference line. From the total station's perspective, when moving perpendicular from the reference line, if the new point ends up being closer to the total station, then you would set the perpendicular offset to Perp Offset Towards Inst. Alternatively, if the new point ends up being farther from the total station, then you would use the Perp Offset Away From Inst.

Elevation Offset

This is the vertical offset from the reference line to the new point. If the new point is above the reference line, then you would set this to Elev Offset Up. If the new point is below the reference line you would set it to Elev Offset Down.

Measure Points

When you start line angle offset command, you will see an empty list.

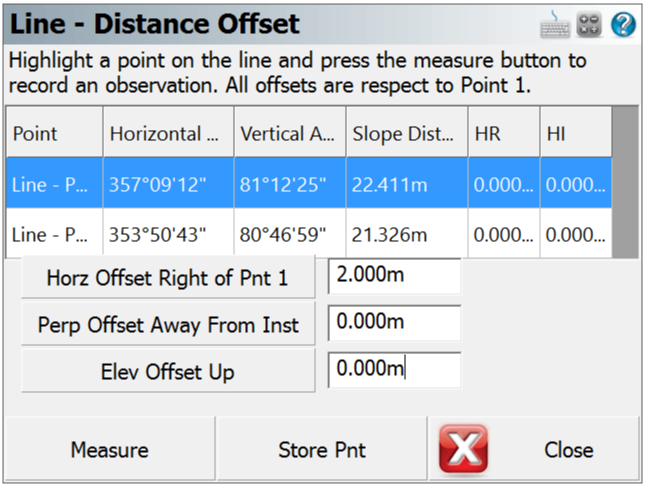
Highlight the row that you would like to make a measurement for and simply press the **Measure** button to begin the measuring process.

If you need to redo a measurement, simply highlight it in the list and press the measure button.

Notes:

1. The x and y values for the new point will be computed using the horizontal and perpendicular offsets defined by the user. These horizontal offset is referenced to point 1 on the reference line. The perpendicular offset is a perpendicular offset from the reference line.

2. The z value for the new point will be computed using the projected elevation along the reference line, plus or minus any elevation offsets defined by the user.



Note: You can increase the size of the text shown in the grid by setting the Text Size option in the Options screen.

Store the Point

Once you've made your measurements that will be used to compute the intersection, you can press the **Store Point** button. This will store a point in the map screen, store a point in the database as well as record information to the raw file.

Raw File

Everything about the intersection is stored in the raw file.

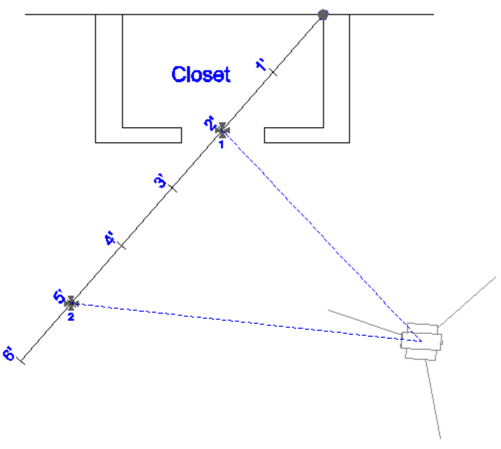
```
--Line - Distance Offset
--HI0.000,HR0.000,AR357.09120,ZE81.12250,SD22.4114,--Pnt 1 of Line
--HI0.000,HR0.000,AR353.50430,ZE80.46590,SD21.3255,--Pnt 2 of Line
--Horizontal Offset: 2.000
--Perpendicular Offset: 0.000
--Elevation Offset: 0.000
SP,PN1018,N 123.5558,E 100.2931,EL103.4035,--EV2
```

Example

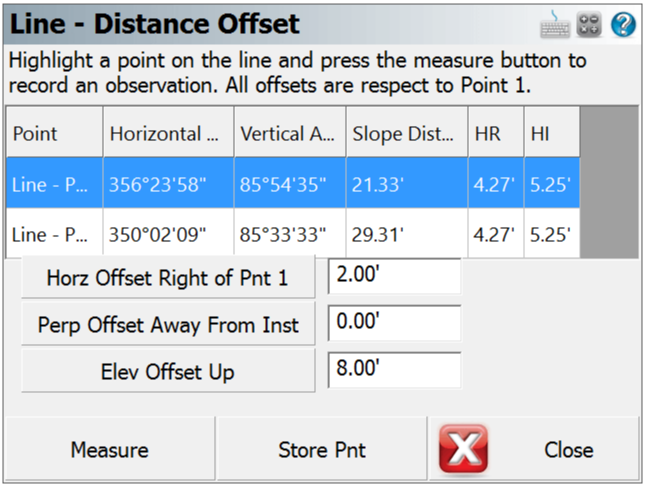
The top corner in a closet needs to be located, but it isn't visible from the total station.

So the user lays a hand tape on the floor, with the start of the tape located at the bottom corner of the closet, directly below the point that needs to be recorded. The direction of the tape is then laid out such that two measurements can be made on the tape.

Essentially, the tape now becomes the reference line. Two shots are taken, one at the 2 foot mark, and the other at the 5 foot mark.



After you take your two measurements, all you need to define is the offset distances. In this example, the corner is two feet to the right of the first measurement (point 1), and 8' up from the floor. After you define the offset directions and offset amounts, you can press the **Store Pnt** button to store the new point.

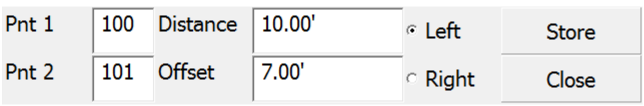


Baseline Offset

Main Menu or Instrument Toolbar | Mapping Methods | Offsets | Baseline Offset

Overview

Use this function to define a baseline using two existing points, and calculate new points by using a distance and offset on the baseline.



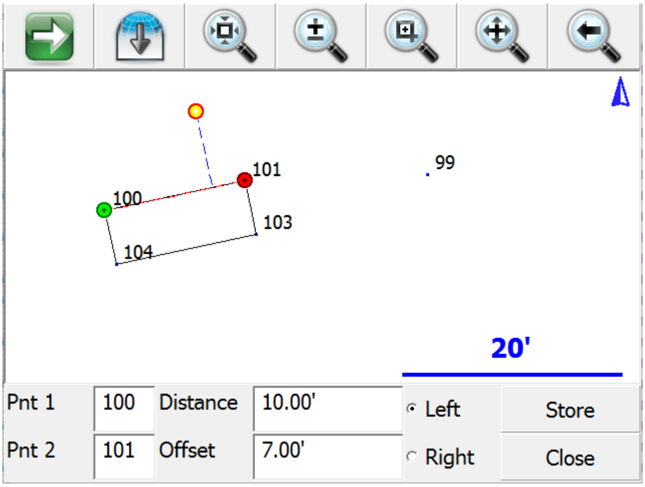
Define Baseline

You can manually type in the point numbers that define the baseline or pick the points from the map. The left/right side will be based on looking down the baseline from point 1 to point 2.

Entering a Distance and Offset

Once you've defined a baseline, you can manually enter a distance and offset and Evidence Recorder will compute a point for you. Simply type in the distance and offset values, and specify whether the offset is to the left or the right of the baseline.

You can also double tap within either the Distance or Offset fields to open up the calculator or the inverse command, or to measure the distance with a Leica Disto.



In this example, the baseline is from point 100 to point 101. You will see that an orange dot is displayed in the drawing at the location defined by the point 10m down the baseline and offset 7m to the left.

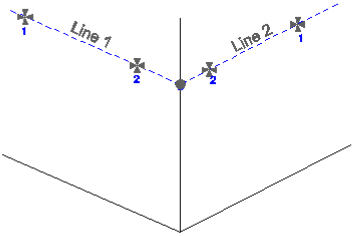
You can press the **Store** button to save the point using the Store / Edit Points command.

Intersections

Two Line Intersection

Main Menu or Instrument Toolbar | Mapping Methods | Intersections | Two Line Intersection

The two line intersection command is used to locate the corner of an object, whose corner cannot be directly measured. Two intersecting lines will be defined by four measurements, two shots on each line. The intersection of these two lines will define the corner of the object. This routine is intended to be used with a reflectorless total station.



Measure Points

When you start the two line intersection command, you will see an empty list. Each row represents a measurement to a point on one of the two lines needed to compute the intersection.

Highlight the row that you would like to make a measurement for and simply press the **Measure** button to begin the measuring process.

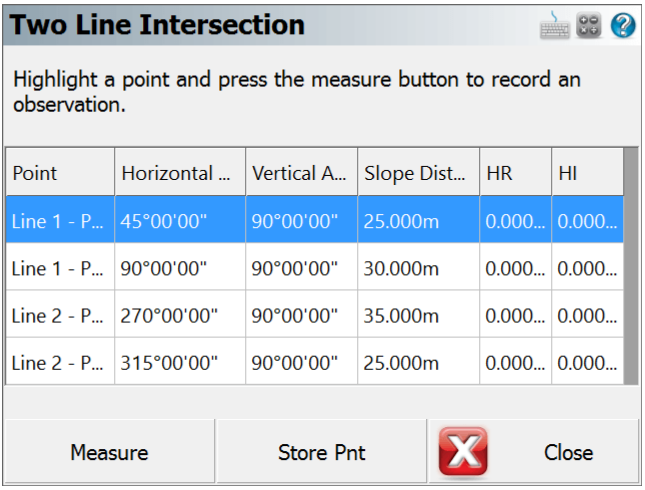
If you need to redo a measurement, simply highlight it in the list and press the measure button.

Notes:

1. You can shoot the points in any order you like, Evidence Recorder will determine what direction to go in to compute an intersection

2. The x and y values for the new point will be computed using the intersection of the two lines.

3. The two lines you define will rarely intersect at exactly the same point. The elevation of where the lines intersect will be averaged, and used as the z value for the new point.



Note: You can increase the size of the text shown in the grid by setting the Text Size option in the Options screen.

Store the Point

Once you've made measurements to the four points that will define the two intersection lines, you can press the Store Point button. This will store a point in the map screen, store a point in the database as well as record information to the raw file.

Raw File

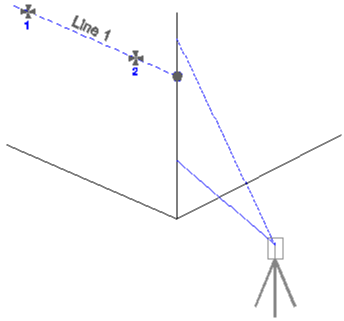
Everything about the intersection is stored in the raw file.

```
--Two Line Intersection
--HI1.340,HR0.000,AR280.55220,ZE81.15170,SD6.8350,--Pnt 1 of Line 1
--HI1.340,HR0.000,AR276.59380,ZE81.05590,SD6.4400,--Pnt 2 of Line 1
--HI1.340,HR0.000,AR287.18580,ZE81.13350,SD6.7960,--Pnt 1 of Line 2
--HI1.340,HR0.000,AR296.06280,ZE80.14520,SD6.0940,--Pnt 2 of Line 2
SP,PN3,N -0.0039,E -0.0060,EL0.5325,--
```

Line - Angle Intersection

Main Menu or Instrument Toolbar | Mapping Methods | Intersections | Line - Angle Intersection

The **Line-Angle Intersection** command is used to define two points that will be used to establish a reference line then measure an angle that intersects this reference line, and Evidence Recorder will automatically compute the coordinate at the intersecting point.



An example of where you might use this is to locate the corner wall of a building. Simply shoot two points on one of the walls, then turn the instrument so it is pointing anywhere along the corner of the building. This command is intended to be used with reflectorless total stations.

Measure Points

When you start the **Line-Angle Intersection** command, you will see an empty list.

Highlight the row that you would like to make a measurement for and simply press the **Measure** button to begin the measuring process.

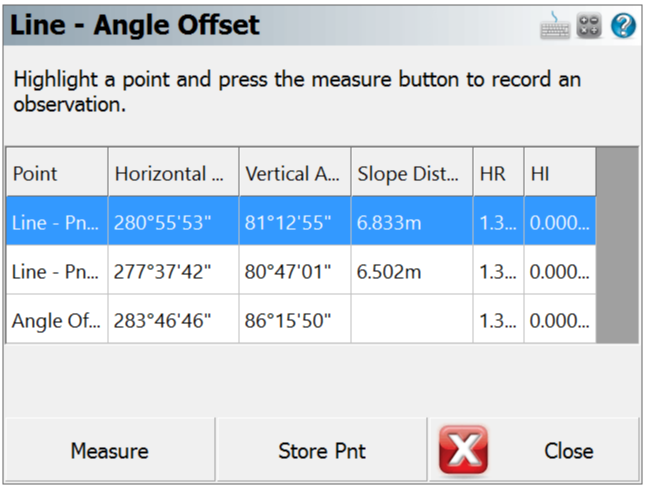
If you need to redo a measurement, simply highlight it in the list and press the measure button.

Notes:

1. You can shoot the points in any order you like, Evidence Recorder will determine what direction to go in to compute an intersection

2. The x and y values for the new point will be computed using the intersection of the line and the angle that was read.

3. The z value for the new point will be computed using the projected elevation along the reference line to the point where an intersection is computed.



Note: You can increase the size of the text shown in the grid by setting the Text Size option in the Options screen.

Store the Point

Once you've made your measurements that will be used to compute the intersection, you can press the **Store Point** button. This will store a point in the map screen, store a point in the database as well as record information to the raw file.

Raw File

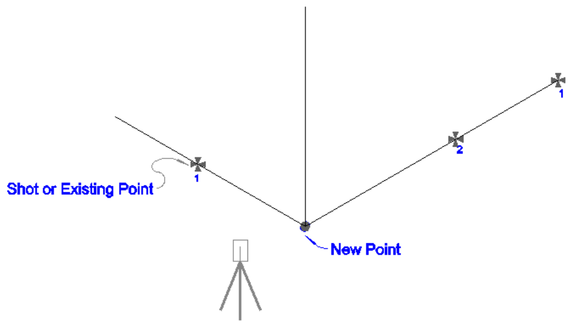
Everything about the intersection is stored in the raw file.

```
--Line - Angle Offset
--HI1.340,HR0.000,AR280.55530,ZE81.12550,SD6.8330,--Pnt 1 of Line
--HI1.340,HR0.000,AR277.37420,ZE80.47010,SD6.5020,--Pnt 2 of Line
--HI1.340,HR0.000,AR283.46460,ZE86.15500,--Angle Offset
SP,PN4,N -0.0050,E 0.0051,EL0.5761,--
```

Line - Perpendicular Point

Main Menu or Instrument Toolbar | Mapping Methods | Intersections | Line - Perpendicular Point

This offset command is used to define two points that will be used to establish a reference line. Once the reference line is established, you can specify a point that will be used to compute a perpendicular intersection from the point to the reference line. The point can either be shot or you can select an existing point from your scene database or map.



An example of where you could use this is to pick up the corner of a building, whose corner cannot be scene from the total station. You could take two shots on one wall to define the reference line, and then take another shot on the intersecting wall. A perpendicular intersection will be computed, which in this case would be the corner of the building.

Measure Points

When you start the command, you will see an empty list.

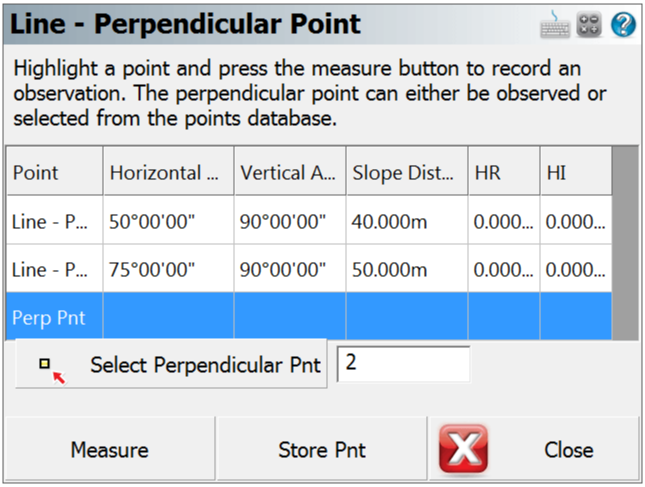
Highlight the row that you would like to make a measurement for and simply press the **Measure** button to begin the measuring process.

If you need to redo a measurement, simply highlight it in the list and press the measure button.

Notes:

1. The x and y values for the new point will be computed by computing a perpendicular intersection between the reference line and a point defined by the user.

2. The z value for the new point will be computed using the projected elevation along the reference line to the point where a perpendicular intersection occurs.



Note: You can increase the size of the text shown in the grid by setting the Text Size option in the Options screen.

Select Perpendicular Point

You can define the perpendicular point one of two ways. The first is to simply take a measurement that will define the perpendicular point. The shot is only used to make an intersection, a point isn't stored at the measurement location.

The other method is to choose an existing point that exists in your scene. Press the Select Perpendicular Pnt button to select a point.

Store the Point

Once you've made your measurements and defined a perpendicular point that will be used to compute the intersection, you can press the Store Point button. This will store a point in the map screen, store a point in the database as well as record information to the raw file.

Raw File

Everything about the intersection is stored in the raw file. In the following example, if you shot the perpendicular point you will see a third shot that records the measurement.

```
--Line - Perpendicular Point
--HI1.340,HR0.000,AR353.49130,ZE80.47360,SD21.3386,--Pnt 1 of Line
--HI1.340,HR0.000,AR357.07260,ZE81.13020,SD22.4245,--Pnt 2 of Line
--HI1.340,HR0.000,AR12.10230,ZE83.00580,SD19.8819,--Perpendicular Pnt
```

```
SP,PN6,N 123.3028,E 100.0209,EL104.7737,--RM
```

If the perpendicular point exists in your scene and you selected it using the point chooser, then you will see a store point recorded as a note. The last store point is the new point that was computed.

```
--Line - Perpendicular Point
--HI1.340,HR0.000,AR353.49520,ZE80.46560,SD21.3419,--Pnt 1 of Line
--HI1.340,HR0.000,AR357.07330,ZE81.12210,SD22.4147,--Pnt 2 of Line
--SP,PN7,N 119.2906,E 104.1611,EL103.7580,--Perpendicular Pnt
SP,PN8,N 123.3107,E 100.0504,EL104.7751,--SCR
```

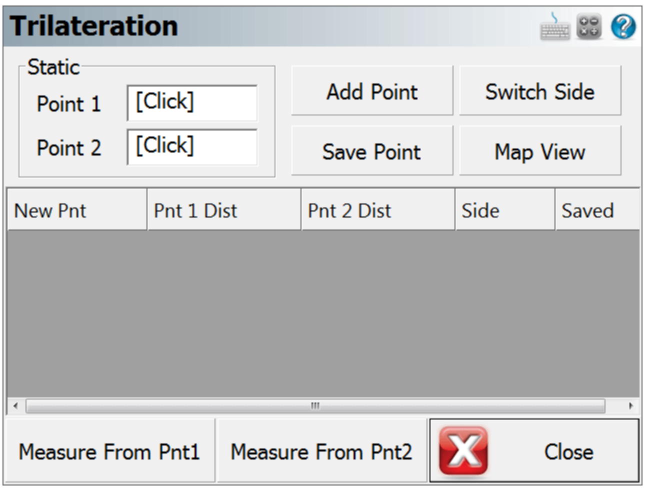
Trilateration

Main Menu or Instrument Toolbar | Mapping Methods | Intersections | Trilateration

This routine allows you to trilaterate the position of new points by observing their distances from two known positions. The two known points will make up a baseline, from which a distance-distance intersection will be calculated to determine the position of each new point.

The primary use of this routine is for GNSS users so they can locate inaccessible points. They can locate two points with GNSS, and then use the Trilateration routine to locate the inaccessible points.

This routine can accept distances measured with the Leica Disto.

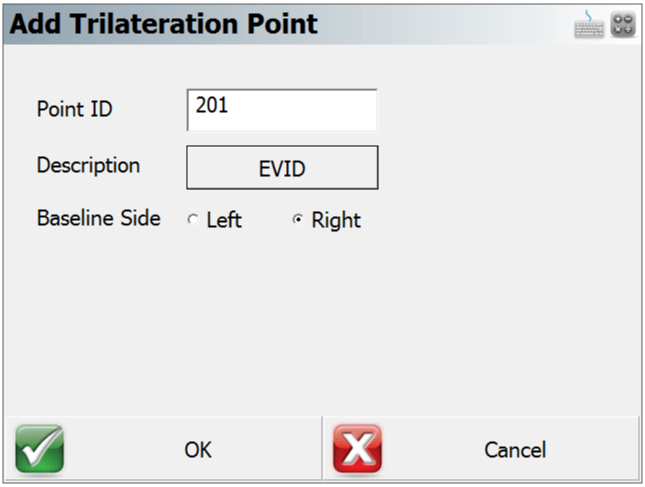


Static Points (Baseline)

Select your two baseline points, from which you will be observing the distances to the new points.

Add Point

Use this to add a new unknown point to solve for. When you press this, you will be prompted for the new point number and description, and whether it is on the left or right side of the baseline.



Save Point

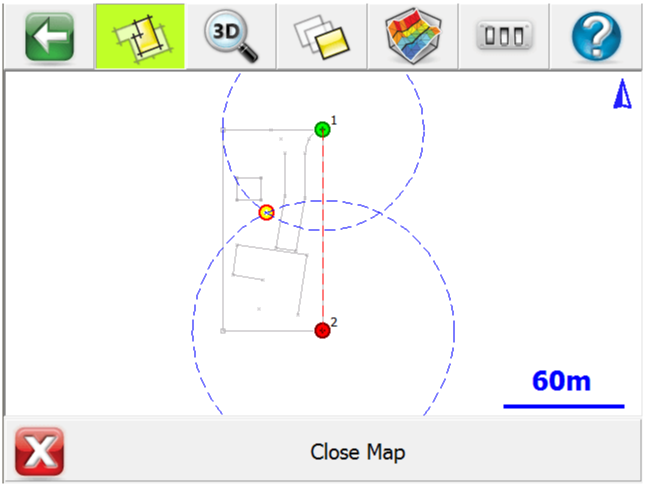
This saves the selected New Point into your Scene database.

Switch Side

This toggles the selected New Point to the Left or Right side of the baseline.

Map View

This takes you to a map view showing your baseline, the distance measured from each point, and the calculated position of the new point.



If desired, you can press the World View button on the Display toolbar to hide unnecessary data.

Measure from Point 1

Press this to record the distance from Point 1 of your baseline to the selected New Point.

Measure from Point 2

Press this to record the distance from Point 2 of your baseline to the selected New Point.

Vertical Scene Projection

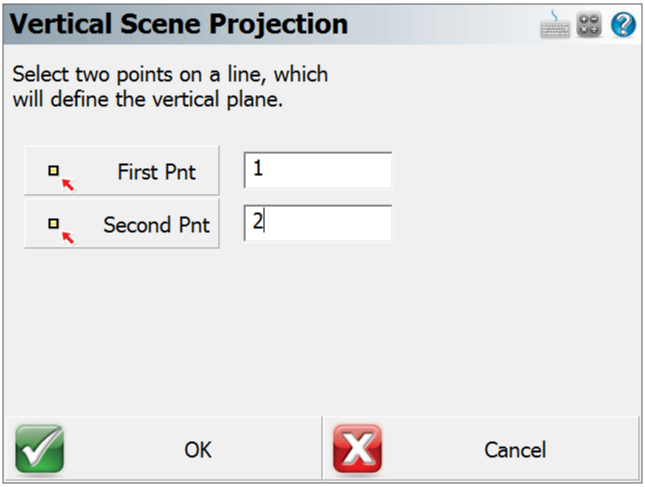
Main Menu or Instrument Toolbar | Mapping Methods | Intersections | Vertical Scene Projection

This function is for locating multiple points on a vertical place defined by two previously measured points. The program will calculate the distance for each shot taken to an un-measurable position so that coordinates can be generated for the shot.

An example of how you could use this would be to shoot two corners of a wall to define a vertical plane. Then you could sight four corners for window on the second floor and Evidence Recorder will use the HA and VA values and compute the intersection with the vertical plane. Once the intersection is computed, the point will be stored.

Function

When the command is started you will see a screen that will allow you to specify the points that will form the baseline for the vertical plane.



Note: You need to measure and store the points that will be used to define the vertical mapping plane, prior to starting the Vertical Projection command.

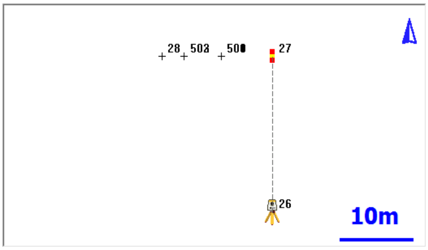
When ready to continue, press the **OK** button.

You will now be in the Vertical projection mode which will be indicated by the Mapping Method button on the instrument toolbar. To begin calculating points on the vertical plane, you need to point the total station at the new point you want to create. To complete the shot, press the measure button, and then store the point.

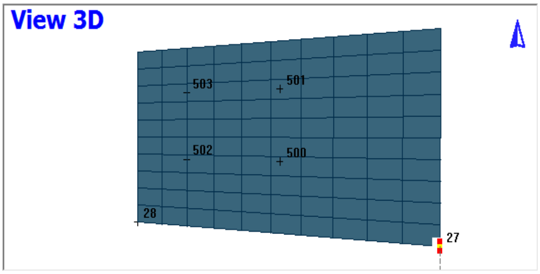
Note: You do not need to use a prism when measuring points on the vertical plane. Simply point the instrument at the point you want to create.

Since vertical planes represent 3D data, it is sometimes necessary to rotate your perspective of the Scene to help you see the point you're computing on the vertical plane.

Press the 3D View button on the display toolbar which will open the 3D toolbar. If you press the Planar View button, your scene will be rotated so it matches your perspective. For example, a vertical plane was defined by points 27 and 28. When the planar view option is used, you can see your work in a 3D perspective. You can now see the 4 measurements (points 500 – 503) that were made to record the position of a window on the vertical plane.

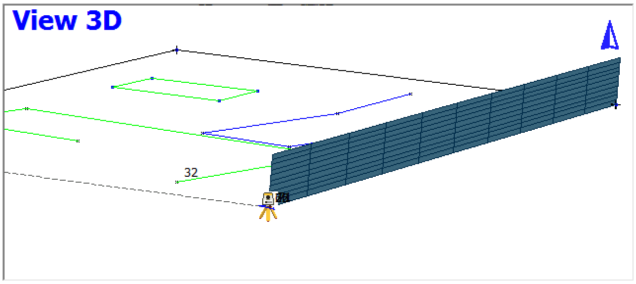


Plan View



3D Perspective

You can also hide objects that are behind the vertical plane from viewing by pressing the **Vert Grid** button. In the example below, you will see that after this is turned on, some of the line work is hidden from view.



To exit this routine, simply switch to a different Mapping Method.

Raw File

Each point that is computed on the vertical plane will also have a computed sideshot stored in the raw file.

```
--VS,PA27,PB28
SS,OP1,FP503,AR142.24510,ZE78.37170,SD17.8888,--VERTICAL
```

For each shot you record you will see a note before the shot in the raw file indicating which points were used to define the vertical plane.

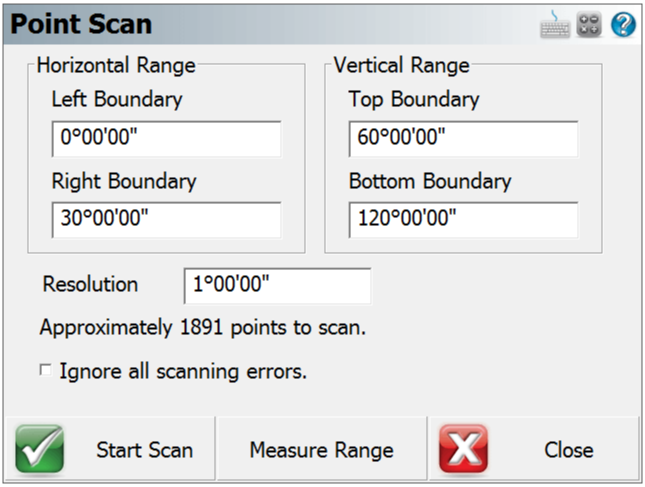
Special Notes

Vertical projection measurements will automatically be recognized by your IMS Map360 desktop software. Please refer to the IMS Map360 help file for more information regarding importing vertical projections.

Point Scanning

Main Menu or Instrument Toolbar | Mapping Methods | Point Scanning

Evidence Recorder supports point scanning which allows you to create a point cloud of data. To use this routine you need a reflectorless instrument that has servo motors.



To start, you will be asked to define a scan area by pressing the Measure Range button and pointing the instrument at the Bottom-Left and Top-Right corners of the area you want to confine the scanning to.

Once the scan area is defined, you can define the scan resolution by using an angular value. For example if you set it to 0°30'00", Evidence Recorder will create a pattern confined to the limits you defined, and scan at 30 minute intervals both horizontally and vertically. Once you've defined the scan area and resolution, Evidence Recorder will display an estimate of how many points will be stored.

You also can control how Evidence Recorder deals with measurement errors while scanning. If you turn on "**Ignore all scanning errors**", Evidence Recorder will ignore measurement errors and continue without interruption. If you don't turn this on, Evidence Recorder will stop and display a message allowing you to stop the scanning process, or continue on with the next measurement.

Press the **Start Scan** button to select the desired reflectorless EDM Mode and initiate scanning. Evidence Recorder will display an estimate of the time remaining for the scan to complete.

Points will be stored using the description defined in the map screen. The point number of the first point will be set to the "next available" id and will increment sequentially. The shots are stored in the raw file as sideshots so you have a record of the observations.

Upon completion, you will receive a summary showing the total number of successful measurements and errors received.

Scan Settings

When connected to the Leica MS50/MS60 and you select the Point Scanning command you will see the Scan Settings dialog.

Scan Settings - Type

Scan Method

You have 4 options

- Polygon area - Scan area confined by polygon vertices (video scanning supported)
- Rectangular area - Scan a rectangular area defined by 2 opposite corners (video scanning supported)
- Full Dome - Scan the entire field of view of the total station
- Partial Dome - Scan area confined by angler constraints. Can also be used to scan Ceilings or Floors

Scan Rate

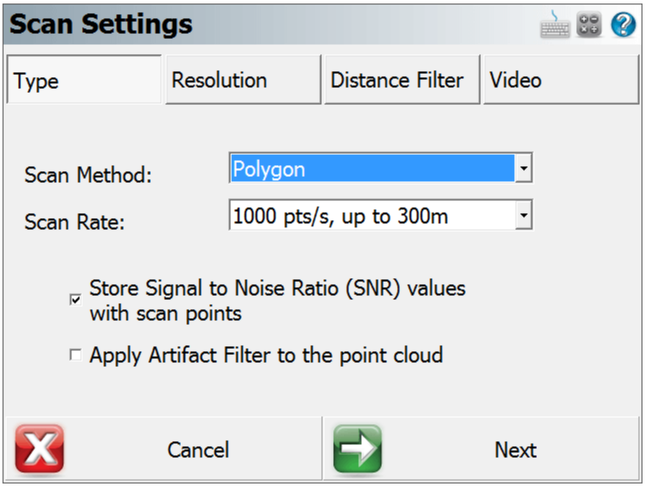
Define the scan rate you want to use. High density scans require more time to complete, while lower density scans require less time.

Store SNR

Use this to control the recording of SNR data on each point captured with the MS50/MS60.

Artifact Filter

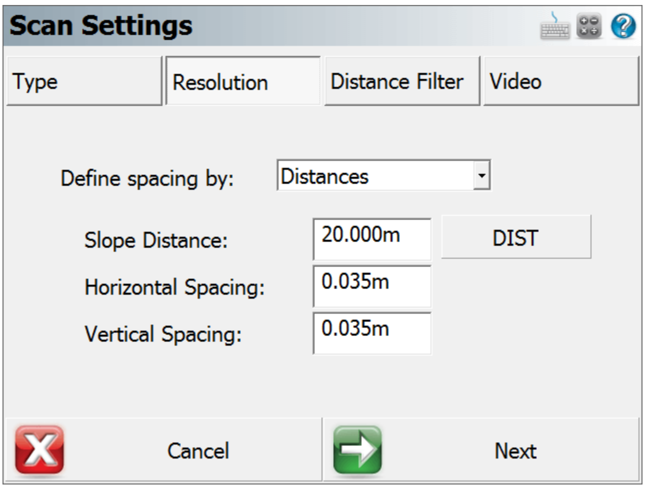
Use this to help eliminate ghost points and enhances the point cloud quality.



Scan Settings - Resolution

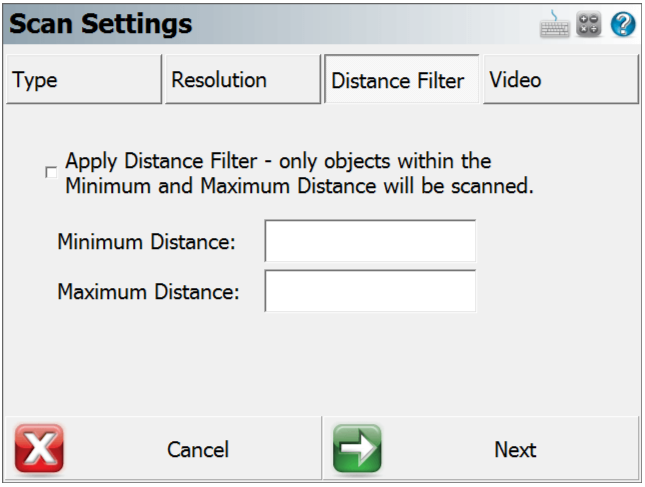
You can define the resolution of scan by distance or angle. The easiest is by distance.

Measure near the area you want to scan and press the DIST button, spacing information will be determined automatically.



Scan Settings - Distance Filter

You can define a minimum and maximum distance filter that will help confine the scan data within this range.



Scan Settings - Video

You can use the cameras on the total station to define scan area.

- This option is only applicable for Rectangular and Polygon modes.
- This option is only available on Windows desktop PC or tablet platforms.

View Streaming Video

This button Enable/Disable the video streaming feature. If video streaming is disabled, regular measurement mode will apply to define the scan area

If you are unable to turn on this button, please check the Bluetooth PAN or USB connection.

Connection

You can either use Bluetooth PAN connection or USB cable connection for streaming video views

See "Setup Video Streaming Connection" Section below for more details.

FrameRate

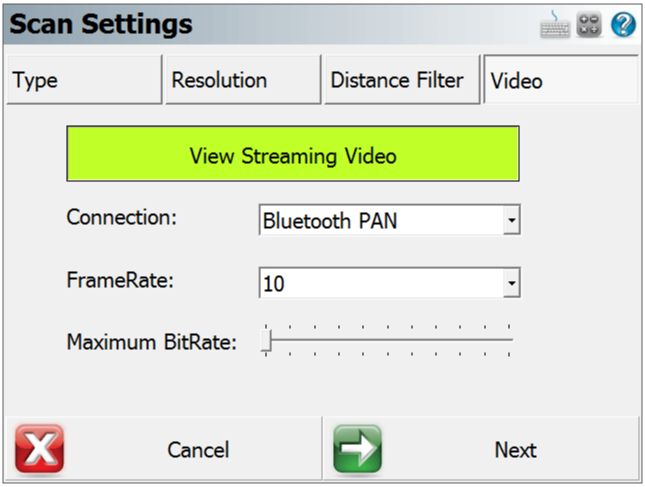
Use this to adjust frame rate of the video

Maximum BitRate

This setting controls the maximum video data transfer rate between total station and your data collector.

Lower this setting if you are experiencing high latency, slow response time, or video flickering in video extents view when using Bluetooth PAN connection.

We recommend lowest setting for Bluetooth PAN connection due to limited wireless bandwidth, and highest setting for USB Cable connection. **(These are default settings)**



Setup Video Streaming Connection

This section details set up procedures for establishing Bluetooth PAN and USB cable connection

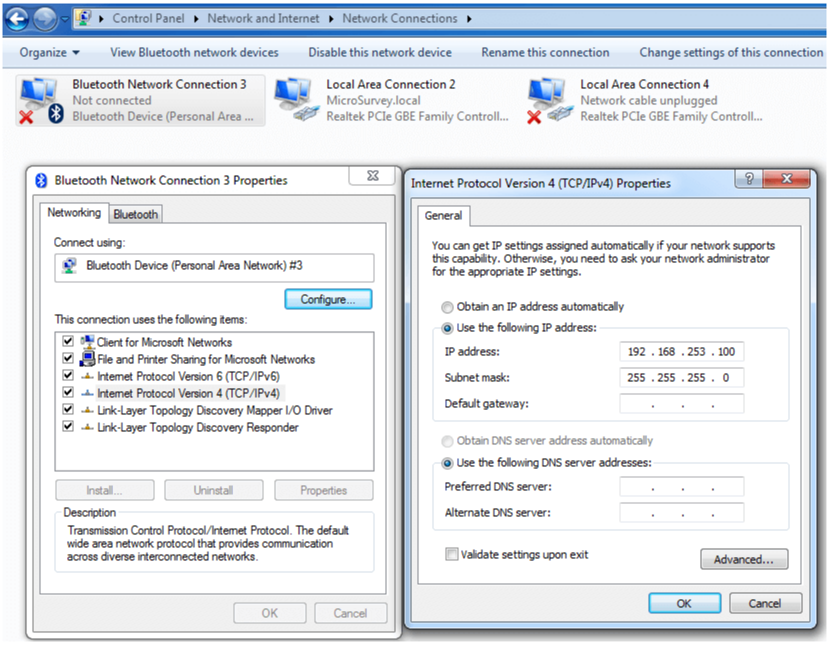
USB Cable Connection Setup

- Install Leica MS50/MS60 driver or Leica Viva/Captivate software that contains the driver on the PC/Tablet you wish to run Evidence Recorder
- Connect Leica Lemo 8-pin to USB cable to the PC/Tablet

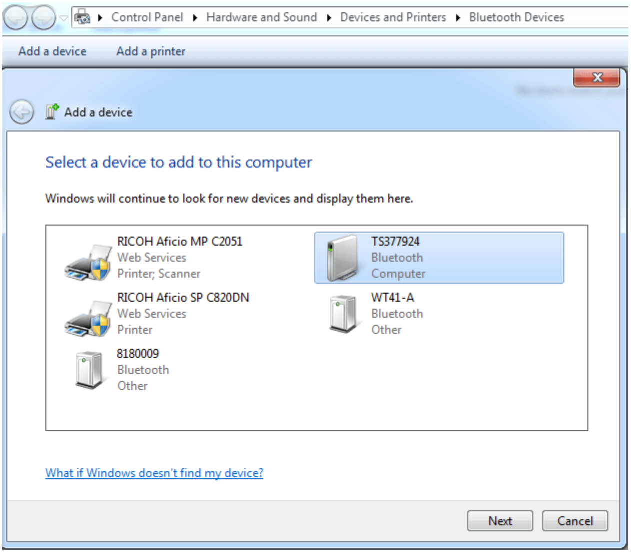
Bluetooth PAN Connection Initial Setup

NOTE: ALL setup steps below are one-time-only. This setup guide is also available as a video on MicroSurvey.com

- On a Bluetooth capable Windows PC or tablet, go to **Control Panel** -> **Network and Sharing Center** -> **Change Adapter Settings**
- Locate **Bluetooth Network Connection**, right click on the icon and select **Properties**.
- Under **Networking** tab, click on **Internet Protocol Version 4 (TCP/IPv4)**, then click on **Properties** again
- Select **Use the following IP address:**, and enter **192.168.253.100** as IP address, and **255.255.255.0** as Subnet mask
- Click **OK** twice to save the settings

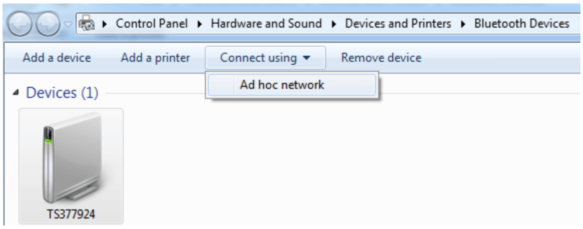


- Now go to **Control Panel** -> **View Devices and Printers** or alternatively right click **Bluetooth task bar status icon**, and select **Show Bluetooth Devices**
- From either places, click **Add a device** button to add MS50/MS60 (names as TS or TSxxxxxx) as a device. Make sure the instrument is turned on and within range.
- When asked for **pairing code** or **PIN**, make sure to enter **0000** as code on both Windows and MS50/MS60 instrument.
- The MS50/MS60 instrument is now successfully paired with your PC/Tablet. All steps above are one time only



Bluetooth PAN Connection Setup

- Once the initial setup is completed, you should be able to see your instrument under **Bluetooth devices** or **Devices and Printers** screen
- Right click the MS50/MS60 instrument, select **Connect using**, then click **Ad hoc network**
- Windows may take a few seconds to finish the connection. You are now good to go!



Bluetooth PAN Troubleshoot or Reset

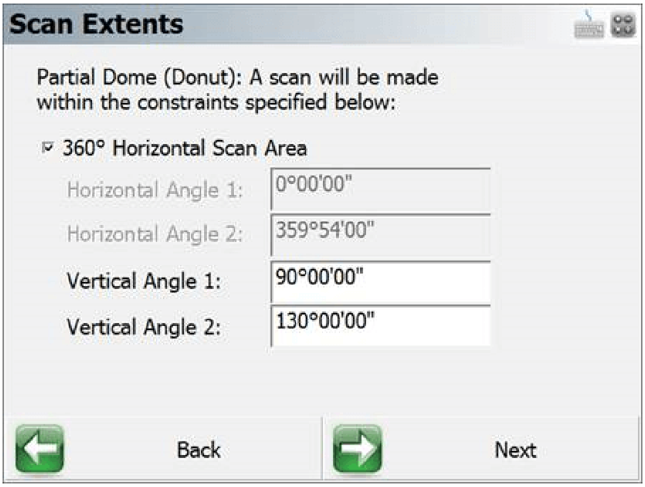
- If your Bluetooth PAN connection is unstable or video camera cannot be started, you can follow the steps below to reset the connection
- Remove MS50/MS60 instrument from Bluetooth device list on your PC/Tablet
- On MS50/MS60, hold the **Power** button, and choose **Reset**, and select **Reset Windows CE**. This will clear WinCE system settings.
- Follow the steps above to re-add MS50/MS60 instrument in the Bluetooth device **using PIN code 0000**

Scan Extent - Partial Dome

Partial Dome scan routine can help you:

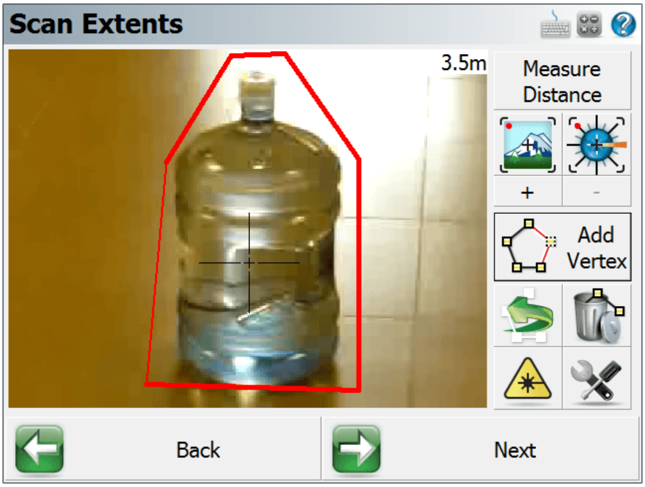
- Define a rectangular shaped scan area by entering four angular constraints
- Define a donut shaped scan area by checking on **360 Horizontal Scan Area** option.

A practical application of the donut mode would be to either scan Ceilings or Floors by limiting the 2 vertical angles.



Video Scan Extents

When Point Scanning settings are confirmed, and "View Streaming Video" option is turned on, you will be directed to the Video Scan Extents screen



A detailed video walkthrough of this feature is available at MicroSurvey.com

Scan Extents Icons

Note: Click and hold any buttons will show a tool tip of the button.

Measure Distance

Measures the distance of the object at crosshair. It is recommend to measure distance before adding polygon vertices with overview camera.

Current distance is displayed at the upper-right corner of the video screen.

If the camera is moved, a "Distance Required" text will be displayed instead of the number.

Overview Camera

This is the default camera - ideal for shorter distance.

The Overview Camera is NOT aligned with the total station scope, and will require user "Measure Distance" before adding each polygon vertex to align the crosshair and the scope/laser.

On-Axis Camera

This camera is ideal for longer distance.

The On-Axis Camera is aligned with the total station scope, you can add vertices directly without "Measure Distance"

Zoom In

This will zoom in on the camera view

Zoom Out

This will zoom out on the camera view

Add Vertex

Vertices can be defined using this button to form a scan area.

Remove Vertex (Undo)

Use this button to remove the previously defined vertex

Clear All Vertices

You can clear the all previous defined vertices

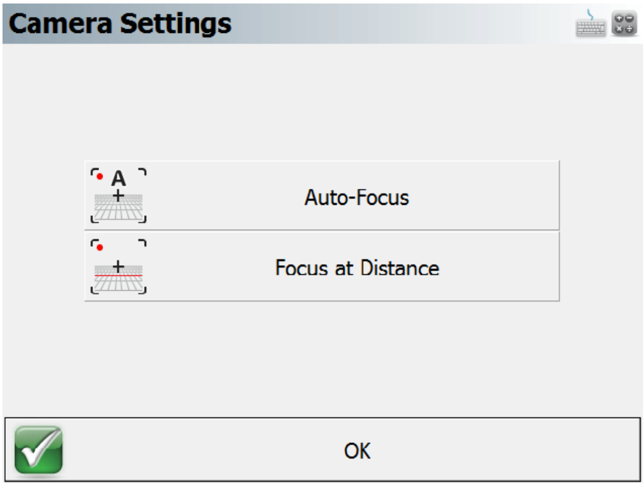
Set Laser Pointer ON/OFF

You can toggle laser pointer on the total station on or off

More Options

This button will open up Camera Settings dialog

- Auto-Focus - Turn on auto focus of the selected camera
- Focus at Distance - Focus the camera at the distance measured



Video Scan Workflow

You can choose to use either Overview Camera or On-Axis Camera to define the scan area, based on distance, video quality, or other factors.

Overview Camera

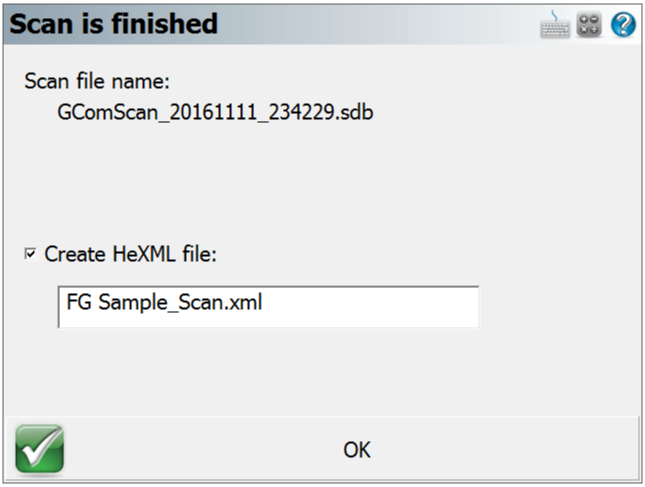
- Turn on laser pointer.
- Move the crosshair to the edge of the scanning area by directly clicking the video itself.
- You will notice the crosshair has a circle in the middle, and a "Distance Required" text on the upper-right corner of the video view.
- Click "Measure Distance" button to determine the slope distance, and the software will align the crosshair with the laser/scope.
- Click "Add Vertex" button to add the first polygon vertex.
- Repeat previous steps until the scan area is defined.
- Note: if the scanning object is efficiently far away from the total station, then the misalignment between crosshair and laser/scope will be small. You can directly add vertex without the measuring distance, and the scanning area will be similar to what you would see on the video screen.

On-Axis Camera

- Move the crosshair to the edge of the scanning area by directly clicking the video itself.
- Zoom to the appropriate level
- Click "Add Vertex" button to add the first polygon vertex.
- Repeat previous steps until the scan area is defined.

Scan Complete

When Point Scanning is completed, a few options will be available to you.



Scan Complete Options

Scan File Name:

The Scan file is normally stored in the SD Card inserted into the Total Station. The scan file name will help you to locate the correct file, if you wish you manually transfer the file.

Create HeXML File:

You can export the Scene into HeXML format directly. If this option is skipped, you can also go to "Import/Export" menu, and choose "Export LandXML" option

If there are multiple scan files in the same Scene, and the same xml file name is used. The xml file will be overwritten to include all scan files currently in the Scene folder

Transfer Scan File to Local Scene Folder:

You must manually copy the scan files into your Scene folder. (Requires "Scans" sub folder) Automatic transfer over Bluetooth is no longer possible due to transfer rate and the size of scan files.

For Example:

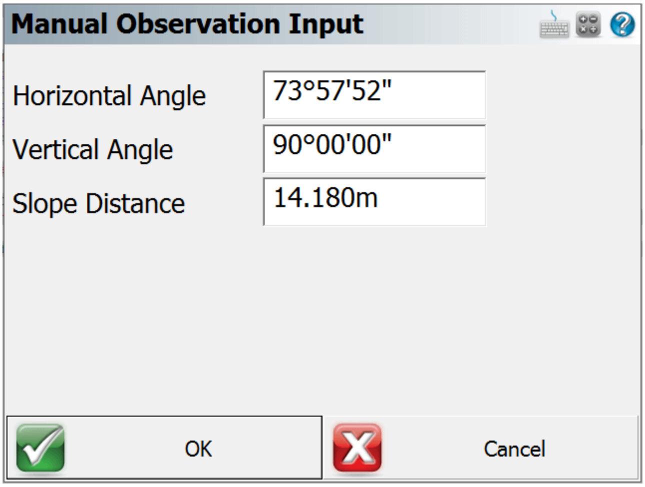
...\Documents\Leica Geosystems\EvidenceRecorder\Scenes\[SceneName]\Scans*.sdb

Manual

Manual Entry

Main Menu or Instrument Toolbar | Mapping Methods | Manual | Manual Entry

When you set the Mapping Method to manual entry on the instrument toolbar you will be required to manually input your measurements. When you press the measure button you will see the following screen:



Press **OK** to Store the point.

A normal sideshot record will be written to the raw file just as if you shot it with a total station.

Tip:

You can also use the Manual Entry mode for repeating your last shot. If you have previously taken a measurement, then the angle and distance values on this screen will default to those of your previous shot.

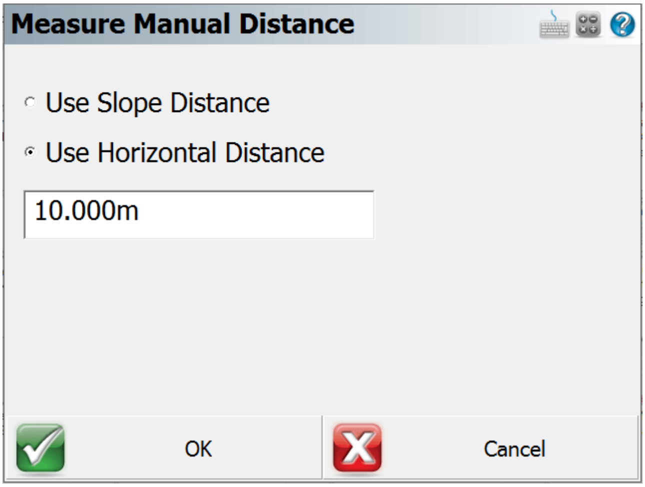
Manual Distance

Main Menu or Instrument Toolbar | Mapping Methods | Manual | Manual Distance

Use this mode to shoot an observation where only the horizontal and zenith angles will be measured with the instrument. You will be then prompted to enter the distance.

When you set the Mapping Method to manual distance and press the measure button the horizontal and vertical angles will be read from your total station. Since this is only measuring angles, you do not need to have a prism to shoot to.

Following this you will see a screen allowing you to enter a horizontal distance.



Press **OK** to save the point. You will now see the measurement info screen.

A regular sideshot record will be created in the raw file.

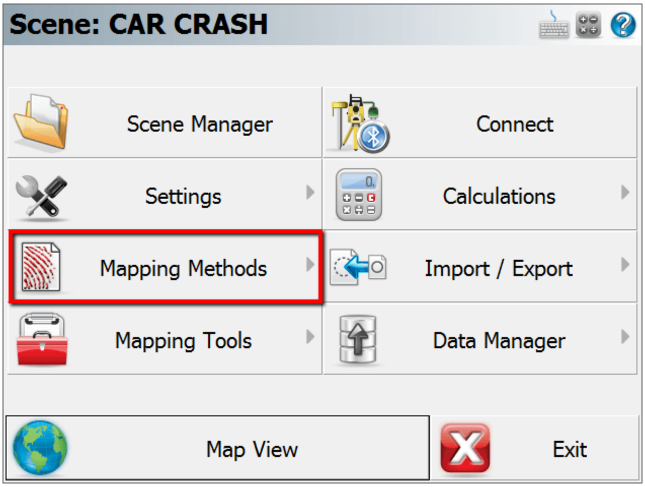
Mapping Methods (GNSS Reference)

Main Menu or Instrument Toolbar | Mapping Methods

When you connect to a reference receiver you need to program a position into the receiver so accurate positions can be transmitted to the rover.

You can access the different Mapping Methods to program your receiver with a position by selecting the Mapping Methods button in the main menu, or the Mapping Methods button on the GNSS instrument toolbar.

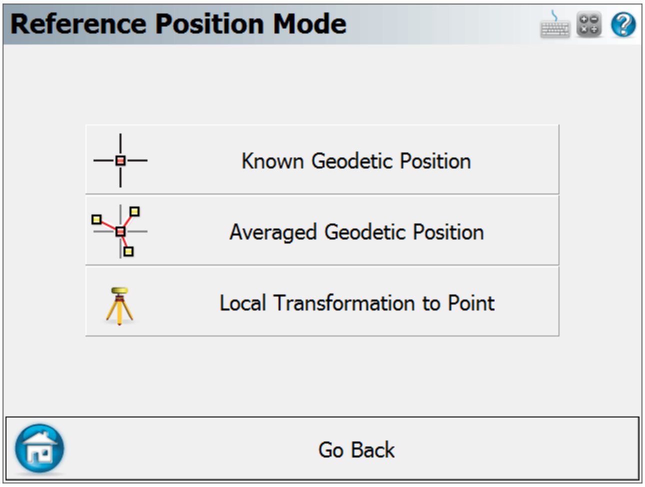
Main Menu - Mapping Methods



Instrument Toolbar

Selecting the Mapping Methods button will display these options:

1. Known Geodetic Position
2. Averaged Geodetic Position
3. Local Transformation to Point



Overview

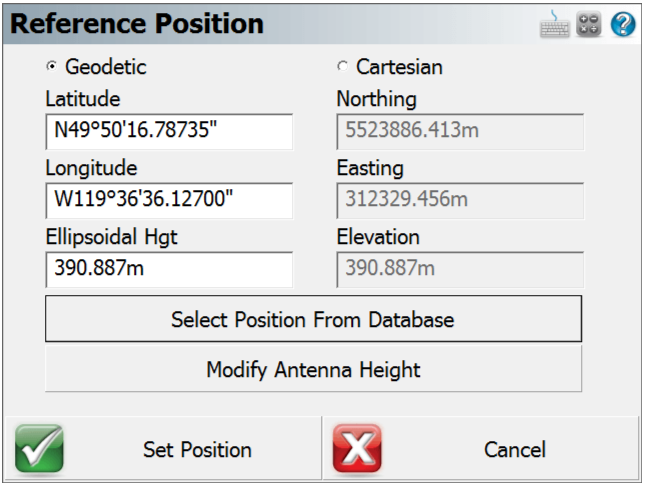
There are three different modes available for programming a position into your reference receiver.

When you're ready to program your base receiver with a position you need to select the reference position mode then to start the process press the **Measure** button on the GNSS toolbar. Please review the following sections for a detailed explanation of how each mode is used.

Known Geodetic Position

Main Menu or GNSS Toolbar | Mapping Methods | Known Geodetic Position

Use this when you know the geodetic position of the point the base is setup on. You have two options, you can program it with a known Geodetic or known Cartesian Coordinate.



Geodetic Coordinates

Enter the know Latitude, Longitude and Ellipsoidal Height for your base setup. The coordinates you enter here will be programmed into the receiver.

Cartesian Coordinates

Cartesian coordinates can be SPCS, UTM coordinates or any other grid system as long as it matches the horizontal and vertical system you've defined in your GNSS profile. You cannot enter local coordinates as Cartesian coordinates! Doing so will cause a warning message to be displayed indicating that the coordinates you entered do not fall inside the GNSS grid files you have loaded on your data collector.

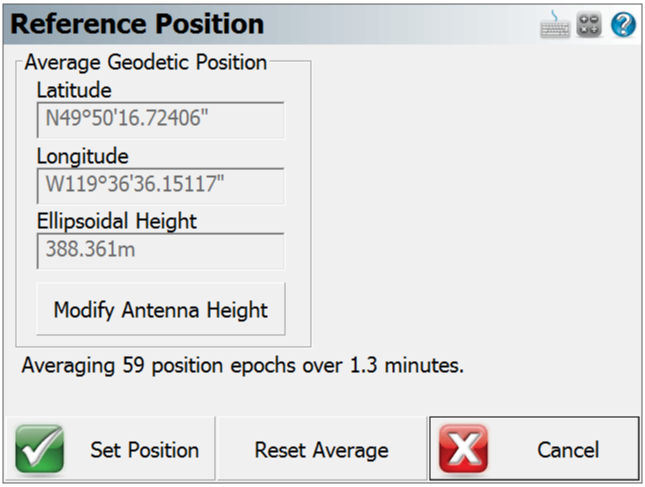
Select Position from Database

This allows you to choose a point a number of different ways. The point you select must be a grid coordinate such as a SPCS or UTM coordinate.

Averaged Geodetic Position

Main Menu or GNSS Toolbar | Mapping Methods | Averaged Geodetic Position

Use this to measure and average an Autonomous Geodetic position.



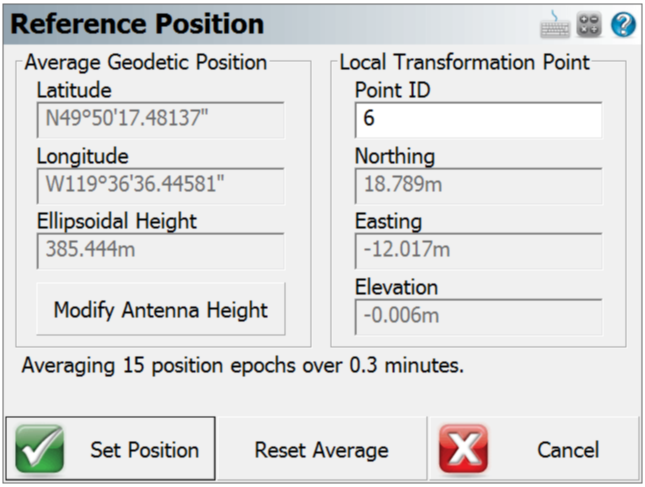
It is up to you to determine how many observations or the duration of time you want to wait before accepting the averaged position. At any time you can restart the process by pressing the **Reset Average** button.

If you press **Set Position**, your receiver will be programmed with the new position and you will have the option of storing a point's position in the database.

Local Transformation to Point

Main Menu or GNSS Toolbar | Mapping Methods | Local Transformation to Point

Use this to compute a one point transformation so your GNSS derived measurements can be referenced into a local system.

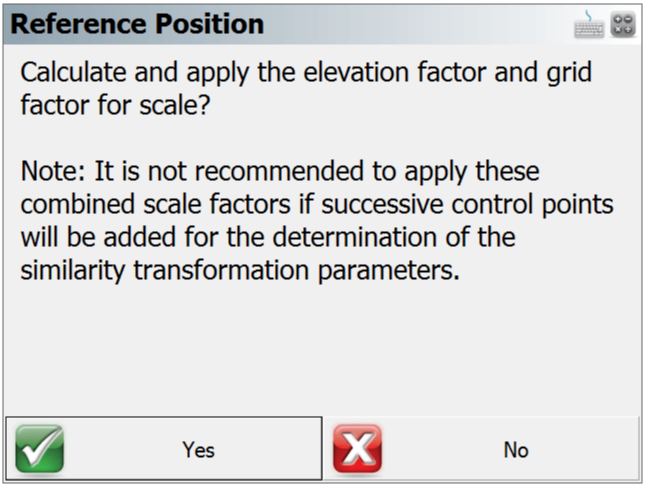


When this option is used, Evidence Recorder starts receiving data and computes an averaged Autonomous position for the base receiver. The current position, how many epochs it has received and the total elapsed time is displayed on the screen.

It is up to you to determine how many observations or the duration of time you want to wait before accepting the averaged position. At any time you can restart the process by pressing the **Reset Average** button.

You then have to define a local coordinate that you want to localize to. It is assumed that the point exists in your Scene. If it doesn't, simply double tap the Point ID field which will open the point toolbar. You can use the new option to create a point or if it exists select it from the map or from the list.

When you press Set Position, Evidence Recorder will save the averaged location into the point database. It will then compute a one point transformation which is simply a horizontal and vertical shift from the grid coordinate system into your local system, as well as a combined scale factor. You will be presented with the option to apply the combined scale factor at the point



Pick **Yes** if:

- You are calculating a one point transformation and your Scene coordinates are *ground-level* coordinates. Please Note: No rotation will be applied and the Scene North direction will be Grid North as per your Scene Coordinate System Settings.

Pick **No** if:

- You are calculating a transformation from multiple points and will be adding more points to the calculation. In this case the scale parameters will be determined from the best fit to all the points used for the transformation.
- You are calculating a one point tranformation and your Scene coordinates are grid coordinates as per your Scene Coordinate System Settings.

All future GNSS measurements in the current Scene will have your new transformation parameters applied automatically.

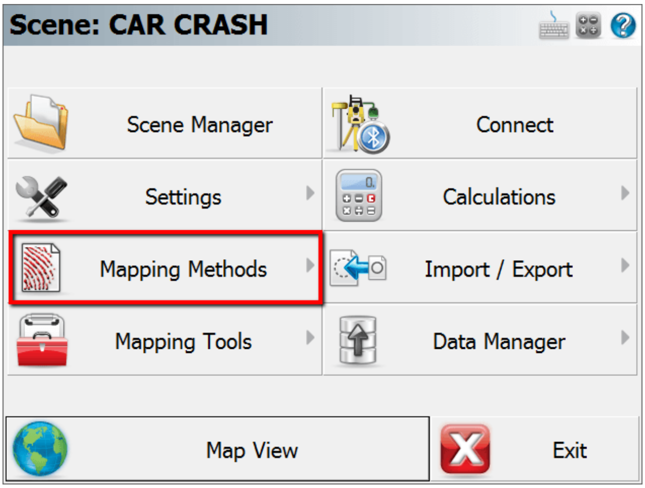
Mapping Methods (GNSS Rover)

Main Menu or Instrument Toolbar | Mapping Methods

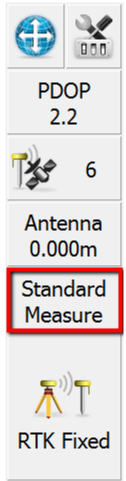
When you connect to a rover receiver you will have a choice of Mapping Methods available to you.

You can access the different Mapping Methods by selecting the Mapping Methods button in the main menu, or the Mapping Methods button on the GNSS instrument toolbar.

Main Menu - Mapping Methods

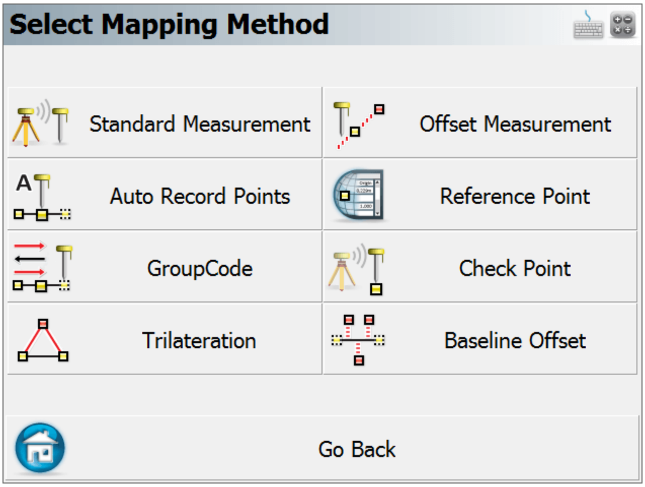


Instrument Toolbar



Selecting the Mapping Methods button will display various options:

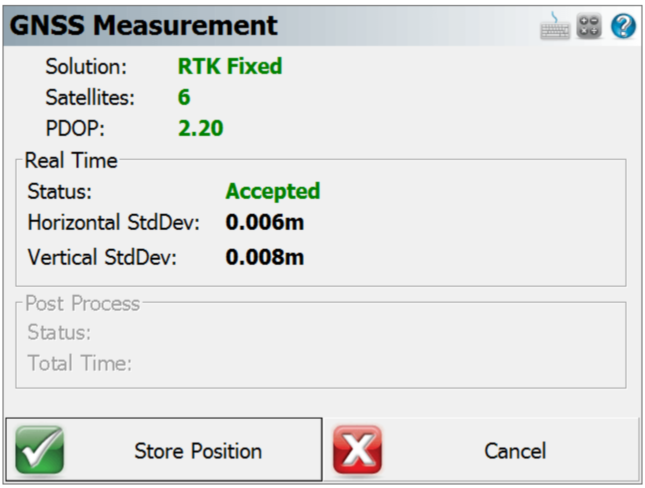
1. Standard Measurement
2. Offset Measurement
3. Tilt Offset Measurement
4. Auto Record Points
5. Local Transformation Point or Reference Point
6. GroupCode
7. Check Point
8. Trilateration
9. Baseline Offset



Standard Measurement

Main Menu or GNSS Toolbar | Mapping Methods | Standard Measurement

When you have connected to your rover and you press the measure button on the GNSS Toolbar you will see the GNSS Measurement Screen



The measurement process works like this:

Once the satellites have been filtered out based on your tolerance settings, Evidence Recorder will only begin collecting measurement data if all your tolerances are met. During the measurement process you might see that certain tolerances are not being satisfied, this is normal. Evidence Recorder will continue monitoring the measurement data and will accept measurements that pass the mask criteria.

Once the tolerances have been met, the position status will change to an **Accepted** position. Prior to accepting the position, the user can look at the RMS values for the computed position and determine if they wish to accept or reject the measurement. Pressing Cancel will exit the measure function without storing any data. Pressing Store Position will accept the position and store it in the database. You can change your true or measured Antenna Height on the Store Point screen.

By default, if you have some transformation parameters defined, they will be applied to the measurement prior to storing it.

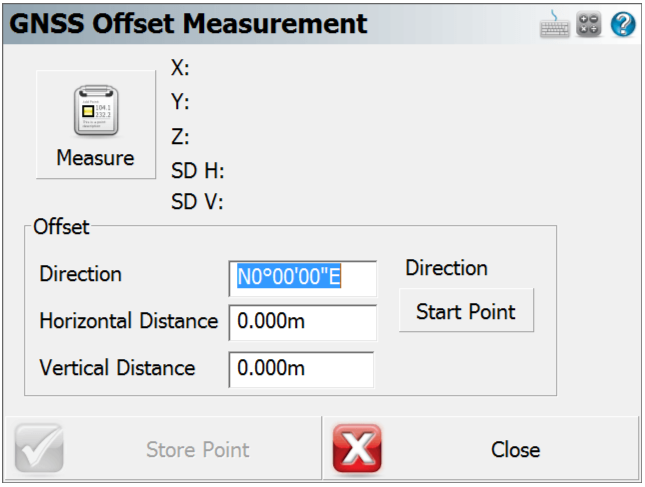
Offset Measurement

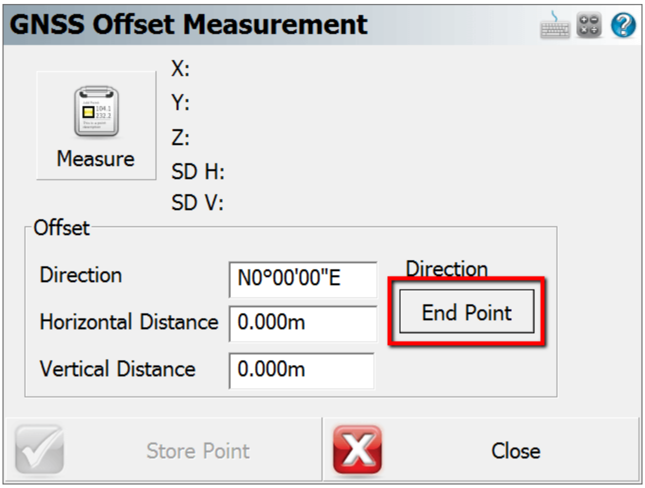
Main Menu or GNSS Toolbar | Mapping Methods | Offset Measurement

Evidence Recorder features a GNSS offset functionality to calculate an offset from the current position based on a direction and distance offsets. The direction may be determined from two observations. This feature is particularly handy when a direct observation is inaccessible or there is too much canopy coverage to get an RTK fixed position.

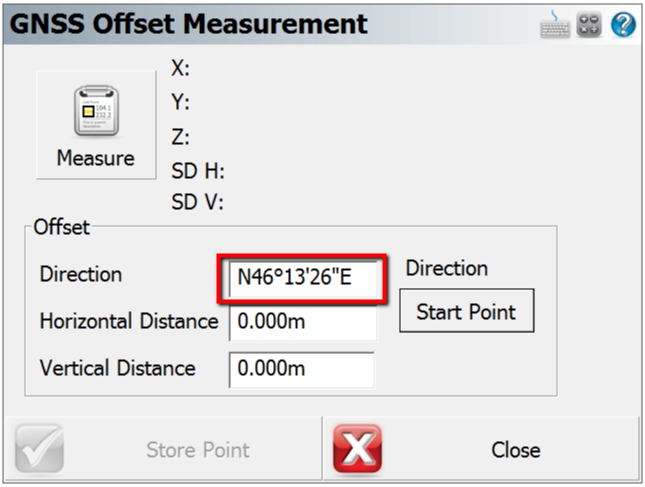
Function

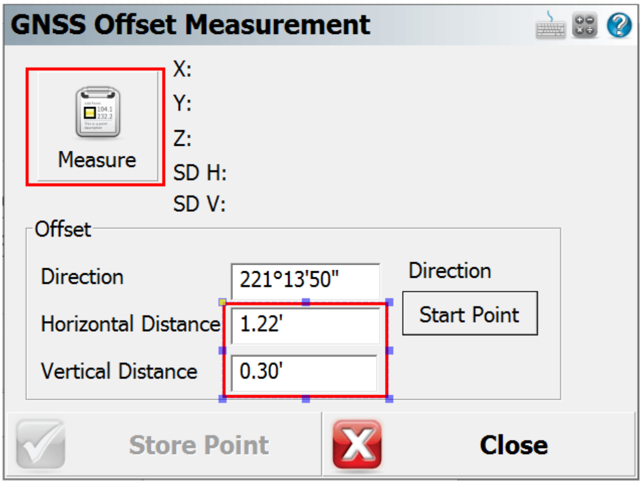
When this mode is enabled Evidence Recorder the user will press the observation button to start the routine. After this, the GNSS Offset measurement screen as shown below will appear and is ready for the user to press the "Start Point" button to take the first shot. Once that is done the "Start Point" button will change to "End Point". Press this when you are on the second point and ready to take the second observation.

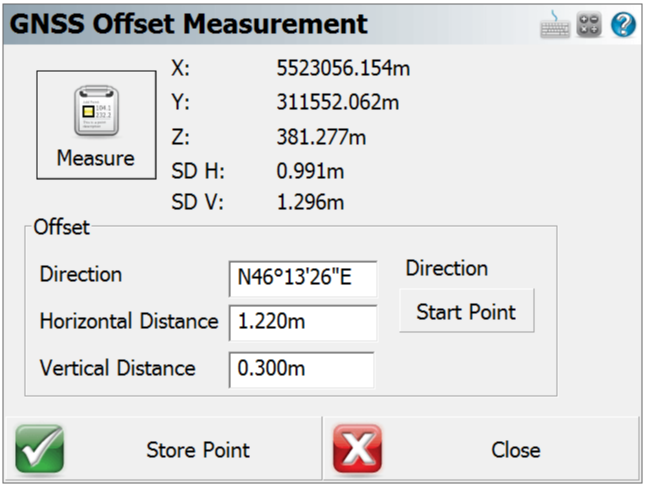




After both Start and End points are observed the Direction field will now be filled with the computed bearing between the two observed points. The next step is to manually enter in the Horizontal and Vertical distances to the new offset point. Fill these fields in and press the "Measure" button to take one more observation that will apply the computed direction, horizontal and vertical distances to the shot and will now populate the Northing, Easting and Elevation fields of the new calculated point in the GNSS Measurement area. The user can now press the "Store Point" button to store the calculated point into the database.


GNSS Offset Measurement
Measure
X:
Y:
Z:
SD H:
SD V:
Offset
Direction
N46°13'26"E
Direction
Start Point
Horizontal Distance
0.000m
Vertical Distance
0.000m
Store Point
Close


GNSS Offset Measurement
Measure
X:
Y:
Z:
SD H:
SD V:
Offset
Direction
221°13'50"
Direction
Start Point
Horizontal Distance
1.22'
Vertical Distance
0.30'
Store Point
Close



Additional Notes

The user has the option to manually enter in the direction to the offset point if it is already known. A vertical distance is not needed to calculate an offset point, only a Direction and a Horizontal distance are required to complete the routine.

Tilt Offset Measurement

Main Menu or GNSS Toolbar | Mapping Methods | Tilt Offset Measurement

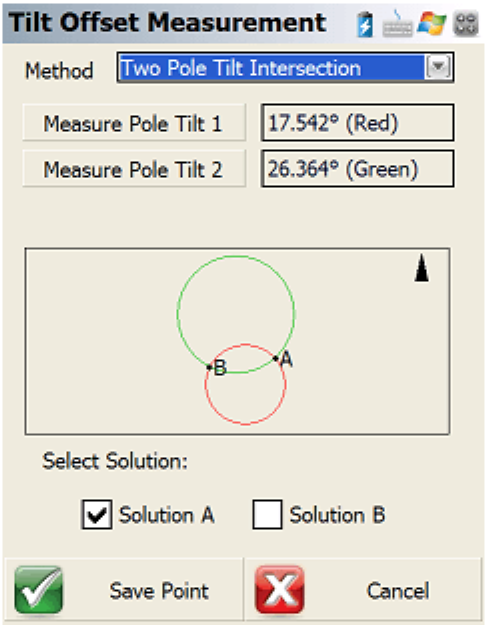
GNSS receivers usually comes with 2 measurement sensors (Tilt Sensor & Magnetic Sensor) to assist with tilted measurements (See Electronic Bubble section for more information)

The Tilt Sensor is more reliable and provides better accuracy compared to the Magnetic Sensor. This routine takes advantage of this, and only uses Tilt Sensor to Trilaterate a position what is difficult to survey without tilted pole measurement.

Two methods are available:

- Two Pole Tilt Intersection
- Three Pole Tilt Intersection

Two Pole Tilt Intersection



Make sure the button of the pole is at the same point

Measure Pole Tilt 1

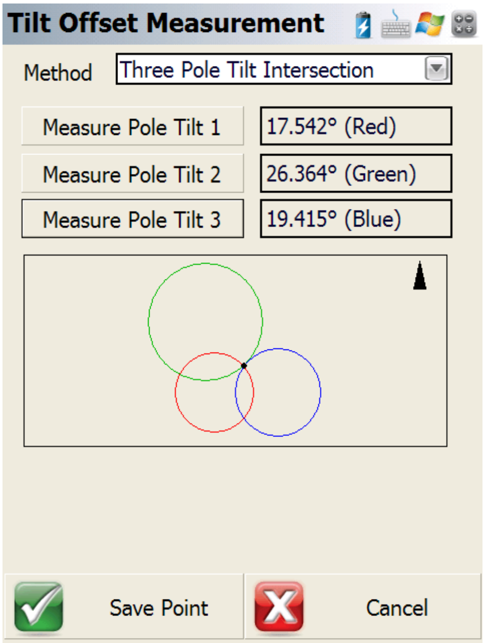
Tilt the pole in one direction and Click this button to store the first tilt angle (Red Circle)

Measure Pole Tilt 2

Tilt the pole in the other direction and Click this button to store the first tilt angle (Green Circle)

There will be two intersecting points, choose Solution A or Solution B for the desired intersecting point, and click Save Point to Store it

Three Pole Tilt Intersection



Make sure the button of the pole is at the same point

Measure Pole Tilt 1

Tilt the pole in one direction and Click this button to store the first tilt angle (Red Circle)

Measure Pole Tilt 2

Tilt the pole in another direction and Click this button to store the first tilt angle (Green Circle)

Measure Pole Tilt 3

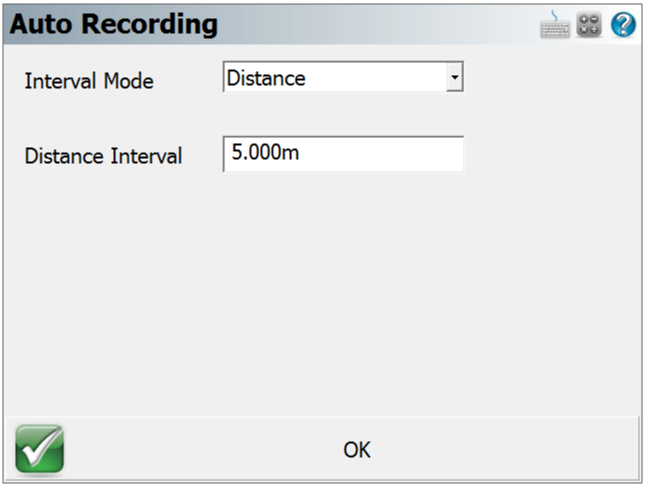
Tilt the pole in the last direction and Click this button to store the first tilt angle (BlueCircle)

There will be only one intersecting point, click Save Point to Store it

Auto Record Points

Main Menu or GNSS Toolbar | Mapping Method | Auto Record Points

The Auto Recording settings are used when collecting GNSS data in a "Kinematic" mode. The receiver can automatically log a point every X distance or Y seconds. The user simply selects what option they prefer to use for logging Kinematic data and start the survey. Keep in mind while collecting data at higher velocities that Evidence Recorder receives position updates from the GNSS at a maximum rate of once per second.



Once configured, Auto-Recording is activated on the Rover Mapping Method screen after pressing the Measure button:

Once activated, Auto-Recording is deactivated by pressing the Measure button again.

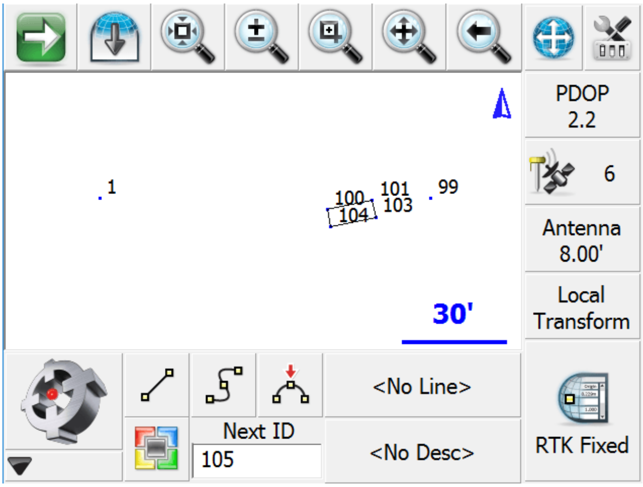
Local Transformation Point

Main Menu or GNSS Toolbar | Mapping Methods | Local Transformation Point

NOTE: This mapping method is only available when the GNSS Option is enabled to 'Allow Advanced Settngs'.

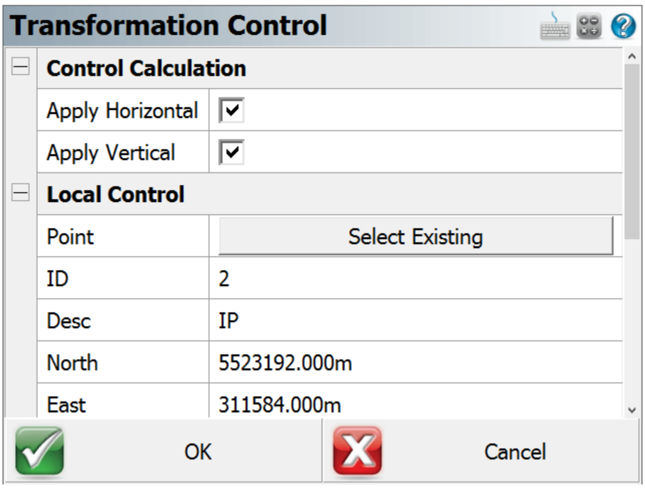
This Mapping Method is designed to quickly add control points to a **GNSS Local Transformation**, using the Similarity method by matching up control points. The procedure is as follows:

1. Set the **Local Transformation Point** Mapping Method:

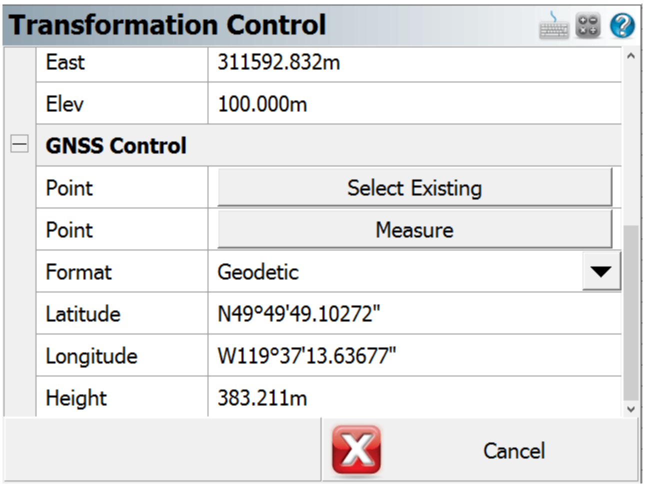


2. Measure a control point that you wish to use for your localization. You will have the choice to store the observation as a point in the database:

3. Specify whether the control point will be used for horizontal and/or vertical control, then pick **Select Existing** to set the local control point:

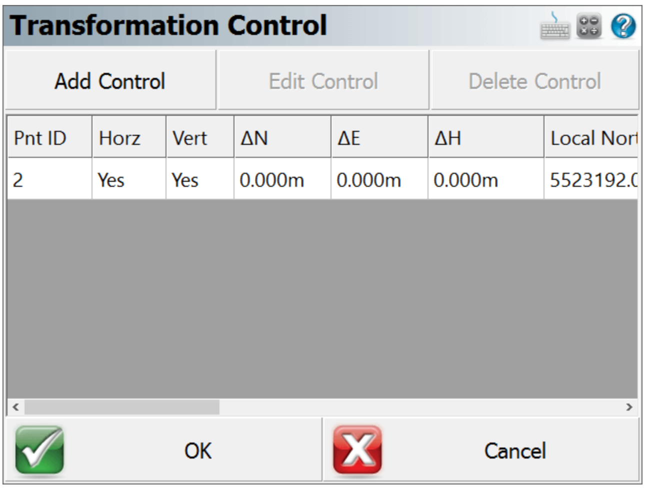


4. Optionally confirm the measured values for the GNSS Control Point:



5. Pick **OK** to accept the control pair.

6. Pick **OK** on the Transformation Control screen:



7. Repeat Steps 2-6 for any additional control points.

8. Review and apply the transformation, please see the GNSS Local Transformation topic for more details.

Reference Point

Main Menu or GNS Toolbar | Mapping Methods | Reference Point

NOTE: This mapping method is only available when the **Allow Advanced Settings** GNSS Option is disabled.

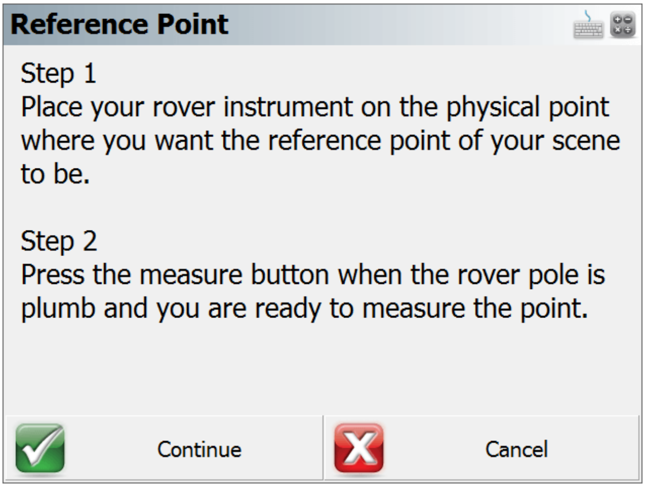
The **Reference Point** Mappiong Method is designed to be a easy to follow, fast one point GNSS localization procedure. Instructions are provided for the user during the procedure.

Step 1 - Place Rover on a Point

Pick a permanent point on site that you will be able to accurately locate again in the future if necessary, and place the GNSS pole on the point.

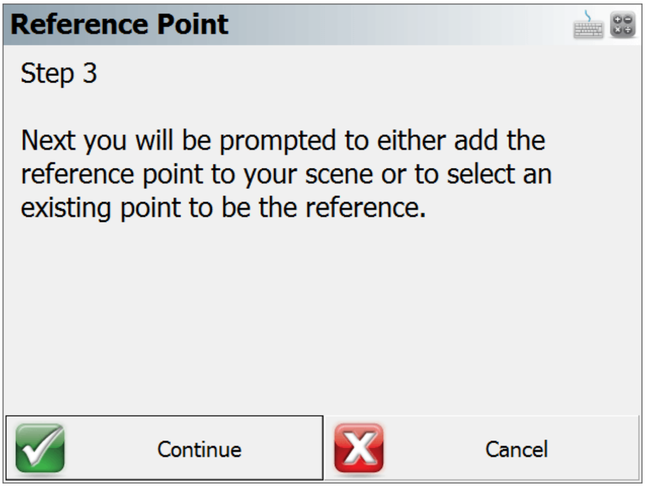
Step 2 - Plumb Pole and Measure

Make sure the GNSS Pole is plumb and then press the Measure button to measure the location.

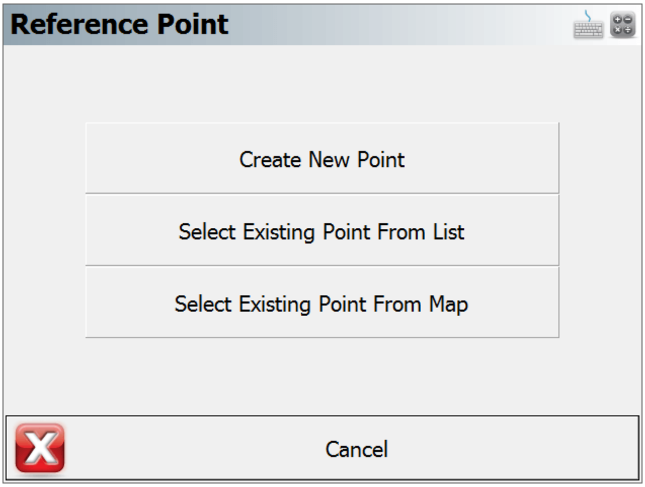


Step 3 - Create or Pick a Coordinate

When the location has been measured, a screen informs the user that they will have the option to pick an exisiting point already stored within the Scene database, or create a new point coordinate in the database.

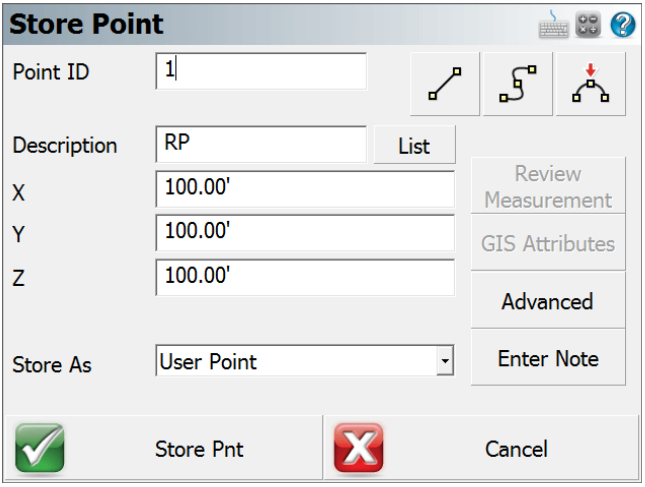


On the next screen pick the method to define the point to be used as your reference point.



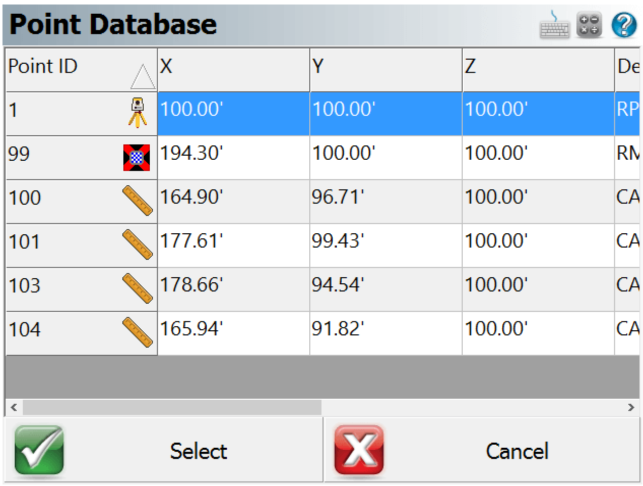
Create New Point

This option allows you to create a new point in the database and store it.



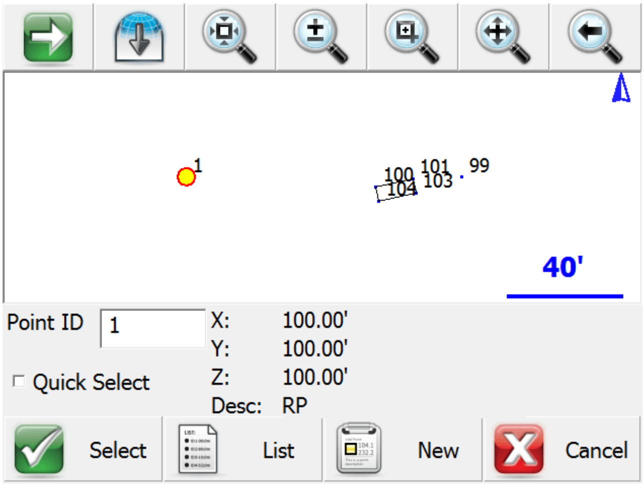
Select Existing Point From List

This option allows you to pick an existing point from the Point List.



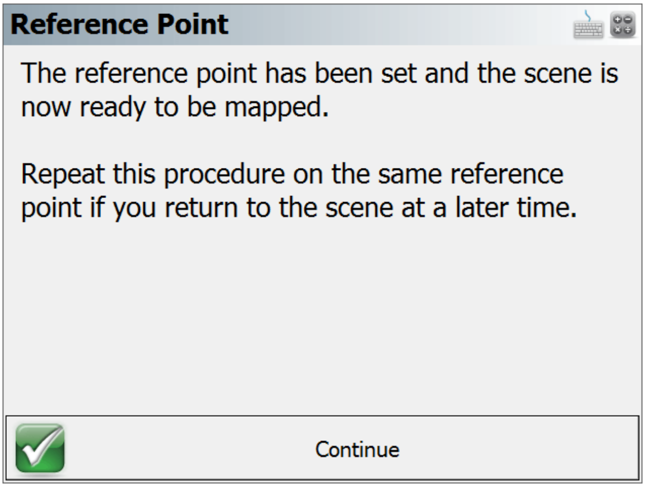
Select Existing Point From Map

This option allows you to pick an existing point from the map view.



Complete

A final screen confirms the procedure is complete and advises the user to use the same procedure with the same point in the future if they will be returning to the site.



Evidence Recorder has calculated the localization parameters:

- Scale Factor - Mapped will be stored at ground-level coordinates so the Inverse calculation will match the distance you can physically measure with a tape measure.
- Rotation - The orientation of the Scene coordinate system is rotated so that the Scene North direction is aligned with Geodetic North at the Reference Point.
- Shift - The measured point will inherit the coordinates of the point that was created or selected.

GroupCode

Main Menu or GNSS Toolbar | Mapping Methods | GroupCode

Overview

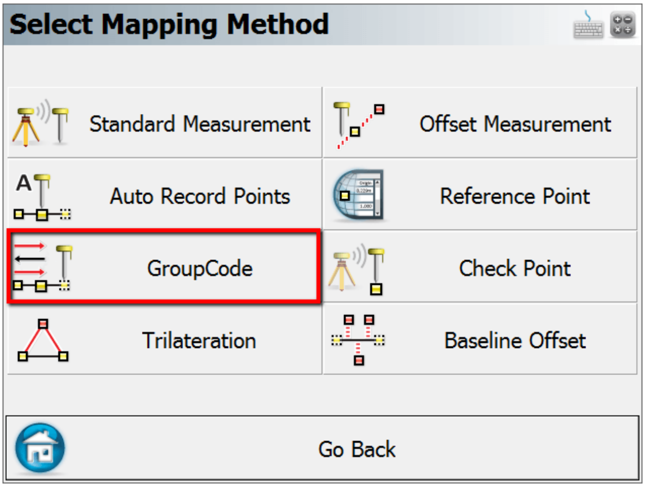
GroupCode is a Mapping Method that allows the user to set up a Group of Codes that have a common theme or purpose, and is ideal to increase productivity for repetitive feature collection. GroupCode allows:

- Creating multiple groups of codes
- Setting a pattern to automate code selection for feature collection in a repetitive sequence (such as road cross sections)
- Linework toggles for each code in the group allowing linework to be automatically completed for each feature in the group as separate figures without any effort from the operator
- Switching between a carousel display combined with the Map screen, or a full-screen button panel with the codes in the group
- Fast switching between groups with settings retained for each group
- Fast switching between GroupCode and other Mapping Methods and being able to resume collection within GroupCode with no additional steps

Operation Notes

For GNSS operation there is only one GroupCode Mapping Method. The GNSS Tolerance Settings will be honoured to determine if the observation is automatically stored:

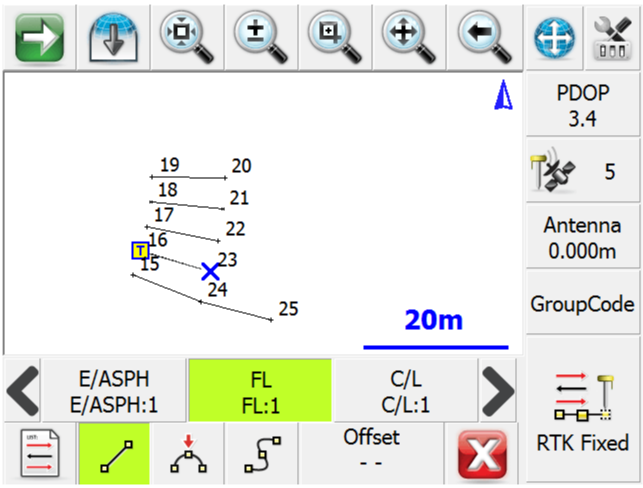
- Auto Skip Meas Stat – This option in the Tolerance Setting determines if the measurement statistics are displayed during the measurement process
- Auto Store Meas – This option in the Tolerance Setting determines if the Store Point dialog will be displayed prior to storing an observation



See the GroupCode Editor topic for information about setting up a group and changing its behaviours.

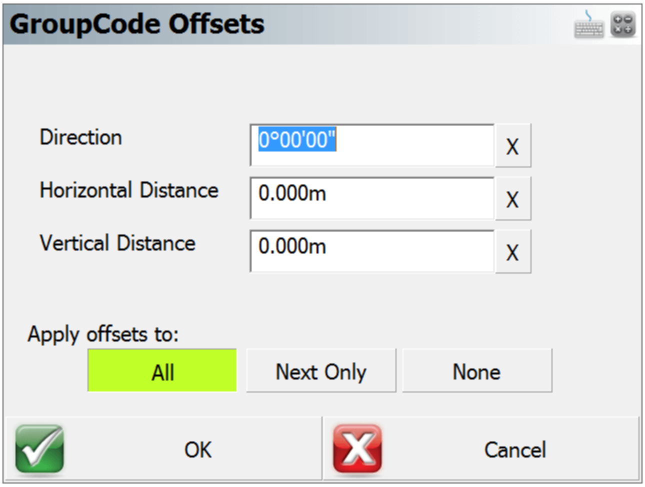
Workflow

The **GroupCode** feature is designed to allow fast measuring, and as such the automation of the code selection and multiple linework figures can reduce the task to a simple measurement button press. When no pattern is set, the user will manually need to select the next code to use, and line toggles will be necessary for drawing arcs.



Entering Offsets

It is possible to pre-enter distance offsets that will be applied to the next measurement. The Offset button will display the offset directions that will be applied if the offsets are set. Direction, Horizontal Distance, and Vertical Distance.



The offset entry screen has toggles that can be used to set the values:

- Field Value Resets, X next to field
- Apply offsets to All Measurements, Next Measurement Only, or None

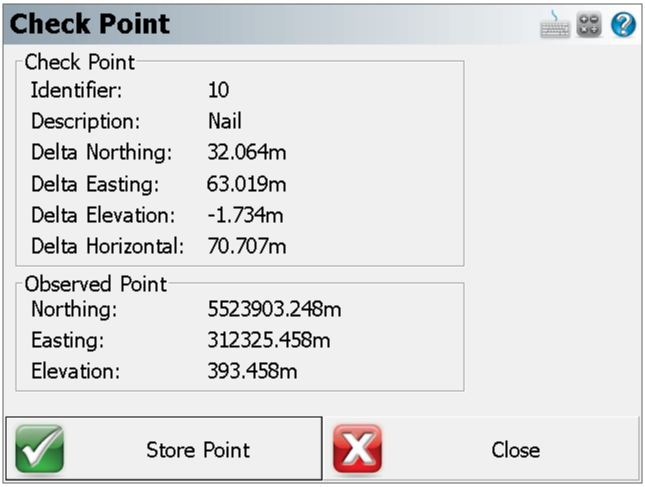
Check Point

Main Menu or GNSS Toolbar | Mapping Methods | Check Point

Use this to measure a check shot to an existing point. When you start the command you will see the point chooser appear where you can create a new point or pick an existing one from a list or from the screen. After you choose your point you will be ready to measure. You will note the Mapping Method will be set to **Check Pnt** and if you need to cancel the operation you can do it by pressing the Mapping Method button and choose to cancel it.

Check Point Summary

When you're ready to record the shot press the **Measure** button on the instrument toolbar. You will be presented with a screen that compares your measured values to the ones that were computed for the check shot point.



The deltas that are displayed are computed by subtracting the shot coordinates from the known coordinates. In other works if you add the deltas to the shot point coordinates you will end up at the known point.

Store Point

Pressing this will exit the function and write several notes to the raw file summarizing your check shot, and allow you to store the shot using the Store/Edit Point screen.

```
--Check Point
-- Check Point ID: 110
-- Check Point dNorthing: -4.59'
-- Check Point dEasting: -1.82'
-- Check Point dElevation: -4.96'
-- Check Point dHorizontal: 4.94'
-- Observed Values: HA 45°00'00.0" VA 90°00'00.0" SD 23.00' HR 5.00'
-- Observed Point Northing: 5016.26'
-- Observed Point Easting: 5016.26'
-- Observed Point Elevation: 95.00'
```

Close

This will exit the check shot function and not write anything to the raw file or storing a new point.

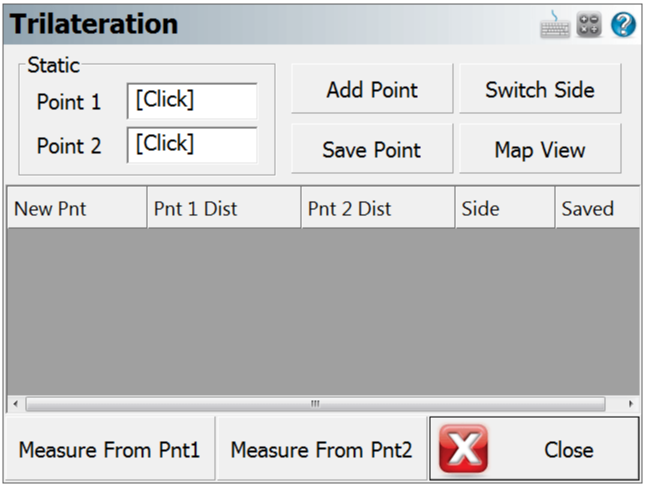
Trilateration

Main Menu or GNSS Toolbar | Mapping Methods | Trilateration

This routine allows you to trilaterate the position of new points by observing their distances from two known positions. The two known points will make up a baseline, from which a distance-distance intersection will be calculated to determine the position of each new point.

The primary use of this routine is for GNSS users so they can locate inaccessible points. They can locate two points with GNSS, and then use the Trilateration routine to locate the inaccessible points.

This routine can accept distances measured with the Leica Disto.

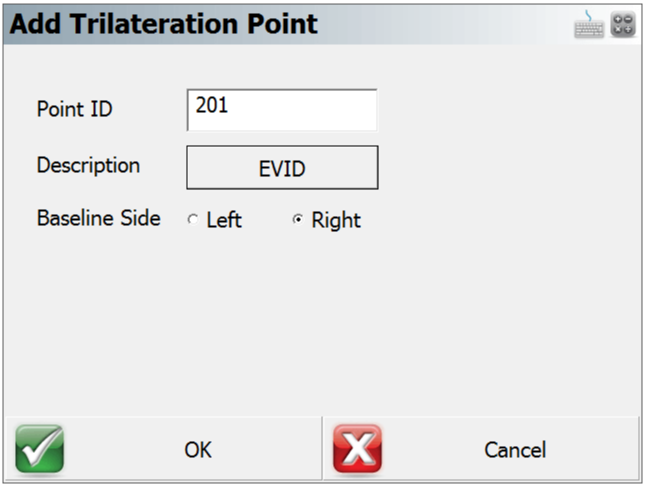


Static Points (Baseline)

Select your two baseline points, from which you will be observing the distances to the new points.

Add Point

Use this to add a new unknown point to solve for. When you press this, you will be prompted for the new point number and description, and whether it is on the left or right side of the baseline.



Save Point

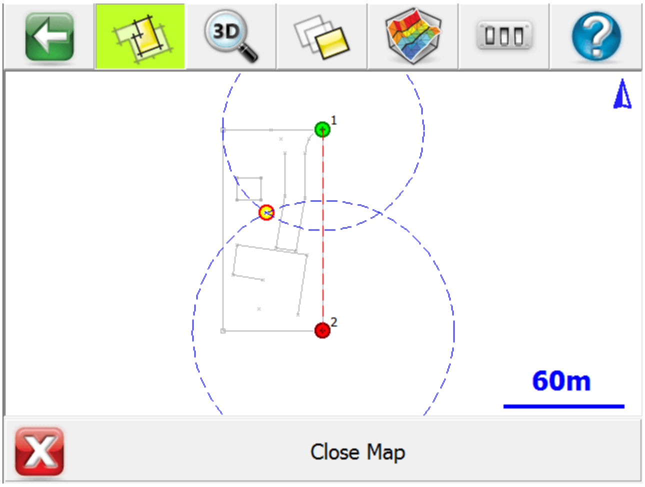
This saves the selected New Point into your project.

Switch Side

This toggles the selected New Point to the Left or Right side of the baseline.

Map View

This takes you to a map view showing your baseline, the distance measured from each point, and the calculated position of the new point.



If desired, you can press the World View button on the Display toolbar to hide unnecessary data.

Measure from Point 1

Press this to record the distance from Point 1 of your baseline to the selected New Point.

Measure from Point 2

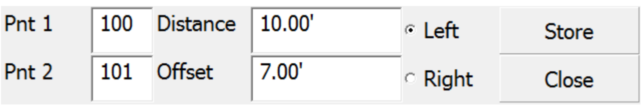
Press this to record the distance from Point 2 of your baseline to the selected New Point.

Baseline Offset

Main Menu or GNSS Toolbar | Mapping Methods | Baseline Offset

Overview

Use this function to define a baseline using two existing points, and calculate new points by using a distance and offset on the baseline.



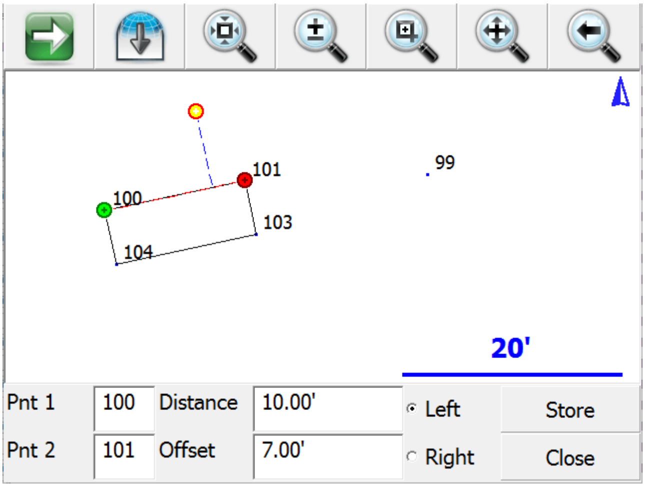
Define Baseline

You can manually type in the point numbers that define the baseline or pick the points from the map. The left/right side will be based on looking down the baseline from point 1 to point 2.

Entering a Distance and Offset

Once you've defined a baseline, you can manually enter a distance and offset and Evidence Recorder will compute a point for you. Simply type in the distance and offset values, and specify whether the offset is to the left or the right of the baseline.

You can also double tap within either the Distance or Offset fields to open up the calculator or the inverse command, or to measure the distance with a Leica Disto.

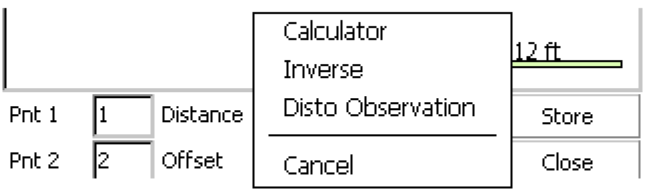


In this example, the baseline is from point 100 to point 101. You will see that an orange dot is displayed in the drawing at the location defined by the point 10m down the baseline and offset 7m to the left.

You can press the **Store** button to save the point using the Store / Edit Points command.

Disto Distances

If you have a Leica Disto, you can send distances back to the distance edit fields. Simply double tap the distance field.



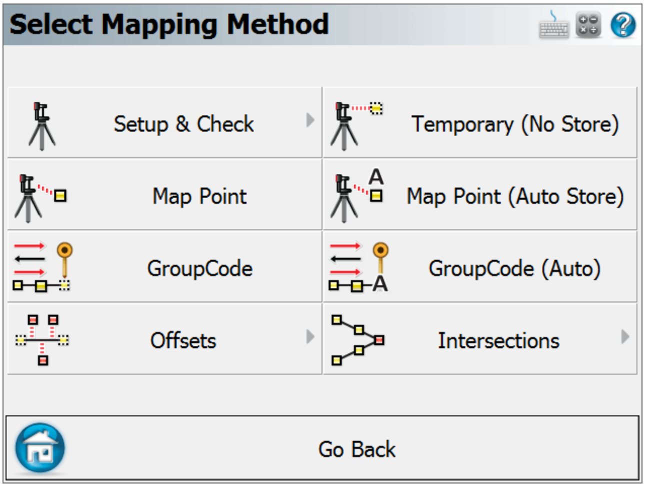
Select "Disto Observation" which will then set Evidence Recorder in a "waiting" mode. Take the measurement with the Disto, press the Bluetooth icon on the Disto, and the measured distance will be accepted byEvidence Recorder and will appear in that distance field.

Mapping Methods (Disto/Laser)

Main Menu or Instrument Toolbar | Mapping Methods

These are commands built into Evidence Recorder that will help you measure and map your points while connected to a supported Disto/Laser device. The desired Mapping Method must be selected before you begin a measurement.

For a faster way to get to this screen, you can also press the Mapping Methods button which is located on the instrument toolbar.



Note: Several of these modes will not be available until you have completed a setup.

Setup and Check

Quick Setup

Use this to perform a quick setup procedure, with the instrument on a point facing a certain direction. Please see the Quick Setup topic for more information.

Occupy Reference Point

Use this to define an instrument setup. Same procedure as with a Total Station, please see the Backsight Method topic for more information.

Resection

This will start the multiple point resection routine to allow you to determine your current instrument position by measuring to known points. Same procedure as with a Total Station, please see the Resection topic for more information.

Occupy Baseline

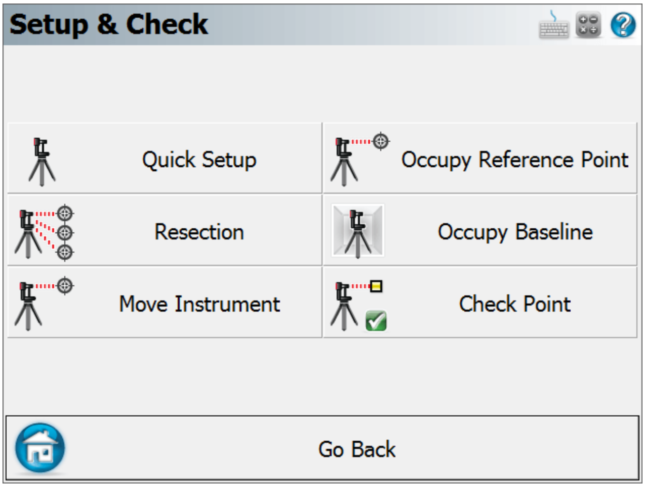
Use this to define an instrument setup from the position and orientation of an arbitrary baseline. Same procedure as with a Total Station, please see the Occupy Baseline topic for more information.

Move Instrument

This is a wizard that will help you establish a new reference point, and then will step you through moving your instrument. Same procedure as with a Total Station, please see the Move Instrument topic for more information.

Check Point

Use this to display a check measurement to an existing point in your Scene. Same procedure as with a Total Station, please see the Check Point topic for more information.



Temporary (No Store)

This will allow you to take a measurement without storing it. Same procedure as with a Total Station, please see the Temporary (No Store) topic for more information.

Map Point

This mode allows you to measure a point. After the measurement, it will allow you to review your measurement data and allow you to make changes to the point ID and description before it is stored. Same procedure as with a Total Station, please see the Map Point topic for more information.

Map Point (Auto Store)

This mode allows you to measure a point using the next available point id, and the description and line toggles specified on the main map screen. Using this is a very fast method for recording your measurements. Same procedure as with a Total Station, please see the Map Point (Auto Store) topic for more information.

GroupCode

This mode allows you to set up a Group of Codes that have a common theme or purpose, and is ideal to increase productivity for repetitive feature collection. Same procedure as with a Total Station, please see the GroupCode topic for more information.

GroupCode (Auto)

The GroupCode mode with automatic point storing using the next available Point ID.

Offsets

Distance Offset

This will start the distance offset routine. Same procedure as with a Total Station, please see the Distance Offset topic for more information.

Horizontal Angle Offset

This will start the angle offset routine. Same procedure as with a Total Station, please see the Horizontal Angle Offset topic for more information.

Vertical Angle Offset

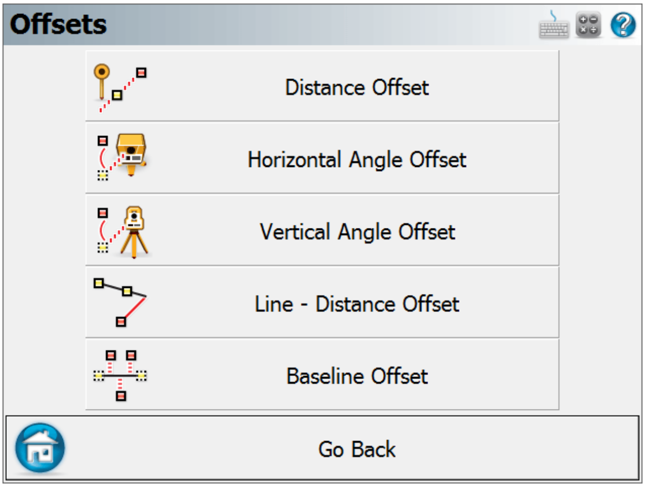
This will allow you to compute the height of an object. Same procedure as with a Total Station, please see the Vertical Angle Offset topic for more information.

Line - Distance Offset

This allows you to measure two points to define a baseline, then manually enter measured distances. These distances will be used to compute a new point based on the baseline. Same procedure as with a Total Station, please see the Line - Distance Offset topic for more information.

Baseline Offset

This will allow you to compute points offset from a baseline. Please see the Baseline Offset topic for more information.



Intersections

Two Line Intersection

This allows you to measure two baselines and Evidence Recorder will compute the intersection point. Same procedure as with a Total Station, please see the Two Line Intersection topic for more information.

Line - Angle Intersection

This allows you to measure two points to define a baseline, measure an angle, and Evidence Recorder will compute the intersection point. Same procedure as with a Total Station, please see the Line - Angle Intersection topic for more information.

Line - Perpendicular Point

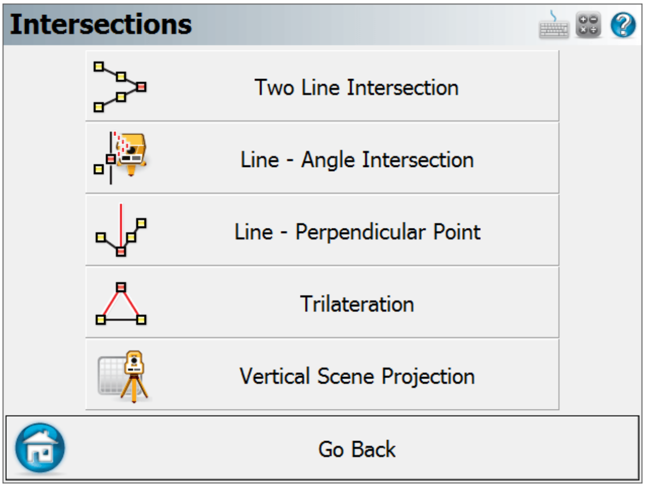
This allows you to measure two points to define a baseline, then you can select an existing point which will be used to compute a perpendicular intersection. Same procedure as with a Total Station, please see the Line - Perpendicular Point topic for more information.

Trilateration

This will allow you to compute new points by observing their distances from two known existing points. Please see the Trilateration topic for more information.

Vertical Scene Projection

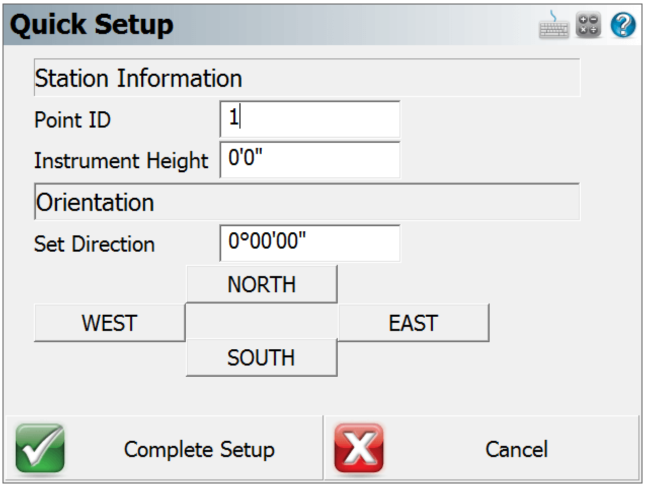
This will allow you to compute points on a user defined vertical plane. Same procedure as with a Total Station, please see the Vertical Scene Projection topic for more information.



Quick Setup

Main Menu or Instrument Toolbar | Mapping Methods | Setup & Check | Quick Setup

This setup procedure requires a Point and a direction to complete the setup.



Point ID

Enter a Point ID to set the Station, or tap in the field to open a menu to pick a point from a list or map, or create a new point.

Instrument Height

Enter the height of the device above ground if you wish to reference it.

Set Direction

Enter the direction that the device is pointing, or pick on one of the four direction buttons to set the direction.

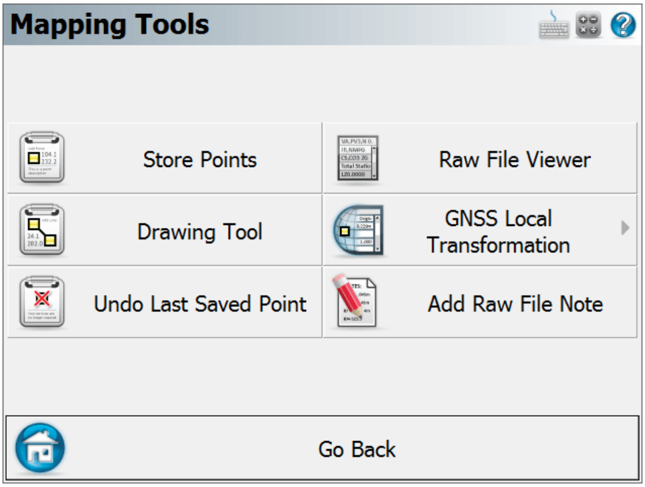
Complete Setup

Pick **Complete Setup** to finish. The direction will be captured and set as the orientation reference.

Mapping Tools

Main Menu | Mapping Tools

This menu contains functions pertaining to the data in your Scene.



Store Points

Use this to enter new coordinates into your scene's database. Please see the Store Points topic for more information.

Drawing Tool

This starts up the draw plan tool.

Undo Last Saved Point

Use this to "undo" up to ten of the last points that were saved. Please see the Undo Last Saved Point topic for more information.

Raw File Viewer

Use this to open a viewer that will display your current raw file. Please see the Raw File Viewer topic for more information.

GNSS Local Transformation

NOTE: This item is only available when the GNSS Option is enabled to 'Allow Advanced Settngs'.

Use this to specify transformation parameters that can be used to localize GNSS data. Please see the Transformation Setup topic for more information.

Add Raw File Note

Use this to add a comment to the raw file. Please see the Raw File Comment topic for more information.

Store / Edit Points

Main Menu | Mapping Tools | Store Points

This is a multi-use function that is used by many parts of the program. Essentially any time a point needs to be stored or edited, it will done via the store point screen. Depending on what it is you're doing, certain parts of the dialog will be disabled or not editable. Following is an explanation of what you should expect.

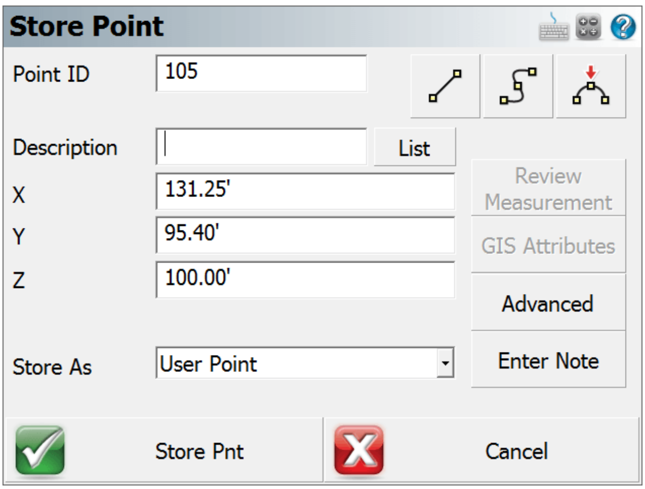
Measured or Calculated Points

Points that were measured or computed via any of our commands will automatically have their Survey Role set to **measured**. When these types of points are edited, only the description can be changed; the point id and coordinate values will be non-editable. The reason we do this is so the coordinates don't accidentally get altered. You can check a point's survey role by pressing the **Advanced** button. You can override this by changing the survey role type to "null".

Certain commands in Evidence Recorder are allowed to ignore the measured survey role, such as the overwrite option that is triggered when you try to store a point using a point id that already exists in the Scene.

Manually Entered or Imported Points

Point that have been manually entered or imported from an ASCII file for example, will have their Survey Role set to **null**. Points that have a Survey Role set to null can be edited except for the point id.



Point ID

Enter in the point number you would like to assign to the point. Note that by default it will display the next available point number. If you're editing an existing point, this field will not be editable.

Line/Spline/Arc Buttons

This is used to toggle on and off the draw lines function. When turned on as you shoot your points in the drawing they will be connected with a line. This button can only be used if you're storing a point after a measurement.

This is used to toggle on and off the draw curvy lines button. This function will draw a best-fit curve through your points as you shoot them. This button can only be used if you're storing a point after a measurement.

3-Point arcs can be started using the same method as for a Line or Curvy Line. This button can only be used if you're storing a point after a measurement.

Description

This is where you can enter a description for your point. This field is associated with your AutoMap library so as soon as you start typing in descriptions, a list appears displaying descriptions that match what you've entered. Simply press your **Enter** Key to accept your entry. You can also have Evidence Recorder notify you when the description you've entered isn't in your AutoMap library. To do this you need to make sure you have the **New Description Prompt** toggle turned on in the Options menu.

List Button

Press this to open the AutoMap Library screen. You will be able to choose the description that will be assigned to the point.

X, Y, Elevation

Input your coordinate values in these fields when manually creating a new point using the add point function. If measuring a point, you cannot manually enter or edit coordinates.

Note Button

Press this to enter a note or record an audio note for the point. See the Notes topic for more information.

Prism Hgt (Height) / GNSS Hgt (Height)

When storing a point measured by a total station, you can set the Prism Height. When storing a point measured by a GNSS receiver, you can set the true or measured Antenna Height.

Review Measurement Button

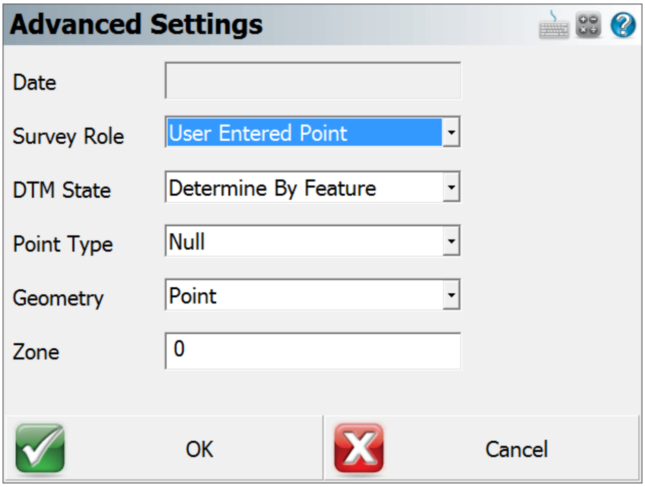
This button is available when you have taken a measurement, and can be used to review the distance and angles measured.

GIS Attributes Button

If you loaded a feature list, then this button will be enabled. It allows you to access your feature list so you can edit feature attributes.

Advanced Button

Use this button to add or edit advanced tags to your point.



Survey Role: Use this to edit the survey role for the point. By default points that are measured will have a role of **Measured**. Points with a **Measured** role type are read only when they're viewed with the store and edit screen.

DTM State: Use this to choose the DTM attribute that will be written to the database file. **Determine By Feature** is the default value, if you don't want the point used in Evidence Recorder's modeling commands, you can set the DTM value to **Do not Include**.

Point Type: Use this to enter a point type that will be written to the database file.

Geometry: Use this to enter a geometry type that will be written to the database file.

Zone: Use this to enter a zone number that will be written to the database file.

Drawing Tool

Main Menu | Mapping Tools | Drawing Tool

Line Toolbar | Pencil button

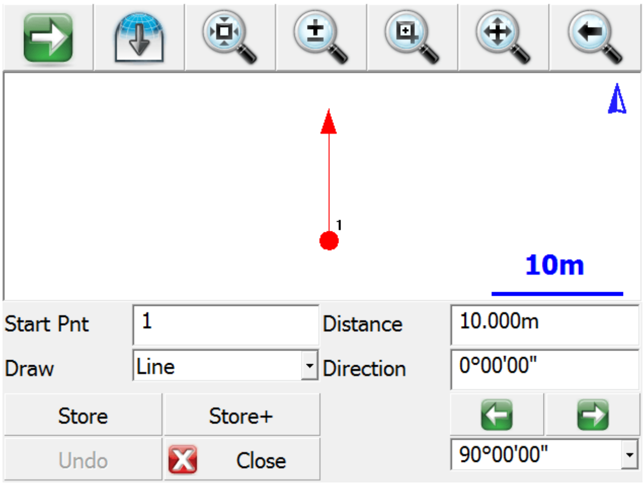
Point Toolbar | Pencil button

This tool allows you to quickly draw a plan such as a pad or a building footprint into your Scene, and is typically used to recreate plans from a paper hard-copy. You can use this to either calculate new points, or to connect existing points that are already in your Scene.

You must have at least one point in your Scene before you can start, to define the starting position for your plan. If a point does not yet exist (for example if this is the first command you run in a new Scene), you will be prompted to store a new point before you can proceed.

Line Mode

Use the Line draw mode to add straight line segments to your figure.



Start Point

Specify the start point for the new segment.

For starting a new plan, this should be set to an existing point in your Scene, typically a corner that you will begin drawing the plan from.

As you continue adding subsequent points/segments to your plan, you will see the Start Point field automatically advance for you.

Distance

Specify the length of the line segment you wish to draw.

Direction

Specify the direction (Azimuth or Bearing) of the line segment you wish to draw. The easiest way to do this is to use the right/left arrow buttons, which will increment/decrement the direction value by the amount shown in the pulldown list below the arrows. You can select a common angle from the choices in the list (90, 45, or 30 degrees), or you can type any value if you need to increment it by some other amount.

Store

After you have defined the segment to add, press this to store the new point and line segment into your Scene.

Store+

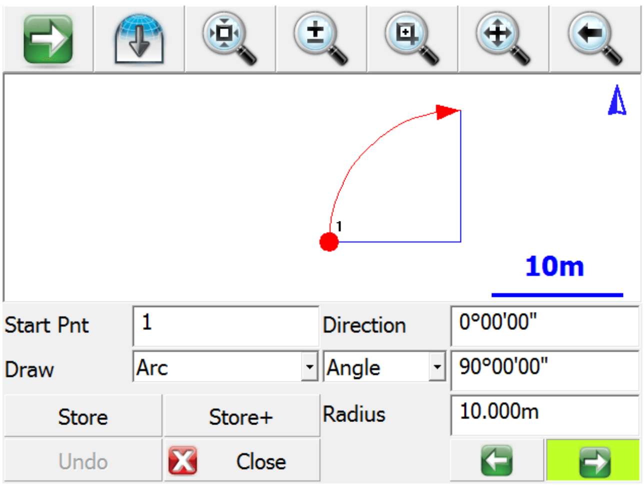
This does the same as the Store button, but you will see the Store/Edit Point screen. Use this to confirm or view the coordinates, or to specify a description.

Point by Line Mode

This is the same as the Line mode, except that when you press Store or Store+ it will only store the point, without drawing the line segment.

Arc Mode

Use the Arc draw mode to add arc segments to your figure.



Start Point

Specify the start point for the new segment.

For starting a new plan, this should be set to an existing point in your Scene, typically a corner that you will begin drawing the plan from.

As you continue adding subsequent points/segments to your plan, you will see the Start Point field automatically advance for you.

Direction

Specify the direction (Azimuth or Bearing) of the **tangent in** to the arc segment you wish to draw. This will default to either the direction of the previous line segment or the tangent out of the previous arc segment, so as long as your arc is tangential to the previous segment you will not need to change this value.

Angle / Chord Length / Arc Length

Specify one of the three available methods to define your arc:

- Angle: Enter the interior delta angle of the arc.
- Chord: Enter the chord length of the arc.
- Arc: Enter the arc length of the arc.

Radius

Specify the radius to define your arc.

Clockwise / Counter-Clockwise Arrows

Use the Right/Left arrow buttons to define whether the arc rotates clockwise or counter-clockwise.

Store

After you have defined the segment to add, press this to store the new end and radial points, and draw the arc segment into your Scene.

Store+

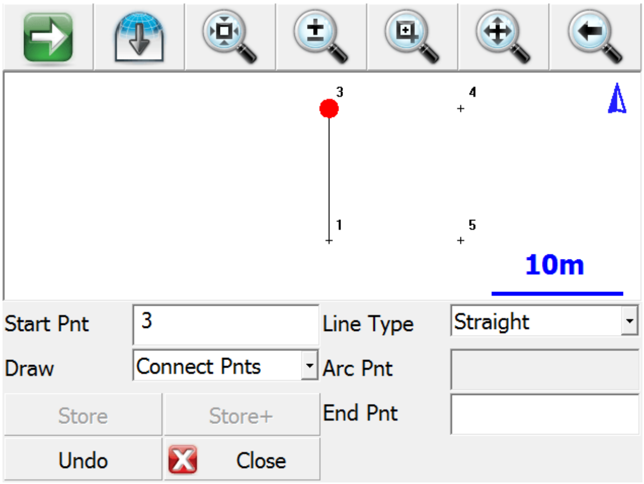
This does the same as the Store button, but you will see the Store/Edit Point screen. Use this to confirm or view the coordinates, or to specify a description.

Point by Arc Mode

This is the same as the Arc mode, except that when you press Store or Store+ it will only store the points, without drawing the arc segment.

Connect Points Mode

This mode lets you draw lines/arcs by connecting points that already exist in your Scene.



Start Point

Specify the start point for the new segment.

For starting a new plan, this should be set to an existing point in your Scene, typically a corner that you will begin drawing the plan from.

As you continue connecting subsequent points to your plan, you will see the Start Point field automatically advance for you.

Line Type

Specify one of the five available methods to define your next figure segment:

- Straight: this will draw a straight line between the specified Start Point and End Point.
- Arc (CW): this will draw a clockwise arc between the specified Start Point and End Point, with the specified Radial Point.
- Arc (CCW): this will draw a counter-clockwise arc between the specified Start Point and End Point, with the specified Radial Point.
- Arc (3Pnt): this will draw an arc (clockwise or counter-clockwise) between the specified Start Point and End Point, going through the specified intermediate Arc Point (any point directly on the arc, does not need to be the midpoint).
- Spline: this will draw a curvy line between the specified Start Point and End Point.

Store / Store+

The Store and Store+ buttons are disabled for this mode, because new points are not being calculated for your Scene. The line or arc segment will be automatically drawn into your Scene after you specify its parameters.

Undo

Press the **Undo** button to undo the last segment you computed, removing both the point and/or the line segment (as appropriate) from your Scene. You can undo multiple steps.

Note, there is no Redo function.

Close

Press the **Close** button to exit from the Draw Plan command, and you will be returned to the map screen.

Undo Last Saved Point

Main Menu | Mapping Tools | Undo Last Saved Point

Use this to undo the last point that was saved. When you undo a point, a record is written the raw file indicating which point was undone. Also, when this function is used, the user is asked to enter a comment as to why they decided to undo the point. His or her comment is saved in the raw file. You can only undo up to the last ten points that have been stored.

When you select the undo command, you will be asked to confirm that you would like to undo the last saved point.

Press **Yes** to undo.

Press **No** to cancel.

If you select Yes, you will be asked to enter a comment explaining why you want to undo the point. Your comment is saved in the raw file. If you choose not to enter a comment, a note will be written to the raw file indicating that you didn't enter a comment.

Press **OK** to finish.

The point is now removed from the Scene's map and database, but the original measurement data and the reason for the undo remains in the raw file.

Raw File

Using the example from above, this is what you will see in the raw file.

```
SS,OP34,FP36,AR270.00000,ZE121.16010,SD2.5060,--TABLE
--Undo PN 36
--Reason for Undo: Accidentally pressed the measure button
```

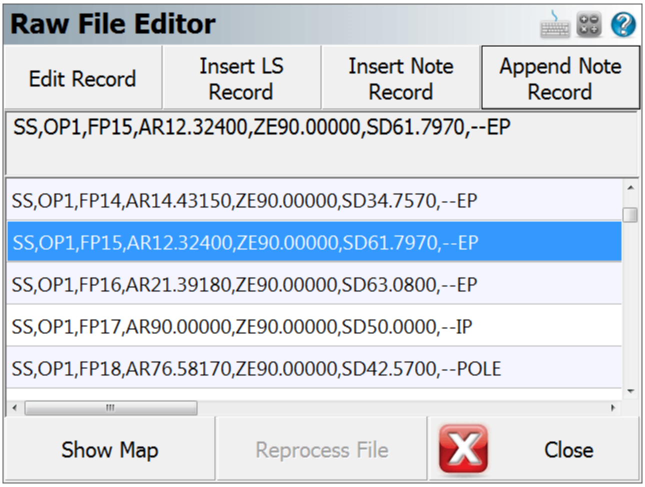
```
DP,PN36
```

The first line is the shot to point 36. The second and third lines are comments indicating which shot was undone and the reason for the undo. The last line is a delete point record which is used to remove the point from the database.

Raw File Viewer

Main Menu | Mapping Tools | Raw File Viewer

Use this button to open the raw file viewer. The raw file editor displays your scene's raw file and allows you to review it in an easy to read grid. For reference on the different raw file record types that Evidence Recorder uses you can refer to the Raw File Record Types topic for more information.



Insert Note Record

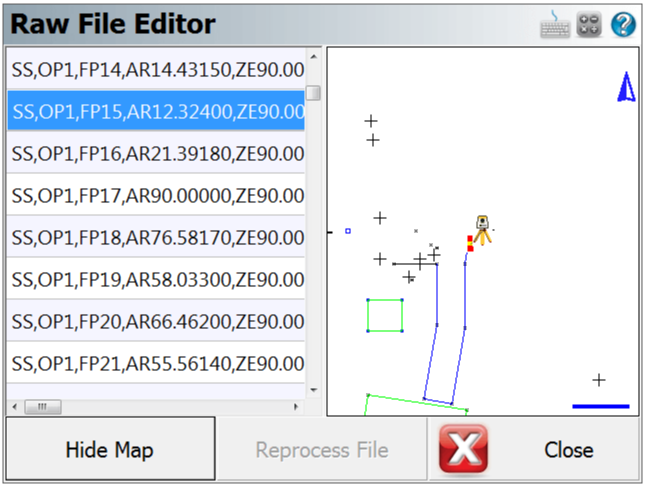
This will allow you to enter a comment. The comment will be inserted above the current line you have highlighted in the grid.

Append Note Record

This will allow you to enter a comment. The comment will be appended to the end of the raw file.

Show Map

This will change the raw file viewer to a split-screen display with a map view of your scene on half of the screen. When certain raw file records are selected, you will be shown the reference and backsight points, and the selected measurement record will be highlighted on the map.



GNSS Local Transformation

Overview

Due to a variety of reasons, it may be necessary to adjust position coordinates for distortions which can include scale, rotation, translation in northing and translation in easting. The flexibility of Evidence Recorder's local transformation utility allows it to be used for a variety of applications and applied to positions derived from GNSS or terrestrial observations. For GNSS applications there are two possible reasons for the need of a transformation:

1. **Translating from Local System to Plan System**
   GNSS receivers by default generate geodetic coordinates (latitude, longitude and ellipsoidal height) and the process of converting to Cartesian coordinates (northing, easting and orthometric height) or local system is done with existing well defined map projection systems such as Universal Transverse Mercator (UTM) or the State Plane Coordinate System (SPCS). Selection of the map projection in Evidence Recorder is done within the Datum page of the GNSS Configuration and a local zone is selected to minimize scale and meridian convergence distortion. Most land, boundary or property surveys are unique with regards to their generalized plane and coordinate origin for each Scene. The coordinate system for these surveys is often referred to as a plan system with coordinate magnitudes being kept small for ease of recording and calculations. The majority of Scenes can suffice with a simple translation in northing and easting to produce plan system coordinates from GNSS determined local system coordinates. The translation is easily determined by comparing a plan system coordinate and a local system coordinated for a single point.
2. **Consideration for Scale and Rotation**
   Scenes with larger extents need to take into consideration the curvature of the earth's surface which can be handled by the application of scale and rotation transformations plus the previously mentioned translations. In the case of mixing GNSS observations and terrestrial observations it does become important to apply a transformation, especially in scale, due to the fact that there is a difference in distance between positions measured on the ellipsoid and the terrain surface. As seen in Figure 1, coordinates derived from GNSS are always referenced to the surface of the ellipsoid as per the application of map projections. When the two points on the ellipsoid are projected upwards along the ellipsoid normals onto the earth's surface, they diverge, and a terrestrial distance observed between the points will be greater than the computed distance of the same two points on the ellipsoid. The effects of this zenith divergence becomes more evident as distance between the two points becomes greater and for larger terrain heights above the ellipsoidal surface.

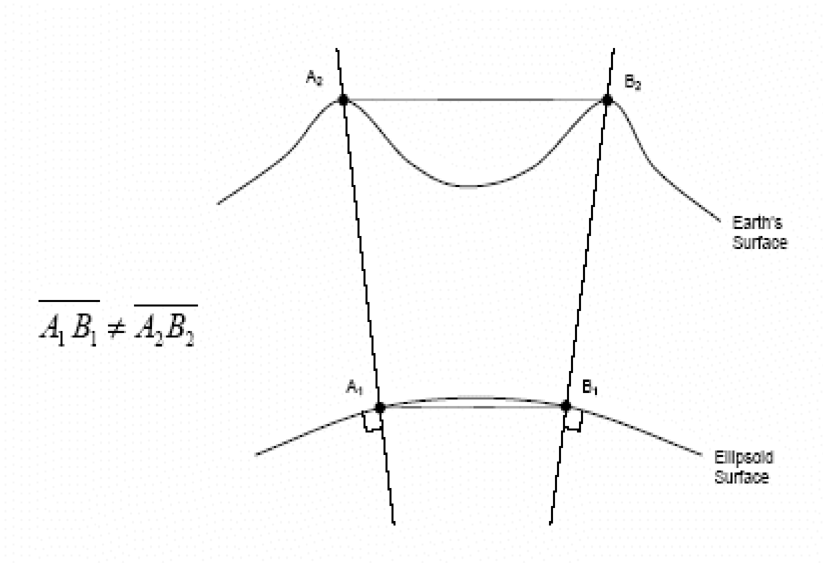


Figure 1. Divergence of Ellipsoid Normals.

Transformation Concepts

In order for the transformation parameters to be resolved, a sufficient number of control points are required with coordinates in both the plan system and local system. The determination of a four parameter transformation (two translations, scale and rotation) on a horizontal plane requires at minimum two physical points with each having two sets of corresponding coordinates as illustrated in Figure 2. Points A1 and B1 exist in what is termed the local system and are transformed into the plan system points of A2 and B2. The use of more coordinate observations will provide redundancy and the means to identify outliers for elimination. Solving for over constrained parameters is done with the application of least squares to provide the most rigorous minimization of residuals. Once transformation parameters have been resolved, newly observed or existing coordinates can easily be converted to the plan coordinate system.

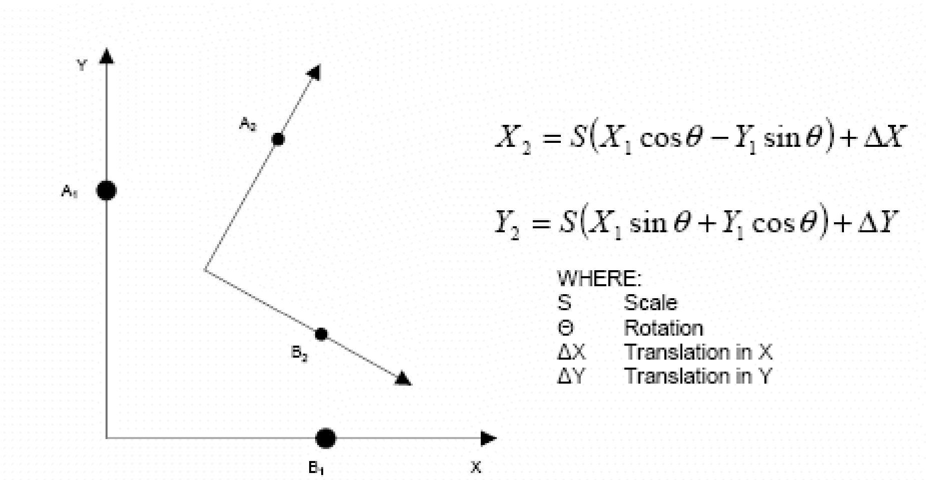


Figure 2. Horizontal Four Parameter Transformation.

The selection of control points for determining the transformation parameters are critical in reducing a colinearity condition along a particular axis. Colinearity will present itself if the control points are concentrated in a linear fashion as shown in Figure 3 (Poor Design) and thus weaken the parameters in a perpendicular direction. Control points should extend to the corners of the Scene boundary and be extended with equal distances in both horizontal directions.

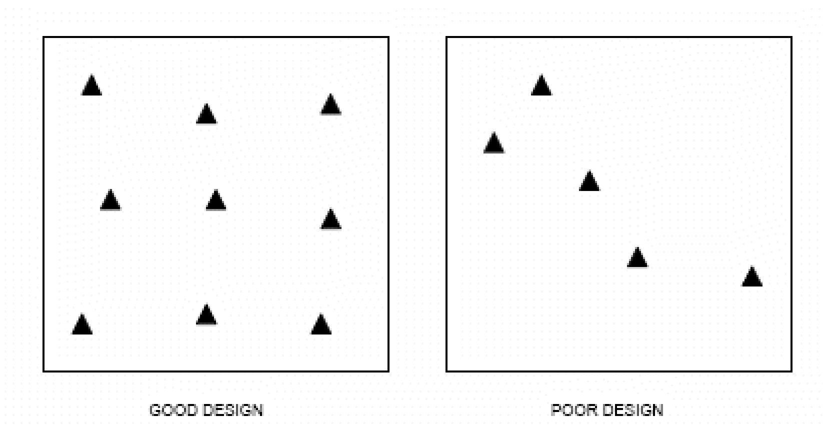


Figure 3. Transformation Control Design.

Vertical Transformation

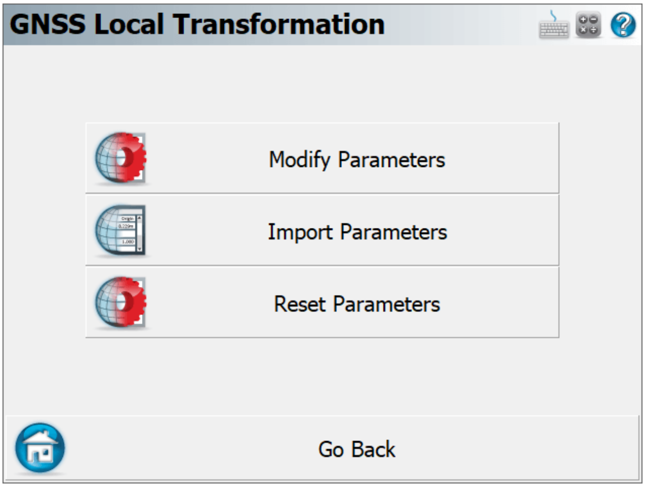
The vertical transformation function of Evidence Recorder operates independently of the horizontal transformation. A sloped plane is calculated from the residuals of the constrained point pairs to determine a vertical bias, slope in X and slope in Y. To determine a vertical bias at least one point pair must be constrained and for all three parameters to be determined at least three point pairs must be constrained.

The use of the vertical transformation function should be restricted to cases where a geoid model is not available or there is a known problem with an existing geoid model.

Transformation Setup

Main Menu | Mapping Tools | GNSS Local Transformation

Starting a new transformation, the following options will be available:



Modify Parameters

The Modify Parameters page allows the user to set the transformation method and parameters. This is always the first step of any local transformation. See the Modify Parameters topic for more information.

Import Parameters

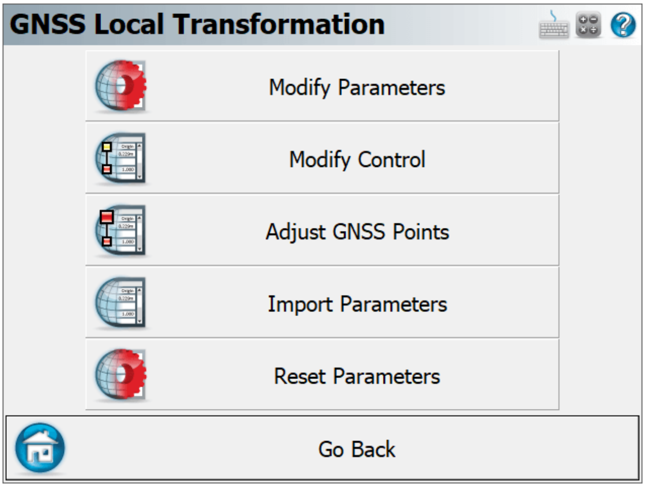
Evidence Recorder has the ability to read in a localization file (*.loc) to apply a previously used transformation to the current Scene. Select this button and navigate to the desired .loc file to load it in. There is no need to export the .loc file as it is automatically updated during the transformation routine.

Reset Parameters

Use this option to reset any previously applied transformation parameters. This cannot be undone.

NOTE: Depending on what the user specifies at the "Modify Parameters" page, additional options may become available:

Modify Control



Only applicable for a "Similarity" method where the parameters are calculated by matching up control points. This option can be used to add, edit or delete control pairs used for the calculation of the transformation parameters. See the Modify Control topic for more information.

Adjust GNSS Points

When the transformation parameters are finalized, this option can be used to update the coordinates of every GNSS measured point in the database. The transformation parameters are always applied to the original Lat/Long of the measured point, to compute the adjusted grid coordinates.

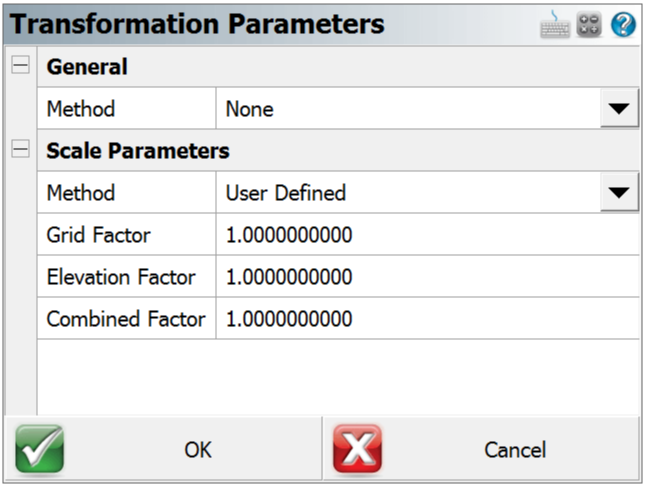
Modify Parameters

Main Menu | Mapping Tools | GNSS Local Transformation | Modify Parameters

The first step of a transformation is to specify the method to use: **None**, **Similarity** or **Helmert**. Depending on your selection, different input will be required.

None

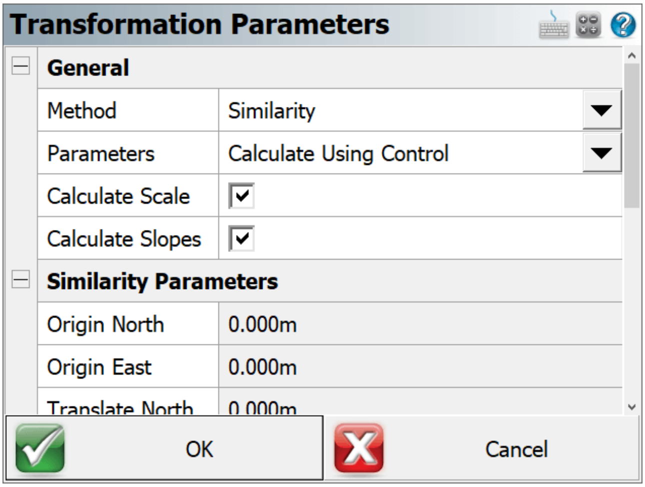
For this method, the only input required are the Scale Parameters.

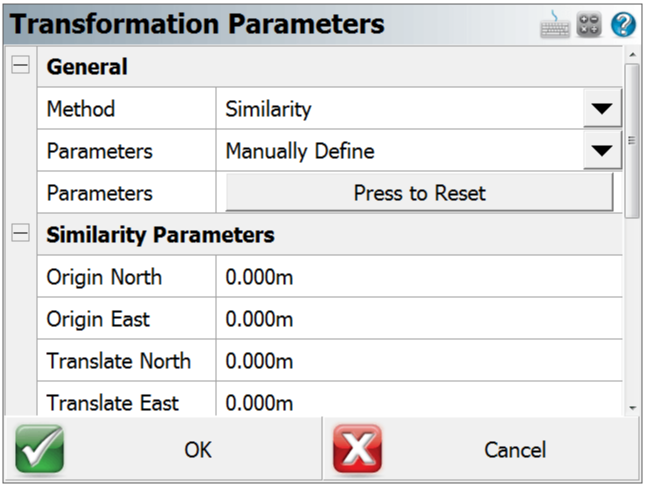


Similarity Method

Similarity transformation parameters can be calculated from control points, or manually defined:

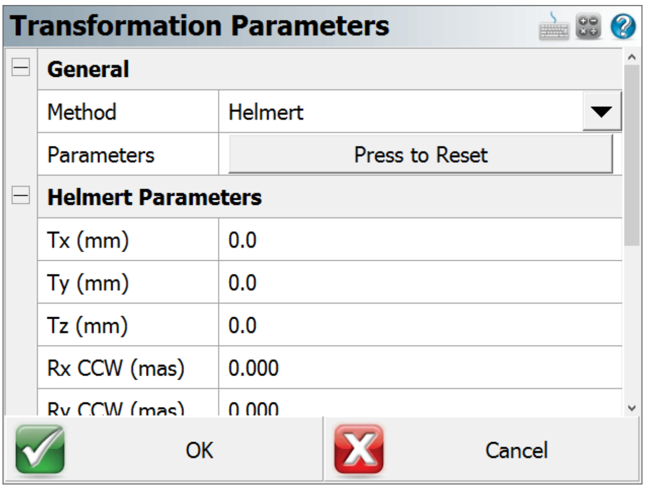
- **Calculate Using Control** - Requires control points to be measured with GNSS.
  - An option exists to Calculate Slopes. This option should only be used if you do not have a geoid model to use for your vertical datum and you need your transformation to align well with the orthometric heights of your local control points. Use this feature with care as it can cause distortions in your elevations if it is used incorrectly.
  - An option exists to Calculate Scale. Disabling this option will ensure that no scale is calculated from the control points and the user may want to enter a pre-determined scale in the **Scale Parameters** section. When this option is enabled, the **Scale Parameters** should not be manually defined.
- **Manually Define** - Requires previously determined transformation parameter values. The user enters the Origin and Translate Point coordinates, Rotation, Scale Factor, Height Translation and Slopes.





Helmert Method

This method allows the user to manually enter the 7 Parameters of a Helmert Transformation (Translation X, Y and Z, Rotation X, Y, and Z, and Scale). These parameters will usually be pre-computed and/or published.



Scale Parameters

The Scale Parameters can be:

1. **User Defined** - Manually enter the Grid Factor and Elevation Factor to determine the Combined Factor.
2. **Select From Database** - Pick a point from the database that was already measured with GNSS and stored. The Combined Factor of the point will be calculated.
3. **Measure GNSS Position** - Use the current position of the rover to calculate a Combined Factor.

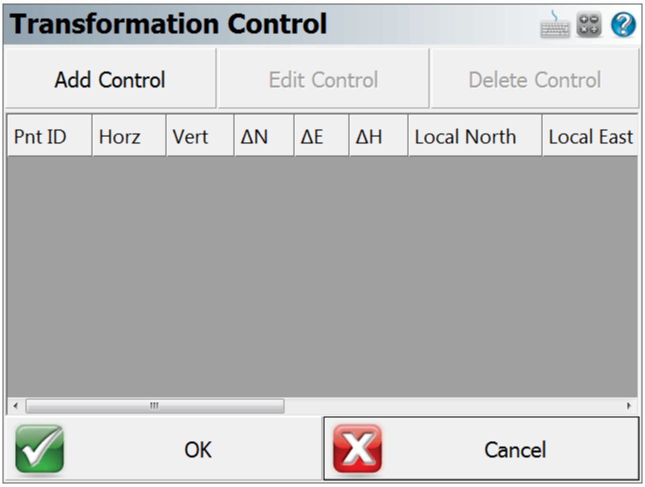
> **NOTE:**
>
> In all cases the entered or calculated Combined Factor will be the inverse of the Combined Factor typically seen published or otherwise calculated.
>
> The standard expression of the typical Combined Factor is:
> **Grid Distance = Ground Distance * Combined Factor**.
> We can refer to this as the "Ground to Grid" factor.
>
> Evidence Recorder expects the "Grid to Ground" Combined Factor, which is the inverse of the typical Combined Factor.

NOTE: The transformation parameters are immediately applied to your current position and written to the Scene's *.loc file when you confirm the values with **OK**.

Modify Control

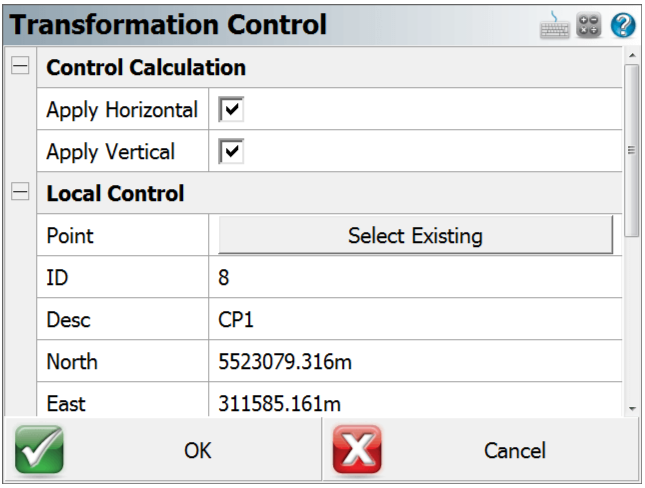
Main Menu | Mapping Tools | GNSS Local Transformation | Modify Control

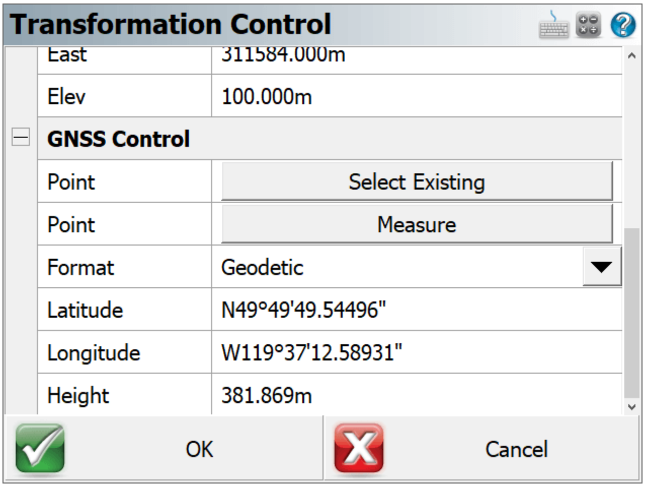
Use this option to Add, Edit and Delete control points used to calculate the Similarity Transformation parameters.



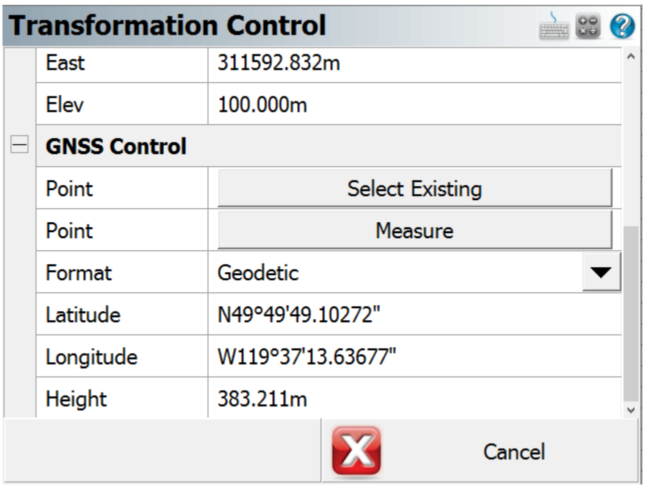
Add Control

Pick **Add Control** to match a Local Control point with a GNSS Control point. Control points can be matched 1D, 2D or 3D.





- The Local Control section only allows the user to select an existing point from the database.
- The GNSS Control section allows the user to select an existing point from the database (must have been previously measured with GNSS) or to measure a position which can then optionally be added to the database.



Edit Control

Select a row and then pick **Edit Control** to modify any component of a matched pair. For example, after reviewing the residuals of all the control points, it may be necessary to change a 3D match to a 2D match. The calculated parameters are immediately updated.

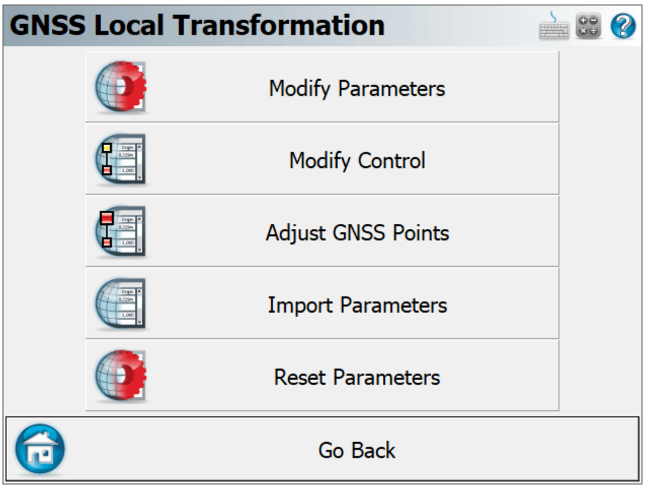
Delete Control

Select a row and then pick **Delete Control** to completely remove a control pair from the list. The calculated parameters are immediately updated.

Continue to add/edit/delete control until you are satisfied with the residuals. When done; press the **OK** button to take you back to the main GNSS Local Transformation dialog.

NOTE: The transformation parameters are immediately applied to your current postion and written to the Scene's *.loc file when you confirm the values with **OK**.

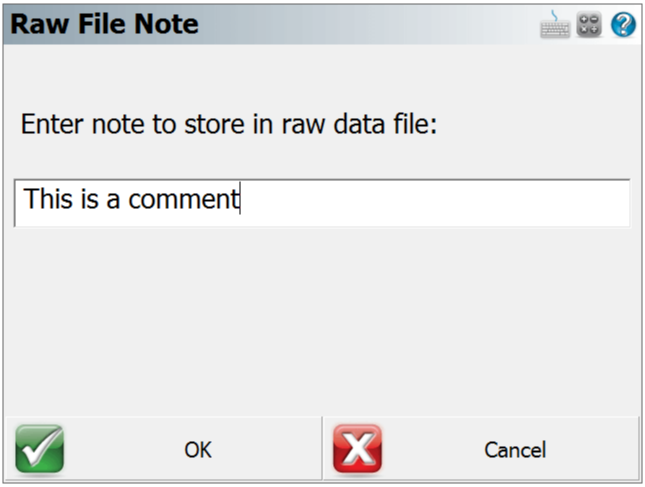
To complete the transformation and update previously measured GNSS points, pick the **Adjust GNSS Points** option.



Add Raw File Note

Shortcut Key - X

At any time you can enter a note that will be recorded to the raw file. Simply press the X key on your keyboard device which will open the Enter Comment dialog. Enter a comment that you want appended to the end of your raw file. You are limited to 99 characters.



If you view your raw file your comments will appear as shown in the following example.

```
--This is a comment
```

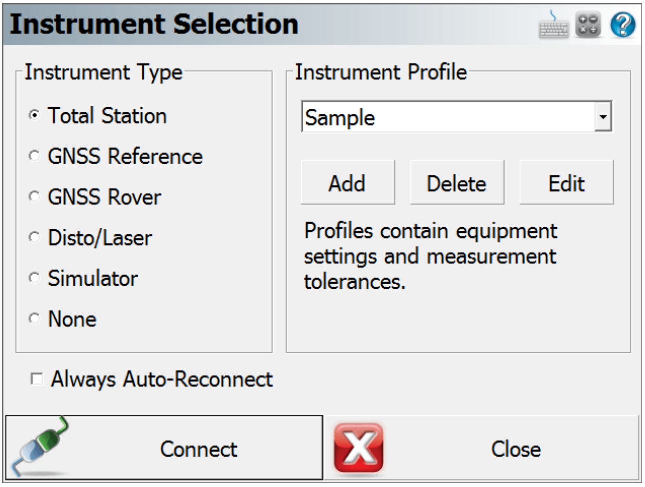
You can also enter comments into the raw file by using the Raw File Viewer.

Instrument Selection

Main Menu | Connect

The Instrument Selection screen allows you to choose the type of equipment you will be connecting to Evidence Recorder. An Instrument Profile can be created for each different instrument you will be working with, to make changing between different hardware a breeze. Once you have setup a profile for each different instrument you will be using, switching between them is a simple matter of selecting the appropriate profile and pressing **Connect**.

Note, this screen is not available if Evidence Recorder is running onboard your instrument.



For all future Scenes you create with Evidence Recorder, when you create a new or open an existing Scene you will see the Instrument Selection screen with the profiles you have already created. It will default to the last Profile you used, so if you are using the same instrument just press Connect. If you are using different equipment, just select the appropriate Instrument Type and Profile (or add a new profile if one does not yet exist for it), then press **Connect**.

Your profiles are stored in the **Settings.xml** file within the **...\Leica Geo-systems\EvidenceRecorder\Scenes** (Windows CE/Mobile) or **...\Documents\Leica Geo-systems\EvidenceRecorder\Scenes** (Windows Tablet/PC) directory so once you have configured one data collector, you can copy this file onto other data collectors to make the profiles available on them. This file should also be backed up for easy recovery.

Total Station

When you select the **Total Station** instrument type, you will be able to Add, Delete, or Edit a profile for your conventional and robotic total stations. See the Total Station Configuration topic for more details about configuration for your total station.

For more information on connecting to your instrument please refer to the Conventional Total Station and Robotic Total Station topics.

GNSS Reference / GNSS Rover

When you select the **GNSS Reference** or **GNSS Rover** instrument type, you will be able to Add, Delete, or Edit a profile for your GNSS receiver. When you edit a GNSS Rover or GNSS Reference profile, you will see the Configure Rover or Configure Reference screens. For more information about using Evidence Recorder for GNSS surveying, you should review the GNSS Overview topics.

If you have not purchased the GNSS module for Evidence Recorder, then you will not have access to the GNSS commands and you will see a "Requires GNSS module license" message.

Disto/Laser

When you select the **Disto/Laser** instrument type, you will be able to Add, Delete, or Edit a profile for your supported Leica Disto and supported Laser Technology Inc devices. Please review the Disto/Laser Reference topic for more details.

Simulators

GNSS Rover Demo

When you select *GNSS Rover Demo* from the **Simulators** instrument type, you will be able to Edit and Connect to a profile for a simulated GNSS Rover receiver. When you edit the RTK Demo profile, you will see the Configure Rover screen. For more information about using Evidence Recorder for GNSS surveying, you should review the GNSS Overview topics.

The *GNSS Rover Demo* will simulate connecting Evidence Recorder to a GNSS Rover receiver. The coordinates in the GNSS Demo are located outside our office in Westbank, British Columbia, Canada, so to use the GNSS Demo mode you need to set your Coordinate System Settings to UTM Zones, NAD83, UTM83-11, Ellipsoidal.

Total Station Demo

When you select *Total Station Demo* from the **Simulators** instrument type, you will be able to Edit and Connect to a profile for a simulated Total Station. All measurements are manually entered, but point coordinates and the raw file are updated as if connected to an instrument.

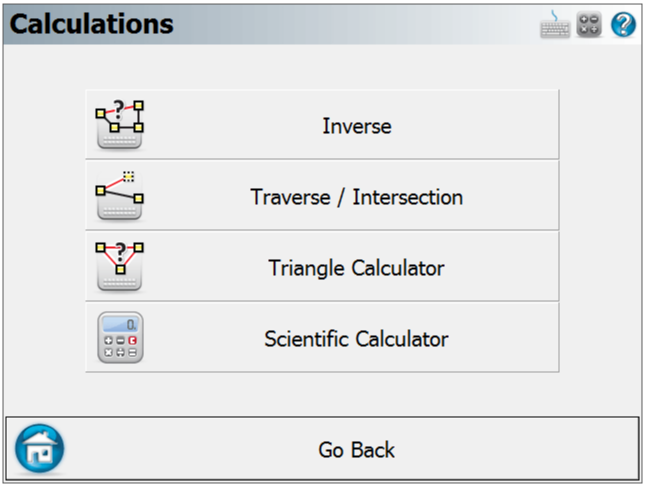
None

Use this option if you're not connecting anything to Evidence Recorder. With this mode, the instrument toolbar will not be displayed in the map screen.

Calculations

Main Menu | Calculations

The calculation menu contains calculation based functions that can be used to compute points, lines and other data.



Inverse

Use this to inverse between points. Please see the Inverse topic for more information.

Traverse / Intersection

This will open the Traverse / Intersect toolbar. You can enter in directions and distances and perform common intersections such as bearing / bearing, distance/distance and many more. Please see the Traverse / Intersection topic for more information.

Triangle Calculator

Use this to compute a triangle solution using known angles or distances. Please refer to the Triangle Calculator topic for more information.

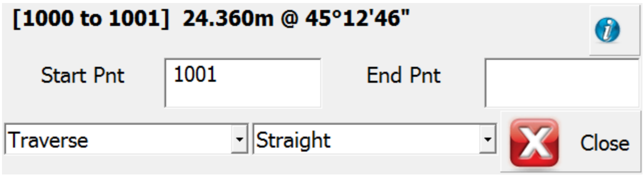
Scientific Calculator

Use this to display the RPN calculator. Please see the Calculator topic for more information.

Inverse

Main Menu | Calculations | Inverse

This command will calculate for you the inverse between two points. It will display the horizontal / slope distance, direction, vertical distance and slope between the two points. You do not need to have a line drawn between the points to use the inverse command.



A large font can be set for the results toolbar and COGO results. Please refer to the Options topic for more information.

Traverse Inverse

Function

1. Start the inverse command and make sure the **Traverse Inverse** and **Line** options are selected.
2. Enter or choose the first point to calculate from, and press your enter key to continue on to the next point.
3. Now you can choose or enter the second point and press your Enter button to compute an answer.
4. The inverse information will be displayed in the results toolbar.
5. In the COGO history you will see the following information for the two points:

```
-------------------------------
INVERSE
-------------------------------
PNT 44 to 8 (HD 1352.84' @ NA 323°48'03.1") SD 1353.39' GR -2.85' VD -
38.51' AR 323°48'03.1"
```

Your first inverse will calculate a right angle from north to the direction you inversed.

Multiple Lines

After you have specified two points, you can continue inversing from point to point. You should notice that the point id previously in the 2nd point field will move to the 1st point field, and the cursor will remain in the 2nd point field allowing you to quickly enter in your next point.

If you continue inversing from point to point, the angle right will not be referenced to north, but the last leg you inversed. Essentially this is computing a clockwise angle between the current and last legs you inverse.

Perimeter Distance and Area

If you close back to the first point, a perimeter distance and enclosed area will also be computed.

Radial Inverse

You can compute radial inverses from a point.

Function

1. Start the inverse command and make sure the **Radial Inverse** and **Line** options are selected.
2. Enter or choose the 1st point to calculate from, and press your enter key to continue on to the next point.
3. Now you can choose or enter the 2nd point and press your Enter button to compute an answer.
4. The inverse information will be displayed in the results toolbar.
5. You can now continue computing radial inverses. The 2nd point field will remain activated allowing you to continue entering point numbers.

Radial Arc

You can compute the curve information for an arc defined by three points, PC (start), Radius Point, and PT (End)

Function

1. Start the inverse command and make sure the **Rad Arc** button is turned on.
2. Enter or choose the starting point for the arc in the Start field, and press your enter key to continue on to the next point.
3. Enter or choose the radius point in the Arc field, and press your enter key to continue on to the next point.
4. Enter or choose the end point for the arc in the End field, and press your enter key to compute an answer.
5. The inverse information will be displayed in the results toolbar.

Three Point Arc

You can compute the curve information for an arc defined by three points along the arc.

Function

1. Start the inverse command and make sure the **3 Pt Arc** button is turned on.
2. Enter or choose the starting point for the arc in the Start field, and press your enter key to continue on to the next point.
3. Enter or choose the point that falls on the arc in the Arc field, and press your enter key to continue on to the next point.
4. Enter or choose the end point for the arc in the End field, and press your enter key to compute an answer.
5. The inverse information will be displayed in the results toolbar.

Traverse / Intersection

Main Menu | Calculations | Traverse / Intersection

Evidence Recorder includes a powerful COGO function that allows you to compute new points. The toolbar allows you to specify the solution type, point numbers, directions and distances. When you enter enough information to compute a solution it will be draw visually on the screen. Pressing the Store Pnt button will store the point that you just solved.

Input

You can type in the point ID, or select a point by tapping on the map screen.

The direction and distance fields support the direction and distance recall features.

If you are measuring distances with a Leica Disto, just double tap in the distance field and choose the "Disto Observation" option.

Disto Distances

If you have a Leica Disto, you can send distances back to the distance edit fields. Simply double tap the distance field and select "Disto Observation" which will then set Evidence Recorder in a "waiting" mode. Take the measurement with the Disto, press the Bluetooth icon on the Disto, and the measured distance will be accepted by Evidence Recorder.

Calculator

You can open our calculator by double-tapping the Direction or Distance fields then pressing Calculator on the Keypad screen.

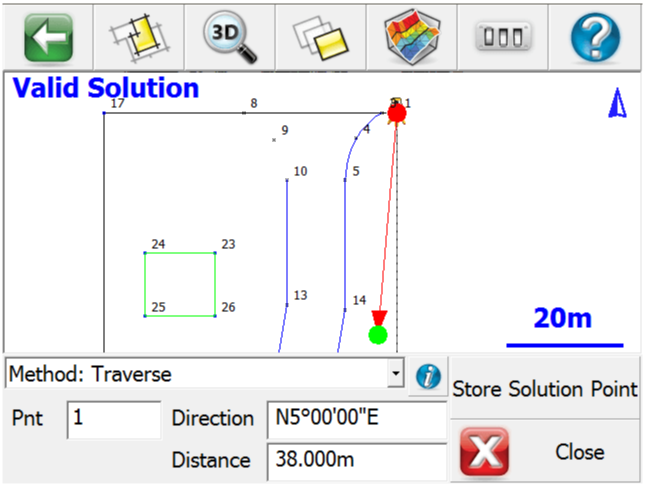
Information

You can review the results of your calculation by pressing the "i" information button. For intersections with multiple solutions, the results of both solutions will be displayed.

Solution Methods

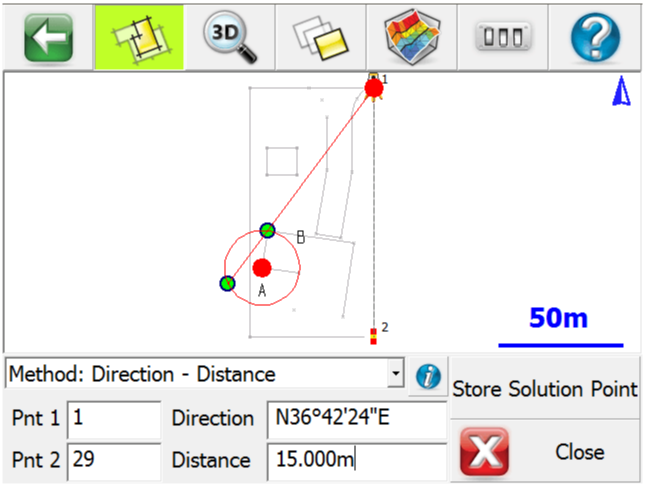
Method: Traverse

The traverse method allows you to define a direction and distance that you want to traverse. After you solve your point and store it, it will become the new start point.



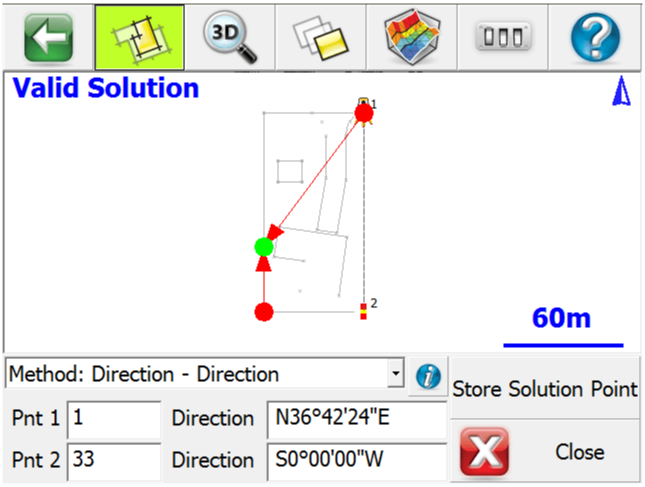
Method: Direction - Distance

This will compute two solutions based on the values you input. To store the solution, simply press the **Store Pnt** button which will ask you what solution to use, in this case either **A** or **B**.



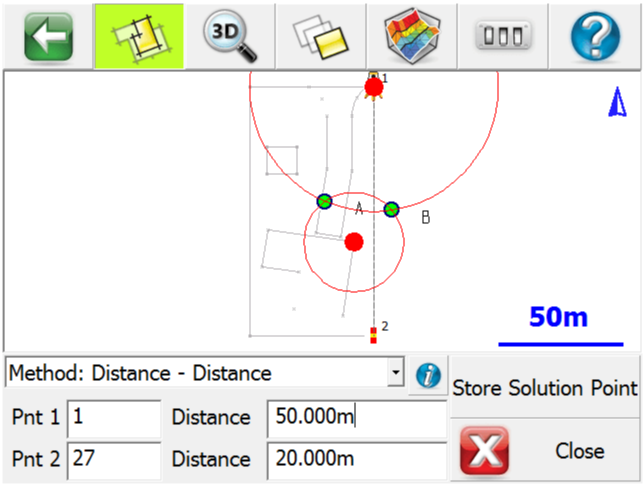
Method: Direction - Direction

Use this to compute a new point by computing an intersection using directions. After you enter your known values a solution will be displayed on the screen. To store the solution, simply press the **Store Pnt** button.



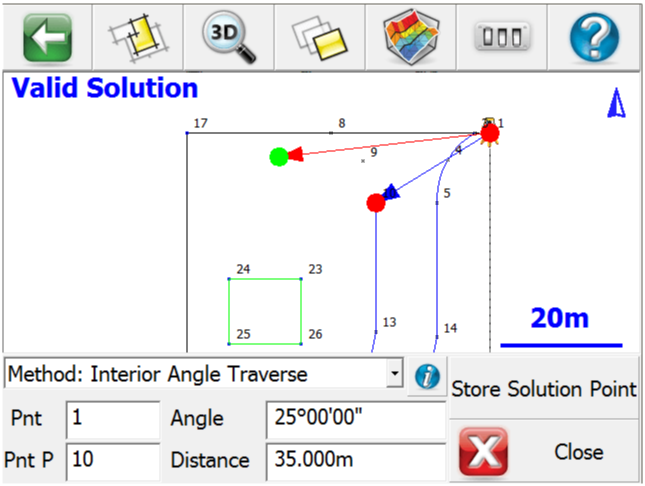
Method: Distance - Distance

Use this to compute a new point by computing an intersection using distances. This will compute two solutions based on the values you input. To store the solution, simply press the **Store Pnt** button which will ask you what solution to use, in this case either A or B.



Method: Interior Angle Traverse

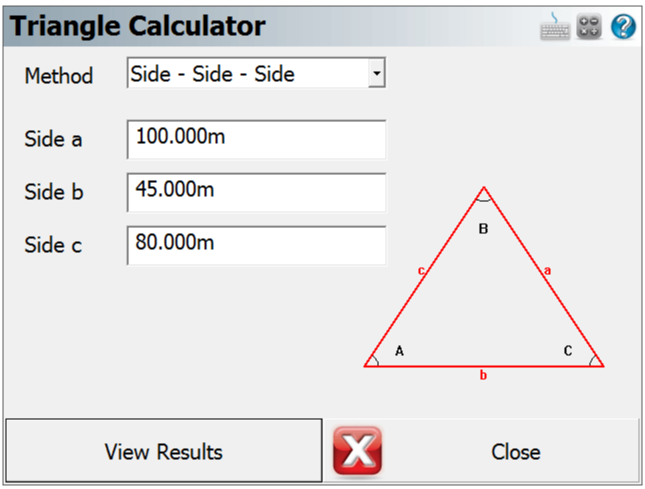
Use this to compute a new point by turning an angle from another point. Enter the current (setup) and previous (backsight) points, then the interior angle and the distance. Positive angles will be interpreted as angle right; if you want to turn an angle left, enter the angle as negative. To store the solution, simply press the **Store Pnt** button. After the point is stored, the points will automatically leapfrog so you can continue traversing by just entering the next interior angle and distance.



Triangle Calculator

Main Menu | Calculations | Triangle Calculator

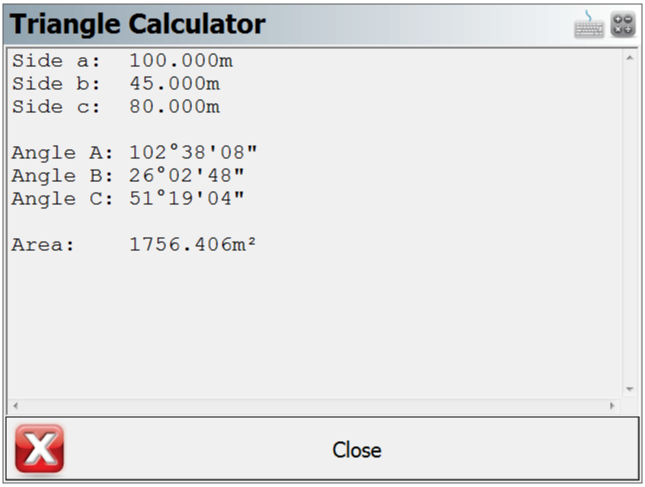
The triangle calculator can be used to solve unknown sides or angle of a triangle given three know components.



You first need to select a Method for the triangle calculation. There are 5 methods available to choose from and you can decide what method to use based on your known triangle components.

- **Side-Side-Side**: Use this when you know the length of the three sides of a triangle.
- **Angle-Side-Angle**: Use this when you know two angles and the distance between them.
- **Side-Angle-Angle**: Use this when you know two angles and one side. The know side must not lie in between the two known angles.
- **Side-Angle-Side**: Use this when two sides and the angle between them are known.
- **Side-Side-Angle**: Use this when two sides and one angle that is not between the known sides are known. This method will produce two solutions.

After you choose the solution method and enter the known components of the triangle, press the **View Results** button to complete the calculation.



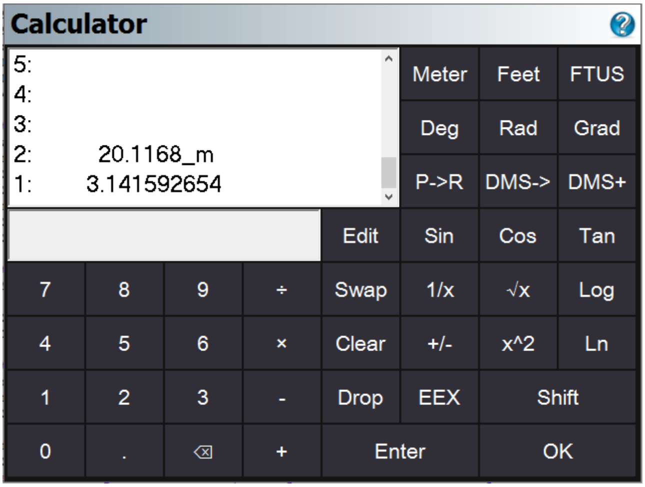
Scientific Calculator

Main Menu | Calculations | Scientific Calculator

Evidence Recorder includes an RPN (Reverse Polish Notation) Calculator. RPN Calculators (such as the HP48) are stack based, where values are popped from a stack, and the results of the calculation are pushed back onto the stack. This type of calculator may seem foreign at first, so several examples of its use are included below.

The calculator can be launched several ways:

1. By tapping inside certain numeric entry fields to directly open the Calculator. This will copy whatever value is currently in that entry field into the calculator's command line, and the calculated value can then be automatically copied back into the field which the calculator was launched from.
2. By tapping inside most text and numeric entry fields to open the keypad, and then tapping the "Calculator" button on the keypad. This will copy whatever value was currently in that entry field first into the keypad and then into the calculator's command line. The calculated value can then be automatically copied back into the keypad and then to the field which the calculator was launched from.
3. Or it can be launched through the menu system.



The Stack

The stack is a series of memory storage locations for numeric data. Each location in the stack is called a Level. There are a maximum of 20 Levels available in the Stack.

As you push new values on the stack, the stack grows to accommodate them: the new data moves into level 1, and older data is pushed to a higher level. Data in level 1 will move to level 2, data in level 2 to level 3, and so on. Any data in level 20 will be bumped off the stack if new data is added, and is unrecoverable. As you pop data off of the stack, the number of levels decrease as data is automatically bumped down to lower levels.

The stack display always shows levels 1 to 5, and you can use the scroll bar to view the other levels up to level 20.

The Command Line

The command line is where you enter or edit data. You can enter up to 20 characters in the command line.

The command line is closely tied to the stack. You use it to enter or edit data and then process it, and the results are pushed onto level 1 of the stack.

Function

Numeric Entry

You can enter values using the keys provided on the calculator or use the numeric keys on your keyboard.

[0] - [9] - Types numeric data into the command line

[←] - Types a backspace into the command line. You can also use the Backspace key on your keyboard.

Stack Operations

Functions are available to help you manipulate data that is currently stored in the stack.

[EDIT] - Pops data from level 1 of the stack into the command line, bumping all other data down one level.

[SWAP] - Switches positions of the data in levels 1 and 2 of the stack. Or you can highlight a level on the stack and pressing the Swap button will move the value to level 1.

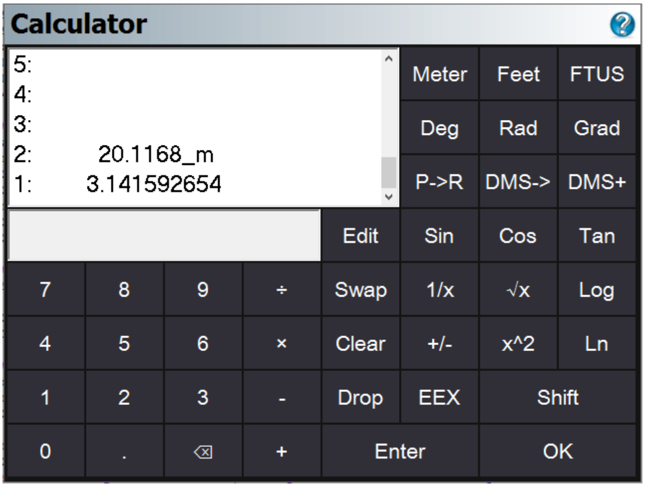
[CLEAR] - Deletes all data from the stack.

[DROP] - Deletes the data in level 1 of the stack, bumping all other data down one level.

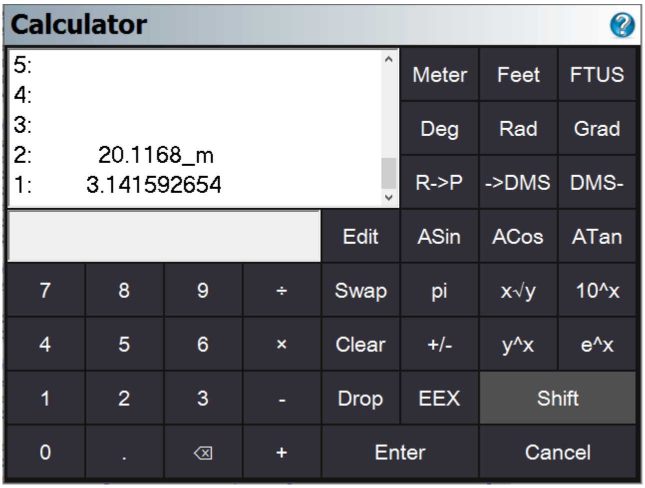
[ENTER] - Pushes data from the command line into level 1 of the stack, bumping all other data up one level. You can also use your keyboard's Enter key.

The Shift Button

[SHIFT] - This is used to show the reverse functions of each operation.



When the shift key highlighted in grey, it indicates that the shift key is currently depressed, press it again to un-shift



The OK/Cancel button

[OK] copies the value in level 1 of the stack back into the either the keypad or the numeric entry field which was double-tapped to launch the calculator, and closes the calculator.

[Cancel] closes the calculator, without copying the data anywhere

Note:

All data will remain on the Stack, and will be available the next time the calculator is re-started. On Exiting from Evidence Recorder, all data on the stack is written out to a file called CalcStack.bin and will be automatically re-loaded when Evidence Recorder is re-started.

Converting Units

[METER] , [FEET] , [FTUS]

Assigns a linear unit to the data in the Command Line, and places it on the Stack. If the Command Line is empty, then the unit is applied to the data currently in Level 1 of the Stack.

[DEG] , [RAD] , [GRAD]

Assigns an angular unit to the data in the Command Line, and places it on the Stack. If the Command Line is empty, then the unit is applied to the data currently in Level 1 of the Stack.

Note:

You do not need to press enter before pressing a unit button, it will automatically move whatever data is in the Command Line into Level 1 of the Stack.

Example: determine the metric equivalent of 15 feet:

[1][5] [FEET] [METER]

```
1: 4.572_m
```

Example: determine the gradient equivalent of 45 degrees:

[4][5] [DEG] [GRAD]

```
1: 50_grad
```

Basic Mathematical Operations

[+] , [-] , [x] , [/]

Performs a mathematical operation on the data in Level 1 and Level 2 of the Stack, or on Level 1 and the Command Line.

Note:

You do not need to press [ENTER] before pressing a math button, it will automatically move whatever data is in the Command Line into Level 1 of the Stack.

Example: determine the sum of 2 + 3

```
[2] [ENTER] [3] [+]
1: 5
```

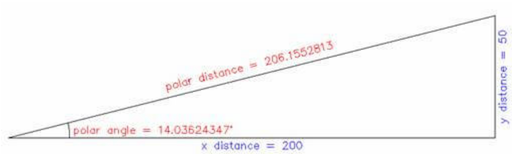
Advanced Mathematical Operations

Note:

You do not need to press [ENTER] before pressing a math button, it will automatically move whatever data is in the Command Line into Level 1 of the Stack.

[P>R] , [R>P]

Convert data between Polar and Rectangular notation



Example: Convert 206 feet at 14° to Rectangular components.

```
[2][0][6] [ENTER] [1][4] [P->R]
2: 199.8809196
1: 49.83591049
```

Example: Convert x=200, y=50 to Polar components.

```
[2][0][0] [ENTER] [5][0] [SHIFT] [R->P]
2: 206.1552813
1: 14.03624347_°
```

[DMS>] , [>DMS]

Converts data between Degrees/Minutes/Seconds and Decimal Degrees

Example: Convert from 12° 34' 56" to decimal degrees

```
[1][2][.][3][4][5][6] [DMS->]
1: 12.58222222_°
```

Example: Convert from 12.3456° to degrees, minutes, seconds

```
[1][2][.][3][4][5][6] [SHIFT] [->DMS]
1: 12.204416
```

[DMS+] , [DMS-]

Add or subtract DMS angles

Example: 12° 34' 56" + 1° 2' 3"

```
[1][2][.][3][4][5][6] [ENTER] [1][.][0][2][0][3] [DMS+]
1: 13.3659
```

[SIN] , [COS] , [TAN] , [ASIN] , [ACOS] , [ATAN]

Trigonometric calculations

Example: Cosine of 12.3456°

```
[1][2][.][3][4][5][6] [COS]
1: 0.9768757205
```

Example: Cosine of 12° 34' 56"

```
[1][2][.][3][4][5][6] [DMS->] [COS]
1: 0.9759844006
```

Example: Arc Cosine of 0.3456°

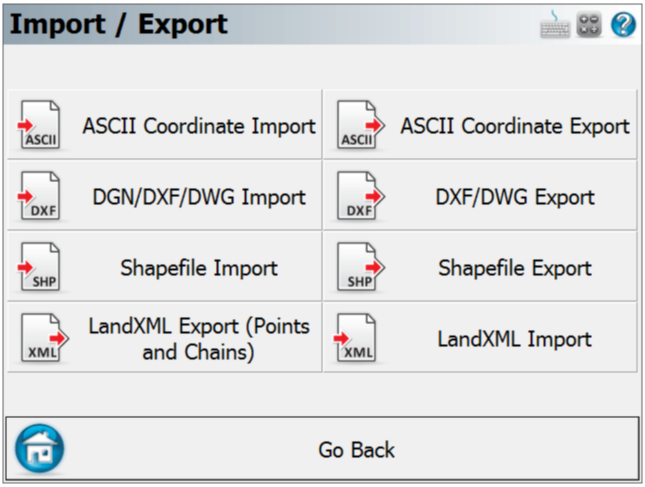
```
[0][.][3][4][5][6] [SHIFT] [ACOS]
1: 69.78157371
```

[1/X]	Inverse of X. Example: 1/4 = [4] [1/X] = 0.25
[√x]	Square Root of X. Example: ROOT(9) = [9] [√x] = 3
[LOG]	Logarithm (Base 10). Example: LOG(1000) = [1][0][0][0] [LOG] = 4
[+/-]	Change Sign. Example: [3] [ENTER] [+/-] = -3
[x^2]	X Squared. Example: 3^2 = [3] [x^2] = 9
[LN]	Natural Logarithm. Example: LN(148) = [1][4][8] [LN] = 4.997212274
[EEX]	Scientific Notation. Example: 3x10^4 = [3] [EEX] [4] = 30,000
[pi]	Pushes pi onto the stack. Example: [SHIFT] [pi] = 3.141592654
[x√y]	X'th root of Y. Example: 3ROOT(8)= [8] [ENTER] [3] [SHIFT] [x√y] = 2
[10^x]	10 to the X. Example: 10^3 = [3] [SHIFT] [10^x] = 1000
[y^x]	Y to the X. Example: 2^3 = [2] [ENTER] [3] [SHIFT] [y^x] = 8
[e^x]	Exponent of X. Example: e^1 = [1] [ENTER] [SHIFT] [e^x] = 2.718281828

Import / Export

Main Menu | Import / Export

Use this menu to display different options for importing data into or exporting data out of your Scene.



ASCII Coordinates

You can import and export ASCII coordinates to/from your current Scene. Please see the Import ASCII Coordinates and Export ASCII Coordinates topics for more information.

DXF/DWG/DGN

Import DXF/DWG/DGN files into your current Scene. Please see the Import DXF/DWG/DGN File and Map Data Layers topics for more information. When importing in a DWG or DGN files there are some limitations with regards to the file size being imported and the data collector being used. Should you experience any graphical display issues, try importing in a smaller file or unloading the file entirely to clear it up.

Export DXF/DWG files of your current Scene. The file will contain drawing entities of your points and lines. Please see the Export DXF/DWG File topic for more information.

LandXML

Import and export LandXML files. Exported files can contain CgPoints and Chains. The file will be saved in your current Scene directory. Please see the LandXML Import and LandXML Export topics for more information.

Shapefiles

Evidence Recorder now supports the importing and exporting of ESRI shapefiles. Please see the Shapefile Export topic for more information.

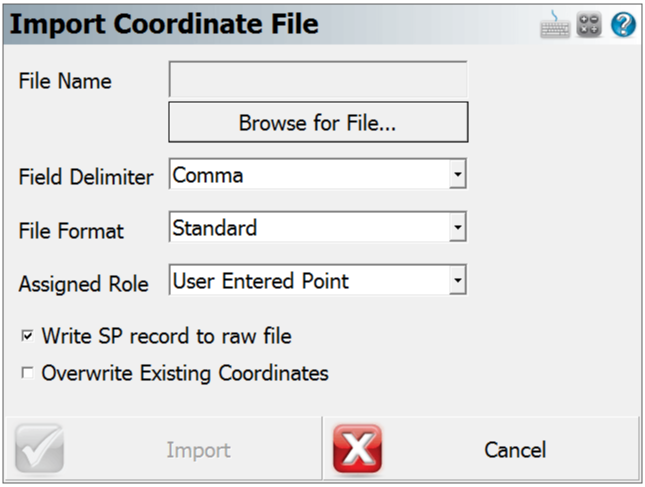
Notes:

- For importing DXF/DWG/DGN and raster image files, please see the Map Data Layers topic in the Data Manager menu.

ASCII Coordinate Import

Main Menu | Import / Export | ASCII Coordinate Import

Use this option to import a list of coordinates to the current Scene.



This may be required if a separate coordinate file is uploaded to the device by itself (not as part of a Scene with linework). This is also useful for transfer of points from one file to another.

Function

1. Click on the "Browse for File..." button to navigate to and select your file.
2. Choose the field delimiter, either Comma or Space.
3. Choose the file format. See below for more information regarding file format. If you are uncertain, use the **Standard** format.
4. Use the assigned role field to select the survey role of the points being imported. If these points are to go into the list, then select **To Stake Out** as the survey role.
5. **Write SP** (Store Point) **record to raw file** will store the imported coordinates to the raw file. This is very useful if you wish to reprocess coordinates later, so we recommend that you select this when importing points.
6. **Overwrite Existing Coordinates** - allows you to control whether points will be overwritten during the import.
7. **Set as Control Points** – will set a flag in the database that will prevent these points from being edited or changed in Evidence Recorder (under any circumstances!)
8. Choose **OK** to import the coordinates, **Cancel** to abort the import.
9. You will be shown a confirmation of how many points were imported to the current Scene.

File Formats

Both space and comma delimited files are supported.

For all formats, the order of the Northing and Easting fields are determined by setting the Coordinate Order in the Options screen.

Standard

```
ID, Northing/Y or Easting/X, Easting/X or Northing/Y, Elevation, Descrip-
tion:Note
```

This format expects the file to be in a standard ASCII format. If your descriptions have a colon in them, then Evidence Recorder will store everything before the colon as a description, and everything after the colon will be considered to be a note.

Standard with Header

Same as the Standard format, but the first row in the file is ignored.

Extended

```
ID, Northing/Y or Easting/X, Easting/X or Northing/Y, Elevation, Descrip-
tion, Note, Latitude, Longitude, Ellipsoidal Height, Latitude StdDev, Lon-
gitude StdDev, Height StdDev
```

This format is different than the standard such that notes are separate from descriptions. Also if you collected GNSS data, the WGS 84 information can also be included and imported along with other information related to the GNSS point.

Extended with Header

Same as the Extended format, but the first row in the file is ignored.

More about the Extended Format

If you import a Evidence Recorder extended file format ASCII file, Evidence Recorder will create EP and GS records in the raw file. Also, the coordinates will be imported and stored in the database. Importing this type of file is useful for seeding points when using the OmniStar GNSS system or to create a list of geodetic and cartesian points that you can select while programming a GNSS base receiver.

ID	Northing	Easting	Elevation	Description	Note	Latitude	Longitude	Ell
100	5523097.874	311564.984	399.387	CONTROL		49.83067177	-119.6202724	
101	5523168.871	311529.912	401.188	CONTROL		49.83129864	-119.620794	
102	5523164.192	311507.476	400.85	CONTROL		49.83124955	-119.6211034	
103	5523135.07	311511.185	399.795	CONTROL		49.83098906	-119.6210377	
104	5523099.336	311521.81	399.552	CONTROL		49.83067133	-119.6208728	
105	5523074.024	311506.919	399.233	CONTROL		49.83043923	-119.6210673	
106	5523046.282	311521.379	398.049	CONTROL		49.83019451	-119.620853	
201	5523161.883	311526.004	400.632	CONTROL		49.83123463	-119.6208449	
202	5523159.786	311530.386	400.665	CONTROL		49.83121716	-119.620783	
203	5523167.28	311538.864	401.095	CONTROL		49.83128716	-119.6206689	
204	5523165.261	311551.194	400.946	CONTROL		49.8312729	-119.6204967	
205	5523172.776	311493.661	401.686	CONTROL		49.83132233	-119.6212995	

Importing Cartesian and Geodetic Coordinates

Above is an example of an Extended ASCII file. For the format to work correctly, each point should include Cartesian and Geodetic coordinates for each point. The standard deviations are not needed unless the point is going to be used to "seed" a position for use with the OmniStarVBS system. **The Latitude and Longitude values are required to be stored in decimal degrees.**

So if this type of file is imported into Evidence Recorder the following will occur:

- A point is stored in the Scene database using the Cartesian Coordinates.
- A GS record is written in the raw file using the Cartesian Coordinates as a reference.
- An EP record is written to the raw file using the Geodetic Coordinates as a reference.

Importing Geodetic Coordinates Only

You can create an Extended ASCII Point file that only contains a point number, description, note and Geodetic coordinates. Upon import Evidence Recorder will use the Geodetic coordinates and your defined coordinate system in your coordinate system settings to compute Cartesian coordinates to be stored in the database.

So if this type of file is imported into Evidence Recorder the following will occur:

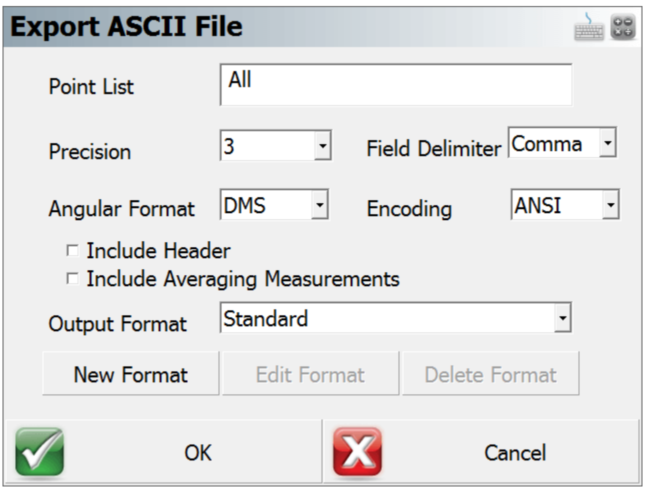
- Using the horizontal and Vertical datum settings you've defined in your coordinate system settings, Evidence Recorder will compute a Cartesian coordinate for each point using the Geodetic values imported from the ASCII file.
- A point is stored in the Scene database using the Cartesian Coordinates that was computed. The point will be assigned the point number that was imported from the ASCII file.
- A GS record is written in the raw file using the Cartesian Coordinates as a reference.
- An EP record is written to the raw file using the Geodetic Coordinates as a reference.

ASCII Coordinate Export

Main Menu | Import / Export | ASCII Coordinate Export

Use this option to export a coordinate list from the current file.

This is useful for transfer of points from one file to another.



Function

1. Specify a range of point to export in the form **#..#**. Accept default of **All** if desired.
2. Specify the number of decimal places to carry on the export. (maximum=6)
3. Specify if you want to export them with either a space or comma delimiter.
4. Specify the Angular format.
5. Specify the Encoding format.
   - ANSI - This is the default format for ASCII, which is compatible with majority of the CAD programs such as Autodesk products.
   - UNICODE - This is for use with non-English characters in the Description or Note fields.
6. Include Header will add a header row to the exported file.
7. Include Averaging Measurements - This will include all the temporary observations of all the averaged points into the exported file
8. Choose the file format type that you want to use. See below for more details about the different file formats. If you are uncertain, use the **Standard** format.
9. Choose **Export** to export the coordinates, or **Cancel** to abort the export.
10. Browse to the folder where you want to save the file, enter a filename including an extension, then press **Save File**. Evidence Recorder will not add any extension to the filename you enter.
11. You will be shown a confirmation of how many points were exported.

File Formats

Both space and comma delimited files are supported.

For all formats, the order of the Northing and Easting fields are determined by setting the Coordinate Order in the Options screen.

Standard

```
ID, Northing/Y or Easting/X, Easting/X or Northing/Y, Elevation, Descrip-
tion:Note
```

This format will append any notes you have to your description, separated by a colon.

Evidence Recorder has recently added two check boxes to include the Header and the Averaging Measurements to the ASCII file when exporting.

Extended

```
ID, Northing/Y or Easting/X, Easting/X or Northing/Y, Elevation, Descrip-
tion, Note, Latitude, Longitude, EllipsoidalHeight, LatitudeStdDev, Lon-
gitudeStdDev, HeightStdDev
```

This format is different than the Standard such that notes are separated from descriptions.

If you collected GNSS data, the WGS 84 information will also be exported along with other information related to the GNSS point. The WGS 84 information will be extracted from your GS records in the raw file.

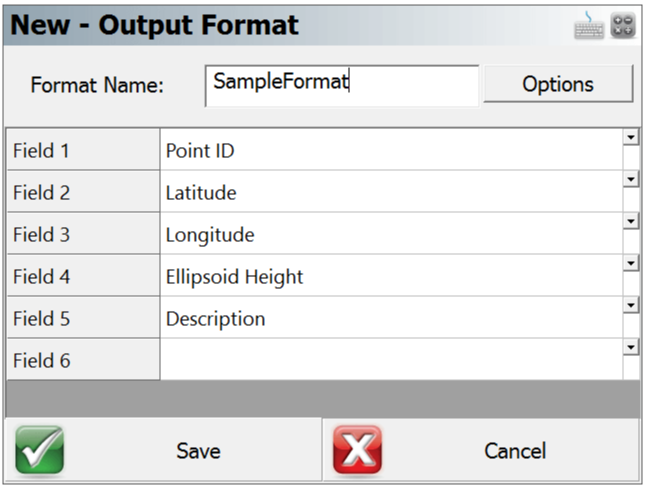
Extended with Header

Same as the Extended format, but with Header data in the first row.

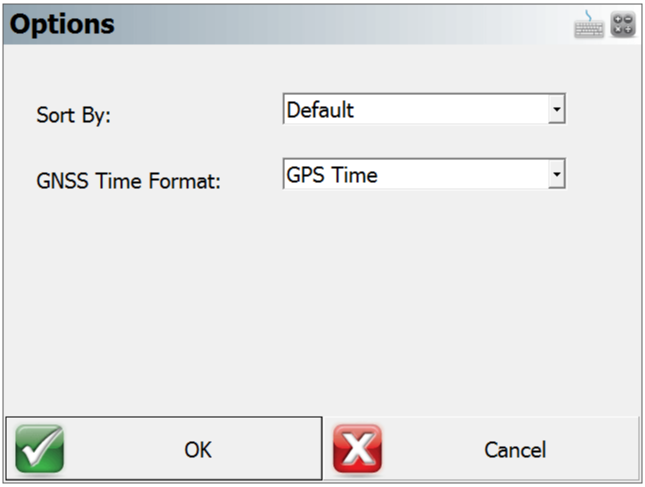
CST

This is a predefined format intended for Leica ELLIPSE Neo software

Custom Formats



Evidence Recorder has the option to create a customized ASCII file for exporting. This option allows the user to add additional information to the standard ASCII file format. Simply click in the grey area to add in an extra info line and select what you wish to add in from the pull down menu.



There is also an "Options" button in the upper right corner where you can specifically request the ASCII file to either sort by Point ID or Measurement type as select what GNSS time format.

More about the Extended Format

If you import a Evidence Recorder extended file format ASCII file, we will create EP and GS records in the raw file. Also, the coordinates will be imported and stored in the database. Importing this type of file is useful for seeding points when using the OmniStar GNSS system.

There is more detailed information about the extended format in the ASCII Coordinate Import topic.

DGN/DXF/DWG Import

Main Menu | Import / Export | DGN/DXF/DWG Import

Use this function to import CAD DXF files into a Evidence Recorder Scene.

Evidence Recorder supports all Point nodes, Lines, Arcs, Polylines, Text and 3D Faces in the DXF file.

Evidence Recorder does not support Blocks or any other entities not mentioned above in the DXF file.

All items from the DXF file will be drawn in their respective layers as defined in the DXF file. These layers may be toggled on and off using Evidence Recorder's layer manager.

Importing Steps

1. From the main menu, press the **Data Manager** button then the **Map Data Layers** button.
2. Press the **Add File** button on the Layer Manager.
3. Using the browse window, find the DXF file you would like to import and press the **Open File** button.
4. Use the Layer Manager to turn on or off any layers you don't want to view.
5. Press **Close** and return to the map view.
6. Press the zoom extents button to see your entire DXF file.

For more information on the layer manager please visit the Layer Manager topic.

Important Notes:

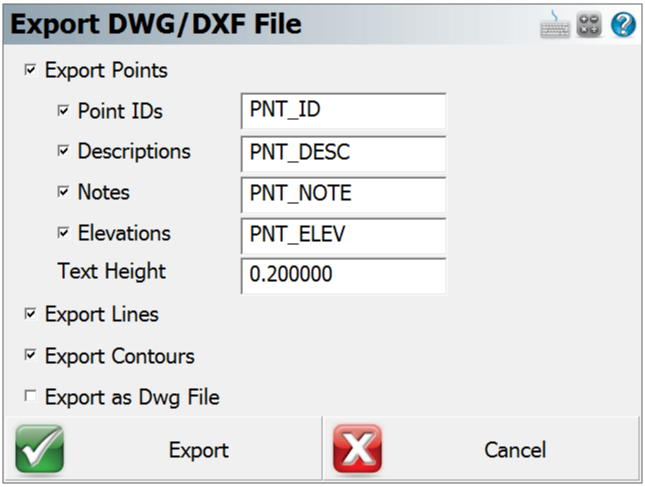
- Your CAD desktop system likely has a super fast processor and 1GB or more of RAM but most current Windows CE devices run at 206Mhz and have 32 or maybe 64MB of RAM. For this reason, you will not be able to manipulate a 5MB DXF file with the same speed as your desktop system so minimize the size of the DXF files for most efficient operation.

- TEXT is the biggest performance reducer in your DXF files. For best performance, minimize the amount of text in the DXF files or turn off layers containing text when not needed.

DXF/DWG Export

Main Menu | Import / Export | DXF/DWG Export

Use this to export your current Evidence Recorder drawing as a DXF or DWG file. This allows for easy import of linework and nodes into most cad or graphic systems



Function

1. Select the options for your DXF file.

   Export Points: If this is checked, your coordinate point nodes will be exported to the DXF file. You can also specify what layer you want the labels to go on and a default text height.

   Export Lines: If this is checked, all figures (lines, arcs, and splines) will be exported to the DXF file.

   Export Contours: If this is checked, all contour lines drawn using the Surface Manager will be exported to the DXF file.
2. Click **Export.**
3. Browse to the folder where you want to save the file, enter a filename, then press Save File. Evidence Recorder will add a .dxf extension to the filename if you did not include it.
4. The DXF file is created and you can copy it to your desktop computer.

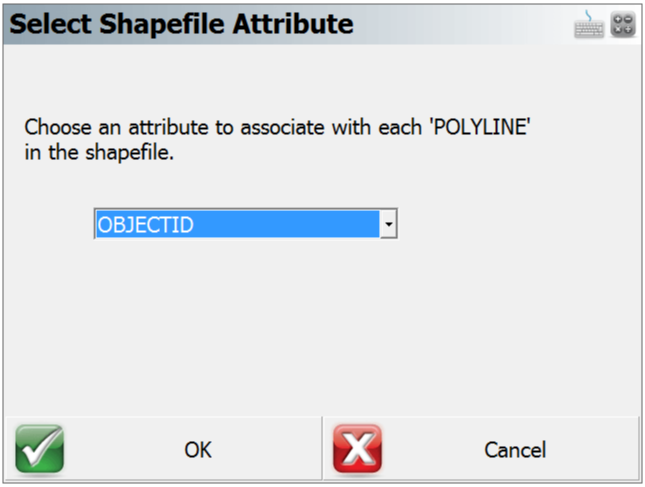
Notes about DXF files:

- Upon export, Evidence Recorder will compare the figure name to see if it has a match in the AutoMap file. If it does, Evidence Recorder will draw the points along the figure, as well as draw the figure on the layer specified in the AutoMap library.
- Points that are exported will match the point color settings set in the AutoMap library.
- Figures that don't have a match in the AutoMap library will be drawn on a layer named "Default". Color setting will be set to 256.
- Points or nodes will be 2D or 3D depending on the Z value.
- Lines will be 2D or 3D depending on the Z values of the end points.
- Figures will be drawn as polylines.
- Curvy lines or arcs will be drawn as segmented polylines. Evidence Recorder will automatically interpolate an elevation along the arc or curved section of the figure at 1° intervals.
- Contours will be drawn as polylines and will be 3D based on the contour elevation.
- Points or nodes will appear as an "X" marker in the DXF file because the PDMODE variable is being set to 3 in the DXF file. In most desktop CAD programs you can change this marker type by typing PDMODE.

Shapefile Import

Main Menu | Import / Export | Shapefile Import

Imports a Shapefile and allows you to pick one attribute to associate with the shape.



Shapefile Export

Main Menu | Import / Export | Shapefile Export

Use this to export your points and linework in a shape file format. This can then be imported into products that support shape files. This export will create a DBF, SHP and a SHX file for the linework and points in your Scene.

For example, if your Scene name was CAR CRASH, the following files will be created for the line-work.

CAR CRASH_POLYLINE.shx

CAR CRASH_POLYLINE.shp

CAR CRASH_POLYLINE.dbf

For the points in your Scene, Evidence Recorder already stores points in a DBF file (CAR CRASH.dbf) so only two other files will be created.

CAR CRASH.shx

CAR CRASH.shp

Importing into ESRI or other application

To open these files in a compatible product you need to ensure you have all six file saved in the same directory.

For more information on shape files, visit www.esri.com

LandXML Import

Main Menu | Import / Export | LandXML Import

Evidence Recorder can import LandXML files. Rather than convert these files into some different format, you can read these files directly into Evidence Recorder.

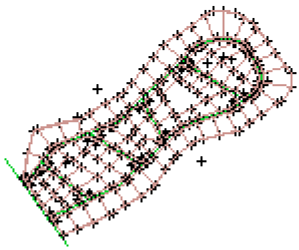
Importing a LandXML File

There are several different methods of importing a LandXML file:

- By using the Import LandXML File command.
- By using the Data Manager | Map Data Layers | Add File command.
- By placing a LandXML file into a Scene folder. This is normally done by desktop software like IMS Map360. If Evidence Recorder finds a LandXML file that has the same name as the Scene, and it is in the Scene folder, then it will automatically be imported when you load the Scene.

When a LandXML file is read, it is scanned to make a list of the objects that it contains. Loading the entire file into the Evidence Recorder Scene could use many megabytes of valuable memory. Therefore, when you wish to use data from a LandXML file, you need to load it as needed. Sample LandXML files are available at the LandXML web site: www.landxml.org

One of the example files posted is subdivision-xsec.xml. We have downloaded and are now going to show the results of reading it into Evidence Recorder:



LandXML Components and How to Use Them

There are many different types of objects in a LandXML file. Evidence Recorder will be expanding the use of these objects as the program grows.

As of the date this manual was written, the following objects are supported. This list will change, so you may notice other options on the smart menus for these objects.

CgPoints

A LandXML file can contain many different sets of points. The LandXML specification requires that every point in a LandXML file have a different id. For example you cannot have two CgPoint sets containing a point with the same id. Since a LandXML file can contain many different CgPoint sets, and these point sets may contain thousands of points, Evidence Recorder lists these sets in the Scene Manager. When you want to see them on the screen, you need to use the Smart Menu to Load the CgPoint Sets.

By default when you import your LandXML file, the CgPoints will be displayed on the screen. CgPoints are not stored in the database but they can be used by our commands. For example you can use the Occupy Point command and select the CgPoints with the point chooser for the setup and backsight points. You can also consider them to be read only points.

Surfaces

Surfaces can be imported into Evidence Recorder from a LandXML file. The surfaces can be imported in two ways:

- Fast: We can use the points that define the surface and let Evidence Recorder re-calculate the TIN model. This might be acceptable for an area where no attempt was made to edit the triangles or add break lines. Evidence Recorder can compute a surface in seconds from large numbers of points.
- Maintain Triangulation: we can force Evidence Recorder to read the TIN exactly as computed by the desktop software. This requires much more computing by the import program, but it will exactly maintain the triangulation in the original surface. For example, if the LandXML surface was created by using breaklines and hand editing, you will want to maintain the exact triangles for staking and viewing the surface.

You can set the import method by going to the Main Menu | Data Manager | Surfaces | Surface Options.

From the Surface Manager you can see a list of the surfaces in the XML file. Select the one you want to load.

Alignments, Profiles, and Cross Sections

Alignments, cross sections, and staking of these items are some of the powerful features in Evidence Recorder. Almost all modern road design software will export alignments in LandXML format. We read the horizontal alignment (which is normally at elevation zero), the vertical profile, and the cross sections from LandXML files. Individual components can be selected for staking or viewing information. The Scene Manager is used for visibility of these items, and you can drill down into the components right to the coordinate level.

Reading the basic alignment information is done when you import the LandXML file. Alignments generally are not too large, so we read the alignment, profile and cross sections into memory for later use. There may be several surfaces in an alignment, so you can view each cross section surface separately. Each may be staked. In this sample file, there are several alignments. Each alignment can be turned on or off, or just the cross sections for an alignment can be turned off.

Following is a tiny excerpt from the first few lines of this LandXML file. Fortunately, it is rarely necessary to open a file; however, if you open one in Internet Explorer, you will see the format. They are easily explored, because you can "collapse" sections of the file by picking on the negative signs at the beginning of the lines in Internet Explorer. In this picture, all of the file has been collapsed except for the header. It is easy to see that the file was created by Autodesk Land Desktop version 3 with Service Pack 1 installed.

```
 <?xml version="1.0" ?>
- <LandXML xmlns="http://www.landxml.org/schema/LandXML-1.0"
   xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
   xsi:schemaLocation="http://www.landxml.org/schema/LandXML-1.0
   http://www.landxml.org/schema/LandXML-1.0/LandXML-1.0.xsd" version="1.0
   time="10:08:09" readOnly="false" language="English">
   <Project name="subdivision" />
 + <Units>
 + <Application name="Land Desktop" manufacturer="Autodesk" version="3 - Service Pa
     manufacturerURL="www.autodesk.com">
 + <CgPoints>
 + <Surfaces>
 + <Parcels>
 + <Alignments>
 </LandXML>
```

Parcels/Lots

Parcels are displayed in the graphics when you import a LandXML file. You can select the lines to get basic information, and you can drill down into the Scene Manager to see more details. The points that define a Parcel are stored in the CgPoints section of the LandXML file. If you want to see the point numbers on the screen, then you need to load the CgPoints. If you want to stake the points, then you need to load the CgPoints into the Points DB.

Chains/Figures

These LandXML items may or may not appear, because a chain can cross from one CgPoints set to another. This means that if you do not have all the CgPoint sets loaded, then the chains cannot appear.

LandXML Export (Points and Chains)

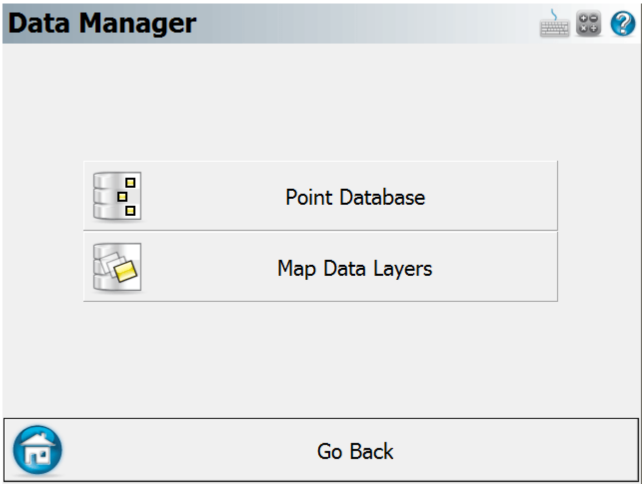
Main Menu | Import / Export | LandXML Export (Points and Chains)

Writes a LandXML *.xml file, including CgPoint records of the point coordinates and Chain records of the figures in the current Scene.

Data Manager Menu

Main Menu | Data Manager

This menu allows you to organize, manipulate and view the different data types that may be associated with your Evidence Recorder Scenes.



Points Database

Use this to open the points database. From here you will find numerous tools that can be used to edit your points. Please see the Coordinate Database topic for more information.

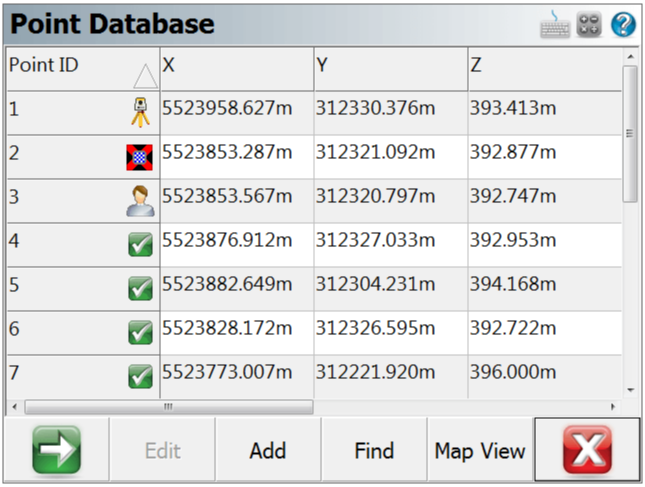
Map Data Layers

Use this to import DXF, and georeferenced raster image files into your Scene, and to control the visibility of database layers and any files that you may have associated with your Scene. Please see the Map Data Layers topic for more information.

Point Database

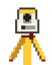
Main Menu | Data Manager | Point Database

The point database dialog is used to review, edit, and manipulate your point data in your Scene database. The list will display all points currently stored in the database, and the data can be sorted by pressing the column headers.

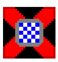


Point ID	X	Y	Z
1	5523958.627m	312330.376m	393.413m
2	5523853.287m	312321.092m	392.877m
3	5523853.567m	312320.797m	392.747m
4	5523876.912m	312327.033m	392.953m
5	5523882.649m	312304.231m	394.168m
6	5523828.172m	312326.595m	392.722m
7	5523773.007m	312221.920m	396.000m

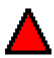
Point ID (Survey Role) Icons



The instrument icon indicates your current occupied reference point.



The target icon indicates your current backsight point.



The hub icon indicates control points, they cannot be edited under any circumstances.

The user icon indicates user entered points, the coordinate can not be edited.

The ruler icon indicates measured points, the coordinate cannot be edited.

The 123 icon indicates calculated points, the coordinate cannot be edited.

The stake and square icon indicates a Staked and Stored point. The Staked and Stored survey role is unique and not associated with LandXML schema.

Note:

To edit the coordinate of a measured or calculated point, you must first change its survey role to **user entered.**

Edit

Use this to edit the coordinates of a point that is highlighted in the list using the Store/Edit Points tool. Remember you must change the Survey Role to **User Entered**.

Add

Use this to open the Store Point screen to manually enter a new point.

Find

Use this to select multiple points, based on a single point ID, a point ID range, a point coordinate range, or point descriptions.

Statistics

Use this to display statistics of the coordinate database, including the total number of points, bounding minimum and maximum coordinate values, and point ID's in use, and point ID's not in use.

Map View

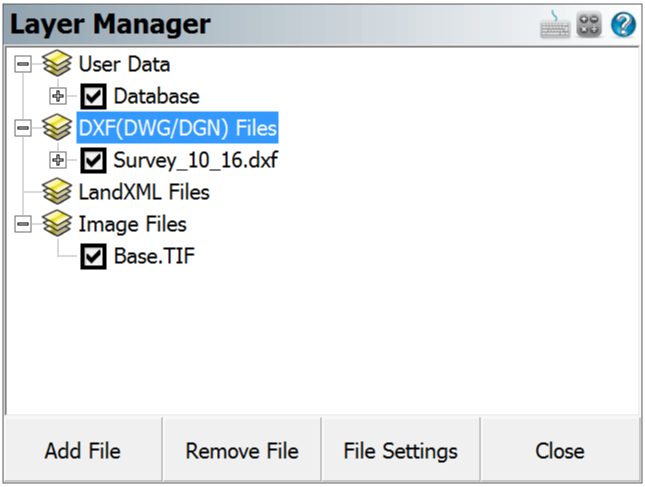
Use this to display the currently highlighted points on the screen.

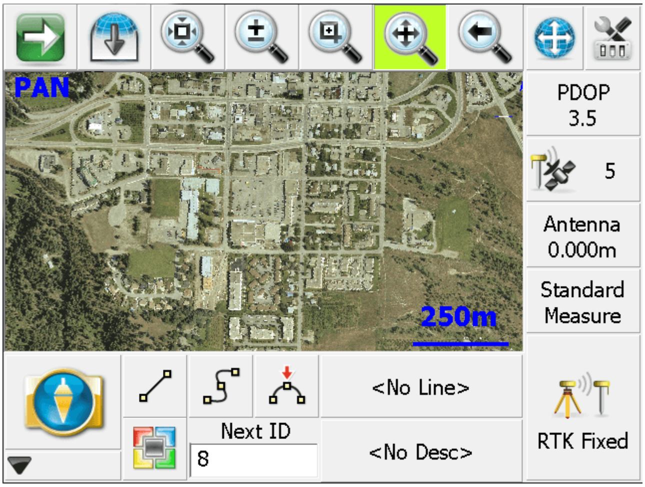
Average

Map Data Layers

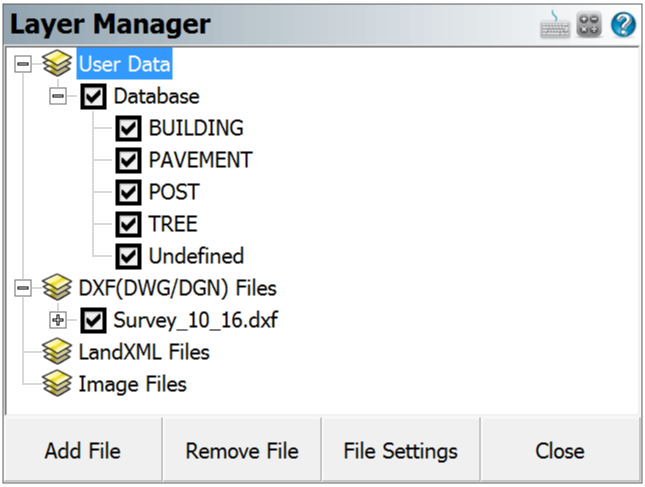
Main Menu | Data Manager | Map Data Layers

Use this to load, unload, and control the visibility of DXF files, and JPG or TIFF raster image files that are associated with your Scene, and to control the visibility of your database layers.


Layer Manager
User Data
Database
DXF(DWG/DGN) Files
Survey_10_16.dxf
LandXML Files
Image Files
Base.TIF
Add File
Remove File
File Settings
Close


PAN
250m
PDOP
3.5
5
Antenna
0.000m
Standard
Measure
<No Line>
Next ID
8
<No Desc>
RTK Fixed

User Data



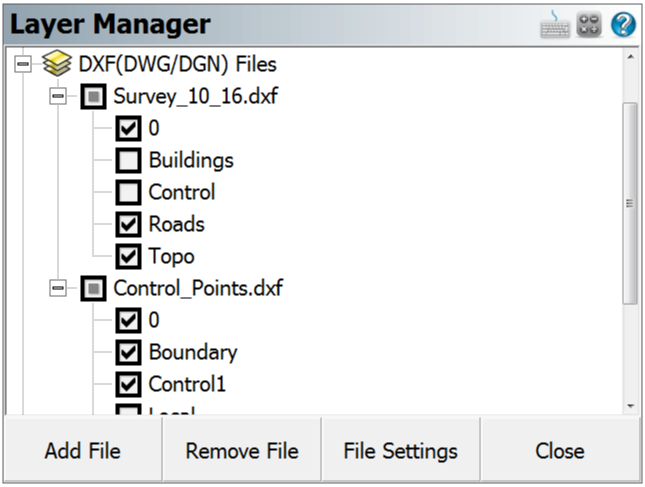
Evidence Recorder uses the layer names specified in the AutoMap library to control the visibility of points and figures by their description.

You can control the visibility of the entire database (both points and figures) by checking or unchecking the Database option under the User Data section of the tree. If the box is checked, then the database is turned on and all of its layers will be visible; if unchecked, then the file and all of its layers is turned off and it will not be visible. If the box has another smaller square inside it, this means that some of its layers are turned on and other layers are turned off.

You can control the visibility of individual layers by expanding Database option under the User Data section of the tree, and checking or unchecking the box beside the name of the layer. If the box is checked, then the layer is turned on and entities on that layer will be visible; if unchecked, then the layer is turned off and entities on it will not be visible.

When you close the Scene, the layer status will be saved so that the next time the Scene is opened, the layer visibility will automatically be set the same as you had left it, so layers that were turned off will remain turned off the next time the Scene is opened up.

DXF Files



You can load multiple DXF files into your Evidence Recorder Scene, and control the visibility of each of their layers independently from the others.

You can control the visibility of the entire DXF file by checking or unchecking the box beside the name of the DXF file, under the DXF Files section of the tree. If the box is checked, then the file is turned on and all of its layers will be visible; if unchecked, then the file and all of its layers is turned off and it will not be visible. If the box has another smaller square inside it, this means that some of its layers are turned on and other layers are turned off.

You can control the visibility of individual layers by expanding the name of the DXF file under the DXF Files section of the tree, and checking or unchecking the box beside the name of the layer. If the box is checked, then the layer is turned on and entities on that layer will be visible; if unchecked, then the layer is turned off and entities on it will not be visible.

When you close the Scene, the layer status will be saved so that the next time the Scene is opened, the layer visibility will automatically be set the same as you had left it, so files that were turned off will remain turned off the next time the Scene is opened up.

Add File

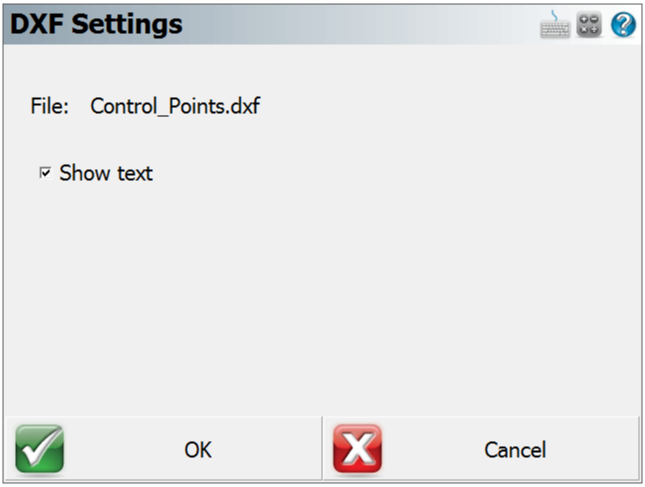
Press the Add File button to select a DXF file that you want to load into your Scene. You will be able to browse to and select any DXF file. Please see the Import DXF File topic for more information.

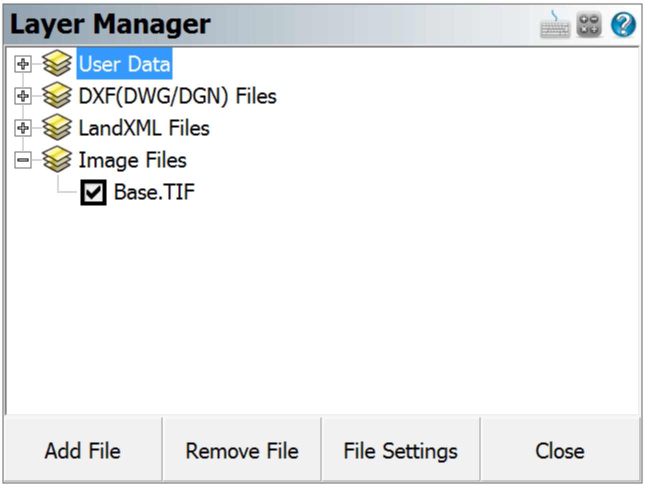
Remove File

Highlight the DXF file that you want to remove from your Scene, then press the Remove File button. If a file is not highlighted, you will be reminded that a file must first be selected from the tree. This will turn off all layers from the selected file in your Evidence Recorder Scene and disassociate the DXF file. It does not delete the DXF file.

File Settings

Highlight the DXF file that you wish to change the settings for, then press the File Settings button. You can enable or disable the display of text in the selected file. If your DXF file contains text, turning this off will improve performance of Evidence Recorder. Pressing the OK or Cancel buttons will return you to the Layer Manager screen.





You can load georeferenced JPG or TIFF images into your Evidence Recorder Scene, and control the visibility of the image.

You can control the visibility of your image by checking or unchecking the box beside the name of the image file, under the Image Files section of the tree. If the box is checked, then the image is turned on and it will be visible; if unchecked, then the image is turned off and it will not be visible.

When you close the Scene, the visibility and opacity status of the image file will be saved so that the next time the Scene is opened, the image visibility will automatically be set the same as you had left it.

Add File

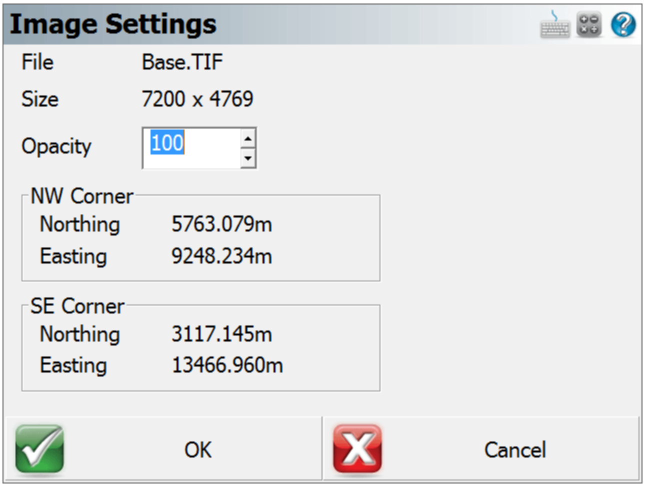
Press the Add File button to select an image file to load into your Scene. You will be able to browse to and select any JPG or TIF file. JPG files must have a corresponding JGW world file, and TIF files must have a corresponding TFW world file; these world files contain the georeferenced positioning information. The world file must have the same file name as the image file (just with the appropriate extension), and it will be automatically used to position the image. Note that the world file is unit-less, make sure that the unit settings in the desktop and mobile software are the same.

Remove File

Highlight the image file you want to remove from your Scene, then press the Remove File button. If a file is not highlighted, you will be reminded that a file must first be selected from the tree. This will turn off the selected image in your Evidence Recorder Scene and disassociate the image file.

File Settings

Highlight the image file you want to view or change the display settings for, then press the File Settings button. You will see the file's name, size, and position information. You can also adjust the opacity of the image. The default value of 100 will cause the image to be displayed normally, and reducing this value will make it appear fainter on the screen. This is useful if the image file being displayed makes your other Evidence Recorder data too hard to see over top of the image. Pressing the Close button will return you to the Layer Manager screen.



Total Station Reference

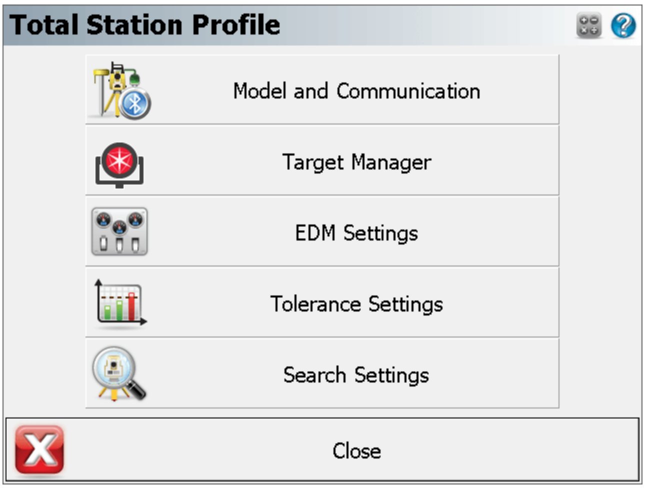
Make and Model Settings

Evidence Recorder includes instrument and GNSS drivers for most popular brands. This list of supported hardware is constantly changing and for a complete list of supported hardware, please visit the following webpage: http://hardware.microsurvey.com

Total Station Profile

Main Menu | Connect | Edit Total Station Profile

This screen will help you configure your total stating settings such as the make and model of instrument you plan on using and set any desired parameters you may need to use with your instrument. This option will only be available if you specified **Total Station** in the Instrument Selection screen and then **Edit** a profile.



Model and Communication

This allows you to specify the make and model of instrument that will be connected to Evidence Recorder. You can also specify the communication settings such as baud rate and com port. See the Model and Communication topic for more information.

Target Manager

This allows you to create, copy, and delete targets in Evidence Recorder. You can define a unique backsight and foresight target for example. See the Target Managertopic for more information.

EDM Settings

This allows you to specify if you will be using prism offsets in Evidence Recorder and allows you to specify tolerances that will be used to ensure your EDM measurement meet your criteria. See the EDM Settings topic for more information.

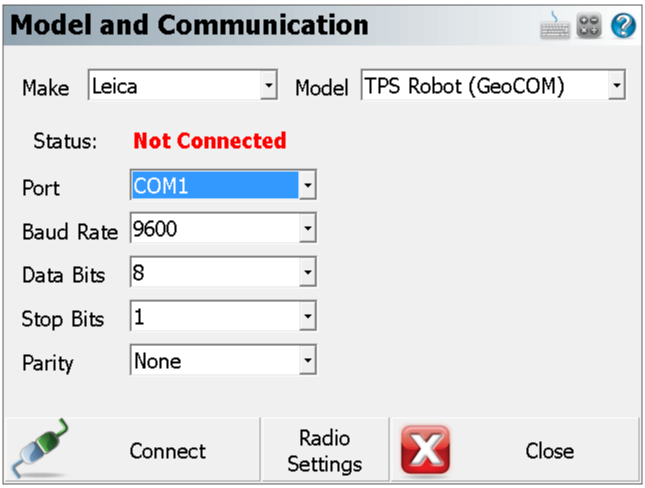
Search Settings

When using a robotic instrument, you can specify search window parameters. See the Search Settings topic for more information.

Model and Communication

Main Menu | Connect | Edit Total Station Profile | Model and Communication

This is where you can specify the make and model of instrument you will be connecting to, as well as specify your communication parameters.



Total Station Make

Use this to select the make of your instrument.

Total Station Model

Use this to select the model of your instrument.

Status

This indicates whether Evidence Recorder is Connected or Not Connected to your instrument.

Port, Baud Rate, Data Bits, Stop Bits, and Parity

If you know the settings of your instrument you can set them here in Evidence Recorder. They have to match exactly the ones on your instrument or you will get a communications error when you try to connect.

It is important to confirm these settings on your instrument when you're trying to connect Evidence Recorder for the first time! Most connection problems occur because the user has specified parameters that don't match the ones on their instrument.

On many data collectors you can select Bluetooth as your communication port. If you select the Bluetooth port, the traditional serial communication options (Baud Rate, Data Bits, Stop Bits, Parity) will be replaced with a Bluetooth Search function.

> Please note that not all Bluetooth-enabled devices will list Bluetooth as a Port option. In some cases you must configure and use a virtual COM port through Windows CE's internal Bluetooth Settings, for example COM6.

Bluetooth Search

If you set the port to Bluetooth, a **Bluetooth Search** button will appear. Press the search button to find the device you want to communicate wirelessly with. All devices within range will be listed, choose the one you want to use

The device you selected will be saved into your instrument profile for future use so you do not need to Search every time.

Bluetooth PIN

After initiating a Bluetooth connection, you will be prompted to enter the PIN (passkey) for the instrument you are connecting to. If your instrument does not need one just leave it blank and continue by pressing OK.

The PIN you enter will be encrypted and stored in your instrument profile.

RC Port

If you are connecting with a Topcon Robot, you can specify which port on your data collector the RC unit is connected to.

Radio Settings

Use this to set the communication parameters for your radios or other communication device, such as the channel or frequency. You can also use it to specify a direct connection to Evidence Recorder instead of using radios. Please see the Radio Settings topic for additional information.

Connect

Use this to connect to your instrument after you have specified your communication settings.

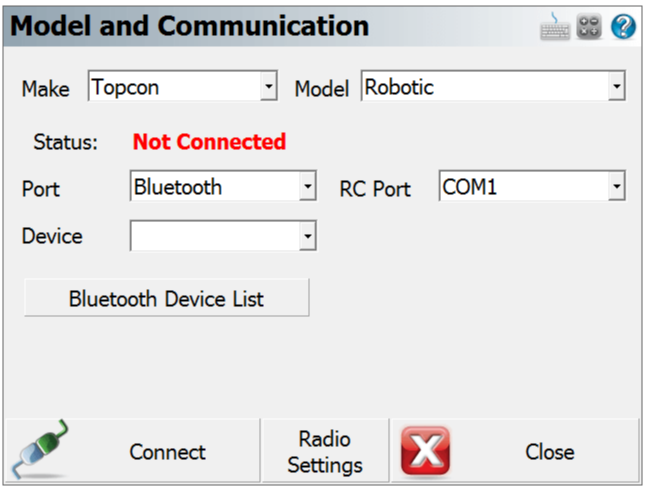
If you see the following message, "No communication with instrument. Check settings, cables and power." read the No Communication topic for possible causes.

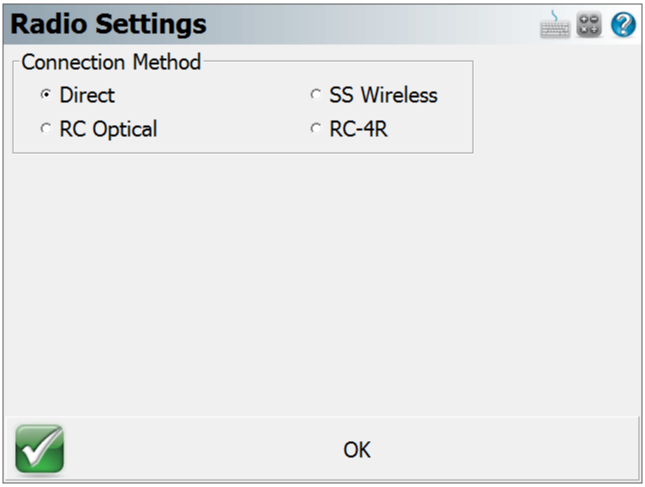
Evidence Recorder connects successfully, the Status will change to "Connected", and if your instrument supports graphical representation of the level bubble, you will see the Check Level screen.

Radio Configuration

Main Menu | Connect | Edit Total Station Profile | Model and Communication | Radio Settings

Use this to specify if you want to connect to your robotic instrument using a direct connection or through the instrument's radios. If you're using a Topcon, you can specify your RC unit as the communication device and assign a COM port for it. Press the Radio Settings to bring up the options for what type of radio you are using to connect to the Topcon instrument.





Connection

Direct

This will allow you to connect directly to your instrument through an instrument cable.

Radio

This will allow you to connect to your instrument using external radios. Select your radio channel, if this option is available.

Note: If you are using radios with your instrument but this option is disabled or not available, then pick the Direct option instead.

RC

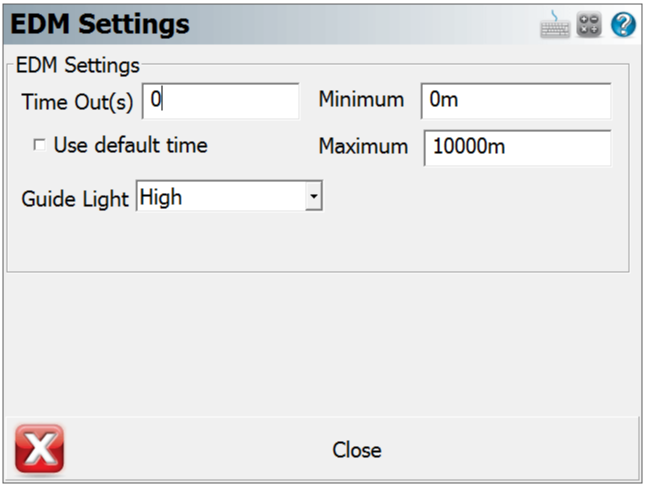
This will allow Evidence Recorder and your instrument to communicate through the RC unit.

EDM Settings

Main Menu | Connect | Edit Total Station Profile | EDM Settings

Total Station Toolbar | Instrument Settings | EDM Settings

From here you can specify EDM settings such as prism offsets and measurement modes.



EDM Settings

Time Out (s)

Use this to specify the length of time Evidence Recorder will try to receive a measurement from your instrument. You may need to set this to a higher number if you're trying to receive measurement in wooded areas or long sights.

Use Default Time Out

If this is checked on Evidence Recorder will use a default time out value. If you would like to change it you need to uncheck it and update the **Time Out** field.

Minimum and Maximum

You can specify the minimum and maximum distance that Evidence Recorder will accept as being valid. Example is if you set this the minimum to 10 feet and you measure 5 feet, Evidence Recorder will not record the measurement and will display a "Distance out of range" error in the status toolbar.

Guide Light

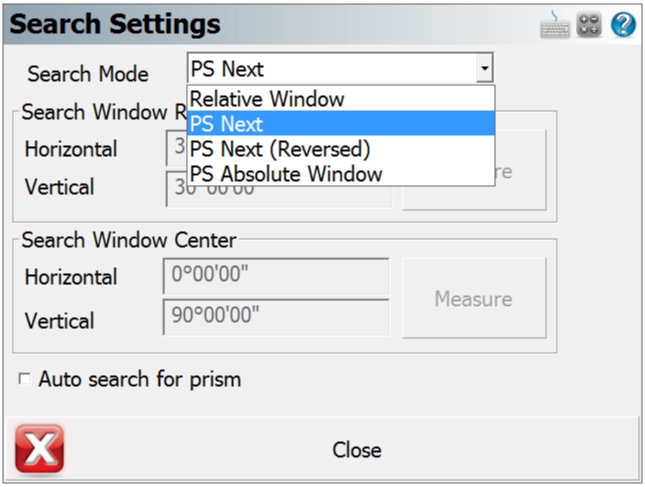
If your instrument has guide lights you will be able to set their intensity modes here. Please refer to your owner's manual for more information on the different intensities.

Search Settings

Main Menu | Connect | Edit Total Station Profile | Search Settings

Total Station Toolbar | Instrument Settings | Search Settings

When using a robotic or motorized instrument you can specify search settings for your instrument.



Search Modes

Some of Evidence Recorder's search modes are common to all robotic instruments, but there are a few model specific ones. The modes available are:

Relative Window

This allows you to specify a "window" defined by measuring a point at the top right and bottom left corners. If you press the search button, the search limits will be relative to the direction the instrument is currently pointing. In other words if your **search window ranges** are 30° horizontal and 30° vertical, it will apply this to your current direction. So the search will be limited to an area 15° left, right, up and down from your current direction.

Absolute Window

This allows you to specify an absolute search "center" for your search window. This forces Evidence Recorder to search in an absolute area defined by the angles set in the **search window center** fields. Furthermore, the search window range parameters apply to the search window center. For example, let's assume you defined 180° as the horizontal search window center, and the horizontal search window range is 30°. Your instrument will be forced to search in an area 15° left and right of the 180° plate reading. So if your prism is situated at a circle reading of 210°, it would never find you as the instrument would never go past a circle reading of 195° (180+15) when searching.

RC-2 Fast Track

If you're using a Topcon instrument, you can set the search mode to RC-2. This will force the instrument to use the RC-2 system for the search.

PS Next

This setting will appear if your Leica instrument has the power search system. Using this setting with Evidence Recorder onboard will operate the new directional Power Search function relative to the prism. Pressing the PS button on the right side will force the instrument to start its search turning to the right. If Evidence Recorder is being operated via a Data Collector and this setting is used the functions will be relative to the Instrument. So pressing the PS button on the right side will force the instrument to turn to the left.

PS Next (Reversed)

This setting will appear if your Leica instrument has the power search system. Settings it to this will reverse the behaviour of the Power Search directional function. If Evidence Recorder is being operated onboard then pressing the PS right will turn the instrument left and opposite if Evidence Recorder is being operated on a data collector.

PS Absolute Window

This setting will appear if your Leica instrument has the power search system. This will force the power search system to do a relative search based on the **search window range**.

RC-PR

If you're using a Sokkia SRX, you can set the search mode to RC-PR. This will force the instrument to use the RC system for the search.

Search Window Range

Use this to define the upper right corner and lower left corner of your search window. Pressing the measure button will step you through the procedure and it will calculate the horizontal and vertical search range. This range will be applied to the instrument's current direction when the user presses the search button.

Search Window Center

Use this to set an absolute center for your search window. The search window range parameters will be applied to the search window values that were measured. Pressing the measure button will step you through the procedure and it will calculate the horizontal and vertical search range.

Auto search for prism

If this is checked, then if your instrument has lost its lock on the prism, Evidence Recorder will automatically initiate a search for the prism when the measure button is pressed. You will see the word "Search" on the lock button at the top of the robotic instrument toolbar while a search is in progress.

Conventional Total Station

When connecting to a conventional total station there are a few things you need to confirm before connecting to Evidence Recorder.

You need to know what the communication parameters are set to on the instrument. Please take the time to find what the following settings are set to on the instrument: Baud Rate, Data Bits, Stop Bits and Parity.

Because of all the different instruments available, we cannot provide help on retrieving these settings from your instrument. Please refer to your owner's manual or contact technical support from your equipment manufacturer.

Total Station Profile

Once you know the settings, you can connect Evidence Recorder to the instrument. If you just installed Evidence Recorder you can start the program and follow the prompts until you get to the Instrument Selection screen. From there, select **Total Station** as the Instrument Type, and then press the **Add** button to create a new Instrument Profile. Name the profile for your instrument, and then press the **Edit** button to access the Total Station Configuration screen to configure your profile. From there choose the **Model and Communication** button to configure Evidence Recorder.

You can also access this screen by going to **Main Menu | Connect | Instrument Selection** and choose total station.

Select Make and Model

Evidence Recorder uses a smart driver that will poll the instrument to see what commands it supports. Because of this you will see that in the Model section we don't list every instrument built by the manufacturer. If you're unsure of what make and model to choose visit our website and use the online helpdesk support center to do a search for your instrument.

Communication Settings

Confirm the settings so they match the settings from your instrument. If you don't know what the settings on the instrument are, you can always try the **Default Comm Settings** button.

Other Settings

On the Total Station Configuration screen, you can review the other options to set some additional parameters for your instrument.

Connect to Instrument

If you're not connected to the instrument you will see a status of "**Not Connected**" displayed above the Connect to Instrument button. When you're ready to connect make sure you have done the following:

1. Powered on the instrument
2. Levelled the instrument
3. Compensated the instrument.
4. Connected the data cable from the instrument to your data collector.

Once you have done all four steps, you can press the **Connect to Instrument** button. If you see a status of "**Connected**" displayed above the Connect to Instrument button then you have successfully connected.

Getting Started

To start taking measurement you need to exit out the Total Station Configuration screen by pressing close button. Depending on the instrument you connected to you will have different options available. Please review the Instrument Toolbar topic for more information.

Tip: You can use the enter key on your device to take a measurement. For example, if your Mapping Method is set to Map Point and you press the enter key, your instrument will take a measurement.

Robotic Total Station

When connecting to a robotic total station there are a few things you need to confirm before connecting to Evidence Recorder.

You need to know what the communication parameters are set to on the instrument. Please take the time to find what the following settings are set to on the instrument: Baud Rate, Data Bits, Stop Bits and Parity.

Because of all the different instruments available, we cannot provide help on retrieving these settings from your instrument. Please refer to your owner's manual or contact technical support from your equipment manufacturer.

Create Total Station Profile

Once you know the settings, you can connect Evidence Recorder to the instrument. If you just installed Evidence Recorder you can start the program and follow the prompts until you get to the Instrument Selection screen. From there, select **Total Station** as the Instrument Type, and then press the **Add** button to create a new Instrument Profile. Name the profile for your instrument, and then press the **Edit** button to access the Total Station Configuration screen to configure your profile. From there choose the **Model and Communication** button to configure Evidence Recorder.

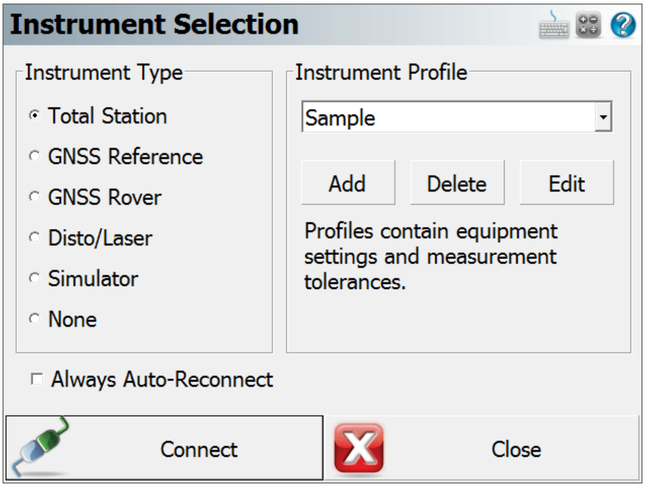
You can also access this screen by going to **Main Menu | Connect | Instrument Selection** and choose total station.

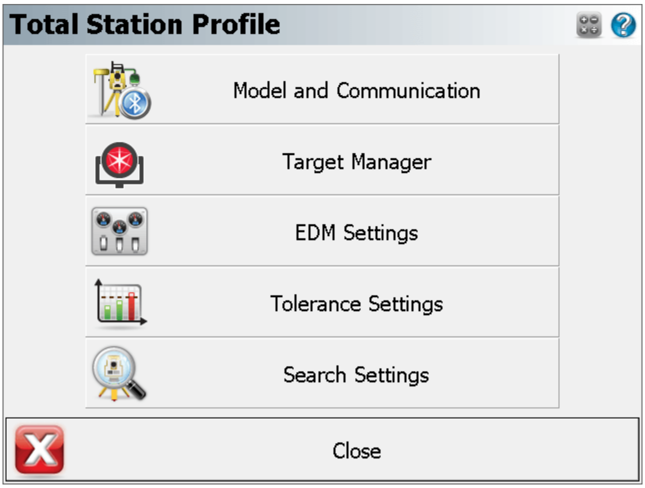
Select Make and Model

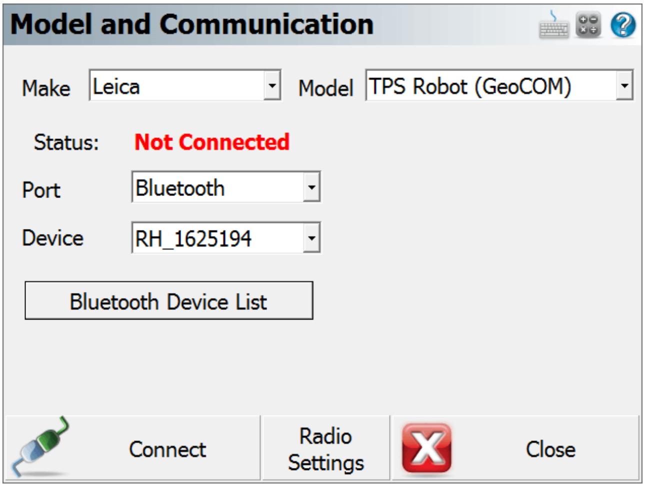
Evidence Recorder uses a smart driver that will poll the instrument to see what commands it supports. Because of this you will see that in the Model section we don't list every instrument built by the manufacturer. If you're unsure of what model and make to choose visit our website and use the online helpdesk support center to do a search for your instrument.

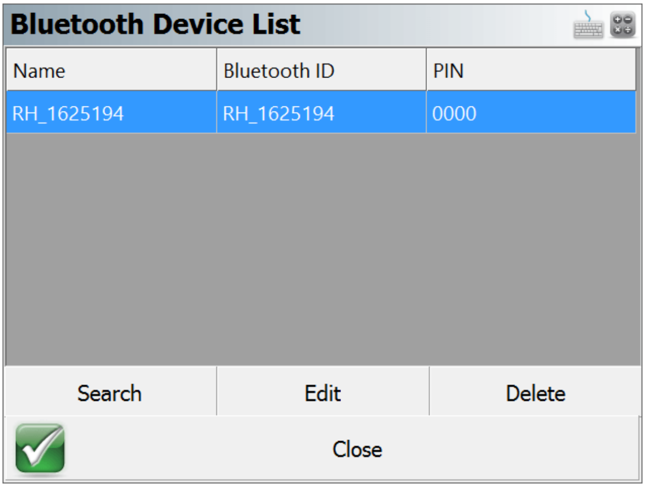
Communication Settings

Evidence Recorder has updated its Bluetooth connection process to save all previously connected devices in a convenient pull down list. To connect to a Bluetooth device from the Instrument Selection screen choose the type of device you wanting to connect to and Click "Add" button. This will prompt the user to give the device a unique name and then proceed to the Instrument Profile screen. Now click on the "Model and Communication" button to take you to the next screen where it will prompt the user for the make and model of the device you wish to connect to. Press the "Bluetooth Device List" button to take you to the BT device List screen where you can Search for, Edit or Delete a device.


Instrument Selection
Instrument Type
Total Station
GNSS Reference
GNSS Rover
Disto/Laser
Simulator
None
Instrument Profile
Sample
Add
Delete
Edit
Profiles contain equipment settings and measurement tolerances.
Always Auto-Reconnect
Connect
Close


Total Station Profile
Model and Communication
Target Manager
EDM Settings
Tolerance Settings
Search Settings
Close





Other Settings

On the Total Station Configuration screen, you can review the other options to set some additional parameters for your instrument.

Connect to Instrument

If you're not connected to the instrument you will see a status of "**Not Connected**" displayed above the Connect to Instrument button. When you're ready to connect make sure you have done the following:

1. Powered on the instrument and radios
2. Leveled the instrument
3. Compensated the instrument
4. Connected the data cable from the instrument to one radio, and your data collector to the other radio

Once you have done all four steps, you can press the **Connect to Instrument** button. If you see a status of "**Connected**" displayed above the Connect to Instrument button then you have successfully connected.

Getting Started

To start taking measurement you need to exit out the Total Station Configuration screen by pressing the Connect button. Depending on the instrument you connected to you will have different options available. Please review the Robotic Instrument Toolbar topic for more information.

No Communication

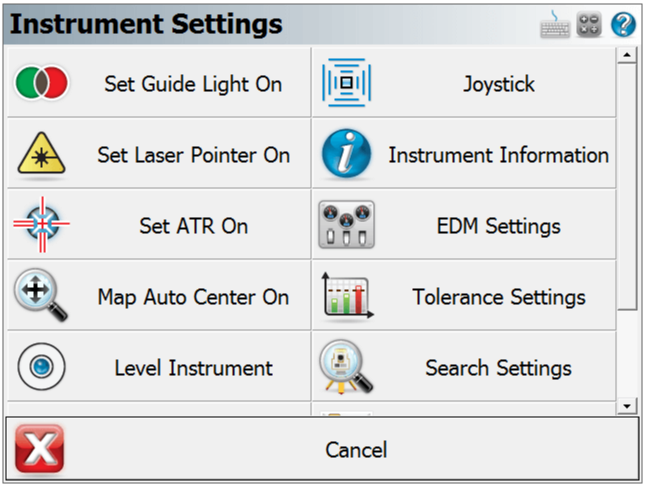
When trying to communicate with your instrument you will see sometimes see a "*No communication with instrument. Check settings, cables and powe*r." error message if Evidence Recorder can't make a connection with your instrument.

Usually this happens when your communication parameters are not the same on the instrument and in Evidence Recorder. You need to check these settings again to make sure they're correct.

This can also happen if you have a bad cable. If you're using a robotic instrument you might have setup your radios incorrectly.

Total Station Settings

Total Station Toolbar | Instrument Settings



Use the vertical scroll bar along the side to access additional instrument settings if they cannot all fit on screen at the same time.

Please note that not every instrument supports each of the following functions, so you may not see all of the following buttons when connected to your total station.

Level Instrument

This will open the Check Level screen, where you can check how level your instrument is.

Instrument Information

When this is pressed, we will display the current battery status of your instrument. Note, not all instruments support this.

EDM Settings

Use this to set the EDM mode for your instrument. Every manufacturer has different measurement modes available but we will list only those that your instrument supports. Please refer to your instrument manual for more information on the EDM modes your instrument supports. Any time you change your EDM Mode, Evidence Recorder writes a comment into the raw file indicating which mode is being used.

Set Angle

Use this to open the Set Angle screen where you can view the current angles and turn or flop your motorized instrument.

Auto-Center On / Off

Use this to automatically center the map when a point is shot. If turned on, whenever you take a measurement, the current prism location will always appear in the center of your map display.

ATR On / Off

Use this to turn on and off your instruments Auto Target Recognition feature. When ATR is turned on the measure button on the Instrument Toolbar will have "ATR" with the Icon on the button.

Laser Pointer On / Off

This turns on and off the instrument's red laser pointer.

Guide Lights On / Off

This will turn on and off your instrument's guide lights.

Rotate Instrument

This will allow you to set the horizontal and vertical ranges for the instrument search. You can set the instrument to Move Absolute, Mover Relative, Turn+90, Turn -90 and Flip Scope.

Basic Measure

This will bring up the Basic Measure screen and allow you to measure an angle and distance .

Enable Auto-Location

This will turn on the mechanical, electrical, plumbing functionality. See Measurement Mode AutoLayout sections for Point on Wall , Point on Floor, and Pipe through wall.

Instrument Joystick

This is the Total Station Joystick function. When activated you will be able to move your motorized instrument to the left, right, up and down by using the joystick touch-screen. There are three speeds that can be activated: slow, medium, and fast. The smaller inside blue buttons activate the slowest turn mode, and the larger outside blue buttons activate the fastest turn mode. To stop the instrument from turning, simply press the red Stop button at the center. **The directions assume you are at the pole looking at the instrument.** Pressing the right buttons will turn the instrument to your right, pressing the up buttons will turn the scope up, etc.

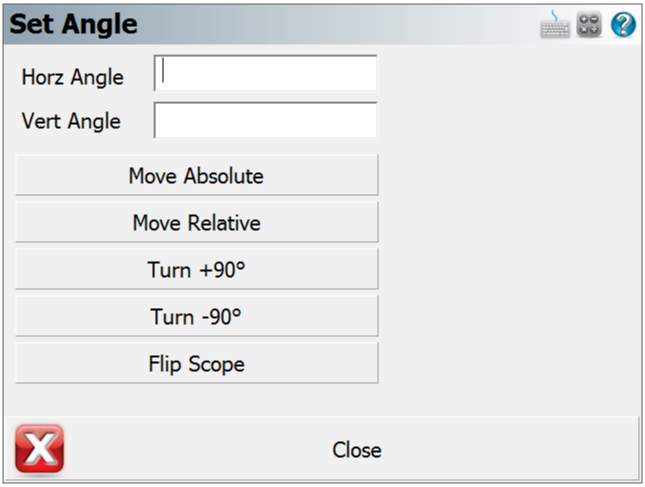
Instrument Connect / Disconnect

Use this to connect or disconnect Evidence Recorder from the instrument. When you are connected to the instrument you will see the Disconnect Instrument button.

Rotate Instrument

Total Station Toolbar | Instrument Settings | Rotate Instrument

You can access this screen by pressing the **Rotate Instrument** button on the Total Station Settings screen.



Horizontal and Vertical Angles

Use these two fields to enter in angles that will be used by the Set Angle buttons.

Move Absolute

Use this to turn the instrument to a plate reading that you've entered in the HA or VA fields. For example if you enter 45°30'30" for the HA and 90°10'00" for the VA, pressing the Absolute button will turn your instrument so the plate reading equals these values.

Move Relative

Use this to turn an angle to the right or left of the current instrument plate reading. Positive values will be added to the current plate reading, negative values will be subtracted. Enter your values in the HA and VA fields.

Turn +90°

Pressing this will force your instrument to turn 90 degrees to the right.

Turn -90°

Pressing this will force your instrument to turn 90 degrees to the left.

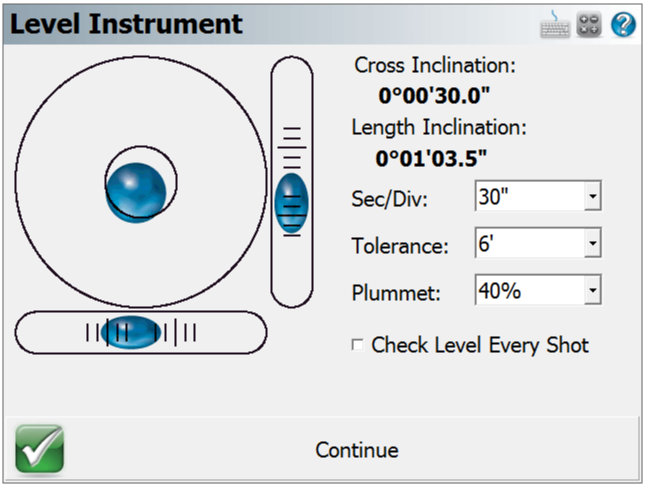
Flip Scope

This will plunge the scope and reverse the direction for you.

Check Level

Total Station Toolbar | Settings | Level Instrument

If your instrument supports it, you can check to see how level your instrument is.



Plummet Intensity

If your instrument has a laser plummet or laser pointer, Evidence Recorder can toggle those functions on or off. On some models of total station this feature is turned on automatically.

Division

You can now adjust the sensitivity of your display to show 20, 30, and 60 second intervals.

Tolerance

You can now set a tolerance for the level bubble sensor. If you exceed that tolerance then you will receive a warning message that indicates your instrument is out of level. You can also set the tolerance level to OFF, which basically turns off the tilt compensator on the instrument. Please note that turning the compensator off can greatly affect the quality of the data surveyed.

Check Level Every Shot

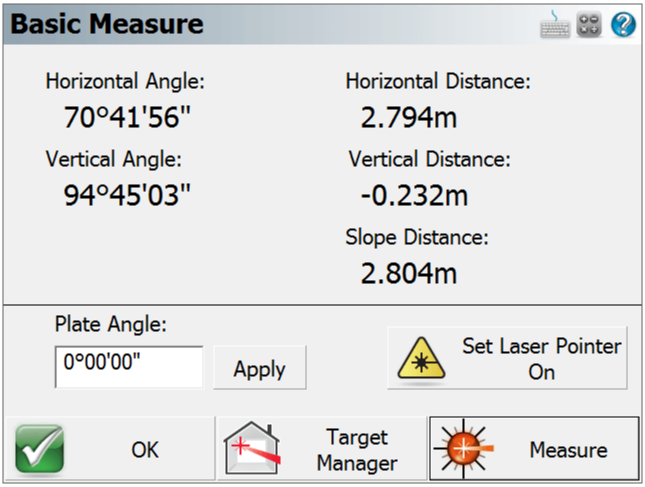
Use this option to force our software to check instrument level before every measurement. The default is off.

Basic Measure

Total Station Toolbar | Instrument Settings | Basic Measure

Total Station Onboard

The Basic Measure mode is a quick way for the user to setup and take a quick measurement without having a Scene or a total station setup and provides a direct view of the angular and distance values. However using this mode will not allow the observation to be stored to the database or RAW file.



Options

Plate Angle

Users can define a desired plate angle to be applied to the current orientation.

Set Laser Pointer

Toggles Laser Pointer ON/OFF

Target Manager

Target Manager allows the users to toggle between Prisms and EDM modes.

Note: Basic Measure mode does not take Target Height into consideration.

Measure

Initiates an observation from the Total Station.

OK

Pressing this button with Evidence Recorder onboard Total Station will take the user to the Scene Manager.

Target Manager

Total Station Toolbar | Target Manager

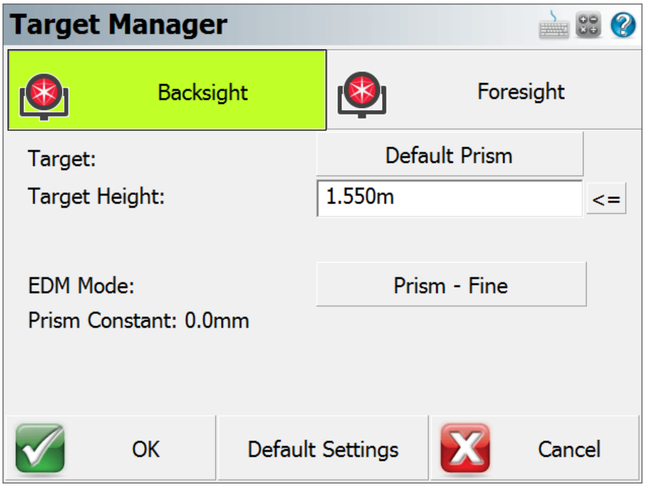
The Target Manager is a place where you can manage your EDM (electronic distance measurement) targets. You can create, edit, copy, and delete targets.

The Target Manager is divided into 2 sections: Backsight and Foresight.

Note: Leica users should refer to the Leica version of the Target Manager topic.

Target Manager: Backsight

Use the Backsight screen to define your backsight target and enter a backsight target height.



Target

Press this button to select a backsight target from the Prism Selection window.

Target Height

Enter the height of your target here.

<= Press the **Set Default Height** button to assign the default height to this **Target Height** field. The default height is defined in the Default Settings screen.

EDM Mode

Use this field to select the EDM Mode you would like to use. You will only be able to select an EDM mode that corresponds to your target type.

Prism Constant

This field will display whatever prism constant that you entered for the selected target.

OK

This records the settings you have just made, closes the Target Manager, and returns you to the MapView.

Target List

Press this button to access the Target List. The Target List consists of user-defined and default instrument targets. Here you can create, copy, edit, and delete targets.

Default Settings

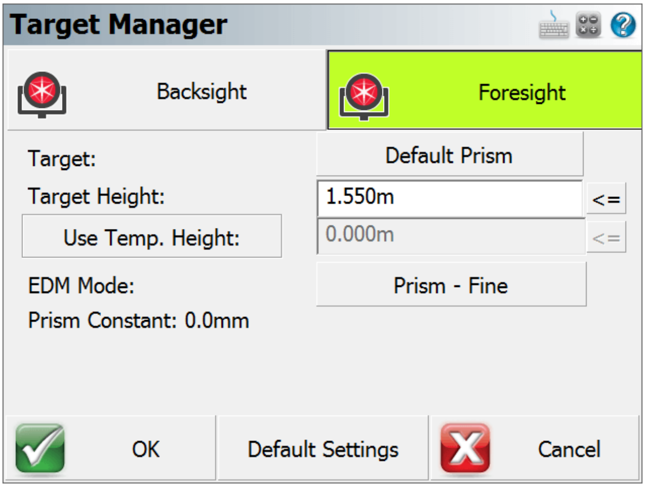
Press this button to access the Default Settings screen. This is where you define the default target heights.

Cancel

Press this button to discard any changed made to the Backsight dialog and returns you to the MapView.

Target Manager: Foresight

Use the Foresight screen to select the foresight target and enter a target height.



Target

Press this button to select a foresight target from the Prism Selection window.

Target Height

Enter the height of your foresight target here.

Press the **Set Default Height** button to assign the default target height to this **Target Height** field. The default height is defined in the Default Settings screen.

EDM Mode

Use this field to select the EDM Mode you would like to use. Typically you will want to select an EDM Mode that corresponds to your target type.

Use Temp. Height

Press this button to activate the Temporary Height function (button is active in the above image). To enable the temporary height be used, you must press the **Use Temp. Height** button. Once activated, the following measurement will use this temporary height but it will be a one-time measurement, and then the system will immediately revert back to the height defined in the **Target Height** field. This is handy if you need to take a quick shot using a different height such as when measuring an invert.

Press the **Set Default Height** button to assign the default Temporary height to this **Target Height** field. The default height is defined in the Default Settings screen

Prism Constant

This field will display whatever prism offset that you entered for the selected target.

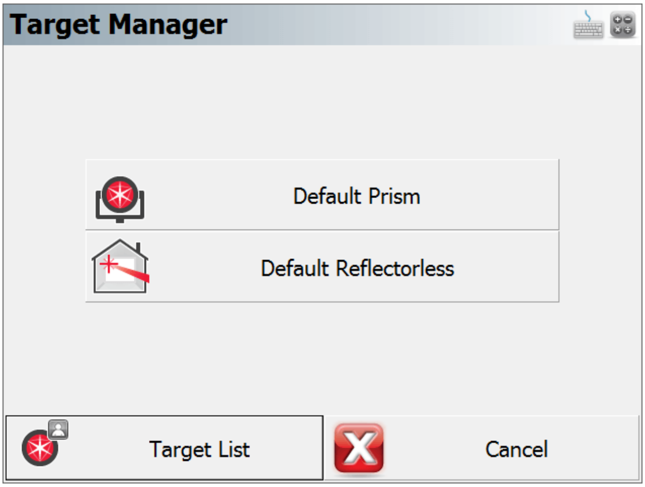
OK

This records the settings you have just made, closes the Target Manager, and returns you to the MapView.

Cancel

Press this button to discard any changed made to the Backsight dialog and returns you to the MapView.

Prism Selection Window



Press the button labelled with the desired prism to use to set it as the Prism for either the backsight or foresight.

Target List

Press this button to access the Target List. Here you can create, copy, edit, and delete targets.

Cancel

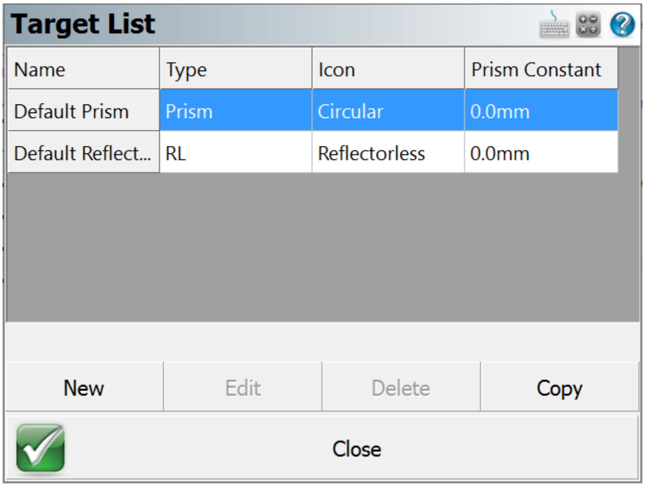
Press this button to go back to the Target Manager window.

Target List

Total Station Toolbar | Target Manager | Target List

The Target List is where you can create, edit, copy, and delete targets. The Target List comes with 2 default targets (Default Prism and Default Reflectorless) but you can create as many more as you like. All targets are saved in the Settings.xml file and is located in the Programs folder.

Click here for help with Leica Targets



You are not permitted to delete or edit a default target but you certainly can copy one and edit the copy.

New

Tap on this button to access the **New Target** dialog. Here you can create a new target.

Edit

Tap on a target to select it. Then press the **Edit** button to access the **Edit Target** dialog. Default targets cannot be edited.

Delete

Tap on a target to select it. Then press the **Delete** button to delete the selected target. You will receive a warning message that you must acknowledge before deletion is complete. Default targets cannot be deleted.

Copy

Tap on a target to select it. Then press the **Copy** button. This will open the **Edit Target** dialog and you can then edit the copied parameters.

Close

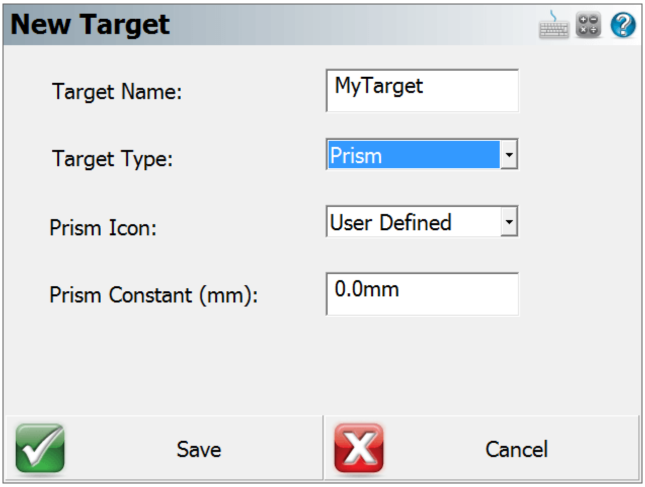
Pressing this button returns you to the Target Manager screen.

New Target

Total Station Toolbar | Target Manager | Target List | New

Use this option to create a new target. Provide the new target with a unique name, a prism constant, and select an icon to represent your new target.

Click here for help creating a new Leica Geosystems target.



Target Name

Use this field to either edit or enter a new name for the target you are editing.

Target Type

There are two target types available to select. **Prism** is to be used when you are selecting a target that has a known offset. This can be a round prism, 360, mini, etc. **RL** stands for reflectorless and you should select this target type if you are using an instrument that is reflectorless capable and you do not wish to use a designated reflector.

Prism Icon

Use this field to select an icon for your new target.

Prism Constant

This defines the relation of the distance measurement to the mechanical reference point of the reflector. Your prism will have a published prism constant (also called and offset).

Save

Press this button to store your new changes to the Settings.xml file, and return you to the Target List screen.

Cancel

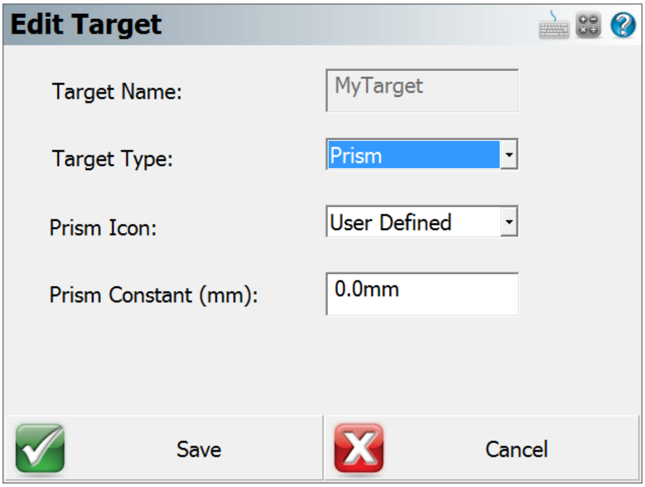
Press this button to cancel creating a new target. You will be returned to the Target List screen.

Edit Target

Total Station Toolbar | Target Manager | Target List | Edit

Use this option to edit an existing target. You will also see this display after you copy an existing target.

Click here for help on editing a Leica Geosystems target.



Target Name

Use this field to either edit or enter a new name for the target you are editing.

Target Type

There are two target types available to select. **Prism** is to be used when you are selecting a target that has a known offset. This can be a round prism, 360, mini, etc. **RL** stands for reflectorless and you should select this target type if you are using an instrument that is reflectorless capable and you do not wish to use a designated reflector.

Prism Icon

Use this field to select an icon for your new target.

Prism Constant (mm)

This defines the relation of the distance measurement to the mechanical reference point of the reflector. Your prism will have a published offset.

Save

Press this button to store your new changes to the Settings.xml file, and return you to the Target List screen.

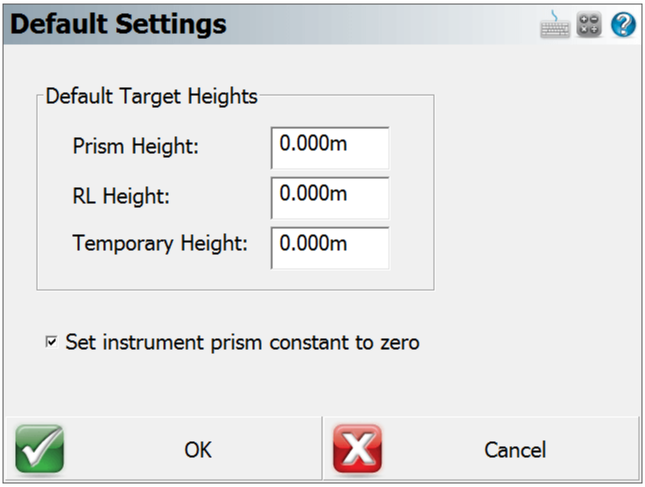
Cancel

Press this button to cancel creating a new target. You will be returned to the Target List screen.

Default Settings

Total Station Toolbar | Target Manager | Default Settings

The Default Settings screen is where you can define the default target heights for prism targets, RL (reflectorless) targets, and a temporary height. The temporary height value is used for taking a one-time measurement using the height value entered in this field. After the measurement is completed, the system will revert back to using the current target height.



Prism Height

Enter your most common prism height into this field. When you press the **Use Default Height** button in the Target Manager screen, this value will populate the **Target Height** field. This is convenient when you have a standard prism height and want to assign it quickly.

Important Note: You must be in a prism measure mode to be able to use the **Default Height** button in the Target Manager screen and have it use a default prism height.

RL Height

Enter your most common ReflectorLess (RL) height into this field. When you press the **Use Default Height** button in the Target Manager screen, this value will populate the **Target Height** field with this default height.

Important Note: You must be using a reflectorless measure mode to populate this field using the **Default Height** button in the Target Manager screen, and have it use the default reflectorless height.

Temporary Height

The temporary height function works as a one-time measurement using the height entered into this field. After the measurement has completed, the target height will revert back to the height that had been defined in the **Target Height** field. This is very handy when you want to take a quick one-time measurement such as for when measuring an invert.

Set instrument prism constant to zero

If this has a check mark in the box, a prism constant of zero will be uploaded to your instrument. The offsets specified in the foresight and backsight targets will be applied to the measurements when received by Evidence Recorder. Remove the check mark if you don't want Evidence Recorder to modify your instrument's prism offset. **Not all instruments support this feature.**

When you connect your instrument to Evidence Recorder, special notes are recorded in the raw file regarding prism offsets.

If you have the ”Set Instrument” toggle turned on and your instrument supports this feature, Evidence Recorder will set your instrument's prism offset to zero so no correction will be applied to the measurement. Then once Evidence Recorder receives this uncorrected measurement, it will use the values you specified in the prism offset fields and adjust the distance accordingly. For example, if you specified an offset of 30mm, Evidence Recorder will upload an offset of zero to your instrument and apply the 30 mm offset to the measurement after it is received. In your raw file you will see the following note:

```
--Evidence Recorder Prism: 30mm Instrument Prism: 0mm
```

Most prism offset are specified in millimeters. Evidence Recorder will make the necessary conversions so the proper adjustment is applied.

If Evidence Recorder can't set the prism offset on your instrument, it usually can't read it either. Since a prism offset wasn't uploaded, we don't know what prism offset is set on the instrument. So we indicate this by writing to the raw file that the instrument prism offset is "unknown".

```
--Evidence Recorder Prism: 30mm Instrument Prism: Unknown
```

When this happens you will usually want to confirm what offset are currently configured on your instrument in regards to prism offsets.

> **Special Notes:**
>
> - When using instruments that don't support uploading of prism constants, be sure not to double up your prism offsets by applying it in the instrument and Evidence Recorder at the same time.
>
> - Since prism offsets are so important, on the measurement progress meter you will see what offset is being applied to your measurement.

OK

Pressing this button will save your changes in this dialog, and return you to the Target Manager.

Cancel

Pressing this button will ignore your changes in this dialog and return you to the Target Manager.

Target Manager: Leica Instruments

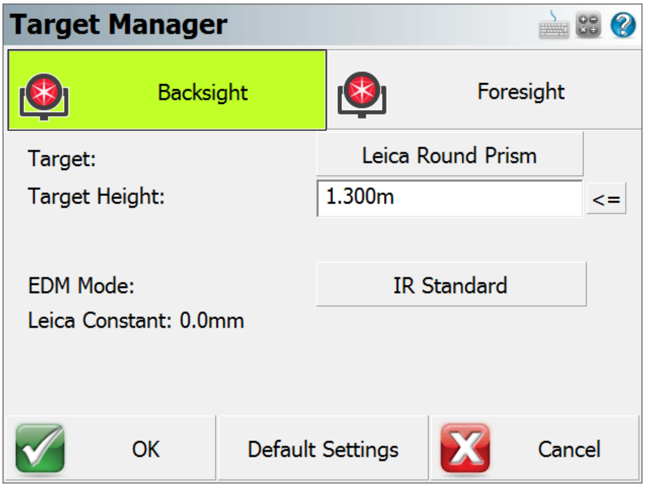
Total Station Toolbar | Target Manager

The Target Manager is a place where you can manage your EDM (electronic distance measurement) targets. You can create, edit, copy, and delete targets. Leica Geosystems uses a different method for determining prism offsets as they have a value called a *Leica Constant*. See the help on the New or Edit Target screens for information on how to calculate a Leica Constant.

The Target Manager is divided into 2 sections: Backsight and Foresight.

Target Manager: Backsight

Use the Backsight screen to define your backsight target, choose a measure mode, and enter a backsight target height. Tap on the Backsight tab at the top of the screen to access the Backsight section



Target

Use this field to select a backsight target from the Target List.

Target Height

Enter the height of your target here.

Press the **Set Default Height** button to assign the default Target height to this **Target Height** field. The default height is defined in the Default Settings screen.

EDM Mode

Use this field to select the EDM mode you would like to use. Typically you will want to select an EDM mode that corresponds to your target type.

Leica Constant

This field will display the Leica constant associated with your target. See the New or Edit Target Help for an explanation of how to compute a Leica constant. This will be especially important if you are using a non-Leica target.

OK

This records the settings you have just made, closes the Target Manager, and returns you to the MapView.

Target List

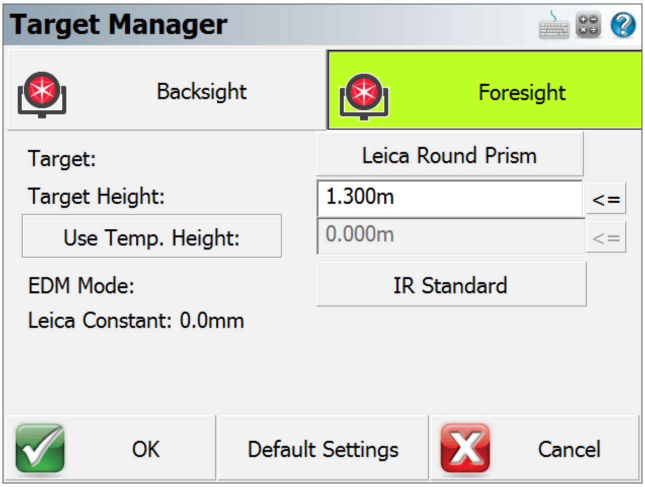
Press this button to access the Target List. Here you can create, copy, edit, and delete targets.

Cancel

Press this button to discard any changed made to the Backsight dialog and returns you to the MapView.

Target Manager: Foresight

Use the Foresight screen to select the foresight target, choose a measure mode, and enter a target height. You also have the option of using a temporary target height. Tap on the Foresight tab at the top of the screen to access the Foresight section.



Target

Use this field to select a foresight target.

Target Height

Enter the height of your foresight target here.

<= Press the **Set Default Height** button to assign the default height to this **Target Height** field. The default height is defined in the Default Settings screen.

Use Temp. Height

Press this button to activate the Temporary Height function (button is active in the above image). To enable the temporary height be used, you must press the **Use Temp. Height** button. Once activated, the following measurement will use this temporary height but it will be a one-time measurement, and then the system will immediately revert back to the height defined in the **Target Height** field. This is handy if you need to take a quick shot using a different height such as when measuring an invert.

<= Press the **Set Default Height** button to assign the default height to this **Target Height** field. The default height is defined in the Default Settings screen.

EDM Mode

Use this field to select the EDM Mode you would like to use. Typically you will want to select an EDM Mode that corresponds to your target type.

Leica Constant

This field will display the Leica constant associated with your target. See the New or Edit Target Help for an explanation of how to compute a Leica constant. This will be especially important if you are using a non-Leica target.

OK

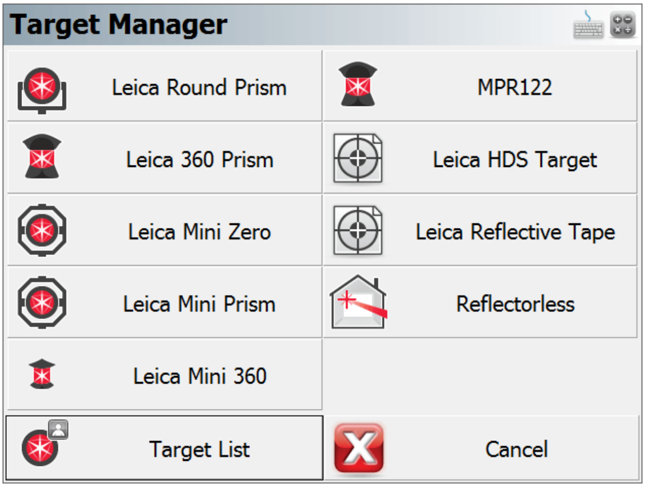
This records the settings you have just made, closes the Target Manager, and returns you to the MapView.

Target List

Press this button to access the Target List. Here you can create, copy, edit, and delete targets.

Cancel

Press this button to discard any changed made to the Backsight dialog and returns you to the MapView.



Press the button labelled with the desired prism to use to set it as the Prism for either the backsight or foresight.

Target List

Press this button to access the Target List. Here you can create, copy, edit, and delete targets.

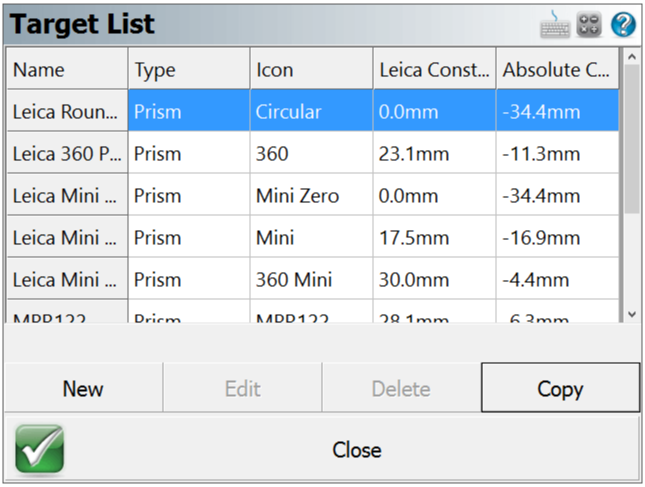
Cancel

Press this button to go back to the Target Manager window.

Target List: Leica

Total Station Toolbar | Target Manager | Target List

The Target List is where user-defined and default Leica targets are kept. The Target List is where you can create, edit, copy, and delete targets. The Leica instruments Target List comes with 9 default Leica targets. You cannot edit or delete a default Leica target but you can copy a default target and edit the copy. All targets are saved in the Settings.xml file, and is located in the Programs folder.



You are not permitted to delete or edit a default target but you certainly can copy one and edit the copy.

New

Tap on this button to access the New Target dialog. Here you can create a new target.

Edit

Tap on a target to select it. Then press the **Edit** button to access the Edit Target dialog. Default targets cannot be edited.

Delete

Tap on a target to select it. Then press the **Delete** button to delete the selected target. You will receive a warning message that you must acknowledge before deletion is complete. Default targets cannot be deleted.

Copy

Tap on a target to select it. Then press the **Copy** button. This will open the **Edit Target** dialog and you can then edit the copied parameters.

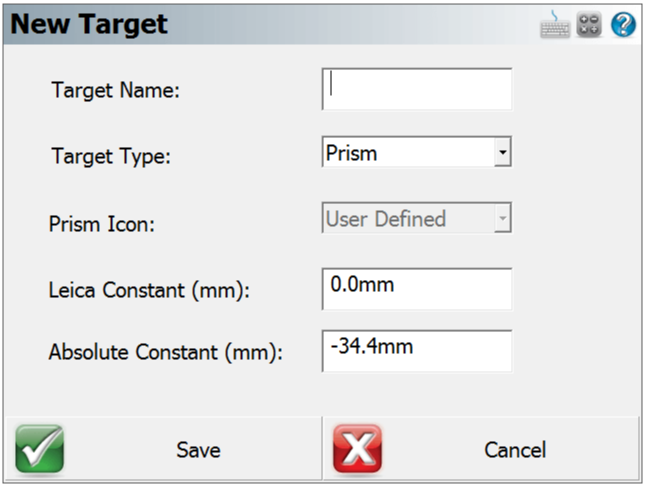
Close

Pressing this button returns you to the Target Manager screen.

New Target: Leica

Total Station Toolbar | Target Manager | Target List | New

Use this option to create a new target for your Leica Geosystems instrument. Provide the new target with a unique name, define the target type, and enter the Leica constant. Leica uses a different prism offset method than other manufacturers and you should familiarized yourself with how they are computed. See the **Leica Constant** section below for more information.



Target Name

Use this field to either edit or enter a new name for the target you are creating.

Target Type

There are two target types available to select. **Prism** is to be used when you are selecting a target that has a known offset. This can be a round prism, 360, mini, etc. **RL** stands for reflectorless and you should select this target type if you are using an instrument that is reflectorless capable and you do not wish to use a designated reflector.

Prism Icon

The mandatory icon for any new Leica target must have the **User Defined** prism icon. This is a Leica instrument requirement and therefore cannot be changed.

Leica Constant (mm)

Leica prism constants differ from non-Leica prism constants. In summary, Leica's prism constant of 0mm is equal to -34.4mm absolute prism constant relative to the plumb line. A simple formula to explain the relationship:

Leica Constant (for non-Leica prisms) = Absolute Constant + 34.4mm, or

Absolute Constant (for Leica prisms) = Leica Constant – 34.4mm

Examples:

1. SECO -30mm offset prism
   a. Leica Constant = -30mm + 34.4mm = 4.4mm
   b. Absolute Constant = -30mm
2. SECO 0mm offset prism
   a. Leica Constant = 0mm + 34.4mm = 34.4mm
   b. Absolute Constant = 0mm
3. Leica GPR1 round prism
   a. Absolute Constant = 0mm - 34.4mm = -34.4mm
   b. Leica Constant = 0mm
4. Leica GRZ4 360° prism
   a. Absolute Constant = 23.1mm - 34.4mm = -11.3mm
   b. Leica Constant = 23.1mm

It is strongly recommended that you test your use of prism constants on a known baseline to be sure that your non-Leica prism is in the true zero prism system.

Absolute Constant (mm)

This defines the relation of the distance measurement to the mechanical reference point of the reflector. Use the formula in the **Leica Constant** section above to calculate the Leica constant. Enter that value in the **Leica Constant** field and see the Absolute constant be automatically computed for you.

Save

Press this button to store your new changes to the Settings.xml file, and return you to the Target List screen.

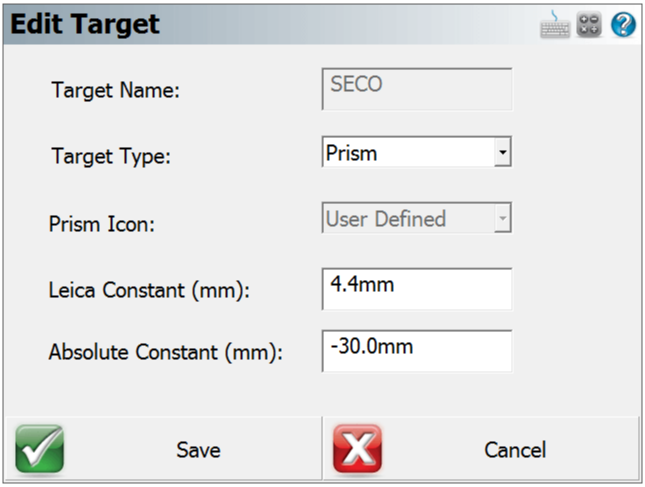
Cancel

Press this button to cancel creating a new target. You will be returned to the Target List screen.

Edit Target: Leica

Total Station Toolbar | Target Manager | Target List | Edit

Use this option to edit an existing user-defined target or edit a copy of a Leica instrument target. You will also see this display after you copy an existing target. Leica uses a different prism offset method than other manufacturers and you should familiarized yourself with how they are computed. See the *Leica Constant* section below for more information.



Target Name

Use this field to either edit or enter a new and unique name for the target you are editing.

Target Type

There are two target types available. **Prism** is to be used when you are selecting a target that has a known offset or prism constant. This can be a round prism, 360, mini, etc. **RL** stands for reflectorless and you should select this target type if you are using an instrument that is reflectorless capable, and you do not wish to or cannot use a designated reflector.

Prism Icon

When creating Leica instrument targets, the prism icon must be **User Entered**, and that's why you are not permitted to edit the target's icon. This is a Leica instrument requirement and therefore cannot be changed.

Leica Constant (mm)

Leica prism constants differ from non-Leica prism constants. In summary, Leica’s prism constant of 0mm is equal to -34.4mm absolute prism constant relative to the plumb line. A simple formula to explain the relationship:

Leica Constant (for non-Leica prisms) = Absolute Constant + 34.4mm, or

Absolute Constant (for Leica prisms) = Leica Constant – 34.4mm

Examples:

1. SECO -30mm offset prism
   a. Leica Constant = -30mm + 34.4mm = 4.4mm
   b. Absolute Constant = -30mm
2. SECO 0mm offset prism
   a. Leica Constant = 0mm + 34.4mm = 34.4mm
   b. Absolute Constant = 0mm
3. Leica GPR1 round prism
   a. Absolute Constant = 0mm - 34.4mm = -34.4mm
   b. Leica Constant = 0mm
4. Leica GRZ4 360° prism
   a. Absolute Constant = 23.1mm - 34.4mm = -11.3mm
   b. Leica Constant = 23.1mm

It is strongly recommended that you test your use of prism constants on a known baseline to be sure that your non-Leica prism is in the true zero prism system.

Absolute Constant (mm)

The Absolute Constant or more commonly known as the Prism Constant defines the relation of the distance measurement to the mechanical reference point of the reflector. Use the formula in the **Leica Constant** section above to calculate the Leica constant. Enter that value in the **Leica Constant** field and see the Absolute constant be automatically computed for you.

Save

Press this button to store your target edits. Targets are stored to the Settings.xml file, and you are returned to the Target List screen.

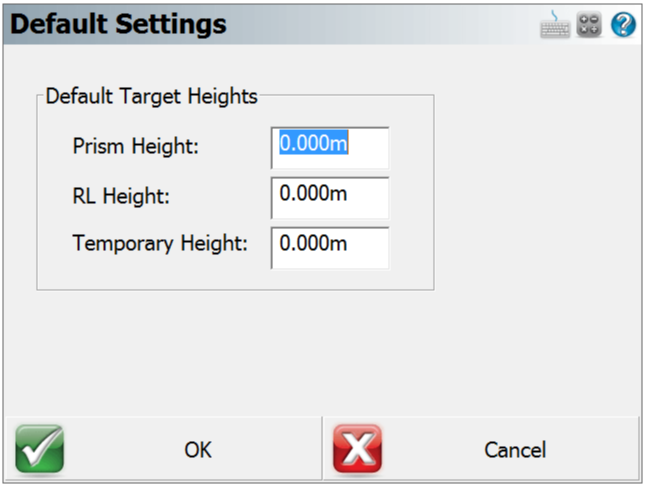
Cancel

Press this button to cancel creating a new target. You will be returned to the Target List screen.

Default Settings: Leica

Total Station Toolbar | Target Manager | Default Settings

The Default Settings screen is where you can define the default target heights for prism targets, RL (reflectorless) targets, and a temporary height. The temporary height value is used for taking a one-time measurement using the height value entered in this field. After the measurement is completed, the system will revert back to using the current target height.



Prism Height

Enter your most common prism height into this field. When you press the **Use Default Height** button in the Target Manager screen, this value will populate the **Target Height** field. This is convenient for when you have a standard prism height and want to assign it quickly.

Important Note: You must be in a prism measure mode to be able to use the **Default Height** button in the Target Manager screen and have it use a default prism height.

RL Height

Enter your most common ReflectorLess (RL) height into this field. When you press the **Use Default Height** button in the Target Manager screen, this value will populate the **Target Height** field with this default height.

Important Note: You must be using a reflectorless measure mode to populate this field using the **Default Height** button in the Target Manager screen, and have it use the default reflectorless height.

Temporary Height

The temporary height fucntion works as a one-time measurement using the height entered into this field. After the measurement has completed, the target height will revert back to the height that had been defined in the **Target Height** field. This is very handy when you want to take a quick one-time measurement such as for when measuring an invert.

OK

Pressing this button will save your changes in this dialog, and return you to the Target Manager.

Cancel

Pressing this button will ignore your changes in this dialog and return you to the Target Manager.

Note: If you are wondering where the **Set Instrument Prism Constant to Zero** check box is, this is now done automatically when using Leica instruments.

GNSS Reference

Create/Edit GNSS Profile

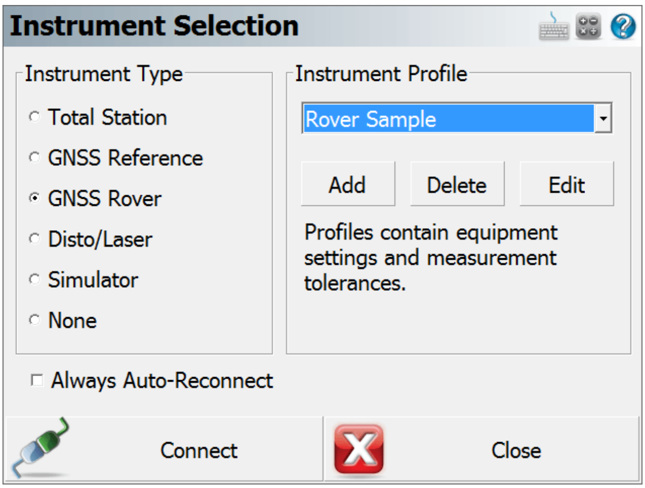
Select GNSS Profile

Main Menu | Connect

This is where you can create a new profile for each rover/base receiver you will be using.

There are two ways to get to this screen.

1. You can open the profile screen for your rover or base by going to Main Menu | Settings | Instrument Selection. This will display the Instrument Selection screen which contains the GNSS Rover and GNSS Reference profiles.
2. If you already have your instrument type set to GNSS and you're currently in the map view, you can press the **Settings** button on the GNSS toolbar. This will display the Instrument Selection screen which contains the GNSS Rover and GNSS Reference profiles.



Editing Profiles

On the Add Profile screen you can enter any name you wish for the profile. Profiles can be copied from one data collector to another, so you can have a "Master" profile file that is sent to all crews so they can quickly set up systems.

When you're ready to edit the settings for the profile you have selected, press the **Edit** button. This will display the GNSS configuration screen for the selected rover or reference profile.

Refer to the GNSS Configuration (Reference) or GNSS Configuration (Rover) topics for more information on the settings available for your profiles.

Your profiles are stored in the Settings.xml file within the ...\Leica Geosystems\EvidenceRecorder\Scenes\ (Windows CE/Mobile) or ...\Documents\Leica Geosystems\EvidenceRecorder\Scenes\ (Windows Tablet/PC) directory so once you have configured one data collector, you can copy this file onto other data collectors to make the profiles available on them. This file should also be backed up for easy recovery.

Using Profiles for Connection

Once you've created your profiles, you can use them to connect to your receiver. Simply select the correct GNSS Mode, either GNSS Rover or GNSS Reference, then select the profile you want to use in the profile list.

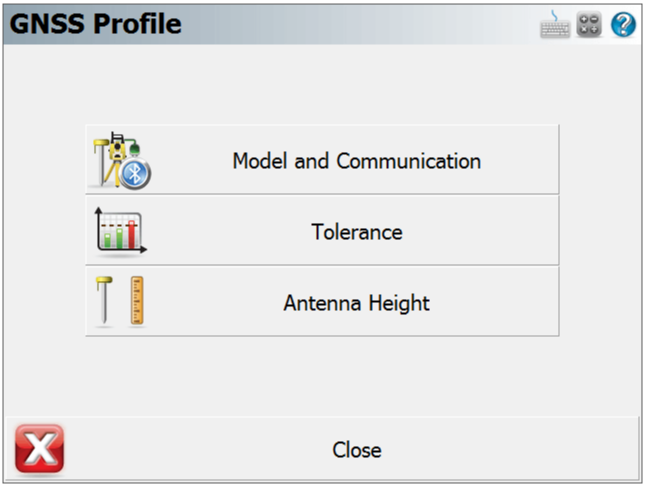
When you've physically connected the data collector to your receiver, press the **Connect** button to start the connection process.

If it isn't successful you will see the following message "Could not detect GNSS receiver! Please check configuration, cable and power." You can then press the Auto Detect Baud Rate button to force Evidence Recorder to automatically try different baud rate settings. If this doesn't work you should review your profile settings and ensure that you have the correct COM port selected and that you have your data collector connected to the correct port on the GNSS receiver.

GNSS Reference Profile

Main Menu | Connect | Edit Profile

The GNSS Configuration for your reference unit is accessed from the Instrument Selection screen by selecting GNSS Reference as the Instrument Type, then pressing the **Edit** button to configure your selected GNSS Reference Profile.



Model and Communication

This is used to select the Make and Model of receiver, the port that the data collector is connected to and the mode that the current receiver will play in the RTK process. Please see the GNSS Model and Communication topic for more information.

Tolerance

This is used to enter information about the location of the reference (base) station. Please see the GNSS Tolerance (Reference) topic for more information.

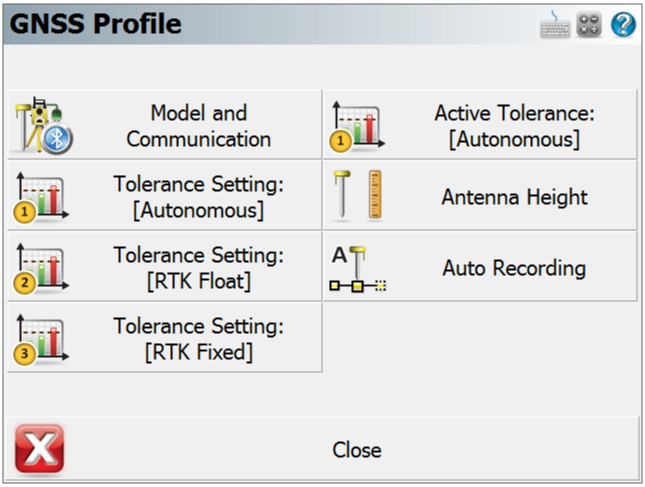
Antenna Height

The antenna settings are used to calculate or enter the height of the antenna phase center above the ground. Please see the GNSS Antenna Configuration topic for more information.

GNSS Rover Profile

Main Menu | Connect | Edit Profile

The GNSS Configuration for your rover unit is accessed from the Instrument Selection screen by selecting GNSS Rover as the Instrument Type, then pressing the **Edit** button to configure your selected GNSS Rover Profile.



Model and Communication

This is used to select the Make and Model of receiver, and the port settings that the data collector will connect with. Please see the GNSS Model and Communication topic for more information.

Tolerance Setting: [Description] (x3)

The three configurable tolerance modes are used to enter information used in computing the position of the rover once a measurement has begun. Please see the GNSS Tolerance Modes (Rover) topic for more information.

Active Tolerance: [Description]

This displays the current tolerance mode, which can be changed at any time during your survey by selecting the GNSS Settings button in the GNSS toolbar. Please see the GNSS Tolerance Modes (Rover) topic for more information

Antenna Height

The antenna settings are used to calculate or enter the height of the antenna phase center above the ground. Please see the GNSS Antenna Configuration topic for more information.

Auto Recording

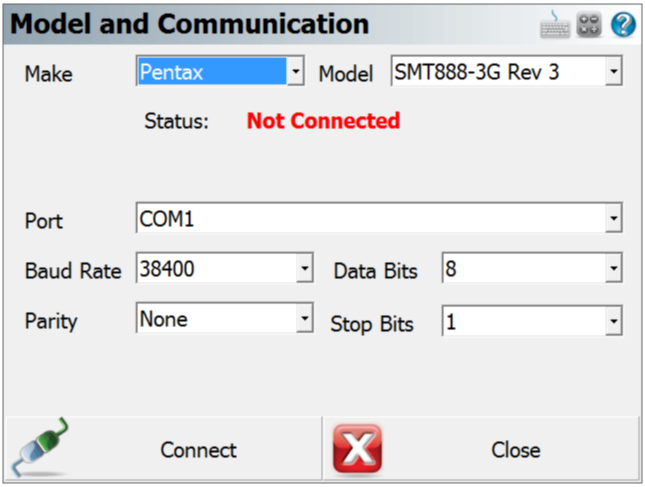
The Auto Recording settings are used for collecting data in a "Kinematic" mode. The receiver can automatically log a point every X distance or Y seconds. The user simply selects what option they prefer to use for logging Kinematic data and start the survey. Keep in mind while collecting data at higher velocities that Evidence Recorder receives position updates from the GNSS at a maximum rate of once per second.

GNSS Model and Communication

Main Menu | Connect | Edit Profile | Model and Communication

The Model and Communication settings are used to select the Make and Model of receiver, the port that the data collector is connected to, and other communication parameters.

Cable Connection



Model

Specify the make and model of receiver you are connecting to.

Sensor Port

If your receiver has more than one data port, specify the port on the receiver that the data collector will be connected to.

Port

Specify the port on your data collector (usually COM1) that you will connect a cable between your receiver and this port.

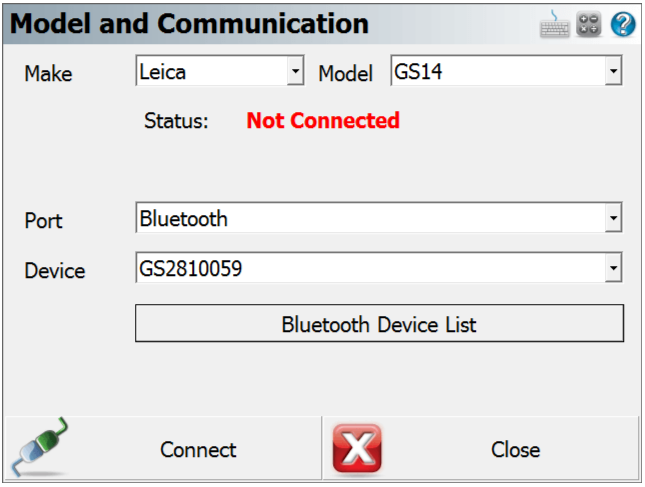
Baud Rate, Data Bits, Parity, Stop Bits

Specify the communication parameters for the serial connection. If you're unsure of what baud rate your receiver is set to you might want to set the baud rate to Auto Detect. This will force Evidence Recorder to check for communication using all the baud rate settings and if successful, it will set this baud rate in the profile.

Bluetooth Connection

Port

On many data collectors you can select Bluetooth as your communication port. If you select the Bluetooth port, the traditional serial communication options (Baud Rate, Data Bits, Stop Bits, Parity) will be replaced with a Bluetooth Search function.



Please note that not all Bluetooth-enabled devices will list Bluetooth as a Port option. In some cases you must configure and use a virtual COM port through Windows CE's internal Bluetooth Settings, for example COM6.

Note: If long range Bluetooth (LRBT) connection is supported by both the GNSS instrument / total station and the data cotroller the port option of Bluetooth (LR) needs to be selected to enable LRBT communications.

Bluetooth Search

If you set the port to Bluetooth, a **Bluetooth Search** button will appear. Press the search button to find the device you want to communicate wirelessly with. All devices within range will be listed, choose the one you want to use

The device you selected will be saved into your instrument profile for future use so you do not need to Search every time.

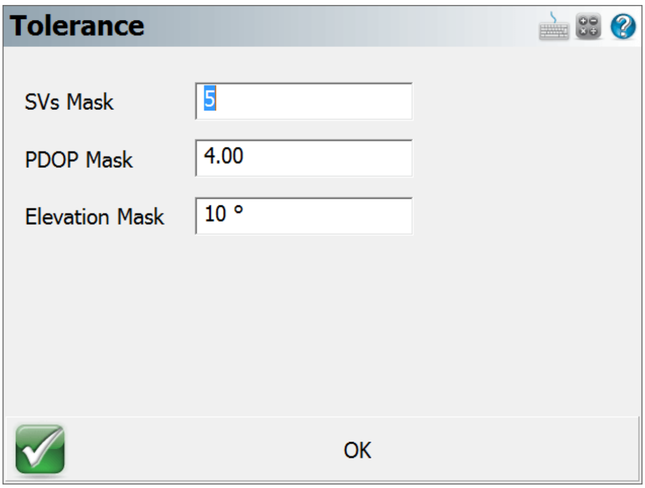
Bluetooth PIN

After initiating a Bluetooth connection, you will be prompted to enter the PIN (passkey) for the instrument you are connecting to. If your instrument does not need one just leave it blank and continue by pressing OK.

The PIN you enter will be encrypted and stored in your instrument profile.

GNSS Tolerance Settings (Reference)

Main Menu | Connect | Edit Profile | Tolerance Settings



SVs Mask

The SVs Mask setting is used to establish the minimum number of satellites that are necessary to produce a solution with a valid position. The SVs must also pass the elevation mask test to be included in this number for the calculation of the rover position.

PDOP Mask

The PDOP mask is used to control the acceptable geometry of the satellites used to compute the RTK position. If the PDOP value exceeds this number, the user will not be eligible to collect an RTK position.

Elevation Mask

The Elevation Mask is used to determine which satellites to use in computing the differential corrections to broadcast to the rover(s). Satellites below this value will not be used in the solution. Elevation mask angles are typically equal or less than the elevation mask set for the rover system.

GNSS Tolerance Settings (Rover)

Main Menu | Connect | Edit Profile | Tolerance Settings

GNSS Toolbar | Instrument Settings | Sensor Configure | Tolerance Settings

The tolerances settings are used to enter information used in computing the position of the rover once a GNSS measurement has begun.

You can define three different tolerance modes that can be selected from the Sensor Configure option in the GNSS Settings menu while surveying. Tolerance settings are used to ensure that certain criteria are being met every time you take a measurement. The reason for three different settings is to allow you to specify different tolerances for different types of measurements you might need to make. For example, control points would need to be measured more precisely then those used for topographic measurements.

Description

This is where you can assign a "friendly" description to your three tolerance modes to make them more easily identifiable to you - for example "Control Points" or "Topo Points".

Options

Real Time

Toggle to set the Tolerance Settings for RTK.

Observations

This is the minimum number of observations that the receiver must collect and average in order to compute a solution.

Solution

Each observation must be of the specified solution type (or better). You can select from several Solution modes depending on your receiver make and model, these can be:

- Autonomous
- SBAS (Satellite-based Augmentation System)
- DGPS (Differential Global Positioning System)
- RTK Float (Differential Carrier Solution)
- RTK Fixed (Differential Carrier Solution)

Please refer to your GNSS manufacturer's documentation for the solutions' respective positional accuracy.

Elevation Mask

The elevation mask is used to filter out satellites that are close to the horizon and are, thus, unreliable. Typical elevation mask angles can range between 10º and 20º.

PDOP

The PDOP (Position Dilution of Precision) mask is used to control the acceptable geometry of the satellites used to compute the solution. If the PDOP value exceeds this number, the user will not be eligible to collect a position. Typical PDOP masks are 5 or 6.

Satellites Computed

The Satellites mask is used to establish the minimum number of satellites that are necessary to produce a solution with a valid position. Each satellite must also pass the elevation mask test to be included in this number for the calculation of the rover position.

StdDev Horizontal

Evidence Recorder will use the instantaneous Standard Deviation values that your receiver is outputting to determine if the measurement can proceed. If the instantaneous Standard Deviation values are equal to or less than the values you've specified, then the measurement can proceed. Once this happens, Evidence Recorder will start averaging the measurements and will compute and display averaged Standard Deviation values. These averaged Standard Deviation values must then remain equal to or less than the values you've specified for the entire duration of the measurement, for the measurement to be accepted as being within the specified tolerances.

This is your maximum acceptable horizontal standard deviation to be maintained during the point measurement.

StdDev Vertical

This is your maximum acceptable vertical standard deviation to be maintained during the point measurement.

Correction Age

The maximum time (in seconds) since correction data was received.

Point Tolerance

Point Tolerance - Observations

This is the minimum number of observations that the receiver must collect and average in order to compute a solution.

Point Tolerance - Time

This is the minimum time duration that the receiver must collect and average observations in order to compute a solution.

Post Processing Tolerances

These settings apply when using Evidence Recorder to collect static data for later post processing.

Please note that Evidence Recorder does not support collecting raw data on all GNSS receivers, please refer to the Raw Data Logging topic for additional details including a list of receivers which support this function.

Usage

This option determines whether Evidence Recorder should use Post Process mode to collect static data for later post processing.

Selecting **Always** instructs Evidence Recorder to automatically switch into Post Process mode to collect static data for all points.

Selecting **Auto Start** instructs Evidence Recorder to automatically switch into Post Process mode to collect static data for the point currently being measured, if the current solution masks are not met.

Selecting **Manual** allows you to switch into Post Process mode to collect static data for any point as it is being measured, but Evidence Recorder will not do so automatically.

Time - Less than 5 SVs

This defines the duration of the static collection if the minimum number of satellites being tracked during the static session is 4 satellites. Default = 30 minutes.

If at any time the number of satellites drops below 4 (which is the minimum number of satellites required to post process a 3D solution), the internal clock timing the static session will reset to zero and begin again.

Time - Less than 6 SVs

This defines the duration of the static collection if the minimum number of satellites being tracked during the static session is 5 satellites. Default = 25 minutes.

Time - Less than 7 SVs

This defines the duration of the static collection if the minimum number of satellites being tracked during the static session is 6 satellites. Default = 20 minutes.

Time - Less than 8 SVs

This defines the duration of the static collection if the minimum number of satellites being tracked during the static session is 7 satellites. Default = 15 minutes.

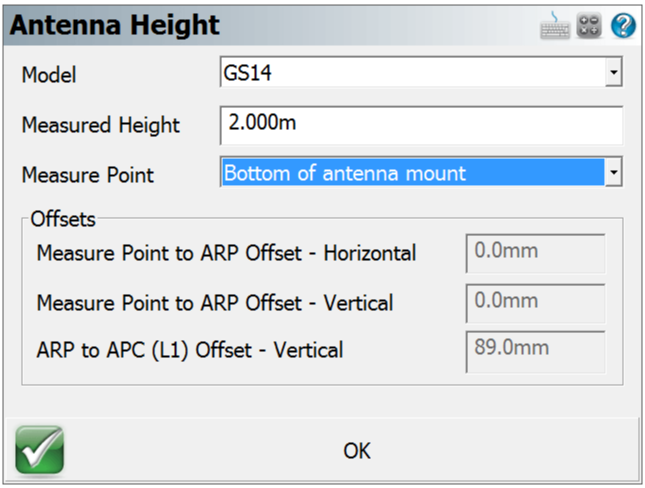
Time - 8 or more SVs

This defines the duration of the static collection if the minimum number of satellites being tracked during the static session is 8 or more satellites. Default = 10 minutes.

GNSS Antenna Height

GNSS Toolbar | Antenna Height

The antenna settings are used to calculate or enter the height of the antenna phase center above the ground. You can enter the true height (if it is known) or enter the measured height and any horizontal or vertical offsets and have Evidence Recorder calculate the antenna height for you.



Depending on the model you've selected, manufacturer specific antenna offsets will be listed. If your specific antenna model is not listed, you can select "User Supplied" and specify appropriate offset measurements. For more detailed information about these offsets, refer to your users guide for your receiver.

The true height is simply computed by the use of Pythagoras' theorem:

$$TrueHeight = VerticalOffset + sqrt((MeasuredHeight)^2 - (HorizontalOffset)^2)$$

You can change the true or measured antenna height at any time, on the Store Point screen when storing your GNSS shots.

Overview - Reference Receiver

Before you can start your GNSS survey, there are a few things you need to confirm and setup.

Profile and Coordinate System Files

- You will need to determine and select the correct coordinate system and optional geoid model to use for your GNSS survey work.
- Create a profile for your reference (base) and rover receivers. Profiles contain receiver settings such as baud rates and tolerance masks that are used by Evidence Recorder. Refer to the Reference Configuration and Rover Configuration topics for more information.

Reference (Base) Connection Procedure

1. Main Menu | Connect | Instrument Selection
2. Choose **GNSS Reference** as the type of instrument.
3. If you have not already done so, you need to create a profile for your reference receiver. If you have a profile already defined, select it now and then press **Connect**.
4. You will now see the map screen. On the GNSS Toolbar you can review information about receiver, sky plot list, display current position, and review DOP values.
5. Select one of the available methods to set your reference position, described in more detail in the Reference Position Modes topic. The three different methods are: Known Geodetic Position, Averaged Geodetic Position, or Local Transformation to Point.
6. When you're ready to measure the reference position, press the **Measure** button on the GNSS Toolbar.
7. You will be prompted with an option to store the measured position in the points database.
8. Once the reference position has been set, the Link Configure dialog will be displayed where you can configure your radio settings to transmit corrections.
9. If setting up your receivers for the first time, press the **Setup** button to set the radio protocol and frequency, etc.
10. Press the **Connect** button to begin broadcasting corrections.
11. This completes the Reference portion of the connection. Disconnect from the Reference receiver and continue to the Rover Connection steps.

Overview - Rover Receiver

Before you can start your GNSS survey, there are a few things you need to confirm and setup.

Profile and Coordinate System Files

- You will need to determine and select the correct coordinate system and optional geoid model to use for your GNSS survey work.
- Create a profile for your reference (base) and rover receivers. Profiles contain receiver settings such as baud rates and tolerance masks that are used by Evidence Recorder. Refer to the Reference Configuration and Rover Configuration topics for more information.

Rover Connection Procedure

1. Main Menu | Connect | Instrument Selection
2. Choose **GNSS Rover** as the type of instrument.
3. If you have not already done so, you need to create a profile for your rover receiver. If you have a profile already defined, select it now and then press **Connect**.
4. Once connected, the Link Configure dialog will be displayed where you can configure your correction settings.
5. If setting up your receiver for the first time, additional steps will be required to make the initial connection. Exact steps vary depending on the device type: UHF Radio / GSM / Data Collector Internet.
6. Press the **Connect** button to begin receiving corrections.
7. With a successful connection you will see the map screen. The Measure button might say **"No Link"** to begin with, then switch to **"RTK Float"** and finally to **"RTK Fixed"**.
8. To record a position, simply press the **Measure** button on the GNSS toolbar. Refer to the GNSS Measurement topic for more information.

Electronic Bubble / Tilt Survey

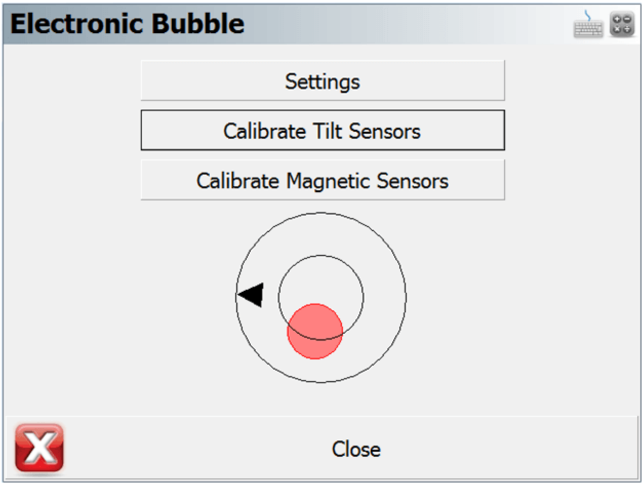
GNSS Toolbar | Instrument Settings | Sensor Configure | Electronic Bubble

The Electronic Bubble utilizes MEMS sensors in the GNSS receiver to compensate for the antenna pole tilt.

This feature improves the GNSS point collection workflow by:

- Vertical and horizontal distance introduced by the pole tilt will be compensated automatically if desired.
- Eliminate the need to focus on the conventional bubble on the GNSS pole while taking measurements.
- Stop user from saving points if the pole tilt angle is greater than tolerance level.

The Electronic Bubble feature requires calibrations before being used in production works. With a supported GNSS receiver connected, Settings and Calibrations related to the Electronic Bubble can be located in the **Settings | Sensor Configure | Electronic Bubble** screen.



Settings

Electronic Bubble

Toggles Electronic Bubble feature ON/OFF

Tilt Compensated

Toggles tilt compensation ON/OFF

With tilt compensation turned on, tilt distance will be added into the calculation of GNSS measurements.

Tilt Rejection

Toggles tilt rejection ON/OFF

With tilt rejection turned on, user will not be able to store points if the tilt angle exceeds the specified rejection tolerance.

Tilt Rejection (Deg)

Tilt rejection tolerance in degrees. User can only store points if only the tilt angle is below the set limit.

Magnetic Declination

Specify the angle between magnetic north and true north

- *Computed*- Magnetic Declination is computed using International Geomagnetic Reference Field (IGRF-12) model.
- *User* - Enter a desired magnetic declination value.

Calibrate Sensors

Calibrate Tilt Sensors

This procedure calibrates the internal tilt sensor, and stores the zeroed the vertical angle.

1. Click “Calibrate Tilt Sensors” button to enter the procedure.
2. Level the GNSS receiver with a calibrated reference such as a bipod or tripod.
3. Ensure the GNSS receiver is in a stable plumb position.
4. Click “Calibrate” button to finish the tilt sensor calibration.

Note: Control panel on the GNSS receiver must be facing the operator when using the electronic bubble.

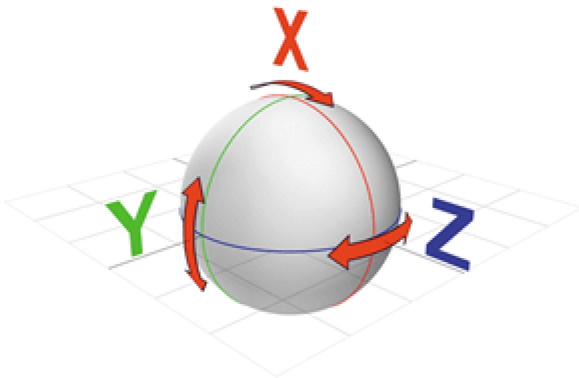
Calibrate Magnetic Sensors

This procedure calibrates the internal magnetic sensor.

1. Click “Calibrate Magnetic Sensors” button to enter the procedure.
2. Ensure the GNSS receiver is away from any artificial magnetic sources.
3. Click “Calibrate” button to start the magnetic calibration.
4. **Slowly** rotate the GNSS receiver about its 3 axes to fill up the progress bar.
    - Note that the progress bar will not move unless the instrument is being rotated.

This demonstrate the rotation axes:

- Longitudinal Axis (Roll)
- Lateral Axis (Pitch)
- Vertical Axis (Yaw)



We recommend to perform both calibration procedures on regular basis to ensure the reliability and accuracy of the Electronic Bubble. Magnetic Sensor may require more frequent calibration than tilt sensor depending on your calibration location and distance travelled. Consult with your GNSS receiver manufacture representative for more information regarding calibrate internals.

Settings

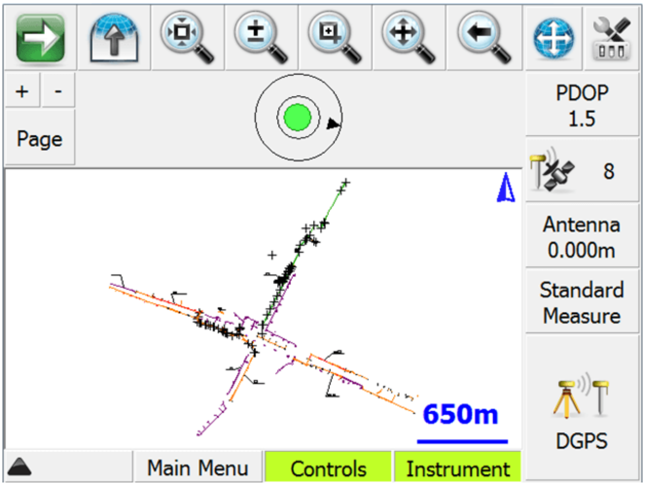
Electronic Bubble

After calibration, the electronic bubble can be found in two places.

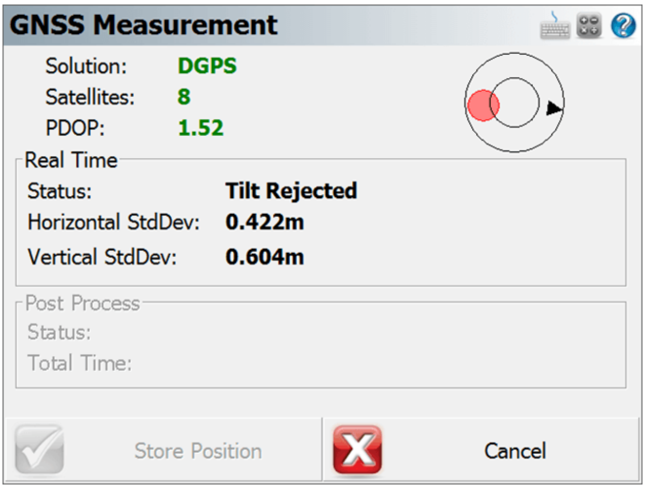
- Observation toolbar (One of the pages)
- GNSS Measurement screen

The black arrow shows the direction of magnetic north.

The bubble is green if the instrument is plumb, and red if the instrument is tilted beyond certain degree.



On the GNSS Measurement Screen, if the Tilt Rejection is turned on and current tilt angle exceeds the preset rejection value, the Store Position button will be deactivated and GNSS measurements will not be averaged until the GNSS receiver turns to a plumb and stable position.



Reference and Rover Common Tools

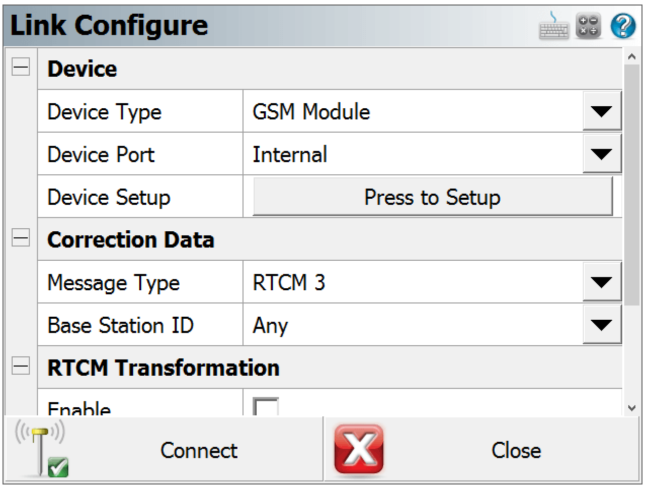
Correction Link

The Link Configure screen is used to configure the radio or GSM link for transmitting or receiving RTK corrections. The mode will vary depending on your receiver type. The Setup button allows the user to go into further device details including channels and frequencies for radios and GSM modems.

If you need to connect to a NTRIP caster, you can also access that in the setup screen.

Accessing Link Configure

To access this screen you need to first connect to a reference or rover receiver. Once connected you can access this dialog. Please review the Reference (Base) Receiver Overview or the Rover Receiver Overview topics for more details about work flow.



Device

Device Type

Select the appropriate Correction Link device type, such as GSM Module, UHF Radio Module, Data Collector Internet, or Other Device.

Device Port

Select the appropriate Port when multiple options exist.

Device Setup

When you press the Setup button on the dialog above, the Radio Setup or Modem Setup screen will appear. Choose the radio make and model from the pull-down and set the channel or frequency, the radio will be programmed by Evidence Recorder to the channel or frequency selected (on some models). If you are using an NTRIP or GPRS server, enter your internet and server credentials here.

Correction Data

Message Type

The message type is used in determining what data streams are sent from the reference station to the rover. They can be RTCM, CMR or a proprietary format.

Base Station ID

Select a specific Base Station ID to restrict message corrections to specific reference stations.

RTCM Transformation

To receive horizontal and vertical coordinate system information from your network, enable RTCM Transformation messages.

GNSS RTCM Transformation

GNSS Toolbar | Instrument Settings | Link Configure | RTCM Transformation

RTCM Transformation messages can be utilized to provide horizontal and vertical systems from RTK network using RTCM 3.1 or higher correction messages.

At the Link Configure dialog select the option to enable the RTCM Transformation messages.

RTCM Transformation Information

GNSS Toolbar | Instrument Settings | Link Information

Information Table:

The information table displays the mountpoint name, current status of the incoming corrections, and coordinate systems information received from the NTRIP Caster.

NTRIP casters typically do not send out RTCM transformation messages at the same frequency as RTK correction messages. A 90 seconds waiting time is reserved to receive the messages.

Please ensure the Target System field is what you would expect at current location.

If no the transformation messages are not received after 90s, the **Options** screen will automatically show up, which allows you to select a valid predefined coordinate system or choose a different mount point.

OK:

The OK button will only become active if valid transformation messages are received.

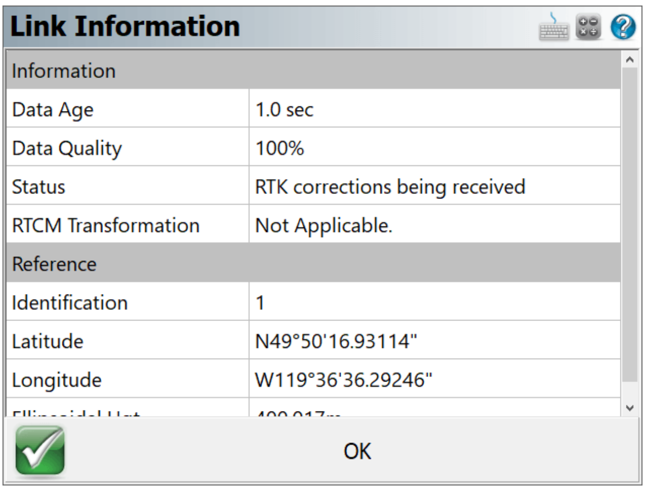
Options:

- **Coordinate System** - Predefined coordinate systems can be used if you no longer wish to use RTCM transformation. Horizontal and Vertical system can be selected separately.
- **Mount Points** - A different mount points can be selected if the current mount point do not support RTCM messages.
- **Go Back** - Allows you go back to the previous screen and continue waiting for incoming messages
- **Cancel** - This button will exit the link configuration work flow and bring out the map view. You will need to select a valid coordinate system before taking measurement if the RTCM transformation messages are not received.

Correction Information

GNSS Toolbar | Instrument Settings | Link Information

The Correction Information screen is accessed from the GNSS Settings screen. It displays information about the correction message being received by your receiver via a radio link from a base receiver, or via a cellular modem link from an NTRIP or GPRS server.



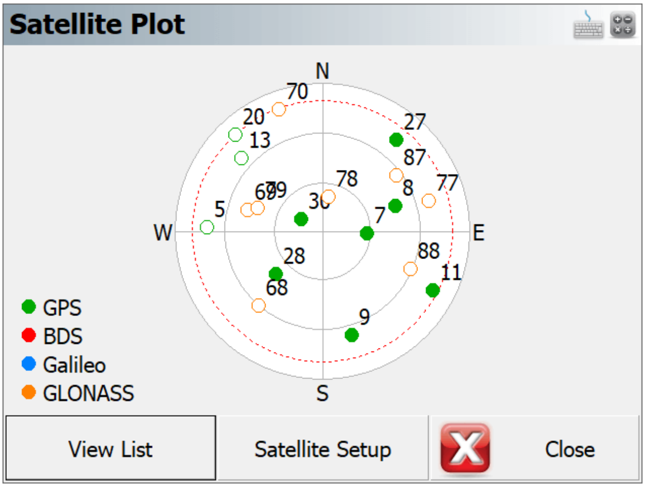
For information on configuring your correction link please see the Correction Link topic.

GNSS Satellite Plot

To access this screen, press the Satellite button on the GNSS Toolbar.

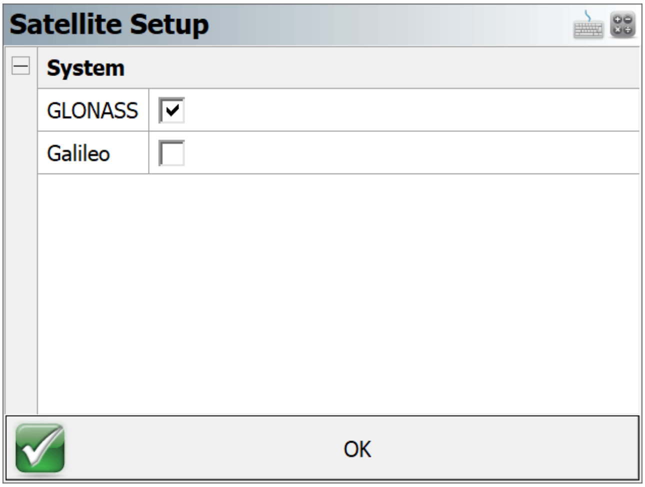
The Satellite Plot screen is a graphical representation of the current GNSS satellite constellation. It shows all visible satellites including both GPS and GLONASS. Those satellites being used in the current solution are indicated with a black dot, and those being ignored are indicated with a white dot.

Each satellite is displayed with its PRN (identification) number, and the Elevation Mask specified in your current Tolerance Mode is indicated by a red dashed line.



Press the **View List** button to open the Satellite List screen.

Press the **Satellite Setup** button to enable/disable constellations.



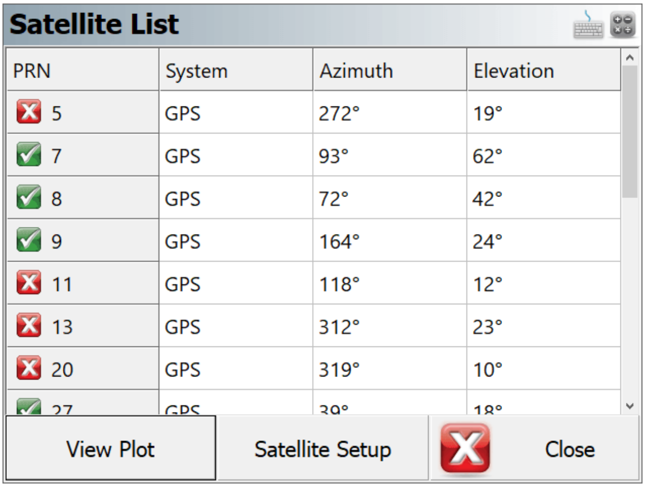
Press the **Close** button to return to the map screen.

GNSS Satellite List

To access this screen, press the Satellite button on the GNSS Toolbar, then press the **View List** button on the Satellite Plot screen.

The Satellite List screen displays information on the current GNSS satellite constellation. It shows all visible satellites including both GPS and GLONASS. Those satellites being used in the current solution are indicated with a checkmark, and those being ignored are indicated with an X.

Each satellite is displayed with its PRN (identification) number, Azimuth and Elevation, and Signal-to-Noise Ratio.

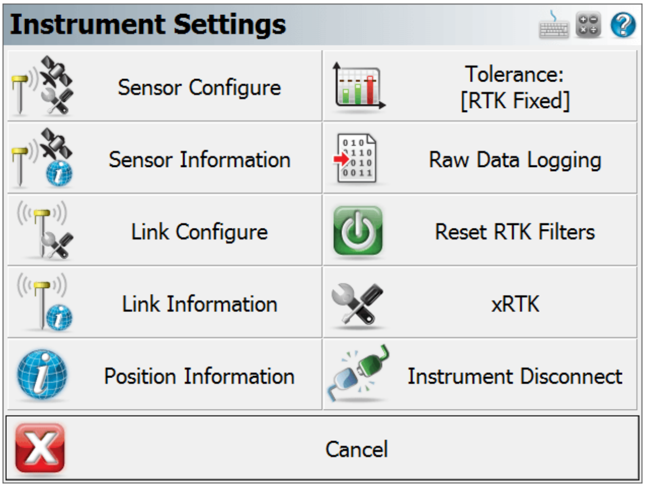


Press the **View Plot** button to open the Satellite Plot screen.

Press the **Close** button to return to the map screen.

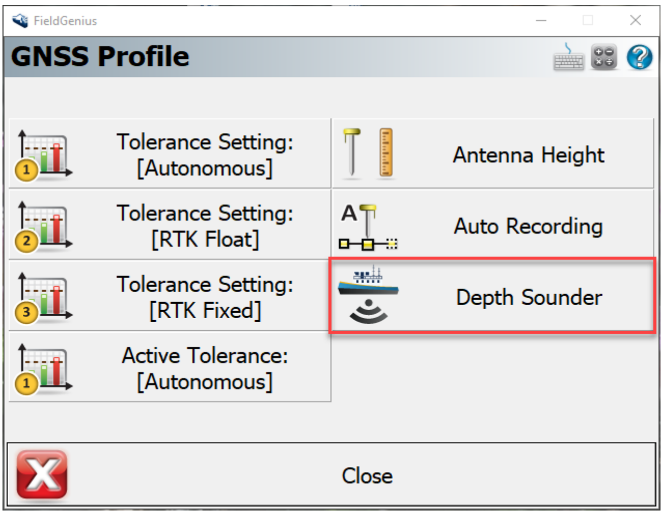
GNSS Settings

The GNSS Settings screen is accessed from the GNSS Toolbar.



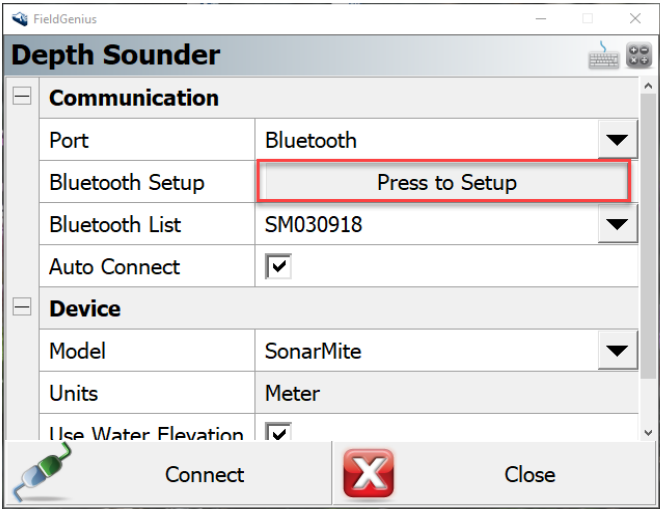
Sensor Configure

This will allow you to make changes to most of the settings in your reference or rover profile, including configuring the three tolerance modes, selecting the active tolerance mode, configuring the antenna height, configuring the auto-recording options and depending on the GNSS Sensor connected, the Electronic Bubble settings will be shown here as well. (The Model and Communication options cannot be configured while you are connected to your GNSS receiver.)

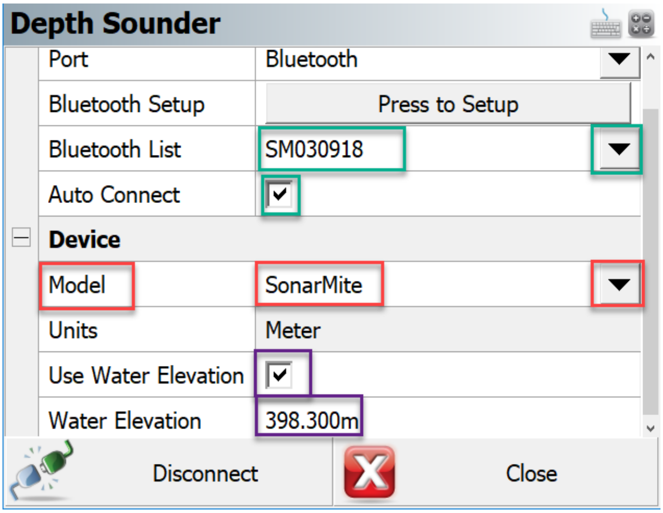


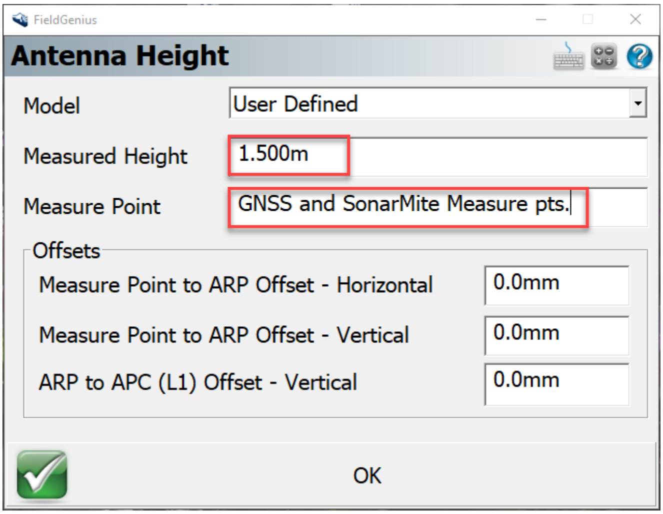
Depth Sounder

The Depth sounder option allows the program to connect by Bluetooth to a supported depth sounder sensor after you are connected to a GNSS receiver. The program supports the SonarMite BTX depth sounder and other depth sounders that support the NMEA depth sounder standard format .On the depth sounder set the port to Bluetooth and the Press to Setup button. Search and select the depth sounder Bluetooth device from the list and configure the Bluetooth connection per the manufacturers instructions (pin code may be required). Once you have selected the correct depth sounder Bluetooth device select Connect.



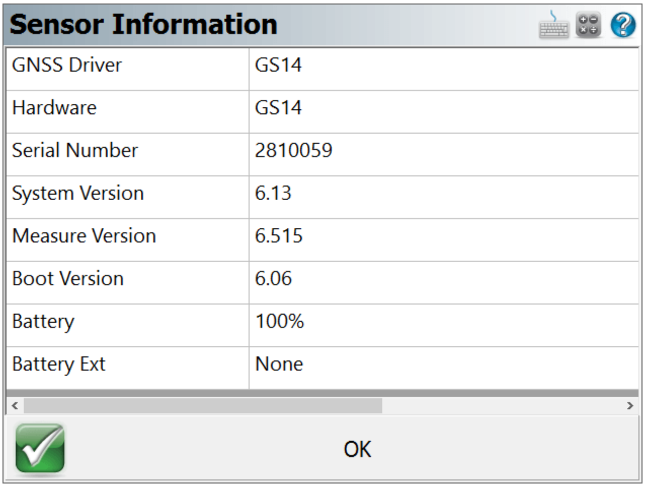
Once connected to the Depth Sounder you can select the auto reconnect option to reconnect to the sensor if communication is interrupted. With Bluetooth communication established you can select the device model as SonarMite or NMEA depending on the type of depth sounder device you are using. The units of measure for the depth sounder are the same as the GNSS receiver. If the Use water level box is not checked than the height recorded by the program is a combination of the GNSS receiver position plus the antenna height and the depth sounder measurement. The antenna height needs to be input as the distance between the measure point on the GNSS Receiver and the measure point on the depth sounder. If the water level elevation is checked then the user needs to input the water level and the antenna height needs to be set as the distance from the water surface to the measure point on the depth sounder. The GNSS receiver will record the horizontal location and the height will be the water level plus antenna height and depth sounder measurement.


Depth Sounder
Port
Bluetooth
Bluetooth Setup
Press to Setup
Bluetooth List
SM030918
Auto Connect
Device
Model
SonarMite
Units
Meter
Use Water Elevation
Water Elevation
398.300m
Disconnect
Close


FieldGenius
Antenna Height
Model
User Defined
Measured Height
1.500m
Measure Point
GNSS and SonarMite Measure pts.
Offsets
Measure Point to ARP Offset - Horizontal
0.0mm
Measure Point to ARP Offset - Vertical
0.0mm
ARP to APC (L1) Offset - Vertical
0.0mm
OK

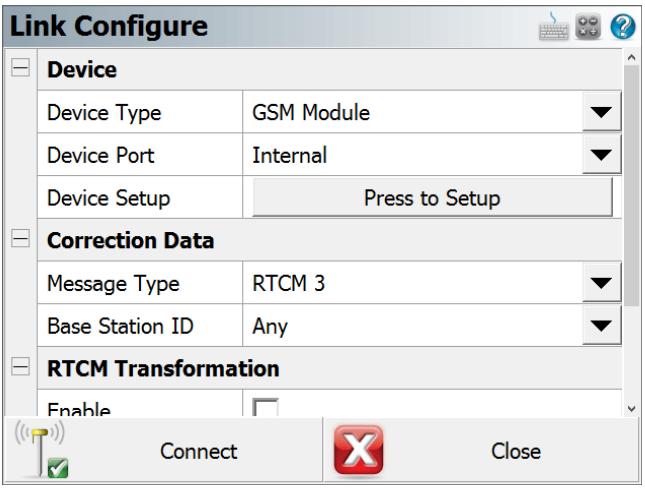
Sensor Information

The Sensor Information screen displays detailed information about the hardware you are connected to.



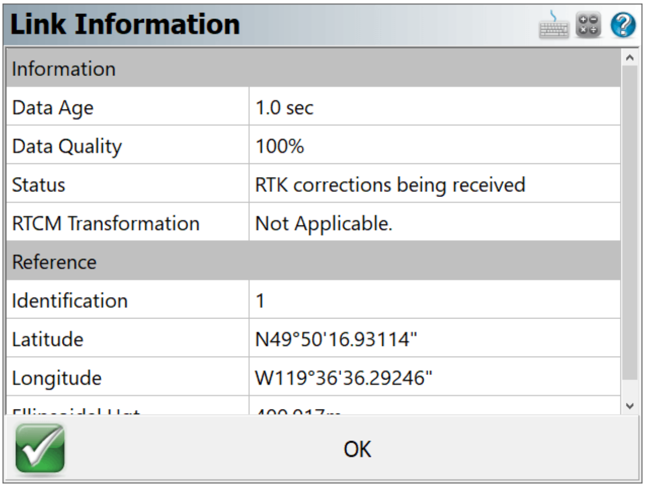
Link Configure

This turns on your GNSS Receiver's radio or modem to begin receiving RTK corrections, from either a base receiver or an NTRIP or GPRS server.



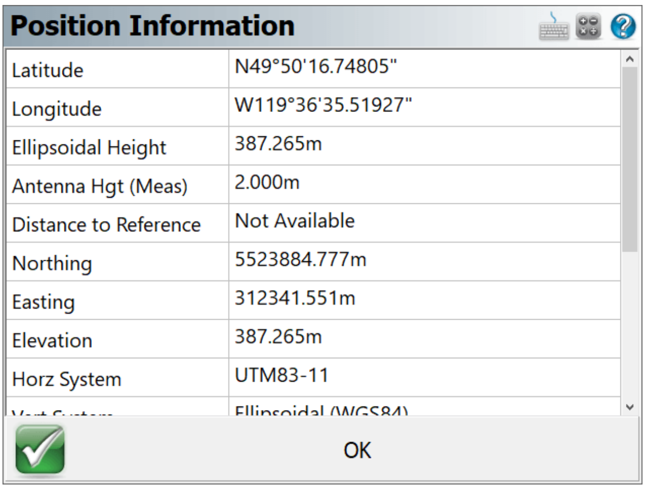
Link Information

The Link Information screen displays detailed real-time information about the correction message being received by your receiver via a radio link from a base receiver, or via a cellular modem link from an NTRIP or GPRS server.



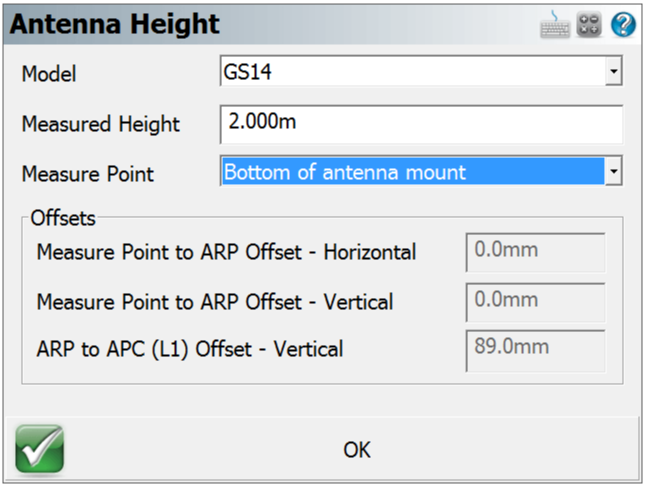
Position Information

The Position Information screen displays detailed real-time information about your current position.



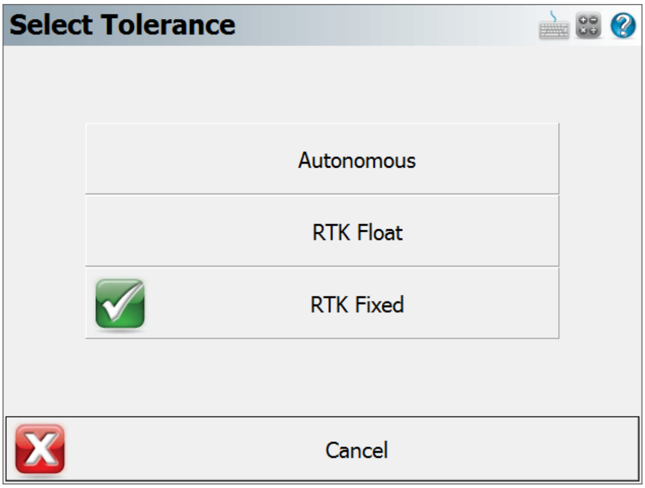
Antenna Height

The Antenna Height screen allows you to configure the antenna height of your GNSS receiver.



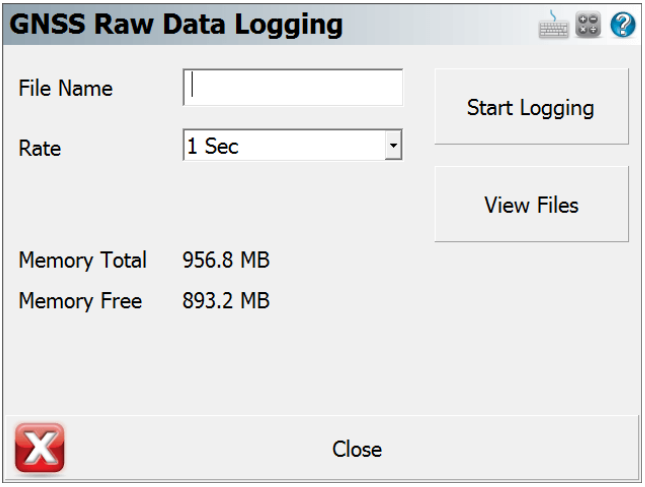
Active Tolerance Mode

This button indicates which of the three tolerance modes setup in your Rover Profile is currently being used. Press this button to select the active tolerance mode. To configure the three tolerance modes, see the "Sensor Configure" button described above.



Raw Data Logging

The Raw Data Logging screen is used to start and stop raw data logging on your GNSS reference or rover receiver, for later post-processing.



Reset RTK Filters

Use this to reset the RTK solution in your receiver, to force it to recalculate a new solution and resolve any ambiguities again from scratch. This has the same effect as inverting your receiver to reset the solution.

Select Mount Point

Use this to select a different mount point from the NTRIP caster you are currently connected to.

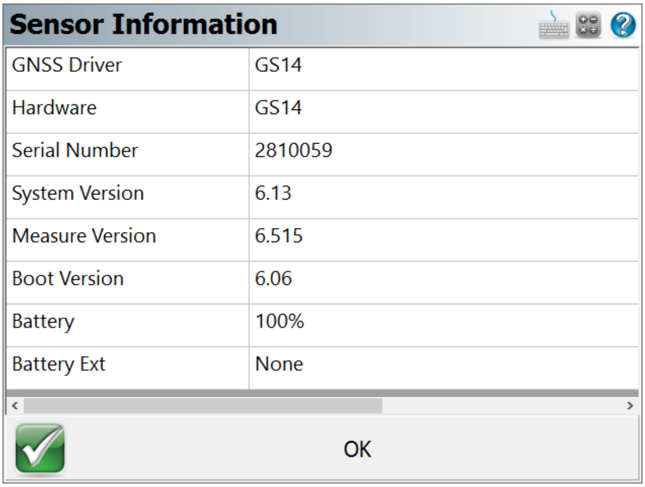
Instrument Disconnect

Use this to disconnect from your receiver. If you are connected to a reference receiver, corrections will continue to be transmitted after you disconnect.

Sensor Information

GNSS Toolbar | Instrument Settings | Sensor Information

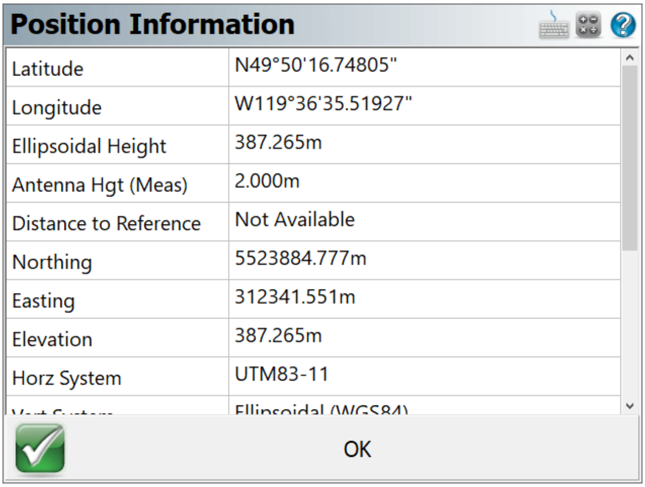
The Sensor Information screen is accessed from the GNSS Settings screen. It displays information about the hardware you are connected to. The specific information available will vary by model, but typically you will see the make and model of your receiver, its serial number, battery status, firmware information, and more.



Position Information

GNSS Toolbar | Instrument Settings | Position Information

The Position Information screen is accessed from the GNSS Settings screen. It displays detailed information about your current position.



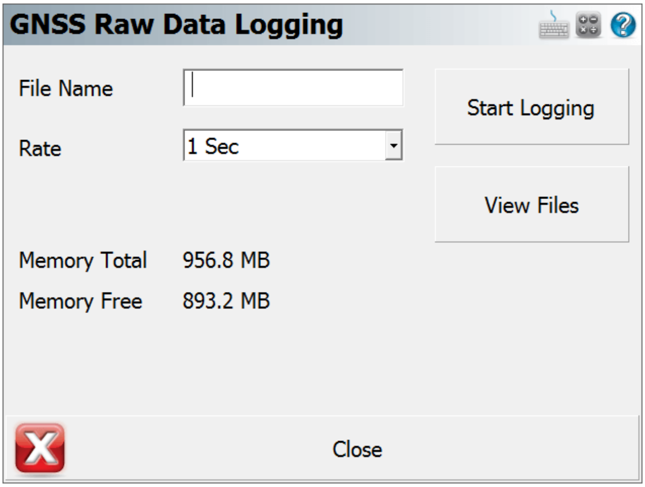
The following information is displayed and updates in real-time:

- Geodetic Position (Latitude, Longitude, Ellipsoid Height)
- Measured Antenna Height
- Baseline Length
- Cartesian Position (Northing, Easting, Elevation)
- Coordinate Systems (Horizontal and Vertical)
- Solution Type
- Standard Deviation
- PDOP
- Number of Satellites
- UTC Date and Time

Raw Data Logging

GNSS Toolbar | Instrument Settings | Raw Data Logging

Use this to start and stop raw data logging on your GNSS reference or rover receiver, for later post-processing of your point data. You can log raw data on the receiver while you carry on with your survey in Evidence Recorder.



Note: Evidence Recorder cannot control the data logging on all models of GNSS receivers. Currently, we support data logging on the:

Acnovo GX9
Acnovo GX10
Altus APS-3
Altus APS-3G
Altus APS-NR2
Ashtech / Thales ProMark 500
Ashtech / Thales ProMark 800
Champion AllStar
Champion Pro
CHC i80
CHC X900+
CHC X91+
ComNav T300
geo-FENNEL FGS 1
GeoMax Zenith10
GeoMax Zenith15
GeoMax Zenith20
GeoMax Zenith25/25Pro
GeoMax Zenith35/35Pro
GINTEC G9
GINTEC G10
Hemisphere S320
Hemisphere S321
Horizon Kronos C3
Javad Triumph-1
KOLIDA K5 Plus
LINERTEC LGN-200S
Leica 1200
Leica GS15
Leica GS10
Leica SmartRover
Leica GPS900
NavCom SF-3040
NavCom SF-3050
NovAtel DL4
Pentax G3100-R1
Pentax G3100-R2
Pentax SMT888-3G
Pentax SMT888-3G Rev 2
Prexiso G4/G5
Septentrio Altus APS3G
Septentrio Altus NR2
Sokkia GRX1
Sokkia GSR2600
SOUTH GALAXY G1/G1 Plus
SOUTH GALAXY G6
SOUTH S82/S82-V
SOUTH S86
Spectra Precision SP80
STONEX S8 Plus
STONEX S9i
STONEX S9III Plus
STONEX S10
Topcon GR-3
Topcon HiPer
Z-SURVEY Z6

Command Console

GNSS Toolbar | Instrument Settings | Command Console

The Command Console screen is accessed from the GNSS Settings screen. It allows you to send commands to your receiver to configure settings, or other related tasks.

You must determine the exact syntax to enter in the console and you can usually gather this information from your GNSS manufacturer.

Send

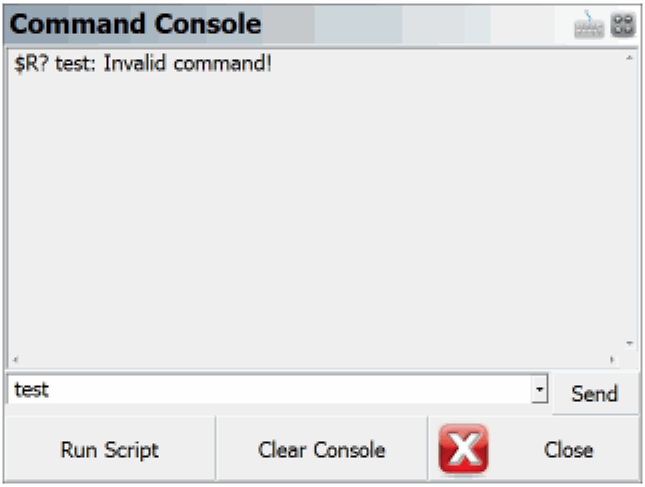
This will send the parameters that you've entered to your receiver.

Run Script

This allows you to import and read a text file that has a sequence of commands that you would like to upload to your receiver.

Clear Console

This will clear console of all parameters sent and received from your receiver.



Disto/Laser Reference

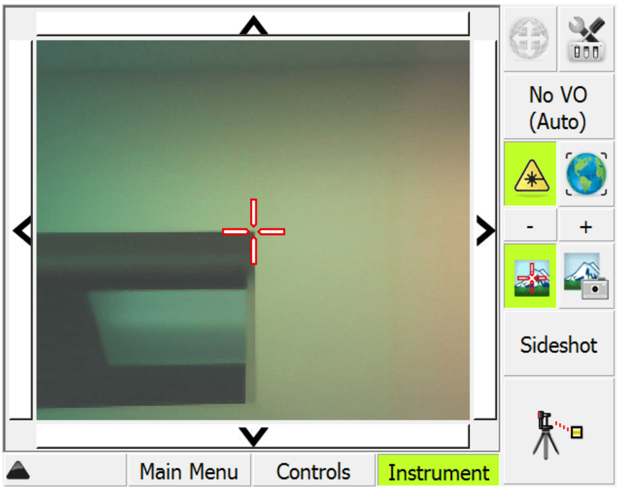
Main Menu | Connect | Disto/Laser

3D Disto

To use a 3D Disto:

- Having a serial number starting with **175** or **177** requires the 3D Disto Software for Windows installed on your computer to make the initial USB or WiFi connection. These devices also are recommended to be used with a USB WiFi stick for WiFi connectivity.
- Having a serial number starting with **176** will connect automatically without the 3D Disto Software for Windows, and does not require a USB WiFi stick.

Evidence Recorder supports live video streaming from the 3D Disto camera into the MapView area. Use the controls at the edges of the video image to turn the 3D Disto, or tap on the image to turn to the point.

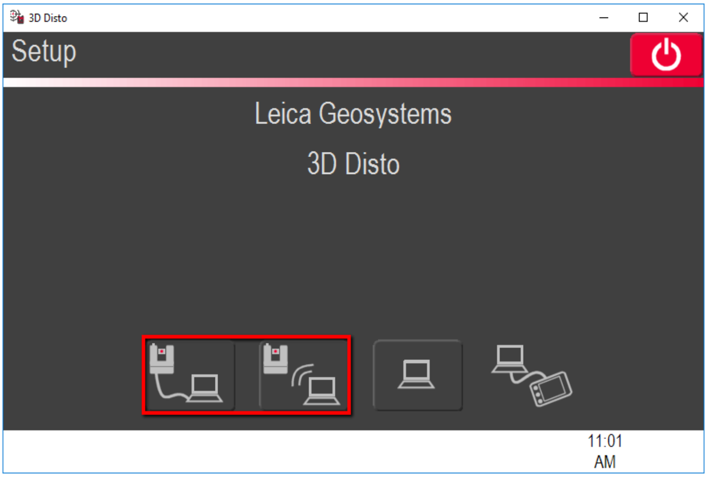


To measure a location simply press the measure button in Evidence Recorder.

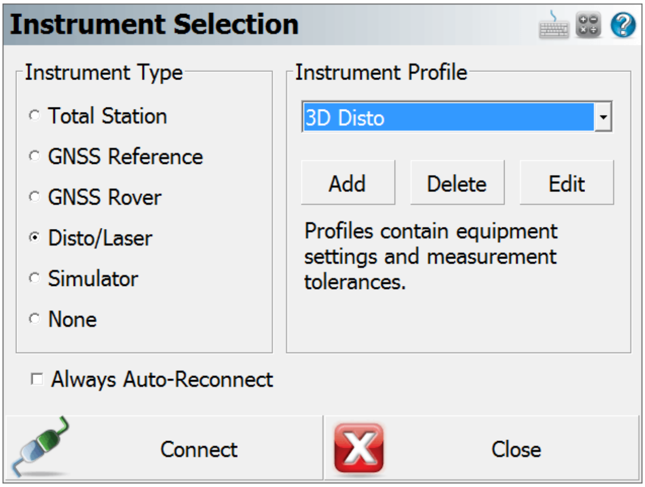
3D Disto Connection Guide

The general connection procedure for Leica 3D Disto:

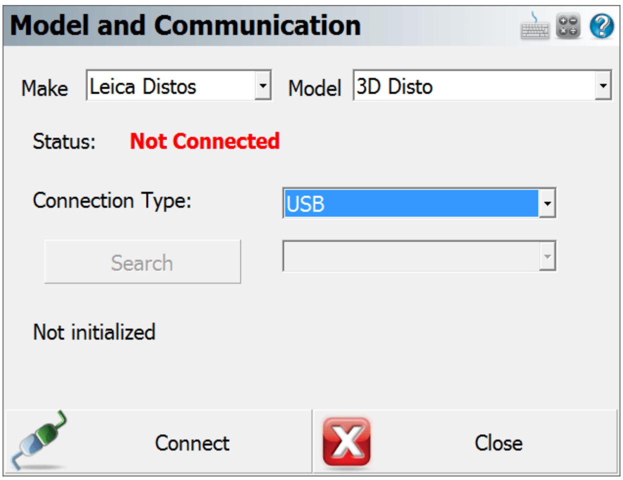
1. Only required for devices having serial numbers starting with **175** or **177**:
    - Download the latest 3D Disto software for Windows from Leica myWorld.
    - Install the 3D Disto software and run it.
    - In the 3D Disto software, select the **Connect USB** or **Connect WiFi** button to connect:



    - Once connected, the main screen of the 3D Disto software will be displayed. The communication ports are now configured on the PC/Tablet.
    - Close the 3D Disto software.
2. Launch Evidence Recorder and open a Scene.
3. At the Instrument Selection screen, pick the **Disto/Laser** type and choose the pre-configured **3D Disto** profile, then pick **Edit**:



4. Choose Model and Communication.
5. Pick the Connection Type:
   - If choosing **USB** you are ready to Connect, pick **Connect**
   - If choosing **WiFi** you will need to perform a WiFi search first, pick **Search** to search for 3D Disto devices. If successfully found, pick **Connect**



6. Complete, see the Mapping Methods (Disto/Laser) topic for supported functionality.

S910 Disto

The Leica S910 Disto is fully supported using a WiFi connection. It can be operated using workflows very similar to a Total Station when combined with a tripod or stand. Without a tripod or stand, the S910 can be used to capture distances for various applications, including:

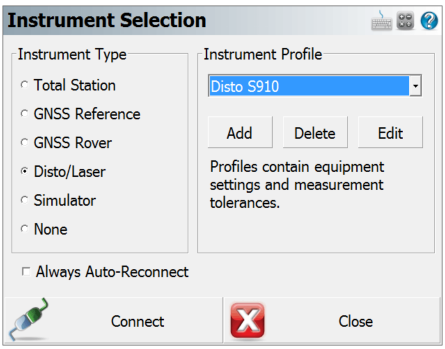
- The Drawing Tool
- Traverse / Intersection calculations
- Baseline Offset calculations
- Trilateration calculations

Disto S910 Connection Guide

The general connection procedure for Leica Disto S910:

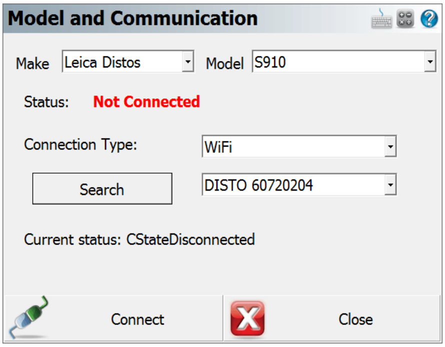
1. Launch Evidence Recorder and open a Scene.

2. At the Instrument Selection screen, pick the **Disto/Laser** type and choose the pre-configured **Disto S910** profile, then pick **Edit**:



3. Choose Model and Communication.

4. **WiFi** is the only supported Connection Type, pick **Search** to search for Disto S910 devices. If successfully found, pick **Connect**.



5. Complete, see the Mapping Methods (Disto/Laser) topic for supported functionality.

Bluetooth Disto

Evidence Recorder supports handheld Leica Distos with Bluetooth connectivity. Supported models include Disto A6 and D330i. Bluetooth LE is not currently supported (E7100i, E7500i, etc.). Supported models are able to capture distances for various applications, including:

- The Drawing Tool
- Traverse / Intersection calculations
- Baseline Offset calculations
- Trilateration calculations

Connecting to Computer

Microsoft ActiveSync / Windows Mobile Device Center

Microsoft ActiveSync and Microsoft Windows Mobile Device Center facilitate communication between your PC and your handheld device.

If you are using Windows XP or earlier, **Microsoft ActiveSync** has to be installed on your computer so you can download data between your hand held and desktop computers. The current version (at time of printing) is ActiveSync 4.5. You may have to use an earlier version if you are running Windows 95 or 98. Check the web page noted below for more information.

If you are using Windows Vista, **Microsoft Windows Mobile Device Center** has to be installed on your computer, rather than Microsoft ActiveSync. The current version (at time of printing) is Windows Mobile Device Center 6.1.

Installing ActiveSync / Windows Mobile Device Center

Installing From Web

Microsoft ActiveSync or Microsoft Windows Mobile Device Center might already be installed on your computer; you can confirm this by looking for it in your Windows Start Menu.

If you do not have Microsoft ActiveSync or the Windows Mobile Device Center installed, you can download and install the latest version from Microsoft's website at this address:

http://www.microsoft.com/windowsmobile/activesync/default.mspx

Note: You may be asked to reboot your system once the installation is complete.

Installing From CD

Microsoft ActiveSync or Microsoft Windows Mobile Device Center might be already be installed on your computer, you can confirm this by looking for it in your Windows Start Menu.

If you do not have Microsoft ActiveSync or the Windows Mobile Device Center installed, and you don't have access to the internet, it can be installed from your Evidence Recorder CD. You can browse into the Evidence Recorder folder on your CD and run one of the following files:

MSASYNC.EXE (for Windows XP or earlier)

MSWMDC32.EXE (for Windows Vista 32-bit)

MSWMDC64.EXE(for Windows Vista 64-bit)

Note: You may be asked to reboot your system once the installation is complete.

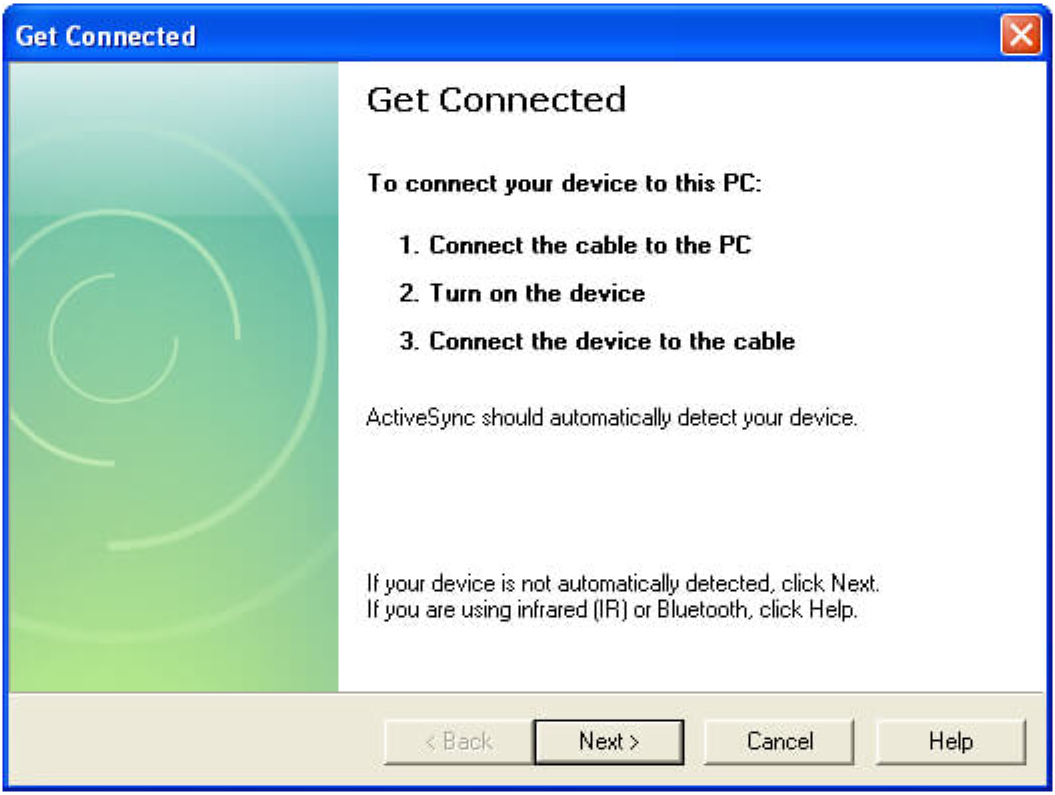
Connecting ActiveSync / Windows Mobile Device Center

Get Connected

We now need to establish a connection between your data collector and desktop computer as prompted by the ActiveSync or Windows Mobile Device Center Connection Wizard. The following screenshots are specific to ActiveSync, but the Mobile Device Center is almost identical.

After the install is complete, ActiveSync will display a Get Connected screen.

If ActiveSync was already installed, you can start it by going to your Start menu | All Programs | Microsoft ActiveSync. The Get Connected Wizard should appear. If it does not, go to the ActiveSync **File** menu and select **Get Connected**.



Connect your handheld data collector to your desktop or laptop computer using the supplied cradle and/or cables.

Power ON the data collector and click **Next** on the Get Connected Wizard. Some devices require you to tap a **PC Link** icon on the device while the Get Connected function is in operation.

When communication is established, you will be prompted to set up a partnership between your data collector and the desktop computer.

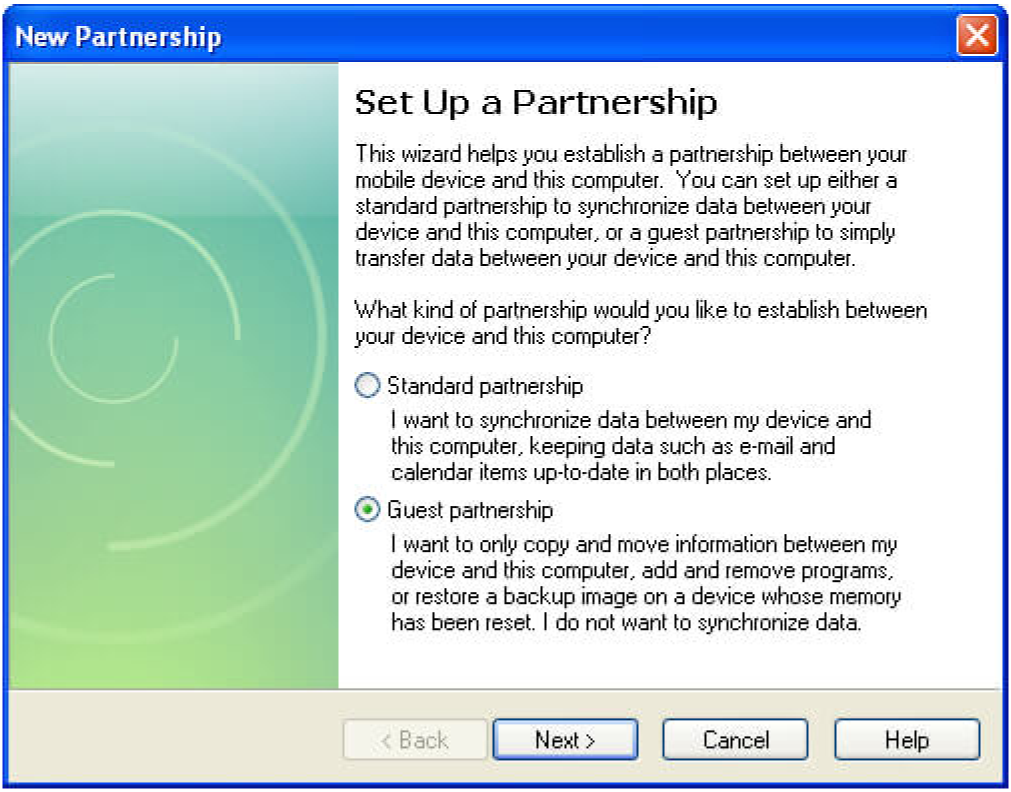
Note: If your device does not connect as shown, turn the device off, and then back on again to retry

Establish a Guest Connection

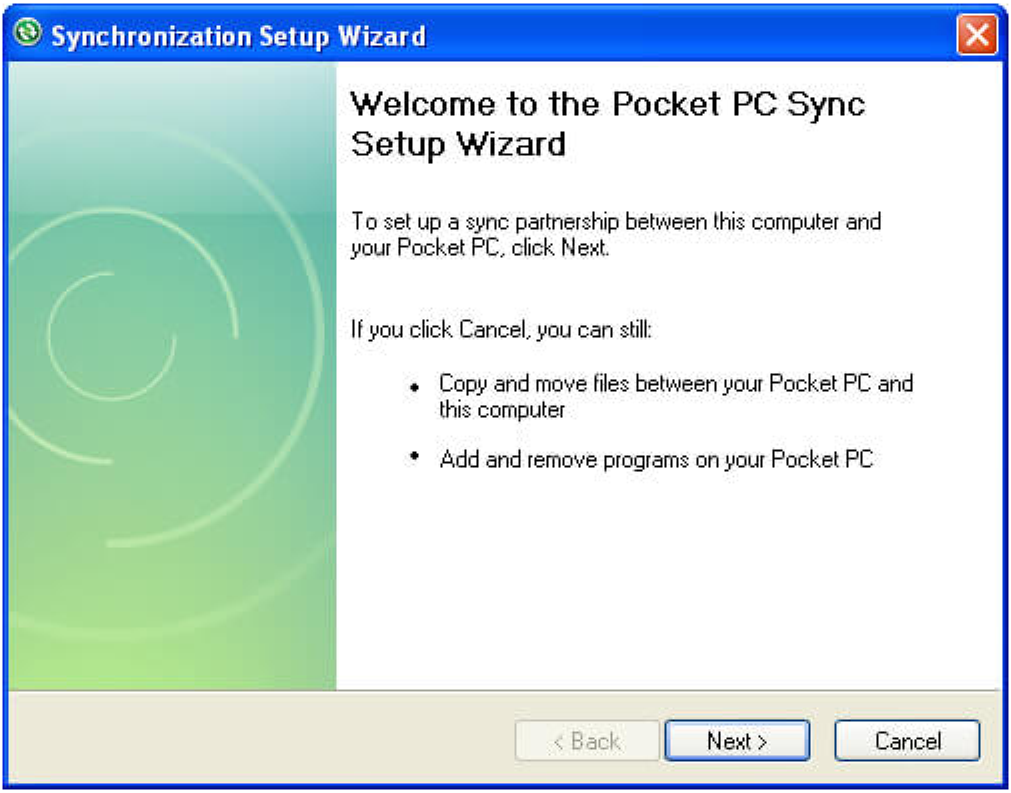
After you successfully connect to your computer, you will be asked to setup a partnership. Choose **Guest Partnership** then click **Next** to continue.

Note:

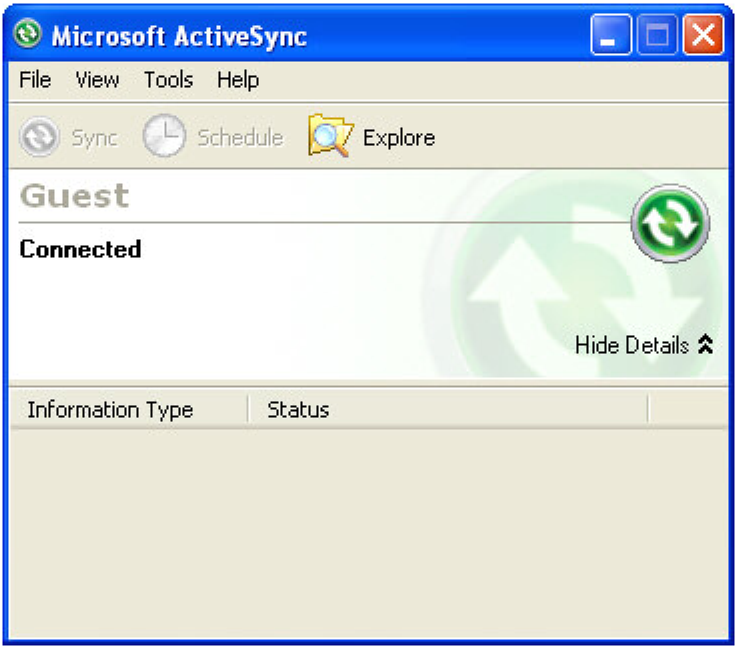
You can setup a Standard Partnership if desired, but this is not necessary and adds complexity. We recommend using a Guest Partnership.



Or if you are using a handheld device running Windows Mobile 5.0 or newer, you may instead see the Synchronization Setup Wizard, simply press **Cancel** to use a guest connection.



ActiveSync should now display as shown below:



You are now ready to move on to the next step - MicroSurvey Transfer Program

Note:

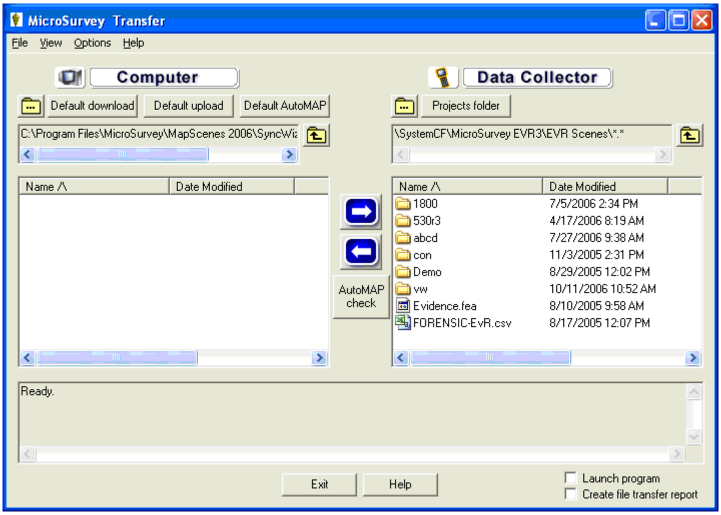
A small circular ActiveSync icon will appear in the lower right corner of your desktop (like the one at right in the above image). This will display in gray when ActiveSync is inactive but will change to green when your device is connected.

MicroSurvey Transfer

We provide a free transfer tool with Evidence Recorder to help you copy Scenes to and from your data collector. The program is called MicroSurvey Transfer and it can be download from our website or installed directly off of the CD provided with Evidence Recorder.

Once installed all you need is to connect your handheld computer to your desktop computer via an ActiveSync or Windows Mobile Device Center connection. ActiveSync is a Microsoft Windows product which establishes a serial or USB connection between your data collector and your computer.

Once connected, you can start the MicroSurvey Transfer program.

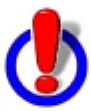


The program has been designed to streamline the transfer of Scenes and files back and forth between you data collector and computer.

For more details, please refer to the Help file included with the MicroSurvey Transfer program.

Synchronize

To import your Scenes into your IMS Map360 desktop product, please refer to the **Evidence Recorder SyncWizard** topic in the IMS Map360 help file.



Evidence Recorder 3 scenes can only be imported into MapScenes 2006 or newer.

Evidence Recorderr 4 (and newer) scenes with an unencrypted raw file (*.raw) can only be imported into MapScenes 2006 or newer.

Evidence Recorder 4 (and newer) scenes with an encrypted raw file (*.rae) can only be imported into MapScenes 2008 or newer.

RAW File Reference

Raw File Record Types

To increase our compatibility with other data collectors and desktop systems, Evidence Recorder uses the TDS RW5 raw file format. The raw file contains virtually all the measurements made in the field and is a complete history of what was recorded.

For more information on the raw data record format, or for additional record types, please review the Raw Data Record Specification document from Tripod Data Systems, Inc. It is available for download at www.tdsway.com

Conventional Raw Data Records

-- - Note or Comment Records

A comment in the raw file will be depicted with a record type of two dashes. Text found after the dash is the comment.

Comments are ignored during processing of the raw file and are used only for information purposes only. You can add a comment to the raw file by using the Add Comment button in the Mapping Tools Menu.

```
-- This is a comment
```

BK - Backsight Record

A backsight record is written to the raw file when you complete an occupy point command. Please review the Setup Occupy Point topic for more information.

Field headers:

OP: Occupy point

BP: Back point

BS: Backsight

BC: Back circle

```
BK,OP101,BP100,BS0.00000,BC0.00000
```

CF - Cut Sheet

When you stake out a point, a CF record will be recorded in the raw file.

ST: Station

OD: Offset direction (ENUM)

OL: Offset length

EL: Elevation

GD: Grade (design)

DE - Design Point / Location

During a stakeout the point you're staking will be recorded in the raw file with as DE record.

PN: Point name (*design point, may be blank*)

N : Northing

E : Easting

EL: Elevation

--: Description (*design point description, may be blank*)

JB - Job Record

Every time a raw file is created or opened a JB record will be written to the file.

Field headers:

NM: Job name

DT: Date

TM: Time

```
JB,NMTraverse1,DT03-05-2004,TM14:07:52
```

LS - Line of Sight (Instrument and Target Height)

HI: Height of instrument

HR: Height of rod

```
LS,HI1.500,HR1.500
```

MO - Mode Setup Record

Every time a raw file is created or opened a MO record will be written to the file.

Field headers:

AD: Azimuth direction - (0 = North) (1 = South)

UN: Distance unit - (0 = Feet) (1=Meter) (2=US Survey Feet)

SF: Scale factor

EC: Earth curvature - (0 = off) (1=On)

EO: EDM offset (inch) (Default string "0.0") **Not used by Evidence Recorder

AU: Angle unit - (0=Degree) (1=Grads)

```
MO,AD0,UN1,SF1.000000,EC0,EO0.0,AU0
```

OC - Occupy Point Record

When you complete the occupy point command an OC record will be written to the raw file. Please review the Setup Occupy Point topic for more information.

Field headers:

OP: Point number

N : Northing (the header is N space)

E : Easting (the header is E space)

EL: Elevation

--: Description

```
OC,OP101,N 1000.0000,E 1000.0000,EL10.0000,--
```

OF - Off Center Shot Record

When you use any of the offset shot commands an OF record will be written to the raw file. Two types of measurements will create offset records and they are the Angle Offset and Distance Offset mMapping Methods. Please see the Mapping Methods topic for more information.

Field headers:

AR: Angle right

ZE: Zenith

SD: Slope distance

OL: Offset length

HD: Horizontal distance

VD: Vertical distance

LR: Left/Right Offset

```
OF,AR90.00000,ZE90.00000,SD50.0000
OF,ZE60.00000,--Vert Angle Offset
OF,OL45.00000,--Right Angle Offset
OF,HD-10.0000,--Horizontal Distance Offset
OF,LR0.0000,--Left / Right Offset
OF,VD0.0000,--Elevation Offset
```

Offset shots will always contain the original measurement plus the offset information. You will also see a SS record accompany the OF records and it will contain the reduced measurement. Following is an example of a distance offset where an offset of -10 was entered:

```
OF,AR180.00000,ZE90.00000,SD50.0000
OF,HD-10.0000,--Horizontal Distance Offset
OF,LR0.0000,--Left / Right Offset
OF,VD0.0000,--Elevation Offset
LS,HI1.500,HR1.500
SS,OP1,FP5,AR180.00000,ZE90.00000,SD40.0000,--<No Desc>
```

RS - Resection

When you use the resection function a RS record will be recorded for each observation made to your control points. Please refer to the Resection topic for more information.

PN: Point number

CR: Circular reading

ZE: Zenith (or VA, CE)

SD: Slope distance (or HD)

```
RS,PN103,CR2.42220,ZE90.00000,SD25.0980
```

When you complete a resection the control points you used will be written as SP records and after the RS records you will see one final SP for the computed resection point. An example of a resection is shown below:

```
--Resection
SP,PN103,N 3135.070,E 1511.185,EL399.795,--:
SP,PN100,N 3097.874,E 1564.984,EL399.387,--:
LS,HI1.300,HR0.000
RS,PN103,CR2.42220,ZE90.00000,SD25.0980
RS,PN100,CR102.26120,ZE90.00000,SD56.3050
SP,PN999,N 3110.000,E 1510.000,EL398.291,--
```

SD - Stakeout Deltas

When you complete a stakeout by pressing the store point command a SD record will be written to the raw file. It is the difference between the design location (DE record) and the actual point staked (SP record).

ND: Delta northing

ED: Delta easting

LD: Delta elevation

SK - Stake Out Record

When you stake out a point and use the Store Point command a SK record will be written to the raw file. This is the raw observation that was recorded when you stored you stake point.

OP: Occupy point

FP: Foresight point

AR: Angle right

ZE: Zenith

SD: Slope distance

```
SK,OP251,FP10000,AR175.00000,ZE90.00000,SD6.0000,--Design Point: 342
```

SP - Store Point

Many routines in Evidence Recorder will write a SP record to the raw file. SP records contain coordinate information that can be used for setups, resections, etc…

PN: Point number

N: Northing

E: Easting

EL: Elevation

--: Description

```
SP,PN103,N 3135.070,E 1511.185,EL399.795,--:
```

SS - Sideshot

When you record a shot a SS record will be recorded in the raw file. Many other functions also create a SS record such as when offset and multi set shots are reduced.

OP: Occupy point

FP: Foresight point

AR: Angle right

ZE: Zenith

SD: Slope distance

--: Description

```
SS,OP1,FP7,AR176.11093,ZE90.00000,SD60.1332,--<No Desc>
```

GPS Raw Data Records

AH - GPS Antenna Height

DC: Derivation Code (ENUM)

MA: Measured antenna height

ME: Measure Method (ENUM)

RA: Reduced antenna height (to phase center)

BL - GPS Base Line

DC: Derivation

PN: Point Name

DX: Base line Delta X

DY: Base line Delta Y

DZ: Base line Delta Z

-- : Description (Feature Code)

GM: GPS Measure Method (ENUM)

CL: Classification

HP: Horizontal Precision

VP: Vertical Precision

BP - Set Base Receiver Position

PN: Point Name

LA: Latitude

LN: Longitude

HT: Ellipsoid Height

SG: Setup Group (default = 0)

CS - Coordinate System Identity

CO: Coordinate system option (ENUM)

ZG: Zone group (system) name

ZN: Zone name

DN: Datum name

CT - Calibration Point

PN: Point Name

DM: Dimensions used (ENUM)

RH: Horizontal residual

RV: Vertical residual

CV - RMS Covariance of GPR Position

DC: Derivation (ENUM)

SV: Minimum number of SV during observation

SC: Error Scale

XX: Variance X

XY: Covariance X,Y

XZ: Covariance X,Z

YY: Variance Y

YZ: Covariance Y,Z

ZZ: Variance Z

EP - Geodetic Position

When you save the location of a point, its geodetic position is also recorded.

TM: Time

LA: Latitude

LN: Longitude

HT: Ellipsoid Height

RH: Horizontal RMS returned from receiver

RV: Vertical RMS returned from receiver

DH: HDOP if receiver returns this info

DV: VDOP if receiver returns this info

GM: GPS Method (ENUM)

CL: Classification (ENUM)

HA - Horizontal Calibration (Adjust)

N : Origin north

E : Origin east

TH: Translation north

TE: Translation east

RT: Rotation about origin

SF: Scale factor at origin

GS - GPS Store Point

This is similar to a regular SP (store point) record but the GS indicates that it is create by GPS.

PN: Point Name

N : Local Northing

E : Local Easting

EL: Local Elevation

-- : Description

RP - Local coordinates of calibration point

N : Northing

E : Easting

EL: Elevation

-- : Description

VA - Vertical Calibration (Adjust)

PV: Type of vertical adjustment (ENUM)

N : Origin north (*may be blank*)

E : Origin east (*may be blank*)

LZ: Constant adjustment – translation Z (*may be blank*)

SO: Slope north (*may be blank*)

SA: Slope east (*may be blank*)

GN: Geoid Model Name

DZ - Depth Sounder Record Field Label

PN – Point number lint to associated GNSS measurement

DZx.xxx – Measured depth from depth sounder measure point

WE – Water elevation level input by user (optional on Depth Sounder screen)

QA= Depth sounder quality assurance value

Bat= Depth sounder battery level

INDEX