

# **Topcon Link**

### Data Import/Export Software

Icon		Ground Northin	Ground Easting	Elevation (USft)	
	113 DUP	4983.924	5029.685		
	114	5037.156	4978.755	701.326	
	114 DUP	4984.663	5043,346	700.071	
	115	4930.923	5046.257	700.092	
	1 0 0		5032.124	699.918	
	10.7	4928.984	5029,460	699.948	
	118	4924.945	5027.888	699.872	BC
		4700000 1186 125 0 071			
-					
		5000	_		



## Topcon Link Reference Manual

Part Number 7010-0522 Rev L

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ECO#3671

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# Preface

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## **Manual Conventions**

This manual uses the following conventions:

1 111	this manual uses the following conventions.		
Example		Description	
File → Exit Connection Frequency Enter		Click the <b>File</b> menu and click <b>Exit</b> . Indicates the name of a dialog box or screen. Indicates a field on a dialog box or screen, or a tab within a dialog box or screen. Press or click the button or key labeled <b>Enter</b> .	
	Note	Further information to note about the configuration, maintenance, or setup of a system.	
		Supplementary information that can help you configure, maintain, or set up a system.	
NOTICE on system operation		Supplementary information that can have an affect on system operation, system performance, measurements, or personal safety.	
	CAUTION	Notification that an action has the potential to adversely affect system operation, system performance, data integrity, or personal health.	
		Notification that an action <i>will</i> result in system damage, loss of data, loss of warranty, or personal injury.	
	DANGER	Under no circumstances should this action be performed.	

# Introduction

Welcome to Topcon Link, a full-featured data import/export and conversion utility for Topcon instruments. Topcon Link contains features and functions to perform the following activities:

- Import data files from all Topcon instruments.
- Convert all Topcon data files and many industry-standard data files to corresponding file formats.
- Open and display data in easy to use tables and screens.
- Provide basic editing tools for some data types.
- Export an OAF to a Topcon GPS receiver, export coordinate files to a total station, and export any data file to a TPS controller.

Topcon Link supports all Topcon file formats and an increasing number of industry standard formats. Any format can be converted to a Topcon format for export to a Topcon instrument. Many files can be converted between third-party and proprietary formats.

## **Installing Topcon Link**

Topcon Link software comes either on a CD (as a standalone application with TopSURV software), and also available as free download from the TPS website to install on a computer. The InstallAware® Wizard will save the earlier versions of Topcon Link already installed, and will install the latest version in the folder the user selects.



The CD version of Topcon Link contains all projections, datums and geoids. The version downloaded from the Topcon web site comes without the projections, datums and geoids. They will be downloaded from the Internet and installed on our computer during the installation process. Make sure that your computer has Internet access during installation.

Table 1-1 lists the recommended system requirements needed to install this software on a computer.

Table 1-1. Topcon Link System Requirements for Installation

Microsoft® Windows XP/Vista     operating system	• 512 MB of RAM (1000MB recommended)
1 6 7	• 100 MB of available hard-disk space

Before connecting the receiver's USB port to the computer's USB port, the TPS USB driver must be installed on the computer. The driver is available on the TPS website:

(http://www.topconsupport.com/documents/view/1743).

- 1. Navigate to the Topcon Link executable file or insert the software CD-ROM.
  - If downloading the software from the TPS website, save the downloaded compressed file to an accessible location and extract the Topcon Link executable file.
  - If downloading the software from a TPS software CD, insert the CD into the computer's CD-ROM drive.

2. The InstallAware Wizard starts up:



- 3. Click Next to start the installation process.
- 4. Check the '*I accept the terms of the license agreement*' box, to continue the installation (Figure 1-1). Type *User Name* and *Company Name* information, then click **Next** (Figure 1-1)



Figure 1-1. Review License Agreement and Enter User Information

- 5. Select a needed setup type. Depending on the user's selection, either all program features or only highlighted features will be installed. If the user selects *Typical* type and presses **Next**, the installation software will do the following:
  - automatically select all available datums and projections (except the following *Table Projections*:
    - rdtrans 2004 and rdtrans for Netherlands
    - LB72 for Belgium
    - KKJ for Finland
    - USTNO2 for United Kingdom)

• display the next installation dialog (Figure 1-2)



Figure 1-2. Typical Setup Type

If the user selects the *Custom* type and press **Next**, the *Custom Setup* dialog displays (Figure 1-3).



Figure 1-3. Custom Setup Type



The typical installation does not allow one to install a geoid on the computer. As against of the typical installation, the custom installation allows one to install the highlighted

Feature Description

IGN69, IGN78, RAF98

Feature Description

Projections: GERMANY-Berlin
 Soldner, GERMANY,
 GERMANY-Gauss Krueger

ov BKG Geoid B

geoid for the corresponding projection(s)/datum(s) of the given region.

The user can highlight only those features (projection or projection and geoid), which needed for the given job area. Such regional selection allows one to economize the computer's disk size.

> 🗧 💷 France Geoid

> > Germany

This dialog box contains the list of projections:

Europe • with regional geoids

or

• without regional geoids

or

• with table projection

Netherlands     Projection: PDTP ANS 200		Factory Description
radie Projections	Table Projections	<ul> <li>Feature Description</li> <li>Projection: RDTRANS 2004</li> </ul>

The *Feature Description* displays the list projection(s)/ formats/ geoid(s) which consist the highlighted item. To see what the feature contains, select the desired feature:

Germany	Pri So GE	eature Description ojections: GERMANY-Berlin Idner, GERMANY, RMANY-Gauss Krueger rmany BKG Geoid Format	
		Denmark	Peature Description     Original bin geoid *.01

If the selected projection contains a list of projection(s) and a geoid file format, Topcon Link will be installed with the selected projection(s) and format for adding the corresponding geoid to the Topcon Link (but not a geoid file). In the given case:

 the Setup tab of the Coordinate System item of the Configuration dialog box will display the installed geoid file format in the list of geoid:

TopconLink v.7.3 - InstallAware Wizard			
Custom Setup Choose the program features you would like to install.	5		
Click on an icon in the list below to change how a feature is insta the structure is insta the struc	Feature Description Projection: NETHERLANDS-RD Dutch 2004 Geoid Format	Setup Conversion	
	Coordinate Systems Save Process T5 Computations	Open	reth Minimum Long
	File no Forma	at name: Dutch 2004 Geoid (* Open	grd] 💽

- the installed projection(s) will be displayed in the list of



If the selected projection contains a list of projection(s) and the geoid, Topcon Link will be installed with the selected projection(s), format for adding the corresponding geoid and the corresponding geoid(s) into the user's computer. In the given case:

 the Setup tab of the Coordinate System item of the Configuration dialog box will display the geoid file format in the list of geoid and installed geoid(s):

	J▼ Denmark		ature Description ginal bin geoid *.01	
Configuration  Display Coordinate Systems Save	Setup Conversion Geoids List			
Process	I Name	Path	Minimum Longit	Maximum Lone
E Compute Coordinates	🕪 dvr90g2002	c:\program files	6°00'00.00000E	17°00'00.00
TS Computations	🚯 fe95g	c:\program files	8°00'00.00000W	6°00'00.000
	🚯 gr2000g	c:\program files	75°00'00.00000W	10°00'00.000
	P nkg96g	c:\program files	1°00'00.00000E	33°00'00.00

- the installed projection(s) will be displayed in the list of

projections for conversion:



To add/remove the desired regional projection or geoid to/from the installing, click the desired feature and select the corresponding command from the pop-up menu:



The following rules is used for adding projection and geoid:

1. It is not possible to highlight a geoid without highlighting of the corresponding projection:

2. It is possible to highlight only the desired

projection:



Without reference to the selected projection type, Topcon Link installation will install all datums

If the user did not select any geoid file in the process of installation, after finishing Topcon Link installation process it is possible to add (using *Configuration* dialog box) **only** the following geoids (global (\*.glc), custom regional (\*.rgm) and topcon geoid (\*.jff and/or \*.gff) files):



It the user selected some regional geoid file in the process of installation, after finishing Topcon Link installion process it is possible to add (using *Configuration* dialog box) **only** the following

geoids (selected official geoid, global (\*.glc), custom regional (\*.rgm) and topcon geoid (\*.jff and/or \*.gff) files):





Without reference to the selected projection/geoid type, Topcon Link installation saves geoid(s), which were added in the previous version to the geoid list

To add the desired geoid(s) or the desired projection(s) after finishing Topcon Link installion process, the user needs to do the steps is described in "How to add a feature after installation" on page 1-10

To continue Topcon Link installation, click Next.

- 3. Either keep the default installation folder or click **Browse** to select a different folder in which to install the Topcon Tools. Click **Next** to continue (Figure 1-2 on page 1-4, picture B)).
- 4. If desired, type in a new folder in which to add program icons. For automatically creating Topcon Tools shortcut check the *'Create on Desktop'* box. Then click **Next** (Figure 1-4).
- 5. Click **Next** to start the installation process (Figure 1-4)

#### 6. Topcon Tools is installed on the computer (Figure 1-4)



Figure 1-4. Select Program Folder and Installation Progress

- 7. Click **Finish** to exit the installation.
- 8. Before the user can use Topcon Link, we recommend restarting your computer.
- 9. Create a shortcut on the computer's desktop for easy access (Figure 1-5).



Tiepeen Link

Figure 1-5. Topcon Link Desktop Shortcut

# How to add a feature after installation

The user can add any features from *Custom Setup* window after finishing Topcon Link installion process and restarting Windows. To do it, make the following steps:

- 1. Click Settings > Control Panel > Add or Remove Programs
- 2. Select *Topcon Link v.7.3* in the *Add or Remove Programs* and click *Change* (Figure 1-7):



Figure 1-6. Add and Remove Programs

3. Select *Modify Available Options* and click **Next** (Figure 1-8)



Figure 1-7. InstallAware Wizard

4. Highlight the desired features (projection or projection and geoid) in the *Custom Setup* window (Figure 1-9)



Figure 1-8. Custom Setup Window

## Installing Microsoft ActiveSync for Use With CE-based Devices

ActiveSync® is free software from Microsoft® that establishes a connection between a computer (with operation system Windows XP) and an external device. ActiveSync is used for file transfers and software downloads between a computer and mobile device running the Windows® CE operating system, such as a hand-held controller or CE-based Total Station.

After installing ActiveSync, it will be associated with a port on the computer. This means that the port will be considered "busy", and may need to be freed up for use with other devices.

ActiveSync will start automatically when connecting a CE-based device (such as, Topcon's FC-120/FC-200/FC-2000/FC2200/FC2500, GMS-2/GMS-2Pro, or GTS-720/GTS-750/GPT-7000/GPT-7000i/GPT-7500/GPT-9000).

1. Log on to the Microsoft website (www.microsoft.com) to download ActiveSync. Install the program onto the computer.

 After installing ActiveSync, start the application and click File ▶ Connection Settings. Apply the following settings based on the number of ports on the computer (Table 1-2).



Refer to the help topics in ActiveSync for more details on connecting with devices.

Table 1-2. About ActiveSync Connection Settings		
ActiveSync Settings for Computers With One Port	ActiveSync Settings for Computers With Two or More Ports	
If using a port for multiple purposes, select either "Work Network" or "The Internet". In this case, ActiveSync will free up the port for other uses after disconnecting a device.	If multiple ports are available, the default settings are sufficient. In this case, ActiveSync will retain use of the port after disconnecting a device. If using a USB cable to connect the device to the computer, select the option.	
Waiting for device to connect Connect  Show status icon in taskbar Allow USB connections Allow connections to one of the following: COM1 This computer is connected to: Automatic Open ActiveSync when my device connect Help Automatic Work Network The Internet	Connection Settings     Waiting for device to connect     Connect      Show status icon in taskbar     Allow USB connections     Allow USB connections     COM1     This computer is connected to:     Automatic     Open ActiveSync when my device connects     Help     OK     Cancel	

#### Table 1-2. About ActiveSync Connection Settings



If the user's computer operates under Windows Vista, ActiveSync is not needed. A connection between the computer and an external device with Windows CE will be automatically established after connecting your device to your PC.

## **Getting Acquainted**

The Topcon Link interface is designed for easy, integrated use with a PC-compatible computer, a connected Topcon instrument, and industry-standard data types. The following sections introduce the various functions available in Topcon Link for transferring, viewing, configuring/converting, and editing data files.

### **Main Screen**

The main screen has the following components (Figure 1-9):

- Title bar contains the program name and the name of the currently active file.
- Menu bar contains drop-down menus for all functions.
- Toolbar –contains shortcut buttons to frequently used functions.
- Work area displays dialog boxes, job file information, and popup menus.
- Status bar displays informative messages about Topcon Link and various files, as well as pop-up boxes for quickly changing units and coordinate systems (inactive if no file is open).



Figure 1-9. Topcon Link Main Screen Components

### **Menu Bar**

The menu bar (Figure 1-10) provides access to all available options.

File Edit View Add Process Window Help

#### Figure 1-10. Topcon Link Menu Bar

Table 1-3 briefly describes the functions in each drop-down menu.

Table 1-3. Topcon Link Menu Options

Menu	Functions
File menu File Open File Save File Crit+S Save As Alt+Cvi+S Import from Device Shift+F3 Export to Device Shift+F4 Convert File F5 Print Configuration Ctrl+P File Properties I PROJECT RTK.tlay Exit	<ul> <li>opens and saves a file</li> <li>imports and exports data from a device</li> <li>converts a file from one format to another compatible format<sup>a</sup></li> <li>prints information from an active file</li> <li>displays configuration parameters</li> <li>displays file properties</li> <li>displays recently accessed files</li> <li>closes Topcon Link</li> </ul>
Edit menu Ctri+2 Redo Ctri+2 Cut Ctri+Y Cut Ctri+X Copy Ctri+C Delete Del Properties Ctri+Enter	<ul> <li>allows an undo or redo of the last operation</li> <li>cuts, copies, or deletes selected data</li> <li>adds a point</li> <li>displays the properties for selected data</li> </ul>
View menu voltar vol	<ul> <li>displays or hides the CAD view and/or layers view</li> <li>displays or hides the Topcon Link toolbar and/ or status bar</li> <li>sets the pan or zoom mode</li> <li>sets view options for the tabular and CAD views</li> </ul>
Add menu	• adds a point
Process menu Compute Coordinates F8 Process Properties Alt+Ctrl+P	<ul><li> computes coordinates</li><li> sets processing properties</li></ul>

Menu	Functions
Window menu           Close         Ctrl+F4           Close All         Ctrl+F4           Case All         Ctrl+F4           Case All         Tal VettCally           Title VettCally         Tal vettCally           1 CAD Vew            2 C1/My Data/pROJECT RTK.tlsv< <topsurv job="" pc=""></topsurv>	<ul> <li>closes the current window or all open windows</li> <li>arranges open windows in a cascade (stacked) or tile (adjacent) order</li> <li>arranges icons</li> <li>shows all open windows, and selects a window to be active</li> </ul>
Help menu Context Help Feedback About Topcon Link	<ul> <li>accesses the Topcon Link context help</li> <li>accesses customer feedback options for sending bug reports and questions to TPS support, and accesses the TPS website</li> <li>displays version, publisher, and build date information for Topcon Link</li> </ul>

Table 1-3. Topcon Link Menu Options (Continued)

a. Compatible formats - the formats containing the common data

### Toolbar

The toolbar for Topcon Link (Figure 1-11) contains buttons for frequently used functions.

Figure 1-11. Topcon Link Toolbar

Upon startup, the toolbar displays beneath the menu bar. To display or hide the toolbar, click View > Toolbar.

Table 1-4 describes the various buttons available on the toolbar.

Button	Description
2	<ul> <li>Open File – Opens an existing file.</li> <li>1. Click the button to display the Open dialog box.</li> <li>2. Navigate to and select the desired file.</li> <li>3. Click Open.</li> </ul>
	Save – Saves a file to the current directory.
F	Save As – Saves the current file with a new name and/or in a new directory and/or to save in other compatible format.

Table 1-4. Topcon Link Toolbar Button Functions

Button	Description
◆.₽ 8	Import File from Device – Imports files from TPS GPS+ receivers and memory cards, TPS controllers, TPS Total Stations (CE-based, robotic, conventional), or TPS digital levels See Chapter 4 for details.
e e e e e e e e e e e e e e e e e e e	Export File to Device – Exports data to a TPS controller or Total Station (CE-based, conventional, robotic), and exports an Option Authorization File (OAF) to a TPS receiver. See Chapter 8 for details.
87 10	Convert files between formats – Converts data in a file from one format to another compatible format. See "Converting A File" on page 5-2 for details.
4	Print – Prints the current window or table.
5	Undo – Reverses the last action.
C	Redo – Returns the last action.
ж	Cut – Removes the selected object(s).
Ē	Copy – Copies the selected object(s).
° +	<ul> <li>Add point –Adds a point to the current file.</li> <li>1. Click the button to display the Add point dialog box.</li> <li>2. Enter the point name, coordinates, and codes for the new point.</li> <li>3. Click Ok.</li> <li>See "Add a Point" on page 6-1 for details.</li> </ul>
<b>A</b>	Zoom In – Changes the pointer to a magnifying wand for zooming in on a clicked area of the CAD view. You can also click and drag a square around the area to zoom in on.
_٩	Zoom Out – Changes the pointer to a magnifying wand for zooming out on a clicked area of the CAD view. You can also click and drag a square around the area to zoom out on.
<b>\$</b>	Zoom back – Returns the CAD view to the previous zoom magnification.

Table 1-4. Topcon Link Toolbar Button Functions (Continued)

Button	Description
<b>~</b>	Restore All – Fits all data in the active CAD view into the viewable extents of the view.
<u></u> শ্	Pan – Changes the pointer to a "hand" with which to "grab" and dynamically move the CAD view.
$\square$	CAD View – Available for TopSURV PC Jobs, displays design data (points, linework, roads, and surface).
	Compute coordinates of points – Calculates the point coordinates in the current file. See "Computing Point Coordinates for Raw Data and TopSURV Files" on page 7-1 for more details.
<b>k</b> ?	<ul> <li>Context Help – Displays a pop-up tip with information about the selected view, button, field, etc.</li> <li>1. Click the button. The pointer changes to a question mark.</li> <li>2. Click the object you want additional information on. A pop-up tip gives further information.</li> <li>3. Click outside the pop-up tip to close it.</li> </ul>

Table 1-4. Topcon Link Toolbar Button Functions (Continued)

### **Status Bar**

The status bar (Figure 1-12 on page 1-18) displays:

- various informative messages about current Topcon Link activities and opened file.
- the information boxes provide quick information about the current linear/angular units and coordinate type/system used in the file. These boxes also provide drop-down lists for quickly

converting the linear or angular units used in the file, or the coordinate type or system used in the file.



Figure 1-12. Topcon Link Status Bar

### **TPS Device Directories in Windows Explorer**

The Topcon Link installation process also installs device directories on the computer's hard drive (Figure 1-13). These directories are used

to easily access data on a connected device for import/export activities.



Figure 1-13. Topcon Device Folders in Windows Explorer



On computers with Windows XP, the "Mobile Device" folder displays after installing Microsoft ActiveSync.

On computer with Windows Vista, the "Windows CE" folder automatically displays after connecting a external device with Windows CE.

This device directory displays the contents of the connected TPS controller or TPS CE-based total station.

After connecting a device to the computer, open Windows Explorer and navigate to the My Computer window. Click the device icon/ directory to transfer data files.



Because some devices require special settings or setups to use this feature, see the appropriate section in Chapter 2 for more details.

## Sending Feedback and Bug Reports to Topcon Support

The *Feedback* option in the *Help* menu offers a way for you to provide feedback. An option to connect directly to the Topcon GPS website is also available. These options require Internet access.

To send a bug report:

Click **Help** → **Feedback** → **Send Bug Report**. An email opens with short descriptions of the current version of Topcon Link and OS of the computer, and log files for Topcon Link are automatically attached. Describe activities being performed when the "bug" occurred and send the e-mail to TPS Support:

🗚 Topcon Tools Log File - Message (Plain Text)
· · · · · · · · · · · · · · · · · · ·
🗄 🖃 Send   💭 🎒   🐰 🗈 隆   🏂 🕕   💷 🍢   😼 📍 🦊 😽 🦉
Elle Edit View Insert Format Iools Actions Help
This message has not been sent.
To =SMTP:topcontechnicalsupport@topcon.com <topcontechnicalsupport@topcon.com></topcontechnicalsupport@topcon.com>
<u><u>c</u></u>
Bcc
Subject: Topcon Tools Log File
Attach MessageLog.xml (50 KB); MessageLog.xml.prev (52 KB) Attachment Options
Enter you comment here
 AppInfo: Topcon Link v.7.3 build data is Monday, August 10, 2009 Language: 0x409 OS: Microsoft Windows XP Professional Service Pack 3 (Build 2600)

Figure 1-14. Example E-mail for the Send Bug Report Option

To ask a question:

Click **Help** > Feedback > Question To Support. Enter any questions, describing activities in detail, and send the email to TPS Support:



Figure 1-15. Example E-mail for the Question to Support Option

## Notes:
# Setting up Topcon Link for Transferring Data

Topcon Link provides two methods for transferring data between the computer and a connected device: via the Topcon Link interface or the installed directories in Windows® Explorer. See "Adding and Formatting Devices" on page 2-1 for a quick look at what each device requires for data transfers.

- For Total Stations and Digital Levels, the instrument' information and connection parameters must be set up before it's files can be viewed. The instrument setup will only need to be done once per computer.
- For Topcon Memory Cards (flash cards used for data storage in a TPS receiver), the card must be formatted before data can be recorded. The card will need to be formatted once.

## Adding and Formatting Devices

Depending on the device, an initial device setup may be required before a successful data transfer can be completed. The following table briefly describes the setups required for transferring data between a computer and a connected device (Table 2-1 on page 2-2). See the sections below for specific details.



#### Table 2-1. Setups Required for Connected TPS Devices



Table 2-1. Setups Required for Connected TPS Devices (Continued)

#### Adding a Sokkia GPS receiver

Before Topcon Link or Windows Explorer can read data on a Sokkia GPS receiver, the device must be added to the directory.

- 1. Navigate to the Sokkia Receiver device directory (Figure 2-4 on page 2-6).
  - From Topcon Link Click File ▶ Import from Device. In the left pane, double-click the Sokkia Receiver directory.
  - From Windows Explorer Open the My Computer window. Double-click the Sokkia Receiver directory.

The procedure will be the same whether using Topcon Link or Windows Explorer.

2. Double-click Add New Sokkia receiver (Figure 2-4).



Figure 2-1. Add a New Sokkia receiver

- 3. On the General tab, enter and select the following information (Figure 2-5 on page 2-7):
  - Name enter a unique name for the device
  - Port select the COM Port the device typically connects to
  - Baudrate select the baud rate for communication with the Sokkia Receiver
  - Device enter the receiver type
- 4. On the Advanced tab, select the parity, byte size, stop bits, and the way of the handshake for communication with the Sokkia

Create Sokkia receiver	Create Sokkia receiver
Name: New Sokkia receiver Port: COM1 Baudrate: 9600	General Advanced   Party: None Byte size: 8
Device: RADIAN IS GSR2000 GSR2700 IS/ISX, GSR1700	Stop bits: 1 Handshake: NONE NONE RTS/CTS DTR/DSR Vcon/Xoff
	OK Cancel Apply

receiver (Figure 2-5). Refer to the Sokkia receiver's documentation for details.

#### Figure 2-2. Enter New Sokkia Receiver Information

5. Click OK to save device information to the computer. When connecting to this device, you will select the created device.

Address 📼 Sokkia receivers				
Folders ×		_		
<sup>™</sup> <sup>™         <sup>™</sup> <sup>™     </sup> <sup>™         <sup>™         <sup>™         </sup></sup></sup></sup>	Add New Sokkia	New Sokkia receiver		
🗉 🤹 Topcon 🐨 🏓 Topcon 👯 Import from Device				? 🛛
🗉 🛃 Topcon E 🍯 Topcon	+ 🗈 💣		Look in:	🔁 From_Sokkia_ 💌 🗲 🖭 💣
● Add New Sokkia receiver ● New Sokkia receiver		>>> <<		
		Open Files after Im	port	
		Close		

Figure 2-3. Created Sokkia Receiver for Import

#### **Adding a Total Station Device**

Before Topcon Link or Windows Explorer can read data on a Total Station, the device must be added to the directory.

- 1. Navigate to the Total Station device directory (Figure 2-4 on page 2-6).
  - From Topcon Link Click File > Import from Device. In the left pane, double-click the Topcon Total Station directory.
  - From Windows Explorer Open the My Computer window. Double-click the Topcon Total Station directory.

The procedure will be the same whether using Topcon Link or Windows Explorer.

2. Double-click Add New Station (Figure 2-4).



Figure 2-4. Add a New Station

- 3. On the General tab, enter and select the following information (Figure 2-5 on page 2-7):
  - Name enter a unique name for the device
  - Notes enter any necessary notes

- Port select the COM Port the device typically connects to
- Model enter the model number
- 4. On the Advanced tab, select the baud rate, parity, data bits, stop bits, and protocol used for communication with the Total Station (Figure 2-5). Refer to the Total Station's documentation for details.

<b>Create Station</b>			
General Advar	nced		
Name:	GPT3005W T	Create Station	
Note:		General Advar Baudrate:	nced    9600 💌
Port:	Сом1	Parity:	None
Model:	GPT-2000	Data bits:	8
		Stop bits:	1
		Protocol:	ACK/NACK
	OK Cancel		
			OK Cancel Apply

Figure 2-5. Enter New Total Station Device Information

5. Click OK to save device information to the computer.

When connecting to this device, you will select the created device and then follow the instructions on the Total Station.



Figure 2-6. Created Device

#### **Adding a Digital Level Device**

Before Topcon Link or Windows Explorer can read data on a Digital Level, the device must be added to the directory.

- 1. Navigate to the Digital Level device directory (Figure 2-7).
  - From Topcon Link Click File ▶ Import from Device. In the left pane, double-click the Topcon Digital Level directory.
  - From Windows Explorer Open the My Computer window. Double-click the Topcon Digital Level directory.

The procedure will be the same whether using Topcon Link or Windows Explorer.

2. Double-click Add New Digital Level (Figure 2-7).



Figure 2-7. Add a New Digital Level

- 3. On the General tab, enter and select the following information (Figure 2-5 on page 2-7):
  - Name enter a unique name for the device
  - Port select the COM Port the device typically connects to
  - Baud rate and Parity select the baud rate and parity used for communication with the Digital Level. Refer to the Digital Level's documentation for details.

Create Digital	Level			×
Create Digital General Name: DL-103 Port: COM1 Parity: Even	▼ ▼	Baudrate: 9600	Ţ	×
	ок 💦	Cancel	Apply	

Figure 2-8. Enter New Digital Level Device Information

4. Click OK to save the device information to the computer.

When connecting to this device, you will select the created device and then follow the instructions on the Digital Level.



Figure 2-9. Created Device

#### **Formatting a Topcon Memory Card**

Before Topcon receiver can record data to a Topcon Memory Card the card must be formatted. Formatting a Topcon Memory Card prepares it for data recording.

- A card removed from a Topcon receiver has already been formatted. The device icon is red.
- A card from another device will need to be formatted before being used with a Topcon receiver. The device icon is gray.



Formatting an SD card will erase all data.

If a Topcon Memory Card is already installed in a Topcon receiver, the device will have formatted the card. For some devices—such as the GR-3 and NET-G3—the card can be manually inserted and removed. While cards typically remain in the receiver once inserted, it can be removed for accessing via a card reader connected to the computer. The length of time required to format a card depends on the size of the card and the device formatting the card. For example, Topcon Link formats a card in a couple of minutes while the GR-3 can take around half an hour.

- 1. Navigate to the Memory Card device directory (Figure 2-7 on page 2-9).
  - From Topcon Link Click File ▶ Import from Device. In the left pane, double-click the Topcon Memory Card directory.
  - From Windows Explorer Open the My Computer window. Double-click the Topcon Memory Card directory.

The procedure is the same whether using Topcon Link or Windows Explorer.

- 2. Right-click the gray card icon and click Format (Figure 2-7 on page 2-9).
- 3. Click Format to format the flash card for access by Topcon programs (Figure 2-7 on page 2-9).

😂 Topcon Tota	al Stations				3
File Edit View	v Favorites Tools	Help			
G Back 🔹 🌘	ء 🔎 🏚 - 🕲	iearch 📂 Folders			
Address 🗾 Topo	on Memory Cards		~	🔁 Go	
Folders	×	Name			
Desktop     E Constant     E Constant     E Sector     Angle Compute		G: Open Format			
Loca	🖥 Import from De	vice			? 🗙
⊕ Loca L     □     ⊕ Loca L     □     □     □     □     □     □     □     □     □     □     □     □     □     □     □     □	-ook in: 🗾 Topcon	Memory 🔻 🗲 🖭		L C C C	My Documents 🔻 🖨 🏝
🗉 🧾 Mobi 🗉 🙅 Topc	Format	~	>>	My My My	Capacity 968.5 MB
ا 🗄 🔁 Topc ا 🕀 🛃 Topc ا ا ا ا ا			<<	С Му Му Му	File system
🗄 🧐 My Netw				🖭 My 🧀 Nev	
			Open Files after Imp	port	
			Close		
_					Format Cancel

Figure 2-10. Format Memory Card

When selecting a formatted memory card device, you will view its data in the corresponding screen/pane.

😂 Topcon Tota	l Stations			
File Edit View	Favorites Tools	Help		<i>A</i> 2
G Back 🔹 🤅	🔊 - 🎓 🔎 s	earch 📂 Folders		
Address 📁 Topco	on Memory Cards		✓	Go
Folders	×	Name		
<ul> <li>Desktop</li> <li>My Documer</li> <li>My Compute</li> </ul>		<b>D</b> G:		
	🕷 Import from [	Device		? 🛛
E Cocal D E CD Driv		on Memory 🔻 🗲 💼 📂	_	ook in: [ My Documents 💌 🗲 🖻 📸
E 🧕 DVD-RV E 🔋 Mobile I	G		6	TopconLink My Music
🗉 🙅 Topcon			>> <b>6</b>	≝My Pictures ∋My Received Files
🗄 🏓 Topcon 🗄 🛃 Topcon				My Templates My Videos
🗉 🎍 Topcon E 🔍 My Networl				My Webs
표 🥞 My Networl			Ē	Dew Folder
		V	Open Files after Import	t
			Close	

Figure 2-11. Formatted Memory Card Device

# **Adding a Geoid**

When working with data in Topcon Link, a geoid may be required to ensure correct elevation of the GPS network points. A geoid transforms the ellipsoidal heights measured by GPS to heights based on a physical reference surface. When working with coordinate data, you may want add a geoid, or you can create a regional geoid.



Make sure:

- the geoid used to take point measurements is loaded into Topcon Link before opening a file

- the geoid covers the area where file's points are located

- the geoid used to take point measurements is loaded into Topcon Link before opening a file

The orthometric heights will be equal to ellipsoidal heights if a geoid file is not downloaded to Topcon Link and/or the geoid does not cover the area where file's points are located and/or if the geoid used to take point measurements is missing.

- 1. Click File ► Configuration and click Coordinate Systems in the menu tree.
- 2. Click Add.

Display	Geoid	ds List					Add
Display Coordinate Systems Save Process Compute Coordinates Compute Coordinates	Icon	Name	Path	Minimum Longitude	Minimum Lat	Add be	
						Remove	
	<				3		

Figure 2-12. Add Geoid

- 3. Navigate to the location of the geoid and select the format of the geoid.
- 4. Select the desired geoid and click Open.



Figure 2-13. Select Geoid Format and Geoid

5. Repeat these steps for any other geoids. The geoids will be listed in the right pane (Figure 2-14).

iy	Geoid	s List				
dinate Systems	Icon	Name	Path	Minimum Longit	Minimum	
55	19	EGM96	C:\TOP	180°00'00.0	90°00'00.(	
ompute Coordinates	1	g2003u01	D:\Geoi	130°00'00.0	40°00'00.(	Add
Computations	1	g2003u02	D:\Geoi	113°00'00.0	40°00'00.( -	2003022
compacacions	1	g2003u03	D:\Geoi	96°00'00.00	40°00'00.(	
	1	g2003u04	D:\Geoi	79°00'00.00	40°00'00.(	
	<b>1</b>	g2003u05	D:\Geoi	130°00'00.0	24°00'00.(	
						Remov
	<				>	
					2	

Figure 2-14. Added Geoids

- 6. Any Geoid from the list will be automatically used when Topcon Link opens files.
- 7. Click OK to save the configuration and exit.

#### **About Geoids**

A geoid model is used to transform the ellipsoidal heights measured by GPS (purely geometrical) to heights that are based on a physical reference surface, such as mean sea level. Over small regions there is little difference between the two reference surfaces, but for large projects the differences may be unacceptable. Working with a geoid model when surveying with GPS will ensure proper point measurements.

Geoid models for the United States have been developed by the National Geodetic Survey (NGS). The most recent model is called Geoid 2003. To keep the file size smaller, the continental United States is divided into a grid with eight zones; each zone has a geoid. Use Figure 2-15 to help you determine the geoid file to use for your project. For Geoid 2003, the files are numbered "g2003u01" to "g2003u08" to correspond to grids 1 to 8. For other regions, or if you have questions, contact your local representative or Topcon Support.



Figure 2-15. Geoid Grid Example – Approximate Grid for US

Using Topcon Link, you can create a Topcon geoid file for a specific area from a supported geoid model, and then export the file into

TopSURV. See "Geoid File Conversion Parameters" on page 5-20 for file conversion details.

#### **Creating a Regional Geoid Model**

If geoid heights (the differences between ellipsoidal and orthometric heights) for the nodes of a regular grid are known, you can create a Regional Geoid Model File (\*.rgm). After creating the file, use Topcon Link to convert the regional geoid model file to a Topcon geoid file (\*.gff).

- 1. Open an ASCII text editor (such as Notepad).
- 2. Enter geoid heights in the format shown in Table 2-2, where each row in the table corresponds to a line in the file. See below for a description of the fields in this format.

Format Fields	Example
LAT, LON, n_row, n_column, step_lat, step_lon, geoid_direction, ellipsoid;	40 36 10, -4 30 00, 3, 3, 2 00, 2 00, SE, WGS84;
H1 H2 H3	16.16 11.11 6.6
H4 H5 H6	12.12 7.7 2.2
H7 H8 H9	8.8 3.3 19.19

#### Table 2-2. Regional Geoid Model Format

- 3. Save the file with an ".rgm" extension.
- 4. Open Topcon Link and convert the regional geoid model file to a Topcon geoid file. See "Converting A File" on page 5-2 and "Geoid File Conversion Parameters" on page 5-20 for details.

**The fields in the regional geoid model format** correspond to the following information:

• LAT, LON – latitude (GG MM SS) and longitude (GG MM SS) of the start point for the Regional Geoid Model

- Latitudes are positive for the Northern Hemisphere.

- Longitudes are positive for the Eastern Hemisphere.

Enter latitudes and longitudes in this format:  $dd^* mm' ss''$ 

• n\_row – the number of rows in the file

- n\_column the number of columns in the file
- step\_lat grid step along parallels (MM SS)
- step\_lon grid step along meridians (MM SS)
- geoid\_direction direction for entering geoid heights along the grid (Table 2-3)

NE WS EN from north to east from east to north from west to south Start Point Ν. Ν, 1H1 H2 H3 w H6 H5 H4 H6 H8 H9 H3 H9 H7 нэ ÎH7 H8 H5 H8 H4 H5 H6 H2 H1 H4 H7 Η1 H2 ΗЗ È ┣ Start Point Start Point s

Table 2-3. Entering Geoid Heights

- ellipsoid the ellipsoid type that the given regional geoid is based on
- H1,H2... geoid height in the node (meter)

# **Notes:**


# File Operations and Data Views

Topcon Link works with individual data formats rather than importing data into an application-based, project-style file. This feature allows Topcon Link to provide robust import/export and conversion utilities for multiple data types, as well as the ability to work with a data type in its native format. To this end, Topcon Link uses standard file opening/closing and saving operations. Most files can be opened, saved, and closed. However, a few formats may need to be converted before opening and working with the data, or converted to another format before saving changes.

- See "File Operations" on page 3-2 for details on opening/closing files, and for details on setting file properties and printing.
- See "Saving the File as Another Format" on page 3-9 for details on saving proprietary or device-specific formats.

Topcon Link includes a standard configuration for viewing data, such as distance precisions, applicable coordinate systems, and computation parameters. To change any of these settings, see "Applying Configuration Parameters for Viewing Data" on page 3-11.

The Tabular view initially contains default data columns and settings for viewing and working with data. The CAD view can display information for data points. These columns and settings can be shown/hidden or re-arranged.

- See "Setting Tabular View Options" on page 3-15 for details on setting up data columns for the different tabs.
- See "Setting CAD View Options" on page 3-21 for details on viewing data information in the CAD view.

# **File Operations**

Topcon Link uses standard file opening/closing and saving operations for all file types. A properties feature allows job and company specific information to be saved with the file. The selected view can be printed for further study.

#### **Opening a File**

Because Topcon Link is a utility program that works with various file types, it does not have a type of file specifically associated with this software. Some types of files can be directly opened in Topcon Link. Table 3-1 lists the file types that Topcon Link can open.

File Type	Format Extensions
Code Library	*.las; *.dbf; *.tdd; *.xml
Coordinates	*.sdr; *.pt3; *.mgn; *.txt; *.xml; *.cr5; *.csv; *.xyz; *.fc4; *.pnt; *.fc5; *.*
Digital Level Observations	*.dl;*.lev;*.txt
GPS+ Raw Data	*.pdc; *.tps; *.jps; *.tpd; *.??O; *.??D; *.??G; *.??N
TopSURV PC Jobs	*,tsj; *.tlsv
Total Station Observations	*.dat; *.raw; *.fc5; *.gts; *.gt6*, gts6; *.gts7; *.gt7; *.*; *.xml

Other file types must be converted first before Topcon Link can read the data. See Chapter 3 for details.

- 1. Open Topcon Link and click File ▶ Open File.
- 2. Select the file format.
- 3. Navigate to and select the file to Open.
- 4. If needed, select desired Advanced options.



For Total Station observations measured using a vertical angle, select the vertical angle mode.

5. Click Open.

🚰 Open	
Look in: 🔁 TopSURV	
(☐) 050119 중 050119.tlsv ☐) Imaging.zip	
PROJECT RTK.Nov PROJECT TS.Nov TopSURV DATA FILES.zip	All files (*,*)         ⊕ @ Code Litrary (*.dbf)*.tdd,*.xml)         ⊕ @ Code Litrary (*.dbf)*.tdd,*.xml)         ⊕ @ Dobs (*.dj*.levy*.tdt)         ⊕ @ DL Obs (*.dj*.levy*.txt)         ⊕ @ GPS+R aw Data (*.tpd,*.??o;*.??6;*.??Nj*.??Dj*.tps;*.jps)         ⊕ @ TSOBURY PC Job (*.tlsv)         ⊕ T5 Obs (*.rwf*.raw;*.det;*.fc5;*.gts)*.gt6;*.gts7;*.gt7;*.yt7;*.txml)
File name: PROJECT RTK.tlsv	
Format name: TopSURV PC Job	( <sup>*</sup> .tlsv)
Advanced options	
Open 📐	Cancel

Figure 3-1. Select Format and File to Open

#### Creating a Custom Text File Format for a Coordinate File

To open or save a file of arbitrary coordinate format, you can create and save a custom format. A custom text format allows you to customize the data included in the coordinate file. Text formats are saved as an ASCII format (\*.txt, \*.csv, etc.).

To create an arbitrary text coordinate file, take the following steps:

- 1. Click File ▶ Open File.
- 2. On the Open dialog box, navigate to and select a desired coordinate file in the File name field.
- 3. On the Open dialog box, select the Custom text format from the list of coordinate formats in the Format name field. Click Open.
- 4. On the Custom format properties dialog window select the delimiter that separates data in a line and the coordinate system used to create the data.



Do not use the "Space" delimiter if the file contains codes with attributes.

5. Select data types for the custom format:

- In the left column, select the data type(s) to include and click the Move Right button.
- In the right column, use the Move Up/Move Down button to arrange the data types into the same order used in the opened file.



Always include "PointNum" in the right column and always have it as the first data type. If including "FullCodes" in the right column, always have it as the last data type.

- 6. Select the rule(s) to use for displaying data:
  - Ignore first line if the first line if informational only.
  - FullCodes include Code, String and ControlCode if these codes are included as shown in Figure 3-2 on page 3-4.
  - FullCodes include Code and Attribute if these codes are included as shown in Figure 3-2.

If the custom format has mixed FullCodes, select both options.



Includes Code and Attribute	Code	Attribute
P1,660.343,257.340,180.903,	Base station:	Hiper_H_Vert_1_58.TEXT = "",
		FullCodes

Figure 3-2. Examples of File Formats with FullCodes

- 7. Enter a name for the format and an extension type.
- 8. Click Ok to store the format in the Formats folder (installed with Topcon Link) and include it in the format name list. This format is added to the list of coordinate formats for Open, Save As and Convert File dialog boxes.



Figure 3-3. Create Custom Text Coordinate Format



Topcon Link applies the default file name, UnName\*.\*, if no file name accompanies the new coordinate file format. In this case, Topcon Link deletes the new file format when closed.

#### **About Opening TS Raw Data Files**

While TS raw data file do not record information about the vertical angle mode (Figure 3-4 on page 3-6), you can select the mode under Advanced options when opening the file in Topcon Link.

- Zenith vertical angles are from zenith
- Horizontal Level vertical angles are from horizontal

• Auto – no information available on the vertical angle mode. In this case, angles from 0 to 45° are considered "horizontal" and angles more than 45° are considered "zenith."



If vertical angles measured in a TS raw data file exceed 45°, select the same mode used for these measurements when opening the file. If a different mode or "Auto" is selected, the TS Obs tab will display measurements in the wrong column:

- the Vertical Angle column will display values read from zenith
- the Zenith Angle column will display values read from horizontal level



Figure 3-4. Vertical Angle from Horizontal Level (A) and Zenith (B)

#### Creating a Custom Text File Format for TS Observation file

To open or save a file of arbitrary TS observation format, you can create and save a custom format. A custom text format allows you to customize the data included in the TS observation file. Text formats are saved as an ASCII format (\*.txt, \*.csv, etc.).

To create an arbitrary text TS observation file, take the following steps:

- 1. Click File ▶ Open File.
- 2. On the Open dialog box, navigate to and select a desired TS observation file in the File name field.
- 3. On the Open dialog box, select the Custom text format from the list of TS observation formats in the Format name field. Click Open.
- 4. On the Custom format properties dialog window select the delimiter that separates data in a line
- 5. On the Custom format properties dialog window select data types for the custom format:
  - In the left column, select the data type(s) to include and click the Move Right button.
  - In the right column, use the Move Up/Move Down button to arrange the data types into the same order used in the opened file.
- 6. Enter a name for the format and an extension type.
- 7. Click Ok to store the format in the Formats folder (installed with Topcon Link) and include it in the format name list. This format are added (will be added) to the list of TS observation formats for Open, Save As and Convert File dialog boxes.



Figure 3-5. Create Custom Text TS Obs Format

#### **Saving a File**

Topcon Link opens and imports many files types, but only saves certain file types in a native Topcon format.

When saving a file that has been edited, Topcon Link automatically saves the original version of the file as "\*.\*.initial" in the current folder. Then the edited file is saved.

Use one of the following methods to save a file:

- Click the Save button on the Toolbar.
- Click File ▶ Save File.
- Press Ctrl+S on the keyboard.

An error message displays if the format is not supported for a save operation.

#### **Saving the File as Another Format**

Topcon Link allows one to save the current file with a new name and/ or in a new directory and/or to save in other format. Saving a file in another format uses the same process as a file conversion. Topcon Link allows the user to save files only to compatible formats (the formats with the common data).

For details on converting files, see Chapter 5.



Use the Save As function to keep versions of the same file to show progress. Simply add the date or other indicator to the file name.

- 1. With the desired file open and active, click File  $\blacktriangleright$  Save As.
- 2. Navigate to the location in which to save the file.
- 3. Type in a name for the file.
- 4. Select the format to save to.



Topcon Link will display only compatible formats in the File format field of the Save as dialog box.

5. If selecting a different format from the current format, select applicable Advanced Options.

For details on the advanced options, see the applicable section in "Converting A File" on page 5-2.

6. Click Save.

		□ All files (*.*)
🐔 Save as		Code/Layer Library (*.dbf;*.xml;*.las)
The surve us	-	Coordinates (*.mgn;*.xyz;*.fc4;*.pnt;*.fc5;*.txt;*.xml;*
Save in:	C TLSV	🔁 🖆 Cut Sheet (*.csu;*.css)
	1	Design (*.ln3;*.dgn;*.txt;*.xml;*.dwg;*.dxf;*.*)
		🗄 📲 GIS (*.shp)
		GPS Obs (*.xml;*.tvf;*.*)
		🗄 📲 Localization (*.gc3)
		Topcon XML (*.xml)
L		±≣ TS Obs (*.sht;*.mos;*.raw;*.dat;*.gts;*.gts6;*.gt6;*.gt
File name:	RTK_GPS_&_TS	
Format name:	e <sup>la</sup> Name,N,E,Z,Code - Coordinat	es (".csv)
<ul> <li>Advanced of</li> </ul>	ptions	
	Save	Cancel

Figure 3-6. Save File As...

## **Closing a File**

To close a file without closing Topcon Link, click the system close button on the Tabular View.

						using Syst Tabular Vi	
C:\	topcon\Topco	nLink\TopSURV\PR	OJECT RTK.tlsv <	TopSURV PC Jo	b >		
•° Pe	oints 🔗 GPS	5 Occupations 🛛 🤗 G	PS Obs 🕴 🌲 Codes				
Icon	Name	Ground Northin	Ground Easting	Elevation (USft)	Code	Control	1
•	5000	2064444.891	6179355.110	379.101	EXISTING	None	
۲	5001	2064448.588	6179345.339	379.512	EXISTING	None	
۲	5002	2064451.546	6179335.728	379.531	EXISTING	None	
۲	5003	2064454.479	6179325.560	379,445	EXISTING	None	
<							>

Figure 3-7. Close File

While several files can be open at the same time, it may take longer for Topcon Link to read or compute data if the files have a lot of data. Closing a file before opening another may speed up computations.

### **Viewing and Entering File Properties**

The Properties dialog box is used for viewing and entering filespecific information. This dialog box also includes the location of the file, file type, and date the file was last saved.

1. Click File ▶ File Properties.

- 2. View the path and format of the file.
- 3. For some file types, you can type in a name for the job, the name of the surveyor or company, and any associated notes.
- 4. Click OK to save and exit.

TopSURV PC Job File Properties	Properties	: TopSURV Job C:\topco ? 🔀
	General	
	File Name	C:\topcon\TopconLink\TopSURV\PR0
	Format	TopSURV PC Job
Digital Level File Properties	Date	
Properties : DL Obs C:\topcon\Top ?X	Job	PROJECT RTK
General	Surveyor	John Q. Public
File Name C:\topcon\TopconLink\DigitalLevel\37w	Note	For Demonstration
Format Topcon DL Obs		
OK 📐 Cancel Apply	ок 🔓	Cancel Apply

Figure 3-8. File Properties – Examples

#### **Printing the Selected View**

The Tabular and CAD views in Topcon Link can be printed for viewing offline.

Some views print best with a landscape orientation.

- Use the File ▶ Page Setup option to apply page and margin settings.
  - Use the File > Print Preview option to view the potential result of the selected view.

To print the Tabular view, select the tab and click File > Print.

To print the CAD view, select the CAD view and click File > Print.

# Applying Configuration Parameters for Viewing Data

Configuration parameters apply basic settings for such items as how to display angles and the decimal for digits, the coordinate systems available and adding a geoid, and the settings to use for adjustments. These parameters will be saved with Topcon Link and used when opening a file. The default configuration is usually appropriate for most operations.

- 1. Open Topcon Link and click File ▶ Configuration.
- 2. In the Display pane, select the following parameters for displaying information (Figure 3-9 on page 3-12). Click Ok to save and exit.
  - In the Precisions tab, select the number of digits to display after the decimal for measurements.
  - In the Time tab, select the local time used for start and end times for GPS occupations
  - In the Roads tab, select the term to use for displaying information on the centerline; either Chainage or Station.
  - In the Angles tab, select the form for displaying angles and latitudes/ longitudes.

Precisions Time Display CL Pos as	e Roads Angles Chainage		•
	Precisions Time Angles Lat,Lon	e Roads Angles dd'mm'ss.s'' dd'mm'ss.s''	
Configuration     Conducte Systems     Conducte Systems     Conducte Systems     Conducte Systems     Compute Coordinates     To Compute Coordinates     To Computations	Precisions Time F - Digits after decimal Distances Coordinates(N.E) Heights Angles (Seconds) LatLon (Seconds) LatLon (Seconds) LatLon (Dec.degrees) Area Volumes	3         3           3         3           4         7           5         8           2         2	

Figure 3-9. Select Display Parameters

 In the Coordinate Systems pane the user can view, add, or remove available geoid file (Figure 3-10). Click Ok to save and exit. To add a new Geoid to the list, see "Adding a Geoid" on page 2-13.

ау	Geoid	s List				
dinate Systems	Icon	Name	Path	Minimum Longit	Minimum	
855	19	EGM96	C:\TOP	180°00'00.0	90°00'00.(	
ess Compute Coordinates	1	g2003u01	D:\Geoi	130°00'00.0	40°00'00.(	Add
omputations	1	g2003u02	D:\Geoi	113°00'00.0	40°00'00.( -	20000
Sinpacacions	1	g2003u03	D:\Geoi	96°00'00.00	40°00'00.(	
	1	g2003u04	D:\Geoi	79°00'00.00	40°00'00.(	
	<b>P</b>	g2003u05	D:\Geoi	130°00'00.0	24°00'00.(	
						Remov
					(20)	
	<				>	

Figure 3-10. Select Geoid

- 4. In the Save pane, select the interval in minutes for saving a backup copy of the current file (Figure 3-11). Click **Ok** to save and exit. Topcon Link uses the following rules for saving/ deleting backup copies:
  - The file will be saved at the selected interval.
  - If the file has been edited, a backup copy is automatically saved.
  - After saving the file (either click **Ctrl+S**, click on the **Save** button, or click **File** ▶ **Save/Save As**), the backup copy is deleted. A new backup copy is saved when at the end of the next time interval.
  - Type "0" into the field to turn off the backup save feature.

• If Topcon Link (or the system) shuts down unintentionally, the backup copy of the current files opens and is marked "reserved".

Configuration			? 🛛
Display     Coordinate Systems     Save     To Construct Coordinates     To Compute Coordinates     To Computations	Backup Interval (min)	10	
OK		Cancel	

Figure 3-11. Select File Backup Properties

- 5. In the Process Compute Coordinates pane (Figure 3-12), type in distance and angle measurement errors to take them into account when computing the coordinates of station using directions observed from the station to points of known positions (resection method). Click Ok to save and exit.
- 6. In the Process TS Computations pane, select the refraction coefficient to be applied to total station observations during calculation of the coordinate (Figure 3-12). Click Ok to save and exit.

Configuration		2×	
Display Coordinate Systems Save Process Compute Coordinates	EDM 3 HA Sigma, (sec) VA Sigma, (sec)	mm + 3 ppm  5  10	
Configuration	ystems	Refraction Coefficient C 0 C 0.14 C 0.2 C Without Curvature	

Figure 3-12. Set Processing Properties

# **Setting Tabular View Options**

Topcon Link displays data in two views, a tab view and a CAD view. The Tabular view groups data based on type and displays the information in a series of tables on different tabs (Figure 3-13).

] Fil		Process Window Help						- 8
Z		i 😚 👫 🔤 🗠			l °₊   ₽	• & & <u>₽</u>	🕅   🖉   💞	🔲   崎
P	oints 🔗 🛛	SPS Occupations 🛛 🔗 🛛	sps obs \mid 🌲	Codes				
lcon	Name	Ground Northin	Ground East	ing	Elevation (USft)	Code	Control	Not
•	5000	2064444.891	617935	5.110	379.101	EXISTING	None	
	5001	2064448.588	617934	5.339	379.512	EXISTING	None	
•	5002	2064451.546	617933	5.728	379.531	EXISTING	None	
•	5003	2064454.479	617932	5.560	379.445	EXISTING	None	
•	5004	2064457.738	617931	5.822	379.483	EXISTING	None	
•	5005	2064461.034	617930	6.053	379.528	EXISTING	None	
•	5006	2064464.019	617929	6.227	379.556	EXISTING	None	
•	5007	2064466.339	617928	5.256	379.510	EXISTING	None	
9	5008	2064468.620	617927	4.605	379.563	EXISTING	None	
9	5009	2064471.518	617926	4.888	379.368	EXISTING	None	
9	5010	2064474.482	617925	4.930	379.477	EXISTING	None	
9	5011	2064477.668	617924	5.120	379.386	EXISTING	None	
9	5012	2064480.670	617923	5.556	379.338	EXISTING	None	
	5013	2064483.472	617922	3.924	379.567	EXISTING	None	
9	5014	2064486.950	617921	1.842	379.436	EXISTING	None	
9	5015	2064489.456	617920	1.896	379.360	EXISTING	None	
9	5016	2064492.024	617919	2.095	379.293	EXISTING	None	
								>

Figure 3-13. Tabular View

The tabs that display depend on the type of data in the current file. Data columns for each tab can be shown/hidden and re-arranged based on available data and the user's preference.

#### **Displaying Table Columns**

- To edit the order and visibility of a tab's column, click View ► Options ► Tabular View.
- 2. Click the options tab for the corresponding Tabular View tab.
- 3. For most of the tabs, select the desired field and use the following buttons to set up the data columns. Figure 3-14 on page 3-16 uses the Lines Tab options as an example.
  - Move right ( ) to include the field in the table and move left ( ) remove the field from the table.
  - Move up ( Move Up ) and move down ( Move Down ) to arrange the order of the selected field.

For the Road Graphic Views and Images tab options, select the desired fields to display on a graphic tab. See page 3-18 and page 3-19 for examples.

4. Click Ok to save and apply the settings.

Tabular View Options		
Road X-Sections		Section Templetes DL Obs Tape Obs Arrange Field in Tab
Available columns	>> Con Grder Point Distance from start Distance from prev Entry azimuth	Movel
- Show columns left	«	Images         Horizontal Road Elements         Vertical 'load Elements           Road V-Sections         Road Graphic Views         X-Set, in Templates           Points         Lines         GPS Occupations         GPS Obs         TS Obs         DL O s         Tape Obs
Available columns Distance Area	>> Icon Type Layer Color Line Style Line Width Code String	Available columns Available columns Icon Dider Point Distance from start Distance from start Distance from prev Ertry azmuth Edit control
ОК		A Show columns left
		Available columns
Sav	e Changes ———	OK Cancel

Figure 3-14. Lines Tab Options – Editing Data Columns

Table 3-2 shows an example of, and the default settings for, each of the Tabular View options tabs. See Figure 3-14 on page 3-16 for an example of the Lines options tab.

Points tab Options	GPS Occupations tab Options
22 Tabular View Option:     22 Tabular View Option:     22 Tabular View Option:     22 Research Road Elements     22 Research Road Road Road Elements     22 Research Road Road Road Road Elements     22 Research Road Road Road Road Road Road Road Road	Construction of the second secon
OK Cancel GPS Observations tab Options	TS Observations tab Options
Tabular View Options     Images     Horizontal Road Literents     Not Section     Road Graphic View     Vertical Road Climents     Note Columns     Sectors     Sectors     Sectors     Sectors     Sectors     Sectors     Sectors     Sectors     Sectors     Note     Not	Images     Hericontal Road Elements     Vertical Road Elements       Images     Hericontal Road Elements     X-Section Templates       Parks     Unes     GPS One parking     X-Section Templates       Parks     Unes     GPS One parking     X-Section Templates       Parks     Unes     GPS One parking     X-Section Templates       Available columns     GPS One parking     GPS One parking     Move Up       Homod Algo     Prior From     Move Up       Other Algo     Distance     GPS       Other Algo     Code     Move Up       Other Algo     Code     Move Down       Void Residual     Code     Move Up
OK Cancel	OK Cancel

Table 3-2. Tabular View Options Tabs



#### Table 3-2. Tabular View Options Tabs (Continued)
X-Section Templates tab Options	Images tab Options
I Tabular View Options	Tabular View Options
Images         Horizontal Road Elements         Vertical Road Elements           Points         Lines         GPS Occupations         GPS Obs         TS Obs         T cape Obs           Road X-Sections         Road Graphic Vews         X-Section Templates	Ponts Lines GPS Occupations GPS Obs TS Obs DL Obs Tage Obs Road X-Sections Road Graphic Views X-Section Templates Temages Horizontal Road Elements Vertical Road Elements
Show columns gold     Available columns     Selected columns     Code     Dode     Code     Hz_Dist     V_Dat     Bode     Hz_Dist     V_Dist     Hz_Oit     V_Dist     Hz_Oit     V_Dist     Hz_Oit     Hz_	Show on tabu bar ♥ Name ■ Code ■ Code ■ Height ♥ Kalence ♥ Name ♥ Name ♥ Name ♥ Soon ■ Show on tabu bar ♥ Soon ■ Height ♥ Code ■ Height ♥ Code
- Show columns lift Available columns 	17 Height
OK Cancel	OK Cancel
Horizontal Road Elements tab Options	Vertical Road Elements tab Options  Tobular View Options  Ports Lines GPS Occupations GPS Obs TS Obs LC Obs Tage Obs Road X-Sections Road Graphic Views X-Section Terrolates Images Horizontal Road Elements Vertical Road Elements
Shore Columns Available columns Selected columns Icon Icon Icole Type Asimuth Length L	Shore Columns Available columns  Ione Order Type Star Chainage Length Start State Elevation Elevation Hadus Move Down
OK Concel	OK Cancel

#### Table 3-2. Tabular View Options Tabs (Continued)

### **Arranging Table Columns**

The columns in the Tabular views can be sorted and arranged (Table 3-3) to best display the file's data. The arrangement is used the next time you open a file.

#### To reset the table's columns to default settings, right-click the

column's header and click Reset Columns



Column Arranging Options	Examples					
Sort columns	Decre	Decreasing Order Increasing				
Data in a column can be sorted in	A 6	round Northing (USf	t) 🔍 🤍 🤇	Ground Easting (USft)		
decreasing/increasing order.		4835.75	9	12654.110		
e e		4858.72	3	10748.594		
		4858.72	3	10694.174		
Click the column's header, or right-		4923.51	2	10693.274		
		4999.98	6	10685.742		
click and click Sort.		5000.02	:4	10597.129		
		5000.02	:4	10594.929		
Swap columns	Before					
		• Points 📿 Lines	GPS Occupations	🔗 GPS Obs 🛛 🔕 TS Obs		
Columns can be moved from one		I V Name	Ground Northing (USft)	Ground Easting (USft)		
location to another in the table.		29412	5697.936	10259.732		
		0 29411A	5691.762 5691.763	10282.462 10282.466		
		0 26942A	5111.627	10202.400		
Click the column's header and drag it	During					
to the desired location.		🔹 Points 📿 Lines	GPS Occupations	🛛 🤗 GPS Obs 🛛 🛇 TS Obs		
to the desired location.		I V Name	Ground Northing (ປຣ໌ທີ່ອ)ຄ	d Eastin <i>G</i> (blifit) Easting (USft)		
		29412	5697.936	10259.732		
			5691.762 5691.763	10282.462 10282.466		
		0 26942A	5111.627	10202.400		
	After					
	Allei	° Points 📿 Lines	GPS Occupations	🛛 🤗 GPS Obs 🗍 🕎 TS Obs		
		I V Name	Ground Easting (USft)	Ground Northing (USft)		
	1	29412	10259.732	5697.936		
	1		10282.462 10282.466	5691.762 5691.763		
	1	0 26942A	10202.466	5111.627		

#### Table 3-3. Arranging Table Columns

Column Arranging Options	Examples
Size columns Columns can be sized to display/hide data. Click the column's right edge and drag left to decrease, right to increase the width of the column.	Before
	After

Table 3-3. Arranging Table Columns

# **Setting CAD View Options**

Topcon Link displays data in two views: a tab view and a computer aided drawing view. The CAD view is a two-dimensional, graphical representation of linework road and surface data, with associated points. To view the CAD graphic, click View → CAD View. Depending on the file's data and the filters used, the following information displays:

- Points with associated symbols If the point does not have a symbol, its survey symbol is used.
- Lines using the associated code/layer color, style, and width.
- Control codes (/AS, /AE, /C) display as an arc or closed polyline, respectively.
- Codes with a polygon entity display as closed and filled (if a fill color has been set).

• Surfaces and road display in the color applied to the corresponding layer(s).



Figure 3-15. CAD View



The Roads tab and X-Section Templates tab have independent CAD graphical views associated with the selected data element.

- To filter (show/hide) points, lines and codes in the CAD view, click View ▶ Options ▶ CAD View.
- 2. On the Window tab, select to show/hide a grid on the CAD view.
- 3. On the Labels tab, select to show/hide the following information on the CAD viewmap, as a pop-up with the cursor, or on the Status bar.
  - Name the name of the point
  - Code any code associated with the point
  - Height the height (elevation) of the point
- 4. On the Selection tab, check on (off) the following parameters of the selecting rectangle to show/hide them in the Status Bar:
  - Show distance the length of the selecting rectangle's diagonal
  - Show azimuth the azimuth of the selecting rectangle's diagonal
  - Show dimension the dimension (along the Easting and Northing axis correspondingly) of the selecting rectangle

- Show area the area of the selecting rectangle.
- 5. Click Apply to save changes, then Ok to exit.



Figure 3-16. CAD View Options

# **Notes:**

# Importing Data Files From a TPS Device

Topcon Link provides a simple interface for importing data files directly from a Topcon device (instrument). The imported file is saved to the selected directory, and is immediately available for opening and viewing in Topcon Link.

A unique feature of the software includes the ability to import data from a connected device to the computer using Windows® Explorer, without having to open Topcon Link. Then use Topcon Link to open the files for viewing, editing, converting, or uploading.



Before importing data from some devices, the device must first be set up. See "Adding and Formatting Devices" on page 2-1 for details.

This chapter first discusses the steps to view device properties, or file properties on a device's memory card. The remaining sections in this chapter detail the steps required to import data files from a connected device or an inserted memory card.

- See "Importing Files from a Topcon GPS Receiver" on page 4-2.
- See "Importing Files from a Mobile Device" on page 4-5.
- See "Importing Files from a Total Station" on page 4-7.
- See "Importing Files from a Digital Level" on page 4-9.
- See "Importing Files from a Memory Card" on page 4-11.
- See "Using Windows Explorer to Import Files from a Device" on page 4-13.

# Importing Files from a Topcon **GPS** Receiver

The Topcon family of GPS receivers have an internal data storage device to record data in \*.tps format. This family of products includes the following receivers. Refer to the receiver's documentation for details on setup, operation, and connection with other devices.

- Odyssey-E, Odyssey-RS, NET-G3
- HiPer+, HiPer Pro
- HiPer Lite, HiPer Lite+ • HiPer, HiPer GD, HiPer L1, HiPer GGD
  - GR-3
  - Map-HP, Map-RT
- HiPer XT. HiPer XR

When importing files from a TPS GPS receiver, Topcon Link automatically detects the receiver for importing data, and no further setups are required.

Before connecting the receiver's USB port to the computer's USB port, the TPS USB driver must be installed on the computer. The driver is available on the TPS website: (http:// www.topconsupport.com/documents/view/1743)



This section describes data import using the Topcon Link interface.

To import data using Windows® Explorer, see "Using Windows Explorer to Import Files from a Device" on page 4-13.

1. Connect your receiver and computer according to the receiver's documentation.

Note that a Bluetooth<sup>®</sup> connection requires that both devices have Bluetooth wireless technology capabilities.

- With Topcon Link open, click File > Import from Device. 2.
- 3. In the left panel, double-click Topcon Receivers. Topcon Link searches for connected devices.



Click Stop to quit the search and display detected devices.

Figure 4-1. Search For Connected Devices

- 4. Double-click the Topcon Receivers to access the device's data storage module and view the collected raw files.
- 5. In the right pane, navigate to the folder on the computer in which to save data files.
- 6. In the left pane, select the desired \*.tps file(s) and click the Move Right button. The file import progress displays.



Figure 4-2. Import File from Receiver

7. If Open File After Import was selected, the import function closes and the \*.tps file opens in Topcon Link:

GPS Occupa	tions								
Point Name	Original Name	Antenna Type	Antenna H	Ant Height	Start Time	Stop Time	Duration	Method	Note
EPOCA10	EPOCA10	HiPer GD/GGD	1,500	Vertical	05.09.200	05.09.200	0:00:50	Static	NEpoch=10
2	EPOCA10_K1	HiPer GD/GGD	1,500	Vertical	05.09.200	05.09.200	0:00:35	Kinematic	NEpoch=7
EPOCA5	EPOCA5	HiPer GD/GGD	1,600	Vertical	05.09.200	05.09.200	0:00:30	Static	NEpoch=6
2	EPOCA5_K1	HiPer GD/GGD	1,600	Vertical	05.09.200	05.09.200	0:00:20	Kinematic	NEpoch=4
EPOCA3	EPOCA3	HiPer GD/GGD	1,600	Vertical	05.09.200	05.09.200	0:00:20	Static	NEpoch=4
2	EPOCA3_K1	HiPer GD/GGD	1,600	Vertical	05.09.200	05.09.200	0:00:15	Kinematic	NEpoch=3
EPOCA1	EPOCA1	HiPer GD/GGD	1,600	Vertical	05.09.200	05.09.200	0:00:10	Static	NEpoch=2
2	EPOCA1_K1	HiPer GD/GGD	1,600	Vertical	05.09.200	05.09.200	0:00:30	Kinematic	NEpoch=6
1	1	HiPer GD/GGD	1,600	Vertical	05.09.200	05.09.200	0:00:30	Static	NEpoch=6
λ.	1_K1	HiPer GD/GGD	1,600	Vertical	05.09.200	05.09.200	0:00:20	Kinematic	NEpoch=4
2	2	HiPer GD/GGD	1,600	Vertical	05.09.200	05.09.200	0:00:30	Static	NEpoch=6
2	2_K1	HiPer GD/GGD	1.600	Vertical	05.09.200	05.09.200	0:00:30	Kinematic	NEpoch=6

Figure 4-3. Display data of the \*.tps file

# Importing Files from a Sokkia GPS Receiver

The Sokkia family of GPS receivers have an internal data storage device to record data in \*.pdc format.

When importing files from a Sokkia receiver, Topcon Link connects to the device and provides a path for the data transfer.



This section describes data import using the Topcon Link interface.

To import data using Windows® Explorer, see "Using Windows Explorer to Import Files from a Device" on page 4-13.

- 1. Connect your receiver and computer according to the receiver's documentation.
- 2. With Topcon Link open, click File > Import from Device.
- 3. In the right pane, navigate to the folder on the computer in which to save data files.
- 4. In the left pane, double-click Sokkia Receiver to connect with the recreiver.

5. Select the desired raw (\*.pdc) file in the left panel and click the Move Right button to start downloading the selected file to the computer:

🐨 Import from Device	
Look in: 🛛 📼 New Sokkia rec 💌 🗲 💼 📂	Look in: 🔁 From_Sokkia_re 💌 🗲 🖻 📺
2 00140610.pdc 10_07_09.pdc → static1.pdc	>> i static1.pdc
C Open F	iles after Import
	🔄 File Download 🛛 🛛 🗙
	Waiting for download Downloaded 63346 bytes of 491898 Transfer rate is 7105 bytes/sec
	Cancel

Figure 4-4. Import raw file from Sokkia receiver to Computer

### Importing Files from a Mobile Device

The Topcon family of controller software (such as TopSURV) runs on several Topcon and third-party mobile devices.

Microsoft ActiveSync needs to be installed on the computer with Windows XP. For details, see "Installing Microsoft ActiveSync for Use With CE-based Devices" on page 1-11.

If the user's computer operates under Windows Vista, ActiveSync is not needed. A connection between the computer and an external device with Windows CE will be automatically established after connecting your device to your PC.

TopSURV supports two formats of the job files:

- TopSURV \*. tsj. This job is created in TopSURV version 7.0 and later.
- TopSURV \*.tsv job. This job is created in TopSURV version 6.11.03 and earlier

There is a difference in format of these files and a difference in using these files in the computer's software.

In TopSURV version 7.0 and later, the \*.tsj file is saved on the controller, that this file format can be opened by Topcon Link/Topcon Tools/TopSURV PC. Topcon Link is used only for transferring the \*.tsj file from the controller to the computer without format changes. Moreover, the user can use a movable memory card to transfer the \*.tsj file from the controller to the computer.

In TopSURV version 6.11.03 and earlier, the \*.tsv file is saved on the controller. But Topcon Link/Topcon Tools/TopSURV PC version can not open this file format. Topcon Link has to convert mobile devicebased formats to computer-based formats.Topcon Link performs the conversion during the import process the \*.tsv file to the \*.tlsv file. This format (\*.tlsv) is opened by Topcon Link/Topcon Tools/ TopSURV PC.



This section describes data import using the Topcon Link interface.

To use Windows® Explorer for data importing, see "Using Windows Explorer to Import Files from a Device" on page 4-13.

1. Connect your controller and computer according to the controller's documentation.

Note that a Bluetooth® connection requires that both devices have Bluetooth wireless technology capabilities.

- 2. With Topcon Link open, click File > Import from Device.
- 3. In the left panel, double-click Mobile Device. Topcon Link connects to the internal memory of the controller.
- 4. Navigate to the location in the controller's memory where data files are saved. For example, TopSURV files are saved to the CF Card/TopSURV/Jobs directory.
- 5. In the right pane, navigate to the folder on the computer in which to save data files.
- 6. In the left pane, select the desired file(s) and click the Move Right button. The file import progress displays.

7. If Open File After Import was selected, the import function closes and the file opens in Topcon Link.

🗑 Import 1	from Device				2
Look in:	My Computer Topcon Receivers Topcon Memory Cards Mobile Device CF Card				
	TPS TopSURV	V Open Files	after Import	Look in: 🔁 TopSL	
	Default.tsj		>> <u>}</u>	9 07148.tlsv 9 AIRPORT.tlsv 9 net.tlsv	
			Open Files after Im	port	
			Close		

Figure 4-5. Import File from Mobile Device

# Importing Files from a Total Station

The Topcon family of conventional and robotic Total Stations have an internal data storage device to record data in various formats. Refer to your Total Station's documentation for details on setup, operation, and connection with other devices.

When importing files from a TPS Total Station, Topcon Link connects to the device and provides a path for the data transfer. The actual file transfer is performed at the Total Station.

The connection procedure for TPS Total Stations varies, so refer to the device's documentation for details.

When connecting to a CE-based device, Microsoft ActiveSync automatically starts up and connects with the device. This connection is required to import files, if your computer operate under Windows XP. If the computer operates under Windows Vista, ActiveSync is not needed. If you need to install ActiveSync, see "Installing Microsoft ActiveSync for Use With CE-based Devices" on page 1-11"Installing Microsoft ActiveSync for Use With CE-based Devices" on page 1-11 for details.



This section describes data import using the Topcon Link interface.

To use Windows® Explorer for data importing, see "Using Windows Explorer to Import Files from a Device" on page 4-13.

- 1. Connect your controller and Total Station according to the device's documentation.
- 2. With Topcon Link open, click File > Import from Device.
- 3. In the right pane, navigate to the folder on the computer in which to save data files.
- 4. In the left pane, double-click Topcon Total Stations.
- 5. Double-click the desired device to connect with the Total Station.



Figure 4-6. Select Total Station to Import Data From

- 6. Select the "file.txt" file and click the Move Right button.
- 7. Follow all steps listed in the Download file from Total Station dialog box. These steps may vary depending on the connected device. Click Start.

- 8. Press the F3 key on the Total Station to import data.
- 9. If *Open File After Import* was selected, the import function closes and the file opens in Topcon Link.

🙀 Import from Device	
Look in: GPT3005W Cook	In: SurveyData     SurveyData
Close	Press the TY key for Data Transfer Press the TY key to Send data In the Send Data Screen' the user has a choice to either send to the File name: GPT 3005W Statu: Waiting for start

Figure 4-7. Import File from Total Station

# Importing Files from a Digital Level

The Topcon family of Digital Levels has an internal data storage device to record data. Refer to your Digital Level's documentation for details on setup, operation, and connection with other devices.

When importing files from a TPS Digital Level, Topcon Link simply connects to the device and provides a path for the data import. The actual file transfer is performed at the Digital Level.

The connection procedure for TPS Digital Levels varies, so refer the device's documentation for details.



This section describes data import using the Topcon Link interface.

To use Windows® Explorer for data importing, see "Using Windows Explorer to Import Files from a Device" on page 4-13.

- 1. Connect your controller and Total Station according to the device's documentation.
- 2. With Topcon Link open, click File ▶ Import from Device.
- 3. In the right pane, navigate to the folder on the computer in which to save data files.
- 4. In the left pane, double-click Topcon Digital Levels.
- 5. Double-click the desired device to connect with the Total Station.



Figure 4-8. Select Digital Level to Import Data From

- 6. Select the "file.dl" file and click the **Move Right** button.
- Follow all steps listed in the Download file from the *Digital Level* dialog box (Figure 4-9 on page 4-11) to select a file and begin the import. These steps may vary depending on the connected device.

8. If Open File After Import was selected, the import function closes and the file opens in Topcon Link.

🐖 Import from Device	
Look in: DL-103 V (Look in: Look in: Lo	k ir: SurveyData
Open Files after Import	
	File name: DL-101C Status: Walting for start Cancel

Figure 4-9. Import File from Digital Level

### Importing Files from a Memory Card

Most Topcon devices contain internal memory cards. These movable memory cards are used to collect raw data and to transfer the collected data from the device to the computer. The memory cards can be divided into two different types:

- Memory cards formatted in Topcon receiver's file system. These cards are used in a TPS receiver, such as the GR-3 or NET-G3
- Memory cards formatted using the FAT32 file system. These cards used in controllers, such as the FC-200 or GMS-2.

To download data from the first type of the memory card, use Topcon Link/Topcon Tools. Only these software support such cards.

If a memory (SD) card was used in a TPS receiver, such as the GR-3 or NET-G3, and contains \*.tps files, it has already been formatted. Topcon Link can read files on a memory card formatted in the TPS receiver file system. The device icon for a formatted card is red.

Topcon Link can format a memory card for use in a TPS receiver, such as the GR-3 or NET-G3. The device icon for an unformatted card is gray. See "Adding and Formatting Devices" on page 2-1 for details on formatting cards with a gray device icon.



This section describes data import using the Topcon Link interface.

To use Windows® Explorer for data importing, see "Using Windows Explorer to Import Files from a Device" on page 4-13.

- 1. Insert the memory card into the card reader.
- 2. With Topcon Link open, click File ▶ Import from Device.
- 3. In the left panel, double-click Topcon Memory Card.
- Click the desired, formatted memory card device icon. Wait while Topcon Link checks the card's file system and displays the card's data.

🐖 Import from Device				? 🛛		
Look in: My Computer		Look in: 🔁 Su	irveyData ַ	• • •		
🔚 Impo	rt from Device				? 🗙	
Look in:	📕 Topcon Memory 💌 🖛 🗈 📂		Look in:  🗎	SurveyData 💌	- 🔁 🛋	
<b>⋑</b> н:						
	🕷 Import from Device				(	? 🗙
	Look in: THE Cancel		>>>	k in: 🔁 SurveyC	)ata ▼	
			ïles after Import			
			Close			

Figure 4-10. Mount Memory Card

- 5. In the right pane, navigate to the folder on the computer in which to save data files.
- 6. In the left pane, select the desired file(s) and click the Move Right button. The file import progress displays.
- 7. If *Open File After Import* was selected, the import function closes and the file opens in Topcon Link.

🕷 Import from Device	? 🛛
Look in: 🗾H: 💌 🗢 🖻 🕋	Look in: 🔁 SurveyData 🔍 🗢 🖻 📸
DERC-0705c.tps	
stat2.tps	>> N
stat3.tps	
🐔 stat5.tps	<<
stat7.tps	
🐔 stat8.tps	
, ,	Open Files after Import
	Close

Figure 4-11. Import File from Memory Card

To download data from the second type of the memory card, one can use the standard Windows procedure.

# Using Windows Explorer to Import Files from a Device

After installing Topcon Link, the computer's hard drive contains up to five virtual drives for accessing Topcon devices to import/export data. These virtual drives provide a quick way to transfer data without opening Topcon Link. Many of the steps are the same as for importing/exporting data via the Topcon Link interface. See the corresponding section above for further details on the steps listed in sections below.

#### Import from Topcon/Sokkia GPS Receivers using Explorer

- 1. Connect the receiver to the computer. Turn on the receiver.
- 2. Navigate to the Topcon Receivers device directory and click the device icon.

- 3. After discovering devices, click the receiver's icon.
- 4. Select and copy, or select and drag-and-drop, the desired files to a directory on the computer.



Figure 4-12. Import Using Explorer – Receiver

#### Import from TPS Mobile Device using Explorer

- 1. Connect the controller to the computer. Connect to the controller via ActiveSync.
- 2. Navigate to the Topcon Mobile Devices device directory and click the device icon.
- 3. Navigate to the CF card and the desired job file(s).
- 4. Select and copy, or select and drag-and-drop, the desired files to a directory on the computer.

for the job created by TopSURV version 7.0 and later

		Сору	y & Convert to des	ktop computer l	ormat	X
😂 Jobs			<i>.</i>	Ð	_	
File Edit View Favorites Tools Help	A.		- i i i i i i i i i i i i i i i i i i i			
🚱 Back 🝷 💮 🚽 🏂 🔎 Search	Folders 🛄 🕶					
Address 🔄 \CF Card\TPS TopSURV\Jobs	✓ → Go	JOB	3			
Folders	× 🛤 Default.tsj	Cop	ying (from 'Jobs' to desk			
🗉 📴 Control Panel	JOB.tsj					
Mobile Device	📄 🛋 Net-1.tsj					
Application Data	_					-
🗉 🧰 CF Card						_
<u>~</u>					Cancel	

for the job created by TopSURV version 6.11.03 and earlier

			Copy & Convert to desktop computer format
😂 Jobs			
File Edit View Favorites Tools Hel	p	<b></b>	
🚱 Back 🝷 🌍 🝷 🏂 🔎 Search	Folders		
Address 🛅 \CF Card\TPS\TopSURV\Jobs		💌 🄁 Go	N270405
Folders	× 😤		Copying (from 'Jobs' to desktop computer)
🖃 🔋 Mobile Device	<u> </u>		
Application Data	N270405.tsv		
🗉 🧰 CF Card			Converting (from 'TopSURV SSCE database' to 'TopSURV Access database')
🗉 🚞 TPS	_		
🗷 🚞 TopSURV			Cancel
🔁 Jobs	~		Carca

Figure 4-13. Import Using Explorer – Mobile Device

#### Import from TPS Total Station using Explorer

- 1. Connect the total station to the computer. If needed, connect to the total station via ActiveSync.
- 2. Navigate to the Topcon Total Stations device directory and click the device icon.
- 3. Click the icon for the connected total station and select the "file.txt" file.
- 4. Copy, or select and drag-and-drop, this file to a directory on the computer.
- 5. Follow all instructions on the Download from Total Station dialog box.

6. Click Start, then press F3 on the total station.



Figure 4-14. Import Using Explorer – Total Station

#### Import from TPS Digital Level using Explorer

- 1. Connect the digital level to the computer.
- 2. Navigate to the Topcon Digital Levels device directory and click the device icon.
- 3. Click the icon for the connected digital level and select the "file.dl" file.
- 4. Copy, or select and drag-and-drop, this file to a directory on the computer.
- 5. Follow all instructions on the Download from Digital Level dialog box.



Figure 4-15. Import Using Explorer – Digital Level

#### Import from Memory Card using Explorer

1. Insert the memory card into the card reader.

- 2. Navigate to the Topcon Memory Cards device directory and click the device icon.
- 3. Click the desired, formatted memory card device icon.
- 4. After mounting the card, select and copy, or select and drag-anddrop, the desired files to a directory on the computer.



Figure 4-16. Import Using Explorer – Memory Card

# Viewing File and Device Properties

The properties of a data file on a device can be viewed after connecting to the device. Once set up in Topcon Link, device properties can be viewed at any time. To view the properties of a file in a connected TPS controller or TPS memory card, right-click the file and click Properties. Figure 4-17 gives an example of the Properties dialog box for a data file in a connected device.

from_tt_jo	b2.tsv Properties		
General			
<u>8</u>	from_tt_job2.tsv	I	
Туре:	TopSURV SSCE datab	base	
Location:	\CF Card\TPS\TopSU	IRV\Jobs	
Size:	1,43MB (1503232 byte	es)	
Modified:	02.01.2004 10:	51:20	
Attributes:	E Read-only	F Hidden	
	🔽 Archive	🔲 System	
		OK	Cancel

Figure 4-17. Data File Properties (Example of a TopSURV File on a TPS Controller)

To view the properties of a GPS, Total Station or Digital Level device, right-click the device and click Properties. Table 4-1 gives examples of the Properties dialog box for the different devices.

Table	4-1.	Device	Properties	Dialog	Boxes

PS GPS Receiver	TPS Digital Level
Properties         Image: Color           Receiver properties	Digital Level properties       General       Name:       Octore       Port       Baud rate:       [COM1 ]       Parity.       Even ]
OK Cancel Apply	OK Cancel Apply

PS Total	Station			
Station prop	perties	X		
General Ad	vanced	Station prope	rties	X
Name	GPT 3005W	General Adv		
Note		Baud Rate	9600	
		Parity	None	
Port	COM1	<ul> <li>Data Bits</li> </ul>	8	
Model	GPT-3000	Stop Bits	1	
		Protocol	ONE-WAY	
	OK Cancel	Ap		
			OK Cancel Ap	yla

Table 4-1. Device Properties Dialog Boxes

For details on editing Digital Level and Total Station device properties, see "Adding and Formatting Devices" on page 2-1.

# **Notes:**


# **Converting Files Between Formats**

One of the primary functions of Topcon Link is to convert files from one format to another. A file format conversion may be required to access or work with data from multiple, proprietary, or third-party software or systems. The Topcon Link conversion function allows data to be cross-functional and multi-disciplinary. For example, a survey crew may take point measurements in a field adjacent to a city park in preparation for a new shopping center. Using Topcon Link, this data can be converted to a shape file for uploading into the city's GIS database, or it can be converted to a Topcon GC3 file for sharing with the construction crew for three-dimensional grading.

When converting files, a custom projection or custom datum may need to be created. Topcon Link includes a number of pre-defined projections and datums from which to base a custom projection or custom datum.

When applying a projection or datum to a data set, transformation parameters between the jobsite's "grid" and the projection's "ground" can also be specified.

### **Converting A File**

To perform a format conversion, Topcon Link checks the data and its format in the selected file and converts it to the default settings of the selected format. Topcon Link will offer the user to select the desired format of the file to be created from those which are allowed for the data included in the file being converted. If it is desired to change the coordinate system, coordinate order and/or metric units during the process of transformation, use the *Advanced Conversion options*. These options provide further control over the resulting data format.

- 1. Click *File* ► *Convert Files*.
- 2. To select the file to convert, click *Add files* in the *Convert Files* window.
- 3. In the *Open* dialog box select the appropriate format name. Navigate to and select the desired file, then click *Open*. Also, the user can activate the option for automatic recognition of the file format in the process of opening the file. To do this, check the "Recognize the file automatically" checkbox in the Open window and do not select the desired file format.
- 4. If the selected file format is correct, the *File status* field displays "File format is verified" and you can continue converting.
- 5. To create the file, select the appropriate format name and desired folder where this file will be saved.
- 6. Topcon Link will use the name of the converted file to name of the created file (except the RINEX file format). The extension for the created file will be automatically assigned in accordance with the selected file format. The *Destination file name* field displays the name of the created file. To edit the name, click- pause-click on this field.
- 7. To remove a file from the *Convert Files* window, select the desired file and click **Remove files.**
- 8. To remove all files from the *Convert Files* window, click **Clear all**.

9. If needed, click *Advanced Conversion options* and select the parameters to apply to data during the conversion. See the following sections for more details.



Available parameters depend on data in the selected file and the format being converted to.

10. Click Convert.

Topcon Link performs the conversion, saves the file in the selected directory.

Convert Files		😭 Open			? 🗙
purce file path	Source file	le type Look in:	CopSURV_Jobs		1
2		06-224.ts	sj		
I					
Add files 🔀 Remove files	🔆 Clear all				
tination folder	C:V				
tination format	P Topcon	IXML (**) File name:	06-224.tsj		
Overwrite existing Advanced conversion options		Format name:	TopSURV Job (*.tsj;*	.tlsv)	
Convert		🗙 🗹 Recognize	e file format automatically		
10 g = 5 5					
			Open I	Cancel	
			Open	Cancel	
B3 Convert Film			Open	Cancel	
Convert Files			Open	Cancel	?×
Source file path		Source file type	Open Destination file name	Cancel	       
	224.tsj	Source file type TopSURV 7 Job - TopS	Destination file name		?×
Source file path	224.tsj	TopSURV 7 Job - TopS	Destination file name	File status	
Source file path	224.tsj		Destination file name	File status	2×
Source file path C:\TopSURY_Jobs\06-		TopSURV 7 Job - TopS	Destination file name 5U 06-224.csv	File status	
Source file path C:\TopSURY_Jobs\06-	nove files	TopSURV 7 Job - TopS	Destination file name 5U 06-224.csv	File status	
Source file path C:\TopSURY_Jobs\06-	nove files	TopSURV 7 Job - TopS	Destination file name 5U 06-224.csv	File status	
Source file path C:\TopSURV_Jobs\06- Add files X Rer Destination folder Destination format Overwrite existing	nove files	TopSURV 7 Job - TopS Clear all C:\Creating Files\	Destination file name 5U 06-224.csv	File status	
Source file path C:\TopSURY_Jobs\06- C:\TopSURY_Jobs\06- C:\TopSURY_Dobs\06- C:\TopSURY_Dobs\06- Constraintion folder Destination format	nove files	Clear all	Destination file name 5U 06-224.csv	File status	

Figure 5-1. Convert File

If the file conversion is successful, the *Convert Files* dialog box displays the following:

Convert Files						
Source file path	Source file type	Destination file name	File status			
C:\TopSURV_Jobs\06-224.tsj	TopSURV 7 Job - TopSURV Job	06-224.csv	File is successfully converted			

To automatically overwrite the previously created file check the

checkbox: 🔽 Overwrite existing

The user can add unlimited number of files to the *Convert Files* dialog box, if these files contain compatible data. If the user added the files which have incompatible data, the conversion of these files is not performed and the following alarm message displays:

```
Destination format 🛕 Source files contain no compatible data 🚽
```

To perform a conversion, delete file(s) containing data incompatible with other file(s).

If the user selects other format for the converted file in the *Open* widow, he can select the desired file format from the format list of the *Source file type* column. To activate this list, double click on the name of the selected format:

Convert Files				
Source file path C:\Examples_for converting files	Source file type	Inates		
	Source file path C:\Examples. C:\Examples. Destination folder Destination format COverwrite existi Advanced com	-	Source file type Name,N,E,Z,Code - Coordinates All files Coordinates BLH_JMIEA-1 Custom Text Format Custom Text Format FullCode_Coord_BLH BLICODES FullCode_Coord_BLH Coston FullCode_Coord_BLH FullCode_C	Jon

The *Advanced conversion option* dialog box contains a group of fields. They are necessary to input the data used for the coordinate transformation/metric unit/coordinate order, etc. during the file conversion. Each converted file should be supplied with information that is absent in the file but needed for the correct transformation. For example, the user can set the coordinate system, metric units for the converted coordinate file, if these data are available. These data are entered to the From fields. For the created file, one should enter the parameters that appear in this file after conversion. For example, the

coordinate system in the file should be NAD 83, metric units - US Feet, orthometric heights - take into account the usage of Geoid 2003. These data are entered to the To fields.

In general, the data entered to the *Advanced conversion option* dialog box can be divided into following groups:

- 1. Convert coordinate type and system, including Grid to Ground conversion
- 2. Convert ellipsoidal/orthometric height
- 3. Convert coordinate order
- 4. Convert metric unit
- 5. Convert angular unit
- 6. Convert vertical angle
- 7. Convert distance format
- 8. Change geoid bounds
- 9. Filter raw data

Topcon Link analyses the data type of the converted/created file, automatically selects the needed group parameter(s) used for each format. *Advanced conversion option* will display only those parameters which are needed for given types of input/output data.

The groups are independent in selecting and can be enabled/disabled independently.

Depending on the data type of the converted/created file some fields of any group can be disabled or not presented.

### **Convert Coordinate Type and System**

Using the fields in the *Convert coordinate type and system* tab the user can specify a coordinate system for converting and creating file.

Depending on the data type of the converted/created file, the user can select the following coordinate type in the To/From fields:



If the user selected the Ground or Localization coordinate type, the coordinate system is set to None for the converted/created file:

Coordinate type:	Ground or Localization	-
Coordinate system:	None	

If the user selected the Grid (Grid coordinate system with orthometric heights) or Grid Ell (Grid coordinate system with ellipsoidal height) coordinate type, the user can select a desired projection type from the list of projections available or create a new projection. For details on how to create a projection, see "Adding a Custom Projection" on page 5-34:



• If the user selected the Lat,Lon,Ell.H (a datum with ellipsoidal heights) or Lat,Lon,Ellevation (a datum with orthometric heights) coordinate type, the user can select a desired datum from the list of datums available, or create a new datum. For details on how to create a datum, see "Adding a Custom Datum" on page 5-38.

Coordinate type:	Lat, Lon, Ell.H		•
Datum:	NAD83	-	Custom
	NAD83 More		

If the user selected the WGS-84 Lat,Lon,Ell.H coordinate type, the datum will be selected automatically:



Using this tab the user can perform transformation between Grid and Ground coordinate systems. The transformation will be enabled if:

• the converted file contains points in the Ground coordinate system but a created file has to contain points in a Grid or a Datum coordinate system. In this case Topcon Link performs Ground to Grid transformation:



• the converted file contains points in the Grid coordinate system but a created file has to contain the point in the Ground coordinate system. In this case Topcon Link performs Grid to Ground transformation:

ſ	Convert coordinate type and system						
		From			То		
		Coordinate type:	Grid	-	Coordinate type:	Ground or Localization	
	•	Projection:	Alaska (Zone 8)	▼ Custom	Coordinate system:	None	
		Datum:	NAD83	•	operation of events		
	dii Grid to ground						

For all other combinations of coordinate systems for input/output

files the Grid and Ground is disabled: Field to ground

For details on setting these parameters, see "About Grid->Ground Parameters" on page 5-39

### **Convert Height**

The conversation of heights is enabled if is needed to obtain orthometric heights for the points of the created file from the ellipsoidal heights of the points in the converted file and vise versa.

The transformation will be enabled if:

• the converted file contains points in the Ground or Grid/Datum coordinate system with orthometric heights, but a created file must contain points in a Grid/Datum coordinate system with ellipsoidal heights:

Co	Convert coordinate type and system							
	From		То					
	Coordinate type:	Ground or Localization	Coordinate type:	Grid, Ell.H	Ð			
•	Coordinate system:	None	Projection:	California (Zone3) Custom	1			
	Loordinate system: None		Datum:	NAD83	·			

• the converted file contains points in the Grid/Datum coordinate system with ellipsoidal heights, but a created file has to contain points in a Grid/Datum coordinate system with orthometric heights:

Coordinate type: Grid, Ell.H Coordinate type: Lat, Lon, Elevation		
	ate type: Grid, Ell.H 🗨 Coordinate type: Lat, Lon	n, Elevation 📃 💌
Projection: Alaska (Zone 8) Custom Datum: NAD83 Custom.	on: Alaska (Zone o) Custom	Custom
Datum: NAD83		

In these cases Topcon Link offers to select the desired Geoid from the list of geoids used. The user can add any Geoid file to this list by clicking the Geoid List button (see"Adding a Geoid" on page 2-13):

- From <elevation></elevation>	To <ell. ht=""></ell.>		. Hb	
Use geoid		-	Geoids List	
	g2003u01			
	g2003u02 g2003u03 g2003u04	R.		
	Egm96			

TopSURV Job is the most informative file format. This format can contain both ellipsoidal and orthometric heights and also the name of the geoid used for height calculation. If TopSURV Job is converted, Topcon Link automatically uses the height information contained in the job. The height conversion will be available if the geoid used in TopSURV is presented in the Topcon Link geoid list. In an example below, the geoid selection from the geoid list is not available:



If the geoid used in TopSURV is not presented in the Topcon Link geoid list, the following message will appear:



### **Convert Coordinate Order**

This type of conversion allows one to select the order of the horizontal coordinate (Easting and Northing) for the points of the created file if Ground/Grid/Grid Ell coordinate system is set for this file:

Convert coordinate order		
	To NEH	•
p	NEH ENH	

If the user selected Name,N,E,Z,Code or Name,E,N,Z,Code coordinate file format, the fields of coordinate order selecting will display the order which defined by the corresponding file format:

Convert coordinate order		
From ENH	To NEH	<b>_</b>

### **Convert Metric Unit**

This type of conversion allows one to select the desired metric unit for converted and created files:

Convert metric unit		
From Meters	▼ To USFeet	-
	Meters IFeet	
	USFeet	

### **Convert Angular Unit**

This type of conversion allows one to select the desired format of angular values for converted/created Total Station raw files:

Convert angular unit		
<b>v</b>	To DMS	•
	DMS	
	Gons	

### **Convert Vertical Angle**

If TS raw data file does not have information about vertical angle mode, the user can select the mode under *Advanced conversion option* when such file is converted/created by Topcon Link:

Convert vertical angle		
✓ From Auto (ZA if angle > 45 degrees)	To ZA	•
	ZA	
	VA	

- ZA vertical angles are from zenith
- VA- vertical angles are from horizontal
- Auto no information available on vertical angle mode. In an example below, angles from 0 to 45° are considered "vertical" and angles more than 45° are considered "zenith."



Figure 5-2. Vertical Angle from Horizontal (A) and Zenith (B)
#### **Convert Distance Format**

This type of conversion allows one to select the desired format of distance values for a created Total Station raw file: the distance between a station and a measured point can be recorded either as slope distance and vertical angle or as horizontal and vertical distances. Selecting Auto records distances into the created file using the distance format of the converted file:

Convert distance format		
	To HD & VD	•
	Auto SD & Anale	
	HD & VD	

## **Change Geoid Bounds**

This option allows one to define the area of a created geoid file from any supported geoid model. When converting from a Geoid file, the following parameters are available in the right pane:

• Minimum / Maximum Latitude – enter the minimum and maximum latitude of the points that limit the use of this model. Latitudes are positive for the Northern hemisphere.

Minimum / Maximum Longitude – enter the minimum and maximum longitude of the points that limit the use of this model. Longitudes are positive for the Eastern hemisphere.

### **Filter Raw Data**

This option allows one to include:

- GPS or GLONASS satellites
- pseudorange and phase measurements on L1 or L2 frequency to created RINEX/Compact RINEX/Topcon TPD file formats:

The fait and	
	Channels
	🔽 GPS
	GLONASS
	🔽 L1
	✓ L2

To remove any item, uncheck a desired checkbox.

The following sections describe the file format conversions, as well as list which files can be converted to which format.

- "Code Library File Conversion Parameters" on page 5-12
- "Coordinate File Conversion Parameters" on page 5-13
- "Example of Conversion Coordinates File" on page 5-14
- "Geoid File Conversion Parameters" on page 5-20
- "GPS+ Raw Data File Conversion Parameters" on page 5-21
- "Localization GC3 File Conversion Parameters" on page 5-24
- "Road File Conversion Parameters" on page 5-24
- "Topcon XML File Conversion Parameters" on page 5-26
- "TopSURV Job File Conversion Parameters" on page 5-27
- "TS Obs File Conversion Parameters" on page 5-33
- "X-Section Template File Conversion Parameters" on page 5-34

#### **Code Library File Conversion Parameters**

A code library file contains a description of codes, such as code name, plotting style, and attribute. Table 5-1 lists the formats that a code library can be converted to.

From a	То а
Code Library file:	Code Library file
DBF Code Library, TDD Code Library, XML Code Library, Autodesk Layer States Code Library	TopSURV Job file
TopSURV Job file	Code Library file

Table 5-1. Code Library File Conversion Formats

When converting from a Code Library file, no further parameters are required.

#### **Coordinate File Conversion Parameters**

A coordinate file contains a list of points in some coordinate system. Table 5-2 lists the formats that a coordinate file can be converted to/ from.

From a	То а
Coordinate file: Custom Text Format; Topcon FC-4; Topcon FC-5; Topcon GTS-210/310-10; Topcon GTS 210/310-12; Topcon GTS- 7; LandXML; Topcon XML; TopSURV; Name,E,N,Z,Code; Name,N,E,Z,Code; Name,Lat,Lon,Ht,Code; SBG Geo; SBG Pxy; TDS; KOF	<ul> <li>Coordinate file</li> <li>Design</li> <li>GIS: ESRI Shape</li> <li>Topcon XML file</li> <li>TopSURV Job file</li> </ul>
TopSURV Job file	Coordinate file
Design	Coordinate file
TS Obs (if the format contains point coordinates)	Coordinate file
GIS: ESRI Shape	Coordinate file



Available parameters depend on the data in the selected file and the format being created.

When converting from/to a coordinate file the user can select the following parameters:

- 1. Convert coordinate type and system (see "Convert Coordinate Type and System" on page 5-5)
- 2. Convert height (see "Convert Height" on page 5-8)
- Convert coordinate order (see "Convert Coordinate Order" on page 5-9)
- 4. Convert metric unit (see "Convert Metric Unit" on page 5-9)

read accordin

These parameters are selected independently and can be enabled/ disabled independently:

		teu cooruma	ie me.		
	Advanced conversion of invert coordinate type a				
U.	From	ng tystem			
	Coordinate type:	Ground or Localization			
Þ	Coordinate system:	None			
			Grid to gr	ound	
	nvert height From <elevation></elevation>			CEIL HD	
2			Use geoid g2003.01	▼ Geoids List	
	From NEH				for created coordinate file
Co	invert metric unit				
	From Meters				
				To	
	49 C	onvert		Coordinate type:	Grid, EILH
_				Projection	Tustom
				D-atum:	NAD83
			<b>e</b> Gi	rid to ground	
				To KEIL HID	
			Use geoid 92003u01	Geoids Lis	L
				To ENH	<u>×</u>
				To USFeet	-

Figure 5-3. Convert Coordinate File – Example

#### **Example of Conversion Coordinates File**

The following pages describe the example of conversion of the coordinate file ('lat\_lon\_ell.txt'), which contains the points in the datum coordinates (NAD83). This file has Lat, Lon, Ht, Code file format, and height is ellipsoidal height in meters:



The task is to convert this file to other coordinates file, which will contain the points in Grid coordinates system (SPC83-Ohio (North)), with orthometric height in US Feet.

To create such a file, we do the following steps:

- 1. Click *File->Convert Files* and click *Add Files* in the window. The *Import* window appears.
- 2. Navigate to the desired file, highlight it and select the corresponding file format in the *Format name* field:

Source file path		Source file type	í.	Destination file name	File sta
	🚰 Open				? 🛛
	Look in:	🗀 Ra	w Data	• 4	
🖶 Add files	Columbus Total Station Survey				
Destination folder					
Destination folder Destination format	File name:	lat_lon_ell.tx	't		

3. The converted file appears in the list of the converted files:

Source file path	Source file type	Destination file name	File status
C:\Raw Data\lat_lon_ell.txt	Name,Lat,Lon,Ht,Code - Coor	lat_lon_ell.csv	Not converted

4. Check the Advanced conversion option checkbox:



5. Select the format name for the grid coordinate system of the created file in the *Destination format* field:

Destination format	Rame, N, E, Z, Code - Coordinates (*.csv)

6. Select or create the folder where this file will be saved (by clicking ):



7. Change the name of the created file in the *Destination field name* field:



8. Select the Grid coordinate system and Ohio (North) projection in the corresponding fields:



9. Add the 'g2003u07.bin' geoid file to the list of geoids used. To do this, click the *Geoid List* button, click *Add* 

and select the folder where the desired geoid file is located:



Then activate this geoid for conversion of the coordinate file:



10. Select 'Meters' for the converted and 'Us Feet' for the created file in the *Convert metric unit* fields:

Convert metric unit		
From Meters	▼ To USFeet	-
	Meters IFeet	
	USFeet	

11. Click the *Convert* button. If the file conversion is successful, the *Convert Files* dialog box displays the following:

Source file path	Source file type	Destination file name	File status
<pre>Output: C:\Raw Data\lat_lon_ell.txt.csv</pre>	Name,Lat,Lon,Ht,Code - Coor	Grid_Ortho.csv	File is successfully converted

12. The created file has the following coordinates and heights:



#### Design and Surface File Conversion Parameters

A design file contains CAD information (points, linework, surfaces). Table 5-3 lists the formats that a design file can be converted to/from.

From a	То а
Design file: AutoCAD Drawing, AutoCAD DXF; KOF; LandXML, Microstation 95/ISFF, MX GENIO Line, SBG Geo, SBG Pxy, Topcon 3D Linework, Topcon 3D Surface,	<ul> <li>Design file</li> <li>Coordinate file</li> <li>TopSURV Job file</li> <li>Surface file</li> </ul>
Coordinate file	Design file: AutoCAD Drawing, AutoCAD DXF; KOF; LandXML,SBG Geo, SBG Pxy,
TS Obs	Design file: AutoCAD Drawing, AutoCAD DXF; KOF; LandXML,SBG Geo, SBG Pxy,
TopSURV Job file	Design file: AutoCAD Drawing, AutoCAD DXF; KOF; LandXML,SBG Geo, SBG Pxy, Microstation 95/ISFF, Microstation V8, Topcon 3D Linework
Topcon XML file	Design file: AutoCAD Drawing, AutoCAD DXF; KOF; LandXML,SBG Geo, SBG Pxy,
GPS Obs	Design file: LandXML

Table 5-3. DWG, DXF, LandXML Design File Conversion Formats

From a	То а
Design file, Topcon 3D Surface	Design file: AutoCAD Drawing, AutoCAD DXF; LandXML

Table 5-3. DWG, DXF, LandXML Design File Conversion Formats (Continued)



Available parameters depend on the data in the selected file and the format being created.

When converting from/to a Design file, the user can enable and select the following parameters:

- 1. Convert coordinate type and system (see "Convert Coordinate Type and System" on page 5-5)
- 2. Convert height (see "Convert Height" on page 5-8)
- 3. Convert coordinate order (see "Convert Coordinate Order" on page 5-9)
- 4. Convert metric unit (see "Convert Metric Unit" on page 5-9)

for converted design file:

•	Advanced conversion op	stions			
¢	onvert coordinate type ar	nd system			
	From				
	Coordinate type:	Ground or Localization	-		
Þ	Coordinate system:	None			
			Grid to group	vd	
-0	onvert height				
7	From <elevation></elevation>			EIL HD	
~			Use geoid g2003.01	Geoids List	for created design file:
c	onvert coordinate order				
V	From NEH			To	
c	onvert metric unit			Coordinate type:	Grid, EILH
V	From Meters			Projection	Custom
-	23 00	orwert		Datum:	N4D83
				to ground	
			Geo Guo	to ground	
				To <eil hts<="" td=""><td></td></eil>	
			Use geoid g2003u01		1
			Use geoid (\$2003001	Geoids List.	
				To ENH	×
				To USFeet	-

Figure 5-4. Convert Design File – Example

#### **Topcon Digital Level File Conversion Parameters**

A digital level file contains level measurements from a station to points. Table 5-4 lists the formats that a digital level file can be converted to.

From a	To a
Topcon Digital Level:	Topcon XML file
DL, LEV, TXT, Topcon XML	TopSURV Job file

Table 5-4. Topcon Digital Level Conversion Formats

When converting from Topcon Digital Level file the user can select only the *Convert metric unit* option (see "Convert Metric Unit" on page 5-9).

### **Geoid File Conversion Parameters**

A geoid file contains data on a physical reference surface. The shape of the geoid reflects the distribution of mass inside the earth. The rise and fall of the surface in a geoid is important for converting GPSderived ellipsoidal height differences to orthometric height differences.

Using Topcon Link, you can create a Topcon geoid file (\*.gff) for a defined area from any supported geoid model—creating a sub-section of the selected geoid file. This file can then be exported into TopSURV. Table 5-4 lists the formats that a geoid file can be converted to.

Table 5-5. Geoid	Conversion Formats
------------------	--------------------

From a	То а
Geoid file	Topcon Geoid file

When converting from a Geoid file, the user can enable and select only the *Change geoid bounds* option (see "Change Geoid Bounds" on page 5-11)

#### GPS+ Raw Data File Conversion Parameters

RINEX is the standard format for exchanging GPS raw data between devices and software. For a static/kinematic observation session (occupation), two or three files are created.

- The first file stores the observations and has a \*.O\* extension.
- The second and third files store GPS and GLONASS navigation data (orbits) for those observations and has a \*.N\* or \*.G\* extension, respectively.

A Compact RINEX file (or Hatanaka compressed file) is the compression of a RINEX observation file, and has a \*.D\* extension. TPD (and TPS/JPS) files are a Topcon proprietary format for storing and transferring GPS raw data.

Table 5-6 lists the formats that a GPS+ raw data file can be converted to/from.

From a	То а
Compact RINEX file	<ul><li> RINEX file</li><li> TPD file</li></ul>
RINEX file	<ul><li>Compact RINEX file</li><li>TPD file</li></ul>
GPS+ TPS/JPS and TPD	<ul><li> RINEX file</li><li> Compact RINEX file</li></ul>

Table 5-6. Compact RINEX File Conversion Formats

When converting to a RINEX or Compact RINEX file, the user can enable and select only the Filter raw data option (see "Filter Raw Data" on page 5-11).

#### **Example of Conversion TPS File to RINEX File**

The following pages describe the example of conversion of the TPS file ('DER1-0303b.tps'). This file was collected by dual frequency GPS/GLONASS Topcon receiver. It needs to create the RINEX file with GPS L1 raw data only.

To create this file, do the following steps:

- 1. Click *File->Convert Files* and click *Add Files* in the window. The *Import* window displays
- 2. Navigate to the desired file, highlight it and select the corresponding file format in the *Format name* field:

Conve				? 🗙
Source file	path	Source file type	Destination folder	File status
	Open	Jource nie type	Descindent roder m	
	Look in:	🗀 TPS data		
-	DER1-0303	-	<u></u>	
	E DERI 0000	orcho.		
<				
Add fil	File name:	DER1-0303b.tps		
and the second	Format name:		.tpd;*.??0;*.??G;*.??N;*.??D	(;*.tps;*.jps) 💌
Destination	I♥ Recognize h	le format automatically		1
<ul> <li>Overwrit</li> <li>Advance</li> </ul>		Open	Cancel	
0.2	Convert	× Stop		ose

3. The converted file appears in the list of the converted files:

Convert Files			? 🛛
Source file path	Source file type	Destination folder	File status
C:\Examples_for converting files for TLink\TPS data\DER1-0303b.tps		1	File format is verified

4. Check the Advanced conversion option checkbox:



5. Select the RINEX file format for the created file in the *Destination format* field:

Destination format	🚔 RINEX - GPS+ Raw Data (*.??0,*.??G,*.??N)

6. Type in a name of a new folder in the *Destination folder name* field:

Destination folder C:\Examples_for converting files for TLink\RINEX	DA
---	----

The created files will be stored in the folder.

7. Uncheck the desired channels:

_CC	hannels
☑	GPS
Г	GLONASS
☑	L1
Г	L2

8. Click the Convert button. The following message appears:



Press Yes to create this folder. If the file conversion is successful, the *Convert Files* dialog box displays the following:

Convert Files			?
Source file path	Source file type	Destination folde	File status

9. The created file has the following data:

2.10 Topcon Link 7 build July 25, DER1-0303b_JFG		(c) Ta	•	21-N0	V-07 20:58	RINEX VERSION / TYPE PGM / RUN BY / DATE Comment Marker Name Marker Number
-Unknown-		-Unkno	own-			OBSERVER / AGENCY
AFFRRRFJFGG		-Unkno	own-	-Unkn	own-	REC # / TYPE / VERS
-Unknown-		-Unkno	own-			ANT # / TYPE
2850716.2627	2199	374.17	97 52	247224.3437		APPROX POSITION XYZ
0.0000		0.00	300	0.0000		ANTENNA: DELTA H/E/N
1 0						WAVELENGTH FACT L1/2
2005 3	3	1	0	0.000000	GPS	TIME OF FIRST OBS
2005 3	3	1	59	59.0000000	GPS	TIME OF LAST OBS
1.000						INTERVAL
13						LEAP SECONDS
13						# OF SATELLITES
4 61	P1	11	D1			# / TYPES OF OBSERV
C 5 991	706	821	821			PRN / # NF NRS

#### Localization GC3 File Conversion Parameters

A localization file contains coordinate points in both the local and global coordinate systems. These systems are used in the calculation of localization points. Table 5-7 lists the formats that a localization file can be converted to.

From a	То а
Localization file: Topcon 3D	TopSURV Job file
TopSURV Job file If the TopSURV file contains pairs of point coordinates in WGS84 and local system for each Control point.	Localization file

Table 5-7. Localization File (	<b>Conversion Formats</b>
--------------------------------	---------------------------

When converting from a Localization file, no further parameters are required.

When converting to a Localization file, the user can enable and select only the *Convert metric unit* option (see "Convert Metric Unit" on page 5-9)

#### **Road File Conversion Parameters**

A road file contains information about the stations/chainages, alignments, cross-sections, and grades required for creating a road. Table 5-8 lists the formats that a road file can be converted to/from.

From a	То а
Road file: CLIP, ISPOL, LandXML, MX GENIO, SBG, SSS, TDS, Tekla, Topcon 3D, Topcon XML, TopSURV	<ul> <li>Road file</li> <li>TopSURV Job file</li> <li>Topcon XML</li> <li>X-Section Templates</li> <li>Design file: LandXML</li> </ul>
TopSURV Job file If the TopSURV file contains road data.	Road file

Table 5-8. Road File Conversion Formats

When converting from a Road file, the user can select:

- 1. Convert coordinate type and system (see "Convert Coordinate Type and System" on page 5-5)
- 2. Convert metric unit (see "Convert Metric Unit" on page 5-9.
- 3. Convert coordinate order (see "Convert Coordinate Order" on page 5-9)
- 4. Convert metric unit (see "Convert Metric Unit" on page 5-9 no further parameters are required.

Convert coordinate type and system From Coordinate type: Ground or Localization	¥		
Coordinate system: None			
	dia Grid to g	ground	for created road file:
Convert metric unit		- To	
From Meters		Coordinate type:	Grid
문급 Convert	×	Projection:	Custom
for converted road file:		Datum:	NAD83
	June Grid	to ground	
		To NEH	<b>_</b>
		To USFeet	•

Figure 5-5. Convert Roads File – Example

#### **Topcon XML File Conversion Parameters**

A Topcon XML file can contains points, roads, TS measurements, DL measurements, and/or any GPS observations. Table 5-9 lists the formats that a Topcon XML file can be converted to/from.

From a	То а
Topcon XML file	Coordinate file
	• Design (except TN3) file
	GIS: ESRI Shape file
	TopSURV Job file
	GPS Obs
	• DL Obs
	• TS Obs
	• Road
	X-Section
	Topcon XML
Coordinate file	Topcon XML file
Design (except TN3and LN3)	Topcon XML file
TopSURV Job file	Topcon XML file
DL obs	Topcon XML file
TS Obs	Topcon XML file
GPS Obs	Topcon XML file
Land XML	Topcon XML file
Road	Topcon XML file
X-Section	Topcon XML file

Table 5-9.	Topcon	XML	File	Conversion	Formats
Table J-J.	ropcon		i ne	001146131011	i onnat3



Available parameters depend on the data in the selected file and the format being created.

When converting from/to a Design file the user can select the following options:

- 1. Convert coordinate type and system (see "Convert Coordinate Type and System" on page 5-5)
- 2. Convert height (see "Convert Height" on page 5-8)
- 3. Convert coordinate order (see "Convert Coordinate Order" on page 5-9)
- 4. Convert metric unit (see "Convert Metric Unit" on page 5-9)
- 5. Convert angular unit (see "Convert Angular Unit" on page 5-10)
- 6. Convert vertical angle (see"Convert Vertical Angle" on page 5-10)

### **TopSURV Job File Conversion Parameters**

A TopSURV Job file can contain the following measurements:

- Total Station measurements (the distance, vertical angle, and horizontal angle measurements from a station to a point).
- Digital Level measurements (the level measurements from a station to a point).
- GPS Observation (the coordinate increment in the current projection and solution type for the measurement).

Table 5-10 lists the formats that a TopSURV Job file can be converted to/from.

From a	То а
TopSURV Job file:	Code/Layer Library
TopSURV 7 Job,	Coordinate file
TopSURV PC Job	GPS Obs
	• TS Obs
	• DL Obs
	GIS: ESRI Shape file
	Design file
	Topcon XML file
	• Localization file (if the TopSURV file contains pairs of point coordinates in WGS84 and local system )
	• Cut Sheet file (if the TopSURV file includes Stakeout points)
	• Road file (if the TopSURV file includes road data)
	<ul> <li>X-Section Template file (if the TopSURV file includes an X-section template)</li> <li>TopSURV Job file</li> </ul>
Coordinate file	TopSURV Job file
DL Obs	TopSURV Job file
TS Obs	TopSURV Job file
GPS Obs	TopSURV Job file
Topcon XMLr	TopSURV Job file
Localization file	TopSURV Job file
Design file	TopSURV Job file
Road file	TopSURV Job file
X-Section Template file	TopSURV Job file
Code/Layer Library	TopSURV Job file
TopSURV 7 Job/TopSURV PC Job	TopSURV PC Job/TopSURV 7 Job

Table 5-10. TopSURV Job File Conversion Formats



Available parameters depend on the data in the selected file and the format being created.

When converting from a TopSURV Job file, no further parameters are required.

When converting to a TopSURV Job file the following parameters are available:

- 1. Convert coordinate type and system (see "Convert Coordinate Type and System" on page 5-5)
- 2. Convert height (see "Convert Height" on page 5-8)
- 3. Convert coordinate order (see "Convert Coordinate Order" on page 5-9)
- 4. Convert metric unit (see "Convert Metric Unit" on page 5-9)
- 5. Convert angular unit (see "Convert Angular Unit" on page 5-10)
- Convert vertical angle (see "Convert Vertical Angle" on page 5-10)

# Example of Conversion TopSURV File to Topcon Vector File

The following pages describe the example of conversion of the TopSURV 7 Job file ('columbus\_rtk\_ts.tsj'). This file was collected by Topcon Controller FC -200 with TopSURV version 7.0 and was

saved on the controller's removable flash memory card. This job contains the TS measurements and GPS RTK observations:



The task is to create the Topcon Vector file and save this file on the computer.

To create this file, we do the following steps:

- 1. Insert the controller's removable flash memory card into the computer's card reader.
- 2. Click *File->Convert Files* and click *Add Files* in the window. The *Import* window displays.

3. Navigate to the desired file, highlight it and select the corresponding file format in the *Format name* field:



4. The converted file appears in the list of the converted files:

Convert Files				? 🗙
Source file path	Source file type	Destination file name	File status	
G:\topSURV_Job_7\columbus_rtk_ts.tsj	TopSURV 7 Job - TopSURV Job	columbus_rtk_ts.xml	File format is verified	

5. Check the Advanced conversion option checkbox:



6. Select the Topcon vector file format for the created file in the *Destination format* field:



7. Type in a name of a new folder in the *Destination folder name* field:

Destination folder	C:\raw Data\GPS 0B	

The created files will be stored in this folder.

8. Select the desired metric unit for the created file:

Convert metric unit		
V	To USFeet	•
	Meters	

9. Click the Convert button. The following message appears:



10. Press Yes to create this folder. If the file conversion is successful, the *Convert Files* dialog box displays the following:

Convert Files			? 🛛
Source file path	Source file type	Destination file name	File status
G:\topSURV_Job_7\columbus_rtk_ts.tsj	TopSURV 7 Job - TopSURV Job	columbus_rtk_ts.tvf	File is successfully converted

#### 11. The created file has the following data:



#### **TS Obs File Conversion Parameters**

A total station observation file contains the distance and vertical/ horizontal angles measurements from a station to a point. Table 5-11 lists the formats that a total station observation file can be converted to.

From a	To a
TS Obs file: Custom Text Format, FC-5 Raw, GTS-210_310 Raw, GTS-6 Raw, GTS- 7 Raw, GTS-7+ Raw, Topcon XML TS Obs	<ul> <li>Measurement file</li> <li>Coordinate file</li> <li>Design file</li> <li>GIS: ESRI Shape file</li> <li>Topcon XML file</li> <li>TopSURV Job file</li> <li>TS Obs file</li> </ul>
TopSURV Job file	• TS Obs file
Topcon XML file	TS Obs file
TS Obs file	• TS Obs file

Table 5-11. TS Obs File Conversion Formats



Available parameters depend on the data in the selected file and the format being created.

When converting from/to a TopSURV Job file, the following parameters are available:

- 1. Convert coordinate system (see "Convert Coordinate Type and System" on page 5-5)
- 2. Convert height (see "Convert Height" on page 5-8)
- 3. Convert coordinate order (see "Convert Coordinate Order" on page 5-9)
- 4. Convert metric unit (see "Convert Metric Unit" on page 5-9)
- 5. Convert angular unit (see "Convert Angular Unit" on page 5-10)
- Convert vertical angle (see "Convert Vertical Angle" on page 5-10)

 Convert distance format (see "Convert Distance Format" on page 5-11)

### X-Section Template File Conversion Parameters

A cross-section template file contains information used for creating a road. Table 5-12 lists the formats that a cross-section template file can be converted to/from.

From a	То а
X-Section Template file	<ul><li>X-Section Template file</li><li>TopSURV Job file</li></ul>
TopSURV Job file If the TopSURV file contains cross- section data.	X-Section Template file

Table 5-12. X-Section Template File Conversion Formats

When converting from/to X-section Template file, the user can select only the *Convert metric unit* option (see "Convert Metric Unit" on page 5-9).

# **Adding a Custom Projection**

A projection contains pre-defined transformation data that is used for conversions between local and global positions. While Topcon Link includes a number of pre-defined projections, a custom projection may be needed for your jobsite or geographical area. Custom projections are included in the projection list.

1. On the *Convert Files* dialog box, click Custom next to the Projection selection box.

#### 2. Click Add.

Name	Regio	n	Datum	Note	
<					>

Figure 5-6. Custom Projections List

- 3. Enter a name for the new projection.
- 4. Select the type of projection and edit the parameters to create a custom projection. See Table 5-13 on page 5-36 for details and a description of editable parameters for each projection type.
- 5. Set remaining information for the custom projection.
  - enter a region for the projection (for example: USA)
  - enter any applicable notes, such as the projection used (for example: CA, Zone 5)

🕷 New Custom	Projection : Projection None	? 🛛						
General					_			
Name	My New Projection				3			
Projection Type	Transverse-Mercator							
Name	Value							
Central meridian	0°00'00.000							
Scale	1.5				4			
Lat0	0°00'00.000							
East0 (m)	50		1	Custom Project	tions I is	a de la composición d		? 🗙
North0 (m)	50		LIL	dustoin rojec				
				lame	Region	Datum	Note	Projection Type
			ΗГ	My New Proje	CA	WGS84	My notes	Transverse-Mercator
			11					
<				Add		Remo	ve	Close N
Region	CA							
nogion								
	My notes							
Note					5)			(7)
Datum	WGS84							
ок 🗋	Cancel	Apply			6			

• select the datum for the projection

Figure 5-7. Enter Custom Projection Parameters – Example

- 6. Click Apply to set the information, then Ok to add the projection to the list of custom projections.
- 7. Click Close to exit the custom datum function.

#### The following table (Table 5-13 on page 5-36) describes

**projection types** and lists the parameters available for creating a custom projection. A map projection is a systematic representation of all or part of the surface of a round body (the Earth) on a plane. Each projection is specified using a particular set of parameters and can be used for different territories or customized uses.

Projection Type and Editable Settings	Examples (With Defaults)				
<b>Transverse-Mercator</b> A cylindrical projection of the Earth rotated at 90° relative to the equator. This projection creates little distortion of scale where the projected surface is tangent to the sphere representing the Earth. This projection is useful in areas of narrow longitudinal range.	New Custom Projection : Projection None       Image: Control of the second				
<b>Lambert</b> A conic conformal projection of the Earth. This projection is useful in areas with a predominant east-west expanse.	Name       My New Projection         Projection Type       Imbert         Name       Value         South Lat       0°0000.000         North       0°0000.000         Lato       0°0000.000         Lato       0°0000.000         East0 (m)       0				
<b>Double Stereographic</b> A spherical projection of the Earth first on conformal sphere, then on a plane, from a single point. This projection provides a perspective view while conformally mapping a sphere onto a plane. This projection is useful in single hemispheres.	Name       My New Projection None         Reneral       My New Projection         Name       My New Projection         Projection Type       Double Sterographic         Name       Value         Lat0       0°0'00.000         Lon0       0°0'00.000         Scale       1         East0 (m)       0				

#### Table 5-13. Projection Types

Projection Type and Editable Settings	Examples (With Defaults)				
<b>Stereographic</b> A spherical projection of the Earth on a plane from a single point. This projection conformally maps shapes and angles, but creates areal distortion farther from the projection point. This	New Custom Projection : Projection None       General       Name     My New Projection       Projection Type     Stereographic       Name     Value       Lat0     0°00'00.000       Lot0     0°00'00.000       Scale     1				
projection is useful in single hemispheres.	East0 (m) 0 North0 (m) 0				
Oblique Mercator	🙀 New Custom Projection : Projection None 🛛 🕐 🗙				
A cylindrical projection of the Earth rotated at some angle relative to a central line. This projection creates little distortion of scale where the projected surface is tangent to the sphere representing the Earth. This projection is useful in areas that are oblique from a other Mercator projections, that is an area predominantly neither east-west nor north-south.	General       Name     My New Projection       Projection Type     Oblique Mercator       Name     Value       Asia catmuth     0°0000,000       Scale     1       Lato     0°0000,000       East0 (m)     0       North0 (m)     0				
Albers Equal Area	🙀 New Custom Projection : Projection None				
A conical, equal area projection of an area that uses two standard parallels to minimize distortion. This projection creates little distortion of angle and scale between two parallel lines. This	Mame         My New Projection           Projection Type         Alberts Equal Area         ▼           Name         Yalue         ▼           Name         Value         ▼           South Lat         0*00700.0000         North Lat           North Lat         0*00700.0000         Lond           Lato         0*00700.000         Lato				
projection is useful in equal-area, predominantly east-west regions.	East0 (m) 0 North0 (m) 0				

#### Table 5-13. Projection Types (Continued)

Projection Type and Editable Settings	Examples (With Defaults)				
<b>Cassini-Soldner</b> A cylindrical, equidistant projection of the Earth rotated at 90° along the central meridian with lines plotted along an X,Y graph. This projection creates little distortion of scale along the meridian and lines perpendicular to the meridian. This projection is useful in simple mappings.	Mew Custom Projection : Projection None       Projection         General       My New Projection         Name       My New Projection         Projection Type       Cassin's Soldner         Lat0       0°00'00.000         Lot0       0°00'00.000         Ass azimuth       0°00'00.000         East(m)       0         North0 (m)       0				

Table 5-13. Projection Types (Continued)

## **Adding a Custom Datum**

While Topcon Link includes a number of pre-defined datums from around the world, a custom datum may be needed for your particular jobsite or geographical area. Custom datums are included in the datum list.

- 1. On the *Convert Files* dialog box, click Custom next to the Datum selection box.
- 2. Click Add.



Figure 5-8. Custom Datums List

- 3. Set the following information for the new datum:
  - enter the new datum name
  - select the ellipsoid used for the datum
  - enter the DX, DY, DZ values for the ellipsoid's shift parameters (the default values are zero)
  - enter the RX, RY, RZ values for the ellipsoid's angle rotation parameters (the default values are zero)

- enter the Scale by which to adjust the ellipsoid (the default value is zero)
- enter any identifying notes for the datum

The shifts, rotations and scale parameters specify a coordinate transformation from the newly created reference datum to WGS84 according to the following equation:

$$\begin{bmatrix} X \\ Y \\ Z \end{bmatrix}_{WGS-84} = \begin{bmatrix} DX \\ DY \\ DZ \end{bmatrix} + (1 + Scale \cdot 10^{-6}) \cdot \begin{bmatrix} 1 & RZ & -RY \\ -RZ & 1 & RX \\ RY & -RX & 1 \end{bmatrix} \cdot \begin{bmatrix} X \\ Y \\ Z \end{bmatrix}_{new-datum}$$

🕒 New Custo	m Datum : Datum None 김 🔀									
General										
Name	CA									
Ellipsoid	WGS84									
DX (m)	3			_						
DY (m)	3		◀	3						
DZ (m)	3									
RX ('')	1.5		😭 Cust		na Lint					? 🗙
RY ('')	1.5		Name	Note	Ellipsoid	DX (m)	DY (m)	DZ (m)	RX (")	RY (")
RZ ('')	1.5			My N	WG584	3.0000	3.0000	3.0000	1.5	1.5
Scale (ppm)	1.5									
	My New Datum		<						)	>
Note				Add		Remo	ive		Close	$\mathbb{R}$
ОК	Cancel Apply	t		-4				E	2	

Figure 5-9. Enter Custom Datum Parameters

- 4. Click Apply to set the information, then Ok to add the datum to the list of custom datums.
- 5. Click Close to exit the custom datum function.

## About Grid->Ground Parameters

A ground projection is a grid mapping projection re-scaled, rotated and shifted to convertpoint coordinates to another reference surface (up to average project elevation) to produce near ground values. To set a grid-to-ground transformation, Topcon Link rotates the ground system relative to the origin of the grid coordinate system.

- 1. To enter grid->ground parameters, enable the corresponding check box and click the browse button.
- 2. Set the scale factor using one of the following methods:
  - Select Avg. Job Height. Then enter an average height from all points in the job and enter the value of the Map Scale Factor.
  - Select Scale Factor. Then enter the value of the Map Scale Factor.
- 3. Enter the northing and easting offsets in meters from the origin of the grid coordinate system.
- 4. Enter the azimuth rotation angle in degrees/minutes/seconds between the grid and ground coordinate systems. This angle defines the reference direction for ground azimuths.
- 5. Click Ok.

🖑 Grid->Grou	]	🖑 Grid->Grour	? 🗙			
Scale Factor				Scale Factor		
Avg Job Height		•		Scale Factor		-
Avg Job Height (m)	8.23			Avg Job Height (m)	0	
Scale Factor				Scale Factor	3	
Mapping Scale	1			Mapping Scale	1	
Northing Offset (m)	5			Northing Offset (m)	5	
Easting Offset (m)	5		1	Easting Offset (m)	5	
Azimuth Rotation	8*15'00.0000		1	Azimuth Rotation	8*015'00.0000	
ОК		Cancel		OK	L.	Cancel

Figure 5-10. Enter Grid->Ground Parameters

# Editing Data in Topcon Link

After opening a file in Topcon Link, you may want to edit some data before saving it for post-processing or exporting it to a device. The following list describes just some of the edits you can perform to prepare data for other activities.

- Add a point
- Edit/add a GPS antenna
- Assign photo notes
- Add codes/attributes
- Edit total station observation offsets

Because many editing activities are similar, the sections in this chapter are set up to provide editing details based on data tables.

# **Editing Points**

Among other editing activities, Topcon Link can be used to edit coordinates or point names, delete a measurement taken for another point, edit or enter the antenna height.

## Add a Point

- 1. Open a file (excepting a GPS+ Raw Data file)
- 2. Click Edit > Add > Point (or click Add Point on the toolbar).
- 3. Enter a new name for the point.
- 4. Edit other parameters as needed. See "Edit in the Point Properties Dialog Box" on page 6-3 for more details.

5. Click Apply to save the new point. Click Ok to exit. The new point is added to the end of point listing.

· Add Point : Point User1						
General	Coordinates	;   (	odes and Style			
Name		User1				
Note						
Control		None				-
Code		tt				-
Source						
	ОК		Cancel		Apply	

Figure 6-1. Edit New Point Parameters

If the user added a point with a code into a TopSURV file, the CAD View displays this point:



Figure 6-2. Points tab and Cad View

#### **Edit on the Points Tab**

You can edit all fields directly on the Points tab except the Icon and Photo note. Click-pause-click to access editable fields. Figure 6-3 shows an example of editing fields on the Points tab.

ooo\$		2064444.891	<u> </u>	E	KISTING XISTING lore			BYC 0	ODE(0)	
📆 To	pcon Lir	ık - [C:\topcon\Top	conl ink\TopSUR	RVIPROJECT RT	K.tlsv <t< th=""><th>pSURV P</th><th>[Job&gt;]</th><th></th><th></th><th></th></t<>	pSURV P	[Job>]			
📃 Fil	e Edit \	/iew Process Windov	, Help						-	Ξ×
<b>1</b>	🖬 🖬	😚 🔗 🗟 🧲	6 N N   8	B 8	• <u></u> •	2 2	🕅 📿	9	<b>R</b> ?	
•° P	Points d	GPS Occupations	😚 GPS Obs   🕯	Codes						
Icon	Name	Ground Northin	Fround Easting	Elevation (USft).	Code	Control	Note	Photo Note	Laver	
0	5000	2064444.891	6179355.110	379.101	EXISTING	None			0	
	5001	2064448.588	6179345.339	379.512	EXISTING	None			0	
۲	5002	2064451.546	6179335.728	379.531	EXISTING	None			0	
	5003	2064454.479	6179325.560	379.445	EXISTING	None			0	
•	5004	2064457.738	6179315.822	379.483	EXISTING	None			0	
۲	5005	2064461.034	6179306.053	379.528	EXISTING	None			0	
0	5006	2064464.019	6179296.227	379.556	FXISTING	None			n	$\mathbf{\Sigma}$
				USFer	et DMS	Ground	PROJECT R	TK.tlsv Localiz	ation	

Figure 6-3. Editable Fields on the Points Tab – Example (Coordinate File)

## Edit in the Point Properties Dialog Box

The available property tabs depend on the information in the file. For example, the Offset tab is only available if a point-to-line offset was measured.



Note the following restrictions when editing a point in a coordinate file:

- If the file currently lacks the data being edited in the Properties dialog box, Topcon Link will ask to save to another format before continuing.
- 1. To edit a point's properties, double-click the desired point.
- 2. Edit the point's general properties:
  - Name the name of the point
  - Note any notes associated with the point
  - Code the code of the point

3. Edit the point's coordinates (Latitude\Northing, Longitude\Easting and Elevation).

Properties : I	Point occ	?	
General Coordi	nates Codes and Style		
Name	000	Properties : Poin	t occ 🛛 🖓 🗙
Note	#1	General Coordinate	
Control	None	Ground Northing (m)	500
Code	Station	Ground Easting (m)	500
Source		Elevation (m)	145,16
ОК	Cancel Apply		
		ОК	Cancel Apply

Figure 6-4. Edit General and Coordinate Properties

4. Edit the point's CAD information. The user can edit the data in the following field: Code, String, Control Code and Control Code2, Color and Point Symbol.

Properties : Point 500							
General Coordinates Photo Notes Codes and Style							
Code		String	Attribute	Value			
• 3		AA	Lamp	1	1		
۲		>					
Strin	Ig	AA					
Control Code		Lamp#1323					
Con	trol Code 2						
Color							
Point Symbol							
	OK	Can	cel	Apply			

Figure 6-5. Edit CAD and Style Properties

- 5. The Photo Notes tab is available only for points of TopSURV Job. The user can select a desired photo note from the list, or add/ remove a photo note for the point. (The user can add \*.jpg or \*.bmp files of type).
  - To add a photo note, click Add Photo Note. Browse for and select the desired photo, click Open. The photo is added to the list, in the order added, and automatically applied to the point.

• To delete a photo note, select the photo from the list and click Delete Photo Note.



Figure 6-6. Edit Photo Note and Offset Properties

 For PTL (point to line) points, edit the point's offset. To obtain new coordinates of the point after editing offset parameters, need click *Calculate Coordinates*. See ("About Editing Offsets in Topcon Link" on page 6-46) for more details

General Coordinates	Offset	Photo Not	es 📔	Codes and Style	1			
Offset Dist (m) Offset Ht (m)	15				_			
Offset Across (m)	6							
From Point	P_12				-			
To Point	P_13				•			
- Height is								
Relative     Absolute								
ОК	0	Cancel		Apply				

#### Figure 6-7. Edit Offsets for the PTL point

7. Click Apply to save the changes. Click OK to exit.

# **Editing GPS Occupations**

Among other editing activities, Topcon Link can be used to edit the height of the antenna and the point name, associated with the occupation. A custom antenna can also be created and applied to an occupation.

## **Edit on the GPS Occupations Tab**

You can edit the Point Name, Antenna Type/Height/Height Method, and Note fields directly on the GPS Occupations tab. Click-pauseclick to access editable fields. Figure 6-8 shows an example of editing fields on the GPS Occupations tab.



Figure 6-8. Editable Fields on the GPS Occupations Tab – Example
### Edit in the GPS Occupations Properties Dialog Box

The available property tabs depend on the information in the file. For example, the Offset tab is only available if a line with known azimuth offset was measured.



Note the following restrictions when editing a GPS occupation:

- If making changes to a GPS occupation in a TopSURV PC Job file, the file must be saved to the same file format.
- If the RTK base station does not have any information about the antenna, Topcon Link will recalculate the coordinates of the rover's points from the phase center of the base antenna. In the given case, after clicking *Compute Coordinate*, the following message appears:

Topcon	Link
⚠	There is no antenna information for some of the RTK Bases Phase center coordinates will be used to compute rover positions
	ОК

- 1. To edit a GPS occupation's properties, double-click the desired occupation.
- 2. Edit the GPS occupation's general properties. The Point Name and Note can be edited.

3. Edit the GPS occupation's antenna. To create/edit a custom antenna type, see "Add a Custom GPS Antenna" on page 6-9.

• Properties : GPS Occupation Start_Pt	• Properties : GPS Occupation Start_Pt ? 🛛
General         Occupation         Antenna         Offset         Point Name         Start_PDINTI         Image: Comparison of the start	General     Occupation     Antenna       Antenna Type        • GR-3         Custom        Antenna Height (m)        2.06        Ant Height Method     Vertical
Method         Topo           Start Time         12.12.2007 10:01:49           Stop Time         12.12.2007 10:01:58           Duration         0:00.09           OK         Cancel         Apply	OK Cancel Apply

Figure 6-9. Edit General Coordinate Properties

4. Edit the GPS occupation's offsets. See ("About Editing Offsets in Topcon Link" on page 6-46) for more details.

• Properties : C	GPS Occupation Start_Pt 💦 🛛 🛜	
General Occupa		
Azimuth	270*00'00,0000	
Offset Dist (m)	25	1
Offset Ht (m)	0,43638	1
Offset Across (m)		ſ
		-
OK	Cancel Apply	

Figure 6-10. Edit Offset Properties

5. View information for the occupation (the number of epochs, the record interval, the GPS week and day of the occupation start time):

Properties : GPS Occupation topo						
General	Occupati	on Antenna	Offset			
NEpoch	10	)				
Interval	10	000				
GPS week,	day 14	457,346				
Receiver	8	RE5SNA5L34				
0	<	Cancel		Apply		
				//		

Figure 6-11. View Occupation Properties

6. Click Apply to save the changes. Click OK to exit

### Add a Custom GPS Antenna

Each antenna type has unique phase center parameters obtained through factory calibration. These parameters are not viewable nor editable, but a custom antenna can be added to the Topcon Link list of antennas. You will need the measurements (calibrations) shown in Figure 6-12 to properly add a custom antenna and ensure correct coordinate computations.



Figure 6-12. Determining Antenna Parameters

- 1. Measure or record the antenna's offset parameters as shown in Figure 6-12.
- 2. To add a custom antenna, double-click a GPS occupation.
- 3. On the Antenna tab, click Custom. Then click Add.

• Properties : GF	PS Occupation CHK	PT1	? 🔀					
General Antenna	Offset							
Antenna Type HPer Lite/Lite+ Custom								
Antenna Height (USft)	6.562							
Ant Height Method	Vertical		-					
		🚰 C	ustom Anten	nas List			? 🗙	
		Icon	NGS Name	Name	Radius (mm)	L1 Base offset(A1) (mm)	L2 Ba:	
							_	
		<					>	
			Add 🔓		Remove	Close		
OK	Cancel	App	ly I					

Figure 6-13. Add Custom Antenna

4. Enter the NGS name for the antenna and the display name for Topcon Link. NGS (National Geodetic Services) provides a common database for distributing official antenna designators and offset measurements. 5. Enter the measured offsets for the antenna and select the method used to measure the height.

🔹 New Custom Anten	na	
General Parameters	PCV	
NGS Name	Cust_Ant	
Name	Ant_01	💉 New Custom Antenna 🛛 🛜 🔀
Manufacturer	Anywhere Inc.	General Parameters PCV
	My custom antenna	Radius (mm) 0.4
Note		L1 Base offset(A1) (mm) 0.5
	,	L2 Base offset(A2) (mm) 0.6
		L1 Plane offset(C1) (mm) 0.2
		L2 Plane offset(C2) (mm) 0.3
		L1 Easting offset(E1) (mm) 0.2
		L2 Easting offset(E2) (mm)
		L1 Northing offset(N1) (mm) 0.1
ОК	Cancel	L2 Northing offset(N2) (mm)
		Measured Height Method Vertical
		OK Cancel Apply

Figure 6-14. Enter General and Offset Parameters

- 6. Enter the PCV values. These values represent the antenna phase center variations.
- 7. Click OK to save the custom antenna and exit.

• New	Custom Anten	na				1	2 🗙
	Parameters PS L1 (mm)	РС₩		- PC	V, GPS L2 (mm)		
0*		50*		0*		50*	
5*		55*		5*		55*	
10*		50*		10*		60*	
15*	6	65*		15*		65*	
20*		70*		20*		70*	
25*		75*		25*		75*	
30*		30*		30*		80*	
35*		35*		35°		85*	
40*		30°		40°		90*	
45*				45*			
	ок 🔓		Cance	I		Apply	

Figure 6-15. Enter PCV Parameters

**To edit a custom antenna,** double-click the antenna on the antenna in the custom antenna list. The antenna's properties dialog box displays.

🐔 Custom Antennas List 🛛 🤶							
Icon	NGS Name	Name	Radius (mm)	L1 Base offset(A1) (mm)	L2 Bas		
¢۲	Cust_Ant	Ant	0.4	0.5			
<					>		
	Add	]	Remove	Close			

Figure 6-16. Custom Antennas

# **Editing TS Observations**

Among other editing activities, Topcon Link can be used to edit the height of the reflector, the number of the observation, the point the observation was made to. You can also apply sting and control code values to the observation.

### **Edit on the TS Observations Tab**

In the left panel, you can edit all fields except the Icon directly on the TS Observations tab. In the right panel, you can only edit the following fields: Point To, Type of measured point (except BKB

points), Azimuth (only for BKB points measured from the point with unknown coordinates), Reflector Height, Note, String and Control Code, Offsets, etc.—directly on the TS Observations tab. Click-pause-click to access editable fields. Figure 6-17 shows an example of editing fields on the TS Observations tab.

1			1 lore						51						
Tile		~	pcon\TopconLin ess Window Help	κw	lant	WLA	16 3U 31 3. TIS	v <lop< th=""><th>URV PC Job&gt;j</th><th></th><th></th><th></th><th></th><th>l</th><th></th></lop<>	URV PC Job>j					l	
<i>i</i>		🖻 🈘 🕉	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		×	χ.	b 🖻 🔓	<b>4</b>	9 3 3 m		7 🔳	<b>k</b> ?			
•° P	oints	🛇 TS Obs	🛃 Images  🌡	C	odes										
Icon	#	Point Name	Instrument Hei	۲	Icon	#	Point From	Point To	Reflector Hei	Azimut	h Hor	izontal Circ	le Slope I	Dist	Zeni 🔨
٥,	1	27	5.180		٠	1	27			356°56'.	356	°56'12.000	0		
٥,	2	A1	5.170		٠,	2	27		E 000		356	°56'12.000	00		92°18'
٥,	3	В	5.170		٥,	3	27	А	5.000		179	°10'12.000	0 2	01.350	90°04'
٥,	4	С	5.280		٠	4	27			356°56'.		°56'12.500			
					۰,	5	27		0.000			°56'12.500			92°18' 🧹
					Ŷ	1	27		E 000		170	10'07 000	0 0	01.050	00004 <sup>1</sup>
											USFeet	DMS	Ground	None	

Figure 6-17. Editable Fields on the TS Observations Tab – Example

### **Edit in the TS Observations Properties Dialog Box**

The available property tabs depend on the information in the file and in the selected observation. For example, the Image tab is only available if an image is associated with the observation.

#### Edit Left Panel TS Obs Properties

- 1. To edit a TS observation's left panel properties, double-click the desired observation in the left panel.
- 2. Edit the TS observation's general properties (point name, instrument height, order number).

Properties : TS Occupation 1.27						
General						
Point Name	27	•				
Instrument Height (USft)	5.18					
#	1	-				
ОК	Cancel Apply					

Figure 6-18. Edit General Properties for the Left Panel

#### **Edit Right Panel TS Obs Properties**

- 1. To edit a TS observation's right panel properties, select the observation in the left panel then double-click the desired measurement in the right panel.
- 2. Edit the TS observation's general properties. The following information can be edited in the General tab: Note, Code, String and Control Code.

• Properties : TS Obs 1.occ-8.101						
Observation	General Offset Adjustment Image					
Point From	occ					
#	8					
Note	for 1243 area					
Date						
Code	plane 💌					
String	1					
Control Code	<b>•</b>					
OK	Cancel Apply					

Figure 6-19. Edit General Properties

- 3. Edit data in the Observation tab. The following information can be edited:
  - Point To,
  - Type of measured point for side shot point (SS), backsight point (the previous occupation point) (BS), foresight point (the next occupation point) (FS), Horizontal/Vertical Resection/Resection points,
  - Azimuth only for backsight bearing point (BKB)

• Properties : TS Obs 1.occ-8.101							
Observation General Offset Adjustment Image							
Point To	101 💌						
Туре	SS 🗸						
Reflector Height (m)	1.45						
Horizontal Circle	0*00'00,0000						
Zenith Angle	90*00'00,0000						
Slope Distance (m)	20						
Vertical Angle	0*00'00,0000						
Horizontal Distance (m)	20						
Vertical Distance (m)	0						
Exclude							
Horizontal Circle							
Vertical Angle							
Slope Distance							
ОК	Cancel Apply						

Figure 6-20. Edit Observation Properties

4. Edit the TS observation's offset properties. See ("About Editing Offsets in Topcon Link" on page 6-46) for more details.

? 🗙	[	.101	1.occ-8	: TS Obs	Properties	Ф,
	ment   Image	Adjust	Offset	General	bservation	(
				2.1	et Along (m)	Off
				4.2	et Across (m)	Off
			1	0.90	et dHt (m)	Off
		tion Line	n Observal	Fron	et Type	Off
	1					
	Apply	ncel	Car		OK	
	Apply	ncel	Car		OK	

Figure 6-21. Edit Offset Properties

- 5. View the image(s) associated with the observation measurement in the Image tab.
- 6. View the adjustment results for the observation measurement in the Adjustment tab.



Figure 6-22. View Image and Adjustment Properties

## **Editing GPS Observations**

Since GPS observations are based on GPS occupation measurements, the user can select/add antenna parameters for the base and the rover stations of the observation and can edit notes for the observation. To edit an occupation, see "Editing GPS Occupations" on page 6-6.

### **Edit on the GPS Observations Tab**

You can only edit the Note field directly on the GPS Observations tab. All other fields are static in this tab. Click-pause-click to access editable fields. Figure 6-17 shows an example of editing this field on the GPS Observations tab.

						F	Ī					
_		2 A		opSURVV	PROJE	CT RTK, lsv <top< th=""><th>SURV PC Job&gt;]</th><th></th><th></th><th></th><th></th><th></th></top<>	SURV PC Job>]					
File	Edit View	Process	Window Help	×   <u>X</u> [	6 B		8 8 <b>8</b> 1	2 4	■ <b>\</b> ?		-	8
•° P	oints 🛛 🤗	GPS Occupa	ations 🤗 GPS C	bs 🎄 d	odes	1						
Icon	Point From		Start Time	Duration	Note	Horizontal Preci	Vertical Precisio	dN (USft)	dE (USft)	dHt (USft)	Method	
31	CP_1	CP3 CP2	2/2/2004 12:52	0:00:02		0.019	0.014	-9.845 5.866	1.027	0.398	RTK Topo RTK Topo	
2	CP_1 CP_1	CP2 CP4	2/2/2004 12:53 2/2/2004 12:56	0:00:02		0.024	0.018	428.578	-93.436	-7.756	RTK TODO	
0	CP_1	CP5	2/2/2004 1:01:	0:00:02		0.023	0.024	-47.046	-421.114	33,580	RTK Topo	
õ.	CP_1	CP6	2/2/2004 1:04:	0:00:02		0.032	0.024	-173.419	-175.162	40.273	RTK Topo	
2	CP 1	CP8	2/2/2004 1:10:	0:00:02		0.023	0.017	-627.569	347.734		RTK Topo	>
eady							USFeet DMS	Ground	PROJECT P	TK.tlsv Locali	zation	

Figure 6-23. Editable Field on the GPS Observations Tab – Example

### Edit and View in the GPS Observations Properties Dialog Box

The antenna parameters for the base and the rover stations and the notes associated with a GPS observation can be changed; all other fields are informational.

- 1. To edit a GPS observation's properties, double-click the desired observation.
- 2. As needed, edit the GPS observation's note in the General tab.

• Proper	rties : Gl	PS Obs Base1	Pt2	? 🛛						
General	Quality	Observation	Base Antenna	Rover Antenna						
Point From		Base1								
Point To		Pt2								
Note for Road_A34										
Start Time		12.12.2007 10	:01:49							
Duration		0:00:09								
Stop Time		12.12.2007 10	12.12.2007 10:01:58							
GPS week,d	day	1457,346								
Method		RTK Topo	RTK Topo							
	эк	Car	ncel	Apply						

Figure 6-24. Edit General Properties

3. As needed, edit the antenna parameters for the base/rover stations in the corresponding tab:

• Properties : GP	S Obs Base1-Pt2		
General Quality	Observation Base	Antenna R	Rover Antenna
Antenna Type 🛛 🔷 🕻	CR-3 💌	Custom	• Properties : GPS Obs Base1-Pt2
Antenna Height (m)	1.77		General Quality Observation Base Antenna Rover Antenna
Ant Height Method	Vertical		Antenna Type 💽 GR-3 🔽 Custom
	Vertical Slant		Antenna Height (m) 2,05
			Ant Height Method Vertical
ОК	Cancel		App
		J	=
			OK Cancel Apply

Figure 6-25. Edit Antenna Parameters

- 4. View the quality information about the observation measurement in the Quality tab (Precision, RTK Solution Type, Number of epochs, the common number of SV's observed by the base and rover in the last common epoch, the horizontal/vertical/total position dilution of precision in the last common epoch for RTK observation).
- 5. View the GPS observations solution components in the Observation tab.

Horizontal Precision (m)         0.040              Properties: GPS Obs Base 1-Pt2	General Quality	Observation Base Antenna	Rover Antenna		
Solution Type         Fixed_Phase Diff         General         Quality         Observation         Base Antenna         Rover Antenna           Epochs         10         d< (m)			Properties : GP	S Obs Base1-Pt2 ?	
Epochs         10         2099.293           GPS Satellites         9         4/ (m)         /3944.138           GLONASS Satellites         2         4/ (m)         /3944.138           GLONASS Satellites         2         Azimuth         /2019.293           PDDP         1,915         Elevation Angle         /070402.0111           HDDP         0.943         Distance (m)         /4496.671           DK         Cancel         dE (m)         /4386.965			General Quality	Observation Base Antenna Rover Anten	na
GPS Satellities         9         0					
GLDNASS Satellites         2         Azimuth         281'39'25,9879           PDDP         1.915         Elevation Angle         -0'04'02,0111           HDDP         0.943         Distance (m)         4496,671           VDDP         1.666         aN (m)         988,407           DK         Cancel         dE (m)         4386,965	GPS Satellites	9	.,	1	
PDDP         1.915         Elevation Angle         0'0'0102.0111           HDDP         0.943         Distance (m)         4496.671           VDDP         1.666         dN (m)         988.407           DK         Cancel         dE (m)         4386.965		,			_
VDDP         Distance (m)         [4496,671           0K         Cancel         dN (m)         [988,407           0K         Cancel         dE (m)         [-4386,965					-
DK         Cancel         dE (m)         988,407           OK         Cancel         dE (m)         -4386,365			Distance (m)	4496,671	_
OK Carical XY		1,000	dN (m)	1	
dHt(m) [-3,779	ок	Cancel			
			dHt (m)	1-3,779	

Figure 6-26. View Quality and Observation Properties

## Editing Digital Level Observations

Among other editing activities, Topcon Link can be used to edit the level run of an observation, the point, and the vertical offset. Figure 6-27 shows typical observations taken with a digital level.



Figure 6-27. Example Digital Level Observation

The DL Obs tab displays a table containing two panels. The left panel displays the start and end level points of a job, and the right panel displays all level measurements of the selected job.

### **Edit on the DL Observations Tab**

In the left panel, you can directly edit order, note, and level run fields directly on the DL Observations tab. In the right panel, you can only edit fields that correspond to available data and non-static information—such as Point, Vertical Offset, and Note—directly on the DL Observations tab. Click-pause-click to access editable fields.

Figure 6-28 shows an example of editing fields on the DL Observations tab.

			1 More			
🔚 Topcon Link - [ ::\topcon\Top	conLink	\DigitalLevel\37wcent1.lev <	[opcon DL Obs>]			
File Edit View Process Window	v Help					_ 8 X
🖙 🖃 📽 🐴 🌮 🗞 🖉		~ 👗 🖻 💼 📫 🐥	<u>a</u> & & 🕅	🖸   🏐 🛅   🎙		
🔮 Points 🖳 D. Obs						
Icon # From To Leve	31 * I	# Point	BS (USft)	Instrument Elev	SS (USft)	FS (U 🔼
5 TOF	C 🖪,	1 B01	14.829	35.000		
	α,	2 1	4	35.000		17.
	Π,	3 1	16.699	34.850		
	α,	4 2		34.850		17.
	, ∎,		14.797	33.900		
	> <	r   00		22.000	10.274	>
Ready				USFeet	Ground	

Figure 6-28. Editable Fields on the DL Observations Tab – Example

### Edit in the DL Observations Properties Dialog Box

The available property tabs depend on the information in the file and in the selected observation. For example, the Image tab is only available if an image is associated with the observation.



If making changes to a digital level observation in a TopSURV PC Job file, the file must be saved to a \*.tlsv or \*.tsj file.

#### Edit Left Panel DL Obs Properties

1. To edit a DL observation's left panel properties, double-click the desired observation in the left panel.

2. Edit the DL observation's general properties (level run name, note and level run order).

R Properties	: DL Run 1.J01	11 🦳 🔀
General		
Level Run	<u>J0111</u>	
From	B001	
To	4	
Date		
Note		
#	1	-
Distance (m)	36,135	
Balance (m)	0,025	
ОК	Cancel	Apply

Figure 6-29. Edit General Properties for the Left Panel

#### Edit Right Panel DL Obs Properties

- 1. To edit a DL observation's right panel properties, select the observation in the left panel then double-click the desired measurement in the right panel.
- 2. Edit the DL observation's general properties.

Properties	: DL Obs 1.J0111-2.1	? 🗙
Observation	General Adjustment	
Level Run	J0111	
#	2	
Note		
Date	01.01.1999 19:57:00	
ОК	Cancel App	ly .

Figure 6-30. Edit General Properties for the Right Panel

3. Edit the Vertical offset and the measured point for the DL observation in the Observation tab.

•, Properties : DL	Obs 1.J0111-2.1	? 🗙
Observation Gene	ral Adjustment	
Туре	FS	-
Point	1	-
Ht. Measurement (m)	1,42	
Vert.Offset (m)	0	
Distance (m)	6,19	
Instrument Elevation (m)	11,417	
Std Dev (m)		
ОК	Cancel Apply	

Figure 6-31. Edit Observation Properties

4. View the adjustment elevation for the DL observation.



Figure 6-32. View Elevation Adjustment Properties

## **Editing Codes**

Among other editing activities, Topcon Link can be used to edit codes and their attributes. New codes can also be created.

### **Edit on the Codes Tab**

In the left panel, you can edit code and layer fields directly on the Codes tab; you can also add codes and attributes to codes using the pop-up menu. In the right panel, you can only edit the attribute name and default value fields directly on the Codes tab. Click-pause-click to access editable fields. Figure 6-28 shows an example of editing fields on the Codes tab.

	0 1						I	]			
🚮 Тор	con Link - [C: to	pcon\TopconLir	ık\TopSUR	<b>WIPROJECT</b>	RTK.tlsv <1op	SURV PC .	Job>]				
File	Edit View Proce	ss Window Help			1						_ 8 ×
<b>6</b>	a 🖻 🍃 🏄	R 🖨 🗠	୍ 🖌	B B	्र 斗 🖣	8 8 K	🕅 🛛	💞 🛛	🛛   🍕		
•° Po	ints 🛛 🤗 GPS Oc	upations 🛛 🤗 G	PS Obs 🎄	Codes							
Icon	Code	Laver	· ^ ·	🔺 Icon	Attribute Name	Default V	'alue	Туре			
•	BLDG PAD ELEV	0	E	L)	test			Real Nun	nber		
•	CP 1	0									
•	CP 2	0									
•	CP 3	0									
•	CP 4	0									
•	CP 5	0	~								
J	CD /	•		ļ.							
Ready						USFeet	DMS	Ground	PROJEC	T RTK.tlsv Localization	

Figure 6-33. Editable Fields on the Codes Tab – Example

### Add a Code

- 1. To add a code, right-click in the left panel and click New Code. The new code is added to the bottom of the code list.
- 2. Double-click the new code and edit code/layer and plotting properties. For more information, see "Edit in the Code or Attribute Properties Dialog Box" on page 6-24.

File Edit View	Process Window	Help		-						
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° Points 🛛 🤗 🗉	GPS Occupations	💡 GPS O	bs 🌲	6	File	Edit View	Process W	ndow Help		
A Code	Layer		۱ 🔨	-	🖻	3 🖬 🏱	j 🎓 👌	🖨 🗠	C4   X	B 🔒
• CP 1	0			1	•° Po	ints 🛛 🥜 G	PS Occupatio	ns 🛛 🤗 GP	S Obs 🏼 🌲	Codes
<ul> <li>CP 2</li> </ul>	New Code	N			A	Code	Laye		· ·	A Icon
<ul> <li>CP 3</li> </ul>	New Attribute	, ki	•		F-					- 1000
<ul> <li>CP 4</li> </ul>	Cut	Ctrl+X			·	PT4 FIND	0			
<ul> <li>CP 5</li> </ul>	Copy	Ctrl+C			•	STK	0			
• CP 6	Delete	Del			•	TPAV PT 2	0			
· CD 7		DG			•	TRAV PT 1	0			
	Properties				•	BLDG PAD EL	EV 1			
eady			_		•	New Code	₽ °		~	

Figure 6-34. Add New Code

### Add an Attribute

As many attributes can be assigned to a code as needed. Attributes can be an integer, a real number, a text string, or selected from a menu.

- 1. To add an attribute, right-click in the left panel, click New Attribute, then click the type of attribute.
- 2. Enter a name and default value for the attribute. Click Ok to save.

E	📆 Topcon Lini	k - [C:\topcon	Topconl	.ink\Top	SURVIPROJE	т					
	File Edit Vi	ew Process W	indow He	lp							
Ī	🛎 🖬 💣	👌 🤔 🖏	8	<b>∩</b> ∩	¥ 🖻 🖻						
	📲 Points 🛛 🧬	GPS Occupatio	ns 🛛 🤗	GPS Obs	Codes						
	Icon         A         Co           •         New Coi         PT1 FIN           •         PT2 FIN           •         PT3 FIN           •         PT4 FIN           •         STK	D New Cor D New Att D Cut D Copy	de	I+X I+C		La Prop	oertie	s : Atti	ribute Nev	v Attr 🛐	2 🗙
	. тран рт	Properti	es			Genera	al				
F	eady			_		Attribute		Sanol	(e		
						Default V		4			
							alue				
Тор	con Link - [C:\to	pcon\TopconLin	(TopSUR)	VPROJEC	T RTK.tlsv <tc< th=""><th>Туре</th><th></th><th>Intege</th><th>er</th><th></th><th></th></tc<>	Туре		Intege	er		
	Edit View Proces	ss Window Help		<b>B B</b>	°,   A _A	0	ĸ	]	Cancel	Apply	
• Poi	nts 🛛 🥜 GPS Occi	upations 🛛 🤗 GP	S Obs 🌲	Codes							
icon	▲ Code	Layer	۱ 🔼	🔺 Icon	Attribute Name	Default V	alue	Туре			
•	New Code	0		<u>1</u>	Sanoke	4		Integer			
•	PT1 FIND	0				ŵ					
•	PT2 FIND	0									
•	PT3 FIND	0									
•	PT4 FIND	0									
•	STK	0	~								
ady	TRAIL DT O					USFeet	DMS	Ground	PROJECT RTK.	lsv Localization	

Figure 6-35. Add New Attribute

### Edit in the Code or Attribute Properties Dialog Box

The property tabs create or edit a new code and assign plotting styles to lines and points associated with that code.

#### Edit Left Panel Code Properties

1. To edit the properties for a code, double-click the desired code in the left panel.

- 2. Edit the Code's general properties (code name and layer).
- 3. Edit the Code's plotting styles for line and points.
- 4. Click Ok to save.

• Properties	s : Code New Code	? 🛛	Properties : Code New Code				? 🔀
General Pl	otting styles		General	Plot	ting styles		
Code	New Code		Line Style		BYLAYER -		<b>-</b>
Layer	0	-	Line Width		BYLAYER	1 pt	
			Color		BYLAYER		•
			Point Symbo	ol	BYLAYER •		•
ок	Cancel	Apply	ок		Cancel		Apply

Figure 6-36. Edit Properties for the Code

#### **Edit Right Panel Attribute Properties**

- 1. To edit the attribute properties for a code, select the code in the left panel then double-click the desired attribute in the right panel.
- 2. For Integer, Real Number, Text, and Menu attributes, edit the name and default value properties.

Properties	: Attribute S	ianoke ?	$\mathbf{X}$			
General						
Attribute Name	Sanoke					
Default Value	4	🛂 Properties	: Attribute t	est 🤶		
Туре	Integer	General				
ОК	Cancel	Attribute Name	Test	_		
		Default Value		🚇 Properties	: Attribute fert	: ? 🔀
		Туре	Real Number	General		
		ок	Cancel	Attribute Name	Fixit	
				Default Value		
				Туре	Text	
				ОК	Cancel	Apply

Figure 6-37. Edit General Properties for Integer, Real Number, and Text Attributes

3. To add a value to a Menu attribute, type the value and click Add. The value is saved in the file and with the attribute to be selected for other attributes with the same name. To delete the value, select it and click delete.

🗄 Properties : Attribute New Attr ? 🔀								
General	General							
Attribute Name	Attribute Name New							
_ Default Value —								
1 💌	Add	Remove						
Type Menu								
ок	Cancel	Apply						

Figure 6-38. Edit General Properties for a Menu Attribute

# **Editing Line**

Among other editing activities, Topcon Link can be used to edit layer, line type (line or area), and line segments.

### **Edit on the Line Tab**

In the left panels, you can edit line type, plotting style (Line Style/ Line Width/Line Color), select new layer directly on the Line tab. In the left panels, you can edit only the name of the line's vertex. Click-pause-click to access editable fields. Figure 6-28 shows an example of editing fields on the Line tab.

Line Line Area	Points	BYLAYE		BYLAYER —		4 pt 5 pt 6 pt 7 pt 8 pt 9 pt 10 pt 3YLAYER1		The l	eft panel
I	Тур	La	Color	Line Style	Line Width	Code	String	Distan	Area (Sq.m)
	Area	0	BYLAYER		BYLAYER 1 pt	CODE	1	150,529	
	Line	0		BYLAYER	FYLAYER 1 pt	COD 1	1	10,554	
	Line	0	BYLAYER	YLAYER	8 pt	CODE2	1	13,672	
	Line	0	BYLAYER	BYLAYER	BYLAYER 1 pt	CODE3	1	18,657	
	Area	0	BYLAYER	BYLAYER	BYLAYER 1 pt	CODE3	2	3,000	0,56
	Area	0	BYLAYER	BYLAYER	BYLAYER 1 pt	CODE3	3	3,225	0,65
	Line	0		BYLAYER	BYLAYER 1 pt	CODE2	2	43,103	
			I Order · 1 · 2	Poi	-	Distance f	The	e right j	oanel

Figure 6-39. Editable Fields on the Line Tab – Example

137 138 139



Line segments (in the right panel) can only be edited in the Tabular view as shown above.

### Edit and View in the Line Properties Dialog Box

Only line information and plotting styles can be changed; all other fields are informational.

#### Edit Left Panel Line Properties

- 1. To edit the properties for line, double-click the desired line in the left panel.
- 2. Edit the line's general properties and view its length.
- 3. Edit the line's plotting styles.
- 4. View CoGo information.

- 5. View and edit the photonotes of this line.
- 6. Click Ok to save.

Properties : Line 0	Properties : Line 0
Photonotes Line Plotting styles CoGo	Photonotes Line Plotting styles CoGo
Type Line 💌 Layer 👔 💌	Line Style BYLAYER  Vidth BYLAYER 1 pt Color BYLAYER  V
Properties ?	Properties : Line 0
Photonotes Line   Plotting styles Coe	Photonotes Line   Plotting styles   CoGo
Distance (m) 133,304	Photo Note Number: 1
Area (Sq.m) 37,21	
<u></u> OK	OK Add Photo Note Remove Photo Note
OK Cancel Apply	OK Cancel Apply

Figure 6-40. Edit Properties for the Line

## **Editing Tape Dimensions**

Among other editing activities, Topcon Link can be used to edit start and end points, tape distance, and point to for a tape dimension.

Tape dimensions are measurements of lines perpendicular to a reference line. The reference line is defined using two points with known coordinates. Figure 6-41 shows tape dimensions measured from a reference line (between points 1 and 2).



Figure 6-41. Example Tape Dimension Measurements - CAD View

### **Edit on the Tape Dimensions Tab**

In the left panel, you can edit all fields, except the Icon, directly on the Tape Dimensions tab. In the right panel, you can edit all fields, except the Icon and Date, directly on the Tape Dimensions tab. Clickpause-click to access editable fields. Figure 6-42 shows an example of editing fields on the Tape Dimensions tab.



Figure 6-42. Editable Fields on the Line Tab – Example

### Edit in the Tape Dimensions Properties Dialog Box

Available tabs depend on the selected object, either a tape or a dimension.

#### **Edit Left Panel Tape Dimension Properties**

- 1. To edit the properties for the tape dimension, double-click the desired tape in the left panel.
- 2. Edit the tape dimension's start and end point.
- 3. Click Ok to save.

📮 Properties:Tape Dimension Re ? 🗙						
General						
Start Point		100	-			
End Point	Γ	2	-			
ОК		Cancel	Apply			

Figure 6-43. Edit Properties for the Tape Dimension

#### **Edit Right Panel Dimension Properties**

- 1. To edit the properties for the dimension, double-click the desired dimension in the right panel.
- 2. Edit the dimension's general properties and view the date it was measured.
- 3. Click Ok to save.

🚇 Properties : Tape Dimension 2 🛛 ? 🔀						
General						
Point To	2	•				
Distance (m)	20					
Date	3/30/2004 9:20:16	AM				
#	2					
ОК	Cancel	Apply				

Figure 6-44. Edit Properties for the Dimension

# **Edit Image Properties**

The Images tab displays when the file contains data associated with captured images, such as data obtained using the GPT-7000i total station.

Adding a photo note to data will also cause the Images tab to display.

Note the following restrictions when editing Images:

- Topcon Link expects images to reside in a folder with the same name as the data file. For example, data from the "050119.tlsv" file will be associated with images in the "050119" folder.
  - The data file and image folder must reside in the same directory for the images to display.

The image tab contains thumbnails of images in the file in the left panel and the selected image, with associated points and line, in the right panel. Figure 6-42 shows an example of the fields on the Images tab.

- A red cross indicates the point that the image is associated with.
- The currently selected point(s) is indicated with corner edges.
- The currently selected line(s) is highlighted.



Figure 6-45. Viewing Images

While photo images cannot be edited, any points or lines associated and displayed on the image in the right panel can be edited. Doubleclicking the point/line will open the corresponding Properties dialog box. See the following sections for editing this data:

- "Edit Image Point Properties" on page 6-33
- "Edit Image Line Properties" on page 6-34

### **View Image Properties**

- 1. To view the properties for the image, double-click the desired image in the left panel.
- 2. View the image's general properties.
- 3. View a larger size of the image without associated points/line.

4. Click Ok to exit.

🚰 Properties		? 🗙
General Image Name	  100	Properties ? 🔀
Point	100	General Image
ОК	Cancel Apply	
		OK Cancel Apply

Figure 6-46. View Properties for the Image

### **Edit Image Point Properties**

- 1. To view the properties for a point on an image, double-click the point on the image in the right panel.
- 2. Edit desired fields as described in "Edit in the Point Properties Dialog Box" on page 6-3.
- 3. View the image associated with the point.
- 4. Click Apply to save the changes. Click OK to exit.

Properties : Poi	nt 100	? 🛛		
General Coordinati	es CAD String Images Photo	• Properties : Po	oint 100	? 🛛
Name	100	General Coordina	ates CAD String	Images Photo Notes
Note				115
Code		I I I Z I K I Z		The start of the s
Control	None	1 St. 7 St. 7		The second second
Layer	0	and the second		
			+	
OK	Cancel			
		OK	Cancel	Apply

Figure 6-47. Edit Properties for Point on Image

### **Edit Image Line Properties**

- 1. To view the properties for a line on an image, double-click the line on the image in the right panel.
- 2. Edit the line's general properties (line or area type, ordered sequence, layer assigned to). View the line's code and its from/to points.
- 3. Edit the line's plotting styles.
- 4. Edit the control codes used to for the line View the string assigned to the code.
- 5. Click Apply to save the changes. Click OK to exit.



Figure 6-48. Edit Properties for Line on Image

# **Editing X-Section Templates**

Among other editing activities, Topcon Link can be used to edit much of the information associated with cross section template, including the slopes, distances, and grades of the template items.

### **Edit on the X-Section Templates Tab**

In the left panel, you can edit all fields, except the Icon, directly on the X-Section Templates tab. In the right panel, you can edit all fields, except the Icon and Hz/V Offset, directly on the X-Section Templates tab. Click-pause-click to access editable fields. Figure 6-49 shows an example of editing fields on the X-Section Templates tab.



Figure 6-49. Editable Fields on the X-SEction Templates Tab – Example

### Edit in the X-Section Templates Properties Dialog Box

Much of the information associated with cross section templates can be edited, except segment offsets.

#### Edit Left Panel X-Section Template Properties

1. To edit the properties for the x-section template, double-click the desired template in the left panel.

- 2. Edit the x-section template's name and cut/fill slopes.
- 3. Click Apply to save the changes. Click OK to exit.

📥 Properties : X-Section Templat 🕐 🗙					
General					
Name	88200R				
Cut Slope (1:n)	0				
Fill Slope (1:n)	0				
ок	Cancel	Apply			

Figure 6-50. Edit Properties for the X-Section Template

#### **Edit Right Panel Segment Properties**

1. To edit the properties for a segment of the cross section template, double-click the desired segment in the right panel.



You can also double-click the segment in the graph to open the Properties dialog box.

- 2. Edit the segment's order, horizontal/vertical distance, percentage of grade, and code. View the horizontal/vertical offsets from the centerline.
- 3. Click Apply to save the changes. Click OK to exit.

Properties : X-Section Segment 3						
General						
Order	3	*				
Hz. Dist (m)	1.219					
V. Dist (m)	0.049					
Grade (%)	3.998					
Hz. Offset from CL (m)	6.706					
V. Offset from CL (m)	-0.101					
Code		-				
ок	Cancel Apply	,				

Figure 6-51. Edit Properties for a Segment of the X-Section Template

# **Editing Roads**

Among other editing activities, Topcon Link can be used to edit alignment and cross-section information for a road.

A road as an object can be described through the horizontal and vertical projections of the center line, called alignments, and the line describing the surface of the road and lying in the plane perpendicular to the center line, called a cross section (x-section). An alignment can be divided into sections, each of which can be described using algebraic functions.

- The horizontal alignment can be described through lines, spirals, curves and intersection points.
- The vertical alignment can be described through either parabolas long sections or arc long sections.
- The cross-section can be described using templates. (To edit the templates for cross-sections, see "Editing X-Section Templates" on page 6-35.)
- 1. To edit the properties for a road, double-click the desired road in

the left panel of the Roads tab:



2. Edit the name of the road, the coordinates of the start point, Start Sta/Chainage and Stationing Stakeout Interval.

3. Select a horizontal/vertical alignment and X-section from the list of the used alignments/ X-sections in the given TopSURV job.

Properties : Road CONV	EYANCE2				2 🔽	
General Alignment names	🖊 Prope	🖉 Properties : Road HIAA EOG				
Name	Road-333	General	Alignment n	ames		
Start Coordinates		Horizontal A	lignment Name	H-1		-
Start Point		Vertical Alig	nment Name	V-22	!	•
Northing (USft)	406,90	X-Section S	et Name	X-17	_left_right	-
Easting (USft)	1751,10					
Elevation (USft)	10					
Start Sta/Chainage (USft)	10					
Stationing Stakeout Interval (USft)	30					
Layer	C					
ОК	Ca					
			OK		Cancel	Apply

Figure 6-52. Edit Properties for the Road

### **Edit on the Roads Tab**

In the horizontal alignment panel, you can edit the following fields directly on the Roads tab. Click-pause-click to access editable fields.

- order
- azimuth
- length
- turn
- start radius
- tangential to previous element
- spiral direction
- delta
- chord

- tangent
- mid ord
- external
- start degree chord
- start degree curve

Figure 6-53 shows an example of editing fields on the Roads tab, horizontal alignment panel.

C:\topcon\TopconLi	ink\gr	deworl	k_road.tlsv	Rigi Left Right	Job >		873.19				
🔹 Points 🥢 Roads		X-section	Templates	🌲 Codes				1			
🖃 🥒 6220-A12Grade	Icon	Order	Туре	Azimuth	Length (m)	Turn	Start Rad	End Rad	North	East	^
E Z Horizontal al	1	1	Line	60°57'59.0000	250.94						
- III Table	P	2	Spiral TS	60°57'59.0000	88.392	Right		873.190			
2 Graphic	C	3	Curve	63°51'58.9963	624.177	Right	873.190	873.190			
E Vertical align	P	4	Spiral CS	104°49'21.9835	88.392	Right	873.190				$\mathbf{v}$
Z Graphic	<									>	
A Table	North	hing, - m — -	5895		25867.8979 16.949 	1 1 1	262886682859 26883.	27327	472.261	Easting,	

Figure 6-53. Editable Fields on the Roads Tab – Horizontal Alignment Example

• In the vertical alignment panel, you can edit only the Sta/ Chainage, Length, and Elevation fields directly on the Roads tab. Click-pause-click to access editable fields. Figure 6-54 shows an example of editing fields on the Roads tab, vertical alignment panel.

29772.8	sŢ				487.0	581	Ţ	367.73	Ţ		
C:\topcon\TopconL	ink\gr	adewo	_road.tlsv		SURV	PC .	Job>				
🔹 Points 🥢 Roads		X-Section	Templates	🌲 c	odes						
🖃 🥒 6220-A12Grade 📩	Icon	Туре	Sta/Chaina	ige (m)	Order		Length (m)	Start Grade (%)	End Grade (%)	Elevation (m)	Radiu
😑 🔁 Horizontal al	$\square$	Parab	256	16.949	1		0.000	0.000	0.00	478.866	
Table		Parab	288	70.168	2	Ι	304.801	-3.000	-1.500	381.269	
C Graphic		Parab	2973	72.850	3		487.681	-1.500	4.500	367.730	
E Vertical align		Parab	300-	47.171	4	_	0.000	4.500	4.500	380.074	
2 Graphic	<										>
➡ ★ X-Sections Table	Eleval	tion, m	×25616	.949	_				×29 <u>022.56</u>	:8	947.17
<			26	0+0		27	°0+0	280+0	290+0	CL Positio	ns, m

Figure 6-54. Editable Fields on the Roads Tab – Vertical Alignment Example

In the x-sections panel, you can edit all fields, except the Icon, directly on the Roads tab. Click-pause-click to access editable fields.

Figure 6-55 shows an example of editing fields on the Roads tab, x-sections panel.

[ <u>2</u> 6883.4	ŧ14 <u>]</u>	Rig Lef	t K	88200R 88150R 88200R More	2	
C:\topcon\TopconL	ink\gra	dework_road.tlsv <to< th=""><th>opSURV PC Job</th><th></th><th></th><th></th></to<>	opSURV PC Job			
🔹 Points 🥢 Roads	📥 x	Section Templates 🛛 🌲	Codes			
🖃 🥢 6220-A12Grade	Icon	Sta/Chainage (m) Side	Timplate			<u>^</u>
E Z Horizontal al	<b>↔</b>	26868.174 Right	8150R			
Table	<del>^</del>	26868.174 Left	88150L			
C Graphic	-	26883.414 Right	88200R			
Table	÷	26883.414 Left	88200L			
2 Graphic	<u> </u>	26974.854 Right	88500R			~
C Table	V. Offs from C		-25 0	P × ×	50 Hz.	Offset from CL, m

Figure 6-55. Editable Fields on the Roads Tab – X-Sections Example

### Edit in the Horizontal Alignment Properties Dialog Box

The user can edit the type of element in the Properties dialog box. The user can select the following horizontal element:



If the current type of element is changed, the corresponding Properties dialog box will be appeared for the selected element.

#### Edit Line Segment Properties

1. To edit the properties for a line segment, double-click the desired segment in the horizontal alignment table.



In the graph view, double-click the segment to open the Properties dialog box.

- 2. View the end position for the line segment.
- 3. Edit the general properties for the line segment.

- The tangential to previous element is unavailable if the first segment is a line.
- Edit the type of element, the azimuth, order, and length as needed.
- 4. Click Apply to save the changes. Click OK to exit.

	Properties :	? 🛛						
	General End Position							
	Туре	<b></b>						
Properties : Horz Element	Length (m)							
General End Position End Sta/Chainage (m) 9,103	 Tangential to prev element Azimuth 214*22'57,2913							
End Northing (m) 7,709	 OK		Cancel	Apply				
End Easting (m) -2,227								
End Azimuth 214°22'57,2913								
OK Cancel	Apply							



#### Edit Curve Segment Properties

1. To edit the properties for a curve segment, double-click the desired segment in the horizontal alignment table.



In the graph view, double-click the segment to open the Properties dialog box.

- 2. View the end position for the curve segment.
- 3. Edit the general properties for the curve segment.
  - Select whether or not the segment is tangential to the previous element.
  - Edit the type of element.
  - Edit the azimuth and order of the curve segment.
  - Edit the length for the curve segment.
  - Edit the radius of the curve segment.

4. Click Apply to save the changes. Click OK to exit.

		CB	roper	rties : Ho	orz Element			? 🗙
C Properties : Ho	rz Element	Type Leng Tum Radi	yth (m) us	Right 2,414		Curve Deg Curve Deg Chord Delta Chord (m)	2373°25'41,1062 94°32'31,8697 3,547	
General End Posit End Sta/Chainage (m) End Northing (m) End Easting (m) End Azimuth	ion    3,983  -3,484  0,664  216*28'34,9366	Azim	uth	iial to prev ( 121°56'03)	,0668	Tangent (m) Mid Ord (m) External (m)	0,776	
ок	Cancel		Apply					

Figure 6-57. Edit Properties for a Curve Segment in a Horizontal Alignment

#### **Edit Spiral Segment Properties**

1. To edit the properties for a spiral segment, double-click the desired segment in the horizontal alignment table.



In the graph view, double-click the segment to open the Properties dialog box.

- 2. View the end position for the spiral alignment.
- 3. Edit the general properties for the spiral alignment.
  - Select whether or not the segment is tangential to the previous element.
  - Edit the type of element
  - Edit the azimuth and order of the spiral segment.
  - Edit the length and spiral constant for the spiral segment.
  - Edit the spiral direction.
  - Edit the radius of the spiral segment.
4. Click Apply to save the changes. Click OK to exit.

	🥂 Ргоре	rties : Horz E	lement				? 🗙
	General	End Position	1				
	Туре	Spiral CS to ST	•	Curve			
	Length (m)	3,941		Spiral Const (m)	-		
	Turn	Right	-	Deg Curve	2291*49'52,	2499	
	Radius	2,5		Deg Chord			
	🗌 Tanger	tial to prev eleme	ent				
C Properties : Horz Element	Azimuth	34°23'39,7735					
General <b>End Position</b> End Sta/Chainage (m) 408,334		OK		Cancel		Apply	
End Northing (m) -6,355				-			
End Easting (m) 10,729				-			
End Azimuth 79°33'17,6938				-			
OK Cance		Арр	ly				

Figure 6-58. Edit Properties for a Spiral Segment in a Horizontal Alignment

### **Edit in the Vertical Alignment Properties Dialog Box**

1. To edit the properties for the vertical alignment, double-click the desired alignment in the vertical alignment table.



In the graph view, double-click the alignment to open the Properties dialog box.

- 2. Edit the type of the alignment (Parabola Long Section and Arc Long Section), alignment's station/chainage, length/radius, and elevation.
- 3. Click Apply to save the changes. Click OK to exit.

🗅 Properties : Vert Element 🛛 💽 🔀							
General							
Туре	Parabola Long Section 📃						
Length (m)	10						
Sta/Chainage (m)	41,632						
Elevation (m) 134,07							
ОК	Cancel Apply						

🗇 Properties : Vert Element 🛛 💽 🔀							
General							
Туре	Arc Long Section 📃						
Radius (m)	100						
Sta/Chainage (m)	41,632						
Elevation (m) 134,07							
ОК	Cancel	Apply					

Figure 6-59. Edit Properties for the Vertical Alignment

## **Edit in the X-Section Properties Dialog Box**

#### **Edit Template Properties**

- 1. To edit the properties for the x-section template, double-click the desired template in the x-section table.
- 2. View the name of used x-section template for the road.
- 3. Click Apply to save the changes. Click OK to exit.

🖊 Properties	: X-Section Set	c ? 🔀
General Name	0	
ОК	Cancel	Apply

Figure 6-60. Edit Properties for the X-Section

## **Editing Layers**

Among other editing activities, Topcon Link can be used to edit the layers in a file, including the layer name, line and point styles, and the color to use for objects on the layer.

### **Edit on the Layers Screen**

In the Layers screen, you can edit all fields directly on the screen. Figure 6-61 shows an example of editing fields on the Layers screen.

j/Brk <i>■</i> Layers	7	n\TopconLii	nk\g/adework	_road.tlsv	Auto Auto Breakline Boundary Exclusion			
Name	Vsible	Line Style	Line Width	Color	Point Symbol	Breakline Type	Note	Fill Area
€ EP	es		1 pt		• \	Auto		No
<i>≝</i> ESP	Yes		1 pt		• \	Auto		No
S/Brk	Yes		1 pt		•	Auto	1	No
🕖 Vflo	Yes		1 pt		•	Auto		No
€o	Yes		1 pt		•	Auto		No

Figure 6-61. Editable Fields on the Layers – Example

## Edit in the Layer Properties Dialog Box



Use a color other than black (or the background color) for lines and points.

- 1. To edit the properties for the layer, double-click the desired layer in the Layers screen.
- 2. Edit the general properties for the layer.
  - The notes.
  - Whether the layer is visible or not.
  - The layer's breakline type.
- 3. Edit the plotting styles for the layer.
  - The line style and width.
  - The color to use for lines and points.
  - The point symbol.

- 4. Edit the fill for areas in the layer, either filled or not filled.
- 5. Click Apply to save the changes. Click OK to exit.



Figure 6-62. Edit Properties for the Layer

## About Editing Offsets in Topcon Link

Using the associated Properties dialog box, you can edit the offsets for TS or GPS measurements and for PTL (point to line) points. Topcon Link recognizes offsets from an observation line, point-toline offsets, and offsets from a line with a known azimuth.

#### Offsets from an observation line in Total Station measurements

- Offset Along the distance from the Prism Point to the projection of the Offset Point along the line of sight
- Offset Across the distance from the offset Point to the line of sight, either to the left or to the right of the line

• Offset Height – the height difference from the prism point to the offset point



Figure 6-63. Measuring/Editing Offsets From Observation Line

## Offsets from the reference line formed by reference points (point-to-line offsets) in TS and GPS measurements

- From Point the start point of the reference line (Point 1)
- To Point the end point of the reference line (Point 2)
- Offset Dist the distance along the reference line from the prism or the rover GPS antenna point to the offset point
- Offset Across the distance perpendicular to the reference line from the prism or the rover GPS antenna point to the offset point
- Height is relative the height difference from the prism point to the offset point

• Height is absolute - the absolute height of the offset point



TopSURV sets only absolute elevation for a PTL point.



Figure 6-64. Measuring/Editing Offsets From Point-to-Line

## Offsets from a line with a known azimuth in TS and GPS measurements

- Azimuth offset line azimuth
- Offset Dist the distance along the line with known azimuth from the rover GPS antenna point to the offset point
- Offset Across the distance perpendicular to the line with known azimuth from the rover GPS antenna point to the offset point
- Offset Ht the height difference from the rover GPS antenna to the offset point
- Height is relative the height difference from the prism point to the offset point

- ↑ North Offset Azimuth **?**× Properties : GPS Occupation 5031-5069 General Antenna Offset Offse dHt Azimuth 35 Offset Dist (USft) 12.8 Offset 0.45 Offset Ht (USft) Distance Offset Across (USft) 7.4 Prism Point οк Cancel Apply Occupation Point
- Height is absolute the absolute height of the offset point

Figure 6-65. Measuring/Editing Offsets From Observation Line

## **Notes:**


## Working with Point Data in Topcon Link

Topcon Link includes a function for working with point data: computing coordinates of TS and GPS network.

## Computing Point Coordinates for Raw Data and TopSURV Files

Topcon Link allows computing point coordinates for raw data and TopSURV files.

## **Compute Coordinates**

Note the following restrictions for coordinate computations:



When editing data, coordinate computations (re-calculation) are not automatic. You must manually select the Compute Coordinate function.

If there is no antenna information ('Antenna Type' field is empty) for Base RTK station, the phase center of the Base station will be used to compute Rover positions.

For details on setting the parameters for computations, see "Set Process Properties for Computations" on page 7-2.

1. Open a raw data or TopSURV PC Job File.

#### 2. Click **Process > Compute Coordinates**.

Any new point coordinates are added and written to the file.

	topcon\1 pints 🔷	1	JRV\PROJECT TS.1	tlsv <topsur< th=""><th>V PC Jo</th><th>)b&gt;</th><th></th><th></th><th></th><th></th></topsur<>	V PC Jo	)b>				
Icon	Name	Grid Northing (m)	Grid Easting (m)	Elevation (m)	Code	Control	Note	Photo Notes	Layer	^
<b>A</b>	AP_S	633368.683	1883133.272	113.985		Both			0	
Φ	CP2CHK				CP 2	None		-	0	
Φ	<b>CP3CHK</b>				CP 3	None			0	
♦	CP4T				CP4	None			0	
Ф Ф	CP5CHK CP6CHK				Grid	Northing (m)	Grid Ea	asting (m)	Elev	ation (
A	CP_1	629327.384	1883339.868	117.226		633368.683	188	3133.272		113.9
▲	CP_2	629329.167	1883339.866	117.383		629329.161		3339.875		117.3
Δ	CP_3	629324.386	1883340.138	117.350						
						629324.374		3340.150		117.3
						629458.398	188	3313.262		114.8
						629314.878	188	3211.333		127.4
						629275.289	188	3285.739		129.5
						629327.384	188	3339.868		117.2
						629329.167	188	3339.866		117.3
						629324.386	188	3340.138		117.3

Figure 7-1. Coordinate Calculation – Before and After Example

### Set Process Properties for Computations

Typically, the default parameters are sufficient for most coordinate computations of TS network. In the *Process Compute Coordinates* pane, the user can set distance and angle measurement errors to take them into account when computing the coordinates of the station using directions observed from the station to points of known positions (resection method):

Process properties	?	X
EDM	1 3 mm + 3 ppm	
Compute Coordina TS Computations	Sigma, (sec) 5	_
	Sigma, (sec) 10	_
< >		
ОК	Cancel	

Figure 7-2. Apply Coordinate Computation Parameters

3. Click **TS Computations** in the left pane and select the refraction coefficient for total station observations.

The refraction coefficient corrects the vertical angle between the earth's curvature and refraction in the atmosphere.

4. Click OK to save the settings.

🕑 Process properties			? 🗙
	Refraction Coefficient © 0 0.14 © 0.2 © Without Curvature		
OK		Cancel	

Figure 7-3. Apply Total Station Computation Parameters

## **Notes:**


# **Exporting Data Files to a TPS Device**

Topcon Link provides a simple interface for exporting data files directly to a Topcon device (instrument). Topcon Link exports any file type to a hand-held controller, coordinate files to a total station, and an option authorization file (OAF) to a GPS receiver.



Before you can export data to a total station, the device must first be set up. See "Adding and Formatting Devices" on page 2-1 for details.

This chapter discusses the steps to export data files to a connected device.

- See "Exporting Files to a Mobile Device" on page 8-2.
- See "Exporting Files to a Total Station" on page 8-3.
- See "Exporting an OAF to a GPS Receiver" on page 8-5.

## Exporting Files to a Mobile Device

The Topcon family of controller software runs on several Topcon and third-party mobile devices. Microsoft® ActiveSync® is used to read the data on the mobile device.

TopSURV supports two formats of the job files:

- TopSURV \*. tsj. This job is created in TopSURV version 7.0 and later.
- TopSURV \*.tsv job. This job is created in TopSURV version 6.11.03 and earlier

There is a difference in format of these files and a difference in using these files in the computer's software.

In TopSURV version 7.0 and later, the \*.tsj file is saved on the controller, that this file format can be opened by Topcon Link/Topcon Tools/TopSURV PC. Topcon Link is used only for transferring the \*.tsj file from the controller to the computer without format changes. Moreover, the user can use a movable memory card to transfer the \*.tsj file from the controller to the computer.

In TopSURV version 6.11.03 and earlier, the \*.tsv file is saved on the controller. But Topcon Link/Topcon Tools/TopSURV PC version can not open this file format. Topcon Link has to convert mobile devicebased formats to computer-based formats.Topcon Link performs the conversion during the import process the \*.tsv file to the \*.tlsv file. This format (\*.tlsv) is opened by Topcon Link/Topcon Tools/ TopSURV PC

When connecting to a CE-based device, Microsoft ActiveSync automatically starts up and connects with the device. This connection is required to properly export files. If you need to install ActiveSync, see "Installing Microsoft ActiveSync for Use With CE-based Devices" on page 1-11 for details.



This section describes data export using the Topcon Link interface.

To use Windows® Explorer for data exporting, see "Using Windows Explorer to Export Files to a Device" on page 8-7.

1. Connect your controller and computer according to the controller's documentation.

Note that a Bluetooth<sup>®</sup> connection requires that both devices have Bluetooth wireless technology capabilities.

- 2. With Topcon Link open, click File ▶ Import from Device.
- 3. In the right panel, double-click Mobile Device. Topcon Link connects to the internal memory of the controller.
- 4. Navigate to the location in the controller's memory in which data files are saved. For example, TopSURV files are saved to the CF Card/TopSURV/Jobs directory.
- 5. In the left pane, navigate to the folder on the computer in which the file is saved.
- 6. Select the desired file(s) and click the Move Right button. The file export progress displays.

## Exporting Files to a Total Station

The Topcon family of conventional and robotic Total Stations have an internal data storage device to record data to in various formats. Refer to your Total Station's documentation for details on setup, operation, and connection with other devices.

When exporting files to a TPS Total Station, Topcon Link simply connects to the device and provides a path for the data transfer. The actual file transfer is performed at the Total Station.

The connection procedure for TPS Total Stations varies, so refer to the device's documentation for details.

When connecting to a CE-based device, Microsoft ActiveSync automatically starts up and connects with the device. This connection is required to properly export files. If you need to install ActiveSync, see "Installing Microsoft ActiveSync for Use With CE-based Devices" on page 1-11 for details.



This section describes data export using the Topcon Link interface.

To use Windows® Explorer for data importing, see "Using Windows Explorer to Export Files to a Device" on page 8-7.

- 1. Connect your controller and Total Station according to the device's documentation.
- 2. With Topcon Link open, click File > Export to Device.
- 3. In the left pane, navigate to the folder on the computer in which the file is saved.
- 4. In the right pane, double-click Topcon Total Stations.
- 5. Double-click the desired device to connect with the Total Station.
- 6. Select the coordinate file to export and click the Move Right button.



Figure 8-1. Select File to Export and Total Station

 Follow all steps listed in the Upload file(s) to Total Station dialog box. These steps may vary depending on the connected device. Press the F3 key on the Total Station. 8. Click Start in Topcon Link to export the data and save it in the Total Station.

Upload file(s) to Total Station	×
For export to Topcon TotalStations GPT-3000 series please follow instruction below: Turn on the Total Station by pressing the POWER button. Press the Henu Key Press the F3 key for Memory Manager Press the F4 key twice[2] until you arrive at page 3 Press the F1'key for Data Transfer In the "Data Transfer" the user has a choice to either receive from the computer data in GTS format 'F1', or in SSS format (GTS-7) by pressing 'F2'.	
File name: Status: Cancel Start	

Figure 8-2. Export File to Total Station

## Exporting an OAF to a GPS Receiver

Topcon Positioning Systems issues an Option Authorization File (OAF) to enable the specific options that customers purchase. An Option Authorization File allows customers to customize and configure the receiver according to particular needs, thus only purchasing those options needed.

Typically, all receivers ship with a temporary OAF that allows it to be used for a pre-determined period of time. When the receiver is purchased, a new OAF permanently activates desired, purchased options. Receiver options remain intact when clearing the NVRAM or resetting the receiver. The OAF enables the following kinds of functions. For a complete list of available options and details, visit the TPS website or consult your TPS dealer.

- Type of signal (standard L1; optional L2)
- Memory (standard 0Mb; optional up to 128Mb)
- Update rate (standard 1Hz; optional 5, 10, or 20Hz)
- RTK at 1Hz, 5Hz, 10Hz, and 20Hz
- RTCM/CMR Input/Output

- Co-Op tracking
- Advanced multipath reduction
- Wide Area Augmentation System (WAAS)
- Receiver Autonomous Integrity Monitoring (RAIM)
- 1 PPS (Pulse-Per-Second; a timing signal)

• Event marker

As job requirements expand, new options can be purchased and uploaded to a Topcon GPS receiver as an OAF. The Topcon Link installation creates a virtual directory for connecting to GPS receiver's via the Windows Explorer interface. Use this directory for uploading an OAF to a connected receiver.

- 1. Connect the receiver to the computer. Turn on the receiver.
- 2. Navigate to the Topcon Receivers device directory and click the device icon.
- 3. After discovering devices, right-click the receiver's icon and click Transfer options file.
- 4. Navigate to and select the OAF file for this TPS receiver. Click Open to upload the file.

	Open	? 🛛
	Look in: 🗀 oaf-1 🔹 🗲 🖆 🖽 -	
	AEBQ3P6ZU00.tpo	
😂 Topcon Receivers		
File Edit View Favorites To	ools Help 🥂	
🕒 Back 🔹 🕥 🕤 🏂 🍃	Search 🎼 Folders	
Address 🛃 Topcon Receivers	🖌 🔁 🕞	
Folders  Topcon Digital Levels  Control Control Stations  Topcon Total Stations  Topcon Total Stations  Recycle Bin  Recycle Bin  My Bluetooth Places	Search for connect	
	My Network File name: AEBQ3P6ZU00 tpo  Places Files of type: Topcon Dptions file (*.tpo; *.jpo)	Open Cancel

Figure 8-3. Export OAF to GPS Receiver

## Using Windows Explorer to Export Files to a Device

After installing Topcon Link, the computer's hard drive contains up to five virtual drives for accessing Topcon devices to import/export data. These virtual drives provide a quick way to transfer data without opening Topcon Link. Many of the steps are the same as for importing/exporting data via the Topcon Link interface. See the corresponding section above for further details on the steps listed in sections below.

#### Export to a TPS Mobile Device using Explorer

- 1. Connect the controller to the computer. Connect to the controller via ActiveSync.
- 2. On the computer, navigate to and copy the file(s) to export.
- 3. Navigate to the Topcon Mobile Devices device directory and click the device icon.
- 4. Navigate to the CF card and the desired job file(s).

5. Paste, or drag-and-drop, the desired file(s) to the controller.



Figure 8-4. Export Using Explorer – Mobile Device

#### Export to a TPS Total Station using Explorer

- 1. Connect the total station to the computer. If needed, connect to the total station via ActiveSync.
- 2. On the computer, navigate to and copy the coordinate file to export.
- 3. Navigate to the Topcon Total Stations device directory and click the device icon.
- 4. Click the icon for the connected total station.
- 5. Paste, or drag-and-drop, the file to a directory on the computer.
- 6. Follow all instructions on the Upload file(s) to Total Station dialog box.

7. Press F3, then click Start to upload the file.



Figure 8-5. Export Using Explorer – Total Station

## **Notes:**


## **Data Views Reference**

Topcon Link has up to three views for displaying job file data: a tabular view, a CAD view, and a layers view. The view that displays—and any data in that view—depends on both the file format and the data contained in the job.

For coordinate, total station raw data and digital level files, the same tabs will always open, whether or not the data is present. However, when opening a TopSURV database file, Topcon Link reads the file and displays the appropriate tabs and graphical views associated with the data.

- Coordinate file tab Points
- Total Station raw data file tabs Points and TS Obs
- Digital Level file tabs Points and DL Obs
- TopSURV database file tabs Points
  - GPS Occupations, if the job contains GPS occupations
  - TS Obs, if the job contains total station observations
  - GPS Obs, if the job contains GPS observations
  - Codes, if the job contains codes
  - Linework, if the job contains linework
  - Tap Dimensions, if the job contains tape measurements
  - Images, if the job contains images (such as data obtained using the GPS-7000i total station)
  - X-Section Templates, if the job contains road data
  - Roads, if the job contains road data

When viewing a TopSURV database file, the CAD view displays points and linework, and a Layers view can be displayed if the job file contains layers.

## **Coordinate File Data View**

Coordinate files contain data on points taken with total station, digital levels, or GPS receivers. The coordinate file data table contains only one tab to display data. Because coordinate files do not store unit and system information, you can select these settings using the advanced options while opening or in the status bar.

For details on editing coordinate information, see Chapter 6 (coordinate data can be contained in TS, DL, or GPS measurements).

## **Points Tab**

For coordinate files, the Points tab has the following default columns.

- Icon the symbol used for the point
- Name the name of the point
- Latitude\Northing the measured northing coordinate for the point and coordinate type
- Longitude\Easting the measured easting coordinate for the point and coordinate type
- Elevation the elevation of the point
- Note any notes associated with the point
- Code any codes associated with the point

•°	Points					
I	Name	Latitude	Longitude	Ell.Height (m)	Code	Note
Δ	BASE2	40 06 07.52051N	82 59 12.47055W	808,095	Base	
Δ	CP2	40 06 11.08726N	82 59 16.18872W	810,591		
≙	CP4	40 06 13.12269N	82 59 10.68572W	809,265		
Δ	CP5	40 06 07.23787N	82 59 06.52397W	807,545		
⊿	CP6	40 06 05.22798N	82 59 12.11935W	808,409		Base for TS
					Meters	None

Figure A-1. Coordinate File Data Table

### **Icon Descriptions**

Table A-1 lists the icons used to represent different information in the data table.

Location	lcon	Description
	•	Unknown point
Points Tab	Δ	Fixed coordinates point
	<del>(*)</del>	Offset point (only for GTS-7 Points)

Table A-1	Coordinate	File Icons

## **TS Observations File Data** Views

Total Station observation files contain data on points and observations taken with a total station instrument. The TS observations file data table contains two tabs to display data. Because total station files do not store system information, you can select these settings using the advanced options while opening or in the status bar.

For details on editing total station observation information, see "Editing TS Observations" on page 6-12.

## **Points Tab**

For TS Obs files, the Points tab has the following default columns:

- Icon the symbol used for the point
- Name the name of the point
- Latitude\Northing the measured northing coordinate for the point and coordinate type
- Longitude\Easting the measured easting coordinate for the point and coordinate type
- Elevation the elevation of the point

- Code any codes associated with the point
- Control the coordinate fix of the point (None, Horizontal, Vertical, Both)
- Note any notes associated with the point

Icon	Name	Ground Northing (m)	Ground Easting (m)	Elevation (m)	Code	Control	Note
•	1	9,938	13.391	1.122	TREE	None	
۰ ف	10	18,474	15.984	-0.086	TREE	None	
۰ ف	2	3.111	15.239	4,290	TREE	None	
Φ	3	4.000	9,992	-0.095	TREE	None	
\$	4	6.913	7.632	0.407	TREE	None	
\$	5	2.554	3.574	0.731	TREE	None	
Φ	6	12.070	3.740	-0.889	TREE	None	
Φ	7	15.848	1.402	2.238	TREE	None	
\$	8	21.133	2.555	0.443	TREE	None	
\$	9	17.476	8.531	-1.408	TREE	None	
Δ	MARK	10.000	10.000	0.500	STAT	Both	
Δ	ST1	13.845	7.055	-0.256	STAT	Horizontal	
	ST2	14.859	10.678	-0.202	STAT	Vertical	

Figure A-2. TS Obs File Data Table – Points Tab

## TS Obs Tab

For TS Obs files, the TS Obs tab has two panels, the left for points with known coordinates, the right for points with unknown coordinates measured from the point selected in the left panel.

The left panel contains the following default columns:

- Icon the symbol of the point
- # the number of the point
- Point Name the name of the point
- Instrument Height the height of the instrument in the selected units (ft, m)

The right panel contains the following default columns:

- Icon the symbol of the point
- # the number of the point
- Point From the beginning of the vector

- Point To the end of the vector
- Reflector Height the height of the reflector
- Azimuth, Horizontal Circle, Zenith Angle, Slope Distance angular and linear measurements in the selected units (DMS, qon, mil, radian, ft, m)
- Note any notes associated with the point
- Code any code associated with the point
- Type the type of point
  - SS: side shot point
  - BS: backsight point (the previous occupation point)
  - FS: foresight point (the next occupation point)
  - BKB: backsight bearing point
  - Horizontal/Vertical Resection: plane or vertical coordinates of station point are computed using measurements from two (or more) points with known coordinates
  - Resection: plane and vertical coordinates of station point are computed using measurements from two (or more) points with known coordinates

	C:\Topcon Link Data\M062502.raw         GTS-6 Raw>         Image: Control of the second											
Icon	#	Point Name	Instrument Height	Icon	#	Point From	Point To	Reflector Heig	Azimth			
۵,	1	MARK	1.520	Φ,	1	MARK	ST1	1.600				
$\diamond$	2	ST1	1.460	\$,	2	MARK	ST1	1.600				
\$,	3	ST2	1.410	Φ,	3	MARK	ST2	1.600				
\$.	4	1	1.510	Φ,	4	MARK	ST2	1.600				
♦	5	2	1.520	Φ,	5	MARK	1	1.600				
$\diamond$	6	3	1.460	\$,	6	MARK	2	1.600				
♦.	7	4	1.410	Φ,	7	MARK	3	1.600				
				Φ,	8	MARK	4	1.600				
				•					Þ			

Figure A-3. TS Obs File Data Table – TS Obs Tab

## **Icon Descriptions**

Table A-2 lists the icons that represent different Topcon Link parameters in the data table.

Location	lcon	Description
	٥	TS station
	$\Phi$	TS point
Points Tab	$\Delta$	Fixed coordinates point
	Δ	Fixed Horizontal control
		Fixed Vertical control
TS Obs Tab, Left Panel	♦,	TS station
	$\diamond_{2}$	ForeSight measurement
TS Obs Tab, Right Panel	Ф,	SideShot measurement
	٠,	BackSight
TS Obs Tab, Right Panel	۵.	BackSightBearing point measurement
(Continued)	$\Phi_{\rm c}$	TS Resection Observation

Table A-2. Total Station Raw Data File Icons

## **Digital Level File Data Views**

Digital level files contain data on points measured with a digital level instrument. The DL observations file data table contains two tabs to display data.

For details on editing level measurements, see "Editing Digital Level Observations" on page 6-19.

## **Points Tab**

For a Digital Level file, the Points tab has the following default columns:

- Icon the symbol used for the point
- Name the name of the point
- Latitude\Northing the measured northing coordinate for the point and coordinate type
- Longitude\Easting the measured easting coordinate for the point and coordinate type
- Elevation the elevation of the point
- Code any codes associated with the point
- Control the coordinate fix of the point (None, Horizontal, Vertical, Both)
- Note any notes associated with the point

	C:\topcon\TopconLink\DigitalLevel\37wcent1.lev <topcon dl="" obs=""></topcon>										
•°	Points	🛃 DL Obs	1								
Ic			Ground Northin	Ground Easting	Elevation (USft)	Code	Control	Note			
	1						None				
	2						None				
	20						None				
	21						None				
	22						None				
	3						None				
	4						None				
	5				100.000		None				
	B01				100.000		Vertical				
<								>			

Figure A-4. DL Obs File Data Table – Points Tab

## **DL Obs Tab**

For a Digital Level file, the DL Obs tab has two panels, the left for start and end points of a job, the right for all level measurements for the job selected in the left panel.

The left panel contains the following columns:

- Icon the symbol of the leveling job
- *#* the number of the leveling job
- From the start leveling point of the job
- To the finish leveling point of the job
- Level Run the name of the leveling job created in a Topcon digital level
- Date the start date (day/month/year) and time of job creation
- Note displays user comments
- Distance the sum of all backsight and foresight distances
- Balance the sum of differences between DL to BS point and DL to FS point of the job

The right panel contains the following columns:

- Icon displays a symbol associated with turning points
- # the number of the measurement
- Point the name of the turning point
- BS the measurement for backsight point
- FS the measurement for foresight point
- Distance measured distance
- Elevation the orthometric heights of the point (or the height of the point is calculated from a point with known height)
- Vert. Offset displays the vertical offset from the horizontal plane for traverse and sideshot points
- Note any comment for the level measurement

- Std Dev standard deviation for the level measurement. This value is created in the digital level
- Date the date and time of level measurement
- Level Run the name of the leveling job created in a Topcon digital level

Points DL Obs											
I #	From	To	Level Run	I	#	Point	BS (USft)	Instrument Elev	SS (USft)	FS (USft)	Eleva 🗸
Z, 1	B01	5	TOPCON	Π,	1	B01	14.829	35.000			
				0,	2	1		35.000		17.192	
				Π,	3	1	16.699	34.850			
				Ο,	4	2		34.850		17.913	
				Π,	5	2	14.797	33.900			
				Ω,	6	20		33.900	18.274		
				Ω,	7	21		33.900	20.046		
				Ω,	8	22		33.900	19.718		-
				Δ,	9	3		33.900		17.552	
					10	3	17.487	33.880			

Figure A-5. DL Obs File Data Table – DL Obs Tab

### **Icon Descriptions**

Table A-3 lists the icons that represent different Topcon Link parameters in the data table.

Location	lcon	Description
	۵	Traverse Point for digital level observation
Points Tab	¢	Side Shot
	Δ	Fixed coordinates point
	Δ	Fixed Horizontal control
		Fixed Vertical control
DL Obs Tab, Left Panel	8,	Leveling job

Table A-3. DL OBS File Icons

Location	lcon	Description
	₽,	BackSight level measurement
DL Obs Tab, Right Panel	۵,	ForeSight level measurement
	●,	SideShot level measurement

Table A-3. DL OBS File Icons (Continued)

## **TopSURV** File Data Views

A TopSURV database file contains information on the various GPS, total station, digital level, tape dimension, and cross-section template data measured/recorded with an instrument running TopSURV. The type of information in the TopSURV database file determines the tabs that will display. TopSURV database files also display linework and points in a graphical CAD view. If the TopSURV file includes layers, another view is available for managing this data.

If TopSURV job contains localization, Topcon Link displays the point coordinates in the both coordinate systems (WGS-84/Datum and Ground/Localization). Topcon Link does not recalculate localization parametes which were ctreated in TopSURV.

•° Poi	nts 🤗 GPS Occ	upations \mid 🤗 GPS O	bs 🛛 🌲 Codes 🗎				
Icon A A C C C C C C C C C C C C C	🔺 Name	Ground Northing (Ift)	Ground Easting	Elevation (Ift)	Code	Note	
Δ	A	3273.761800	4142.383900	100.00000	1		
Δ	В	3313.552600	4038.771800	100.00000	1		
۲	BASE_F1	4934.179000	4983.853000	200.00000	<sup>1</sup> in local	coordinate	eveten
Δ	C	3415.514200	3632.428900	100.00000	in iocai	coorumate	systen
•	F1-1	4010.038539	4449.902470	200.00000	2		
0	F1-2	4011.296856	4492.716598	200.00000	2		
<							
_							
eady			IFee	t DMS Ground	06_078STCL_GPS_	7.tlsv Localization	
							-

		Latitude	Longitude	Ell.Height (Ift)	Code		Note	Photo Notes
Δ	A	33°38'24.8	111°55'31	1438.19224	1			
Δ	В	33°38'39.0	111°55'32	1453.17121	1			
۲	BASE_F1	33°38'29.8	111°55'32	1443.57057	1in l	Datun	i coordina	te syste
Δ	С	33°38'29.3	111°55'32	1443.11139				
0	F1-1	33°38'29.3	111°55'38	1445.09037	2			
•	F1-2	33°38'21.1	111°55'38	1436.60310	2			
<								
•								

For details on editing TopSURV data file information, see Chapter 6 (TopSURV data files can contain TS, DL, or GPS measurements).

## **CAD** View for TopSURV Files

The CAD view is a two-dimensional, graphical representation of linework road and surface data, with associated points, in a TopSURV file. To view the CAD graphic, click View → CAD View. Depending on the file's data and the filters used, the following information will be displayed. To set filters, see "Setting CAD View Options" on page 3-21.

- Points display with the associated symbols. If the point does not have a symbol assigned, its survey symbol will be used.
- Lines display with the associated code/layer color, style, and width.
- Control codes (/AS, /AE, /C) display as an arc or closed polyline, repectively.
- Codes with a polygon entity display as closed and filled (if a fill color has been set).



• Roads display in the color applied to the corresponding layer(s).

Figure A-6. TopSURV File CAD View



The Roads tab and X-Section Templates tab have independent CAD graphical views associated with the selected data element.

## **Layers View for TopSURV Files**

The Layers view lists all layers in the file with associated properties. To view the layers, click View > Layers. The following information will be displayed for each layer. To edit a layer's properties, see "Editing Layers" on page 6-44.

- Name the name of the layer
- Visible if the layer is visible in the CAD view
- Line Style the style used for lines in this layer
- Line Width the width of lines in this layer
- Color the color of points and lines in this layer
- Point Symbol the icon used for points in this layer
- Breakline Type the type of breakline for the layer (Auto, Breakline, Boundary, or Exclusion)
- Note any notes associated with the layer
- Fill Area any closed polylines will be filled with the color associated with the layer

Layers : C:\topcon\TopconLink\gradework_road.tlsv									
Name	Visible	Line Style	Line Width	Color	Point Symbol	Breakline Type	Note	Fill Area	
<i> o</i>	Yes		1 pt		•	Auto		No	
🕖 EP	Yes		1 pt		•	Auto		No	
🕖 ESP	Yes		1 pt		•	Auto		No	
🍠 S/Brk	Yes		1 pt		•	Auto		No	
🕖 Vflo	Yes		1 pt		•	Auto		No	

Figure A-7. TopSURV File Layers View

## **Points Tab**

For a TopSURV database file, the Points tab has the following default columns:

- Icon the symbol of the point
- Name the name of the point

- Latitude\Northing the measured northing coordinate for the point and the coordinate type
- Longitude\Easting the measured easting coordinate for the point and the coordinate type
- Elevation the elevation of the point
- Code any codes associated with the point
- Control the coordinate fix of the point (None, Horizontal, Vertical, Both)

° Po	ints 🔗 G	PS Occupations 🛛 👌	👔 TS Obs   🤗 GP	S Obs 🛛 🌲 Codes	0,	Tape Dimensions	
Icon	Name	Grid Northing (m)	Grid Easting (m)	Elevation (m)	Code	Control	Note
Φ	1000	235252.180	559029.918	244.423		None	
Φ	1001	235255.868	559044.886	244.619		None	
Φ	1100	235236.378	559020.844	245.866		None	
Φ	1101	235236.218	559018.840	246.114		None	
Φ	1102	235236.219	559018.850	245.860		None	
Φ	1110	235236.374	559020.858	245.870		None	
Φ	1111	235236.381	559020.878	245.471		None	
Φ	1112	235236.379	559020.848	245.471		None	
Φ	2000	235229.374	559056.119	243.832		None	
Φ	2001	235229.374	559056.119	241.832		None	
<b>\$</b>	88	235238.862	559052.102	242.673		None	
Δ	89	235255.863	559044.905	242.619		Both	
Φ	90	235255.864	559044.905	244.619		None	
<del>\$</del>	E4					None	
<del>ф</del>	Office_2					None	
•	Office_3					None	
⊕.	Office 4					None	

• Note - any notes associated with the point

Figure A-8. TopSURV Data Table – Points Tab

## **GPS Occupations Tab**

For a TopSURV database file, the GPS Occupations tab has the following default columns:

- Icon displays a symbol associated with the occupation
- Point Name displays the name of the occupation
- Original Name displays the original occupation name
- Antenna Type the antenna type used on the occupation
- Antenna Height the antenna height

- Antenna Height Method the method used to measure the antenna height, either Vertical or Slant
- Start Time and Stop Time- displays the beginning and end dates (day/month/year) and starting and stopping epoch time of the occupation
- Duration the duration of time in which the observational data was acquired (duration = start time stop time)
- Method the surveying method used at the occupation; either Static or Kinematic
- Note displays user comments
- Source displays the path of the source information on the computer disk drive, local area network, or storage media
- Interval displays the occupation logging interval
- Receiver displays the TPS receiver serial number used for the occupation
- Offset Azimuth defines the direction from occupation other horizontal offsets (distance and cross) are given
- Offset Dist displays the occupation's distance offset
- Offset dHt displays the occupation's height offset
- Offset Across displays the occupation's across offset

° P	oints 🤗 GPS Oc	cupations 🤗 GPS (	Obs 🛛 🌲	Codes			
Icon	Point Name	Original Name	Anten	Ant	Ant Height Met	Start Time	Stop Time
0		5000-5030	HiPer	2.000	Vertical	2/2/2004 1:23:	2/2/2004 1:24:
0		5031-5069	HiPer	2,000	Vertical	2/2/2004 1:35:	2/2/2004 1:36:
0		5070-5128	HiPer	2.000	Vertical	2/2/2004 1:37:	2/2/2004 1:39:
•	CHKPT1	CHKPT1	HiPer	2.000	Vertical	2/2/2004 1:33:	2/2/2004 1:33:
•	CHKPT2	CHKPT2	HiPer	2.000	Vertical	2/2/2004 1:34:	2/2/2004 1:34:
•	CP2	CP2	HiPer	2.000	Vertical	2/2/2004 12:53	2/2/2004 12:53
•	CP3	CP3	HiPer	2,000	Vertical	2/2/2004 12:52	2/2/2004 12:52
o,	CP4	CP4	HiPer	2.000	Vertical	2/2/2004 12:56	2/2/2004 12:56
•	CP5	CP5	HiPer	2.000	Vertical	2/2/2004 1:01:	2/2/2004 1:01:
•	CP6	CP6	HiPer	2.000	Vertical	2/2/2004 1:04:	2/2/2004 1:04:
•	CP7	CP7	HiPer	2.000	Vertical	2/2/2004 1:18:	2/2/2004 1:18:
<b>_</b>	CP8	CP8	HiPer	2.000	Vertical	2/2/2004 1:10:	2/2/2004 1:10:
•	CP_1	CP_1			Vertical		
•	CP_1	CP_1			Vertical	2/2/2004 12:52	2/2/2004 1:36:
•	POND1	POND1	HiPer	2.000	Vertical	2/2/2004 1:27:	2/2/2004 1:27:

Figure A-9. TopSURV Data Table – GPS Occupations Tab
#### TS Obs Tab

For a TopSURV database file, the TS Obs tab has two panels, the left for points with known coordinates, the right for points with unknown coordinates measured from the point selected in the left panel.

The left panel contains the following default columns:

- Icon the symbol of the point
- *#* the number of the point
- Point Name the name of the point
- Instrument Height the height of the instrument in the selected units (ft, m)

- Icon the symbol of the point
- # the number of the point
- Point From the beginning of the vector
- Point To the end of the vector
- Reflector Height the height of the reflector
- Azimuth, Horizontal Circle, Slope Distance, Vertical Angle, Zenith Angle – angular and linear measurements in the selected units (DMS, qon, mil, radian, ft, m)
- Code any code associated with the point
- Type the type of point
  - SS: side shot point
  - -BS: backsight point (the previous occupation point)
  - FS: foresight point (the next occupation point)
  - BKB: backsight bearing point
  - Horizontal/Vertical Resection: plane or vertical coordinates of station point are computed using measurements from two (or more) points with known coordinates
  - Resection: plane and vertical coordinates of station point are computed using measurements from two (or more) points with known coordinates

- Note any notes associated with the point
- Date date and time of the point measurement

Points	0	GPS Occupat	ions 🛇	TS Obs 🤗 GP:	5 Obs	🌲 Codes 🛛 🗖	Tape Dimension	is		
Icon	#	Point From	Point To	Reflector Heig	Azi	Horizontal C	Slope Distan	Vertical Angle	Zenith Angle	Date
Ф,	3	TGLA	88	1.770		129°26'24	34.130	358°58'45	91°01'15.0	8/12/2002 11:14:39
�,	4	TGLA	88	1.770		129°26'22	34.130	358°58'27	91°01'33.0	8/12/2002 11:14:39
Φ,	5	TGLA	88	1.770		148°42'42	5.830	359°02'47	90°57'13.0	8/12/2002 11:14:39
Φ,	6	TGLA	88	1.770		148°42'32	5.830	359°03'00	90°57'00.0	8/12/2002 11:14:39
Φ,	7	TGLA	88	1.770		129°26'23	34.130	358°58'35	91°01'25.0	8/12/2002 11:14:39
Φ,	8	TGLA	88	1.770		129°26'27	34.130	358°58'25	91°01'35.0	8/12/2002 11:14:39
•	٥.	TGLA	88	1 770		148942'34	5,830	350902'36	00%57 <sup>1</sup> 24 0	8/12/2002 11-14-30

Figure A-10. TopSURV Data Table – TS Obs Tab

#### **GPS Obs Tab**

For a TopSURV database file, the GPS Obs tab has the following default columns for baseline measurements from the Base station to the Rover point:

- Icon the symbol of the point
- Point From the starting point of the baseline measurement
- Point To the ending point of the baseline measurement
- Start Time the date and time of the start of the measurement
- Duration the time during which the measurement was taken
- Note any note for the baseline measurement
- Horizontal Precisions, Vertical Precisions the horizontal and vertical precisions of the measurement
- dN, dE, dU the coordinate increments of the measurement in the current projection
- Method the measurement method (RTK Topo or RTK AutoTopo)
- Solution type the type of solution used for the measurement
  - Float, Phase Diff: float phase difference measurement
  - FixeMd,Phase Diff: fixed phase difference measurement
  - Float,Phase Diff, mm GPS: float phase difference measurement with mm GPS

 Fixed,Phase Diff, mm GPS: fixed phase difference measurement with mm GPS

•°	Points	🤶 GPS O	ccupations	🔷 TS Ob:	s 🤗 (	iPS Obs   🎄 😋	des					
I	Point F	Point To	Start Time	Duration	Note	Horizontal Pre	Vertical Pre	dN (m)	dE (m)	dHt (m)	Method	Solution Type
0,	0	Topo1	10/14/	0:00:00	pipe	0.004	0.002	26.118	-19.522	3.809	RTK Topo	Fixed, Phase Diff
0	0	Topo2	10/14/	0:00:00		0.004	0.002	26.119	-19.523	3.804	RTK Topo	Fixed, Phase Diff
0	0	Торо3	10/14/	0:00:00		0.004	0.002	26.121	-19.524	3.801	RTK Topo	Fixed, Phase Diff
0,	0	Auto1	10/14/	0:00:00		0.005	0.003	26.116	-19.522	3.907	RTK Aut	Fixed, Phase Diff
٩,	0	Auto2	10/14/	0:00:00		0.005	0.003	26.121	-19.526	3.913	RTK Aut	Fixed, Phase Diff
0	0	Auto3	10/14/	0:00:00		0.005	0.003	26.117	-19.522	3.911	RTK Aut	Fixed, Phase Diff

Figure A-11. TopSURV Data Table – GPS Obs Tab

#### **Codes Tab**

For a TopSURV database file, the Codes tab has two panels, the left for all available codes, the right for all attributes associated with the object (code) selected in the left panel.

The left panel contains the following default columns:

- Icon the symbol of the object
- Code the code of the object
- Layer display the layer in which the code is used

- Icon the symbol of the attribute
- Name a unique name for the attribute
- Default value the value of the attribute
- Type the type of attribute (integer, real number, text, or menu)

D:\coo	D:\codes_for_linework.tlsv <topsurv files="" pc=""></topsurv>									
•° Point	s 🛛 📿 Lineworl	k 🌲 Codes								
Icon	Code	Layer	· [	lcon	Attribute Name	Default Value	Туре			
•	C-1	For Line1	E		List for ob18	pipe	Menu			
•	C-2	for_Points	1	2	exam	4	Real Number			
*	C-3	For Points 3		1 2	quiz	lamp	Text			
			1	2	test	6	Integer			

Figure A-12. TopSURV Data Table – Codes Tab

#### **Linework Tab**

For a TopSURV database file, the Linework tab has two panels, the left for all lines (codes, layers, and strings) in the job, the right for all line segments associated with the line selected in the left panel.

The left panel contains the following default columns:

- Icon the symbol associated with the line
- Code the primary code used for the line
- String (enable in Tabular view options) the string for the line
- Layer the layer for the selected line
- Color/Line Style/ Point Symbol/Line Width the plotting style of the selected line

- Icon the symbol associated with the line segment
- Order the order of points associated with the line segment
- From the beginning point of the line segment
- To the end point of the line segment. If the line is closed, the "To" point for the last segment will be the same as the start point of the line.
- Control Code (enable in Tabular view options) the control code of the point
  - Arc Start: the starting point of the arc
  - Arc End: the ending point of the arc
  - Close: the last point in a closed line

- D:	from_tt2	tlsv <to< th=""><th>PSURV P</th><th>C files&gt;</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>(</th><th></th></to<>	PSURV P	C files>										(	
• •	oints 🔽	Linework	4 Code	15											
Icon	Code	String	Layer	Color	Line Style	Line Width	Point Symbol	Ŀ	Icon	Order	From	To	Control Code	Control Code 2	
•	1	2	Line_L2	BYLAYER	BYLAYER	BYLAYER 5 pt -	BYCODE .		•	1	User10	User13			
									•	2	User13	User12			
									•	3	User12	User11			
									•	4	User11	User10	Close		

Figure A-13. TopSURV Data Table – Linework Tab

#### **Tape Dimensions Tab**

For a TopSURV database file, the Tape Dimensions tab has two panels, the left for all tape dimensions in the job, the right for tape measurements of the tape dimension selected in the left panel.

The left panel contains the following default columns:

- Icon the symbol associated with the tape dimension
- Start Point the name of the starting point for the dimension
- End Point the name of the ending point for the dimension

- Icon the symbol of the point
- # measurement sessions
- Point to measurement direction
- Distance the length of the line
  - the "-" sign stands for a left turn
  - the "+" sign stands for a right turn relative to the direction of the measurement the last line
- Date the date and time of the measurement finished
- Note any notes associated with the measurement

🗖 C:\Topcon Link	Data\Jobs\tape	.tlsv	<topsu< th=""><th>₹¥ file</th><th>25&gt;</th><th></th><th></th><th>_ 🗆</th></topsu<>	₹¥ file	25>			_ 🗆
🔹 Points 🛛 🤗	GPS Occupations	🛇	TS Obs	8	GPS Obs	🌲 Codes 🔍	Tape Dimensions	
Icon Start Point	End Point		Icon	#	Point To	Distance (m)	Date	Note
<b>P</b> 100	A			1	1	-10.000	3/30/2004 09:	
				2	2	20.000	3/30/2004 09:	
				3	3	20.000	3/30/2004 09:	
				4	4	20.000	3/30/2004 09:	

Figure A-14. TopSURV Data Table – Tape Dimensions Tab

#### **Images Tab**

For a TopSURV database file, the Images tab has two panels, the left for a thumbnail of all images in the job, the right for larger version of the thumbnail image selected in the left panel.

- Topcon Link expects images to reside in a folder with the same name as the data file. For example, data from the "050119.tlsv" file will be associated with images in the "050119" folder.
  - The data file and image folder must reside in the same directory for the images to display.

The left panel contains a thumbnail image of all images in the job, with the lowest image title (either numerically or alphabetically) listed first.

The right panel contains the selected image with measured points and linework associated with the image. The symbols of the points correspond to the settings selected in the Line and Code properties dialog boxes. The size of the symbol depends on the distance from the station.



Figure A-15. TopSURV Data Table – Images Tab

#### **X-Section Templates Tab**

For a TopSURV database file, the X-Section Templates tab has two panels, the left for all cross-section templates in the job, the right for segments used in the cross-section template selected in the left panel.

The left panel contains the following default columns:

- Icon the symbol associated with the template
- Name the name of the template
- Cut Slope (1:n) the percentage of cut for the slope
- Fill Slope (1:n) the percentage of fill for the slope

The right panel contains the following default columns and a graph for the x-section template selected in the left panel:

- Icon the symbol of the segment
- Order the sequential order of the segment
- Code the code used for the segment
- Hz. Dist the horizontal offset from the central line for the segment
- V.Dist the vertical offset from the horizontal plane for the segment. If a value is entered for this parameter, the Grade will be automatically calculated.
- Grade% the ratio of Hz. Dist and V.Dist multiplied by 100%. If a value is entered for this parameter, the V.Dist will be automatically calculated.
- Hz. Offset from CL (m) horizontal offset from the central line for the segment start point. Calculated using the corresponding values of the previous segment(s).

• V. offset from CL (m) – vertical offset from the horizontal plane for the start point of the segment. Calculated using the corresponding values of the previous segment(s).

Name	S A X-Section Ter	Fill Slope (1:n)	· · · · · · · · · · · · · · · · · · ·	Code	Hz. Dist	V. Dist (m)	Grade (%)	Hz. Offset from	V. Offset from
Station-121	0.000	0.000	- 1		1.000	-0.020	-2.000	0.000	0.00
right-left	0.000	0.000	2		4.000	-0.200	-5.000	1.000	-0.02
			V. Offset from CL, m						
			0 -						

Figure A-16. TopSURV Data Table – X-Section Templates Tab

#### **Roads Tab**

For a TopSURV database file, the Roads tab has two panels, the left for all roads in the job, the right for horizontal alignments/vertical alignments/x-section templates for the road selected in the left panel.

The left panel contains a data tree with the following entries for each road in the job.

- Horizontal alignment select to show both table and graph; expand to select and show just the table or graph
- Vertical alignment select to show both table and graph; expand to select and show just the table or graph
- X-Sections select to show both table and graph; expand to select and show just the table or graph

The right panel contains information for the object selected in the left panel, whether a road or an alignment/x-section.

C:\topcon\TopconLink	gradework_road.tls	v <topsurv pc<="" th=""><th>Job&gt;</th><th></th></topsurv>	Job>	
🔹 Points 🥢 Roads	X-Section Templates	🌲 Codes		
<ul> <li>- ✓ 6220-A12GradeWork</li> <li>- Z, Horizontal alignme</li> <li>- ∰ Table</li> <li>- Z Graphic</li> </ul>	I Order 1 2 3	Type	Northing, m -	
Vertical alignment     Table     C Graphic		Spiral CS to S		590000 Easting, m
X-Sections	I Type  Parabola Long	Sta/Chainage (n 25616.94	Elevation, m	
	Parabola Long Parabola Long Parabola Long	28870.16 29772.85	-	<u>~25616.949</u> 29022.5681
	Parabola Long	30047.17		275+0 CL Positions, m
	I Sta/Chainage (m)	Side 🔼	V. Offset	
	26868.174 26868.174	Right Left 🗸		0 Hz. Offset from CL, m
< • >	<	>		o H2. Offset from CL, m

Figure A-17. TopSURV Data Table – Roads Tab

**The horizontal alignment table** has the following default columns and/or a graph for the road or horizontal alignment selected in the left panel.

- Icon the symbol associated with the element of the alignment
- Order the order of the element in the horizontal alignment
- Type the type of element (line, curve, spiral, or intersection)
- Azimuth the azimuth of the element
- Length the length of the element; editable for all types of elements except Intersection, where the length is calculated for the compound curve consisting of two spirals and one curve
- Turn the direction of the turn for a curve, a spiral, and intersection; "Right" is a clockwise direction, "Left" is a counter-clockwise direction
- Start Radius/End Radius the radius of the curve or spiral
- Northing/Easting the grid/ground coordinates of the intersection point
- Spiral 1 Len/Spiral 2 Len the length of the spiral at the intersection point
- End Station the number of the end station for the element

- Intersection Pt the name of the intersection point
- Tangential to prev element displays "True" if the azimuth for this element is the end azimuth for the previous element; displays "False" if the azimuth for this element is arbitrary
- End Northing /End Easting the grid/ground coordinates of the end station of the element
- End Azimuth the azimuth that sets the tangent to the end station of the element
- Spiral Dir the spiral direction
- Delta the angle between the radii corresponding to the curve
- Chord the length of the segment joining start and end points of a curve
- Tangent the length of the segment which touches the given curve
- Mid Ord the distance from the midpoint of a chord to the midpoint of the corresponding curve
- External the distance from the midpoint of the curve to the intersection point of the tangents
- Spiral Const the square root of the product of the length and the radius of the spiral
- Spiral Const 1/Spiral Const 2 the spiral constants used to define a compound curve

• Start Deg Chord/End Deg Curve – the angle in degrees used to compute the radius of curve whose chord is 100 units long.

📍 Points 🛷 Roads 🛛 🦻	X-Section Template	es 🛔 Codes 📔				
= 🥢 6220-A12GradeWork	I Order	Туре	Azimuth	Length (m)	Turn	1
Z Horizontal alignme	/ 1	Line	60°57'59.0000	250.948		
Table	C 2	Spiral TS to SC	60°57'59.0000	88.392	Right	
2 Graphic	<u>(</u> 3	Curve	63°51'58.9963	624.177	Right	
Vertical alignment	P 4	Spiral CS to ST	104°49'21.9835	88.392	Right	
Z Graphic	/ 5	Line	107°43'21.9798	214.555		
X-Sections	/ 6	Line	107°43'21.9798	488.263		
Table	0 7	Spiral TS to SC	107°43'21.9798	100.584	Right	1
	Northing, _	255887.8979 x25616.949		.414 *273 <u>7</u> 14	9 <u>7</u> 261	>

Figure A-18. TopSURV Data Table – Roads Tab, Horizontal Alignment Panel

**The vertical alignment table** has the following default columns and/ or a graph for the road or vertical alignment selected in the left panel.

- Icon displays an image associated with the elements.
- Type the type of the element (grade, parabola, or long section)
- Sta/Chainage the number of the start station or chainage for the grade, parabola, and long section element
- Order the order of the element in the vertical alignment
- Length the length of the vertical element for the grade and parabola, and the length of the curve of the long section
- Start Grade / End Grade the starting and ending percentages of grade of the element. If the grade is rising, the value should be positive; if the grade is falling, the value should be negative
- Elevation the elevation value on the end station for the grade and parabola and the elevation value of the station used for creating of the long section

C:\topcon\TopconLink\	grade	work_road.tls	<pre>v <topsurv pc<="" pre=""></topsurv></pre>	Job >		
🗣 Points 🥢 Roads 🗠	X-S	ection Templates	🎄 Codes			
E- 🖉 6220-A12GradeWork 📍	I '	Туре	Sta/Chainage (m)	Order	Length (m)	Start Grade (
E Z Horizontal alignme		Parabola Long	25616.949	1	0.000	0.0
Table		Parabola Long	28870.168	2	304.801	-3.(
2 Graphic		Parabola Long	29772.850	3	487.681	-1.5
Vertical alignment		Parabola Long	30047.171	4	0.000	4.5
2 Graphic						
X-Sections						
Table						
	<			)		>
	Elev	ation,	25616.949			
<			260+0 27	0+0 280+0	290+0	EL Positions, m

Figure A-19. TopSURV Data Table – Roads Tab, Vertical Alignment Panel

**The x-section table** has the following default columns and/or a graph for the road or cross section selected in the left panel.

- Station the station at which the template is applied
- Side the left or the right side of the road relative to the central line where this template is used
- Template the name of the template (selected from the list of existing templates in the current job)

C:\topcon\TopconLink	\gradework_road.tls	v <topsurv pc<="" th=""><th>Job&gt;</th><th></th></topsurv>	Job>	
🔹 Points 🥢 Roads	X-Section Templates	🗍 🌲 Codes 📔		
E 🖉 6220-A12GradeWork	I Sta/Chainage (m)	Side	Template	<u> </u>
E	26868.174	Right	88150R	
- III Table	26868.174	Left	88150L	
C Graphic	- 26883.414	Right	88200R	
Vertical alignment     Table	- 26883.414	Left	88200L	
2 Graphic	- 26974.854	Right	88500R	
E X-Sections	26974.854	Left	88500L	
Table	27035.814	Left	88700L	
	27188.214	Left	89200L	~
	V. Offset from CL, - m			
		0	10	20 Hz. Offset from CL, m

Figure A-20. TopSURV Data Table – Roads Tab, X-Section Template Panel

#### **Icon Descriptions**

Table A-4 lists the icons that represent different Topcon Link parameters in the data table. Note that the icons for codes and linework are user-selectable, and are not listed below.

Location	lcon	Description
	$\diamond$	TS station
	<b></b>	TS point
	•	TS BackSight point
	•	Point coordinates input manually
	•	Point coordinates calculated by means of COGO
	<b></b>	Design point
	Φ	Stakeout point
	Δ	Fixed coordinates point
Points Tab	Δ	Fixed Horizontal control
		Fixed Vertical control
	۲	Base station
	0	Topo point <sup>a</sup>
	۲	Auto Topo point <sup>b</sup>
	<del>(*)</del>	PTL (point to line) offset point
	•	GPS offset point
		Tape Measurement Point

Table	A-4.	TopSUR\	/ File	Icons
Tuble	~	ropoorti		100110

Location	lcon	Description	
TS Obs Tab, Left Panel	♦,	TS station	
	$\diamond_{\mathbf{x}}$	ForeSight measurement	
	$\Phi_{\rm a}$	SideShot measurement	
		BackSight measurement	
TS Obs Tab, Right Panel	۵.	BackSightBearing point measurement	
	Ф.	TS Resection Observation	
	* <sup>*</sup>	TS MLM Observation	
	۹	Base station occupation	
GPS Occupations Tab	0	Auto Topo occupation <sup>c</sup>	
	<b>_</b>	Topo occupation <sup>d</sup>	
GPS Obs Tab	0,	Baseline from the base station to a Topo point	
	0	Baseline from the base station to an Auto Topo point	
Tape Dimensions Tab Left Panel	<b>0</b> 8 8	Start reference line	
Tape Dimensions Tab Right Panel		Tape Measurement Point	

Table A-4. TopSURV File Icons (Continued)

Location	lcon	Description	
	Z	Horizontal Alignment	
Roads Tab	A	Vertical Alignment	
	÷.	X-Section Template	
	Ħ	View Table	
	Ś	View Graphic	
Roads Tab Horizontal Alignment Table	<b>1</b>	Line element	
	ſ	Curve element	
	0	Spiral element	
	5	Intersection element	
Roads Tab Vertical Alignment Table	$\square$	Grade element	
	Q	Parabola element	
	$\bigcirc$	Long Section element	

Table A-4. TopSURV File Icons (Continued)

a. Topo point - the point collected during a static RTK measurement

 b. Auto Topo point – the point collected during a kinematic RTK measurement

c. Auto Topo occupation - the kinematic occupation in the RTK survey

d. Topo occupation - the static occupation in he RTK survey

## **Notes:**

# **Sample File Formats**

## **Coordinate File Formats**

Topcon Link can send, receive, and convert a number of different coordinate file data types. ASCII file formats are listed below.

#### **KOF Coordinates Format**

05	CP1	NAIL	48450.534	558462.743	246.368
05	CP2	NAIL	48579.742	558401.918	247.067
05	CP3	NAIL	48472.603	558478.853	245.887
05	100	BC	48456.890	558451.681	246.684
05	101	BC	48459.802	558456.825	246.468
05	102	BC	48460.338	558457.281	246.439
05	103	BC	48461.074	558457.147	246.408

#### Name, E, N, Z, Code/Name, N, E, Z, Code Coordinate Format

This file has the following format:

Name, Easting/Northing, Northing/Easting, Elevation, Code

CP1,1832223.183,158958.128,808.292,NAIL CP2,1832023.626,159382.035,810.585,NAIL CP3,1832276.036,159030.533,806.714,NAIL 100,1832186.891,158978.979,809.329,BC 101,1832203.767,158988.534,808.619,BC 102,1832205.263,158990.294,808.526,BC 103,1832204.823,158992.706,808.423,BC 104,1832196.907,159086.653,807.951,BC

If the code information is absence in the file:

CP2\_NAD83,1832023.616,159382.018,810.587,

#### Name,Lat,Lon,Ht,Code Coordinate Format

This file has the following format:

Name, Lat, Lon, Ht, Code

CP1,40 06 06.90974,-82 59 13.59001,808.292,NAIL CP2,40 06 11.08744,-82 59 16.18833,810.585,NAIL CP3,40 06 07.62810,-82 59 12.91513,806.714,NAIL 100,40 06 07.11376,-82 59 14.05850,809.329,BC 101,40 06 07.20911,-82 59 13.84203,808.619,BC 102,40 06 07.22658,-82 59 13.82291,808.526,BC 103,40 06 07.25040,-82 59 13.82875,808.423,BC

If the code information is absence in the file:

CP2\_NAD83,40 06 11.08726,-82 59 16.18847,810.587,

#### **FC-4 Coordinate Format**

This file has the following format:

Name

Northing

Easting

Elevation

Code

CP1 158958.12838 1832223.18323 808.29207 NAIL CP2 159382.03548 1832023.62629 810.58455 NAIL

#### GTS-210/310-10 Coordinate Format

Ъ +CP1 x+001524003\_y+001524003\_z+000213360\_\*NAIL\_+CP2 x+001666808\_\_\_\_\_v+001524001\_\_\_\_z+000214079\_\*NAIL\_+CP3 0<sup>0</sup>485 Ъх+801537190\_\_у+801547977\_ z+808212980\_\*NAIL\_+188 у+801516782\_ z+888213672\_\*8С\_+181 \_\_\_\_х+881534 x+001534464 x+001534908\_y+010735 0\_\*BC\_+102 x+001535200 y+001523237 x+001535922\_y+001523429\_z+0002132023% x+001540796\_y+001523056\_z+000213258\_\*BC\_+105 **Ђ01522596\_ z+000213460\_\*ВС\_+102** z+000213433\_\*BC\_+103 Ъ401\_\*BC\_+1<mark>0</mark>4 x+001541721\_ y+001537314\_ z+000212903 \*BC +106 3057Ђ Ъ\_\_\_\_\_х+00154Т078\_\_\_\_у+00154Т972\_\_\_z+000212840\_\*8C\_+107 у+001534145\_\_\_z+000213366\_\*8C\_+108\_\_\_\_\_\_x+0015279 x+001528084 ъ́001532304\_ z+000213372\_\*BC\_+109 x+001527571\_y+001531580 z+000213377\_\*BC\_+110 \_\_\_\_\_x+001526026\_\_\_y+001531069\_\_\_z+0002150195

#### **GTS-7 Coordinate Format**

This file has the following format:

Name, Northing, Easting, Elevation, Code

CP1,5000.0000,5000.0000,700.0000,NAIL CP2,4999.9943,5468.5286,702.3573,NAIL CP3,5078.6555,5042.9982,698.4903,NAIL 100,4976.0449,5034.3210,701.0230,BC 101,4995.3832,5035.7784,700.3283,BC 102,4997.4859,5036.7339,700.2372,BC 103,4998.1150,5039.1041,700.1345,BC 104,4996.8930,5055.0934,699.6638,BC 105,5043.6716,5058.1299,698.4984,BC

If the code information is absent in the file

CP2\_NAD83,4999.9771,5468.5091,702.3597,

#### **TopSURV Coordinate File**

This file has the following format:

Name, Northing, Easting, Elevation, Note, Code

CP1,5000.000,5000.000,700.000,Base St,NAIL

If the note information is absence in the file:

CP3,5042.998,5078.655,698.490,,NAIL

#### **NOTES** information is absence in the file I CP2\_NAD83,5468.509,4999.977,702.360,,

### **GPS Vector File Format**

GPS Vector files have the following format:

Header(//Top<u>con Vector Format:v.number of the version, linear units,)</u> VPP(for

vector),Name\_Point1,Name\_Point2,dX,dY,dZ,sigma\_dX,sigma\_dY,sigma\_dZ,co

r\_XY,cor\_XZ,cor\_YZ,

P(for point), Nane\_Point, Lat(DD MMSS.ss), Lon(DD

MMSS.ss),Ell.Height,Code,Note,

//TopconvectorFormat:v.1\_USFeet, vTRT topo, Base1\_154\_161\_2419, -89. 8123, -68. 3288, 0.00773025, 0.01944847, 0.01418940, 0.0900, -0.0300, -0.2800, LT+T vTRT topo, Base1\_155, 75. 3292, -27. 0161, -17.1042, 0.00894811, 0.02141176, 0.00965958, 0.2500, -0.1300, -0.2900, LT+T vTRT topo, Base1\_156, 27. 2449, -40. 4948, -43. 0569, 0.00796278, 0.01099455, 0.01267762, 0.2000, -0.0300, -0.3500, LT+T vTRT topo, Base1\_156, 27. 2449, -40. 4948, -43. 0569, 0.00796278, 0.01039455, 0.01057974, 0.4300, -0.1200, -0.4300, LT+T vTRT topo, Base1\_157, 27. 0149, -104 54 00.37541, 5879, 325, CP, LT+T PL COR P, 1543, 59 32 17. 60194, -104 53 59. 0528, 5870. 7387, 202, CP, LT+T P, 1563, 59 32 17. 72175, -104 53 59. 57981, 5877. 202, CP, LT+T P, 1563, 59 32 17. 72175, -104 53 59. 05675, 5876, 6057, 5876, 5876, 587, 5870, 202, CP, LT+T P, 156, 39 32 18, 13790, -104 54 00.05369, 5879, 843, CP, LT+L




# Notes:

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