GPS System 500

Getting Started with the Format Manager

Version 4.00
English

Leica Geosystems

Symbols used in this manual

Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

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Chapter Overview

Contents

Introduction to this book

The aim of this book is to help users in getting started with using the Format Manager software to create format files (.frt files) that can be used with Leica GPS System 500.

The best way to learn how to use the Format Manager is to actually generate format files. There are 3 "Quick Tours" in this book which are step by step tutorials explaining how to create the following 3 different format files:

- Quick Tour I - **Report Style** format file
- Quick Tour II - **Leica GSI16** output format file using thematical coding
- Quick Tour III - **Leica GSI16** output format file using free coding

It is recommended that you complete all of these Quick Tours. What you learn in Quick Tour I you will need to use in Quick Tours II and III.

After completing these Quick Tours you should be able to appreciate the flexibility of format files and be able to create a format file for almost any output type you need.

For example, it is possible to create both common output formats such as a Geodimeter type format or a Sokkia SDR33 format and an unlimited number of unique "report" style formats.

Any surveyed data can be used with these format files. However, sample data is provided on the SKI-Pro CD which can be used with each of the Quick Tour format files.

What is a format file?

A format file is quite simply a "mask" or "filter" which allows surveyed GPS data to be exported in any format as an ASCII text file. The format file can be used both in SKI-Pro and on the System 500 sensor.

For example one user may wish to export post processed data from SKI-Pro in a standard Leica GSI16 format. A second user wishes to export RTK data from the sensor in a "Report Style" format.

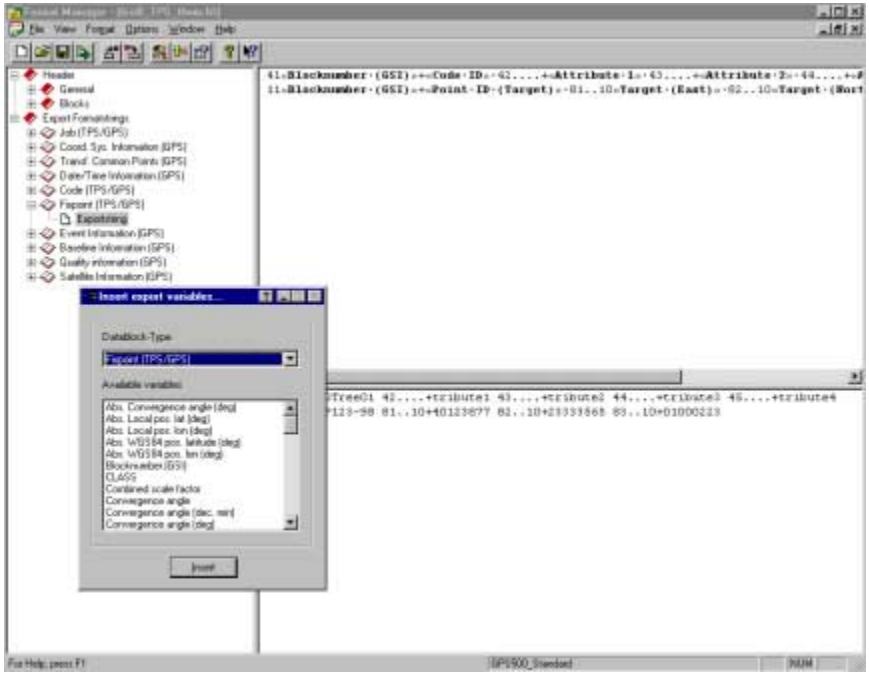
Using the appropriate format file, the export of any data from the sensor and SKI-Pro into both these formats is possible. It is thus easily possible to build up a library of many different output formats.

Each format file needs only to be created once and the same format file can be used on both the sensor and with SKI-Pro.

What is the Format Manager?

The Format Manager is the software that is used to create the format files. It is automatically installed onto your PC when you install SKI-Pro. You do not require a software protection key (dongle) to use the Format Manager.

If you have not yet installed SKI-Pro on your PC, please refer to the **Getting Started with SKI-Pro** user manual for installation instructions.

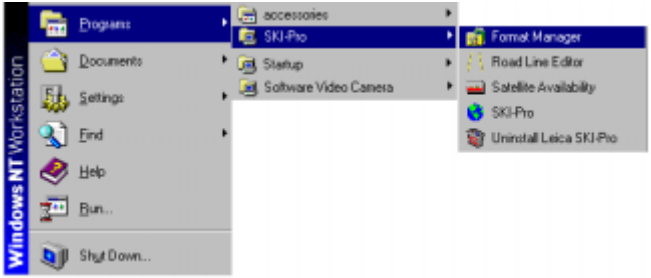


To start Format Manager:

➢From the Windows™ **Start** bar, click **Programs**

➢Select **SKI-Pro**

➢Select **Format Manager**

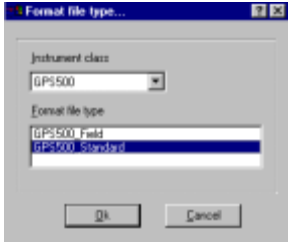


To create a new format file:

Upon starting the Format Manager, you can choose to create a new format file or open an existing format file.

➢To create a new format file, ensure that **GPS500** is chosen as the **Instrument Class** and then click **OK.**

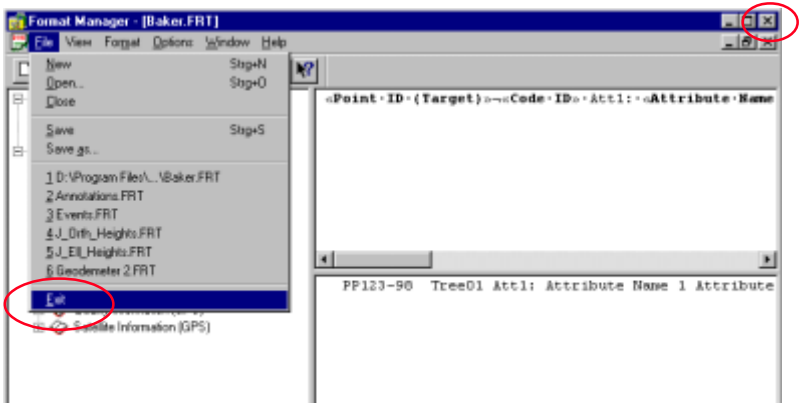
The **Format File Type GPS500_Standard** supports all variables, whereas **GPS500_Field** only supports the sensor variables.



To exit Format Manager:

Firstly ensure any changes you have made to a format file are saved.

➢From the **File** menu click **Exit** or click on the ☒ icon of the Format manager main window.



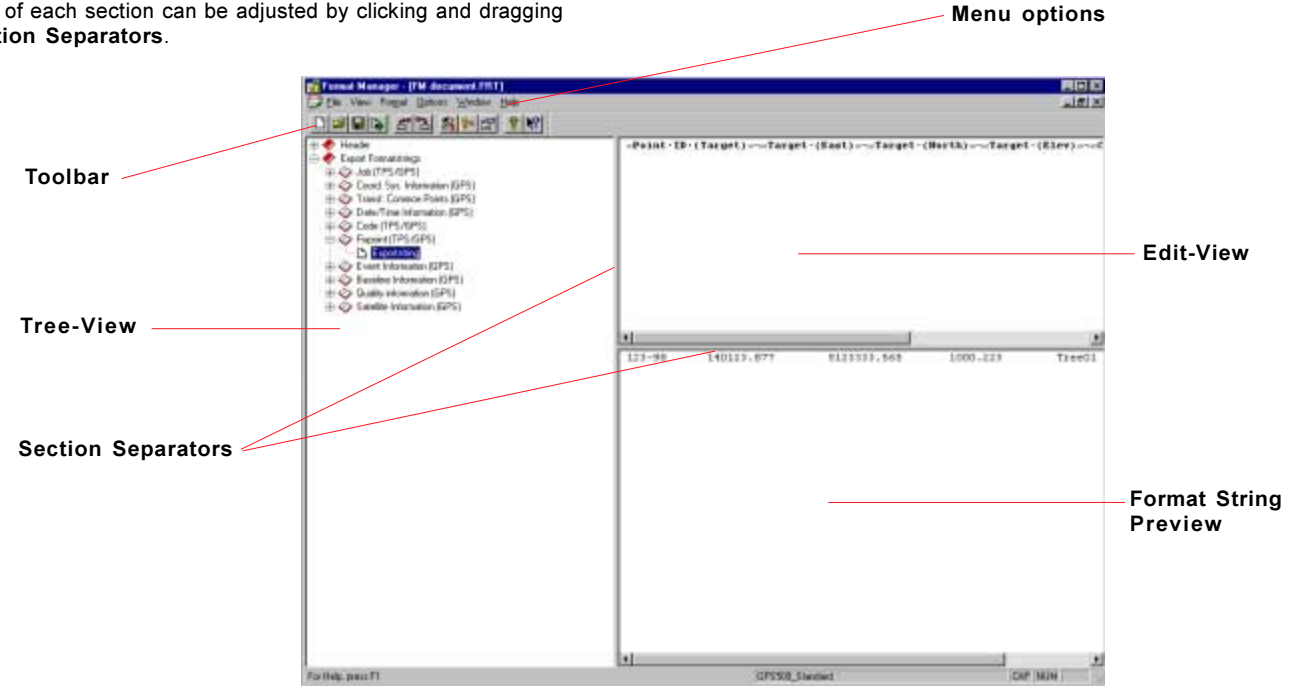
An Overview of Format Manager

Format Manager runs on 32-bit Microsoft Windows™ 95,98 or NT platforms. It is based on standard Windows™ operating procedures and is therefore very easy to learn and to use

The Format Manager screen is divided into 3 sections - the **Tree-View**, the **Edit-View** and the **Format String Preview** sections.

The size of each section can be adjusted by clicking and dragging the **Section Separators**.

The **Menu options** and **Toolbar** are used to navigate through the software.



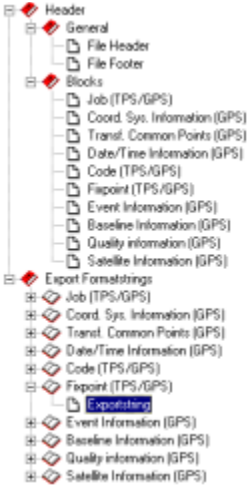
Tree-View:

The tree view provides an overview of all the **Header** data blocks and all **Export Formatstrings** in an expandable hierachy of books and pages .

Double click on an item or click ⊞ to expand it.

If an item is open, double click on it or click ⊟ to close it.

If a **Header** data block or an **Export Formatstring** contains data then the page is shown thus:



Tree-View

Edit-View:

After selecting a **Header** data block or an **Export Formatstring** from the tree view, the data that should be exported for that **Header** data block or an **Export Formatstring** is entered in the Edit-View.

The Edit-View is basically similar to any text editor. Any **text** that is required to be included in the output file needs to be entered here.

In addition, if an **Export Formatstring** page is selected from the Tree-View then the **Insert export variable** dialog box appears. This allows any variables that are to be exported to be chosen.

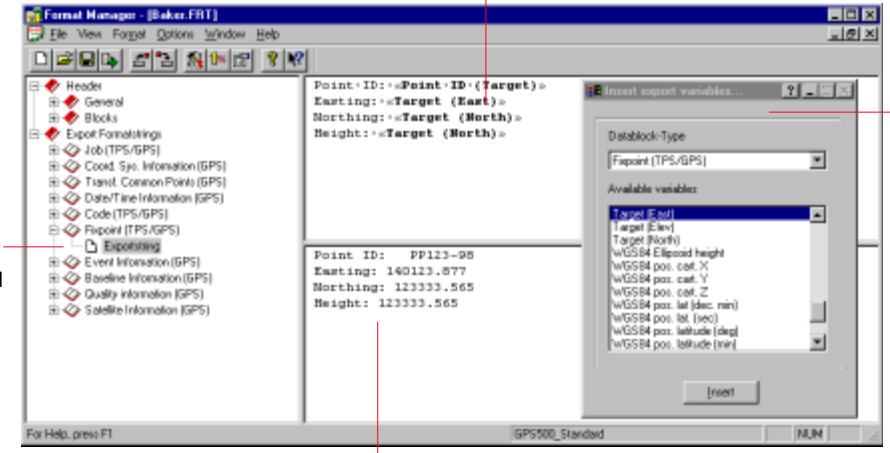
Insert export variable dialog box

Format String Preview:

The Format String Preview section is simply a preview screen. It allows you to see how the **text** and **export variables** will look when the format file is used. No data can be entered in this screen.

Example of how the Views may look whilst working in the Format Manager:

In the **Edit-View** a mix of some **text** and **export variables** has been entered



In the **Tree-View** the Fixpoint **Export Format String** has been selected

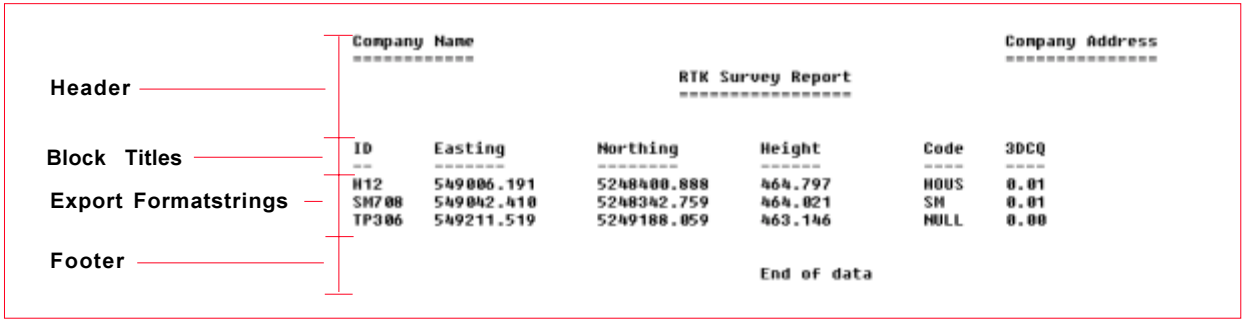
The **Insert export variable dialog box** is active because an **Export Format String** is selected in the **Tree-View**

In the **Format String Preview** you can see how the output data would appear when this format string is used

Quick Tour I - Creating a Report Style Output

This Quick Tour is a step-by-step tutorial to create a format file that will output data in a "report style" format.

The following output is required:



This format file has the following sections:

- **Header** information appearing only once at the head of the report.
- A **Block Title** appears once over the actual surveyed data output.
- **Export Formatstrings** (the surveyed data) arranged in tab delimited columns.
- **Footer** information appearing only once at the end of the report.

A format file does not always have to include a **Header, Block Titles** or a **Footer**.

Note also the following characteristics of this format file:

- All the **Export Formatstrings** are left aligned.
- The **Coordinate** values are output to 3dp but the **CQ** values are output to 2dp.
- There are 2 blank lines between the **Header** and the **Block Titles** and two blank lines between the **Export Formatstrings** and the **Footer**.
- Point **TP306** was not coded when it was surveyed. In the output above, it is given a "default value" of **NULL**.

In Lesson One you will learn how to create the header and footer for the format file.

Start-up the Format Manager:

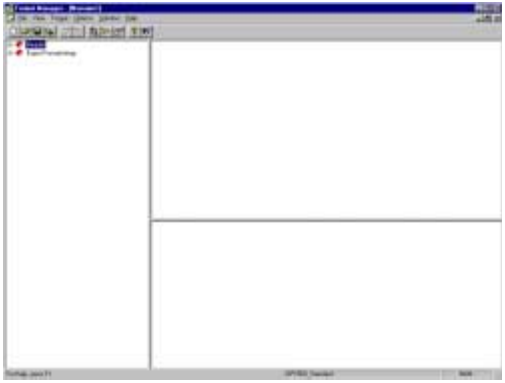
➢From the Windows™ **Start** bar, click **Programs, SKI-Pro** and then click on **Format Manager**.

The **Format file type** dialog box appears.

➢Select **GPS500** as **Instrument Class**. The **Format File Type GPS500_Standard** supports all variables, whereas **GPS500_Field** only supports the sensor variables.

➢Click **OK** to create a GPS500 new format file.

The main Format Manager window appears.

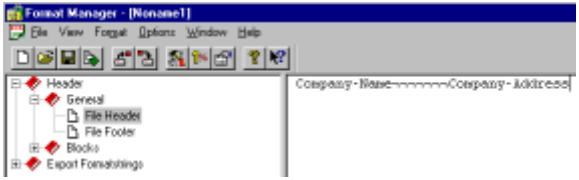


➢In the Tree-View open the **Header** folder and then the **General** folder.

➢Select the **File Header** page.

Click in the Edit-View section and enter the text for the first line of the header.

➢Type the words **Company Name** and then press **Tab** on your keyboard 7 times. Then type the words **Company Address** and then press **Enter**.



As you enter text in the Edit-View, the same text can be seen in the Formatstring-Preview section. Remember, you cannot enter text in this section - it is a preview screen of what is currently shown in the Edit-View.

A space is shown as a ▪ and a tab is shown as a ¬ in the Edit-View.

➢Underline the words Company Name and Company Address using **=** to underline the text. Press **ENTER** after entering the last **=**.

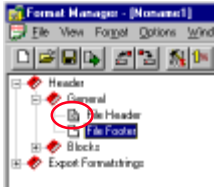
➢Enter the rest of the header text. Enter 4 **tabs** before the words **RTK Survey Report** to centre this text. Press **ENTER** after the last **=**.

➢Press **ENTER** 2 more times. This will put two empty lines before the text which will follow.

You have now completed the header for this format file. We will now enter the **footer** details.

➢Select the **File Footer** page.

Note how the **File Header** page has become grey to show that there is data entered for this page.



Click in the Edit-View section and enter the text for the footer.

➢Press **ENTER** twice. This will put two empty lines after the data that will be output and before the footer text.

➢Enter 4 **tabs** and then type the words **End of Data**.

You have completed the footer for this format file. We will now create the **Block Titles**.

Lesson Two - Creating the Block Titles

A **Block Title** is text that will appear as a "title" above any surveyed data that will be output as **Export Formatstrings.**

➢In the Tree-View open the **Blocks** folder and then select the **Fixpoint (TPS/GPS)** page.

Click in the Edit-View section and enter the text for the block title.

➢Enter the text as shown below and then press **ENTER**. Use the **-** to underline the text.

➢Press **ENTER** at the end of the last **-** . This will ensure the **Export Formatstrings** are output on a new line.

Note there are two tabs between **Easting** and **Northing** and **Height** and **Code**. This is to space the output data correctly.

Lesson Three - Creating the Export Formatstrings output

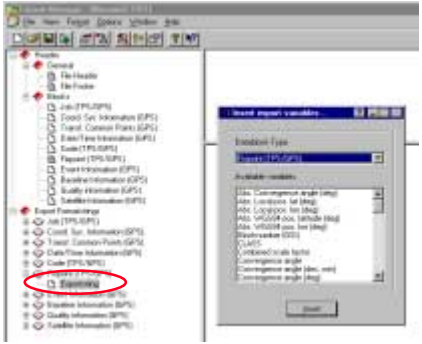
The **Export Formatstrings** are the actual surveyed data values that are required to output. For this format file we need to output the following **export variables:**

- **Point ID**
- **Coordinates -** easting, northing and ellipsoidal height
- **Code ID**
- **3D Coordinate Quality**

An **Export Formatstring** can consist of both variables and text.

➢In the Tree-View open the **Export Formatstrings** folder and then open the **Fixpoint (TPS/GPS)** folder.

➢Select the **Fixpoint** Exportstring.



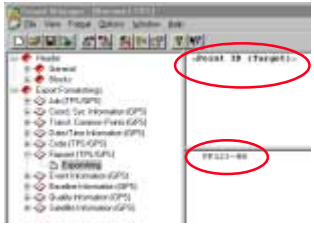
When you select an **Export Formatstring**, the **Insert export variable** dialog box becomes active. This allows the different variables you need for a format file to be chosen.

The first variable needed in this format file is the **Point ID (Target)** variable.

➢Scroll the list box to find the **Point ID (Target)** variable. Select this variable either by double clicking on it, or by highlighting it and then pressing **Insert**.

The **Point Id (Target)** variable will appear in the **Edit-View**.

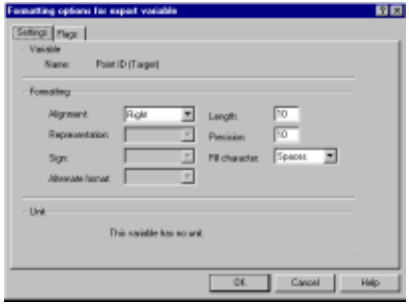
In the **Format String Preview** screen you can see how this variable will look when the format file is used (Format Manager uses a dummy point ID value).



Export Variables that have been selected are shown in the Edit-View with **<< >>** brackets.

For this format file, we only require 6 characters of the point ID to be output. (No point ID in our surveyed data has more than 6 characters). We also require the point ID data to be left aligned.

➢Double click on the **Point ID (Target)** export variable in the Edit-View. The **Formatting options for export variable** dialog box will appear.



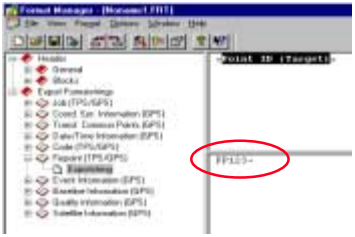
Note that because **Point ID (Target)** is a **String** (text) variable, the **Representation**, **Sign**, and **Alternate Format** options are grey. These settings only apply to **Floating Point (numerical)** variables such as grid or geodetic coordinates.

➢Select the **Alignment** to be **Left**.

➢Choose the **Length** to be **6** and the **Precision** to be **6**.

➢Click **OK**.

The example point ID in the Format String Preview screen will now apppear as left aligned with only 6 characters.

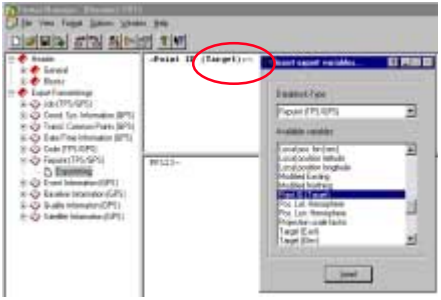


A full description of using the **Default settings for variables** dialog box is given in Appendix A of this manual.

We now need to enter the coordinate variables.

➢Click in the Edit-View screen to put the cursor behind **<<Point ID (Target)>>** variable.

➢Enter a **tab** which will separate the **<<Point ID (Target)>>** export variable from the easting export variable.



Before entering the coordinate variables, we should consider something.

Previously, after we had entered the variable **<<Point ID (Target)>>** we then had to set the alignment and the length and precision by using the **Formatting options for export variable** dialog box.

This was because the default settings for alignment, length and precision were not as we required.

It is possible to set the default settings for a newly selected variable. This would then mean we do not have to set the format settings individually for each of the coordinate export variables.

➢From the **Options** menu or from the Toolbar select **Defaults**

The following dialog appears - these are the current output settings that will be applied to any variable which is selected:

However, the next 3 variables we will enter will be **easting**, **northing** and **height**. For these 3 variables we require the same format settings: **Alignment** to be **left**, the **length** to be **12** and the **precision** to be **3**.

➢Edit the settings to those shown below.

If you require these settings also to be applied to subsequently created format files, select the **Apply to every new format option**.

➢Ensure the **Apply to every new format option** is selected.

➢Click **OK**.

We can now enter the easting, northing and height export variables.

➢From the **Insert export variable** dialog box insert **Target (East)**.

➢Enter a **tab**.

➢From the **Insert export variable** dialog box insert **Target (North)**.

➢Enter a **tab**.

➢From the **Insert export variable** dialog box insert **Local Ellipsoidal Height**.

➢Enter a **tab**.

Ensure you choose the **Local Ellipsoidal Height** export variable **not** the **Target (Elev)** export variable.

If you select a wrong export variable, put the cursor to the right of that export variable by clicking just behind it and press **Backspace**. This will delete that export variable.

You should now see the following:

➢Double click on **Local Ellipsoidal Height**. The **Formatting options for export variable** dialog box will show the default settings you have previously set to be the default.

➢Click **Cancel**.

To output a Local Ellipsoidal Height in a format file, use the **Local Ellipsoidal Height** export variable. For this format file we need the local ellipsoidal height. This is because the sample data we will use with this format file has local **ellipsoidal** heights, not **orthometric** heights.

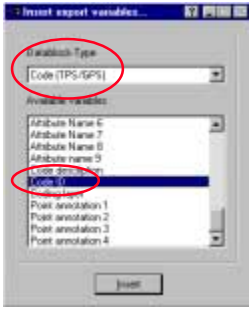
To output a local orthometric height in a format file, use the **Target (Elev)** export variable.

We now need to choose the **Code ID** export variable. This is stored in the **Code** data block type.

To make export variables easier to find in the **Insert export variables** dialog box, they are sorted into different data block types. For example all code information is stored in the **Code (TPS/GPS)** data block type whereas all quality information is stored in the **Quality information (GPS)** data block type.

Put the cursor behind the **Local Ellipsoidal Height** export variable and the **tab** by clicking in the Edit-View.

➢From the **Insert export variable** dialog box select the **Datablock-Type** to be **Code (TPS/GPS)**.



➢Scroll the **Available variable** list box to find **Code ID**. Double click on the **Code ID** or highlight the variable and click **Insert**.

➢Enter a **tab**.

The format settings for the **Code ID** export variable are however again different to those we have previously set to be default. Thus we need to edit the format settings for the **Code ID** export variable.

➢Double click on the **Code ID** to activate the **Formatting options for export variable** dialog box.

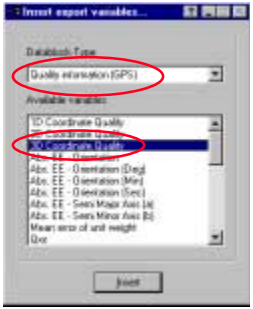
➢Select the **Alignment** to be **Left**.

➢Choose the **Length** to be **4** and the **Precision** to be **4**.

➢Click **OK**.

You should now see the following:

The final export variable to enter is the **3D Coordinate Quality**.



➢From the **Insert export variable** dialog box choose data block type **Quality information (GPS)** and the export variable.

➢Double click on the **3D Coordinate Quality** or highlight the variable and click **Insert**.

Because this is the final export variable we need to enter a carriage return at the end of the line. This will ensure the information for each point will start on a new line.

➢Press **Enter**.

The format settings are again different to those we have previously set to be default and need to be changed for the code ID.

➢Double click on the **3D Coordinate Quality** to activate the **Formatting options for export variable** dialog box.

➢Ensure the **Alignment** is set to be **Left**.

➢Change the **Length** to be **5** and the **Precision to be 2.**

➢Click **OK.**

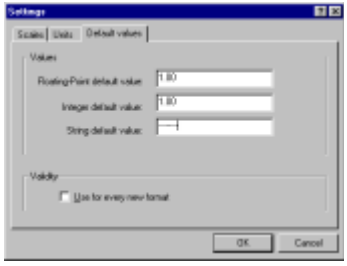
You should now see the following:

It is of course possible to use this format file with surveyed points that were not coded. For these points, a default value would be assigned to these points.

It is possible to edit the default values that are assigned to points that do not contain data for the export variables that are being used.

➢From the **Options** menu or from the Toolbar select **Formats** .

The following dialog box will appear. Select the **Default values** tab. This shows the current default settings.



➢Change the **String default** value to be **NULL**.

This means that when this format file is used, any point surveyed without a code will be given the value **NULL**.

➢Click **OK.**

It is also possible to change the **default values** for **Floating-Point** variables (such as coordinate values) and **Integer** variables (such as angular values). Refer to Appendix B for a complete description of the use of the **Settings** dialog box.

The export formatstring and the format file is now complete and needs to be saved.

➢From the **File** menu choose **Save as...**

➢Choose the directory where you wish to save this format file. Give the format file a file name and click **OK**. The .frt extension is automatically added.

It is recommended that all format files are stored in the same directory.

Congratulations! You have created a Report Style format file that can be used with either SKI-Pro or on board the System 500 sensor.

It is recommended that you use the Real Time sample data to test this format file. Import this sample data into SKI-Pro and then export the data using this format file.

If you are not sure how to use the format file in SKI-Pro, please refer to the **Quick Tour I** in the **Getting Started with SKI-Pro** user manual.

When you installed SKI-Pro, the sample data should have been installed on your PC in the directory:

\SkiPro\Data\SampleData\Sys500\Realtime.

When you export the sample data using this format file, you should see the following output. If you do not, check the format file to identify the problem.

Company Name — Company Address

RTK Survey Report

PtId	Easting	Northing	Height	Code	3DCQ
9001	1801360.270	5248334.959	463.632	EB	0.01
9002	1801346.506	5248336.065	463.720	EB	0.02
9003	1801331.193	5248338.127	463.841	EB	0.01
9004	1801316.365	5248341.946	463.932	EB	0.01
9005	1801306.450	5248348.189	463.945	EB	0.01
9006	1801296.992	5248357.507	463.812	EB	0.02

The best way to test a format file is to use any sample data and inspect the output. The format file can then be edited until you are satisfied with the output.

Quick Tour II - Creating a Leica GSI16 Output for use with Thematical Coding

Quick Tour II is a step-by-step tutorial to create a format file that will output data in the standard Leica GSI16 format for use with thematically coded data.

Quick Tour II follows on from what you have learnt in Quick Tour I. If you have not yet completed Quick Tour I, it is recommended that you do so.

Note, this format file can only be used with data that has been coded using **Thematical coding**. This format file could not be used with data that was surveyed using **Free coding**. No code information would be output.

A GSI16 format file that can be used with data that has been coded with Free Coding will be created in Quick Tour III.

A brief overview of the differences between Thematical and Free coding is given here. For a full description, please refer to Chapter 8 of the **System 500 Technical Reference Manual** which can be found on the SKI-Pro CD.

A brief overview of the differences between Thematical and Free Coding

Thematical coding means that when a point is coded in the field, the code information is directly connected to that surveyed point - it is a "property" of the point. For this reason, the code export variables have to be entered into the **Fixpoint (TPS/GPS) Export Formatstring**.

When thematically coded points are exported with this format file, any code information connected with the surveyed points is also output.

Thematically coded data can be sorted by time or point ID when exported from SKI-Pro or the sensor.

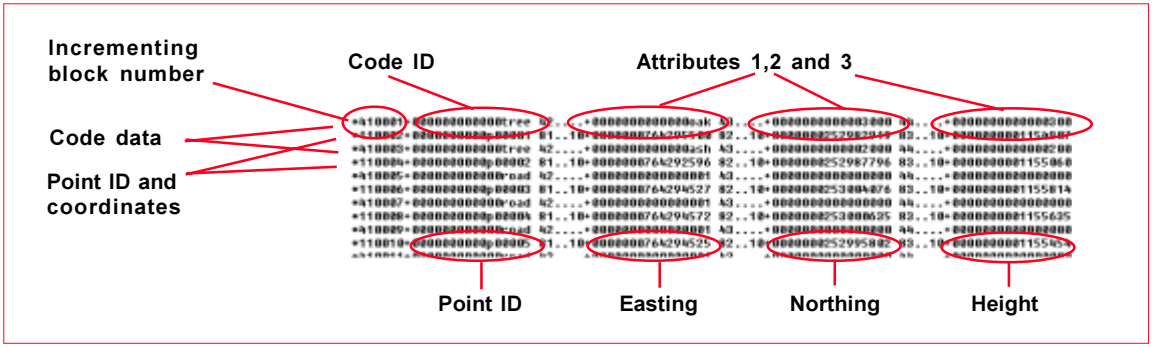
Free coding means that when a code is selected in the field, that code is given only a time stamp. It is not connected directly to any surveyed point. For this reason, the code export variables have to be entered into the **Code (TPS/GPS) Export Formatstring**. When free coded survey data is exported it must be sorted by time.

When the data is exported, both the codes and the surveyed points will be exported in exactly the same chronological order in which they were collected in the field.

Free coded data must be sorted by time when exported from SKI-Pro or the sensor.

The output shown below is required.

In this format, the **Export Formatstrings** consist of both text and export variables. For each point, the code data is output on one line and then the point ID and coordinate data is output immediately on the following line.



Note also the following characteristics of this format file:

• This format file does not include a **Header, Block Titles** or a **Footer**. It contains only one **Export Formatstring**.

• The **Coordinate** values are output in mm values and contain no decimal point.

• All variables are right aligned.

• The length of the output variables must always be exactly 16. If the surveyed data contains less than 16 characters for any variable then the "fill" character must be **0**. If the surveyed data that is output using this format file contains more than 16 characters, then the data must be truncated.

• Attributes 2 and 3 for points **p00003** to **p00005** were not given a value when surveyed. In the output above, they are given a "default value" of **0**.

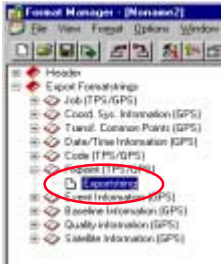
• Each line contains an incrementing number - the **GSI block number**

Choose to create a new format file.

➢From the **File** menu or from the Toolbar select **New**

➢Click **OK** to create a **standard GPS 500** format file.

➢Expand the tree view and select the **Fixpoint (TPS/GPS)** Exportstring.



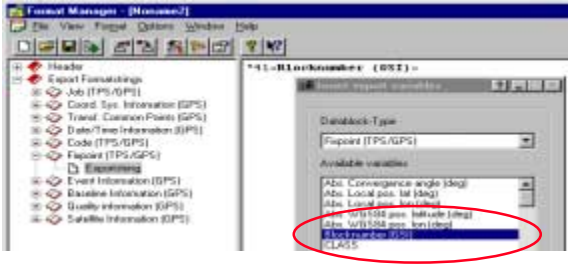
We will enter the code export variables into the **Fixpoint (TPS/GPS)** Export Formartstring because this format file is for use with data surveyed using **Thematical** coding.

The first part of the code line is the text ***41**. This is not an export variable, but simply text.

➢Enter the text ***41**.

The next part of the code line is an incrementing block number. This is effectively a line counter which increases by 1 for each line that is output.

➢From the **Insert export variable** list box, choose **Blocknumber (GSI)**.



➢Double click on the variable to access the **Formatting options for export variable** dialog box.

➢Set the format options as shown below.

Note that when you choose to right align a variable you can choose between a space or zero as the fill character. For GSI formats, the fill character will always be **zero**.

➢Click **OK**.

The next character is a **+** sign immediately after the **Blocknumber (GSI)** export variable.

➢Enter a **+**.

The remainder of the export variables in this line are the **Code ID** and **Attribute values 1**, **2** and **3** all have the same format.

They are all **Right** aligned, with a **Length** of **16**, a **Precision** of **0** and use the **Fill Character** of **0**.

Remember that it is possible to set the **default format values** for export variables.

➢From the **Options** menu or from the Toolbar select **Defaults**

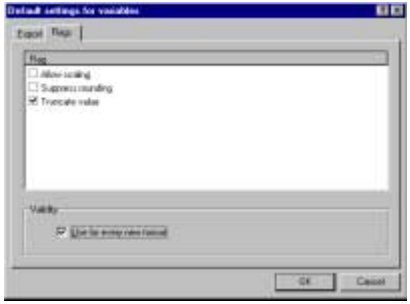
➢Set the format options as shown below. Ensure to click the **Use for every new format** option.

Instead of setting the length of the variable to be **16**, you could also set the length of the variable to be **8** and then enter **00000000** as text. The output would be exactly the same.

We must also ensure that the number of characters output for any export variable is never more than 16. GSI16 format does not allow any export variable to be greater than 16 characters in length. We must therefore set the **truncate** flag.

➢Select the **Flags** tab view and tick the **Truncate value** option as shown below.

➢Set the format options as shown below. Ensure to click the **Use for every new format** option.



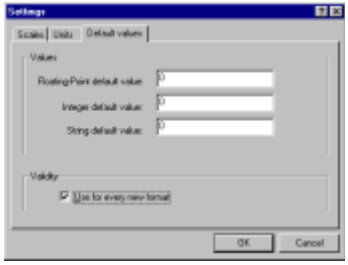
➢Click **OK**.

A full description of using the **Default settings for variables** dialog box is given in Appendix A of this manual.

As mentioned at the beginning of the Quick Tour, any "gaps" in GSI16 format must be filled with a **0**. This means that we must ensure **0** is output for the points where codes or attribute values are not available.

➢From the **Options** menu or from the Toolbar select **Formats** .

➢Select the **Default values** tab. Change the settings to those shown below.

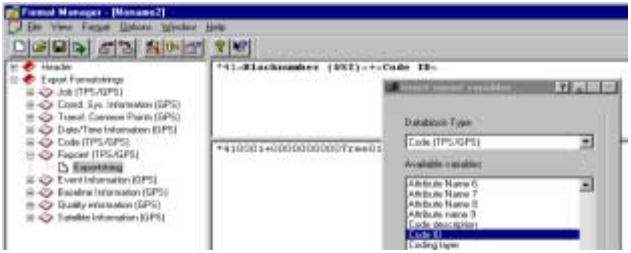


This means that when this format file is used, any point without a code or attribute value, the code and attribute output will be **0**.

➢Click **OK**

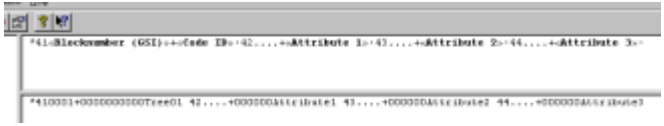
A full description of using the **Settings** dialog box is given in Appendix B of this manual.

➢From the **Insert export variable** list box, choose **Code ID**. Remember to select the **Code (TPS/GPS)** Datablock-Type first.



➢Enter a **space** and then the text **42....+**

Complete the rest of the code line as shown below. Ensure you select the **Attribute** value export variables, not the **Attribute Name** export variable.



All GSI16 output requires a space at the end of the line.

➢At the end of the line enter a **space** and then press **Enter**.

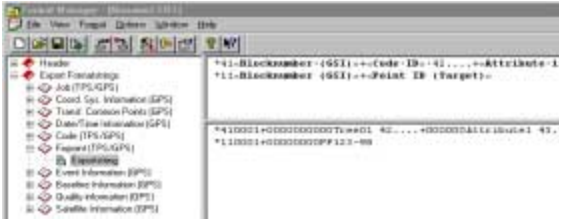
The first part of the coordinate line is the same as the code line. It again consists of text and the **Blocknumber (GSI)**.

➢Enter the text ***11** and the **Blocknumber (GSI)** as described for the code line in Lesson One.

Remember to set the format settings for the blocknumber as in Lesson One.

➢Enter a **+** as text.

The next part of the line is the **Point ID (Target)**. Enter the **Point ID (Target)** export variable as shown below.



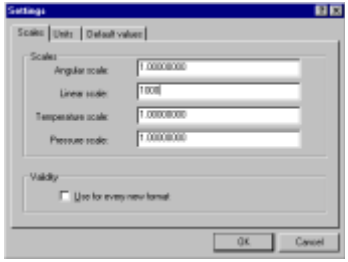
The next part of the line is the coordinate variables.

For metric formats, the GSI format allows no decimal point in the output string which means the coordinates have to be output in mm. However, the coordinate data that will be output from SKI-Pro or the sensor will be in metres. It is therefore necessary to **scale** the coordinate values by 1000.

➢From the **Options** menu or from the Toolbar select **Formats** .

The **Setting** dialog box will appear. Ensure the **Scales** tab view is selected.

It is possible here to enter 4 differerent scale values for **Angular**, **Linear**, **Temperature** and **Pressure** type export variable. (Normally, GPS users would only be interested in scaling linear export variables such as coordinate values or baseline lengths).



➢Change the **Linear scale** to be **1000**.

➢Click **OK**.

We now need to define the **Formatting options** for the coordinate export variables.

Since the easting, northing and height will all have exactly the same settings, it is more efficient to set the default format settings that will be applied to every subsequently selected export variable than to enter each export variable and then individually set the format settings for each variable.

➢From the **Options** menu or from the Toolbar select **Defaults**

Set the format options as shown below.

It is quite possible that a coordinate system could be used that may produce negative values for any of the coordinate values. For this reason the correct sign must always be included in the output.

➢Choose **Always** for the **Sign**.

A **length** of **17** is required because the sign of the export variable is included in the export variable. Thus we will have 16 actual numeric characters for the coordinate value and one character for the sign.

A **precision** of **0** is required because we do not want a decimal point or any decimal values in the output.

➢Set the **Length** to **17** and the **Precision** to **0**.

Notice that we have set the **length** of the output to be **17**. However, if the actual length of the coordinate value that is output contains only 12 characters then the "missing" characters need to be filled. The choice is to fill with either **0** or **spaces**. For a GSI format the spaces need to be filled with **0**.

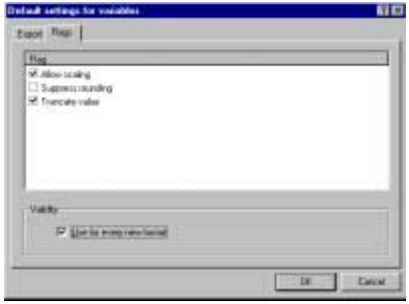
➢Set the **Fill character** to be **0**.

➢Ensure to select the **Use for every new format option**.

➢Select the **Flags** tab view.

➢Ensure the **Allow scaling** option is selected.

This option means that any real or integer type export variable (coordinates, baselines, angular values...) will be scaled by the appropriate factor that was entered in the **Scales** dialog box. In this example, the coordinate values will be scaled by 1000.

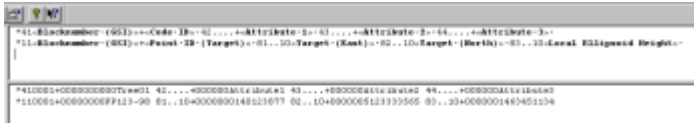


Ensure that the **Truncate value** flag that we set for the code export variables is still selected.

➢Click **OK**.

➢Enter the remainder of the coordinate line as shown below. Do not enter the **+** charcter as text. Remember this will be output as part of the coordinate export variable itself.

➢At the end of the line enter a **space** and press **ENTER**



The export formatstring and the format file is now complete and needs to be saved.

➢From the **File** menu choose **Save as...**

➢Give this format file a file name and click **OK**. The .frt extension is automatically added.

Congratulations! You have created a GSI16 format file that can be used with either SKI-Pro or on board the System 500 sensor.

It is recommended that you use the **Thematically Coded** sample data to test this format file. Import this sample data into SKI-Pro and then export the data using this format file.

When you installed SKI-Pro, the **Thematical** sample data should have been installed on your PC in:

\SkiPro\Data\SampleData\Sys500\Thematic Coded.

When this sample data is exported using this format file, you should see the following output. If you do not, carefully check the format file to identify the problem.

The best way to test a format file is to use any sample data and inspect the output. The format file can then be edited until you are satisfied with the output.

Quick Tour III- Creating a Leica GSI16 Output for use with Free Coding

Quick Tour III is a brief tutorial to create a format file that will output data in the standard Leica GSI16 format for use with free coded data. The actual creation and the export variables used for this format file is virtually identical to the format file we have just created in Quick Tour II.

Quick Tour III follows on from what you have learnt in **Quick Tours I** and **II**. If you have not yet completed **Quick Tours I** and **II**, it is recommended that you do so.

Note, this format file can only be used with data that has been coded using **Free coding**. This format file could not be used with data that was surveyed using **Thematical coding**. No code information would be output.

We have already created a GSI16 format file that can be used with data that has been thematically coded in Quick Tour II.

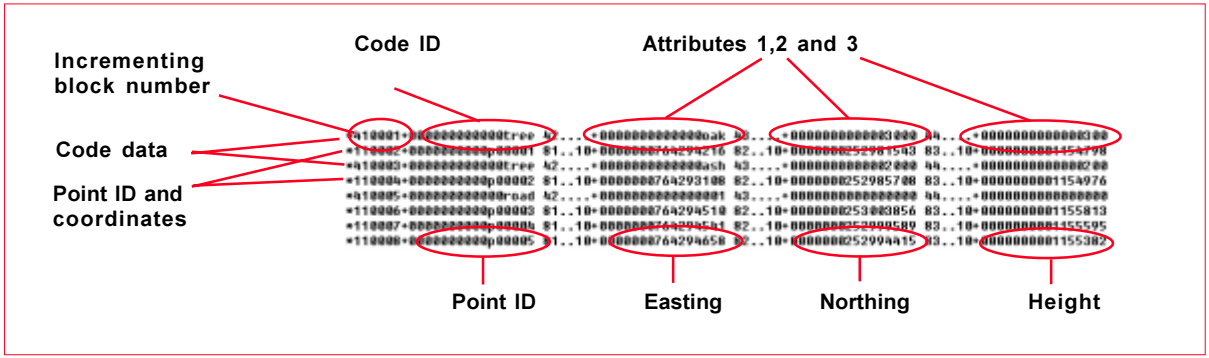
For a brief description of the differences between Thematical and Free coding, refer to Quick Tour II. For a full description, please refer to Chapter 8 of the **System 500 Technical Reference Manual** which can be found on the SKI-Pro CD.

There is only one difference between this format file for use with free coding and the format file created in Quick Tour II for use with thematical coding.

With this format file, the code export variables are entered into the **Code (TPS/GPS)** Exportstring. With the format file created in Quick Tour II, the code export variables were entered into the **Fixpoint (TPS/GPS)** Exportstring.

The output shown below is required.

Note here that the code **road** was only entered once, immediately before point **p00003** was surveyed. Most CAD pakages will interperate that subsequent points (**p00004** to **p00005**) will also use this code until a new code is entered. This is the correct way to survey with free codes.



The characteristics of this format file are identical to the format file created in Quick Tour II:

• This format file does not include a **Header, Block Titles** or a **Footer**. It contains only two **Export Formatstrings**.

• The **Coordinate** values are output in mm values and contain no decimal point.

• All variables are right aligned.

• The length of the output variables must always be exactly 16. If the surveyed data contains less than 16 characters for any variable then the "fill" character must be **0**. If the surveyed data that is output using this format file contains more than 16 characters, then the data must be truncated.

• Attributes 2 and 3 for the code **road** were not given a value when surveyed. In the output above, they are given a "default value" of **0**.

• Each line contains an incrementing number - the **GSI block number**

Choose to create a new format file.

➢From the **File** menu or from the Toolbar select **New**

➢Click **OK** to create a **standard GPS 500** format file.

To create the export formatstring for the code information, repeat exactly what you did in Lesson One of Quick Tour II. The only difference is to enter the code information into the **Code (TPS/GPS)** Exportstring.

We will enter the code export variables into the **Code (TPS/GPS)** Export Formartstring because this format file is for use with data surveyed using **Free** coding.

➢Expand the tree view and select the **Code (TPS/GPS)** Exportstring.

To enter the code and attribute export variables, repeat exactly what we did for Lesson One of Quick Tour II. Refer back to this lesson if necessary.

Note, that when you activate the **Formatting options for export variable** dialog box, many of the settings will be correct. This is because we ticked the **Use for every new format** option in Quick Tour II.

After creating the code information export formartstring, you should see the following.

We now need to enter the coordinate information. Again, this is identical to what we did in Lesson Two of Quick Tour II.

➢Expand the tree view and select the **Fixpoint (TPS/GPS)** Exportstring.

To create the export formatstring for the coordinate information, repeat exactly what you did in Lesson One of Quick Tour II. Refer back to this lesson if necessary.

After creating the coordinate information export formartstring, you should see the following.

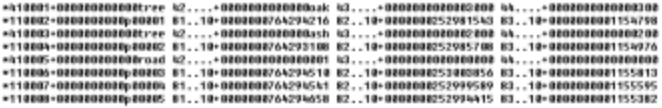
Once you have completed entering the coordinate information, save the format file.

It is recommended that you use the **Free Coded** sample data to test this format file. Import this sample data into SKI-Pro and then export the data using this format file.

When you installed SKI-Pro, the **Free Coded** sample data should have been installed on your PC in:

\SkiPro\Data\SampleData\Sys500\Free Coded

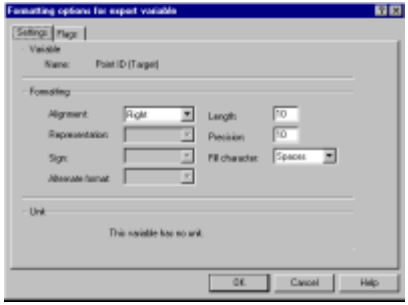
When this sample data is exported using this format file, you should see the following output. If you do not, carefully check the format file to identify the problem.



If you do not see any code information, it is possible that you have selected in the export setting options in SKI-Pro to sort the data by **Point Id**. Export the data again, this time sorting by **Time**.

Appendix A - The Formatting Options for Export Variables

This Appendix describes the different format options that are possible using the **Formatting Options for Export Variables** dialog box. Double click on any export variable to access this dialog box.



The use of the options within this dialog box allows a large number of different output formats to be created.

As mentioned in Quick Tour I only all format options are available if the selected export variable is a **Floating point** export variable. This type of variable normally contains a decimal point and a decimal value. An example of such an export variable is **Coordinate (Easting)**.

If the export variable is a **String** (text) variable or an **Integer** variable then not all format options are available. An example of a **String** variable is a **Point ID**. An example of an **Integer** variable is the **degree** part of the **Latitude** of a point.

In the following descriptions of each format option it is stated if that option is applicable to **String** and/or **Integer** export variables.

It is possible to set the default Formatting Options for Export Variables. From the **Options** menu or from the Toolbar select **Defaults** .

You can then define the formatting options that will be applied to every subsequently selected export variable for that particular format file.

Additionally, if you wish those formatting options to also be applied and used in every subsequent format file you create, you should select the **Use for every new format** option.

Settings

This section describes the options that are available on the **Settings** tab view of the **Formatting options for export variables** dialog box.

Alignment

The alignment defines the orientation of the string within the defined string length. Applies also to **String** and **Integer** export variables.

Example (using Point ID of **12345678**):

Left alignment - 12345678

Right alignment - 12345678

Representation

The representation allows a decimal or an exponential representation to be chosen. Does **not** apply to **String** and **Integer** export variables.

Example (using Easting of **609.173**):

Normal - 609.173

Exp. basis e - 6.092e+02

Exp. basis E - 6.092E+02

Sign

The sign controls if a sign (**+** or **-**) will be output with the export variable. Does **not** apply to **String** export variables.

Example 1 (using Easting of **123456.123**):

Only negative - 123456.123

Always - +123456.123

Example 2 (using Easting of **-123456.123**):

Only negative - -123456.123

Always - -123456.123

Alternate Format

This is a functionality which may be introduced in the future. It has no function at the present time.

Length

Defines the **minimum** length of the output. This length includes the sign (if selected to use) and the decimal point. Applies also to **String** and **Integer** export variables.

Length 0 is not allowed. Maximum length is 20.

See below in the description of **Precision** for examples of using the length.

Precision

This has different meaning for **String** and **Integer** variables and **Floating point** variables.

String and **Integer variables:** Precision defines the **maximum** length of the output.

In the examples below, the output is shown for both **using truncation** and **not using truncation** is shown and uses **0** as the fill character (both truncation and the fill character are explained later).

Examples (using Point ID of **12345678**):

Length	Precision	Truncation	Output
5	0	No	12345678
5	0	Yes	45678
5	3	No	00123
5	3	Yes	00123
5	5	No	12345
5	5	Yes	12345
5	7	No	1234567
5	7	Yes	34567

It can be seen that using the correct length, precision and the truncation flag, any output can be achieved.

Note how a precision of **0** does not set the maximum length - the whole string is output (truncated if the truncation flag is set).

If the length is greater than the precision, the remaining spaces are filled with the fill character.

Floating point variables: Precision defines the number of decimal places of the output. The examples below use a fill character of **0**

Examples (using Easting of **123456.12345**):

Length	Precision	Output
15	3	00000123456.123
15	6	00123456.123450

Note that the length of 15 includes the decimal point.

Fill Character

Fill characters are used to "fill" variables that have fewer characters than the defined **length** for that variable. Applies also to **String** and **Integer** export variables.

Either **spaces** or **0** can be used as the fill character.

In the example below, the output is **right aligned** and has a **length** of **7**.

Examples (using Point ID of **12345**):

0 as fill character -	0012345
space as fill character -	12345

The **space** fill character is automatically selected if a variable is **left aligned**.

Units

The unit type as to how the data will be output for each variable can be defined. This setting will overide any unit setting in SKI-Pro or on the sensor. Does **not** apply to **String** export variables.

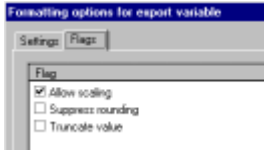
Linear variables (such as coordinates, baseline lengths) can be set to **metres, US feet,** or **Intl feet**.

Angular variables (such as convergence angle) can be set to **radians**, **gons**, **degrees (sexagesimal)**, **degrees (decimal)** or **mils**.

The **Use system unit** will read the instrument settings regardless of the Format Manager settings for that variable.

Flags

Flags are special "attributes" that can be set to export variables to increase the flexibility of the output format.



Some flags are not applicable to **String** and **Integer** export variable types. For each flag it is stated in the following descriptions if that flag is applicable to these export variable types.

Allow scaling

If this option is selected, variables will be multiplied by the entered scaling factor. Does **not** apply to **String** and **Integer** variables.

In the examples below, the **linear scale** is set to **1000**.

Example (using Easting of **123456.789**)**:**

Flag **Enabled** (use scaling) - 123456789.000

Flag **Disabled** (do not scale) - 123456.789

The scaling factors themselves are entered in the **Settings** dialog box. (From the **Options** menu or from the Toolbar select **Formats**).

Suppress rounding

If this option is selected, the true value will be truncated (instead of rounded) at the specified precision. Does **not** apply to **String** and **Integer** variables.

In the examples below, the **Precision** is set to **2**.

Example (using Easting of **123456.789**)**:**

Flag **Enabled** (rounding suppressed) - 123456.78

Flag **Disabled** (rounding not suppressed) - 123456.79

Truncate value

If this option is selected, variable values will be truncated to reach the desired string length. Applies also to **String** and **Integer** variables.

In the examples below, the **Length** is set to **7**.

Example (using Easting of **123456.789**)**:**

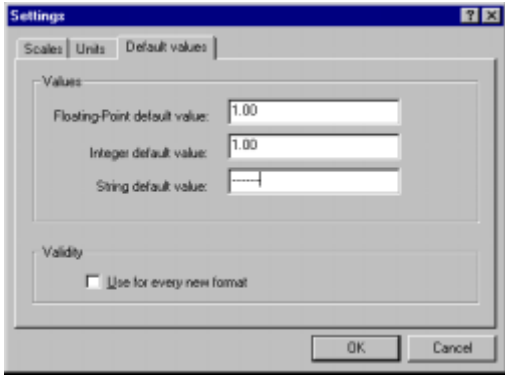
Flag **Enabled** (truncate) - 456.789

Flag **Disabled** (do not truncate) - 123456.789

For **Floating Point** variables the truncation is always from the left. For **String** and **Integer** only variables, the text can be truncated from the left or right depending on the **Length** and **Precision** settings. Please refer to the previous description on **Precision**.

Appendix B - The Setting Options

This Appendix describes the different format options that are possible using the **Settings** dialog box. This is accessed from the **Options** menu or from the Toolbar select **Formats** .



The use of the options within this dialog box allows the **Units**, **Scaling factors** and the export variable **Default values** to be set.

Scales

Scales can be defined for all export variable types. All export variables will then be mutiplied by the specific scale factor.

Example (using Easting of **123456.12345**):

In the example below, the linear scale is set to **1000**.

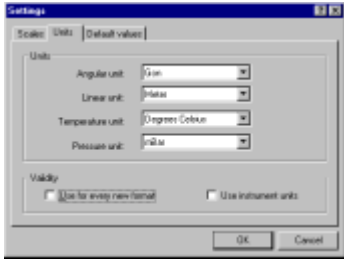
Output - 123456123.45

If you wish to use scaling for an export variable, remember to set the **Allow scaling** flag for that export variable. Refer to Appendix A.

If you wish the scaling values also to be used in every subsequent format file you create, you should select the **Use for every new format** option.

Units

The **units** for angular, linear, temperature and pressure units can be selected. The output will then be converted into the selected units.

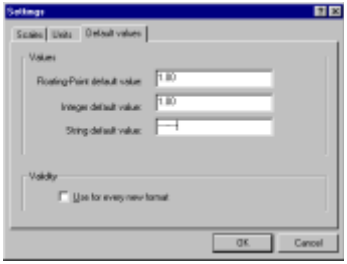


If you wish the unit settings also to be used in every subsequent format file you create, you should tick the **Use for every new format** option.

If you wish the units which are currently chosen on the instrument or in SKI-Pro to be output, you should select the **Use instrument units** option.

Default values

This allows the **default values** to be defined that will be output for **Floating Point**, **Integer** and **String** export variables.



➢Examples of **Floating Point** variables are **coordinate** or **baseline length** variables. They are variables which could contain a decimal point in their output.

➢An example of an **Integer** variable is the **degree** part of the WGS84 coordinates. They are variables which do not contain a decimal point in their output.

➢Examples of **String** variables are **Point ID** or **Code ID**. They are purely text variables.

The default value you enter will be output when that variable type (floating point, integer or string) is output but no actual data for that particular variable is available.

For example, a simple format file is created which will output point ID, coordinates and code. However, during the survey, not every point is coded. When the format file is used with this survey data, the code ID that will be seen in the output for the points that have not been coded will be the default value.

If you wish the default values you enter also to be used in every subsequent format file you create, you should tick the **Use for every new format** option.

Q. Why has my data not come out on separate lines? It has scrolled around the screen.

This is because you have not pressed **ENTER** at the end of the output string. You must enter the complete output for a format file and the carriage return / line feed to create a new line is part of that format. This also applies to any footers, headers or block titles.

Q. Why do I see 1.00 for my local heights? I can see the proper heights in SKI-Pro.

You see 1.00 because this is the default export value for floating point export variables when you install Format Manager. This means that the export variable you have selected does not contain data. Check you have selected the correct export variable for your local height.

Remember the **Target (Elev)** export variable will output local orthometric heights. The **Local Ellipsoidal Height** export variable will output local ellipsoidal heights.

Q. Why are there so many export formatstrings in the tree view? Do I always have to use the Fixpoint exportstring folder?

Using the different formatstring "folders" allows data of certain specific types to be grouped together.

Example:

You require GPS data to be output in a format that is similar as shown below

Job Details...
Name of job, Creator etc
Point Details...
Point ID, coordinates, CQ etc
Baseline Information...
Baseline lengths etc

Each "type" of data (Job, Point details, Baseline information) is grouped together in blocks which allows complex format outputs to be created.

However, the vast majority of format outputs can be created by just using the Fixpoint folder.

Not every export variable can be used in every folder. For example the **Baseline Cofactor Qzz** export variable could not be used in the Job folder. The baseline cofactor information would simply not be output.

Q. Why has the code information not been output?

Are you using thematical coding or free coding?

If you have coded with **thematical** coding then the code export variables must be entered into the **Fixpoint (TPS/GPS)** Exportstring. If you have entered the code export variables into the **Code (TPS/GPS)** Exportstring, no thematical code information will be output.

The format files created in Quick Tours I and II in this book can only be used with thematical codes. Please refer to Quick Tour II in this book for further information on thematical and free coding.

If you have coded with **free** coding then the code export variables must be entered into the **Code (TPS/GPS)** Exportstring. If you have entered the code export variables into the **Fixpoint (TPS/GPS)** Exportstring, no free code information will be output.

Additionally, when you export the surveyed data from the sensor or SKI-Pro, the data must be sorted by **Time**. If the surveyed data is sorted by **Point Id**, no free code information will be output.

The format file created in Quick Tour III in this book can only be used with free codes. Please refer to Quick Tour II in this book or Chapter 8 of the **System 500 Technical Reference Manual** for further information on thematical and free coding.

Q. What is the String Pool?

The string pool is a library for storing "strings" (combinations of export variables). This may be useful if you wish to use the same combination of export variables again and again in different format files.

Example: How to save strings into the string pool

You wish to use the combination of export variables shown below in other format files you will create.

➢Right click in the edit view or tree view sections of the screen to activate the **String pool** menu. Choose **Save**. Alternatively select the icon from the toolbar.

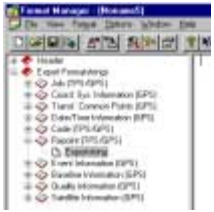
➢Enter a **name** to identify this combination of export variables and save the combination to the string pool.

➢Click **Save**.

Example: How to load strings from the string pool

You now wish to create a different format file that will use this combination of export variables.

➢Open the tree view to access the **Fixpoint** Export Formatstring.



➢Right click in the edit view or tree view sections of the screen to activate the **String pool** menu. Choose **Load**. Alternatively select the icon from the toolbar.

The **pool content** shows what strings are currently stored in the pool.

➢Select the correct string and click **Load**.

The combination of export variables will appear in the edit-view.

Any export variables or entered text that is present in the formatstring where you will load the string from the string pool will be deleted when you load the string.

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