Format Manager Documentation

Reference Guide V1.0

Leica

MADE TO MEASURE

1. Contents

1. Introduction

The Leica SurveyOffice “Format Manager” (FM) is used to create and administrate data output Format Files.These Format Files act as an individual data filter and can be uploaded to any instrument of the TPS300 and TPS700 Series. A Format File basically consists of headers and variable strings. The various types of available variables are described in an instrument specific format template, which is exclusively provided by Leica Geosystems.

A defined format must be saved as a Format File (*.FRT) to be recognized by TPS 300/700 Insruments. Any format file can be modified and uploaded to an instrument using the LSO Data Manager. As a new feature, the FM supports more than one active window at the same time, thus various Format Files can be compared. Each Format is displayed in a separate window with a caption. All format windows are divided into three sections, a Tree View, an Edit View and a Format String Preview.

Be aware, that the FM can only handle Format Files created with FM. It is not possible to create files for the previous TPS100 series (TC600/800, TC605/805/905) nor to edit files created with TCFORM. Existing Format Files for the TPS100 series must be rewritten, to be used on the new TPS300 series.

The goal of this documentation is to help anybody creating customer oriented format Files for TPS300/700 instruments. This documentation consists of various parts of the Format Manager ONLINE help and is therefore an overall document.

This guide considers all necessary steps to successfully create any kind of formats. Starting with the installation process, then proceeding with explanations to FM's functionality and settings and finally closing with useful examples in the Annex, this guide is covering basic to intermediate topics.

Marco Mueller
Business Area TPS

2. Installing "Format Manager"

Some of you may not have installed “TPS300_Tools” already, which includes the “Format Manager”. Some may not even have installed Leica SurveyOffice (LSO) yet. All you need to know about complete or additional installation follows.

Before running the LSO installation wizard, we recommend to close all running windows applications. Place your CD-Rom “TPS Series”, (Art.No. 713765) in your PC’s CD slot and browse for the following path:
“OSW\Soffice\”YOUR-Language”\Disk1\”;Setup.exe
Setup starts. The installation wizard will guide you through the whole installation process.

The default path for WinNT platforms is set to:
“D:\ProgramFiles\LeicaGeosystems\SurveyOffice”.

The default path for Win98 platforms is set to:
“**C:\ProgramFiles\LeicaGeosystems\SurveyOffice”**.

The default path may vary, if any of LSO's components where previously installed in a different path or drive. We recommend to confirm our suggested path, because any further Leica Application (e.g. TPS-CAD, Fieldlink, etc) would be installed at the same location.

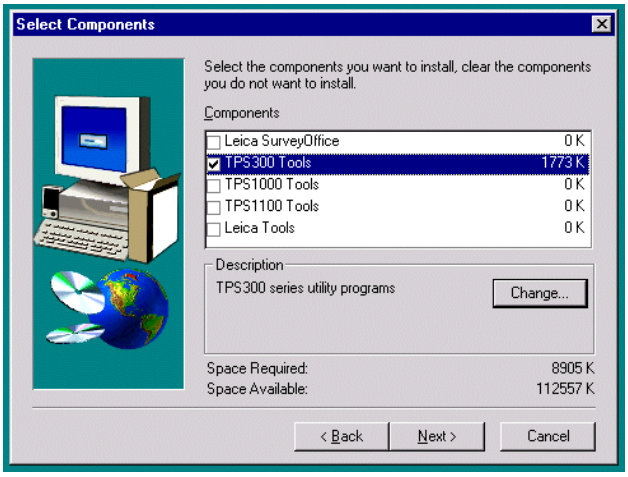
If LSO has already been installed on your PC or Laptop, you don't need to perform a complete LSO package installation.

Choose the preferred SETUP type according your requirements:

Typical:
To perform a complete installation of LSO, including the necessary Format Manager, please choose the “Typical” installation option. We recommend this option if none of LSO's components have been installed previously.

Compact:
Program will be installed with a minimum of required options, e.g for Notebook installations. Be aware, that this option will NOT install “Format Manager”.

Custom:
This option is recommended if LSO has been installed previously, but not “TPS300 Tools”, including FM. You may also use the Custom option for installation of other components.



1. Window "SETUP Type": choose "CUSTOM

2. Press "NEXT" button

3. Enable "TPS300 Tools" in the components selection window to install FM.

4. Press "NEXT" button

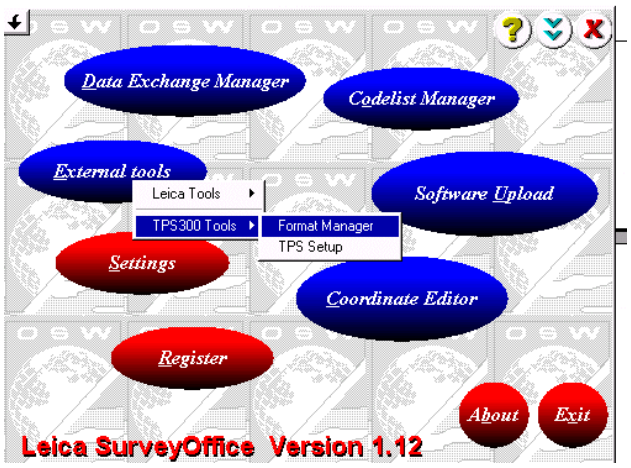
Format Manager must be installed together with Leica Survey Office. It is not possible to run Format Manager as a stand-alone application.

3. Starting "Format Manager"

According to Microsoft Windows' policy, applications are either being started by clicking the corresponding "*.exe" file or creating a shortcut icon on your desktop or in a specified folder. We recommend to place the main LSO icon on your desktop.

3.1 Starting "Format Manager" from the main application

To run the FM please follow the steps below:



1. Start "Leica SurveyOffice" with the corresponding icon on your desktop, or by calling "MAIN.exe" in the LSO folder.
2. Click the ellipse "External Tools"
3. Choose the option "TPS300 Tools, and...
4. ...select "Format Manager"

3.2 Starting "Format Manager" as a stand-alone application

It is also possible to run FM as a stand-alone application. To create and test Format Files successfully, you only need to run FM and later the DXM for the file transfer and final testing.

Double click "FM.exe"
Browse for the corresponding file with your windows explorer or other browser. Double click the file "FM.exe" which you may find in the default directory.

D:\ProgramFiles\LeicaGeosystems\SurveyOffice\UserTools\FormatManager\FM.exe

Install a FM icon
Click the right mouse button, while beeing on the active windows desktop and choose option "NEW -> SHORTCUT". The automatically evoked windows wizard will guide you through the process. Browse again for the FM directory:

D:\ProgramFiles\LeicaGeosystems\SurveyOffice\UserTools\FormatManager\FM.exe

... and choose "FM.exe". Select or retype a name for your shortcut icon. Windows will create a special icon to run "Format Manager" as stand-alone application.

Once you have started FM it will take a couple of seconds until FM is completely initialized and a "Format File Type" will appear.

3.3 Format file type / Template

The LSO Format Manager basically provides three different types of format file templates. One is dedicated to GPS500, which supports GPS related format functionality, the others are designed to work with TPS300/700.

- GPS500 (GPS500_Standard): The GPS500_Standard Format File contains GPS specific headers and export strings. Be aware that GPS format files will not work successfully on Total Stations!

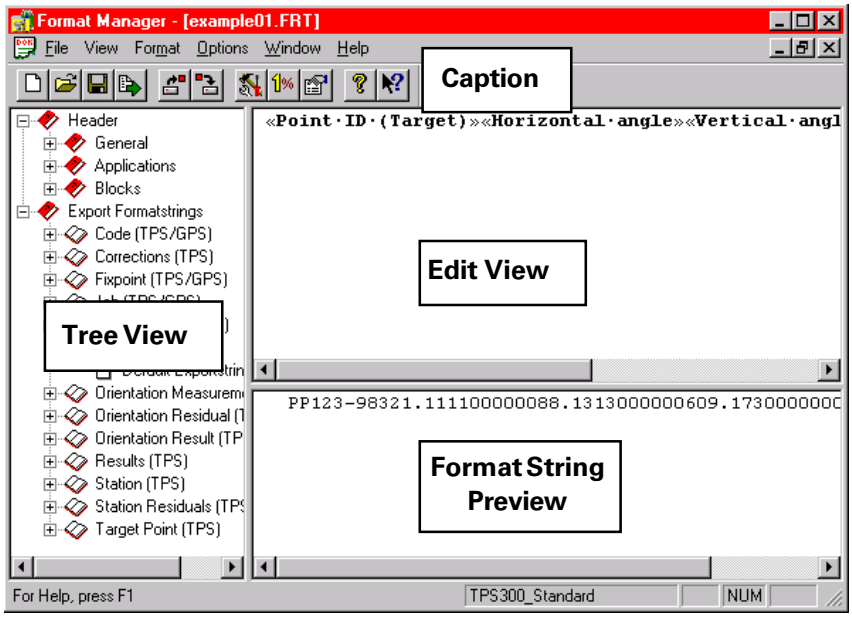
- TPS300/700 (Basic or Standard): The difference between Basic and Standard is simply a difference of some single headers or strings. The functionality of both is equal. The standard format allows additional headers and strings for Orientation Measurement (TPS), Station Residuals (TPS), as well as an additional "Default Exportstring". We recommend to use the TPS300_Standard Format File type to meet any requirements.

Choose TPS300/700_Basic or _Standard to open a new Format File or press "CANCEL" to abort. You will be able to open or create different files without closing the active sheet.

Use the icons in the menu bar, to open, save, and create new or existing titles.

4. Format Manager Layout

Each Format File will be displayed in a separate Window. A Format Window consists of a caption, a Tree View, an Edit View and a Format String Preview.



Caption
The Format name (e.g. “REPORT1.FRT”) is displayed as the Format Window caption. The template name (e.g. TPS300_standard) is displayed in the status bar.

Tree View
All Format String categories, Datablock types and Format Strings of the active Format File are listed in the Tree View . This allows an easy access to all headers and export format strings within a Format File. Tree View items can easily be extended by clicking the “+” or double-clicking the corresponding item.

Edit View
A Format String will be displayed in the Edit View once it has been selected in the Tree View. The Edit View works similarly to any text editor. An additional dialog appears that enables you to insert and edit export variables. Similar to an editor, additional text may be entered or edited using the keyboard. The number of characters allowed is defined in the Format Template. In the Edit View some characters have a special meaning:

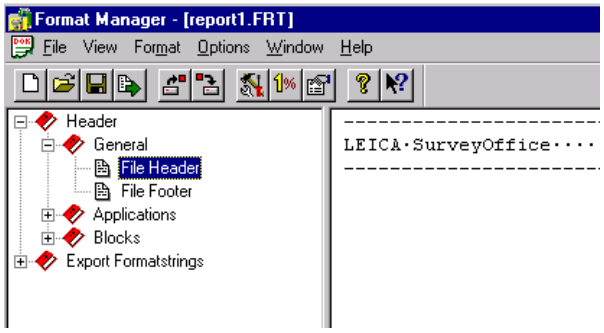
- « » **Variable delimiters**
- ¬ **Tabulator (= 8 spaces)**
- • **space**

5. Format File

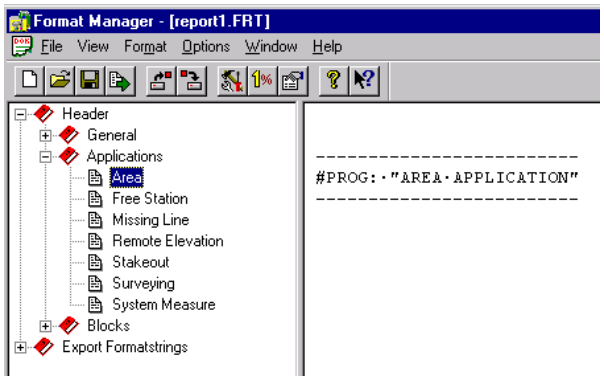
Each Format File consists of headers and strings. This chapter will inform you about the possibilities and limitations of both, while formatting options will be discussed later.

5.1 Header

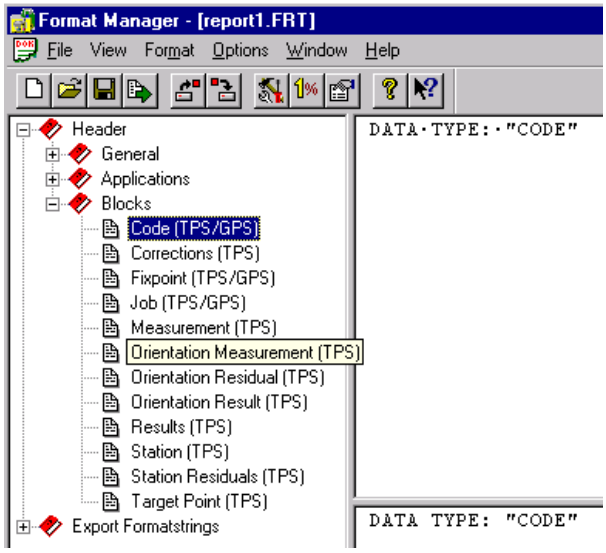
The Header section in the Tree View contains three different types of headers ("General", "Applications" and "Blocks"). Expanding the header section is either possible by clicking the “+” or double-clicking on "Header". To view or edit a header, highlight it with a mouse click and type in the contents in the office view. A header can only contain static text.



General
The general header section contains a *File Header* and a *File Footer*. The File Header will be placed at the very beginning of every instrument data output. The File Footer will be placed at the very end of every instrument data output. Both header and footer will be printed only once in each file.

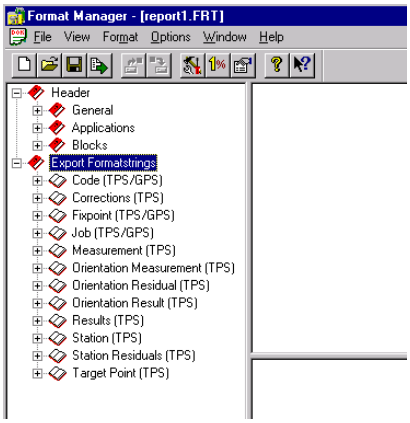


Applications
Application Headers separate Data Blocks registered within different applications. Whenever an application is started the specified application header text will be printed at the beginning of this application.



Blocks
Block Headers (e.g. Code-Header) are placed at the beginning of a new Data Block. A block specifies a unique type of data (e.g. Code, Results) which can be recorded at any occasion within applications or system measuring.

5.2 Export Formatstring

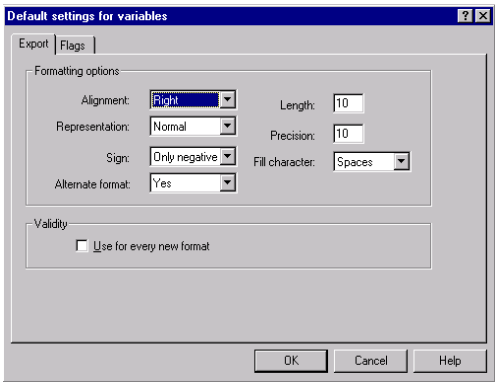


Data Block
A Data Block is a data record generated by an onboard instrument application. The output data depends basically on the Data Block type. The number of available Data Blocks and their names (for example *Measurement, Orientation)* are defined by a Format Template, which varies for different series of instruments.

Export String
An export string is basically a sequence of variables. A variable represents a specific data item within the instrument (e.g. Hz-angels, Code ID, etc). The maximum number of variables per string depends on the used template. All TPS templates are at the time limited to 30 variables.
A Format String may contain text and variables. At least one application must be assigned to every defined Exportstring. It will be used to generate all data output by the assigned application.

5.3 Default Export String

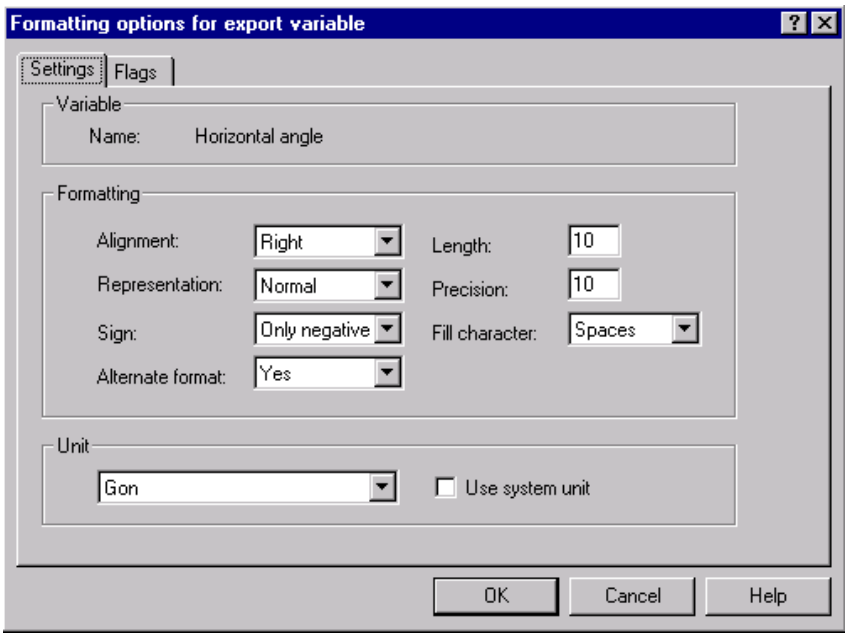
The purpose of designing a default string is to assign a default format to any variable which was not individually formatted. Any newly inserted variable will be formatted according to the default settings, if no individual changes were made. However, the settings of a variable can be edited at any time.
The default format window is accessible from the menu bar:
Options -> Defaults



6. Formatting a String

Double click any variable in the EDIT view to get to the "Formatting" window.

6.1 Settings



Alignment
The alignment defines the string orientation within a defined string length.

Example: LEFT/RIGHT alignment

- Alignment RIGHT Angle Hz: | 321.1111|
- Alignment LEFT Angle Hz: |321.1111 |

Representation
The type of representation can be defined for float variables. You may choose between *decimal* and *exponential* representation.

- Normal Slope Dist: 609.173
- Exp. basis e Slope Dist: 6.092e+02
- Exp. basis E Slope Dist: 6.092E+02

Sign
The sign output can be defined for float and integer variables. If *only negative* is selected, the sign will be output out for negative values only. If *always* is selected the sign will be output for both positive and negative values.

- Only negative Easting: 140123.877 (for positive values)
  Easting: -140123.877 (for negative values)
- Always Easting: +140123.877 (for positive values)
  Easting: -140123.877 (for negative values)

Alternate Format
The option "Alternate Format" is a formatting functionality based on "PrintF" ("C+"function). However none of the specified variables are implemented in TPS300/700 Series instruments to support this function. "Alternate Format" is therefore disabled.

Length
Defines the minimum output lenght (including decimal point or fill characters) for either floating point or string variables. Note that "0" is an invalid variable length. Maximum lenght is limited to "20".

- Always `12345678901234567890`

```
Length "10" Easting: |140123.877     |
Length "15" Easting: |  140123.877   |
Length "20" Easting: |    140123.877 |
```

Precision
a) Float variables: Precision defines the number of decimals

- Length 15, precision 5 `Easting:000140123.87700`
  precision 3 `Easting:00000140123.877`

b) String variables: Precision defines the maximum string length. If "Length" is larger than precision the remaining space will be used with fill characters. Precision set to "0" will not set string length limitation.

- Length 8, precision 3 `PtNr: 00000PFL`
  precision 0 `PtNr: 00PFL100`

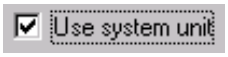
Fill Character
Fill characters are used to extend strings with fewer characters than its length is defined as. Either "spaces" or "0" can be selected as fill characters.

- fill character “0” Easting:0000000000140123.877
- fill character “_” Easting: 140123.877

Unit
Referencing specific units to certain variables will output the corresponding values in the specified unit no matter which unit is set on the instrument.

- Unit meter Easting : 122001905.579 [m]
- Unit US Feet Easting : 400268719.700 [us ft]
- Unit Intl. Feet Easting : 400267918.555 [Intl.ft]

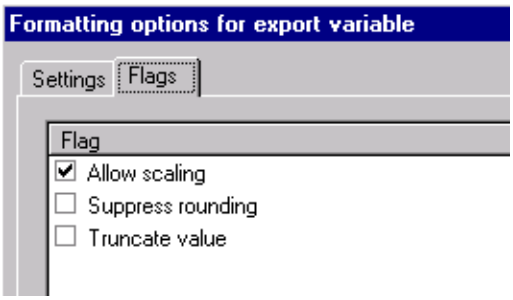
- Unit gon Hz-angle: 371.7449 [gon]
- Unit decree decimal Hz-angle: 334° 34' 13" [deg.sexa]
- degree sexag. Hz-angle: 334.5704 [deg.dec.]
  Hz-angle: 5947.9190 [mils]
  Hz-angle: 5.8394 [rad]



Enabling the "use system unit" button, will read instrument unit settings regardless of FM unit settings. Be aware, that sexagesimal output requires special formatting. Creating a format in “GON”-style for example, but reading instrument units "sexagesimal" will output the correct digits, but in an unusable format.

6.2 Flags

Flags are special attributes assigned to strings and floating point values. Depending on the type of variable, FM offers the following options:



Double click on the variable in the EDIT view to get the "Formatting options for export variable".

Allow scaling:
Floating variables will be multiplied by the entered scalling factor.
E.g. scale factor "1000"

- flag enabled Easting: 140123877.000
- flag disabled Easting: 140123.877

Suppress rounding:
When "suppress rounding" is enabled, the true value will be truncated (instead of rounded) at the specified precision. Disabling the "suppress rounding" will mathematically round the true value to its specified precision (e.g. ".58").

- true value 122001905.579
- suppress rounding Easting: 122001905.57
- rounding Easting: 122001905.58

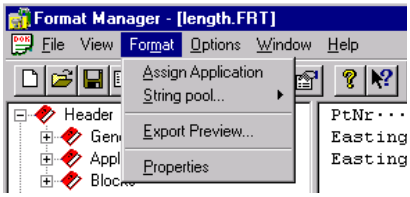
Truncate value:
Variable values will be truncated from the left to reach the defined string length. Our example shows a string truncated at 9 digits.

- disabled Easting: 122001905.579 ("no truncate")
- enabled Easting: 01905.579 ("truncate")

7 Menu Bar

There are basically only two menu options specificly related to FM: "Format" and "Options". All other topics are global windows functions and will not be explained.

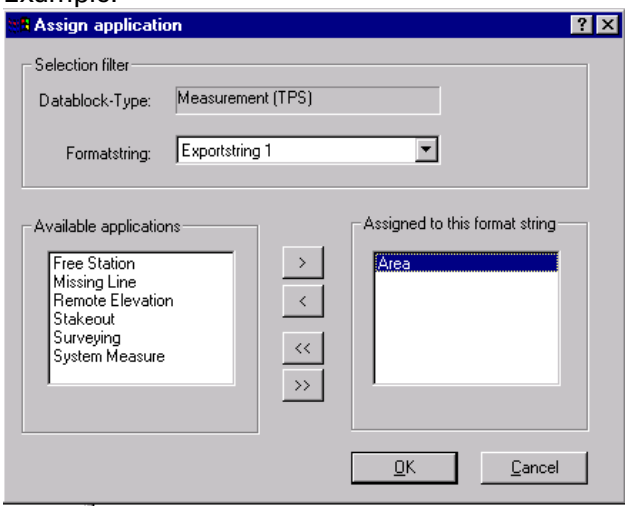
7.1 Menu “Format”



- Assign Application
- String Pool (Load/Save)
- Export Preview
- Properties

Assign application
Assigning applications limits the output to data recorded in specific applications. Various applications can be assigned to each format string. At least, one application has to be assigned. Data measured in non-assigned applications will be output in the default exportstring format. Therefore, it is not possible to assign applications to a "DEFAULT" exportstring.

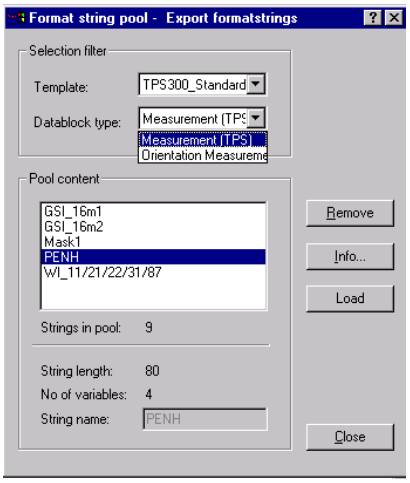
Example:



In the example above, only the onboard application "Area" was assigned to the exportstring of datablock type "Measurement TPS". Any measurement recorded within the area application would be output with the specific "Exportstring " format. Any other data measured with the TPS300/700 would only be output, if a Default exportstring is defined.

String pool

The String Pool works like a format string library. Any format string created can be saved to the String Pool. All strings in the string pool can be used globally, i.e. in different format files, than they were created in. There is no relation to the original Format file at all.



Select the Data Block Type and Export String in the Tree View. To save an existing string to the string pool, click the right mouse button to evoke the "String Pool" menu. Enter an individual string name. The string pool wizard will also record the format template and the datablock type in which the string was created.

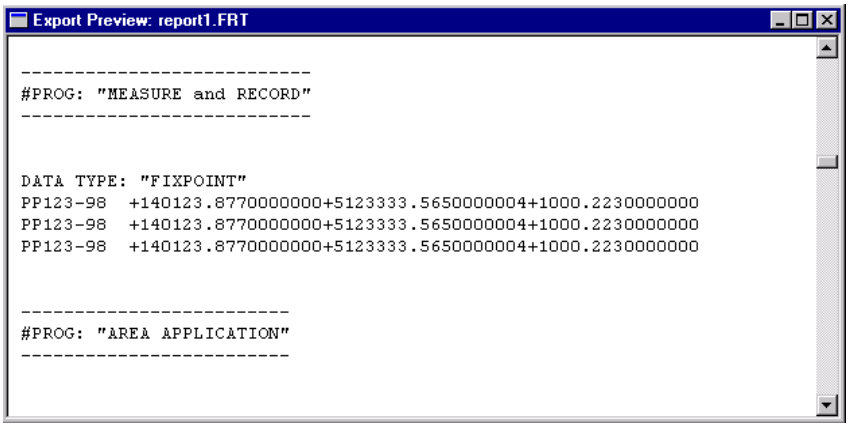
To load a string from the string pool library, press your right mouse button and perform "String pool --> Load". Since the string pool is a global provider, you may use the selectionfilter to preselect the template and datablock type to find your string faster.

Loading a string from the string pool will replace the current string. Therefore ensure that you really want to delete the current string, or that the exportstring is empty.

Export preview

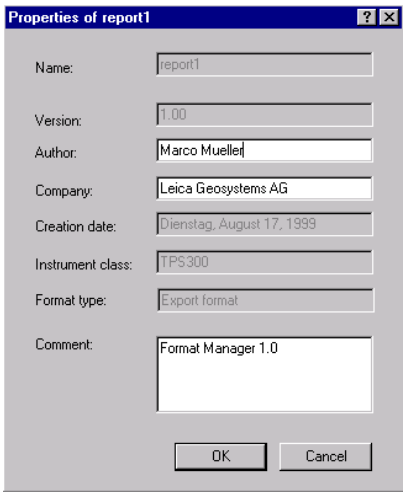
Once, you have created an output format string, FM allows you to preview the complete string with dummy data.

A separate preview window will appear and show you each string tree time in sequence. Press  to perform an export preview.



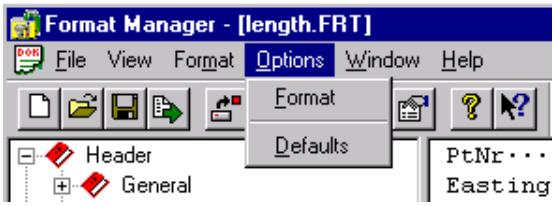
Note:
The Export Preview will not be updated if you make changes in the Format File.Therefore, you must perform a new preview to view the modified Format File.
To print an Export Preview, the Export Preview window must be active.

Properties



All common windows applications provide a special “properties” window to specify author and other file specific information. Filling in properties will make it easier to administer or find formats.

7.2 Menu “Option”

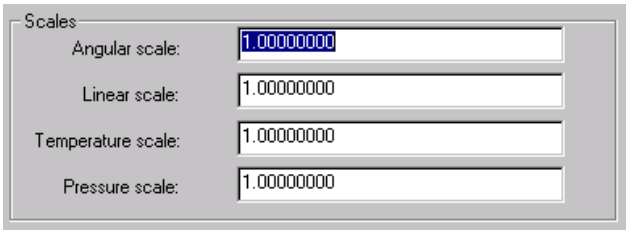


- Format
- Defaults

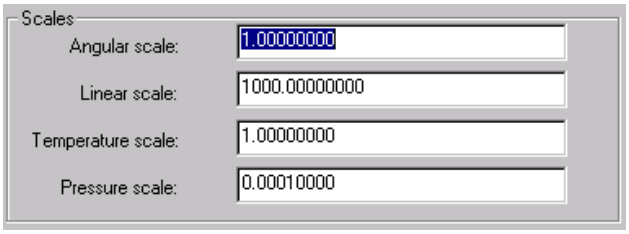
Format
The Settings for the currently opened Format File can be defined. When a new Format File is created the default Format Settings will be assigned automatically. To view or modify the Format File settings select "Format" from the Options menu and then select the property page you want to view or modify.

Scales
Scale factors can be defined for all unit types. FM will multiply all float variables with its specific scale factor before outputting them.

Example:




```
Hz-Angle   :    321.1111
Slope Dist :    609.173
Temperatur :     12.000
Pressure   :    760.000
```

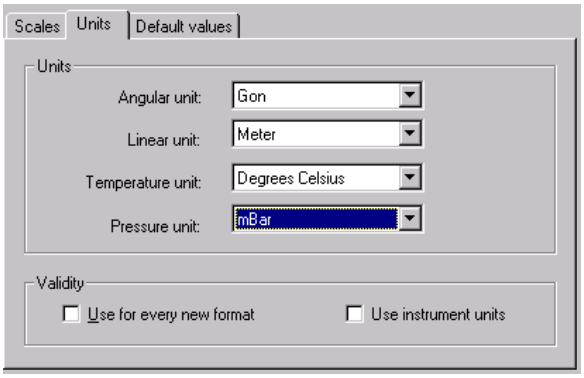



```
Hz-Angle   :    321.1111
Slope Dist :609173.000
Temperatur :     12.000
Pressure   :      0.076
```

Linear scaling may be used to convert data from [meter] to [millimeter] or to convert pressure from [mBar] to [Bar]

Units

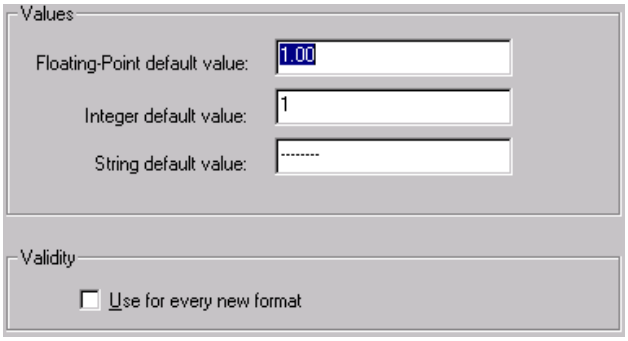
Any combination of angular, linear, temperature and pressure units can be selected. FM will convert the measured values into the selected units, regardless of the einstrument settings.



Type	Units
Angular units	Radians, Gons, degrees (sexagesimal), degrees (decimal), mils
Linear units	meter, Intl. feet, US feet
Temperature units	Degrees celsius, Kelvin, Fahrenheit
Pressure units	mm, mmHG, InchHG, Hectopascal

Default Values

FM allows to set Default values for either floating-point, integer or string variables. For example, a customer needs to protocol data with a customized fieldbook format containing angle, distance and coordinate information. Any measurement recorded without valid distances (...when pressing REC only), would lead to invalid coordinates because of missing distance measurement. In such a case, default values allows to define special coordinate values, (e.g. „- - - - - „) to visualize the use of specific recording technique in the field.



8. Sample Format Elements

Formats often consist of standardized elements. Rather than explaining a complex format at the beginning. This chapter focusses focussing on sample elements, which can play a key part in any particular output format.

8.1 Job Exportstring

At the beginning of a job, it can be useful to have a general information header, considering job and operators name, or the instrument used. Since this data may vary from job to job, we use corresponding variables to record data from the instrument.

EDIT VIEW: "INPUT"

```
==========JOB·INFORMATION==========
Project···:·«Jobname»·(«Job Comment 1»)
Operator··:·«Operator»
Instr/S.No:·«Instrument·type»/«Instrument·No»
====================================
```

FORMAT PREVIEW: "OUTPUT"

```
==========JOB INFORMATION==========
Project    : BLDG_EAST01 (FACTORY)
Operator   : JohnDoe
Instr/S.No: TCR305/640054
====================================
```

- All text strings, Alignment: LEFT
- Length set to "1"; Every string will take as much space as needed
- Limit length of <<instrument No>> to "6"

8.2 Time and date function

Time and date functions are often used to identify a sequence of measurements. FM provides full date and time functionality.

INPUT:

```
Time:···«Time·(hours-24)»:«Time·(Minutes)»:«Time·(Seconds)»
Date:·«Date (day)»/«Date (month)»/«Date (long year 1998)»
```

OUTPUT:

```
Time:    17:13:17
Date:  2/07/1998
```

- Create information text (eg. "Time:").
- Insert time and data variables as requested. Browse datablock type "Station" or "Measurement" for time and data variables.
- Change variable length to "2", except for long year variables.
- Additionally enable fill character "0" or "_" for single digit values.
- Type in separation characters (e.g. "/" or ":") manually.

8.3 How to create sexagesimal angles

Sexagesimal angles require a special format handling. Instead of a single variable (e.g. for gons) FM supports 3 different sexagesimal variables for degrees, minutes and seconds.

INPUT

```
Hz:«Horizontal angle (Deg)»°«Horizontal angle (Min)»'«Horizontal angle (Sec)»"
V:·«Vertical angle (Deg)»°«Vertical angle (Min)»'«Vertical angle (Sec)»"
```

OUTPUT

```
Hz: 321°11'11"
V:  88°12'12"
```

FORMATTING:

- Insert sexagesimal "degrees", "minutes" and "seconds" variables from the data block type "Measurement".
- Set the length to "3" for sexagesimal degrees, "2" for minutes and seconds. Select spaces as fill characters.
- Set alignment to "right".
- Insert sexagesimal unit symbols manually (e.g. °,',").

8.4 Data in sequence

FM allows you to create an endless number of ASCII formats. One of the most common formats is the sign delimited "data in sequence" format. Sign delimited Format Files can easely be imported into almost any windows application (e.g. EXCEL, WORD, etc.).

INPUT:

```
«Point·ID·(Target)»;·«Horizontal·angle»;·«Vertical·angle»;·«Slope·distance»
```

OUTPUT:

```
PtNr.     HZ          V         SD
DFB03; 41.7433; 94.7544; 3.151
DFB04; 60.8726; 71.8583; 4.030
DFB05; 37.4635; 341.3971; 2.706
AA.1; 51.0244; 69.8460; 2.535
0; 51.0248; 69.8462; 2.533
1; 51.0243; 69.8461; 2.533
AB.1; 51.0244; 69.8464; 2.534
FST1; 5.7986; 80.8330; 3.242
```

FORMATTING:

- Set variable length to "1", so that every value takes as much space as it really needs. As a separator, you may insert a ";" manually.
- Set the precision of angle units to "4" or as you like.
- Set the precision of distance units to "3" or as you like it.
- When you download data in the above format, the Excel import with import wizard will easely recognize your delimiter and put measured values in separte cells.

8.5 Atmospheric correction block

TPS300/700 instruments have a built-in correction record. Any time you change your atmospheric constants or the EDM measuring mode, the firmware will record a correction block to inform you of your current settings. You may print those settings in a Format File to recall the meteorological conditions at the time you measured in the field. Following is an example of these special variables.

INPUT:

```
------ATMOSPHERE----------------------------------
Prism·const:·«Prism·constant»·mm
Atmos.·PPM·:·«Atmospheric·correction·(PPM)»·ppm
Pressure···:·«Pressure»·mmHG
Temperature:·«Temperature»·°F
Proj.PPM···:·«Projection·scaling·total·(PPM)»·ppm
-------------------------------------------------
```

OUTPUT:

```
-------ATMOSPHERE---------------------------------
Prism const:       0 mm
Atmos. PPM :      30 ppm
Pressure   :     760 mmHG
Temperature:      62 °F
Proj.PPM   :       0 ppm
-------------------------------------------------
```

FORMATTING:

- create a header environment
- change units to your local preferences (e.g. mmHG and degree Fahrenheit)
- set length of variables to e.g. 8, precision 0
- you may define separate scaling factors for either pressure or temperature
- PPM values are fix, no modifications possible
- type the units manually behind the variable inserted to avoid confusion.

9. Errors

Format Error
Format Error might occur when editing or loading a Format String from the String Pool. The message appears when the Format string is saved to the Format File after selecting a different Format String. Correct the Format String either by changing the length or removing variables.

Dialog Data Validation Error
A Dialog Data Validation Error occurs when the field entry is not valid and OK is selected. The expected range will be displayed. Modify the field input so that it is included in the input range.

Format Template Error
A Format Template Error occurs when the Format Template File is corrupted. Reinstall the Format Manager from the installation media. If the Error still occurs contact Leica for support.

Profile Error
A Profile Error occurs when the profile file is corrupted. Reinstall the Format Manager from the installation media. If the Error still occurs contact Leica for support.

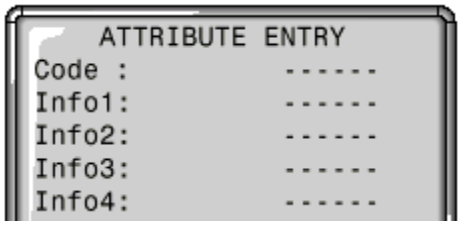
Invalid Format File Error
An Invalid Format File Error occurs when for some reason the Format file is corrupt. Delete the corrupted Format file and create a new Format File with the same contents.

10. Implemented Export Variables

This section basically presents a reference list. All available variables are listed with a short explanation of their functionality. Many of the variables exist in more than one datablock type and will therefore be explained only once.

Code

For detailled coding information, please refer to the corresponding user manual.



↑ Attribute Name ↑ Attribute

CodeID Alphanumeric value with a maximum length of 8 characters (e.g. CodeID: TREE).

Code description Additional information line for up to 30 characters. Availability of code description on the instrument depends on layout version. LSO fully supports the code description functionality.

Attributes Up to 8 attributes allowed. Attributes are additional information text, limited to 16 characters per line. (e.g. Info1: CONCRETE_PYLON)

Attribute names Attribute names define a group of attributes. The length of attribute names is basically limited by the corresponding TPS layout. However, LSO supports a maximum of 10 characters. (e.g. "Info1:" is an attribute name)

Corrections

Correction blocks are recorded to the internal memory any time the EDM settings have changed.

Prism constant

- onboard recording range [0..±999mm]
- variable output in [m]; e.g. 0.035 for prism constant = 35mm
- set scale factor to 1000 to get mm
- set precision to 3, to show all decimals

Atmospheric correction (PPM)

- calculated PPM value from atmosperic data dialoge
- Precision fixed
- Scaling NOT possible
- e.g. output “-23” [ppm]

Pressure

- calculated air pressure from atmospheric data dialogue
- Instrument supports integer values only (e.g. “1013” [mbar])
- separate scaling possible (option “pressure scale”)

Temperature

- manually entered temperature in atmospheric data dialogue
- Instrument supports integer values only (e.g. “12” [°C])
- separate scaling possible (option “temperature scale”)

Projection Height
Offset central meridian
Projection scaling total (PPM)
— on request

Projection scaling (PPM)
Height reduction (PPM)
— on request

Relative humidity

- refer to the manual for further information

Refraction coefficient

- fixed instrument value “0.130”

Elevation above mean sea level

- e.g. output “605.500” [m]
- scaling possible, using option “Linear Scale”

Scale factor central meridian

- fixed output “1”
- scaling possibe, using option “Linear Scale”

EDM type

- fixed text value
  RL: Reflectorless
  IR: Infrared

	Prism Type	• fixed text value User Round (GPR1, mm=0) Mini (GMP101, mm=+17,5) 360° (GMP74, mm=+23,1)
	EDM measure mode	• fixed text value RL_Short; (Red Laser, reflectorless) RL_Prism; (Red Laser, Prism mode) RL_Track; (Red Laser, Reflectorless tracking) IR_Fine; (Infrared, prism mode, high accuracy) IR_Fas; (Infrared, prism mode) IR_Track; (Infrared, prism mode tracking)
Fixpoint	Variables of the datablock type “Fixpoint” will read manually entered coordinates or data retrieved from the onboard fixpoint. Data memory without valid coordinates will be printed with DEFAULT values.	
	Point ID (Target)	Target point number (e.g. “11001”)
	Target (East)	Easting coordinate of measured point (e.g. “5401.220”)
	Target (North)	Northing coordinate of measured point (e.g. “3701.951”)
	Target (Elevation)	Elevation of measured point (e.g. “654.000”)
	Point description	Point description assigned to target PointID
	Point class	GPS only
Job	**Job Comment 1 / 2**	Additional text lines for up to 16 alphanumeric characters, each. Job comments can only be entered onboard the instrument and are not allowed to edit.
	Time	Time variables read the actual clock time from the instrument's system. Time (Seconds): 1..60 Time (Minutes): 1..60 Time (hours-24): 1..24
	Date	Date variables read the actual date form the instrument's sytem. Date (day): 1..31 Date (month): 1..12 Date (short year 99): 0..99 Date (long year 1999): 0..9999
	Jobname	Reads the jobname of the active job.
	Operator	Reads the “operator” (OPER:) value of the active job at the time the corresponding string has been recorded.
	Instrument Type	Reads the instrument type from the system. This is a fixed value, depending the type of instrument you are using (e.g. “TCR305”).

Instrument No Reads the instrument's serial number, which is also a fixed value (e.g. "640054", which is a TCR305).

Measurement Variables of datablock type "measurement" read out the corresponding values from the last recorded measurement block. For any block not containing the request variables, the format will read the last valid values.

Point ID (Target) refer to "Fixpoint"

Horizontal Angle Reads the recorded Hz angle value from the instrument. Variables allows unlimited scaling and formatting. Make sure your output string matches the specific angle units format options (e.g. gon --> sexagesimal).
Example: 243.5891 [gon]

Vertical Angle Reads the recorded vertical angle from the instrument.
Example: 101.4763 [gon]

Slope distance Reads the recorded slope distance value.
If the distance is invalid (e.g. only angles recorded in the last measurement block), the variable will read the specified default value, which can be edited in the menu: "OPTION -> FORMAT -> Default values".
Example: 1522.143 [m]

Horizontal Distance Reads the computed horizontal distance value, which is calculated with the originally measured angle and distance value.

Height Difference Reads the computed height difference to the target point, which is calculated with the originally measured angle and distance value.

Target (East)
Target (North)
Target (Elevation)
Time (Seconds)
Time (Minutes)
Time (hours-24)
Date (day)
Date (month)
Date (short year 99)
Date (long year 1999)

refer to "Fixpoint"

General GSI Block information

For detailed Leica GSI format information, please refer to our document “WILD ONLINE GUIDE” (Art.No GZ-366 0en).

GSI Block information

Example: 21.012+124 04510
Pos 1-2: Word index (e.g. "21" for Hz Angle
Pos 3-6: Block number (GSI), for WI11 blocks
Pos 4: Compensator flag
Pos 5: GSI flag
Pos 6: Unit flag
Pos 7: Sign
Pos8-15: Data
Pos 16: blank (separating character)

Blocknumber (GSI)

Incrementing block number (used in GSI output) to count measurement and coding records. Block No. 1 signalizes the first block.
- single digit, integer value

Counter (Cnt++)

Any recorded block gets a continuously incremented number, no matter wether a new job was created or not.

V-Index (GSI)

- vertical index operation flag
- single digit, integer value
- pos 5

Hz Correction (GSI)

- Hz correction operation flag
- single digit, integer value
- pos 5

Inputmode (GSI)

- GSI input mode flag
- single digit, integer value
- pos 5
  (e.g. "0" = measured value)

Units (GSI)

- GSI unit flag
- single digit, integer value
- pos 6
  (e.g. "2" = gon)

Horizontal Angle (Deg.)

- integer value
- range [0..359]
  (e.g. "153" degree)

Horizontal angle (Min)

- integer value
- range [0..59]
  (e.g. "45" minutes)

Horizontal angle (Sec)
- integer value
- range [0..59]
  (e.g. "13" seconds)

Vertical angle (Deg.) refer to Horizontal angle (Deg.)
Vertical angle (Min) refer to Horizontal angle (Min)
Vertical angle (Sec) refer to Horizontal angle (Sec)

Hz count direction
- Text value
  Left (counter-clockwise)
  Right (clockwise)

Reflector Height
- floating point value
- full scaling and formatting options available
  (e.g. 1.300 [m])

Orientation Measurement

Reflector height refer to "Measurement"

Orientation Residuals

If more than one target is measured in orientation applications, point residuals will be calculated, according the least square method.

Point-ID (Residual)
- Target PointID, for which residual is calculated for
- alphanumeric value
- refer to PointID

Residual (Dist)
- floating point value
- difference of measured and calculated distance to target point

Residual (Height Diff)
- floating point value
- difference of measured and calculated height difference of target point

Residual (Hz)
- angle value
- difference of measured and calculated Hz angle to target point

Residual (Hz-Deg) refer to Hz-angle (Deg)
Residual (Hz-Min) refer to Hz-angle (Min)
Residual (Hz-Sec) refer to Hz-angle (Sec)

Orientation Result

Orientation results are mathematically calculated values, as a result of the multiple target orientation application.

StdDev (Ori-correction)
- standard deviation of calculated orientation angle
- floating point value

StdDev (Ori-correction-Deg) refer to Hz-angle (Deg)
StdDev (Ori-correction-Min) refer to Hz-angle (Min)
StdDev (Ori-correction-Sec) refer to Hz-angle (Sec)

Orientation correction
- floating point value
- refer to Hz-angle

Orientation correction (Deg) refer to Hz-angle (Deg)
Orientation correction (Min) refer to Hz-angle (Min)
Orientation correction (Sec) refer to Hz-angle (Sec)

Orientation Hz-Angle
- floating point value
- refer to Hz-angle

Orientation Hz-Angle (Deg) refer to Hz-angle (Deg)
Orientation Hz-Angle (Min) refer to Hz-angle (Min)
Orientation Hz-Angle (Sec) refer to Hz-angle (Sec)

Orientation Face
- floating point value
  I (Face Left; Hz fine drive on the right hand side)
  II (Face Right; Hz fine drive on the left hand side)

Point count
- incrementing integer value
- counts no. of orientation target points (max. 5 allowed)

Ori Pt ID (Result) refer to Point ID
Point ID (Residual) refer to Point ID

Results

Result variables are calculated values from specific onboard functions or applications (e.g. AREA). Results in a measurement will for example always read the last valid values form the previously recorded result block.

StdDev (..)
- floating point coordinate values
- applied in FREE STATION application
- represents position error of station point
- applied formula: $\sqrt{(s.Dev\ E)^2+(s.Dev\ N)^2}$

Area
- floating point value
- fixed units
- applied in AREA application
  e.g. 4756.490 [m2]

Circumference
- floating point value
- fixed units
- applied in AREA application
  e.g. 214.644 [m]

Point count
- integer value [1…n]
- applied in AREA application
- counts No. of recorded points for area calculation

Result height difference
- floating point variable (e.g. 15.721 [m])
- applied in TIE DISTANCE application
- Height difference between measured Point1 and Point 2

Result Point ID1/2
- string value (e.g. Pt102)
- applied in TIE DISTANCE application
- PointID of measured points 1/2

Stakeout difference /East /North /Elev
- floating point variables (e.g. 12.442 [m])
- applied in SETTING OUT application
- difference of measured and calculated Stakeout Coordinates and Elevation (dE, dN, dH)

Result slope distance
- floating point variables (e.g. 412.810 [m])
- applied in TIE DISTANCE application
- slope distance of point-to-point line from "P1" to "P2" of "TIE DISTANCE"

Result horizontal distance
- floating point variables (e.g. 372.527 [m])
- applied in TIE DISTANCE application
- Horizontal (=plan) distance of point-to-point line from “P1” to “P2” of “TIE DISTANCE”

Computed bearing
- floating point angle value (e.g. 12,4712 [gon])
- applied in TIE DISTANCE application
- calculated bearing from Point1 to Point2 in "TIE DISTANCE"

Computed bearing /Deg, /Min, /Sec
- refer to computed bearing
- refer to Datablock MEASUREMENT

Station	"Station" variables, used in strings other than "Station", will print the last valid recorded value. E.g. if "Station" variables are being used in the datablock type "Measurement", the system will return the last valid station data, recorded in the memory. If no valid station is set (e.g. after reinitializing mem), the specified default value will be printed.
Target Point	Manually entered coordinates or fixpoints recorded in memory, used as target points for applications (e.g. SET ORIENTATION, STAKEOUT, or FREE STATON). For further information, please refer to Datablock Type MEASUREMENT.

Annex 1

Report format

Report formats are often used as measurement and data protocols or documents. The purpose is to visualize recorded data in a readable format. As a first exercise, this example guides you trough the necessary steps of creating a report format. This Format File consists of a combination of “headers” and “output-strings” and will therefore cover a lot of FM’s functionality.

Example data file:

```
================================================
SurveyOffice FM V1.1                     Report.FRT
================================================
Jobname: BLDG4_WST (Operator: MM-3519)
Instr. : TCR305/640054
Date   : 11/15/1999


NEW  STATION-----------------------------------
StID:ST-105     hi: 1.500
East: 771.200 North: 535.500 Elev:  13.250

MEASURE&RECORD---------------------------------
PtID:2201     hr   :   1.60
East: 778.216 North: 539.819 Elev:  11.942
PtID:2202     hr   :   1.60
East: 778.251 North: 540.392 Elev:  12.987
PtID:2203     hr   :   1.60
East: 775.949 North: 537.817 Elev:  13.611
PtID:2204     hr   :   1.60
East: 776.179 North: 536.440 Elev:  13.920
PtID:2205     hr   :   1.60
East: 776.225 North: 536.270 Elev:  14.159

REMOTE  ELEVATION------------------------------
PtID:2210     hr   :   1.20
East: 769.776 North: 538.583 Elev:  13.453
PtID:2210B    hr   :   0.00
East: 769.776 North: 538.583 Elev:  16.456
PtID:2210C    hr   :   0.00
East: 769.795 North: 538.591 Elev:  17.226

MEASURE&RECORD---------------------------------
PtID:2300     hr   :   1.70
East: 772.581 North: 539.017 Elev:  14.150
PtID:2301     hr   :   1.70
East: 774.000 North: 539.099 Elev:  13.243
```

End of file.

Step1 "Format Structure"
Use the menu "Options->Format" to prepare units, scales and default values according your requirements. Think about the needs of your format and plan a suitable format structure:

e.g

- File header

```
===============
SurveyOffice ...
================
```

- Job Exportstring

```
Jobname: BLDG4...
Instr. : TCR305/...
Date   : 11/1...
```

- Block header "Station"

```
NEW STATION---
```

- Station export string

```
StID:ST-105...
East: 771.20 Nor...
```

- Application header "Measure&Record"

```
MEASURE&RECORD---
```

- Application header "Remote Elevation"

```
REMOTE ELEVATION---
```

- Measurement(TPS) export string

```
PtID:2210...
East: 769.776 No...
```

Step2 "Create Block- and Application headers"

Open the header section by pressing the corresponding "+" signs in the tree view. Highlight the general "File Header" to create a simple header element in the edit view. Any ASCII sign is accepted. However headers do no support export variables. The same procedure is valid for application and block headers.

Step3 "Create export format strings"

Click the tree view and highlight the required formatstring. In this example, three different export strings will be used.
- Job Exportstring
- Measurement Exportstring
- Station Exportstring

Varying from exportstring to exportstring, a separate window with corresponding insert variables will appear. However you are allowed to browse for variables of different datablock types at any time. Insert the variables and additional text as required (e.g. Job, Operater, etc.)!

Export String:	**Job**	
Edit View:	Jobname:·«**Jobname**»·(Operator:·«**Operator**»)	
	Instr.·:·«**Instrument·type**»/«**Instrument·No**»	
	Date···:·«**Date·(month)**»/«**Date·(day)**»/«**Date·(long·year·1998)**»	
Preview:	Jobname: xxxxxx (Operator: yyyyyy)	
	Instr. : zzzzzz/nnnnnn	
	Date : mm/dd/yyyy	
String Element:	Variable	Formatting
xxxxxx	Jobname	Alignment: left Length: 1 Precision: 0
yyyyyy	Operator	refer to "Jobname"
zzzzzz	Instr.Type	refer to "Jobname"
nnnnnn	Ser.No.	Length: 6 Precision: 0
mm	Date month	refer to chpt.9.2
dd	Date day	refer to chpt.9.2
yyyy	Date year	refer to chpt.9.2

Export String:	**Measurement**	
Edit View:	PtID:«**Point·ID·(Target)**»·hr···:·«**Reflector·height**»	
	East:«**Target·(East)**»·North:«**Target·(North)**»·Elev:«**Target·(Elev)**»	
Preview:	PtID:nnnn	hr : mm.mm
	East: xxx.xxx	North: yyy.yyy Elev: zzz.zzz
String Element:	Variable	Formatting
nnnn	PointID	Alignment: left Length: 8 (or as required) Precision: 0
mm.mm	hr	Alignment: right Sign: only negative Length: 6 (or as required) Precision: 2 (or as required)
xxx.xxx	Target East	Alignment: right Sign: only negative Length: 8 (or as required) Precision: 3 (or as required)
yyy.yyy	Target North	refer to "Target East"
zzz.zzz	Target Elev	refer to "Target East"

Export String:	**Station**	
Edit View:	StID:«**Point·ID·(Station)**»···hi:«**Instrument·height**» East:«**Station(East)**»·North:«**Station(North)**»·Elev:«**Station(Elev)**»	
Preview:	StID:nnnn hi : mm.mm East: xxx.xxx North: yyy.yyy Elev: zzz.zzz	
String Element:	Variable	Formatting
nnnn	StationID	refer to "PointID"
mm.mm	hi	refer to "PointID"
xxx.xxx	Station East	refer to "Target East"
yyy.yyy	Station North	refer to "Target North "
zzz.zzz	Station Elev	refer to "Target Elevation"

Step3 "Application assignment"
Before saving a "Standard" template Format File, at least one application has to be assigned to an "Exportstring1,2,...". Please refer to chapter 7 for detailed information. You will not need to perform application assignments, when using "Default" exportstrings.

Step4 "Format preview"
Once having completed a Format File, we recommend to perform a format preview. The preview function will print an example of each defined export string three times without loading the format to the instrument. Finally satisfied with the output data you can load the file to an instrument and make a "real life" test. Go and collect any data in your office or in the field and check what your file creates. Improve any of the above steps until the Format File is doing exactly, what your aim was at the beginning.

Annex 2

GSI Format

GSI output formats consist of basically any sequence of measured values lead by a specific word index (WI). The example below, is a typical standard mask output containing pointnumber (WI11), horizontal angel (WI21), vertical angle (WI22), slope distance (WI31), combined PPM and prism constant values (WI51), reflector height (WI87) and instrument height (WI88). For further information on GSI formatting options, please refer to the "Wild ONLINE" guide.

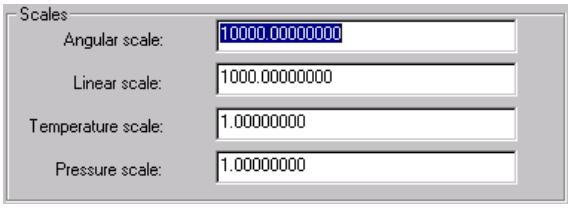
Example GSI data file:
110001+0OP-1340 21.002+29459500 22.002+10576550 31...0+0004130751... 87... 88...
110002+0OP-1341 21.002+29375900 22.002+10522500 31...0+0003284751... etc
110003+0OP-1342 21.002+29341150 22.002+10451100 31...0+0002967351... etc
110004+0OP-1343 21.002+29147250 22.002+10321850 31...0+0002002551... etc
110005+0OP-1344 21.002+28991450 22.002+10201550 31...0+0001503351... etc
110006+0OP-1345 21.002+28679850 22.002+10068700 31...0+0001058651... etc

Additionally to above data blocks, it is possible to output codes and up to 8 code informations in the standard GSI format.

410018+000LYR15 42....+00A_OP12 43....+00000000 44....+000000G4 45....+00000000
410025+000LYR18 42....+00A_OP12 43....+00000000 44....+00000000 45....+00000000

One may create any kind of GSI formats to meet local requirements (e.g Fieldprotocols, Postprocessing, etc). We recommend to use always the "Standard" template for either TPS300 or TPS700 Format Files. Since GSI does not have decimal delimiters, you need to adjust scales as follows:

- Menu "Options"-> Format -> Scales setting:



- Menu "Options"-> Format -> Unit setting: as required
- Menu "Options"-> Format -> Default value setting:
  suggest to set values to "0"

EXAMPLE 1:
Customized GSI format (FM_GSI1.FRT)

- Pointnumber WI11 (Point ID)
- Easting coordinate WI81 (Target point easting)
- Northing coordinate WI82 (Target point northing)
- Code WI41 (Code ID)

Example data file:
11001+0OP-1341 81...0+0198282 0 82...0+00839396 410002+000LYR12
11002+0OP-1342 81...0+0198596 0 82...0+00839542 410003+000LYR12
11003+0OP-1343 81...0+0199558 0 82...0+00839929 410004+000LYR12
11004+0OP-1344 81...0+0200056 3 82...0+00840229 410005+000LYR12
11005+0OP-1371 81...0+0201444 8 82...0+00842927 410013+000LYR14
11006+0OP-1372 81...0+0200808 6 82...0+00842610 410014+000LYR14
11007+0OP-1373 81...0+0200493 1 82...0+00842475 410015+000LYR14
11008+0OP-1380 81...0+0200174 4 82...0+00842324 410016+000LYR15

Step1
Open a new format file and browse for datablock type "Measurement(TPS)" in the tree view. Use the Exportstring1 to limit the data ouput to specific applications or use the Default Exportstring to output all recorded measurement (see also KpXX "assign applications"). For purpose of easier understanding, we will explain each word index element separately, although all indices would be in sequence in the edit view.

Step2

Element name: Edit View: Preview:	**Point number** 11 «Blocknumber (GSI)»+«Point ID (Target)» **11xxxx+ nnnnnnnn**	
String Element:	Variable	Formatting
"11"	Manual entry	----
"xxxx" negative	Blocknumber	Alignment: right Sign: only Length: 4 Fill character: 0
"+"	Manual entry	----
nnnnnnnn negative	PointID	Alignment: right Sign: only Length: 8 Precision: 0

Step3

Element name: Edit View: Preview:	**Easting coordinate** 81...«Units (GSI)»«Target (East)» 81...x+ nnnnnnnn	
String Element:	Variable	Formatting
"81..."	Manual entry	----
"x"	Units (GSI)	Alignment: right Length: 1
+ nnnnnnnn	Target (East)	Alignment: right Sign: always Length: 9 Precision: 0 Fill character: 0

Step4

Element name: Edit View: Preview:	**Northing coordinate** 82...«Units (GSI)»«Target (North)» **82...x+ nnnnnnnn**	
String Element:	Variable	Formatting
"82..."	Manual entry	----
"x"	Units (GSI)	Alignment: right Length: 1
+ nnnnnnnn	Target (North)	Alignment: right Sign: always Length: 9 Precision: 0 Fill character: 0

Step5

Element name: Edit View: Preview:	**Code** 41«Blocknumber (GSI)»+«Code ID» **41xxxx+nnnnnnnn**	
String Element:	Variable	Formatting
"41"	Manual entry	----
"xxxx"	Units (GSI)	Alignment: right Length: 1
+nnnnnnnn	Code ID	Alignment: right Sign: only negative Length: 9 Precision: 0 Fill character: 0

EXAMPLE 2:
Customized GSI format (FM_GSI2.FRT)

- Pointnumber WI11
- Horizontal-Angle WI21
- Vertical-Angle WI22
- Slope Distance WI31
- Reflector Height WI87

Example data file:

110001+0OP-1340 21.012+29459490 22.312+1057656031...0+0004130787...0+00001100
110002+0OP-1341 21.012+29375900 22.312+1052251031...0+0003284787...0+00001100
110003+0OP-1342 21.012+29341130 22.312+1045109031...0+0002967387...0+00001100
110004+0OP-1343 21.012+29147260 22.312+1032183031...0+0002002587...0+00001100
110005+0OP-1344 21.012+28991430 22.312+1020156031...0+0001503387...0+00001100
110006+0OP-1371 21.012+32103170 22.312+0462158031...0+0000151787...0+00001400
110007+0OP-1372 21.012+30008950 22.312+0957150031...0+0000733187...0+00001400
110008+0OP-1373 21.012+29923800 22.312+0996166031...0+0001047087...0+00001400

Step1

Element name: **Pointnumber** Edit View: 11«Blocknumber (GSI)»+«Point ID (Target)» Preview: **11xxxx+nnnnnnnn**		
String Element:	Variable	Formatting
"11"	Manual entry	----
"xxxx"	Blocknumber	Alignment: right Sign: only negative Length: 4 Fill character: 0
"+"	Manual entry	----
nnnnnnnn	Point ID	Alignment: right Sign: only negative Length: 8 Precision: 0 Fill character: 0

Step2

Element name: **Horizontal angle** Edit View: 21.«V-Index (GSI)»«Inputmode (GSI)»«Horizontal angle» Preview: **21.xyz+nnnnnnn0**		
String Element:	Variable	Formatting
"21."	Manual entry	----
"x" "y" "z"	Hz-Corr (GSI) Inputmode (GSI) Units (GSI)	Alignment: right Length: 1
+nnnnnnnn	Hz-Angle	Alignment: right Sign: always Length: 8 Precision: 0 Fill character: 0
"0"	Manual entry	----

Step3

Element name: Edit View: Preview:	**Vertical angle** 22.«Hz correction»«Inputmode (GSI)»«Vertical angle» **22.xyz+nnnnnnn0**	
String Element:	Variable	Formatting
"22."	Manual entry	----
"x" "y" "z"	Hz-Corr (GSI) Inputmode (GSI) Units (GSI)	Alignment: right Length: 1
+nnnnnnnn	V-Angle	Alignment: right Sign: always Length: 8 Precision: 0 Fill character: 0
"0"	Manual entry	----

Step4

Element name: Edit View: Preview:	**Slope distance** 31...«Units (GSI)»«Slope distance» **31...x+nnnnnnnn**	
String Element:	Variable	Formatting
"31..."	Manual entry	----
"x"	Units (GSI)	Alignment: right Length: 1
+nnnnnnnn	Slope Dist	Alignment: right Sign: always Length: 9 Precision: 0 Fill character: 0

Step5

Element name: Edit View: Preview:	**Reflector height** 87...«Units (GSI)»+«Reflector height» **87...x+nnnnnnnn**	
String Element:	Variable	Formatting
"87"	Manual entry	----
"x"	Units (GSI)	Alignment: right Length: 1
nnnnnnnn	hr	Alignment: right Sign: always Length: 9 Precision: 0 Fill character: 0

For GSI16 formats, extend the length of all measured value variables ("nnnnnnnn") by 8 characters. Do not change the length of GSI flags!

Annex 3

SDRMap 3 Format

The SDR format is a common Sokkia communication device. Its architectural design uses a combination of “Headers” and “Exportstrings”. Some of the SDR supporting instruments do not provide direct application of PPM and other scaling factors to measurements. Since Leica’s Total Stations do automatically apply the corresponding factors, the measured data does not need to be corrected by any postprocessing software. To consider this fact, the emulated SDRMap3 format contains neutral, but fix scaling values in its header section.

This example supports limited coding, using the first and second code attributes within a code block.

Example data file:

```
0EDSDR2x    V03-05K000001-Jan-99 00:00 113121
10NMBLDG4_WS
13NMSurveyor MM-3519
06NM1.00000000
13CPSea Level crn:N
13CPC and R crn : N
13CPAtmos crn : N
13TS15-11-99 11:07
13NMLeica TCR305  640054
01NM        000000                00000031    0.0000
02TVST-105 771.200   535.500   13.250    1.500 ----
07TVST-105 208  38.67340  38.67340
03NM1.600
09F1ST-105 2201 8.327  98.33953 58.38285  PIT12  DRY
03NM1.600
09F1ST-105 2202 8.584  91.08496 55.25052  PIT14  DRY
03NM1.600
09F1ST-105 2203 5.304  85.01375 63.99626  PIT14  ---
03NM1.600
09F1ST-105 2204 5.126  81.36146 79.31152 PIT16  WET
03NM1.600
09F1ST-105 2205 5.183    78.77104 81.29315 PIT16 ---
03NM1.600
09F1ST-105 2206 5.912    77.56975 97.78376 ---------
```

Step1 "Format Structure"
Use the menu "Options->Format" to prepare units, scales and default values according your requirements. Think about the structure of SDR Format Files:

e.g

- File header 00EDSDR2x····V03-05K000...
- Job Exportstring 10NMBLDG4_WS
  13NMSurveyor...
  06NM1.00000000
  13CPSea Level...
  13CPC and R...
  13CPAtmos cr...
  13TS15-11-99...
  13NMLeica TCR...
  01NM...
- Station Exportstring 02TVST-1771.200...
- Orientation Exportstring 07TVST-1020838.673...
- Measurement(TPS) export string 03NM1.600
  09F1ST-122018.327...

Step2 "Create Block- and Application headers"
The SDR format uses only the first line as a file header. This line contains information about the SDR release version and release date. All contents are fix and could simply be typed in in the edit view.

"0EDSDR2x V03-05K000001-Jan-99 00:00 113121"

You may adapt the header line according the SDR requirements.

Step3 "Create export format strings"

Click the tree view and highlight the corresponding formatstring. In this example, four different export strings will be used.
- Job Exportstring
- Station Exportstring, including coding attribute1
- Orientation Exportstring,
- Measurement Exportstring, including coding attribute1 an2

Export String:	**Job**	
Edit View:	10NM«**Jobname**» 13NMSurveyor·«**Operator**» 06NM1.00000000 13CPSea·Level·crn:N 13CPC·and·R·crn·:·N 13CPAtmos·crn·:·N 13TS«**Date(d)**»-«**Date(m)**»-«**Date(yy)**»·«**Time(h)**»:«**Time(m)**» 13NMLeica·«**Instrument·type**»«**Instrument·No**» 01NM···//···000000···//···00000031···// ··0.000	
String Element:	Variable	Formatting
Line "10NM"	Jobname	Alignment: left Length: 1 Precision: 0
Line "13NM"	Operator	Alignment: left Length: 1 Precision: 0
Line "06NM"	Scalefactor	fixed
Lines "13CP"	Scalefactors	fixed
Line "13TS"	Time/Date	Refer to Chapter 9.2
Line "01NM"	???	fixed

Export String:	**Station**	
Edit View:	02TV«**Point·ID(St)**»«**Stat(East)**»«**Stat(North)**» «**StatElev)**»«**Instr.height**»«**Attribute·1**»	
Preview:	02TVnnnn xxx.xxx yyy.yyy zzz.zzz aa.aaa bbbbb	
String Element:	Variable	Formatting
"02TV"	LineID	fixed
nnnn	PointID	Alignment: left Length: 8 (or as required) Precision: 0
xxx.xxx	Station East	Alignment: right Sign: only negative Length: 8 (or as required) Precision: 3 (or as required)
yyy.yyy	Station North	refer to " Station East "
zzz.zzz	Station Elev	refer to " Station East "
aa.aaa	Instr.Height	Alignment: right Sign: only negative Length: 6 (or as required) Precision: 3 (or as required)
bbbbb	Code Attribute1	Alignment left Length: 1 Precision: 0

Export String:	**Orientation**	
Edit View:	07TV«PtID(Stat)»«PointID(Target)»«Hz angle»«Hz·angle»	
Preview:	07TVnnnnn mmmmm xxx.xxxx xxx.xxxx	
String Element:	Variable	Formatting
07TV	LineID	fixed
nnnn	PointID	refer to "StationID"
xxx.xxxx	Hz-Angle	Alignment: right Sign: only negative Length: 8 (or as required) Precision: 4 (or as required)

Export String:	**Measurement**	
Edit View:	03NM**«Reflector·height»** 09F1**«PtID·(Stat)»«PtID·(Target)»«Slope·distance»** **«V·angle»«Hz·angle»·«Attribute·1»«Attribute·2»**	
Preview:	03NMn.nnn 09F1aaaaa bbbbb ccc.cccc xxx.xxxx yyy.yyyy ooooo ppppp	
String Element:	Variable	Formatting
03NM	LineID	fixed
09F1	LineID	fixed
n.nnn	Refl.Height	refer to "StationID"
aaaaa	Station ID	refer to "StationID"
bbbbb	Target ID	refer to "StationID"
ccc.ccc	Slope Dist	Alignment: right Sign: only negative Length: 8 (or as required) Precision: 3 (or as required)
xxx.xxxx	Hz-Angle	Alignment: right Sign: only negative Length: 8 (or as required) Precision: 4 (or as required)
yyy.yyyy	V-Angle	refer to "Hz-Angle"
ooooo	Attribute1	refer to "StationID"
ppppp	Attribute2	refer to "StationID"

For closer information to coding, attributes and attribute names, please refer to the corresponding user manual.

Notes:

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