

Long-term archiving and display of process data with WinCC V16 RT Advanced and SIMATIC Panels

WinCC (TIA Portal) V16

https://support.industry.siemens.com/cs/ww/en/view/109477071

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1 Introduction

1.1 Overview and tasks

This application example illustrates how to perform long-term archiving of process tags with HMI operator interfaces or WinCC Runtime Advanced and then output the logged values with trend views/f(x) trend views.

Long-term archiving of process tags

The storage of process tags in the form of tag logs on internal drives or the removable media of HMI operator interfaces allows the subsequent evaluation of the process flow at any time.

The method, however, depends on the system limits of the operator interface type used. For example, a single TP1200 Comfort Panel log can contain a maximum of 20000 values. If 10 process tags are to be recorded at intervals of one second, the first values of a cyclical log are overwritten after 2000 seconds or approx. half an hour. Detailed information on the quantity structures of the individual SIMATIC operator interfaces can be found at \5\.

Often, administrators want to exceed the archiving system limits. This is made possible by this application example.

Display of tag logs by means of trend views and f(x) trend views

The tag logs should also be displayed on the operator interfaces for analysis and checking. The configuration of trend views and f(x) trend views for this purpose is explained in this application example.

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1.2 How it works

Technical details on the configuration principles can be found in chapter 2.1.

Storage

The application example moves the current data log to a folder for long-term archiving whenever the current log is filled. The storage location for long-term archiving can be a removable storage device or a network drive with a storage capacity adapted to the requirements of the project. In this long-term folder a new log file, whose name contains the time stamp of the copy, is created for each copy process, so that a "library of long-term logs" is created.

The storage takes place during operation and does not interrupt the process value archiving, since it is carried out exclusively via system functions. This causes the process values to be buffered as long as the files to be moved are locked.

Restoring

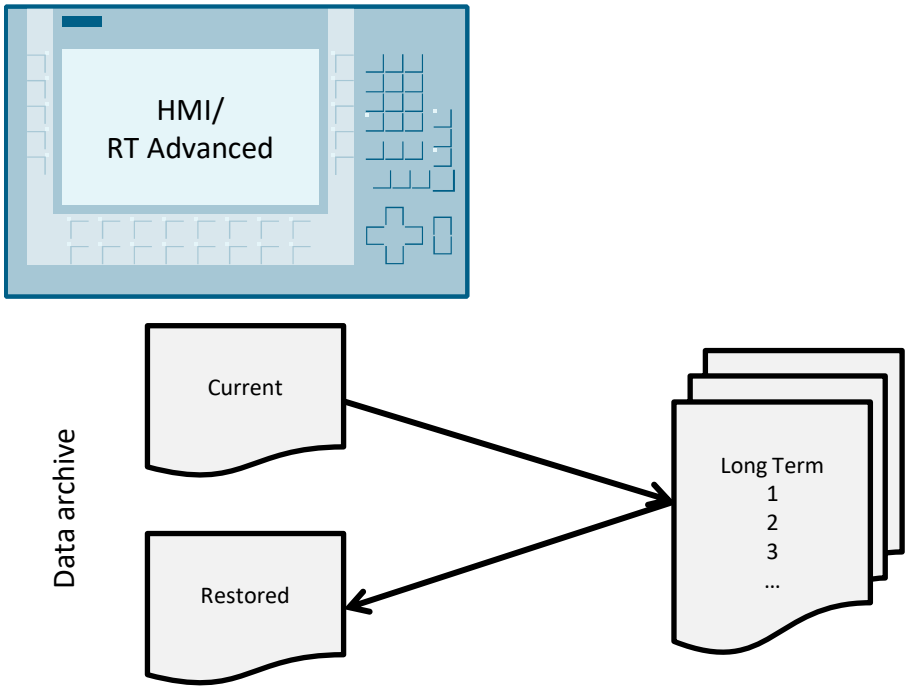
In the configuration, a curve or f(x) trend view is permanently connected to a log whose name cannot be adapted at runtime. For this reason, it is not possible to simply link the trend view to a stored long-term log file. In addition, a log is always firmly linked to the process tags to be stored. This means that copying the old log file back to its original location is not sufficient for restoring and viewing the long-term logged data, because the old values would immediately be overwritten by current process values.

To this end, the long-term log is retrieved from the library and copied to a second log. Logging is stopped for this log, which means that the recovered values are not overwritten by current process values in this case.

For the duration of the recovery, the read access that the panel requires for displaying the recovered values is interrupted. This makes it necessary to control the recovery through a Visual Basic script that controls the locking of log accesses during disk accesses.

Note The procedure is only suitable for tag logs in CSV format.

Figure 1-1



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1.3 Components used

This application example was created with these hardware and software components:

Table 1-1

Components	Quantity	Article number	Note
SIMATIC HMI TP1900 Comfort	1	6AV2124-0UC02-0AX1	Or equivalent panel
SIMATIC WinCC Advanced V16	1	6AV2102-0AA06-0AA5	Or later version
PC	1		Commercially available PC with PROFINET interface for project planning and for WinCC Runtime Advanced

This application example consists of the following components:

Table 1-2

Components	File name	Note
Documentation	109477071_LongTermDataArchives_de_v20.pdf	
Project log	109477071_Project.zip	Contains the WinCC V16 configuration for four devices: Trend view and f(x)-trend view for TP1900 Comfort and WinCC Runtime Advanced (PC)

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2 Engineering

2.1 General

Structure of the configuration

The supplied WinCC (TIA Portal) project demonstrates the handling of long-term archiving for SIMATIC HMI Comfort Panels and PCs with the WinCC Runtime Advanced, each with one device for trend views and one for f(x) trend views, so that the project contains a total of four devices.

Where the configuration of the individual devices deviates from each other, this is indicated accordingly.

Data logs used

The configurations use two directories for storing the data on the SD memory card or the local hard disk:

- `\logs` (Panel) or `c:\logs` (Runtime Advanced) for the log of the currently stored process values,
- `\logs` (Panel) or `c:\temp` (Runtime Advanced) for the library of the long-term logs

The following data logs are created there:

Table 2-1

Storage location/Name	Use
`CurrentLog0.csv`	The current data log in which the simulated process values are continuously written.
`Restorelog0.csv`	A data log restored from the library of the long-term logs, the contents of which are displayed in the project engineering.
`CurrentLog0~…~.csv`	Long-term logs. Each time the log is filled, its contents are moved to a new file in the long-term log library. The name of the copy is extended by the time stamp of the storage time and the name of the device (see also page 15).

See also chapter 2.2.3.

System messages and functions

This application example is intended to provide the most general solution possible for storing and displaying long-term logs. Large variations in the performance of the devices, the type of connection of the storage medium (memory card, network drive, etc.) and the size of the files to be moved must be taken into account. In addition, the ongoing operation of data archiving should not be interrupted during the storage and recovery processes.

Scripts are not very suitable for this purpose, which is why their use has been minimized in this application example. Instead, system messages are used as triggers for system functions as far as possible. This ensures that archiving is buffered even during file access and that no undefined states occur, e.g. due to aborted scripts.

The configuration uses the following system messages (each linked to the "Come" event):

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Table 2-2

Number	Meaning	Use
110001	Change to "Online" mode.	Variable initialization
80019	All logs closed	Start the copy procedure
80048	Log successfully copied	Open log again

In addition, the "11_Module1" screen is linked to the "Built" event in order to carry out further initializations.

See also chapter 2.2.7.

Functionality

The configuration continuously logs process values in a data log and displays them via a trend view / f(x) trend view. In addition, there are two further tasks:

- When the data log is full, its contents are copied to a second directory for long-term archiving.
- At the operator's request, one of the long-term logs is copied back and displayed on a second trend view / f(x) trend view in the operator interface.

The interaction of system functions, system alarms and scripts is described in Figure 2-1.

Securing the log

To save the current log, when the fill level is reached the flag `archive_mode` is set to the value "0" (1) and the system function `CloseAllLogs` is called (2).

The completion of this system function triggers the system message "80019" (3). Linked to this is the call of the script `Archive_action`, which checks the value of the flag `archive_mode` (4). If the flag is not set, the system function `ArchiveLogFile` is called, and this copies the current log file into the long-term directory (5).

The successful completion of the copy operation is then indicated by the system alarm "80048" (6). This event is associated with the system function `OpenAllLogs` (7), and the backup operation is complete.

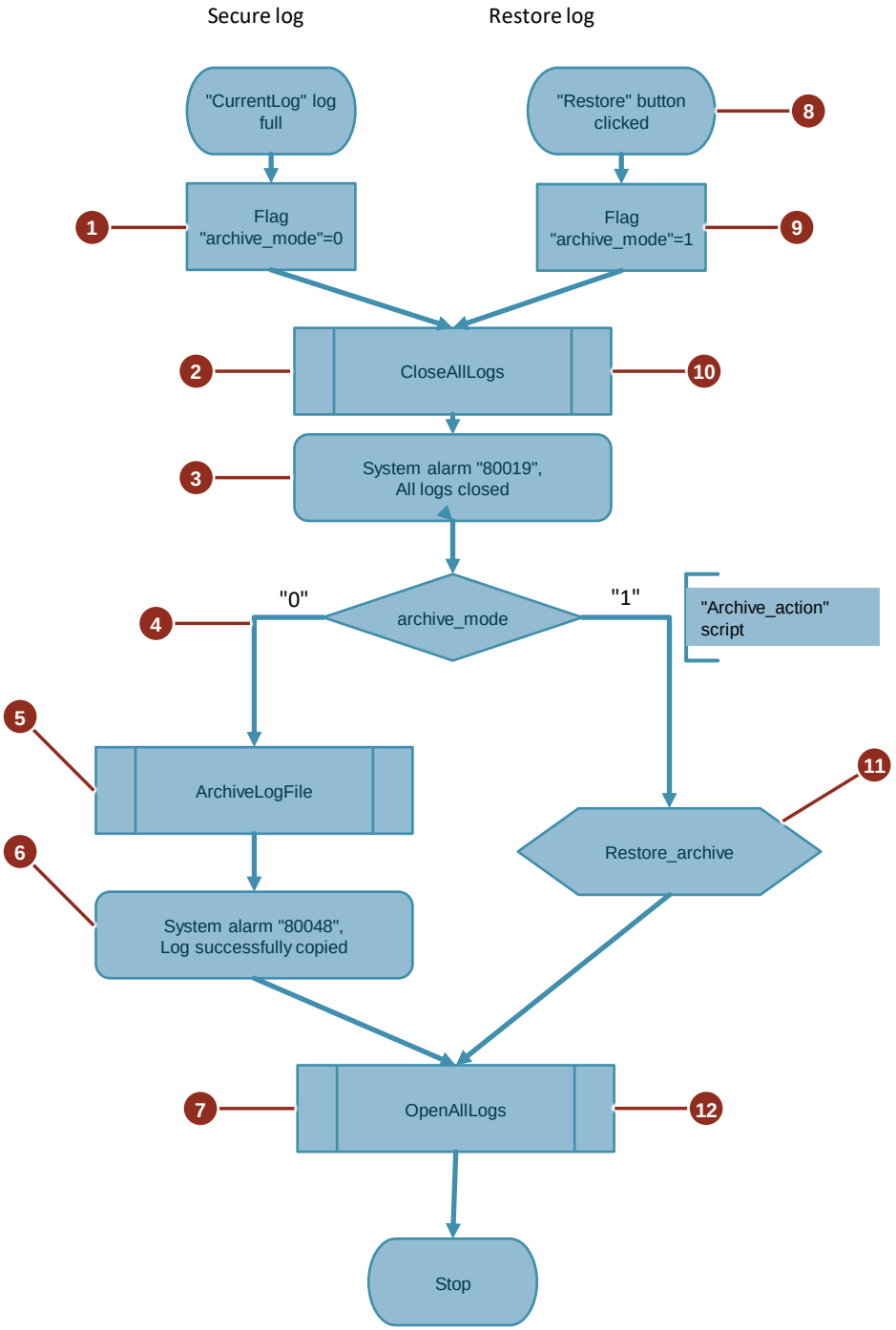
Restoring

After the log to be restored has been determined from the long-term directory, the restoration is initiated by clicking the "Restore" button (8). The flag `archive_mode` is set to the value "1" (9). As with the log backup, the script `Archive_action` is called (10), and this, in turn, after checking `archive_mode` calls the script `Restore_archive` (11), to carry out the restoring.

After the restoration is complete, `Archive_action` calls the system function `OpenAllLogs` again (12), and the script execution is complete.

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Figure 2-1



Script `Restore_archive`

After the current logs have been closed, the `Restore_archive` script to restore an log from the long-term directory performs several tasks in sequence:

- Copy the new log to be restored to the appropriate directory (overwrite an existing file if necessary).
- Read the time stamp from the stored data of the long-term log to set the trend view accordingly.
- Only for f(x) trend logs: Rename variable names in the restored file

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- Re-open all logs, activate the current image to update the trend view, output a corresponding system message.

For details on script programming, see chapter 2.2.6.

2.2 Project Planning

The following documentation explains the configuration steps required to configure long-term archiving and recovery with a trend view for WinCC Runtime Advanced. If changes or additional configuration steps are necessary for an f(x) trend view or a Windows HMI operating device, this is indicated at the appropriate point.

The project included in the download of this application example comprises four devices with the different possible combinations

- "F_x_Panel": f(x) trend view / TP900 Comfort Panel
- "Trendview_Panel": Trend view / TP900 Comfort Panel
- "F_x_Advanced": f(x) trend view / WinCC RT Advanced
- "Trendview_Advanced": Trend view / WinCC RT Advanced

Note The project in the download of this application example was created with a template that offers you additional functionalities, such as a direct connection to the Siemens Industry Online Support Portal.

This documentation does not deal with the configuration of the template, but only explains the configuration steps for long-term archiving independent of the template.

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2.2.1 Requirements

1. Open a TIA project for your desired target device (HMI operating device or WinCC Runtime Advanced) and create an image with the name "11_Module1" in it. Define screen picture as the startup screen for your configuration, where applicable.
2. Configure a pop-up screen "Pop Up FileExplorer" from the library "LHmiView_FileExplorer" in the screen management. This pop-up screen is used in the project to select the data log to be restored.

Note The library "LHmiView_FileExplorer" is part of the "Toolbox for HMI Projects", which you can download free of charge from the SIOS portal (see \6\). Under this entry link you will find details on the installation and configuration of the pop-up screens.

2.2.2 HMI tags

Tag table

Create the following tags in the standard tag table:

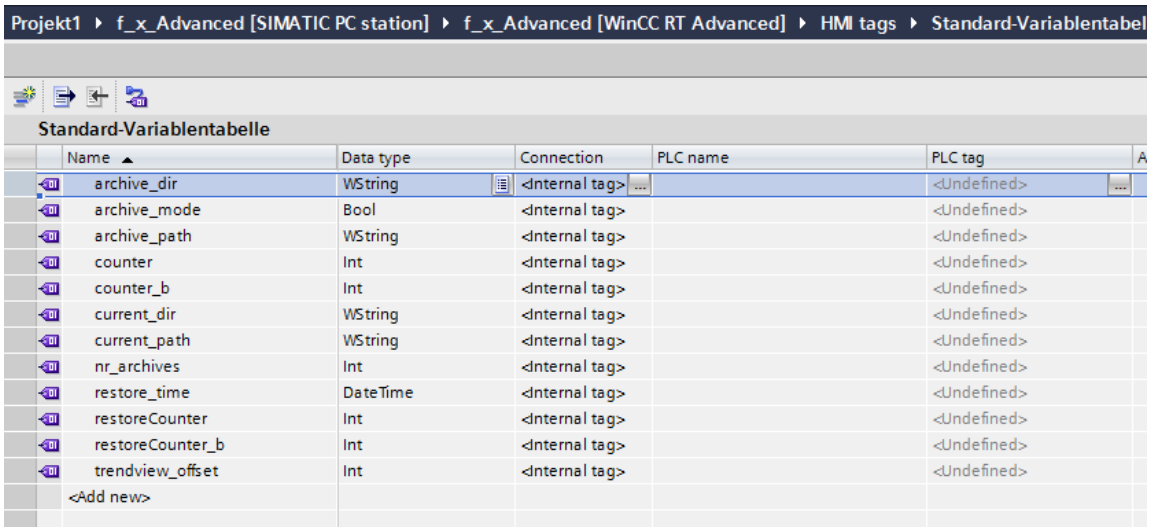
Table 2-3

Name	Type	Function
archive_dir	WString	Directory for the storage of long-term data logs
archive_mode	Bool	Flag for the operating mode of the configuration: "0" = Saving of the current log, "1" = Recovery of a long-term log
archive_path	WString	Complete path (directory + file name) of the selected long-term data log.
counter	Int	Process value to be logged; for f(x) trend view x-component of the process value to be logged
counter_b	Int	For f(x) trend view: y-component of the process value to be logged *)
current_dir	WString	Directory for the storage of current and restored data logs
current_path	WString	Complete path (directory + file name) of the selected restored data log.
nr_archives	Int	Number of long-term logs stored (for information purposes only)
restore_time	DateTime	Time stamp of the first entry of the restored data log
restoreCounter	Int	Process value restored from the long-term log; For f(x) trend view: x-component of the restored process value
restoreCounter_b	Int	For f(x) trend view:y component of the restored process value *)
trendview_offset	Int	Offset of the display of the trend view of the restored log

*) Only necessary for f(x) trend views

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Figure 2-2



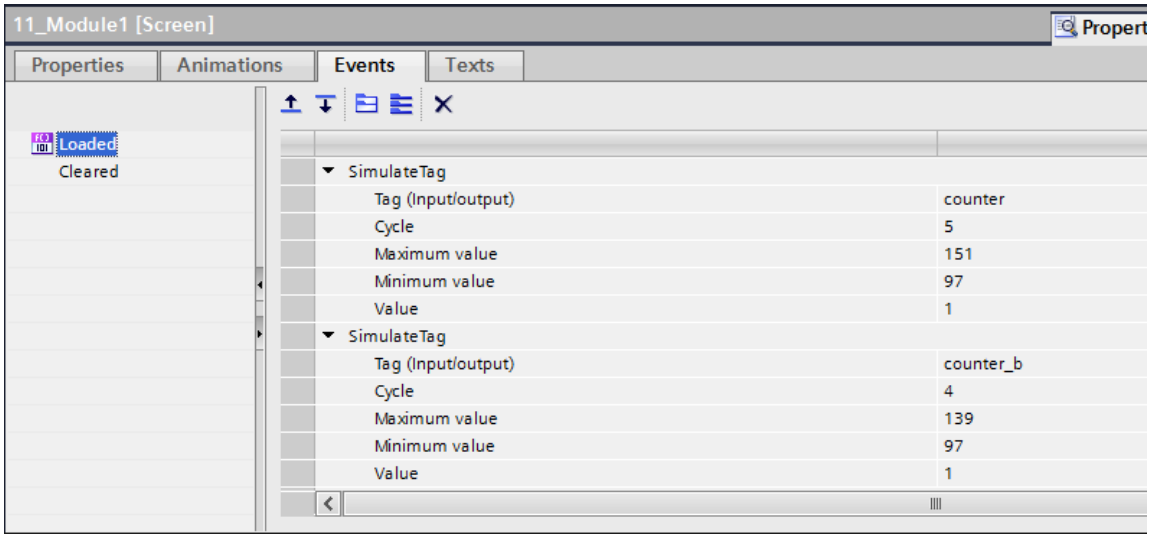
All tags are configured via an internal connection.

Tag simulation (optional)

If you want to simulate the process variables, proceed as follows:

1. Open the "Properties > Events" tab of the screen "11_Module1".
2. Link the "Loaded" event to the system function `SimulateTag`. Transfer the tag `counter` as parameter "Variable (Input/Output)".
3. For f(x) trend views, repeat the procedure with the tag `counter_b`.
4. Select suitable values for the other parameters.

Figure 2-3



See also page 23

2.2.3 Logs

The configuration uses two logs:

- `CurrentLog`, which stores the current process values in an log in the directory `current_dir`. Whenever this log is filled, its contents are automatically moved to the long-term archiving directory designated by `archive_dir`. The logs that have been moved are grouped there.
- `RestoredLog`, a log for the process values recovered from long-term archiving.

Archiving concept

A naive approach for the configuration of a long-term archiving would be to move the current tag log whenever it is filled. If recovery is desired, the old log is copied to the current log and the old values are available again.

However, this method does not work, since the process values for the restored log should of course also be archived further. This would also fill the restored log immediately, and new process values would immediately overwrite the archived values.

Another approach would be to maintain two identically configured logs: One for the current process values, and one for the recovered values, and copying the logs back and forth between them. But each process tag can only be assigned to **one**

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log. This means that it cannot be the content of both the current and the restored log.

For these reasons, the logs are handled as follows:

Log of current process values "Current Log"

1. Open the entry "Log" ("Historical Data") in the project tree.
2. Create the tag log `CurrentLog` for the current process values. Parameterize the log in the tabular area or in the inspector window under "Properties > Properties > General" as follows:
   - "Storage Location": "CSV file (ASCII)" ("CSV file (ASCII)") This parameter specifies the format in which the data is stored in the log. The application example only supports the CSV format.
   - "Data records per log": See the note below for more information
   - "Path": Assign the storage location that you have also transferred to the tag `CurrentDir` to the current log.[1]
   - "Logging method": "Trigger event". If you choose this option, a log overflow triggers an event that triggers the start of the backup process (see Figure 2-1).
   - Check the box "Restart behavior –> Enable logging at runtime start"
   - "Restart behavior > Log handling at restart": "Reset log"

Note As is customary with the configuration of logs, you must also make a compromise here with regard to the number of data records per log:

If you select a high value here, you will need a lot of space on the local storage medium. Moving the log to the long-term log is performed only rarely, but then the moving process can take a relatively long time and block the operating device for this period. On the other hand, the copying process with a small number of data records is done frequently, but only takes a relatively short time in each case.

The optimum choice depends on your configuration requirements, the performance and memory space of your operator panel, and the speed of data transfer to and from the long-term directory.

Note When setting up your logs, note that a maximum of 1000 files can be created in one directory under the Windows CE operating system used by panels.

3. Configure at least one logging tag in the tabular area under "Logging tags" or in the inspector area under "Properties > Properties > General" as follows:
   - "Name": (any one)
   - "Process tag": `counter`
   - "Acquisition mode": "Cyclic"
   - "Logging cycle": "1 s"
4. For f(x) trend logs, project at least one additional log tag:
   - "Name": (any one)

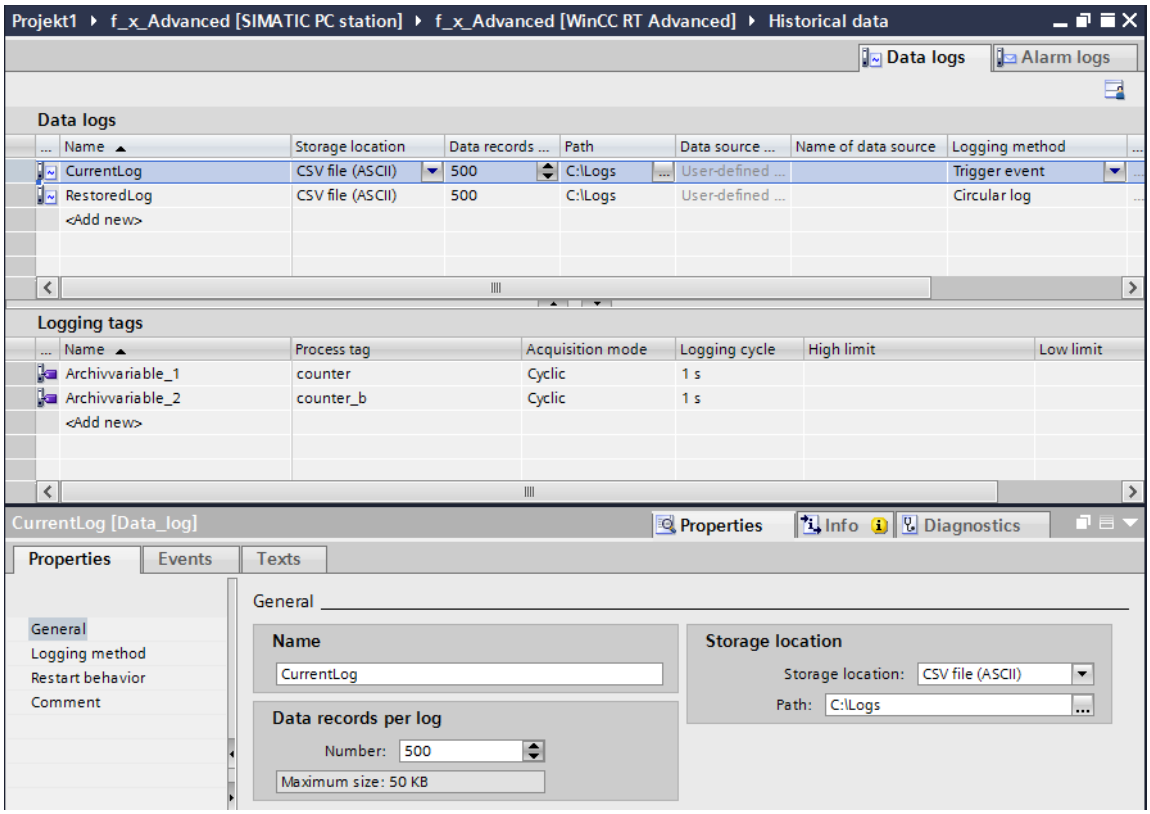
[1] It is not possible to configure the storage location via a string variable.

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- "Process tag": `counter_b`
- "Acquisition mode": "Cyclic"
- "Logging cycle": "1 s"

For your own configuration, you can adapt the process values to be logged and the other parameters to your requirements.

Figure 2-4

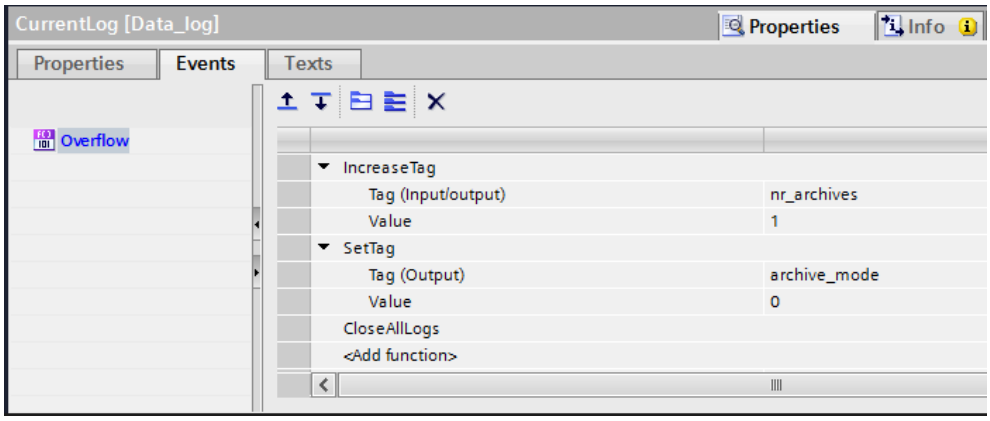


5. In the Inspector window under "Properties > Events", link the "Overflow" event of the log in the specified order with the following system functions:
   a. (optional) `IncreaseTag ("Increase tag")`
      "Tag": `nr_archives`
      "Value": 1
   b. `SetTag`
      "Tag": `archive_mode`
      "Value": 0
   c. `CloseAllLogs`

For a description of how it works, see Figure 2-1.

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Figure 2-5



Designation of the log files

WinCC Runtime uses the following conventions for the log files in CSV format on HMI operating devices and PCs:

- A "0" and the extension ".csv" are appended to the configured log name of the current log.
  For the log `my_values` the file name would be "my_values0.csv", for example.
- A filled log that is moved for long-term archiving receives a file name in the form "[Name]0_[Storage date]_[Storage time]_[Computer name].csv".
  For the `my_values` log, which is moved from the computer "PCStation" on February 1, 2019 at 13:25:00, the file name would be "my_values0_20190201_132500_PCStation.csv", for example.

Note

The timestamp used in the long-term log file name may differ from the timestamp used to store the process values in the log. A UTC time stamp is used for the log name and the local time set on the panel/PC for the process values.

Note this difference when using your long-term logs, especially when restoring data (see 2.2.6).

"RestoredLog" archive of restored process values

1. Open the entry "Log" ("Historical data") in the project tree.
2. Create the tag log `RestoredLog` for the restored long-term process values. Parameterize the log in the tabular area or in the inspector window under "Properties > Properties > General" as follows:
   - "Storage Location": "CSV file (ASCII)"
   - "Data records per log": Use the `CurrentLog` value.
   - "Path": Assign the storage location that you have also transferred to the tag `CurrentDir` to the restored log.
   - "Logging method": "Circular log"
   - Delete the check for the box "Restart behavior –> Enable logging at runtime start"
   - "Restart behavior > Log handling at restart": "Reset log"
3. Configure at least one logging tag in the tabular area under "Logging tags" or in the inspector area under "Properties > Properties > General" as follows:
   - "Name":

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- for trend views: any,
- for f(x) trend views: `Logtag_1`

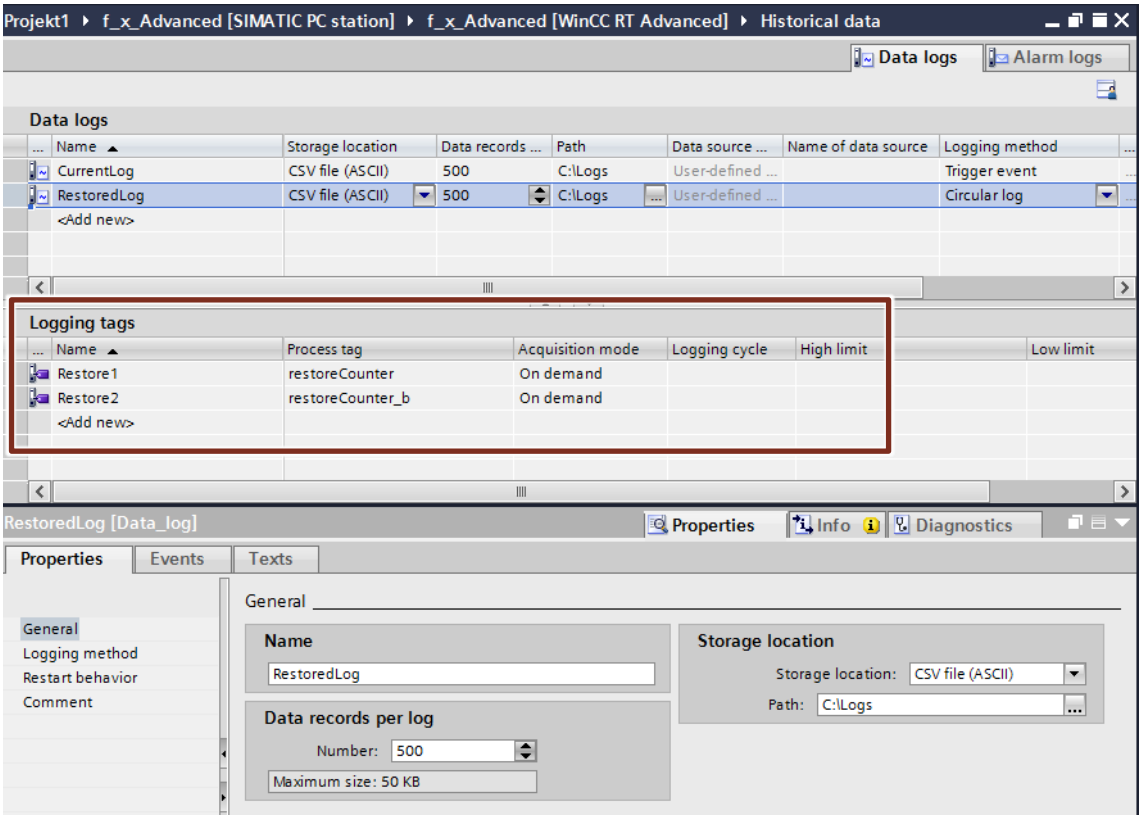
- "Process tag": `restoreCounter`
- "Acquisition mode": "On demand"

4. For f(x) trend logs, project at least one additional log tag:
   - "Name":
     - for trend views: any,
     - for f(x) trend views: `Logtag_2`
   - "Process tag": `restoreCounter`
   - "Acquisition mode": "On demand"

For your own configuration, you can adapt the process values to be restored to your requirements. Note that the entries under "Process tag" in the tabular area of the log tags (see below) must be **different** from those used in `CurrentLog`, while the number of process tags and their types must be **identical**.

This log has no events for linking to functions.

Figure 2-6



2.2.4 Trend views / f(x) trend views

Trend views

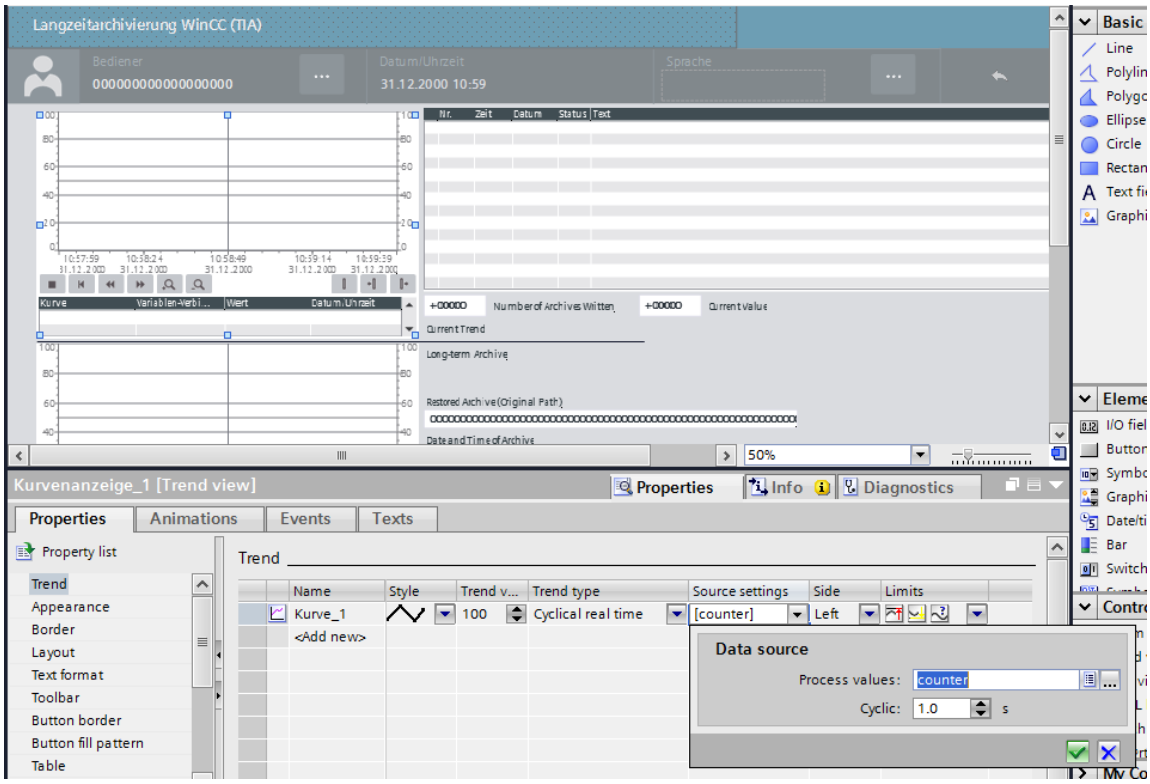
For the **current** log (log of the current process values):

1. Configure a trend view in the upper screen area.

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2. Parameterize this as follows:
   - "Trend Type": "Cyclical real time"
   - "Source Settings": `counter` (or the process tag you require)

Figure 2-7

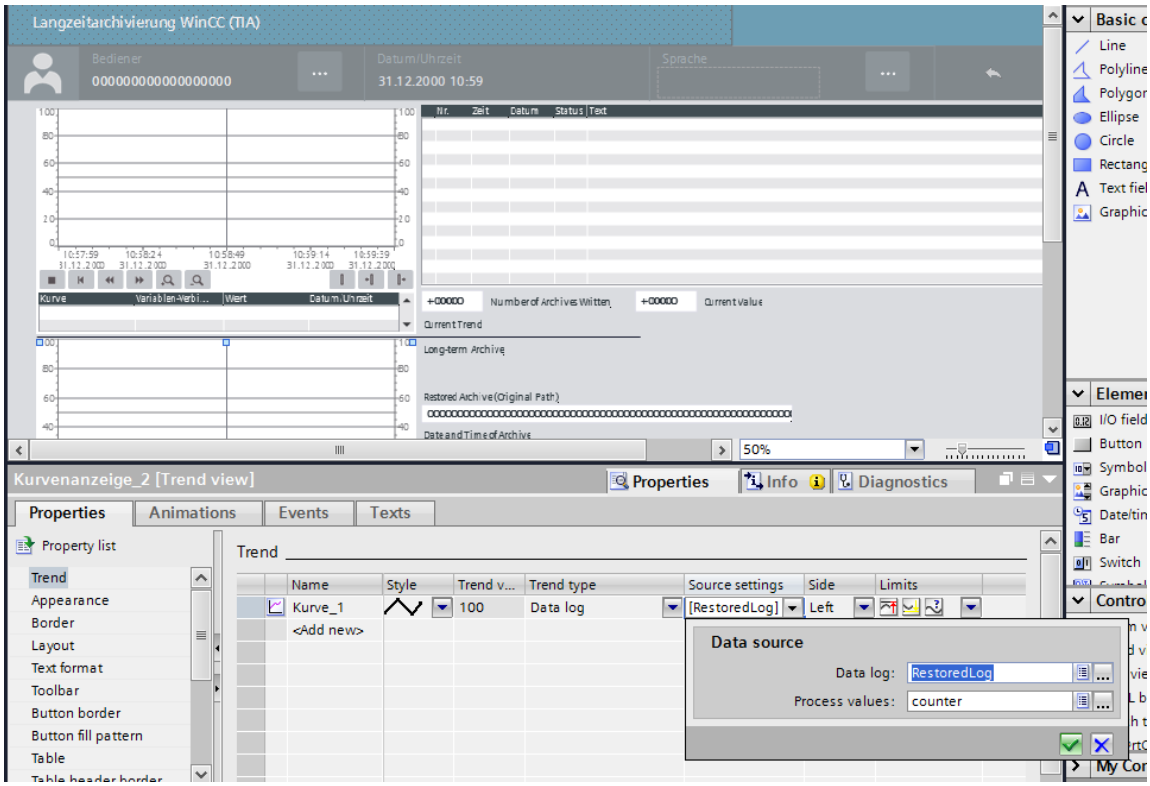


For the **restored** log (log of the restored process values):

3. Configure a trend view or f(x) trend view in the lower screen area.
4. Parameterize them in the inspector window under "Properties > Properties" as follows:
   - "Trend Type": "Data log"
   - Under "Source settings":
     - "Data log": `RestoredLog`
     - "Process values": `counter` (or the process tag you require)
   - Under "Time axis > External time": `restore_time` The value of this variable corresponds to the time stamp of the first entry in the restored long-term log, see also chapter 2.2.2.

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Figure 2-8



Note

Note that you must specify a tag that is not configured for the log used for the process value to be displayed.

This is necessary to circumvent the restrictions discussed in chapter 2.2.3.

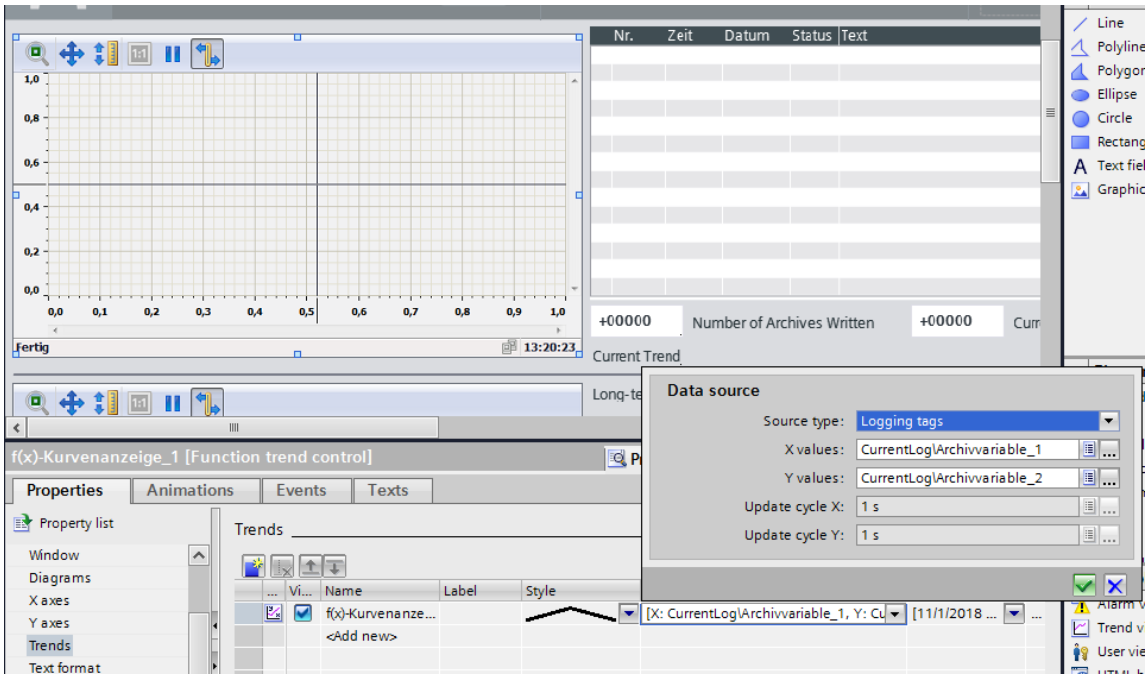
F(x) trend views

For the **current** log:

1. Configure an f(x) trend view in the upper screen area.
2. Parameterize it in the inspector window under "Properties > Properties" under "Data source":
   - "Source type": "Logging tags"
   - "X values": `CurrentLog\Logtag_1`
   - "Y values": `CurrentLog\Logtag_2`

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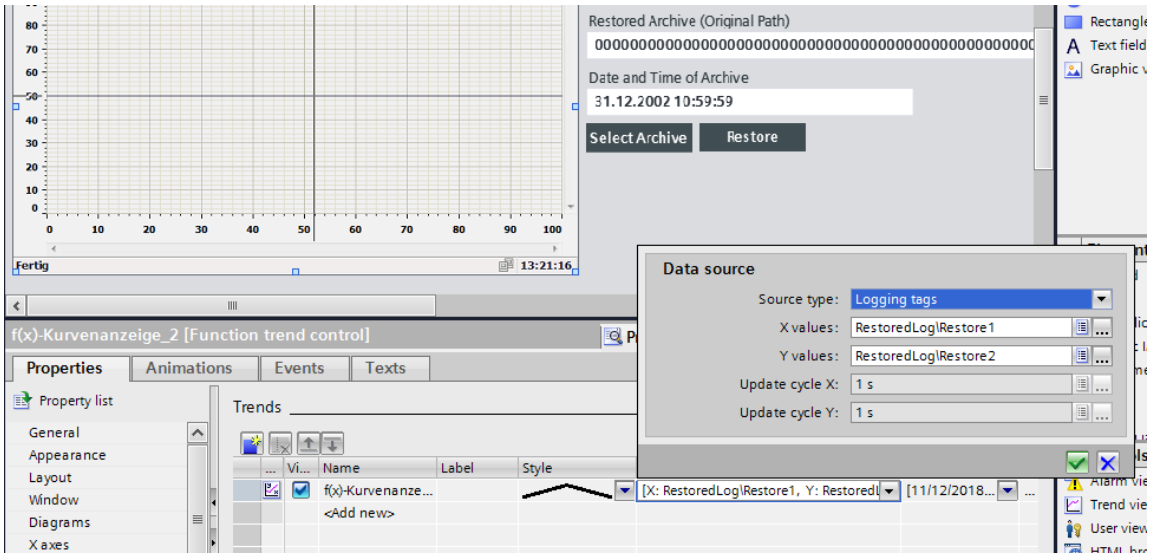
Figure 2-9



For the **restored** log:

3. Configure a trend view or f(x) trend view in the lower screen area.
4. Parameterize this as "data source":
   - "Source type": "Logging tags"
   - "X values": `RestoredLog\Restore1`
   - "Y values": `RestoredLog\Restore2`

Figure 2-10



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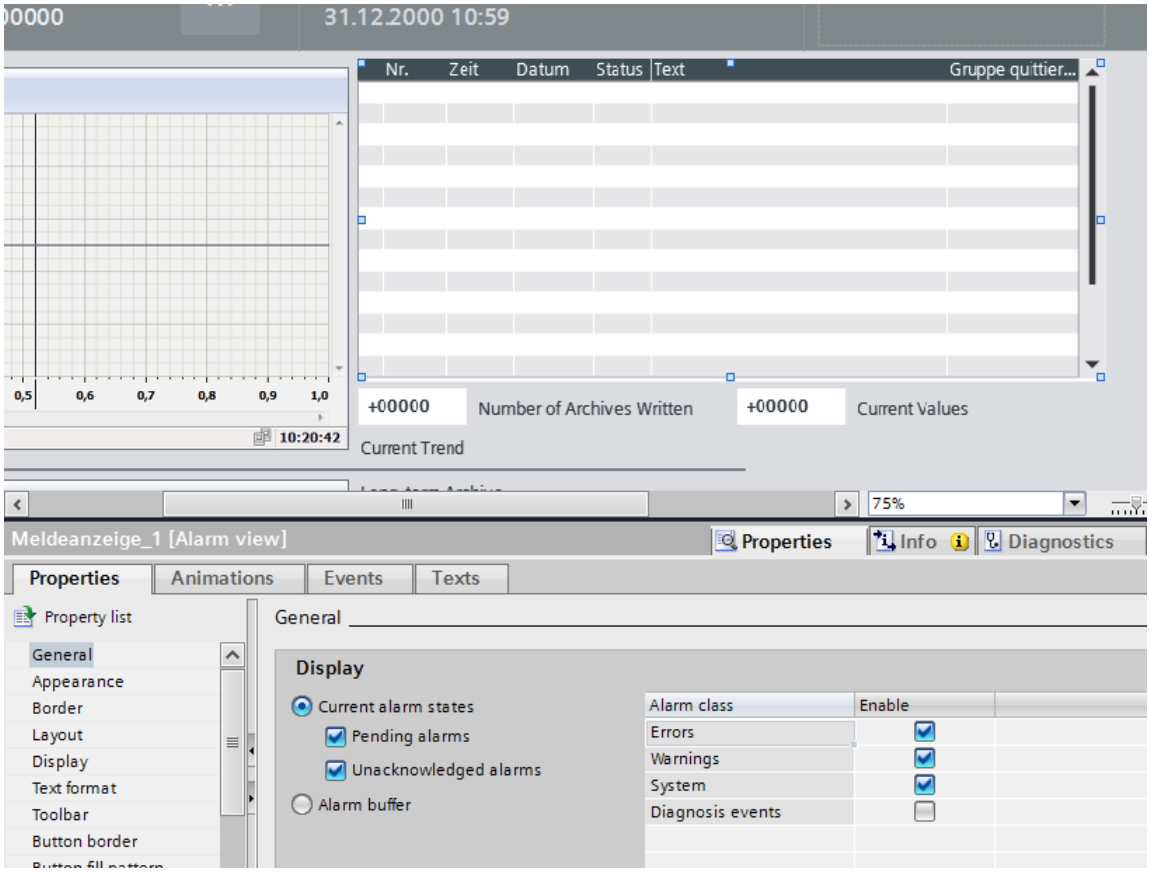
2.2.5 Other screen elements

Alarm window

Configure an alarm window in the upper screen area. In the Inspector window, under "Properties > General > Display", check

- "Current alarm states"
- "Pending alarms"
- "Unacknowledged alarms"

Figure 2-11



Note Select "Runtime settings" in the project tree and increase the entry "Display duration in seconds" under "Messages > System messages" to see the pending messages over a longer period of time.

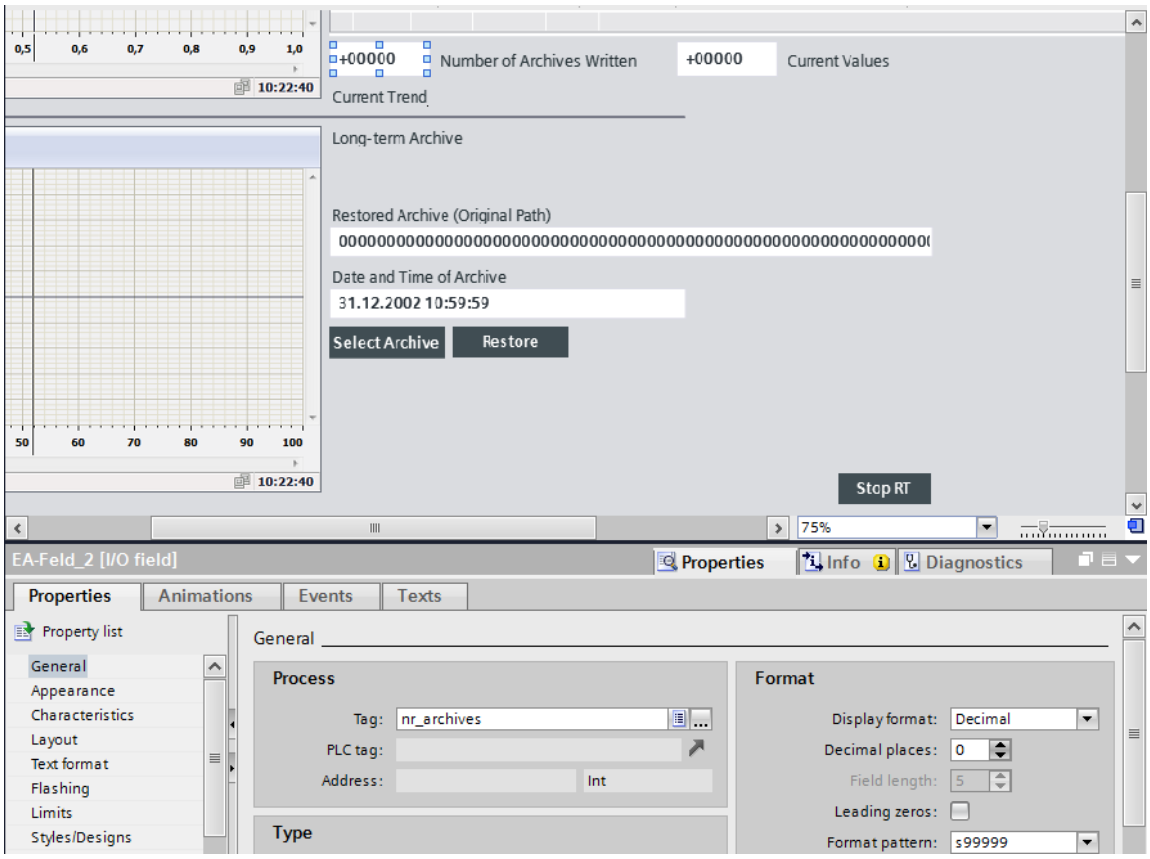
Output fields (optional)

Configure output fields for the following tags:

- `nr_archives`
- `counter`
- `archive_path`
- `restore_time`

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Figure 2-12



These output fields only serve to track the functionality of the configuration by the operator and can be omitted if necessary.

Buttons

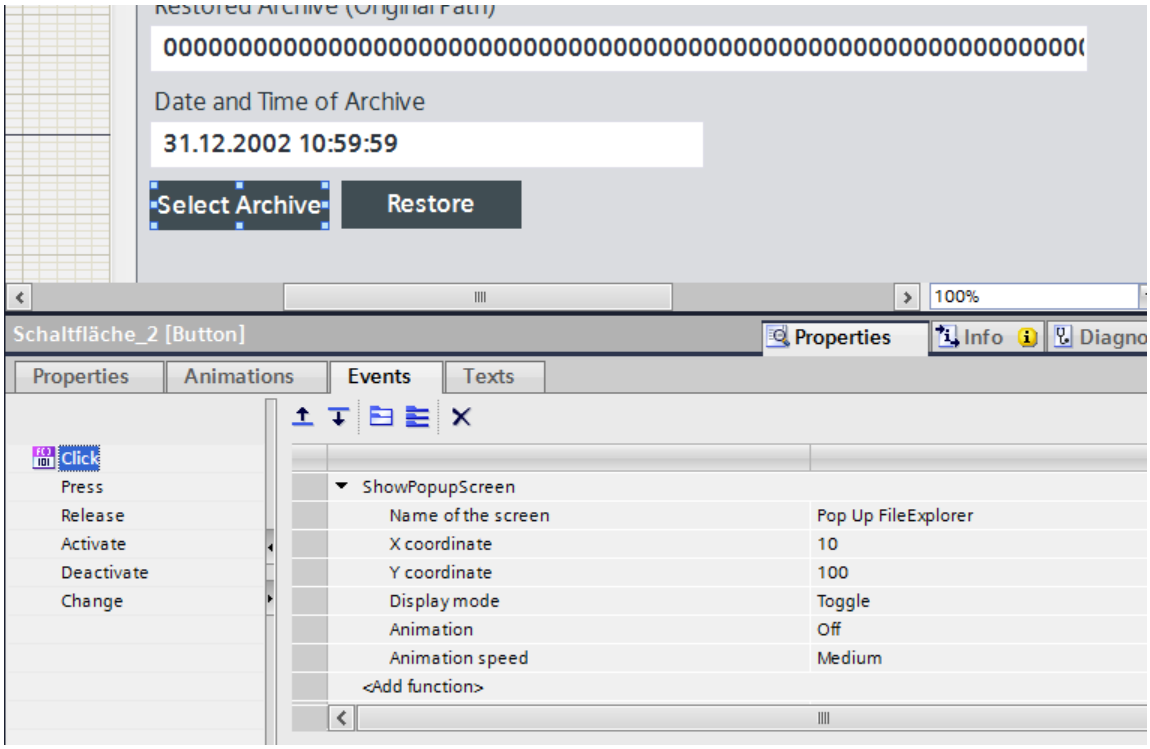
Configure two buttons for selecting or restoring a long-term archive:

1. Configure a button "Select archive"
   - In the Inspector window, under "Properties > Events", link the "Click" event to the action `ShowPopupScreen`.
   - For this function, use the value `Pop Up FileExplorer` as the "Name of the screen" parameter.

A click on the button now opens the File Explorer dialog, where you can select the long-term archive to be restored.

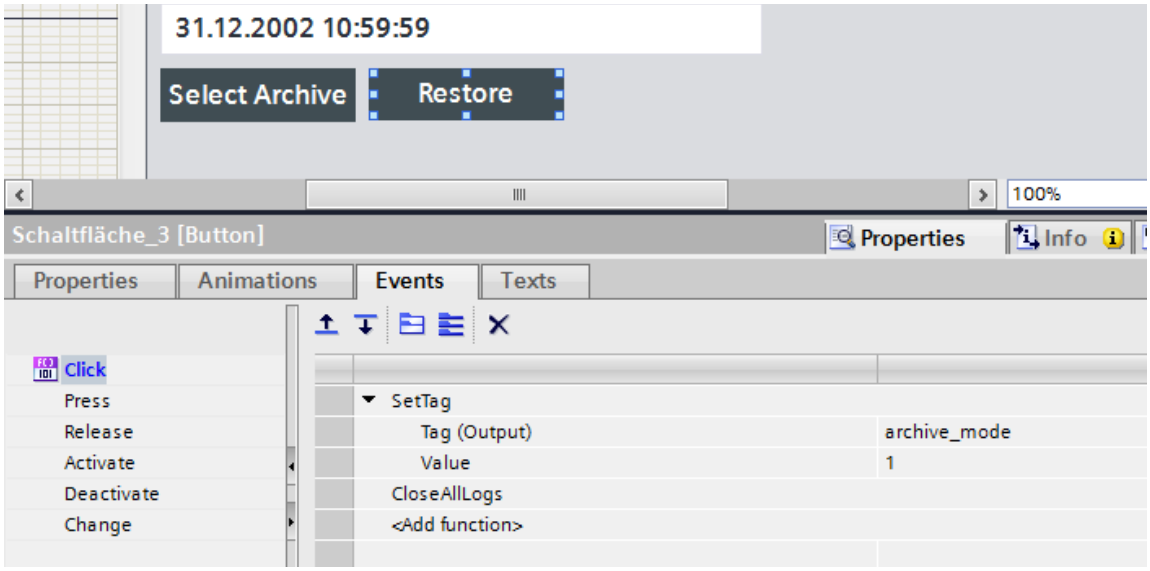
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Figure 2-13



2. Configure a button "Restore"
3. In the Inspector window under "Properties > Events", link their "Click" event with the following system functions:
   - `SetTag`. Assign the value `archive_mode` as the "Tag (Output)" parameter, and the number "1" as the "Value" parameter.
   - `CloseAllLogs`. This function "must" be executed after `SetTag`.

Figure 2-14



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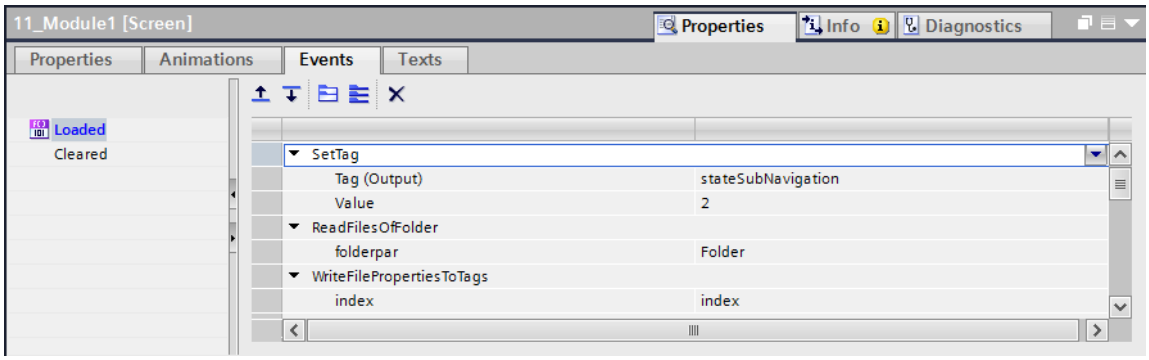
A click on the button now starts the process of restoring the selected long-term archive.

Pop Up FileExplorer

To ensure that the pop up FileExplorer functions correctly, link the "Loaded" event of the "11_Module1" screen in the Inspector window under "Properties > Events" with the following actions to ensure correct initialization of the pop up screen:

1. `SetTag`
   - "Tag (Output)": `stateSubNavigation`
   - "Value": "2"
2. `ReadFilesOfFolder`
   - "Folderpar": `Folder`
3. `WriteFilePropertiesToTags`
   - "Index": `index`

Figure 2-15



See also chapter 2.2.1.

2.2.6 Scripts

Note

When programming your scripts, note that data carrier access via Visual Basic Script differs for Windows CE devices (i.e. SIMATIC Panels) from access via Windows XP/7/10 (PCs with WinCC Runtime Advanced).

In both cases, you must use different instructions for data carrier operations. You can find more details on this on page 28 and at \4\.

Create two scripts for your configuration in the project tree under "Scripts":

- `Archive_action`: This script is called when the system message "80019" is received, which reports the successful closing of the data logs. Both the storage of the current log and the restoration of a long-term log are initiated by this, and `Archive_action` decides on the further procedure.
- `Restore_action`: The recovery of a long-term archive is not only accomplished by system functions, but also requires a more complex action sequence. `Restore_action` implements these functions.

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Define further procedure: "Archive_action" script

Write the following script:

```
Sub Archive_action()

If archive_mode=False Then
   ' save an archive to the long-term directory
   ArchiveLogFile hmiDataLog, "CurrentLog", archive_dir, hmiMove
Else
   ' restore an archive from long-term directory
   Restore_archive
End If

End Sub
```

Based on the value of the `archive_mode` tag, the script decides whether a current log should be moved to the long-term directory, or whether a long-term log should be restored by the `Restore_archive` (see below) script.

This script can be used with both WinCC Runtime Advanced and Windows CE-based operator interfaces without modifications and supports both trend views and f(x) trend views.

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Restoring long-term archiving: "Restore_archive" script

To restore a long-term archive, different script versions must be used depending on the Windows version used (Windows CE operating device or on a PC with WinCC Runtime Advanced) and the desired functionality (trend view or f(x) trend view).

The following sections first explain the script for WinCC Runtime Advanced with trend views and then the necessary changes for the other configurations in the following sections.

"Restore_archive" for WinCC RT Advanced and trend views

When using WinCC Runtime Advanced, write the following script for a trend view:

```
Sub Restore_archive()
   Dim fso, f
   Dim restore_entry, restore_fields, date_time
   Set fso = CreateObject("Scripting.FileSystemObject")

   archive_path = SmartTags("File_" & fileChosen)
```

The FileExplorer pop-up stores the name of the selected entry from the file selection dialog in the `File_[fileChosen]` tag, where `fileChosen` is the index of the selected entry in the file list.

```
   current_path= current_dir & "RestoredLog0.csv"

   fso.CopyFile archive_path, current_path, 1
   Set f= fso.GetFile(current_path)
   f.Attributes= 0
```

The selected long-term archive is copied back into the directory of the current logs and its name is changed accordingly. The call `f.Attributes=0` removes the write protection of the file.

The next step is to determine the time at which the entries of the long-term archive were written. The trend view is later set to this value so that it represents a time interval for which process values are also available. Due to the possibly different time zones, this cannot be done from within the file name (see note on page 15). Instead, the information is read from the archived process values themselves.

The first line of the archive contains no measured values and is therefore discarded. As of the second line, the second field of each archived process value contains the corresponding time stamp. The comma "," is taken as the separator between the fields (see note on page 25)

```
   Set f= fso.OpenTextFile(current_path, 1)
   restore_entry= f.ReadLine
   restore_entry= f.ReadLine
```

In the following line, the imported data record of the archive is divided into individual data fields. The comma "," is specified as the separator between the fields.

Note

Depending on the regional settings of your panel/PC, the characters used to separate the data fields within a CSV file may vary. Make sure that the separator character expected in the configuration matches the character selected in your Windows settings. If necessary, adjust the separator in the following line of code or change the Windows regionalization settings. (See note on page 32)

```
   restore_fields= Split(restore_entry, ",")
   date_time= Mid(restore_fields(1), 2, Len(restore_fields(1))-2)


   OpenAllLogs


   If IsDate(date_time)=True Then
         restore_time= DateAdd("s", trendview_offset,
CDate(date_time))
```

The trend view is configured in such a way that `restore_time` determines the time interval shown in the display (see chapter 2.2.3, S. 17).

```
   Else
         ShowSystemAlarm "Can't set trend view time to <" &
date_time & ">."
   End If


   ShowSystemAlarm "Restored archive <" & archive_path & "> to <" &
current_path &"> at " & restore_time & "."
   Set fso= Nothing
   Set f= Nothing
End Sub
```

Adjustments for the use of f(x) trend views

Actually, it is not possible to store an archived process tag simultaneously in two archives. The same tag cannot be displayed in two trend views connected to different archives (see the discussion in chapter 2.2.3).

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With a simple trend view, this problem is bypassed by configuring the trend view for a process tag from the archive that is not configured there, but is still in it. (`counter` or `restoreCounter`; see chapter 2.2.4 and the note on page 18).

Table 2-4

Function	Tag name
Log `CurrentLog`:	
Configured tag	`counter`
Actual tag	`counter`
Log `RestoreLog`:	
Configured tag	`restoreCounter`
Actual tag	`counter`
Trend view - Source:	
Log	`RestoreLog`
Tag	`counter`

This is unfortunately not possible for f(x) trend views. For this reason, the names of the archived process tags are replaced by the dummy tags `Restore1`, `Restore2` during the copy process for recovery, and these are then displayed in the f(x) trend view.

Table 2-5

Function	Tag name
Log `CurrentLog`:	
Configured tags	`counter, counter_b`
Actual tags	`counter, counter_b`
Log `RestoreLog`:	
Configured tags	`restoreCounter, restoreCounter_b`
Actual tags	`restoreCounter, restoreCounter_b`
Trend view - Source:	
Log	`RestoreLog`
Tags	`restoreCounter, restoreCounter_b`, bzw. `Restore1, Restore2`

Note With the trend view, the tag to be displayed is identified by the **archive** tag name, but with the f(x) trend view it is identified by the **process** tag name.

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"Restore_archive" for WinCC RT Advanced and f(x) trend views

When using WinCC Runtime Advanced, write the following script for an f(x) trend view: Please also note the notes on the trend view version of `Restore_archive` (page 24).

```
Sub Restore_archive()
   Dim fso, f, f2
   Dim source_name1, target_name1
   Dim source_name2, target_name2
```

The first step is to prepare the tag names to be replaced during the copy process (see page 25). Note that tag names must be enclosed in quotation marks for the replacement to work correctly.

```
   source_name1= """ & "counter" & """
   target_name1= """ & "restoreCounter" & """
   source_name2= """ & "counter_b" & """
   target_name2= """ & "restoreCounter_b" & """

   Dim restore_entry, restore_fields

   archive_path = SmartTags("File_" & fileChosen)
   current_path= current_dir & "RestoredLog0.csv"

   Set fso = CreateObject("Scripting.FileSystemObject")
```

The copy process should only be triggered if the selected long-term archive exists at all.

```
   If fso.FileExists(archive_path) Then

         Set f= fso.OpenTextFile(current_path, 2, True)
         Set f2= fso.OpenTextFile(archive_path, 1)
```

Both archives must be given read and write access.

The following code section extracts the timestamp of the stored values from the actual archive contents, since the timestamp contained in the file name can be misleading. (See note on page 15) The first line of the CSV file contains only header information, and it is only the second line that contains process values with time stamps.

Both lines must then be copied to the target archive. For the second line, the names of the archive variables must first be replaced with the function `Restore(…)`:

```
         '-------------------------------------------------------
         restore_entry= f2.ReadLine
         f.WriteLine(restore_entry)
         restore_entry= f2.ReadLine
         restore_entry= Replace(restore_entry, source_name1,
target_name1)
         restore_entry= Replace(restore_entry, source_name2,
target_name2)
         f.WriteLine(restore_entry)
```

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```
        restore_fields= Split(restore_entry, ",")
        restore_time= Mid(restore_fields(1), 2,
Len(restore_fields(1))-2)
```

The second line read contains the time stamp of the stored process value in the second field. The comma "," is taken as the separator between the fields (see note on page 25)

```
        If Not IsDate(restore_time) Then
              ShowSystemAlarm "Can't set trend view time to <" &
restore_time & ">."
        End If
        '-----------------------------------------------------------
```

Below, the long-term log is copied line by line into the restored archive up to the end of the file, with the tag names being replaced accordingly.

```
        While Not f2.AtEndOfStream
              restore_entry=f2.ReadLine
              restore_entry= Replace(restore_entry, source_name1,
target_name1)
              restore_entry= Replace(restore_entry, source_name2,
target_name2)
              f.WriteLine(restore_entry)
        Wend
```

Then close all files, open the archives and update the screen display with the system function `ActivateScreen`.

```
        f2.Close
        f.Close
        OpenAllLogs
        ActivateScreen "11_Module1", 0
        ShowSystemAlarm "Restored archive <" & archive_path & "> to
<" & current_path &"> at " & restore_time & "."
        Set f2= Nothing
        Set f= Nothing
  Else
        OpenAllLogs
        ShowSystemAlarm "Long-term archive <" & archive_path & ">
not found."
  End If

  Set fso= Nothing
End Sub
```

Adaptations for Windows CE based HMI devices

When using a Windows CE-based operating device, make the following replacements to the script `Restore_archive`:

For **trend views**:

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Table 2-6

WinCC Runtime Advanced	Windows CE
`CreateObject("Scripting.FileSystemObject")`	`CreateObject("FileCtl.FileSystem")`
`If fso.FileExists(archive_path) Then`	`If fs.Dir(lta_path)<>"" Then" *)`
`Set f=fso.OpenTextFile(current_path, 2, True)`	`Set f=CreateObject("FileCtl.File")` `f.open current_path, 2`

`Set f2=fso.OpenTextFile(archive_path, 1)`	`Set f2=CreateObject("FileCtl.File")`
	`fs.setAttr lta_path, 0`
	`f.open lta_path, 1`

`restore_entry=F2.ReadLine`	`restore_entry=f2.lineinputstring`
`f.WriteLine(restore_entry)`	`f.lineprint(restore_entry)`
`restore_time= Mid(restore_fields(1), 2, Len(restore_fields(1))-2)`	`restore_time= CDate(Mid(restore_fields(1), 2, Len(restore_fields(1))-2))`
`While Not f2.AtEndOfStream`	`While Not f2.eof`

*) Note that between versions, the parameter name was also changed from "`archive_path`" to "`lta_path`".

For **f(x) trend views**:

Table 2-7

WinCC Runtime Advanced	Windows CE
`CreateObject("Scripting.FileSystemObject")`	`CreateObject("FileCtl.FileSystem")`
`If fso.FileExists(archive_path) Then`	`If fs.Dir(lta_path)<>"" Then" *)`
`Set f=fso.OpenTextFile(current_path, 2, True)`	`Set f=CreateObject("FileCtl.File")` `f.open current_path, 2`

`Set f2=fso.OpenTextFile(archive_path, 1)`	`Set f2=CreateObject("FileCtl.File")`
	`fs.setAttr lta_path, 0`
	`f.open lta_path, 1`

`restore_entry=F2.ReadLine`	`restore_entry=f2.lineinputstring`
`f.WriteLine(restore_entry)`	`f.lineprint(restore_entry)`
`restore_time= Mid(restore_fields(1), 2, Len(restore_fields(1))-2)`	`restore_time= CDate(Mid(restore_fields(1), 2, Len(restore_fields(1))-2))`
`While Not f2.AtEndOfStream`	`While Not f2.eof`

*) Note that between versions, the parameter name was also changed from "`archive_path`" to "`lta_path`".

You can find adapted scripts at the respective device projects in the download of the entry.

Note Note that in the Windows CE version script, the tag name "`fso`" ("file system object") has been replaced by "`fs`" ("file system"). This is a standard VSB convention.

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2.2.7 System alarms

HMI system alarms are used in the configuration to trigger the individual steps of the archiving and recovery process one after the other without causing synchronization problems. Since the configuration waits for the system alarm, it is also ensured without waiting loops or the like that the next one is only triggered after the completion of one work step.

Open the entry "HMI alarms" in the project tree and scroll through the tabular view until you have reached the respective system alarm. Select the system alarm and link the respective events in the Inspector window under "Properties > Events".

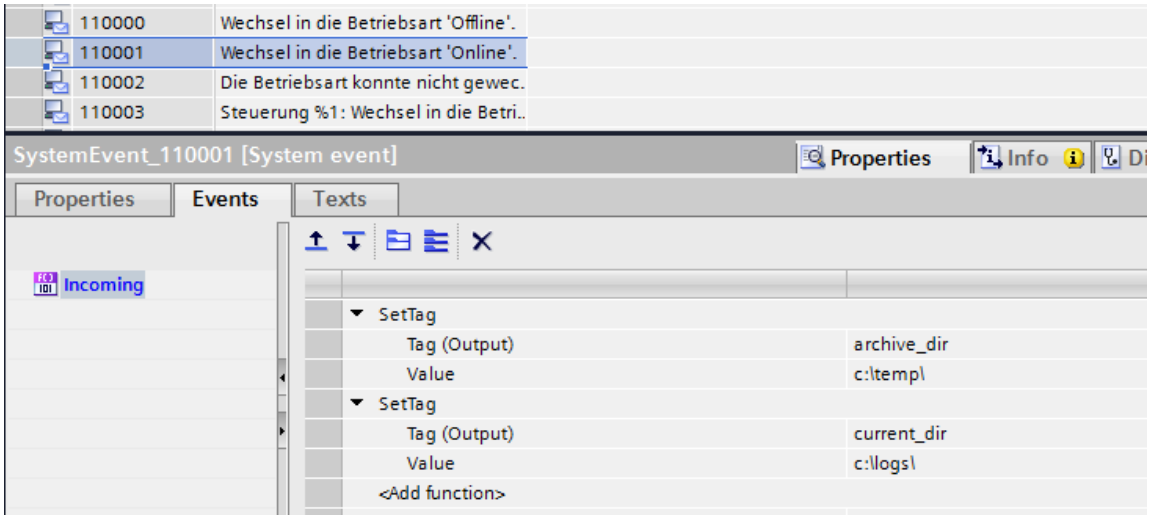
System alarm "110001": "Change to Online mode"

Link the "Incoming" event of the system message "110001" with the following system functions:

1. `SetTag`
   - "Tag (Output)": `archive_dir`
   - "Value": `c:\temp\` (Runtime Advanced) or `\Storage Card SD\archive\` (Panel)
2. `SetTag`
   - "Tag (Output)": `archive_dir`
   - "Value": `c:\logs\` (Runtime Advanced) or `\Storage Card SD\logs` (Panel)

These tags determine the storage paths of the current logs and the long-term archives. Adapt these values to your requirements (network drives, etc.).

Figure 2-16

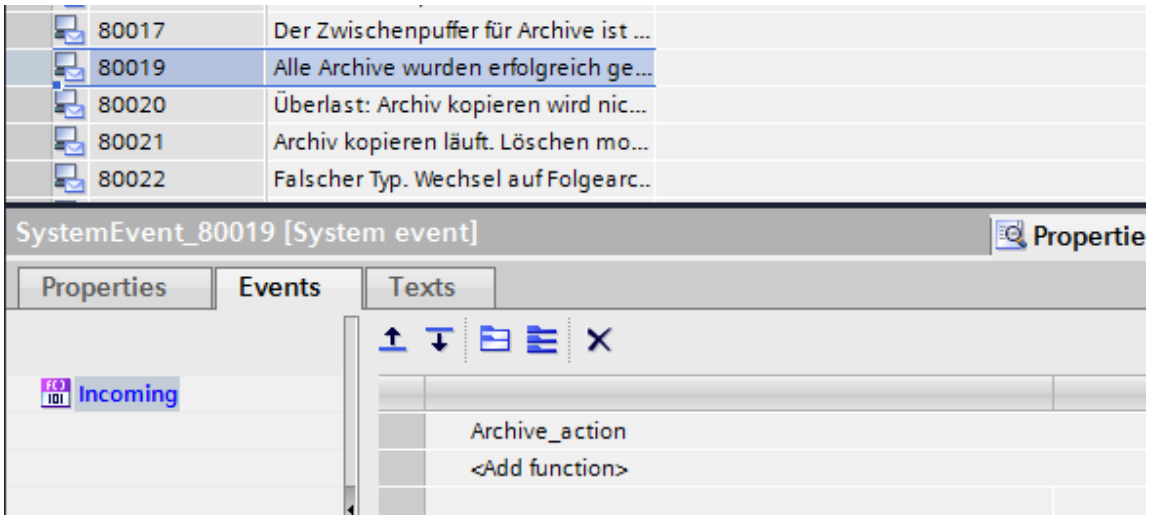


System alarm "80019": "All logs closed"

Link the "Incoming" event of the system message "80019" with the `Archive_action` script.

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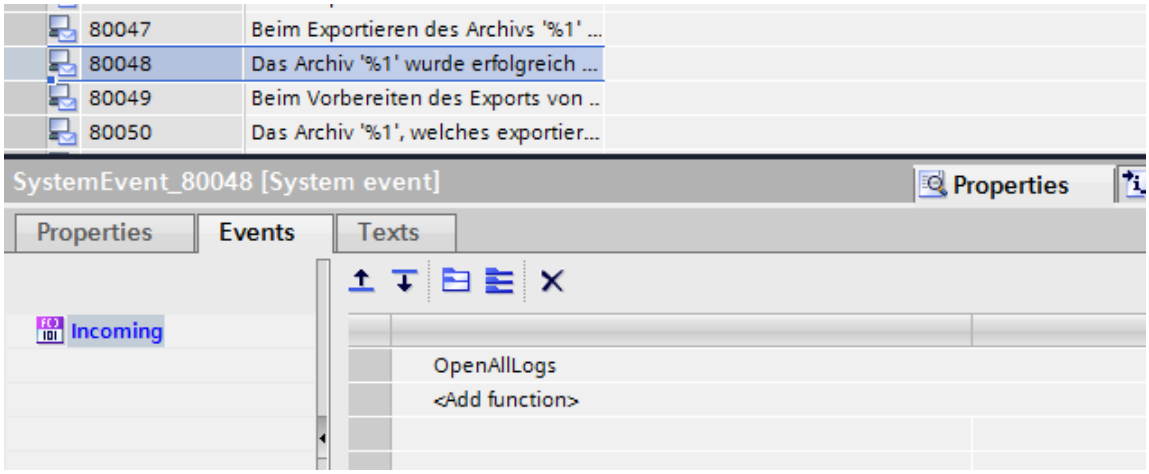
Figure 2-17



System alarm "80048": "Log successfully copied"

Link the "Incoming" event of the system message "80048" of your configuration with the `OpenAllLogs` system function.

Figure 2-18



2.3 Operation

The project, which you can download with the application example, contains four device configurations for the various combinations of runtime version (Advanced or HMI operating unit) and display control (trend view or f(x) trend view). The operation of the four configurations is identical.

1. Download the configuration to your HMI operating device or start the Runtime on a PC.
2. Click the "Start application" button to start the overview screen of the application example.
3. Click the "Module1" button at the bottom of the screen to start the application example.

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Note

Depending on the size of the archives to be moved and the speed of the data carriers or the network connection, the system message "80053" ("Error during read access to closed archive...") may occur during generation and restoration of the long-term archives.

The cause is an attempt by the runtime to access the archive before the opening of the archive is complete after the copy operation. If necessary, trigger a new reading of the restored archive by touching one of the control elements of the trend view, e.g. "Fast forward" ("►►").

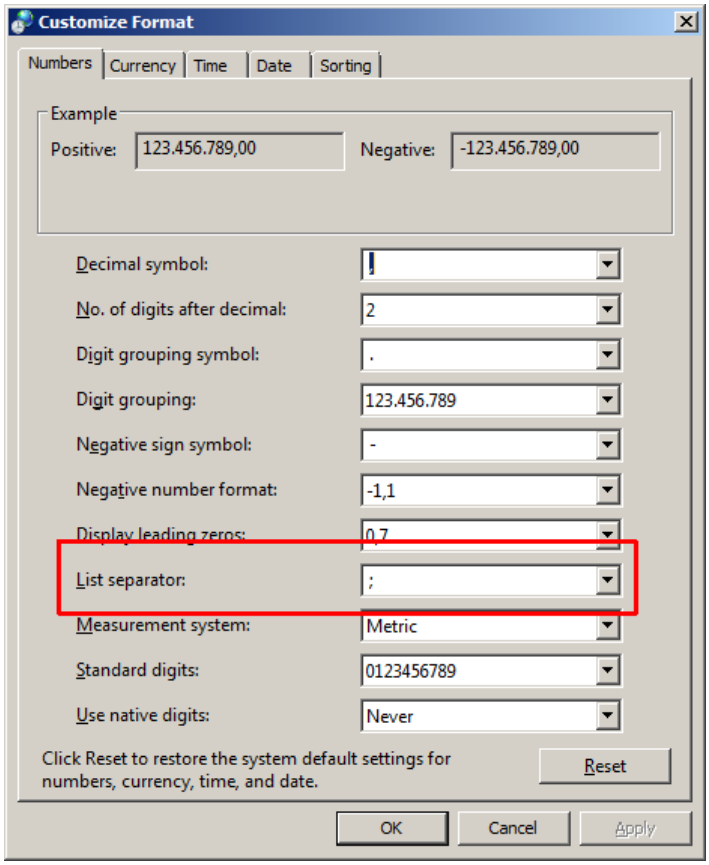
Since the log data is buffered, there is no data loss as long as the buffer size is not exceeded.

Windows regionalization settings

The character used in the .CSV log file to separate the data fields must match the separator used in the script `restore_archive` (see note on page 25). To do this, adjust the script or change the corresponding regionalization setting.

For Windows, the separator is set in Control Panel > Region and Language > Additional Settings... > List Separator.

Figure 2-19



Note

Do not change the regionalization settings while the runtime is in operation.

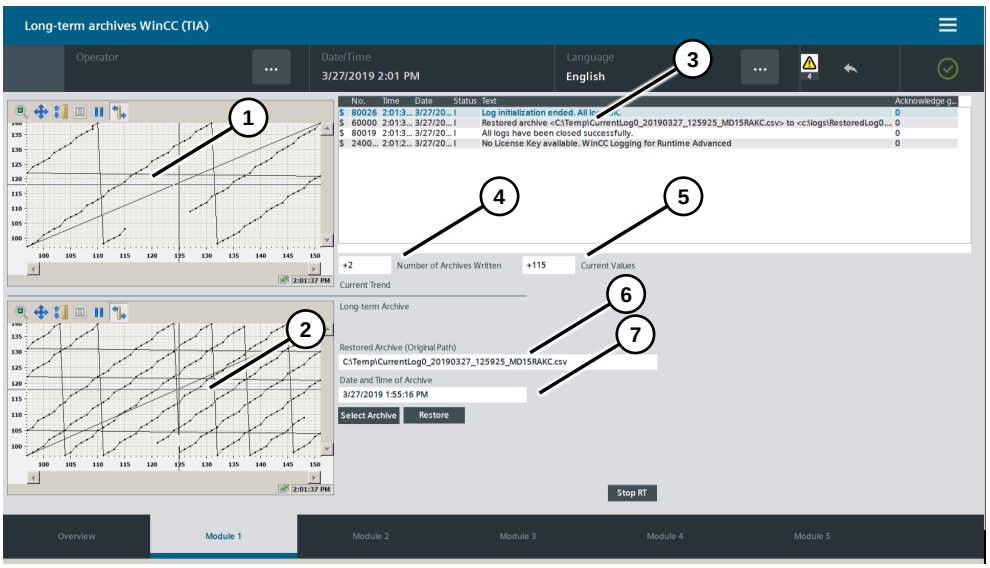
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Display elements

The "11_Modul1" screen has the following display elements:

1. Upper trend view /f(x) trend view: Displays the values of the process tags to be archived in a continuously updated form
2. Lower trend view /f(x) trend view: Represents the values of the recovered process tags after at least one restoration of the long-term archives has been performed.
3. Message window: Display of the current system messages
4. "Number of Archives Written": Number of copies performed from the current process value log to the long-term archive directory.
5. "Current Value(s)": Current process value(s) of the tag(s) to be archived
6. "Restored Archive": Path (= directory + file name) of the long-term archive to be restored, if this was selected via the "Archive" button (see below).
7. "Date and Time of Archive": Date and time of the first entry from the restored archive after it has been copied back with the "Restore" button (see below).

Figure 2-20



Operator controls

The "11_Modul1" screen has the following operator elements:

1. "Select Archive" button: Opens a file explorer (see below) with which you can select a data archive from the long-term archive library. After selecting archive, close the file explorer with the "Cancel" button.

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Note

As the source of the process values to be restored, select archive log whose configuration (stored variables, archive size, etc.) matches the archive of the trend view / f(x) trend view, otherwise your configuration might crash.

In particular, do not try to use the f(x) trend view to display an archive for trend view, or vice versa.

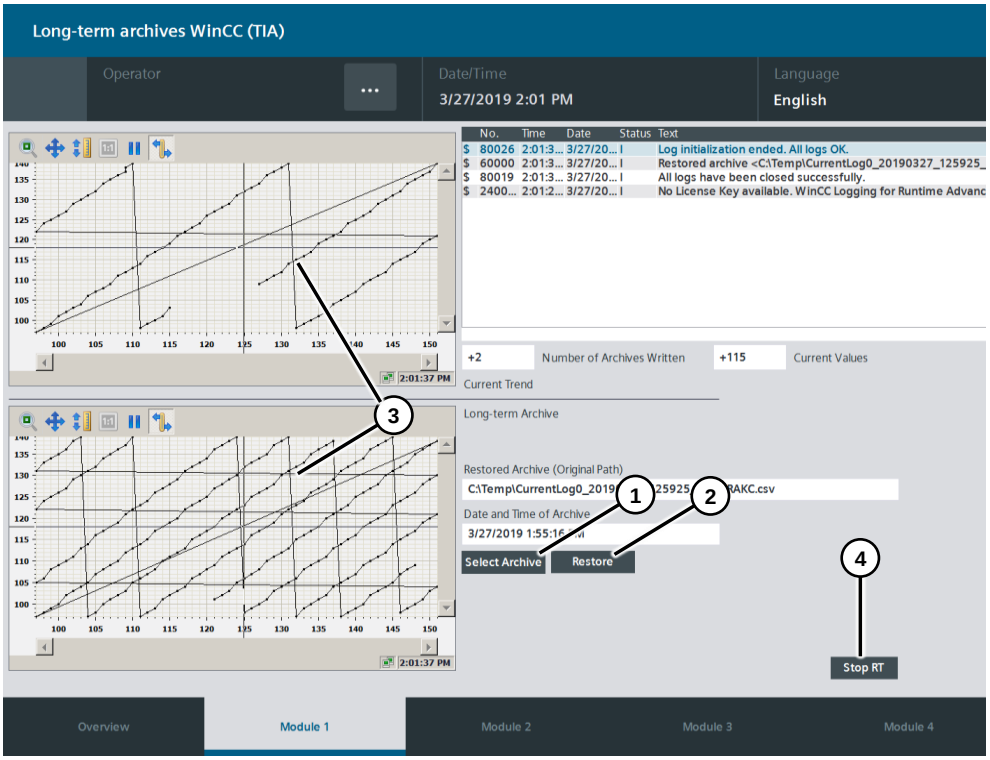
2. "Restore" button: After you have selected an archive with "Select Archive", use this button to start the long-term archive restoring process. The lower trend view / f(x) trend view is updated with the values of the selected long-term archive.
3. You can use the trend view /f(x) trend view as usual to navigate through the data in the corresponding archive and analyze specific sections of the archive separately.

Note

Information on configuring and operating the trend views and f(x) trend views under WinCC Advanced can be found at \7\ and \8\.

4. "Stop RT" button Ends the application example.

Figure 2-21



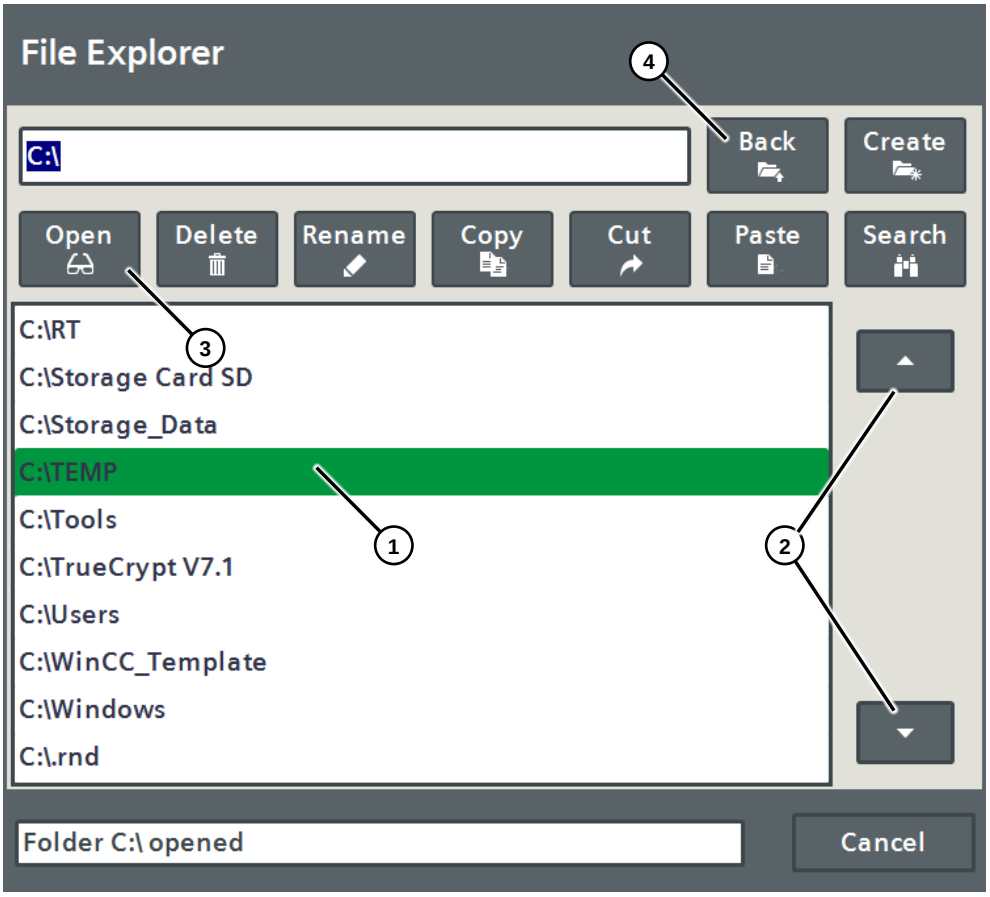
Operation of the "Pop Up FileExplorer".

You use FileExporer to specify the archive file to be recovered as follows:

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1. The overview area shows all files and subdirectories of the current directory. Click a file or subdirectory to highlight it.
2. Click the up and down buttons to scroll through the list of displayed files.
3. Click on the "Open" button to open a marked subdirectory. If you have selected a file, clicking on "Open" opens the associated Windows application, e.g. Excel for ".CSV" files. This function is not wanted here however.
4. Click on the "Back" button to return to the last opened directory.

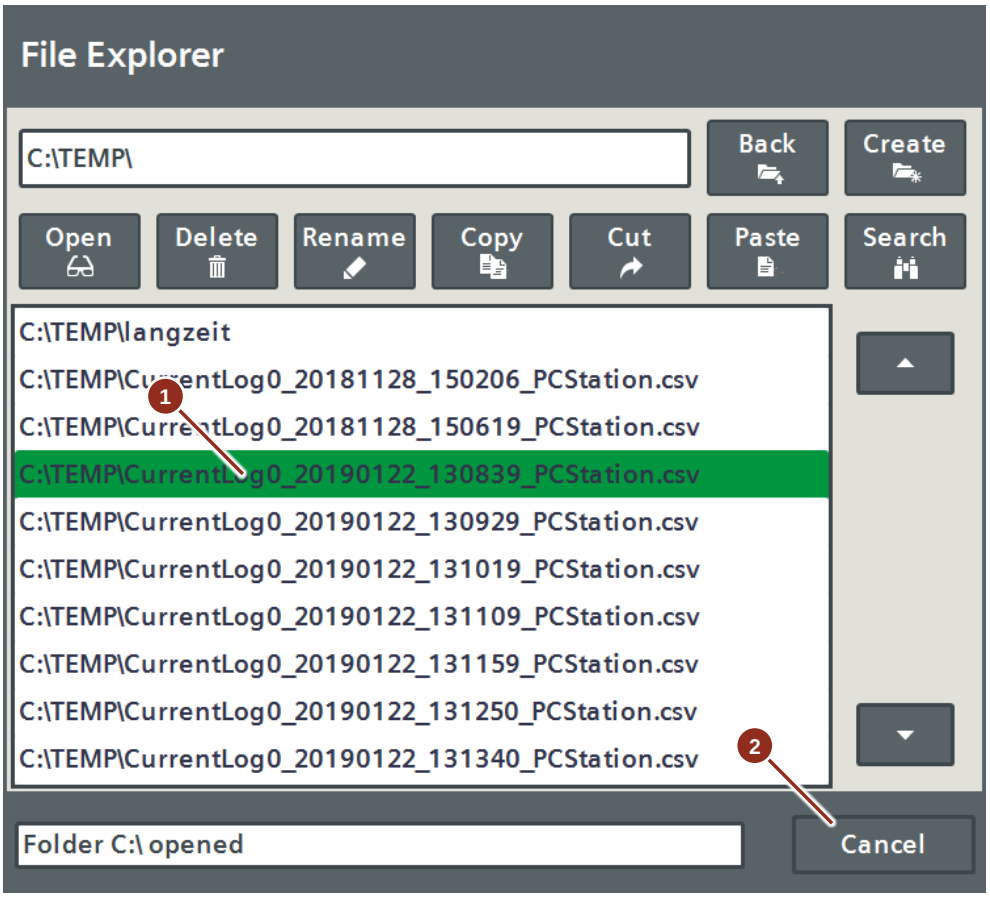
Figure 2-22



1. In the desired target directory, select the file that you want to restore.
2. Click on the "Cancel" button to transfer the corresponding file name to the runtime. This file will be restored later with the "Restore" button.

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Figure 2-23



Note

The "Pop Up FileExplorer" is located in the "LHmiView_FileExplorer" library of the HMI toolbox.
These can be downloaded as an application example from \6\ and integrated into your own projects.

Modules 2 to 5

Modules 2 to 5 of the application example have no function.

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3 Appendix

3.1 Service and support

Industry Online Support

Do you have any questions or need assistance?

Siemens Industry Online Support offers round the clock access to our entire service and support know-how and portfolio.

The Industry Online Support is the central address for information about our products, solutions and services.

Product information, manuals, downloads, FAQs, application examples and videos – all information is accessible with just a few mouse clicks:
https://support.industry.siemens.com

Technical Support

The Technical Support of Siemens Industry provides you fast and competent support regarding all technical queries with numerous tailor-made offers – ranging from basic support to individual support contracts. Please send queries to Technical Support via Web form:
www.siemens.com/industry/supportrequest

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SITRAIN – Training for Industry

We support you with our globally available training courses for industry with practical experience, innovative learning methods and a concept that's tailored to the customer's specific needs.

For more information on our offered trainings and courses, as well as their locations and dates, refer to our web page:
www.siemens.com/sitrain

Service offer

Our range of services includes the following:

- Plant data services
- Spare parts services
- Repair services
- On-site and maintenance services
- Retrofitting and modernization services
- Service programs and contracts

You can find detailed information on our range of services in the service catalog web page:
Fehler! Linkreferenz ungültig.

Industry Online Support app

You will receive optimum support wherever you are with the "Siemens Industry Online Support" app. The app is available for Apple iOS, Android and Windows Phone:
Fehler! Linkreferenz ungültig.

3.2 Links and literature

Table 3-1

No.	Topic
1.	Siemens Industry Online Support https://support.industry.siemens.com
2.	Link to the article page of the application example https://support.industry.siemens.com/cs/ww/en/view/109477071
3.	FAQ "Which external storage media can you use with the current SIMATIC Panels, or which memory card interfaces do they have?" https://support.industry.siemens.com/cs/ww/en/view/21847868
4.	FAQ "Which DDPS information and DDPS programming aids are available in WinCC (TIA Portal)?" https://support.industry.siemens.com/cs/ww/en/view/59885894
5.	FAQ "What are the functional differences between the different SIMATIC panels?" https://support.industry.siemens.com/cs/ww/en/view/40227286
6.	Application example "Toolbox for HMI projects". https://support.industry.siemens.com/cs/ww/en/view/106226404
7.	Manual for SIMATIC STEP 7 Basic/Professional V16 and SIMATIC WinCC V16, "Configuration and Operation of Trend Views with WinCC Advanced". https://support.industry.siemens.com/cs/us/en/view/109773506/124693726859
8.	Manual for SIMATIC STEP 7 Basic/Professional V16 and SIMATIC WinCC V16, "Configuration and Operation of f(x) Trend Views with WinCC Advanced". https://support.industry.siemens.com/cs/us/en/view/109773506/110882753291

3.3 Change documentation

Table 3-2

Version	Date	Modifications
V2.0	03/2019	Completely revised edition

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