TECH NOTE :: CODESYS application - Data storage

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Author: Michael Guckes, Florian Schopp
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Short description

This is a guide to creating a CODESYS application on PMX. Basic experience with CODESYS is assumed. Experienced users are free to adopt a different approach. Further help is available in the examples that are normally installed on the desktop when the PMX package is imported and in the online Help for the package.
The necessary files are on the "PMX CODESYS" CD included in the scope of supply of every PMX containing CODESYS, or they can be downloaded from the support page at hbm.com. Firmware version 3.0 or higher is required in PMX.

In this example, PMX is used to store measured values from real sensor signals and/or computation channels. The settings for the measured values that are to be recorded, the memory cycle rate and the type of activation of the storage of measured values can be made using CODESYS WebVisu integrated in this example.

Available options are: activation by digital input, by limit value switch and by digital output. The PMX browser interface enables downloading of the measurement series from the device for subsequent processing in catman Easy/AP or Microsoft Excel.
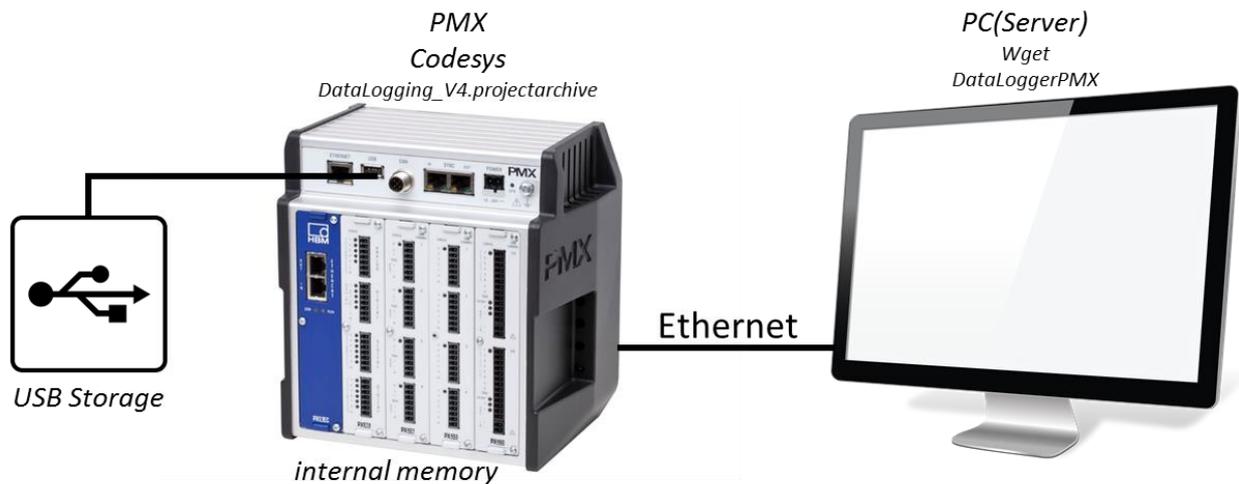
CODESYS - extract the project

Open the development environment

Run CODESYS as administrator.

Extract the package

In CODESYS click the "File" tab, select "Project Archive" and then "Extract Archive...".
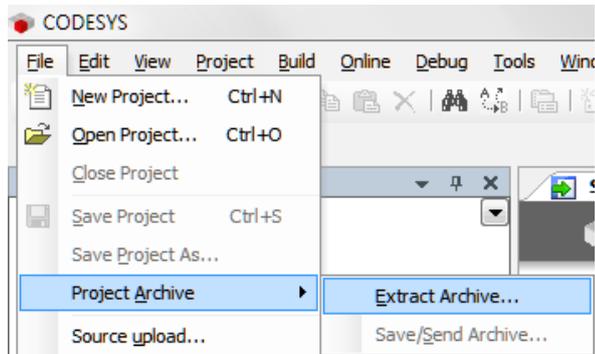
In the dialog that opens, select the directory in which the archive „**DataLogging_V4.projectarchive**" was stored and open it.

In the next dialog, click "Extract" to complete extraction of the archive.
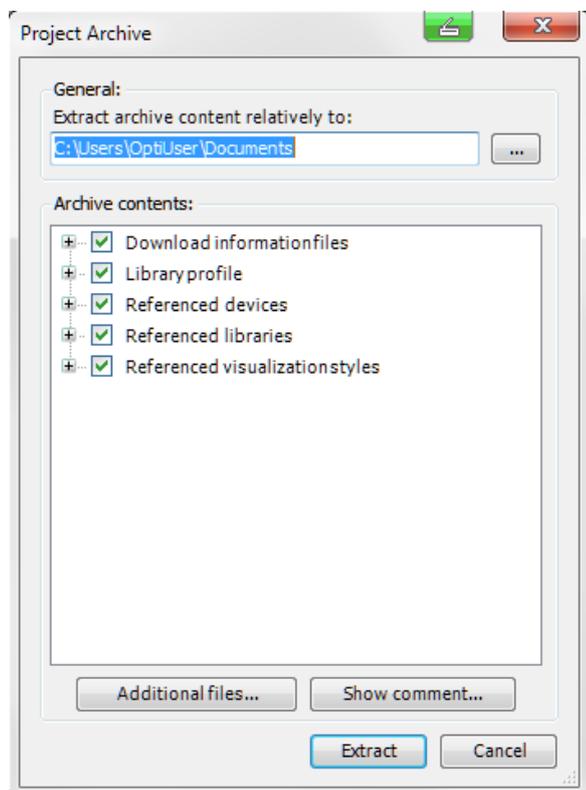
Connect the PMX

Add gateway

Double-click "Device (CODESYS Control HBM PMX V3)" and then press "Add gateway…" on the right side.
Keep the settings by default and confirm by pressing "OK".
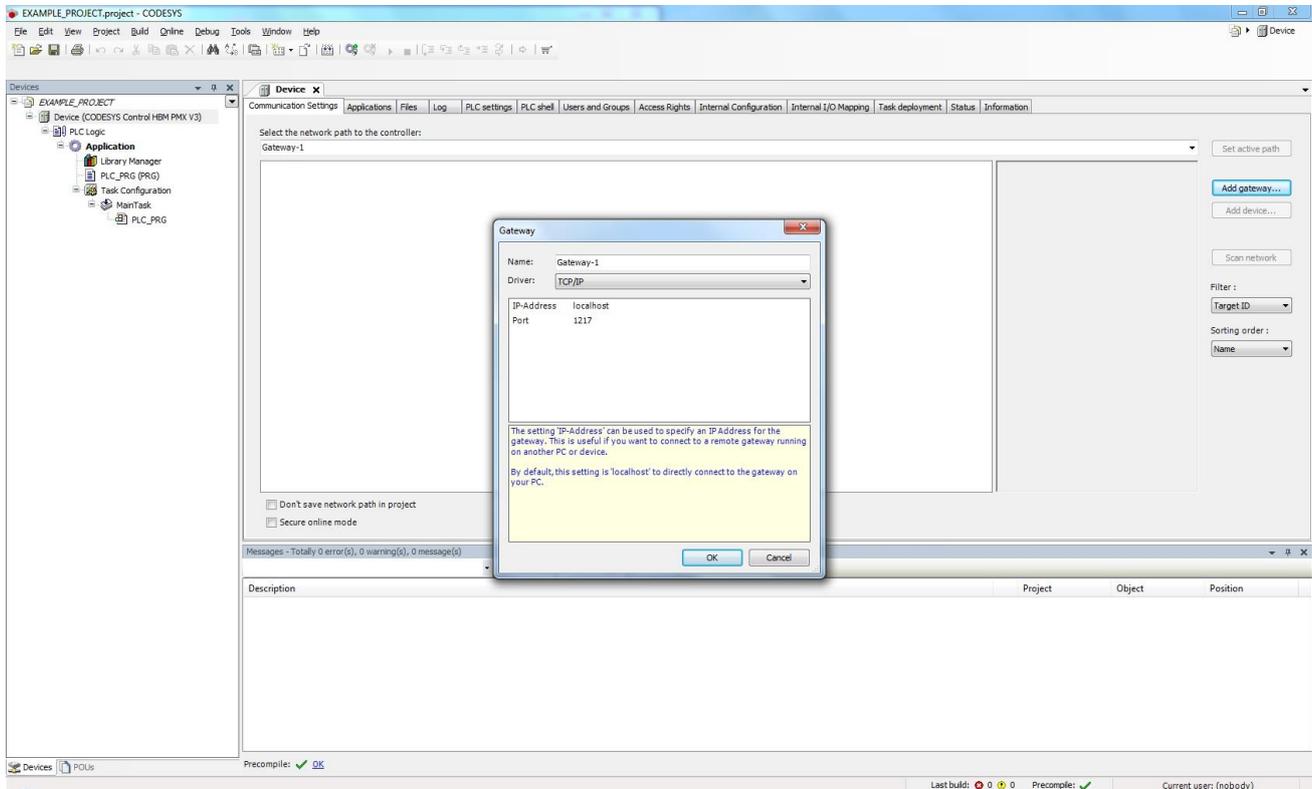
Integrate PMX

The function "Scan network" should automatically detect the PMX.
Activate the device by double-clicking it.

Compile and start the application

By clicking on "Login" the program will be compiled an downloaded. Then the application will be started by clicking the "Start" button .

Data Logger Operating Principle

The data logger is a Codesys program that can cyclically record both measured data/ curves and results data/ results like peak-values, for example from calculated channels.

A cycle is defined by a start condition and a stop condition. During a cycle, the PMX logs measured data from channels, with a clock rate of 100 Hz. When the process is complete, there is another trigger that defines whether a process has been OK.

Data is stored on the internal PMX-memory (1GB) or on a connected USB flash drive. Up to one gigabyte of data can be stored. In addition, the data logger offers a FIFO function that enables a number to be set that specifies how many files are to be stored in a ring-memory.

WebVisu

WebVisu is used for controlling the recording of measured data:

WebVisu of the "Data Logger" project

Channel selection

Settings can only be made at admin level. To do so, the operator must log in with the passcode **123** after activating the **Login button**. The passcode can only be changed in the codesys application itself.

By activating the combo box, the signals from the measurement cards can be saved as measured values to the curve file. Calculated channels provide three options: save no data (**Inactive**), save curve data (**Curve)**, and save only the channel result value at the end of the process (**Result**).

The **start trigger** determines how the process is started. In this example, the process starts when limit value 1 is set to true. The stop trigger determines the end of the process. In our example, the process stops when limit value 1 is set to false.

The **NOK trigger** determines which digital output is set when a process was OK/NOK. In our example, the process is OK when digital output 1 is set to false.
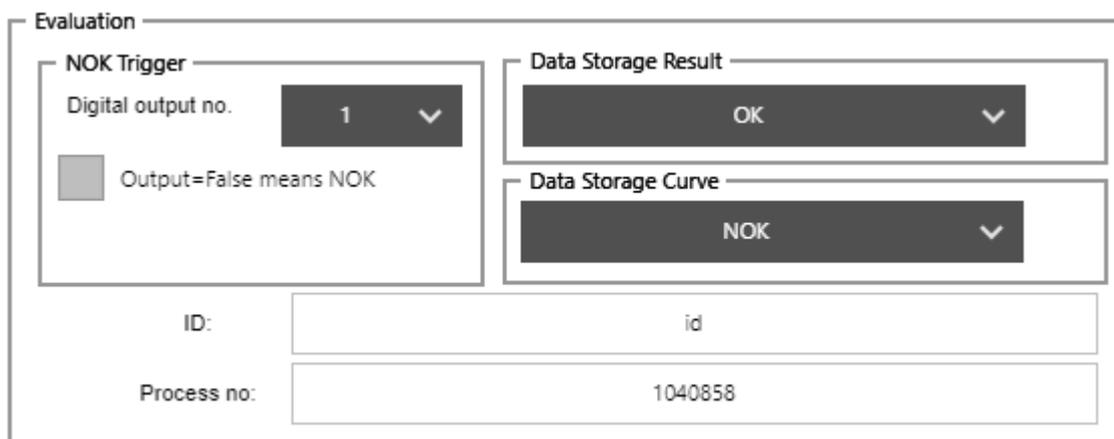
Data Storage Result determines which results are logged. The following options are available: save all results ("**All**"), save not results ("**None**"), save only OK processes ("**OK**", or save only NOK processes ("**NOK**").

Data Storage Curve determines which curve data are logged. The following options are available: save all results ("**All**"), save not results ("**None**"), save only OK processes ("**OK**"), or save only NOK processes ("**NOK**").

The process number assigns automatically an individual number to each process, to enable it to be identified. With each process It is incremented up to 10^9 and then starts from 0 again.

The ID is the workpiece ID. It is also given in the curve files to allow for retracing of the workpiece. It can only be entered manually.

Storage, you can specify the **storage location**: internally in the PMX-memory or on a USB flash drive which is sticked in the PMX. In addition, the actual available memory is displaied.
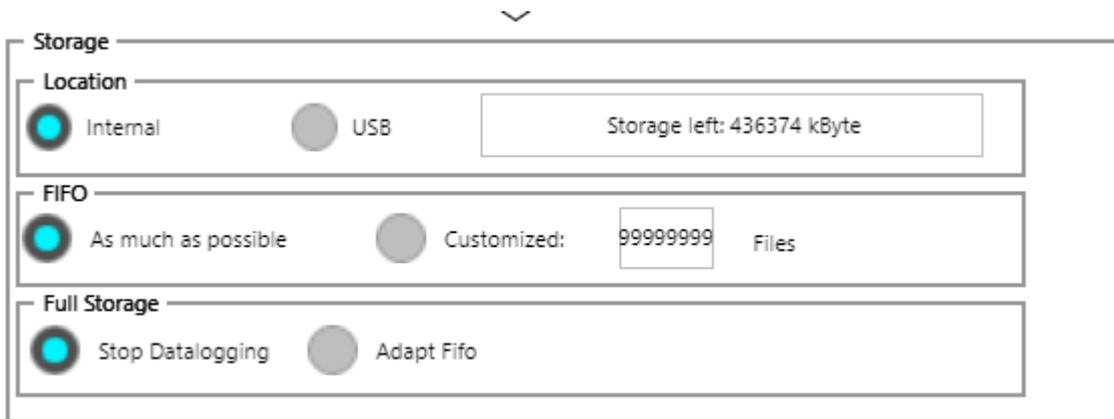
The FIFO memory can either save as much data as possible before it starts deleting old files or it can be set to a fixed size.

Caution: This only refers to curve files. Result files are permanently stored and are only deleted when the device is reset or the files have been successfully transferred to a computer using the software tool "DataLoggerPMX".

Full Storage queries, what is to happen when the medium has no available memory. Data storage will either be stopped or the FIFO overwrites the oldest files with new files.

Status display and control panel

All program statuses are displayed here. Error messages can viewed here that describe why data storage has been stopped.

Main Program creates the files and logs the data, **TCP Server** indicates whether a computer has connected and which files are transferred to the computer, and **FIFO** specifies which files are currently being deleted.

The "**Activate**" control enables the data logger to be activated or deactivated. The application can be reset using the "**Reset**" button. This means that all files are deleted from the internal memory and the process number is reset to 0. The "**Login**" button enables the user to log in. All other dialogs cannot be used without a valid login.
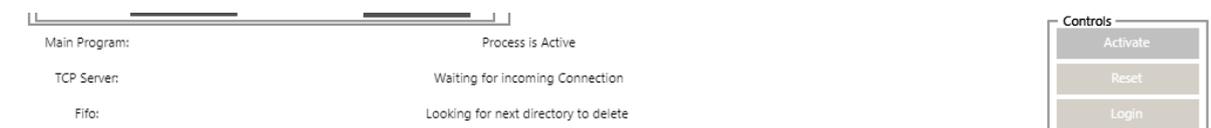
Caution: The user is logged out after one minute and must log in again. The standard information is: Admin with password 123. You need to be logged in to make changes to the system.

Prerequisites and maximum data-storage rate

The data-storage rate of this codesys application with which the data can be cyclically stored is 50 Hz, it can not be changed. This means that max. up to 3000 processes per minute can be stored.

The results of the measurement data, e.g. Peak values, are recorded at 20 kHz in the PMX via the calculation channels. So, this does not result in any information loss due to the codesys data storage.

Storage of curves and results	PMX Internal & USB
Full utilization	50 Hz (50 files per minute)
Interval between 2 process starts	20 ms
Interval between 2 measurement points	10 ms

Caution: Data storage at full utilization means that the device's base load is already very high. I.e. when programming other applications you should keep in mind that you have fewer resources available than usual. Overload results in a Codesys process crash. Removing the USB stick can also result in data loss.

File transfer to a computer

Files can optionally be sent to a computer or server via an Ethernet connection. For this application, there is a special PC transmission software "DataLoggerPMX" from HBM that communicates with the PMX. This runs on the target PC in the background and ensures the data transfer.

Note:
If the connection of PMX to the PC has been interrupted for a short time, the files are buffered in the PMX and transferred to the PC once the connection has been established. This prevents data loss. All files of the data storage are downloaded from the PMX / USB and then deleted on the PMX / USB.

Before the first start
In order to transfer the data via the transfer-software „DataLoggerPMX", "Wget" is required, a freeware, that can be downloaded from the Internet (https://www.gnu.org/software/wget/). This must then be installed once on the target PC.

"DataLoggerPMX" software to transfer data from PMX to PC/ server

No installation is required to start this HBM transfer software for PMX, only the .exe file must be run.
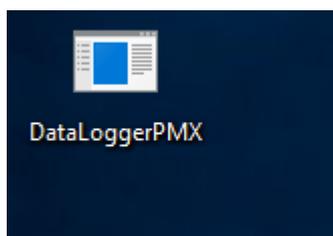
The DataLoggerPMX.exe file must be run.

The PMX's IP address and the directory in which the Wget.exe file can be found must be specified. Then, after pressing the "connect"-button, then software establishes a connection with the PMX.
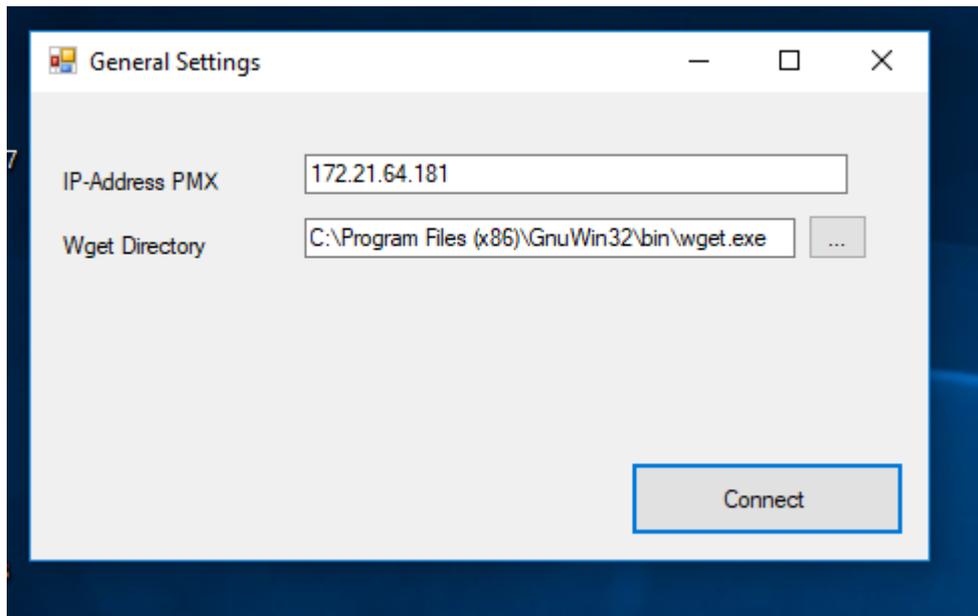
Important: The **destination folder** specifies the directory to which all downloaded files will be saved. **Start Download** starts the download. All folders will be downloaded from the PMX and deleted from the PMX after downloading.
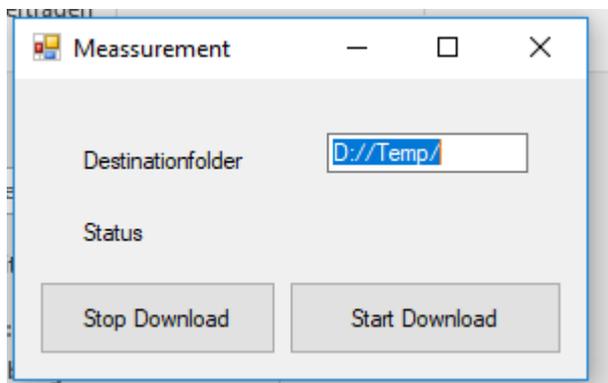
This program can be run continuously so that every time there are new files available for download, the software will get them.
Stop Download finally stops the download. However, this is normally not required.

More information

When using the project as described and running out of memory space this may result in data loss.

Example result file

[ResultFile]			
Hostname	hbm-002d9a		
IP-Addres	127.24.23.180		
Processnu	Date and T	Paramete	Status
2662	28-01-201(	0	OK
2663	28-01-201(	0	OK
2664	28-01-201(	0	OK
2665	28-01-201(	0	OK
2666	28-01-201(	0	OK
2667	28-01-201(	0	OK
2668	28-01-201(	0	OK
2669	28-01-201(	0	OK
2670	28-01-201(	0	OK
2671	28-01-201(	0	OK
2672	28-01-201(	0	OK
2673	28-01-201(	0	OK
2674	28-01-201(	0	OK
2675	28-01-201(	0	OK
2676	28-01-201(	0	OK
2677	28-01-201(	0	OK
2678	28-01-201(	0	OK
2679	28-01-201(	0	OK
2680	28-01-201(	0	OK
2681	28-01-201(	0	OK

Example process file

[Header]					
Time	26-01-2016_15-22-07-169				
Hostname	PMX				
IP-Addres	127.24.23.180				
paramete	0				
ID	id				
Processnu	1212				
[Channel]					
		Channel 1	Channel 1	Channel 1	Channel 1	Channel 2 (
[Data]					
0	-1.10E-05	-0.00027	-0.00021	-0.0003	0
23	-1.10E-05	-0.00027	-0.00021	-0.0003	0
33	-1.10E-05	-0.00027	-0.00021	-0.0003	0
43	-1.10E-05	-0.00027	-0.00021	-0.0003	0
53	-1.10E-05	-0.00027	-0.00021	-0.0003	0
63	-1.10E-05	-0.00027	-0.00021	-0.0003	0

TIP

Further information and help with creating Codesys programs is available from the Codesys online Help, on the Internet at http://www.codesys.com/ or in the Codesys chat room http://forum.codesys.com/

Benefit from the knowledge and information available in the Codesys Store. Here you'll find many examples of programs and solutions covering a wide range of tasks
http://store.codesys.com/?____store=en&____from_store=default

Disclaimer

These examples are for illustrative purposes only. They cannot be used as the basis for any warranty or liability claims.