cynapse®

SIEMENS PLC – ifm IO-Link master

Getting started

2022-D076765

Revision: 03

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Cybertronic support

If you have questions about this implementation example, please contact:
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Subject to technical and content changes without notice.

Table of contents

1 About this manual

This guide contains procedures for the exemplary use of the WITTENSTEIN sensor cynapse®.

This guide uses example code. If you require any code examples, please contact:
cybertronic-support@wittenstein.de

The original was prepared in German, all other language versions are translations of the original instructions.

1.1 Information symbols and cross references

The following information symbols are used:

- Indicates an action to be performed

➲ Indicates the results of an action

ⓘ Provides additional handling information

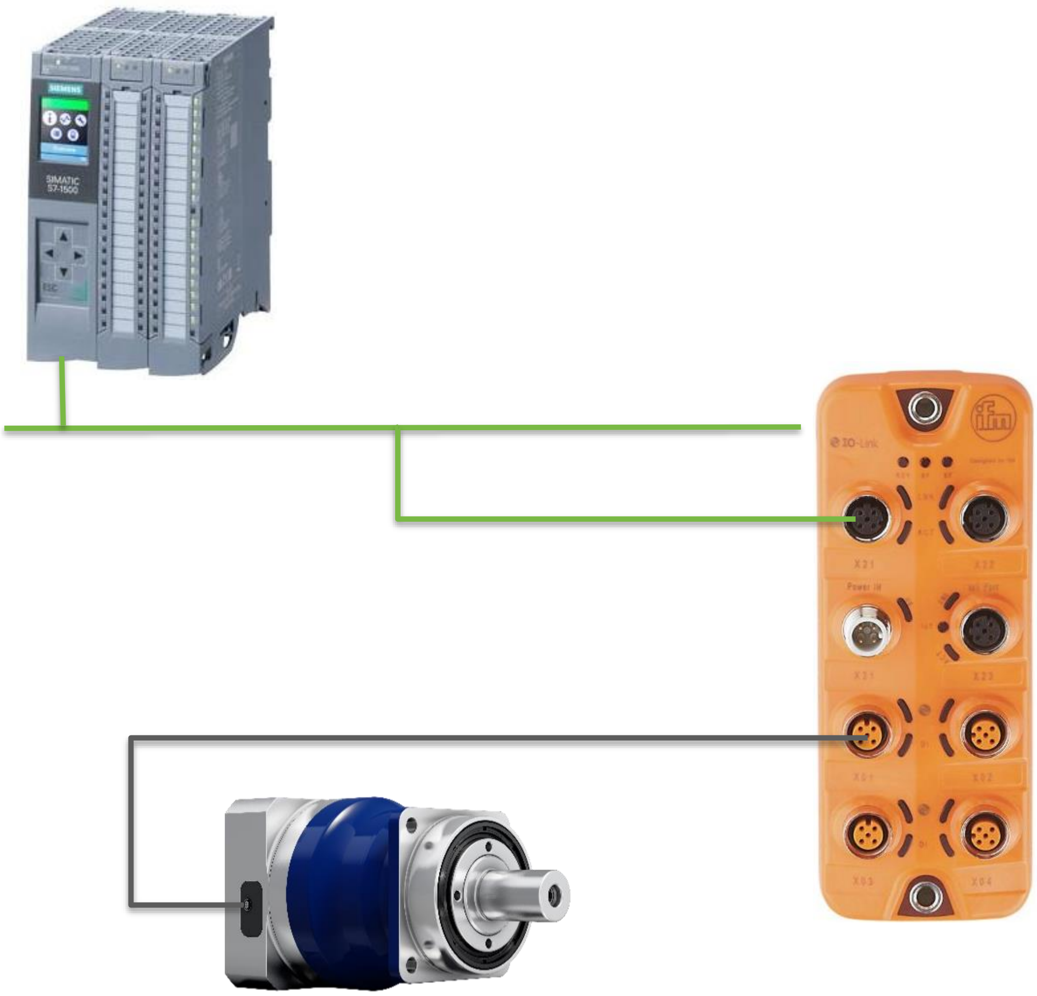
A cross reference refers to the chapter number and the header of the target section
(e. g. chapter 5 “Parameter”).

A cross reference to a table refers to the table number (e.g. table “Tbl - 1”).

2 Hardware structure

The hardware structure of the sample project consists of the following components:

- Control system: SIEMENS S7-1500 (6ES7511-1AK02-0AB0)
- IO-Link master: IFM AL1300
- IO link device: WITTENSTEIN cynapse®



The Siemens control unit is connected to the IFM IO-Link master via PROFINET (green). cynapse® is connected to one of the IO-Link ports of the master (black).

Knowledge of the correct wiring of all components is assumed and is not covered in this example description.

3 Commissioning in the SIEMENS TIA Portal V15.1

Requirement

To carry out the commissioning of cynapse® you need an open project in the TIA portal.

- ➲ The hardware has been set up.
- ➲ An IP address and the subnet mask have already been assigned for the existing CPU.
- ➲ The GSD file of the IO-Link master was obtained from the website of the master manufacturer and is available.

If you require any code examples, please contact cybertronic-support@wittenstein.de

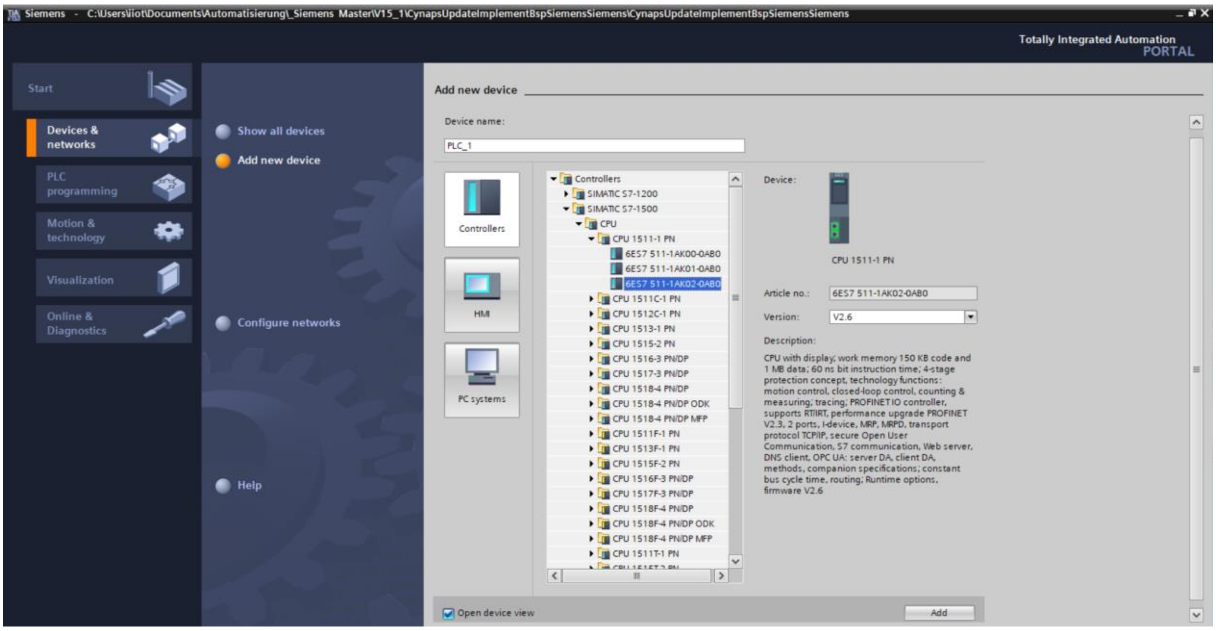
3.1 Hardware configuration of the components

Introduction

In the following, you create the CPU and the IO-Link master in the hardware configuration and network them together.

Procedure

1. Open the “Devices & networks” portal.
2. Insert a new device.
3. Open the folder “SIMATIC S7-1500”.
4. Select the CPU you are using.
5. If necessary, adjust the version of your hardware.



Siemens - C:\Users\iot\Documents\Automatisierung_Siemens Master\V15_1\CynapsUpdateImplementBspSiemensSiemens\CynapsUpdateImplementBspSiemensSiemens

Add new device

Device name: PLC_1

Device: CPU 1511-1 PN

Article no.: 6ES7 511-1AK02-0AB0

Version: V2.6

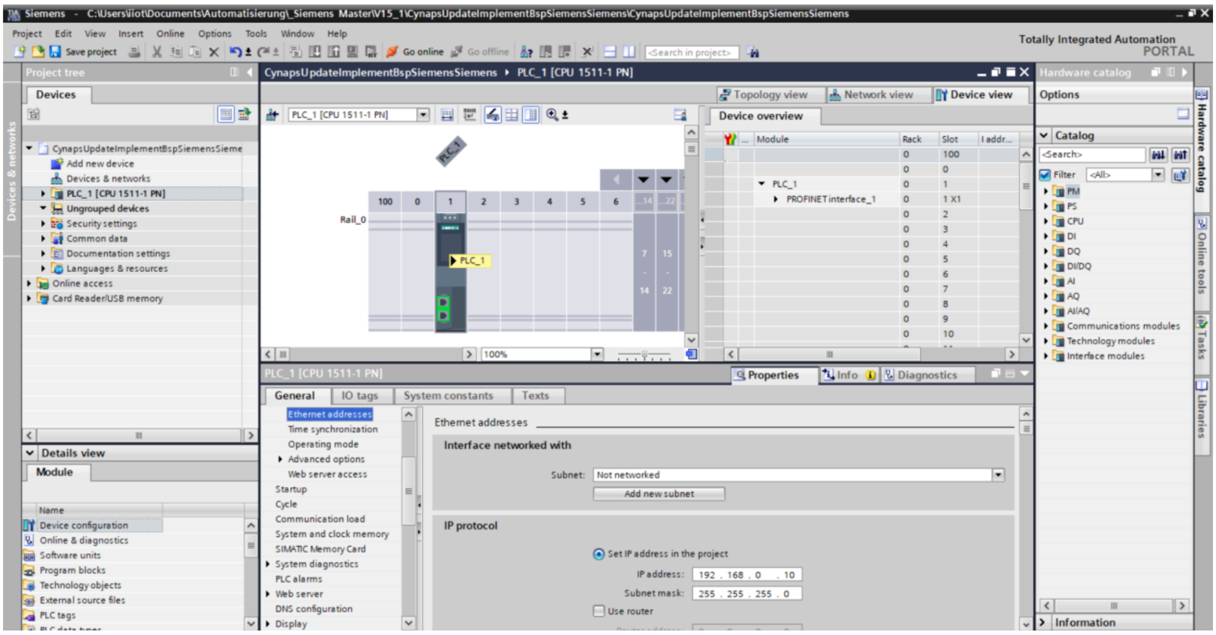
Description:

CPU with display; work memory 150 KB code and 1 MB data; 60 ns bit instruction time; 4-stage protection concept, technology functions: motion control, closed-loop control, counting & measuring; tracing; PROFINET IO controller, supports RT/IRT, performance upgrade PROFINET V2.3, 2 ports, I-device, MRP, MRPD, transport protocol TCP/IP, secure Open User Communication, S7 communication, Web server, DNS client, OPC UA: server DA, client DA, methods, companion specifications; constant bus cycle time, routing; Runtime options, firmware V2.6

☑ Open device view

6. Create the CPU by double-clicking on the name.
7. Double-click on the CPU in the automatically opened project view and jump into the CPU settings.

8. Under “Ethernet addresses”, enter the assigned IP address and the subnet mask.



Ethernet addresses

Interface networked with

Subnet: Not networked

Add new subnet

IP protocol

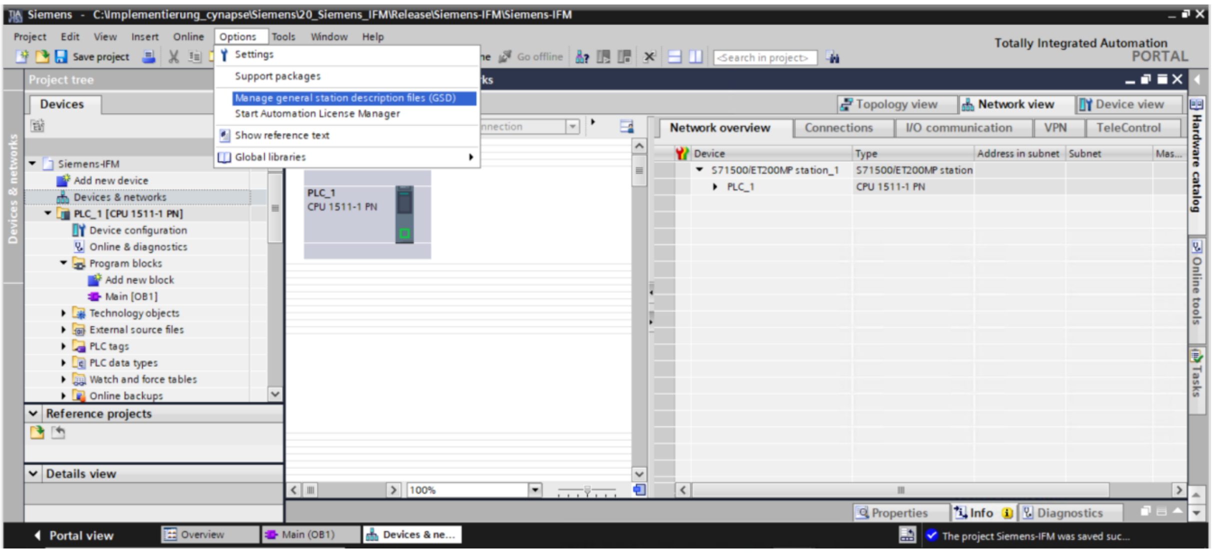
● Set IP address in the project

IP address: 192 . 168 . 0 . 10

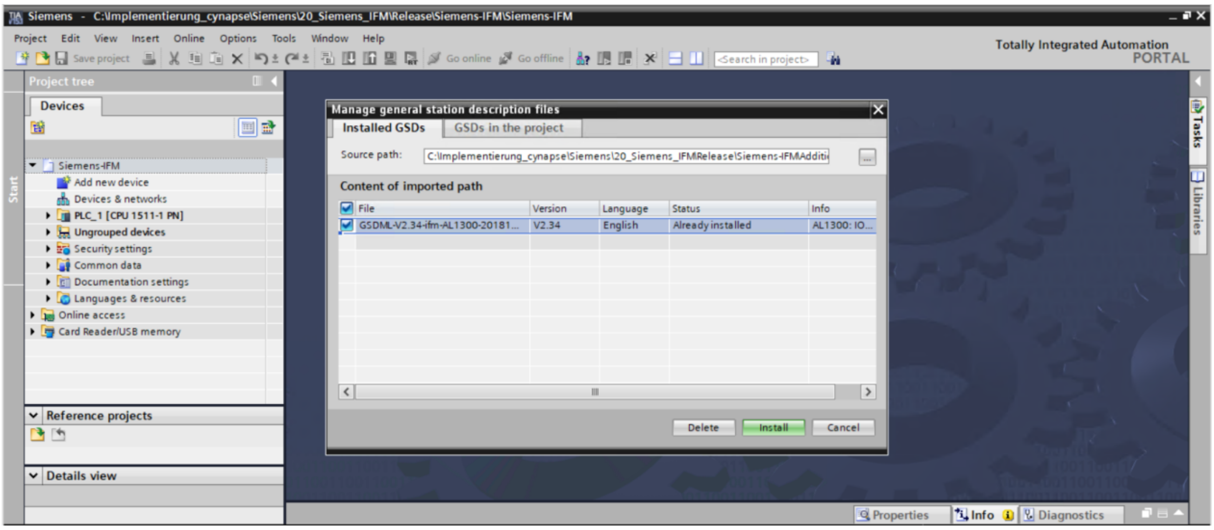
Subnet mask: 255 . 255 . 255 . 0

□ Use router

9. Import the GSD file of the IO-Link master via “Options”.



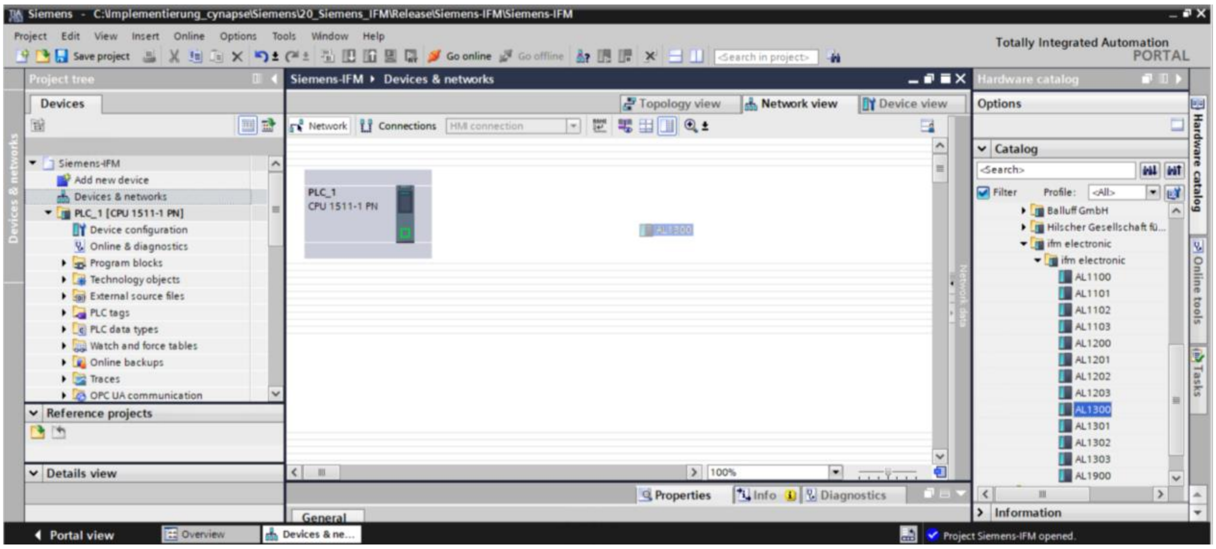
10. Open the GSD Manager and install the GSD file.

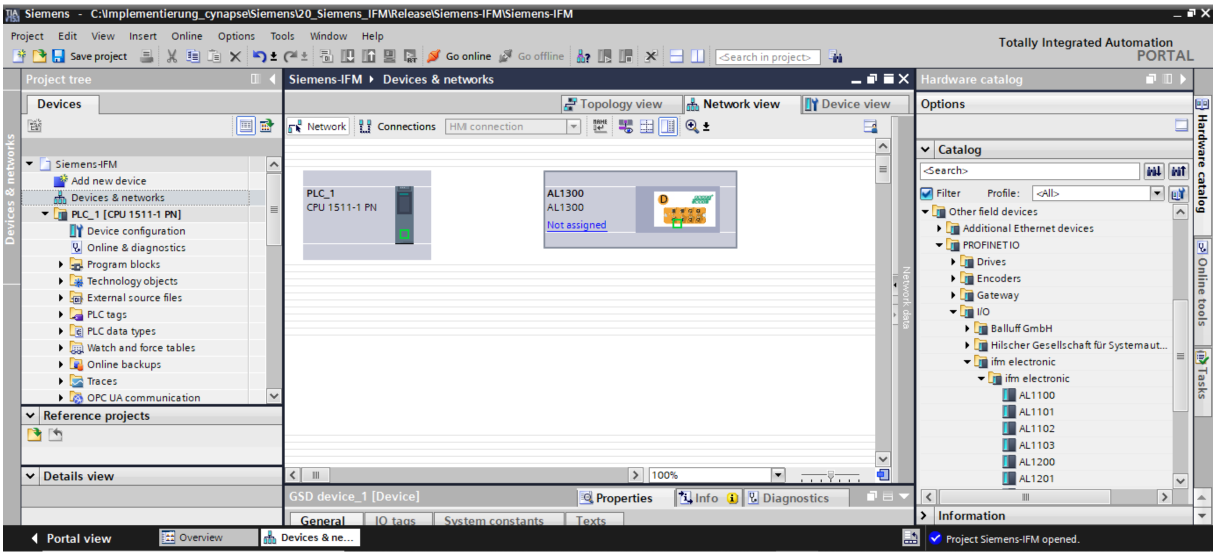

Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens-IFM\Siemens-IFM
Totally Integrated Automation PORTAL
Manage general station description files
Installed GSDs
GSDs in the project
Content of imported path
Delete
Install
Cancel

Source path: C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens-IFM\Additi

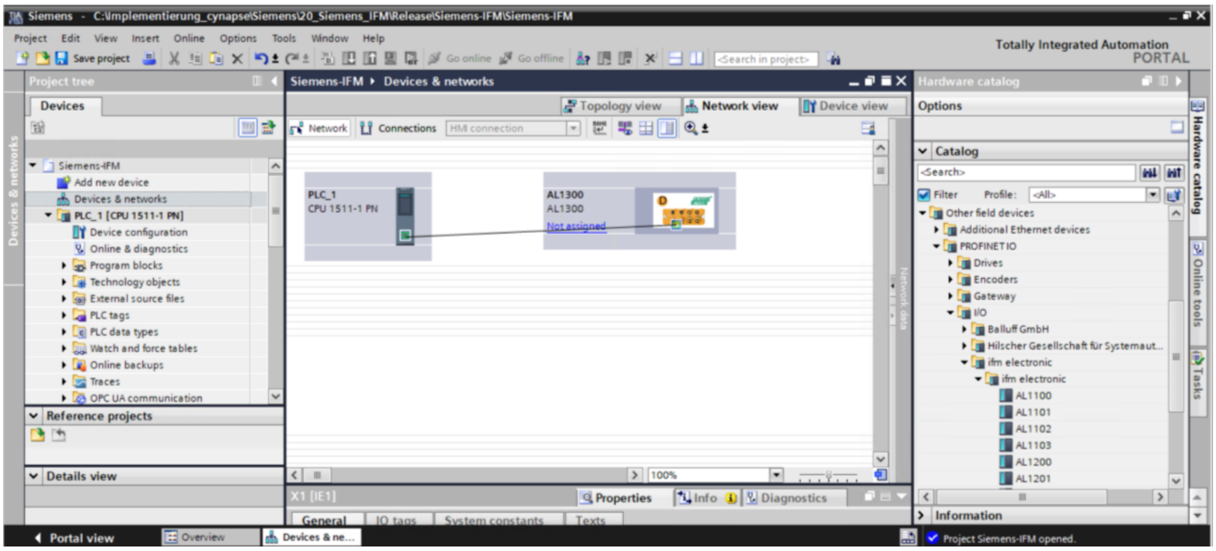
☑ File	Version	Language	Status	Info
☑ GSDML-V2.34-ifm-AL1300-20181...	V2.34	English	Already installed	AL1300: IO...

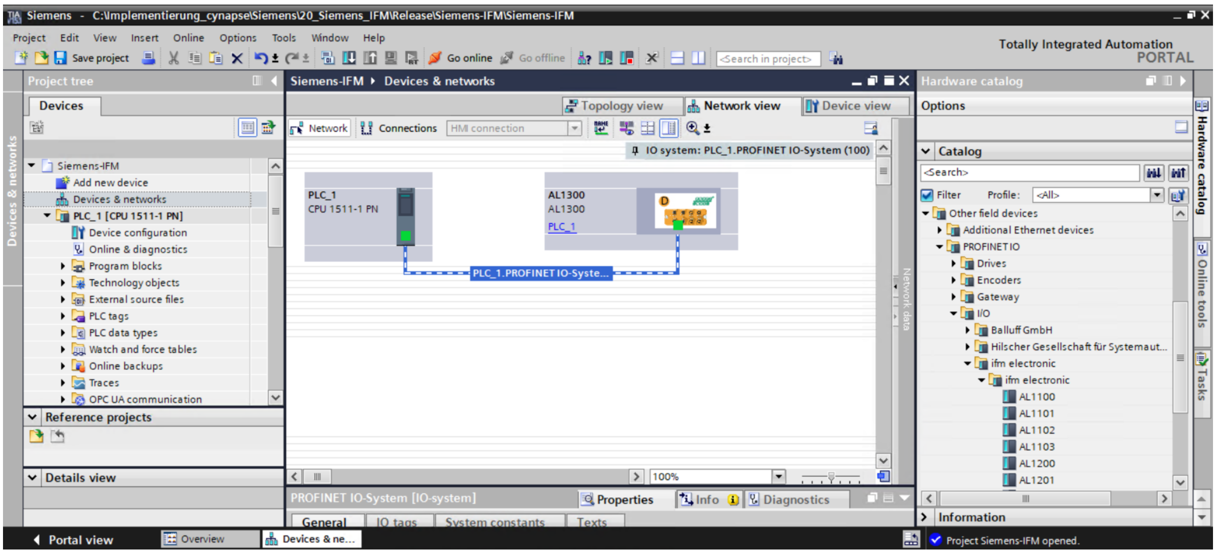
11. Open the “Hardware catalog”.
12. Switch to the “Network view”.
13. Open the “Other Field Devices” folder and the “Profinet IO” folder.
14. Open the “I/O” and “ifm Electronic” folders and the “ifm Electronic” folder.
15. Drag the interface module you are using and drop it into the white background of the network view.





16. Drag & drop a connection from the interface of the CPU to the interface of the interface module in order to link these via PROFINET.

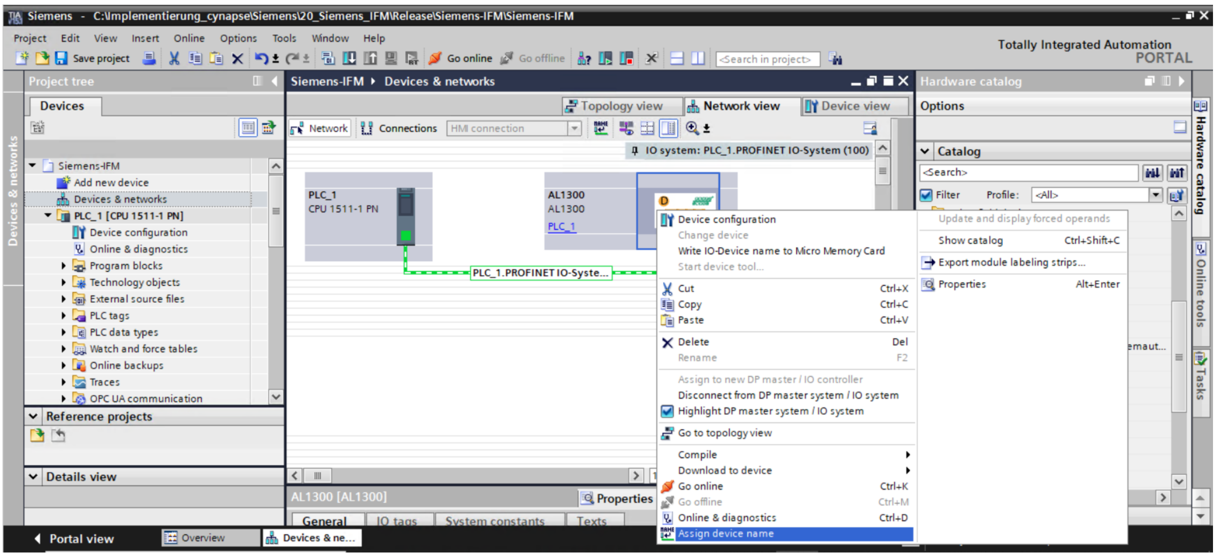



Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens-IFM\Siemens-IFM
Totally Integrated Automation PORTAL
Siemens-IFM ▸ Devices & networks
IO system: PLC_1.PROFINET IO-System (100)
PLC_1
CPU 1511-1 PN
AL1300
AL1300
PLC_1
PLC_1.PROFINET IO-Syste...
PROFINET IO-System [IO-system]
Properties
Info
Diagnostics
Portal view
Devices & ne...
Project Siemens-IFM opened.

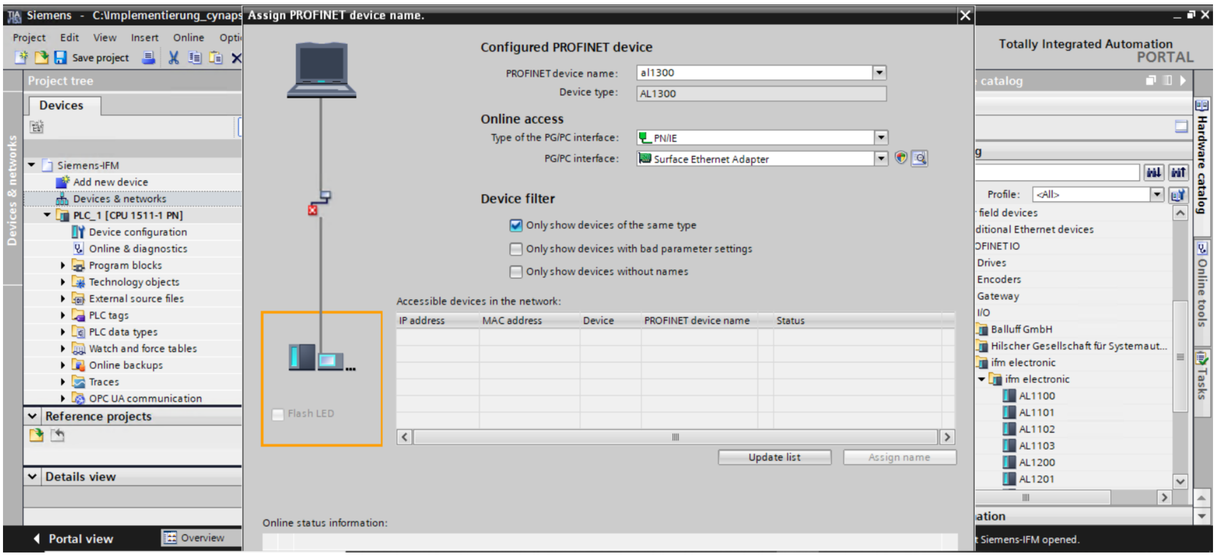
17. For successful communication, the device name of the reachable subscriber must match that of the hardware configuration. Check it as follows:

- Right click on the IO device.
- Select "Assign device name".

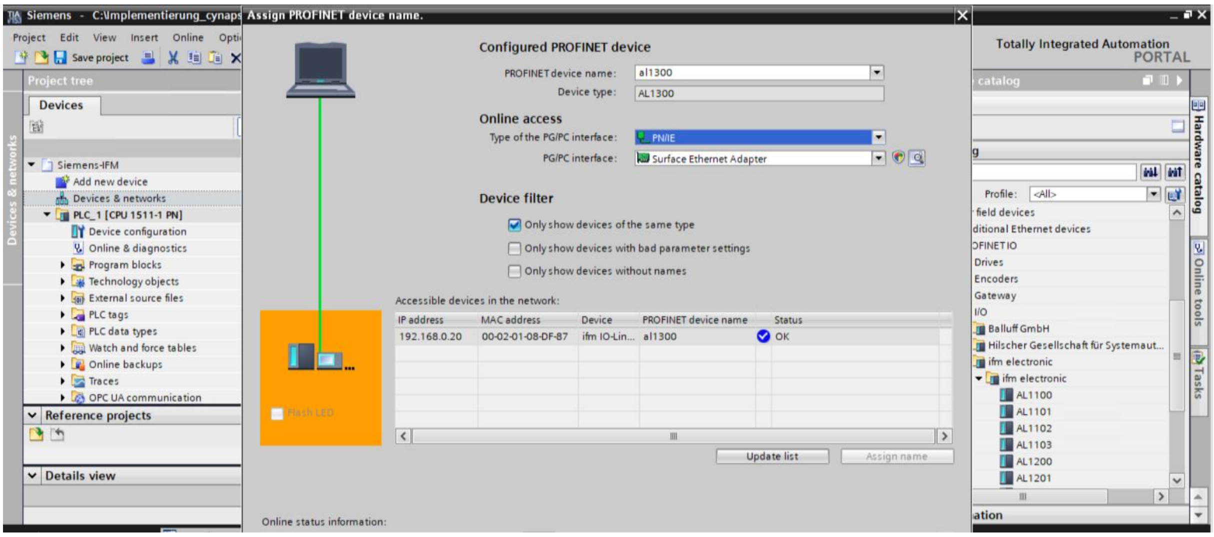
ⓘ The name is suggested by the development environment. However, it can also be renamed.



- Click on "Update list".



PROFINET device name: al1300
Device type: AL1300
Type of the PG/PC interface: PN/IE
PG/PC interface: Surface Ethernet Adapter
☑ Only show devices of the same type
☐ Only show devices with bad parameter settings
☐ Only show devices without names



Assign PROFINET device name.

Configured PROFINET device

PROFINET device name: al1300

Device type: AL1300

Online access

Type of the PG/PC interface: PN/IE

PG/PC interface: Surface Ethernet Adapter

Device filter

☑ Only show devices of the same type

☐ Only show devices with bad parameter settings

☐ Only show devices without names

Accessible devices in the network:

IP address	MAC address	Device	PROFINET device name		Status
192.168.0.20	00-02-01-08-DF-87	ifm IO-Lin...	al1300	✓	OK

Update list Assign name

Online status information:

Result

➲ The hardware components are all connected and a successful communication between TIA Portal, CPU and IO-Link master is possible.

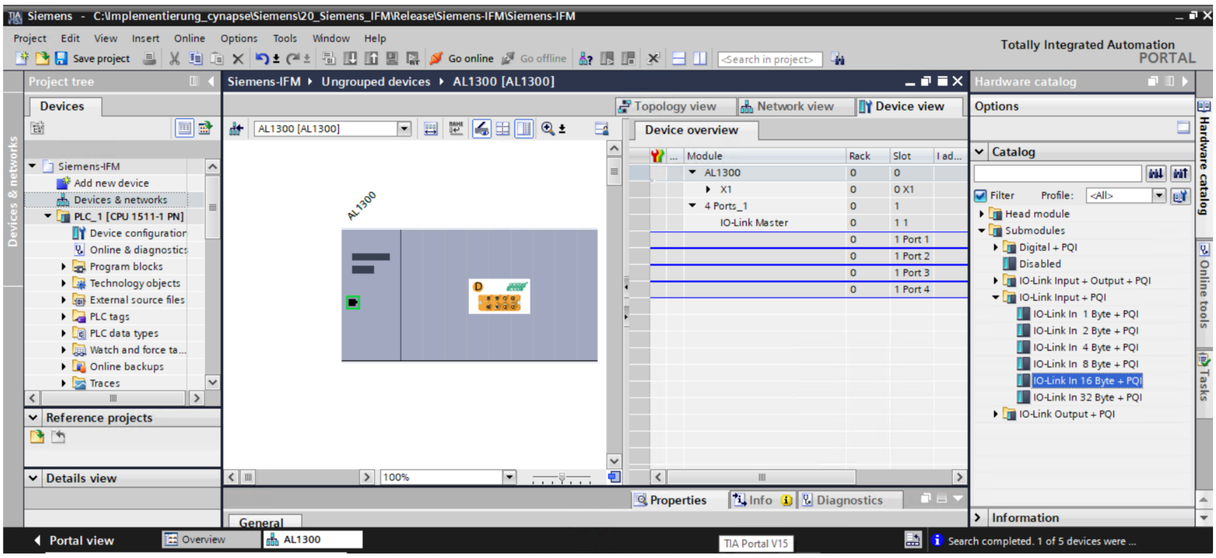
3.2 Integration of cynapse®

Introduction

In the following, you complete the hardware configuration with the integration of cynapse®.

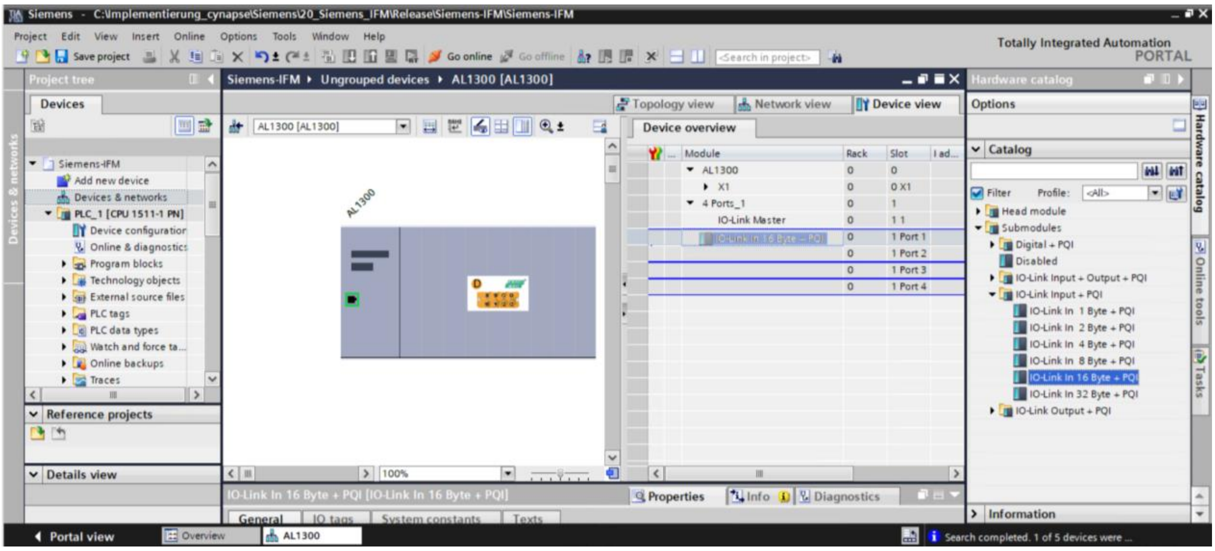
Procedure

1. Open the “Device View” tab and the hardware catalog.



Module	Rack	Slot	I ad...
AL1300	0	0	
X1	0	0 X1	
4 Ports_1	0	1	
IO-Link Master	0	1 1	
	0	1 Port 1	
	0	1 Port 2	
	0	1 Port 3	
	0	1 Port 4	

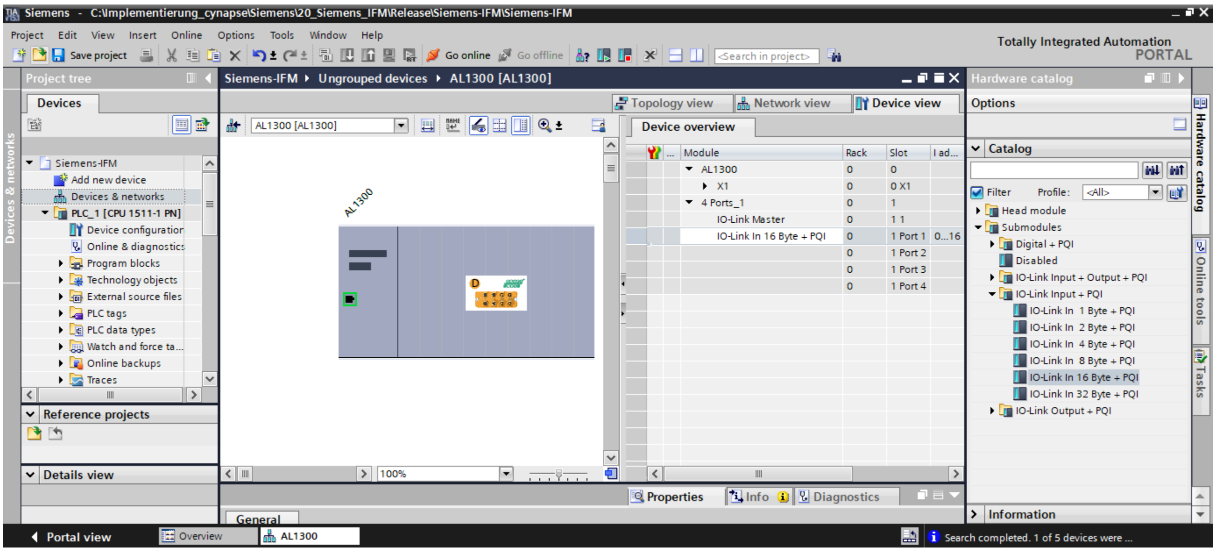
2. Drag and drop “IO-Link IN 16 Byte+PQI” according to the operating manual to the port where cynapse® is attached.



Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens-IFM\Siemens-IFM
Totally Integrated Automation PORTAL
Project tree
Devices
Siemens-IFM ▸ Ungrouped devices ▸ AL1300 [AL1300]
Device overview
AL1300
Hardware catalog
IO-Link In 16 Byte + PQI
IO-Link In 16 Byte + PQI [IO-Link In 16 Byte + PQI]
General
IO tags
System constants
Texts
Properties
Info
Diagnostics
Portal view
Overview
Search completed. 1 of 5 devices were ...

Module	Rack	Slot	I ad...
AL1300	0	0	
X1	0	0 X1	
4 Ports_1	0	1	
IO-Link Master	0	1 1	
IO-Link In 16 Byte + PQI	0	1 Port 1	
	0	1 Port 2	
	0	1 Port 3	
	0	1 Port 4	

3. As a result, the data can now be transmitted from the sensor.

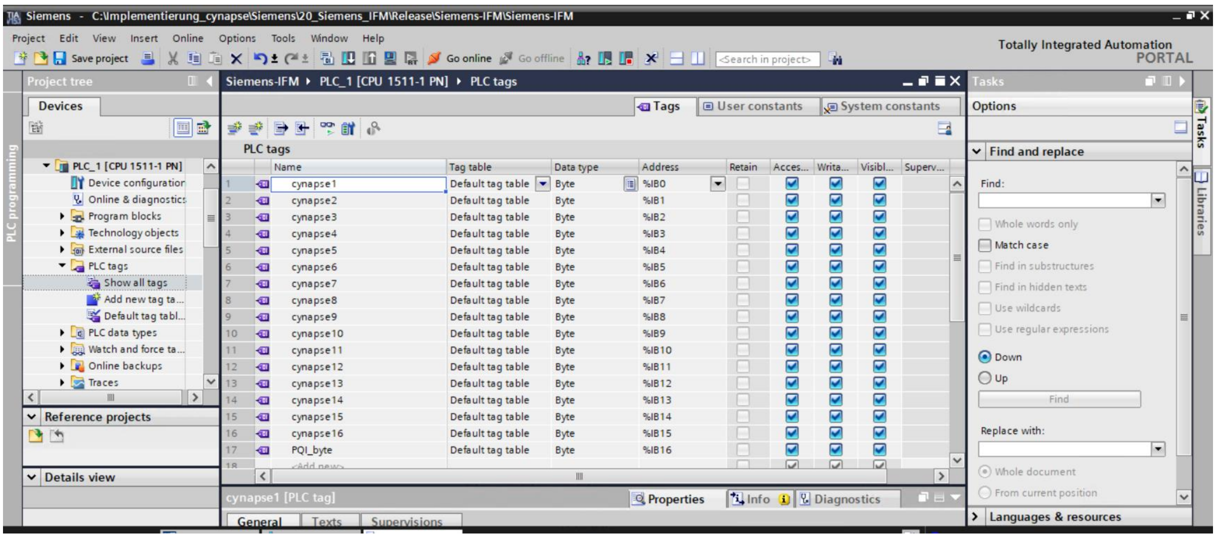


Siemens-IFM ▸ Ungrouped devices ▸ AL1300 [AL1300]

Device overview

Module	Rack	Slot	I ad...
AL1300	0	0	
X1	0	0 X1	
4 Ports_1	0	1	
IO-Link Master	0	1 1	
IO-Link In 16 Byte + PQI	0	1 Port 1	0...16
	0	1 Port 2	
	0	1 Port 3	
	0	1 Port 4	

4. To use cynapse® data in the TIA portal, you have to create a variable table.
5. In the project tree, go to PLC tags and create the following variables.



Siemens-IFM ▸ PLC_1 [CPU 1511-1 PN] ▸ PLC tags

PLC tags

	Name	Tag table	Data type	Address	Retain	Acces...	Writa...	Visibl...	Superv...
1	cynapse1	Default tag table	Byte	%IB0	□	☑	☑	☑	
2	cynapse2	Default tag table	Byte	%IB1	□	☑	☑	☑	
3	cynapse3	Default tag table	Byte	%IB2	□	☑	☑	☑	
4	cynapse4	Default tag table	Byte	%IB3	□	☑	☑	☑	
5	cynapse5	Default tag table	Byte	%IB4	□	☑	☑	☑	
6	cynapse6	Default tag table	Byte	%IB5	□	☑	☑	☑	
7	cynapse7	Default tag table	Byte	%IB6	□	☑	☑	☑	
8	cynapse8	Default tag table	Byte	%IB7	□	☑	☑	☑	
9	cynapse9	Default tag table	Byte	%IB8	□	☑	☑	☑	
10	cynapse10	Default tag table	Byte	%IB9	□	☑	☑	☑	
11	cynapse11	Default tag table	Byte	%IB10	□	☑	☑	☑	
12	cynapse12	Default tag table	Byte	%IB11	□	☑	☑	☑	
13	cynapse13	Default tag table	Byte	%IB12	□	☑	☑	☑	
14	cynapse14	Default tag table	Byte	%IB13	□	☑	☑	☑	
15	cynapse15	Default tag table	Byte	%IB14	□	☑	☑	☑	
16	cynapse16	Default tag table	Byte	%IB15	□	☑	☑	☑	
17	PQI_byte	Default tag table	Byte	%IB16	□	☑	☑	☑	
18	<Add new>								

Result

➲ The hardware configuration is linked to the correct data types and a variable table has been created. Now the integration of cynapse® is complete and the connection to cynapse® is established.

4 Process data

4.1 Definition

Process data is understood to mean cyclically communicated data between the IO-Link master and control. In each cycle, these data are transferred. The process data sent by cynapse® depends on the version status of the hardware and software. For more information, see the cynapse® operating manual.

4.2 Read process data using the “cynapse process data” FB

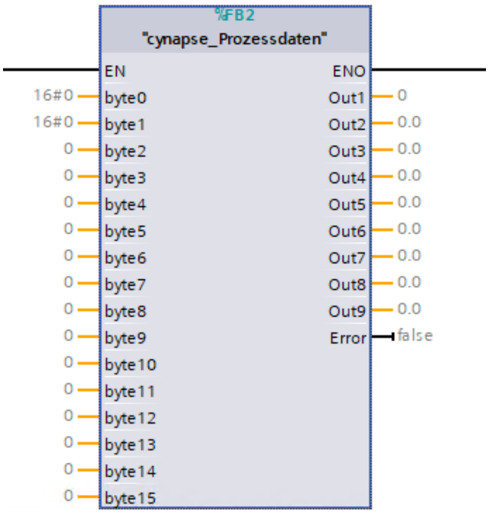
Requirement

- ➲ You have obtained a sample project for reading out the process data from the following source:
  cybertronic-support@wittenstein.de

Introduction

In the following, you will read process data from a sample project using a function module. The latter takes over the scaling of the measured values.

cynapse® offers different process data formats to offer different data for further processing while maintaining the same process data length. These process data can be selected by the parameter Settings. For more information, see the operating manual cynapse® and Chapter 5.4 “Writing parameters”.

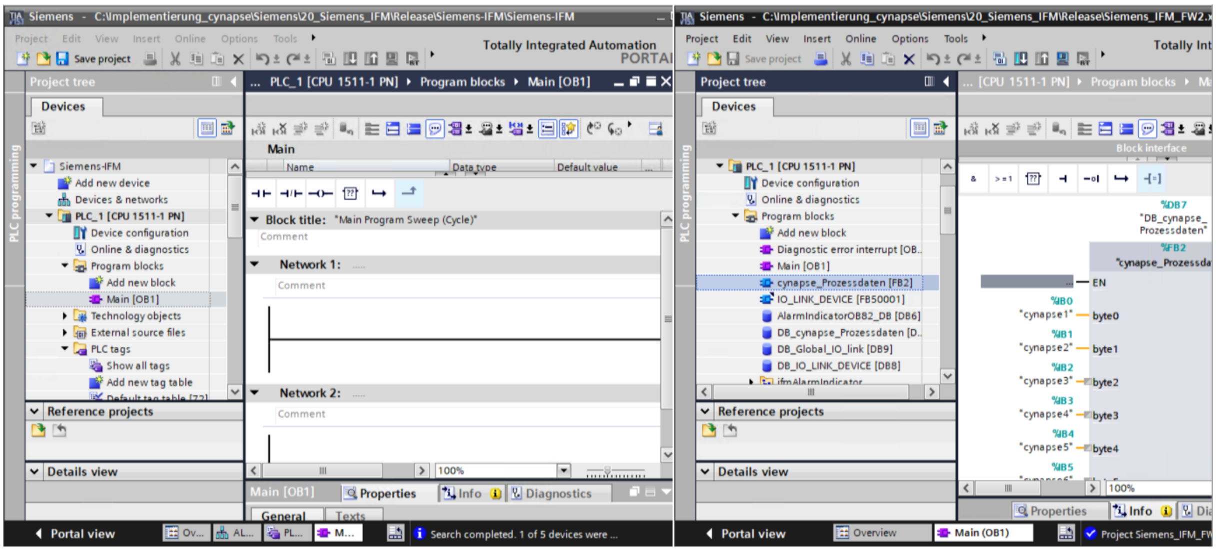


Input/output	Data type	Function
Input 0	BYTE	Byte 0 reserved
Input 1	BYTE	Byte 1 process data profile
Input 2-14	INT	Process data profile dependent input variables – more information on this in the operating manual
Out 1	INT	-
Out 2	REAL	Current active process data profile
Out 3-9	REAL	Scaled values of inputs 2-14

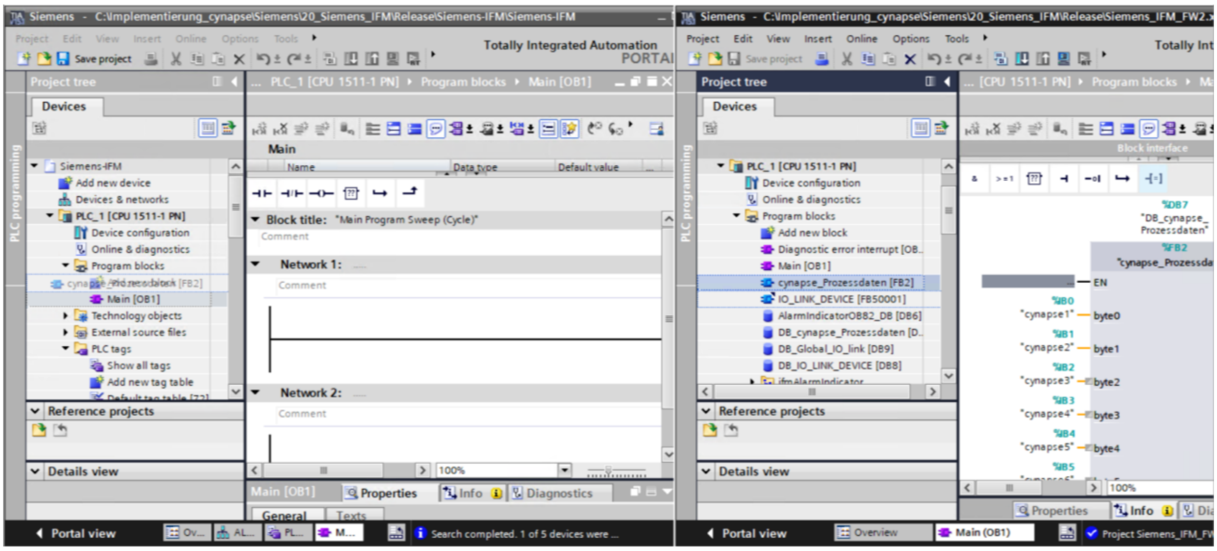
Tbl - 1

Procedure

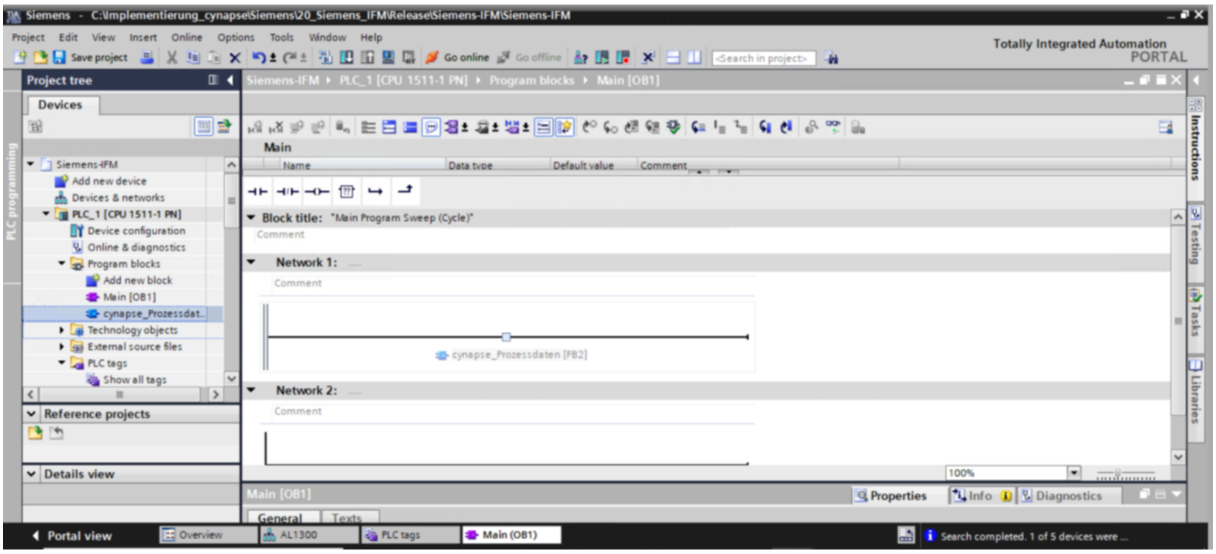
1. Open the resulting sample project.
2. In parallel, open the project in which you want to read process data.
3. Select the “cynapse_Process Data” FB in the sample project.



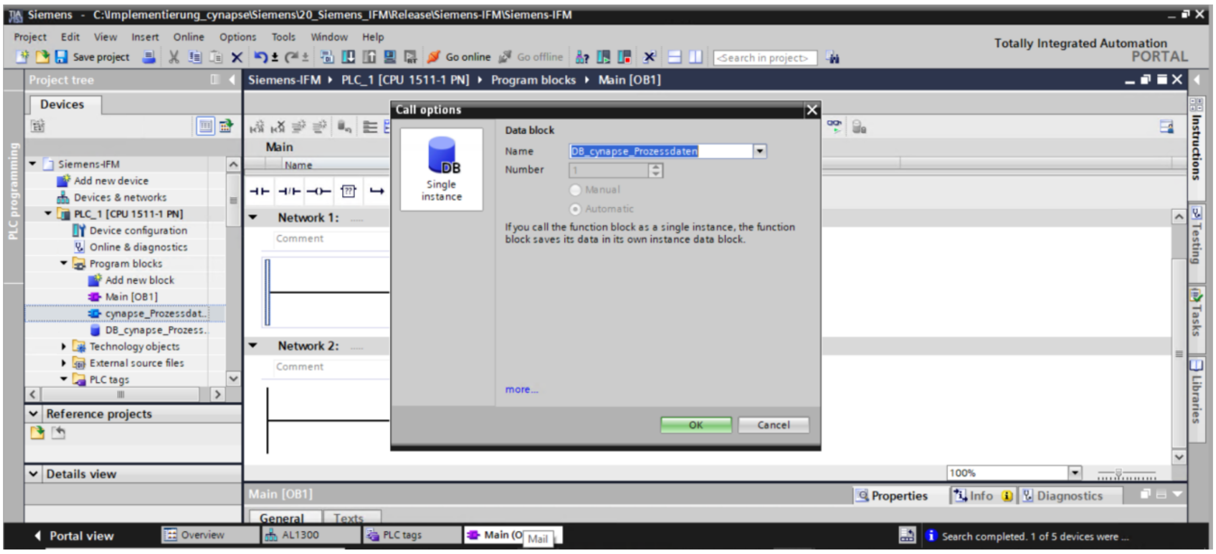
4. Drag and drop it into your project under “Program blocks”.



5. Drag and drop the FB into the main block.



6. Create the DB by clicking on "OK".


Call options

Single instance

Data block

Name: DB_cynapse_Prozessdaten

Number: 1

○ Manual

● Automatic

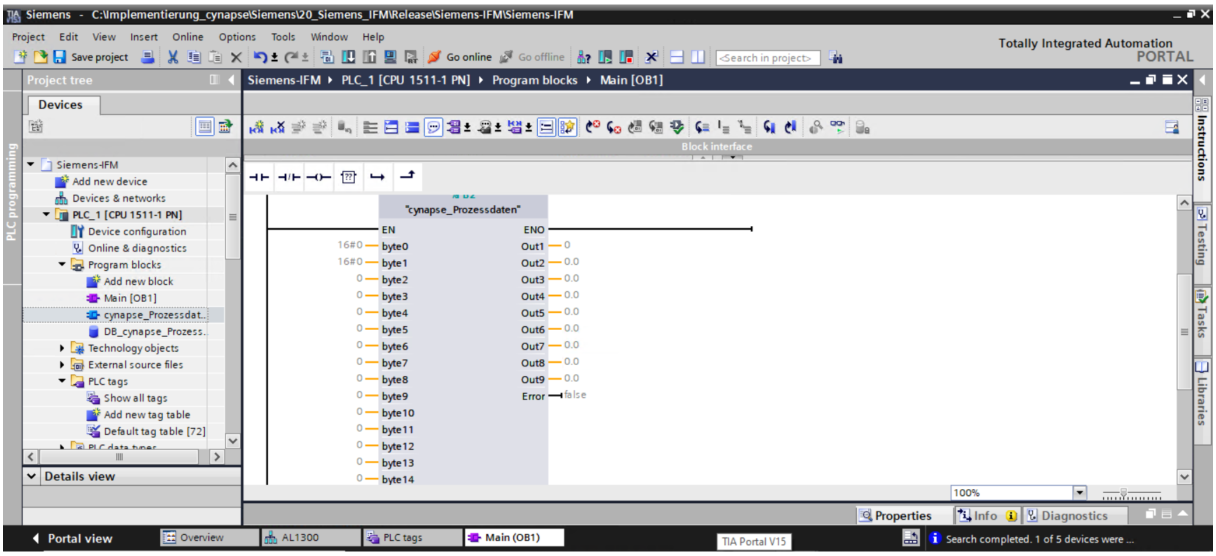
If you call the function block as a single instance, the function block saves its data in its own instance data block.

more...

OK Cancel

Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens-IFM\Siemens-IFM
Totally Integrated Automation PORTAL
Project tree
Devices
DB_cynapse_Prozess...
Siemens-IFM ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ Main [OB1]
Network 1:
Network 2:
Portal view

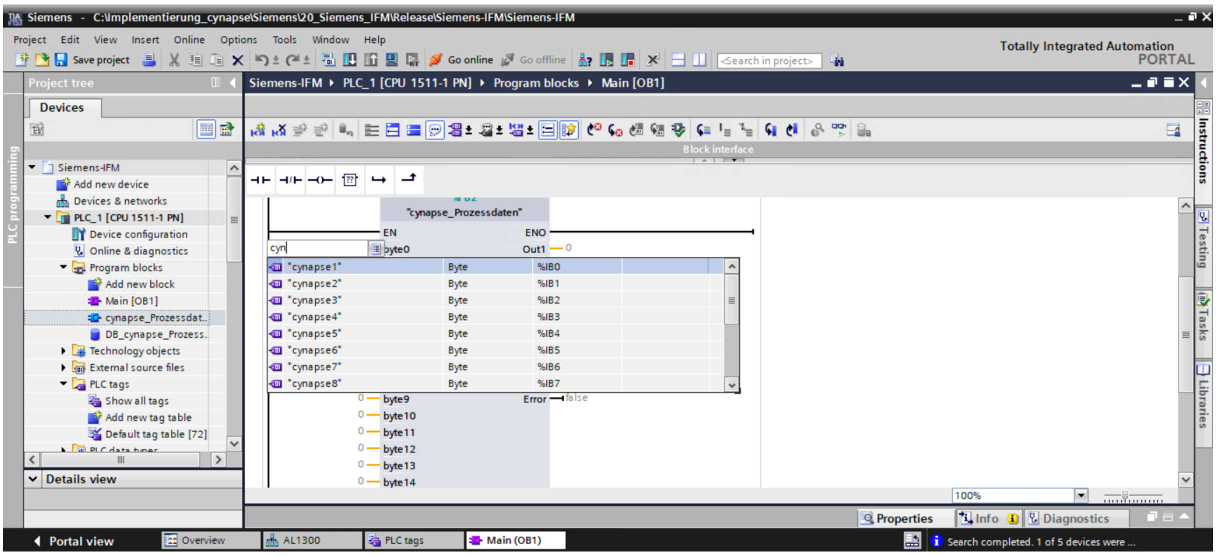
7. The block is contained in a network of the main block.


"cynapse_Prozessdaten"

	EN	ENO	
16#0	byte0	Out1	0
16#0	byte1	Out2	0.0
0	byte2	Out3	0.0
0	byte3	Out4	0.0
0	byte4	Out5	0.0
0	byte5	Out6	0.0
0	byte6	Out7	0.0
0	byte7	Out8	0.0
0	byte8	Out9	0.0
0	byte9	Error	false
0	byte10		
0	byte11		
0	byte12		
0	byte13		
0	byte14		

Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens-IFM\Siemens-IFM
Totally Integrated Automation PORTAL
Project tree
Devices
Add new tag table
Default tag table [72]
Siemens-IFM ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ Main [OB1]
Block interface
TIA Portal V15
Portal view

8. Assign PLC tags from the variable table to the inputs.

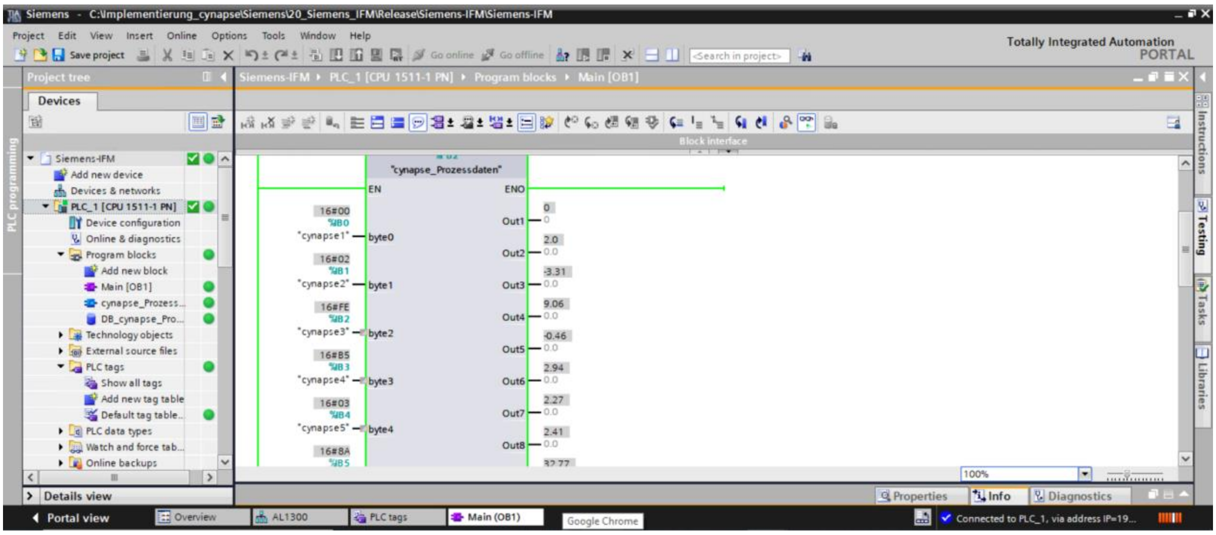


"cynapse1"	Byte	%IB0
"cynapse2"	Byte	%IB1
"cynapse3"	Byte	%IB2
"cynapse4"	Byte	%IB3
"cynapse5"	Byte	%IB4
"cynapse6"	Byte	%IB5
"cynapse7"	Byte	%IB6
"cynapse8"	Byte	%IB7

Result

➲ The scaled process data are present at the outputs of the module according to the selected process data image and can be used further in the program.

After compiling and downloading the data can be Go online observed online.



```
16#00
%IB0
"cynapse1" — byte0        Out1 — 0    (0)
16#02
%IB1
"cynapse2" — byte1        Out2 — 2.0  (0.0)
16#FE
%IB2
"cynapse3" — byte2        Out3 — -3.31 (0.0)
16#B5
%IB3
"cynapse4" — byte3        Out4 — 9.06 (0.0)
16#03
%IB4
"cynapse5" — byte4        Out5 — -0.46 (0.0)
16#8A
%IB5                      Out6 — 2.94 (0.0)
                          Out7 — 2.27 (0.0)
                          Out8 — 2.41 (0.0)
                          32.77
```

5 Parameter

5.1 Definition

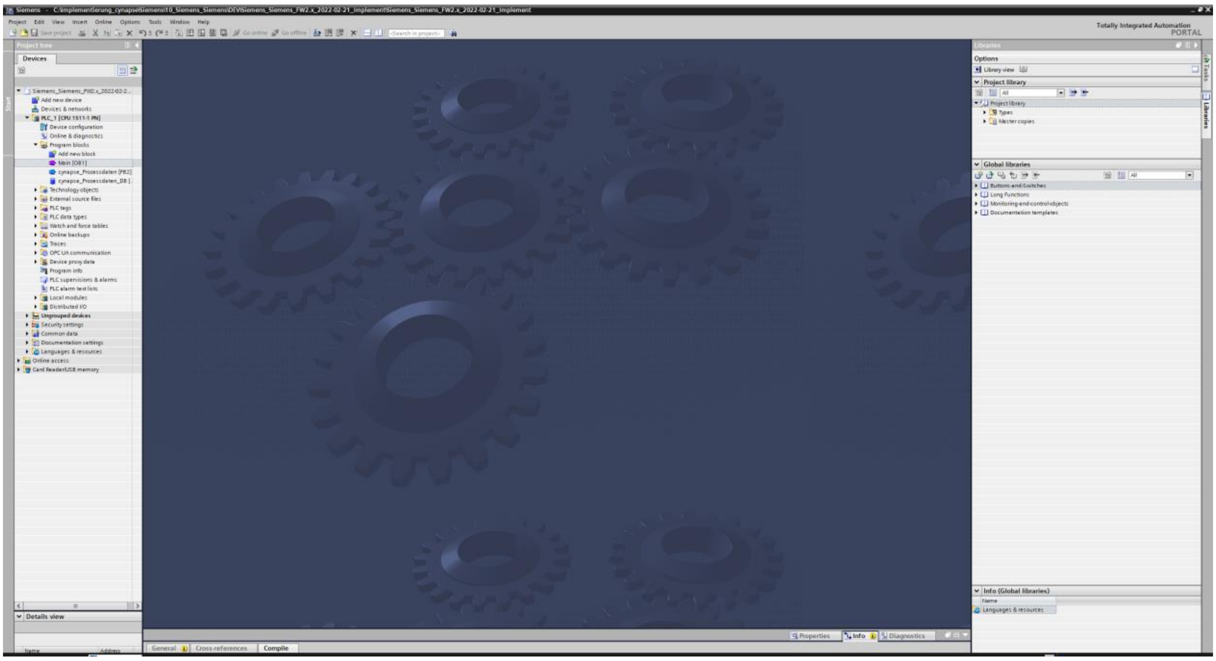
Parameters are understood to be acyclically communicated data. In this way, device parameters such as device information, threshold values or diagnostic data of an IO-Link device (e.g cynapse®) can be read or written. The data on the device is uniquely addressed with index and subindex.

For more information about the index and subindex as well as the structure of the data set, see the cynapse® operating manual.

5.2 Integrating Siemens block for parameter reading/writing into program

Requirement

➲ You have obtained the LIOLink library from the Siemens website and know the location.
➲ Your TIA project is open and the Libraries task card is open.



ⓘ **Note:** A duplicate request to a device via the IO_LINK_DEVICE module is not possible. Since parameters are read, parameters are written and blob data are accessed on this block, these are to be locked against one another.

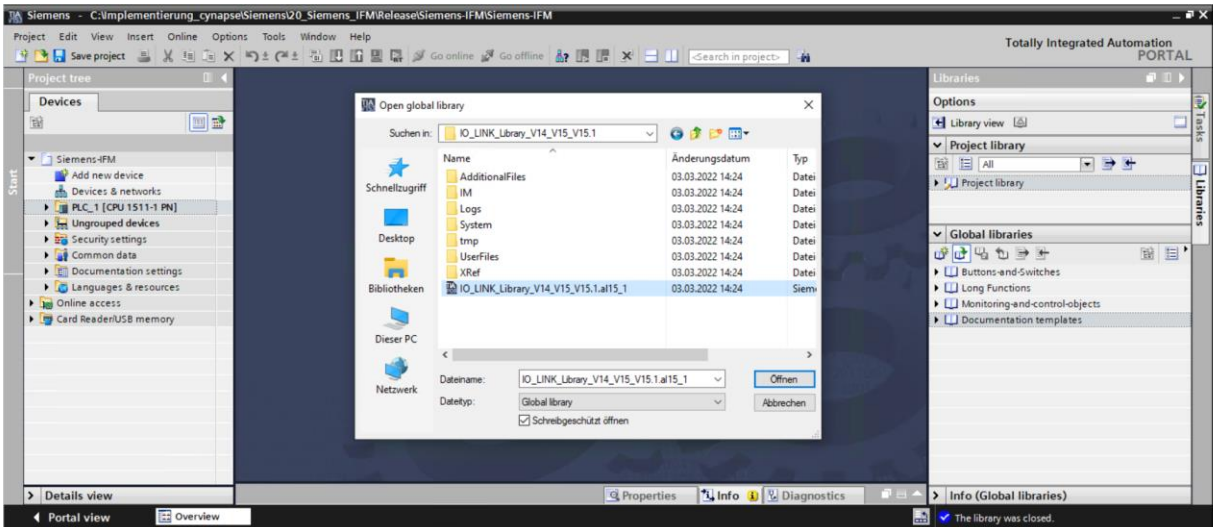
Introduction

In the following, you integrate the functional module “FBIoLinkDevice” published by Siemens into your project and determine project-specific input variables of the module.

With the help of this function module, you can read program parameters, measured values and diagnostic data from an IO-Link device or write device parameters to an IO-Link device or send system commands.

Procedure

1. Click the “Open global library” button.
2. Select the library in the known location.
3. Click “Open”.



Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens-IFM\Siemens-IFM

Open global library

Suchen in: IO_LINK_Library_V14_V15_V15.1

Name	Änderungsdatum	Typ
AdditionalFiles	03.03.2022 14:24	Datei
IM	03.03.2022 14:24	Datei
Logs	03.03.2022 14:24	Datei
System	03.03.2022 14:24	Datei
tmp	03.03.2022 14:24	Datei
UserFiles	03.03.2022 14:24	Datei
XRef	03.03.2022 14:24	Datei
IO_LINK_Library_V14_V15_V15.1.al15_1	03.03.2022 14:24	Siem

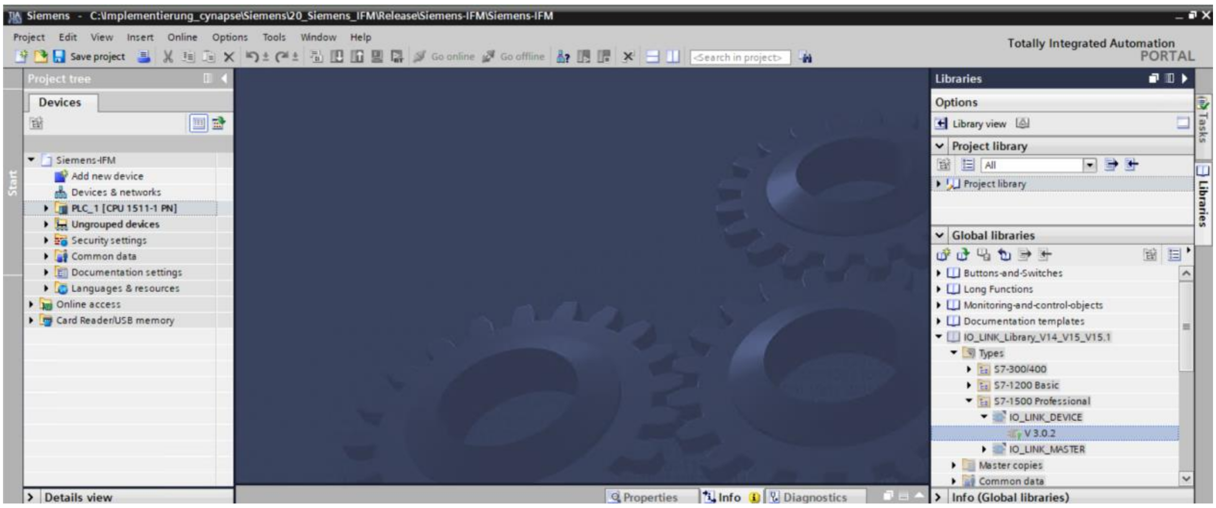
Dateiname: IO_LINK_Library_V14_V15_V15.1.al15_1

Dateityp: Global library

☑ Schreibgeschützt öffnen

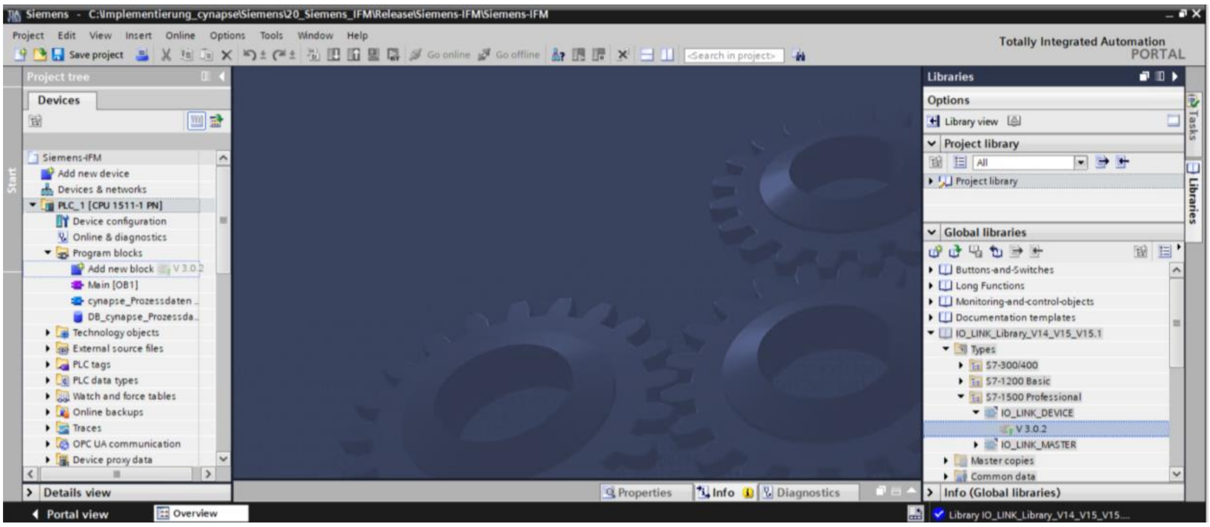
The library was closed.

4. The library appears under “Global libraries” and can be opened.

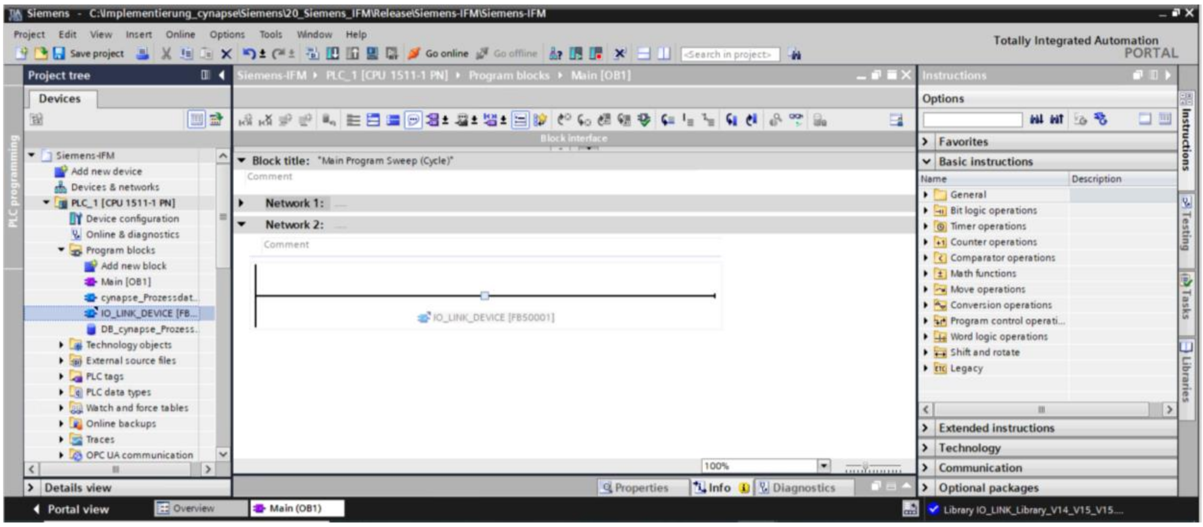


Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens-IFM\Siemens-IFM

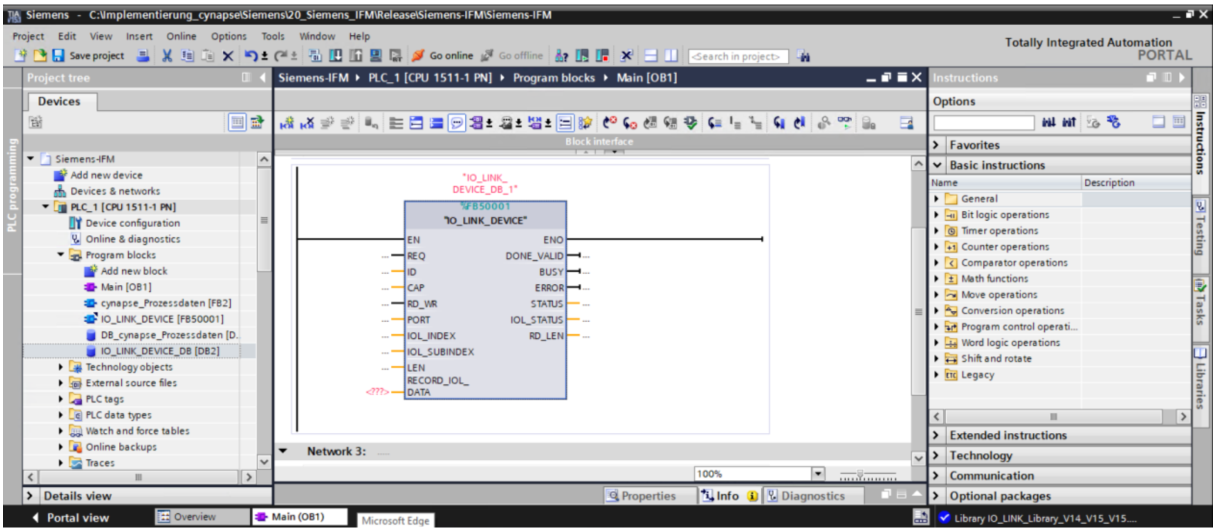
5. Drag and drop the IO_LINK_DEVICE block into program blocks.



6. Open the main block with a double click.
7. Drag and drop the IO_LINK_DEVICE block into the network.

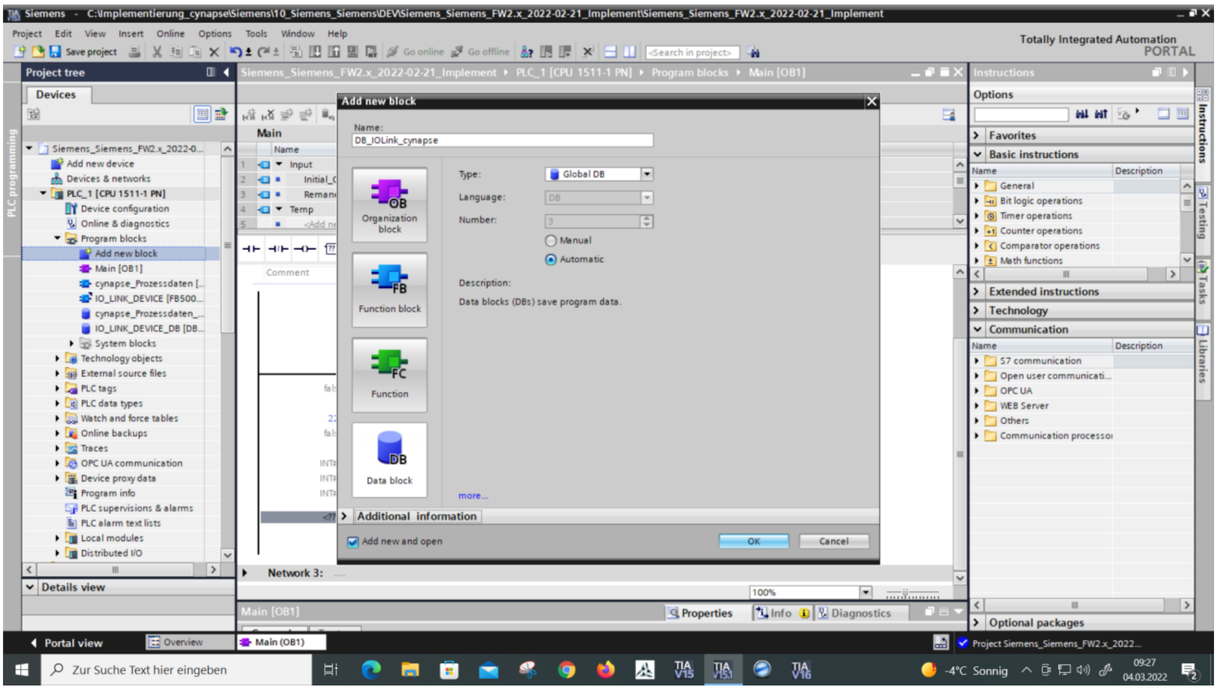


8. Have the corresponding DB created by the TIA Portal statement.



9. Create the global data block DB for inputs and outputs:

- Under “Program blocks”; click on “Add new block”.
- Select and name DB.
- Click “OK”.



Add new block

Name: DB_IOLink_cynapse

Type: Global DB

Language: DB

Number: 3

○ Manual

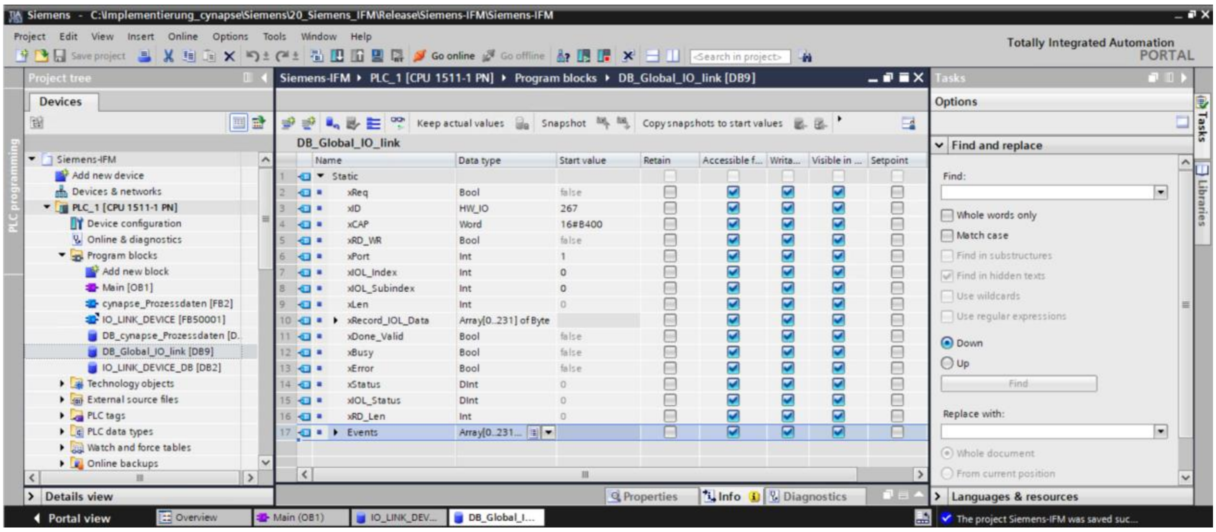
● Automatic

Description:

Data blocks (DBs) save program data.

☑ Add new and open

- Open the global DB by double-clicking on it.
- Create variables in the required data types according to the block description of Siemens in the DB.

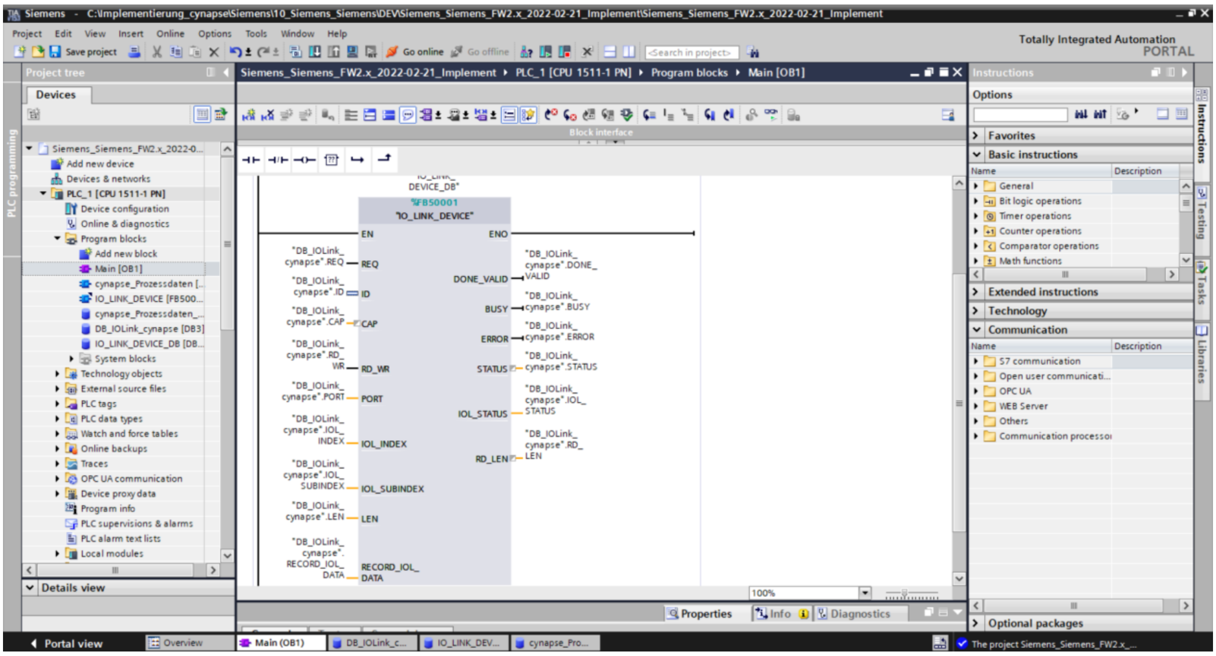


Siemens-IFM ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ DB_Global_IO_link [DB9]

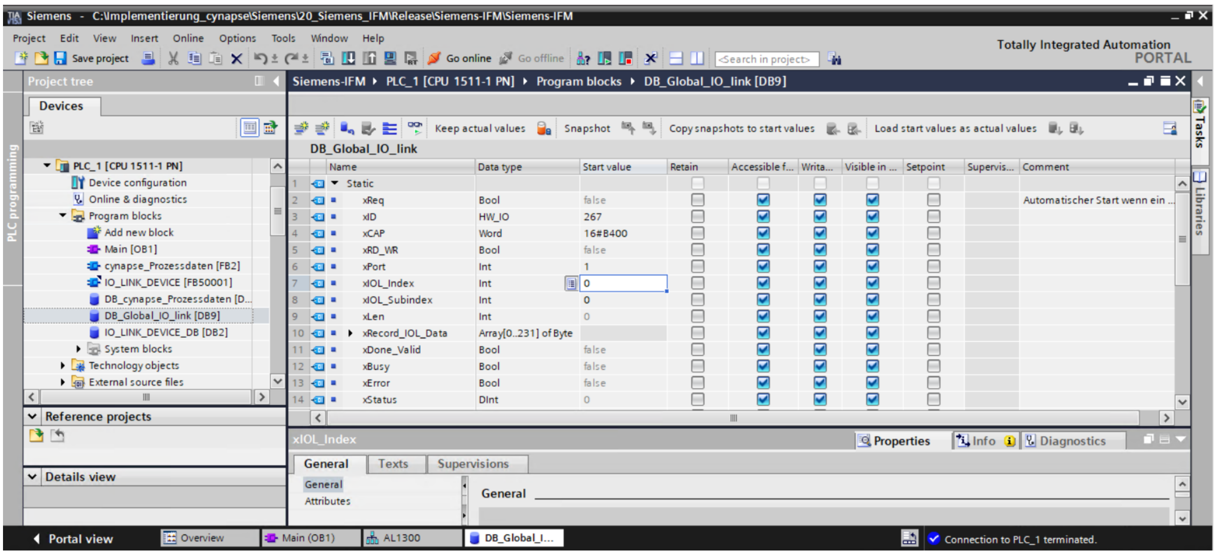
DB_Global_IO_link

	Name	Data type	Start value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint
1	▼ Static			□	□	□	□	□
2	xReq	Bool	false	□	☑	☑	☑	□
3	xID	HW_IO	267	□	☑	☑	☑	□
4	xCAP	Word	16#B400	□	☑	☑	☑	□
5	xRD_WR	Bool	false	□	☑	☑	☑	□
6	xPort	Int	1	□	☑	☑	☑	□
7	xIOL_Index	Int	0	□	☑	☑	☑	□
8	xIOL_Subindex	Int	0	□	☑	☑	☑	□
9	xLen	Int	0	□	☑	☑	☑	□
10	▸ xRecord_IOL_Data	Array[0..231] of Byte		□	☑	☑	☑	□
11	xDone_Valid	Bool	false	□	☑	☑	☑	□
12	xBusy	Bool	false	□	☑	☑	☑	□
13	xError	Bool	false	□	☑	☑	☑	□
14	xStatus	DInt	0	□	☑	☑	☑	□
15	xIOL_Status	DInt	0	□	☑	☑	☑	□
16	xRD_Len	Int	0	□	☑	☑	☑	□
17	▸ Events	Array[0..231...		□	☑	☑	☑	□

10. Link the inputs and outputs of the function block in the main block to the created variables in the global data block.


Siemens_Siemens_FW2.x_2022-02-21_Implement ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ Main [OB1]
"IO_LINK_DEVICE_DB"
%FB50001
"IO_LINK_DEVICE"
EN
ENO
"DB_IOLink_cynapse".REQ — REQ
"DB_IOLink_cynapse".ID — ID
"DB_IOLink_cynapse".CAP — CAP
"DB_IOLink_cynapse".RD_WR — RD_WR
"DB_IOLink_cynapse".PORT — PORT
"DB_IOLink_cynapse".IOL_INDEX — IOL_INDEX
"DB_IOLink_cynapse".IOL_SUBINDEX — IOL_SUBINDEX
"DB_IOLink_cynapse".LEN — LEN
"DB_IOLink_cynapse".RECORD_IOL_DATA — RECORD_IOL_DATA
DONE_VALID — "DB_IOLink_cynapse".DONE_VALID
BUSY — "DB_IOLink_cynapse".BUSY
ERROR — "DB_IOLink_cynapse".ERROR
STATUS — "DB_IOLink_cynapse".STATUS
IOL_STATUS — "DB_IOLink_cynapse".IOL_STATUS
RD_LEN — "DB_IOLink_cynapse".RD_LEN
Main (OB1)
DB_IOLink_c...
IO_LINK_DEV...
cynapse_Pro...

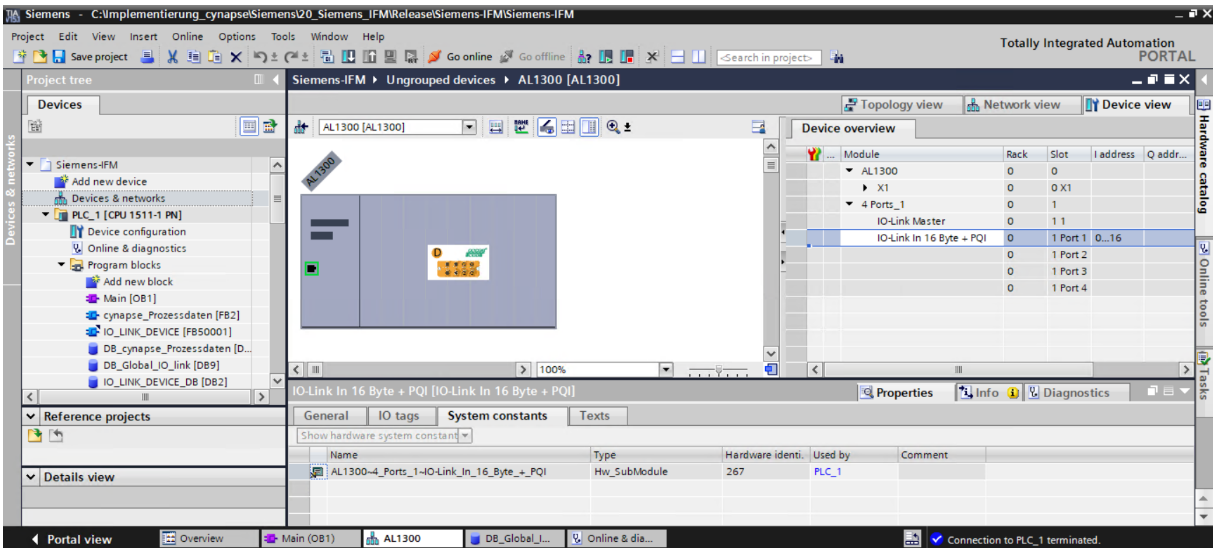
11. Open the created global DB by double-clicking.
12. Set project-specific input parameters:


Siemens-IFM ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ DB_Global_IO_link [DB9]
Keep actual values
Snapshot
Copy snapshots to start values
Load start values as actual values
Connection to PLC_1 terminated.

DB_Global_IO_link

	Name	Data type	Start value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervis...	Comment
1	Static			□	□	□	□	□		
2	xReq	Bool	false	□	☑	☑	☑	□		Automatischer Start wenn ein ...
3	xID	HW_IO	267	□	☑	☑	☑	□		
4	xCAP	Word	16#B400	□	☑	☑	☑	□		
5	xRD_WR	Bool	false	□	☑	☑	☑	□		
6	xPort	Int	1	□	☑	☑	☑	□		
7	xIOL_Index	Int	0	□	☑	☑	☑	□		
8	xIOL_Subindex	Int	0	□	☑	☑	☑	□		
9	xLen	Int	0	□	☑	☑	☑	□		
10	xRecord_IOL_Data	Array[0..231] of Byte		□	☑	☑	☑	□		
11	xDone_Valid	Bool	false	□	☑	☑	☑	□		
12	xBusy	Bool	false	□	☑	☑	☑	□		
13	xError	Bool	false	□	☑	☑	☑	□		
14	xStatus	DInt	0	□	☑	☑	☑	□		

- ID: IO-Link communication module hardware ID: This information can be found in the system constants in the hardware view = 267
- CAP: Client Access Point: This information can be found in the master documentation = 16#B400
- PORT: Port number to which the IO-Link device is connected.



Device overview

Module	Rack	Slot	I address	Q addr...
AL1300	0	0		
X1	0	0 X1		
4 Ports_1	0	1		
IO-Link Master	0	1 1		
IO-Link In 16 Byte + PQI	0	1 Port 1	0...16	
	0	1 Port 2		
	0	1 Port 3		
	0	1 Port 4		

IO-Link In 16 Byte + PQI [IO-Link In 16 Byte + PQI]

Properties | Info | Diagnostics

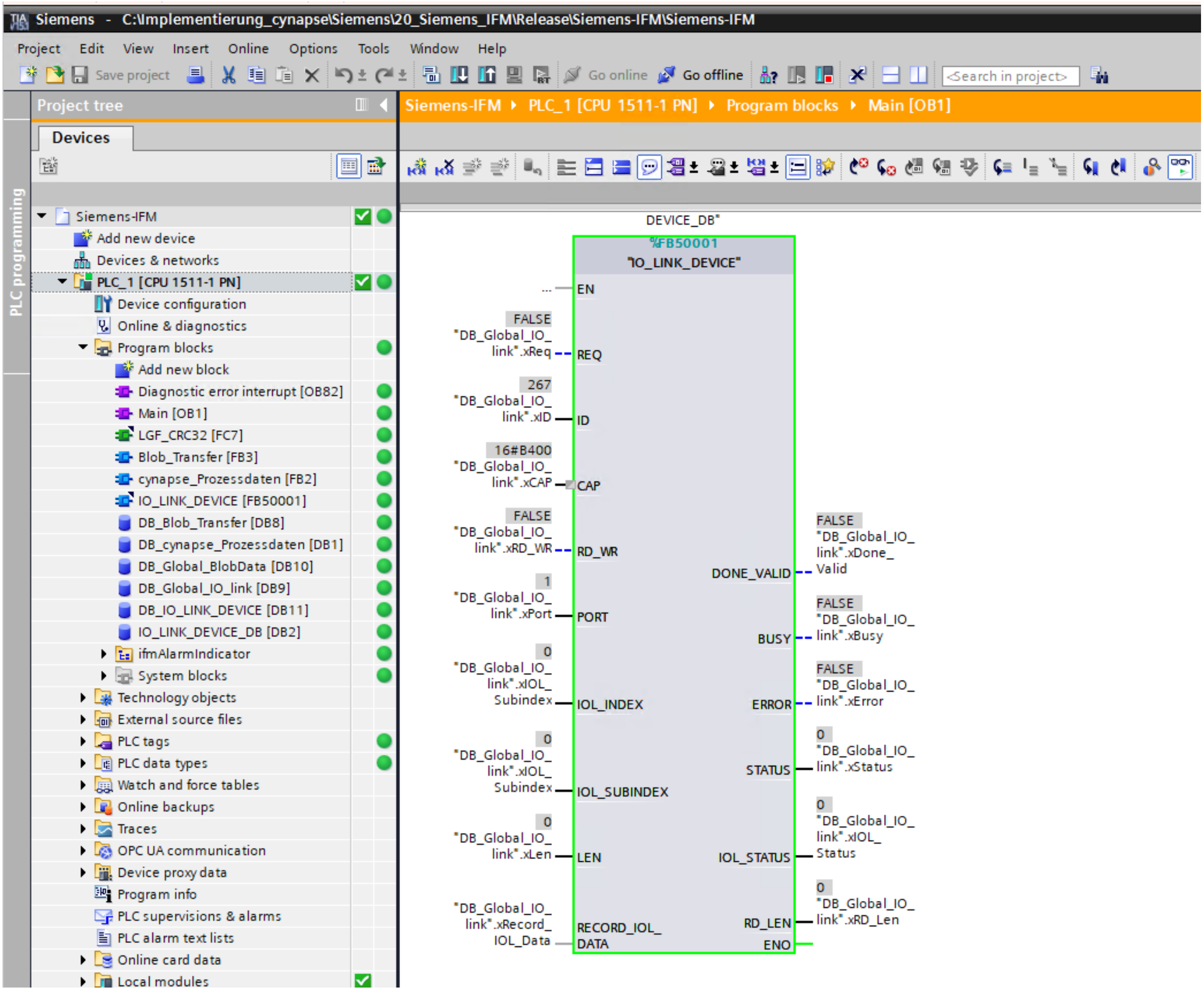
General | IO tags | System constants | Texts

Show hardware system constant

Name	Type	Hardware identi.	Used by	Comment
AL1300~4_Ports_1~IO-Link_In_16_Byte_+_PQI	Hw_SubModule	267	PLC_1	

Result

- ➲ The functional module is integrated into the main module.
- ➲ All inputs and outputs are linked to the created data block.
- ➲ Project-specific input quantities were determined and set as starting values in the DB.



```
                          "IO_LINK_DEVICE_DB"
                              %FB50001
                          "IO_LINK_DEVICE"
 ...                   EN
 FALSE
 "DB_Global_IO_
 link".xReq            REQ
 267
 "DB_Global_IO_
 link".xID             ID
 16#B400
 "DB_Global_IO_
 link".xCAP            CAP
 FALSE                                                  FALSE
 "DB_Global_IO_                                         "DB_Global_IO_
 link".xRD_WR          RD_WR                            link".xDone_
                                           DONE_VALID   Valid
 1                                                      FALSE
 "DB_Global_IO_                                         "DB_Global_IO_
 link".xPort           PORT                 BUSY        link".xBusy
 0                                                      FALSE
 "DB_Global_IO_                                         "DB_Global_IO_
 link".xIOL_                                ERROR       link".xError
 Subindex              IOL_INDEX
 0                                                      0
 "DB_Global_IO_                                         "DB_Global_IO_
 link".xIOL_                                STATUS      link".xStatus
 Subindex              IOL_SUBINDEX
 0                                                      0
 "DB_Global_IO_                                         "DB_Global_IO_
 link".xLen            LEN                  IOL_STATUS  link".xIOL_
                                                        Status
                                                        0
 "DB_Global_IO_                                         "DB_Global_IO_
 link".xRecord_        RECORD_IOL_          RD_LEN      link".xRD_Len
 IOL_Data              DATA                 ENO
```

5.3 Reading parameters

Requirement

➲ The project is open and the function module IO_Link Device has been integrated into the program as described in chapter 5.2 “Integrating Siemens block for parameter reading/writing into program”.

➲ The project was successfully loaded into the hardware and online access is possible.

➲ The index and subindex information of the desired parameter were determined.
The general indices are given in the IO-Link specification. The cynapse®-specific indices can be found in the operating manual.

ⓘ **Note:**A duplicate request to a device via the IO_LINK_DEVICE module is not possible.
Since parameters are read, parameters are written and blob data are accessed on this block, these are to be locked against one another.

Introduction

In the following, you will use the integrated function module “FBIoLinkDevice” to read the currently issued process data format from cynapse® using the parameter Settings.

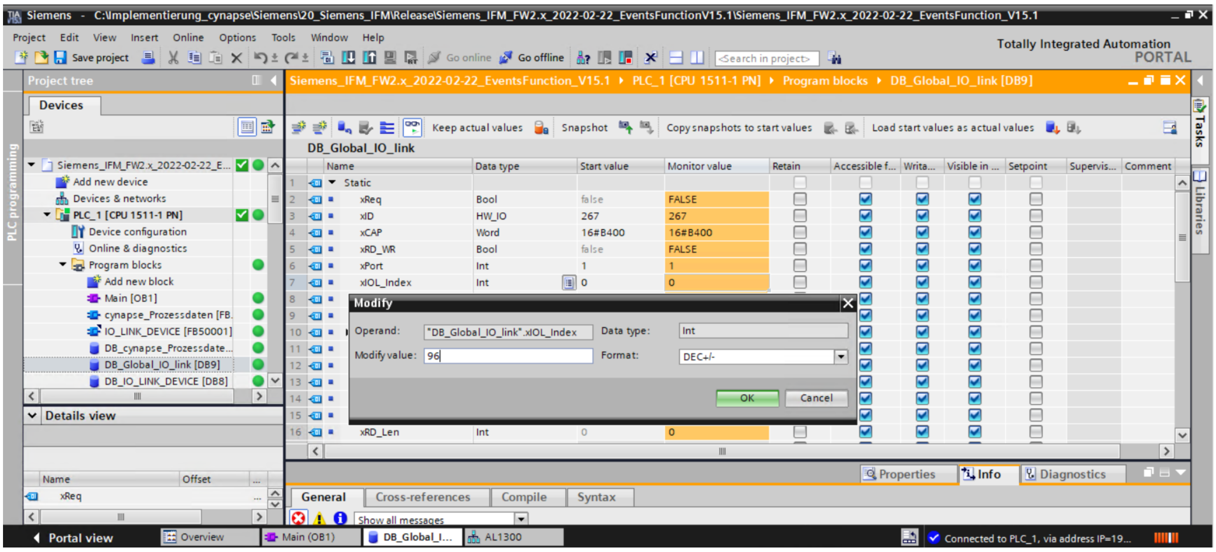
Here is some information about the module:

- The data transmission takes place in the form of raw data (ARRAY of byte)
- If “RD_WR” = FALSE, data is read out and output to “RECORD_IOL_DATA”.
- As long as no valid response data have been received, this is signaled via the output “BUSY” = TRUE.
- The value TRUE of the output “DONE_VALID” indicates that the transfer was successful.
  In the case of a read job, the data are now consistently present at the input/output “REDORD_IOL_DATA” and the output “RD_LEN” indicates the length of the received data.
- The value TRUE of the output “ERROR” indicates that an error has occurred. As long as the input REQ = TRUE, the output parameters retain their value. If the input REQ = FALSE before the processing of the FB is completed, the values of the output parameters are held for only one cycle after the processing of the order.

Procedure

1. Open the data block with input/output variables of the block by double-clicking.
2. Press the “Go online” button. Go online
3. Start online monitoring.
4. Double-click on “Monitor value” of the input you want to change.
5. Enter the index.

6. Confirm with “OK”.


Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens_IFM_FW2.x_2022-02-22_EventsFunctionV15.1\Siemens_IFM_FW2.x_2022-02-22_EventsFunction_V15.1
Project Edit View Insert Online Options Tools Window Help
Save project
Go online
Go offline
Totally Integrated Automation PORTAL
Project tree
Devices
Siemens_IFM_FW2.x_2022-02-22_E...
Add new device
Devices & networks
PLC_1 [CPU 1511-1 PN]
Device configuration
Online & diagnostics
Program blocks
Add new block
Main [OB1]
cynapse_Prozessdaten [FB...
IO_LINK_DEVICE [FB50001]
DB_cynapse_Prozessdate...
DB_Global_IO_link [DB9]
DB_IO_LINK_DEVICE [DB8]
Details view
Name
Offset
xReq
Siemens_IFM_FW2.x_2022-02-22_EventsFunction_V15.1 ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ DB_Global_IO_link [DB9]
Keep actual values
Snapshot
Copy snapshots to start values
Load start values as actual values
Tasks
Libraries
Properties
Info
Diagnostics
General
Cross-references
Compile
Syntax
Show all messages
Portal view
Overview
Main (OB1)
DB_Global_I...
AL1300
Connected to PLC_1, via address IP=19...

DB_Global_IO_link

	Name	Data type	Start value	Monitor value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervis...	Comment
1	▼ Static				□	□	□	□	□		
2	xReq	Bool	false	FALSE	□	☑	☑	☑	□		
3	xID	HW_IO	267	267	□	☑	☑	☑	□		
4	xCAP	Word	16#B400	16#B400	□	☑	☑	☑	□		
5	xRD_WR	Bool	false	FALSE	□	☑	☑	☑	□		
6	xPort	Int	1	1	□	☑	☑	☑	□		
7	xIOL_Index	Int	0	0	□	☑	☑	☑	□		
16	xRD_Len	Int	0	0	□	☑	☑	☑	□		

Modify

Operand: "DB_Global_IO_link".xIOL_Index

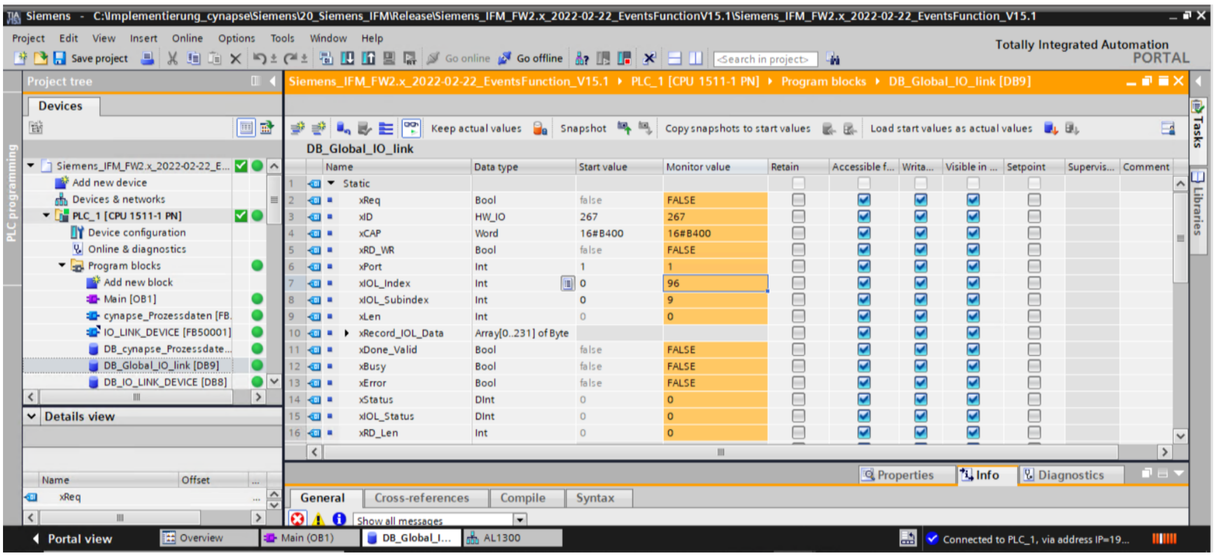
Data type: Int

Modify value: 96

Format: DEC+/-

OK Cancel

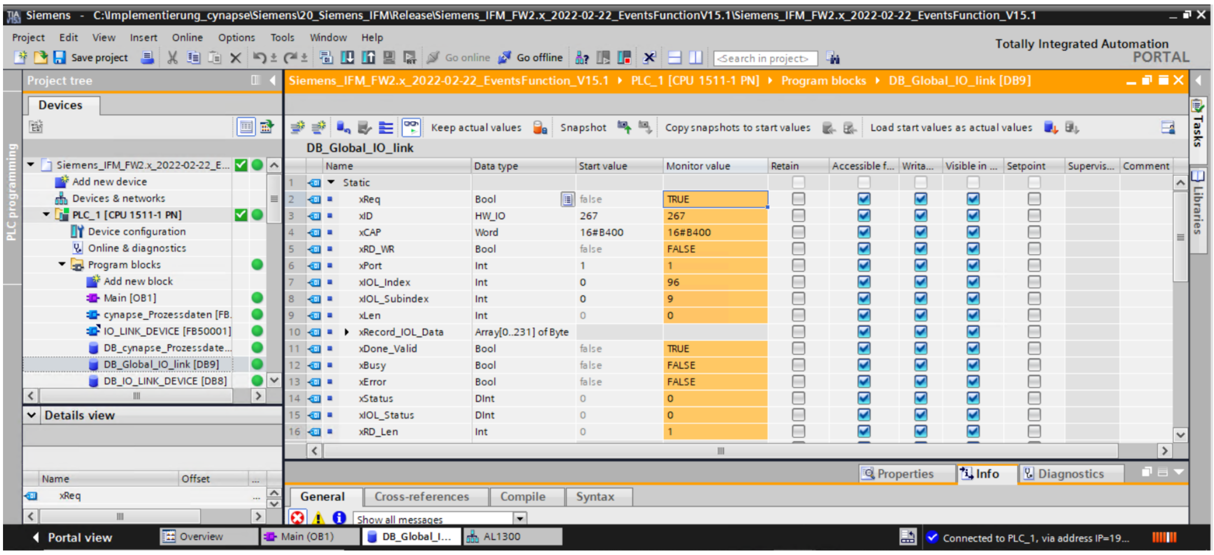
7. Enter the subindex according to the same scheme.


Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens_IFM_FW2.x_2022-02-22_EventsFunctionV15.1\Siemens_IFM_FW2.x_2022-02-22_EventsFunction_V15.1
Project Edit View Insert Online Options Tools Window Help
Save project
Go online
Go offline
Totally Integrated Automation PORTAL
Project tree
Devices
Siemens_IFM_FW2.x_2022-02-22_E...
Add new device
Devices & networks
PLC_1 [CPU 1511-1 PN]
Device configuration
Online & diagnostics
Program blocks
Add new block
Main [OB1]
cynapse_Prozessdaten [FB...
IO_LINK_DEVICE [FB50001]
DB_cynapse_Prozessdate...
DB_Global_IO_link [DB9]
DB_IO_LINK_DEVICE [DB8]
Details view
Name
Offset
xReq
Siemens_IFM_FW2.x_2022-02-22_EventsFunction_V15.1 ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ DB_Global_IO_link [DB9]
Keep actual values
Snapshot
Copy snapshots to start values
Load start values as actual values
Tasks
Libraries
Properties
Info
Diagnostics
General
Cross-references
Compile
Syntax
Show all messages
Portal view
Overview
Main (OB1)
DB_Global_I...
AL1300
Connected to PLC_1, via address IP=19...

DB_Global_IO_link

	Name	Data type	Start value	Monitor value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervis...	Comment
1	▼ Static				□	□	□	□	□		
2	xReq	Bool	false	FALSE	□	☑	☑	☑	□		
3	xID	HW_IO	267	267	□	☑	☑	☑	□		
4	xCAP	Word	16#B400	16#B400	□	☑	☑	☑	□		
5	xRD_WR	Bool	false	FALSE	□	☑	☑	☑	□		
6	xPort	Int	1	1	□	☑	☑	☑	□		
7	xIOL_Index	Int	0	96	□	☑	☑	☑	□		
8	xIOL_Subindex	Int	0	9	□	☑	☑	☑	□		
9	xLen	Int	0	0	□	☑	☑	☑	□		
10	▸ xRecord_IOL_Data	Array[0..231] of Byte			□	☑	☑	☑	□		
11	xDone_Valid	Bool	false	FALSE	□	☑	☑	☑	□		
12	xBusy	Bool	false	FALSE	□	☑	☑	☑	□		
13	xError	Bool	false	FALSE	□	☑	☑	☑	□		
14	xStatus	DInt	0	0	□	☑	☑	☑	□		
15	xIOL_Status	DInt	0	0	□	☑	☑	☑	□		
16	xRD_Len	Int	0	0	□	☑	☑	☑	□		

8. Set input REQ from FALSE to TRUE by double-clicking on “Monitor value”.



Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens_IFM_FW2.x_2022-02-22_EventsFunctionV15.1\Siemens_IFM_FW2.x_2022-02-22_EventsFunction_V15.1

Siemens_IFM_FW2.x_2022-02-22_EventsFunction_V15.1 ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ DB_Global_IO_link [DB9]

DB_Global_IO_link

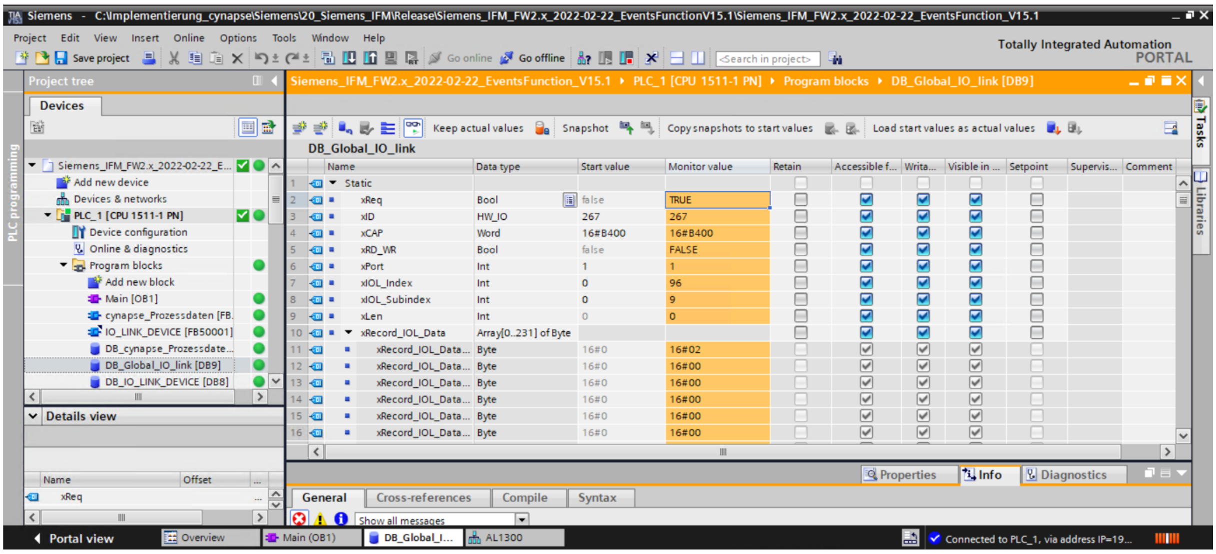
	Name	Data type	Start value	Monitor value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervis...	Comment
1	▼ Static				☐	☐	☐	☐	☐		
2	xReq	Bool	false	TRUE	☐	☑	☑	☑	☐		
3	xID	HW_IO	267	267	☐	☑	☑	☑	☐		
4	xCAP	Word	16#B400	16#B400	☐	☑	☑	☑	☐		
5	xRD_WR	Bool	false	FALSE	☐	☑	☑	☑	☐		
6	xPort	Int	1	1	☐	☑	☑	☑	☐		
7	xIOL_Index	Int	0	96	☐	☑	☑	☑	☐		
8	xIOL_Subindex	Int	0	9	☐	☑	☑	☑	☐		
9	xLen	Int	0	0	☐	☑	☑	☑	☐		
10	▸ xRecord_IOL_Data	Array[0..231] of Byte			☐	☑	☑	☑	☐		
11	xDone_Valid	Bool	false	TRUE	☐	☑	☑	☑	☐		
12	xBusy	Bool	false	FALSE	☐	☑	☑	☑	☐		
13	xError	Bool	false	FALSE	☐	☑	☑	☑	☐		
14	xStatus	DInt	0	0	☐	☑	☑	☑	☐		
15	xIOL_Status	DInt	0	0	☐	☑	☑	☑	☐		
16	xRD_Len	Int	0	1	☐	☑	☑	☑	☐		

Connected to PLC_1, via address IP=19...

9. DONE_VALID TRUE indicates successful readout.
10. RD_LEN displays the length of the parameter read.
11. Expand RECORD_IOL_DATA.

Result

➲ In the RECORD_IOL_DATA array, the parameters read are displayed in coded form.



Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens_IFM_FW2.x_2022-02-22_EventsFunctionV15.1\Siemens_IFM_FW2.x_2022-02-22_EventsFunction_V15.1

Siemens_IFM_FW2.x_2022-02-22_EventsFunction_V15.1 ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ DB_Global_IO_link [DB9]

DB_Global_IO_link

	Name	Data type	Start value	Monitor value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervis...	Comment
1	▼ Static				☐	☐	☐	☐	☐		
2	xReq	Bool	false	TRUE	☐	☑	☑	☑	☐		
3	xID	HW_IO	267	267	☐	☑	☑	☑	☐		
4	xCAP	Word	16#B400	16#B400	☐	☑	☑	☑	☐		
5	xRD_WR	Bool	false	FALSE	☐	☑	☑	☑	☐		
6	xPort	Int	1	1	☐	☑	☑	☑	☐		
7	xIOL_Index	Int	0	96	☐	☑	☑	☑	☐		
8	xIOL_Subindex	Int	0	9	☐	☑	☑	☑	☐		
9	xLen	Int	0	0	☐	☑	☑	☑	☐		
10	▼ xRecord_IOL_Data	Array[0..231] of Byte			☐	☑	☑	☑	☐		
11	xRecord_IOL_Data...	Byte	16#0	16#02	☐	☑	☑	☑	☐		
12	xRecord_IOL_Data...	Byte	16#0	16#00	☐	☑	☑	☑	☐		
13	xRecord_IOL_Data...	Byte	16#0	16#00	☐	☑	☑	☑	☐		
14	xRecord_IOL_Data...	Byte	16#0	16#00	☐	☑	☑	☑	☐		
15	xRecord_IOL_Data...	Byte	16#0	16#00	☐	☑	☑	☑	☐		
16	xRecord_IOL_Data...	Byte	16#0	16#00	☐	☑	☑	☑	☐		

Connected to PLC_1, via address IP=19...

This example specifies the currently output process data format.

5.4 Writing parameters

Requirement

- ➲ The project is open and the function module IO_Link Device has been integrated into the program as described in chapter 5.2 “Integrating Siemens block for parameter reading/writing into program”.
- ➲ The project was successfully loaded into the hardware and online access is possible.
- ➲ The information about the index, subindex and length of the desired parameter was determined. The general indices are given in the IO-Link specification. The cynapse®-specific indices can be found in the operating manual.

ⓘ **Note:** A duplicate request to a device via the IO_LINK_DEVICE module is not possible. Since parameters are read, parameters are written and blob data are accessed on this block, these are to be locked against one another.

ⓘ **Note:** If the length of the parameter to be written is greater than 1 byte, it must be converted into a byte array. For example, parameters of the float type must be converted into a 4-byte array using the “REAL_TO_DWORD” command.

Introduction

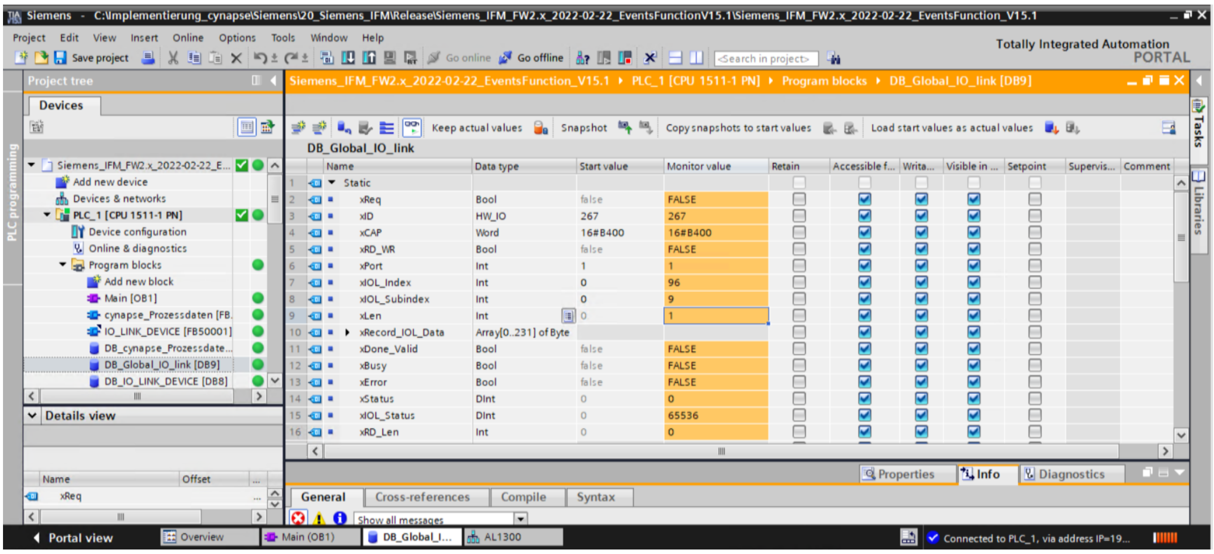
In the following, you change the currently output process data format using the parameter Settings of cynapse® for example by using the integrated function module “FBIoLinkDevice”.
A parameter is written for this.

Here is some information about the module:

- The data transmission takes place in the form of raw data (ARRAY of byte)
- If “RD_WR” = TRUE, the data from “RECORD_IOL_DATA” is written in cynapse®.
- For a write job, the length of the parameter to send must be specified under LEN.
- As long as no valid response data have been received, this is signaled via the output “BUSY” = TRUE.
- The value TRUE of the output “DONE_VALID” indicates that the transfer was successful.
- The value TRUE of the output “ERROR” indicates that an error has occurred. As long as the input REQ = TRUE, the output parameters retain their value. If the input REQ = FALSE before the processing of the FB is completed, the values of the output parameters are held for only one cycle after the processing of the order.

Procedure

1. Open the global data block with input/output variables of the block by double-clicking.
2. Press the "Go online" button. Go online
3. Start online monitoring.
4. Set the value for the input variable RD_WR by double-clicking on the variable in the orange "Monitor value" column to TRUE.
5. Enter the length of the parameter to write in LEN.



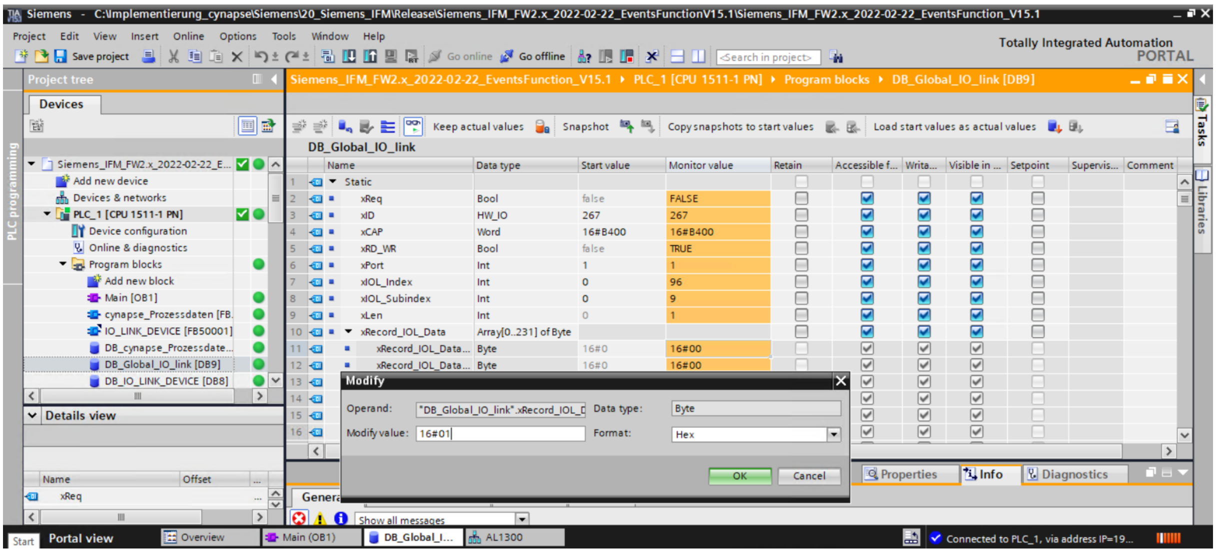
Siemens_IFM_FW2.x_2022-02-22_EventsFunction_V15.1 ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ DB_Global_IO_link [DB9]

DB_Global_IO_link

	Name	Data type	Start value	Monitor value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervis...	Comment
1	▼ Static				□	□	□	□	□		
2	xReq	Bool	false	FALSE	□	☑	☑	☑	□		
3	xID	HW_IO	267	267	□	☑	☑	☑	□		
4	xCAP	Word	16#B400	16#B400	□	☑	☑	☑	□		
5	xRD_WR	Bool	false	FALSE	□	☑	☑	☑	□		
6	xPort	Int	1	1	□	☑	☑	☑	□		
7	xIOL_Index	Int	0	96	□	☑	☑	☑	□		
8	xIOL_Subindex	Int	0	9	□	☑	☑	☑	□		
9	xLen	Int	0	1	□	☑	☑	☑	□		
10	▸ xRecord_IOL_Data	Array[0..231] of Byte			□	☑	☑	☑	□		
11	xDone_Valid	Bool	false	FALSE	□	☑	☑	☑	□		
12	xBusy	Bool	false	FALSE	□	☑	☑	☑	□		
13	xError	Bool	false	FALSE	□	☑	☑	☑	□		
14	xStatus	DInt	0	0	□	☑	☑	☑	□		
15	xIOL_Status	DInt	0	65536	□	☑	☑	☑	□		
16	xRD_Len	Int	0	0	□	☑	☑	☑	□		

Connected to PLC_1, via address IP=19...

6. In Array RECORD_IOL_DATA, enter the desired process data format = 1 in the first byte.



Siemens_IFM_FW2.x_2022-02-22_EventsFunction_V15.1 ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ DB_Global_IO_link [DB9]

DB_Global_IO_link

	Name	Data type	Start value	Monitor value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervis...	Comment
1	▼ Static				□	□	□	□	□		
2	xReq	Bool	false	FALSE	□	☑	☑	☑	□		
3	xID	HW_IO	267	267	□	☑	☑	☑	□		
4	xCAP	Word	16#B400	16#B400	□	☑	☑	☑	□		
5	xRD_WR	Bool	false	TRUE	□	☑	☑	☑	□		
6	xPort	Int	1	1	□	☑	☑	☑	□		
7	xIOL_Index	Int	0	96	□	☑	☑	☑	□		
8	xIOL_Subindex	Int	0	9	□	☑	☑	☑	□		
9	xLen	Int	0	1	□	☑	☑	☑	□		
10	▼ xRecord_IOL_Data	Array[0..231] of Byte			□	☑	☑	☑	□		
11	xRecord_IOL_Data...	Byte	16#0	16#00	□	☑	☑	☑	□		
12	xRecord_IOL_Data...	Byte	16#0	16#00	□	☑	☑	☑	□		

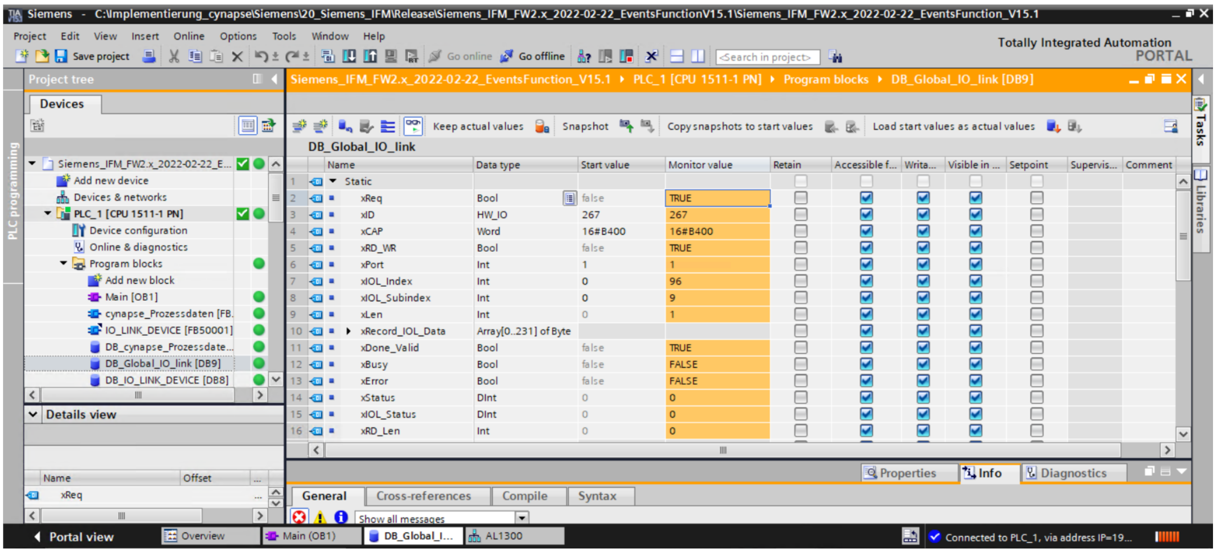
Modify

Operand: "DB_Global_IO_link".xRecord_IOL_D
Data type: Byte
Modify value: 16#01
Format: Hex

OK Cancel

Connected to PLC_1, via address IP=19...

7. Set the REQ input from FALSE to TRUE by double-clicking on “Monitor value”.



Siemens_IFM_FW2.x_2022-02-22_EventsFunction_V15.1 ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ DB_Global_IO_link [DB9]

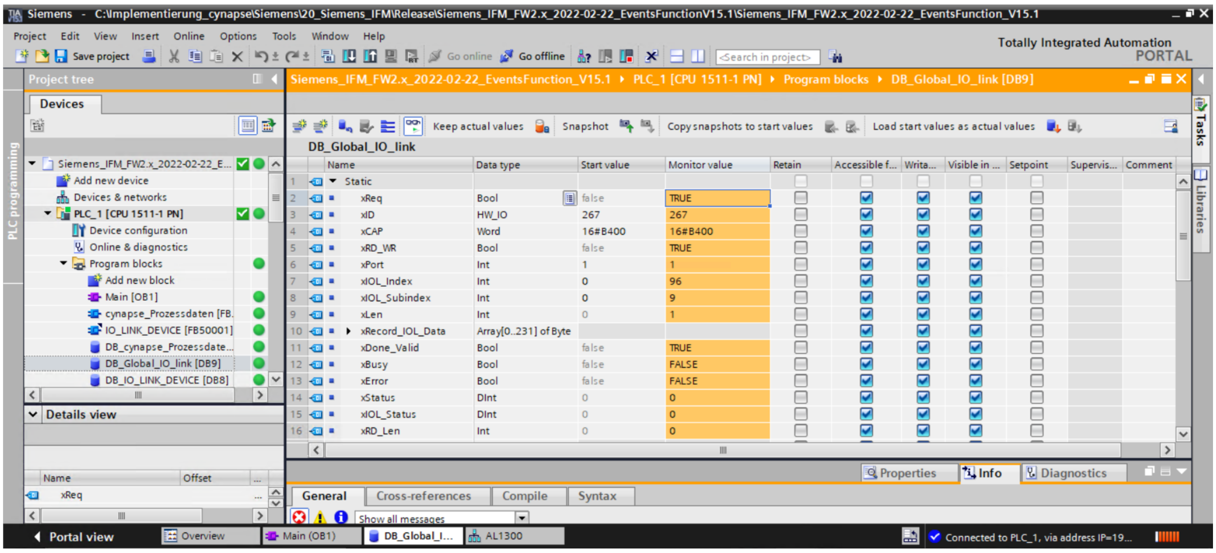
DB_Global_IO_link

	Name	Data type	Start value	Monitor value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervis...	Comment
1	Static				□	□	□	□	□		
2	xReq	Bool	false	TRUE	□	☑	☑	☑	□		
3	xID	HW_IO	267	267	□	☑	☑	☑	□		
4	xCAP	Word	16#B400	16#B400	□	☑	☑	☑	□		
5	xRD_WR	Bool	false	TRUE	□	☑	☑	☑	□		
6	xPort	Int	1	1	□	☑	☑	☑	□		
7	xIOL_Index	Int	0	96	□	☑	☑	☑	□		
8	xIOL_Subindex	Int	0	9	□	☑	☑	☑	□		
9	xLen	Int	0	1	□	☑	☑	☑	□		
10	xRecord_IOL_Data	Array[0..231] of Byte			□	☑	☑	☑	□		
11	xDone_Valid	Bool	false	TRUE	□	☑	☑	☑	□		
12	xBusy	Bool	false	FALSE	□	☑	☑	☑	□		
13	xError	Bool	false	FALSE	□	☑	☑	☑	□		
14	xStatus	DInt	0	0	□	☑	☑	☑	□		
15	xIOL_Status	DInt	0	0	□	☑	☑	☑	□		
16	xRD_Len	Int	0	0	□	☑	☑	☑	□		

Connected to PLC_1, via address IP=19...

Result

➲ DONE_VALID TRUE indicates successful writing of the parameter.



Siemens_IFM_FW2.x_2022-02-22_EventsFunction_V15.1 ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ DB_Global_IO_link [DB9]

DB_Global_IO_link

	Name	Data type	Start value	Monitor value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervis...	Comment
1	Static				□	□	□	□	□		
2	xReq	Bool	false	TRUE	□	☑	☑	☑	□		
3	xID	HW_IO	267	267	□	☑	☑	☑	□		
4	xCAP	Word	16#B400	16#B400	□	☑	☑	☑	□		
5	xRD_WR	Bool	false	TRUE	□	☑	☑	☑	□		
6	xPort	Int	1	1	□	☑	☑	☑	□		
7	xIOL_Index	Int	0	96	□	☑	☑	☑	□		
8	xIOL_Subindex	Int	0	9	□	☑	☑	☑	□		
9	xLen	Int	0	1	□	☑	☑	☑	□		
10	xRecord_IOL_Data	Array[0..231] of Byte			□	☑	☑	☑	□		
11	xDone_Valid	Bool	false	TRUE	□	☑	☑	☑	□		
12	xBusy	Bool	false	FALSE	□	☑	☑	☑	□		
13	xError	Bool	false	FALSE	□	☑	☑	☑	□		
14	xStatus	DInt	0	0	□	☑	☑	☑	□		
15	xIOL_Status	DInt	0	0	□	☑	☑	☑	□		
16	xRD_Len	Int	0	0	□	☑	☑	☑	□		

Connected to PLC_1, via address IP=19...

The change can be checked by reading the parameter as described in chapter 5.3 “Reading parameters”.

6 Events

6.1 Definition

Events is the notification of an incorrect operating state of the IO-Link device. Examples of this are too high an operating temperature, vibrations or a detected defect on the device. In this case, warnings or errors in the form of events only occur when threshold values are exceeded or undershot and are automatically reset. cynapse® distinguishes between limit values defined by WITTENSTEIN and user-defined limit values. The latter can be changed via Write parameters.

For details on parameters for custom thresholds and error-specific codes, see the cynapse® operating manual.

6.2 Reading events

Requirement

➲ You have obtained a sample project for reading out events from the following source: cybertronic-support@wittenstein.de

Introduction

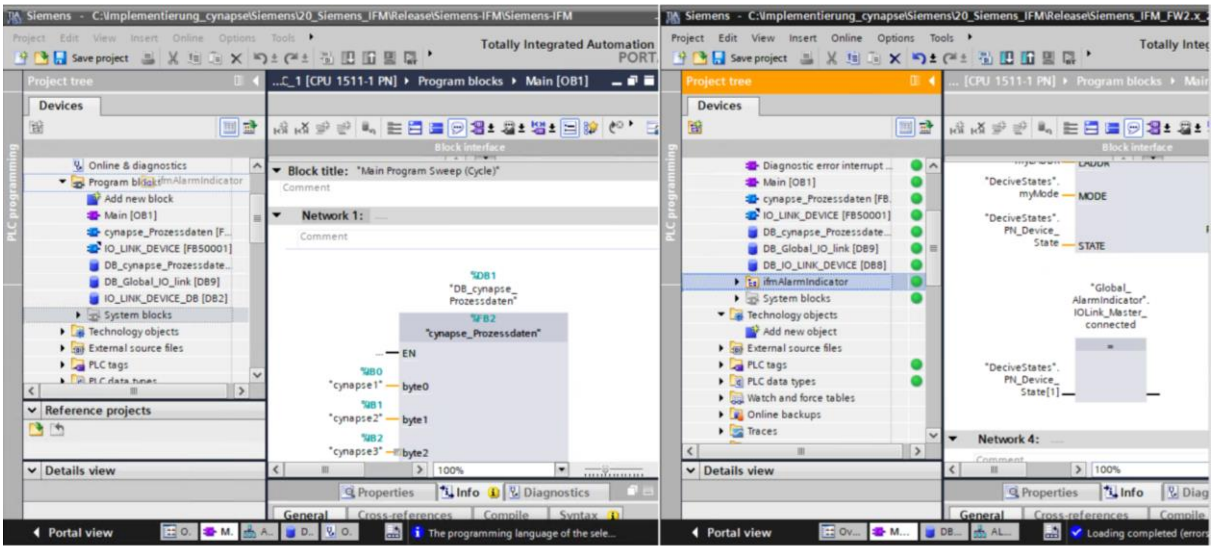
In the following, you will read upcoming events using a function module from a sample project. Movements of cynapse® are used to provoke several events.

In order to read out events, a general event release must take place in cynapse®. This release is given in the parameter Index = 96, Subindex = 1. In addition, events are enabled for reporting via the subindexes 2, 3, 5 and 7. For more information, see the cynapse® operating manual.

ⓘ **Note:** A duplicate request to a device via the IO_LINK_DEVICE module is not possible. Since parameters are read, parameters are written and blob data are accessed on this block, these are to be locked against one another.

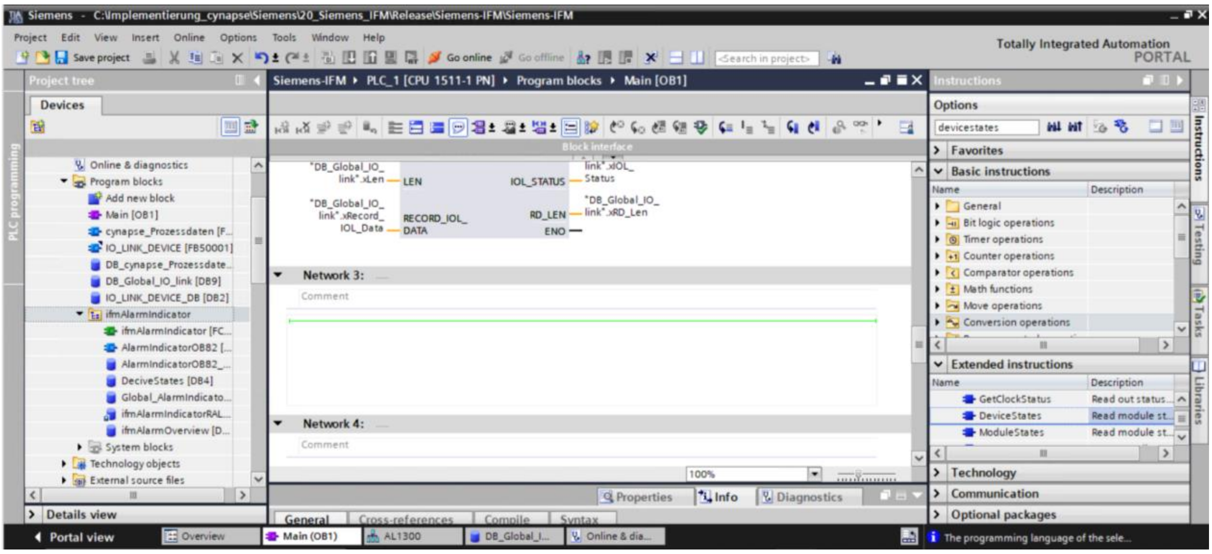
Procedure

1. Open the resulting sample project.
2. In parallel, open the project in which you want to monitor events.
3. Highlight the IFMAlarmindicator folder.
4. Drag and drop it into your project under “Program blocks”.

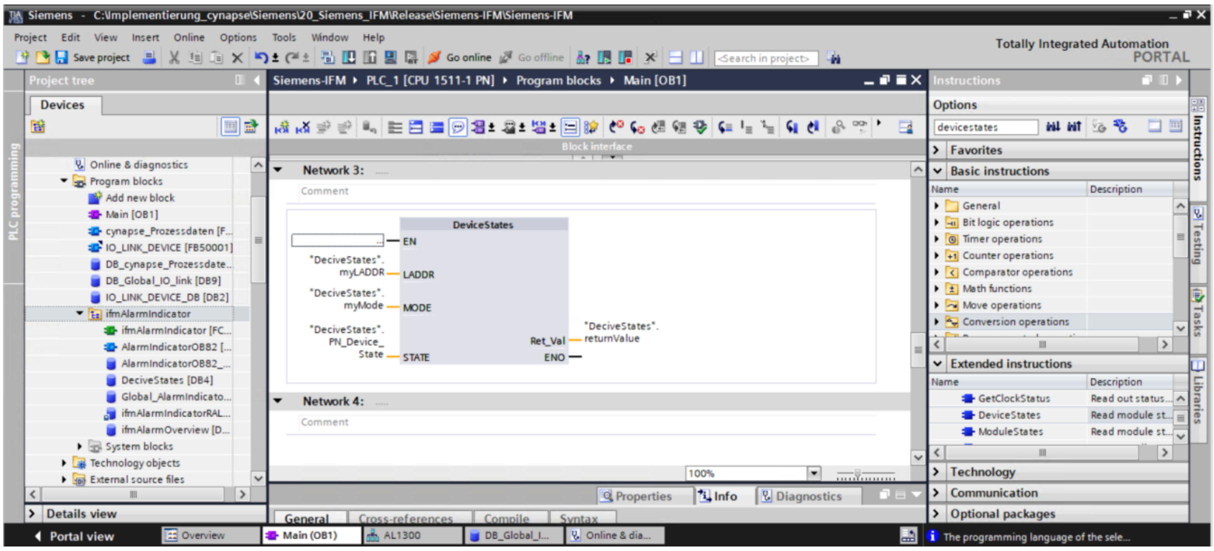


5. Drag and drop the device states from the extended instructions to any network.

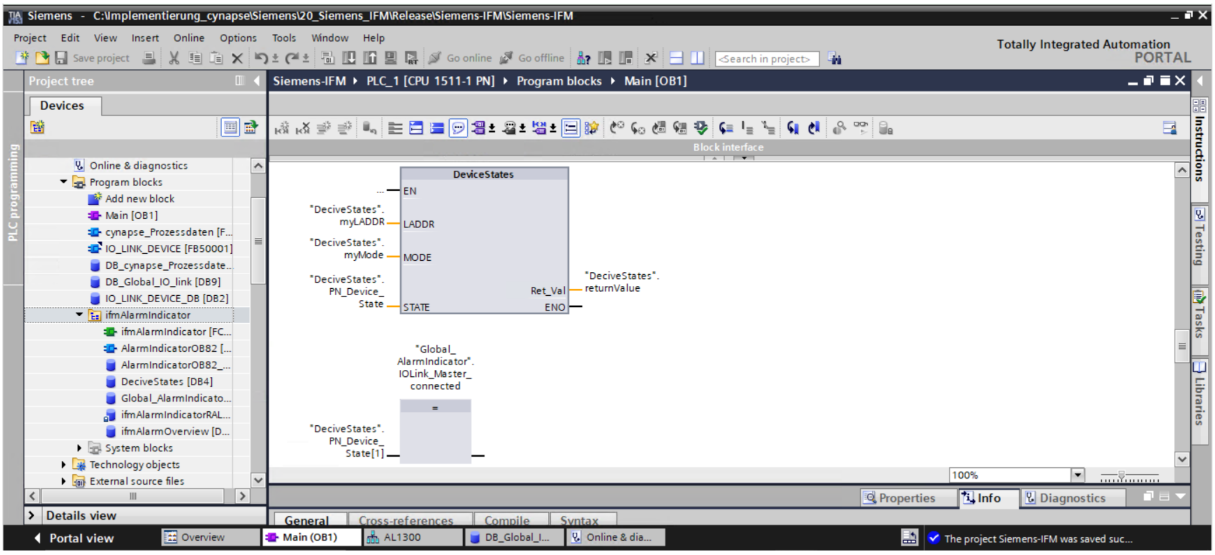
ⓘ This block checks the activity of the connected port.



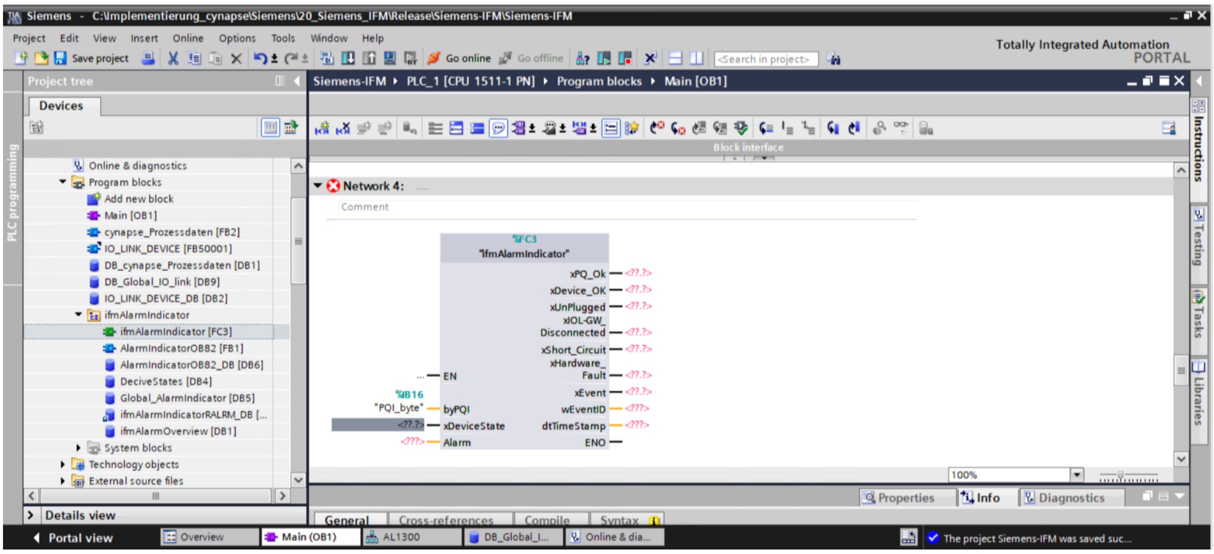
6. Link the inputs to the corresponding variables from the global DB “DeviceStates”.



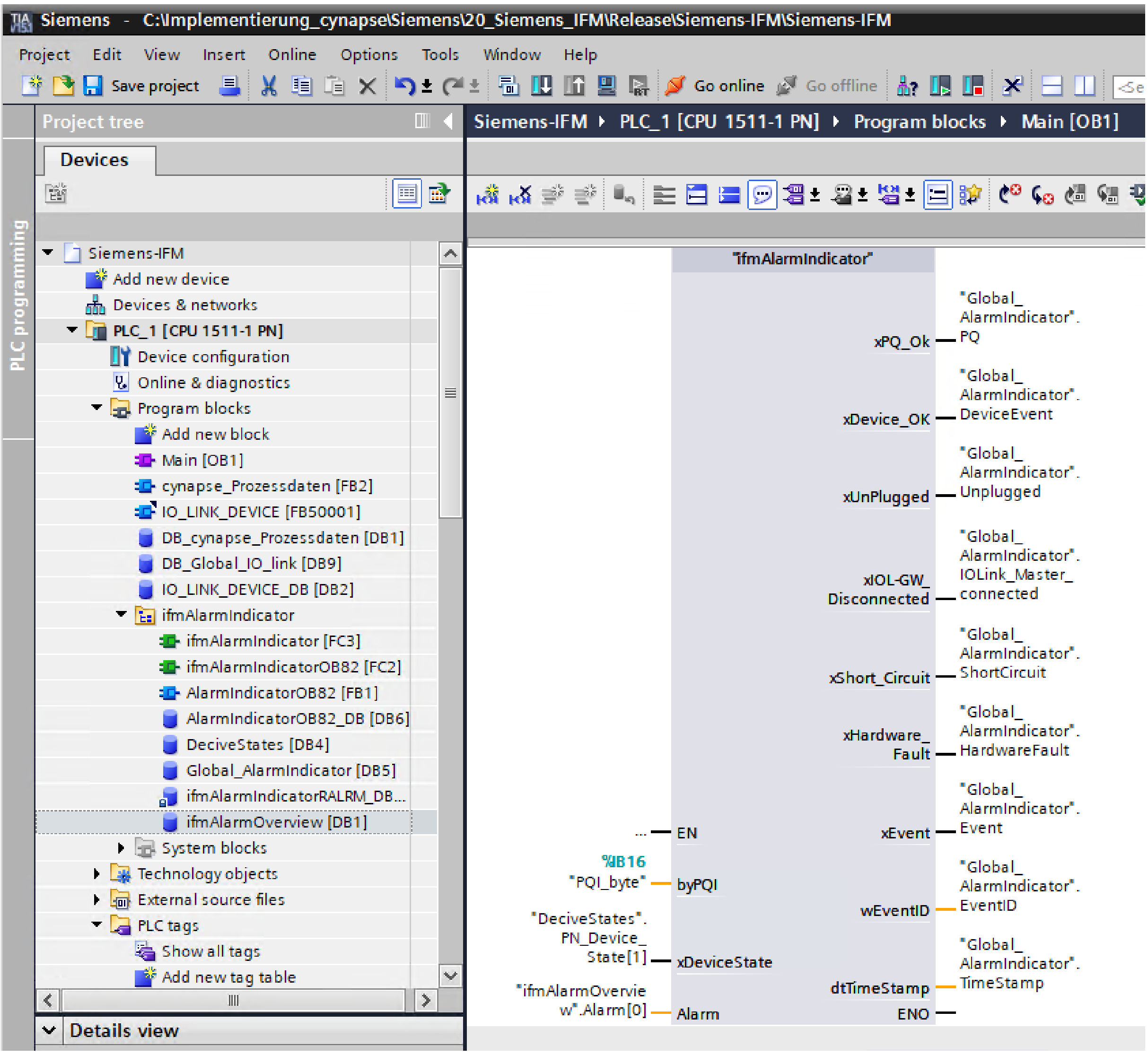
7. Then assign the connected port.



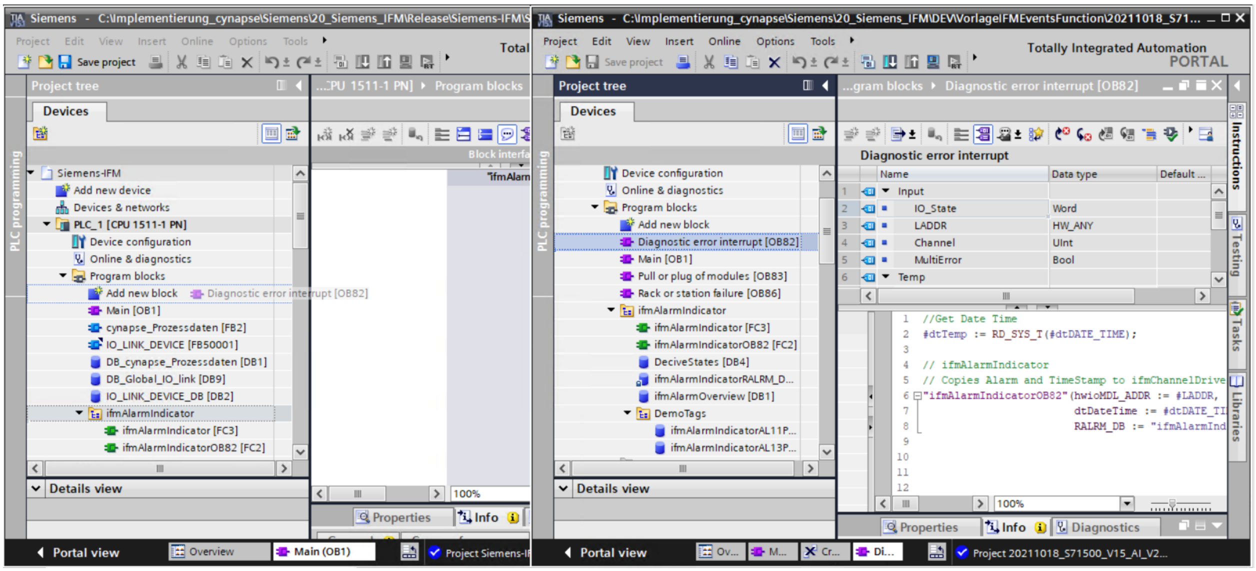
8. Drag the “ifmAlarmIndicator” module into a free network.



9. Link the inputs and outputs to the corresponding variables from the global DB “Global_AlarmIndicator”.


Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens-IFM\Siemens-IFM
Project Edit View Insert Online Options Tools Window Help
Save project
Go online
Go offline
Project tree
Devices
Siemens-IFM
Add new device
Devices & networks
PLC_1 [CPU 1511-1 PN]
Device configuration
Online & diagnostics
Program blocks
Add new block
Main [OB1]
cynapse_Prozessdaten [FB2]
IO_LINK_DEVICE [FB50001]
DB_cynapse_Prozessdaten [DB1]
DB_Global_IO_link [DB9]
IO_LINK_DEVICE_DB [DB2]
ifmAlarmIndicator
ifmAlarmIndicator [FC3]
ifmAlarmIndicatorOB82 [FC2]
AlarmIndicatorOB82 [FB1]
AlarmIndicatorOB82_DB [DB6]
DeciveStates [DB4]
Global_AlarmIndicator [DB5]
ifmAlarmIndicatorRALRM_DB...
ifmAlarmOverview [DB1]
System blocks
Technology objects
External source files
PLC tags
Show all tags
Add new tag table
Details view
PLC programming
Siemens-IFM ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ Main [OB1]
"ifmAlarmIndicator"
xPQ_Ok — "Global_AlarmIndicator".PQ
xDevice_OK — "Global_AlarmIndicator".DeviceEvent
xUnPlugged — "Global_AlarmIndicator".Unplugged
xIOL-GW_Disconnected — "Global_AlarmIndicator".IOLink_Master_connected
xShort_Circuit — "Global_AlarmIndicator".ShortCircuit
xHardware_Fault — "Global_AlarmIndicator".HardwareFault
... — EN
xEvent — "Global_AlarmIndicator".Event
%IB16 "PQI_byte" — byPQI
wEventID — "Global_AlarmIndicator".EventID
"DeciveStates".PN_Device_State[1] — xDeviceState
"ifmAlarmOverview".Alarm[0] — Alarm
dtTimeStamp — "Global_AlarmIndicator".TimeStamp
ENO

10. Drag and drop the OB82 “Diagnostic Error Interrupt” into your project tree.


Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens-IFM\S
Project tree
Devices
Siemens-IFM
Add new device
Devices & networks
PLC_1 [CPU 1511-1 PN]
Device configuration
Online & diagnostics
Program blocks
Add new block
Diagnostic error interrupt [OB82]
Main [OB1]
cynapse_Prozessdaten [FB2]
IO_LINK_DEVICE [FB50001]
DB_cynapse_Prozessdaten [DB1]
DB_Global_IO_link [DB9]
IO_LINK_DEVICE_DB [DB2]
ifmAlarmIndicator
ifmAlarmIndicator [FC3]
ifmAlarmIndicatorOB82 [FC2]
Details view
Portal view
Overview
Main (OB1)
Project Siemens-I
Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\DEV\Vorlage\IFMEventsFunction\20211018_S71...
Totally Integrated Automation PORTAL
Project tree
Device configuration
Online & diagnostics
Program blocks
Add new block
Diagnostic error interrupt [OB82]
Main [OB1]
Pull or plug of modules [OB83]
Rack or station failure [OB86]
ifmAlarmIndicator
ifmAlarmIndicator [FC3]
ifmAlarmIndicatorOB82 [FC2]
DeviceStates [DB4]
ifmAlarmIndicatorRALRM_D...
ifmAlarmOverview [DB1]
DemoTags
ifmAlarmIndicatorAL11P...
ifmAlarmIndicatorAL13P...
...gram blocks ▸ Diagnostic error interrupt [OB82]
Properties
Info
Diagnostics
Portal view
Project 20211018_S71500_V15_AI_V2...
Instructions
Testing
Tasks
Libraries

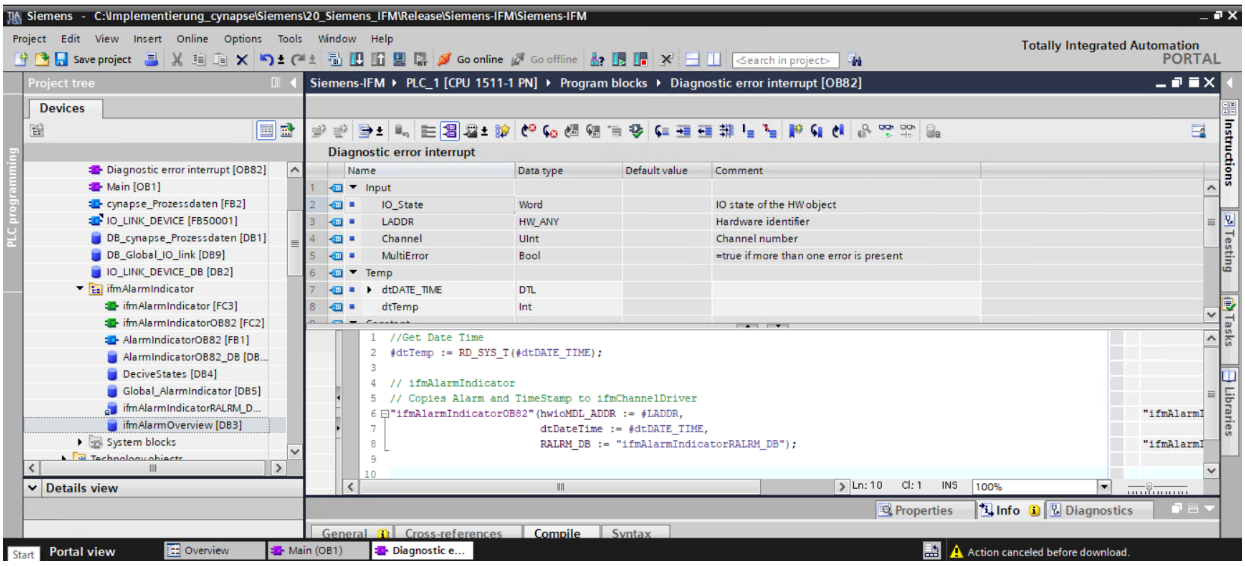
Diagnostic error interrupt

	Name	Data type	Default ...
1	Input		
2	IO_State	Word	
3	LADDR	HW_ANY	
4	Channel	UInt	
5	MultiError	Bool	
6	Temp		

```
//Get Date Time
#dtTemp := RD_SYS_T(#dtDATE_TIME);

// ifmAlarmIndicator
// Copies Alarm and TimeStamp to ifmChannelDrive
"ifmAlarmIndicatorOB82"(hwioMDL_ADDR := #LADDR,
                        dtDateTime := #dtDATE_TI
                        RALRM_DB := "ifmAlarmInd
```

11. The OB82 becomes active as soon as an event is present and controls the module to read out the event.


Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens-IFM\Siemens-IFM

Siemens-IFM ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ Diagnostic error interrupt [OB82]

Diagnostic error interrupt

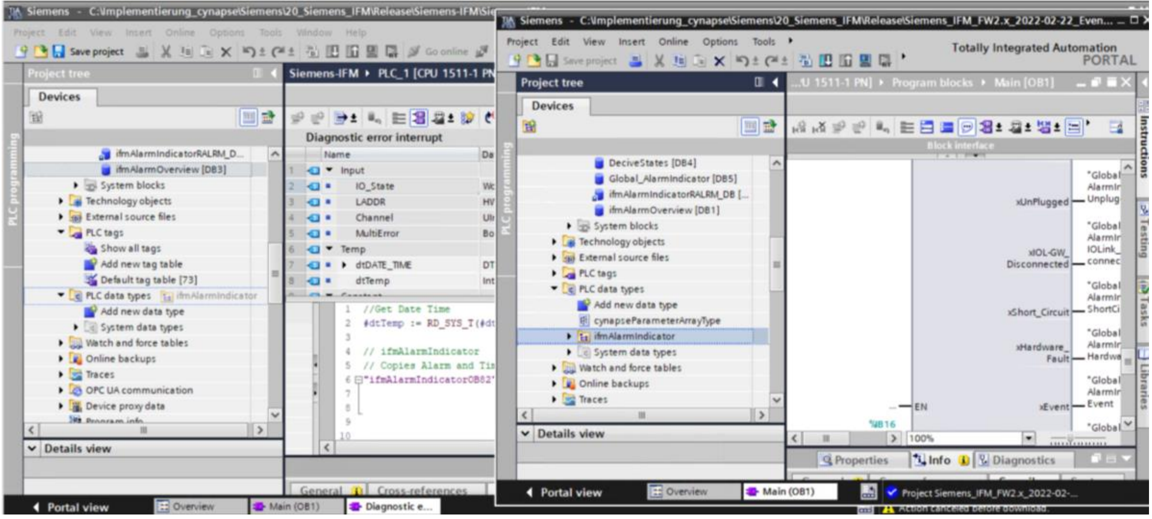
	Name	Data type	Default value	Comment
1	▼ Input			
2	IO_State	Word		IO state of the HW object
3	LADDR	HW_ANY		Hardware identifier
4	Channel	UInt		Channel number
5	MultiError	Bool		=true if more than one error is present
6	▼ Temp			
7	▸ dtDATE_TIME	DTL		
8	dtTemp	Int		

```
//Get Date Time
#dtTemp := RD_SYS_T(#dtDATE_TIME);

// ifmAlarmIndicator
// Copies Alarm and TimeStamp to ifmChannelDriver
"ifmAlarmIndicatorOB82"(hwioMDL_ADDR := #LADDR,
                        dtDateTime := #dtDATE_TIME,
                        RALRM_DB := "ifmAlarmIndicatorRALRM_DB");
```

Action canceled before download.

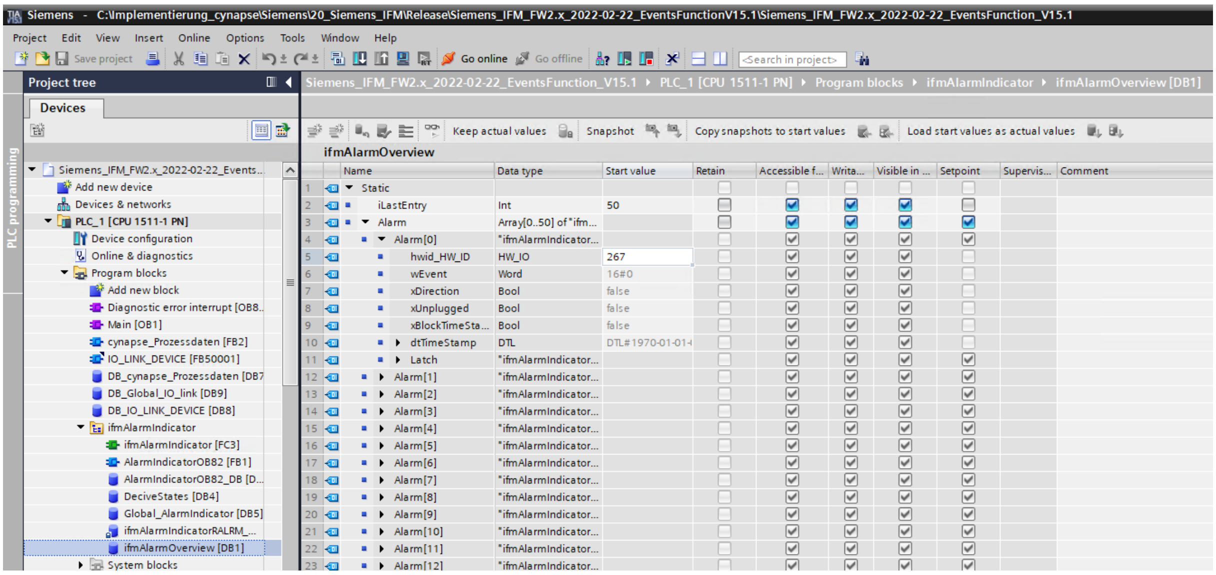
12. Drag and drop the folder “ifmAlarmIndicator” from the PLC data types into your project.


Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens-IFM\Siemens-IFM

Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens_IFM_FW2.x_2022-02-22_Even...

13. Enter the correct hardware ID in the DB “ifmAlarmOverview”.

ⓘ You can find these in chapter 5.2 “Integrating Siemens block for parameter reading/writing into program”, action step 12.


Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens_IFM_FW2.x_2022-02-22_EventsFunctionV15.1\Siemens_IFM_FW2.x_2022-02-22_EventsFunction_V15.1

Siemens_IFM_FW2.x_2022-02-22_EventsFunction_V15.1 ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ ifmAlarmIndicator ▸ ifmAlarmOverview [DB1]

ifmAlarmOverview

	Name	Data type	Start value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervis...	Comment
1	▼ Static			□	□	□	□	□		
2	iLastEntry	Int	50	□	☑	☑	☑	□		
3	▼ Alarm	Array[0..50] of "ifm...		□	☑	☑	☑	☑		
4	▼ Alarm[0]	"ifmAlarmIndicator...		□	☑	☑	☑	☑		
5	hwid_HW_ID	HW_IO	267	□	☑	☑	☑	□		
6	wEvent	Word	16#0	□	☑	☑	☑	□		
7	xDirection	Bool	false	□	☑	☑	☑	□		
8	xUnplugged	Bool	false	□	☑	☑	☑	□		
9	xBlockTimeSta...	Bool	false	□	☑	☑	☑	□		
10	▸ dtTimeStamp	DTL	DTL#1970-01-01-	□	☑	☑	☑	□		
11	▸ Latch	"ifmAlarmIndicator...		□	☑	☑	☑	☑		
12	▸ Alarm[1]	"ifmAlarmIndicator...		□	☑	☑	☑	☑		
13	▸ Alarm[2]	"ifmAlarmIndicator...		□	☑	☑	☑	☑		
14	▸ Alarm[3]	"ifmAlarmIndicator...		□	☑	☑	☑	☑		
15	▸ Alarm[4]	"ifmAlarmIndicator...		□	☑	☑	☑	☑		
16	▸ Alarm[5]	"ifmAlarmIndicator...		□	☑	☑	☑	☑		
17	▸ Alarm[6]	"ifmAlarmIndicator...		□	☑	☑	☑	☑		
18	▸ Alarm[7]	"ifmAlarmIndicator...		□	☑	☑	☑	☑		
19	▸ Alarm[8]	"ifmAlarmIndicator...		□	☑	☑	☑	☑		
20	▸ Alarm[9]	"ifmAlarmIndicator...		□	☑	☑	☑	☑		
21	▸ Alarm[10]	"ifmAlarmIndicator...		□	☑	☑	☑	☑		
22	▸ Alarm[11]	"ifmAlarmIndicator...		□	☑	☑	☑	☑		
23	▸ Alarm[12]	"ifmAlarmIndicator...		□	☑	☑	☑	☑		

14. Compile the program.

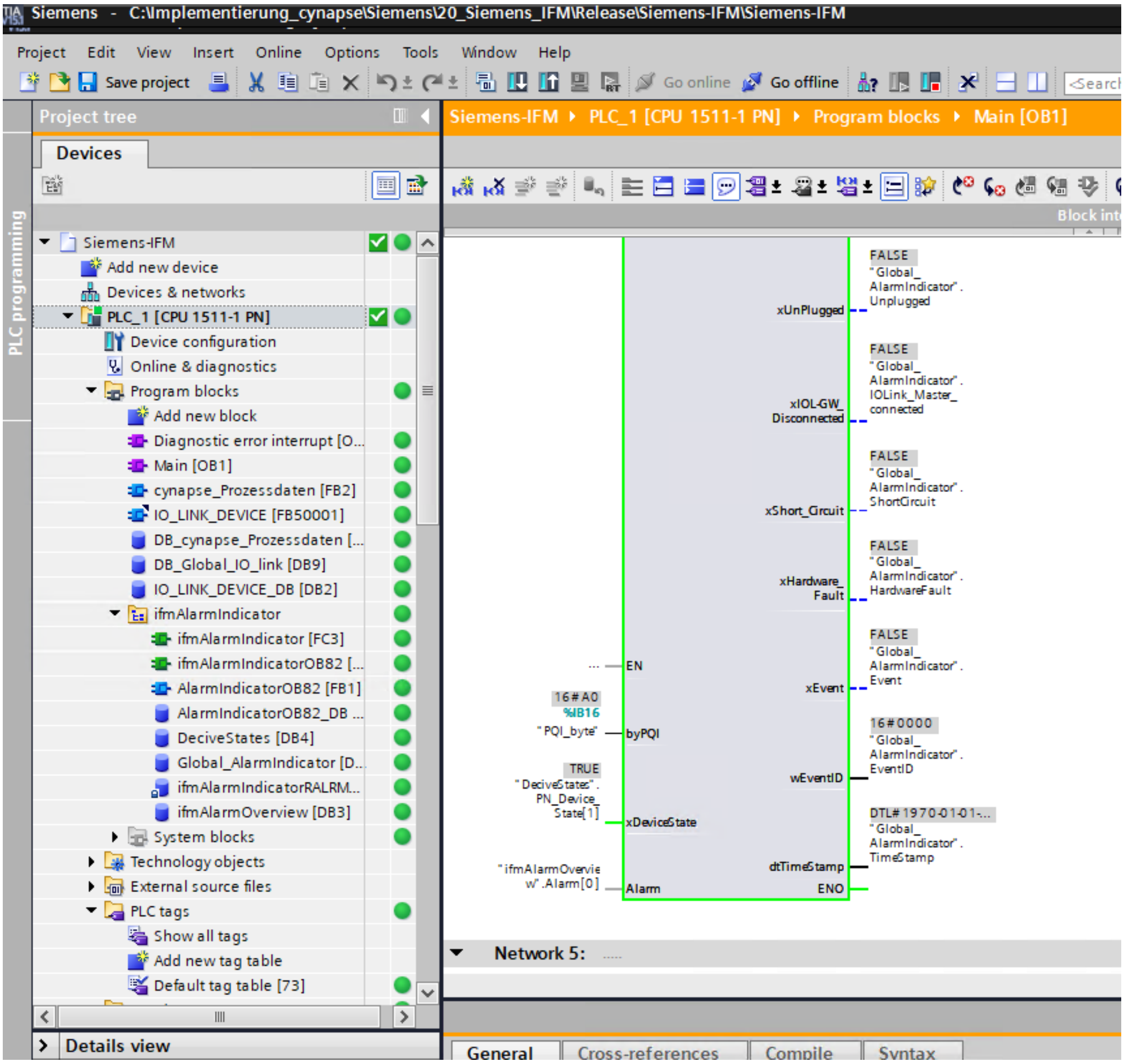
15. Run the program on the hardware.

16. Press the “Go online” button. Go online

17. Start online monitoring.

Result

➲ The upcoming event code can be found at the wEventID output.


Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens-IFM\Siemens-IFM
Project Edit View Insert Online Options Tools Window Help
Save project
Go online
Go offline
<Search
Project tree
PLC programming
Devices
Siemens-IFM
Add new device
Devices & networks
PLC_1 [CPU 1511-1 PN]
Device configuration
Online & diagnostics
Program blocks
Add new block
Diagnostic error interrupt [O...
Main [OB1]
cynapse_Prozessdaten [FB2]
IO_LINK_DEVICE [FB50001]
DB_cynapse_Prozessdaten [...
DB_Global_IO_link [DB9]
IO_LINK_DEVICE_DB [DB2]
ifmAlarmIndicator
ifmAlarmIndicator [FC3]
ifmAlarmIndicatorOB82 [...
AlarmIndicatorOB82 [FB1]
AlarmIndicatorOB82_DB ...
DeviceStates [DB4]
Global_AlarmIndicator [D...
ifmAlarmIndicatorRALRM...
ifmAlarmOverview [DB3]
System blocks
Technology objects
External source files
PLC tags
Show all tags
Add new tag table
Default tag table [73]
Details view
Siemens-IFM ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ Main [OB1]
Block int
... EN
16#A0
%IB16
"PQI_byte" byPQI
TRUE
"DeviceStates".PN_Device_State[1] xDeviceState
"ifmAlarmOverview".Alarm[0] Alarm
xUnPlugged FALSE "Global_AlarmIndicator".Unplugged
xIOL-GW_Disconnected FALSE "Global_AlarmIndicator".IOLink_Master_connected
xShort_Circuit FALSE "Global_AlarmIndicator".ShortCircuit
xHardware_Fault FALSE "Global_AlarmIndicator".HardwareFault
xEvent FALSE "Global_AlarmIndicator".Event
wEventID 16#0000 "Global_AlarmIndicator".EventID
dtTimeStamp DTL#1970-01-01-... "Global_AlarmIndicator".TimeStamp
ENO
Network 5: .....
General Cross-references Compile Syntax

7 Blob data

7.1 Definition

IO-Link defines the transfer of large amounts of data (**b**inary **l**arge **ob**ject) by the BLOB transfer profile. In this case, the type of the data block to be transmitted is identified via the BLOB_ID between 1 and 32767. The sign of the ID indicates the direction of the transfer; a positive sign indicates the data flow direction from master to device, a negative sign indicates data flow from device to master.

cynapse® offers various data packages transported by BLOB transfer. For more information about the BLOB_ID and the decoding of the data packages read out, see the cynapse® operating manual.

7.2 Reading blob data using the “Blob_Transfer” FB

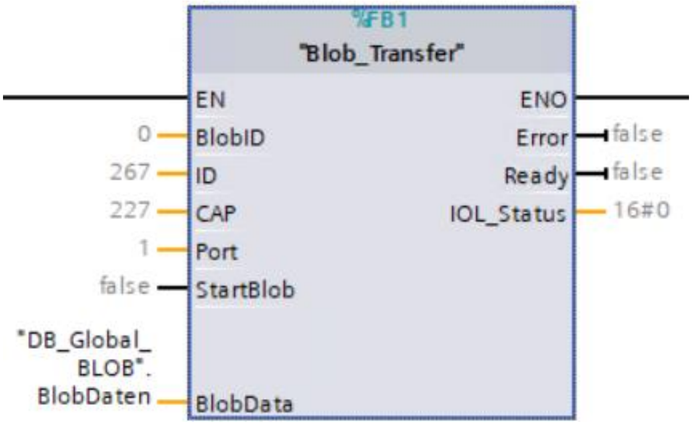
Requirement

➲ You have obtained a sample project for blob transfer from the following source: cybertronic-support@wittenstein.de

ⓘ **Note:** A duplicate request to a device via the IO_LINK_DEVICE module is not possible. Since parameters are read, parameters are written and blob data are accessed on this block, these are to be locked against one another.

Introduction

Below, you will read blob data from a sample project using a function block. The latter takes over the specification-compliant sequence of the blob transfer. For more information, see the IO-Link specification.



Input/output	Data type	Function
BlobID	Integer	ID of the data block to be transmitted
ID	HW_IO	IO-Link Communication Module Hardware ID
CAP	Integer	Client Access Point
Port	Integer	Port number where the IO-Link device is operated
StartBlob	Bool	Positive edge: Start blob transfer
BlobData	Array of bytes	Read data
Error	Bool	Error status (0: no error)
Ready	Bool	Ready status (1: successfully completed blob transfer)
IOL_Status	DWord	IO-Link error status of IO_LINK_DEVICE block

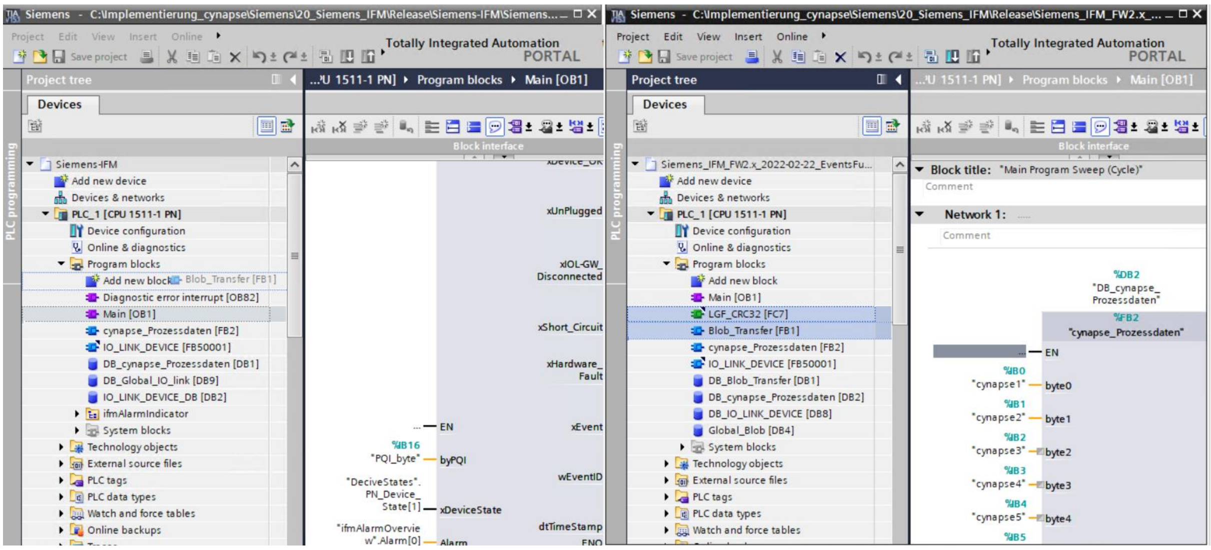
Tbl - 2

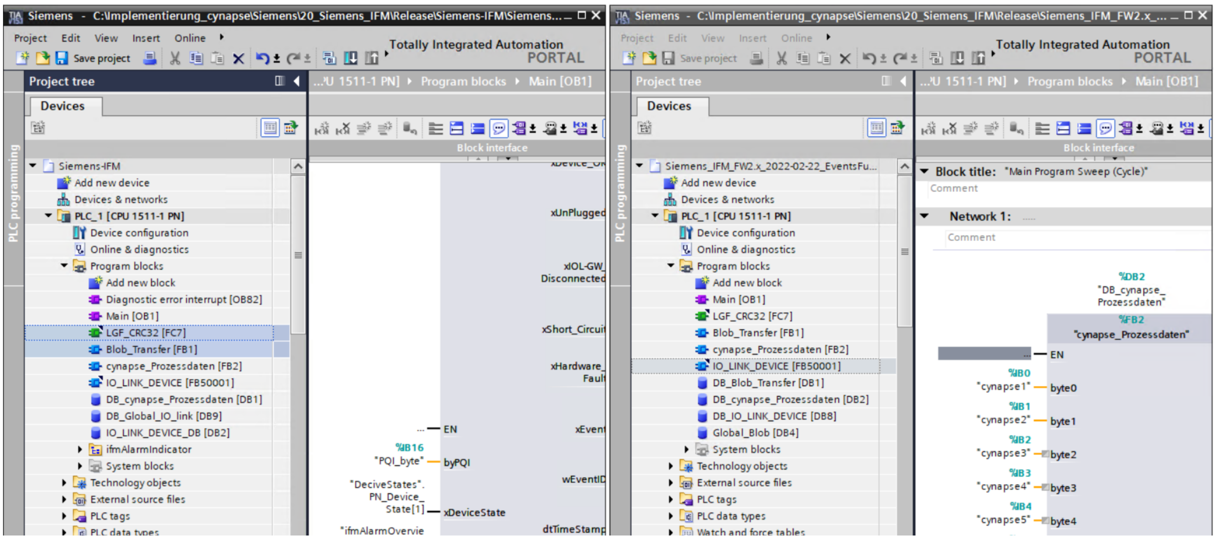
Procedure

1. Open the code sample project you received.
2. In parallel, open the project in which you want to read blob data.
3. Select the Blob-Transfer function block and the LGF_CRC32 function in the sample project

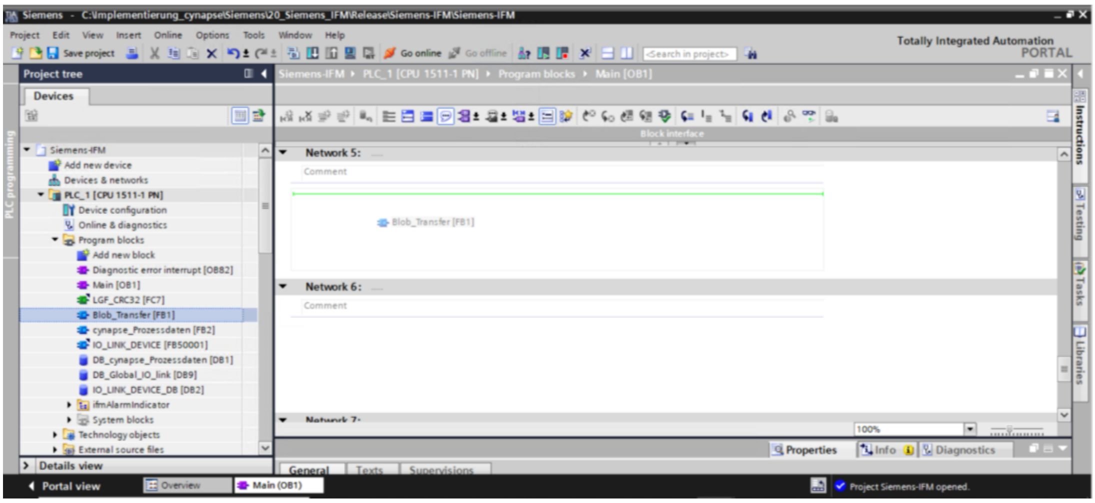
ⓘ **Note:** Important: LGF_CRC32 from example project is slightly modified. If this is not used, the length of the array must be included in the original module.

4. Drag and drop this into your project under “Program blocks”.

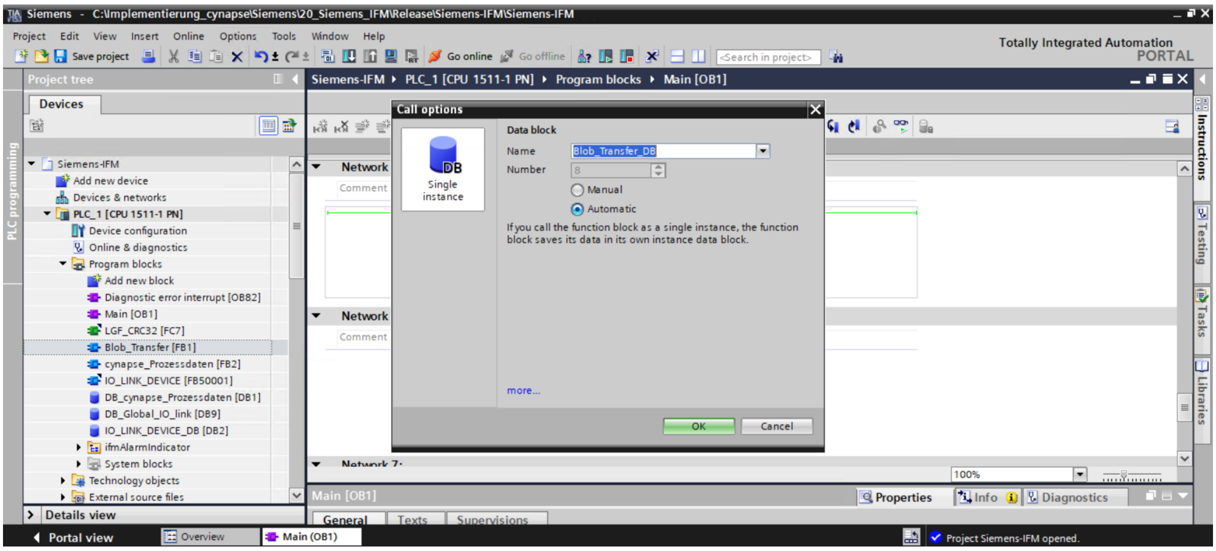




5. Drag and drop the FB into the main block.



6. Create the DB by clicking on “OK”.


Siemens - C:\Implementierung_cynapse\Siemens\20_Siemens_IFM\Release\Siemens-IFM\Siemens-IFM
Siemens-IFM ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ Main [OB1]
Call options
DB
Single instance
Network
Comment
Network 7:
more...
OK
Cancel
Project Siemens-IFM opened.

Data block

Name: Blob_Transfer_DB

Number: 8

○ Manual

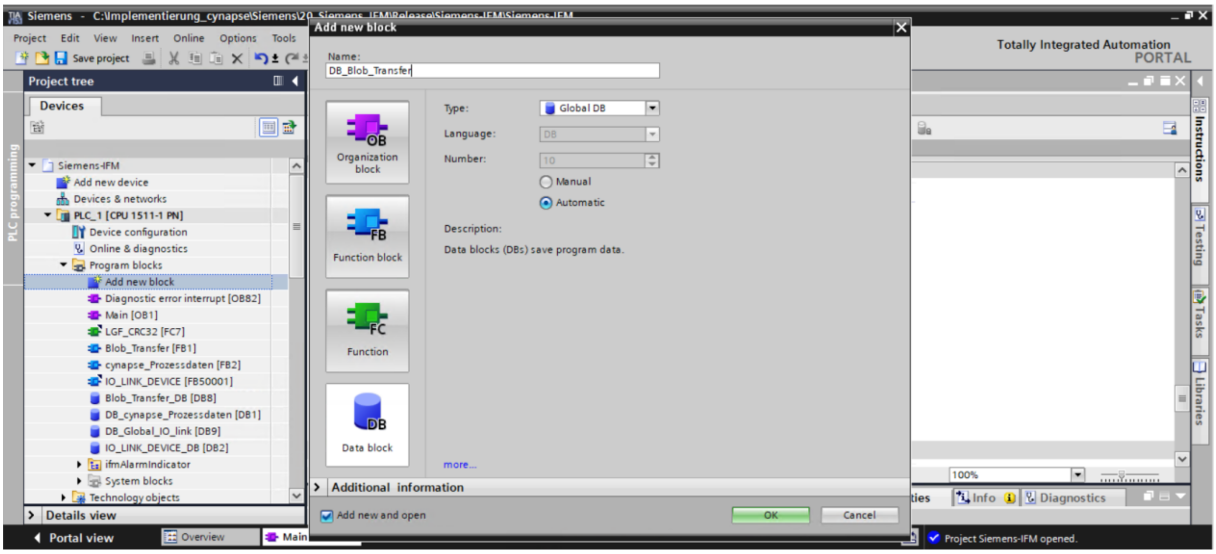
● Automatic

If you call the function block as a single instance, the function block saves its data in its own instance data block.

7. The block is contained in the main block in the network.

8. In order to be able to operate this, a range of values for the read-out BLOB data must be reserved in a global data module.

- Double click on “Add new block”
- Create global data block.



Add new block

Name: DB_Blob_Transfer

Type: Global DB

Language: DB

Number: 10

○ Manual

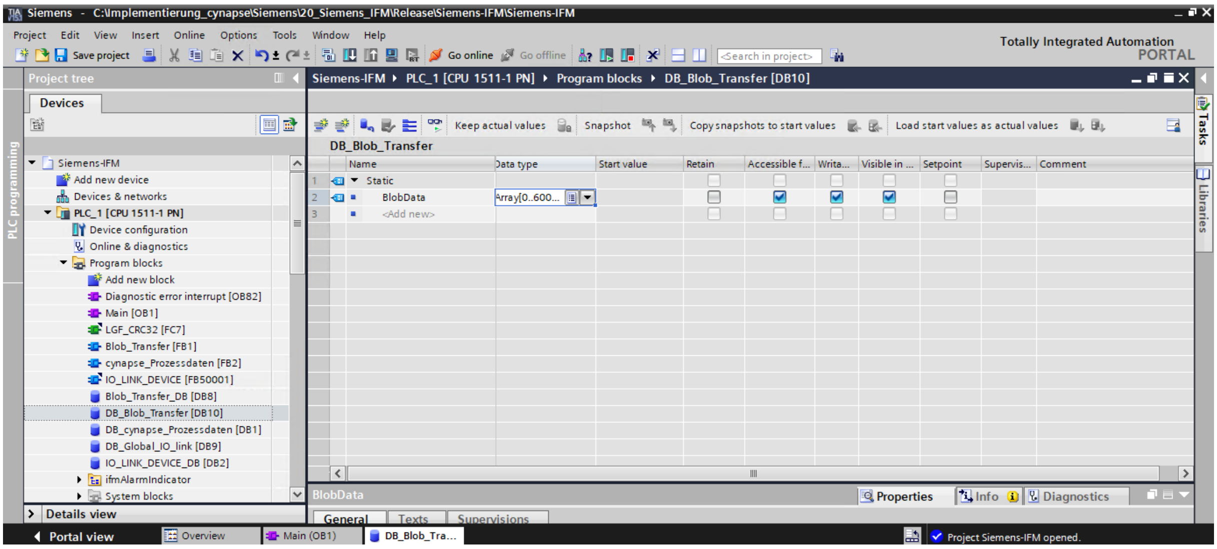
● Automatic

Description:

Data blocks (DBs) save program data.

☑ Add new and open

- Create an array in the size of 0-600000 bytes.

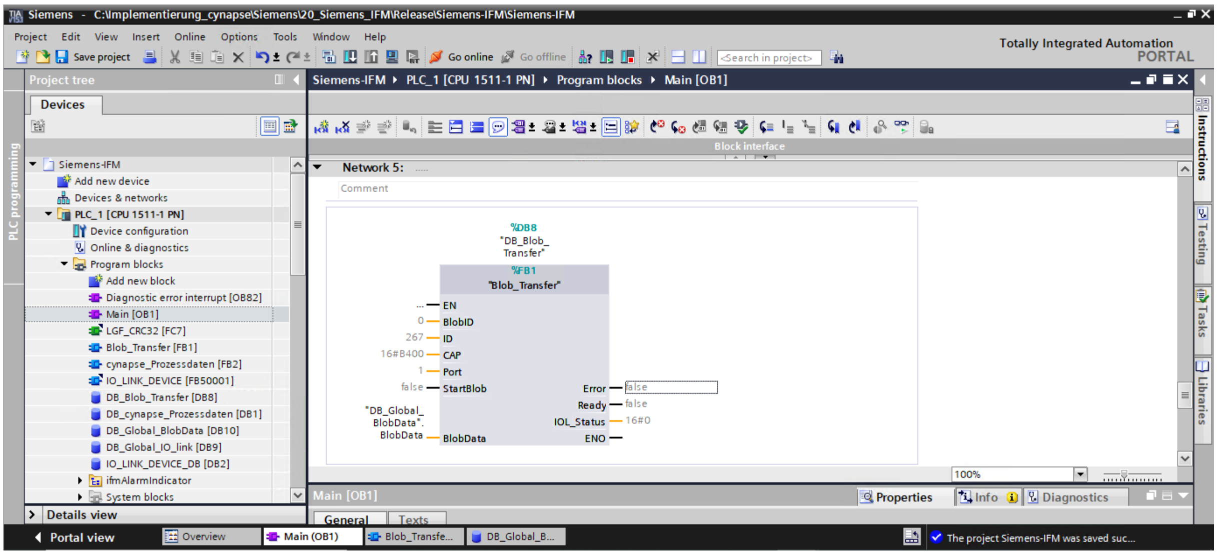


Siemens-IFM ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ DB_Blob_Transfer [DB10]

DB_Blob_Transfer

	Name	Data type	Start value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervis...	Comment
1	▼ Static			□	□	□	□	□		
2	BlobData	Array[0..600...		□	☑	☑	☑	□		
3	<Add new>			□	□	□	□	□		

9. Link the block.



Siemens-IFM ▸ PLC_1 [CPU 1511-1 PN] ▸ Program blocks ▸ Main [OB1]

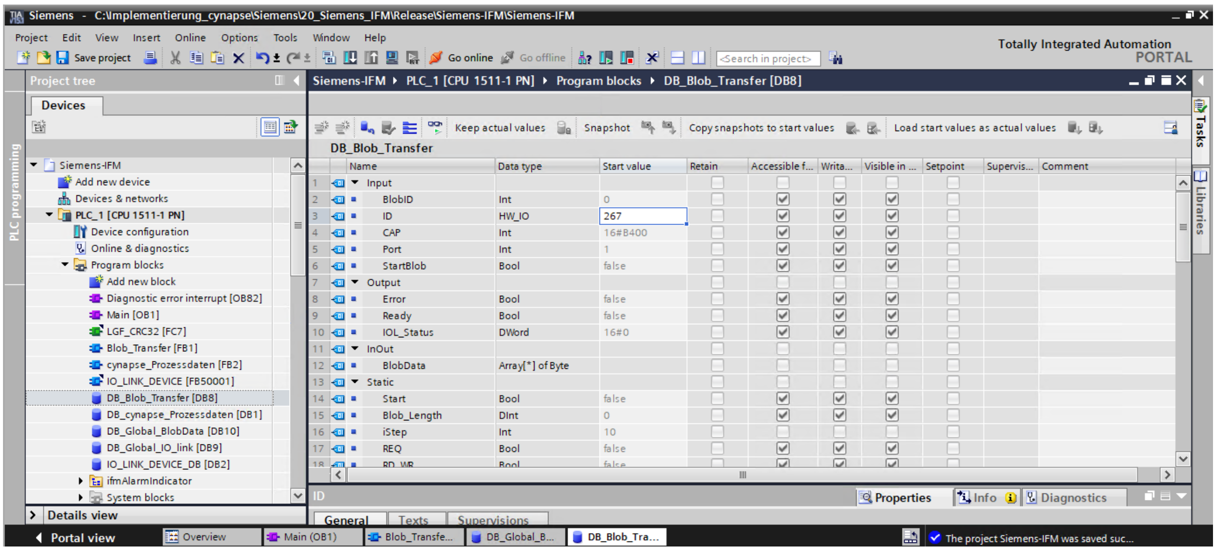
Network 5:

%DB8 "DB_Blob_Transfer"

%FB1 "Blob_Transfer"

Input	Value	Output	Value
EN	...	Error	false
BlobID	0	Ready	false
ID	267	IOL_Status	16#0
CAP	16#B400	ENO	
Port	1		
StartBlob	false		
BlobData	"DB_Global_BlobData".BlobData		

10. Set project-specific input parameters:



DB_Blob_Transfer

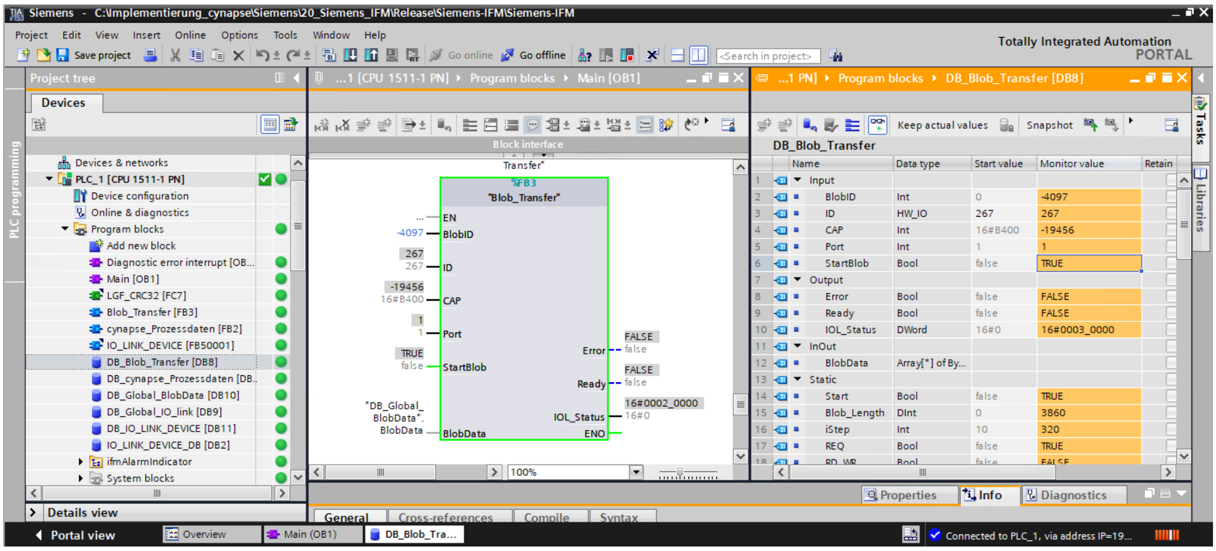
	Name	Data type	Start value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint	Supervis...	Comment
1	▾ Input			□	□	□	□	□		
2	BlobID	Int	0	□	☑	☑	☑	□		
3	ID	HW_IO	267	□	☑	☑	☑	□		
4	CAP	Int	16#B400	□	☑	☑	☑	□		
5	Port	Int	1	□	☑	☑	☑	□		
6	StartBlob	Bool	false	□	☑	☑	☑	□		
7	▾ Output			□	□	□	□	□		
8	Error	Bool	false	□	☑	☑	☑	□		
9	Ready	Bool	false	□	☑	☑	☑	□		
10	IOL_Status	DWord	16#0	□	☑	☑	☑	□		
11	▾ InOut			□	□	□	□	□		
12	BlobData	Array[*] of Byte		□	□	□	□	□		
13	▾ Static			□	□	□	□	□		
14	Start	Bool	false	□	☑	☑	☑	□		
15	Blob_Length	DInt	0	□	☑	☑	☑	□		
16	iStep	Int	10	□	□	□	□	□		
17	REQ	Bool	false	□	☑	☑	☑	□		
18	RD_WR	Bool	false	□	☑	☑	☑	□		

ID

The project Siemens-IFM was saved suc...

- ID: IO-Link communication module hardware ID: This information can be found in the system constants in the hardware view = 267

11. Download the project onto the hardware and go online.
12. Specify the BlobID.
13. Start the blob transfer with the start trigger.



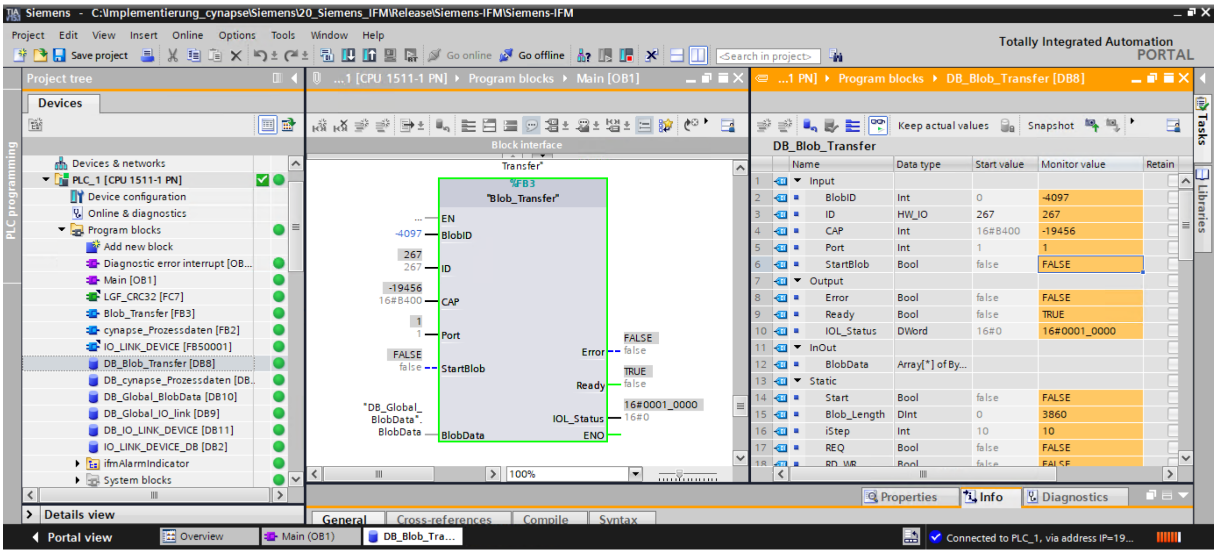
DB_Blob_Transfer

	Name	Data type	Start value	Monitor value	Retain
1	▾ Input				□
2	BlobID	Int	0	-4097	□
3	ID	HW_IO	267	267	□
4	CAP	Int	16#B400	-19456	□
5	Port	Int	1	1	□
6	StartBlob	Bool	false	TRUE	□
7	▾ Output				□
8	Error	Bool	false	FALSE	□
9	Ready	Bool	false	FALSE	□
10	IOL_Status	DWord	16#0	16#0003_0000	□
11	▾ InOut				□
12	BlobData	Array[*] of By...			□
13	▾ Static				□
14	Start	Bool	false	TRUE	□
15	Blob_Length	DInt	0	3860	□
16	iStep	Int	10	320	□
17	REQ	Bool	false	TRUE	□
18	RD_WR	Bool	false	FALSE	□

Connected to PLC_1, via address IP=19...

Result

- ➲ By the output Ready = true, the block indicates a successfully executed blob transfer.
- ➲ The data being read out is in the array associated with the BlobData output and can be used further.



DB_Blob_Transfer

	Name	Data type	Start value	Monitor value	Retain
1	▼ Input				□
2	BlobID	Int	0	-4097	□
3	ID	HW_IO	267	267	□
4	CAP	Int	16#B400	-19456	□
5	Port	Int	1	1	□
6	StartBlob	Bool	false	FALSE	□
7	▼ Output				□
8	Error	Bool	false	FALSE	□
9	Ready	Bool	false	TRUE	□
10	IOL_Status	DWord	16#0	16#0001_0000	□
11	▼ InOut				□
12	BlobData	Array[*] of By...			□
13	▼ Static				□
14	Start	Bool	false	FALSE	□
15	Blob_Length	DInt	0	3860	□
16	iStep	Int	10	10	□
17	REQ	Bool	false	FALSE	□
18	RD_WR	Bool	false	FALSE	□

Revision history

Revision	Date	Comment	Chapter
01	11/18/2019	New version	All
02	07/15/2022	cynapse® Trademark, Revision	All
03	06/20/2023	Translation EN	All

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