Application Note for using PROtop / topGUARD with IO-Link in Siemens TIA Portal

AN0012-PROtop_topGUARD_IO-Link_Siemens

Revision history

Version	Date	Change log	Author
01	2019-09	First released version	W010843
02	2021-04	Minor corrections	W010843

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Content

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2. Abstract

This application note contains instructions how to set up PROtop and topGUARD devices with IO-Link communication interface in Siemens TIA Portal with Siemens hardware. It explains cyclic and acyclic access to I/O data of PROtop and topGUARD.

3. Requirements

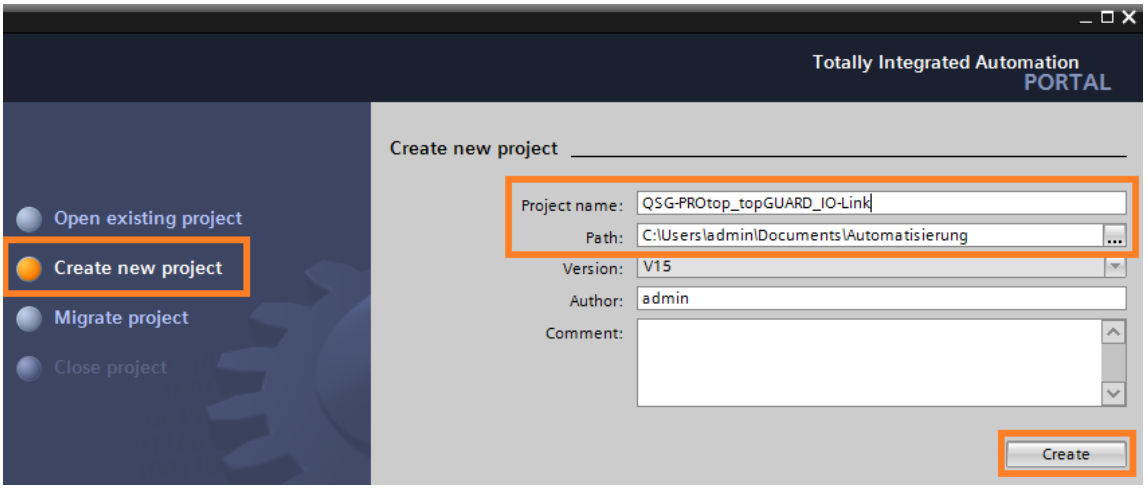
The following hardware and software was used for this guide.

Hardware	Order Number
1 x Siemens S7 1515-2 PN V2.5	6ES7 515-2AM01-0AB0
1 x Siemens ET200SP	6ES7155-6AU00-0DN0
1 x Siemens CM 4xIO-Link	6ES7137-6BD00-0BA0
2 x PRO COM IO-LINK	2587360000
1 x PROtop 240W, 24V, 10A	2466880000
1 x topGUARD TGD FIM-C	2625000000
4 x TGD ELM-6	2624980000
4 x TGD ELM-12	2624990000

Software
Siemens TIA Portal V15
IODD Weidmueller-PROtopIO-LINK
IODD Weidmueller-topGUARDIO-LINK

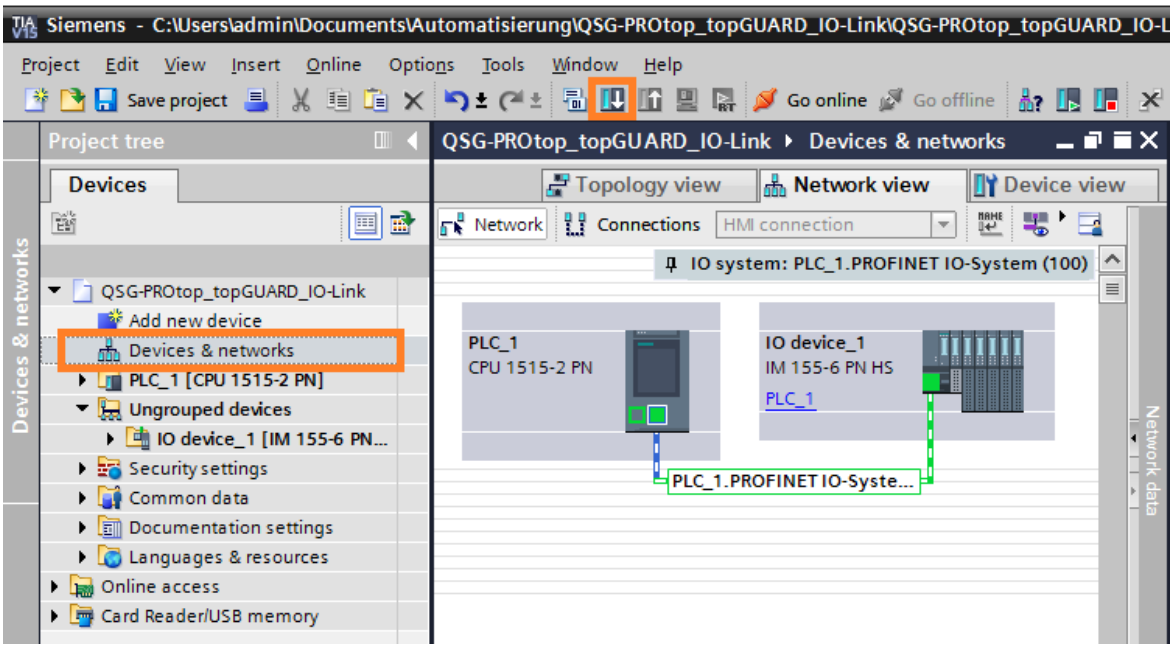
4. Create Project

Start TIA Portal and create a new project. Please type in a project name, select a project path and click “Create”.

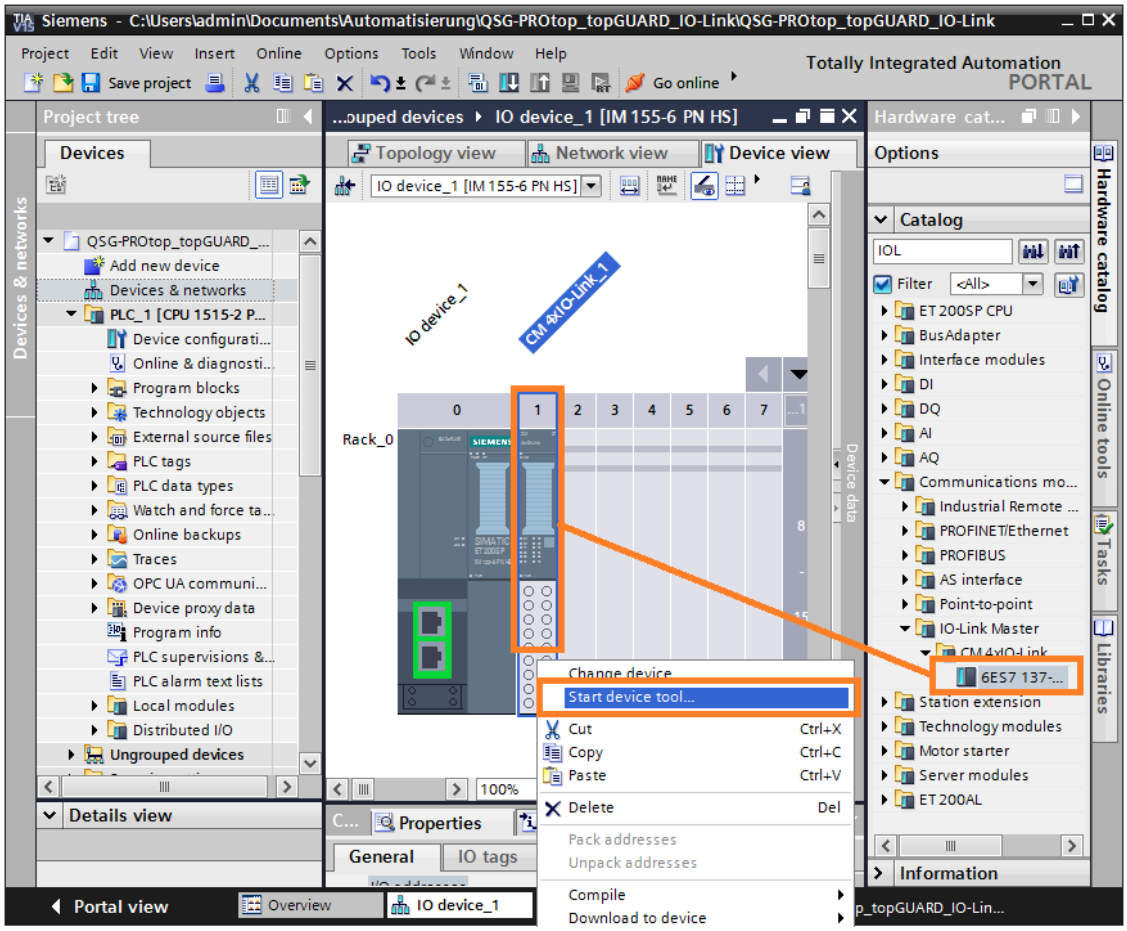


5. Hardware Setup

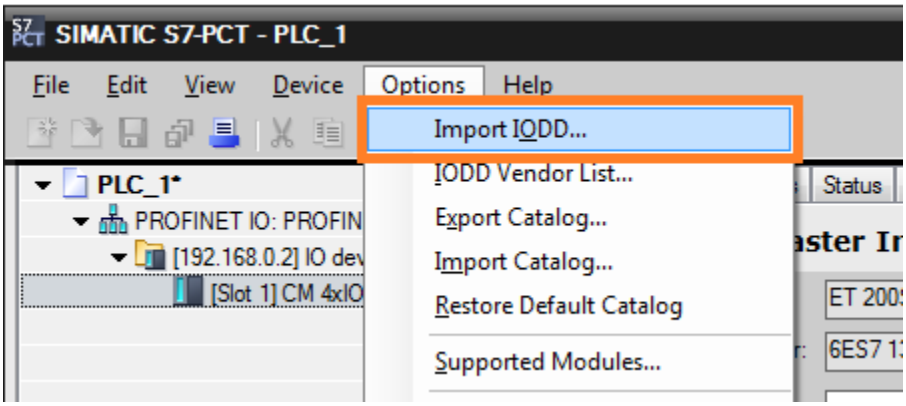
First set up a hardware configuration. Go to “Devices & networks” and simply drag and drop the devices from hardware catalog into network view. Connect the network adapters in the same way as the physical connection. Change IP-Addresses if necessary. Now download the project.



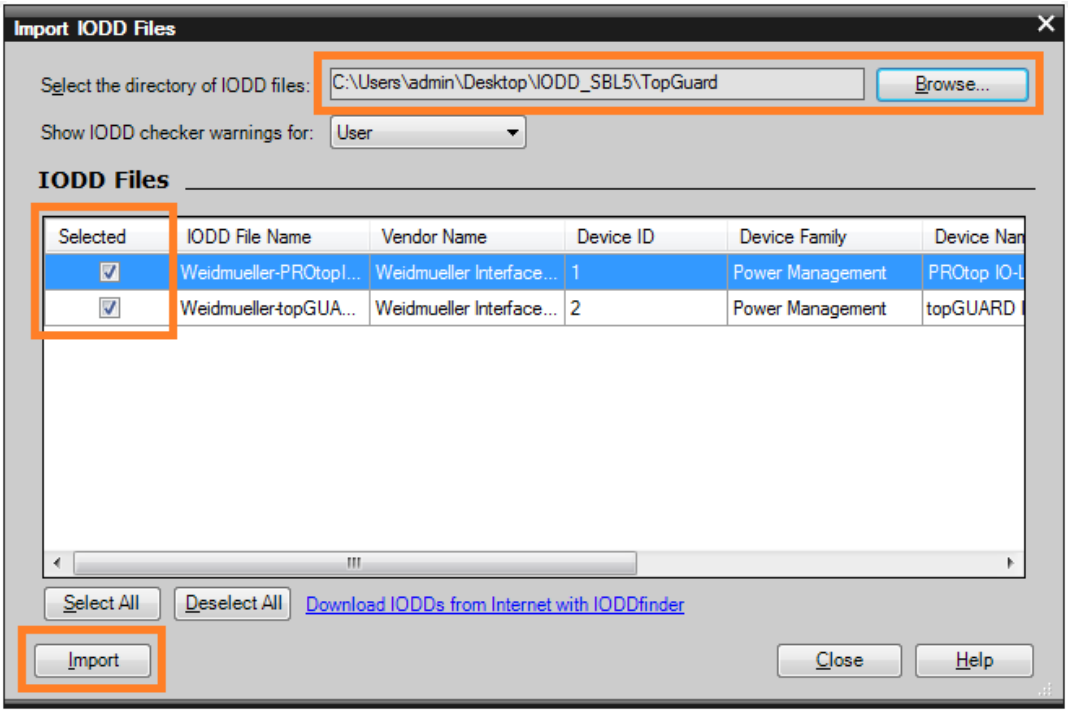
Double click on the IO device and select IO-Link Master module from catalog and drag and drop it to the desired slot.



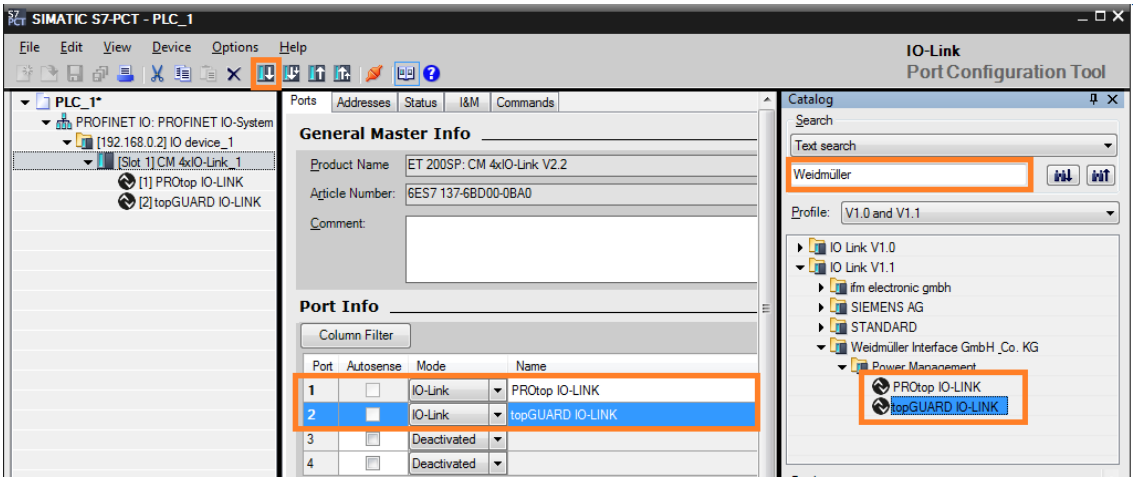
Do a right click on the IO-Link module and start the device tool. Go to Options and click on Import IODD.



Browse for the IODD files for PROtop and topGUARD and import the selected files.



After successful import the IO-Link devices are available in the device catalog. You can search for them by typing “Weidmüller” in the search box. Drag and drop the devices to the desired channel. In this example PROtop is put du channel 1 and topGUARD to channel 2. Then download the configuration to the device.

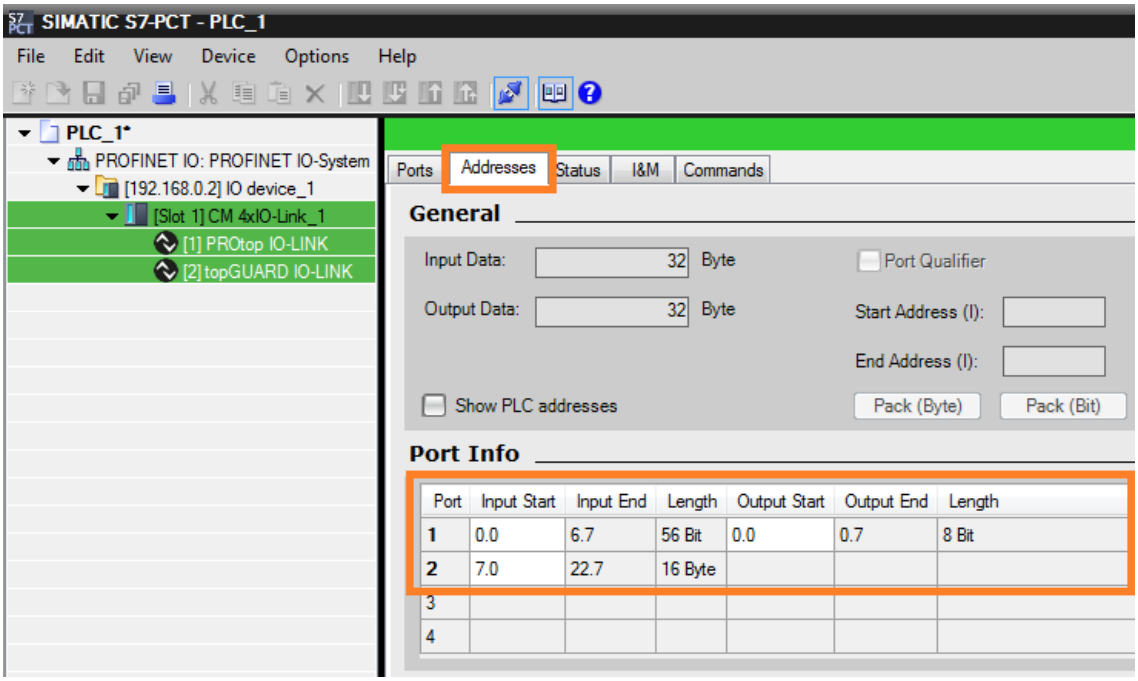


6. Program

When hardware setup is done you can start creating a program to read and write data to the connected IO-Link devices. IO-Link data is divided into cyclic data like process data and acyclic data like parameter or device data.

Process Data

To read or to write process data you first need to find out the address range of your IO devices. Open the IO-Link device tool again, select the IO-Link module and click on Addresses.



Channel 1 – PROtop

Input	0.0 … 6.7	(7 Byte)
Output	0.0 … 0.7	(1 Byte)

Channel 2 – topGUARD

Input	7.0 … 22.7	(16 Byte)
Output	No process data outputs	

(Addresses in you project may differ due to other connected IO devices.)

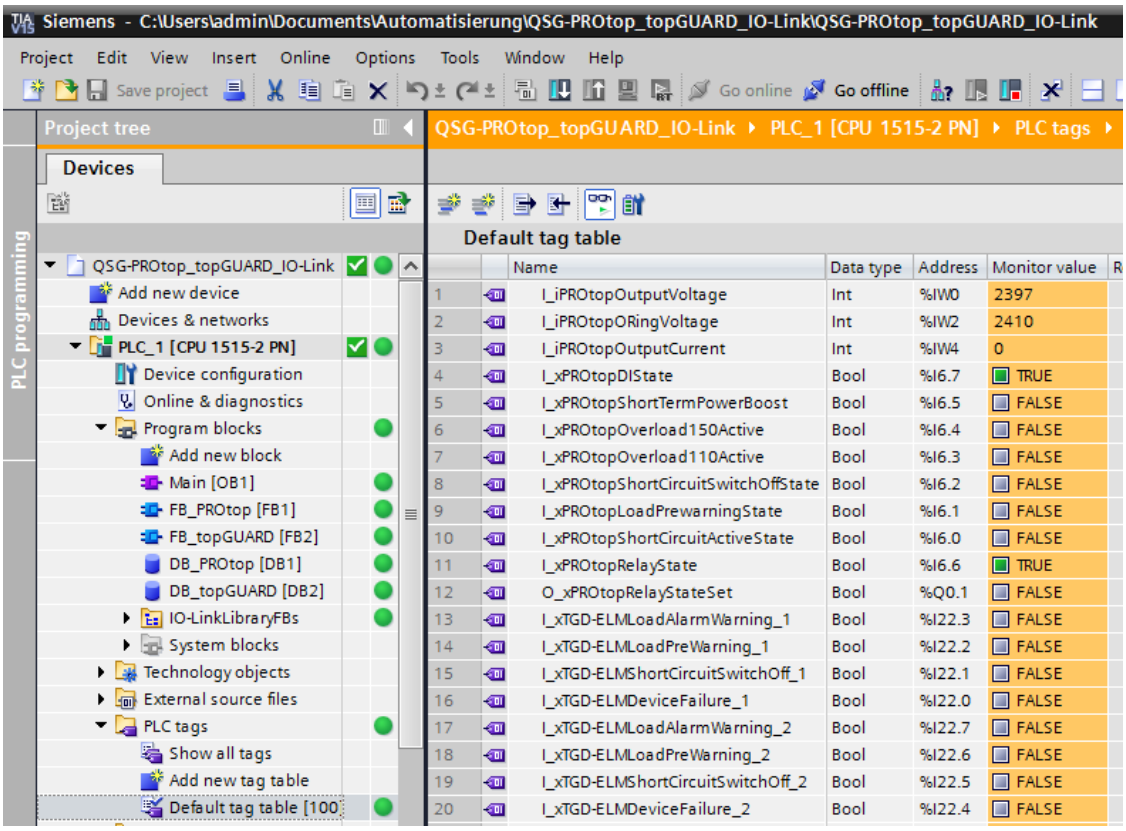
Based on these addresses you can start to create tags. Please refer to the PROtop / topGUARD IO-Link manual.

7 Process data and parameter

7.1 Process data in

Table 4: Process data in for PROtop IO-LINK

Parameter	Type	Bit-Offset	Length [Bit]	Comment/ Description
PROtop - Output Voltage	INT16	40	16	Output voltage value in cV (1000 = 10.00V) on DC- Output after O-ring MOSFET (on terminal).
PROtop - O-Ring Voltage	INT16	24	16	Output voltage value in cV (1000 = 10.00V) on DC- Output before O-ring MOSFET.
PROtop - Output Current	INT16	8	16	Output current in cA (1000 = 10.00A) on DC- Output
PROtop - DI State	Bool	7	1	Get Status of Digital Input 0 = false (V_{in} < 5V) 1 = true (V_{in} > 15V)

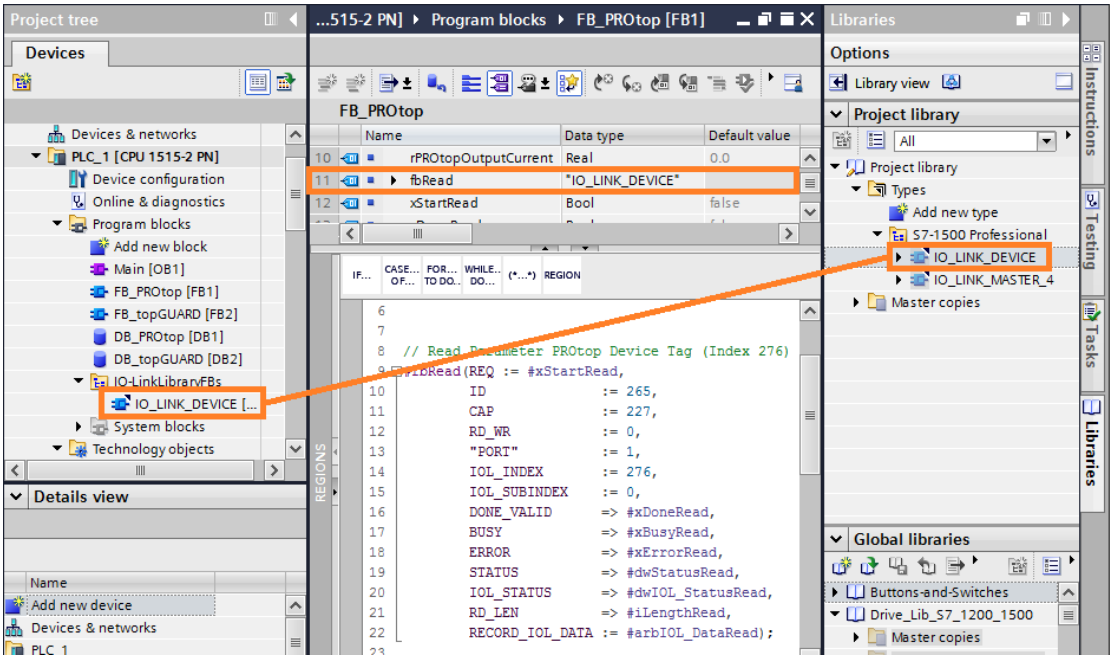


Download the project to the plc. Now you should see process data values when you go online.

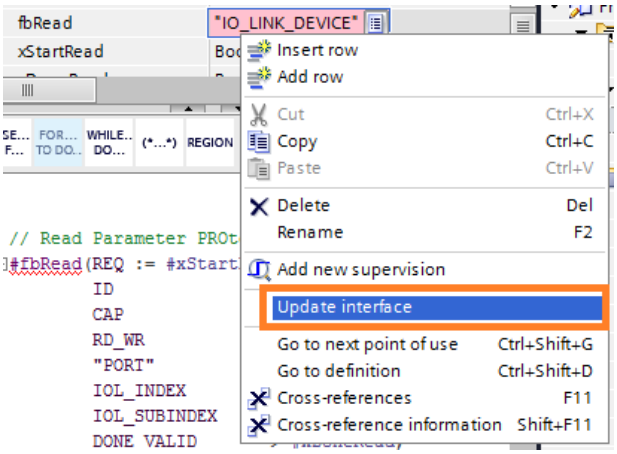
Parameters

To read or to write acyclic data Siemens provides a function block called “IO_LINK_DEVICE” which is part of the Siemens IO-Link library available on their website.
https://support.industry.siemens.com/cs/document/82981502/acyclic-read-and-write-with-the-io-link-library?dti=0&lc=en-WW

Please see library documentation how to install the library.
When the library was installed successfully, you can drag the IO_LINK_DEVICE function block from the library into the “Program blocks” folder in you project tree.



Now you can use the IO_LINK_DEVICE FB in your program. You may need to update the FB interface.



To read or to write parameters the function block requires some input tags (see function block comments). For detailed information please see Siemens library documentation.
To find out the index or subindex of a parameter you want to read or to write please see PROtop / topGUARD IO-Link manual.