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SINUMERIK MC with SINAMICS S210 as NC Axis

SINUMERIK MC / SW V1.12

<https://support.industry.siemens.com/cs/ww/en/view/109769849>

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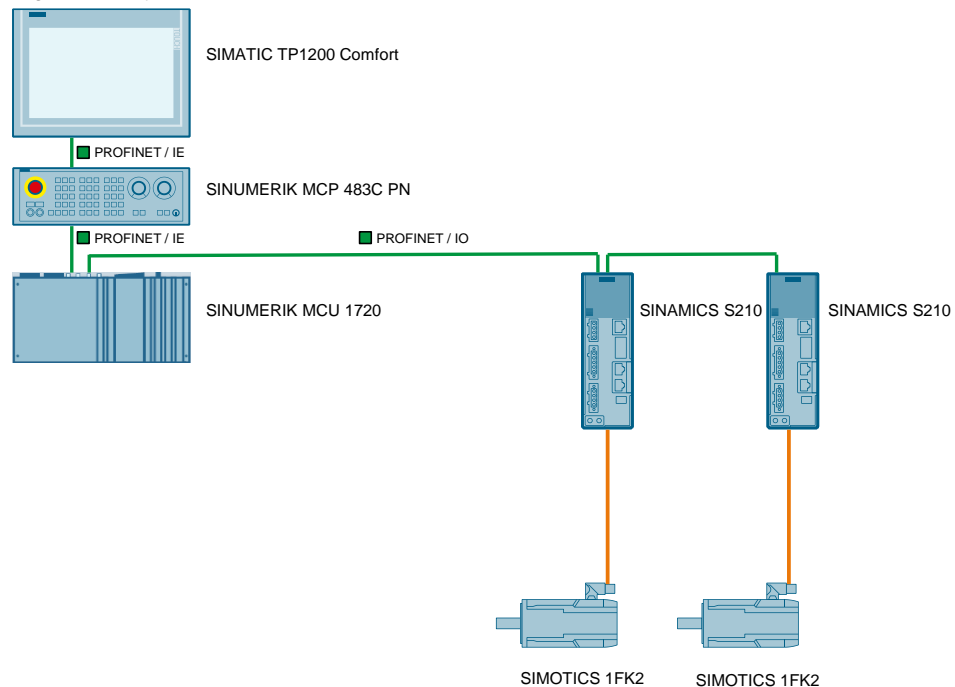
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1 Introduction

1.1 Overview

This application example describes how to interface a SINUMERIK MC with a SINAMICS S210 via PROFINET IRT. Two drives are used as NC axes. The SIMATIC TP1200 Comfort is used as the HMI device, and the SINUMERIK MCP 483C PN is used to control the movement of the axes.

Figure 1-1 System overview of the SINUMERIK MC with SINAMICS S210



1.2 Mode of operation

The application example as described here is limited to the setting up of a connection between one SINUMERIK MC and two SINAMICS S210, the basic controller settings, and the drive configuration. The objective is to operate the SINAMICS S210 drives as NC axes via the SINUMERIK NC.

Prerequisites and additional configuration

To use this application example, the SINUMERIK MCP 483C PN and the interfaces between the NC and the PLC must have been configured so that the simulation axes can be moved, for example by a part program. You will find information about commissioning the NC and the PLC under [3](#) and commissioning the SINUMERIK MCP 483C PN under [4](#).

You will find information about configuring and programming the SIMATIC TP1200 Comfort under [5](#) and [6](#).

1.3 Components used

This application example has been created with the following hardware components:

Table 1-1

Component	Number	Article number	Note
SINUMERIK MCU 1720	1	6FC5222-1AA00-0AA0	-
SINAMICS S210	2	6SL3210-5HB10-1UF0	-
SIMOTICS 1FK2 Motor	1	1FK2102-0AG00-0SA0	-
SIMOTICS 1FK2 Motor	1	1FK2102-0AG10-0SA0	-
SINUMERIK MCP 483C PN	1	6FC5303-0AF22-0AA1	-
SIMATIC TP1200 Comfort	1	6AV2124-0MC01-0AX0	-

This application example has been created with the following software components:

Table 1-2

Component	Version	Note
SINUMERIK MC CNC SW	V1.12	
SINAMICS S210 FW	V5.2	
SINUMERIK MCP 483C PN FW	N/A	GSDML-V2.1-SIEMENS-SINUMERIK-MCPRT-20161205.XML
SIMATIC TP1200 Comfort SW	V15	
TIA Portal	V15.1 Upd2	
SINAMICS Startdrive Advanced	V15.1 Upd2	
STEP 7 Professional	V15.1 Upd2	
SINUMERIK STEP 7 Toolbox	V15.1 Upd1	
SINUMERIK STEP 7 Motion Control	V15.1 Upd1	
SINUMERIK Integrate Create MyHMI /WinCC	V15.1 Upd1	
WinCC Professional	V15.1 Upd2	
SINUMERIK ONE Operate Commissioning Tool	V4.92	

2 Engineering

2.1 Hardware setup

Connect the components as shown in [Figure 1-1](#). The SINUMERIK MCP 483C PN and the SIMATIC TP1200 Comfort must be connected to the X160 interface of the SINUMERIK MCU 1720. To operate the SINAMICS S210 as a NC axis, PROFINET IRT must be used. Therefore, the SINAMICS S210 must be connected to the X150 interface of the SINUMERIK MCU 1720 and the interconnection of the remaining interfaces must be consistent with the hardware configuration of the TIA Portal.

NOTE

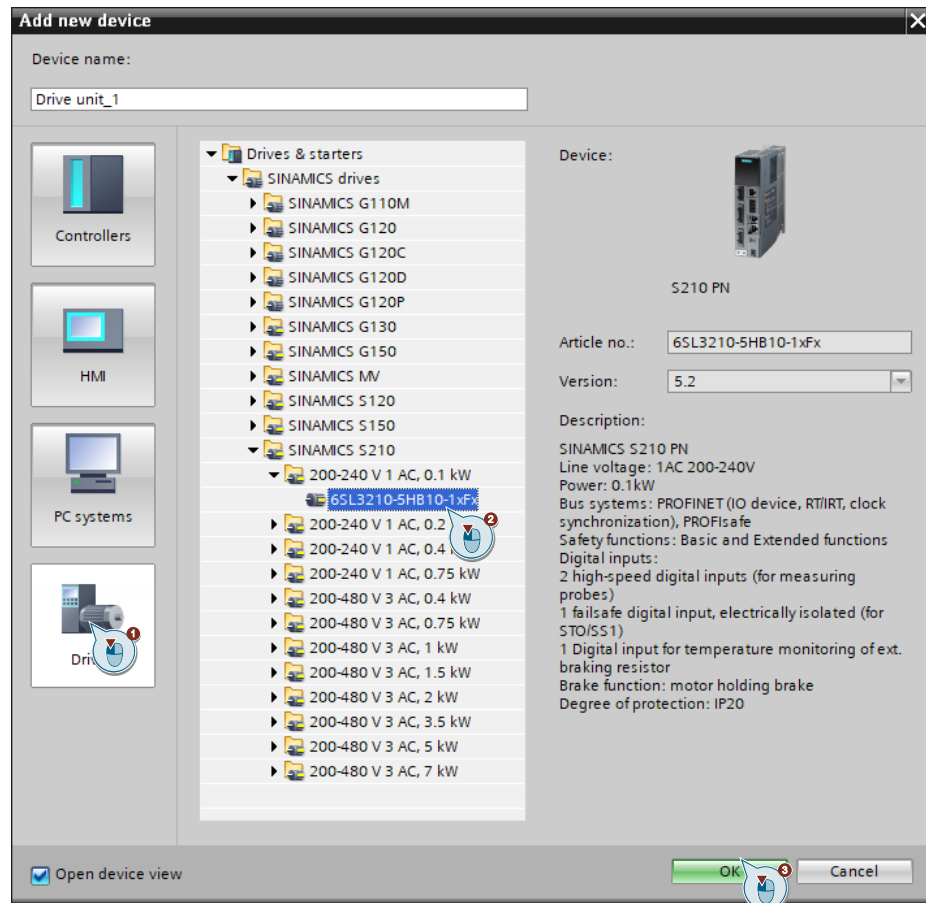
In this example, the handwheel of the SINUMERIK MCP 483C PN cannot be used. If you want to use the handwheel, connect the MCP to the X150 interface of the SINUMERIK MCU 1720.

2.2 Configuration

2.2.1 Configuration of SINUMERIK MCU 1720 and SINAMICS S210 in TIA Portal

Use the TIA Portal to configure the SINAMICS S210 drives.

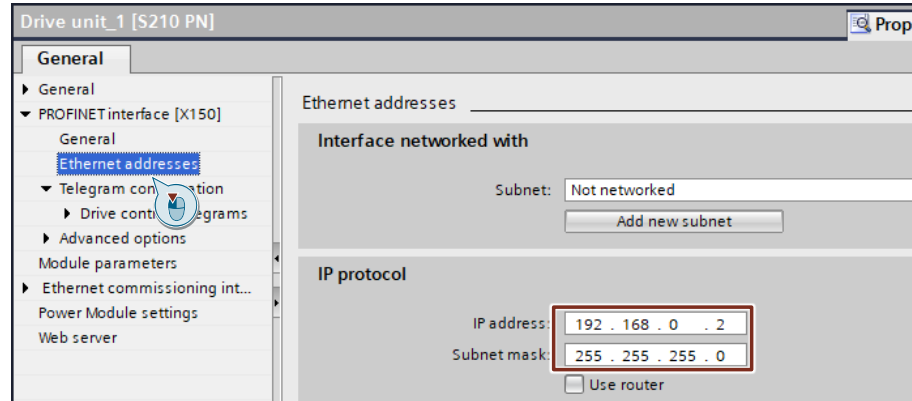
1. As shown in [Figure 1-1](#), connect the SINUMERIK MCU 1720, the SINAMICS S210 drives, and the PG/PC via the X150 network.
2. In TIA Portal, add a new SINAMICS S210 device.



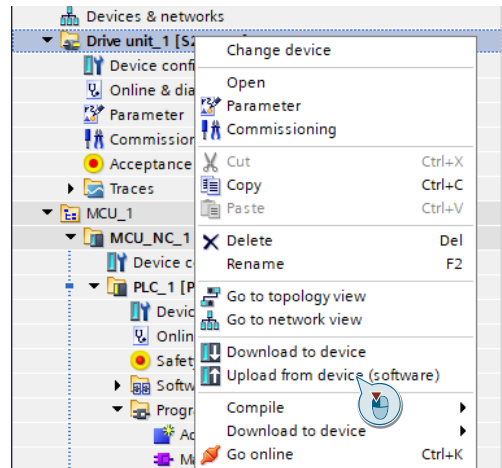
3. In the Properties window of the S210 device, enter an IP address and a subnet mask.

In this example:

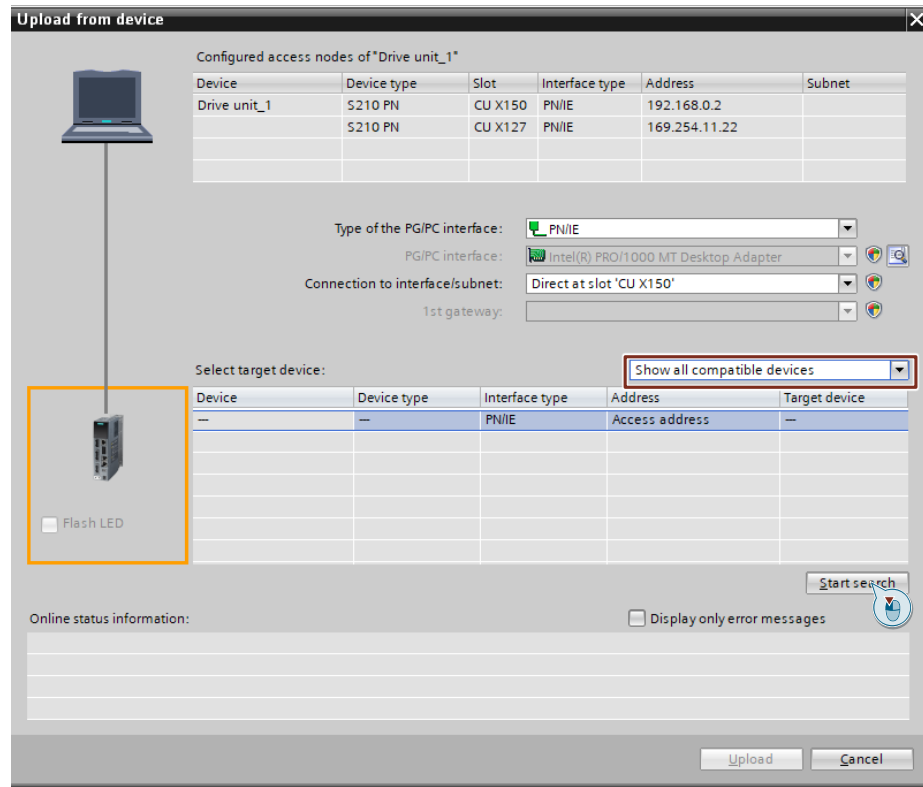
- IP address: "192.168.0.2"
- Subnet mask: "255.255.255.0"



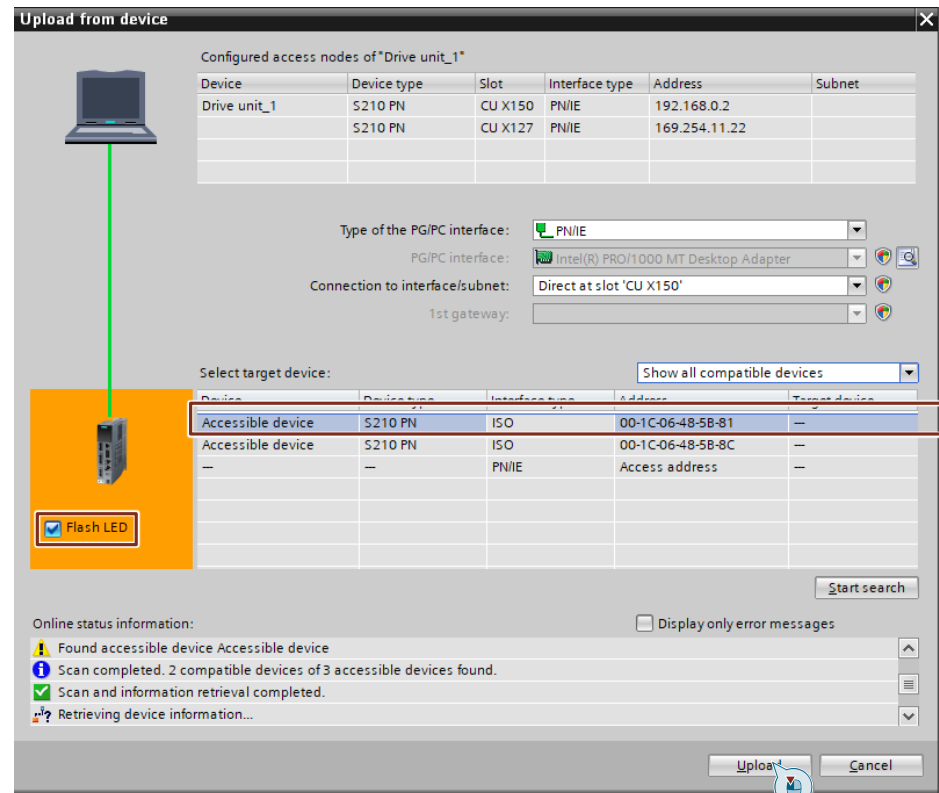
4. Upload the data from the real device to the S210 object.



Start a search for the devices of the X150 network by choosing menu entry "Show all compatible devices".

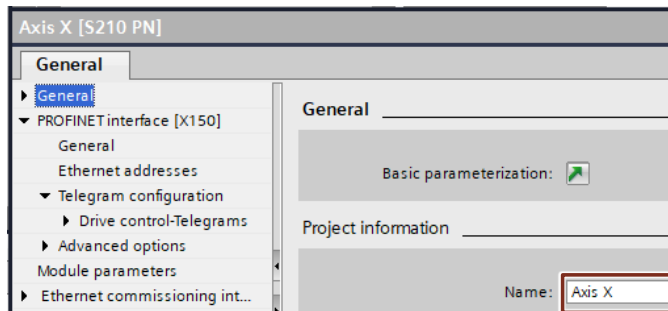


Select one of the two found devices and activate the "Flash LED" option to signal the active upload at the relevant device.

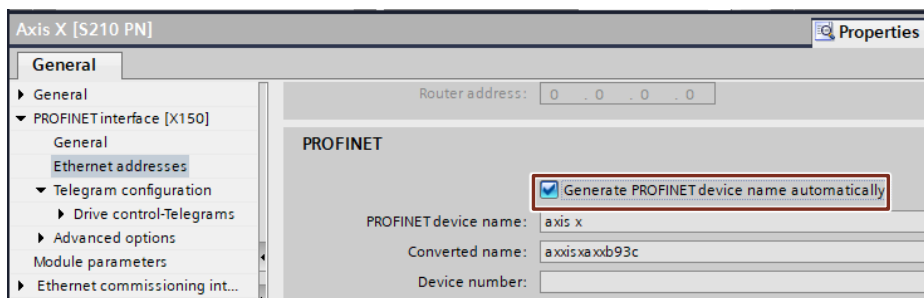


Click the “Upload” button to start uploading and wait until uploading has finished.

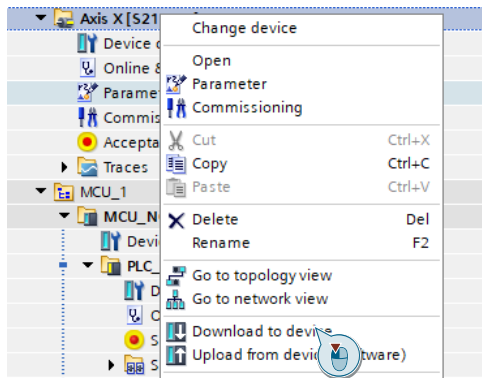
5. In the Properties window, you can change the drive name, for example to “Axis X”.



Select the “Generate PROFINET device name automatically” option.

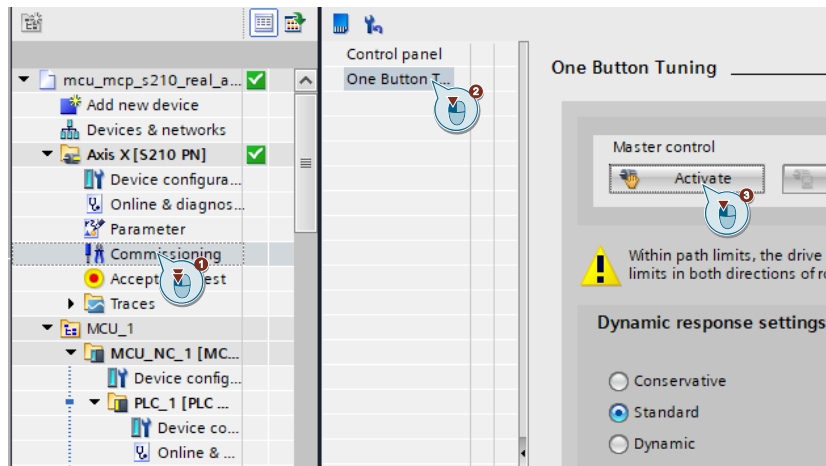


Download the configuration to the drive.

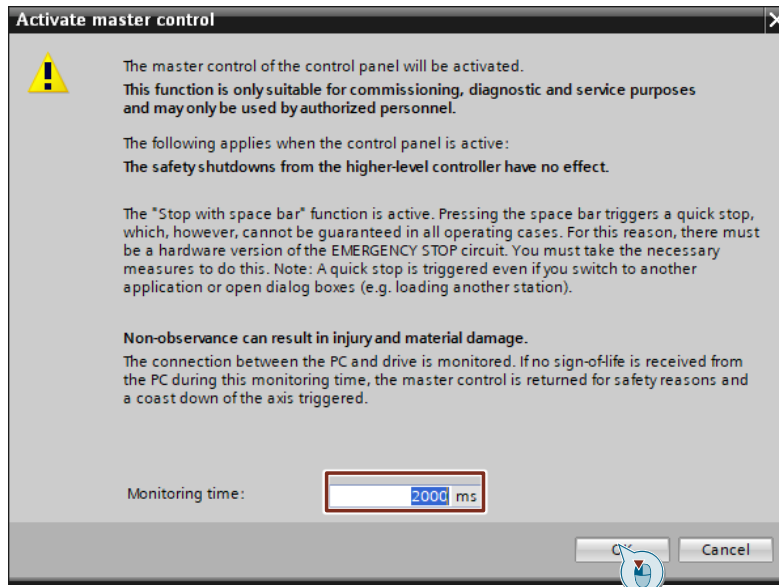


6. Tune the drive:

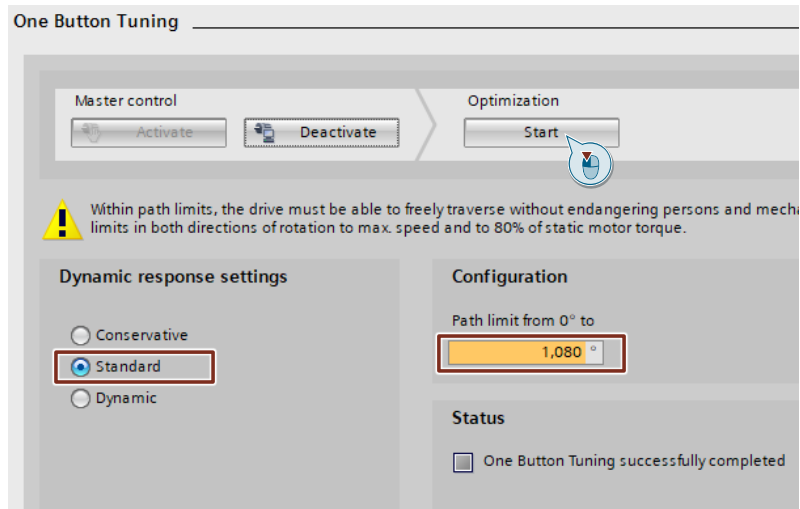
- Go online to the drive.
- In the menu, choose "Commissioning" > "One Button Tuning" and then click the "Activate" button.



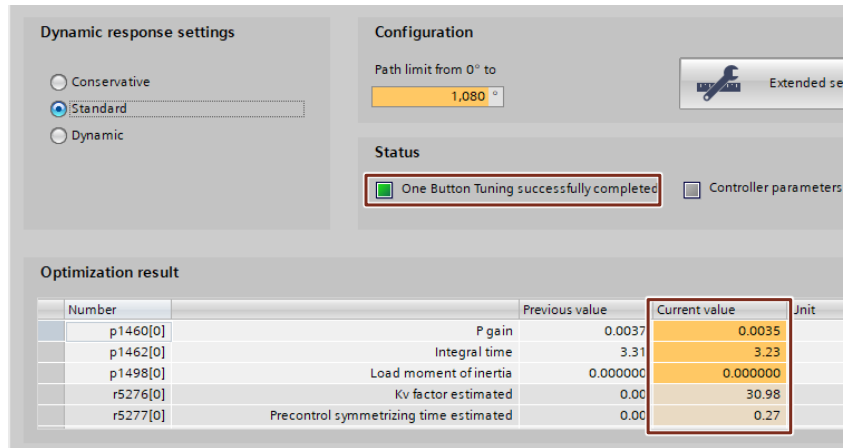
- Accept the default monitoring time.



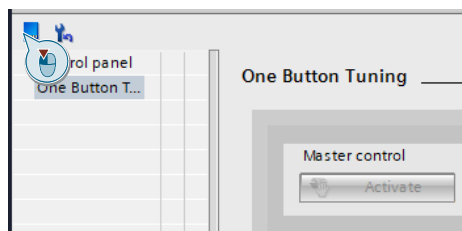
- For "Dynamic response settings" and "Path limitation", select appropriate values according to your application. Then click the "Start" button to begin tuning.



- Wait until tuning is completed. The result of tuning is displayed.



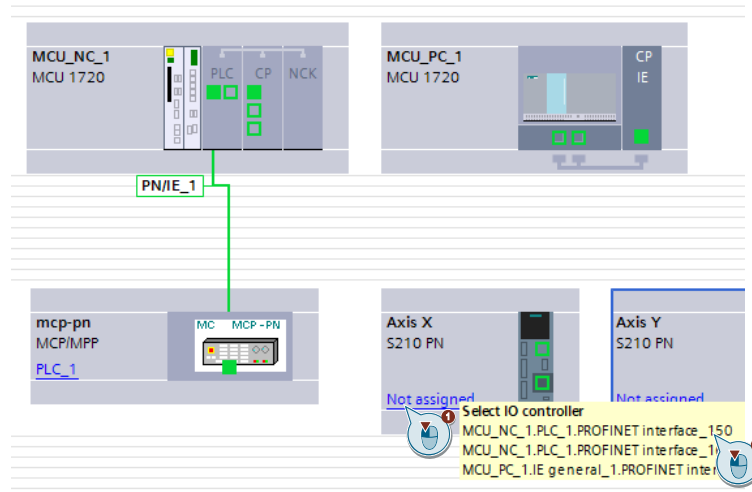
- Save the drive data retentively.



- Repeat steps 2 to 6 for the other drive with the following settings:

- IP address: 192.168.0.3
- Drive name: "Axis Y"

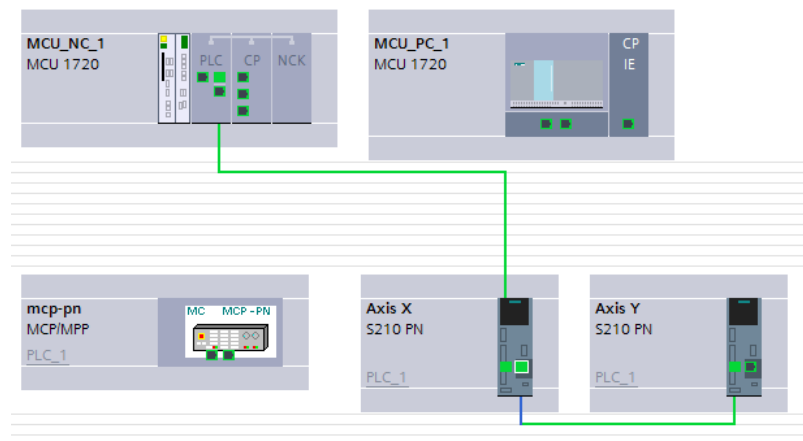
- In the network view, assign both drives "Axis X" and "Axis Y" to the X150 interface of the SINUMERIK MCU 1720 PLC.



In the topology view, connect the X150 interfaces according to the real hardware wiring.

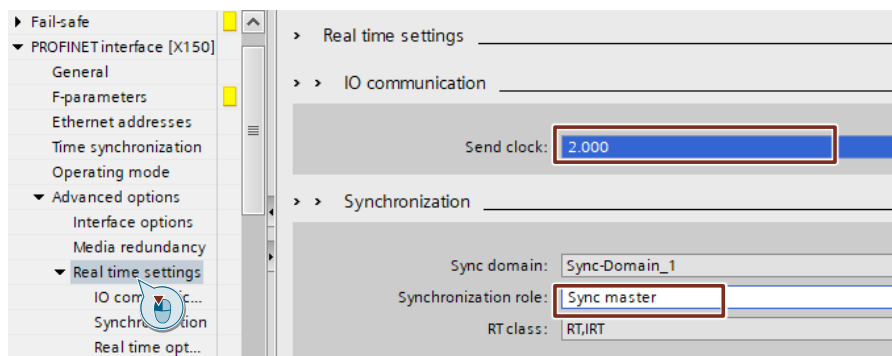
In this example:

- PLC_1 X150.P1 → Axis X X150.P1
- Axis X X150.P2 → Axis Y X150.P1



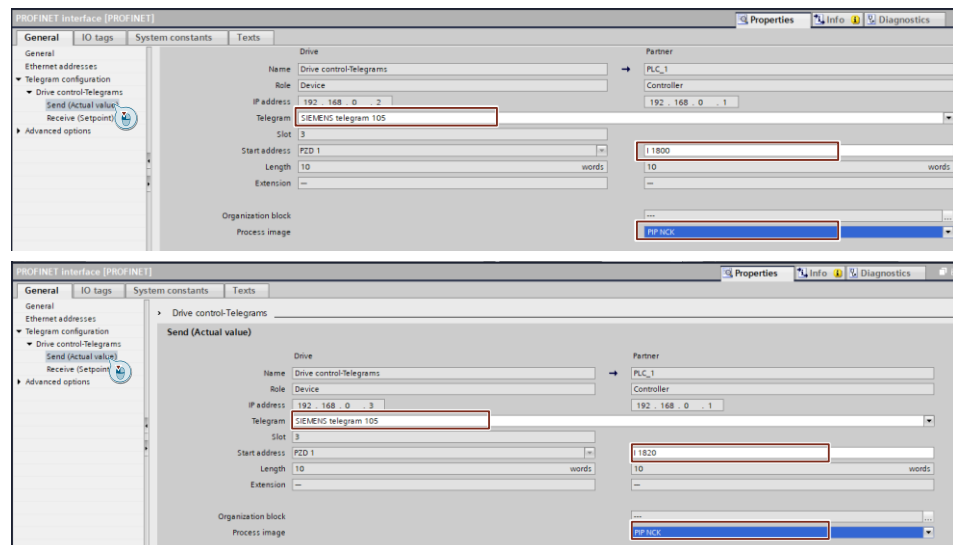
- In the Properties window of the PLC, configure the real-time settings:

- Synchronization role: "Sync master"
- Send clock: "2 ms"



10. Configure the SINAMICS S210:

- In the Properties window of the PROFINET interface, configure "Send (Actual value)" for the telegram:
 - Telegram: "SIEMENS telegram 105"
 - Start address: "I 1800" (X axis)
 - "I 1820" (Y axis)
 - Process image: "PIP NCK"
- The telegram settings for "Receive (Setpoint)" will be adjusted automatically.
- Configure the RT class as IRT.



11. Compile and download the HW configuration to the PLC.

2.2.2 Configuring the NCK with the SINUMERIK ONE Operate commissioning tool

Configure the NCK MDs in such a way that the NCK can control the SINAMICS S210 drives.

1. Link the PLC start address of the X axis and Y axis of the SINAMICS S210 drives to the NCK:
 - MD13050[0] \$MN_DRIVE_LOGIC_ADDRESS = 1800
 - MD13050[1] \$MN_DRIVE_LOGIC_ADDRESS = 1820
 Assign the telegram types of the SINAMICS S210 drives to the NCK:
 - MD13060[0] \$MN_DRIVE_TELEGRAM_TYPE = 105
 - MD13060[1] \$MN_DRIVE_TELEGRAM_TYPE = 105
2. Change the mode of the axes from "Simulation axis" to "Real axis":
 - MD30130[0] \$MA_CTRL_OUT_TYPE = 1
 - MD30240[0] \$MA_ENC_TYPE = 1
 - MD32250[0] \$MA_RATED_OUTVAL = 100%
3. Reset the NCK.

Now the two real axes with SINAMICS S210 can be moved in JOG mode or controlled by a part program.

3 Appendix

3.1 Service and support

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3.2 Links and literature

Table 3-1

No.	Topic
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Link to this entry page of this application example https://support.industry.siemens.com/cs/ww/en/view/109769849
\3\	SINUMERIK MC MCU commissioning: NC, PLC, Drive Commissioning Manual https://support.industry.siemens.com/cs/document/109769920
\4\	SINUMERIK 840D sl Operator Components and Networking Manual https://support.industry.siemens.com/cs/document/109736205
\5\	SINUMERIK 840D sl SINUMERIK Integrate Create MyHMI /WinCC V15.1 Configuration Manual https://support.industry.siemens.com/cs/document/109763525
\6\	SIMATIC HMI HMI devices Comfort Panels Operating Instructions https://support.industry.siemens.com/cs/document/49313233

3.3 Change documentation

Table 3-2

Version	Date	Modifications
V1.0	08/2019	First version