

**ibaPDA
with SIMOTION D4x5
and SINAMICS CU320**

Preliminary

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1 OVERVIEW

This document describes the configuring of a IBA PDA using the SIMOTION system. As an example configuration a SIMOTION D445 and a PC with a CP1616 card is used.

1.1 Requirement for the Engineering

1.1.1 Hardware requirements

- SIMOTION D4x5
- SINAMICS CU320, S120
- CBE30
- CBE20
- CP1616
- PROFINET – Cable (CAD6)

1.1.2 Software requirements

- SIMATIC STEP7 V5.4 SP2
- SIMOTION SCOUT V4.1.1.x
- IBA PDA Client V6.15

1.2 Changes against older versions

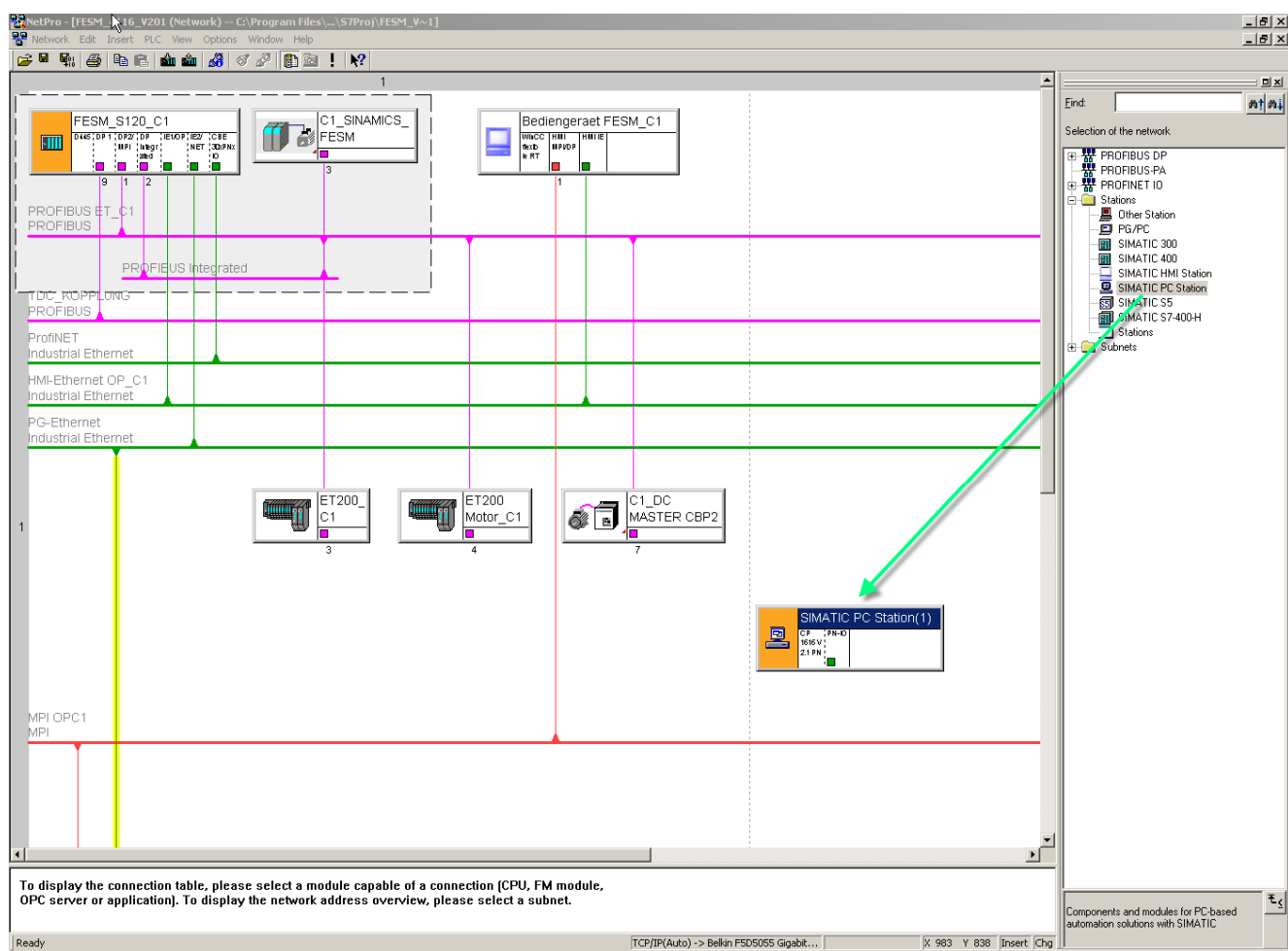
- Communicationboard CP1616 of the PDA PC programmable as Synch-Master for PROFINET (V PEP 01.03.En.a)

2 ADDING A CP1616 IN AN EXISTING PROJECT

In an existing project with a D4x5 should a PC-Station (CP1616) be added. The PC-Station is added in NetPro. Additionally in the HW Configuration for the PC-Station a CU320 is added and parameterized.

2.1 Insert PC-Station(CP1616)

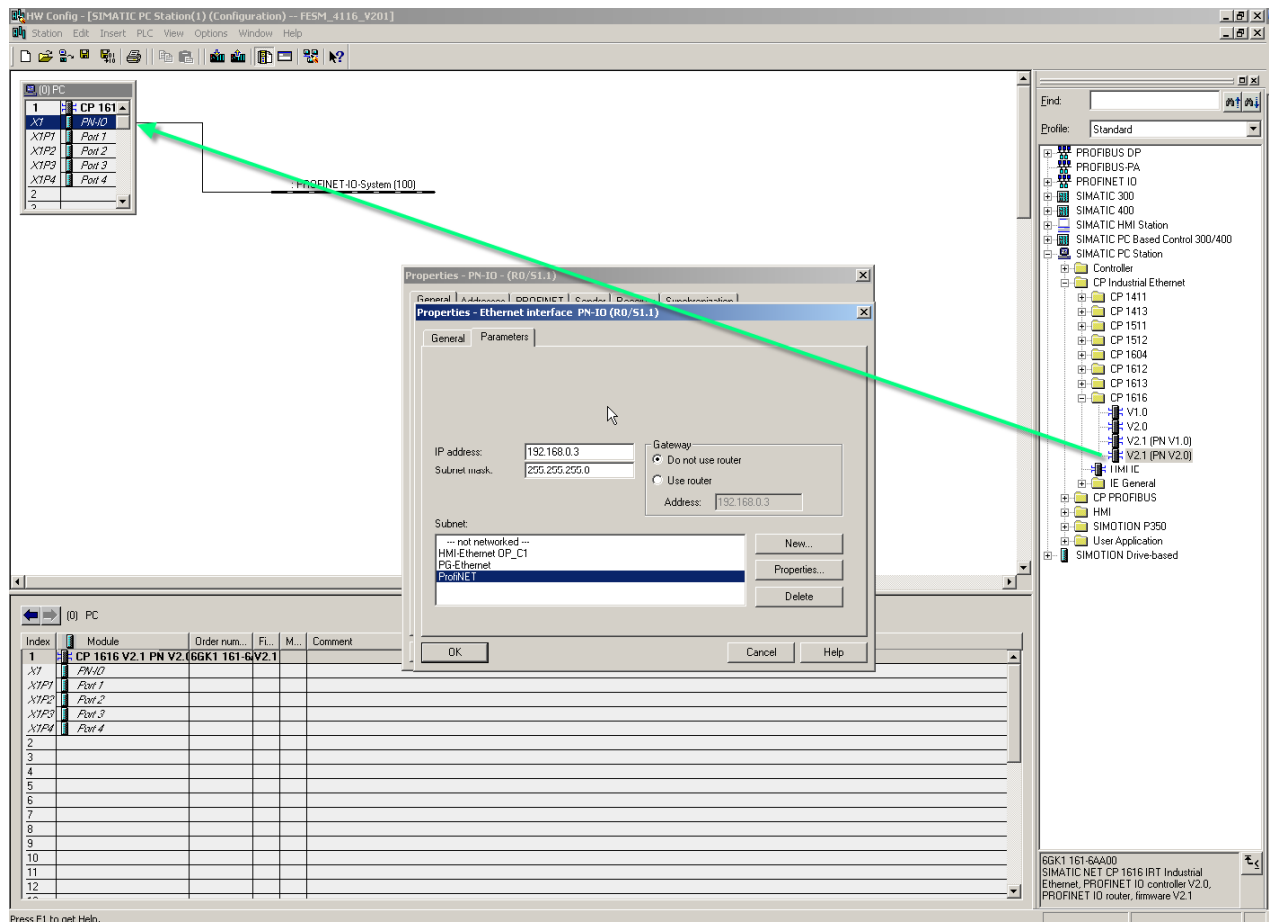
2.1.1 Open NetPro and insert PC-Station



2.1.2 Open HW-Config in the PC Station with a double click to insert the CP1616

2.1.3 Inserting the CP1616

When inserting the CP1616 the window properties-Ethernet interface opens, in which the Ethernet Subnets between CP1616 and SIMOTION D4x5 must be configured.



2.1.4 Assign the ethernet interface

In our example the ethernet interface with the name ProfiNET is assigned.

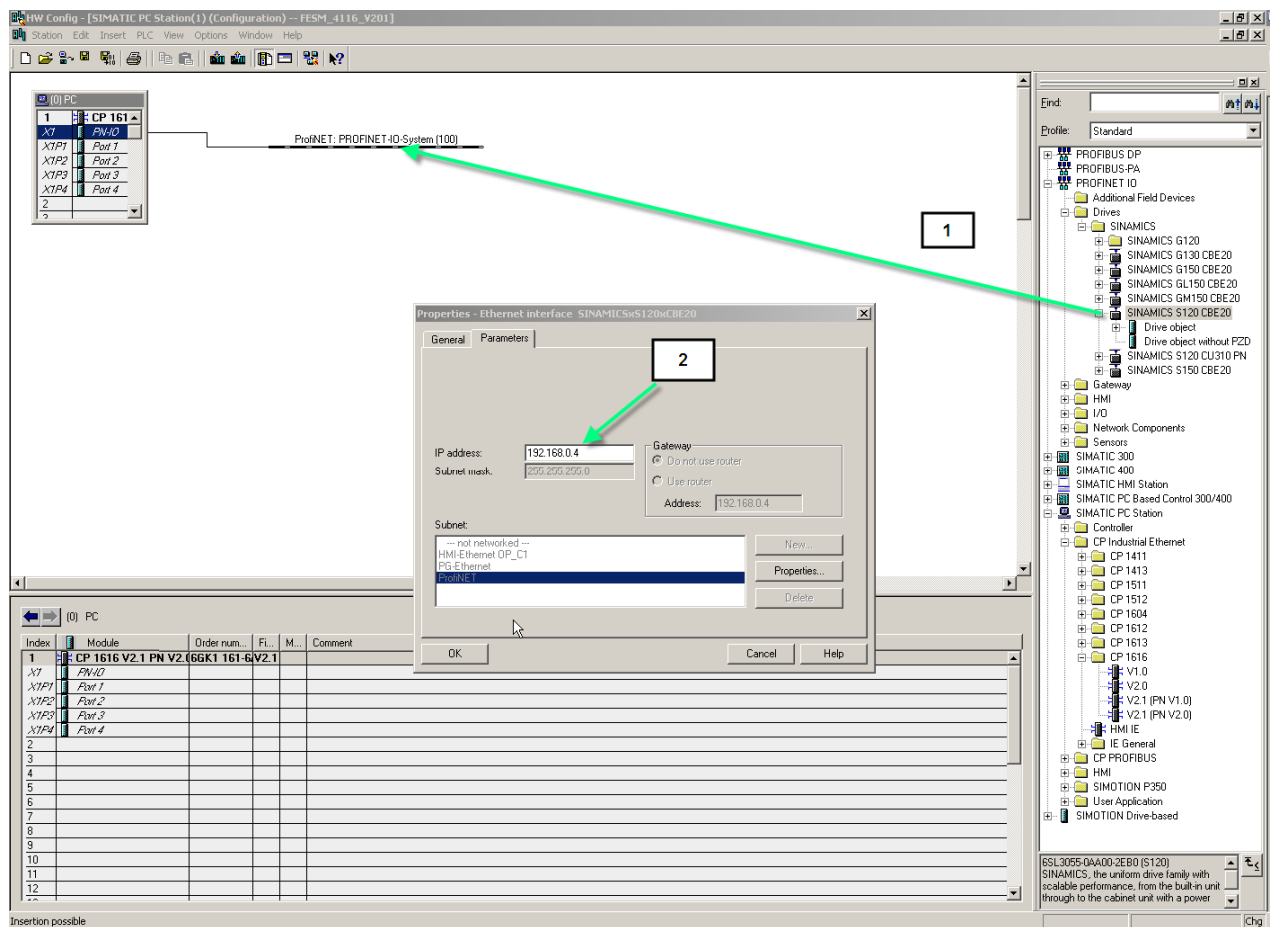
2.1.5 Addressing the CP1616

Now the addressing of the CP1616 is carried out: In our example the IP-Address 192.168.0.3 is selected.

2.1.6 Insert a SINAMICS CU320

In the hardware catalogue is the hardware SINAMICS S120 CU320 with the version xx selected and inserted (Pkt 1).

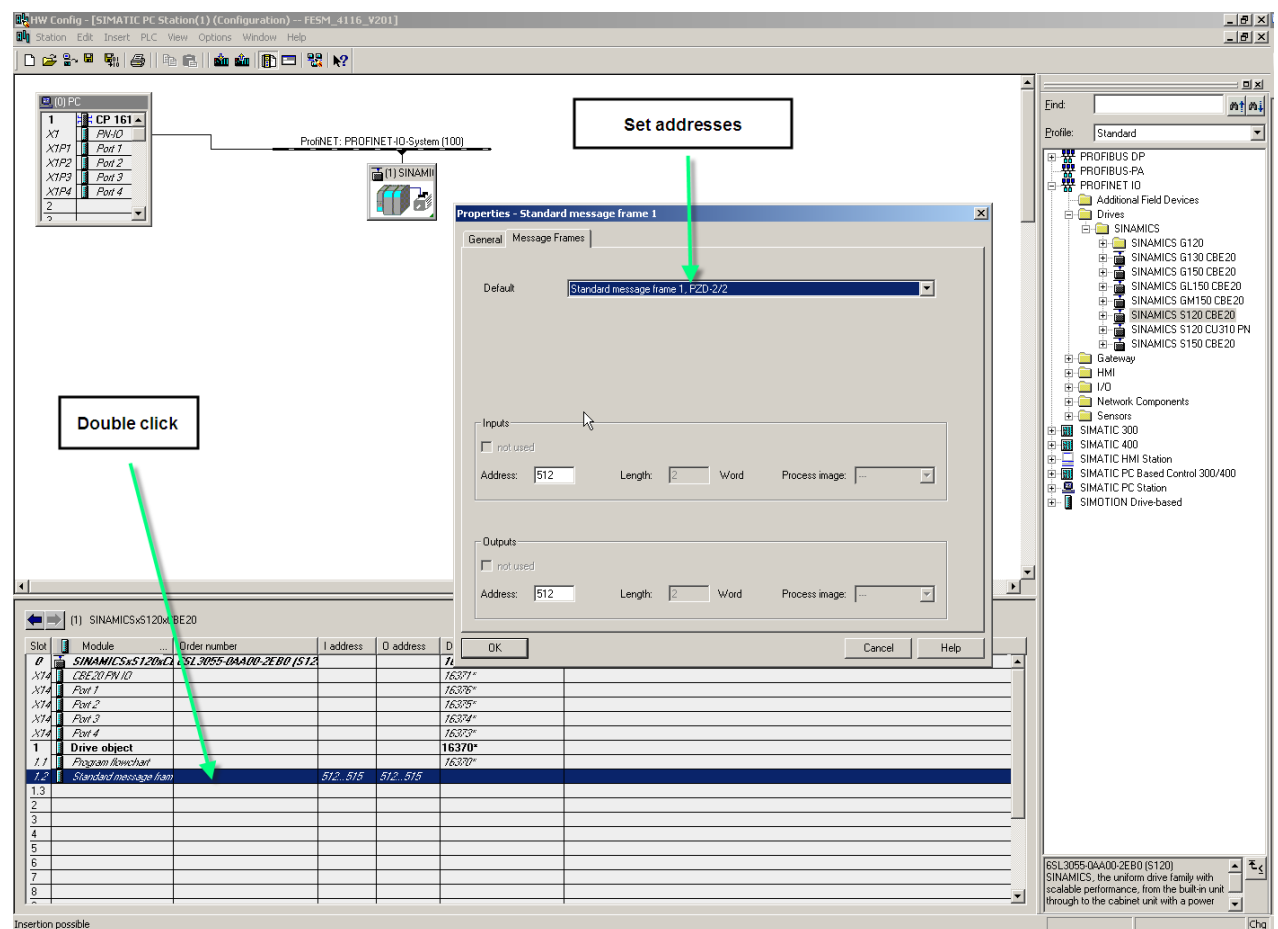
When inserting the SINAMICS component the window Properties -Ethernet interface opens, in which the IP-Address for the SINAMICS-unit is defined. (Pkt 2)



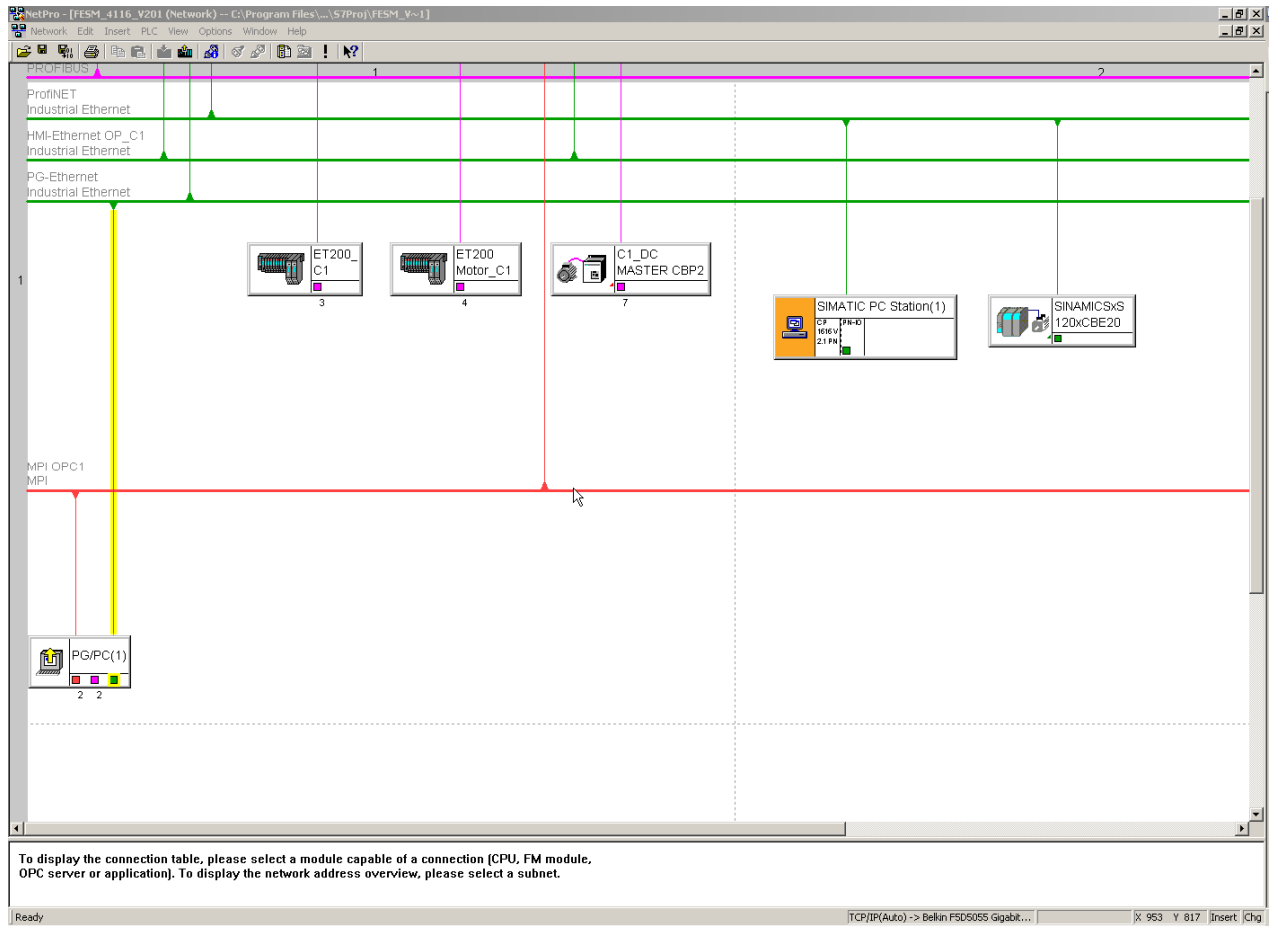
2.1.7 Define Telegram length for PDA-Recording

Below the SINAMICS-component must the Address area and Telegram length for the PDA-recording be defined.

This can be done with a double click on -Standard message frame- which opens the properties window in which this is defined under register -Message Frames.



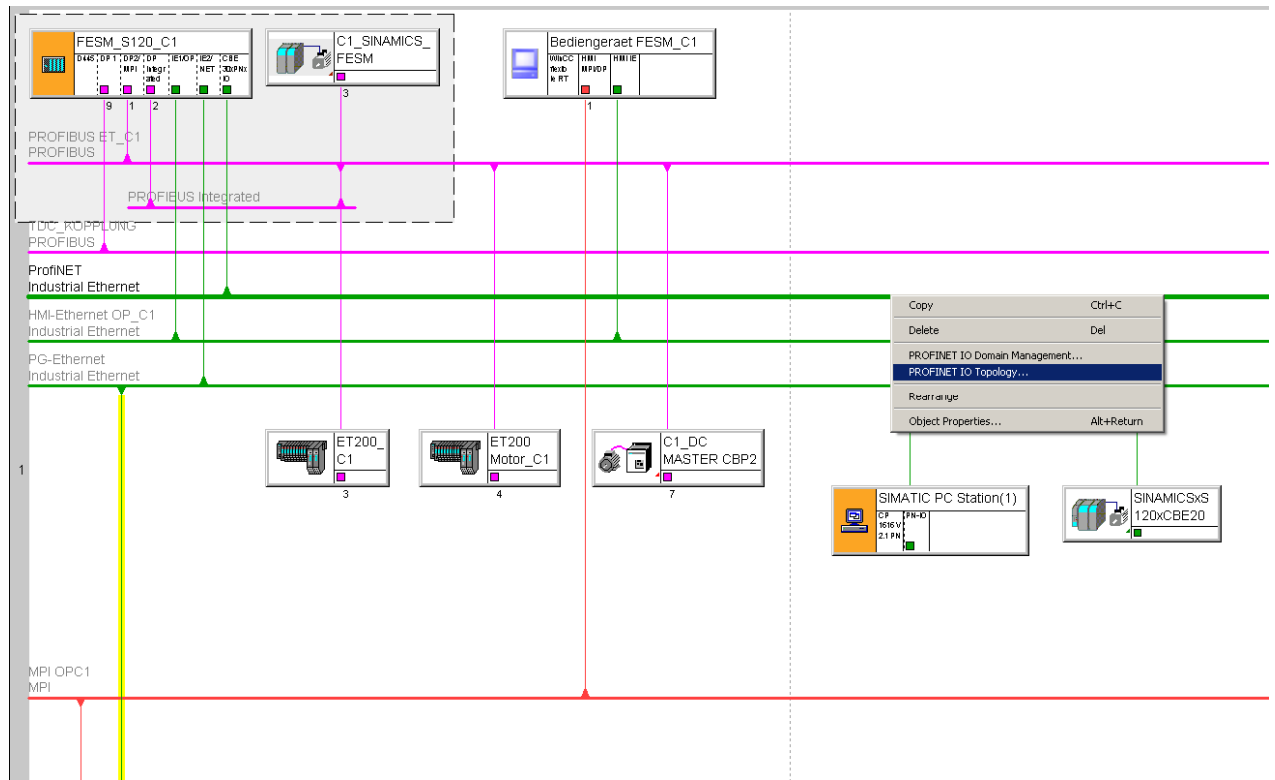
Hint: The assignment of the interface should be double checked in Netpro.



2.2 Define PROFINET Topology

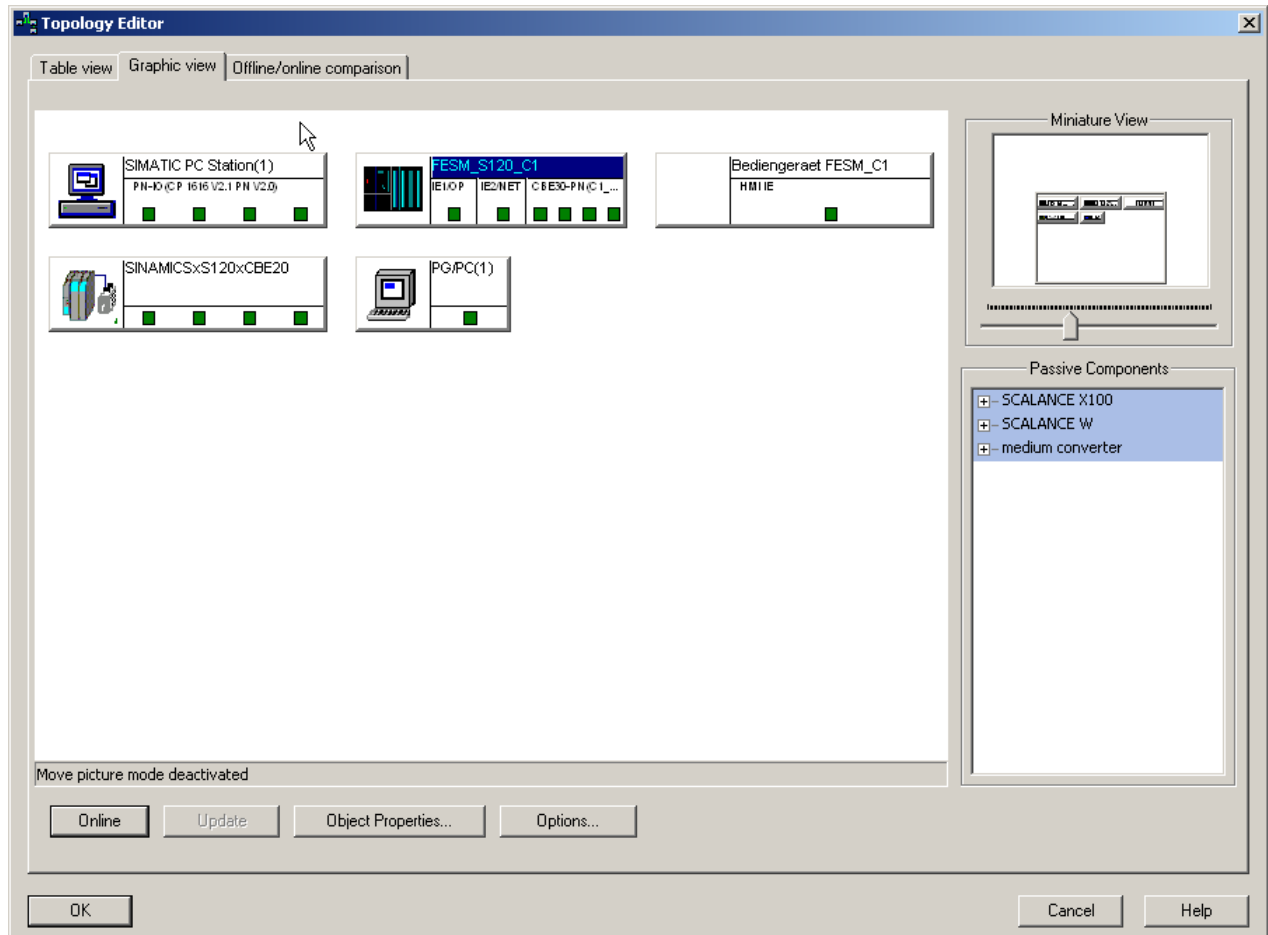
2.2.1 Selection of „PROFINET“ Interface using the right mouse key

When selecting the PROFINET- Interface using the right mouse key the context menu opens. In context menu the row - PROFINET IO Topology – is to be selected.



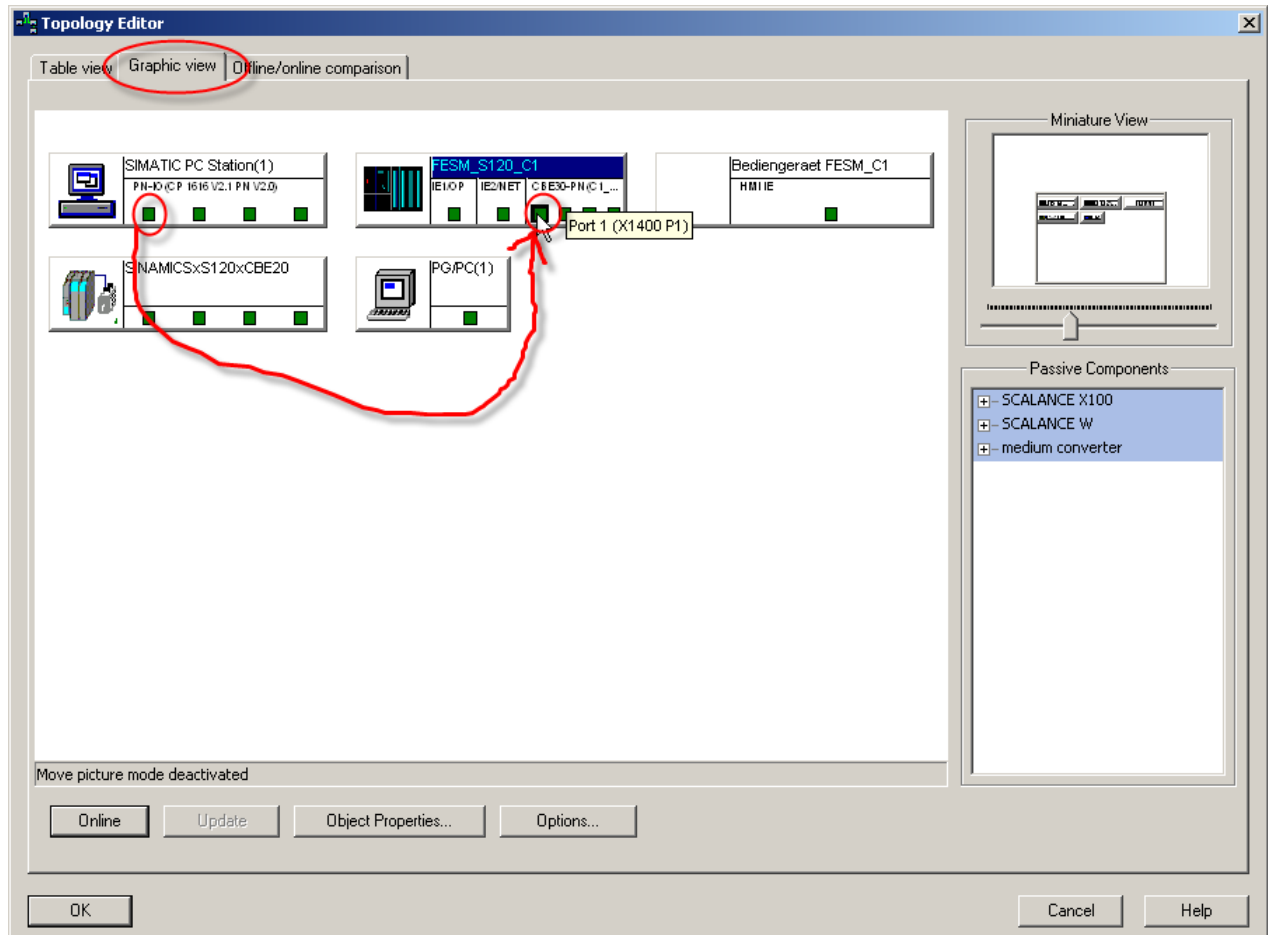
2.2.2 By selecting PROFINET IO Topologie a new window opens

2.2.2.1 Select Register – Graphical view



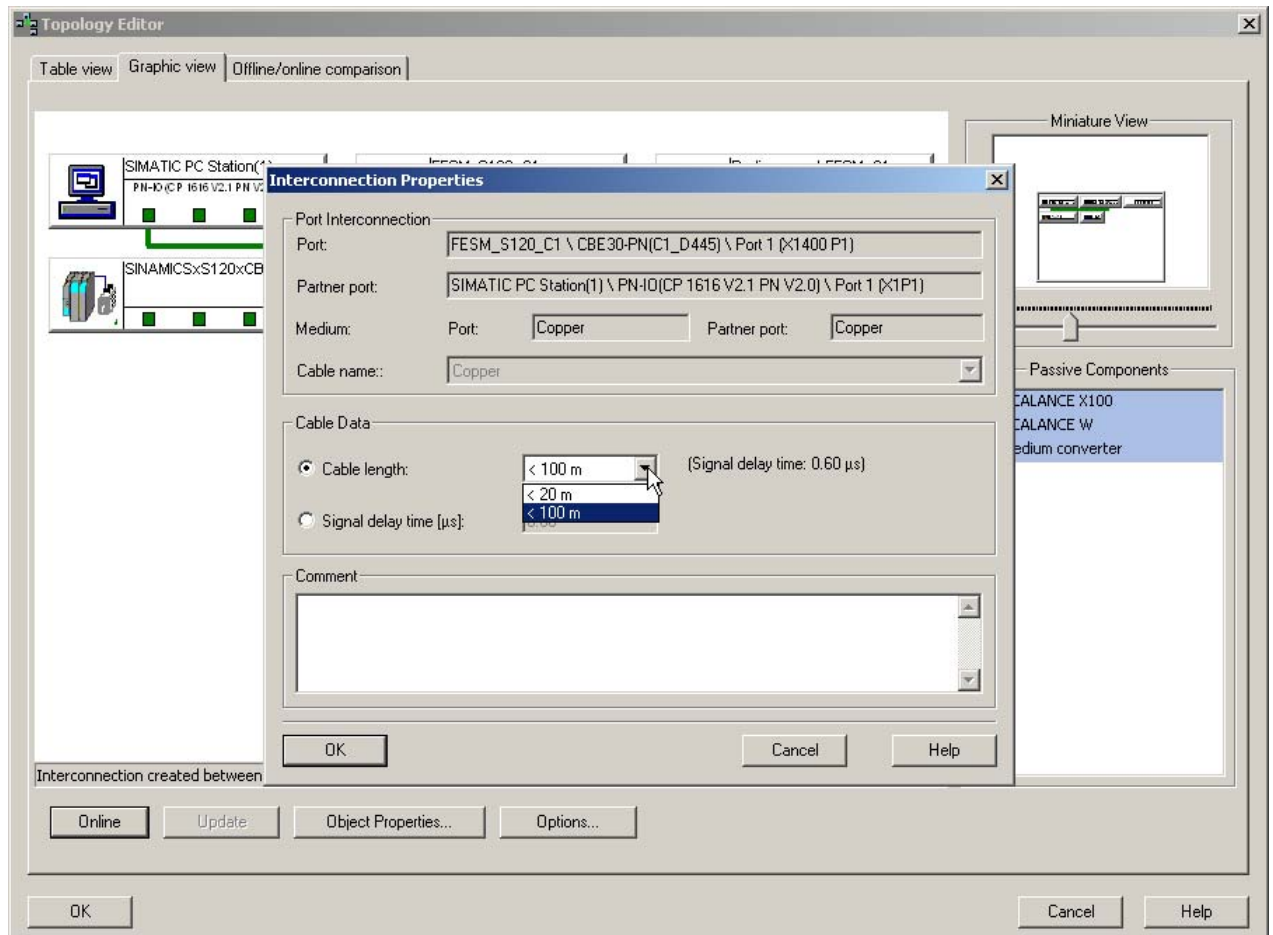
2.2.2.2 Selection of the ports that are to be connected.

Selection of the port with the left mouse key. The left mouse key must remain pressed. The mouse pointer has to be moved to the port that is to be connected. When the mouse key is released the connection is active.



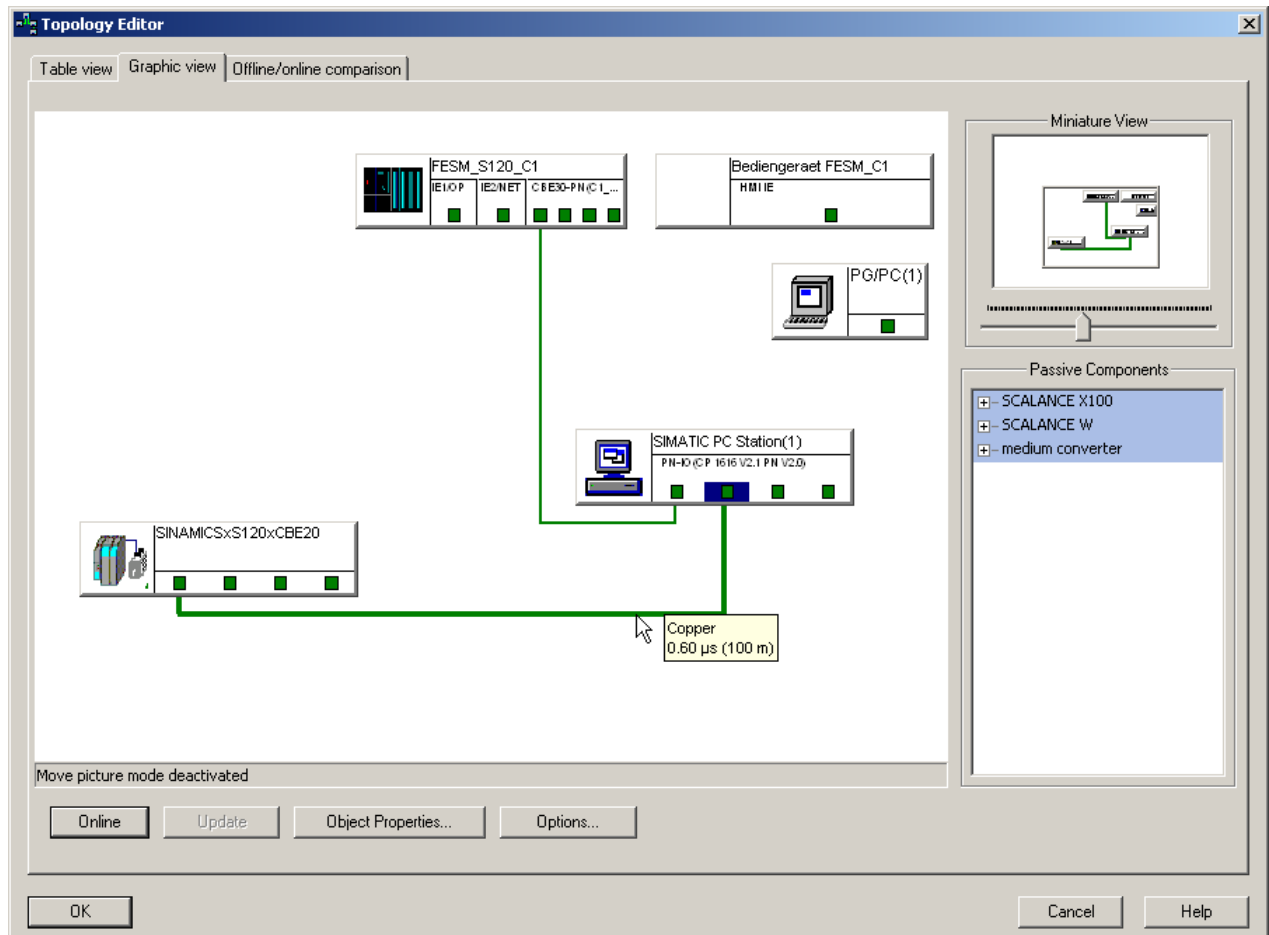
2.2.2.3 Define the cable length

The cable type and length must be defined. Confirm the window with OK.



2.2.2.4 Confirm the Topology wiring in Topology editor

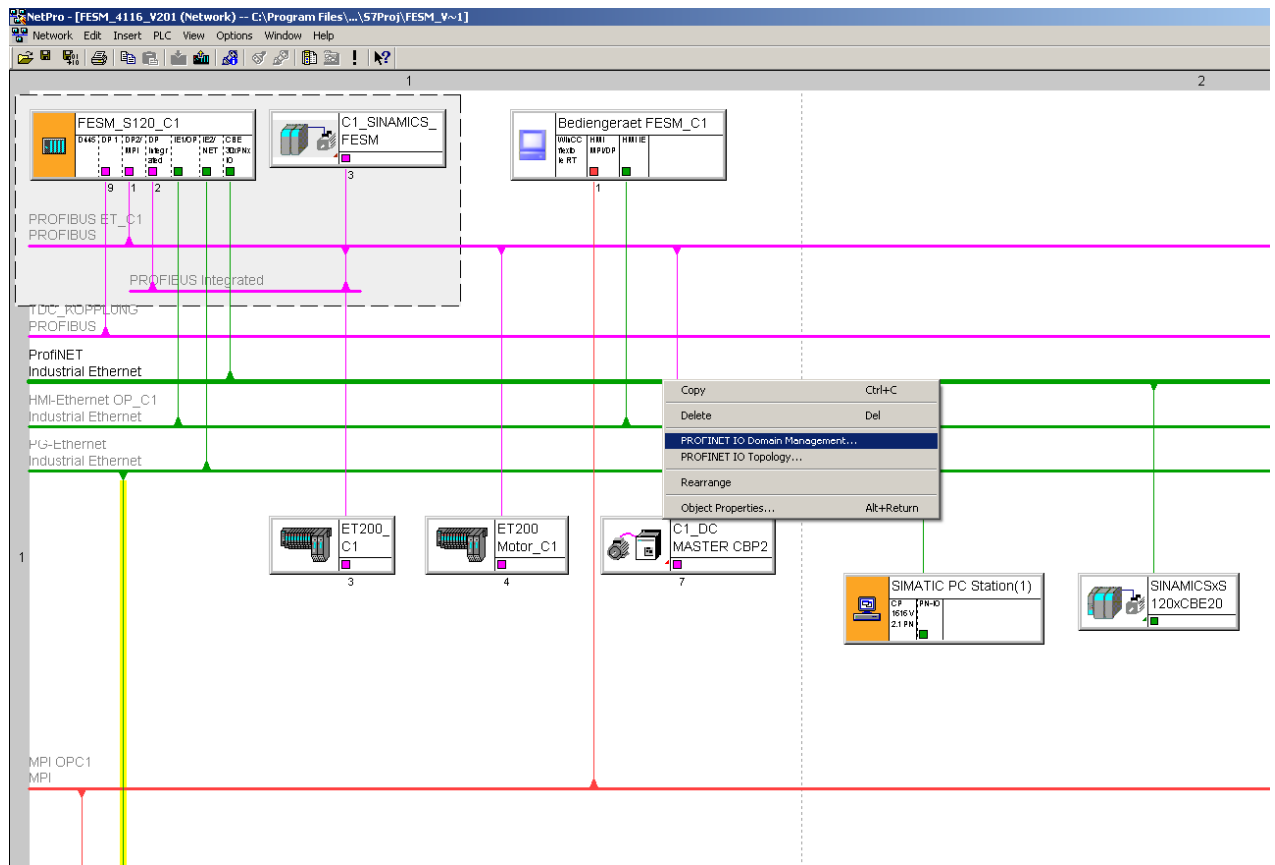
By confirming with OK is the Topology wiring finished.



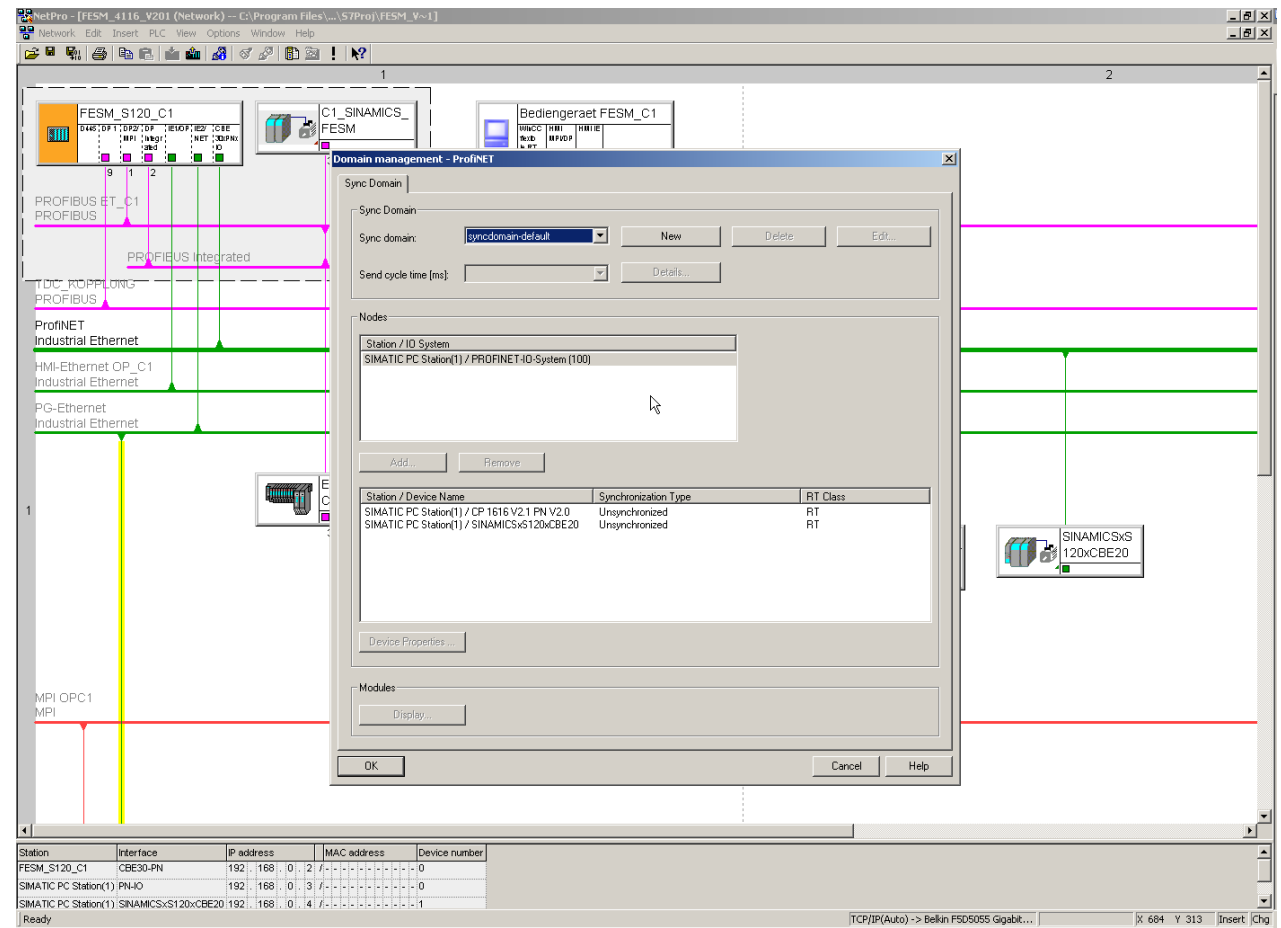
2.3 Define the PROFINET Domain

2.3.1 Select the „PROFINET“ interface with the right mouse key

When selecting the PROFINET-interface with a right mouse click the context menu opens. In the context menu the row - PROFINET IO Domain Management – should be selected.



2.3.2 By selecting PROFINET IO Domain Management a new window opens



2.3.3 Define the Sync-Master and Sync-Slave correlation

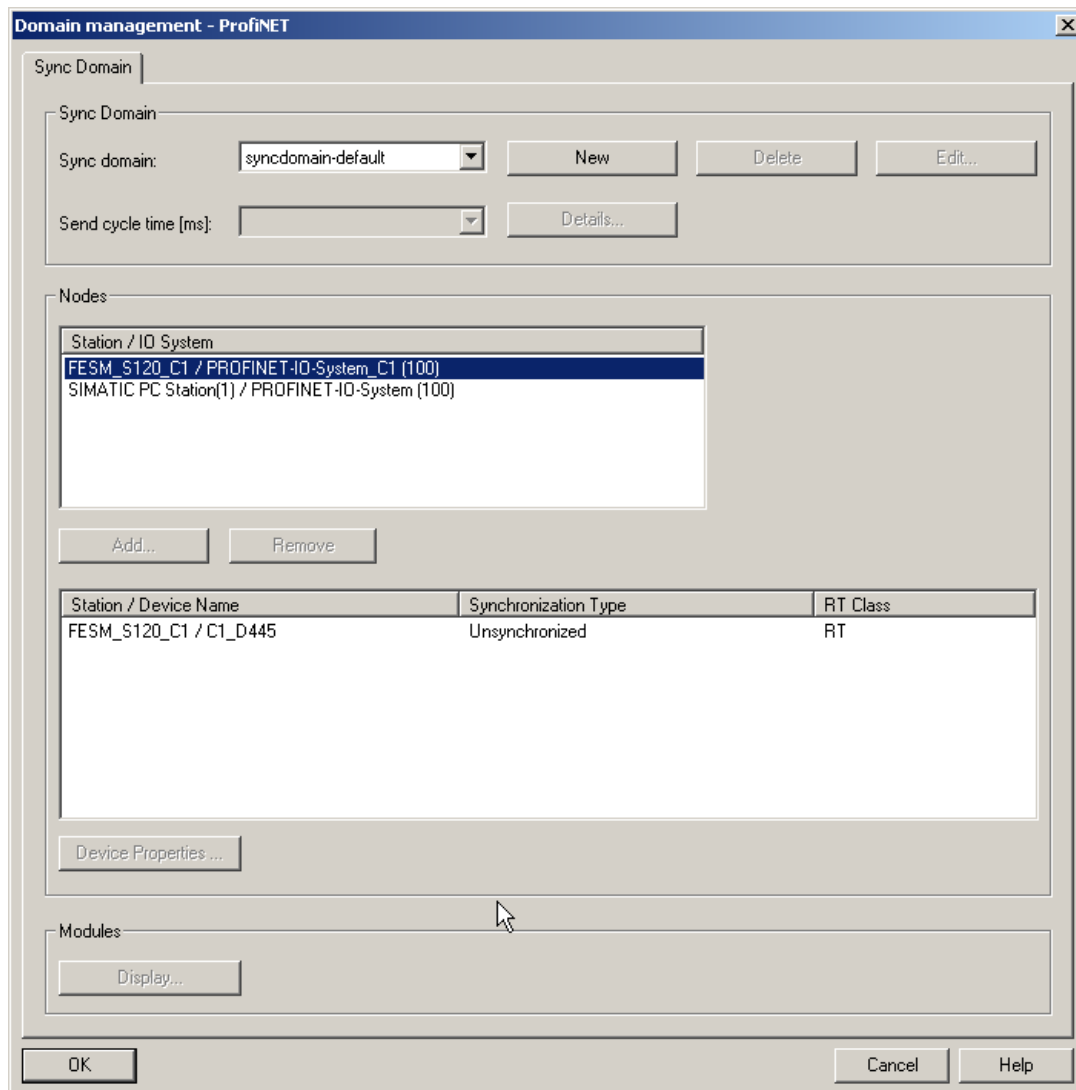
Chose the controller that should be Synch-Master in the PROFINET-system.

As Sync-Master a controller should be chosen that has a significance for the process → for example: A main drive.

We in our example have only one SIMOTION D4x5 controller, so we define this as Sync-Master.

Hint: A PC-Station (CP1616) should not be programmed as a Sync-Master, if SIMOTION - controller are used, because the PDA – System could be switched off independent of the drives and so the communication master for the SIMOTION – controller is missing.

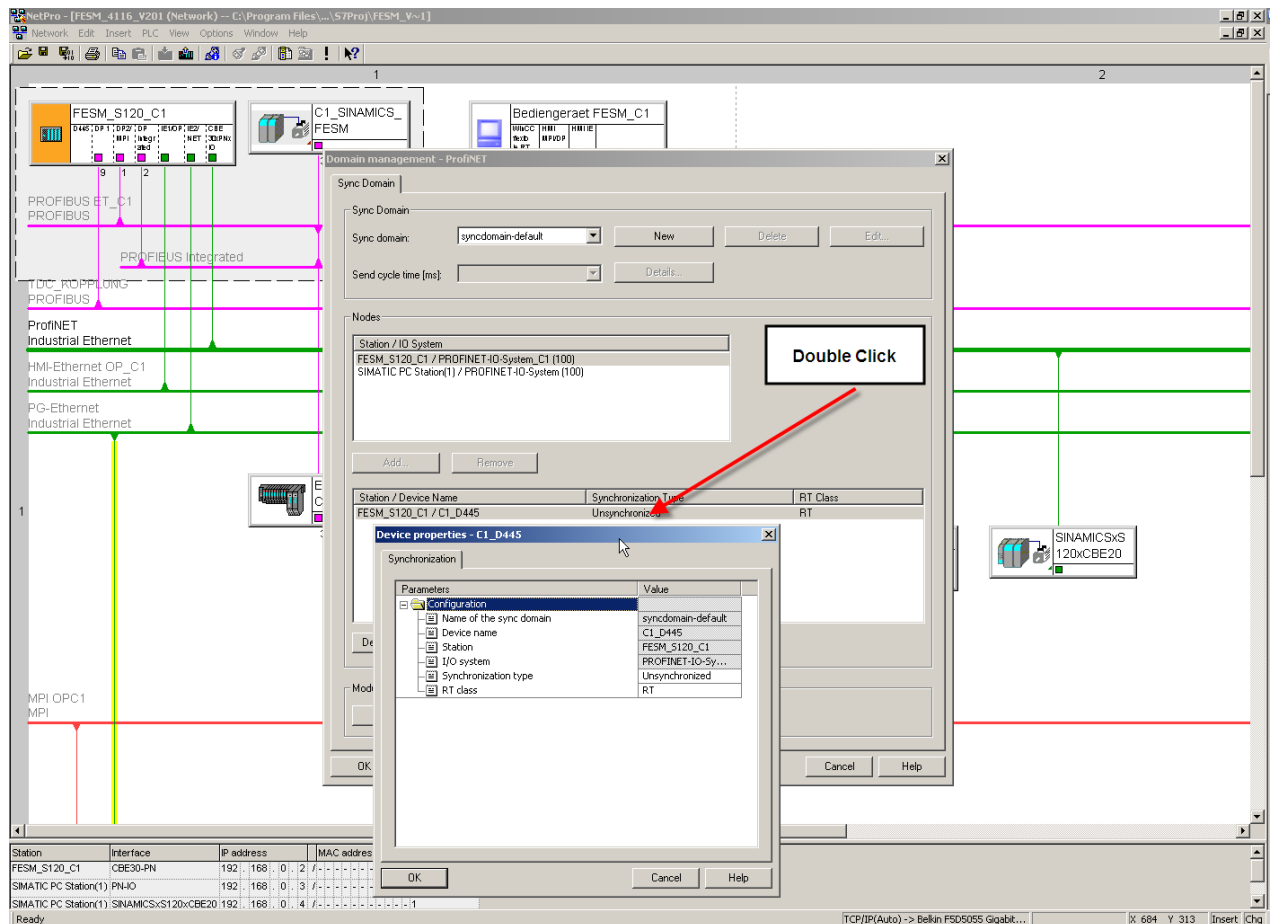
In a project with PDA and SINAMICS's CU's, the CP1616 has to be programmed as PROFINET Synch-master, because only the CP1616 is able to be the Synch-Master of this configuration. All the SINAMICS CU's with CBE20 have to be programmed as Synch-Slave.



2.3.3.1 Define the Parameterization for the Sync-Master

Select the participant – in our example – FESM_S120_C1 / PROFINET-IO-System_C1

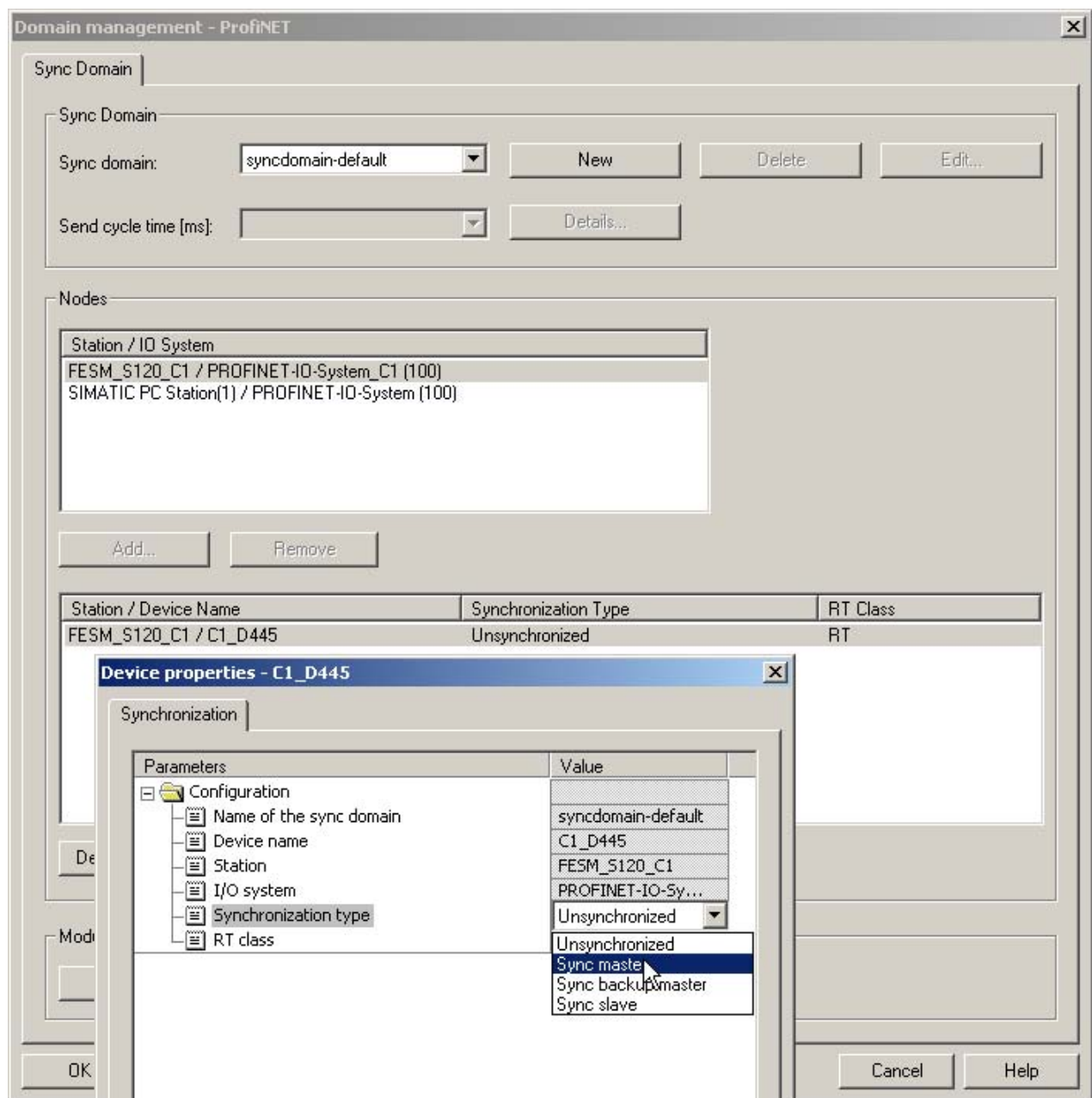
By a double click on „Station/device name“ – in our example – FESM_S120_C1 - the window device properties for C1_D445 opens.



2.3.3.2 Defining the type of synchronizing

The SIMOTION D4x5 controller should be defined as Sync-Master on the PROFINET-Bus.

Sync-Master should be chosen.

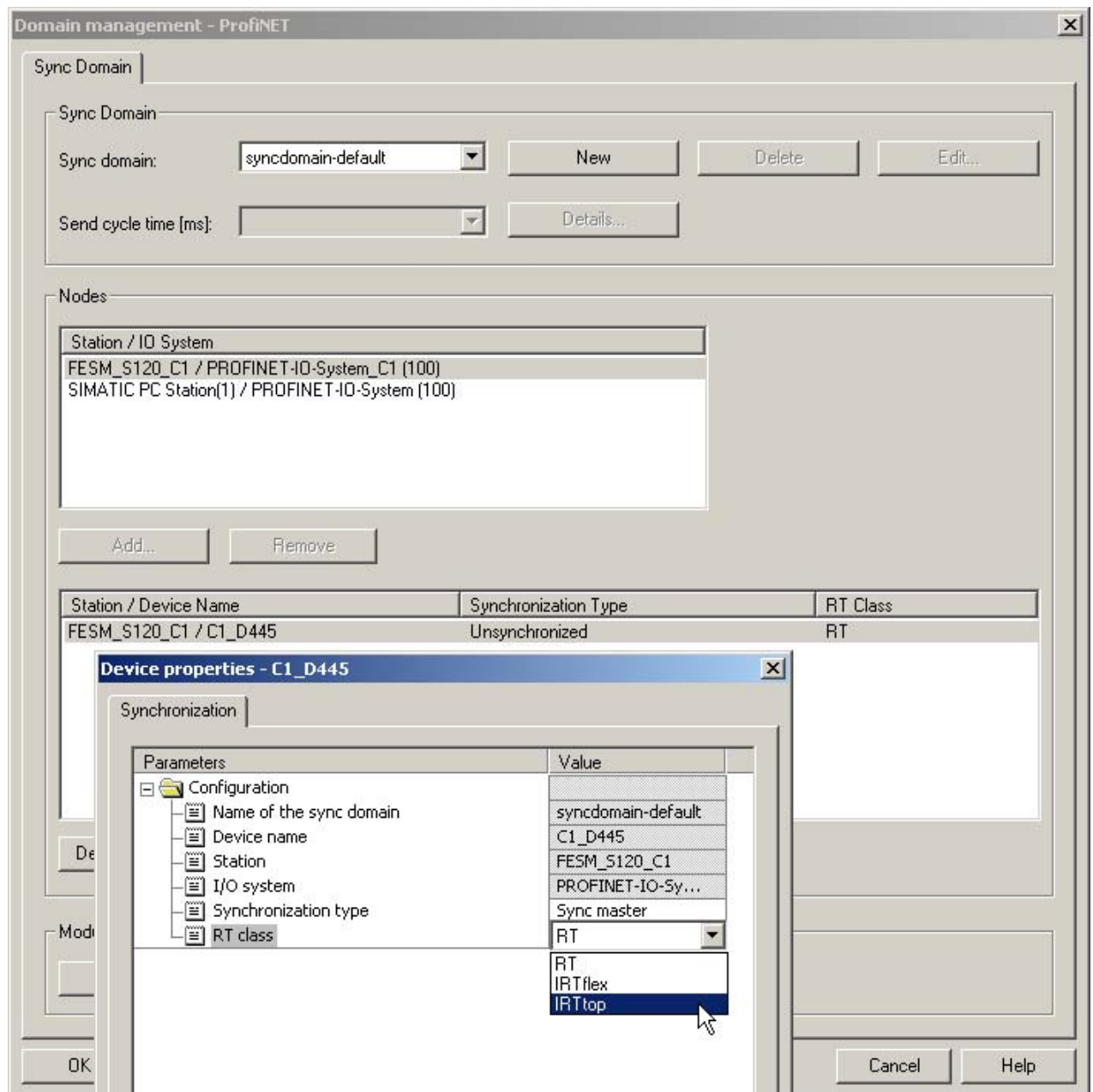


2.3.3.3 Defining the RT-class

When using PROFINET and PDA is the RT-class – IRT TOP – to be selected.

Confirm the window with OK.

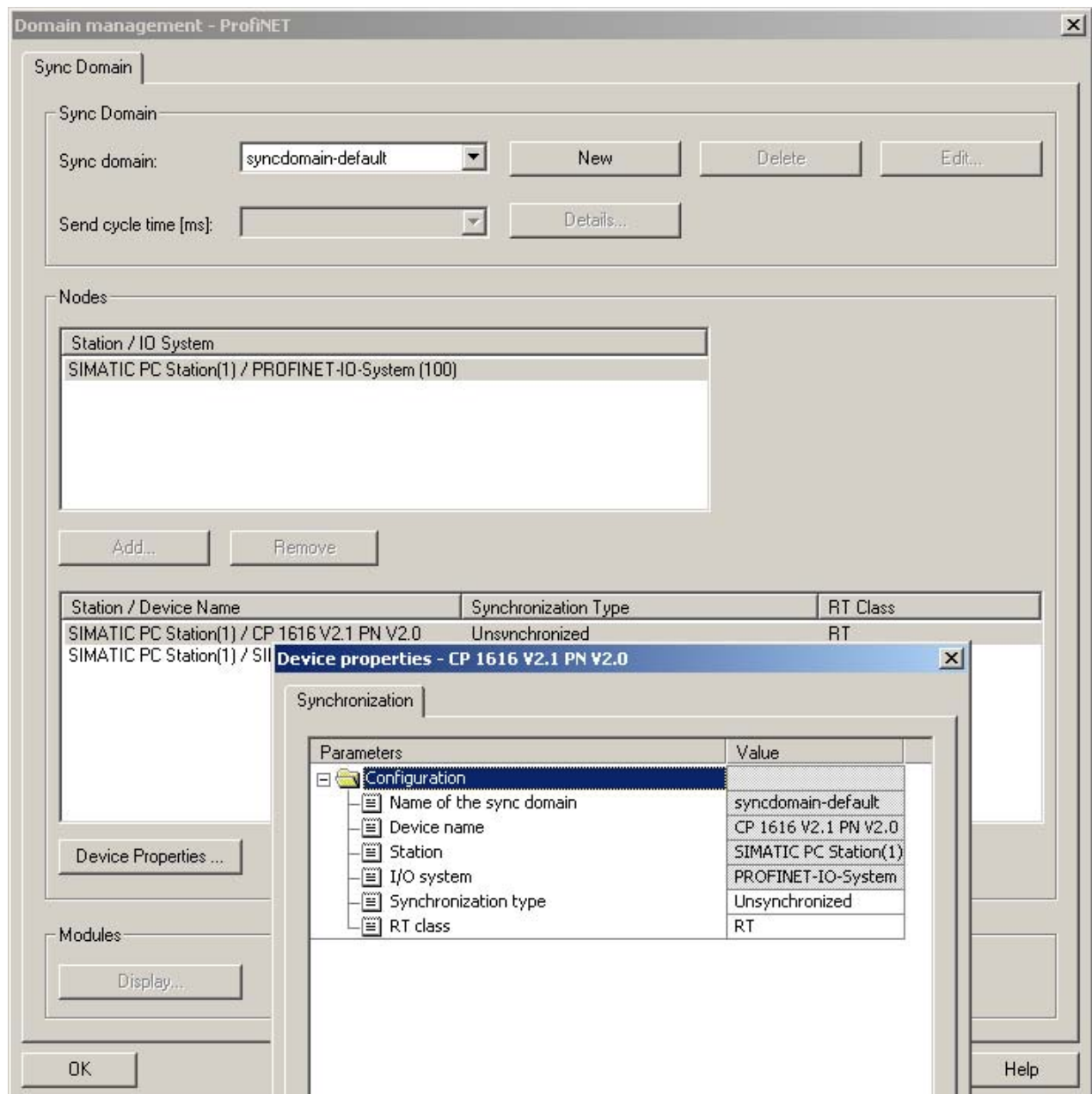
The settings for the Sync-Master are then completed.



2.3.3.4 Define the Parameterization for the Sync-Slave

Select the participant – in our example –SIMATIC PC-Station.

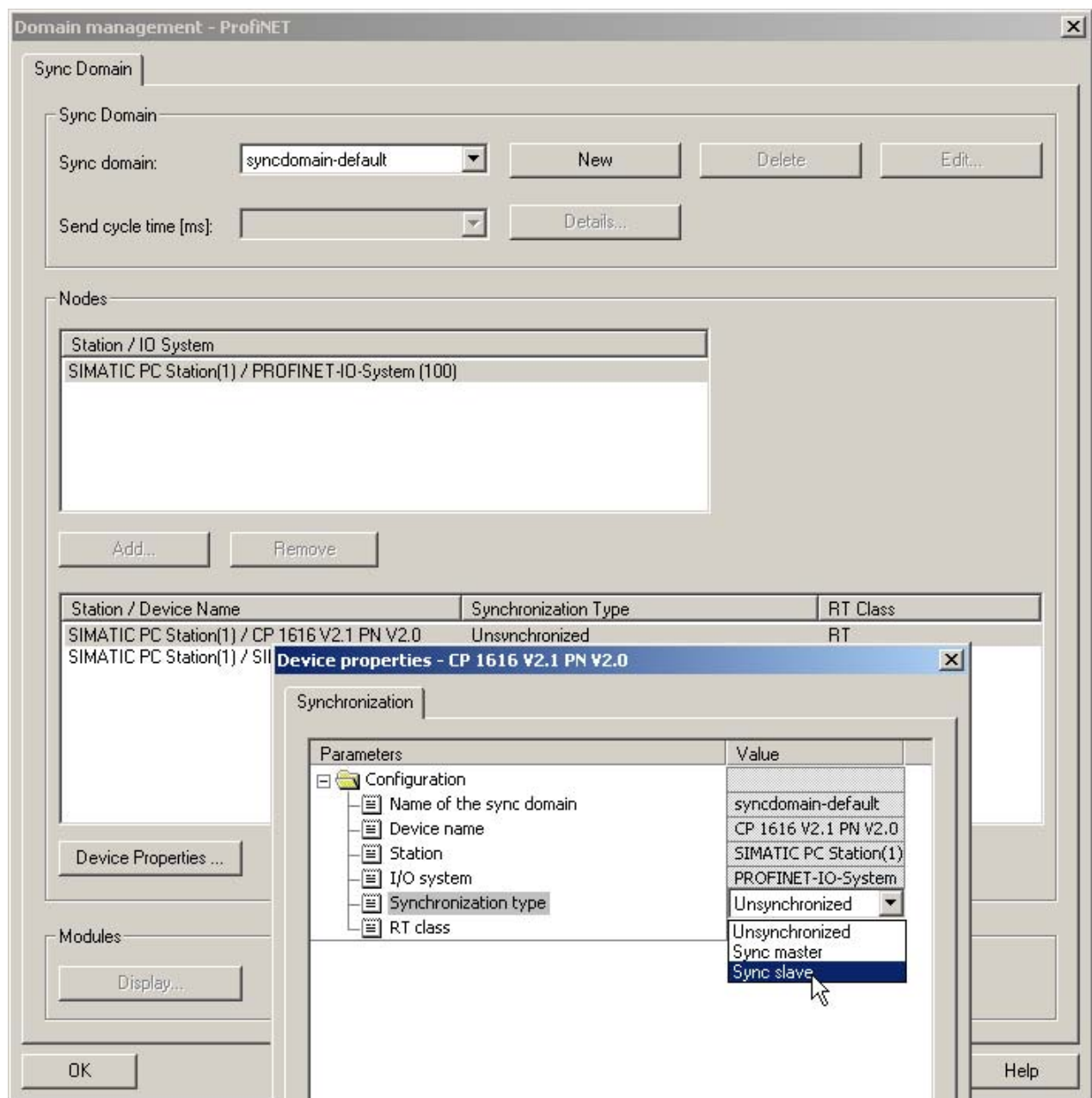
By a double click on „Station/device name“– SIMATIC PC-Station- the window properties for the device CP1616 opens.



2.3.3.5 Defining the type of synchronizing

The CP 1616 should be defined as Sync-Slave on the PROFINET-Bus.

Sync- Slave should be chosen.

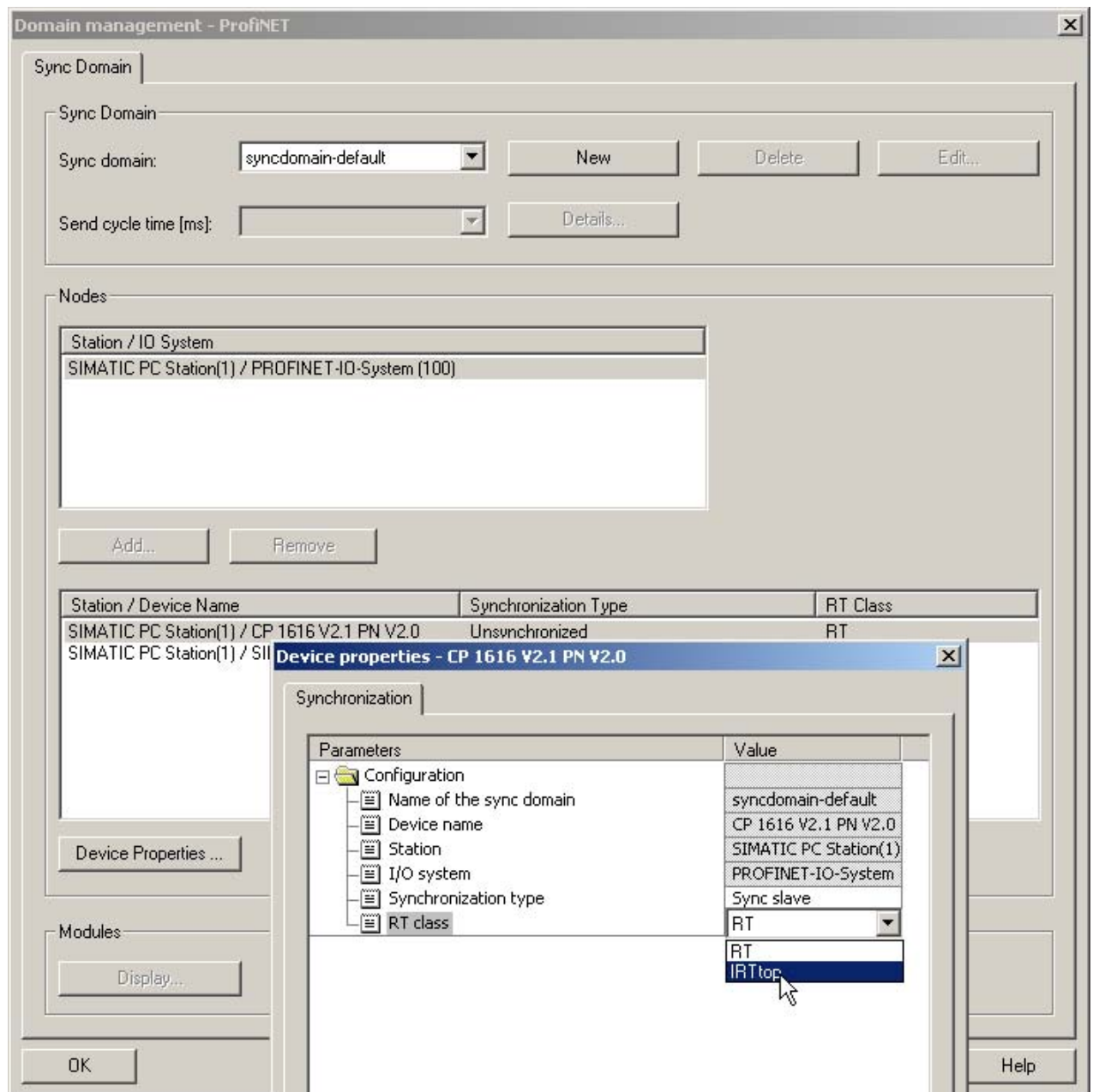


2.3.3.6 Defining the RT-class

When using PROFINET and PDA is the RT-class – IRT TOP – to be selected.

Confirm the window with OK.

The settings for the Sync- Slave are then completed.

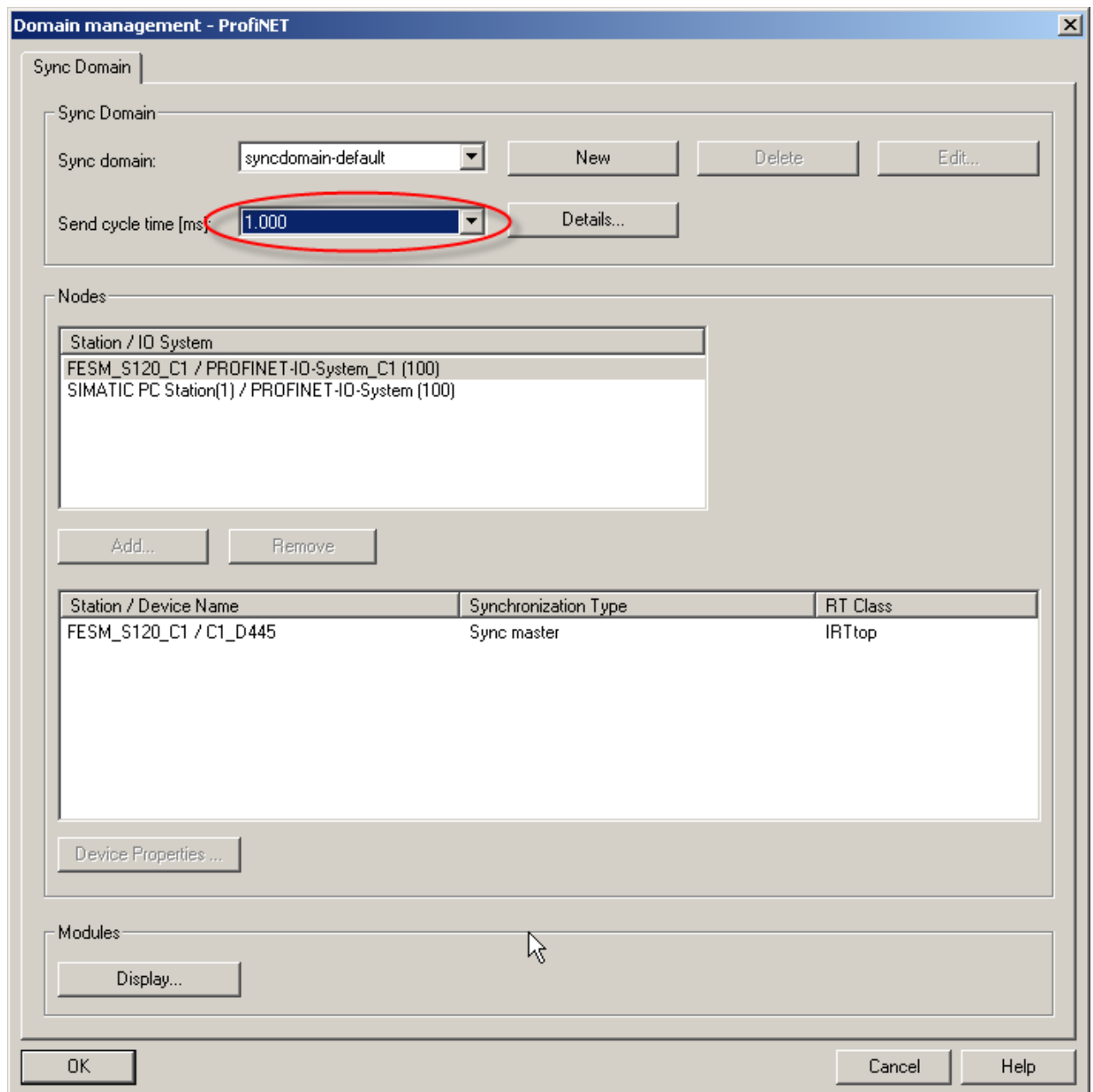


2.3.3.7 Defining the - PROFINET Sending cycle

The PROFINET – Sending cycle must be an integer based on the Servo-Cycle (T1) of all SIMOTION controllers on this PROFINET Line.

In our example is the basic clock rate set at the DP-Cycle of 4ms.

There is the possibility to decrease the sending cycle of the PROFINET, which is not considered in this document.



2.3.3.7.1 Checking the basic clock rate

The basic clock rate (DP-cycle) of the SIMOTION controllers can be checked in the HW-config .

DP slave properties

General Configuration Isochronous Operation

☒ Synchronize drive to equidistant DP cycle

Network settings in ms

Equidistant bus cycle activated

Equidistant DP cycle: 1.500 Data_Exchange_Time comp. Tdx: 0.000

Master application cycle Tmapc [ms]: 1.500 = 1 x 1.500

DP cycle Tdp [ms]: 1.500 = 12 x 0.125

Time Ti [ms] (actual value acquisition): 0.500 = 4 x 0.125

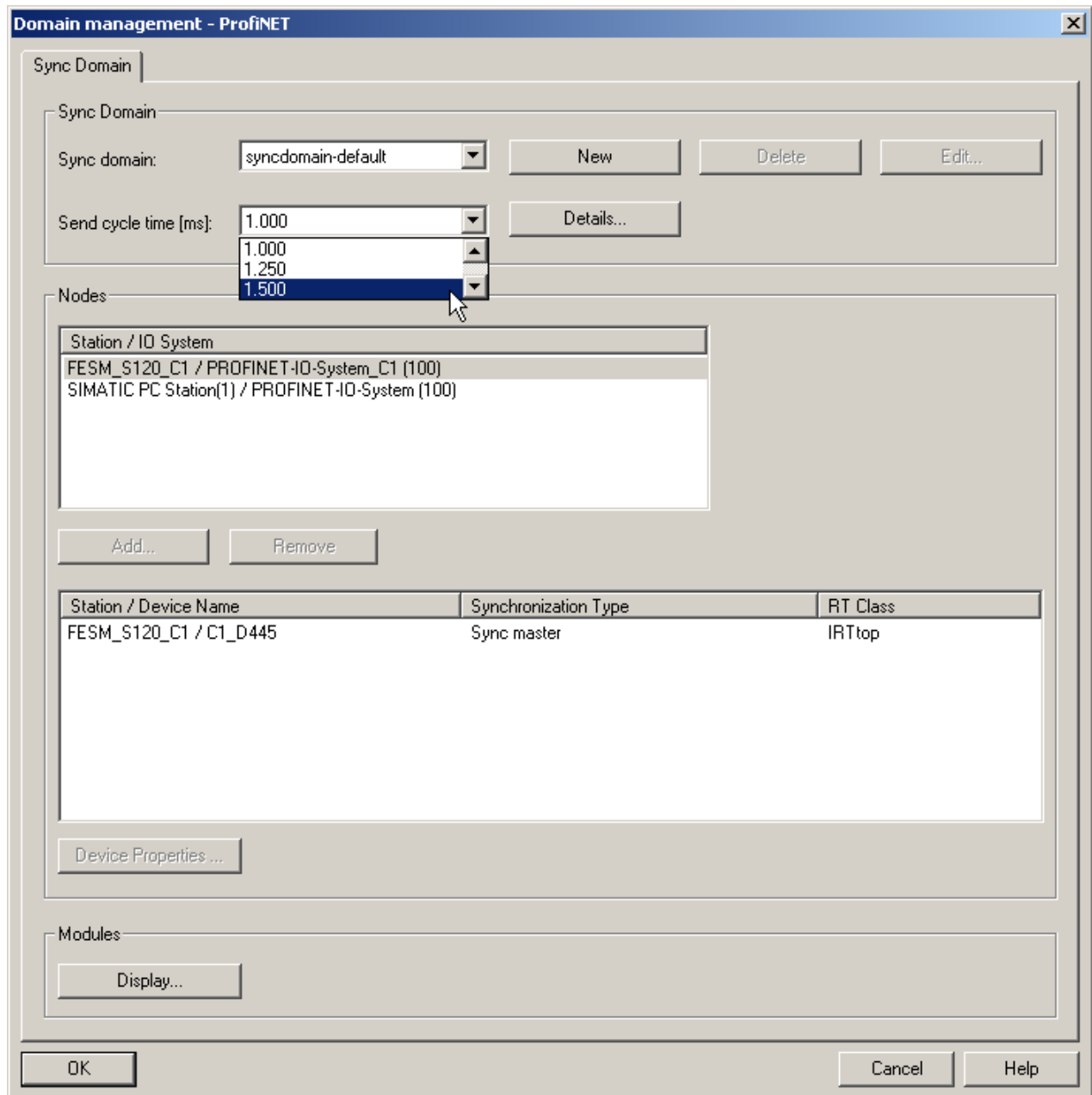
Time To [ms] (setpoint acceptance): 0.500 = 4 x 0.125

Slot	M	Message frame selection / default	I address	Q address
4	Drive	User-defined	286...319	
5	Drive	User-defined	286...319	
6	Drive	User-defined		
7	Drive	SIEMENS message frame 380, P2D-2/2	604...613	
8	Drive	SIEMENS message frame 380, P2D-2/2	604...613	
9	Drive	User-defined		
10	Drive	User-defined	548...555	
11	Drive	User-defined	548...555	
12	Drive	User-defined		
13	Drive	User-defined	556...563	
14	Drive	User-defined	556...563	
15				
16				
17				
18				
19				
20				

Press F1 to get Help.

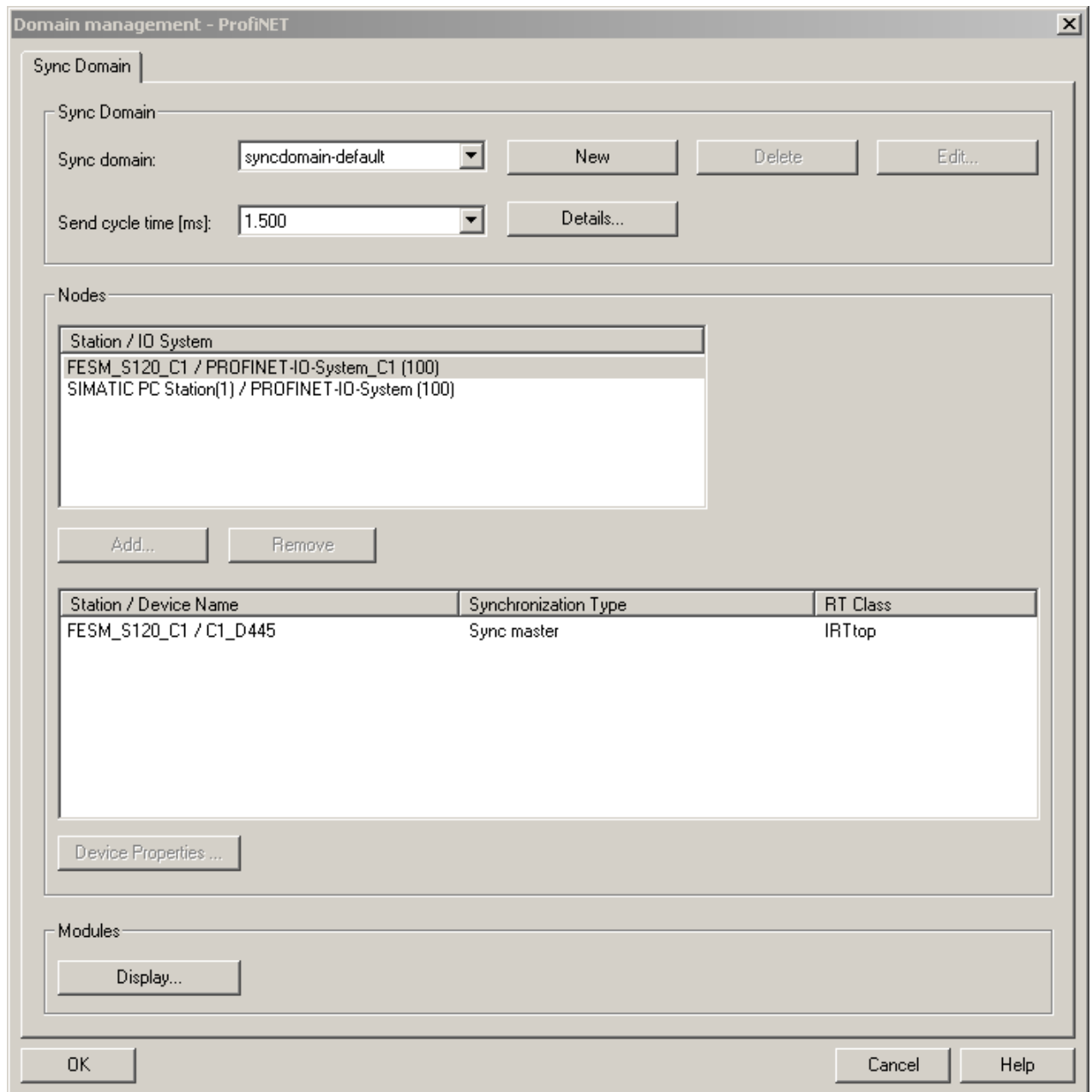
PROFIBUS-DP slaves for SIMATIC S7, M7, and C7 (distributed rack)

2.3.3.8 Adjust the - PROFINET Sending cycle to the DP-cycle of the controllers



2.3.3.9 Confirm the Domain Management

By confirming with OK is the adjustment of the Domain Management finished.



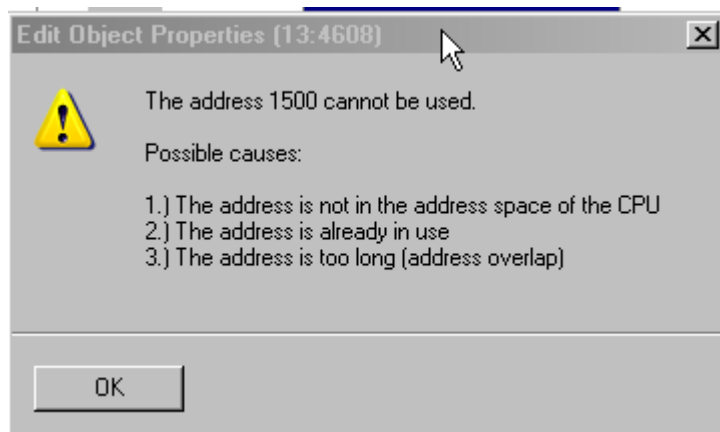
2.4 Defining the data for the PDA

In our example we have only one SIMOTION – Controller, for which we have to define the send area for PROFINET. The Start address for the PDA data is 1024. The telegram length is 8 Words/ 16 Bytes.

Caution:

When there is a fault message coming when entering the address 1024 – see below, this can be caused by the „DUMMY-device“ in the project, which is used to keep the address space for a not yet existing PDA system.

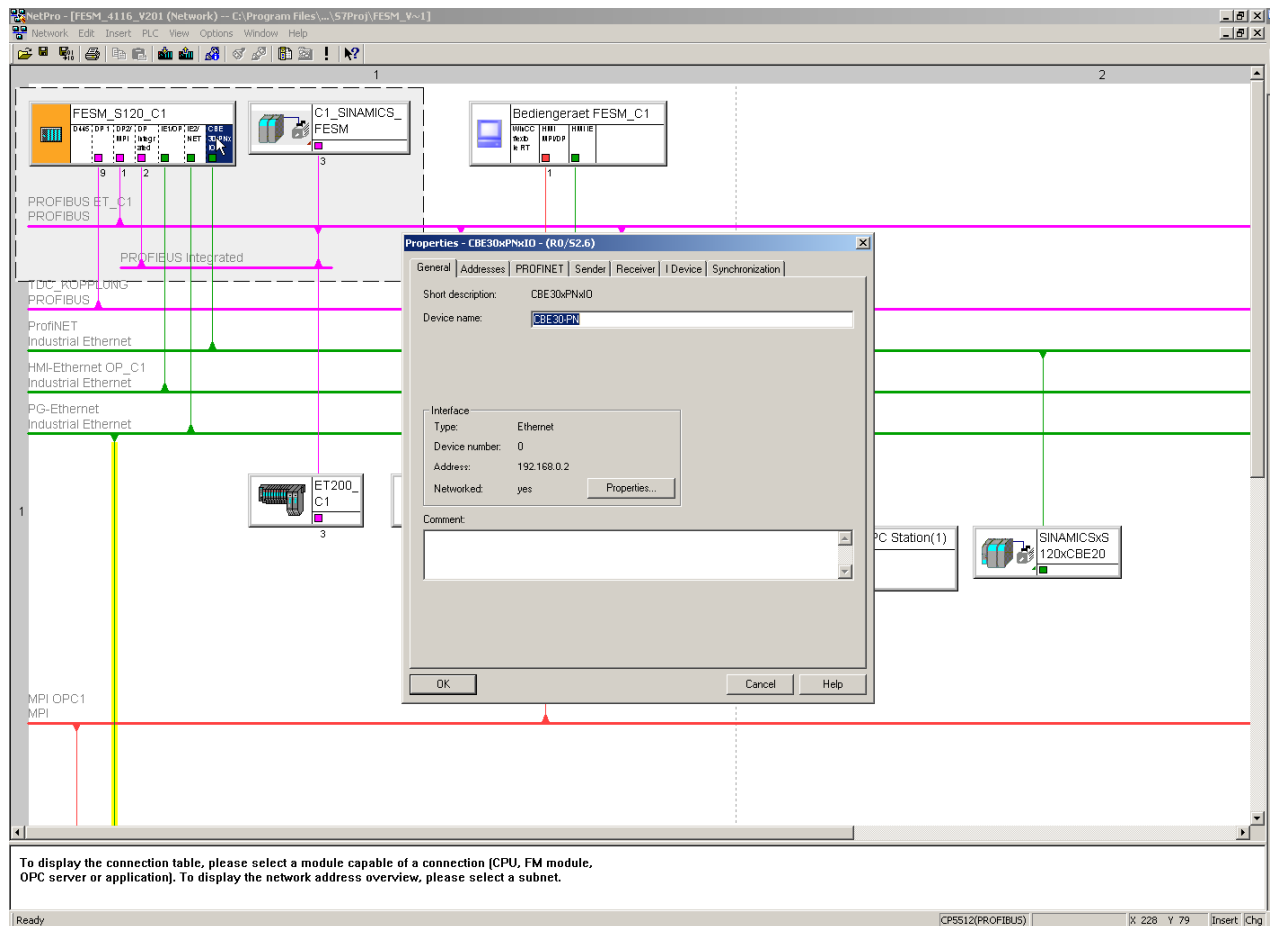
This „DUMMY-device“ must be deleted in the project.



2.4.1 Define the sending area for the SIMOTION

2.4.1.1 Double click on the CBE30 of the SIMOTION D

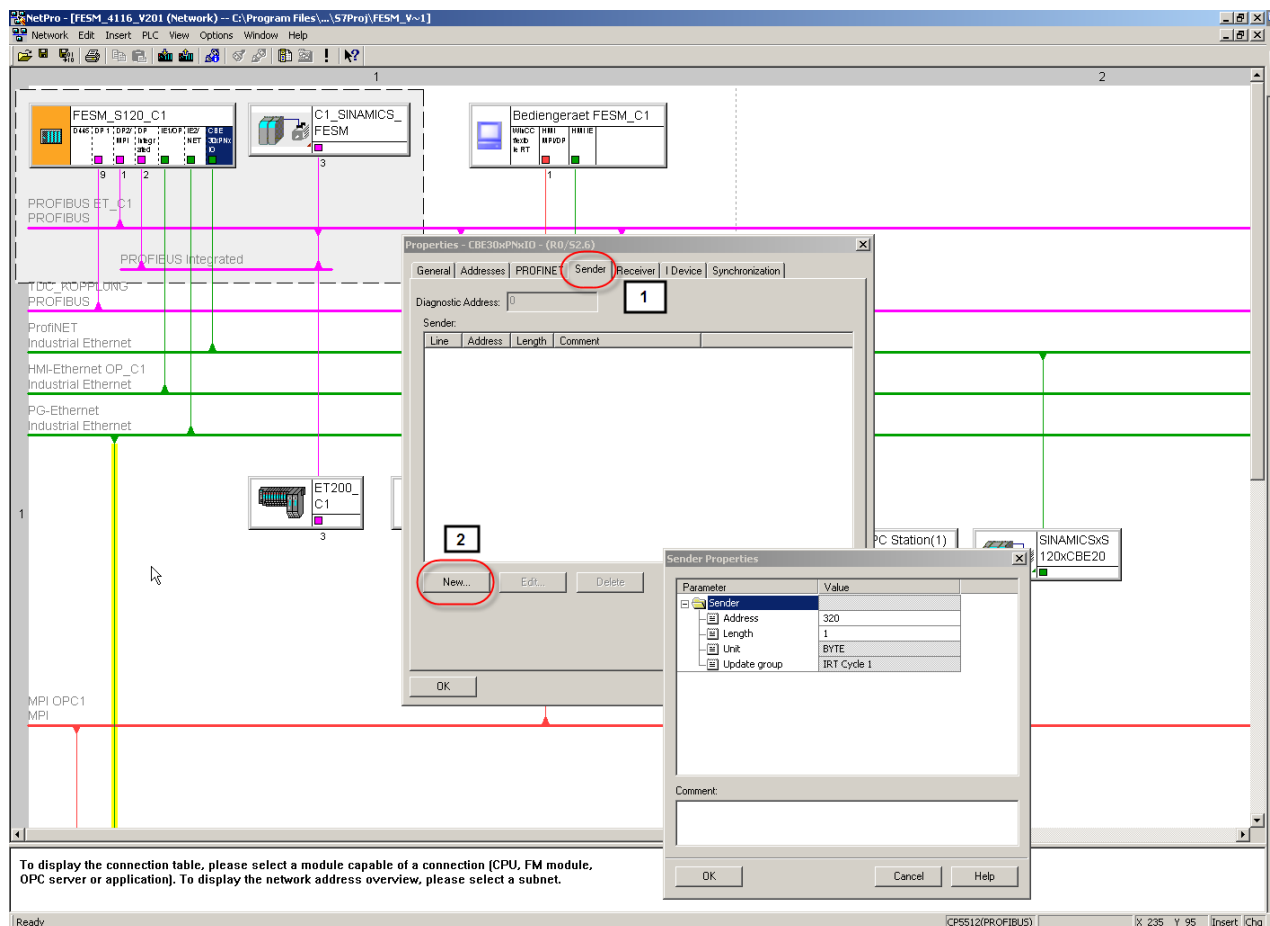
Through a double click on the CBE30 of the SIMOTION D device a new window opens.



2.4.1.2 Define the sending area

Select the Register – Sender (1)

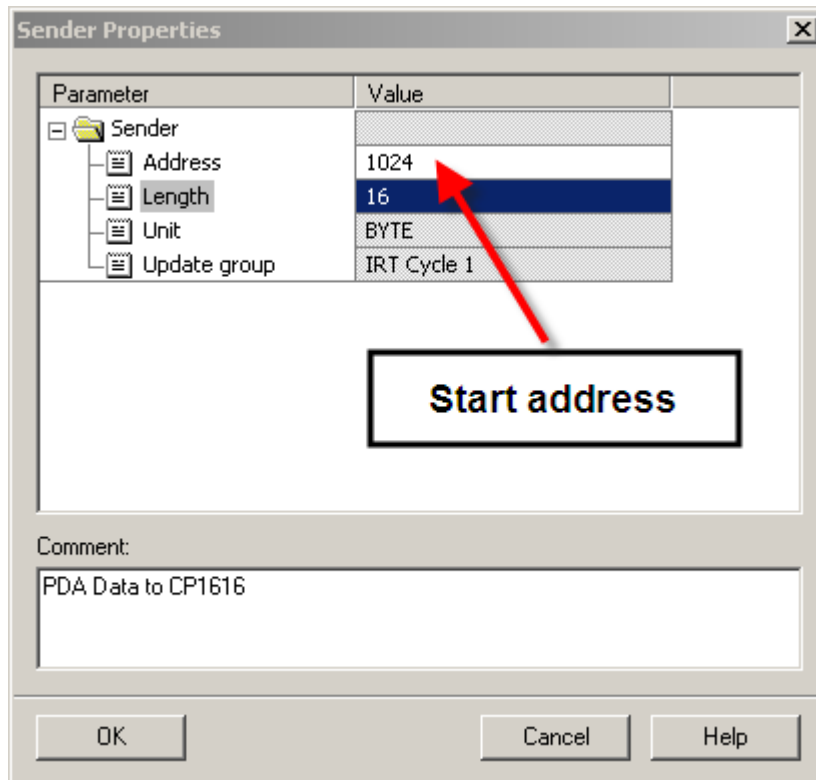
Select New(2) –the window properties sender opens.



2.4.1.3 Enter the address area for sending

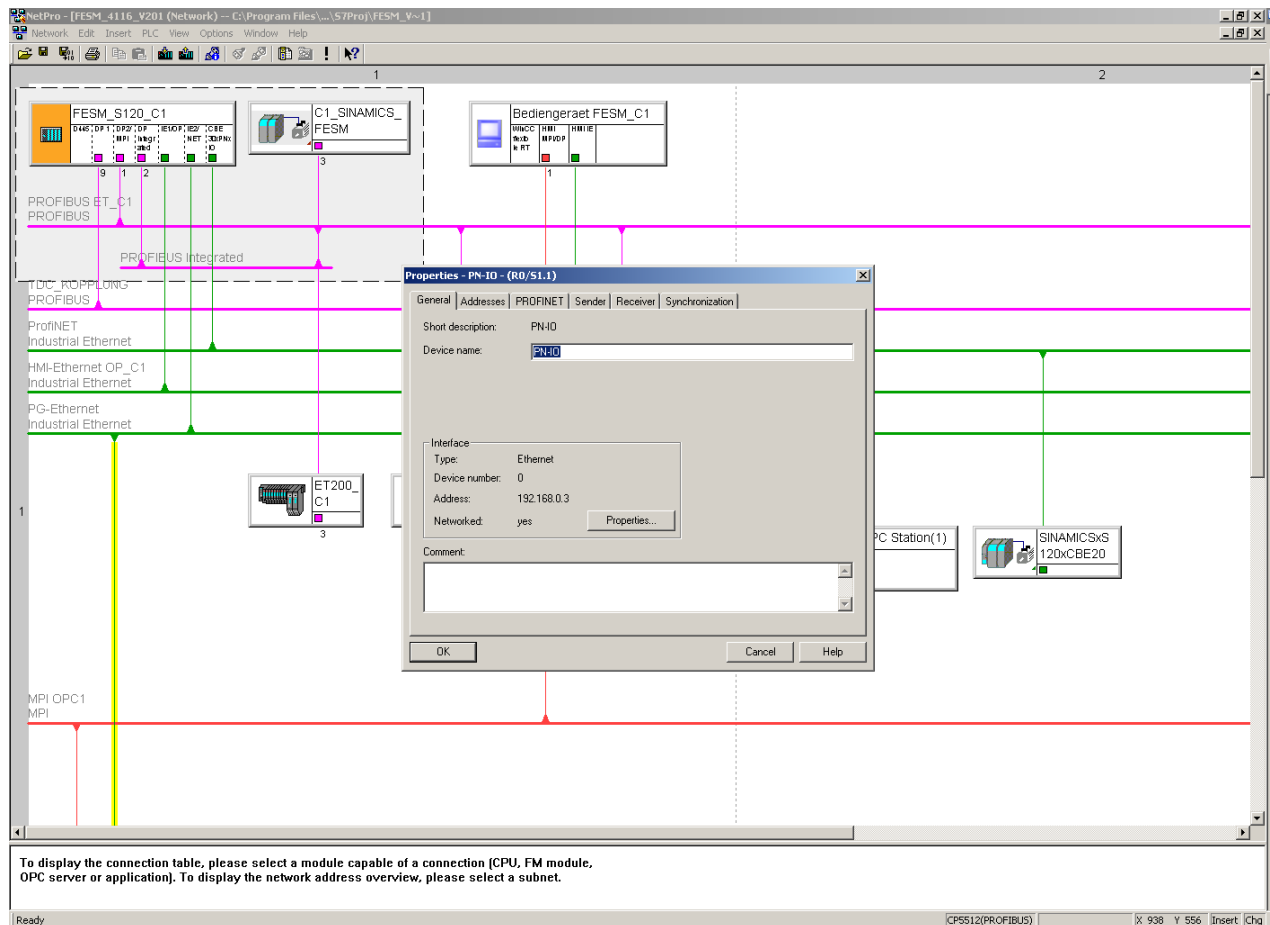
The start address for the PDA – Data is 1024 (The I/O – Variables in Scout are predefined for this area)

Note: Writing a comment makes it easier to define the addresses at a later date. By confirming with the window OK is the defining of the sending area finished



2.4.2 Define the receive area for the CP1616

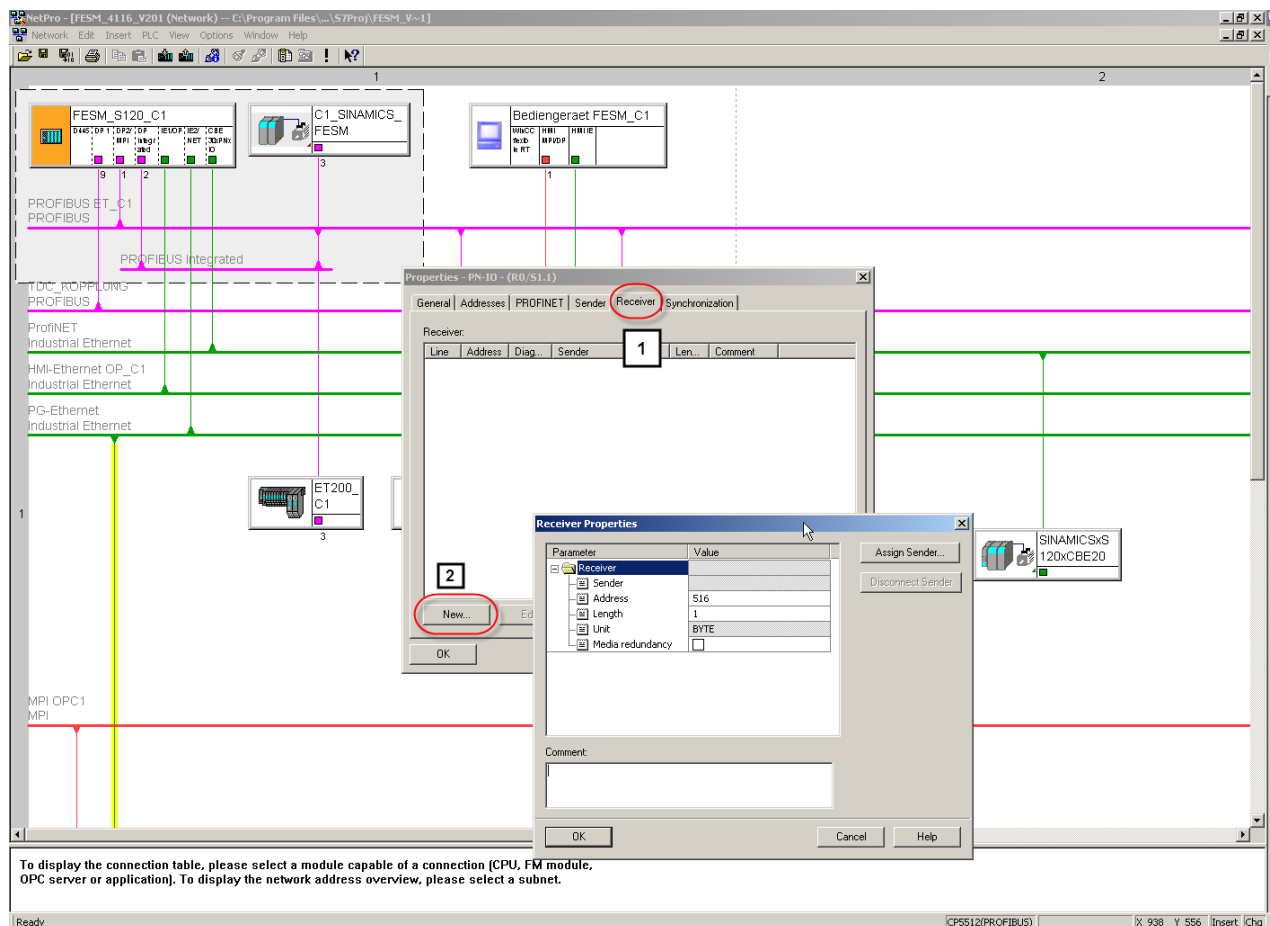
With a double click of the CP1616 in the PC-Station a new window opens.



2.4.2.1 Define receive area for the CP1616

Chose the Register – Receiver (1)

Chose new –the window properties receiver opens (2)

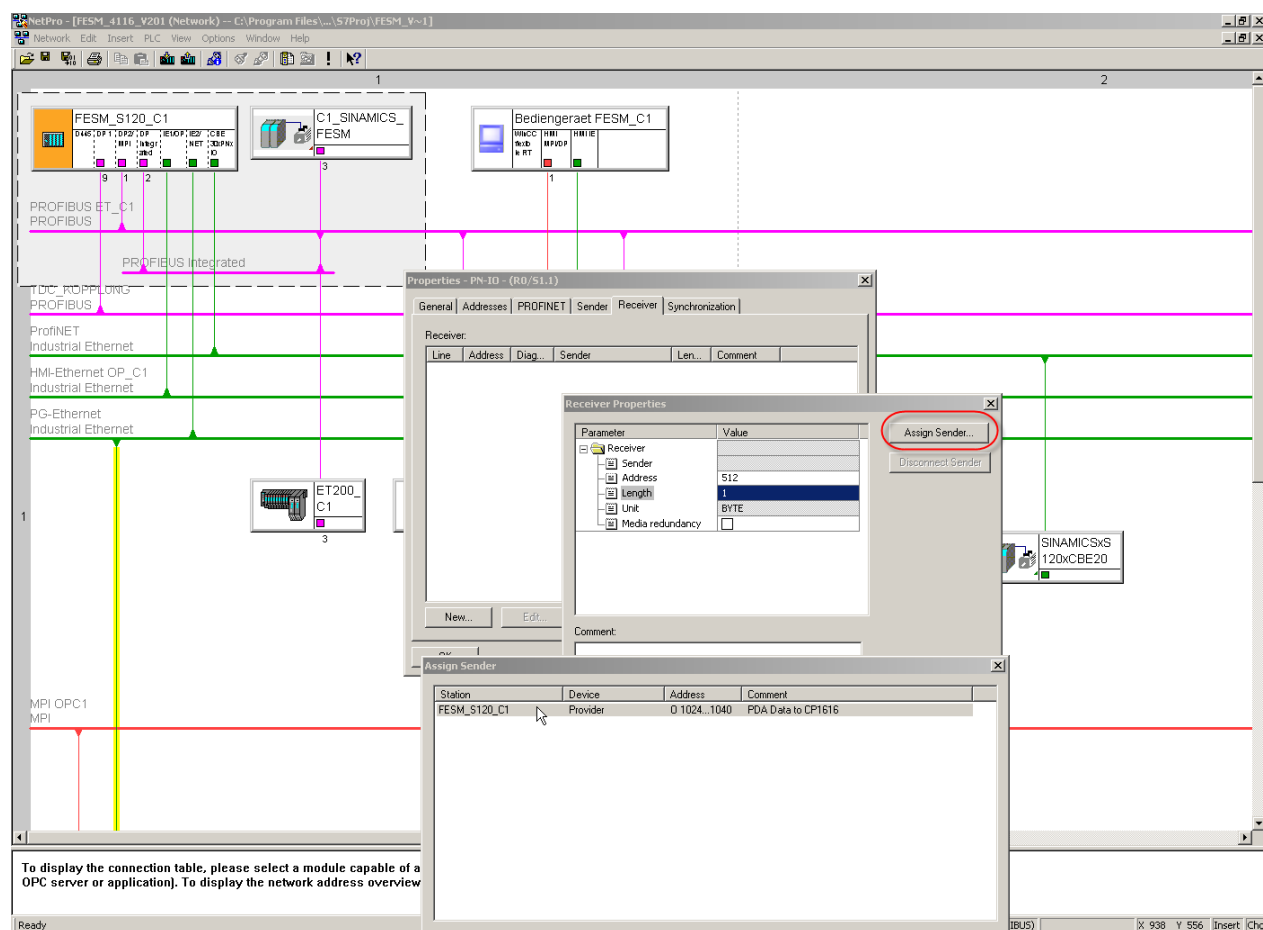


2.4.2.2 Enter the address area for receiving

By clicking on the button – assign Sender – is the controller, that sends Data shown. The row of the sender is to be marked and confirmed with ok.

The start address for the PDA in the CP1616 is not important, therefore can the suggested addresses from the system be used.

By confirming with the window OK is the defining of the receiving area finished



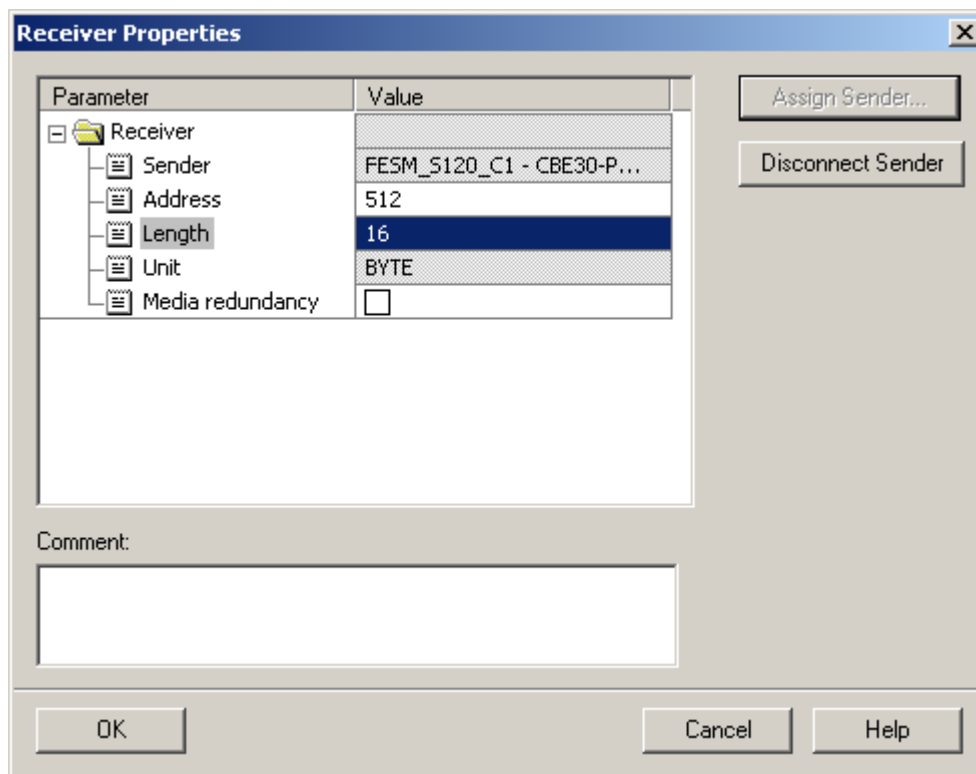
2.4.2.3 Properties of the receiver

After confirming the window – assign sender- are the addresses for the CP1616 for this one controller defined.

Are more controllers to be assigned to the CP1616, is this Step to be repeated once for each controller.

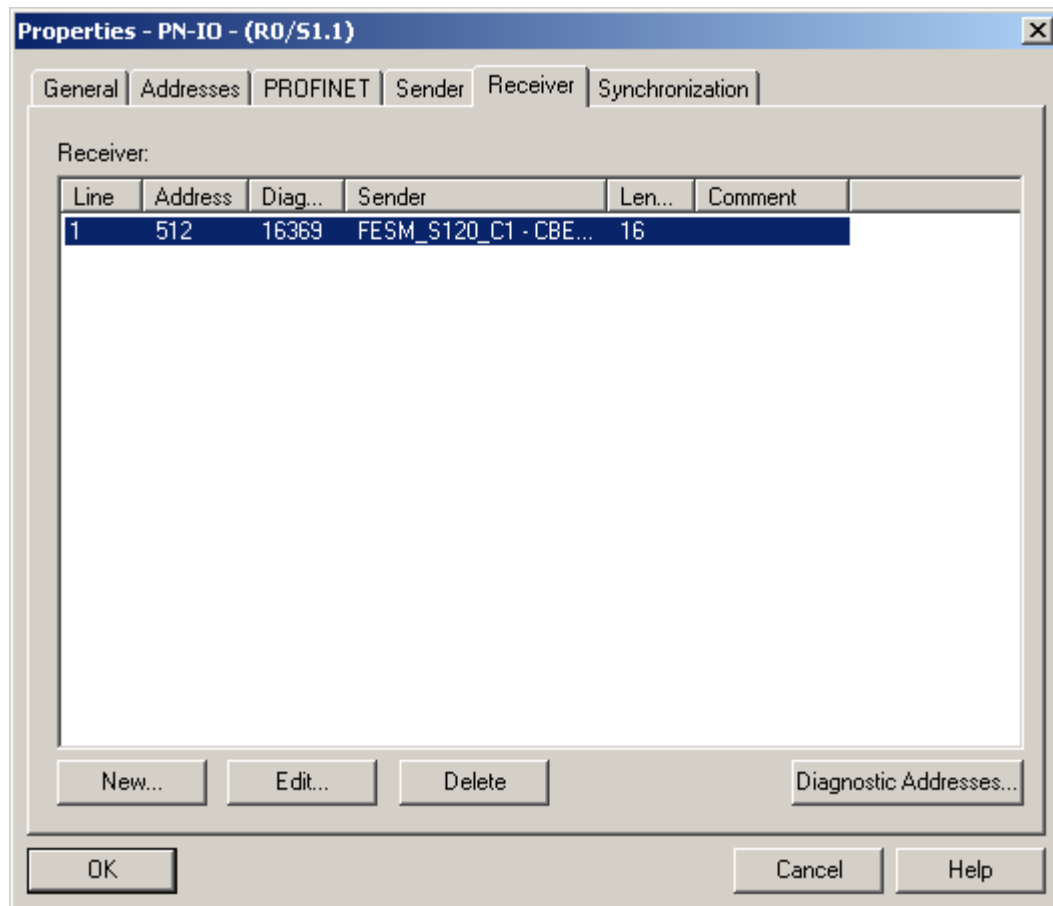
Note:

The addressing for the SINAMICS CU320 must not be carried out. It is enough when the addressing was made like in chapter 2.1.7.



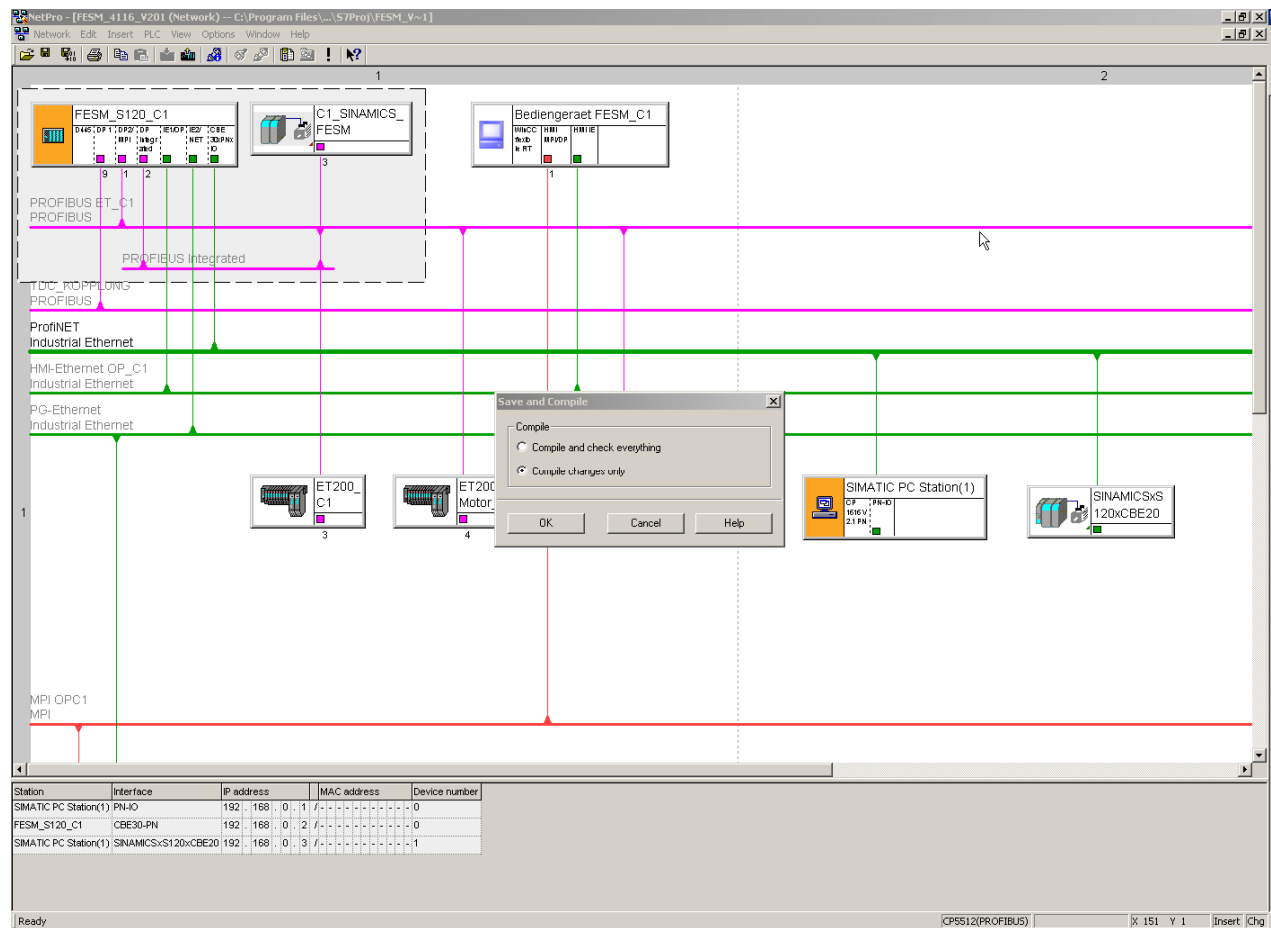
2.4.2.4 Finishing the parameterization for the CP1616

By confirming the window properties PN-IO with OK is the parameterization for the CP1616 device finished.



2.5 Saving and compiling the project

By saving and compiling are no faults allowed to appear. The appearance of warnings are normal, as these informs that a new download has to be performed for all controllers.



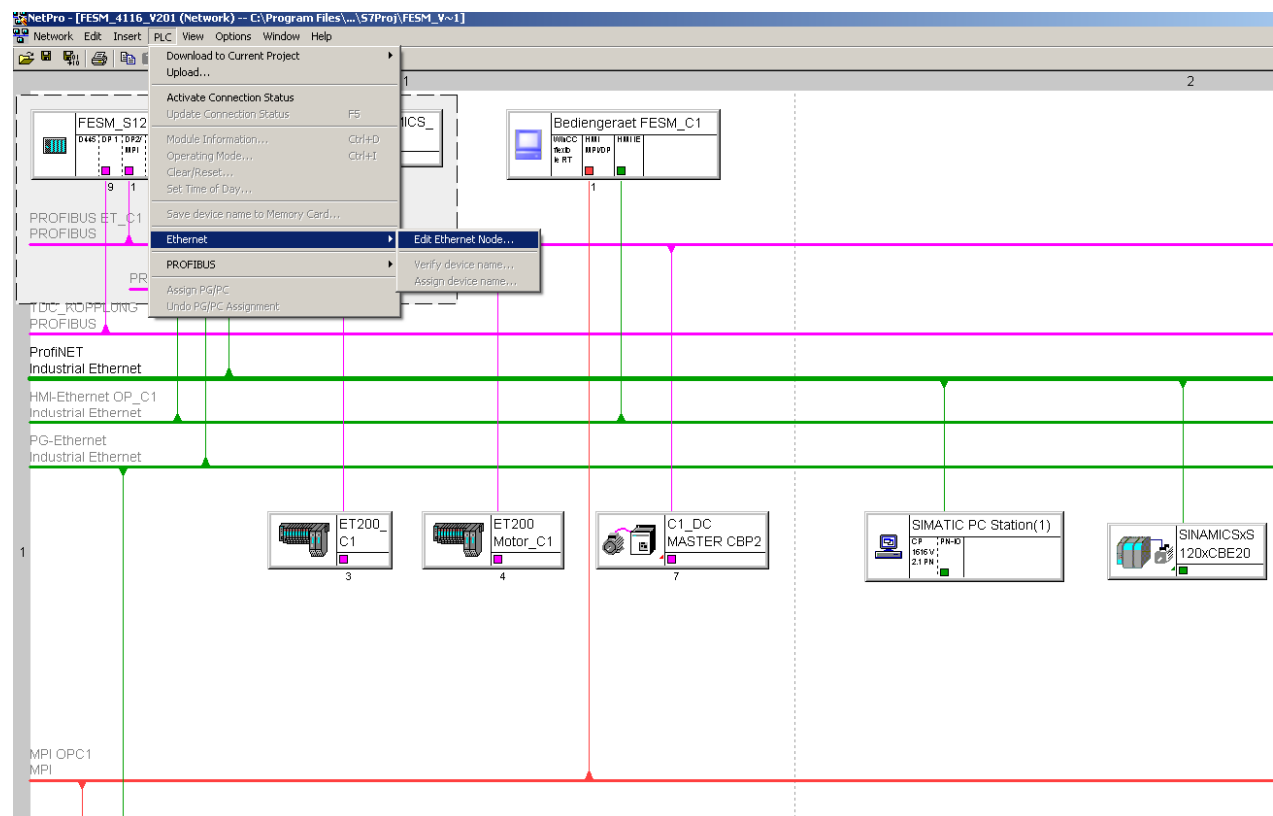
3 DOWNLOAD THE CONFIGURATION FOR THE CP1616

To download the configuration to the CP1616 is assumed, that the PC is connected to one of the PROFINET – Slaves to which the configuration should be loaded.

3.1 Assign IP – address for the CP1616

3.1.1 Edit the Ethernet- slave

In NETPRO must the menu PLC → Ethernet → edit Ethernet node be selected.



The window – Edit Ethernet Node - opens.

The screenshot shows the 'Edit Ethernet Node' dialog box. It has a title bar with a close button. The main area is divided into several sections:

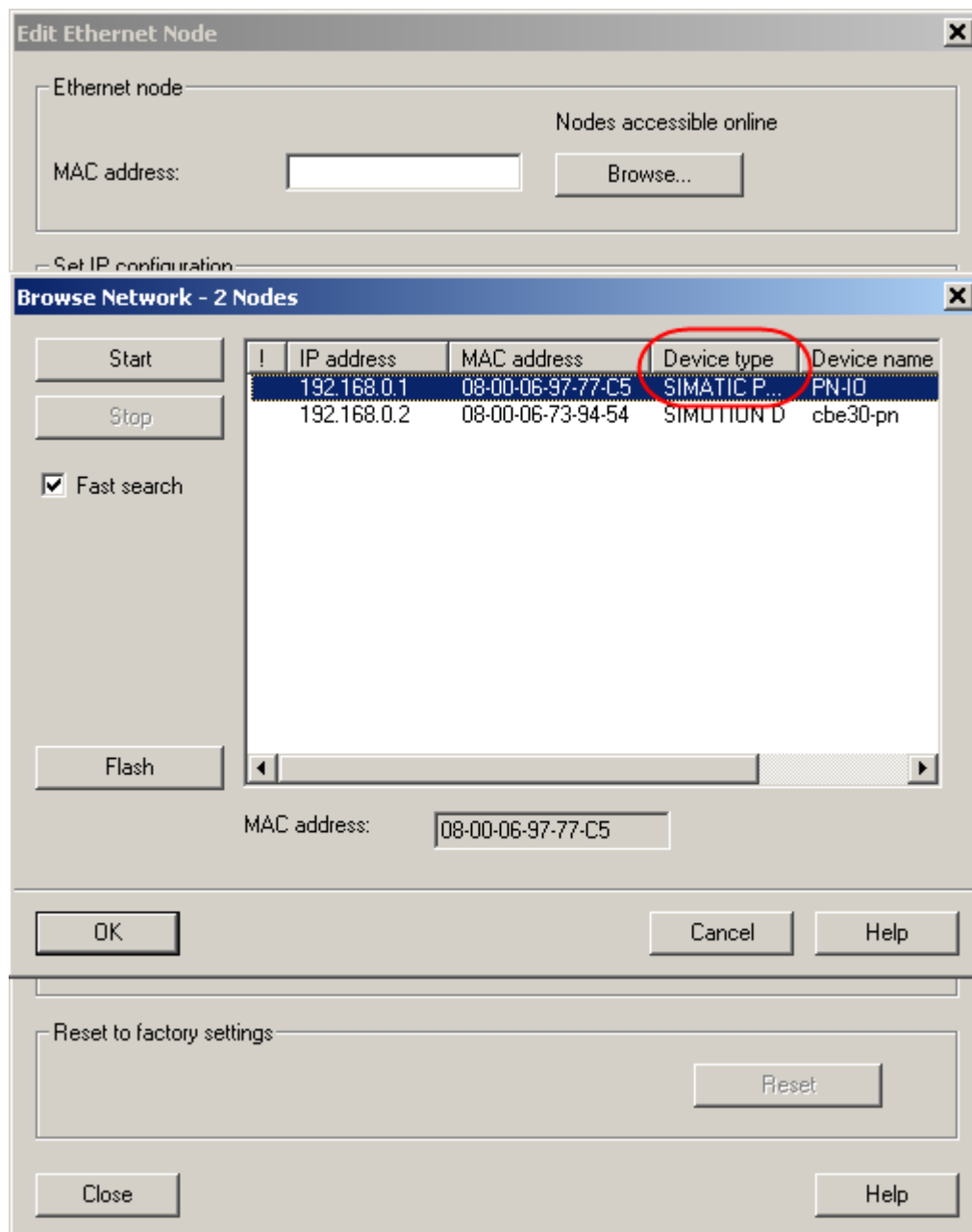
- Ethernet node**: Contains a 'MAC address' text box and a 'Browse...' button. The 'Browse...' button is circled in red. Above it, the text 'Nodes accessible online' is displayed.
- Set IP configuration**: Contains two radio buttons: 'Use IP parameters' (selected) and 'Obtain IP address from a DHCP server'. Under 'Use IP parameters', there are text boxes for 'IP address' and 'Subnet mask', and a 'Gateway' section with a radio button for 'Do not use router' (selected) and 'Use router' (disabled), followed by an 'Address' text box. Under 'Obtain IP address from a DHCP server', there is an 'Identified by' section with three radio buttons: 'Client ID' (selected), 'MAC address', and 'Device name'. Below this is a 'Client ID' text box.
- Assign device name**: Contains a 'Device name' text box and an 'Assign Name' button.
- Reset to factory settings**: Contains a 'Reset' button.

At the bottom of the dialog are 'Close' and 'Help' buttons.

When clicking on -Browse- another window opens showing all participants on the Profinet-line.

The participant with Device type SIMATIC PC-CP is the PC-Station with the CP1616. This participant must be selected and confirmed with Ok. Then you return to the window→ Edit Ethernet Slave.

Note: If the CP1616 never had an Address is the Default- IP-address 0.0.0.0 shown.



Beneath set IP-configuration (1) must a suitable address for the system be put in. In our example is the address 10.105.51.124 and subnetmask 255.255.255.0 used.

The IP Address is transferred to the device by activating the button – assign IP-configuration - The device is now addressed.

Beneath – assign device name – must the device name for the CP1616 be assigned (3) and subsequent the button - assign name – be activated. (the device name can be found in Netpro by a double click on the CP1616 in the PC Station.)

Edit Ethernet Node

Ethernet node

MAC address: 08-00-06-97-77-C5 Nodes accessible online
Browse...

Set IP configuration

☒ Use IP parameters 1

IP address: 192.168.0.1

Subnet mask: 255.255.255.0

Gateway

☒ Do not use router

☐ Use router

Address: 192.168.0.1

☐ Obtain IP address from a DHCP server

Identified by

☒ Client ID ☐ MAC address ☐ Device name

Client ID:

Assign IP Configuration 3

Assign device name

Device name: PN-IO Assign Name

Reset to factory settings

Reset

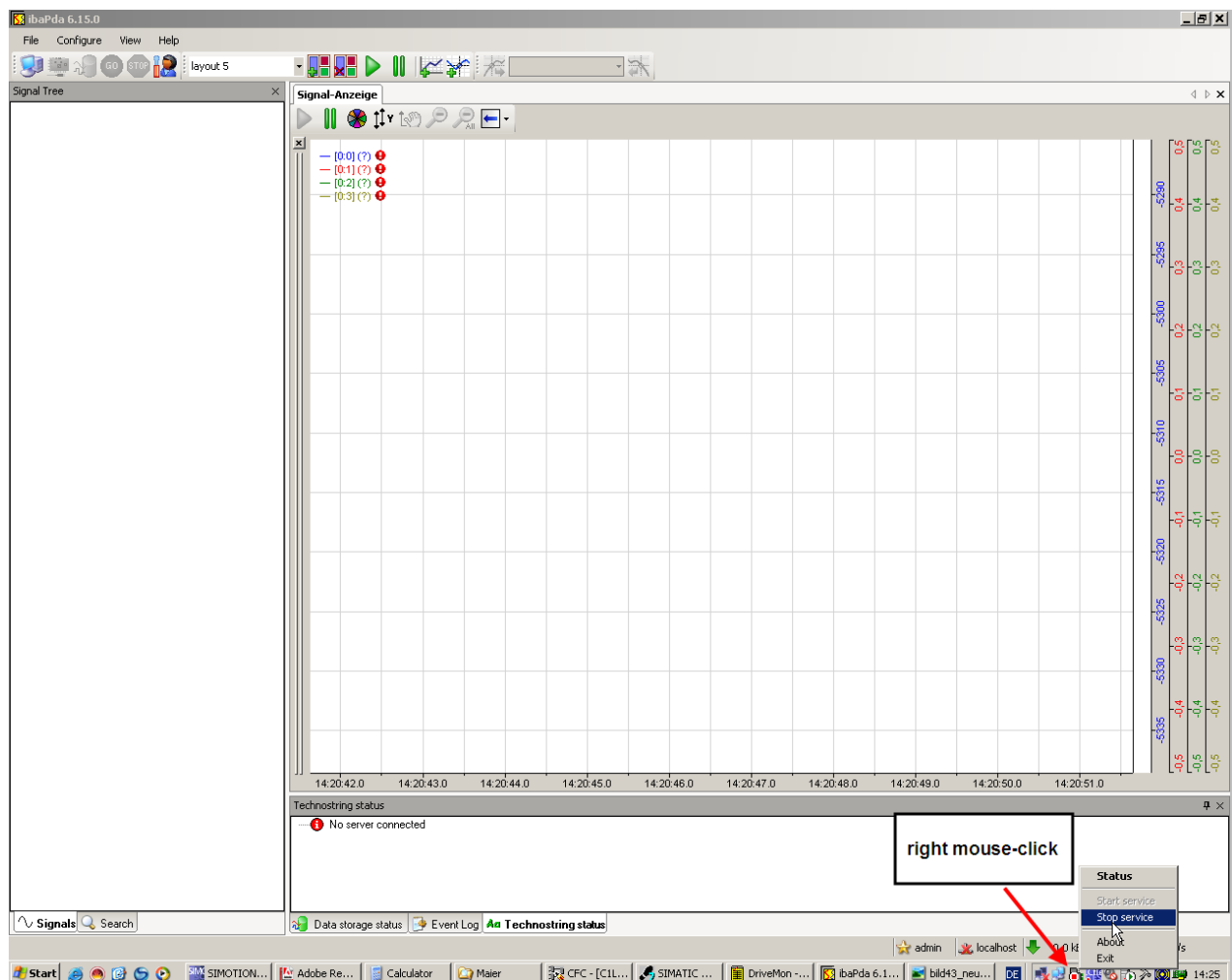
Close Help

3.2 Stop recording service at PDA PC

The IBA – PC connects to the CP1616 after start. The download of the configuration of the CP1616 with NETPRO can therefore lead to problems. Because of this must the access to the CP1616 be disconnected.

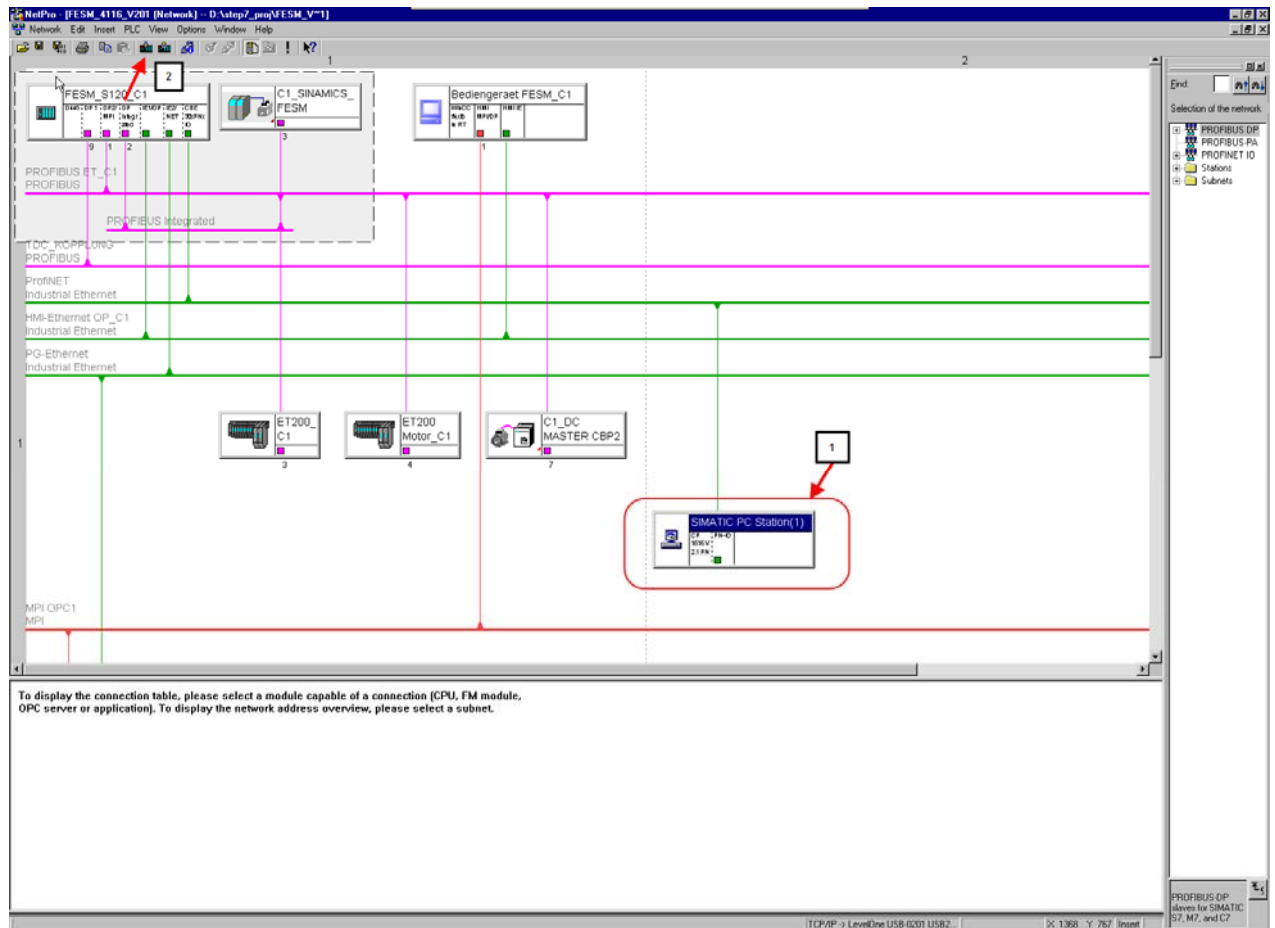
At IBA – PC has the recording service to be stopped.

Selection of the IBA – Services + right mouse button

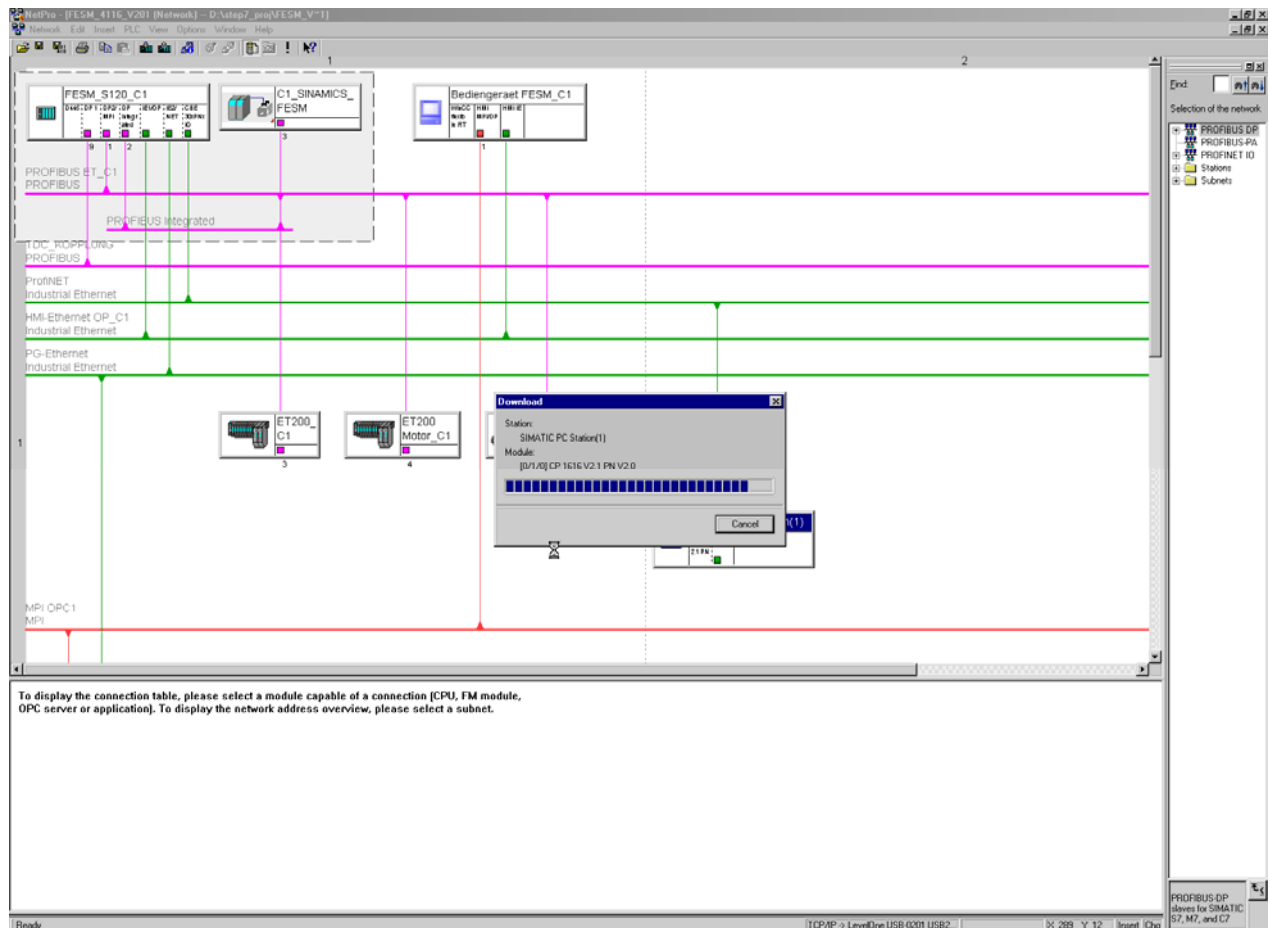


3.3 Selection of the CP1616

The download in the CP1616 can be activated. Select the SIMATIC PC Station (1) and activate the downloadbutton (2)

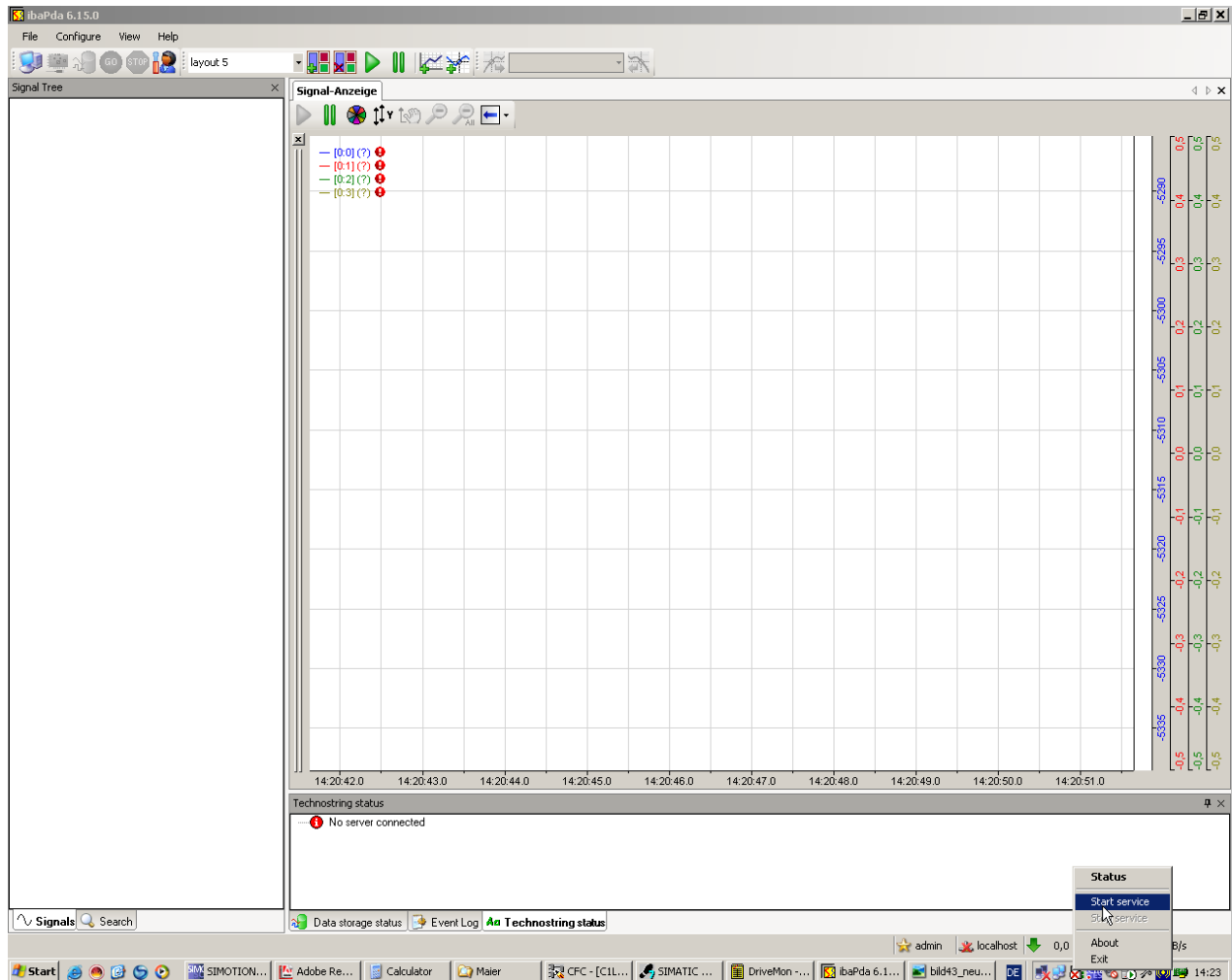


3.4 Download of the configuration for the CP1616



3.5 Start the recording service of the PDA PC

The recording service of the PDA PC must be restarted



4 DOWNLOAD THE CONFIGURATION TO THE SIMOTION CONTROLLER

After defining Profinet must also the configuration be downloaded to the SIMOTION – controller.

After loading must the controller be put back into RUN mode.

The loading sequence of the Simotion controller is not described here.

4.1 Check the configuration of the PDA – PC

It is good when the rows for recording have a green background in the configuration of the loaded CP1616. The green row means:

- The communication between CP1616 and SIMOTION is running
- The Profinet-cabling is correct
- The Data length is ok
- The SIMOTION-controller is in mode RUN

