



ibaPDA-Interface-SINUMERIK-Xplorer

Data Interface for Siemens SINUMERIK Controllers

Manual
Issue 1.2

Measurement Systems for Industry and Energy

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The current version is available for download on our web site www.iba-ag.com.

Version	Date	Revision	Author	Version SW
1.2	06-2023	GUI new, S7 routing via TIA Portal	rm, mm	8.0.0

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1 About this Manual

This document describes the function and application of the software interface *ibaPDA-Interface-SINUMERIK-Xplorer*.

This documentation is a supplement to the *ibaPDA* manual. Information about all the other characteristics and functions of *ibaPDA* can be found in the *ibaPDA* manual or in the online help.

1.1 Target group and previous knowledge

This manual is aimed at qualified professionals who are familiar with handling electrical and electronic modules as well as communication and measurement technology. A person is regarded as professional if he/she is capable of assessing safety and recognizing possible consequences and risks on the basis of his/her specialist training, knowledge and experience and knowledge of the standard regulations.

This documentation in particular addresses persons, who are concerned with the configuration, test, commissioning or maintenance of Programmable Logic Controllers of the supported products. For the handling *ibaPDA-Interface-SINUMERIK-Xplorer* the following basic knowledge is required and/or useful:

- Windows operating system
- Basic knowledge of *ibaPDA*
- Knowledge of configuration and operation of the relevant control system

1.2 Notations

In this manual, the following notations are used:

Action	Notation
Menu command	Menu <i>Logic diagram</i>
Calling the menu command	<i>Step 1 – Step 2 – Step 3 – Step x</i> Example: Select the menu <i>Logic diagram – Add – New function block</i> .
Keys	<Key name> Example: <Alt>; <F1>
Press the keys simultaneously	<Key name> + <Key name> Example: <Alt> + <Ctrl>
Buttons	<Key name> Example: <OK>; <Cancel>
Filenames, paths	Filename, Path Example: Test.docx

1.3 Used symbols

If safety instructions or other notes are used in this manual, they mean:

Danger!



The non-observance of this safety information may result in an imminent risk of death or severe injury:

- Observe the specified measures.

Warning!



The non-observance of this safety information may result in a potential risk of death or severe injury!

- Observe the specified measures.

Caution!



The non-observance of this safety information may result in a potential risk of injury or material damage!

- Observe the specified measures

Note



A note specifies special requirements or actions to be observed.

Tip



Tip or example as a helpful note or insider tip to make the work a little bit easier.

Other documentation



Reference to additional documentation or further reading.

2 System requirements SINUMERIK-Xplorer

The following system requirements are necessary for the use of the SINUMERIK-Xplorer data interface:

- *ibaPDA* v8.0.0 or higher
- Base license for *ibaPDA* + license for *ibaPDA-Interface-SINUMERIK-Xplorer*
- For more than 16 SINUMERIK NCUs (Numerical Control Unit), you need additional *one-step-up-Interface-SINUMERIK-Xplorer* licenses each additional 16 connections.
- Siemens SINUMERIK CNC control type 840D sl (Solution line) or 840D pl (Power line) or 828D sl (Solution line)
- SIMATIC NET or SIMATIC STEP 7 in case of connecting via SIMATIC NET communication board (CP)

For further requirements for the used computer hardware and the supported operating systems, refer to the *ibaPDA* documentation.

System constraints

Regarding the number of connections, the following technical constraints apply:

The number of S7-, SINAMICS- and SIMOTION-Xplorer connections is limited to 240. TCP and PC/CP connections of the SINAMICS-, SIMOTION- and SINUMERIK-Xplorer are evaluated differently. A SINAMICS-, SIMOTION- or SINUMERIK-Xplorer connection over TCP only counts 1/16. A PC/CP connection is calculated in full.

This means:

Number of S7-Xplorer connections

- + number of SINAMICS-Xplorer-TCP connections not routed / 16¹⁾
- + number of SIMOTION-Xplorer-TCP connections not routed / 16¹⁾
- + number of SINUMERIK-Xplorer-TCP connections not routed / 16¹⁾
- + number of SINAMICS-Xplorer-TCP connections routed
- + number of SIMOTION-Xplorer-TCP connections routed
- + number of SINAMICS-Xplorer-PC/CP connections
- + number of SIMOTION-Xplorer-PC/CP connections
- + number of SINUMERIK-Xplorer-PC/CP connections

≤ 240!

¹⁾ Only active connections are taken into account. The division must always be rounded to the next larger number. (One connection resource per started 16 connections.)

Access to the SINAMICS Control Units which are integrated in the SIMOTION controls is not supported.

License information

Order No.	Product name	Description
31.000033	ibaPDA-Interface-SINUMERIK-Xplorer	Extension license for an <i>ibaPDA</i> system adding the data interface: + SINUMERIK-Xplorer (interface for up to 16 SINUMERIK NCUs).
31.100033	one-step-up-Interface-SINUMERIK-Xplorer	Extension license for another 16 SINUMERIK NCUs (max. 15 licenses)

Note

To use more than 16 data connections per interface, you can purchase the one-step-up-... extension licenses separately for each interface. Up to 16 further connections to SINUMERIK NCUs can be established on each one-step-up-license. Up to 256 connections can be configured and used per data interface with the multiple purchase or multiple release of these licenses (up to 15 in total).

3 Data interface SINUMERIK-Xplorer

3.1 General information

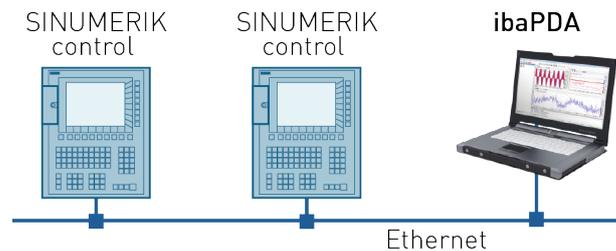
The SINUMERIK-Xplorer interface is suitable for the acquisition of measurement data from the NCK (numerical control kernel) part of Siemens SINUMERIK CNC controllers via Ethernet using the standard network interface cards as well as PROFIBUS via SIMATIC NET interface cards. Access thereby is transparent for the SINUMERIK controller. Separate engineering and programming is not necessary.

The signals to be measured can be selected by using the SINUMERIK symbol browser in the *ibaPDA I/O Manager*.

3.2 System topologies

You can establish the connections to the SINUMERIK NCUs (numerical control units) via standard interfaces of the computer or corresponding CP modules.

Additional Siemens software (e.g. SIMATIC NET or SIMATIC STEP 7) is needed for operation, in case you establish the connection to the control system via a SIMATIC NET communication card (CP) in the computer to an integrated Ethernet interface of the CPU (if available) or to a CP module in the PLC.



Note



It is recommended carrying out the TCP/IP communication on a separate network segment to exclude a mutual influence by other network components.

3.3 Configuration and engineering SINUMERIK

Generally, no specific engineering and programming is needed on the SINUMERIK side.

When using the PC/CP connection mode, you have to configure a suitable access point in the SIMATIC PG/PC interface on the *ibaPDA* computer, see [➤ Setting PG/PC interface/defining new access point](#), page 42.

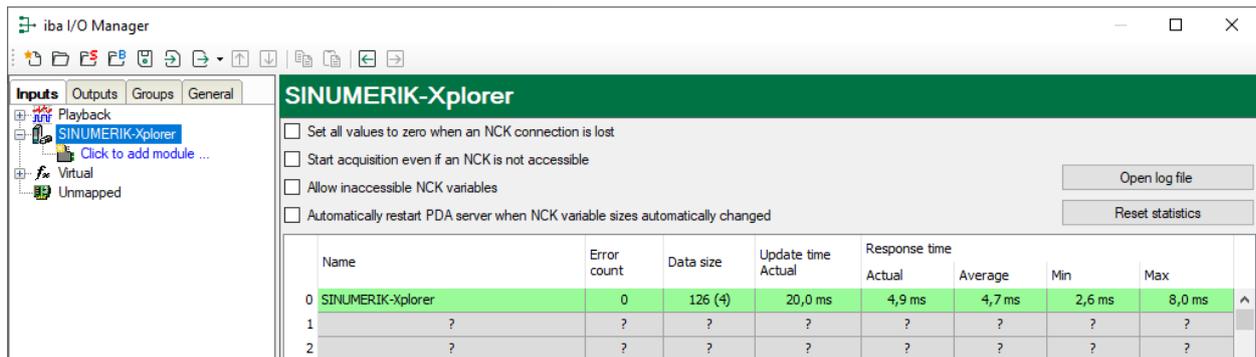
3.4 Configuration and engineering ibaPDA

The engineering for *ibaPDA* is described in the following. If all system requirements are fulfilled, *ibaPDA* displays the *SINUMERIK-Xplorer* interface in the interface tree of the I/O Manager.

3.4.1 General interface settings

If the data interface is selected in the tree, you can see an overview of diagnostics information on the configured connections between *ibaPDA* and the NCKs.

The interface has the following features and configuration options.



Set all values to zero when an NCK connection is lost

If this option is enabled, all measured values of the NCK are reset to 0 as soon as the connection is lost. If this option is disabled, *ibaPDA* keeps the last valid measured value in memory when the connection is lost.

Start acquisition even if an NCK is not accessible

If this option is enabled, the acquisition starts even if the NCK is not accessible. A warning is prompted in the validation dialog, not an error. If the system was started without a connection to the NCK, *ibaPDA* periodically attempt to connect to the NCK.

Enabling this option is recommended if multiple connections are configured to one CPU. Because the SINUMERIK CPU is unable to launch multiple connections at a time, this will provide for a smooth start of acquisition.

Allow inaccessible NCK variables

If this option is enabled, the acquisition starts even if NCK variables are not accessible or if they are configured with an incorrect size. These inaccessible variables are prompted as warnings in the validation dialog box, not as errors.

Automatically restart PDA server when NCK variable sizes automatically changed

If this option is enabled, the *ibaPDA* server will automatically be restarted when the NCK variable sizes changed automatically.

<Open log file>

If connections to controllers have been established, all connection specific actions are recorded in a text file. Using this button, you can open and check this file. In the file system on the hard disk, you find the log files of the *ibaPDA* server (...*ProgramData\iba\ibaPDA\Log*). The file name of the current log file is *InterfaceLog.txt*; the name of the archived log files is *InterfaceLog_yyyy_mm_dd_hh_mm_ss.txt*.

<Reset statistics>

Click this button to reset the calculated times and error counters in the table to 0.

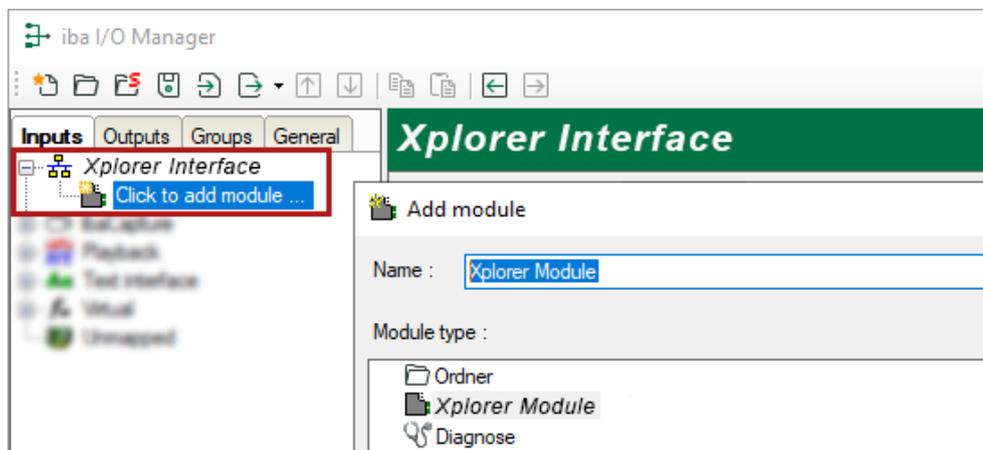
Connection table

For each connection, the table shows the connection status, the current values for the update time (current, real value, average, min. and max.) as well as the data size. In addition, there is an error counter for the individual connections during the acquisition.

For more information, see ↗ *Connection table*, page 29.

3.4.2 Adding a module

1. Click on the blue command *Click to add module...* located under each data interface in the *Inputs* or *Outputs* tab.
2. Select the desired module type in the dialog box and assign a name via the input field if required.
3. Confirm the selection with <OK>.



3.4.3 General module settings

To configure a module, select it in the tree structure.

All modules have the following setting options.

The screenshot shows the 'SINUMERIK-Xplorer (6)' configuration window with the 'General' tab selected. The settings are organized into several sections:

- Basic**
 - Module Type: SINUMERIK-Xplorer
 - Locked: False
 - Enabled: True
 - Name: **SINUMERIK-Xplorer**
 - Module No.: **6**
 - Timebase: **10 ms**
 - Use name as prefix: False
- Sinumerik NCU**
 - NCK version: 4.8
 - NCU device: SINUMERIK 840D sl (Solution Line)
 - Dynamic addressing: False
- Module Layout**
 - No. analog signals: **32**
 - No. digital signals: **32**
- PLC**
 - Update time: 20 ms

Below the settings table, there is a 'Name' field with the description 'The name of the module.' and two buttons: 'Select Symbols' and 'Open NC-Var Selector file'.

Basic settings

Module Type (information only)

Indicates the type of the current module.

Locked

You can lock a module to avoid unintentional or unauthorized changing of the module settings.

Enabled

Enable the module to record signals.

Name

You can enter a name for the module here.

Module No.

This internal reference number of the module determines the order of the modules in the signal tree of *ibaPDA* client and *ibaAnalyzer*.

Timebase

All signals of the module are sampled on this timebase.

Use name as prefix

This option puts the module name in front of the signal names.

Sinumerik NCU

NCK version

Version of the NCK software on the flash drive in the SINUMERIK controller, also referred to as the firmware version of the NCU. The version specifies the symbols in the symbol browser that are documented to work with the selected firmware. You can select the version via the drop-down list.

How to determine the NCK version is described in chapter [➤ NCK version](#), page 14.

NCU device

The hardware type of NCU device (read only)

Dynamic addressing

Row and column values can be addressed dynamically. If this option is enabled, two additional columns are added to the signal grids: *Row Source* and *Col Source*. In these columns, you can configure the signal whose value should be used as row or column number. See also chapter [➤ Signal configuration](#), page 18

Module layout

No. of analog signals/digital signals

Define the number of configurable analog and digital signals in the signal tables. The default value is 32 for each. The maximum value is 1000. The signal tables are adjusted accordingly.

Note



Observe the maximum number of signals permitted by your base license for *ibaPDA*.

Note



Take into consideration that the number of signals, which are read by a CPU, influences the minimum achievable update cycle. The more signals acquired, the longer the achievable update time.

PLC

Update time

Specifies the reference update time in which the data is requested from the PLC. During measurement, the real current update time may be higher than the specified value if the PLC needs more time to transmit the data. You can check in the connection table how fast the data is actually updated.

Check the diagnostic overview for measured update rates as overload will result in lost samples.

Link "Select symbols"

Click on this link after the connection has been successfully established to configure the signals to be measured.

Link "Open NC-Var Selector file"

Click on this link to open the file browser in which you can select a variable file (*.var). All variables contained in the VAR file are added. You can create VAR files with the NC-VAR-Selector. The NC-VAR-Selector program is bundled with the Siemens SINUMERIK Toolbox for both STEP 7 and TIA Portal.

3.4.3.1 NCK version

The NCK version is the version of the firmware that is installed on the flash card inserted in the SINUMERIK controller. The firmware version is printed on the flash card. If you want to pull out the flash card and read the firmware version, you have to switch off the SINUMERIK controller.

However, you can also find the NCK version by using the HMI. In the HMI, open the *Diagnostics* tab by pressing the *ALARM* or *Diagnostics* key.



In the *Diagnostics* area, press the softkey *Version* at the bottom of the screen.



Now, an overview of the versions of different components in the NC controller is displayed. In the image below, you can see that firmware version 4.7 is used.

SIEMENS SINUMERIK OPERATE 09/26/19 11:27 AM

Version data		
SINUMERIK Operate		
Version: 04.07.06.00		
InternalVersion: 04.07.06.00.021		
Name	Actual version	Target version
Basesystem	04.07.06.00	✓
Applications	04.07.06.00	✓
3D graphics	04.07.06.00	✓
Qt	04.08.04.00	✓
ACE/TAO	6.1.2	✓
Autostart	04.07.06.00	✓
Language files	04.05.00.00	✓
Online help	04.05.00.00	✓

Logbook

Details

Save

Alarm list Mes-sages Alarm log NC/PLC variab. Version

The next image shows an example of the version data of a different controller, with firmware version 4.8.

Version data		
SINUMERIK 840D sl - 840DSL-711		
Name	Actual version	Target version
CNC software	V04.08 + SP 02 + HF 03	✓
Basic PLC program	04.08.06	✓
System extensions		
OEM applications		
User		
Hardware		

3.4.4 Connection settings

Configure the connection of the module to the NCK CPU of a SINUMERIK NCU in the *Connection* tab.

You can choose between the TCP/IP and PC/CP connection modes.

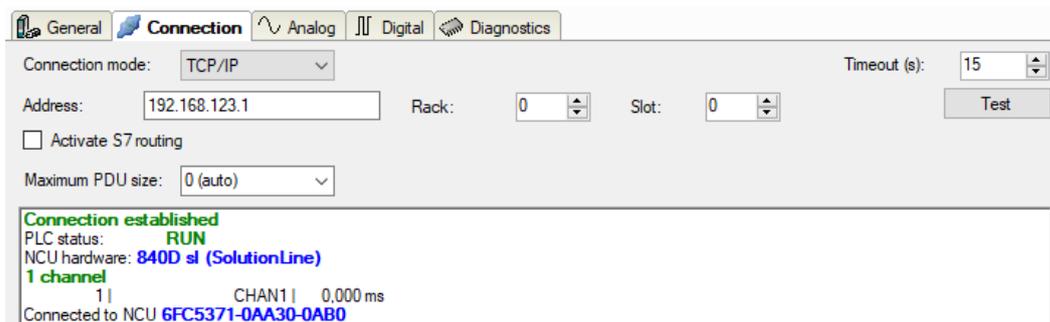
Note



Make sure that you connect to the NCK and not to the PLC. Both can have the same IP or MPI address, but it is not possible to read NCK variables using a connection to the PLC part of the NCU.

3.4.4.1 Connection mode TCP/IP

This mode activates a connection via the standard network interface of the computer.



Connection mode

Selection of the TCP/IP connection mode

Timeout

Here you can specify a value for the timeout in seconds for establishing the connection and for read accesses. If the time set here is exceeded, *ibaPDA* declares the controller as not accessible or not responsive.

Address

IP address of the NCK

Rack

Rack number of the NCK (default: 0)

Slot

Slot number of the NCK in the rack

Activate S7 routing

Activate this option if the NCK and the *ibaPDA* computer are not in the same network, but only communicate over a gateway that supports S7 routing. Such a gateway can be e.g. an IE/PB link, over which the NCK can be reached without an Ethernet connection.

Two additional input fields appear:

- Address of device acting as gateway: Enter the IP address of the gateway.
- S7 subnet ID of target net: Enter subnet ID from STEP 7 NetPro or TIA Portal.

For more information on S7 routing, see [➤ S7 routing](#), page 46.

Maximum PDU size

You can limit the PDU (packet data unit) to a maximum size.

You can select a value from the drop-down list or enter a value.

If the value "0" (default setting) is set, *ibaPDA* automatically identifies the PDU size by the network protocol.

<Test>

ibaPDA tests the connection to the CPU and displays available diagnostic data. E.g. if a CPU was connected but not the NCK, the MLFB number of the CPU that was found is displayed if possible.

Note



Port 102 in the firewall must be released for the communication with the CPU for signal request.

Note



When using an MPI/DP to Ethernet converter, like the Helmholz NetLink-PRO compact, you can connect using TCP/IP after the adapter is configured through its web interface. There is then no need to install Siemens SIMATIC NET.

3.4.4.2 Connection mode PC/CP

This mode activates a connection over the interface cards of the computer that are configured using SIMATIC Net.

The interfaces configured in SIMATIC Net can be used, e.g.:

- PROFIBUS (CP5611, CP5622)

Note



If you want to use this connection type, the Siemens software SIMATIC Net (e.g. SIMATIC Manager or Softnet) has to be installed. When using the modules CP55..., CP56... and the MPI adapter, the installation of the device drivers is sufficient.

Connection mode

Selection of the PC/CP connection mode

Timeout

Here you can specify a value for the timeout in seconds for establishing the connection and for read accesses. If the time set here is exceeded, *ibaPDA* declares the controller as not accessible or not responsive.

Access point for applications

Selection of the access point to be used

For more information on creating and configuring an access point, see [↗ Setting PG/PC interface/defining new access point](#), page 42.

Note



Configure available access points in SIMATIC Net with the "PG/PC interface settings" tool by Siemens.

For the connection of *ibaPDA-Interface-SINUMERIK-Xplorer* to SIMATIC S7 via PC/CP connections, it is generally recommend setting a specific access point for *ibaPDA* when *ibaPDA-Interface-SINUMERIK-Xplorer* and SIMATIC Manager run on the same computer. With an own access point, there is no longer the risk that the access for *ibaPDA-Interface-SINUMERIK-Xplorer* will be disturbed in case the standard access point is changed in the SIMATIC Manager.

<Configure PG/PC interface>

This button opens the dialog box for setting the PG/PC interface of SIMATIC STEP 7.

Address

IP address of the NCK

Rack

Rack number of the NCK

Slot

Slot number of the NCK in the rack

Activate S7 routing

Activate this option if the NCK and the *ibaPDA* computer are not in the same network, but only communicate over a gateway that supports S7 routing. Such a gateway can be e.g. an IE/PB link, over which the NCK can be reached without an Ethernet connection.

Two additional input fields appear:

- Address of device acting as gateway: Enter the IP address of the gateway.
- S7 subnet ID of target net: Enter subnet ID from STEP 7 NetPro or TIA Portal.

For more information on S7 routing, see [➤ S7 routing](#), page 46.

Maximum PDU size

You can limit the PDU (packet data unit) to a maximum size.

You can select a value from the drop-down list or enter a value.

If the value "0" (default setting) is set, *ibaPDA* automatically identifies the PDU size by the network protocol.

<Test>

ibaPDA tests the connection to the NCK and displays available diagnostic data.

3.4.5 Signal configuration

The signals you want to acquire are selected in the I/O Manager. You have multiple options to specify the variables to be acquired:

- Enter the required parameters directly in the analog or digital signal grid or select them via a drop-down menu.

An NCK variable is determined by 5 parameters, which are shown in both the analog and the digital signal grids: Area, Area Number, Module, Column and Row. Each analog variable also has a data type, which is determined by the NCK.

	Name	Symbol	Unit	Gain	Offset	Area	Area number	Module	Column	Row	Data Type	Active
0	rotation	rotation		1	0	N	1	FA	2	1	Double	<input checked="" type="checkbox"/>
1				1	0	none	1	AD	1	1	Char	<input type="checkbox"/>
2				1	0	none	1	AD	1	1	Char	<input type="checkbox"/>
3				1	0	none	1	AD	1	1	Char	<input type="checkbox"/>

- Open the NC-Var Selector file via the corresponding link in the *General* tab. This link opens the file browser, in which you can select a variable file (*.var). All variables contained in the VAR file are added. You can create VAR files with the NC-VAR-Selector. The NC-VAR-Selector program is bundled with the Siemens SINUMERIK Toolbox for both STEP 7 and TIA Portal.
- Reading GUD variables and R parameters, description see chapter [➤ Reading GUD variables and R parameters](#), page 21.
- Use the SINUMERIK symbol browser, see description below.

If the option *Dynamic addressing* is enabled in the *General* tab, two additional columns are added to the signal grids: *Row Source* and *Col Source*, see description below.

SINUMERIK symbol browser

You have two options to open the SINUMERIK Symbol browser:

- In the module's *General* tab, click on the *Select symbols* link.



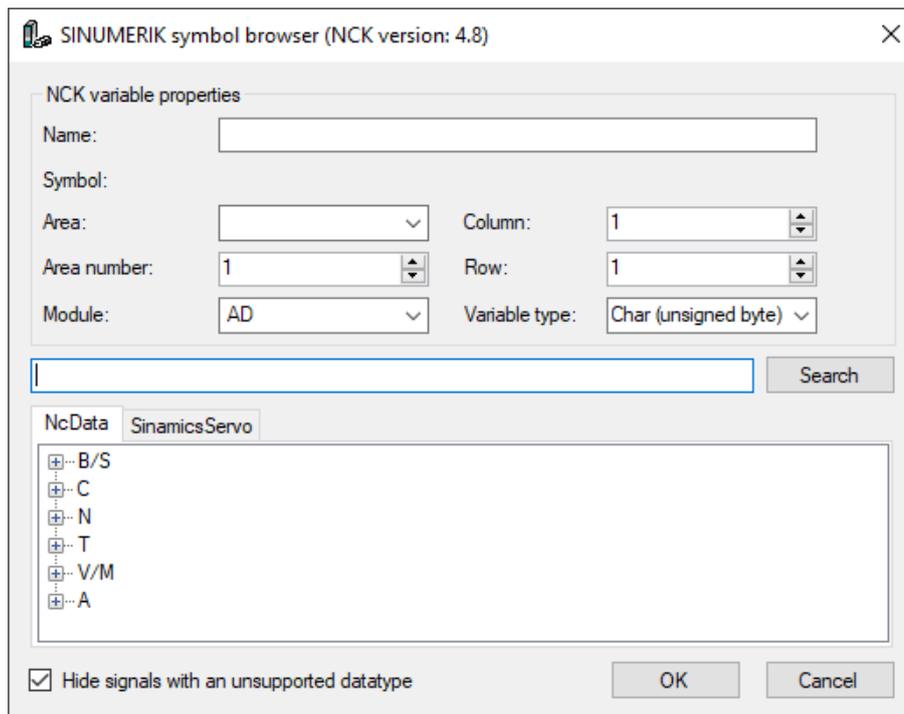
The symbol browser opens.

In the symbol browser, you can select all symbols of the address book. *ibaPDA* enters the selected signals automatically in the appropriate table *Analog* or *Digital*. You can add several signals successively.

- On the *Analog* or *Digital* tab, click in a cell of the *Symbol* column.

The button <...> appears. Click this button to open the symbol browser.

In the symbol browser, you can only select symbols with the data type matching the table. *ibaPDA* enters the symbol in the previously selected row of the signal table. After every selection, the symbol browser closes.



All available signals are displayed on the two tabs:

- *NcData* (NCK variables)
- *Sinamics Servo* (signals from the Integrated SINAMICS in an NCU)

Note



It is not possible to start acquiring NCK and integrated SINAMICS variables of the same NCU at exactly the same time. If you want to acquire variables from both parts observe the notes at the end of this chapter.

Other documentation



You can find information about the available signals in the Siemens list manual *SINUMERIK 840D sl, NC variables and interface signals*.

Variables with Bool data type are digital signals, others are analog. If you want a digital signal to be shown in the analog tab, you can change its data type to char or byte.

By means of the *Search* tab, you can search for symbols with their name. The tree with the search results works exactly the way as the whole symbol tree.

Note



If the option *Hide symbols with an unsupported data type* is enabled, only symbols with an allowed data type are shown.

Dynamic addressing

If the option *Dynamic addressing* is enabled in the *General* tab, two additional columns are added to the signal grids: *Row Source* and *Col Source*.

SINUMERIK-Xplorer (6)

Name	Symbol	Unit	Gain	Offset	Area	Area number	Module	Column	Col Source	Row	Row Source	DataType	Active
0	SAFE_INFO_TELEGRAM_TYPE		1	0	N	1	M	13376	Unassigne	1	Unassigne	Int_32	<input checked="" type="checkbox"/>
1	nckVersion		1	0	N	1	Y	32	Unassigne	1	Unassigne	Double	<input checked="" type="checkbox"/>
2	TEST51INT	kg	1	0	N	1	GUD5	1	Unassigne	1	Unassigne	Int_32	<input checked="" type="checkbox"/>
3	TEST52INT	m	1	0	N	1	GUD5	2	Unassigne	1	Unassigne	Uint_32	<input checked="" type="checkbox"/>
4	TEST51REAL	bar	1	0	N	1	GUD5	3	Unassigne	1	Unassigne	Double	<input checked="" type="checkbox"/>
5	TEST52REAL		1	0	N	1	GUD5	4	Unassigne	1	Unassigne	Double	<input checked="" type="checkbox"/>
6	TEST51REALGAIN		1	0	N	1	GUD5	3	Unassigne	1	Unassigne	Double	<input checked="" type="checkbox"/>
7	TEST51REALOFFSET		1	0	N	1	GUD5	3	Unassigne	1	Unassigne	Double	<input checked="" type="checkbox"/>
8	TEST51STR		1	0	N	1	GUD5	9	Unassigne	1	Unassigne	String	<input checked="" type="checkbox"/>
9	TEST52STR		1	0	N	1	GUD5	10	Unassigne	1	Unassigne	String	<input checked="" type="checkbox"/>
10	TESTARRAY1		1	0	N	1	GUD5	11	Unassigne	1	Unassigne	Double	<input checked="" type="checkbox"/>
11	TESTARRAY2		1	0	N	1	GUD5	11	Unassigne	2	Unassigne	Double	<input checked="" type="checkbox"/>
12	TESTARRAY3		1	0	N	1	GUD5	11	Unassigne	3	Unassigne	Double	<input checked="" type="checkbox"/>
13	TESTCA1		1	0	C	1	GUD5	1	Unassigne	1	Unassigne	Double	<input checked="" type="checkbox"/>

Open the drop-down menu and select a reference signal in the respective field. The value of this signal is then used as row number or column number.

If you do not want to use this feature in a signal, leave it "Unassigned".

Module	Column	Col Source	Row	Row Source	DataType	Active
M	13376	Unassigne	1	Unassigne	Int_32	<input checked="" type="checkbox"/>
Y	32	Unassigned			Double	<input checked="" type="checkbox"/>
GUD5	1	4: SAFE_INFO_TELEGRAM_TYPE			Int_32	<input checked="" type="checkbox"/>
GUD5	2	4:1: nckVersion			Uint_32	<input checked="" type="checkbox"/>
GUD5	3	4:2: TEST51INT			Double	<input checked="" type="checkbox"/>
GUD5	4	4:3: TEST52INT			Double	<input checked="" type="checkbox"/>
GUD5	3	4:4: TEST51REAL			Double	<input checked="" type="checkbox"/>
GUD5	3	4:5: TEST52REAL			Double	<input checked="" type="checkbox"/>
GUD5	3	4:6: TEST51REALGAIN			Double	<input checked="" type="checkbox"/>
GUD5	9	4:7: TEST51REALOFFSET			String	<input checked="" type="checkbox"/>
GUD5	10	4:10: TESTARRAY1			String	<input checked="" type="checkbox"/>
GUD5	11	4:11: TESTARRAY2			Double	<input checked="" type="checkbox"/>
GUD5	11	4:12: TESTARRAY3			Double	<input checked="" type="checkbox"/>
GUD5	11	4:13: TESTCA1			Double	<input checked="" type="checkbox"/>
GUD5	1				Double	<input checked="" type="checkbox"/>

During validation, *ibaPDA* uses the values in the columns *Column* and *Row*. During acquisition, *ibaPDA* uses the values in the columns *Col Source* and *Row Source*. If there is an invalid value in the selected reference signal, *ibaPDA* uses the last valid value.

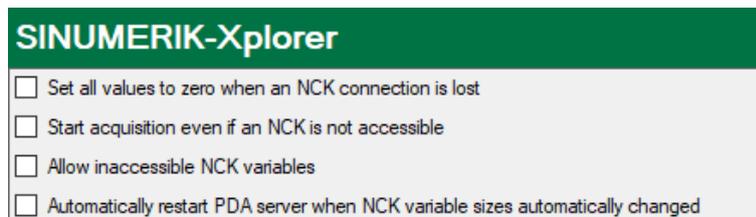
The data types of these values must be known and always the same. You can only use reference signals from the same module.

Notes on measuring both NCK and Integrated Sinamics signals

The SINUMERIK NCU consists internally of multiple hardware parts. With SINUMERIK-Xplorer it is possible to access the NCK of an NCU and the Integrated SINAMICS.

However, it is not possible to start acquiring NCK and SINAMICS variables of the same NCU at exactly the same time. In order to correctly configure *ibaPDA* to acquire both NCK and Integrated SINAMICS values, the following measures are required:

- You must define Integrated SINAMICS and NCK signals in separate modules
- In the SINUMERIK-Xplorer interface, you must enable the option *Start acquisition even if an NCK is not accessible*. In this way, it is possible to independently connect to the NCK and the Integrated SINAMICS.



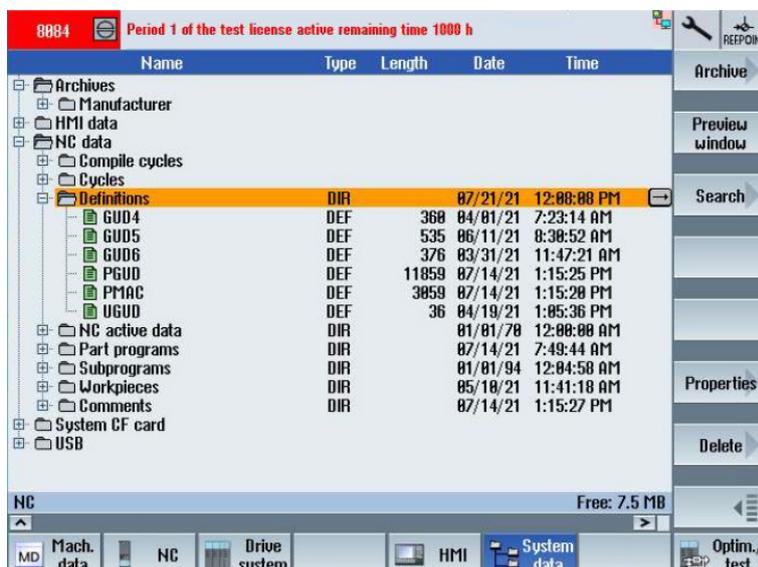
3.4.5.1 Reading GUD variables and R parameters

GUD (Global User Data)

GUD variables can also be read in *ibaPDA*.

Open the file browser in the HMI of the SINUMERIK in the *SETUP* menu. The files for the user variables are in the folder path *NC data/Definitions*.

The procedure is described using the definition file *GUD5.def* as an example.



The structure of the `GUD5.def` file is as follows:

```

8884 Period 1 of the test license active remaining time 1000 h
NC/DEF.DIR/GUD5.DEF
DEF NCK INT TEST51INT = 0
DEF NCK INT TEST52INT = 0
DEF NCK REAL TEST51REAL = 0
DEF NCK REAL TEST52REAL = 0
DEF NCK BOOL TEST51BOOL = 1
DEF NCK BOOL TEST52BOOL = 0
DEF NCK CHAR TEST51CHAR = 69
DEF NCK CHAR TEST52CHAR = 98
DEF NCK STRING[100] TEST51STR = "Program is stopped"
DEF NCK REAL TESTARRAY[3] = (123, 456, 789)
DEF CHAN REAL TESTCA[3] = (987, 654, 321)
DEF NCK INT temp1 = 0
DEF NCK INT temp2 = 0
DEF NCK INT temp3 = 0
DEF NCK INT temp4 = 0
DEF NCK INT temp5 = 0
M30
  
```

The variables/commands have the following meaning:

DEF Command for a variable definition

NCK Variable is used in the NCK

CHAN Variable is used in the channel

After that the variable type (INT, REAL, BOOL, CHAR, STRING) and the variable name are specified.

Global GUD data

In the *PARAMETERS* area in the *User variable* submenu, you can view the variables and their current values. To do this, select the appropriate area (Global or Channel) and the corresponding user definition data file.

Global user variables		GUD5
TEST51INT		0
TEST52INT		150002
TEST51REAL		0.8571673007
TEST52REAL		0.5150300749
TEST51BOOL		0
TEST52BOOL		1
TEST51CHAR		69
TEST52CHAR		98
TEST51STR		Program is STOPPED
TEST52STR		Mission complete
TESTARRAY[0]		123
TESTARRAY[1]		456
TESTARRAY[2]		789
TEMP1		150001
TEMP2		1500
TEMP3		151000
TEMP4		0
TEMP5		0

In order to acquire the variables in *ibaPDA*, you need the number of the row in the variable view in the HMI. Arrays count together as one line.

The number of the row is entered into the column *Column* in *ibaPDA*. For arrays, the array index is entered in the *Row* column.

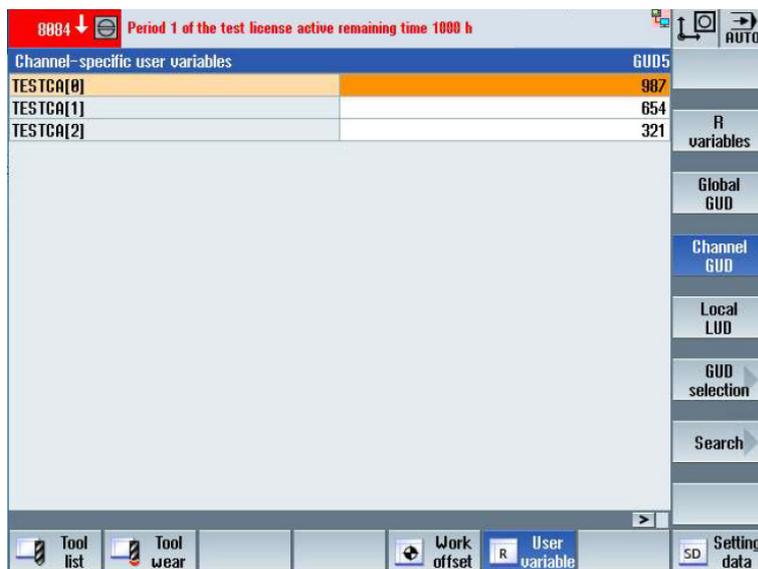
Note that the HMI is 0-based and *ibaPDA* is 1-based. Therefore, 1 must be added to the *HMI* array index.

Global user variab		Name	Symbol	Area	Area number	Module	Column	Row	DataT
1	TEST51INT			N	1	M	13376	1	Int
2	TEST52INT	SAFE_INFO_TELEG...	SAFE...	N	1	M	13376	1	Int
3	TEST51REAL			N	1	M	13376	1	Do
4	TEST52REAL	nckVersion	nckV...	N	1	Y	32	1	Do
5	TEST51BOOL	TEST51INT		N	1	GD5	1	1	Int
6	TEST52BOOL	TEST52INT		N	1	GD5	2	1	Uint
7	TEST51CHAR	TEST51REAL		N	1	GD5	3	1	Do
8	TEST52CHAR	TEST52REAL		N	1	GD5	4	1	Do
9	TEST51STR	TEST51CHAR		N	1	GD5	7	1	C
10	TEST52STR	TEST52CHAR		N	1	GD5	8	1	C
11	TESTARRAY[0]	TEST51STR		N	1	GD5	9	1	SI
12	TESTARRAY[1]	TEST52STR		N	1	GD5	10	1	SI
13	TESTARRAY[2]	TESTARRAY1		N	1	GD5	11	1	Do
14	TEMP1	TESTARRAY2		N	1	GD5	11	2	Do
15	TEMP2	TESTARRAY3		N	1	GD5	11	3	Do
16	TEMP3								
17	TEMP4								
18	TEMP5								

Since the global GUD data run in the NCK, "N" must be selected in the *Area* column in *ibaPDA*.

Channel-specific GUD data

Variables that are defined as channel-specific GUD data can be found in the HMI in the CHANNEL GUD view.



In order to acquire the variables in *ibaPDA*, you also need the number of the line here. The number of the row is entered into the column *Column* in *ibaPDA*. For arrays, the array index is entered in the *Row* column.

Note that the HMI is 0-based and *ibaPDA* is 1-based. Therefore, 1 must be added to the *HMI* array index.

Channel-specific user variables						
TESTCA[0]						
TESTCA[1]						
TESTCA[2]						

TESTCA1		C	1	GD5	1	1	Double
TESTCA2		C	1	GD5	1	2	Double
TESTCA3		C	1	GD5	1	3	Double

Since the channel-specific GUD data run in the channel area, "C" must be selected in *ibaPDA* in the *Area* column.

R parameters

R parameters are also user variables which can be read and written. They can be viewed and preassigned in the HMI.

To do this, select the *R variables* area in the *User variable* submenu in the *PARAMETERS* area.

R 0	6546	R 20	0	R 40	0
R 1	684687	R 21	0	R 41	0
R 2	9875	R 22	0	R 42	0
R 3	12358	R 23	0	R 43	0
R 4	4982	R 24	0	R 44	0
R 5	4879	R 25	0	R 45	0
R 6	35789	R 26	0	R 46	0
R 7	78542	R 27	0	R 47	0
R 8	25486	R 28	0	R 48	0
R 9	0	R 29	0	R 49	0
R 10	0	R 30	0	R 50	0
R 11	0	R 31	0	R 51	0
R 12	0	R 32	0	R 52	0
R 13	0	R 33	0	R 53	0
R 14	0	R 34	0	R 54	0
R 15	0	R 35	0	R 55	0
R 16	0	R 36	0	R 56	0
R 17	0	R 37	0	R 57	0
R 18	0	R 38	0	R 58	0
R 19	0	R 39	0	R 59	0

In order to read the corresponding R parameters in *ibaPDA*, the variable "rpa" can be searched for via the symbol browser, which corresponds to the R parameters in the SINUMERIK.

To read in a specific R parameter, the corresponding number of the R parameter must be entered in the *Row* column.

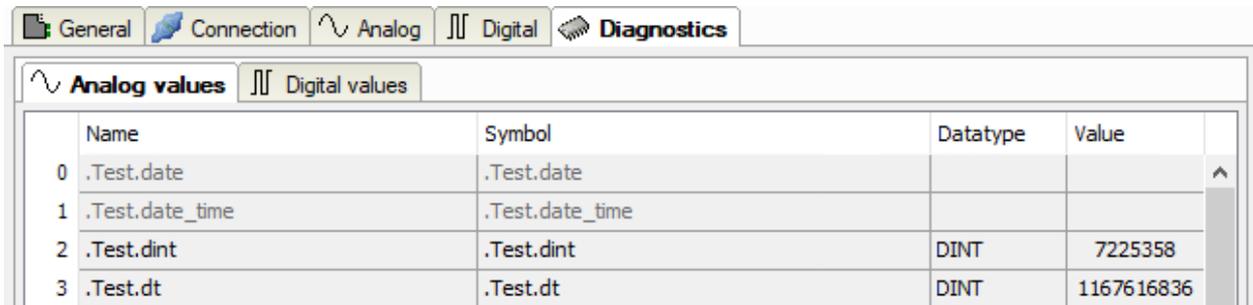
Note that the HMI is 0-based and *ibaPDA* is 1-based. Therefore, 1 must be added to the HMI R parameter number.

7	rpa0	rpa	C	1	RP	1	1	Double	<input checked="" type="checkbox"/>
8	rpa1	rpa	C	1	RP	1	2	Double	<input checked="" type="checkbox"/>
9	rpa2	rpa	C	1	RP	1	3	Double	<input checked="" type="checkbox"/>
10	rpa3	rpa	C	1	RP	1	4	Double	<input checked="" type="checkbox"/>
11	rpa4	rpa	C	1	RP	1	5	Double	<input checked="" type="checkbox"/>

In *ibaPDA*, you have to enter the names of the R parameter variables manually. The names can be helpful for later orientation.

3.4.6 Module diagnostics

After applying the configuration the actual values of the analog and digital signals are displayed in the *Diagnostics* tab of the relevant module.



	Name	Symbol	Datatype	Value
0	.Test.date	.Test.date		
1	.Test.date_time	.Test.date_time		
2	.Test.dint	.Test.dint	DINT	7225358
3	.Test.dt	.Test.dt	DINT	1167616836

Inactive signals are grayed out.

4 Diagnostics

4.1 License

If the interface is not displayed in the signal tree, you can either check in *ibaPDA* in the I/O Manager under *General – Settings* or in the *ibaPDA* service status application whether your license for this interface has been properly recognized. The number of licensed connections is shown in brackets.

The figure below shows the license for the *Codesys Xplorer* interface as an example.

License information		Licenses:
License container:	3-...	...
Customer name:	i...	...
License time limit:	Unlimited	...
Container type:	WIBU CmStick v4.40	ibaPDA-Interface-Codesys-Xplorer (16)
Container host:
Required EUP date:	01.02.2023	...
EUP date:	31.12.2025	...

4.2 Visibility of the interface

If the interface is not visible despite a valid license, it may be hidden.

Check the settings in the *General* tab in the *Interfaces* node.

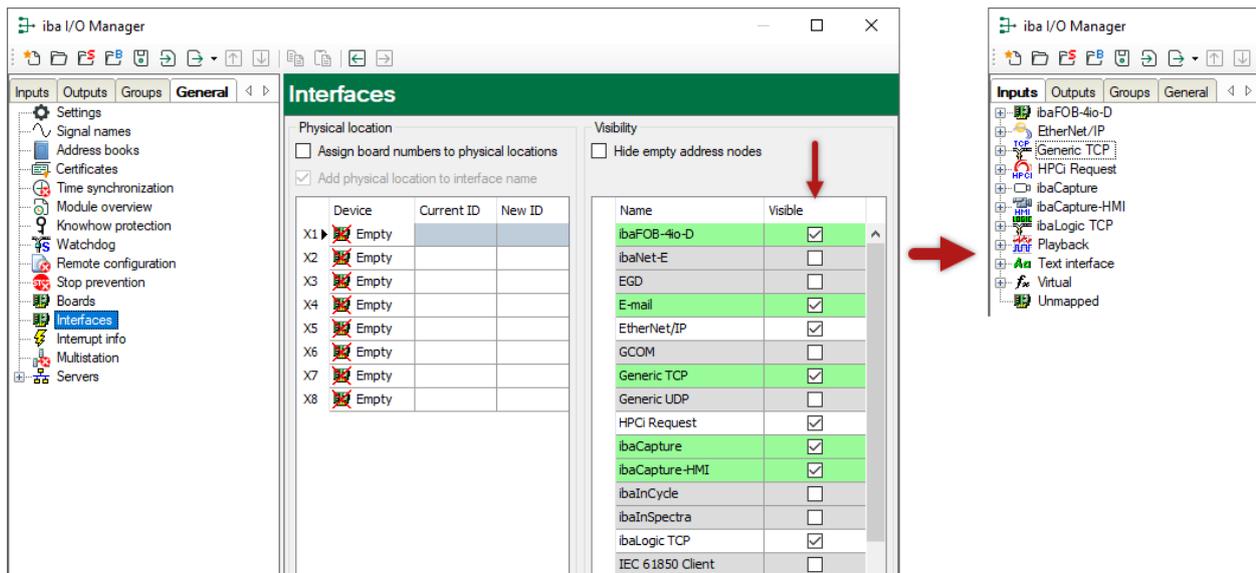
Visibility

The table *Visibility* lists all the interfaces that are available either through licenses or installed cards. These interfaces can also be viewed in the interface tree.

You can hide or display the interfaces not required in the interface tree by using the checkbox in the *Visible* column.

Interfaces with configured modules are highlighted in green and cannot be hidden.

Selected interfaces are visible, the others are hidden:



4.3 Log files

If connections to target platforms or clients have been established, all connection-specific actions are logged in a text file. You can open this (current) file and, e.g., scan it for indications of possible connection problems.

You can open the log file via the button <Open log file>. The button is available in the I/O Manager:

- for many interfaces in the respective interface overview
- for integrated servers (e.g. OPC UA server) in the *Diagnostics* tab.

In the file system on the hard drive, you can find the log files of the *ibaPDA* server (...\[ProgramData\iba\ibaPDA\Log](#)). The file names of the log files include the name or abbreviation of the interface type.

Files named [interface.txt](#) are always the current log files. Files named [Interface_yyyy_mm_dd_hh_mm_ss.txt](#) are archived log files.

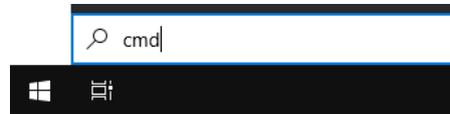
Examples:

- [ethernetipLog.txt](#) (log of EtherNet/IP connections)
- [AbEthLog.txt](#) (log of Allen-Bradley Ethernet connections)
- [OpcUAServerLog.txt](#) (log of OPC UA server connections)

4.4 Connection diagnostics with PING

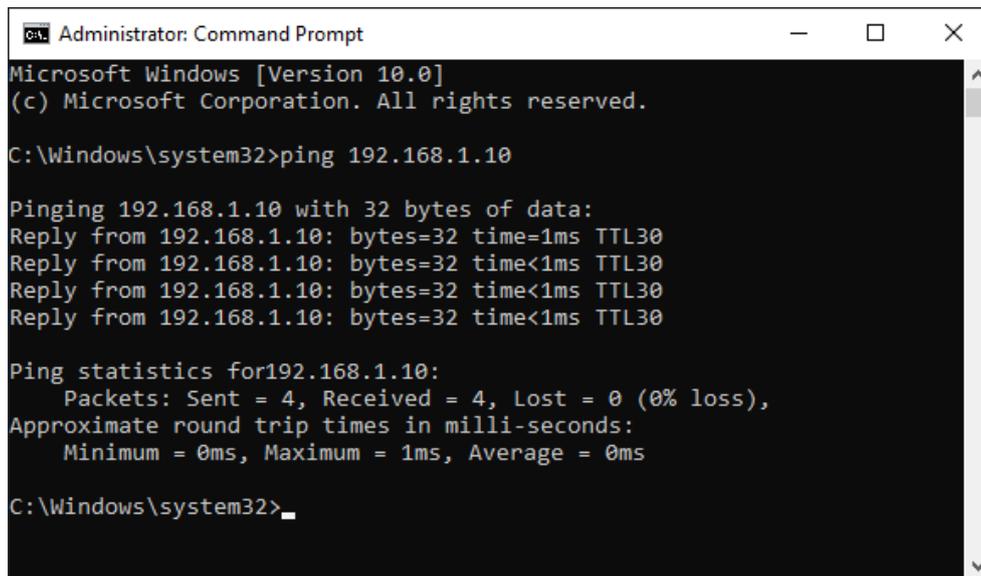
PING is a system command with which you can check if a certain communication partner can be reached in an IP network.

1. Open a Windows command prompt.



2. Enter the command "ping" followed by the IP address of the communication partner and press <ENTER>.

→ With an existing connection you receive several replies.

A screenshot of a Windows Command Prompt window titled 'Administrator: Command Prompt'. The window shows the following text:

```
Microsoft Windows [Version 10.0]
(c) Microsoft Corporation. All rights reserved.

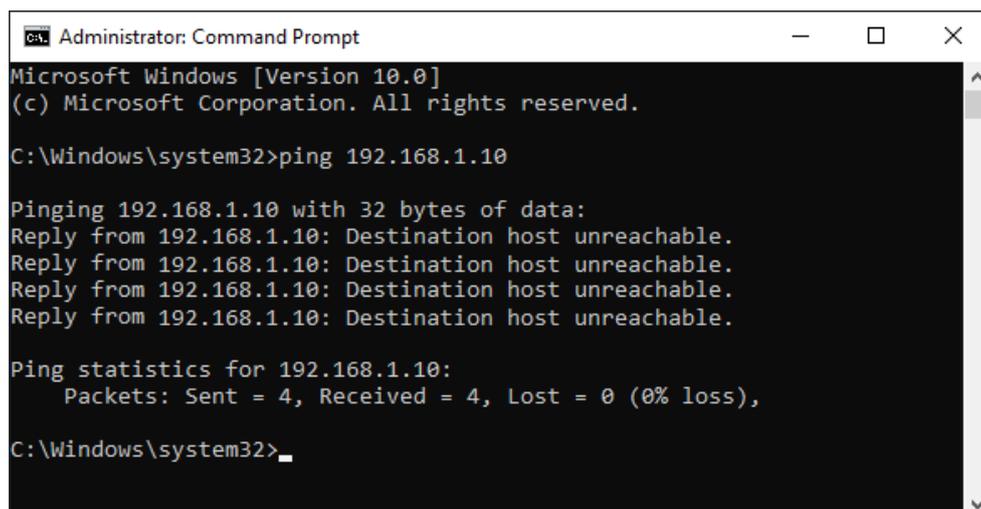
C:\Windows\system32>ping 192.168.1.10

Pinging 192.168.1.10 with 32 bytes of data:
Reply from 192.168.1.10: bytes=32 time=1ms TTL30
Reply from 192.168.1.10: bytes=32 time<1ms TTL30
Reply from 192.168.1.10: bytes=32 time<1ms TTL30
Reply from 192.168.1.10: bytes=32 time<1ms TTL30

Ping statistics for 192.168.1.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Windows\system32>_
```

→ With no existing connection you receive error messages.

A screenshot of a Windows Command Prompt window titled 'Administrator: Command Prompt'. The window shows the following text:

```
Microsoft Windows [Version 10.0]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\system32>ping 192.168.1.10

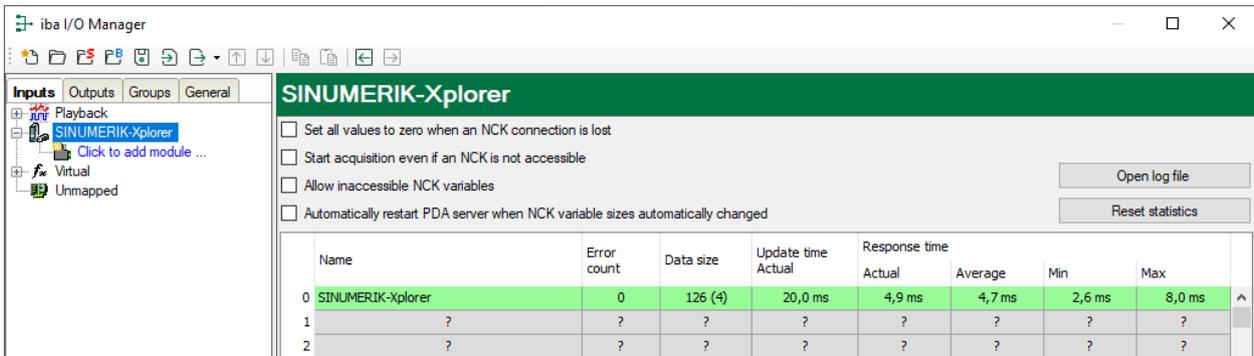
Pinging 192.168.1.10 with 32 bytes of data:
Reply from 192.168.1.10: Destination host unreachable.

Ping statistics for 192.168.1.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

C:\Windows\system32>_
```

4.5 Connection table

For every SINUMERIK-Xplorer interface there is a table available in the I/O Manager which shows the status of each connection. Each row represents one connection.



The columns display different values, depending on the type of the interface. The connected target systems (NCKs) are identified by their name or IP address in the first (left) column.

The table shows the cycle times and error counters of the different connections during the data acquisition. In the *Data size* column, the number of requested bytes and - in brackets and for support purposes - the number of Request telegrams are displayed.

Click the <Reset counters> button to reset the error counters and the calculation of the response times.

Additional information is provided by the background color of the table rows:

Color	Meaning
Green	The connection is OK and the data are read.
Orange	The connection is OK, however the data update is slower than the configured update time.
Red	The connection has failed.
Grey	No connection configured.

4.6 Diagnostic modules

Diagnostic modules are available for most Ethernet based interfaces and Xplorer interfaces. Using a diagnostic module, information from the diagnostic displays (e.g. diagnostic tabs and connection tables of an interface) can be acquired as signals.

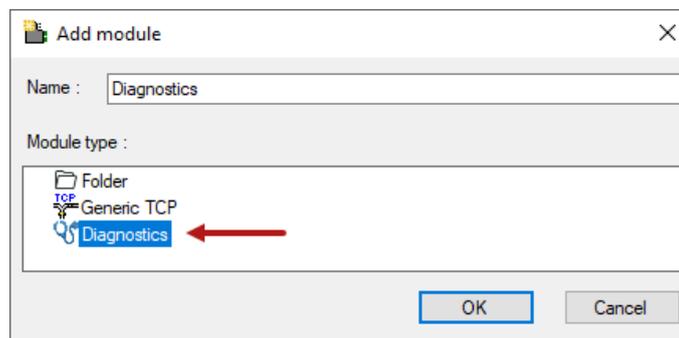
A diagnostic module is always assigned to a data acquisition module of the same interface and supplies its connection information. By using a diagnostic module you can record and analyze the diagnostic information continuously in the *ibaPDA* system.

Diagnostic modules do not consume any license connections, since they do not establish their own connection, but refer to another module.

Example for the use of diagnostic modules:

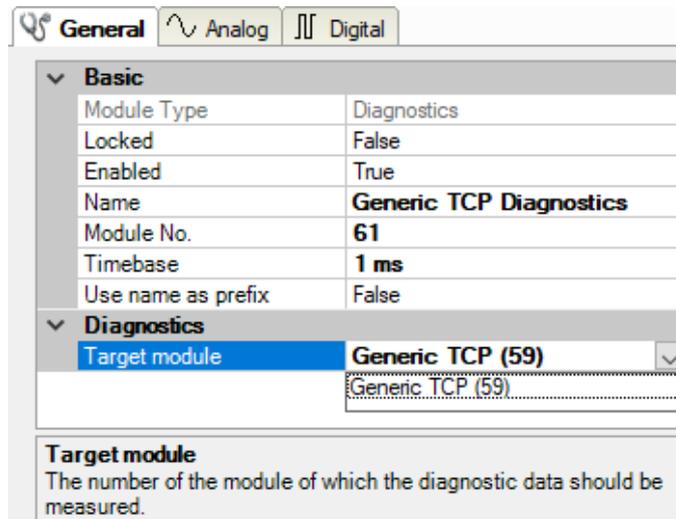
- A notification can be generated, whenever the error counter of a communication connection exceeds a certain value or the connection gets lost.
- In case of a disturbance, the current response times in the telegram traffic may be documented in an incident report.
- The connection status can be visualized in *ibaQPanel*.
- You can forward diagnostic information via the SNMP server integrated in *ibaPDA* or via OPC DA/UA server to superordinate monitoring systems like network management tools.

In case the diagnostic module is available for an interface, a "Diagnostics" module type is shown in the "Add module" dialog (example: Generic TCP).



Module settings diagnostic module

For a diagnostic module, you can make the following settings (example: Generic TCP):



The basic settings of a diagnostic module equal those of other modules.

There is only one setting which is specific for the diagnostic module: the target module.

By selecting the target module, you assign the diagnostic module to the module on which you want to acquire information about the connection. You can select the supported modules of this interface in the drop down list of the setting. You can assign exactly one data acquisition module to each diagnostic module. When having selected a module, the available diagnostic signals are immediately added to the *Analog* and *Digital* tabs. It depends on the type of interface, which signals exactly are added. The following example lists the analog values of a diagnostic module for a Generic TCP module.

General Analog Digital						
Name	Unit	Gain	Offset	Active	Actual	
0 IP address (part 1)			1	0	<input checked="" type="checkbox"/>	
1 IP address (part 2)			1	0	<input checked="" type="checkbox"/>	
2 IP address (part 3)			1	0	<input checked="" type="checkbox"/>	
3 IP address (part 4)			1	0	<input checked="" type="checkbox"/>	
4 Port			1	0	<input checked="" type="checkbox"/>	
5 Message counter			1	0	<input checked="" type="checkbox"/>	
6 Incomplete errors			1	0	<input checked="" type="checkbox"/>	
7 Packet size (actual)	bytes		1	0	<input checked="" type="checkbox"/>	
8 Packet size (max)	bytes		1	0	<input checked="" type="checkbox"/>	
9 Time between data (actual)	ms		1	0	<input checked="" type="checkbox"/>	
10 Time between data (min)	ms		1	0	<input checked="" type="checkbox"/>	

For example, the IP (v4) address of a Generic TCP module (see fig. above) will always be split into 4 parts derived from the dot-decimal notation, for better reading. Also other values are being determined, as there are port number, counters for telegrams and errors, data sizes and telegram cycle times. The following example lists the digital values of a diagnostic module for a Generic TCP module.

General Analog Digital			
Name	Active	Actual	
0 Active connection mode	<input checked="" type="checkbox"/>		
1 Invalid packet	<input checked="" type="checkbox"/>		
2 Connecting	<input checked="" type="checkbox"/>		
3 Connected	<input checked="" type="checkbox"/>		

Diagnostic signals

Depending on the interface type, the following signals are available:

Signal name	Description
Active	Only relevant for redundant connections. Active means that the connection is used to measure data, i.e. for redundant standby connections the value is 0. For normal/non-redundant connections, the value is always 1.
Buffer file size (actual/avg/max)	Size of the file for buffering statements
Buffer memory size (actual/avg/max)	Size of the memory used by buffered statements
Buffered statements	Number of unprocessed statements in the buffer
Buffered statements lost	Number of buffered but unprocessed and lost statements
Connected	Connection is established
Connected (in)	A valid data connection for the reception (in) is available
Connected (out)	A valid data connection for sending (out) is available
Connecting	Connection being established
Connection attempts (in)	Number of attempts to establish the receive connection (in)
Connection attempts (out)	Number of attempts to establish the send connection (out)
Connection ID O->T	ID of the connection for output data (from the target system to <i>ibaPDA</i>). Corresponds to the assembly instance number
Connection ID T->O	ID of the connection for input data (from <i>ibaPDA</i> to target system). Corresponds to the assembly instance number
Connection phase (in)	Status of the ibaNet-E data connection for reception (in)
Connection phase (out)	Status of the ibaNet-E data connection for sending (out)
Connections established (in)	Number of currently valid data connections for reception (in)
Connections established (out)	Number of currently valid data connections for sending (out)
Data length	Length of the data message in bytes
Data length O->T	Size of the output message in byte
Data length T->O	Size of the input message in byte
Destination IP address (part 1-4) O->T	4 octets of the IP address of the target system Output data (from target system to <i>ibaPDA</i>)
Destination IP address (part 1-4) T->O	4 octets of the IP address of the target system Input data (from <i>ibaPDA</i> to target system)
Disconnects (in)	Number of currently interrupted data connections for reception (in)
Disconnects (out)	Number of currently interrupted data connections for sending (out)
Error counter	Communication error counter
Exchange ID	ID of the data exchange
Incomplete errors	Number of incomplete messages

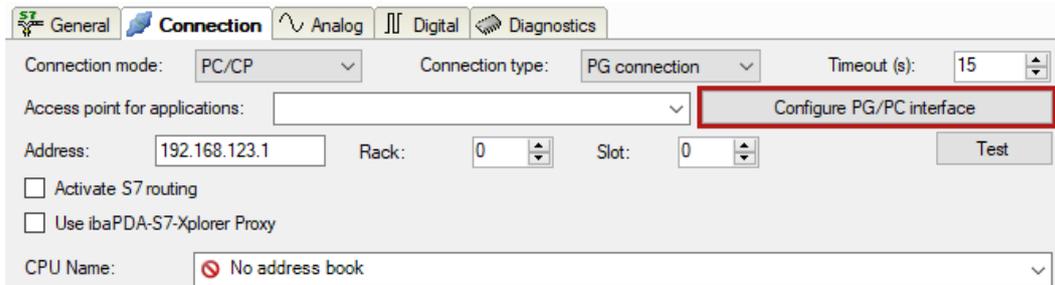
Signal name	Description
Incorrect message type	Number of received messages with wrong message type
Input data length	Length of data messages with input signals in bytes (<i>ibaPDA</i> receives)
Invalid packet	Invalid data packet detected
IP address (part 1-4)	4 octets of the IP address of the target system
Keepalive counter	Number of KeepAlive messages received by the OPC UA Server
Lost images	Number of lost images (in) that were not received even after a retransmission
Lost Profiles	Number of incomplete/incorrect profiles
Message counter	Number of messages received
Messages per cycle	Number of messages in the cycle of the update time
Messages received since configuration	Number of received data telegrams (in) since start of acquisition
Messages received since connection start	Number of received data telegrams (in) since the start of the last connection setup. Reset with each connection loss.
Messages sent since configuration	Number of sent data telegrams (out) since start of acquisition
Messages sent since connection start	Number of sent data telegrams (out) since the start of the last connection setup. Reset with each connection loss.
Multicast join error	Number of multicast login errors
Number of request commands	Counter for request messages from <i>ibaPDA</i> to the PLC/CPU
Output data length	Length of the data messages with output signals in bytes (<i>ibaPDA</i> sends)
Packet size (actual)	Size of the currently received message
Packet size (max)	Size of the largest received message
Ping time (actual)	Response time for a ping telegram
Port	Port number for communication
Producer ID (part 1-4)	Producer ID as 4 byte unsigned integer
Profile Count	Number of completely recorded profiles
Read counter	Number of read accesses/data requests
Receive counter	Number of messages received
Response time (actual/average/max/min)	<p>Response time is the time between measured value request from <i>ibaPDA</i> and response from the PLC or reception of the data.</p> <p>Actual: current value</p> <p>Average/max/min: static values of the update time since the last start of the acquisition or reset of the counters.</p>
Retransmission requests	Number of data messages requested again if lost or delayed

Signal name	Description
Rows (last)	Number of resulting rows by the last SQL query (within the configured range of result rows)
Rows (maximum)	Maximum number of resulting rows by any SQL query since the last start of acquisition (possible maximum equals the configured number of result rows)
Send counter	Number of send messages
Sequence errors	Number of sequence errors
Source IP address (part 1-4) O->T	4 octets of the IP address of the target system Output data (from target system to <i>ibaPDA</i>)
Source IP address (part 1-4) T->O	4 octets of the IP address of the target system Input data (from <i>ibaPDA</i> to target system)
Statements processed	Number of executed statements since last start of acquisition
Synchronization	Device is synchronized for isochronous acquisition
Time between data (actual/ max/min)	Time between two correctly received messages Actual: between the last two messages Max/min: statistical values since start of acquisition or reset of counters
Time offset (actual)	Measured time difference of synchronicity between <i>ibaPDA</i> and the <i>ibaNet-E</i> device
Topics Defined	Number of defined topics
Topics Updated	Number of updated topics
Unknown sensor	Number of unknown sensors
Update time (actual/average/ configured/max/min)	Specifies the update time in which the data is to be retrieved from the PLC, the CPU or from the server (configured). Default is equal to the parameter "Timebase". During the measurement the real actual update time (actual) can be higher than the set value, if the PLC needs more time to transfer the data. How fast the data is really updated, you can check in the connection table. The minimum achievable update time is influenced by the number of signals. The more signals are acquired, the greater the update time becomes. Average/max/min: static values of the update time since the last start of the acquisition or reset of the counters.
Write counter	Number of successful write accesses
Write lost counter	Number of failed write accesses

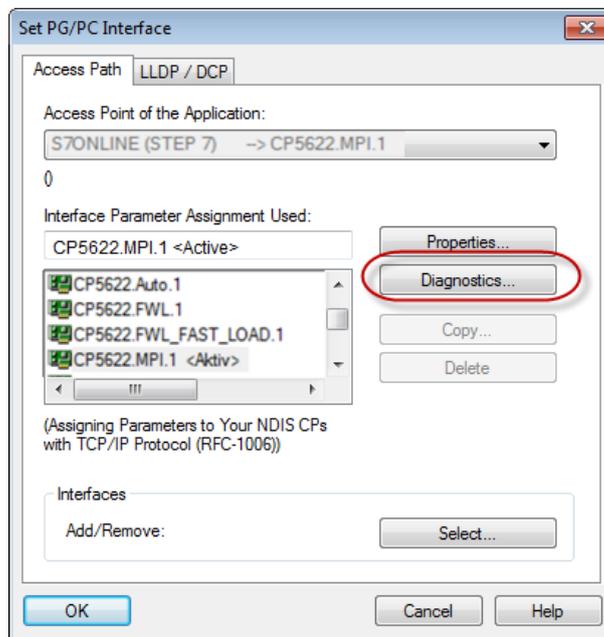
4.7 Connection diagnostics with PG/PC interface

Use the diagnostic function of the PG/PC interface to the functionality and connection configuration.

1. Open the dialog for configuring the PG/PC interface with the <Configure PG/PC interface> button.



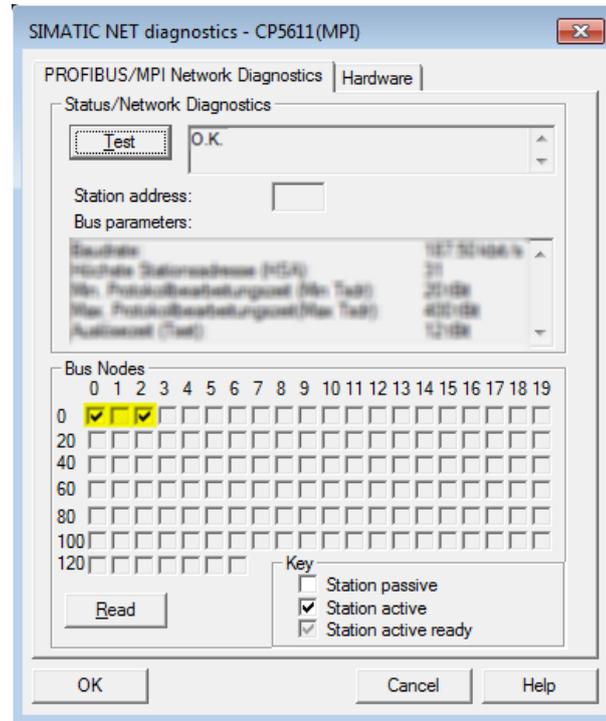
2. Open the diagnostics dialog with the <Diagnostics> button.



3. Start the network diagnostics with the <Test> button.
Check the availability of the bus devices with the <Read> button.

→ The following figure shows an example of a diagnostics of a SIMATIC Net CP5622 (PROFIBUS).

One active station is on the address 0 and 2 each.



4.8 Error messages

The following tables contain error messages and their possible cause.

The error messages are output when validating the configuration at the beginning of the measurement in the I/O Manager of *ibaPDA*.

Error code	Description	Possible cause
0xFFFF00000	Function not implemented	
0xFFFF00001	Parameter error when calling a function	False format of IP address
0xFFFF00002	Invalid device number	
0xFFFF00003	Invalid PLC number	
0xFFFF00004	Invalid parameter type	
0xFFFF00005	Not enough memory	
0xFFFF00006	Device already opened	
0xFFFF00007	Device not opened	
0xFFFF00008	Order has already been removed	
0xFFFF00009	Invalid order number	
0xFFFF0000A	Function is not supported	
0xFFFF0000B	Adapter not initialized	
0xFFFF0000C	No free connections available	

Error code	Description	Possible cause
0xFFFF0000D	Device is not configured and not supported	
0xFFFF0000E	Hardware was not found	No connection Adapter not connected Interface not available
0xFFFF0000F	Error when reading the parameters	
0xFFFF00010	Error when writing the parameters	
0xFFFF00011	The demo time has elapsed	
0xFFFF00012	False character in the text. Conversion not possible.	
0xFFFF00013	Buffer is not long enough.	
0xFFFF00014	File was not found	
0xFFFF00015	Error when calling the configuration program	
0xFFFF00016	Error when dynamically loading the DLL	
0xFFFF00017	The file could not be generated	
0xFFFF50000	No free order buffer available	
0xFFFF50001	Invalid packet	
0xFFFF50002	No connection to the PLC	All connections are already assigned
0xFFFF50003	The connection has been closed	
0xFFFF50004	Timeout	Wrong MPI address False rack number False slot number
0xFFFF50005	Invalid context	
0xFFFF50006	PLC-memory error	
0xFFFF50007	Invalid operating state	
0xFFFF50008	Invalid address on the PLC	
0xFFFF50009	Invalid mode	
0xFFFF5000A	No data available, e.g. DB is missing	
0xFFFF5000B	Execution level for OB not available	
0xFFFF5000C	Empty block list	
0xFFFF5000D	Error in the block size	
0xFFFF5000E	Invalid block number	
0xFFFF5000F	Protection level of the function not sufficient	
0xFFFF50010	Unknown SSL ID (e.g. access to CP instead of PLC)	False slot number

Error code	Description	Possible cause
0xFFFF50011	Unknown SZL index (e.g. access to CP instead of PLC)	
0xFFFF50012	Information cannot be obtained at the moment	
0xFFFF50013	Unknown error message from PLC (please report!)	
0xFFFF50014	Hardware failure, e.g. nonexistent peripherals	
0xFFFF50015	Object access not allowed	
0xFFFF50016	Context is not supported	
0xFFFF50017	Type (data type) not supported	
0xFFFF50018	Internal error, please report	
0xFFFF50019	Error when restarting the PLC	
0xFFFF5001A	Error at automatic start-up of the PLC	
0xFFFF5001B	End of connection received	
0xFFFF5001C	PLC not found	False rack number False slot number
0xFFFF5001D	Too many data for this ACCON-AGLink version	
0xFFFF5001E	The PLC does not support this function	
0xFFFF5001F	The password entered is wrong	
0xFFFF50020	The connection has already been legitimized	
0xFFFF50021	The connection legitimation has already been canceled	
0xFFFF50022	The password is not required, since no password has been configured	
0xFFFF50023	At least one variable address is invalid	
0xFFFF50024	Specified order does not exist	
0xFFFF50025	Impermissible order state	
0xFFFF50026	Impermissible cycle time (timebase or multiple thereof impermissible)	
0xFFFF50027	No further cyclical reading order can be set up	
0xFFFF50028	Function for this order not possible (false state)	
0xFFFF50029	Termination of the function due to overload (reading cycle takes longer than the cycle time set)	
0xFFFF5002A	No data for this part of the reading cycle has been supplied	

Error code	Description	Possible cause
0xFFFF5002B	False time format	
0xFFFF5002C	Unknown PI name	
0xFFFF5002D	Transfer has been interrupted by NCK	
0xFFFF5002E	The response telegram is too big for the PDU size	
0xFFFF5002F	No H-CPU found	
0xFFFF50030	The data have not changed	
0xFFFF30000	Error when reading the device information	
0xFFFF30001	Error when reading the bus parameters	
0xFFFF30002	Error when writing the bus parameters	
0xFFFF30003	No resources available on the device	
0xFFFF30004	Invalid device	
0xFFFF30005	Adapter was not found	
0xFFFF30006	Required device driver has not been found	
0xFFFF20000	The desired adapter address already exists	
0xFFFF20001	The HSA is invalid (shorter than biggest active node)	
0xFFFF20002	The adapter is not in the logical ring	
0xFFFF20004	Received packet has wrong contents	
0xFFFF20006	Unknown error code of the adapter	
0xFFFF20007	Unknown error code of the device driver	
0xFFFF20008	The communication adapter has been removed	
0xFFFF20009	The modem has been removed	
0xFFFF2000A	No directly connected PLC found	
0xFFFF20313	Invalid speed at the MPI bus	
0xFFFF20314	The address is longer than HSA	
0xFFFF20315	The desired adapter address already exists	
0xFFFF2031A	No other active bus device found	
0xFFFF2031C	The bus is disturbed	
0xFFFF2031D	The bus is disturbed	
0xFFFF2031E	Automatic bus profile identification does not work, bus parameter telegram is missing	
0xFFFF20337	Legitimization for accessing the TS adapter is missing	
0xFFFF10000	The COM port is already in use	
0xFFFF10001	The modem was not found	
0xFFFF10002	The modem did not hang up	
0xFFFF10003	The modem did not respond	

Error code	Description	Possible cause
0xFFFF10004	Modem error when initializing the basis	
0xFFFF10005	Error in Initstring 1	
0xFFFF10006	Error in Initstring 2	
0xFFFF10007	Error in Initstring 3	
0xFFFF10008	Error in Initstring 4	
0xFFFF10009	Error in the dial mode specification sequence	
0xFFFF1000A	Error in the dial tone specification sequence	
0xFFFF1000B	Error in the automatic call acceptance sequence	
0xFFFF1000C	The modem has been removed	
0xFFFF1000D	No connection could be established	
0xFFFF1000E	Login has been rejected. The specified user name is not known.	
0xFFFF1000F	Login has been rejected. The password entered is not correct.	
0xFFFF10010	Login has been rejected. A callback number has already been configured in the TS adapter.	
0xFFFF10011	Error when selecting	
0xFFFF80000	Function not allowed	
0xFFFF80001	Invalid project handle	
0xFFFF80002	Error when opening a project	
0xFFFF80003	Error when creating the program instance of the project	
0xFFFF80004	Error when closing a project	
0xFFFF80005	No or no further program found	
0xFFFF80006	Specified program has not been found	
0xFFFF80007	One of the parameters is outside the valid range	
0xFFFF80008	Scope of functions or runtime has elapsed (demo version)	
0xFFFF8000A	No or invalid data indicated	
0xFFFF8000B	The selected program does not contain a symbol table	
0xFFFF8000C	Symbol table already opened	
0xFFFF8000D	No or no further symbol entry found	
0xFFFF8000E	Error when reading the symbol dataset	
0xFFFF8000F	Symbol not found	
0xFFFF80010	Absolute operand not found	

Error code	Description	Possible cause
0xFFFF80011	Invalid symbol	
0xFFFF80012	Invalid absolute operand	
0xFFFF80013	Invalid filter string	
0xFFFF80014	The indicated DB is not available	
0xFFFF80015	Error when reading the block data of the DB	
0xFFFF80016	Error when relocating the block data of the DB	
0xFFFF80017	A DB for searching components is already opened	
0xFFFF80018	No DB for searching components is opened yet	
0xFFFF80019	No or no further component available	
0xFFFF8001A	DB component not found	
0xFFFF8001B	Invalid DB component	
0xFFFF8001C	DB component not suitable	
0xFFFF8001E	Invalid constant specification	
0xFFFF8001F	Invalid constant size or formatting	
0xFFFF80020	Initializing the object types failed	
0xFFFF80021	False version of the message configuration	
0xFFFF80022	Error when opening the message configuration	
0xFFFF80023	Error when exiting the message configuration	
0xFFFF80024	No or no further message entries found	
0xFFFF80025	No or no further language found	
0xFFFF80026	Error when accessing the database	
0xFFFF80027	Invalid signal number	
0xFFFF80028	Invalid specification of associated value	
0xFFFF80029	Invalid number of the associated value	
0xFFFF8002A	Invalid element type	
0xFFFF8002B	Invalid length of associated value data	
0xFFFF8002C	Format not specified	
0xFFFF8002D	Invalid format specification	
0xFFFF8002E	No or no further text library available	
0xFFFF8002F	No or no further text library entry available	
0xFFFA0195	Wrong read type	

5 Appendix

5.1 Setting PG/PC interface/defining new access point

ibaPDA-Interface-SINUMERIK-Xplorer cannot establish a connection to a S7-CPU if the parametrization "AUTO" for an access point (MPI-adapter or CP) has been set in the SIMATIC Manager.

There are 2 possible remedies:

Changing the interface with remaining access point name

Change interface in the SIMATIC Manager e.g. from "CP5622 (AUTO)" to "CP5622 (MPI)" or "CP5622 (PROFIBUS)".

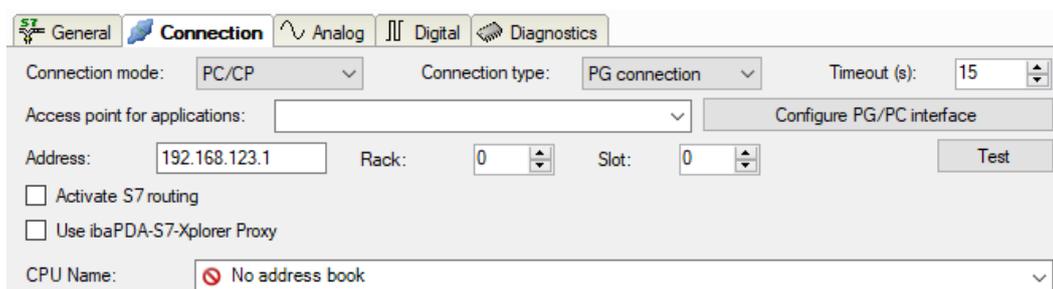
Disadvantage of this method: If the setting of the access point is changed again in the SIMATIC Manager, the measurement does no longer work because *ibaPDA* no longer has any access.

Adding a special access point for *ibaPDA*

To avoid conflicts with the setting of SIMATIC Manager and *ibaPDA* when both programs run on the same computer, you can define a new access point.

There is the <Configure PG/PC interface> button in the dialog window of the module. With this button, you can open the dialog for configuring the PG/PC interface.

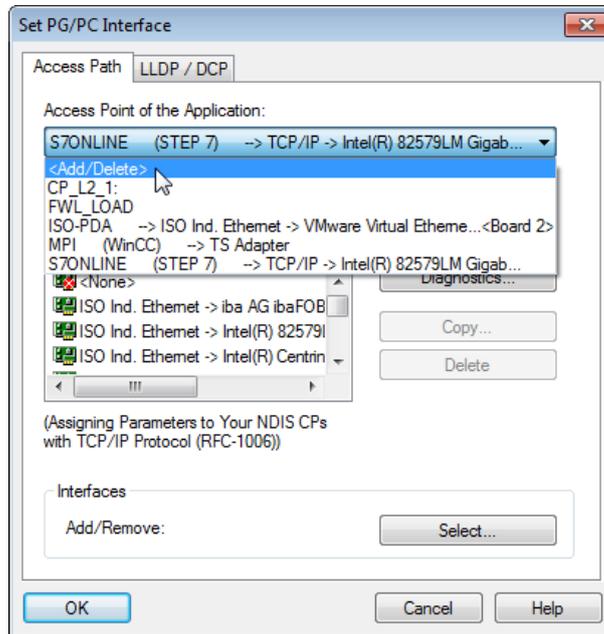
The setting for the SIMATIC Manager is also changed.



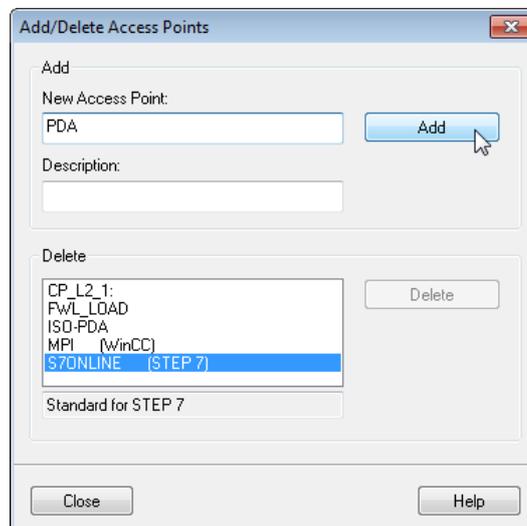
The screenshot shows the 'Connection' tab of a configuration dialog. The 'Connection mode' is set to 'PC/CP' and the 'Connection type' is 'PG connection'. The 'Timeout (s)' is set to 15. The 'Access point for applications' dropdown is empty, and a 'Configure PG/PC interface' button is visible next to it. The 'Address' field contains '192.168.123.1', 'Rack' is '0', and 'Slot' is '0'. There is a 'Test' button. Two checkboxes are present: 'Activate S7 routing' and 'Use ibaPDA-S7-Xplorer Proxy', both are unchecked. The 'CPU Name' dropdown shows 'No address book' with a red error icon.

Procedure

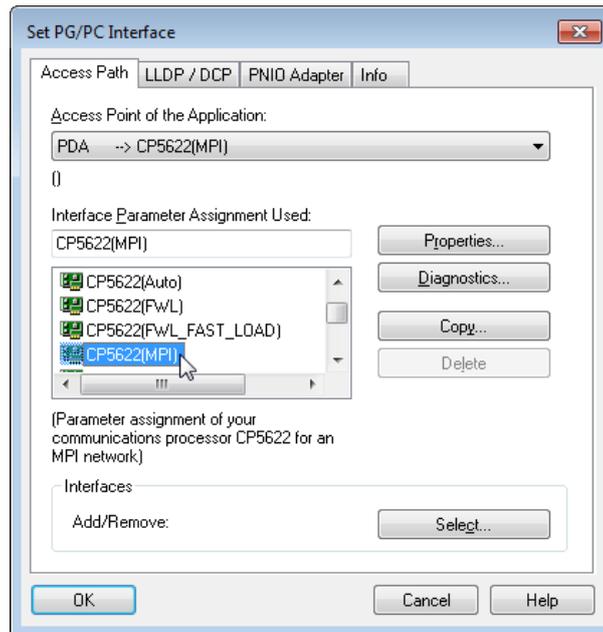
1. Open the dialog for configuring the PG/PC interface with the <Configure PG/PC interface> button.
2. Under *Access Point of the Application* select the row <Add/Delete>.



3. Define a new access point: Enter a name, e.g. "PDA", and optionally a description for a better understanding. Confirm your entries with <Add> and <Close>.

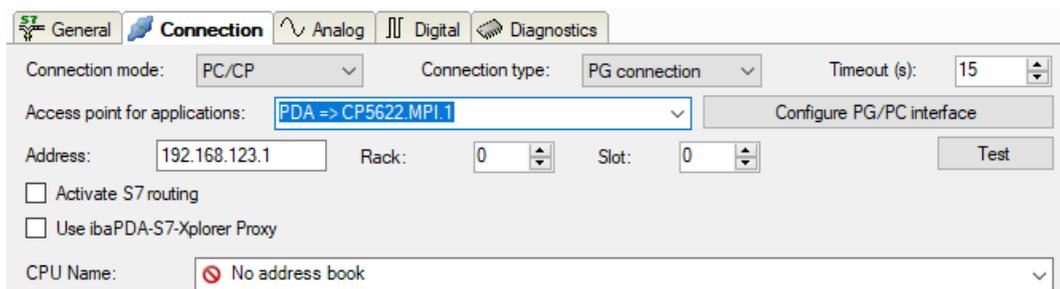


4. Add an interface to the access point, e.g. "CP5622 (MPI)".



5. Exit the configuration with <OK>.

→ *ibaPDA* subsequently displays the newly defined access (e.g. "PDA --> CP5622.MPI.1") in the connection dialog under *Access points for applications*.



Notes on the different access points

Depending on which access points have been configured in the Engineering computer, there are different access points available for selection in the *ibaPDA* system.

Basically, there are 3 types of access points:

- TCP/IP
- ISO
- Bus system PROFIBUS or MPI

TCP/IP

If you select an access point using TCP/IP, you need to enter the IP address, rack number and slot number of the CP in the module configuration dialog. If you do not know the rack number and/or slot number, enter "0" for slot and click on the <Test> button.

ISO

If you select an access point using an ISO interface, you need to enter the MAC address, rack number and slot number. If you do not know the rack number and/or slot number, enter "0" for slot and click on the <Test> button.

Bus system PROFIBUS or MPI

If you select an access point using a bus interface, like e.g. PROFIBUS or MPI, you need to enter the bus address, the rack number and slot number. You can also use the <Test> button and then click on one of the CPU links found to test the connection.

5.2 S7 routing

S7 routing is defined as the possibility to use S7 controls as router to access secondary target systems, i.e. controls or drives, which are in different subnets. This also includes changing the bus system (Ethernet, PROFIBUS, MPI).

Reference



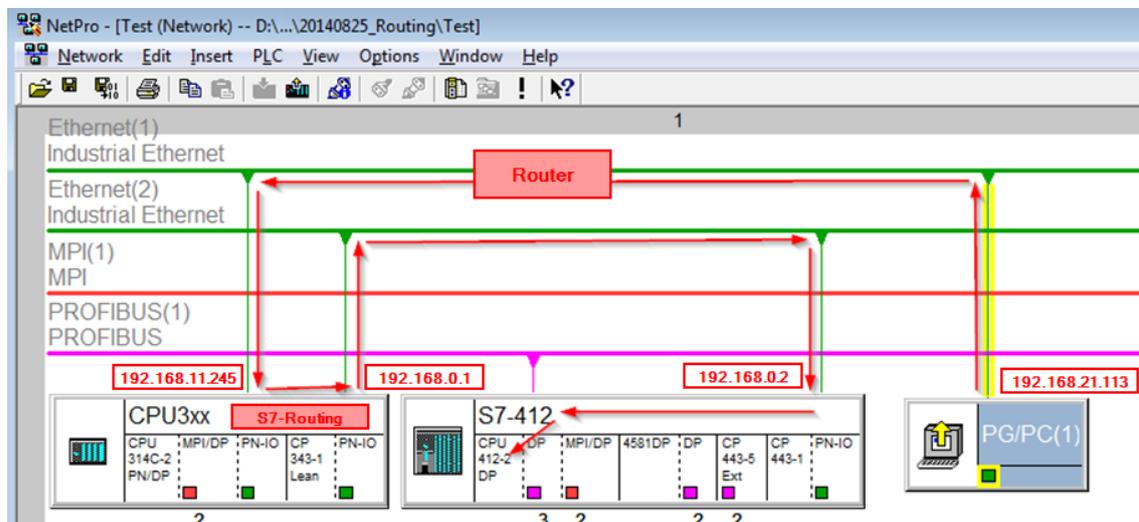
For more information about the S7-Routing, please refer to:

- Which modules support the "S7 Routing" function in S7 subnets?
<https://support.automation.siemens.com/ww/view/en/584459>
- Which requirements must be fulfilled and what do I have to observe if I want to execute routing?
<https://support.industry.siemens.com/cs/ww/en/view/2383206>
- How do you enable cross-project S7 Routing in the TIA Portal and in STEP 7 V5.x?
<https://support.industry.siemens.com/cs/ww/en/view/109474569>

5.2.1 Routing from Ethernet to Ethernet

Please do not mix up the *S7 Routing* function with IP routing.

The example shows how to implement the following way of access via S7 Routing in NetPro.



The engineering computer (also with *ibaPDA*) is to access the CPU412 controller. The computer and the controller are not directly connected via a common network/bus. The connection has to run over the CPU314C controller.

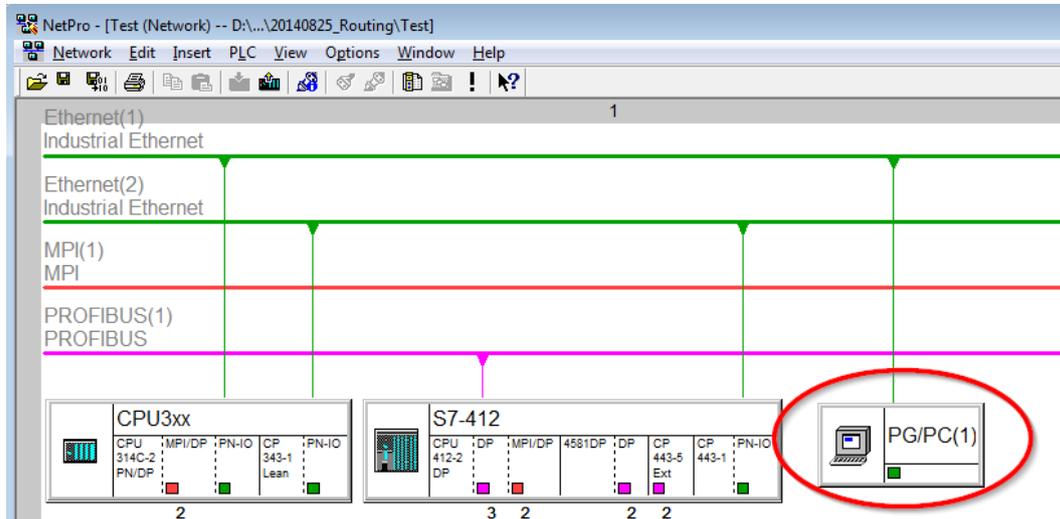
"Passing" the communication through this controller is called *S7 Routing*.

In our example, engineering computer and CPU314C are also located in two different (logic) subnets. You need an (IP) router for establishing a communication connection. This is completely independent of the S7 Routing function and should not be mixed up with it.

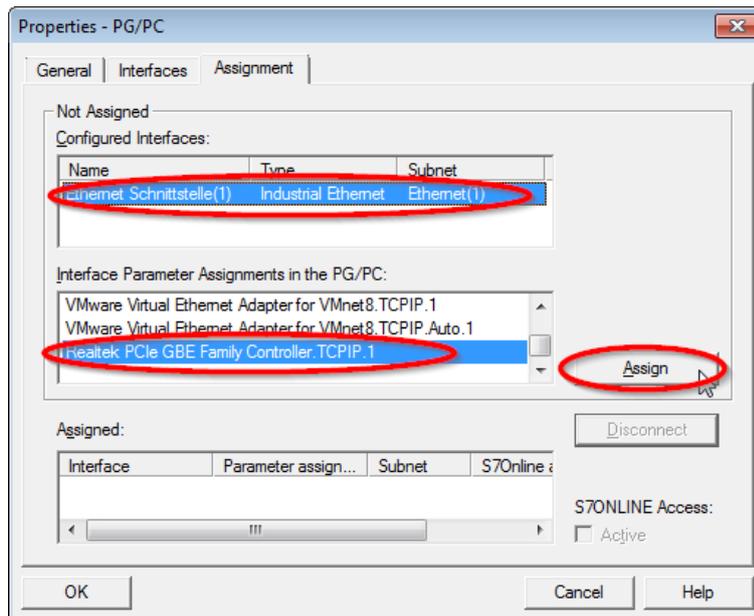
5.2.1.1 Configuration of STEP 7/NetPro

The following configuration steps are required to be able to access the secondary CPU412 control with the SIMATIC STEP 7 programming software. For using *ibaPDA*, these configuration steps are not required.

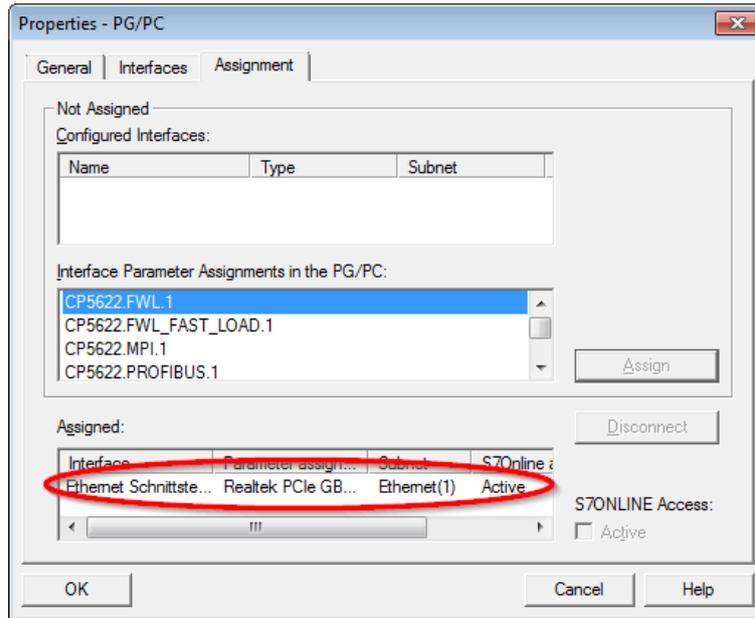
1. Add a PG/PC station and configure it.



2. Assign an interface (network card).

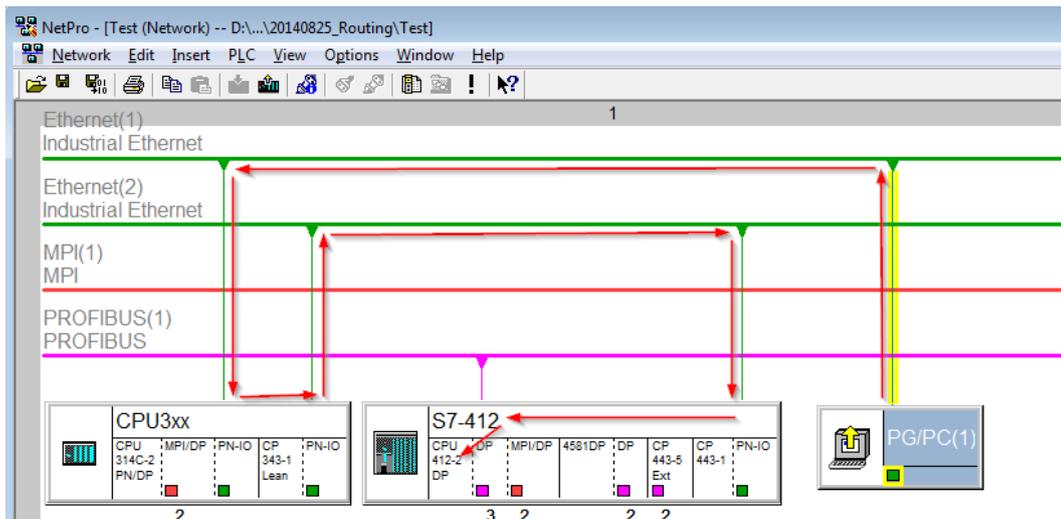


→ Result:



Now, the connection line from PG/PC to the network has to be marked in yellow.

In the following figure, the communication path is shown using arrows (these are not displayed in SIMATIC NetPro).

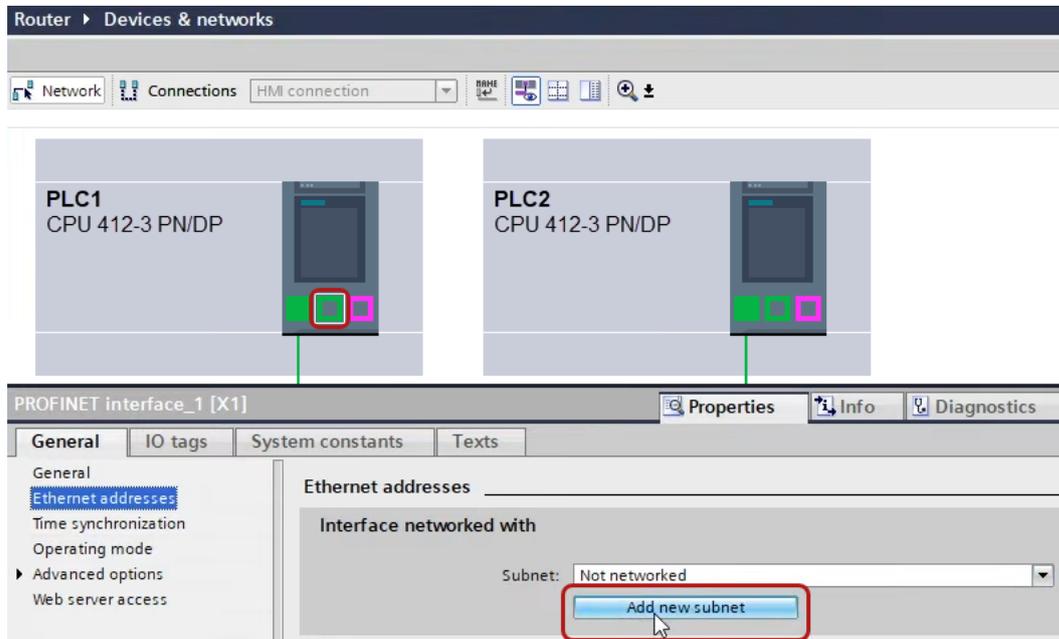


3. Finally, load all hardware configurations and connection data from NetPro.

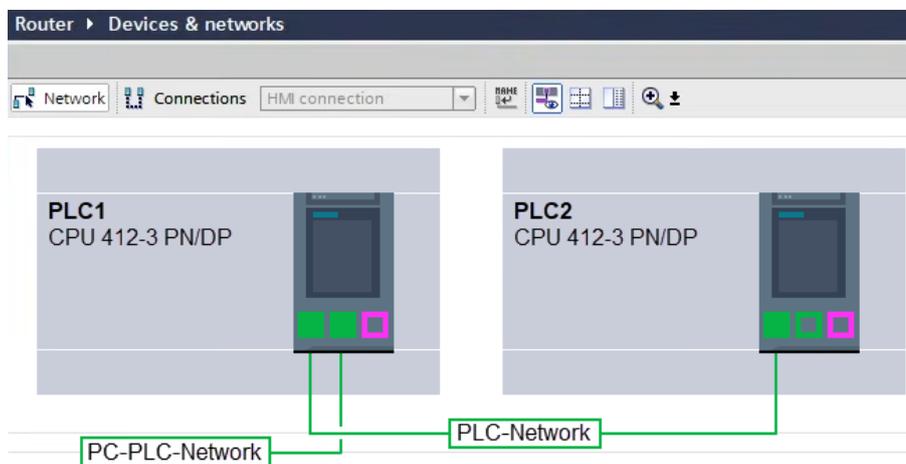
5.2.1.2 Configuration of TIA Portal

The following configuration steps are required exclusively for accessing the subordinate control "PLC2" by the programming software TIA 7. For using *ibaPDA*, these steps are not required.

1. Connect both controllers in TIA Portal via the Ethernet ports.
2. Establish a connection with your computer and the first controller "PLC1" by adding a subnet.

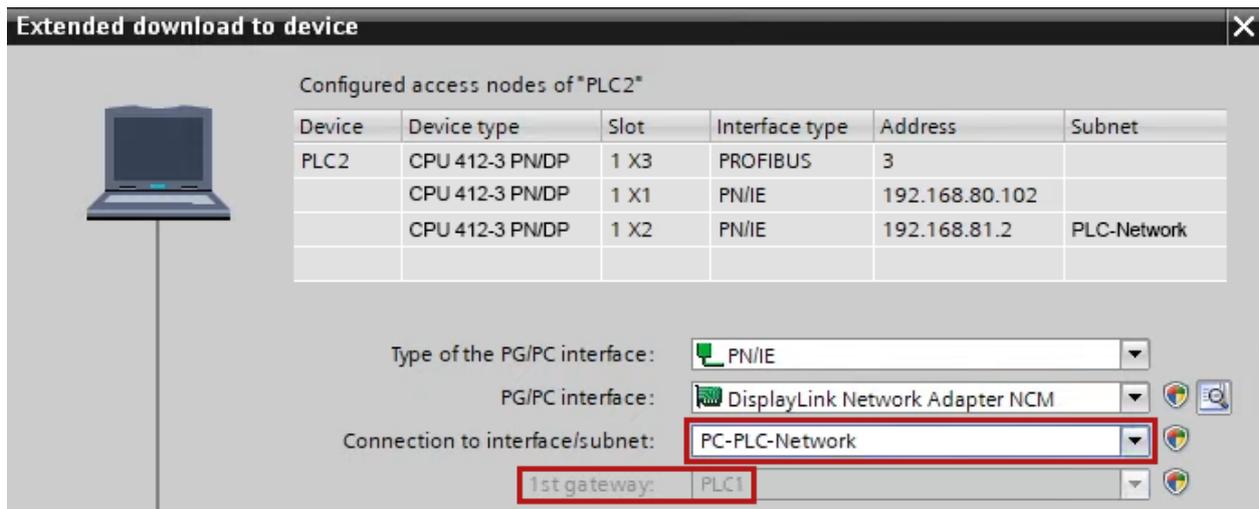


→ The connections between the controllers and to the computer are shown in TIA Portal.



3. Download the programming of the controller "PLC1" and then the programming of the controller "PLC2".

4. In the controller "PLC2", set the connection from "PLC1" to the computer as the connection to the interface/subnet.

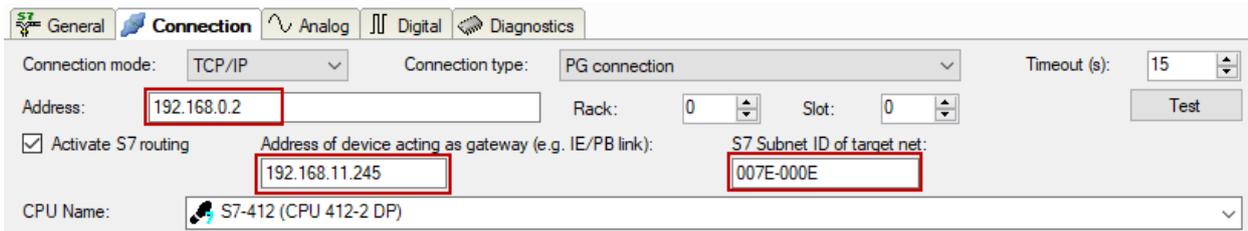


→ "PLC1" appears as the first gateway.

→ "PLC2" is now connected to the computer via S7 routing via "PLC1".

5.2.1.3 Configuration of ibaPDA

Configure the following settings.



Activate S7 routing

Enable this option to use S7 routing.

Address

Enter the address of the target control (here CPU412)

Address of device acting as gateway

Enter the address of the gateway (here CPU314C).

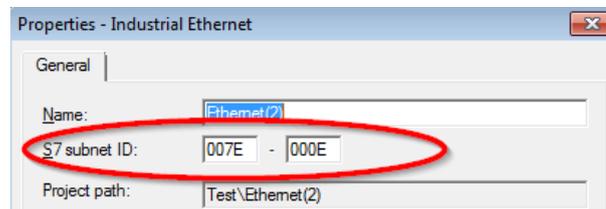
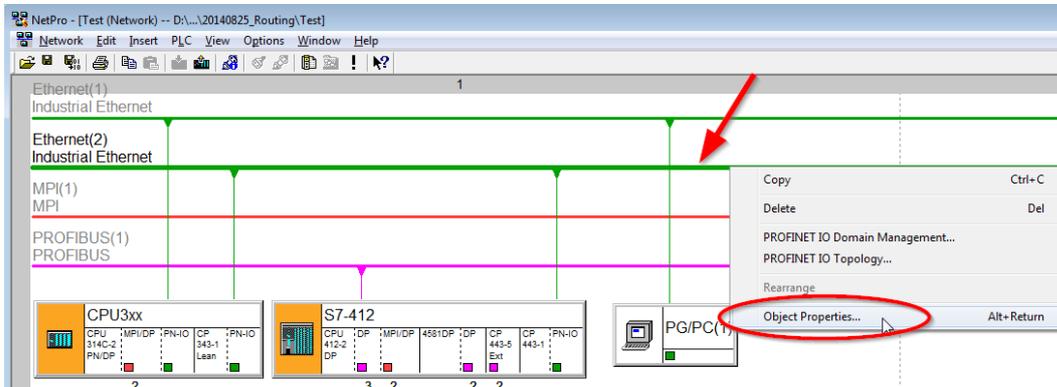
S7 subnet ID of target net

Enter the subnet ID from STEP 7 NetPro or TIA Portal.

Identifying the S7 subnet ID in NetPro

You can identify the S7 subnet ID in NetPro.

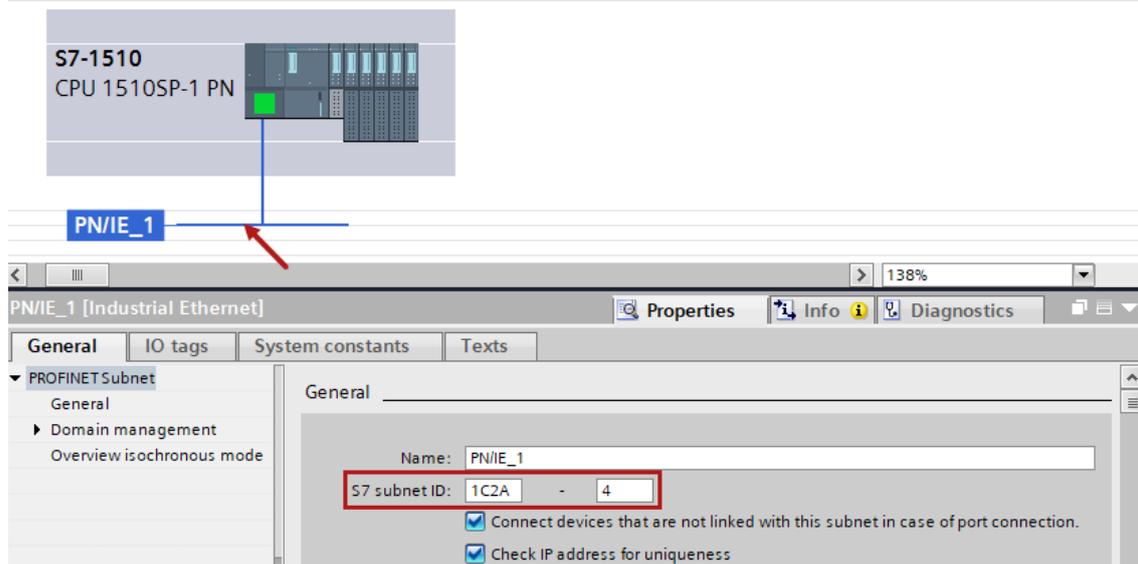
Right-click on the secondary bus system and open the *Object Properties*.



Identifying the S7 subnet ID in TIA Portal

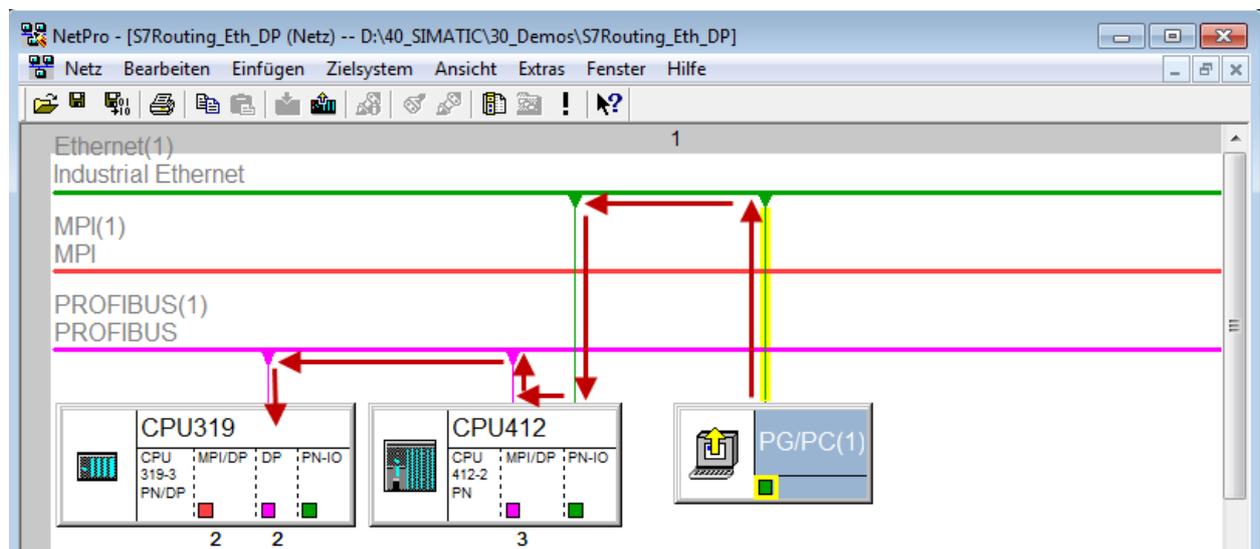
You can identify the S7 subnet ID in TIA Portal.

Click on the bus system and go to *Properties – General – General*.



5.2.2 Routing from Ethernet to PROFIBUS

The example shows how to implement the following way of access via S7 Routing and an example system topology for Ethernet PROFIBUS in NetPro.



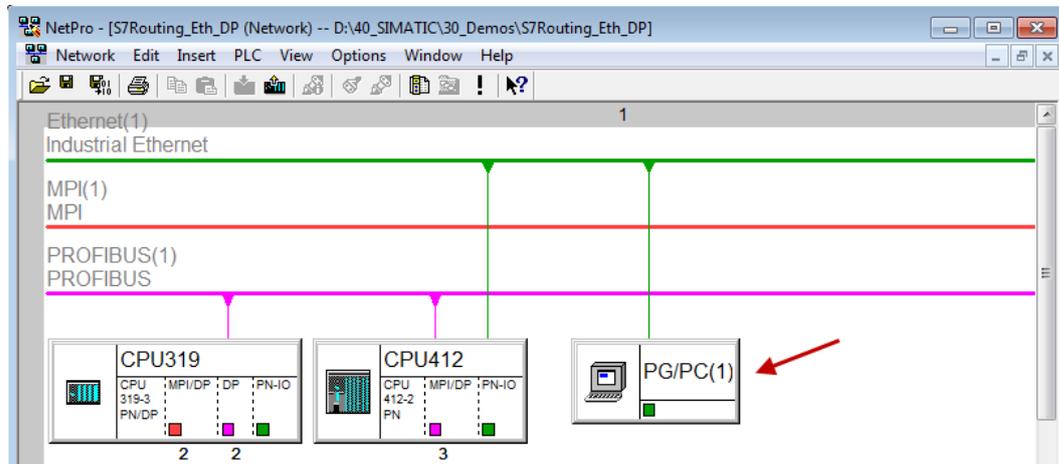
The engineering computer (also with *ibaPDA*) is to access the CPU319 controller. The computer and the controller are not directly connected via a common network/bus. The connection has to run over the CPU412 controller.

"Passing" the communication through this controller is called *S7 Routing*.

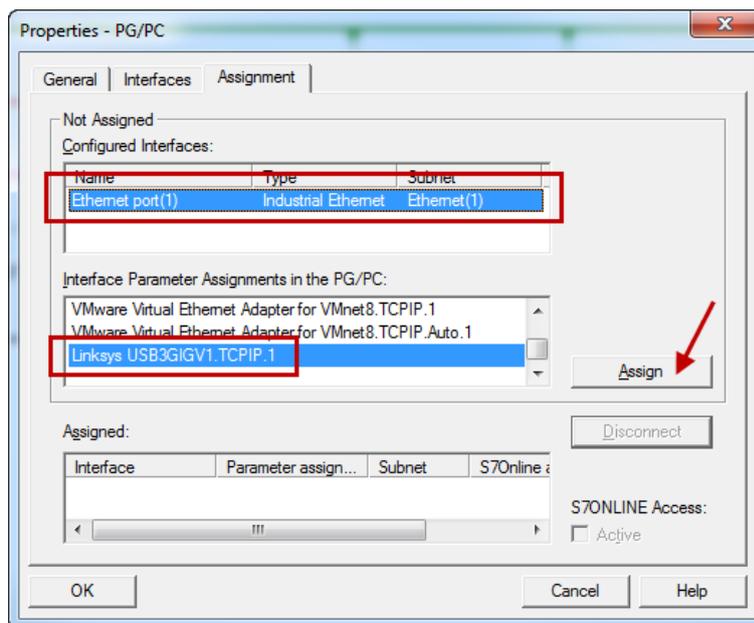
5.2.2.1 Configuration of STEP 7/NetPro

The following configuration steps are exclusively required for accessing the subordinate controller CPU319 via the SIMATIC STEP 7 programming software. For using *ibaPDA*, these configuration steps are not required.

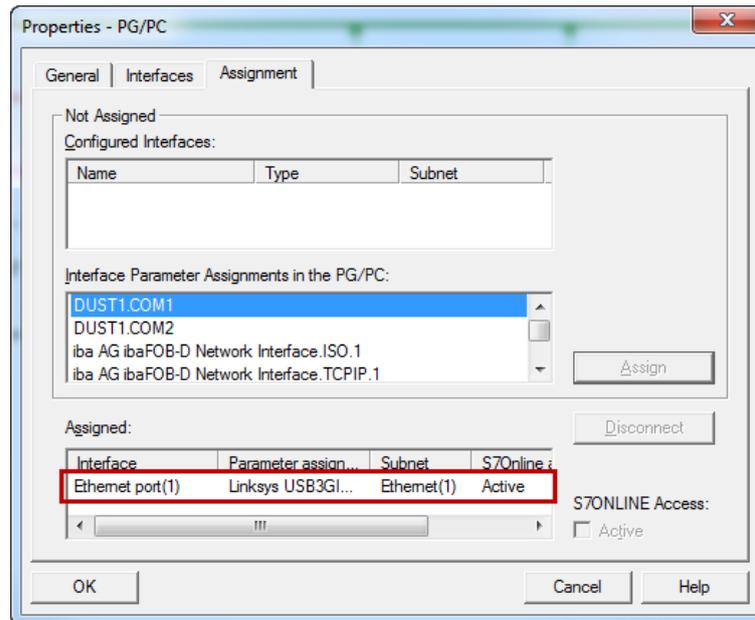
1. Add a PG/PC station and configure it.



2. Assign an interface (network card).

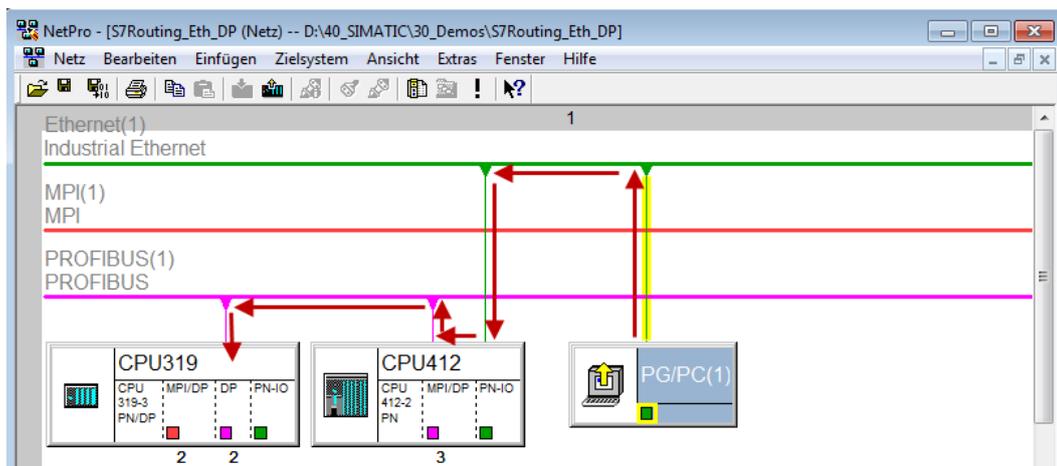


→ Result:



Now, the connection line from PG/PC to the network has to be marked in yellow.

In the following figure, the communication path is shown using arrows (these are not displayed in SIMATIC NetPro).



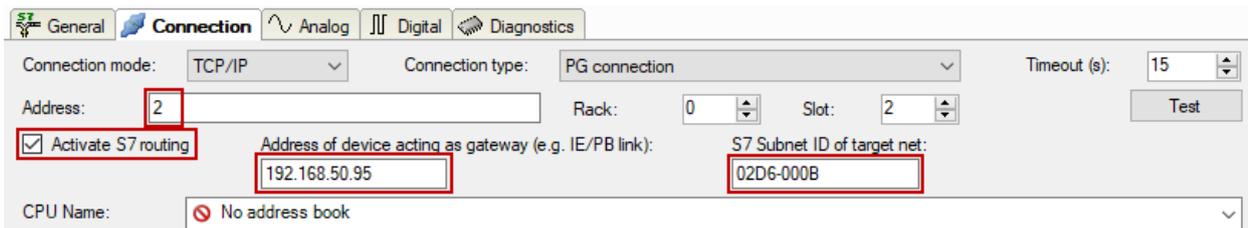
3. Finally, load all hardware configurations and connection data from NetPro.

5.2.2.2 Configuration of TIA Portal

The configuration steps are required exclusively for accessing the subordinate control "PLC2" by the programming software TIA Portal. For the configuration of PROFIBUS proceed as described for Ethernet, see [↗ Configuration of TIA Portal](#), page 49.

5.2.2.3 Configuration of ibaPDA

Configure the following settings.



Activate S7 routing

Enable this option to use S7 routing.

Address

Enter the address of the target control (here CPU319).

Address of device acting as gateway

Enter the address of the gateway (here CPU412).

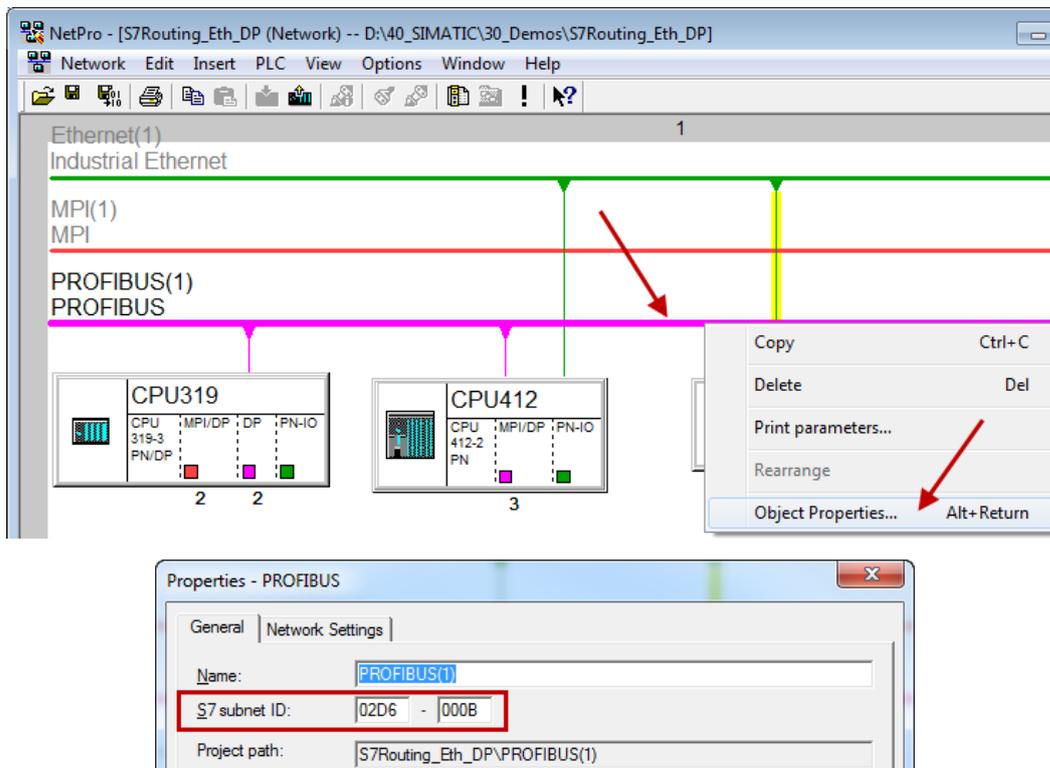
S7 subnet ID of target net

Enter the subnet ID from STEP 7 NetPro.

Identifying the S7 subnet ID in NetPro

You can identify the S7 subnet ID in NetPro.

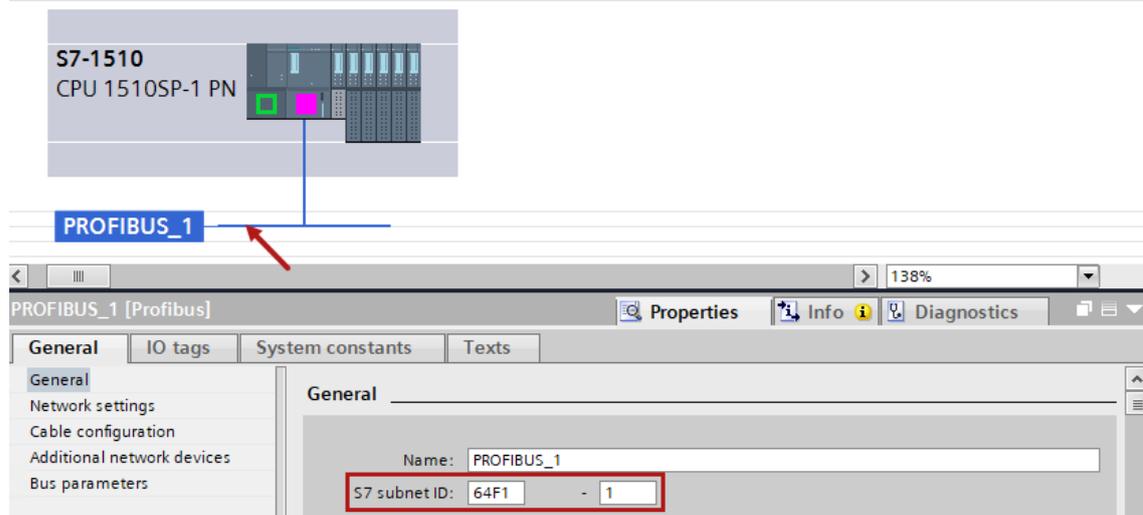
Right-click on the secondary bus system and open the *Object Properties*.



Identifying the S7 subnet ID in TIA Portal

You can identify the S7 subnet ID in TIA Portal.

Click on the bus system and go to *Properties – General – General*.



6 Support and contact

Support

Phone: +49 911 97282-14
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Email: support@iba-ag.com

Note



If you need support for software products, please state the number of the license container. For hardware products, please have the serial number of the device ready.

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