



ibaPDA-Interface-SINAMICS-Xplorer

Data Interface to Siemens SINAMICS Drives

Manual
Issue 1.3

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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
1.3	06-2023	GUI new, S7 routing via TIA Portal	rm, mm	8.0.0

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1 About this documentation

This documentation describes the function and application of the software *ibaPDA-Interface-SINAMICS-Xplorer*.

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-SINAMICS-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 drive 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: <i>Test.docx</i>

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 SINAMICS-Xplorer

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

- *ibaPDA* v8.0.0 or higher
- Base license for *ibaPDA* + license for *ibaPDA-Drive-Xplorer* or *ibaPDA-Interface-SINAMICS-Xplorer*
- For more than 32 SINAMICS drives, you need additional *one-step-up-Interface-SINAMICS-Xplorer* licenses for each additional 32 connections.
- Siemens SINAMICS drive
- Commissioning tool Siemens STARTER or SIMOTION SCOUT

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.

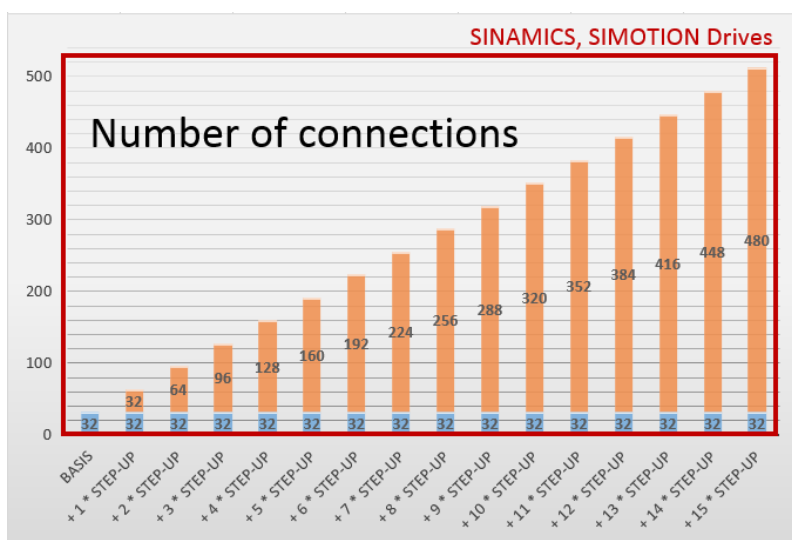
License information

Order No.	Product name	Description
31.001044	ibaPDA-Drive-Xplorer	Extension license for an <i>ibaPDA</i> system adding the data interfaces SINAMICS-Xplorer and SIMOTION-Xplorer
31.000030	ibaPDA-Interface-SINAMICS-Xplorer	Extension license for an <i>ibaPDA</i> system adding the data interface: + SINAMICS-Xplorer (interface for up to 32 SINAMICS drives)
31.100030	one-step-up-Interface-SINAMICS-Xplorer	Extension license for another 32 SINAMICS drives (max. 15 licenses)

Note



To use more than 32 data connections per interface, you can purchase the one-step-up-... extension licenses separately for each interface. Up to 32 further connections to drives can be established on each one-step-up-license. Up to 512 connections can be configured and used per data interface with the multiple purchase or multiple release of these licenses (up to 15 in total).



Consider the limitation of the number of signals by the *ibaPDA* base license.

3 SINAMICS-Xplorer data interface

3.1 General information

The SINAMICS-Xplorer interface is suitable for the acquisition of measurement data of SINAMICS frequency converters via TCP/IP using the standard network interface cards as well as PRO-FIBUS via SIMATIC NET interface cards. Access thereby is transparent for the drive controller. Separate engineering and programming is not necessary.

The signals to be measured can be comfortably selected by entering the parameter indices and data types in the *ibaPDA I/O Manager*.

There is a Parameter Constructor available, in case you want to enter more than one parameters.

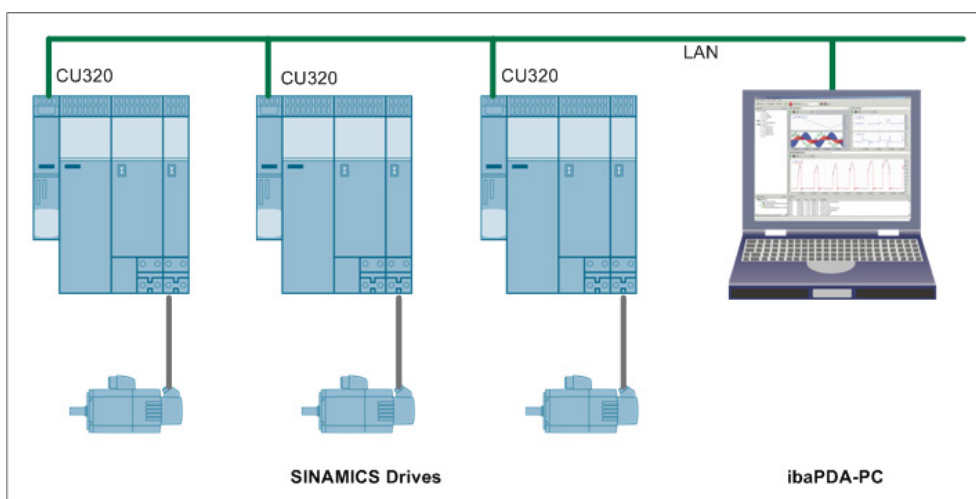
3.2 System topologies

You can establish the connections to the SINAMICS drives via standard interfaces of the computer or corresponding CP modules.

On the SINAMICS-side the following interfaces are supported:

- LAN X127 (TCP)
- PROFINET X150 P1 and X150 P2 (TCP)
- Communication Board Ethernet CBE20 X1400 (TCP)
- PROFIBUS interface X126 (PROFIBUS)

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 SINAMICS

Generally, no specific engineering and programming is necessary on the drive 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 30.

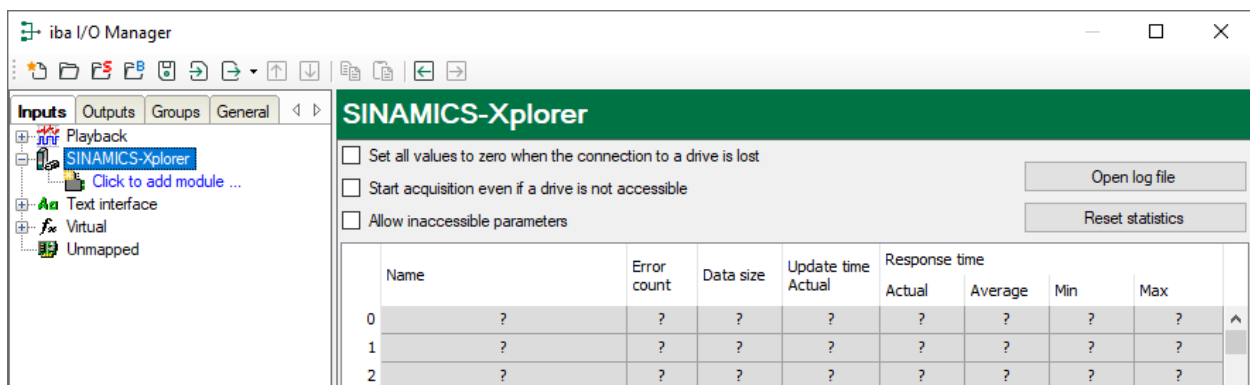
3.4 Configuration & engineering ibaPDA

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

3.4.1 General interface settings

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

The interface has the following functions and configuration options:



Set all values to zero when the connection to a drive is lost

If this option is enabled, all measured values of the drive are set to zero 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 a drive is not accessible

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

Allow inaccessible parameters

If this option is enabled, the acquisition starts even if drive parameters are not accessible. These inaccessible parameters are prompted as warnings in the validation dialog box, not as errors.

<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.

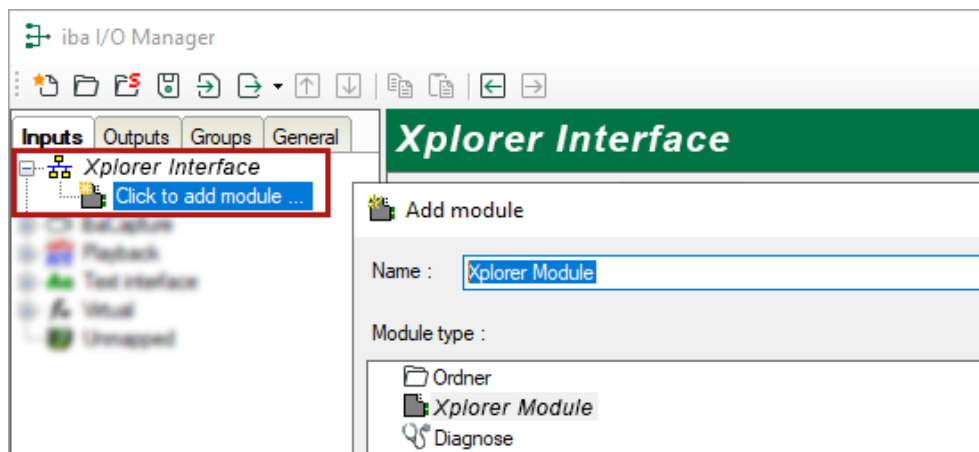
Connection table

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.

See ↗ *Connection table*, page 22.

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.

SINAMICS (2)

General Connection Analog Digital Diagnostics

Basic

Module Type	SINAMICS
Locked	False
Enabled	True
Name	SINAMICS
Module No.	2
Timebase	10 ms
Use name as prefix	False

Module Layout

No. analog signals	32
No. digital signals	32

SINAMICS

Update time	10 ms
Connection	0.0

Name
The name of the module.

[Add parameters](#)

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.

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.

SINAMICS

Update time

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

Connection (read only)

Connection ID that is used to access the drive.

Link "Add parameters"

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

For more information, see ↗ *Signal configuration*, page 17.

3.4.4 Connection settings

Configure the connection of the module to the drive in the *Connection* tab.

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

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 drive. You can determine this value by accessing the running drive configuration of SINAMICS, e.g. with Siemens STARTER or SIMOTION SCOUT.

Drive object number

ID of the Control Unit or the drive object in the Control Unit

You can determine this value by accessing the running drive configuration of SINAMICS, e.g. with Siemens STARTER or SIMOTION SCOUT.

Activate S7 routing

Activate this option if the S7-CPU 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 a S7-CPU 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 34.

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 drive and displays available diagnostic data, e.g. Firmware when connecting to the CU.

Consider that at this point in time the validity of the drive object number is not checked. This can only be done at the start of the acquisition.

Note

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

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 30.

Note

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

For the connection of *ibaPDA-Interface-SINAMICS-Xplorer* to SIMATIC S7 via PC/CP connections, it is generally recommend setting a specific access point for *ibaPDA* when *ibaPDA-Interface-SINAMICS-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-SINAMICS-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

Address of the drive

You can determine this value by accessing the running drive configuration of SINAMICS, e.g. with Siemens STARTER or SIMOTION SCOUT.

Drive object number

ID of the Control Unit or the drive object in the Control Unit

You can determine this value by accessing the running drive configuration of SINAMICS, e.g. with Siemens STARTER or SIMOTION SCOUT.

Activate S7 routing

Activate this option if the S7-CPU 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 a S7-CPU 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 34.

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.

Consider, that at this point in time, the validity of the drive object number is not checked. This can only be done at the start of the acquisition.

3.4.5 Signal configuration

The signals to be acquired are selected in the I/O Manager by entering the parameter indices and their data types. The parameters can be determined using the software Siemens STARTER or SIMOTION SCOUT.

By entering the parameter indices and their data types, the signals can be selected in the I/O Manager.

1. Open the *Analog* and *Digital* tabs of the module to configure the parameters that are to be read from the SINAMICS drive.
2. Enter the index of the parameter in the *Parameter* column.
As you can see in the following figure, you can add the letters 'p' and 'r' in front of the index. This perfectly complies with the usual notation of the SINAMICS parameters. However, *ibaPDA* ignores the letters.

Alternatively, you can also use the SINAMICS Parameter Constructor, see below.

General Connection Analog Digital Diagnostics								
	Name	Unit	Gain	Offset	Parameter	DataType	Active	
0	r2		1	0	r2	Integer16	<input checked="" type="checkbox"/>	^
1	p3		1	0	p3	Integer16	<input checked="" type="checkbox"/>	
2	p5[0]		1	0	p5[0]	Integer16	<input checked="" type="checkbox"/>	
3			1	0		Float32	<input type="checkbox"/>	

3. For analog signals, you have to select the correct data type of the parameter from the drop-down list in the *DataType* column.

If you want to address array elements, enter the array index in brackets directly after the parameter index.

Example: `p5[0]` reads the first element of the array which is represented by the parameter 5.

4. For digital signals, you have to define the bit position of the signal in the *Bit no.* column in the *Digital* tab.

Other documentation

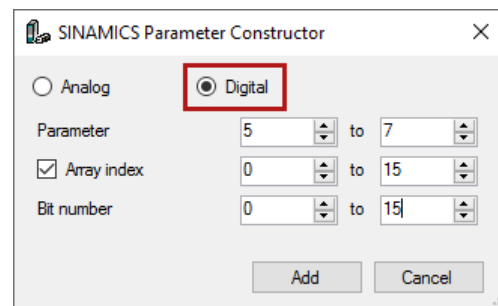
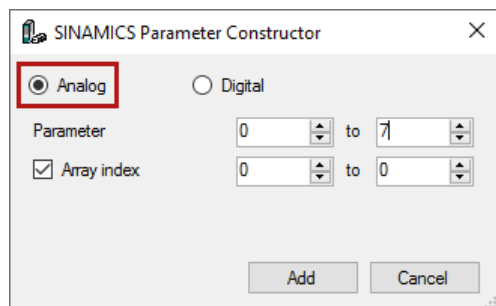


You can find information about the available signals in the Siemens list manual *SINAMICS S120/S150*.

Adding parameters with the Parameter Constructor

With the SINAMICS Parameter Constructor, you can add a whole range of parameters to the *Analog* and *Digital* tabs.

1. To open the Constructor, click on the blue link *Add Parameter* on the *General* tab of the module.
2. In the Constructor window, choose if you want to add analog or digital signals.



3. Define the beginning and the end of the parameter range you want to add.

If you enable the *Array index* option, you can additionally add (sub-)arrays.

4. For digital signals, define the range of bit numbers.

In our example, the following signals would be added on the *Digital* tab for the digital signals.

Bits 0 to 15 of the array elements 0 to 15 of the parameters 5 to 7.

This makes a total number of 768 digital signals ($16 \cdot 16 \cdot 3$).

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.

General Connection Analog Digital Diagnostics				
Analog values		Digital values		
	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:	3-4...
Customer name:	i...
License time limit:	Unlimited
Container type:	WIBU CmStick v4.40
Container host:	...
Required EUP date:	01.02.2023
EUP date:	31.12.2025

ibaPDA-Interface-Codesys-Xplorer (16)

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.

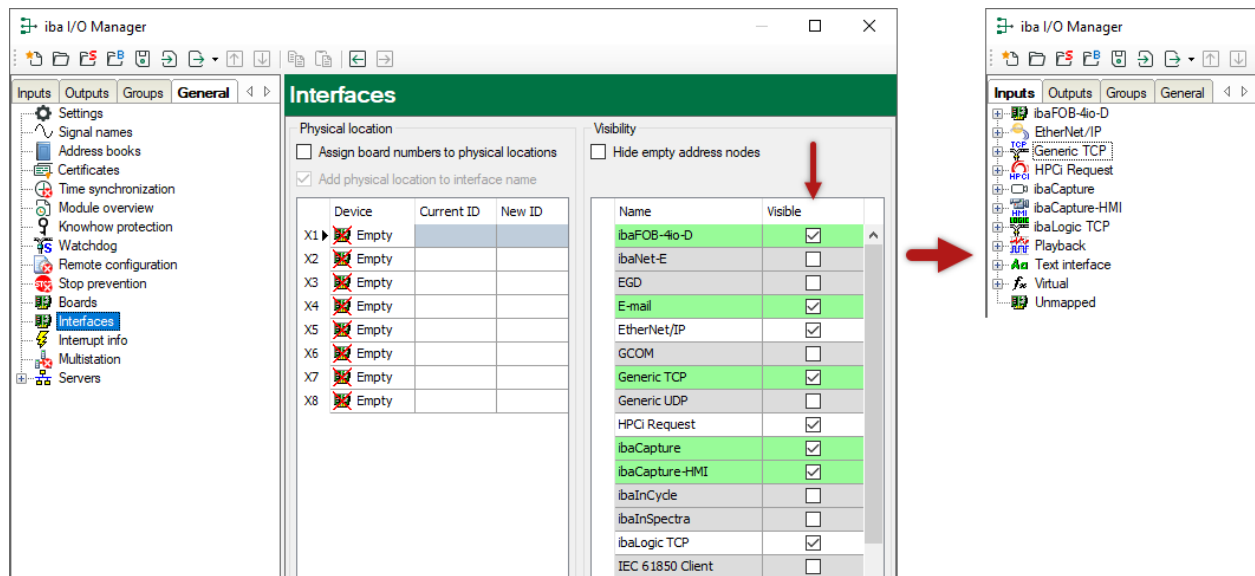
Visibility

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.

```
Administrator: Command Prompt
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.

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\system32>ping 192.168.1.10

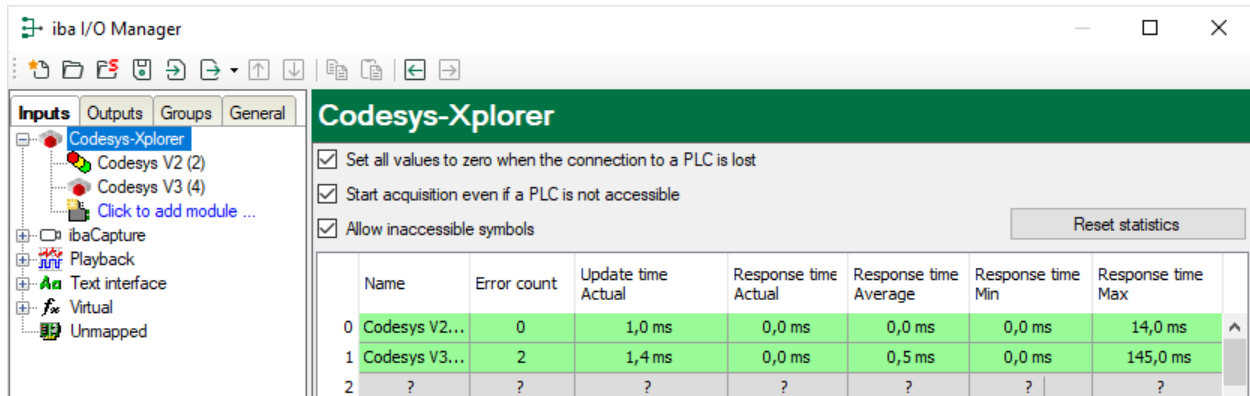
Pinging 192.168.1.10 with 32 bytes of data:
Reply from 192.168.1.10: Destination host unreachable.
Reply from 192.168.1.10: Destination host unreachable.
Reply from 192.168.1.10: Destination host unreachable.
Reply from 192.168.1.10: Destination host unreachable.

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 Ethernet-based interface, there is a table available in the I/O Manager which shows the status of each connection. Each line represents one connection. The following figure shows, as an example, the connection table of the Codesys-Xplorer interface:



The connected target systems (controllers) are identified by their name or IP address in the first (left) column.

Depending on the interface type the table shows error counters, read counters and/or data sizes, as well as the cycle times, refresh times and/or update times of the different connections during the data acquisition. Click the <Reset statistics> 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.
Yellow	The connection is OK, however the data update is slower than the configured update time.
Red	The connection has failed.
Gray	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.

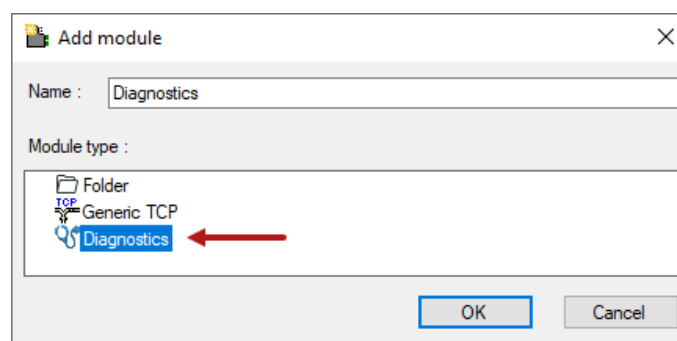
A diagnostic module is always assigned to a data acquisition module of the same interface and supplies its connection information. By using a diagnostic module you can record and analyze the diagnostic information continuously in the *ibaPDA* system.

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:

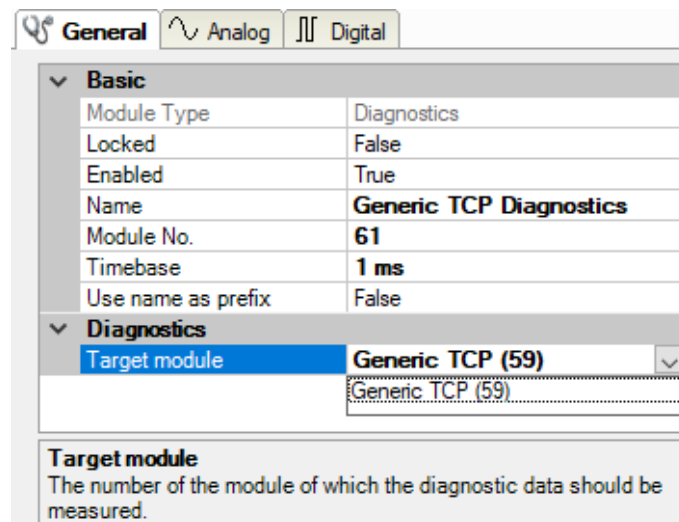
- A notification can be generated, whenever the error counter of a communication connection exceeds a certain value or the connection gets lost.
- In case of a disturbance, the current response times in the telegram traffic may be documented in an incident report.
- The connection status can be visualized 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):



General Analog Digital

Basic

Module Type	Diagnostics
Locked	False
Enabled	True
Name	Generic TCP Diagnostics
Module No.	61
Timebase	1 ms
Use name as prefix	False

Diagnostics

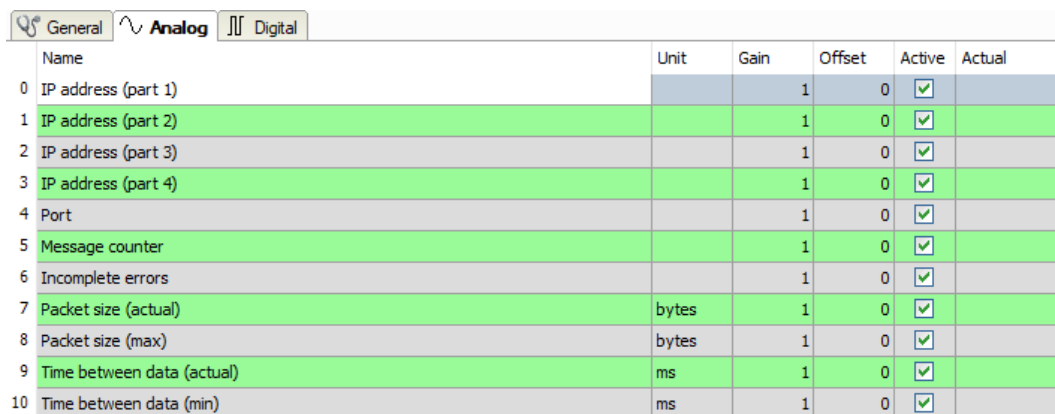
Target module	Generic TCP (59)
---------------	------------------

Target module
The number of the module of which the diagnostic data should be measured.

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

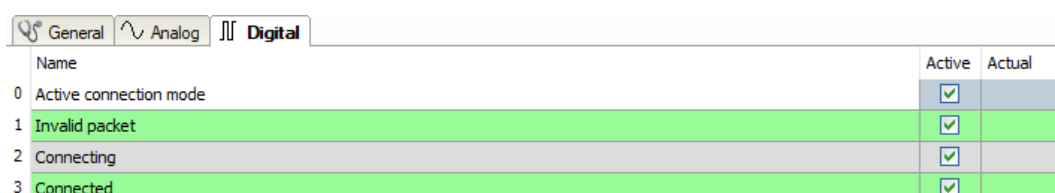
There is only one setting which is specific for the diagnostic module: the target module.

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.



	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.



	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

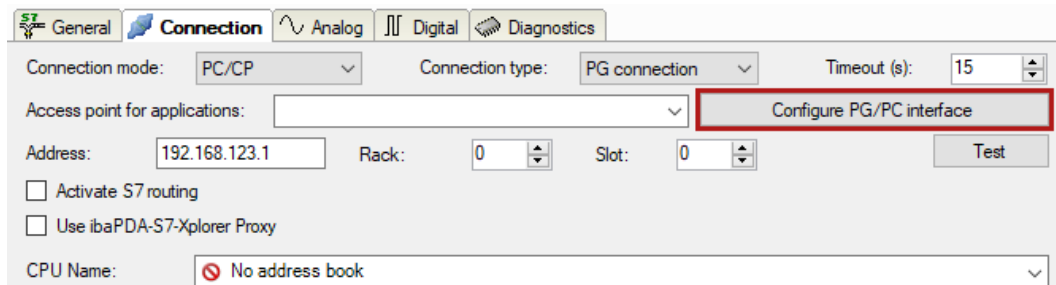
Signal name	Description
Incorrect message type	Number of received messages with wrong message type
Input data length	Length of data messages with input signals in bytes (<i>ibaPDA</i> receives)
Invalid packet	Invalid data packet detected
IP address (part 1-4)	4 octets of the IP address of the target 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

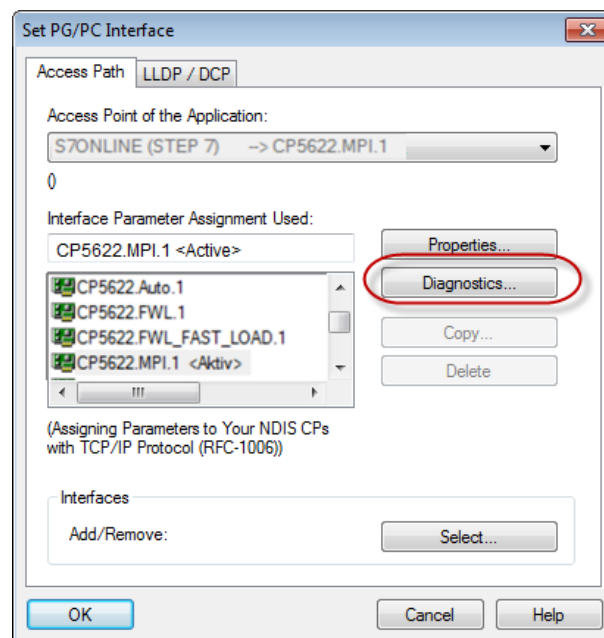
4.7 Connection diagnostics with PG/PC interface

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.

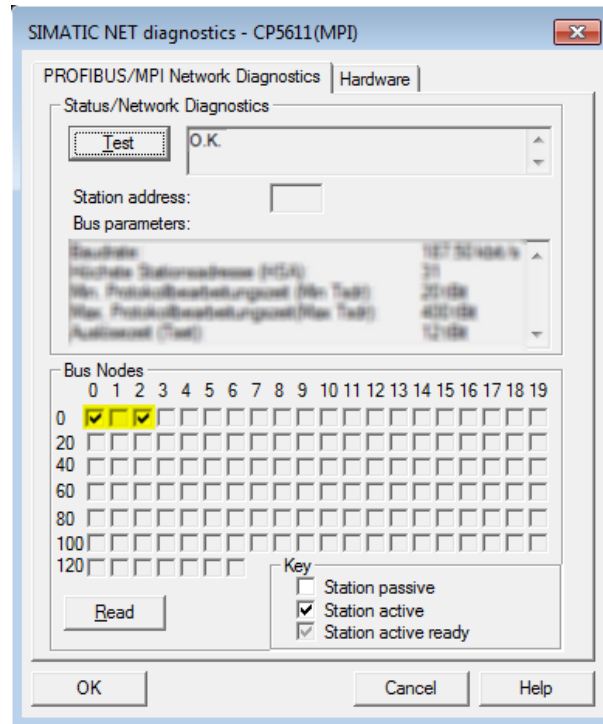


2. Open the diagnostics dialog with the <Diagnostics> button.



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.



5 Appendix

5.1 Setting PG/PC interface/defining new access point

ibaPDA-Interface-SINAMICS-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)".

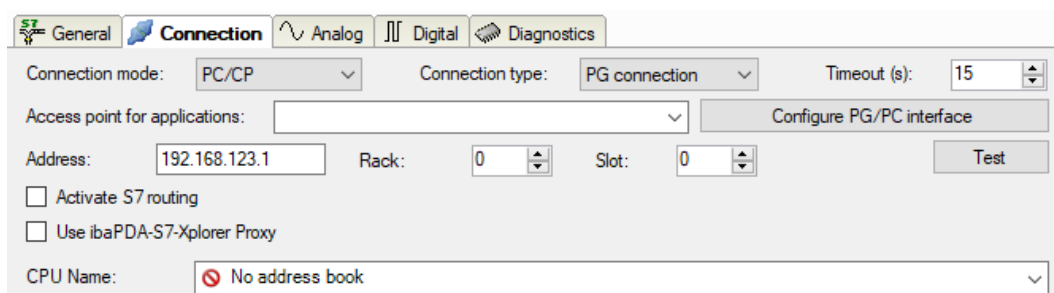
Disadvantage of this method: If the setting of the access point is changed again in the SIMATIC Manager, the measurement does no longer work because *ibaPDA* no longer has any access.

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.

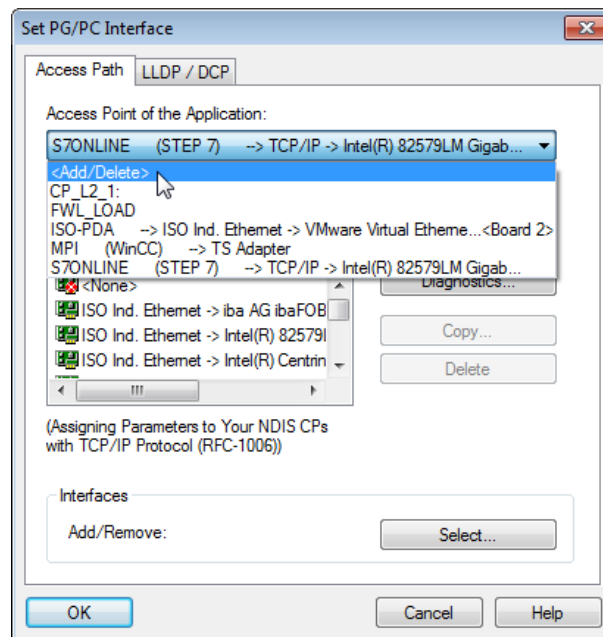
There is the <Configure PG/PC interface> button in the dialog window of the module. With this button, you can open the dialog for configuring the PG/PC interface.

The setting for the SIMATIC Manager is also changed.

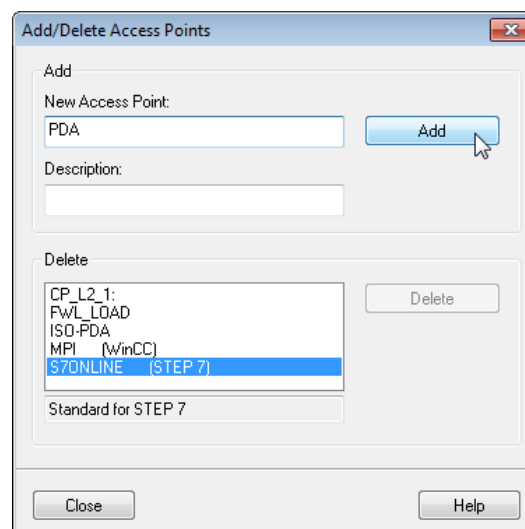


Procedure

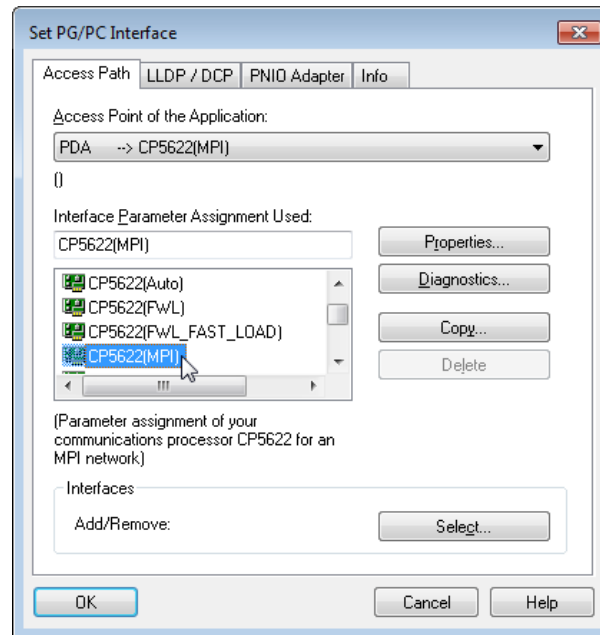
1. Open the dialog for configuring the PG/PC interface with the <Configure PG/PC interface> button.
2. Under *Access Point of the Application* select the row <Add/Delete>.



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>.

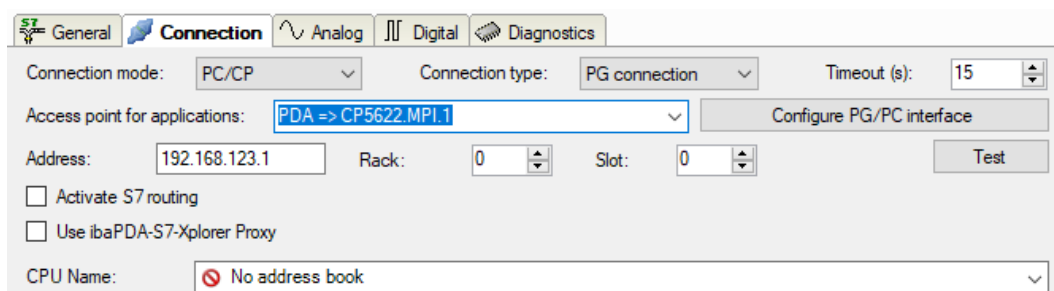


4. Add an interface to the access point, e.g. "CP5622 (MPI)".



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



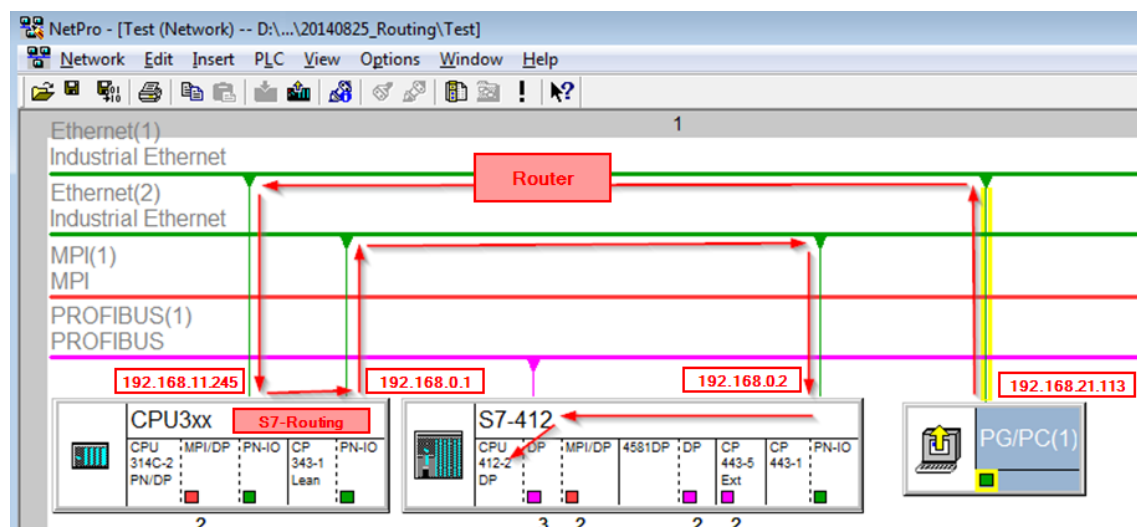
For more information about the S7-Routing, please refer to:

- 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.

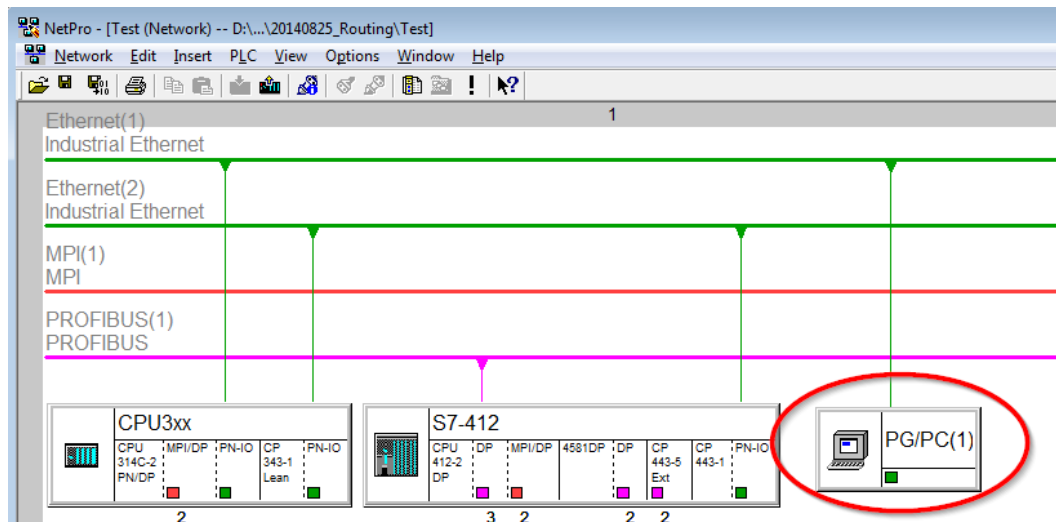
"Passing" the communication through this controller is called *S7 Routing*.

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.

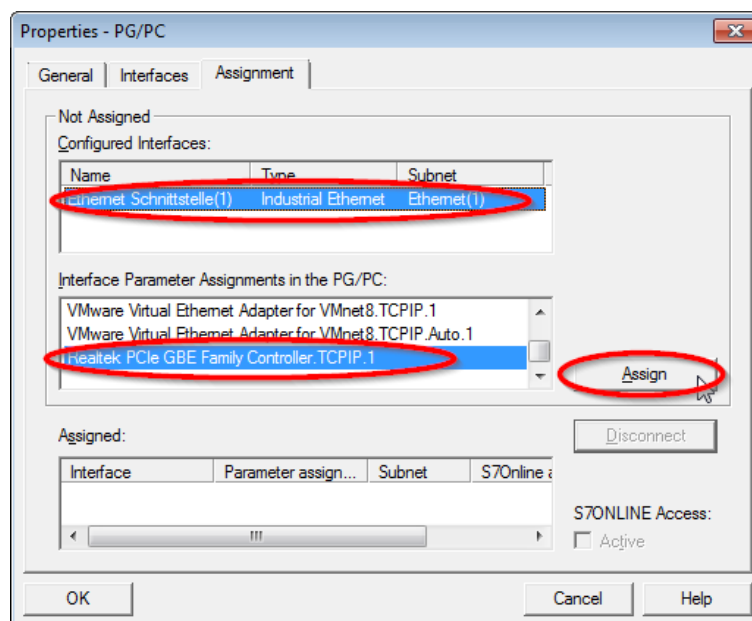
5.2.1.1 Configuration of STEP 7/NetPro

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.

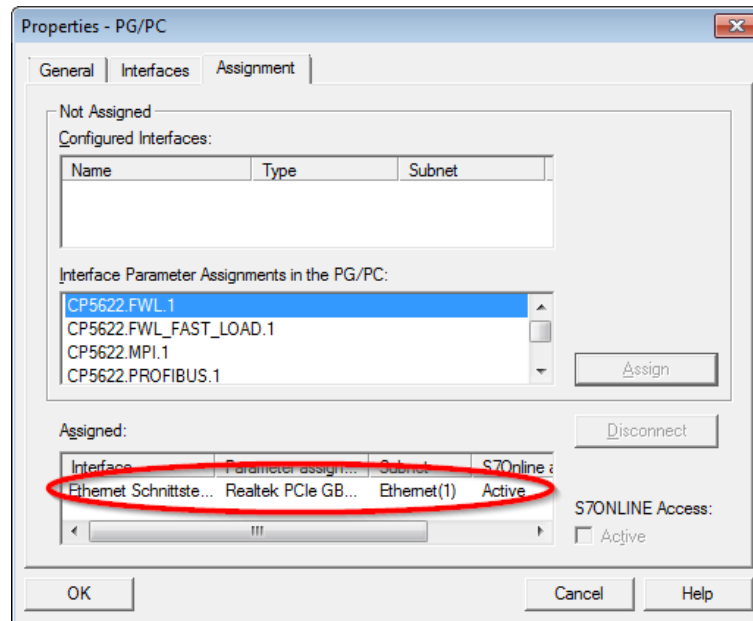
1. Add a PG/PC station and configure it.



2. Assign an interface (network card).

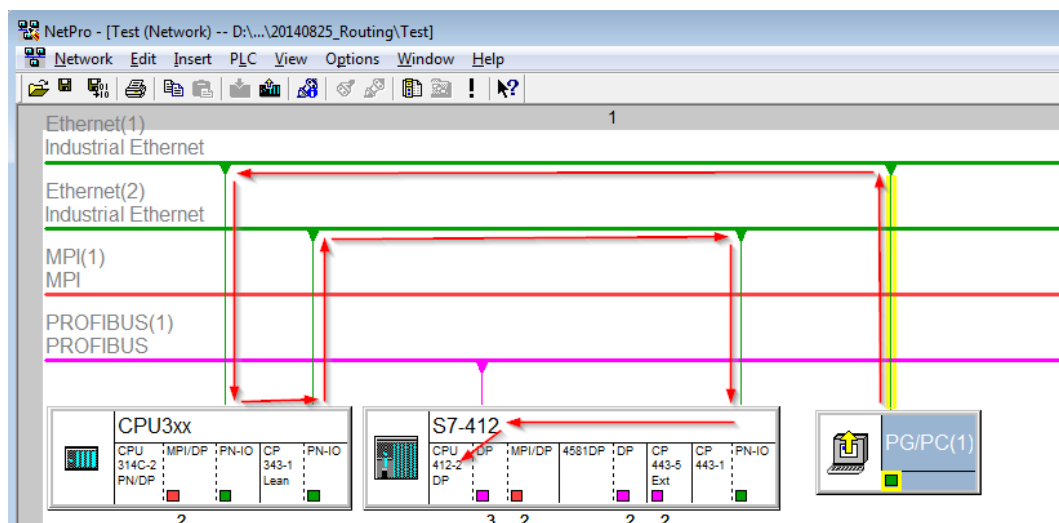


→ Result:



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).

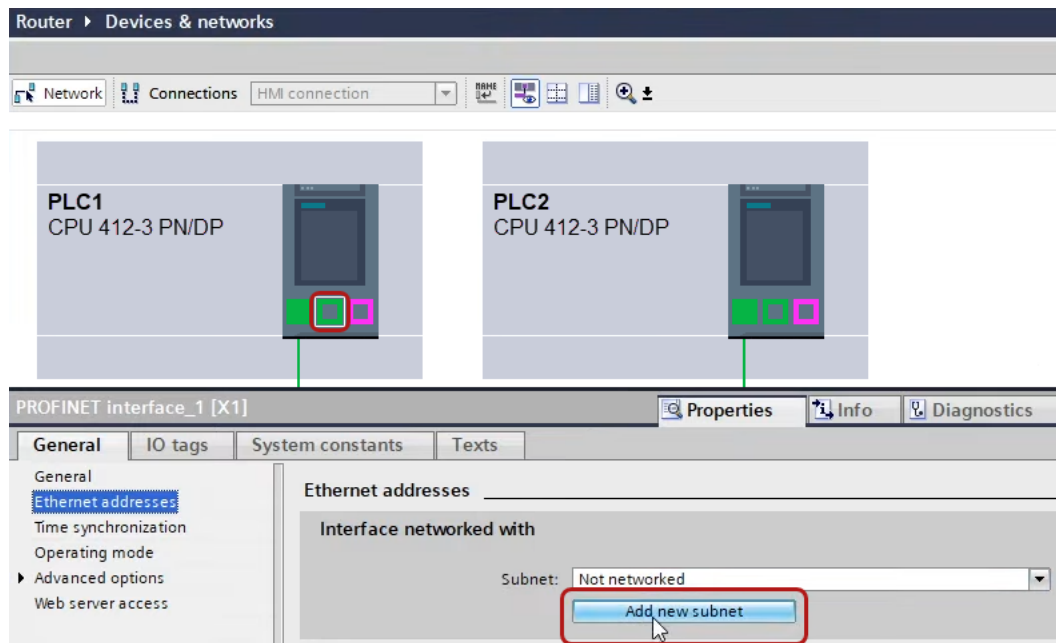


3. Finally, load all hardware configurations and connection data from NetPro.

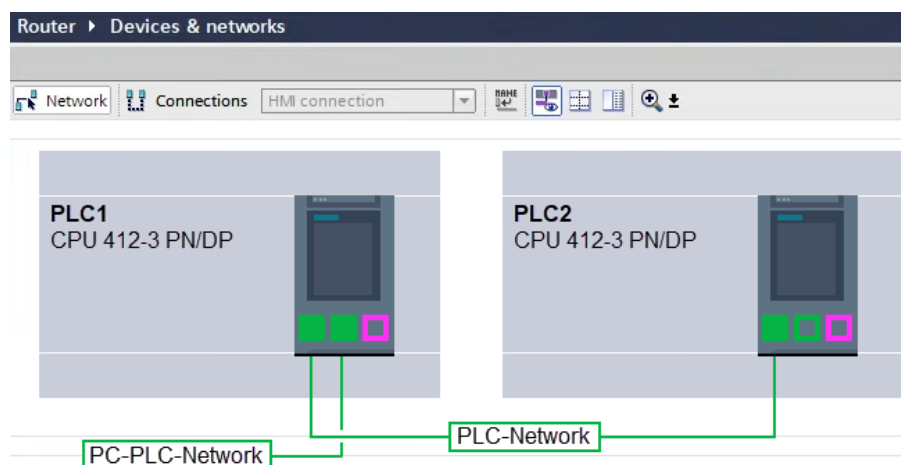
5.2.1.2 Configuration of TIA Portal

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.

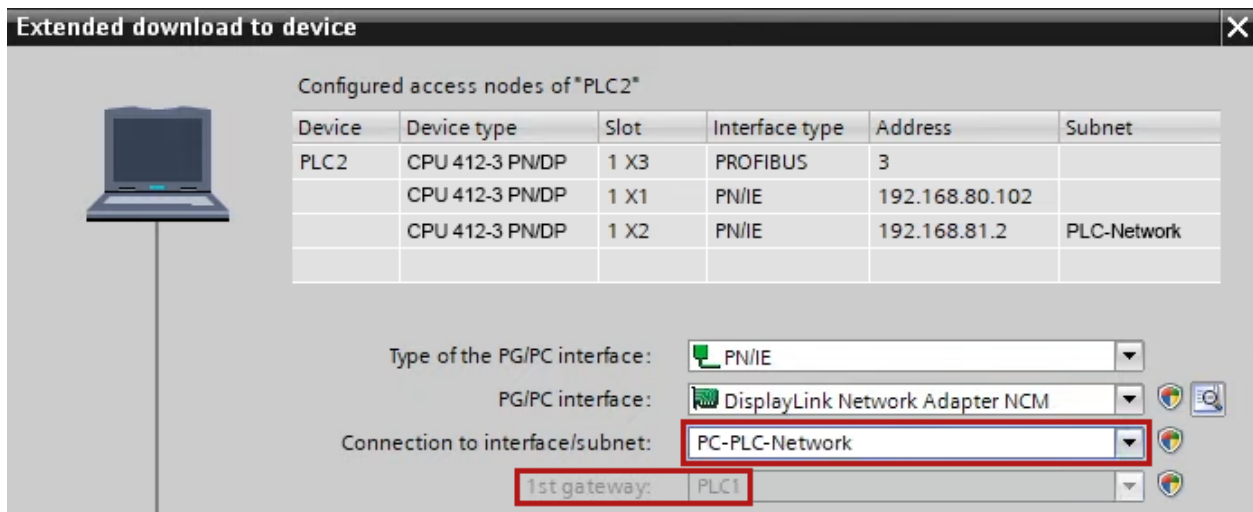


→ The connections between the controllers and to the computer are shown in TIA Portal.



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.

Connection mode: TCP/IP Connection type: PG connection Timeout (s): 15

Address: 192.168.0.2 Rack: 0 Slot: 0 Test

☒ Activate S7 routing Address of device acting as gateway (e.g. IE/PB link): 192.168.11.245 S7 Subnet ID of target net: 007E-000E

CPU Name: S7-412 (CPU 412-2 DP)

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).

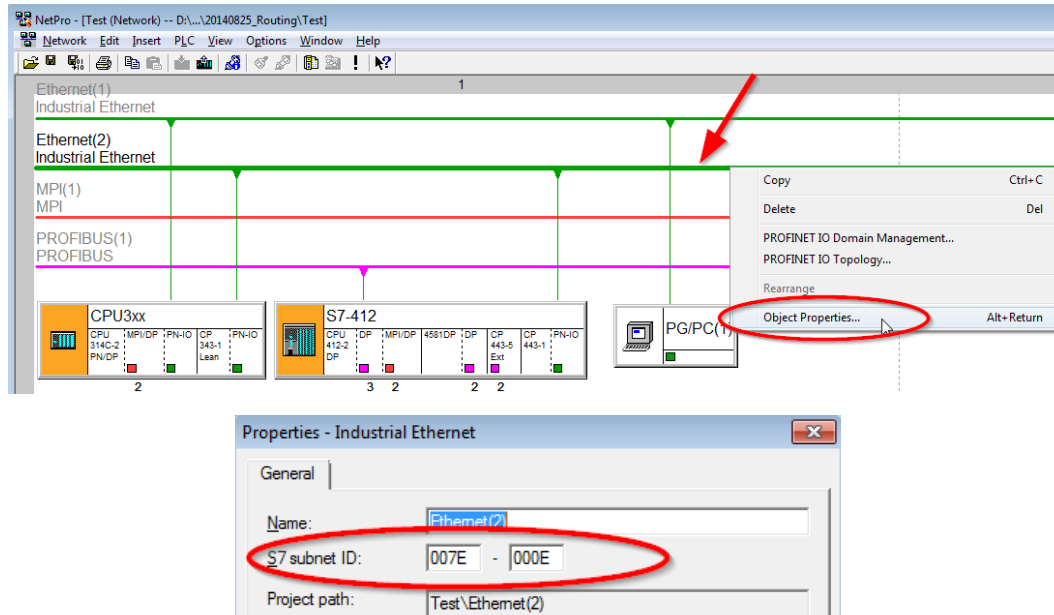
S7 subnet ID of target net

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.

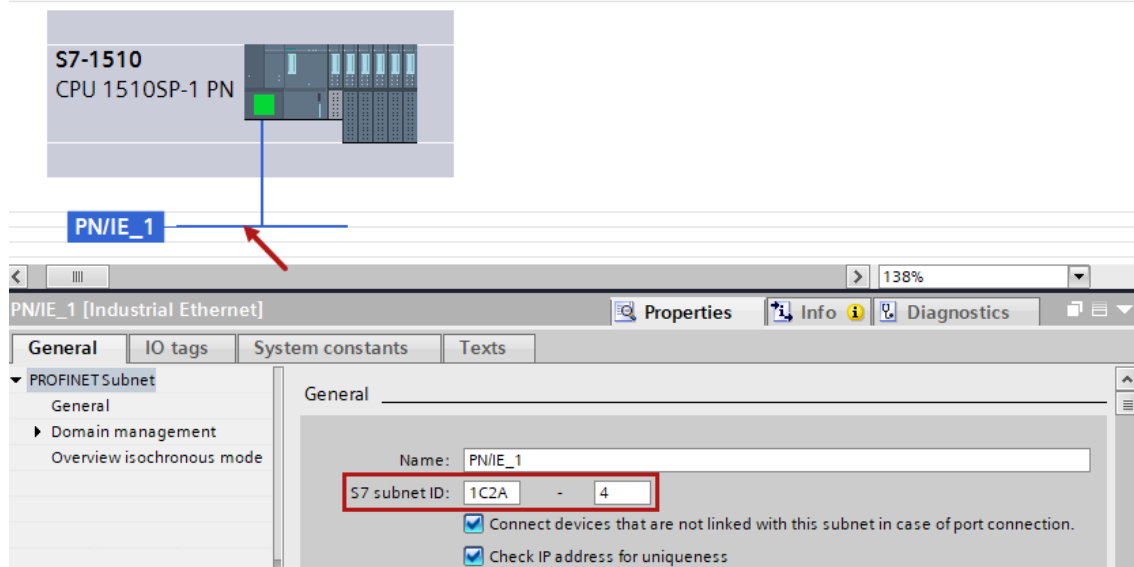
Right-click on the secondary bus system and open the *Object Properties*.



Identifying the S7 subnet ID in TIA Portal

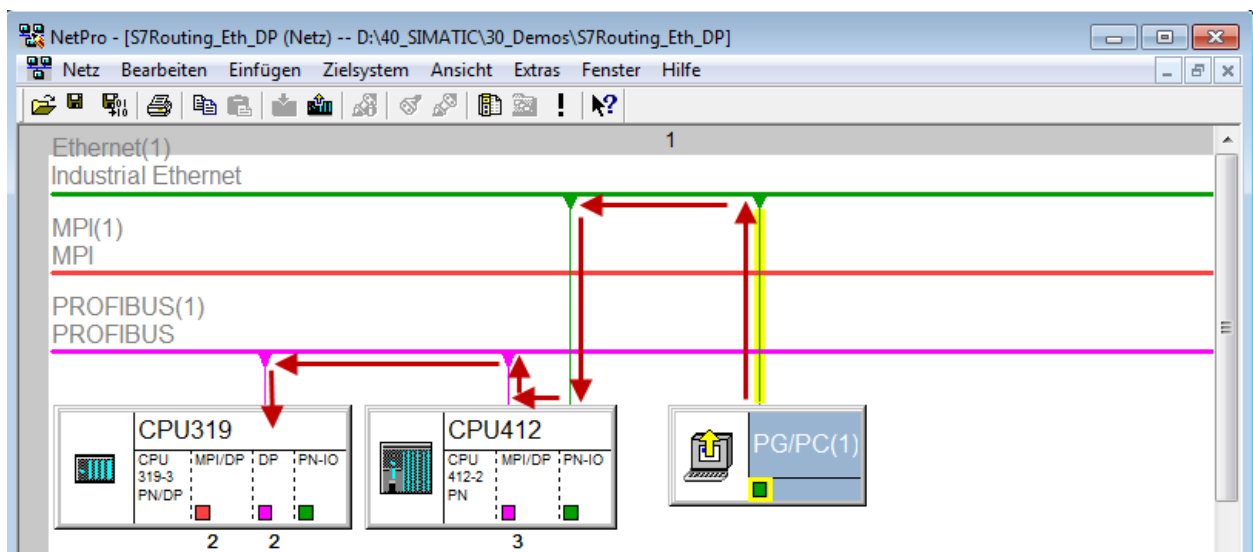
You can identify the S7 subnet ID in TIA Portal.

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.



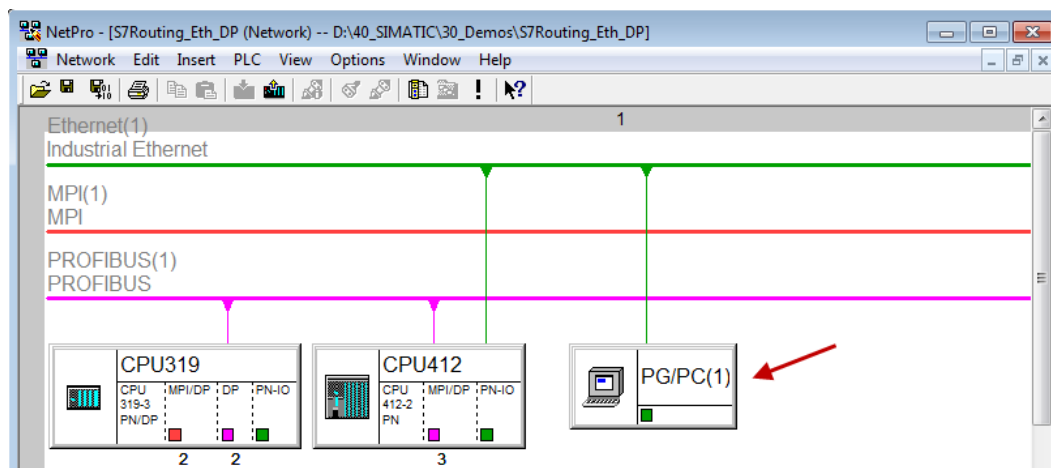
The engineering computer (also with *ibaPDA*) is to access the CPU319 controller. The computer and the controller are not directly connected via a common network/bus. The connection has to run over the CPU412 controller.

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

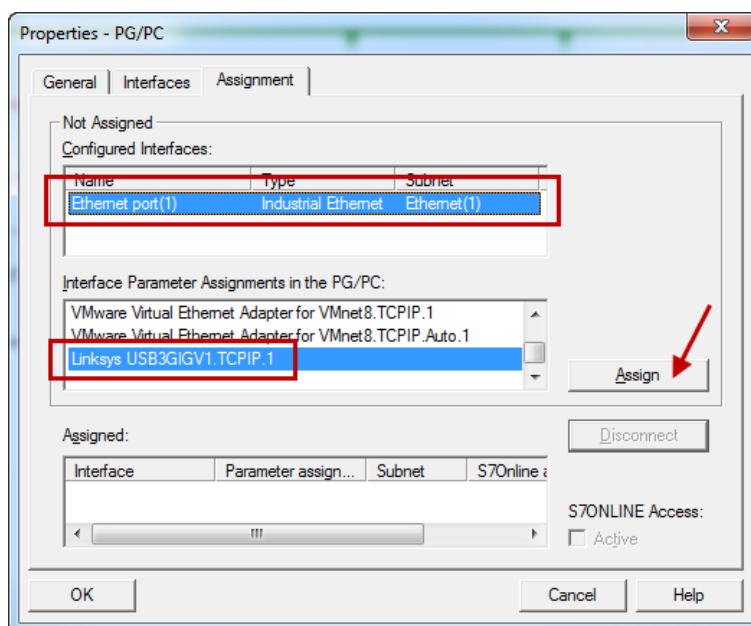
5.2.2.1 Configuration of STEP 7/NetPro

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.

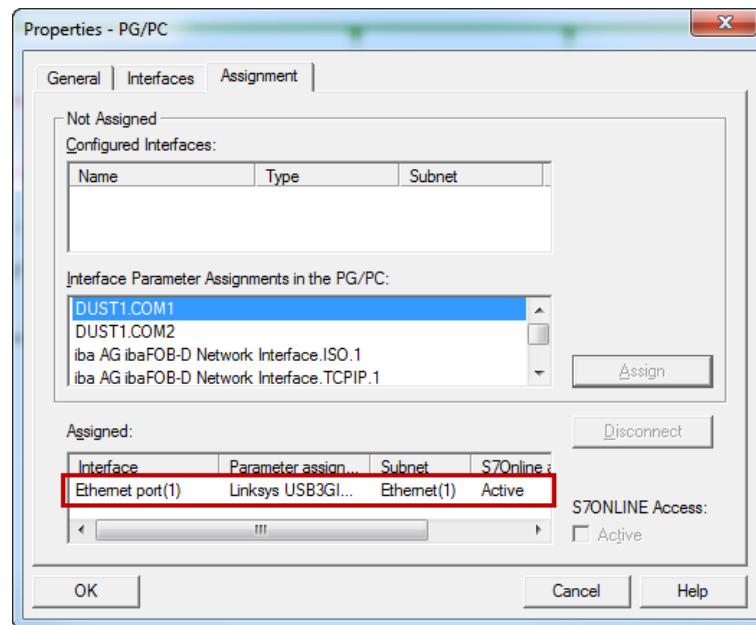
1. Add a PG/PC station and configure it.



2. Assign an interface (network card).

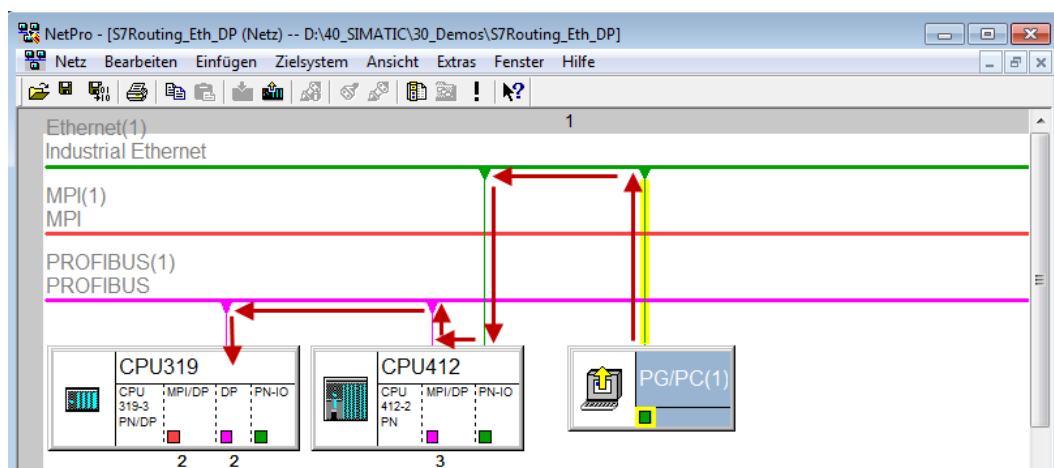


→ Result:



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 37.

5.2.2.3 Configuration of ibaPDA

Configure the following settings.

General Connection Analog Digital Diagnostics

Connection mode: TCP/IP Connection type: PG connection Timeout (s): 15

Address: 2 Rack: 0 Slot: 2 Test

☒ Activate S7 routing Address of device acting as gateway (e.g. IE/PB link): 192.168.50.95 S7 Subnet ID of target net: 02D6-000B

CPU Name: No address book

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).

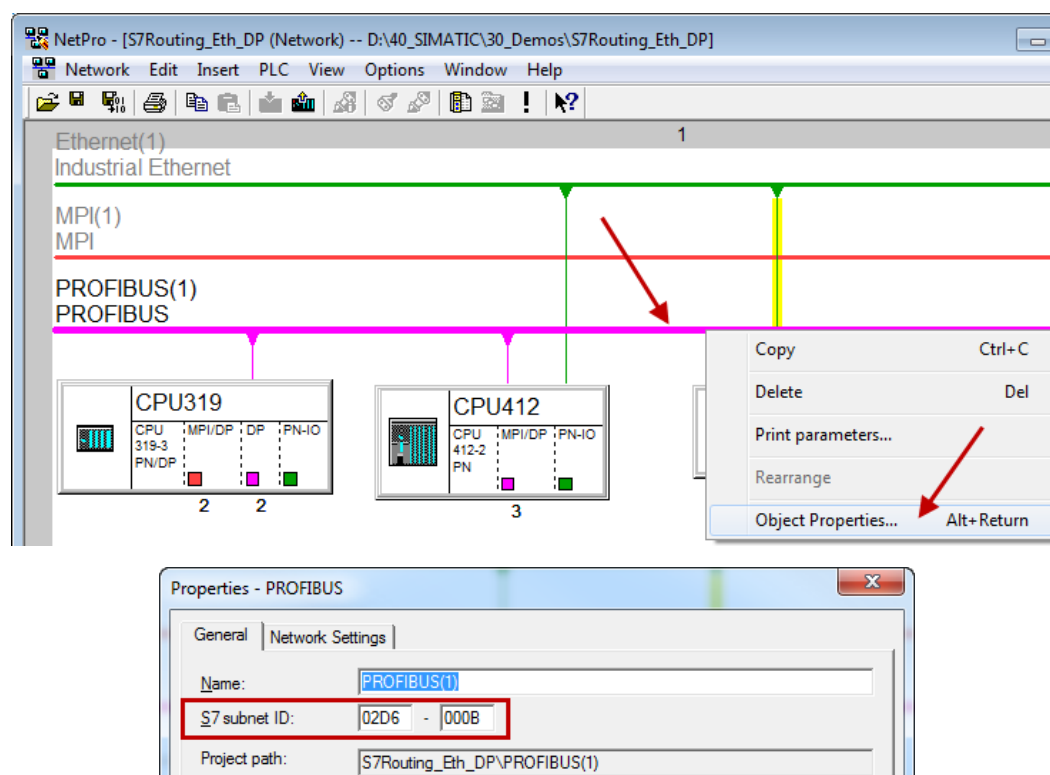
S7 subnet ID of target net

Enter the subnet ID from STEP 7 NetPro.

Identifying the S7 subnet ID in NetPro

You can identify the S7 subnet ID in NetPro.

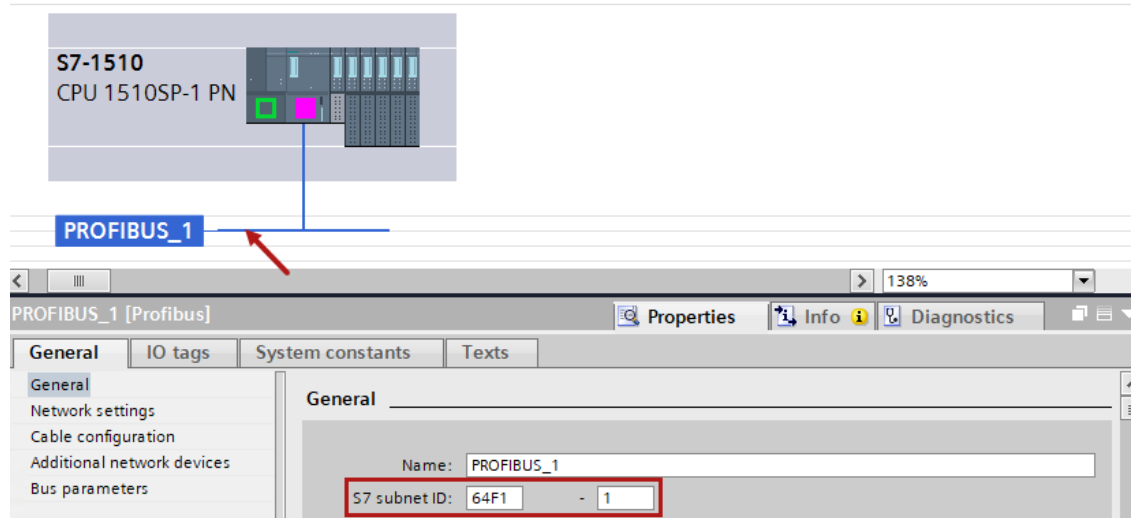
Right-click on the secondary bus system and open the *Object Properties*.



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
Fax: +49 911 97282-33
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.

Contact

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For contact data of your regional iba office or representative please refer to our web site

www.iba-ag.com.