ibaPDA-Interface-S7-Xplorer

PLC-Xplorer Data Interface to SIMATIC S7 Systems

Manual

Issue 2.1

Measurement Systems for Industry and Energy

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The content of this publication has been checked for compliance with the described hardware and software. Nevertheless, discrepancies cannot be ruled out, and we do not provide guarantee for complete conformity. However, the information furnished in this publication is updated regularly. Required corrections are contained in the following regulations or can be downloaded on the Internet.

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

Version	Date	Revision - Chapter / Page	Author	Version SW
2.1	03-2020	System restrictions	RM	7.0.0

Content

1 About this Manual

This document describes the function and application of the software interface

ibaPDA-Interface-S7-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 documentation addresses qualified professionals, who are familiar with handling electrical and electronic modules as well as communication and measurement technology. A person is regarded as a professional if he/she is capable of assessing the work assigned to him/her and recognizing possible 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-S7-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 *Logic diagram*
Calling the menu command	*Step 1 – Step 2 – Step 3 – Step x* Example: Select the menu *Logic diagram - Add - New function block*.
Keys	<Key name> Example: <Alt>; <F1>
Press the keys simultaneously	<Key name> + <Key name> Example: <Alt> + <Ctrl>
Buttons	<Key name> Example: <OK>; <Cancel>
File names, paths	"Filename", "Path" Example: "Test.doc"

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 S7-Xplorer

The following system requirements are necessary for the use of the S7-Xplorer data interface:

- *ibaPDA* v7.0 or higher
- Basic license for *ibaPDA* + license for *ibaPDA-Interface-PLC-Xplorer* or *ibaPDA-Interface-S7-Xplorer*
- For more than 16 connections, you need additional *ibaPDA-Interface-S7-Xplorer* licenses

Note

The *ibaPDA-Interface-PLC-Xplorer* license contains, among others, the license for the S7-Xplorer interface.

- SIMATIC S7-controller LOGO!, S7-200, S7-300, S7-400, S7-400H, S7-1200, S7-1500 or WinAC RTX or S5
- SIMATIC STEP 7 or SIMATIC NET, in case PC/CP connections should be used
- SIMATIC STEP 7 and S7-CFC, in case signals are to be selected using Drag & Drop

Other documentation

For more prerequisites concerning the used PC hardware and the supported operating systems, please see the *ibaPDA* documentation

System restrictions

- Restrictions SIMATIC TIA-Portal:
  - SIMATIC TIA-Portal STEP 7 V14 SP1 or higher is a prerequisite for generating address books from TIA Portal projects.
- Restrictions S7-1200 CPU:
  - For the TIA connection mode with S7-1200 CPUs, only firmware versions ≥ V4 are supported by the S7-Xplorer module.
- Restrictions LOGO! and S7-200:
  - Only LOGO!-controllers of the 0BA7 and 0BA8 families are supported.
  - Access to absolute operands only
  - The controllers SIMATIC LOGO! and SIMATIC S7-200 are to be configured via special software tools. Both project types cannot be read by *ibaPDA*. Hence, address books cannot be generated for a signal selection by means of the symbolic names or CFC connectors.
- Restrictions for S5:
  - Since *ibaPDA* cannot read SIMATIC STEP 5 projects, yet, address books for the signal selection cannot be created with the symbolic names.

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 / 16 [1)]

+ number of SIMOTION-Xplorer-TCP connections not routed / 16 [1)]

+ number of SINUMERIK-Xplorer-TCP connections not routed / 16 [1)]

+ 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.

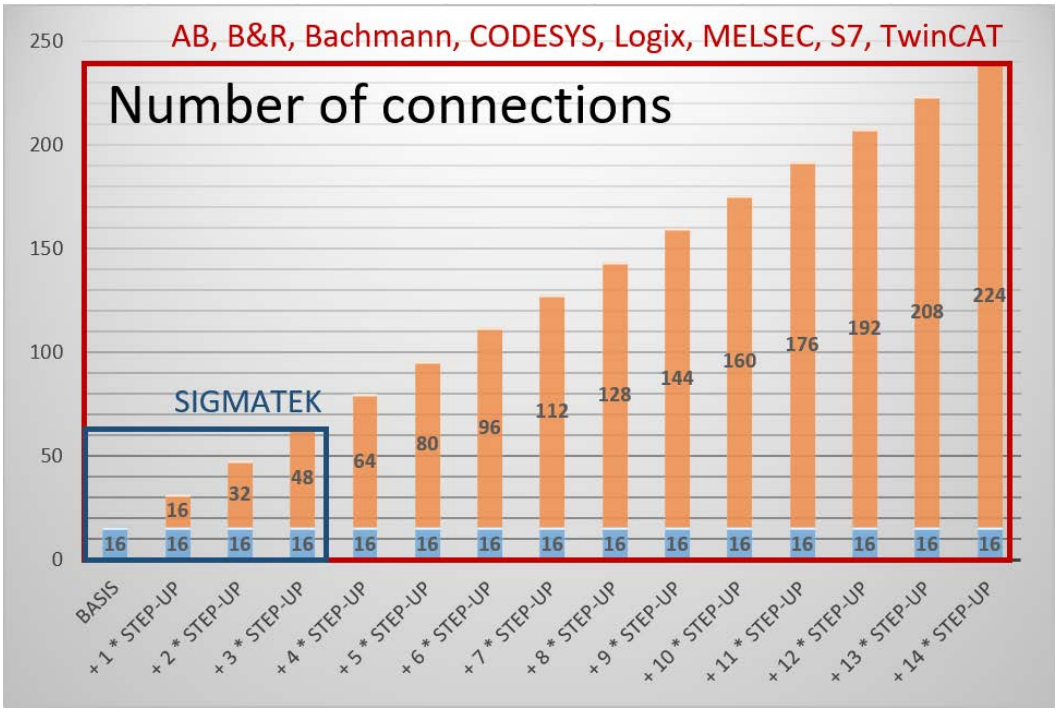
License information

Order no.	Product name	Description
31.000.001	ibaPDA-Interface-S7-Xplorer	Extension license for an ibaPDA system adding the data interface: + S7-Xplorer (interface to SIMATIC S7)
31.100.001	one-step-up-Interface-S7-Xplorer	Extension license for 16 further S7-Xplorer connections, (a maximum of 14 permissible)

Table 1: Available S7-Xplorer 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 PLCs can be established on each one-step-up-license. Up to 240 connections can be configured and used per data interface with the multiple purchase or multiple release of these licenses (up to 15 in total). Exception of SIGMATEK: Here, only up to 4 licenses (64 connections) can be activated.



Please consider the limitation of signals given by the *ibaPDA* base license.

3 PLC-Xplorer data interface to SIMATIC S7 systems

3.1 General information

The S7-Xplorer interface is suitable for acquiring measured data via TCP/IP using the standard network interface cards as well as using the PPI, MPI, Profibus, TCP/IP and ISO transport logs via SIMATIC NET interface cards. Access is transparent for the controller. Separate engineering and programming of the control is not necessary.

The signals to be measured can be comfortably selected either with the absolute operand address or with the symbolic name with support of the *ibaPDA* address book browser. This browser allows to access to all defined symbols of the attached STEP 7 project.

When using the SIMATIC CFC editor (version V 6.0 or higher) on the same PC, the signals that are to be measured and the connectors from the control program can be configured via drag & drop.

Using an additional interface converter (ACCON-S5-LAN®, Deltalogic), also measured data from a SIMATIC S5 controller can be acquired via its AS511 interface.

3.2 System topologies

The connections to the control systems can be established via standard interfaces of the computer or corresponding CP modules.

The different connection types are categorized as follows:

- TCP/IP connection via the standard network interface
- SIMATIC specific connections via standard network adapters, special coupling modules (CP) or coupling adapters.

Controller	TCP/IP connection via the standard network interface	PPI/MPI/Profibus connection via CP modules (PC/CP)	MPI/Profibus connection via adapter (PC/CP)	TCP/IP and ISO connection (PC/CP)
S5	X[1)]			
LOGO!	X[2)]			
S7-200	X[3)]	X[5)]	X[6)]	
S7-300	X[4)]	X[5)]	X[7)]	X[4)]
S7-400	X[4)]	X[5)]	X[7)]	X[4)]
S7-400H	X[4)]	X[5)]	X[7)]	X[4)]
S7-1200	X			
S7-1500	X			

Table 2: Available connection types

[1] On side of the SIMATIC S5, the AS511 interface is used with an additional interface converter (ACCON-S5-LAN ®, Deltalogic).

[2] Only modules with Ethernet interface TCP/IP are supported (starting from …-0BA7)

[3] Only with CP243-1

[4] Only CPU/CP, whose Ethernet interface supports TCP/IP or ISO respectively

[5] Only with CP55xx (MPI), CP56xx (PPI/MPI/PROFIBUS) or CP57xx (PPI/MPI/PROFIBUS)

[6] PPI Multimaster cable is NOT supported.

[7] MPI/DP adapter serial / USB / TCP/IP

Additional Siemens software (e.g. SIMATIC NET or SIMATIC STEP 7) is needed for operation, in case the connection to the control system is established via a SIMATIC NET card in the computer to an integrated Ethernet interface of the CPU (if available) or to a CP module in the PLC. Please take into account that further licenses are required which are not part of *ibaPDA-Interface-PLC-Xplorer*.

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 SIMATIC S7

Generally, no specific engineering and programming is necessary on the control side. In particular, no program modules have to be activated.

When using the *PC/CP* connection mode, a suitable access point is to be configured in the SIMATIC PG/PC interface on the *ibaPDA* computer (see ↗ *Setting PG/PC interface / defining new access point*, page 85).

Only for the LOGO! and S7-200 controller types, an Ethernet connection has to be configured in the control system (see ↗ *LOGO! configuration*, page 12 and ↗ *S7-200 configuration*, page 14).

3.3.1 LOGO! configuration

Access to LOGO! CPU is carried out via Ethernet only.

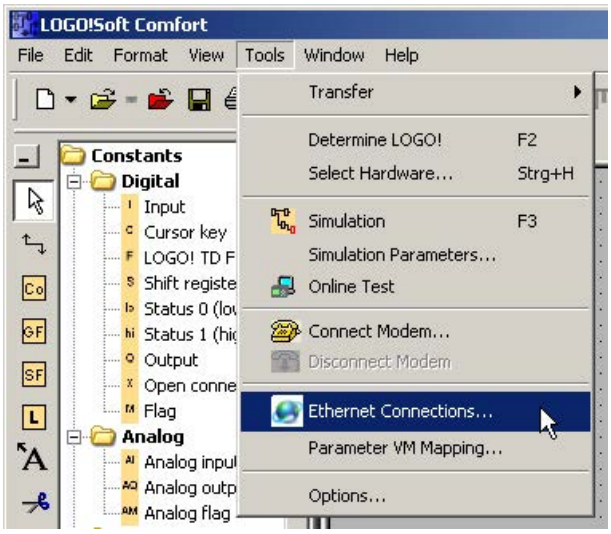
The following LOGO! types are supported:

- SIMATIC LOGO! 0BA7
- SIMATIC LOGO! 0BA8

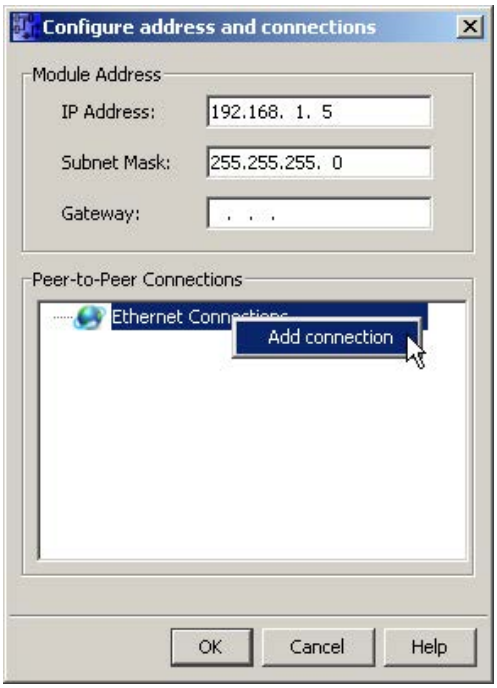
When using LOGO! 0BA7, you first have to establish an Ethernet connection with your LOGO! software or configure an existing connection respectively.

Create Ethernet connection

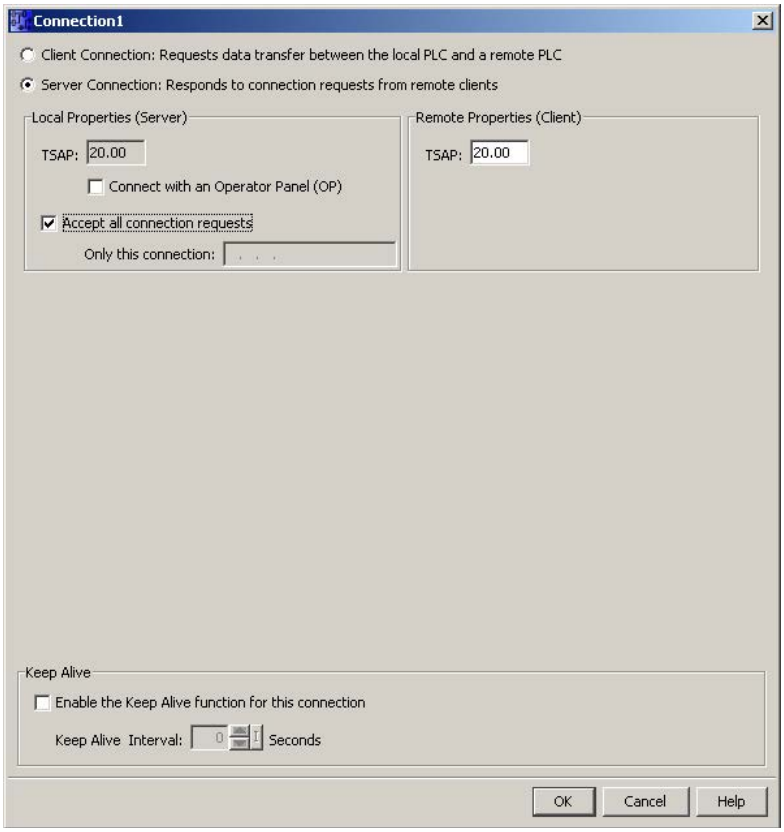
1. Select the menu *Tools* - *Ethernet connections...* in the LOGO! programming software



2. Select "Add connection"



3. Select “Server connection”, enter a TSAP (e.g. 20.00) and activate “Accept all connection requests”. The TSAP used has to comply with that used in ↗ *Module LOGO!*, page 43.

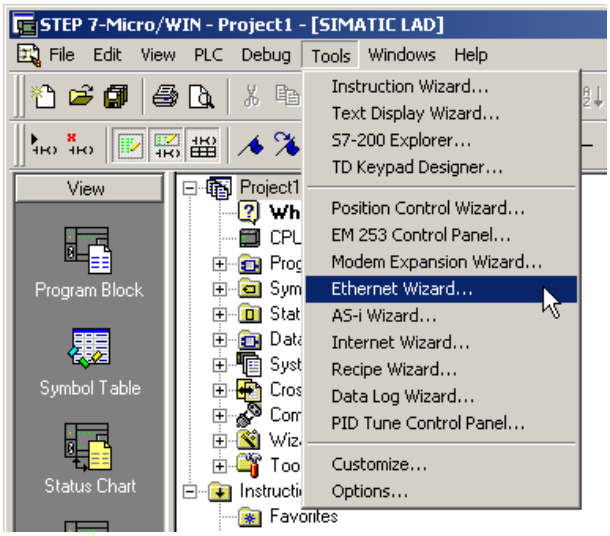


When using a LOGO! 0BA8, this is not required. However, the user has to consider here that every connection to the PLC has a 10 seconds timeout. Hence, an open connection will be closed automatically, if for a period of 10 seconds no user data are being exchanged.

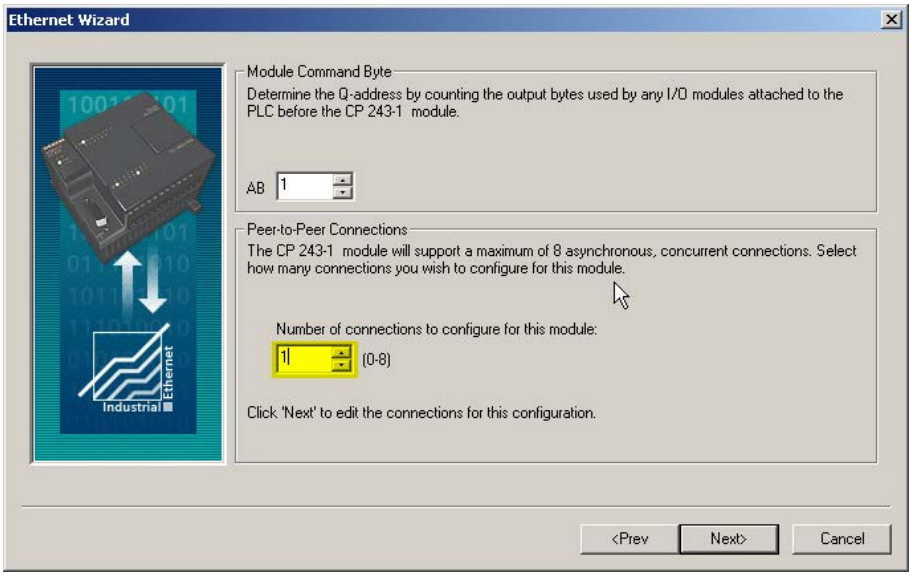
3.3.2 S7-200 configuration

Access to the S7-200 is carried out via Ethernet. Therefore, you first have to establish a connection using the STEP 7-Micro/WIN software or parameterize an existing connection accordingly. The following figures provide more details on this.

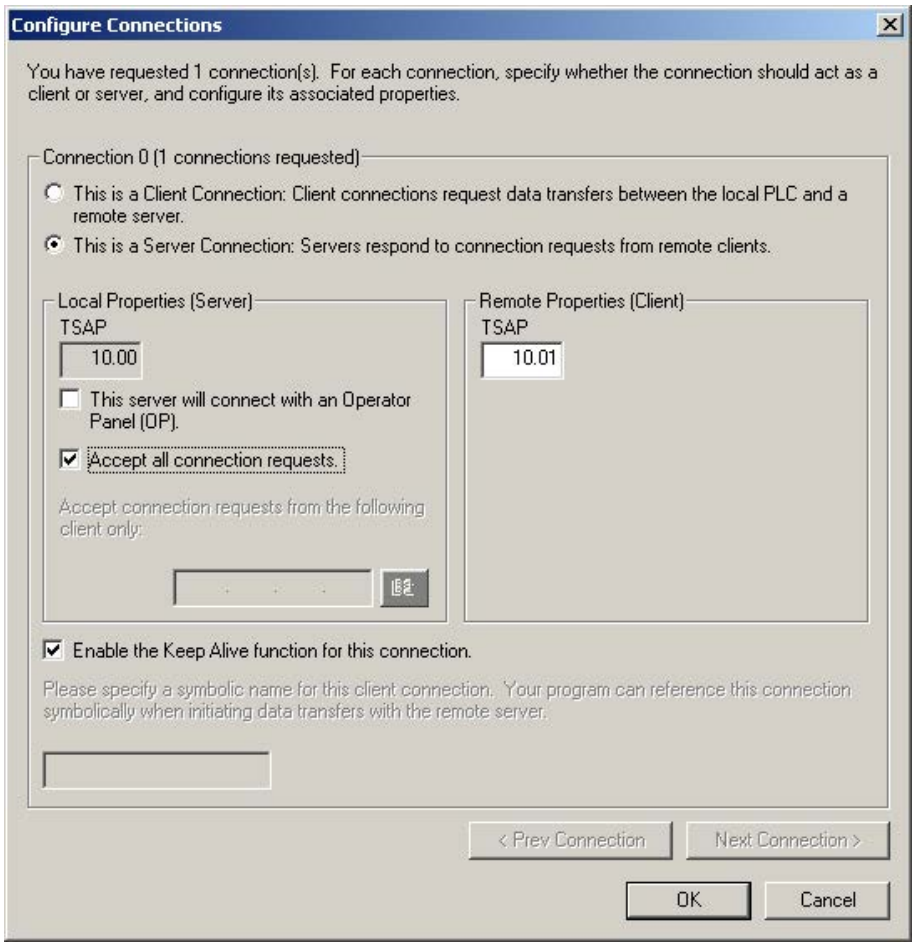
1. In the STEP 7-Micro/WIN software, start the Ethernet wizard in the menu *Tools – Ethernet Wizard...*



2. Create an Ethernet connection.



3. Select “Server connection”, enter a TSAP (e.g. 10.00) and activate “Accept all connection requirements”. The TSAP used has to comply with that used in ↗ *Module S7-200*, page 46.



3.3.3 Configuration of S7-300 and S7-400

Access protection

An access protection can be configured for S7-300/400 CPUs:

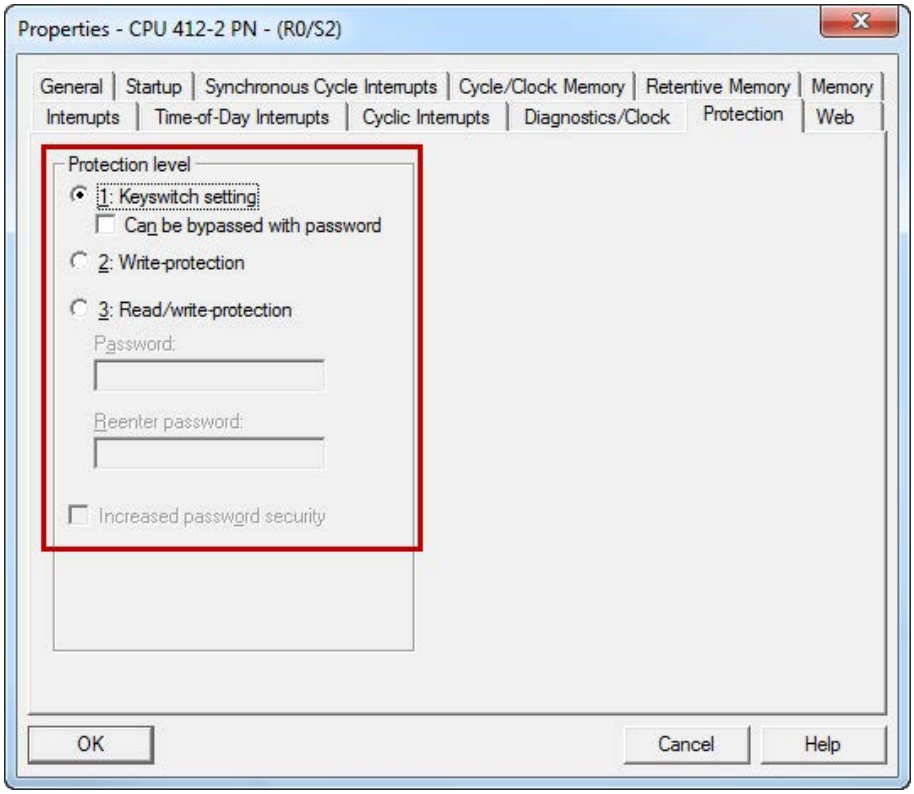


Fig. 1: Configuration of the protective level in the CPU properties

Depending on the settings a read and/or write access on the CPU by *ibaPDA* may be permitted or not.

3.3.4 Configuration of S7-1200 and S7-1500

Please note the following when using the module S7-Xplorer on the CPUs S7-1200 and S7-1500:

in case of connection mode TCP/IP or PC/CP

- Access to data blocks only without "Optimized block access".

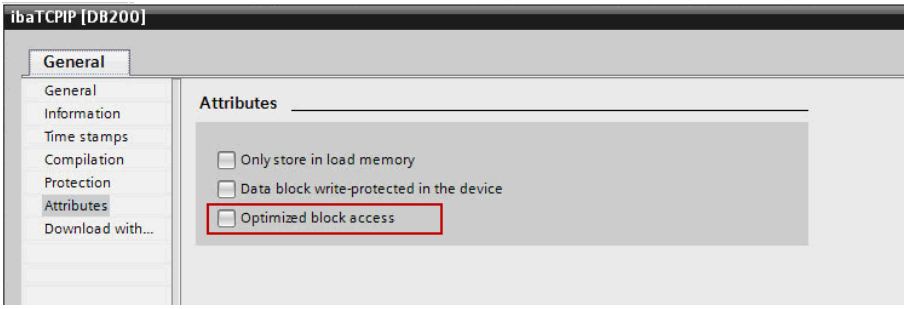


Fig. 2: Attributes for block access (S7-1200, S7-1500)

- In the CPU properties (*Properties - General - Protection - Connection mechanisms*) the access has to be activated via PUT/GET communication.

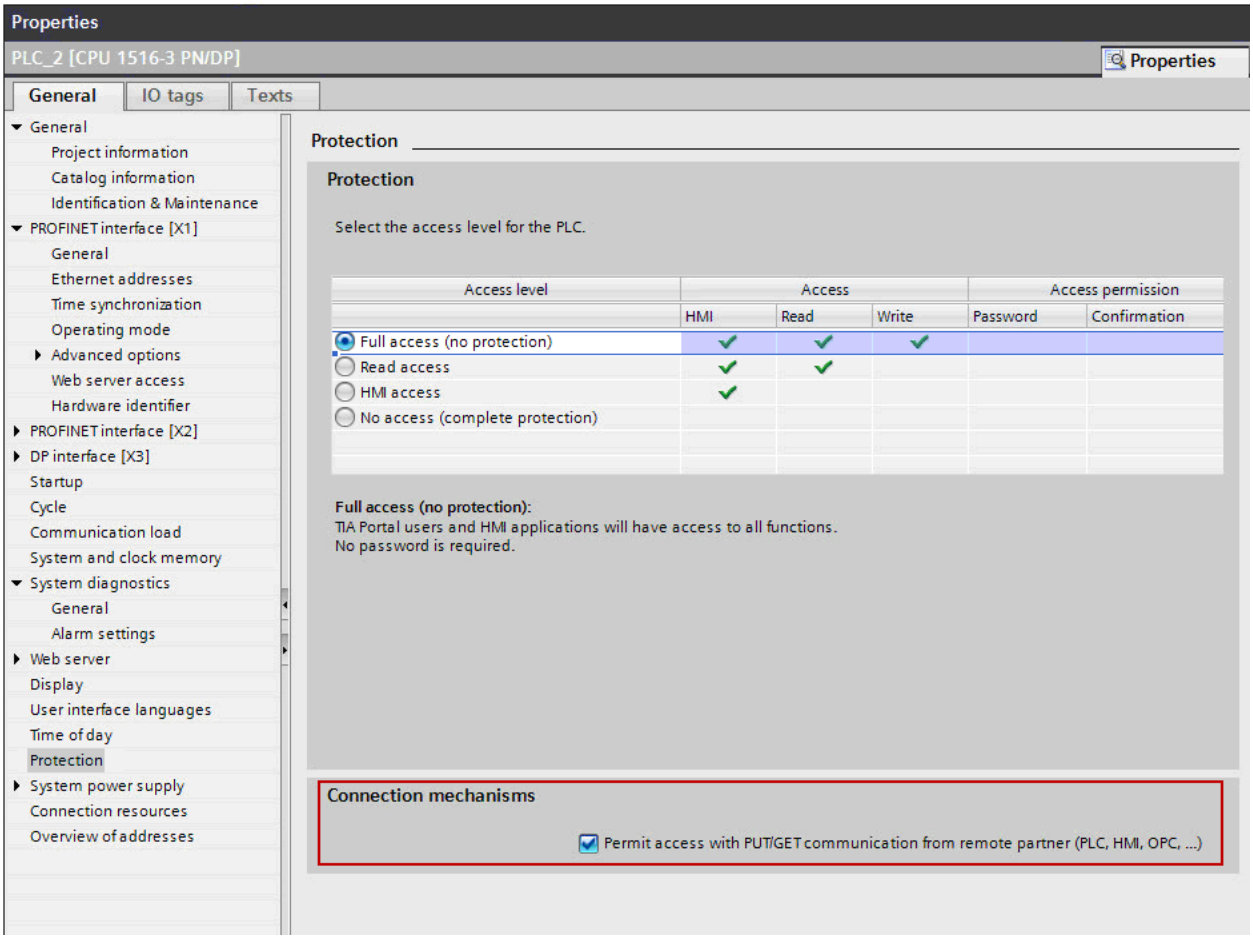


Fig. 3: Permit access PUT/GET

For the S7-1200, this option is only available beginning with firmware V4.0.

For connection mode TCP/IP S7-1x00
Nothing to observe

Access protection

An access protection can be enabled for an S7-1200 and S7-1500 CPU. The following dependencies on *ibaPDA* apply:

Access level	CPU access	ibaPDA reads symbols from CPU	S7-Xplorer access
Full access (no protection)	HMI, read, write	OK	OK
Read access	HMI, read	OK	OK
HMI access	HMI	No	OK
No access (complete protection)		No	No

Table 3: Access protection S7-1200/1500

3.4 Configuration & engineering ibaPDA

Open the I/O manager, e.g. with the toolbar  .

If all the system requirements are met, (see ↗ *System requirements S7-Xplorer*, page 7) the "S7-Xplorer" interface will be displayed in the signal tree.

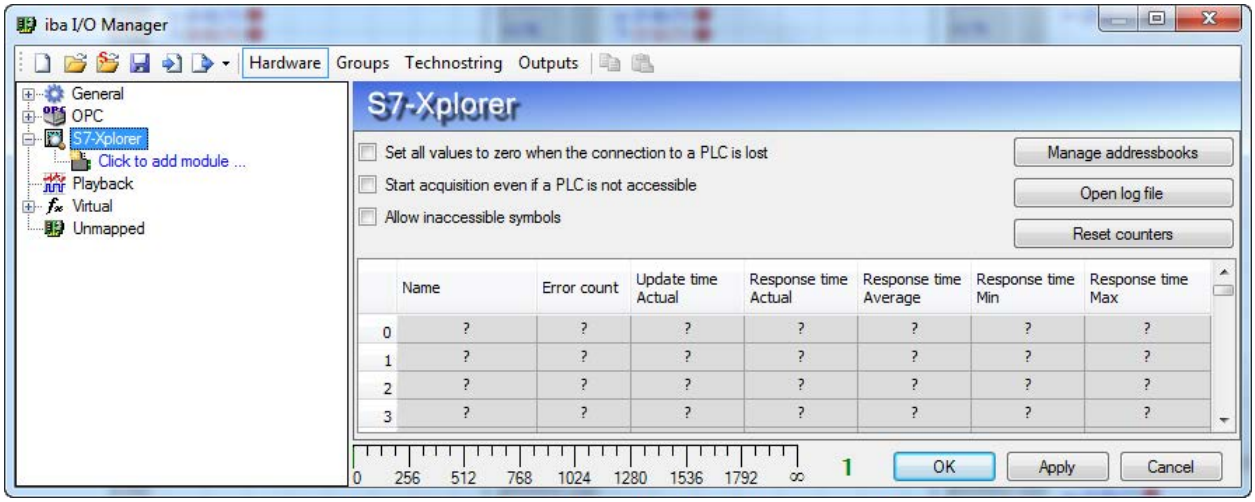


Fig. 4: Interface in the I/O manager

3.4.1 General interface settings

The interface itself has the following functions and configuration options:

Fig. 5: General interface settings

Set all values to zero when the connection to a PLC is lost
If this option is activated, all measured values of an S7-CPU are reset to 0 as soon as the connection gets lost.

Start acquisition even if a PLC is not accessible
If this option is enabled, the acquisition will start even if an S7 CPU is not accessible. Instead of an error, a warning is indicated in the validation dialog. If the system was started without a connection to the S7-CPU, *ibaPDA* will periodically attempt to connect to the CPU.

Allow inaccessible symbols
Enable this option to start the acquisition even if no S7 operands are accessible. The inaccessible operands are indicated as a warning in the validation dialog.

Enable S7-Xplorer outputs
Enable this option for activating the output modules. With the S7-Xplorer outputs you can write directly on S7 operands and S7 symbols.

Caution

Please consider that writing data to the PLC might exert an influence on programs running on the PLC and can lead to adverse reactions and processes. Please make sure that no danger arises from the activation. Please take into consideration that the description of data in the controller has influence on the programs which run there and can result in unwanted reactions and processes. Therefore please make sure that activating the S7-Xplorer outputs does not involve any risks.

Manage address books
For more details about working with S7 address books, see ↗ *Address books*, page 56.

Open log file
If connections to S7 controllers have been established, all connection specific actions are recorded in a text file. With this button, you can open and have a look at this file. In the file system on the harddisk, you will find the log files in the program path of the *ibaPDA* server (...\Programs\iba\ibaPDA\Server\Log\). The file name of the current log file is S7Log.txt, the name of the archived log files is S7Log_yyyy_mm_dd_hh_mm_ss.txt.

Reset counter
Resets the error counter as well as the response times in the connection table to zero.

Connection table
The table shows the counters as well as the response times of the individual connections during data measurement.

For further details see ↗ *Connection table*, page 70

3.4.2 Add module

Add a module by clicking below the interface. Select the desired module type and click on <OK>.

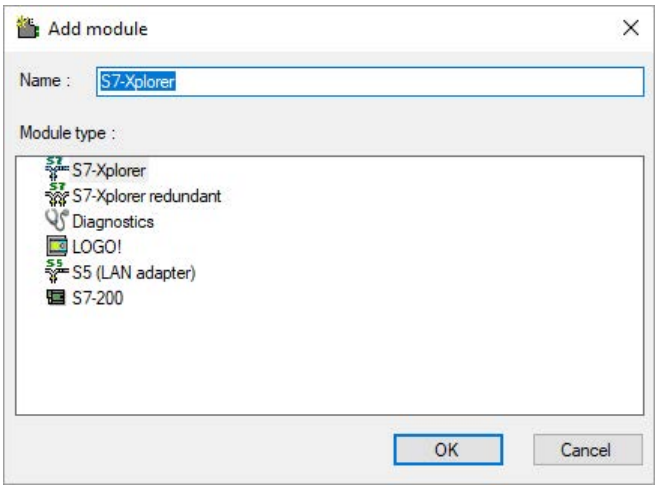


Fig. 6: Add module

Module name	Description
S7-Xplorer	Connection to SIMATIC S7-300, S7-400, S7-1200 and S7-1500
S7-Xplorer redundant	redundant connection to SIMATIC S7-300, S7-400, S7-400H, S7-1200 and S7-1500 via the standard network interface
LOGO!	Connection to SIMATIC LOGO!
S7-200	Connection to SIMATIC S7-200
S5 (LAN adapter)	Connection to SIMATIC S5 via AS511 (Adapter ACCON-S5-LAN®, Deltalogic required)
Diagnostics	Allows the recording of connection related diagnostic data.

Table 4: Module overview of the S7-Xplorer interface

3.4.3 General module settings

All modules have the following settings in common:

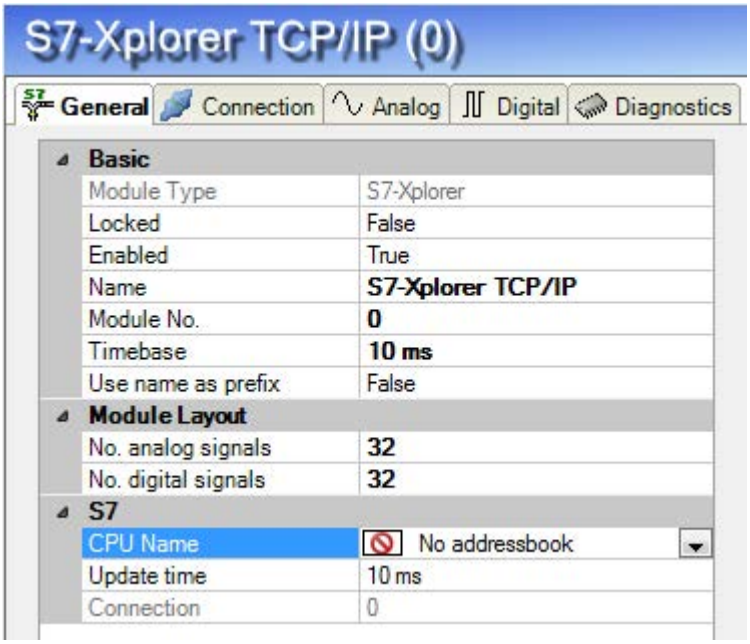


Fig. 7: General module settings

Basic settings

Module Type (information only)
Indicates the type of the current module.

Locked
A module can be locked to avoid unintentional or unauthorized changing of the module settings.

Enabled
Disabled modules are excluded from signal acquisition.

Name
The plain text name should be entered here as the module designation.

Module No.
Internal reference number of the module. This number determines the order of the modules in the signal tree of *ibaPDA* client and *ibaAnalyzer*.

Time base
All signals of the module will be sampled on this time base.

Use name as prefix
Puts the module name in front of the signal names.

Module Layout

No. of analog/digital signals
Defines the number of configurable analog/digital signals in the signal tables. The default setting is 32. You can change the number. 1000 is the maximum value.

Note

Observe the maximum number of signals permitted by your basic 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.

S7

CPU name (not available with all modules)
Address book to which this module is connected. This is where the symbolic operands are selected.

S7 update time
Displays the reference update time during which data can be requested from the PLC. If the PLC needs more time for transferring the data, the real current update time may be higher than the set value in course of the measurement. In the connection table you can check the real updating time of the data.

Connection (read only)
Connection ID that is used to access S7.

Other documentation

For a detailed description of the parameters, please see the *ibaPDA* manual.

Link "Select symbols"

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

For further information see ↗ *Signal configuration*, page 23.

3.4.4 Connection settings

The connection of the module to the controller is configured in the *Connection* tab.

The connection settings differ according to the controller type. You will find a detailed description in

↗ *Module S7-Xplorer*, page 32

↗ *Module S7-Xplorer redundant*, page 41

↗ *Module LOGO!*, page 43

↗ *Module S7-200*, page 46

↗ *Module S5 (LAN adapter)*, page 49

↗ *Module S7-Xplorer diagnostics*, page 54

3.4.5 Signal configuration

The signals to be acquired are selected in the I/O manager.

There are 3 different ways for selecting the signals to be acquired:

1. Selection via the absolute address of the S7 operands
2. Selection via the S7 symbol addresses (symbol table and symbols from DBs) in a symbol browser
3. Selection via the CFC connectors (when programming the CPU with S7-CFC V6.0 or higher)

The following controllers, connection modes and selection methods are supported:

Controller	Connection mode and signal selection								
	TCP/IP			PC/CP			TCP/IP S7-1x00		
	ABS	SYM	CFC	ABS	SYM	CFC	ABS	SYM	CFC
S5	X								
LOGO!	X								
S7-200	X			X					
S7-300	X	X	X	X	X	X			
S7-400	X	X	X	X	X	X			
S7-400H	X	X	X	X	X	X			
S7-1200	X[1)]							X	
S7-1500	X[1)]							X	

Explanation: **ABS**olute address, **SYM**bolic, **CFC**connector

1) no access on optimized blocks

Note

When using the TIMER operand type with S7-200 controllers, you have to consider that this type has - depending on the operand address - different fixed time bases. Unlike the S7-300 / S7-400 controllers, this type cannot be selected in the configuration and cannot be read by *ibaPDA*.

This is why - when using *ibaPDA* - you have to multiply the read value with the time base determined from the S7-200 manual for getting an absolute time value in milliseconds.

3.4.5.1 Access via the absolute address of the operands

There are 2 ways for selecting the measurement values via the operand address.

- You can either click “Select S7 operands” (hyperlink) in the *General* tab of the module to open the S7 operand editor.

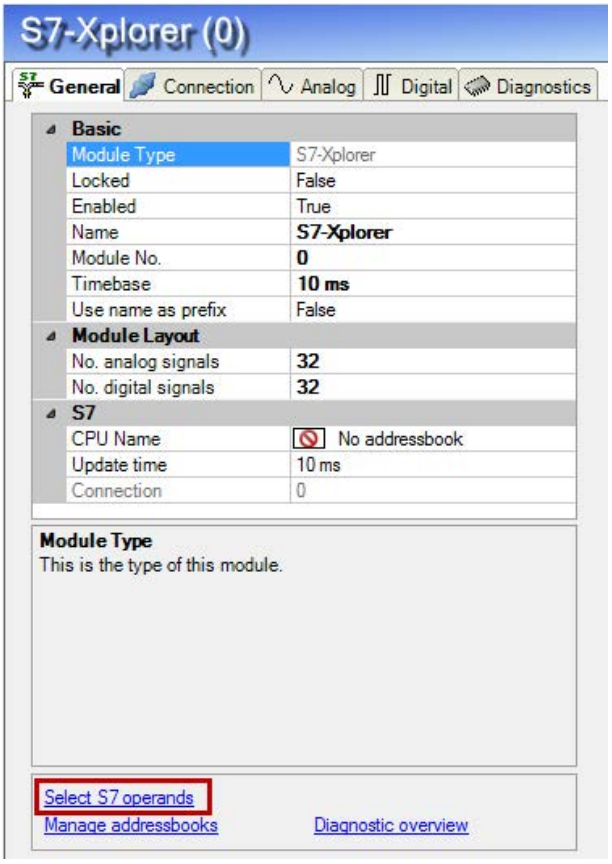


Fig. 8: Selecting S7 operands

- Or click in a field of the “S7 operand” column in the *Analog* or *Digital* tab of the module.

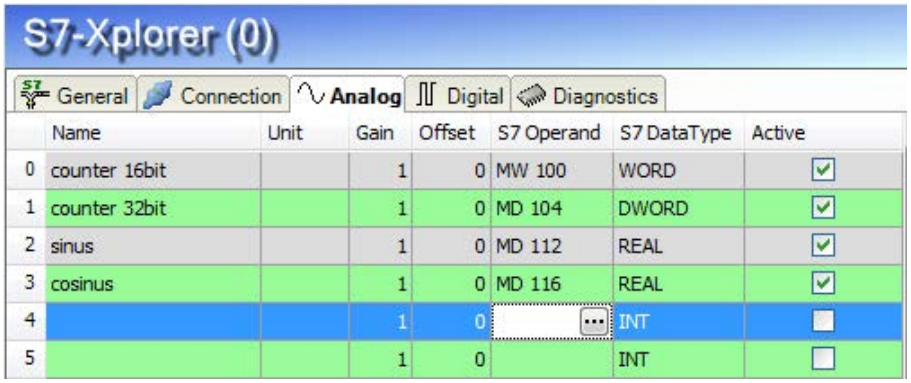


Fig. 9: Selecting S7 operand

In both cases, a dialog box is opened, in which you can select the S7 operand to be measured.

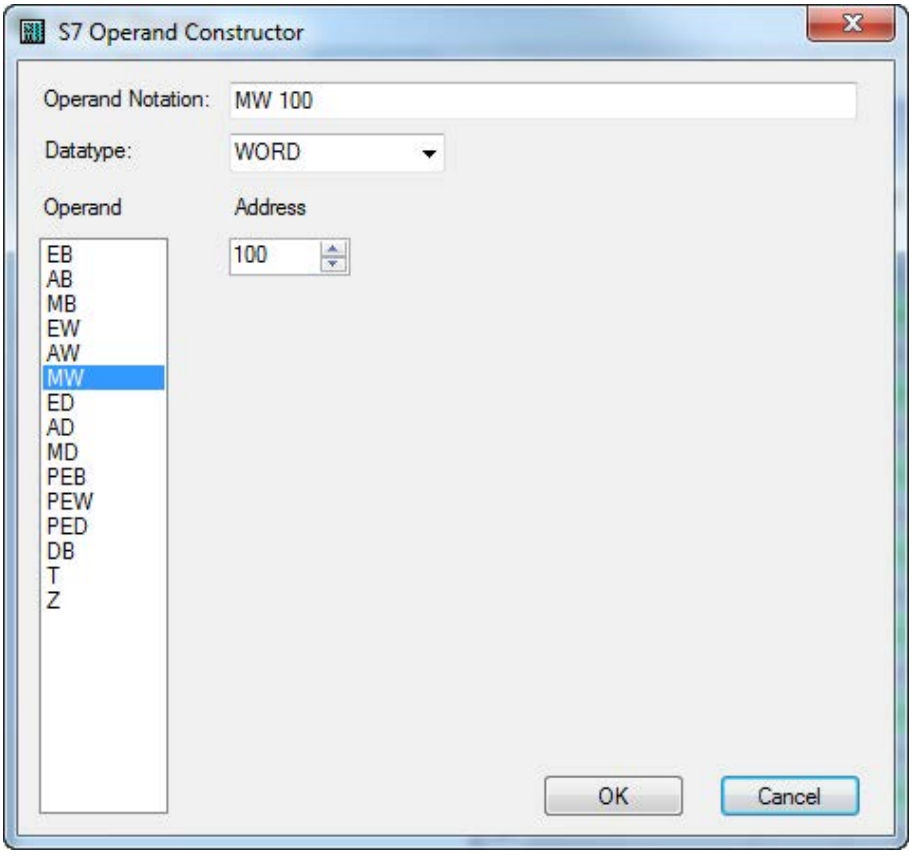


Fig. 10: S7 operand constructor

After you have set the desired operand address, click <OK> to exit the dialog.

Thereafter, you can enter the signal name in the *Name* column.

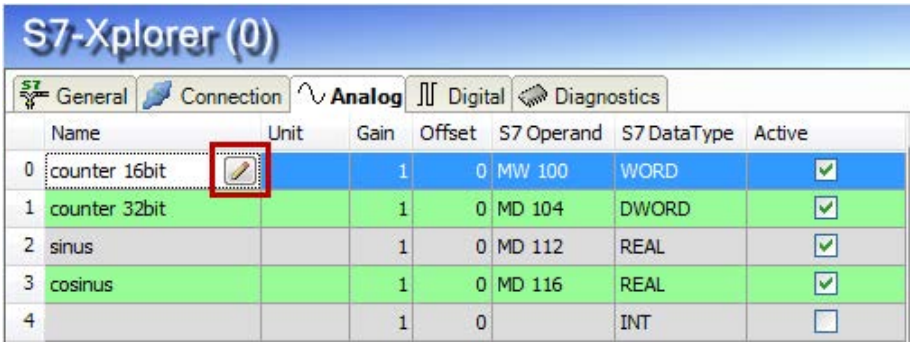


Fig. 11: Operand names

You can enter the desired operand address also directly in the *S7 Operand* column without using the S7 operand editor.

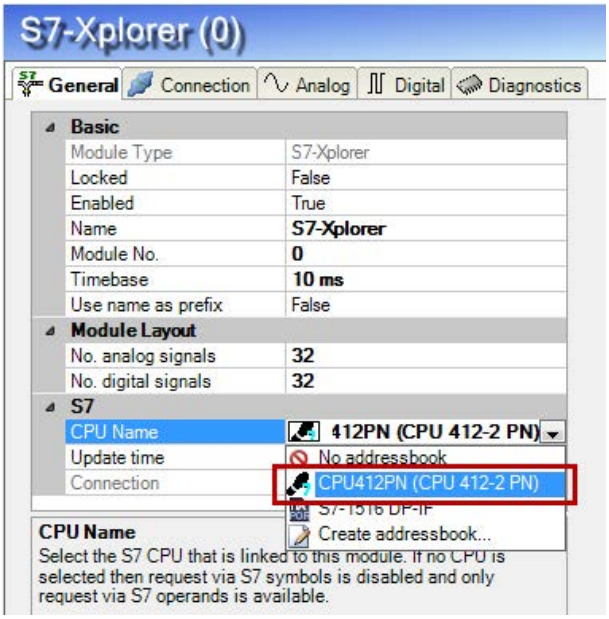
3.4.5.2 Selection via the symbolic operand addresses

This method of access requires that the signals to be measured already have an entry in the S7 symbol table, the PLC variable list or in a data block and that an address book has been created (see chapter ↗ *Address books*, page 56).

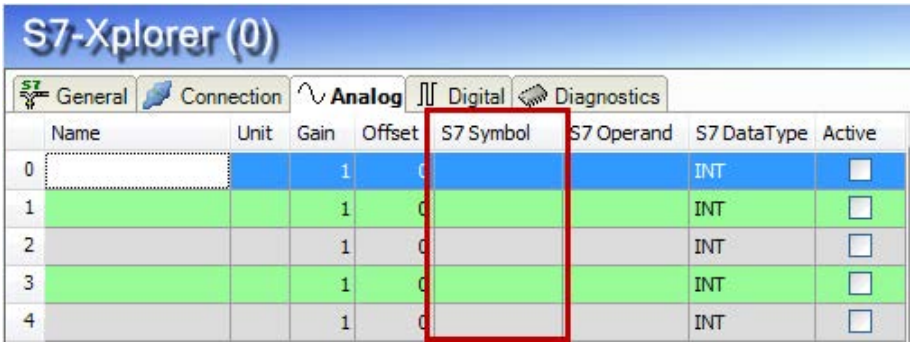
An advantage of this way of access is that the symbol addresses are applied automatically in *ibaPDA* as signal names.

You can integrate an address book into the module as follows:

1. Select the S7-CPU you want to assign this module to in the drop down menu on the *General* tab of the module under "CPU Name".

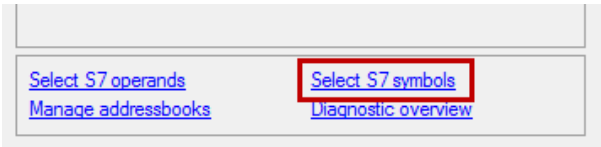


2. On the *Analog* and *Digital* tabs, an additional column *S7 Symbol* is displayed.

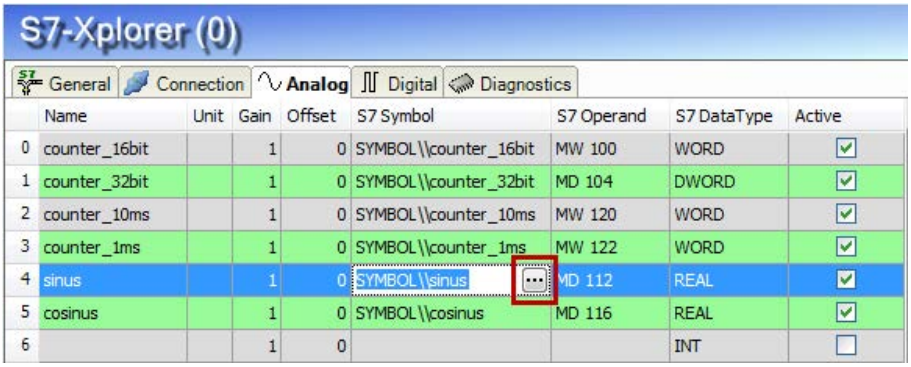


Now you can access symbol addresses using the „S7 CFC- and Symbol Browser" (in short: symbol browser). The symbol browser can be opened in different ways:

1. Click on the link "Select S7 symbols" on the *General* tab of the module. The selected signals are entered automatically in the appropriate table *Analog* or *Digital*. The symbol browser stays open until it is closed with <OK>. Therefore, several signals can be added successively.



2. On the *Analog* or *Digital* tabs click in a cell of the *S7 Symbol* column. You can only select the symbols with the data type matching the table. After every selection, the symbol browser is closed.



In the symbol browser, you have the following options:

- CFC variables:
  On the CFC tab, you can select the configured CFC variables – consisting of the configured names of chart, block and connector.
- DB variables:
  On the DB tab, the individual data blocks and their variables are displayed.
- Symbol table:
  On the Symbols tab, the entries of the S7 symbol table can be selected.
- Search tab:
  You can search the variables with a part of their name.

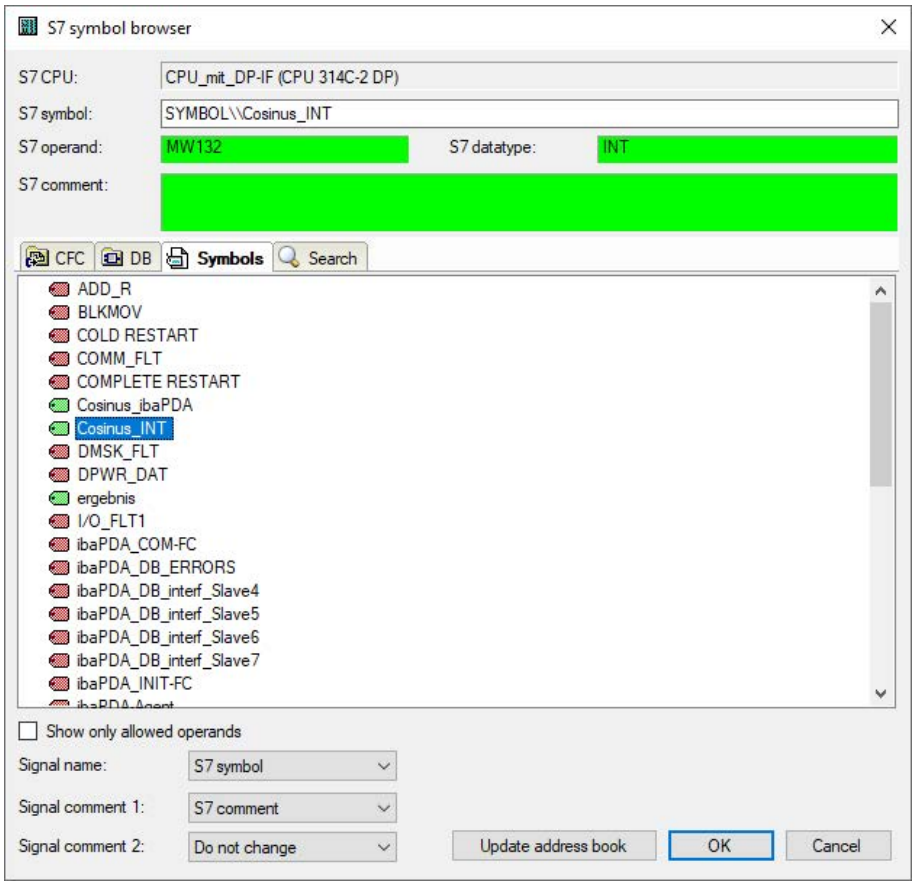


Fig. 12: S7-CFC and symbol browser

After having selected the variable, the operand address, the data type and a comment are displayed on the right side.

The variables are shown in the following colors:

Green	The operand is valid and can be transferred to the module setting with <OK>.
Yellow	The operand has a data type that does not match the selected column, e. g. in case you have selected a Boolean variable as analog value or an integer value as digital value.
Red	The operand has a data type that is not supported by *ibaPDA* (e.g. STRING), or the operand is a constant.

Show only allowed operands
If you activate this option, only allowed operands and symbols (no red and yellows ones) for the current signal table which you opened from the browser are shown in the tree structure. This is done for transparency reasons.

Signal name, signal comment 1 and 2
Usually, the symbolic signals name from STEP 7 is adopted as signal name in the I/O manager. Using these three combo boxes you can alternatively design the signal name and both comments.

Please select an option from the alternatives offered. If a signal name or comment in the signal table should not be changed, select “do not change”.

Lookup symbols in the signal grid

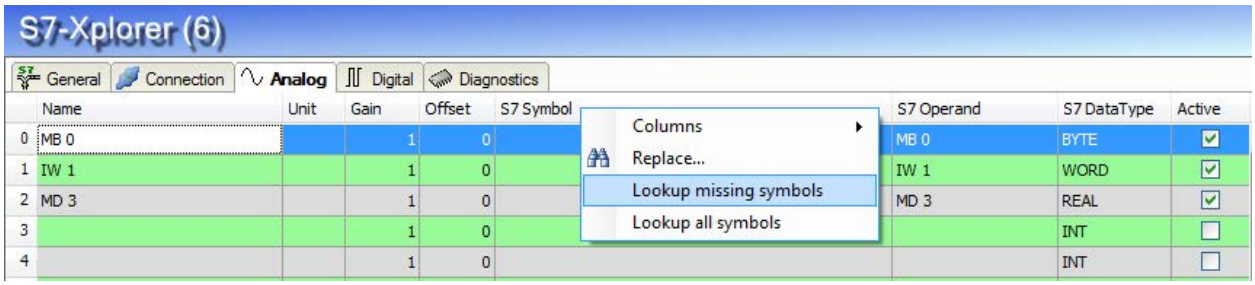


Fig. 13: Lookup symbols

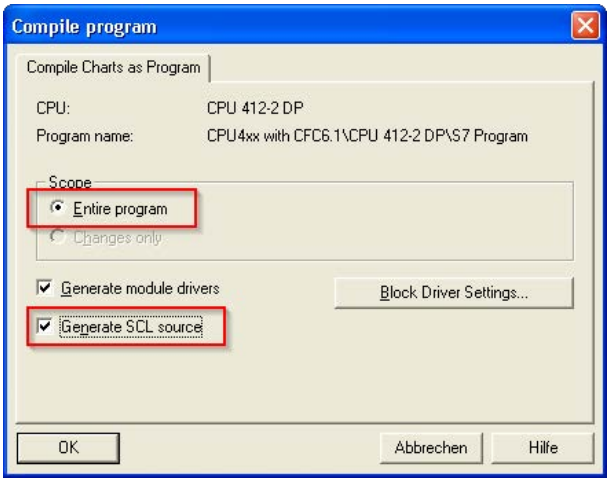
ibaPDA can lookup the symbol that corresponds with an operand. Right-click on the table header of the signal grid and select either *Lookup missing symbols*, then only the missing symbols are searched for, or *Lookup all symbols*, then all symbols are searched for and replaced. The command executes a backward resolution of the S7 symbols out of the S7 operands. *ibaPDA* will first search the symbol table, then CFC and finally the DBs for the operand.

3.4.5.3 Measuring the CFC connectors

In order to select CFC connectors for the measurement, proceed as described in ↗ *Selection via the symbolic operand addresses*, page 26 until you open the S7-CFC and symbol browser.

Note

If no connectors are shown in the CFC tab, the SCL sources might not have been translated in the STEP 7 project. Activate the following options in the dialog for compiling the program in the SIMATIC software:



Afterwards, generate the address books again.

Note

When compiling a CFC program, DB addresses are assigned automatically in STEP 7 to the connectors. It may happen that other DB addresses are assigned to connectors, depending on the scope of the program changes that have been made between two compilation runs.

In this case, also the address book for *ibaPDA* has to be generated again. The symbolically configured signals are automatically checked in the I/O manager whereas the related absolute S7 operands are updated.

In the *S7-CFC* and *symbol browser*, you can select the *CFC* tab instead of the *Symbols* tab and select the signal. The connectors are listed hierarchically by chart name, module name and connector name:

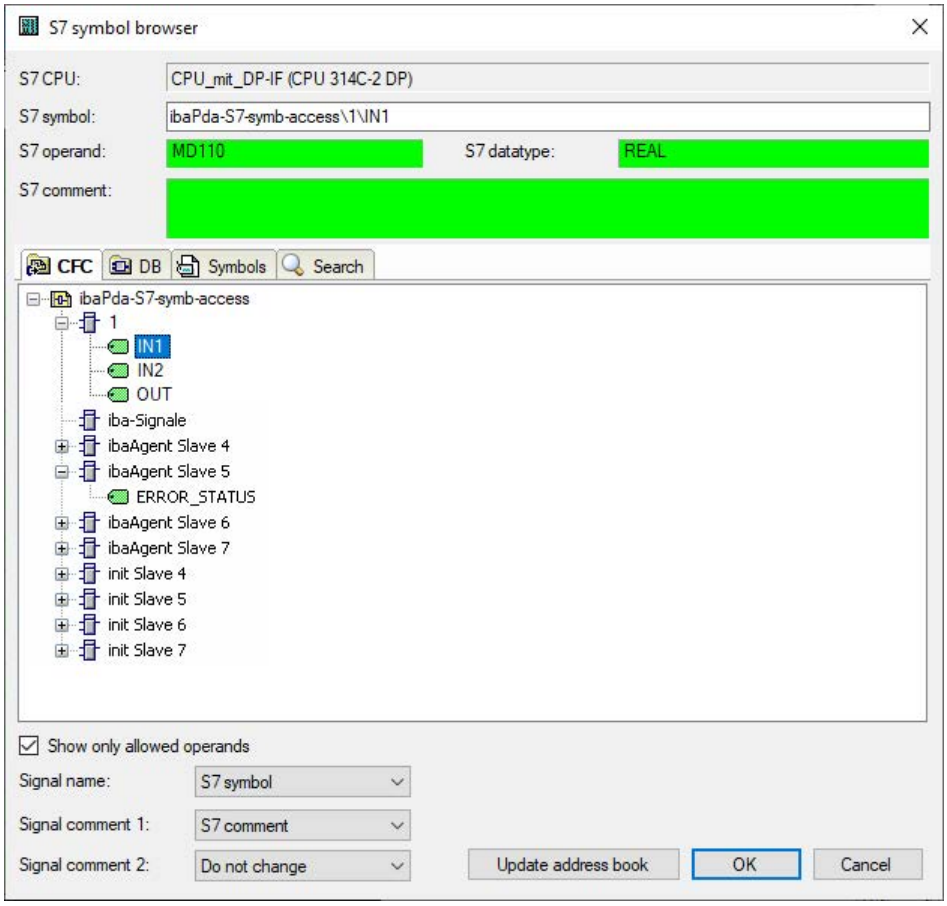


Fig. 14: S7 CFC and symbol browser

Special function Drag & Drop

A convenient way to select signals is to drag & drop them from the CFC chart into the I/O manager of *ibaPDA*.

For this purpose, show the CFC editor as full screen in the background and the *ibaPDA* client in window mode in the foreground on the same computer. Start the I/O manager.

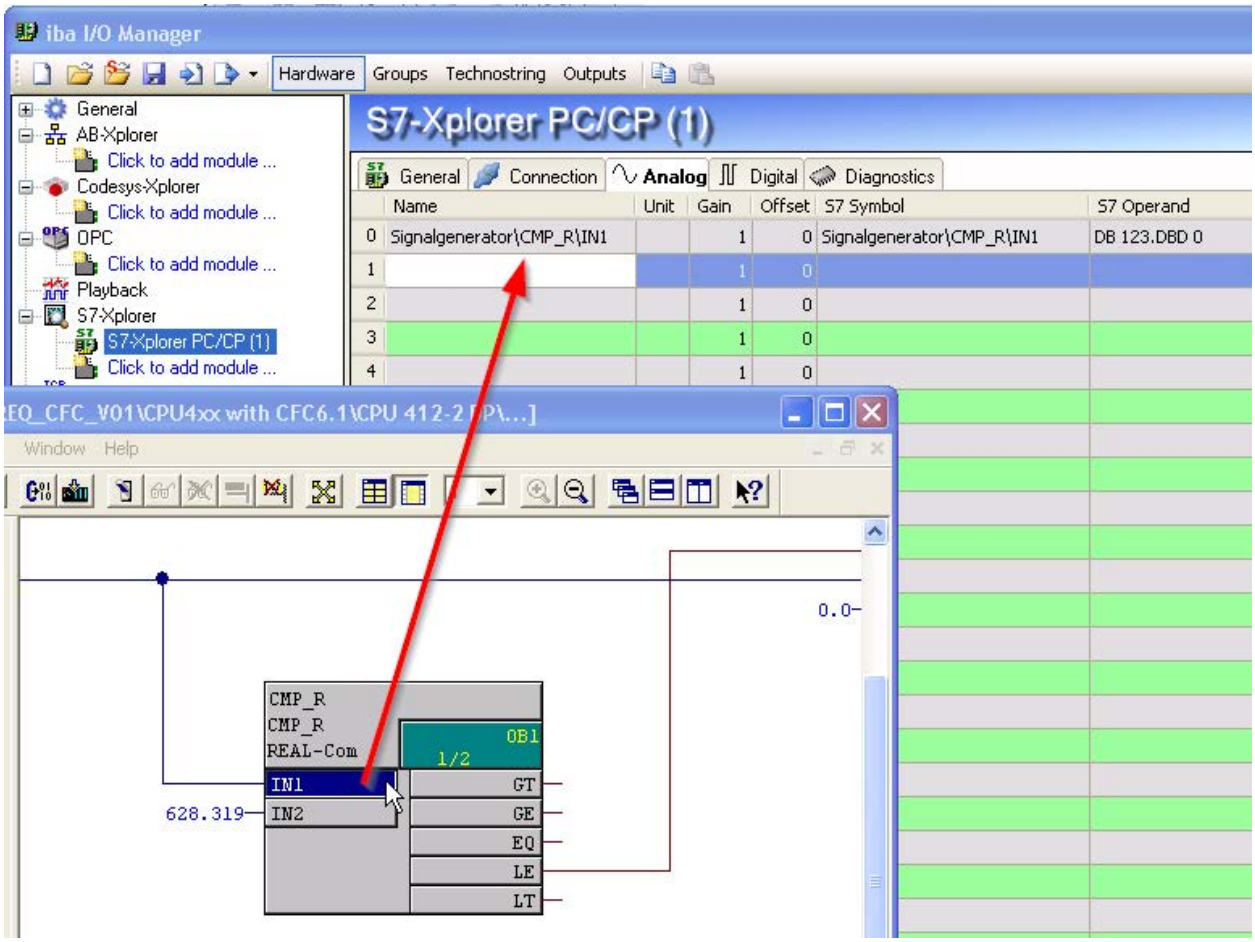


Fig. 15: Add signal via drag & drop.

Click on the connector in the CFC chart with the left mouse key. Keep the left mouse key depressed, while dragging the connector onto the I/O manager and then drop it in the desired signal row. The CFC connector is now entered as measured signal in the signal table of the module.

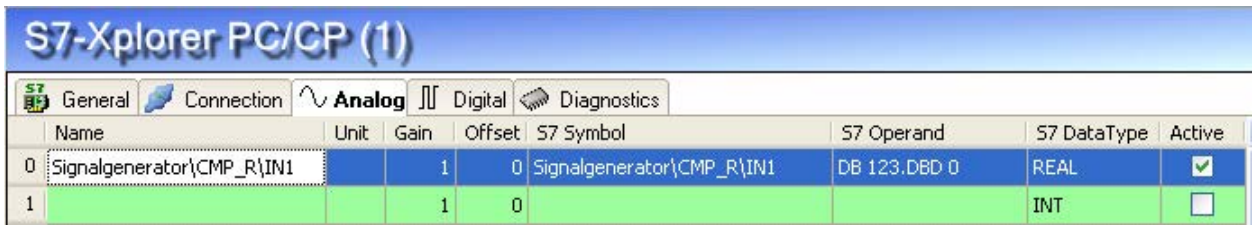


Fig. 16: Added signal

3.4.6 Module S7-Xplorer

This module establishes the connection to various SIMATIC S7 controllers via the standard network interface of the computer or an additional network interface card.

The following controllers, connection modes and selection methods are supported:

Controller	**Connection mode and signal selection**								
	TCP/IP			**PC/CP**			**TCP/IP S7-1x00**		
	ABS	**SYM**	**CFC**	**ABS**	**SYM**	**CFC**	**ABS**	**SYM**	**CFC**
S7-300	X	X	X	X	X	X			
S7-400	X	X	X	X	X	X			
S7-1200	X							X	
S7-1500	X							X	

Explanation: **ABS**olute address, **SYM**bolic, **CFC**connector

The following operand types are supported:

Selection via	Analog	Digital
S7-300 S7-400	EB, AB, MB, PEB, DBB EW, AW, MW, PEW, DBW ED, AD, MD, PED, DBD T, Z	E, A, M, DBX
S7-1200 S7-1500	EB, AB, MB, DBB EW, AW, MW, DBW ED, AD, MD, DBD	E, A, M, DBX

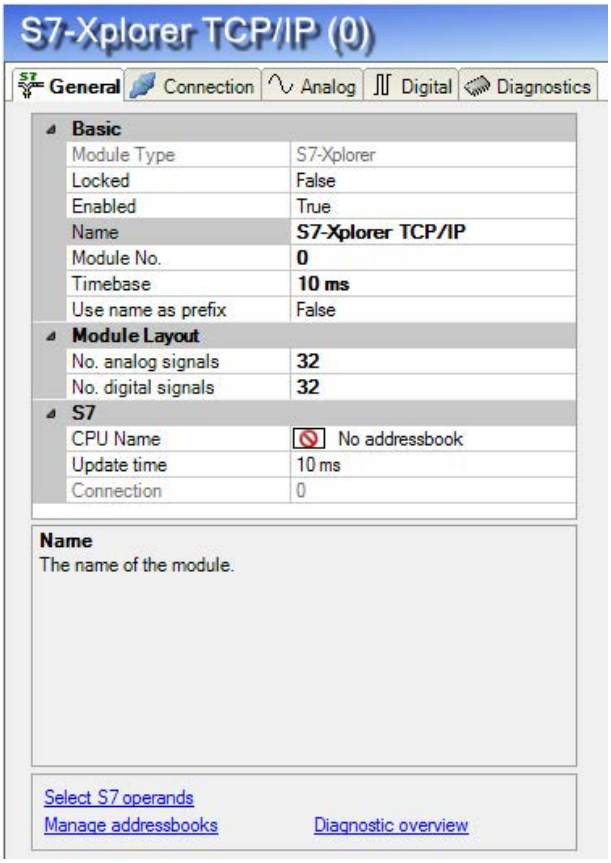


Fig. 17: General module settings S7-Xplorer

For details concerning the module settings see ↗ *General module settings*, page 21.

3.4.6.1 Connection mode TCP/IP

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

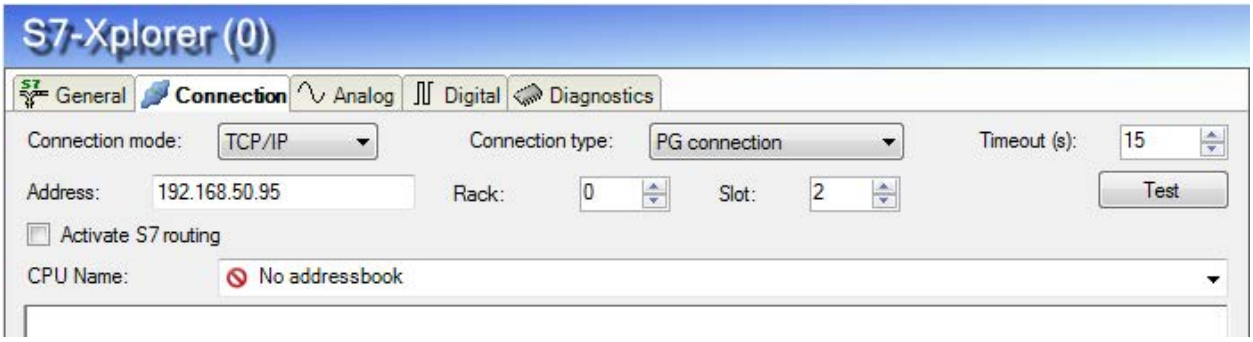


Fig. 18: Connection configuration TCP/IP

Connection mode
Selection of the TCP/IP connection mode

Connection type
Selection of the connection type PG, OP or other connections (determines which type of connection resource is occupied on the CPU).

Timeout
Timeout of the connection

Address
IP address of the controller

Rack
Rack number of the controller station (default: 0)

Slot
Number of the slot of the controller in the rack
(for S7-1500 CPUs)

Test
Connection test to the CPU and available diagnostic data are issued.

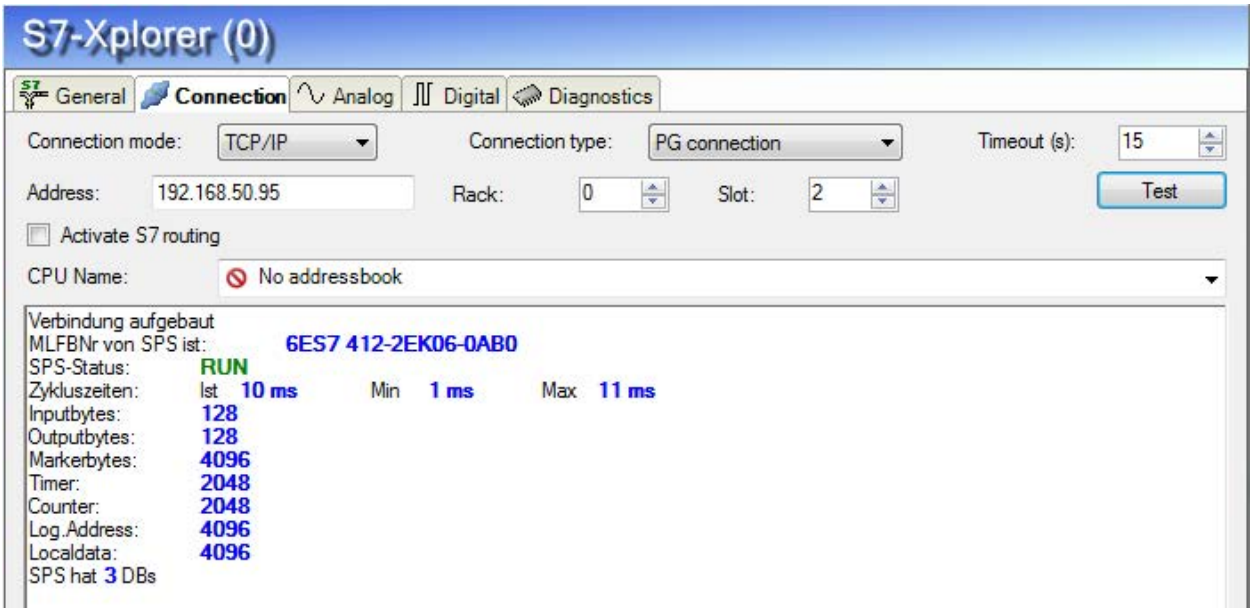


Fig. 19: Connection test / diagnostic data

Activate S7 routing
Activate this option, if the S7-CPU and the *ibaPDA*-PC 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

For more information about S7 routing, see ↗ *S7 routing*, page 89

CPU Name
Selection of the linked address book

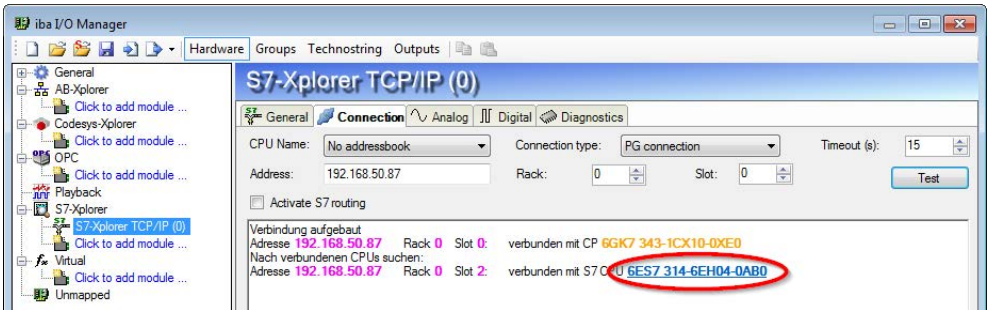
Tip

If you do not know the rack and/or slot number, enter 0 and click the <Test> button.

ibaPDA then tries to establish a connection. If the connection is successfully established, the relevant rack will be scanned for available CPUs.

The CPUs found are listed with rack and slot numbers. The CP to which *ibaPDA* is directly connected is always at the top.

By clicking the S7-CPU (hyperlink), the connection is established and the CPU diagnostic data is displayed.



Note

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

3.4.6.2 Connection mode PC/CP

This mode activates a connection over the interface card of the PC, which is configured using SIMATIC Net.

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

- MPI adapter (COM)
- MPI adapter (USB)
- PROFIBUS (CP5611)
- TCPIP (RFC1005)
- .....

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 will be sufficient.

Note

The SIMATIC PC/PPI cable as well as the SIMATIC USB/PPI cable are not supported for connecting S7-200 CPUs to *ibaPDA*. For this purpose, either use a CP56xx (PPI) on the computer side, or a CP243-1 and TCP/IP on the PLC side.

Fig. 20: Connection configuration PC/CP

Connection mode
Selection of the PC/CP connection mode

Connection type
Selection of the connection type PG, OP or other connections (determines which type of connection resource is occupied on the CPU).

Timeout
Timeout of the connection

Access point for applications
Selection of the access point that is to be used

Tips for creating and configuring an access point, see ↗ *Setting PG/PC interface / defining new access point*, page 85

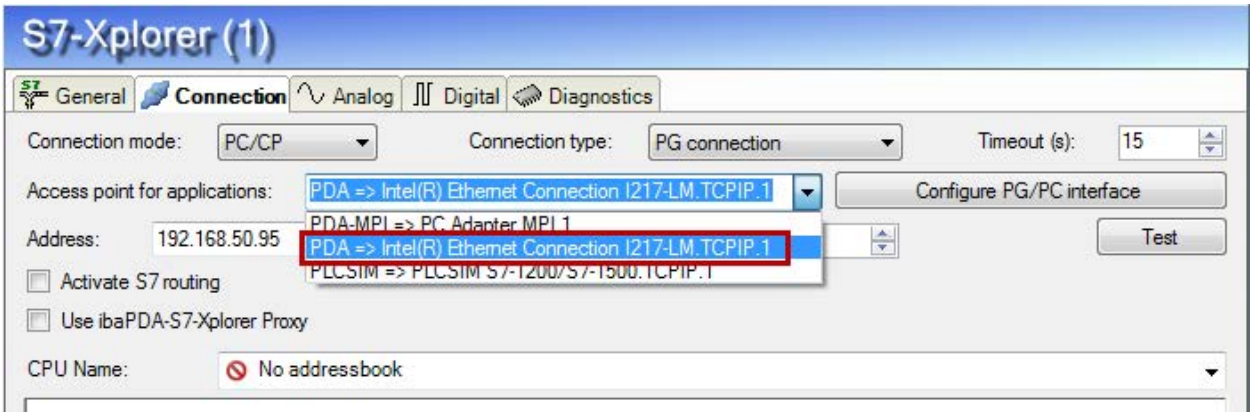


Fig. 21: Select access point

Note

Access points available in SIMATIC Net are configured with the "PG/PC interface settings" tool by Siemens.

For the connection of *ibaPDA-Interface-S7-Xplorer* to SIMATIC S7 via PC/CP connections, we generally recommend setting a specific access point for *ibaPDA* when *ibaPDA-Interface-S7-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-S7-Xplorer* will be disturbed in case the standard access point is changed in the SIMATIC Manager.

Configure PG/PC interface
Opens the dialog box for setting the PG/PC interface of SIMATIC STEP 7

Address
Address of the controller (MPI, PROFIBUS or IP address depending on the configured access point)

Rack
Rack number of the S7 station (default: 0)

Slot
Number of the slot of the CPU in the rack
(please use "0" for S7-1500 CPUs)

Test
Connection test to the CPU and available diagnostic data are issued.

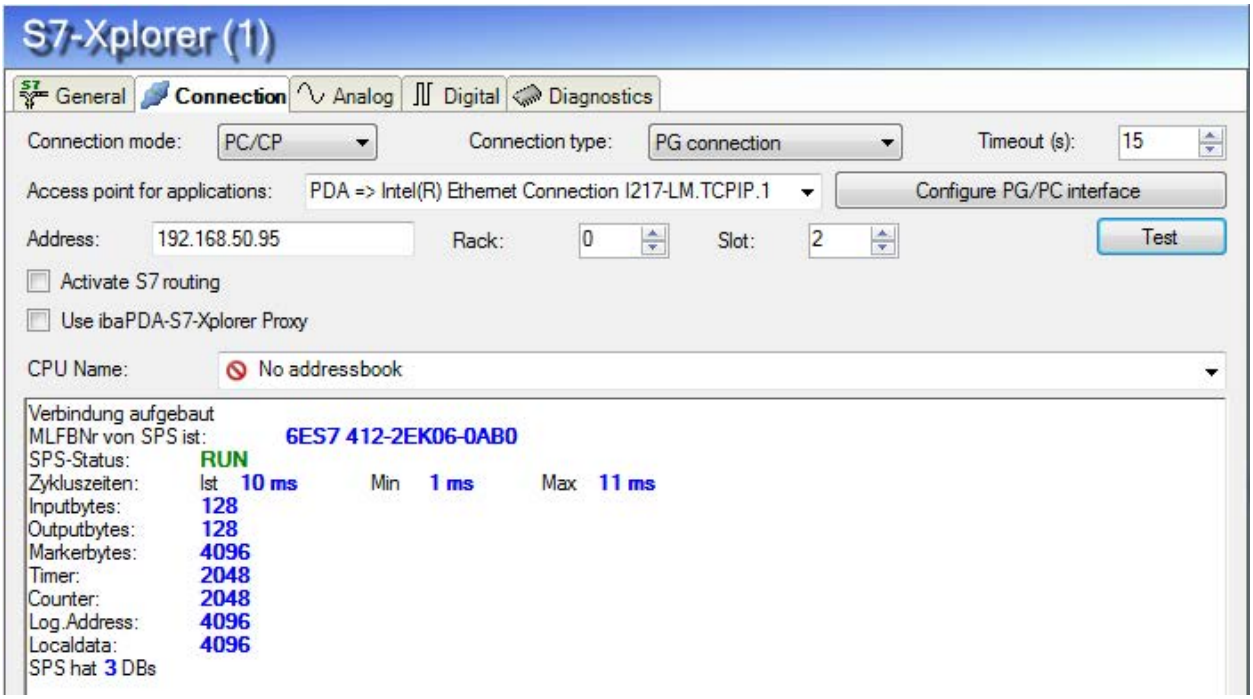


Fig. 22: Connection test / diagnostic data

By clicking the S7-CPU (hyperlink), the connection is established and the CPU diagnostic data is displayed.

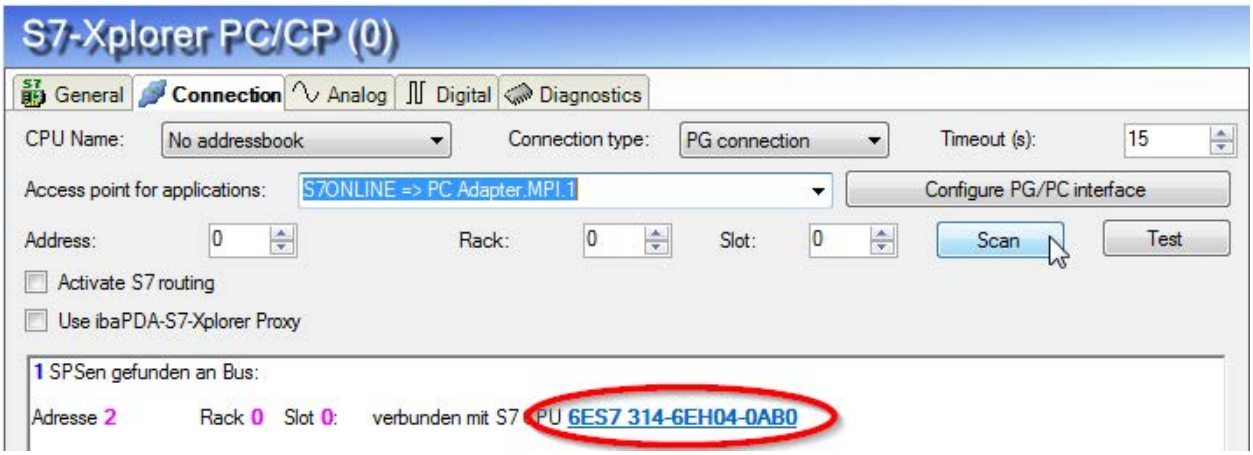


Fig. 23: Hyperlink to S7-CPU

Activate S7 routing
Activate this option, if the S7-CPU and the *ibaPDA*-PC 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

For more information about S7 routing, see ↗ *S7 routing*, page 89

Use ibaPDA-S7-Xplorer Proxy
For a connection to S7-PLCSIM it is necessary to use the *ibaPDA-S7-Xplorer Proxy*, because due to operating system reasons it is not possible to establish a direct connection between the *ibaPDA* service and S7-PLCSIM.

See also ↗ *Connection with S7-PLCSIM*, page 60 and ↗ *ibaPDA-S7-Xplorer Proxy as PC/CP interface proxy*, page 84

Two additional input fields appear:

- IP address or hostname of the *ibaPDA-S7-Proxy*-computer
- Number of the port used by the *ibaPDA-S7-Proxy*

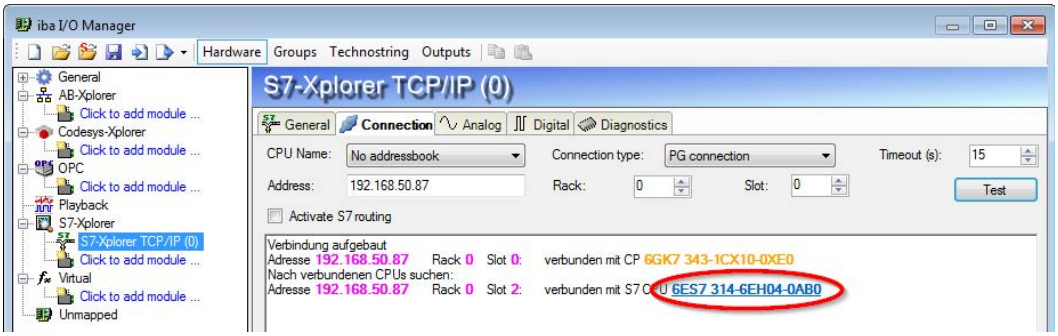
CPU Name
Selection of the linked address book

Tip for S7-300 and S7-400 CPUs

If you do not know the rack and/or slot number, enter 0 and click <Test>.

ibaPDA tries to establish a connection. If the connection is successfully established, the relevant rack will be scanned for available CPUs. The CPUs found are listed with rack and slot numbers. The CP to which *ibaPDA* is directly connected is always at the top.

By clicking the S7-CPU (hyperlink), the connection is established and the CPU diagnostic data is displayed.



Note

If no PLC or CPU is displayed for the MPI access point, check the interface setting in the SIMATIC Manager.

ibaPDA does not detect an online connection if a PG/PC interface with interface parameterization “AUTO” has been set for MPI adapter or CPs in the SIMATIC Manager.

In this case, the interface or the access point needs to be changed.

3.4.6.3 Connection mode TCP/IP S7-1x00

This mode activates a connection over the standard network interface of the PC and can only be used in combination with S7-1200 CPUs (beginning with V4) and S7-1500 CPUs.

Access is supported on both optimized and non-optimized blocks.

Fig. 24: Connection configuration TCP/IP S7-1x00

Connection mode
Selection of the TCP/IP S7-1x00 connection mode

Connection type
Selection of the connection type PG, OP or other connections (determines which type of connection resource is busy on the CPU).

Timeout
Timeout of the connection

Address
IP address of the controller

Test
Connection test to the CPU and available diagnostic data are issued.

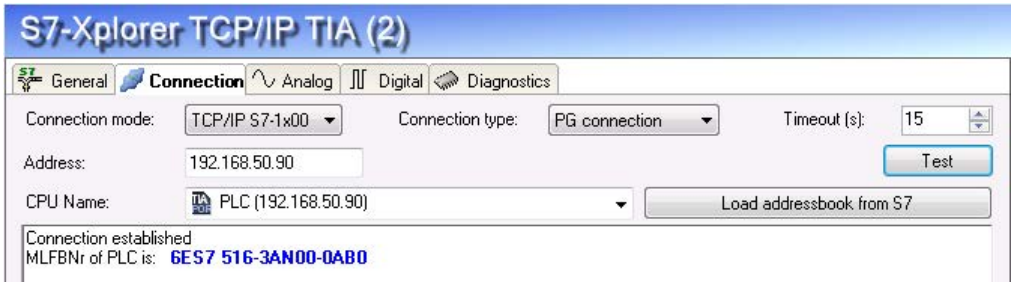
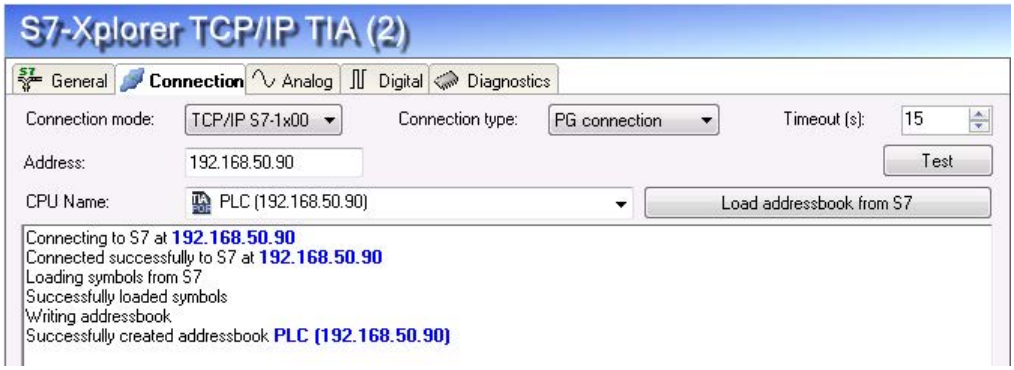


Fig. 25: Connection test / diagnostic data

Load address book from S7
By clicking on this button *ibaPDA* will read the list of symbols directly from the PLC and store it in an address book for further use in the symbol browser.



In case of an S7-1500, please consider the option to enable access protection.

For further information see ↗ *Configuration of S7-1200 and S7-1500*, page 17↗ , page

CPU name
Selection of the linked address book; only address books of the "TIA Portal" type can be selected.

Note

The "TCP/IP S7-1x00" connection mode does not support the use of absolute operand addresses.

Note

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

3.4.7 Module S7-Xplorer redundant

This module establishes a redundant connection via the standard network interface of the PC or an additional network card.

Note

The module S7-Xplorer redundant seizes two licensed connections. Please check whether the total number of licensed connections is also sufficient when using redundant modules.

ibaPDA always reads data only from one CPU, which is called active CPU. It is decided on the basis of the CPU status and the connection status from which CPU the data are taken.

With only one CPU connected, data is taken from this one. If both CPUs are connected and only one of them in the RUN status, the latter CPU is chosen. If both are connected and in RUN status, then the first one (connection 0) is chosen. This does not apply to a S7-400H system. In that case the CPU with the RUN MASTER status is chosen.

If there is a change of the CPU status or the connection status of the active connection, *ibaPDA* switches the connection. A change of the CPU status or the connection status of the currently inactive connection, does not cause a switch-over of the connection.

This is the coupling of two "normal" S7-Xplorer connections that are switched in case of an error. It is not a so-called "fault tolerant connection". This is why there may be signal gaps of 1-2 s during a switching operation.

The connected controllers may be an S7-400H controller pair (fault tolerant) or two standard S7 controllers. A prerequisite is that the acquired operands occupy in both controllers identical addresses.

The following controllers, connection modes and selection methods are supported:

Controller	Connection mode and signal selection								
	TCP/IP			PC/CP			TCP/IP S7-1x00		
	ABS	SYM	CFC	ABS	SYM	CFC	ABS	SYM	CFC
S7-300	X	X	X	X	X	X			
S7-400	X	X	X	X	X	X			
S7-400H	X	X	X	X	X	X			
S7-1200	X							X	
S7-1500	X							X	

Explanation: **ABS**olute address, **SYM**bolic, **CFC**connector

Note

A download of the HW Config is not possible while the data acquisition of *ibaPDA* is still running. Stop the *ibaPDA* data acquisition first.

The following operand types are supported:

Selection via	Analog	Digital
S7-300 S7-400	EB, AB, MB, PEB, DBB EW, AW, MW, PEW, DBW ED, AD, MD, PED, DBD T, Z	E, A, M, DBX
S7-1200 S7-1500	EB, AB, MB, DBB EW, AW, MW, DBW ED, AD, MD, DBD	E, A, M, DBX

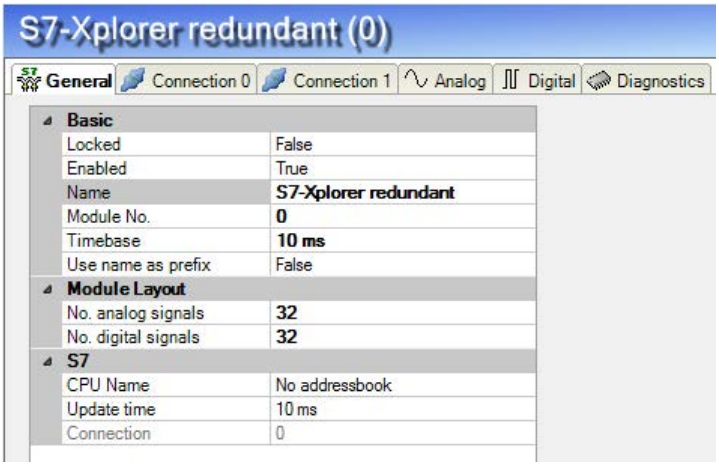


Fig. 26: General module settings S7-Xplorer redundant

For details concerning the module settings see ↗ *General module settings*, page 21

Connection configuration

The two connections are configured on the *Connection 0* and *Connection 1* tabs. The name of the tabs can be assigned using the *Connection name* fields.

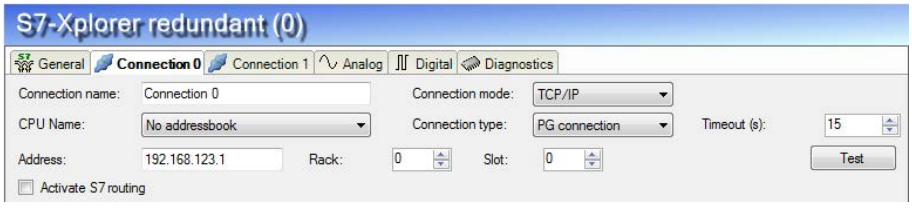


Fig. 27: Connection configuration 0 S7-Xplorer redundant

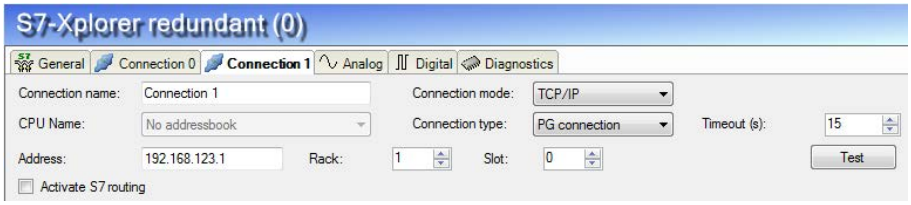
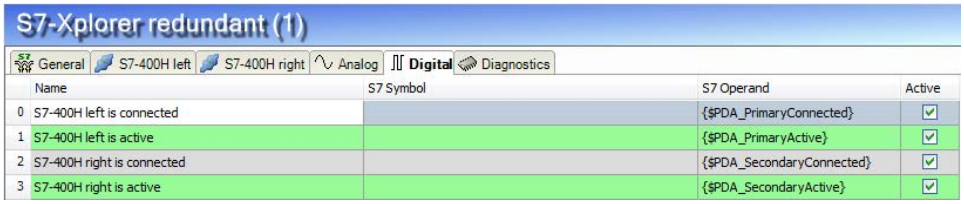


Fig. 28: Connection configuration 1 S7-Xplorer redundant

For details concerning the module settings see ↗ *Module S7-Xplorer*, page 32.

For diagnosis of the status of both connections, there are special signals available on the *Digital* tab. These occupy the first 4 signal positions:



Signal	Meaning
$PDA_PrimaryConnected	Connection 0 established
$PDA_PrimaryActive	Data acquisition active over connection 0
$PDA_SecondaryConnected	Connection 1 established
$PDA_SecondaryActive	Data acquisition active over connection 1

Table 5: Status signals of the redundant connection

One signal out of the two signals {PDA_PrimaryActive} and {PDA_SecondaryActive} is always TRUE even if none of the two connections is active.

3.4.8 Module LOGO!

Choose this module for connecting one of the following LOGO! controllers.

- SIMATIC LOGO! 0BA7
- SIMATIC LOGO! 0BA8

The connection is established via the standard network interface of the computer or an additional network interface card.

The following controllers, connection modes and selection methods are supported:

Controller	**Connection mode and signal selection**								
	TCP/IP			**PC/CP**			**TCP/IP S7-1x00**		
	ABS	**SYM**	**CFC**	**ABS**	**SYM**	**CFC**	**ABS**	**SYM**	**CFC**
LOGO!	X								

Explanation: **ABS**olute address, **SYM**bolic, **CFC**connector

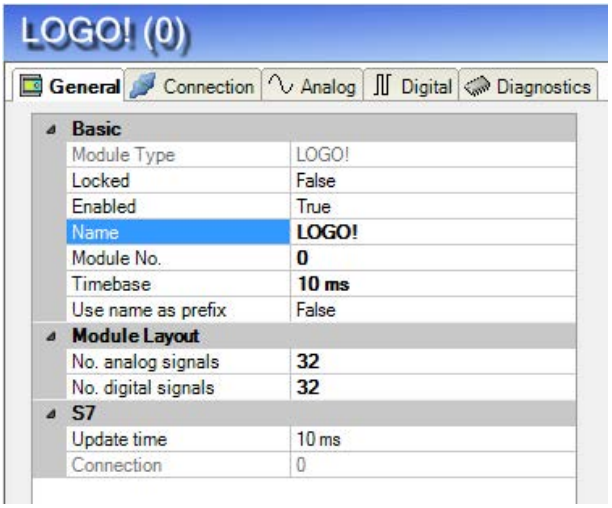


Fig. 29: General module settings LOGO!

For details concerning the module settings see ↗ *General module settings*, page 21

Connection configuration

Enter the IP address of the LOGO! in the "Address" field on the *Connection* tab and the local and remote TSAP configured in the LOGO! (see LOGO! configuration, page ↗ *LOGO! configuration*, page 12) and click <Test>.

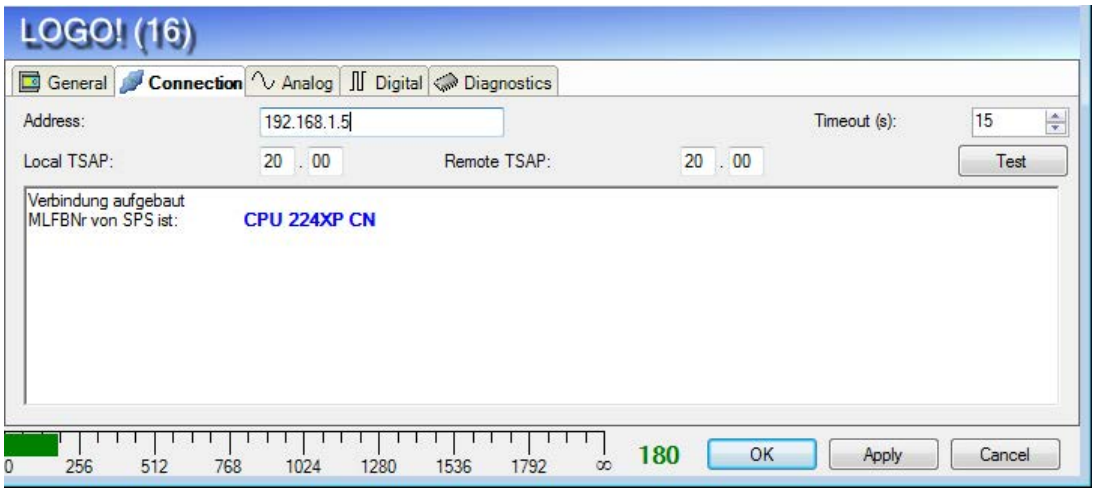


Fig. 30: Accessible LOGO! CPU

ibaPDA establishes a connection. The LOGO! found is displayed.

When connecting a LOGO! 0BA8 please use "01.00" as local and remote TSAP.

The variable memory (VM) allows to access all address ranges of a LOGO!. As interface for the S7 communication, the VM operates as local communication buffer for the data exchange via a connection-/data transfer configuration.

When connecting a LOGO! 0BA7, the variable storage range is also mapped on the DB1. This is why you can access the variables with S7-addresses (see table below). The marker-, input- and output bits of a LOGO can also be accessed via direct addressing.

Overview of variable ranges (VM) LOGO! 0BA7

Block type	Address range	VM-address	S7-address	Direct address
Digital input	I1 – I24	923 – 925	DB1.DBX923.0 – 925.7	E0.0 – E2.7
Analog input	AI1 – AI8	926 - 941	DB1.DBW926 – 940	
Digital output	Q1 – Q16	942 – 943	DB1.DBX942.0 – 943.7	A0.0 – A1.7
Analog output	AQ1 – AQ2	944 – 947	DB1.DBW944 – 946	
Digital markers	M1 – M27	948 - 951	DB1.DBX948.0 – 951.2	M0.0 – M3.2
Analog markers	AM1 – AM16	952 – 983	DB1.DBW952 – 983	

Overview of variable ranges (VM) LOGO! 0BA8

Block type	Address range	VM-address	S7-address	Direct address
Digital input	I	1024 – 1031	DB1.DBX1024.0 – 1032.7	E0.0 – E7.7
Analog input	AI	1032 – 1063	DB1.DBW1032 – 1062	
Digital output	Q	1064 – 1071	DB1.DBX1064.0 – 1071.7	A0.0 – A7.7
Analog output	AQ	1072 – 1103	DB1.DBW1072 - 1102	
Digital markers	M	1104 – 1117	DB1.DBX1104.0 – 1117.7	M0.0 – M13.7
Analog markers	AM	1118 – 1245	DB1.DBW1118 – 1244	
Network input	NI	1246 – 1261		
Analog network input	NAI	1262 – 1389		
Network output	NQ	1390 – 1405		
Analog network output	NAQ	1406 – 1469		

3.4.9 Module S7-200

Select this module for connecting a SIMATIC S7-200.

The following controllers, connection modes and selection methods are supported:

Controller	Connection mode and signal selection								
	TCP/IP			PC/CP			TCP/IP S7-1x00		
	ABS	SYM	CFC	ABS	SYM	CFC	ABS	SYM	CFC
S7-200	X			X					

Explanation: **ABS**olute address, **SYM**bolic, **CFC**onnector

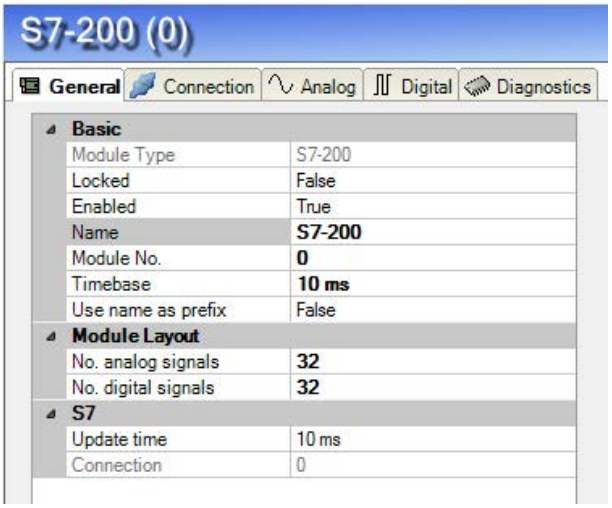


Fig. 31: General module settings S7-200

For details concerning the module settings see ↗ *General module settings*, page 21

Connection configuration

Select the desired connection mode in the *Connection* tab:

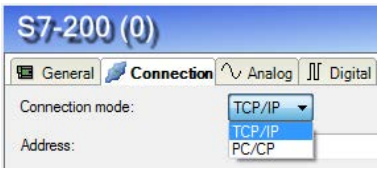


Fig. 32: Select connection mode for S7-200

Note

If you access an S7-200, the programming device access is always used internally. However, this can only be used once simultaneously. This means that if you access the S7-200 that way, STEP 7-Micro/WIN cannot access at the same time. To avoid this, you can use a projected connection in *ibaPDA*.

3.4.9.1 Connection mode TCP/IP

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

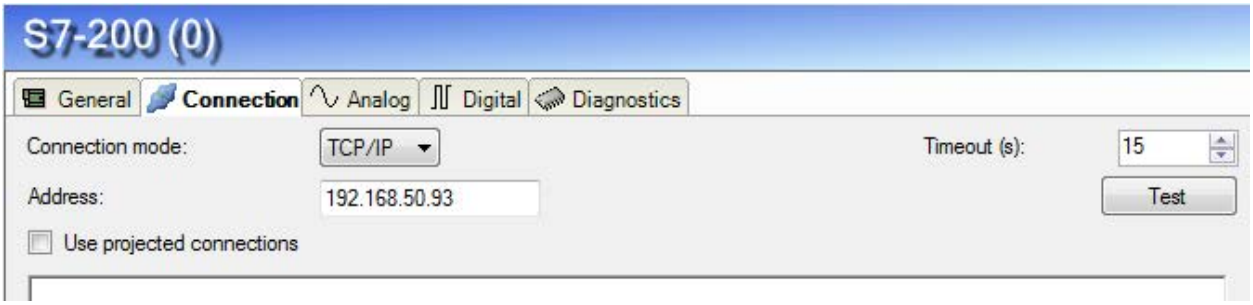


Fig. 33: Connection configuration

Connection mode
Selection of the TCP/IP connection mode

Timeout
Timeout of the connection

Address
IP address of the controller

Test
Connection test to the CPU and available diagnostic data are issued

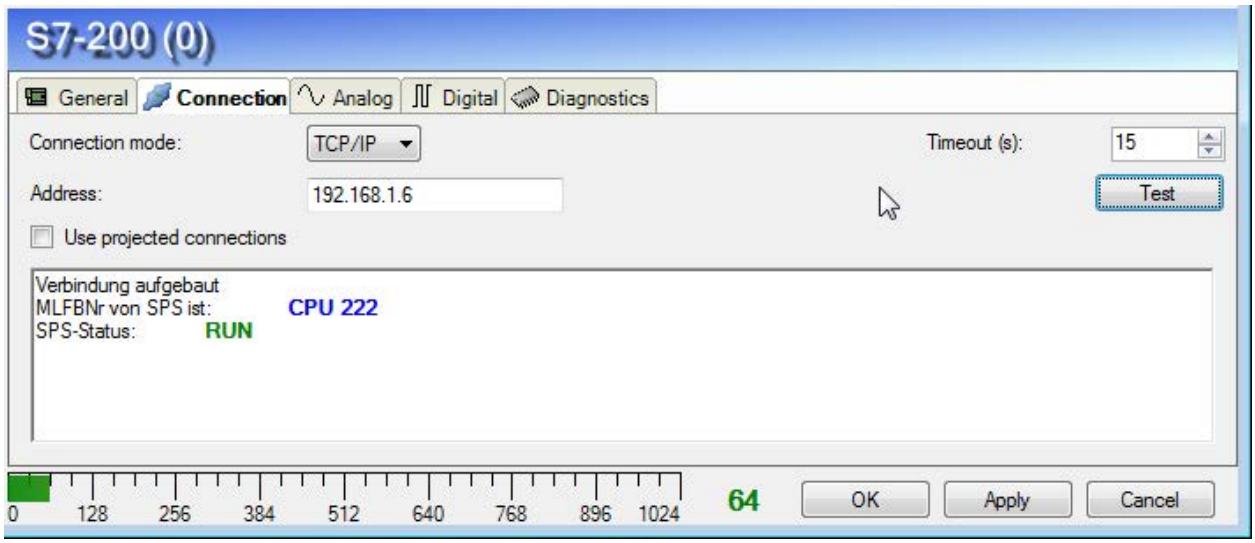


Fig. 34: Connection test / diagnostic data

When using *projected connections*, the following settings have to be made additionally:

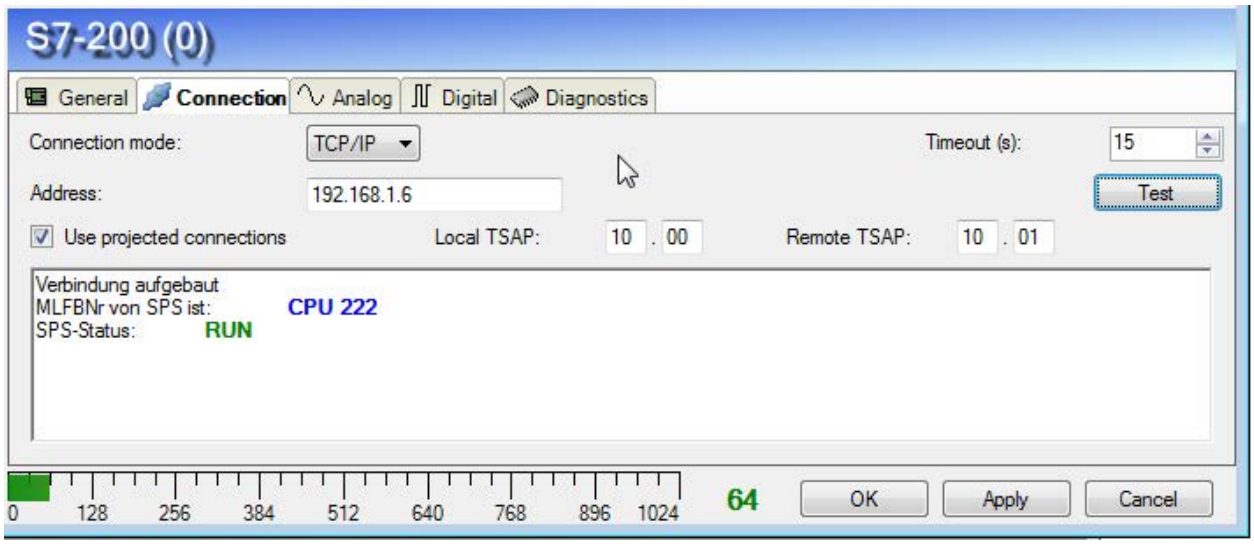


Fig. 35: Connection test projected connection

TSAP local and remote
The values are described in the connection configuration in STEP 7-Micro/WIN (see ↗ *S7-200 configuration*, page 14).

3.4.9.2 Connection mode PC/CP

This mode activates a connection over the interface card of the PC, which is configured using SIMATIC Net.

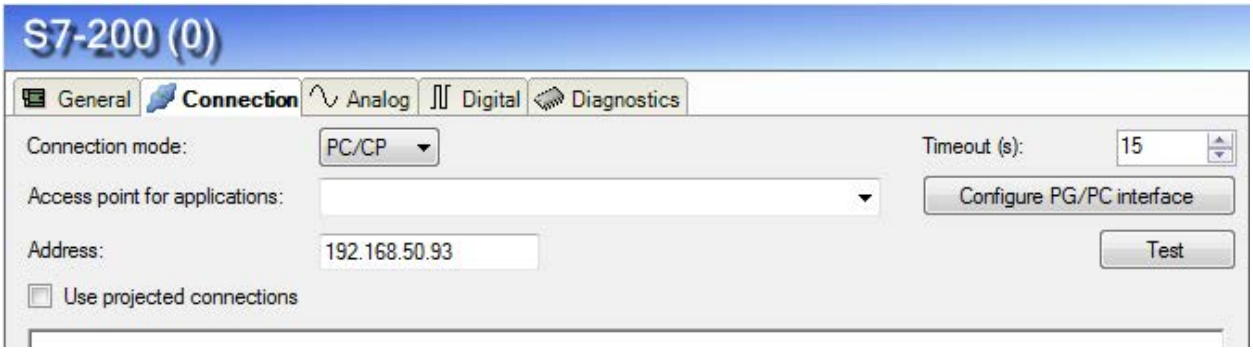


Fig. 36: Connection configuration

Connection mode
Selection of the PC/CP connection mode

Connection type
Selection of the connection type PG, OP or other connections (determines which type of connection resource is occupied on the CPU).

Timeout
Timeout of the connection

Access point for applications
Selection of the access point that is to be used

For tips for creating and configuring an access point, see ↗ *Setting PG/PC interface / defining new access point*, page 85.

Test
Connection test to the CPU and available diagnostic data are issued.

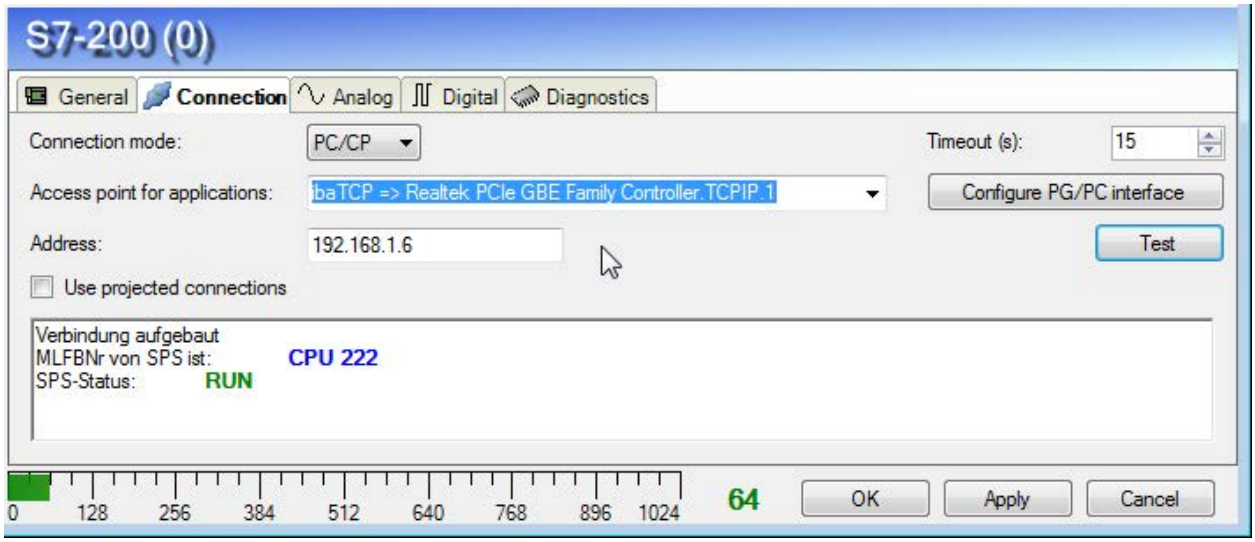


Fig. 37: Connection test

When using projected connections, the following settings have to be made additionally:

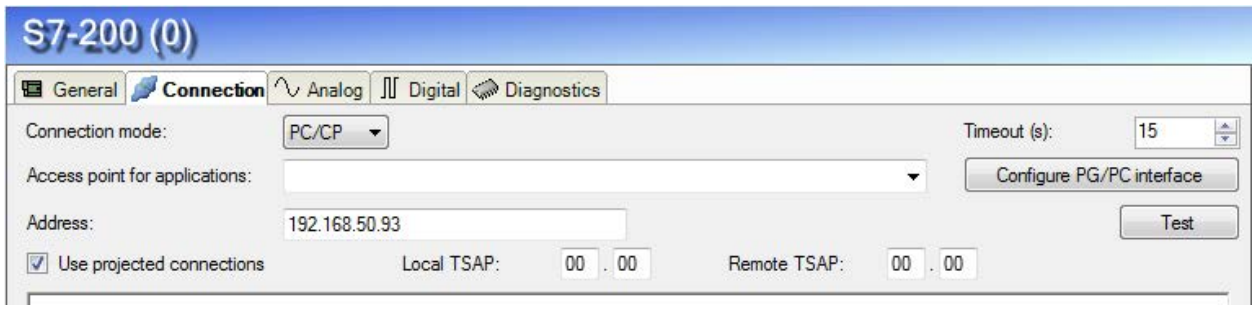


Fig. 38: Connection test projected connection local TSAP / remote TSAP

The values for the local TSAP and remote TSAP can be obtained from the connection engineering in STEP 7-Micro/WIN (see ↗ *S7-200 configuration*, page 14).

3.4.10 Module S5 (LAN adapter)

This module establishes the connection to an AS511 interface of a SIMATIC S5 via the standard network interface of the computer or an additional network interface card. For this purpose, an additional interface converter for converting the signals (from AS511 to TCP/IP) is needed.

It was tested with the following components:

- ACCON-S5-LAN®, Deltalogic
  Article no. 11800

The following controllers, connection modes and selection methods are supported:

Controller	Connection mode and signal selection								
	TCP/IP			PC/CP			TCP/IP S7-1x00		
	ABS	SYM	CFC	ABS	SYM	CFC	ABS	SYM	CFC
S5	X								

Explanation: **ABS**olute address, **SYM**bolic, **CFC**connector

The module does not support any timers, counters or S markers.

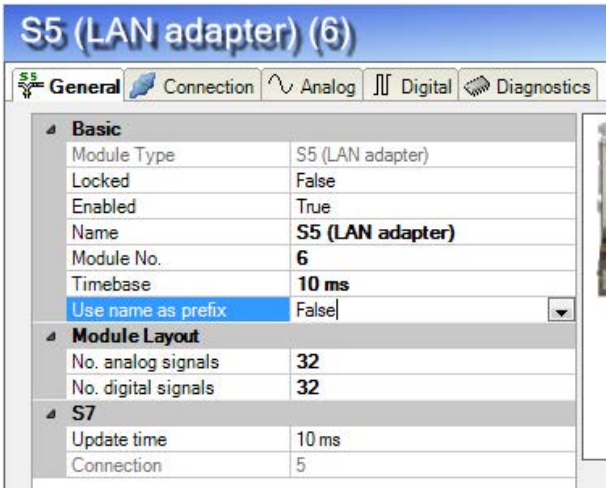
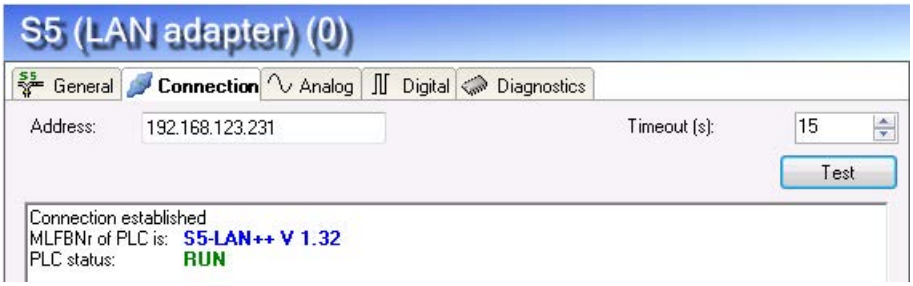


Fig. 39: General module settings S5 (LAN adapter)

For details concerning the module settings see ↗ *General module settings*, page 21

Connection configuration

Enter the IP address of the S5-LAN-adapter on the *Connection* tab in the “Address” field and click <Test>.



Note

As the AS511-interface is operated with only 9600 Baud, the data throughput that can be reached is correspondingly low.

Measured update times with a CPU948:

32 bytes: 220ms

64 bytes: 260ms

96 bytes: 290ms

128 bytes: 330ms

160 bytes: 450ms

Other documentation

For more information about how to use the ACCON-S5-LAN adapter, see the product documentation.

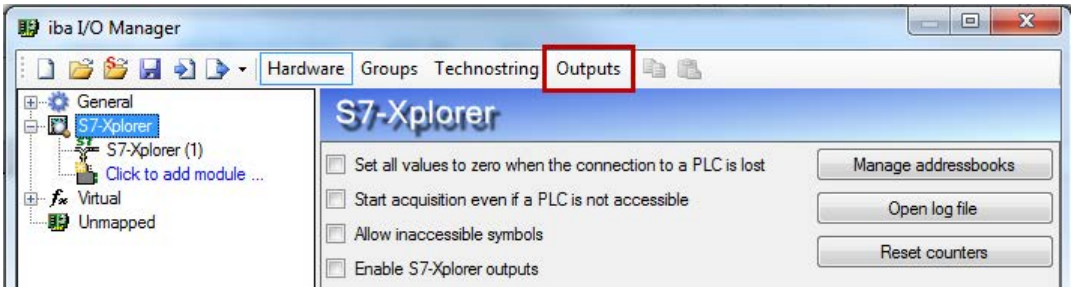
3.4.11 Module outputs

The output module is not an autonomous module, but an extension of the S7-Xplorer module. With the output module, you can write data from *ibaPDA* to a controller.

Note

Depending on the configured protection-level access of the S7 CPU, writing values into the CPU may be not possible.

You can access the configuration of the module by selecting "Outputs" in the toolbar. You do not have to add it separately. The module will be available as soon as a S7-Xplorer module has been added.



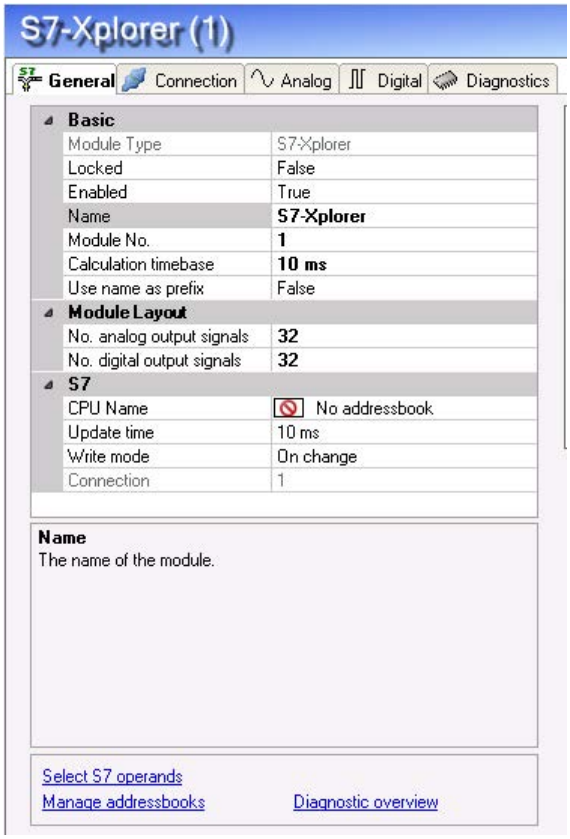


Fig. 40: General module settings

For details concerning the module settings
see ↗ *General module settings*, page 21

Except from the module-specific settings, the settings correspond to the settings in the "Hardware" view. The user can define the settings in the "Hardware" view. The connection settings also correspond to those in the "Hardware" view.

Module-specific settings

No. of analog signals/ No. of digital signals
Defines the number of configurable analog/digital signals in the signal tables. The default setting is 32. You can change the number. Maximum value is 1000.

Write mode
Determines when new data are written on the controller.

- Cyclic: Data are written in the update cycle clock-synchronously.
- On change: Data are written every time the signal data are changed
- On trigger: Data are written with every rising edge of the trigger signal

Always all signals of a module are written, independently of the writing mode.

Write trigger
The signal values are written to the PLC with the rising edge of the digital signal. You can only see this field if you have selected the "On trigger" write mode.

The analog and digital signals, that are to be outputs, are configured in the expression builder. The expression builder can be opened by the <fx> button from each signal row.

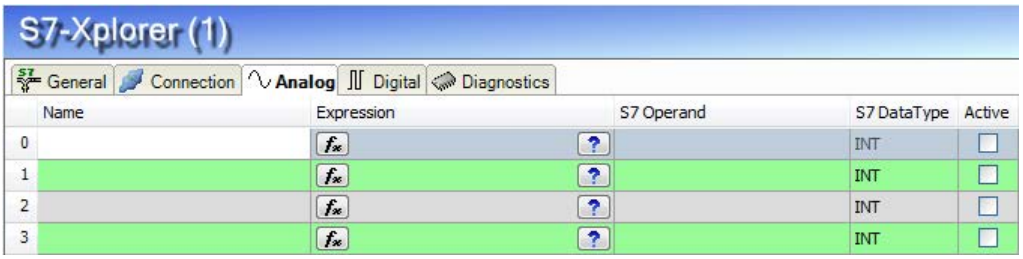


Fig. 41: Analog signals

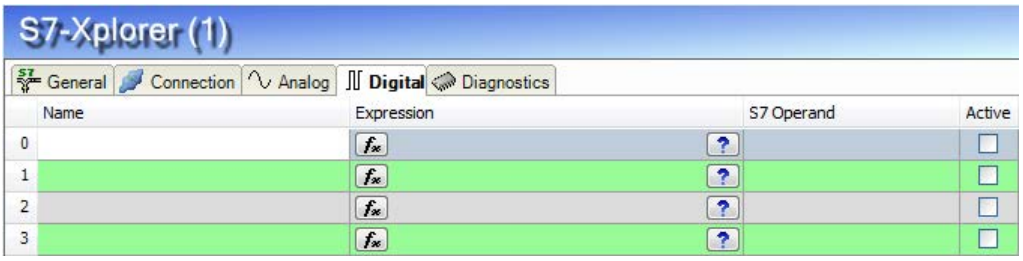


Fig. 42: Digital signals

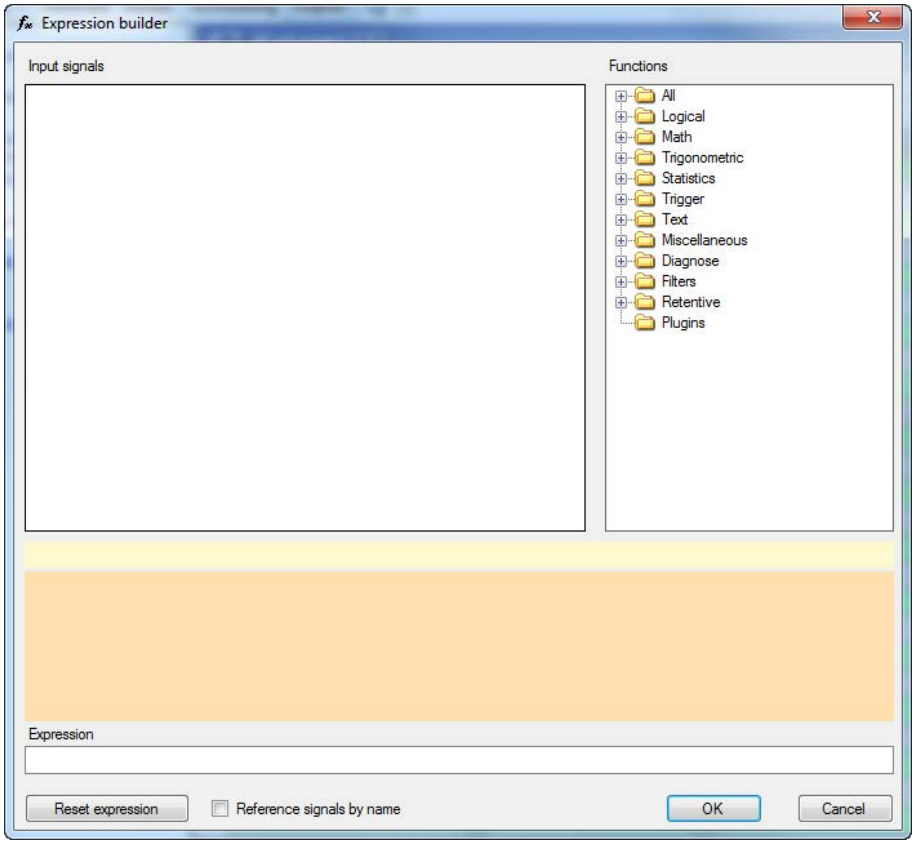


Fig. 43: Expression builder

Other documentation

For more information about how to use the expression builder, see the *ibaPDA* manual.

Note

All signals of an S7-Xplorer module are read and written via a common connection. Therefore, the total number of configured signals has influence on the update time.

3.4.12 Module S7-Xplorer diagnostics

With the S7-Xplorer diagnostics module, the user can record connection-related diagnostic data. Basically, these data are the values displayed in the connection table (see ↗ *Connection table*, page 70)

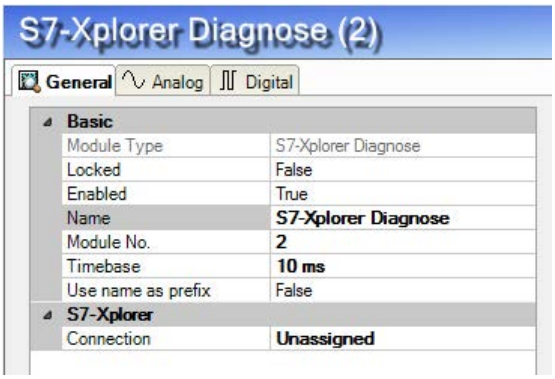


Fig. 44: Module diagnostics - general values

For details concerning the module settings
see ↗ *General module settings*, page 21

Module-specific settings

Connection
Selection of the module that is to be diagnosed

The available signals are preset in the signal tables. More signals are not available.

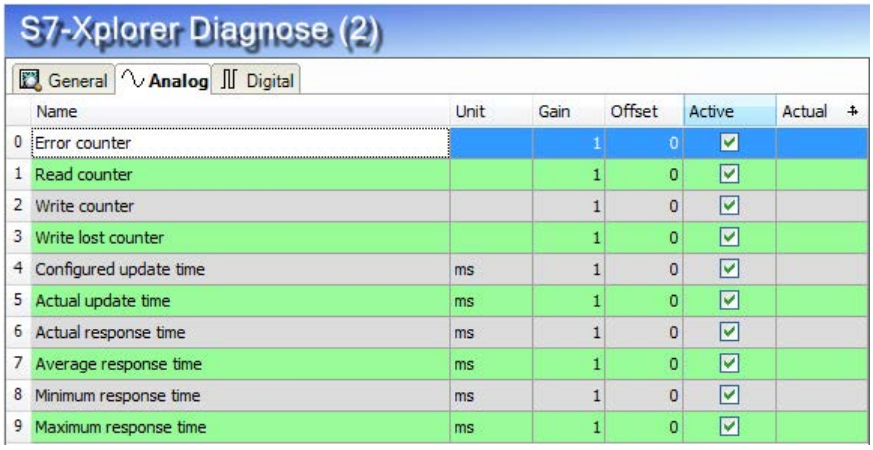


Fig. 45: Module diagnostics, analog values

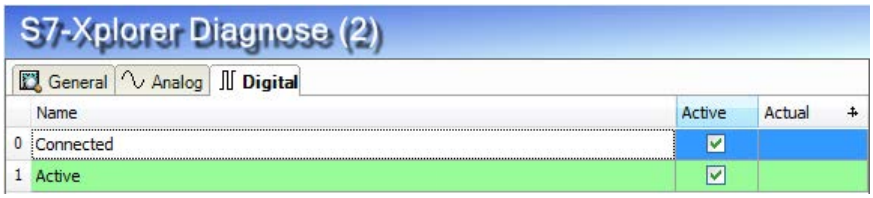


Fig. 46: Module diagnostics, digital values

3.4.13 Module diagnostics

In the *Diagnostics* tab, all configured operands are listed in a table with their data type and actual value.

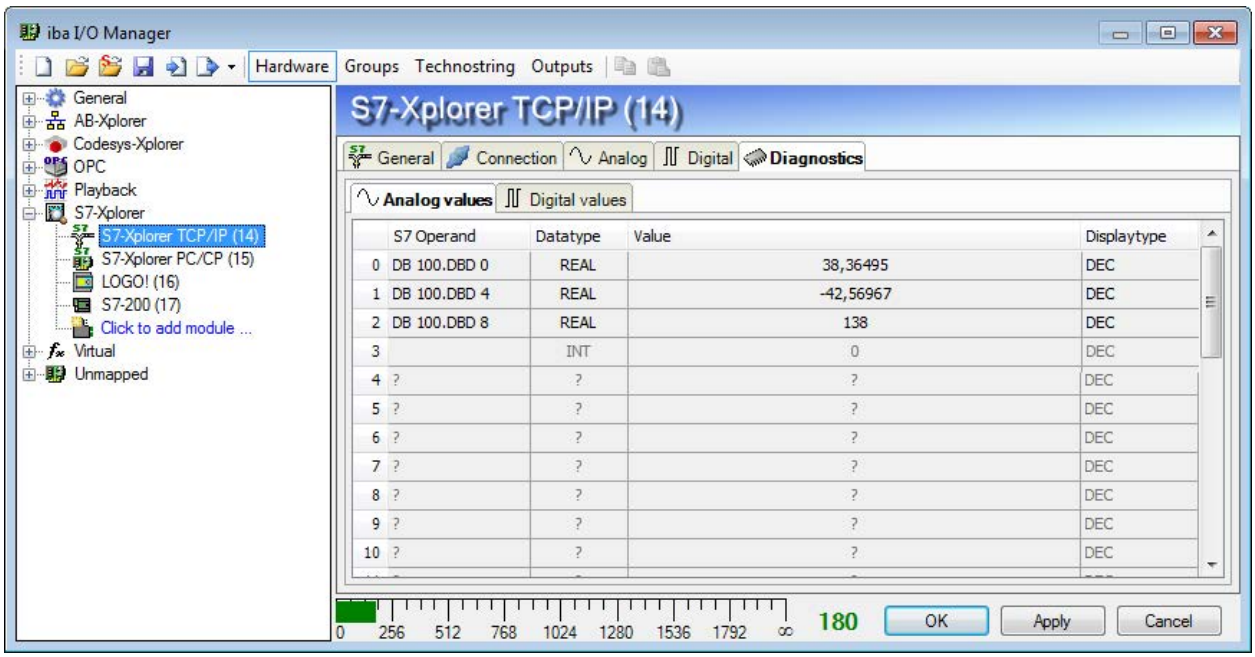


Fig. 47: Module diagnostics, analog values

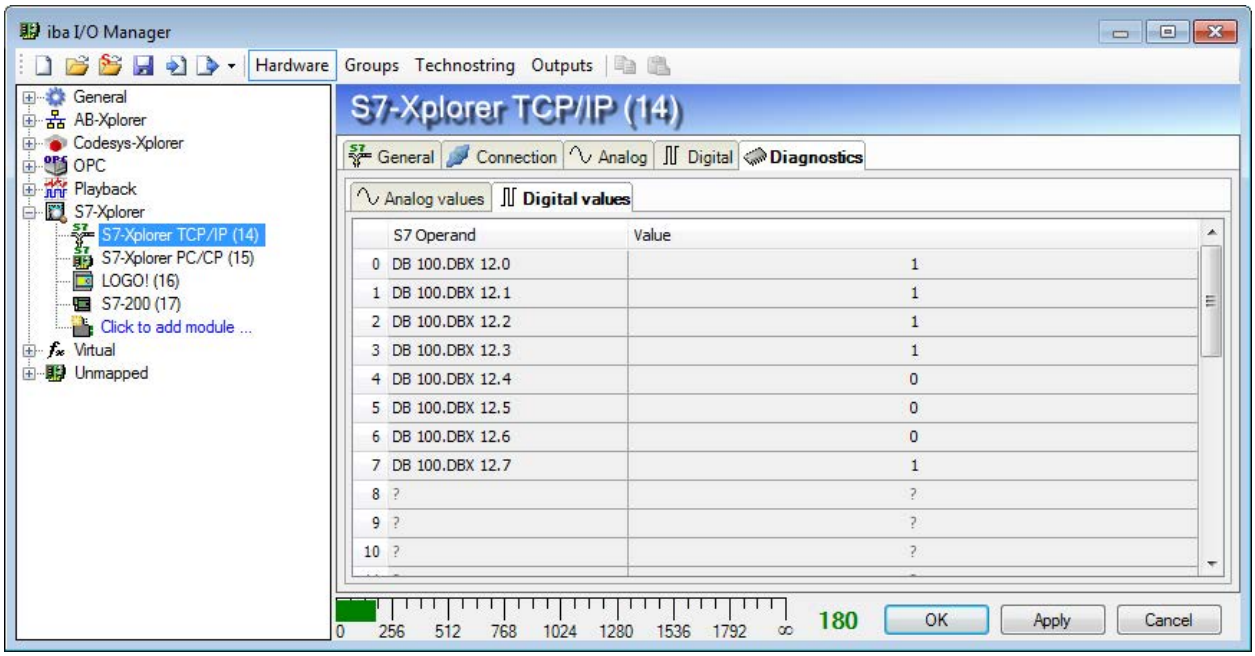


Fig. 48: Module diagnostics, digital values

3.4.14 Address books

The address books for SIMATIC S7 controllers are created and managed across modules. One address book can be used in more than one module.

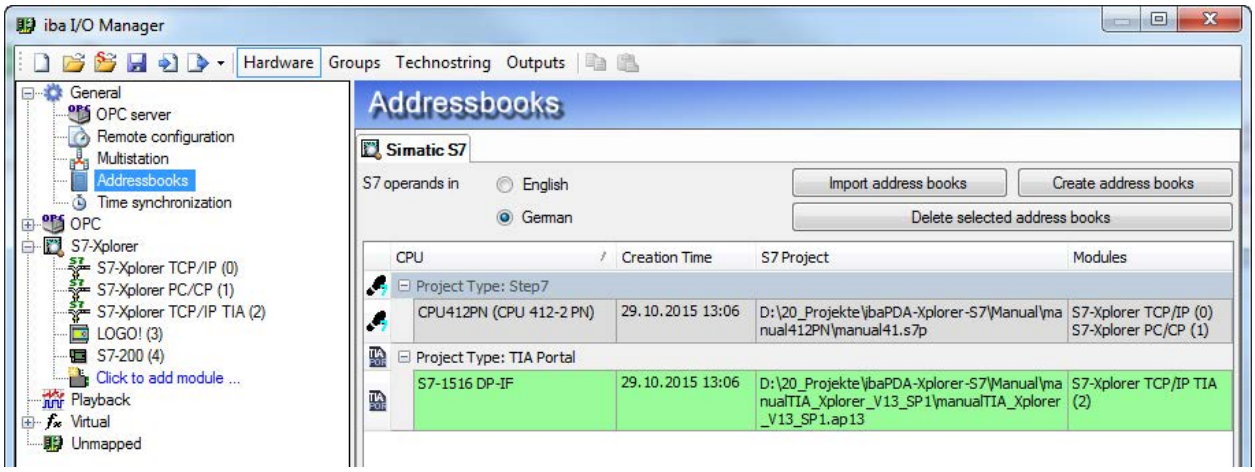


Fig. 49: S7 address book

There are different types of address books for the different S7 project types:

- STEP 7: SIMATIC Manager project
  (not for S7-Xplorer modules with connection mode TCP/IP S7-1x00)
- TIA Portal: TIA Portal Project

S7 operands in English / German
Selection of the signal mnemonics

Import address books
Import of address books which have already been created

Create address books
Creates new address books from STEP 7 projects

Delete selected address books
Deletes address books from a table

Table
List of all address books that are currently available in the system with name, creation data, path of the STEP 7 project or IP address of the CPU in case of online generated address books and location where the address book is used.

Creating an address book

An S7 address book can either be created offline from an S7 project (both STEP 7 CLASSIC and TIA-Portal) or online directly from a CPU (S7-1200 / 1500 only).

Offline from S7 project

For creating an address book, the S7 project has to be available. For the subsequent use, this is not necessary.

Open the S7 address book generator with the <Create address books> button. Optionally, you can also open it under "S7 - CPU Name" on the *General* tab in the module configuration. Select "Create addressbook..." in the dropdown menu.

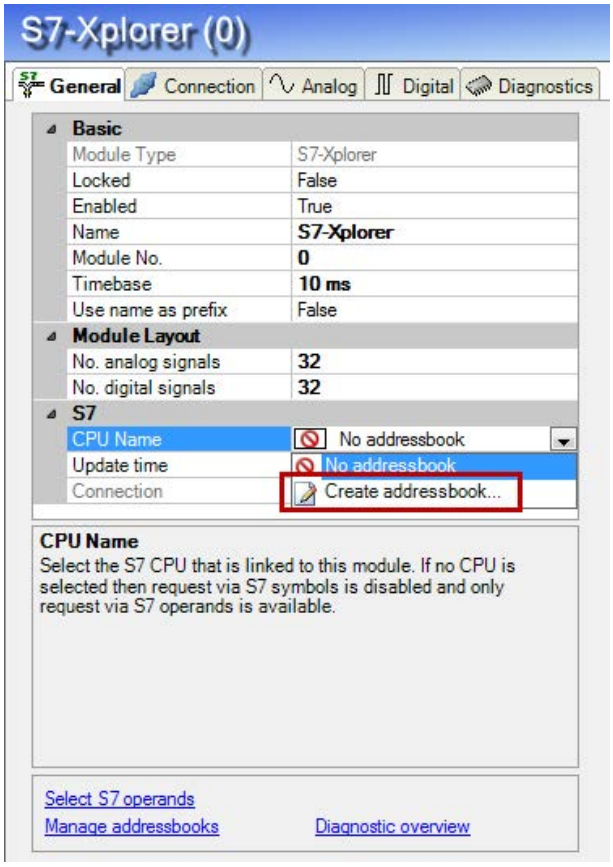
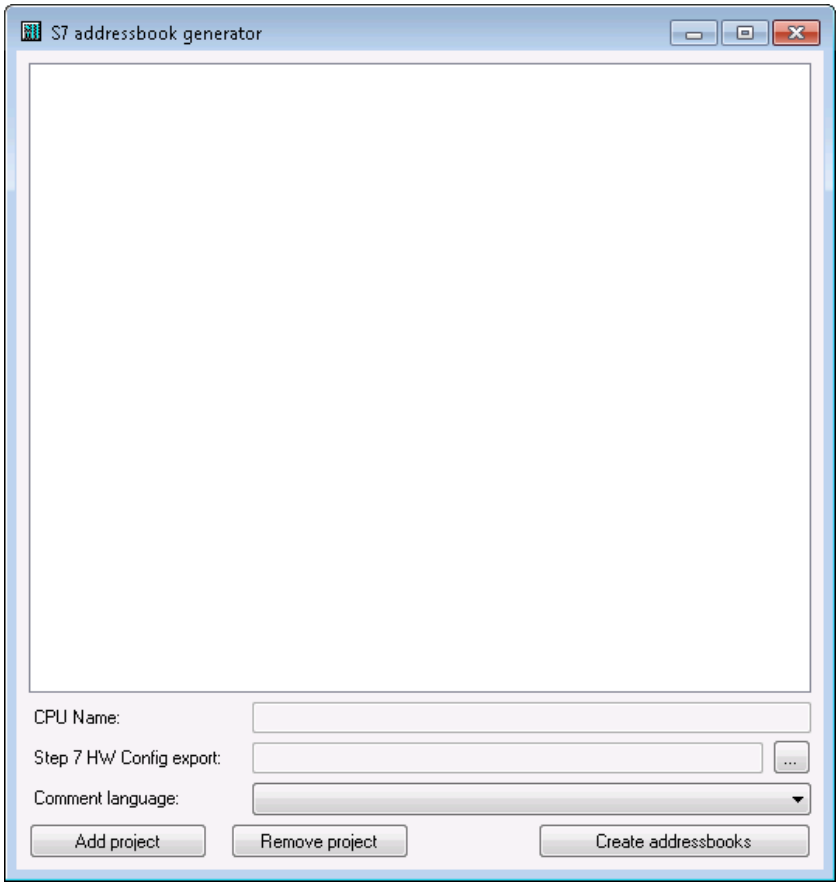


Fig. 50: Create S7 address book from module configuration

Procedure in the S7 address book generator:

- Click on the <Add project> button



CPU Name:
Name of the CPU

Step 7 HW Config export:
A HW config export file can be selected as an option (useful when using an iba bus monitor in sniffer mode)

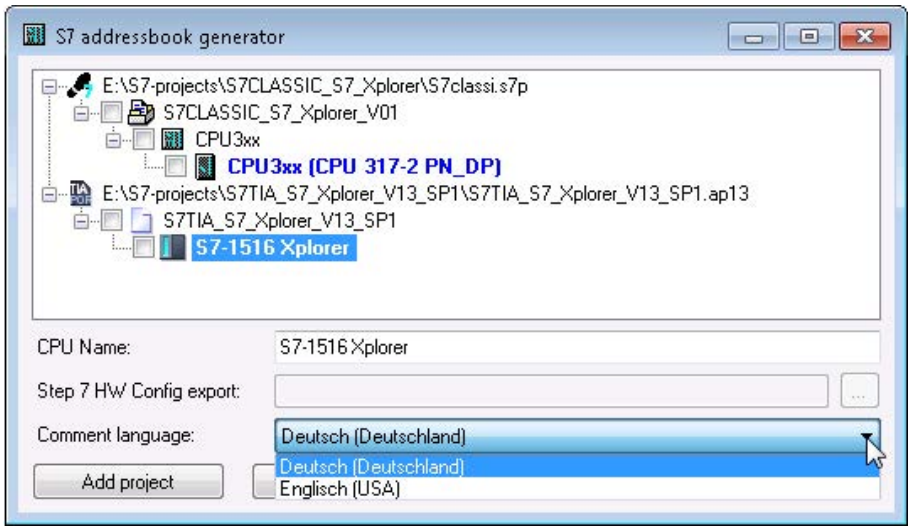
Comment language:
Selection of the language that is to be imported for comment texts (only available for SIMATIC TIA portal projects)

Add project
Adds a new project to the list

Remove project
Removes the marked project from the list

Create address books
Creates address books from the selected projects

- Select a project file in the file browser
- Now, the STEP 7 project with all configured CPUs is displayed. Mark the CPUs you want to create the address books from and click on the button <Create addressbooks>.



Note

The entry in the "CPU Name" field can be overwritten. Thus, you can assign a unique name for the CPU that differs from that in the STEP 7 project. This is especially interesting, when you use several STEP 7 projects in which the CPUs have the same name.

Note

To create address books from TIA Portal Projects, they have to be translated, stored and closed.

Online from S7-1200 / 1500 CPU

Online address books can be created out of an S7-1200 or S7-1500 CPU if connection mode TCP/IP S7-1x00 has been selected. The address data are read directly from the CPU. Accessing the S7 project is not necessary.

Click on button <Load addressbook from S7> to load the address book.

The CPU name of the address book will be given automatically.

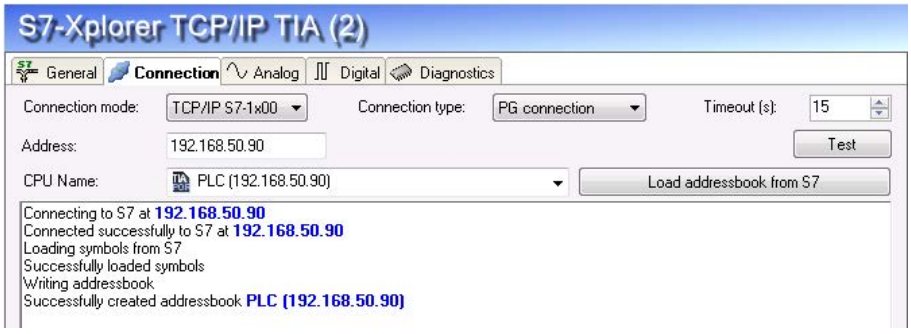


Fig. 51: Load address book online from CPU

Address books which have been created online do also contain operand type address information and hence can be used in connection mode TCP/IP as well. Just change the connection mode after creation of the address book.

3.4.15 Specific features

Please take into account the following specific features:

3.4.15.1 Connection with SIMATIC WinAC (WinLC RTX)

For using *ibaPDA-Interface-S7-Xplorer* with a Soft-PLC SIMATIC WinAC RTX, the following items have to be observed:

- Operating *ibaPDA* and WinAC RTX on the same computer is generally permitted.
- Not permitted is using iba interface boards (e.g. *ibaFOB* or *ibaCom-L2B*) on a WinLC RTX system. Here, high loads of the PCI bus from both sides might lead to instabilities.
- When using the module *S7-Xplorer TCP/IP*, the value 0 must always be entered in the “Rack” and “Slot” field in the I/O Manager.
- When using the module *S7-Xplorer PC/CP*, the MPI or Profibus address must be entered in the “Address” field, the value 0 must always be entered in the “Rack” and “Slot” field in the I/O Manager.

3.4.15.2 Connection with S7-PLCSIM

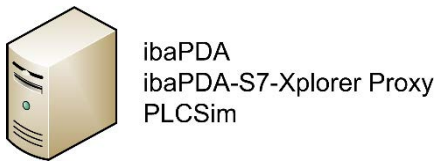
The *ibaPDA-Interface-S7-Xplorer* can also be used with a CPU simulated by SIMATIC S7-PLCSIM. This requires the use of the *ibaPDA-S7-Xplorer Proxy*. This proxy acts as data gateway between *ibaPDA* and SIMATIC S7-PLCSIM.

Prerequisites

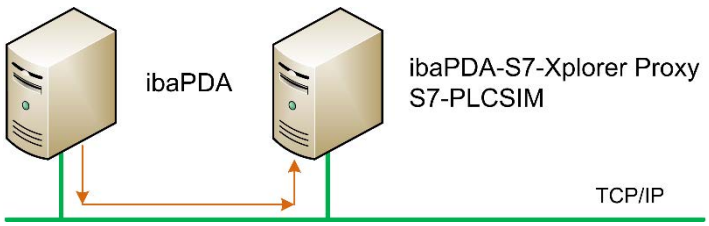
- S7-PLCSIM version 5.4.3.0 or higher
- *ibaPDA-S7-Xplorer Proxy*

System topologies

- Single user
  All software components are running on one computer.



- Distributed installation
  ibaPDA is not installed on the computer with S7-PLCSIM and *ibaPDA-S7-Xplorer Proxy*



Access of *ibaPDA* to the proxy takes place via TCP/IP.

For the connection to a CPU simulated with S7-PLCSIM, it is necessary to install and operate the *ibaPDA-S7-Xplorer Proxy* on the same computer. This can be optionally installed when installing *ibaPDA*.

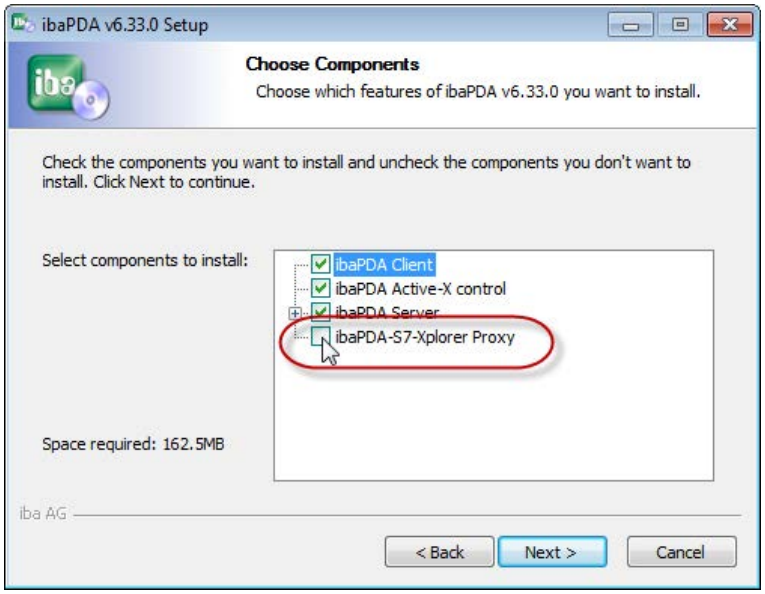


Fig. 52: Installation of ibaPDA-S7-Xplorer Proxy

Select the default setting “Local system account”

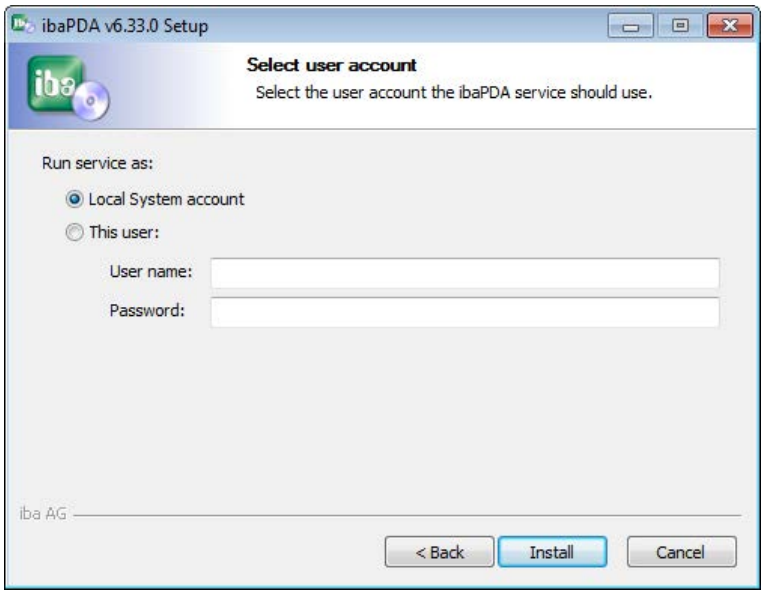


Fig. 53: Selection of user account

The *ibaPDA-S7-Xplorer Proxy* runs as stand-alone application. A configuration interface can be started.

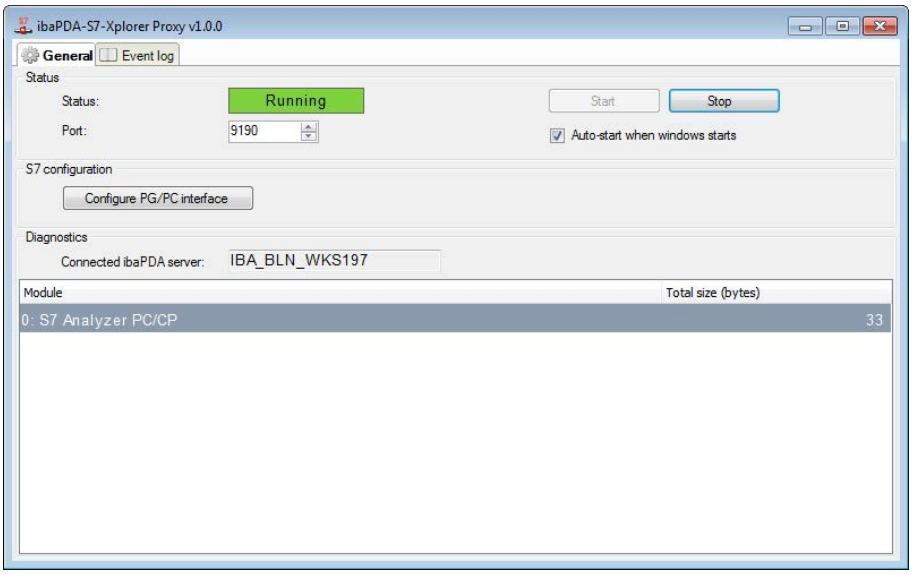


Fig. 54: ibaPDA-S7-Xplorer Proxy status indication

Status
Current operating state

Port
Used port

Start / Stop
Manually starting and stopping the *ibaPDA-S7-Xplorer Proxy*

Auto-start when Windows starts
ibaPDA-S7-Xplorer Proxy is automatically started when starting the system.

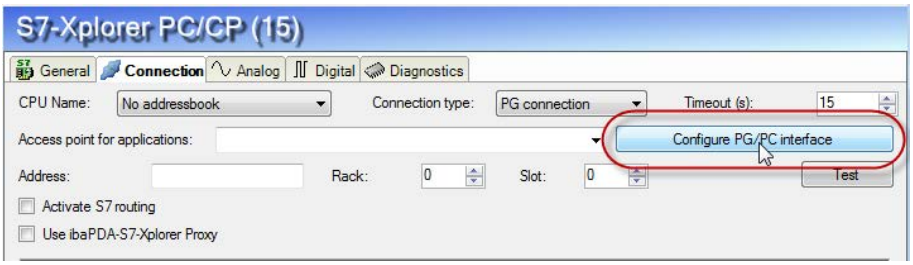
S7 configuration
Starts the configuration dialog to set the SIMATIC PG/PC interface.

Diagnostics
Shows the ibaPDA server currently connected.

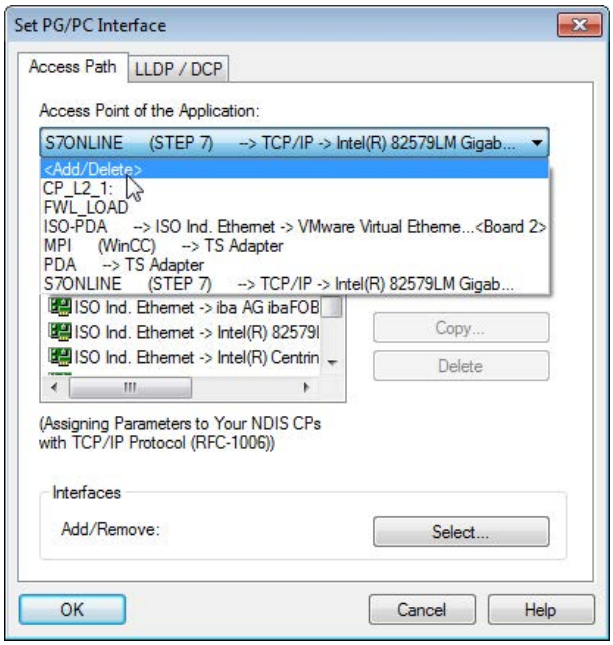
Module
Shows the modules currently active.

Configuration & engineering ibaPDA

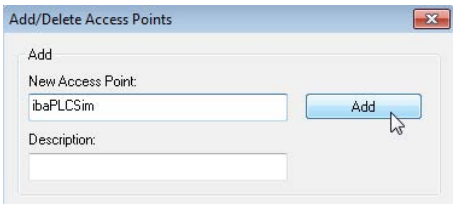
1. We recommend defining a separate "Access point for applications" first. Therefore, click on <Configure PG/PC interface>



2. Open the dropdown list of the access points in this dialog, if any, scroll to the top and click the line “<Add/Remove>”.

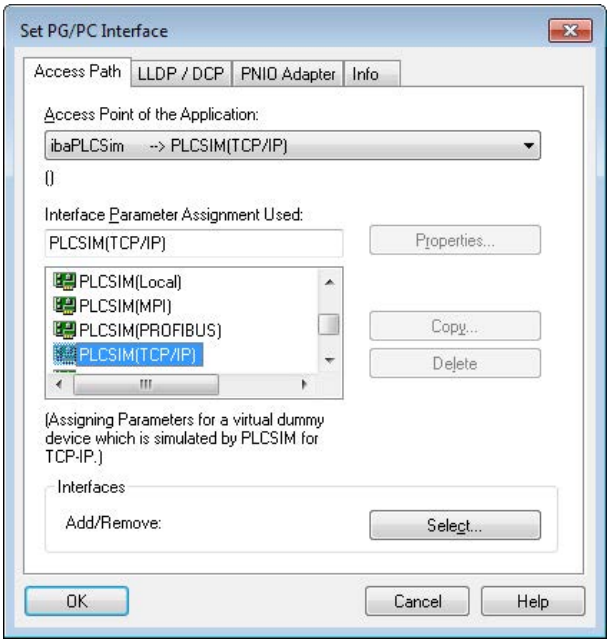


3. Enter the name of the new access point, e.g. “ibaPLCSim”, in the following dialog.

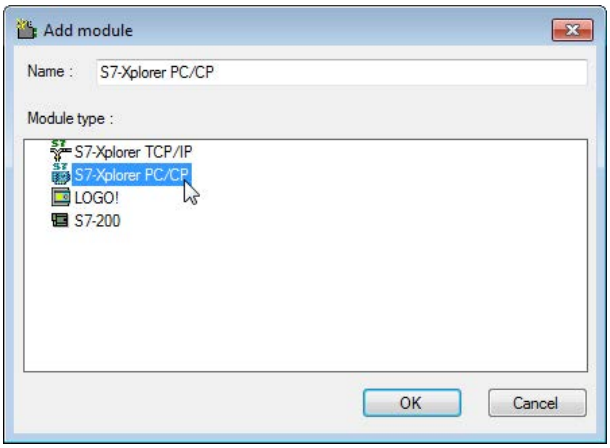


4. Click <Add> and <Exit>.

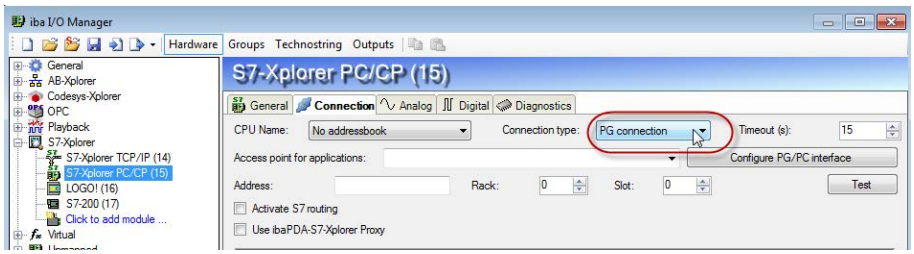
5. Now assign this access point one of the selectable PLCSim interface parameter assignments, e.g. PLCSIM.TCPIP.1, by clicking on the desired interface parameter assignment.



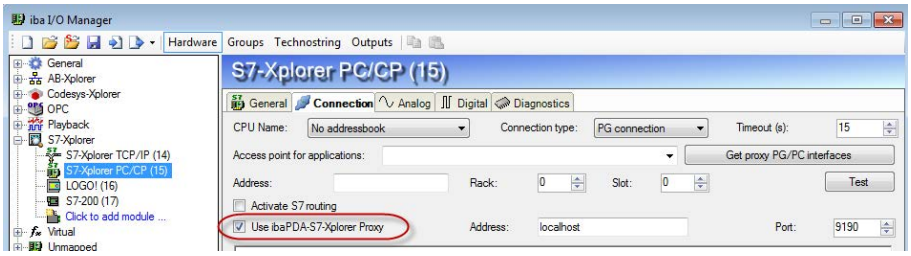
6. Now create an *S7-Xplorer* module of type PC/CP in the I/O Manager of *ibaPDA*.



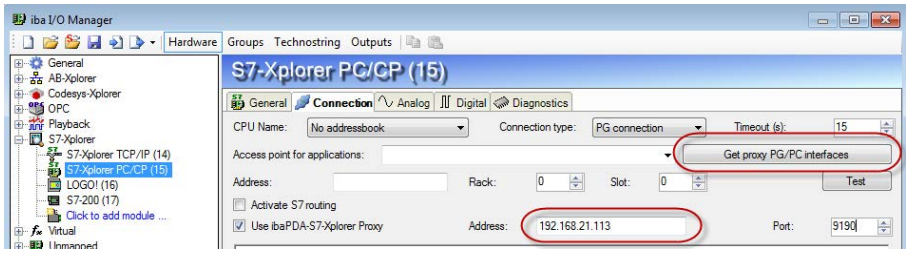
7. Set “PG connection" as connection type.



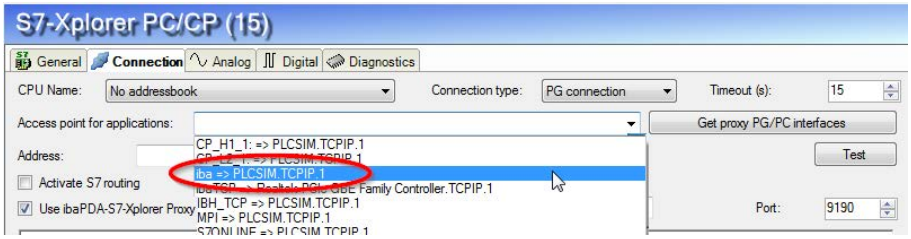
8. Enable the “Use ibaPDA-S7-Xplorer Proxy” option.



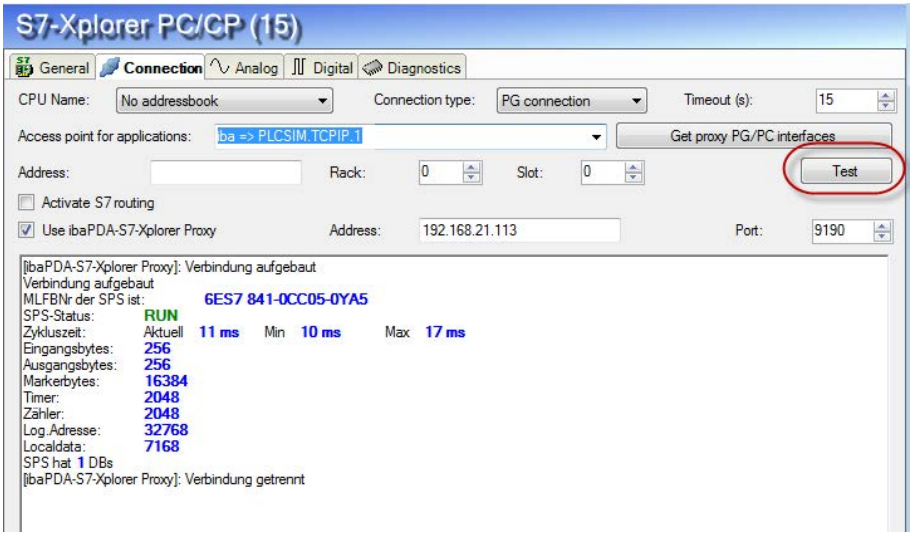
9. If the *ibaPDA-S7-Xplorer Proxy* should run on another computer, adjust the address accordingly and get proxy PG/PC interfaces.



10. Now select the access point set before from the list.



11. Check the connection using <Test>



3.4.15.3 Connection with S7-PLCSIM Advanced

The interface *ibaPDA-Interface-S7-Xplorer* can also be used with a CPU simulated by SIMATIC S7-PLCSIM Advanced. Depending on the selected communication path, it may be necessary to use the ibaPDA-S7-Xplorer Proxy. This acts as a data gateway between *ibaPDA* and SIMATIC S7-PLCSIM Advanced.

SIMATICS S7-PLCSIM Advanced offers two different methods of online access:

- PLCSIM
- PLCSIM Virtual Ethernet Adapter

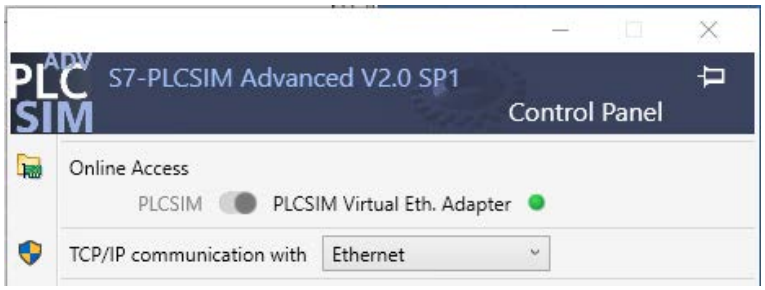


Fig. 55: Methods of online access

When using "PLCSIM" please proceed as described in chapter ↗ *Connection with S7-PLCSIM*, page 60 .

If "PLCSIM Virtual Ethernet Adapter" is used, the connection mode *TCP/IP* and *TCP/IP S7-1x00* can also be used in *ibaPDA*. The use of the ibaPDA-S7-Xplorer Proxy is then not necessary.

In particular, this enables access to "optimized blocks" and online address book generation directly from the CPU.

Other documentation

Further information can be found in the documentation for SIMATIC S7-1500 S7-PLCSIM-Advanced.

https://support.industry.siemens.com/cs/de/en/view/109760835

4 Diagnostics

4.1 License

If the "S7-Xplorer" interface is not displayed in the signal tree, you can either check in *ibaPDA* under *General - Settings - License info* in the I/O manager or in the *ibaPDA* service status application whether your license "Interface S7-Xplorer" has been properly recognized. The number of licensed connections is indicated in brackets.

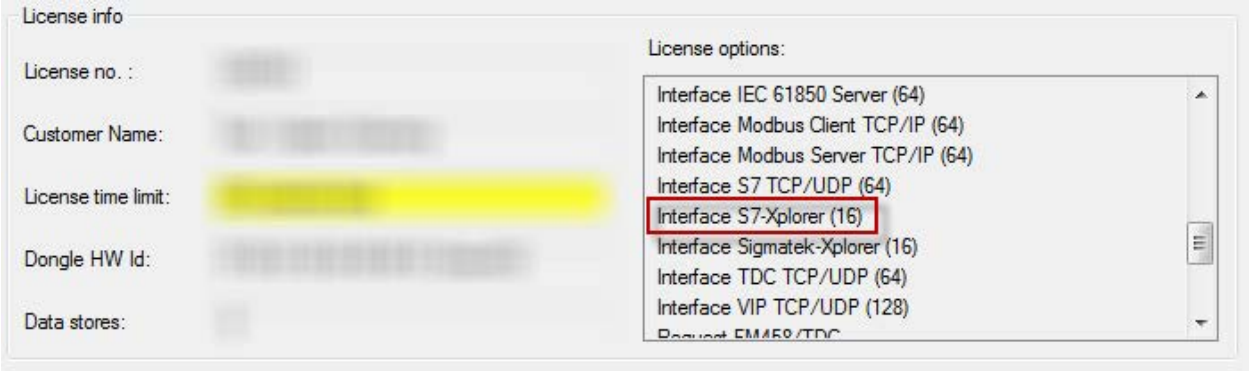


Fig. 56: License displayed in the ibaPDA I/O manager, example of the S7-Xplorer license

Note

The module S7-Xplorer redundant seizes two licensed connections. Please check if the total number of licensed connections is sufficient when using redundant modules, too.

4.2 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.

The log file can be opened 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 will find the log files in the program path of the *ibaPDA* server (...\Programs\iba\ibaPDA\Server\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)

4.3 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.

Open a Windows command prompt.

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

With an existing connection you receive several replies.

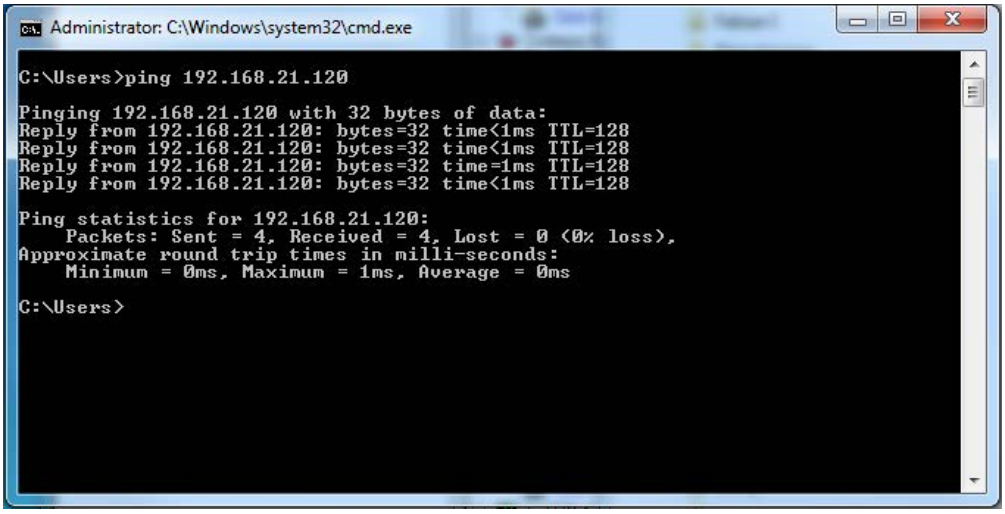


Fig. 57: PING successful

With no existing connection you receive error messages.

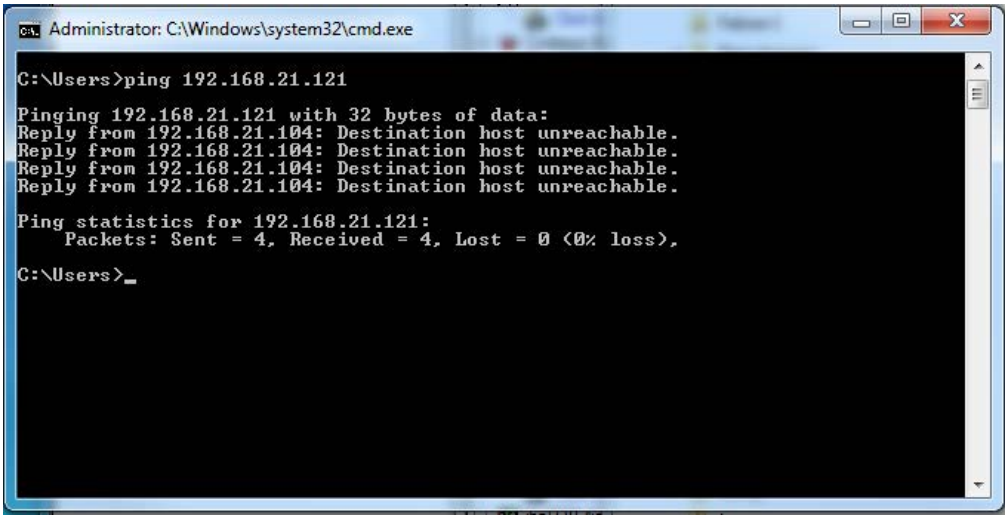


Fig. 58: PING unsuccessful

4.4 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 the connection table for the Codesys Xplorer interface as an example.

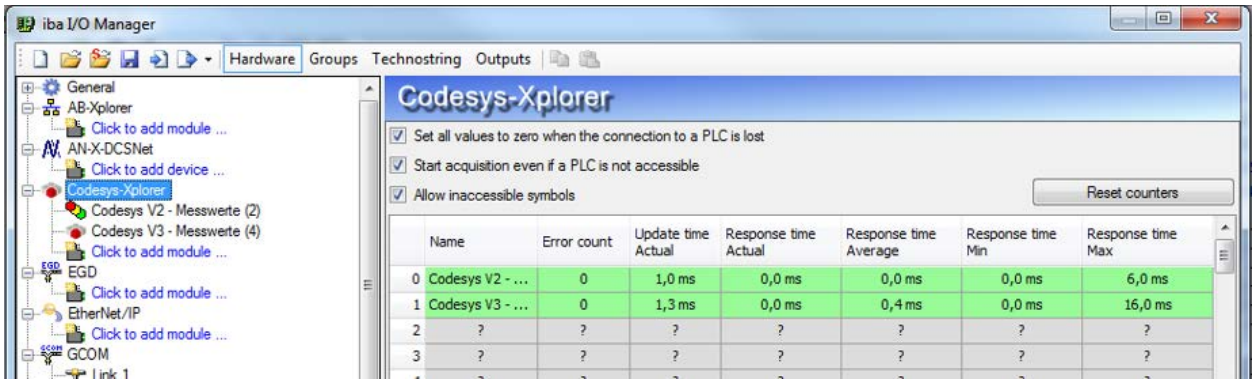


Fig. 59: Connection table, example for Codesys-Xplorer

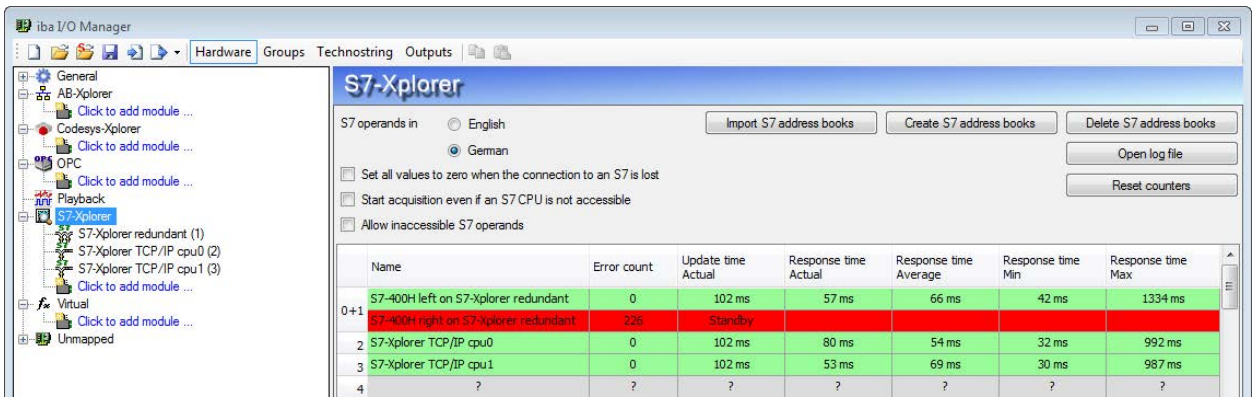
The columns contain different values and information according to the interface type. The connected target systems (controllers) are identified by their name or IP address in the first (left) column.

The table shows the cycle times of the different connections during the data acquisition. 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.
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.

When using the module *S7-Xplorer redundant,* for both connections, a row is displayed. To the connection that is not active, the status "Standby" is assigned and the connection is displayed in red. This is not an error situation, but the normal operating status.



4.5 Module diagnostics

You will find another diagnostic aid with a tabular display of the actual analog and digital values and the data types on the *Diagnostics* tab of each Xplorer module.

For further information see ↗ *Module diagnostics*, page 55

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.

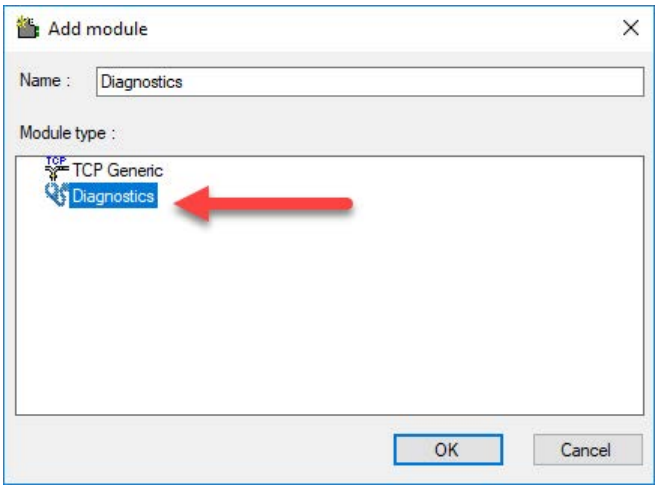


Fig. 60: Add diagnostic module, example Generic TCP

Module settings diagnostic module

For a diagnostic module, you can make the following settings:

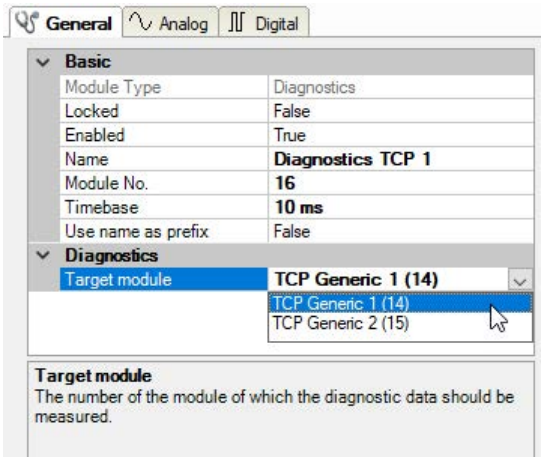


Fig. 61: Module settings diagnostic module, example TCP Generic

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.

General | **Analog** | Digital

	Name	Unit	Gain	Offset	Active	Actual
0	IP address (part 1)		1	0	☑	
1	IP address (part 2)		1	0	☑	
2	IP address (part 3)		1	0	☑	
3	IP address (part 4)		1	0	☑	
4	Port		1	0	☑	
5	Message counter		1	0	☑	
6	Incomplete errors		1	0	☑	
7	Packet size (actual)	bytes	1	0	☑	
8	Packet size (max)	bytes	1	0	☑	
9	Time between data (actual)	ms	1	0	☑	
10	Time between data (min)	ms	1	0	☑	
11	Time between data (max)	ms	1	0	☑	

Fig. 62: Example: Analog values of a diagnostic module for a TCP Generic module

For example, the IP (v4-) address of a TCP Generic 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.

General | Analog | **Digital**

	Name	Active	Actual
0	Active connection mode	☑	
1	Invalid packet	☑	
2	Connecting	☑	
3	Connected	☑	

Fig. 63: Example: Digital values of a diagnostic module for a TCP Generic module

4.7 Connection diagnostics by means of PG/PC interface

By means of the diagnostic function of the PG/PC interface, the functionality and connection configuration can be tested.

For this purpose, open the PG/PC interface.

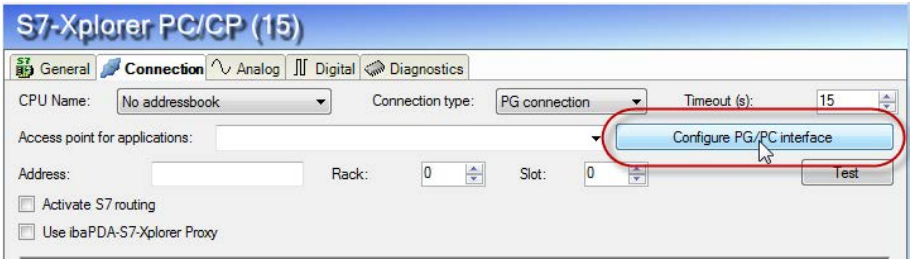


Fig. 64: Open PG/PC interface

Open the diagnostics dialog.

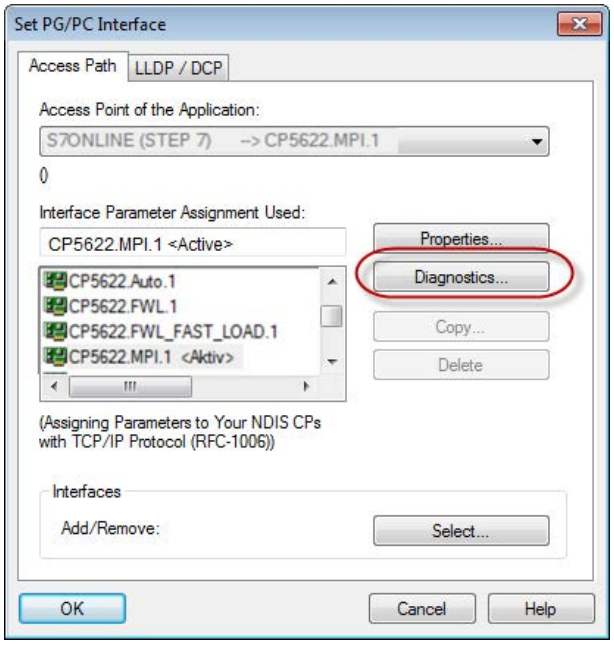


Fig. 65: Open diagnostics

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

By clicking <Test>, a network diagnostics will be started.

By clicking <Read>, an availability check of the bus devices will be started.

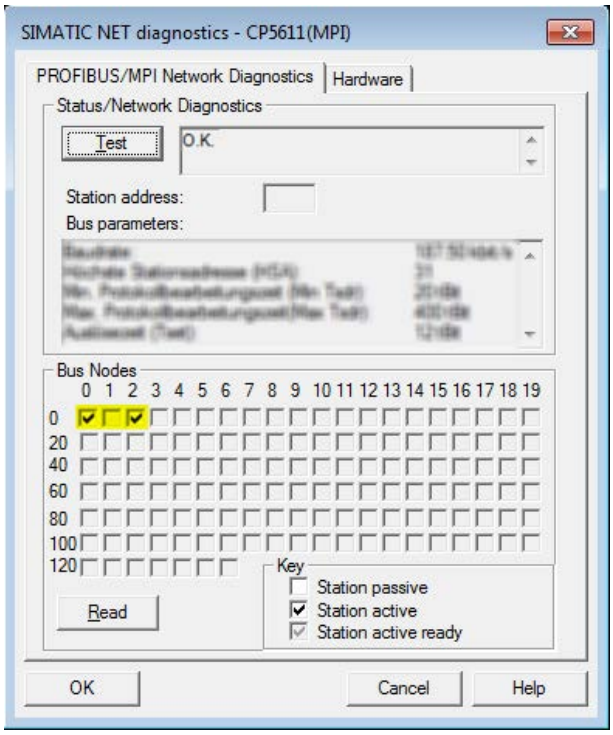


Fig. 66: SIMATIC NET diagnostics

In this example, one active station was found 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
0xFFF00000	Function not implemented	
0xFFF00001	Parameter error when calling a function	False format of IP address
0xFFF00002	Invalid device number	
0xFFF00003	Invalid PLC number	
0xFFF00004	Invalid parameter type	
0xFFF00005	Not enough memory	
0xFFF00006	Device already opened	
0xFFF00007	Device not opened	
0xFFF00008	Order has already been removed	
0xFFF00009	Invalid order number	
0xFFF0000A	Function is not supported	
0xFFF0000B	Adapter not initialized	
0xFFF0000C	No free connections available	

Error code	Description	Possible cause
0xFFF0000D	Device is not configured and not supported	
0xFFF0000E	Hardware was not found	No connection Adapter not connected Interface not available
0xFFF0000F	Error when reading the parameters	
0xFFF00010	Error when writing the parameters	
0xFFF00011	The demo time has elapsed	
0xFFF00012	False character in the text. Conversion not possible.	
0xFFF00013	Buffer is not long enough.	
0xFFF00014	File was not found	
0xFFF00015	Error when calling the configuration program	
0xFFF00016	Error when dynamically loading the DLL	
0xFFF00017	The file could not be generated	
0xFFF50000	No free order buffer available	
0xFFF50001	Invalid packet	
0xFFF50002	No connection to the PLC	All connections are already assigned
0xFFF50003	The connection has been closed	
0xFFF50004	Timeout	Wrong MPI address False rack number False slot number
0xFFF50005	Invalid context	
0xFFF50006	PLC-memory error	
0xFFF50007	Invalid operating state	
0xFFF50008	Invalid address on the PLC	
0xFFF50009	Invalid mode	
0xFFF5000A	No data available, e.g. DB is missing	
0xFFF5000B	Execution level for OB not available	
0xFFF5000C	Empty block list	
0xFFF5000D	Error in the block size	
0xFFF5000E	Invalid block number	
0xFFF5000F	Protection level of the function not sufficient	
0xFFF50010	Unknown SSL ID (e.g. access to CP instead of PLC)	False slot number

Error code	Description	Possible cause
0xFFF50011	Unknown SZL index (e.g. access to CP instead of PLC)	
0xFFF50012	Information cannot be obtained at the moment	
0xFFF50013	Unknown error message from PLC (please report!)	
0xFFF50014	Hardware failure, e.g. nonexistent peripherals	
0xFFF50015	Object access not allowed	
0xFFF50016	Context is not supported	
0xFFF50017	Type (data type) not supported	
0xFFF50018	Internal error, please report	
0xFFF50019	Error when restarting the PLC	
0xFFF5001A	Error at automatic start-up of the PLC	
0xFFF5001B	End of connection received	
0xFFF5001C	PLC not found	False rack number False slot number
0xFFF5001D	Too many data for this ACCON-AGLink version	
0xFFF5001E	The PLC does not support this function	
0xFFF5001F	The password entered is wrong	
0xFFF50020	The connection has already been legitimized	
0xFFF50021	The connection legitimation has already been canceled	
0xFFF50022	The password is not required, since no password has been configured	
0xFFF50023	At least one variable address is invalid	
0xFFF50024	Specified order does not exist	
0xFFF50025	Impermissible order state	
0xFFF50026	Impermissible cycle time (timebase or multiple thereof impermissible)	
0xFFF50027	No further cyclical reading order can be set up	
0xFFF50028	Function for this order not possible (false state)	
0xFFF50029	Termination of the function due to overload (reading cycle takes longer than the cycle time set)	
0xFFF5002A	No data for this part of the reading cycle has been supplied	

Error code	Description	Possible cause
0xFFF5002B	False time format	
0xFFF5002C	Unknown PI name	
0xFFF5002D	Transfer has been interrupted by NCK	
0xFFF5002E	The response telegram is too big for the PDU size	
0xFFF5002F	No H-CPU found	
0xFFF50030	The data have not changed	
0xFFF30000	Error when reading the device information	
0xFFF30001	Error when reading the bus parameters	
0xFFF30002	Error when writing the bus parameters	
0xFFF30003	No resources available on the device	
0xFFF30004	Invalid device	
0xFFF30005	Adapter was not found	
0xFFF30006	Required device driver has not been found	
0xFFF20000	The desired adapter address already exists	
0xFFF20001	The HSA is invalid (shorter than biggest active node)	
0xFFF20002	The adapter is not in the logical ring	
0xFFF20004	Received packet has wrong contents	
0xFFF20006	Unknown error code of the adapter	
0xFFF20007	Unknown error code of the device driver	
0xFFF20008	The communication adapter has been removed	
0xFFF20009	The modem has been removed	
0xFFF2000A	No directly connected PLC found	
0xFFF20313	Invalid speed at the MPI bus	
0xFFF20314	The address is longer than HSA	
0xFFF20315	The desired adapter address already exists	
0xFFF2031A	No other active bus device found	
0xFFF2031C	The bus is disturbed	
0xFFF2031D	The bus is disturbed	
0xFFF2031E	Automatic bus profile identification does not work, bus parameter telegram is missing	
0xFFF20337	Legitimization for accessing the TS adapter is missing	
0xFFF10000	The COM port is already in use	
0xFFF10001	The modem was not found	
0xFFF10002	The modem did not hang up	
0xFFF10003	The modem did not respond	

Error code	Description	Possible cause
0xFFF10004	Modem error when initializing the basis	
0xFFF10005	Error in Initstring 1	
0xFFF10006	Error in Initstring 2	
0xFFF10007	Error in Initstring 3	
0xFFF10008	Error in Initstring 4	
0xFFF10009	Error in the dial mode specification sequence	
0xFFF1000A	Error in the dial tone specification sequence	
0xFFF1000B	Error in the automatic call acceptance sequence	
0xFFF1000C	The modem has been removed	
0xFFF1000D	No connection could be established	
0xFFF1000E	Login has been rejected. The specified user name is not known.	
0xFFF1000F	Login has been rejected. The password entered is not correct.	
0xFFF10010	Login has been rejected. A callback number has already been configured in the TS adapter.	
0xFFF10011	Error when selecting	
0xFFF80000	Function not allowed	
0xFFF80001	Invalid project handle	
0xFFF80002	Error when opening a project	
0xFFF80003	Error when creating the program instance of the project	
0xFFF80004	Error when closing a project	
0xFFF80005	No or no further program found	
0xFFF80006	Specified program has not been found	
0xFFF80007	One of the parameters is outside the valid range	
0xFFF80008	Scope of functions or runtime has elapsed (demo version)	
0xFFF8000A	No or invalid data indicated	
0xFFF8000B	The selected program does not contain a symbol table	
0xFFF8000C	Symbol table already opened	
0xFFF8000D	No or no further symbol entry found	
0xFFF8000E	Error when reading the symbol dataset	
0xFFF8000F	Symbol not found	
0xFFF80010	Absolute operand not found	

Error code	Description	Possible cause
0xFFF80011	Invalid symbol	
0xFFF80012	Invalid absolute operand	
0xFFF80013	Invalid filter string	
0xFFF80014	The indicated DB is not available	
0xFFF80015	Error when reading the block data of the DB	
0xFFF80016	Error when relocating the block data of the DB	
0xFFF80017	A DB for searching components is already opened	
0xFFF80018	No DB for searching components is opened yet	
0xFFF80019	No or no further component available	
0xFFF8001A	DB component not found	
0xFFF8001B	Invalid DB component	
0xFFF8001C	DB component not suitable	
0xFFF8001E	Invalid constant specification	
0xFFF8001F	Invalid constant size or formatting	
0xFFF80020	Initializing the object types failed	
0xFFF80021	False version of the message configuration	
0xFFF80022	Error when opening the message configuration	
0xFFF80023	Error when exiting the message configuration	
0xFFF80024	No or no further message entries found	
0xFFF80025	No or no further language found	
0xFFF80026	Error when accessing the database	
0xFFF80027	Invalid signal number	
0xFFF80028	Invalid specification of associated value	
0xFFF80029	Invalid number of the associated value	
0xFFF8002A	Invalid element type	
0xFFF8002B	Invalid length of associated value data	
0xFFF8002C	Format not specified	
0xFFF8002D	Invalid format specification	
0xFFF8002E	No or no further text library available	
0xFFF8002F	No or no further text library entry available	

5 Appendix

5.1 Comparison of the cycle times on different access points

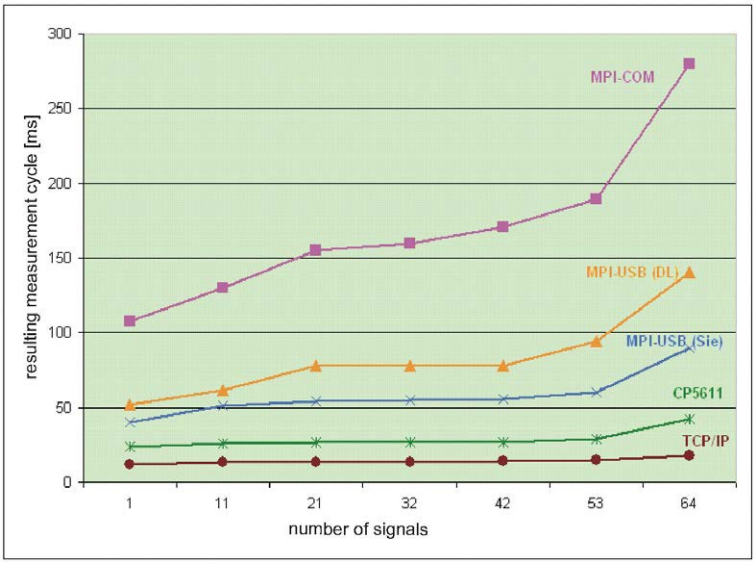
The resulting cycle times of the measurement depending on the different access points of the S7 CPU had been evaluated in a testing environment.

Configuration of the PLC:

- S7-400 CPU 416 2DP
- Cycle OB1: 6 ms to 10 ms
- *ibaPDA* measurement time base: 1 ms

Number of signals	MPI adapter (COM) 38,4 kBd	MPI adapter (USB, DeltaL)38,4 kBd	MPI adapter (USB, Siemens)	CP5611Profibus, 12Mbit/s	TCP/IP	L2B *)
1	108	52	40	24	12	1
11	130	62	51	26	13	1
21	155	78	54	27	13	1
32	160	78	55	27	13	1
42	171	78	56	27	14	1
53	189	94	60	29	15	1
64	280	140	90	42	18	1

*) 1 ms is the *ibaPDA* time base which is supported by iba cards such as ibaCom-L2B-8-8, for example. But the actual measurement cycle, in fact, is depending on the Profibus cycle time (with 2 slaves: 0,98 ms; with 8 slaves: 1,6 ms, provided 12 Mbit/s) and the program cycle (OB1 or OB35)



5.2 Comparison of the cycle times for different S7-CPUs

Using an experimental arrangement, the updating times of the signals on different S7-CPUs and access via TCP/IP were measured.

Configuration of the controllers:

- Cycle OB1: 10 ms
- *ibaPDA* base measurement time base: 1 ms
- Connection mode TCP

There are many different factors that have influence on the measured updating times. A direct transfer to a specific plant configuration is only feasible to a certain extent.

Quantity structure	8A +8D	32A +32D	64A +64D	128A +128D	256A +256D	512A +512D	1000A +1000D
CPU	**Updating time [ms]**						
CPU 314C 6ES7314 6EH04-0AB0 via internal PN-IF	10	10	22	33	55	109	208
CPU 317 6ES7317 2EK14-0AB0 V3.2.10 via internal PN-IF	10	11	22	33	54	109	207
CPU 317 6ES7317 2EK14-0AB0 V3.2.10 via CP343-1 LEAN	33	39	77	124	215	431	825
CPU 412-2PN 6ES7412 3HJ14-0AB0 V6.0.3 via internal PN-IF	2	2	2	4	7	12	21
CPU 412-2PN 6ES7412 3HJ14-0AB0 V6.0.3 via CP443-1	6	6	8	14	22	40	72
WinAC via internal PN-IF	0	0	0	1	1	3	5
CPU1212C 6ES7 212-1BD30-0XB0 V2.0 via internal PN-IF	20	20	39	59	99	197	374
CPU1516 6ES7 516-3AN00-0AB0 V1.0 via internal PN-IF	1	1	1	1	2	4	8

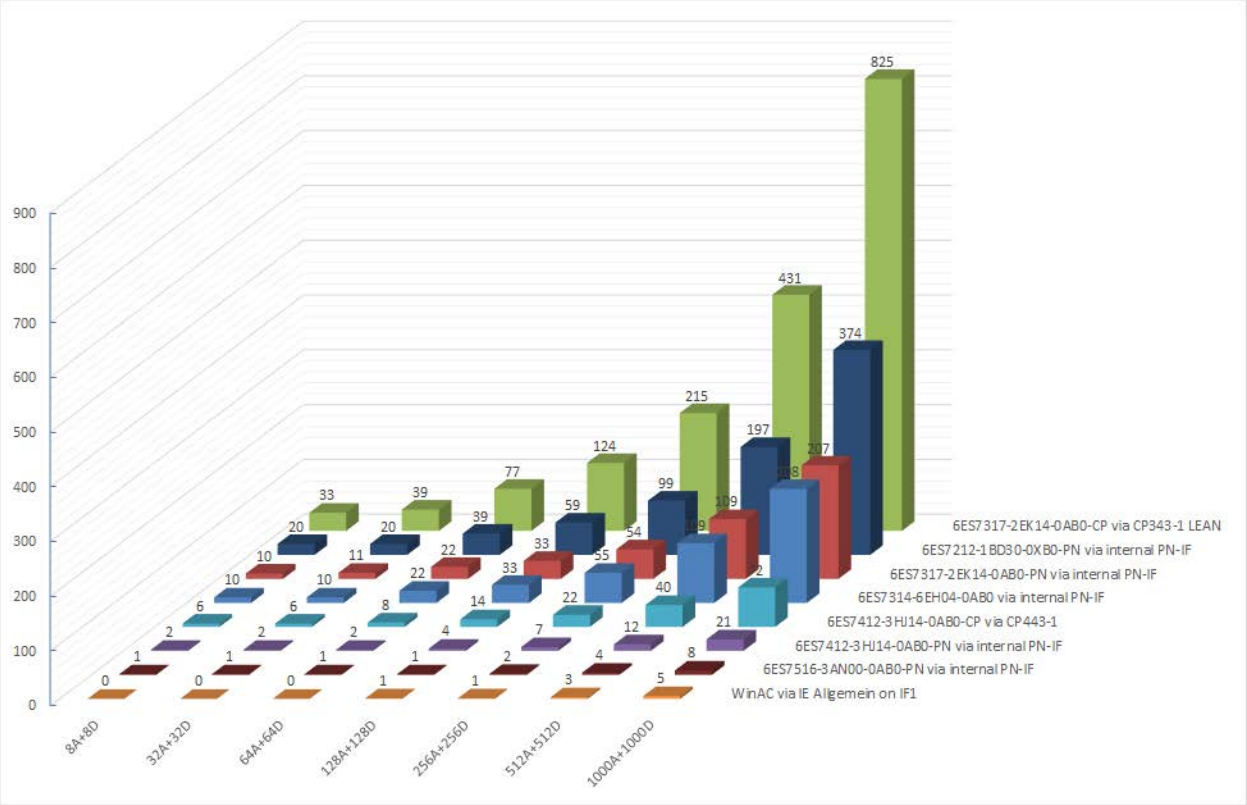


Fig. 67: Comparison of Updating times

5.3 ibaPDA-S7-Xplorer Proxy as PC/CP interface proxy

The *ibaPDA-S7-Xplorer Proxy* can also be used in situations when there is no STEP 7 or SIMATIC Net installed on the *ibaPDA* computer (computer A), but access to the CPU, however, still must be effected via an *S7-Xplorer PC/CP* module.

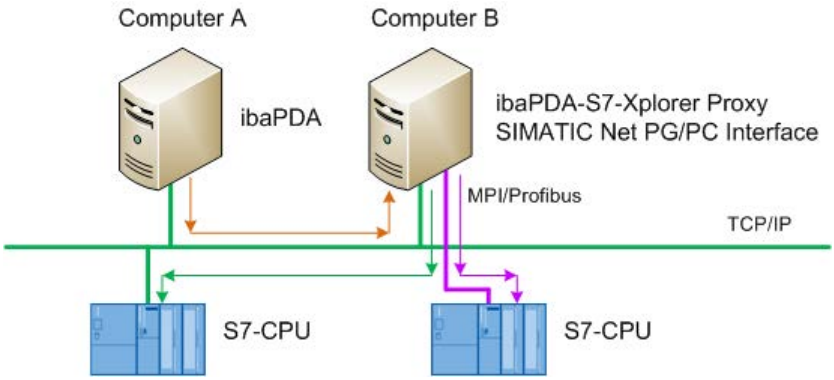


Fig. 68: System topology

For this purpose, the *ibaPDA-S7-Xplorer Proxy* is to be installed and started on the computer with the STEP 7- / SIMATIC NET installation (computer B).

Unlike the configuration with S7-PLCSIM (see chapter ↗ *Connection with S7-PLCSIM*, page 60), a real interface (e.g. the network interface card) is to be set as access point for applications. The access point is to be installed on computer B.

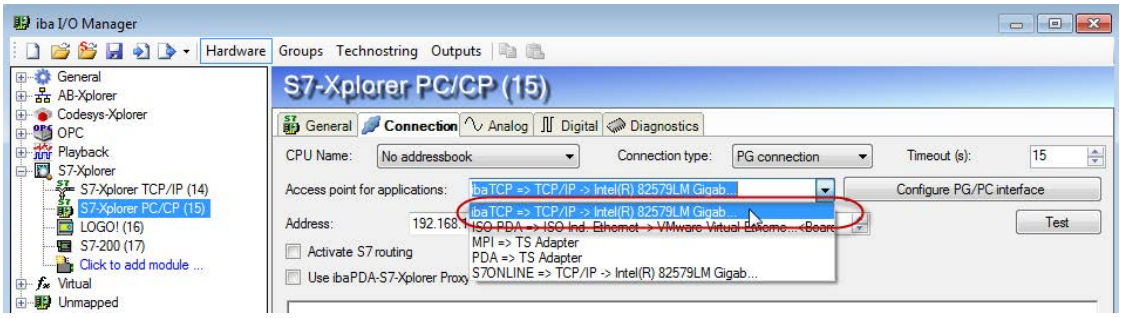


Fig. 69: Selection of access point

S7-CPU can be accessed via all installed access points.

5.4 Setting PG/PC interface / defining new access point

ibaPDA-Interface-S7-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 will be 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, a new access point should be defined.

There is the <Configure PG/PC interface> button in the dialog window of the PC/CP module. It can be used to open the dialog for configuring the PG/PC interface.

The setting for the SIMATIC Manager will also be changed.

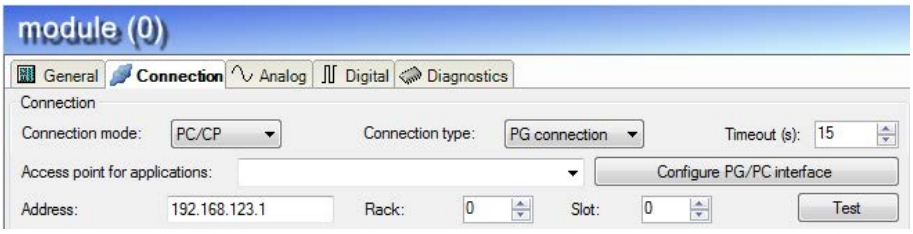
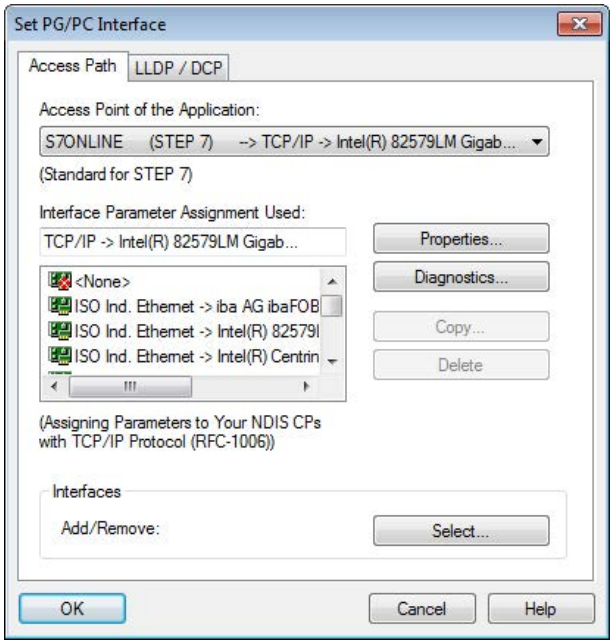


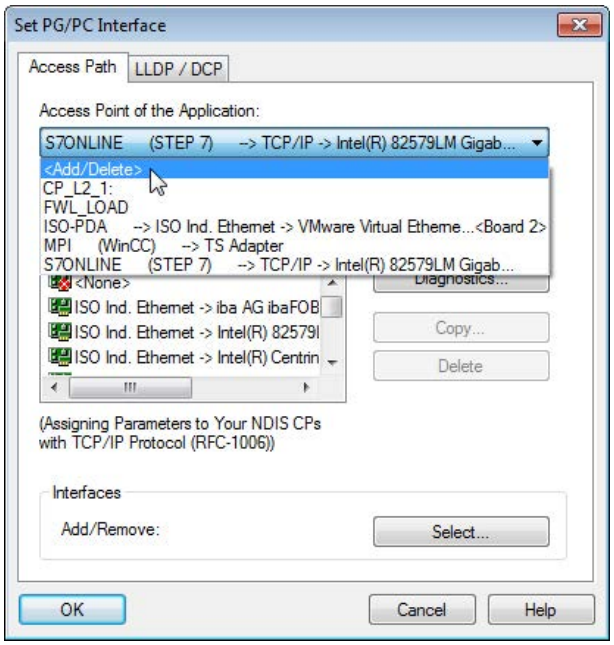
Fig. 70: Configure PG/PC interface

Procedure

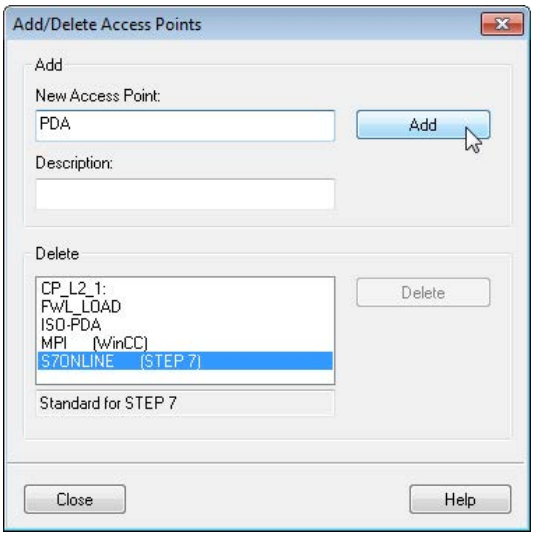
1. Open the dialog box with the <Configure PG/PC interface> button.



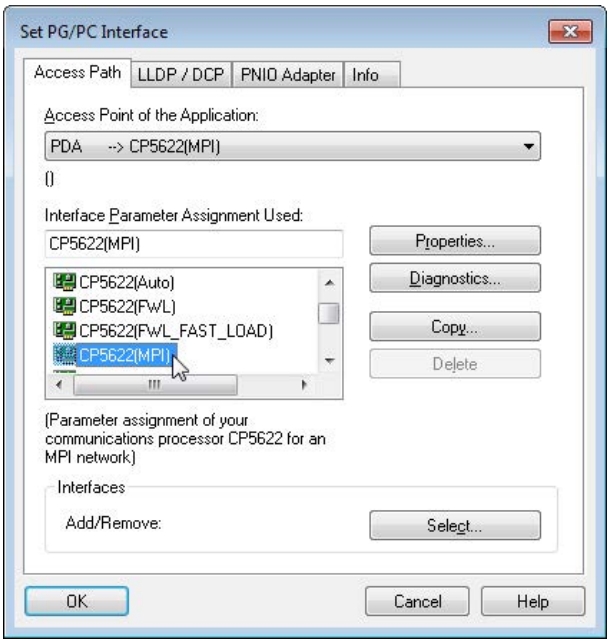
2. Select the row <Add/Delete> under "Access Point of the Application".



3. Define a new access point; enter a name, e.g. PDA and optionally a description for a better understanding, click on <Add> and <Close>.



4. Add an interface to the access point, e.g. "CP5622 (MPI)" and exit with <OK>.



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

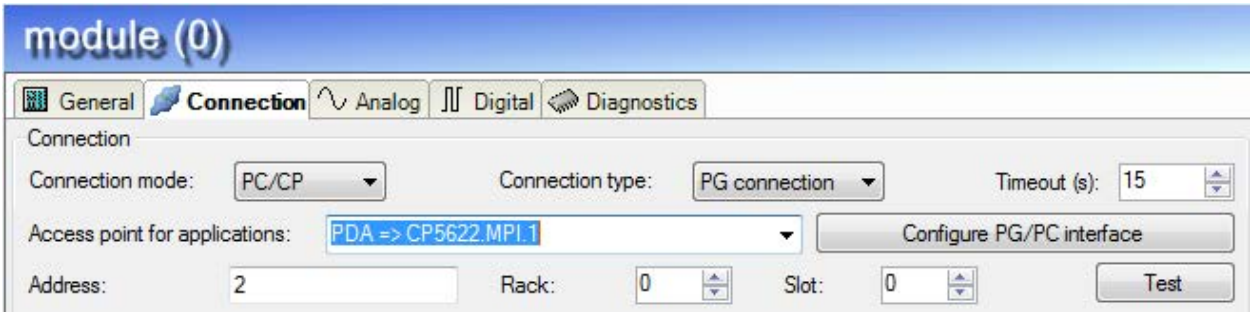


Fig. 71: Set access point

Notes on the different access points

Depending on which access points have been configured in the Engineering PC, 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 and slot number of the CP in the module configuration dialog. If you do not know the rack 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 and slot number. For the rack and slot number, use the <Search> 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 and slot number. You can also use the <Search> button and then click on one of the CPU links found to test the connection.

5.5 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).

5.5.1 Routing from Ethernet to Ethernet

Please do not mix up the “S7 Routing” function with “IP Routing”.

The following constellation will make this clear:

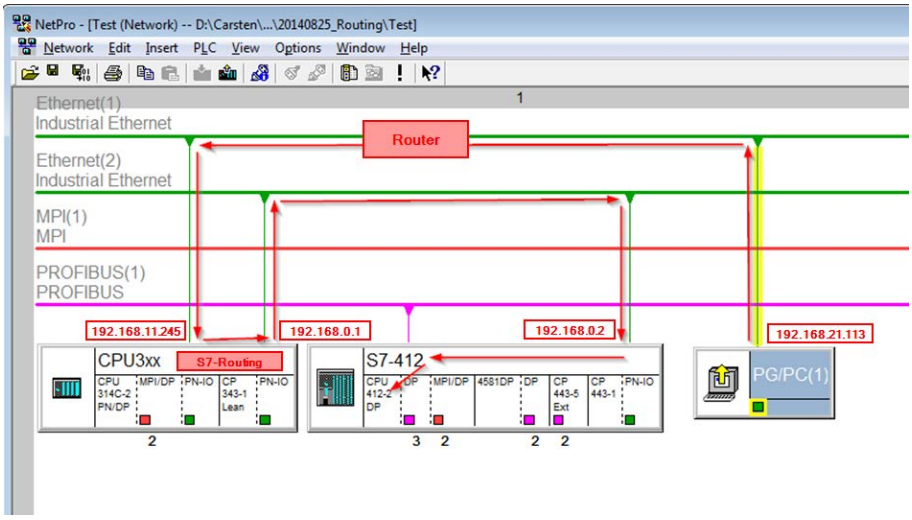


Fig. 72: S7 Routing, example system topology

We want to access the CPU412 controller from the engineering PC (also with *ibaPDA*). The computer and the controller are not directly connected via a common network/bus. We want to run the connection over the CPU314C controller. “Passing” the communication in this controller is called “S7 Routing”.

In our example, engineering PC 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 confounded with it.

5.5.1.1 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. These are not required for using *ibaPDA*.

Inserting a PG/PC station:

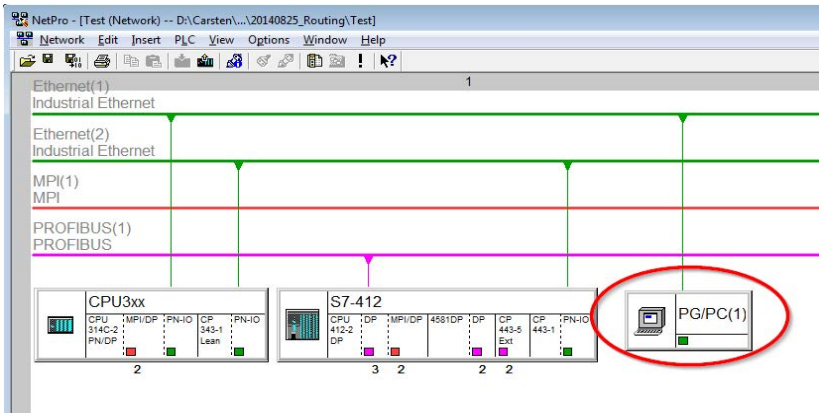


Fig. 73: NetPro configuration

Assigning an interface (network interface card):

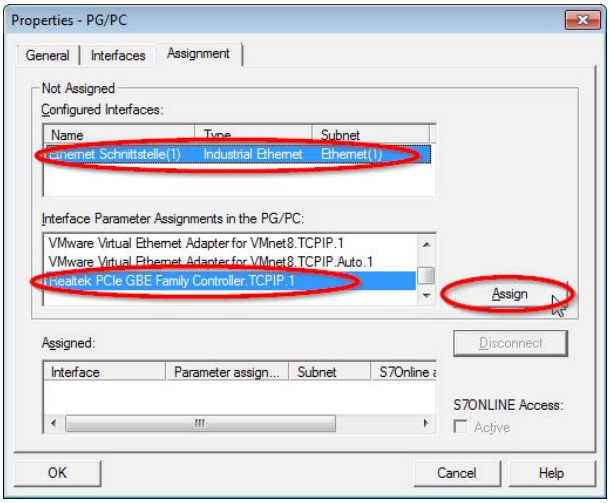


Fig. 74: PG/PC interface assigned

Result:

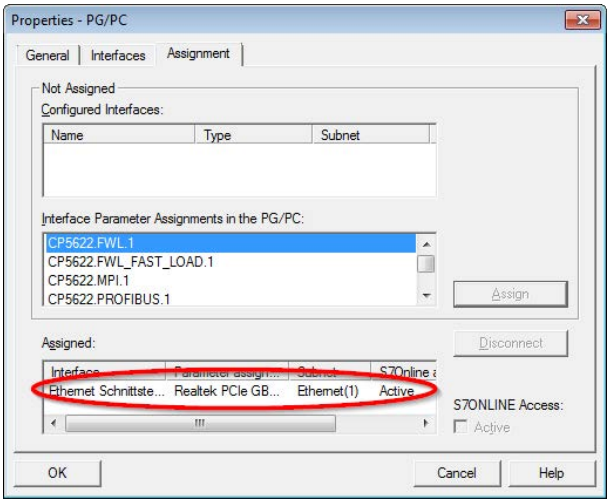


Fig. 75: Interface assigned

The connection line of PG/PC to the network should be highlighted yellow now.

The following figure shows the communication channel using arrows (these are not shown in SIMATIC NetPro).

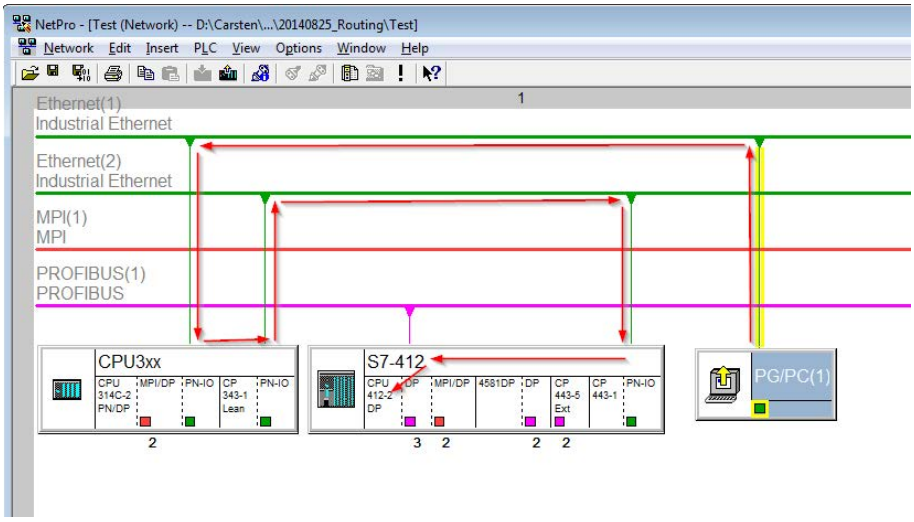


Fig. 76: Communication channel

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

5.5.1.2 ibaPDA configuration

The following entries have to be made:

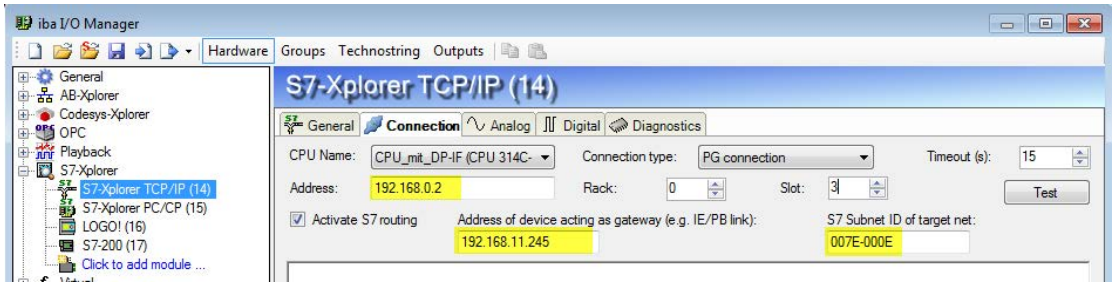


Fig. 77: Enable S7 routing

Activate S7 routing
Enable to use S7 routing

Address
Address of the target control (here CPU412)

Address of device acting as gateway
Enter address of the gateway (here CPU314C)

S7 subnet ID of target net
Enter subnet ID from STEP 7 NetPro

You can identify the S7 subnet ID in NetPro. For doing so, right-click on the secondary bus system and open the “Properties”.

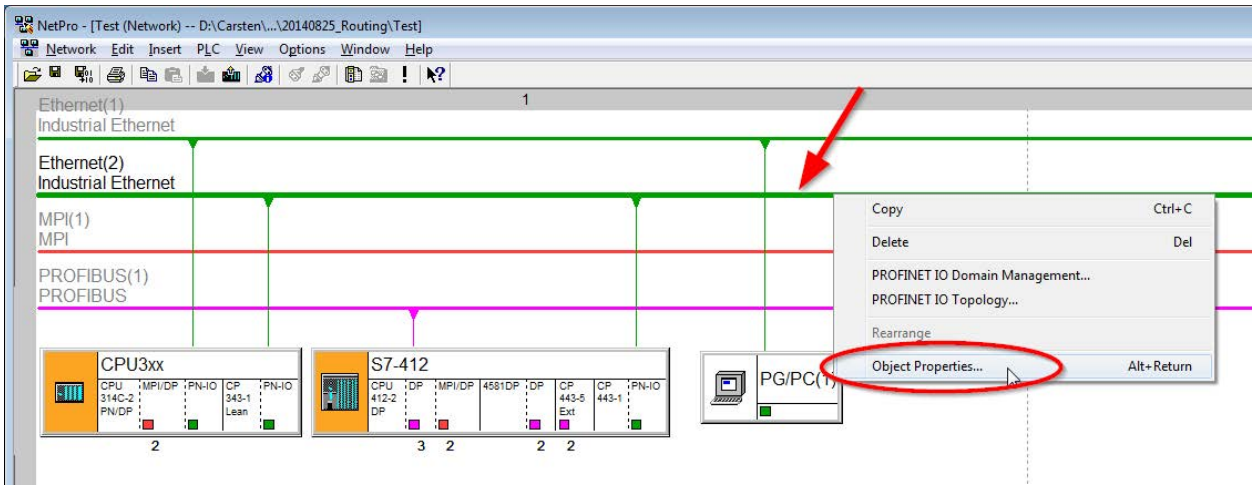


Fig. 78: Determine S7 subnet ID

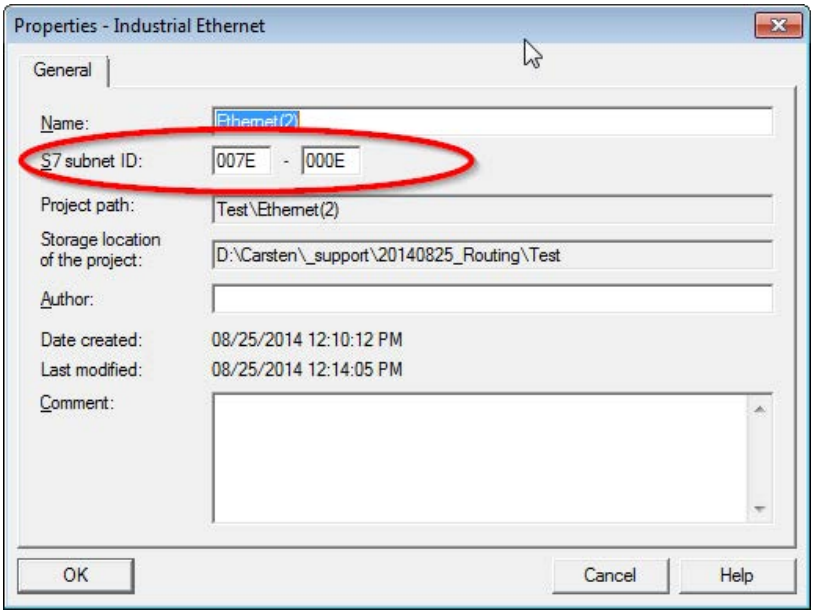


Fig. 79: S7 subnet ID

5.5.2 Routing from Ethernet to PROFIBUS

We want to implement the following way of access:

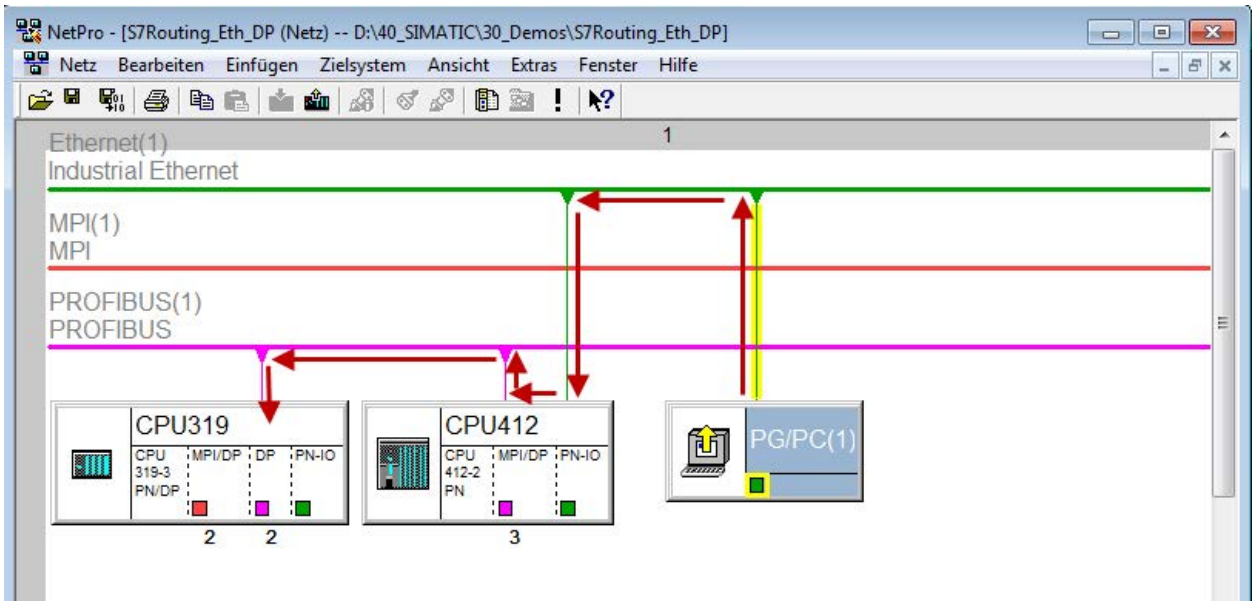


Fig. 80: S7 Routing, example system topology Ethernet PROFIBUS

We want to access the CPU319 controller from the engineering PC (also with *ibaPDA*). The computer and the controller are not directly connected via a common network/bus. We want to run the connection over the CPU412 controller. “Passing” the communication in this controller is called “S7 Routing”.

5.5.2.1 Configuration 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. Adding a PG/PC station:

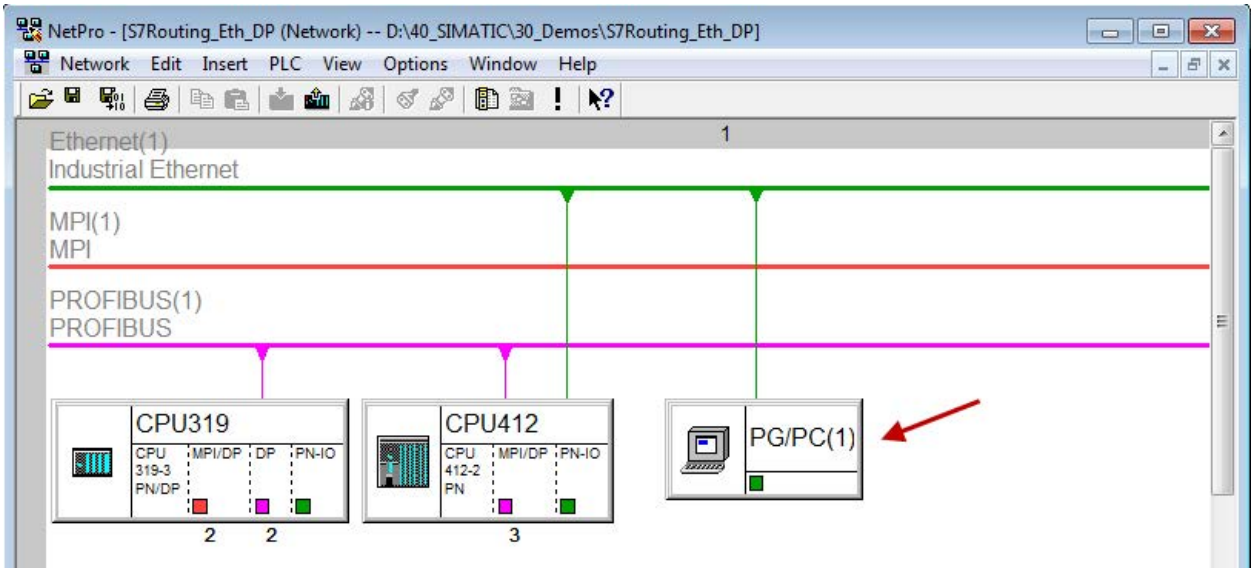


Fig. 81: Configuration NetPro

Assigning an interface (network card):

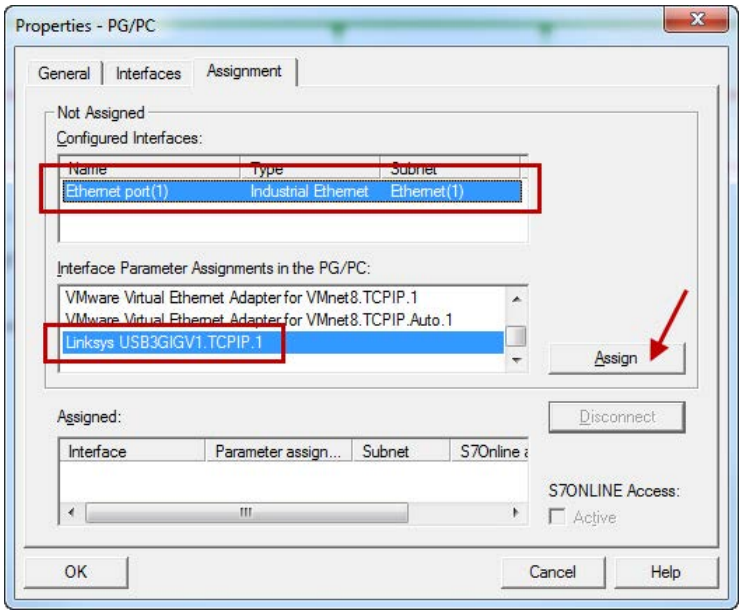


Fig. 82: Assign PG/PC interface

Result:

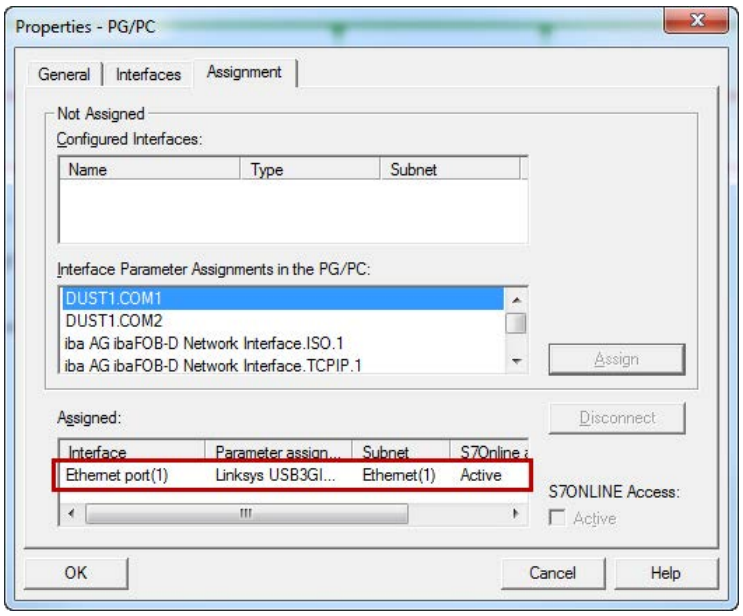


Fig. 83: Interface has been assigned

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).

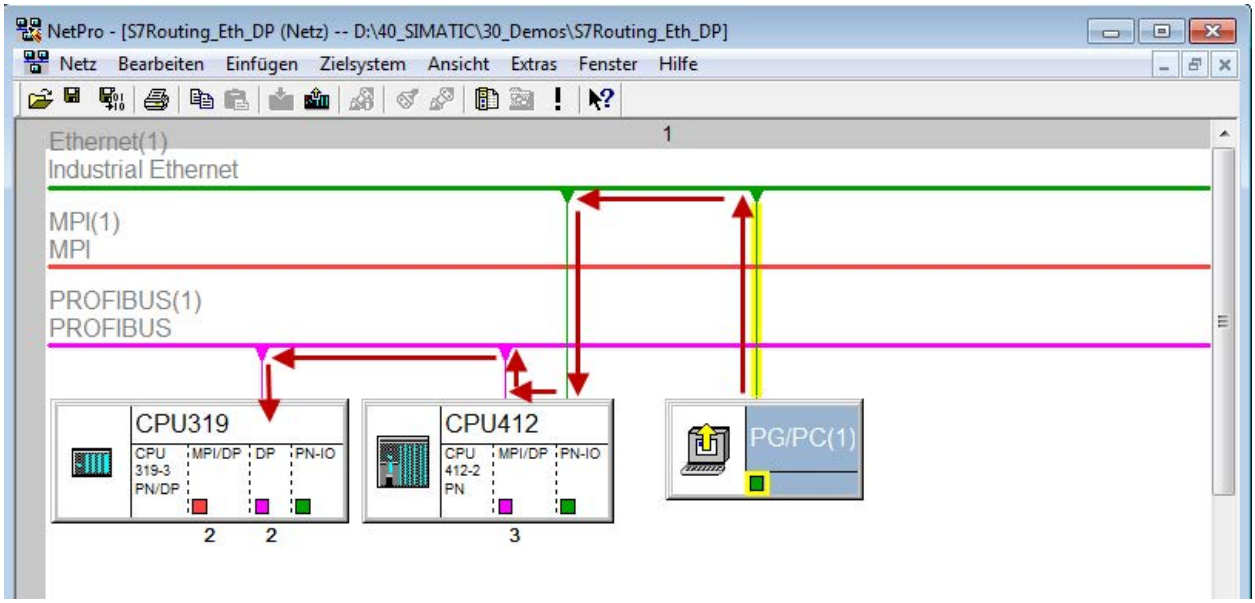


Fig. 84: Communication path

Finally, all HW configurations and connection data are loaded from NetPro.

5.5.2.2 ibaPDA configuration

The following entries have to be made:

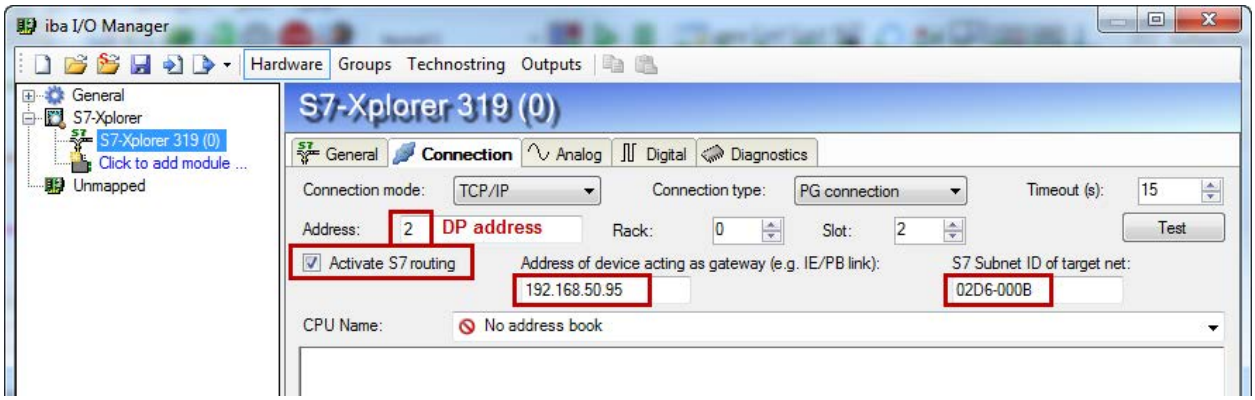


Fig. 85: Enable S7 routing

Activate S7 routing
Enable to use S7 routing

Address
Address of the target control (here CPU319)

Address of device acting as gateway
Enter address of the gateway (here CPU412)

S7 subnet ID of target net
Enter subnet ID from STEP 7 NetPro

You can identify the S7 subnet ID in NetPro. For doing so, right-click on the secondary bus system and open the “Properties”.

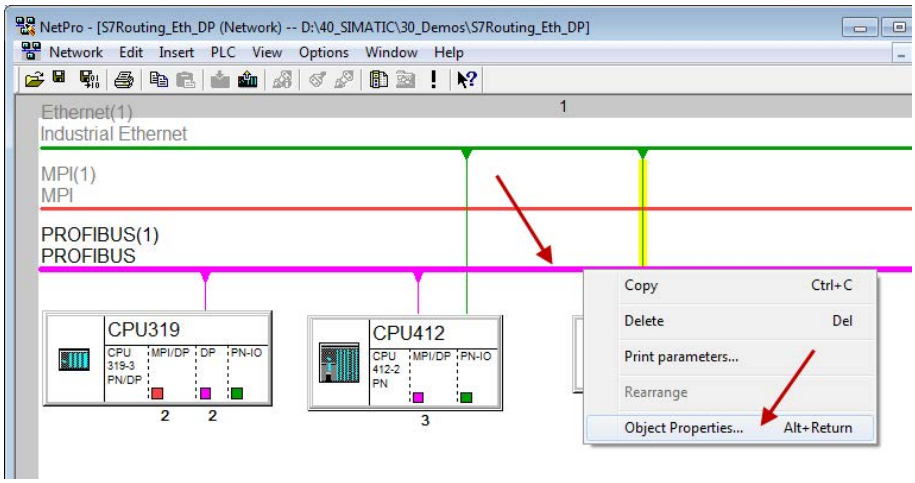


Fig. 86: Determine S7 subnet ID

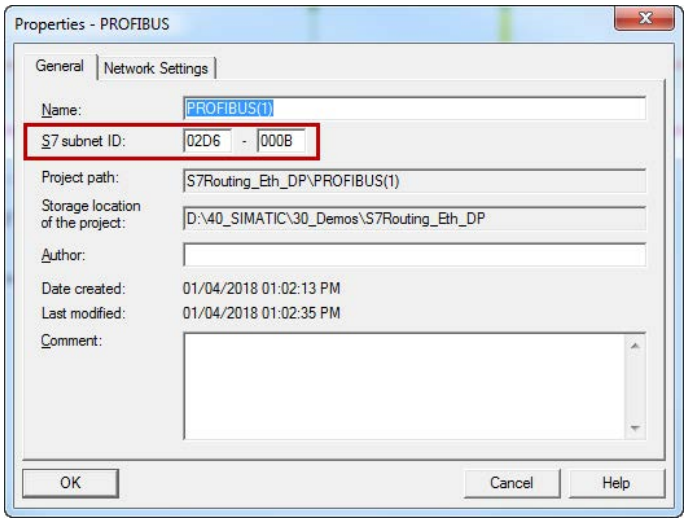


Fig. 87: S7 subnet ID

Reference

For more information about the S7-Routing, please see:

Which modules support the "S7 Routing" function in S7 subnets?

http://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/de/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

5.6 Use of MPI/DP-TCP-adapters

Siemens S7 CPUs, which do not have an Ethernet interface can be connected via MPI/DP-TCP-adapters on their MPI interface.

Adapters, which convert the S7 communication from TCP/IP to MPI/PROFIBUS DP, are offered by different manufacturers.

Basically, these adapters can be used together with *ibaPDA*. Therefore, the connection on the *ibaPDA*-side must be configured as a TCP-connection.

The access on the adapter is possible over its IP-address, which can be set by means of the associated software provided by the manufacturer.

In the connection configuration enter "0" for frame and the MPI- or DP-address of the S7 CPU as slot.

For more information, please refer to the corresponding device documentation.

6 Support and contact

Support

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Fax: +49 911 97282-33

Email: support@iba-ag.com

Note

If you require support, indicate the serial number (iba-S/N) of the product and the license number.

Contact

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please refer to our web site

www.iba-ag.com.