ibaBM-PN

PROFINET Busmonitor

Manual

Issue 2.0

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, deviations cannot be excluded completely so that the full compliance is not guaranteed. However, the information 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 http://www.iba-ag.com.

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Certification

The device is certified according to the European standards and directives. This device corresponds to the general safety and health requirements. Further international customary standards and directives have been observed.

CE

Issue	Date	Revision	Chapter	Author	Version HW / FW
2.0	08-2023	Scope of delivery, ibaPDA GUI			

Table of contents

1 About this manual

This manual describes the construction, the use and the operation of the ibaBM-PN device.

1.1 Target group

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

1.2 Notations

The following designations are used in this manual:

Action	Notations
Menu command	Menu *Logic diagram*
Call of menu command	*Step 1 – Step 2 – Step 3 – Step x* Example: Select menu *Logic diagram – Add – New logic diagram*
Keys	<Key name> Example: <Alt>; <F1>
Press keys simultaneously	<Key name> + <Key name> Example: <Alt> + <Ctrl>
Buttons	<Button name> Example: <OK>; <Cancel>
File names, Paths	„File name“, „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:

- By an electric shock!
- Due to the improper handling of software products which are coupled to input and output procedures with control function!

If you do not observe the safety instructions regarding the process and the system or machine to be controlled, there is a risk of death or severe injury!

⚠ WARNING

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

⚠ CAUTION

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

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 Introduction

The PROFINET bus monitor ibaBM-PN is a device for acquiring the cyclical data exchange between the PROFINET (PN) controller and PN devices. The device supports PROFINET IO specification V2.35 and can be integrated in an existing PROFINET network with one or more standard PN controllers.

The bus monitor has 2 independent, internal PN devices, which can be supplied with data by PN controllers. A bus monitor can communicate with several PN controllers. For this purpose, the device has to be integrated in a PN engineering project. The bus monitor can be integrated in line or star topologies and can be connected as well to two independent PROFINET lines.

The two PN devices each support S2 system redundancy independently of each other. An additional license is required for this.

To act as sniffer, ibaBM-PN can be integrated into the PROFINET network without interferences using the TAP-interface (Ethernet). As a sniffer, the device monitors the data exchange between PN controller and PN devices.

The entire communication via the TAP-interface is being mirrored to a monitor port and can be recorded using an external network analysis tool.

On the optical-fiber side, ibaBM-PN works with the ibaNet protocol 32Mbit Flex. With this protocol, measuring and configuration data are transferred via a bidirectional fiber optic connection. The sampling rate and the data formats can be configured flexibly.

The both internal PN devices of the bus monitor can be configured independently in ibaPDA. Each of the internal PN devices can capture up to 1440 bytes (incl. status bytes) per cycle.

Furthermore, ibaBM-PN provides the function to acquire and record data as sniffer on a SINAMICS Link and thus replaces the bus monitor ibaBM-SiLink in a functionally compatible way. SINAMICS Link is a special type of PROFINET communication for exchanging PROFINET IRT data between Siemens SINAMICS controllers. SINAMICS Link is based on a strict, straight network topology with a maximum of 64 PROFINET (PN) controllers.

Each controller sends data that ibaBM-PN can read and acquire. The sampling time can be decreased down to 500 µs when less controllers are connected.

Overview of the most important characteristic values:

- ❑ 2 independent internal PROFINET IO devices
- ❑ Each PN device has a 2-port switch
- ❑ Up to 4 controllers can be connected per device (shared device)
- ❑ Up to 1440 bytes per device
- ❑ TAP interface for sniffer function
- ❑ Sniffer function on SINAMICS Link for Siemens SINAMICS Control Units equipped with a CBE20 option board
  Supported SINAMICS Link profiles:
  - 64 devices, 16 words, 1 or 2 ms
  - 16 devices, 16 words, 500 µs
  - 12 devices, 24 words, 500 µs

  - 8 devices, 32 words, 500 µs

- ❑ Monitor interface for connecting a network analysis tool
- ❑ Supports PROFINET IO specification V2.35
- ❑ RT (Real Time) and IRT communication (Isochronous Real Time) possible, up to 250 µs
- ❑ Data acquisition with ibaPDA
- ❑ Simple configuration and measurement via bidirectional FO connection with ibaNet-protocol 32Mbit Flex
- ❑ Flexible configuration of sampling rate and data formats with 32Mbit Flex
- ❑ MRP and MRPD Client (Media Redundancy Protocol)
- ❑ NetLoad Class III
- ❑ Supports S2 system redundancy

Order data

Order no.	Product designation	Description
13.120000	ibaBM-PN	Bus module for acquiring data on PROFINET networks, 2 PROFINET devices
13.120001	ibaBM-PN-Upgrade-S2-Redundancy	Upgrade for redundancy mode

3 Scope of delivery

After having unpacked the delivery, please check if it is complete and intact.

The following components are included in delivery:

- ibaBM-PN device
- Patch cable short
- Data medium “iba Software & Manuals" with the following content:
  - GSDML files
  - Application examples

4 Safety instructions

4.1 Designated use

The device is an electrical equipment. It may only be used for the following applications:

- ❑ Measurement data acquisition and measurement data analysis
- ❑ Automation of industrial plants
- ❑ Applications of iba software products (e.g ibaPDA) and iba hardware products

The device may only be used as defined in the "Technical Data" chapter.

4.2 Special safety instructions

Warning!

This is a Class A device. This equipment may cause radio interference in residential areas. In this case, the operator will be required to take appropriate measures.

⚠ CAUTION

Observing the operating voltage range

The device should not be operated at voltages exceeding +24 V DC! An overly high operating voltage destroys the device and may result in death or serious injury.

⚠ CAUTION

Connecting the PROFINET cable

The PROFINET cable should be connected after proper completion of the configuration only.

See also chapter 10.1 "Operation as device".

⚠ CAUTION

Do not open the device!

There are no serviceable parts inside the device.

Opening the device will void the warranty.

Note

Cleaning

To clean the device, use a dry or slightly moistened cloth.

5 System requirements

5.1 Hardware

- ibaBM-PN, firmware beginning with version v01.06.001; hardware version beginning with version A1

For operation:

- 24 V DC voltage supply

For the device configuration and for measuring:

- PC as recommended for use with ibaPDA:
  - Multicore CPU 2 GHz, 2048 MB RAM, 100 GB HDD, or higher
  - At least one free PCI/PCIe slot (computer)

On our homepage http://www.iba-ag.com you find suitable computer systems with desktop and industry housing.

- At least one FO input and output card of the ibaFOB-D, ibaFOB-Dexp, ibaFOB-io-ExpressCard type or ibaFOB-io-USB adapter
- One ibaNet FO patch cable for bidirectional connection of ibaBM-PN and ibaPDA-PC
- PROFINET network with PROFINET controller

5.2 Software

- ibaPDA / ibaQDR, Version 7.3.0 or higher

6 Mounting and dismounting

6.1 Mounting

1. Insert the DIN rail clip on the rear side of the device on top in the DIN rail, press the device down/back and let the DIN rail lock.
2. If there is the provision in the plant that the device has to be grounded, then connect the device to the ground (shield connector X29).
3. Once fixed, connect the 24 V DC power supply with the right polarity.
4. Connect FO cable to the ibaPDA system (bidirectional).
5. Connect the PROFINET cable

⚠ CAUTION

Connecting the PROFINET cable

Changes in the PROFINET network might have an impact on the functionality of the connected controller.

6.2 Dismounting

1. First of all, disconnect all connections that exist to the device.
2. Grasp the device with one hand firmly on the top side. For the device later lies firmly in your hands and does not fall to the floor, please press the device slightly down.
3. With the other hand, grasp the device on the bottom and pull it to the front/top. The device will get detached from the DIN rail.

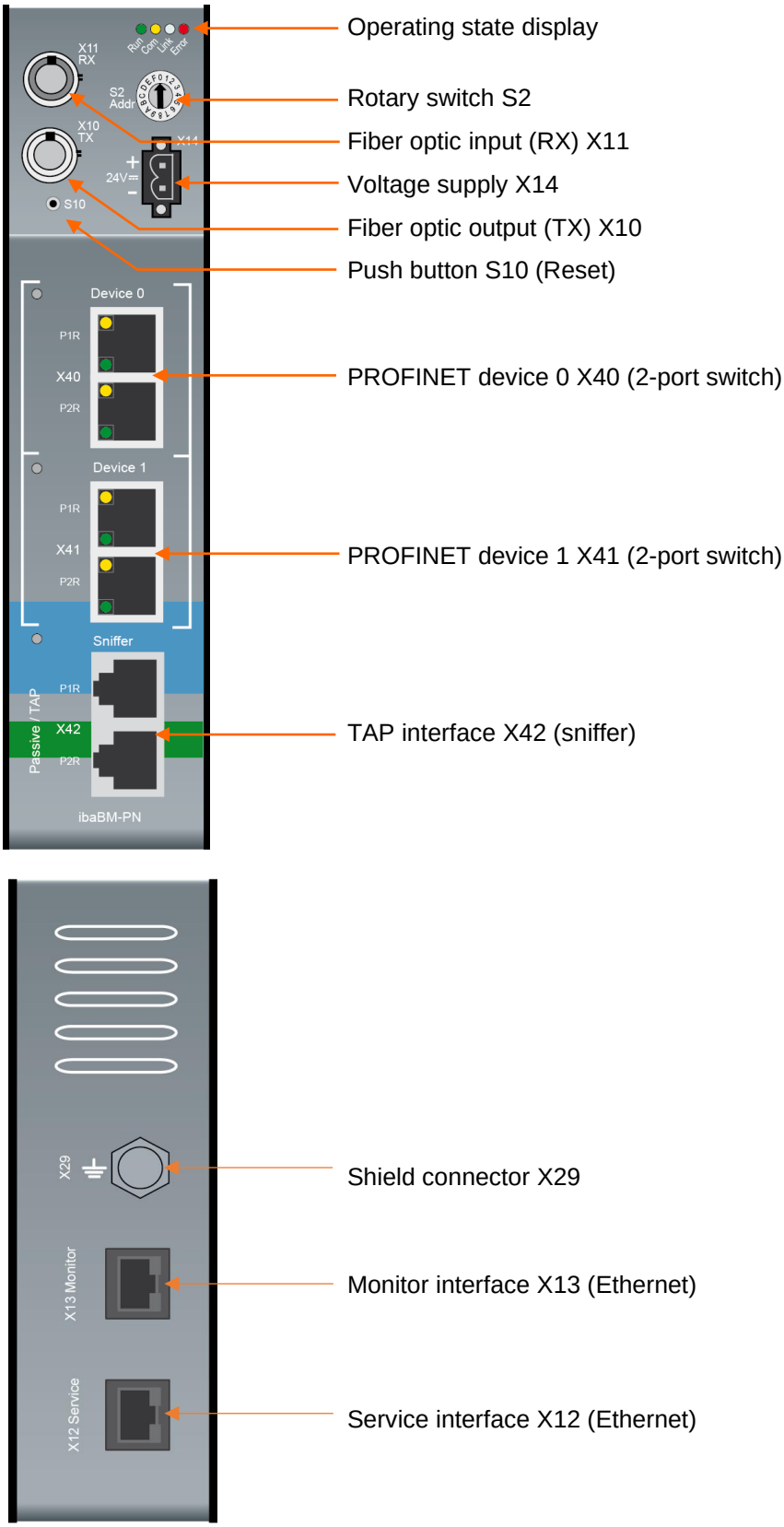
⚠ CAUTION

Removing the PROFINET cable

Changes in the PROFINET network might have an impact on the functionality of the connected controller.

7 Device description

7.1 Device view



7.2 Indicating elements

On the device, colored light diodes (LED) show the operating status of the device.

Operating state

LED	State	Description
Run (green)	Blinking	Ready for operation, power supply connected
	Blinking rapidly	Update mode or reset to default settings (S10 push button)
	On	Boot phase
Com (yellow)	Blinking	TCP/UDP/IP telegram detected via FO
Link (white)	Blinking	32Mbit input signal connected, but the device is not configured for this mode, S2 is on position 0
	On	Valid 32Mbit input signal detected
Error (red)	Blinking	Defect (configuration error)
	On	Hardware error

The operating status of the PROFINET devices is indicated by multi-color LEDs.

Operating state PROFINET device 0/1

Color	State	Description
Green	On	Device is connected and at least one connection to a PROFINET controller is established
Yellow	On	Device is started, but no IO connection is established
Red	On	Hardware error or overload
Blue	Blinking	PROFINET blink test

Operating state of the TAP interface “Sniffer“

Color	State	Description
Green	On	Cyclic PROFINET IO telegrams are detected and a configuration for the sniffer is active.
Green	Blinking	Cyclic PROFINET IO telegrams are detected, but no configuration for the sniffer is active.
Yellow	On	Device is started but no cyclic PROFINET IO telegrams are detected
Red	On	Hardware error

7.3 Operating elements, connections

7.3.1 FO connections X10 (TX) and X11 (RX)

X11 (RX): FO receiving interface

X10 (TX): FO sending interface

On the ibaPDA system, a FO input/output card of the ibaFOB-D or ibaFOB-Dexp type has to be installed for receiving and sending the data.

Maximum distance of fiber optic connections

The maximum distance of fiber optic connections between 2 devices depends on various influencing factors. This includes, for example, the specification of the fiber (e.g. 50/125 µm, 62.5/125 µm, etc.), or the attenuation of other components in the fiber optic cable plant such as couplers or patch panels.

However, the maximum distance can be estimated on the basis of the output power of the transmitting interface (TX) or the sensitivity of the receiving interface (RX). A model calculation can be found in chapter 11.4.

The specification of the transmitter's output power and the receiver's sensitivity of the fiber optic components installed in the device can be found in chapter "Technical data" 11.1 under "ibaNet interface".

7.3.2 Voltage supply X14

The ibaBM-PN device has to be operated with an external DC voltage 24 V (unregulated) with a maximum current consumption of 400 mA. The operating voltage should be supplied using the 2-pin Phoenix screw connector included in delivery.

7.3.3 Push button S10

With the S10 push button, all settings can be reset to the factory settings:

1. Switch off the device.
2. Switch on the device with the push button S10 keeping pushed.
3. Keep the push button S10 pushed until the green LED "Run" of the operating status display starts blinking rapidly. Now, release the push button.
4. When the green LED "Run" stops blinking rapidly, the factory settings have been applied. The device is immediately ready for operation and does not need to be switched off and on again.

Note

The device must not be switched off during the reset procedure.

7.3.4 Rotary switch S2

With the 32Mbit Flex protocol, up to 15 devices can be connected in a ring topology. The devices are addressed using the rotary switch S2.

Device number in the cascade	Position of the rotary switch
Not permitted	0
1. device	1
2. device	2
⋮	⋮
14. device	E
15. device	F

❑ Factory settings rotary switch position: 1

7.3.5 PROFINET interfaces X40 (Device 0) and X41 (Device 1)

Each of the two PROFINET devices X40 and X41 has an independent 2-port switch with RJ45 (10/ 100Mbit/s) connectors. The two switches are not internally connected.

When the autonegotiation is switched off, the P2R port of each device functions as uplink port, i.e. you do not need a cross-cable for connecting another device.

7.3.6 TAP interface X42

With the TAP interface, the device can be integrated in an Ethernet/PROFINET network without any interferences. The whole data exchange can be acquired.

7.3.7 Service interface X12

The Ethernet interface „X12 Service“ (RJ45) at the bottom of the device is designated for service purposes.

The Ethernet interface is set to a static IP address 192.168.1.1 which cannot be changed.

7.3.8 Monitor interface X13

The Ethernet interface „X13 Monitor“ (RJ45, 1Gbit/s, no autonegotiation) at the bottom of the device is designated for connecting a network analysis tool like e.g. Wireshark[1]. The communication via the TAP interface is mirrored and output on the X13 Monitor interface.

7.3.9 Shield connector X29

Connector (screw) for connecting the protective ground. Depending on the configuration of the control cabinet, it might be necessary to connect the shields of the PROFINET cable to the shield connector X29. Use a M6 terminal for connecting purposes.

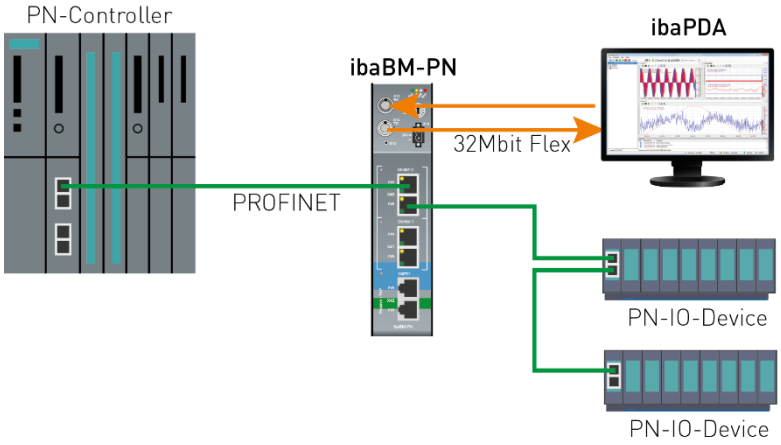
If the shields of the PROFINET cables have been connected yet to the protective ground of the control cabinet, also connect the shield connector X29 to the protective ground of the control cabinet.

[1] https://www.wireshark.org/

8 System integration

The ibaBM-PN device can be integrated into an automation system in many different ways.

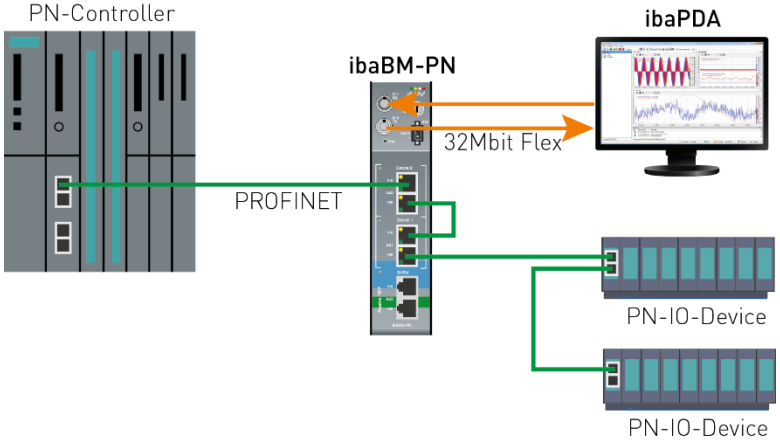
8.1 Data acquisition with 1 device



In the example above, one PROFINET device of the ibaBM-PN is used by a PROFINET controller. For this purpose, the device has to be entered via the GSDML file in the configuration of the PROFINET controller.

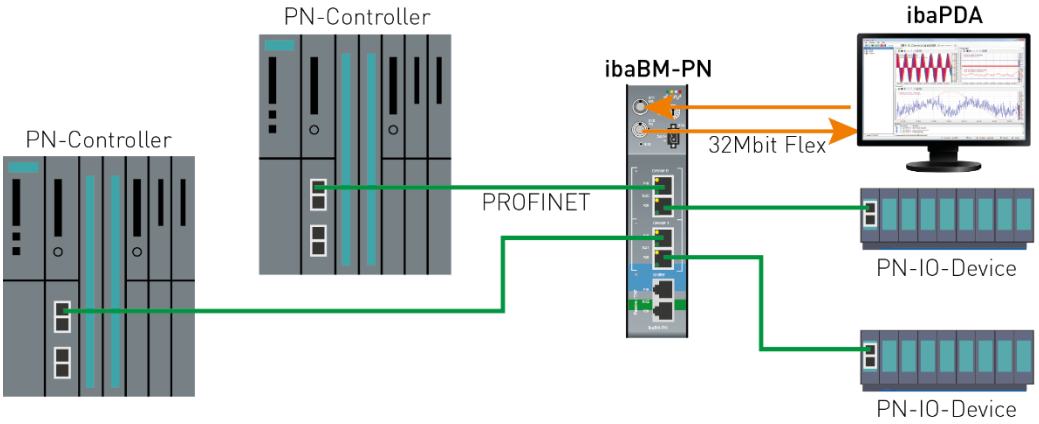
The installation location within the PROFINET line is **not** relevant. The PROFINET topology can have a linear or a star structure.

8.2 Data acquisition with 2 devices



In the example above, both ibaBM-PN PROFINET devices are used by one PROFINET controller. For this purpose, both devices have to be entered via the GSDML file in the configuration of the PROFINET controller. The two PROFINET devices are connected with a patch cable.

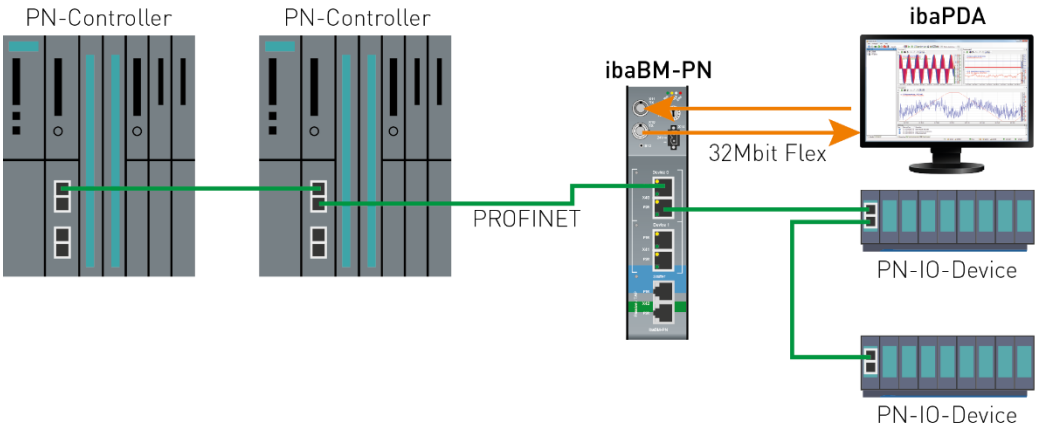
The installation location within the PROFINET line is **not** relevant. The PROFINET topology can have a linear or a star structure.



In the example above, the two ibaBM-PN PROFINET devices are used by different PROFINET controllers. For this purpose, each device has to be entered via the GSDML file in the configuration of the respective PROFINET controller.

The installation location within the PROFINET line is **not** relevant. The PROFINET topology can have a linear or a star structure.

8.3 Data acquisition as shared device

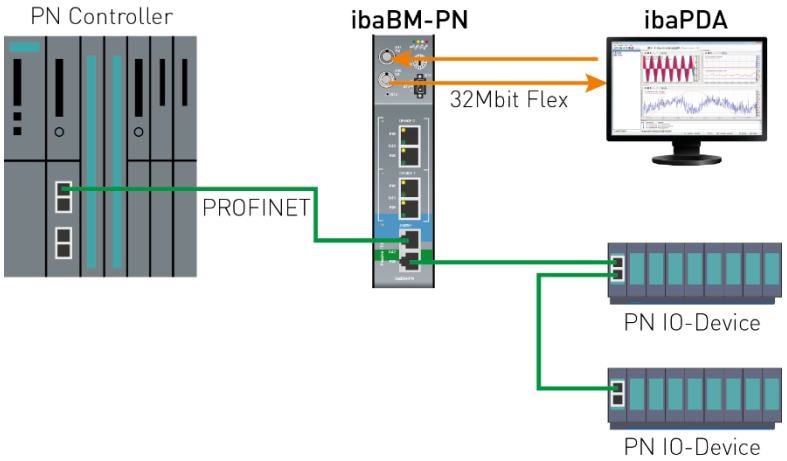


In the example above, an ibaBM-PN PROFINET device is used by several PROFINET controllers. For this purpose, the device has to be entered via the GSDML file in the configuration of all PROFINET controllers.

When configuring, please make sure that each slot of the device is assigned to exactly one PROFINET controller. One slot cannot be used by more than one controllers. Both PROFINET devices could be used as shared devices.

The installation location within the PROFINET line is **not** relevant. The PROFINET topology can have a linear or a star structure.

8.4 Data acquisition with TAP / Sniffer



In the above example, the TAP interface is used for aquiring and analyzing the transferred data without interferences. It does not have to be integrated into the configuration of the PROFINET controller.

The installation location within the PROFINET line is relevant. The TAP interface always has to be integrated linearly. You can only acquire data which are transmitted at this position in the network.

8.5 Media Redundancy Protocol (MRP)

The Media Redundancy Protocol is a PROFINET feature and allows you to build up a ring-topology network. Using redundant physical connections, a higher reliability of the PROFINET network can be reached.

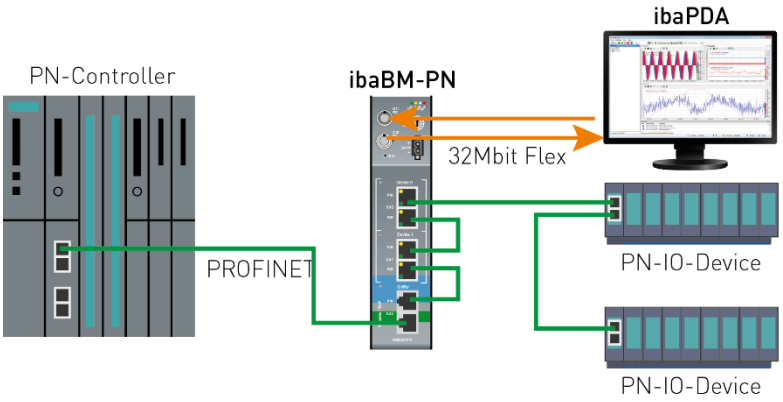
Both PROFINET device interfaces support MRP as a MRP client as well as MRPD-client.

Via the TAP interface, data can also be acquired in a ring topology, as long as the connection telegrams can be recorded. Depending on the configuration status of the MRP ring (sending direction in the ring), the dataflow of the PROFINET telegrams changes. Also depending on the installation location of the ibaBM-PN only those data can be acquired which are currently transported at this position of the network.

Important Note

ibaBM-PN in sniffer operation is not designed to be used in a MRP ring topology.

8.6 Data acquisition in mixed operation



With the example above, we show one possible scenario how to combine the different versions.

Here, we show the data acquisition via TAP/Sniffer and both PROFINET devices.

The installation location within the PROFINET line is relevant regarding the TAP interface. The TAP interface always has to be integrated linearly. You can only acquire data which are transmitted at this position in the network.

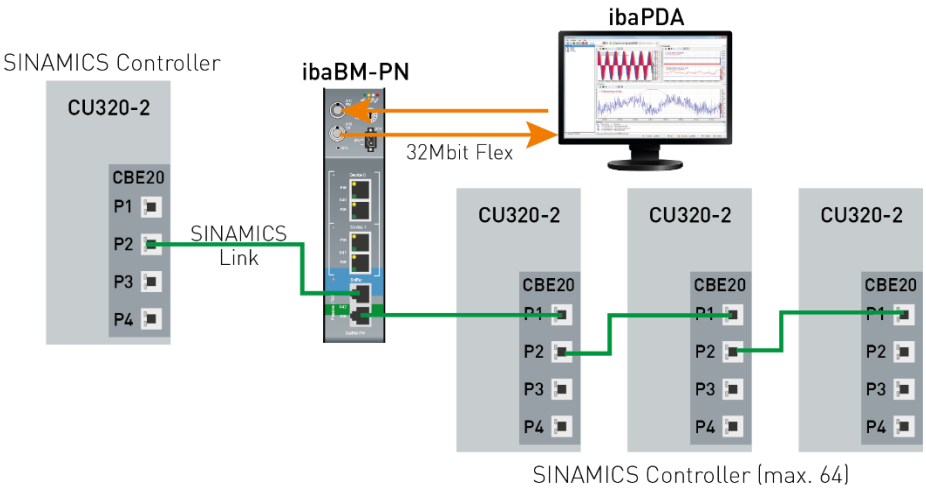
8.7 Data acquisition at SINAMICS Link

SINAMICS Link is a special type of PROFINET communication for exchanging PROFINET IRT data between Siemens SINAMICS controllers. SINAMICS Link is based on a strict, straight network topology with a maximum of 64 PROFINET (PN) controllers.

Note

SINAMICS Link allows data exchange between the Control Units CU320-2PN and CU320-2DP. For this purpose they must be equipped with the CBE20 option board.

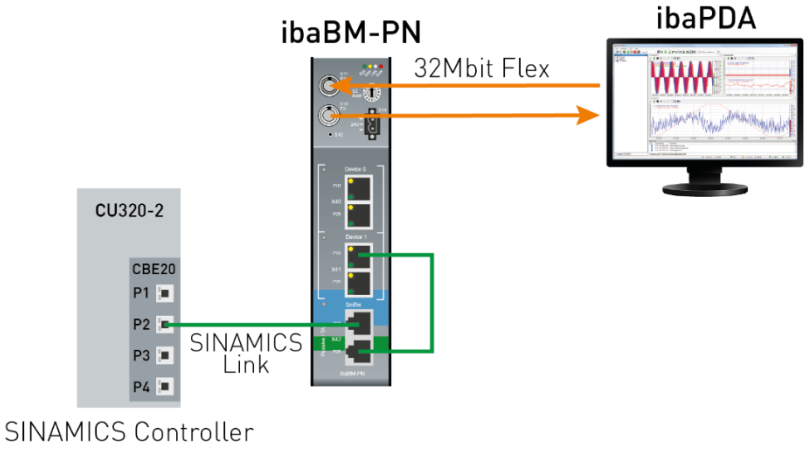
8.7.1 2 or more SINAMICS Link participants



The point of installation within the SINAMICS Link is not relevant. The TAP interface always has to be integrated linearly.

In this configuration, ibaBM-PN can be integrated into the SINAMICS Link at any point between two control units and read data.

8.7.2 1 SINAMICS Link participant

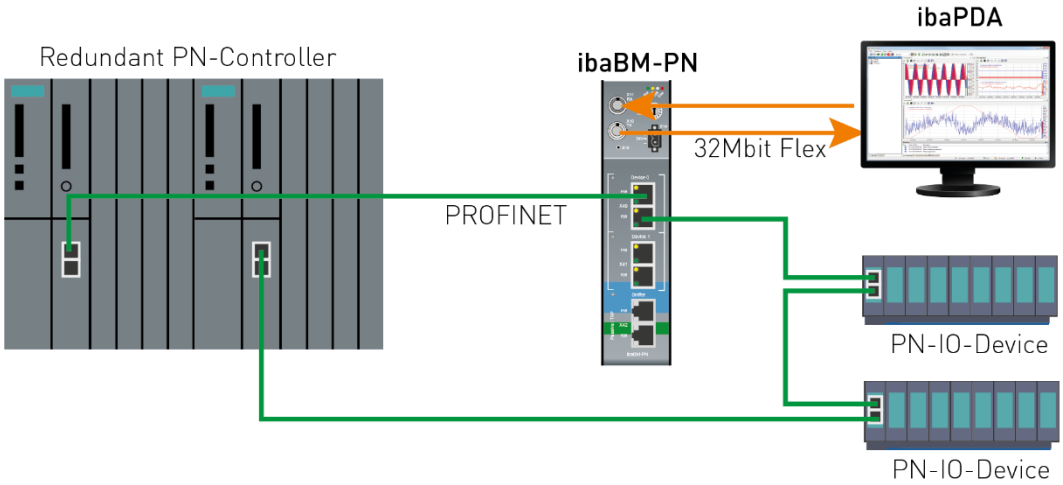


To enable data acquisition at the SINAMICS Link with only one controller, one of the two PROFINET devices can be switched to the SINAMICS emulation mode. The device can then no longer be used as a normal PROFINET device.

Port 1 (P1R) of the respective PROFINET device and one of the two ports of the TAP interface are connected with a patch cable. The second port of the TAP interface is connected to the controller.

The actual data acquisition is realized via a “Sniffer SiLink” module, as when operating with several SINAMICS controllers.

8.8 Data acquisition on redundant PROFINET



PROFINET system redundancy is distinguished into three configurations with the designations S2, R1 and R2. ibaBM-PN only supports "S2" configurations.

Each of the two PROFINET devices of the ibaBM-PN supports S2 redundancy separately, i.e. configurations with the use of one or two PROFINET devices (analog to chapter 8.1 and 8.2) are possible.

The installation location within the PROFINET line is **not** relevant. The PROFINET topology can have a linear or a star structure.

Data acquisition via TAP / Sniffing is not possible in redundant networks, since the data that can be acquired depends on the installation location.

Other documentation

SIEMENS FAQ on the basics of PROFINET system redundancy

What are the PROFINET redundancy functions?

https://support.industry.siemens.com/cs/ww/en/view/109756450

8.9 32Mbit Flex protocol and ibaFOB-D network

The ibaNet 32Mbit Flex protocol (referred to as "Flex protocol") is a manufacturer-specific data transfer protocol by iba AG. This protocol serves to transfer measurement and configuration data via FO connections between different iba devices. The PC cards of the ibaFOB-D/ibaFOB-Dexp and ibaFOB-io-ExpressCard series as well as some devices for data acquisition support this protocol.

8.9.1 Data amount and sampling rate

The Flex protocol works with a data transfer rate of 32 Mbit/s and supports up to 15 "Flex-capable" devices connected in a ring topology.

With 32Mbit Flex, the data amount and the sampling rate can be flexibly customized. The data amount transferred per cycle depends on the sampling rate. Generally, the following applies: The less data are transferred, the higher is the possible sampling rate.

For the signals to be measured, sampling rates of 500 Hz to 100 kHz can be realized, which correspond to a timebase from 10 µs up to 2 ms. The maximum sampling rate also depends on the acquisition device and can be found in the device manual. In ibaPDA you can select even smaller sampling rates down to 1 Hz. This corresponds to a timebase of 1000 ms. In this case, the timebase in the Flex ring is set to 2 ms and in ibaPDA a subsampling is carried out. Redundant data is discarded by ibaPDA.

With 32Mbit Flex, up to 4060 bytes per cycle can be acquired and recorded depending on the sampling rate.

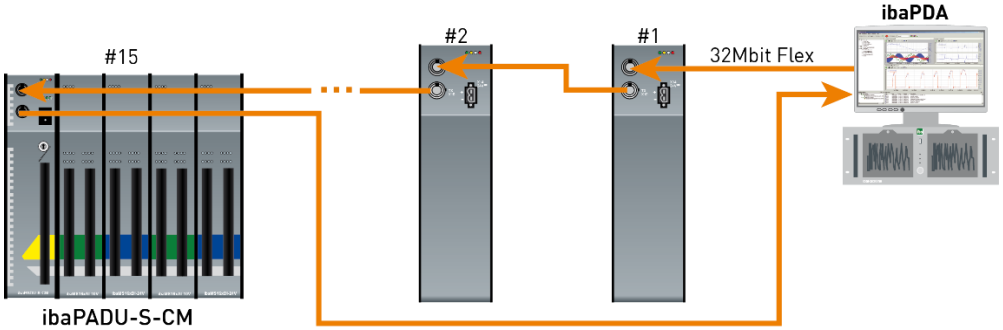
For the max. possible data amount of 4060 bytes, the cycle time (timebase) is up to 1.4 ms. In the following table, you find reference values for the relation between cycle time and the max. transferable data amount per cycle.

Timebase	Max data amount
1.4 ms	4060 bytes
1.0 ms	3100 bytes
0.5 ms	1540 bytes
0.025 ms	64 bytes

To acquire further samples, especially if several devices are connected in a Flex ring topology, iba recommends using the simulator integrated in ibaPDA, see chapter 9.3.

The following data types are supported: BYTE, WORD, DWORD, INT, DINT, FLOAT and DOUBLE in Big/Little Endian format. These data amounts represent the limit values for the overall data amount on a Flex ring that can be transferred via an FO link.

8.9.2 Ring topology



In a ring with 32Mbit Flex protocol, up to 15 devices can be connected. In the ring, all configuration and process data are transmitted.

ibaPDA automatically detects the devices in the ring and automatically determines the maximum possible sampling rate, depending on the type and number of the devices.

In the ring, also other 32Mbit Flex capable iba devices can be integrated, e. g. ibaPADU-S-CM like in the example above. The devices in the ring are addressed using the rotary switch for the device address (rotary switch S2 for ibaBM-PN).

The individual device in the cascade can work with different access cycles. However, these cycles have to be an integer multiple of the smallest cycle; e.g: device #1 works with 0.5 ms, device #2 with 1 ms, device #3 with 4 ms, etc. If the max. data rate is exceeded, ibaPDA issues an error message that advices you to enhance the timebase and decrease the data amount.

The calculation of the maximum data amount is based on the fastest device in the ring. i.e. an increase in the cycle time of slow devices in the ring does not lead to an increased data transfer. Only when the cycle time of the fastest device in ring is increased, the data amount can be increased.

↗ For further information about the distribution of the data amount in the Flex ring, please see chapter 9.3.

Note

Due to the large data amounts which are usually acquired with ibaBM-PN, it is in most cases appropriate only to operate one device on a 32Mbit Flex link (see chapter 8.1).

9 Configuration with ibaPDA

9.1 First steps for the configuration in ibaPDA

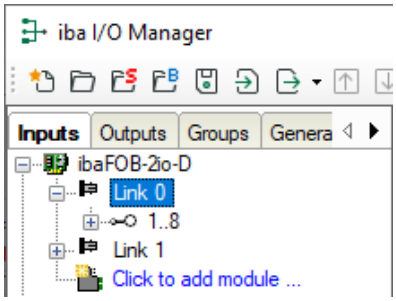
9.1.1 Configuration as active device

With the following instructions, you integrate the ibaBM-PN device stepwise as an active device in ibaPDA and configure the measurement signals.

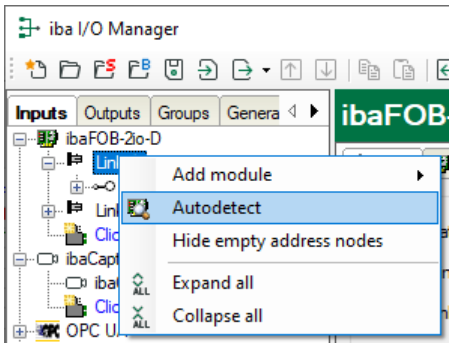
1. Connect the device to a voltage source and switch on the device (see chapter 7.3.2).
2. Establish a FO connection between the TX connector of the device and a free RX input of an ibaFOB-D card as well as a FO connection between the RX connector and a free TX output of the ibaFOB-D card. The TX/RX connectors of the ibaFOB-D card belong together in pairs, i.e. you cannot use just any free TX/RX connectors

   Dark grey FO connectors are receiving **RX inputs**

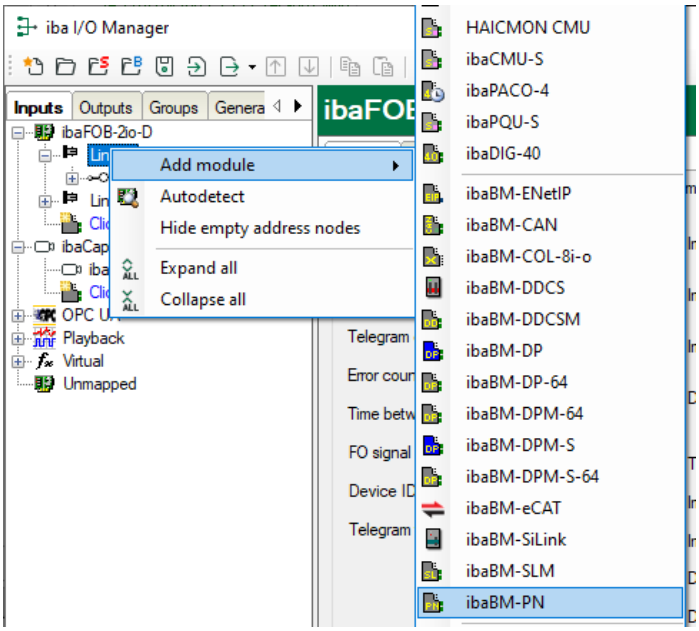
   Light grey FO connectors are sending **TX outputs**
3. Start the ibaPDA Client and open the I/O Manager .
4. On the left-hand side in the I/O Manager, the available system interfaces are displayed. Choose the desired ibaFOB-D card and mark the link, ibaBM-PN is connected to.



5. Click with the right mouse button on the link and select "Autodetect". The device is identified automatically and shown in the signal tree. Depending on the Flex address (switch S2), the device appears at the respective address position 1-15.

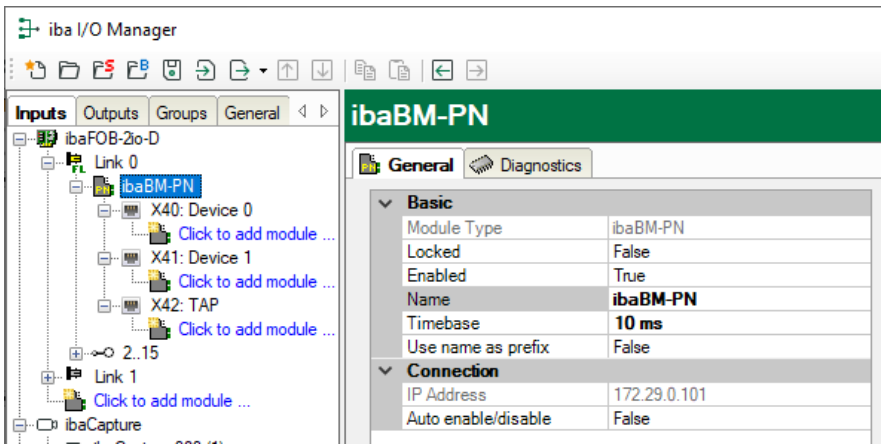


6. Optionally, you can also add the device manually. In this case select "Add module - ibaBM-PN" in the context menu.

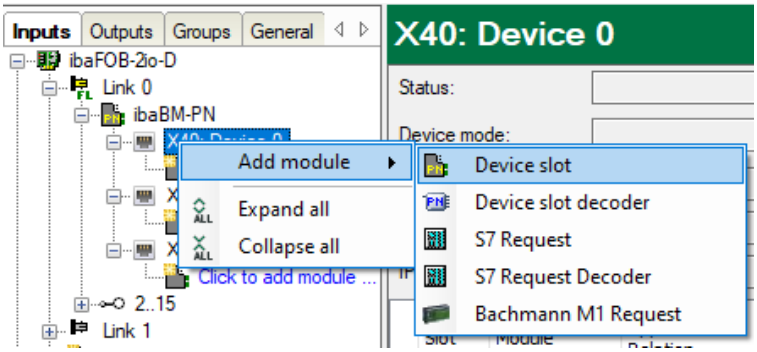


According to the selected Flex address (switch S2), the device has to be dragged to the correct address position using drag & drop.

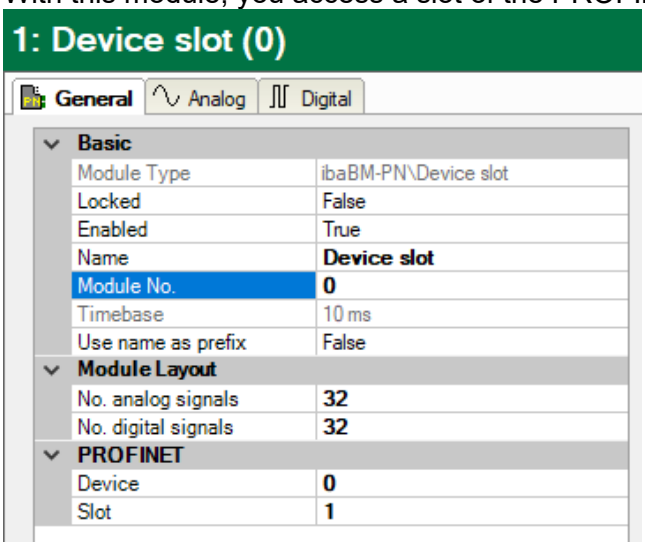
7. Please define on the "General" tab the parameters of ibaBM-PN. The following parameters are important:
   - Name: Assign a meaningful name to the connected device.
   - Timebase: Select a timebase for data acquisition in ibaPDA.



8. If you want to connect the device with one or two devices to PROFINET, you first have to configure the controller (see chapter 10.1).
9. Add a module under the ibaBM-PN device. Click with the right mouse-button on the ibaBM-PN device and select "Add module" and the module "Device slot“ from the list.



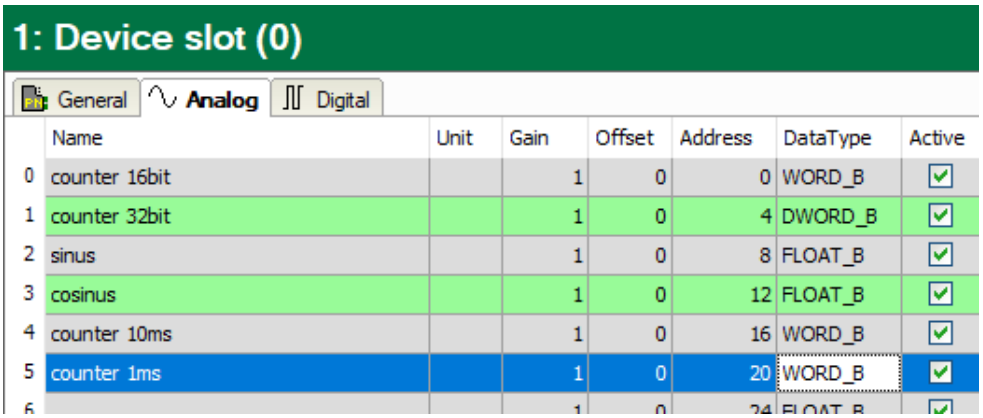
10. With this module, you access a slot of the PROFINET device of ibaBM-PN.



If you want to operate more devices, then add more modules of the “Device slot“ type.

11. Now, enter the “No analog signals“ and “No digital signals“ in the “General” tab of the module. The default setting is 32; a maximum of 252 analog and 1024 digital signals can be assigned per module. This value determines the length of the signal tables on the “Analog“ and “Digital“ tabs.

12. Enter in the “Analog“ tab the signals you want to acquire in sequential order. Assign a name to each signal (“Name“ column) and define in the “Address“ and “Data type“ columns the information about where to find the signal on the interface of the device.



Tip

By clicking on the header of a column, all the settings in the rows below are filled in automatically.

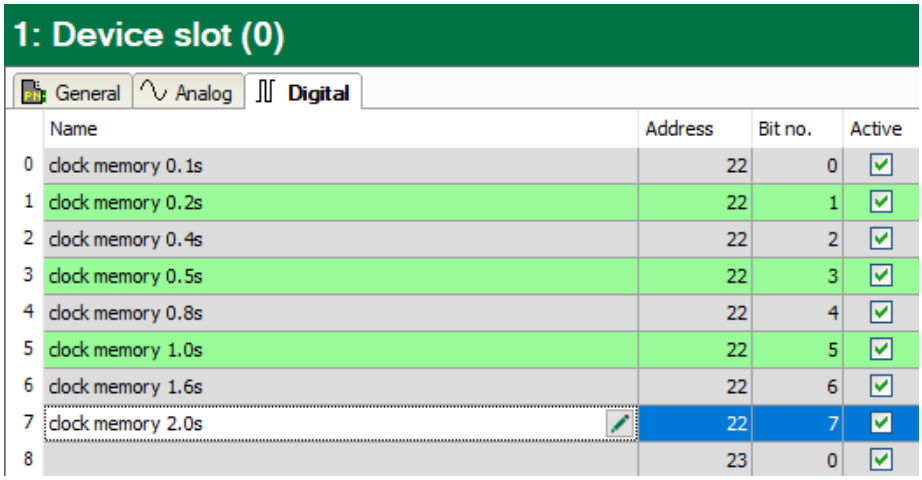
Example:

If you want to configure another data type, beginning with a specific row, then change the data type in the first concerned row. Now, click on the “Data type“ header. In all the rows below, the data type is changed automatically.

If you want to have calculated the addresses automatically depending on the selected data type: Configure the correct address in the first row (usually 0) and then click on the “Address“ header. Now, considering the selected data types, the addresses are filled in automatically in sequential order. Similar functions are also available for the other columns.

Thus, the project effort can be reduced.

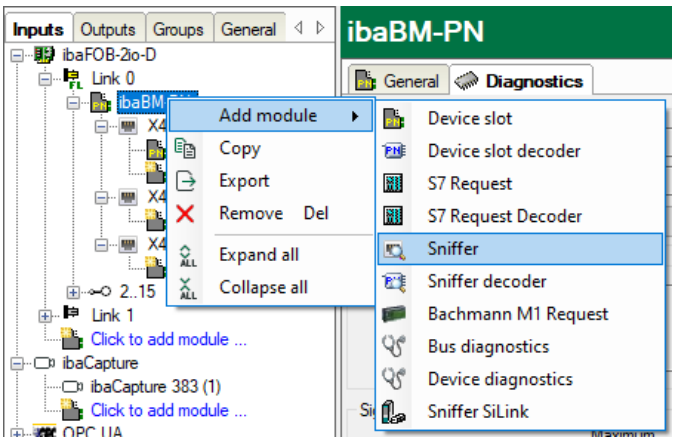
13. If required, select a scaling value of the signals in the “Gain“ and “Offset“ columns if required, for converting the signals into physical units.
14. For the digital signals on the “Digital“ tab, proceed as described above. A data type is not defined. The address offset is given in 1-byte-steps. The individual signals are addressed via the bit numbers 0 to 7.



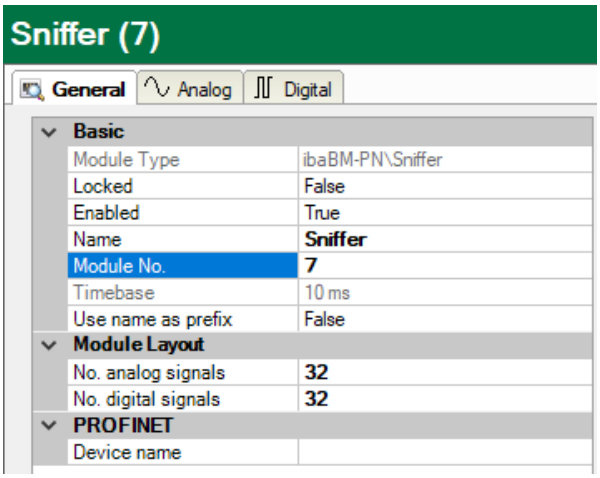
9.1.2 Configuration as sniffer

In pure sniffer mode, the device is integrated into PROFINET via the TAP interface, see chapter 8.4.

1. In the I/O Manager in ibaPDA, integrate the device as described in chapter 9.1.1, steps 1 - 7. Add a sniffer module under the node "X42: TAP”. To do this, right-click on the ibaBM-PN device, select "Add module" from the context menu and select the module "Sniffer" from the list. Or mark the node "X42: TAP" and select the module "Sniffer" from the list via the context menu "Add module".



2. Now, enter the “No analog signals“ and “No digital signals“ in the “General” tab of the module. The default setting is 32; a maximum of 1000 analog and 1000 digital signals can be assigned per module. This value determines the length of the signal tables on the “Analog“ and “Digital“ tabs. Under "PROFINET", select a device to which the signals are to be assigned.

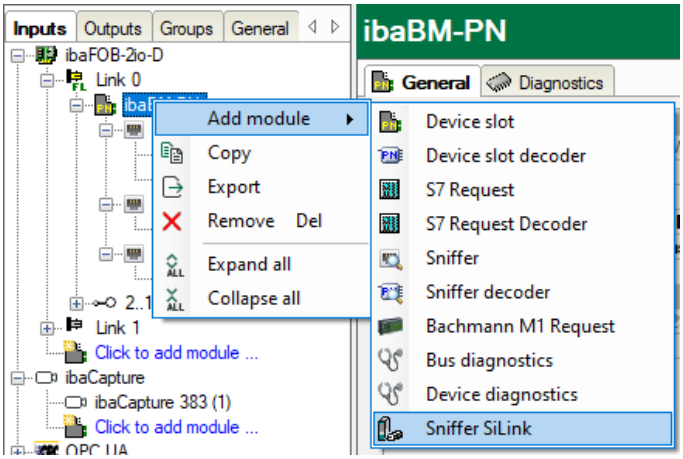


3. Enter the signals to be acquired on the “Analog“ and “Digital” tab. For details see chapter 9.1.1, steps 12 – 14.

9.1.3 Configuration as sniffer at the SINAMICS Link

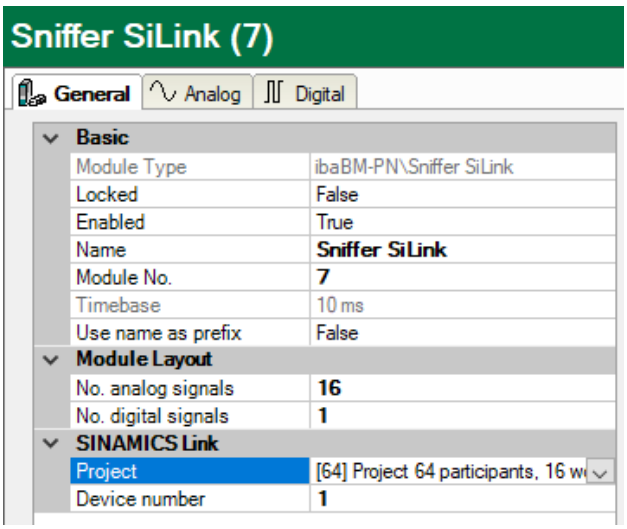
For data acquisition at the SINAMICS Link, the device is integrated into PROFINET via the TAP interface, see chapter 8.7.

1. In the I/O Manager in ibaPDA, integrate the device as described in chapter 9.1.1, steps 1 - 7. Add a “Sniffer SiLink” module under the node "X42: TAP”. To do this, right-click on the ibaBM-PN device, select "Add module" from the context menu and select the module "Sniffer SiLink”" from the list. Or mark the node "X42: TAP" and select the module "Sniffer SiLink" from the list via the context menu "Add module".



2. Now, enter the “No analog signals“ and “No digital signals“ in the “General” tab of the module. The default setting is 16 analog and 1 digital signal; a maximum of 1000 analog and 1000 digital signals can be assigned per module. This value determines the length of the signal tables on the “Analog“ and “Digital“ tabs.

3. Select a project under "SINAMICS Link". The project determines the number of devices and the number of data words per device.



4. Enter the signals to be acquired on the “Analog“ and “Digital” tab. For details see chapter 9.1.1, steps 12 – 14.

At least two SINAMICS controllers must be available for data acquisition at the SINAMICS Link. In case you want to acquire data at one controller, see chapter 9.2.8.4.

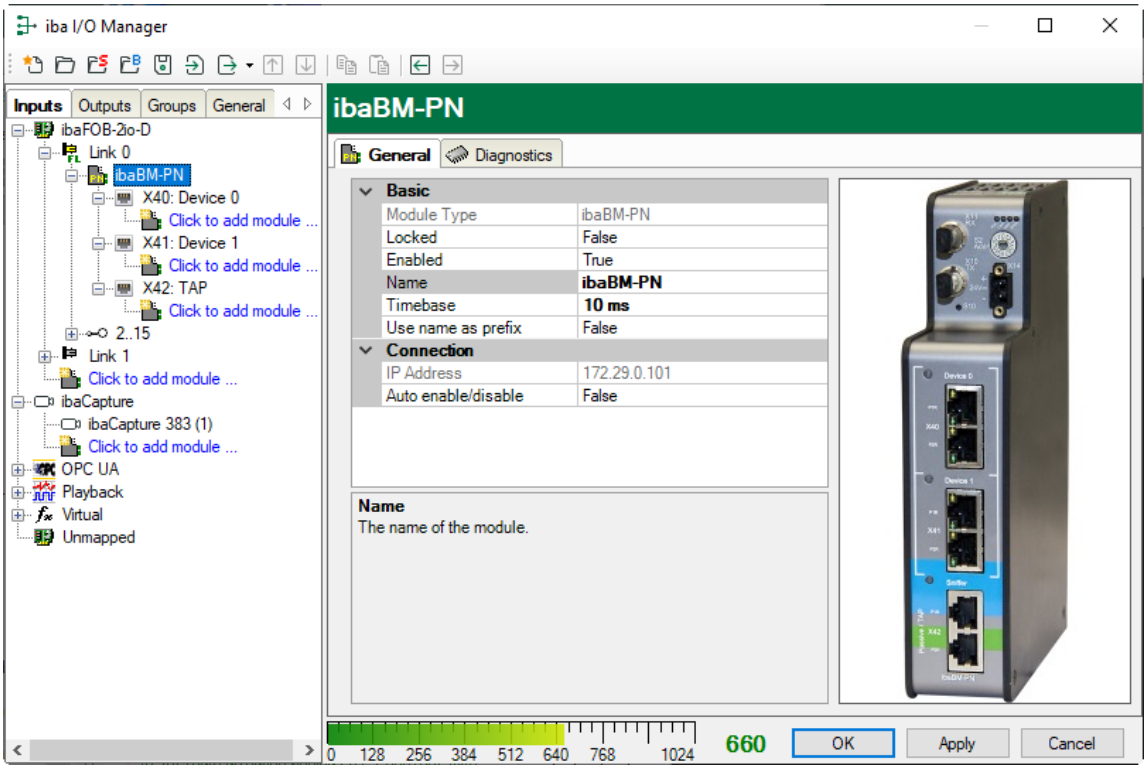
9.2 Modules in the I/O Manager

If you want to use ibaBM-PN with ibaPDA, you have to configure the device in the ibaPDA I/O Manager. Use the step-by-step procedure described in chapter 9.1.

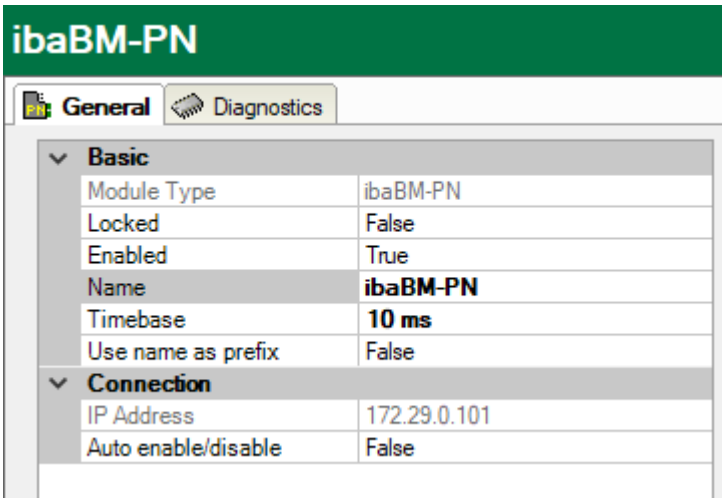
In the following paragraphs, we describe the available modules.

9.2.1 "ibaBM-PN“ device module

The module "ibaBM-PN" contains of 4 different tabs. The "General" and "Diagnostics" tabs are always visible. The "Analog" and the "Digital" tab contain dynamic online views of the analog and digital signals acquired by the device. This is why these two tabs are only visible after modules of „Device slot“ type have been added and the configuration has been transferred to the device.



9.2.1.1 "General“ tab



Basic settings

❑ Module type (only read)
Display of the module type

❑ Locked
A module can be locked in order to prevent accidental or unauthorized changes in the module settings.

❑ Enabled
Disabled modules are excluded from signal acquisition.

❑ Name
Enter here the name for the module as clear text.

❑ Timebase
Timebase for the data acquisition which is used for this device in ms. Cycles of down to 0.125 ms are possible (depending on the number of the signals).

❑ Use name as prefix
The module name is placed in front of the signal name as prefix.

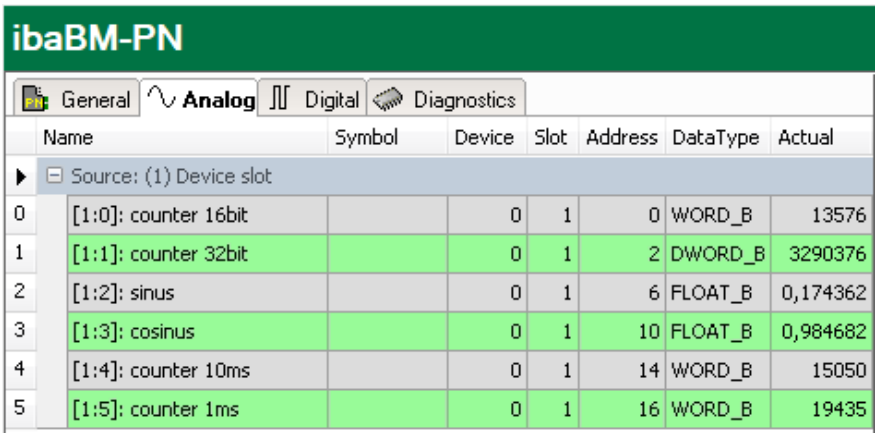
Connection

❑ IP address
IP address of the device (via FO); cannot be changed.

❑ Auto enable/disable
If the value is TRUE, the data acquisition is started even though the device is miss-ing. The missing device is temporarily disabled in the configuration. During the measurement process, ibaPDA tries to re-establish the connection to the missing device. If this is successful, the measurement is restarted automatically including the device that has been missing. If the value is FALSE, the measurement will not be started, in case ibaPDA cannot establish a connection to the device.

9.2.1.2 “Analog“ tab

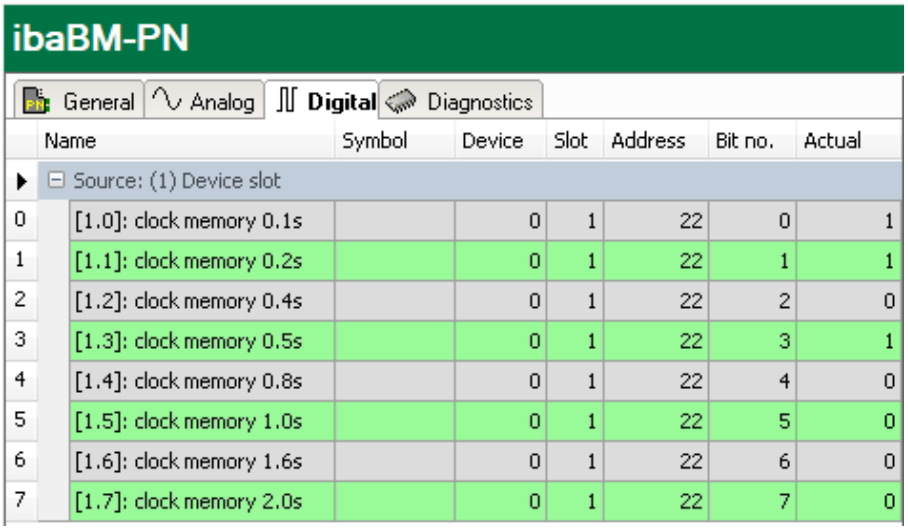
If analog signals have been configured in the modules „Device slot“ and the configuration has been transferred to ibaBM-PN, you will see here an overview of all acquired analog signals with an online overview of the currently acquired values.



	Name	Symbol	Device	Slot	Address	DataType	Actual
	Source: (1) Device slot						
0	[1:0]: counter 16bit		0	1	0	WORD_B	13576
1	[1:1]: counter 32bit		0	1	2	DWORD_B	3290376
2	[1:2]: sinus		0	1	6	FLOAT_B	0,174362
3	[1:3]: cosinus		0	1	10	FLOAT_B	0,984682
4	[1:4]: counter 10ms		0	1	14	WORD_B	15050
5	[1:5]: counter 1ms		0	1	16	WORD_B	19435

9.2.1.3 “Digital“ tab

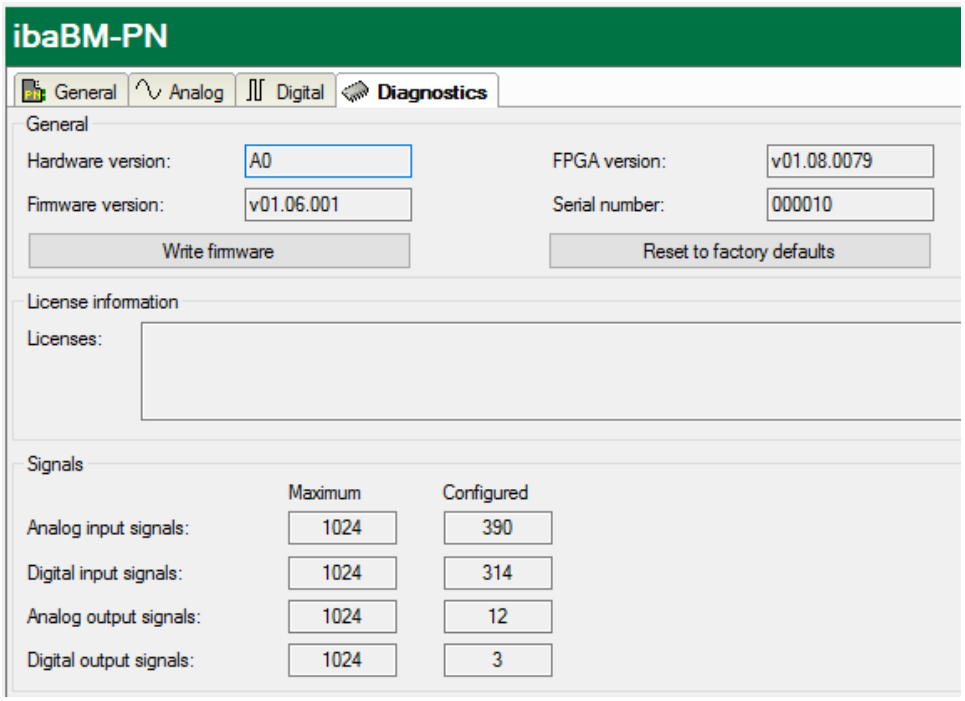
If digital signals have been configured in the modules „Device slot“ and the configuration has been transferred to ibaBM-PN, you will see here an overview of all acquired digital signals with an online overview of the currently acquired values.



	Name	Symbol	Device	Slot	Address	Bit no.	Actual
	Source: (1) Device slot						
0	[1.0]: clock memory 0.1s		0	1	22	0	1
1	[1.1]: clock memory 0.2s		0	1	22	1	1
2	[1.2]: clock memory 0.4s		0	1	22	2	0
3	[1.3]: clock memory 0.5s		0	1	22	3	1
4	[1.4]: clock memory 0.8s		0	1	22	4	0
5	[1.5]: clock memory 1.0s		0	1	22	5	0
6	[1.6]: clock memory 1.6s		0	1	22	6	0
7	[1.7]: clock memory 2.0s		0	1	22	7	0

9.2.1.4 “Diagnostics“ tab

On the “Diagnostics“ tab, the current versions of hardware, firmware and FPGA firmware as well as the serial number and, if available, additional licenses are displayed. Moreover, you can carry out an update of the firmware and reset the device to the factory settings.



❑ Firmware update

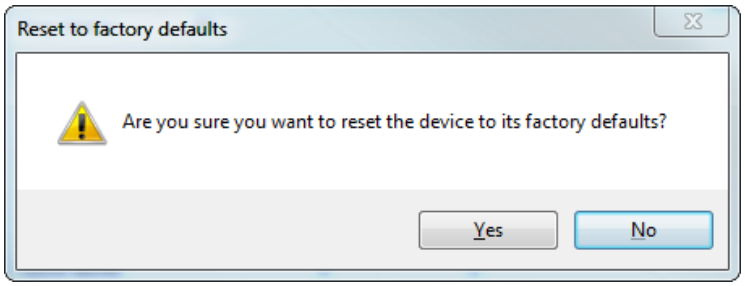
With the <Write firmware> button, you can install firmware updates. Please select the update file „bmpn_v[xx.yy.zzz].iba“ in the browser and start the update with <OK>.

Important note

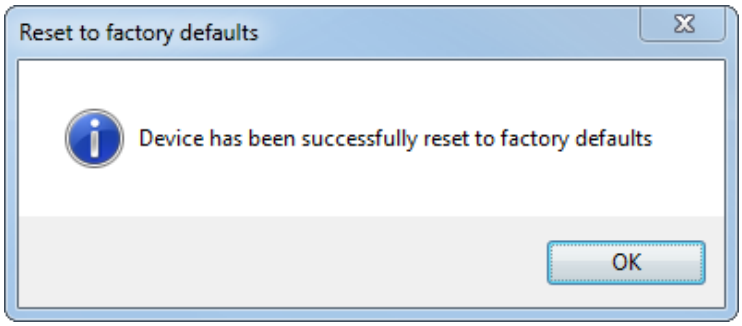
This procedure might take some minutes and must not be interrupted. As soon as the process has been finished, the device restarts automatically.

❑ Reset to factory defaults

Having opened the following dialog by clicking on the button <Reset to factory de-faults>, all settings are reset to factory settings by confirming with <Yes>.



Finally, the following message is shown:



❑ Enter license code

The button <Enter license code> opens a dialog in which you enter the numeric key for activation.

Note

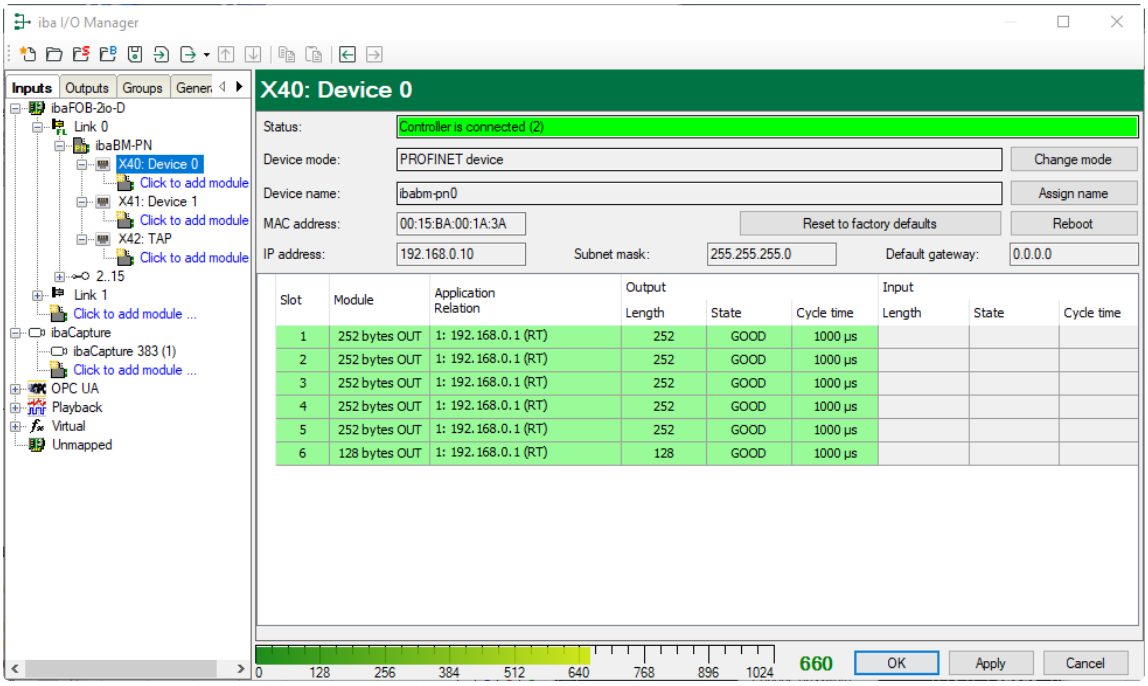
Licenses are always bound to a device, i.e. they are not portable between devices.

❑ Signals

Number of maximum configurable and currently configured signals

9.2.2 „Device 0/1“ node

The „Device 0/1“ node shows information about the respective internal PROFINET device: the current status, the PROFINET device name, the MAC address and the slot configuration.



❑ Status, Device mode, Device name, MAC address
Display of current states/values

❑ IP address, Subnet mask, Default gateway
Display of current states/values

❑ Change mode
A click on the button <Change mode> opens a dialog for setting the device mode. The following options are available:

- PROFINET Device: normal operating mode as PROFINET device
- SINAMICS Emulation: Mode for data acquisition at the SINAMICS Link with only one participant. Description of the settings, see chapter 9.2.8.4.

❑ Assign name
A click on the button <Assign name> opens an entry form, where you can enter a device name.

❑ Reset to factory defaults
With a click on the button <Reset to factory defaults> all settings of the PROFINET device will be reset to factory defaults, see chapter 9.2.1.4.

❑ Reboot
A click on the button <Reboot> reboots the PROFINET device.

Slot configuration table

The table shows the slot configuration. The configuration is written to the device by the connected PROFINET controller. The columns have the following meanings:

❑ Slot
Slot number

❑ Module
Module type

❑ Application Relation
Each PN controller can be connected to one or more slots, but each slot is assigned to only one PN controller. The „Application relation“ column shows the index and the IP address of the connected PN controller for that slot.
If the PROFINET device is operated as S2 device, the index and IP addresses of both PN controllers are displayed in the column.

❑ Output/Input
A slot can consist of output and input bytes.

❑ Length
Size of the data bytes

❑ State
The state is indicated by a description and a color:

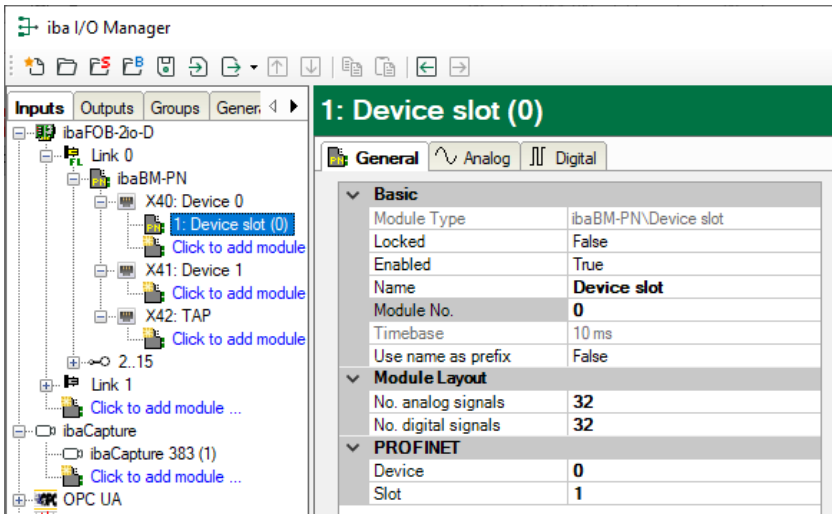
- Green: a controller is connected and the slot state is GOOD
- Orange: a controller is connected and the slot state is BAD, e.g. the controller is in STOP.
- Red: no controller is connected

❑ Cycle time
Cycle duration

9.2.3 “Device slot“ module

The module „device slot“ is only available underneath a device node.

9.2.3.1 “General“ tab



Basic settings

❑ Module type, Locked, Enabled, Name, Timebase, Use name as prefix
see chapter 9.2.1.1.

❑ Module No.
Logical module no. for clearly referencing of signals, e.g., in expressions in virtual modules and ibaAnalyzer.

Advanced

❑ No. analog signals
Defining the number of analog signals for this module (max. 252).

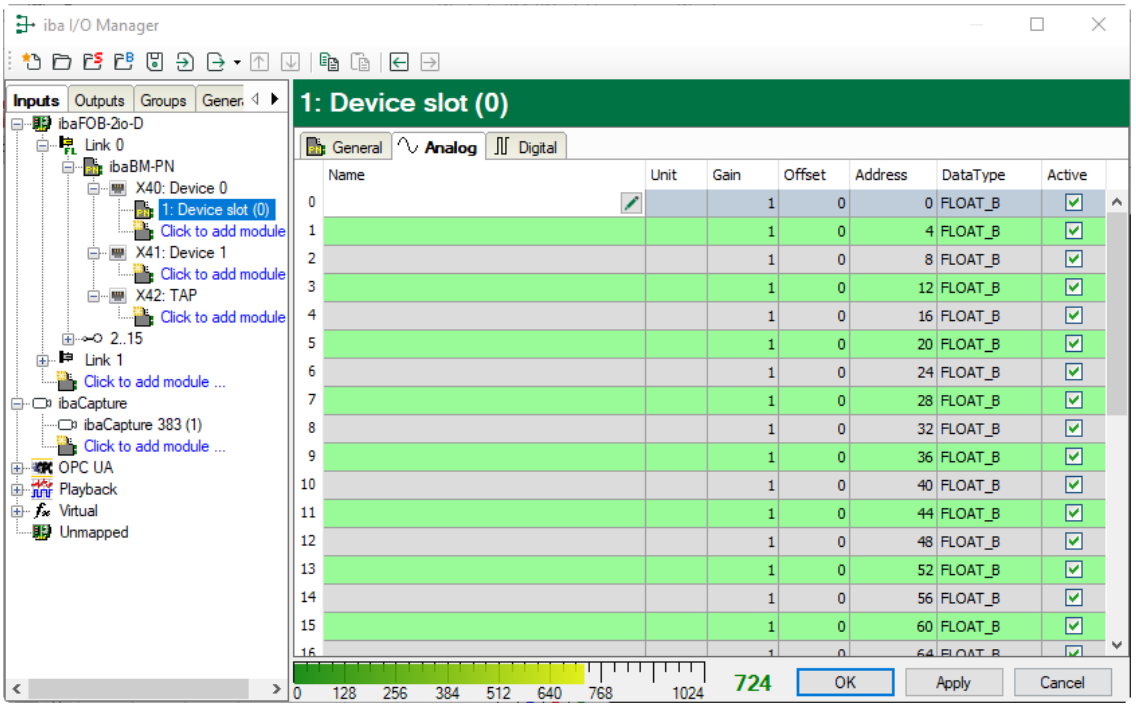
❑ No. digital signals
Defining the number of analog signals for this module (max. 1024).

PROFINET

❑ Device
Assigning the module to device 0 or 1

❑ Slot
Assigning the module to a specific slot of the device.

9.2.3.2 “Analog“ tab



Enter the analog signals you want to acquire in sequential order here. The individual columns in the signal list have the following meanings:

❑ Name
Here, you can enter a signal name and additionally two comments when clicking the symbol in the signal name field.

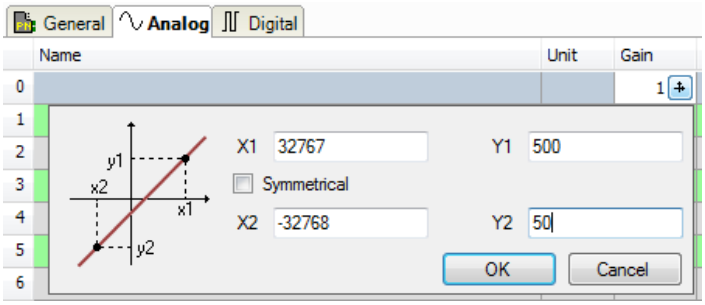
❑ Unit
Here, you can enter the physical unit of the analog value.

❑ Gain / Offset
Gradient (Gain) and y axis intercept (Offset) of a linear equation. You can convert a standardized and unitless transmitted value into a physical value.

Example

For a SIMATIC ET200 AI/AO module, a +/-10V signal with a value range of -27648 … 27648 (equals -10V … +10V) is transferred. Within the control program, the transferred value has a physical meaning (e. g. temperature 50°C … 500°C). You can choose by Gain/Offset a conversion of the value. The no unit value is then recorded with the physical unit.

For making the calculation of Gain/Offset easier, an auxiliary dialog appears when clicking on the co-ordinate cross icon in the "Gain" or "Offset" field. In this dialog, you only enter two points in the line equation. Gain and offset are then calculated automatically.



Data type of the signal. Available data types for analog signals:

Data type		Description	Value range
Big Endian	Little Endian		
BYTE	BYTE	8 Bit without plus/minus sign	0 to 255
INT_B	INT	16 Bit with plus minus sign	-32768 to 32767
WORD_B	WORD	16 Bit without plus/minus sign	0 to 65535
DINT_B	DINT	32 Bit with plus/minus sign	-2147483647 to 2147483647
DWORD_B	DWORD	32 Bit without plus/minus sign	0 to 4294967295
FLOAT_B	FLOAT	IEEE754; Single Precision; 32 Bit floating point	$1.175 \cdot 10^{-38}$ to $3.403 \cdot 10^{38}$
S5_FLOAT_B	S5_FLOAT	Simatic S5 Float Format, 32 Bit	±0.1701412 e+39 ... ±0.1469368 e-38

Tip

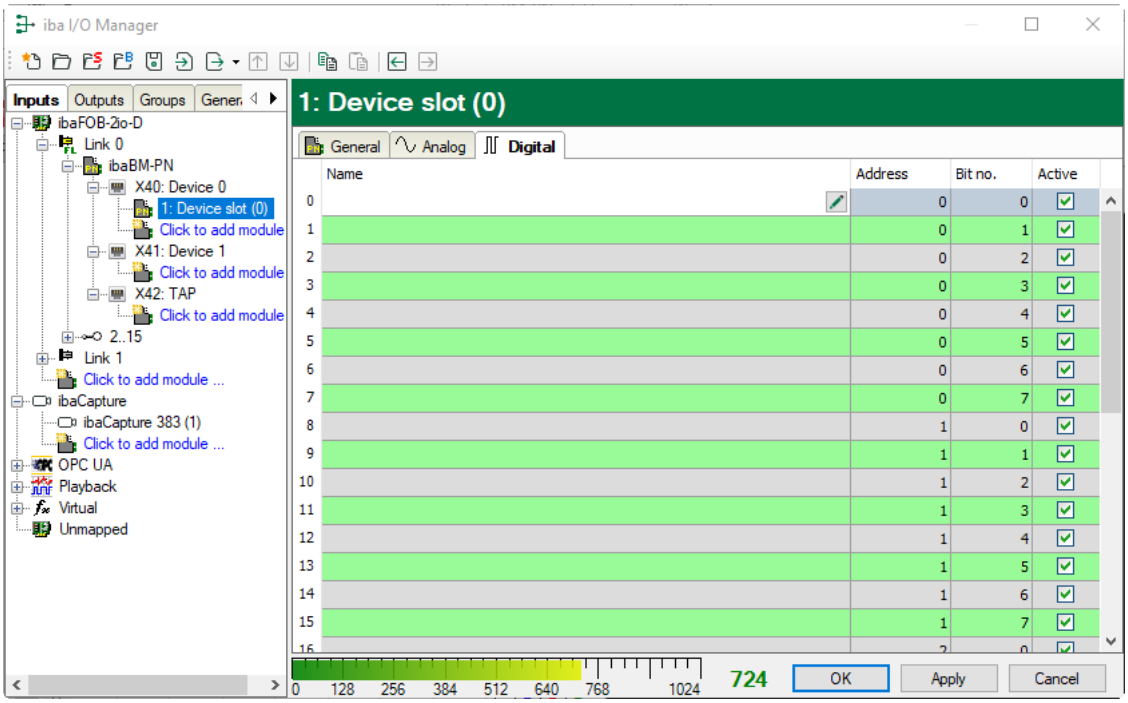
When entering the signals of a device in sequential order, only the data types have to be selected for all signals. The byte addresses of the signals are then calculated automatically. For this purpose, please enter only for the first signal of the desired device the correct byte address into the address column and then click on the column header. Starting with the first address (where the cursor is positioned) and considering all data types, the addresses of the other signals of this device are filled in automatically.

❑ Active

Only when this option is selected, the signal is acquired and considered when checking the number of licensed signals.

More columns can be displayed or hidden, using the context menu (right mouse-click on the header).

9.2.3.3 “Digital“ tab



Enter here the digital signals you want to record in sequential order. The columns in the signal list have the following meaning:

❑ Name

Here, you can enter a signal name and additionally two comments when clicking the symbol in the signal name field.

❑ Address

The byte address of the signal within the input and output range of the device. The address range always begins with the address 0.

❑ Bit No.

Enter the bit no within the byte defined as “Address“.

❑ Active

Only when this option is selected, the signal is acquired and is also considered when checking the number of licensed signals.

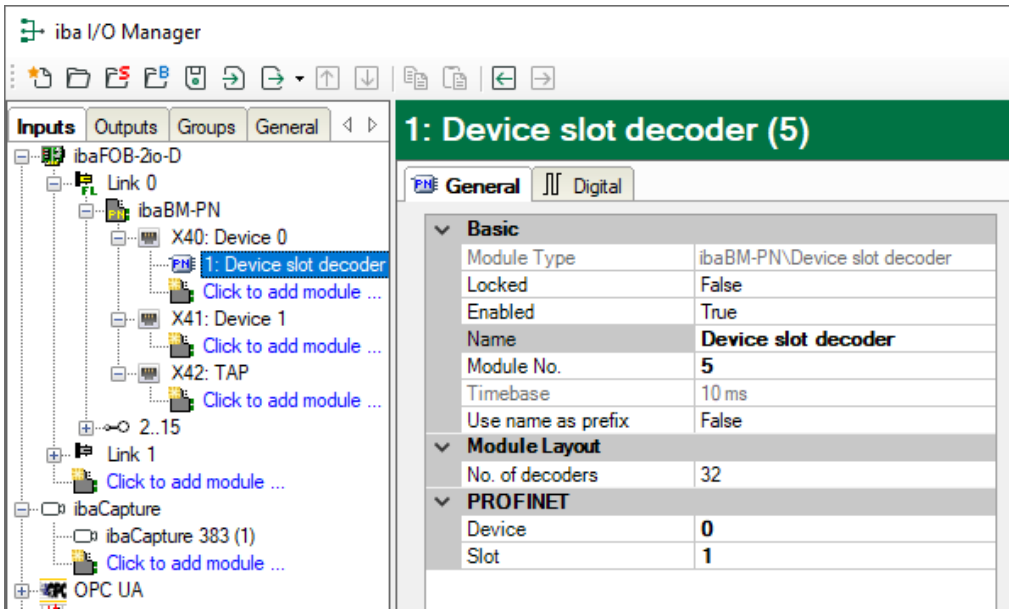
More columns can be displayed or hidden, using the context menu (right mouse-click on the header).

9.2.4 “Device slot decoder“ module

The module „Device slot decoder“ is only available underneath a device node.

The "Device slot decoder" module is suited for acquiring large amounts of digital signals of a device. The signals are sent as bytes, words, or double words from a controller to a device.

9.2.4.1 “General“ tab



Basic settings

❑ Locked, Enabled, Name, Module No., Timebase, Use name as prefix
see chapter 9.2.1.1.

Module Layout

❑ No. of decoders
Defining the number of signals for this module that can be decoded into digital signals.

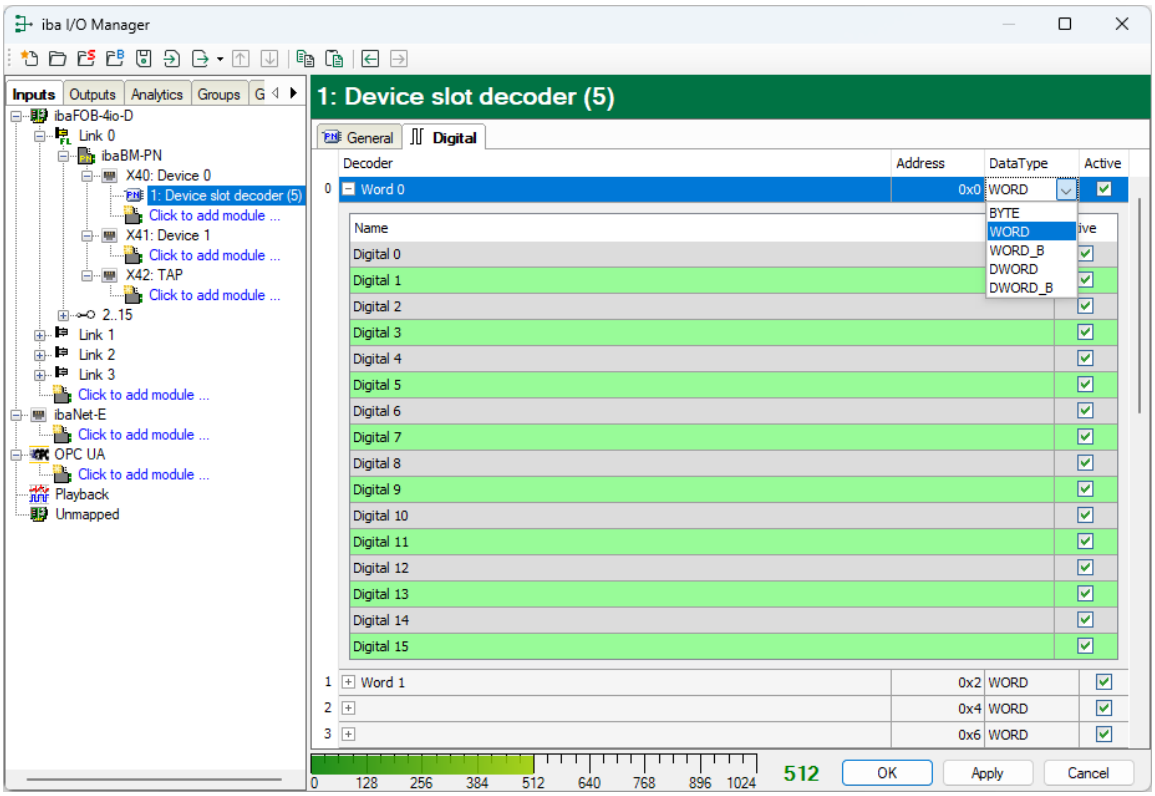
PROFINET

❑ Device
Specify here which PROFINET device is to be used in the ibaBM-PN.

❑ Slot
Specify the slot of the PROFINET device that is used for the data of this module.

9.2.4.2 “Digital” tab

The signals are declared in two steps. First, the signals you want to acquire as source for the digital signals have to be defined in sequential order.



❑ Decoder

Assign a meaningful name to the source signal.

❑ Address

The byte address of the signal within the input or output data range of the device. The address range always begins with the address 0.

❑ Data type

Data type of the signal. The following are available: BYTE, WORD, WORD_B, DWORD, DWORD_B.

❑ Active

With this option enabled, the source signal is acquired with its digital signals and considered when checking the number of licensed signals. Individual digital signals can be disabled.

For every source signal, the list of digital signals can be opened by clicking on the plus sign. Here, the single bits of the source signal are defined.

❑ Name

Assign a meaningful name to the individual digital signals.

❑ Active

Only when this option is selected, the signal is acquired and considered when checking the number of licensed signals.

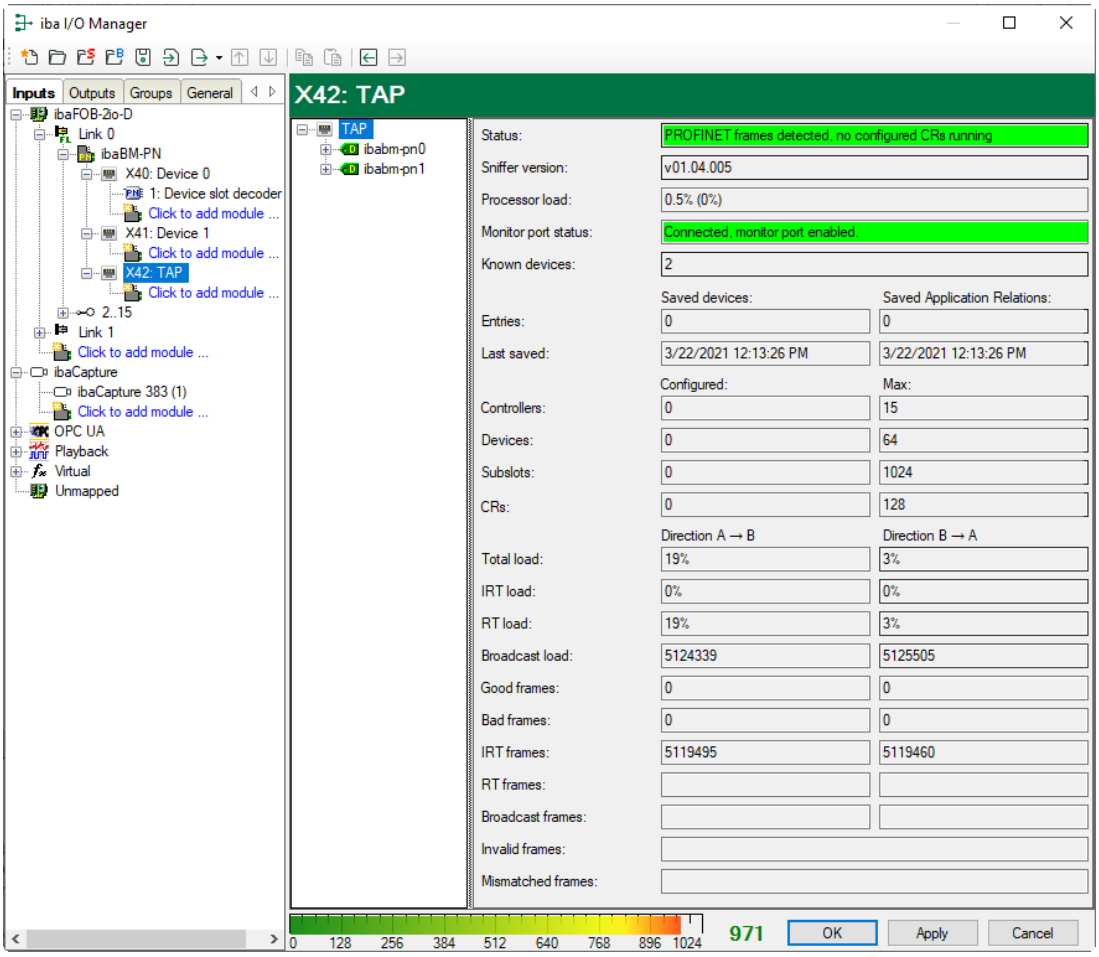
Note

Only the activated digital signals are considered when counting the number of licensed signals, hence no additional signal for the source signal.

ibaBM-PN only acquires one analog value, which is then decoded by ibaPDA. Thus, the range of analog values is used in ibaBM-PN for acquiring large amounts of digital signals.

9.2.5 „TAP“ Node

The „TAP“ node shows diagnostic information regarding the sniffer function.



❑ Device list

Displays the PROFINET devices detected in the network.

- Bold: Device detected in the network and referenced at least to one sniffer module
- Normal: Device detected in the network and not referenced to a sniffer module

❑ Status, Sniffer version

Displays the current values

❑ Processor load

CPU load due to sniffing

Specification in brackets: Workload of internal communication channels

❑ Monitor port status

Current status of the monitor port

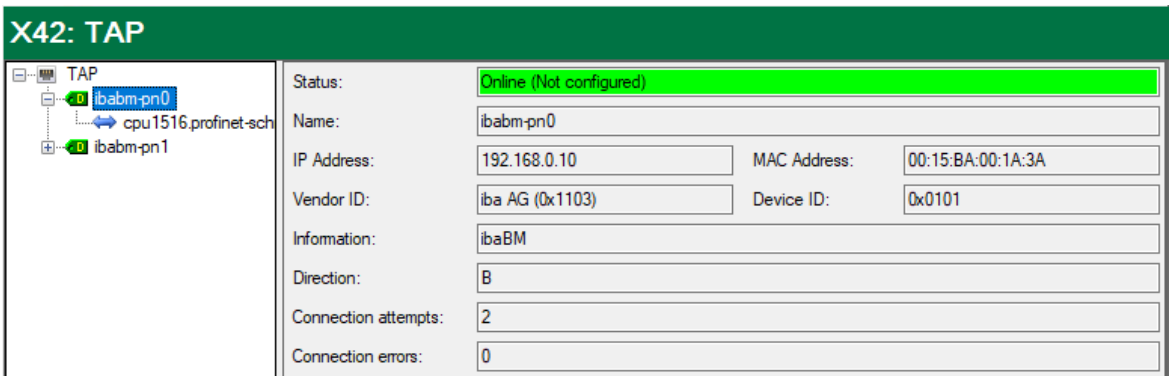
❑ Known devices
Number of devices detected in the network

❑ Entries, Last saved
Number of the saved PROFINET devices and their applications relations as well as the time period since the last time they were saved. Only data of configured and enabled devices will be saved.

❑ Controllers, Devices, Subslots, CRs
Number of the used, configured and maximum allowed controllers, devices, subslots or CRs.

❑ Total, IRT, RT load
Respective percentage utilization of communication bandwidth

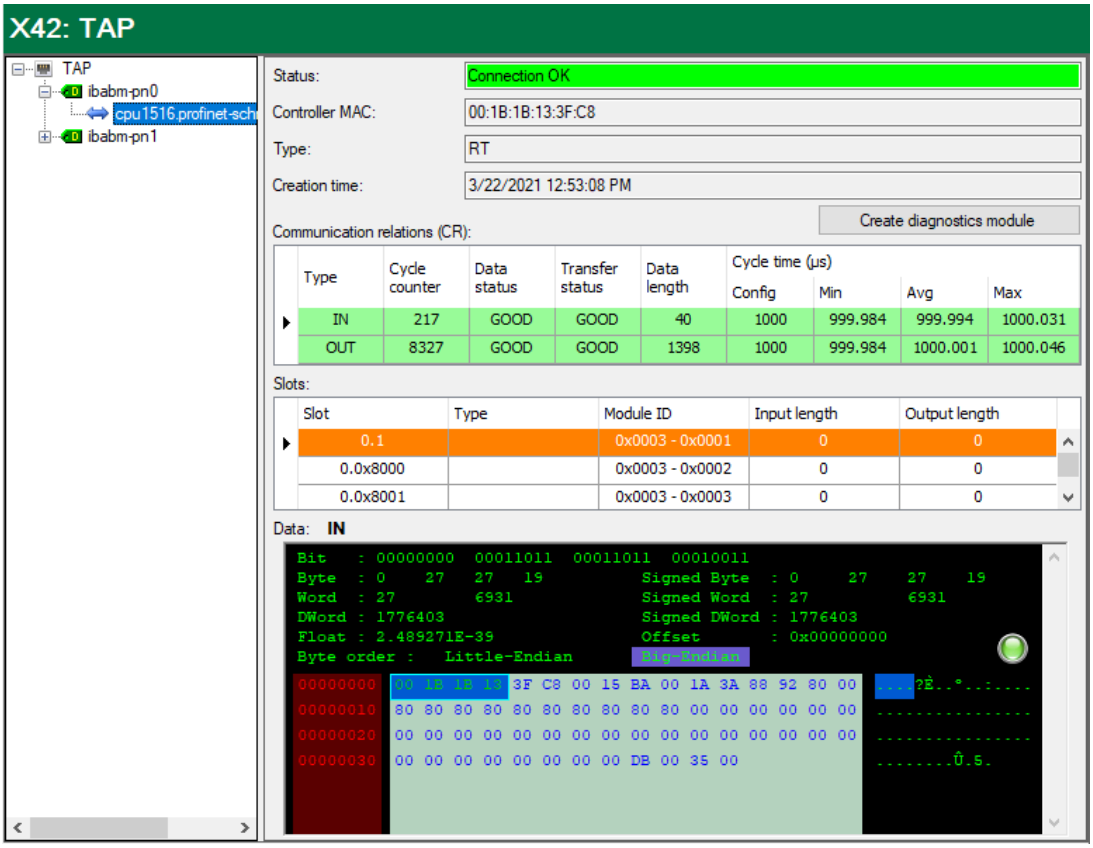
❑ Good, Bad, IRT, RT frames
Respective consecutive counter of the frames detected



❑ Status, name, IP address, MAC address, vendor ID, device ID, information
Displays the current values

❑ Direction
Display on which side (A or B) of the TAP the device was detected.
The assignment which physical side of the TAP is A or B is made by the device. For technical reasons, the assignment A or B may change after each restart.

❑ Connection attempts, Connection errors
Counters of connection attempts and errors



❑ Application relations (AR)
Displays the current values
A tab is displayed per detected application relation, this appears when e.g. „shared devices“ is used.

❑ Status, controller MAC, type, creation time
Displays the current values

❑ Communication relations (CR)
Displays the used Frame ID, cycle counter, data status, transfer status, data length, cycle time and timeout for both communication directions.

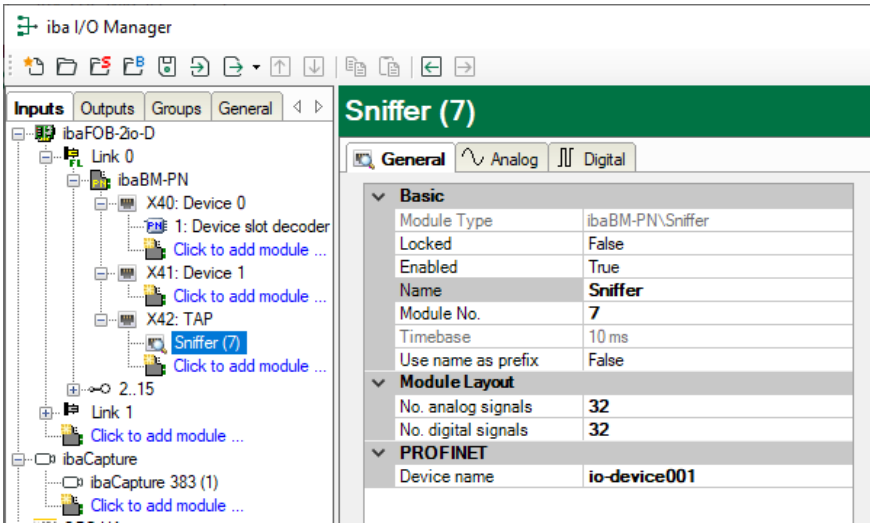
❑ Slots
Displays the configured subslots with subslot number, type, module ID, input length and output length.

❑ Hex viewer
Display of the binary data of the selected subslot.

9.2.6 „Sniffer“ module

The sniffer module is only available underneath a TAP node.

9.2.6.1 „General“ tab



Basic settings

❑ Module type, Locked, Enabled, Name, Timebase, Use name as prefix
see chapter 9.2.1.1.

❑ Module No.
Logical module no. for clearly referencing of signals, e.g. in expressions in virtual modules and ibaAnalyzer

Module Layout

❑ No. analog signals
Defining the number of analog signals for this module (max. 1000)

❑ No. digital signals
Defining the number of digital signals for this module (max. 1000)

PROFINET

❑ Device name
Assignment of the module to a device, the selectable devices are listed under "TAP".

9.2.6.2 „Analog“ tab

Sniffer (7)

General | Analog | Digital

	Name	Unit	Gain	Offset	I/O	Slot	Subslot	Address	DataType	Active
0	IN #0		1	0	In	1	1	0	WORD_B	☑
1	IN #1		1	0	In	1	1	2	WORD_B	☑
2	IN #2		1	0	In	1	1	4	WORD_B	☑
3	IN #3		1	0	In	1	1	6	WORD_B	☑
4	IN #4		1	0	In	2	1	0	WORD_B	☑
5	IN #5		1	0	In	2	1	2	WORD_B	☑
6	IN #6		1	0	In	2	1	4	WORD_B	☑
7	IN #7		1	0	In	3	1	6	WORD_B	☑
8	IN #8		1	0	In	3	1	0	BYTE	☑
9			1	0	In	3	1	1	BYTE	☐
10	OUT #0 Device number		1	0	Out	4	1	0	WORD_B	☑
11	OUT #1 counter 10ms		1	0	Out	4	1	2	WORD_B	☑
12	OUT #2 counter		1	0	Out	4	1	4	WORD_B	☑
13	OUT #3 counter		1	0	Out	4	1	6	WORD_B	☑
14	OUT #4 counter		1	0	Out	5	1	0	WORD_B	☑
15	OUT #5 counter		1	0	Out	5	1	2	WORD_B	☑
16	OUT #6 counter		1	0	Out	5	1	4	WORD_B	☑
17	OUT #7 counter		1	0	Out	5	1	6	WORD_B	☑
18	OUT #8 Clockbyte		1	0	Out	6	1	0	BYTE	☑
19			1	0	Out	6	1	1	BYTE	☐

Enter the analog signals you want to record in sequential order. The columns of the signal list have the following meaning:

❑ Name

You can enter a signal name and additional two comments when clicking the  symbol in the signal name field.

❑ Unit

Physical unit of the signal

❑ Gain / Offset

Gradient (gain) axis intercept y (offset) of a linear equitation. You can convert a standardized and unitless transmitted value into a physical value.

❑ I/O

Input or output signals from the controller view

❑ Slot, Subslot

Slot and subslot of the signals

❑ Address

Byte address of the signal within a subslot. The adress range starts with address 0.

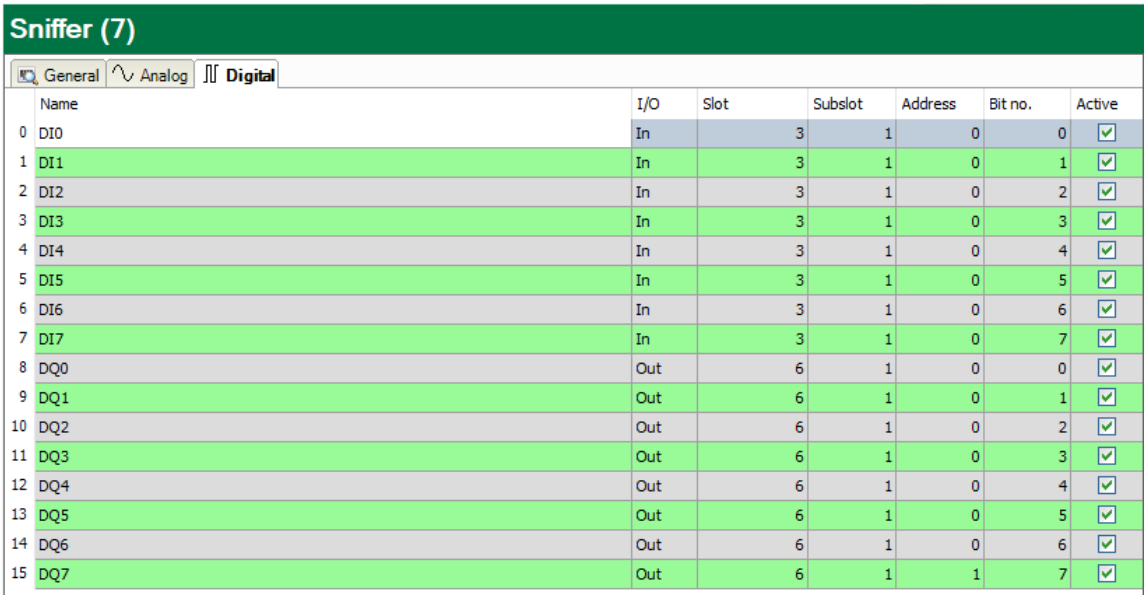
❑ Data type

see chapter 9.2.3

❑ Active

Only when this option is selected, the signal is acquired and also considered when checking the number of licensed signals.

9.2.6.3 „Digital“ tab



	Name	I/O	Slot	Subslot	Address	Bit no.	Active
0	DI0	In	3	1	0	0	☑
1	DI1	In	3	1	0	1	☑
2	DI2	In	3	1	0	2	☑
3	DI3	In	3	1	0	3	☑
4	DI4	In	3	1	0	4	☑
5	DI5	In	3	1	0	5	☑
6	DI6	In	3	1	0	6	☑
7	DI7	In	3	1	0	7	☑
8	DQ0	Out	6	1	0	0	☑
9	DQ1	Out	6	1	0	1	☑
10	DQ2	Out	6	1	0	2	☑
11	DQ3	Out	6	1	0	3	☑
12	DQ4	Out	6	1	0	4	☑
13	DQ5	Out	6	1	0	5	☑
14	DQ6	Out	6	1	0	6	☑
15	DQ7	Out	6	1	1	7	☑

Enter here the digital signals you want to record in sequential order. The columns of the signal list have the following meaning:

❑ Name
You can enter a signal name and additional two comments when clicking the symbol in the signal name field.

❑ I/O
see chapter 9.2.6.2

❑ Slot, Subslot
see chapter 9.2.6.2

❑ Address
see chapter 9.2.6.2

❑ Bit no.
Bit number within with the byte specified in the address

❑ Active
Only when this option is selected, the signal is acquired and considered when checking the number of licensed signals.

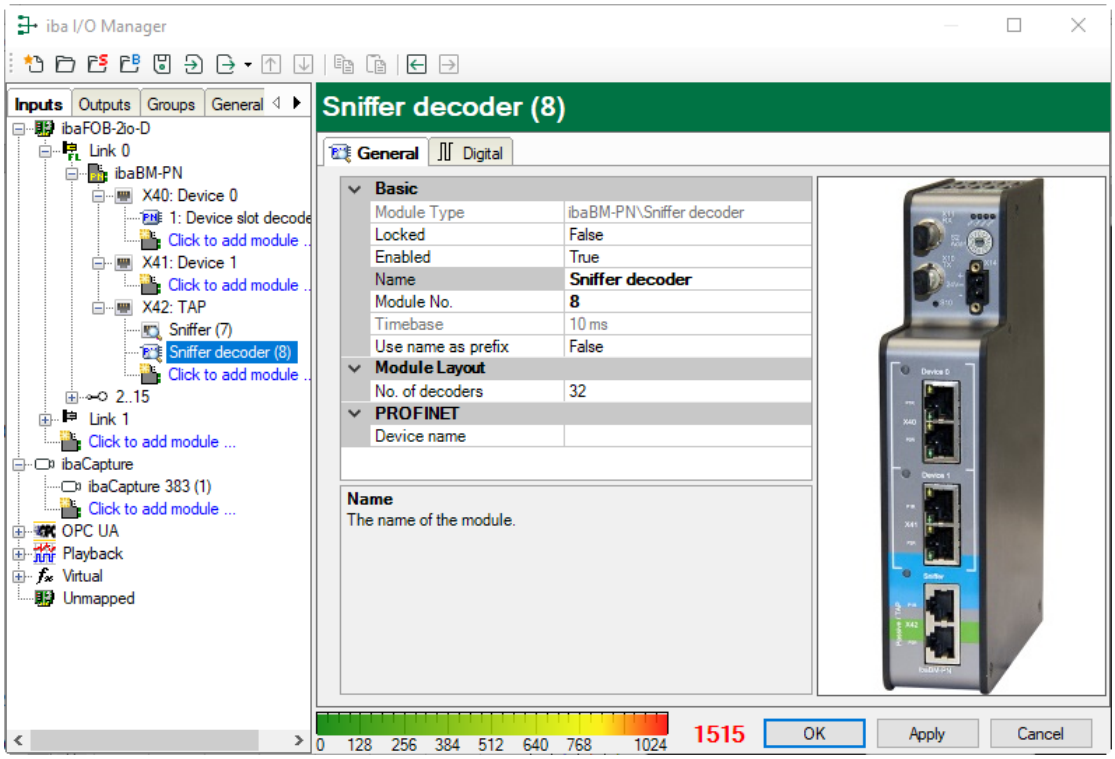
You can add further columns by clicking the right mouse button in heading or hide them.

9.2.7 „Sniffer decoder“ module

The “Sniffer decoder” module is only available underneath a TAP node.

The "Sniffer decoder" module is suited for acquiring large amounts of digital signals in the form of bytes, words, or double words on PROFINET (e.g. status words of drives).

9.2.7.1 „General“ tab



Basic settings

❑ Locked, Enabled, Name, Module No., Timebase, Use name as prefix
see chapter 9.2.1.1.

Module layout

❑ No. of decoders

Defining the number of signals for this module that can be decoded into digital signals.

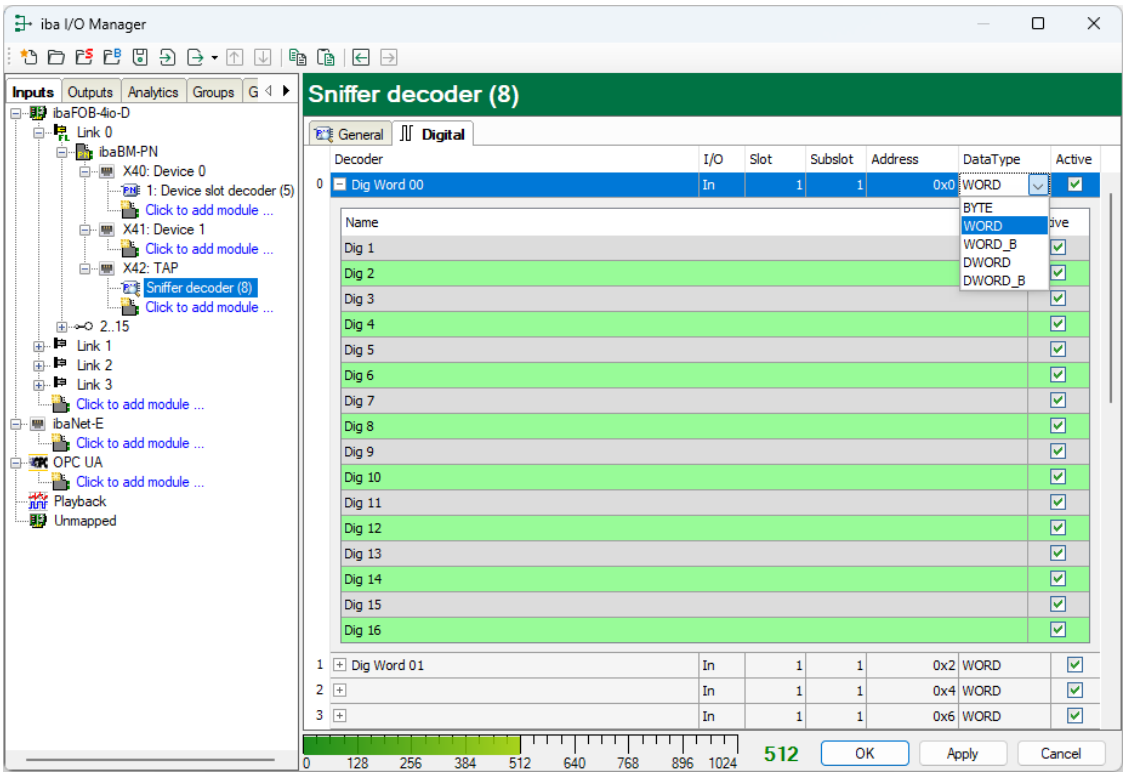
PROFINET

❑ Device name

Name of the PROFINET device from which you want to sniff data.

9.2.7.2 “Digital” tab

The signals are declared in two steps. First, the signals you want to acquire as source for the digital signals have to be defined in sequential order.



Enter here byte, word, or double word signals, which contain the digital signals in sequential order. The columns in the signal list have the following meaning:

❑ Decoder

Assign a meaningful name to the source signal.

❑ I/O

Select the I/O type of the signal:
In: Input signal from the controller´s perspective
Out:Output signal from the controller´s perspective

❑ Slot

Enter the number of the slot to which the signal is assigned.

❑ Subslot

Enter the number of the subslot to which the signal is assigned.

❑ Address

The byte address of the signal within the input or output data range of the slot. The address range always begins with the address 0.

❑ Data type

Data type of the signal. The following are available: BYTE, WORD, WORD_B, DWORD, DWORD_B.

❑ Active

With this option enabled, the source signal is acquired with its digital signals and considered when checking the number of licensed signals. Individual digital signals can be disabled.

For every source signal, the list of digital signals can be opened by clicking on the plus sign. Here, the single bits of the source signal are defined.

❑ Name

Assign a meaningful name to the individual digital signals.

❑ Active

Only when this option is selected, the signal is acquired and considered when checking the number of licensed signals.

Note

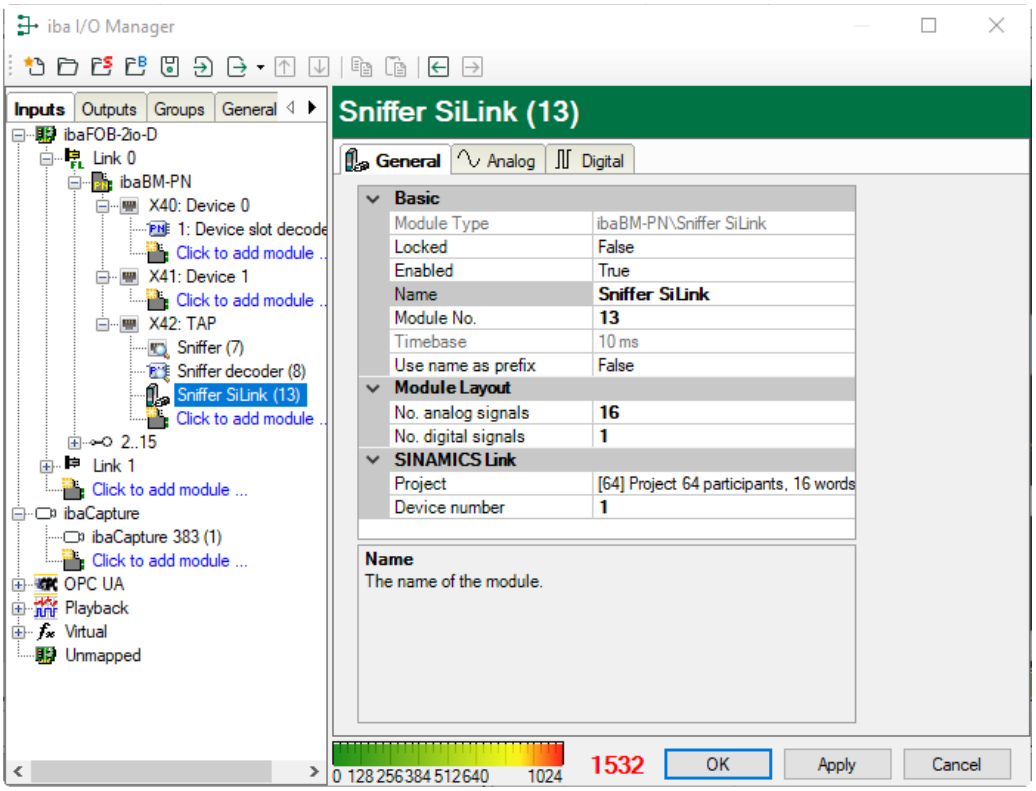
Only the activated digital signals are considered when counting the number of licensed signals, hence no additional signal for the source signal.

ibaBM-PN only acquires one analog value, which is then decoded by ibaPDA. Thus, the range of analog values is used in ibaBM-PN for acquiring large amounts of digital signals.

9.2.8 „Sniffer SiLink“ module

The “Sniffer SiLink” module is only available underneath a TAP node. Each SINAMICS controller corresponds to one module "Sniffer SiLink" in ibaPDA. Each controller is identified by its own device number (ID). This is defined in the SINAMICS project engineering.

9.2.8.1 „General“ tab



Basic settings

❑ Module type, Locked, Enabled, Name, Timebase, Use name as prefix
see chapter 9.2.1.1.

❑ Module No.
Logical module no. for clearly referencing of signals, e.g., in expressions in virtual modules and ibaAnalyzer

Module Layout

❑ No. analog signals
Defining the number of analog signals for this module (default 16)

❑ No. digital signals
Defining the number of digital signals for this module (default 1)

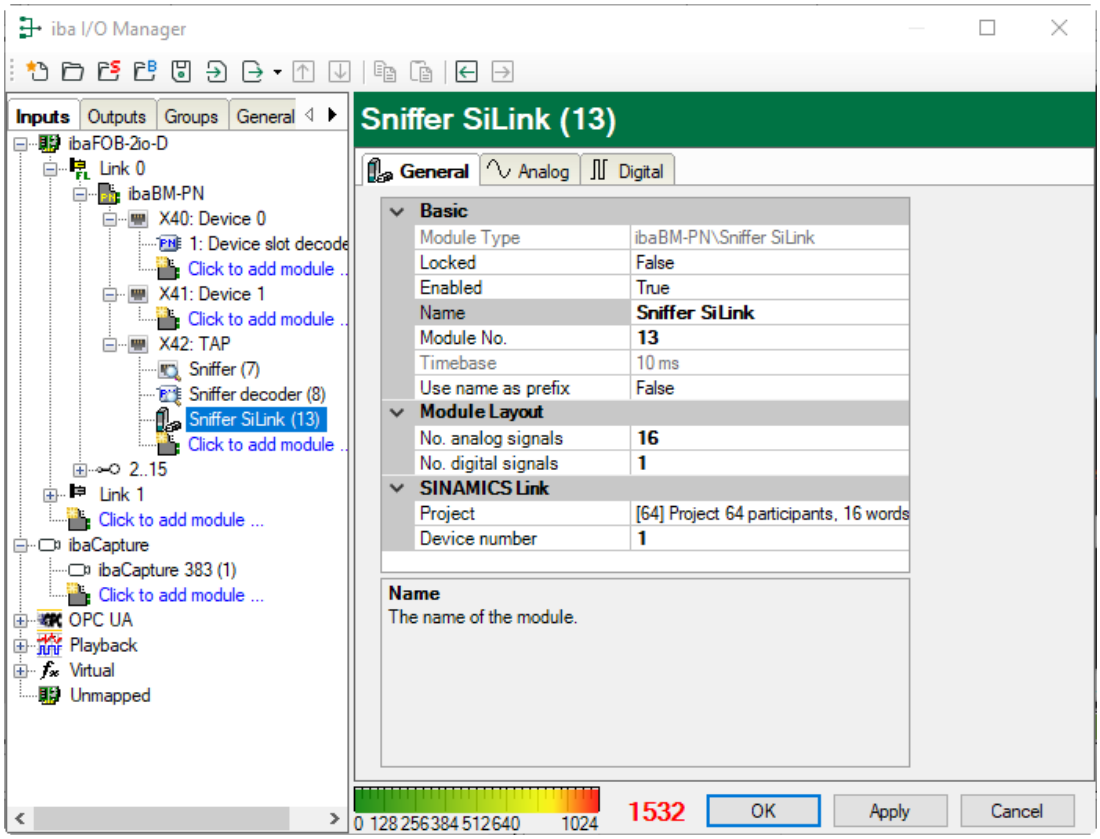
SINAMICS Link

❑ Project
The project determines the number of devices and the number of data words per device. The following are available:

- 64 participants, 16 words
- 16 participants, 16 words
- 12 participants, 24 words
- 8 participants, 32 words

❑ Device number
Device number of the controller on the SINAMICS Link

9.2.8.2 „Analog“ tab



Enter the analog signals you want to record in sequential order. The columns of the signal list have the following meaning:

❑ Name
You can enter a signal name and additional two comments when clicking the symbol in the name field.

❑ Unit
Physical unit of the signal

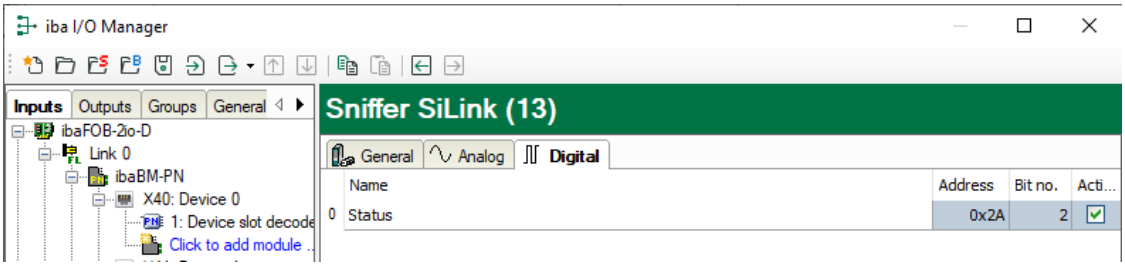
❑ Gain / Offset
Gradient (gain) axis intercept y (offset) of a linear equitation. You can convert a standardized and unitless transmitted value into a physical value.

❑ Address
Byte address of the signal. The adress range starts with address 0.

❑ Data type
see chapter 9.2.3.2

❑ Active
Only when this option is selected, the signal is acquired and also considered when checking the number of licensed signals.

9.2.8.3 “Digtal“ tab



❑ Name

Default name: “Status”. You can enter two comments when clicking the symbol.

❑ Address

Byte address of the signal

❑ Bit no.

Bit number within with the bytes specified in the address

❑ Active

Only when this option is selected, the signal is acquired and considered when checking the number of licensed signals.

You can add further columns by clicking the right mouse button in heading or hide them.

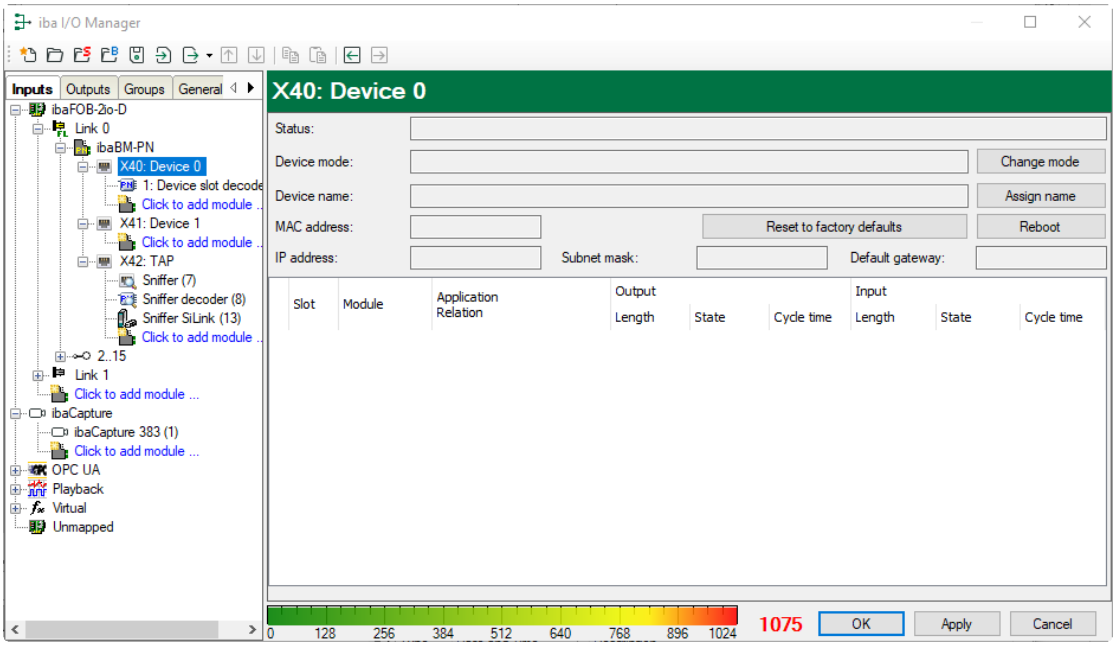
9.2.8.4 Special features when acquiring data at the SINAMICS Link with only one participant

The prerequisite for data acquisition at the SINAMICS Link with only one participant is that one of the two PROFINET devices is switched to the SINAMICS emulation mode. This PROFINET device then emulates a SINAMICS controller.

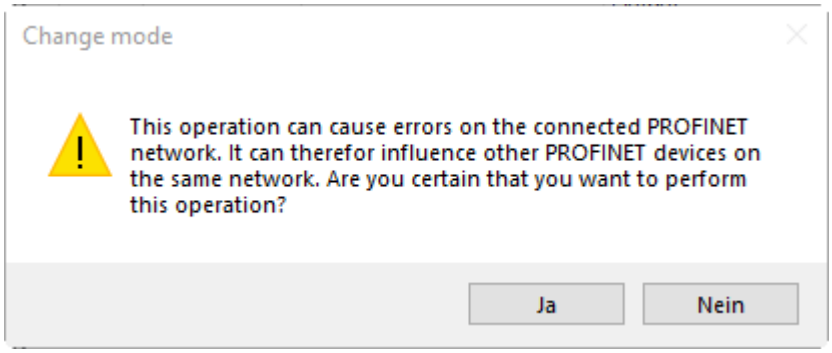
No modules can be configured on this PROFINET device. A "normal" operation as PROFINET device is not possible.

Proceeding:

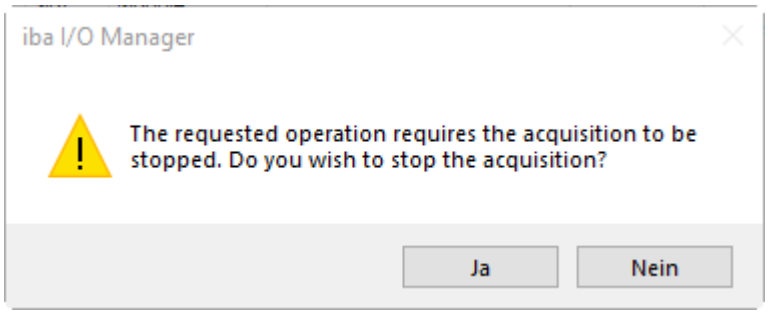
Select one of the Device 0/1 nodes in the module tree.



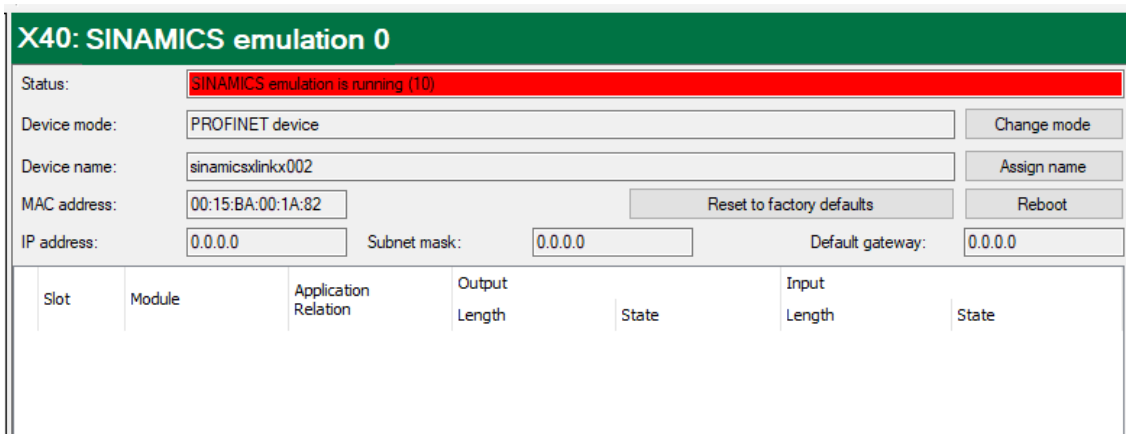
Click on the <Change mode> button and confirm the following warning message.



In the following dialog select the device mode “SINAMICS emulation” and confirm with <OK>.



The enabled mode is displayed in the *Device mode* field.



Port 1 of the PROFINET device with enabled SINAMICS emulation mode must be connected to a port of the TAP interface with a patch cable. At the TAP interface it is irrelevant which port is used.

The actual data acquisition is carried out with the "Sniffer SiLink" module, as when operating with several SINAMICS controllers, see chapter 9.2.8.

9.2.8.5 Notes on the exchange of an ibaBM-SiLink bus monitor

A bus monitor ibaBM-SiLink can be replaced in a SINAMICS Link by ibaBM-PN in a function-compatible way. The following conditions apply:

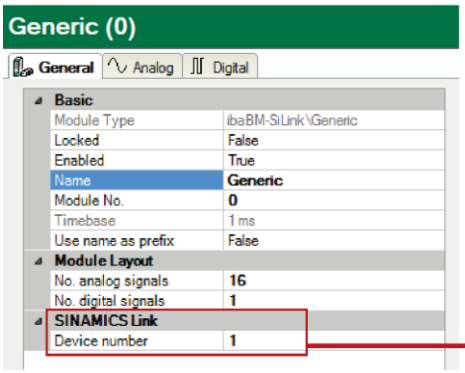
- ❑ The installation location within the SINAMICS Link is not relevant. The TAP interface must always be integrated in a linear structure.
- ❑ The combination of SINAMICS Link cables with PROFINET cables is not permitted for technical reasons.

The "Sniffer SiLink" modules in the ibaBM-PN device module must be newly configured in ibaPDA. Proceed as follows:

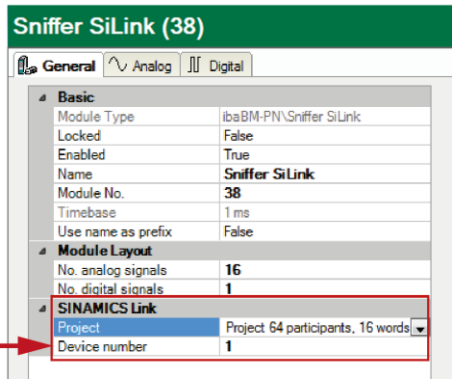
Configuration in ibaPDA

1. Add a "Sniffer SiLink" module for each controller to be acquired.
2. Copy the device number from the “General” tab of the ibaBM SiLink module to the “General” tab of the “Sniffer SiLink” module of ibaBM-PN.

ibaBM-SiLink

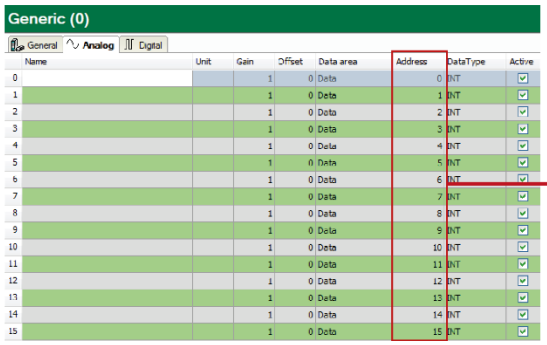


ibaBM-PN

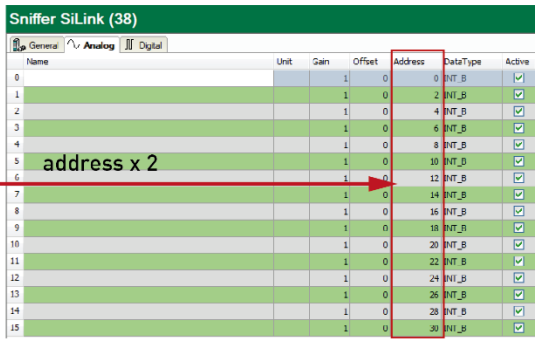


3. In the "Analog" tab, multiply the address from the ibaBM-SiLink device module by 2 and enter the address into the "Analog" tab of the “Sniffer SiLink” module.

ibaBM-SiLink



ibaBM-PN

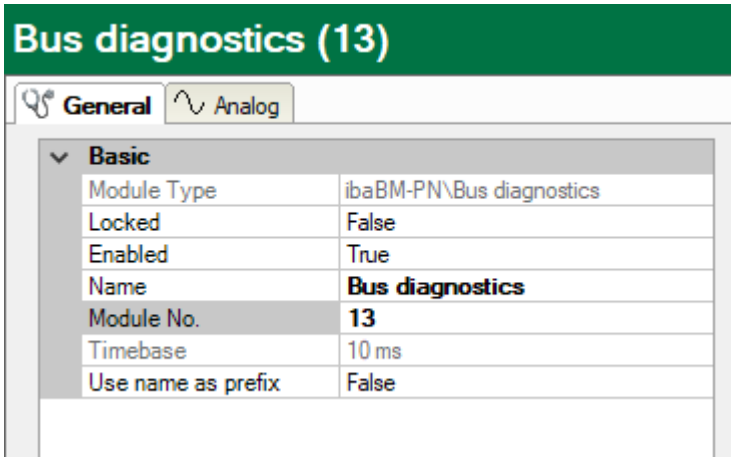


9.2.9 “Bus diagnostics” module

Predefined diagnostic signals to the connected PROFINET network can be acquired as signals in ibaPDA with the "Bus diagnostics" module.

For the meaning of the signals see chapter 9.2.5.

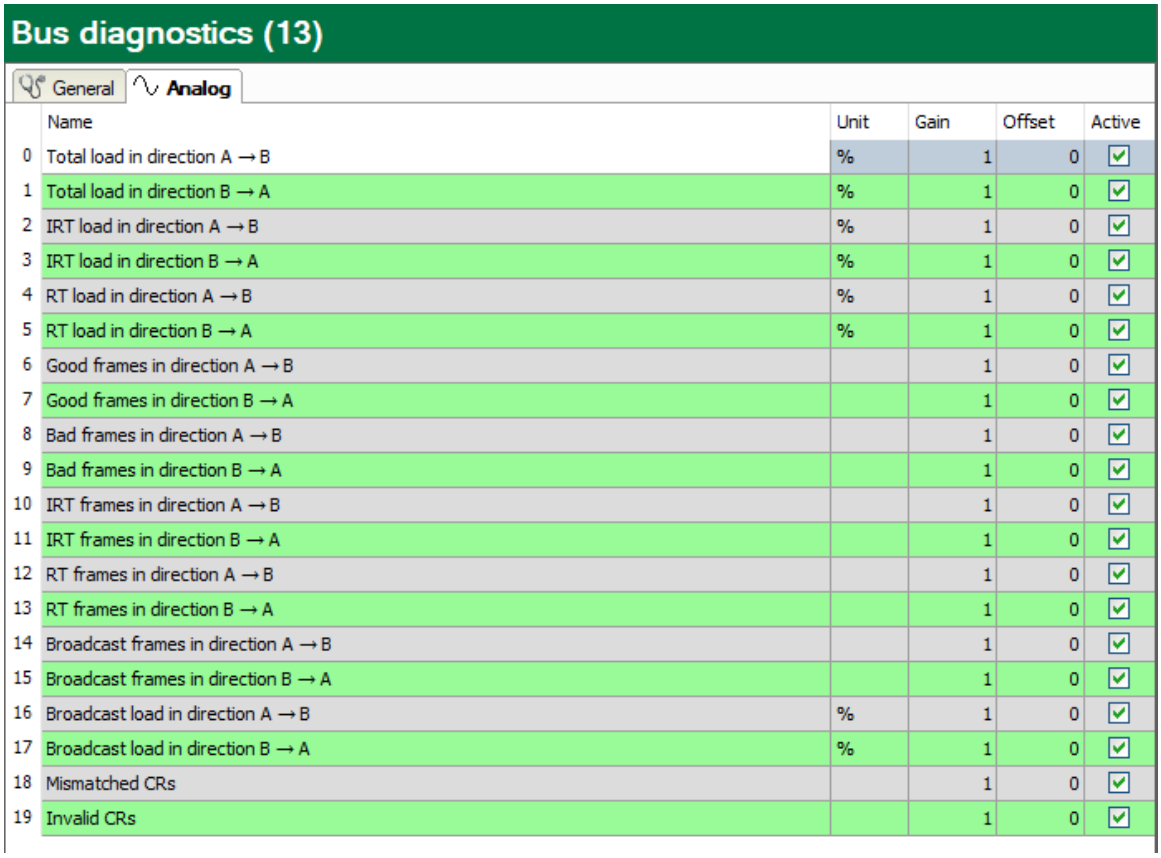
9.2.9.1 “General” tab



❑ Module type, Locked, Enabled, Name, Timebase, Use name as prefix
see chapter 9.2.1.1.

❑ Module No.
Logical module no. for clearly referencing of signals, e.g., in expressions in virtual modules and ibaAnalyzer.

9.2.9.2 “Analog” tab



	Name	Unit	Gain	Offset	Active
0	Total load in direction A → B	%	1	0	☑
1	Total load in direction B → A	%	1	0	☑
2	IRT load in direction A → B	%	1	0	☑
3	IRT load in direction B → A	%	1	0	☑
4	RT load in direction A → B	%	1	0	☑
5	RT load in direction B → A	%	1	0	☑
6	Good frames in direction A → B		1	0	☑
7	Good frames in direction B → A		1	0	☑
8	Bad frames in direction A → B		1	0	☑
9	Bad frames in direction B → A		1	0	☑
10	IRT frames in direction A → B		1	0	☑
11	IRT frames in direction B → A		1	0	☑
12	RT frames in direction A → B		1	0	☑
13	RT frames in direction B → A		1	0	☑
14	Broadcast frames in direction A → B		1	0	☑
15	Broadcast frames in direction B → A		1	0	☑
16	Broadcast load in direction A → B	%	1	0	☑
17	Broadcast load in direction B → A	%	1	0	☑
18	Mismatched CRs		1	0	☑
19	Invalid CRs		1	0	☑

❑ Name
The names are predefined. You can enter additional two comments when clicking the symbol in the signal name field.

❑ Unit
Physical unit of the signal.

❑ Gain / Offset
Gradient (Gain) and y axis intercept (Offset) of a linear equation. You can convert a standardized and unitless transmitted value into a physical value.

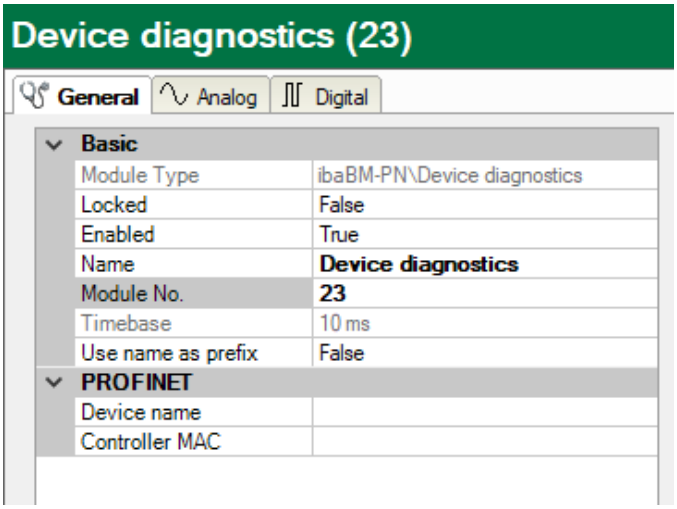
❑ Active
Only when this option is selected, the signal is acquired and considered when checking the number of licensed signals.

More columns can be displayed or hidden, using the context menu (right mouse-click on the header).

9.2.10 "Device diagnostics" module

Predefined diagnostic signals for a specific PROFINET device can be acquired as signals in ibaPDA using the "Device diagnostics" module.

9.2.10.1 "General" tab



❑ Module type, Locked, Enabled, Name, Timebase, Use name as prefix
see chapter 9.2.1.1.

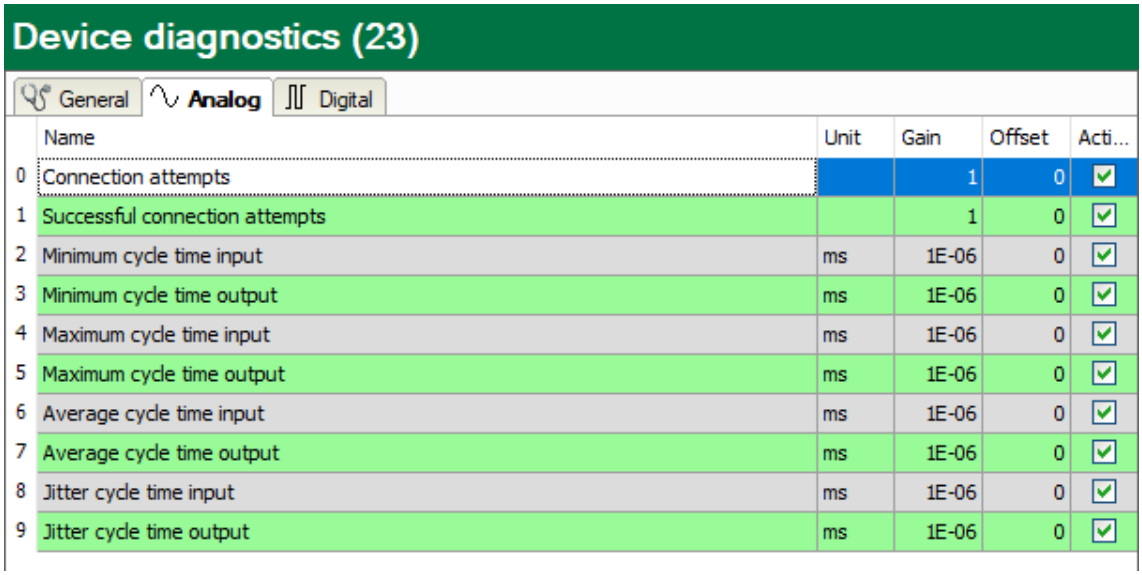
❑ Module No.
Logical module no. for clearly referencing of signals, e.g., in expressions in virtual modules and ibaAnalyzer.

PROFINET

❑ Device name
Assignment of the module to a device, the selectable devices are listed under "TAP".

❑ Controller MAC
Optional: MAC address of the connected PROFINET controller.
Only necessary if several controllers are connected to the device (shared device).

9.2.10.2 “Analog” tab



❑ Name

The names are predefined. You can enter additional two comments when clicking the symbol in the signal name field.

❑ Unit

Physical unit of the signal.

❑ Gain / Offset

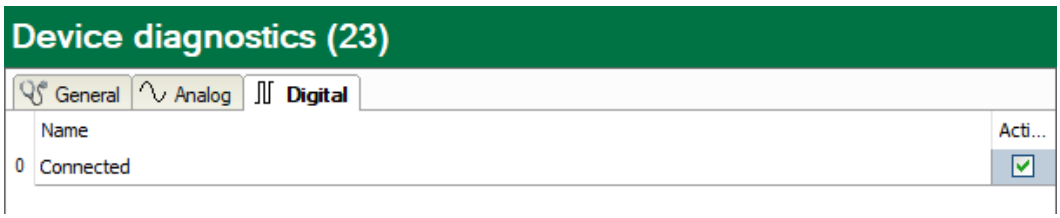
Gradient (Gain) and y axis intercept (Offset) of a linear equation. You can convert a standardized and unitless transmitted value into a physical value.

❑ Active

Only when this option is selected, the signal is acquired and considered when checking the number of licensed signals.

More columns can be displayed or hidden, using the context menu (right mouse-click on the header).

9.2.10.3 “Digital” tab



❑ Name

Default name: “Connected”. You can enter additional two comments when clicking the symbol in the signal name field.

❑ Active

Only when this option is selected, the signal is acquired and considered when checking the number of licensed signals.

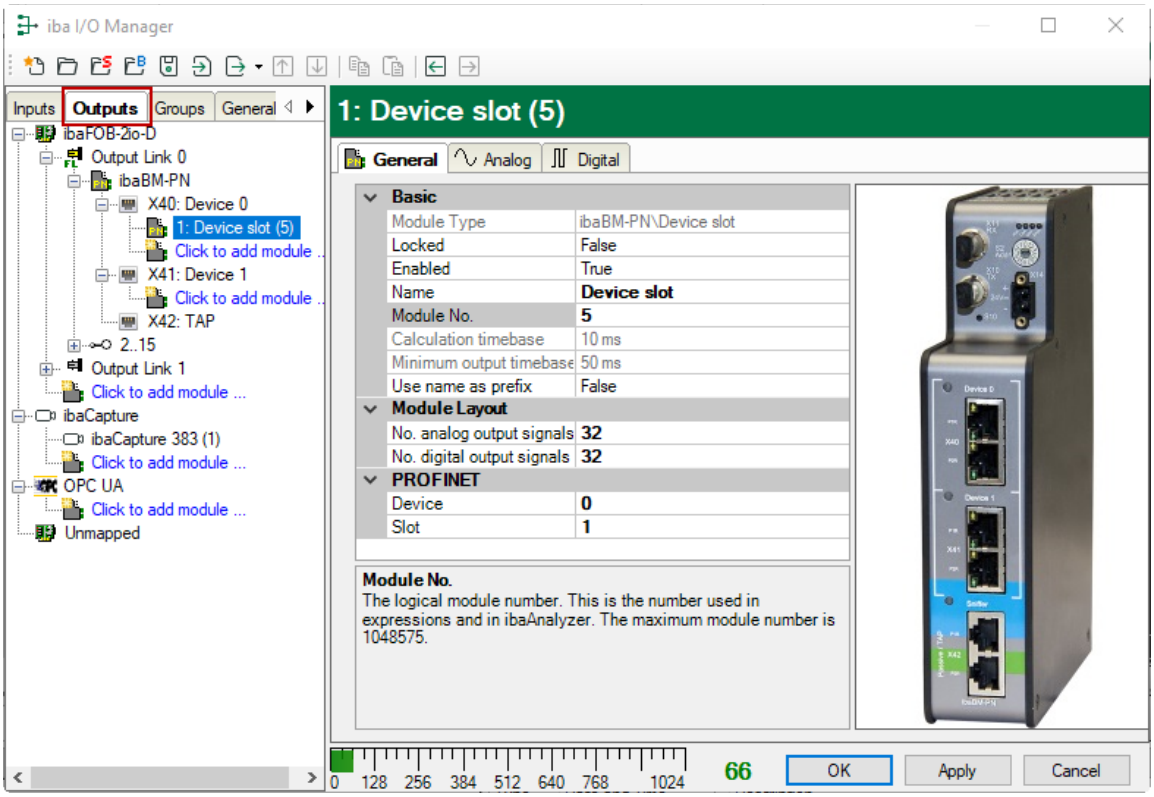
More columns can be displayed or hidden, using the context menu (right mouse-click on the header).

9.3 Configuring outputs

Outputs can be used to send signals from ibaPDA to a PROFINET controller via a device slot.

The device must have at least one slot with input data for this purpose. This must be taken into account in the controller configuration.

For configuring the outputs, select the "Outputs" tab in the I/O Manager. Modules which have been configured on the input side (hardware tab) may be displayed here.



Note

ibaPDA processes output signals with lower priority compared to the acquisition of input signals with a cycle not faster than 50 ms depending on the I/O configuration.

9.3.1 Device module “ibaBM-PN”

For a description of the settings, see the "General" tab, chapter 9.2.1.1.

When selecting the "Outputs" menu, modules already configured under "Hardware" may be displayed. Signals can only be output with modules of the type "Device slot".

You can configure a new module of the "Device slot" type by clicking on the blue "Click to add module…" command. Add the module by clicking on <OK>.

9.3.2 "Device slot" module

The settings on the "General" tab are described in chapter 9.2.3.

Output of analog values

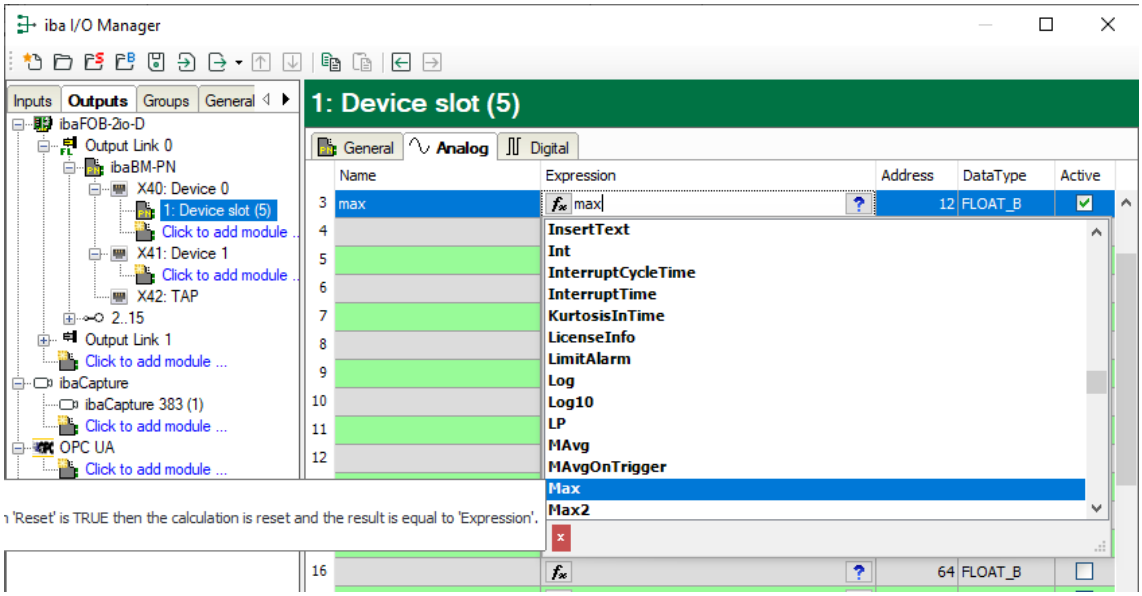
Define the analog values you want to output in the "Analog" tab.

❑ Name

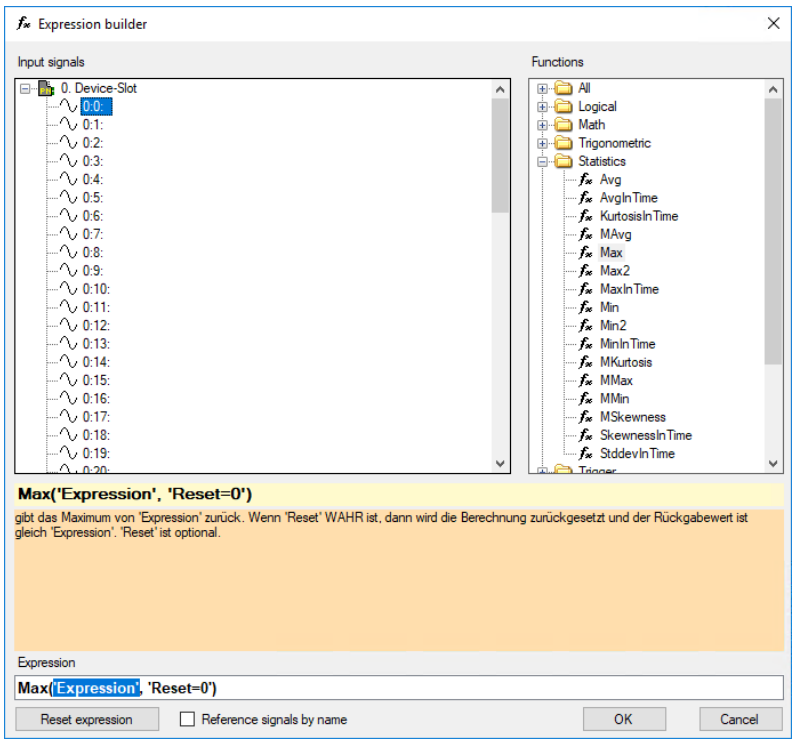
Here, you can enter a signal name and additional two comments when clicking the symbol in the signal name field.

❑ Expression

Enter here an expression which defines the output signal. The Intellisense function supplies you with automatic support for creating an expression.



Optionally, you can also open the expression builder by clicking on the symbol. The expression builder will help you in creating an expression.



Other documentation

For more information about the function of the expression builder and the available functions, please refer to the ibaPDA manual.

❑ Address

The byte address of the signal within the input range of the device slot. The address range always begins with the address 0.

❑ Data type

Data type of the signal

❑ Active

Please activate here the signal, which is to be output.

Output of digital values

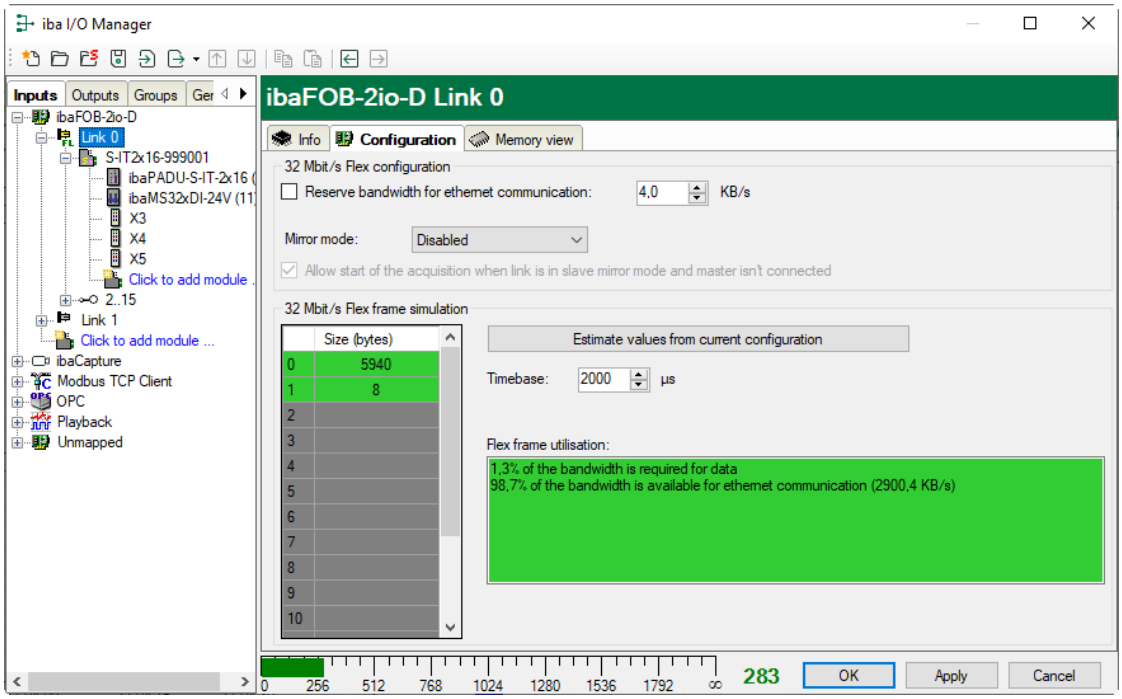
Define the digital values you want to output on the "Digital" tab.

The procedure is identical to the procedure for the analog values. Additionally to the "Address" column, there is the "Bit no." column where the bit address of the output signal is defined within the address byte.

9.4 Calculation of the telegram size with 32Mbit Flex

The data size per participant is dynamically allocated in a 32Mbit Flex ring. The data size is calculated by ibaPDA and it depends on the configured number of analog and digital signals and the smallest configured timebase in the ring.

In ibaPDA, in the link view of the ibaFOB-D card on the “Configuration“ tab, you can access a simulator. This simulator calculates the data amount which can be transferred via the FO connection with the 32Mbit Flex protocol.



The data sizes in bytes of each device on the link and the timebase of the data acquisition on the link (in µs) is needed for the calculation.

The values can be manually entered or taken automatically from the current configuration, either with a click on the button <Estimate values from current configuration> or when the respective link of the ibaFOB card is marked in the module tree.

The devices in the Flex ring and the corresponding data sizes are listed in the grid on the left. Address 0 corresponds to the Ethernet channel and is not editable.

The section “Flex frame utilization” indicates how much of the bandwidth is still available. The color of the section changes with the utilization rate:

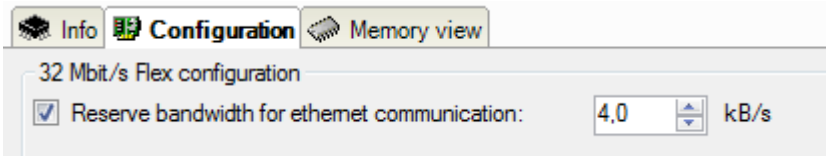
- Green: OK
- Orange: bandwidth for the Ethernet channel < 3 kB/s
- Red: too much data.

The automatically derived values are a first estimation: The firmware of the individual devices determines where in the Flex telegram the data are transferred. Filling bytes can be inserted between the requested data. After the configuration has been applied with a click on <OK> or <Apply>, the actual data values are displayed on the “Info“ tab.

Reserved bandwidth for Ethernet communication

The Ethernet channel (address 0) is used to transmit configuration data. If many devices are configured with a lot of signals, it may happen, that only the minimum size of 1 kB/s is reserved for Ethernet communication. This is not sufficient in many cases and may cause, that the configuration data are transmitted only slowly or cannot be transmitted at all.

It is now possible to reserve a fixed bandwidth for the Ethernet channel with the option “Reserve bandwidth for ethernet communication“.



10 PROFINET engineering

⚠ CAUTION

Connecting and removing PROFINET cables

Changes in the PROFINET network might have an impact on the functionality of the control system.

10.1 Operation as device

For operating as device, you have to configure it in the engineering tool of the used PROFINET controller.

You have to carry out the following basic steps:

1. Install the GSDML file. The ibaBM-PN will be integrated in the hardware catalog in PROFINET IO -> General -> iba AG -> iba BM -> ibaBM-PN busmonitor.
2. Insert the ibaBM-PN device in the configuration of the PROFINET controller.
3. Assign at least one module to a slot of the device.
4. Adapt the PROFINET network configuration, if required (e.g. sending clock cycle, synchronization…).
5. Assign the configured device name.

You find the GDSML file on the data medium “iba Software & Manuals“ under

\02_iba_Hardware\ibaBM-PN\01_GSD_File\

Substitute values

During connection loss to the PN controller 0 will be used as substitue value for analog and digital values.

Maximum amount of process data

The maximum amount of process data is determined by the maximum telegram size (net 1440 bytes of IOCR data) and the number of subslots with input or output data (parameters in the GSD file).

The maximum data length in bytes is:

- ❑ Max. number of input bytes = MaxInputLength - 4 - (number of input-subslots) – (number of output-subslots)
- ❑ Max. number of output bytes = MaxOutputLength - 4 - (number of input subslots) – (number of output-subslots)

A submodule containing both input and output data must be counted as input subslot and as output subslot.

Maximum slot configuration

The following configuration can be used to exploit the maximum device size of 1440 bytes:

5x 252 bytes + 170 bytes = 1430 bytes

In addition, 6 status bytes (1 byte per slot) + 4 global diagnostic bytes are taken into account by the system, the result is the maximum 1440 bytes.

Other documentation

For further information about engineering, please see the documentation of the used PROFINET controller.

10.2 Operation as S2 device

Basically, all instructions in chapter 10.1 apply for operation in redundant PROFINET networks in "S2" configuration.

The redundancy functions are activated via the configuration of the PROFINET controller. No configuration is required in the device of the ibaBM-PN.

License

A separate license is required for operation as an S2 capable device, see chapter 9.2.1.4.

10.3 Operation as sniffer

When the device operates as sniffer, no configuration in the engineering tool of the used PROFINET controller is necessary; especially no GSDML file is needed.

To configure ibaPDA, knowledge concerning the structure of the transferred user data is needed, basically the following information:

- ❑ The controller and the device that are used for data transfer
- ❑ Will the data be transfered from the controller to the device (OUTPUT) or will it be transfered from the device to the controller (INPUT)
- ❑ Where (byte offset) in the slot data the corresponding signal is saved and which data type is used.

PROFIsafe

PROFIsafe is a certified profile for PROFIBUS and PROFINET which overlays the PROFIBUS and PROFINET standard protocol to transmit safe input and output data. The transmitted data does not only include the pure user data but also an area for the transmission of the data securing information.

User data from PROFIsafe connections can be acquired using the same functions as from PROFIBUS and PROFINET standard connections.

The definition of the transmitted data can be found in the respective device manual of the IO module. In most cases, the user data is located from byte offset 0 on.

The following technical restrictions are to be taken into consideration:

- To detect a PROFINET device in the network, the telegram interexchange during connection set-up (CPU restart, cable reconnection) must be recorded.
  The configuration data from once in the network detected and from Sniffer modules referenced PROFINET devices is saved.
- In the case of short connection interruptions, it is possible that a controller may establish AR (Application Relation) without a previous DCP request. As a result, the devices may not be fully detected (e.g. device names and device IDs are missing). The behavior depends on the controller. The observed time spans are up to 30 seconds.
- A maximum amount of 512 PROFINET devices can be managed.
- A maximum amount of 1024 ARs (application relation) can be managed.
- Data can be sniffed of max. 64 PROFINET devices simultaneously. The number of sniffer modules used herefore is irrelevant.
- A maximum amount of 128 CRs (communication relation) can be configured simultaneously.
- A maximum amount of 1024 subslots can be configured simultaneously. If a subslot is configured for input and for output, it counts twice.

11 Technical data

11.1 Main data

Manufacturer	iba AG, Germany	
Order no.	13.120000	
Description	PROFINET bus monitor	
PROFINET interfaces		
Number	3 (2 x PROFINET devices for up to 2 PROFINET lines, 1 x sniffer)	
PROFINET devices	2 x 2-port switches Each with 2 x RJ45 socket 10/100 Mbit/s, autonegotiation With the autonegotiation switched off, the port P2R of each device works as uplink port	
TAP interface (sniffer)	2-port switch, 2 x RJ45 socket, 10/100 Mbit/s	
Functions	2 x PROFINET device, shared device (up to 4 controllers each), RT, IRT (≥ 250 µs), MRP and MRPD Client, NetLoad Class III, S2 system redundancy	
ibaNet interface		
Number	1 (e. g. for the connection to ibaPDA)	
Design	Fiber optic cable	
ibaNet protocol	32Mbit Flex (bidirectional) Up to 15 devices can be connected in a FO ring topology Can be used for data, settings and service purposes (e.g. updates) max. 1024 analog signals (BYTE, INT, WORD, DINT, DWORD, FLOAT, Big/Little Endian) + max. 1024 digital signals (BOOL) max. 4060 bytes at a cycle time of 1.4 ms	
Data transmission rate	32 Mbit/s	
Sampling time	From 125 µs, freely adjustable	
Connector type	2 ST connectors for RX and TX; iba recommends the use of FO with multimode fibers of type 50/125 µm or 62.5/125 µm; For information on cable length, see chap. 11.4.	
Transmitting interface (TX)		
Output power	50/125 µm FO cable	-19.8 dBm to -12.8 dBm
	62.5/125 µm FO cable	-16 dBm to -9 dBm
	100/140 µm FO cable	-12.5 dBm to -5.5 dBm
	200 µm FO cable	-8.5 dBm to -1.5 dBm
Temperature range	-40 °F to 185 °F (-40 °C to 85 °C)	
Light wavelength	850 nm	
Receiving interface (RX)		
Sensitivity[2]	62.5/125 µm FO cable	-30 dBm

[2] Data for other FO cable diameters not specified

Temperature	77 °F (25 °C)
Further interfaces, operating and indicating elements	
Power supply	24 V DC ±10% not stabilized 2-pin connector, clamp-type terminal (0.2 mm² to 2.5 mm²), screw connection, included in delivery
Power consumption	Up to 9.6 W
Rotary switch	Device address (in the cascade)
Indicators	4 LEDs for device status Multi-color LED per PROFINET device/TAP interface
Monitor interface	Ethernet RJ45 1 Gbit/s
Service interface	Ethernet RJ45 10/100/1000 Mbit/s
Grounding screw	
Operating and environmental conditions	
Cooling	Passive
Operating temperature range	32 °F to 122 °F (0 °C to 50 °C)
Storage temperature range	-13 °F to 158 °F (-25 °C to 70 °C)
Transport temperature range	-13 °F to 158 °F (-25 °C to 70 °C)
Humidity class (DIN 40040) (Operation, storage, transport)	F (5% - 95%), no condensation
Protection class	IP20
Mounting	DIN rail, vertical
Free space for air circulation	Min. 2 cm on top and bottom of the device required
Standards	EMC: IEC 61326-1 FCC part 15 class B
MTBF[3]	1,661,625 hours / 189 years
Dimensions and weight	
Dimensions (width x height x depth)	1.61 in x 7.87 in x 5.51 in (41 mm x 200 mm x 140 mm), incl. DIN rail clip
Weight (incl. packaging and manual)	approx. 1.0 kg

[3] MTBF (mean time between failure) according to Telcordia 3 SR232 (Reliability Prediction Procedure of Electronic Equipment; Issue 3 Jan. 2011) and NPRD, Non-electronic Parts Reliability Data 2011

Supplier's Declaration of Conformity
47 CFR § 2.1077 Compliance Information

Unique Identifier: 13.120000 ibaBM-PN

Responsible Party - U.S. Contact Information
iba America, LLC
370 Winkler Drive, Suite C
Alpharetta, Georgia
30004

(770) 886-2318-102
www.iba-america.com

FCC Compliance Statement
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

11.2 MAC addresses

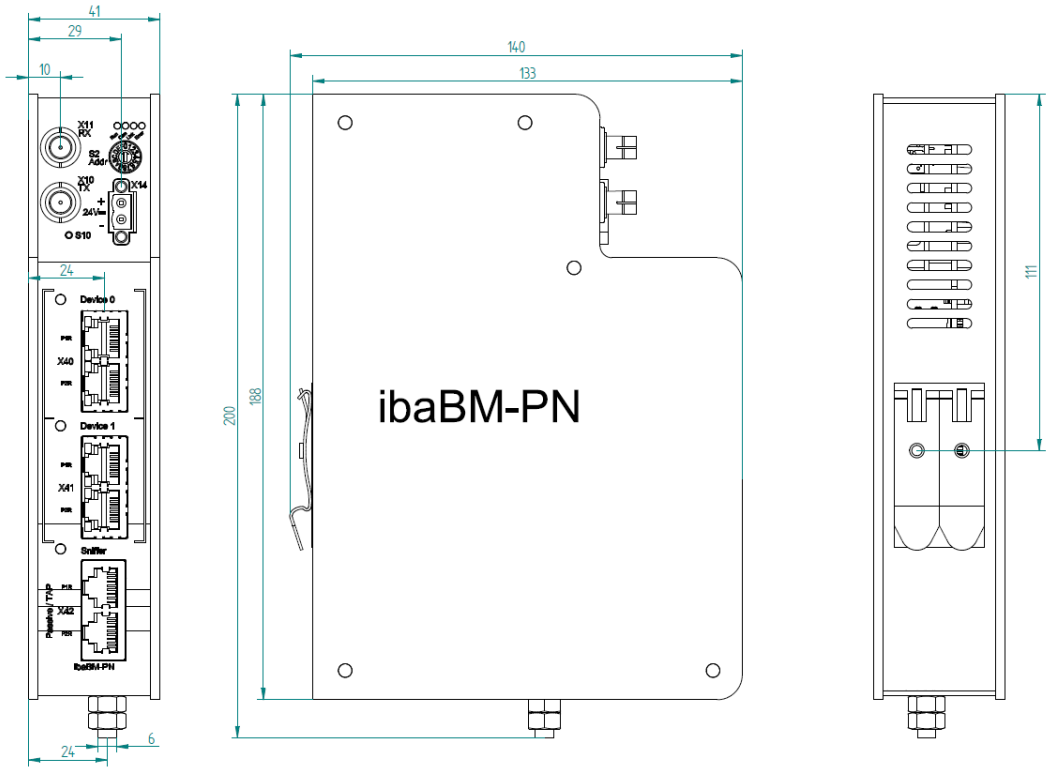
The MAC addresses of the different interfaces are based on the MAC address of the service interface, which can be found on the type label.

Interface	MAC address
Service interface	See type label
Device 0	Service interface+ 1
Switch port 1	Service interface+ 2
Switch port 2	Service interface+ 3
Device 1	Service interface+ 4
Switch port 1	Service interface+ 5
Switch port 2	Service interface+ 6

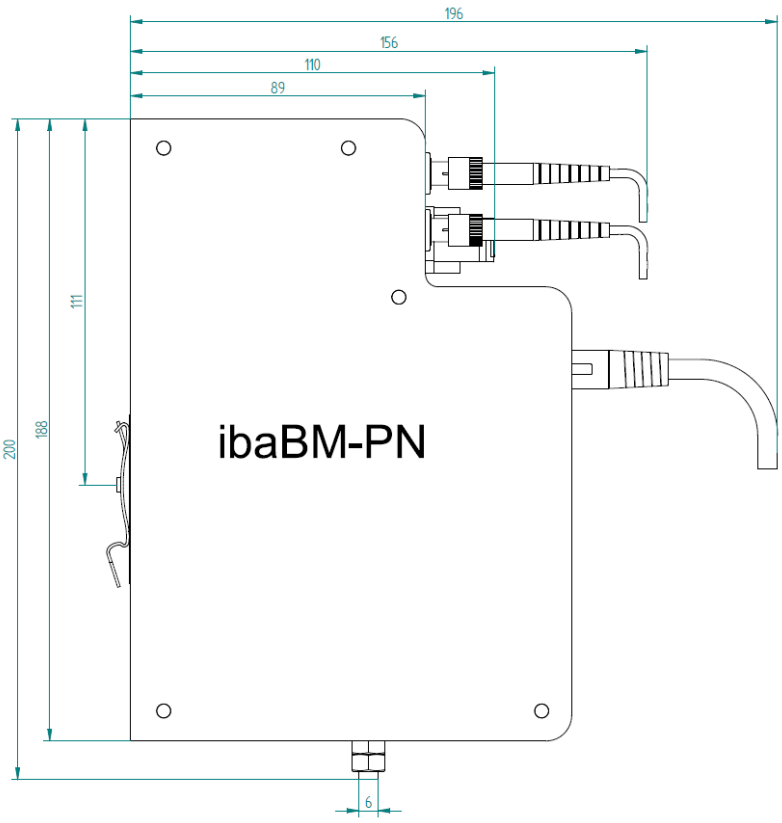
The monitor port does not use a MAC address.

The MAC addresses of device 0 and device 1 can also be read via ibaPDA.

11.3 Dimensions



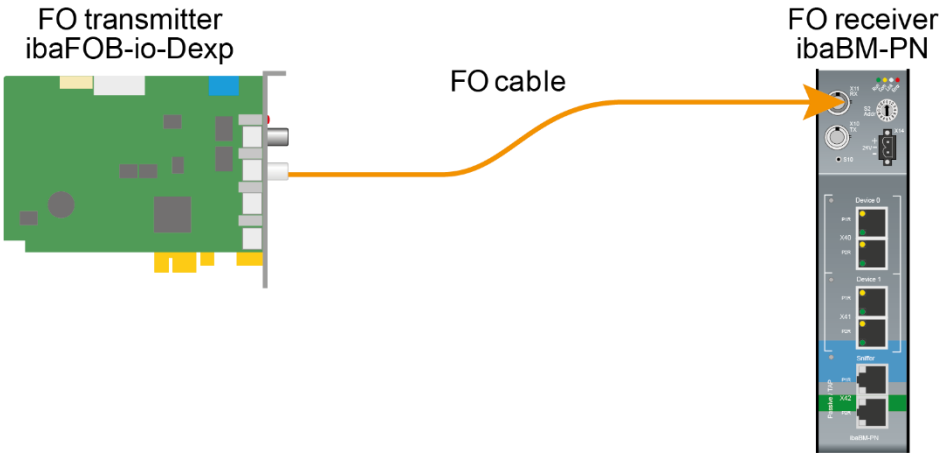
(Dimensions in mm)



(Dimensions in mm)

11.4 Example for FO budget calculation

As an example, an FO connection from an ibaFOB-io-Dexp card (FO transmitter) to an ibaBM-PN device (FO receiver) is used.



The example refers to a point-to-point connection with an FO cable of type 62.5/125 µm. The light wavelength used is 850 nm.

The range of the minimum and maximum values of the output power or receiver sensitivity depends on the component and, among other things, on temperature and aging.

For the calculation, the specified output power of the transmitting device and on the other side the specified sensitivity of the receiving device must be used in each case. You will find the corresponding values in the respective device manual in the chapter "Technical data" under "ibaNet interface".

Specification ibaFOB-io-Dexp:

Output power of FO transmitting interface		
FO cable in µm	Min.	Max.
62.5/125	-16 dBm	-9 dBm

Specification ibaBM-PN:

Sensitivity of FO receiving interface		
FO cable in µm	Min.	Max.
62.5/125	-30 dBm	

Specification FO cable

To be found in the data sheet of the fiber optic cable used:

FO cable	62.5/125 µm
Connector loss	0.5 dB connector
Cable attenuation at 850 nm wavelength	3.5 dB / km

Equation for calculating the FO budget (A_{Budget}):

$$A_{Budget} = |(P_{Receiver} - P_{Sender})|$$

$P_{Receiver}$ = sensitivity of FO receiving interface

P_{Sender} = output power of FO transmitting interface

Equation for calculating the fiber optic cable length (l_{Max}):

$$l_{Max} = \frac{A_{Budget} - (2 \cdot A_{Connector})}{A_{Fiberoptic}}$$

$A_{Connector}$ = connector loss

$A_{Fiberoptic}$ = cable attenuation

Calculation for the example ibaFOB-io-Dexp -> ibaBM-PN in the best case:

$$A_{Budget} = |(-30\ dBm - (-9\ dBm))| = 21dB$$

$$l_{Max} = \frac{21dB - (2 \cdot 0.5dB)}{3.5\ \frac{dB}{km}} = 5.71\text{km}$$

Calculation for the example ibaFOB-io-Dexp -> ibaBM-PN in the worst case:

$$A_{Budget} = |-30\ dBm - (-16\ dBm)| = 14dB$$

$$l_{Max} = \frac{14dB - (2 \cdot 0.5dB)}{3.5\ \frac{dB}{km}} = 3.71\text{km}$$

Note

When connecting several devices as daisy chain (e.g. ibaPADU-8x with 3Mbit) or as ring (e.g. ibaPADU-S-CM with 32Mbit Flex), the maximum distance applies to the section between two devices. The FO signals are re-amplified in each device.

Note

When using fiber optics of the 50/125 µm type, a distance reduction of approx. 30-40% must be expected.

12 Appendix

12.1 Example: sniffer configuration

The following example shows the configuration of a sniffer module to acquire data of a ET200SP (IM155-6 PN) component that uses several IO modules.

The engineering was done with TIA Portal V14.

A S7 CPU 1516 and two identical ET200SP IM155-6 PN HF as PROFINET devices are configured.

The ibaBM-PN device is not configured and integrated in the PROFINET line between CPU and first IM155-6 via the X42 TAP interface.

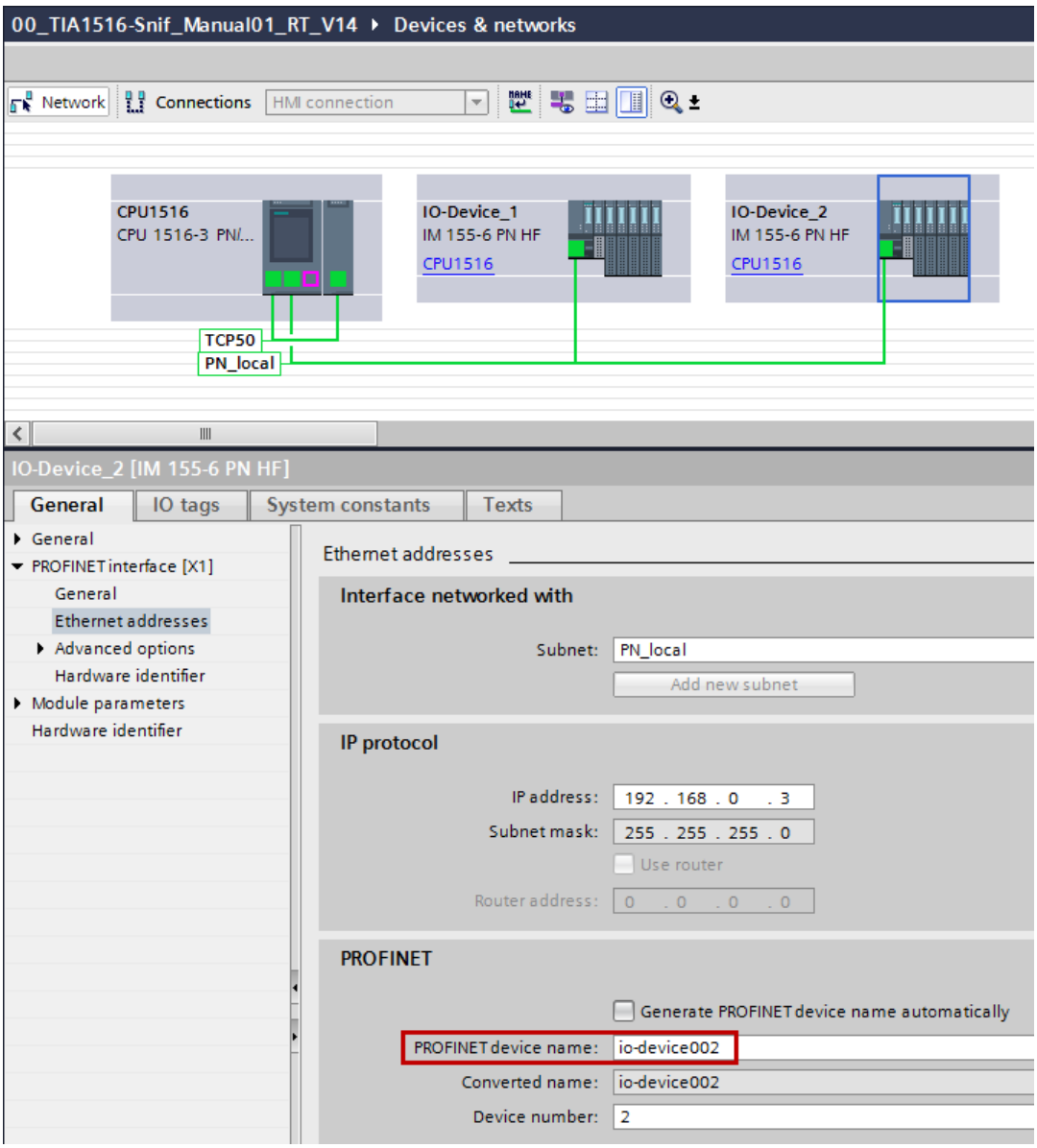


Figure 1: Network overview and PROFINET device name

Containing the following IO modules:

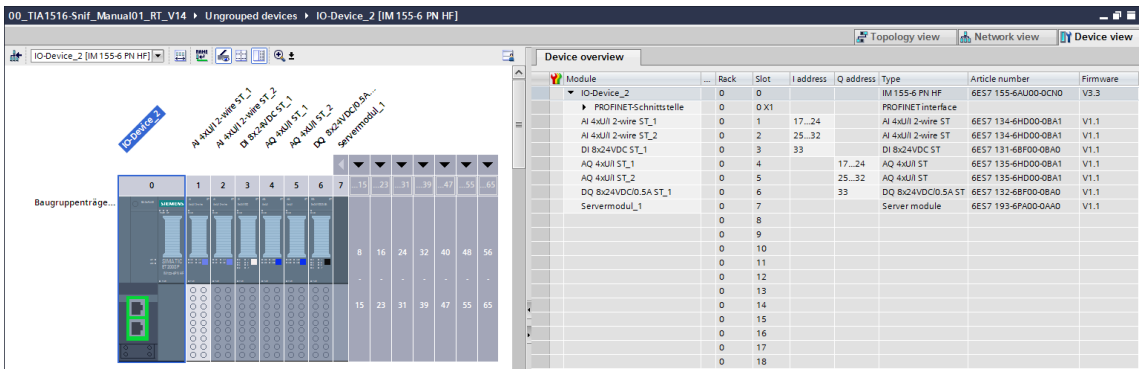


Figure 2: Configuration IM155-6 PN

Device overview

Module	...	Rack	Slot	I address	Q address	Type
IO-Device_2		0	0			IM 155-6 PN HF
PROFINET-Schnittstelle		0	0 X1			PROFINET interface
AI 4xU/I 2-wire ST_1		0	1	17...24		AI 4xU/I 2-wire ST
AI 4xU/I 2-wire ST_2		0	2	25...32		AI 4xU/I 2-wire ST
DI 8x24VDC ST_1		0	3	33		DI 8x24VDC ST
AQ 4xU/I ST_1		0	4		17...24	AQ 4xU/I ST
AQ 4xU/I ST_2		0	5		25...32	AQ 4xU/I ST
DQ 8x24VDC/0.5A ST_1		0	6		33	DQ 8x24VDC/0.5A ST
Servermodul_1		0	7			Server module

Figure 3: Slot / subslot configuration

After rebooting the CPU resp. restoring the network connection, the list of all detected PROFINET devices is available under the „TAP“ node (see Figure 1: Network overview and PROFINET device name) as well as the list of the configured slots (see Figure 2: Configuration IM155-6 PN and Figure 3: Slot / subslot configuration).

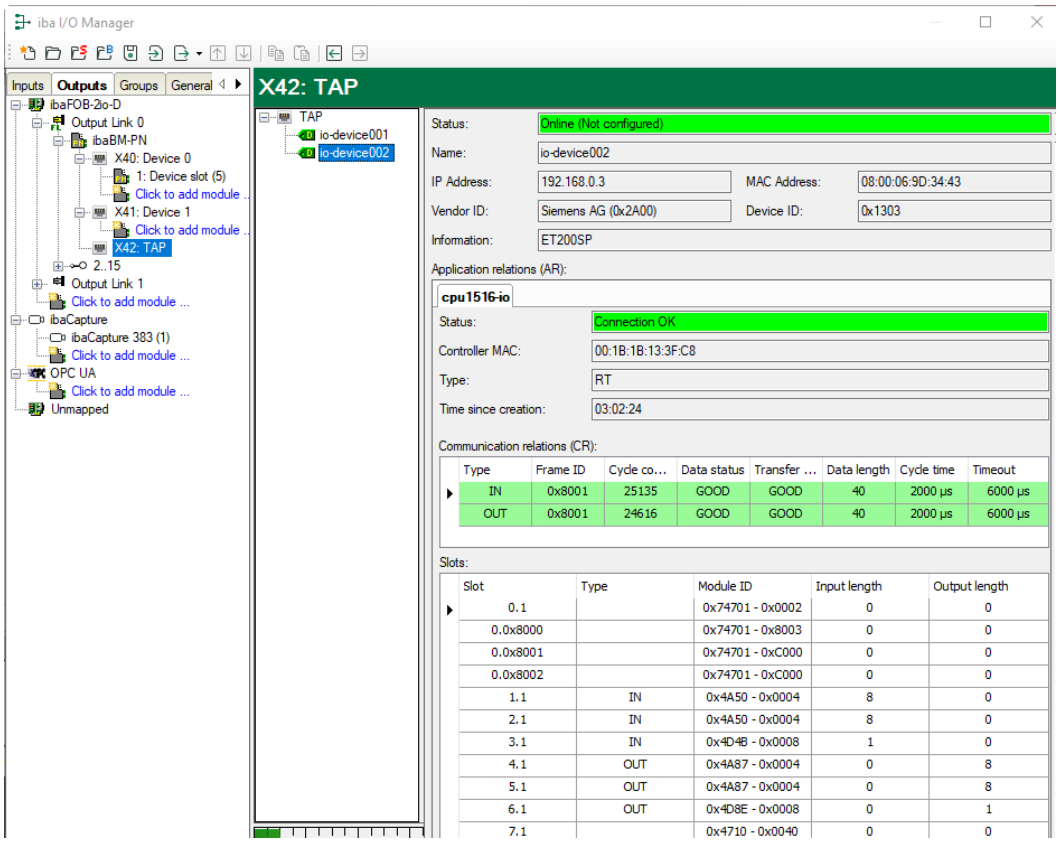


Figure 4: ibaBM-PN diagnostic information

To acquire data from the „io-device002“ device, a sniffer module has to be added.

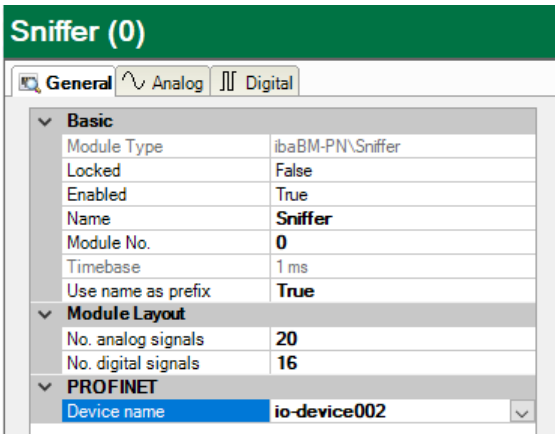
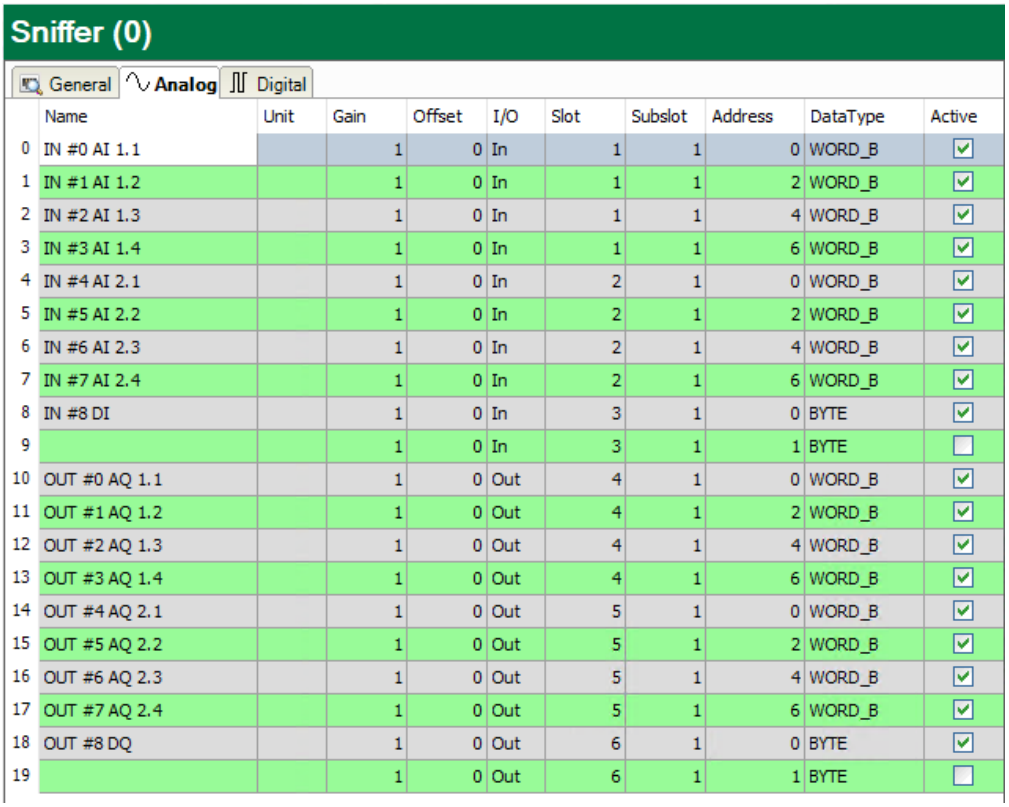


Figure 5: ibaPDA Sniffer module „General“ tab

The device name „io-device002“ must be selected in the PROFINET – Device section.

The analog signals must be configured as follows:



	Name	Unit	Gain	Offset	I/O	Slot	Subslot	Address	DataType	Active
0	IN #0 AI 1.1		1	0	In	1	1	0	WORD_B	☑
1	IN #1 AI 1.2		1	0	In	1	1	2	WORD_B	☑
2	IN #2 AI 1.3		1	0	In	1	1	4	WORD_B	☑
3	IN #3 AI 1.4		1	0	In	1	1	6	WORD_B	☑
4	IN #4 AI 2.1		1	0	In	2	1	0	WORD_B	☑
5	IN #5 AI 2.2		1	0	In	2	1	2	WORD_B	☑
6	IN #6 AI 2.3		1	0	In	2	1	4	WORD_B	☑
7	IN #7 AI 2.4		1	0	In	2	1	6	WORD_B	☑
8	IN #8 DI		1	0	In	3	1	0	BYTE	☑
9			1	0	In	3	1	1	BYTE	☐
10	OUT #0 AQ 1.1		1	0	Out	4	1	0	WORD_B	☑
11	OUT #1 AQ 1.2		1	0	Out	4	1	2	WORD_B	☑
12	OUT #2 AQ 1.3		1	0	Out	4	1	4	WORD_B	☑
13	OUT #3 AQ 1.4		1	0	Out	4	1	6	WORD_B	☑
14	OUT #4 AQ 2.1		1	0	Out	5	1	0	WORD_B	☑
15	OUT #5 AQ 2.2		1	0	Out	5	1	2	WORD_B	☑
16	OUT #6 AQ 2.3		1	0	Out	5	1	4	WORD_B	☑
17	OUT #7 AQ 2.4		1	0	Out	5	1	6	WORD_B	☑
18	OUT #8 DQ		1	0	Out	6	1	0	BYTE	☑
19			1	0	Out	6	1	1	BYTE	☐

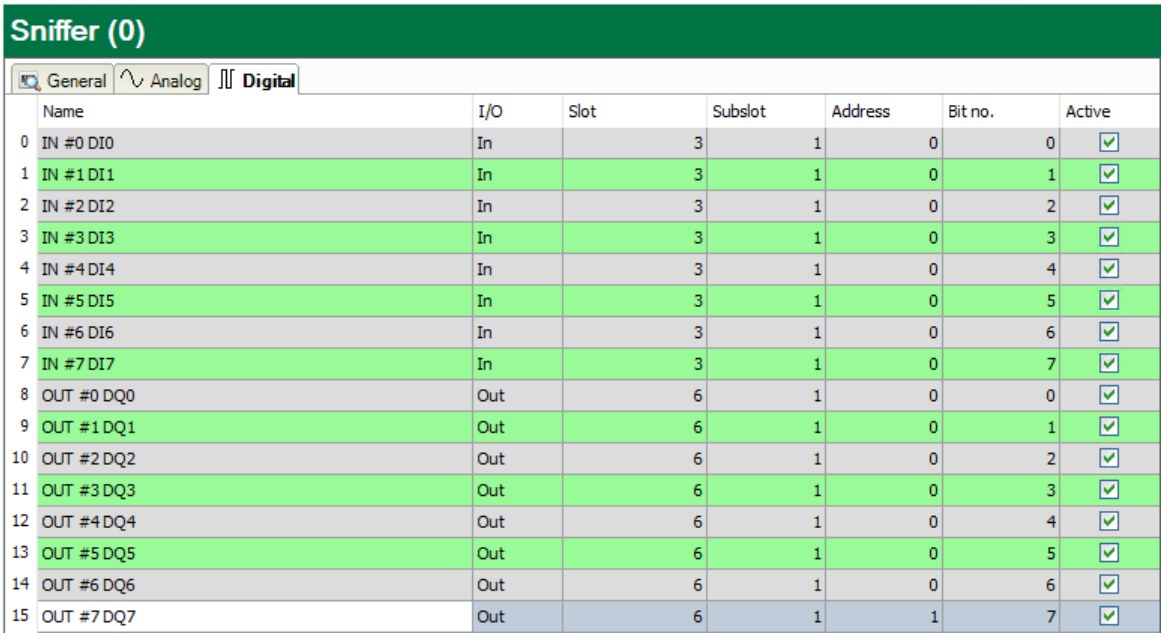
Figure 6: ibaPDA sniffer module „Analog“ tab

For the slots, subslots and addresses see figures Figure 2: Configuration IM155-6 PN and Figure 3: Slot / subslot configuration.

Please note that when addressing the signals in ibaPDA, the counting starts with 0 per slot/subslot unlike in TIA portal.

The signal [8:0] accesses the DI module in slot 3 and reads the 8 digital signals as BYTE. It is the same with signal [18:0] and the DQ module in slot 6.

The digital signals must be configured as follows:



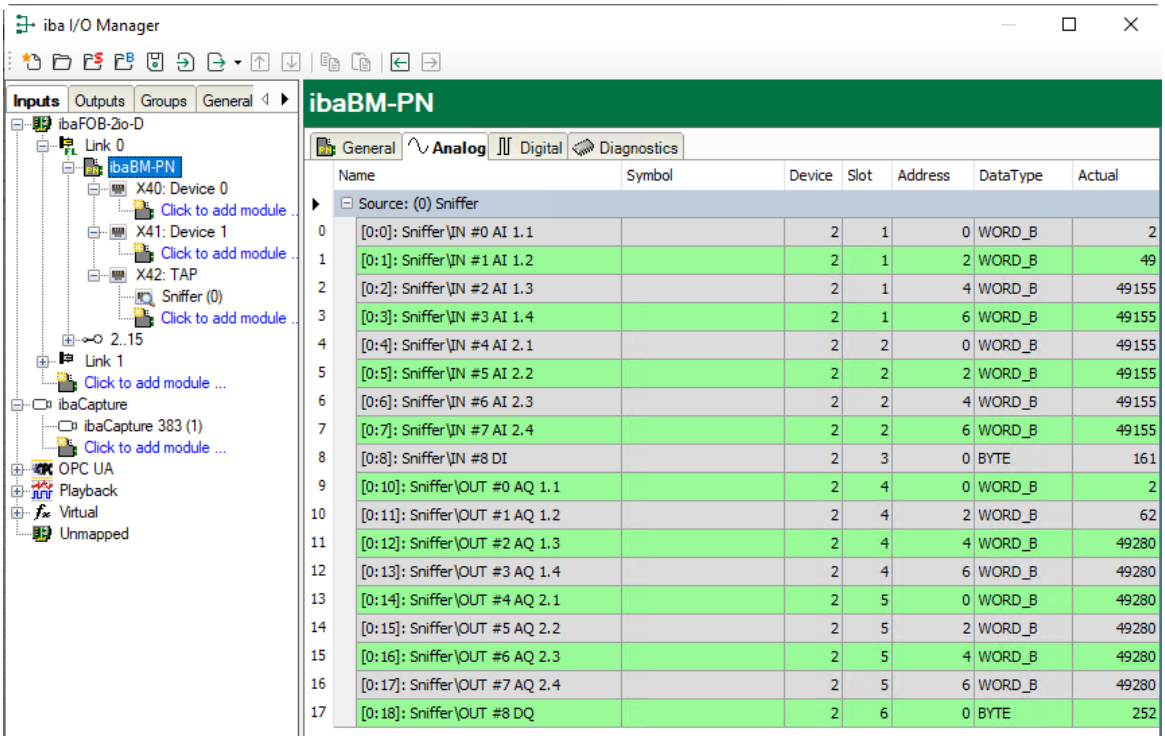
Sniffer (0)

General | Analog | Digital

	Name	I/O	Slot	Subslot	Address	Bit no.	Active
0	IN #0 DI0	In	3	1	0	0	☑
1	IN #1 DI1	In	3	1	0	1	☑
2	IN #2 DI2	In	3	1	0	2	☑
3	IN #3 DI3	In	3	1	0	3	☑
4	IN #4 DI4	In	3	1	0	4	☑
5	IN #5 DI5	In	3	1	0	5	☑
6	IN #6 DI6	In	3	1	0	6	☑
7	IN #7 DI7	In	3	1	0	7	☑
8	OUT #0 DQ0	Out	6	1	0	0	☑
9	OUT #1 DQ1	Out	6	1	0	1	☑
10	OUT #2 DQ2	Out	6	1	0	2	☑
11	OUT #3 DQ3	Out	6	1	0	3	☑
12	OUT #4 DQ4	Out	6	1	0	4	☑
13	OUT #5 DQ5	Out	6	1	0	5	☑
14	OUT #6 DQ6	Out	6	1	0	6	☑
15	OUT #7 DQ7	Out	6	1	1	7	☑

Figure 7: ibaPDA sniffer module „Digital“ tab

After starting data acquisition the configuration is finished and enabled.



iba I/O Manager

Inputs | Outputs | Groups | General

- ibaFOB-2io-D
  - Link 0
    - ibaBM-PN
      - X40: Device 0
        - Click to add module ...
      - X41: Device 1
        - Click to add module ...
      - X42: TAP
        - Sniffer (0)
        - Click to add module ...
    - 2..15
  - Link 1
    - Click to add module ...
- ibaCapture
  - ibaCapture 383 (1)
  - Click to add module ...
- OPC UA
- Playback
- Virtual
- Unmapped

ibaBM-PN

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	Name	Symbol	Device	Slot	Address	DataType	Actual
	Source: (0) Sniffer						
0	[0:0]: Sniffer\IN #0 AI 1.1		2	1	0	WORD_B	2
1	[0:1]: Sniffer\IN #1 AI 1.2		2	1	2	WORD_B	49
2	[0:2]: Sniffer\IN #2 AI 1.3		2	1	4	WORD_B	49155
3	[0:3]: Sniffer\IN #3 AI 1.4		2	1	6	WORD_B	49155
4	[0:4]: Sniffer\IN #4 AI 2.1		2	2	0	WORD_B	49155
5	[0:5]: Sniffer\IN #5 AI 2.2		2	2	2	WORD_B	49155
6	[0:6]: Sniffer\IN #6 AI 2.3		2	2	4	WORD_B	49155
7	[0:7]: Sniffer\IN #7 AI 2.4		2	2	6	WORD_B	49155
8	[0:8]: Sniffer\IN #8 DI		2	3	0	BYTE	161
9	[0:10]: Sniffer\OUT #0 AQ 1.1		2	4	0	WORD_B	2
10	[0:11]: Sniffer\OUT #1 AQ 1.2		2	4	2	WORD_B	62
11	[0:12]: Sniffer\OUT #2 AQ 1.3		2	4	4	WORD_B	49280
12	[0:13]: Sniffer\OUT #3 AQ 1.4		2	4	6	WORD_B	49280
13	[0:14]: Sniffer\OUT #4 AQ 2.1		2	5	0	WORD_B	49280
14	[0:15]: Sniffer\OUT #5 AQ 2.2		2	5	2	WORD_B	49280
15	[0:16]: Sniffer\OUT #6 AQ 2.3		2	5	4	WORD_B	49280
16	[0:17]: Sniffer\OUT #7 AQ 2.4		2	5	6	WORD_B	49280
17	[0:18]: Sniffer\OUT #8 DQ		2	6	0	BYTE	252

Figure 8: Online view – analog signals

13 Support and contact

Support

Phone: +49 911 97282-14

Fax: +49 911 97282-33

E-Mail: support@iba-ag.com

Note

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

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