



ibaBM-DP

PROFIBUS Bus monitor

Manual

Issue 2.0

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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.



Issue	Date	Revision	Chapter	Author	Version HW / FW
2.0	07-2023	Scope of delivery without manual			

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1 About this manual

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

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 <i>Logic diagram</i>
Call of menu command	<i>Step 1 – Step 2 – Step 3 – Step x</i> Example: Select menu <i>Logic diagram – Add – New logic diagram</i>
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 bus monitor ibaBM-DP is used for the cyclical data acquisition in PROFIBUS DP networks via the acquisition software ibaPDA. The device can be connected to two separate PROFIBUS networks independently through two PROFIBUS connections. Transmission rates up to 12 Mbit/s are supported by the device and are automatically detected.

Using the sniffer function of ibaBM-DP, the cyclical data traffic on PROFIBUS (acc. to DP-V0) can be monitored and acquired. Internal slaves can be activated in parallel on the device and can have data written on them directly from the master.

On the optical-fiber side, ibaBM-DP works with the ibaNet protocol 32Mbit Flex by default. Thus, measurement and configuration data are transferred via a bidirectional fiber optic connection. Therefore, a FO card ibaFOB-D is required at the ibaPDA side. The sampling rate and the data formats can be flexibly adjusted. Up to 4060 bytes max. can be transmitted with a cycle time of 1.4 ms. The amount of data falls with faster sampling rates. Data output from ibaPDA via ibaBM-DP slaves is also possible with 32Mbit Flex.

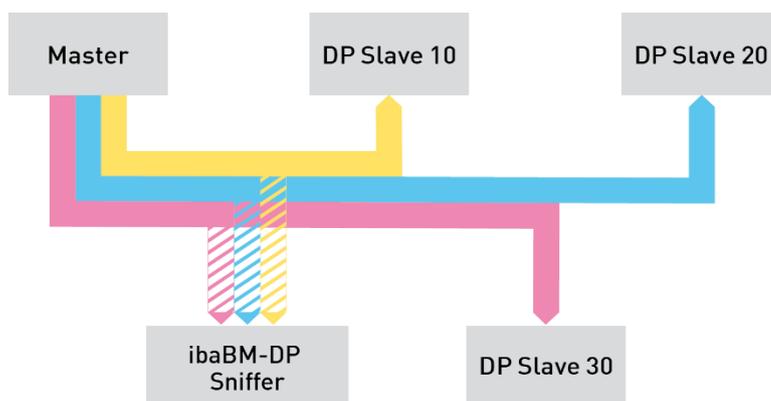
The device offers moreover modes of compatibility for the ibaNet protocols 32Mbit and 3Mbit. This makes it possible to exchange the previous devices ibaBM-DPM-S and ibaBM-DPM-S-64 without changing the configuration in ibaPDA. The compatibility modes can also be used with previous FO cards.

For special applications, additional operating modes such as redundancy mode¹, simulation mode¹, mirror mode¹, mapping mode¹ and P2P mode are available.

Sniffer function

Due to the sniffer function, ibaBM-DP can read all data sent on PROFIBUS DP (cyclical data exchange according to DP-V0). The device must merely be connected to PROFIBUS. The device does not need to be configured as a PROFIBUS slave in order to use the sniffer function.

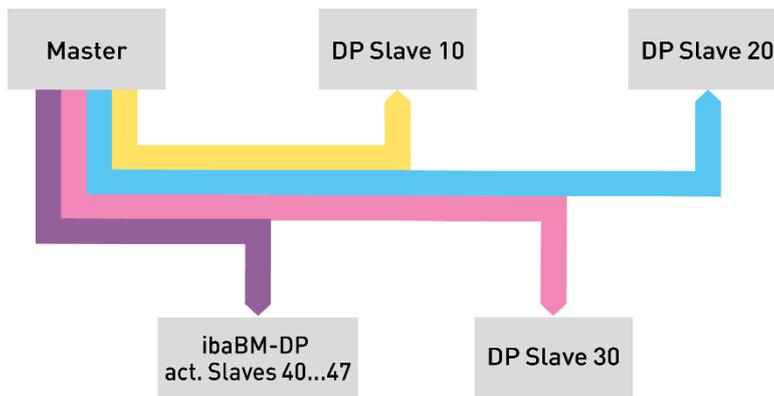
The acquisition of slave-to-slave communication (DP-V2) is not supported.



Active slave

Up to 8 slaves (extension to 16 slaves is possible with additional license) can be activated on the ibaBM-DP bus monitor. The maximum output data range of each slave is 244 bytes, which can be written by the master. Active slaves have to be configured by means of the provided GSD file. The active slaves can be distributed to both PROFIBUS connections. The sniffer function and the active slaves can be used simultaneously.

¹ Additional license required



Redundancy mode

With the 'redundancy mode' option, ibaBM-DP can read and acquire data on redundant PROFIBUS lines on S7-400H control systems, both as sniffer and as active slave.

ibaBM-DP monitors the telegram traffic on both PROFIBUS lines and dynamically detects, over which line valid data are currently being sent that are recorded with ibaPDA. This procedure offers the advantage that data do not need to be acquired twice.

ibaBM-DP immediately identifies error situations such as the switching of a CPU to STOP, the failure of a slave connection or broken cables and automatically switches to the intact bus system.

P2P mode

The P2P mode (peer-to-peer) enables a bidirectional system interconnection via PROFIBUS with iba devices with an ibaNet 32Mbit interface (e.g. via ibaLink-VME to VME-based control systems). For this purpose, the data from the ibaNet interface are mapped on up to 8 PROFIBUS slaves.

Simulation mode

With the 'simulation mode' option, software and the configuration of a DP master station can be tested without the need for a peripheral system of the PROFIBUS to be physically present. This means, for example, that a new control program can be tested in a test environment. This way, expensive down times during commissioning can be reduced.

ibaBM-DP simulates the slaves as they are configured in the master. It is not necessary to carry out a PROFIBUS configuration in ibaBM-DP since the configuration telegrams of the master are evaluated for the simulation and the corresponding slaves are automatically created.

The input values of the slaves are simulated using a TCP/IP telegram interface and the output values are requested. The use of this TCP/IP interface for the simulation of the plant is possible using any tools (e.g. ibaLogic).

The simulation mode is approved for the use with PROFIBUS masters supplied by Siemens only.

Mirror mode

The 'mirror mode' option is ideally suitable for modernizations where a new control system needs to run in test mode alongside the plant in operation. ibaBM-DP is coupled into the original PROFIBUS link via a PROFIBUS connection. The second connection is connected to the new control system. ibaBM-DP mirrors resp. simulates the slaves from the original line in the parallel system and the input data are also copied in this process. Thus, a new control system can be tested in parallel with the original slaves and the real

input data. Signals from the original and parallel system can be recorded and compared simultaneously with ibaPDA using the sniffer function.

Mapping mode

The 'mapping mode' option provides extensive possibilities to exchange data between two PROFIBUS system connected to Bus0 and Bus1 interfaces. This option is suitable for modernizations but also for plain data coupling on a PROFIBUS level. A classic DP-DP coupler is available for transfer of output data of one slave to the input data range of an assigned slave in a bidirectional way. In addition the output data of existing slaves of the PROFIBUS system Bus0 can be sniffed and transferred to the input data range of an assigned slave. In total up to 8 of these mapping assignments can be used (when using the expansion of active slaves even 16). The functionality of the mapping mode therefore offers much more than just a classic DP-DP coupler.

Overview of the most important characteristic values:

- Bus monitor for PROFIBUS DP
- Connections for 2 PROFIBUS lines up to 12 Mbit/s
- Sniffer function for interference free acquisition of the cyclic master slave communication (DP-V0)
- Up to 8 or 16² active slaves can be configured; can be distributed as required on both connections
- Acquisition of up to 244 bytes per active slave
- Flexible configuration of sampling rate, data format and data volume
- Support of ibaNet protocol 32Mbit Flex: Transmission of configuration and measurement data via bidirectional FO connection
- Compatibility mode 3Mbit and 32Mbit allows the exchange of previous devices ibaBM-DPM-S and ibaBM-DPM-S-64
- Request procedure can be used with ibaPDA for SIMATIC S7, FM458 and TDC
- Additional operating modes are available for specific applications: redundancy mode², simulation mode², mirror mode², mapping mode² and P2P mode.

License model

Additional licenses are needed for some functional expansions:

- Expansion of active slaves on the device from 8 to 16
- Redundancy mode
- Simulation mode
- Mirror mode
- Mapping mode

² Additional license required

**Note**

Licenses for functional expansions are tied to the serial number of the device. The licenses are activated via the web interface of the device or via the I/O Manager in ibaPDA by entering a license key.

For buying a license key for one or more functions, please contact iba AG.

Order information

Order no.	Product name	Description
13.121001	ibaBM-DP	Bus monitor: Data acquisition on PROFIBUS DP
13.321001	ibaBM-DP-Upgrade-8Slaves	Upgrade with 8 more DP slaves
13.321021	ibaBM-DP-Upgrade-Redundancy	Upgrade for redundancy mode
13.321011	ibaBM-DP-Upgrade-Simulation	Upgrade for simulation mode
13.321031	ibaBM-DP-Upgrade-Mirror	Upgrade for mirror mode
13.321032	ibaBM-DP-Upgrade-Mapping	Upgrade for mapping 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-DP device
- Information sheet for setting the operating mode
- USB cable
- Data medium “iba Software & Manuals” with the following content:
 - GSD files
 - USB driver
 - 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 PROFIBUS cable

The PROFIBUS cable should be connected after proper completion of the active slave configuration only.

See also chapter 11.2 "Operation as active slave".



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

For operation:

- 24 V DC, 0.5 A current 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
 - At least one free PCI/PCIe slot

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 type or ibaFOB-io-ExpressCard.
- Compatibility mode 32Mbit: at least one FO input card of the ibaFOB-X, ibaFOB-D or ibaFOB-Dexp type or ibaFOB-io-ExpressCard.
- Compatibility mode 3Mbit: at least one FO input card of the ibaFOB-S, ibaFOB-X, ibaFOB-D or ibaFOB-Dexp type or ibaFOB-io-ExpressCard.
- One ibaNet FO patch cable for bidirectional connection of ibaBM-DP and ibaPDA-PC
- Compatibility mode 3/32Mbit: unidirectional FO patch cable sufficient
- Compatibility mode 32Mbit: Ethernet connection to ibaPDA-PC
- PROFIBUS DP network with PROFIBUS master

5.2 Software

- ibaPDA-V6/ ibaQDR-V6 version 6.20.2 and higher for measuring and recording the data in compatibility mode 32Mbit.
- ibaPDA-V6 / ibaQDR-V6 version 6.26.3 or higher for measuring and recording the data on the redundant PROFIBUS in compatibility mode 32Mbit.
- ibaPDA-V6/ ibaQDR-V6 version 6.32.0 or higher for measuring and recording the data with 32Mbit Flex



Note

With version 6.20.2 or higher of ibaPDA, the following Request access procedures are possible: ibaPDA-Request-S7, ibaPDA-Request-FM458, ibaPDA-Request-TDC.

For further information, please read the product manuals.

6 Mounting and dismantling

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 and establish the connection as follows:
 - FO to the ibaPDA system (unidirectional or bidirectional depending on the mode of operation)
 - Network connection via Ethernet TCP/IP (in compatibility mode 32Mbit)



CAUTION

Connecting the PROFIBUS cable

Do not connect the PROFIBUS cable until the configuration of the “Active slaves“ has been done correctly.

Please see also chapter 11.2.

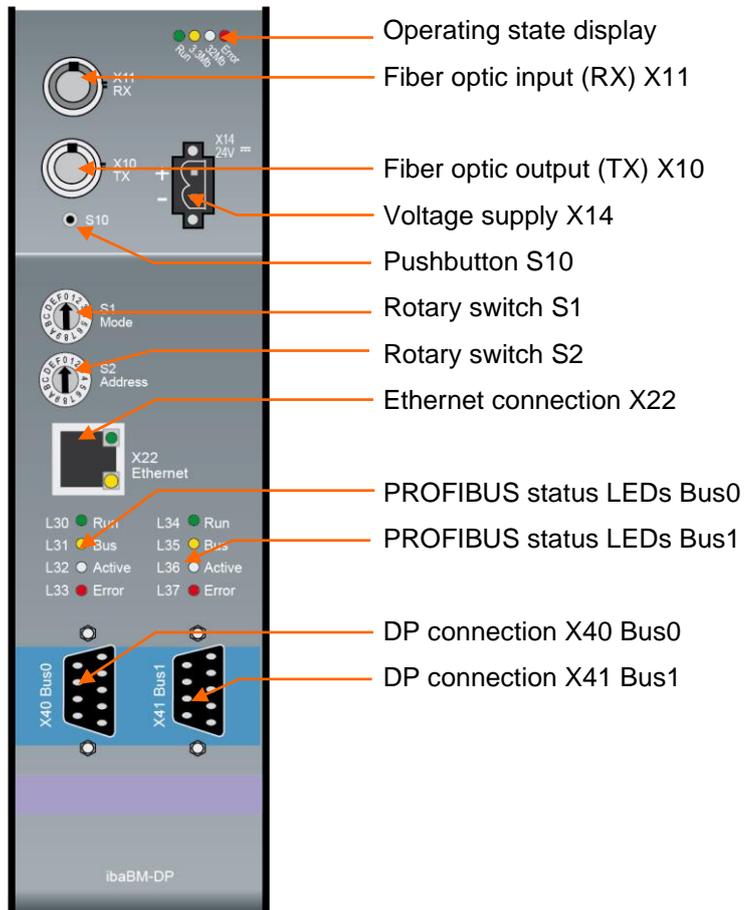
6.2 Dismounting

1. First, 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.

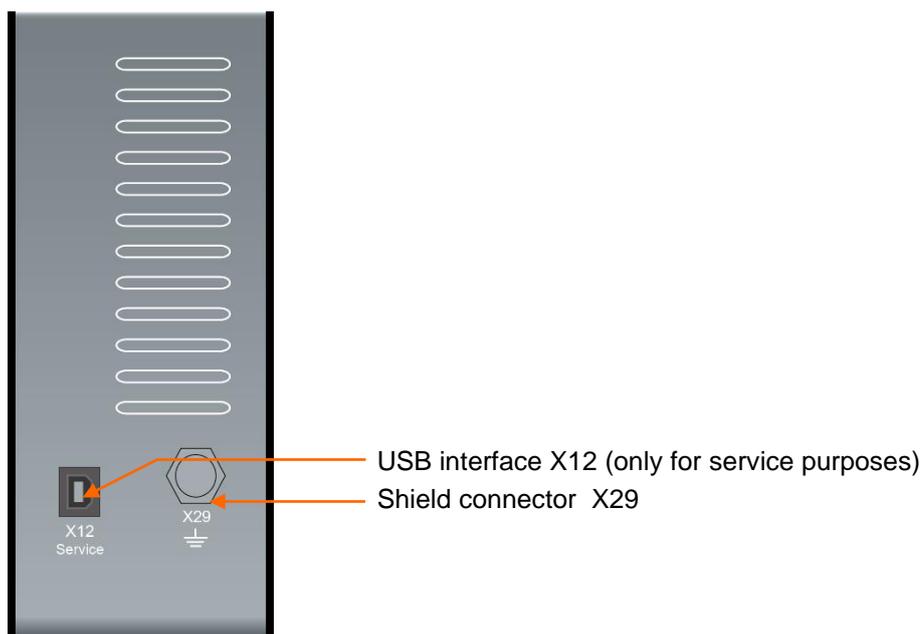
7 Device descriptions

7.1 Device view

7.1.1 Front view



7.1.2 Bottom view



7.2 Display elements

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

Operating state

LED	Status	Description
Run (green)	Flashing	Ready for operation, power supply connected
	Flashing rapidly	Update mode or reset to default settings (S10 pushbutton)
	On	Boot phase
3.3Mb (yellow)	Off	No 3Mbit input signal detected
	Flashing	3Mbit input signal connected, but the device is not configured for this mode 32Mbit Flex mode: TCP/IP telegram detected via FO (blinking irregularly)
	On	Compatibility mode: valid 3Mbit signal detected
32Mb (white)	Off	No 32Mbit input signal detected
	Flashing	32Mbit input signal connected, but the device is not configured for this mode
	On	Valid 32Mbit input signal detected
Error (red)	Off	Normal operation
	Flashing	Defect (configuration error)
	On	Hardware error

PROFIBUS

LED	Status	Description
Run (green)	Off	Boot phase
	Flashing	Normal operation
Bus (yellow)	Off	Boot phase / no PROFIBUS communication detected
	Flashing rapidly	At least one master active on the DP, but none of the configured slaves is active
	Flashing	At least one master and one slave active on the DP, but not all slaves that have been configured.
	On	All configured masters and slaves active on the DP
Active (white)	Off	Boot phase / no active slave configured in the device
	Flashing rapidly	No active slave in data exchange (with bus connected)
	Flashing	Not all active slaves in data exchange (with bus connected)
	On	All active slaves in data exchange (with bus connected)
Error (red)	Off	Normal operation
	Flashing	Sporadic failures on the DP
	On	Error on the DP line

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 or ibaFOB-io-ExpressCard has to be installed for receiving and sending the data.

For compatibility mode 32Mbit, an FO input card of the ibaFOB-X type is sufficient. The prerequisite for compatibility mode 3Mbit is an FO input card of the ibaFOB-S type.

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 17.3.

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" 17.1 under "ibaNet interface".

7.3.2 Voltage supply X14

The ibaBM-DP device has to be operated with an external DC voltage 24 V (unregulated) with a maximum current consumption of 500 mA. The operating voltage should be supplied using the 2-pin Phoenix screw connector included in delivery. On request, you can order DIN rails and plug-in power supplies at iba AG.

The device can be switched off by disconnecting it from the voltage supply.

Switching the device on and off is without interferences regarding the PROFIBUS, i.e. the PROFIBUS communication on the DP line will continue without disruption when the device is switched off.



Note

In case you use active slaves in ibaBM-DP, the master detects these slaves as failed. Take the right measures in the program of the master for coping appropriately with slave failures (e. g. by configuring the error OBs with a SIMATIC S7-CPU).



Note

If ibaBM-DP should be the last device on the bus line, the bus has to be terminated via the termination resistor on the PROFIBUS connector. When switching off ibaBM-DP, the correct termination is not guaranteed any longer, as the voltage supply for the bus is missing. This may lead to malfunctions on the PROFIBUS.

7.3.3 Pushbutton S10

With the S10 pushbutton, all settings (network parameters, passwords, signal configuration) can be reset to the factory settings:

1. Switch off the device.
2. Switch on the device with the pushbutton S10 keeping pushed.
3. Keep the pushbutton S10 pushed until the green LED "Run" of the operating status display starts blinking rapidly. Now, release the pushbutton.
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.

For detailed notes on the factory settings, please see chapters 9.2.1 (network) and 9.3.1 (password).

**Note**

The device must not be switched off during this procedure.

7.3.4 Rotary switches S1 and S2

The operating modes (rotary switch S1) and the device address (rotary switch S2) are being set with the rotary switches.

S1	S2	ibaNet protocol	Data volume / timebase	Note
Compatibility mode 3Mbit				
0	0	3Mbit	64A + 64D in 1 ms	Up to 2 slaves no sniffer function
Compatibility mode 32Mbit				
1	0	32Mbit	512A + 512D in 1 ms Max. data volume of analog values: 1984 Bytes	Sniffer function + up to 8 active slaves Redundancy mode* can be used
32Mbit Flex mode				
1	1...F	32Mbit Flex	1024A + 1024D Max. data volume depends on timebase Max. possible data volume: 4060 Bytes at 1.4 ms timebase Min. timebase: 0.5 ms at max. possible data volume of 1540 Bytes	Sniffer function + up to 8 active slaves Redundancy mode* can be used
P2P mode				
4	0	32Mbit		
Simulation mode*				
5	0	Not used		
Mirror mode*				
6	0	32Mbit	See compatibility mode 32Mbit	Sniffer function, no active slaves
6	1...F	32Mbit Flex	See 32Mbit Flex mode	Sniffer function, no active slaves
Mapping mode*				
7	0	Not used		No data acquisition possible

* additional license required

yellow: delivery state (with S2 = 1)



Note on the compatibility mode 3Mbit / 32Mbit

In contrast to the predecessor, ibaBM-DP does not have any PROFIBUS terminating resistors and no switch for bridging the buses 0 and 1. Please use instead the terminating resistors on the PROFIBUS connectors. For connecting the buses 0 and 1, you may use a cable bridge.

7.3.4.1 Compatibility mode 3Mbit (DP-64 mode)

S1 = 0 and S2 = 0

With this setting, the device replaces the predecessor devices ibaBM-DPM-S-64, ibaBM-DPM-64 and DPM64. The devices can be used for data acquisition with ibaPDA, but also as system coupling without ibaPDA. In this mode, the device provides up to 2 slaves, which can be operated in different modes. Up to 64 analog and 64 digital values can be transmitted in 1 ms. A sniffer function is not available.

The device can be operated in DP-64 mode also with an older ibaFOB-S or ibaFOB-X card.

➤ For further information, please see chapters 8.9 and 13.

7.3.4.2 Compatibility mode 32Mbit

S1 = 1 and S2 = 0

With this setting, the device replaces the predecessor device ibaBM-DPM-S in existing installations and works with a fixed 32Mbit telegram on the FO side. A unidirectional FO connection is needed to the ibaPDA system. The configuration data is transmitted to the device via an Ethernet connection. Sniffer function and active slaves can be used simultaneously.

In this mode, up to 512 analog (a total max. of 1984 Bytes for analog values) and 512 digital values can be acquired. Up to 8 active slaves can be optionally assigned to bus 0/1.

The redundancy mode can be used in compatibility mode 32Mbit, see chapter 12. The use of redundancy mode requires an additional license.

The device can be operated in 32Mbit mode also with an older ibaFOB-X card. The compatibility mode is also a good solution, if an existing ibaPDA system is to be extended, but no FO outputs are available or cannot be retrofitted.

➤ For further information, please see chapters 8.2, 8.4 and 10.2.

7.3.4.3 32Mbit Flex mode

S1 = 1 and S2 = 1 ... F (variable)

32Mbit Flex mode is the delivery state of the device (with S2 = 1)

With this setting, the device operates with 32Mbit Flex telegram on the FO side. A bidirectional FO connection is needed to the ibaPDA system. The configuration data is transferred from ibaPDA to the device via FO connection. Sniffer function and active slaves can be used simultaneously.

Depending on the timebase, up to 4060 Bytes per cycle can be acquired and recorded with up to 1024 analog values and 1024 digital values. When transferring the maximum data volume of 4060 Bytes the timebase must not be faster than 1.4 ms. With a timebase of 1 ms, up to 3100 Bytes can be transferred. The shortest cycle time is 0.5 ms (1540 Bytes). The data types BYTE, WORD, DWORD, INT, DINT, FLOAT and S5 FLOAT in big/little endian format are supported.

When the device is operated in a ring topology with other 32Mbit Flex devices, the data volume that can be transmitted, decreases accordingly.

Up to 8 slaves can be optionally assigned to bus 0/1.

With 32Mbit Flex, output signals of ibaPDA can be sent to the PROFIBUS master. Thus, e. g. certain signal values can be monitored, a warning message is being issued in case a limit value is exceeded or other events are signalized.



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.

The redundancy mode can be used in 32Mbit Flex mode, see chapter 12. The use of redundancy mode requires an additional license.

➤ For further information, please see chapter 8.1, 8.3 and 10.1.

7.3.4.4 P2P mode

S1 = 4 and S2 = 0

With P2P mode (peer to peer), systems can be coupled bidirectionally to iba devices with ibaNet 32Mbit interface via PROFIBUS (e.g. via ibaLink-VME to VME based control systems). For this purpose, the data from the ibaNet interface are mapped on up to 8 PROFIBUS slaves: The data received by ibaBM-DP via fiber optic cable are output via the input area of the PROFIBUS slaves. Data which are received over the output area of the PROFIBUS slave, are output via fiber optic cables.

The P2P mode is applied in couplings of controllers with a ibaNet 32Mbit interface (e. g. SIMATIC TDC with ibaLink VME) to new controllers via PROFIBUS, e.g. in modernization projects.

➤ For further information, please see chapters 8.5 and 8.9.2.

7.3.4.5 Simulation mode

S1 = 5 and S2 = 0

If you want to use the simulation mode, you need an additional license (order data see chapter 2).

The simulation mode is designed to test the software and the configuration of a DP master station, although the PROFIBUS environment is physically not available. Thus, e.g. a new control program can be tested in a test environment and expensive downtimes during the commissioning process can be reduced.

The PROFIBUS slaves that have been configured in the master, but are not physically present, are simulated on the device. As the device analyzes the configuration telegrams of the master, and generates from this information the required slave, you do not have to configure the PROFIBUS in the ibaBM-DP.

Via a TCP/IP interface, the input values of the slaves are simulated and the output values are requested. This TCP/IP interface for simulating the system can be used with any tool (e.g. ibaLogic).

The simulation mode is approved for the use with PROFIBUS masters supplied by Siemens only.

➤ For further information, please see chapters 8.6 and 14.

7.3.4.6 Mirror mode

S1 = 6 and S2 = 0 for mirror mode with compatibility mode 32Mbit

S1 = 6 and S2 = variable 1...F for mirror mode with 32Mbit Flex.

If you want to use the mirror mode, you need an additional license (order data see chapter 2).

The mirror mode option is ideally suited for modernization purposes, in case you want to run a control system in test mode in parallel to the running system. ibaBM-DP is coupled into the original PROFIBUS line using a PROFIBUS connection. The second connection is connected to the new control system. ibaBM-DP mirrors and simulates the slaves from the original line to the parallel system. The input data are also copied. This way, the new controller can be tested in parallel with the original slaves and real input data. With the sniffer function, you can record and compare data from the original and parallel system simultaneously, using ibaPDA.

➤ For further information, see chapters 8.7 and 15.

7.3.4.7 Mapping mode

S1 = 7 and S2 = 0

If you want to use the mapping mode, you need an additional license (order data see chapter 2).

The mapping mode provides extensive possibilities to exchange data between two PROFIBUS systems connected to Bus0 and Bus1 interfaces. A classic DP-DP coupler is available for transfer of output data of one slave to the input data range of an assigned slave in a bidirectional way. In addition the output data of existing slaves of the PROFIBUS system Bus0 can be sniffed and transferred to the input data range of an assigned slave. In total up to 8 of these mapping assignments can be used (when using the expansion of active slaves even 16).

➤ For further information, see chapters 8.8 and 9.3.4.3.

7.3.5 Ethernet connection X22

Via the Ethernet interface (RJ45 connector) the device can be connected to a computer or a network.

The interface has a unique MAC address and is used for transmitting the configuration files (device parameters) in compatibility mode 32Mbit.

7.3.6 PROFIBUS DP connections X40 (Bus0) and X41 (Bus1)

The connection is established via standard PROFIBUS DP connector (9-pin D-Sub):

- One PROFIBUS line can be connected to each of these connectors.
- You can use connectors with incoming and outgoing lines as well as end plugs with only incoming lines.

The PROFIBUS lines are terminated in the connector.

7.3.7 USB interface X12 (bottom)

The USB interface (type B) at the bottom of the device is designated for service purposes. If an Ethernet connection is not available, a temporary access to the web interface of the device is possible via the USB interface. The connection between the USB interface X12 and the computer is established using a standard USB cable.

The USB interface is set to a fixed IP address 192.168.0.1 and cannot be changed.

➤ For further information, please see chapter 9.2.2.

7.3.8 Shield connector X29

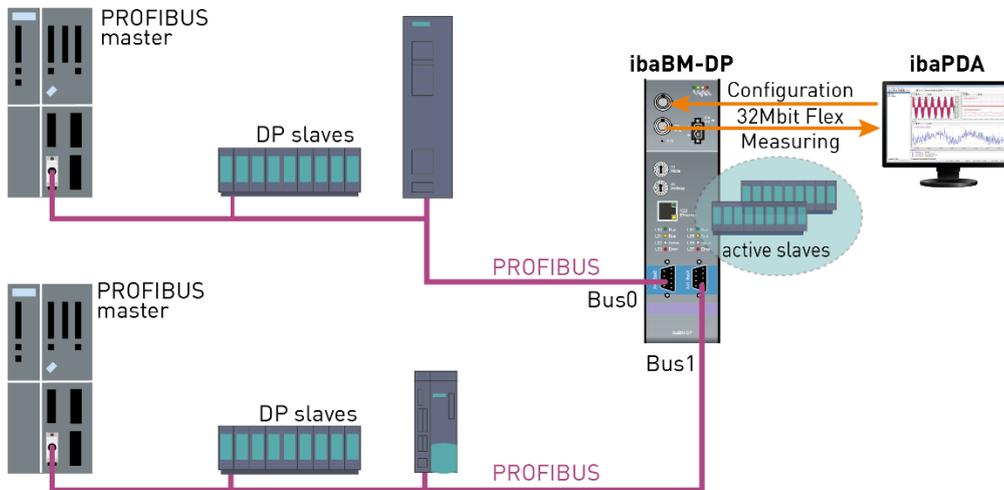
Connector (screw) for connecting the protective ground. Depending on the configuration of the control cabinet, it might be necessary to connect the shields of the PROFIBUS cable to the shield connector X29.

If the shields of the PROFIBUS 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.

8 System integration

The following examples show different typical system integrations with ibaBM-DP.

8.1 Data acquisition 32Mbit Flex

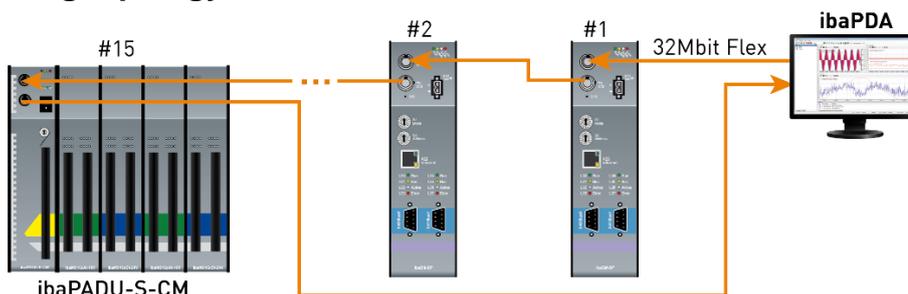


In the above example, the device is connected to 2 separate PROFIBUS lines. Using the sniffer function the device can acquire all data sent on both PROFIBUS lines. In order to use the sniffer function, the device does not need to be considered in the configuration of the DP master.

Simultaneously, active slaves can be configured in the device, which then are supplied with data in a targeted way. For this purpose, the device has to be entered via the GSD file in the configuration of the DP master. The slaves (up to 8) can be optionally distributed on both DP lines.

ibaBM-DP is connected to the ibaPDA system via a bidirectional FO cable (ibaFOB-D card). The configuration and the acquired data are exchanged via FO between ibaPDA and ibaBM-DP.

8.1.1 Ring topology with 32Mbit Flex



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

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

In the ring, also other 32Mbit Flex capable iba devices can be integrated, e. g. ibaPADAU-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-DP).

The individual devices in the ring can work with different cycle times. However, these cycle times have to be an integer multiple of the smallest cycle. Example: Device #1 works at a cycle of 0.5 ms, device #2 with 1 ms, device #3 with 4 ms, etc. If the maximum data rate has been exceeded, ibaPDA issues an error message indicating that the time-base has to be increased or the data amount has to be lowered.

The calculation of the maximum data amount depends on the fastest device in the ring. This means: If you increase the cycle time of slow devices in the ring topology, this does not mean that a higher amount of data can be transferred. Only if you increase the cycle time of the fastest device, also the data amount can be increased.

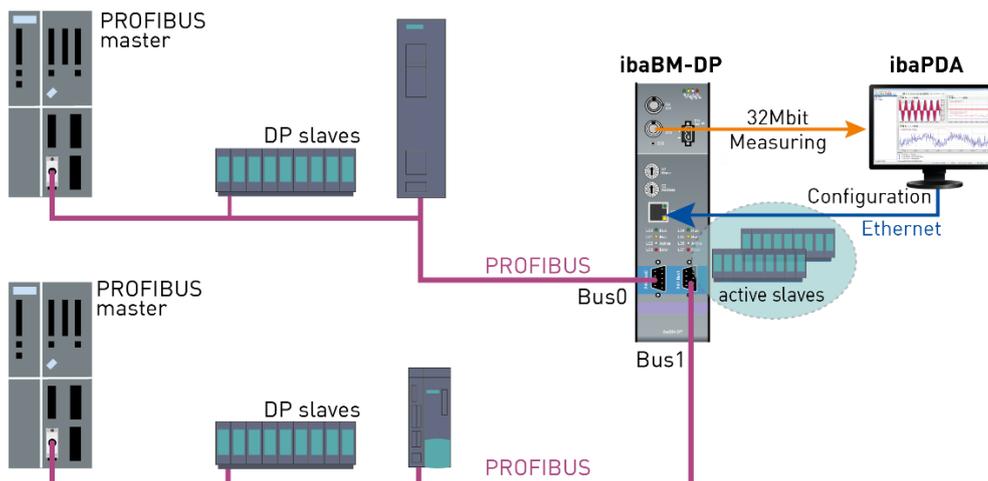
➤ For more information about data allocation in a 32Mbit Flex ring, see chapter 10.8.



Note

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

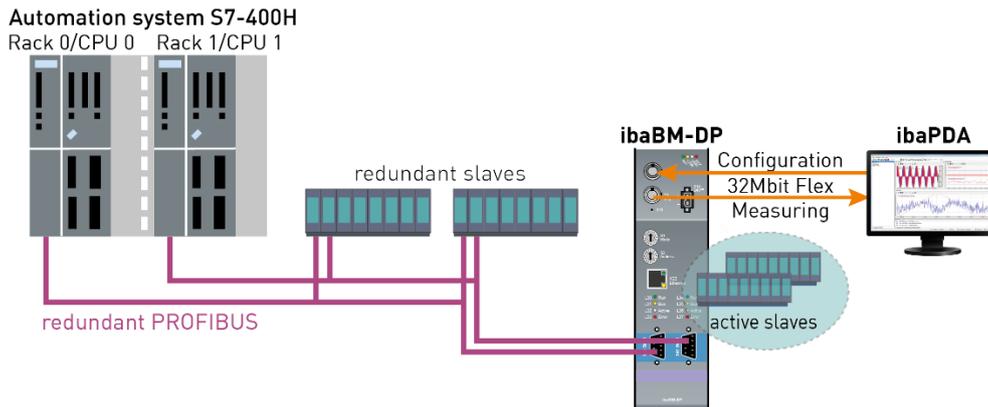
8.2 Data acquisition compatibility mode 32Mbit



If the device is operated in compatibility mode 32Mbit, only a unidirectional connection is needed for acquiring the data in the ibaPDA system. The configuration data is transmitted over an Ethernet connection.

Regarding the configuration as sniffer or active slave, the same is true as shown in the example with 32Mbit Flex, see chapter 8.1.

8.3 Data acquisition on the redundant PROFIBUS 32Mbit Flex



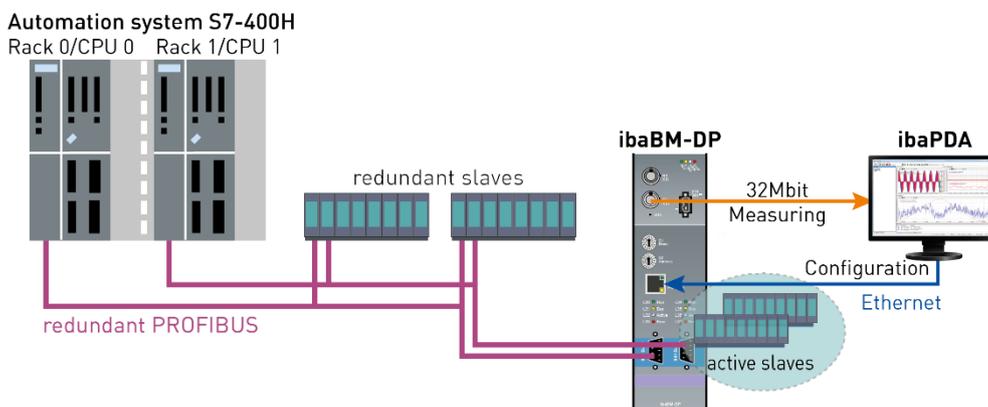
When using the highly available automation system S7-400H, there are two parallel redundant PROFIBUS lines. ibaBM-DP is connected to both lines using the two DP connections Bus0 (X40) and Bus1 (X41).

Up to 8 pairs of active slaves (one slave with the same number on Bus0/1) can be created.

Just as with non-redundant PROFIBUS systems, the device configuration and the acquired data are exchanged via a bidirectional FO connection with ibaPDA.

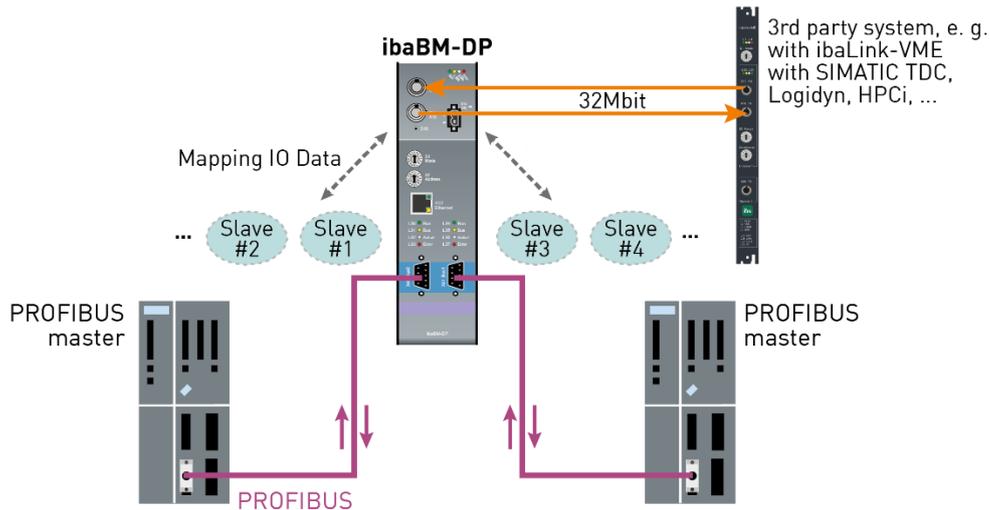
➤ For further explanations concerning the redundancy mode, please see chapter 12.

8.4 Data acquisition on the redundant PROFIBUS compatibility mode 32Mbit



Also in compatibility mode 32Mbit, the device can be operated on the redundant PROFIBUS of a highly available automation system S7-400H. The same notes apply as for chapter 8.3.

8.5 P2P mode



Using the P2P (peer to peer) mode, systems can be coupled bidirectionally to iba devices with ibaNet 32Mbit interface via PROFIBUS (e.g. via ibaLink-VME to VME-based control systems). For this purpose, data from the ibaNet interface are mapped on up to 8 PROFIBUS slaves that can be arbitrarily distributed over the two DP lines: The data received by ibaBM-DP via fiber optic cable are output via the input area of the PROFIBUS slaves. Data which are received over the output area of the PROFIBUS slaves, are output via fiber optic cables. The slaves have to be defined via the GSD file in the configuration of the PROFIBUS master.

The P2P mode is applied in couplings of controllers with an ibaNet 32Mbit interface (e. g. SIMATIC TDC with ibaLink-VME) to new controllers via PROFIBUS, e. g. in modernization projects.

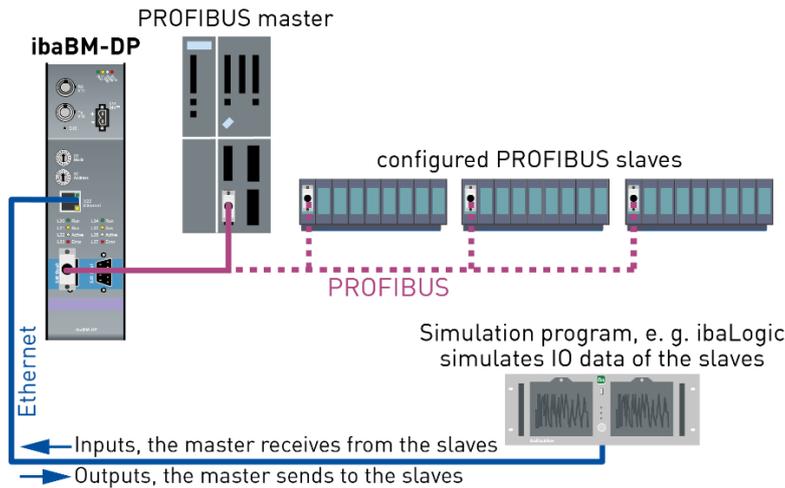
Configuration of the slaves and the data mapping is done exclusively in the web dialog of ibaBM-DP (see chapter 9.3.4.2).



Note

In P2P mode, the ibaBM-DP device is operated without ibaPDA. It is only used to couple the 32Mbit ibaNet interface and the PROFIBUS slaves. You cannot record data in parallel via ibaPDA.

8.6 Simulation mode



With the 'simulation mode' option, software and the configuration of a DP master station can be tested without the need for a peripheral system of the PROFIBUS to be physically present. This means, for example, that a new control program can be tested in a test environment.

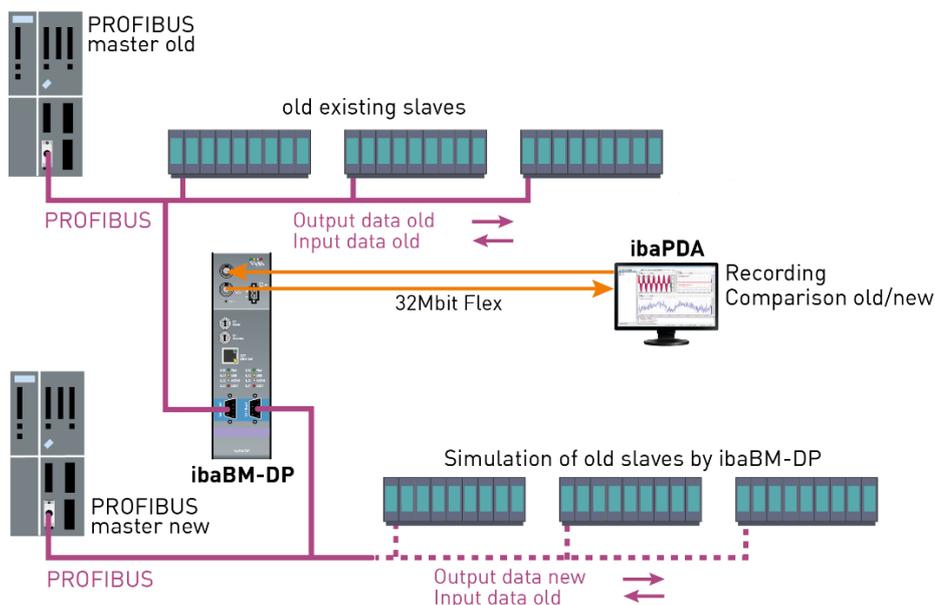
ibaBM-DP simulates the slaves, which are not physically present, as they are configured in the master. It is not necessary to carry out a PROFIBUS configuration in ibaBM-DP, since the device evaluates the configuration telegrams from the master and creates the corresponding slave automatically.

The input values of the slaves are simulated using a TCP/IP telegram interface and the output values are requested. The use of this TCP/IP interface for the simulation of the plant is possible using any tools (e.g. ibaLogic).

The simulation mode is approved for the use with PROFIBUS masters supplied by Siemens only.

➤ For further notes concerning the simulation mode, please see chapter 14.

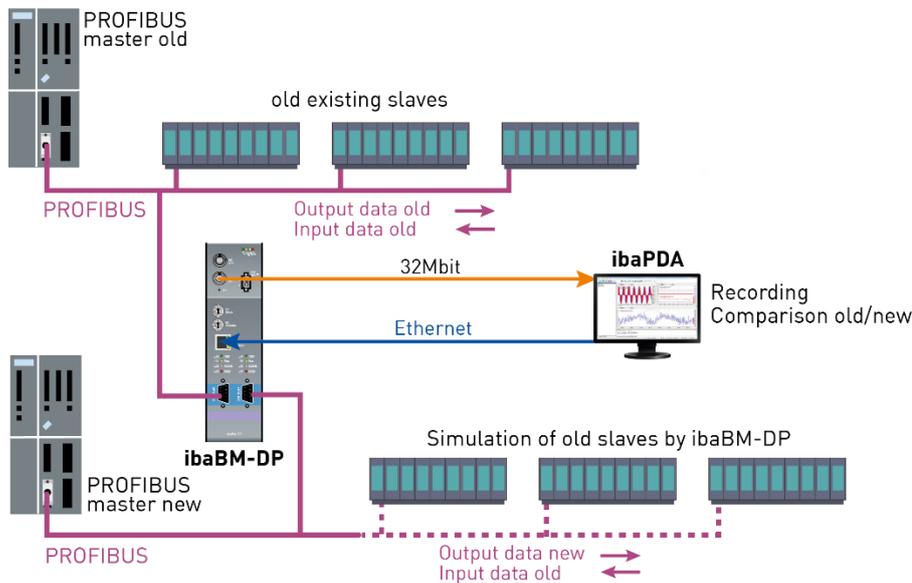
8.7 Mirror mode



In the above example, an existing old controller (“PROFIBUS master old”) including existing periphery shall be replaced by a new controller. The peripherals are to remain unchanged after the old controller had been removed and should be operated with the new controller. Using the mirror mode, the new controller can be tested and commissioned in parallel to the running plant.

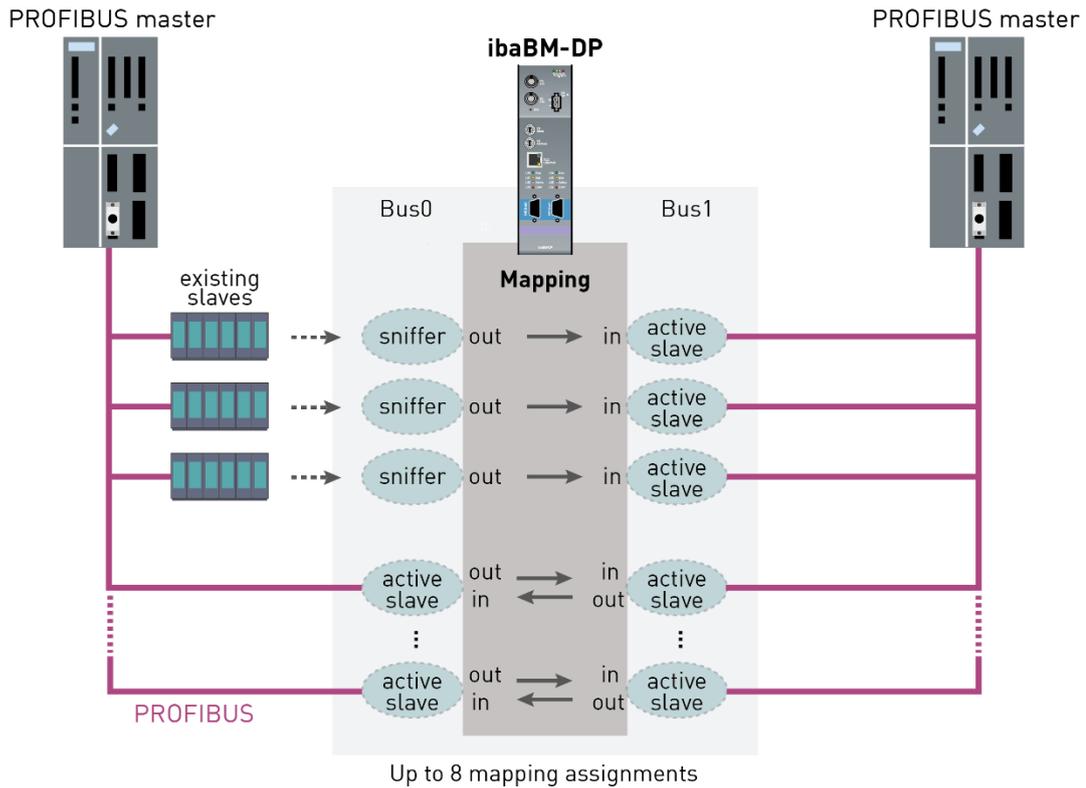
The PROFIBUS system of the old controller is connected to the X40 connection of ibaBM-DP. The new controller is connected to X41. ibaBM-DP automatically detects and then duplicates the slaves of the old system including input data of the new system. The new controller works with the duplicated slaves. Now the program can be tested with real input data. The output data will not be duplicated. Simultaneously, you can record data via ibaPDA from both PROFIBUS systems using sniffer modules. Thus, you can compare the old system to the new system.

In mirror mode, the data can also be acquired in compatibility mode 32Mbit.



➤ For further information on the mirror mode, see chapter 15.

8.8 Mapping mode



In the example shown in the figure above data should be exchanged between the PROFIBUS masters connected to Bus0 and Bus1. By configuring pairs of active slaves assigned to each other the master on Bus0 can send data to the master on Bus1 and vice versa. This is done by mapping the output data range of an active slave to the input data range of the respectively assigned slave.

Additionally in the example real external slaves exist in the PROFIBUS system of Bus0 (e.g. Remote IO stations, drives etc.). The output data sent by the master to these slaves can be sniffed and mapped to the input data range of an assigned active slave on Bus1. Sniffing existing slaves is only possible on Bus0.

In total up to 8 of these mapping assignments can be used in parallel. When using the additional license for extending the number of slaves (see chapter 2) up to 16 mapping assignments can be used.

➤ For further information on the mapping mode, see chapter 9.3.4.3.

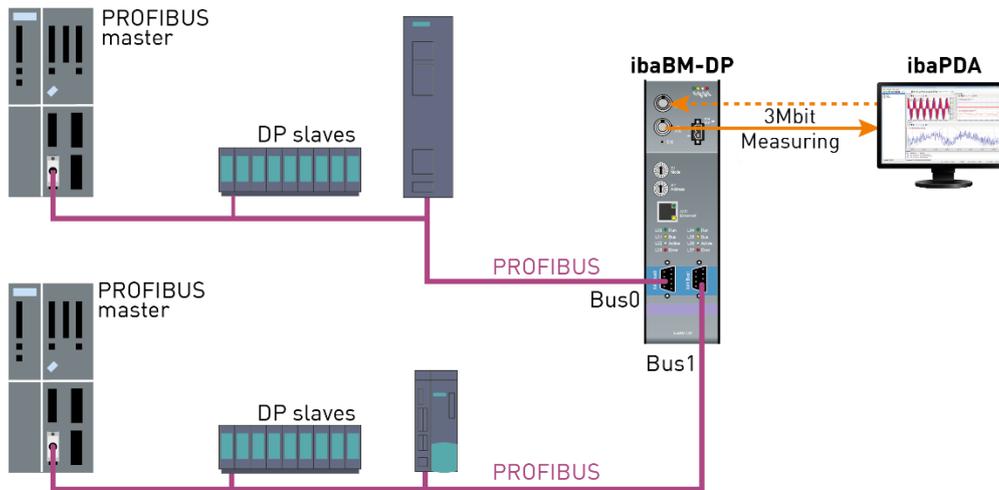


Note

In mapping mode, the ibaBM-DP device is operated without ibaPDA. It is only used to couple the PROFIBUS systems on Bus0 and Bus1. You cannot record data in parallel via ibaPDA.

8.9 Data acquisition compatibility mode 3Mbit (DP-64 mode)

8.9.1 Uni-/bidirectional connection between DP master and ibaBM-DP

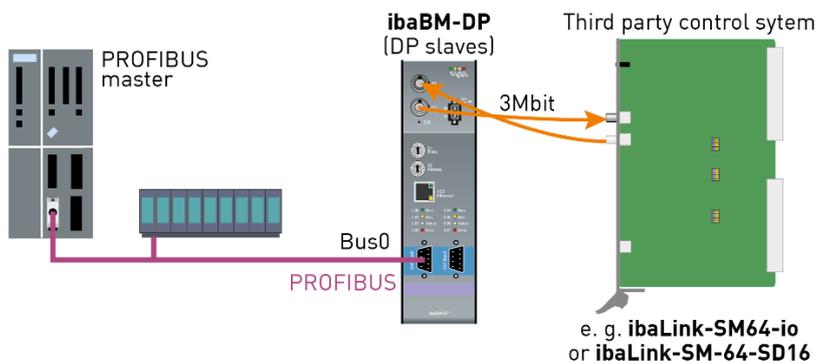


In compatibility mode 3Mbit, you can set up two slaves-DP on the ibaBM-DP device. The slaves are configured via the web dialogs of ibaBM-DP.

Depending on the configuration of the slaves, you can send data for acquisition to ibaPDA (unidirectional FO connection) or use the bidirectional data exchange with ibaPDA (bidirectional FO connection).

➤ For further information on the compatibility mode 3Mbit, see chapter 13.

8.9.2 Coupling of PROFIBUS DP with third party systems



The topology in the figure above is a typical configuration for a system coupling. The ibaLink-SM64-io/-SD16 modules are interface cards for the control systems Simatic S5, Simadyn D or Simicro MMC. The modules have an ibaNet 3Mbit FO interface.

The data from the ibaNet 3Mbit interface are mirrored to 2 configurable PROFIBUS slaves. Thus, the data can be exchanged bidirectionally.

The configuration of the slaves is done in the web dialogs of ibaBM-DP. You do not need ibaPDA for operating this system coupling.

➤ For further information on the compatibility mode 3Mbit, please see chapter 13.

9 Configuration of the device

9.1 Basic principles

The operating mode of the device is chosen using the rotary switches S1 and S2.

The further configuration of the device is done in the I/O Manager of ibaPDA. With 32Mbit Flex, the parameters are transmitted over FO cables to the device, in compatibility mode 32Mbit via the Ethernet interface.

Moreover, the device possesses a web server. The web server can be accessed with a web browser (e. g. Internet Explorer or Mozilla Firefox) via all interfaces (32Mbit Flex, Ethernet and USB).

The following functions are available in the web interface:

- Overview of general device information (device name, serial number, hardware and firmware version, MAC address, IP address, existing licenses)
- Display of status information (position of rotary switches, selected mode)
- Network settings for Ethernet interface (IP address, DHCP setting)
- Firmware updates
- Add additional licenses (additional active slaves, redundancy mode, simulation mode, mirror mode, mapping mode)



Note

If the device is operated with 32Mbit Flex, it is not necessary to use the Ethernet or USB interface.

9.2 Establishing communication links

If the device is operated in 32Mbit Flex mode, it is not necessary to use the Ethernet or USB interface. In Flex mode, you have got access to the device directly via the FO interface (e. g. the web interface, see chapter 9.3.1).

9.2.1 Ethernet interface

Via an Ethernet connection, the web interface of the device can be accessed. Moreover, the Ethernet interface is used for transmitting the configuration in compatibility mode 32Mbit.

Each ibaBM-DP device has a unique MAC address for identification in the network.



Tip

You find the MAC address on the type label at the front of the device.



Moreover, each device can be addressed with a name in the network.

Hostname: **DP_xxxxxx**

xxxxxx corresponds to the 6-digit serial number of the device (see type label), example: DP_000007.

For compatibility mode 32Mbit, the device disposes of a second alternative hostname: **dpms_nnnn**

nnnn corresponds to the last four characters/digits of the MAC address.

Example: The device with the MAC address 0015BA000101 has the name dpms_0101.

With the initial setup of the device, please select an IP address that is fitting for the existing network. You can enter the IP address via the web interface (see chapter 9.3.3). Here, you can also select whether DHCP (dynamic allocation of IP address) is to be used or a fixed IP address.



Important note

The factory setting for the Ethernet interface of ibaBM-DP is the fixed IP address **192.168.1.1**. When resetting to the factory settings (see chapter 7.3.3), this IP address will be recovered.

For establishing a network connection via the Ethernet interface (X22), please proceed as follows:

1. Connect the PC and the device using a network cable, either directly or via a switch or hub. PC and device must belong to the same network.
2. Set the network interface of the computer via „Control panel – Network connections“ (Windows XP) or „Control panel – Network and Sharing Center – Change adapter settings“ (Windows 7) to the same subnet address 255.255.255.0 as the device and assign an appropriate IP address, e. g. 192.168.1.2.



Note

The IP address of your computer must not be 192.168.1.1, as this is the address of ibaBM-DP. Select another IP address in the format 192.168.1.x.

3. Start a web browser on the computer and enter the IP address of the device as URL: <http://192.168.1.1>



Note

As a prerequisite for DHCP, a DHCP server has to be available in the network that assigns IP addresses automatically. Experience shows that in the field of automation technology, rather fixed IP addresses are used, i.e. there is no DHCP server.

If DHCP is activated in the network settings of ibaBM-DP, please proceed as follows for establishing a network connection:

1. Connect the computer and the device to a hub, switch or router by means of a network cable. A DHCP server has to be in the network.
 2. Switch on the device.
As soon as the LED "Run" is blinking regularly, the device is ready for operation.
 3. The DHCP server automatically assigns an IP address to the device.
 4. Set the network interface of the computer also to DHCP by clicking on „Control panel – Network and Sharing Center – Change adapter settings“.
 5. The DHCP server automatically assigns an IP address to the computer.
 6. Start a web browser on the computer and enter the host name of the device into the URL: e. g. http://dp_000007.
- For further information, please see chapter 9.3.3.

**Note**

For communicating with ibaBM-DP via Ethernet (only relevant in compatibility mode 32Mbit), the following TCP port is being used in ibaPDA, which possibly has to be released in a firewall in the network.

ibaPDA-PC --> ibaBM-DP, Port **999**.

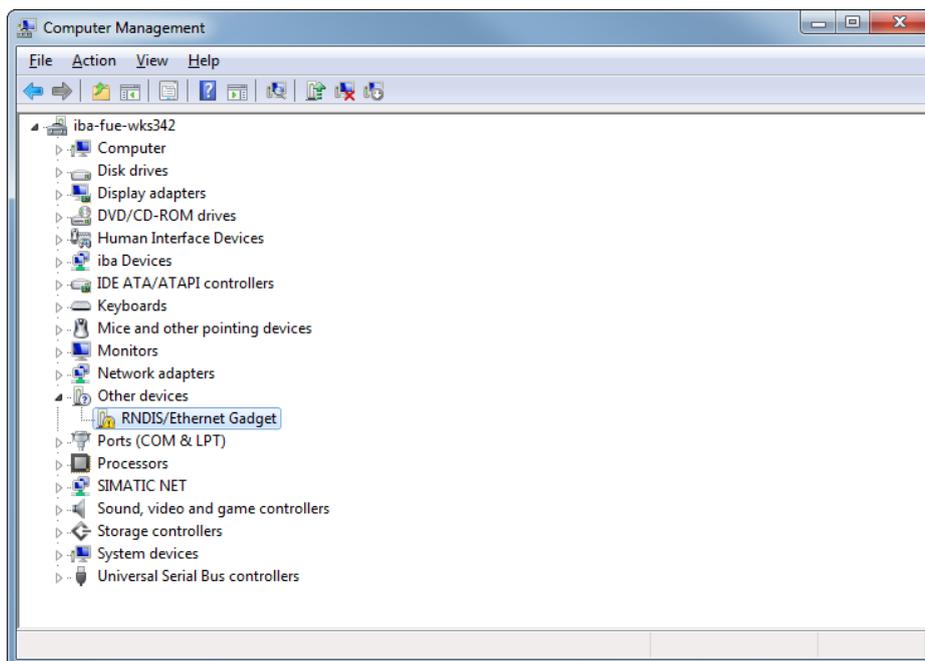
9.2.2 USB interface

The USB interface is located at the bottom of the device and can also be used for accessing the web interface.

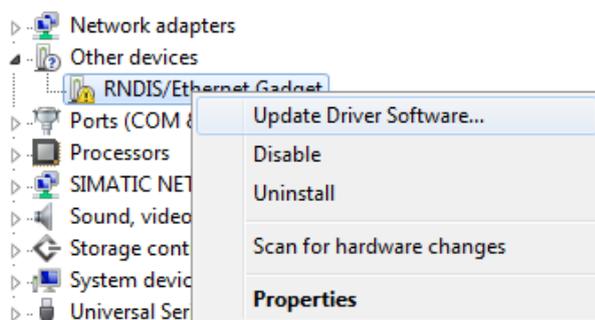
Driver files are necessary for establishing the access via USB interface. You find driver files for Windows XP, Windows 7, Windows 8/8.1 and Windows 10 on the data medium "iba Software & Manuals" in the directory

02_iba_Hardware\ibaBM-DP\01_USB_Driver\

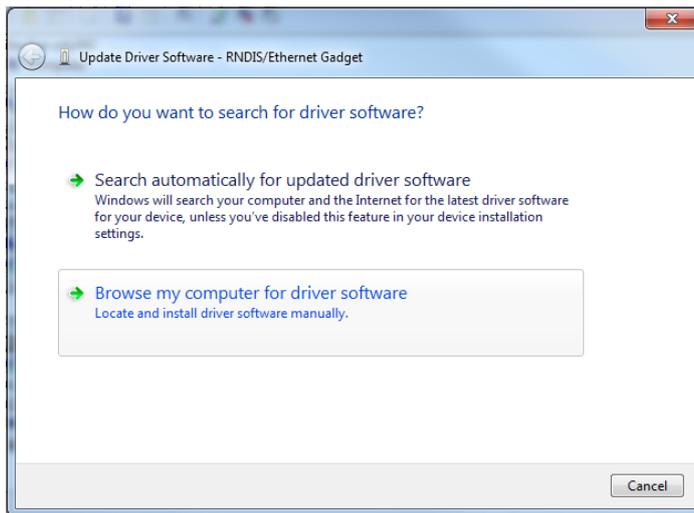
1. Connect the PC or Laptop to the USB interface of the device via a standard USB cable.
2. Open the device manager. A new device appears depending on the Windows version in different sections and with different names:
Windows XP: „RNDIS/Ethernet Gadget“ under „Network adapters“
Windows 7: „RNDIS/Ethernet Gadget“ under „Other devices“
Windows 10: „Serial USB device“ under „Ports (COM & LPT)“.



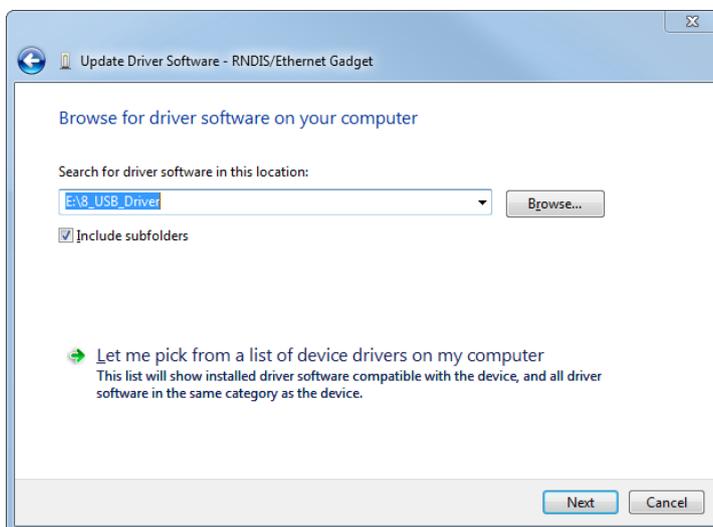
3. Mark the device. When you press the right mouse button, a submenu will be opened. Select "Update Driver Software...".



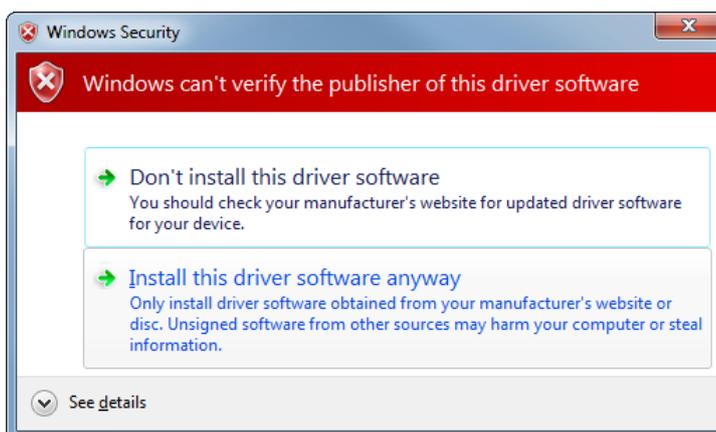
- In the following dialog, choose "Browse my computer for driver software" and click on <Next>.



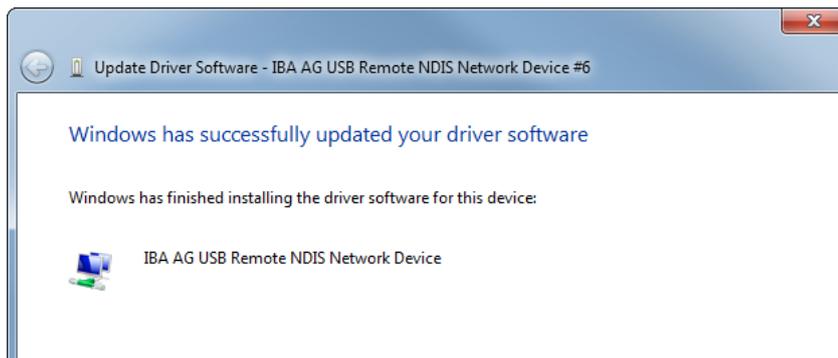
- Insert the data medium "iba Software & Manuals" (included in delivery) and click on <Browse> in the following dialog. Choose the directory with the drivers (02_iba_Hardware\ibaBM-DP\01_USB_Driver).



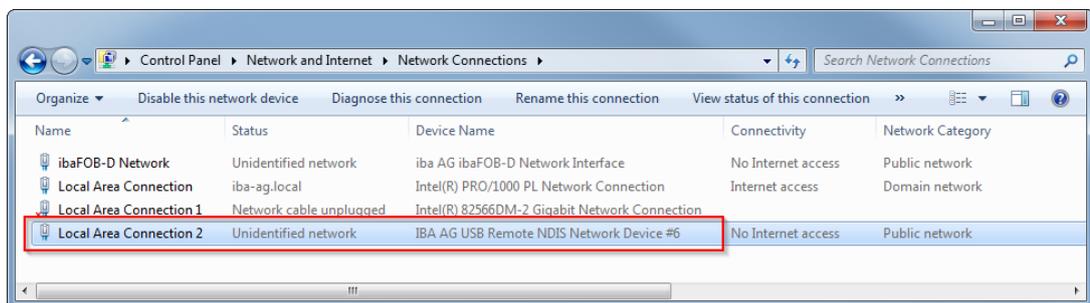
- In the Windows security notification, select "Install this driver software anyway".



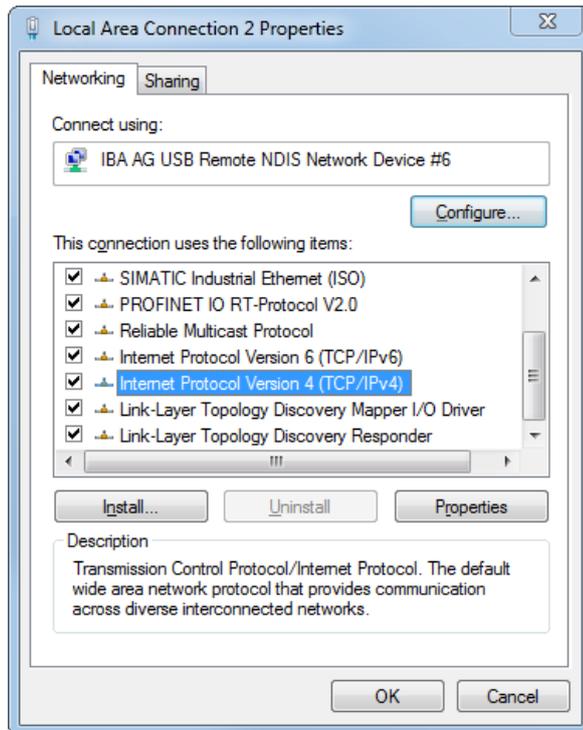
7. When the driver installation has been finished successfully, the following message is shown:



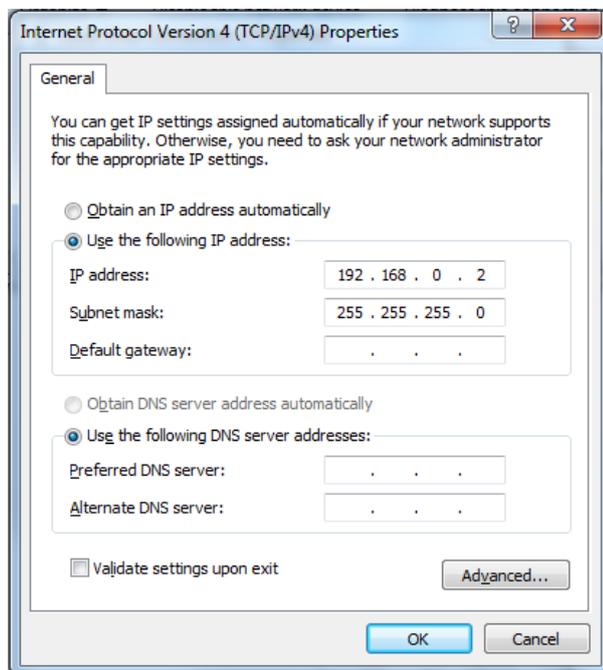
8. To verify the new device, open the overview of the network adapters by clicking on "Control panel – Network and Internet – Network Connections". A new network adapter of the type „IBAAG USB Remote NDIS Network Device“ should be displayed. ibaBM-DP assigns automatically a suitable IP address to the new network adapter from the subnet 192.168.0.x using DHCP.



9. Start your web browser. By entering the address <http://192.168.0.1>, you gain access to the web interface of ibaBM-DP.
10. If there are connection problems, the IP address allocation with DHCP may not work properly. If this is the case, assign manually an IP address to the new network adapter „IBAAG USB Remote NDIS Network Device“.
- Open the properties dialog of the network adapter with a click on the right mouse button. Mark the entry "Internet protocol Version 4 (TCP/IPv4)" and click on <Properties>.



11. A new dialog "Internet Protocol Version 4 (TCP/IPv4) Properties" is opened.



12. Select "Use the following IP address" and enter an address in the "IP address" field which belongs to the same subnet like the fixed IP 192.168.0.1 of the USB interface of ibaBM-DP. This can be e. g. the address "192.168.0.2". Under "Subnet mask", you have to enter "255.255.255.0".

13. End the dialog by clicking on <OK> and the preceding dialog with <Close>.

14. Now, try to open the web interface of the device with your web browser again. Enter the address <http://192.168.0.1> in the web browser.

**Important note**

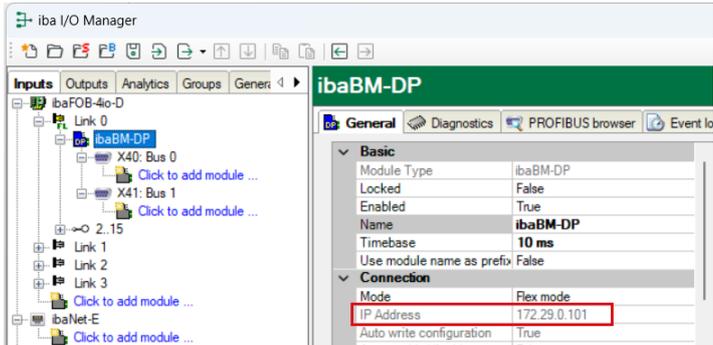
The USB interface of the ibaBM-DP has the fixed IP address 192.168.0.1. This address cannot be modified.

The web interface in the browser can only be opened with the address <http://192.168.0.1>. The host name cannot be resolved via the USB interface.

9.3 Web interface

9.3.1 Accessing the web interface

1. If your computer is connected to ibaBM-DP via 32Mbit Flex, Ethernet, or USB, start your web browser.
2. Enter one of the following URLs in the web browser:

If connected via ...	Then URL ...
32Mbit Flex	<p>IP address, that appears in the I/O Manager of ibaPDA on the "General" tab in the field "IP Address", when the device has been configured or detected automatically. In the example below http://172.29.0.101.</p>  <p>The device name cannot be resolved.</p>
Ethernet TCP/IP interface	<p>IP address of the device, e. g. http://192.168.1.1</p> <p>Or device name http://dp_xxxxxx or http://dpms_nnnn</p>
USB interface	<p>Fixed IP address of the device: http://192.168.0.1.</p> <p>The device name cannot be resolved.</p>



IP address in 32Mbit Flex mode

The IP address which is assigned automatically in 32Mbit Flex mode, consists of 4 positions, e. g. 172.29.0.101.

The first two positions (172.29) are equivalent to the IP address of the ibaFOB-D network adapter, the third position (0) corresponds to the number that is displayed in the display of the ibaFOB-D card in the computer + link number the device is connected to. The fourth position (101) is the device address selected on the rotary switch S2 +100.



Tip

In case you use the Internet Explorer as browser, it might be necessary - depending on the security level of the Internet Explorer - to enter the address http://dp_xxxxxx or - depending on the way of access - the IP based URL as a trusted website.

The "Network", "Settings" and "Administration" pages can only be accessed by administrators and are protected by a password.

Sign in to access this site

Authorization required by http://**192.168.1.100**
Your connection to this site is not secure

Username

Password

Factory settings for the user account:

User name: admin

Password: 1234

Only experienced users should have access, in order to prevent an accidental change of the settings. An unintentional change of the network parameters can have as consequence that an access to the device via Ethernet is not possible anymore and the device parameters have to be reset to the factory settings. Therefore, please change the password immediately, if possible. As characters, all numbers and letters in upper or lower case are allowed.



Tip

You can reset the passwords to the factory settings, e. g. if you forgot the password. For further information, see chapter 7.3.3

9.3.2 Info – Homepage

ibaBM-DP

Info | Network | Settings | Diagnostics | Administration | Help | (1)

Bringing Transparency to the World of Automation.

Mode (S1/S2): DP Sniffer Flex (2)

Product Information	Device type	ibaBM-DP
	Serial number	000001
	Firmware version	v01.00.000-rc012
	Hardware version	A0
Network Information	Device name	DP_000001
	2nd Device name	DPMS_D601
	IP address	192.168.11.89
	Subnet mask	255.255.255.0
	MAC address	00:15:BA:FF:D6:01
License Information	Max. active slaves	16
	Redundancy mode	not available
	Simulation mode	not available

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The basic structure is the same for the webpages:

- (1) Navigation field for selecting the webpages. The webpage currently displayed is marked in green.
- (2) In the status bar, the currently selected operating mode is shown. The status bar is being updated automatically.
- (3) Display area for detailed data, depending on the page selected in the navigation field.



Important note

For ensuring that the status bar is updated automatically, the web browser has to allow for the execution of JavaScript.

You find an overview of the most important device data on the “Info” page:

- Product information: serial number of the device, installed firmware version, hardware version
- Network information: device names in the network, current IP settings of the Ethernet interface
- License information: currently available licenses

9.3.3 Network

This page can only be accessed by the "admin" user.

This page shows both network adapters of the device. The upper interface "Network interface: Ethernet" describes the settings of the LAN interface X22, the lower interface "TCP/IP over USB" describes the settings of the USB connection X12.

- (1) Here, you can choose, if a DHCP server existing in the network, should be used
- (2) or a static IP address.
- (3) The "Subnet mask" suitable for the network
- (4) "Default gateway", in case no gateway is used, enter 0.0.0.0.
- (5) With the <Submit> button, the entries for the network interface "Ethernet" are stored in the device.
- (6) With the <Refresh> button, the display of the entries can be updated (e. g. relevant for DHCP).
- (7) Fixed IP address of the USB connection that cannot be changed.

**Note**

Ask your network administrator for an IP address suitable for your network.

The following IP addresses are not permitted:

0.0.0.0, broadcast: 255.255.255.255 and Localhost-addresses (also known as loopback addresses): 127.0.0.0 to 127.255.255.255 and the Multicast addresses 224.0.0.0 to 239.255.255.255 (224.0.0.0/4).

For the IP address, the "standard IPv4 dotted-decimal format" without a leading zero is used. If you have entered any leading zeros, they will be automatically eliminated as soon the IP address is being accepted.

**Tip**

In case of wrong entries, you might not have access again after a restart!

You can reset the network parameters to the default settings. For further information, please see chapter 7.3.3

9.3.4 Settings

This page can only be accessed by the "admin" user. Depending on the selected mode, current device settings are displayed on this page.

Mode Information	
ibaNet protocol	32Mbit Flex
Sample time	0.5 - 1.4 ms (adjustable)
Data volume	depends on sample time max. 4060 bytes 1024 analog + 1024 digital signals

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When compatibility mode 3Mbit, P2P mode or mapping mode are selected, further detail settings must be done here.

9.3.4.1 Compatibility mode 3Mbit (DP-64 mode)

Mode (S1/S2): DP-64

DP-64-Mode: 0: PDA 32 Integers

Output (analog / digital): 2*32(int) / 2*32

Input (analog / digital): -

GSD-Files: ibaF01n4.gsd; ibaF01n3.gsd; iba_0F01.gsd

Slave	Bus Number	Address	Active
A	0	0	<input type="checkbox"/>
B	0	0	<input type="checkbox"/>

Submit Refresh

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The figure shows the „Settings“ page, when the device is set to compatibility mode 3Mbit (DP-64 mode). In this mode, further settings must be carried out on the “Settings” page.

The operating mode can be selected in the combo box “DP-64-Mode”. The mode names correspond to those described in chapter 13.2.1.

Mode (S1/S2): DP-64

DP-64-Mode: 0: PDA 32 Integers

Output (analog / digital): 2*32(int) / 2*32

Input (analog / digital): -

GSD-Files: ibaF01n4.gsd; ibaF01n3.gsd; iba_0F01.gsd

Slave	Bus Number	Address	Active
A	0	0	<input checked="" type="checkbox"/>
B	0	0	<input checked="" type="checkbox"/>

Make sure that the two slaves are assigned to the correct bus line (bus 0 – connector X40, bus 1 – connector X41). Enter the slave address for each slave, as they are given in DP project engineering. The permissible address range is 0 to 126.



Note

You can deactivate the slave with the checkbox „Active“.

Mode (S1/S2): DP-64

DP-64-Mode: 0: PDA 32 Integers

Output (analog / digital): 2*32(int) / 2*32

Input (analog / digital): -

GSD-Files: ibaF01n4.gsd; ibaF01n3.gsd; iba_0F01.gsd

Slave	Bus Number	Address	Active
A	0	10	<input checked="" type="checkbox"/>
B	1	20	<input checked="" type="checkbox"/>

Submit Refresh

In the example (see figure above), the first slave with the PROFIBUS address 10 is activated on bus 0, the second slave with the address 20 is activated on bus 1. The FO interface is set to „0: PDA 32 Integers“ mode. This means, that each of both slaves has an output range for 32 analog signals (Integer) and 32 digital signals. The data is transferred via the FO interface to e.g. ibaPDA.

The settings are stored in the device by clicking the button <Submit>.

The display of the settings is updated by clicking the button <Refresh>.

➤ For further information about DP-64 mode, please see chapter 13.

9.3.4.2 P2P mode

In the P2P mode, the following settings can be configured in the “Settings” mask:

Transmission Mode

The P2P mode uses the 32Mbit ibaNet protocol. In the transmission mode field, you define how this protocol is assigned. You can choose from the following transmission modes:

4: 1024 Integer + 1024 Digital in 800µs

A: 512 Real + 512 Digital in 800µs

C: 2872 bytes in 1000µs

The setting has to correspond with the setting in the 32Mbit communication partner (e.g. ibaLink-VME).

For each slave: bus number, address and active

The data from the ibaNet telegrams are mapped in send and receive direction on up to 8 slaves (A - H). For each slave, you can choose, on which bus it is to be activated, which PROFIBUS address should be assigned and if you want to use this slave at all.

▪ Digital

The Slave H can be used in the transmission modes 4 and A, either for the analog value range or the digital value range. If you want to use the slave H for the digital values, then activate the “Digital” setting.

- **Submit**
You activate changed settings by clicking on <Submit>.
- **Refresh**
With a click on <Refresh>, the mask will be updated.

Mode (S1/S2): 32Mbit P2P

Transmission Mode: 4: 1024 Integer + 1024 Digital in 800 µsec

2048 Byte (1024 Integer) | 128 Byte (1024 Digitals)

Slave	Bus Number	Address	Active	Digital	Input	Output
A	0	10	<input checked="" type="checkbox"/>		128	128
B	0	11	<input checked="" type="checkbox"/>		244	12
C	0	12	<input checked="" type="checkbox"/>		122	64
D	0	13	<input checked="" type="checkbox"/>		122	128
E	1	20	<input checked="" type="checkbox"/>		128	128
F	1	21	<input checked="" type="checkbox"/>		244	12
G	1	22	<input checked="" type="checkbox"/>		122	64
H	1	23	<input checked="" type="checkbox"/>	<input type="checkbox"/>	12	244

Submit Refresh

The colored bar visualizes the mapped data from the ibaNNet-telegram. The mapping of the data is always identically for both directions.

	Mode		
	4: 1024 Integer + 1024 Digital	A: 512 Real + 512 Digital	C: 2872 Bytes
Slave A	Integer 0 – 121	Real 0 -60	Bytes 0 – 243
Slave B	Integer 122 – 243	Real 61 – 121	Bytes 244 – 487
Slave C	Integer 244 – 365	Real 122 – 182	Bytes 488 – 731
Slave D	Integer 366 – 487	Real 183 – 243	Bytes 732 – 975
Slave E	Integer 488 – 609	Real 244 - 304	Bytes 976 – 1219
Slave F	Integer 610 – 731	Real 305 – 365	Bytes 1220 - 1463
Slave G	Integer 732 – 853	Real 366 – 426	Bytes 1464 – 1707
Slave H	Integer 854 – 975 or digital values 0 - 1023	Real 427 – 487 or digital values 0 - 512	Bytes 1708 – 1951
Not to be used	Integer 976 - 1023	Real 488 - 512	Bytes 1952 - 2872



Note

In total, the ibaNNet-telegram always contains more data than can be mapped on 8 slaves (each with 244 Bytes). This is why a part of the telegram cannot be used.

Under “Actual length” you can see the length of the inputs and outputs in the web dialog that has been detected for the respective slave. This corresponds to the configured length in the PROFIBUS configuration (e.g. Step 7 HWConfig).



Note

In the PROFIBUS configuration, there are certain limits for the maximum length that can be configured for the inputs and outputs. Under Step 7, for example, the sum of the configured inputs and outputs of a slave may not exceed a maximum length of 256 Bytes.

9.3.4.3 Mapping mode

The mapping mode is completely configured via the web interface. ibaPDA is not required for using the mapping mode.

ibaBM-DP

Info | Network | Settings | Diagnostics | Administration | Help |

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Mode (S1/S2): Mapping Flex

	Bus 0				Bus 1			
#	Slave	State	IO		IO	State	Slave	Status (Bus 0 / Bus 1)
A	8	Sniffer	out: 6 in: 10	→	in: 122 out: 122	Active Slave	9	OK / OK
B	113	Sniffer	out: 18 in: -	→	in: 122 out: 122	Active Slave	10	OK / OK
C	65	Sniffer	out: - in: 10	→	in: 122 out: 122	Active Slave	11	OK / OK
D	99	Active Slave	out: 128 in: 128	↔	in: 128 out: 128	Active Slave	100	OK / OK
E	16	Active Slave	out: 244 in: -	↔	in: 244 out: -	Active Slave	16	OK / OK
F	55	Active Slave	out: 244 in: 12	↔	in: 244 out: 12	Active Slave	36	OK / OK
G	114	Active Slave	out: - in: 244	↔	in: - out: 244	Active Slave	115	OK / OK
H	88	Disabled	out: 128 in: 128		in: 128 out: 128	Disabled	88	-- / --

Submit Refresh

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In the settings dialog up to 8 mapping assignments can be configured (rows A – H). In case the device has a license extension to use up to 16 slaves up to 16 mapping assignments can be configured. In general two types of mapping assignments are possible:

❑ Sniffer / Active Slave

On Bus0 the output data range of an existing slave is sniffed and this data is mapped (copied) to an active slave on Bus1. In this case data is transferred only from Bus0 to Bus1. It is not possible to configure a Sniffer on Bus1.

❑ Active Slave / Active Slave

On Bus0 as well as on Bus1 an active slave exists. In both directions the respective output data range is mapped to the input data range of the assigned slave.

Settings and displayed data

- ❑ **Slave:** Configure the address of the slave here. In case you use a “Sniffer” this is the address of the existing slave you want to “sniff”. When you use an “Active Slave” a slave with this address will be generated in ibaBM-DP.
- ❑ **State:** Choose if you want to use a “Sniffer” or “Active Slave”. Additionally you can choose “Disabled”.
- ❑ **IO:** The length of the output and input address range of the slave is automatically detected and shown here. The length is determined by the configuration of the slave using the corresponding GSD file.
- ❑ **Arrows:** The arrows show in which direction data is exchanged with the current settings.
- ❑ **Status:** Status information regarding the state of the bus system is shown here.

For configuration of the active slaves in your PROFIBUS configuration the GSD file „ibaDPMSi.gsd“ is required. You find this file on the data medium „iba Software & Manuals“ included in delivery in the directory

02_iba_Hardware\ibaBM-DP\02_GSD_Files\01_General\

Just configure the input and output ranges required for your application. The length of inputs and outputs do not have to match. In case the output range is shorter than the input range the remaining input range is just unused. Its data content is undetermined. When the output range is longer than the input range only the fitting output range is mapped. The remaining data is discarded.



Note

In the PROFIBUS configuration, there are certain limits for the maximum length that can be configured for the inputs and outputs. The maximum length of the output and input range in general is 244 bytes. Under Step 7, for example, the sum of the configured inputs and outputs of a slave may not exceed a maximum length of 256 Bytes.

9.3.5 Diagnostics

Mode (S1/S2): DP Sniffer Flex

Status Information	S1 Mode	1
	S2 Address	1
	Mode	DP Sniffer Flex
	Bus0	missing slaves
	Bus1	no communication
Firmware Information	Firmware version	v01.01.002
	FPGA version	v1.1 build 35
	DPF version	v01.00.080 (05.06.2014)

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On the "Diagnostics" page, the following features are displayed:

- Settings of the rotary switches S1 and S2
- Selected operating mode
- Communication status of the PROFIBUS lines
- Firmware information

9.3.6 Administration

This page can only be accessed by the "admin" user. On the "Administration" page, the password can be changed for the administrator, new firmware can be loaded and additional licenses can be activated.

The screenshot shows the ibaBM-DP web interface. At the top right is the 'ibaBM-DP' logo. Below it is a navigation menu with 'Info', 'Network', 'Settings', 'Diagnostics', 'Administration', and 'Help'. A banner below the menu reads 'Bringing Transparency to the World of Automation.' The main content area is titled 'Mode (S1/S2): DP Sniffer Flex'. It contains three sections:

- Change password:** Fields for 'Old password', 'New password', and 'Retype password', followed by a 'Change password' button.
- Update device: Firmware:** A 'File' field with a 'Browse...' button and the text 'No file selected.', followed by an 'Update firmware' button.
- Enter License Code:** Two input fields and a 'Submit' button.

 At the bottom of the interface, it says 'Measurement and Automation Systems' and 'www.iba-ag.com'.

Changing the password

1. In case you want to change a password, enter it in the fields. For safety reasons, the old password has to be entered and the new password has to be entered twice.
2. Finally, click on <Change password>. The changes are applied.

Firmware Update

1. Click on the <Browse...> button and choose the update file <dp_v[xx.yy.zzz].iba>.
2. When clicking on <Update firmware>, the update is started. The progress of the update is shown in the status bar.



Note

If a firmware update should be needed, please contact the iba support. We then supply you with the files you need and further information about the update.



Important note

The firmware update takes some minutes. When the update is running, the device must not be switched off! Otherwise, there is a risk that the device does not work anymore!



Note

The firmware update can also be done in the I/O Manager of ibaPDA (see chapter 10.4.5).

Activating licenses

1. If you have purchased an additional license (redundancy, mirror or simulation mode), please enter in both fields the two numeric keys, iba has sent you.
2. Please click on the <Submit> button and the device detects automatically which license(s) is/are activated.



Note

Activating an additional license is also possible via the I/O Manager in ibaPDA (see chapter 10.4.5).

Licenses always belong to one device and cannot be transferred to other devices.

9.3.7 Help

Support

Phone	+49 911 97282-14
Fax	+49 911 97282-33
Email	support@iba-ag.com
Note	If you require support, please specify the serial number and firmware version of the product.

iba AG Headquarters

iba AG	
Koenigswarterstrasse 44	
90762 Fuerth	
Germany	
Phone	+49 911 97282-0
Fax	+49 911 97282-33
Email	iba@iba-ag.com

iba Regional Offices

For contact data of your regional iba office or representative, please refer to our website www.iba-ag.com.

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This page contains important contact data for getting support for the device.

10 Configuration with ibaPDA

For measuring and recording data over ibaBM-DP in 32Mbit Flex mode, you need ibaPDA version 6.32.0 or higher.

For measuring and recording data over ibaBM-DP in compatibility mode 32Mbit, you need ibaPDA version 6.20.2 or higher.

For ibaPDA versions older than version 6.32.0, you can use the device module ibaBM-DPM-S for I/O configuration. For a description, please see the "ibaBM-DPM-S" manual.

CAUTION

When changing the slave configuration of the ibaBM-DP device (add, delete active slaves or transferring them on another bus) during operation, this results in a temporal decoupling of the slaves from the PROFIBUS. The communication to the DP master is interrupted. If the PLC (e.g. SIMATIC S7®) is not secured by OBs, this will result in a stop of the PLC!

When changing addresses and data within slaves that have been already defined, there will be no disturbances in the PROFIBUS communication!

CAUTION

For preventing disturbances on the PROFIBUS, use for active slaves only free slave numbers that are not used by other devices!

10.1 First steps in ibaPDA configuration

By means of the following instruction, you learn how to integrate ibaBM-DP step by step into ibaPDA and how to configure measurement signals. The description refers to the **32Mbit Flex mode** (see chapters 7.3.4.3 and 8.1). In chapter 10.2 we describe special features and deviations which have to be considered in compatibility mode 32Mbit.



Note

Make sure that 32Mbit Flex mode has been selected using the S1 and S2 rotary switches (see chapter 7.3.4.3).

The basic device settings like network settings, passwords etc. should be done in advance via the web interface.

With ibaPDA, you can define the PROFIBUS slave addresses and configure analog and digital measurement signals. The following description refers to ibaPDA version 6.32.0 or higher.

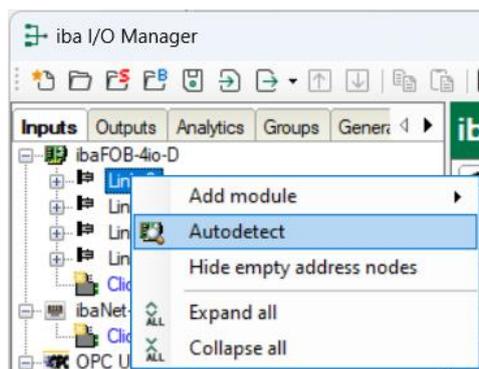
1. Connect the device to a voltage source and switch on the device (see chapters 7.3.2).
2. Establish a FO connection between the TX connector of the device and a free RX input of an ibaFOB-D card as well as a FO connection between the RX connector and a free TX output of the ibaFOB-D card.
The TX/RX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

use just any free TX/RX connectors.

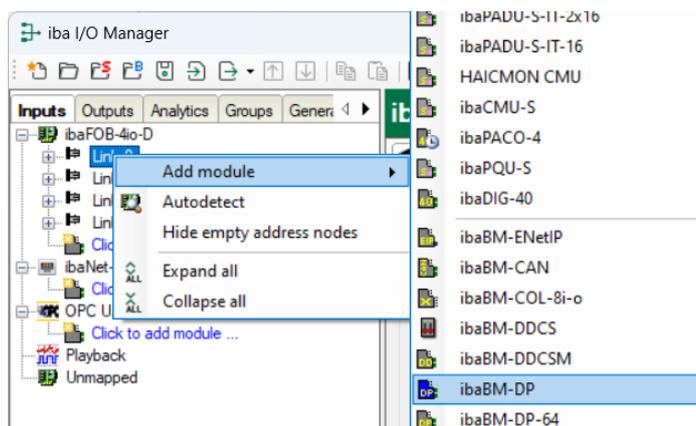
Dark grey FO connectors are receiving **RX inputs**

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 right ibaFOB-D card and mark the link, ibaBM-DP 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, see chapter 7.3.4), the device appears at the respective address position 1-15.

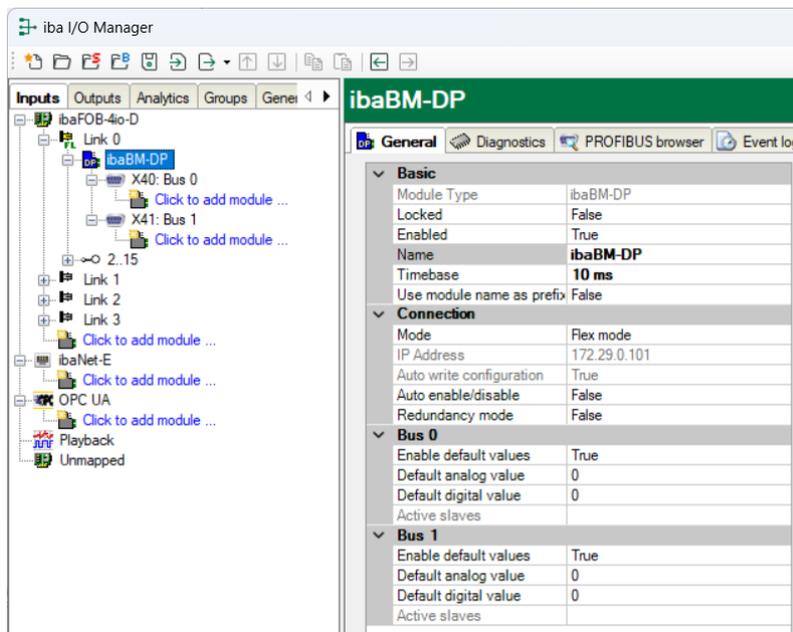


6. Optionally, you can also add the device manually. In this case select "Add module - ibaBM-DP" in the context menu.

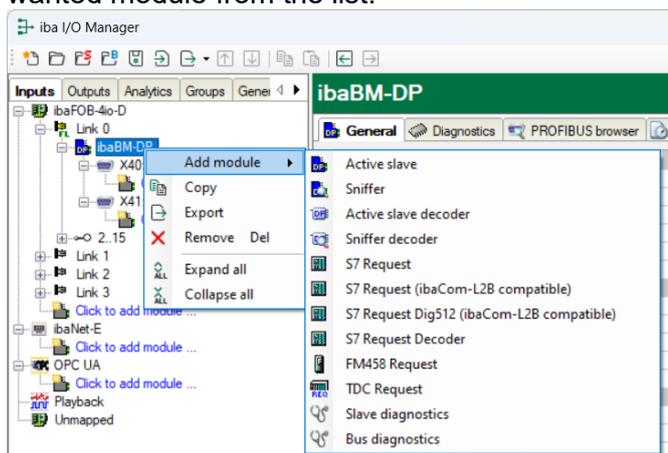


According to the selected Flex address (switch S2, see chapter 7.3.4), the device has to be dragged to the correct address position using drag & drop.

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



8. Please decide, if you want ibaBM-DP to work with active slaves and/or only as sniffer. If the device is to be connected with one or more active slaves to the PROFIBUS, you first have to configure the PROFIBUS on the PLC side for defining the slave numbers of the active slaves of the device (see chapter 11.2). Moreover, the PROFIBUS parameters of all participants are needed, you want to measure data from (slave no., length of inputs and outputs and data types). These are also needed for the pure sniffer operation.
9. Add a module under the ibaBM-DP device module. Click with the right mousebutton on the ibaBM-DP device module and select in the context menu "Add module" the wanted module from the list.

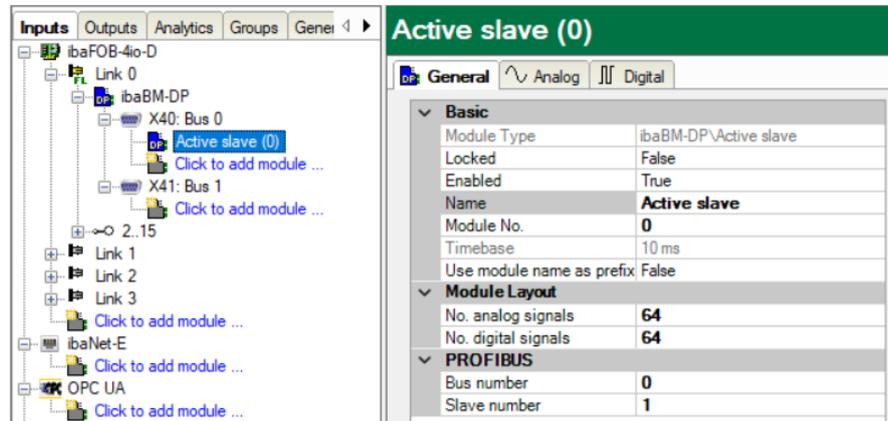


Optionally, for adding a module, you can also select the option "Click to add module..." marked in blue under the bus connection. Depending on the license, the following modules are available:

- Active slave, Sniffer, Active slave decoder, Sniffer decoder, Slave diagnostics, Bus diagnostics
- With additional ibaPDA license: S7 Request, S7 Request Decoder, FM458 Request, TDC Request. For information regarding these modules, please read the respective manuals.

10. Active Slave (Module "Active Slave")

With this module, you generate a single active slave on ibaBM-DP, the master of the PROFIBUS line can directly send data to. Enter the address of the slave (as parametrized in the configuration of the PLC) on the "General" tab under "Slave number". Under "Bus number", you can enter the PROFIBUS line (0: connector X40, 1: X41) on which the active slave is being operated.

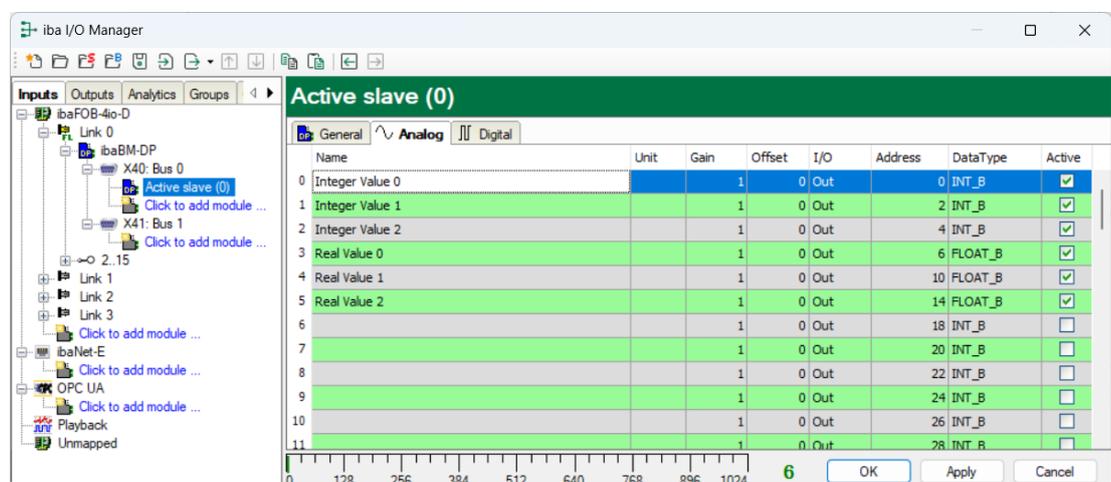


If you want to operate several active slaves, then add more modules of the "Active slave" type.

➤ For a detailed description of the "Active slave" module, please see chapter 10.3.3.

11. Then, enter the "Number of analog signals" and the "Number of digital signals" in the "Active slave" module on the "General" tab. The default setting is 64, a maximum of 512 analog and 512 digital signals can be assigned per module, a total over all modules of 1024 analog and 1024 digital signals. This value determines the length of the signal tables on the "Analog" and "Digital" tab.

12. Enter the signals you want to record on the "Analog" tab in the sequential order you want. Assign a name to each signal ("Name" column). In the "I/O", "Address" and "Data type" column, define the information where the signal can be found in the interface of the slave.





Note

When clicking on the header of a column, the settings of the lines below are completed automatically.

Example:

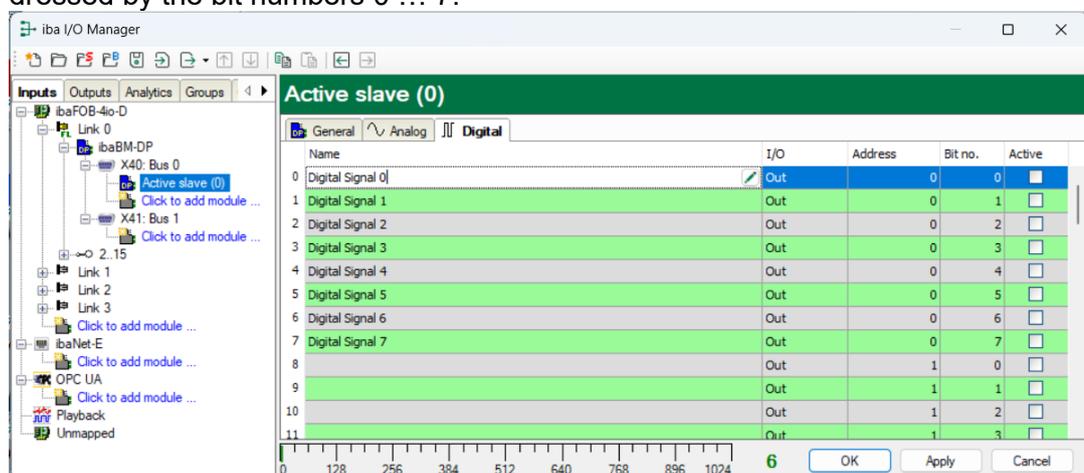
You want to set a different data type beginning with a certain row: Change the data type in the first row of the chosen rows and then click on the header "Data type". The data type will be changed automatically in all lines below.

If you want to calculate the addresses automatically depending on the selected data type: Set the right address in the first row (usually 0) and then click on the "Address" header. Now, the addresses are filled in sequential order taking into account the data type you have selected.

Similar functions are also available for the other columns.

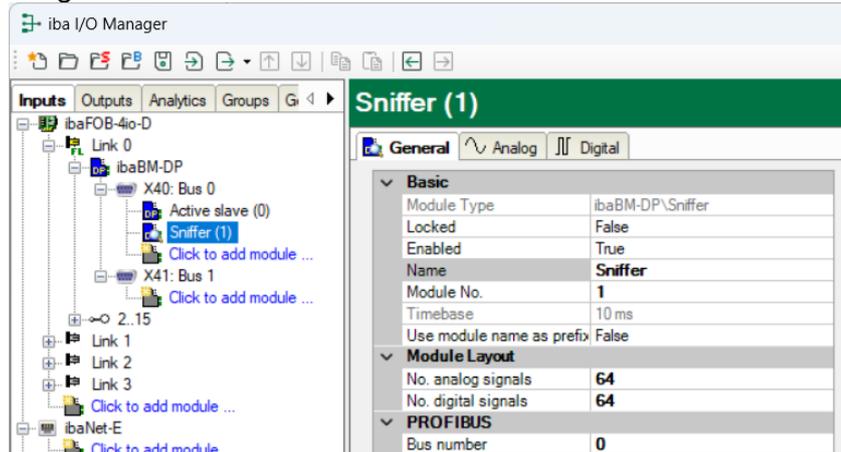
Thus, the effort for configuration can be reduced.

13. If required, select a scaling value of the signals in the columns "Gain" and "Offset" for converting them into physical units.
14. For digital signals on the "Digital" tab, proceed as shown above. You do not need to enter a data type. The address offset is given in 1 byte steps. The signals are addressed by the bit numbers 0 ... 7.



15. Sniffing on the PROFIBUS ("Sniffer" module)

With this module, you generate a sniffer on the bus that is able to record the existing telegram traffic between master and slaves within a PROFIBUS system.

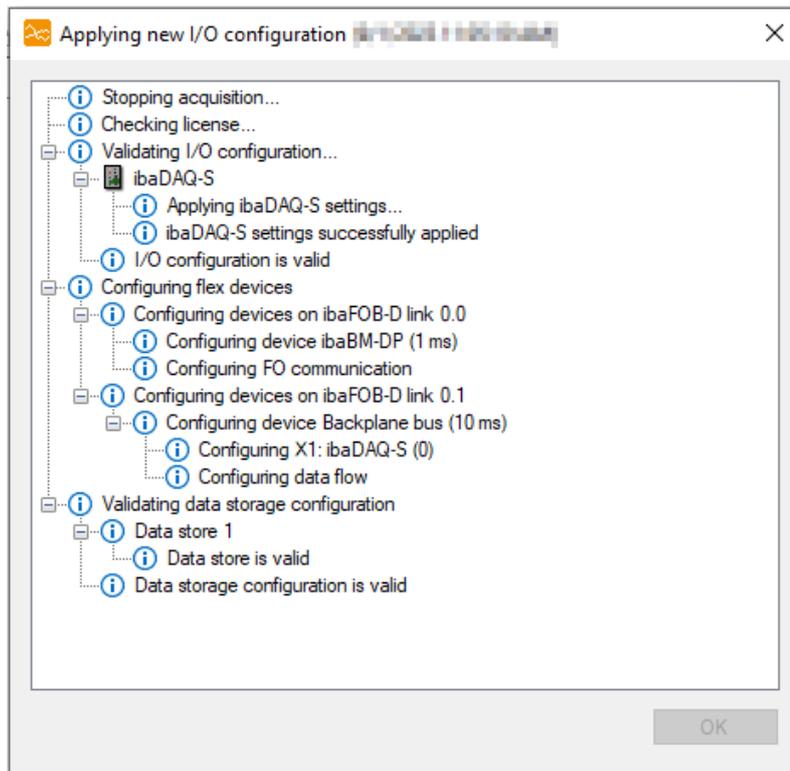


➔ For a detailed description of the "Sniffer" module, please see chapter 10.3.2.

16. Now, enter the "Number of analog signals" and the "Number of digital signals" on the "General" tab. The default setting is 64, a maximum of 512 analog and 512 digital signals can be assigned per module, in total over all modules of 1024 analog and 1024 digital signals. This value determines the length of the signal tables on the "Analog" and "Digital" tab.
17. The signals on the "Analog" and "Digital" tab are configured as for the "Active slave" module. In the "Slave" column, enter the slave number the data is to be captured from.

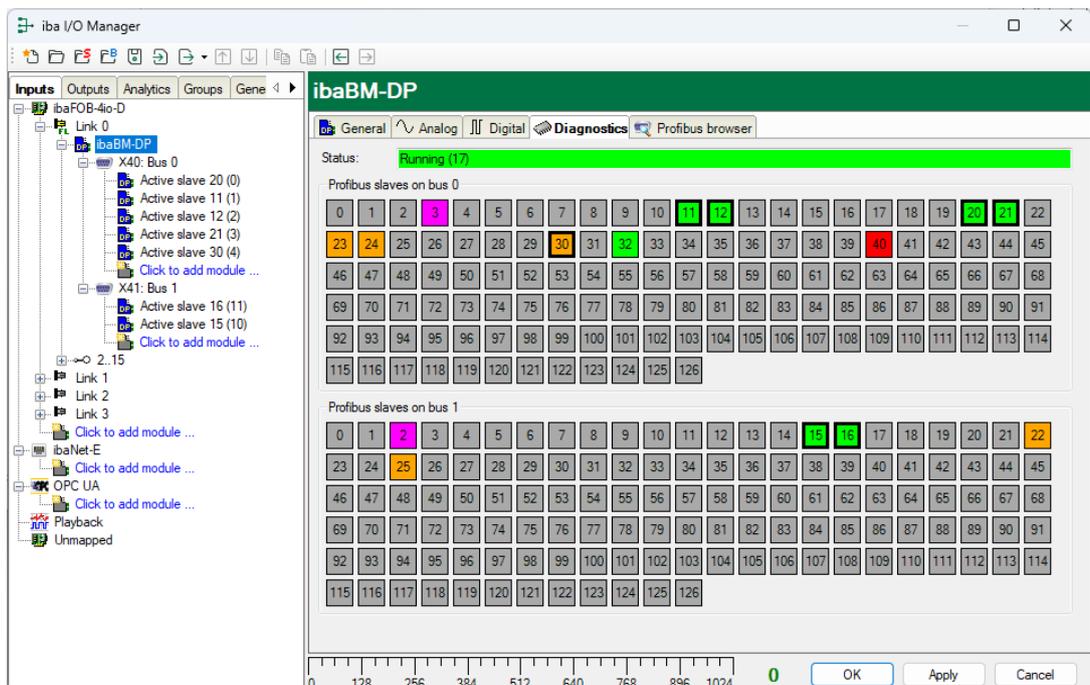
Name	Unit	Gain	Offset	Slave	I/O	Address	DataType	Active
0 Integer Value 0		1	0	19	Out	0	INT_B	<input checked="" type="checkbox"/>
1 Integer Value 1		1	0	19	Out	4	INT_B	<input checked="" type="checkbox"/>
2 Integer Value 2		1	0	19	Out	8	INT_B	<input checked="" type="checkbox"/>
3 Real Value 0		1	0	19	Out	12	FLOAT_B	<input checked="" type="checkbox"/>
4 Real Value 1		1	0	19	Out	16	FLOAT_B	<input checked="" type="checkbox"/>
5 Real Value 2		1	0	19	Out	20	FLOAT_B	<input checked="" type="checkbox"/>
6		1	0	1	Out	24	FLOAT_B	<input type="checkbox"/>
7		1	0	1	Out	28	FLOAT_B	<input type="checkbox"/>

18. If required, please define a scale value of the signals in the "Gain" and "Offset" column that the signals can be converted into physical values. For sniffing, in general a scaling is needed, as the data is transferred in a normalized way over the PROFIBUS to the slave.
For example for a SIMATIC ET200 AO module, a +/- 10V signal is transferred with the value range -27648 ... 27648 (equals -10V ... +10V). You find the physical meaning in the control program.
19. If a larger amount of digital signals has to be acquired, (e. g. status/control words of a large number of drives) the modules "Sniffer decoder" and "Active slave decoders" are a good solution.
- For a detailed description, please see chapters 10.3.4 and 10.3.5.
20. When all signals have been configured, activate the configuration by clicking on <OK> or <Apply>. In course of the following validation, the configuration is transferred to ibaBM-DP. <OK> closes the I/O Manager, provided that no warning or error messages have appeared during the validation process.

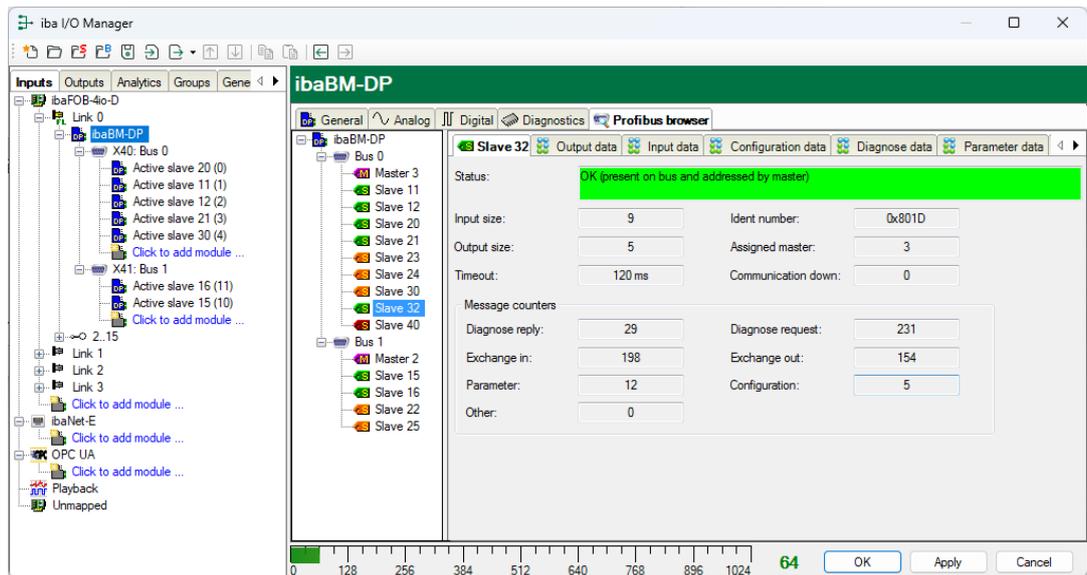


Of course, you can do the configuration step by step and hence check the validity of the current configuration.

21. ibaBM-DP provides a wide variety of diagnostic features for PROFIBUS systems. The “Diagnostics” tab in the device module is very helpful. On this tab, the identified masters and slaves and their status are shown for both PROFIBUS systems.



The “Profibus browser” tab shows detailed information about both PROFIBUS systems (e. g. bus cycle time) and about the input and output areas of each slave.



➤ For detailed information about the diagnostic functions, please see chapter 10.3.6.

10.2 Notes on the compatibility mode 32Mbit

10.2.1 Compatibility mode 32Mbit with ibaBM-DPM-S device module

When compatibility mode 32Mbit is selected, the device can be used with an **ibaBM-DPM-S device module** in the ibaPDA configuration (I/O Manager).

This is the case, if you have to replace ibaBM-DPM-S devices with new ibaBM-DP devices in an existing ibaPDA system.

This is why the commissioning procedure is different from the procedure described in chapter 10.1.

In this case, you can replace the old ibaBM-DPM-S devices 1:1 with new ibaBM-DP devices. You do not have to make any changes in the I/O configuration of ibaPDA.

The following prerequisites have to be met:

- ibaPDA version V6.20.2 or higher
- The rotary switches on the device have to be set to S1 = 1 and S2 = 0 (see chapter 7.3.4.2).

All cables have to be replugged 1:1 from the old device to the new device:

- FO cable TX-X10 to TX-X10
- Ethernet network from X22 bottom to X22 on the front side
- PROFIBUS X40 top to PROFIBUS X40 left
- PROFIBUS X41 bottom to PROFIBUS X41 right
- If the buses for ibaBM-DPM-S should have been connected by S6 = ON, both PROFIBUS lines for ibaBM-DP have to be connected by a cable bridge.
- If you should have done the bus termination for ibaBM-DPM-S by means of the device switch S4/S5, you have to do the termination for ibaBM-DP with switches on the PROFIBUS connectors.

Check the following settings in ibaPDA:

- If the device names (format dpms_nnnn) have been used for the settings of the "IP address" in the I/O configuration, you need to enter the device name of the new ibaBM-DP replacement devices. A suitable IP address has to be set in ibaBM-DP.
- If the IP addresses have been used when setting the "IP address", you have to proceed as follows:
 - either set the old IP addresses 1:1 in the new ibaBM-DP device (see description of the web interface in chapter 9.3.3)
 - or you set new IP addresses on the new ibaBM-DP devices. Of course, these addresses have to be adapted in the I/O configuration.



Note

As the device is always identified as ibaBM-DP, you should not do an automatic device detection on the FO link in the I/O Manager for this application.

10.2.2 Compatibility mode 32Mbit with ibaBM-DP device module

In compatibility mode 32Mbit, the device can be used with an **ibaBM-DP device module** in the ibaPDA configuration (I/O Manager).

This mode is necessary when you want to connect an ibaBM-DP device to an ibaPDA system but cannot establish a bidirectional FO cable connection. One reason might be e. g. that you have only ibaFOB-D cards with inputs and outputs cannot be added anymore due to a lack of space.

This is why the commissioning procedure is different from the procedure described in chapter 10.1.

The following prerequisites have to be met:

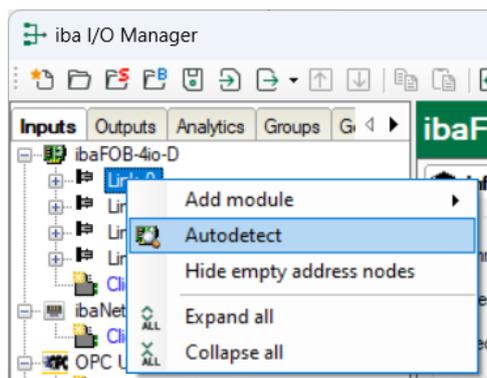
- ibaPDA version V6.32.0 or higher
- The rotary switch on the device has to be set to S1 = 1 and S2 = 0 (see chapter 7.3.4.2).

The following connections have to be established:

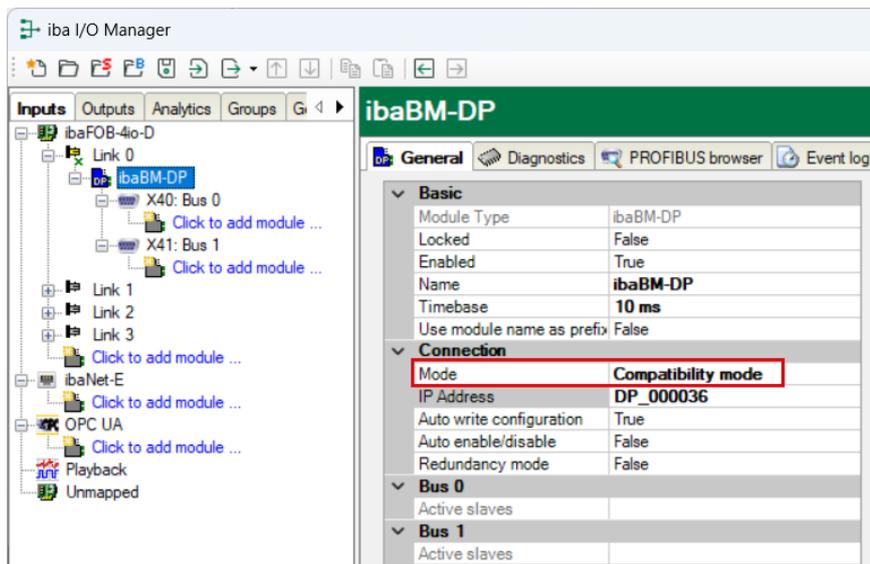
- Unidirectional FO connection between the transmission output TX-X10 of ibaBM-DP and a free input of an ibaFOB-D card in the ibaPDA-PC.
- For this application, ibaBM-DP has to be connected via X22 to the Ethernet network. For this purpose, you have to set an appropriate IP address.
- Connection to the PROFIBUS network via X40 and/or X41.

Notes on the configuration in the ibaPDA I/O Manager:

1. Select the correct ibaFOB-D card and mark the link ibaBM-DP is connected to.



2. Click on the link with the right mouse button and choose "Autodetect". The device is identified automatically and displayed in the module tree.



In compatibility mode 32Mbit, only one device can be operated on one link. The compatibility mode 32Mbit you have set by means of S1 = 1 and S2 = 0 is detected automatically and the device is displayed with the respective configuration.

3. The further proceeding is identical to the description in chapter 10.1.

10.2.3 Replacing the ibaBM-DPM-S device module with ibaBM-DP

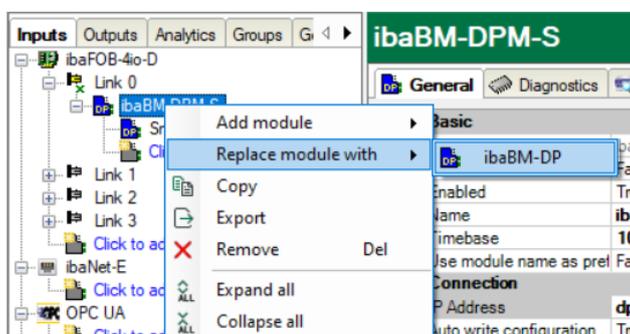
If an ibaBM-DPM-S device is replaced by an ibaBM-DP device, it may be an advantage that the ibaBM-DPM-S device module is no longer used in the I/O Manager but is replaced by an **ibaBM-DP device module**.

The advantage of the ibaBM-DP device module is that separate nodes are available for bus 0 and bus 1. There are separate modules for each bus, such as sniffer, active slave, Dig512 sniffer. This way, configuring the signals is easier to manage.

Furthermore, functions such as the display of bus voltages and the event log can only be used with the ibaBM-DP device module.

Notes on the configuration in the I/O Manager of ibaPDA:

Right-click on the existing ibaBM-DPM-S device module and select "Replace module with ibaBM-DP".



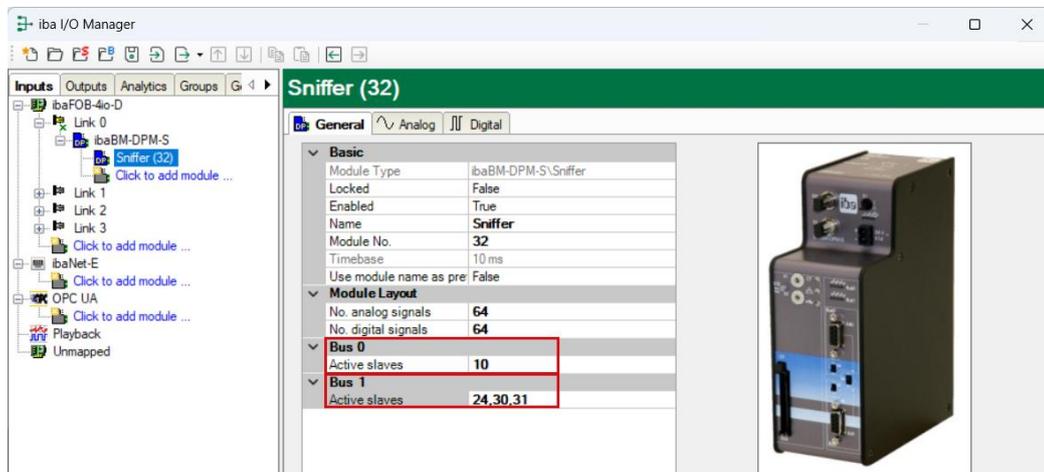
A device module ibaBM-DP is automatically generated in the module tree. Existing modules under the device module ibaBM-DPM-S are automatically assigned to the correct bus node bus 0/bus 1. Modules containing signals from both buses are automatically split. For example, two sniffer modules for bus 0 and bus 1 are created if signals are present on both busses. The same applies to Dig512 sniffer modules. For each active slave configured in the ibaBM-DPM-S device, a separate "active slave" module is created under the corresponding bus node.

After replacing, check whether the correct mode is set in the ibaBM-DP device module for your application. For a FOB-io card (bidirectional), the Flex mode is set in the device module. For a FOB-i card (unidirectional) the compatibility mode 32Mbit is set.

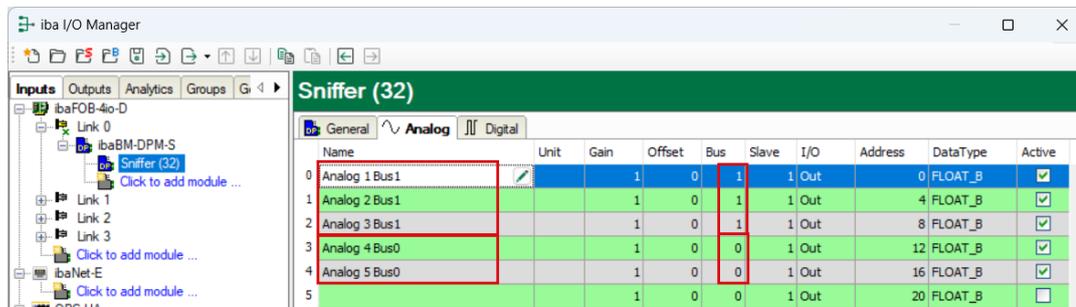
Example:

Previous configuration in ibaBM-DPM-S

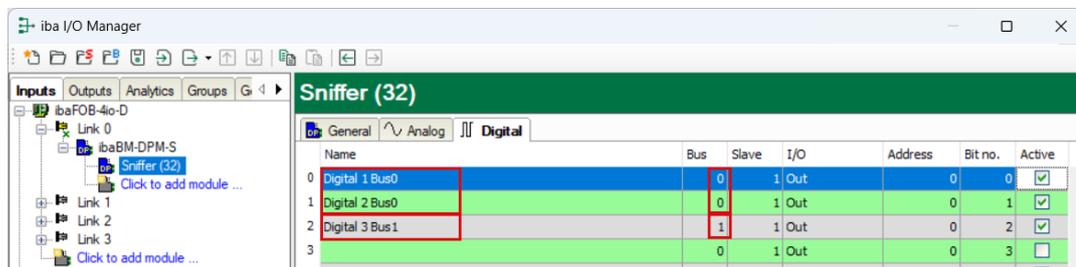
A sniffer module is configured under the ibaBM-DPM-S module. Active slaves are configured on bus 0 and bus 1 in the "General" tab. The tabs "Analog" and "Digital" contain signals on bus 0 and bus 1.



Configured active slaves in the ibaBM-DPM-S sniffer module

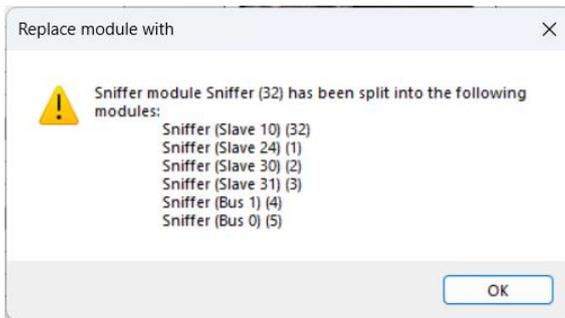


Analog signals in the ibaBM-DPM-S sniffer module



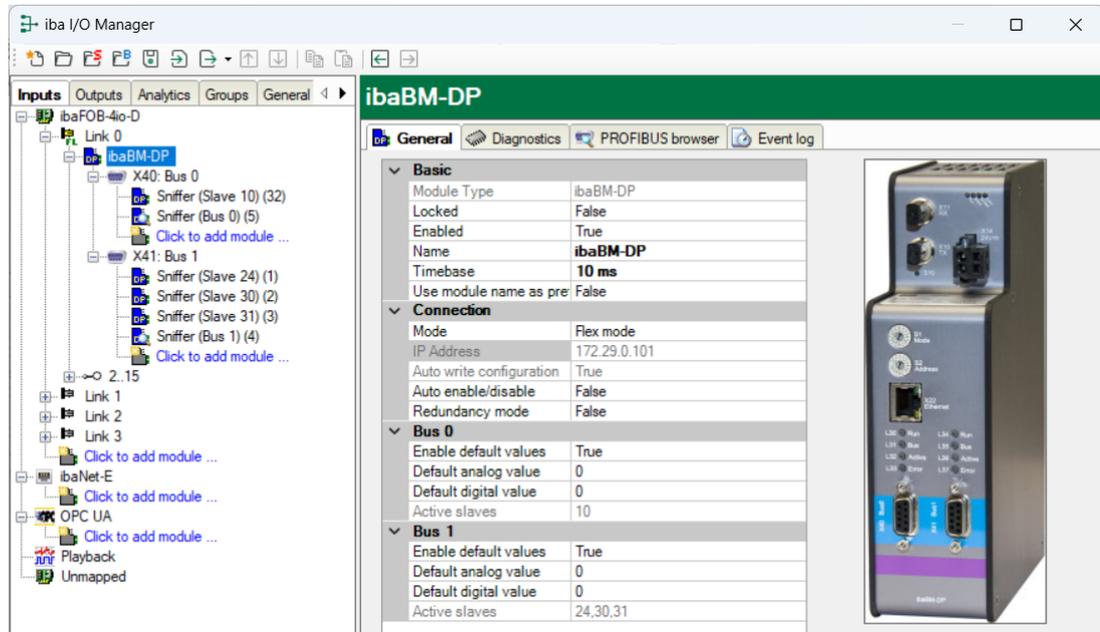
Digital signals in the ibaBM-DPM-S sniffer module

After selecting the "Replace module with ibaBM-DP" function, a message appears telling you which modules have been created.



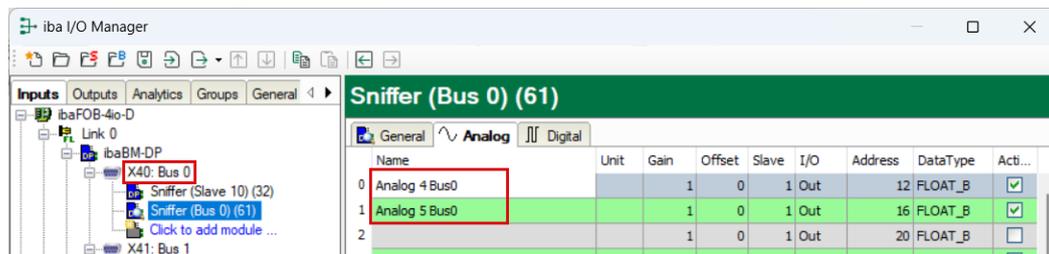
Message about new modules

New configuration with ibaBM-DP module:



Modules are created for the active slaves (👤) under each bus, a module for each active slave under the respective bus node. The name of the module "Sniffer..." is taken from the old configuration, because the active slaves were configured in the module "Sniffer". The name can be changed subsequently.

A sniffer module (👤) is created under each bus. The previously configured signals are entered in the registers "Analog" and "Digital".



Analog signals on bus 0



Digital signals on bus 0

Name	Unit	Gain	Offset	Slave	I/O	Address	Data Type	Active
0 Analog 1 Bus1		1	0	1	Out	0	FLOAT_B	<input checked="" type="checkbox"/>
1 Analog 2 Bus1		1	0	1	Out	4	FLOAT_B	<input checked="" type="checkbox"/>
2 Analog 3 Bus1		1	0	1	Out	8	FLOAT_B	<input checked="" type="checkbox"/>

Analog signals on bus 1

Name	Slave	I/O	Address	Bit no.	Act...
0 Digital 3 Bus1	1	Out	0	2	<input checked="" type="checkbox"/>

Digital signals on bus 1

10.3 Modules in I/O Manager

If you want to use ibaBM-DP with ibaPDA, you have to configure the device in the ibaPDA I/O Manager. Use the step-by-step procedure described in chapter 10.1. If necessary consider the notes on the compatibility mode 32Mbit in chapter 10.2.

In the following chapters, the device module "ibaBM-DP" as well as the modules "Active slave", "Sniffer", "Active slave decoder", "Sniffer decoder", "Slave diagnostics" and "Bus diagnostics" are described.



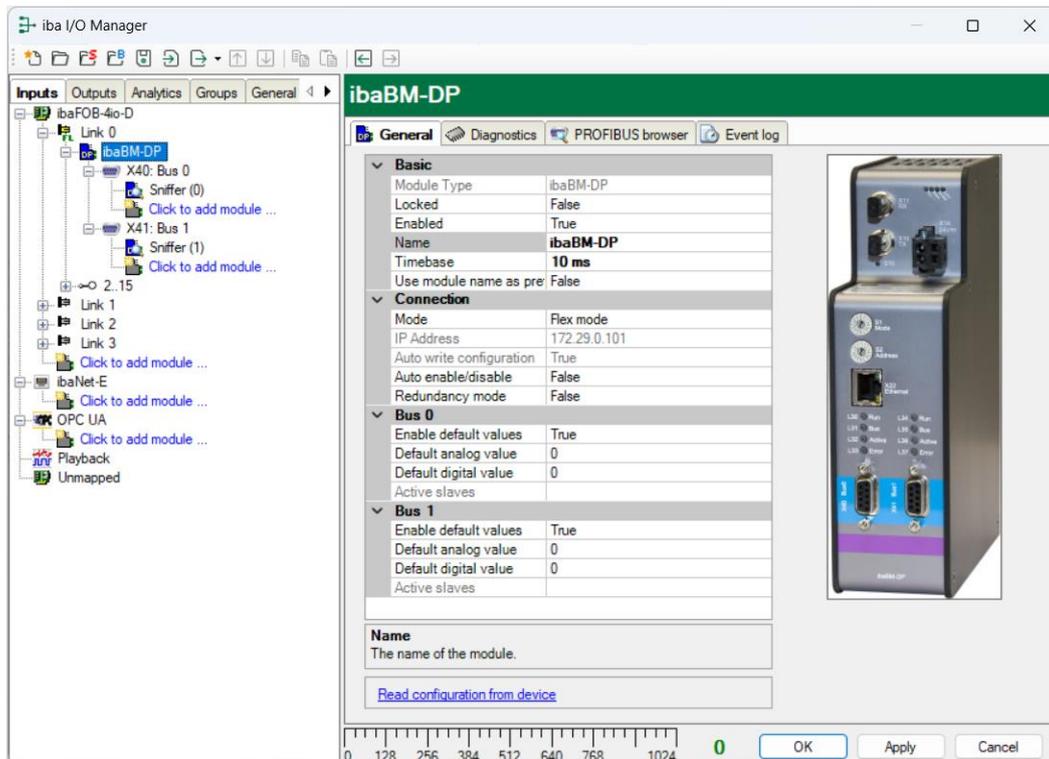
Note

In the following chapters, the modules are described the way they are used on the input side of ibaPDA (data acquisition). In chapter 10.7 we describe how data can be sent from ibaPDA over ibaBM-DP to the PROFIBUS.

10.3.1 "ibaBM-DP" device module

The device module "ibaBM-DP" disposes of 6 different tabs. The "General", "Diagnostics", "PROFIBUS Browser" and "Event log" tabs are always available. 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 have been added and the configuration has been transferred to the device.

10.3.1.1 "General" tab



Basic settings

Locked

A locked module can only be modified by authorized users.

Enabled

The data acquisition for this module is either enabled or disabled.

Name

Name of the module

Timebase

Timebase for the data acquisition which is used for this device in ms. With 32Mbit Flex cycles of up to 0.5 ms are possible (depending on the number of signals). In compatibility mode 32Mbit, the smallest timebase is 1 ms.

Use name as prefix

If TRUE is selected, the module name is placed in front of the signal name as prefix.

Connection

Mode

Choose between Flex mode (the 32Mbit Flex protocol is used on the FO connection) and compatibility mode (the fixed 32Mbit protocol is used). In Flex mode, you can measure more signals and send output data.

This value has to equal the settings of the switches S1 and S2 on the device:

S1 = 1 and S2 = 0: compatibility mode 32Mbit

S1 = 1 and S2 = 1...F: Flex mode

IP Address

IP address of the device.

- In Flex mode, the IP address cannot be changed. For notes on the structure of the automatically generated IP address, please see chapter 9.3.1.

- In compatibility mode 32Mbit, you can enter here the device name or the IP address. In course of the automatic detection, the device name of the connected device is displayed.

Auto write configuration

At every start of ibaPDA, the configuration is transferred to the device. In Flex mode, this setting is always TRUE and cannot be changed. In compatibility mode 32Mbit, this option can be set to FALSE, if there is no continuous online connection to ibaBM-DP and the configuration does not always have to be transferred.

Auto enable/disable

If the value is TRUE, the data acquisition is started even though the device is missing. 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 is not started, if ibaPDA cannot establish a connection to the device.

Redundancy mode

Here, the redundancy mode is enabled. Then, the device treats both PROFIBUS lines as a redundant PROFIBUS line. For detailed information on operating the ibaBM-DP on the redundant PROFIBUS, please see chapter 12.

Bus0/1

Enable default values

If TRUE, for a slave which is not supplied with data (e. g. broken PROFIBUS cable or Master in STOP), the default values (see below) are sent by the device.

If FALSE, in this case the last received data is repeated.

Default analog value

If the default values are enabled (see option mentioned above), all analog signals of a disconnected slave are set to this default analog value.

Default digital value

If the default values are enabled (see option mentioned above), all digital signals of a disconnected slave are set to this default digital value.



Note

In case analog and digital signals should access the same addresses simultaneously, the default analog value is overwritten by the default digital value.

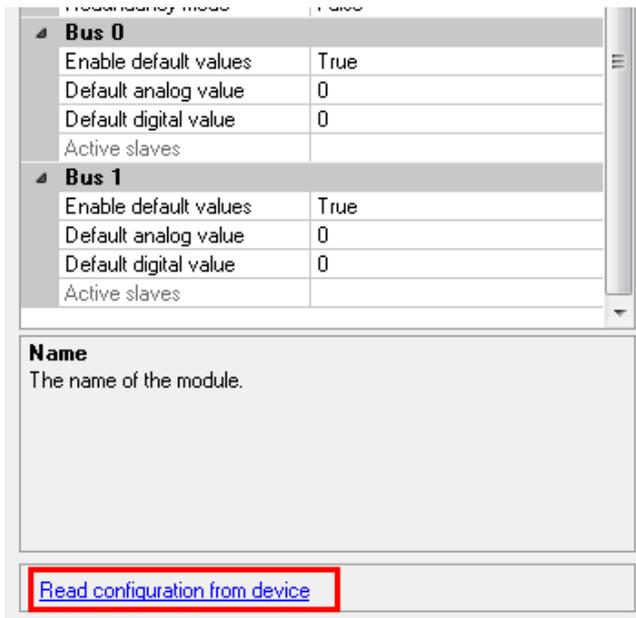
Active slaves (only display)

Numbers of the active slaves configured on the bus.

Command for reading the configuration

- Read configuration from device

By means of this option, you can directly read a configuration from the device.

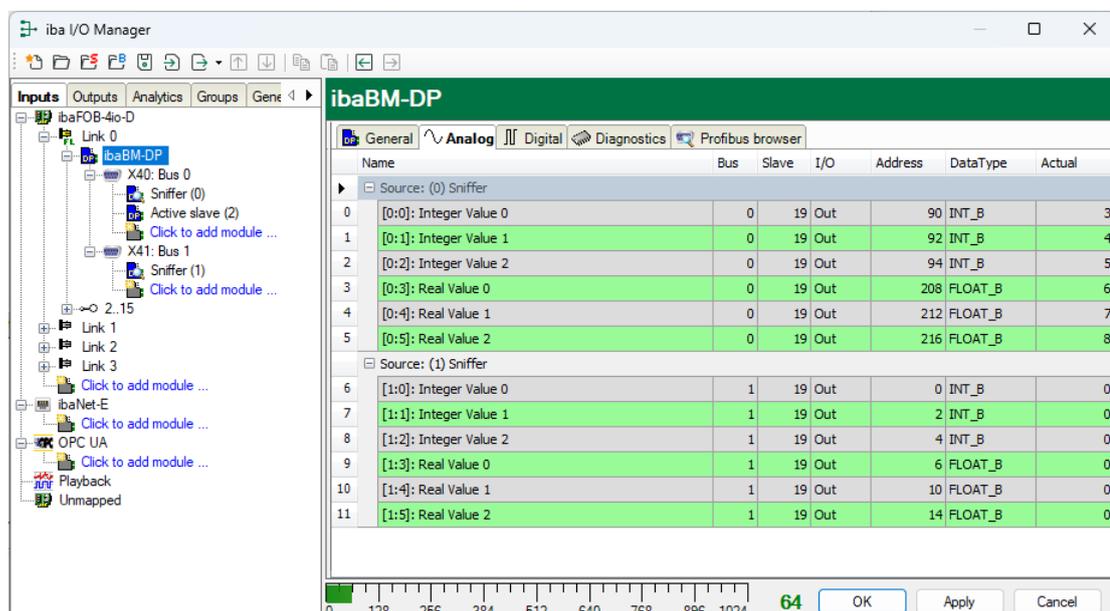


Note

The configuration can only be read in “Flex mode”. Using the command, the configuration of a single device can be read also while the acquisition is running. Please use the “Autodetect” command in the context menu of the FO link, for detecting all the devices that are connected to a FO link along with reading out their saved configurations.

10.3.1.2 "Analog" tab

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



10.3.1.3 "Digital" tab

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

Name	Bus	Slave	I/O	Address	Bit no.	Actual
Source: (0) Sniffer						
[0.0]: Digital Signal 0	0	19	Out	143	0	1
[0.1]: Digital Signal 1	0	19	Out	143	1	0
[0.2]: Digital Signal 2	0	19	Out	143	2	1
[0.3]: Digital Signal 3	0	19	Out	143	3	1
[0.4]: Digital Signal 4	0	19	Out	143	4	1
[0.5]: Digital Signal 5	0	19	Out	143	5	0
[0.6]: Digital Signal 6	0	19	Out	143	6	0
[0.7]: Digital Signal 7	0	19	Out	143	7	0
Source: (1) Sniffer						
[1.0]: Digital Signal 0	1	19	Out	20	0	0
[1.1]: Digital Signal 1	1	19	Out	20	1	0
[1.2]: Digital Signal 2	1	19	Out	20	2	0
[1.3]: Digital Signal 3	1	19	Out	20	3	0
[1.4]: Digital Signal 4	1	19	Out	20	4	0
[1.5]: Digital Signal 5	1	19	Out	20	5	0
[1.6]: Digital Signal 6	1	19	Out	20	6	0

10.3.1.4 "Diagnostics" tab

Here, the detected masters and slaves and their current state are displayed.

➤ For a description of the diagnostic functions, please see chapter 10.4.

10.3.1.5 "Profibus Browser" tab

The "Profibus Browser" tab belongs to the diagnostic functions and displays detailed information about both PROFIBUS systems (e. g. bus cycle time) and about the available input and output ranges of the individual slaves.

➤ For a description of the diagnostic functions, please see chapter 10.4.

10.3.1.6 Bus node X40: Bus0 / X41: Bus1

The device module "ibaBM-DP" shows two bus nodes "X40: Bus0" and "X41: Bus1" which represent the two bus connections available on the device (see chapter 7.3.6). Modules which are configured on "X40: Bus0" or "X41: Bus1" physically refer to the respective bus connection.

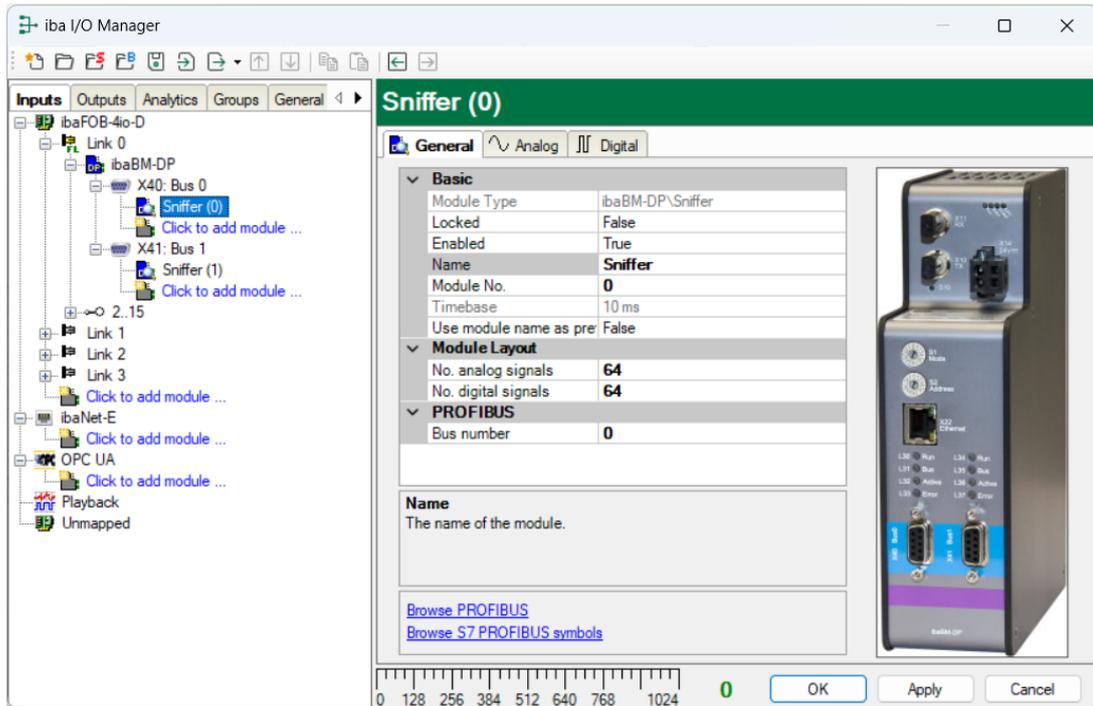
If you mark a bus node, all status and diagnostic information as well as the measured bus voltages for the connected PROFIBUS line are shown.

➤ For a detailed description, please see chapter 10.4.

10.3.2 "Sniffer" module

The "Sniffer" module can be added to an ibaBM-DP device module. You can use it, if you want to "listen to" signals from an existing Master/Slave communication.

10.3.2.1 "General" tab



Basic settings

Locked, Enabled, Name, Timebase, Use name as prefix
see chapter 10.3.1.1 "General" tab

Modul No.

Logic module number for clear referencing of signals e. g. in expressions in virtual modules or ibaAnalyzer

Advanced

No. analog signals

Defining the number of analog signals for this module (min. 0, max. 512).

No. digital signals

Defining the number of digital signals for this module (min. 0, max. 512).

Profibus

Bus number

The bus number corresponds to the PROFIBUS connection in the module tree. You can change the bus number. In this case, the Sniffer module is displayed under the respective PROFIBUS connection.

Command for browsing the PROFIBUS

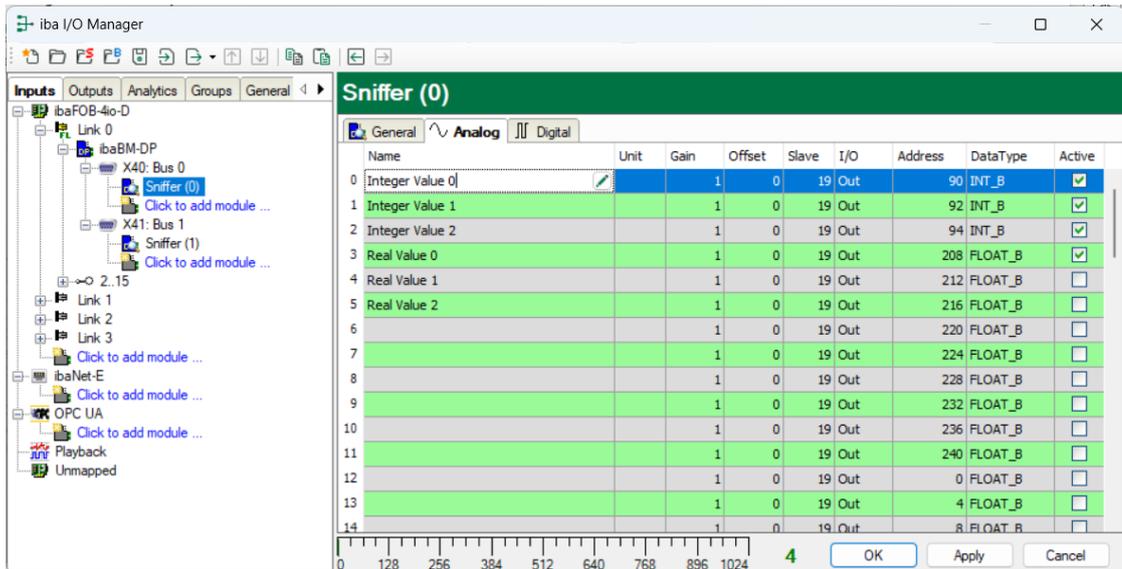
Browse profibus

When using this command, a special version of the PROFIBUS browser is opened (for a detailed description, please see chapter 10.4.5). With this browser, signals from the input and output data range of the slaves can be added to the analog and digital signals.

Browse S7 profibus symbols

With this command, you can open the Sniffer symbol browser (for a detailed description, please see chapter 10.6). With this browser, you can use the PROFIBUS symbols available in a Step 7 project for adding signals in an interactive manner.

10.3.2.2 "Analog" tab



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

Name

Here, you can enter a signal name and additionally two comments if you click on the  icon on the signal name field.

Unit

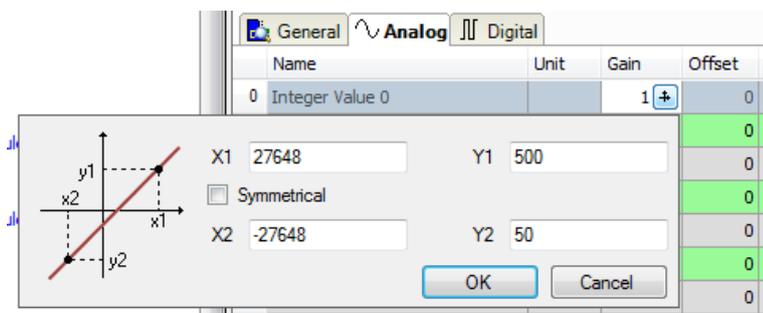
Here, you can enter the physical unit of the analog value

Gain / Offset

Gradient (Gain) and y axis intercept (Offset) of a linear equation. You can convert a normalized value transferred without a unit 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 PLC 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 value which has been acquired without a unit 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.



Slave

Enter the slave address that is assigned to the signal. Here, you can enter third party slaves that are present on the bus line as well as own active slaves on the device.

I/O

Select the I/O type of the signal:

In: Input signal from the master's perspective

Out: Output signal from the master's perspective

Service: Only for service purposes in support cases

Address

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

Data type

Data type of the signal. Available data types:

Data type		Description	Value range
Big Endian	Little Endian		
BYTE	BYTE	unsigned 8 Bit	0 to 255
INT_B	INT	signed 16 Bit	-32768 to 32767
WORD_B	WORD	unsigned 16 Bit	0 to 65535
DINT_B	DINT	signed 32 Bit	-2147483647 to 2147483647
DWORD_B	DWORD	unsigned 32 Bit	0 to 4294967295
FLOAT_B	FLOAT	IEEE754; Single Precision; 32 Bit floating point	$\pm 3,402823 \text{ E}+38 \dots$ $\pm 1,175495 \text{ E}-38$
S5_FLOAT_B	S5_FLOAT	Simatic S5 Float Format, 32 Bit	$\pm 0,1701412 \text{ E}+39 \dots$ $\pm 0,1469368 \text{ E}-38$



Tip

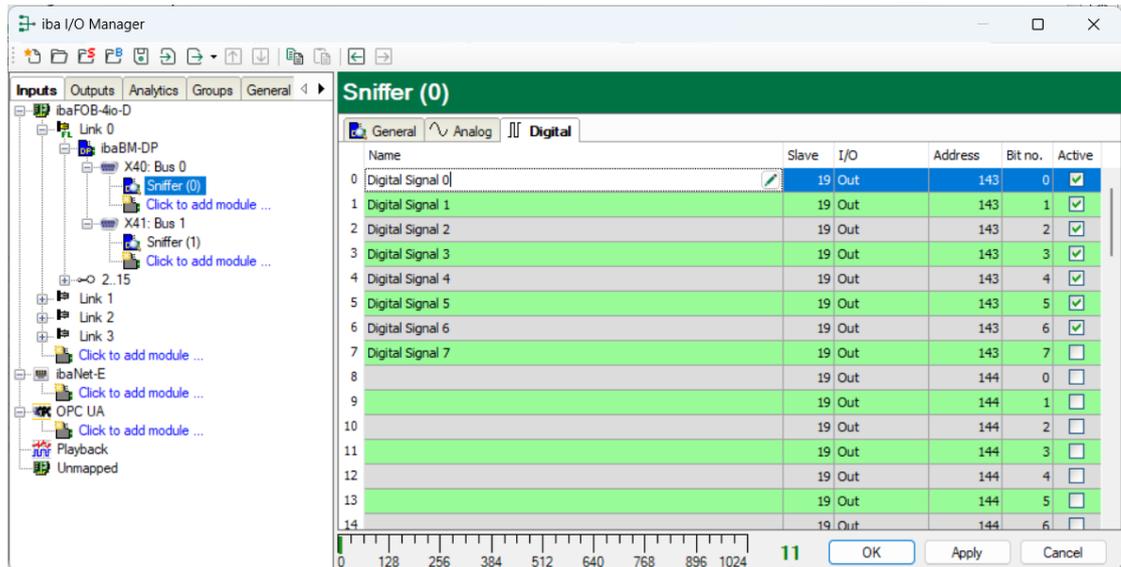
When entering the signals of a slave in sequential order, only the data types have to be selected for all signals. The Byte addresses of the signals are then calculated automatically. For this purpose, please enter only for the first signal of the desired slave the correct Byte address into the address 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 slave are filled in automatically.

Active

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).

10.3.2.3 "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 if you click on the  icon in the signal name field.

Slave

Enter the slave address that is assigned to the signal. Here, you can enter third party slaves that are present on the bus line and as well as active slaves on the device.

I/O

Select the I/O type of the signal:

In: Input signal from the master's perspective

Out: Output signal from the master's perspective

Status: Displays the status of the slave defined as "Slave" (TRUE: Slave is OK, FALSE: Slave is not OK).

Active bus: Only relevant in redundancy mode (see chapter 12)

Service: Only for service purposes in support cases

Address

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

Bit No.

Please enter here the Bit number within the Byte defined as "address".

Active

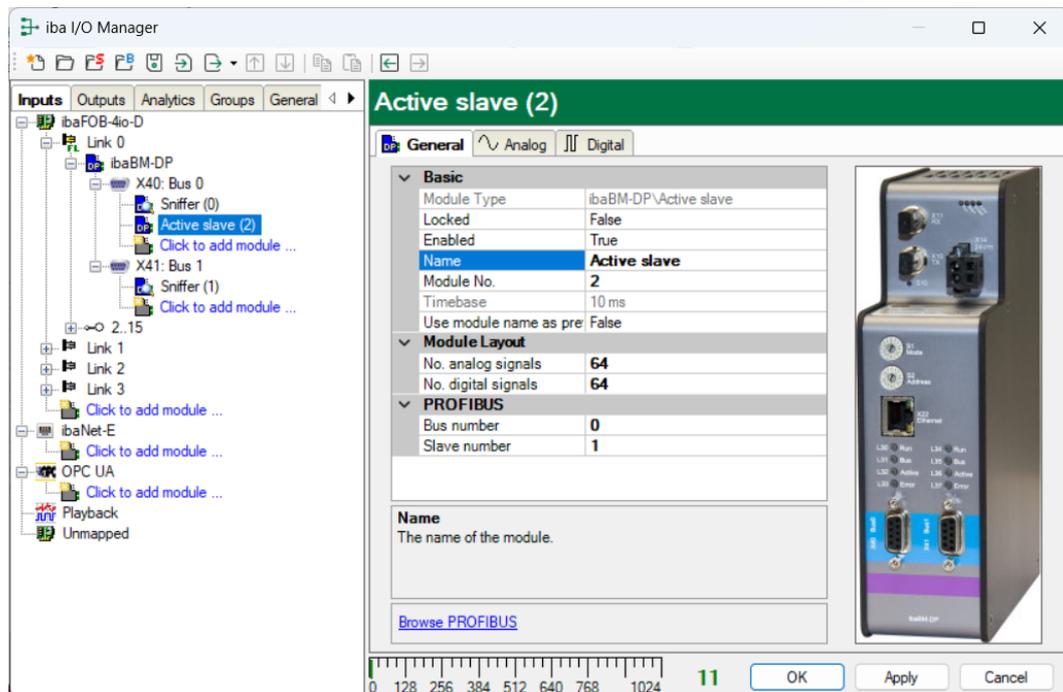
If this option is selected, the signal is acquired and is also considered when checking the number of licensed signals.

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

10.3.3 "Active slave" module

The "Active slave" module can be added to an ibaBM-DP device module. With the "Active Slave" module, you generate a single slave on ibaBM-DP. A master can send data you want to record directly to that slave (see also step by step configuration in chapter 10.1).

10.3.3.1 "General" tab



Basic settings

Locked, Enabled, Name, Module No., Time base (only display), Use name as prefix see chapter 10.3.1.1

Advanced

No. analog signals

Defining the number of analog signals for this module (min. 0, max. 512).

No. digital signals

Defining the number of digital signals for this module (min. 0, max. 512).

PROFIBUS

Bus number

Please define here, on which bus system (Bus0: X40, Bus1: X41) you want the active slave to be generated.

Slave number

Please define here the address of the active ibaBM-DP slave.

Command for browsing the PROFIBUS

Browse profibus

With this option, you can open the PROFIBUS browser (for a detailed description, please see chapter 10.4.5). With this browser, you can add signals from the input and output data range of the slaves to the analog and digital signals.



Note

By adding more modules of the "Active slave" type, you can generate more slaves on ibaBM-DP.

By default the max. number of active slaves is eight. If you define more than these eight slaves, an error message will appear. If you need more than eight active slaves, please do not hesitate to contact the iba support. By means of an additional license, you can increase the number of active slaves to 16.



Important note

Select for the device only slave numbers that are not yet existing in the PROFIBUS line. Select exactly these addresses that you have defined in your control configuration (e. g. SIMATIC® Step7 Hardware Configuration) for the active slaves.

Prior to enabling active slaves, ibaBM-DP checks if there are slaves with the same number on the bus. If there is a slave with the same number existing, the own slave will not be enabled.

CAUTION

Connecting the PROFIBUS cable

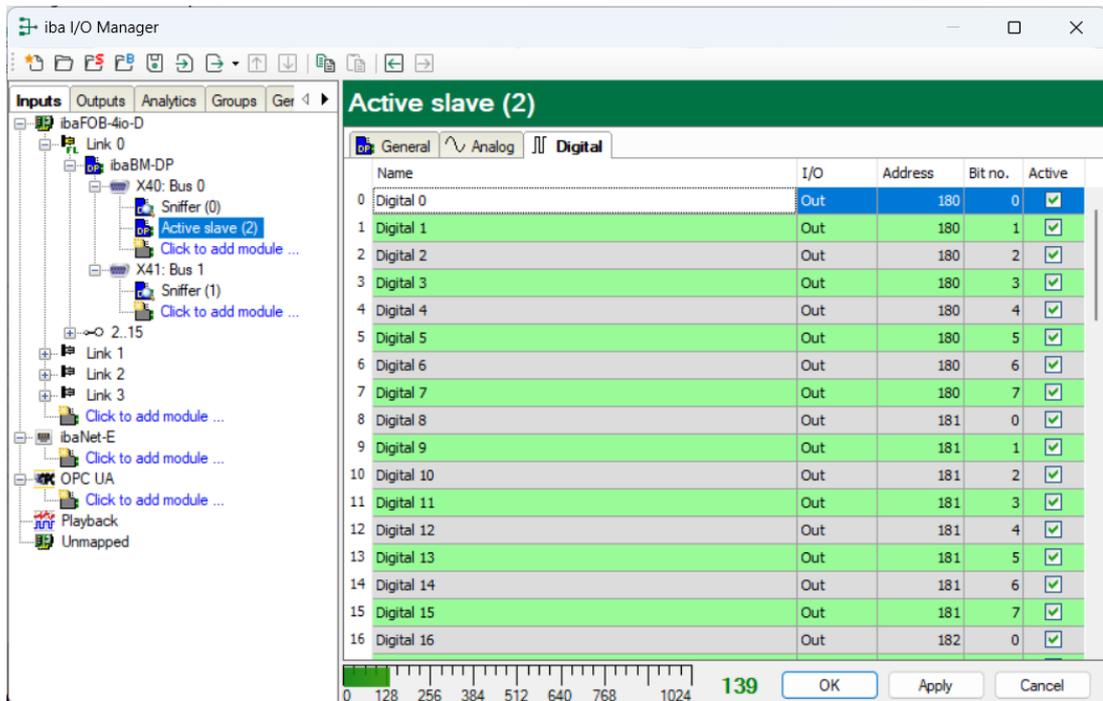
Do not connect the PROFIBUS cable until the configuration of the "active slaves" has been done correctly. This way, you make sure that no slave number exists twice. If there is more than one slave with the same number, this can lead to a complete breakdown in communication on the PROFIBUS and hence, a complete machine downtime!

10.3.3.2 "Analog" tab

Name	Unit	Gain	Offset	I/O	Address	DataType	Acti...
0 Analog 0		1	0	Out	0	DINT_B	<input checked="" type="checkbox"/>
1 Analog 1		1	0	Out	2	DINT_B	<input checked="" type="checkbox"/>
2 Analog 2		1	0	Out	4	DINT_B	<input checked="" type="checkbox"/>
3 Analog 3		1	0	Out	6	DINT_B	<input checked="" type="checkbox"/>
4 Analog 4		1	0	Out	8	DINT_B	<input checked="" type="checkbox"/>
5 Analog 5		1	0	Out	10	DINT_B	<input checked="" type="checkbox"/>
6 Analog 6		1	0	Out	12	DINT_B	<input checked="" type="checkbox"/>
7 Analog 7		1	0	Out	14	DINT_B	<input checked="" type="checkbox"/>
8 Analog 8		1	0	Out	16	DINT_B	<input checked="" type="checkbox"/>
9 Analog 9		1	0	Out	18	DINT_B	<input checked="" type="checkbox"/>
10 Analog 10		1	0	Out	20	DINT_B	<input checked="" type="checkbox"/>
11 Analog 11		1	0	Out	22	DINT_B	<input checked="" type="checkbox"/>
12 Analog 12		1	0	Out	24	DINT_B	<input checked="" type="checkbox"/>
13 Analog 13		1	0	Out	26	DINT_B	<input checked="" type="checkbox"/>
14 Analog 14		1	0	Out	28	DINT_B	<input checked="" type="checkbox"/>
15 Analog 15		1	0	Out	30	BYTE	<input checked="" type="checkbox"/>
16 Analog 16		1	0	Out	32	BYTE	<input checked="" type="checkbox"/>
17 Analog 17		1	0	Out	34	BYTE	<input checked="" type="checkbox"/>
18 Analog 18		1	0	Out	36	BYTE	<input checked="" type="checkbox"/>

Make the settings as for the "Sniffer" module (see chapter 10.3.2.2). You cannot define a slave number here as this is already done on the "General" tab. This means that all defined signals refer to the active slave of this module.

10.3.3.3 "Digital" tab

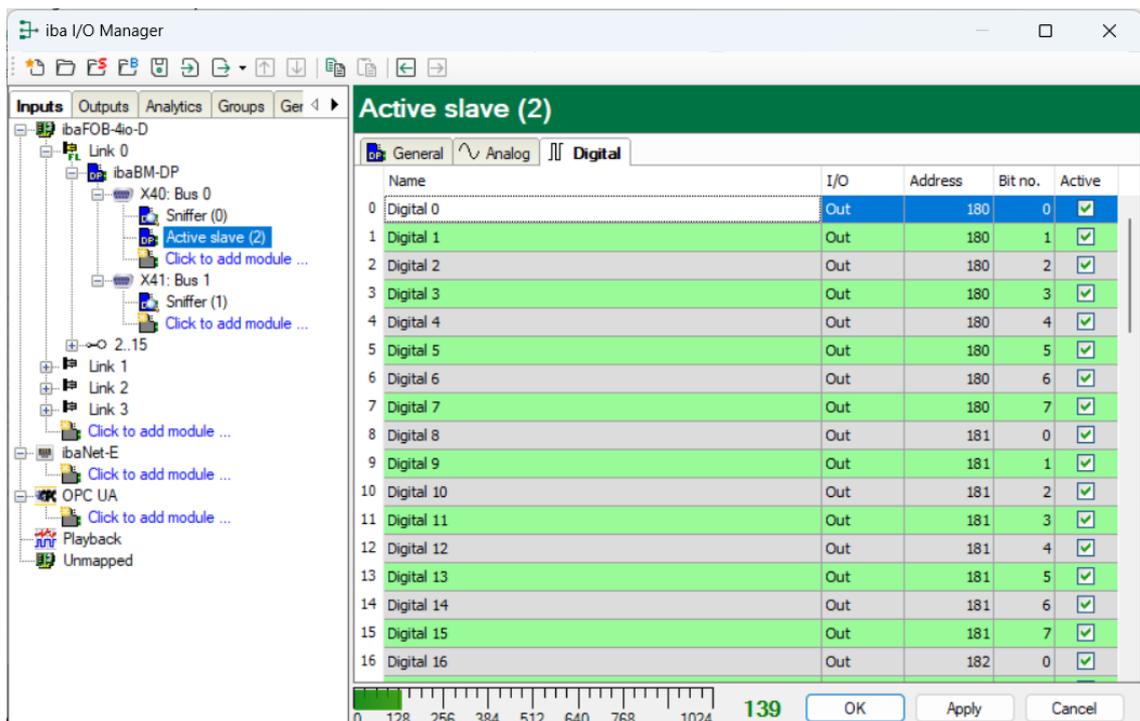


Make the settings as for the "Sniffer" module (see chapter 10.3.2.3). You cannot define a slave number here as this is already done on the "General" tab. This means that all defined signals refer to the active slave of this module.

10.3.4 "Sniffer decoder" module

The "Sniffer decoder" module is especially suited for acquiring large amounts of digital signals, which are present on the PROFIBUS as words (e. g. status words of drives).

10.3.4.1 "General" tab



Basic settings

Locked, Enabled, Name, Module No., Time base (only display), Use name as prefix see chapter 10.3.1.1.

Advanced

No. of decoders

Definition of the number of decoder modules (words) for this module, max. 512.

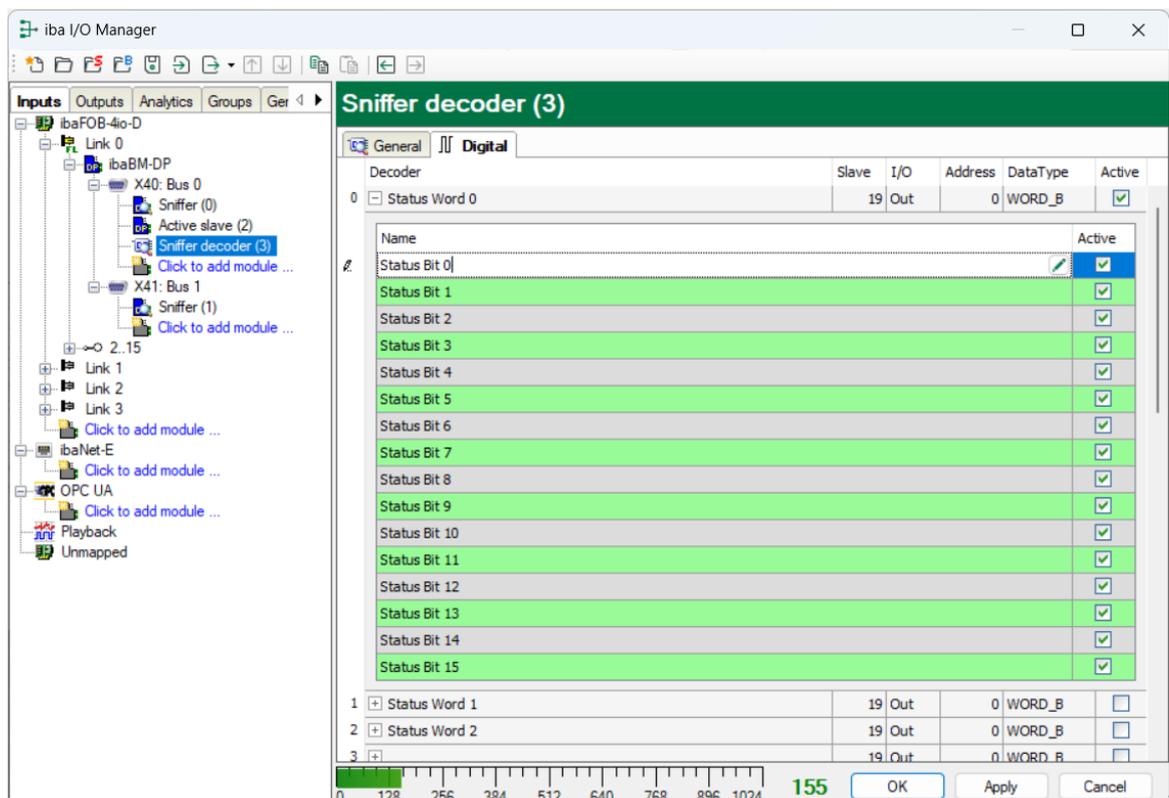
Profibus

Bus number

The bus number corresponds to the PROFIBUS connection in the module tree. You can change the bus number; the decoder module is then displayed under the corresponding PROFIBUS connection.

10.3.4.2 "Digital" tab

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



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

Connector

Assign a meaningful name to the source word.

Slave

Enter the slave address of the slave which you have assigned the signal to

I/O

Select the I/O type of the signal:

In: Input signal from the master's perspective

Out: Output signal from the master's perspective

Address

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

Data type

Data type of the signal. Here, you can only select the types WORD and WORD_B.

Active

With this option enabled, the source signal is acquired with its 16 digital signals and considered when checking the number of licensed signals. Individual digital signals can be disabled.

For every source word, the list of 16 digital signals can be opened by clicking on the plus sign. Here, the single bits of the source word are defined.

 Name

Assign a meaningful name to the individual digital signals.

 Active

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

**Note**

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

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

10.3.5 "Active slave decoder" module

The "Active slave decoder" module is perfectly suited for acquiring large amounts of digital signals of an active slave. The signals are sent as words from a master to a slave.

10.3.5.1 "General" tab

The screenshot displays the 'iba I/O Manager' window. The left sidebar shows a tree view of modules under 'ibaF0B-4io-D', with 'Active slave decoder (4)' highlighted. The main area shows the configuration for this module, with the 'General' tab selected. The settings are as follows:

Basic	
Module Type	ibaBM-DP\Active slave decoder
Locked	False
Enabled	True
Name	Active slave decoder
Module No.	4
Timebase	10 ms
Use module name as prefix	False
Use decoder name as prefix	False
Module Layout	
No. of decoders	32
PROFIBUS	
Bus number	0
Slave number	1
Name The name of the module.	

At the bottom of the window, there is a progress bar and a status indicator showing '155'. Buttons for 'OK', 'Apply', and 'Cancel' are visible.

Basic settings

Locked, Enabled, Name, Module No., Timebase (only display), Use name as prefix see chapter 10.3.1.1.



Important note

The “Slave diagnostics” module requires Firmware v01.04.001 or more recent and ibaPDA v6.37.0 or higher. You can use the module only in 32Mbit Flex mode. In compatibility mode 32Mbit, the module remains disabled in the I/O Manager.

10.3.6.1 „General“ tab

Basic settings

Locked, Enabled, Name, Modul No., Timebase (only display), Use name as prefix
See chapter 10.3.1.1.

Profibus

Bus number

The bus on the ibaBM-DP which is connected to the PROFIBUS slave being monitored with this module.

Slave number

Number of the slave which is being monitored with this module.

10.3.6.2 „Analog“ tab

On the “Analog” tab, you find a series of predefined diagnostic values:

Counter “slave resets”

Shows how often the connection between the master and the monitored slave has been terminated and reestablished.

Voltage difference between High and Low level measured between B and A

In the device, there is a transducer, that allows you to measure the voltage difference between line B and line A for the slave which is being monitored. For detailed information about measuring the voltage, see chapter 10.4.3.

Timeout

Timeout parameter which has been detected for the slave that is being monitored.

❑ Various telegram counters

There are counters for the different telegram types.

Slave diagnostics (5)				
🔍 General 📡 Analog 🔲 Digital				
Name	Unit	Gain	Offset	Active
0 Counter slave resets		1	0	<input checked="" type="checkbox"/>
1 Voltage difference between High and Low level measured between B and A	V	0,001	0	<input checked="" type="checkbox"/>
2 Timeout	ms	1	0	<input checked="" type="checkbox"/>
3 Telegram counter parameter request		1	0	<input checked="" type="checkbox"/>
4 Telegram counter parameter response		1	0	<input checked="" type="checkbox"/>
5 Telegram counter check configuration request		1	0	<input checked="" type="checkbox"/>
6 Telegram counter check configuration response		1	0	<input checked="" type="checkbox"/>
7 Telegram counter get configuration request		1	0	<input checked="" type="checkbox"/>
8 Telegram counter get configuration response		1	0	<input checked="" type="checkbox"/>
9 Telegram counter get diagnostics request		1	0	<input checked="" type="checkbox"/>
10 Telegram counter get diagnostics response		1	0	<input checked="" type="checkbox"/>
11 Telegram counter FDL status request		1	0	<input checked="" type="checkbox"/>
12 Telegram counter FDL status response		1	0	<input checked="" type="checkbox"/>
13 Telegram counter SAP 0x33 write request		1	0	<input checked="" type="checkbox"/>
14 Telegram counter SAP 0x33 write response		1	0	<input checked="" type="checkbox"/>
15 Telegram counter SAP 0x33 read request		1	0	<input checked="" type="checkbox"/>
16 Telegram counter SAP 0x33 read response		1	0	<input checked="" type="checkbox"/>
17 Telegram counter data exchange request (outputs)		1	0	<input checked="" type="checkbox"/>
18 Telegram counter data exchange response (inputs)		1	0	<input checked="" type="checkbox"/>
19 Telegram counter data exchange request (outputs without data)		1	0	<input checked="" type="checkbox"/>
20 Telegram counter data exchange response (inputs without data)		1	0	<input checked="" type="checkbox"/>
21 Telegram counter other types		1	0	<input checked="" type="checkbox"/>



Note

All counters are Byte values revolving between 0 – 255.

10.3.6.3 „Digital“ tab

On the “Digital” tab, you find two predefined diagnostic values:

- Slave is in exchange mode

Shows that a slave is in exchange mode, thus sends and receives Data Exchange Telegrams. This is the normal state.

- Currently active bus (for redundant slaves)

When the redundancy mode is activated (see chapter 12), the active bus for the slave that is being analyzed is shown here. (0: Bus0,1: Bus1).

Slave diagnostics (5)		
General Analog Digital		
Name		Active
0 Slave is in exchange mode		<input checked="" type="checkbox"/>
1 Currently active bus (for redundant slaves)		<input checked="" type="checkbox"/>

10.3.7 „Bus diagnostics“ module

With the “Bus diagnostics” module, you can acquire predefined diagnostic signals for both busses 0/1 of ibaBM-DP in ibaPDA.



Important note

The “Bus diagnostics” module requires firmware v01.04.001 or more recent and ibaPDA v6.37.0 or higher. You can use the module only in 32Mbit Flex mode. In compatibility mode 32Mbit, the module remains disabled in the I/O Manager.

10.3.7.1 „General“ tab

The screenshot displays the 'iba I/O Manager' interface. On the left, a tree view shows the hardware configuration: 'Link 0' contains 'ibaBM-DP', which includes 'X40: Bus 0' (with Sniffer (0), Active slave (2), Sniffer decoder (3), Active slave decoder (4), Slave diagnostics (5), and Bus diagnostics (6)) and 'X41: Bus 1' (with Sniffer (1)). Below this are other links and modules like '2.15', 'Link 1-3', 'ibaNet-E', 'OPC UA', 'Playback', and 'Unmapped'. The main window shows the configuration for 'Bus diagnostics (6)' on the 'General' tab. The 'Basic' section includes: Module Type (ibaBM-DP\Bus diagnostics), Locked (False), Enabled (True), Name (Bus diagnostics), Module No. (6), Timebase (10 ms), and Use module name as prefix (False). The 'PROFIBUS' section includes: Bus number (0). A 'Name' field is also present. At the bottom, a progress bar shows '203' and buttons for 'OK', 'Apply', and 'Cancel'. A photograph of the physical 'Bus diagnostics' module is shown on the right side of the configuration window.

Basic settings

- Locked, Enabled, Name, Modul No., Timebase (only display), Use name as prefix
See chap. 10.3.1.1.

Profibus

- Bus number

The bus on ibaBM-DP which is being monitored with this module.

10.3.7.2 „Analog“ tab

On the “Analog” tab, you find a series of predefined diagnostic values:

- Counter corrupt frame

Shows the number of the detected, incomplete telegrams. The counter is a Byte value revolving between 0 - 255.

- Transmission rate

Detected transmission rate of the PROFIBUS in Mbit/s.

- Bus cycle time

Measured bus cycle time in ms.

- Number of masters

Number of the master stations detected on the PROFIBUS.

- Number of slaves in exchange mode

Number of the slaves detected on the PROFIBUS which are exchanging data (Exchange Mode).

- Number of active slaves

Number of slaves enabled on the device.

- Number of missing slaves

Number of slaves which are configured on the PROFIBUS but are missing.

- Number of phantom slaves

Number of phantom slaves

Bus diagnostics (6)					
General		Analog			
Name	Unit	Gain	Offset	Active	
0 Counter corrupt frame		1	0	<input checked="" type="checkbox"/>	
1 Transmission rate	Mbit/s	1E-06	0	<input checked="" type="checkbox"/>	
2 Bus cycle time	ms	0,001	0	<input checked="" type="checkbox"/>	
3 Number of masters		1	0	<input checked="" type="checkbox"/>	
4 Number of slaves in exchange mode		1	0	<input checked="" type="checkbox"/>	
5 Number of active slaves		1	0	<input checked="" type="checkbox"/>	
6 Number of missing slaves		1	0	<input checked="" type="checkbox"/>	
7 Number of phantom slaves		1	0	<input checked="" type="checkbox"/>	

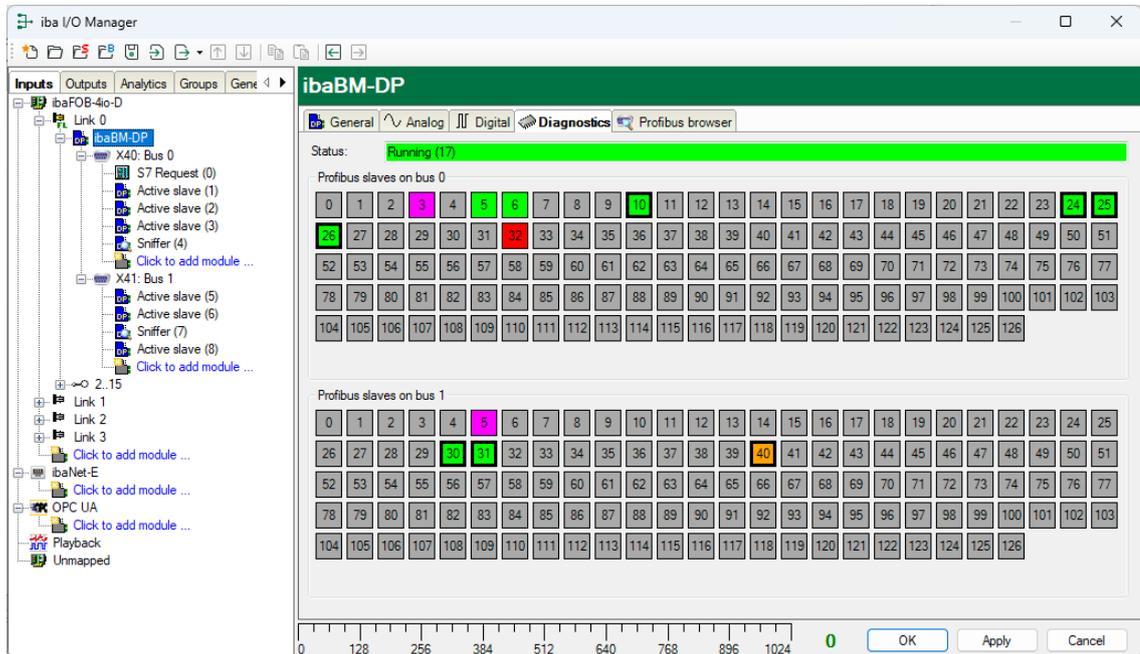
10.4 Diagnostic functions

The device provides numerous diagnostic functions which can be used to analyze the state of the connected PROFIBUS system.

Firmware v01.04.001 and ibaPDA v6.37.0 are prerequisites for the use of the event log, the bus voltage display, and the diagnostic modules.

10.4.1 Diagnostic in the I/O Manager

On the "Diagnostics" tab of ibaBM-DP in the I/O Manager, the operating state for bus 0/1 and all available participants are displayed.



The different statuses of the slaves are shown in different colors:

Color	Status	Note
Green	5	OK The slave is available on the bus and is addressed by a master.
Red	32	Missing The slave is configured for a master but is not available on the bus. This status leads to a bus error on the respective master.
Orange	40	Phantom The slave is available on the bus, but not configured on a master.
Gray	10	Not active
Magenta	5	Master This is a master
Bold margin	26	Active slave on an ibaBM-DP device

Moreover, the device supports a collision detection. Before ibaBM-DP activates its own active slaves, the device first checks, if there are slaves with the same number on the bus. If there is a slave with the same number, the own slave is not activated.

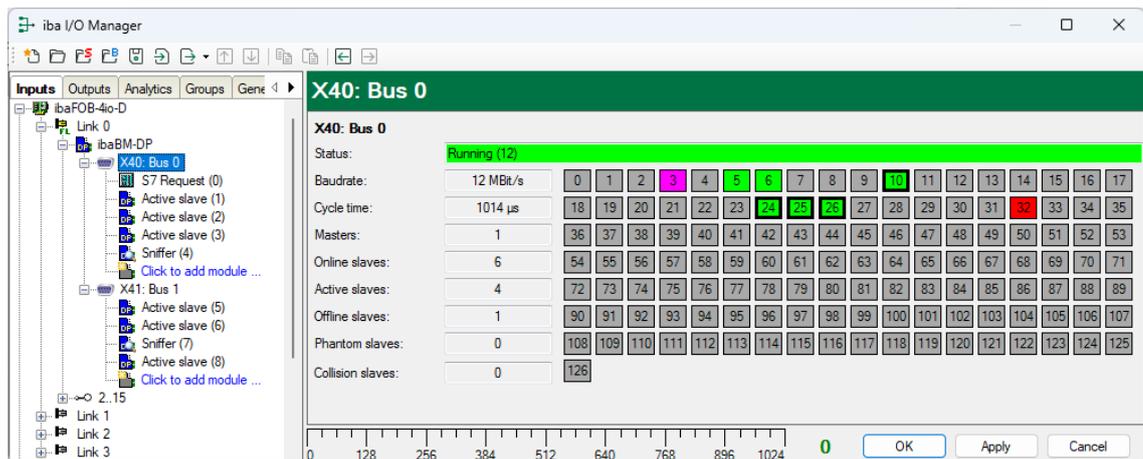


Note

A slave with the risk of colliding is blinking in the bus overview. When validating the I/O configuration after having clicked on <OK> or <Apply>, an error message is shown for the identified collision.

The status of a slave is shown in the tooltip text when you position the cursor on a slave symbol. By clicking on the slave symbol, you get directly to the detailed view of the slave in the PROFIBUS browser (see chapter 10.4.5).

When marking the bus connection "X40: Bus0" or "X41: Bus1", you will see a detailed diagnostics view of a bus line. Here, additionally the detected transfer rate, cycle time and the number of masters and the different slave types are displayed.



10.4.2 Event log in the I/O-Manager

You can use the event log in 32Mbit Flex mode as well as in compatibility mode 32Mbit. In 32Mbit Flex mode, the events are transmitted via the Ethernet communication which is running via the FO connection simultaneously to the measurement data acquisition. In compatibility mode 32Mbit, the Ethernet interface is used.

In the event log, the status changes on the PROFIBUS detected by ibaBM-DP are documented in a list. You find the event log in the I/O Manager: Mark the ibaBM-DP device in the interface tree. Now, you can see the "Event log" tab on the right.

ibaBM-DP		
General Analog Digital Diagnostics PROFIBUS browser Event log		
<input checked="" type="checkbox"/> Enable device event log Status: Connected to device.		
Maximum number of events: <input type="text" value="1000"/> Current number of events: <input type="text" value="998"/>		
Time	Source	Event
01.09.2023 11:28:16.5	Bus 1	Own slaves: 12
01.09.2023 11:28:16.5	Bus 1	Masters: 2 Online slaves: 11, 12, 13
01.09.2023 11:28:16.5	Bus 1	Bus is running. Baudrate: 1.5 MBit/s, Cycle time: 5133 µs, Masters: 1, Online slaves: 3, Missing slaves: 0, Own slaves: 1, Phantom slaves: 0
01.09.2023 11:28:16.5	Bus 0	Own slaves: 11
01.09.2023 11:28:16.5	Bus 0	Masters: 2 Online slaves: 11, 12, 13
01.09.2023 11:28:16.5	Bus 0	Bus is running. Baudrate: 1.5 MBit/s, Cycle time: 5133 µs, Masters: 1, Online slaves: 3, Missing slaves: 0, Own slaves: 1, Phantom slaves: 0
01.09.2023 11:28:16.0	ibaBM-DP	ibaBM-DP configuration changed. Mode: Sniffer (Flex)
01.09.2023 11:26:56.9	Bus 1	Missing slaves: 11
01.09.2023 11:26:56.9	Bus 1	Own slaves: 12
01.09.2023 11:26:56.9	Bus 1	Masters: 2 Online slaves: 12, 13
01.09.2023 11:26:56.9	Bus 1	Bus is running. Baudrate: 1.5 MBit/s, Cycle time: 3527 µs, Masters: 1, Online slaves: 2, Missing slaves: 1, Own slaves: 1, Phantom slaves: 0
01.09.2023 11:26:56.9	Bus 0	Missing slaves: 11
01.09.2023 11:26:56.9	Bus 0	Masters: 2 Online slaves: 12, 13
01.09.2023 11:26:56.9	Bus 0	Bus is running. Baudrate: 1.5 MBit/s, Cycle time: 3527 µs, Masters: 1, Online slaves: 2, Missing slaves: 1, Own slaves: 0, Phantom slaves: 0
01.09.2023 11:26:27.4	Bus 0	Bus is not connected
01.09.2023 11:26:27.4	Bus 1	Bus is not connected
01.09.2023 11:26:27.4	Bus 0	Removed masters: 2
01.09.2023 11:26:27.4	Bus 0	Slave status changed: 11: Missing -> Not available, 12: OK -> Phantom, 13: OK -> Phantom
01.09.2023 11:26:27.3	Bus 0	New masters: 2
01.09.2023 11:26:27.3	Bus 0	Slave status changed: 11: Not available -> Missing, 12: Phantom -> OK, 13: Phantom -> OK
01.09.2023 11:26:27.3	Bus 1	Removed masters: 2
01.09.2023 11:26:27.3	Bus 1	Slave status changed: 11: Missing -> Not available, 12: OK -> Phantom, 13: OK -> Phantom
01.09.2023 11:07:54.0	Bus 1	Missing slaves: 11
01.09.2023 11:07:54.0	Bus 1	Own slaves: 12
01.09.2023 11:07:54.0	Bus 1	Masters: 2 Online slaves: 12, 13
01.09.2023 11:07:54.0	Bus 1	Bus is running. Baudrate: 1.5 MBit/s, Cycle time: 3527 µs, Masters: 1, Online slaves: 2, Missing slaves: 1, Own slaves: 1, Phantom slaves: 0
01.09.2023 11:07:54.0	Bus 0	Missing slaves: 11
01.09.2023 11:07:54.0	Bus 0	Masters: 2 Online slaves: 12, 13
01.09.2023 11:07:54.0	Bus 0	Bus is running. Baudrate: 1.5 MBit/s, Cycle time: 3527 µs, Masters: 1, Online slaves: 2, Missing slaves: 1, Own slaves: 0, Phantom slaves: 0
01.09.2023 11:07:53.5	ibaBM-DP	ibaBM-DP configuration changed. Mode: Sniffer (Flex)
01.09.2023 11:07:25.9	Bus 1	Missing slaves: 11
01.09.2023 11:07:25.9	Bus 1	Own slaves: 12
01.09.2023 11:07:25.9	Bus 1	Masters: 2 Online slaves: 12, 13

The following settings and operation modes are available:

- “Enable device event log”: Here, you enable the event log for the device. You have to enable the event log separately for each individual device.
- “Status”: Here, the status of the connection between ibaPDA and ibaBM-DP for reading the events is displayed.
- When pressing the button , the list of the events will be continuously updated automatically. With the button , you can stop the automatic update.
- With the button , you can export the events as *.tsv (tabulator separated values) file.
- “Maximum number of events”: Here, you configure the maximum number of saved events (100 - 100,000).
- “Current number of events”: The currently saved number of events.

The list of events can be filtered in a customized way. For this purpose, enter the filter text you are searching for in the upper line in the desired field. All events containing the entered search text, will be displayed. The symbol in the first column shows the type of the event. If you want to filter the events according to a type, just select the desired symbol in the filter row.

Time	Source	Event
23.01	1	
23.01.2017 14:04:55.653	Bus 1	Missing slaves: 8, 65, 80, 81, 113
23.01.2017 14:04:55.653	Bus 1	Own slaves: 82, 96, 97, 98, 99, 100
23.01.2017 14:04:55.653	Bus 1	Masters: 2 Online slaves: 82, 96, 97, 98, 99, 100
23.01.2017 14:04:55.653	Bus 1	Bus is running. Baudrate: 6 MBit/s, Cycle time: 3056 µs, Masters: 1, Online slaves: 6, Missing slaves: 5, Own slaves: 6, Phantom slaves: 0
23.01.2017 11:48:23.418	Bus 1	Missing slaves: 8, 65, 80, 81, 113
23.01.2017 11:48:23.418	Bus 1	Own slaves: 82, 96, 97, 98, 99, 100
23.01.2017 11:48:23.418	Bus 1	Masters: 2 Online slaves: 82, 96, 97, 98, 99, 100
23.01.2017 11:48:23.418	Bus 1	Bus is running. Baudrate: 6 MBit/s, Cycle time: 3056 µs, Masters: 1, Online slaves: 6, Missing slaves: 5, Own slaves: 6, Phantom slaves: 0



Note

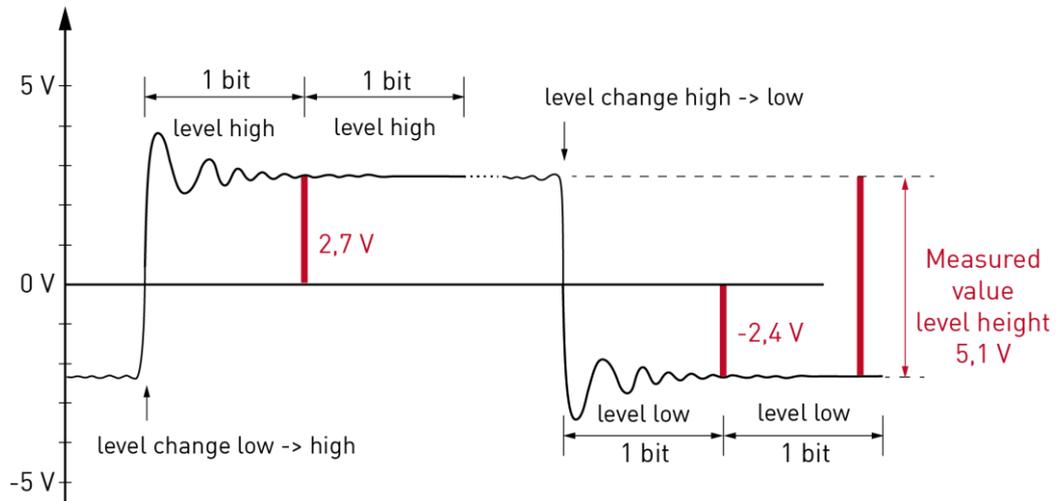
The status of the PROFIBUS system and thus the events, are generated by numerous asynchronous monitorings of various PROFIBUS telegrams in ibaBM-DP.

Thus, the correct time sequence of the reported events cannot be guaranteed. Events, that have been generated within a short continuous time period, always have to be analyzed in common.

10.4.3 Display of bus voltages in the I/O Manager

ibaBM-DP has a transducer (8 Bit, sampling rate 10 ns). With this transducer, you can measure the bus voltages. The measured voltages are displayed as bar diagram in the I/O Manager. Moreover, you can acquire the bus voltages as signals. For this purpose, use the “Slave diagnostics” module (see chapter 10.3.6 and 10.4.4).

Measurement principle



For determining the voltage difference between High and Low level, one voltage value will be determined in the High and Low status each. The difference is the measured value for the level height.

The measurement in the High status is done in situations, where the level is at High for at least two consecutive bits after the level has changed from Low to High. The values are measured at the end of the first bit. Thus, a nearly steady state of the level at the time of the measurement can be assumed.

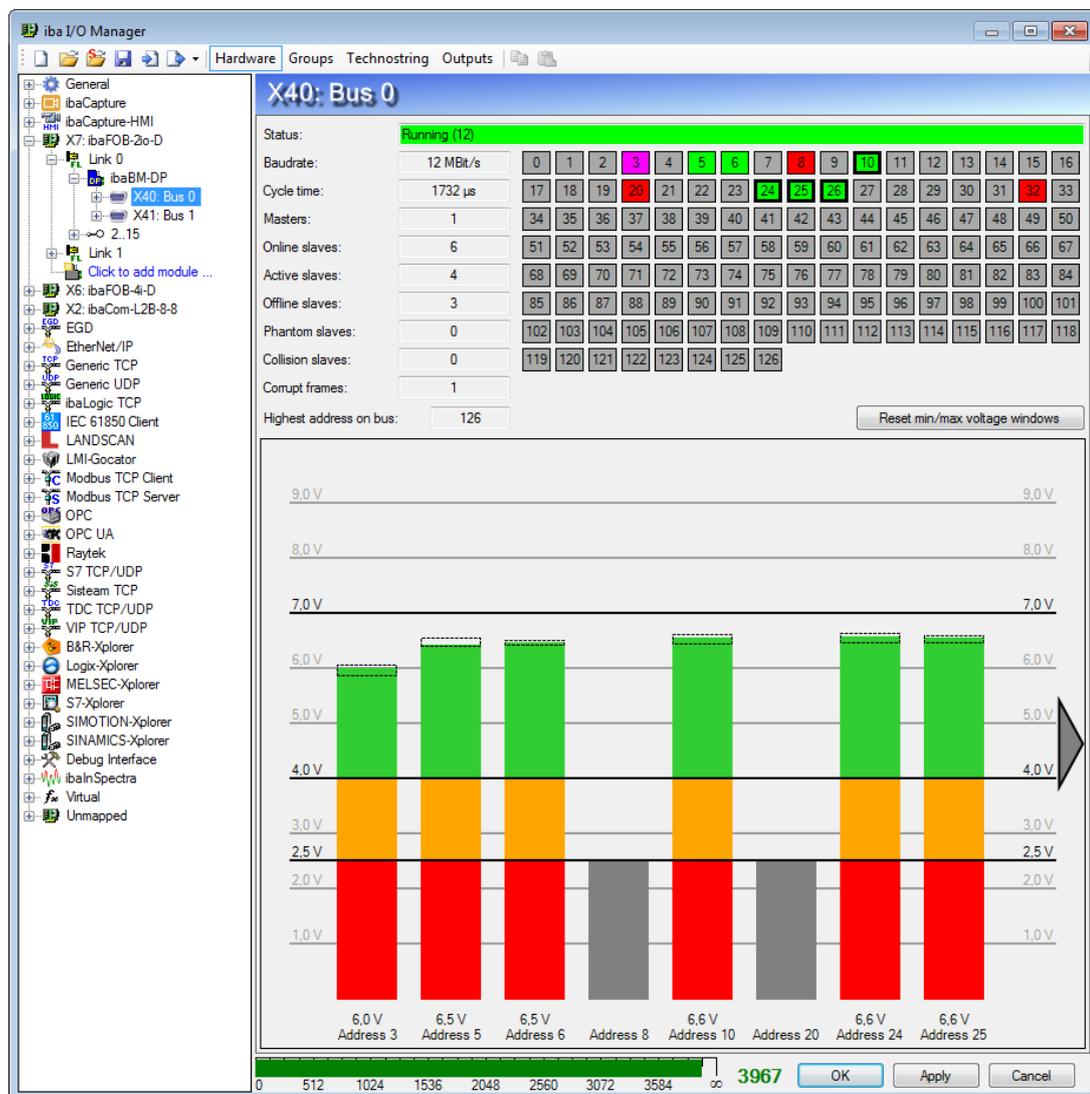
The measurement in the Low status is done according to the same principle, i.e. in situations where the level is at Low for at least two consecutive bits after the level has changed from High to Low.

With an increasing transfer rate, the number of available measurement values decreases as the time period of one bit is getting shorter and shorter. Moreover, the time of measurement within one bit has a Jitter. With an increasing transfer rate, this Jitter becomes more and more relevant as the voltage does not reach a steady state anymore. Thus, the precision of the measurement gets lower at high transfer rates.

The measurement is only done for status telegrams which are exchanged between master and slaves. Depending on the bus cycle (depending on the transfer rate and the number of participants), the update rate of the bus voltages can be in the seconds range. The ibaBM-DP hardware does not allow for a more frequent measurement. The focus of the voltage measurement in the ibaBM-DP lies on the statistic evaluation of the voltage ratio on the bus and the long-term acquisition of the voltages. The measurement of the bus voltages in ibaBM-DP is not suited for acquiring and analyzing fast processes on the bus voltage.

Bar diagram

When selecting the bus node “X40: Bus0” or “X41: Bus1” of an ibaBM-DP in the I/O Manager, you can see the bar diagram of the bus voltages.



The currently measured bus voltage is shown as bar diagram for each participant on the bus. We use colors to differentiate between the following areas:

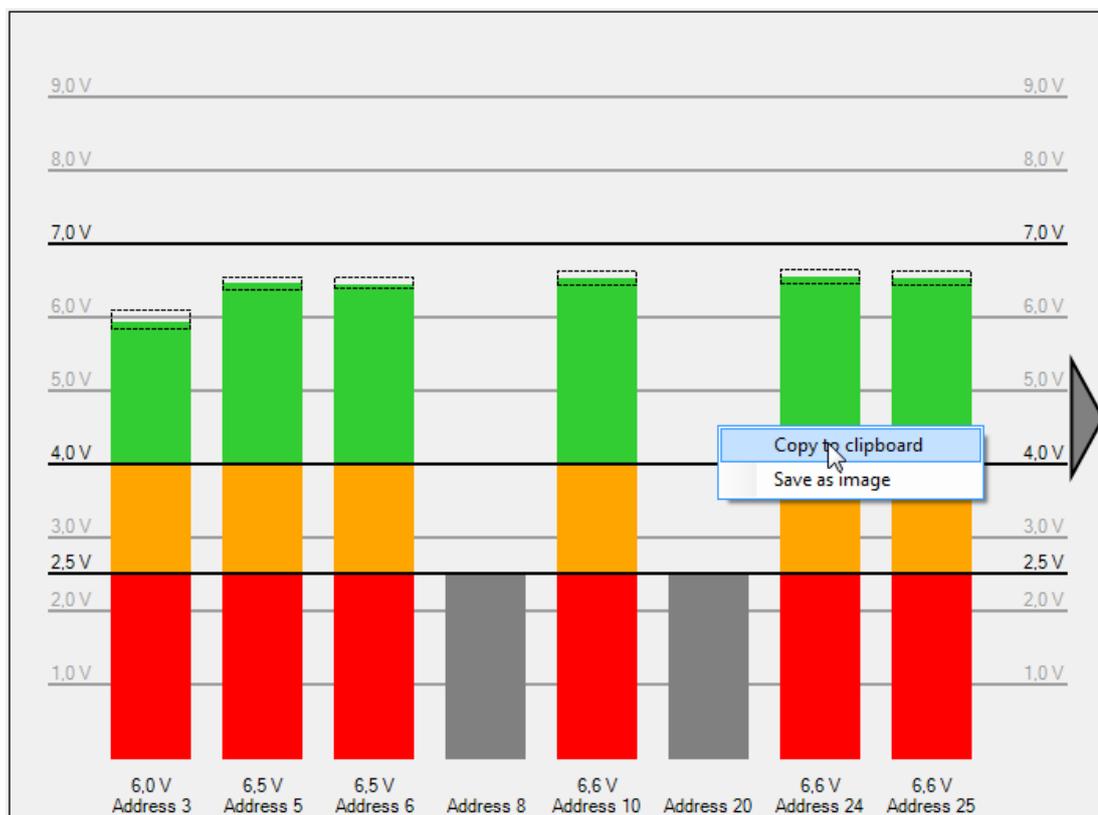
- Green: Participants with a voltage in the range between 4.0 V and 7.0 V are generally called “okay”.

- ❑ Orange: Participants with a voltage in the range between 2.5 V and 4.0 V may be okay. Line losses due to a long length of the conductor between ibaBM-DP as point of measurement and the participant, may result in a lower voltage. Also, a problem with the participant itself may result in a lower voltage.
- ❑ Red: Participants with a voltage lower than 2.5 V are generally designated as “not okay”.
- ❑ Gray: Slaves that do not exist but are configured are displayed as gray bars at the corresponding position. In the overview of the bus participants above, these slaves correspond to the red marked slave symbols.

The dotted rectangles show the range between the minimum and maximum value of the bus voltage. Minimum and maximum value are only determined as long as the bar diagram is visible in the I/O Manager. When you leave the bar diagram view, the values will be reset. The values can also be reset manually with a click on <Reset min/max voltage windows>.

Clicking on the grey triangle displays additional participants.

For further use, the bar diagram can be saved as image or copied to the clipboard. Open the context menu with a right mouse click in the bar diagram and select "Copy to clipboard" or "Save as image". The image formats *. png, *. gif, *. jpg, *. tif, *. bmp are supported.



10.4.4 Diagnostic modules

If you want to examine sporadic errors in the PROFIBUS system in detail, you can acquire slave- and bus-specific diagnostic values as signals in ibaPDA using the diagnostic modules “Slave diagnostics” and “Bus diagnostics”. The data are analyzed, just as for all other acquired signals, online via PDA client or offline with the DAT file in ibaAnalyzer.

Both diagnostic modules and the values are described in the chapters 10.3.6 and 10.3.7.



Important note

You can use the “Slave diagnostics” and “Bus diagnostics” modules only in 32Mbit Flex mode. In compatibility mode 32Mbit, the modules remain disabled in the I/O Manager.

10.4.5 PROFIBUS browser

The PROFIBUS browser supplies you with detailed information about the PROFIBUS which is connected to ibaBM-DP. If you mark the main node in the tree structure of the browser, you get information about the device, like hardware and firmware versions, device names, license options and the max. number of the possible and configured slaves and signals.

	Maximum	Configured
Active slaves:	8	7
Analog input signals:	1024	66
Digital input signals:	1024	1
Analog output signals:	1024	0
Digital output signals:	1024	0

Moreover, you can install new firmware, reset the device to factory settings or enter license codes for additional functions.



Important note

You can only install new firmware and reset the device to factory settings in 32Mbit Flex mode.

In compatibility mode 32Mbit, please use the web interface for installing firmware updates. In this case, the reset to factory settings can be done using the S10 pushbutton (see chapter 7.3.3).

❑ Firmware Update

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

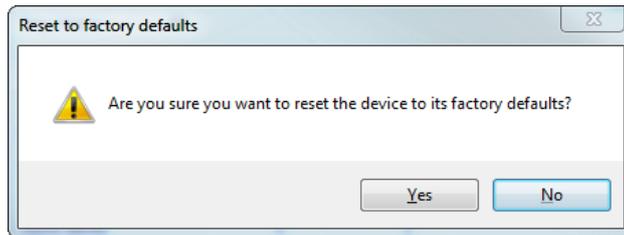


Important note

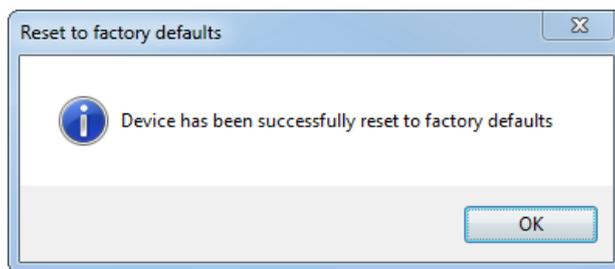
This procedure might take some minutes and must not be interrupted. As soon as the process has been finished, the device restarts automatically.

❑ Reset to factory defaults

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

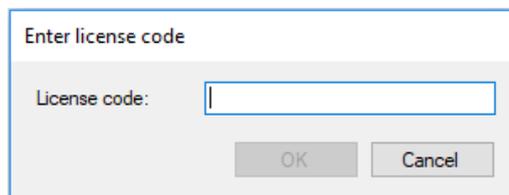


Finally, the following message is shown:



❑ Enter license code

Click the button <Enter license code> to open the dialog "Enter license code".



If you have purchased an additional license from iba (redundancy, mirror, simulation or mapping mode or the extension to 16 active slaves), enter the key that you have received from iba in the "License code" field. With a click on <OK> the device automatically detects which license(s) will be activated.

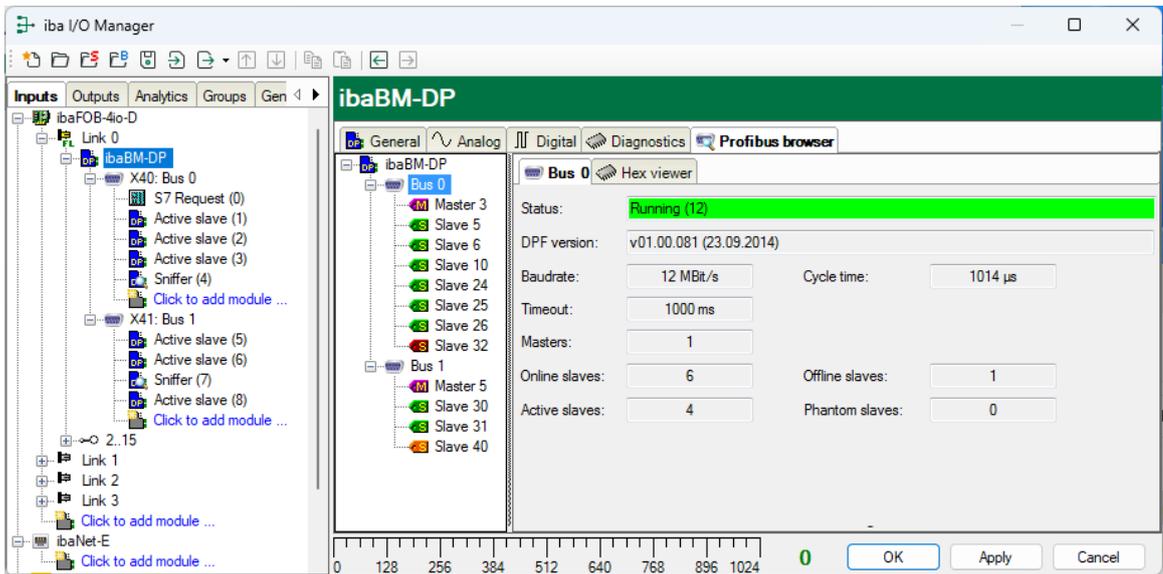


Tip

In addition to the diagnostic functions described above, the PROFIBUS browser can be used to select signals in the "Sniffer" and "Active slave" modules. For a detailed description please refer to chapter 10.5.

Bus information in the Profibus browser

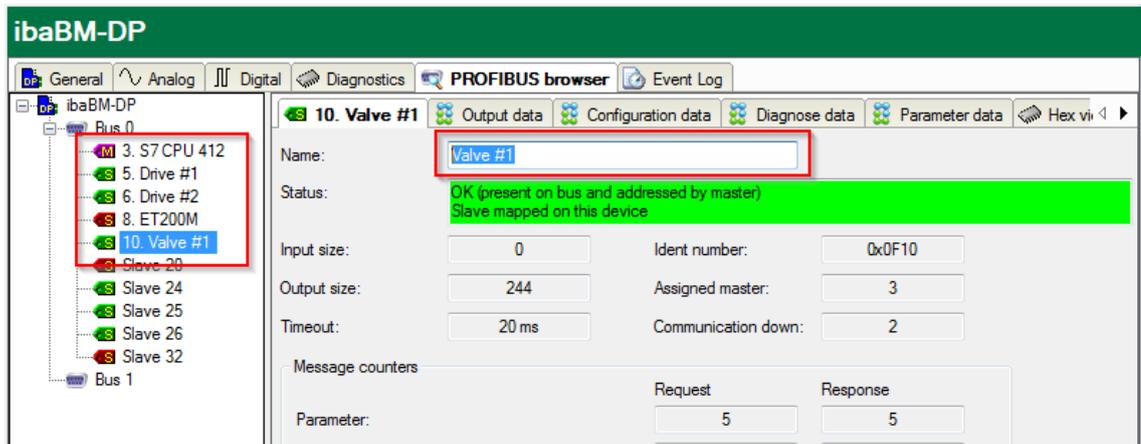
If a bus node is marked in the browser, the information about the respective PROFIBUS line, like transfer rate, cycle time and number of slaves is displayed.



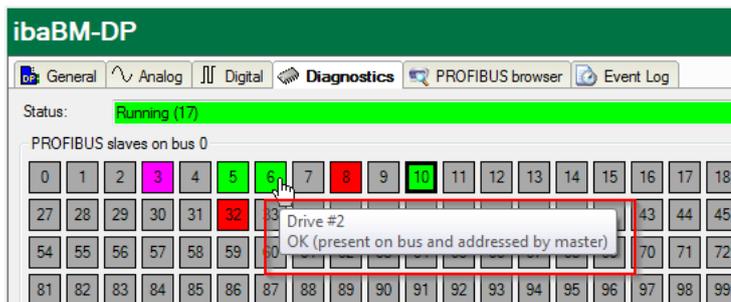
Slave information in the Profibus browser

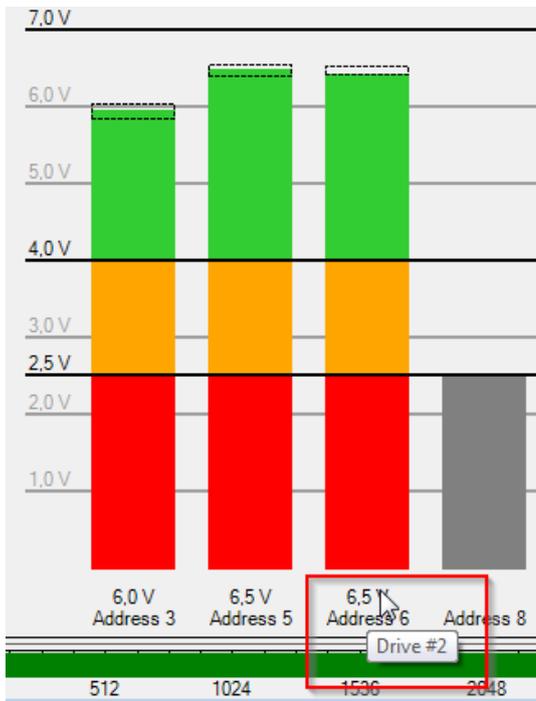
If the node of a bus participant (slave or master) is marked, you get information about the participant, like length of the input and output range, the assigned master and counters for different telegram types.

In the field "Name" you can assign a symbolic name to the slave. This improves clarity and assignment.

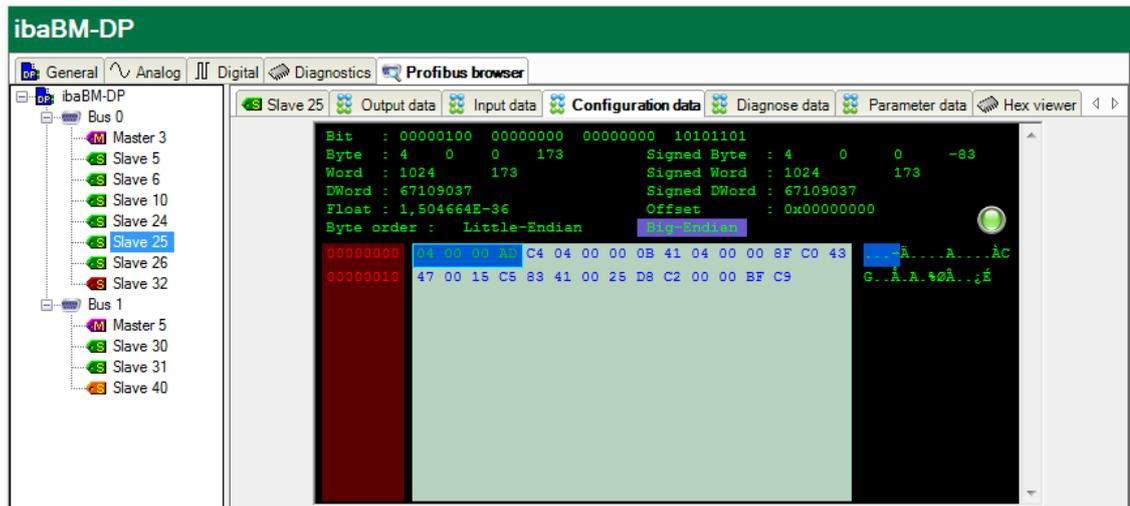


The assigned names are also displayed as tooltips in the diagnostics overview and in the bar diagram of the bus voltages.



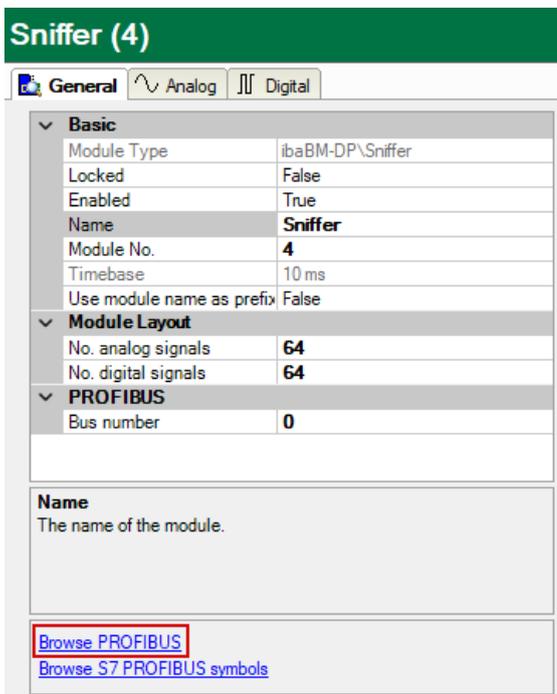


On the additional tabs "Output data", "Input data", "Configuration data", "Diagnose data" and "Parameter data", the current contents of the individual telegram types are shown. This information might be helpful in case you need support.

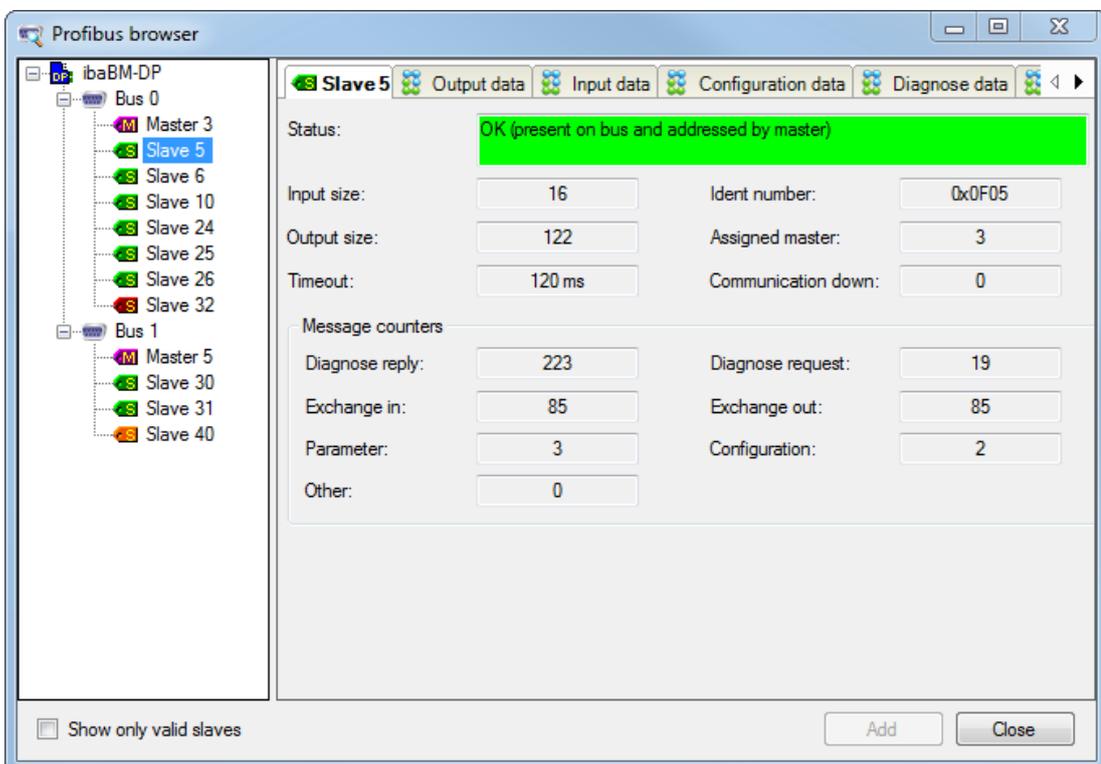


10.5 Signal selection in the PROFIBUS Browser

You can use the PROFIBUS Browser for choosing analog and digital signals for a "Sniffer" or "Active slave" module. Please open the PROFIBUS Browser on the "General" tab of the "Sniffer" or "Active Slave" module (see also chapters 10.3.2.1 and 10.3.3.1).



Then, mark the node of the participant (slave).



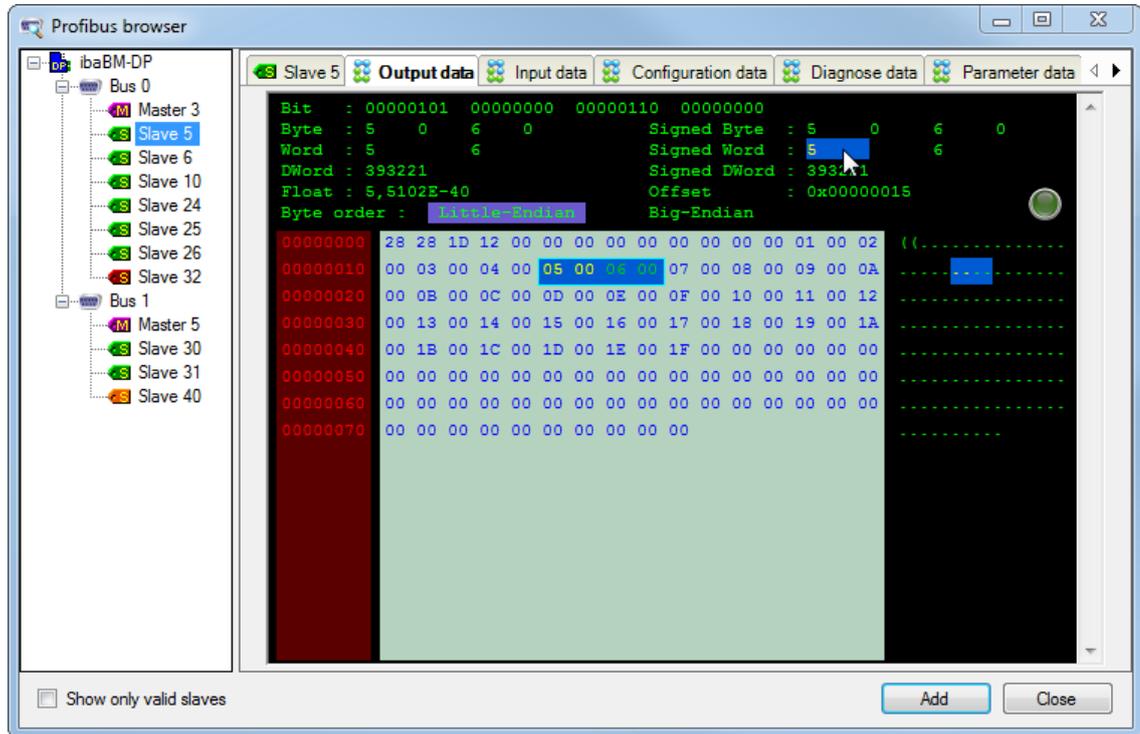
PROFIBUS browser– Slave with input data and output data

If a slave has input and/or output data, (e. g. ET200 station with input and/or output signals), the data are shown on two tabs, the "Output data" and the "Input data" tab. You can interpret the binary data by means of the Hex viewer.

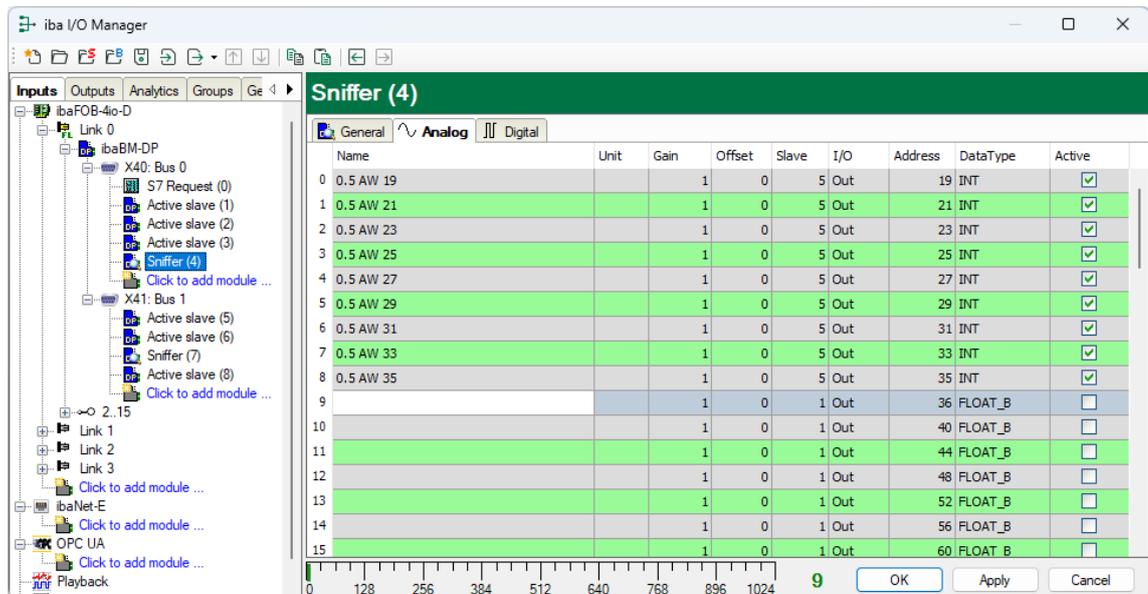
In the figures above, slave no. 5 has input data and output data.

In the upper part of the tab (here, e. g. the "Output data" tab), the value of a chosen byte sequence is shown (interpreted for different data types) in the bottom part. You can switch between "Big Endian" and "Little Endian". If you have identified the chosen byte sequence as signal value, and want to apply it as measurement signal, mark the correct value in the upper part of the dialog. Then, you can add the signal by clicking on the

<Add> button to the signal table in the Sniffer (or “Active slave”) module. Bus number, slave number, I/O, offset and data type are entered automatically. After you have added the signal, the marked choice automatically jumps to the next value of the same data type. You can also transfer a signal to the signal table by double clicking on the correct value.



PROFIBUS browser – "Output data" view

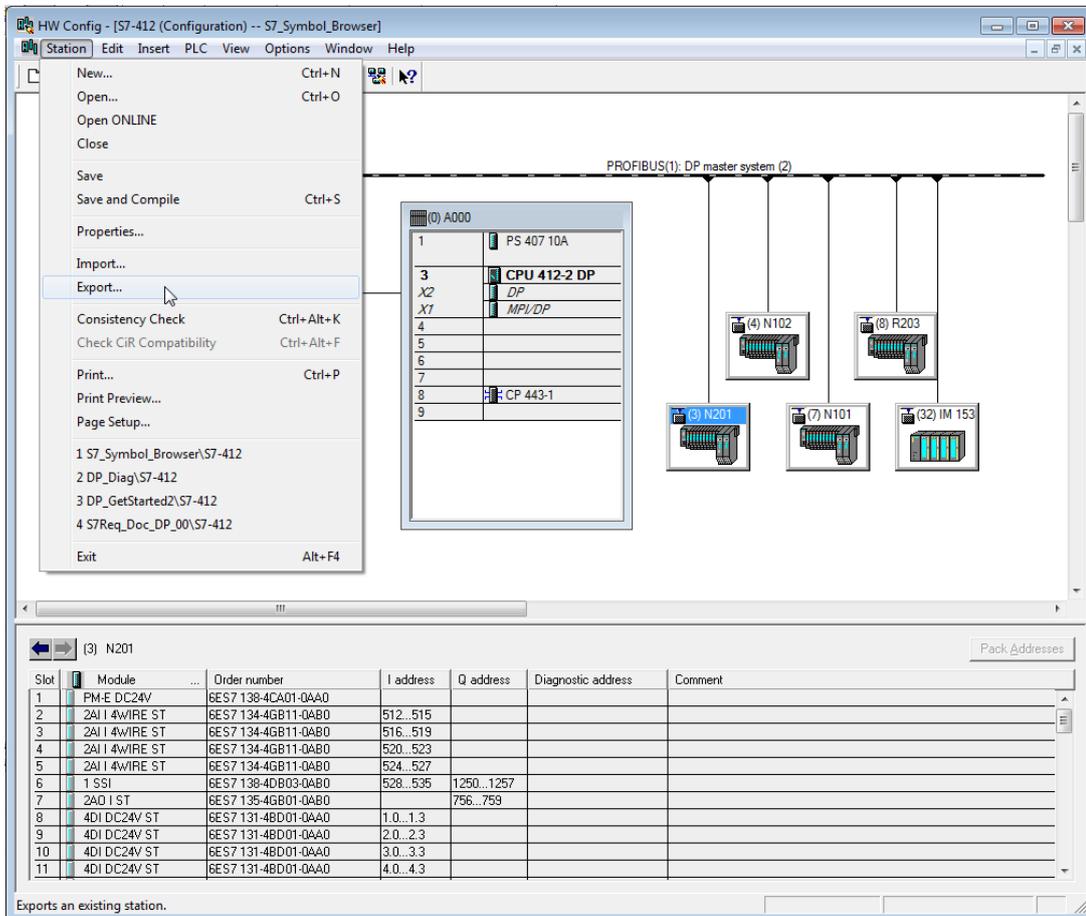


PROFIBUS browser – Applying the signal

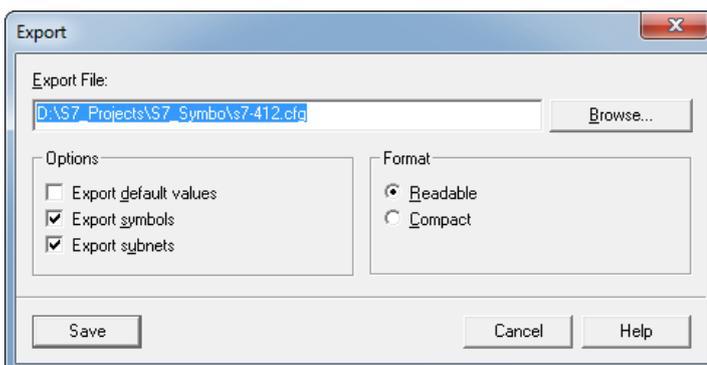
10.6 Selecting signals via Sniffer Symbol Browser

You can perform "symbolic browsing" with "sniffer" modules for PROFIBUS configurations of S7-CPU, which have been configured under Step 7 V5.x and contain the symbols of the PROFIBUS peripherals in the symbol table. This function cannot be used for TIA Portal projects.

An export file ***.cfg** of the hardware configuration from Step 7 has to be available when creating the address book. For generating such an export file, open the hardware configuration of your S7-CPU in Step 7. Under the menu item "Station - Export..", you can generate an export of the configuration:

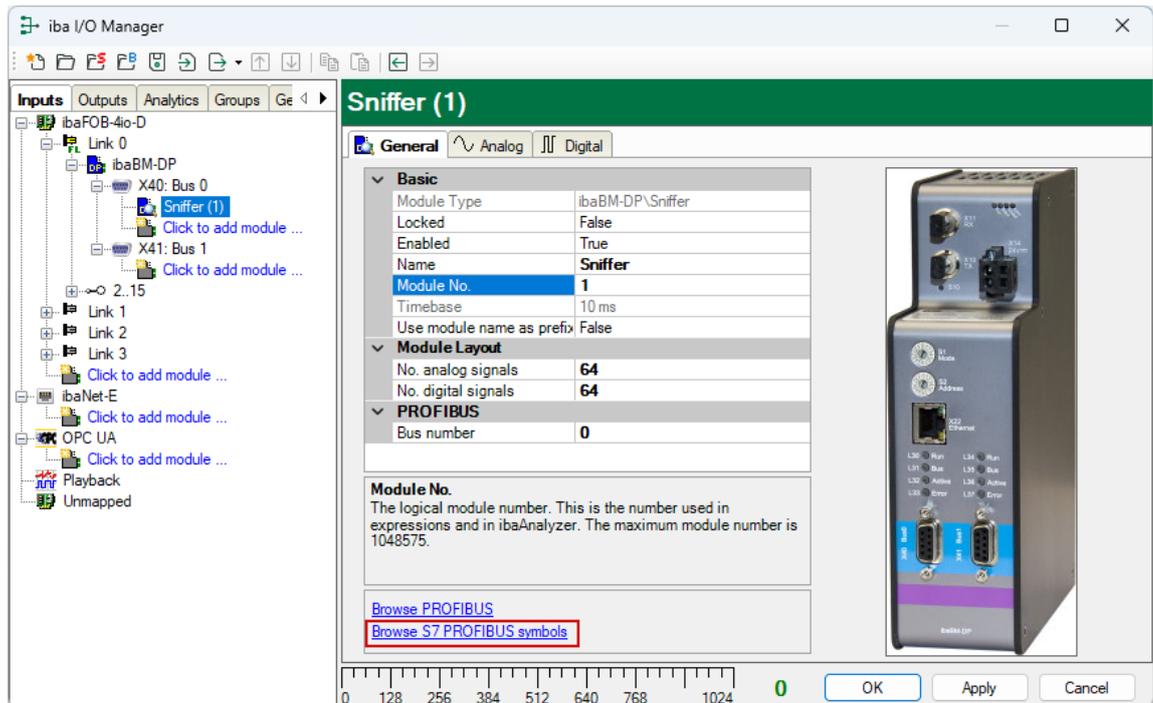


Please select the following settings for "Options" and "Format":

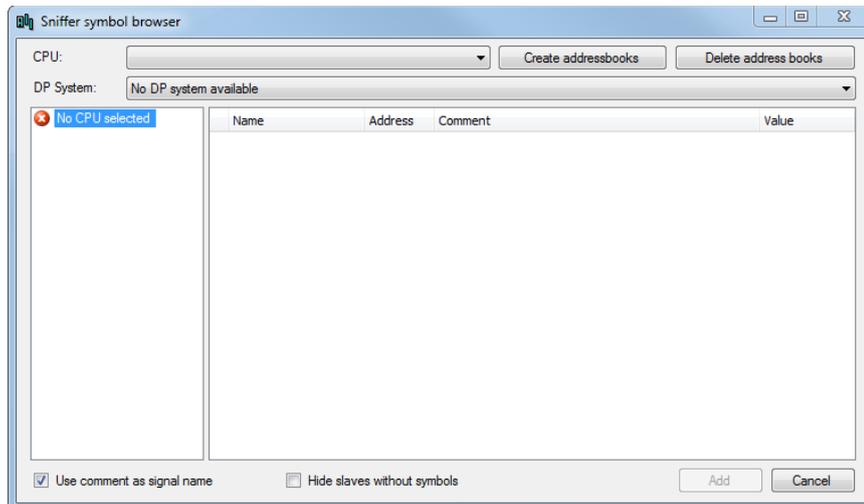


Any path can be defined for the export file. Close the dialog with <Save> and switch over to ibaPDA.

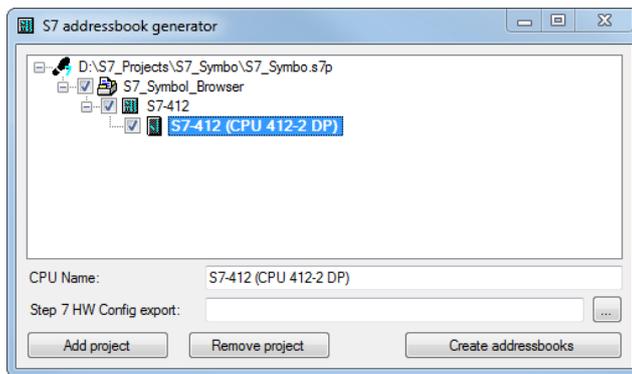
For creating the address book in ibaPDA, choose the "General" tab of a sniffer module and click on the blue link "Browse S7 profibus symbols".



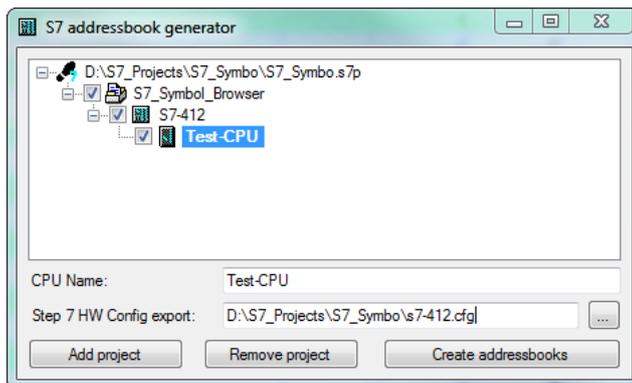
The sniffer symbol browser is opened. Currently, no CPU and no DP system are available.



For opening the S7 addressbook generator, click on the <Create addressbooks> button. Add your Step 7 project by clicking on the <Add project> button and selecting the *.s7p file of your Step 7 project in the file browser. In the example below the Step 7 project is stored under the path "D:\S7_Projects\S7_Symbol" and the *.s7p-file is named „S7_Symbol.s7p“. The available S7-CPU's are displayed automatically.

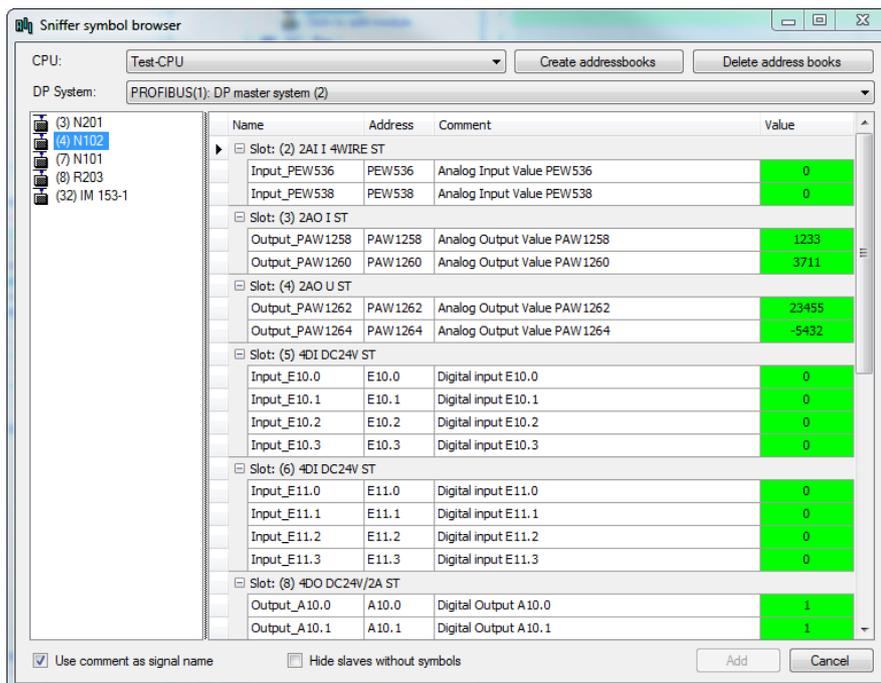


Enter now the path to the exported hardware configuration file in the field "Step 7 HW Config export". In the field "CPU Name", you can enter a meaningful name for the CPU. The default setting is the original name which is used in the Step 7 project.



Then, click on the button <Create addressbooks>. Now, an addressbook including the PROFIBUS symbols is generated.

Now, you can choose a CPU and a DP system in the sniffer symbol browser.

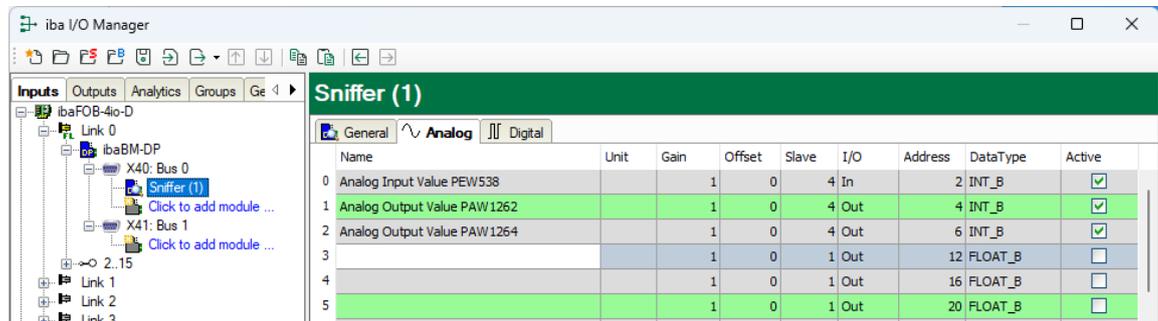


On the left-hand side, the PROFIBUS slaves available in the DP system are displayed. On the right-hand side, you see the structure of the marked slaves with the individual I/O signals. If ibaBM-DP is connected, you see a preview of the current value in the "value" column.

With the option "Use comment as signal name", the signal comment from the Step 7 symbol table is used as signal name in the sniffer module.

With the option "Hide slaves without symbols" you can hide slaves for which a symbol is not defined in Step 7.

If you want to add signals for recording to the sniffer module, mark the signals on the right and click on <Add>. Now the marked signals are inserted with the correct data for slave, I/O, address and data type in the sniffer module.



Name	Unit	Gain	Offset	Slave	I/O	Address	Data Type	Active
0 Analog Input Value PEW538		1	0	4 In		2 INT_B		<input checked="" type="checkbox"/>
1 Analog Output Value PAW1262		1	0	4 Out		4 INT_B		<input checked="" type="checkbox"/>
2 Analog Output Value PAW1264		1	0	4 Out		6 INT_B		<input checked="" type="checkbox"/>
3		1	0	1 Out		12 FLOAT_B		<input type="checkbox"/>
4		1	0	1 Out		16 FLOAT_B		<input type="checkbox"/>
5		1	0	1 Out		20 FLOAT_B		<input type="checkbox"/>



Tip

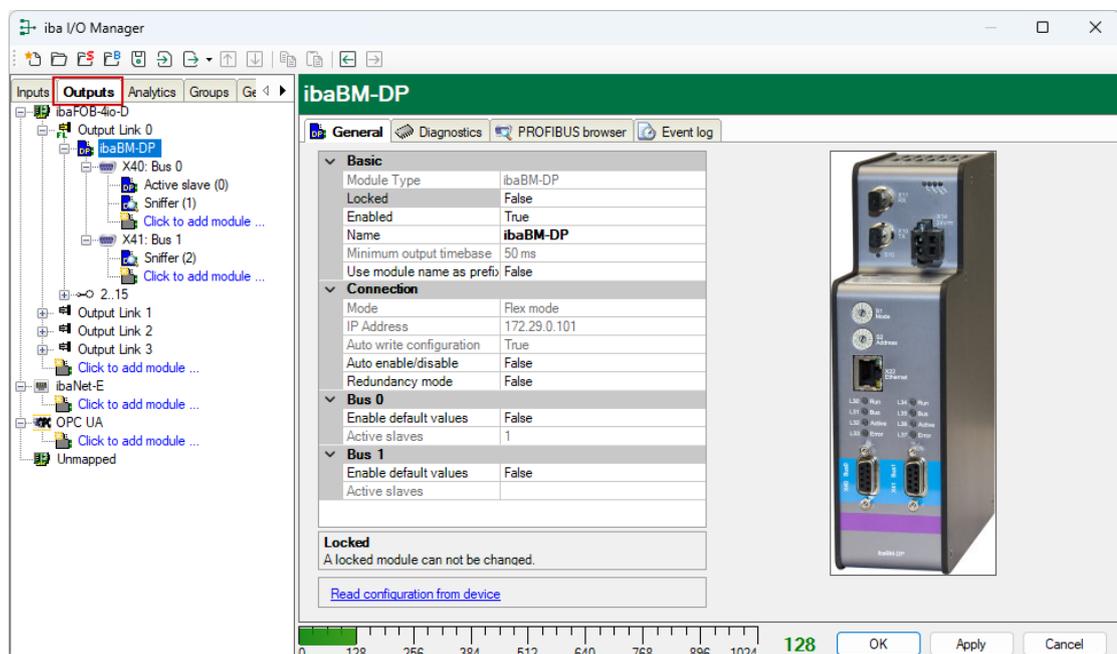
If you keep the <Ctrl> key pressed in the sniffer symbol browser, you can mark and add several signals at once.

10.7 Configuring outputs

With 32Mbit Flex, output signals can be sent via an active slave configured on the device to the DP master.

The slave has to be configured e. g. under Step 7 with an appropriate input range, for the master can read the data from the slave (see example in chapter 11.2).

For configuring the outputs, select the "Output" tab in the I/O Manager of ibaPDA. Modules which have been configured on the input side (hardware tab) are displayed here.



Category	Property	Value
Basic	Module Type	ibaBM-DP
	Locked	False
	Enabled	True
	Name	ibaBM-DP
Connection	Mode	Flex mode
	IP Address	172.29.0.101
	Auto write configuration	True
	Redundancy mode	False
Bus 0	Enable default values	False
	Active slaves	1
Bus 1	Enable default values	False
	Active slaves	

Locked
A locked module can not be changed.

[Read configuration from device](#)

128 OK Apply Cancel

**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.

10.7.1 "ibaBM-DP" device module

The following settings on the "General" tab refer exclusively to the outputs (for more settings, please see description chapter 10.3.1):

Bus 0/1

Enable default values

If the value is TRUE, for a slave which is not supplied with data, (e. g. broken FO cable, stop of data acquisition in ibaPDA) the default values are sent by the device.

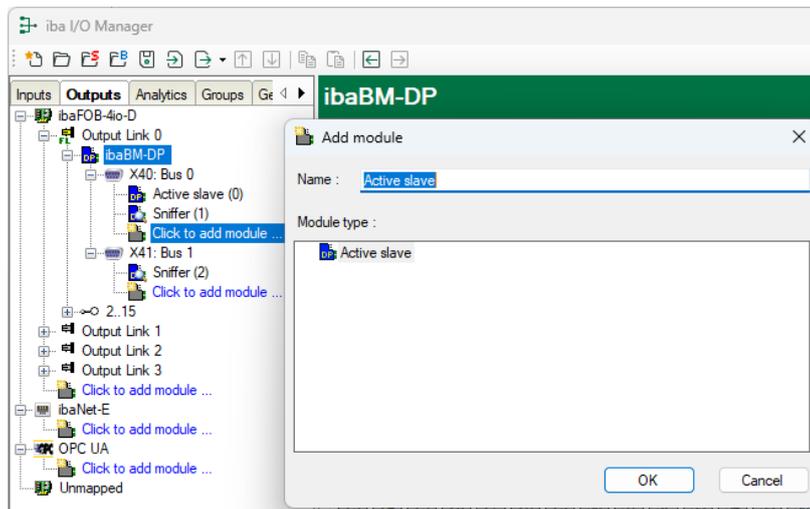
If the value is FALSE, the signal values which have been received last, will be repeated.

The default values can be individually set for the outputs for each signal. If the value is TRUE, an additional column "Default" is displayed for the analog and digital signals.

Name	Expression	Address	DataType	Default	Active
0 DataStoreInfo(0,2)	f_x DataStoreInfo(0,2)	?	0 FLOAT_B	0	<input checked="" type="checkbox"/>
1 Max2([1:0],[1:1])	f_x Max2([1:0],[1:1])	?	4 FLOAT_B	0	<input checked="" type="checkbox"/>
2	f_x	?	8 FLOAT_B	0	<input type="checkbox"/>
3	f_x	?	12 FLOAT_B	0	<input type="checkbox"/>
4	f_x	?	16 FLOAT_B	0	<input type="checkbox"/>
5	f_x	?	20 FLOAT_B	0	<input type="checkbox"/>
6	f_x	?	24 FLOAT_B	0	<input type="checkbox"/>
7	f_x	?	28 FLOAT_B	0	<input type="checkbox"/>
8	f_x	?	32 FLOAT_B	0	<input type="checkbox"/>
9	f_x	?	36 FLOAT_B	0	<input type="checkbox"/>
10	f_x	?	40 FLOAT_B	0	<input type="checkbox"/>
11	f_x	?	44 FLOAT_B	0	<input type="checkbox"/>
12	f_x	?	48 FLOAT_B	0	<input type="checkbox"/>
13	f_x	?	52 FLOAT_B	0	<input type="checkbox"/>
14	f_x	?	56 FLOAT_B	0	<input type="checkbox"/>
15	f_x	?	60 FLOAT_B	0	<input type="checkbox"/>
16	f_x	?	64 FLOAT_B	0	<input type="checkbox"/>

When selecting the "Output" menu, the modules which have been configured under "Hardware" are displayed. Outputs can be used only for modules of the type "Active slave".

You can configure a new module of the "Active slave" type by clicking on the blue "Click to add module..." command. In the dialog box, only the "Active slave" type module is available. Add the module by clicking on <OK>.



10.7.2 "Active slave" module

The settings on the "General" tab are described in chapter 10.3.3.

Output of analog values

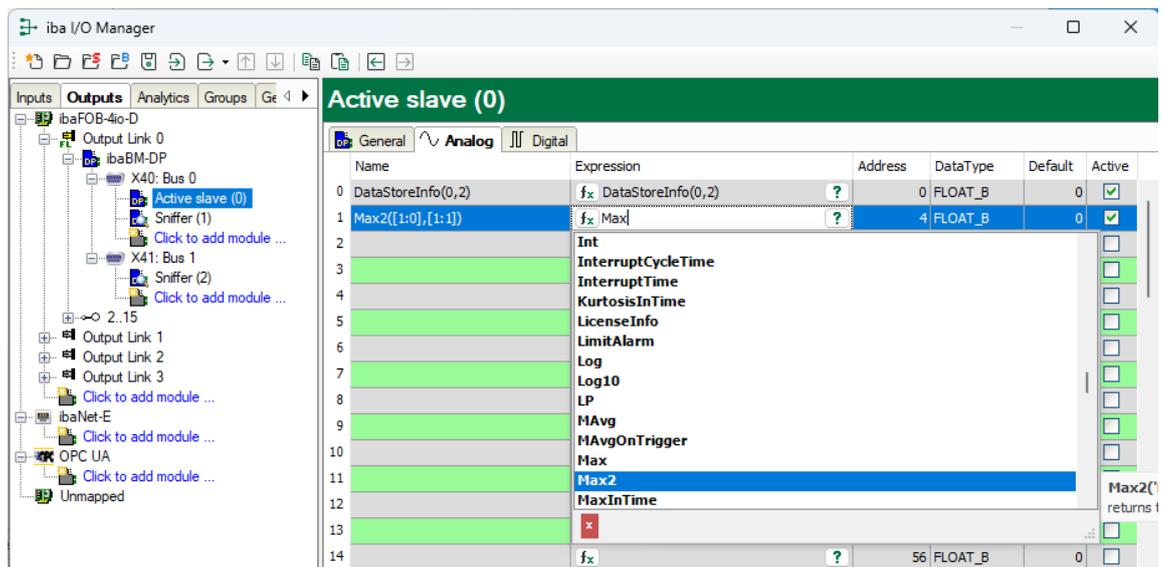
Define the analog values you want to output on the "General" tab.

❑ Name

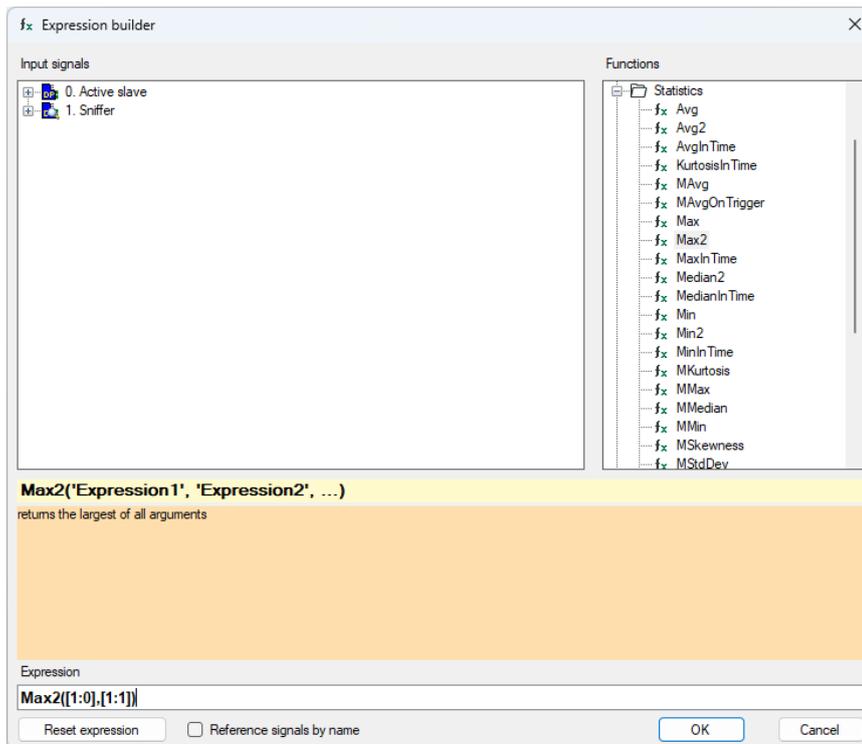
Here, you can enter a signal name and another two comments by clicking on the  symbol in the signal name field.

❑ 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 slave. The address range always begins with the address 0.

Data type

Data type of the signal, see table in chapter 10.3.2.2.

Default

Here, you can enter the default value. This column is only visible for enabled default values (see chapter 10.7.1)

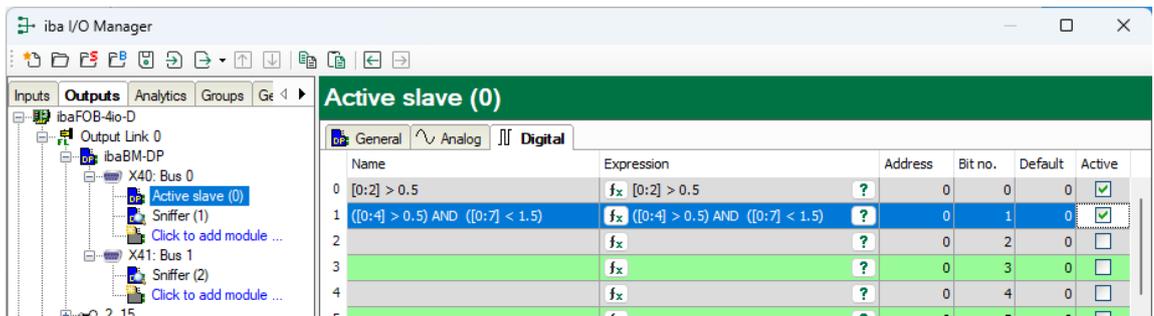
Active

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.



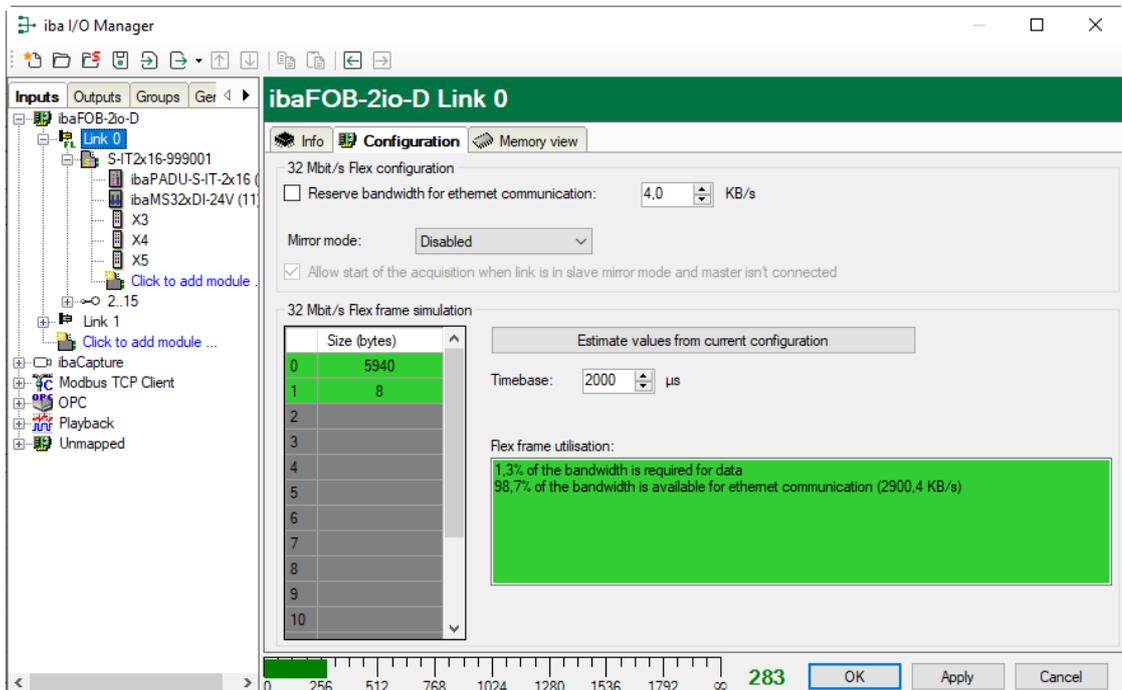
Note

In case different analog signals and/or digital signals of a slave are configured on the same address, an error message will be issued when the I/O configuration is validated.

10.8 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 time base in the ring.

Beginning with version 6.33.1, ibaPDA provides a simulator which calculates the data size that can be transmitted via fiber optics with 32Mbit Flex protocol. The simulator is available in the “Configuration” tab.



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 values taken automatically are estimated first. When the configuration is applied by a click on <OK> or <Apply> the actual data sizes are shown on the "Info" tab.

When too much data is configured, you may either decrease the number of signals to be measured or increase the timebase.

Simulation of the load

Even if no devices have been connected and configured, the calculation of the telegram size can be used for calculating the expected data load in advance. However, an ibaFOB-D or ibaFOB-io-ExpressCard card should be available in the computer.

Open the I/O Manager in ibaPDA, click on the link of the card and select the "Configuration" tab.

Set the smallest planned sampling time in the "Timebase" field. Now, you can enter manually the planned or expected data amount (in Bytes) in the table rows 1 to 15. With every new entry, the result values in the "Flex frame utilization" field are re-calculated.

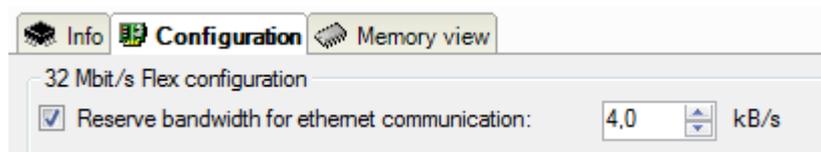
In this way, you can estimate if the planned number of signals can be processed on one Flex link or if you should use an additional Flex link.

Due to the large data amounts that are usually captured with ibaBM-DP, it makes sense in most cases to operate just one device on a 32Mbit Flex link.

Reserved bandwidth for Ethernet communication

The Ethernet channel (address 0) is used to transmit configuration data, to communicate with the web interface and especially with ibaBM-DP for the display of the PROFIBUS diagnosis. 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 PROFIBUS diagnosis cannot be displayed or the communication with the web interface is very slow.

It is now possible to reserve a fixed bandwidth for the Ethernet channel with the option „Reserve bandwidth for ethernet communication“. The default value of 4 kB/s is usually sufficient for configuration data and PROFIBUS diagnosis.



11 PROFIBUS configuration

11.1 Sniffer operation

No GSD file and no special configuration (for example in the SIMATIC Manager) are required for the device.

The telegrams on the PROFIBUS must be known if you want to enter the data to be measured in the configuration files of the device or in ibaPDA. The following signal information must be known:

- The slave on which it is to be acquired (bus no. and slave no.).
- If it is a signal that is sent from the DP master to the slave (OUTPUT) or from the slave to the master (INPUT).
- Where the signal is located in the telegram or where the range of values for several signals starts (byte offset) and what data type is involved. The byte offset is the offset within the payload data.



Tip

If you use Step 7 and S7-CPU's, you can generate a symbolic address book for the data you want to measure. Please see chapter 10.6. As a prerequisite, the IO signals have to be defined in the symbol table.



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.

11.2 Operation as active slave

For operation as active slave, one or several slave addresses (max. total of 8) must be assigned to the device. These slave addresses must be parametrized in the PROFIBUS configuration (e. g. in the SIMATIC manager) as well as in the configuration of the device (e. g. by using „Active slave“ modules in ibaPDA).

CAUTION

Connecting the PROFIBUS cable

The PROFIBUS cable should only be connected after proper completion of the active slaves configuration in ibaPDA. This is to make sure that no slave number has been used twice.

A conflict of several slaves with the same number may cause a complete breakdown of the communication on the PROFIBUS and may finally lead to a plant downtime.

It makes sense to configure active slaves, if data have to be acquired with the device that are not sent on the PROFIBUS anyway.

For configuring the slaves on the PROFIBUS, you need the “ibaDPMsi.gsd” GSD file. You find this file on the data medium „iba Software & Manuals“ included in delivery in the directory

02_iba_Hardware\ibaBM-DP\02_GSD_Files\01_General\.

Import the GSD file in the “HW Config” tool under Step 7. In the catalog of the available modules, you now find the “ibaBM-DPM-S/DP-Monitor” device under „PROFIBUS DP – Additional Field Devices – General“.

With this GSD file, the slaves can be freely defined concerning offsets and data types. The file contains some predefined slot modules for configuring certain signal groups. “Output” represents the output signal group (from the master’s perspective). “Input” is an input signal group.

The prepared slot modules in the figure below appear in the tree structure in the right-hand window. Apart from the slot module sets for input and output signals, several prepared modules for using the ibaPDA-Request-S7 option are available. For more information, please see the “ibaPDA-Request-S7” manual.

In the example in the figure below, we have assigned 112 bytes of source data (from master to slave) to the ibaBM-DP device. These source data are combined by three slot modules (64 bytes, 32 bytes and 16 bytes).

Slot	DP ID	Order Number / Designation	I Address	Q Address	Comment
1	128	output 64 BYTES		512...575	
2	239	output 32 BYTES		576...607	
3	231	output 16 BYTES		608...623	
4					
5					
6					
7					
8					

PROFIBUS configuration and GSD file in the SIMATIC HW configuration



Note for S7-CPU

The following S7-CPU are considered to be “older”: S7-400 CPUs with firmware < V3.0 and S7-300 CPUs with firmware < 2.0 or CPUs, where no firmware version is indicated in the hardware configuration.

In general, S7-CPU of the older type do not support long slots with the setting “Consistent over total length”. When configuring those slots, **no** error message is generated in Step 7.

In this case, use the universal module with the setting “Consistent over unit” for the ibaBM-DP configuration.

When using CP443-5, there are also restrictions regarding the max. slot length when “Consistent over total length” is set. For more information, please see the according module manuals.

When using S7-CPU of the older type, the max. slave address length may also lead to restrictions. Some models support only a maximum slave length of 122 Bytes. Usually, an error message occurs when the device is being configured.

11.3 Operation with outputs

If you want to use outputs in ibaPDA, the PROFIBUS configuration of the master needs to have an appropriate range of input data. Please use the slot modules for inputs in the GSD file.

In the following example, a total of 244 Bytes of input data have been configured with 2 slot modules with a length of 122 Bytes each for slave 21.

Slot	DP ID	Order Number / Designation	I Address	Q Address	Comment
1	64	input 122 BYTES	512...633		
2	64	input 122 BYTES	634...755		
3					
4					
5					
6					
7					
8					

Inputs in SIMATIC HW Configuration

Exactly as for the outputs, the maximum length of the input range is also 244 Bytes.

Configurations with both inputs and outputs can also be used and can be addressed in ibaPDA under "Hardware" for reading data as well as under "Outputs" for signal output.



Note

In the PROFIBUS configuration, there are limitations for the maximum length to be configured for the inputs and outputs. Under Step 7, for example, the sum of the configured inputs and outputs of a slave may not exceed a maximum length of 256 Bytes.

➤ For more information about the operation with outputs, please see chapter 10.7.

12 Redundancy mode



Note

The following description provides you with general information about the operation of the ibaBM-DP device in redundancy mode. You will find detailed information about differences and special features in comparison to operation on the normal PROFIBUS.

For understanding the following description, we suppose that you have basic knowledge in using the ibaBM-DP device.

The redundancy mode of ibaBM-DP and ibaPDA is required if you want to capture data of redundant PROFIBUS systems of a SIMATIC S7-400H control.

Basically, data can also be captured without redundancy mode. The disadvantage is that data have to be captured on each of the both PROFIBUS systems. When analyzing data, the user has to decide which of the two data sets is valid.

In redundancy mode, ibaBM-DP decides automatically and dynamically, which PROFIBUS system sends the valid data sets. Only valid data is sent to ibaPDA for recording.

ibaBM-DP recognizes situations like the switching of a S7-400H CPU to STOP, the failure of a slave connection (e. g. IM153-2 for a redundant ET200) or a broken cable. It then changes dynamically the bus system used for data capturing.

In case, valid data is recognized on both bus systems, the bus system 0 (connected to the X40 plug) is preferred.

In redundancy mode, "sniffing" an existing master/slave communication can be done. You can also use active slaves in ibaBM-DP for sending internal data of the PLC directly to ibaPDA. The active slaves can also have an input data range. Then the signals can be passed from ibaPDA via ibaBM-DP to the master.

CAUTION

When using active slaves on ibaBM-DP, you have to take measures in the program of the S7-400H CPU, for preventing an eventual failure of an active slave (e. g. over OB85). This is necessary for preventing negative influences on the rest of the program.

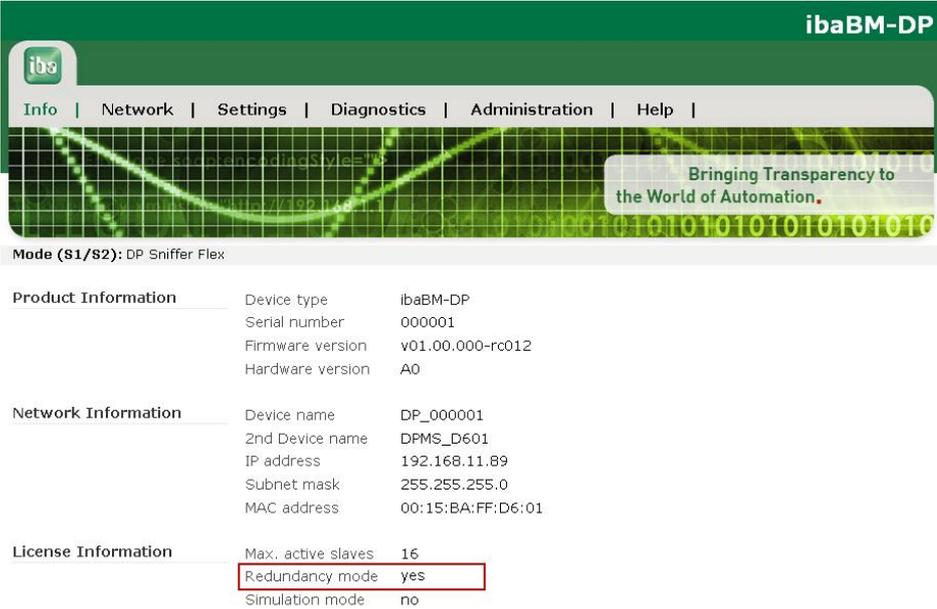


Note

Due to the system, for some cycles zero values or „frozen“ values might be recorded when changing the active bus system (e. g. a S7-400H CPU switches to STOP status).

For using redundancy mode, you need an additional license (order information see chapter 2). The license is activated via the administrator functions in the web dialog of ibaBM-DP (see chapter 9.3.6) or via the I/O Manager in ibaPDA in the "Profibus Browser" dialog (see chapter 10.4.5.)

After having activated the license in the web dialog, the "Info" page shows that redundancy mode is available.



Mode (S1/S2): DP Sniffer Flex

Product Information	Device type	ibaBM-DP
	Serial number	000001
	Firmware version	v01.00.000-rc012
	Hardware version	A0
Network Information	Device name	DP_000001
	2nd Device name	DPMS_D601
	IP address	192.168.11.89
	Subnet mask	255.255.255.0
	MAC address	00:15:BA:FF:D6:01
License Information	Max. active slaves	16
	Redundancy mode	yes
	Simulation mode	no



Note

ibaBM-DP can either be operated in normal mode or in redundancy mode. A combination of these modes is not possible.

12.1 Configuration with ibaPDA

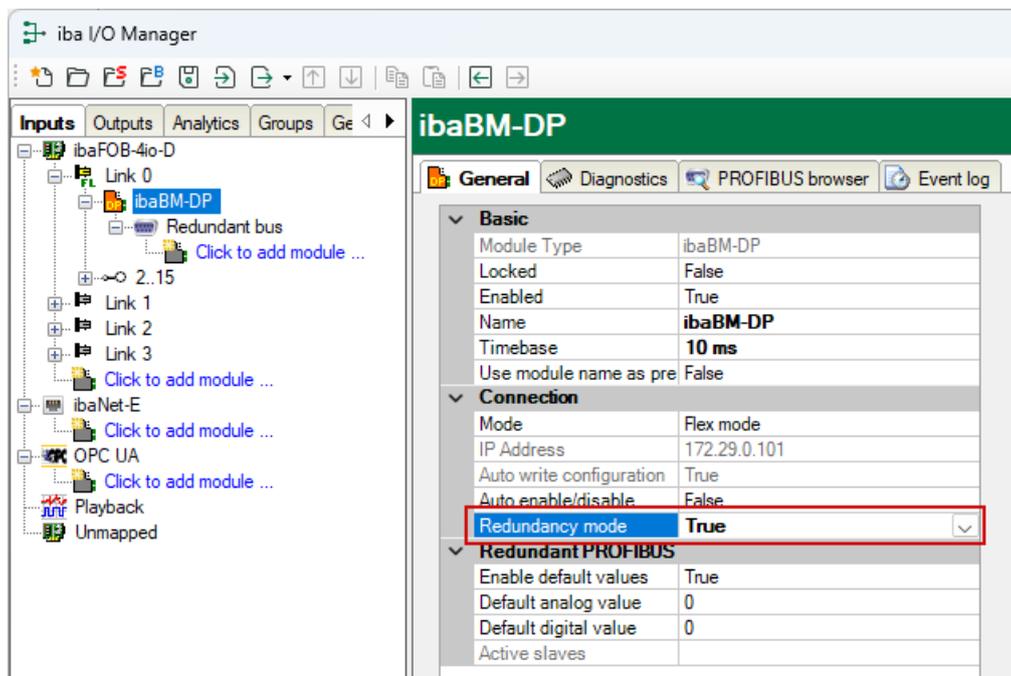


Note

The following description refers to the use of ibaBM-DP in 32Mbit Flex mode. The redundancy mode can also be used in compatibility mode 32Mbit (with ibaBM-DPM-S and with the ibaBM-DP device module). Please consider the general notes about compatibility mode 32Mbit in chapter 10.2.

Connect the ibaBM-DP device to a free link of an ibaFOB-D input card. In the I/O Manager, add a device module "ibaBM-DP".

Set the redundancy mode on TRUE on the "General" tab. The redundancy mode, being activated now, is shown by an orange colored symbol  of the device module.



As on the redundant PROFIBUS both bus systems 0 and 1 are operated in parallel, there are only settings for the "redundant PROFIBUS" on the "General" tab.

On the left-hand side in the module tree, only a common redundant bus is displayed.

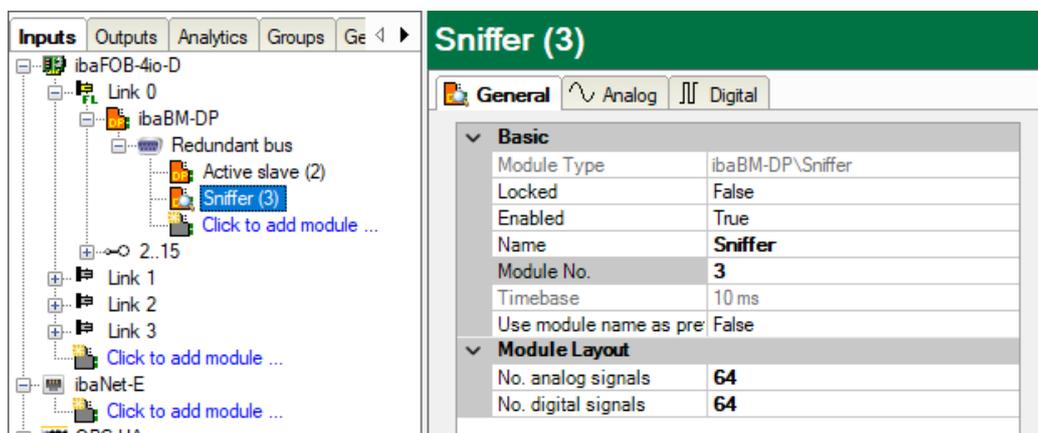


Note

Several Request modules are not available in redundancy mode: the modules „FM458 Request“, „TDC Request“, „Bachmann M1 Request“ and the ibaCom-L2B compatible modules „S7 Request“ and „S7 Request Dig512“ are disabled automatically in redundancy mode.

12.1.1 Notes on the "Sniffer" module

In redundancy mode, there is no "Profibus" group for setting bus 0/1 for the "Sniffer" module on the "General" tab. There is only a common redundant bus. The "Sniffer" module is assigned to this PROFIBUS.

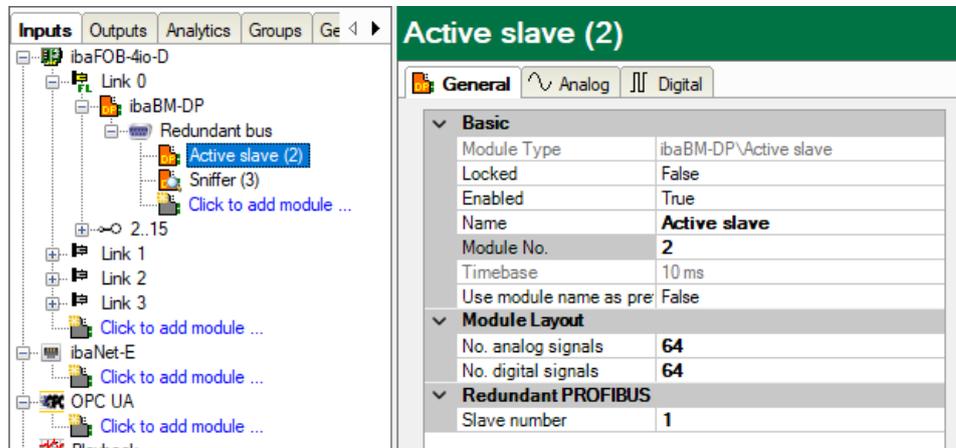


Hence, configured signals always refer to the redundant bus. As usually, you can define the signals you want to capture on the "Analog" and the "Digital" tab.

12.1.2 Notes on the "Active slave" module

In redundancy mode, there is only one group "Redundant Profibus" on the "General" tab where you can set the slave numbers. There is no entry any more for selecting the bus number, as the active slave in redundancy mode is always generated on both buses simultaneously.

Each of the two S7-400H CPUs sends data to the slave on its own PROFIBUS system. This is why an active slave always has to be available on both PROFIBUS systems.

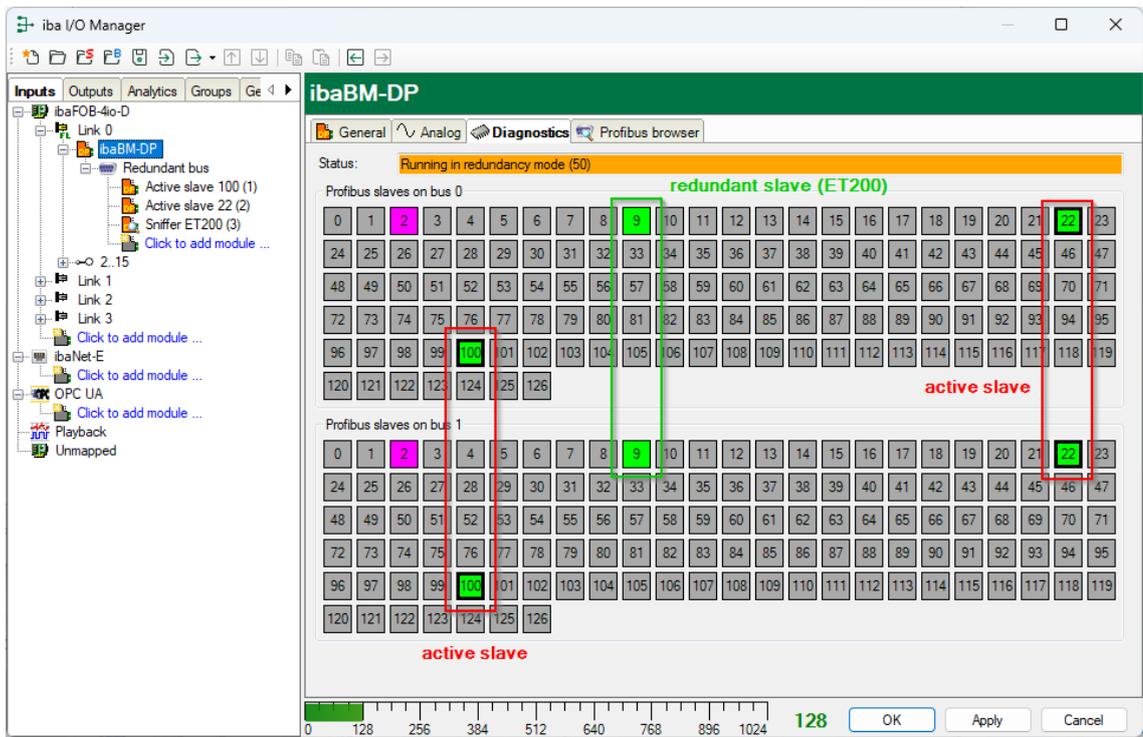


12.1.3 Notes on Diagnostics

On the "Diagnostics" tab, you see that ibaBM-DP runs in redundancy mode. In the top row "Status" on the "Diagnostics" tab, the current operating status of the device is displayed. In redundancy mode, you will see the following message:

Status: **Running in redundancy mode (53)**

In the example below, by means of two modules of the "Active slave" type, slaves with the addresses 22 and 100 have been generated. If you take a look at the diagnostics you see that both slaves were generated on both bus systems (bold margin shows that this slave is assigned to the chosen ibaBM-DP device). Moreover, you can see an "external" slave, in this case an ET200 station with the address 9. The master with the address 2 (each a S7-400H CPU) is displayed on both bus systems in magenta.

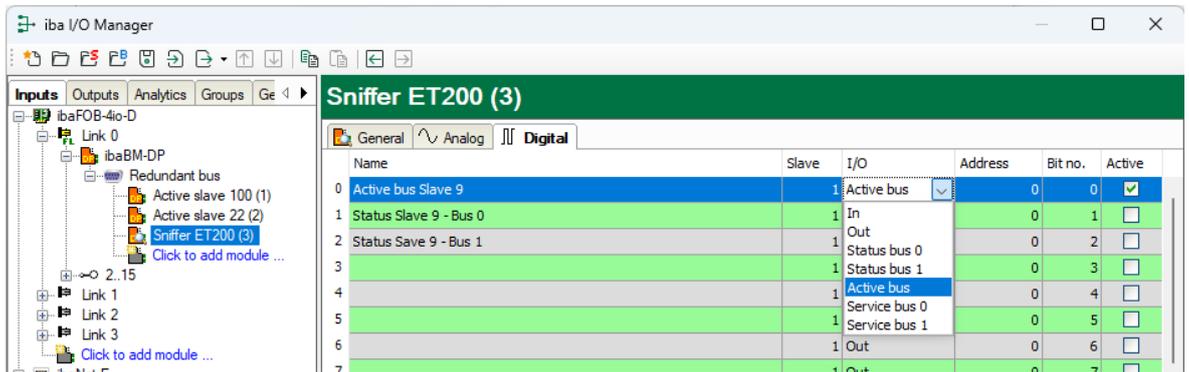


12.1.4 Special features of I/O types

Active bus

In redundancy mode, ibaBM-DP "decides" individually for each slave, on which bus the relevant information is sent.

By means of a supplementary I/O type "Active bus" (see chapter 10.3.2.3) for the digital signals, you are supplied with the information on which bus the signals of a certain slave are currently captured.



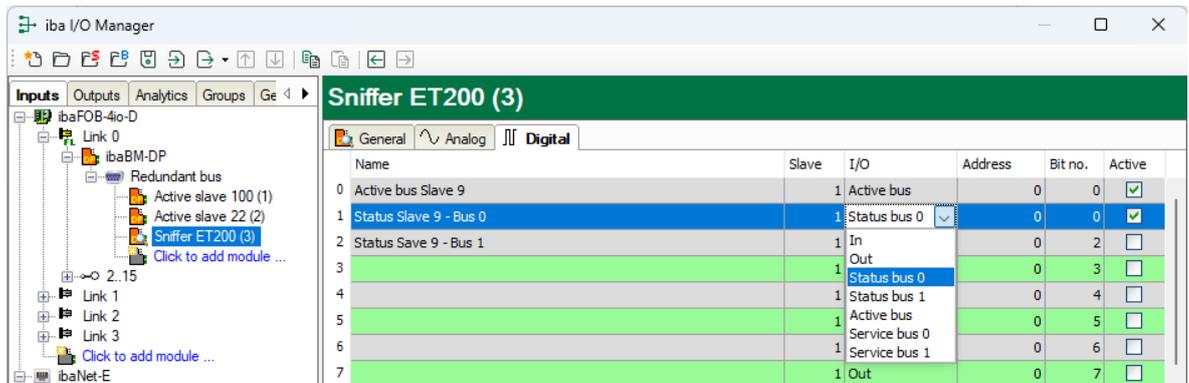
In the "Slave" column, you can define the slave for which you want to get information about the currently valid bus.

Status bus 0/1

Due to the way ibaBM-DP works, you do not need to select a bus system for the analog and digital signals in redundancy mode.

There is only one exception: the signal with the I/O type "status". In this case, the user needs to have the opportunity to address bus 0 or 1 for requesting the status.

As in redundancy mode there is no column for the bus system, here the I/O types "Status bus 0" and "Status bus 1" are being displayed.



Tip

Define for each slave in the PROFIBUS system digital signals of the I/O type "Status" and "Active bus". Thus, you can evaluate the status of the slaves when analyzing the data later.

12.2 PROFIBUS configuration

12.2.1 Sniffer operation

Here, the same notes are applicable as for sniffing on the regular PROFIBUS (see chapter 11.1).

When using the sniffer symbol browser, the symbolic names are always assigned to the CPU in Rack 0, as the common symbol table is only maintained in this CPU.

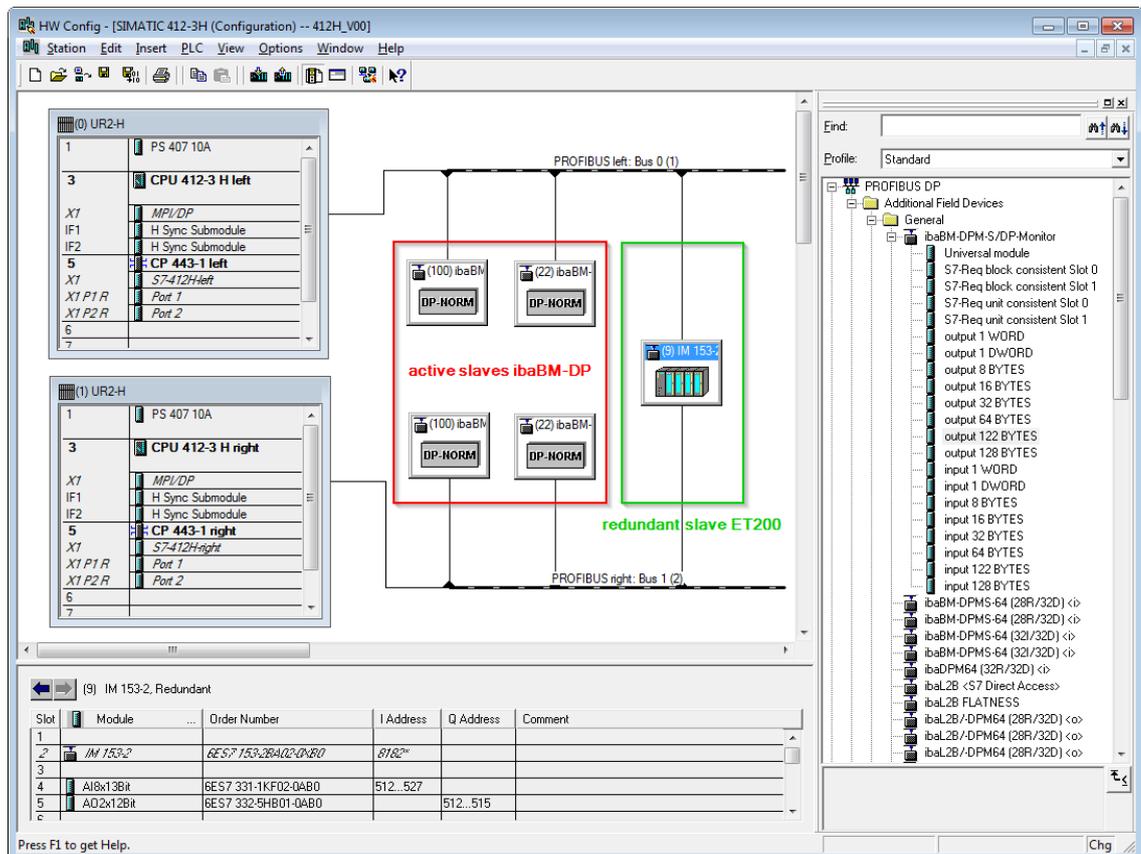
12.2.2 Operation as active slave

If you want to send internal data from the S7-400H to an ibaBM-DP active slave, you need to configure the active slaves in the S7-400H hardware configuration under SIMATIC Step 7.

For this purpose, you need the "ibaDPMSi.gsd" GSD file. You find this file on the data medium „iba Software & Manuals“ included in delivery in the directory

02_iba_Hardware\ibaBM-DP\02_GSD_Files\01_General\.

Import the GSD file in the "HW Config" tool under Step 7. In the catalog of the available modules, you now find the "ibaBM-DPM-S/DP-Monitor" device under „PROFIBUS DP – Additional Field Devices – General“.



ibaBM-DP/DP Monitor module in the S7-400H hardware configuration

A normal redundant slave (e. g. ET200) is shown with two connections in the hardware configuration that are connected to both PROFIBUS systems. This redundant slave has a single I/O address range (see figure above).

In contrast to that, an active slave of the ibaBM-DP has to be configured **on both bus systems**. In both bus systems, the slave has to get the **same PROFIBUS address**.

This way, the configured slaves each have their own I/O address range. You can combine the address range for each slave from the modules in the hardware catalog. A PROFIBUS slave can have a maximum payload data length of 244 bytes. This is why you should use two modules of the “output 122 BYTES” type.

Example configuration Step 7 hardware configuration

In the figure above, two active slaves have been configured (addresses 22 and 100). The following address ranges have been assigned to:

Slave 22 – Bus 0

- output 122 BYTES: 1024...1145
- output 122 BYTES: 1146...1267

Slot	DP ID	Order Number / Designation	I Address	Q Address	Comment
1	128	output 122 BYTES	1024..1145		
2	128	output 122 BYTES	1146..1267		

Address range Slave 22 – Bus 0

Slave 22 – Bus 1

- output 122 BYTES: 1268...1389
- output 122 BYTES: 1390...1511

Slot	DP ID	Order Number / Designation	I Address	Q Address	Comment
1	128	output 122 BYTES		1268...1389	
2	128	output 122 BYTES		1390...1511	

Address range Slave 22 – Bus 1

Slave 100 – Bus 0

- output 122 BYTES: 1600...1721
- output 122 BYTES: 1722...1843

Slot	DP ID	Order Number / Designation	I Address	Q Address	Comment
1	128	output 122 BYTES		1600...1721	
2	128	output 122 BYTES		1722...1843	

Address range Slave 100 – Bus 0

Slave 100 – Bus 1

- output 122 BYTES: 1844...1965
- output 122 BYTES: 1966...2087

Slot	DP ID	Order Number / Designation	I Address	Q Address	Comment
1	128	output 122 BYTES		1844...1965	
2	128	output 122 BYTES		1966...2087	
3					
4					
5					
6					

Address range Slave 100 – Bus 1

12.2.3 Operation with outputs

In 32Mbit Flex mode, outputs in ibaPDA can also be used in redundancy mode.

The description for using outputs in chapter 10.7 is applicable here as well as the description about active slaves in redundancy mode in chapter 12.2.2.

Just like the output data range, the input data range has to be configured on the two slaves belonging together. The PLC has access to the values sent by ibaPDA in two address ranges as inputs.

Example Step 7 Hardware configuration

Hereafter, an active slave 38 has been configured with a total of 244 Bytes input data. For this purpose, two modules of the "input 122 BYTES" type were used.

Slave 38 – Bus 0

- input 122 BYTES: 528...649
- input 122 BYTES: 650...771

Slot	DP ID	Order Number / Designation	I Address	Q Address	Comment
1	64	input 122 BYTES	528...649		
2	64	input 122 BYTES	650...771		
3					
4					
5					
6					

Address range Slave 38 - Bus 0

Slave 38 – Bus 1

- input 122 BYTES: 772...893
- input 122 BYTES: 894...1015

Slot	DP ID	Order Number / Designation	I Address	Q Address	Comment
1	64	input 122 BYTES	772...893		
2	64	input 122 BYTES	894...1015		
3					
4					
5					
6					

Address range Slave 38 - Bus 1

12.3 Transferring data to active slaves

In the PLC program of the S7-400H, you need to output the data you want to record with the active slave always to the two slaves belonging together.

Hereafter, we give an example of how data can be written on the slaves on bus 0 and 1 in the S7-400H in the exemplary PROFIBUS configuration in chapter 12.2.2.

For this purpose, you generate in your PLC a data block (DB) for each active slave. In this block, you cyclically write the data you want to record. You can customize the structure of the DB. The length of the DB has to equal the length of the output data range of the active slave (i.e. again a max. of 244 Bytes).

In our example, the interface DB looks as follows:

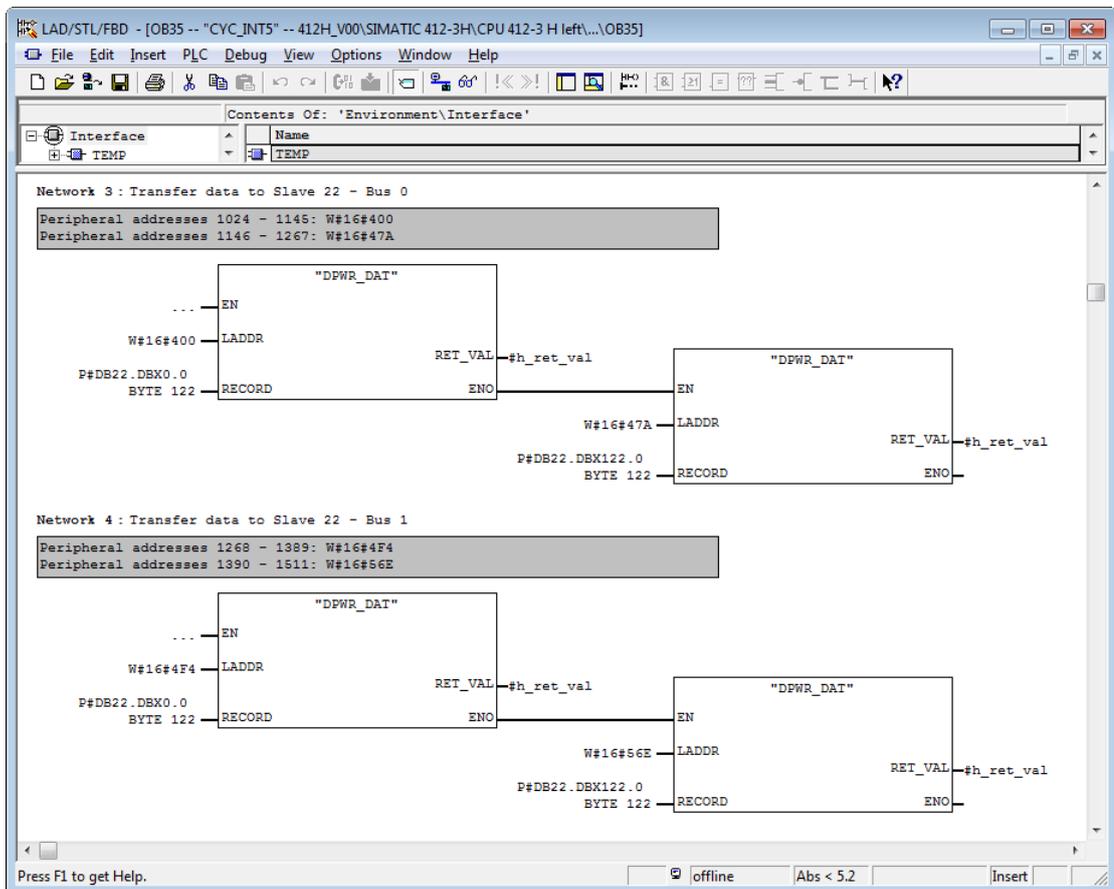
Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+0.0	VAL_BOOL	ARRAY[1..2]		
+1.0		BYTE		
+2.0	VAL_WORD	WORD	N#16#0	
+4.0	VAL_INT	ARRAY[1..60]		
+2.0		INT		
+124.0	VAL_REAL	ARRAY[1..30]		
+4.0		REAL		
=244.0		END_STRUCT		

Example interface data block

The data is output by calling up SFC15 (DPWR_DAT) several times. When calling up the SFC15 twice in network 3 (figure below), all 244 bytes of the interface DBs DB22 for slave 22 – bus 0 are written. In network 4, with two more SFC15 call ups the same data is put out on slave 22 – bus 1.

Several SFC15 calls are needed as the transferred address range must not overlap the address range of the single modules of the slave in the hardware configuration. The maximum length of a module is 128 Bytes.

For more information about to use of SFC15, please see the SIMATIC Step 7 manuals.



Transferring data to the active slave with SFC15



Note

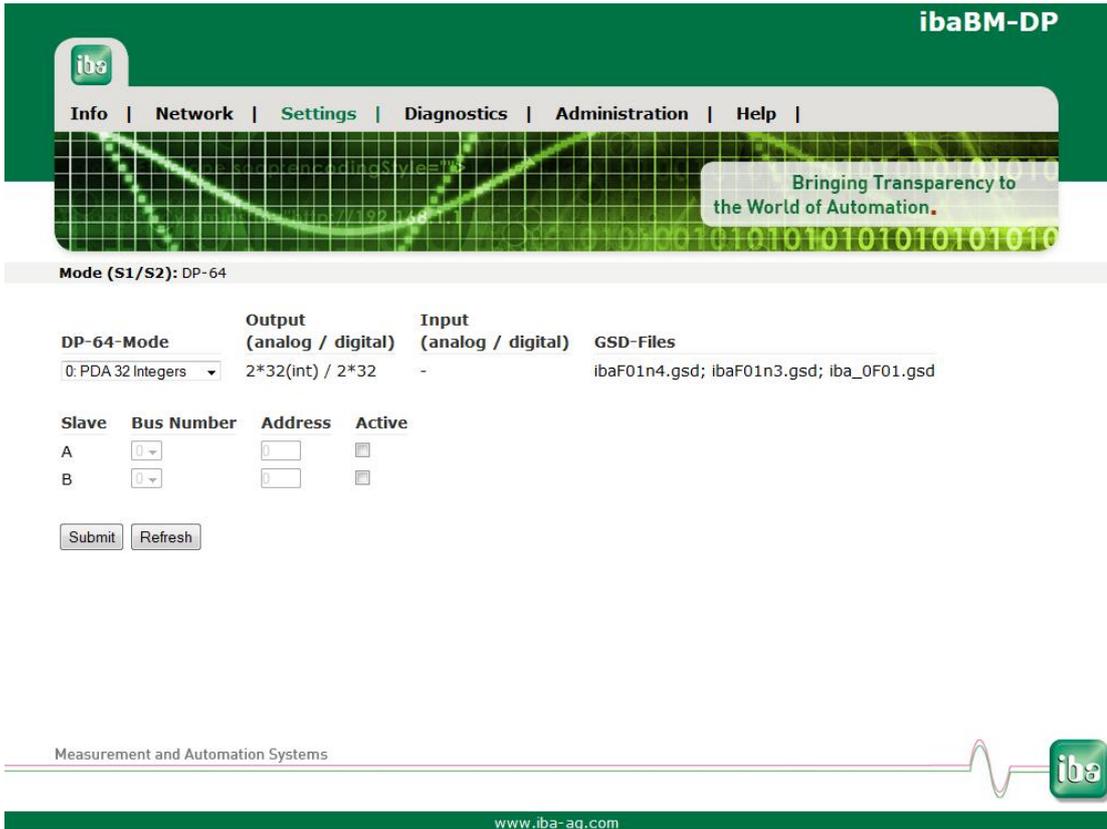
Data should be exclusively given out to the active slave by SFC15 (DPWR_DAT). Data output by load/transfer commands leads to a much higher cyclic load in the CPU.

CAUTION

When using active slaves on ibaBM-DP, you have to take measures in the S7-400H CPU program for preventing an eventual downtime of an active slave (e. g. over OB85) for there will be no negative consequences for the rest of the program.

13 Compatibility mode 3Mbit (DP-64 mode)

13.1 Configuration via web interface



The figure shows the “Settings” webpage with the compatibility mode 3Mbit configured (DP-64 mode). In this mode, the device has to be configured via the web interface. You do the settings on the “Settings” webpage.

You select the operational mode in the “DP-64 mode” combobox. Click on the little arrow in the box for opening the selection list. The names of the modes correspond to those in chapter 13.2.1.



Assign both slaves to the right bus each (Bus0 – plug X40, Bus1 – plug X41). Enter a slave address (as defined in the DP configuration) for each slave. The allowed address range reaches from 0 to 126.



Note

In the “Active” checkbox you can disable the slave.

Mode (S1/S2): DP-64

DP-64-Mode: 0: PDA 32 Integers

Output (analog / digital): 2*32(int) / 2*32

Input (analog / digital): -

GSD-Files: ibaF01n4.gsd; ibaF01n3.gsd; iba_OF01.gsd

Slave	Bus Number	Address	Active
A	0	10	<input checked="" type="checkbox"/>
B	1	20	<input checked="" type="checkbox"/>

Submit Refresh

When you click on the <Submit> button, the settings are stored on the device.

With the <Refresh> button, you can update the settings display.

13.2 Operating modes and data types

The data to be measured from the PROFIBUS is defined using the GSD data files which is used in the PROFIBUS configuration. The data types for both slaves on the device are furthermore selected over the web interface by choosing the operating mode. GSD file and operating mode must match.

In general, the following data types may be processed:

- 2 * (32 * 16 bit integer + 32 binary) in modes 0, 5, 8
- 2 * (32 bit floats + 32 binary) in modes 1, 6, 9
- 2 * (28 SIMATIC S7 Floats + 32 binaries) in modes 3, 7, B

Depending on whether you want to read data from the PROFIBUS master or write data to it or both the mode switch has to be set appropriately.

➤ For more information see chapter 9.3.4.

The transmission of data is usually managed by telegram block transmission.

Each DP slave uses one block for data transmission in each direction, i. e. an ibaBM-DP uses two blocks per direction (slave 1 and 2).

The data structure of these blocks for reception (outputs) and transmission (inputs) is shown in the following for each of the different operating modes.

Please note that the description gives examples for one slave. The description applies to the second slave as well.



Important note

When connecting a SIMATIC S5 to an ibaBM-DP (in DP-64 mode) via PROFIBUS, e. g. by an IM308C interface board, you should prevent a data format conflict. Because the REAL format of S5 does not comply with IEEE standard, the S5-data should be converted on S5-side before being transferred to the PROFIBUS interface!

In compatibility mode 32Mbit or in 32Mbit Flex mode, the data type "S5 FLOAT" is available.

13.2.1 Modes of Operation Overview

The following table gives an overview of the operating modes which are available on the device. For each mode you'll find the appropriate GSD files in the corresponding row. For more information, please refer to the following chapters.

Mode	Name	Outputs	Inputs	GSD-file	Application
0	PDA 32 Integers	2 * 32 analog (int) 2 * 32 digital	-	ibaF01n4.gsd ibaF01n3.gsd iba_0F01.gsd	ibaPDA, ibaLogic, SIMATIC S7 system coupling
1*	PDA 32 Reals	2 * 32 analog (real) 2 * 32 digital	-	iba_0F02.gsd	ibaPDA, ibaLogic, system coupling no S7* , SD
2	n/a	-	-	-	-
3	PDA 28 Reals	2 * 28 analog (real) 2 * 32 digital	-	ibaF04n4.gsd ibaF04n3.gsd iba_0F04.gsd	ibaPDA, ibaLogic, S7, system coupling
4	n/a	-	-	-	-
5	INPUT 32 Integers	(4 byte reserved)	2 * 32 analog (int) 2 * 32 digital	ibaF00n4.gsd ibaF00n3.gsd	ibaLogic, S7, system coupling
6*	INPUT 32 Reals	(4 byte reserved)	2 * 32 analog (real) 2 * 32 digital	iba_0F06.gsd	ibaLogic, system coupling no S7* , SD
7	INPUT 28 Reals	(4 byte reserved)	2 * 28 analog (real) 2 * 32 digital	ibaF07n4.gsd ibaF07n3.gsd	ibaLogic, S7, system coupling
8	IN-OUT 32 Integers	2 * 32 analog (int) 2 * 32 digital	2 * 32 analog (int) 2 * 32 digital	ibaF08n4.gsd ibaF08n3.gsd iba_0F08.gsd	ibaLogic, S7, system coupling
9*	IN-OUT 32 Reals	2 * 32 analog (real) 2 * 32 digital	2 * 32 analog (real) 2 * 32 digital	iba_0F09.gsd	ibaLogic, system coupling no S7* , SD
A	n/a	-	-	-	-
B	IN-OUT 28 Reals	2 * 28 analog (real) 2 * 32 digital	2 * 28 analog (real) 2 * 32 digital	ibaF0Bn4.gsd ibaF0Bn3.gsd	ibaLogic, S7 system coupling

* Not applicable to former CPUs SIMATIC S7 (firmware <2.0 for S7-300, firmware < 3.0 for S7-400) or SIMADYN D

**Note**

Please note that the terms "in" and "out" refer to the point of the PROFIBUS master's view, i.e. "out" means signals being transmitted from the PROFIBUS master (e. g. SIMATIC S7) to the ibaBM-DP device, "in" vice versa.

Both slaves are always used with the same mode.

The file names of the GSD files which come with our PROFIBUS products had been renamed for standardization purposes (eff. 10/2005).

If you still use the old files, please refer to the following table for reference.

New GSD file name	Old GSD file name
ibaF01n4.gsd	DPM32IO.GSD
ibaF01n3.gsd	DPL32IO.GSD
iba_0F01.gsd	L2B_32I.GSD
iba_0F02.gsd	L2B_32R.GSD
ibaF04n4.gsd	DPM28RO.GSD
ibaF04n3.gsd	DPL28RO.GSD
iba_0F04.gsd	L2B_28R4.GSD
ibaF00n4.gsd	DPM32II.GSD
ibaF00n3.gsd	DPL32II.GSD
iba_0F06.gsd	L2B32RI.GSD
ibaF07n4.gsd	DPM28RI.GSD
ibaF07n3.gsd	DPL28RI.GSD
ibaF08n4.gsd	DPM32IOI.GSD
ibaF08n3.gsd	DPL32IOI.GSD
iba_0F08.gsd	L2B32IOI.GSD
iba_0F09.gsd	L2B32ROI.GSD
ibaF0Bn4.gsd	DPM28ROI.GSD
ibaF0Bn3.gsd	DPL28ROI.GSD

**Note**

The GSD files required for the DP-64 mode can be found on the data medium "iba Software & Manuals" in the directory

02_iba_Hardware\ibaBM-DP\02_GSD_Files\02_DP64_Mode\

13.2.2 Mode 0 – PDA 32 Integers

This mode is used to read up to 32 integer values and 32 digital signals from the PRO-FIBUS (OUT 72 Bytes).

13.2.2.1 Output data

OUTPUT DATA											
Byte no.	Offset	Contents									Remark
1	0	Status									not used
2	1	Status									not used
3	2	Status									not used
4	3	Status									not used
5	4	7	6	5	4	3	2	1	0	Dig. outputs channel 0...7	
6	5	15	14	13	12	11	10	9	8	Dig. outputs channel 8...15	
7	6	23	22	21	20	19	18	17	16	Dig. outputs channel 16...23	
8	7	31	30	29	28	27	26	25	24	Dig. outputs channel 24...31	
9	8										MSB Analog output channel 0
10											LSB Integer (2 byte), Big Endian Motorola
11	10										MSB Analog output channel 1
12											LSB Integer (2 byte), Big Endian Motorola
	12										Analog outputs in total: 32 Words (16-bit integer), Big Endian Motorola
71	70										MSB Analog output channel 31
72											LSB Integer (2 byte), Big Endian Motorola

Slave data space

13.2.2.2 Input data

No inputs

13.2.2.3 GSD-File

GSD file name	Remark
ibaF01n4.gsd	Transfer in one block with SFC (S7-400)
ibaF01n3.gsd	Transfer in three blocks with SFC (S7-300)
iba_0F01.gsd	Transfer as word (S7-300/400)

13.2.2.4 Applications

- ibaPDA
- ibaLogic
- System coupling SIMATIC S7
- SIMATIC TDC
- SIMADYN D

13.2.3 Mode 1 – PDA 32 Reals

This mode is used to read up to 32 real values and 32 digital signals from the PROFIBUS (OUT 136 Bytes).

13.2.3.1 Output data

OUTPUT DATA											
Byte no.	Offset	Contents									Remark
1	0	Status									not used
2	1	Status									not used
3	2	Status									not used
4	3	Status									not used
5	4	7	6	5	4	3	2	1	0	Dig. outputs channel 0...7	
6	5	15	14	13	12	11	10	9	8	Dig. outputs channel 8...15	
7	6	23	22	21	20	19	18	17	16	Dig. outputs channel 16...23	
8	7	31	30	29	28	27	26	25	24	Dig. outputs channel 24...31	
9	8										MSB
10											Analog output channel 0
11											Real (4 byte), Big Endian Motorola
12											LSB
13	12										MSB
14											Analog output channel 1
15											Real (4 byte), Big Endian Motorola
16											LSB
	16										Analog outputs in total: 32 Longs (Real), Big Endian Motorola
133	132										MSB
134											Analog output channel 31
135											Real (4 byte), Big Endian Motorola
136											LSB

Slave data space

13.2.3.2 Input data

No inputs

13.2.3.3 GSD File

GSD file name	Remark
iba_0F02.gsd	-

13.2.3.4 Applications

- ibaPDA
- ibaLogic
- System coupling
- SIMATIC TDC
- NO SIMATIC S7 (FW < 2.0 for S7-300, FW < 3.0 for S7-400), SIMADYN D

13.2.4 Mode 3 – PDA 28 Reals

This mode is used to read up to 28 real values and 32 digital signals from the PROFIBUS (OUT 120 Bytes) from a SIMATIC S7 as PROFIBUS master. Due to limitations of the S7 real data type only 28 values can be used.

13.2.4.1 Output data

OUTPUT DATA										
Byte no.	Offset	Contents								Remark
1	0	Status								not used
2	1	Status								not used
3	2	Status								not used
4	3	Status								not used
5	4	7	6	5	4	3	2	1	0	Dig. outputs channel 0...7
6	5	15	14	13	12	11	10	9	8	Dig. outputs channel 8...15
7	6	23	22	21	20	19	18	17	16	Dig. outputs channel 16...23
8	7	31	30	29	28	27	26	25	24	Dig. outputs channel 24...31
9	8									MSB
10										
11										Analog output channel 0
12										Real (4 byte), Big Endian Motorola
13										LSB
14	12									MSB
15										
16										Analog output channel 1
										Real (4 byte), Big Endian Motorola
										LSB
	16									
										Analog outputs in total:
										28 Longs (Real), Big Endian Motorola
117	116									MSB
118										
119										Analog output channel 27
120										Real (4 byte), Big Endian Motorola
										LSB

Slave data space

13.2.4.2 Input data

No inputs

13.2.4.3 GSD File

GSD file name	Remark
ibaF04n4.gsd	Transfer in one block with SFC (S7-400)
ibaF04n3.gsd	Transfer in four blocks with SFC (S7-300)
iba_0F04.gsd	Transfer as double word (S7-300/400)

13.2.4.4 Applications

- ibaPDA
- ibaLogic
- System coupling
- SIMATIC S7
- SIMATIC TDC
- SIMADYN D

13.2.5 Mode 5 – INPUT 32 Integers

This mode is used to write up to 32 integer values and 32 digital signals to the PROFIBUS (IN 72 Bytes/OUT 4 Bytes).

13.2.5.1 Output data

OUTPUT DATA			
Byte no.	Offset	Contents	Remark
1	0	Status	not used
2	1	Status	not used
3	2	Status	not used
4	3	Status	not used

13.2.5.2 Input data

INPUT DATA			
Byte no.	Offset	Contents	Remark
1	0	FO message counter-A	incremented by each new FO message
2	1	FO reception status	Bit 7: FO reception OK; Bit 3: 0 = integer, 1 = real
3	2	7 6 5 4 3 2 1 0	Dig. inputs channel 0...7
4	3	15 14 13 12 11 10 9 8	Dig. inputs channel 8...15
5	4	23 22 21 20 19 18 17 16	Dig. inputs channel 16...23
6	5	31 30 29 28 27 26 25 24	Dig. inputs channel 24...31
7	6		MSB Analog input channel 0
8			LSB Integer (2 byte), Big Endian Motorola
9	8		MSB Analog input channel 1
10			LSB Integer (2 byte), Big Endian Motorola
	12		Analog inputs in total: 32 Words (16-bit integer), Big Endian Motorola
69	68		MSB Analog input channel 31
70			LSB Integer (2 byte), Big Endian Motorola
71	70	Device-ID of FO transmitter	see list of iba device-IDs
72	71	FO message counter-B	incremented by each new FO message



13.2.5.3 GSD File

GSD file name	Remark
ibaF00n4.gsd	Transfer in one block with SFC (S7-400)
ibaF00n3.gsd	Transfer in three blocks with SFC (S7-300)

13.2.5.4 Applications

- ibaLogic
- System coupling
- SIMATIC S7
- SIMATIC TDC
- SIMADYN D

13.2.6 Mode 6 – INPUT 32 Reals

This mode is used to write up to 32 real values and 32 digital signals to the PROFIBUS (IN 136 Bytes/OUT 4 Bytes).

13.2.6.1 Output data

OUTPUT DATA			
Byte no.	Offset	Contents	Remark
1	0	Status	not used
2	1	Status	not used
3	2	Status	not used
4	3	Status	not used

13.2.6.2 Input data

INPUT DATA			
Byte no.	Offset	Contents	Remark
1	0	FO message counter-A	incremented by each new FO message
2	1	FO reception status	Bit 7: FO reception OK; Bit 3: 0 = integer, 1 = real
3	2	7 6 5 4 3 2 1 0	Dig. inputs channel 0...7
4	3	15 14 13 12 11 10 9 8	Dig. inputs channel 8...15
5	4	23 22 21 20 19 18 17 16	Dig. inputs channel 16...23
6	5	31 30 29 28 27 26 25 24	Dig. inputs channel 24...31
7	6	MSB	Analog input channel 0 Real (4 byte), Big Endian Motorola
8			
9			
10		LSB	
11	10	MSB	Analog input channel 1 Real (4 byte), Big Endian Motorola
12			
13			
14		LSB	
	14		Analog inputs in total: 32 Longs (Real), Big Endian Motorola
131	130	MSB	Analog input channel 31 Real (4 byte), Big Endian Motorola
		LSB	
135	134	Device-ID of FO transmitter	see list of iba device-IDs
136	135	FO message counter-B	incremented by each new FO message

13.2.6.3 GSD File

GSD File name	Remark
iba_0F06.gsd	-

13.2.6.4 Applications

- ibaLogic
- System coupling
- SIMATIC TDC
- NO SIMATIC S7 (FW < 2.0 for S7-300, FW < 3.0 for S7-400), SIMADYN D

13.2.7 Mode 7 – INPUT 28 Reals

This mode is used to write up to 28 real values and 32 digital signals to a SIMATIC S7 (resp. TDC, SD) as PROFIBUS master. Due to limitations of the SIMATIC real data type only 28 values can be used (IN 122 Bytes/OUT 4 Bytes).

13.2.7.1 Output data

OUTPUT DATA			
Byte no.	Offset	Contents	Remark
1	0	Status	not used
2	1	Status	not used
3	2	Status	not used
4	3	Status	not used

13.2.7.2 Input data

INPUT DATA			
Byte no.	Offset	Contents	Remark
1	0	FO message counter-A	incremented by each new FO message
2	1	FO reception status	Bit 7: FO reception OK; Bit 3: 0 = integer, 1 = real
3	2	reserved	
4		reserved	
5	4	7 6 5 4 3 2 1 0	Dig. inputs channel 0...7
6	5	15 14 13 12 11 10 9 8	Dig. inputs channel 8...15
7	6	23 22 21 20 19 18 17 16	Dig. inputs channel 16...23
8	7	31 30 29 28 27 26 25 24	Dig. inputs channel 24...31
9	8	MSB	Analog input channel 0 Real (4 byte), Big Endian Motorola
10			
11			
12		LSB	
13	12	MSB	Analog input channel 1 Real (4 byte), Big Endian Motorola
14			
15			
16		LSB	
	16		Analog inputs in total: 28 Longs (Real), Big Endian Motorola
117	116	MSB	Analog input channel 27 Real (4 byte), Big Endian Motorola
		LSB	
121	120	Device-ID of FO transmitter	see list of iba device-IDs
122	121	FO message counter-B	incremented by each new FO message

Slave data space

13.2.7.3 GSD File

GSD file name	Remark
ibaF07n4.gsd	Transfer in one block with SFC (S7-400)
ibaF07n3.gsd	Transfer in four blocks with SFC (S7-300)

13.2.7.4 Applications

- ibaLogic
- System coupling
- SIMATIC S7
- SIMATIC TDC
- SIMADYN D

13.2.8 Mode 8 – IN-OUT 32 Integers

This mode is used to read / write up to 32 integer values and 32 digital signals from / to a PROFIBUS master (IN 72 Bytes / OUT 72 Bytes).

13.2.8.1 Output data

OUTPUT DATA			
Byte no.	Offset	Contents	Remark
1	0	Status	not used, fill with zero
2	1	Status	not used, fill with zero
3	2	7 6 5 4 3 2 1 0	Dig. outputs channel 0...7
4	3	15 14 13 12 11 10 9 8	Dig. outputs channel 8...15
5	4	23 22 21 20 19 18 17 16	Dig. outputs channel 16...23
6	5	31 30 29 28 27 26 25 24	Dig. outputs channel 24...31
7	6		MSB Analog output channel 0
8			LSB Integer (2 byte), Big Endian Motorola
9	8		MSB Analog output channel 1
10			LSB Integer (2 byte), Big Endian Motorola
	10		Analog outputs in total: 32 Words (16-bit integer), Big Endian Motorola
69	68		MSB Analog output channel 31
70			LSB Integer (2 byte), Big Endian Motorola
71	70	Status	customized functions possible (e.g. status, watchdog etc.)
72		Status	

13.2.8.2 Input data

INPUT DATA			
Byte no.	Offset	Contents	Remark
1	0	FO message counter-A	incremented by each new FO message
2	1	FO reception status	Bit 7: FO reception OK; Bit 3: 0 = integer, 1 = real
3	2	7 6 5 4 3 2 1 0	Dig. inputs channel 0...7
4	3	15 14 13 12 11 10 9 8	Dig. inputs channel 8...15
5	4	23 22 21 20 19 18 17 16	Dig. inputs channel 16...23
6	5	31 30 29 28 27 26 25 24	Dig. inputs channel 24...31
7	6		MSB Analog input channel 0
8			LSB Integer (2 byte), Big Endian Motorola
9	8		MSB Analog input channel 1
10			LSB Integer (2 byte), Big Endian Motorola
	12		Analog inputs in total: 32 Words (16-bit integer), Big Endian Motorola
69	68		MSB Analog input channel 31
70			LSB Integer (2 byte), Big Endian Motorola
71	70	Device-ID of FO transmitter	see list of iba device-IDs
72	71	FO message counter-B	incremented by each new FO message

13.2.8.3 GSD File

GSD file name	Remark
ibaF08n4.gsd	Transfer in one block with SFC (S7-400)
ibaF08n3.gsd	Transfer in three blocks with SFC (S7-300) with SFC (S7-300)
iba_0F08.gsd	Transfer as Word (S7-300/400)

13.2.8.4 Applications

- ibaLogic
- System coupling
- SIMATIC S7
- SIMATIC TDC
- SIMADYN D

13.2.9 Mode 9 – IN-OUT 32 Reals

This mode is used to read / write up to 32 real values and 32 digital signals from/to a PROFIBUS master (IN 136 Bytes/OUT 136 Bytes).

13.2.9.1 Output data

OUTPUT DATA										
Byte no.	Offset	Contents								Remark
1	0	not used								
2		not used								
3	2	7	6	5	4	3	2	1	0	Dig. outputs channel 0...7
4	3	15	14	13	12	11	10	9	8	Dig. outputs channel 8...15
5	4	23	22	21	20	19	18	17	16	Dig. outputs channel 16...23
6	5	31	30	29	28	27	26	25	24	Dig. outputs channel 24...31
7	6	MSB								Analog output channel 0 Real (4 byte), Big Endian Motorola
8										
9										
10		LSB								
11	10	MSB								Analog output channel 1 Real (4 byte), Big Endian Motorola
12										
13										
14		LSB								
	14									Analog outputs in total: 32 Longs (Real), Big Endian Motorola
131	130	MSB								Analog output channel 31 Real (4 byte), Big Endian Motorola
		LSB								
135	134	not used								customized functions possible (e.g. status, watchdog etc.)
136	135	not used								

Slave data space

13.2.9.2 Input data

INPUT DATA											
Byte no.	Offset	Contents									Remark
1	0	FO message counter-A									incremented by each new FO message
2	1	FO reception status									Bit 7: FO reception OK; Bit 3: 0 = integer, 1 = real
3	2	7	6	5	4	3	2	1	0	Dig. inputs channel 0...7	
4	3	15	14	13	12	11	10	9	8	Dig. inputs channel 8...15	
5	4	23	22	21	20	19	18	17	16	Dig. inputs channel 16...23	
6	5	31	30	29	28	27	26	25	24	Dig. inputs channel 24...31	
7	6	MSB									Analog input channel 0 Real (4 byte), Big Endian Motorola
8											
9											
10		LSB									
11	10	MSB									Analog input channel 1 Real (4 byte), Big Endian Motorola
12											
13											
14		LSB									
	14										Analog inputs in total: 32 Longs (Real), Big Endian Motorola
131	130	MSB									Analog input channel 31 Real (4 byte), Big Endian Motorola
		LSB									
135	134	Device-ID of FO transmitter									see list of iba device-IDs
136	135	FO message counter-B									incremented by each new FO message

Slave data space

13.2.9.3 GSD File

GSD file name	Remark
iba_0F09.gsd	-

13.2.9.4 Applications

- ibaLogic
- System coupling
- SIMATIC TDC
- No SIMATIC S7 (FW < 2.0 for S7-300, FW < 3.0 for S7-400), SIMADYN D

13.2.10 Mode B – IN-OUT 28 Reals

This mode is used to read / write up to 28 real values and 32 digital signals from / to a SIMATIC S7 (resp. TDC, SD) as PROFIBUS master. Due to limitations of the SIMATIC real data type only 28 values can be used (IN 122 Bytes/OUT 122 Bytes).

13.2.10.1 Output data

OUTPUT DATA			
Byte no.	Offset	Contents	Remark
1	0	not used	
2	1	not used	
3	2	not used	
4	3	not used	
5	4	7 6 5 4 3 2 1 0	Dig. outputs channel 0...7
6	5	15 14 13 12 11 10 9 8	Dig. outputs channel 8...15
7	6	23 22 21 20 19 18 17 16	Dig. outputs channel 16...23
8	7	31 30 29 28 27 26 25 24	Dig. outputs channel 24...31
9	8	MSB	Analog output channel 0 Real (4 byte), Big Endian Motorola
10			
11			
12		LSB	
	12		Analog outputs in total: 28 Longs (Real), Big Endian Motorola
117	116	MSB	Analog output channel 27 Real (4 byte), Big Endian Motorola
118			
119			
120		LSB	
121	120	not used	customized functions possible (e.g. status, watchdog etc.)
122	121	not used	



13.2.10.2 Input data

INPUT DATA			
Byte no.	Offset	Contents	Remark
1	0	FO message counter-A	incremented by each new FO message
2	1	FO reception status	Bit 7: FO reception OK; Bit 3: 0 = integer, 1 = real
3	2	reserved	
4		reserved	
5	4	7 6 5 4 3 2 1 0	Dig. inputs channel 0...7
6	5	15 14 13 12 11 10 9 8	Dig. inputs channel 8...15
7	6	23 22 21 20 19 18 17 16	Dig. inputs channel 16...23
8	7	31 30 29 28 27 26 25 24	Dig. inputs channel 24...31
9	8	MSB	Analog input channel 0 Real (4 byte), Big Endian Motorola
10			
11			
12		LSB	
	12		Analog inputs in total: 28 Longs (Real), Big Endian Motorola
117	116	MSB	Analog input channel 27 Real (4 byte), Big Endian Motorola
		LSB	
121	120	Device-ID of FO transmitter	see list of iba device-IDs
122	121	FO message counter-B	incremented by each new FO message



13.2.10.3 GSD File

GSD file name	Remark
ibaF0Bn4.gsd	Transfer in one block with SFC (S7-400)
ibaF0Bn3.gsd	Transfer in four blocks with SFC (S7-300)

13.2.10.4 Applications

- ibaLogic
- System coupling
- SIMATIC S7
- SIMATIC TDC
- SIMADYN D

13.3 Application notes

1. Install or copy the appropriate GSD file(s) on the PROFIBUS master. The choice of GSD file depends on the mode to be used.
 - For more information see chapter 13.1.
2. By means of the master configuration program register the GSD file(s) in order to assign the ibaBM-DP slaves.
3. Connect the ibaBM-DP physically with the DP line.

CAUTION

Connecting the PROFIBUS cable

The PROFIBUS cable should be connected after proper completion of the active slave configuration in the web interface or ibaPDA only to ensure that the slave numbers do not exist twice. A conflict due to slaves with the same number can lead to a breakdown of the PROFIBUS communication and finally to a complete downtime of the system.

4. Activate application-specific transfer programs in the master (PLC).
5. Connect the fiber optical links of the ibaBM-DP with another iba-sytem, e. g. ibaPDA, ibaLogic etc.

13.4 Applications with SIMATIC S7

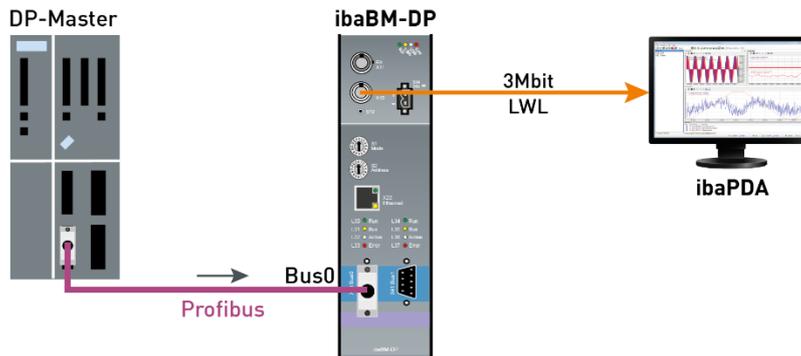
In the following sections you will find a description of 2 very simple applications for uni-directional and bidirectional communication with ibaBM-DP in compatibility mode 3Mbit which show the principles in configuration and engineering.

The following remarks concerning applications with SIMATIC S7 basically apply also to SIMATIC TDC and SIMADYN D accordingly.

13.4.1 The first Test

13.4.1.1 SIMATIC S7 Application unidirectional (S7-300)

An analog value (e.g. a temperature scaled with FC105 from S7 standard library) is to be transferred as a REAL variable from S7-PLC to ibaBM-DP and acquired with ibaPDA.



Connection between ibaBM-DP and ibaPDA

Step 1: FO connecting and cabling

Because ibaPDA is a passive application and thus only reads data from the PROFIBUS, the modes 0, 1 and 3 are available.

1. Connect the fiber optical transmitting link (TX) on the ibaBM-DP with a receiving link on the FOB card in the ibaPDA-PC.
2. Start the ibaPDA software and define a module "ibaBM-DP-64" in the I/O Manager of ibaPDA.
3. In the ibaPDA I/O Manager, mark the corresponding link under the FOB card in the signal tree.

Without being connected to the PROFIBUS line, the ibaBM-DP should send valid telegrams to ibaPDA. Using the diagnostics of ibaPDA you should be able to watch the telegram counter running.

As soon as the connection between the DP master and both slaves of ibaBM-DP has been established the "Bus" LED should light yellow and the "Active" LED white.

Step 2: GSD file installation and hardware configuration

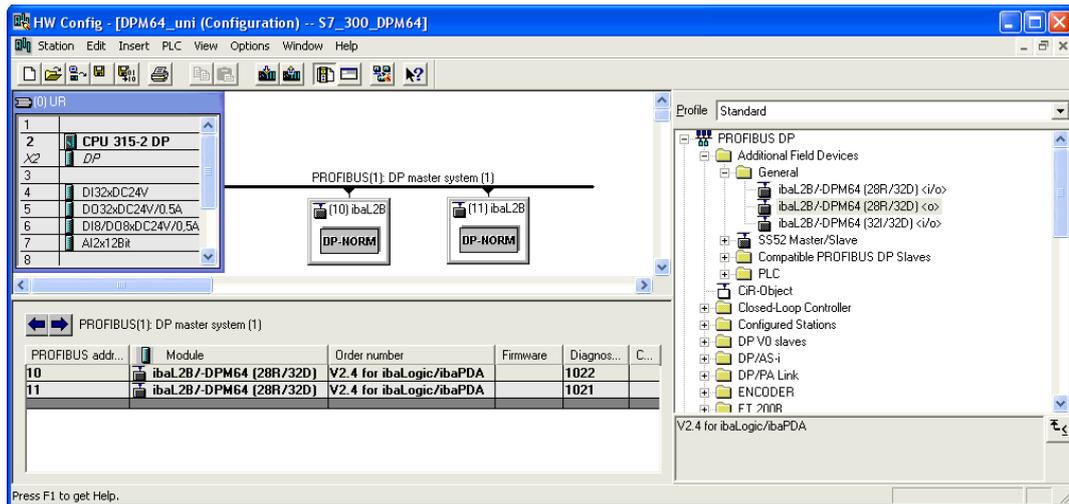
1. Start the "HW Config" tool in the current S7 project and install the GSD file named "ibaF04n3.gsd".
2. In the web interface of the ibaBM-DP, set the operating mode to mode 3 (PDA 28 Reals).
3. Open the "PROFIBUS DP" folder in the hardware catalog of "HW Config".
4. Connect an ibaDPM64 module with the PROFIBUS line per drag & drop and set an DP address (in the example 10) for this module.



Important note

The same address has to be set in the web interface of ibaBM-DP!

5. If you want to use both slaves in ibaBM-DP, connect another module to the PROFIBUS line and assign the other address configured in the web interface of the device to this module in the "HW Config" program.



PLC S7 hardware configuration user interface HW Config

Step 3: Connecting DP

1. Connect the left DP interface on ibaBM-DP with the DP interface of your S7 PLC.
2. Activate the DP termination in the PROFIBUS connector if the device is the last in the DP line.
3. Download the system data to S7-PLC with HW Config and start the PLC.
As soon as the connection between the DP master and the slave(s) has been established via the PROFIBUS line the “Bus“ LED should light yellow and the “Active” LED white.

Step 4: S7 test program

1. Generate a DB11 (or any free DB number) in your S7 project.

Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+0.0	status	ARRAY[0..3]	B#16#0	4 byte status information
+1.0		BYTE		
+4.0	digital_signal	ARRAY[0..3]	B#16#0	32 binary signals (4 byte)
+1.0		BYTE		
+8.0	analog_value	ARRAY[0..27]	0.000000e+00	28 real values (e.g. scaled analog values)
+4.0		REAL		
=120.0		END_STRUCT		

DB11 contains 120 byte data for DPM64

2. Define the local variables and call up FC105 and SFC15 (both blocks from S7 standard library) in OB1 or any other FC.
The scaled temperature (0.0 - 700.0 °C) is saved as a REAL value in DB 11.DBD8 (the first memory range for analog signals)!

```

OBI : "Main Program Sweep (Cycle)"
Network 1: static "0"- and static "1"- flag
    A   M   0.0
    R   M   0.0
    AN  M   0.1
    S   M   0.1

Network 2: reading in and scaling the temperature (from PIW 304)

CALL FC 105
IN   :=PIW304           //temperature (0-32767)
HI_LIM :=7.000000e+002
LO_LIM :=0.000000e+000
BIPOLAR:=MO.0          //static "0" -flag
RET_VAL:=#error_code_fc105
OUT   :=DB11.DBD8      //temperature (0-700 °C)

Network 3: DPM 64 connection (ibaPDA)

CALL SFC 15
LADDR :=W#16#200       //peripheral output- address (PQM) 512
RECORD :=P#DB11.DBX0.0 BYTE 32 //starting address of data source length of data block (32 byte)
RET_VAL:=#error_code_sfc15 //error code
NOP 0
    
```

Example how to transfer a consistent range of 32 byte from S7 PLC (DB11) to ibaBM-DP using SFC15

- In your program you have to adjust the peripheral output address in network 3 (LADDR-parameter) with the DP output addresses in the HW configuration (column Q Address).

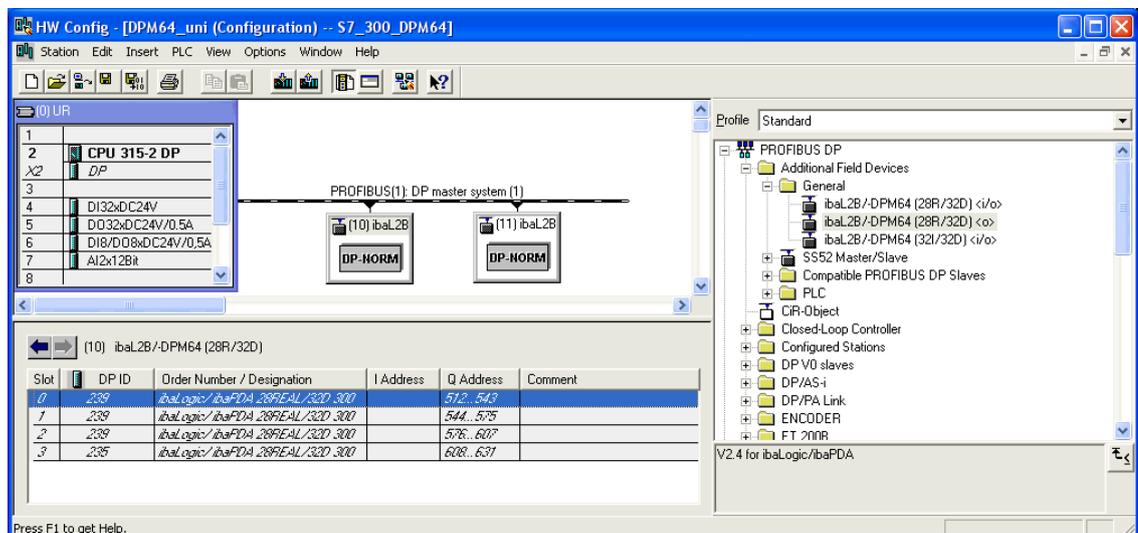


Note

Do not forget the offset of the data set in the PROFIBUS message.

Example: In order to address the first analog value in mode 3, please consider an offset of 8 Bytes / 4 Words.

➤ For more information see chapter 13.2.4.1 „Output data “.



PLC S7 hardware configuration, PROFIBUS slave address space

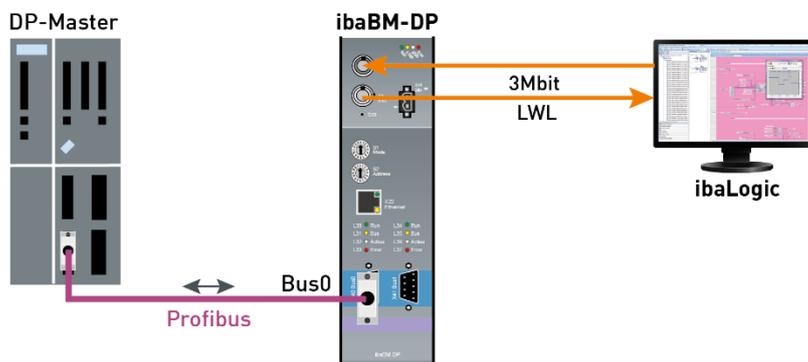
- Now, download all modified blocks to PLC.

Step 5: ibaPDA setup and test

1. In step 1 you should have already defined one module “ibaBM-DP-64” in the I/O Manager of ibaPDA.
2. In the signal tables of the module in ibaPDA, activate (check) the analog and digital channels of the module(s) and enter signal names and comments if required.
3. Start measurement by click on the green <GO> button.
4. Drag & drop the signals from the signal tree into the signal view.
5. If all connections are done and if the S7 PLC sends data via the PROFIBUS then signal curves should appear in the trend graphs of the ibaPDA client. If the signals are not displayed properly, please use the “auto scale” option in the context menu after right clicking in the strip.

13.4.1.2 SIMATIC S7 and ibaLogic Application bidirectional (S7-300)

A temperature signal is to be transferred from S7-PLC to ibaLogic and a generator signal is to be transferred from ibaLogic to S7-PLC.



Step 1: FO connecting and cabling

Because the data are to be transmitted in two directions, the bidirectional modes 8, 9 and B are available.

1. Take a duplex fiber optic cable and connect the transmitting link (TX) on ibaBM-DP with a receiving link of der ibaFOB-io or ibaFOB-4i card of the ibaLogic system. Connect the receiving link (RX) on ibaBM-DP with a transmitting link of the ibaFOB-io or ibaFOB-4o card.

Step 2: GSD installation and hardware configuration

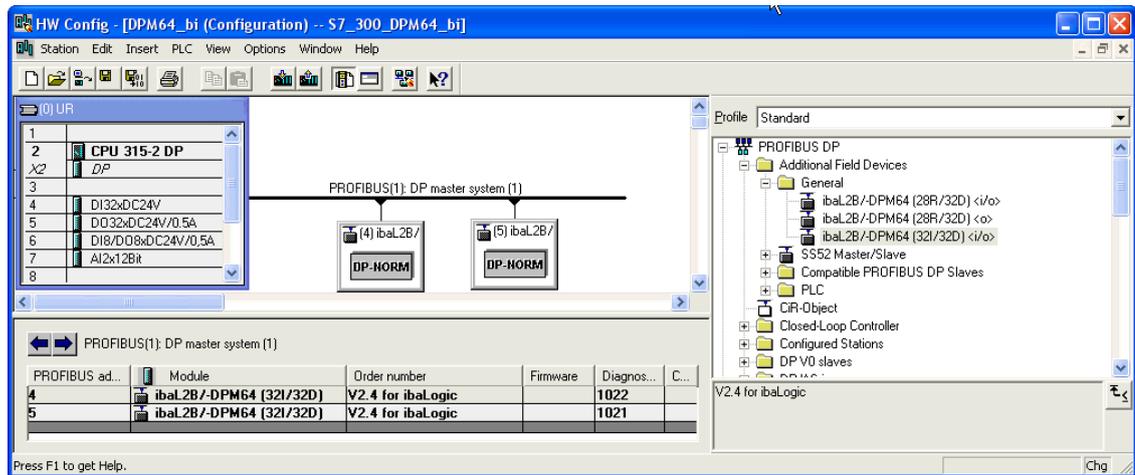
1. Start the “HW Config” tool in the current S7 project and install the GSD file with name ibaF08n3.gsd
- For more information see chapter „Modes of Operation Overview“, chapter 13.2.1
2. In the web interface of ibaBM-DP set the operating mode to mode 8.
3. Open the “PROFIBUS DP” folder in the hardware catalog of “HW Config”.
4. Connect an DPM64 module with the PROFIBUS line by drag & drop and set a DP address for this module (in this example 4).



Important note

The same address has to be set in the web interface on ibaBM-DP.

- If you want to use both slaves on ibaBM-DP connect another module with the PROFIBUS line and assign in HW Config the other DP address set in the web interface.



PLC S7 hardware configuration for bidirectional DP communication

Step 3: Connecting DP

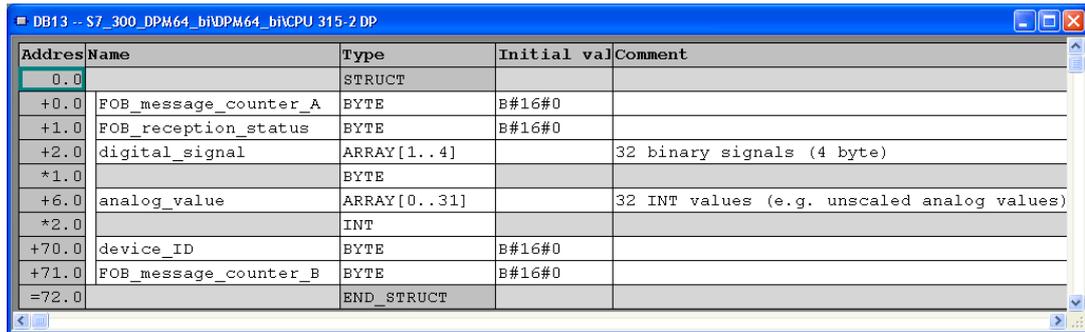
- Connect the left DP interface on ibaBM-DP with the DP interface of your S7-PLC.
- Activate the DP termination in the PROFIBUS connector if the device is the last one in the DP line.
- Download the system data to the S7-PLC with HW Config and start the PLC.
As soon as the connection between the DP master and the slave(s) has been established via the PROFIBUS line the “Bus” LED should light yellow and the “Active” LED white.

Step 4: S7-test program

- Generate a SEND-DB12 (or any free DB number) in your S7 project.

Address	Name	Type	Initial val	Comment
0.0		STRUCT		
+0.0	status_1	ARRAY [0..1]	B#16#0	2 byte status information
*1.0		BYTE		
+2.0	digital_signal	ARRAY [0..3]		32 binary signals (4 byte)
*1.0		BYTE		
+6.0	analog_value	ARRAY [0..31]		32 INT values (e.g. unscaled analog values)
*2.0		INT		
+70.0	status_2	ARRAY [0..1]	B#16#0	2 byte status information
*1.0		BYTE		
=72.0		END_STRUCT		

2. Generate a RECEIVE-DB13 (or any free DB number) in your S7 project.



Address	Name	Type	Initial val	Comment
0.0		STRUCT		
+0.0	FOB_message_counter_A	BYTE	B#16#0	
+1.0	FOB_reception_status	BYTE	B#16#0	
+2.0	digital_signal	ARRAY[1..4]		32 binary signals (4 byte)
*1.0		BYTE		
+6.0	analog_value	ARRAY[0..31]		32 INT values (e.g. unscaled analog values)
*2.0		INT		
+70.0	device_ID	BYTE	B#16#0	
+71.0	FOB_message_counter_B	BYTE	B#16#0	
=72.0		END_STRUCT		

3. Enter the content of OB1. Define the local variables and call up SFC14 (DP receive) and SFC15 (DP send), both blocks from S7 standard library, in OB1 or any other FC. The unscaled temperature (0 - 32767) is saved as an INT value in DB12.DBW6 (in the first memory range for analog signals) and is to be transferred to ibaLogic!

```

OB1 : "Main Program Sweep (Cycle)"
Network 1: static "0"- and static "1"- flag
    A   M      0.0
    R   M      0.0
    AN  M      0.1
    S   M      0.1

Network 2: copy send data to send- DB
    L   PIW  304           //e.g. unscaled temperature value (0-32767)
    T   DB12.DBW  6       //save to send- DB (1. analog value in the OUTPUT block; DPM mode 8)

Network 3: DPM 64 SEND- connection (to ibaLogic)
    CALL SFC  15
    LADDR :=W#16#100      //peripheral output- address (PQW) 256
    RECORD :=P#DB12.DBX0.0 BYTE 32 //starting address of data source; length of data block 32 byte
    RET_VAL:=#error_code_sfc15 //error code
    NOP  0

Network 4: DPM 64 RECEIVE- connection (from ibaLogic)
    CALL SFC  14
    LADDR :=W#16#100      //peripheral input- address (PIW) 256
    RET_VAL:=#error_code_sfc14 //error code
    RECORD :=P#DB13.DBX0.0 BYTE 32 //starting address of data destination; length of data block 32 byte

Network 5: read out from receive- DB and process received data
    L   DB13.DBW  6       //load INT- variable from receive- DB (1. analog value in the INPUT block; DPM m
    L   2500              //load a limit
    >I              //compare greater than
    =   M      30.0      //assign the result to a flag

```

Example for transfer of 32 bytes transmitting (DB12, SFC15) and receiving data (DB13, SFC14) in S7-PLC

4. In your program you have to adjust the peripheral input/output address in network 3 and 4 (LADDR- parameter) with the DP input/output addresses in the HW-configuration (column I-/ Q- Address).

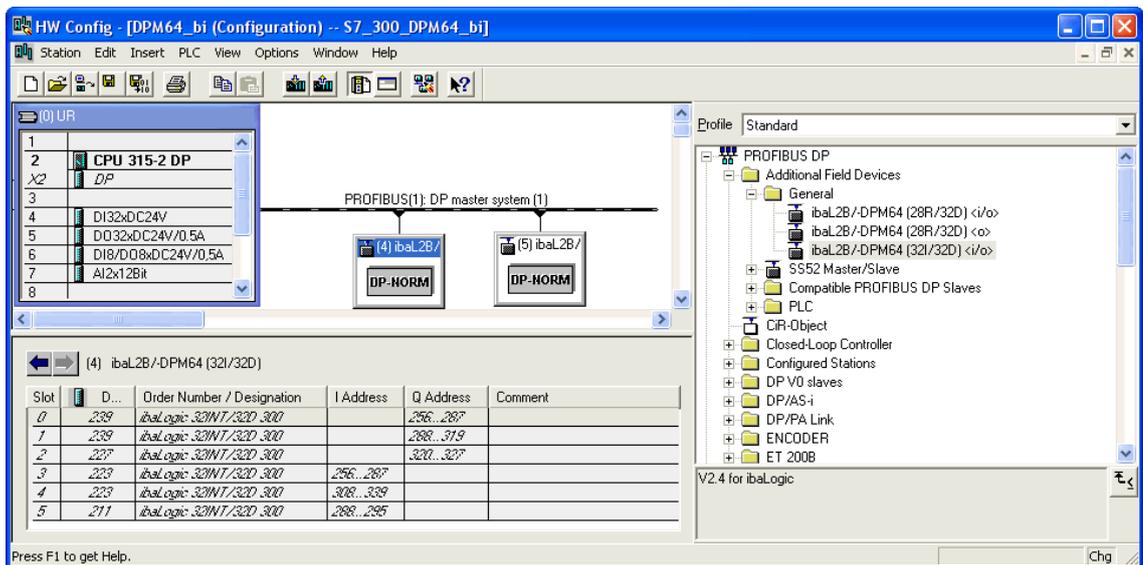


Note

Do not forget the offset of the data set in the PROFIBUS message.

Example: To address the first analog value in mode 8, please consider an offset of 6 Bytes / 3 Words. (See tables in section 13.2.8)

- ➔ For more information, see chapter 13.2.1.



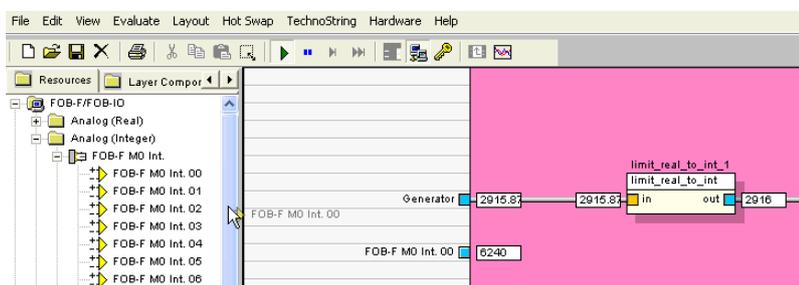
PLC S7 hardware configuration, PROFIBUS slave I/O address space

In this example the addresses PIW 256 and PQW 256 are displayed in HW Config. For S7-300, 3 ranges (2 with 32 bytes and 1 with 8 bytes) are automatically created per slave. The maximum size of transfer data with SFC14 and SFC15 to any DP device is limited to 32 bytes (only for S7-300). That means, if you want to transfer the complete block of 72 bytes, you have to call up the DP-SFCs three times in your S7 program.

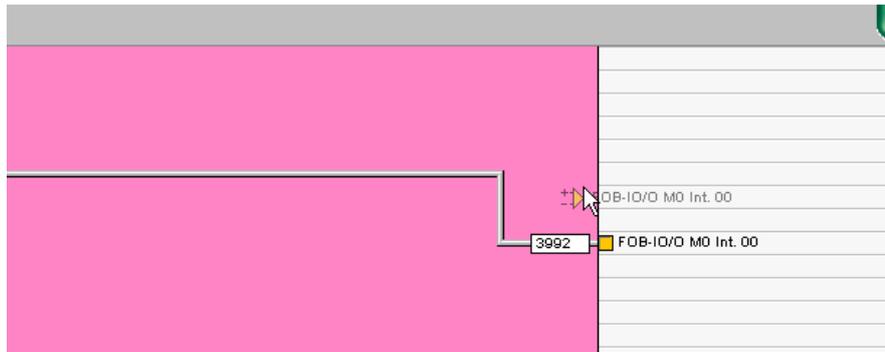
- Now, download all modified and new blocks (incl. the DBs!) to PLC.

Step 5: ibaLogic test program

- Start ibaLogic and create a new test-layout. Activate the ibaFOB-i/o or ibaFOB-4i/4o card in the system settings.
- Received data from S7
To display the received data (temperature value) from S7-PLC, you have to position the input resource from the 1st analog INT-value



- Transmit data to S7
To create a signal in ibaLogic, you can use the generator (input resource). To transmit data from ibaLogic to the S7-PLC you have to position the output resource from the 1st analog INT-value! Don't forget to connect generator with the output resource. (The converter is inserted automatically.)



4. Start the SIMATIC-Manager, enter a new variable table and display the transmitted generator signal (DB13.DBW6) in INT format.

13.4.2 Reloading S7 Application Data from/to DP Master

When assigning the slaves in the master system several data blocks are defined in the peripheral address space at the same time. The block-wise reloading of data is used to reach a higher security and a better detection of short-term failures.

To reload the data from or to the periphery the use of SFC14 and SFC15 is recommended.

When dealing with the S7-300 family more than one call of SFC14/SFC15 is required because the data block length is limited to 32 Bytes. When working with the S7-400 family, 122 Bytes are available per data block. This is the reason why you find different GSD files on the data medium.

13.4.3 DP Faults with S7 Master may cause Zeros in Data

Please note that slave data can be overwritten with zeros in case of a DP slave failure.

Such failures can lead to zeros or no values in the data flow, even for a few milliseconds. In real time automation systems this effect may cause failures of the entire system which are hard to examine.

Concerning incoming data (master's view), there are some possibilities using the DP monitoring functions of the S7-system, such as alert function blocks.

When it comes to outgoing data the receiving systems, which are connected to the PROFIBUS via ibaBM-DP and interface boards like ibaLink-VME or ibaLink-SM-64-io, can only read 32 analog and 32 digital data per slave (= module in ibaPDA) from the iba interface cards.

On that end even the breakdown of the entire DP line cannot be detected. In case of a PROFIBUS failure the most recent signal values remain.



Note

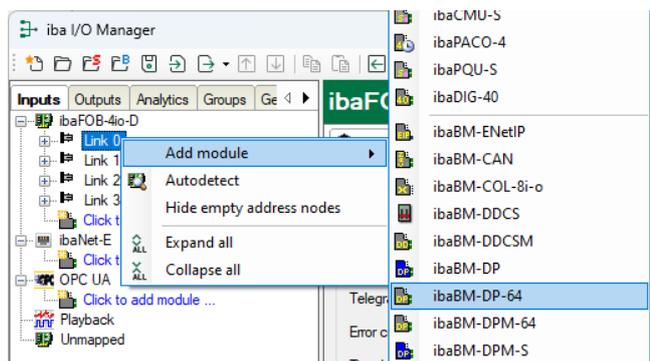
There is a way to realize corresponding indications by using the data set. For example a digital channel of this data set can serve as a "hot wire". The master should hold this digital value always on TRUE (= 1) as long as the PROFIBUS works properly. In case of a short DP failure the master will write zero to all outgoing data for a short time, including the digital monitoring signal. When the receiving system reads a FALSE (= 0) on the digital channel it is clear that all other values are not valid and therefore should not be taken into account.

Other methods may be engineered as well by means of the data set. Particularly a dynamic life sign, i. e. a toggling digital signal, from the master is recommended.

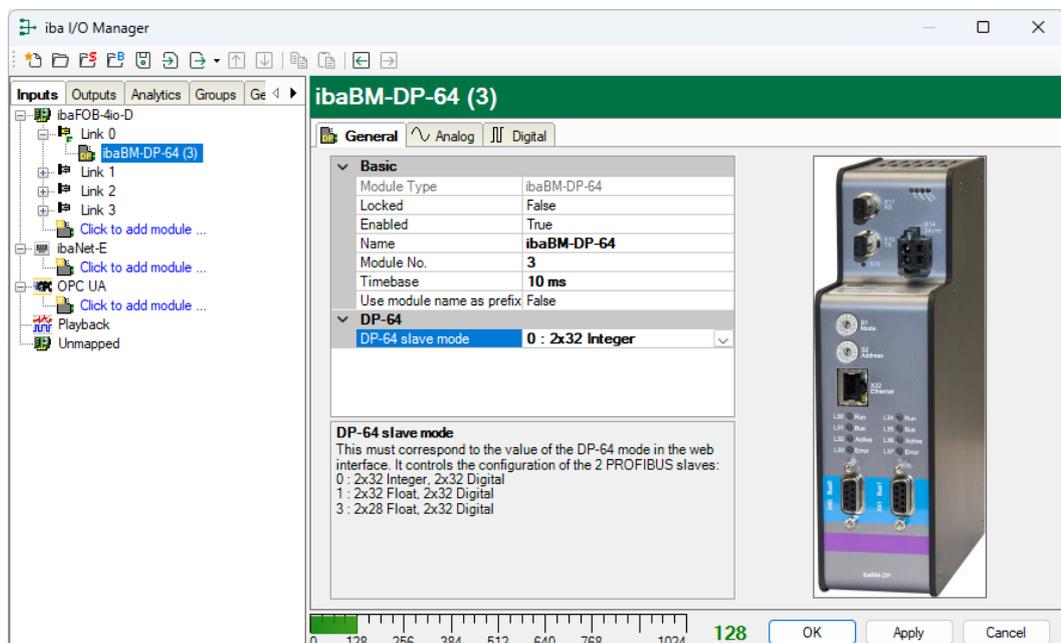
13.5 Configuration with ibaPDA

The following description refers to ibaPDA version 6.32.0 or higher. If older ibaPDA versions are use, please see chapter 13.5.1.

1. On the left-hand side in the I/O Manager, choose the desired ibaFOB-D card and mark the link, ibaBM-DP is connected to.
2. Click with the right mouse button on the link and select "Autodetect". The device set to compatibility mode 3Mbit (rotary switch S1 = 0 and S2 = 0) is identified automatically and shown as ibaBM-DP-64 in the signal tree.
3. Optionally, you can also add the device manually. In this case select "Add module - ibaBM-DP-64" in the context menu.

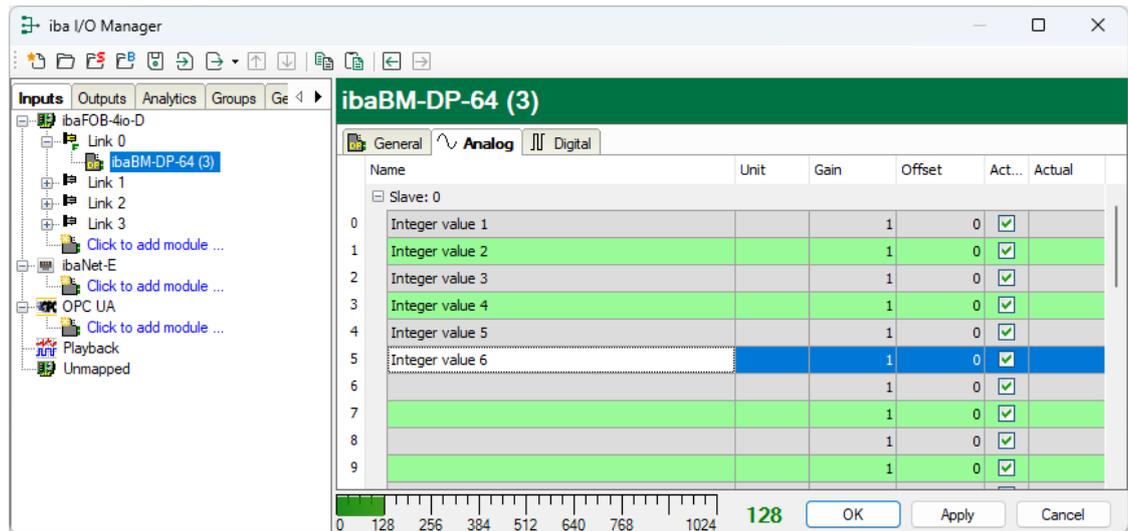


4. Select the operating mode in the "General" tab in the field "DP-64". The mode set in ibaPDA must correspond with the mode in the web interface.



5. Enter the analog signals you want to record in sequential order in the "Analog" tab. Enter a name for each signal (column "Name") and optionally the physical unit in the column "Unit". If necessary, enter values in the columns "Gain" and "Offset" for all

signals.

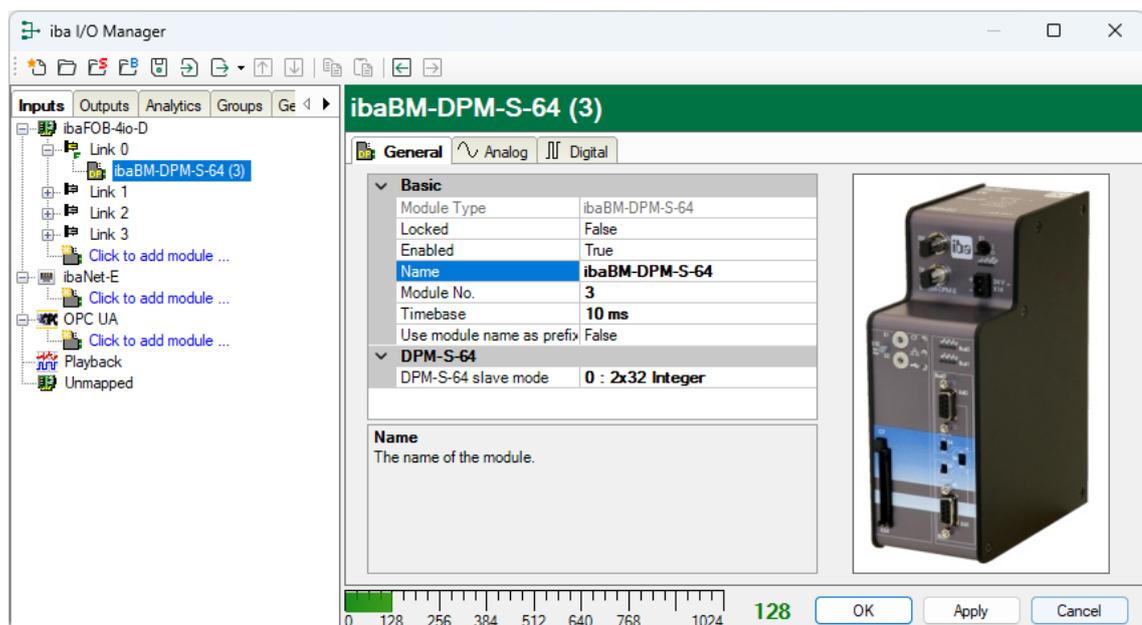


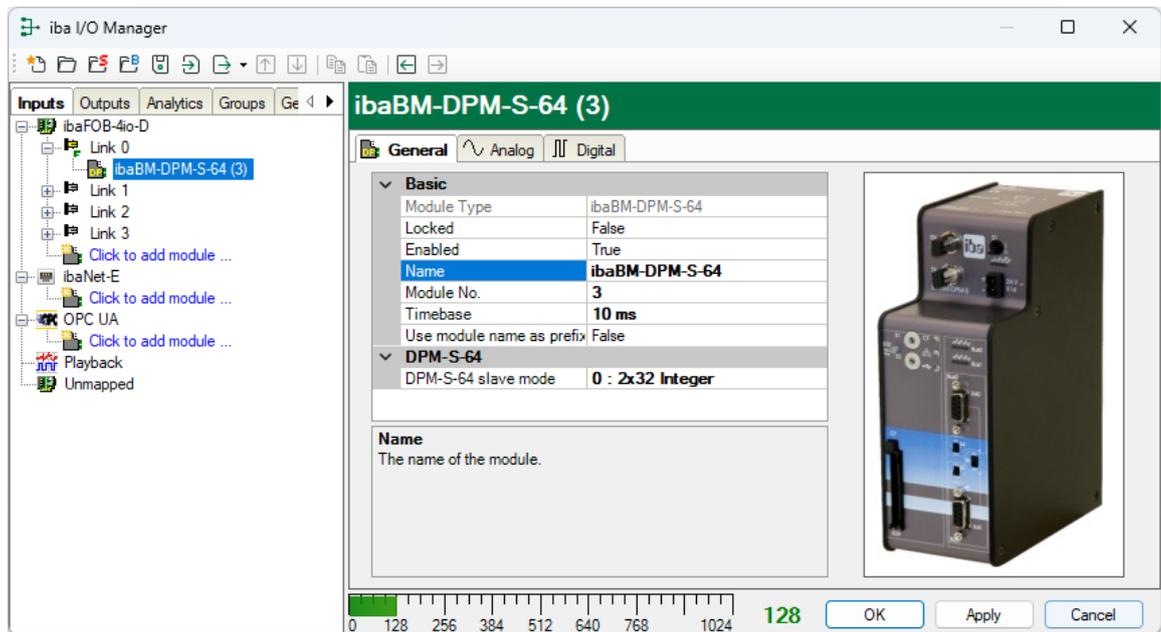
- Proceed accordingly for the digital signals in the “Digital” tab. Here, only signal names have to be entered.

13.5.1 Compatibility mode 3Mbit with older device modules

To record data in compatibility mode 3Mbit, the device modules ibaBM-DPM-64 or ibaBM-DPM-S-64 can also be used. If an ibaPDA version older than V6.32.0 is used, only these device modules are available.

Configuration proceeding is the same as with the ibaBM-DP-64 module.



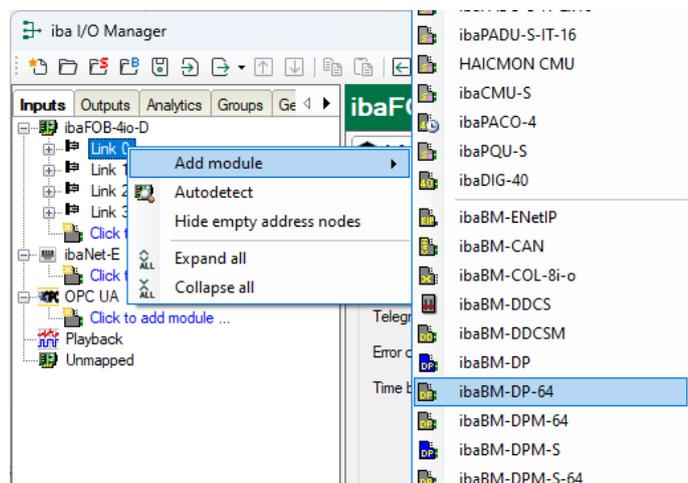


13.6 Outputs from ibaPDA to PROFIBUS Master (bidirectional)

Depending on the analog value type (Integer or Real) mode 8, 9 or B has to be set for bidirectional operation on the device. The notes for configuration of outputs in ibaPDA (from step 4) apply also, if the modes 5, 6 or 7 are used to transfer data from ibaPDA to a master.

➤ For more information see chapter 9.3.4.

1. Configure an applicable GSD file in the PROFIBUS configuration of the master.
2. Choose the correct ibaFOB card in the ibaPDA I/O Manager and add an "ibaBM-DP-64" module.



3. Choose the "DP-64 slave mode" on the "General" tab.

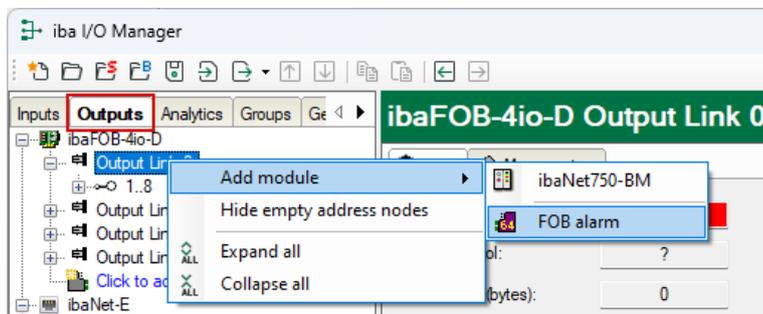


Note

The mode set in the web interface must correspond with the mode in ibaPDA.

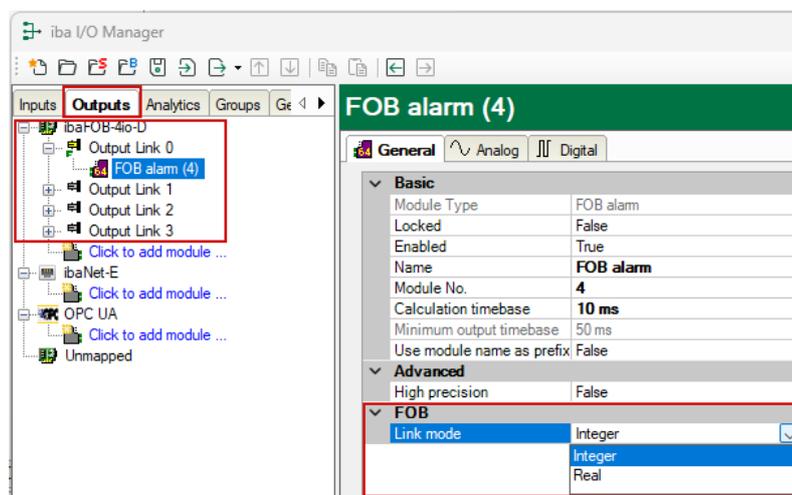
Device mode	DP-64 slave mode (ibaPDA I/O Manager)
8	0 (2 x 32 integer)
9	1 (2 x 32 float)
B	3 (2 x 28 float)

- Choose the “Outputs” menu and add a “FOB alarm” module at the appropriate output link.



- Choose the “General” tab of this module and select the correct link mode “Integer” or “Real”.

Device mode	Link mode
8	Integer
9	Real
B	Real



- Click on <OK>.
- Enter the data to be written in the “Analog” and “Digital” tables.

14 Simulation mode

For general information about system integration and activating the simulation mode, see chapters 7.3.4.5 and 8.6. If you want to use the simulation mode, you need an additional license (order information, see chapter 2).



Important note

The simulation mode is approved for the use with PROFIBUS masters supplied by Siemens only.

14.1 Commissioning procedure

1. Configure the PROFIBUS master and start it, even when not all configured slaves have been connected.
2. Connect the ibaBM-DP device to the PROFIBUS. Both connections X40: Bus0 and X41: Bus1 can be used. This way, the slaves can be simulated by two different bus lines.
3. Switch on ibaBM-DP.
While booting, ibaBM-DP is searching for “missing” slaves. These are all slaves, which are requested by the PROFIBUS master, but do not respond, as they are not present on the bus. These physically missing slaves are simulated by ibaBM-DP.



Important note

Switch on the device only, after you have connected the connections X40: Bus0 or X41: Bus1 to the PROFIBUS. Missing slaves are searched for and simulated only while ibaBM-DP is booting.

4. From now on, all displayed bus errors should disappear on the PROFIBUS master. Since ibaBM-DP simulates all missing slaves, the PROFIBUS master detects the configured slaves as being existent and valid.
5. Start the simulation program and establish a TCP/IP connection to ibaBM-DP.

The following settings apply to the TCP/IP connection:

- The simulation program is the “active” communication partner. Here, you have to enter the IP address (or device name) and the port number of ibaBM-DP. You find the IP address on the “Info” webpage in the web interface. The port number is “999”.
- You can define a “send” and “receive” telegram for each slave to be simulated. The receive telegram contains the data, the master sends to the slave (outputs). Within the send telegram, you can simulate the data the slave sends to the master (inputs). The telegram structures are explained in chapter 14.3.2.

14.2 Boundary conditions

- ❑ ibaBM-DP searches for missing slaves only when the device is booting. Subsequent changes of the configuration like adding or removing slaves are not detected by ibaBM-DP. Only after a restart of the device, by switching on and off, ibaBM-DP searches for missing slaves.
- ❑ Any number of slaves can be simulated. The limitation of ibaBM-DP to 8 active slaves does not apply to the simulation mode.
- ❑ In simulation mode, you generally cannot acquire simultaneously data from the ibaBM-DP in ibaPDA via FO cable.
- ❑ If ibaPDA is available, you can use it for diagnostic purposes. The ibaPDA-PC has to be equipped with an ibaFOB-X or ibaFOB-D card. Additionally you need:
 - a network connection between the ibaPDA-PC and ibaBM-DP and
 - an unused link on the ibaFOB-X or ibaFOB-D card

ibaBM-DP does not need to be connected via a fiber optic cable to this unused link. The diagnostic can be used only by temporarily adding ibaBM-DP to the I/O configuration.

Insert an ibaBM-DP device on the unused ibaFOB link, activate the compatibility mode 32Mbit in the "General" tab and parametrize the IP address or device name of ibaBM-DP. In the "**PROFIBUS** browser" tab you can now see the status of the simulated slaves and analyze the output and simulated input data.

14.3 TCP/IP protocol

14.3.1 Telegram data transfer

Slave data is transferred to ibaBM-DP via TCP/IP at port 999.

The telegrams sent **to ibaBM-DP** are referred to as **request** in this manual, the telegrams sent **from ibaBM-DP** as **response**.

The input data is sent to ibaBM-DP with a request telegram. ibaBM-DP takes over the data and returns the output data of this slave with a response telegram.

The request telegrams are processed sequentially, i.e., it is not necessary to wait for a response after a request, before sending further requests.

Possible procedures:

Procedure 1 (synchronous)

Request 1	→	
	←	Response 1
Request 2	→	
	←	Response 2
	:	
Request X	→	
	←	Response X

Procedure 2 (asynchronous)

Request 1	→	
Request 2	→	
Request 3	→	
	←	Response 1
	←	Response 2
Request 4	→	
	←	Response 3
	←	Response 4
	:	
Request X	→	
	←	Response (X-1)
	←	Response X

14.3.2 Telegram structure

The structure of the request and response telegram is identical. The structure is described in the table below. All 2/4 Byte fields are formatted as Little Endian ("Intel").

Offset	Bytes	Field	Values	Description
0	2	id		Can be set to any value in the request, the value is mirrored in the corresponding response
2	2	fc	7	Exchange telegram identifier
4	2	length	272	Telegram length
6	2	reserved	0	
8	4	success		Response only: error messages, see below
12	1	bus	0..1	Bus number, ibaBM-DP interface
13	1	slave	1..126	Slave number
14	1	dummy1	0	
15	1	dummy2	0	
16	244	Data	-	Slave I/O data - Request: input data (from DP Master's view) - Response: output data (from DP Master's view)
260	1	DataSize	0..244	Response only: actual user data length in the data field
261	3	Service1	0	Not used
264	1	MasterNr	-	Response only: Profibus address of the master which has written the output data to the slave
265	1	Service2	0	Not used
266	6	Timestamp	0	Response only: counter 48 Bits: 33 Ticks/1µs

Field "Success":

Value	Description
1	Without error
-3	Bus number is wrong
-5	Slave number is wrong
-7	Simulation mode is not available

14.4 Sample project

On the data medium "iba Software & Manuals", you find an example. In this example, we use ibaLogic V5 as simulation program and an S7-400 CPU with 5 configured slaves as PROFIBUS master. You find the example in the following folder:

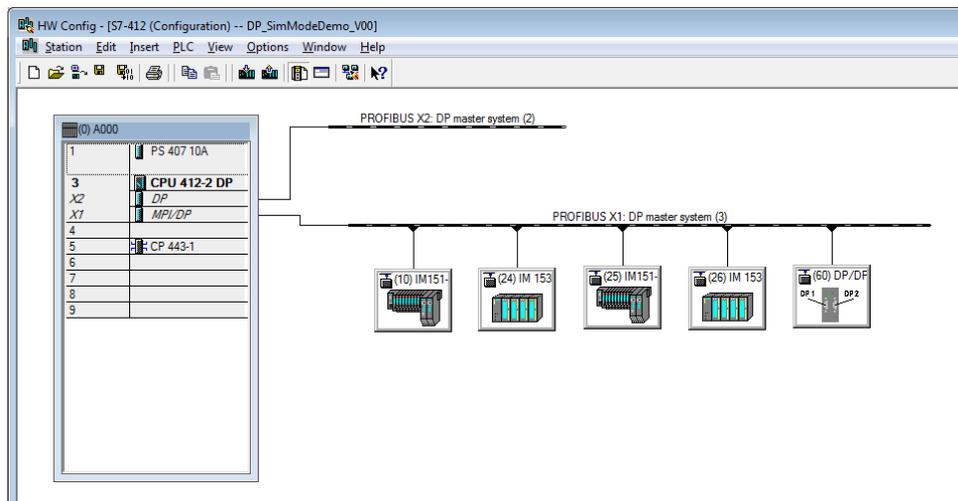
04_Libraries_and_Examples\31_ibaBM-DP\00_GENERAL\Simulation_Mode\

14.4.1 Step7 project "S7_DP_SimModeDemo_Vxy.zip"

The PROFIBUS configuration comprises the following slaves:

Slave	Type	Inputs *)	Outputs *)	ibaLogic struct type
10	ET200S	8 Byte	4 Byte	Slave_10_in / Slave_10_out
24	ET200M	9 Byte	5 Byte	Slave_24_in / Slave_24_out
25	ET200S	8 Byte	4 Byte	Slave_25_in / Slave_25_out
26	ET200M	9 Byte	5 Byte	Slave_26_in / Slave_26_out
60	DP/DP coupler	32 Byte	32 Byte	Slave_60_in / Slave_60_out

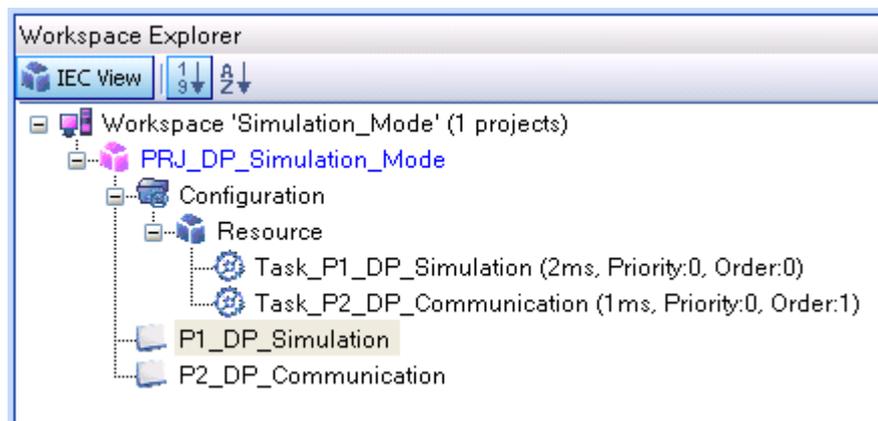
*) Inputs/Outputs from the view of the DP master



Example Step7 project

14.4.2 ibaLogic-Project „ibaLogic_DP_Simulation_Mode_Vxy.zip“

The ibaLogic project (ibaLogic V5) contains two programs:



Example ibaLogic-Project

□ P1_DP_Simulation:

The data is evaluated by the DP master and the response data to the DP master is generated. The data is exchanged with the P2_DP_Communication program as arrays with 244 Bytes. The following tasks are carried out:

- Definition of the slaves to be simulated
- Converting the received data (arrays) into the slave-specific data structures (see table above).
- Processing the received values and generating the data to be sent (simulation)
- Collecting and converting the data structure to be sent into the 244 Byte arrays for data transfer

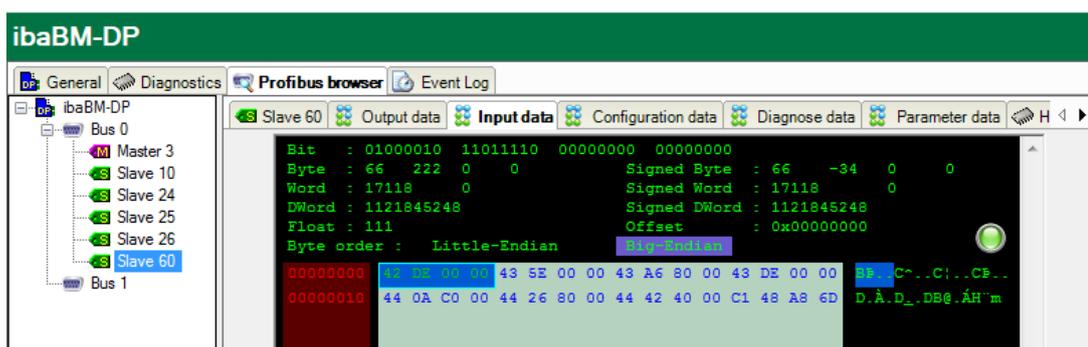
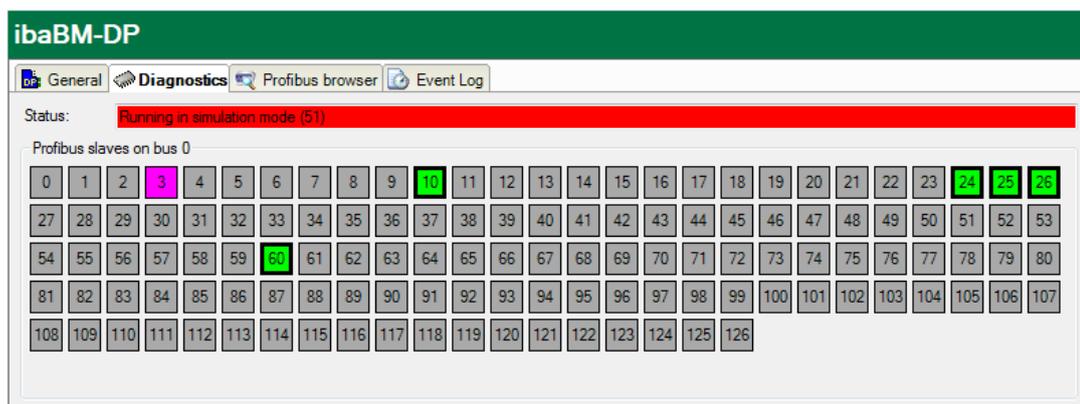
□ P2_DP_Communication:

The TCP/IP communication with ibaBM-DP is handled here. The user data is sequentially processed, i.e., the headers are added and the data is sent consecutively to ibaBM-DP via TCP/IP. The following tasks are carried out:

- Process control of sending and receiving TCP/IP telegrams.
- Selection of output data per slave
- Calling the macro “transmit/receive”. The macro adds the headers before sending, and evaluates and removes them after the reception.
- The receive telegram is copied into the slave specific data array.

14.4.3 Diagnostics with ibaPDA

As described in chapter 14.2, you can use the diagnostic functions in ibaPDA to check if all slaves are simulated and if the simulation program generates input data.



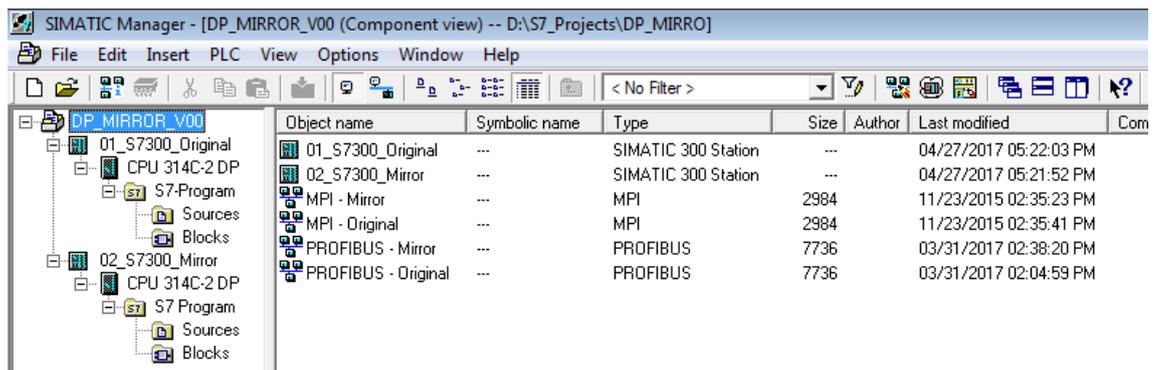
15 Mirror mode

In the following, we explain the mirror mode, using an example. You find the project data we have used (Step7 project and ibaPDA project) on the data medium “iba Software & Manuals“ in the directory:

04_Libraries_and_Examples\31_ibaBM-DP\00_GENERAL\Mirror_Mode\

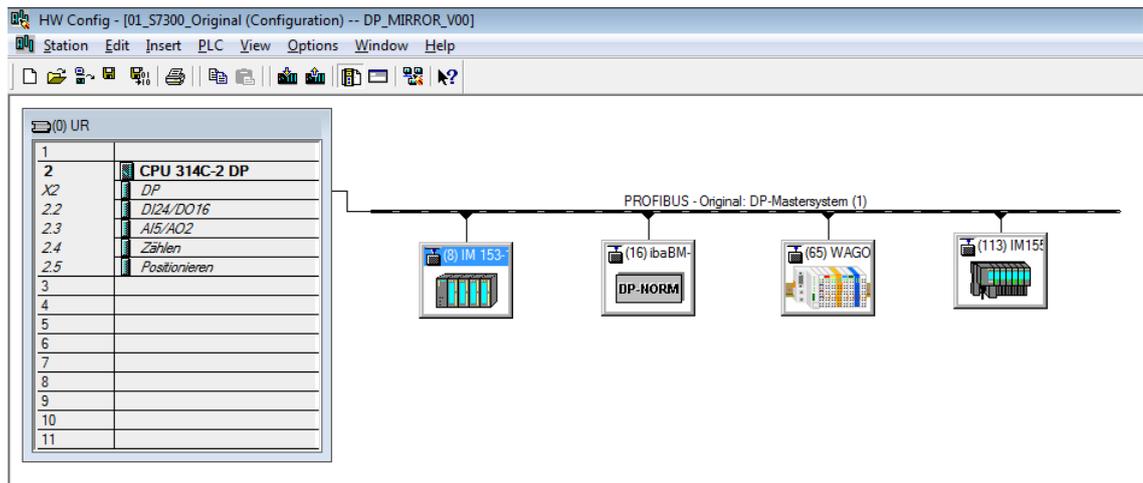
The setup of the sample project basically corresponds to that one in **Fehler! Verweisquelle konnte nicht gefunden werden.**, chapter 8.7:

- As “PROFIBUS master old”, we use an S7-300, hereinafter referred to as “01_S7300_Original“.
- As “PROFIBUS master new”, we use an S7-300 CPU, hereinafter referred to as “02_S7300_Mirror“.



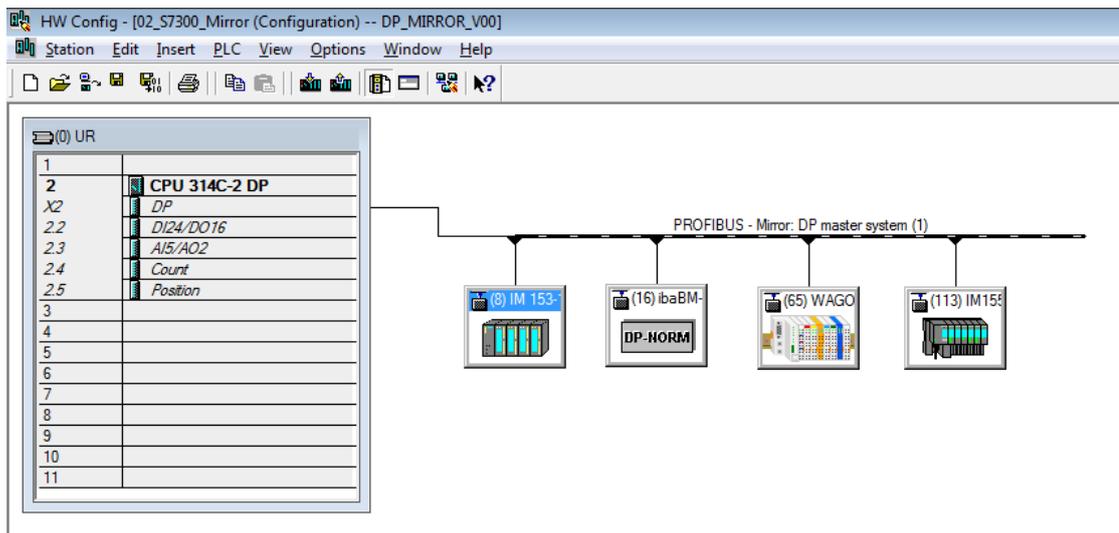
SIMATIC Manager, example mirror mode

For the original system “01_S7300_Original“, we have configured 4 slaves, that really exist. The slaves are connected to the X2 PROFIBUS interface of the CPU. This PROFIBUS line is connected to the X40 (Bus0) of ibaBM-DP.



HW Config, original system

In the mirror system “02_S7300_Mirror“, we have configured the same four slaves. The slaves do not physically exist. The PROFIBUS interface X2 of the CPU is connected to X41 (Bus1) of ibaBM-DP.



HW Config, mirror system



Important note

In mirror mode, the original system always has to be connected to X40 (Bus0). The mirror system always has to be connected to X41 (Bus1).

ibaBM-DP automatically detects the slaves on the “original” side (X40) and mirrors them to the mirror side (X41). In this process, the input data of all slaves are also mirrored. Thus, the controller “02_S7300_Mirror” also can see the input data from the original system, although it is not physically present, there. The output data are not being mirrored.

In case of a modernization of the system, in our example, the controller “02_S7300_Mirror” would be the new automation system. We can now test this system via the mirrored input data and in parallel to the running system.

In mirror mode, we can connect ibaBM-DP in parallel to an ibaPDA system. In sniffer mode, you can record the data from both PROFIBUS systems. Thus, you can compare the original system to the mirror system.



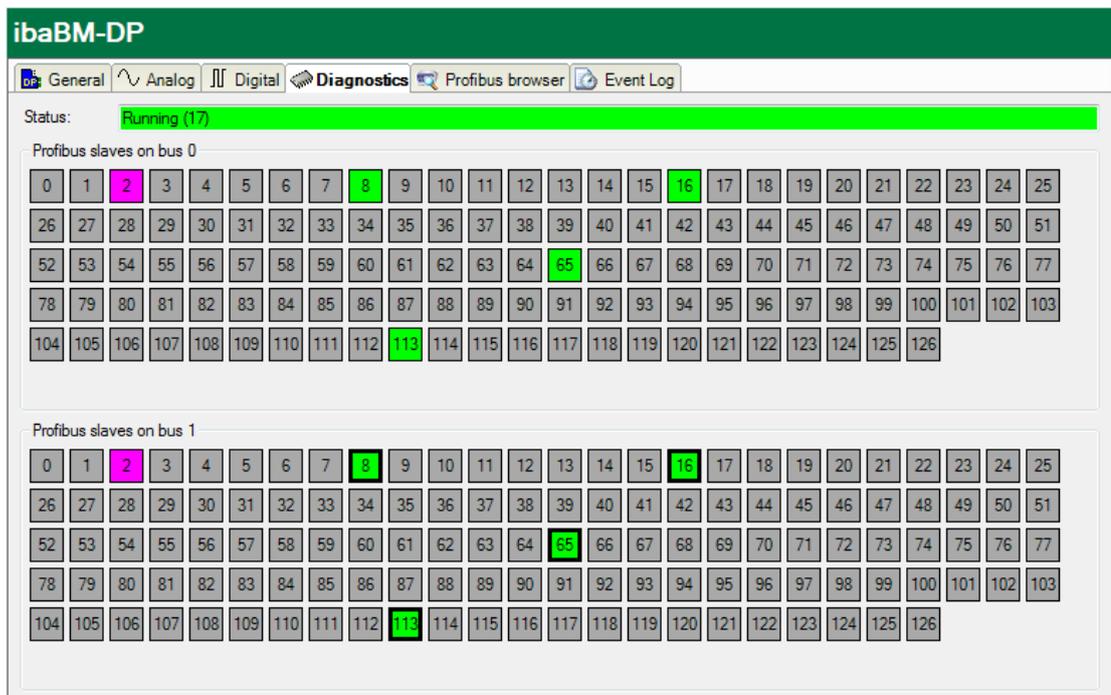
Important note

For acquiring data from both PROFIBUS systems, you can connect in mirror mode ibaPDA via FO cable to ibaBM-DP. Using ibaPDA is not compulsory. You can use the mirror mode also without ibaPDA.

In ibaPDA, sniffer modules can be used. Active slaves are not supported.

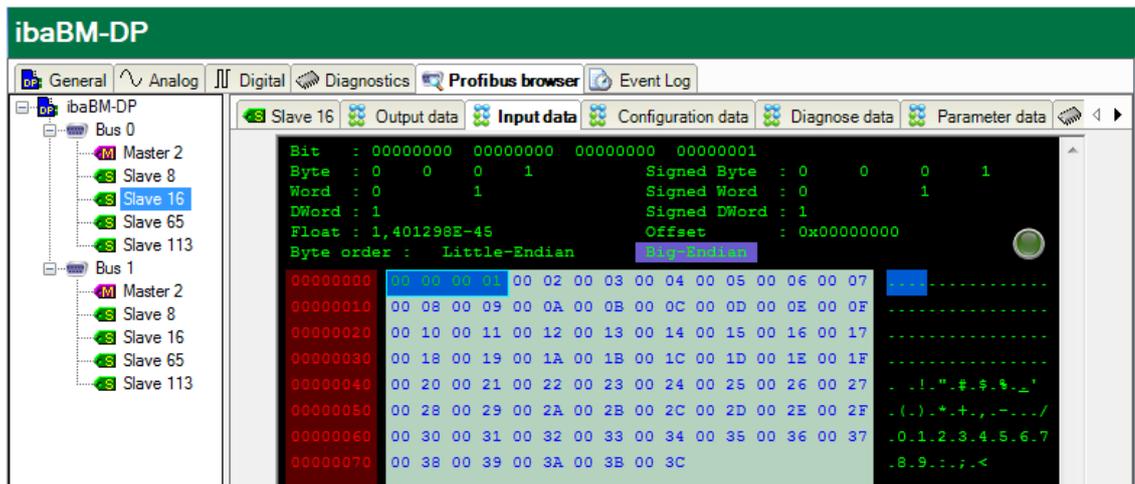
By means of the diagnostic functions in ibaBM-DP, slaves can be detected in the original as well as in the mirror system.

- On bus 0, you can see the slaves 8, 16, 65 and 113 of the CPU “01_S7300_Original”.
- On bus 1, the mirrored slaves are visible with the same addresses. As the slaves are not external slaves, but slaves generated on the device itself (see chap. 10.4.1), these slaves are marked - in contrast to bus 0 - with a bold frame.

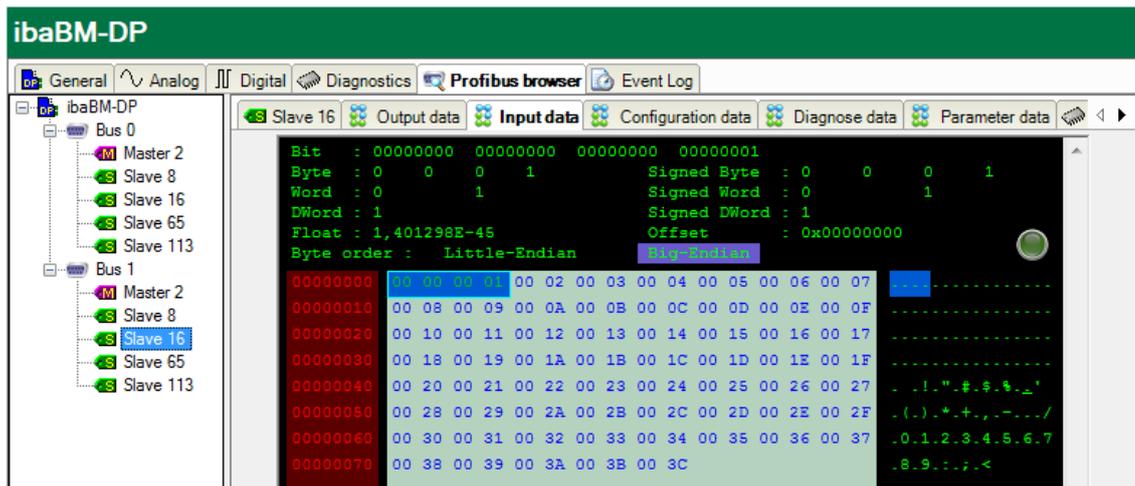


Comparison of both systems on the “Diagnostics” tab

In the detailed view of the individual slaves, you can see the identical input data.

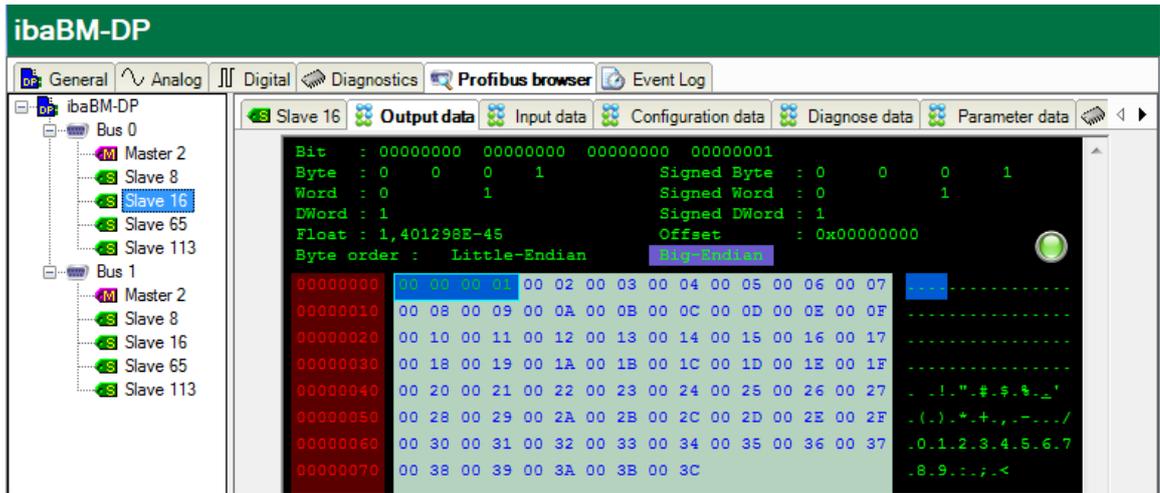


Input data original system

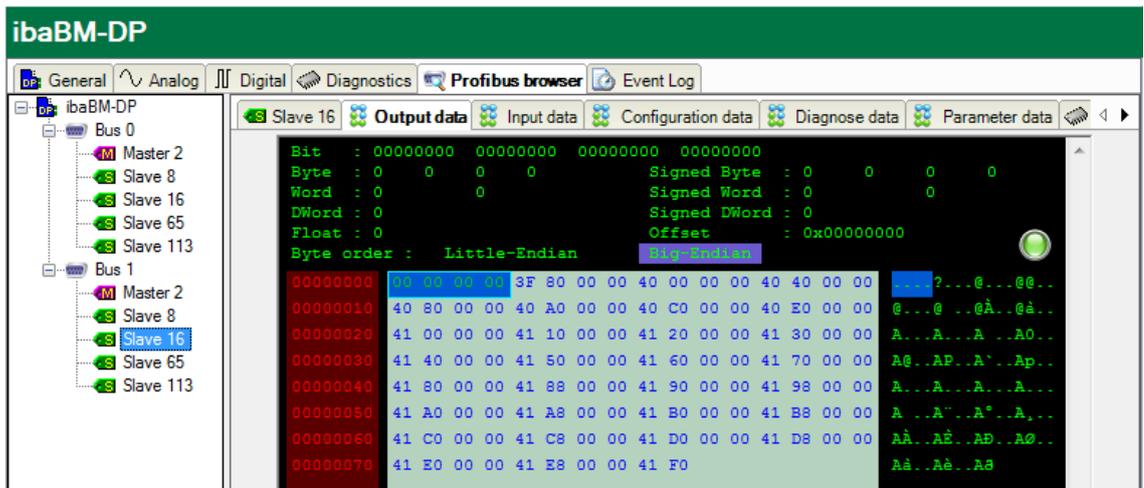


Input data mirror system

In contrast, the output data are differing.



Output data original system



Output data mirror system

16 Notes on the different PROFIBUS masters

16.1 Beckhoff master

The Beckhoff master (e. g. EL6731 master terminal) does not cyclically request the status of slaves.

This is why in this case no external (not activated on the device itself) Phantom slaves (see chapter 10.4.1) can be detected in the diagnosis.

Measurement of the bus voltages (see chapter 10.4.3) is also not possible due to the missing status telegrams.

16.2 Siemens IM308C Master

The master IM308C for Simatic S5 does not cyclically request the status of slaves.

This is why in this case no external (not activated on the device itself) Phantom slaves (see chapter 10.4.1) can be detected in the diagnosis.

Measurement of the bus voltages (see chapter 10.4.3) is also not possible due to the missing status telegrams.

17 Technical data

17.1 Main Data

Manufacturer	iba AG, Germany	
Order No.	13.121001	
Description	PROFIBUS bus monitor	
PROFIBUS interfaces		
DP connections	2 x 9-pin D-Sub connector (Bus0, Bus1)	
Data transfer rates	9.6 kbit/s to 12 Mbit/s	
DP slaves (can be configured as active slaves on the device)	Max. 8, can be distributed as required on both PROFIBUS lines (can be extended on request)	
Address range of the slaves	1 to 126	
ibaNet interface		
ibaNet protocols	Cycle time	Number of signals
32Mbit Flex	Selectable beginning with 0.5 ms (1540 Bytes), data amount depending on cycle time	Up to 1024 analog values (BYTE, INT, WORD, DINT, DWORD, FLOAT, Big/Little Endian) + up to 1024 digital signals (bits) A total max. of 4060 Bytes at a cycle time of 1.4 ms
32Mbit (Compatibility mode ³)	1 ms	Up to 512 analog values (BYTE, INT, WORD, DINT, DWORD, FLOAT, Big/Little Endian; max. 1984 Bytes) + up to 512 digital signals (bits)
3Mbit (Compatibility mode ³)	1 ms	Up to 64 analog values (INT or FLOAT) + up to 64 digital signals (bits)
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. 17.3.	
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 ⁴	100/140 µm FO cable	-33.2 dBm to -26.7 dBm
Temperature range	-40 °F to 185 °F (-40 °C to 85 °C)	

³ With ibaPDA version V6.20.2 or higher

⁴ Data for other FO cable diameters not specified

More interfaces, operating and indicating elements	
Voltage supply	24 V DC \pm 10% not stabilized
Current consumption	Max. 500 mA
Connection	2-pin Phoenix connector, can be screwed
Voltage switch	HW version A9 and lower: On/off switch for the whole device HW version B0 and higher: No on/off switch included
Rotary switch	Operation modes, address switch (in the cascade)
Ethernet	10/100 Mbit/s, RJ45 connector
Other interfaces	USB (only for service purposes) Grounding screw
Indicators	4 LEDs for device status 4 LEDs for PROFIBUS status bus 0 4 LEDs for PROFIBUS status bus 1 2 LEDs for Ethernet interface
Operating and environmental conditions	
Operating temperature range	32 °F to 122 °F (0 °C to 50 °C)
Storage temperature range	-13 °F to 149 °F (-25 °C to 65 °C)
Transport temperature range	-13 °F to 149 °F (-25 °C to 65 °C)
Humidity class acc. to DIN 40040	F, no condensation
Protection class	IP20
Mounting	DIN rail mounting
Mounting position	Vertical (typ.)
Cooling	Passive
Standards	CE, EMC (EN 61326-1:2006, class A) FCC part 15 class A
Mechanical stability	DIN IEC 68-2-6 (when mounted correctly)
MTBF ⁵	1,428,860 hours / 163 years
Dimensions and weight	
Dimensions (Width x Height x Depth)	2.1 in x 7.5 in x 5.8 in (54 mm x 189 mm x 148 mm) incl. DIN rail clip
Weight (incl. packaging and manual)	Approx. 2.2 lb (ca. 1000 g)

⁵ 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: 13.121001, ibaBM-DP

Responsible Party - U.S. Contact Information

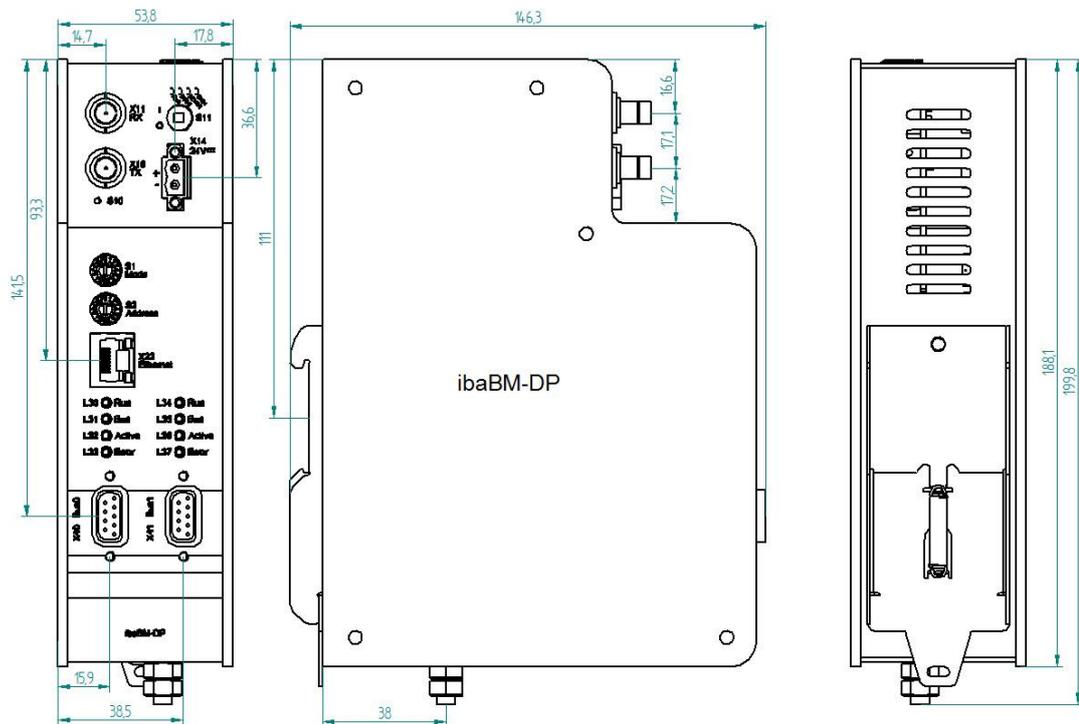
iba America, LLC
370 Winkler Drive, Suite C
Alpharetta, Georgia
30004

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

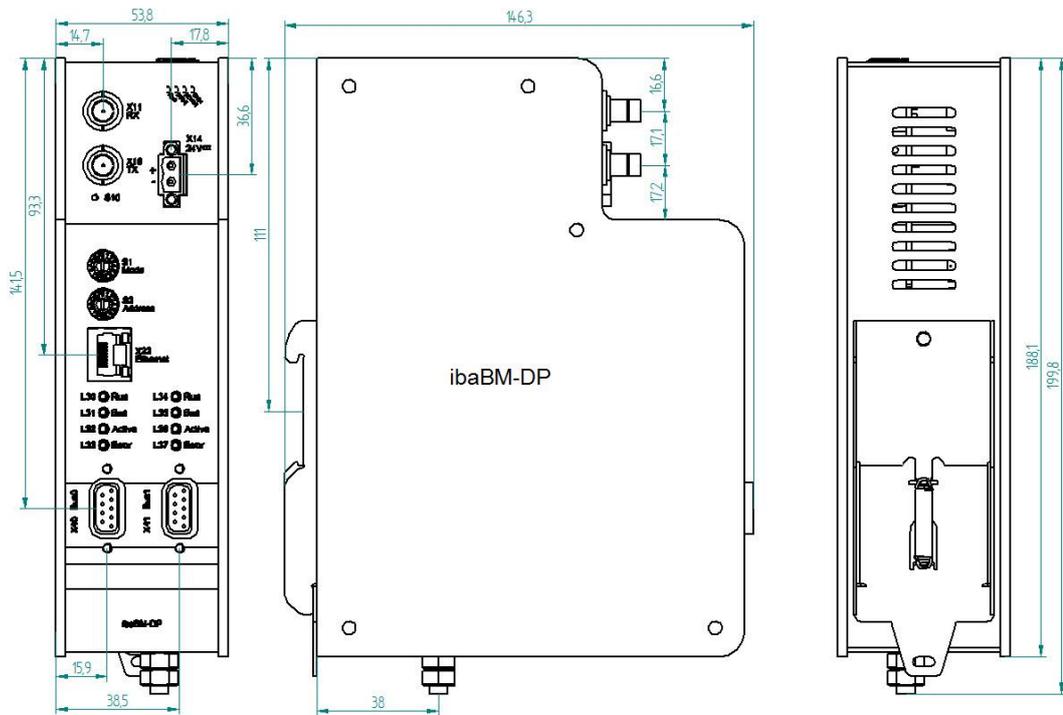
FCC Compliance Statement

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.

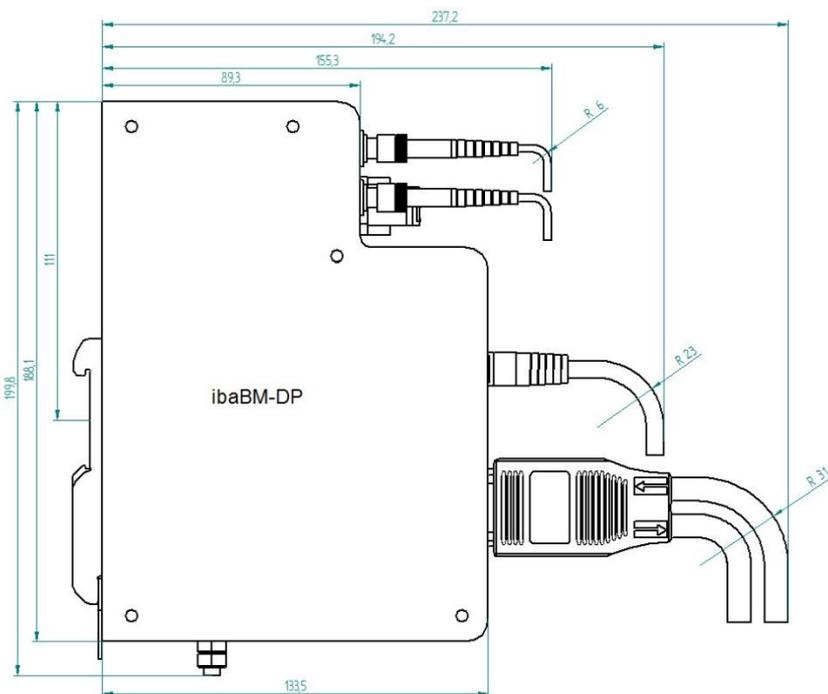
17.2 Dimensions



Dimensions ibaBM-DP HW version A9 and lower (dimensions in mm)



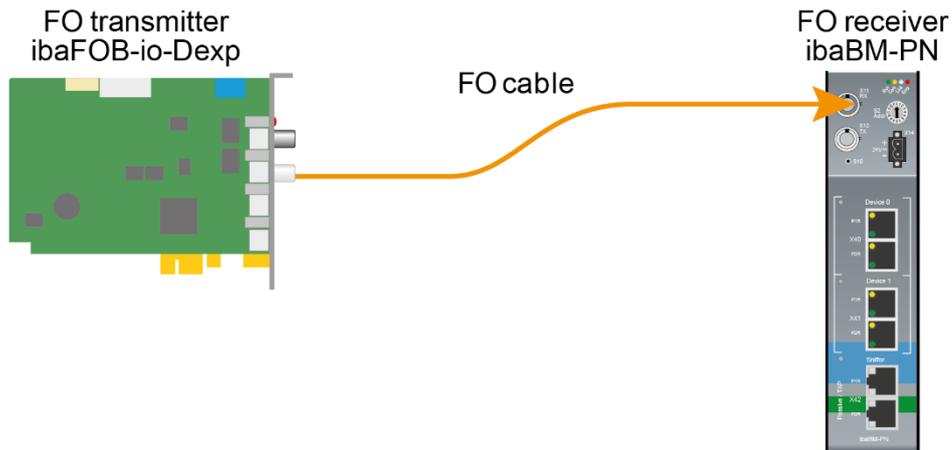
Dimensions ibaBM-DP HW version B0 and higher (dimensions in mm)



Dimensions ibaBM-DP with cable (dimensions in mm)

17.3 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:

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

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

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

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

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

**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.

18 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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www.iba-ag.com.