ibaM-DAQ

Processor module for stand-alone data acquisition

Manual

Issue 2.0

Measurement Systems for Industry and Energy

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Version	Date	Revision	Author	Version SW
2.0	03-2026	ibaNet-E interface	st	01.06.002

Contents

1 About this documentation

This documentation describes the design, application and operation of the device *ibaM-DAQ*.

Note

Observe this danger sign:

In all cases where this danger sign is displayed, refer to the manual to find out more about the nature of the potential hazards and the measures that must be taken to avoid them.

1.1 Target group

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

1.2 Notations

In this manual, the following notations are used:

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

1.3 Used symbols

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

Danger!

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

Observe the specified measures.

Warning!

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

Observe the specified measures.

Caution!

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

Observe the specified measures.

Note

A note specifies special requirements or actions to be observed.

Tip

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

Other documentation

Reference to additional documentation or further reading.

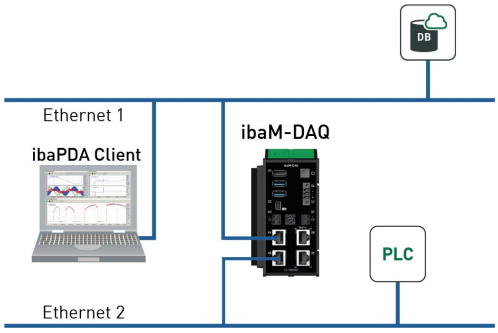
2 About ibaM-DAQ

The *ibaM-DAQ* processor module is part of the modular system ibaMAQS (Modular Acquisition System). It can be used as a stand-alone device to acquire and record data. *ibaM-DAQ* provides an integrated *ibaPDA* system, a powerful CPU, and hard disk for storing data, as well as two interfaces each for standard Ethernet and ibaNet-E.

The range of applications includes:

- Local, on-site data acquisition on machines and plants (troubleshooting, process analysis)
- Edge analytics (process monitoring, calculation of characteristic values (KPIs))
- Data acquisition at test stands
- Data acquisition on cranes
- ... and anywhere where data should be acquired locally on site

With its independent 1 Gbit/s Ethernet interfaces, *ibaM-DAQ* can be connected to two independent networks. This allows *ibaM-DAQ*, for example, to connect to the IT business network and the PLC network. ibaNet-E-capable devices can be integrated via the ibaNet interfaces, separate from the standard Ethernet.



Simple remote configuration

A monitor, mouse, and keyboard can be connected to *ibaM-DAQ* and can be operated as conveniently as an *ibaPDA* system running on a PC. Moreover, it can also be operated from an *ibaPDA* client connected via the network, just like on a PC.

Users can easily configure their measuring task in the software – and can use the full scope of *ibaPDA* functions. The data recording can start automatically with the acquisition and/or be controlled by trigger signals.

Data storage in the device

An internal SSD provides local storage for recorded data. If required, disk space can be expanded by connecting an external hard drive to the USB interface or to a NAS. Recorded data can be transferred via a network connection and can be further processed and analyzed with the license-free ibaAnalyzer software – independently of *ibaM-DAQ*.

Time synchronization

For global time synchronization, all time sources supported by *ibaPDA* (DCF77, PTP) as well as NTP can be used. The time is buffered by means of an internal battery.

For more information on configuring NTP time synchronization, see chapter ↗ *NTP time synchronization, page 77*.

Monitoring and alarm

A digital input and output are available on the processor module. The latter can be configured as an alarm output, for example. The input can be used to initiate a safe shutdown of the device, for example from a back-up battery digital signal.

Modular concept

ibaM-DAQ can be combined with up to 15 different I/O modules. Modules are available for discrete input and output signals as well as for special technological features.

Use of additional iba devices via fiber optics

The *ibaM-FO-2IO* module offers the functionality of the proven ibaFOB-io boards and supports the 32Mbit Flex and 32Mbit ibaNet protocols. If corresponding iba devices are already available or no suitable ibaMAQS modules are available for certain tasks, devices like the ibaPADU family, iba bus monitors or system interfaces can be connected to the ibaMAQ system via the *ibaM-FO-2IO*.

The data concentrator *ibaBM-COL-8i-o* can be used to connect also iba devices with the ibaNet protocol 3Mbit.

Beginning with *ibaPDA* v8.13.0, the *ibaM-DAQ* processor module supports two *ibaM-FO-2IO* modules. With *ibaPDA* < v8.13.0, the *ibaM-DAQ* processor module supports only one *ibaM-FO-2IO* module.

Licenses included

ibaM-DAQ comes with an *ibaPDA* base license for up to 64 signals and two data stores.

In addition, *ibaM-DAQ* includes further licenses. With the license *ibaPDA-Interface-PLC-Xplorer*, *ibaM-DAQ* has direct access to different PLC systems. The access to the PLC systems is established via standard interfaces of the systems without additional hardware for measured value acquisition.

The *ibaPDA-OPC-UAServer+* license allows you to operate the OPC UA server integrated in the *ibaPDA* system. This makes all signals configured in *ibaPDA* available to other systems.

With the included *ibaPDA-Data-Store-MQTT-16* license, signal data can be streamed to an MQTT broker.

Following are communication interfaces included in the delivery:

Order no.	Name	Description
30.670051	ibaPDA-OPC-UA-Server+	Advanced OPC UA Server function ibaPDA can be used as OPC UA server. This license allows access to all ibaPDA signals.
30.671000	ibaPDA-Data-Store-MQTT-16	Data streaming via MQTT, 16 signals
31.001042	ibaPDA-Interface-PLC-Xplorer	PLC-Xplorer interfaces (S7, Allen Bradley, ABB, B&R, Bachmann, Beckhoff, Codesys, Logix, Mitsubishi MELSEC, OMRON, Sigmatek)

Other documentation

For the description and configuration of *ibaPDA* and the interfaces, please refer to the corresponding manuals. You can find the manuals on the data medium supplied.

3 Scope of delivery

After having unpacked the delivery, please check it for completeness and possible damage.

The scope of delivery comprises:

- *ibaM-DAQ* device
- Covering caps for USB, Ethernet, and Mini DisplayPort
- 3-pin connector, push-in (power supply)
- End cover ibaM-CoverPlate
- Data medium "System-Recovery"
- Data medium "iba Software & Manuals”

4 Safety and other instructions

Note

Work on the system, as well as mounting and dismounting, must only be carried out by trained and qualified specialists.

Careful working methods and compliance with safety measures when working with electrical devices of all types must be observed.

Note

Observe this danger sign:

In all cases where this danger sign is displayed, refer to the manual to find out more about the nature of the potential hazards and the measures that must be taken to avoid them.

4.1 Intended Use

The device is an electrical operating resource. It must only be used for the following applications:

- Measurement data acquisition and analysis
- Applications of software products (*ibaPDA*, *ibaLogic* etc.) and hardware products from iba AG

The device must only be used as specified in the *Technical data* chapter, and is designed and approved for continuous operation.

Danger!

Electric shock

If the device is used or operated in a manner other than specified in the *Technical data* chapter, the protection supported by the device may be impaired.

4.2 Special safety instructions

Danger!

Operation

- The system must only be operated permanently connected and not touchable, only in a building (in-door) and only in a fire protection housing in accordance with IEC 61010-1.
- The system must only be operated with a mounted end cover.
- The external power supply/power supply unit for supplying the central unit and thus for the complete system must be tested for use with this system in accordance with IEC 61010-1.
- Modules from this system must only be operated with a central processing unit from this system.
- The supply voltage for this system must only be fed from this system via a central unit.
- The supply may only be provided via an energy-limited circuit in accordance with IEC 61010-1 and must either include a fuse that trips after 120 s at the latest in the event of an overcurrent greater than 4 A or limit the total current of the system to 4 A.
- In addition to their own current consumption from the supply voltage via the module-module interface, the central units and the modules also pass on the supply voltage for other connected modules, so that the module-module interfaces may have to carry the maximum specified total current of the system.
- Only a maximum of 15 modules may be installed next to the central unit.

Danger!

Duty of care

Take care when working on the system and always check that the system and the modules themselves are in perfect condition, as well as ensuring that they are properly installed and correctly attached to the DIN rail.

If damage to cables, devices, supplies or enclosures is detected before commissioning or during operation, the system must not be put into operation or must be taken out of operation immediately.

Warning!

Compliance with the supply voltage range
A higher supply voltage may destroy the device!

Never supply the device with a voltage other than 24 V DC!

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.

Warning!

Mounting and dismounting / Disconnection from the grid

Work on the device or system may only be carried out when the power is switched off!

Due to the modular concept of this system, modules connected in series with this module can also carry dangerous voltages.

All energized components of all modules in the system must therefore be disconnected from the grid before mounting and dismounting.

In addition to disconnecting the power supply at the system's central unit, the signal plugs and connections of all modules in the system must also be de-energized or disconnected from the grid.

Caution!

A suitable disconnecting device for this system must be available and disconnect all energized components of this system.

This disconnecting device must include a switch or circuit breaker that is easily accessible at a suitable location in the vicinity and is also clearly marked as a disconnecting device for this system.

Caution!

Supply and measuring cables

- Do not use damaged supply and measuring cables.
- Do not connect or disconnect supply and measuring cables when the device is connected to the power.
- Supply and measuring cables must be suitable for the corresponding voltages.

Caution!

You must only connect one conductor to each terminal connection.

Several individual conductors, whether single-wired or fine-wired, are not permitted.

Only connectors classified by iba may be used for connecting conductors.

Caution!

Hot surfaces

Individual device surfaces can become very hot.

Observe the danger sign "Warning of hot surface":

- The cooling fins of the device can become very hot.
- Make sure that the cooling fins get optimal ventilation.
- Observe the specifications for the installation clearances of the entire system.

Note

Do not switch off the device uncontrolled, e.g. by disconnecting the supply voltage. This can lead to data loss. Always shut down the device properly.

Note

A power supply unit with safety extra-low voltage and appropriate power limitation must be provided as power supply.

Protect the device against uncontrolled power dips/drops of the power supply unit with an uninterruptible power supply (UPS).

Note

Do not open the device! Opening the device results in a loss of warranty!

Note

The device does not require any special cleaning or maintenance!

However, if you want to carry out an inspection, return the device to iba.

5 System requirements

Observe the following requiremenst for using the device *ibaM-DAQ*.

5.1 Hardware

For operation

- Power supply 24 V DC, ca. 0.7 A as stand-alone device,
  up to 4 A with modules

For device parameterization and operation

- Monitor (via the Mini DisplayPort), mouse, and keyboard (via the USB ports)

  or

- *ibaPDA* client via network connection

5.2 Software

- *ibaPDA* version 8.13.0 or higher for device configuration and for measuring and recording the data

Note

The *ibaM-DAQ* device runs *ibaPDA* by default. The license for 64 signals is included in the delivery. The number of signals can be extended up to 1024 with additional licenses. A further increase of the number of signals is possible on request and depends on your application. See also chapter *Introduction*, section ↗ *Licenses included*, page 9.

Note

The *ibaFOB-io-USB* adapter cannot be used in connection with the devices of the ibaMAQ system. Devices with the communication protocol 32Mbit or 32Mbit Flex can be connected using the *ibaM-FO-2IO* module. See also chapter *Introduction*, section ↗ *Use of additional iba devices via fiber optics*, page 9.

5.3 Firmware

- ibaMAQS version 01.06.002 or higher

6 Mounting and dismounting

Danger!

Operation

- The system must only be operated permanently connected and not touchable, only in a building (in-door) and only in a fire protection housing in accordance with IEC 61010-1.
- The system must only be operated with a mounted end cover.
- The external power supply/power supply unit for supplying the central unit and thus for the complete system must be tested for use with this system in accordance with IEC 61010-1.
- Modules from this system must only be operated with a central processing unit from this system.
- The supply voltage for this system must only be fed from this system via a central unit.
- The supply may only be provided via an energy-limited circuit in accordance with IEC 61010-1 and must either include a fuse that trips after 120 s at the latest in the event of an overcurrent greater than 4 A or limit the total current of the system to 4 A.
- In addition to their own current consumption from the supply voltage via the module-module interface, the central units and the modules also pass on the supply voltage for other connected modules, so that the module-module interfaces may have to carry the maximum specified total current of the system.
- Only a maximum of 15 modules may be installed next to the central unit.

The modular system is designed as follows and is to be mounted on the DIN rail:

- Central unit on the far left
- Up to 15 modules to the right of the central unit
- End cover on the far right to protect the contacts

Make sure that the modules

- are properly secured to the DIN rail and
- are correctly positioned in the side guide rails.

Check the correct fitting of the modules after mounting by a visual inspection.

Note

An end cover is included in the scope of delivery of the central unit.

The end cover is also available as an accessory or spare part from iba.

Installation clearances

Ensure a minimum clearance of the entire system of 30 mm upwards and downwards and 10 mm to the right and left for sufficient ventilation of the device.

6.1 Disconnection from the grid

To enable safe, hazard-free work on the system, all live components in the system must be disconnected from the grid.

Warning!

Mounting and dismounting / Disconnection from the grid

Work on the device or system may only be carried out when the power is switched off!

Due to the modular concept of this system, modules connected in series with this module can also carry dangerous voltages.

All energized components of all modules in the system must therefore be disconnected from the grid before mounting and dismounting.

In addition to disconnecting the power supply at the system's central unit, the signal plugs and connections of all modules in the system must also be de-energized or disconnected from the grid.

Caution!

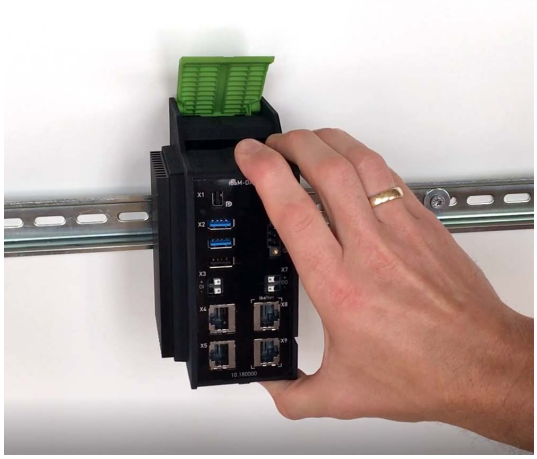
A suitable disconnecting device for this system must be available and disconnect all energized components of this system.

This disconnecting device must include a switch or circuit breaker that is easily accessible at a suitable location in the vicinity and is also clearly marked as a disconnecting device for this system.

6.2 Central unit

Mounting

- Lift the green lever upwards and place the device onto the rail.
- Hold the device firmly and push the lever down again to lock the device onto the rail.
- If no further modules are mounted, mount the end cover.



Connecting

- Connect the Ethernet cable(s) to one of the network interfaces X4 or X5[1)].
- Connect the 24 V DC power supply with the correct polarity and switch on the device.

Dismounting

- Shut down the processor module and switch off the power supply.
- Remove all connections from the processor module.
- Grasp the module at the top and bottom with one hand and lift the green lever upwards to release the lock on the DIN rail.
- Pull the module forward.
- Push down the green lever.

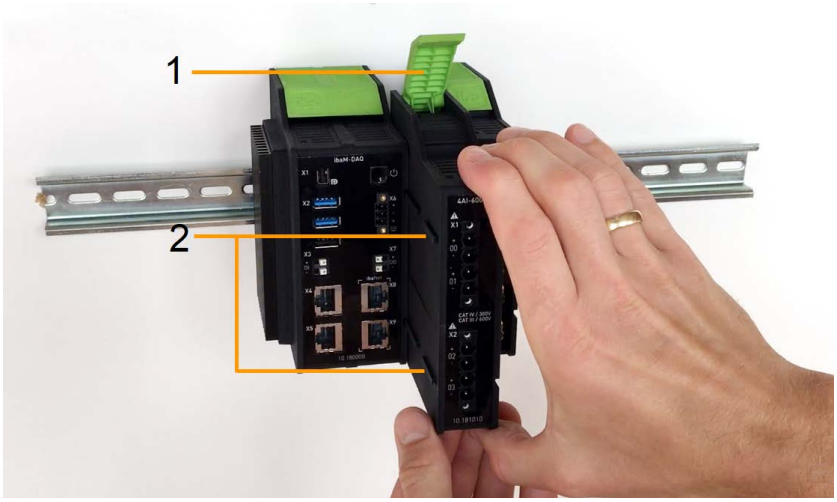
6.3 Modules

Mounting

- Shut down the system and/or switch off the power supply.
- Disconnect the power supply and the entire system from the mains as instructed in chapter ↗ *Disconnection from the grid, page 18*.
- Remove the end cover, if present.
- Lift the green lever of the module upwards.
- Push the module backwards along the guide rails onto the DIN rail.
- Push down on the green lever.

[1)] The interfaces marked with ibaNet are reserved for later use and are currently without function

- To protect the side contacts from dirt and damage, install the end cover on the last module.
- Switch on the power supply.
- Start the system.



1 Green lever for locking and releasing the modules

2 Guide rails

Dismounting

- Shut down the system and/or switch off the power supply.
- Disconnect the power supply and the entire system from the mains as instructed in chapter ↗ *Disconnection from the grid, page 18*.
- Remove all connections from the module that is to be dismounted.
- If you want to dismount the module on the far right, first remove the end cover. This is mounted again on the last module on the right after the module has been dismounted.
- Grasp the module at the top and bottom with one hand and lift the green lever upwards to release the lock on the DIN rail.
- Pull the module forward along the guide rails.
- Push down on the lever.

6.4 End cover

The rightmost module is terminated on the right side with the end cover ibaM-CoverPlate.

Mounting

- Push this end cover along the guide rail until the cover snaps into place.

Dismounting

- Push this end cover forward along the guide rail.

Note

An end cover is included in the scope of delivery of the central unit.

The end cover is also available as an accessory or spare part from iba.

6.5 Connection technology connector/terminals

Caution!

You must only connect one conductor to each terminal connection.

Several individual conductors, whether single-wired or fine-wired, are not permitted.

Only connectors classified by iba may be used for connecting conductors.

Connection technology power supply connector

Connection technology	Push-in			
Clamping range	0.14 - 1.5 mm^2			
Cable cross-section				
Single wired	0.14 - 1.5 mm^2			
Fine wired	0.14 - 1.5 mm^2			
With wire end ferrule	0.25 - 1.5 mm^2			
With wire end ferrule/ collar	0.25 - 1.0 mm^2			
Stripping length				
Cross-section	0.5 mm^2	0.75 mm^2	1.0 mm^2	1.5 mm^2
Single wired	9 mm			
Fine wired				
With wire end ferrule	10 mm			
With wire end ferrule/ collar	12 mm			-
Recommended cables				
Single wired	H05V-U; H07V-U			
Fine wired	H05V-K; H07V-K			
Screwdriver blade	0.4 mm x 2.5 mm			
Tightening torque connector	0.3 Nm			

Connection technology terminals for digital inputs/outputs

Connection technology	Push-in			
Clamping range	0.13 - 1.5 mm²			
Cable cross-section				
Single wired	0.2 - 1.5 mm²			
Fine wired	0.2 - 1.5 mm²			
With wire end ferrule	0.25 - 1.5 mm²			
With wire end ferrule/ collar	0.25 - 0.75 mm²			
Stripping length				
Cross-section	0.25 mm²	0.5 mm²	0.75 mm²	1.5 mm²
Single wired	8 mm			
Fine wired				
With wire end ferrule	10 mm			7 mm
With wire end ferrule/ collar	10 mm			-
Recommended cables				
Single wired	H05V-U; H07V-U			
Fine wired	H05V-K; H07V-K			
Screwdriver blade	0.4 mm x 2.5 mm			

Caution!

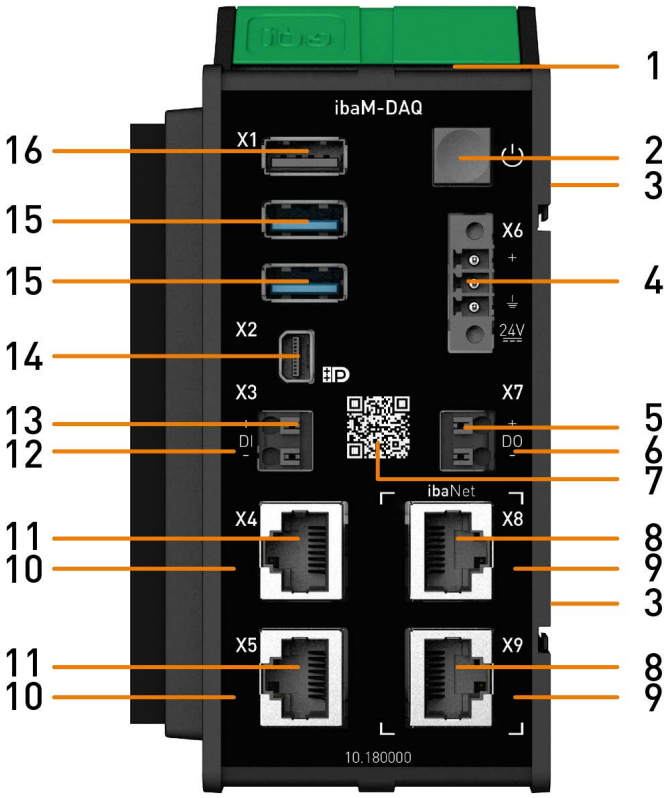
Supply and measuring cables

- Do not use damaged supply and measuring cables.
- Do not connect or disconnect supply and measuring cables when the device is connected to the power.
- Supply and measuring cables must be suitable for the corresponding voltages.

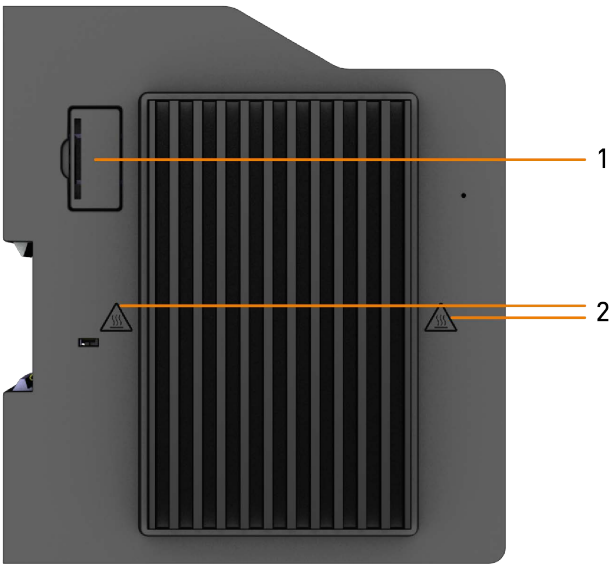
7 Device description

Here you will find views and descriptions of the *ibaM-DAQ* device.

7.1 View



1	Status indicator	9	Indicator ibaNet interfaces
2	On/off switch	10	Indicator network interfaces
3	Contacts module-module interface	11	Connector network interfaces X4, X5
4	Connector 24 V power supply X6	12	Indicator digital input
5	Connector digital output X7	13	Connector digital input X3
6	Indicator digital output	14	Connector Mini DisplayPort
7	QR code for installation notes	15	USB 3.0 ports
8	Connector ibaNet interfaces X8, X9	16	USB 2.0 port



1 Battery compartment

2 Danger signs "Warning of hot surface"

Caution!

Hot surfaces

Individual device surfaces can become very hot.

Observe the danger sign "Warning of hot surface":

- The cooling fins of the device can become very hot.
- Make sure that the cooling fins get optimal ventilation.
- Observe the specifications for the installation clearances of the entire system.

7.2 Indicating elements

Colored LEDs on the device indicate the operating status of the device.

7.2.1 Operating status

Color	Status	Description
--	off	down, no power supply
Green	on	ready for operation
	flashing slowly	device is booting
	flashing quickly	update is running
Red	on	error, reset

7.2.2 Network/ibaNet interface

LED	Status	Description
Network X4, X5	green on	connectivity OK
ibaNet X8, X9	green on	connectivity OK (not currently used)
--	off	no connectivity

7.2.3 Digital input/output

LED	Status	Description
DI	green on	input signal OK
DO	green on	output controlled
--	off	no signal

7.3 Operating elements

You will find the following operating elements on the *ibaM-DAQ* device.

7.3.1 ON/OFF switch

Switching the device off and on again switches the supply voltage off and on and reboots the device. The switched-on device can be switched off or shut down with one of several methods:

- Press briefly: System shuts down (controlled)
- Press and hold (> 5 s): System switches off (without controlled shutdown)

Please note when switching off or shutting down by briefly pressing the on/off switch:

If the device is in an energy-saving state, e.g. because the monitor has been switched off, the on/off switch must be pressed a second time to shut down the device in a controlled manner. Pressing once first wakes the device from energy-saving state.

If the device should not shut down when the on/off switch is pressed briefly, this function can be can be disabled as described in chapter ↗ *On/off switch function, page 75*.

7.4 Connectors

You will find the following connections and interfaces on the device *ibaM-DAQ*.

7.4.1 Power supply X6

The external power supply is connected using a 3-pin connector.

Caution!

Power supply
Only connect the device to an external power supply 24 V DC!

Observe the correct polarity!

Note

ibaM-DAQ is not grounded by mounting on a grounded DIN rail.

ibaM-DAQ can only be grounded via the grounding pole of the 3-pin connector for power supply X6.

7.4.2 Network interfaces X4, X5

The device can be integrated into Ethernet networks via the network interfaces X4 and X5.

The two interfaces are **without switch function** and support:

- 10/100/1000 Mbit
- Auto-MDI(X)
- Autonegotiation
- Jumbo Frames (9.5 KB)
- APIPA[2)]
- Wake-on-LAN (only at X4)

The default settings of the network connections can be found in chapter ↗ *Default settings, page 31*.

[2)] Automatic Private IP Addressing = automatic IP addressing without DHCP server in the IP address space 169.254.x.x

For the integration into Ethernet networks see chapter ↗ *Addressing in the networks, page 32*.

A description of the Wake-on-LAN function can be found in chapter ↗ *Wake-on-LAN, page 70*.

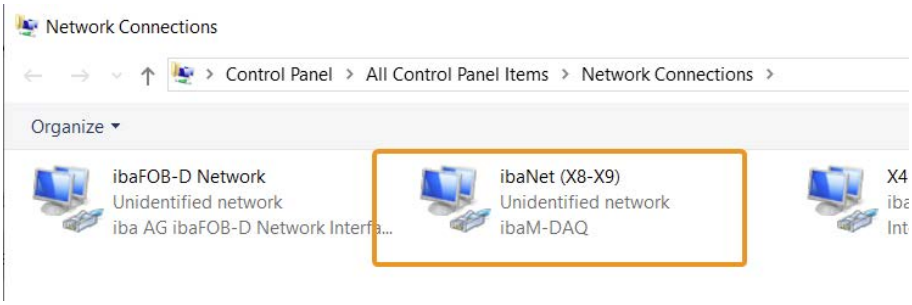
7.4.3 ibaNet X8, X9 interfaces

The ibaNet interfaces X8 and X9 are intended for use with dedicated ibaNet-E connections that can acquire data with a synchronization accuracy of up to 1 µs.

The two 1GbE interfaces are **with switch function** and support:

- Autonegotiation (100/1000 Mbit, full duplex)
- Auto-MDI(X)

The ibaNet connections X8 and X9 also appear as network cards in the Windows network settings. Since X8 and X9 are designed with a switch function, they are only displayed as one network card in Windows:



This means it can also be used as a separate network card in Windows.

The IP setting for this network card depends on the *ibaPDA* version when performing a new installation:

ibaPDA	Name of the network card	Default IP settings		
			IP address	Subnet
< v8.13.0	IO bus	fixed IP address	169.254.255.2	255.255.255.252
from v8.13.0	ibaNet (X8-X9)	DHCP	-	-

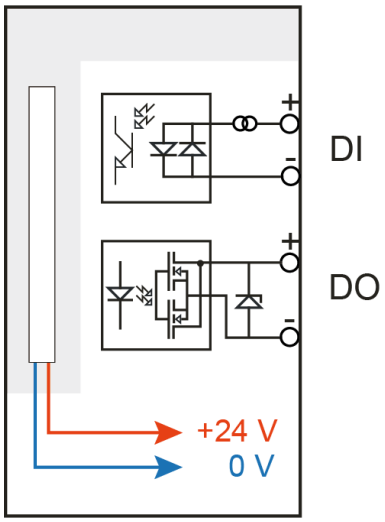
After updating the *ibaPDA* version from < v8.13.0 to ≥ v8.13.0, the previously configured IP settings remain unchanged.

7.4.4 Digital input X3

This is a bipolar and electrically isolated digital input. Due to the reverse polarity protection, the measurement signal is indicated logically correct, even if the connection is polarity-reversed.

The DI input can be used to initiate safe shutdown and powering off if a trigger signal indicates that the power supply is interrupted. This is configured in *ibaPDA*.

Connection diagram for digital input and output:



7.4.5 Digital output X7

An alarm signal can be configured in ibaPDA to be sent as a digital output.

Note

Due to the protective diode in the output of DO 00, the load to be switched must be connected to the negative pole (-) and the voltage to the positive pole (+).

7.4.6 Mini DisplayPort X2

Use the Mini DisplayPort to connect to a monitor. If the monitor does not have a DisplayPort, an adapter can be used, e.g., CSL - 3in1 Mini DisplayPort to VGA + HDMI + DVI adapter.

7.4.7 USB ports X1

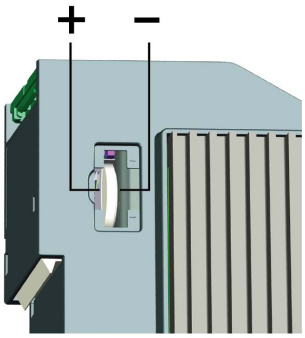
- 1x USB 2.0: 480 Mbit/s
- 2x USB 3.0: up to 5 Gbit/s

7.4.8 Battery compartment

The battery compartment is located on the heat sink side at the bottom end of the housing.

The internal time is buffered with a 3V Lithium BR2032 battery. The battery can be replaced during operation. Only batteries of type BR2032 may be used as replacements.

Observe the correct polarity of the battery, see figure:



Note

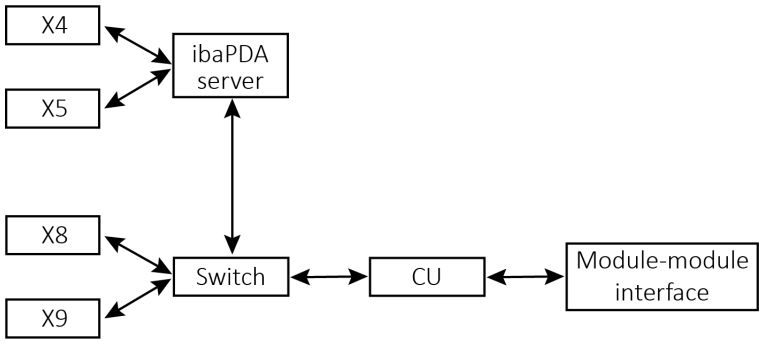
Used batteries and rechargeable batteries must not be disposed of with residual waste.

Batteries contain valuable raw materials that can be recycled and reused. Devices with the symbol are subject to EU Directive 2002/96/EC on waste electrical and electronic equipment. As a manufacturer we are obliged under the above directive to make you aware of this directive in the context of selling batteries or rechargeable batteries.

Batteries must not be disposed of in the household waste. This is marked by a crossed-out rubbish bin or waste container. You are legally responsible for the proper disposal of batteries. Please dispose of spent batteries as required by law at municipal collection centers or return them to your local retailer free of charge. It is expressly forbidden to dispose of batteries in the household waste; this is harmful for the environment. Batteries delivered by us can be returned free of charge or returned by mail with sufficient postage.

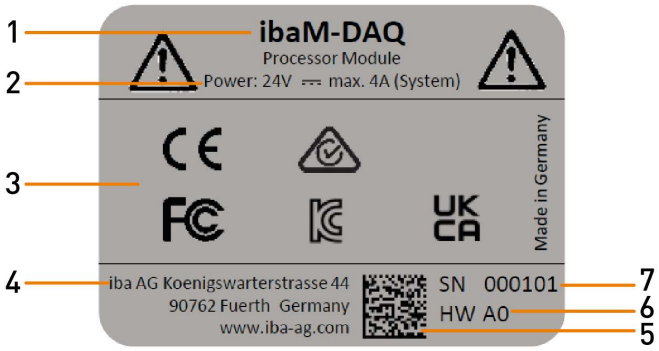
7.5 Flow chart

The following block diagram visualizes the internal communication of the device.



7.6 Type label

The type label provides the following information:



1	Name	5	DataMatrix code (iba internal)
2	Power supply	6	Hardware version
3	Standards	7	Serial number
4	Manufacturer		

8 System integration

8.1 Default settings

The following parameters are preset in the device at delivery:

8.1.1 Network parameters

Ethernet X4	DHCP active
Ethernet X5	Fixed IP address: 192.168.1.1 Subnet mask: 255.255.255.0
ibaNet (X8/X9)	Settings from *ibaPDA* v8.13.0 ■ DHCP active Settings with *ibaPDA* < v8.13.0 ■ Fixed IP address: 169.254.255.2 ■ Subnet mask: 255.255.255.252
Hostname	MDAQ-xxxxxx xxxxxx = 6-digit serial number, e. g. MDAQ-000036 The serial number can be found on the type label.

8.1.2 User accounts

Users	Password	Rights
DAQ	iba.SNxxxxxx xxxxxx = 6-digit serial number The serial number can be found on the type label. E.g. iba.SN000036	Administrator

Note

After 5 times of incorrect password entry, the login function is blocked for 30 minutes.

Each system installation also creates an administrator account (without password) by default. However, the account is not visible. To make the account visible, proceed as follows:

1. Run cmd as administrator
2. net user administrator /active:yes
3. Start menu - account screen - "Administrator" account

Note

Change default passwords after you have started up *ibaM-DAQ*! This makes unauthorized use of the system more difficult.

8.1.3 Other system settings

- Auto login is disabled
- The Windows “Account Lockout Threshold” feature is enabled:
  After 5 times of incorrect password entry, the login function is blocked for 30 minutes.
- The ScreenSaver lock is set to 5 minutes and password entry.

These settings can only be changed at the operating system level, either via a remote desktop connection or when input devices (monitor, mouse, keyboard) are connected directly.

8.2 Initial commissioning

First connect to the device or connect monitor, keyboard and mouse. When setting up via network, also refer to chapter ↗ *Addressing in the networks, page 32*.

The following options for initial commissioning are available:

- Connection with external *ibaPDA* client, see chapter ↗ *Connection with an external ibaPDA client, page 33*
- Connectio via Remote Desktop, see chapter ↗ *Connection via Remote Desktop, page 34*
- Set up with monitor, keyboard and mouse, see chapter ↗ *Set up with monitor, keyboard and mouse, page 35*

8.2.1 Addressing in the networks

In the factory setting, DHCP is enabled for the network interface X4. Thus, an IP address is automatically assigned to the device, as soon as it is connected to a network with a DHCP server. If the IP configuration is successful, *ibaM-DAQ* can be accessed via the host name MDAQ-<serial number>, e.g. MDAQ-000036.

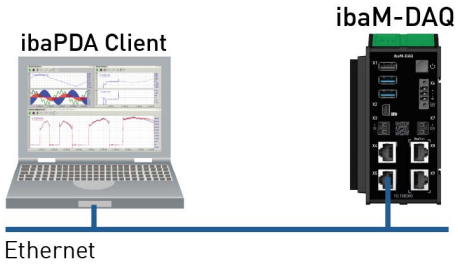
The network interface X5 is set to the fixed IP address 192.168.1.1 in the factory setting. If no DHCP server is available in your network, you can connect the device to the network via X5. To access the device via the fixed IP address, your PC also needs a free IP address in the same address space: 192.168.1.x (Note: x ≠ 1, since this is the address of *ibaM-DAQ*).

Note

In administrated network environments, it may occur that the device does not receive an IP address even if a DHCP server is available. This is usually due to the fact that unknown network devices are not allowed in the network for safety reasons. In this case, please contact your IT department to obtain network approval for the device.

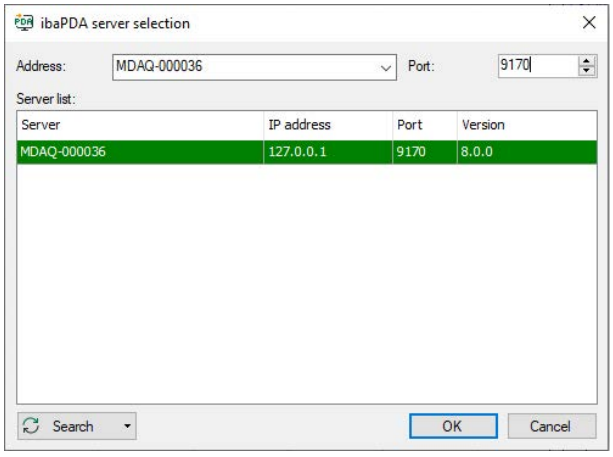
8.2.2 Connection with an external ibaPDA client

If you are using an external *ibaPDA* client for the configuration, the *ibaPDA* client and *ibaM-DAQ* have to be connected via the network.



Start *ibaPDA* on the external *ibaPDA* client and select *ibaM-DAQ* as *ibaPDA* server.

Click the button PDA on the toolbar or click *"Select server..." in the Configuration* menu.



Address
Enter the name or the IP address of the *ibaM-DAQ* device in the *address* bar. The name is composed of MDAQ-<six-digit serial number>. The serial number is found on the device type label. Example: MDAQ-000036.

Port number
The port number is entered automatically.

<Search> button
This button starts and stops the search for active *ibaPDA* servers in the network. If the *ibaPDA* client and *ibaM-DAQ* are located in the same network, the device should be displayed in the

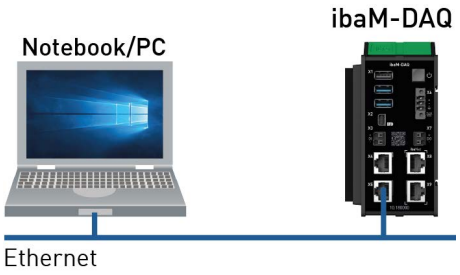
server list. The device can be selected either by double-clicking the device or by selecting it and subsequently clicking <OK>.

After the connection has been established, the device is displayed in the *ibaPDA* signal tree.

For further configuration proceed as described in chapter ↗ *Configuration in ibaPDA, page 36*.

8.2.3 Connection via Remote Desktop

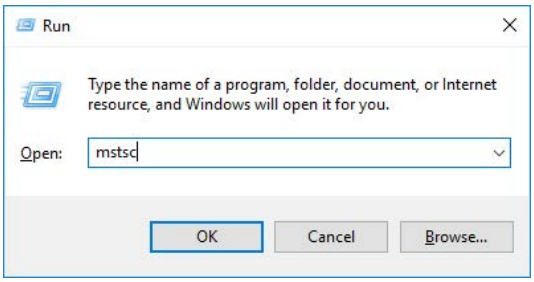
Operation is carried out via the network using Remote Desktop.



Open the Remote Desktop Connection on the system used to configure *ibaM-DAQ*. You can find this in the *Start* menu under Windows Accessories.

There is another option to open the Remote Desktop Connection:

Press the keys <Windows>+<R> and enter “mstsc“ in the field.



Enter the host name or the IP address of the *ibaM-DAQ* device in the field “Computer”.

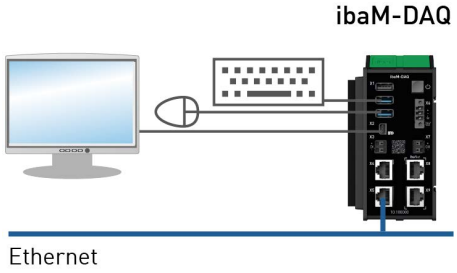
If you are requested to enter login information, use the information given in chapter ↗ *User accounts, page 31*.

Start the *ibaPDA* client from the Windows Start menu.

For further configuration, proceed as described in chapter ↗ *Configuration in ibaPDA, page 36*.

8.2.4 Set up with monitor, keyboard and mouse

Connect a monitor to the Mini DisplayPort port and a keyboard and mouse to the USB ports of *ibaM-DAQ*. If necessary use an adapter.



If required, log in to the system. You can find the login data in chapter ↗ *User accounts, page 31*.

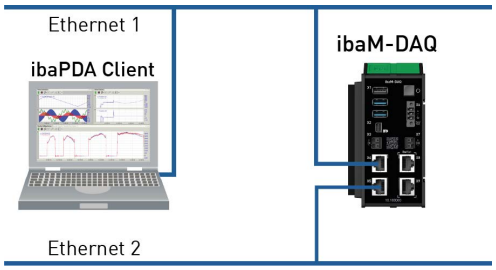
Start the *ibaPDA* client from the Windows Start menu.

For further configuration proceed as described in chapter ↗ *Configuration in ibaPDA, page 36*.

8.3 Connection to different networks

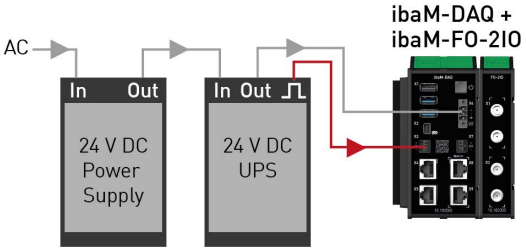
ibaM-DAQ can be operated in two different networks, for example, to separate the network that transmits and acquires measurement data from the rest of the network. For this purpose, the 2 Ethernet interfaces X4 and X5 are available.

Settings for addressing in the networks, see chapter ↗ *Addressing in the networks, page 32*.



8.4 Operation with compact UPS

In order to secure an optimal operation, it is recommended to buffer the power supply of the *ibaM-DAQ* system via an uninterruptible power supply (UPS) with additional digital output. For this purpose, the digital output of the UPS serves as signal for securely shutting down the operating system. The UPS should be designed in such a way that the system is buffered for at least 5 minutes.



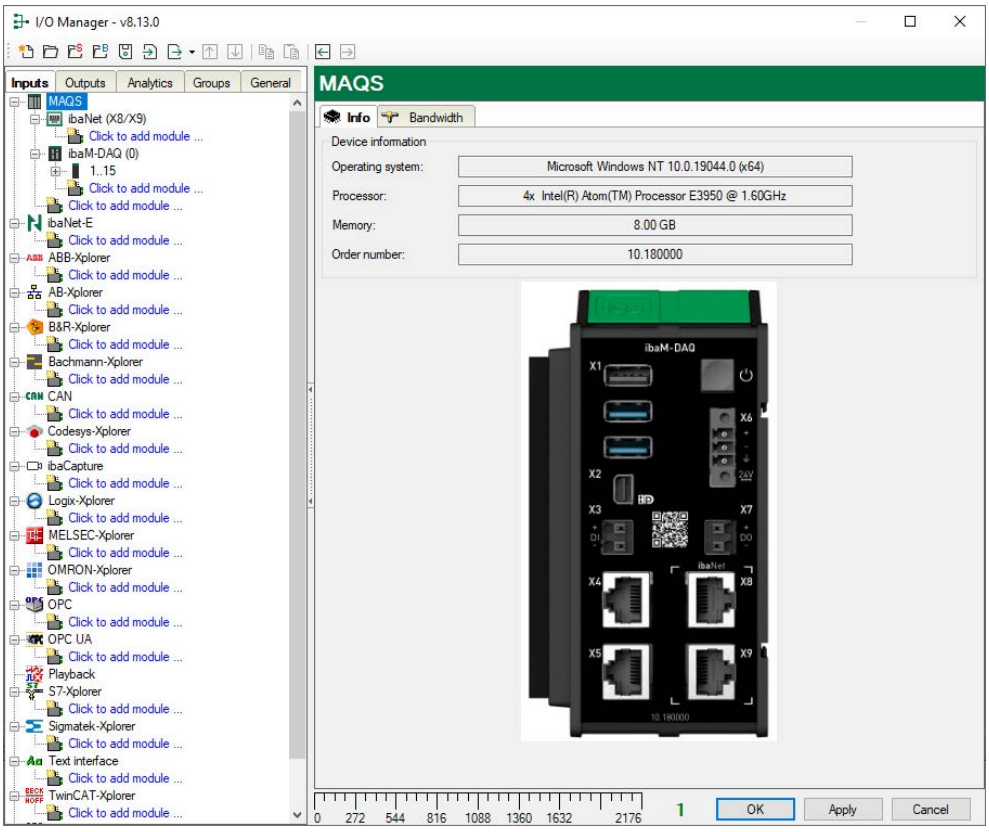
9 Configuration in ibaPDA

ibaPDA allows you to configure, acquire, and record the analog and digital signals of the connected modules.

Prerequisite: You have established a connection to the device and started *ibaPDA*. See chapter ↗ *System integration*, page 31.

9.1 Interface MAQS

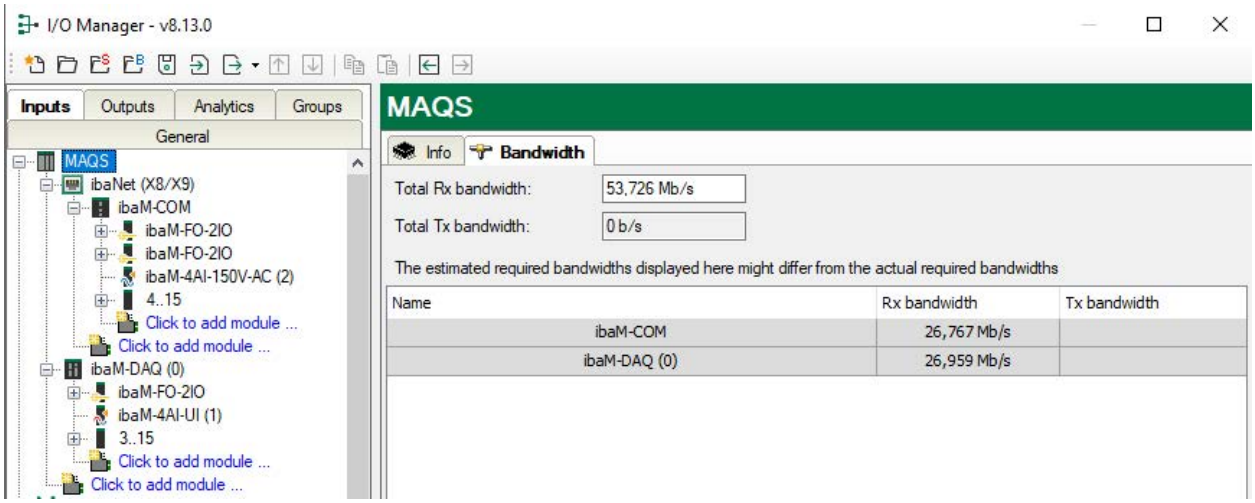
If the *MAQS* interface is marked, the *Info* tab is displayed.



The *Device information* section provides information on the operating system, processor, memory, and order number.

9.1.1 MAQS – Bandwidth tab

The *Bandwidth* tab provides information about the data throughput of the module-module interface, including the ibaNet (X8/X9) interface. The estimated data throughput in the transmit and receive directions is displayed, as well as the data throughput of the connected modules.

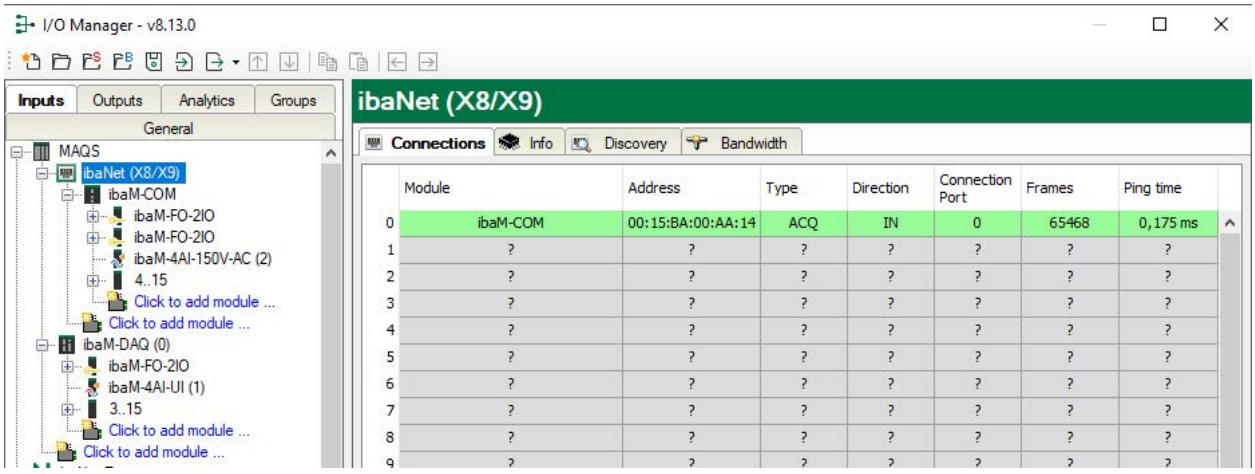


9.2 Interface ibaNet (X8/X9)

Additional ibaNet-E-compatible devices can be connected via the ibaNet interface (X8/X9). The interface provides the following information and configuration options.

9.2.1 ibaNet (X8/X9) – Connections tab

All ibaNet-E connections are displayed in an overview.



Module
The name of the connected module or device.

Address
Address of the target device. Depending on the set data path, the MAC address or the IP address/host name (with DHCP) is displayed here.

Type
Type of the ibaNet-E connection.

- ACQ: Receive connection; isochronous acquisition of all values; with telegram repetitions
- PLC: Send connection; only the most recent value is sent without any repetitions if there are transmission errors

Direction
Input or output direction

- Input direction: Receiving data from the ibaNet-E device
- Output direction: Sending data to the ibaNet-E device

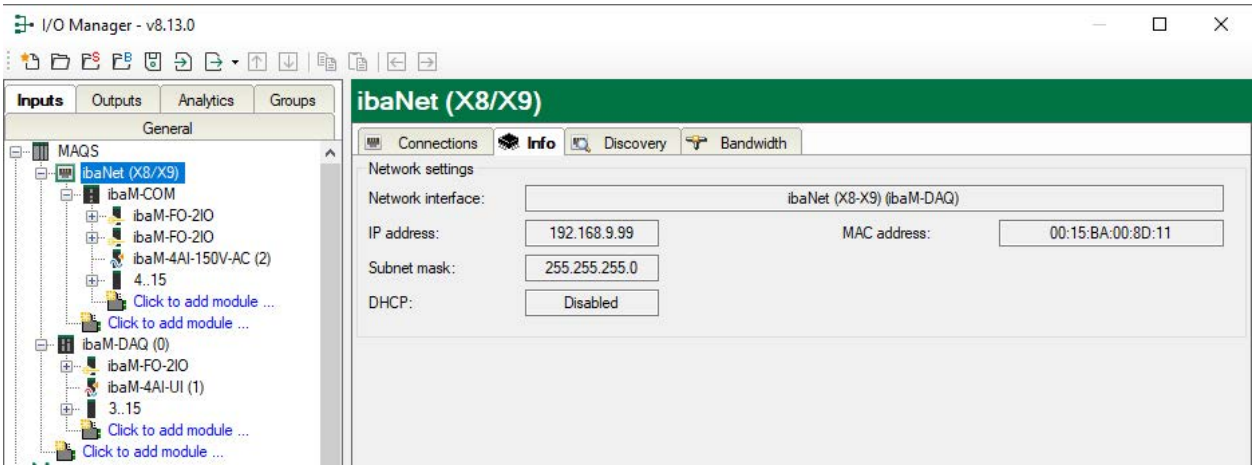
Frames
Number of telegrams for this connection.

Ping time
Current ping time for this connection.

While a valid ibaNet-E receive connection is live, a ping is sent cyclically to the ibaNet-E device. The measured time is displayed here, and indicates the connection quality of the Ethernet network. The shorter this time is, the better the connection quality, and the more secure the data transmission. If the connection quality is poor, the connection in question is highlighted in orange.

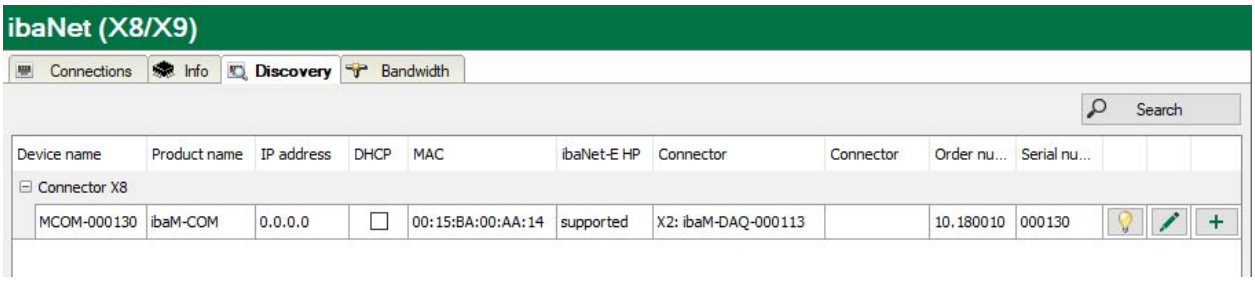
9.2.2 ibaNet (X8/X9) – Info tab

The Info tab provides information about the network settings.



9.2.3 ibaNet (X8/X9) – Discovery tab

You can search for ibaNet-E devices in the *Discovery* tab. Please note that this search can only be successful if the device is located in the same LAN as the *ibaM-DAQ* device.



Search devices

1. Start *ibaPDA* and open the I/O Manager.
2. Select the *ibaNet (X8/X9)* interface and select the *Discovery* tab.
3. Start the search by clicking on <Search>.

→ Devices found are listed in a table and cannot be changed in this display.

Information on the devices found

If individual columns are not displayed, you can show or hide them using the context menu (right-click in the header). The header contains the following information:

Device name
Device name, or host name of the device

Product name
ibaM-DAQ

IP address
The IP address of the device

Subnet mask
The subnet mask of the IP settings

Gateway
The gateway of the IP settings

DHCP
The IP settings are obtained from a DHCP server (enabled or not).

MAC
MAC address of the device

Order number
The iba order number of the device

Serial number
The serial number of the device

ibaNet-E HP
This column shows support for ibaNet-E HP (High Performance). Explanations for the display in this column can be found in chapter ↗ *ibaNet-E HP support, page 40*.

Under certain conditions, ibaNet-E communication can also be operated as “High Performance (HP)”, then referred to as ibaNet-E HP. With ibaNet-E HP, it is possible to achieve, among other things, a higher data throughput per ibaNet interface (750 Mbit/s) and a synchronization accuracy of up to 1 µs.

Connector
ibaM-DAQ recognizes the participants in the ibaNet-E network. The participants are displayed per connector of the *ibaM-DAQ* device (Connector X8 or Connector X9). Connected participants that can be identified are displayed with the connector they are using.

Meaning of the buttons:

Identify device
When you click this button, the status indicators (LEDs) on the front of the device start blinking for a short time. This makes it possible to identify the device directly.

Edit device settings
Click this button to open the window for the device and IP settings.

Add device to I/O configuration
Click this button to add the device to the I/O configuration of the ibaNet-E-interface in *ibaPDA*. Connected modules are identified and added automatically as far as possible.

9.2.3.1 ibaNet-E HP support

The *Discovery* tab, in the *ibaNet-E HP* column, shows support for ibaNet-E HP (High Performance).

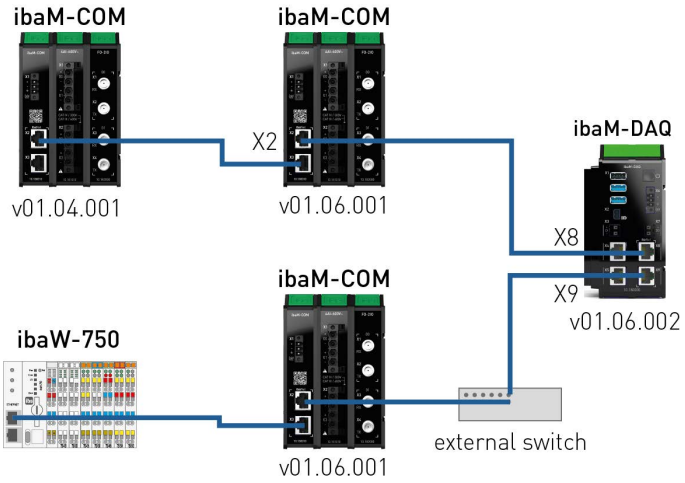
The requirements for ibaNet-E HP are:

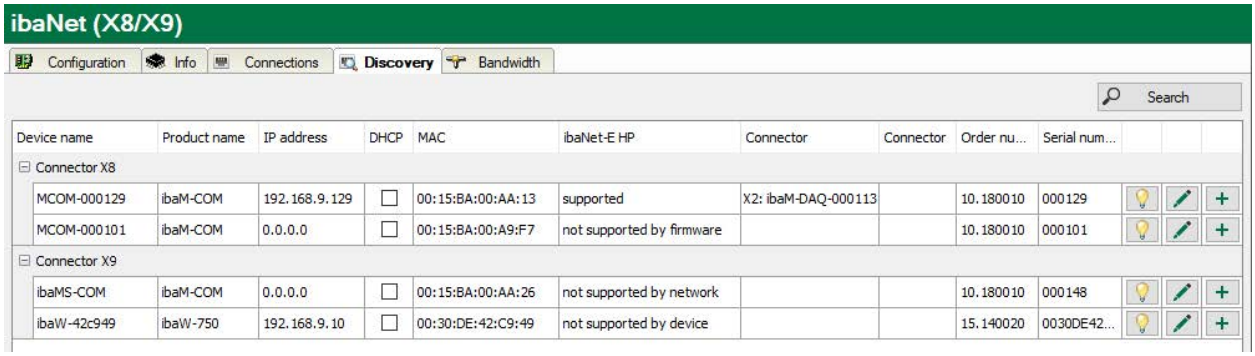
- *ibaPDA* v8.13.0 or higher
- dedicated ibaNet-E network
- *ibaM-DAQ* with firmware v01.06.002 or higher
- max. 10 *ibaM-COM* devices in a daisy chain (firmware v01.05.001 or higher)
- Data path MAC in the *ibaPDA* configuration

Possible displays in the *ibaNet-E HP* column and their meaning:

Display	Meaning
supported	The connected device supports ibaNet-E connections with High Performance (ibaNet-E HP).
not supported by network	The connected device supports ibaNet-E HP. However, the network is not configured in such a way that ibaNet-E HP can be used.
not supported by firmware	The connected device may support ibaNet-E HP, but the firmware on the device does not support ibaNet-E HP. A firmware update is required to support ibaNet-E HP.
not supported by device	The device itself does not support ibaNet-E HP.
not supported	A device was found for which no statement can be made about the capability of ibaNet-E HP.

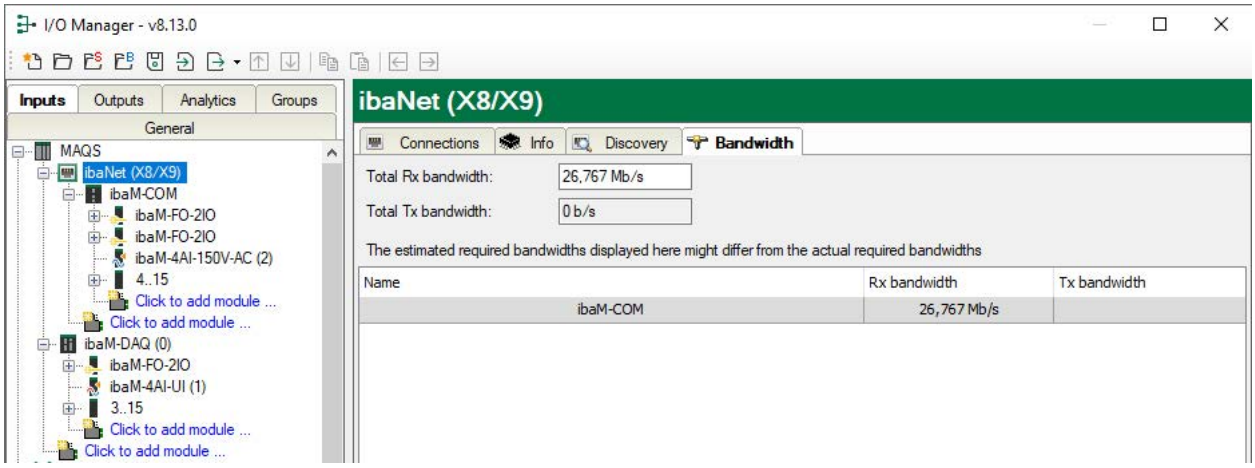
Example:
With the following network topology, this display appears in the *Discovery* tab:





9.2.4 ibaNet (X8/X9) – Bandwidth tab

The *Bandwidth* tab provides information about the data troughput of the ibaNet (X8/X9) interface. The estimated total data troughput in the transmit and receive direction is displayed here, as well as the data troughput for the connected ibaNet-E devices.

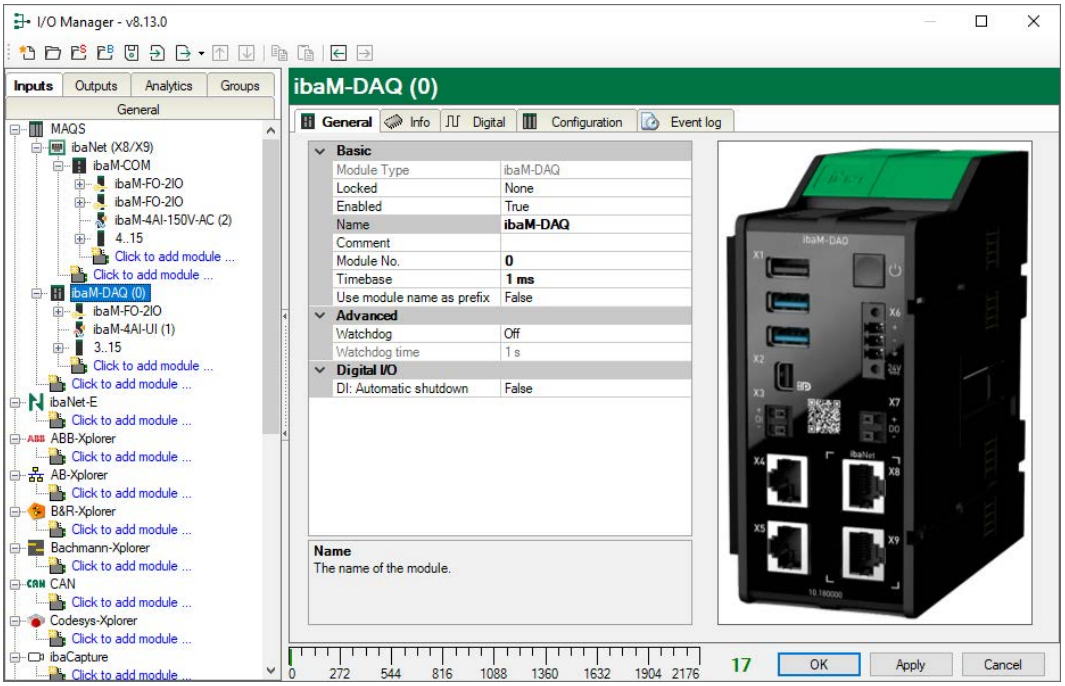


9.3 Configuring ibaM-DAQ

The *ibaM-DAQ* device module is described below.

9.3.1 ibaM-DAQ – General tab

In the *General* tab, you make the basic settings and settings for the digital input.



Basic

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

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

Enabled
Enable the module to record signals.

Name
You can enter a name for the module here.

Comment
You can enter a comment or description of the module here. This will be displayed as a tooltip in the signal tree.

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

Timebase
All signals of the module are sampled on this timebase.

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

Advanced

Watchdog
Enable the watchdog function by selecting a type:

- I/O bus watchdog

  Watchdog function for attached modules. If an error occurs on the I/O bus that would prevent data acquisition from continuing, this watchdog triggers immediately. This means that data acquisition is stopped, the I/O bus is reset, and data acquisition is then restarted.

  Only one attempt is made to reset the I/O bus. If the error persists after this, the system remains in error mode.

- System watchdog

  Watchdog function to ensure that the *ibaPDA* server is running. When this watchdog triggers, the operating system will restart the entire system.

  The system watchdog function includes the I/O bus watchdog function.

Watchdog time
Time delay for the system watchdog function in seconds, minimum 1 s, in increments of 0.5 s.

Digital I/O

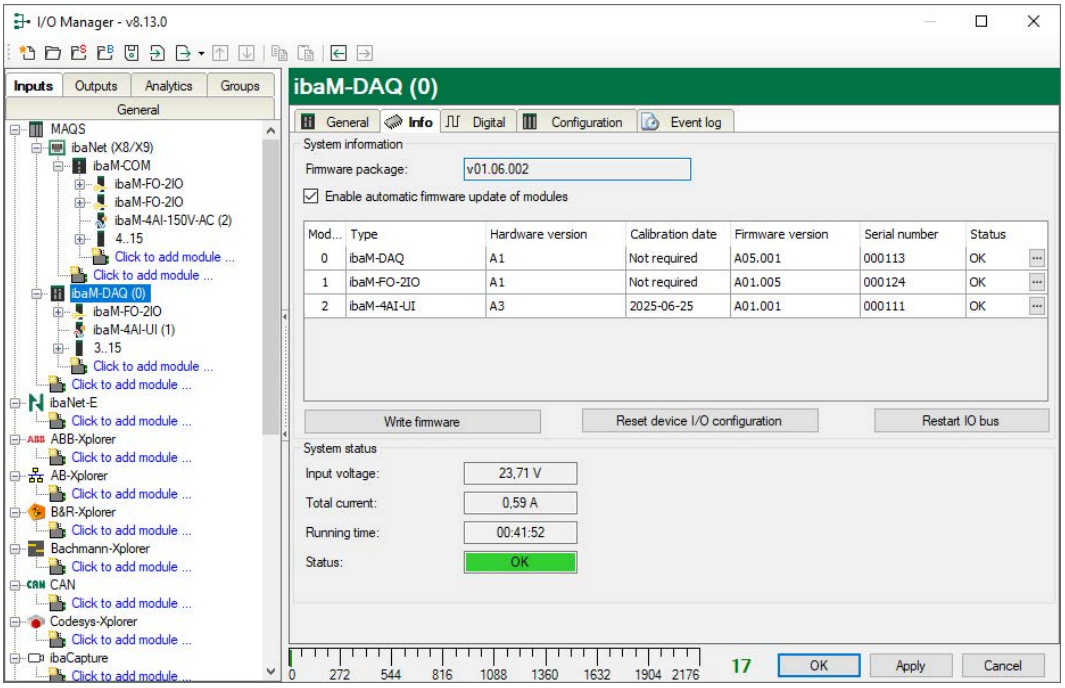
DI: Automatic shutdown
TRUE: *ibaM-DAQ* is shut down automatically if DI is asserted.

Note

If TRUE is selected here, the automatic shutdown function is active even if the signal in the *Digital* tab is disabled.

9.3.2 ibaM-DAQ – Info tab

Mark the *ibaM-DAQ* module in the module tree and select the *Info* tab. You can find the firmware version and information about the individual modules connected to the IO bus in the *System information* area.

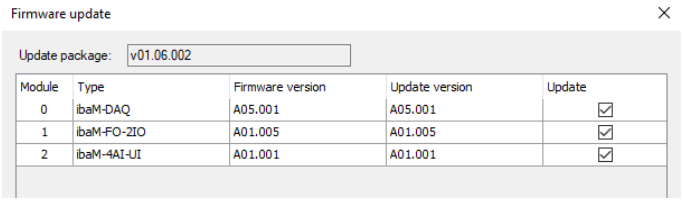


Enable automatic firmware update of modules
If the firmware version of a module does not match the firmware package of *ibaM-DAQ*, *ibaM-DAQ* performs an automatic firmware update of the module.

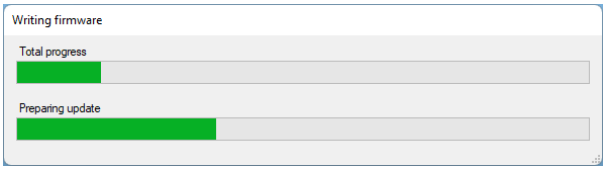
The device must not be switched off during the update.

Write firmware
With this button it is possible to perform firmware updates. Select the update file `ibaM_v[xx.yy.zzz].iba` in the browser and start the update process by clicking <Open>.

In the following dialog, you can specifically select which modules you want to update or whether you want to update the overall system.



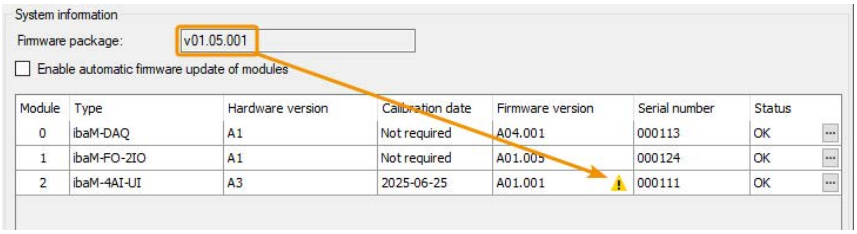
The update process is started by clicking on <OK>. The following dialog informs you about the progress of the update.



Note

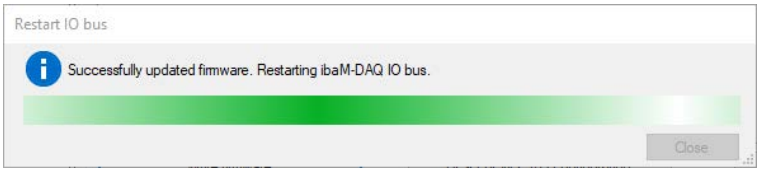
This process may take several minutes and must not be interrupted. After an update, the I/O bus will restart automatically.

If the firmware version of a module does not match the version included in the firmware package or if no firmware is included for this module in the firmware package, an exclamation mark appears.

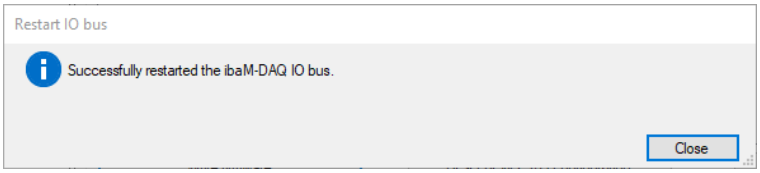


Reset device I/O configuration
You can use this button to reset the entire module configuration.

Restart IO bus
You can use this button to restart the IO bus and the modules within it.



The successful restart is confirmed with the following notification.



The following information is displayed in the *System status* area:

Input voltage
Internal supply voltage, deviates minimally from the supply voltage at the power supply connector due to the internal circuitry.

Total current
The power consumption of the entire system including all modules (with an accuracy of ±10 %).

Running time
The total running time of the I/O bus since the last start in the format [d].hh:mm:ss

Status
The status of the entire system incl. all modules.

9.3.3 ibaM-DAQ – Configuration tab

The *Configuration* tab displays information about the module-module interface and its configuration:

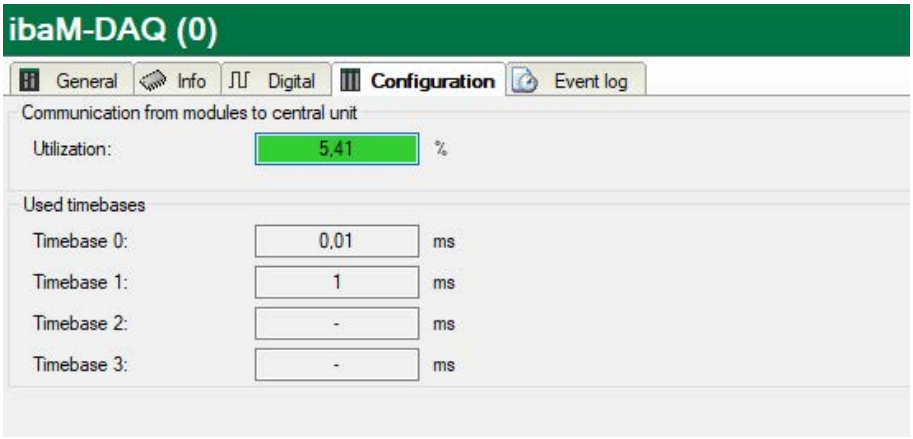
- Utilization of the module-module interface in percent

  The utilization of this interface depends on various factors, mainly the typical data throughput of 512 Mbit/s, the timebases used, and the signals configured in *ibaPDA*.

  The utilization indicator is green from 0 to 90%. Above 90%, it turns orange, indicating imminent overload. If the module-module interface utilization exceeds 100% (the display turns red), acquisition can no longer be started.

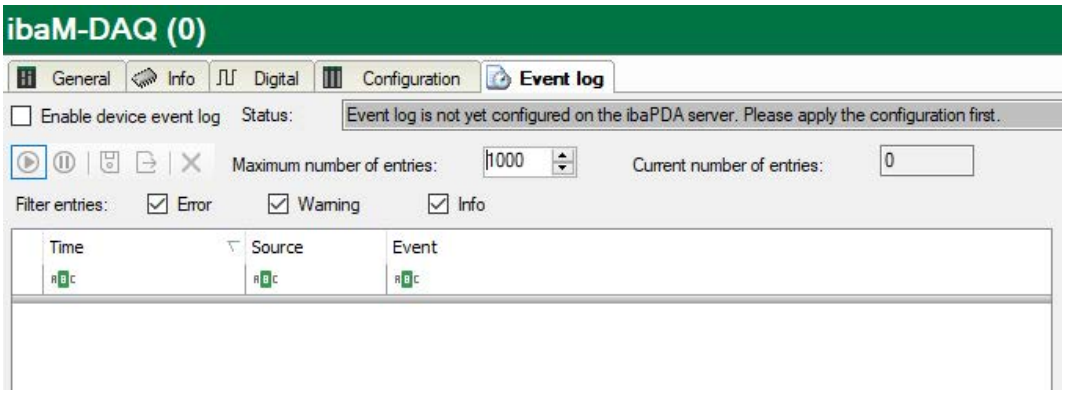
- Used timebases

  Each *ibaM-DAQ* device supports four different timebases for module configuration and communication. This overview shows the use of timebases with the corresponding configured time in ms.



9.3.4 ibaM-DAQ – Event log tab

In the *Event log* tab, the status changes of the *ibaM-DAQ* device are documented in a list.



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
The status of the connection between *ibaPDA* and *ibaM-DAQ* for reading the events is displayed here.

Maximum number of entries
Here you can set the maximum number of saved entries (100 - 100,000).

Current number of entries
The currently saved number of entries.

Operating elements

	When pressing the button, the list of events is automatically updated
	The automatic update is paused
	Continuously save messages in a file
	Export visible entries to a text file
	Clear diagnostic buffer

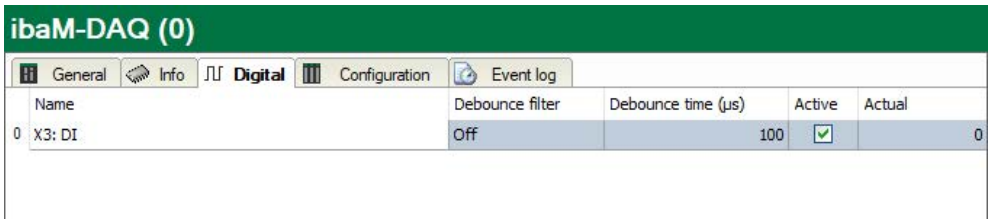
The list of events can be filtered in a customized way. If you want to filter the events according to a type, just select one or more types above the list: error, warning, info.

For further filtering, enter the filter text you are searching for in the desired field in the top line. All events containing the entered search text, will be displayed.

9.3.5 ibaM-DAQ – Inputs

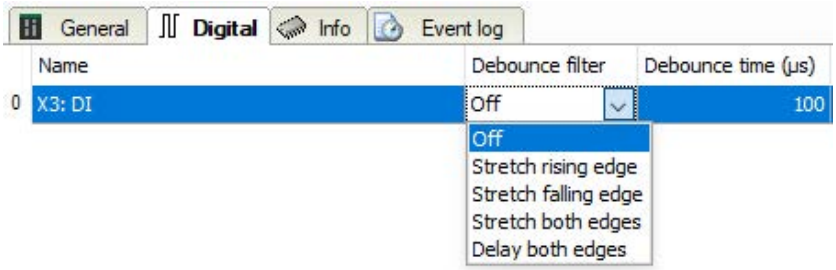
Select the *Inputs* tab in the module tree to define settings for the input signals.

9.3.5.1 ibaM-DAQ – Digital tab



Name
Here you can enter a signal name and additionally two comments when clicking the icon in the *Name* field.

Debounce filter
In the dropdown menu, you can choose the operating mode for the debounce filter. The following settings are available: Off, Stretch rising edge, Stretch falling edge, Stretch both edges, Delay both edges.



Debounce time (µs)
Here you can define the debounce time in µs

Active
Enabling/disabling the signal

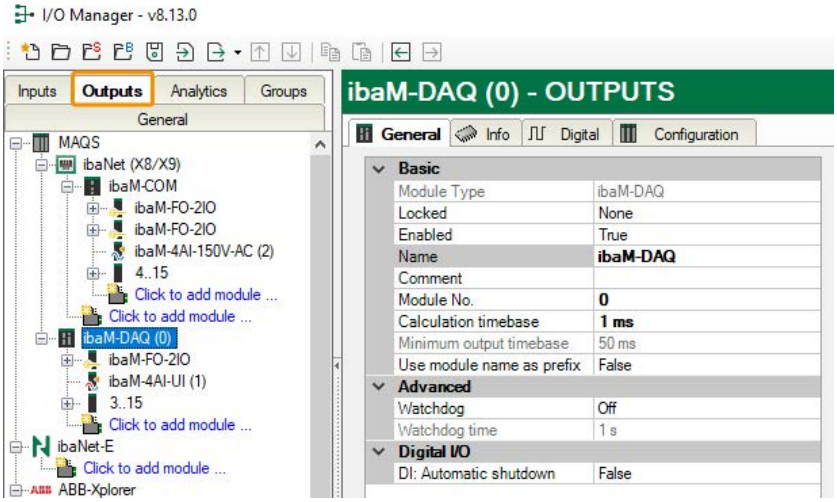
Actual
Display of the currently measured value

9.3.6 ibaM-DAQ – Outputs

Select the *Outputs* tab in the module tree to define settings for the output signals.

9.3.6.1 ibaM-DAQ - General tab

Most of the basic settings apply to the input and output module. The *Calculation timebase* and *Minimum output timebase settings* are only available for the output module.



Basic

Module type, Locked, Enabled, Name, Module No., Use name as prefix
see chapter ↗ *ibaM-DAQ – General tab, page 42*.

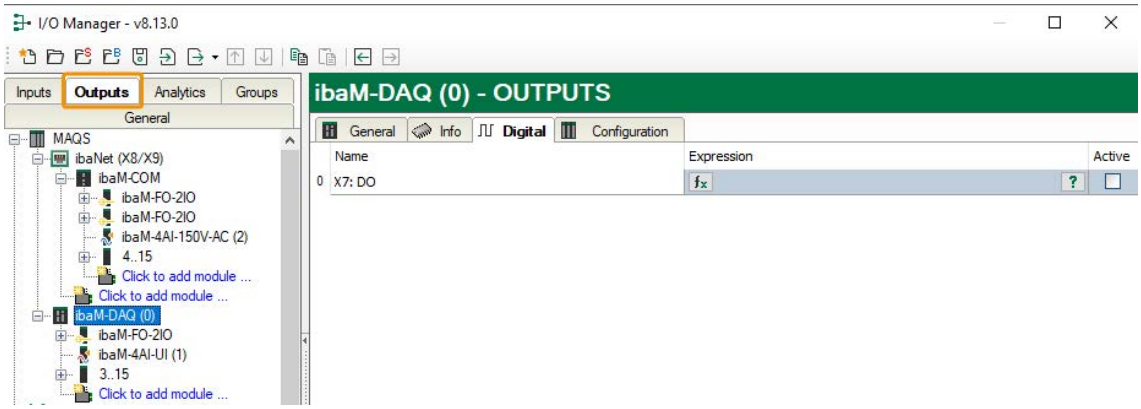
Calculation timebase
Timebase (in ms) used for the calculation of the output values.

The calculation timebase is not the same as the output timebase, with which the values are output. The calculation timebase is identical to the timebase of the input module.

Minimum output timebase (information only)
Timebase with which the outputs can be updated as quickly as possible. The output timebase results from the smallest common multiple of all module timebases or is at least 50 ms.

9.3.6.2 ibaM-DAQ – Digital tab

The following parameters can be set on the *Digital* tab:



Name
Here you can enter a signal name and additionally two comments when clicking the icon in the *Name* field.

Expression
You can use the expression builder to assign signals to the outputs or to combine signals through logical or mathematical operations.

Active
Enabling/disabling the signal

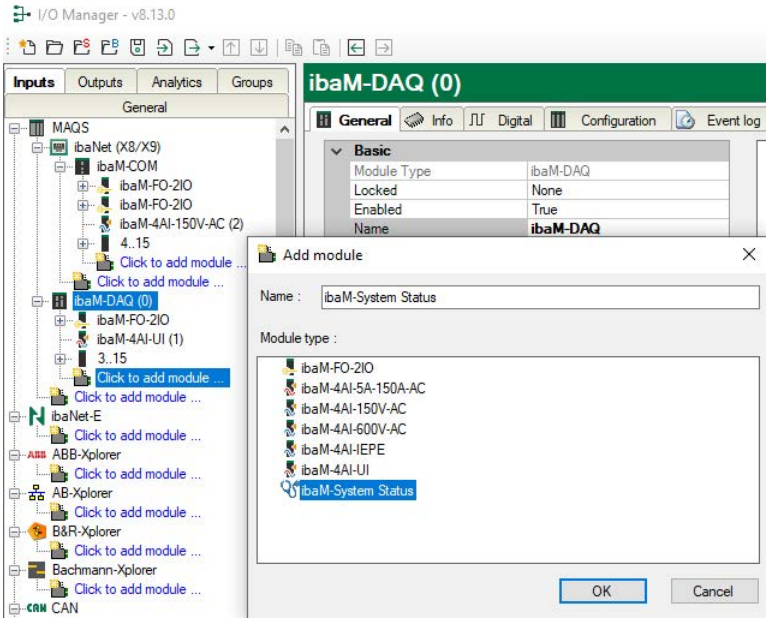
9.3.7 ibaM-DAQ system status

The *ibaM-System Status* module can be used to record information about the system status of the *ibaM-DAQ* system as signals.

9.3.7.1 Add system status module

Procedure

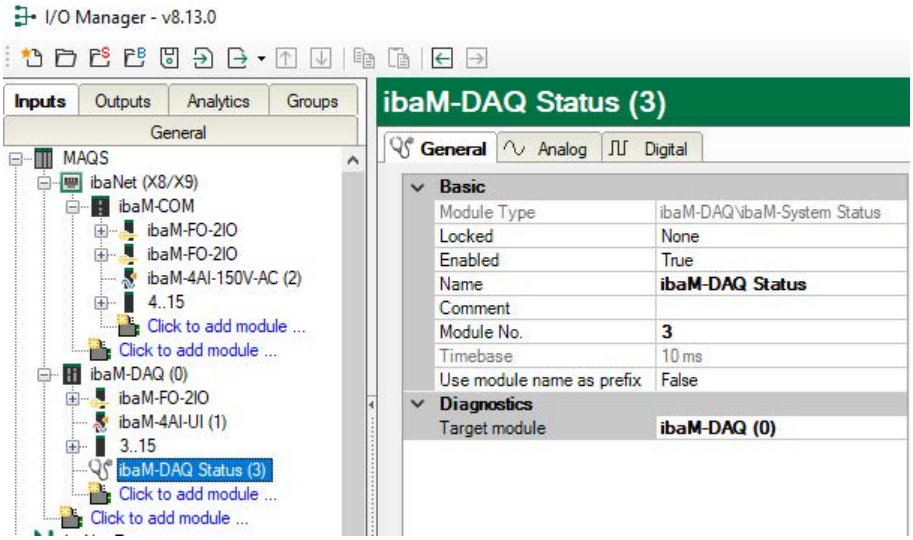
1. Click on the link *Click to add module* under *ibaM-DAQ*.
2. Select *ibaM-System Status*.



Note: The system status signals reduce the *ibaPDA* signal license.

9.3.7.2 ibaM-DAQ Status – General tab

The following settings can be made in the *General* tab.



Basic

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

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

Enabled
Enable the module to record signals.

Name
You can enter a name for the module here.

Comment
You can enter a comment or description of the module here. This will be displayed as a tooltip in the signal tree.

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

Timebase
The time base is preset and cannot be changed here.

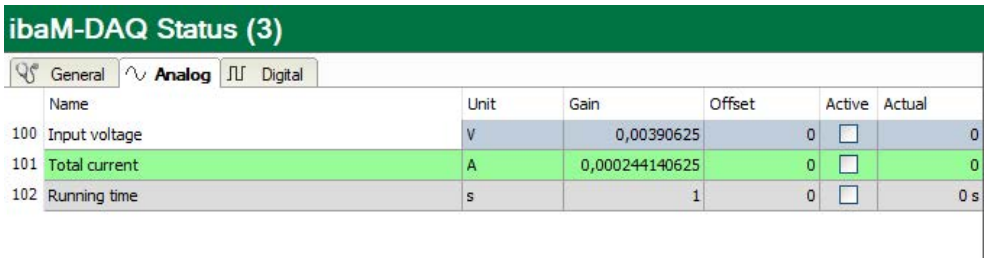
Use module name as prefix
This option puts the module name in front of the signal names.

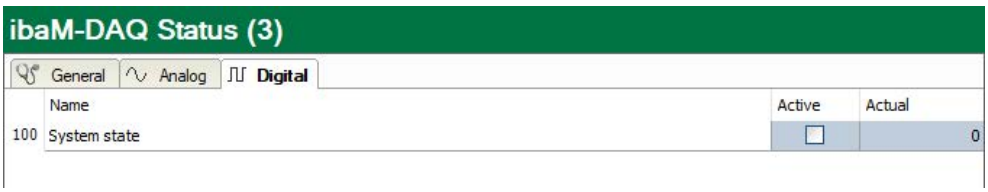
Diagnostics

Target module
The target module *ibaM-DAQ* is already preset.

9.3.7.3 Status signals

The available signals are automatically generated in the *Analog* and *Digital* tabs.





Analog status signals

Signal name	Description
Input voltage	Internal supply voltage, deviates minimally from the supply voltage at the power supply connector due to the internal circuitry.
Total current	The power consumption of the entire system including all modules (with an accuracy of ±10%).
Running time	The total running time of the IO bus since the last start in the format [d].hh:mm:ss

Digital status signals

Signal name	Description
Status	The status of the entire system incl. all modules.

9.3.8 ibaNet-E diagnostics

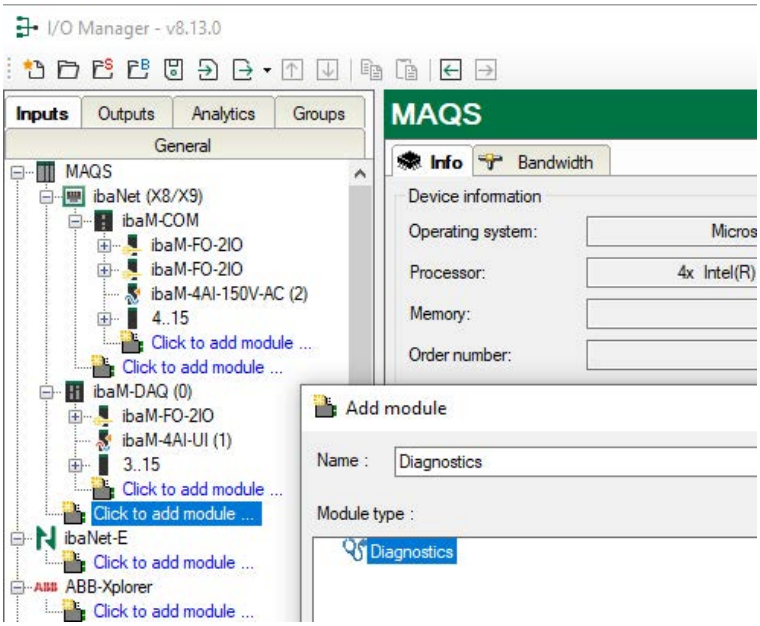
With the *Diagnostics* module at *ibaM-DAQ* level, information about the ibaNet-E connection can be recorded as signals.

9.3.8.1 Add a diagnostic module

Diagnostic modules do not require an additional license, since they do not establish their own connection, but refer to another module.

Procedure

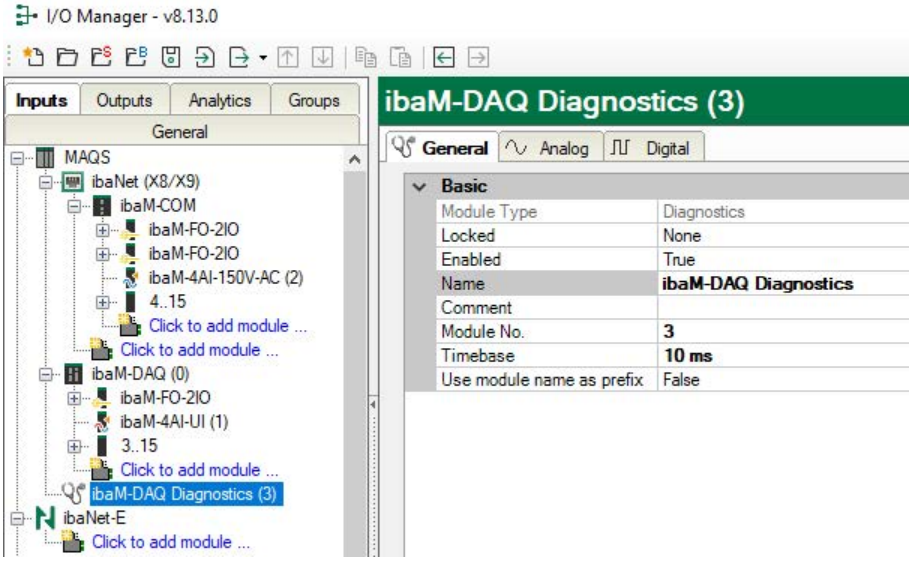
1. Click on the link *Click to add module* under MAQS.
2. Select *Diagnostics*.



Note: The diagnostic signals reduce the *ibaPDA* signal license.

9.3.8.2 General tab

Make the basic settings in the *General* tab.



Basic

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

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

Enabled
Enable the module to record signals.

Name
You can enter a name for the module here.

Comment
You can enter a comment or description of the module here. This will be displayed as a tooltip in the signal tree.

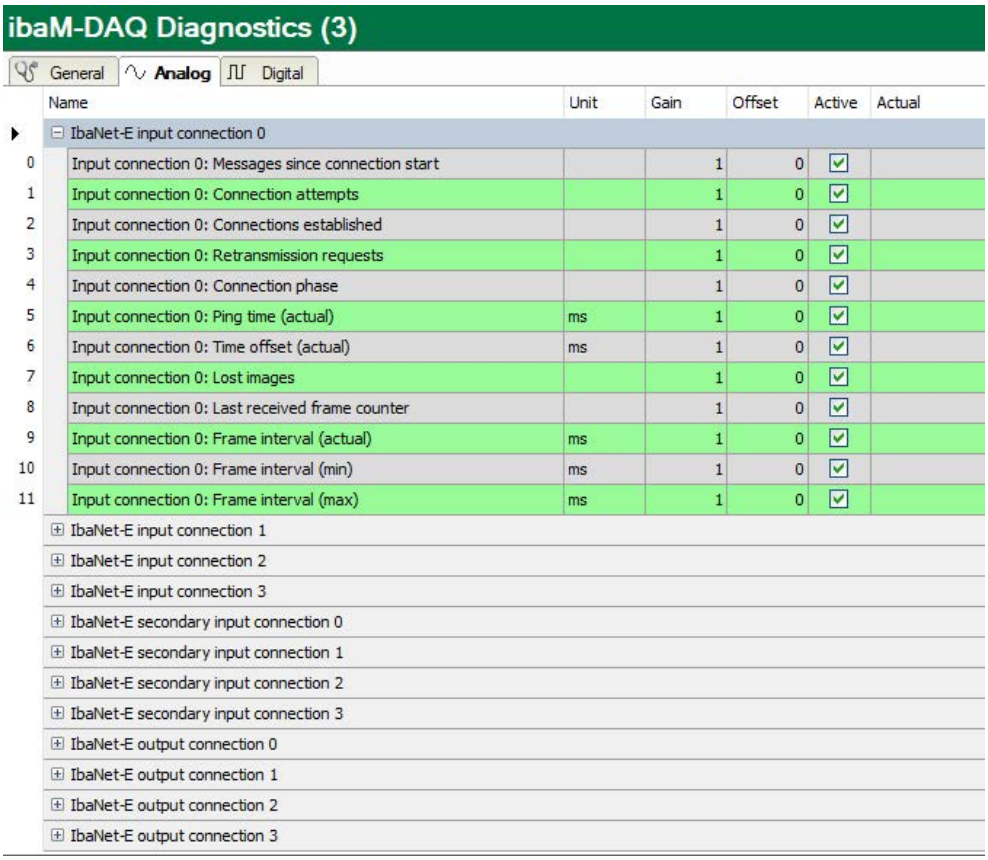
Module No.
This internal reference number of the module determines the order of the modules in the signal tree of *ibaPDA* client and *ibaAnalyzer*.

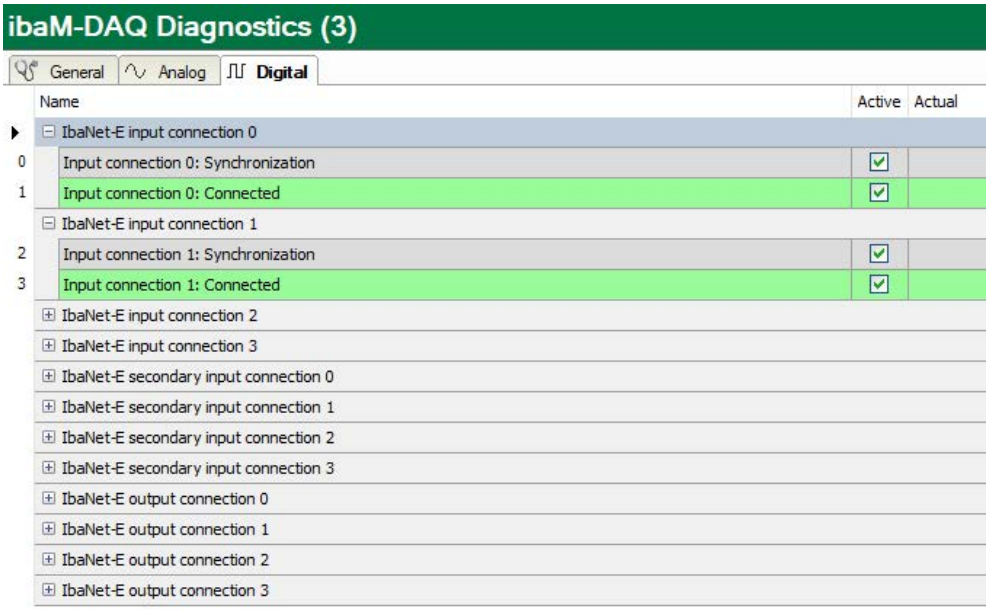
Timebase
All signals of the module are sampled on this timebase.

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

9.3.8.3 ibaM-DAQ diagnostic signals

The available diagnostic signals are automatically generated in the *Analog* and *Digital* tabs.



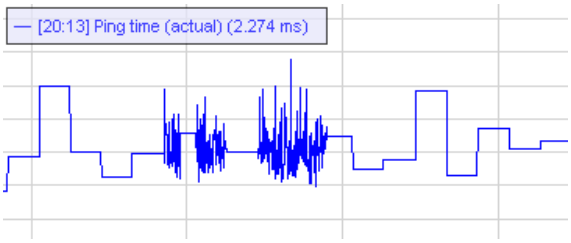


The signals are all enabled by default.

The signals are grouped by connection type:

- Input connection: connection diagnostics of the measurement signals
- Secondary input connection: connection diagnostics of diagnostic, status and additional signals
- Output connection: connection diagnostics of the output signals

Examples of diagnostic signals:

Name	Signal type	Description
Ping time (actual)	analog	A feature of the connection quality for the Ethernet: In regular operation, a ping to the ibaNet-E device is performed every one second and the measured time is displayed here. The shorter this time is, the better the connection quality and the more reliable the data transmission. For the synchronization at the start of the acquisition and sporadically during the acquisition, this ping is performed at a much higher frequency. 
Time offset	analog	Measured time difference of synchronicity between *ibaPDA* and the ibaNet-E device
Lost images	analog	Number of lost images that were not received even after a retransmission
Synchronization	digital	The device is synchronized for isochronous acquisition. This is always mandatory at the start of data acquisition, but can also be performed sporadically during data acquisition.

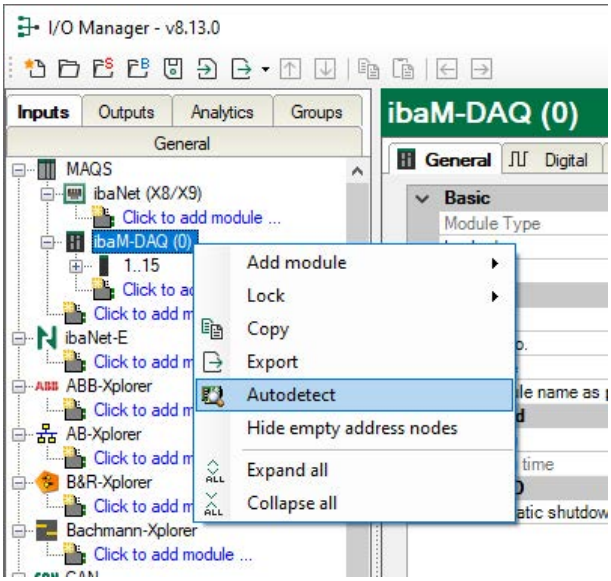
9.3.9 Adding modules

Up to 15 I/O modules from the ibaMAQ system can be added to *ibaM-DAQ*.

9.3.9.1 Adding module automatically

1. Select the "ibaM-DAQ" link in the I/O Manager.
2. Right-click on the link to open a submenu.
3. Select *Autodetect*.

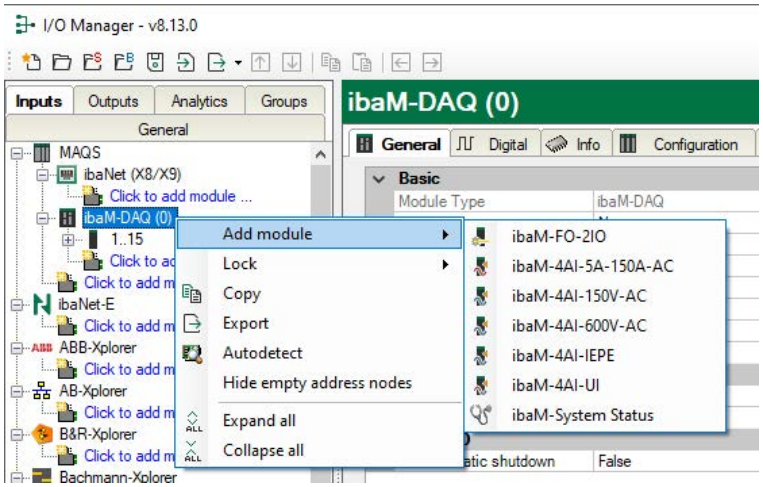
→ If *ibaPDA* detects the device automatically, the device and the connected modules are listed in the module tree.



9.3.9.2 Adding module manually / offline

Modules can also be added manually.

1. Right-click on the "ibaM-DAQ" link and select *Add module*.
2. Select the desired modules from the list.



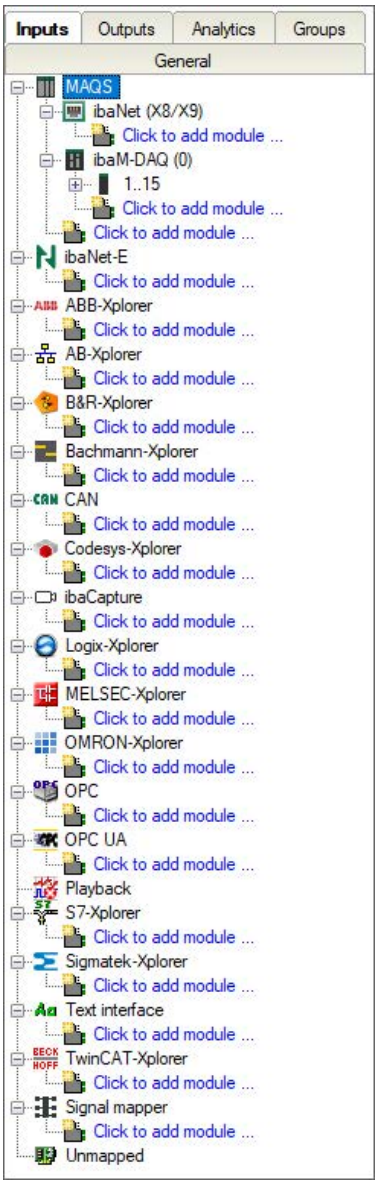
An offline configuration makes it possible, for example, to export a module configuration without existing or connected modules or to save the entire I/O configuration of the I/O Manager.

Other documentation

For detailed information, refer to the corresponding device manuals.

9.3.10 ibaPDA interfaces

Communication interfaces are additionally available for the connection of the field level (e.g., Modbus, etc.) as well as standard interfaces to communicate data to superordinate IT systems (DB-Datastore, Kafka, ...). The interface *ibaPDA-OPC-UA-Server+* is already included in the standard scope of delivery. Further communication interfaces require separate licenses. If you have licensed additional communication interfaces, they appear as nodes in the tree structure.

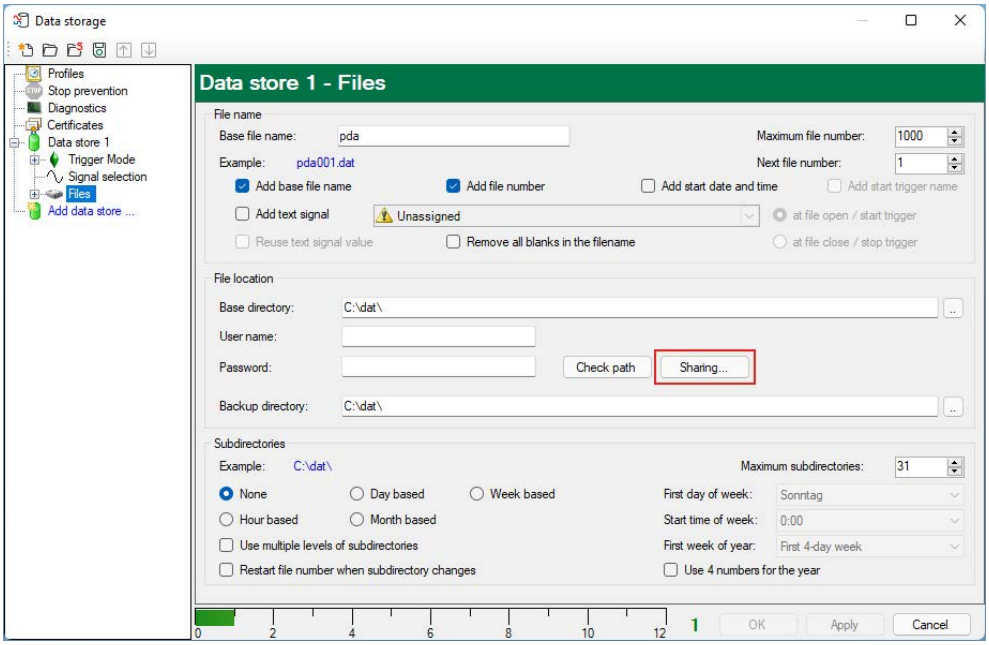


Other documentation

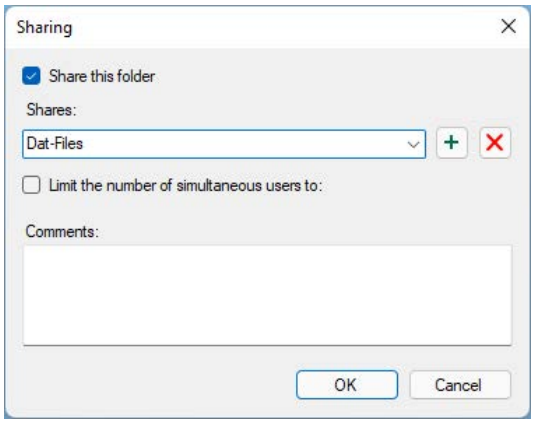
The description and configuration of the individual communication interfaces can be found in the corresponding interface manuals.

9.3.11 Setting up file sharing

To comfortably access measurement files recorded with *ibaPDA* through the network, the *ibaPDA* client allows setting up read-only access. Open the data storage dialog in *ibaPDA* and mark the *Files* node.



Select a folder to be released for access.



Note

When running *ibaM-DAQ* in a so-called work group, you need the user name and the password to access it.

If *ibaM-DAQ* and the accessing PC are in the same domain, a separate authentication is usually not necessary.

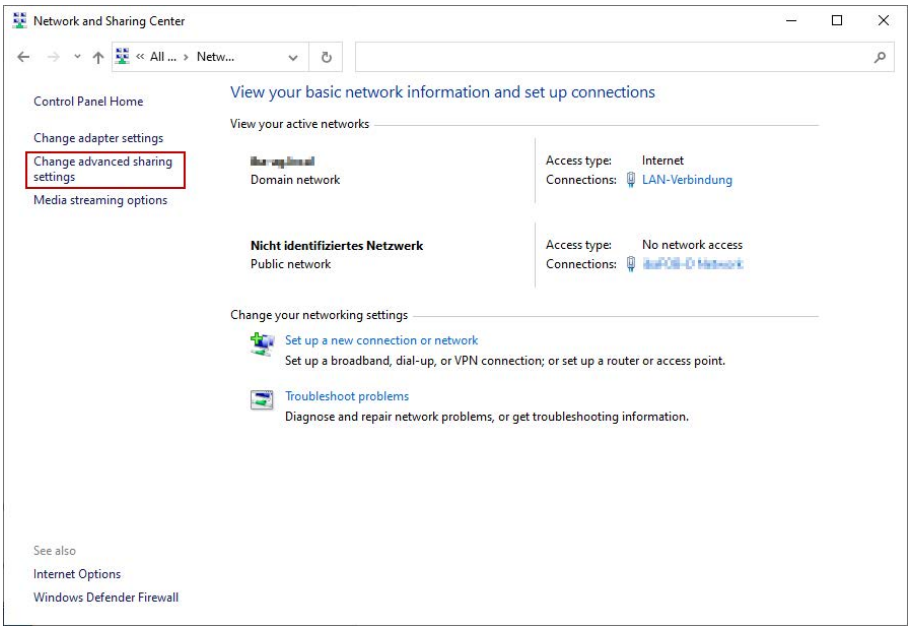
9.3.11.1 Troubleshooting

If you cannot access the shared directory from another system, file and printer sharing may not be enabled.

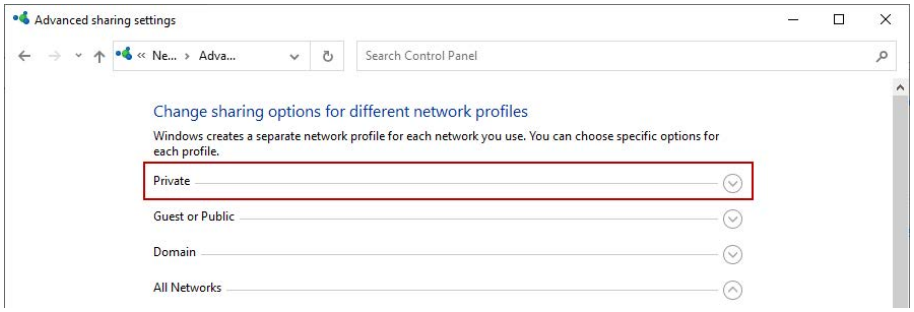
You can activate it as follows:

1. Right-click the network icon in the notification area of the taskbar to open the "Network and Sharing Center."

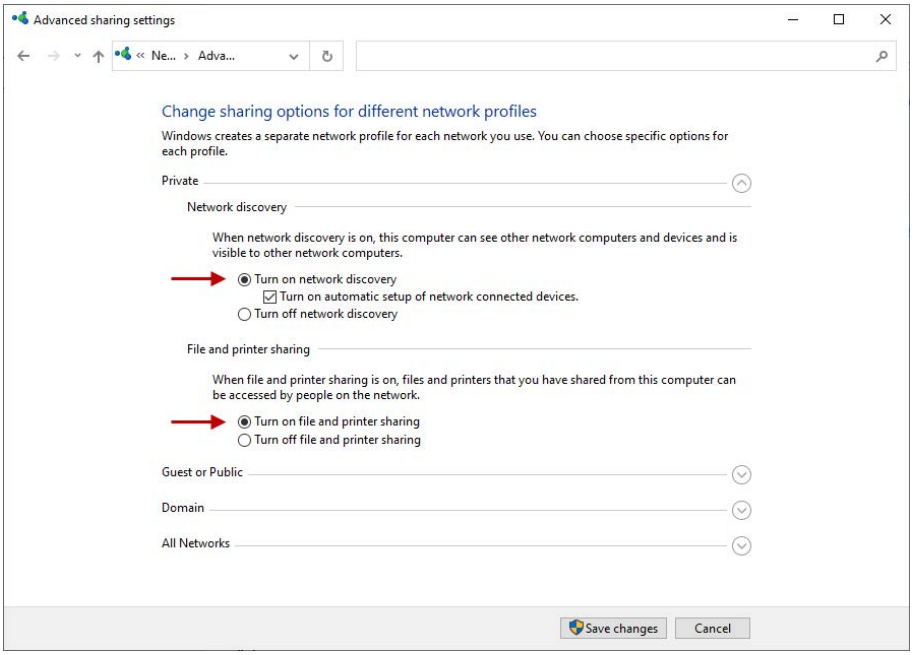
2. In the "Network and Sharing Center" open the "Advanced Sharing Settings."



3. Select the profile you are using. This is indicated by the addition "(current profile)."



4. Make sure that the "Turn on network discovery" and "Turn on file and printer sharing" settings are enabled.



10 Technical data

Danger!

Electric shock

If the device is used or operated in a manner other than specified in the *Technical data* chapter, the protection supported by the device may be impaired.

10.1 Main data

Short description

Name	ibaM-DAQ
Module label	ibaM-DAQ
Description	Processor module for stand-alone data acquisition
Order number	10.180000

Processor unit

Processor	Intel Atom x7-E3950 4x 1.6 GHz (2.0 GHz boost)
Operating system	Windows 10 IoT Enterprise x64 LTSC 2021/v21H2 (Long-Term Servicing Version; extended support date 13-Jan-2032[3)])
Main memory	8 GB
Flash memory	Solid state drive 512 GB
Clock	buffered by battery, (3 V, lithium BR2032) only batteries of type BR2032 may be used.

Power supply

Power supply	24 V DC SELV; 4 A; UPS recommended
Voltage range	21.6 V … 26.4 V DC
Current consumption (max.)	
ibaM-DAQ stand-alone	0.7 A
ibaM-DAQ with modules	4 A
Electrical isolation	
Supply - system	none
Connection technology	3-pin multi-pin connector, pitch 3.81 mm

[3)] based on information provided by Microsoft

Connector	included in delivery; push-in, conductor max. 1.5 mm², protected against reverse polarity, screw connection; Information on conductor and stripping length see chapter ↗ *Connection technology connector/terminals*, page 21 order no. 52.000031

Further interfaces, operating and indicating elements

Indicators	LEDs for operation, channel states and errors
Switch	1 momentary switch for ON/OFF
Graphics	1 Mini-DisplayPort (4K/UHD)
USB	3 (1x USB 2.0; 2x USB 3.0)

Operating and environmental conditions

Temperature range	
Operation	14 °F to 131 °F (-10 °C to +55 °C)
Storage	-13 °F to 185 °F (-25 °C to +85 °C)
Mounting	DIN rail according to EN 50022 (TS 35, DIN Rail 35)
Cooling	passive
Relative humidity	15 % … 95 % (indoor), no condensation
Operating altitude	0 ... 2000 m above sea level
Protection type	according to IP20; without test certificate according to IEC 60529
Certifications / standards	CE, C-Tick, UKCA, FCC, KC, IEC 61010-1, IEC 61000-6-5 interface range 4
Pollution degree	2
MTBF[4)]	317,489 hours / 36 years
Dimensions	
Width x height x depth	69 mm x 133 mm x 120 mm
Height with open lever	160 mm
Height units	3
Installation clearances	
Top / bottom	30 mm / 30 mm
Left / right	10 mm / 10 mm
Mounting position	vertical, lever up
Weight / incl. packaging	0.55 kg / 0.78 kg

Licenses

Type	WIBU CmDongle (internal)
ibaPDA	ibaPDA-64 with 2 data stores

[4)] according to: Telcordia 4 SR332 (Reliability Prediction Procedure of Electronic Equipment; Issue Mar. 2016) and NPRD (Non-electronic Parts Reliability Data 2011)

	ibaPDA-Interface-PLC-Xplorer
	ibaPDA-OPC-UA-Server+
	ibaPDA-Data-Store-MQTT-16

10.2 Declaration of conformity

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

Unique Identifier: 10.180000, ibaM-DAQ

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.

10.3 Interfaces

Module-module interface

Number	1
Connection technology	2x 8 sliding contacts
Number of modules	15

Ethernet interface

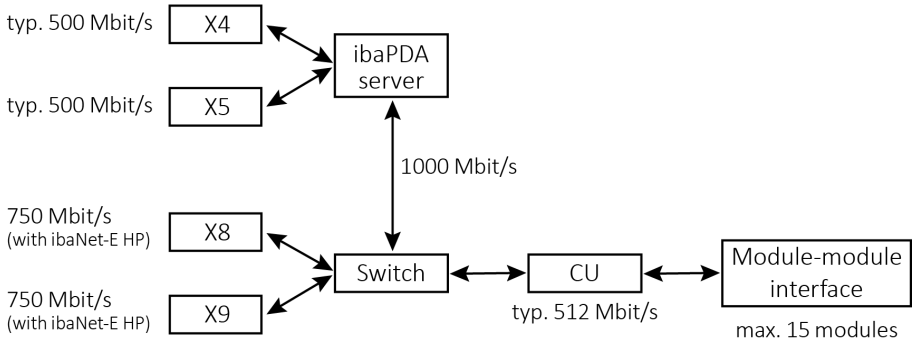
Number	2
Design	Standard Ethernet
ibaNet protocol	ibaNet-E
Connection technology	2 RJ45 socket; 1GbE, Base-T

ibaNet interface

Number	2; switched
Design	copper
ibaNet protocol	ibaNet-E / ibaNet-E HP

Connection technology	2 RJ45 socket; 1GbE, Base-T
Cable length (PTP)	max. 100 m
Cable type	min. Cat.6a, S/FTP

Maximum throughput of I/O data:



10.4 Digital input and output

Digital input

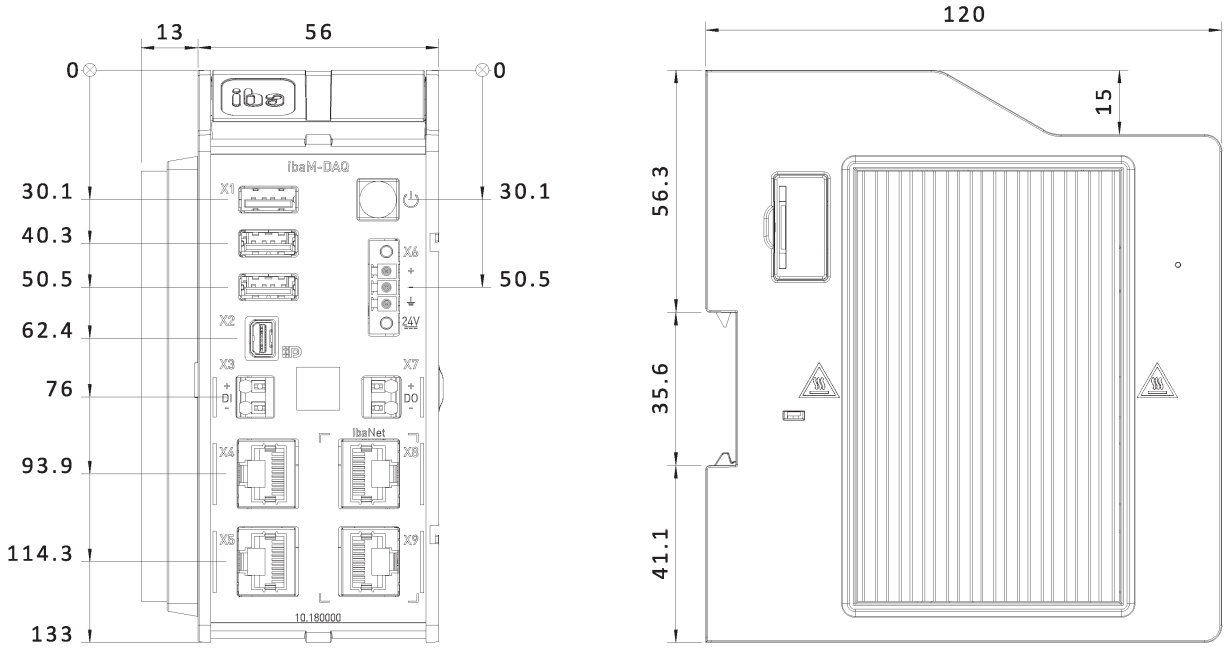
Number	1
Design	galvanically isolated, protected against reverse polarity, single ended
Input signal	24 V DC
Max. input voltage	±60 V permanent
Signal level log. 0	> -6 V; < +6 V
Signal level log. 1	< -10 V; > +10 V
Hysteresis	none
Input current	1 mA, constant
Debounce filter	optional, 4 operating modes
Sampling rate	max. 10 kHz, freely adjustable
Electrical isolation	
Channel - system	functional isolation: 1 kV AC
Connection technology	2-pin socket, push-in, pitch 5 mm, conductor max. 1.5 mm²; information on conductor and stripping length see chapter ↗ *Connection technology connector/terminals*, page 21
Additional function	shutdown

Digital output

Number	1
Design	galvanically isolated, solid-state DC switch
Switching voltage max.	200 V DC; protection against surge voltages
Switching current max.	up to 350 mA (permanent), overcurrent protection
Switching delay	< 2 ms (at 100 mA)

OFF resistance (log. 0)	> 100 MΩ
ON resistance (log. 1)	< 3.75 Ω (at 100 mA)
Electrical isolation	
Channel - system	functional isolation: 1 kV AC
Connection technology	2-pin socket, push-in, pitch 5 mm, conductor max. 1.5 mm^2; information on conductor and stripping length see chapter ↗ *Connection technology connector/terminals*, page 21.

10.5 Dimensions



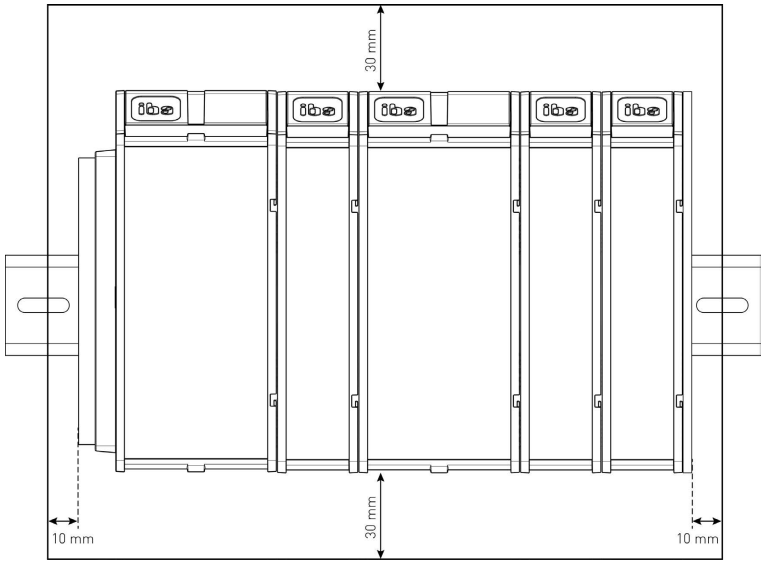
ibaM-DAQ dimensions, dimensions in mm

Note

Installation clearances

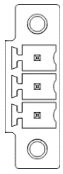
Ensure a minimum clearance of 30 mm above and below the housing and 10 mm to the left of the cooling fins to ensure adequate ventilation of the device.

If the device has been extended with further modules, the above-mentioned clearances apply to the entire system.

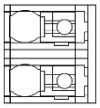


10.6 Connection diagrams

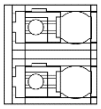
Pin assignment power supply X6

Pin	Connector	
1	+ 24 V	
2	0 V	
3	Ground	

Pin assignment digital input X3

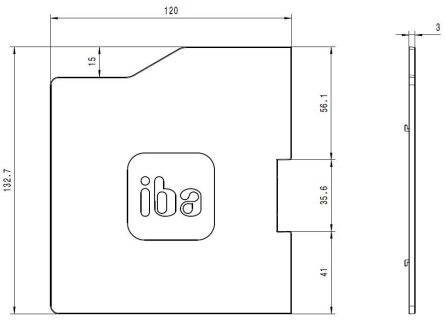
Pin	Connector	
1	Digital input 00+	
2	Digital input 00-	

Pin assignment digital output X7

Pin	Connector	
1	Digital output 00+	
2	Digital output 00-	

11 Accessories

End cover for MAQS modules



Short description	
Name	ibaM-CoverPlate
Description	End cover for MAQS modules
Order number	10.180020
Design	
Dimensions (w x h x d)	3 mm x 132.7 mm x 120 mm
Weight	0.05 kg

Connector for power supply

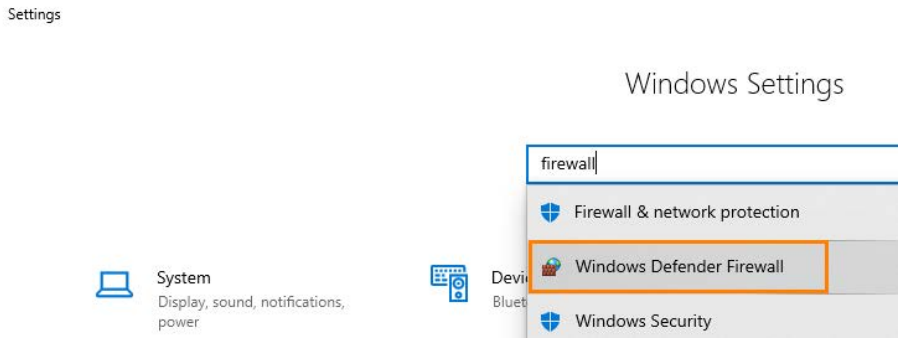
Short description	
Name	3-Pin Terminal Block MAQS-PWR RM3.81 Push-In SF
Description	3-pin socket connector/plug for power supply, push-in, screw connection
Order number	52.000031

12 Appendix

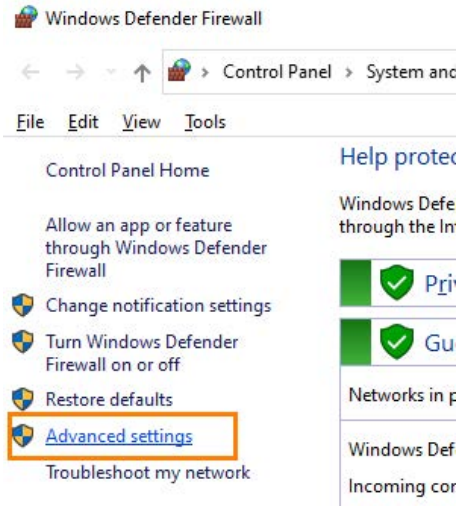
12.1 Ping function (ICMP echo request)

The ping function, the ICMP echo request, is disabled by default in the Windows 10 installation of *ibaM-DAQ*. If you need the ping function and your company's security policy allows it, you can enable it as follows.

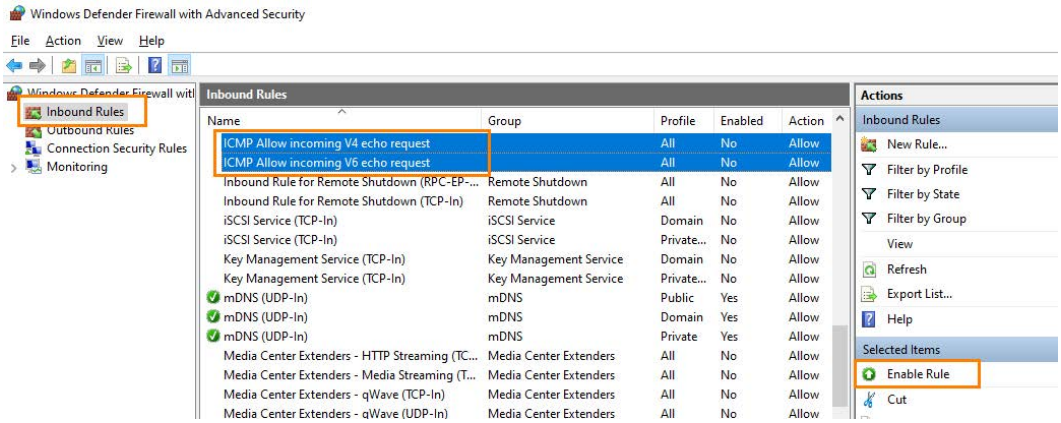
1. Open Windows Defender Firewall (e.g. via settings and searching for "firewall").



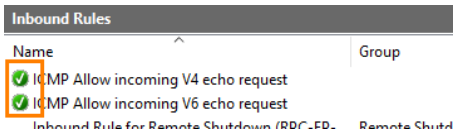
2. Select the advanced settings.



3. First select the inbound rules and select from the list of inbound rules according to these two rules:
   - ICMP Allow incoming V4 echo request
   - ICMP Allow incoming V6 echo request



4. Select both rules and activate them together via the "Enable rule" menu item.
5. Afterwards, both rules are marked as enabled in the list via the green checkmark and *ibaM-DAQ* can now be found in the network via a *ping* command or the *ICMP echo request*.



12.2 Wake-on-LAN

The Wake-on-LAN function described here is based on the wake-up via sent Ethernet telegrams of the so-called "Magic Packet" type.

Note

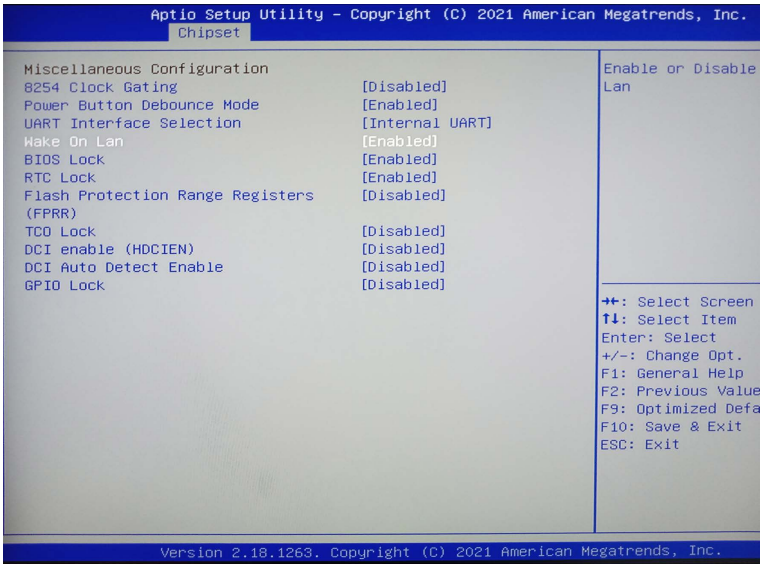
The Wake-on-LAN function is only possible via the X4 network interface.

12.2.1 WoL – BIOS settings

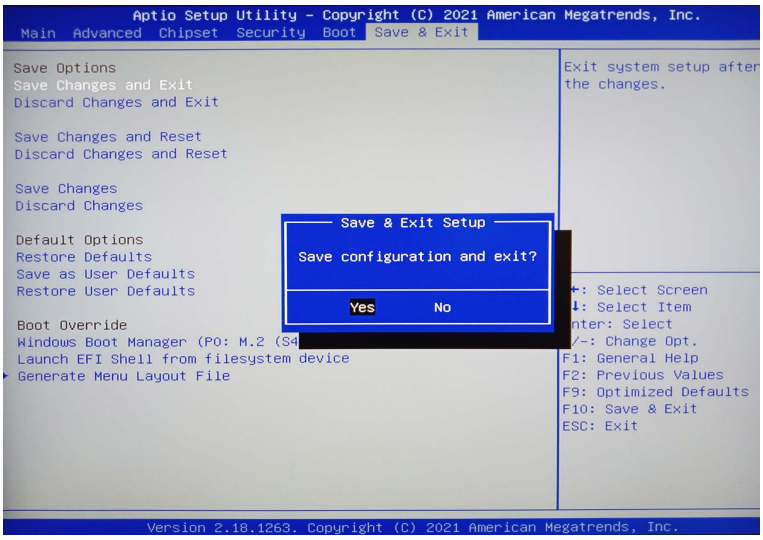
The Wake-on-LAN function must be enabled in the BIOS settings. BIOS settings can only be made if monitor, keyboard and mouse are connected to the *ibaM-DAQ* device and the device is operated via these.

To enter the BIOS, press the <del> remove key during bootup.

The Wake-on-Lan setting can be enabled via Chipset, South Cluster Configuration and Miscellaneous Configuration:



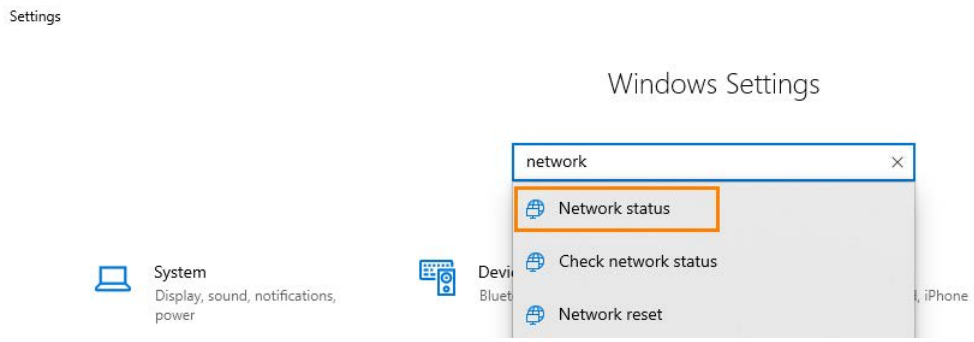
Now exit the BIOS and do not forget to save the change and reboot the system.



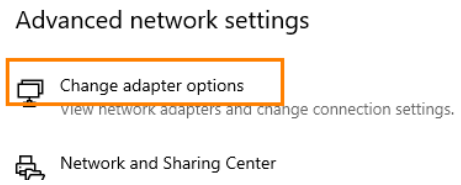
12.2.2 WoL – Operating system settings

In addition, the network card of the X4 network interface requires the following setting in the operating system:

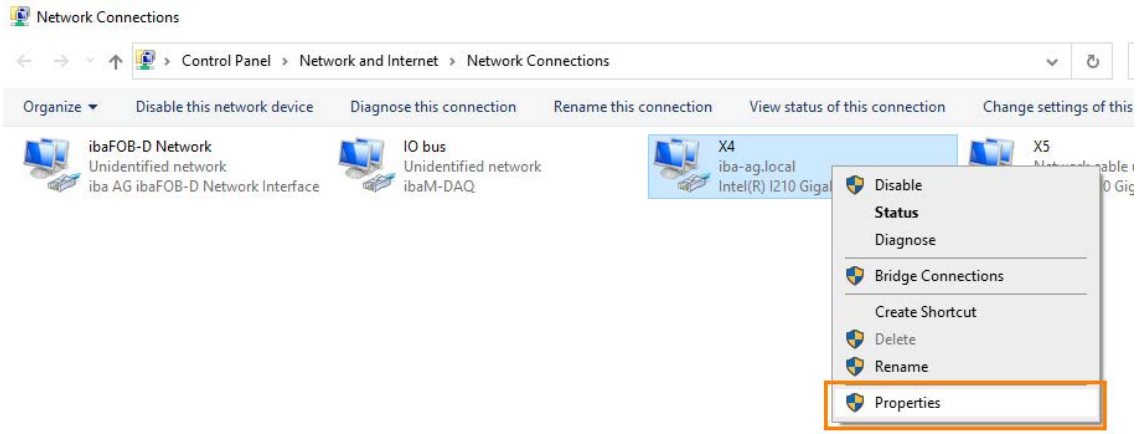
1. Open the network status (e.g. via Settings and the search for "network").



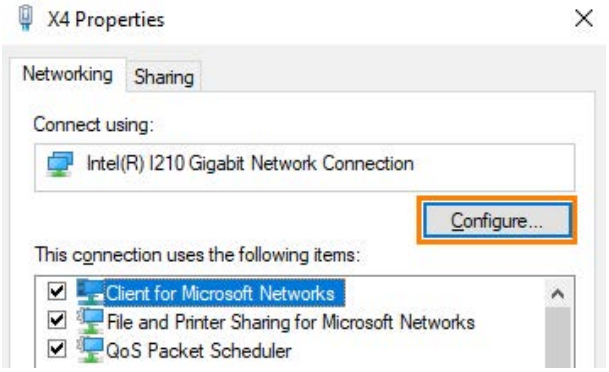
2. Below the advanced network settings, select "Change adapter options" to be able to change the adapter options:



3. At the network interface X4, open the menu for this interface with the right mouse button:

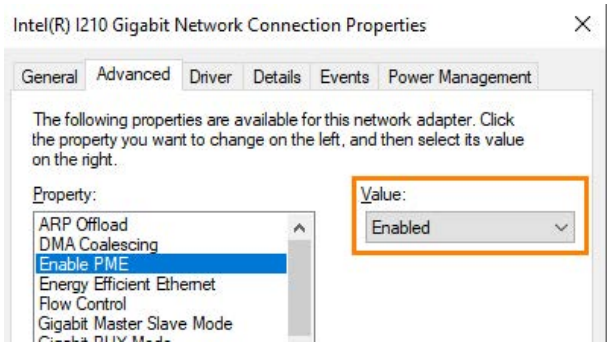


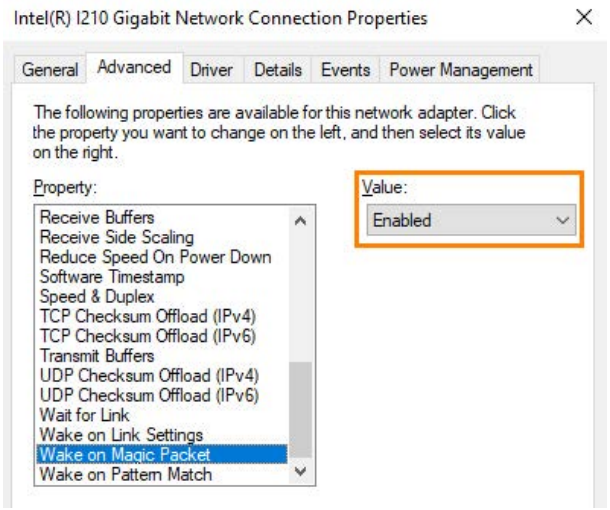
4. Open the properties of this interface. Open the configuration option in the properties window with the <Configure> button:



5. First, enable the following options in the power management area:

6. Switch to the advanced area and enable the following properties:

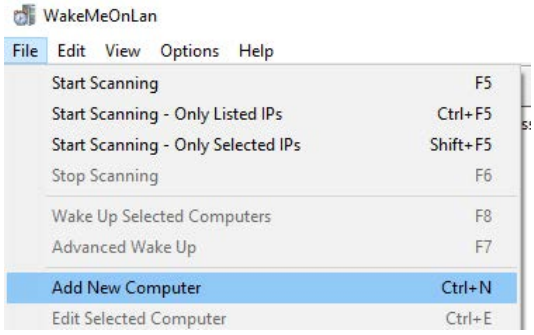




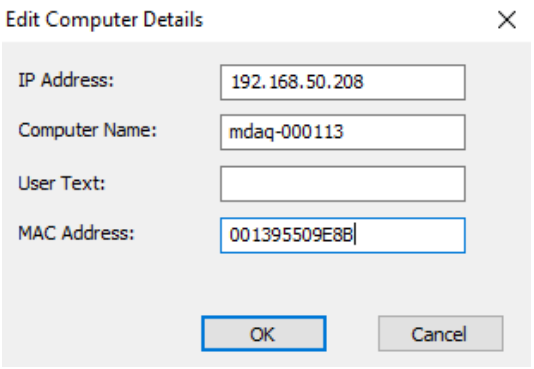
12.2.3 WoL – WakeMeOnLan-Utility

An initial check of the fully activated Wake-on-LAN function on X4 can be realized e.g. with the freeware program *WakeMeOnLan*.

1. To do so, download this program from the manufacturer's site and run it.
2. Add a new computer:

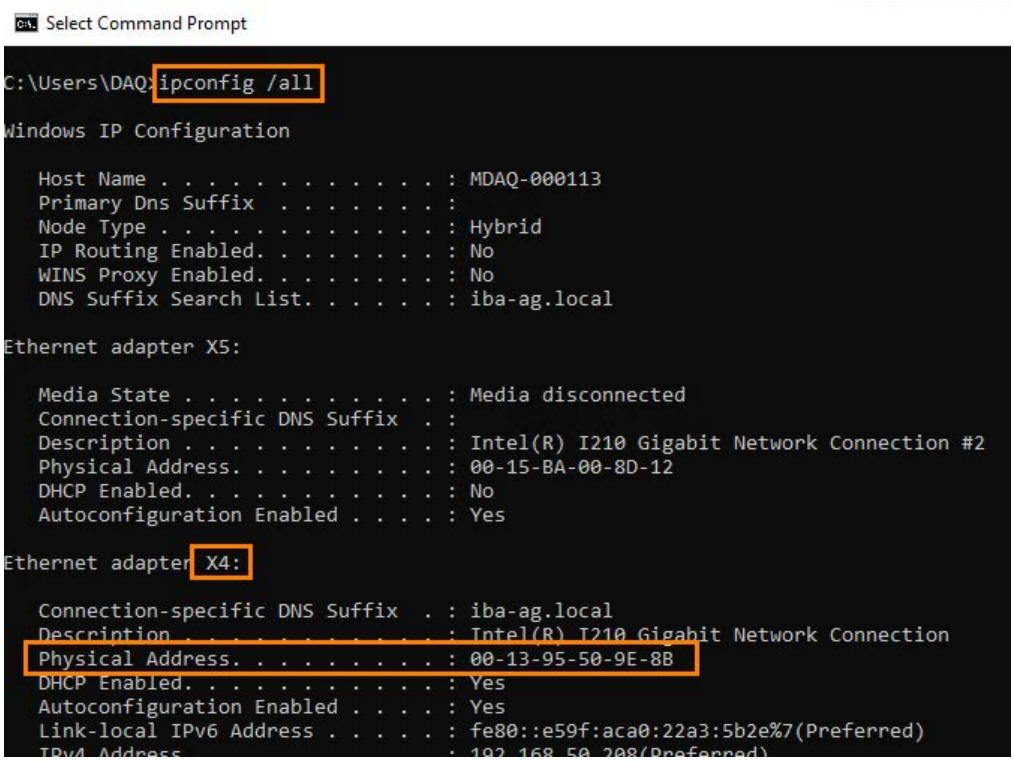


3. Configure the IP address and the MAC address of the network interface X4 and the host name of *ibaM-DAQ*:

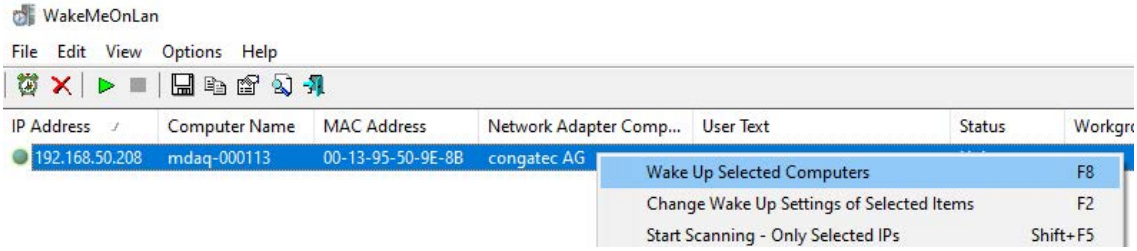


Note

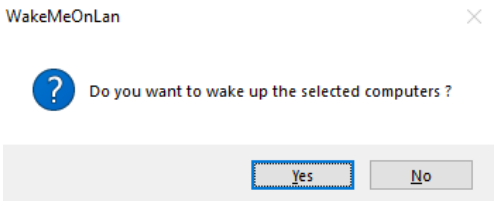
The MAC address can be identified by opening a command prompt ("cmd") on the *ibaM-DAQ* device and entering "ipconfig /all" as command:



4. In the overview, open the menu with the right mouse button and select "Wake Up":



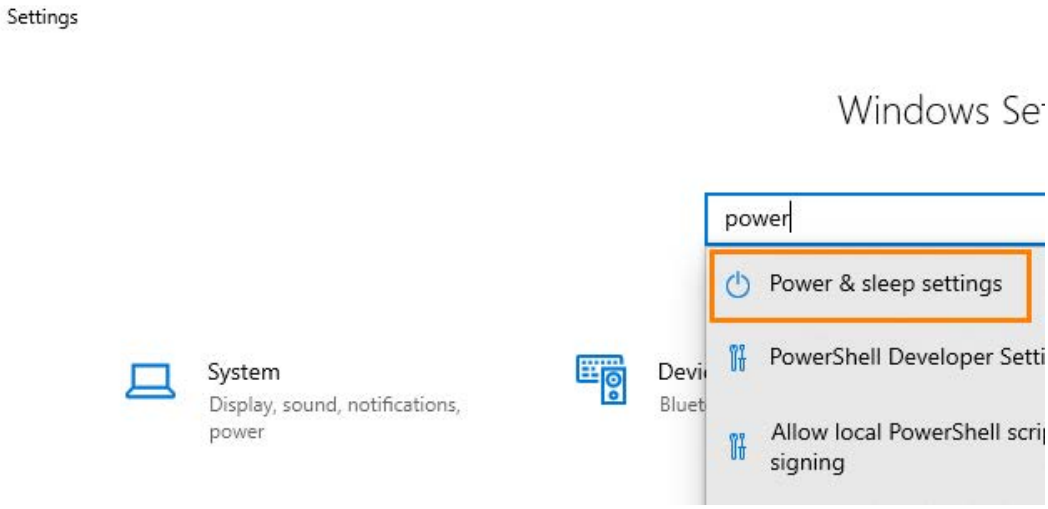
5. After confirmation, the switched off *ibaM-DAQ* device should boot up.



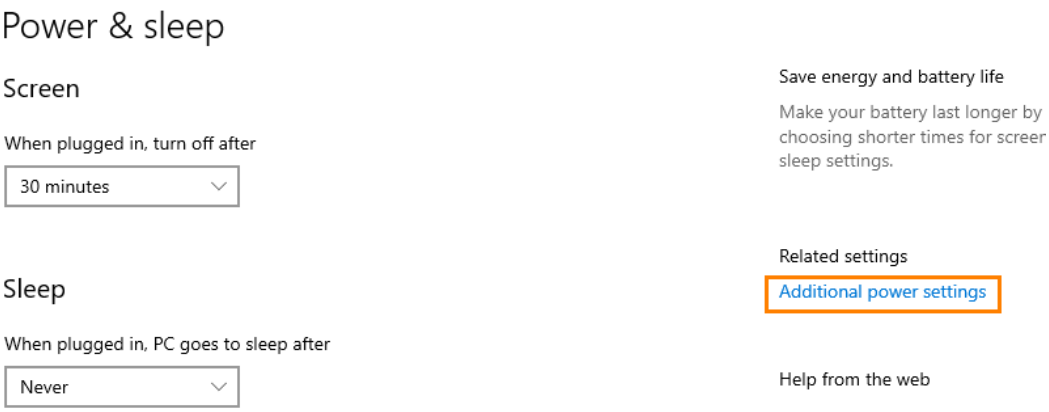
12.3 On/off switch function

The system shuts down by default when the on/off switch is briefly pressed. This setting can be changed via the operating system. Proceed as follows:

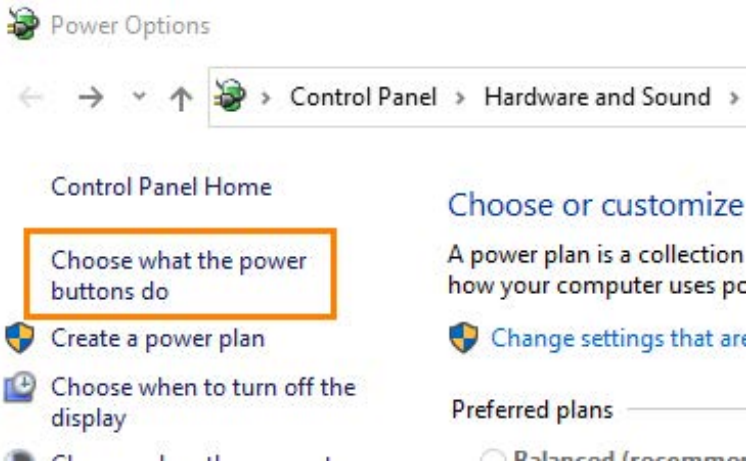
1. Open the "Power & sleep settings" (e.g. via Settings and search for "power"):



2. Select "Additional power settings":

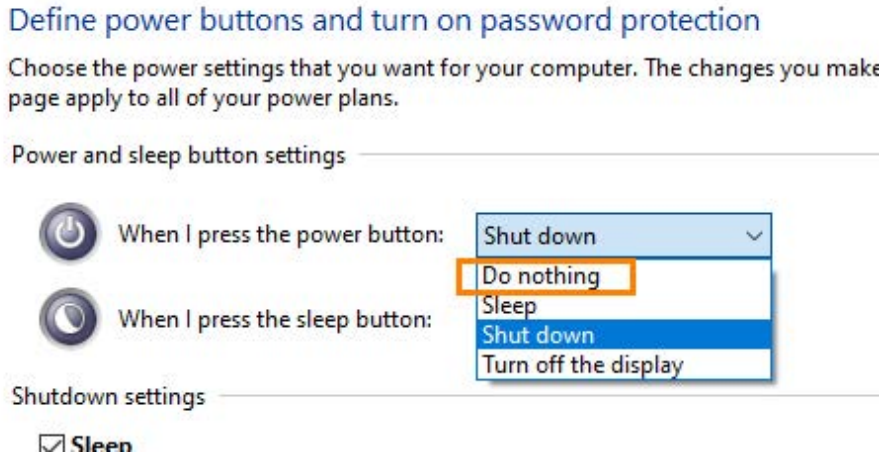


3. Select the menu item "Choose what the power buttons do".

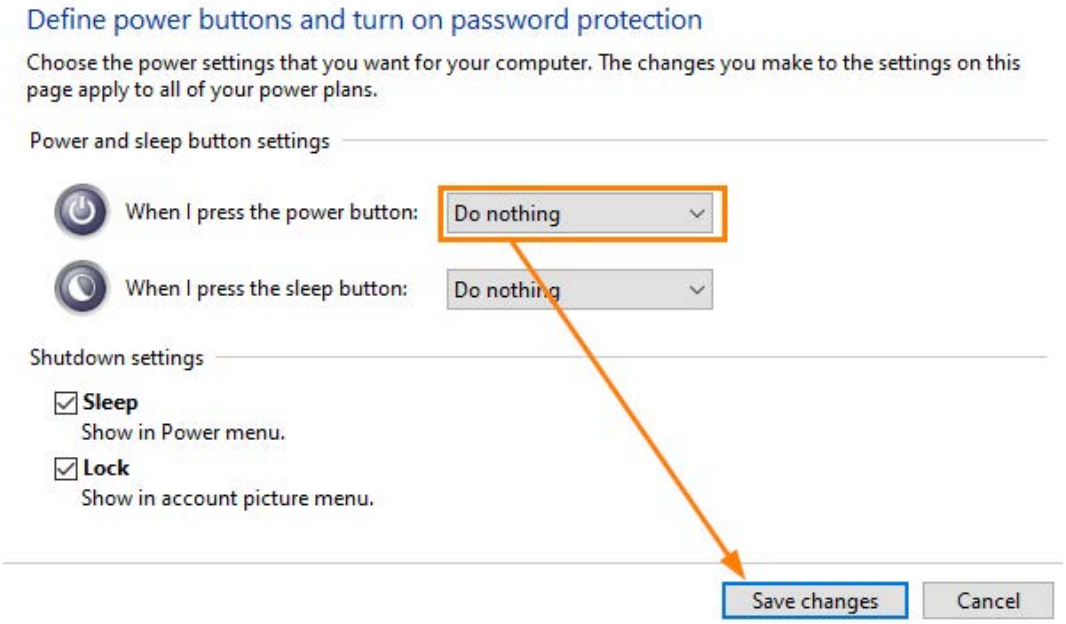


The default setting "When I press the power button" is shut down and "When I press the sleep button" is do nothing.

4. Also select "Do nothing" from the drop-down menu for the power button.



5. Finally, save the changes.



The default function of shutting down when the on/off switch is briefly pressed is now disabled.

Note

Please note that switching off (without controlled shutdown) is still active if you press and hold (> 5 s).

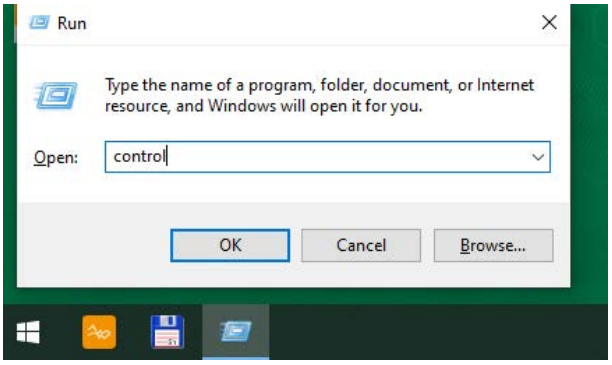
This function cannot be configured due to the system.

12.4 NTP time synchronization

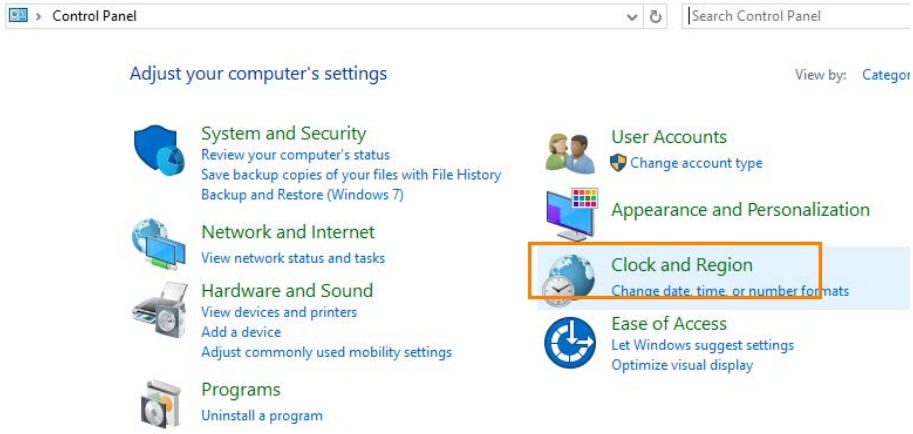
The system clock can be synchronized with a network NTP server using the NTP (Network Time Protocol) settings at the operating system level.

To configure this function, proceed as follows (using Windows 10 as an example):

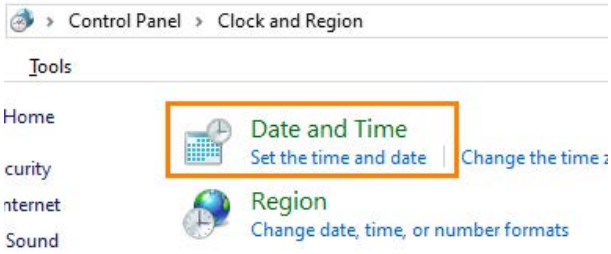
1. Open the “Run” dialog box in Windows using the keyboard shortcut <Windows> + <R>.
2. Enter “control” in the input field and confirm with Return or <OK>.



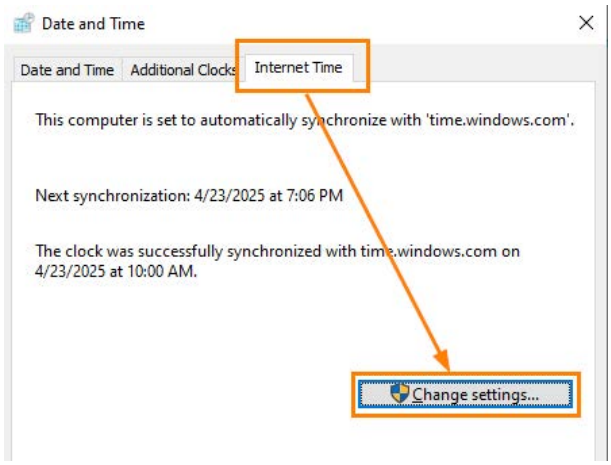
3. In the Control Panel, open the settings for *Clock and Region*.



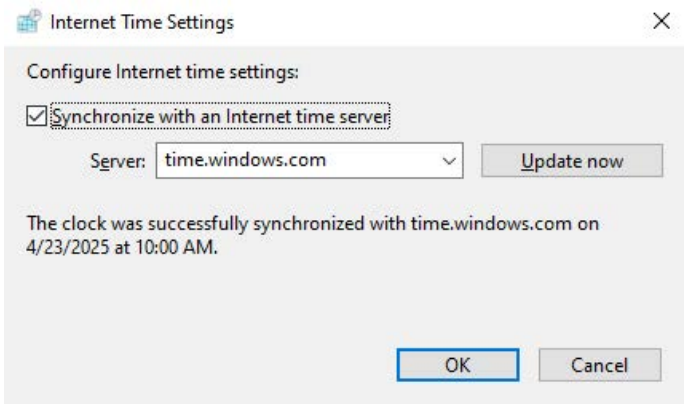
4. Select *Date and Time*.



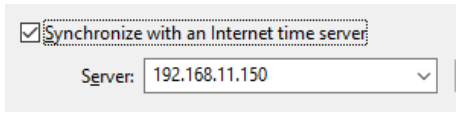
5. Switch to the *Internet Time* tab and open the settings by clicking <Change settings...>.



6. Enable time synchronization and specify an accessible NTP server.



7. You can specify the NTP server either via a host name or an IP address.



12.5 Tips for using ibaPDA

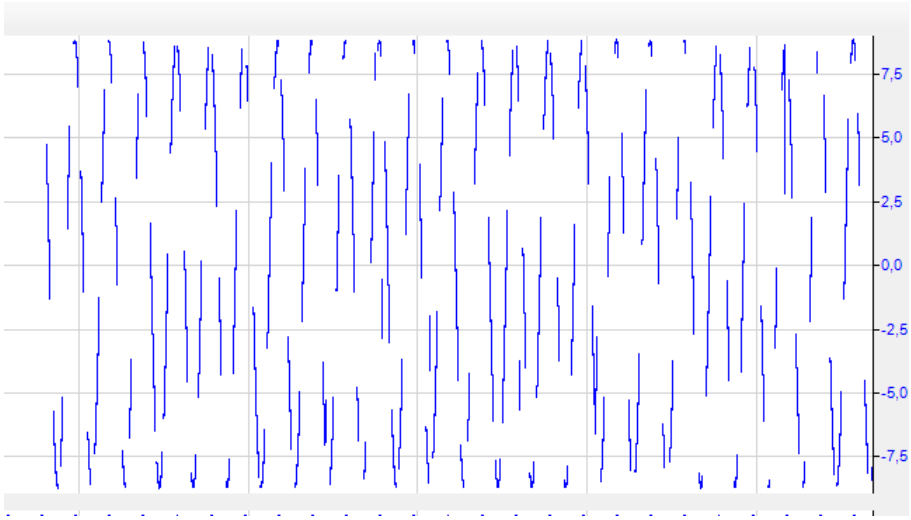
Here you will find useful tips on how to use *ibaM-DAQ* and *ibaPDA*.

12.5.1 Gaps in the trend graph

How can gaps in the trend graph display be avoided?

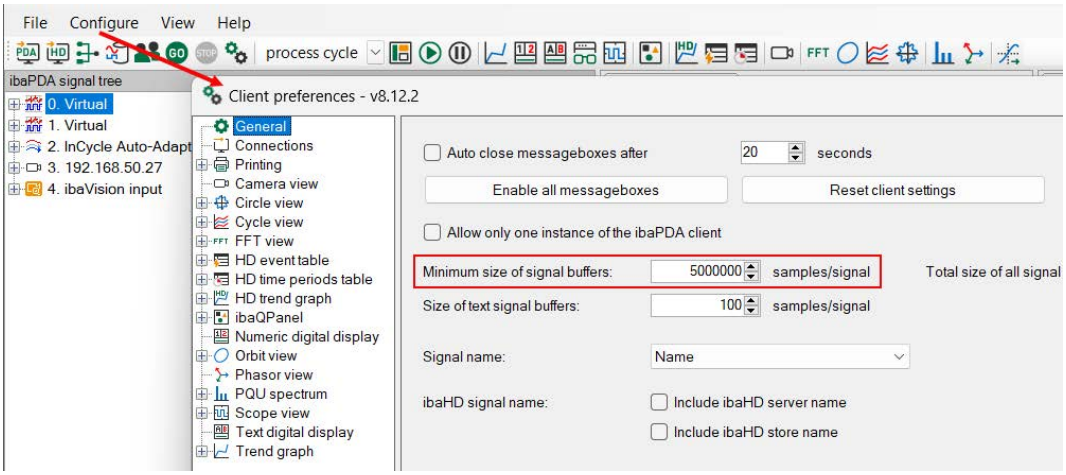
Problem:
Gaps appear in the trend graph if the time base in *ibaPDA* is set too low for data acquisition.

However, the values are recorded correctly and without gaps in the DAT file or in the ibaHD-Server.



Remedy:
To obtain a complete display of the trend graph, the minimum size of the signal buffer must be increased in the client preferences (default 100,000). The maximum size is 100,000,000.

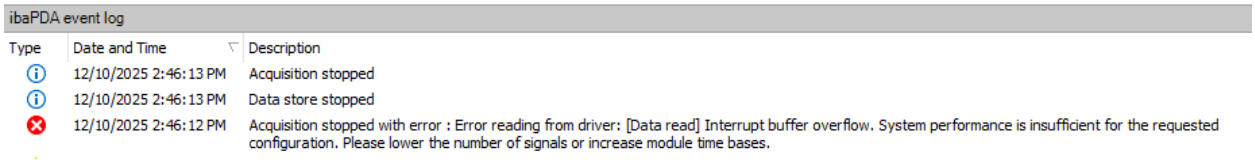
You can find the client preferences in the *Configuration* menu.



12.5.2 Error message Interrupt buffer overflow

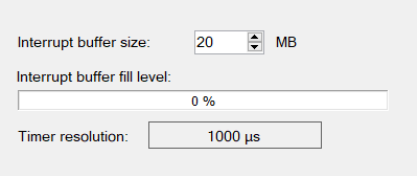
How can you avoid an interruption of the acquisition that is indicated by the error message *Interrupt buffer overflow*?

Problem:
Acquisition stops, especially when data recording is activated. The following error message is displayed in the *ibaPDA* event log: *Recording stopped due to error... Interrupt buffer overflow.*

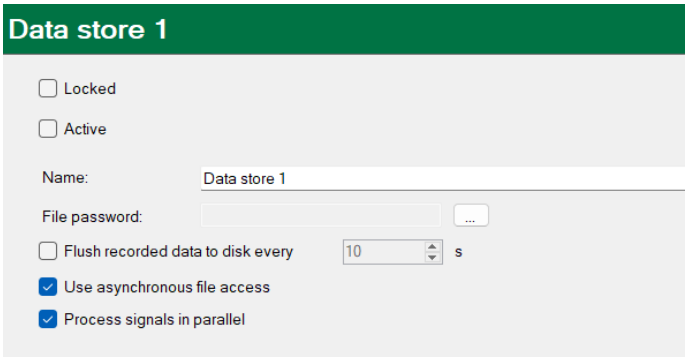


Remedy:
The size of the interrupt buffer may be set too low. The size of the interrupt buffer is set in the I/O Manager, in the *General* tab, in the node *Interrupt Info*.

The maximum size is 1000 MB.



Another way to avoid the error is to enable asynchronous file access during data recording. This setting can be found in the Data Store Manager, under the *Data Store* node.



13 Support and contact

Support

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Email: support@iba-ag.com

Note

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

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