ibaPDA-Interface-AMEPA

Data interface for AMEPA

Manual

Issue 1.0

Measurement Systems for Industry and Energy

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1.0	06-2025	First edition	nm	8.11.0

Contents

1 About this documentation

This documentation describes the function and application of the software interface *ibaPDA-Interface-AMEPA*.

Other documentation

This documentation is a supplement to the *ibaPDA* manual. Information about all the other characteristics and functions of *ibaPDA* can be found in the *ibaPDA* manual or in the online help.

1.1 Target group and previous knowledge

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

For the handling of *ibaPDA-Interface-AMEPA* the following basic knowledge is required and/or useful:

- Basic knowledge of *ibaPDA*
- Knowledge of configuration and operation of the relevant measuring devices/measuring systems

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 System requirements

The following system requirements are necessary for the use of the AMEPA data interface:

Software

- *ibaPDA* v8.11.0 or higher
- License for *ibaPDA-Interface-AMEPA*
  (supports one AMEPA device)

  If you have more than one device, you will need additional *one-step-up interface AMEPA* licenses for each additional device. A total of up to 255 devices are possible.

For further requirements for the used computer hardware and the supported operating systems, refer to the *ibaPDA* documentation.

Hardware

- AMEPA device with Ethernet interface, e.g. AMEPA-TSD-devices

  Information on which devices are supported in detail can be obtained from the manufacturer.

License information

Order no.	Product name	Description
31.001019	ibaPDA-Interface-AMEPA	*ibaPDA* data interface for the connection to an AMEPA device
31.101019	one-step-up-Interface-AMEPA	Extension license for an additional AMEPA device, maximum 254 step-up licenses possible

3 AMEPA interface

The bidirectional AMEPA interface is suitable for the acquisition of measurement data for thermographic slag detection with AMEPA TSD sensors. In addition, you can send process data cyclically to the connected AMEPA devices to optimize the measurement process.

Other documentation

Further information can be found on the manufacturer's website.

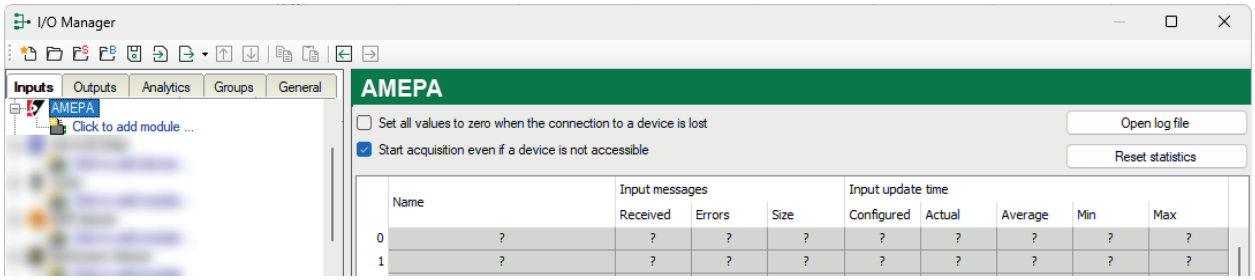
3.1 Configuration and engineering ibaPDA

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

3.1.1 Interface settings

Depending on whether you have selected the *Inputs* or *Outputs* tab, the interface displays information on the messages that *ibaPDA* receives from or sends to AMEPA devices.

The interface has the following functions and configuration options:



Set all values to zero when the connection to a device is lost
If enabled, all measured values of the AMEPA device are set to zero as soon as the connection is lost. If this option is disabled, *ibaPDA* will keep the last valid measured value at the time the connection was lost in the memory.

Start acquisition even if a device is not accessible
If this option is enabled, the acquisition will start even if the AMEPA device is not accessible. In case of a an error, a warning is indicated in the validation dialog. If the system has been started without a connection to the device, *ibaPDA* will periodically try to connect to the device.

<Open log file>
Messages relating to the interface are written to a separate log file. To open the current log file, click on <Open log file>.

<Reset statistics>
Click this button to reset the calculated times and error counters in the table to 0.

Connection table

For each connection, the table shows the connection status, the current values for the update time (actual value, average, min. and max.) as well as the data size. In addition, there is an error counter for the individual connections during the acquisition.

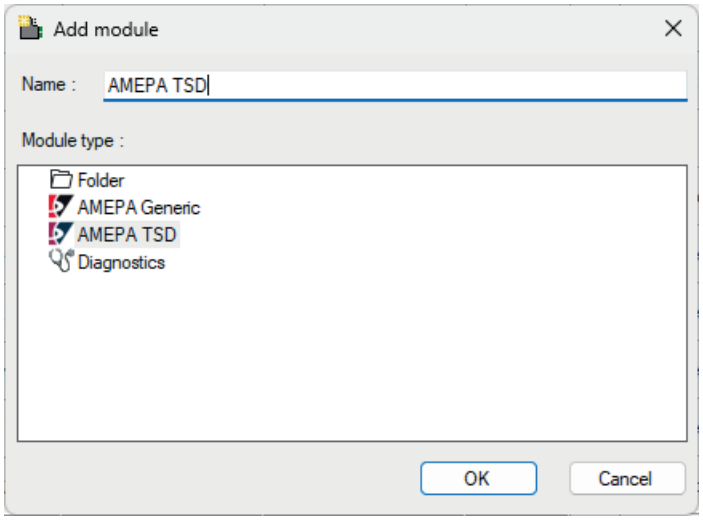
For more information on the connection table, see ↗ *Connection table*, page 16.

3.1.2 Adding a module

Below you will learn how to add a module to the AMEPA interface.

Procedure

1. Click on the blue link *Click to add module* located under each data interface in the *Inputs* or *Outputs* tab.
2. Select the desired module type in the dialog box and assign a name via the input field if required.
3. Confirm the selection with <OK>.



Module types

You can add the following module types to the interface:

- AMEPA Generic

  Use this module type to receive data from any AMEPA device.

- AMEPA TSD

  Use this module type to receive data from an AMEPA TSD device. The module type offers an additional *Diagnostics* tab, which you can use to check or monitor the TSD device.

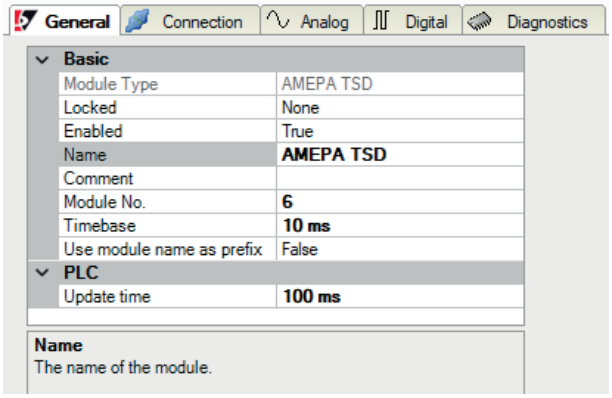
- Diagnostics

  For information on the *Diagnostics* module, see ↗ *Diagnostic modules*, page 17.

3.1.3 General module settings

To configure a module, select it in the tree structure.

All modules have the following setting options.



Basic settings

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

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

Enabled
Enable the module to record signals.

Name
You can enter a name for the module here.

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.

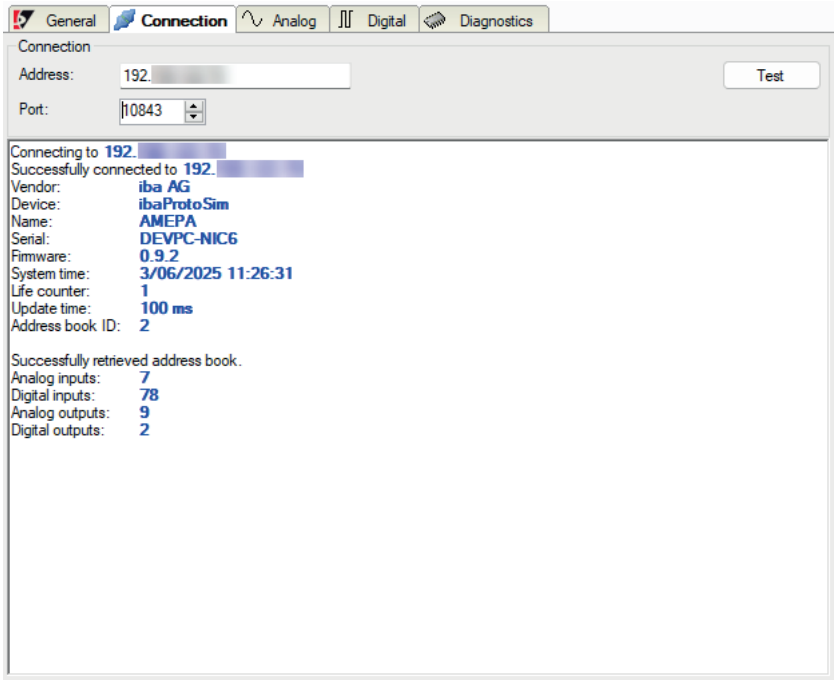
Use module name as prefix
This option puts the module name in front of the signal names.

PLC

Update time
The update time determines how fast *ibaPDA* tries to retrieve data from the AMEPA device. The actual resulting update time may be higher, depending on factors such as CPU load or communication load. Check the measured update rates in the *Diagnostics* tab, as an overload can lead to a loss of measurement data.

3.1.4 Connection settings

Configure and test the connection to the AMEPA device in the *Connection* tab.



Connection

Address
Enter the host name or IP address of the AMEPA device.

Port
Port number via which the device communicates with *ibaPDA*. The port number 10843 is preset. You can change the port number as required. The port number must be the same on both sides (*ibaPDA* and AMEPA device).

<Test>
When you click on the button, *ibaPDA* attempts to establish a connection to the device and read out various data. Among other data, the device's address book with all available input and output signals is also read. You will then see the signals on the *Analog* and *Digital* tabs, see ↗ *Signal configuration*, page 11.

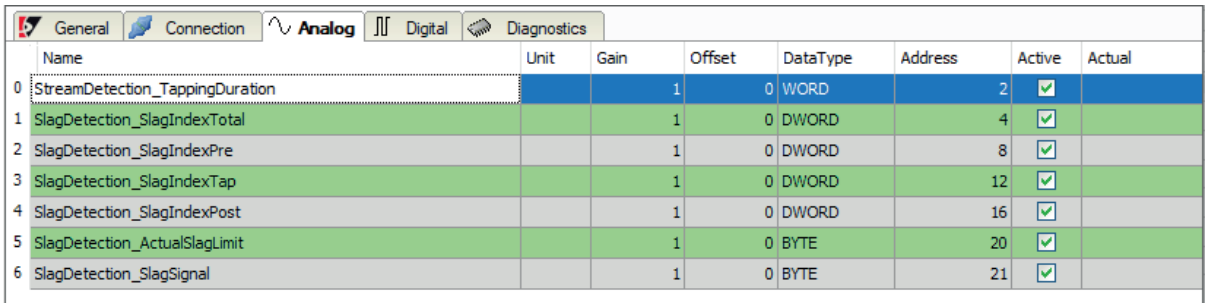
3.1.5 Signal configuration

In the *Analog* and *Digital* tabs, you can configure the signals. As soon as you have established the connection to an AMEPA device, the tabs display all available input and output signals, see ↗ *Connection settings*, page 10.

Other documentation

Detailed descriptions of the columns and how to fill in the signal tables can be found in the documentation for *ibaPDA*.

Analog and Digital tab



	Name	Unit	Gain	Offset	DataType	Address	Active	Actual
0	StreamDetection_TappingDuration		1	0	WORD	2	☑	
1	SlagDetection_SlagIndexTotal		1	0	DWORD	4	☑	
2	SlagDetection_SlagIndexPre		1	0	DWORD	8	☑	
3	SlagDetection_SlagIndexTap		1	0	DWORD	12	☑	
4	SlagDetection_SlagIndexPost		1	0	DWORD	16	☑	
5	SlagDetection_ActualSlagLimit		1	0	BYTE	20	☑	
6	SlagDetection_SlagSignal		1	0	BYTE	21	☑	

Name
Enter a meaningful plain text name for the signal.

Unit (analog signals only)
Assignment of a physical unit for the signal

You can enter a maximum of 11 characters, the field is only considered a comment field. The unit is always displayed in conjunction with a numerical display of the values.

Gain, Offset (analog signals only)
Specification of gain and offset for scaling the incoming values

The values describe a linear characteristic curve for scaling. If incoming values are specified in physical units, you can ignore this function, i.e. Gain = 1 and Offset = 0.

Data type (analog signals only)
Selection of the data type of the signal

The data type determines the address of the next signal.

Adress
Position in the user data area of a telegram or dual-port memory (specified in bytes) where the desired signal is located

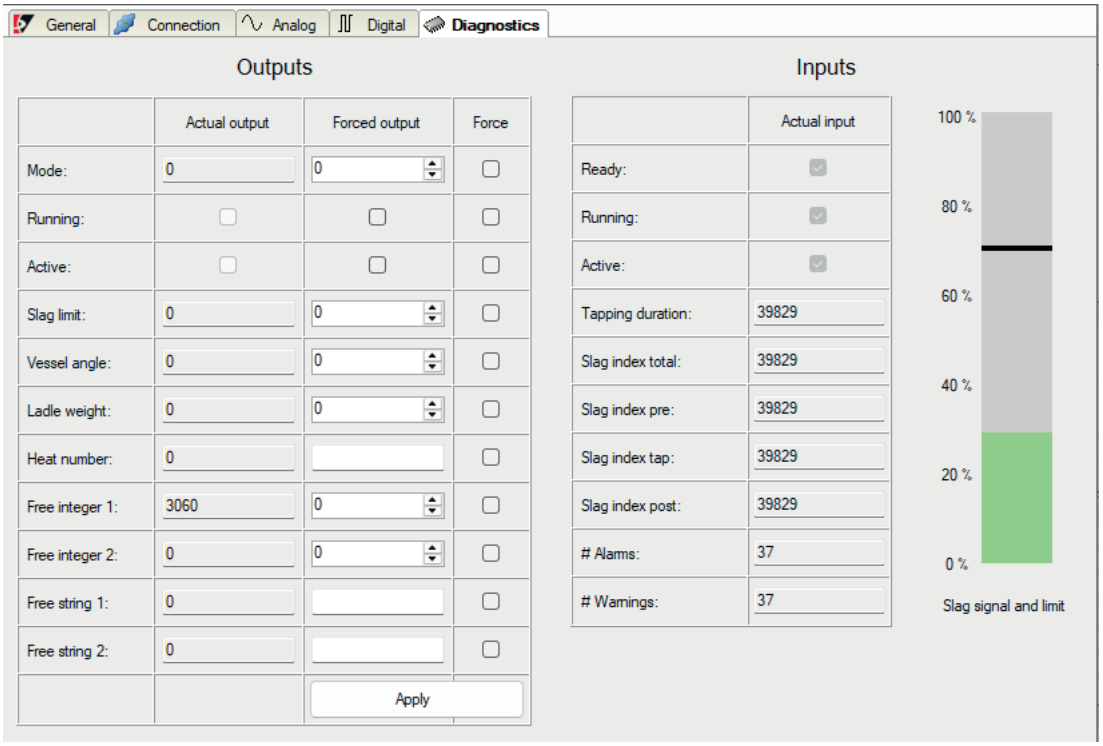
Bit no. (digital signals only)
Display of the bit number

Active
Activation or deactivation of the respective signal

Actual
Display of the current actual value of the signal

3.1.6 Diagnostics tab

The *Diagnostics* tab is available for *Amepa TSD* modules and shows current input values of the AMEPA device, as well as output values that are sent to the device by *ibaPDA*.



You control what is sent to the device via the outputs. You can overwrite these values here by setting a force value and activating the checkbox. To apply the values, click on <Apply>.

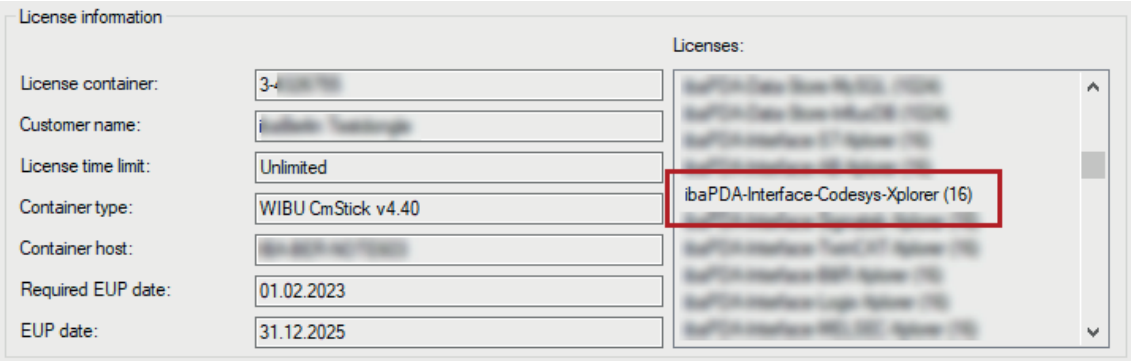
If an output signal is disabled in *ibaPDA*, you cannot force this output.

4 Diagnostics

4.1 License

If the interface is not displayed in the signal tree, you can either check in *ibaPDA* in the I/O Manager under *General – Settings* or in the *ibaPDA* service status application whether your license for the interface *ibaPDA-Interface-AMEPA* has been properly recognized. The number of licensed connections is shown in brackets.

The figure below shows the license for the *Codesys Xplorer* interface as an example.



4.2 Visibility of the interface

If the interface is not visible despite a valid license, it may be hidden.

Check the settings in the *General* tab in the *Interfaces* node.

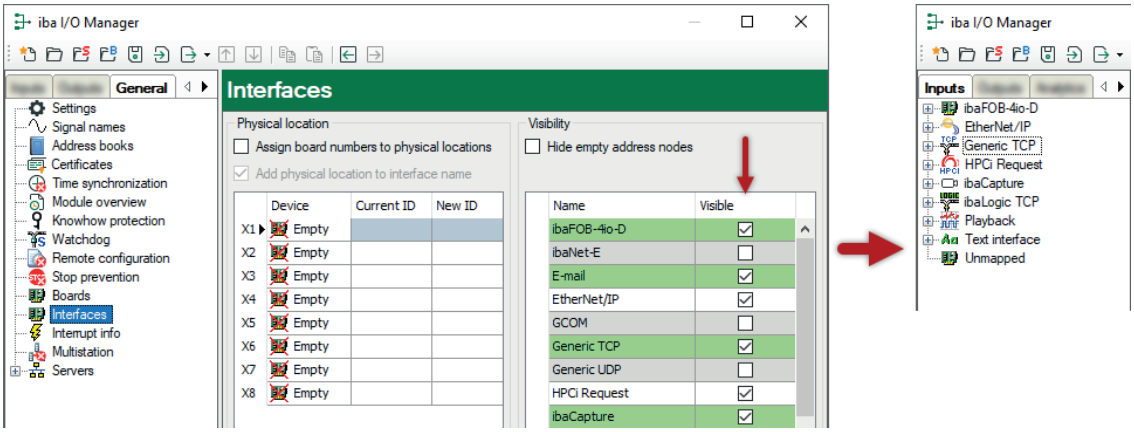
Visibility

The table *Visibility* lists all the interfaces that are available either through licenses or installed cards. These interfaces can also be viewed in the interface tree.

You can hide or display the interfaces not required in the interface tree by using the checkbox in the *Visible* column.

Interfaces with configured modules are highlighted in green and cannot be hidden.

Selected interfaces are visible, the others are hidden:



4.3 Log files

If connections to target platforms or clients have been established, all connection-specific actions are logged in a text file. You can open this (current) file and, e.g., scan it for indications of possible connection problems.

You can open the log file via the button <Open log file>. The button is available in the I/O Manager:

- for many interfaces in the respective interface overview
- for integrated servers (e.g. OPC UA server) in the *Diagnostics* tab.

In the file system on the hard drive, you can find the log files of the *ibaPDA* server (…\ProgramData\iba\ibaPDA\Log). The file names of the log files include the name or abbreviation of the interface type.

Files named `interface.txt` are always the current log files. Files named `Interface_yyyy_mm_dd_hh_mm_ss.txt` are archived log files.

Examples:

- `ethernetipLog.txt` (log of EtherNet/IP connections)
- `AbEthLog.txt` (log of Allen-Bradley Ethernet connections)
- `OpcUAServerLog.txt` (log of OPC UA server connections)

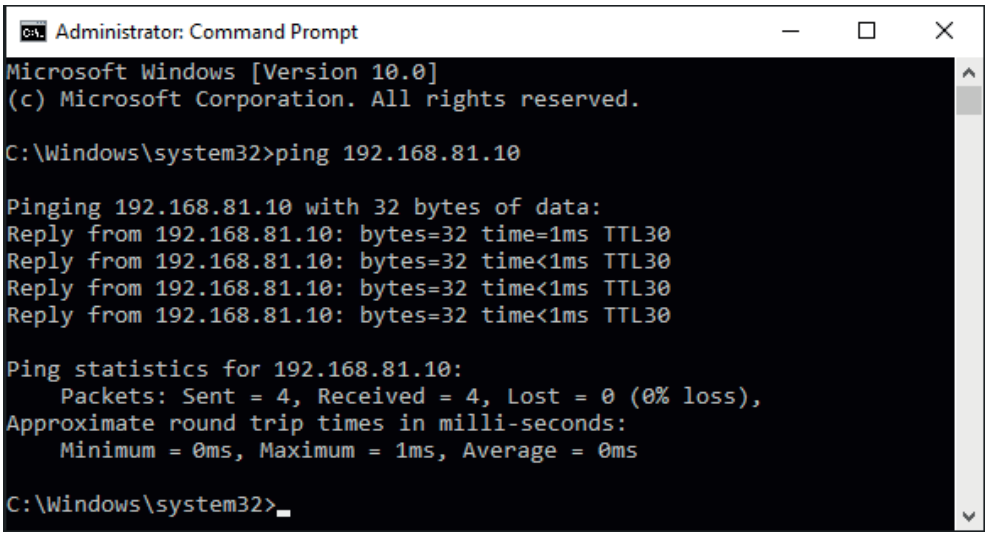
4.4 Connection diagnostics with PING

PING is a system command with which you can check if a certain communication partner can be reached in an IP network.

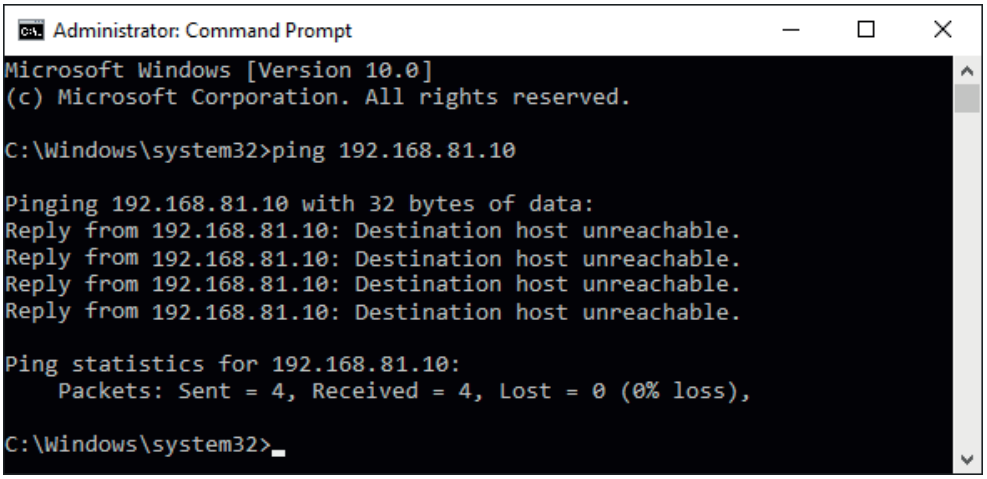
1. Open a Windows command prompt.

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

→ With an existing connection you receive several replies.

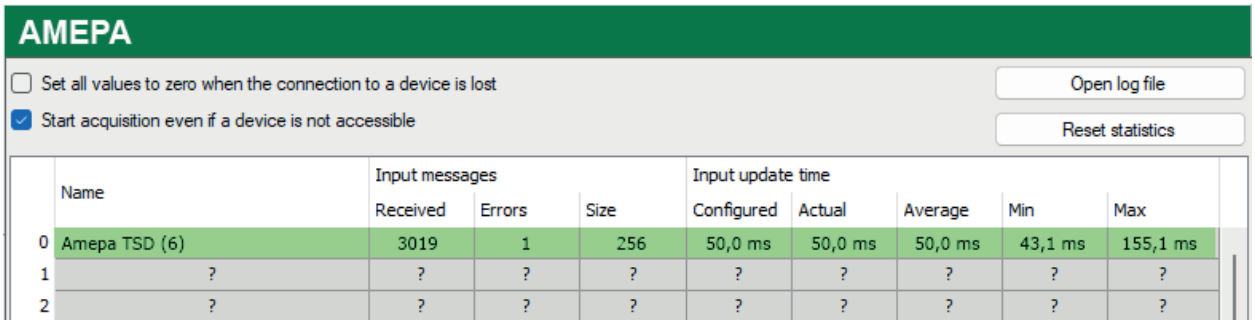


→ With no existing connection you receive error messages.



4.5 Connection table

The AMEPA interface shows all configured connections to AMEPA TSD devices in a table. There is one row per connection to a device.



The table columns and their meaning:

- Name: Name of the module
- Received spectra: Number of received datasets from the AMEPA device
- Error counter: Number of communication errors that occurred
- Response time actual, average, minimum, maximum:
  Specifies how quickly the data is received by *ibaPDA* via the TCP/IP data connection.

Additional information is provided by the background color of the table rows:

Color	Meaning
Green	The connection is OK and data is being received with an update time equal to or faster than configured.
Orange	The connection is active, but the data is being received with an update time slower than configured.
Red	The connection is not active.
Gray	No connection configured.

4.6 Diagnostic modules

Diagnostic modules are available for most Ethernet based interfaces and Xplorer interfaces. Using a diagnostic module, information from the diagnostic displays (e.g. diagnostic tabs and connection tables of an interface) can be acquired as signals.

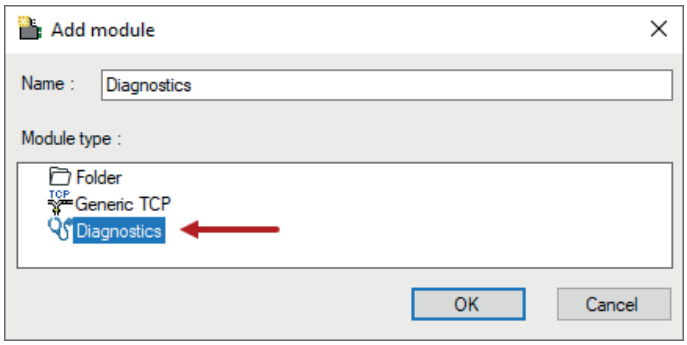
A diagnostic module is always assigned to a data acquisition module of the same interface and supplies its connection information. By using a diagnostic module, you can record and analyze the diagnostic information continuously in the *ibaPDA* system.

Diagnostic modules do not consume any license connections because they do not establish their own connection but refer to another module.

Example for the use of diagnostic modules:

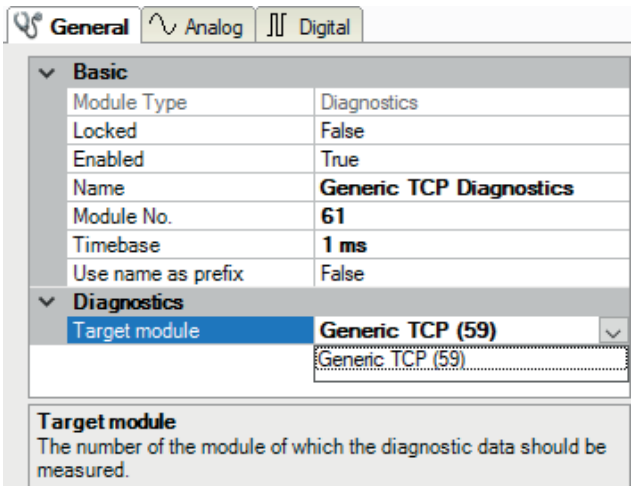
- A notification can be generated, whenever the error counter of a communication connection exceeds a certain value or the connection gets lost.
- In case of a disturbance, the current response times in the telegram traffic may be documented in an incident report.
- The connection status can be visualized in *ibaQPanel*.
- You can forward diagnostic information via the SNMP server integrated in *ibaPDA* or via OPC DA/UA server to superordinate monitoring systems like network management tools.

In case the diagnostic module is available for an interface, a "Diagnostics" module type is shown in the *Add module* dialog (example: Generic TCP).



Module settings diagnostic module

For a diagnostic module, you can make the following settings (example: Generic TCP):



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

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

By selecting the target module, you assign the diagnostic module to the module on which you want to acquire information about the connection. You can select the supported modules of this interface in the drop-down list of the setting. You can assign exactly one data acquisition module to each diagnostic module. When having selected a module, the available diagnostic signals are immediately added to the *Analog* and *Digital* tabs. It depends on the type of interface, which signals exactly are added. The following example lists the analog values of a diagnostic module for a Generic TCP module.

General | **Analog** | Digital

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

For example, the IP (v4) address of a Generic TCP module (see fig. above) will always be split into 4 parts derived from the dot-decimal notation, for better reading. Also other values are being determined, as there are port number, counters for telegrams and errors, data sizes and telegram cycle times. The following example lists the digital values of a diagnostic module for a Generic TCP module.

General | Analog | **Digital**

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

Diagnostic signals

Depending on the interface type, the following signals are available:

Signal name	Description
Active	Only relevant for redundant connections. Active means that the connection is used to measure data, i.e. for redundant standby connections the value is 0. For normal/non-redundant connections, the value is always 1.
Buffer file size (actual/avg/max)	Size of the file for buffering statements
Buffer memory size (actual/avg/max)	Size of the memory used by buffered statements
Buffered statements	Number of unprocessed statements in the buffer
Buffered statements lost	Number of buffered but unprocessed and lost statements
Connected	Connection is established
Connected (in)	A valid data connection for the reception (in) is available
Connected (out)	A valid data connection for sending (out) is available
Connecting	Connection being established
Connection attempts (in)	Number of attempts to establish the receive connection (in)
Connection attempts (out)	Number of attempts to establish the send connection (out)
Connection ID O->T	ID of the connection for output data (from the target system to *ibaPDA*). Corresponds to the assembly instance number
Connection ID T->O	ID of the connection for input data (from *ibaPDA* to target system). Corresponds to the assembly instance number
Connection phase (in)	Status of the ibaNet-E data connection for reception (in)
Connection phase (out)	Status of the ibaNet-E data connection for sending (out)
Connections established (in)	Number of currently valid data connections for reception (in)
Connections established (out)	Number of currently valid data connections for sending (out)
Data length	Length of the data message in bytes
Data length O->T	Size of the output message in byte
Data length T->O	Size of the input message in byte
Destination IP address (part 1-4) O->T	4 octets of the IP address of the target system Output data (from target system to *ibaPDA*)
Destination IP address (part 1-4) T->O	4 octets of the IP address of the target system Input data (from *ibaPDA* to target system)
Disconnects (in)	Number of currently interrupted data connections for reception (in)
Disconnects (out)	Number of currently interrupted data connections for sending (out)
Error counter	Communication error counter
Exchange ID	ID of the data exchange
Incomplete errors	Number of incomplete messages

Signal name	Description
Incorrect message type	Number of received messages with wrong message type
Input data length	Length of data messages with input signals in bytes (*ibaPDA* receives)
Invalid data points	Number of received data points with missing configuration
Invalid packet	Invalid data packet detected
IP address (part 1-4)	4 octets of the IP address of the target system
Keepalive counter	Number of Keepalive messages received by the OPC UA Server
Lost images	Number of lost images (in) that were not received even after a retransmission
Lost Profiles	Number of incomplete/incorrect profiles
Message counter	Number of messages received
Messages per cycle	Number of messages in the cycle of the update time
Messages received since configuration	Number of received data telegrams (in) since start of acquisition
Messages received since connection start	Number of received data telegrams (in) since the start of the last connection setup. Reset with each connection loss.
Messages sent since configuration	Number of sent data telegrams (out) since start of acquisition
Messages sent since connection start	Number of sent data telegrams (out) since the start of the last connection setup. Reset with each connection loss.
Multicast join error	Number of multicast login errors
Number of request commands	Counter for request messages from *ibaPDA* to the PLC/CPU
Output data length	Length of the data messages with output signals in bytes (*ibaPDA* sends)
Packet size (actual)	Size of the currently received message
Packet size (max)	Size of the largest received message
Ping time (actual)	Response time for a ping telegram
Port	Port number for communication
Producer ID (part 1-4)	Producer ID as 4-byte unsigned integer
Profile Count	Number of completely recorded profiles
Read counter	Number of read accesses/data requests
Receive counter	Number of messages received
Response time (actual/average/max/min)	Response time is the time between measured value request from *ibaPDA* and response from the PLC or reception of the data. Actual: current value Average/max/min: static values of the update time since the last start of the acquisition or reset of the counters.
Retransmission requests	Number of data messages requested again if lost or delayed

Signal name	Description
Rows (last)	Number of resulting rows by the last SQL query (within the configured range of result rows)
Rows (maximum)	Maximum number of resulting rows by any SQL query since the last start of acquisition (possible maximum equals the configured number of result rows)
Send counter	Number of send messages
Sequence errors	Number of sequence errors
Source IP address (part 1-4) O->T	4 octets of the IP address of the target system Output data (from target system to *ibaPDA*)
Source IP address (part 1-4) T->O	4 octets of the IP address of the target system Input data (from *ibaPDA* to target system)
Statements processed	Number of executed statements since last start of acquisition
Synchronization	Device is synchronized for isochronous acquisition
Time between data (actual/ max/min)	Time between two correctly received messages Actual: between the last two messages Max/min: statistical values since start of acquisition or reset of counters
Time offset (actual)	Measured time difference of synchronicity between *ibaPDA* and the ibaNet-E device
Topics Defined	Number of defined topics
Topics Updated	Number of updated topics
Unknown sensor	Number of unknown sensors
Update time (actual/average/ configured/max/min)	Specifies the update time in which the data is to be retrieved from the PLC, the CPU or from the server (configured). Default is equal to the parameter "Timebase". During the measurement the real actual update time (actual) can be higher than the set value, if the PLC needs more time to transfer the data. How fast the data is really updated, you can check in the connection table. The minimum achievable update time is influenced by the number of signals. The more signals are acquired, the greater the update time becomes. Average/max/min: static values of the update time since the last start of the acquisition or reset of the counters.
Write counter	Number of successful write accesses
Write lost counter	Number of failed write accesses

5 Support and contact

Support

Phone: +49 911 97282-14

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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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