



# ibaPDA-Interface-MELSEC-Xplorer

PLC-Xplorer Data Interface to Mitsubishi MELSEC Systems

Manual Issue 1.4

> Measurement Systems for Industry and Energy www.iba-ag.com

#### Manufacturer

iba AG Koenigswarterstrasse 44 90762 Fuerth Germany

#### Contacts

Main office	+49 911 97282-0
Fax	+49 911 97282-33
Support	+49 911 97282-14
Engineering	+49 911 97282-13
E-mail	iba@iba-ag.com
Web	www.iba-ag.com

Unless explicitly stated to the contrary, it is not permitted to pass on or copy this document, nor to make use of its contents or disclose its contents. Infringements are liable for compensation.

© iba AG 2023, All rights reserved.

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

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

Version	Date	Revision	Author	Version SW
1.4	02-2023	GUI new, changes in GX Works ethernet module	RM, mm	8.2.0

Windows<sup>®</sup> is a brand and registered trademark of Microsoft Corporation. Other product and company names mentioned in this manual can be labels or registered trademarks of the corresponding owners.

## Content

1	About this Manual								
	1.1	Target group and previous knowledge4							
	1.2	Notations4							
	1.3	Used symbols5							
2	System i	requirements MELSEC-Xplorer6							
3	PLC-Xplo	orer interface to MELSEC controllers8							
	3.1	General information8							
	3.2	System topologies8							
	3.3	Configuration and engineering GX Works 28							
	3.3.1	Configuration CPU8							
	3.3.2	Configuration Ethernet module9							
	3.4	Configuration and engineering ibaPDA11							
	3.4.1	Interface settings11							
	3.4.2	Adding a module12							
	3.4.3	General module settings13							
	3.4.4	Connection settings15							
	3.4.5	Signal configuration17							
	3.4.6	Module diagnostics18							
4	Diagnos	tics19							
	4.1	License							
	4.2	Visibility of the interface19							
	4.3	Log files							
	4.4	Connection diagnostics with PING21							
	4.5	Connection table22							
	4.6	Diagnostic modules							
5	Support	and contact							

## 1 About this Manual

This document describes the function and application of the software interface

ibaPDA-Interface-MELSEC-Xplorer

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

## **1.1** Target group and previous knowledge

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

This documentation in particular addresses persons, who are concerned with the configuration, test, commissioning or maintenance of Programmable Logic Controllers of the supported products. For the handling *ibaPDA-Interface-MELSEC-Xplorer* the following basic knowledge is required and/or useful:

- Windows operating system
- Knowledge of configuration and operation of the relevant control system

## 1.2 Notations

In this manual, the following notations are used:

Action	Notation
Menu command	Menu <i>Logic diagram</i>
Calling the menu command	Step 1 – Step 2 – Step 3 – Step x
	Example: Select the menu <i>Logic diagram – Add – New function block</i> .
Keys	<key name=""></key>
	Example: <alt>; <f1></f1></alt>
Press the keys simultaneously	<key name=""> + <key name=""></key></key>
	Example: <alt> + <ctrl></ctrl></alt>
Buttons	<key name=""></key>
	Example: <ok>; <cancel></cancel></ok>
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.

#### Тір



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 MELSEC-Xplorer

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

- *ibaPDA* v7.1.7 or more recent
- Base license for *ibaPDA*+ license for *ibaPDA*-Interface-PLC-Xplorer or *ibaPDA*-Interface-MELSEC-Xplorer
- With more than 16 connections you need additional *one-step-up-Interface-MELSEC-Xplorer* licenses for each additional 16 connections.

#### Note



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

*ibaPDA* supports the following MELSEC controller families:

- MELSEC-A
- MELSEC FX3U
- MELSEC-Q
- MELSEC-L
- MELSEC iQ-R
- MELSEC iQ-F

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

#### License information

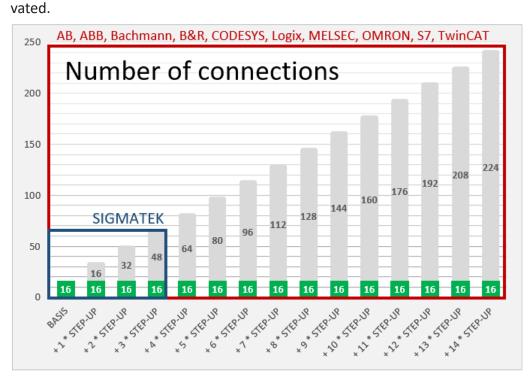
Order no.	Product name	Description
31.001042	ibaPDA-Interface-PLC-Xplorer	Extension license for an <i>ibaPDA</i> system adding all available Xplorer data interfaces. (Complete specification under www.iba-ag.com)
31.000008	ibaPDA-Interface-MELSEC- Xplorer	Extension license for an <i>ibaPDA</i> system adding the data interface: + MELSEC-Xplorer (16 connections)
31.100008	One-step-up-Interface-MELSEC- Xplorer	Extension license for 16 additional MELSEC-Xplorer connections (max. 14 exten- sion licenses)

Table 1: Available MELSEC-Xplorer interface licenses

#### Note



To use more than 16 data connections per interface, you can purchase the onestep-up-... extension licenses separately for each interface. Up to 16 further connections to PLCs can be established on each one-step-up-license. Up to 240 connections can be configured and used per data interface with the multiple purchase or multiple release of these licenses (up to 15 in total). Exception of SIGMATEK: Here, only up to 4 licenses (64 connections) can be acti-



Consider the limitation of the number of signals by the *ibaPDA* base license.

## **3 PLC-Xplorer interface to MELSEC controllers**

## 3.1 General information

The MELSEC-Xplorer interface is suitable for measurement data acquisition with *ibaPDA* from Mitsubishi MELSEC PLCs. The data is cyclically read by *ibaPDA* instead of being sent by the PLC.

## 3.2 System topologies

The connections to the controllers can be established via the computer's standard Ethernet ports.

No further software is necessary for operation.

Note



It is recommended carrying out the TCP/IP communication on a separate network segment to exclude a mutual influence by other network components.

## 3.3 Configuration and engineering GX Works 2

## 3.3.1 Configuration CPU

For access to the MELSEC controllers, *ibaPDA* uses the Mitsubishi MC Protocol.

Activate the Mitsubishi MC Protocol in the PLC parameters on the controller side.

- IP Address Set	-	Ethern	et F	ort Open Setting			Open Settin	9 🗆 🗆 Set Ethe	Open Setting ir rnet Configura	1 tion window
IP Addres									IP Addres	s/Port No. Input Format DEC
Subnet M		Proto	col	Open System		TCP Connection	Host Station Port No.	Destination IP Address	Destination Port No.	Start Device to Store Predefined Protocol Operation
diana dia	1	TCP		MELSOFT Connection	-	•				
Default R	2	_	_	MELSOFT Connection	-	+				
	3	TCP	-	MC Protocol	-	-	2000			
	4	UDP	-	MC Protocol	-	-	2001			
Communicat	5	TCP	_	MELSOFT Connection	•	•		4		
	6	TCP	-	MELSOFT Connection	-	-				
Binary	7	TCP	-	MELSOFT Connection	-				°	
	8	TCP	-	MELSOFT Connection	-	-				
C ASCII	9	TCP	-	MELSOFT Connection	-	-				
	10	TCP	-	MELSOFT Connection	-	-			2	
	11	TCP	-	MELSOFT Connection	-	-				
✓ Enable	12	TCP	-	MELSOFT Connection	-	-				
	13	TCP	-	MELSOFT Connection	•	-				
Disable	14	TCP	-	MELSOFT Connection	-	-				
, 01300/6	15	TCP	-	MELSOFT Connection	-	-				
_	16	TCP	-	MELSOFT Connection	-	-				
🗖 Do not				and Port No. will be dis ne value according to th			ed format.			

Apart from that no further configuration and programming is required on the controller side. In particular, it is not necessary to call any program modules.

8

### 3.3.2 Configuration Ethernet module

The communication with the CPU is also possible via a MELSEC Ethernet module over TCP. First configure the hardware and then set the network parameters. The single steps are described below.

#### Hardware configuration

- 1. Open the PLC setting dialog and select the *I/O Assignment* tab.
- 2. Enter the corresponding communication module.

١o,	Slot	Type	9	Model Name	Points	2 B	Start XY		Switch Setting
0	PLC	PLC	<b>-</b> 0	D03UDVCPU	1. witten	+			1
1	0(0-0)	Intelligent	- 9	QJ71E71-100	32Points	+	00	000	Detailed Setting
2	1(0-1)		-			+	1.117.5	- G	<u> 74</u>
3	2(0-2)		-			-		11	Select PLC type
4			*			*		8	New Module
5			-			-		<u> (</u>	
6			-			+		19	
7			-			-		-	
eavir		ddress is not necessary as the C blank will not cause an error to							Base Mode
avir ase S	ng this setting Setting(*1)	Section of the sectio			Extension Ca	ble	Slot	:5	and the second sec
eavir ase S	ng this setting Setting(*1) Iain	blank will not cause an error to			Extension Ca	ble	Slot 3	-	C Auto
eavir ase S M Ext,	ng this setting Setting(*1) lain Base1	blank will not cause an error to			Extension Ca	ble	and the second second	• •	and the second sec
eavir ase 9 M Ext, Ext,	ng this setting Setting(*1) lain Base1 Base2	blank will not cause an error to			Extension Ca	ble	and the second second	*	← Auto ● Detail
eavir ase S M Ext. Ext. Ext.	ng this setting Setting(*1) Iain Base1 Base2 Base3	blank will not cause an error to			Extension Ca	ble	and the second second	* * *	C Auto
eavir ase S M Ext. Ext. Ext. Ext.	ng this setting Setting(*1) Iain Base1 Base2 Base3 Base4	blank will not cause an error to			Extension Ca	ble	and the second second	* * *	← Auto ● Detail
eavir ase S Ext. Ext. Ext. Ext. Ext.	ng this setting Setting(*1) Iain Base1 Base2 Base3	blank will not cause an error to			Extension Ca	ble	and the second second	* * *	C Auto C Detail 8 Slot Default

#### Network parameter configuration

1. Open *Ethernet Settings* and enter the corresponding parameters.

E Set network configuration setting in CC IE Field configuration window

	Module 1	Module 2	
Network Type	Ethernet 🗸	one 🗸	None
Start I/O No.	0000		
Network No.	1		
Total Stations			
Group No.	0		
Station No.	2		
Mode	Online 🗸	-	
	Operation Setting		
	Initial Setting		
	Open Setting		
	Router Relay Parameter		
	Station No. <->IP Information		
	FTP Parameters		
	E-mail Setting		
	Interrupt Settings		
4			

2. Open Operation Settings and enter the corresponding parameters.

Communication D	ata Code	Initial Timir	ng	
<ul> <li>Binary Code</li> <li>ASCII Code</li> </ul>		imposs Always	ible at STO s wait for O	PEN (Communication
		possibl	e at STOP I	ime)
IP Address Settir Input Format D IP Address	EC 🔹	168 80	42	<ul> <li>Send Frame Setting</li> <li>Ethernet(V2.0)</li> <li>IEEE802.3</li> </ul>
☑ Enable Online (	Thange			Confirmation Setting he KeepAlive he Ping

3. Open *Open Settings*. Here you have to open the ports for the connection to *ibaPDA*. The example shows ports 2012 and 2013. (Both settings are functioning but only one of the two is necessary.)

IP Address/Port No. Input Format													-			
		Protocol		Open System		Fixed Buffe	r	Fixed Buffer Communication		Pairing Open		Existence Confirmation	Host Station Port No.	Destina IP Add		Destination Port No.
	1		١		•	•	•		•		Ŧ					
	2		Ŧ		-		Ŧ		Ŧ		Ŧ					
	3	TCP	•	Unpassive	•	Receive •	•	Procedure Exist	Ŧ	Disable	Ŧ	Confirm 👻	2012			
	4	TCP	¥	Unpassive	•	Receive 🔹	-	Procedure Exist	•	Disable	Ŧ	No Confirm 📼	2013			
	5		•		•		T.		Ŧ		Ŧ			-		
	6		ਙ		-		-		-		•					

4. In the MELSEC-Xplorer module in *ibaPDA*, configure the same port as previously configured. The example shows port 2012.

MELSEC (	MELSEC (2)											
📴 General 🝠	Connection 🔨 Analog	g 👖 Digital 🧼 Diag	nostics									
Connection												
Protocol:	TCP/IP ~	Encoding:	Bytes $\lor$									
IP address:	192.168.80.42			Timeout (	s): 5	÷						
PLC type:	MELSEC-Qna 🗸 🗸			Port:	20	012 🖨						
PC number:	FF 🚖	Network number:	00									
Request destination	on module I/O number:		03FF ≑									
Request destination	on module station number:		00 ≑		Test							

## 3.4 Configuration and engineering ibaPDA

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

## 3.4.1 Interface settings

If the Xplorer interface is selected in the tree, you can see an overview of diagnostics information on the configured connections between *ibaPDA* and the controllers.

The interface has the following features and configuration options.

<table-of-contents> iba I/O Manager</table-of-contents>								_		×		
🗄 🎦 🔁 🕄 🗲 🗲 🗔 🗎												
Inputs         Outputs         Groups         General         ↓         ↓           □	ME	IELSEC-Xplorer										
		Set all values to zero when the connectio		Open log file								
Click to add module		Start acquisition even if a PLC is not acce	essible					Open log lile				
Az Text interface	<b> </b>   <i>P</i>	Now inaccessible operands		Reset statistics								
⊕ fx Virtual IIII Unmapped		Name	Error	Data size	Update time	Response tir	ne					
		INGINE	count	Data size	Actual	Actual	Average	Min	Max			
	0	?	?	?	?	?	?	?	?	^		
	1	?	?	?	?	?	?	?	?			

#### Set all values to zero when the connection to a PLC is lost

If this option is enabled, all measured values of the PLC are set to zero as soon as the connection is lost. If this option is disabled, *ibaPDA* keeps the last valid measured value in memory when the connection is lost.

#### Start acquisition even if a PLC is not accessible

If this option is enabled, the acquisition starts even if the controller is not accessible. A warning is prompted in the validation dialog, not an error. If the system has been started without a connection to the controller, *ibaPDA* periodically tries to connect to the PLC.

#### Allow inaccessible operands

Enable this option if you wish to start acquisition even if an operand is not accessible during the validation of the I/O configuration. If you do not enable this option, measurement does not start when inaccessible operands are present.

#### <Open log file>

If connections to controllers have been established, all connection specific actions are recorded in a text file. Using this button, you can open and check this file. In the file system on the hard disk, you find the log files of the *ibaPDA* server (...\ProgramData\iba\ibaPDA\Log). The file name of the current log file is InterfaceLog.txt; the name of the archived log files is InterfaceLog\_yyyy\_mm\_dd\_hh\_mm\_ss.txt.

#### <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 (current, real 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.

See **7** Connection table, page 22.

- Data size: The data size shows how much data is read per read operation; in between brackets, the number of commands used to request the data is displayed.
- Response time: The time it takes to read the data for a connection. The table shows the actual, average, minimum and maximum values of the response time.
- Update time: The update time indicates the time between 2 read operations.

## 3.4.2 Adding a module

- 1. Click on the blue command *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>.

🗗 iba I/O Manager	
: *3 🖻 🔁 🛢 🗲 • 🗛 🛛	)   🖻 ( 🖹   🗲 🖂
Inputs Outputs Groups General 금~器 Xplorer Interface	Xplorer Interface
Click to add module	🖺 Add module
i) 😭 Playback i) 📥 Test interface	Name : Xplorer Module
K What     What     Wrapped	Module type :
	Conduer

## 3.4.3 General module settings

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

All modules have the following setting options.

iba I/O Manager		
Ketsec-Xplorer     MELSEC-Xplorer     Metsec (2)     Click to add module     Playback     Ar Text interface     fx Virtual	WELSEC (2)         Image: General Image: Connection Image: Optimized in the provided	agnostics
I∎P Unmapped	Name     MELSEC       Module No.     2       Timebase     10 ms       Use name as prefix     False       V     MELSEC       Update time     10 ms       Read mode     Batch read	
	Module Layout       No. analog signals       32       No. digital signals       32         Name       The name of the module.         Add operands	

#### **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.

#### 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 name as prefix

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

#### MELSEC

#### Update time

Specifies the reference update time in which the data is requested from the PLC. During measurement, the real current update time may be higher than the specified value if the PLC needs more time to transmit the data. You can check in the connection table how fast the data is actually updated.

#### Note



It is recommended to check the diagnostic overview (connection table) for measured update rates as overload will result in lost samples.

#### Read mode

The read mode defines how data is read from the PLC.

- Batch read: Most generic way of reading data. Neighboring operands are grouped into a single request message; otherwise a single message per operand is used. This is the least performant method but supported by most PLC types.
- Random read: Most suited for situations where a lot of non-neighboring operands are requested. Not supported by all PLC types.
- Monitor: Most performant method. The requested operands are registered once and the data is requested periodically. Limited to 192 operands and can only be used in one module per PLC. Not supported by all PLC types.

#### Module Layout

#### No. of analog signals/digital signals

Define the number of configurable analog and digital signals in the signal tables. The default value is 32 for each. The maximum value is 1000. The signal tables are adjusted accordingly.

#### Link "Add operands"

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

## 3.4.4 Connection settings

Configure the connection of the module to the controller in the *Connection* tab.

MELSEC (	(2)				
	Connection 🔨 Analo	g 👖 Digital 🧼 Diag	gnostics		
Connection					
Protocol:	TCP/IP ~	Encoding:	Bytes 🗸		
IP address:	192.168.3.39			Timeout (s):	5 🜲
PLC type:	MELSEC-Qna $\sim$			Port:	4888 🜲
PC number:	FF ≑	Network number:	00		
Request destination	on module I/O number:		03FF ≑		
Request destination	on module station number:		00	Т	est

#### Protocol

You can select either "TCP/IP" or "UDP". Note that some PLC types only support TCP/IP.

You have to enable the used protocol within the PLC parameters settings of GX works (see chapter **7** *Configuration CPU*, page 8).

#### Other documentation



Refer to the particular PLC manual for more information.

#### Encoding

You can select either "Bytes" or "ASCII", depending on the configuration of your PLC. If possible, it is recommended to use the bytes-encoding method. This way, the size of the data request message is smaller and the processing is more efficient at the PLC side.

#### **IP address**

Enter the IP address at which the network interface of the PLC is located.

#### Timeout

Here you can specify a value for the timeout in seconds for establishing the connection and for read accesses. If the time set here is exceeded, *ibaPDA* declares the controller as not accessible or not responsive.

#### PLC type

Specify to which MELSEC series the PLC is assigned to.

👫 General 💋 🕻	Connection 🔨 Analog
Connection	
Protocol:	TCP/IP ~
IP address:	192.168.3.39
PLC type:	MELSEC-Qna 🗸 🗸
PC number:	MELSEC-A MELSEC FX3U MELSEC-Q
Request destination	MELSEC-Qna
Request destination	MELSEC-L しう MELSEC iQ-R : MELSEC iQ-F -

#### Port

Specify the TCP or UDP port the PLC refers to for incoming requests.

#### PC number

Specify the network module station number of the access target. The default value is "FF".

#### Network number

Specify the network number of the access target. The default value is "00".

#### **Request destination module I/O number**

When accessing a multidrop connection station, the start input/output number of a multidrop connection source module is to be specified. The default value is "03FF".

#### Request destination module station number

When accessing a multidrop connection station, specify the station number of an access target module. The default value is "00".

#### **Other documentation**



Refer to the Mitsubishi MELSEC documentation for more information on *PC number, Network number, Request destination module I/O number* or *Request destination module station number*.

#### <Test>

*ibaPDA* tests the connection to the CPU and displays available diagnostic data, e.g. the PLC model name and the PLC type. If this option is not supported by the PLC, a warning message will be generated. However, this does not imply that requesting data will not work.



## 3.4.5 Signal configuration

In the *Analog* or *Digital* tab you configure the signals to be measured. In the *General* tab under *Module Layout* you define the length of the signal tables or the number of signals per table.

#### Note



Observe the maximum number of signals permitted by your license.

Note



Take into consideration that the number of signals, which are read by a CPU, influences the minimum achievable read cycle. The more signals recorded, the slower the reachable reading cycle.

#### Selection of the signals to be measured

You have two options to select the signals to be measured:

■ In the module's *General* tab, click on the *Add operands* hyperlink.

The MELSEC Operand Constructor opens.

Click on a field in the Analog or Digital tab, click in a cell in the MELSEC Operand column.
 The button <...> appears. Click the <...> button to open the MELSEC Operand Constructor.

T MELSEC Operan	d Constructor	$\times$
Operand notation:	D 7.7	
Operand mode:	Octal	$\sim$
Operand	Address	Bit
SM SD X Y M L F V B D W	7	7
	ОК	Cancel

Using the MELSEC Operand Constructor, you can easily add analog and digital signals to the MELSEC-Xplorer module. Depending on which signal tab is selected (*Analog* or *Digital*) and the PLC type configured in the *Connection* tab (see **7** *Connection settings*, page 15), a list of accessible operands is available. In the digital operand type list, the analog operand types are listed as well.

#### User interface of the MELSEC Operand Constructor

#### **Operand mode**

The following number systems are supported: octal, decimal and hexadecimal.

#### Address

Apart from the operand type, you also have to enter the address.

#### Bit

Since the digital operands are still analog data types in the PLC, you also have to specify the bit number you want to use for the digital signal.

The figure below shows an example of an *Analog* tab of a MELSEC-Xplorer module. Apart from the standard properties of an analog signal, there is a column for editing the MELSEC Operand. You can also configure the data type of the requested operand here. *ibaPDA* supports the following data types are supported: BYTE, INT, WORD, DINT, DWORD and FLOAT.

The *Digital* tab shows a similar grid for the digital signals.

E	General 🝠 Connection 🔨 Analog 👖 Digital	🧼 Diagnostic	s				
	Name	Unit	Gain	Offset	MELSEC Oper	DataType	Active
0	D0		1	0	D0	word 🗸	<b>V</b>
1	D5		1	0	D5	BYTE	<b>V</b>
2	D10		1	0	D10	INT WORD	<ul> <li>Image: A start of the start of</li></ul>
3	D15		1	0	D15	DINT 🗟	
4	D20		1	0	D20	DWORD FLOAT	
5	D25		1	0	D25	WORD	

## 3.4.6 Module diagnostics

After applying the configuration the actual values of the analog and digital signals are displayed in the *Diagnostics* tab of the relevant module.

G	eneral 🝠 Connection 🔨 Analog 🗍	Digital 🧼 Diagnostics			
$\sim$	Analog values 📗 Digital values				
	Name	Symbol	Datatype	Value	
0	.Test.date	.Test.date			^
1	.Test.date_time	.Test.date_time			
2	.Test.dint	.Test.dint	DINT	7225358	
3	.Test.dt	.Test.dt	DINT	1167616836	

Inactive signals are grayed out.

## 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 this interface 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.

License information		Licenses:	
License container:	3-4	Ind Circles New York, 1924	^
Customer name:	kallado Tatología	Auffild Sate Sone Multill (1924) Auffild Intelling 17 Autom (192	
License time limit:	Unlimited	terfile sectors in terms in	
Container type:	WIBU CmStick v4.40	ibaPDA-Interface-Codesys-Xplorer (16)	
Container host:	B+801-107010	BaPCH Intellace TearCHT Spine (10)	
Required EUP date:	01.02.2023	Saff in markets (safe falses (15)	
EUP date:	31.12.2025	Ind Constant Mo. 201 Spine (10)	¥

## 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:

∃→ iba I/O Manager					– – ×		➡ iba I/O Manager
: * • • • • • • • • • • • •							: *> 🖻 🔁 🖯 🕂 🗸 🐚
Inputs Outputs Groups General 4 b	Interfaces						Inputs Outputs Groups General ↓ ↓ Imputs ibaFOB-4io-D
Address books	Physical location Assign board numb Add physical locati	pers to physical locations	5	Visibility	s 📘		Barcos and Barcos
Module overview	Device	Current ID	New ID	Name	Visible	1	ibaCapture 
Watchdog	X1 M Empty	Current 1D	New ID	ibaFOB-4io-D			ibaLogic TCP
Remote configuration				ibaNet-E			Playback
Stop prevention							An Text interface
	X3 👿 Empty			ABB-Xplorer			⊕ f Virtual ∰ Unmapped
Interrupt info	X4 👿 Empty			AB-Xplorer			
	X5 👿 Empty			AN-X-DCSNet			
Multistation	X6 👿 Empty			B&R-Xplorer			
OPC server	X7 👿 Empty			Bachmann-Xplorer			
	X8 👿 Empty			Codesys-Xplorer			
IEC 61850 server				DGM200E			
				DTBox Request			
				DTBox Request UDP			
				EGD			
				E-mail			
				EtherNet/IP			
				GCOM			
				Generic TCP			
				Generic UDP			
				HPCi Request			
				ibaCapture			
				ibaCapture-HMI			
				ibaInCycle			
				ibaInSpectra			
				ibaLogic TCP			
				IEC 61850 Client			
				IEC 61850-9-2			
				LANDSCAN			
			Preview	LMI-Gocator			
		· · · · · · · · · · · · · · · · · · ·					
		8 1024 1280 153		96 OK Apply	Cancel		

## 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\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)

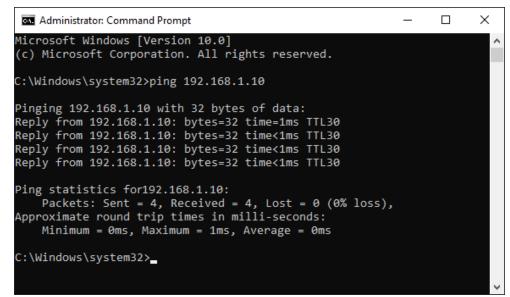
## 4.4 Connection diagnostics with PING

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

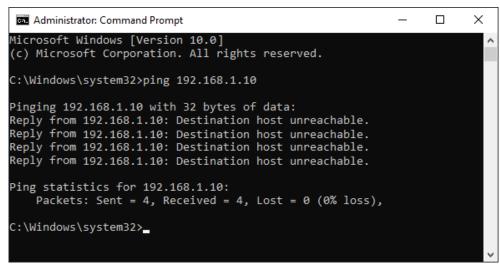
1. Open a Windows command prompt.



- 2. Enter the command "ping" followed by the IP address of the communication partner and press <ENTER>.
- $\rightarrow$  With an existing connection you receive several replies.



 $\rightarrow$  With no existing connection you receive error messages.



## 4.5 Connection table

For every Ethernet-based interface, there is a table available in the I/O Manager which shows the status of each connection. Each line represents one connection. The following figure shows, as an example, the connection table of the Codesys-Xplorer interface:

➡ iba I/O Manager		– 🗆 X						×	
: *• 🗗 🔁 🛢 🗲 • 🛧 🕖	Ē	Ĩ≞   <del>←</del> →							
Inputs Outputs Groups General	Co	desys-X	plorer						
Codesys V2 (2)	⊠ s	et all values to z	ero when the o	connection to a PLC is	lost				
Codesys V3 (4)	🗹 S	tart acquisition e	even if a PLC is	not accessible					
Elick to add module ⊡⊡ ibaCapture	🗹 A	llow inaccessible	e symbols				R	eset statistics	
		Name	Error count	Update time Actual	Response time Actual	Response time Average	Response time Min	Response time Max	
	0	Codesys V2	0	1,0 ms	0,0 ms	0,0 ms	0,0 ms	14,0 ms	^
	1	Codesys V3	2	1,4 ms	0,0 ms	0,5 ms	0,0 ms	145,0 ms	
	2	?	?	?	?	?	?	?	

The connected target systems (controllers) are identified by their name or IP address in the first (left) column.

Depending on the interface type the table shows error counters, read counters and/or data sizes, as well as the cycle times, refresh times and/or update times of the different connections during the data acquisition. Click the <Reset statistics> button to reset the error counters and the calculation of the response times.

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

Color	Meaning
Green	The connection is OK and the data are read.
Yellow	The connection is OK, however the data update is slower than the config- ured update time.
Red	The connection has failed.
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, since they do not establish their own connection, but refer to another module.

Example for the use of diagnostic modules:

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

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

🖺 Add module		×
Name : Diagnostics		
Module type :		
E Folder Generic TCP Diagnostics		
	ОК	Cancel

#### Module settings diagnostic module

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

ř	Basic			
	Module Type	Diagnostics		
	Locked	False		
	Enabled	True		
	Name	Generic TCP Diagnostics		
	Module No.	61		
	Timebase	1 ms		
	Use name as prefix	False		
$\mathbf{v}$	Diagnostics			
	Target module	Generic TCP (59)		
		Generic TCP (59)		
The	rget module e number of the module o asured.	f which the diagnostic data should be		

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.

8	General 🔨 Analog 👖 Digital					
	Name	Unit	Gain	Offset	Active	Actual
0	IP address (part 1)		1	0	<b>V</b>	
1	IP address (part 2)		1	0		
2	IP address (part 3)		1	0	<b>V</b>	
3	IP address (part 4)		1	0	<b>×</b>	
4	Port		1	0	<b>V</b>	
5	Message counter		1	0		
6	Incomplete errors		1	0	<b>V</b>	
7	Packet size (actual)	bytes	1	0		
8	Packet size (max)	bytes	1	0	<b>V</b>	
9	Time between data (actual)	ms	1	0		
10	Time between data (min)	ms	1	0	<b>V</b>	

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.

Q	🖞 General 🔨 Analog 🛛 🗍 Digital		
	Name	Active	Actual
0	Active connection mode	<b>V</b>	
1	Invalid packet	<b>V</b>	
2	Connecting	<b>V</b>	
3	Connected	<b>V</b>	

## **Diagnostic signals**

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

Signal name	Description
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 <i>ibaPDA</i> ). Corresponds to the assembly instance number
Connection ID T->O	ID of the connection for input data (from <i>ibaPDA</i> 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 <i>ibaPDA</i> )
Destination IP address (part 1-4) T->O	4 octets of the IP address of the target system Input data (from <i>ibaPDA</i> to target system)
Disconnects (in)	Number of currently interrupted data connections for recep- tion (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
Incorrect message type	Number of received messages with wrong message type
Input data length	Length of data messages with input signals in bytes ( <i>ibaPDA</i> receives)
Invalid packet	Invalid data packet detected
IP address (part 1-4)	4 octets of the IP address of the target system

Signal name	Description
Keepalive counter	Number of KeepAlive messages received by the OPC UA Serv- er
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 con- figuration	Number of received data telegrams (in) since start of acquisi- tion
Messages received since con- nection start	Number of received data telegrams (in) since the start of the last connection setup. Reset with each connection loss.
Messages sent since configu- ration	Number of sent data telegrams (out) since start of acquisition
Messages sent since connec- tion 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 com- mands	Counter for request messages from <i>ibaPDA</i> to the PLC/CPU
Output data length	Length of the data messages with output signals in bytes ( <i>ibaPDA</i> 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/aver- age/max/min)	Response time is the time between measured value request from <i>ibaPDA</i> 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
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

iba

Signal name	Description
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 <i>ibaPDA</i> )
Source IP address (part 1-4) T->O	4 octets of the IP address of the target system Input data (from <i>ibaPDA</i> 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/	Time between two correctly received messages
max/min)	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 <i>ibaPDA</i> 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). De- fault is equal to the parameter "Timebase". During the mea- surement 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
Fax:	+49 911 97282-33

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.

#### Contact

#### Headquarters

iba AG Koenigswarterstrasse 44 90762 Fuerth Germany

Phone: +49 911 97282-0

Fax: +49 911 97282-33

Email: iba@iba-ag.com

#### **Mailing address**

iba AG Postbox 1828 D-90708 Fuerth, Germany

#### **Delivery address**

iba AG Gebhardtstrasse 10 90762 Fuerth, Germany

#### **Regional and Worldwide**

For contact data of your regional iba office or representative please refer to our web site

www.iba-ag.com.