



ibaF0B-PlusControl

Interface card for PLUSCONTROL systems

Manual

Issue 1.3

Measurement Systems for Industry and Energy

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The content of this publication has been checked for compliance with the described hardware and software. Nevertheless, deviations cannot be excluded completely so that the full compliance is not guaranteed. However, the information in this publication is updated regularly. Required corrections are contained in the following regulations or can be downloaded on the Internet.

The current version is available for download on our web site <http://www.iba-ag.com>.

Issue	Date	Revision	Author	Version HW/FW
1.3	02-2025	SFP variant	Ms, st	A2

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Certification

The product is certified according to the European standards and directives. This product meets the general safety and health requirements.

Other international and national standards were observed.

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1 About this documentation

This documentation describes the structure, application and operation of the card *ibaFOB-PlusControl*.

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 he/she is capable of assessing safety and recognizing possible consequences and risks on the basis of his/her specialist training, knowledge and experience and knowledge of the standard regulations.

1.2 Notations

In this manual, the following notations are used:

Action	Notation
Menu command	Menu <i>Logic diagram</i>
Calling the menu command	<i>Step 1 – Step 2 – Step 3 – Step x</i> Example: Select the menu <i>Logic diagram – Add – New function block</i> .
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	<i>Filename, Path</i> Example: <i>Test.docx</i>

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



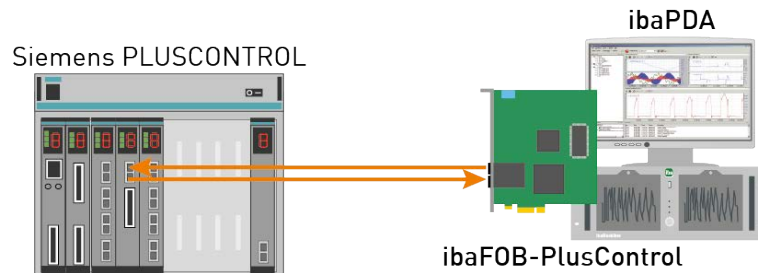
Reference to additional documentation or further reading.

2 About the ibaFOB-PlusControl card

The *ibaFOB-PlusControl* card couples the iba process data acquisition system *ibaPDA* with Siemens PLUSCONTROL systems. To achieve this, the *ibaFOB-PlusControl* card must be connected to a PLUSCONTROL CP.

The connection supports a data transfer rate of 1 Gbit/s. Up to 400 analog or digital signals can be transmitted.

The parameters are completely configured in the software. Jumper settings are not necessary.



2.1 Characteristics

The card has the following characteristics:

- PCI Express card for 1.0-x1 compatible slot
- Firmware update without dismounting the card
- Bidirectional fiber optic link with SC technology
- Transmission rate up to 1 Gbit/s
- Absolutely noise free acquisition of process data
- Display of card ID, processor and link status via 7 segment display and LEDs
- Up to 4 PCIe cards per PC can be plugged in (depending on the performance load, especially at maximum data transfer rates, only 3 or 2 PCIe cards per PC may be possible)
- Plug and play installation

2.2 Mode of operation

The *ibaFOB-PlusControl* card in combination with *ibaPDA* is suitable for measurement data acquisition with free operand/symbol selection.

The data to be measured is requested online by *ibaPDA*. For this purpose the symbolic names and addresses of all available variables are read from the PLUSCONTROL CP and stored internally in *ibaPDA* when the connection has been established for the first time. This address book serves as base to select the measuring data using the address book browser.

3 Scope of delivery

The delivery includes the following components:

ibaFOB-PlusControl

- *ibaFOB-PlusControl* card
- Synchronization cable (sync cable)

ibaFOB-PlusControl-SFP

- *ibaFOB-PlusControl-SFP* card
- Synchronization cable (sync cable)
- SFP Optical Transceiver (pre-assembled)

For more accessories not included in delivery, please see www.iba-ag.com.

4 Safety instructions

Please note when installing the card:

Danger from electric shock!



Disconnect the power supply from the computer before opening the device to avoid an electric shock!

Do not install or remove the card while the power supply is switched on.

Caution!



Electrostatic discharges can damage the board! To avoid electrostatic ESD damage, discharge your body electrically before touching the electronic board.

You can discharge your body by touching a conductive, grounded object immediately before working with the board (e.g. metal cabinet components, socket protective conductor contact).

5 System requirements

Hardware

PC with the following minimum configuration (depending on application):

- Pentium IV/3 GHz or higher
- At least one free PCIe slot (PCIe 1.0-x1-compatible slot)
- 512 MB RAM or more
- Free disk space > 10 GB

For more information about iba PC, please see www.iba-ag.com

Software

- *ibaPDA* version v8.7.0 or higher

Firmware

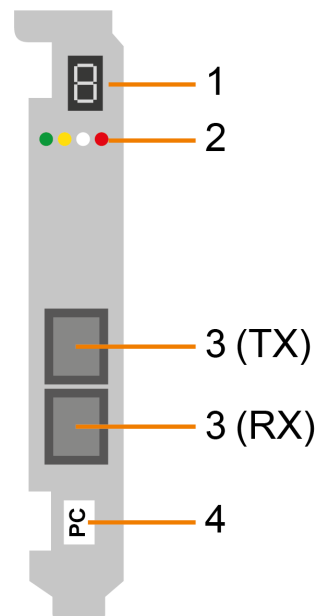
- *ibaFOB-PlusControl* v01.00-12-(A2)
- *ibaFOB-PlusControl-SFP* v01.00-16-(A2)

6 Description

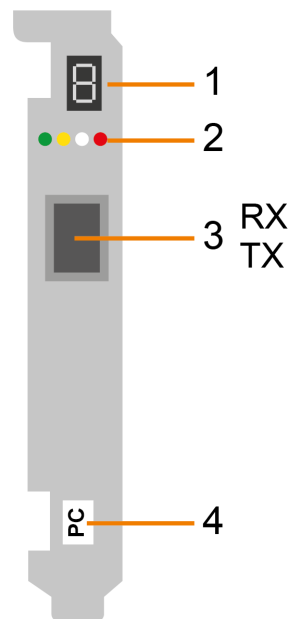
Here you will find views and descriptions of the *ibaFOB-PlusControl* card.

6.1 Front view

ibaFOB-PlusControl



1	7 segment display
2	Operating status indicator
3	Fiber optic connection (duplex SC)
4	Identifier for cards of the ibaFOB family

ibaFOB-PlusControl- SFP

1	7 segment display
2	Operating status indicator
3	SFP cage with pre-assembled SFP module (duplex LC)
4	Identifier for cards of the ibaFOB family

The identifier is used to distinguish the individual ibaFOB card types. The following identifier stands for the following card types:

D: *ibaFOB-D* and *ibaFOB-Dexp*

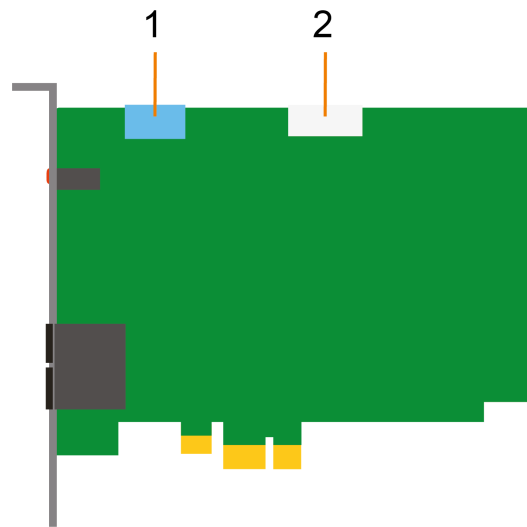
TDC: *ibaFOB-TDC* and *ibaFOB-TDCexp*

SD: *ibaFOB-SD* and *ibaFOB-SDexp*

PC: *ibaFOB-PlusControl*

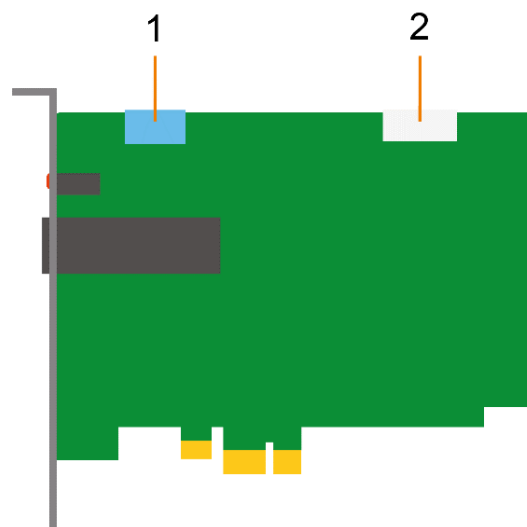
6.2 Card connectors

ibaFOB-PlusControl



1	SYNC interface, for synchronizing several cards via sync cable
2	JTAG interface, for service purposes only

ibaFOB-PlusControl- SFP



1	SYNC interface, for synchronizing several cards via sync cable
2	JTAG interface, for service purposes only

6.3 Indicating elements

Operating status indicator (LEDs)

LEDs indicate the operational state of the card and fiber optic channels. When switching on, all LEDs light up briefly to prove their proper function.

LED	Status	Description
Green	off	card without power or defective
	flashing	normal operation
Yellow	off	no connection, fiber optics not connected or PLUSCONTROL system switched off
	flashing	connection to PLUSCONTROL system is OK, but system not ready
	on	connection to PLUSCONTROL system is OK, system ready
White	off	no data transfer
	on	data transfer in progress
Red	off	normal state, no error
	flashing	running in FPGA factory rescue mode
	on	hardware error (FPGA not configured)

7 segment display



The 7 segment display shows the following information:

- Horizontal segment: After switching on, until the initialization by *ibaPDA* is finished
- Numbers 0 to 3: Ident number, card is initialized

The decimal point shows how the card is configured:

- Always lights up: configured as internal interrupt master
- Off: configured as interrupt slave
- Flashing: configured as external interrupt master

Note



It is not allowed to configure the *ibaFOB-PlusControl* as external interrupt master.

6.4 Fiber optic connections

The *ibaFOB-PlusControl* card provides an SC socket (duplex) with optical transmitter (TX) and receiver (RX).

The *ibaFOB-PlusControl-SFP* card provides an SFP cage that is pre-assembled with an SFP module with LC socket (duplex). The SFP module has an optical transmitter (TX) and receiver (RX).

Maximum distance of fiber optic connections

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

However, the maximum distance can be estimated on the basis of the output power of the transmitting interface (TX) or the sensitivity of the receiving interface (RX). A model calculation can be found in chapter [➤ Example for FO budget calculation](#), page 35.

The specification of the transmitter's output power and the receiver's sensitivity of the fiber optic components installed in the device can be found in chapter [➤ Main data](#), page 33 "Technical data" under "ibaNet interface".

7 Installing and removing the card

The cards may be used in every PCIe 1.0-x1 compatible slot. Observe the following warnings when working with the cards.

Danger from electric shock!



Disconnect the power supply from the computer before opening the device to avoid an electric shock!

Do not install or remove the card while the power supply is switched on.

Caution!



Electrostatic discharges can damage the board! To avoid electrostatic ESD damage, discharge your body electrically before touching the electronic board.

You can discharge your body by touching a conductive, grounded object immediately before working with the board (e.g. metal cabinet components, socket protective conductor contact).

7.1 Installing the card

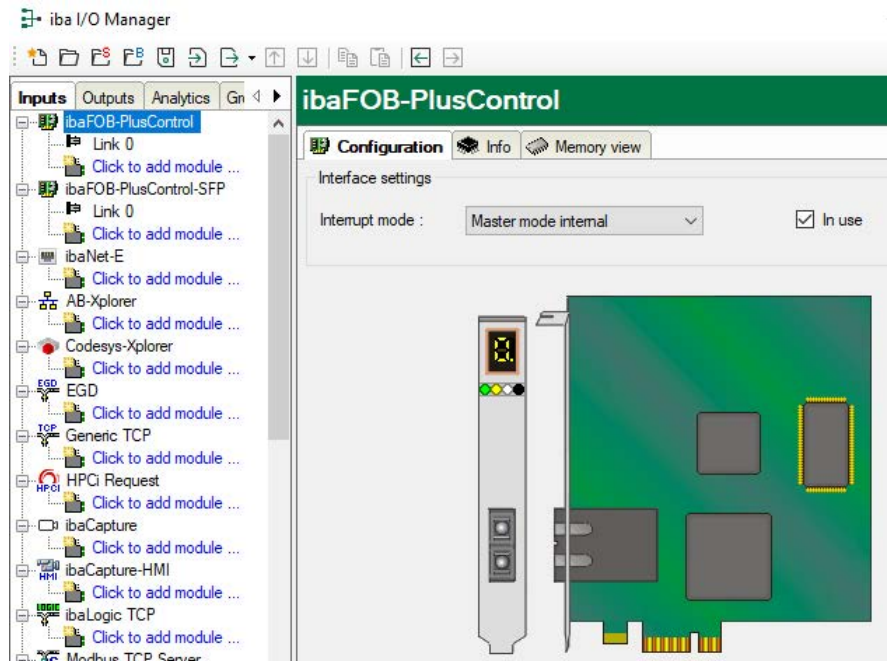
1. Shut down the PC.
2. Unplug the mains power line and open the computer so you can reach the PCIe slots.
3. Carefully remove the card from its packaging. Use a grounding cable or discharge any electrostatic charge before taking the card. No wiring or jumpering is necessary.
4. Grab the card at the front plate and the rear upper corner. Do not touch the contacts.
5. Carefully plug the card into a free PCIe slot on the computer and fix it to the housing using the fixing screw.
6. If you install more than one card, connect them with a flat ribbon cable (sync cable).
7. Close the computer.
8. Plug in the power line and start the computer.

7.2 Removing the card

1. Shut down the computer.
2. Unplug the mains power line and open the PC so you can reach the card.
3. Disconnect all external connecting cables from the card.
4. Release the fixing screw.
5. Unplug the card carefully out of the slot. Store the card in a conductive plastic bag.

8 Configuration in ibaPDA

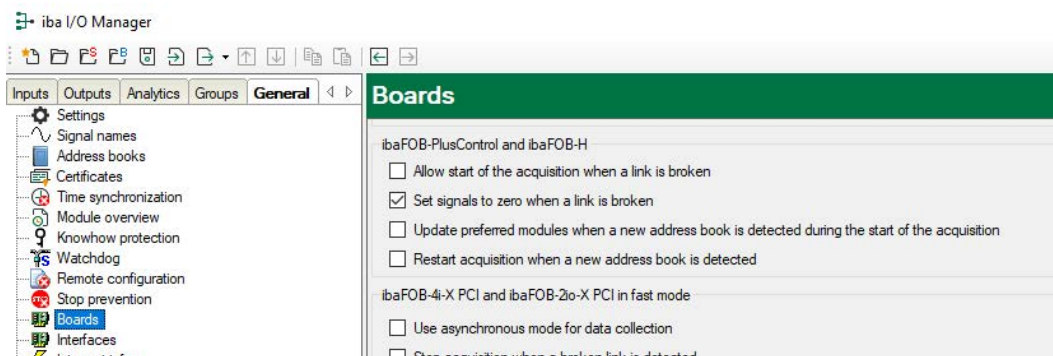
If the card has been installed correctly, it is displayed as an interface in the tree structure of the I/O Manager.



8.1 General card settings

In order to configure general settings of the *ibaFOB-PlusControl* card, select the *General* tab in the interface tree and choose the *Boards* node.

You can enable the following options in the section *ibaFOB-PlusControl*.



Allow start of the acquisition when a link is broken.

If one or more connections to the PLUSCONTROL system cannot be established at the start of the acquisition, the acquisition will start anyway.

Set signals to zero when a link is broken

If you enable this option, all measurement signals of the connection will be set to zero if the link is broken. Otherwise the signal values would display the last value at the time the connection was broken.

Update preferred modules when a new address book is detected during the start of the acquisition

When establishing a connection with a PLUSCONTROL system, the address book is read and evaluated. "Preferred modules" are automatically created for the preferred signals. If there is a new address book, then it is usually possible to choose how to proceed with the "preferred modules" (update or replace).

If you enable this option, then the existing "preferred modules" will be updated with the "preferred modules" from the new address book. The signal IDs of already existing preferred signals remain unchanged.

Restart acquisition when a new address book is detected

If this option is enabled, *ibaPDA* checks regularly every 10 s whether the address book has changed.

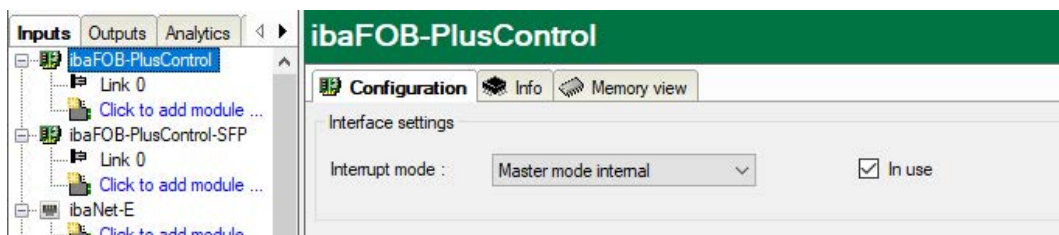
If a new address book is detected, then the acquisition is stopped and restarted. When the acquisition is restarted, the address book is read. If the option above is enabled, the preferred modules are also updated automatically.

8.2 Card configuration

If you click on the interface icon 3 tabs appear on the right side of the dialog displaying the card's properties. Select the *Configuration* tab.

The interrupt mode is automatically generated by *ibaPDA*: as soon as other iba-cards are plugged in, *slave mode* is activated. In case that no other card types are used, but only several *ibaFOB-PlusControl* cards, it is possible to specify which card is set to *interrupt master internal*. This card will generate the interrupt for the other cards. The interrupt will be transmitted to these iba cards via the synchronization cable (sync cable is included in delivery).

Check the option *In use* if the card is being used by *ibaPDA*.



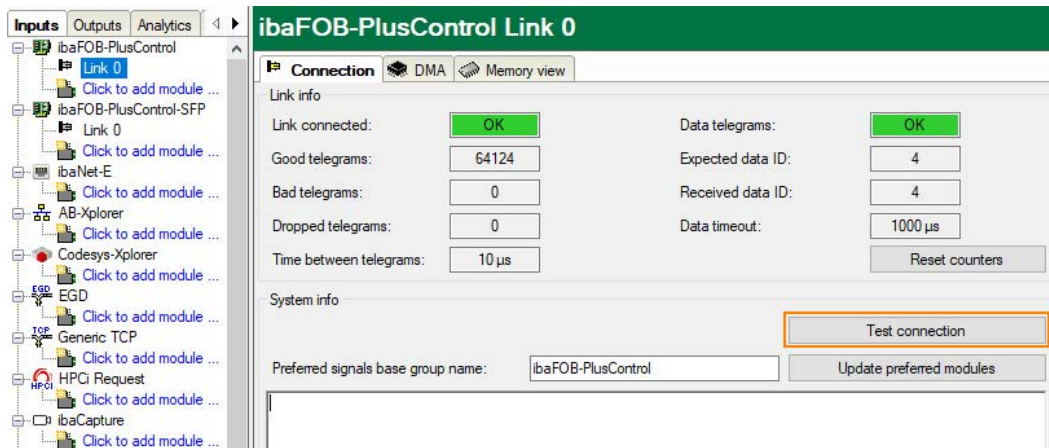
You can find a further description of the information and the other tabs in the chapter [↗ Card diagnostics](#), page 27.

8.3 Link configuration

If the card is displayed correctly in the I/O Manager, mark the *Link* node under the interface. 3 tabs appear on the right side displaying connection information.

For description of diagnostics information and other tabs please refer to chapter [↗ Diagnostics](#), page 27.

The connection to a PLUSCONTROL system is being established by clicking the <Test connection> button in the *Connection* tab.



If the connection to the PLUSCONTROL system has been successfully established, the following actions are performed:

1. The system information of the connected PLUSCONTROL CP is read and displayed in the *Connection* tab
2. The address book is read and evaluated: The address book contains all available variables. Available signal types are standard signals and preferred signals, see chapter [↗ Configuration of preferred modules](#), page 20.
3. “Preferred modules” are automatically created in *ibaPDA* for the preferred signals. When the address book has been updated, a dialog appears providing options how to proceed with preferred signals:

Loading address book

i A new address book is loaded. How do you want to handle the preferred modules from this address book?

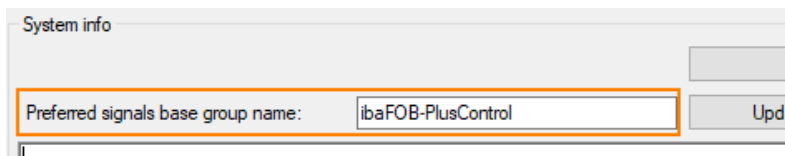
→ Update preferred modules

Update the current preferred modules with the preferred modules from the address book. The signal IDs of existing preferred signals will not change.

→ Replace preferred modules

Remove all the current preferred modules and create new preferred modules from the address book. The signal IDs of existing preferred signals could change.

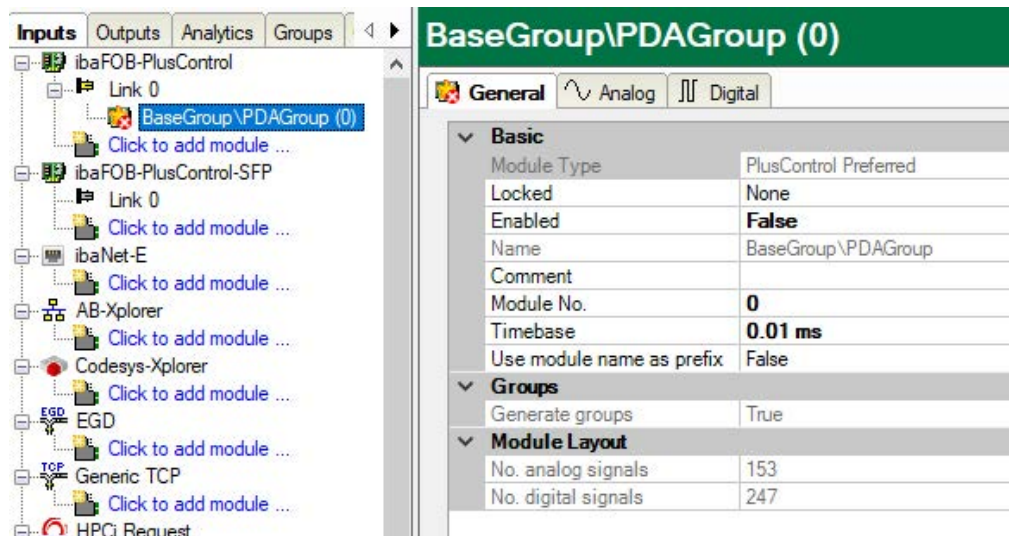
- a.) Update preferred modules: The preferred modules are updated with the preferred modules from the address book. The signal IDs of already existing preferred signals remain unchanged.
 - b.) Replace preferred modules: The current preferred modules are removed and replaced by new preferred modules from the address book. The signal IDs of existing preferred signals may change.
4. Groups are automatically created for preferred signals in the I/O Manager. You can enter a group name in the text box at the bottom of the tab. Default name is "ibaFOB-PlusControl".



See also chapter [➤ Groups](#), page 26.

8.4 Configuration of preferred modules

General tab



The preferred modules contain the preferred signals assigned in the address book.

Only the following properties of a preferred module can be changed:

Locked

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

Enabled

Enable the module to record signals.

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

Timebase for data acquisition, cycles down to 10 µs are possible (depending on the number of signals). Default setting is 25 µs.


Use module name as prefix

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

Analog tab

BaseGroup\PDAGroup (0)							
<div>  General  Analog  Digital </div>							
	Name	Unit	Gain	Offset	Symbol	Active	Actual
0	C1_I_L1	kA	1	0	BaseGroup\PDAGroup\IM1\MPP\C1_I_L1	<input checked="" type="checkbox"/>	
1	C1_I_L1_scc	kA	1	0	BaseGroup\PDAGroup\IM1\MPP\C1_I_L1_scc	<input checked="" type="checkbox"/>	
2	C1_I_L1_fir_scc	kA	1	0	BaseGroup\PDAGroup\IM1\MPP\C1_I_L1_fir_scc	<input checked="" type="checkbox"/>	
3	C1_I_L2	kA	1	0	BaseGroup\PDAGroup\IM1\MPP\C1_I_L2	<input checked="" type="checkbox"/>	
4	C1_I_L2_scc	kA	1	0	BaseGroup\PDAGroup\IM1\MPP\C1_I_L2_scc	<input checked="" type="checkbox"/>	
5	C1_I_L2_fir_scc	kA	1	0	BaseGroup\PDAGroup\IM1\MPP\C1_I_L2_fir_scc	<input checked="" type="checkbox"/>	

Name

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

Unit

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

Gain / Offset

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

Symbol

Name of the displayed value provided by the address book. This field cannot be changed.




Active

Only enabled signals are acquired.


Actual

Display of the currently acquired value (only available when acquisition is running).

Digital tab

BaseGroup\PDAGroup (0)							
<div>  General  Analog  Digital </div>							
	Name	Symbol				Active	Actual
0	C1_SYS_STATUS_BKPL_IN:OTH_NOK	BaseGroup\PDAGroup\Common\C1_SYS_STATUS_BKPL_IN:OT...				<input checked="" type="checkbox"/>	
1	C1_SYS_STATUS_BKPL_IN:OWN_NOK	BaseGroup\PDAGroup\Common\C1_SYS_STATUS_BKPL_IN:O...				<input checked="" type="checkbox"/>	
2	C1_SYS_STATUS_BKPL_IN:ACTIVE	BaseGroup\PDAGroup\Common\C1_SYS_STATUS_BKPL_IN:AC...				<input checked="" type="checkbox"/>	
3	C1_SYS_STATUS_BKPL_IN:HBLOCK	BaseGroup\PDAGroup\Common\C1_SYS_STATUS_BKPL_IN:HB...				<input checked="" type="checkbox"/>	
4	C1_SYS_STATUS_BKPL_IN:HBLOCK_PM	BaseGroup\PDAGroup\Common\C1_SYS_STATUS_BKPL_IN:HB...				<input checked="" type="checkbox"/>	
5	C1_SYS_STATUS_BKPL_IN:ESOF	BaseGroup\PDAGroup\Common\C1_SYS_STATUS_BKPL_IN:ESOF				<input checked="" type="checkbox"/>	

Name

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

Symbol

Name of the displayed value provided by the address book. This field cannot be changed.

Active

Only enabled signals are acquired.

Actual

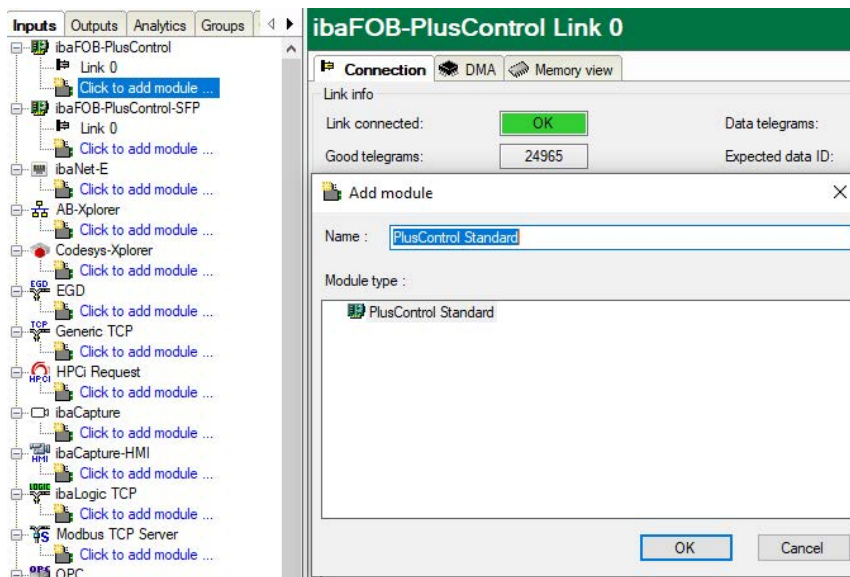
Display of the currently acquired value (only available when acquisition is running).

8.5 Configuration of standard modules

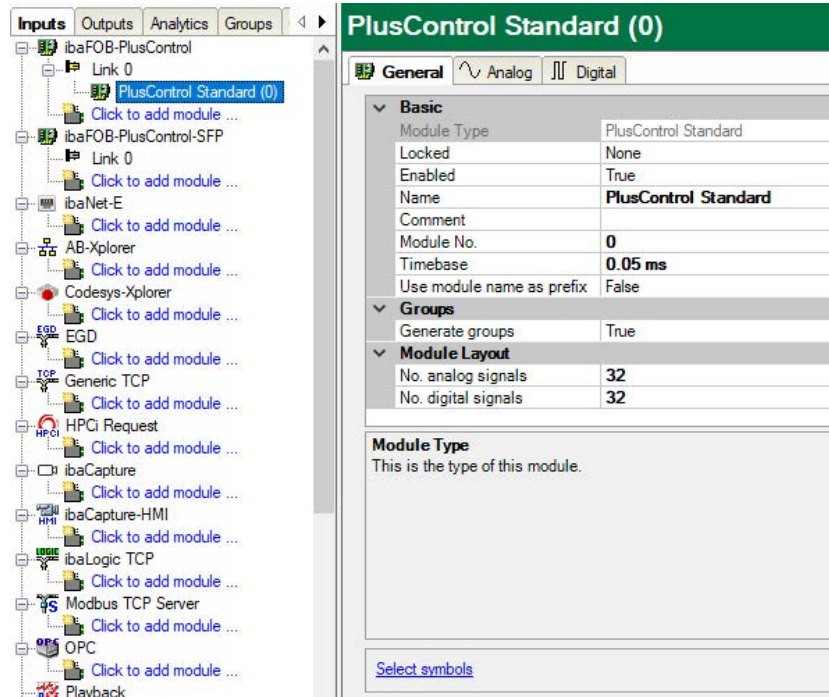
Standard modules may contain preferred symbols and standard symbols.

Add module

In order to add manually a standard module right-click the link of the *ibaFOB-PlusControl* card and select *PlusControl Standard*.



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.

Groups

Generate groups

If TRUE is selected, the symbols are entered in the I/O Manager groups according to the structure in the address book which has already been generated for the preferred signals.

See also chapter [➤ Groups](#), page 26.

Module Layout

No. analog signals

Defining the number of analog signals in this module.

No. digital signals

Defining the number of digital signals in this module.

Note

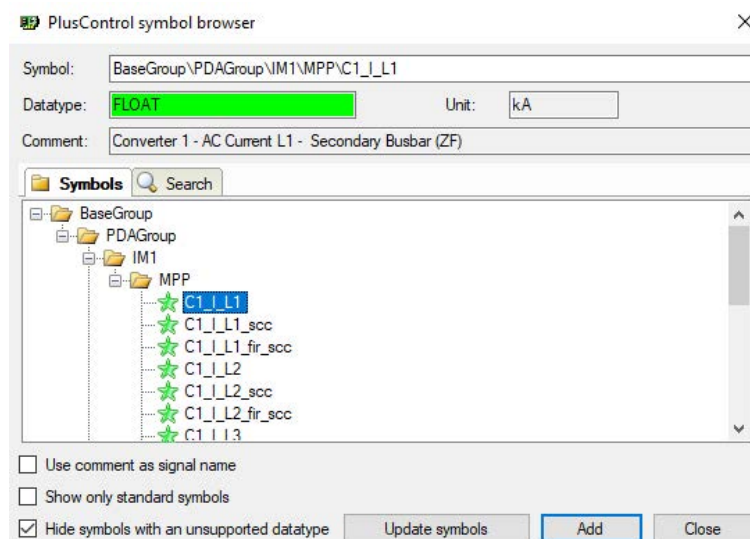




When clicking in a field the corresponding description will be displayed in the text field below the input fields.

For a detailed parameter description please refer to the *ibaPDA* manual.

Select symbols

Measurement values for this standard module can be selected using the PlusControl symbol browser. A click on the blue link [Select symbols](#) opens the symbol browser.



Preferred symbols are indicated by a star symbol , standard symbols by a flag .

In the symbol browser, you have the following options:

Use comment as signal name

The signal comment from the symbol table is used as signal name in the standard module.

Show only standard symbols

Filter function for standard symbols

Hide symbols with unsupported datatype

A symbol whose datatype is not supported, will not be displayed. In order to add symbols to the recording, mark the desired symbols and click the <Add> button. The marked symbols will be inserted in the corresponding *Analog* or *Digital* tab.

Tip



While pressing the keys <Shift> or <Ctrl> several symbols can be marked at once and then be added together.

Analog tab

Identical to the *Analog* tab of the preferred modules.

It is also possible to open the symbol browser with a click on the <...> button and directly enter the variables.

PlusControl Standard (0)							
General Analog							
	Name	Unit	Gain	Offset	Symbol	Active	Actual
0	C1_I_L1	kA	1	0	BaseGroup\PDAGroup\IM1\MPP\C1_I_L1	<input checked="" type="checkbox"/>	
1			1	0			
2			1	0		<input type="checkbox"/>	
...						<input type="checkbox"/>	

Digital tab

Identical to the *Digital* tab of the preferred modules.

It is also possible to open the symbol browser with a click on the <...> button and directly enter the variables.

PlusControl Standard (0)							
General Analog							
	Name	Symbol			Active	Actual	
0						<input type="checkbox"/>	
1					<input type="checkbox"/>		

8.6 Groups

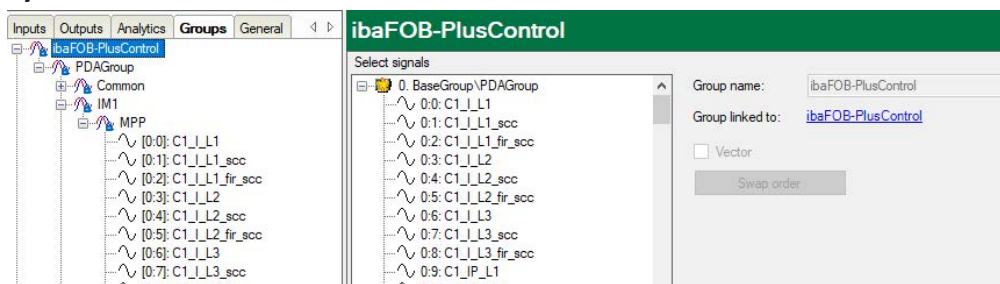
A group is generated automatically for each *ibaFOB-PlusControl* card. The group names are pre-set with the interface name, e. g. “ibaFOB-PlusControl”. The names, however, may be changed, see also chapter [↗ Link configuration](#), page 18.

The signals from the preferred modules are entered automatically in the groups. The signals from the standard groups are entered in the groups only when the setting “Generate groups” is set to TRUE.

The grouped signals are displayed in a tree structure according to the address book. The generated groups cannot be deleted and are indicated by a key symbol.

Signals which are selected several times will be entered in the group only once.

Grouped symbols



9 Diagnostics

The essential tools for diagnostics are integrated in the I/O Manager of *ibaPDA*.

9.1 Card diagnostics

If you click on the ibaFOB-PlusControl interface in the tree structure of the I/O Manager, 3 tabs appear in the right part of the dialog window showing the card properties.

Configuration tab

In addition to the image of the card the interrupt mode, addresses and memory regions in the PCIe bus are displayed.

The graphic depiction of the card is dynamic, i.e. the 7 segment display with the card number and the LEDs for the connection status reflect the same status that can be seen on the card itself. See chapter [↗ Card configuration](#), page 18.

The displays and their meanings are summarized in chapter [↗ Indicating elements](#), page 14.

Info tab

The screenshot shows the 'Info' tab of the ibaFOB-PlusControl interface. It is divided into three main sections: Bus information, Board information, and Firmware information.

Bus information:

- Bus type: PCIe
- Slot number: 0
- Bus number: 4
- Vendor: iba AG
- Device ID: 0xF6BE

Board information:

- Board version: A1.0
- Board clock: 50 µs

Board info:

```
# FOB-PlusControl Product Info
Serial Number : 000011
Production Date : 25/08/2022
```

Firmware information:

- Firmware version: 1.00 build 12
- Buttons: Write firmware, Reload FPGA

User firmware info:

```
# ibaFOB-PlusControl FPGA (C)2022 iba AG
# Version 01.00 build 12 (A2)
# 25/08/2022 / JDS
FW loaded by PDA at 04/04/2024 14:52
```

Golden firmware info:

```
# ibaFOB-PlusControl FPGA (C)2022 iba AG
# Version 01.00 build 12 (A2)
# 25/08/2022 / JDS
FW loaded by Jon at 30/08/2022 11:53
```

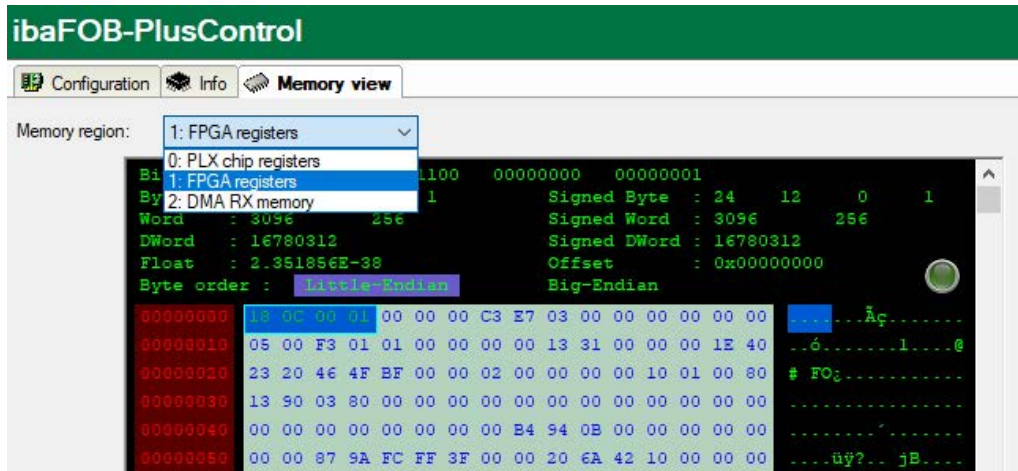
On the *Info* tab you can see information about the card and the loaded firmware. Functions for service and support, such as reloading the FPGA and updating the firmware are available on this tab.

Note



A firmware update should only be performed after consulting the iba support. The respective file can be selected and loaded via the “Write firmware” dialog.

Memory view tab

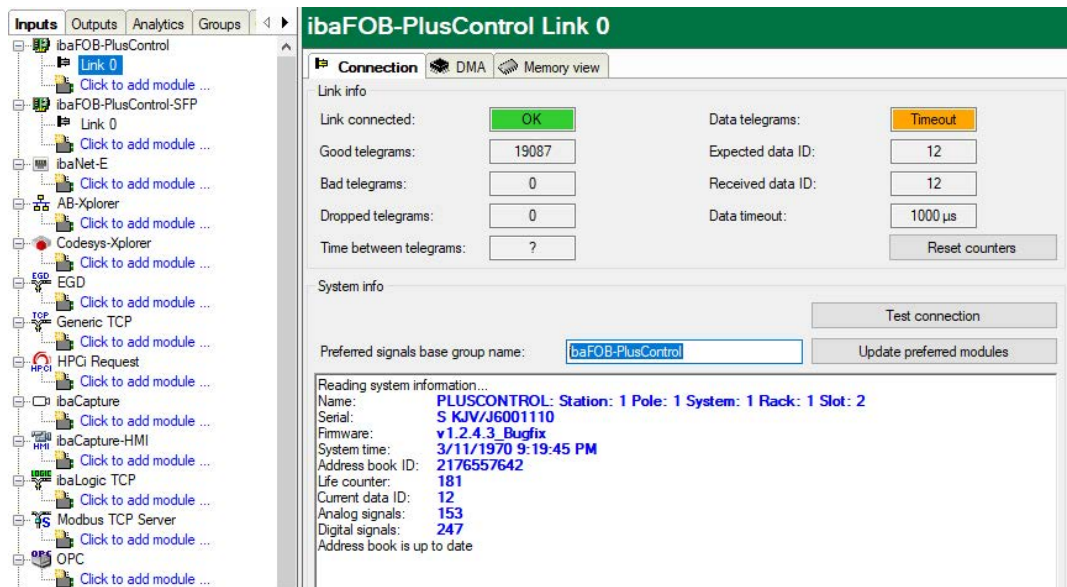


The memory view can be used for diagnostics of internal register and memory ranges.

9.2 Connection diagnostics

Connection tab

The *Connection* tab shows information about the connection status and the connected system.



In addition to the display of the connection status and telegram status several counters are available:

Good telegrams

Counter of correctly received telegrams

Bad telegrams

Counter of faulty telegrams

Dropped telegrams

Counter of dropped telegrams

Time between telegrams

The time interval between the last 2 correctly received telegrams.

Expected data ID, received data ID

The IDs are used to identify the received data in *ibaPDA*. The ID is incremented by every request. The ID in the measurement data telegram must match the ID of the request telegram. Otherwise the data will be dropped.

Data timeout

ibaPDA monitors the telegram counter of the measurement data telegrams. If the counter does not change within the timeout calculated according to the cycle time, the data is set to 0.

System info

System information is displayed in this field, which is read from the PLUSCONTROL CP while testing the connection.

DMA tab

ibaFOB-PlusControl Link 0

Connection DMA Memory view

Image generation

	Actual	Min	Max
Images processed at interrupt:	20	20	20
Images in DMA buffer:	200		
Images copied to interrupt buffer:	247100		
DMA buffer empty:	0		
Time between telegrams:	10 μ s	10 μ s	10 μ s
Image sample rate:	50 μ s		
Image size (bytes):	640		
Dropped images:	0		
DMA buffer size:	4 MB		

Reset counters

The tab gives information about the image generation (process image). An image is a dataset that the card writes into the PC system memory via DMA. This image contains all data of the measured signals within a sample on that link.

Here is a short description of the image generation information:

Images processed at interrupt:

These counters show how many images were available in the DMA buffer when the last interrupt fired. This value should normally correspond with the interrupt time divided by the image sampling rate.

Images in DMA buffer:

This is the number of images that are in the DMA buffer. This number should remain constant. If this number starts to increase, the system does not work correctly. This may happen if e.g. an interrupt is missed.

Images copied to interrupt buffer:

This counter shows how many images have been retrieved from the DMA buffer and have been processed by *ibaPDA*. This counter should count up continuously.

DMA buffer empty:

This counter increments each time the DMA buffer is empty when the interrupt fires. If this is the case, then the driver sets all signal values of the respective link to 0 (zero). This may happen if the FO link is disconnected.

Time between telegrams:

Time interval between the last 2 correctly received telegrams This is the same value as the time in the FO communication information but the driver maintains the minimum and maximum values. There shouldn't be much difference between the minimum and maximum values.

Image sample rate:

The rate at which the board writes images to the DMA buffer. This should be faster or equal to the fastest time base of the modules connected to this link.

Image size:

This is the size of the image in bytes. If you multiply the image size with the image sample rate then you know how many bytes per second are transferred by this link over the PCIe bus.

Dropped images:

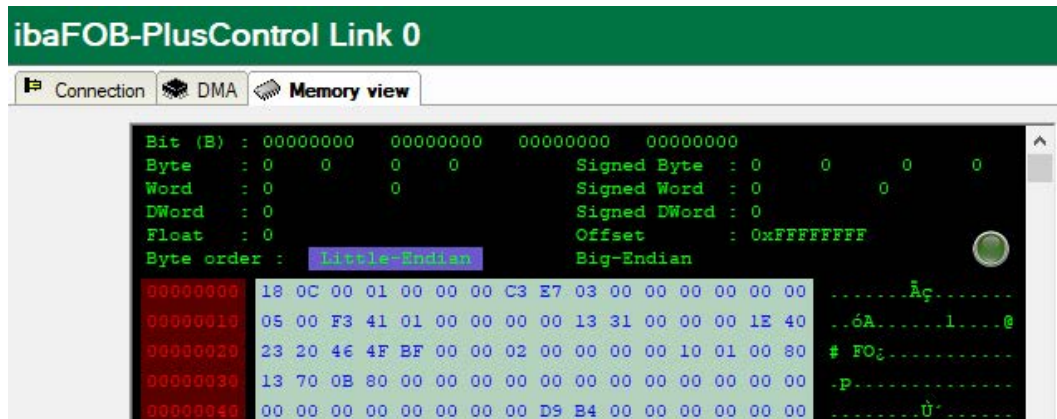
A value >0 indicates an overload on the PCIe bus.

DMA buffer size

Fixed value of the card

Memory view tab

The memory view tab displays the DPR memory on the *ibaFOB-PlusControl* card.



This memory view corresponds to the view in the memory view tab of the card diagnostics when *1:FPGA registers* is selected as memory region.

10 Synchronization of more than one card

Observe the following notes when synchronizing several cards.

Note



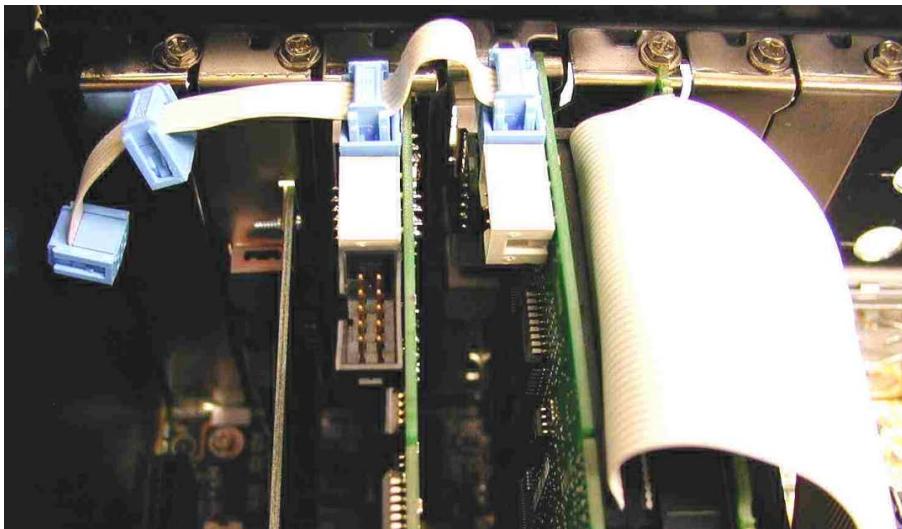
A bad or missing synchronization can lead to inconsistent or contradictory data blocks. This can affect the signal correlation!

Each card is delivered with a synchronization cable (flat ribbon cable) for connecting up to 6 cards. Unused connections of the synchronization cable can remain unused and must not be terminated.

If you plug in or unplug PCI/PCIe cards this may change the PCI/PCIe configuration of the PC. This may also have an effect on the signals or the I/O configuration of the system, as the module ID may change. Plug the fiber optic cables into the corresponding card after making changes. Always save your system configuration before making any hardware changes.

Prerequisite: The cards are installed in the computer.

1. Connect the synchronization cable to all cards that are to be synchronized with each other (light blue plug SYNC).



2. Close the computer.
3. Insert the mains plug into the earthed socket.
4. Switch on the power supply of the computer.
5. Start the computer.

11 Technical data

In the following you will find the technical data and dimensions for *ibaFOB-PlusControl*.

11.1 Main data

Short description		
Name	ibaFOB-PlusControl	ibaFOB-PlusControl-SFP
Description	PCI Express cards for Siemens PLUSCONTROL connections	
Order no.	11.112602	11.112603
PlusControl interface		
Number	1	1
Design	Fiber optics	SFP
Data transfer rate	1.25 Gbit/s	
Sampling rate	max. 100 kHz, freely adjustable	
Connection technology	1 duplex SC connector for RX and TX	1 SFP cage (RX/TX); 1 SFP module pre-assembled with a duplex LC connector for RX and TX, type Finisar FTLF8519P3BNL, order no: 11.112613
	iba recommends the use of FO with multimode fibers of type 50/125 µm or 62.5/125 µm; For information on cable length, see chap. ➤ <i>Example for FO budget calculation</i> , page 35.	
Transmitting interface (TX)		
Output power		
50/125 µm MMF	-9.5 dBm ... -4.0 dBm	-9.0 dBm ... -2.5 dBm
62.5/125 µm MMF	-9.5 dBm ... -4.0 dBm	-9.0 dBm ... -2.5 dBm
Temperature range	32 °F to 158 °F (0 °C to +70 °C)	-4 °F to 185 °F (-20 °C to +85 °C)
Light wavelength	850 nm	
Laser class	Class 1	
Receiving interface (RX)		
Receiving sensibility	-18 dBm	-18 dBm
Supply		
Power supply	via PCIe bus	
Further interfaces, operating and indicating elements		
Indicators	LEDs for operation and errors; 7 segment display	

Operating and environmental conditions		
Temperature range		
Operation	32 °F to 122 °F (0 °C to +50 °C)	
Storage	-13 °F to 158 °F (-25 °C to +70 °C)	
Mounting		
PCIe slot	lane x1 or higher	
PCIe Gen	Gen1	
Cooling	passive	
Relative humidity	15 % ... 95 % (indoor), no condensation	
Operating altitude	0 m ... 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	
MTBF ¹⁾ (+25 °C)	6,209,439 hours / 708 years	23,715,364 hours / 2,707 years
Dimensions (width x height x depth)	21.6 mm x 120.8 mm x 143.4 mm	
Weight, incl. packaging	0.18 kg	0.20 kg

Supplier's Declaration of Conformity

47 CFR § 2.1077 Compliance Information

Unique Identifier:

11.112602 ibaFOB-PlusControl

11.112603 ibaFOB-PlusControl-SFP

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

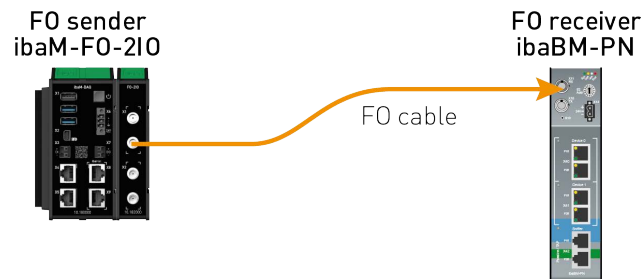
FCC Compliance Statement

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.

¹⁾ MTBF (mean time between failure) according to Telcordia 4 SR332 (Reliability Prediction Procedure of Electronic Equipment; Issue Mar. 2016) and NPRD (Non-electronic Parts Reliability Data 2011)

11.2 Example for FO budget calculation

A fiber optic link from an *ibaM-FO-2IO* module (FO transmitter) to an *ibaBM-PN* device (FO receiver) is used as an example.



The example refers to a P2P connection with an FO cable of type 62.5/125 μm . The light wavelength used is 850 nm.

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

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

ibaM-FO-2IO specification

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

ibaBM-PN specification

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

Specification FO cable

Refer to the data sheet for the fiber optic cable used:

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

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

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

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

P_{Sender} = output power of FO transmitting interface

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

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

$A_{Connector}$ = connector loss

$A_{Fiberoptic}$ = cable attenuation

Calculation for the example ibaM-FO-2IO -> ibaBM-PN in the best case:

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

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

Calculation for the example ibaM-FO-2IO -> ibaBM-PN in the worst case:

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

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

Note

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

Note

When using fiber optics of the 50/125 µm type, a reduced distance (by approx. 30–40%) must be expected.

Note

In addition to conventional multimode cable types OM1 (62.5/125 µm) and OM2 (50/125 µm), the other cable types OM3, OM4 and OM5 of the 50/125 µm fiber can also be used.

12 Support and contact

Support

Phone: +49 911 97282-14

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

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