L1....L4
L10....L13
L18....L21
L14....L17
L22....L25
X5
X6
00
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15

ibaMS16xDI-24V/-220V

Input module for digital signals

Manual

Issue 2.0

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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.

Further international customary standards and directives have been observed.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Issue	Date	Revision	Chapter	Author	Version HW / FW
2.0	08-2023	Scope of delivery, ibaPDA GUI			

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1 About this manual

In this manual, you learn a lot about the design of the ibaMS16xDI-24V/-220V device and how to use and operate them. You can find a general description of the iba-modular system and further information about the design of the central units and how to use and operate them in separate manuals.

Note

The documentation for the iba-modular system is part of the data medium "iba Software & Manuals". The documentation is also available at www.iba-ag.com in the download area.

The documentation of the iba-modular system comprises the following manuals:

☐ **Central units**

The manuals of the ibaPADU-S-IT-2x16 central units and ibaPADU-S-CM contain the following information:

- Scope of delivery
- System requirements
- Description of the device
- Mounting/Demounting
- Start-up
- Configuration
- Technical data
- Accessories

☐ **Modules**

The manuals for the single modules contain specific information about the module. There are the following information classes:

- Short description
- Scope of delivery
- Product characteristics
- Configuration
- Description of the functions
- Technical data
- Connection diagram

1.1 Target group

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

1.2 Notations

In this manual, the following notations are used:

Action	**Notations**
Menu command	Menu *Logic diagram*
Call of menu command	*Step 1 – Step 2 – Step 3 – Step x* Example: Select menu *Logic diagram – Add – New logic diagram*
Keys	<Key name> Example: <Alt>; <F1>
Press keys simultaneously	<Key name> + <Key name> Example: <Alt> + <Ctrl>
Buttons	<Button name> Example: <OK>; <Cancel>
File names, Paths	„File name“, „Path” Example: „Test.doc“

1.3 Used symbols

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

⚠ DANGER

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

- By an electric shock!
- Due to the improper handling of software products which are coupled to input and output procedures with control function!

If you do not observe the safety instructions regarding the process and the system or machine to be controlled, there is a risk of death or severe injury!

⚠ WARNING

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

⚠ CAUTION

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

Note

A note specifies special requirements or actions to be observed.

Tip

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

Other documentation

Reference to additional documentation or further reading.

2 Introduction

The modules ibaMS16xDI-24V and ibaMS16xDI-220V are members of the iba-modular system. The design and the handling of the modules are similar, they only differ in their signal level. By way of an example this description is based on the ibaMS16xDI-24V module.

The modular concept is designed on the basis of a backplane. You can plug on this backplane not only the CPU, but also up to 4 input/output modules. The power supply of the I/O modules is provided by the backplane bus. The modules offer 16 digital inputs.

In brief

- I/O module for the iba-modular system
- 16 digital inputs, galvanically isolated
- Input level ± 24 V or ±220 V (nominal voltage)
- Sampling rate up to 40 kHz, freely adjustable
- Debounce filter
- Rugged design, easy mounting
- Certification according to CE

Fields of application

Capturing digital input signals in the fields:

- Power generation and distribution
- Power factor compensation plants
- Test benches
- Condition Monitoring

3 Scope of delivery

After having unpacked the delivery, please check it for completeness and have a look if the parts might be damaged.

The scope of delivery comprises:

- ☐ ibaMS16xDI-24V or ibaMS16xDI-220V device
- ☐ 2 x 16-pin multi-pin connector, clamp type terminal (contact spacing 5.08)
- ☐ Data medium „iba Software & Manuals“ (only for single delivery)

4 Safety instructions

4.1 Intended use

The device is an electrical apparatus. It is only allowed to use the device for the following applications:

- ☐ Measurement data acquisition
- ☐ Automation of industrial plants
- ☐ Applications with iba products (ibaPDA, ibaLogic etc.)

The device is only to be applied as shown in the Technical Data.

4.2 Special safety instructions

⚠ DANGER

Strictly observe the operating voltage range (see Technical Data)!

Never use damaged measuring cables!

Measuring cables must NOT be attached or detached to/from the device under voltage!

⚠ WARNING

Modules must NOT be attached or detached to/from the rack under voltage!

Switch off the central unit or disconnect power supply before attaching or detaching the modules.

⚠ WARNING

This is a Class A device. This equipment may cause radio interference in residential areas. In this case, the operator will be required to take appropriate measures.

Important Note

Do not open the device! Opening the device will void the warranty!

Note

Clean the device only on the outside with a dry or slightly damp and statically discharged cloth.

5 System Requirements

5.1 Hardware

- ☐ Central unit: ibaPADU-S-IT-2x16 or ibaPADU-S-CM (version 02.10.001 or later)
- ☐ Backplane unit, e. g. ibaPADU-B4S

5.2 Software

- ☐ ibaPDA version 6.34.0 or later
- ☐ ibaLogic-V5 version 5.0.2 or later

Note

The use of ibaLogic-V5 requires the central unit ibaPADU-S-IT-2x16. If the module is used with the predecessor ibaPADU-S-IT-16, only ibaLogic-V4 can be used.

6 Mounting, Connecting, Dismounting

⚠ CAUTION

Works on the device must NOT be done when it is under voltage! Always disconnect the central unit from the power supply!

Note

Mount one or more modules on the right next to the central unit (slot X2 to X5 can be freely selected).

6.1 Mounting

1. Disconnect the central unit from the power supply.
2. Remove the cover from the backplane bus, to which the module should be attached.
3. Attach the device to the backplane bus and press it firmly against the backplane.
4. Secure the device with the fixing screws.
5. Connect the grounding screw with the protective ground / grounding shield.

⚠ CAUTION

Connect the grounding screw on the bottom side of the housing with the protective ground / grounding shield.

Important note

Always screw tight the device and the modules. Otherwise, plugging or unplugging the connectors for the inputs/outputs can cause damage.

6.2 Connecting

Note

The backplane unit and the device must be connected to a protective conductor.

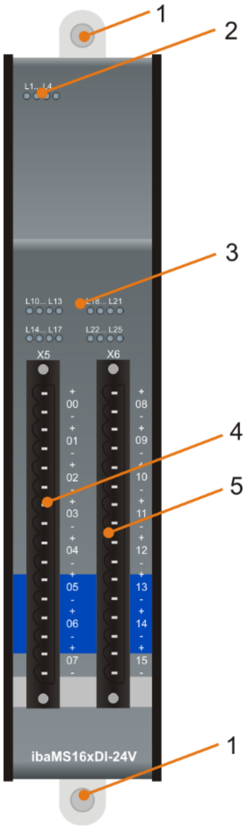
1. Connect all cables.
2. If all required cables are connected, connect the central unit to the power supply.
3. Switch on the central unit.

6.3 Dismounting

1. Disconnect the central unit from the power supply.
2. Remove all cables.
3. Remove the both fixing screws on the upper and the lower side of the device.
4. Pull the device straight from the backplane.
5. Put the cover on the backplane bus.

7 Device description

7.1 Views


1
2
L1...L4
3
L10...L13
L18...L21
L14...L17
L22...L25
X5
X6
00
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
4
5
ibaMS16xDI-24V
1

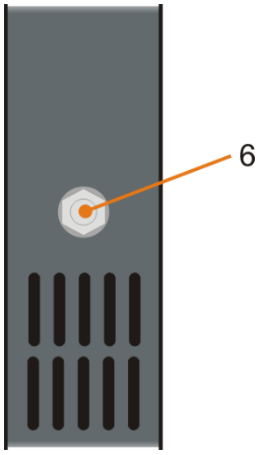
1 Fixing screws

2 Operating status indicators L1 to L4

3 Status LEDs L10 to L25 of the digital inputs 00 to 15

4 Connector X5 for digital inputs 00 to 07

5 Connector X6 for digital inputs 08 to 15



6 Grounding screw (only with ibaMS16xDI-220V)

7.2 Indicating elements

The operating status of the device and the status of the digital inputs are shown by colored status LEDs.

7.2.1 Operating status

LED	Status	Description
L1: green	Flashing / On	Device is working
	Off	Device is not working (switched off)
L2: yellow	On	Access to the backplane bus
L3: white	-	-
L4: red	Off	Normal status, no faults
	Flashing	Device failure

Important note

When the LED L4 indicates a failure, please contact the iba support.

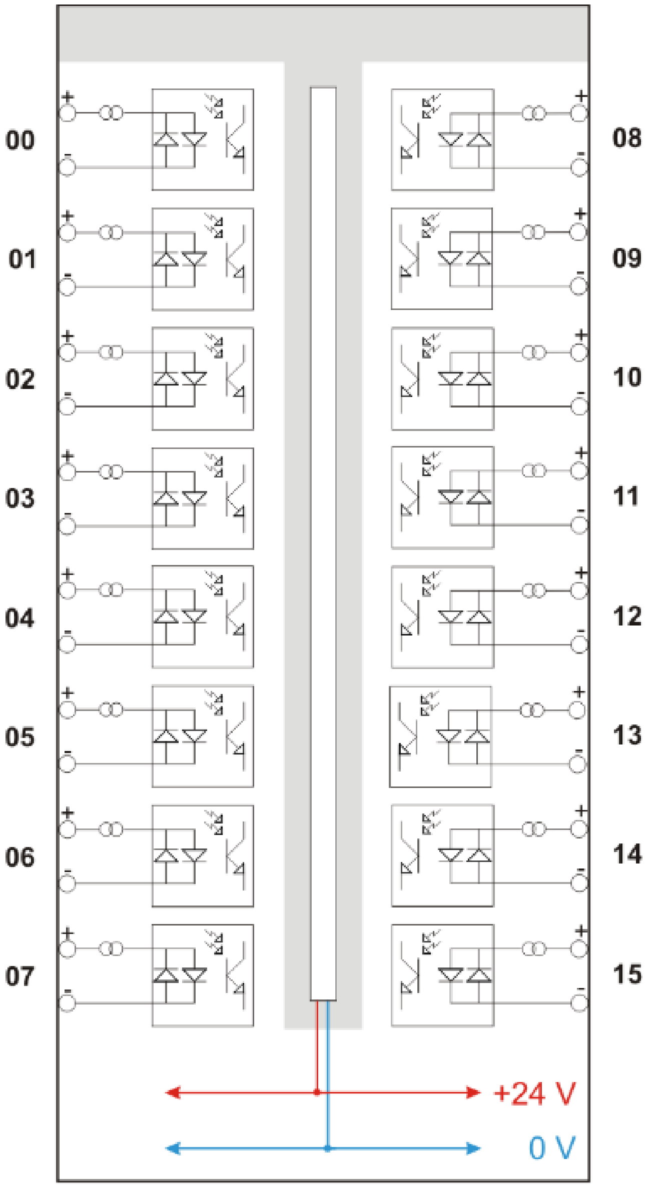
7.2.2 Status of digital inputs

LED per channel	Status	Description
L10 … L25 green	Off	No signal, logical 0
	On	Signal ok, logical 1

7.3 Digital inputs X5, X6

7.3.1 Connection diagram / Pin assignment

Here, you can connect 16 input signals (0…15), each bipolar and electrically isolated. Each channel is connected by means of two-wire connection. Due to the reverse polarity protection, the measuring signal is indicated logically correct, even if the connection is polarity-reversed.


00
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
+
-
+24 V
0 V

Pin assignment

X5 Pin...	Connection	LED
1	Digital input 00 +	L10
2	Digital input 00 –	
3	Digital input 01 +	L11
4	Digital input 01 –	
5	Digital input 02 +	L12
6	Digital input 02 –	
7	Digital input 03 +	L13
8	Digital input 03 –	
9	Digital input 04 +	L14
10	Digital input 04 –	
11	Digital input 05 +	L15
12	Digital input 05 –	
13	Digital input 06 +	L16
14	Digital input 06 –	
15	Digital input 07 +	L17
16	Digital input 07 –	

X6 Pin...	Connection	LED
1	Digital input 08 +	L18
2	Digital input 08 –	
3	Digital input 09 +	L19
4	Digital input 09 –	
5	Digital input 10 +	L20
6	Digital input 10 –	
7	Digital input 11 +	L21
8	Digital input 11 –	
9	Digital input 12 +	L22
10	Digital input 12 –	
11	Digital input 13 +	L23
12	Digital input 13 –	
13	Digital input 14 +	L24
14	Digital input 14 –	
15	Digital input 15 +	L25
16	Digital input 15 –	

7.3.2 Debounce filters

For the digital inputs, there are four debounce filters for each. These can be chosen and configured for each signal independently. You have got the following filters at your disposal:

- ❑ „Off“ (without filter)
- ❑ „Stretch rising edge“
- ❑ „Stretch falling edge“
- ❑ „Stretch both edges“
- ❑ „Delay both edges“

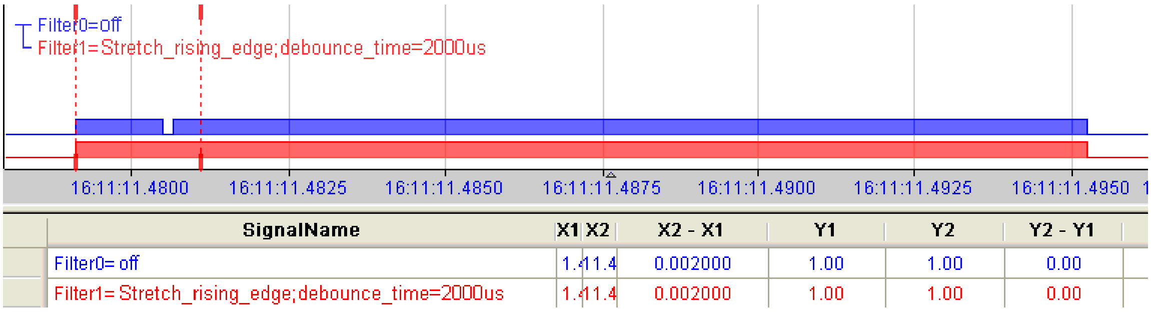
For each filter, a debounce time has to be defined in µs. This debounce time can have a value between [1µs…65535µs].

Off

The measured input signal is transferred without filtering.

„Stretch rising edge“

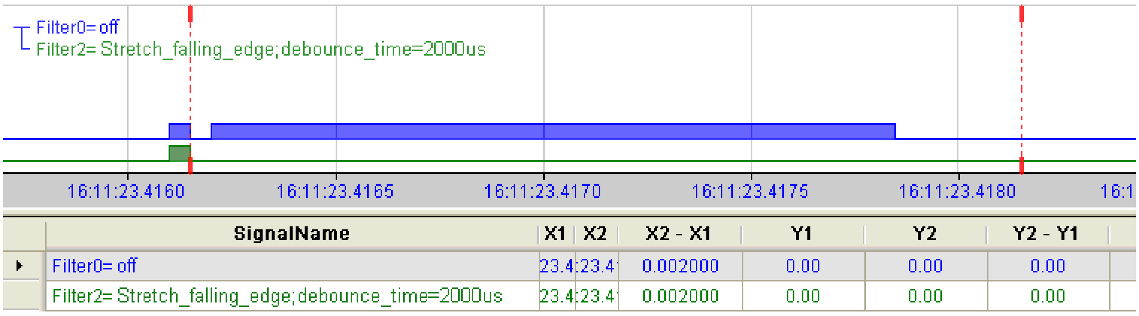
With the first rising edge, the input signal (red) switches to logical 1 and keeps this value for the defined debounce time. Thereafter, the channel is transparent again and waits for the next rising edge.


Filter0=off
Filter1=Stretch_rising_edge;debounce_time=2000us
16:11:11.4800
16:11:11.4825
16:11:11.4850
16:11:11.4875
16:11:11.4900
16:11:11.4925
16:11:11.4950

SignalName	X1	X2	X2 - X1	Y1	Y2	Y2 - Y1
Filter0= off	1.4	11.4	0.002000	1.00	1.00	0.00
Filter1= Stretch_rising_edge;debounce_time=2000us	1.4	11.4	0.002000	1.00	1.00	0.00

„Stretch falling edge“

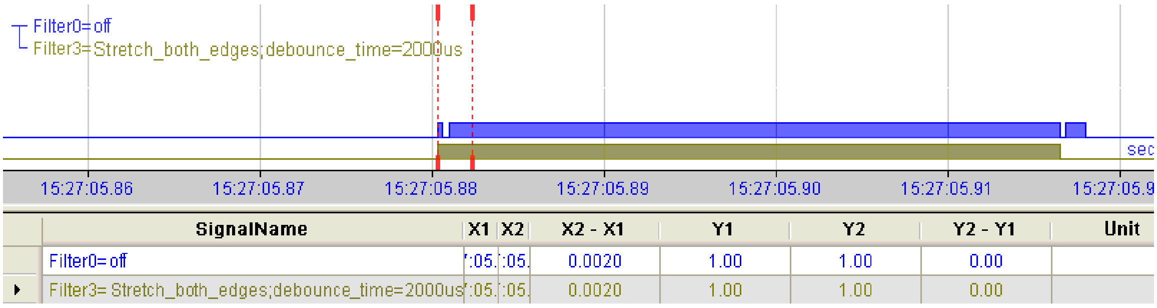
With the first falling edge, the output signal (green) switches to logical 0 and keeps this value for the defined debounce time. Thereafter, the channel is transparent again and waits for the next falling edge.


Filter0= off
Filter2= Stretch_falling_edge;debounce_time=2000us
16:11:23.4160
16:11:23.4165
16:11:23.4170
16:11:23.4175
16:11:23.4180
16:1

SignalName	X1	X2	X2 - X1	Y1	Y2	Y2 - Y1
Filter0= off	23.4	23.4	0.002000	0.00	0.00	0.00
Filter2= Stretch_falling_edge;debounce_time=2000us	23.4	23.4	0.002000	0.00	0.00	0.00

„Stretch both edges“

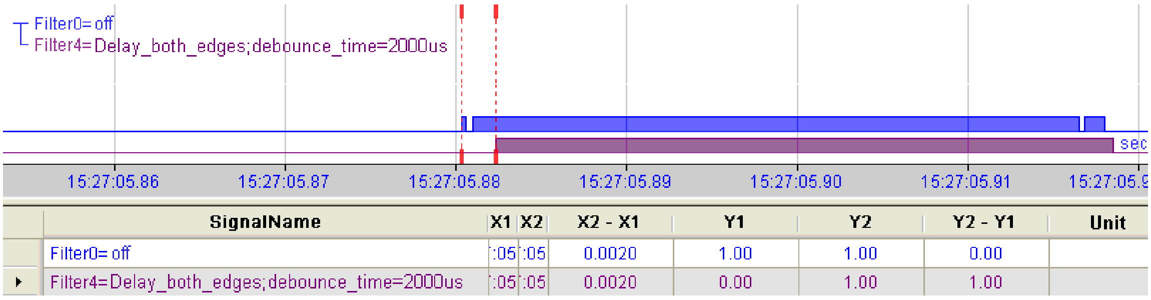
With the first edge, the output signal (ocher) follows the initial signal (blue) and keeps the logical level for the duration of the defined debounce time. Thereafter, the channel is transparent again and waits for the next edge – be it rising or falling.


Filter0= off
Filter3= Stretch_both_edges;debounce_time=2000us
sec
15:27:05.86
15:27:05.87
15:27:05.88
15:27:05.89
15:27:05.90
15:27:05.91
15:27:05.9

	SignalName	X1	X2	X2 - X1	Y1	Y2	Y2 - Y1	Unit
	Filter0= off	':05.	':05.	0.0020	1.00	1.00	0.00	
▸	Filter3= Stretch_both_edges;debounce_time=2000us	':05.	':05.	0.0020	1.00	1.00	0.00	

„Delay both edges“

Beginning with the first edge, the output signal (purple) blocks the input and keeps the logical value of the edge for the duration of the defined debounce time. Thereafter, the channel is transparent again, directly assumes the logical level of the input signal and waits for the next edge – be it rising or falling.


Filter0= off
Filter4=Delay_both_edges;debounce_time=2000us
sec
15:27:05.86
15:27:05.87
15:27:05.88
15:27:05.89
15:27:05.90
15:27:05.91
15:27:05.9

	SignalName	X1	X2	X2 - X1	Y1	Y2	Y2 - Y1	Unit
	Filter0= off	':05	':05	0.0020	1.00	1.00	0.00	
▸	Filter4=Delay_both_edges;debounce_time=2000us	':05	':05	0.0020	0.00	1.00	1.00	

8 Start-up / Update

Important note

Installing an update can take some minutes. Please do not switch off the device when an update is running. This might damage the device.

8.1 Auto-Update

After having mounted the module and applied the voltage to the central unit, the central unit detects the modules and checks the software version.

The central unit has a so called “overall release version“. This version contains the current software version of the central unit as well as the software versions of the modules. You can find the “overall release version“ on the website of the central unit on the „firmware“ tab.

When the software version of a module does not match the “overall release version“ of the central unit, the central unit does an automatic up- or downgrade of the module. Thereafter, the module is ready to be used.

Important note

The “overall release version“ contains all modules developed up to the date of release of this firmware and the corresponding software versions. If a module cannot be detected, yet (i.e. it is more recent than the firmware version of the CPU), this module is ignored and outlined in red on the web interface.

In this case, a new update file has to be installed for the “overall release version“. If you want to get the current update file, please contact the iba support.

8.2 Overall Release Version

The „overall release version“ provides information about the software version of the entire iba-modular system. You can find it on the website of the central unit or in the I/O Manager of ibaPDA.

Important note

If you require support, specify the „overall release version“.

8.3 Update

An update can be installed in two different ways.

- ☐ Web interface (only with ibaPADU-S-IT-2x16)
- ☐ ibaPDA

No matter which of the both ways you choose to install an update: the progress of the update is shown by the LEDs L5 … L8. Beginning with L5, the LEDs are flashing one after another, at first in orange and then in green and at a slower rate. When the update is finished, the device will be rebooted.

Important note

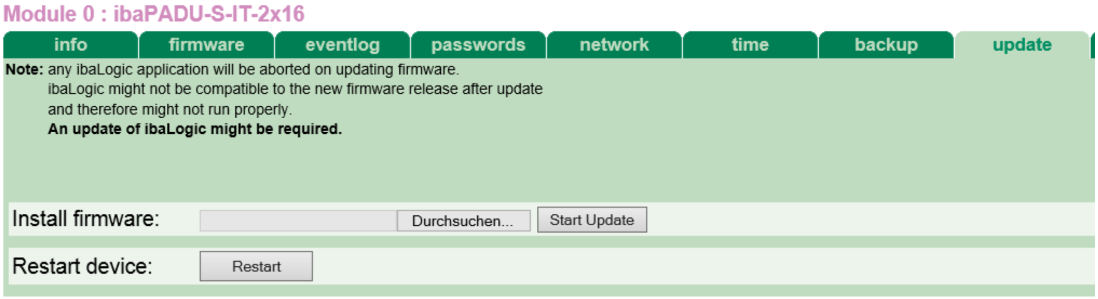
When updating the iba-modular system, a possible autostart of the ibaLogic PMAC is deactivated and the existing ibaLogic-V5 application deleted. Furthermore, an update of the ibaLogic-V5 software (ibaLogic Clients) might be necessary.

8.3.1 Update via web interface

Important note

The web interface is available only with the central unit ibaPADU-S-IT-2x16.

- ❑ Start the website of the iba-modular system in your browser and select the central unit.
- ❑ On the “update“ tab, click on the <Browse…> button and choose the <padusit2x16_ v[xx.yy.zzz].iba> update file.
- ❑ By clicking on <Start Update>, you start the update.

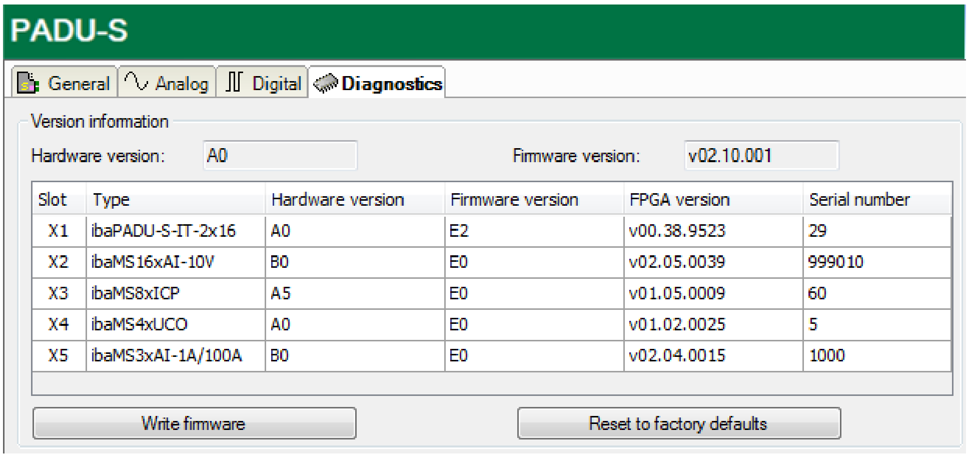

Module 0 : ibaPADU-S-IT-2x16
info
firmware
eventlog
passwords
network
time
backup
update

Note: any ibaLogic application will be aborted on updating firmware.
ibaLogic might not be compatible to the new firmware release after update
and therefore might not run properly.
An update of ibaLogic might be required.

Install firmware:
Durchsuchen...
Start Update
Restart device:
Restart

8.3.2 Update via ibaPDA

- ❑ Open the ibaPDA I/O Manager and choose your iba-modular system in the tree structure.
- ❑ On the “Diagnostics“ tab, click on the <Write firmware> button and choose the „padusit2x16_v[xx.yy.zzz].iba“ or „paduscm_v[xx.yy.zzz].iba“ update file.
- ❑ You start the update by clicking on <OK>.


PADU-S
General
Analog
Digital
Diagnostics
Version information

Hardware version: A0

Firmware version: v02.10.001

Slot	Type	Hardware version	Firmware version	FPGA version	Serial number
X1	ibaPADU-S-IT-2x16	A0	E2	v00.38.9523	29
X2	ibaMS16xAI-10V	B0	E0	v02.05.0039	999010
X3	ibaMS8xICP	A5	E0	v01.05.0009	60
X4	ibaMS4xUCO	A0	E0	v01.02.0025	5
X5	ibaMS3xAI-1A/100A	B0	E0	v02.04.0015	1000

Write firmware
Reset to factory defaults

8.4 Module Information / Diagnostics

8.4.1 Diagnostics

Important information about the iba-modular system, like hardware version, firmware version, FPGA version and serial number is displayed in the “Diagnostics” tab. Open the ibaPDA I/O Manager and choose your iba-modular system in the tree structure (see also the figure above).

8.4.2 Web interface

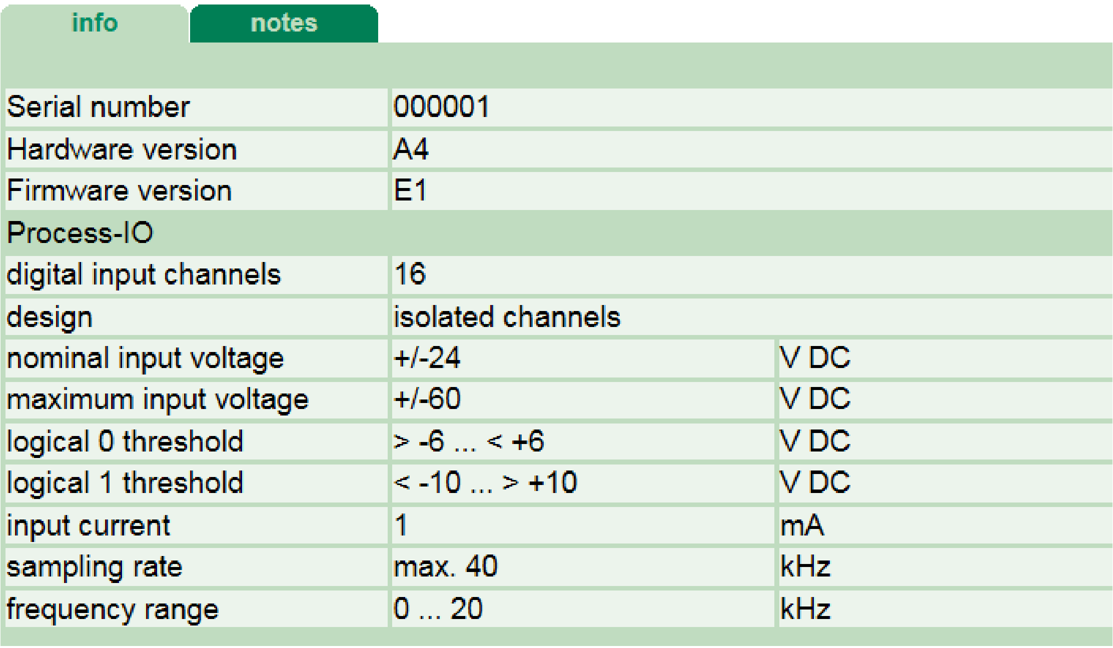
On the module website, general information about the module is only displayed. You cannot change the values.

Important note

The web interface is only available with the central unit ibaPADU-S-IT-2x16.

8.4.2.1 „info“ tab

The „info“ tab displays general information and technical specifications of the I/O module.

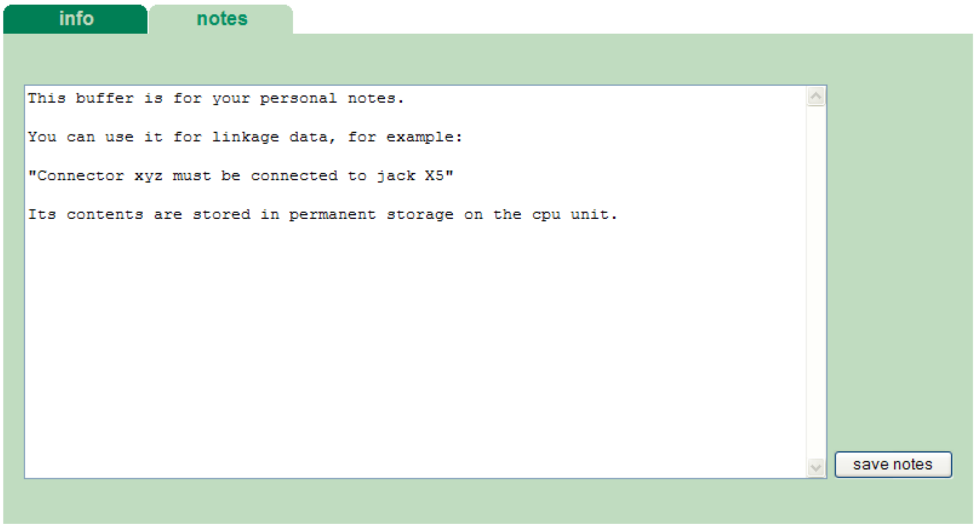


Serial number	000001	
Hardware version	A4	
Firmware version	E1	
Process-IO		
digital input channels	16	
design	isolated channels	
nominal input voltage	+/-24	V DC
maximum input voltage	+/-60	V DC
logical 0 threshold	> -6 ... < +6	V DC
logical 1 threshold	< -10 ... > +10	V DC
input current	1	mA
sampling rate	max. 40	kHz
frequency range	0 ... 20	kHz

8.4.2.2 „notes“ tab

On the “notes“ tab, you can enter notes, e.g. for notes on wiring or on recording of changes.

By clicking on <save notes>, the notes are permanently stored on the device.

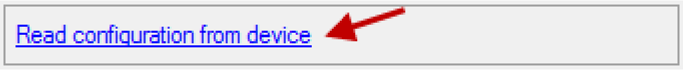


```
This buffer is for your personal notes.

You can use it for linkage data, for example:

"Connector xyz must be connected to jack X5"

Its contents are stored in permanent storage on the cpu unit.
```

9 iba Applications

9.1 Configuration in ibaPDA

You can configure the signals with the I/O Manager of ibaPDA. If the iba-modular system is already installed and you want to add a new module, click on „Read configuration from device“. The module will be detected automatically.



Read configuration from device

Note

The automatic detection requires a bidirectional FO connection from the ibaPDA computer to the central unit.

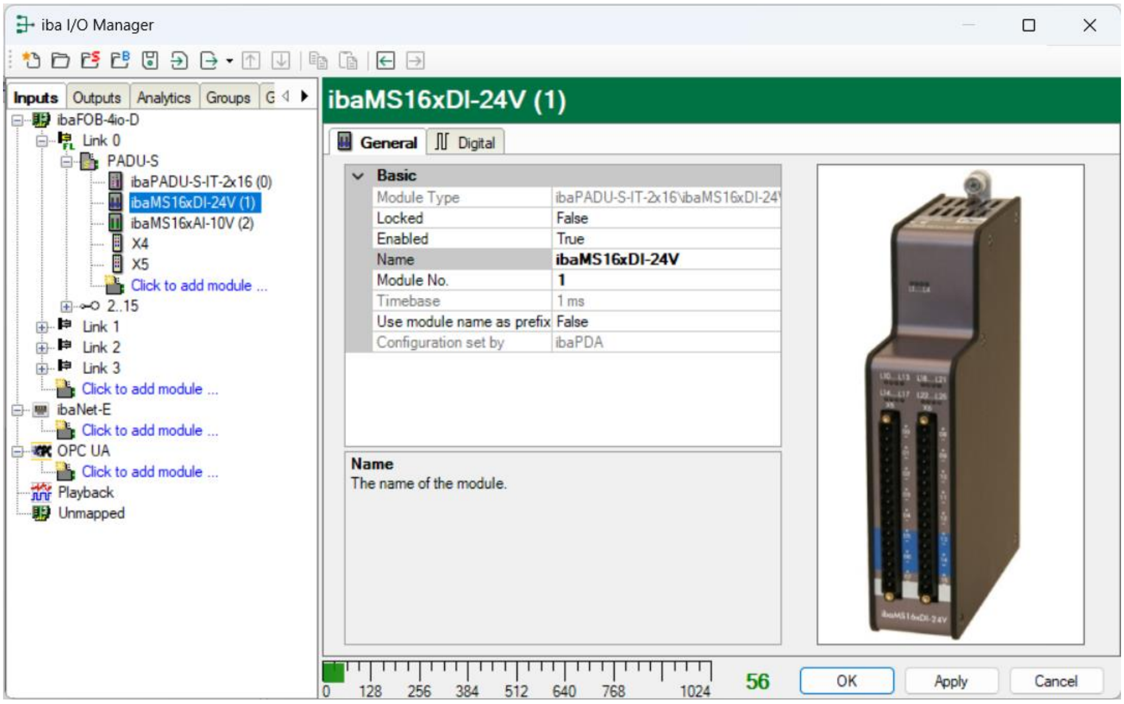
Other documentation

If you want to install the iba-modular system at first, refer to the manual of the central unit, chapter “Configuration with ibaPDA”.

If the module is detected, click on the module in the signal tree and the “General” tab appears.

Note

The menu interface in ibaPDA is similar for the ibaMS16xDI-24V and ibaMS16xDI-220V modules.



iba I/O Manager
Inputs
Outputs
Analytics
Groups
G
ibaFOB-4io-D
Link 0
PADU-S
ibaPADU-S-IT-2x16 (0)
ibaMS16xDI-24V (1)
ibaMS16xAI-10V (2)
X4
X5
Click to add module ...
2..15
Link 1
Link 2
Link 3
Click to add module ...
ibaNet-E
Click to add module ...
OPC UA
Click to add module ...
Playback
Unmapped
General
Digital
0
128
256
384
512
640
768
1024
56
OK
Apply
Cancel

ibaMS16xDI-24V (1)

Basic	
Module Type	ibaPADU-S-IT-2x16\ibaMS16xDI-24
Locked	False
Enabled	True
Name	ibaMS16xDI-24V
Module No.	1
Timebase	1 ms
Use module name as prefix	False
Configuration set by	ibaPDA

Name
The name of the module.

Basic settings

- ❑ Module Type

Display of module type (read only)

❑ Locked

True: the module can only be changed by an authorized user.
False: the module can be changed by any user.

❑ Enabled

Data capturing for this module is enabled.

❑ Name

You can enter a name for the module.

❑ Modul No.

Consecutive module number assigned by ibaPDA for clearly referencing the signals, e.g. in expressions or ibaAnalyzer. The number can be changed by the user.

❑ Timebase

Timebase, specified in the PADU-S module.

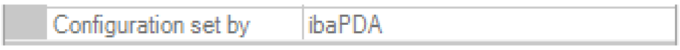
❑ Use name as prefix

Prefix the signal names of this module with the module name.

❑ Configuration set by

This item is only visible when ibaPADU-S-IT-2x16 is used as central unit. When an embedded application has been started on ibaPADU-S-IT-2x16 (e. g. ibaLogic), then ibaPDA cannot modify the configuration of the modules and signals. In this case the configuration is set by the embedded application. The following entries can be displayed:

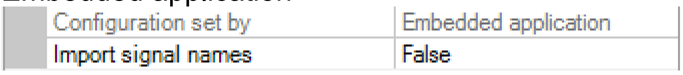
- ibaPDA

Configuration set by	ibaPDA

  When ibaPDA is displayed, an embedded application has not been started and the configuration can be set by ibaPDA.

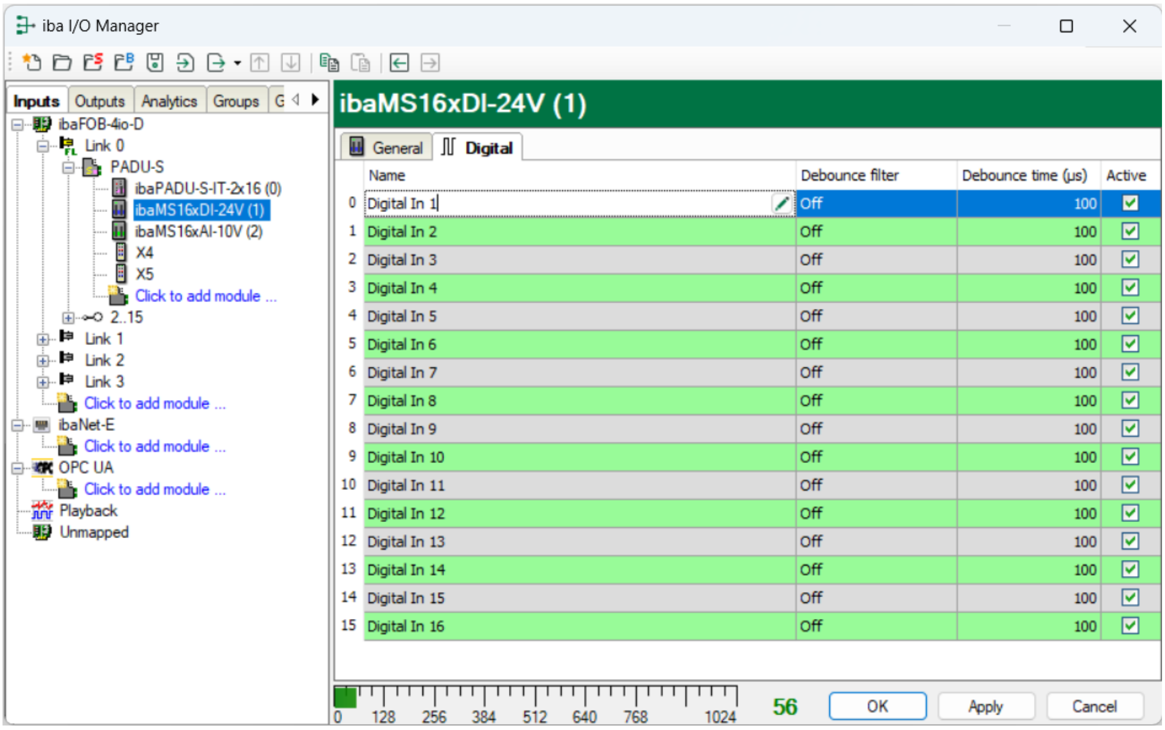
- Embedded application

Configuration set by	Embedded application
Import signal names	False

  When embedded application is displayed, the configuration of the modules and signals is set by the embedded application on the device. In this case it is possible to import user-defined signal names, which are configured in the embedded application, provided that the embedded application supports this function (Import signal names: True).
  The modules and signals configured by the embedded application cannot be configured in ibaPDA, they are displayed in gray in the respective fields.
  The configuration is read by ibaPDA and used for the acquisition. Modules and signals which are not displayed in gray can be used in ibaPDA.

The following settings apply to the “Digital” tab:


iba I/O Manager
Inputs
Outputs
Analytics
Groups
ibaFOB-4io-D
Link 0
PADU-S
ibaPADU-S-IT-2x16 (0)
ibaMS16xDI-24V (1)
ibaMS16xAI-10V (2)
X4
X5
Click to add module ...
2..15
Link 1
Link 2
Link 3
Click to add module ...
ibaNet-E
Click to add module ...
OPC UA
Click to add module ...
Playback
Unmapped
ibaMS16xDI-24V (1)
General
Digital
0
128
256
384
512
640
768
1024
56
OK
Apply
Cancel

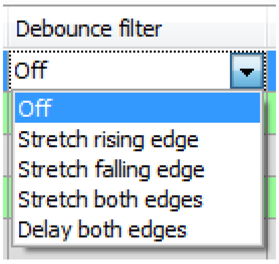
	Name	Debounce filter	Debounce time (µs)	Active
0	Digital In 1	Off	100	☑
1	Digital In 2	Off	100	☑
2	Digital In 3	Off	100	☑
3	Digital In 4	Off	100	☑
4	Digital In 5	Off	100	☑
5	Digital In 6	Off	100	☑
6	Digital In 7	Off	100	☑
7	Digital In 8	Off	100	☑
8	Digital In 9	Off	100	☑
9	Digital In 10	Off	100	☑
10	Digital In 11	Off	100	☑
11	Digital In 12	Off	100	☑
12	Digital In 13	Off	100	☑
13	Digital In 14	Off	100	☑
14	Digital In 15	Off	100	☑
15	Digital In 16	Off	100	☑

☐ Name

You can enter a name for the signal and two additional comments (click on the ✎ icon in the Name field).

☐ Debounce filter

In the dropdown menu, you can choose the operating mode for the debounce filter. You have got the following settings at your disposal: Off, stretch rising edge, stretch falling edge, stretch both edges, delay both edges.


Debounce filter
Off
Off
Stretch rising edge
Stretch falling edge
Stretch both edges
Delay both edges

➚ See chapter 7.3.2.

☐ Debounce time (µs)

Here, you can define the debounce time in µs

☐ Active

Enabling/disabling the signal

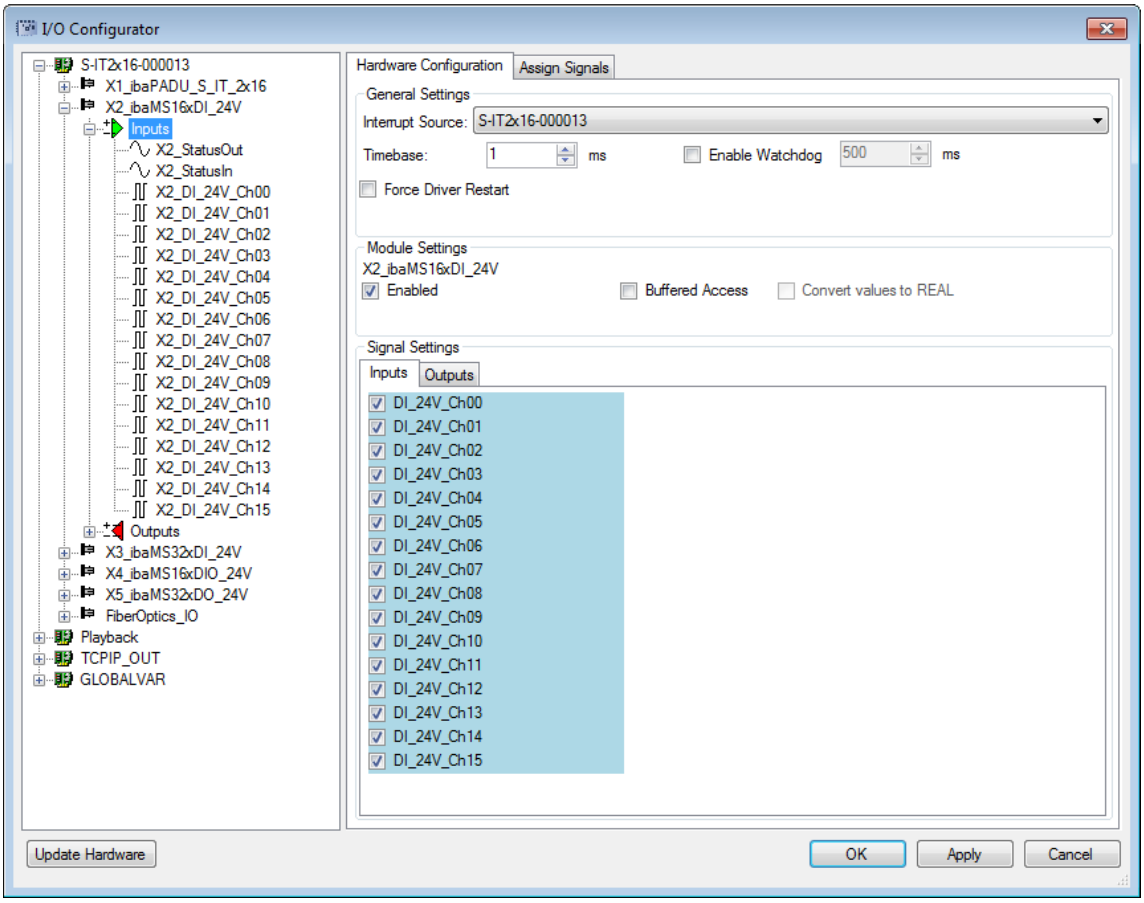
9.2 Configuration in ibaLogic-V5

Other documentation

Combined with ibaLogic-V5, an ibaPADU-S-IT-2x16 device can be used to realize individual signal pre-processing or stand-alone applications. You find the basic way of proceeding description in the separate ibaPADU-S-IT-2x16 manual. This manual describes only the signals belonging to this module.

9.2.1 Configuring signals

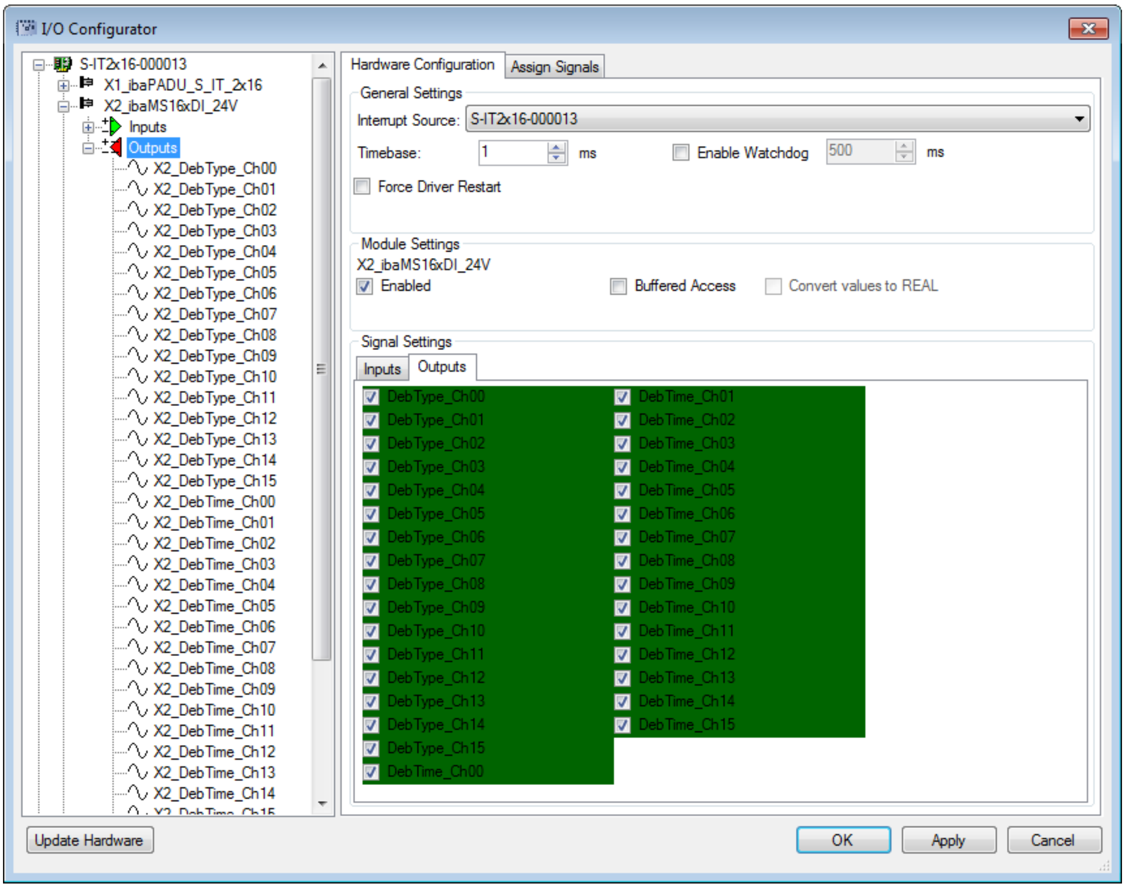
The signals can be configured in the I/O Configurator of ibaLogic-V5. Open the I/O Configurator in the "Tools – I/O Configurator" menu. When you click on the <Update hardware> button, then ibaLogic detects the module.


I/O Configurator
S-IT2x16-000013
X1_ibaPADU_S_IT_2x16
X2_ibaMS16xDI_24V
Inputs
X2_StatusOut
X2_StatusIn
X2_DI_24V_Ch00
X2_DI_24V_Ch01
X2_DI_24V_Ch02
X2_DI_24V_Ch03
X2_DI_24V_Ch04
X2_DI_24V_Ch05
X2_DI_24V_Ch06
X2_DI_24V_Ch07
X2_DI_24V_Ch08
X2_DI_24V_Ch09
X2_DI_24V_Ch10
X2_DI_24V_Ch11
X2_DI_24V_Ch12
X2_DI_24V_Ch13
X2_DI_24V_Ch14
X2_DI_24V_Ch15
Outputs
X3_ibaMS32xDI_24V
X4_ibaMS16xDIO_24V
X5_ibaMS32xDO_24V
FiberOptics_IO
Playback
TCPIP_OUT
GLOBALVAR
Hardware Configuration
Assign Signals
Update Hardware
OK
Apply
Cancel

General Settings
Interrupt Source: S-IT2x16-000013
Timebase: 1 ms
☐ Enable Watchdog 500 ms
☐ Force Driver Restart

Module Settings
X2_ibaMS16xDI_24V
☑ Enabled
☐ Buffered Access
☐ Convert values to REAL

Signal Settings
Inputs | Outputs
☑ DI_24V_Ch00
☑ DI_24V_Ch01
☑ DI_24V_Ch02
☑ DI_24V_Ch03
☑ DI_24V_Ch04
☑ DI_24V_Ch05
☑ DI_24V_Ch06
☑ DI_24V_Ch07
☑ DI_24V_Ch08
☑ DI_24V_Ch09
☑ DI_24V_Ch10
☑ DI_24V_Ch11
☑ DI_24V_Ch12
☑ DI_24V_Ch13
☑ DI_24V_Ch14
☑ DI_24V_Ch15


I/O Configurator
S-IT2x16-000013
X1_ibaPADU_S_IT_2x16
X2_ibaMS16xDI_24V
Inputs
Outputs
X2_DebType_Ch00
X2_DebType_Ch01
X2_DebType_Ch02
X2_DebType_Ch03
X2_DebType_Ch04
X2_DebType_Ch05
X2_DebType_Ch06
X2_DebType_Ch07
X2_DebType_Ch08
X2_DebType_Ch09
X2_DebType_Ch10
X2_DebType_Ch11
X2_DebType_Ch12
X2_DebType_Ch13
X2_DebType_Ch14
X2_DebType_Ch15
X2_DebTime_Ch00
X2_DebTime_Ch01
X2_DebTime_Ch02
X2_DebTime_Ch03
X2_DebTime_Ch04
X2_DebTime_Ch05
X2_DebTime_Ch06
X2_DebTime_Ch07
X2_DebTime_Ch08
X2_DebTime_Ch09
X2_DebTime_Ch10
X2_DebTime_Ch11
X2_DebTime_Ch12
X2_DebTime_Ch13
X2_DebTime_Ch14
X2_DebTime_Ch15
Hardware Configuration
Assign Signals
General Settings
Module Settings
Signal Settings
Inputs
Outputs
Update Hardware
OK
Apply
Cancel

Interrupt Source: S-IT2x16-000013

Timebase: 1 ms ☐ Enable Watchdog 500 ms

☐ Force Driver Restart

X2_ibaMS16xDI_24V

☑ Enabled ☐ Buffered Access ☐ Convert values to REAL

☑ DebType_Ch00
☑ DebType_Ch01
☑ DebType_Ch02
☑ DebType_Ch03
☑ DebType_Ch04
☑ DebType_Ch05
☑ DebType_Ch06
☑ DebType_Ch07
☑ DebType_Ch08
☑ DebType_Ch09
☑ DebType_Ch10
☑ DebType_Ch11
☑ DebType_Ch12
☑ DebType_Ch13
☑ DebType_Ch14
☑ DebType_Ch15
☑ DebTime_Ch00
☑ DebTime_Ch01
☑ DebTime_Ch02
☑ DebTime_Ch03
☑ DebTime_Ch04
☑ DebTime_Ch05
☑ DebTime_Ch06
☑ DebTime_Ch07
☑ DebTime_Ch08
☑ DebTime_Ch09
☑ DebTime_Ch10
☑ DebTime_Ch11
☑ DebTime_Ch12
☑ DebTime_Ch13
☑ DebTime_Ch14
☑ DebTime_Ch15

If “Buffered Access“ is enabled, you can see additional input and output signals.

Note

You need to apply the “Buffered Access“ by clicking on the <Apply> button. Only then, you will see additional signals in the signal tree that can be configured as output or input resources.

Signal	Description
Inputs	
DI_24V_Ch[00…15]	Digital input signals
StatusIn	Status information about the plugged input module (for output module without function): 0 = Module not initialized 1 = Module running >1 = Mistake (e.g. module cannot be initialized)
StatusOut	Status information about the plugged module (for input module without function): 0 = Module not initialized 1 = Module running >1 = Mistake (e.g. module cannot be initialized)
Outputs	
DebType_Ch[00…15]	Debounce filter for digital signals
DebTime_Ch[00...15]	Debounce time for the single digital signal

Additional signals for buffered access	
BufferFillCount	Counter, when buffer is filled
BufferOverrun	Counter for Buffer-overrun
Additional output signals for buffered access	
BufferSize	Buffersize
SubSampling	Subsampling of the signals

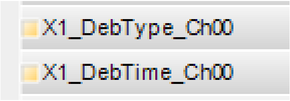
9.2.2 Configuring the debounce filter

If you want to use debounce filters, these are made as configuration output and configured as Off-task connector (OTC) or function block.

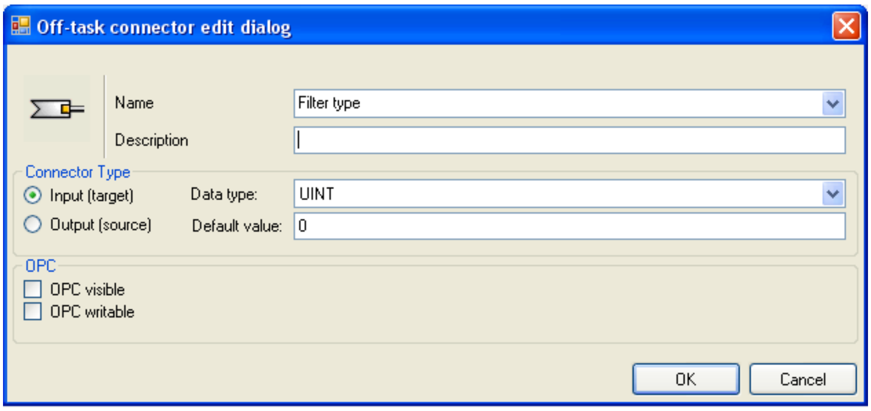
Meaning of the outputs:

DebounceTypex:	debounce filter for digital signals
DebounceTimeUsx:	debounce time for the single digital signal

First, drag the output signals defined in the I/O configurator to the margin of the programming surface, in this example “X1_DebType_Ch00” and “X1_DebTime_Ch00” for the digital input 0.


X1_DebType_Ch00
X1_DebTime_Ch00

Create a new Off-task connector in the programming window, assign a meaningful name to the connector, e.g. “Filter type” and choose “Input” and Data type “UINT” under the Connector type option.


Off-task connector edit dialog

Name: Filter type
Description:
Connector Type
● Input (target)
○ Output (source)
Data type: UINT
Default value: 0
OPC
☐ OPC visible
☐ OPC writable

Meaning of the default values for the debounce filter:

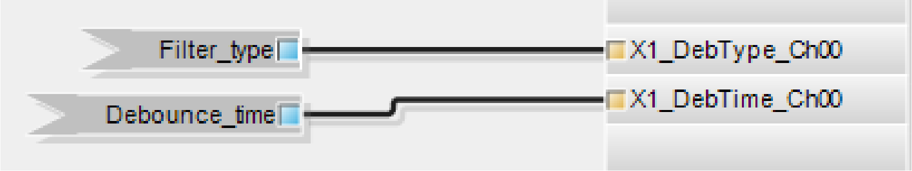
0	Debounce filter switched off
1	Stretch rising edge
2	Stretch falling edge
3	Stretch both edges
4	Delay both edges

➚ You find the explanations of the settings in chapter 7.3.2 „Debounce filters“.

Now, connect the OTC and the signal on the margin of the programming surface.

Create a new OTC, assign a meaningful name, e.g. debounce time and choose “Input” as type. Enter the debounce time in µs in the “Default value“ field. The value can be 65535 at max.

Now, connect the OTC and the signal on the margin of the programming surface.


Filter_type
Debounce_time
X1_DebType_Ch00
X1_DebTime_Ch00

10 Technical Data

10.1 Main data

Short description		
Name	ibaMS16xDI-24V	ibaMS16xDI-220V
Description	Input module with 16 digital inputs	
Order number	10.124201	10.124200
Power supply, interfaces, indicators		
Power supply	DC 24 V, internal via backplane bus	
Power consumption	Up to 8 W	
Indicating elements		
Indicators (LEDs)	4 LEDs for device status 16 LEDs for status of the digital inputs	
Operating and environmental conditions		
Temperature ranges		
Operation	2 °F to 122 °F (0 °C to 50 °C)	
Storage/transport	-13 °F to 158 °F (-25 °C to 70 °C)	
Installation position	Vertical, plugged into backplane bus	
Installation height	Up to 6562 ft (2000 m)	
Cooling	Passive	
Humidity class	F, no condensation	
Protection class	IP20	
Certification/Standards	EMC: IEC 61326-1 FCC part 15 class A	EMC: IEC 61326-1 FCC part 15 class A Safety: EN 61010-1
MTBF[1]	-	2,460,501 hours / 280 years
Dimensions (Width x height x depth)	1.69 in x 8.43 in x 5.83 in (43 mm x 214 mm x 148 mm)	
Weight (incl. packaging and documentation)	approx. 2.43 lbs (1.1 kg)	

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[1] MTBF (mean time between failure) determined according to Telcordia 3 SR232 (Reliability Prediction Procedure of Electronic Equipment; Issue 3 Jan. 2011)

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

Unique Identifier:	10.124200	ibaMS16xDI-220V
	10.124201	ibaMS16xDI-24V

Responsible Party - U.S. Contact Information
iba America, LLC
370 Winkler Drive, Suite C
Alpharetta, Georgia
30004

(770) 886-2318-102
www.iba-america.com

FCC Compliance Statement
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

10.2 Digital inputs

Digital inputs		
Number	16	
Design	Galvanically isolated, protected against reverse polarity, single ended	
	ibaMS16xDI-24V	ibaMS16xDI-220V
Input signal	24 V DC	220 V DC
Max. input voltage	±60 V permanent	±300 V for 1 minute
Signal level log. 0	> -6 V; < +6 V	> -56 V; < +56 V[2]
Signal level log. 1	< -10 V; > +10 V	< -76 V; > +76 V[2]
Hysteresis	none	none
Input current	1 mA, constant	
Debounce filter	Optional: 4 different operating modes	
Sampling rate	Up to 40 kHz, freely adjustable	
Frequency range	0 Hz to 20 kHz	
Delay	Typ. 10 µs	
Electrical isolation		
Channel - channel	AC 2.5 kV	
Channel - housing/power supply	AC 2.5 kV	
Connector type	2 x 16-pin multi-pin; connector, clamp-type terminal (0.2 mm^2 to 2.5 mm^2), screw connection, included in delivery	

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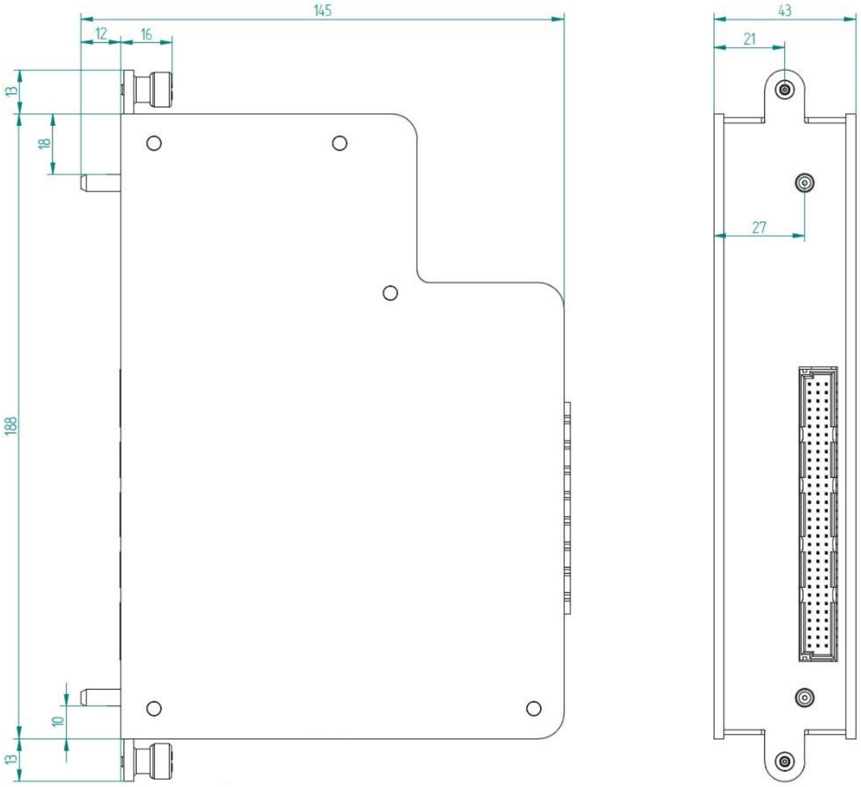
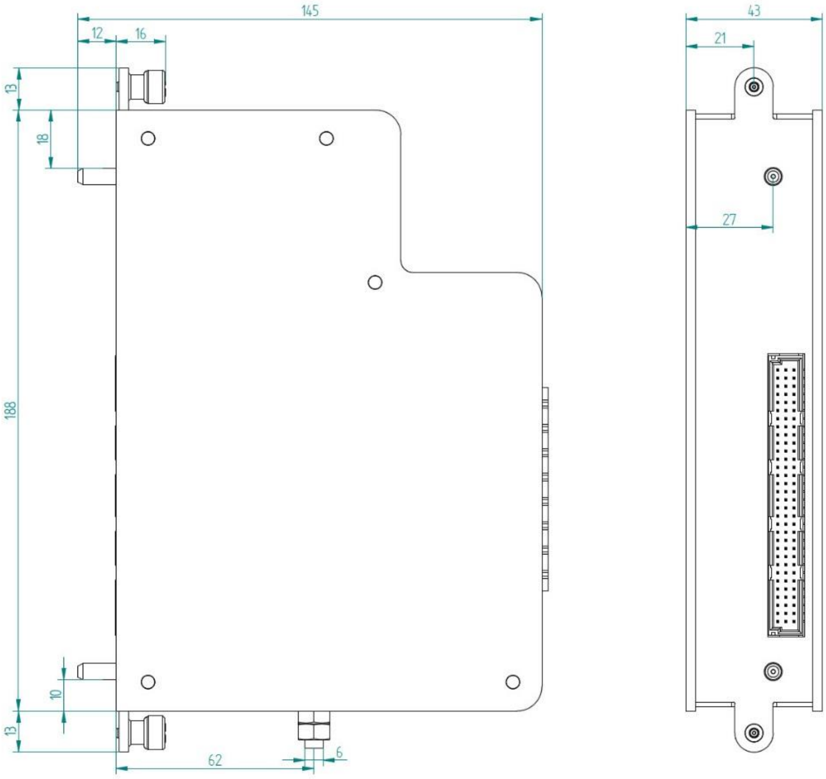
[2] Hardware version A5 or higher

10.3 Dimensions


145
12
16
13
18
188
10
13
43
21
27

Module dimensions ibaMS16xDI-24V (dimensions in mm)


145
12
16
13
18
188
10
13
62
6
43
21
27

Module dimensions ibaMS16xDI-220V (with groundig screw, dimensions in mm)

11 Support and contact

Support

Phone:	+49 911 97282-14
Fax:	+49 911 97282-33
E-Mail:	support@iba-ag.com

Note

If you require support, specify the serial number (iba-S/N) of the product.

Contact

Headquarters

iba AG

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D-90762 Fuerth
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Germany

Regional and Worldwide

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

www.iba-ag.com