



# ibaMS16xDIO-24V

Input and output module for digital signals

Manual

Issue 2.0

Measurement Systems for Industry and Energy

[www.iba-ag.com](http://www.iba-ag.com)

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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 ibaMS16xDIO-24V module and how to use and operate it. 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.



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## 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](http://www.iba-ag.com) in the download area.

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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. These 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 <i>Logic diagram</i>
Call of menu command	<i>Step 1 – Step 2 – Step 3 – Step x</i> Example: Select menu <i>Logic diagram – Add – New logic diagram</i>
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 ibaMS16xDIO-24V module is part of the iba-modular system. The modular concept of the iba-modular system is designed on the basis of a backplane. On this backplane bus, you can plug a central unit and up to 4 input/output modules. The power supply of the module is provided by the backplane bus. The ibaMS16xDIO-24V module offers 16 digital inputs and 16 digital outputs.

### In brief

- ☐ Additional module for the iba-modular system
- ☐ 16 digital inputs
  - Galvanically isolated groups of 4 signals each
  - Input level  $\pm 48\text{ V}$
  - Sampling rate up to 40 kHz, freely adjustable
  - Debounce filters
- ☐ 16 digital outputs
  - Galvanically isolated groups of 4 signals each
  - Switching frequency 0 Hz to 40 kHz
  - Short-circuit limitation
- ☐ Rugged design, easy mounting
- ☐ CE approval

### Application fields

- ☐ Power generation and distribution
- ☐ Test benches
- ☐ Compensation systems
- ☐ Condition Monitoring

## 3 Scope of delivery

After unpacking, check the delivery for completeness and possible damages.

The scope of delivery comprises:

- ☐ ibaMS16xDIO-24V device
- ☐ 4 x 12-pin multi-pin connector (RM 3.81 mm)
- ☐ Data medium „iba Software & Manuals“ (only for single delivery)



## 4 Safety instructions

### 4.1 Proper use

The device is an electrical apparatus. The device is only allowed for use in 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 cables!

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.

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## 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.



#### 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.

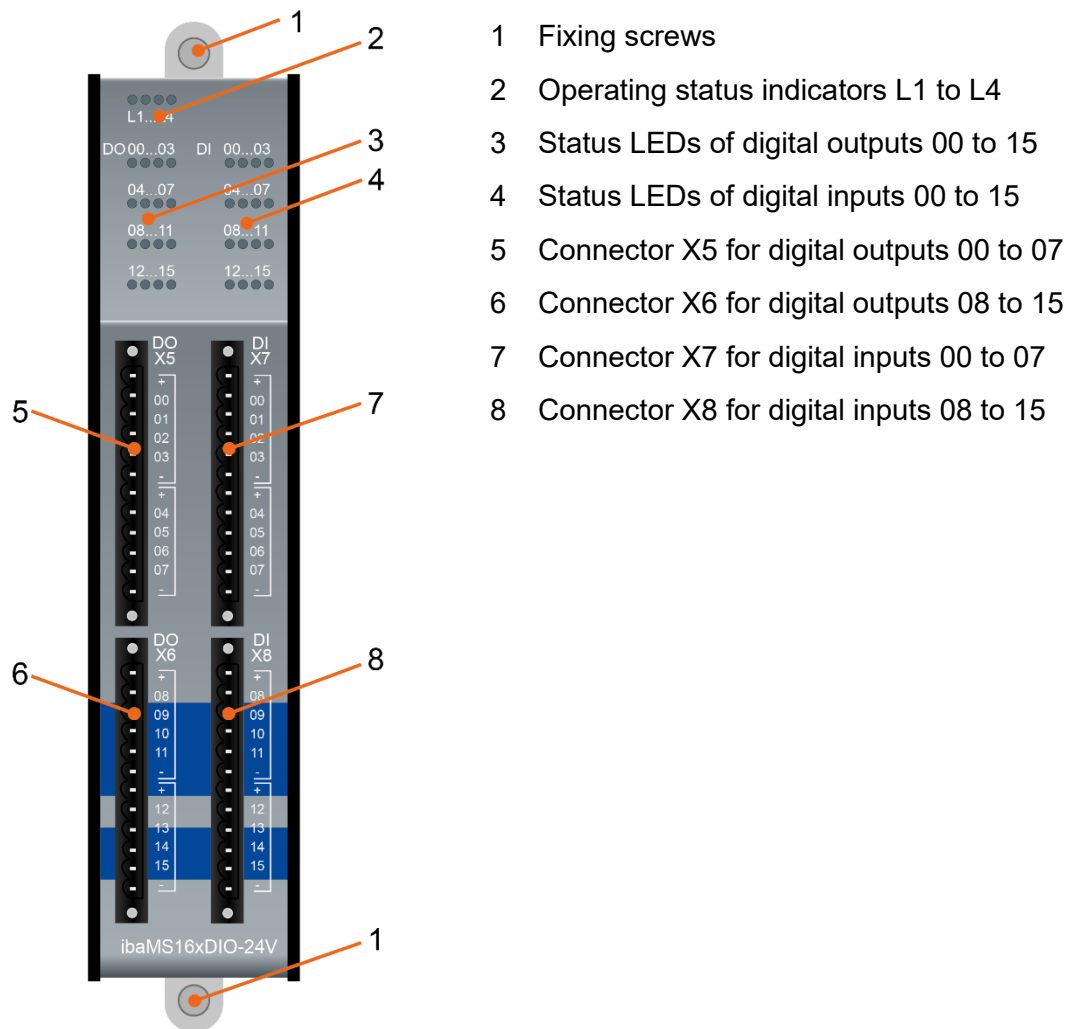
1. Connect all cables.
2. If all required cables are connected, connect the central unit to the power supply.
3. Switch on the central unit.

### 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 View



- 1 Fixing screws
- 2 Operating status indicators L1 to L4
- 3 Status LEDs of digital outputs 00 to 15
- 4 Status LEDs of digital inputs 00 to 15
- 5 Connector X5 for digital outputs 00 to 07
- 6 Connector X6 for digital outputs 08 to 15
- 7 Connector X7 for digital inputs 00 to 07
- 8 Connector X8 for digital inputs 08 to 15

## 7.2 Indicating elements

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

### 7.2.1 Operating status L1 ... L4

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 outputs

LED per channel*	Status	Description
00...15	Off	No signal, logical 0
	Green	Signal ok, logical 1
	Yellow	Load supply voltage not present (per root)
	Red	Overcurrent (Channel root switches off)

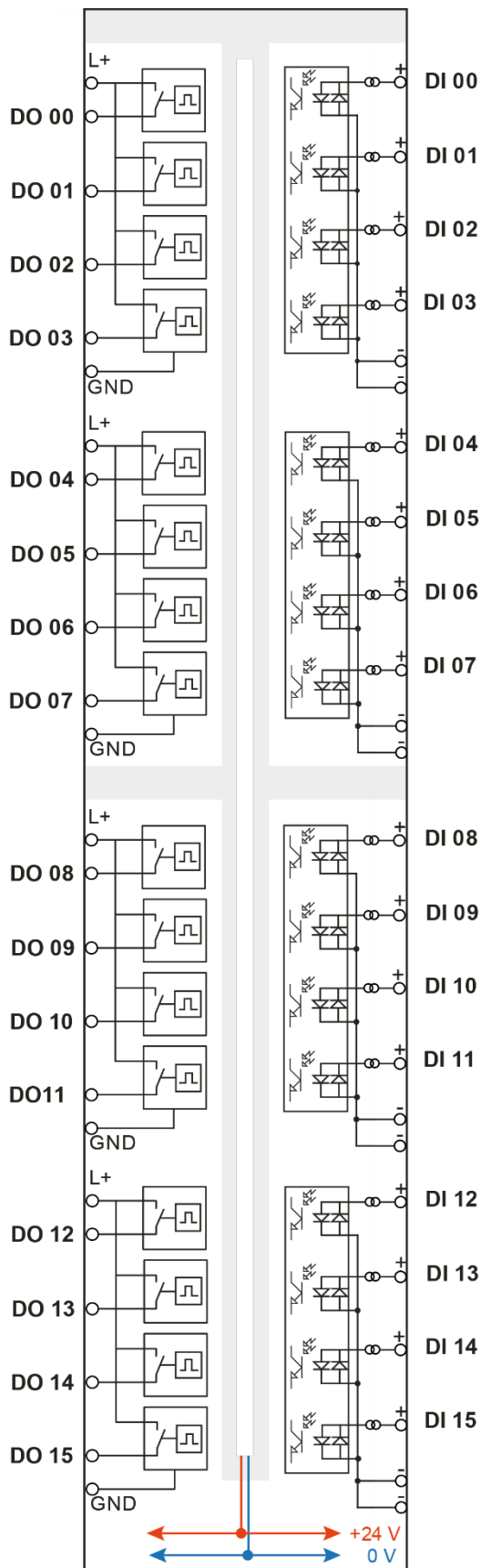
\* If an output is deactivated via ibaPDA, the corresponding channel LED remains off.

## 7.2.3 Status of digital inputs

LED per channel	Status	Description
00...15	Off	No signal, logical 0
	Green	Signal ok, logical 1

## 7.3 Connection diagram

Here, you can connect 16 output signals (0...15) and 16 input signals (0...15).



## 7.4 Digital outputs X5 to X6

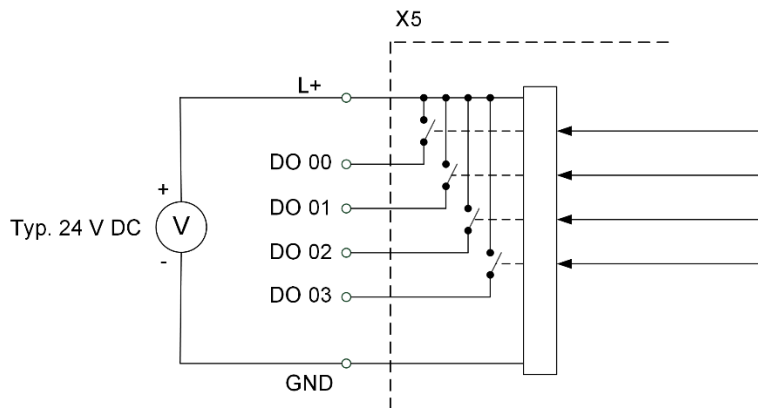
### 7.4.1 Pin assignment

X5: Pin	Connection
1	Load voltage (1) L+
2	Digital output 00
3	Digital output 01
4	Digital output 02
5	Digital output 03
6	Load voltage (1) GND
7	Load voltage (2) L+
8	Digital output 04
9	Digital output 05
10	Digital output 06
11	Digital output 07
12	Load voltage (2) GND

X6: Pin	Connection
1	Load voltage (3) L+
2	Digital output 08
3	Digital output 09
4	Digital output 10
5	Digital output 11
6	Load voltage (3) GND
7	Load voltage (4) L+
8	Digital output 12
9	Digital output 13
10	Digital output 14
11	Digital output 15
12	Load voltage (4) GND

### 7.4.2 Circuit design

The digital outputs of the module are pure high or P switches between the applied supply voltage L+ and each of the 4 output signals Dout [0..3] of a root.



Schematic diagram outputs, upper root X5 as an example

### 7.4.3 Channel protective function

The output channels provide a self-protection function in order to avoid damages to the device under fault conditions in the load circuit as far as possible. Each load current of all 4 channels per channel root is monitored. The protected range begins when the value is higher than approx. 0.6 A per channel. It may happen, that the channel is already switched-off at this value, i. e. all output signals of this root are set to logical 0.

In this case, status signals report the error status to the iba applications. The errors can be reset by the application, but only when the error does not physically exist any longer.



## 7.5 Digital inputs X7 to X8

Due to the reverse polarity protection, the measuring signal is indicated logically correct, even if the connection is polarity-reversed.

### 7.5.1 Pin assignment

X7: Pin	Connection
1	Digital input 00
2	Digital input 01
3	Digital input 02
4	Digital input 03
5	GND Din0
6	GND Din0
7	Digital input 04
8	Digital input 05
9	Digital input 06
10	Digital input 07
11	GND Din1
12	GND Din1

X8: Pin	Connection
1	Digital input 08
2	Digital input 09
3	Digital input 10
4	Digital input 11
5	GND Din2
6	GND Din2
7	Digital input 12
8	Digital input 13
9	Digital input 14
10	Digital input 15
11	GND Din3
12	GND Din3

## 7.5.2 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“

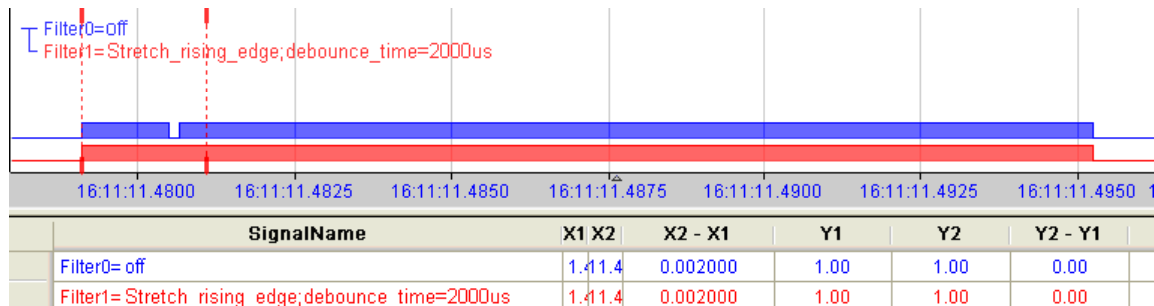
For each filter, a debounce time has to be defined in  $\mu\text{s}$ . This debounce time can have a value between  $[1\mu\text{s} \dots 65535\mu\text{s}]$ .

### Off

The measured input signal is transferred without filtering.

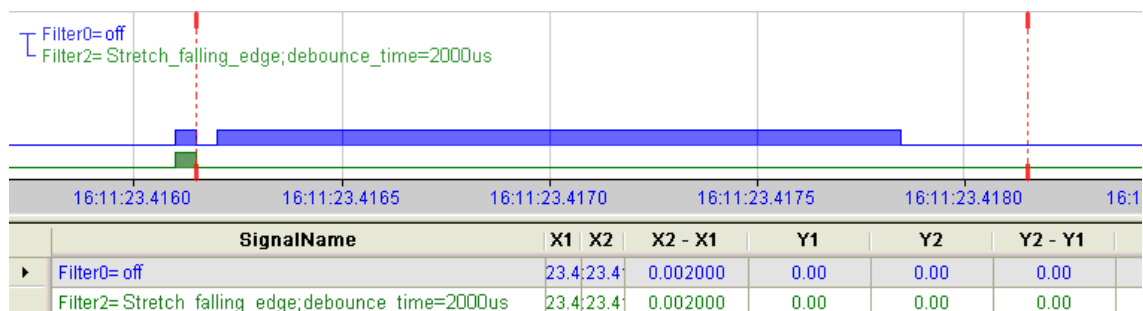
### „Stretch rising edge“

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.



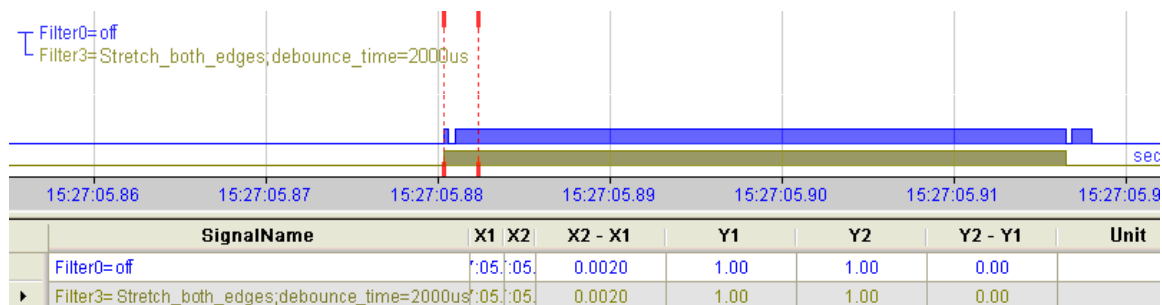
### „Stretch falling edge“

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.



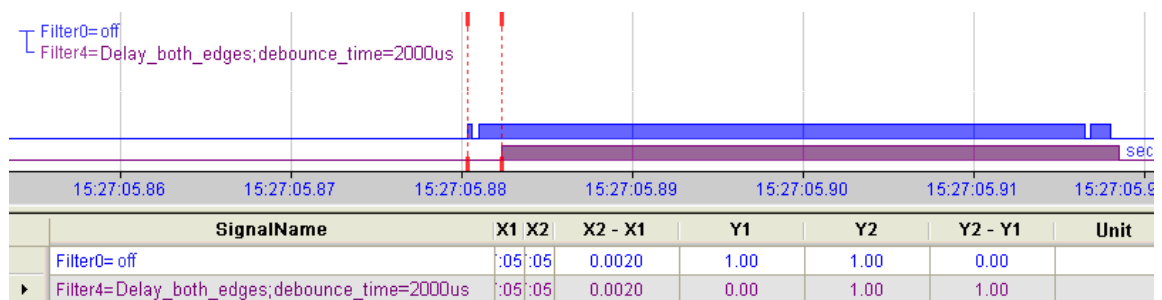
### „Stretch both edges“

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.



### „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.



## 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

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 software:

Restart device:

## 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

## 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

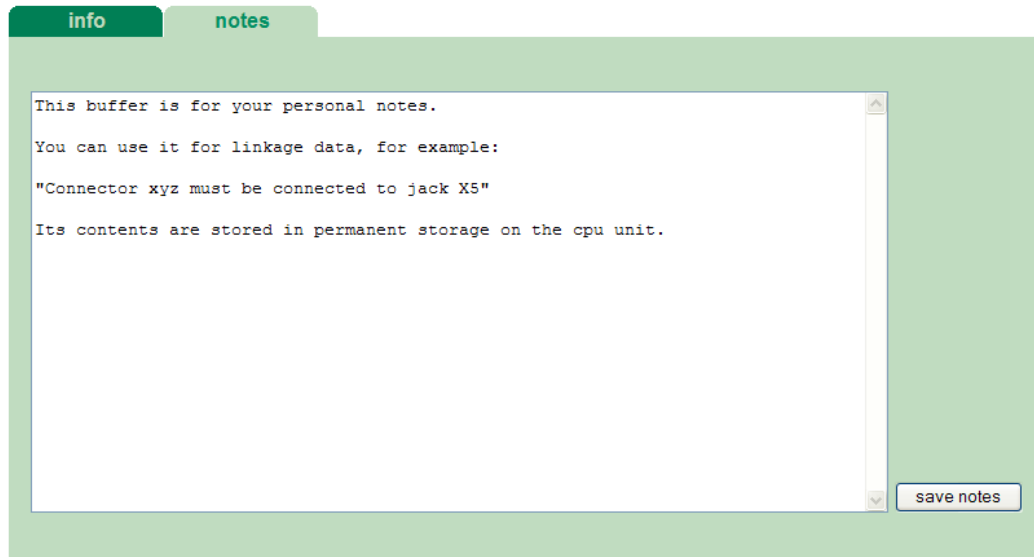
The „info“ tab displays general information and technical specifications of the I/O module.

info		notes
Serial number	001034	
Hardware version	B0	
Firmware version	E1	
Process-I/O		
digital input channels	16	
design	isolated groups of 4 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
digital output channels	16	
design	isolated groups of 4 channels, P switch	
nominal load voltage	24 (external per root)	V DC

### 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.



## 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.

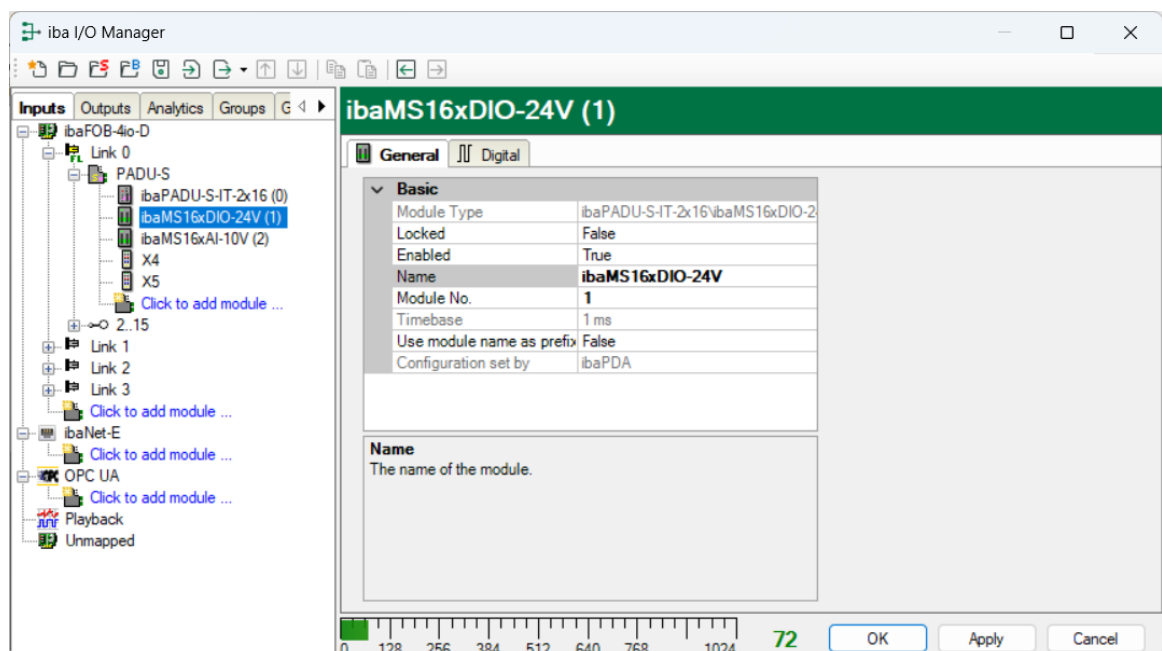


#### Other documentation

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

#### 9.1.1 General settings

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



#### 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. when printing and for 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

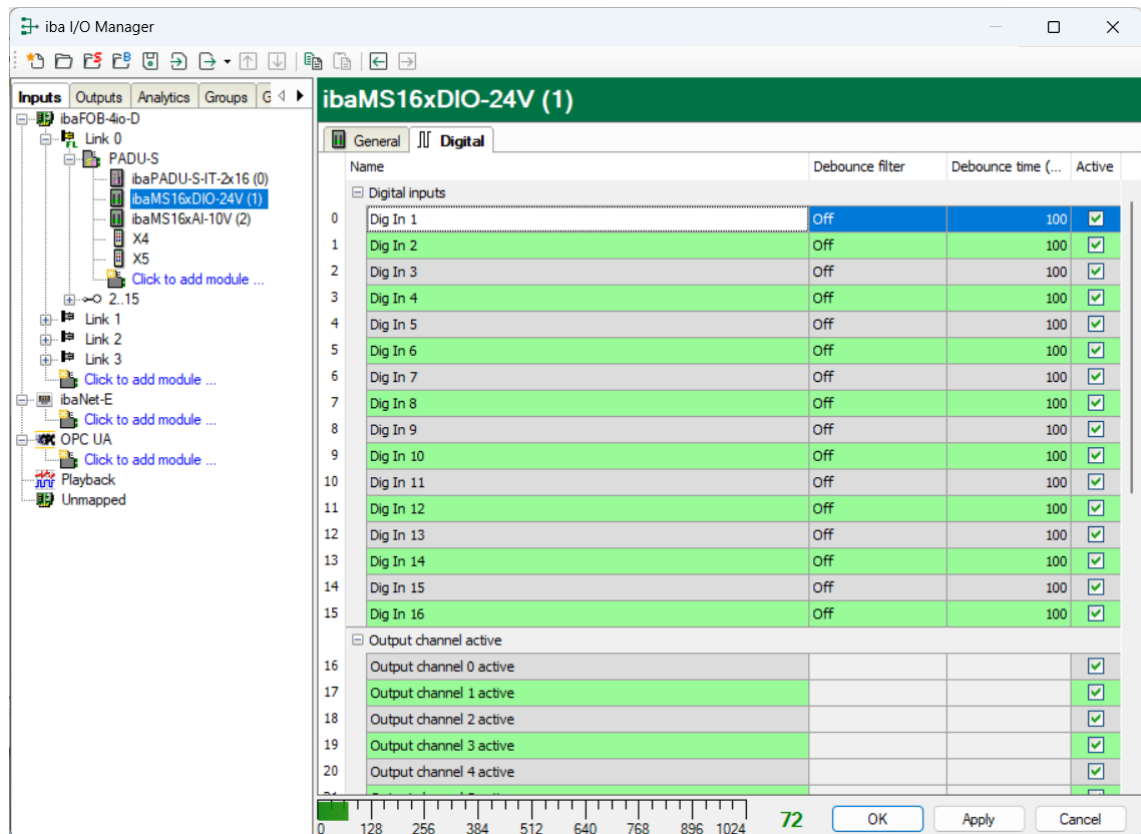
When embedded application is displayed, the configuration of the modules and signals is set by the embedded application on the device. In this case it is possible to import user-defined signal names, which are configured in the embedded application, provided that the embedded application supports this 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.

## 9.1.2 Input configuration

Select the „Hardware“ menu in order to configure settings for the input signals. The following settings apply to the “Digital” tab:

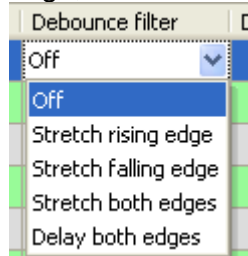


### ☐ Name

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.



➔ See chapter 7.5.2

### ☐ Debounce time (µs)

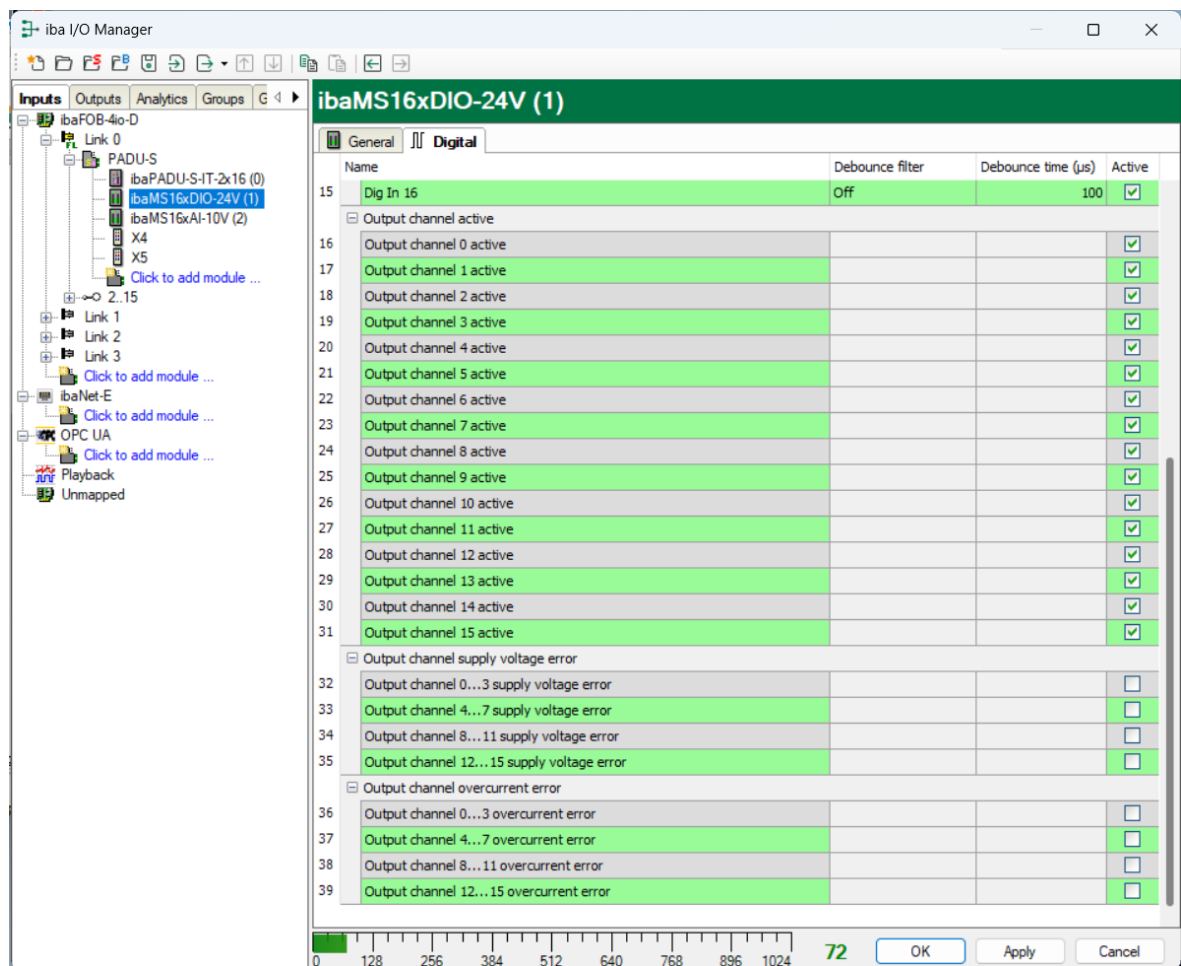
Here, you can define the debounce time in µs.

### ☐ Active


Enabling/disabling the signal

## Diagnostics channels

In the same „Digital“ tab, you can activate status and error information:



### ☐ Name

The signals have default names. You can edit the names and enter two additional comments (click on the  icon in the Name field).

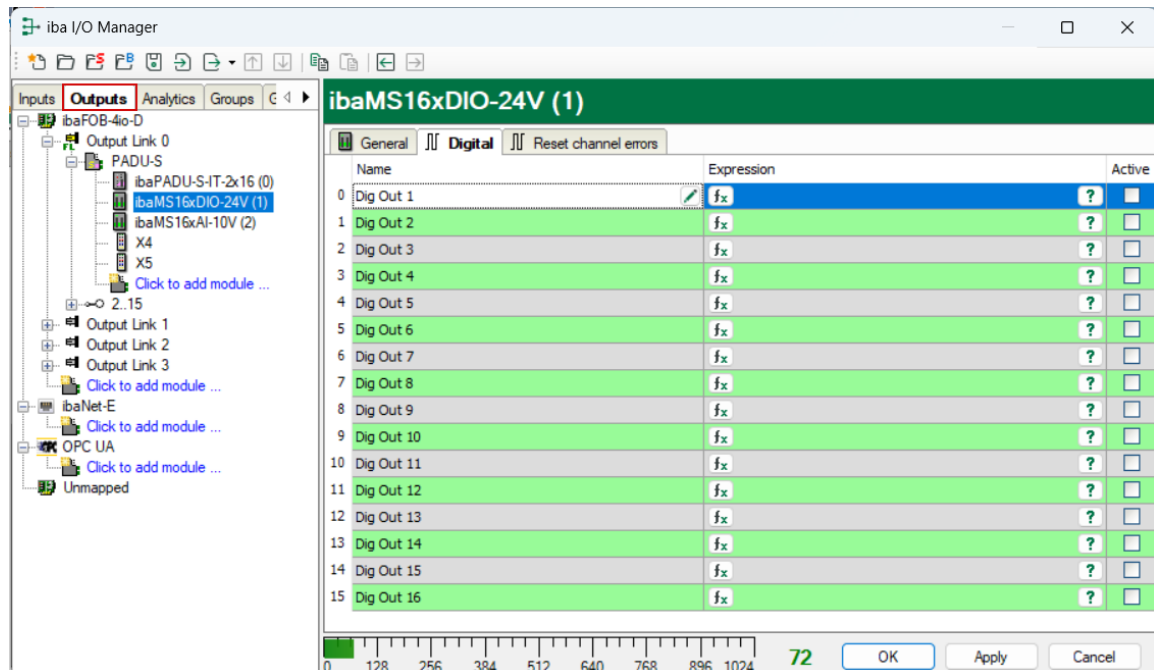
- Output channel [0...15] active  
status signal that indicates whether the output is active
- Output channel [...] supply voltage error  
status signal that indicates whether there is a supply voltage error on output channels (4 at a time)
- Output channel [...] overcurrent error  
status signal that indicates whether there is an overcurrent error on output channels (4 outputs of a root at a time).

### ☐ Active


Enabling/disabling the signal.

### 9.1.3 Output configuration


Select the „Outputs“ tab in order to configure the settings for the output signals. The following settings apply to the “Digital” tab:



#### □ Name

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

#### □ Expression

For each output you can specify a signal using the expression builder . Signals can be linked mathematically or physically.

#### □ Active

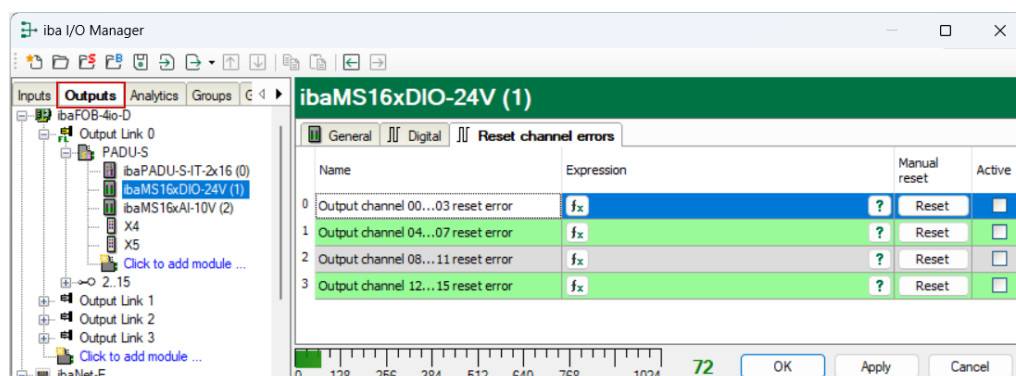
Enabling/disabling the signal.

### 9.1.4 Reset channel errors


In the “Outputs” menu, in the “Reset channel errors” tab, the hardware errors of the quad root of the outputs can be reset in two ways:

- Manually using the <Reset> button
- Automatically by an output signal


The following settings apply to the “Reset channel errors” tab:



☐ Name

The quad roots have default names, but you can edit the names and enter two additional comments (click on the  icon in the Name field).

☐ Expression

Using the expression builder  you can specify an output signal in order to reset a hardware error.

☐ Active

Enabling/disabling the signal.

## 9.2 Configuration in ibaLogic-V5

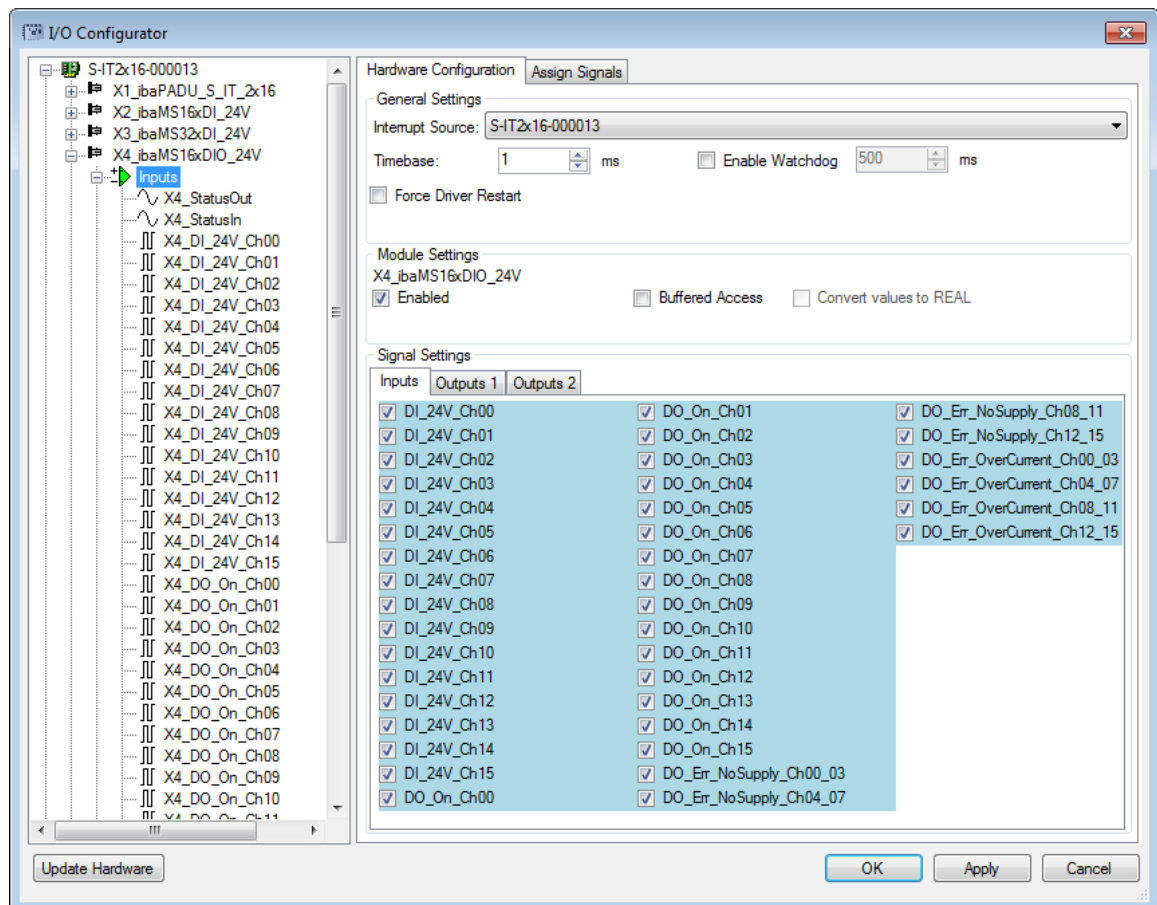


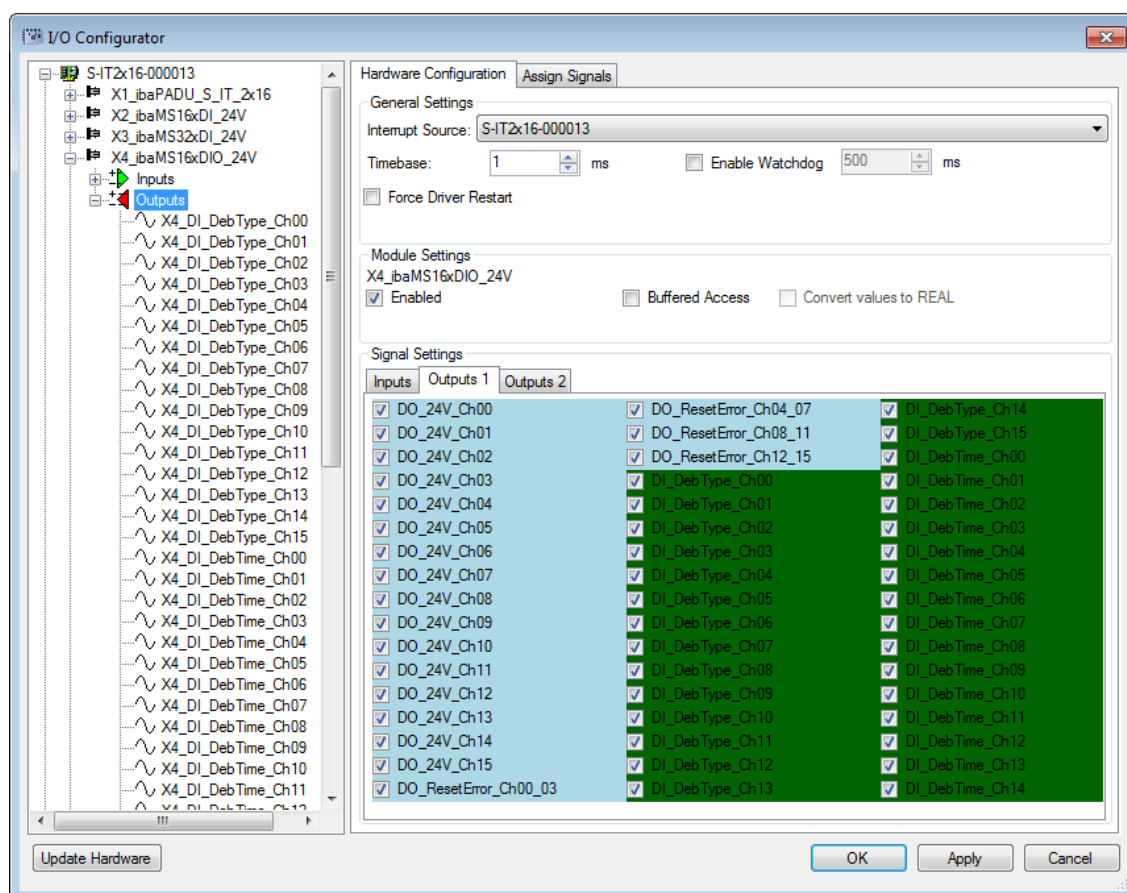
### Other documentation

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.





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
<b>Inputs</b>	
DI_24V_Ch[00...15]	Digital input signals
DO_On_Ch[00...15]	Digital outputs active
DO_Err_NoSupply_Ch[00_03...12_15]	Error in the supply voltage of a quad root
DO_Err_OverCurrent_Ch[00_03...12_15]	Quad root is in error state due to overcurrent
StatusIn	Status information about the plugged input module (for output module without function): 0 = Module not initialized 1 = Module running >1 = Error (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 = Error (e.g. module cannot be initialized)

<b>Outputs</b>	
DO_24V_Ch[00...15]	Digital output signals
DO_ResetError_Ch[00_03...12_15]	Output signal in order to reset a hardware error
DebType_Ch[00...15]	Debounce filter for digital signals
DebTime_Ch[00...15]	Debounce time for the single digital signal
<b>Additional signals for buffered access</b>	
BufferFillCount	Counter, when buffer is filled
BufferOverrun	Counter for Buffer-overrun
<b>Additional output signals for buffered access</b>	
BufferSize	Buffersize
SubSampling	Subsampling of the signals

### 9.2.2 Configuring the debounce filter

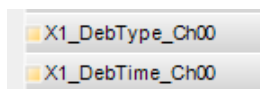
If you want to use debounce filters, these are made as configuration output and configured as Off-task connector (OTC) or function block.

Meaning of the outputs:

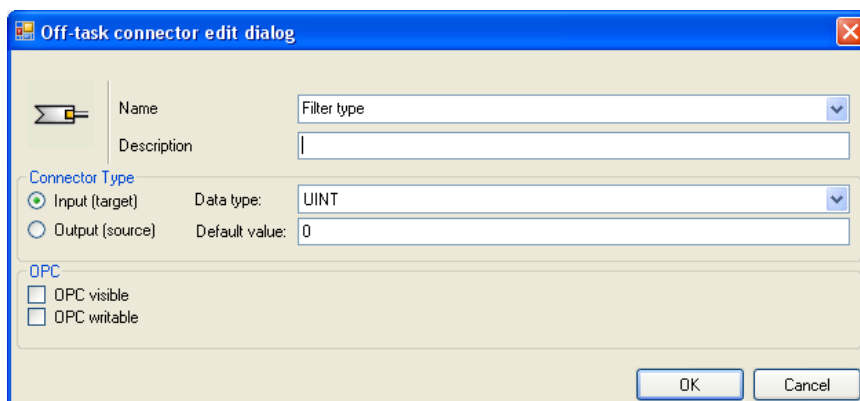
DebounceType\_Ch[00...15]: debounce filter for digital signals

DebounceTime\_Ch[00...15]: 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.



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.



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 7.5.2 „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  $\mu\text{s}$  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.



## 10 Technical data

### 10.1 Main data

Short description	
Name	ibaMS16xDIO-24V
Description	Mixed module with 16 digital inputs and 16 digital outputs
Order no.	10.124220
Power supply	
Power supply	DC 24 V, internal via backplane bus
Power consumption max.	7 W
Interfaces, operating and indicating elements	
Indicators (LEDs)	4 LEDs for device status 16 LEDs for status of the digital outputs 16 LEDs for status of the digital inputs
Operating and environmental conditions	
Temperature ranges	<div>Operation</div> 32 °F to 122 °F (0 °C to 50 °C) <div>Storage/transport</div> -13 °F to 149 °F (-25 °C to 65 °C)
Mounting	Vertical, plugged into backplane bus
Cooling	Passive
Humidity class	F, no condensation
Protection class	IP20
Certification/Standards	EMC: IEC 61326-1 FCC part 15 class A
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. box and documentation	1.54 lbs (0.7 kg) / 2.42 lbs (1.1 kg)

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

**Unique Identifier:** 10.124220 ibaMS16x-DIO-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](http://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 outputs

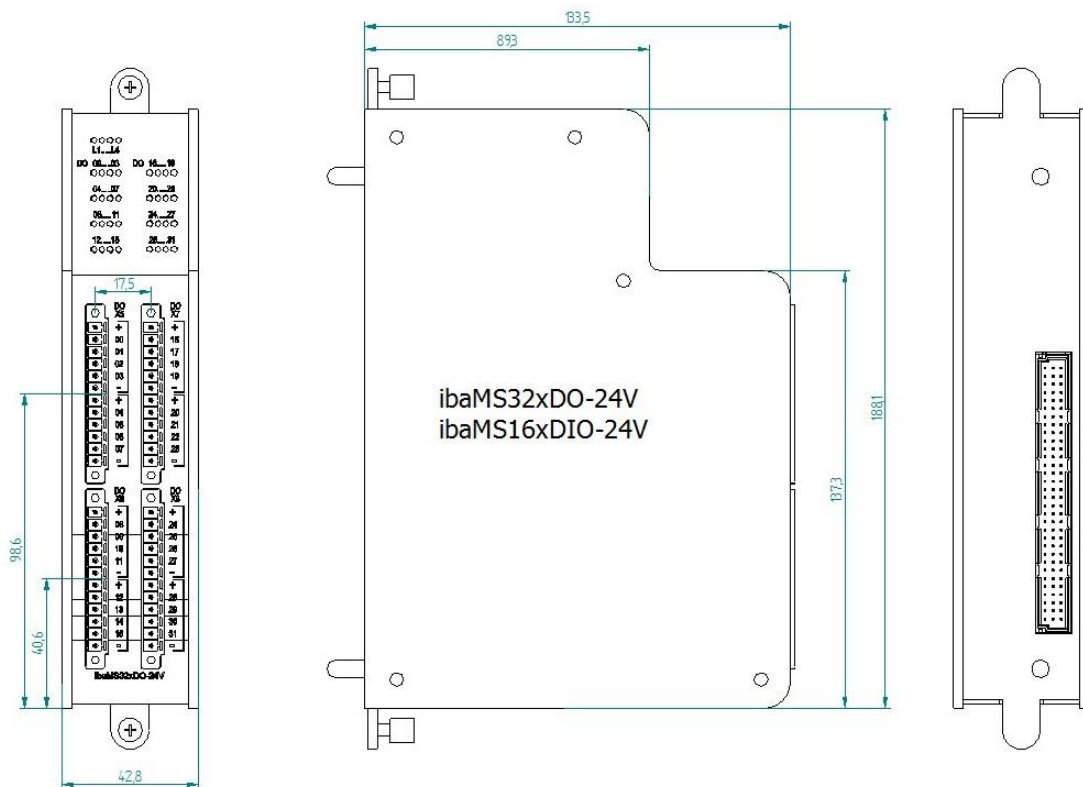
Number	16
Design	4 galvanically isolated roots with 4 outputs each, P switch
Load voltage	24 V DC, external per root, protected against reverse polarity
Load voltage range	+10 V ... +30 V
Switching voltage per channel	= load voltage
Switching current per channel	250 mA
Switching current range per channel	10 mA ... 500 mA
Inductive load	Up to 200 mJ
Switching frequency	Up to 40 kHz <sup>1</sup> , freely adjustable
Switching delay	
Switch-on delay (90% to 10%)	< 10 µs
Switch-off delay (10% to 90%)	< 10 µs at 24V DC switching voltage with 100 Ω load
Electrical isolation	
Root-root	AC 1.5 kV
Root-housing /power supply	AC 1.5 kV
Connector type	2 x 12-pin multi-pin connector; screw-type terminal (0.14 mm <sup>2</sup> to 1.5 mm <sup>2</sup> ), screw connection, included in delivery
<b>Protective functions</b>	
Safe state	Channel root switched-off
Current limitation	From approx. 0.6 A per channel The root switches to „safe state“, when connection is incorrect (resettable via software)

<sup>1</sup> deviating switching frequency with ibaLogic (up to 1 kHz) and ibaPDA (up to 20 Hz)

### 10.3 Digital inputs

Number	16
Design	4 galvanically isolated roots with 4 inputs each
Input signal	24 V DC
Max. input voltage	±48 V permanent
Signal level	log. 0 > -6 V; < +6 V log. 1 < -10 V; > +10 V
Hysteresis	Typ. 1 V
Input current	1 mA, constant
Debounce filter	Optional, 4 different operating modes
Sampling rate	Up to 40 kHz, freely adjustable
Frequency range	0 Hz ... 20 kHz
Delay	Typ. 10 µs
Electrical isolation	Root - root AC 1.5 kV Root - housing/power supply AC 1.5 kV
Connector type	2 x 12-pin multi-pin connector; screw-type terminal (0.14 mm <sup>2</sup> to 1.5 mm <sup>2</sup> ), screw connection, included in delivery

### 10.4 Dimension sheet



(Dimensions in mm)

## 11 Support and contact

### Support

Phone: +49 911 97282-14

Fax: +49 911 97282-33

E-Mail: [support@iba-ag.com](mailto:support@iba-ag.com)



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### Note

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

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### Contact

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**[www.iba-ag.com](http://www.iba-ag.com)**