

# ibaDig-40

Parallel A/D Converter Unit for Digital Signals



# Manual

Issue 1.6

Measurement and Automation Systems



## Manufacturer

iba AG  
Koenigswarterstr. 44  
90762 Fuerth  
Germany

## Contacts

Main office	+49 911 97282-0
Fax	+49 911 97282-33
Support	+49 911 97282-14
Engineering	+49 911 97282-13

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

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

This manual must not be circulated or copied, or its contents utilized and disseminated, without our express written permission. Any breach or infringement of this provision will result in liability for damages.

©iba AG 2009, All Rights Reserved

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>.

## Protection note

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

## Certification

The device is certified according to the European standards and directives. This device corresponds to the general safety and health requirements. Further international customary standards and directives have been observed.



Issue	Page(s)	Remarks	Date	Author	Check	Approval
1.6		Chapter Related Products removed	03/01/2012	st		

## Contents

<b>1</b>	<b>About this manual</b> .....	<b>5</b>
1.1	Target group.....	5
1.2	Notations.....	5
1.3	Used symbols.....	6
<b>2</b>	<b>Scope of Delivery</b> .....	<b>7</b>
<b>3</b>	<b>System Pre-Requisites</b> .....	<b>7</b>
3.1	Hardware.....	7
3.2	Software.....	7
<b>4</b>	<b>Product description</b> .....	<b>8</b>
4.1	Description.....	8
4.2	Properties.....	9
4.3	Device Views, Operating Elements and Connectors.....	10
4.3.1	Power Supply Connector (X14).....	11
4.3.2	Fiber Optic Ports RX (X11) and TX (X10).....	11
4.3.3	Setting the Device Address with S1 and S2 Decade Switches.....	11
4.3.4	Digital Inputs Terminal Blocks (X1, X2, X3, X4, X5).....	12
4.3.5	Run, Link and Error LED Indicators.....	12
4.3.6	LED Indicators for Digital Inputs 00...39.....	12
4.3.7	Service Interface (X12) and Firmware Update.....	13
4.3.8	Shield Connector for Physical Earth.....	13
<b>5</b>	<b>Mounting and Dismounting</b> .....	<b>14</b>
5.1	Mounting.....	14
5.2	Dismounting.....	14
<b>6</b>	<b>Device Parameters</b> .....	<b>15</b>
6.1	Modes of Operation.....	15
6.1.1	F-Mode.....	15
6.1.2	M-Mode.....	15
6.1.3	Synchronous Operation.....	15
6.1.4	Asynchronous Operation.....	16
6.2	Sampling Rate.....	16
<b>7</b>	<b>System Topologies</b> .....	<b>17</b>
7.1	Topologies in F-Mode.....	17
7.2	Topologies in M-Mode.....	18
<b>8</b>	<b>Data Selection for ibaDig-40</b> .....	<b>19</b>
8.1	Working with ibaPDA-V6.....	19
8.1.1	ibaDig-40 running in F-mode.....	19
8.1.2	ibaDig-40 running in M-mode.....	22
8.2	Working with ibaLogic (V3).....	25

8.2.1	Hardware Settings.....	25
<b>9</b>	<b>Working with ibaScope.....</b>	<b>28</b>
<b>10</b>	<b>Technical Data .....</b>	<b>29</b>
10.1	Main data .....	29
10.2	Binary inputs .....	30
10.3	Connectors, Switches and Indicators.....	30
10.4	Data Transmission (Fiber Optic) .....	31
10.5	Dimensional Drawing .....	32
<b>11</b>	<b>Support and Contact.....</b>	<b>33</b>

## 1 About this manual

This manual describes in detail the configuration and use of the device ibaDig-40. It serves both as a tutorial and a reference document.

### 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	Notation
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> + <Strg>
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.

---



---

#### **Important note**

Note if some special features must be observed, for example exceptions from the rule.

---



---

#### **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 Scope of Delivery

The scope of delivery for the ibaDig-40 device comprises the following components:

- ibaDig-40 device with 2-pole Phoenix terminal block
- ibaDig-40 manual
- 5 Phoenix terminal blocks for the binary channels

## 3 System Pre-Requisites

The following system environment and pre-requisites are required for operation of the device ibaDig-40.

### 3.1 Hardware

- IBM-compatible PC with at least:
  - 800 MHz Pentium III or better (for M-mode: 2 GHz P4 or better)
  - 128 MB RAM
  - 10 GB or more free hard disk space (for recorded data)
  - One free slot for ibaFOB card
- FO interface card in PC
  - ibaFOB-io-D
  - ibaFOB-4i-D
  - ibaFOB-4o-D

### 3.2 Software

- Online software for data acquisition
  - ibaPDA-V6
  - Signal manager (Soft-PLC) ibaLogic, V3.60 or higher (F-Mode)
  - ibaScope, Version 3.0.01 or higher, (F-Mode + M-Mode sync.) or
  - ibaChatter (iba America, LLC, [www.iba-ag.com](http://www.iba-ag.com))
  - d.mon (vatron, Austria, [www.vatron.com](http://www.vatron.com))
- Analysis software
  - ibaAnalyzer (V2.50 or higher)

## 4 Product description

### 4.1 Description

The ibaDig-40 device is a member of the ibaPADU family and designed for data acquisition of up to 40 digital signals at input levels up to DC  $\pm 48$  V and at sampling rates from 1 kHz to 25 kHz per channel.

The data measured by ibaDig-40 are transmitted over fiber optic links to an iba data acquisition system (ibaPDA, ibaScope) or an iba signal manager / soft PLC (ibaLogic). Due to its exclusive use of digital input signals the ibaDig-40 device has a strong advantage in combination with fault alarm and fault analysis systems. Particularly with regard to the search of the first event triggering a chain reaction, the combination of ibaDig-40 and the high resolution data acquisition system ibaPDA is a powerful tool.

Of course, ibaDig-40 works with ibaLogic and ibaScope as well.

The device has a switch for selecting one of two modes of operation:

- General data acquisition
- Special measuring applications

For general data acquisition the device ibaDig-40 is connected to a data acquisition system over a simplex fiber optic cable. The measured values are transmitted from the device to the acquisition PC with a preselected transmission rate of 3.3 Mbit/s. This mode of operation is called **F-mode**.

This mode is suitable for

- Measuring digital signals with sample rates up to 1 kHz (sample time 1 ms)
- General process data acquisition

For special measuring applications the ibaDig-40 is connected to a data acquisition system over a duplex fiber optic cable. By means of this duplex connection it is possible to transmit information to the ibaDig-40. This mode of operation is called **M-mode**.

Some applications in this mode are

- Measuring digital signals with sample rates up to 25 kHz (sample time 40  $\mu$ s)
- power switch plant monitoring
- Fault and event analysis

In M-mode up to one device can be connected to one fiber optic port and addressed via an ibaFOB-4i/4o combination or an ibaFOB-io card interface. When using an entire ibaFOB-4i-D card with 4 FO-links this mounts to a total of  $4 \times 40 = 160$  installed signals per card, operating in M-Mode.

In F-Mode up to  $4 \times 8 \times 40 = 1280$  signals may be acquired if 8 ibaDig-40 devices are connected to each FO-port in daisy-chain.

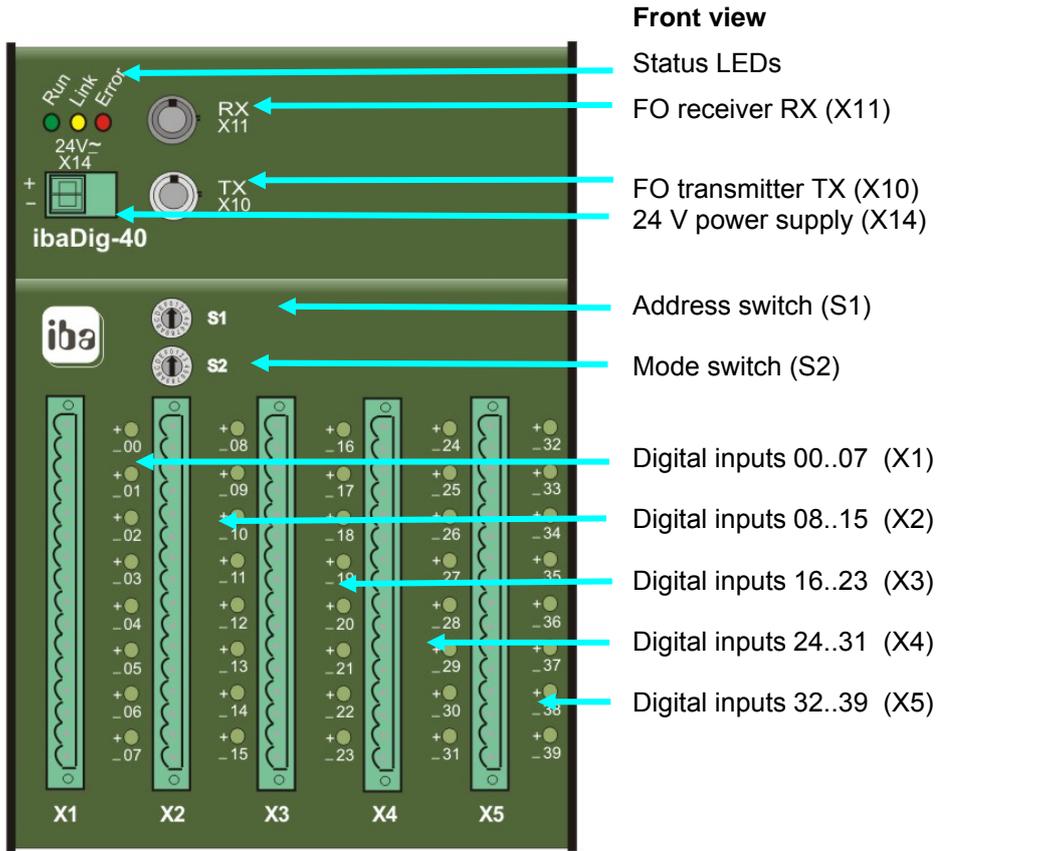
Thus, large amounts of signals over wide areas may be acquired e. g. for works-wide supervision of switchgear.

## 4.2 Properties

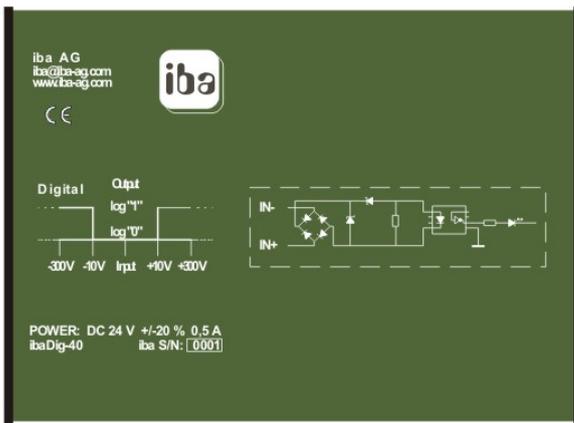
The ibaDig-40 has the following properties.

- ❑ DC 24 V unregulated external power supply (input level 18 V to 32 V possible)
- ❑ DIN-rail mountable, EMI protected, robust metal housing
- ❑ 3 LED device status indicators (Run/Link/Error)
- ❑ TX/RX fiber optic ports for transmission of measured data and reception of configuration requests as well as multiplexing of up to 96 devices
- ❑ Programmable sampling frequency (period)
  - Minimum 500 Hz (2 ms)
  - Maximum 25 kHz (40  $\mu$ s)
  - Sampling period increment of 50 nanoseconds
  - Common rate for all channels
- ❑ Data transmission rate
  - FOB-F-mode: 3.3 Mbit/s
  - FOB-M-mode: 5 Mbit/s
- ❑ 40 digital inputs 24 V, in 5 rows with 8 inputs each, galvanic isolation, with 40 status LEDs
- ❑ Maximum device communication speed of 200,000 samples per second (= 25 kHz per channel) with 40 digital signals
- ❑ RJ11 socket for local measurement by ibaPCMCIA-F interface card
- ❑ RJ45 socket for local measurements via TCP/IP (in preparation)
- ❑ 9-pole D-Sub connection as service interface for future firmware upgrades
- ❑ Shield terminal

### 4.3 Device Views, Operating Elements and Connectors



**Top view**  
Serial number and email support address



**Bottom view**  
Shield terminal (X29)  
RJ11 notebook computer socket (X9)  
RJ45 Ethernet socket (X22)  
Service interface (X12)

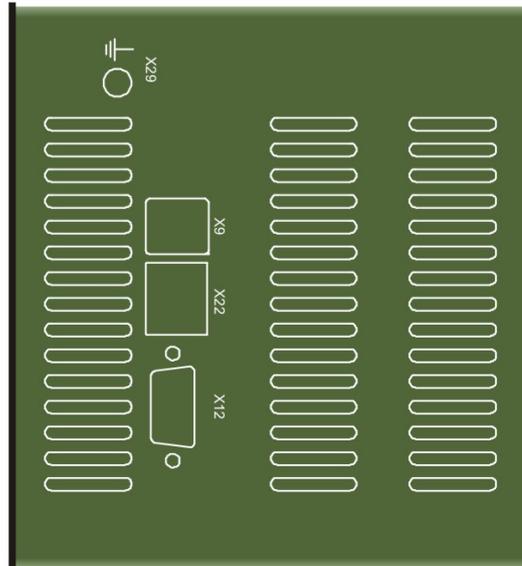


Figure 1: Device views

### 4.3.1 Power Supply Connector (X14)

Phoenix 2-pole terminal is used to connect DC 24 V  $\pm$ 10 %, 500 mA unregulated power. Pay attention to the polarity as marked on the device.

#### Power Supply

Pin	Function (X14)
1	+24 V
2	0 V

### 4.3.2 Fiber Optic Ports RX (X11) and TX (X10)

The 2 fiber optic ports are designed for fiber optic cables with ST connectors.

The TX port transmits the measured signals.

The RX port receives data from other devices, like ibaPADU, ibaFOB-io etc. Depending on the mode of operation the RX port serves different purposes:

- F-mode, daisy-chain with up to eight devices
  - In asynchronous operation the RX port of the first device in the chain is not connected. (see Figure 2, page 17)
  - In synchronous operation the RX port of the first device in the chain should be connected to the output of an ibaFOB-io (ibaFOB-4o) card, which will provide the synchronization clock (just by hardware, see Figure 3, page 17)
- M-mode, point-to-point connection
  - The RX and TX ports of the device should be connected to an out- and input of an ibaFOB-io card or an ibaFOB-4i- and ibaFOB-4o card combination (see Figure 4: System topology for continuous process monitoring)

### 4.3.3 Setting the Device Address with S1 and S2 Decade Switches

Using a precision screwdriver or other suitable instrument, turn the S1 decade switch to the ones digit of the desired device address and then turn the S2 decade switch to the corresponding "tens" digit of the desired device address. Please note that each switch has 16 positions (0...F) and the address will be given in hexadecimal code.

Switch S2	Switch S1	Mode	Address
0	0...F	<b>M</b>	00...15
1	0...F		16...31
2	0...F		32...47
3	0...F		48...63
4	0...F		64...79
5	0...F		80...95
7	1...8	<b>F</b>	1...8

Table 1: Switches for mode of operation and address

The table shows that the switch S2 should always be in position 7 for operating in F-mode. If operating in M-mode together with ibaScope, both switches should be set to position 0.

#### 4.3.4 Digital Inputs Terminal Blocks (X1, X2, X3, X4, X5)

Pin	Digital inputs				
	X1	X2	X3	X4	X5
1	DI 00 +	DI 08 +	DI 16 +	DI 24 +	DI 32 +
2	DI 00 -	DI 08 -	DI 16 -	DI 24 -	DI 32 -
3	DI 01 +	DI 09+	DI 17 +	DI 25 +	DI 33 +
4	DI 01 -	DI 09-	DI 17 -	DI 25 -	DI 33 -
5	DI 02 +	DI 10 +	DI 18 +	DI 26 +	DI 34 +
6	DI 02 -	DI 10 -	DI 18 -	DI 26 -	DI 34 -
7	DI 03 +	DI 11 +	DI 19 +	DI 27 +	DI 35 +
8	DI 03 -	DI 11 -	DI 19 -	DI 27 -	DI 35 -
9	DI 04 +	DI 12 +	DI 20 +	DI 28 +	DI 36 +
10	DI 04 -	DI 12 -	DI 20 -	DI 28 -	DI 36 -
11	DI 05 +	DI 13 +	DI 21 +	DI 29 +	DI 37 +
12	DI 05 -	DI 13 -	DI 21 -	DI 29 -	DI 37 -
13	DI 06 +	DI 14 +	DI 22 +	DI 30 +	DI 38 +
14	DI 06 -	DI 14 -	DI 22 -	DI 30 -	DI 38 -
15	DI 07 +	DI 15 +	DI 23 +	DI 31 +	DI 39 +
16	DI 07 -	DI 15 -	DI 23 -	DI 31 -	DI 39 -

#### 4.3.5 Run, Link and Error LED Indicators

LED	Status	Indication
Run (green)	Blinking	Power is on and device is healthy
	Off	Insufficient power or device failure
Link (yellow)	On in M-mode	Data is being received on FO-link
	Blinking in M-mode	Connection broken
	Blinking in F-mode	Device is sending data
	Off	No incoming data stream (PC not active or previous device in the chain out of order)
Error (red)	On	Device error
	Off	Device healthy, LED automatically resets when error condition ends

#### 4.3.6 LED Indicators for Digital Inputs 00...39

LED	Status	Indication
n : (green)	ON	Digital input TRUE (logical „1“)
	OFF	Digital input FALSE (logical „0“)

n = 00 ...39

### 4.3.7 Service Interface (X12) and Firmware Update

A 9-pin D-Sub port, found on the bottom side of the device, may be used to load new firmware for the device via a V.24-cable.

**Note**

If a firmware update was required please contact iba support. You will get the needed software and further information.

---

**Important note**

Under normal service conditions, the V.24 cable must not be connected.

---

### 4.3.8 Shield Connector for Physical Earth

Proper connection of cable shielding to the device should be ensured. The shield connector is located on the bottom side of the device.

**Note**

Always ground the DIN-rail on which the device is installed.

---

## 5 Mounting and Dismounting

### 5.1 Mounting

Locate the DIN-rail mounting clip on the rear side of the device. Place the device on the DIN-rail so that the top part of the mounting clip engages the top part of the rail appropriately. Slowly push down and in so that the bottom part of the mounting clips snaps onto the bottom part of the rail and firmly fixes the device to the DIN-rail.

Once fixed, connect the DC 24 V power supply to the termination shown on the device. Ensure that the polarity is correct prior to applying power. Finally, connect fiber-optic cable to the TX/RX ports as shown on the device so that the fiber-optic connection is completed. See System Topologies for further details.

### 5.2 Dismounting

Disconnect all external connections from the device. Grasp the device with one hand firmly on the top side. With your free hand, grasp the bottom of the device so that your index and middle fingers rest on the grounding screw. Lightly push down with the hand on the top side of the device and simultaneously pull forward with your other hand. With this action, the device should free itself from the DIN-rail.

## 6 Device Parameters

### 6.1 Modes of Operation

As mentioned at the beginning of this manual the ibaDig-40 device can operate in two modes:

- F-mode
- M-mode

#### 6.1.1 F-Mode

F-mode is the appropriate mode of operation for measurements with the usual iba acquisition devices such as ibaPADU-8, -16, -32, ibaLink-SM-64 io, ibaLink-SM-128V-i-2o, ibaNet750-BM etc.

The highest sample rate is 1 kHz (1 ms). The iba software applications ibaPDA, ibaQDR, ibaLogic and ibaScope can be used. Only asynchronous or externally synchronized operation is permitted.

In F-mode up to eight devices can be connected in a daisy-chain along one FO-link.

In asynchronous operation the RX port of the first device in the chain is not connected to the acquisition system. (see 7.1, Figure 2)

In (external) synchronous operation the RX port of the first device in the chain should be connected to the output of an ibaFOB-io or ibaFOB-4o card, which will provide the synchronization clock (just by hardware, see 7.1, Figure 3)

#### 6.1.2 M-Mode

M-mode is the appropriate mode of operation for fast data acquisition at sample rates up to 25 kHz (40 ms). This mode of operation can only be used with ibaFOB-4i/-io cards (release HWD0/FWD4 or later) and the devices ibaPADU-16-M-2, ibaPADU-8-S, ibaPADU-8-M, ibaPADU-8-ICP or ibaDig-40. Currently, M-mode is supported by ibaScope only, including the synchronization of multiple acquisition systems.

Working in M-mode always requires a bidirectional link between device and acquisition system.

A further distinction is whether the data acquisition should be performed synchronized or not.

#### 6.1.3 Synchronous Operation

Synchronous means that the clock for data acquisition is not provided by the device itself but by an external source like hardware or software. An external source can send a synchronizing clock or synchronizing message to ibaDig-40.

In order to synchronize the device there should be an ibaFOB output board installed in the PC of the acquisition or control system. The output link should be connected to the RX port of ibaDig-40.

There are two kinds of synchronization which have to be distinguished:

- The hardware-based, so called external synchronization
- The software-controlled, direct synchronization over a bidirectional connection

The external synchronization applies to F-mode only. The first output link of an ibaFOB-4o or ibaFOB-io card should be connected to the RX port of the ibaDig-40 device. If a daisy-chain of up to eight devices is installed, the first device in the chain should be connected. In order to synchronize multiple devices or chains in parallel, the one output link should be multiplied by use of an ibaBM-FOX-i-3o. The synchronization signal in fact is the output telegram, generated by the ibaFOB output card. (see Figure 3, page 17) This kind of synchronization can be used in F-mode with all iba software applications because it is software independent.

The direct synchronization applies to the M-mode only and is supported by ibaScope only. In order to realize the direct synchronization each ibaDig-40 (no chains!) should be connected over a bidirectional link (RX and TX port) to a corresponding pair of input and output ports of an ibaFOB-io or ibaFOB-4i/-4o card.

### 6.1.4 Asynchronous Operation

When working in asynchronous operation no external source of synchronization will be connected to the device. ibaDig-40 sends the measured data in its own sampling cycle to the acquisition system and the software uses its own cycle to read the data from the memory of the ibaFOB card. The asynchronous operation is supported in F-mode by the software applications ibaPDA, ibaQDR, ibaLogic and ibaScope, in M-mode not yet.

Working in synchronous or asynchronous operation depends on the availability of a synchronizing link, the kind of software application and whether F-mode or M-mode is selected.

	F-Mode	M-Mode
ibaPDA	Async. 1 kHz	
	Ext. sync. 1 kHz	
ibaLogic	Async. 1 kHz	
	Ext. sync. 1 kHz	
ibaScope	Async. 1 kHz	
	Ext. sync. 1 kHz	Sync. 0.5 kHz to 25 kHz

Table 2: Software applications and applicable modes of operation

## 6.2 Sampling Rate

The sampling rate can be programmed for each device. The setting is done by the connected system (ibaPDA, ibaLogic or ibaScope) via the ibaFOB interface.

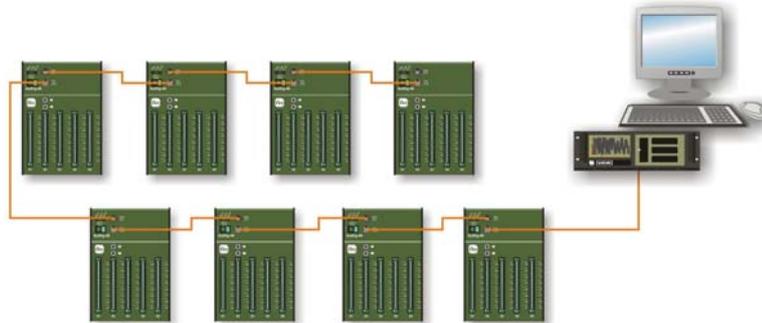
The sampling rate can be adjusted in steps of 50 nanoseconds from 40  $\mu$ s (25 kHz) to 2 ms (500 Hz) in M-mode and from 1 ms (1 kHz) to 1000 ms (1 Hz) in F-mode. The chosen sample rate is then common for all channels of the device.

## 7 System Topologies

For simplification purposes "ibaFOB cards" will be taken as synonym for the types ibaFOB-4i- + ibaFOB-4o and ibaFOB-io- in the following.

### 7.1 Topologies in F-Mode

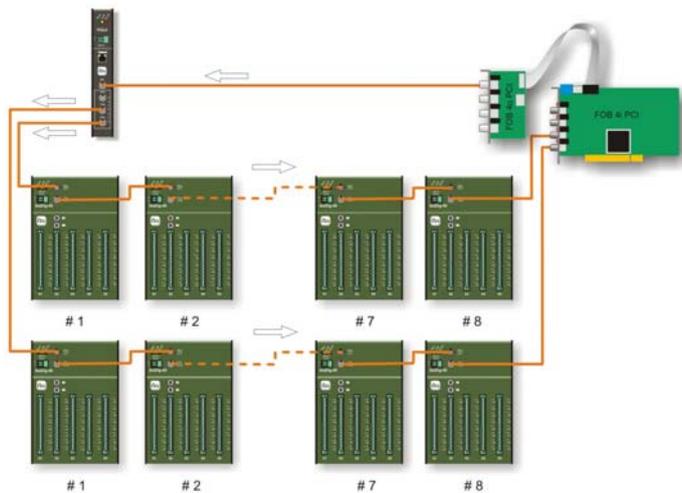
#### Example 1: Homogenous ibaDig-40 chain in F-mode (asynchronous)



8 devices in a daisy-chain.  
 Each device must have its unique number/address.  
 In case of ambiguous numbers the device closest to the ibaFOB card overwrites data from previous devices of the same address.

Figure 2: ibaDig-40 in daisy-chain, no synchronization

#### Example 2: External synchronization of multiple ibaDig-40 chains



The first FO-output port on the ibaFOB card provides the sample clock for the chains, e. g. 3.3 Mbit/s.

ibaBM-FOX-i-3o multiplies the FO signal for all connected chains.

The TX port of the last device of each chain is connected to a FO-input on an ibaFOB card.

The deviation in synchronization between different links is less than 2µs.

This mode is supported by all iba software applications and all devices of ibaPADU family and ibaDig-40 (except ibaPADU-8-O).

No further settings for ibaDig-40 are required.

Figure 3: ibaDig-40 chains with external synchronization



## 8 Data Selection for ibaDig-40

### 8.1 Working with ibaPDA-V6

Digital signals from an ibaDig-40 device running in F-mode or M-mode can be acquired by ibaPDA-V6.



#### Important note

The device ibaDig-40 is available in the I/O manager as a module “Dig40” for operation in F-mode only. For operation in M-mode another configuration is required as described in chapter 8.1.2.

#### 8.1.1 ibaDig-40 running in F-mode

For connecting ibaPDA-V6 to an ibaDig-40 device running in F-mode an ibaFOB-io-D, -2io-D or ibaFOB-4i-D + ibaFOB-4o-D card should be installed in the PC, respectively an ibaPCMCIA-F or ibaFOB-io-ExpressCard in a notebook computer.

In the I/O manager of ibaPDA-V6 a module of type “Dig40” should be added to the corresponding “Link x” of the ibaFOB card. If a connected and active ibaDig-40 was not detected automatically you may add the device in the I/O manager in the tree view by a right mouse click on the desired link, following the shortcut menu down to “Dig40”. Or click on the blue line “Click to add module...” and choose “Dig40” from the list.

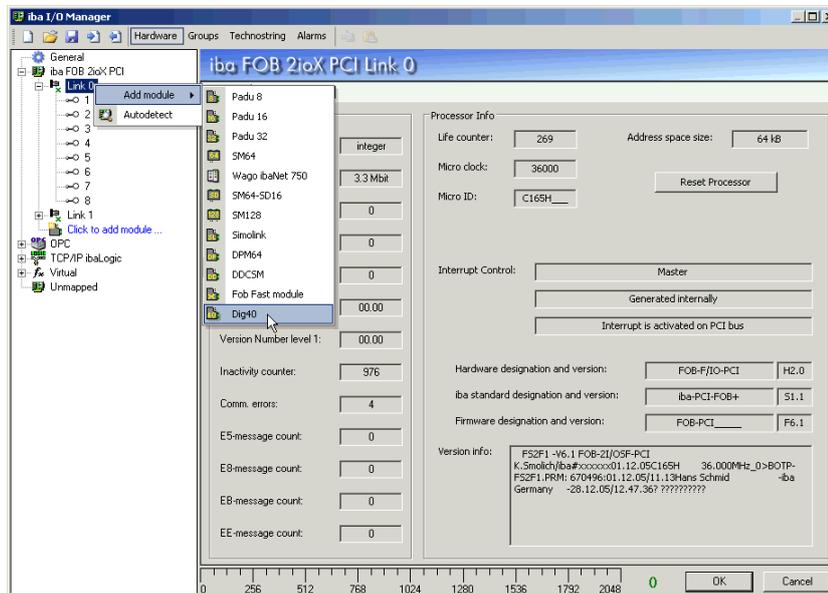


Figure 5: I/O manager - Add module

Then mark the “Dig40” icon in the signal tree and make the general module settings under the tab “General”.

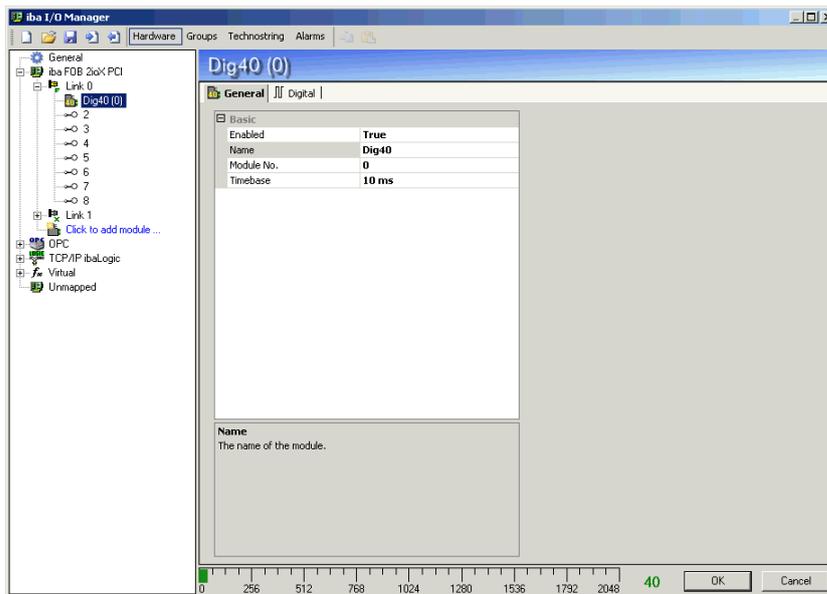


Figure 6: I/O manager - General mode settings

#### Enabled

With selection of one of the options in the drop-down list in the field next to “Enabled” you decide whether this module is to be enabled (True) or disabled (False). If a module is disabled then its signals are excluded from acquisition. Thus, they are available neither for display nor for recording. Furthermore, the number of signals from a disabled module will not be taken into account in the signal statistics (signal-o-meter).

#### Name

In the field next to “Name” enter a comprehensive name for the module.

It is recommended to use an application-specific nomenclature for a better clearness and comprehension, particularly with vast numbers of modules. The name may refer to a technological purpose or a special location in the plant, where the module is used or installed.

The number of characters in the name is unlimited. The name of the module is stored in the data file and visible in ibaAnalyzer.

#### Module No.

In the field next to “Module No.” you may enter a module number (= module index). When adding modules to the configuration the system gives numbers automatically in a chronological order. However, you may prefer a different order later in the data file for analysis. Feel free to change the module number according to your needs. The module number determines the order in the signal tree in ibaAnalyzer.

For the module type TCP/IP ibaLogic the module number must match the module index as configured in the ibaLogic application.

#### Timebase

In the field next to “Timebase” you may enter a time value, given in ms, which is an integer multiple of the general timebase as configured in the “General” branch of the I/O manager tree. All signals of the module will then be sampled on this timebase. The ratio between max. and min. timebase for all modules is limited to 1000. The timebase value is limited to 1000 ms.

Finally, click on the tab “Digital” and edit the signal table.

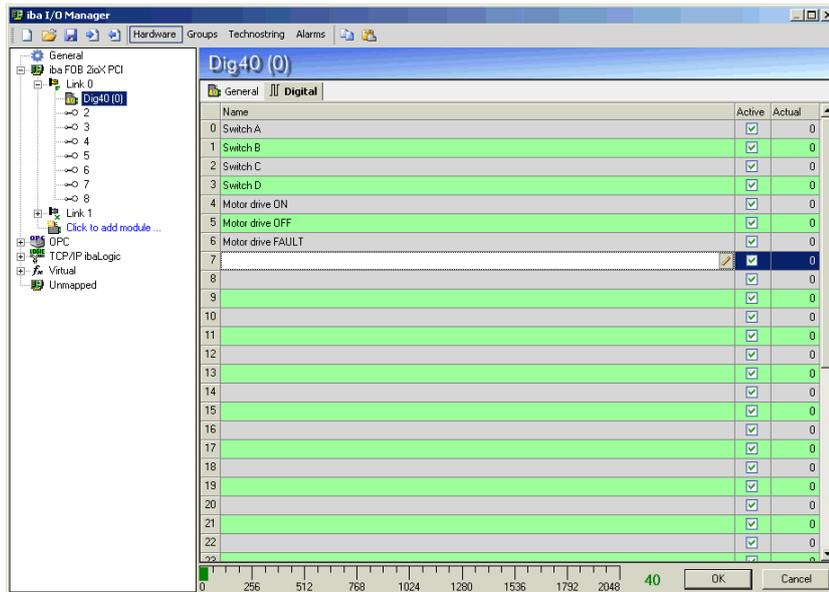


Figure 7: I/O manager - signal table "Digital"

Name

In the "Name" column enter a comprehensive name for each signal.

It is recommended to use an application-specific nomenclature for a better clearness and comprehension, particularly with vast numbers of signals. The name may refer to a technological purpose, the module name or a special location in the plant, where the signal comes from.

The number of characters in the name is unlimited. The names of the signals are stored in the data file and visible in ibaAnalyzer.



**Tip**

A useful feature is the automatic fill function: If you enter a signal name and click on the column header as long as the cursor is still in the name field then all empty fields below will be filled with that name. If the name is ending with a number you will get names with an increasing number like an index. You may use this function in any row of the table. Fields which already has names won't be overwritten.

Active

Activation of signals

A click on the column heading "Active" enables (checkmark) and disables (no checkmark) all the signals at the same time. Individual signals can be activated in the signal-specific activation box. No acquisition takes place for channels which are not activated, so that such channels are available neither for display nor for storage.

Furthermore, disabled signals will not be taken into account in the signal statistics (signal-o-meter).

**Tip**

In order to enable or disable signals just check the box in the first row of the table and click on the Active column caption. Every time you want to change the activation of multiple signals, no matter if from the beginning or somewhere in the middle of the table, just change the activation of the first signal of this group and click on the column caption. All activations for the signals below the one you've changed will switch accordingly.

Entries - such as names or engineering units - remain, however. They are available again right after reactivation of a signal.

 Actual (Value)

The fields in this column show the actual value of the signals. Even if the acquisition is not running yet the actual value may be displayed if the hardware is already connected and working (diagnostic feature).

For digital signals only the values 0 and 1 are permitted.

**Other documentation**

For more information about setting up and working with ibaPDA-V6, please refer to the ibaPDA-V6 manual or online help.

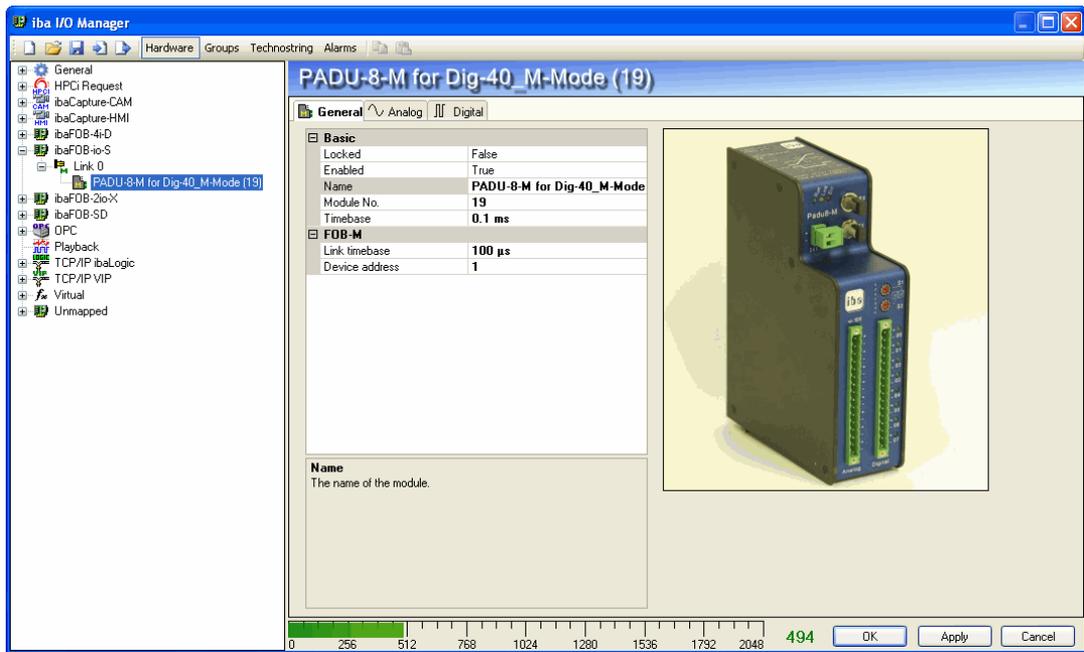
### 8.1.2 ibaDig-40 running in M-mode

For connecting ibaPDA-V6 to an ibaDig-40 device running in M-mode an ibaFOB-io-D, -2io-D or ibaFOB-4i-D + ibaFOB-4o-D card should be installed in the PC, respectively an ibaFOB-io-ExpressCard in a notebook computer.

**Tip**

Due to the fact that the ibaFOB card is set automatically to F-mode (3.3 Mbit/s) when selecting a module "Dig40" another way of configuration is required.

Instead of a module "Dig40" select a module „PADU-8-M“ in the I/O manager.



The digital signals measured by the ibaDig-40 device are packed for transmission in the same area of the ibaNet telegram where usually the first and second analog value of the ibaPADU-8-M is allocated.

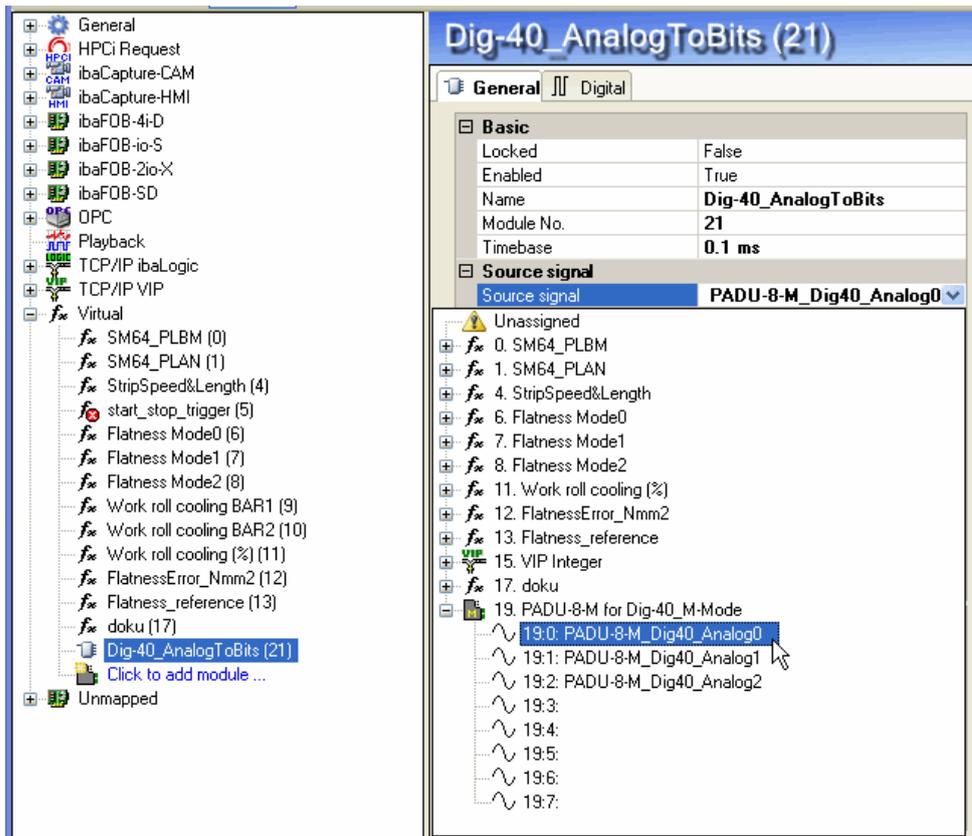
- Bit 0 to 15            Analog value 0
- Bit 16 to 31         Analog value 1
- Bit 32 to 39         Digital value 0 to 7

Thus, the first two analog signals in the PADU-8-M module’s signal table should be used:

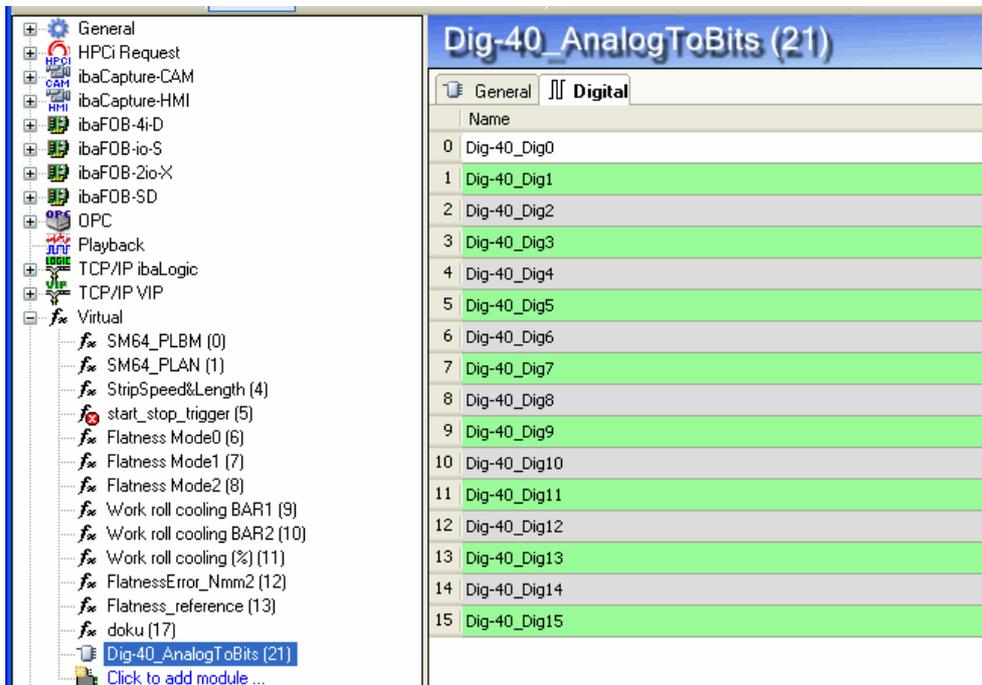


In order to display the digital signals in ibaPDA correctly, 2 modules “16 bit decoder” should be added beneath the interface “Virtual”.

The source signal for each of these modules should be the corresponding analog signal (0 and 1) of the PADU-8-M module.



After, the digital signals are available in the virtual module.



## 8.2 Working with ibaLogic (V3)

ibaLogic can acquire signals with sample rates either up to 1 kHz in F-mode or up to 25 kHz in M-mode with ibaDig-40.

The input signals are linked to the FOB-F/FOB-IO input resources like for any ibaPADU device.

In the following only the basic settings are described.

### 8.2.1 Hardware Settings

The connection between ibaDig-40 and the software application on the PC is the iba-FOB-io-S or the ibaFOB-4i-S (+ibaFOB-4o-S) board.

#### Mode of Operation FOB-F

The mode of operation is set by software means. In ibaLogic there are corresponding dialogs.

Menu "File - System Setup - FOB-IO / FOB-M"

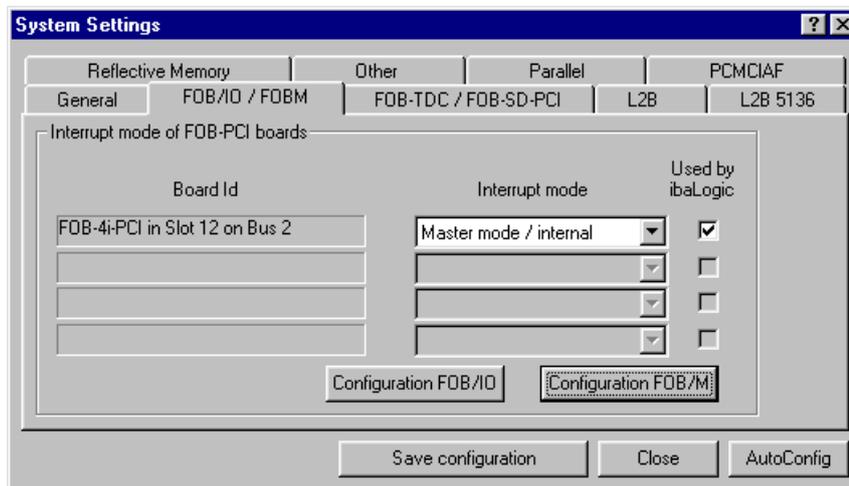


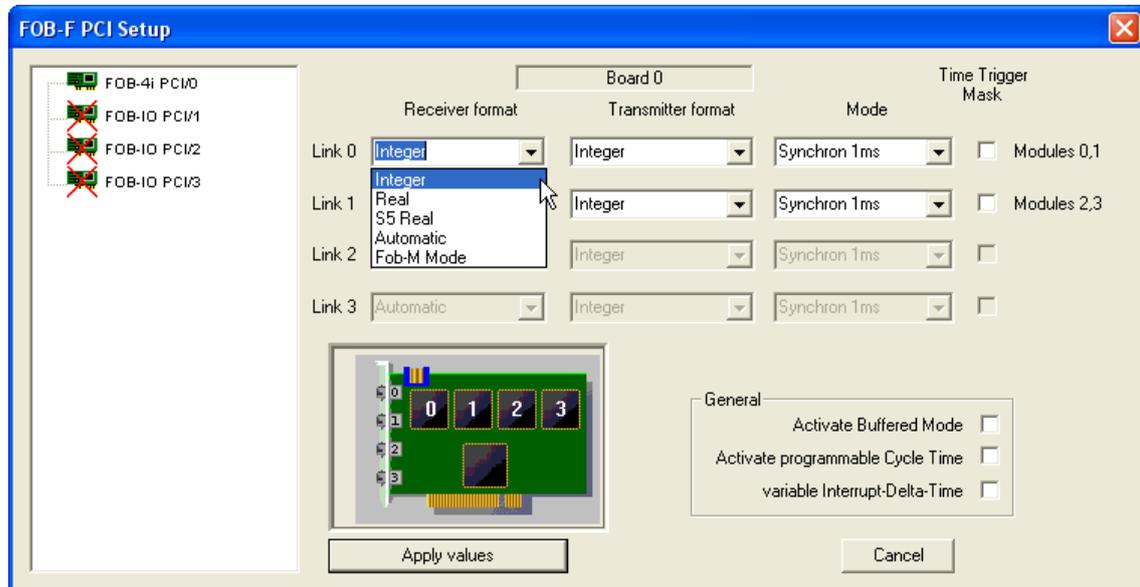
Figure 8: System settings

The checkbox "Used by ibaLogic" must be checked for ibaFOB card which is connected to the ibaDig-40.

Then click on button <Configuration FOB I/O> to open the setup dialog for the ibaFOB card.

Select the corresponding ibaFOB card in the tree on the left side. On the right side you see the settings of the selected card. Choose the line of the link which is connected to the ibaDig-40 and make the settings in the fields for both “Receiver Format” and “Sender Format” as follows.

For operation in F-mode select “Integer” from the drop-down list.



For operation in M-mode select “Fob-M Mode” from the drop-down list.

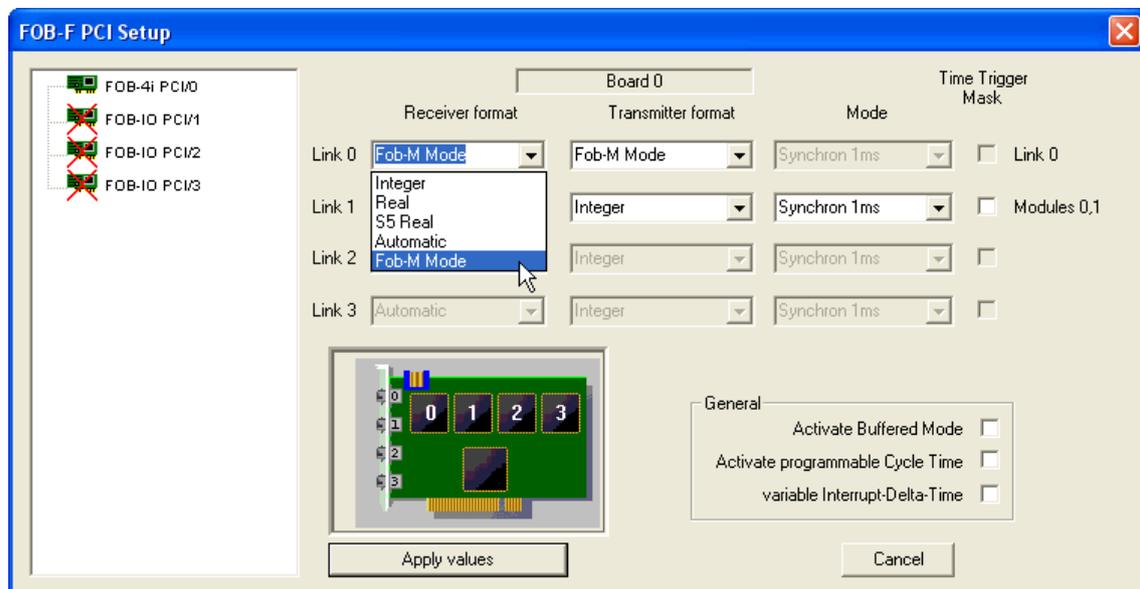


Figure 9: I/O manager - Configuration FOB I/O

Then click on <Apply values> button.

**Tip**

You will get into the same dialog via menu File - PCI-Configuration - FOB-IO-PCI Link Settings. Instead of the <Apply values> button you will find the button <Save configuration> which in fact has the same function.

---

**Other documentation**

For more information about setting up and working with ibaLogic, please refer to the ibaLogic manual.

---

## 9 Working with ibaScope

If you want to measure data with high sampling rates (25 kHz) by ibaDig-40 and ibaScope you should configure the system as follows.

Because ibaDig-40 is not available in the device selection dialog of ibaScope, you should use a trick.

Select the device ibaPADU-8-M from the combo-box in the configuration dialog.

Then create a virtual device whose input signals are actually the first three analog signals Analog 0, 1 and 2 of the supposed ibaPADU-8-M.

The three, or better the  $2 \frac{1}{2}$  16 bit analog values are taken as containers for the 40 bits of the ibaDig-40.

Thus, each of these three analog values must be converted into 16 digital signals in order to display and record them separately.

## 10 Technical Data

### 10.1 Main data

Order number iba	16.120500
Manufacturer	iba AG
Sampling rate	Max. 1,000 samples/s (F-mode) Max. 25,000 samples/s (M-mode)
EMI test parameters	EN 61000-6-2 EN 61000-6-3
Safety in compliance with EN 61010-1	Digital inputs: acc. to CAT II at AC 250 V
Operating temperature	32 °F to 122 °F (0 °C to 50 °C)
Storage temperature	-13 °F to 158 °F (-25 °C to 70 °C)
transport temperature	-13 °F to 158 °F (-25 °C to 70 °C)
Cooling	Self cooling
Mounting	On DIN-rail, snap-on
Humidity Class	F no moisture
Protection Class	IP20
Power supply	DC 24 V ±10 % non stabilized
Power/Current consumption	Max. 500 mA (typical 350 mA) ±20 %
Length of fiber optics between devices	Max. 6.560 ft (2000 m)
Dimensions (W x H x D)	4.96 in x 7.36 in x 6.10 in (126 mm x 187 mm x 155 mm) incl. DIN-rail clip
Weight (incl. packaging and documentation)	53 oz (1500 g)

## 10.2 Binary inputs

Number	40	
Input level	logical 0: < 10 V abs. logical 1: <-10 V, > +10 V (max. ±48 V)	
Max. input level	DC ± 48 V	
Input current	1 mA	
Galvanic isolation	Channel-Channel	1.5 kV
	Channel-Device ground	1.5 kV

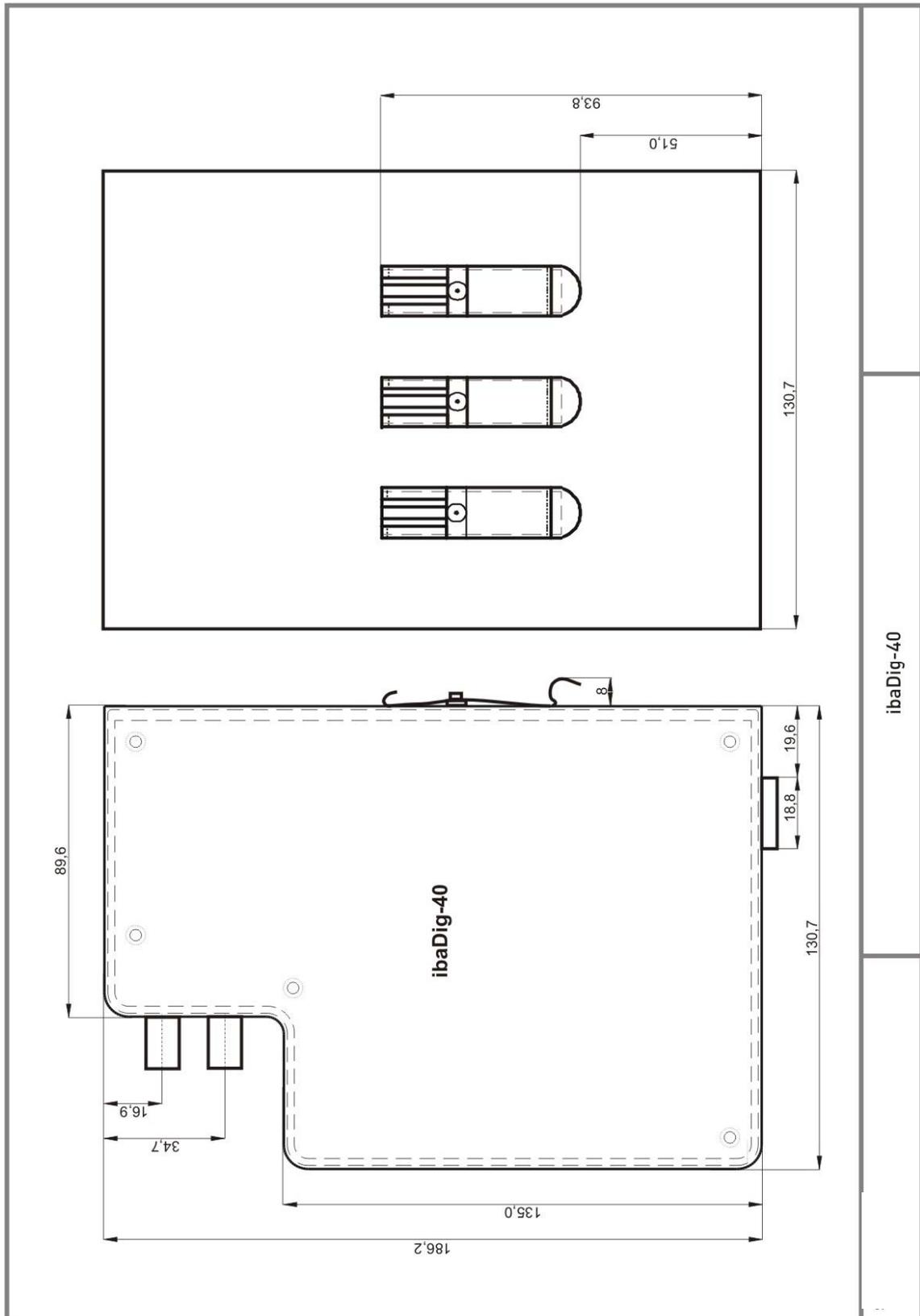
## 10.3 Connectors, Switches and Indicators

Digital inputs	5 x 16-pole connectors	Phoenix terminal blocks
Digital input indication	5 x 8 rows of LEDs	On the right side of the input connectors, 1 LED per input connector 0: 00 ... 07 connector 5: 32 ...39
Dial switches (hex)	S1: address setting (0...F) S2: mode of operation (0...F)	0...5 = M-mode, 7 = F-mode
Fiber optic connectors	2 ST-type connectors	Transmitter and receiver
Power supply	DC 24 V, 2-pole connector	Phoenix terminal block
FO cable	62,5/125 µm	
Coupling	ST Lean	
Indication	Run (green), Link (yellow), Error (red)	LED
Other interfaces	RJ11-socket for notebook connection	Via ibaCom-PCMCIA-F card
	RJ45-socket	Prepared for TCP/IP
	9-pin D-Sub socket	Service interface

## 10.4 Data Transmission (Fiber Optic)

Data transmission rate	3.3 Mbit/s	F-mode
	5 Mbit/s	M-mode
Data amount	40 digital signals per device, in daisy-chain up to $8 \times 40 = 320$ digital signals simultaneously	F-mode
	40 digital signals per device and FO link	M-mode
Refresh rate	1 ms	F-mode
	40 $\mu$ s	M-mode

### 10.5 Dimensional Drawing



ibaDig-40

(Dimensions given in mm)

Figure 10: Dimensional Drawing

## 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)



### Note

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

---

### Contact

#### Headquarters

iba AG

Koenigswarterstr. 44

90762 Fuerth

Germany

Phone: +49 911 97282-0

Fax: +49 911 97282-33

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

Contact: Mr. Harald Opel

#### Regional and Worldwide

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

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