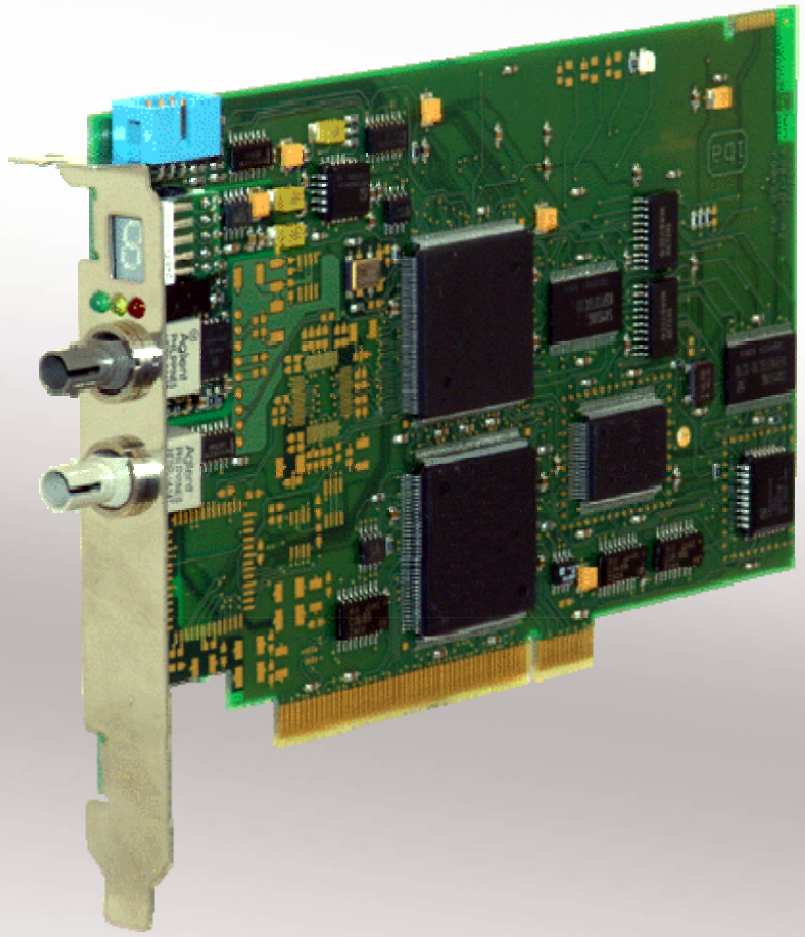
ibaFOB-SD

Interface Board for Simadyn D



Manual

Issue 1.3

Measurement and Automation Systems

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

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

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	Date	Revision	Chapter / pages	Author	Gepr.	Version HW/FW
V 1.3	01/26/10	Layout ibaPDA-V6 CP53M0	 7.1; 8.1 2	if/ma		V 1.3

Table of Contents

1 About this manual

This manual describes in detail the configuration and use of the product ibaFOB-SD. 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> + <Ctrl>
Buttons	<Button name> Example: <OK>; <Cancel>
File names, Paths	„File name“, „Path” Example: „Test.doc“

1.3 Symbols used

If safety instructions or other information 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 iba 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 indicates special requirements or actions to be observed.

Important information

Information that a special indication has to be observed, e.g. exceptions from the general rule.

Tip

Tip or example which serves as helpful information or a trick to facilitate the work.

Other documentation

Reference to supplementary documentation or further literature.

2 PC measurement system requirements

2.1 Hardware

IBM-PC compatible computer with the following minimum configuration:

- ❑ Pentium IV/3 GHz or better
- ❑ At least one free PCI slot
- ❑ 512 MB RAM or better
- ❑ >10 GB hard disk space

↗ Please see http://www.iba-ag.com for further details.

2.2 Software

Note

Only the 32-bit versions of Windows operating systems are supported.

- ❑ Microsoft Windows NT 4.0 SP 5 (ibaPDA ≤V5) only,
  Windows 2000 (ibaPDA-V6, <V6.24.0), XP, Server 2003, Server 2008 R2, Vista or Windows 7 (ibaPDA-V6, ≥6.24.0)
- ❑ ibaPDA Version 4.33 with PCI support or higher
- ❑ ibaLogic V3.73 or higher
- ❑ ibaAnalyzer Version 3.0 or higher (for data analysis)

3 Safety information

Please consider the following safety advises:

⚠ DANGER

To prevent electrical shock during installation or uninstallation of the device disconnect the power supply from the computer before opening!

⚠ CAUTION

This board contains components which can be destroyed by electrostatic discharge. Prior to touching any electronics board, your body must be electrically discharged. This can be simply done by touching a conductive, grounded object immediately beforehand (e.g. bare metal cabinet components, socket protective conductor contact).

4 Scope of delivery

The following components are included with the delivery:

- ibaFOB-SD card
- Manual
- Synchronization cable (sync cable)

↗ For more accessories, not included in the scope of delivery, please refer to www.iba-ag.com.

5 Introduction

5.1 Application

The ibaFOB-SD card couples the iba Process Data Acquisition system ibaPDA or the Soft PLC ibaLogic with the Siemens control system SIMADYN-D. Therefore, the ibaFOB-SD must be connected to one of the free fiber optic links of the SIMADYN-D CS12/13 or 14.

By means of the Siemens interface board CP53M0 the ibaFOB-TDC card can be connected with the SIMATIC TDC control system without the need for a GDM.

This new PCI card replaces the “old” ISA card ibaFOB-x/2 SD.

All component parameters are 100% controlled by software. No wiring or jumpering is necessary for that board.

5.2 Characteristics

The card has the following characteristics:

- ❑ Fully compliant PCI V2.2 board
- ❑ 1 bi-directional fiber optic channel with 96 Mbit/s
- ❑ 256 kB of PCI dual port-RAM for PC access
- ❑ Firmware upgrade in the PC via PCI bus without de-installing the card
- ❑ 3 LEDs for each channel indicating CPU life counter (green), optical transmission status (orange) and processor error (red)
- ❑ 7-segment display for board-ID, indication of sync master board and external or internal synchronization
- ❑ No Jumpers or DIL switches, all parameters are software controlled (the switch on top of the board is for iba internal use only)
- ❑ Dynamic reassigning of interrupt sources and interrupt generation (board and driver synchronization)
- ❑ Absolutely noise free acquisition of process data
- ❑ 100% functional compatibility with predecessor board ibaFOB-x/2 SD (ISA) guaranteed
- ❑ Enhanced SIMADYN-D system diagnostics
- ❑ Up to 4 ibaFOB-SD cards per PC
- ❑ Plug and Play installation

5.3 Operational modes

The following operational modes are supported by ibaFOB-SD:

- ❑ ibaPDA-lite-SD-TDC:
  4 cards with max. 512 analog plus 512 binary values are supported by this software; supports the ibaPDA-Technostring (a non-structured ASCII string) via the SD link.

- ibaPDA-Request-SD (former name Symbolic Request):
  Max. 4 boards with up to 50 µP connections (32 analog plus 32 digital signals each – a maximum of 1600 analog plus 1600 digital signals per card, depending on ibaPDA-V6 license);
  supports the ibaPDA-Technostring (a non-structured ASCII string) via the SD link.
- Bi-directional SD/TDC-Lite connection:(4 cards with up to 512 + 512 input values and 256 + 256 output values) for the ibaLogic Soft-PLC;
  supports the non-structured ASCII string via the SD link

Important note

It is **not allowed** to mix an ibaFOB-SD with an old ibaFOB SD x/2 (ISA) within one PC. To run the ibaFOB-SD the software versions ibaPDA V4.33 or ibaLogic V3.73 or higher are required.

5.4 Remarks concerning SIMADYN-D

The coupling partner on the SIMADYN-D side can be CS12, CS13 und CS14 boards. The boards only differ in the amount of links supported by the cards (1, 4 or 8). If in the following text the CS14 is referred to the meaning is valid for CS12 and CS13 too.

The CS14 is the coupling partner in the master rack. The max 8 slaves are connected via their CS22 cards or the ibaFOB-SD card. The physical connection is bi-directional fiber optic links in a start topology.

The communication RAM is located within the CS14. Via this memory the slaves may communicate with the master and/or other slaves.

The ibaPDA PC with his ibaFOB-SD card acts like a SIMADYN-D slave rack.

This topology enables the ibaFOB-SD to communicate in theory with every processor in one of the connected racks (max 7) or the master rack. This would be up to 64 CPUs.

In reality the amount of connectable CPUs per ibaFOB-SD is limited to max. 50.

5.5 Remarks concerning CP53M0

The board is available in Simatic TDC (D7-SYS V7.1 or higher).

The board can be configured as master or slave. In master mode one port can be used for connection to ibaPDA/ibaLogic with ibaFOB-SD card. The other port provides for connection to a slave rack. The slave rack can be either SIMADYN D with CS22-board or SIMATIC TDC with CP53-board (slave mode). When operated in slave mode the 2nd port cannot be used.

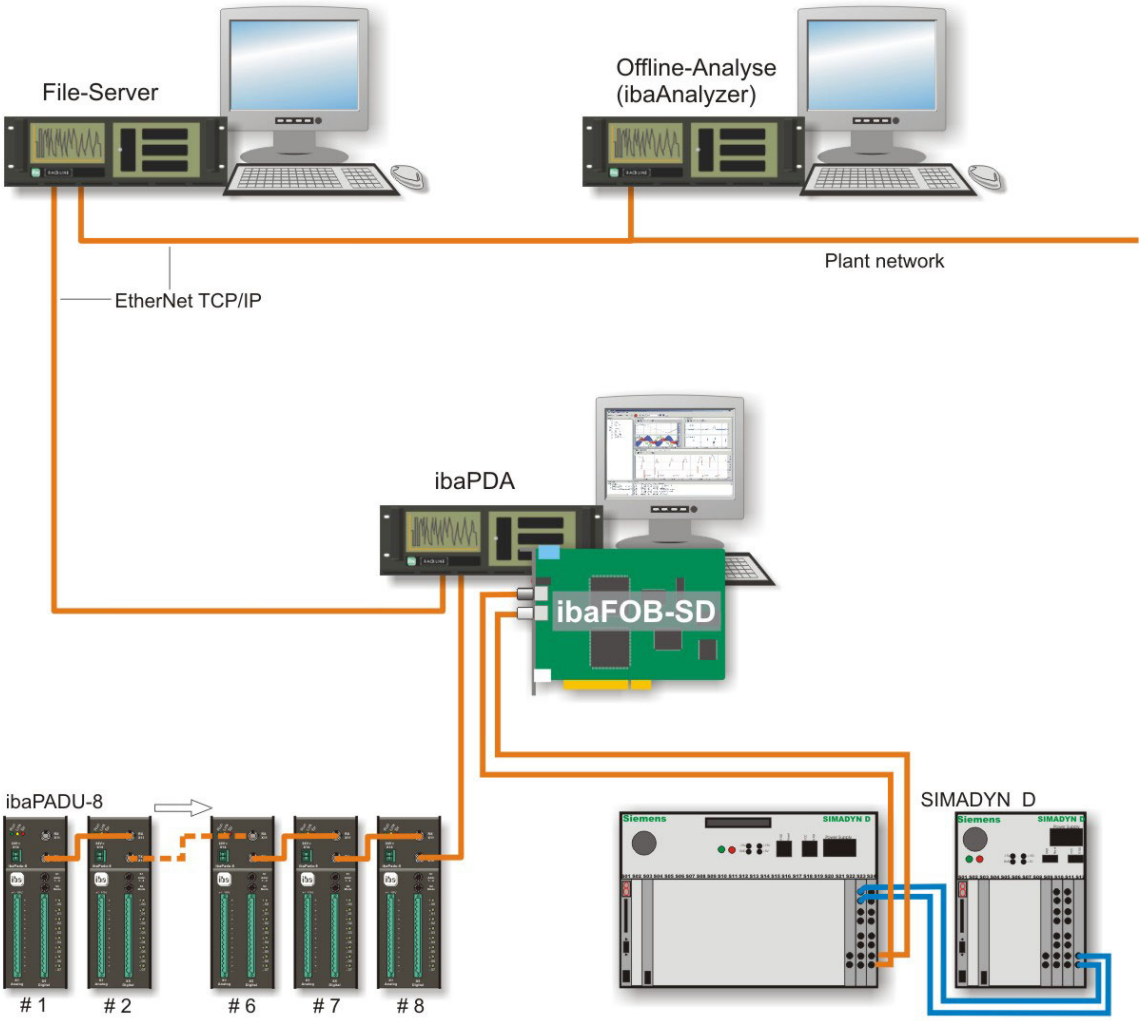


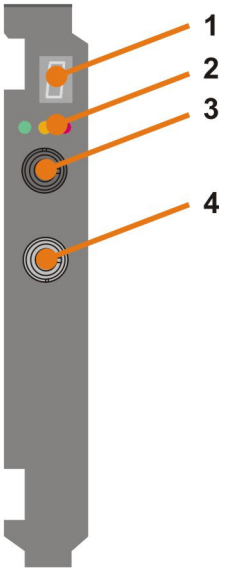
Figure 1: Example of configuration with ibaPDA

5.6 Remarks on the measurement principle

To measure SIMADYN-D system numeric values must be transported between the SD system and the PC, which means that internal variables of the SD system may be visualized and recorded. For recording purposes 2 different software packages are provided by iba.

- Request-SD
  The definition of the signals to be measured is independent of the connected system. All changes are done in ibaPDA. ibaPDA supports the functionality to interpret the SD address book and communicate with the SD in a way that any internal variable of any processor may be requested from the PLC. To do that for every SD CPU two function blocks must be included in the CFC/STRUC plan of the SD-system. These FBs support overload protection to avoid high system loads by ibaPDA.
- SD/TDC-Lite
  All measuring values are pre-programmed and a fixed part of the logic plan of SD. Changing of signals requires a change in this plan. Process telegrams are to be defined which transport the values from (to) ibaPDA (ibaLogic) containing 32 analog plus 32 digital variables each. There is no need for the SD address book. ibaLogic only works with SD-Lite channels (bi-directional).

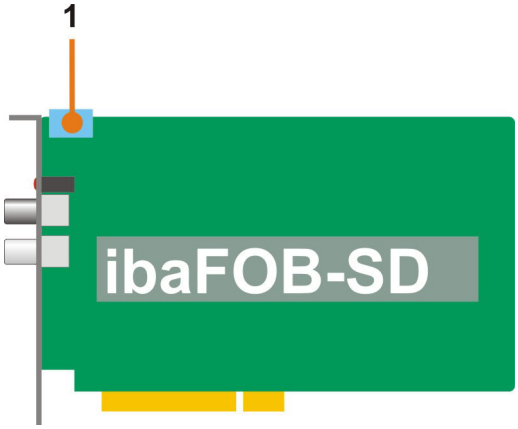
5.7 Front view



1 7-segment display
2 Status LEDs
3 FO-connector (Receiver)
4 FO-connector (Transmitter)

Figure 2 : Front view

5.8 Plug and socket connections



1 Sync- connector (blue)

Figure 3: Plug and socket connections

5.9 Indicators

5.9.1 Device LEDs

Run, Link and Error LEDs indicate the operational state of the ibaFOB-SD channels. The following table describes the states in which you may find the LEDs and their respective meanings. On power on all LEDs are on for a few seconds to prove their proper function.

LED	Status	Indication
Run (green)	Blinking Off On	Power is on and the channel is functioning properly Controller stopped Controller stopped
Link (orange)	On Off	Connection to SD ok, telegrams received/send on this channel No telegrams received; fiber optics not connected or sending device
Err (red)	On Off	Internal error on controller link Normal state; after resolution of error, LED automatically resets

5.9.2 7-Segment display

The 7-segment display shows the following information:

- ❑ Horizontal line: After System switch-on until ibaPDA/ibaLogic has initialized the board
- ❑ Board-ID (ranging from 0 to 3): After board was initialized
- ❑ The decimal dot ON: Board is dedicated to be an internal interrupt master
- ❑ The decimal dot blinking: Board is dedicated to have an external interrupt master
- ❑ The decimal dot OFF: Board is working as interrupt slave

Important note

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

5.9.3 Fiber optic interface

The ibaFOB-SD board provides 2 ST-type jacks:

- ❑ 1 optical transmitter TX (white)
- ❑ 1 optical receiver RX (grey)

6 Mounting and dismounting

6.1 Safety information

The following safety advices apply when handling the card:

⚠ DANGER

Electric shock!

Switch off the PC and disconnect it from the mains power supply before opening!

⚠ CAUTION

Electrostatic discharge!

This board contains components which can be destroyed by electrostatic discharge. Before touching the board makes sure that your body is electrically discharged or works in a designated ESD protected area!

The standards for handling electrostatic sensitive devices (ESD) must be followed.

6.2 Mounting

Note

In order to take advantage of the plug and play function be sure that ibaPDA-V6, respectively ibaLogic-V4 has been installed before inserting the card. Otherwise, Windows will not recognize the card.

1. Shut down the PC.
2. Switch off the power supply of the PC.
3. Unplug the mains power line.
4. Open the PC so you can reach the PCI slots.
5. Take the card carefully out of the package.
6. Grab the card at the front plate and the rear upper corner. Do not touch the contacts.
7. Plug in the card carefully into a free PCI slot.
8. Fix the card to the housing of the PC. If more than one iba PCI card is installed connect all cards with one another by the flat ribbon cable (sync cable).
9. Close the PC.
10. Plug in the power line.
11. Switch on the power supply of the PC.
12. Start the PC.

6.3 Dismounting

1. Shut down the PC.
2. Switch off the power supply of the PC.
3. Unplug the mains power line.
4. Open the PC so you can reach the PCI slots.
5. Release the fixing screw.
6. Unplug the card carefully out of the slot. Store the card in an appropriate container.
7. Close the PC.
8. Plug in the power line.
9. Switch on the power supply of the PC.
10. Start the PC.

7 Software configuration in ibaPDA-V6

Other documentation

For a more detailed description of the board's configuration in ibaPDA-V6 please refer to the ibaPDA-V6 manual or online help and ibaPDA-Request-SD manual.

If card has been installed correctly and the license is enabled in the dongle the card should be available in the I/O manager's signal tree as a data interface.

If you click on the interface icon in the tree you will get a simplified image of the card and essential information in the right part of the dialog. Here, you should set the required interrupt mode of the card and check the option "In use" in order to reserve the card for use by ibaPDA-V6 only (and not by other applications such as ibaLogic).

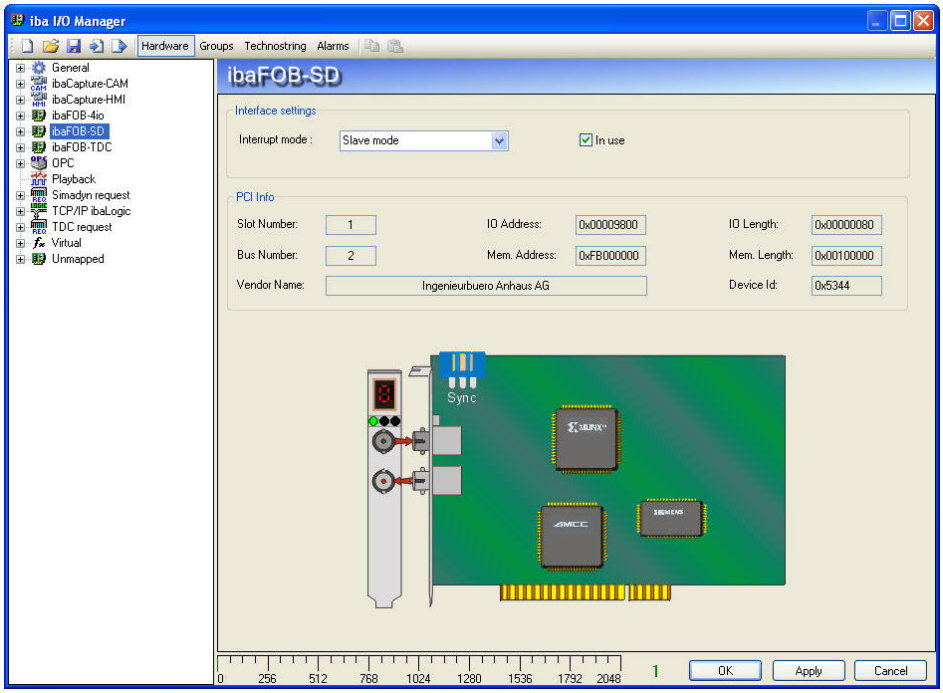


Figure 4: Card representation in ibaPDA-V6

8 Diagnosis in ibaPDA-V6

The essential tools for diagnosis are integrated in the I/O manager of ibaPDA-V6.

8.1 General card diagnosis

The image of the card as shown in chapter 7 provides essential information.

The graphical representation of the card shows the animated displays and indicators of the real card.

Other documentation

For a more detailed description of the following diagnosis dialogs for the card please refer to the ibaPDA-V6 manual or online help and to the ibaPDA-Request-SD manual.

8.1.1 Tab Link info

The tab “Link info” provides information about the connection between ibaPDA and the SIMADYN D system.

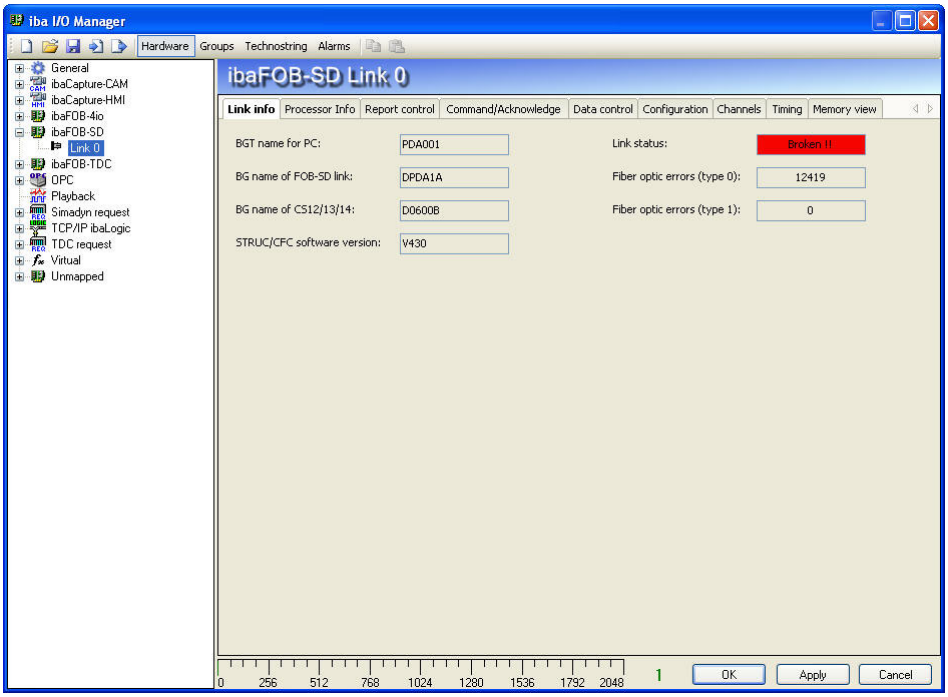


Figure 5: Link information

8.1.2 Tab Processor Info

This information about the DPR interface is for support purposes only. Here you can find the firmware version of the card.

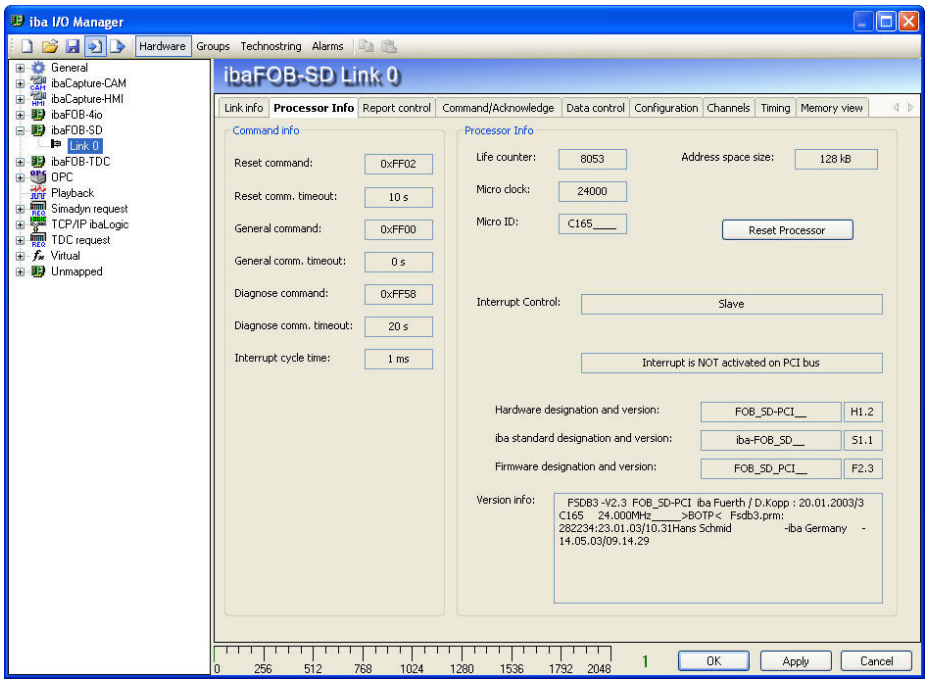


Figure 6: Processor information

8.1.3 Tab Report control

Here you'll find information about the connection and telegram traffic of the up to 50 PDA channels. The bit-numbering (0 on right side) corresponds to the sequence of the processors in the connection table. If you move the slider beneath the bitmasks PN short name and error number of the current PN will be indicated in the fields below.

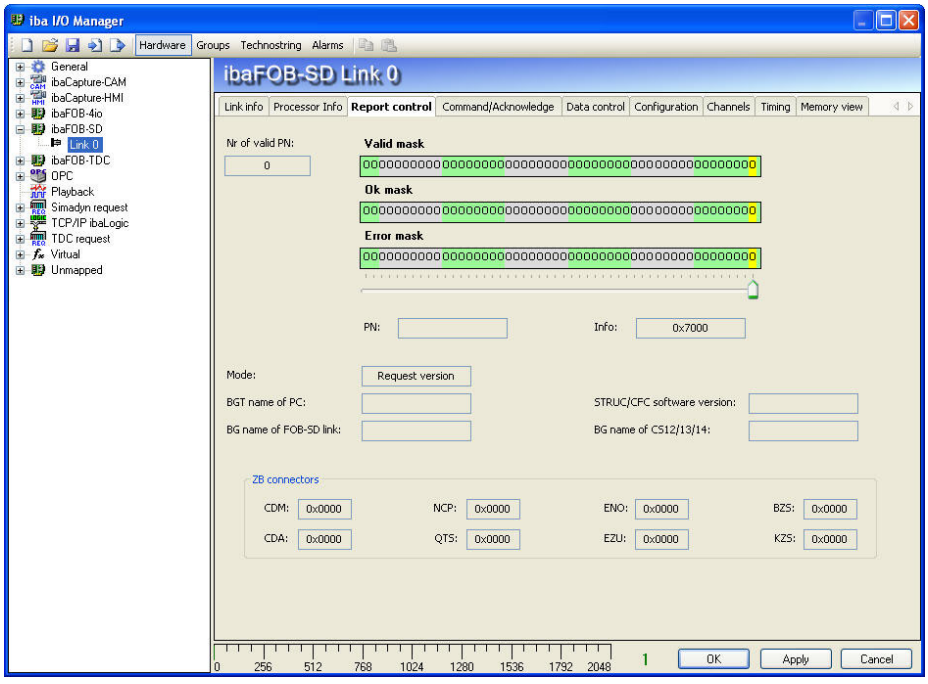


Figure 7: Report control

8.1.4 Tab Command/Acknowledge

Here, you'll find information about the command and acknowledge handshake during telegram traffic of the up to 50 PDA channels.

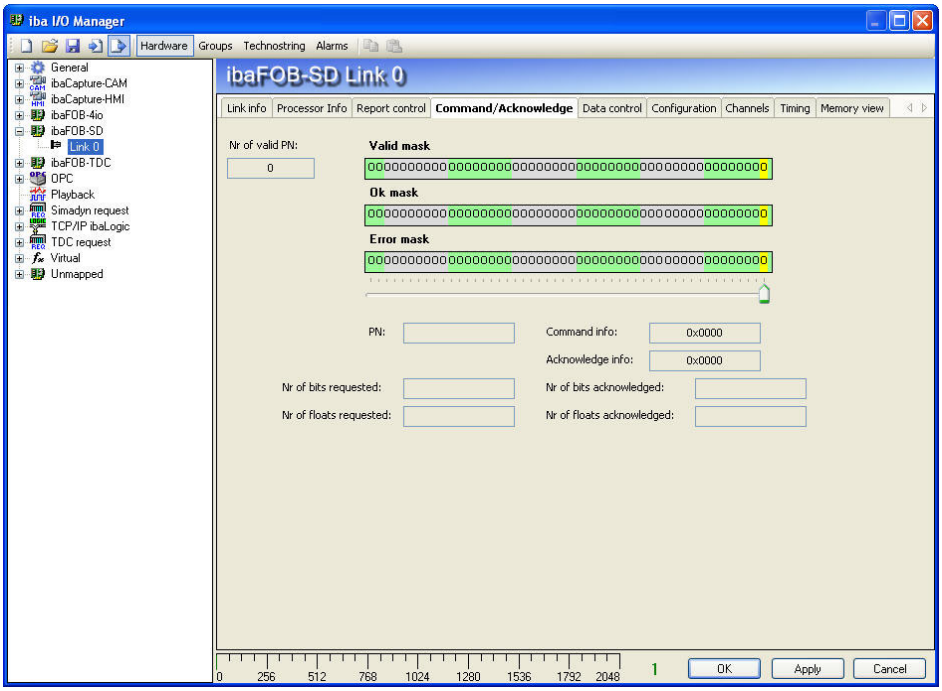


Figure 8: Command / Acknowledge

8.1.5 Tab Data control

Here you'll get information about the data traffic of the up to 50 PDA channels.

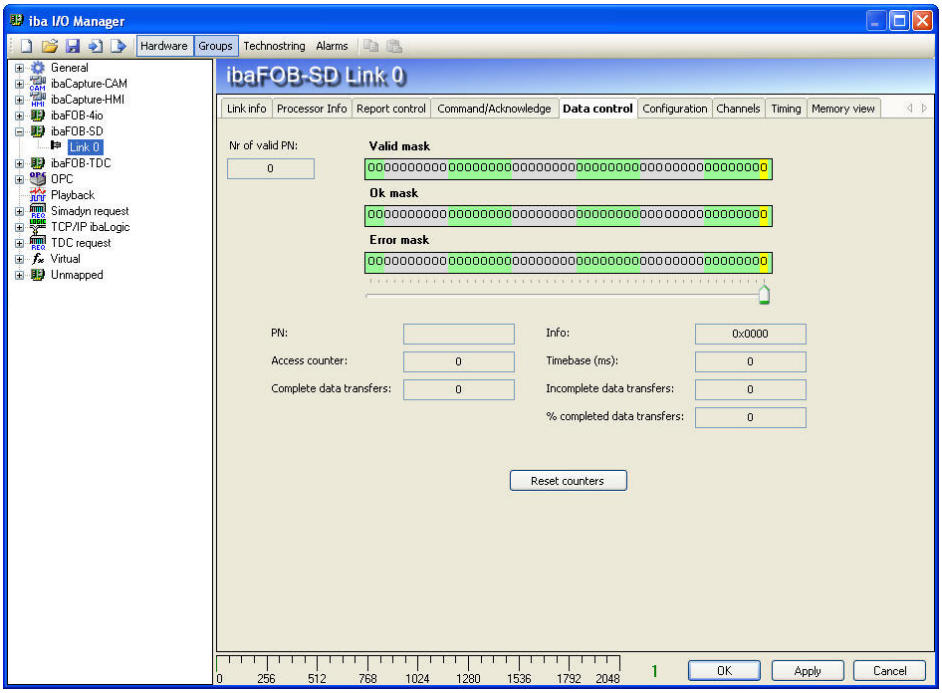


Figure 9: Data control

8.1.6 Tab Configuration

Here you find information about the CS14 report area, where the connected BGTs are registered.

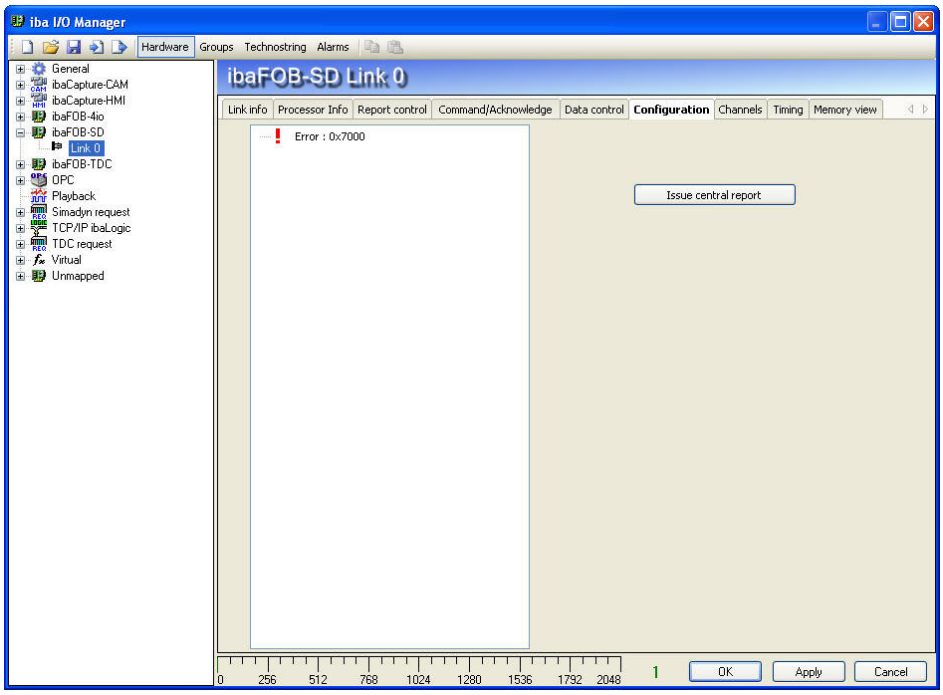


Figure 10: Configuration

8.1.7 Tab Channels

Here, you get information about the CS14 board and the configured communication channels.

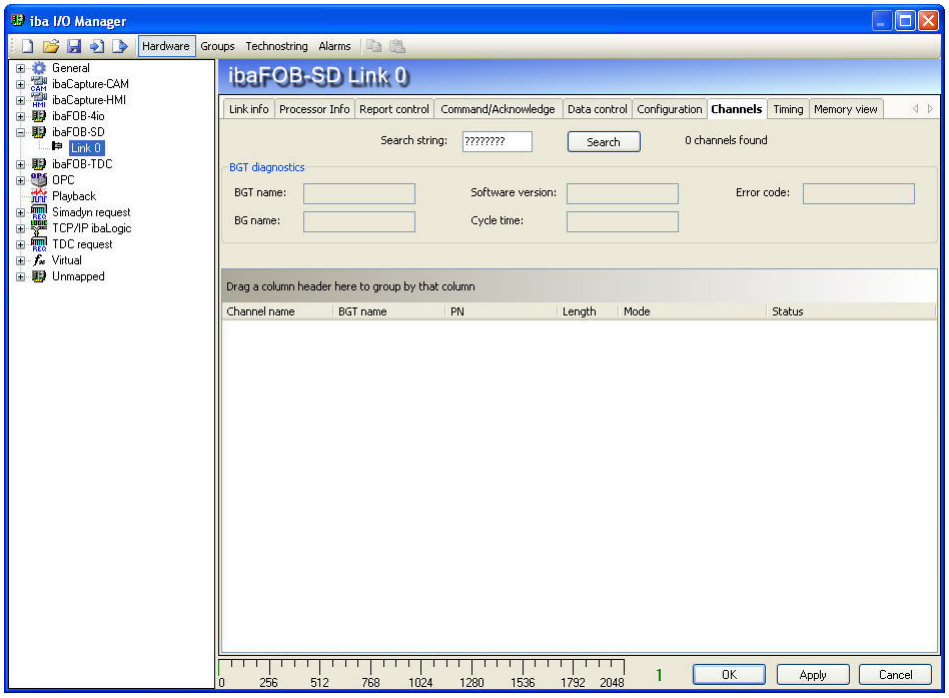


Figure 11: Channels

8.1.8 Tab Timing

Here, you'll find information about the FOB-SD load and access statistic. The firmware ibaFOB-SD provides a statistical log of all SD accesses. Primarily this feature has been added as a helper for the software development and optimization. But a user may use the information as well for a better configuration of the SD.

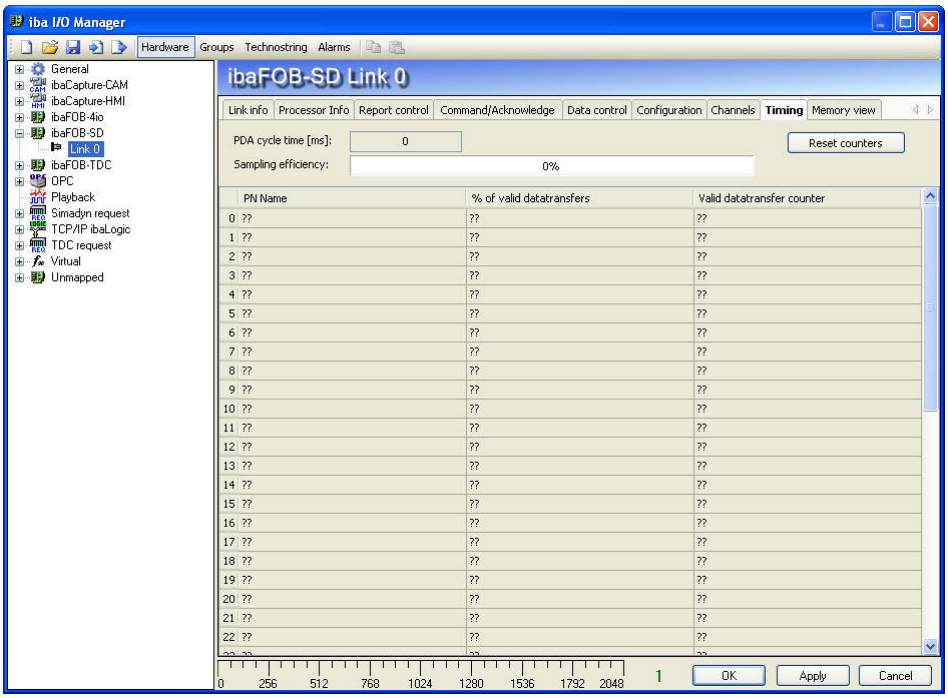


Figure 12: Timing

8.1.9 Tab Memory view

This is a display of the 256 kByte DPR memory on the ibaFOB-SD card.

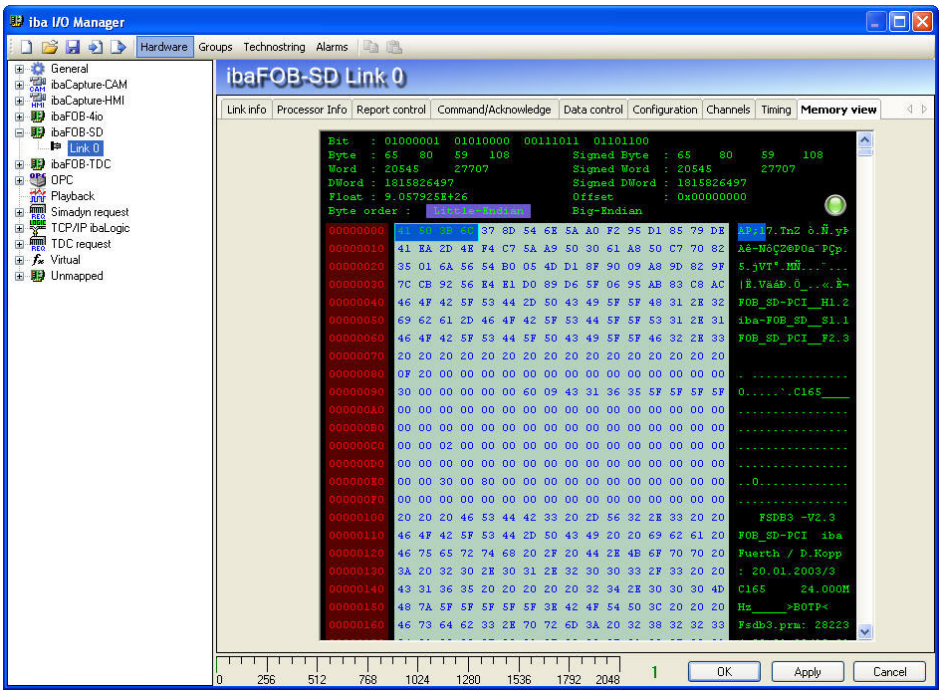


Figure 13: Memory view

9 Synchronization of more than one iba PCI card

9.1 Important information

Important information

A bad or missing sync-connection may lead to inconsistent data blocks. This would affect the data integrity and data correlation.

Every delivered card comes with a synchronization cable (sync cable) for connecting up to 6 cards. Unused plugs of the cable can left unconnected and must not be terminated.

If you plug in or unplug PCI cards this may change the PCI configuration of the PC. This can affect the signal or I/O configuration of the system because the ID of the boards may change.

In that case move the fiber optic cables to the correct card.

Always save your system configuration before changing hardware components.

9.2 Procedure

You should perform the following steps after you've installed the PCI card:

1. Connect all iba PCI cards with the synchronization cable using the blue plugs.

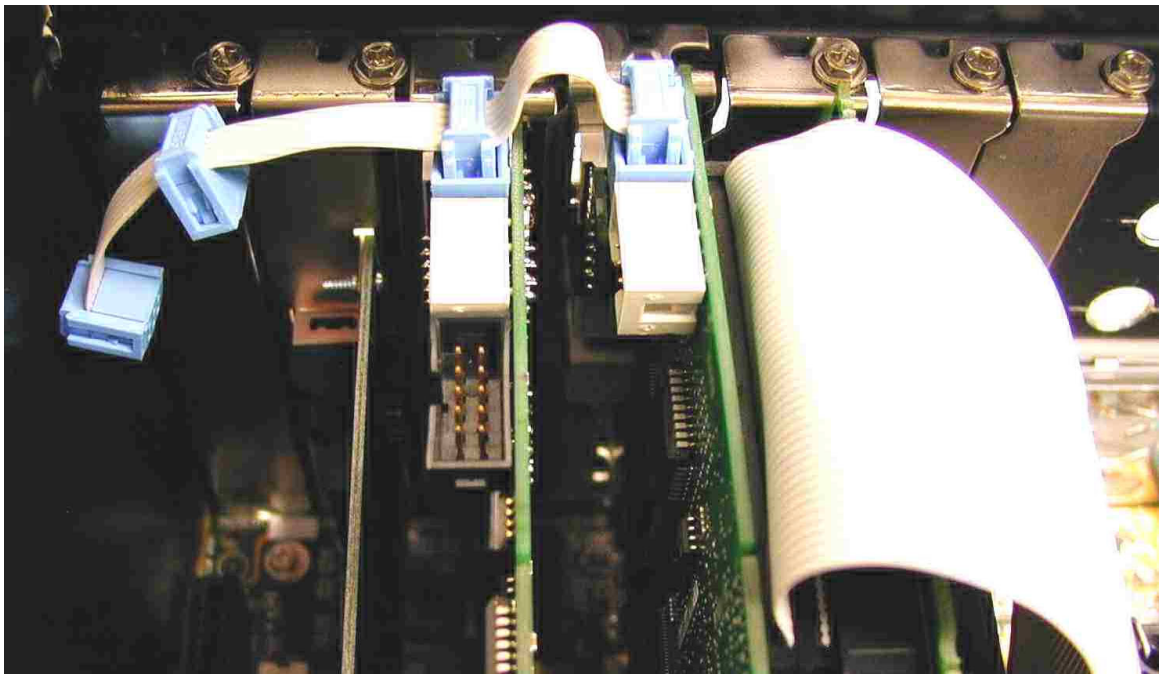


Figure 14: Connecting multiple iba PCI cards by sync cable

2. Close the PC.

3. Plug in the power line.

4. Switch on the power supply of the PC.

5. Start the PC.

10 Technical data

10.1 Main data

Order No.	11.112700
Format/size	Short PCI card
Operating Temperature	From 32 °F to 122 °F (from 0 °C to 50 °C)
Storage Temperature	From -13 °F to 158 °F (from -25 °C to 70 °C)
Transport Temperature	From -13 °F to 158 °F (from -25 °C to 70 °C)
Cooling	Passive
Power Supply SLM	via PCI bus
Current consumption SLM	Max. 950 mA (without connected modules)
FO-cable	62.5/125 µm
Coupling	ST Lean
Distance between 2 devices	Up to 1,312 ft. (400 m) without repeater
Weight (incl. Packaging and Documentation)	0.44 lb (200 g)
Number of SD-connections	1 (duplex)
Data transmission rate	96 Mbit/s
Fastest sample time	1 ms

10.2 Performance of the ibaFOB-SD card/data load

Note

Valid with firmware B5 or higher.

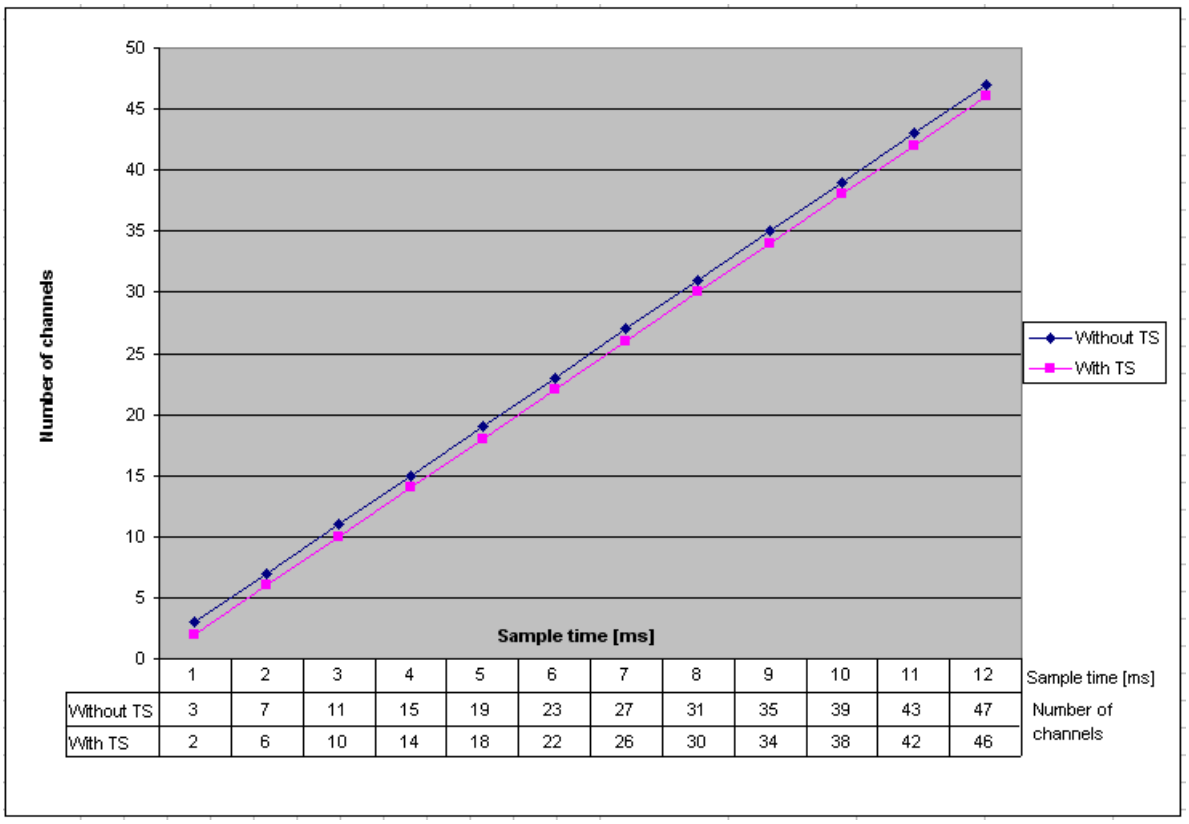
Extract from a test protocol

ibaPDA Sample time (ms)	No. of channels (32 analog + 32 digital signals each)	Measured efficiency % without Techno string	Measured efficiency % with Techno string
1	2	100	100
1	3	90	50
1	4	50	50
2	4	100	100
2	5	100	100
2	6	100	100
2	7	99	55
2	8	50	50
3	8	100	100
3	10	100	100
3	11	99	50
3	12	50	50
4	12	100	100
4	14	100	100
4	15	100	95
4	16	50	50

Table 1: Processing efficiency depending on sample time and number of channels

Legend:

Green	FOB load is OK
Yellow	Critical load
Red	FOB overload



	1	2	3	4	5	6	7	8	9	10	11	12	Sample time [ms]
Without TS	3	7	11	15	19	23	27	31	35	39	43	47	Number of channels
With TS	2	6	10	14	18	22	26	30	34	38	42	46	

Figure 15: Relation between sample time and number of channels

(TS: Technostring)

Reading help (example): At a sample time of 8 ms (ibaPDA) it's possible to process up to 30 channels with Technostring and 31 channels without Technostring at an acceptable efficiency.

11 Support and Contact

Support

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Note

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

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www.iba-ag.com.