ibaFOB-TDC

Interface Card for SIMATIC TDC

Manual

Issue 1.3

Measurement and Automation Systems

iba

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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.

Version	Date	Revision	Chapter / pages	Author	Version HW/FW
V 1.3	01/11/10	ibaPDA-V6, layout		um	

Table of contents

1   About this manual

This manual describes in detail the configuration and use of the product ibaFOB-TDC. 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!

⚠ 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   Scope of delivery

The following components are included with the delivery.

❑   ibaFOB-TDC card

❑   Manual

❑   Synchronization cable (sync cable)

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

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

4   Measurement computer pre-requisites

4.1   Hardware

IBM PC-compatible computer with the following minimum configuration:

❑   400 MHz Pentium II or better

❑   At least one free PCI slot

❑   128 MB RAM or better

❑   Free disk space > 10 Gbyte

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

4.2   Software

❑   ibaPDA Version 4.33 with PCI support or higher

❑   ibaLogic V3.73 or higher

❑   ibaLogic-V4

❑   ibaAnalyzer Version 3.0 or higher (for data analysis)

5   Introduction

5.1   Assignment

The ibaFOB-TDC card couples the iba Process Data Acquisition system ibaPDA or the Soft-PLC ibaLogic with the Siemens control system SIMATIC TDC. To achieve this, the ibaFOB-TDC must be connected to one of the free ports of the CP52IO (GDM Interface Module of the SIMATIC TDC).

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

5.2   Characteristics

The card has the following characteristics:

❑   Bi-directional fiber optic link with 640 MBit/s

❑   Absolutely noise free acquisition of process data

❑   Enhanced SIMATIC TDC system diagnostics

❑   Up to 4 ibaFOB-TDC cards per PC

❑   Display for card id, processor and link status via 7-segment display and LEDs

❑   Plug and Play installation

5.3   Operational modes

The following operational modes are supported by ibaFOB-TDC:

❑   ibaPDA-lite-SD-TDC software interface: Max. 4 cards with up to 512 analog plus 512 digital values are supported by this software (16 telegrams with 32 analog and 32 digital values each);
Supports a non structured so called ASCII Techno string via the TDC link.

❑   ibaPDA-Request-TDC package: Max. 4 cards with up to 50 processor connections (32 analog plus 32 digital signals each) and a total of up to 1024 analog plus 1024 digital signals for one ibaPDA;
Supports one non structured so called ASCII Technostring via the TDC link.

❑   Bi-directional SD/TDC-Lite connection for the ibaLogic Soft-PLC: Max. 4 cards with up to 512 analog plus 512 digital input values and 256 analog plus 256 digital values; Supports the non structured so called ASCII Technostring via the TDC link

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.

Tip

To run the ibaFOB-TDC card the software versions ibaPDA-V4.33 or ibaLogic-V3.73 or higher are required.

5.4   Remarks concerning SIMATIC TDC

The coupling partner on the SIMATIC TDC side is the Interfacemodul CP52IO. This card is located in a slot of the Global Data Memory (GDM) Rack, the common communication memory within a multirack SIMATIC TDC system. The fiber optic connection (FO) may use any free port of any CP52IO.

The CP52IO realizes the access to the GDM memory card CP52M0. The TDC racks are connected to the CP52IO via the CP52A0 card. The ibaPDA PC with his ibaFOB-TDC card acts like a SIMATIC TDC rack with a CP52A0.

This topology enables the ibaFOB-TDC to communicate notionally with every processor in one of the connected racks (max. 43). This would be up to more than 800 CPUs. In reality the amount of simultaneous accessible CPUs per ibaFOB-TDC is limited to 50.

In large systems it makes sense, to equip the ibaPDA-system with several ibaFOB-TDC cards, connected parallel to one GDM.

It is also possible to access one GDM by multiple ibaPDA systems. In this case it is mandatory to use unique link names for the different ibaPDA systems. It is also required that one TDC CPU is accessed by only one ibaPDA system.
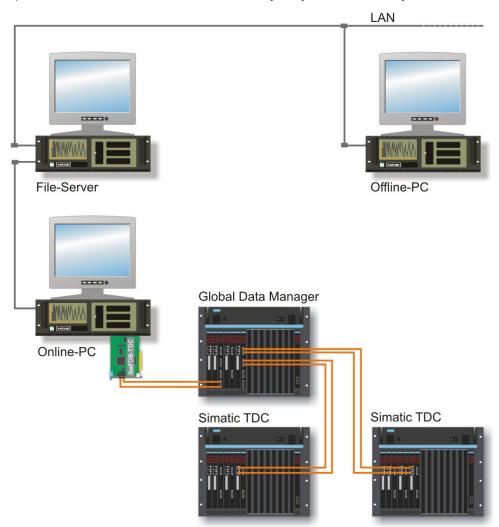

Figure 1:   Typical topology

5.5   Remarks on the measurement principle

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

Request-TDC (former name Symbolic Request):

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 select the internal TDC variables by their names, i.e. the plan, function block and the connector names.

To do that for every TDC CPU 2 service function blocks must be included in the CFC plan of the TDC system. These function blocks support also overload protection to avoid high system loads by ibaPDA.

The information about the variable names (address book) is not provided by the TDC engineering software, but is transferred from the TDC CPU to the ibaPDA system directly via the ibaFOB-TDC card.

Note

An additional software license "ibaPDA-Request-TDC" is required in order to use the Request TDC function. It must be enabled on the iba software dongle.

SD/TDC-Lite:

All values to be measured have to be manually programmed in CFC plans of the TDC system. Changes of signals require a change in this plan. Up to 16 process telegrams are to be defined which transport the values to ibaPDA (or ibaLogic respectively) containing 32 analog plus 32 digital variables each.

ibaLogic works with TDC-Lite channels (bi-directional) only.
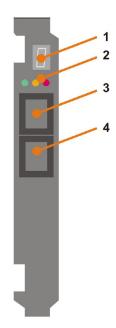
Note

The software license "ibaPDA-lite-SD-TDC" is required in order to use the SD/TDC Lite function. The license must be enabled on the iba software dongle which is done free of charge with purchase of an ibaFOB-TDC card.
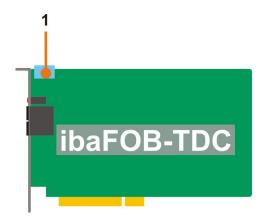
5.6   Front view

1 7-segment display

2 Device status LEDs

3 FO-connector (SC-Technik)

4 FO-connector (SC-Technik)

Figure 2:   ibaFOB-TDC card

5.7   Plug and socket connections

1 Sync- connector (blue)

Figure 3:   Plug and socket connections

5.8   Indicators

5.8.1   Device status LEDs

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

LED	Status	Indication
Run (green)	Blinking Off	Power is on and the channel is functioning properly Controller stopped
	On	Controller stopped
Link (yellow)	On Off	Telegrams received/sent on this channel No telegrams received; fiber optics not connected or sending device switches off
Error (red)	On Off	Internal error on controller link Normal state; after resolution of error, LED automatically resets

5.8.2   7-segment display

The 7-segment display shows the following information:

❑   Horizontal bar: After switching on, until the initialisation by the ibaPDA or ibaLogic is finished.

❑   Card-ID (ranging from 0 to 3): After card was initialized

❑   The decimal point is ON: Card is configured as an internal interrupt master

❑   The decimal point is OFF: Card is configured as an interrupt slave

❑   The decimal point is blinking: Card is configured as an external interrupt master

Note

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

5.9   Fiber optical interface

The card provides 1 duplex SC type jacks with 1 optical transmitter and 1 optical receiver.

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 card contains components which can be destroyed by electrostatic discharge. Before touching the card 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 card's configuration in ibaPDA-V6 please refer to the ibaPDA-V6 manual or online help and ibaPDA-Request-SD-TDC manual.

If the 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).
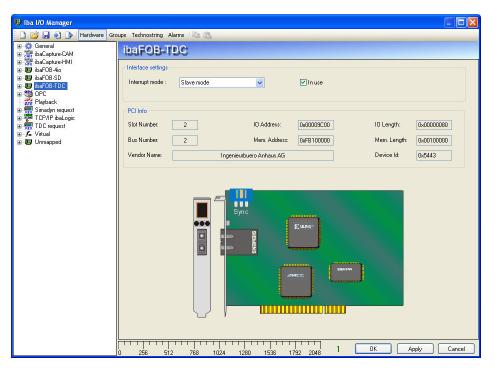

Figure 4:   Card representation in ibaPDA-V6

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 already essential information.

The graphical representation of the card shows the animated displays and indicators of the real card. The 7-segment display shows the actual card number and the LEDs indicate the actual status of the links.

↗ The indicators on the card are described in chapter 5.8.

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-TDC manual.

8.1.1   Tab "Link info"

The tab "Link info" provides information about the connection between ibaPDA and the SIMATIC TDC system.
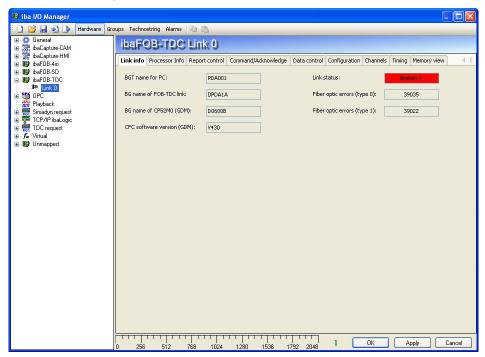

Figure 5:   Link information

8.1.2   Tab "Processor Info"

This information about the ibaFOB cards processor is for support purposes only. Here you can find the firmware version of the card.
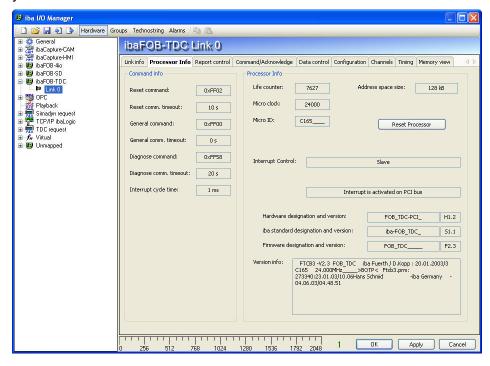

Figure 6:   Processor information

8.1.3   Tab "Report control"

Here you'll find information about the connection and telegram traffic of the up to 50 PDA channels.
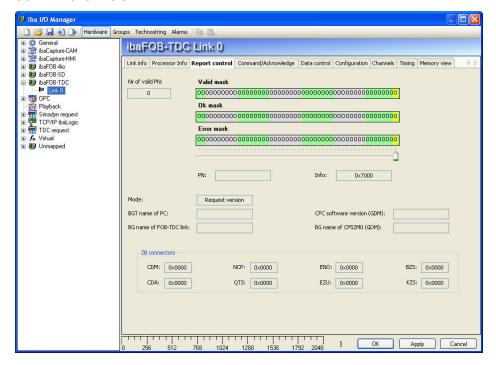

Figure 7:   Report control

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.
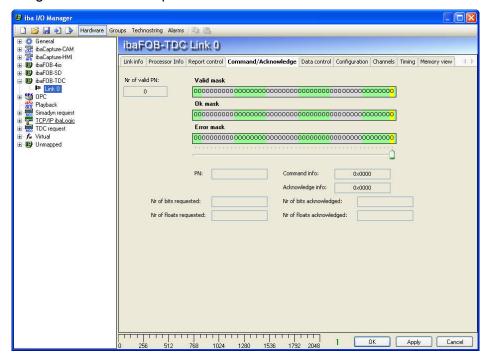

Figure 8:   Command / Acknowledge

8.1.5   Tab "Data control"

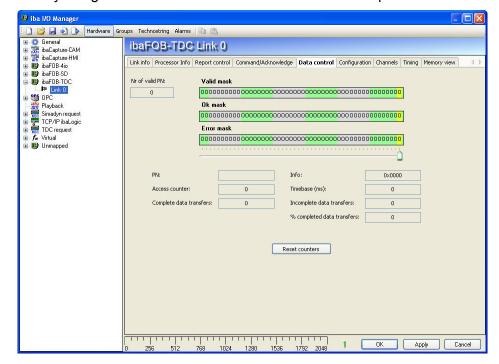Here you'll get information about the data traffic of the up to 50 PDA channels.

Figure 9:   Data control

8.1.6   Tab "Configuration"

Here you find information about the GDM area, where the connected TDC racks are registered.

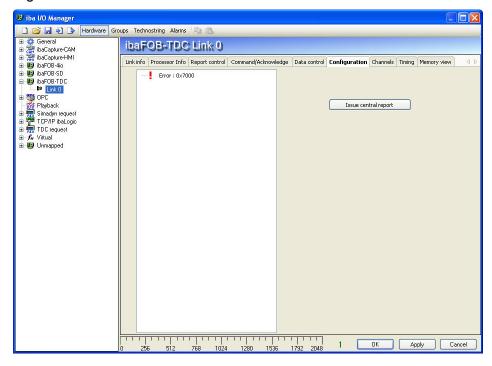

Figure 10:   Configuration

8.1.7   Tab "Channels"

Here you get information about the GDM and the configured communication channels.
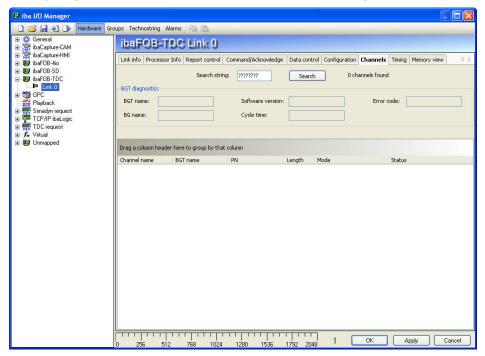

Figure 11:   Channels

8.1.8   Tab "Timing"

Here you'll find information about the ibaFOB-TDC load and access statistics.

The firmware ibaFOB-TDC provides a statistical log of all TDC accesses. Primarily this feature has been added as a helper for the software development and optimization. But you, as a user, may use the information as well for a better configuration of the TDC and ibaPDA systems.
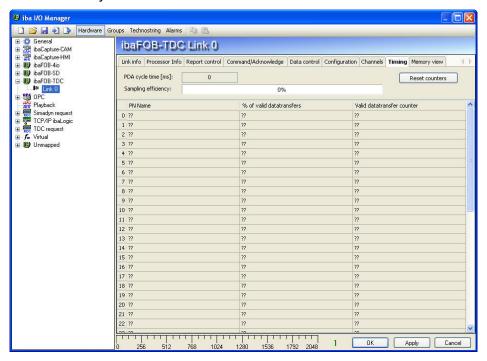

Figure 12:   Timing

8.1.9   Tab "Memory view"

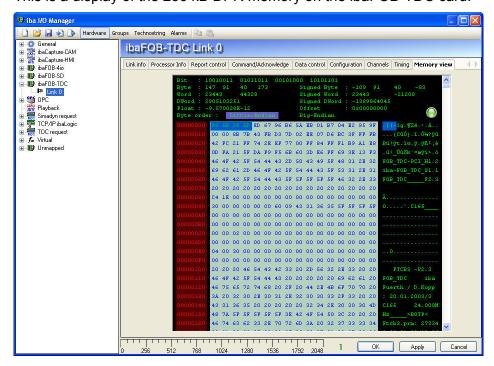This is a display of the 256 kB DPR memory on the ibaFOB-TDC card.

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 be 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 cards 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.
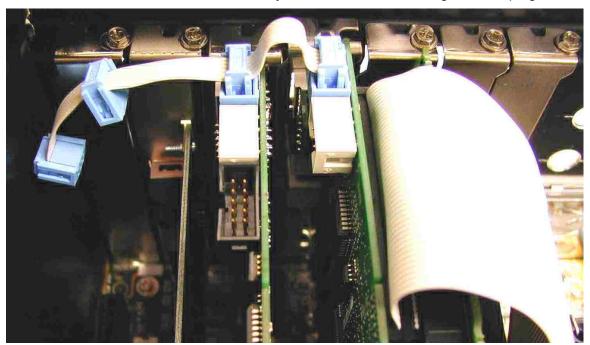

Figure 14:   Connecting multiple iba PCI cards by sync cable

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.	11.112600
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	Via PCI bus
Current consumption	1000 mA max. (without connected modules)
FO-cable Coupling	62.5/125 µm SC
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 TDC-connections	1 (duplex)
Data transmission rate	640 Mbit/s
Fastest sample time	1 ms

10.2   Performance of the ibaFOB-TDC 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 Technostring	Measured efficiency % with Technostring
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

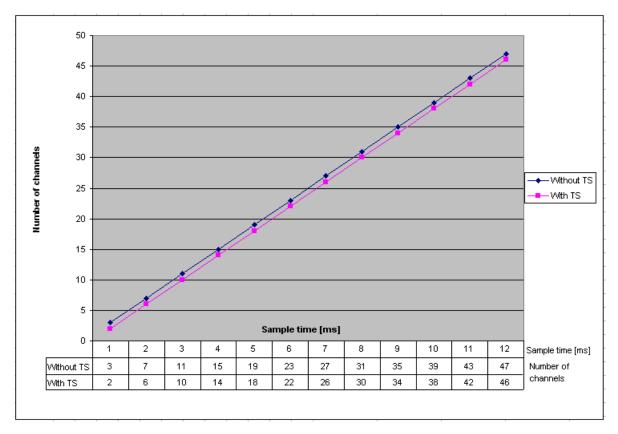| Sample time [ms]	1	2	3	4	5	6	7	8	9	10	11	12
Without TS	3	7	11	15	19	23	27	31	35	39	43	47
With TS	2	6	10	14	18	22	26	30	34	38	42	46

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 Techno string and 31 channels without Techno string at an acceptable efficiency.

11   Support and Contact

Support

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E-Mail: support@iba-ag.com

Note

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

Contact

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