# ibaPDA-Request-SD-TDC

## Interface for the measurement data acquisition for SIMADYN D/SIMATIC TDC

Manual

Issue 4.5

Measurement Systems for Industry and Energy

www.iba-ag.com

**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 |
| Web | www.iba-ag.com |



The content of this publication has been checked for compliance with the described hardware and software. Nevertheless, discrepancies cannot be ruled out, and we do not provide guarantee for complete conformity. However, the information furnished 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 www.iba-ag.com.

| Version | Date | Revision - Chapter / Page | Author | Version SW |
|---|---|---|---|---|
| 4.5 | 08-2021 | Option alternative channels | st | 6.38.0 |

# Content

# 1 About this manual

This documentation describes the function and application of the software

*ibaPDA-Request-SD-TDC*.

## 1.1 Target group and previous knowledge

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

This documentation in particular addresses persons, who are concerned with the configuration, test, commissioning or maintenance of Programmable Logic Controllers of the supported products. For the handling of *ibaPDA-Request-SD-TDC* the following basic knowledge is required and/or useful

- Basic knowledge of *ibaPDA*
- Basic knowledge of network technology
- Knowledge of configuration and operation of the relevant control system

## 1.2 Notations

In this manual, the following notations are used:

| Action | Notation |
|---|---|
| Menu command | Menu *Logic diagram* |
| Calling the menu command | *Step 1 – Step 2 – Step 3 – Step x*<br>Example:<br>Select the menu *Logic diagram - Add - New function block*. |
| Keys | <Key name><br>Example: <Alt>; <F1> |
| Press the keys simultaneously | <Key name> + <Key name><br>Example: <Alt> + <Ctrl> |
| Buttons | <Key name><br>Example: <OK>; <Cancel> |
| File names, paths | "Filename", "Path"<br>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:**

- Observe the specified measures.

**Warning!**

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

- Observe the specified measures.

**Caution!**

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

- Observe the specified measures

**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 System requirements

**iba Hardware**

- PCI card ibaFOB-TDC or ibaFOB-SD or
- PCI-Express card ibaFOB-TDCexp or ibaFOB-SDexp

**iba Software**

- *ibaPDA* v6.38.0 or higher
- License for *ibaPDA-Request-SD* or *ibaPDA-Request-TDC*
- Block library FBAPDA version 140129V001 or higher (for CFC)
- Block library FBAPD5_990619 (for STRUC)

**Siemens Hardware**

**Interface for ibaFOB-SD/-SDexp:**

- 1 free port on SIMADYN D component CS12, CS13 or CS14
- 1 free port on SIMATIC TDC component CP53 (D7-SYS V7.1 or higher)

**Interface for ibaFOB-TDC/-TDCexp:**

- 1 free port on CP52IO in the Global Data Memory (GDM)

**Siemens Software**

**For SD-/TDC-Request with SER04:**

- STRUC starting V4.2.1 or higher
  with block library FBA121 or
- CFC V6.0 or higher with D7-SYS V6.0 or higher
  with Siemens block library FBA121 or iba block library FBAPDA

**For SD-/TDC-Request with SER05:**

- CFC V6.0 or higher
  with D7-SYS V6.0 or higher with iba block library FBAPDA

**Licenses**

| Order no. | Product name | Description |
|---|---|---|
| 31.001320 | ibaPDA-Request-SD | ibaPDA Add-On license for optical connector request via SIMADYN D, light frame coupling, max. 1024 analog and digital signals |
| 31.001330 | ibaPDA-Request-TDC | ibaPDA Request package for free access to communicate via fiber optic link with SIMATIC TDC |

# 3 Product description

## 3.1 Overview

iba AG offers the following request solutions for Siemens controls:

| Platform | Interface | Transmission | iba Interface | Manual | License |
|---|---|---|---|---|---|
| *SIMADYN D* | *CS12/13/14* | *FO* | *ibaFOB-SD* | *Request-SD-TDC* | *Request-SD* |
| *SIMATIC TDC* | *CP53* | | *ibaFOB-SDexp* | | |
| | *GDM* | | *ibaFOB-TDC* | | *Request-TDC* |
| | | | *ibaFOB-TDC-exp* | | |
| | CP50 | Profibus | ibaBM-DP | Request-FM458-TDC | Request-FM458/TDC |
| S7-400 | FM458 | | ibaBM-DPM- | | |
| | S7-CPU | | ibaCom-L2B | Request-S7-DP/PN | Request-S7-DP/PN |
| S7-300 | CP x43 | Profinet | ibaBM-PN | | |
| S7-1200 | | UDP | Ethernet | Request-S7-UDP | Request-S7-UDP |
| S7-1500 | | TCP/IP, MPI, DP | Ethernet, MPI-adapter | S7-Xplorer | S7-Xplorer |

This manual describes the ranges SIMADYN D and SIMATIC TDC which are marked in italics in the table.

**Other documentation**

For older SIMADYN D systems (STRUC V2.2 or higher), iba AG offers a SIMADYN D plug-in card, called ibaLink-SM-64-SD16, with which you can transmit 64 analog and 64 digital signals to the standard ibaFOB cards.

Other than these request interfaces, there are also the standard interfaces via Profibus and TCP/IP available.

You can find the manuals at www.iba-ag.com and on the DVD “iba Software & Manuals” included in delivery.

## 3.2 Basics

You can connect *ibaPDA* directly to SIMADYN D and SIMATIC TDC systems with the ibaFOB-SD and ibaFOB-TDC cards.

Communication protocols are implemented on these cards that facilitate direct connection to the Siemens rack links. From the perspective of a Siemens control, the *ibaPDA* computer acts like a connected Siemens rack.

In this document, all coupling components are designated as rack links, to which an ibaFOB-SD or ibaFOB-TDC card can also be connected. These are:

- With SIMADYN D: CS12, CS13 and CS14
- With SIMATIC TDC: CP53 and GDM (CP52IO interface card)

All CPUs of all frames that are connected by a rack link component can communicate with one another. If the ibaFOB-SD or ibaFOB-TDC is likewise connected with this rack link, then all these CPUs can basically also communicate with *ibaPDA*.

In practice, this number is limited by:

- The max. channel number of 50 PDA channels per FOB-SD/-TDC card
- The limited data rate of FOB-SD/-TDC cards
- The capability of the FO connection

In an *ibaPDA* computer, you can operate 4 ibaFOB-SD or ibaFOB-TDC cards. The cards differ as follows:

| | **ibaFOB-SD/-SDexp** | **ibaFOB-TDC/-TDCexp** |
|---|---|---|
| FO interface | ST technology | SC technology |
| Baud rate | 96 Mbit/s | 640 Mbit/s |
| Possible coupling partners | SIMADYN D<br>CS12 / CS13 / CS14 | |
| | SIMATIC TDC<br>CP53 | SIMATIC TDC<br>CP52IO (GDM) |

| | **ibaFOB-SD/-TDC** | **ibaFOB-SDexp/-TDCexp** |
|---|---|---|
| PC interface | PCI | PCI Express |
| Memory access | via CPU | DMA |
| Request procedure | SER04A/-B | SER04A-/B |
| | | SER05A-/B |

**Other documentation**

You can find the HW descriptions of the ibaFOB-SD and ibaFOB-TDC components at www.iba-ag.com and on the DVD “iba Software & Manuals” included in delivery.

**Special features of the CP53 component (available in SIMATIC TDC starting with D7-SYS V7.1):**

The component can be configured as a master or slave. In the master mode, one connection can be used for connection of *ibaPDA* (ibaFOB-SD card), the other for connection of a slave rack. The slave rack is either SIMADYN D with the CS22 component or SIMATIC TDC with the CP53 component (slave mode). In slave mode, the 2nd connection cannot be used.

If the component is initialized in the STRUC mode for connection with SD under STRUC, then no *ibaPDA* access to the CFC-CPUs is possible.

**Special features of the CS12/13/14 components (SIMADYN D):**
The components differ only in the number of FO connections (1, 4 or 8). When mentioning the CS14 in the following, the information also applies to CS12 and CS13. Any free connection can be occupied on one of these components.

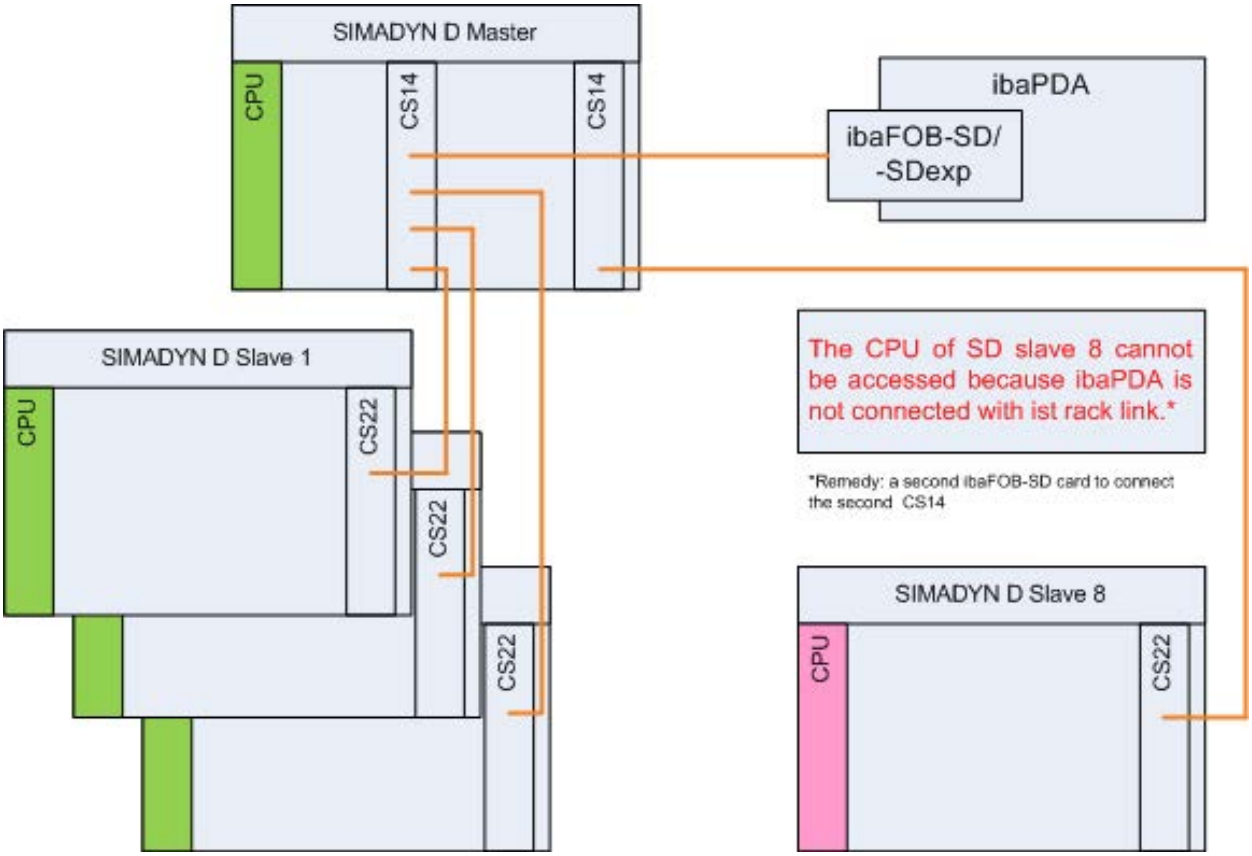
**Special features of the Global Data Memory (GDM) (in SIMATIC TDC):**
The GDM is a complete frame containing only the CP52M0 memory component and up to 11 interface components (CP52IO). Each interface component provides 4 connections. All connections are on an equal footing.

## 3.3 Configurations

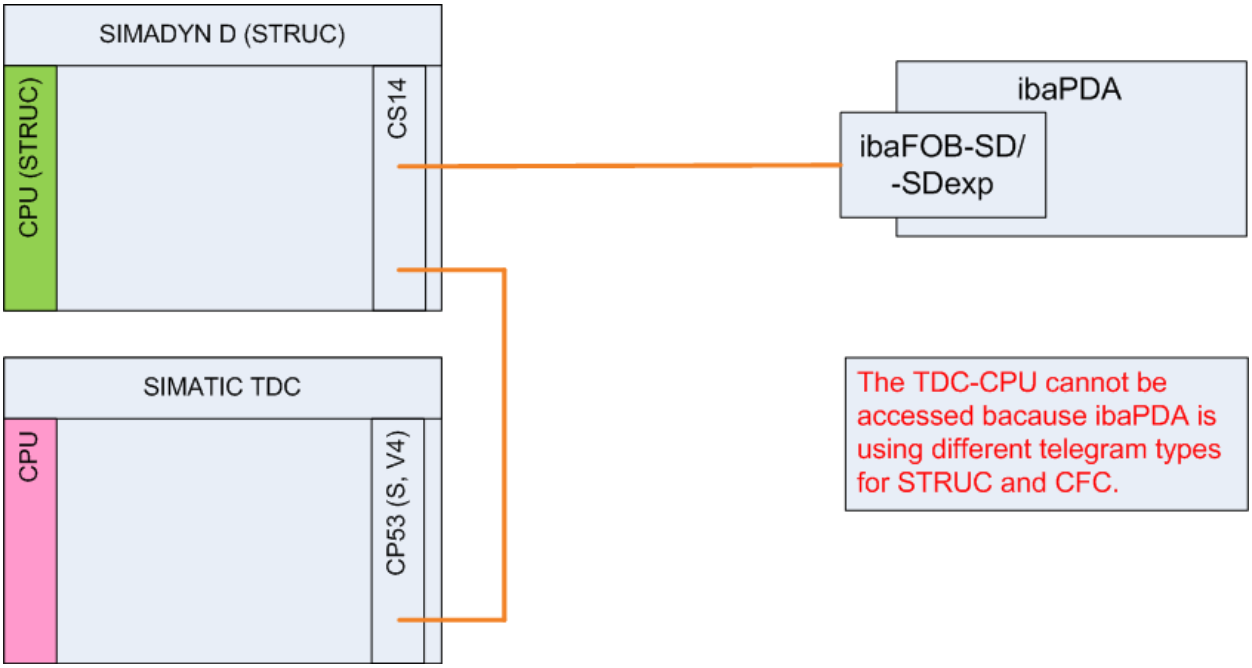
Explanations for the following examples:

- Green CPU: CPU to which *ibaPDA* has access
- Red CPU: CPU to which *ibaPDA* does not have access
- CP53 parameter:
  - S: CP53 as slave
  - M: CP as master
  - V4: CP53 in STRUC mode
  - V6: CP53 in CFC mode

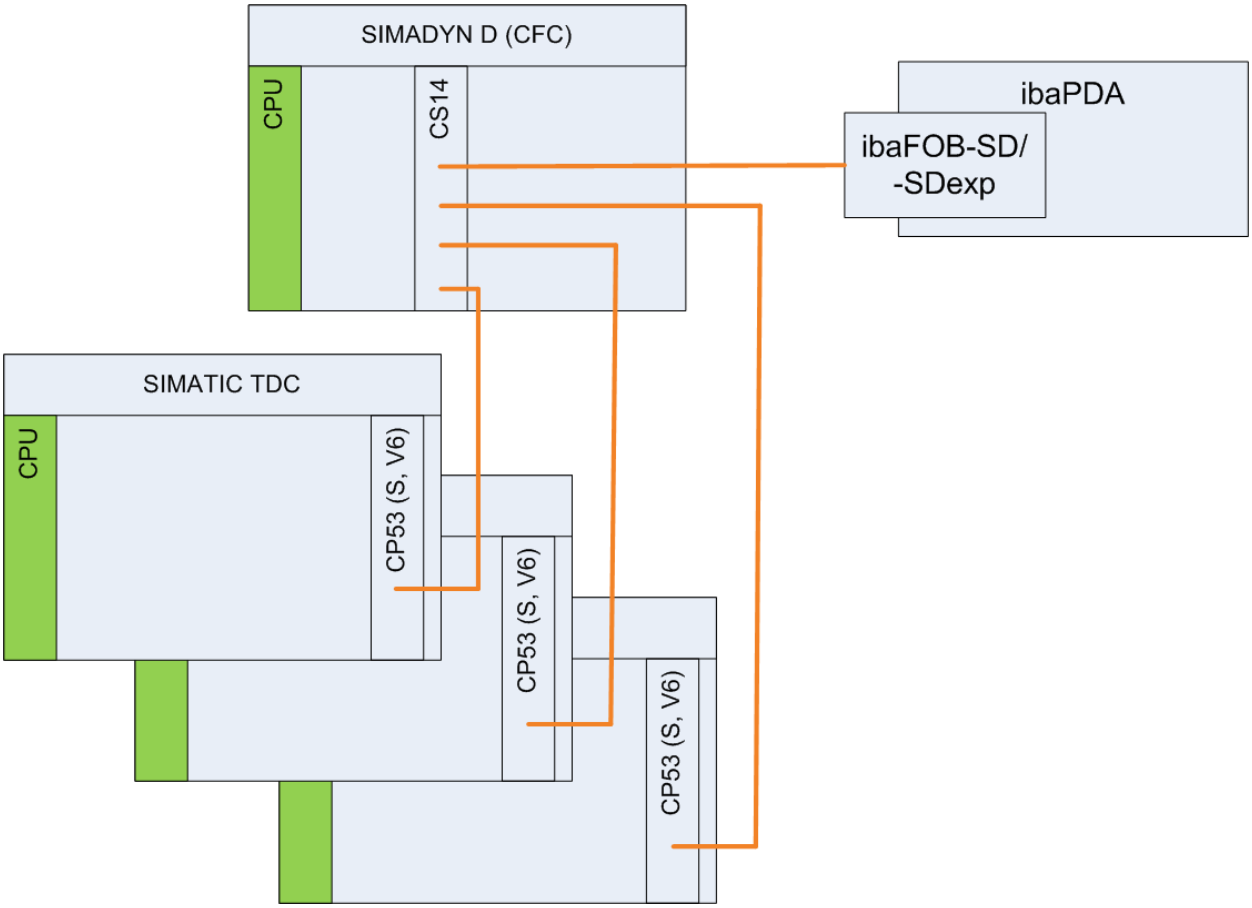
### 3.3.1 ibaFOB-SD/-SDexp to SD-master-slave system (CS14)



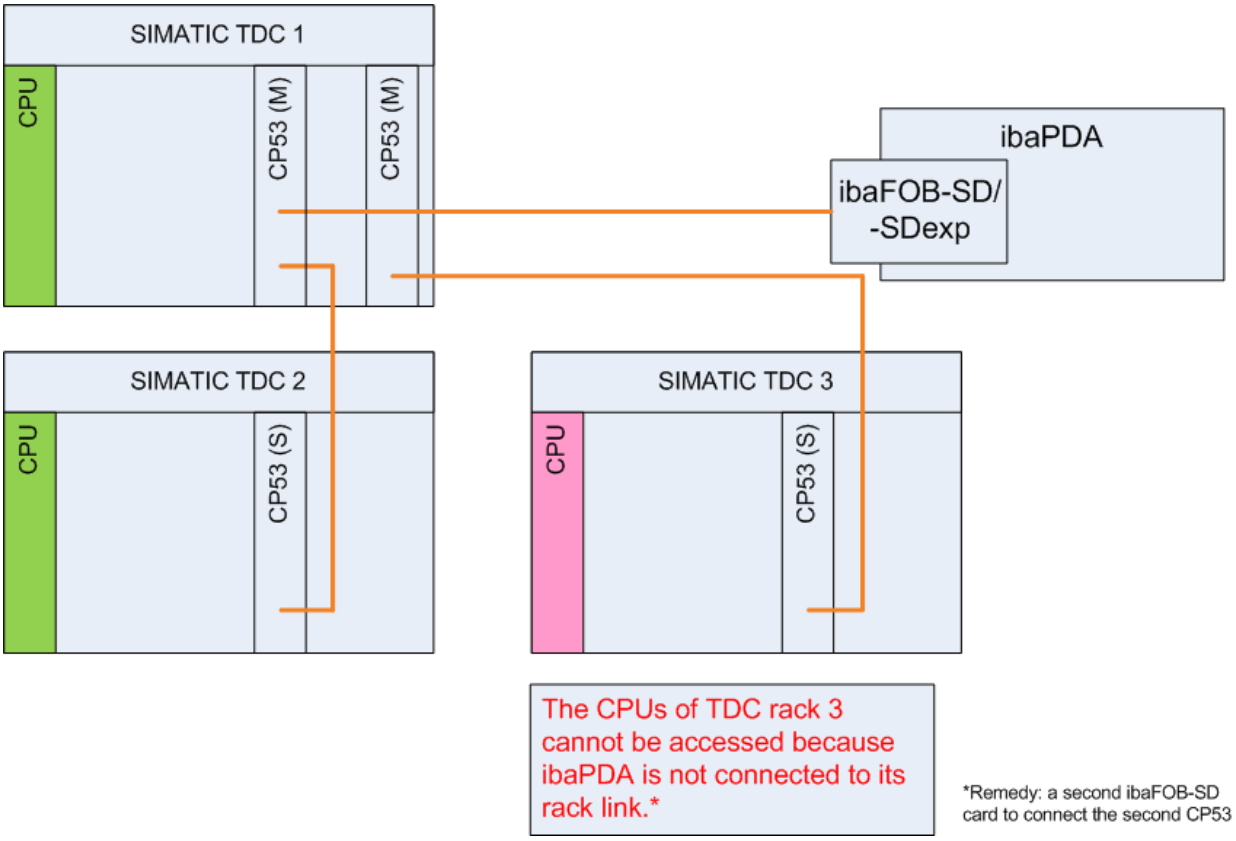

### 3.3.2 ibaFOB-SD/-SDexp to SD-master (STRUC) and TDC-slave



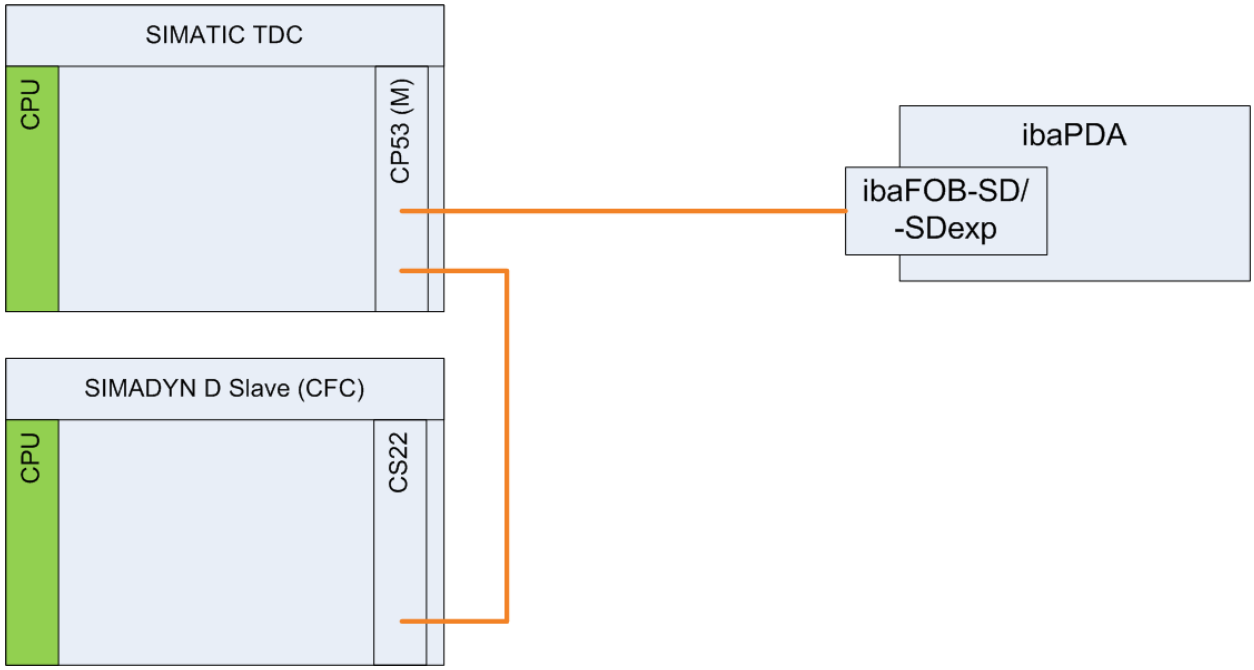
### 3.3.3 ibaFOB-SD/-SDexp to SD-master (CFC) and TDC-slave



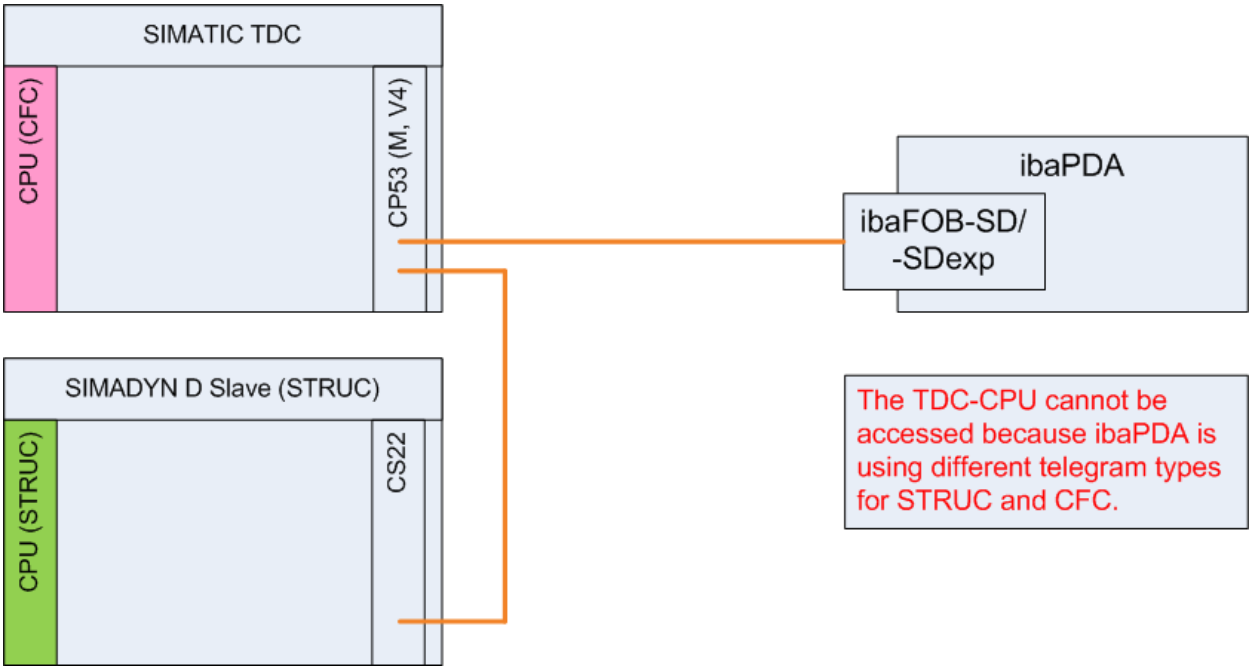
### 3.3.4 ibaFOB-SD/-SDexp to TDC-master and -slave (CP53)



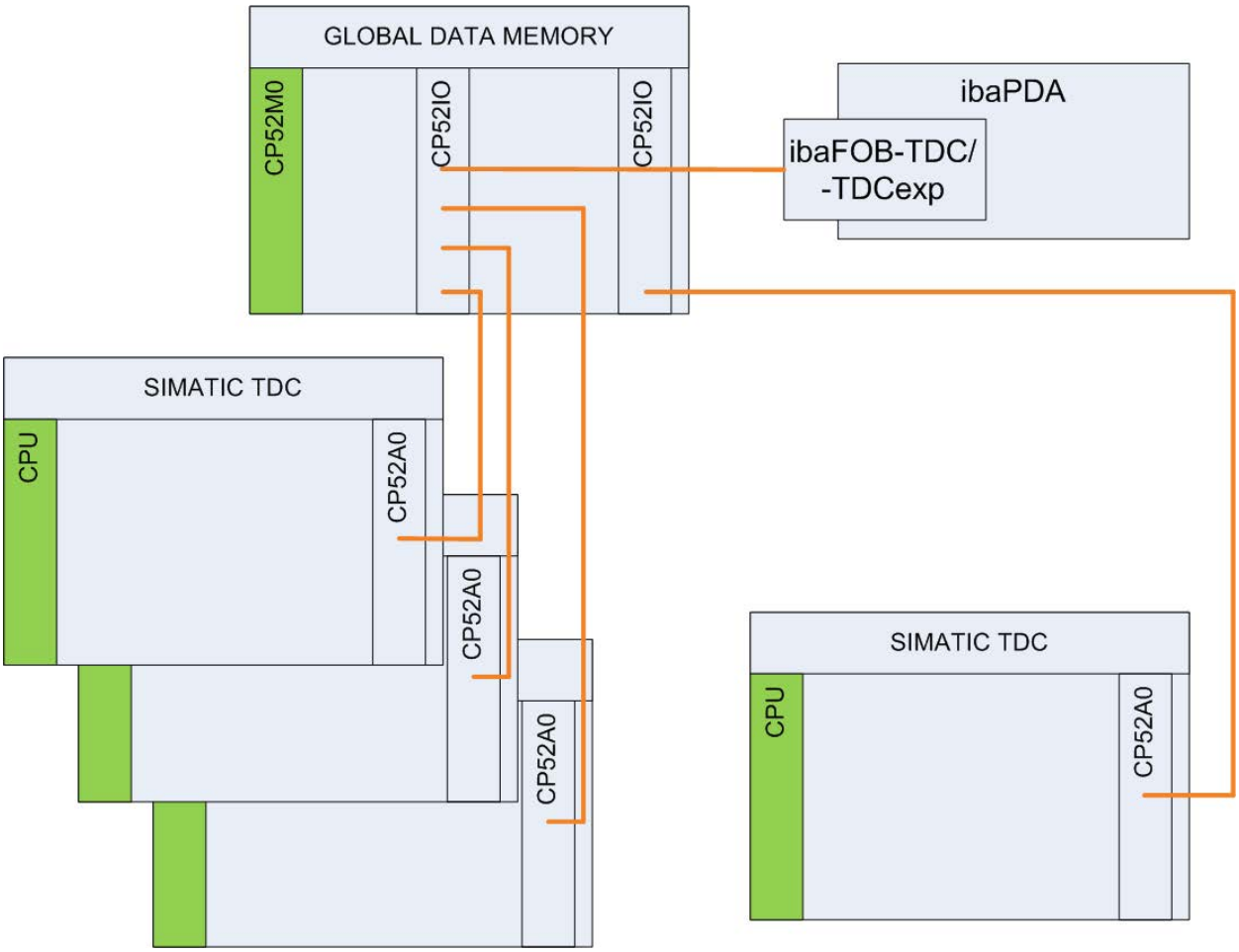

### 3.3.5 ibaFOB-SD/-SDexp to TDC-master and SD-slave (CFC)



### 3.3.6 ibaFOB-SD/-SDexp to TDC-master and SD-slave (STRUC)




### 3.3.7 ibaFOB-TDC/-TDCexp to SIMATIC TDC (GDM)



## 3.4 Functional principle

In the measuring operation, numerical and digital signals are measured, i.e., variables are read out of the computer system and recorded. In defining the variables to be measured, we differentiate 2 procedures:

**SD-TDC Lite**
All values that you want to measure with *ibaPDA* first have to be configured in process data telegrams. To change the measurement scenario, you have to change the configuration.

**Other documentation**

You can find the description of the SD-TDC Lite access mode in the manuals ibaFOB-SDexp and ibaFOB-TDCexp at www.iba-ag.com and on the DVD “iba Software & Manuals” included in delivery.

**Symbolic Request**
You define the variables to be measured not in the control, but rather in *ibaPDA*.

The information about the configured variables, the so-called address book, is either read directly from the CPUs by *ibaPDA* in a configuration operation (with configuration under CFC) or provided by the configuration as an ASCII file (with STRUC).

You can select the variables to be measured from the address book with a browser. Thus, you can apply different measurement scenarios without having to change the configuration.

On the control side, for each PDA channel you have to configure 2 or 5 service function blocks (agents) on the CPU.

In "Symbolic Request“, the connection of a processor to *ibaPDA* is referred to as PDA channel. One channel is identified by 2 signs 'nn'. iba recommends to use the processor short name as name for the channel[1)].

For each CPU, multiple PDA channels can be configured. The channel names need to be different and have to be unambiguous per rack link and per *ibaPDA* system

The iba cards and *ibaPDA* support both procedures. However, only one mode per card can be selected. If there are multiple cards and both licenses available, both procedures can be used simultaneously in *ibaPDA*.

For one card, the following applies: If there is defined at least 1 Lite channel, a Request channel can not be assigned to that card. In case, a Request channel has been assigned to that card, no more Lite channels can be added.

1) The function block names of the processors are only unambiguous within one rack, but not within a communication island. For an unambiguous designation of the communication channels between the processors of different frames, processor short names consisting of 2 signs are used. These short names are defined by the user and need to be unambiguous for all systems that are con-nected to ibaPDA. For Siemens projects, the short names are usually pre-defined in the Siemens configuration guidelines

### 3.4.1 Request with SER04A/-B

Two function blocks SER04A and SER04B are required per PDA channel.

The SER04A administrator component establishes two communication connections to *ibaPDA*. Via the "PDA*nn*CMD" reception channel, the function block receives the requests of ibaPDA either for transmitting the address book or the measured data.

When transmitting address books, the names of all charts, blocks and connectors are transferred to *ibaPDA*. The block creates a transmission channel "ADRB_PDA", that is used by all CPUs of a rack. For a measurement data request, *ibaPDA* passes the names of chart, block and connector for every variable. Using this information, the block calculates the memory addresses and data types of the measured values and transfers both in a common memory area to the connected SER04B block. In a "*nn*PDAACK" transmission channel, the SER04A acknowledges the request or returns error messages, in case the connector does not exist or the data type is not permitted.

The SER04B transfer block creates a transmission channel "*nn*PDADAT" for the fast cyclic transfer of the measurement data. After the starting trigger by SER04A, the addresses and data types of the measurement values are read out of the common memory area in every cycle, the associated measurement values are entered in the telegram buffer and sent.

Via a "LIM" connector, the user may enter a limit value for the maximum permissible CPU load. See chapter ↗ *Load limitation*, page 29.

One PDA channel consists of 3 telegrams (communication channels):

- One Request telegram (PDA*nn*CMD)
- One Acknowledge telegram (*nn*PDAACK)
- One data telegram (*nn*PDADAT) (*nn* = CPU short name)

A maximum of 32 analog values and 32 digital values can be transferred per PDA channel. Before the transmission, all analog values are converted to the „IEEE-FLOAT“ data format.

The following data types are supported:

| | **STRUC** | **CFC** |
|---|---|---|
| 1 bit values | B1 | BOOL |
| 16 bit values | I2, O2, V2, N2 | INT, WORD |
| 32 bit values[2)] | I4, O4, N4 | DINT |
| Floating point values | NF | REAL |

2) When converting to REAL, the precision of the 32 bit Integer values is reduced to 23 bit

### 3.4.2 Request with SER05A/-B

**Notes**

Request with SER05A/-B is only possible with ibaFOB-SDexp or ibaFOB-TDCexp card.

The blocks are called S5A and S5B under STRUC. All specifications for SER05A and SER05B are also valid for S5A and S5B.

**Modifications compared to SER04A/-B**

1. 5 transfer blocks SER05B are connected to each SER05A administrator block, one block per time slice.

   Note: You can also connect a SER05B block with a time slice that is slower than initially planned. E.g., also a SER05B can be connected in T2 to CV1 for preventing a threatening overload of the CPU.

2. No channel names are configured on the blocks. Only the "CPU short name" (2 signs) is given once on the SER05A.NAM connector. Using these data, the blocks create the following channel names:

   - PDA*nn*CMX Request telegram
   - *nn*PDAACX Acknowledge telegram
   - *nn*PDADA1 Data telegram time slice 1
   - *nn*PDADA2 Data telegram time slice 2
   - *nn*PDADA3 Data telegram time slice 3
   - *nn*PDADA4 Data telegram time slice 4
   - *nn*PDADA5 Data telegram time slice 5

3. The "LIM" connector for the CPU load limitation, is entered once at the SER05A block and applies to all connected SER05B blocks.

4. A maximum of 128 analog and 128 digital signals can be requested per time slice, i. e. a total of 1280 signals.

5. The SER05A administrator block does not need to be configured on the slowest time slice. Depending on the project, it might be useful to configure SER05A in T3 or T4 for reducing the times for address book transmission and the start of the measurement (e.g. 100-200 ms).

6. Increased data security: No "invalid values" acquired: On SER04, "slower" connectors have been acquired in a faster time, i.e. partially invalid intermediate values have been measured at the output connectors.

7. The measured values are not converted, but transferred densly packed in their data type. This reduces the CPU computing time and increases the precision for DINT and DWORD values.

8. The user does not need to care for the access optimization concerning the run time. SER05 does this automatically.

9. "Slow" connectors can be integrated in the measurement process without an increase in the CPU load: Measurements show that values in T3-T5 only marginally load the CPU.

10. Reduction in the CPU load: Even when more than one SER04B are used in T1, SER05B provides for an advantage in CPU load.

One **PDA channel** consists of 7 telegrams (communication channels):

- One Request telegram (PDA*nn*CMX) (*nn* = CPU short name)
- One Acknowledge telegram (*nn*PDAACX)
- Five data telegrams (*nn*PDADA*i*) (*i* = time slice 1…5)

A maximum of 128 analog values and 128 digital values are transmitted per time slice over a PDA channel, hence a total of 640 analog and 640 digital values.

The following data types are supported:

| | **STRUC** | **CFC** |
|---|---|---|
| 1 bit values | B1 | BOOL |
| 8 bit values | V1 | BYTE |
| 16 bit values | I2, O2, V2, N2 | INT, WORD |
| 32 bit values | I4, O4, N4, V4 | DINT, DWORD |
| Floating point values | NF, TF | REAL |

# 4 Configuration on SIMADYN D/SIMATIC TDC

## 4.1 Service function blocks SER04A/-B

For the measurement, the functional blocks SER04A and SER04B are needed for each PDA channel. You configure these blocks on each processor, ibaPDA should have access to.

**SER04A**

The SER04A function block should be configured in a slow sampling time (e.g., T5 >200 ms). In any case, it must be configured more slowly than the SER04B function block.

Description of connectors:

| Connector | Description | Value (example) |
|---|---|---|
| CTS | Initialization connector for the connection to the component group, the data interface the communication has to run over. (with SD: CS14 or CP53, with TDC: CP52A0). | "D0600B" |
| AT | Initialization connector for the channel name of the acknowledgement channel in the form "*nn*PDAACK” | "V1PDAACK" |
| AR | Initialization connector for the channel name of the request channel in the form "PDA*nn*CMD” | "PDAV1CMD” |
| CVP | Connection with connector SER04B.ADR | |
| ST | Status indication of internal function block status | see chap. ↗ *SER04A / SER05A*, page 77 |
| YTS | Status indication: error code | |
| YTZ | Status indication: additional error identification | |
| YTT | Status indication: transmission channel | |
| YTR | Status indication: reception channel | |
| LFZ | Indication of last error status | |
| QTS | Indication of operational availability | 1 = ready for operation |

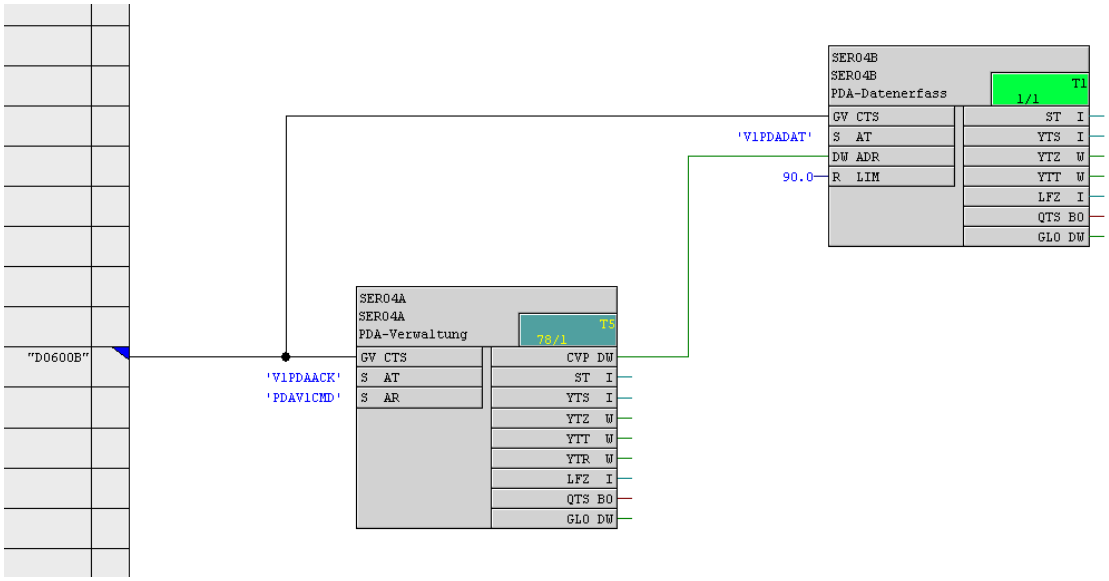
**SER04B**

The SER04B function block is generally configured in the fastest sampling time.

Description of connectors:

| Connector | Description | Value (example) |
|---|---|---|
| CTS | Initialization connector for the configured component group, the data interface the communication is to take place over. (with SD: CS14 or CP53, with TDC: CP52A0) | "D0600B" |
| AT | Initialization connector for the channel name of the data channel in the form "*nn*PDADAT" | "V1PDADAT" |
| ADR | Connection with connector SER04A.CVP | |
| LIM | Limitation of maximum processor load in per-cent (%) | "90.0", see chap. ↗ *Load limitation*, page 29 |
| ST | Status indication of internal function block status | see chap. ↗ *SER04B / SER05B*, page 78 |
| YTS | Status indication: error code | |
| YTZ | Status indication: additional error identification | |
| YTT | Status indication: transmission channel | |
| LFZ | Indication of last error status | |
| QTS | Indication of operational availability | 1 = ready for operation |

**Interconnection:**



## 4.2 Service function blocks SER05A/-B

For the measurement, the functional blocks SER05A and SER05B are needed on each processor, *ibaPDA* should have access to.

**SER05A**

The SER05A function block should be configured in a slow sampling time T3, T4 or T5. We recommend a cycle time of 100-200 ms. The slower the sampling time, the longer the booting process for the start of the measurement and the transfer of the address books.

Description of the connectors:

| Connector | Description | Value (example) |
|---|---|---|
| CTS | Initialization connector for the projected component group, over whose data interface the communication is to take place. (with SD: CS14 or CP53, with TDC: CP52A0). | "D0600B" |
| NAM | Initialization connector for the short name of the CPU. | "AB" |
| LIM | Limitation of the CPU in percent. By means of "0.0", the load monitoring can be disabled. | "95",<br>see chap. ↗ *Load limitation*, page 29 |
| CV1 | Connection to SER05B.ADR configured in T1 | |
| CV2 | Connection to SER05B.ADR configured in T2 | |
| CV3 | Connection to SER05B.ADR configured in T3 | |
| CV4 | Connection to SER05B.ADR configured in T4 | |
| CV5 | Connection to SER05B.ADR configured in T5 | |
| ST | Status indication internal function block status | See chapter ↗ *SER04A / SER05A*, page 77 |
| YTS | Status indication error code | |
| YTZ | Status indication additional error identification | |
| YTT | Status indication transmission channel | |
| YTR | Status indication reception channel | |
| QTS | Indication of operational availability | 1 = ready for operation |

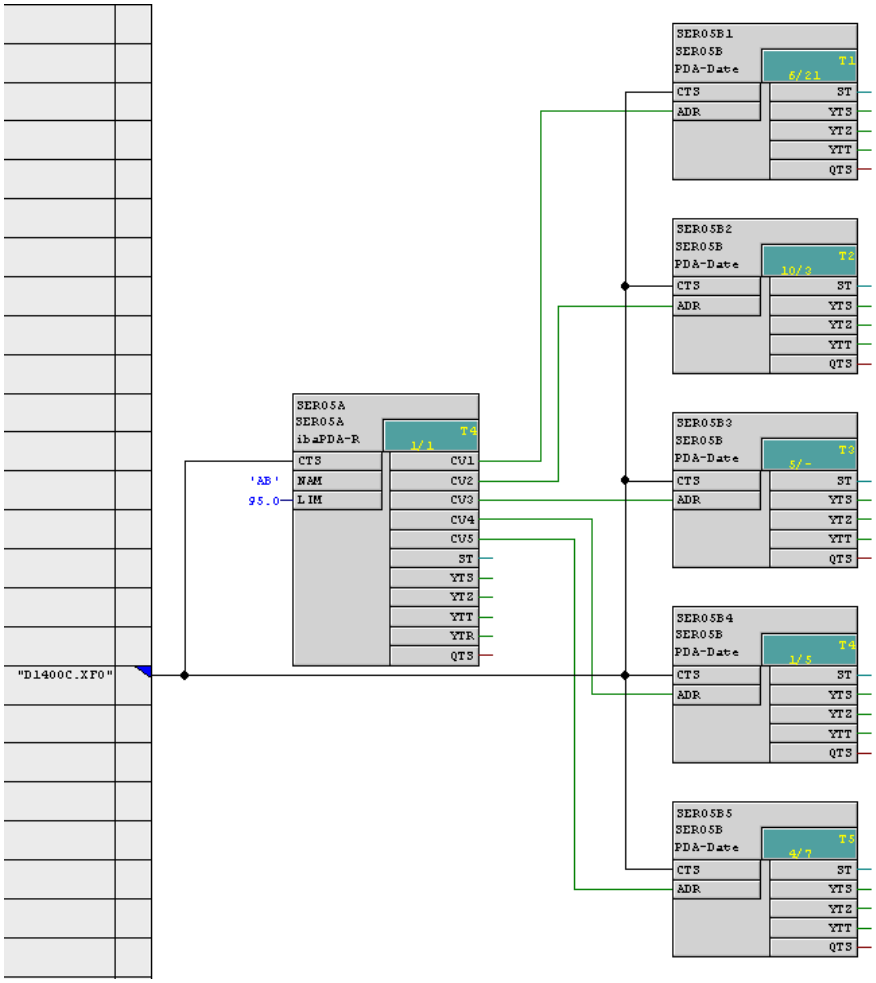
**SER05B**

Configure SER05B once in every sampling time T1 to T5.

Description of the connectors:

| Connector | Description | Value (example) |
|---|---|---|
| CTS | Initialization connector for the connection to the block, via whose data interface communication is to take place. | "D0600B" |
| ADR | Connection with connector SER05A.CVi | |
| ST | Status indication internal function block status | See chapter ↗ *SER04B / SER05B*, page 78 |
| YTS | Status indication error code | |
| YTZ | Status indication additional error identification | |
| YTT | Status indication transmission channel | |
| QTS | Indication of operational availability | 1 = ready for operation |

**Interconnection:**



## 4.3 ibaPDA technostring (TS)

The ibaPDA technostring (TS) is a process data channel over which additional non-cyclical alphanumeric data accompanying the measurement can be transmitted to *ibaPDA*. The *ibaPDA* technostring runs independently of the *ibaPDA* data channels.

The technostring channel must be configured on the control side. The user has to make sure that the TS is transmitted to *ibaPDA* only in case of a modification or in a slow cycle (>= 1 second).

The TS channel is queried each second by *ibaPDA*.

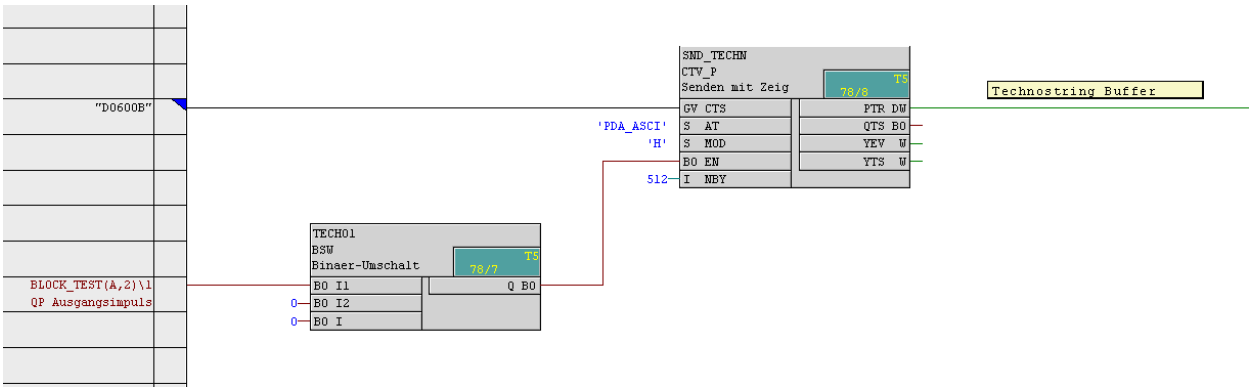
**Note**

Only 1 technostring is possible for each rack link. However, beyond the rack link you have the possibility of transmitting further text signals, e.g., via TCP/IP or serial interface.

The channel characteristics are defined as follows:

| | **ibaPDA technostring** |
|---|---|
| Channel name | PDA_ASCI |
| Channel length | 512 bytes |
| Data format | Unformatted alphanumeric character string |
| Channel mode | Handshake |
| Application | Transmission of strip attributes, technology and material related data before entry of a new strip in the rolling mill |
| Cycle | 1 second |

**Example program "Transmit technostring in CFC" with CTV_P**



**Note**

On *ibaPDA* side the Technostring message is configured in a special text module "TDC text" or "SD text" under the interface node "ibaFOB-TDCexp" or "ibaFOB-SDexp".

By this module the string can be cut into separate text sections. If required, numbers can be interpreted as numeric values.

## 4.4 Time synchronization

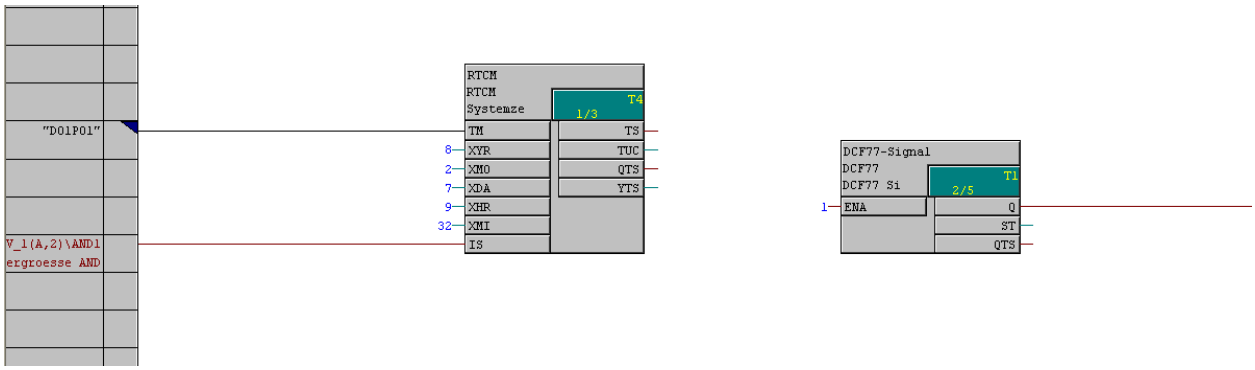
If you synchronize the time of the *ibaPDA* system with the Siemens control, then you have to configure an RTCM function block that reads the system time from a source or generates it itself and distributes it to the connected racks. This function block can only be configured once per rack.

Synchronization under CFC is done by means of a DCF77 digital signal that is generated by the control.

**Procedure**

On the control side, configure a DCF77 function block in the fastest sampling time on one CPU. This function block supplies a digital DCF77 signal that is taken up into the list of digital signals acquired by *ibaPDA* and has to be used in *ibaPDA* for synchronization (see chapter ↗ *Synchronization with DCF77 signal*, page 52)

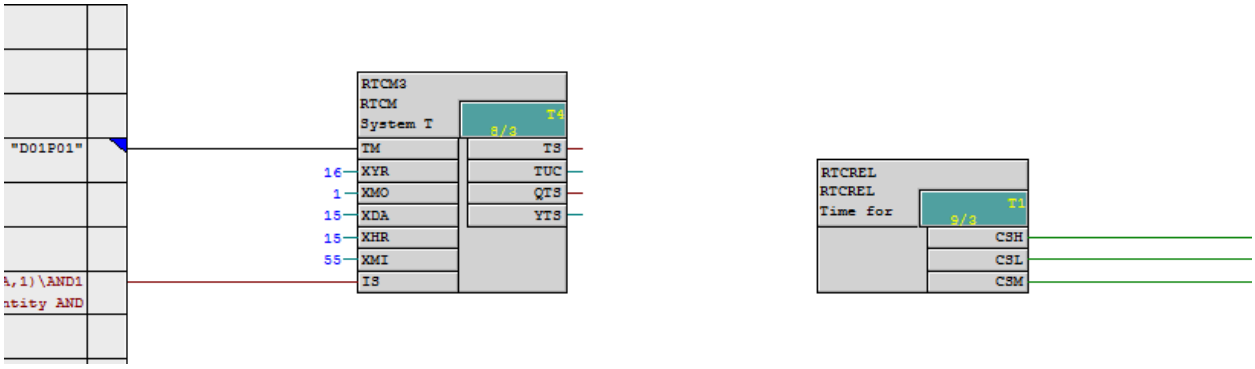
The function block is included in the FBAPDA block library of iba AG.




Alternatively, you can synchronize with an IEC time signal.

**Procedure**

On the controller side, configure an RTCREL function block (in CFC) or an RTC005 function block (in STRUC) to get the values for the seconds since 1.1.1988 (CSH, CSL) and the value for the 1/10 millisecond counter.



## 4.5 Address books

Under STRUC, an address book must be generated for each processor after configuration. It contains the information about all configured variables (function packets, function blocks, connectors and time slices). This address book file named "xxxxxx_y.adr" (xxxxxx = BGT name, y = processor number) must be made available to the *ibaPDA* system, i.e., either *ibaPDA* must be able to directly access the SIMADYN D project path via network functions or this file must be copied onto the *ibaPDA*-PC in an address book directory.

Under CFC, the address books generated by the compiler are not usable for *ibaPDA* since only those variables are included that have the “Operable and observable” checkbox activated when configuring. Therefore the necessary information is read directly from the individual processors via FO connection and stored in files (see chapter ↗ *Address books*, page 41).

## 4.6 Other characteristics

### 4.6.1 Processor load

**Note**

Note that the processor load increases due to an active PDA channel.

For the sporadic load due to transmission of the address book, the SER04A or SER05A function block requires a computing time of max. ca. 10 ms to 20 ms per cycle. The time slice in which the block is configured must therefore be chosen so that sufficient processing time remains for the sporadic T5 task "Transmit address book”.

If this time is not available, then the overload indication "E" is displayed during address book transmission. Since this overload is only sporadic and is caused in T5 and therefore has no influence on T1-T4 processing, this display can be ignored and deleted again by acknowledgement.

The cyclical transmission operation by the SER04B or SER05B function block requires computing time per transmission cycle for assignment of the measurement values in the local data buffer and for transmission of the data into the rack link.

The measurements with **SER04** showed the following results:

| | **Measurement 1** | **Measurement 1** | **Measurement 3** |
|---|---|---|---|
| System | SIMATIC TDC | SIMATIC TDC | SIMADYN D |
| Software | PCS7 V7.1,<br>D7-Sys V7.1 | PCS7 V5.2,<br>D7-Sys V5.2 | STRUC<br>V4.2.5 |
| CPU | **CPU551** | **CPU550** | **PM5** |
| ibaFOB-SD (B5) | - | - | CS13 |
| ibaFOB-TDC (B5) | CP52A0 (GDM) | CP52A0 (GDM) | - |
| SER04A/B | 100204V001 | 020417V007 | 990603V420 |
| Transfer time | (38 + n * 2,7) µs | (44 + n * 3,7) µs | (80 + n * 6) µs |

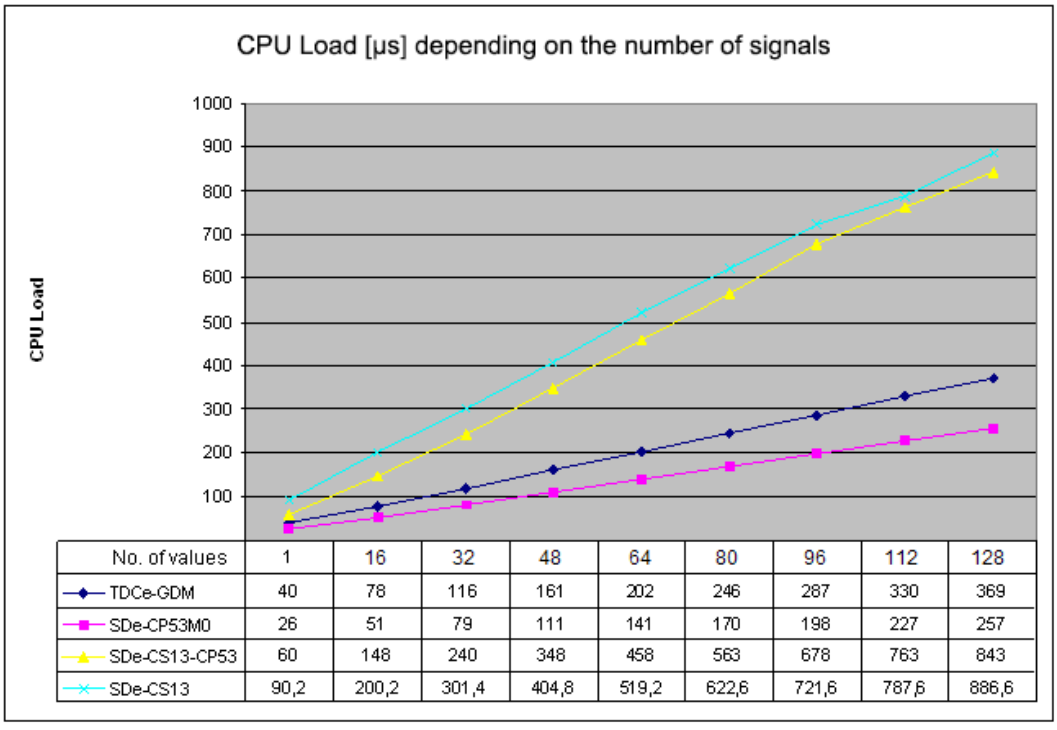
| | Measurement 1 | Measurement 1 | Measurement 3 |
|---|---|---|---|
| full PDA channel (32 A + 32D) | appr. 125 µs | appr. 160 µs | appr. 280 µs |

with n = number DWORD (analog values (FLOAT) and digital values), max. 33

The measurements with SER05 delivered the following results:

| | Measurement 1 | Measurement 2 | Measurement 3 | Measurement 4 |
|---|---|---|---|---|
| System | SIMATIC TDC | SIMATIC TDC | SIMATIC TDC | SIMADYN D |
| Software | PCS7 V7.1, D7-Sys V7.1 | PCS7 V7.1, D7-Sys V7.1 | PCS7 V7.1 D7-Sys V7.1 | PCS7 V7.1 D7-Sys V7.1 |
| CPU | CPU551 | CPU551 | CPU551 | PM5 |
| ibaFOB-TDCexp | CP52A0 (GDM) | - | - | - |
| ibaFOB-SDexp | - | CP53M0 (M) | CS13–CP53M0 | CS13 |
| SER05A/-B | 140129V001 | 140129V001 | 140129V001 | 140129V001 |
| Transfer time | (38 + n*2,7) µs | (26 + n*1,9) µs | (60 + n*6,4) µs | (90 + n*7,0) µs |
| Full channel of a time slice (128 A+ 128 D) | appr. 385 µs | appr. 268 µs | appr. 883 µs | appr. 920 µs |

with n = number DWORD (analog values and digital values packed), max. 132

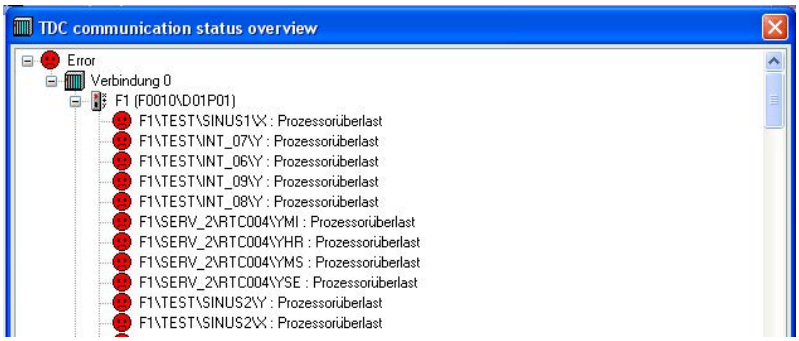



| No. of values | 1 | 16 | 32 | 48 | 64 | 80 | 96 | 112 | 128 |
|---|---|---|---|---|---|---|---|---|---|
| TDCe-GDM | 40 | 78 | 116 | 161 | 202 | 246 | 287 | 330 | 369 |
| SDe-CP53M0 | 26 | 51 | 79 | 111 | 141 | 170 | 198 | 227 | 257 |
| SDe-CS13-CP53 | 60 | 148 | 240 | 348 | 458 | 563 | 678 | 763 | 843 |
| SDe-CS13 | 90,2 | 200,2 | 301,4 | 404,8 | 519,2 | 622,6 | 721,6 | 787,6 | 886,6 |

### 4.6.2 Load limitation

In order to prevent a CPU overload due to the increase in computing time when making a request, the blocks need to have a load limitation (connector LIM).

After the start of acquisition, the function block follows a kind of run-up ramp when taking only parts of the requested values per cycle into its processing. During this phase the required computing time is checked. If the load exceeds the value set at the LIM connector, then the measurement values that have not yet been processed are rejected and a “Processor overload” error message appears on*ibaPDA* (see illustration below: “TDC Communication status overview”. The user needs to reduce the number of the requested values in *ibaPDA* or increase the sampling time base *(ibaPDA* base measuring rate or the PDA channel time bases) or increase the time slice for the SER04B in the TDC system.




**Note**

The load is checked only at the start of acquisition. A load increase due to other acyclic processes during ongoing measurement is not detected by the SER04 function block.

Due to unfavorable temporal relations overload errors can occur despite monitoring. The load increase in high-priority tasks has repercussions on the utilization of low-priority tasks. But the latter lead to a load increase only after expiration of their task cycle. But with slow low-priority task times the run-up of the SER04B function block is already concluded at this point.

**Note**

The load limitation does not work when the SIMATIC TDC processor boards CPU551 or CPU550 work with a "synchronized" base clock cycle. In this case you should switch off the load limitation by entering "LIM=0".

In the CPU 555, this bug is fixed.

### 4.6.3 Transmission cycle

The SER04B works in the configured sampling time (primarily T1).

If the data is requested by *ibaPDA* in a slower cycle, then the function block reduces its own transmission cycle. In other words, it transmits no longer in the projected cycle time, but rather in the cycle in which the data are read by *ibaPDA* (rounded to a multiple of its own cycle). This way, the processor load can be reduced.

Starting with *ibaPDA* v6.24.1 a time base can be specified for each PDA channel in order to optimize the load of the CPUs (see chapter ↗ *Creating PDA channels*, page 36).

When requesting with SER05B, every measured value is sent in the cycle it has been configured.

If all data are requested by *ibaPDA* in a slower cycle (see chap. ↗ *"Timing" tab*, page 65), the block reduces its own transmission cycle. In other words, it transmits no longer in the projected cycle time, but rather in the cycle in which the data are read by *ibaPDA* (rounded to a multiple of its own cycle). This way, the processor load can be reduced.

### 4.6.4 Storage requirement

One SER04A/-B PDA channel needs appr. 1,800 Bytes in the communication storage of the rack coupling link (CS14, CP53 oder GDM).

One SER05A/-B PDA channel needs appr. 7,500 Bytes in the communication storage of the rack coupling link.

The address book telegram requires once 16,516 Bytes.

# 5 Configuration and engineering ibaPDA

The following sequence is recommended for the configuration:

1. *ibaPDA* standard settings
2. Request presettings
3. Automatic detection of connected CPUs
4. Load address books
5. Setting up request modules
6. Selection of signals

With subsequent changes in configuration, only the address books of the changed CPUs have to be updated.

Configuration of the PDA channels is automated as extensively as possible. The following "special cases" are also covered.

- Several PDA channels are projected on one processor
- One *ibaPDA* has several "parallel" links to a rack link
- One *ibaPDA* several links to different rack links
- Several *ibaPDAs* each have a link to the same rack link

## 5.1 ibaPDA standard settings

**Other documentation**

For settings of time base, interrupt, etc. see *ibaPDA* manual.

## 5.2 Hardware interfaces ibaFOB-SD/ibaFOB-TDC

**Procedure**

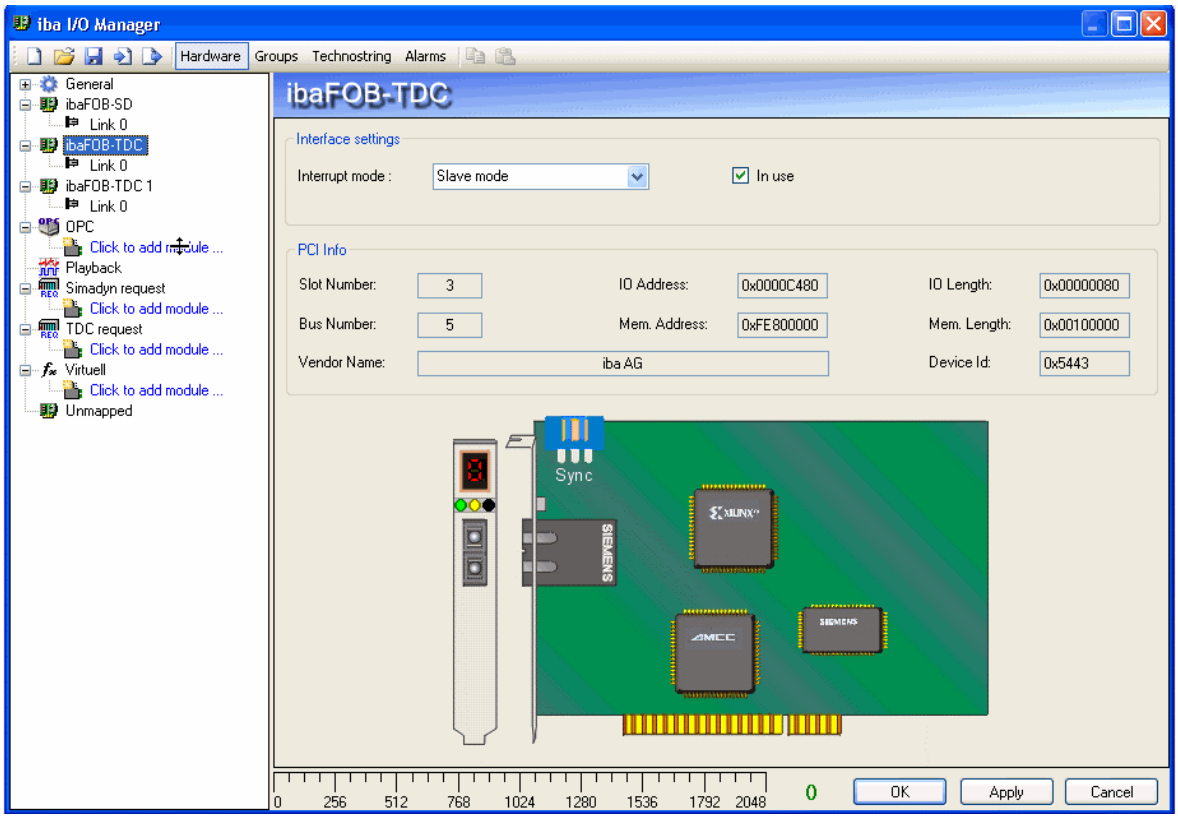
1. Open the I/O Manager in the *ibaPDA* client.
2. Click on <New configuration>.
   *ibaPDA* detects both the installed components as well as the licensed data interfaces and depicts them in the tree structure. The iba components are schematically depicted in the dialog window if they are marked in the hardware tree.

Because the ibaFOB-SD and ibaFOB-TDC cards are functionally not different, only the ibaFOB-TDC card is described in the following. This description also applies to the ibaFOB-SD card, unless otherwise expressly mentioned.

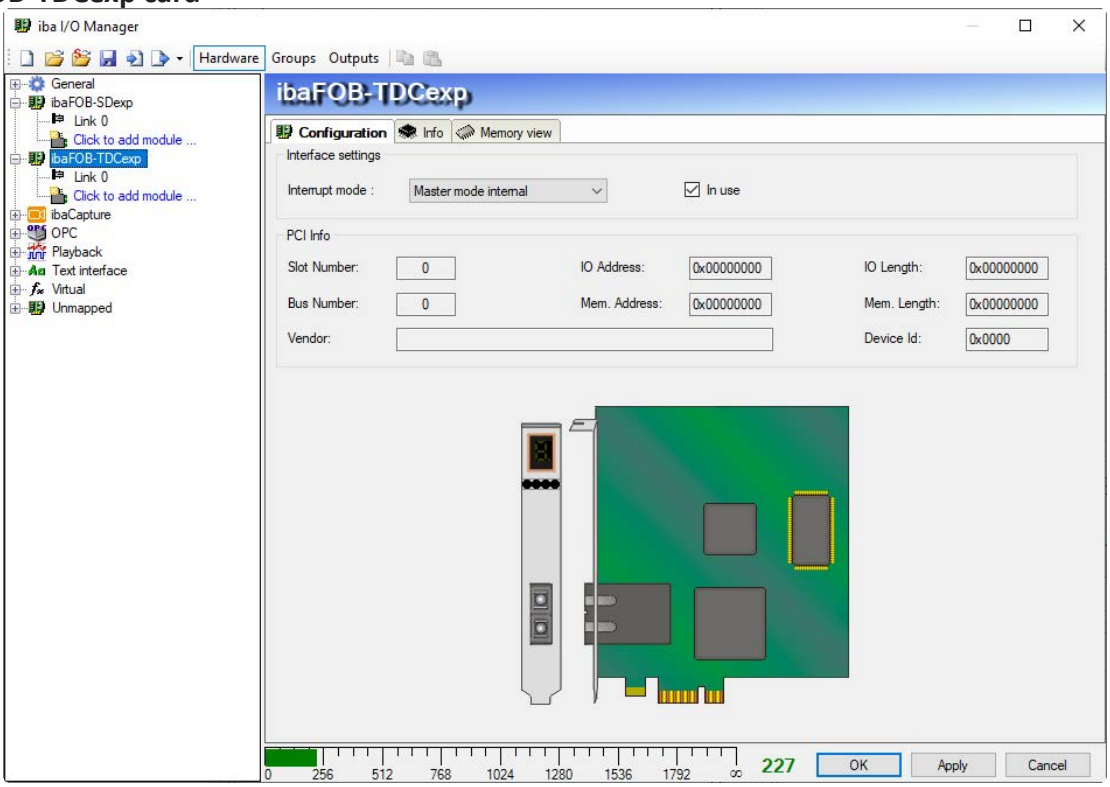
The same applies to the ibaFOB SDexp and ibaFOB TDCexp card.

### 5.2.1 Schematic representations of the iba cards

#### ibaFOB-TDC card




#### ibaFOB-TDCexp card



You get the following information in the dialog window:

**Interface settings**
Set the interrupt mode and tick the "In use" checkbox.

**Note**

Set the ibaFOB-SD or ibaFOB-TDC as interrupt master if you use only ibaFOB-*n*i-S or ibaComL2B-*n*/8 cards.

**PCI Info**
You can find information about the PCI interface in the “PCI info” area of the dialog. It is of interest only to developers.

**ibaFOB-SD-/TDC card display**
The graphic depiction of the card is dynamic, i.e., the 7-segment display with the card number and the LEDs for the connection status reflect the same status that can also be seen on the card itself.

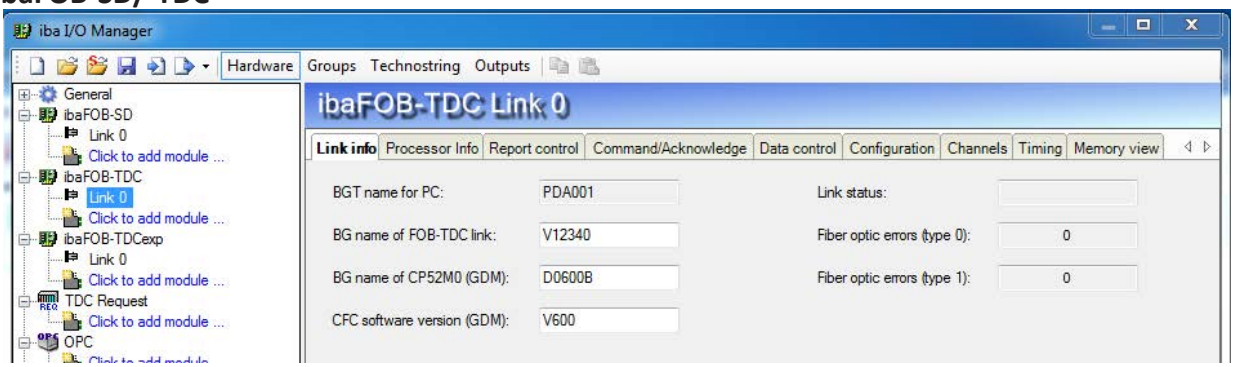
In the following table, you see an overview of the displays and their meanings:

| | Values/states | Meaning |
|---|---|---|
| 7-segment display | 0 ... 3 | Card number of this type (0…3) -> OK |
| | - | Card is not initialized -> error |
| | 8 | Card does not start up (µ-processor stops) -> error |
| Point in the 7 segment display | On | Card set-up: “Interrupt master / internal” |
| | Off | Card set-up: "Interrupt slave” |
| Green LED (RUN) | Flashes | Voltage applied, card is working |
| | Off or on | µ-processor stops -> error |
| Yellow LED (LINK) | On | Connection to the coupling partner exists -> ok |
| | Off | No input signal |
| | Flashes | Connection ok, but partner not ready |
| White LED (only with –exp) | On | Data transfer active |
| | Off | No data transfer |
| Red LED (ERR) | Off | Normal state |
| | On | Internal component error |
| | Flashes | FPGA Factory Rescue Mode |

### 5.2.2 Link level

If you mark the "Link 0" under the card in the hardware tree, then the tabs for diagnosis of the communication connection appear on the right side.

**ibaFOB-SD/-TDC**




For more information, please see the description of the diagnosis in chapter ↗ *ibaFOB-SD/TDC diagnostics*, page 54

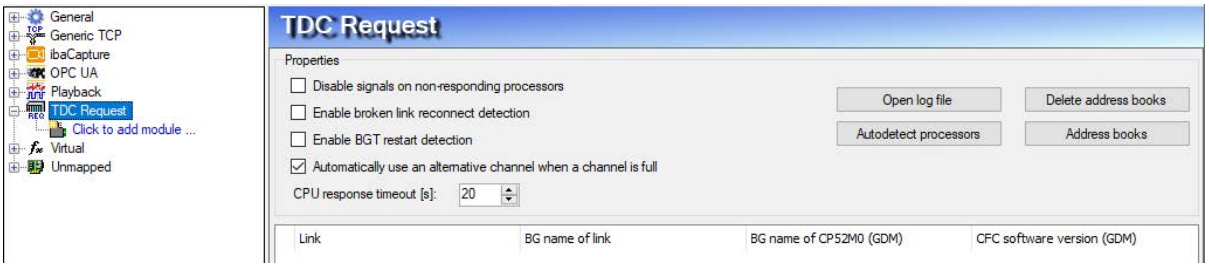
**ibaFOB-SDexp/-TDCexp**


For more information, please see the description of the diagnosis in chapter ↗ *ibaFOB-SDexp/-TDCexp diagnostics*, page 63

## 5.3 SD-/TDC-Request data interface

The “SD request” data interface appears in the tree structure if the "SIMADYN D" or "SIMATIC TDC" license is released in the dongle and an ibaFOB-SD/-SDexp card is installed.

The “TDC request” data interface is listed in the tree structure if the "SIMATIC TDC" license is released in the dongle and an ibaFOB-TDC/-TDCexp card is installed.




### 5.3.1 Settings

This interface contains the following options for reacting to communication errors:

**Disable signals on non-responding processors**
If this function is activated, then at the start of acquisition the measurement channels of the non-responding CPUs are temporarily deactivated. At the next start of acquisition they are then active again. This occurs if, e.g., not all frames are switched on at the *ibaPDA* start.

**Enable broken link reconnect detection**
When the FO link is broken, *ibaPDA* keeps running with the last received values frozen. With this option you can force an *ibaPDA* restart, after the link is reconnected.

**Enable BGT restart detection**
If this option is activated, then even during measurement it is checked whether missing CPUs become available again. If that is the case, then the measurement is stopped, a new request is executed and the measurement is restarted.

**Automatically use an alternative channel when a channel is full**
Here, you can disable the use of alternative channels. By default this option is enabled in order to make *ibaPDA* backwards compatible.

**CPU response timeout**
This is the maximum waiting period for reaction to commands to the ibaFOB-SD/-TDC or assignments to the control. To be adjusted as needed. It depends on the number of CPUs and the time slices of the service function blocks.

**Note**

iba AG recommends the following settings:

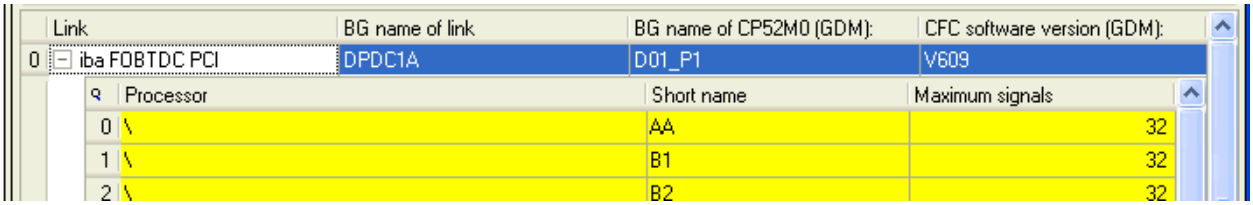
- Disable signals on non-responding processors: yes
- Enable broken link reconnect detection: yes
- Enable BGT restart detection: yes
- Restart in case of an irreparable error (under "General"): yes
- Automatically use an alternative channel when a channel is full: yes

This setting leads to the following behavior:

- Failure of individual CPUs does normally not occur, but only failure of entire racks (e.g., when reloading software).
- In this case the recording continues. Switching on again leads to restart of acquisition. In the process, the CPUs of this rack are taken up again.
- In case the entire connection fails *ibaPDA* keeps running. On restart of *ibaPDA*, the missing signals are deactivated. As soon as the connection is OK again the measurement is restarted. The previously deactivated signals are then reactivated.

### 5.3.2 Creating PDA channels

With the <Autodetect processors> button the rack link is searched for PDA channels. The connection data and all PDA channels found are entered in the connection list.




The connection list contains the following data:

- Connection data necessary for defining ibaPDA as a "Siemens rack" in the rack link
- A list of all PDA channels with the associated parameters

**Connection data**

**Link:**
Name of data interface (ibaFOB-SD/-TDC component)

**BG name of link:**
Name with which *ibaPDA* logs on to the rack link component.
Default setting: 5 digits of the license number and the link number

**Note**

The connection name must be unambiguous within the rack link. If two connections to a rack link are present in an *ibaPDA* system, or two or more *ibaPDA* systems are connected to a rack link, then you have to enter different connection names. Make sure that the name corresponds to the Siemens guideline, i.e. 6 characters A-Z, 0-9 and _.

**BG name of the rack link component:**
Configured name of the CS14, CP53 or GDM memory component (CP52M0). This name is entered upon autodetection of the CPUs by *ibaPDA*.

**STRUC/CFC software:**
Software version of SIMATIC TDC, or SIMADYN D software. The version is entered upon autodetection of the CPUs by *ibaPDA*. *ibaPDA* uses this version designation for differentiating between CFC (V6xx) and STRUC soft-ware (V4xx).

**PDA channel table**

For each connection, the following are listed in tabular form:

**Processor:**
Configured BGT name \ BG name of the CPU

**Short name:**
Name of the PDA channel (see also chapter ↗ *Functional principle*, page 16)

**SFB:**
Type of the service component on the SD-CPU or TDC-CPU (SER04 or SER05)

**Maximum signals:**
Maximum number of analog signals of the channel (version: 32 or 128)

**Time base (ms):**
For each PDA channel a time base can be set. It is thus possible to divide the measurement into fast and slow signals. With time base 0 the *ibaPDA* basic sample time is taken as the time base. You will find notes concerning the temporal sequence in the following chapters ↗ *Temporal sequence of the measurement for SER04*, page 39.

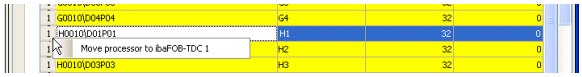
**Note**

In this list only those processors appear, the *ibaPDA* system has exclusive access to. If multiple *ibaPDA* systems are connected to one rack link, you need to ensure that only one *ibaPDA* has access to each PDA channel. This is why you need to delete the PDA channels that are not used after the "Automatic CPU detection".

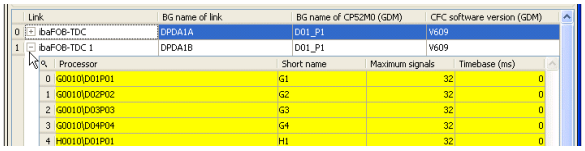
Select the PDA channel and press the <Del> key.

For evenly distributing the load on the ibaFOB-TDC cards when there are parallel connections, drag the channels to another connection:

Move the cursor to the number of the line, and click on the right mouse button. Now, you can transfer this channel to another link using the "Move processor to ibaFOB-TDC 1" context menu.

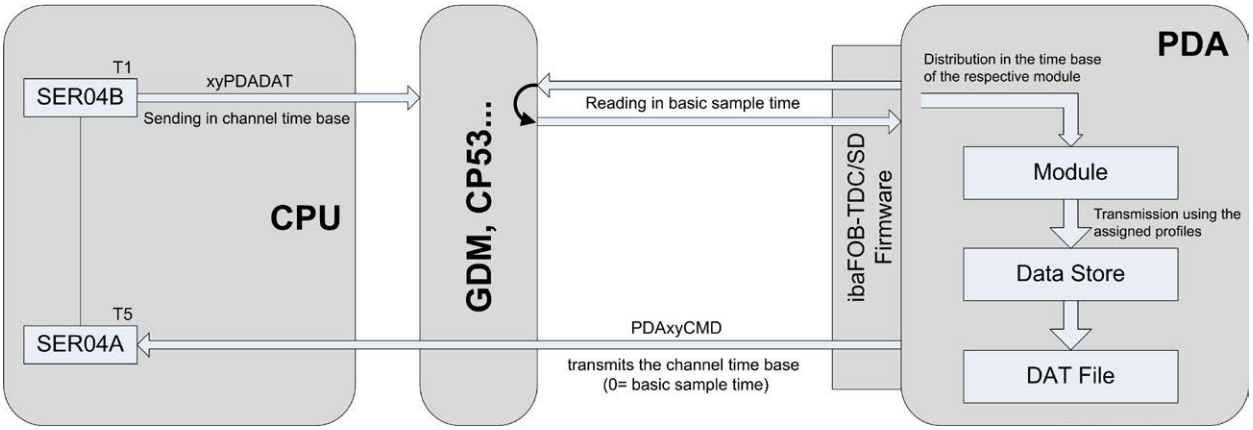



To see all channels, there are two scroll bars on the right. Additionally, you can show and hide the channels of this connection by clicking on the "-" symbol before the connection.



### 5.3.3 Temporal sequence of the measurement for SER04

The significance of and the relationship between the channel time base, the basic sample time and the time base of the individual modules is depicted in the following overview:




*ibaPDA* transmits the set channel time base (0: basic sample time) to the CPU (SER04A function block) for each channel via the PDAxyCMD telegram.

The SER04B function block (called in time slice T1) takes over the actual transmission of data via the xyPDADAT telegramm. The coupling partner is one of the interface components presented in section ↗ *Overview*, page 9. Transmission of SER04B is done in the frequency of the specified channel time base (if applicable, rounded to a multiple of T1). If the channel time base is faster than T1, then SER04B transmits in each T1 cycle.

*ibaPDA* reads out the data of the required channels (depending on projected signals in the I/O Manager) from the interface component in the basic sample time. Processing of the reading assignments is done by the ibaFOB-TDC/-SD card. The capacity utilization of the ibaFOB-TDC/SD card depends on the number of channels and the basic sample time, (see also section ↗ *"Timing" tab*, page 60).

The signals thus received are distributed to the various modules using the respective module time base.

In the next step, the data are transmitted to the data stores and then to the data files (DAT files) using the projected/assigned recording profiles.

**Note**

A maximum of 50 channels per connection are possible. In each channel a maximum of 32 analog and 32 digital values can be measured. If this is not sufficient, project another PDA channel on this CPU.

### 5.3.4 Temporal sequence of the measurement for SER05

The following time values are used:

$T_{pda}$ *ibaPDA* sampling time base

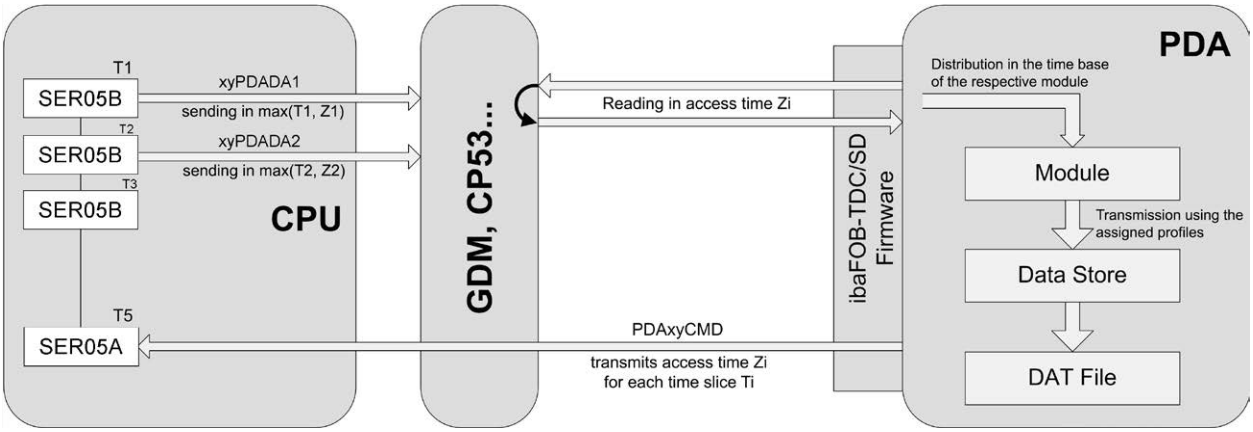
$T_{mod}$ SD-/TDC-Request module time base

$T_i$ Configured time class of SER05B in SIMATIC TDC/SIMADYN D

$Z_i$ Read cycle time for each time class 1-5

$T_s$ Storage cycle, assigned to each measured value in the data storage profile

The connections between these time values are shown in the following overview:




SER05A transfers the associated time slice (T1…T5) for each block in the address book.

In case of a data request *ibaPDA* passes the access time Zi to the CPU (block SER05A). Zi is the smallest configured time slice of all CPUs and is valid for all time classes. It can be selected by the user depending on the requirements or related to the time slice (see chapter ↗ *"Timing" tab*, page 65).

The SER05B function block called in every time slice Ti, takes over the transmission of the data. The coupling memory is one of the interface components presented in chapter ↗ *Overview*, page 9. SER05B sends in the cycle of the access time Zi (in some cases rounded up to a multiple of Ti), or, if Zi is faster than Ti, in every Ti cycle.

*ibaPDA* reads out the data of the required channels from the interface component in the basic reading cycle Zi. Processing of the reading assignments is done by the ibaFOB-TDC/SD card. The capacity utilization of the ibaFOB-TDC/SD card depends on the number of channels and the basic sample time (see also chapter ↗ *"Timing" tab*, page 65).

The signals thus received are distributed to the various modules using the respective module time base $T_{mod}$.

In the next step, the data are transmitted to the data stores and then to the data files (*.dat) using the configured/assigned recording profiles.

**Note**

A maximum of 50 channels per connection are possible. In each channel a maximum of 640 analog and 640 digital values can be measured (128 per time slice). If this is not sufficient, configure another PDA channel on this CPU.

### 5.3.5 Address books

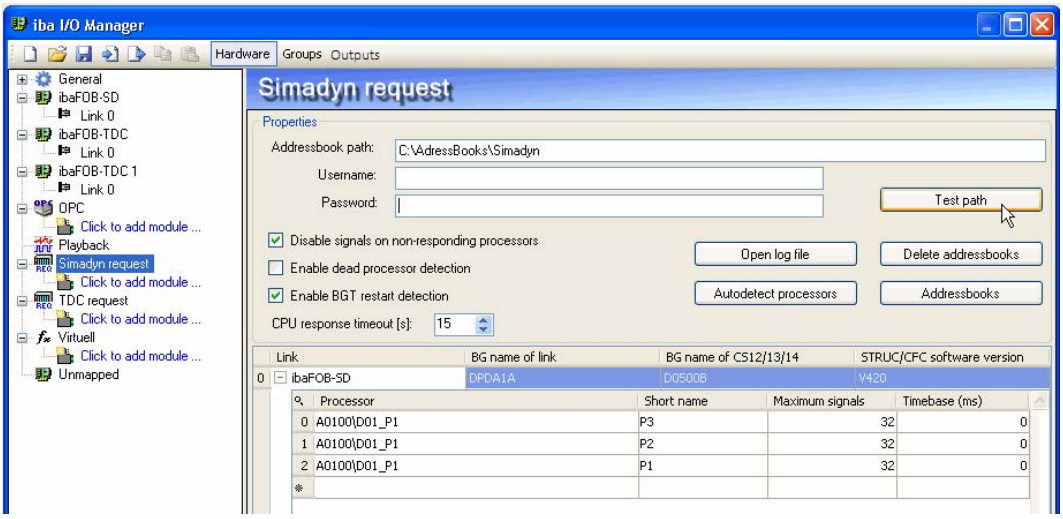
The address books are the database for the symbol browser. An address book contains the names of all charts, function blocks and connections.

See also the explanations in chapter ↗ *Address books*, page 27.

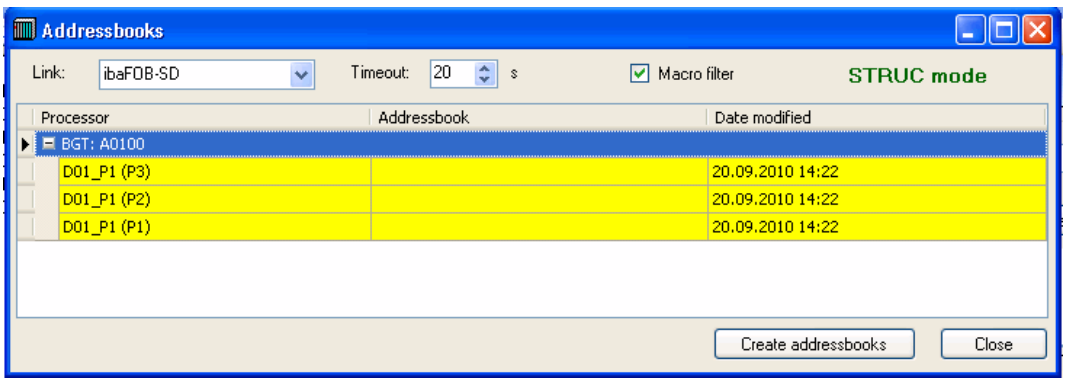
**Adress book import under STRUC**

The address book files generated by the STRUC editor must be imported in the following manner:

1. Indicate the path and user name / password in the "SIMADYN request" menu for the folder where the address book files are and click on <Test path>.




2. Click on <Address books>. The "Address books" dialog is displayed. The channels of the first connection are displayed, sorted according to BGT name. You see the channels of the other connections if you select them in the "Link" drop-down list.



Change the settings as needed:

*Link:* If you have several parallel connections, then you can select the connection here.

*Timeout*: Monitoring time for the response to the "Create address book" assignment. 20 seconds is standard. With very large address books, it may be necessary to increase it.

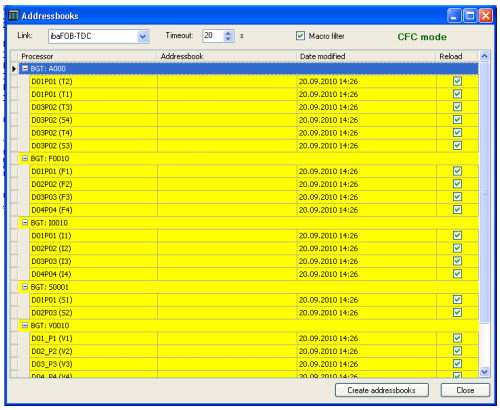
*Macro filter*: No significance here, see chapter ↗ *Macros*, page 46

3. Press <Create address books>.
   The address books are imported. The name of the address book file is entered in the "Address book" column. The date of the address book file is entered in the "Date modified" column. The background color of the channel table becomes white.

**Adress book import under CFC**

The CFC address books are created by *ibaPDA*. Proceed as follows:

1. Click on <Address books>. The "Address books" dialog appears. The channels of the first connection are displayed, sorted according to BGT name. You see the channels of the other connections if you select them in the "Link" drop-down list.




   Change the settings as needed:

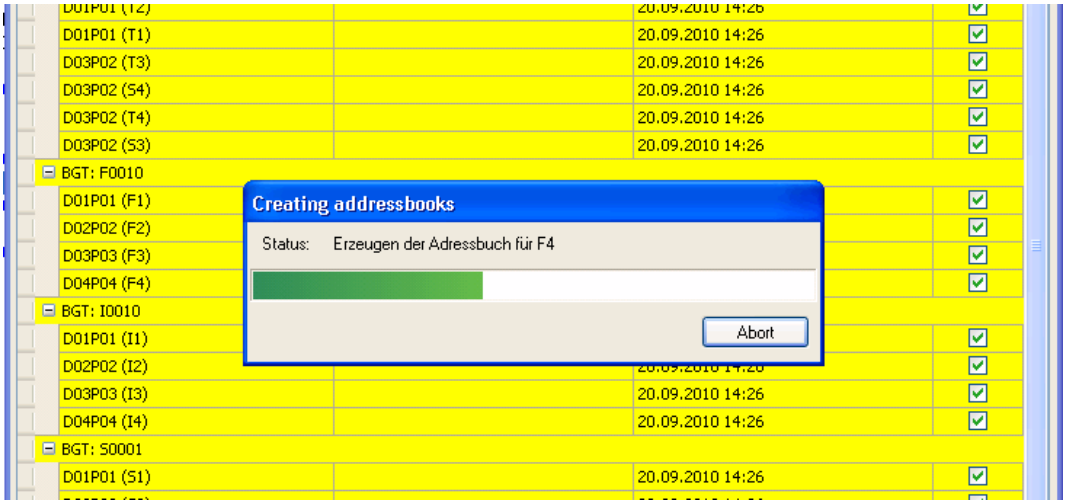
   *Link*: If you have several parallel connections, then you can select the connection here.

   *Timeout*: Monitoring time for the response to the "Create address book" assignment. 20 seconds is standard. With very large address books, it may be necessary to increase it.

   *Macro filter*: If the macro filter is activated, then the connectors within macros are not transmitted. This leads to a shorter transmission time and smaller address books. See chapter ↗ *Macros*, page 46.

2. Mark the PDA channels whose address books you want to load or reload in the "Reload" column. If no address book is present yet (yellow entry), then the marking is activated by default. You invert the marking with a click on the selection box.

3. Click <Generate address books>. The address books are loaded in sequence by the CPU and deposited in files with the name "xxx_yyy".adr (xxx = BGT name, yyy = component name). In some circumstances, the process can take several minutes. The progress is indicated by a status bar.




The name of the address book file is entered in the "Address book" column. The current date is entered in the "Date modified" column. The background color of the channel table becomes white.

**Note**

All PDA channels of a CPU use the same address book. Therefore, only one address book is created per CPU. If a Request Agent SER05 is configured on this CPU, an address book is queried by this agent.

**Note**

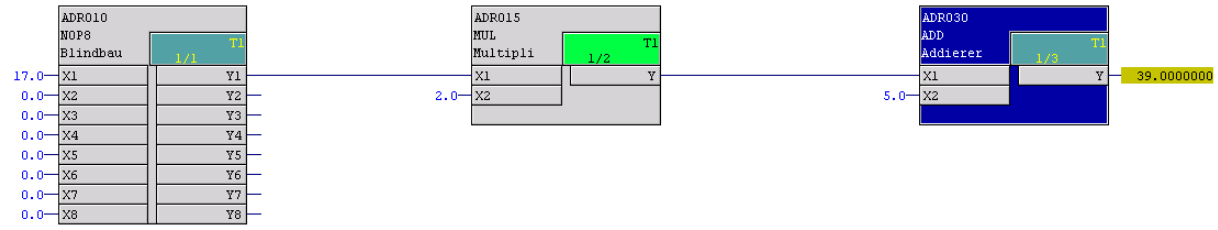
In contrast to COROS or WinCC, *ibaPDA* uses the address book only for support in selecting the variables. Internal addresses are not calculated. Therefore *ibaPDA* can basically work with an address book that is not up to date. The marginal conditions explained in the following must be taken into account when using address books that are not up to date.

### Shifted function block names

Often changes in CFC are executed whereby already existing function block names are transferred to other function blocks, e.g., because a CFC function block is inserted in a series of function blocks and a specified numbering system should be retained for the function blocks. Thus it can happen that a connector address projected in the I/O Manager still exists, but at a completely different CFC function block and with another technological meaning.

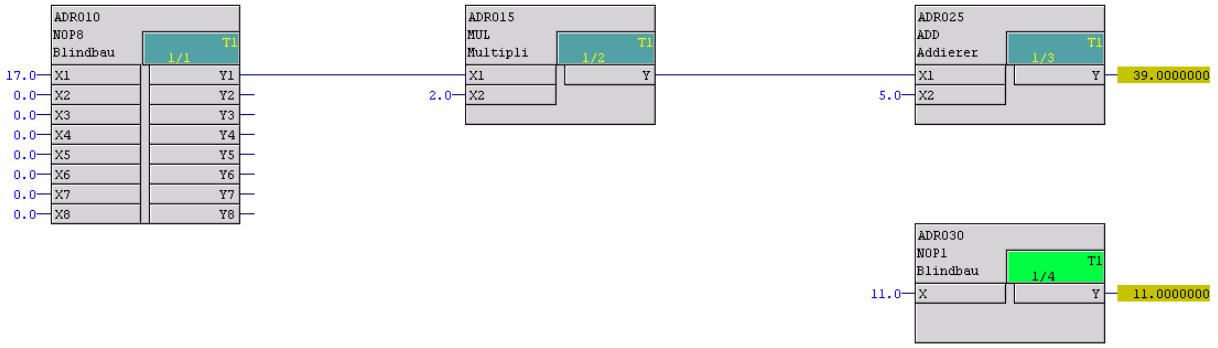
**Example**

The CFC program with the following function blocks is running on the CPU. *ibaPDA* records the ADR030/Y connector (value = 39.0) with a current address book.




The ADR030 function block is renamed in a modification step and another function block which is newly inserted receives the function block number ADR030 (see below). The modifications are compiled and loaded.

*ibaPDA* now records the “new” ADR030/Y connector (value = 11.0). Here you have to make sure that the corresponding adjustments in the I/O configuration are executed.

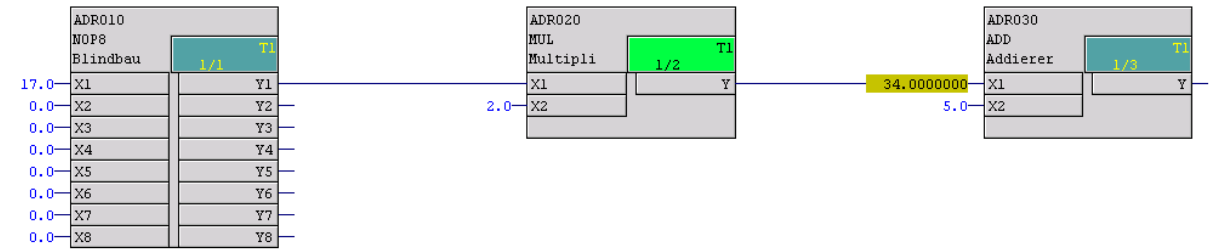



**Online modifications**

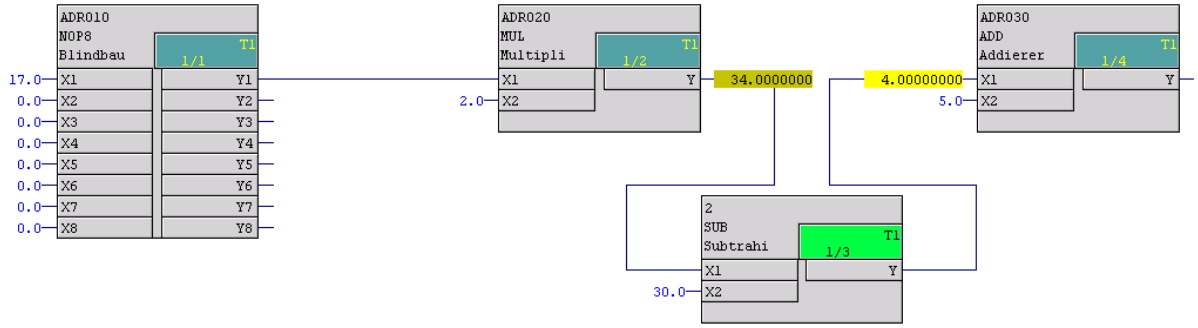
With online modifications (TDC), TDC-internal modifications of storage addresses for connectors result. Data which a CFC function block outputs (output connectors) are stored under storage addresses of the CPU. With online modifications, these addresses are modified during the running time of the program.

**Example**

The CFC program with the following function blocks is running on the CPU. The PDA records the ADR030/X1 connector (value = 34.0) with a current address book. The value of connector ADR030/X1 is under the storage address in which ADR020/Y is stored.



The function block of the type SUB is inserted online. The name of the function block is given by the system (here, the “2”). The function block is deposited in the CPU under this name. An individual name can only be given offline and is brought into the CPU by compiling/loading. The connection between ADR020/Y and ADR030/X1 is modified online.

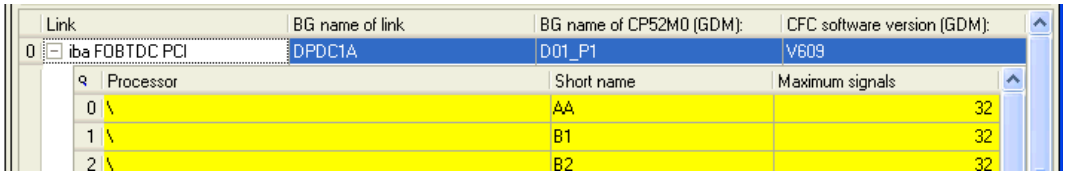



The value of connector ADR030/X1 is now in the storage address of connector 2/Y. But the old address book in *ibaPDA* still accesses the address of connector ADR020/Y. As long as the address book is not updated, the PDA records the value 34.0 instead of 4.0.

## 5.3.6 Manual assignment of address books

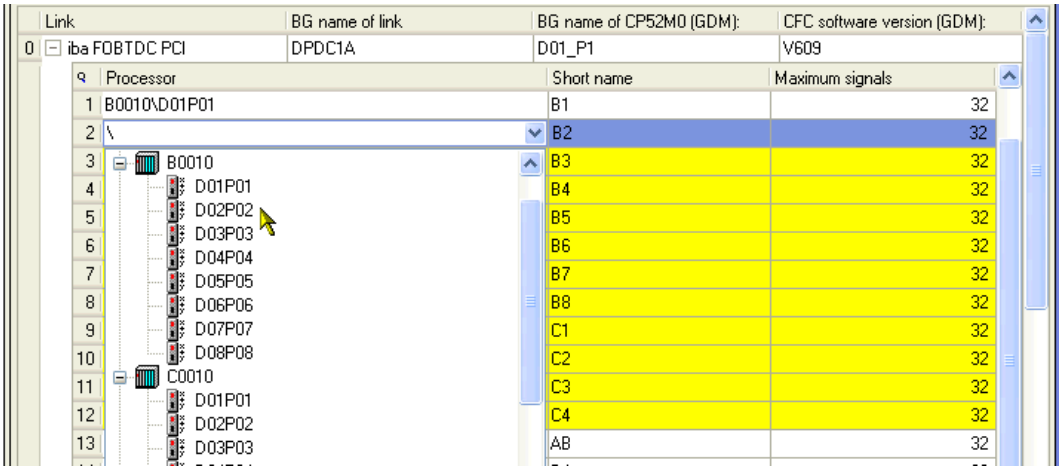
In some cases[3)] automatic assignment of address books to the PDA channels does not work properly:

After execution of the "Autodetect processors" function, BGT or BG names are not displayed in the channel table, but only the channel names.




In this case, after loading the address books the PDA channel names can be manually assigned to the address books. By clicking on the selection box a pull-down button becomes visible with which you can then select the CPU.

3) After the definition of the communication protocol, the first partner that logs into the communication memory sets up the channel. This is the case if ibaPDA starts acquisition before the CPUs have started up on the Siemens side. For assignment of the address books to the PDA channel names, ibaPDA needs information from the communication channel that has been set up, information which is present only if these channels were set up by the SER04A/B service function blocks




After the short name is assigned to the processor, the line is then shown with a white background.

### 5.3.7 Macros

There are also macros available in CFC. Macros are charts, which have been translated to blocks (not nested charts!).

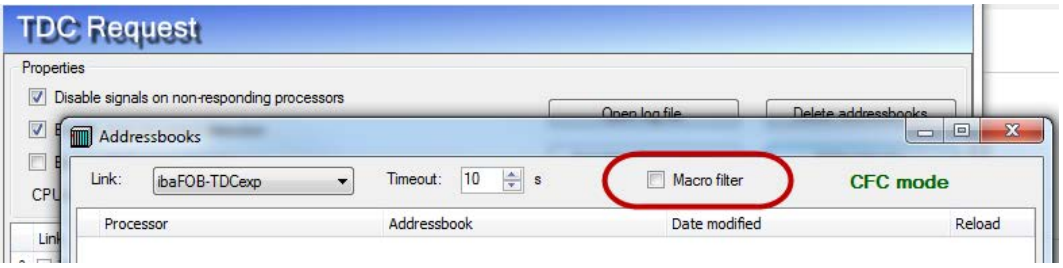
Blocks within the macros are identified by the blockname#nnn.

In order to optimize the address book size, a macro filter can be used. The macro filter filters out all blocks whose name include an #-sign.

This filter is active by default.

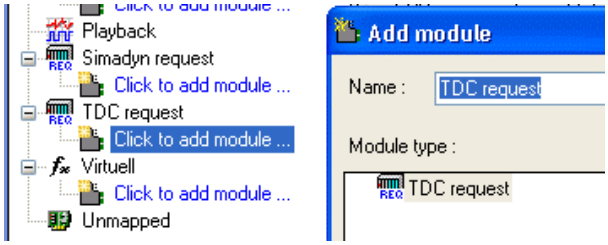
But the #-sign may also be used in block names in the chart level. Then, blocks do not appear in the address book.

In this case, the macro filter has to be deactivated.



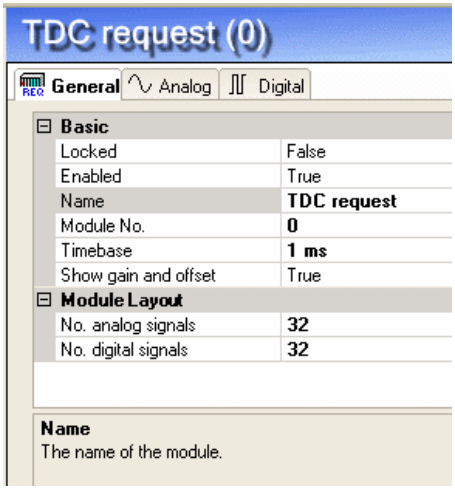
## 5.4 Request modules

Under the "SIMADYN request" or "TDC request" data interfaces, you can add a maximum of 64 data modules.




### 5.4.1 General settings

In the "General" tab you will find the following settings:




If you click on a field, then the associated description is displayed in the text field below the entry fields. For this, see also the general *ibaPDA* manual or online help: <F1>.

**Note**

Because a module is not assigned to a PDA channel, you cannot modify the PDA channel time base here, i.e., the access cycle to the Siemens CPUs. For this, go to the PDA channel time base in the connection table of the data interface.

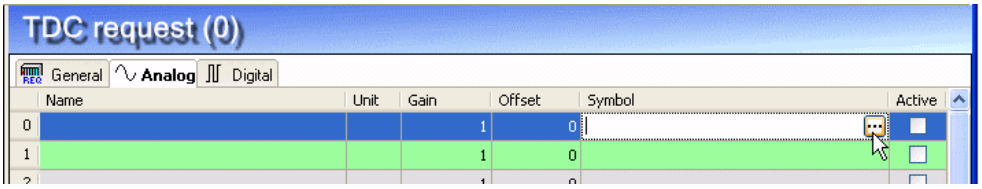
### 5.4.2 Signal selection with symbol browser

You can open the symbol browser in the following ways:

- By means of "Select symbols" in the "General" TDC request module

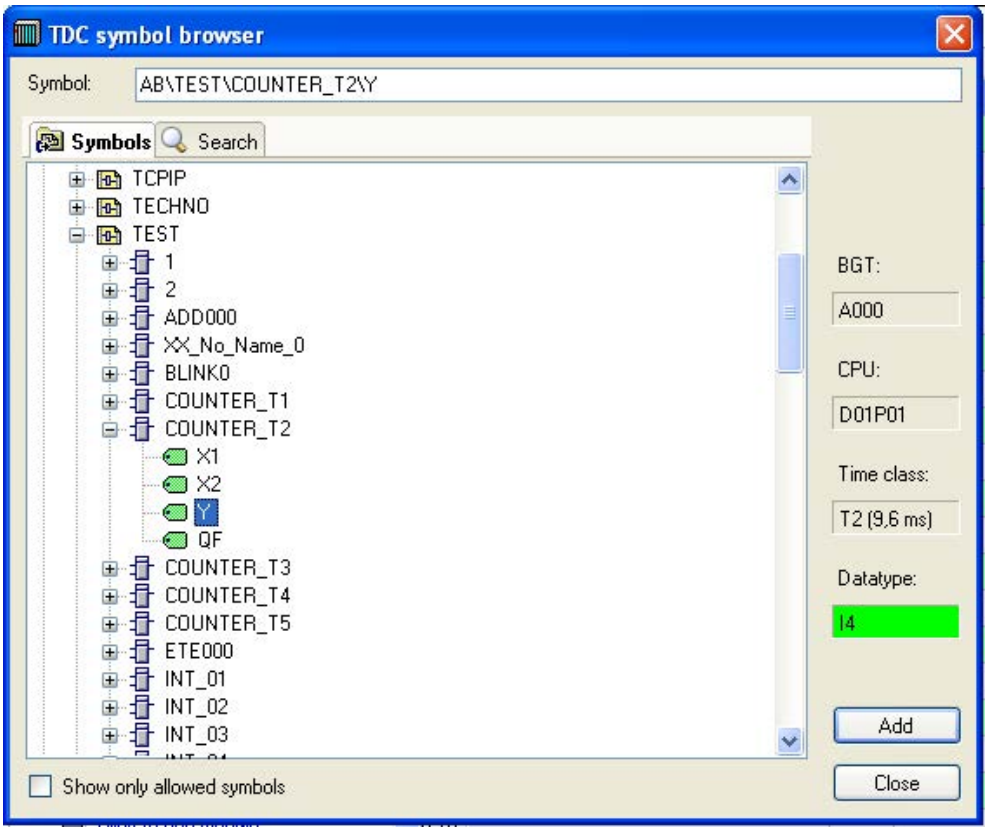

The selected signals are entered automatically in the correct line in the appropriate table "Analog" or "Digital". After selection, the menu remains open.

- In the "Analog" or "Digital" signal table, click on the browser button in a field in the “Symbol” column.




You can only select the variables with the data type matching the table. The menu is closed after each selection.

- TDC symbol browser




You see all variables arranged in a "PDA channel – chart – function block – connector" tree structure.

When you select a variable, then the associated data are displayed on the right edge (BGT, CPU, data type and time class).

If the "Show only allowed symbols" selection box is not activated, then you see the connectors marked in color:

Green: OK
Yellow: Wrong signal table selected
Red: Data type not supported

The selected variable is taken over by means of a double click on the connector or by clicking on <Add>.

**Note**

If certain function blocks do not appear in the address book, please check if the names of these blocks include an #-sign. In this case, the macro filter has to be deactivated when generating the address book. See chapter ↗ *Macros*, page 46

### 5.4.3 Signal selection by Drag & Drop (only with CFC)

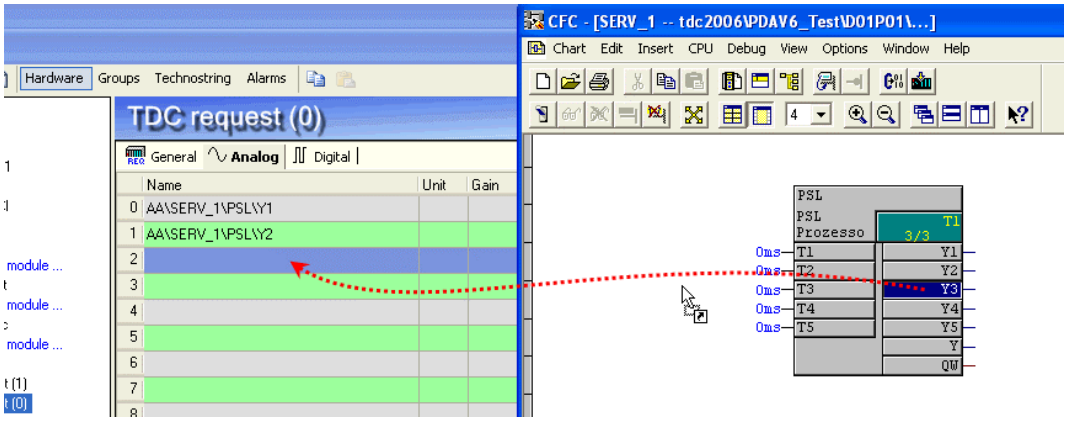
**Prerequisites**

- An *ibaPDA* client must be installed on the same PC as the SIMATIC manager
- The CFC program of this CPU must be flawlessly compiled
- The address book must be present in *ibaPDA*
- Drag & drop is not possible with STRUC programs

**Procedure**

1. Select a request module in the *ibaPDA* I/O Manager.
2. Open the CFC chart in the SIMATIC manager and minimize the window so that both the CFC chart and the *ibaPDA* window can be seen.

3. Drag a connector from the CFC chart via drag & drop onto the *ibaPDA* window – *ibaPDA* automatically opens the correct signal table in the process – and drop it on a line in the signal table. The connector is then entered in the line.




4. When you have selected your data, close the I/O Manager with <OK> and thus hand over the configuration to the *ibaPDA* server. The data are requested. If no error occurs in the process, then acquisition starts and you can drag the signals into the display.

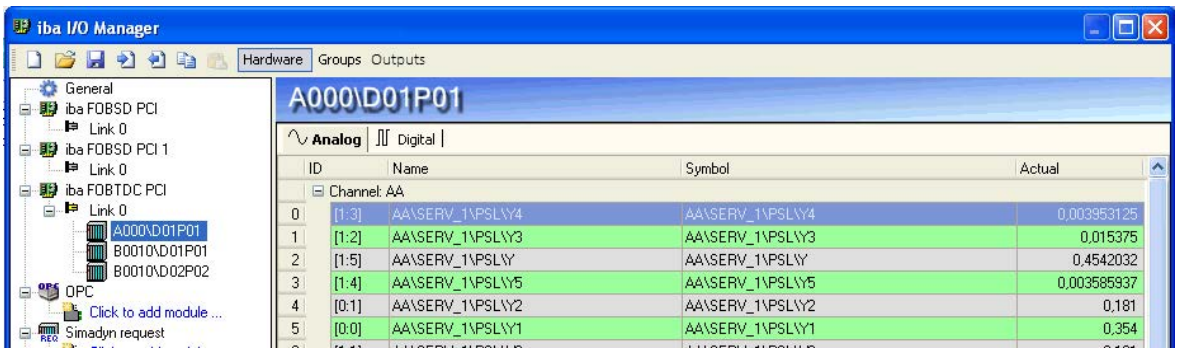
**Note**

For correct generation of the connector address with the drag & drop operation, *ibaPDA* requires an up-to-date address book. Only in this way the path with processor and chart name can be generated. Connectors that are not included in the address book cannot be projected via drag & drop.

### 5.4.4 Data modules

At the start of acquisition, *ibaPDA* applies a data module for each active PDA channel. They can be seen in the hardware tree structure of the I/O Manager under the respective ibaFOB-SD/-TDC card.

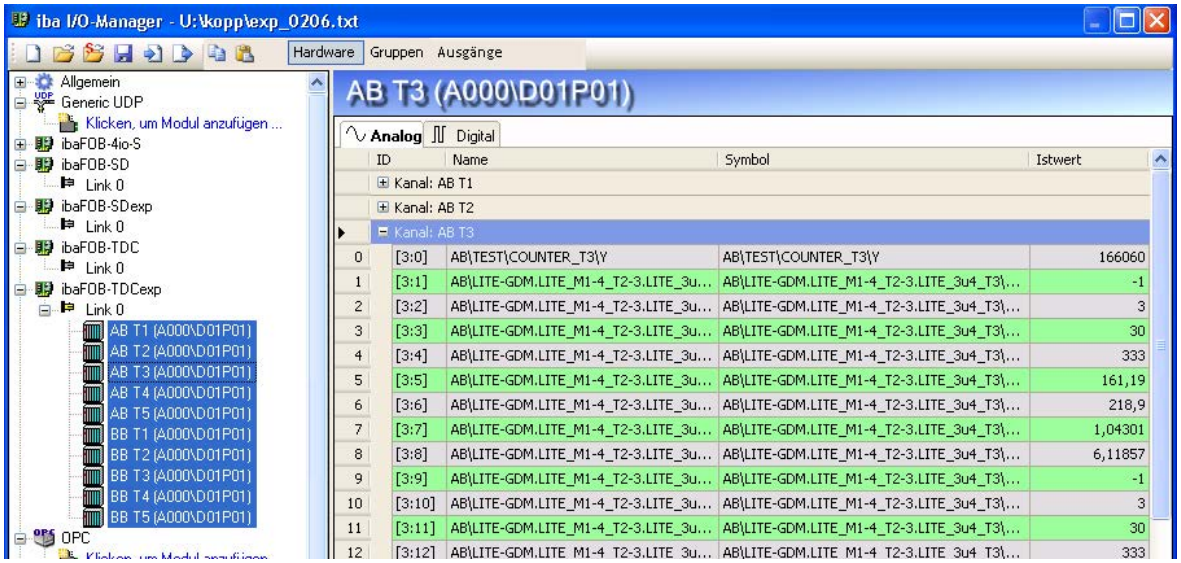
If you mark a module with the mouse, you see in the window to the right the current variable raw values in numerical representation.



The modules are arranged according to BG name \ BGT name. If several PDA channels are projected on a CPU, they can be seen within a data module.

If you have requested more than 32 analog or digital values for a PDA channel and other PDA channels are projected for the assigned CPU, then *ibaPDA* automatically moves these measurement values into the other PDA channel.

When requesting with SER05, the data modules are sorted according to the time slices.



## 5.5 Time synchronization

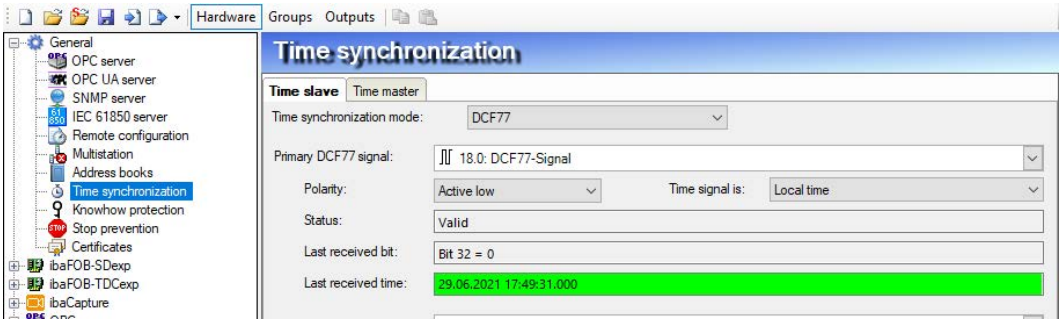
There are two mechanisms available for time synchronization with the Siemens control. For this, see the configuration instructions in chapter ↗ *Time synchronization*, page 26.

**Note**

Synchronization works only if you have set the "Use system time" option for data recording in the "Files" branch.

### 5.5.1 Synchronization with DCF77 signal

1. Select the "Time synchronization” interface in the I/O Manager under *General*.
2. Select the "DCF77" synchronization mode.
3. In the "Primary DCF77 signal" pick-list, select the DCF77 signal previously taken up in the measurement.
4. Set the polarity to "Active low" (presetting).
5. In the "Time signal is" pick-list, choose "UTC time" or "UTC time with DST”.




6. Apply the settings with <OK> or <Apply>. Initially, the "Last received time" field is shown in red. After at most two minutes the time is synchronized. Then you see this field with a green background. Synchronization takes place every minute, or every second if you have activated the "Synchronize every second" selection box. If the color is red, then the time is not synchronized. The DCF77 signal may be faulty or too inexact.
7. To ensure the synchronization, you can specify a second source for synchronization. The secondary DCF77 signal only becomes active if the CPU on which you have projected the primary DCF77 signal fails.

**Note**

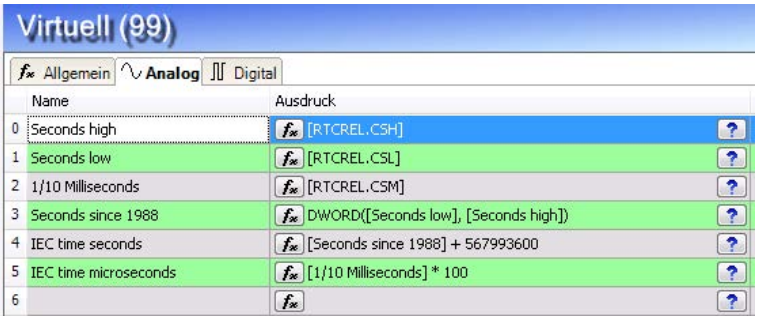
Make sure that the signal is as exact as possible, i.e., measured with the fastest possible acquisition time, ideally in 1 ms.

### 5.5.2 Synchronization with IEC time signal

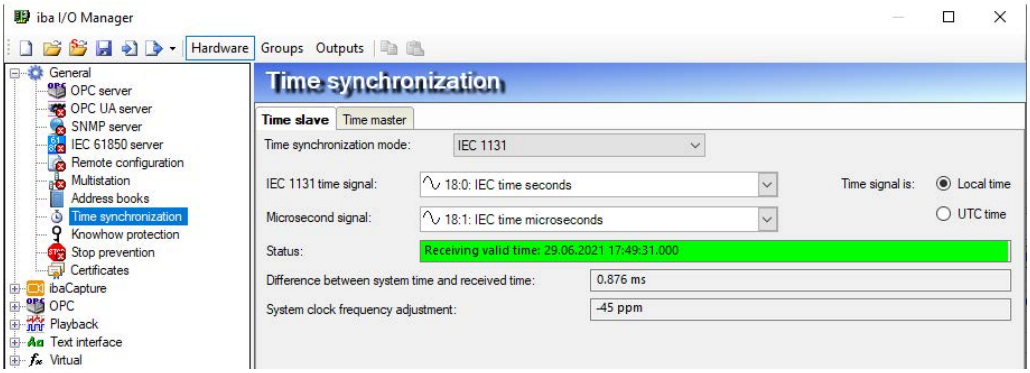
1. Acquire the 3 integer values CSH, CSL and CSM of the time stamp from the function block RTCREL (in CFC) or RTC005 (in STRUC), see chapter ↗ *Time synchronization*, page 26.
2. Calculate the IEC 1131 time stamp (relative to 01.01.1972) from the time stamp of the controller (relative to 01.01.1988) by means of virtual signals:

   Add "567993600" to the seconds

   Multiply the 1/10 milliseconds with "100".



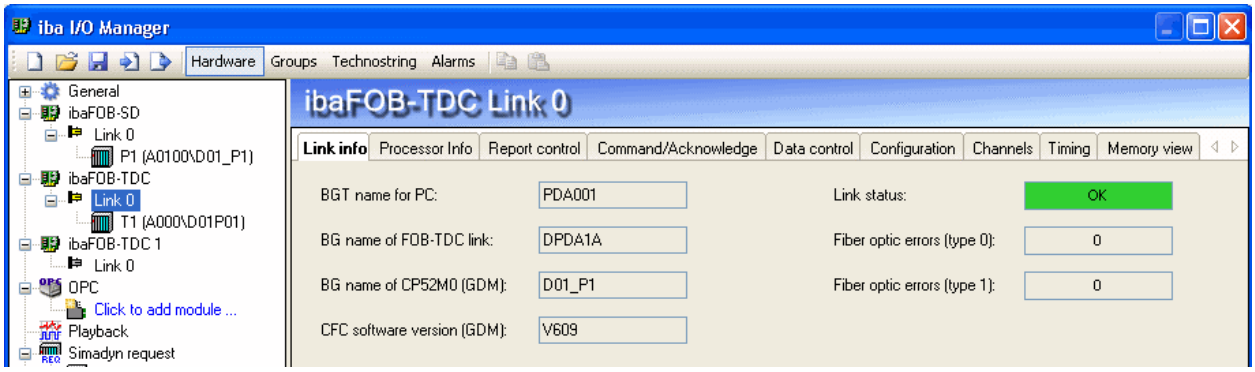

3. Select the "Time synchronization" interface in the ibaPDA I/O Manager .
4. Select the synchronization mode "IEC 1131".
5. Select the calculated virtual signals "IEC time seconds" and "IEC time microseconds" in the pick-lists "IEC 1131 time signal" and "Microseconds signal".




6. Select one of the radiobuttons "Local time" or "UTC time".
7. Apply the setting with <OK> or <Apply>. In the "Status" field you see immediately that the time is synchronized (green). If the field remains red, then the time values have the wrong format or the received time is outside the plausible range.

## 5.6 ibaFOB-SD/TDC diagnostics

When the Link level is highlighted in the tree, you will find some diagnostic information about communication and processors of the card.




**Overview**

- Link Info:
  Set connection parameters and status
- Processor Info:
  Information about the DPR assignment interface, hardware and firmware version
- Report control – command/acknowledgement - data control:
  Information about the telegram traffic of the PDA channels
- Configuration:
  Information about the area in the rack link in which all connected racks are registered
- Channels:
  Information about all communication channels set up in the rack link
- Timing:
  Information about utilization of the ibaFOB-TDC and access statistics
- Memory view:
  Content of DPR memory in the ibaFOB-TDC

### 5.6.1 "Link Info" tab

**BGT name of the PC:**
With this name, ibaPDA logs into the administration area of the rack link function block as BGT. Default setting is "PDA001" (from registry).

**BG name of the FOB-TDC connection:**
With this name, the ibaFOB-TDC logs into the rack link. The setting is taken from the connection list of the SD-/TDC request interface.

**BG name of the rack link:**
Is read by <Autodetect processors> from the rack link

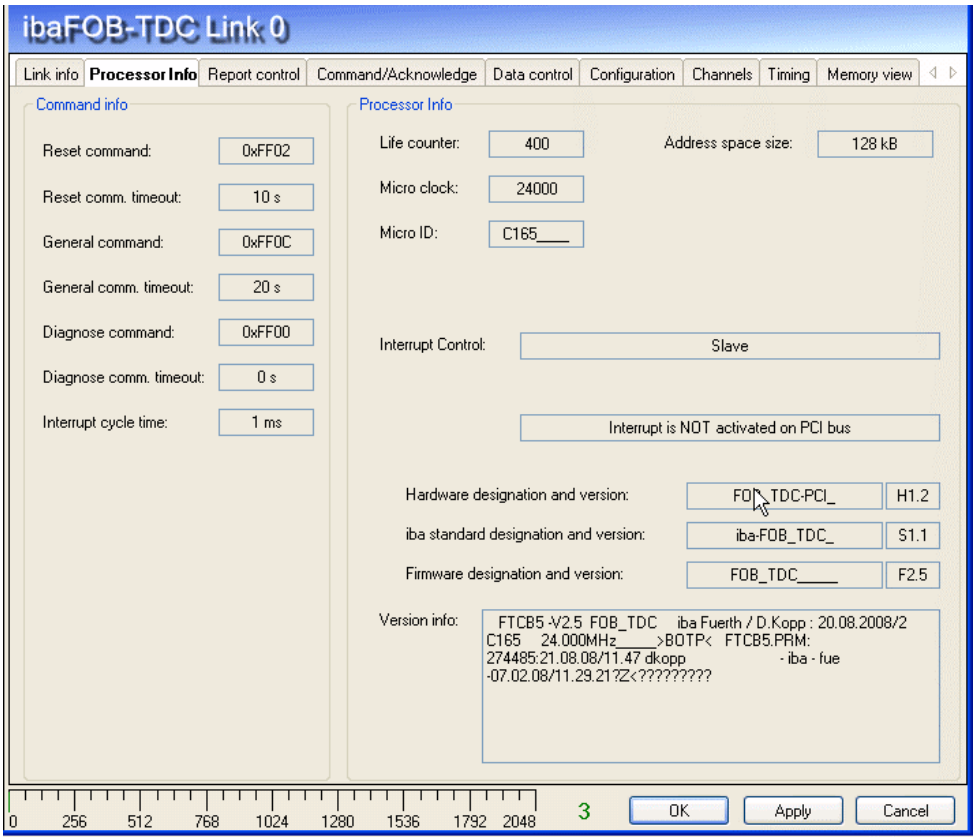
**STRUC/CFC software version of the control:**
Is read by <Autodetect processors> from the rack link

**Connection status**
"OK" (green) / "Interrupted" (red)

**Fiber optic error counters:**
Using the analysis of error interrupts by the optical fiber hardware driver, *ibaPDA* detects a connection interruption. In normal operation, the counters have to remain constant. Long-term observation of the counters can provide additional information about the quality of transmission.

## 5.6.2 "Processor Info" tab

Display of general information about card and firmware.




**Command info**

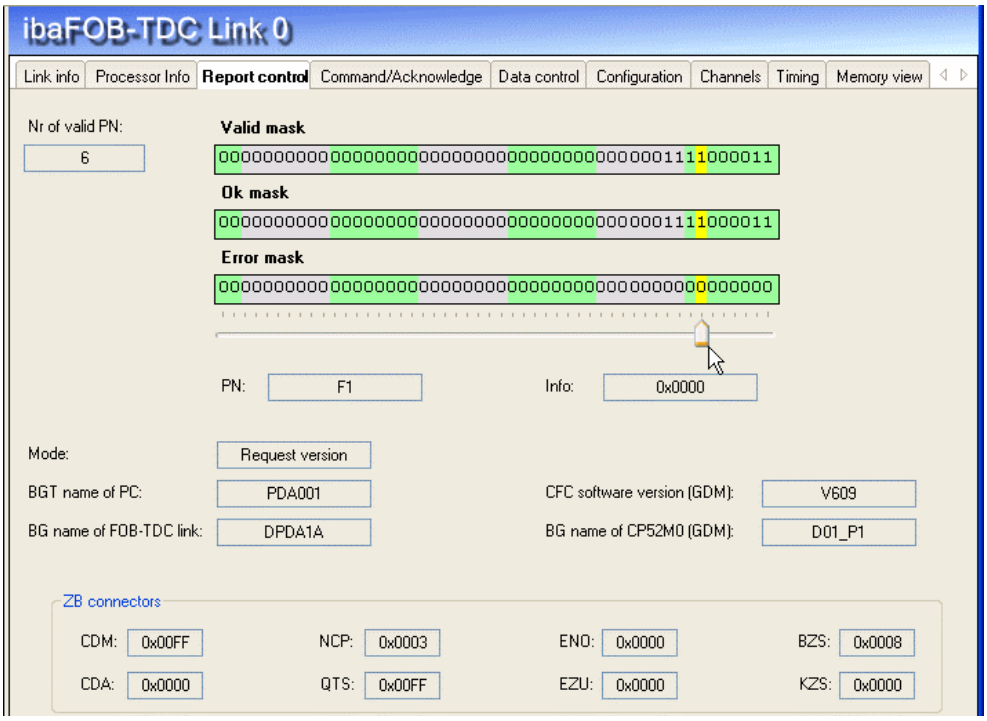
- Display of current values for command and monitoring times

**Processor info**

- Own life counter
- Processor information (type, clock rate, DPR size)
- <Reset processor> button for resetting the function block (only visible if no recording is running)
- Interrupt information
- Information about hardware and firmware version

### 5.6.3 "Report control" tab

The results of logging into the rack link are displayed here.




Number of CPUs (PN) from the processor list

**Bitmasks**

- Valid mask: displays which processors were activated
- OK mask: displays processors that responded with OK
- Error mask: displays processors that responded with Error

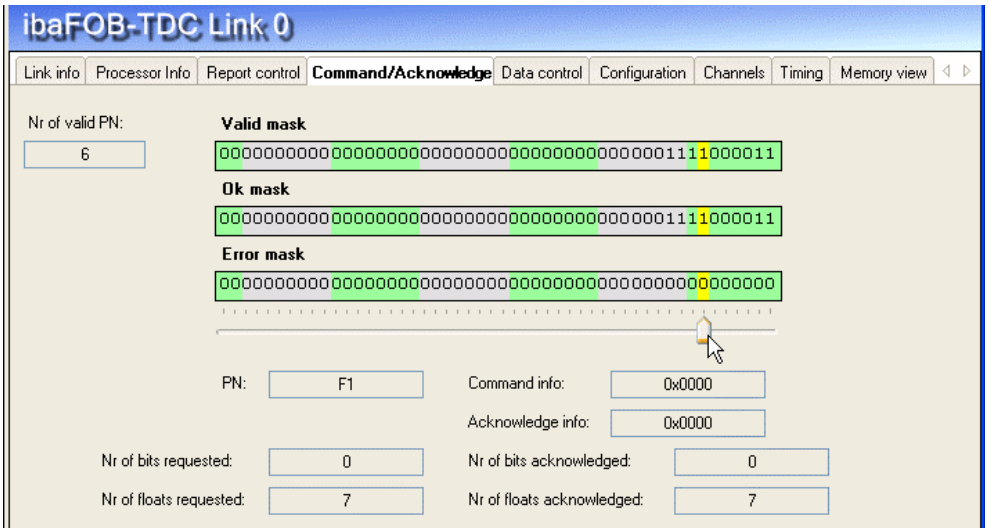
If the slider is moved under the bitmasks with the mouse, the following associated data are displayed for the current processor: The bit numbering (0 is right) corresponds to the sequence of processors in connection list.

- PN, info PDA channel name and error info
- Mode: request version / lite version
- Connection data (as in link info, chapter ↗ *"Link Info" tab*, page 54)
- ZB connectors: diagnostic fields initialization function block
  After correct log-in, the connectors have the following states:

| | | |
|---|---|---|
| CDM: | 0x00FF: | Coupling o.k. |
| CDA: | 0x0000: | Coupling released |
| NCP: | 0x0001...n | Number of connected racks (incl. ibaPDA) |
| QTS:QTS | 0x00FF: | Coupling initialized |
| BZS: | 0x0008: | Life counter monitoring released |
| ENO: | 0x0000: | No error |

### 5.6.4 "Command/Acknowledge" tab

The results of the "Command/acknowledgement" handshake are displayed here.



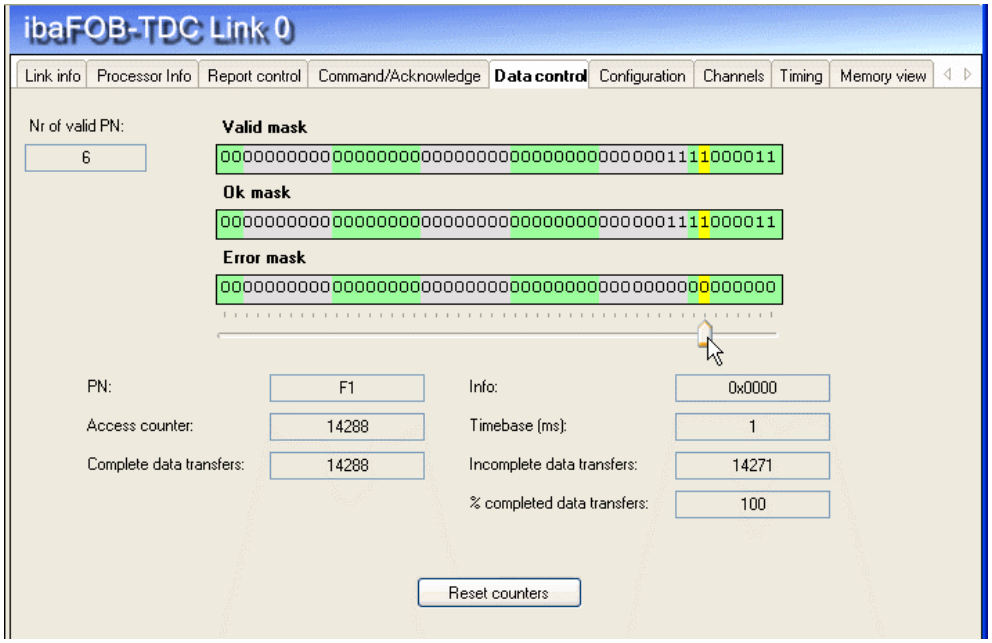

(Bitmasks: see chapter ↗ *"Report control" tab*, page 56)

If the slider under the bitmasks is moved with the mouse, the following associated data are displayed for the current processor:

- PN: PDA channel name
- Command info: error number with command telegram
- Acknowledge info: error number with acknowledgement telegram
- Number of requested and confirmed digital and analog values

### 5.6.5 "Data control" tab

The results of the measurement data transmission are displayed here.



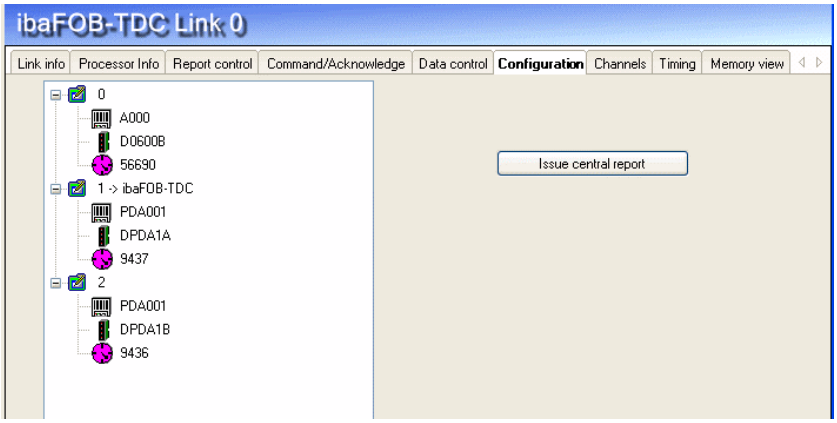

(Bitmasks see chapter ↗ *"Report control" tab*, page 56)

If the slider is moved under the bitmasks with the mouse, the following associated data are displayed for the current processor:

- PN, info: PDA channel name and error info
- Access counters
  - Access counters: Number since the start of the measurement (overrun at 65535)
  - Time base: access cycle (set acquisition time base)
  - Data transfer rate: Percentage since the last reset
- Button for resetting the access counters

### 5.6.6 “Configuration” tab

The data from the log-in area of the rack link are displayed here.

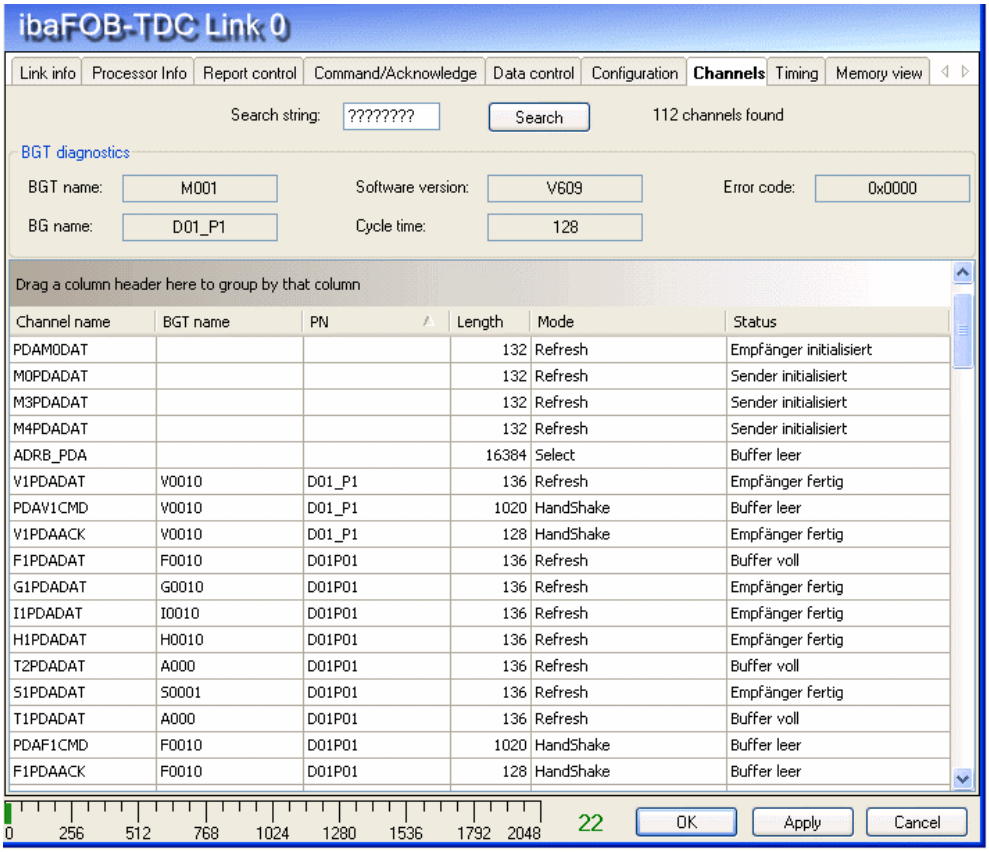


All racks logged in the communication memory of the rack link, are shown. For each rack, the following data are displayed:

- BGT name of the logged-in rack (e. g. of the *ibaPDA*-systems)
- BG name of the connection, e.g., CS22, CP52A0, CP53 or connection name of the *ibaPDA* connection
- Running life counter of the connection

### 5.6.7 “Channels” tab

Information from the data area of the rack link (communication channels) are displayed here.




After entering the search term (with wildcard "?"), the rack link is searched for telegrams that match the search term by clicking on <Search>.

"?????DAT" all ibaPDA data telegrams (Siemens -> ibaPDA)
"?????CMD" all ibaPDA assignment telegrams (ibaPDA -> Siemens)
"?????ACK" all ibaPDA acknowledgement telegrams (Siemens -> ibaPDA)

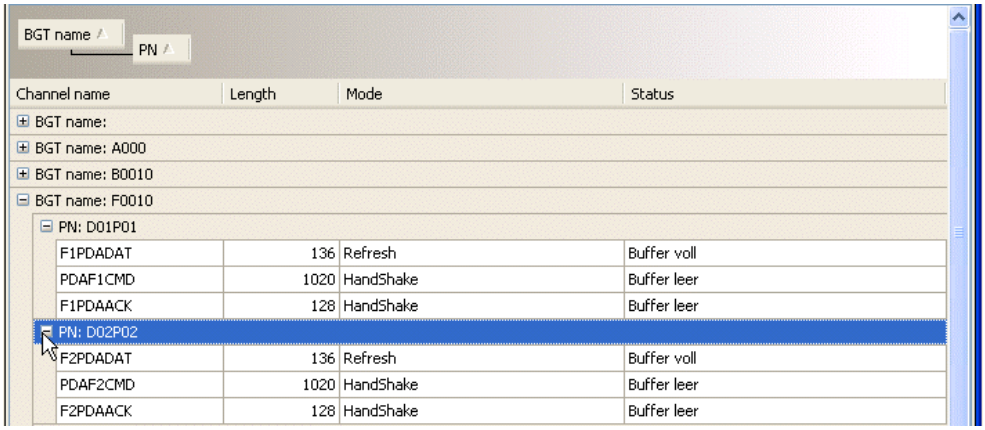
BGT diagnostics

- Log-in data read from the log-in area of the rack link:
  - Error code: error number in the case of access error, see chapter ↗ *Errors with diagnostic functions*, page 69
    List of channels found. For each channel, the following is displayed:
  - Channel name: telegram name

- BGT name: only with ibaPDA channels, otherwise address level 1 or empty
- PN name: only with ibaPDA channels, otherwise address level 2 or empty
- Length: Length: channel user data length in bytes
  DAT telegram: 136,
  ACK telegram: 128
  CMD telegram: 1020 with CFC, 964 with STRUC
- Channel mode: handshake with CMD and ACK, refresh with DAT
- Buffer state: initialized, buffer full, buffer empty (the status is only a snapshot and is not dynamic)

The table can be sorted in ascending/descending order by clicking on a column heading.

The table can be grouped by dragging a column heading onto the free area above.




## 5.6.8 “Timing” tab

A statistical analysis of all accesses is done in the firmware of the ibaFOB-SD/-TDC. It is primarily intended as an aid for software development and optimization. However, it is also accessible to the user for optimal configuration of TDC and ibaPDA.

**Note**

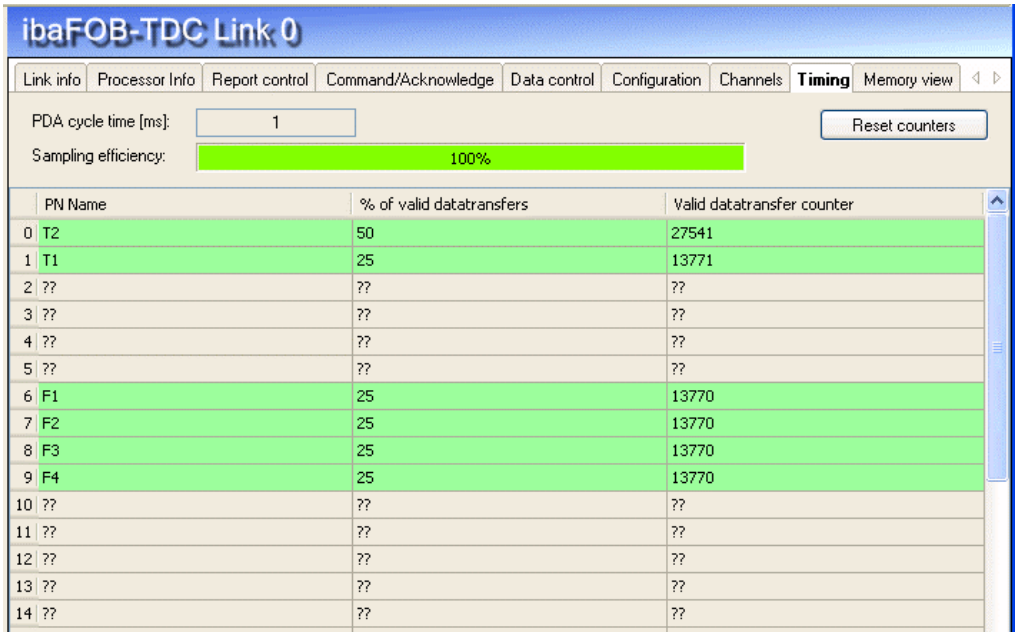
Some values are not mathematically reproducible because certain marginal conditions are not taken into account, but as tendencies and benchmarks they are nonetheless helpful for optimizing settings.

In order to correctly interpret the values, knowledge of the internal assignment and data transfer interface between *ibaPDA* and ibaFOB-SD/-TDC firmware is necessary. Thus, some brief explanations follow.

A basic sample time is set in the *ibaPDA* system. It becomes the basic clock rate of an ibaFOB-TDC access cycle. At the beginning of the cycle, the sequence control starts the acquisition processes for all requested processors. At the end of the cycle, the sequence control checks the results of the accesses. Normally there are the following possibilities (no access errors):

| Case | Cause |
|---|---|
| New data was read | The transmission cycle is faster or the same as the reception cycle (*ibaPDA* sample time) |
| No new data was read | The transmission cycle is slower than the reception cycle (*ibaPDA* sample time) |
| Access to PN has not ended yet | The ibaFOB-TDC is overloaded; the amount of data or processors cannot be processed within the cycle time |

Due to asynchronous events, e.g., incrementing the life counter in CS14, reading the technostring channel or different time slices of the processors, the results vary within a certain bandwidth. The values for statistics are redetermined every 100 basic [sample] times.




- PDA cycle time: currently set *ibaPDA* acquisition timebase (basic sample time)
- Acquisition efficiency (load of FOB-SD/-TDC card): = (number of finished reading calls) / (number of started reading calls) per cycle

The reading calls are generally distributed in the cycle of the basic sample time. The finished reading calls are counted, regardless of whether new data arrive or not. No new data arrive if the data telegram transmission cycle is slower than the PDA basic sample time. Calls are regarded as not completed in a cycle if the processing time of the firmware is longer than the PDA basic sample time. Increasing the channel time base (see chapter ↗ *Creating PDA channels*, page 36) has no direct influence on the acquisition efficiency since the completion of the call is counted, regardless of whether new data arrive. There is an indirect influence because the calls can be processed more quickly without new data than with new data.

**Example:**

Acquisition timebase 2 ms, 40 channels. Only 30 channels are concluded within 2 ms.

-> Eff. = 30/40 = 75%.

For an effective measurement, a value between 80 % and 100 % should be aimed for.

PN Name: channel ID in the order of the connection list

% of valid data transfers = (ibaPDA acquisition timebase) / (data telegram transmission clocking). The data telegram transmission clocking is the maximum from the two "Cycle SER04B function block" and "Channel time base" parameters, and thus is directly dependent on the channel time base (see chapter ↗ *Creating PDA channels*, page 36).

**Example**

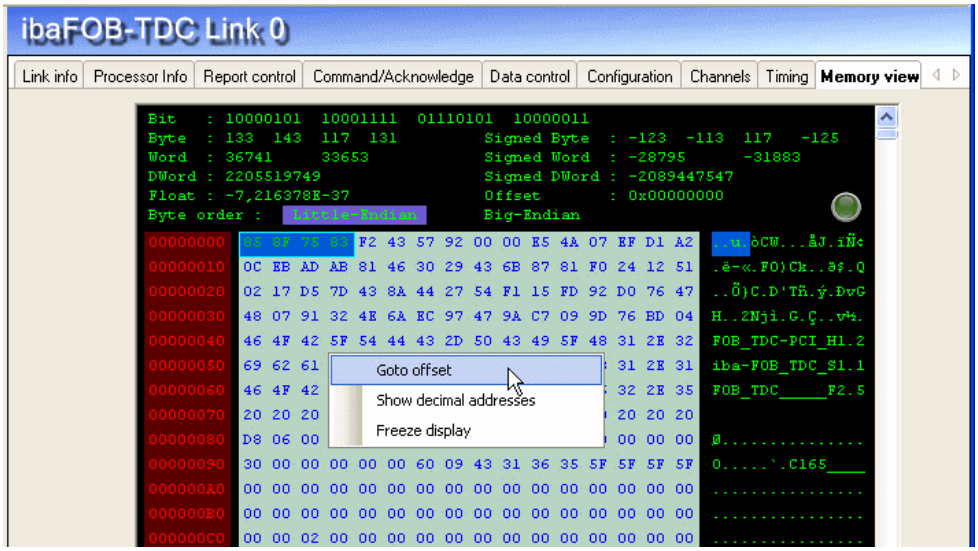
Acquisition timebase 2 ms, cycle SER04B 2 ms, channel time base 12 ms

-> % of valid data transfers = 2/12 = 16.6%

Valid data transfer counter: Number of successful data transfers since the last reset.

### 5.6.9 "Memory view" tab

The DPR memory is displayed here on the ibaFOB-SD/-TDC card.




The marked data are displayed in the upper area in various data formats.

The operating menu is opened by right-clicking with the mouse.

## 5.7 ibaFOB-SDexp/-TDCexp diagnostics

When the Link level is highlighted in the tree, you will find some diagnostic information about communication and processors of the card.

- Configuration:
  Configured connection parameters
- System info:
  Information about the link status, system information of the coupling partner, log-in area in the rack link
- Timing:
  Information about the capacity utilization of the ibaFOB-TDC and access statistics
- Active data channels:
  Overview of PDA channels, their time classes and access times
- Channels in system:
  Information about all communication channels configured in the rack link
- Memory view:
  Content of the DPR memory of the ibaFOB-TDCexp

### 5.7.1 “Configuration” tab


On the "Configuration" tab, you can enter the data that are needed for the connection of *ibaPDA* to the SIMATIC TDC system.

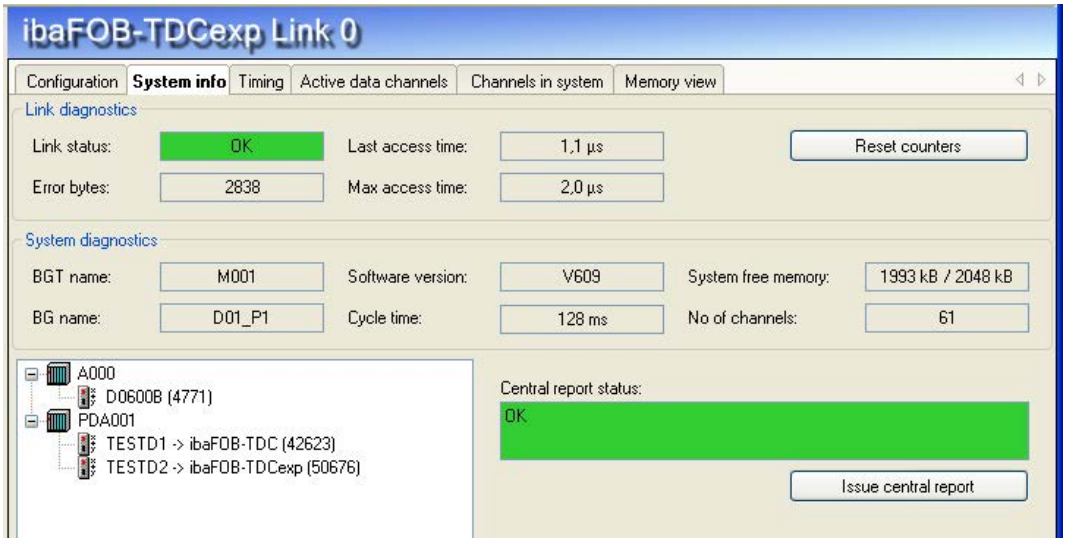
**BGT name for PC:**
With this name, *ibaPDA* logs in on the rack link function block group as BGT. Default setting is "PDA001" .

**BG name of FOB-SDexp/-TDCexp link:**
With this name, ibaFOB-SDexp/-TDCexp logs in on the rack link. The name has to be unambiguous, if there exists more than one FO connection to the same coupling partner. Changes are entered in the respective field in the connection list of the SD-/TDC-Request interface.

**BG name of the rack link:**
Is read from the control by clicking on the button <Autodetect system info>.

**CFC software version**
Is read from the control by clicking on the button <Autodetect system info>.

### 5.7.2 "System Info" tab




On the "System info" tab, you see information about the connection of *ibaPDA* and the SIMATIC TDC system.

**Link diagnostics**

- Link status: "OK" or "Error"
- Error bytes: Counter
- Access error: In normal operation, the counters need to remain constant. The long-term monitoring of the counters may supply some information about the quality of the data transmission.
- Last access time / Max. access time: Duration of the last access or the longest access since resetting.
- <Reset counters> button: Resets the error counter and the max. access time.

**System diagnostics**

- BGT name, BG name, software version: Values read from the store of the coupling partner
- Cycle time: Monitoring cycle of the communication (task of the integrated initialization function block)
- System free memory: free / whole memory in the coupling partner (GDM, CP53 or CS13)
- No of channels: total number of the configured channels in the communication memory

**Log in area**

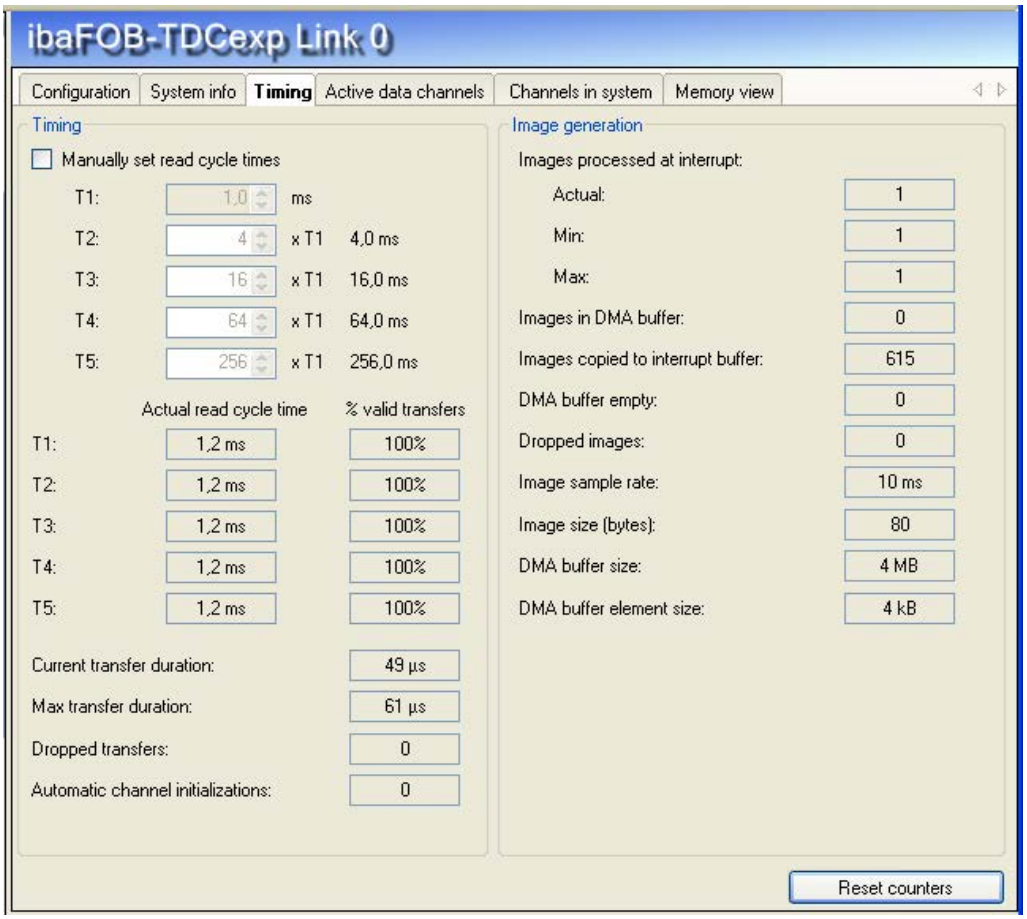
All racks logged in in the rack link incl. *ibaPDA* are displayed. The following data is displayed for each rack:

- BGT name of the rack logged in (e. g. of the *ibaPDA* system)
- BG name of the connection, e.g. CS22 or name of the *ibaPDA* connection
- Running life counter of the connection

**Log in state (OK or error number)**

**Button <Issue central report>**
Log in of the ibaFOB-SDexp/-TDCexp at the coupling partner (Not necessary, as this is done automatically at the first start of the the acquisition by *ibaPDA*).

### 5.7.3 “Timing” tab




On the "Timing" tab, information about the accesses of the card to the SIMATIC TDC CPUs and the accesses of the card to the data memory (DMA) are displayed.

**Timing**

- Manually set read cycle times: Possibility of selecting manually the access times of the single time classes.
- Actual read cycle time: Currently selected or automatically calculated access times.
- % valid transfers: Proportion of the values that can be acquired within the "Actual read cycle time".
- Current transfer duration: Current duration of the data transfer for a sample. The ratio of "Current transfer duration" and the lowest "Actual read cycle time” shows the utilization of the ibaFOB-TDCexp.
- Max. transfer duration: max. duration of a data transfer since the last <Reset counters>
- Dropped transfers: Number of lost samples. Whenever the "Current transfer duration" is higher than the "Actual read cycle time", this counter is incremented.
- Automatic channel initializations: Diagnostics counter for automatic actions.

- Access times
  The smallest time slice of all CPUs is taken as default setting for the access times. The result is an “oversampling” in the time slices T2-T5 on the one hand, but on the other hand the delays during measurement are minimized. If this “oversampling” results in an overload of the ibaFOB-TDCexp/-SDexp card, it is possible to modify the read access times for the single time slices. Please note the following:
  - If the read cycle time of a time slice is slower than the corresponding time slice of a CPU, short pulses may be lost.
  - The slower the read cycle times, the larger are the delays of the signal acquisition.

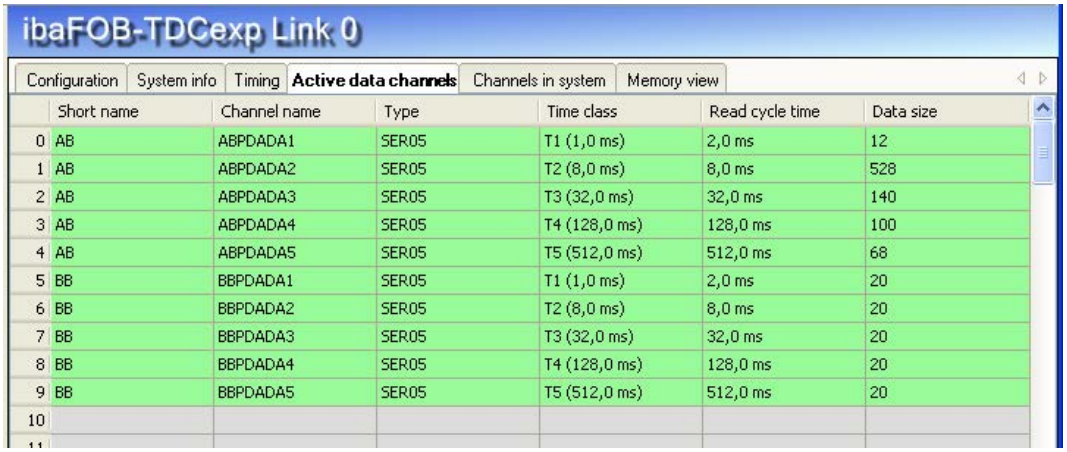
The channel list in chapter ↗ *"Active data channels" tab*, page 67 offers the possibility to compare the configured time slices with the current access times and thus to set optimized values.

- Capacity utilization
  You can see the current capacity utilization by having a look at the fields "Current transfer duration", "Max. transfer duration" and "Dropped transfers":
  - As long as the "Max. transfer duration" is lower than the lowest access cycle, all samples are transferred without any losses.
  - If the "Max. transfer duration" is higher, but the "Current transfer duration" lower, samples get sporadically lost. These samples are counted in "Dropped transfers".
  - If the "Current transfer duration" lies near the access cycle or above, the card is overloaded.
  - You can see the percentage of the lost samples in "% valid transfers".

**Image generation**
Diagnostic data for the DMA accesses to the *ibaPDA* data memory.

**<Reset counters>**
Using this button, all counters are reset and the calculation of "% valid transfers" and "Max. transfer duration" are restarted.

### 5.7.4 "Active data channels" tab

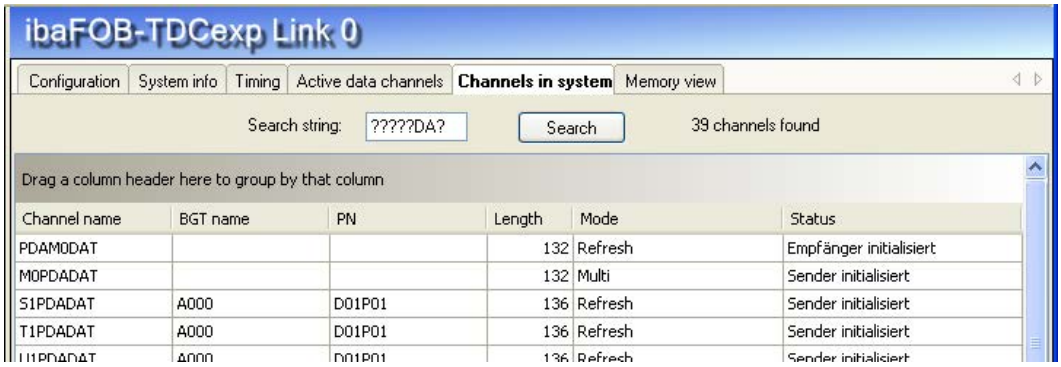



| | Short name | Channel name | Type | Time class | Read cycle time | Data size |
|---|---|---|---|---|---|---|
| 0 | AB | ABPDADA1 | SER05 | T1 (1,0 ms) | 2,0 ms | 12 |
| 1 | AB | ABPDADA2 | SER05 | T2 (8,0 ms) | 8,0 ms | 528 |
| 2 | AB | ABPDADA3 | SER05 | T3 (32,0 ms) | 32,0 ms | 140 |
| 3 | AB | ABPDADA4 | SER05 | T4 (128,0 ms) | 128,0 ms | 100 |
| 4 | AB | ABPDADA5 | SER05 | T5 (512,0 ms) | 512,0 ms | 68 |
| 5 | BB | BBPDADA1 | SER05 | T1 (1,0 ms) | 2,0 ms | 20 |
| 6 | BB | BBPDADA2 | SER05 | T2 (8,0 ms) | 8,0 ms | 20 |
| 7 | BB | BBPDADA3 | SER05 | T3 (32,0 ms) | 32,0 ms | 20 |
| 8 | BB | BBPDADA4 | SER05 | T4 (128,0 ms) | 128,0 ms | 20 |
| 9 | BB | BBPDADA5 | SER05 | T5 (512,0 ms) | 512,0 ms | 20 |
| 10 | | | | | | |

On this tab, all data channels are displayed in a table with information about the configured time class, the access time and the data volume.

By double-clicking on a line with an entry, you are forwarded to the memory view of this data channel (chapter ↗ *"Memory view" tab*, page 68).

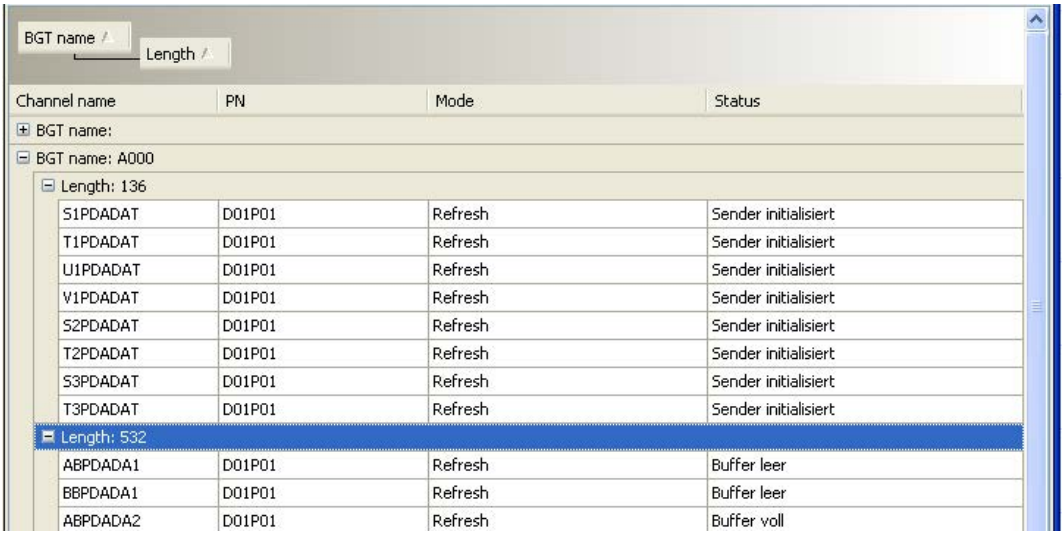
### 5.7.5 “Channels in system” tab




| Channel name | BGT name | PN | Length | Mode | Status |
|---|---|---|---|---|---|
| PDAM0DAT | | | 132 | Refresh | Empfänger initialisiert |
| M0PDADAT | | | 132 | Multi | Sender initialisiert |
| S1PDADAT | A000 | D01P01 | 136 | Refresh | Sender initialisiert |
| T1PDADAT | A000 | D01P01 | 136 | Refresh | Sender initialisiert |
| U1PDADAT | A000 | D01P01 | 136 | Refresh | Sender initialisiert |

On this tab, you find information about the coupling memory and the communication channels configured in this memory. In the search string, you can enter '?' as Wildcard.

The table can be structured hierarchically by dragging and dropping the table headings into the free area.



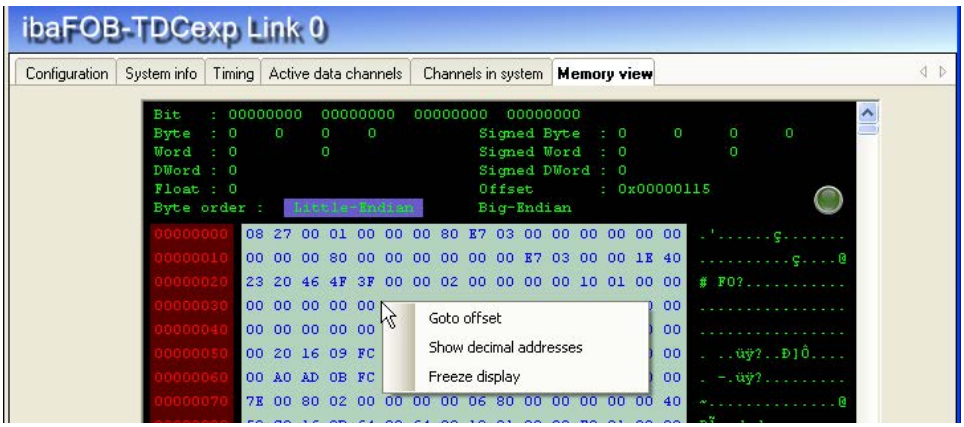

The following data is displayed:

- Channel name: all communication channels in the memory
- BGT name: only for PDA channels that have been created by the SER04/SER05 service block
- PN name: only for PDA channels that have been created by the SER04/SER05 service block
- Length: Length of the user data
- Mode: Channel mode: Refresh, Handshake, Select or Multiple
- Status: Receiver / Sender initialized, channel in operation, buffer empty/full

Caution: the values are not dynamic, but show only a snapshot at the time of access.

### 5.7.6 "Memory view" tab

The "Memory view" tab shows the DPR memory on the ibaFOB-TDCexp.




The operating menu is opened by right-clicking with the mouse.

# 6 Appendix

## 6.1 Error of sequence control

### 6.1.1 Analyzing the error counters

The two "Optical fiber_error_0" and "Optical fiber_error_1" cells in the "Link info" register of the hardware interface include the statuses of two counters that monitor optical fiber communication on the lowest level. Some errors are always registered in the start-up phase. Afterward the values have to remain stable.

With an interruption of the FO connection, one or both counters increment persistently. With systems in continuous operation, long-term observation of the counters can provide additional information about the quality of transmission.

### 6.1.2 Errors with diagnostic functions

When accessing the rack link memory, it is checked whether the data are plausible. Implausible data indicate connection errors, poor or damaged cables or errors in the rack link.

| Error | Meaning | Explanation |
|---|---|---|
| 0 | No error | |
| 0x5000 | Timeout at access | |
| 0x5010 | BG name of the rack link is faulty | No connection to RK, disturbance FO |
| 0x5011 | BGT name is faulty | No connection to RK, disturbance FO |
| 0x5012 | Version identification faulty | No connection to RK, disturbance FO |
| 0x5013 | Sampling time faulty | No connection to RK, disturbance FO |
| 0x5014 | Channel name faulty | No connection to RK, disturbance FO |
| 0x5015 | Number of channels faulty | No connection to RK, disturbance FO |
| 0x5016 | Number of racks faulty | No connection to RK, disturbance FO |

### 6.1.3 Timeout error of ibaPDA

The firmware on the ibaFOB-SD/-TDC card is state-controlled. The *ibaPDA* commands are only processed in certain states. If a command is not processed by the firmware due to a coordination error, then *ibaPDA* generates a timeout error message with the command code as error number.

**Procedure**

1. Restart *ibaPDA* acquisition and activate the option "Restart driver” (in the I/O Manager – “General” tab).
2. Check whether ibaFOB-SD/-TDC is running (green LED must flash).

3. Check whether the connection is OK (yellow LED must light up).

| Error | Meaning |
|---|---|
| 0x04 | Timeout with channel log in |
| 0x08 | Data request with assignment |
| 0x18 | Address book request with assignment |
| 0x0C | Data reading with assignment |
| 0x1C | Technostring reading with assignment |

### 6.1.4 Timeout errors of sequence control

The interface within the firmware between the sequence control and the driver for access to the communication memory in the rack link is similar.

The sequence control generates an error message here if the driver is not ready to accept new transmission/reception assignments.

**Procedure**

1. Restart *ibaPDA* acquisition and activate the option “Restart driver” (in the I/O Manager – “General” tab).
2. Check whether connection is OK (yellow LED must light up).
3. Check whether the optical fiber error counters are constant (see chapter ↗ *"Link Info" tab*, page 54).

| Error | Meaning | Explanation |
|---|---|---|
| 0x7000 | No connection to RK | |
| 0x7001 | TO with ZB log-in | No RS after ZB log in (Step 5) |
| 0x7002 | TO with channel log in | No RS after channel log in (Step 7) |
| 0x7003 | TO with assignment telegram | No acknowledgement telegram (Step 11) |
| 0x7004 | TO with data telegram | No acknowledgement telegram (Step 11) |
| 0x7005 | TO with data telegram | Driver not ready for "data reading" assignment (Step 13) |
| 0x7006 | TO with data telegram | No RS after start of "data reading" (Step14) |
| 0x7008 | TO with data telegram | No RS with cyclic reading (Interrupt routine) |
| 0x700A | TO with assignment telegram | No RS with assignment "Address book request” |
| 0x700B | TO with address book telegram | No RS with reading address book telegram |

TO = Timeout RS = Return signal

## 6.2 Errors of the TDC driver

### 6.2.1 Error classes

Depending on the cause of the error or the necessary reaction on the *ibaPDA* side, the error messages of the SD-/TDC driver can be divided into various classes.

- Temporary status messages, no error; if error is permanently present, then error of class 2 or 3
- Programming error in the ibaFOB-SD/-TDC firmware; please notify iba AG
- Error due to inconsistent data, access error via FO to the rack link
- Configuration error on Siemens side
- Configuration on Siemens side does not match iba configuration
- Configuration or programming error on *ibaPDA* side or error in SER04 function blocks

**Note**

The error codes 0x6000...0x6FFF listed in the following sections correspond to those in the SIMADYN D / SIMATIC TDC manual "Diagnostics" section. More precise descriptions and causes can be found there.

The most frequent configuration errors are marked in bold!

### 6.2.2 Errors with ibaPDA log in in the computer coupling

| Error | Cl. | Meaning | Explanation | Remedy |
|---|---|---|---|---|
| 0 | | Not an error, log-in OK | | |
| #0 | | Login, abort with error, the connectors have the following states:<br>CDM = 0x0000: coupling defective<br>CDA = 0x00FF: coupling blocked<br>NCP = 0x0000: no. of connected racks<br>QTS = 0x0000: coupling not initialized<br>BZS = 0x0000: block switched off<br>ENO = 0xnnnn: error number, see below | | |
| **0x6AA0** | **6** | **Multiple configuration** | **The connection name is already entered in the computer coupling log-in area. Several connected ibaPDA systems have the same link name.** | **Change the BG name of the connection in the link list** (chap. ↗ *Creating PDA channels*, page 36) |

| Error | Cl. | Meaning | Explanation | Remedy |
|---|---|---|---|---|
| 0x6AA1 | 2 | CIP name known, but CIP not addressable | | |
| 0x6AA2 | 5 | CIP name unknown | Names of the rack link function blocks in the Siemens configuration and the ibaPDA configuration do not match. | Check the function block name of the rack link function block (chap. ↗ *Creating PDA channels*, page 36) |
| 0x6AA3 | 2 | Impermissible function value of the zbak_cip_suche [search] function (*) | The connector EZU contains the unknown value | |
| 0x6AA5 | 3 | Too many racks logged in | With CS14: 8 slave racks<br>With GDM: 44 TDC racks | |
| **0x6AA6** | | **Function block name of the rack link function block is unknown** | **Names of the frame coupling function block in the Siemens configuration and the ibaPDA configuration do not match.** | **Check the function block name of the rack link function block (chap. ) ↗** *Creating PDA channels*, page 36 |
| 0x6AA7 | 2 | Impermissible function value of the _CS2_anmeldung [log-in] function | The connector EZU contains the unknown value | |
| 0x6AA8 | 2 | Unknown operating state (*) | The connector EZU contains the unknown value | |
| 0x6AA9 | 2 | SAVE memory too small | | |
| 0x6AAA | 2 | SAVE area unknown | | |
| 0x6AAB | 2 | FOB-SD/-TDC in impermissible sampling time (larger than 2 * @CS1 sampling time) | Since it is preset in the FOB firmware at 64 ms, the error cannot occur with @CS1 sampling time >32 ms. | Check configuration at central block @CS1 or @SRACK |
| 0x6AAC | 2 | No exception memory present | | |
| 0x6AAD | 2 | No reorganisation memory present | | |
| 0x6AAE | 2 | Impermissible function value of the zp_fb_init function (*) | The connector EZU contains the unknown value | |

| Error | Cl. | Meaning | Explanation | Remedy |
|---|---|---|---|---|
| 0x6AAF | 2 | Faulty call of the bsspvw_korrekturwert [correction value] function | | |
| 0x6AB0 | 2 | Faulty call of the ampi_asop function | | |
| 0x6AB1 | 2 | Wrong coupling type | | |
| 0x6AB2 | 2 | 3 CS21 already present | | |
| **0x6AB3** | **5** | **Software version incompatible** | **Version of the Siemens software does not match the version of the connected racks.** | **Change the SW version in the "Link info" menu. See chapter.** ↗ *Creating PDA channels*, page 36 |
| 0x6AB4 | 4 | Memory sizes do not match | FOB-TDC expects CP52M0 with 2MBytes | Check TDC configuration |

### 6.2.3 Errors with channel log in

| Error | Cl. | Meaning | Explanation | Remedy |
|---|---|---|---|---|
| 0 | | No error, log-in OK | | |
| 0x0031 | 2 | Log-in previously not possible | | |
| 0x0032 | 2 | Error with provision of memory | | |
| 0x0033 | 2 | Wrong transmission/reception identification | | |
| 0x0034 | 2 | Too much partial information | | |
| 0x0035 | 2 | Target information not identifiable | | |
| 0x0036 | 2 | Target information faulty | | |
| 0x0037 | 2 | Channel name too long | | |
| 0x0038 | 2 | Address level 1 too long | | |
| 0x0039 | 2 | Address level 2 too long | | |
| 0x003A | 2 | Wrong address string | | |
| 0x003B | 2 | @Ziel [target] rack name too long | | |
| 0x003C | 2 | Length of target function block name wrong | | |

| Error | Cl. | Meaning | Explanation | Remedy |
|---|---|---|---|---|
| 0x003D | 2 | Length of target interface wrong | | |
| 0x003E | 2 | Target interface information wrong | | |
| 0x6031 | 1 | CIP entry found | No connection | Check optical fiber connection |
| 0x6032 | 1 | Coupling for initialization released | No connection | Check optical fiber connection |
| 0x6033 | 3 | Coupling release missing | CP52M0 memory is currently being reorganized or is blocked due to access error | New ibaPDA log-in |
| 0x6034 | 1 | DEXDO3 released | | |
| 0x6035 | 3 | DEXDO3 release missing | CP52M0 memory is blocked due to access error | New ibaPDA login; check optical fiber connection |
| 0x6036 | 1 | Coupling free, initialization running | | |
| 0x6037 | 1 | Semaphore was blocked | | |
| 0x6038 | 1 | Semaphore already blocked | | |
| 0x6039 | 1 | Channel name known | | |
| 0x603A | 1 | Search not yet concluded | | |
| 0x603B | 3 | Channel name unknown | Subsequent error | |
| **0x603F** | **1** | **Channel initialization concluded in faulty manner** | | |
| 0x6040 | 3 | Data inconsistent | Access error | Check optical fiber connection |
| 0x6050 | 3 | Buffer state invalid | | Check optical fiber connection |
| 0x6051 | 3 | Channel state invalid | | Check optical fiber connection |
| 0x6052 | 3 | Buffer semaphore already blocked | | Check optical fiber connection |

| Error | Cl. | Meaning | Explanation | Remedy |
|---|---|---|---|---|
| **0x6053** | **1** | **No more space in ZCVWL list** | **Internal list is full, since with each channel log-in list spaces are occupied but are no longer released.**<br>**(CIP3 concept!)** | **Activate ibaPDA "Driver restart" and restart acquisition** |
| 0x6054 | 2 | No more memory space in ZCDAT area | | |
| 0x6055 | 2 | CIP name known, but CIP not addressable | | |
| 0x6056 | 5 | CIP name unknown | Function block name of the rack link function block in the Siemens configuration does not match the ibaPDA configuration. | Check TDC and ibaPDA configuration |
| 0x6057 | 2 | Unknown zbak_cip_ suche [search] function value | | |
| 0x6058 | 2 | ZINI bus identification invalid | | |
| 0x6059 | 4 | Too little memory space | Channel no longer fits in memory | Check TDC projection |
| 0x605A | 2 | Wrong channel mode | Channel mode is fixedly set in firmware and service building blocks | |
| 0x605B | 2 | Wrong user data structure | Preset in firmware and service function blocks | |
| **0x605C** | **4** | User data length too short | **Possibly after switching STRUC <-> CFC** | **Activate ibaPDA "Driver restart" and restart acquisition** |
| 0x605D | 46 | Wrong service type | With TDC-Lite: PROCESS DATA With TDC symbolic request: SERVICE | Check TDC configuration |

### 6.2.4 Error with data transfer

| Error | Cl. | Meaning | Explanation | Remedy |
|---|---|---|---|---|
| 0x6000 | | No error, data transfer OK | | |
| 0x6001 | 5 | Transmitter not ready to start | No transmission channel configured with this name | Check SD/TDC configuration |
| 0x6002 | 5 | Receiver not ready to start | No reception channel configured with this name | Check SD/TDC configuration |
| 0x6003 | 5 | No assignment, i.e., buffer empty | Transmitter is too slow or not released | Check SD/TDC configuration (sampling time) |
| 0x6004 | 5 | Buffer full (with transmitter, hand-shake) | Receiver is too slow or not released | Check SD/TDC configuration (sampling time) |
| 0x6005 | 3 | DEXDO3 release missing | Initialization function block @CS1 / @SRACK missing | Check SD/TDC configuration |
| 0x6006 | 1 | Coupling free, initialization running | | |
| 0x6007 | 1 | Semaphore was blocked | | |
| 0x6FF0 | 2 | Buffer pointer = 0 | | |
| 0x6FF1 | 2 | Data length = 0 with writing | | |

## 6.3 Display of service blocks

### 6.3.1 SER04A / SER05A

| ST | Internal block status |
|---|---|
| 0 | Waiting for start-up of SER0B |
| 1 | Waiting for the synchronization of the channels with ibaPDA |
| 2 | Normal state, waiting for request of ibaPDA |
| 3 | Stop SER0xB, waiting for feedback |
| 4 | Start SER0xB, waiting for feedback |
| 5 | Send acknowledgement telegram |
| 6 | Fatal error state (see YTS and other connectors) |
| 7 | Assignment transfer of address book |
| 8 | Assignment read version identification |
| 9 | Assignment continuation of address book transmission |
| 10 | Assignment repetition of address book transmission |
| 11 | Send acknowledgement telegram in case of error |

| YTS | YTZ | Error |
|---|---|---|
| 0 | 0 | everything ok |
| 1 | frw[4)] | Error when allocating the local storage |
| 2 | frw | Error when allocating the common storage (VPORT) |
| 3 | frw | Error when reading the own sampling time |
| 4 | frw | Error when creating the transmission channel |
| 5 | frw | Error when creating the reception channel |
| 6 | Status B | Block SER0xB is not in the expected state |
| 7 | Sampling time B<br>Ti B | SER04: Non permissible sampling time (Ta <= Tb)<br>SER05: -B connected with wrong sampling time |
| 8 | frw | Permanent channel error |
| 9 | Mask | Only SER05: At least one SER05B is not connected |
| 10 | frw | Temporary channel error |
| 11 | No. Bits | More than 32 or 128 Bits requested |
| 12 | No. anal. | More than 32 or 128 analog values requested |
| 13 | 0 | No data requested |
| 14 | 0 | Error telegram length request telegram |
| 15 | 0 | Only SER05: Error time slice in the request telegram |
| 20 | frw | Error when reading the own rack name |
| 21 | frw | Error when reading the own CPU name |

[4)] frw = Function return value of a system function

| YTS | YTZ | Error |
|---|---|---|
| 30 | frw | Error when creating the address book channel |
| 31 | frw | Temporary error with the address book channel |
| 32 | Seq.Ctr | Error with address book telegram sequence |
| 33 | frw | Permanent error with address book channel |
| 40-45 | frw | Error with internal system function |
| 50 | 0 | Timeout, no feedback by SER04B |

| YTT (dez) | (hex) | Status transmission channel (ACK) |
|---|---|---|
| 24639 | 603F | Channel initialized, not in operation, yet |
| 24576 | 6000 | Channel in operation, normal state |
| | | Other status, error, see above |

| YTR (dez) | (hex) | Status reception channel (CMD) |
|---|---|---|
| 24677 | 6001 | Channel initialized, not in operation, yet |
| 24576 | 6000 | Channel in operation, reception active |
| 24579 | 6003 | Channel in operation, reception buffer empty |
| | | Other status, error, see above |

### 6.3.2 SER04B / SER05B

| ST | Internal block status |
|---|---|
| 0 | Waiting for initialization |
| 1 | Waiting for synchronization of channels with ibaPDA |
| 2 | Normal status, no data transfer |
| 3 | Data transfer started, start up phase |
| 4 | Data transfer running |
| 5 | Fatal error status (see YTS and other connectors) |
| 6 | Only SER05B: Waiting for synchronization with SER05A |

| YTS | YTZ | Error |
|---|---|---|
| 0 | 0 | Everything ok |
| 1 | frw | Error when allocating the local memory |
| 2 | frw | Error when reading the own sampling time |
| 3 | frw | Error when creating the transmission channel |
| 4 | 0 | Non permissible address on the ADR connection |
| 5 | frw | Permanent channel error |

| YTS | YTZ | Error |
|---|---|---|
| 6 | 0 | Only SER05B: "Short name" in VPORT |
| 10 | frw | Temporary channel error |
| 20 | frw | Error when reading the own rack name |
| 21 | frw | Error when reading the own CPU name |

| YTT (dez) | (hex) | Status transmission channel (ACK) |
|---|---|---|
| 24639 | 603F | Channel initialized, not in operation |
| 24576 | 6000 | Channel in operation, data transfer active |
| | | Other status, error, see above |

## 6.4 Abbreviations

| | |
|---|---|
| BG | Board, component |
| BGT | Rack, sub-rack |
| CFC | Continuous flow chart, graphic programming language |
| CIP | Communication interface for SD and TDC |
| CP52M0 | GDM – memory component |
| CP52IO | GDM – interface component |
| CP52A0 | TDC – interface component to GDM |
| CP53 | TDC/SD rack link configurable as master and slave |
| CS14 | SIMADYN D rack link – master |
| CS22 | SIMADYN D rack link – slave |
| DPR | Dual port RAM, interface ibaPDA <--> FOB TDC |
| FOB | Fiber optical board, optical fiber interface component |
| GDM | Global data memory, central communication memory in the TDC system |
| FO | Fiber optical |
| PDA | Process data acquisition |
| PN | SIMATIC TDC processor component, CPU |
| RK | Rack link, component CS12, CS13, CS14, CP53, GDM |
| SD | SIMADYN D |
| STRUC | Graphic programming interface for SIMADYN D |
| TDC | SIMATIC TDC |
| TS | Technostring (text channel) |
| ZB | Central function block, initialization function block for communication |

# 7 Support and contact

**Support**

Phone: +49 911 97282-14

Fax: +49 911 97282-33

Email: support@iba-ag.com

**Note**

If you need support for software products, please state the license number or the CodeMeter container number (WIBU dongle). For hardware products, please have the serial number of the device ready.

**Contact**

**Headquarters**

iba AG
Koenigswarterstrasse 44
90762 Fuerth
Germany

Phone: +49 911 97282-0

Fax: +49 911 97282-33

Email: iba@iba-ag.com

**Mailing address**

iba AG
Postbox 1828
D-90708 Fuerth, Germany

**Delivery address**

iba AG
Gebhardtstrasse 10
90762 Fuerth, Germany

**Regional and Worldwide**

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

**www.iba-ag.com.**