# ibaLink-SM-64-SD16

## System Interface for SIMADYN D/16 bit Systems

# Manual

Issue 1.6

**Measurement and Automation Systems**

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

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

**Protection note**

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

**Certification**

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

| Version | Date | Revision | Chapter / pages | Author | Version HW/FW |
|---|---|---|---|---|---|
| V 1.6 | 07/2012 | Note added in System requirements | 3.1 | st | |

# Table of Contents

# 1        About this manual

This manual describes in detail the configuration and use of the product ibaLink-SM-64-SD16. It serves both as a tutorial and a reference document.

## 1.1        Target group

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

## 1.2        Notations

In this manual the following notations are used:

| Action | Notation |
|---|---|
| Menu command | Menu „Logic diagram" |
| Call of menu command | „Step 1 – Step 2 – Step 3 – Step x"<br><br>Example:<br><br>Select menu „Logic diagram – Add – New logic diagram " |
| Keys | <Key name><br><br>Example: <Alt>; <F1> |
| Press keys simultaneously | <Key name> + <Key name><br><br>Example:<br><Alt> + <Ctrl> |
| Buttons | <Button name><br><br>Example:<br><OK>; <Cancel> |
| File names, Paths | „File name", „Path"<br><br>Example:<br>„Test.doc" |

## 1.3    Symbols used

If safety instructions or other information are used in this manual, they mean:

**⚠ DANGER**

The non-observance of this safety information may result in an imminent risk of death or severe injury:

- By an electric shock!

- Due to the improper handling of iba software products which are coupled to input and output procedures with control function!

**⚠ WARNING**

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

**⚠ CAUTION**

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

**Note**

A note indicates special requirements or actions to be observed.

**Important information**

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

**Tip**

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

**Other documentation**

Reference to supplementary documentation or further literature.

# 2        Scope of delivery

The following components form part of the delivery:

❑ ibaLink-SM-64-SD16

❑ Manual

❑ Configuration manual with examples

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

# 3        System requirements

## 3.1      SIMADYN D control system

❑ STRUC V3 (Mode "CS3") from V2.3 to V3.x

❑ STRUC V4 (Mode "CS12") from V4.1 to V4.2.8

❑ SR12 or SR24 sub-rack (with C bus)

❑ PM12, PM13 or PM16 processor (with C-bus support) under STRUC V3

❑ P32 processors (PT31, PM5, etc.) under STRUC V4

❑ The ibaLink-SM-64-SD16 board as the communication board

**Important note**

The board cannot be used under CFC, since only the expanded address range (128 kByte) can be used here.

## 3.2      Data processing

❑ ibaPDA version > 4.00

❑ ibaLogic version > 3.80

# 4        Product specifications

## 4.1     Description

The ibaLink-SM-64-SD16 board serves as the direct optical interface between the SIMADYN D automation system and the ibaPDA/ibaScope process data acquisition system or the ibaLogic automation system.

The ibaLink-SM-64-SD16 board features an optical bidirectional channel that can transmit 64 analog and 64 binary signals simultaneously in both directions in one millisecond.

The connection to ibaPDA/ibaScope or ibaLogic is carried out by connecting ibaFOB-4i or ibaFOB-io PC interface boards.

The board can be directly installed in a SIMADYN D rack and behaves there just like a standard SIMADYN D board.

**Note**

The daisy chain jumper must be set on the board, contrary to the master program description.

The C3 module, which is outlined in red in the picture below, is configured for ibaLink-SM-64-SD16. In the STRUC master program the daisy chain jumper are displayed as "not set". Contrary to this description, the daisy chain jumper on the board must be set.



The ibaLink-SM-64-SD16 board also has two different SIMADYN D drivers integrated that can be selected via the switch for selecting operating modes:

## 4.2 Driver

### 4.2.1 Driver 1: CS3 for STRUC version 3:

This variant acts like a CS3 MMC communication board with the following properties:

❑ The board can only be used in sub-racks with C-bus connection (i. e. SR12 or SR24, or SR1 and SR5, respectively)

❑ The board can only communicate with P16 processor modules that have the C-bus connection, i.e. not with the technology processors (e.g. PG16, PG26, PS16, PT20/G/M)

❑ The board features a dual-port RAM (DPR) with a memory capacity of 16 KB

❑ The MMC "COMNET" protocol is used as the communication protocol. All data is exchanged, including initialization tasks and monitoring functions, according to this protocol.

### 4.2.2 Driver 2: CS12 for STRUC version 4:

This variant acts like a CS12 fiber-optic interface module with the following properties:

❑ The board can only be used in sub-racks with C-bus connection (i.e. SR12 or SR24)

❑ The board can also communicate with P32 processor modules. The P32 processors are all equipped with a C-bus connection

❑ The board features a dual-port RAM (DPR) with a memory capacity of 32 KB

❑ The CIP3 protocol is used as the communication protocol. All data is exchanged, including initialization tasks and monitoring functions, according to this protocol

Regardless of the variants of the drivers and the STRUC-version, the board is well embedded in the SIMADYN D environment:

❑ Data is exchanged in SIMADYN D with standard modules.

❑ The board is initialized with a standard central module.

❑ SIMADYN D and the iba system connected can be switched on and off fully independent of each other. SIMADYN D can also run without the iba system connected and visa versa

❑ The execution cycle in the ibaLink-SM-64-SD16 is 1 ms

**Note**

The iba FOB-SD interface board is available for STRUC V4/P32 systems for transmitting large data volumes with optional access; this PC interface board communicates with the SIMADYN D CS12/13/14 interface module.

# 5        Product properties
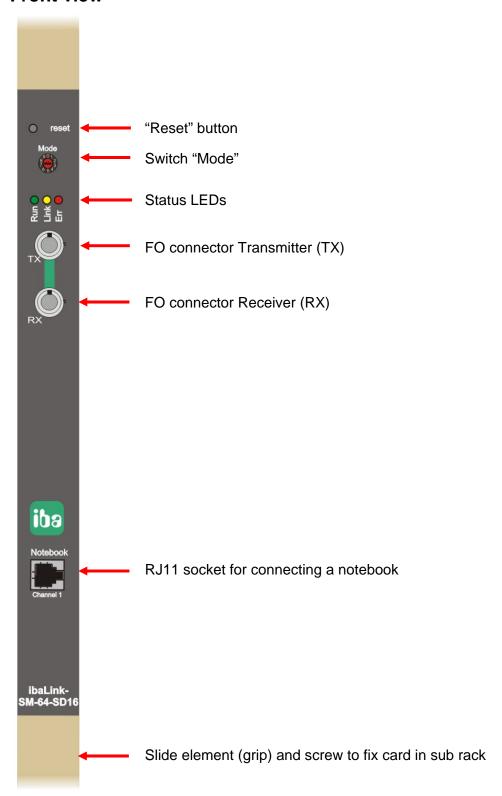
## 5.1       Front view



Figure 1:      Front view

### 5.1.1    "Reset" button

After pressing this button, the board is reset locally. During resetting no access is possible on the ibaLink-SM-64-SD16 card. This may cause trouble depending on the kind of implementation or system characteristics.

### 5.1.2    "Mode" switch

This switch is used to set the telegram format and the SIMADYN-D D driver of the ibaLink-SM-64-SD16. Only positions 0, 1, 4 and 5 are currently permitted. Position 9 is reserved for test mode.

### ⚠ CAUTION

This switch should not be moved when the board is running, because if the driver is switched this can result in a disabling of the dual-port RAM and this may lead to an acknowledgement delay during backplane bus access.

The board features a rotary switch with the positions 0 to 9.

| Position | Operating mode | |
|---|---|---|
| 0 | CS3 real mode: | CS3 driver for STRUC V3, IEEE float format |
| 1 | CS3 integer mode: | CS3 driver for STRUC V3, 16-bit integer format |
| 2 | CS3- | Free for future expansion |
| 3 | CS3- | Free for future expansion |
| 4 | CS12 real mode: | CS12 driver for STRUC V4, IEEE float format |
| 5 | CS12 integer mode: | CS12 driver for STRUC V4, 16-bit integer format |
| 6 | CS12- | Free for future expansion |
| 7 | CS12- | Free for future expansion |
| 8 | | Free for future expansion |
| 9 | Test mode sample is sent | Irrelevant of the SIMADYN D configuration, a test |

Table 1:    Positions of "Mode" switch

This can be used to set the different operating modes:

❑  CS3 mode

Driver for STRUC V3; An MMC CS3 communication board is emulated.

❑  CS12 mode

Driver for STRUC V4; A CS12 fiber-optic interface module is emulated.

❑  Real mode

Data is transmitted in IEEE float format. During conversion, the precision of the 32-bit analog values (N4, I4 formats) is reduced to 24 bits. This mode must be set as the default

mode for connecting ibaPDA and ibaLogic. This is where the lowest loss in precision occurs if data is transmitted in N4 format.

❑ Integer mode

Data is transmitted as 16-bit integers. Here, the precision of the 32-bit analog values (N4, I4 formats) is reduced to 16 bits. This mode must be set as the default mode for connecting ibaScope und iba periphery devices.

### 5.1.3 Status LEDs

The three 3 LEDs represent the following states:

| LED | Status | Description |
|---|---|---|
| Green: Run | ON/OFF | Processor is not running, board is defective or no power t |
| | Flashing | Board has power, processor is running |
| Yellow: Link | OFF | No telegrams active, no send or receive channels have been configured for this board at the SD end! |
| | Flashing | At least one send or receive channel has been configured for this board, however, no telegrams are received, i. e. it is running in unidirectional mode only (e. g. with ibaPDA ) or the connector is not inserted.<br>The send direction is ok if-at the opposite end-the yellow LED on the iba FOB 4i PCI or iba FOB i/o PCI is permanently lit. |
| | On | At least one send or receive channel is configured and the receive direction is ok, i. e. bidirectional mode (e. g. *ibaLogic* $\leftrightarrow$ SIMADYN D) or unidirectional mode from the iba periphery.<br>The send direction is ok if-at the opposite end-the yellow LED on the ibaFOB-4i or ibaFOB- io is permanently lit. |
| Red: Error | OFF | No error, the LED is automatically reset when the error is gone! |
| | ON | Error has occurred within the device |

Table 2: Indicators operating mode

### 5.1.4 TX and RX fiber optic sockets

The 2 fiber-optic sockets (ST) are used to connect the two optical fibers for the 3.3 Mbit/s bus. TX is used for sending and RX for receiving data.

### 5.1.5 RJ11-socket

Here, a notebook computer can be connected via ibaCOM-PCMCIA-F card for the parallel measurement of the fiber optic output signals. The measurement of the input signals is not possible at this socket.

### 5.1.6    Service interface 9-pin D-Sub-socket

On the assembly side of the printed circuit board there is a 9-pin D-Sub connector which is used for service purposes by iba.

**Pin assignment**

| Pin | Signal |
|-----|--------|
| 1 | - |
| 2 | TxD |
| 3 | RxD |
| 4 | - |
| 5 | GND |
| 6 | - |
| 7 | - |
| 8 | - |
| 9 | - |

# 6 Mounting and Dismounting

## 6.1 Safety advices

The following safety advices apply when handling the card:

### ⚠ CAUTION

Before mounting or dismounting the card switch off the SIMADYN D system or the power supply of the rack respectively. Never install or uninstall the card under power.

### ⚠ CAUTION

**Electrostatic discharge!**

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

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

This card requires one slot in a SIMADYN D rack.

## 6.2 Mounting

1. Unpack the card carefully. Use a ground line or discharge any electrostatic charge from yourself before touching the card.

2. Switch off the SIMADYN D rack.

3. Take hold of the card by the two grips between thumb and index finger each.

4. Slide the card carefully into the appropriate slot of the SIMADYN D rack.

5. Before sliding in the card to the end make sure that the two screws on the rear side of the front panel can slide into the dedicated holes in the rack.

6. Push the card firmly until the end by pressing your thumbs on the front panel.

7. Fix the card to the rack with the two screws on the upper and lower end of the front panel.

## 6.3 Dismounting

In order to remove the card from the rack please follows these steps:

1. Switch off the power supply of the SIMADYN D rack.

2. Release the screws in the front panel.

3. Press the two grips apart from each other. This will release the card from the backplane connectors.

4. Pull the card out of the slot.

# 7      System Integration

## 7.1     Compatible iba cards and iba devices

Since the board works with the standard iba fiber-optic telegrams, this means that it can communicate with all iba boards and iba devices that support this standard.

The telegram interface is compatible with the following iba boards and iba devices:

- ❑ ibaLink-SM-128V-i-2o (no cascading)
- ❑  ibaLink-SM-64-io (no cascading)
- ❑ ibaFOB-D-Cards
- ❑ ibaFOB-io-ExpressCard
- ❑ iba FOB-OF Link
- ❑ ibaPADU-8, ibaPADU-8-I, ibaPADU-16, ibaPADU-32, ibaPADU-32R
- ❑ ibaPADU-8-O (Output)
- ❑ ibaBM-FOX-i-3o-D
- ❑ ibaNet750-BM
- ❑ ibaBM-DPM-S-64
- ❑ ibaBM-DDCSM
- ❑ ibaBM-SLM (not on bus-synchronous mode!)
- ❑ ibaBM-COL-8i-o
- ❑ ibaBM-DIS-i-8o

This means that the board can run in many topologies with no special settings being required for this.

## 7.2    Test mode-Feedback

The output of the ibaLink-SM-64-io is connected to its own input.

## 7.3    Interfacing with other systems

The ibaLink-SM-64-io board is connected to another automation system via the optical fibers of a compatible iba board or a compatible iba device and the output and input are crossed. This means that fast and simple communication between different systems can be achieved.

The following communication options exist:

| Automation system | Iba card/iba device |
| --- | --- |
| Siemens SIMADYN P16 | ibaLink-SM-64-SD16 |
| Siemens SIMADYN P32 | ibaLink-SM-64-SD16 |
| Siemens SIMICRO MMC | ibaLink-SM-64-io |
| Siemens SIMATIC S5 | ibaLink-SM-64-io |
| VME bus systems | ibaLink-SM-128V-i-2o |
| Profibus (receiving at the Profibus end only!) | ibaBM-DPM-S-64 |
| ABB DDCS drive bus | ibaBM-DDCSM |
| SIMOLINK Bus | ibaBM-SLM |
| ABB AC800PEC | ibaBM-COL-8i-o |
| | ibaBM-DIS-i-8o |

Table 3:    Communication options

**Important note**

Care must be taken to ensure that the ibaLink-SM-64-SD16 mode matches that of the partner board.

## 7.4    I/O mode

The board serves as an I/O expansion for SIMADYN D systems.

For example, a maximum of 8 ibaPADU-8, 4 ibaPADU-16, 2 ibaPADU-32 or an equivalent of WAGO peripheral devices can be connected to the input of the ibaLink-SM-64-SD16. This means that a maximum of 64 analog values (16-bit integers) and 64 digital values can be imported from the periphery.

A maximum of eight 8 ibaPADU-8-O or an equivalent of WAGO peripheral devices can be connected to the output of the ibaLink-SM-64-io. This means that a maximum of 64 analog values (16-bit integers) and 64 digital values can be output to the periphery.
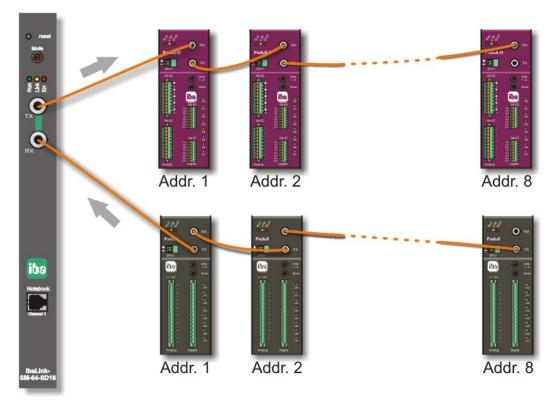


Figure 2:    IO mode

**Other documentation**

For further information, please refer to the documentation on the ibaPADU-x and ibaNet periphery boards.

## 7.5     ibaPDA mode

### 7.5.1     ibaPDA version <6.0

Since ibaPDA is a purely passive system, it can be connected using a simple (simplex) fi-ber-optic cable. The ibaPDA computer is connected using an ibaFOB-4i board.

Two ibaLink-SM-64-io modules are to be configured for this for ibaPDA versions 5.09 and lower. Separate ibaLink-SM-64-SD16 modules are provided in versions 5.10 and higher.

Selecting the modules in the PDA setup → Module selection:

| 7 |  | Nicht installiert |  |
|---|---|---|---|
| 8 | Telegramm M0PDADAT | Sm64-SD16 | FOB-4i-PCI |
| 9 | Telegramm M1PDADAT | Sm64-SD16 ▼ | FOB-4i-PCI |
| 10 |  | Nicht installiert |  |

Figure 3:     Selecting the modules in the PDA setup

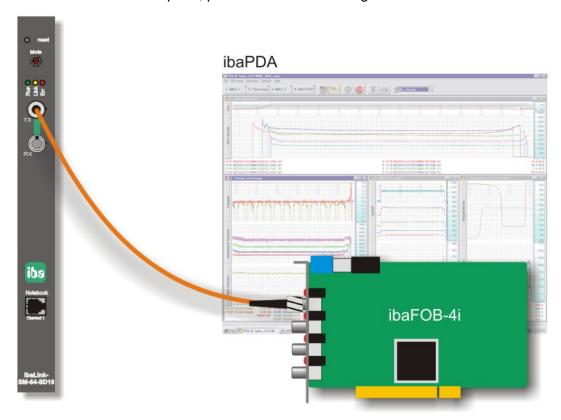↗  For a detailed description, please refer to the configuration instructions.



Figure 4:     FO connection to ibaFOB-4i

### 7.5.2    ibaPDA-V6

Since V6.2 ibaPDA can generate digital outputs. Since V6.15 analog outputs are available too. When using an ibaFOB-io-, 2io- or ibaFOB-4i/4o-card you can configure digital signals - so called alarms – in the I/O manager of ibaPDA-V6 and send them to the input link of the ibaLink-SM-64-SD16 card.

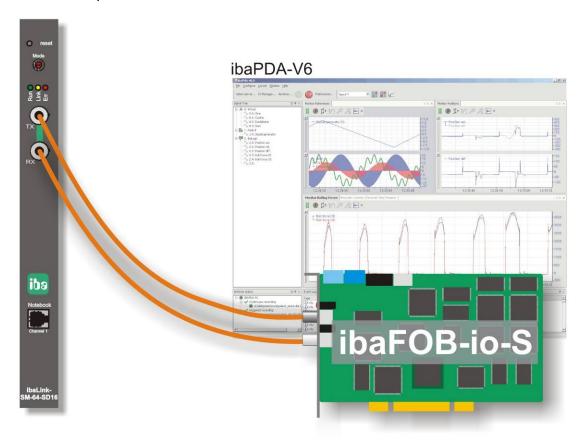This feature provides for indication of limit violations or other events.



Figure 5:    Connection for called alarms

## 7.6 ibaLogic mode

With ibaLogic-V3, bi-directional data communication is possible via a duplex fiber-optic cable.

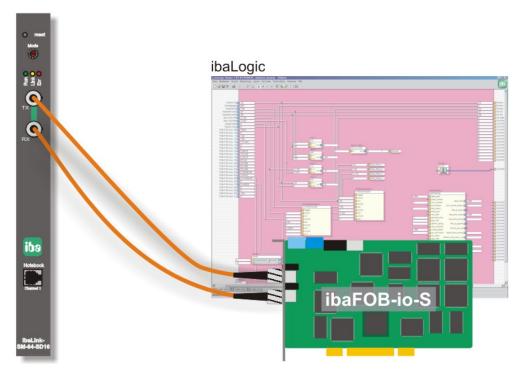The ibaLogic computer is connected via an ibaFOB-io board.



Figure 6:     FO-connection with an ibaLogic-computer via ibaFOB-io-S card.

### 7.6.1 Configuration in ibaLogic-V3

The real or integer format must be set for receiving and sending telegrams in line with the mode on the rotary switch of the ibaLink-SM-64-SD16.

↗ For more information see chapter 5.1.2 on page 11
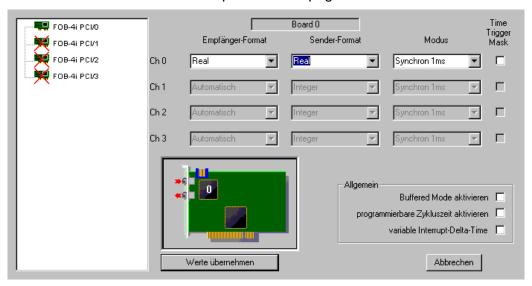


Figure 7:     Setup of receiving and sending mode in ibaLogic-V3

The data is then accessible in ibaLogic via the "FOB-F/FOB_IO" or "FOB-IO OUT" resources.

The analog values are received or sent via two real or integer modules, respectively.

The digital values are received and/or sent via two digital modules.

## 7.6.2    Configuration in ibaLogic-V4

The real or integer format must be set for receiving and sending telegrams in line with the mode on the rotary switch of the ibaLink-SM-64-SD16.

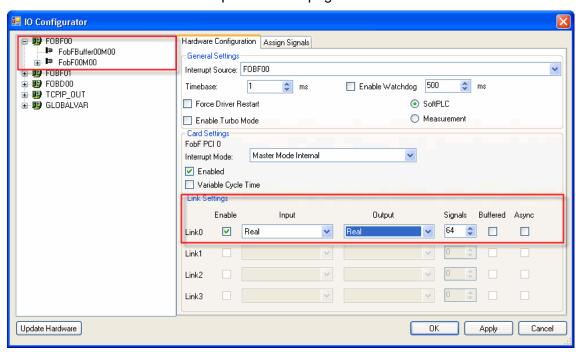➚  For more information see chapter 5.1.2 on page 11



Figure 8:    Setup of receiving and sending mode in ibaLogic-V4

The data is then accessible in the I/O configurator of ibaLogic-V4 via the cards "FOBFnn" or "FOBDnn".

**Other documentation**

For detailed information about I/O-configuration, please refer to the ibalogic-V4 manual.

## 7.7     ibaScope mode

The ibaLink-SM-64-SD16 must be operated in integer mode for ibaScope.

A simple (simplex) fiber-optic cable is needed to connect.

For more information see chapter 5.1.2 on page 11

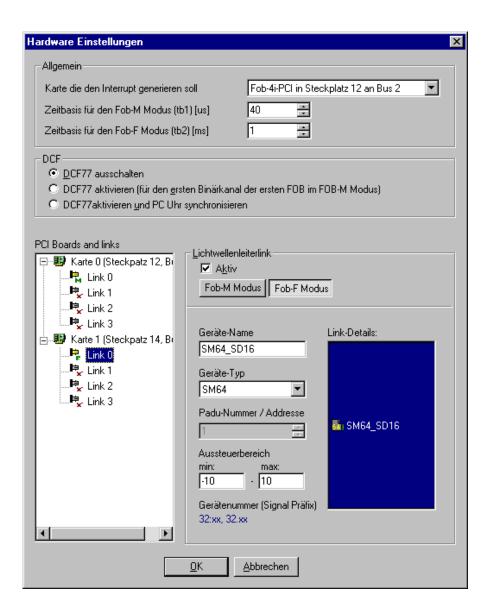The ibaLink-SM-64-io device type must be selected in iba Fob-F mode.



Figure 9:     Hardware settings in ibaScope
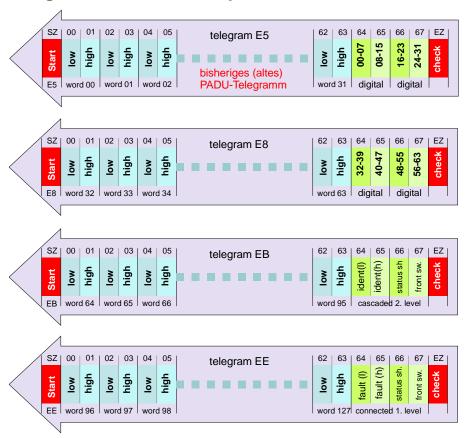
# 8      Telegrams via the fiber-optic connections



Figure 10:    ibaNet telegrams via fiber optic link



Figure 11:    Send sequence

**Status bytes in the send telegrams:**

**Telegram EE:**    **Byte 64**        **00**

| Byte 65: | 64h | Board identification – level 1 |
|---|---|---|

Byte 66:        08h        Telegram status word:

Bit0: 0 = Normal mode        1 = Test mode

Bit1: 0 = IEEE float        1 = S5 real format

Bit2: 0 = ok        1 = Receive error

Bit3: 1 = Real mode        0 = Integer 16 mode

Byte 67:        Setting of mode switch

**Telegram EB:**    **Byte 64:**    **00**    **(debug info)**

Byte 65:    00    (debug info)

Byte 66:    03h    Sampling rate (µs) high byte

Byte 67:    E8h    Sampling rate (µs) low byte

# 9 Technical Data

## 9.1 Main data

| | |
|---|---|
| Order number | 14.130500 |
| Operating temperature range | 32 °F to 122 °F (0 °C to 50 °C) |
| Storage and transport temperature range | -13 °F to 158 °F (-25 °C to 70 °C) |
| Cooling | Passive |
| Assembly | Occupies one slot of the SD sub rack |
| Humidity class | F, no condensation |
| Protection | None |
| Voltage supply | 5 V |
| Power consumption | Max: 5 V/1 A |
| Watchdog | No |
| Length of the fiber-optic line | Max. 1.24 mi (2000 m) |
| Dimensions (Width x Height x Depth) | 1 SD slot x 9.20 in x 6.30 in (233.6 mm x 160 mm) |
| Weight (including box and documentation) | Approx. 2.20 lb (1 kg) |

## 9.2 Communication channels

| | | |
|---|---|---|
| Quantity | 1 x input, 1 x output | Optical fiber each with 3.3 Mbit/s |
| Electrical isolation | | Via optical fibers |
| RJ11 | 1 x output | Parallel measuring with notebook computer and ibaCom-PCMCIA-F card |

# 10      Support and Contact

**Support**

Phone:      +49 911 97282-14

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E-Mail:     support@iba-ag.com

**Note**

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

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