ibaBM-CAN

CAN / CANopen Bus Sniffer

Manual

Issue 1.1

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.

CE

Issue	Date	Revision	Chapter	Author	Version HW / FW
V1.1	01/20/2014	Minor corrections		ms/st	

Table of contents

1 About this manual

This manual describes the construction, the use and the operation of the device ibaBM-CAN.

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

The following designations are used in this manual:

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

1.3 Used symbols

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

⚠ DANGER

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

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

⚠ WARNING

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

⚠ CAUTION

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

Note

A note specifies special requirements or actions to be observed.

Important note

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

Tip

Tip or example as a helpful note or insider tip to make the work a little bit easier.

Other documentation

Reference to additional documentation or further reading.

2 Introduction

ibaBM-CAN is a sniffer device for extraction of measured data from the CAN bus messages which can also be used for diagnostic purposes on the CAN bus.

The data received on the CAN bus is converted and transferred to the ibaNet fiber optic (FO) interface. An input card of the ibaFOB-D family in the connected computer provides the data for further use by the ibaPDA-V6 application.

The device can be inserted in an existing and terminated CAN bus with no effect on the physical behavior of the bus. Also, the two bus lines of the device can be terminated separately, if necessary.

It is a property of the CAN bus, that messages which do not have a receiver occur on the bus. This property can be used by the PLC to send special messages containing additional information to ibaPDA. It is not necessary to configure a receiver ID in ibaBM-CAN.

An outstanding feature of the CAN bus sniffer is the ability to measure the cycle time. This is accomplished by gauging the time distance between the transmitted messages of each ID (in µs). These distance values can be graphically displayed in ibaPDA-V6 and used for trigger control or other processing. This diagnostic feature enables the user to discover malfunctions caused by bus overload or insufficient priority of important IDs.

The device is configured by using the I/O manager of ibaPDA-V6. The configuration data is stored on a non-volatile memory in the device.

For integrating the device in an existing CAN bus, no major physical modifications have to be made. Due to the FO connection, data can be transferred over long distances and across areas with high electromagnetic fields without interference.

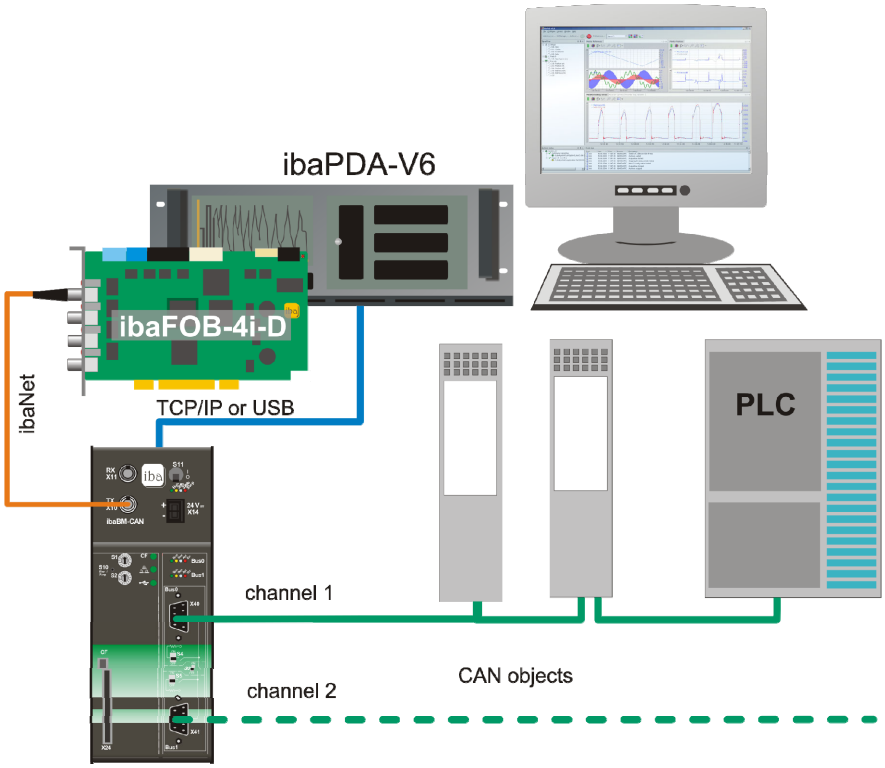


Figure 1: System integration

Overview of the most important features:

- ❑ CAN / CANopen bus sniffer for recording of data traffic on the bus
- ❑ Connections for 2 CAN bus lines with up to 1 Mbit/s, can be terminated separately
- ❑ ID range: Standard ID 11 bit, Extended ID 29 bit
- ❑ Transmission of up to 512 analog signals (BYTE, INT, WORD, DINT, DWORD, FLOAT) and 512 digital signals per millisecond
- ❑ ibaNet fiber optic interface with 32 Mbit/s transmission rate
- ❑ USB and Ethernet interfaces for parameterization
- ❑ Graphical diagnostic function for rating the deterministic behavior of the CAN bus by measurement of cycle time (in µs) for each ID
- ❑ Rugged design, easy mounting

3 Scope of delivery

After unpacking check the completeness and intactness of the delivery.

The scope of delivery includes:

- ibaBM-CAN device
- Manual
- USB cable
- 2pin power supply terminal
- CD-ROM

Delivery status:

Delivery status of network parameters and passwords:

- TCP/IP (Ethernet): DHCP active
- TCP/IP (USB): 192.168.0.1 (fixed IP address)
- User: User: "can", Password: "can"
- Administrator: User: "admin", Password: "can"

4 Safety instructions

⚠ CAUTION

The device should not be operated at voltages exceeding +24 V DC! An overly high operating voltage destroys the device and may result in death or serious injury.

Important note

Do not open the device!

There are no serviceable parts inside the device.

Opening the device will void the warranty.

Note

Cleaning

To clean the device, use a dry or slightly moistened cloth.

5 System requirements

5.1 Hardware

For operation:

- ❑ 24 V DC, 1 A power supply

To set the device's parameters:

- ❑ Ethernet or USB connection to a PC

For measuring:

- ❑ IBM-compatible PC with the following minimum requirements:
  - 1 GHz Pentium III or better
  - At least one free PCI slot (PC)
  - At least 512 MB RAM
  - 4 GB free memory on the hard drive for measurement values

For further information on PC requirements, visit our homepage http://www.iba-ag.com.

- ❑ At least one fiber optic input card of ibaFOB-D type
- ❑ One ibaNet fiber optic patch cable for connecting ibaBM-CAN and ibaPDA-PC
- ❑ CAN bus network

5.2 Software

- ❑ ibaPDA beginning with version 6.24 or ibaQDR-V6 for measuring and recording data
- ❑ ibaAnalyzer to analyze the recorded data

6 Mounting and dismounting

6.1 Mounting

1. Locate the DIN rail mounting clip on the rear side of the device. Slowly push down and in so that the bottom part of the mounting clips snaps onto the bottom part of the rail and firmly fixes the device to the DIN rail.
2. If there is a rule to ground the device, connect the device to the ground (shield connector X29).
3. Once fixed, connect the 24 V DC power supply to the termination shown on the device. Ensure that the polarity is correct prior to applying power. Then install the other connections like:
   - FO cable to the ibaPDA system (connect TX output to an input of the ibaFOB-D card)
   - Network connection via Ethernet TCP/IP or
   - USB connection to a PC with Web browser

Note

If needed, you can activate the CAN bus terminating resistor by operating switch S4 or S5. See also chap. 8, System integration.

6.2 Dismounting

1. Switch off the device
2. Disconnect all external connections from the device.
3. Grasp the device with one hand firmly on the top side. With your free hand, grasp the bottom of the device and push it lightly down.
4. After that pull the device and lift it up. With this action, the device should free itself from the DIN rail.

7 Device description

7.1 Communication interfaces

The figure below shows the integration of the device via its communication interfaces in a measurement assembly:

- ❑ Via the CAN bus interfaces, up to 2 CAN bus lines are connected for data capturing.
- ❑ ibaBM-CAN sends the captured data via the FO interface (TX) to ibaPDA-V6.
- ❑ Parameters can be transferred via the network interface or the USB interface to ibaPDA-V6.

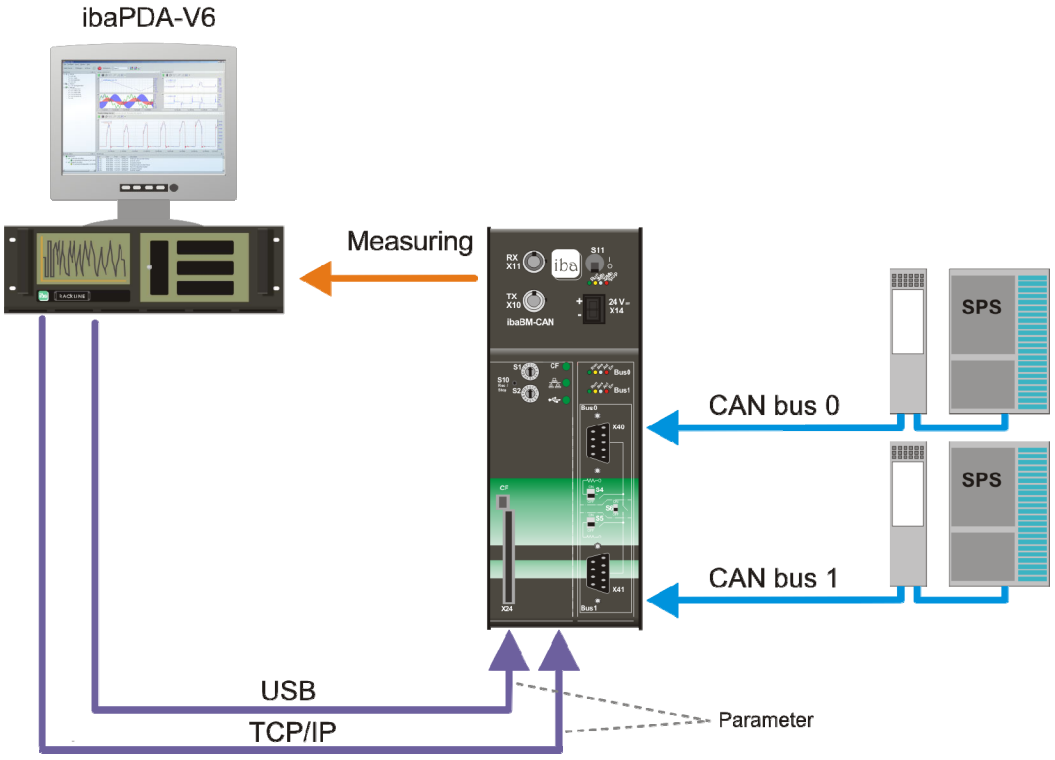
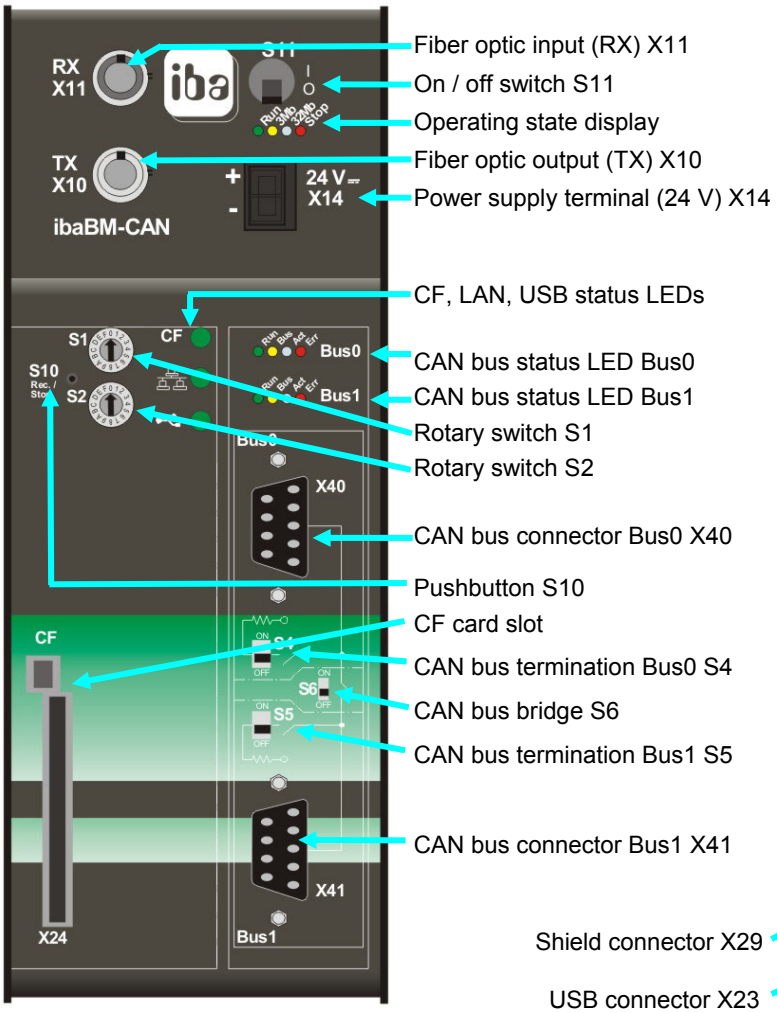


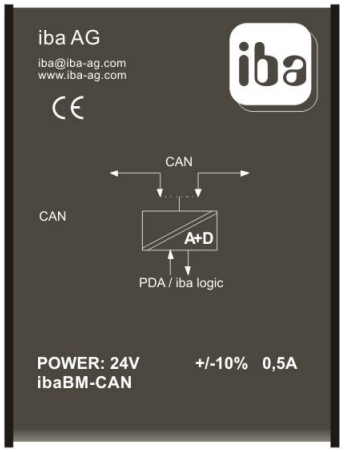
Figure 2: Communication interfaces

7.2 Views of device, control elements and connections

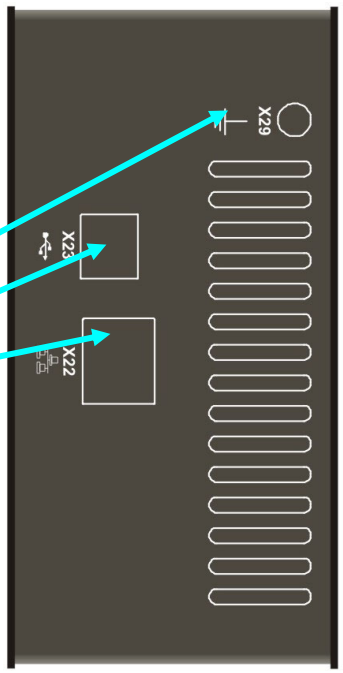
Front view



Top view



Bottom view



Front view can be different from the one shown!

Rear view

Type plate

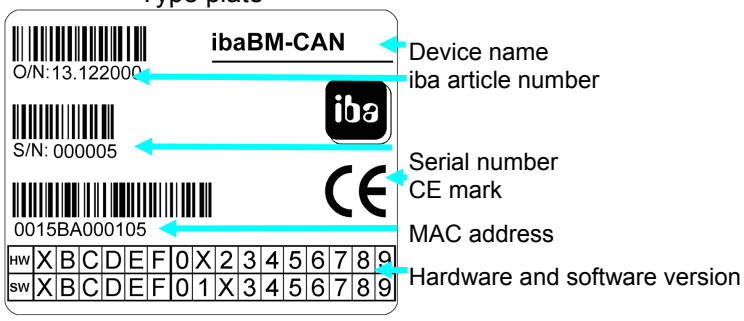


Figure 3: Device views

7.2.1 Fiber optic cable connectors RX/TX

RX: without function.

TX: 32 Mbit/s fiber optic transmission interface for direct data transmission to an ibaPDA-V6 system.

Your ibaPDA-V6 system requires a fiber optic input card of ibaFOB-D type to receive data.

7.2.2 On / off switch S11

Use this switch to turn the device on and off.

Turning the device on and off has no effect on the CAN bus, i.e. other CAN bus communication will continue without disruption when the device is switched off.

When you turn the device off and then restart it, it will be rebooted. This is useful for instance when a fatal error has occurred (Error LED) or if you want to load new device parameters.

7.2.3 Operating status display (status LEDs)

LED	Status	Description
Run (green)	Blinking (1 Hz)	Device is working; irregular blinking rate indicates device is overloaded
	On or of	Controller ok, device has "crashed"
3Mb (yellow)		not supported
32Mb (white)	Off	No communication 32 Mbit/s on TX
	On/blinking	Communication 32 Mbit/s on TX
Stop (red)	Off	Normal, everything OK
	Blinking	Defect, start-up error
	On	Defect, device-internal applications not running

Table 1: Operating status LEDs

7.2.4 24 V Power supply

The ibaBM-CAN device requires an external 24 V DC power supply (unregulated) and should be operated at a maximum of 600 mA. The operating voltage should be run through the provided 2-pin Phoenix threaded coupling connector. If desired, you can order DIN rails or plug-in power supply units from iba.

7.2.5 Status LEDs of the communication interfaces

LED	Status	Description
CF		A CF card is not supported. However the LED reacts, when a card is inserted or removed
	Off	No CF card inserted
	Green	Card detected (card may also be empty), driver loaded; LED flickers during data transfer.
	Red	Error CF card, e.g. incorrect card type or start-up phase.
Ethernet	Off	Ethernet cable not connected
	Green	Driver loaded, LAN ready; LED flickers during data transfer
	Red	Defect; driver not loaded
USB	Off	Normal if nothing is connected
	Green	Connected device detected, driver loaded, LED flickers during data transfer
	Red	Defect or communication setup

Table 2: Status LEDs of communication interfaces

7.2.6 Rotary switches S1 and S2

Using these switches the default settings can be restored:

1. Turn switch S1 to „6“ and S2 to „9“.
2. Push and hold push button S10 and switch device off and on with switch S11. The status LEDs blink for approximately 10 s with 1 Hz.
3. As soon as the LEDs start blinking, release the push button S10.
4. The device restores the default settings and restarts automatically.

Important note

We recommend setting back the hex switches on „0“.

Now all customized settings are deleted and set back to default settings, i. e. also specific settings for TCP/IP or USB are reset, incl. passwords (see also chapter 3 „Scope of delivery “). Saved settings of signal parameters (*.csv) remain.

7.2.7 Pushbutton S10

Reset to default settings, see chapter 7.2.6. „Rotary switches S1 and S2 “.

7.2.8 CompactFlash® card slot X24

The CompactFlash card slot has no function.

7.2.9 LEDs for CAN bus Bus0, Bus1

CAN bus LED	Status	Description
Run (green)	Blinking	CAN bus controller active and OK
	Off	Error in the CPU of the CAN controller
Bus (yellow)	Off	No CAN bus found or no communication
	On/blinking	CAN bus detected or communication
Act (white)	Off	Configuration could not be loaded
	On	Configuration could be successfully loaded
Err (red)	Off	Normal state
	On	CAN line error or boot phase, incorrect parameterization or error while starting
	Blinking (short lighting)	Sporadic errors in the CAN bus

Table 3: LEDs for CAN bus Bus0, Bus1

7.2.10 CAN bus connectors X40 (Bus0) and X41 (Bus1)

Standard CAN connector (9pin D-Sub):

- ❑ These connectors can each accommodate one CAN bus line.
- ❑ You can use connectors with incoming and outgoing wires as well as end plugs with only incoming lines.

Pin assignment CAN connector (D-Sub)

Description	Signal	Pin		Pin	Signal	Description
				1	-	Not used
Not used	-	6		2	CAN_L	CAN $Signal_{Low}$
CAN $Signal_{High}$	CAN_H	7		3	GND	Ground
Not used	-	8		4	-	Not used
Not used	CAN_V+	9		5	Drain Shield	Shield connection

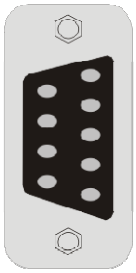


Table 4: Pin assignment of the CAN connector (D-Sub)

Important note

Ensure that the S4, S5 and S6 switches are set correctly!

See also the following chapter „CAN bus switches S4, S5, S6 “.

7.2.11 CAN bus switches S4, S5, S6

The following applies to all switches:

ON = Switch closed

OFF = Switch open.

Note

Before connecting a CAN bus network, please carefully check the switch position with regard to bus termination. We recommend that you first set all switches to OFF as termination is often provided in the connector.

- ❑ Switch S4 is used to switch the terminating resistor for Bus0 on and off.
- ❑ Switch S5 is used to switch the terminating resistor for Bus1 on and off.
- ❑ Switch S6 is used to disconnect or connect both lines Bus0 and Bus1.

The following switch positions can be chosen:

Connection configuration/operating mode	S4	S5	S6
Bus0 and Bus1 are to be operated separately. (a different CAN bus line is connected to each connection)			OFF
ibaBM-CAN is not the last device on Bus0	OFF		OFF
ibaBM-CAN is not the last device on Bus1		OFF	OFF
ibaBM-CAN is the last device on Bus0	ON		OFF
ibaBM-CAN is the last device on Bus1		ON	OFF
ibaBM-CAN is to be looped into a CAN bus line, whereby only two cable ends with end plugs of the same line are available.	OFF	OFF	ON

Table 5: Switch combinations S4, S5 and S6

7.2.12 TCP/IP interface X22

The device can be connected to a PC or a network over a TCP/IP interface (bottom).

The interface has a unique MAC address and is used for transferring configuration files (device parameters).

Note

For connecting the device directly to a PC, please use a cross-over cable. For further information, see chapter 9.2.1 „Ethernet TCP/IP interface“.

7.2.13 USB interface X23

The device can be connected to a PC over a USB interface (bottom). It can be used for parameterize the device. The interface conforms to the USB 2.0 standard.

For further information, see chapter 9.2.2. „USB interface“.

7.2.14 Shield connector X29

Socket for connecting the protective ground (bottom). Depending on the control cabinet configuration it may be necessary to connect the CAN bus cable shields to the X29 connector.

If the CAN bus cable shields are already connected to the protective ground of the control cabinet, connect the X29 connector also to the protective ground of the control cabinet.

8 System integration

In the following examples, only ibaPDA-V6 is referred to as the receiving system. The topologies apply analogously to ibaQDR. The following also applies to ibaQDR: data can only be received with ibaBM-CAN from the CAN bus.

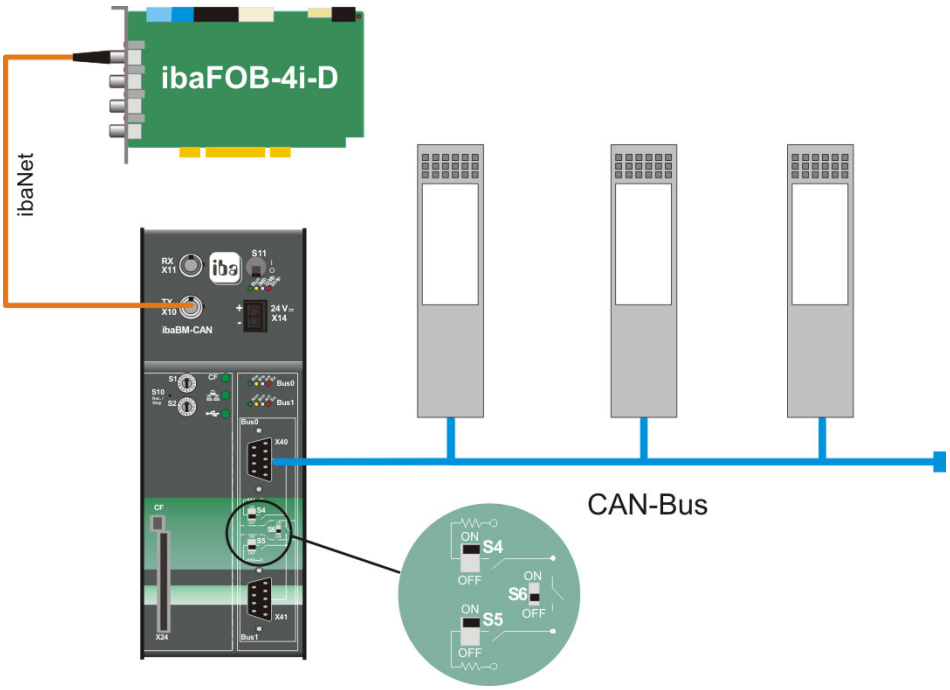


Figure 4: ibaBM-CAN connected to a CAN bus and ibaFOB-4i-D in the measuring PC

The configuration shown above illustrates the ibaBM-CAN device at the end of a CAN bus line. The measured values can be logged with a stationary ibaPDA-V6 PC using an ibaFOB-4i–D card.

ibaBM-CAN can be inserted anywhere into an existing CAN bus. Various cases are conceivable:

8.1 ibaBM-CAN at the end of a CAN bus

When there is an end plug at the CAN bus cable where the device is to be installed, the plug can be plugged onto one of the connections Bus0 or Bus1. The switch S6 must be opended (OFF).

See Figure 4 above.

Note

If the device happens to be the last device on the CAN bus line, as shown in Figure 4, the corresponding terminating resistor must be activated. (In the above example, switch S4 is set to ON.)

Tip

Two different CAN bus lines can be connected to Bus0 and Bus1.

8.2 ibaBM-CAN between CAN bus devices

The CAN bus cable has a plug and incoming and outgoing wires at the point where the device is to be installed. The plug can then be plugged onto one of the connections Bus0 or Bus1. The switch S6 must be opened (OFF) and the terminating resistors (S4, S5) must be switched off (OFF).

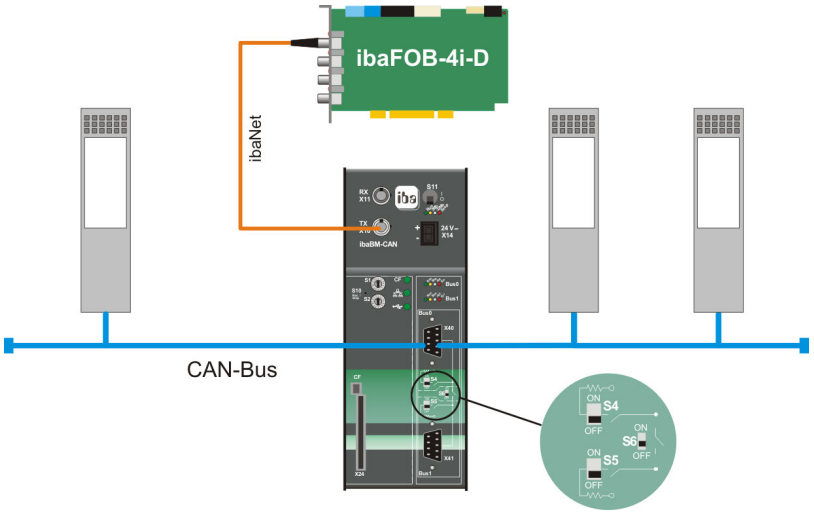


Figure 5: ibaBM-CAN connected between CAN bus devices

Tip

Two different CAN bus lines can be connected to Bus0 and Bus.

8.3 Looping through mode

The CAN bus cable has two cable ends with end plugs at the point where the device is to be installed. Then connect one end to connector Bus0 and the other end to connector Bus1. The switch S6 must be closed (ON) and the terminating resistors (S4, S5) must be switched off (OFF).

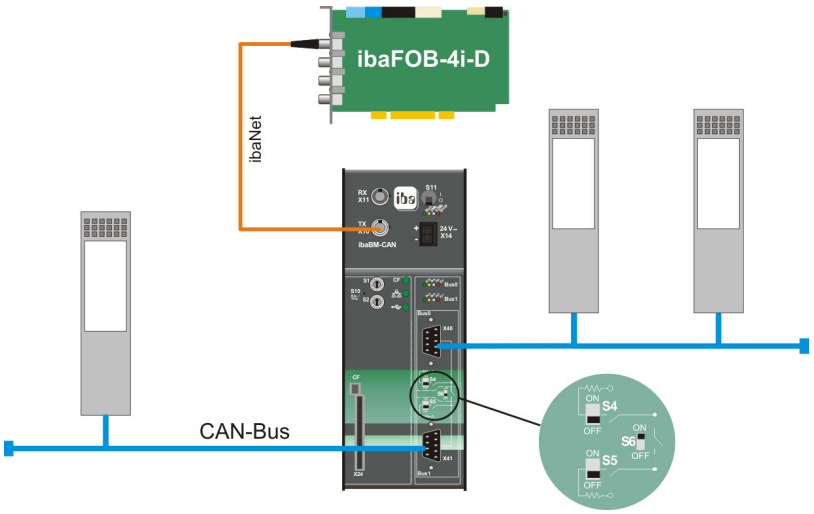


Figure 6: ibaBM-CAN in looping through mode

Important note

In looping through mode only one CAN bus line can be connected.

9 Configuring the communication connections

9.1 Basic principles

The transmission of measuring data from the device requires an input card of the ibaFOB-D familiy, e. g. ibaFOB-2io-D or ibaFOB-4i-D, in the measuring PC and the ibaPDA application. Configuration data is transferred via a TCP/IP connection via Ethernet or USB. Network parameters are configured via the Web interface of the device.

The data to be measured are configured in the ibaPDA I/O manager. In the Web interface, these settings can be seen but not changed. Specific parameters like ID of the signal transmitter, the address range within a telegram and all signals to be measured are defined in a configuration file. The configuration file is stored on a non-volatile memory in the device.

9.2 Establishing communication connections

Important note

For configuring the device on the PC, you need a TCP/IP connection via Ethernet TCP/IP or USB.

9.2.1 Ethernet TCP/IP interface

The Ethernet TCP/IP interface at the bottom of the device is used for configuring device parameters.

Each ibaBM-CAN device has a unique MAC address that allows to identify the device in the network.

Tip

You can find the MAC address on the type label on the back of the device.

Moreover, each device has a unique name. This way, the device can be identified and addressed in the network.

The name is made up of the following components: **can_*nnnn***

nnnn stands for the last four digits of the MAC address.

Example: The device with the 0015BA000101 MAC address carries the name can_0101.

An IP address can be defined via the Web interface (see chapter 11.4 „Network – configuration data “).You can choose if you want to use DHCP (dynamic assignment of IP addresses) or the defined IP address. In case there is a DHCP server in the local network, we recommend the DHCP default setting. If the device is set for a dynamic IP address, or is registered on a name server, it can always be addressed by its unique name. Having connected the device to an active network, a DHCP server is searched for (if the DHCP option is activated), for getting an IP address („Auto-IP“). This can take up to two minutes.

First configuration of a TCP/IP connection

If you connect a new ibaBM-CAN device for the first time to a PC via cross over cable, because there is no network available, please complete the following steps:

1. Please make sure that the PC gets its IP address automatically (see TCP/IP features of the PC´s network connection).
2. As there is no DHCP server available, the PC and the ibaBM-CAN device get automatically an IP address after appr. one minute (Auto-IP). This address should look as follows: 169.254.x.x.
3. Now, you can communicate with the device, by entering **can_nnnn** in the Web browser. nnnn stands for the last four digits of the MAC address (see type plate on the device).
4. If wanted, the IP address can be changed later via the Web interface (http://can_nnnn) of the device.
   (For further information, see chapter 11.4 „Network – configuration data“.)

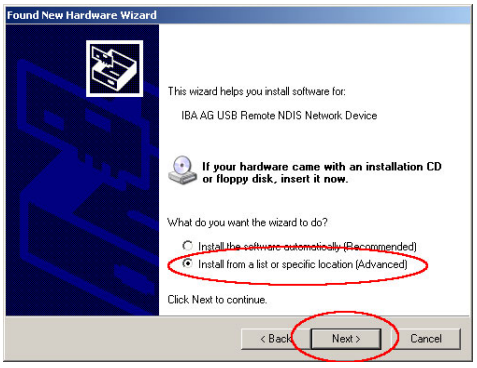
9.2.2 USB interface

The USB interface is located on the bottom side of the device, too, and can also be used for configuration data. The procedure is basically the same like described for the Ethernet TCP/IP interface.

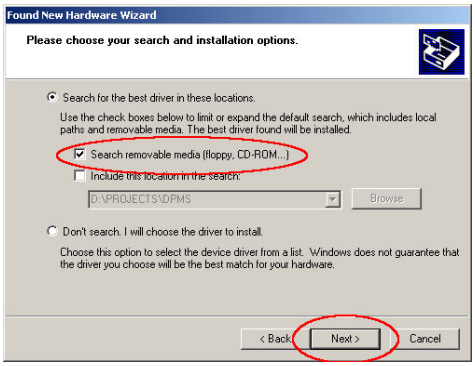
As soon as the PC or laptop computer is connected for the first time over the USB interface by a standard USB cable (A/B), the “Found New Hardware Wizard” will show up.

1. Choose “No, not this time“ in the dialog box and click on <Next>.

2. In the following dialog choose “Install from a list or specific location..“ and click on <Next>.

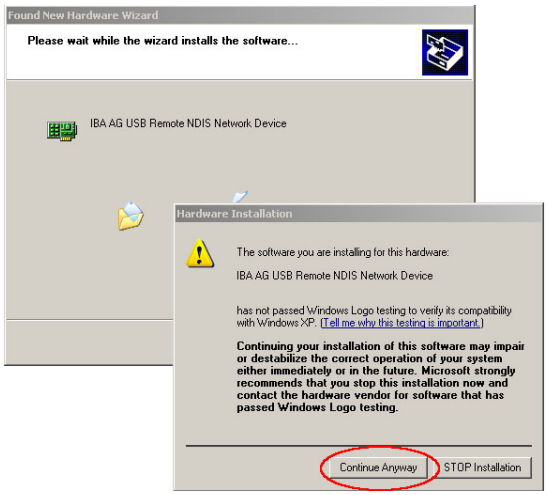


3. Choose “Search for the best driver in these locations“ and check „Search removable media“. Insert the delivered CD-ROM into your CD drive and click on <Next>.



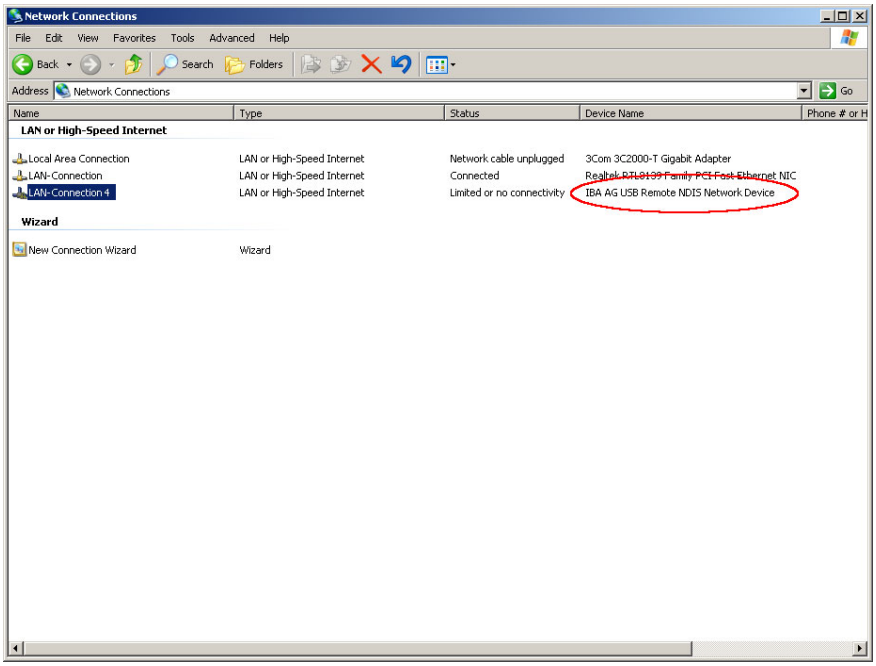
The driver for “IBA AG USB Remote NDIS Network Device“ will be found.

4. The message box which points out that “The software you are installing... has not passed the Windows Logo testing..” is typical and can be closed by a click on <Continue Anyway> because it’s not dangerous.

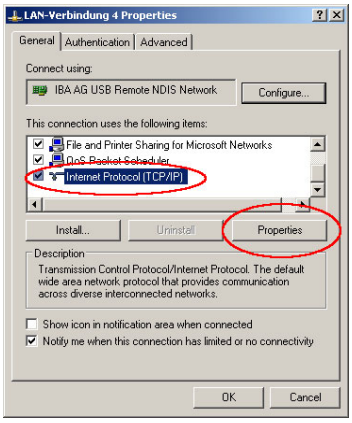


5. After copying the required files click on <Finish>.

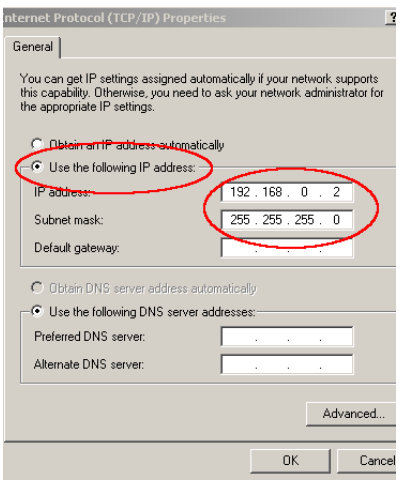
Now, the USB interface is available as an additional Ethernet interface to the device. You should now configure the interface in order to establish a communication to the device over the USB cable. Therefore, choose “Settings” in the Windows Start menu and then “Control Panel”. There open “Network Connections” to see a list of available network connections.



6. There, in section “LAN or High-Speed Internet” you’ll find a LAN connection with the device name “IBA AG USB Remote NDIS Network Device”. Highlight this line and select “Properties” from the “File” menu. A new dialog box “LAN-connection... Properties“ will open.



7. Look for entry “Internet Protocol (TCP/IP) and highlight it. Click on “Properties”. A new dialog box “Internet Protocol (TCP/IP) Properties” will open.



8. Choose “Use the following IP address“ and enter the address “192.168.0.2” into the field “IP address” and the value “255.255.255.0” into the field “Subnet mask”. Then close this dialog and the previous one by click on <OK>.
9. Now you can parameterize the device over USB.

10 Configuration in ibaPDA-V6

For measuring or recording data via ibaBM-CAN you need ibaPDA-V6 version 6.24 or higher.

Note

In a first step, you should define over the Web interface the main device settings like operating mode, network settings, passwords, firmware etc. (see also chapter 11 „Web interface“)

Specific parameters like ID of the signal transmitter, the address range within a telegram and all signals to be measured are defined in a configuration file. The configuration file is stored on a non-volatile memory in the device.

The telegrams on the CAN bus must be known, in order to enter the data to be measured in ibaPDA-V6. The following signal information must be known:

- ❑ The bus on which the signal is received
- ❑ ID of the object
- ❑ Where the signal is located in the telegram or where the range of values for several signals starts (byte offset) and what type of data is involved. The byte offset is the offset within the payload data.

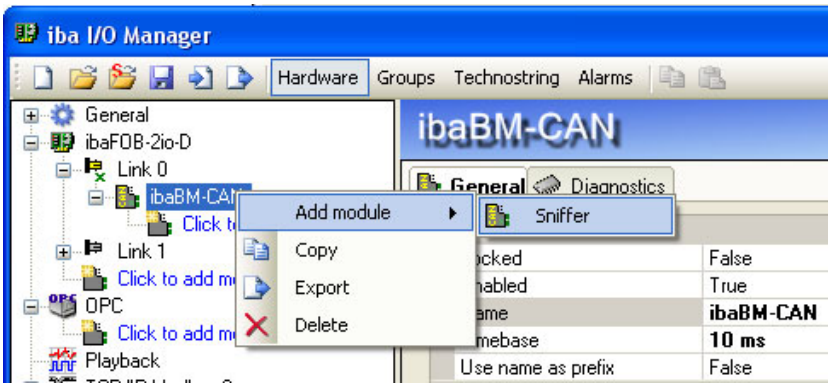
10.1 First steps in ibaPDA-V6 configuration

1. Connect the device to a voltage source and switch it on.
2. Connect the PC to the device (USB or TCP/IP).
3. Establish a FO connection from the TX connection of the device to a free RX input of an ibaFOB-D input card.
4. Start the ibaPDA-V6 client and open the I/O manager .
5. Add an ibaBM-CAN module. For this, choose the correct ibaFOB-D input card and mark the link ibaBM-CAN is connected to. Click with the right mouse button on the link and choose the „Add module – ibaBM-CAN“ option in the context menu. You can also start an automatic detection of the device when you choose “Autodetect”.

„ibaBM-CAN“ is then displayed below the link of the FOB card.

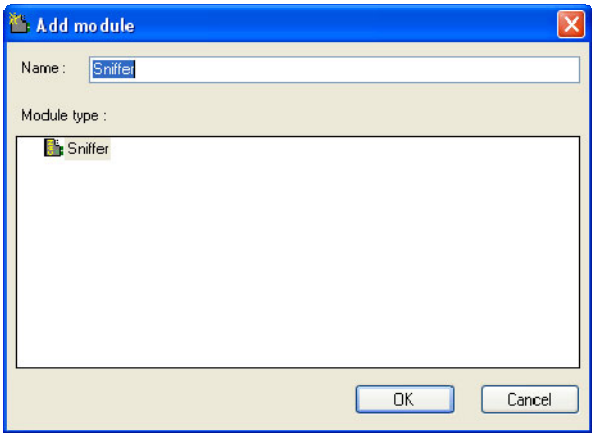
6. Configure the settings for ibaBM-CAN in the “General” tab, see chapter 10.2.1.1 „ibaBM-CAN - General “.

7. Add a sniffer module under the ibaBM-CAN device module. Click with the right mouse button on the ibaBM-CAN device module and choose „Add module“ and “Sniffer” in the context menu.



You can do the same procedure also by clicking on the blue „Click to add module…“ command.

8. The following window appears:



Enter a name and confirm with <OK>. The sniffer sub module is then displayed below the ibaBM-CAN module.

9. Configure the signals to be captured in the sniffer sub module, see chapter 10.2.2 „Sniffer sub module “.

10. When all signals have been configured, please activate the configuration by clicking on <OK> or <Apply>. In course of the following validation, the configuration is transferred to ibaBM-CAN. <OK> closes the I/O manager, provided that no warning or error messages have appeared during the validation process.

10.2 Device modules and sub module in the I/O manager

Note

Global parameters like bus baudrate are configured in the ibaBM-CAN module. The analog and digital signals are configured in the sniffer sub module.

10.2.1 ibaBM-CAN module

The figure below shows the ibaBM-CAN module in the ibaPDA I/O manager:

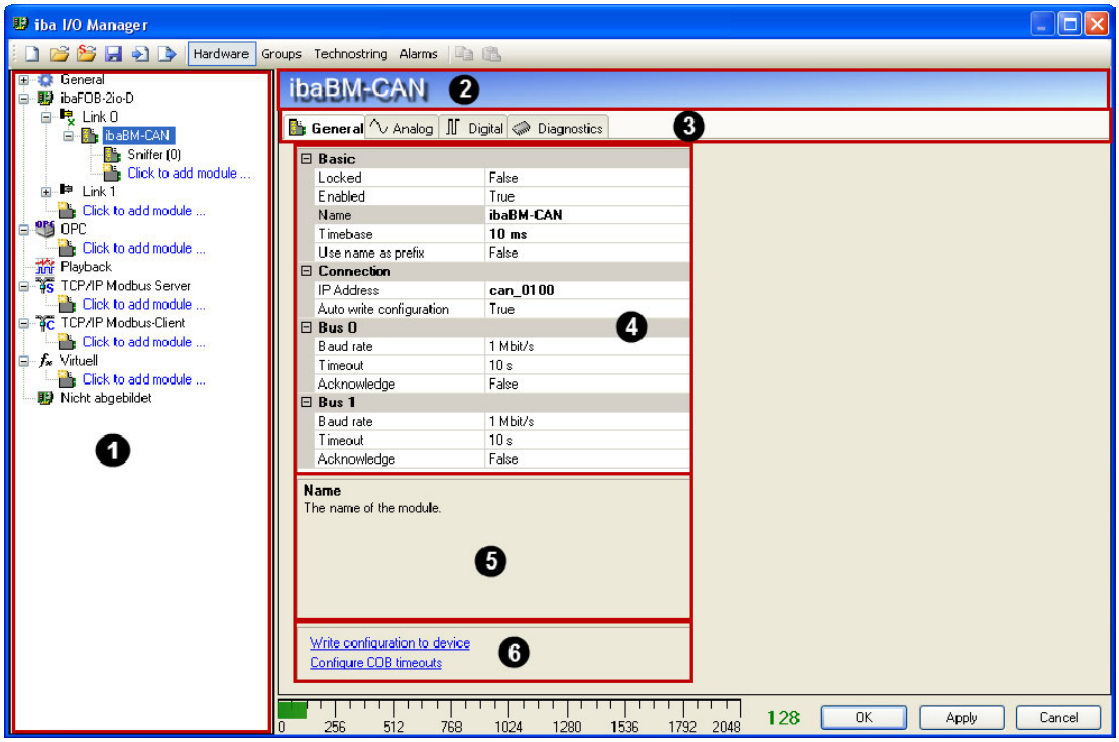


Figure 7: I/O manager ibaBM-CAN

The I/O manager is divided in several sections. In section ❶ the modules are displayed in a tree structure. When a module is selected the related information is displayed in the right part of the window. Section ❷ shows the name of the module.

The right side is divided into several subpages that can be chosen by clicking on the tabs ❸. The global settings of the device are specified in the fields in section ❹. When a field is selected, a related description is shown in section ❺. In section ❻, the configuration can be written into the device. And with a click on the link „Configure COB timeouts“, a timeout for each ID can be specified (COB = communication object).

On the following pages you find a description of each tab:

10.2.1.1 ibaBM-CAN - General tab

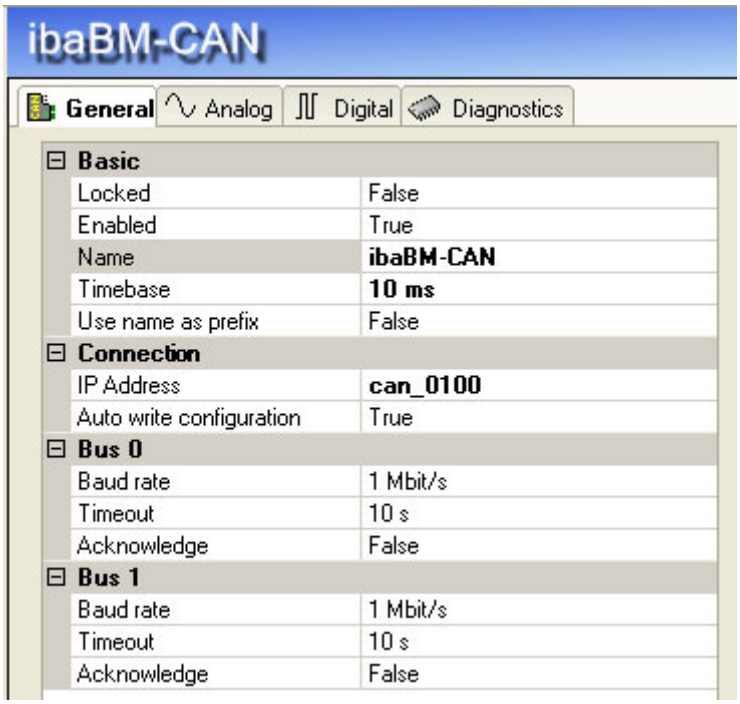


Figure 8: ibaBM-CAN - General tab

Basic

- **Locked**
  A locked module can only be changed by an authorized user
- **Enabled**
  Here, you can activate data capturing for this module
- **Name**
  Name of the module
- **Timebase**
  Timebase that is used for the device, given in ms
- **Use name as prefix**
  Select „True“, if you want to prefix the signal names with the module name

Connection

- **IP Address**
  IP address or device name of ibaBM-CAN.
  The name is made up of the following components: **can_nnnn**.
  nnnn stands for the last four digits of the MAC address, which can be found on the label on the back side of the device
- **Auto write configuration**
  True: The configuration is written to the device at every start of the acquisition.
  False: The last configuration is used at the start of the acquisition. If there is no online connection established to ibaBM-CAN, set the option on FALSE

Bus X

- **Baudrate**
  Baudrate for the related bus (10 kbit/s to 1 Mbit/s)

- **Timeout**
  If the device does not receive a message from an ID on this bus within this time span, the measured value is set to the last measured value or the default value. You can configure the behavior and the default value in the sniffer module.
  A timeout can be separately configured for each ID using the link „Configure COB timeouts“, see chapter 10.2.1.2 „General tab – Configure COB timeouts“.

- **Acknowledge**
  True: The reception of a message is acknowledged
  False: The reception of a message is not acknowledged

Note

This option should only be enabled, when ibaBM-CAN is the only device on the CAN bus. When other devices are also connected to the bus, this option is not necessary.

10.2.1.2 General tab – Configure COB timeouts

If you want to configure individual timeouts for special objects click on the link „Configure COB timeouts “ in the lower part of the „General“ tab.

The local timeout overwrites the global bus setting for the specified ID.

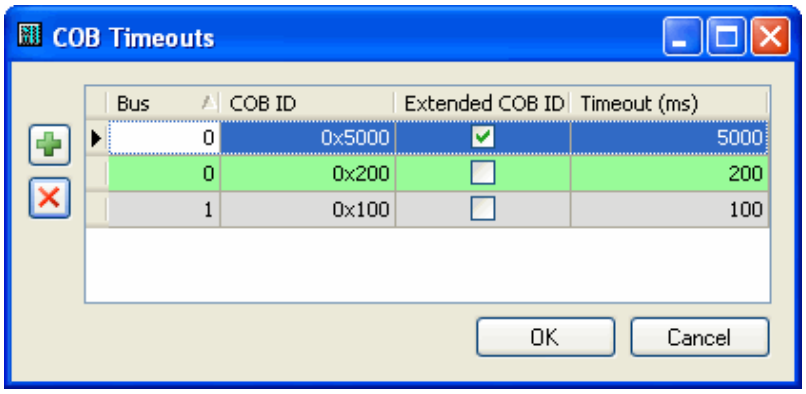


Figure 9: ibaBM-CAN, General tab – COB timeouts

COB Timeouts

- **Bus**
  Physical bus connection of the device, on which the signal is to be measured.
  Possible values: 0,1

- **COB ID** (communication object identifier)
  ID of the CAN bus object.
  Range of values:
  Standard ID (11 bit): 0x1..0x7ff (1..2047$_{dez}$)
  Extended ID (29 bit): 0x1..0x1f ff ff ff (1..536 870 911 $_{dez}$)

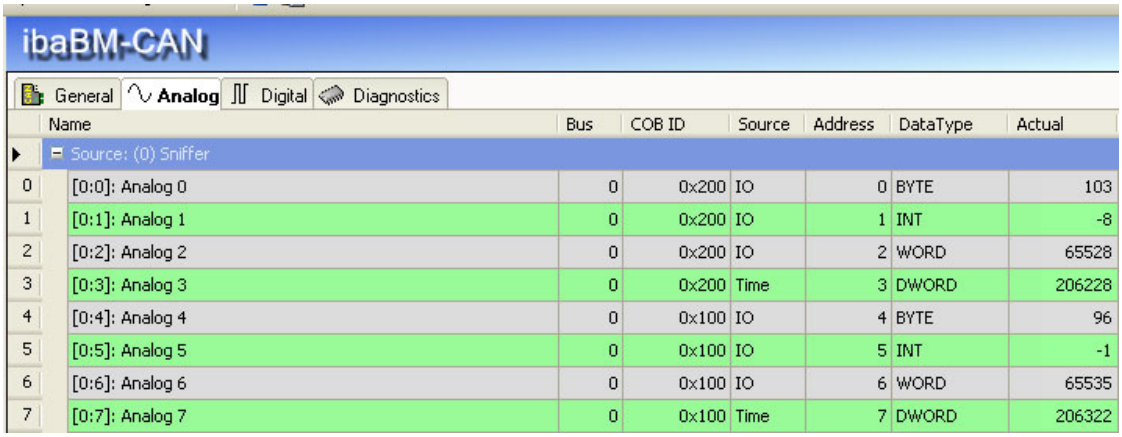
- **Extended COB ID**
  Not enabled: the standard ID range is used (11 bit)
  Enabled: the extended ID range is used (29 bit)

- **Timeout (ms)**
  Timeout for this ID in ms

10.2.1.3 ibaBM-CAN - Analog tab

Note

If analog signals are configured in the sub modules, and the configuration has been transferred to ibaBM-CAN, an overview of all captured analog signals with an online view of the actual values is shown.



	Name	Bus	COB ID	Source	Address	DataType	Actual
	Source: (0) Sniffer						
0	[0:0]: Analog 0	0	0x200	IO	0	BYTE	103
1	[0:1]: Analog 1	0	0x200	IO	1	INT	-8
2	[0:2]: Analog 2	0	0x200	IO	2	WORD	65528
3	[0:3]: Analog 3	0	0x200	Time	3	DWORD	206228
4	[0:4]: Analog 4	0	0x100	IO	4	BYTE	96
5	[0:5]: Analog 5	0	0x100	IO	5	INT	-1
6	[0:6]: Analog 6	0	0x100	IO	6	WORD	65535
7	[0:7]: Analog 7	0	0x100	Time	7	DWORD	206322

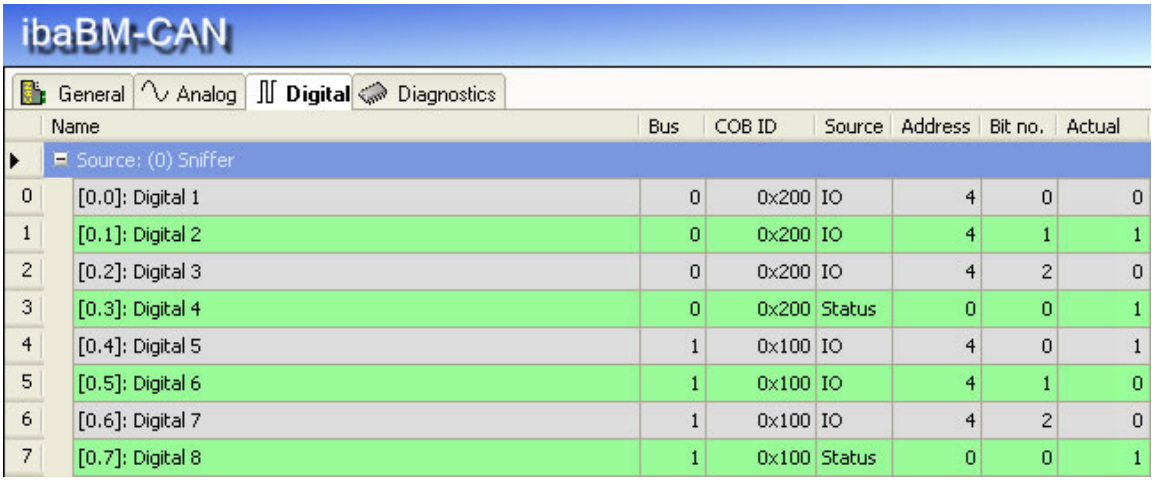
Figure 10: ibaBM-CAN – Analog tab

- **Name**
  Signal name specified in the sniffer module
- **Bus**
  Physical bus connection of the device, on which the signal is to be measured.
  Possible values: 0,1
- **COB ID**
  ID of the CAN bus device
  Range of values:
  Standard ID (11 bit): 0x1..0x7ff (1..2047_{dez})
  Extended ID (29 bit): 0x1..0x1f ff ff ff (1..536 870 911 $_{dez}$)
- **Source**
  Data source:
  IO: Data area of the CAN message.
  Time: Data area of ibaBM-CAN (cycle time).
  RAM: for service purposes only
  DPR: for service purposes only
- **Address**
  Byte address of the desired signal
- **Data type**
  Data type of the signal
- **Actual**
  Actual value of the signal

10.2.1.4 ibaBM-CAN – Digital tab

Note

If digital signals are configured in the modules, and the configuration has been transferred to ibaBM-CAN, an overview of all captured digital signals with an online view of the actual signals is shown.



	Name	Bus	COB ID	Source	Address	Bit no.	Actual
▶	Source: (0) Sniffer						
0	[0.0]: Digital 1	0	0x200	IO	4	0	0
1	[0.1]: Digital 2	0	0x200	IO	4	1	1
2	[0.2]: Digital 3	0	0x200	IO	4	2	0
3	[0.3]: Digital 4	0	0x200	Status	0	0	1
4	[0.4]: Digital 5	1	0x100	IO	4	0	1
5	[0.5]: Digital 6	1	0x100	IO	4	1	0
6	[0.6]: Digital 7	1	0x100	IO	4	2	0
7	[0.7]: Digital 8	1	0x100	Status	0	0	1

Figure 11: ibaBM-CAN – Digital tab

- **Name, Bus, COB ID**
  see “Analog” tab
- **Source**
  Data source:
  IO: Data area of the CAN message
  Status: Status information (COB is available or not)
  RAM: for service purposes only
  DPR: for service purposes only
- **Address**
  Byte address of the desired signal
- **Bit no.**
  Bit number of the signal within the byte
- **Actual**
  Actual value of the signal

10.2.1.5 ibaBM-CAN – Diagnostics tab

The “Diagnostics” tab shows the status of each ID on each bus.

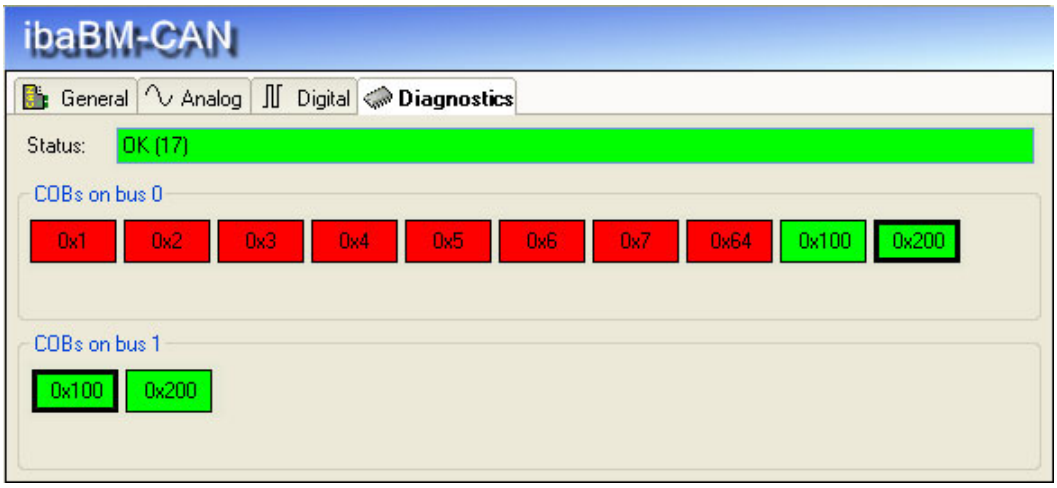


Figure 12: ibaBM-CAN – Diagnostics tab

Display	Description	Sniffing is configured for this ID	CAN message received within the timeout
0x1	Red with a thin border	✓	✗
0x100	Green with a thin border	✗	✓
0x200	Green with a thick border	✓	✓

10.2.2 Sniffer sub module

Several “Sniffer” modules can be added to an ibaBM-CAN device module. This way, signals with different settings can be grouped.

The figure below shows the setting of a sniffer module:

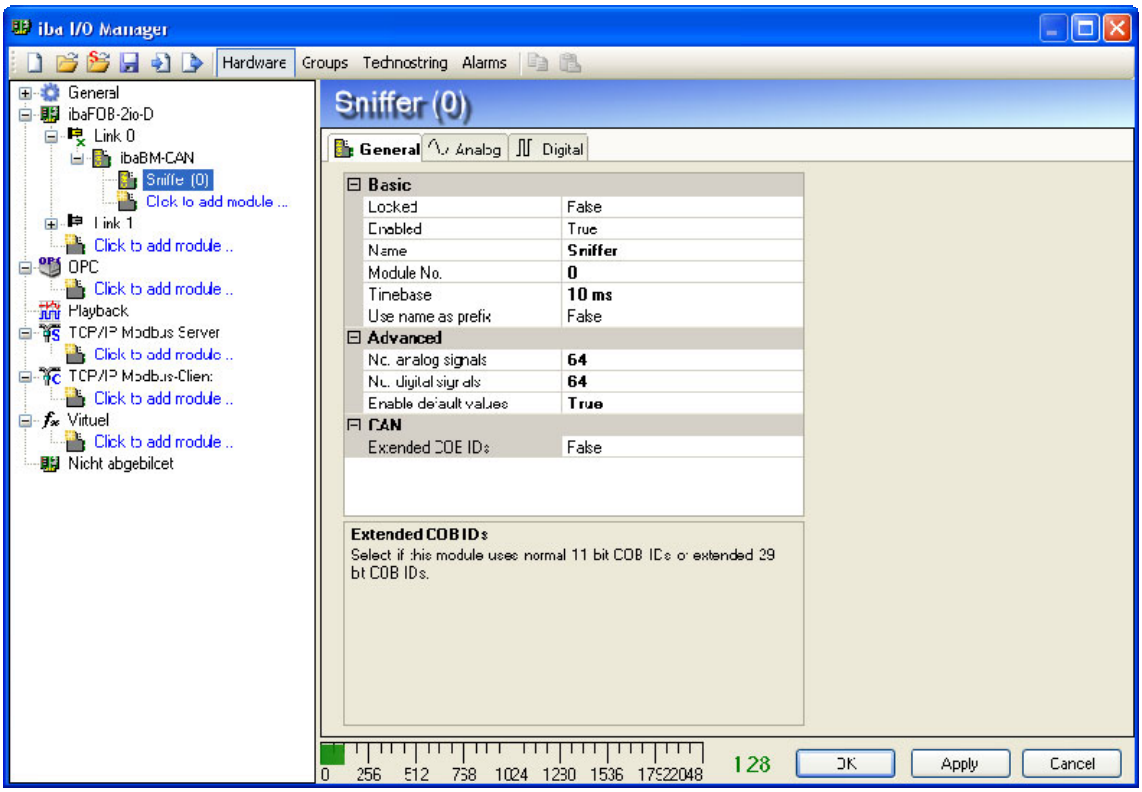


Figure 13: Sniffer module - General tab

10.2.2.1 Sniffer module – General tab

Basic

- **Locked, Enabled, Name**
  see ibaBM-CAN module – General tab
- **Module No.**
  Consecutive module number assigned by ibaPDA for clearly referencing the signals, e.g. when printing and for ibaAnalyzer. The number can be changed by the user.
- **Timebase**
  Timebase used for this module, given in ms. The timebase for the sniffer module must be an integer multiple of the timebase specified in the ibaBM-CAN module.

CAN

- **Extended COB IDs**
  True: the module uses extended 29 bit COB IDs
  False: the module uses standard 11 bit COB IDs:
  Standard ID (11 bit): 0x1..0x7ff (1..2047$_{dez}$)
  Extended ID (29 bit): 0x1..0x1f ff ff ff (1..536 870 911 $_{dez}$)

Advanced

- **No. analog signals**
  Defining the number of analog signals for this module (max. 512)
- **No. digital signals**
  Defining the number of digital signals for this module (max. 512)
- **Enable default values**
  True: The sniffer module will send the default signal value, if the timeout is exceeded for an object
  False: The sniffer module will send the last received value, if the timeout is exceeded for an object

10.2.2.2 Sniffer module - Analog tab

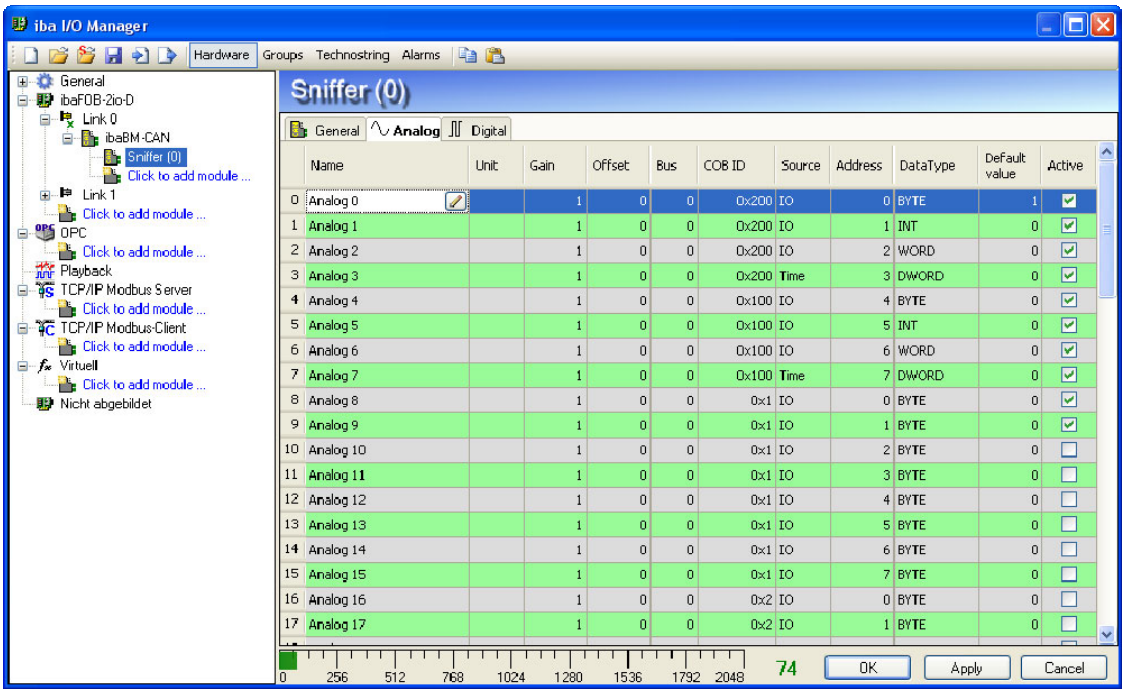
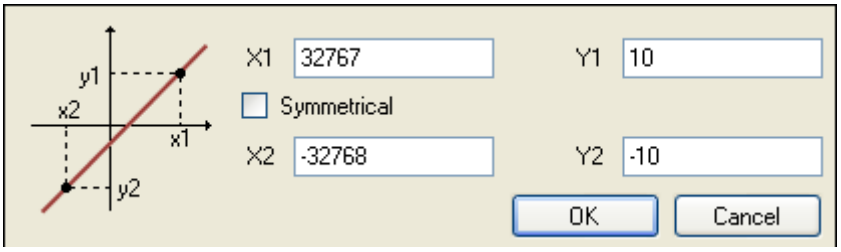


Figure 14: Sniffer module – Analog tab

- **Name**
  You can enter a name for the signal and two additional comments (click on the icon in the Name field)
- **Unit**
  Here, you can enter the physical unit of the analog value
- **Gain/Offset**
  Gradient (Gain) and y axis intercept (Offset) of a linear equation. You can convert a standardized value transferred without a unit into a physical value.
  For making the calculation of Gain/Offset easier, an auxiliary dialog appears when clicking on the co-ordinate cross in the „Gain“ or „Offset“ field. In this dialog, you only enter two points in the line equation. Gain and offset are then calculated automatically.
  The values correspond to the following parameters:
  X1: Maximum measured value of the signal
  Y1: Maximum physical value
  X2: Minimum measured value of the signal
  Y2: Minimum physical value.



❑ **Bus**
Enter the bus connection the signal is to be captured for.
Possible values: 0,1

❑ **COB ID**
ID of the CAN bus object
Range of values:
Standard ID (11 bit): 0x1..0x7ff (1..2047$_{dez}$)
Extended ID (29 bit): 0x1..0x1f ff ff ff (1..536 870 911 $_{dez}$)

❑ **Source**
Data source:
IO: Data area of the CAN message
Time: Time between two messages in µs

Note

When „Time“ is selected, the time between two messages will be measured. The data type is automatically set to DWORD. The address must be set to „0“, otherwise an error message may occur.

RAM: for service purposes only
DPR: for service purposes only

❑ **Address**
Byte address of the desired signal

❑ **Data type**
The data type of the signal can be chosen from a dropdown menu:

Data type		Description	Value range
Big Endian	Little Endian		
BYTE	BYTE	8 Bit without positive or negative sign	0 to 255
INT_B	INT	16 Bit with positive or negative sign	-32768 to 32767
WORD_B	WORD	16 Bit without positive or negative sign	0 to 65535
DINT_B	DINT	32 Bit with positive or negative sign	-2147483648 to 2147483647
DWORD_B	DWORD	32 Bit without positive or negative sign	0 to 4294967295
FLOAT_B	FLOAT	IEEE754; Single Precision; 32 Bit floating point	$1{,}175 \cdot 10^{-38}$ to $3{,}403 \cdot 10^{38}$

Table 6: Data types

- **Default value**
  When the timeout is exceeded for this object, the sniffer module will send the entered value.

- **Active**
  Only if you tick the box, the signal is captured and considered when checking the licensed signals.

10.2.2.3 Sniffer module – Digital tab

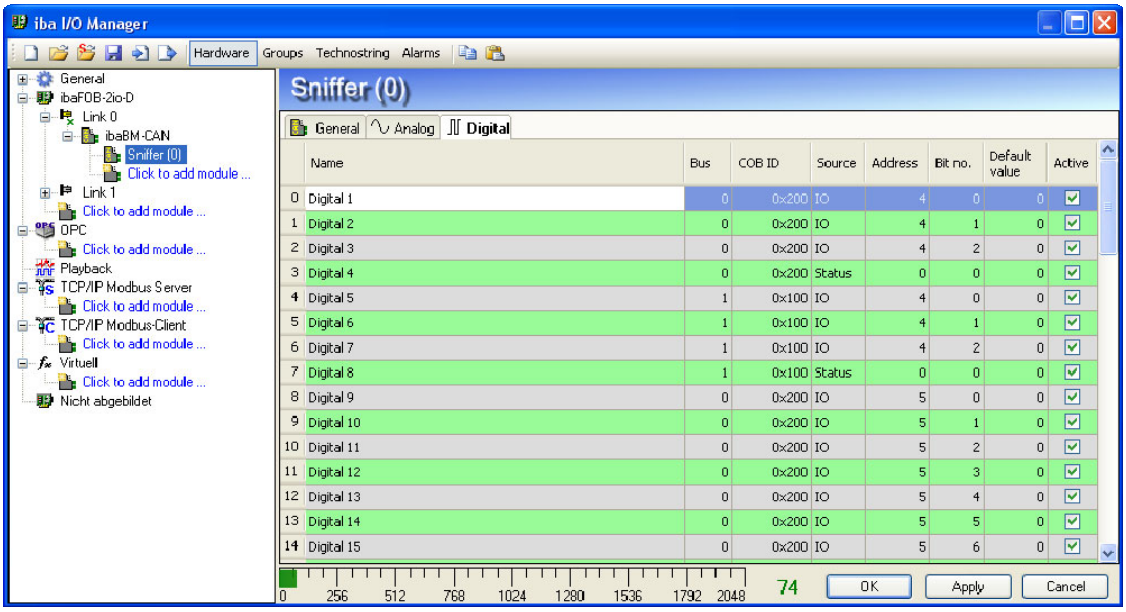


Figure 15: Sniffer module – Digital tab

- **Name, Bus, COB ID, Active, Default value**
  see Sniffer module – Analog tab.

- **Source**
  Data Source:
  IO: Data area of the CAN message.
  Status: Status information (object is available or not)
  RAM: for service purposes only
  DPR: for service purposes only

- **Address**
  Digital signals are organized byte by byte and identified by a byte offset and a bit number. The address parameter specifies the byte offset of the byte where the desired signal is located.

- **Bit no.**
  Enter here the bit no. within the byte defined in “Address“.

11 Web interface

The device has its own web server where the basic settings (network, passwords) can be configured. Once the Ethernet connection between the device and the PC has been established, you can access the device from your Internet browser (e. g. Internet Explorer, Mozilla Firefox, etc.). Suitable web pages for parameterization are stored in the device.

Tip

Once, the basic settings have been done over the web interface, the I/O manager of ibaPDA has to be used to configure the data to be measured.

By means of the ibaPDA system, you may always restore a backed up IO configuration in the device.

For further information on configuring measuring signals in ibaPDA, see also chapter 10 „Configuration in ibaPDA“.

11.1 Starting the Web interfaces

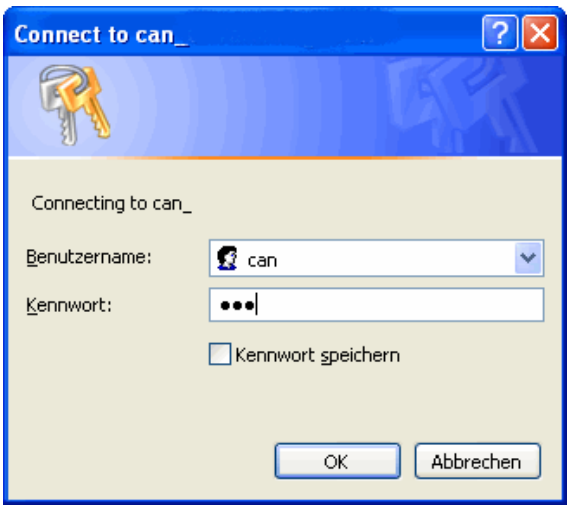
1. After having connected the PC to ibaBM-CAN via Ethernet or USB, start your Web browser.
2. Type the Internet address of the device in the address line (URL)

If connection via …	then URL …
USB interface	http://192.168.0.1
Ethernet TCP/IP interface (with DHCP server in LAN)	http://can_nnnn nnnn = last four digits of the MAC address (see device label)

Tip

Depending on the security level settings of the Internet Explorer it might be necessary to add the address “http://can_nnnn/diag” to the trusted sites.

The first time you access the Web interface you will be prompted to enter a username and password to prevent unauthorized access.



The device recognizes two users for operating the web interface:

User	Rights	User name	Password
Normal user	Display of diagnostics and status messages	can	can
Administrator	Display of diagnostics and status messages Change network parameters Change passwords for both users Execute firmware updates	admin	can

The „admin“ user should only be assigned to experienced users. As network parameters might be changed accidentally, access to the device via Ethernet would no longer be possible. You would have to reset the configuration to default values. Please change the password for the „admin“ user as soon as possible.

Tip

You can reset the passwords to the default values, e. g. if you have forgotten the password. For further information see chapter 7.2.6 „Rotary switches S1 and S2 “.

After login with the user name mentioned above, the home page opens.

11.2 Info - homepage

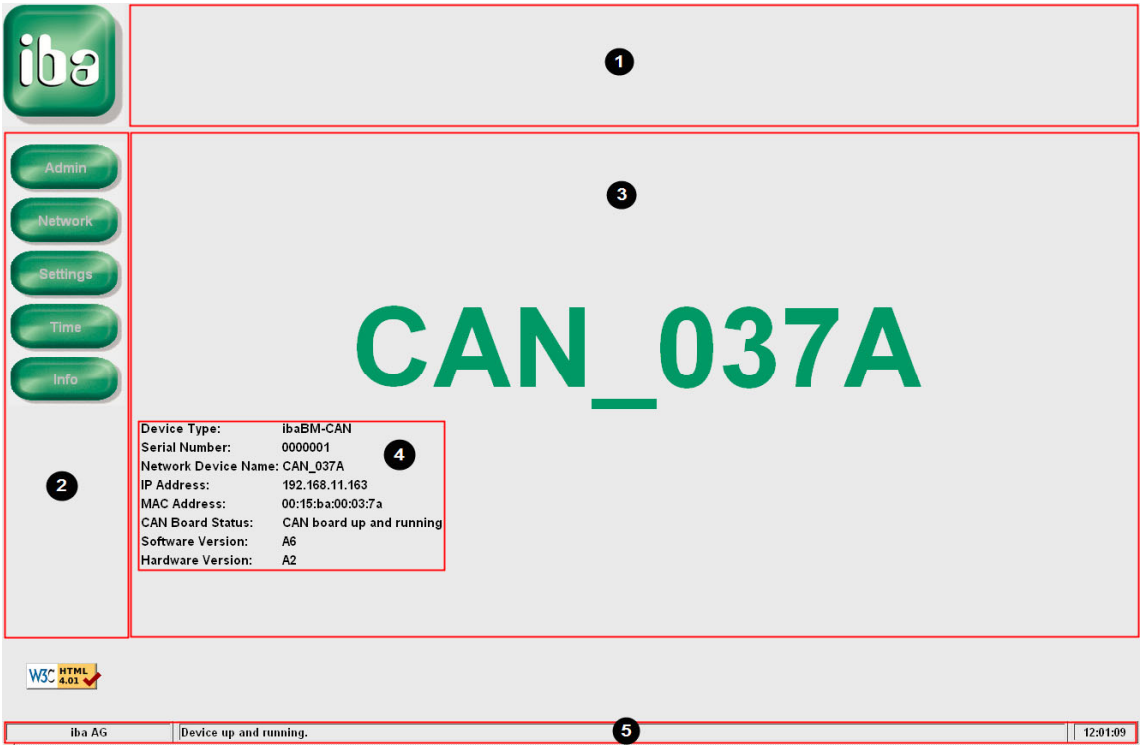


Figure 16: Homepage of the device

The Web pages all have the same basic layout:

❶ The header section on the upper part of the page contains information about the currently selected page.

❷ The navigation section provides buttons for selecting the individual web pages.

❸ The information section provides the desired information of the selected web page and permits data entry whenever necessary.

❹ The home page provides additional information about the device:

- Device type
- Serial number
- Network device name (required for automatic network address assignment by DHCP server)
- IP address of the device
- MAC address (hardware network address)
- Status of CAN board
- Software version
- Hardware version

❺ The status line provides information about the device status and the actual device time. The device starts always at 12:00 h. Due to the system, the status information is not actualized continuously, but only with every new loading of the Website.

You can go to the homepage from any other website by clicking the <Info> button.

11.3 Administrator functions

On the administrating page, passwords can be changed and firmware updates can be loaded into the device. This page can only be used by the „admin“ user.

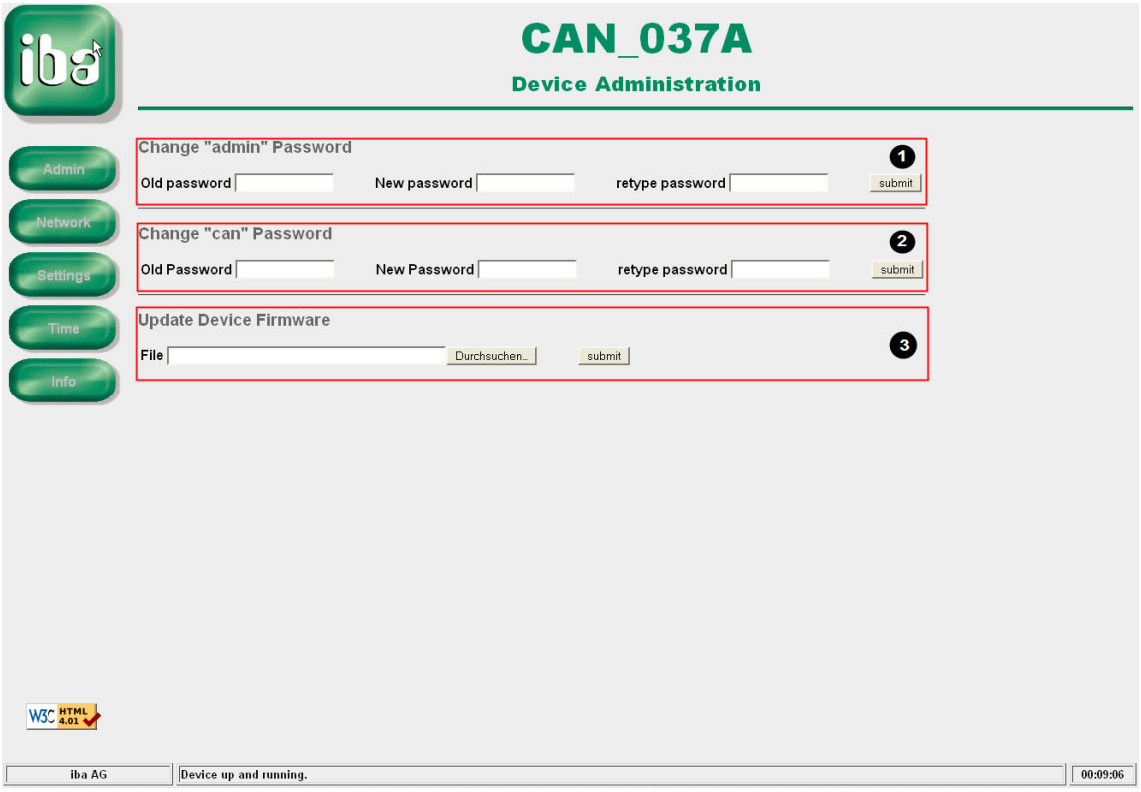


Figure 17: Administration page

❶ Here, you can change the “admin“ password.

❷ This option allows you to change the “can“ (default user) user password.

You need to enter the old password and the new password twice for security reasons. “can” is the default setting for both passwords. By clicking on the <submit> button, the password is transferred to the device.

❸ Loading firmware updates:

The firmware updates are edited by iba, whenever technical innovations or improvements require an update of the device firmware.

If iba has sent you a firmware update, choose the update file in the “browse“ dialog. Usually, this file has a “.CAB“ ending, e.g. “update.SH4.CAB“.

For submitting the update, please click on <submit>. The update is then loaded to the device, unpacked and installed.

Note

The installation might take several minutes. Do not switch off the device, as this would interrupt the procedure. After the installation the device must be rebooted.

11.4 Network – configuration data

Clicking the <Network> button in the navigation section takes you to the configuration data of the network accesses.

You must be logged in as “admin” in order to change network settings.

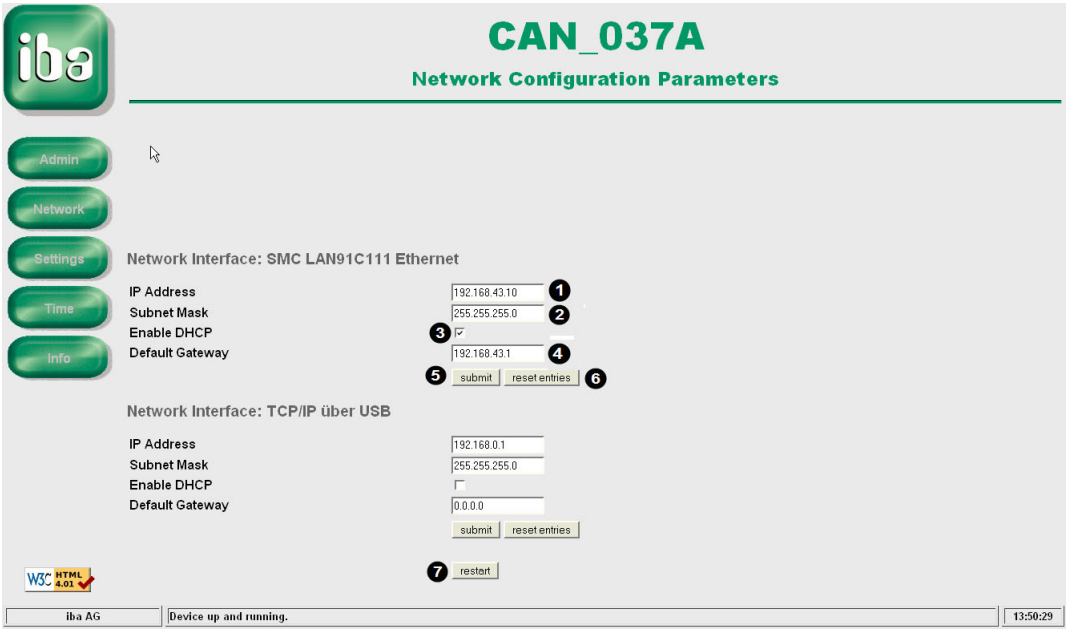


Figure 18: Network settings

This page shows the two network adaptors of the device. The upper interface “SMC LAN91C111 Ethernet“ describes the settings of the X22 LAN interface, the lower “TCP/IP over USB“ interface describes the settings of the X23 USB connection.

The following settings can be chosen for each adapter:

❶ The IP address

❷ The „Subnet Mask“ for the network

❹ The „Default Gateway“

❸ Here, you can choose if a DHCP server is to be used

❺ With the <submit> button, the entries for the network adapter are stored in the device.

❻ With the <reset entries> button, the entries are deleted.

❼ The network settings only become valid if the device is restarted. The device can be restarted by switching on/off or by clicking on the <restart> button.

Tip

In case of wrong entries, it may occur that you lose access after restart!

You can reset the network parameters to default settings, see chapter 7.2.6 „Rotary switches S1 and S2 “.

Note

Due to the simple point-to-point connection and the considerable slower establishing of a connection, we recommend avoiding the use of DHCP in conjunction with USB.

11.5 Settings

By clicking on the <Settings> button, you choose the page for signal settings. You must be logged in as “admin” in order to see the signal settings. This page is divided into several subpages that can be chosen by clicking on tabs. The page is segmented like follows:

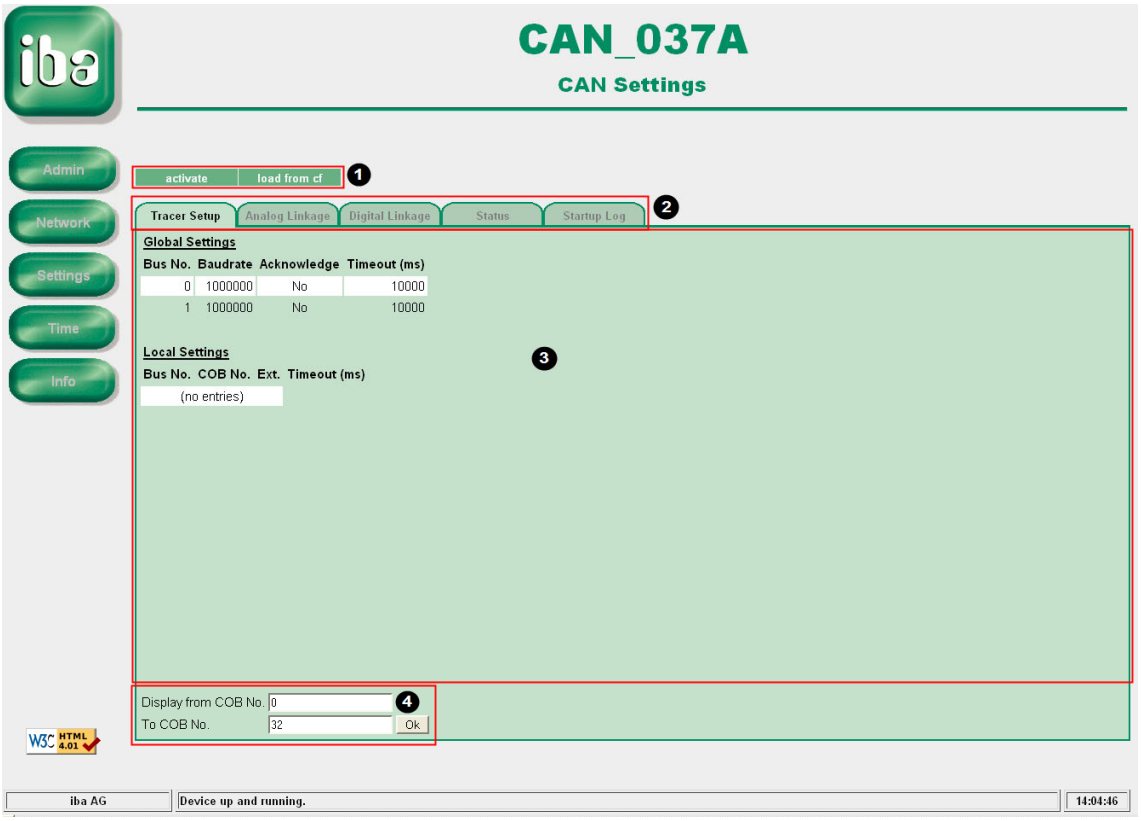


Figure 19: Global settings

The buttons in section ❶ apply to all tabs. You can select the following functions:

- ❑ <activate>: without function
- ❑ <load from cf>: without function

With the tabs in field ❷ you can change between the different types of values.

You can choose between the following options:

- ❑ Tracer Setup: Displays global settings
- ❑ Analog Linkage:Displays the settings of the analog values
- ❑ Digital Linkage: Displays the settings of the digital values
- ❑ Status: Displays the device status
- ❑ Startup Log: Event logs while booting

The content of the tabs ❸ shows the related settings and messages.

This entry ❹ limits the number of displayed objects or signals.

11.5.1 Tracer Setup (Timeout)

The parameters are configured in the I/O manager of ibaPDA. If the designations which are used in the Web interface differ from the designations in ibaPDA, the designation in ibaPDA is stated in brackets.

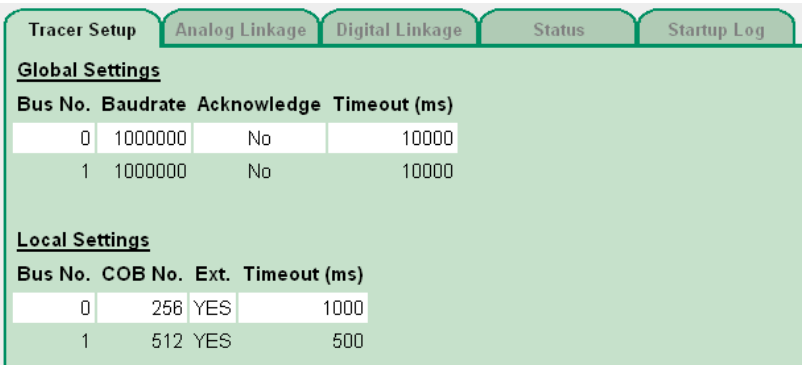


Figure 20: „Tracer Setup“ tab

Global Settings

- **Bus No.**
  Physical bus connection of the device
- **Baudrate**
  Baudrate for the related bus (10 kbit/s to 1 Mbit/s).
- **Acknowledge**
  True: The reception of a message is acknowledged.
  False: The reception of a message is not acknowledged.
- **Timeout (ms)**
  Timeout for the related bus in ms

Local Settings

- **Bus No.**
  Physical bus connection of the device, on which the signal is to be measured.
- **COB No. (ibaPDA: COB ID)**
  ID of the CAN bus object
- **Ext. (ibaPDA: Extended COB IDs)**
  No: the standard ID range is used (11 bit).
  Yes: the extended ID range is used (29 bit).
- **Timeout (ms)**
  Timeout in ms specified for individual IDs.

Note

The timeouts under "Global Settings" are configured in the “General” tab of the ibaBM-CAN module in ibaPDA. The timeouts under "Local Settings" are configured in the submenu "Configure COB timeouts".

Note

The display of the Web interface uses the decimal number system. The hexadecimal number system is used in ibaPDA.

11.5.2 Analog Linkage (Analog signals)

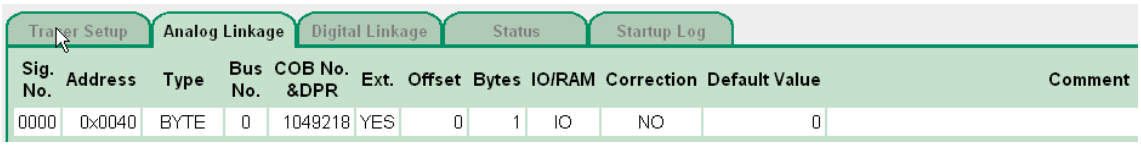


Figure 21: „Analog Linkage“ tab

The parameters are configured in the I/O manager of ibaPDA. The corresponding designations which are used in ibaPDA are stated in brackets.

- **Sig No.**
  Signal number (consecutive numbering)
- **Address**
  Absolute address of the signal within the message
- **Type (ibaPDA: Data type)**
  Data type
- **Bus No. (ibaPDA: Bus)**
  Physical bus connection of the device
- **COB No. &DPR (ibaPDA: COB ID)**
  CAN bus object ID
- **Ext. (ibaPDA: Extended COB IDs)**
  No: the standard ID range is used (11 bit)
  Yes: the extended ID range is used (29 bit)
- **Offset (ibaPDA: Address)**
  Byte address of the desired signal
- **Bytes**
  Number of bytes of the used data type
- **IO/RAM (ibaPDA: Source)**
  Data source:
  IO: Data of the CAN telegram.
  RAM: Status information
- **Correction (ibaPDA: Enable default value)**
  No: If the timeout is exceeded the last signal value will be sent.
  Yes: If the timeout is exceeded the default value will be sent.
- **Default Value**
  Default value
- **Comment**
  Internal system comment.

11.5.3 Digital Linkage (Digital signals)

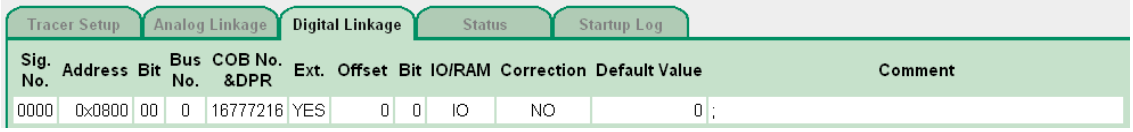


Figure 22: „Digital Linkage“ tab

The parameters of the digital linkage tab are nearly the same as displayed in the analog linkage tab. Only the following are different:

- **Bit (after Address)**
  Service information
- **Bit (after Offset) (ibaPDA: Bit No.)**
  Bit number of the signal within the byte

11.5.4 Status

Figure 23: „Status“ tab

Board Status:

- Status of the CAN controller board

Driver Status:

- Status of the driver

Manager Status:

- Status of the manager.

11.5.5 Startup Log

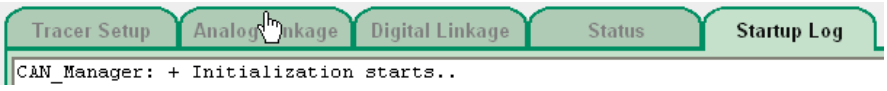


Figure 24: „Startup Log“ tab

Event messages while the device is booting.

Tip

In case of an error, this tab gives more information about the type of error. You may send this message by copy & paste via e-mail to the iba support.

11.6 Time – time setting of the device

By clicking on the <Time> button, you choose the page for time settings. By default the device starts always at 12:00 h. Enter your time settings and click on <submit> to transmit the settings to the device.

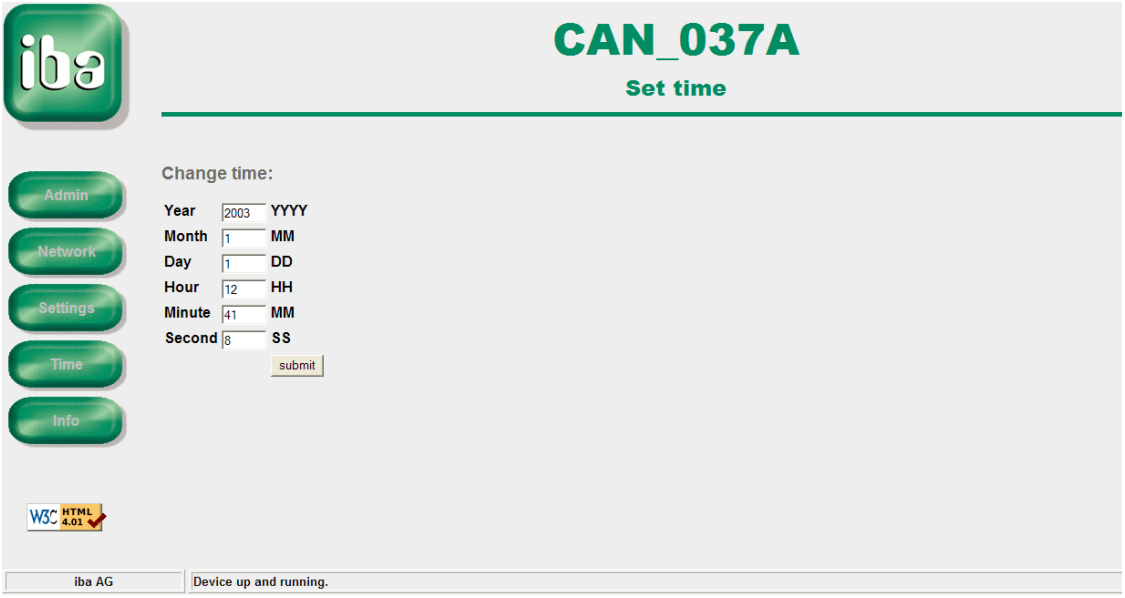


Figure 25: Time setting

The time setting of the ibaBM-CAN device is not relevant.

12 Technical data

Order number	13.122000
Manufacturer	iba AG, Germany
Mechanical properties	DIN IEC 68-2-6 (with properly mounted device and DIN rail)
Operating temperature	32 °F to 122 °F (0 °C to 50 °C)
Storage temperatur	-13 °F to 158 °F (-25 °C to 70 °C)
Transport temperature	-13 °F to 158 °F (-25 °C to 70 °C)
Cooling	Passive
Mounting	DIN rail, vertical
Humidity class	F, no condensation
Protection class	IP20
Power supply	24 V ±10 % DC not stabilized
Current consumption	Up to 600 mA
FO cable FO coupler	62.5/125 µm ST Lean
Max. FO length without repeater	6560 ft (2000 m)
Dimensions (widht x height x depth)	2.72 in x 7.44 in x 5.83 in (69 mm x 189 mm x 148 mm) (incl. DIN rail clip)
Weight (incl. box and documentation)	Approx. 2.87 lb (1.3 kg)

12.1 Connectors/indicating elements

Basic device

Fiber optic connectors	2 ST connectors	
Rotary switch	S1/S2: Special functions	
Power supply	2-pin Phoenix terminal connector (black)	
Power switch	On/off for the entire device	
LEDs	ibaNet communication	Run (green); 3,3 Mbit/s (yellow); 32 Mbit/s (white); Stop (red)
	Interface status	CompactFlash® (green/red) Ethernet (green/red) USB (green/red)
Other interfaces	Bottom side	Ethernet (for configuration) USB (for configuration) Shield connector

CAN bus module

CAN bus	2 x 9-pin D-Sub connector		
Termination switch Bridging switch	S4: Termination resistor switch for Bus0 S5: Termination resistor switch for Bus1 S6: Connecting or disconnecting of Bus0 and Bus1		
LEDs	Status	Bus0	Run (green); Bus (yellow); Active (white); Error (red)
		Bus1	Run (green); Bus (yellow); Active (white); Error (red)

12.2 Data transmission

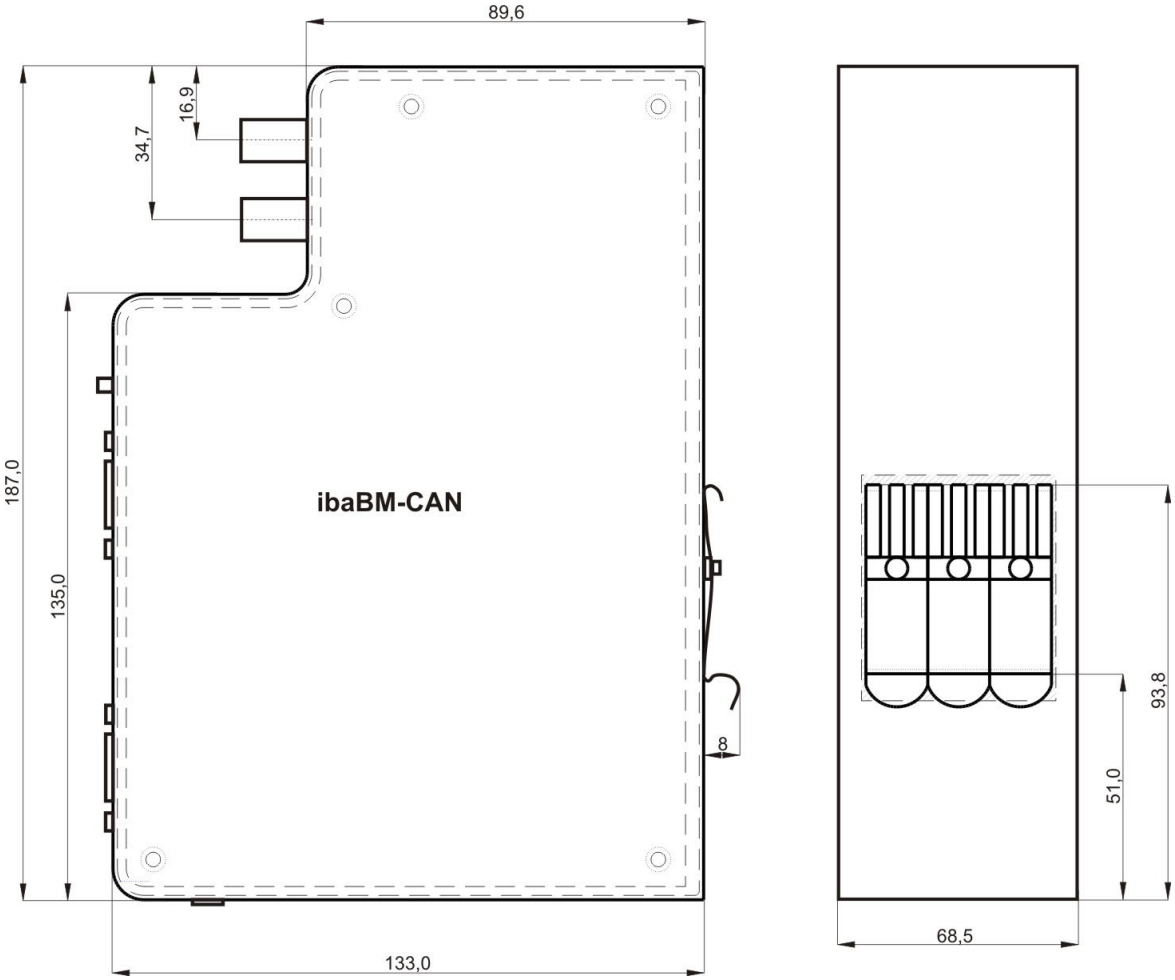
Main board

Data transmission rate (ibaNet fiber optics)	32 Mbit/s
Sample time	1 ms
Data volume	512 analog values, max. 1984 Bytes (BYTE, INT, WORD, DINT, DWORD, FLOAT, Big/Little Endian) + 512 digital signals (bits)
Ethernet	10/100 Mbit/s
USB	2.0
CompactFlash®	without function

CAN bus module

CAN bus data rate	10 kbit/s to 1 Mbit/s
ID range	Standard ID 11 bit, Extended ID 29 bit

12.3 Dimension sheet



Dimensions in mm

Figure 26: Dimension sheet

13 Support and contact

Support

Phone: +49 911 97282-14

Fax: +49 911 97282-33

E-Mail: support@iba-ag.com

Note

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

Contact

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Contact: Mr. Harald Opel

Regional and Worldwide

For contact data of your regional iba office or representative please refer to our web site **www.iba-ag.com.**