ibaBM-DDCSM

Bus Monitor for ABB DDCS+

Manual

Issue 1.8

Manufacturer

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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.

$C\,\epsilon$

Issue	Date	Revision	Chapter / pages	Author	Version HW/FW
1.8	03/31/10	Layout, dimension sheet	all	rm	
		LED interpretation	6.4.5 / 13		

Table of Contents

1   About this manual

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

1.1   Target group

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

1.2   Notations

In this manual the following notations are used:

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

1.3   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 hardware or 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

The device ibaBM-DDCSM (DDCS Monitor) is to be used as an interface between ibaPDA and the DDCS+ Drive bus of ABB.

All drives which are linked to a Level 1 controller over the Drive bus or Module bus, respectively, can be connected to ibaPDA by the DDCS Monitor. The purposes of this device are:

❑   To localize problems

❑   To interpret controller dynamics and quality plus machine condition

❑   Optimize the machinery

The ibaBM-DDCSM selects a subset of variables on the ibaBM-DDCSM bus and transmits them via an ibaFOB card (ibaFOB-io or ibaFOB-4i card) to the PC data acquisition system (ibaPDA), which is equipped with fiber optical input cards.

The data to be transmitted is a fixed set of variable, pre-configured in the ibaBM-DDCSM.

The ibaBM-DDCSM is defined for:

❑   The permanent connection to an ibaPDA data acquisition system

❑   Temporary connection to an ibaPDA system in case of problems (trouble shooting)

❑   The simultaneous data acquisition of a stationary system and a notebook computer system

The process data acquisition system ibaPDA is optimized for high amounts of signals to be monitored simultaneously. Unlimited analog and/or digital signals may be monitored, visualized and stored, depending on the computer capacity.

All data is transported to the PC in 1 ms cycles independent of the running software application.

There are more iba products for data acquisition and direct PLC-backplane communication (i.e. SIMATIC S5 und S7, SIMADYN-D, VME-Bus, Profibus and Reflective Memory may be monitored in parallel to the ibaBM-DDCSM).

3 Scope of delivery

The following components are included with the delivery of the ibaBM-DDCS Monitor:

❑   Device with 2-pole Phoenix screw terminal

❑   Documentation for the device (comp. iba)

4 Mounting and dismounting

4.1 Mounting

Locate the DIN-rail mounting clip on the rear side of the device. Place the device on the DIN-rail so that the top part of the mounting clip engages the top part of the rail appropriately. 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.

Once fixed, connect the DC 24 V power supply to the termination shown on the device. Ensure that the polarity is correct prior to applying power. Finally, connect fiber-optic cable to the TX/RX ports as shown on the device so that the fiber-optic connection is completed.

4.2 Dismounting

Disconnect all external connections from the device. Grasp the device with one hand firmly on the top side. With your free hand, grasp the bottom of the device so that your index and middle fingers rest on the grounding screw. Lightly push down with the hand on the top side of the device and simultaneously pull forward with your other hand. With this action, the device should free itself from the DIN-rail.

5   System pre-requisites

The following system environment and pre-requisites are required for operation of the device ibaBM-DDCSM.

5.1   Hardware

For further processing of the measured data are required:

❑   IBM-compatible PC or notebook computer with the following minimum configuration:

- P4 1 GHz or higher

- ≥ 256 MB RAM

- ≥ 40 GB HDD

- PCI or PCI-X slots (PC)

- Compatible PCMCIA- or ExpressCard slot (notebook computer).

- ibaFOB-io-S, 2io-X, -2io-D or ibaFOB-4i-S, -X, -D respectively ibaCom-PCMCIA-F or ibaFOB-io-ExpressCard

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

5.2   Software

For further processing and analysis of measured data are required:

❑   ibaPDA-V6 for acquisition, recording and display of measured data and for device parameterization

❑   ibaAnalyzer for display and analysis of recorded measured data

5.3   Supported drive and automation systems

❑   ABB drive or automation system which supports the DDCS protocol

- Current drive systems: DCS800, ACS800 and ACS6000

- Older drive systems: DCS600 and ACS600

↗ Please contact ABB Mannheim for more information.

6   Device description

6.1   Properties

❑   Robust metal housing for DIN-rail mounting

❑   DDCS+ Bus interface

❑   One unidirectional fiber-optic link (3.3 Mbit/s) compatible with ibaFOB, with ST connectors

❑   Transfer of up to 64 analog + 64 binary signals per fiber-optic interface, data transfer on fiber-optic links synchronous to DDCS+ Bus cycle

❑   One interface connection (RJ11) to notebook computer compatible with ibaCom-PCMCIA-F

❑   Synchronous data transfer on fiber optical interface with 1 ms precision

❑   Parallel data transfer of up to 64 analog + 64 binary signals on RJ11 interface, whereby only point to point communication is possible for notebook PC applications

❑   External unregulated DC 24 V power supply required (not included)

6.2   Configuration

The selection of signals to be measured is preset in the firmware of the device (see chap. 8.1). Signal selection and grouping of signals is set in advance.

Other configurations are available on request.

6.3   PC side

❑   PCs with PCI slots use an ibaFOB interface card, such as ibaFOB-io-D, ibaFOB-2io-D or ibaFOB-4i-D. If needed, signals can be duplicated and transmitted to other computers without time difference by using the ibaFOB-OF-Link card or ibaBM-FOX-i-3o-D or ibaBM-DIS-i-8o device.

❑   In parallel, primary data (analog and digital) can be acquired over other fiber optical links, e. g. by means of ibaPADU or ibaNet750-BM devices. There is also the opportunity to acquire measured data from other systems using the appropriate PC or system interface boards, such as ibaLink-SM-64-io or ibaLink-SM-128V-i-2o.

❑   Notebook computers with Type II PCMCIA or ibaFOB-io-ExpressCard slot use an ibaCom-PCMCIA-F interface card. This is for measurement only.
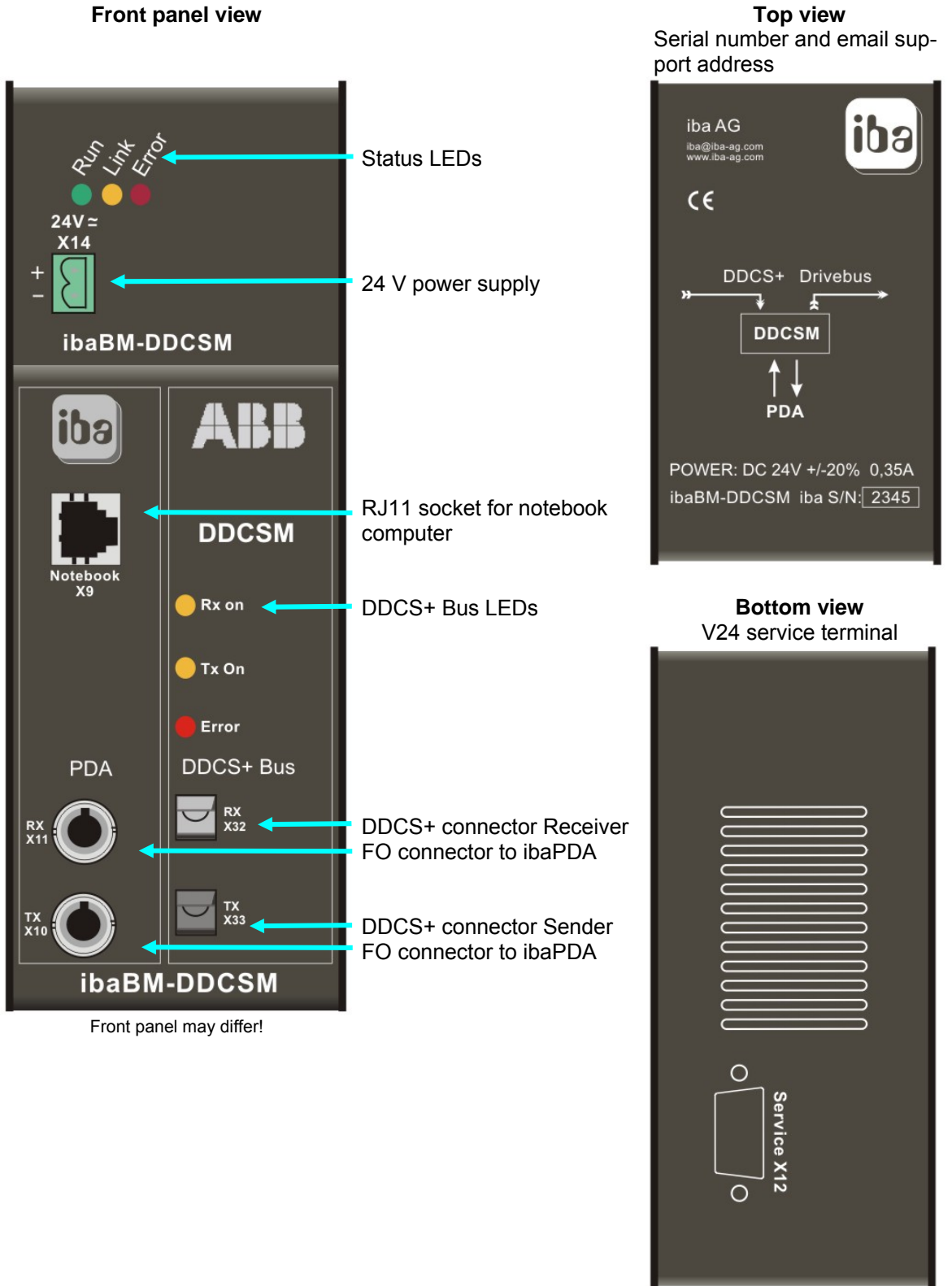
6.4   Device, operating elements and connectors

Front panel view

Top view
Serial number and email support address

Status LEDs

24 V power supply

RJ11 socket for notebook computer

DDCS+ Bus LEDs

DDCS+ connector Receiver
FO connector to ibaPDA

DDCS+ connector Sender
FO connector to ibaPDA

Front panel may differ!

Bottom view
V24 service terminal

Figure 1:   Device, operating elements and connectors

6.4.1 DC 24 V power supply terminals (X14)

The ibaBM-DDCS Monitor device is powered by an external supply, unregulated DC 24 V (DC 20 V to 30 V).

Connect the DC ±24 V terminal from the power supply to the 2-pole Phoenix connector (supplied with device) as shown on the top half of the front of the device.

Please contact iba for additional DIN-Rail or power supply requirements.

6.4.2 Status LEDs

Run, Link and Errors LEDs indicate the general operational state of the device. These three LEDs are located above the DC 24 V power terminals on the top half of the front of the device. The following table describes the states in which you may find the LEDs and their respective meanings.

LED	Status	Indication
Run (green)	Blinking Off	Power on and device functioning properly No power
Link (yellow)	On	The 3.3 Mbit/s FO-transmitter is active (regardless of arriving dates of the DDCS bus)
	Off	Module defect
Error (red)	On	Internal error in ibaBM-DDCS Monitor device - error in dual-port-RAM
	Off	Normal state; after resolution of error, LED resets automatically

6.4.3 RJ11 (X9)

This port can be used for concurrent measurement of signals which are transmitted over the fiber optical output (TX). Therefore, a notebook computer with an ibaCom-PCMCIA-F card and the corresponding spiral cable is required.

6.4.4 ibaNet fiber optic input RX (X11) and output TX (X10)

The ST-socket TX (X10) serves as a connector for the fiber optical cable, transmitting data by 3.3 Mbit/s to ibaPDA or ibaLogic.

RX (X11) is not used.

6.4.5   DDCS+ bus LEDs

LED	Status	Indication
Rx on (orange)	On	Sending data
	Out	No data on ST input Rx
Tx on (orange)	On	Receiving data
	Out	No data
Error (red)	On	Internal device error - No mapping table loaded - Error of dual port ram
	Out	No error, after resolution of error, LED resets automatically

6.4.6   Fiber-optic interface to the ABB DDCS+ bus (X32, X33)

The DDCS+ bus cable should be connected to the RX (X32, receive) fiber optic cable connections in compliance to ABB guidelines.

The connector TX (X33) is not used.

6.4.7   Service interface connector (X12)

A 9-pin SUB-D port, found on the under side of the device, may be used to load new firmware for the device. New firmware is loaded via a V.24 interface.

Note

Please contact iba regarding loading new firmware. You will get the required files and further information about the loading procedure.

Important note

In normal operation mode the DC 24 V-cable must not be connected!

6.5   Device characteristics

2 circuit boards encased in a robust iba metal housing provide the circuitry necessary for interfacing with the ABB drive bus. A basic circuit board handles the control of the overall unit, storage of parameters, handling of dual port RAM and interface communications.

6.5.1   ibaBM-DDCS Monitor base circuit board characteristics

❑   Power Supply (DC 24 V unregulated) with three status LEDs (Run, Link, Error)

❑   Microprocessor with firmware for control of data transfer to ibaPDA

❑   RAM and flash EPROM storage of data, code and parameter sets

❑   Control of one 3.3 Mbit/s fiber-optic and one RS422 (RJ11) external interfaces

❑   Control of V.24 download interface (9-pin D-Sub)

6.5.2   ABB DDCS+ Drive Bus Module

The interface to the DDCS+ bus is placed on a module which consists of the bus chip from ABB and the corresponding bus-specific parts (optical transmitter and receiver):

❑   Bi-directional fiber-optic interface to DDCS+ Bus

❑   3 LEDs TxD (orange), RxD (orange), Error (red)

7 System integration

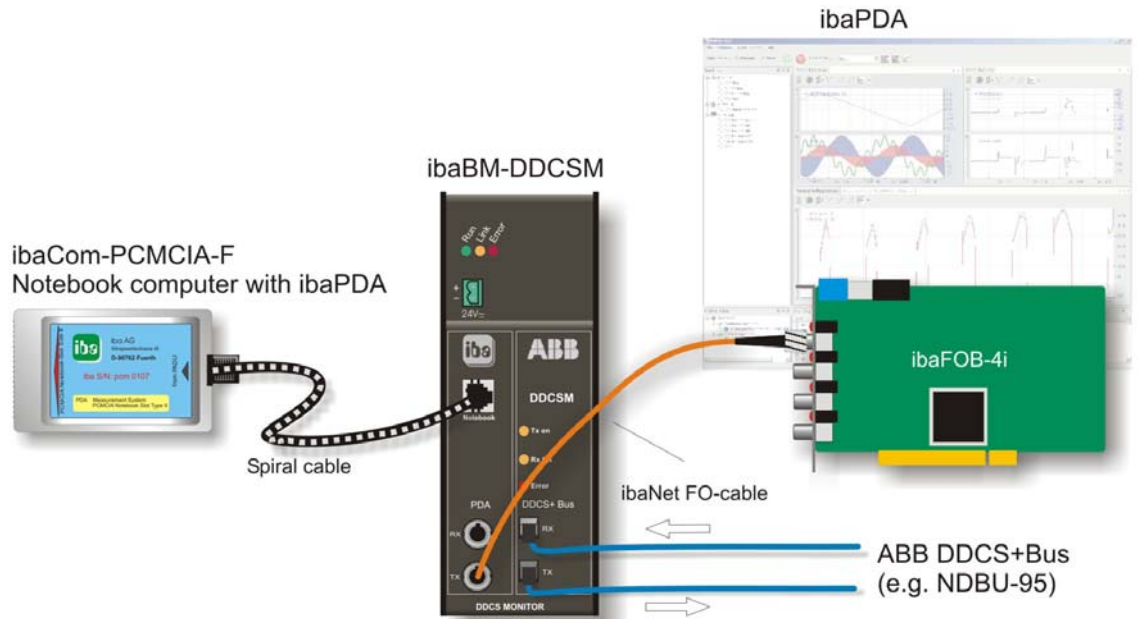## 7.1 ibaBM-DDCS monitor in the ibaPDA environment

Figure 2:   ibaBM-DDCS monitor in the ibaPDA environment

7.2 ibaBM-DDCS monitor in the ABB environment
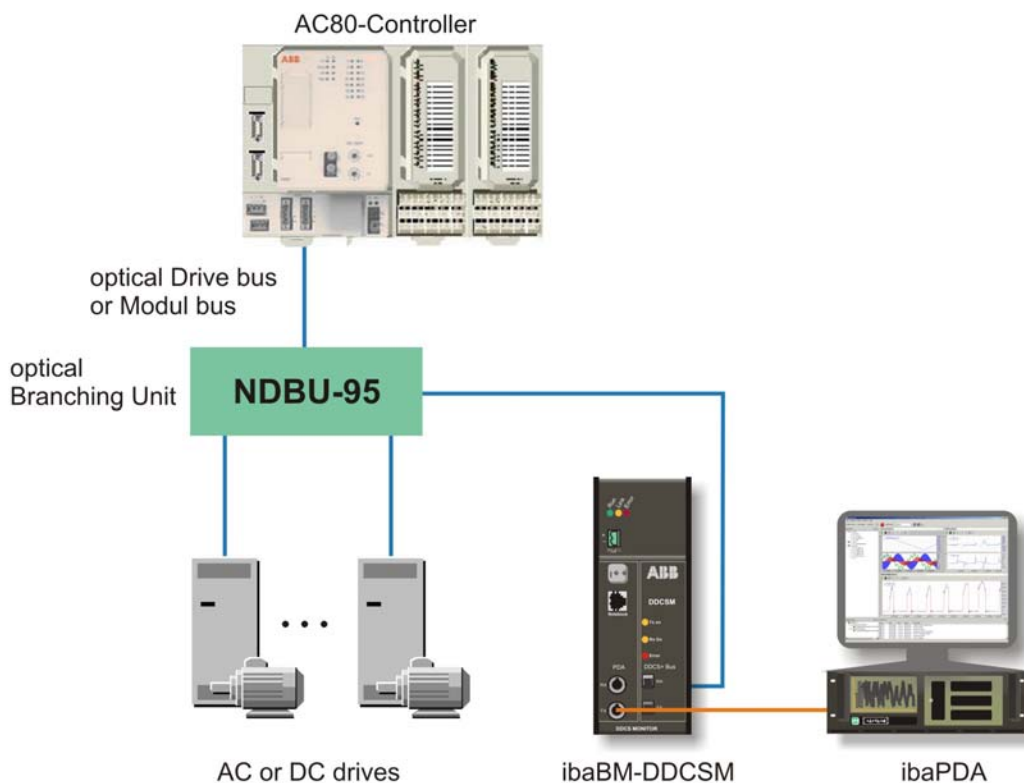
7.2.1 Sample Topology with AC80

Figure 3:   Sample topology with AC80

7.2.2   Sample Topology with AC800PEC
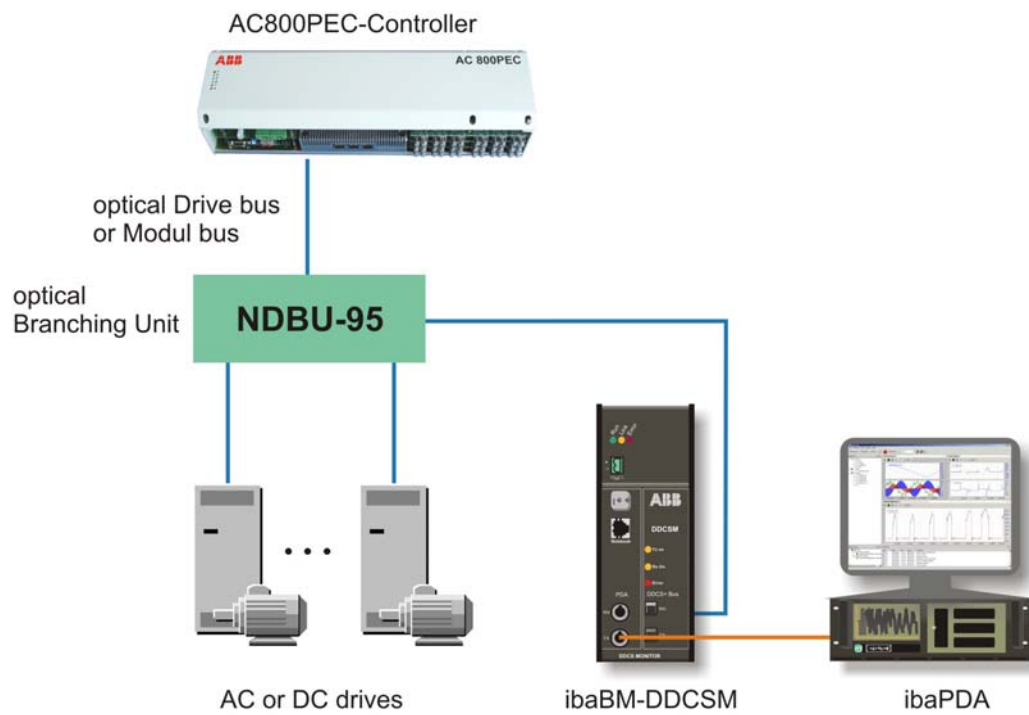

Figure 4:   Sample Topology with AC800PEC

8   Configuration/engineering

8.1   Data selection

ibaBM-DDCSM only supports fixed "hardwired" variables which can be measured from the DDCS+ bus. An ibaBM-DDCSM may monitor up to 8 drives with 8 analog + 8 digital values each. The addresses of the drives MUST be sequential too!

For each drive the following fixed assignment must be followed.

| Meas. Channel analog	DDCS+ name
Channel 0	DN11.2
Channel 1	DN11.3
Channel 2	DN13.1
Channel 3	DN10.2
Channel 4	DN10.3
Channel 5	DN12.1
Channel 6	DN12.2
Channel 7	DN12.3
Meas. Channel digital	**DDCS+ name**
D0	DN11.1.0
D1	DN11.1.1
D2	DN11.1.2
D3	DN11.1.3
D4	DN11.1.4
D5	DN11.1.5
D6	DN11.1.6
D7	DN11.1.7

↗ Other data sets available on request.

8.2   Settings in ibaPDA-V6

Analog and digital signals transmitted by the ibaBM-DDCSM device may be acquired and recorded by ibaPDA-V6.

In order to connect the ibaPDA system to the device an interface card like ibaFOB-io-D or ibaFOB-4i-D must be installed in the ibaPDA-PC. When using a notebook computer, an ibaCom-PCMCIA-F card should be installed.

In the I/O manager of ibaPDA-V6 add a module of type DDCSM to the Link x branch in the signal tree under the interface.

Therefore, make a right mouse click on the Link icon, choose "Add module" in the shortcut menu and select "DDCSM". Or click on Click to add module under the interface.
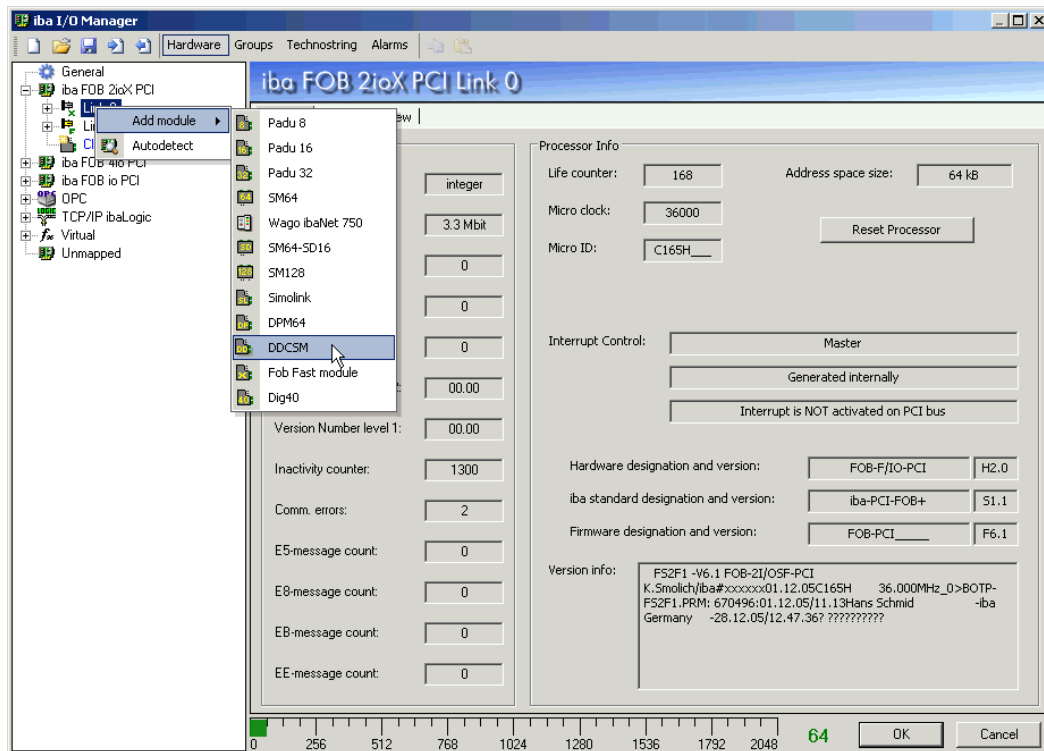
Then mark the module icon of "DDCSM" in the signal tree and make the general module settings.
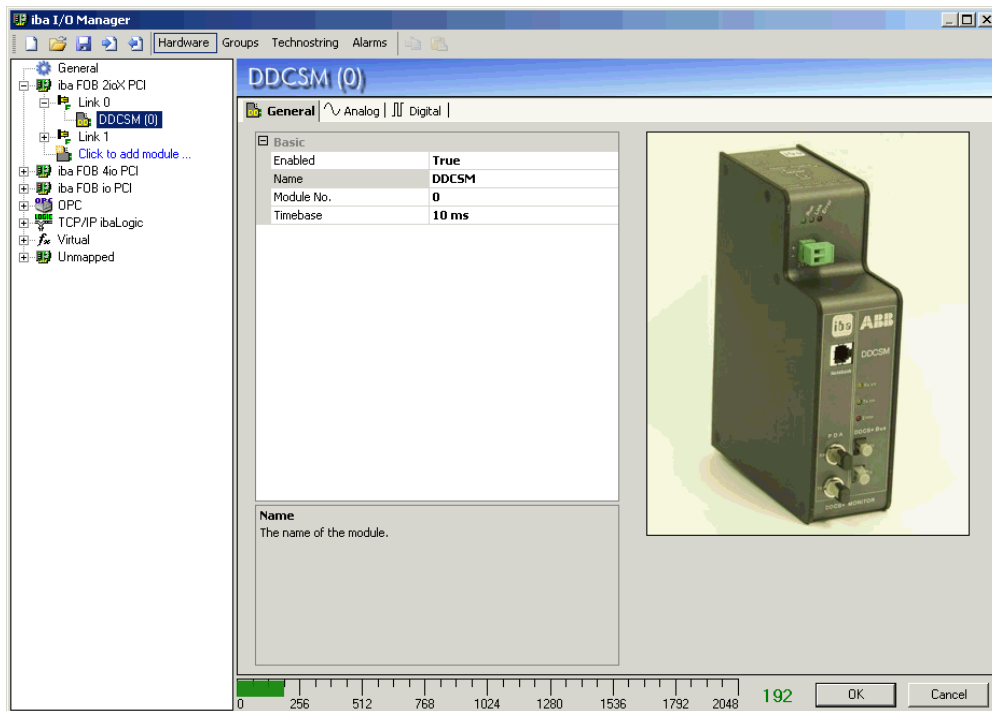
❑   Enabled

With selection of one of the options in the drop-down list in the field next to Enabled you decide whether this module is to be enabled (True) or disabled (False). If a module is disabled then its signals are excluded from acquisition. Thus, they are available neither for display nor for recording. Furthermore, the number of signals from a disabled module will not be taken into account in the signal statistics (signal-o-meter).

❑   Name

In the field next to "Name" enter a comprehensive name for the module.

It is recommended to use an application-specific nomenclature for a better clearness and comprehension, particularly with vast numbers of modules. The name may refer to a technological purpose or a special location in the plant, where the module is used or installed.

The number of characters in the name is unlimited. The name of the module is stored in the data file and visible in ibaAnalyzer.

❑   Module No.

In the field next to "Module No." you may enter a module number (= module index). When adding modules to the configuration the system gives numbers automatically in a chronological order. However, you may prefer a different order later in the data file for analysis. Feel free to change the module number according to your needs. The module number determines the order in the signal tree in ibaAnalyzer.

For the module type TCP/IP ibaLogic the module number must match the module index as configured in the ibaLogic application.

❑   Timebase

In the field next to timebase you may enter a time value, given in ms, which is an integer multiple of the general timebase as configured in the General branch of the I/O manager tree. All signals of the module will then be sampled on this timebase. The ratio between max. and min. timebase for all modules is limited to 1000. The timebase value is limited to 1000 ms.

Then click on the tab "Analog" and make the entries for the signals.

The 64 signals are divided in groups of eight. According to the standard of the DDCS+ Drive bus the signal assignment (function) is already preselected.
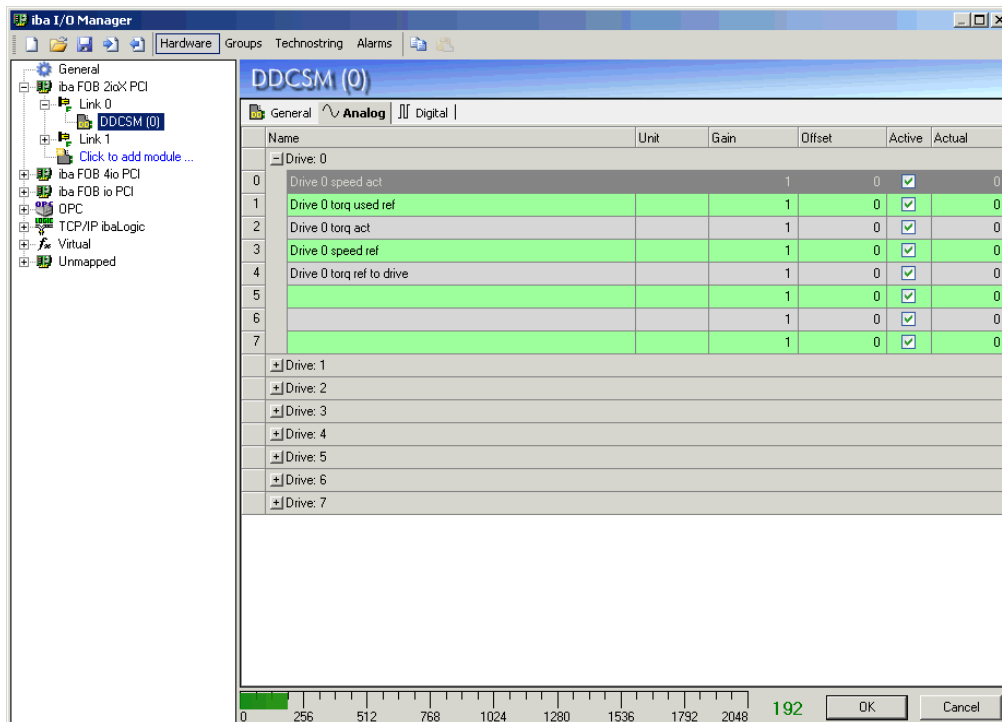
❑   Name

In the "Name" column enter a comprehensive name for each signal.

It is recommended to use an application-specific nomenclature for a better clearness and comprehension, particularly with vast numbers of signals. The name may refer to a technological purpose, the module name or a special location in the plant, where the signal comes from.

The number of characters in the name is unlimited. The names of the signals are stored in the data file and visible in ibaAnalyzer

Tip

A useful feature is the automatic fill function: If you enter a signal name and click on the column header as long as the cursor is still in the name field then all empty fields below will be filled with that name. If the name is ending with a number you will get names with an increasing number like an index. You may use this function in any row of the table. Fields which already has names won't be overwritten.

❑   Activation of signals

A click on the column heading "Active" enables (checkmark) and disables (no checkmark) all the signals at the same time. Individual signals can be activated in the signal-specific activation box. No acquisition takes place for channels which are not activated, so that such channels are available neither for display nor for storage.

Furthermore, disabled signals will not be taken into account in the signal statistics (signal-o-meter).

Tip

In order to enable or disable signals just check the box in the first row of the table and click on the Active column caption. Every time you want to change the activation of multiple signals, no matter if from the beginning or somewhere in the middle of the table, just change the activation of the first signal of this group and click on the column caption. All activations for the signals below the one you've changed will switch accordingly.

Entries - such as names or engineering units - remain, however. They are available again right after reactivation of a signal.

❑   Actual (Value)

The fields in this column show the actual value of the signals. Even if the acquisition is not running yet the actual value may be displayed if the hardware is already connected and working (diagnostic feature).

For digital signals only the values 0 and 1 are permitted.

The digital signals should be configured correspondingly.

Click on tab "Digital" and make the required entries. Like for the analog signals you'll find 8 groups with 8 signals each.

Other documentation

For more information about configuration of ibaPDA-V6 please refer to the corresponding manual or online help.

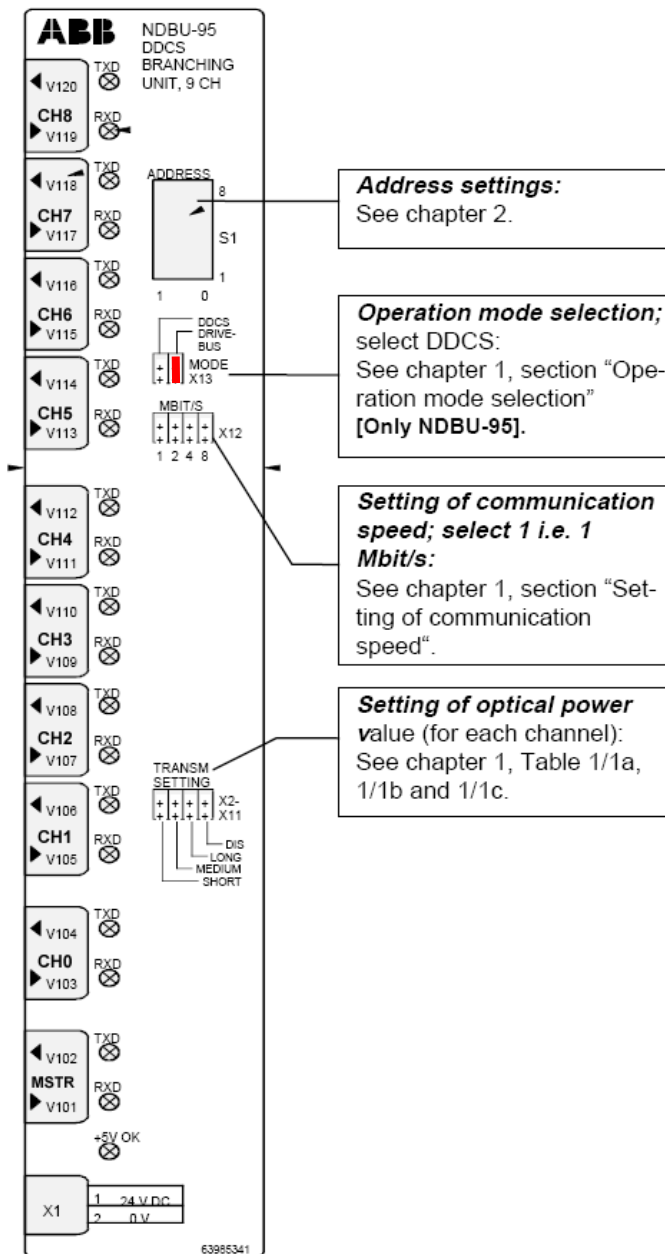## 8.3   Settings on ABB side (Branching Unit NDBU-95)

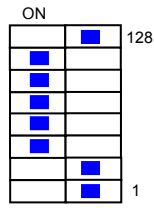Figure 5:   Settings on ABB side (Branching Unit NDBU-95)

Important note

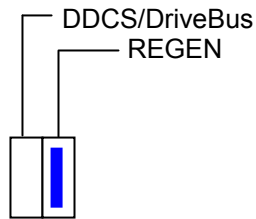The references regarding chapters and tables refer to the ABB documentation!

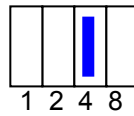❑ Address settings (S1):

Set address range to 76 … 124 (01111100).

❑ Operation mode selection X13:

Set mode to REGEN.

DDCS/DriveBus
REGEN

❑ Transmission speed selection X12:

Set to 4 Mbit/s.

1 2 4 8

9   Technical data

9.1   Main data

Order No.	13.120700
Mechanical	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 Temperature	-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	Snap on DIN Rail
Moisture Class	F, no condensation
Protection Class	IP20
Power Supply ibaBM-DDCSM	DC 24 V, ±20 % unregulated
Current consumption ibaBM-DDCSM	Max 350 mA
FO-cable Coupling	62.5/125 µm ST Lean
Distance from ibaBM-DDCSM to ibaPDA	Up to 6560 ft. (2000 m)
Dimensions (Width x Height x Depth)	2.13 in x 7.56 in x 5.98 in (incl. DIN Rail Clip) 54 mm x 192 mm x 152 mm
Weight (incl. Packaging and Documentation)	2.20 lb (1000 g)

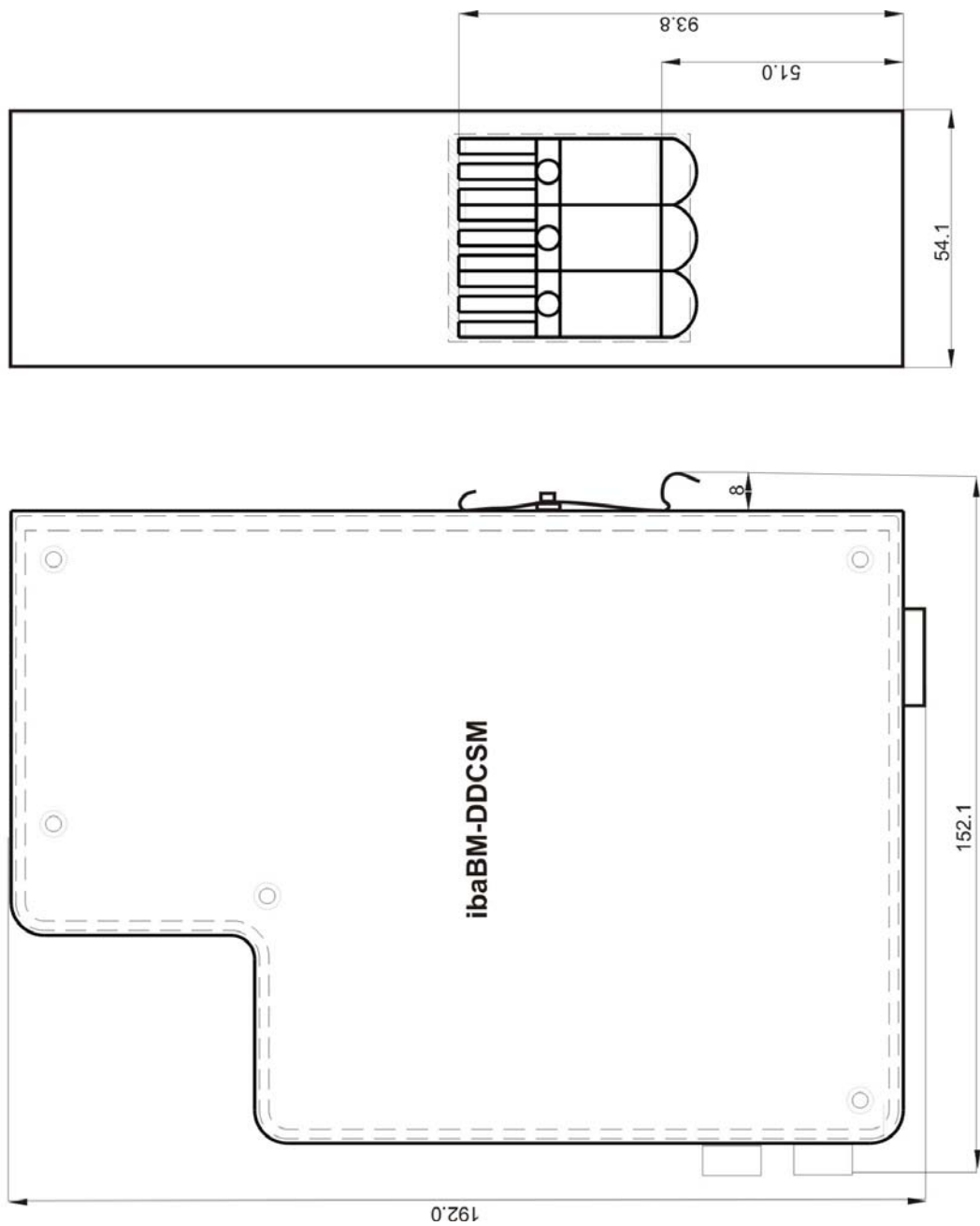## 9.2   Dimensional Drawing

Figure 6:   Dimensional drawing

Measures given in mm

10   Support and Contact

Support

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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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Regional and Worldwide

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

www.iba-ag.com.