AMS42-USB

5B Amplifier Measurement System (USB)

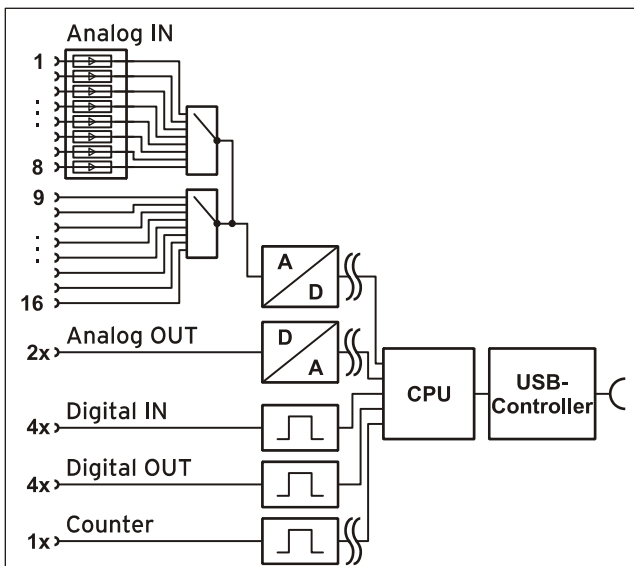## All-In-One Measurement System. Compact. DAQ via USB.

The AMS42-USB, a complete solution: amplifier technology and data acquisition. A high-quality USB data acquisition system is already integrated. Available in a robust aluminum housing as a mobile tabletop unit with skid-proof, tip-up feet.

Modular Concept. Equip Individually. Be Flexible.

The AMS device is equipped with cassettes, on which the required 5B measuring amplifiers are mounted. The variety of available 5B modules allows for the optimum adaptation of the AMS42-USB to any special measuring task.

Choose Connector. Mount 5B Amplifier. Done.

The available plug-in cassettes have different connectors on the front panel. Depending on the sensor or signal to be connected, the suitable cassette can be chosen. Now the 5B module only has to be fixed on the cassette and be integrated in the AMS system.

Clearly Safe.

The galvanic isolation provided by the 5B modules guarantees interference-free operation and protects the DAQ system and the PC against high potentials.

Analog. 16 Inputs. 2 Outputs.

Signals are connected at 8 amplifier inputs with 16 bit resolution and 250kHz total sampling rate. Additional 8 analog inputs and 2 analog outputs are available directly and without amplification at a D-Sub 37 female.

Digital. 4 Inputs. 4 Outputs. 1 Counter.

Digital states are recorded or set at four digital inputs and outputs each. For pulse measurements, an additional isolated counter input is provided.
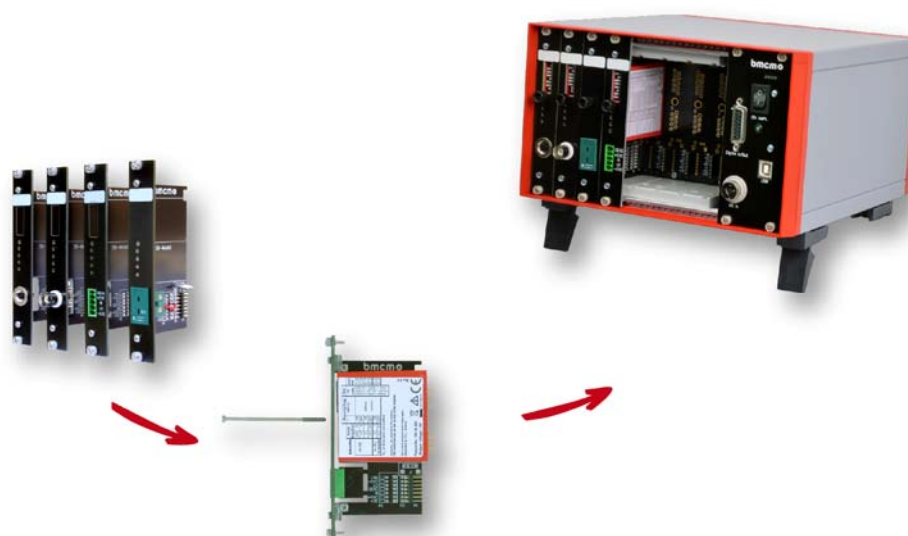
Plug & Play with USB.

The connection to the PC is realized via USB. The AMS42-USB provides all typical USB features (e.g. Plug&Play, Hot-Plug).

Open for Everyone.

Widely supported: The amplifier measurement system can be used under Windows® XP/7/8 as well as under Mac OS X, Free BSD, and Linux. The complete software for installation and programming of the AMS42-USB is included for free. The device is supported by NextView® 4, the software for data acquisition and analysis.

Functional diagram

DSPM Industria®
sensori & trasduttori

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1   Installation

1.1   Assembly

a) Equip the AMS42-USB with the plug-in cassettes (see chapter 6.2) carrying the required 5B modules.

b) Carefully push the cassette along the guide bars of the relevant slot until the 7-way pin connector of the cassette and the pins of the 5B module are plugged into the corresponding connectors on the AMS backplane.

c) If using the option *AMS-EXT8* for the AMS42-USB (see chapter 6.4), the additional cassettes 9-16 are mounted on the back of the device.

d) For a tight installation, fix the front panel at both ends with screws to the housing. Bridge unneeded slots by a blank panel (*AMS-K-BLANK*) to protect the device against outside influences.

1.2   Software Installation and Start-up Procedure

a) Install the bmcm driver package (see chapter (see chapter 5.1.1) on the PC/notebook before connecting the AMS42-USB to a free USB interface.

b) Connect an external power unit to the 3-pin DIN coupling for 9-40V power supply (use a supply cable with a cross sectional area >1mm^2) and turn on the AMS42-USB by pressing the switch to "1" (ON) (see chapter 2.1 and 2.3).

c) Start the Plug&Play installation (see chapter 5.1.2). If necessary, further software components can be installed now, as described in chapter 5.

d) Eight analog input signals can be connected at the specific connector of the respective AMS cassette panel. The other analog channels as well as digital lines are available directly and without amplification at a 37-pin and a 15-pin D-Sub female connector (see chapter 2.5.2 and 2.6).

⚠

- **To change the cassettes, the power of the AMS device must be turned off!**

- **If the AMS system is operated standalone, additional grounding to enhance shielding is recommended but not mandatory.**
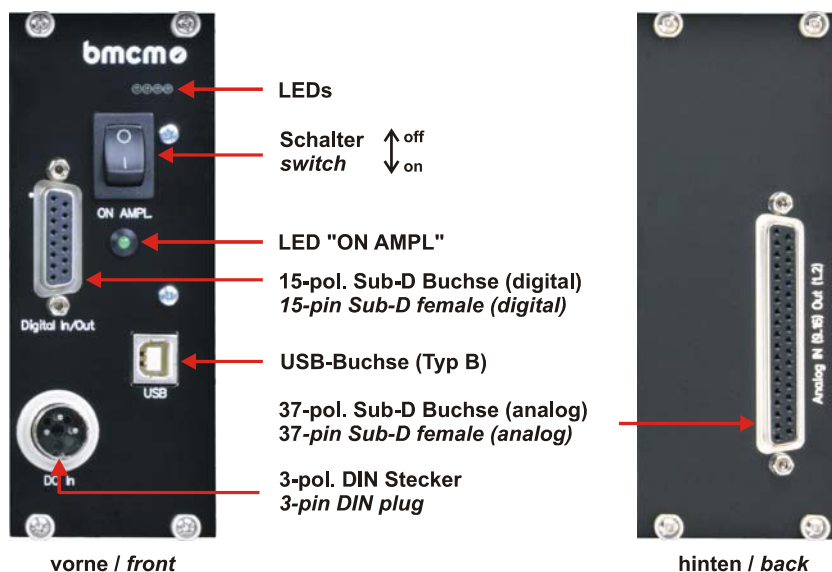
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2 Connections / Assignments

All available connectors and operating elements of the AMS42-USB are accessible on the right-hand side of the device front and back.

2.1 Switch

The supply of the 5B modules of the AMS42-USB is turned on (press "1") and off (press "0") with the switch at the front.

This is indicated by the green LED "ON AMPL".

The DAQ unit is supplied by the PC.

LEDs

Schalter ↑ off
switch ↓ on

LED "ON AMPL"

15-pol. Sub-D Buchse (digital)
15-pin Sub-D female (digital)

USB-Buchse (Typ B)

37-pol. Sub-D Buchse (analog)
37-pin Sub-D female (analog)

3-pol. DIN Stecker
3-pin DIN plug

vorne / front   hinten / back

2.2 LEDs

The two LEDs on the front of the device indicate various states. As already mentioned, the LED "ON AMPL." is on, when the 5B modules are powered with 9-40 DC IN (switch on "1" position).

The other LEDs show the supply of the USB data acquisition unit and of the integrated measuring module by the PC (5V) or signalize the transmission of commands to the PC.

2.3 Power Supply "DC In"

The installed 5B modules are supplied with power (9..40V) via the 3-pin DIN plug with the following assingment. A power supply unit *ZU-PW40W* (24V, 1.67A DC) is optionally available.

Pin	Assignment
1	n. c.
2	ground (GND)
3	9-40V DC

GND
2

9...40V 3   1
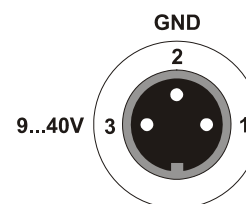
2.4 USB

The standard USB connector (type B) serves for the PC connection of the data acquisition unit integrated in theAMS42-USB. Power supply is also provided via the USB interface.

2.5 Analog Channels

2.5.1 Measuring Amplifier Inputs

Eight analog signals can be connected to the amplifier inputs available at the respective connectors of the cassette panels. Their assignment is illustrated in the data sheet of the *AMS-K* cassettes (see chapter 6.2).

Additional 8 amplifiers inputs can be added with the option *AMS-EXT8* (see chapter 6.4) at the back of the device.

Depending on the application, the shield of the analog input cables can be applied to ground or 0V. Be sure to connect at one end of the cable only. Run the signal ground separately if possible. Lay input cable separately if possible.

🛑

Measurements can be effected on various potentials. The potential deviations, however, should not exceed 60V DC (according to VDE Association of German Electrical Engineers).
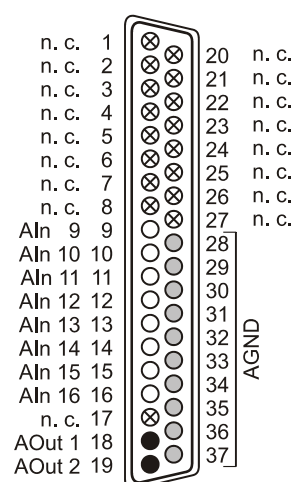

2.5.2 Analog Outputs and Other Analog Inputs

The 37-pin D-Sub female connector at the back of the device is designed for the direct and non-amplified connection of the remaining analog inputs 9..16 and the analog outputs 1+2.

The input range (±10V, ±5V, ±2V, ±1V) is set via software (e.g. in **NextView®4**), the output range is ±10V, the resolution is 16 bit respectively.

Pin	Assignment		Pin	Assignment
1..8	n. c.		15	AIn 15
9	AIn 9		16	AIn 16
10	AIn 10		17	n. c.
11	AIn 11		18	AOut 1
12	AIn 12		19	AOut 2
13	AIn 13		20..27	n. c.
14	AIn 14		28..37	AGND

```
n. c.    1  ⊗ ⊗  20  n. c.
n. c.    2  ⊗ ⊗  21  n. c.
n. c.    3  ⊗ ⊗  22  n. c.
n. c.    4  ⊗ ⊗  23  n. c.
n. c.    5  ⊗ ⊗  24  n. c.
n. c.    6  ⊗ ⊗  25  n. c.
n. c.    7  ⊗ ⊗  26  n. c.
n. c.    8  ⊗ ⊗  27  n. c.
AIn  9   9  ○ ⊗  28
AIn 10  10  ○ ○  29
AIn 11  11  ○ ○  30
AIn 12  12  ○ ○  31
AIn 13  13  ○ ○  32     AGND
AIn 14  14  ○ ○  33
AIn 15  15  ○ ○  34
AIn 16  16  ○ ○  35
n. c.   17  ⊗ ○  36
AOut 1  18  ● ○  37
AOut 2  19  ● ○
```

○ AIn = Analogeingang / *analog input*
● AOut = Analogausgang / *analog output*
◎ AGND = analoge Masse / *analog ground*
⊗ n. c. = nicht verbunden / *not connected*

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The max. potentials to ground must not exceed ±12V. Any channel overload may influence measurements of other channels and may lead to wrong values.
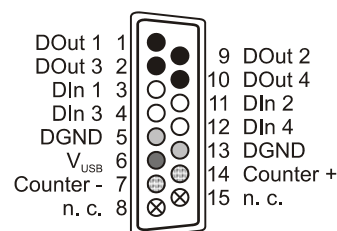

2.6 Digital Channels

The AMS42-USB features 4 digital inputs and outputs each (*low*: 0V..0.7V; *high*: 3V..5V) and an isolated counter input. The 5V auxiliary voltage at pin 6 can be used e.g. for sensor supply.

All connections are led to the 15-pin D-Sub female connector on the back of the device. The following table and figure show the pin assignment.

With the option *AMS-DIG4* (see chapter 6.4), 4 inputs and outputs each can be used as galvanically isolated optocoupler inputs and relay outputs available at the back of the device.

DOut 1	1		9	DOut 2
DOut 3	2		10	DOut 4
DIn 1	3		11	DIn 2
DIn 3	4		12	DIn 4
DGND	5		13	DGND
V$_{USB}$	6		14	Counter +
Counter -	7		15	n. c.
n. c.	8			

- ○ DIn = Digitaleingang / *digital input*
- ● DOut = Digitalausgang / *digital output*
- ◐ DGND = digitale Masse / *digital ground*
- ◑ 4-5V; max. 20mA
- ⊕ Zählereingang / *counter* input
- ⊗ n. c. = nicht verbunden / *not connected*

Pin	Assignment		Pin	Assignment
1	DOut 1		5, 13	DGND
9	DOut 2		6	V$_{USB}$ (4-5V; max. 20mA)
2	DOut 3		7	counter input low
10	DOut 4		14	counter input high
3	DIn 1		8, 15	n. c.
11	DIn 2			
4	DIn 3			
12	DIn 4			

- **The digital lines are protected by 1kΩ resistors. If the input voltage is not within the permitted voltage range of 0..5V, the device may be damaged.**
- **The digital inputs and outputs are not galvanically isolated except for the counter.**
- **The digital ground (DGND) is connected with the PC ground.**

3 Interfacing Examples for the Digital Lines of the AMS42-USB

The following basic connection examples demonstrate the use of the digital inputs and outputs and the connection of a counter to the AMS42-USB. The pin assignment of the 15-pin D-Sub female connector is described in chapter 2.6.

3.1 Interfacing Examples for the Counter Input

The galvanically isolated 16-bit counter is connected at pin 7 and 14.

At maximum performance ($2^{16}-1$), the counter is reset and starts from zero again.

AMS42/84-USB

15-pol. D-Sub Buchse/
15-pin D-Sub female

1kΩ

5..12V

Masse/
Ground
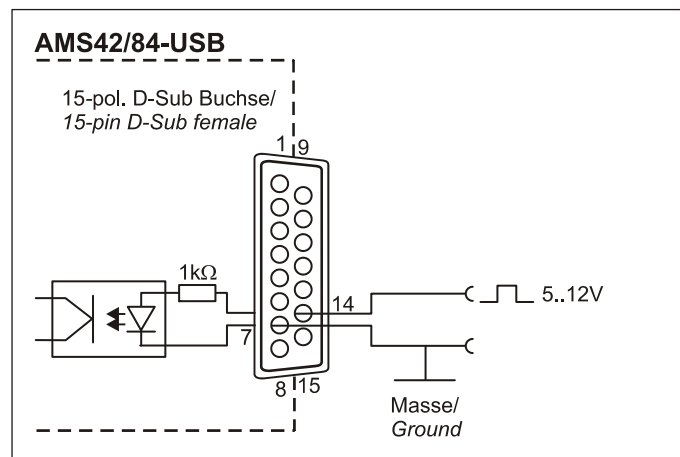
3.2 Interfacing Examples for Digital Inputs

The 3.9kΩ pull-down resistor sets the input to *low* if no voltage is applied there.

3.2.1 Connecting an Optocoupler

Optocouplers provide optimum protection at each input line. With them, it is possible to connect higher voltages and to protect the hardware from being destroyed.

In this regard, please also see application examples of the optocoupler you use.
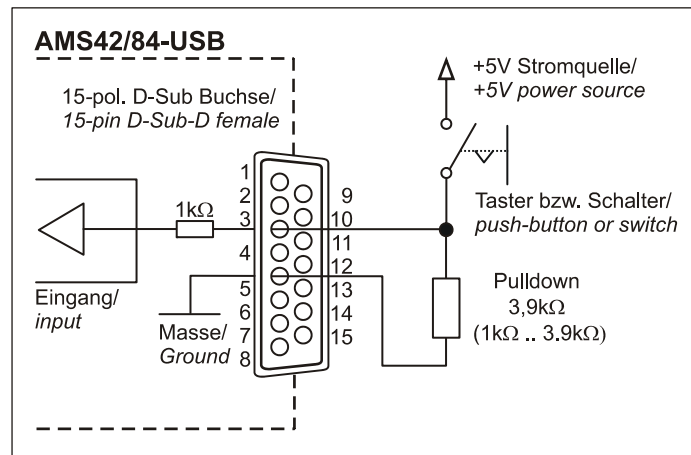
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Optocoupler cards featuring 8 inputs are available at bmcm.
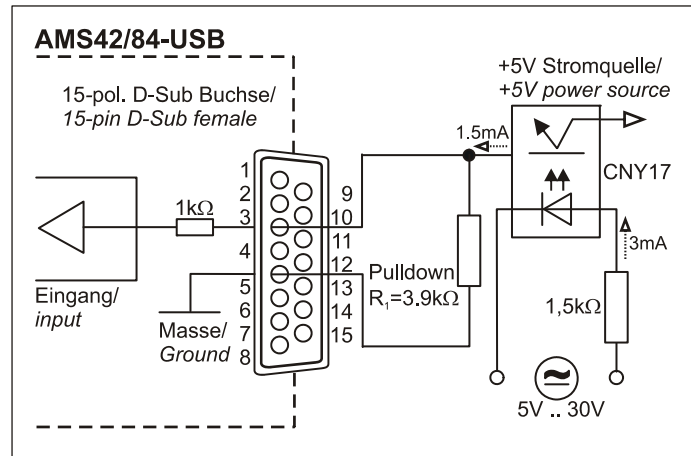
3.2.2 Connecting a Push-Button / Switch

Please make sure to use a push-button with debounce protection, because otherwise several pulses might be recorded.

The 3.9kΩ pull-down resistor is absolutely necessary to create a defined low signal!


3.2.3 Connecting a Voltage Divider

If connecting a DC voltage higher than 5V, a voltage divider must be used so that 5V at the maximum are applied at the device input. Exceeding the 5V input voltage might cause damages to the device.

The relation between the two resistors to be used is calculated with the following formula:

$$U/U_1 = (R_1 + R_2)/R_1$$

Input voltages less than 5V are also sufficient (*high* ≥3V).
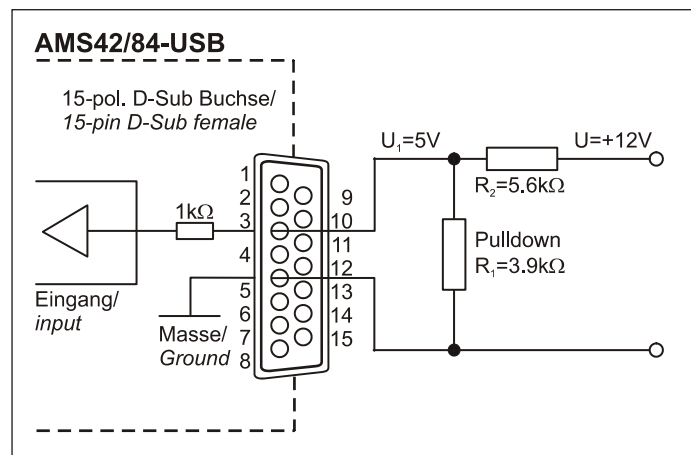
3.3 Interfacing Examples for Digital Outputs

Serial resistors in the output lines limit the current and protect the hardware from being destroyed.

3.3.1   Connecting an LED

Only so-called low-current LEDs can be used, because they already work with 1mA current.

Please also observe the total current listed in the technical data (see chapter 8).
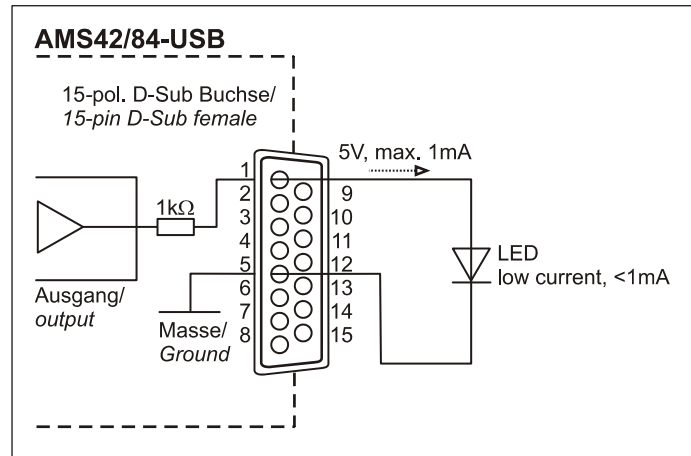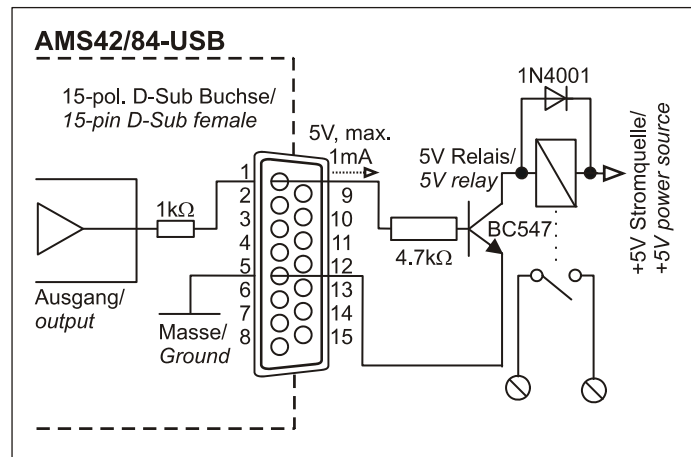
3.3.2   Connecting a Relay

A connected relay is ideal to switch higher currents. Since the field coil of the relay requires a higher current than provided by the measurement system at one line, a transistor is connected ahead.
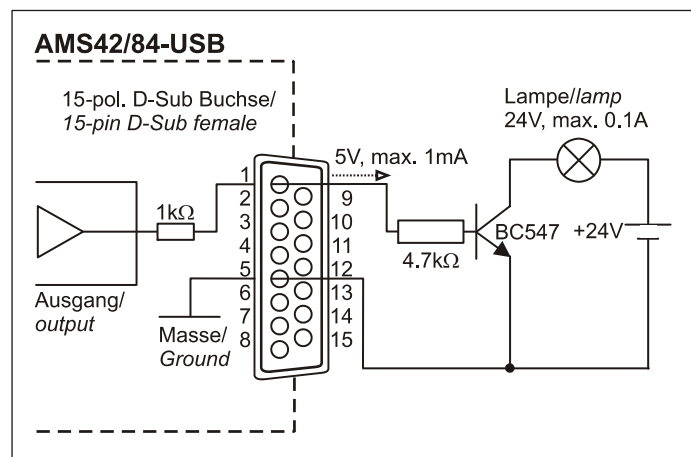
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Relay cards featuring 8 outputs are available at bmcm.
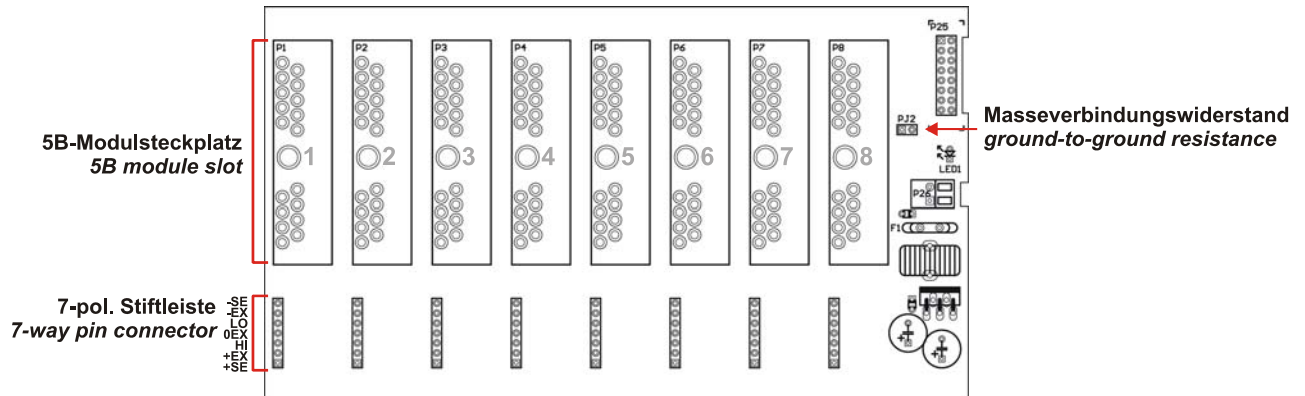
3.3.3   Connecting a Lamp

A transistor can be used to switch higher loads. The selected transistor must comply with the maximum switchable current.

The figure on the right shows an application with a maximum current of 100mA.

4 AMS Backplane

The AMS-backplane provides 8 slots for 5B modules and the *AMS-K* plug-in cassettes (see chapter 6.2) carrying the 5B modules. If the AMS42-USB is used with the optional add-on *AMS-EXT8* (see chapter 6.4), eight slots each are available on the front and on the back of the device.

5B-Modulsteckplatz
5B module slot

Masseverbindungswiderstand
ground-to-ground resistance

7-pol. Stiftleiste
7-way pin connector

4.1 Ground-to-Ground Resistance

Ideally, the output ground is not electrically connected with the power supply ground. If, however, a connection to ground is necessary (e.g. to use the output switch in the 5B module), the 2-pin jumper (see fig. above) must be closed.
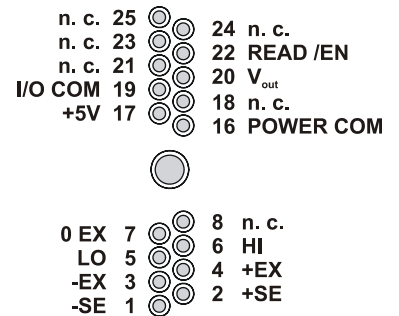
In the case of electrically connected systems (e.g. PC), this jumper represents a high-resistance bridge (1kΩ) and may generate a hum loop!

4.2 Module Pin Assignment

The pin assignment on the right shows the top view of the module backplane (see chapter 4).

The pin assignment corresponds to the 5B modules of Analog Devices®, BURR BROWN® etc. However, an additional 0EX pin has been introduced, which is particularly suitable for ungrounded shielding. This is a specific assignment of BMC Messsysteme GmbH. This pin is not connected in modules of other manufacturers.

n. c.	25	24	n. c.
n. c.	23	22	READ /EN
n. c.	21	20	V_{out}
I/O COM	19	18	n. c.
+5V	17	16	POWER COM
0 EX	7	8	n. c.
LO	5	6	HI
-EX	3	4	+EX
-SE	1	2	+SE

4.3 Fuse

The fusing of the AMS backplane is effected on the backplane (see chapter 4) with one reversible semiconductor fuse. In case of overload, it turns off. To make the fuse work effectively again, first remove the cause for overload before disconnecting the power supply of the AMS42-USB.

4.4 Connection for AMS Cassettes

The cassettes are connected to the AMS backplane via 7-way pin connectors (see chapter 4), leading the input signals connected at the cassette panel to the backplane. The assignment of the 7-way female connector on the board is illustrated in the figure on the right-hand side.

-SE	- 7
-EX	- 6
LO	- 5
0EX	- 4
HI	- 3
+EX	- 2
+SE	- 1
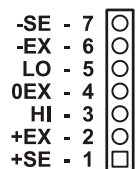
5 Software Installation

All software and documentation available for the AMS42-USB are integrated on the "Software Collection" CD included with delivery. When inserting the CD, a CD starter opens automatically (otherwise: start `openhtml.exe`).

Change to the product page of the AMS42-USB by selecting the entry "Products" in the CD starter and then the hardware ("AMS42-USB") listed under the interface "USB".

AMS42-USB

For detailed information about installing or operating the software, please see the corresponding manuals. The Adobe Acrobat Reader is required to open the documentation in PDF format.

You can run the installation directly from CD. If your browser prevents this, first save the setup program to hard disc before running it separately.

Software	Software product	Notes	Documentation
Device driver	BMCM-DR (driver package)	1. install driver package to hard disc 2. Windows® Plug&Play installation	IG-BMCM-DR (driver installation manual)
Program-ming	STR-LIBADX	ActiveX control for hardware independent pro-gramming	IG-LIBADX (installation / programming manual)
	STR-LIBADX-EX	example programs for LIBADX ActiveX control	-
	SDK-LIBAD	SDK with example programs for C/C++ on Windows®, Mac OS X, FreeBSD, Linux	UM-LIBAD4 (installation / programming manual)
Operating program	NV4.6	measuring software NextView®4 available in the Standalone versions: • Lite: "slim" version with basic functions • Pro: full version with complete functional range • Analysis: version for the analysis of stored measuring data NextView®4 can be used for free as a fully func-tional 30-day trial version. After purchasing the software, all projects, measurement files, and settings can still be used.	DS-NV4 (data sheet) UM-NV4 (user manual) "First steps" in the NextView®4 demo project (displayed when first starting the software)

5.1 Driver Installation

Under Windows®, the driver installation is always required for the AMS42-USB. Only then addi-tional software can be installed. To make sure the installation is done correctly, please follow the instructions in the order as described below.

Under Mac OS X, FreeBSD and Linux, driver installation is not necessary.

5.1.1 Install Driver Package

The prior installation of the bmcm driver package BMCM-DR to the hard disc of your PC makes the driver search for Windows® much easier. Especially in case of driver updates, only the new driver package has to be installed, the hardware automatically uses the new version.

The link to install the driver package is located on the AMS42-USB product page of the "Software Collec-tion" CD.

5.1.2 Plug&Play Installation

As soon as the device is connected to the PC, the system announces the new hardware. Since the driver package has been copied to hard disc before, the hardware will be installed automatically under Windows® 7/8. Under Windows® XP, the automatic hardware detection is started by selecting the following:

- Windows® 7/8: no specifications required
- Windows® XP: "Install the software automatically" (SP2: do not connect with Windows® Update!)

5.1.3 Check Installation

The entry "Data Acquisition (BMC Messsysteme GmbH)" is included in the Windows® Device Manager after successful installation displaying the installed bmcm hardware. To open the Device Manager, proceed as follows:

- Windows® 7:   Start / Control Panel / System and Security / System / Device Manager
- Windows® 8:   Right-click screen corner bottom left (keyboard "Windows+X") / Device Manager
- Windows® XP: Start / Control Panel / System / TAB "Hardware" / button "Device Manager"

Double click the "USB-BASE Analog/Digital I/O Board" to show the properties of the USB data acquisition system. For general information, existing device conflicts and possible sources of error, see TAB "General".

5.2 Programming

Programming the AMS42-USB (installed as "USB-AD16f") with Visual Basic®, Delphi®, Visual C++™ under Windows® XP/7/8 is possible with the hardware independent STR-LIBADX. It is available on the AMS42-USB product page of the "Software Collection" CD. After installation, the ActiveX control must be loaded into the respective programming environment.

- Visual Basic®: menu "Project / Components", entry "LIBADX Object Library 4.0"
- Delphi®:   menu "Components / Import ActiveX", entry "LIBADX Object Library 4.0"

If you select the entry STR-LIBADX-EX listed directly under the installation program of the corresponding ActiveX control, you can install example programs (with source code) demonstrating how to apply the ActiveX control.

Programming the AMS42-USB (installed as "USB-AD16f") under Mac OS X and Unix (FreeBSD, Linux) with C/C++ is done by means of the LIBAD4 programming interface.

The SDK-LIBAD for the respective operating system (also Windows®) is included on the product page of the AMS42-USB. For further information about how to integrate the SDK in the programming environment, please see the corresponding programming manual UM-LIBAD4.

5.3 Using AMS42-USB with NextView®4

Install the fully functional trial of the professional software NextView®4 for measurement data acquisition and processing to directly test the features and functions of the AMS42-USB (installed as "USB-AD16f").

The setup program NV4.6 is available on the product page of the card. When first starting the software, request a license number with the option "Request 30 days free trial version" being checked and select your DAQ system (USB-AD16f) in the following dialog "Device Setup".

The start project of NextView®4 contains first instructions about how to operate the program. For detailed information, an online help is provided.

The trial is valid for 30 days after requesting the license number. If a license is not purchased within this period, the functional range of NextView®4 will be considerably cut down!

6 Supplementary Products for the AMS42-USB

6.1 5B Modules (MA Line)

The 5B measuring amplifiers from bmcm allow for the professional signal adjustment to a data acquisition system.

The amplifier output is ±5V or 0..5V. Most of the modules are electrically isolating and provide sensor supply.

The following 5B modules from bmcm are available:

Product	Description
MA-UNI	universal amplifier with galvanic isolation for U, I, R, thermocouple, strain gauge, LVDT
MA-UI	multi-range amplifier with galvanic isolation for U, I
MA-U	voltage measuring amplifier with galvanic isolation, 50kHz bandwidth
MA-P09/12/15	power supply modules ±9V/ ±12V/±15V

6.2 Plug-in Cassettes (AMS-K Line)

The amplifier system can individually be equipped with 8 plug-in cassettes (or 16 with option *AMS-EXT8*, see chapter 6.4).

Each cassette is equipped with the relevant 5B module and suitable input connector.

The suitable input connector on the front panel guarantees for the relevant connection to be available when exchanging the cassette.

The following cassettes are available:

Product	Description
AMS-K-BIN5	cassette with panel and 5-pin Binder female connector (712 series)
AMS-K-BLANK	blank panel
AMS-K-BNC	cassette with front panel and BNC female connector
AMS-K-CO5	cassette with front panel and 5-pin terminal connector
AMS-K-THK	cassette with front panel and thermocouple socket (type K)

6.3 AMS-HANDLE2

For mobile use, the AMS42-USB can be equipped with two stable metal handles at the housing frame (*AMS-HANDLE2*).
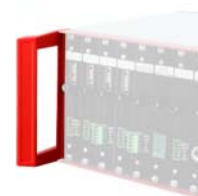
6.4 AMS-EXT8, AMS-DIG4

With the add-on option *AMS-EXT8*, the analog inputs 9..16 are available as amplifier inputs, and four opto-isolated digital inputs and four relay outputs with the option *AMS-DIG4*.

These channels are accessible at the back of the amplifier measurement system and not at the 37-pin or 15-pin D-Sub female of the device anymore (see chapter 2.5.2 and 2.6).

7 Important Notes for Using the AMS42-USB

- The device is only suitable for extra-low voltages - please observe the relevant regulations! Only use the device with housing closed. ESD voltages at open lines may cause malfunction.
- Only use an electrical isolated power supply unit (with CE).
- For cleaning only use non-solvent detergents. The product is designed to be maintenance-free.
- For calibration purposes the device must be returned to BMC Messsysteme GmbH.
- For reasons relating to CE use shielded cables. Connect the shield to ground at one end only. Close open inputs if possible. ESD voltages on lines may cause malfunction during operation.
- When mounting the cassettes, a connection between power supply ground and chassis of the device is made via the module screw.
- The device ground and the chassis are electrically connected to the chassis of the PC, which is usually also connected to ground. Be sure to avoid ground loops since they will cause measuring errors!
- The Gain is adjusted to even values. Therefore, only 64000 values (for 16 bit) of the full range of the converter are used. As a result, the measuring ranges are slightly larger (e.g. ±5.12V) than the indicated measuring ranges so that overranges can be recognized.
- The device must not be used for safety-relevant tasks. With the use of the product, the customer becomes manufacturer by law and is therefore fully responsible for the proper installation and use of the product. In the case of improper use and/or unauthorized interference, our warranty ceases and any warranty claim is excluded.

Do not dispose of the product in the domestic waste or at any waste collection places. It has to be either duly disposed according to the WEEE directive or can be returned to bmcm at your own expense.

8 Technical Data (typical at 20°C, after 5min., +24V supply)

• Analog Channels

Inputs (Measuring range):	8 amplifier inputs (±5V), 8 single-ended, non-amplified inputs (±10V, ±5V, ±2V, ±1V)			
Measuring range // Noise:	±10V // ±5 LSB	±5V // ±7 LSB	±2V // ±8 LSB	±1V // ±8 LSB
Sampling rate // Resolution:	max. 250kHz total sampling rate* // 16 bit			
Abs. accuracy // Memory depth:	±2.5mV // only depending on the size of the hard disk of the server PC			
Surge protection:	±35V (when turned on), ±20V (when turned off), max. ±20mA in total of all input channels!			
Input resistance // Input capacity:	1MΩ (with PC turned off: 1kΩ) // 5pF			
Zero shift // Gain drop:	±50ppm/°C // ±50ppm/°C			
Frequency accuracy // Frequency drift:	max. ±50ppm // max. ±50ppm/°C			
Outputs // Output range // Output current:	2 voltage outputs // ±10V // max. 1mA			
Galv. isolation (to PC // to each other):	all analog channels electrically isolated to the PC // amplifier inputs: depends on the 5B modules used			

* The total sampling rate is the sum of the sampling rates of the individual used channels (e.g. if 5 channels are scanned with 50kHz, the total sampling rate adds up to 250kHz).

• Digital Channels

Channels // Level:	4 input and 4 output channels // CMOS/TTL compatible (low: 0V..0.7V; high: 3V..5V)
Current pick-up per output pin:	1mA (with app. 4V level), max. 2.5mA (with app. 3V level)
Surge protection:	max. ±5.5V, protected with 1kΩ, max. max. ±20mA in total of all channels!
Counter:	1MHz, 16 bit, galvanically isolated, 5..12V input voltage

• General Data

Power supply:	+9..40V DC, ±5%, min 3W, max. 20W (depends on number of 5B modules used) at 3-pin DIN male
Analog connections:	amplifier inputs: different connectors (Phoenix, Binder, BNC, Thermo) on the front panels of the cassettes; other analog channels at a 37-pin D-Sub female at the device back
Digital connections // USB connection:	all channels at a 15-pin D-Sub female at the device front // standard USB female connector, type B
CE standards:	EN61000-6-1, EN61000-6-3, EN61010-1; for decl. of conformity (PDF)
ElektroG // ear registration:	RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
Max. permissible potentials // Protection:	**60V DC acc. to VDE**, max. 1kV ESD on open lines // IP20
Temperature ranges // Relative humidity:	operating temp. -25..50°C, storage temp. -25..70°C // 0-90% (not condensing)
Dimensions (W x H x D):	23,5cm x 13,2cm x 25,6cm
Delivery:	device, 1m USB connection cable, "Software Collection" CD, description
Available accessories:	plug-in cassettes with front panels and different connectors of the AMS-K series, 8-channel extension AMS-EXT8 for add. 8 amplifier inputs, extension AMS-DIG4 for 4 optocoupler inputs and 4 relay outputs, D-Sub plug ZU15ST and ZU37ST, 3-pin DIN socket ZU3DIN, gender changer ZU37SS, connecting cables ZUKA37SB/SS (D-Sub), desktop power supply ZU-PW40W (24V, 1.67A DC), carrying handle AMS-HANDLE2
Warranty:	2 years from date of purchase at bmcm, claims for damages resulting from improper use excluded

• Software

Software on CD (included):	ActiveX Controls LIBADX (hardware independent) for programming on Windows® XP/7/8; LIBAD4 SDK for C/C++ programming on Windows® XP/7/8, Mac OS X, Unix (FreeBSD, Linux); trial version of the measuring software NextView®4 to test and operate the hardware
NextView®4 (optional):	professional software (versions: Professional, Lite) for the acquisition and analysis of measurement data on Windows® XP/7/8

Manufacturer: BMC Messsysteme GmbH. Subject to change due to technical improvements. Errors and printing errors excepted. Rev. 4.2 11/24/2014