meM-ADDA

USB miniature external Measurement System

bmc messsysteme gmbh

Features

- 16 analog, ±5V input channels
- connection via USB-interface
- 12 Bit resolution
- 1 analog 12 Bit output channel
- 4 digital in-/ output channels each

Applications

- measuring analog signals
- analog controls
- measuring digital signals
- digital controls
- perfect for mobile use

With the creation of the modern generation of PCs less and less internal slots are available for additional cards.

The external USB devices of the meM-series (e.g. **meM-ADDA**) provide an alternative choice to substitute the measuring cards integrated in the computer. This USB-solution features

... 16 analog inputs ...

and an accuracy of 12 Bit for the

... measuring range of ±5V ... .

The **meM-ADDA** additionally features

... one analog output channel and
4 digital in-/ outputs each ...

Of course, the meM devices also show all the typical USB features such as *hot-pluggable* (devices can be plugged in during operation), up to 127 devices can be used, *Plug&Play* and power supply via USB interface.

Delivery includes ActiveX Controls **STR-meM** for programming purposes under Windows® 98/Me/2000/XP plus USB-driver.

Additionally available and free of charge is the easy-to-use operating programs **ST-meM-ADDA**, providing for the display and control of analog and digital signals.

The **meM-ADDA** can be used together with our software for data acquisition and processing

... NextView®/NT ...

version 3.2 and higher. It is available in the versions *Light*, *Professional* or *Client-Server* under Windows® 98/Me/2000/XP. A demo version is included with delivery.

Please visit our homepage for detailed information and software updates: www.bmcm.de

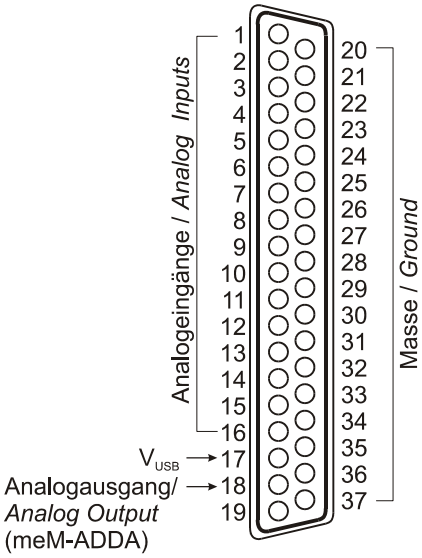
Start-Up Procedure

Plug the red frames onto the short sides of the devices with the feet looking downward, as can be seen in the above diagram. Connect one end of the USB-cable to the device and the other to the USB-interface of the PC. The device is supplied with power via the USB-connection.

Analog In- and Outputs

The 37-pole Sub-D socket at the front of the device is designed for the connection of analog in-and outputs. The following table shows the pin assignment of the 37-pole Sub-D socket:

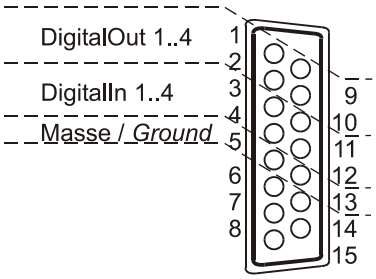
Pin	meM-ADDA
1..16	Analog inputs 1..16
17	V_{USB} (4-5V; max. 20mA)
18	Analog output 1
19	-
20..37	GND



The max. potentials to ground must not exceed ±7V. Any channel overload may influence measurements of other channels and may lead to wrong values.

Digital In- and Outputs

For the **meM-ADDA** 4 in- and outputs, each with CMOS-level (*low*: 0V..1V; *high*: 3V..5V), are available. The 15-pole Sub-D socket is integrated on the back of the device.



The pin assignment of the 15pole Sub-D socket is listed in the following table:

Pin	meM-ADDA	Pin	meM-ADDA
3	Digital In 1	1	Digital Out 1
11	Digital In 2	9	Digital Out 2
4	Digital In 3	2	Digital Out 3
12	Digital In 4	10	Digital Out 4
5	GND	6,7,8,14,15	-
13	GND		

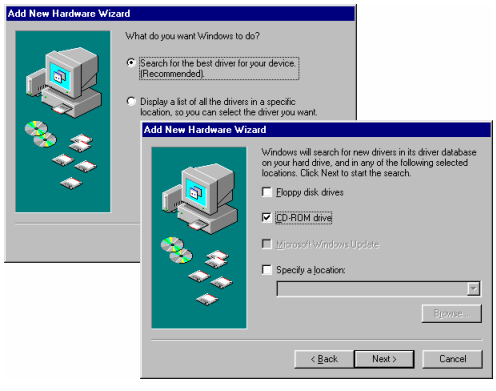
The digital in-and outputs are protected by 1kΩ resistors. If the input voltage is not within the admitted voltage range of 0V..5V the device may be damaged.

Software Installation

Before using the device, the **hardware drivers** must be installed. The device can be programmed under Windows 98/2000/XP by means of programming languages (Visual Basic, Delphi, Visual C++ etc), which are able to link the ActiveX Controls, using the programming interface **STR-meM**. The operating program **ST-meM-ADDA** allows to utilize the hardware´s capacity to its full extent. The device driver, the ActiveX Control **STR-meM** and the operating program **ST-meM-ADDA** are included on the "Software Collection"-CD by BMC Messsysteme GmbH which comes with the delivery.

1. Installation of Drivers

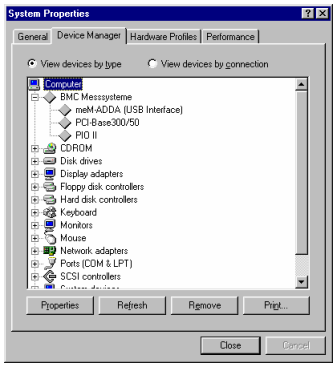
As soon as the device is connected to the computer, the hardware detection is started automatically by the system. The device will be found and displayed and the search for available drivers is started.



Select the recommended option "search for the best driver for your device".

Select "CD-ROM drive" to search for the driver if you have the software on CD. Select "floppy disk drives" to search for the driver, if your software is on a floppy disk. If you have downloaded the driver from our homepage, select the option at the bottom and enter the directory path where the driver is stored. You will be prompted for the driver

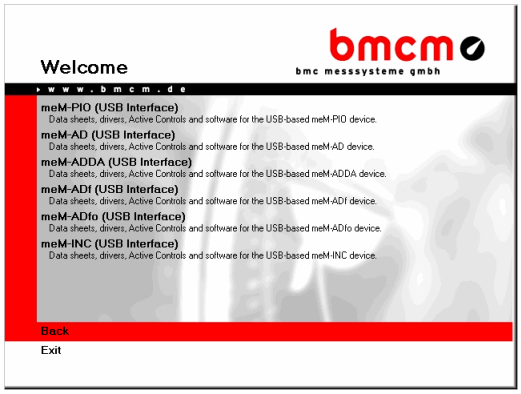
which has been found and asked if you want to install this driver. The installation will be complete after the required files have been copied to the hard disk. You may be requested to restart your computer afterwards.



We strongly recommend you to check the system´s device manager if the installation has been successful. (Windows 98: *My Computer / Control Panel / System / TAB device manager*; Windows 2000/XP: *My Computer / Control Panel / System / TAB Hardware / button device manager*)

It should have a new entry called: "BMC Messsysteme". When you open it by clicking on the "plus" sign on the left, all the installed devices are listed, including the USB device. A doubleclick on the device will show the configuration properties. Selecting TAB *General*, gives you general information and on conflicting devices and possible sources of error. The TAB *Driver* allows you to install new driver versions.

2. Installation of the ActiveX Controls STR-meM



To install or upgrade the ActiveX Control put the "Software Collection"-CD which is included with the delivery in your CD-ROM drive. The installation window with a list of choices will be displayed. Select "Products", then the product group of your device and finally the product type of your meM-device. The following window shows all software and documentation of your product which you can choose to install. Now please select the entry "meM-ADDA ActiveX Control Setup".

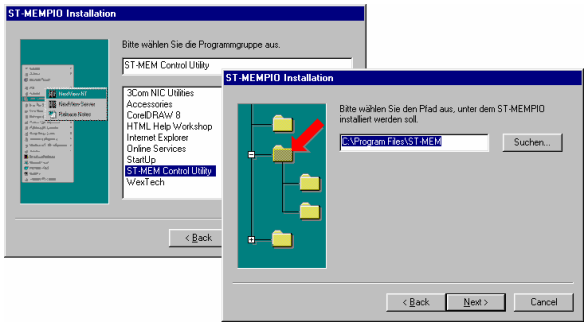
If you don´t use the auto run function of the "Software Collection"-CD for installation, you can install by opening the file `mem-actx-us.exe` (english setup) in the directory *products / mem / adda* .

After a short introduction the driver information will be displayed. Then the required files will be copied to your hard disk and you will be prompted if the installation has been successful. Restart your computer, if necessary.

3. Installation of the Operating Program ST-meM-ADDA

The USB driver and the ActiveX Control STR-meM must be installed before installing this program!

The program is installed in the same way as the ActiveX Controls, except that you now select "ST-meM-ADDA Control Utility" instead of **STR-meM**. If you don´t start the installation from the CD, open the setup program `st-memadda-install.exe` in the directory *products / mem / adda* .



After a short introduction you will be asked to confirm the suggested installation path and group name or enter your changes. Then the required files will be copied to your hard disk and prompt will show whether the installation has been successful. Restart your computer if necessary.

Programming

The CD contains programming examples in the same directory as the ActiveX Controls **STR-meM**. Choose the entry "meM-ADDA Programming Examples". For further information about the programming of the meM-devices please read the respective PDF file, which will be installed together with the programming examples. If you do not start the installation from the CD, open the setup program `mem-examples.exe` in the directory *products / mem / adda* .

Important Notes for Using the meM-ADDA

- The device is only suitable for extra-low voltages – please observe the relevant regulations! For reasons relating to EMC, the device must only be operated with housing closed. ESD voltages at open lines may cause malfunction during operation.
- Only use an electrically isolated power supply unit.
- For cleaning use water and mild detergent only. The device is designed to be maintenance-free.
- At the 37pole and 15pole Sub-D socket signal cables are connected – use shielded cables only. For best possible interference suppression connect shield at one end only. Close open inputs if necessary.
- 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!
- PCs (notebooks), which are not grounded often produce high potentials to earth at the USB socket, so that safe operation cannot be guaranteed. In this case connect the measuring system to earth.
- The Gain is adjusted to even values. Therefore only 4000 values (**meM-ADDA**: 12 Bit) of the full range of the converter are used. As a result, the measuring ranges are slightly larger (±5.12V) than the indicated measuring ranges, providing the advantage that overranges can be recognized.
- The AD converter of the **meM-ADDA** has a code noise of up to ±1 LSB.
- As sampling depends on the software, the device is not suitable for long-term measurements on Windows® 98/Me.
- 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.

Technical Data meM-ADDA (typical at 20°C and 5V supply)

• Analog Inputs

Channels:	16 single-ended			
Surge protection:	max. ±12V (when turned on), ±7V (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			
Max. sampling rate:	10Hz for all channels with NextView®/NT			
	measuring range	**resolution**	**abs. accuracy**	**noise**
meM-ADDA:	±5V	12Bit (2.5mV)	±5mV	±1 LSB

The values for accuracy always relate to the respective measured value. Errors might add at worst.

• Analog Output

Voltage range:	1 voltage output with ±5V
Output current:	max. 1mA
Resolution:	12 Bit
Accuracy:	typ. ±4 LSB, max. ±8 LSB
Zero shift // gain drop:	±50ppm/°C // ±50ppm/°C

• Digital In-/ Outputs

Channels // level:	4 input and 4 output channels // CMOS-level (low: 0V..1V; high: 3V..5V)
Current pick-up per output pin:	1mA (with ca. 4V level), max. 2.5mA (with ca. 3V level)
Input resistance:	min. 1MΩ (with PC turned off: 1kΩ)
Surge protection:	max. ±5.5V, protected with 1kΩ, max. ±20mA in total of all channels!

• General Data

Power supply:	+4.5V..+5.5V from USB connection to the PC, max. 100mA
Analog connections:	all channels at a 37-pole Sub-D socket at the front of the device
Digital connections:	all channels at a 15-pole Sub-D socket at the back of the device
USB interface:	USB 1.1 compatible (full speed)
CE standards:	EN50081T1, EN50082T1, EN61010-1; for decl. of conformity (PDF) visit www.bmcm.de
Max. permissible potentials:	**60V DC acc. to VDE**, max. 1kV ESD on open lines
Temperature range:	-25°C..+70°C
Relative humidity:	0-90% (not condensing)
Housing:	aluminum housing, size: 167 x 113 x 30 mm^3
Protection type:	IP50
Delivery:	device with aluminum housing, 1m USB-connecting cable, "Software Collection"-CD incl. drivers, documentation
Accessories (optional):	hatrail set ZU-SCHI, USB cable ZUKA-USB, connecting cables ZUKA37SB, ZUKA37SS, connector box ZU37BNC, Sub-D plugs ZUST37, ZUST15
Guarantee:	2 years with effect from sales date, damages at product resulting from improper use excluded

• Software Support

Software on CD (included):	ActiveX Controls STR-meM for programming under Windows® 98/Me/2000/XP; operating program ST-meM-ADDA for display/control of analog and digital signals
NextView®/NT optional:	version 3.2 and higher on Windows® 98/Me/2000/XP

Manufacturer: BMC Messsysteme GmbH. Subject to change due to technical improvements. Errors and printing errors excepted. Rev. 3.3 09/29/2005