

Product Datasheet - Technical Specifications



More information in our Web-Shop at ► www.meilhaus.com and in our download section.

Your contact

**Technical and commercial sales, price information,
quotations, demo/test equipment, consulting:**

Tel.: **+49 - 81 41 - 52 71-0**

FAX: **+49 - 81 41 - 52 71-129**

E-Mail: sales@meilhaus.com

Downloads:
www.meilhaus.com/en/infos/download.htm

Meilhaus Electronic GmbH | Tel. **+49 - 81 41 - 52 71-0**
Am Sonnenlicht 2 | Fax **+49 - 81 41 - 52 71-129**
82239 Alling/Germany | E-Mail sales@meilhaus.com

Mentioned company and product names may be registered trademarks of the respective companies. Prices in Euro plus VAT. Errors and omissions excepted.
© Meilhaus Electronic.

www.meilhaus.de



■ PCIe-BASE

Data Acquisition and Control Card (PCIe)

Measurement & Control.

Multifunctional.

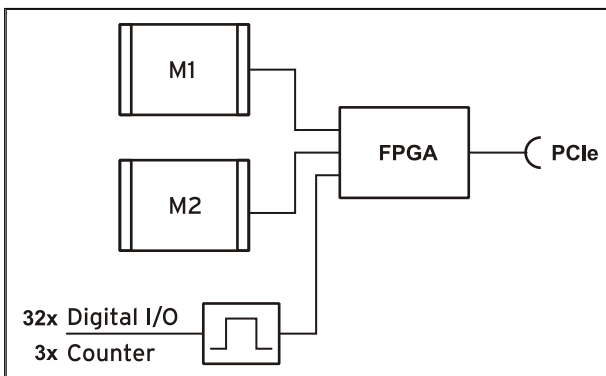
Stationary measurement data acquisition in latest "PCI Express" technology: The PCIe-BASE is a multifunctional data acquisition and control card. Its modular structure guarantees individual and flexible adjustment to a measuring task.

Modular Concept. Optimize Price-Performance-Ratio.

Perfectly adapted to the respective measurement application, data acquisition modules can be selected to equip the two module slots of the PCIe-BASE. It is the customer who decides about performance and price of his DAQ system!

Modules: MADDA. MDA. MCAN. What Would You Like?

A great variety of analog plug-on modules is available differing in the number of inputs and outputs, resolution and sampling rate. If a MADDA module e.g. is combined with a CAN module, analog measurements and via the



Functional diagram



CAN interface are possible. Analog, digital, and CAN channels are sampled time-synchronously.

32 Digital I/O. 3 Counters.

The PCIe-BASE features 32 digital lines, which means that the base board is a digital I/O card itself. The direction of the two 16-bit ports is set via software. 3 counters accessible via any digital inputs allow the acquisition of counting pulses or the connection of incremental encoders.

PCIe. Be on the Cutting Edge.

Designed in "PCIe x1" format, the PCIe-BASE can be installed in any PCIe slot. In the long term, this extremely powerful interface will completely replace the predecessor "PCI" in the PC. Due to Plug&Play, the card is recognized automatically by the PC making installation a lot easier.

Windows®. That's it.

The PCIe-BASE can be used on Windows® XP/7/8/10. The entire software for installation and programming of the multifunction card is included for free.

NextView®. Try for Free.

The DAQ system is supported by NextView®, the software for data acquisition and analysis. A fully functional 14-day trial is included with delivery to directly test the functionality of the PCIe-BASE.

Technical Data

(typical at 20°C, after 5min.)

- Sampling Parameters (with Measuring and Analysis Software NextView®)**

Max. total sampling rate*:	dep. on the modules used, max. 250kHz
FIFO:	4kByte
Memory depth:	depending on the RAM or HD space available

* The total sampling rate is the sum of the sampling rates of the individual used channels (e.g. if 5 channels are scanned with 10kHz, the total sampling rate adds up to 50kHz).

- Digital Input/Outputs**

Channels:	2x 16 lines (bidirectional, set in groups of 8), 3x counters/incremental encoders (32 bit, opt. counter reset) connectable at any digital inputs
Level:	CMOS/TTL compatible (low: 0V..0.7V; high: 3V..5V)
Input resistance:	1MΩ
Surge protection:	20V DC, max. ±20mA in total of all inputs!
Output resistance:	1kΩ
Output current:	1mA

- Signal Connection**

Channels of the plug-on modules:	all channels are accessible at a 37-pin D-Sub female connector at the PC card bracket, via pin connectors or (with ZUKA16 option) at an additional PC slot bracket (37-pin D-Sub female)
Digital channels (of PCIe-BASE):	2x20-way pin connectors on the board; with ZUKA16 (opt.) accessible at a PC slot bracket (D-Sub 37)

- General Data**

Bus connection:	PCIe x1 (PCIe bus)
CE standards:	EN61000-6-1, EN61000-6-3, EN61010-1
ElektroG // ear registration:	RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
Max. permissible potentials:	60V DC acc. to VDE, max. 1kV ESD on the lines
Temperature ranges:	operating temp. -25°C..+50°C, storage temp. -25°C..+70°C
Relative humidity:	0-90% (not condensing)
Size:	without PC card bracket: 174 x 111 x 16 mm ³
Delivery:	product, PC card bracket
Available accessories:	cable with PC card bracket for internal connection ZUKA16, 37-pin D-Sub plug ZUST37, connecting cables ZUKA37SB, ZUKA37SS, connector panels ZU37BB/-CB/-CO, current shunt ZU-CS250R, modules of the series MADD/MDA/MCAN
Warranty:	2 years from date of purchase at bmcm, claims for damages resulting from improper use excluded

- Software**

Software free of charge download:	LIBAD4 SDK for C/C++ programming on Windows® XP/7/8/10, trial version of the measuring software NextView® to test and operate the hardware
NextView® (optional):	professional software (versions: Professional or Lite) for the acquisition and analysis of measurement data on Windows® 8/10



■ PCI-BASEII

Data Acquisition and Control Card (PCI)

Measurement & Control.

Multifunctional.

The PCI-BASEII is a multifunctional data acquisition and control card for stationary applications. Its modular structure guarantees individual and flexible adjustment to a measuring task. The short latency of the PCI interface makes the card especially attractive for controlling tasks.

Modular Concept. Optimize Price-Performance-Ratio.

Perfectly adapted to the respective measurement application, data acquisition modules can be selected to equip the two module slots of the PCI-BASEII. It is the customer who decides about performance and price of his DAQ system!

Modules: MADDA. MDA. MCAN. What Would you Like?

A great variety of analog plug-on modules is available differing in the number of inputs and outputs, resolution and sampling rate. If a MADDA module e.g. is combined with a CAN module, analog measurements and via the

CAN interface are possible. Analog, digital, and CAN channels are sampled time-synchronously.

32 Digital Inputs/Outputs. 3 Counters.

The PCI-BASEII features 32 digital lines, which means that the base board is a digital I/O card itself. The direction of the two 16-bit ports is set via software. 3 counters accessible via any digital inputs allow the acquisition of counting pulses or the connection of incremental encoders.

PCI. Well Fitted in the PC.

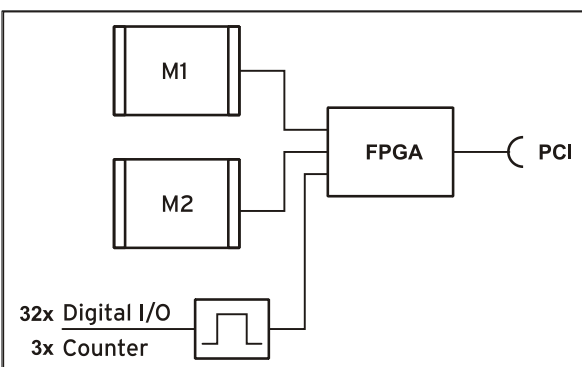
The PCI-BASEII is installed in a free PCI slot and is supplied by the PC – all this without annoying cables. The PC housing provides optimum protection against interferences. Due to Plug&Play, the card is recognized automatically by the PC making installation a lot easier.

Windows®. That's it.

The PCI-BASEII can be used on Windows® XP/7/8/10. The entire software for installation and programming of the multifunction card is included for free.

NextView®. Try for Free.

The DAQ card is supported by NextView®, the software for data acquisition and analysis. A fully functional 14-day trial is included with delivery to directly test the functionality of the PCI-BASEII.



Functional diagram

Technical Data

(typical at 20°C, after 5min.)

- Sampling Parameters (with DAQ and Analysis Software NextView®)**

Max. total sampling rate*:	dep. on the modules used, max. 250kHz
FIFO:	4kByte
Memory depth:	depending on the RAM or HD space available

* The total sampling rate is the sum of the sampling rates of the individual used channels (e.g. if 5 channels are scanned with 10kHz, the total sampling rate adds up to 50kHz).

- Digital Input/Outputs**

Channels:	2x 16 lines (bidirectional, set in groups of 8), 3x counters/incremental encoders (32 bit, opt. counter reset) connectable at any digital inputs
Level:	CMOS/TTL compatible (low: 0V..0.7V; high: 3V..5V)
Input resistance:	1MΩ
Surge protection:	20V DC, max. ±20mA in total of all inputs!
Output resistance:	1kΩ
Output current:	1mA

- Signal Connection**

Channels of the plug-on modules:	all channels are accessible at a 37-pin D-Sub female connector at the PC card bracket, via pin connectors or (with ZUKA16 option) at an additional PC slot bracket (37-pin D-Sub female)
Digital channels (of PCI-BASEII):	2x20-way pin connectors on the board; with ZUKA16 (opt.) accessible at a PC slot bracket (D-Sub 37)

- General Data**

Bus connection:	PCI bus (universal slot: 3.3V and 5V)
PCI specification:	PCI Bus Spec 3.0
CE standards:	EN61000-6-1, EN61000-6-3, EN61010-1
ElektroG // ear registration:	RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
Max. permissible potentials:	60V DC acc. to VDE, max. 1kV ESD on the lines
Temperature ranges:	operating temp. -25°C..+50°C, storage temp. -25°C..+70°C
Relative humidity:	0-90% (not condensing)
Size:	without PC card bracket: 181 x 107 x 16 mm ³
Delivery:	product, PC card bracket
Available accessories:	cable with PC slot bracket for internal connection ZUKA16, 37-pin D-Sub male ZUST37, connecting cables ZUKA37SB, ZUKA37SS, connector panels ZU37BB/-CB/-CO, current shunt ZU-CS250R, modules of the series MADDA/MDA/MCAN
Warranty:	2 years from date of purchase at bmcm, claims for damages resulting from improper use excluded

- Software**

Software free of charge download:	LIBAD4 SDK for C/C++ programming on Windows® XP/7/8/10, trial version of the measuring software NextView® to test and operate the hardware
NextView® (optional):	professional software (versions: Professional or Lite) for the acquisition and analysis of measurement data on Windows® 8/10



■ MDA16-4i

D/A Converter Module for PCI-BASEII, PCIe-BASE

**Assemble Measurement Card.
Control. Analog.**

For optimum customization to a measurement application, the PCI/PCIe cards from BMC Messsysteme GmbH can be supplemented with various modules. The short latency of the PCI/PCIe interface makes the MDA16-4i module especially attractive for controlling tasks.

4 Analog Outputs. 16 Bit. $\pm 10V$.

The MDA16-4i precisely emits analog signals with 16-bit resolution in the $\pm 10V$ range. They are available at the 37-pin D-Sub female connector of the PCI/PCIe card. 4 analog outputs are provided.

Clearly Safe.

The galvanic isolation of the analog outputs from the PC ground provides interference-free operation and protects DAQ system and PC against high potentials.

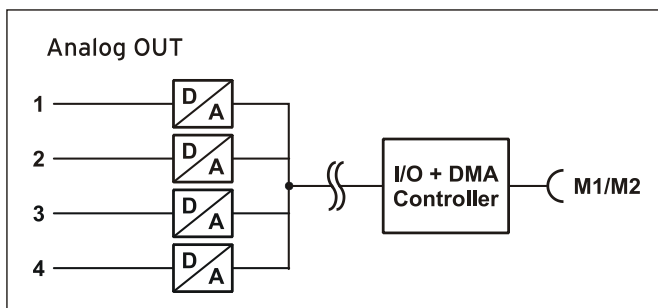
Function Generator.

The MDA16-4i features a function generator, which outputs various signals (sine wave, rectangle, or ramp function). Signal amplitude ($\pm 10V$) and frequency (max. 100kHz) are programmable via software.

Modularity. Individuality. Flexibility.

A great variety of analog input modules, analog output modules or CAN modules is available to equip the PCI/PCIe base board for a measurement application.

The combination of the modules in the two card slots creates individual solutions.



Functional diagram

Technical Data

(typical at 20°C, after 5min.)

• Analog Outputs

Channels:	4 outputs, galvanically isolated from the PC
Resolution:	16 bit
Relative accuracy:	0.0015%
Converter rate:	10µs
Output range:	±10V
Function generator:	sine wave, ramp, rectangle, programmable via software (Libad4 or NextView®4), max. ±10V, 100kHz
Zero shift:	max. ±50ppm/°C
Gain drop:	max. ±50ppm/°C
Output current:	max. 10mA
Settling time:	max. 10µs
R _{out} :	51Ω
Error in the relevant range:	max. ±4 LSB
Noise in the relevant range:	max. ±4 LSB

The values for accuracy always relate to the respective output range. Errors might add at worst.

• General Data

Power supply:	+4.5V..+5.5V from PCI-BASEII or PCIe-BASE, max. 300mA
CE standards:	EN61000-6-1, EN61000-6-3, EN61010-1
ElektroG // ear registration:	RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
Max. perm. potentials:	60V DC acc. to VDE , max. 1kV ESD on open lines
Temperature ranges:	operating temp.: -25°C..+50°C, storage temp.: -25°C..+70°C
Relative humidity:	0-90% (not condensing)
Dimensions:	~ 74 x 52 x 13 mm ₃
Delivery:	product, description
Warranty:	2 years from date of purchase at bmcm, claims for damages resulting from improper use excluded



■ MDA16-8i

D/A Converter Module for PCI-BASEII, PCIe-BASE

Assemble Measurement Card. Control. Analog.

For optimum customization to a measurement application, the PCI/PCIe cards from BMC Messsysteme GmbH can be supplemented with various modules. The short latency of the PCI/PCIe interface makes the MDA16-8i module especially attractive for controlling tasks.

8 Analog Outputs. 16 Bit. $\pm 10V$.

The MDA16-8i precisely emits analog signals with 16-bit resolution in the $\pm 10V$ range. They are available at the 37-pin D-Sub female connector of the PCI/PCIe card. Eight analog outputs are provided.

Clearly Safe.

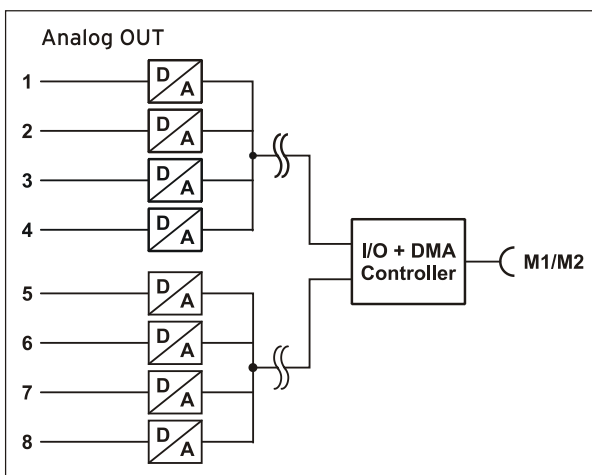
The galvanic isolation of the analog outputs from the PC ground provides interference-free operation and protects DAQ system and PC against high potentials.

Function Generator.

The MDA16-8i features a function generator, which outputs various signals (sine wave, rectangle, or ramp function). Signal amplitude ($\pm 10V$) and frequency (max. 100kHz) are programmable via software.

Modularity. Individuality. Flexibility.

A great variety of analog input modules, analog output modules or CAN modules is available to equip the PCI/PCIe base board for a measurement application. The combination of the modules in the two card slots creates individual solutions.



Functional diagram

Technical Data

(typical at 20°C, after 5min.)

- Analog Outputs

Channels:	8 outputs, galvanically isolated from the PC
Resolution:	16 bit
Relative accuracy:	0.0015%
Converter rate:	10µs
Output range:	±10V
Function generator:	sine wave, ramp, rectangle, programmable via software (Libad4 or NextView®4), max. ±10V, 100kHz
Zero shift:	max. ±50ppm/°C
Gain drop:	max. ±50ppm/°C
Output current:	max. 10mA
Settling time:	max. 10µs
R _{out} :	51Ω
Error in the relevant range:	max. ±4 LSB
Noise in the relevant range:	max. ±4 LSB

The values for accuracy always relate to the respective output range. Errors might add at worst.

- General Data

Power supply:	+4.5V..+5.5V from PCI-BASEII or PCIe-BASE, max. 300mA
CE standards:	EN61000-6-1, EN61000-6-3, EN61010-1
ElektroG // ear registration:	RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
Max. perm. potentials:	60V DC acc. to VDE , max. 1kV ESD on open lines
Temperature ranges:	operating temp.: -25°C..+50°C, storage temp.: -25°C..+70°C
Relative humidity:	0-90% (not condensing)
Dimensions:	~ 74 x 52 x 13 mm ₃
Delivery:	product, description
Warranty:	2 years from date of purchase at bmcm, claims for damages resulting from improper use excluded



Get Connected.

The channels of the module on slot 1 are available at the 37-pin D-Sub female of the PCI/ PCIe data acquisition card and can be connected externally at the PC card bracket. Use the add-on cable ZUKA16 to lead through the connections of the module on the second slot.

Undisturbed and Safe.

The integrated RISC controller generates jitter-free sampling sequences. In addition, the analog channels of the MADDA16 are galvanically isolated from the PC ground. This provides interference-free operation and protects DAQ system and PC against differences of potential.

Modularity. Individuality. Flexibility.

A great variety of analog input modules, analog output modules or CAN modules is available to equip the PCI/PCIe base board for a measurement application. The combination of the modules in the two card slots creates individual solutions.

Analog-CAN Combination. Synchronous.

If using both a MADDA and an MCAN module together on the PCI/PCIe card, analog and CAN data are sampled synchronously in time.

MADDA16/16n

AD/DA-Wandler Module für PCI-BASEII, PCIe-BASE

Assemble DAQ Card. Record and Output Signals. Analog.

For optimum customization to a measurement application, the PCI/PCIe cards from BMC Messsysteme GmbH can be supplemented with various modules. The analog modules of the MADDA series are perfectly suitable for the acquisition of measurement data as well as for analog controlling tasks.

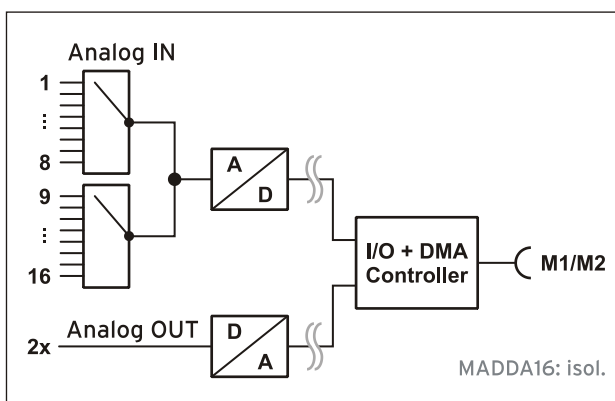
16 Analog Inputs. 250kHz.

16 Bit. $\pm 10V$, $\pm 5V$, $\pm 2V$, $\pm 1V$.

16 analog inputs can be sampled with 16 bit resolution and 250kHz total sampling rate so that even slightest peaks of high-frequent signals can be detected. The measuring range is selected via software for each channel separately and does not affect the sampling rate.

2 Analog Outputs. 16 Bit. $\pm 10V$.

The two 10V outputs can be used for analog controls with 16 bit accuracy.



Functional diagram

Technical Data (typical at 20°C, after 5min.)

• Analog Inputs

Channels // Meas. ranges // Resolution:
 Total sample rate:
 Min. sampling rate per channel:
 Typ. noise // Relative accuracy:
 Converter error // Error between ranges:
 Basic adjustment in the meas. range:
 Surge protection:
 Skew (jitter) with 32-channel operation:
 Input resistance // Input capacity:
 Zero shift // Gain drop:
 Frequency accuracy // Frequency drift:

16 inputs, add. MADDA16: electrically isolated from PC // $\pm 10V$, $\pm 5V$, $\pm 2V$, $\pm 1V$ // 16 bit
250kHz
4 μ s
± 5 LSB, ± 7 LSB, ± 8 LSB, ± 8 LSB // 0.0015%
max. ± 4 LSB // typ. $\pm 0.1\%$
with static calibration signal in the $\pm 5V$ measuring range with ± 1 LSB
$\pm 35V$ (when turned on), $\pm 20V$ (when turned off), max. $\pm 20mA$ in total of all input channels!
max. 1 μ s between 1. + 2. module
1M Ω (with PC turned off: 1k Ω) // 5pF
typ. $\pm 50ppm/^\circ C$, max. $\pm 100ppm/^\circ C$
max. $\pm 100ppm$ (with regard to real time) // max. $\pm 50ppm/^\circ C$

* The MAD modules are factory set in the range of $\pm 5V$. The measuring range can be set for each channel separately.

** The total sampling rate is the sum of the sampling rates of the individual used channels
 (e.g. if 5 channels are scanned with 10kHz, the total sampling rate adds up to 50kHz).

*** The values for accuracy always relate to the respective output range. Errors might add at worst.

• Analog Outputs

Channels // Output range // Resolution:
 Temperature drift:
 Output current // Output resistance:
 Error // Noise:

2 outputs, add. MADDA16: electrically isolated from PC // $\pm 10V$ // 16 bit
max. $\pm 50ppm/^\circ C$
max. 1mA // 1k Ω
typ. ± 4 LSB // max. ± 8 LSB

• General Data

Power supply:
 CE standards:
 ElektroG // ear registration:
 Max. perm. potentials:
 Temperature ranges // Relative humidity:
 Dimensions // Delivery:
 Warranty:

+4.5V..+5.5V from PCI-BASEII or PCIe-BASE, max. 300mA
EN61000-6-1, EN61000-6-3, EN61010-1
RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
60V DC acc. to VDE , max. 1kV ESD on open lines
operating temp.: $-25^\circ C$.. $+50^\circ C$, storage temp.: $-25^\circ C$.. $+70^\circ C$ // 0-90% (not condensing)
~ 74 x 52 x 13 mm ₃ // product, description
2 years from date of purchase at bmcm, claims for damages resulting from improper use excluded

Manufacturer: BMC Messsysteme GmbH. Subject to change due to technical improvements. Errors and printing errors excepted. Rev. 6.1 10.02.2020

Kompatibilität der Mxx-Module untereinander und mit PCI(e)-BASE Versionen /
 Compatibility of the Mxx modules with each other and with PCI(e)-BASE versions



Module - PCI(e)-BASE	Steckpl. 1 - Steckpl. 2 / Slot 1 - Slot 2					Steckpl. 1 - Steckpl. 2 / Slot 1 - Slot 2																		
	PCI-BASE50 *	PCI-BASE300 *	PCI-BASE1000 *	PCI-BASEII	PCIe-BASE	MAD12 *	MAD12a **	MAD12b **	MAD12f **	MAD16 *	MAD16a **	MAD16b **	MAD16f **	MADDA16 ***	MADDA16n ***	MDA12 *	MDA12-4 *	MDA16 *	MDA16-2i **	MDA16-4i **	MDA16-8i **	MCAN **		
MAD12 *	x	x	x	x	x	x			x	x						x	x	x	x	x	x	x		
MAD12a *		x	x	x	x		x	x			x	x	x			x	x	x	x	x	x	x	x	
MAD12b *		x	x	x	x		x	x			x	x	x			x	x	x	x	x	x	x	x	
MAD12f *		x	x	x	x	x			x	x						x	x	x	x	x	x	x		
MAD16 *	x	x	x	x	x	x			x	x						x	x	x	x	x	x	x		
MAD16a *		x	x	x	x		x	x			x	x	x			x	x	x	x	x	x	x	x	
MAD16b *		x	x	x	x		x	x			x	x	x			x	x	x	x	x	x	x	x	
MAD16f *		x	x	x	x		x	x			x	x	x			x	x	x	x	x	x	x	x	
MADDA16 ***		x	x	x	x								x	x****	x****					x	x	x	x	
MADDA16n ***		x	x	x	x								x	x****	x****					x	x	x	x	
MDA12 *	x	x	x	x	x	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	
MDA12-4 *	x	x	x	x	x	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	
MDA16 *	x	x	x	x	x	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	
MDA16-2i *		x	x	x	x	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	
MDA16-4i		x	x	x	x	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	
MDA16-8i		x	x	x	x	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	
MCAN		x	x	x	x		x	x			x	x	x			x	x	x	x	x	x	x	x	

* nicht mehr erhältlich / not available anymore

** nicht mit PCI-BASE50 / not with PCI-BASE50

*** AOut verfügbar nur für PCI-BASE ab Rev. 3.1 und PCIe-BASE ab Rev. 3.3 / AOut only available for PCI-BASE from rev. 3.1 and PCIe-BASE from rev. 3.3

**** Modul mit der niedrigeren Adresse auf Steckplatz 1 / module with the lower address in slot 1