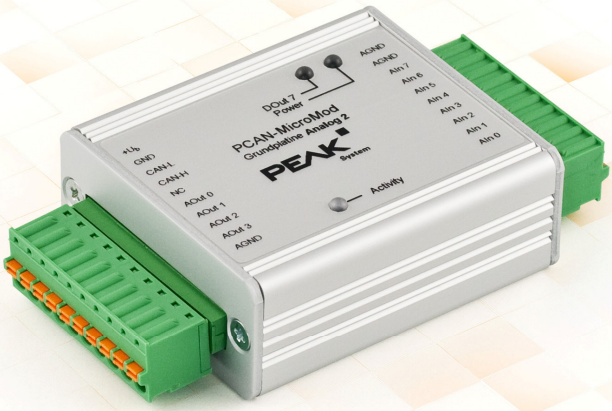
PCAN-MicroMod Analog 2

Application-specific PCAN-MicroMod Motherboard

User Manual



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PEAK System

Products taken into account

Product Name	Model	Part number
PCAN-MicroMod Analog 2	Including casing and PCAN-MicroMod	IPEH-002207
PCAN-MicroMod Configuration	Version 2.5 (Windows software)	

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Contents

1 Introduction

The motherboards for PCAN-MicroMod provide an application-oriented environment. Typical characteristics of this product group include a wide supply voltage range and the protective circuit for the inputs and outputs. CANopen® firmware is available for all PCAN-MicroMod motherboards.

The Analog 2 motherboard serves common analog requirements.

Note: This manual only refers to the motherboard as base for a PCAN-MicroMod and to the standard firmware. For the PCAN-MicroMod and the configuration program PCAN-MicroMod Configuration, there is separate documentation.

1.1 Properties at a Glance

- Completely configurable using the Windows program PCAN-MicroMod Configuration
- Communication through High-speed CAN (ISO 11898-2)
- Operating voltage 11 to 30 V (8 to 30 V w/o use of analog outputs)
- Aluminum profile casing with spring terminal connectors
- Top hat rail mounting option available
- Extended operating temperature range from -40 to +85 °C (-40 to +185 °F)

- 8 analog inputs:
  - Measuring range bipolar, -10 to +10 V (other measuring range on request, also unipolar)
  - Resolution 16 bits
  - Sample rate depends on the number of used channels (2 kHz / n)
  - Protection against undervoltage and overvoltage
  - Hardware low-pass with τ = 1 ms
  - Software low-pass set by configuration (τ = 1 - 1000 ms)
- 4 analog outputs:
  - Voltage range 0 to 10 V (based on 12-bit DAC)
  - Output current 20 mA per channel
  - Short circuit protection
- Status LEDs for power supply and digital output

1.2 Prerequisites for Operation

- Power supply in the range of 11 to 30 V DC (8 to 30 V w/o use of analog outputs)
- For creating and transferring configurations: computer with Windows 8, 7, Vista, XP (32-bit or 64-bit) and a CAN interface from the PCAN series

1.3 Scope of Supply

- PCAN-MicroMod
- PCAN-MicroMod motherboard in casing including mating connectors
- PCAN-MicroMod Configuration for Windows
- Manual in PDF format

2 Operation

2.1 Port Assignment

The motherboard has two connectors, J1/2 on the left and J3 on the right. The port assignment is as follows:

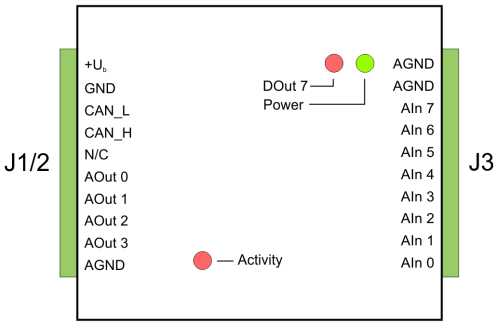

Figure 1: Ports of the Analog 2 motherboard

Port name J1/2	Function
$+U_b$	Operating voltage 11 - 30 V DC, w/o AOut 8 - 30 V DC
GND	Digital ground
CAN_L	Differential CAN signal
CAN_H	
N/C	Not connected
AOut 0	Analog output 0 - 10 V (12 bit)
AOut 1	
AOut 2	
AOut 3	
AGND	Analog ground

Port name J3	Function
AGND	Analog ground
AGND	
AIn 7	Analog input -10 - +10 V (16 bit)
AIn 6	
AIn 5	
AIn 4	
AIn 3	
AIn 2	
AIn 1	
AIn 0	

2.2 Configuration Program

In order to create and transfer MicroMod configurations, the Windows program PCAN-MicroMod Configuration is used. This section covers basic points about installation and use of the program with the Analog 2 motherboard.

You'll find detailed information about the use of PCAN-MicroMod Configuration in the related documentation which is invoked via the program (e.g. with F1).

2.2.1 System Requirements

- Windows 8, 7, Vista, XP (32-bit or 64-bit)
- Computer with CAN interface of the PCAN series (for transferring a configuration to the PCAN-MicroMod via CAN)

2.2.2 Installing the Program

Under Windows install the program from the supplied CD. Start the corresponding installation routine by using the CD navigation going to **Tools** > **PCAN-MicroMod Configuration 2.5.x**.

2.2.3 Creating a Configuration

When you start creating a new configuration in PCAN-MicroMod Configuration, the **Board Type** dialog box appears in order to select the type of the used motherboard. The necessary settings are explained in the following.

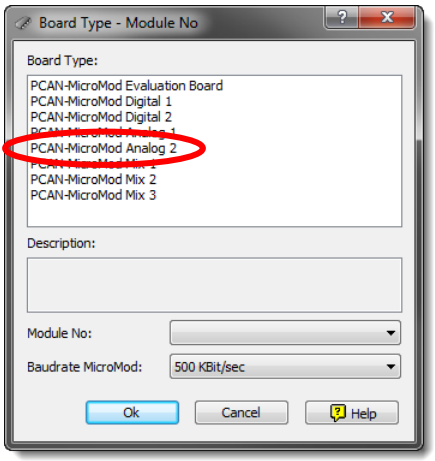

Figure 2: PCAN-MicroMod Configuration: selection of the Analog 2 motherboard

Board Type: PCAN-MicroMod Analog 2

Module No: 0

The module number of the MicroMod on the Analog 2 motherboard is set to 0 at delivery and is relevant if you want to configure more than one MicroMod on the same CAN bus. See also section 2.5 *Several MicroMods on the CAN Bus* on page 11.

Bitrate MicroMod: 500 kbit/s

At delivery the MicroMod is set to a bit rate of 500 kbit/s. A change of this setting will take effect after sending the completed configuration to the MicroMod.

Note: For the first transfer of a configuration to the module it must be integrated in a CAN network with a bit rate of 500 kbit/s.

2.2.4 Applicable MicroMod Services

The motherboard's inputs and outputs are controlled by the services of the MicroMod. The following table shows the assignment of the motherboard functions to the MicroMod services.

Function on motherboard	Port name	Access with MicroMod service(s)
Analog input	AIn 0 ... AIn 7	 Analog Input  Curve  Analog Hysteresis
Analog output	AOut 0 ... AOut 3	 Analog Output
LED DOut 7	DOut 7	 Digital Output

2.3 Correction Factor for Analog Inputs

The impedance of the voltage source being connected to an analog input affects the measurement with 0.2 % per kΩ. Because the resulting error of measurement is linear, it can be compensated in the MicroMod configuration by a matching correction factor (Scale value).

If you know the source impedance R_S and want to gain an accuracy of measurement, use the following formula for the Scale value:

$$\text{Scale} = 1 + \left(R_Q[\text{k}\Omega] \cdot \frac{0.002}{1\text{k}\Omega} \right)$$

Example for a source impedance of 4 kΩ:

$$\text{Scale}(4\,\text{k}\Omega) = 1 + \left(4\,\text{k}\Omega \cdot \frac{0.002}{1\text{k}\Omega} \right) = 1{,}008$$

2.4 Status LEDs

The motherboard including the MicroMod has three LEDs with the following status indications:

LED	Indication
Power (green)	Power is applied.
DOut 7 (red)	Is linked to the digital output DO 7 of the MicroMod and can be configured freely.
Activity (red)	Status of the PCAN-MicroMod:
blinking at 1 Hz	normal operation
blinking at 2 Hz	invalid or no configuration
blinking at 5 Hz	configuration mode
continuously on	internal MicroMod error

2.5 Several MicroMods on the CAN Bus

If you want to use several MicroMods on the same CAN bus and want to configure them, each one needs its own module number. That way the MicroMods are distinguishable for the program PCAN-MicroMod Configuration.

The module number is set on the MicroMod by solder jumpers and lies in the range of 0 to 31. At **delivery** each MicroMod has the **module number 0**.

During normal operation of the PCAN-MicroMod, the module number has no effect on the CAN communication.

For setting the solder jumpers on the MicroMod unscrew the top of the casing and remove the MicroMod from the motherboard. Please find further information about the assignment of module numbers in the separate user manual for the PCAN-MicroMod.

Attention! Electrostatic discharge (ESD) can damage or destroy components on the motherboard or the PCAN-MicroMod. Take precautions to avoid ESD when handling the boards.

Remounting the MicroMod

When you remount the MicroMod, take notice of the white triangular marks on each the motherboard and the MicroMod (upper left corner). These marks must align.

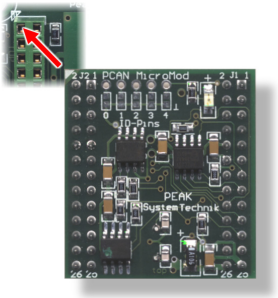

Figure 3: Positioning of the MicroMod

3 Technical Specifications

Power supply	
Operating voltage $+U_b$	11 - 30 V DC (±5 %), 8 - 30 V w/o AOut
Current consumption	max. 200 mA
Ripple (5 V)	< 50 mV (Vb = 12 V, 200 mA load)
Ripple (analog)	< 20 mV
Reverse-polarity protection	extant; can get ineffective by the wiring with other CAN nodes (danger of destruction of electronic components)

Analog inputs	
Count	8
Measuring range	-10 - +10 V, other measuring range on request
Resolution	16 bits, 0.3125 mV/digit
Sampling rate	2 kHz / number of used channels
Input impedance	< 500 kΩ
Overvoltage protection	extant
Low-pass time constant τ	Hardware: 1 ms Software: 1 - 1000 ms (optional by configuration)

Analog outputs	
Count	4
Type	DAC-based
Voltage range	0 - 10 V
Resolution	12 bit
Output current	20 mA
Precision	0,32 % (at full scale 10 V and 25 °C/77 °F)
Short circuit protection	extant

CAN	
Transmission standard	High-speed CAN ISO 11898-2, typ. 500 kbit/s, setup with PCAN-MicroMod Configuration (Windows software)
Termination	none
CAN ID reserved for configuration transfer	0x7E7
Module number at delivery (for configuration transfer)	0

Peculiarity Interference Immunity	
Tests	compliant to IEC 61000 and DIN EN 61326
Surge	±500 V (specification industrial sector: ±1 kV)[1]
Line-conducted HF compatibility	10 V_{eff} (specification: 3 V_{eff})

Environment	
Operating temperature	-40 - +85 °C (-40 - +185 °F)
Temperature for storage and transport	-40 - +100 °C (-40 - +212 °F)
Relative humidity	15 - 90 %, not condensing
Ingress protection (IEC 60529)	IP20
EMC	DIN EN 61326-1:2013-07 EC directive 2004/108/EG

Measures	
Casing size (incl. connectors)	55 x 68 x 24 mm See also dimension drawing in Appendix B on page 16
Weight	108 g

[1] This specification could only be fulfilled with ±500 V due to the available space. Therefore the motherboard should be used with a local power supply.

Appendix A CE Certificate

PCAN-MicroMod Analog 2 IPEH-002207 – EC Declaration of Conformity
PEAK-System Technik GmbH

Notes on the CE Symbol CE

The following applies to the "PCAN-MicroMod Analog 2" product with the item number(s) IPEH-002207.

EC Directive This product fulfills the requirements of EU EMC Directive 2004/108/EC (Electromagnetic Compatibility) and is designed for the following fields of application as for the CE marking:

Electromagnetic Immunity/Emission
DIN EN 61326-1, publication date 2013-07
Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements (IEC 61326-1:2012);
German version EN 61326-1:2013

Declarations of Conformity In accordance with the above mentioned EU directives, the EC declarations of conformity and the associated documentation are held at the disposal of the competent authorities at the address below:

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Signed this 22nd day of October 2013

Appendix B Dimension Drawing

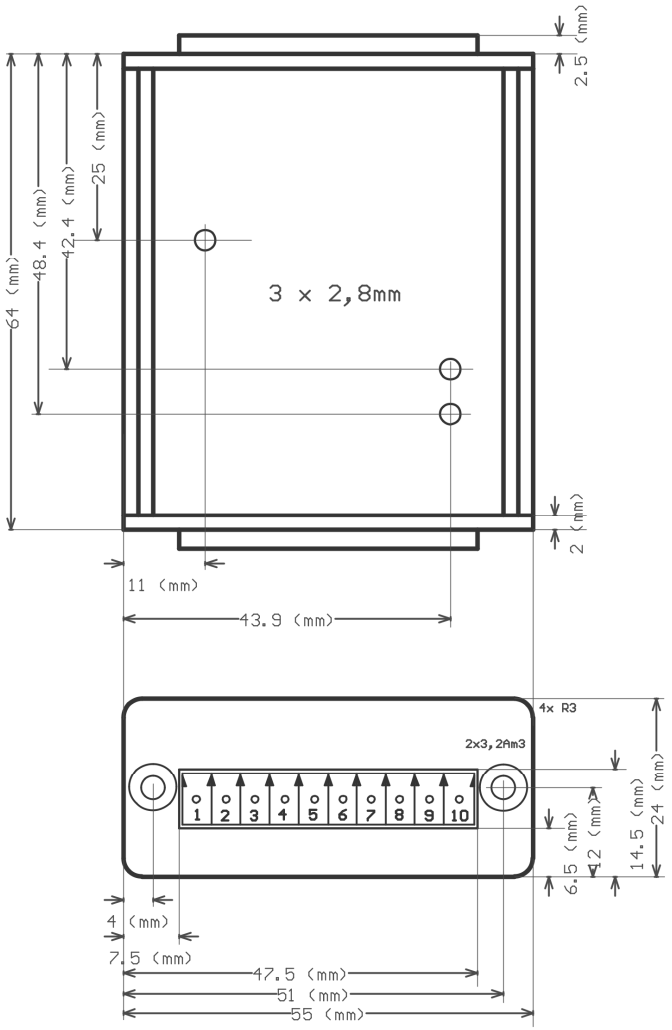

Figure 4: Top view and view of front side with connector.
The figure does not show the actual size of the product.