PCAN-MicroMod Analog 2

Application-specific PCAN-MicroMod Motherboard

User Manual

Document version 1.13.0 (2019-03-22)
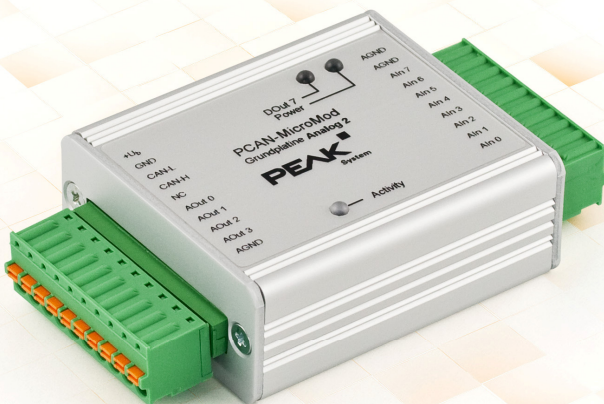
PEAK
System

Relevant products

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

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

⌐ High-speed CAN connection (ISO 11898-2)

⌐ Bit rates from 10 kbit/s up to 1 Mbit/s

⌐ Compliant with CAN specifications 2.0A (11-bit ID) and 2.0B (29-bit ID)

⌐ Completely configurable using the Windows program PCAN-MicroMod Configuration

⌐ Operating voltage 11 to 30 V

⌐ Aluminum casing with spring terminal connectors

⌐ Optional DIN rail fixing available

⌐ Extended operating temperature range from -40 to 85 °C (-40 to 185 °F)

⊢ 8 analog inputs:

- Measuring range bipolar -10 to 10 V

- Resolution 16 bits

- Sample rate depends on the number of used channels (2 kHz / n)

- Low-pass behavior

- Protection against under- and overvoltage

⊢ 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 without use of analog outputs)

⊢ For creating and transferring configurations:

- Computer with Windows 10, 8.1, or 7 (32/64-bit)

- 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:
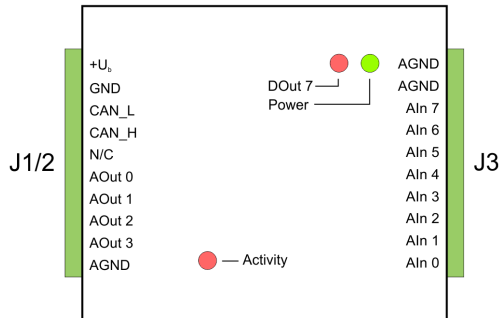
Figure 1: Ports of the Analog 2 motherboard

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

⌐ Computer with Windows 10, 8.1, or 7 (32/64-bit)

⌐ CAN interface from the PCAN series

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.
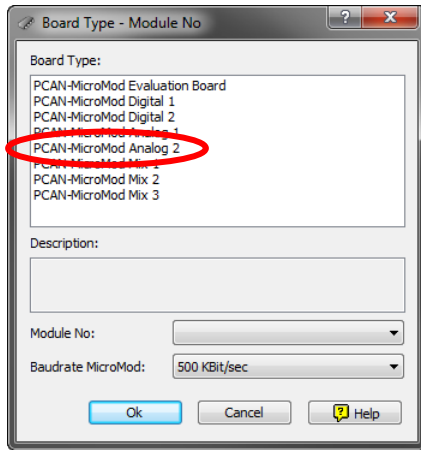

Figure 2: PCAN-MicroMod Configuration: selection of the Analog 2 motherboard

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.
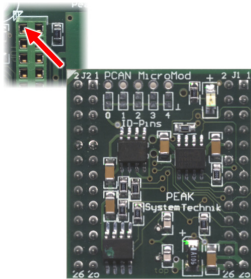

Figure 3: Positioning of the MicroMod

3 Technical Specifications

Connectors	
Mating connector type	Phoenix Contact FK-MCP 1,5/10-ST-3,81 1851122

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 / input impedance	-10 - +10 V (default) / 500 kΩ
	Other measuring range on request:
	  -1 - +1 V / > 100 MΩ
	  -2 - +2 V / 900 kΩ
	  -5 - +5 V / 550 kΩ

Resolution	16 bits, 0.3125 mV/digit
Sampling rate	2 kHz / number of used channels
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

Measures

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

Conformity

EMV	Directive 2014/30/EU DIN EN 61326-1:2013-07
RoHS 2	Directive 2011/65/EU DIN EN 50581 VDE 0042-12:2013-02

[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

EU Declaration of Conformity

This declaration applies to the following product:

Product name: PCAN-MicroMod Analog 2

Item number(s):   IPEH-002207

Manufacturer: PEAK-System Technik GmbH
                   Otto-Roehm-Strasse 69
                   64293 Darmstadt
                   Germany

CE We declare under our sole responsibility that the mentioned product is in conformity with the following directives and the affiliated harmonized standards:

EU Directive 2011/65/EU (RoHS 2)

DIN EN 50581 VDE 0042-12:2013-02
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances;
German version EN 50581:2012

EU Directive 2014/30/EU (Electromagnetic Compatibility)

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

Darmstadt, 22 February 2019

Uwe Wilhelm, Managing Director
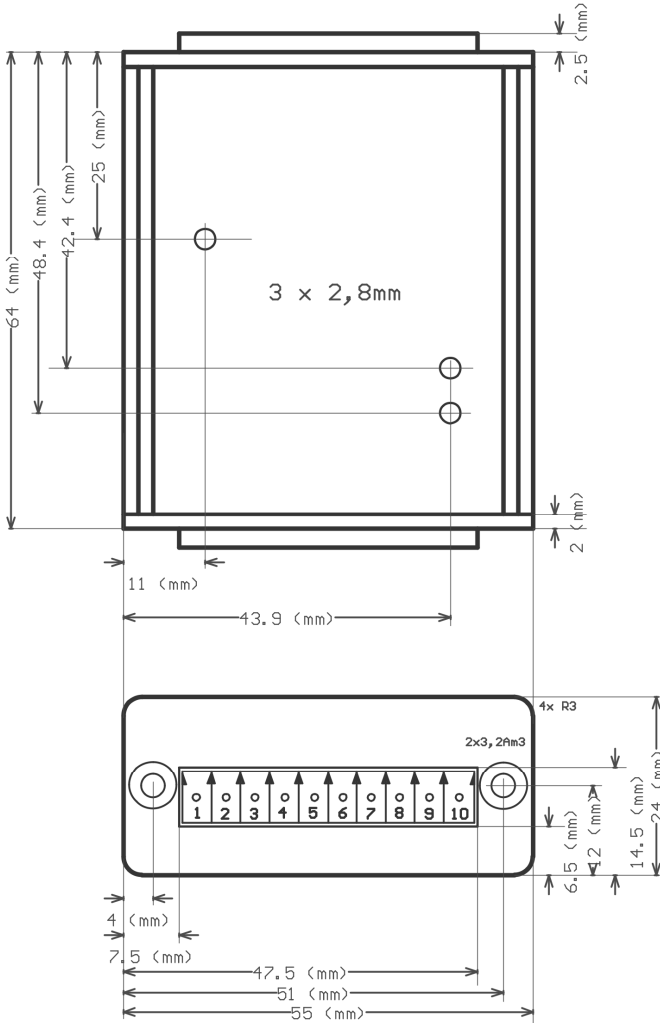
Appendix B Dimension Drawing

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