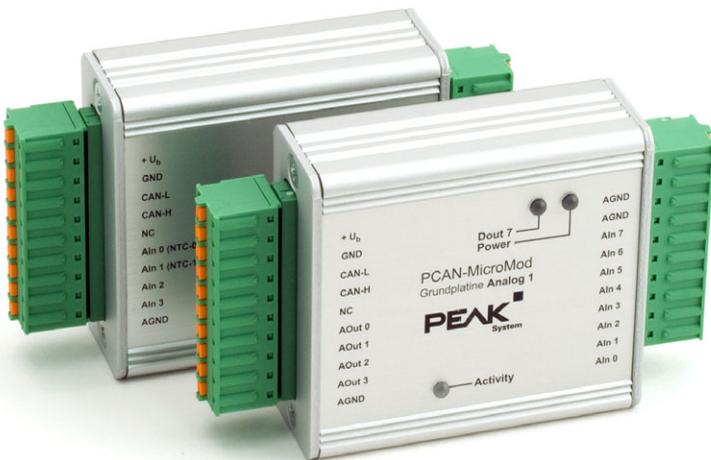


# Analog 1

Motherboard for the PCAN-MicroMod

## User Manual



## Products taken into account

Product Name	Model	Item Number
PCAN-MicroMod Motherboard Analog 1	Including casing and PCAN-MicroMod	IPEH-002204

The picture on the front page shows the PCAN-MicroMod Motherboard Analog 1 in the foreground. All other Motherboards have the same design, but differ in port assignment and labeling.

Product names mentioned in this manual may be the trademarks or registered trademarks of their respective companies. They are not explicitly marked by “™” and “®”.

© 2008 PEAK-System Technik GmbH

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

Phone: +49 (0)6151-8173-20  
Fax: +49 (0)6151-8173-29

[www.peak-system.com](http://www.peak-system.com)  
[info@peak-system.com](mailto:info@peak-system.com)

Issued 2008-09-23

# Contents

<b>1</b>	<b>Introduction</b>	<b>4</b>
1.1	Properties at a Glance	4
1.2	Special Prerequisites for the Operation	5
1.3	Scope of Supply	5
<b>2</b>	<b>Configuring the Module</b>	<b>6</b>
2.1	Modification on Nominal Supply Voltages > 12 V	7
2.2	Measuring Range Extension of the Inputs	8
<b>3</b>	<b>Operation</b>	<b>9</b>
3.1	Pin Assignment	9
3.2	Assignment Functions/MicroMod Services	10
3.3	Status LEDs	11
<b>4</b>	<b>Technical Specifications</b>	<b>12</b>
	<b>Appendix A Certificates</b>	<b>14</b>
A.1	CE	14
	<b>Appendix B Dimension Drawing</b>	<b>15</b>

# 1 Introduction

The Motherboards from PEAK-System Technik provide an accommodated environment for the PCAN-MicroMod. This includes input and output circuits, an aluminum casing, and connectors. This way you can use the MicroMod e.g. at instrument manufacture, plant construction, or in the automotive industry.

The motherboard Analog 1 serves common analog requirements.



**Note:** This manual only refers to the motherboard itself as base for a PCAN-MicroMod. There is separate documentation regarding the hardware and the software of the PCAN-MicroMod.

## 1.1 Properties at a Glance

- └ 8 analog inputs with following properties:
  - Pull-down circuit
  - Measuring range unipolar, 0 to 5 V
  - Measuring range extension possible
  - Protection against undervoltage and overvoltage
  - Parallel connection of a digital input for each analog input (alternative use, e.g. for a push button)
- └ 4 analog outputs with following properties:
  - Voltage range 0 to 10 V based on PWM
  - Output current 15 mA per channel
  - Short circuit protection

- └ Status LEDs for power supply and digital output
- └ Spring-cage connectors (optionally with screw connection)

## 1.2 Special Prerequisites for the Operation

– None –

## 1.3 Scope of Supply

The scope of supply normally consists of the following parts:

- └ Module with following components: Motherboard Analog 1, PCAN-MicroMod, metal casing
- └ Terminal block connectors for the motherboard
- └ User manual

## 2 Configuring the Module

You can customize the motherboard Analog 1 by modifying the hardware. The following subsections contain descriptions about possible modifications.

### Accessing the Motherboard

In order to carry out the modifications described in the following you must unscrew the lids of the casing, remove the motherboard from the casing, and remove the MicroMod, if needed.

### 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, see Figure 1). These marks must align. Another help may be the orientation of the labeling. With a mounted MicroMod the labels have the same orientation on both PCBs (not upside down).

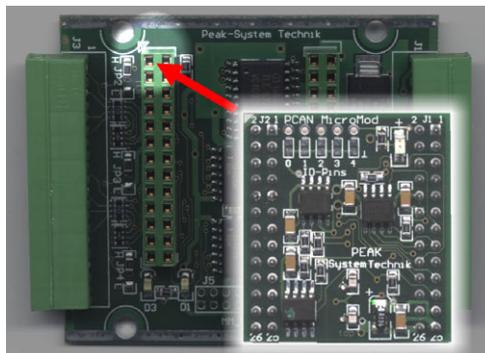


Figure 1: Positioning of the MicroMod

## 2.1 Modification on Nominal Supply Voltages > 12 V

If you want to supply the motherboard Analog 1 with a nominal voltage  $+U_b > 12\text{ V}$  (usually 24 V), then you must do the following modification:

1. Equip the unpopulated position D6 (see Figure 2) with a reference diode BZV55C12.
2. Replace the 0-Ohm resistor on position R35 (see Figure 2) with a resistor of 1.6 k $\Omega$ .

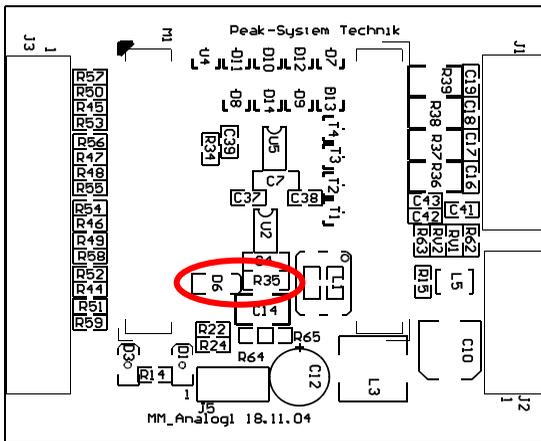


Figure 2: Position D6, R35



**Note:** You don't need to consider voltage fluctuations that might occur. A modification isn't required in that case. Example: In the automotive field up to 18 V may arise at a nominal voltage of 12 V.

## 2.2 Measuring Range Extension of the Inputs

You can extend the measuring range of each analog input to a higher maximum voltage than 5 Volts by using a voltage divider. On shipment of the motherboard the resistor positions R52 through R59 (see Figure 3) are not equipped. By inserting a resistor  $R_x$  with a value calculated with the following formula the measuring range is extended to the desired maximum voltage  $U_{MB}$ .

$$R_x = \frac{2.4\text{k}\Omega}{\frac{U_{MB}}{5\text{V}} - 1} \quad (U_{MB} > 5\text{V})$$

Analog input	Insert $R_x$ on position
Aln 0	R57
Aln 1	R53
Aln 2	R56
Aln 3	R55
Aln 4	R54
Aln 5	R58
Aln 6	R52
Aln 7	R59

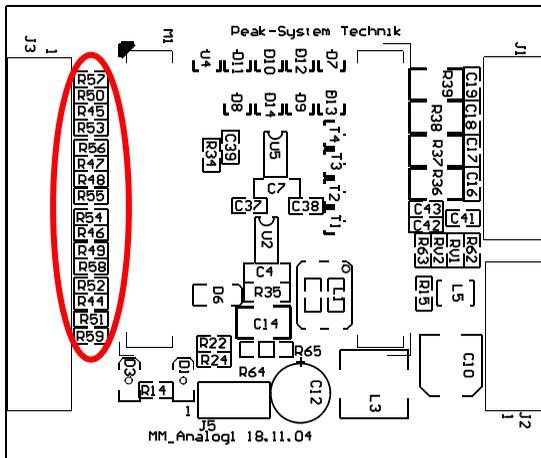


Figure 3: Position of the resistors for the measuring range extension

# 3 operation

## 3.1 Pin Assignment

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

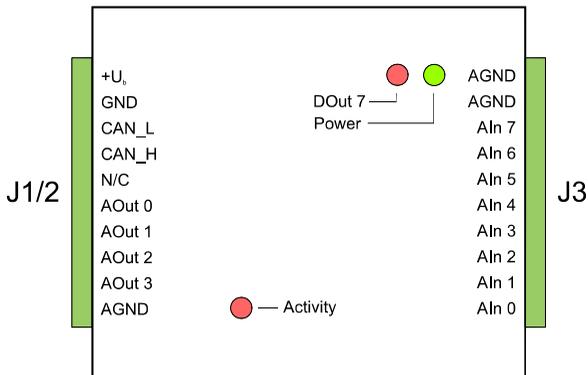


Figure 4: Pin assignment of the motherboard Analog 1

Function label J1/2	Function
+U <sub>b</sub>	Operating voltage 11 - 30 V DC, without AOut 8 - 30 V DC (see also section 2.1 on page 7)
GND	Digital ground
CAN_L	Differential CAN signal
CAN_H	
N/C	Not connected
AOut 0	Analog output 0 - 10 V
AOut 1	
AOut 2	
AOut 3	
AGND	Analog ground

Function label J3	Function
AGND	Analog ground
AGND	
AIn 7	Analog input, digital input parallel (e.g. for a button)
AIn 6	
AIn 5	
AIn 4	
AIn 3	
AIn 2	
AIn 1	
AIn 0	

## 3.2 Assignment Functions/MicroMod Services

The motherboard's inputs and outputs are controlled by the services of the MicroMod. They are set up with PCAN-MicroMod Configuration, a Windows application coming with the PCAN-MicroMod. The following table shows the assignment of the motherboard functions to possible MicroMod services and indicates special settings (column "Remark").

Function on motherboard	Function label	MicroMod channels	MicroMod service(s)	Remark
Analog input, digital input	AIn 0 ... AIn 7	AI 0 ... AI 7	 Analog Input  Curve  Analog Hysteresis	
		DI 0 ... DI 7	 Digital Function  Rotary Encoder	Parallel to channels AI 0 ... AI 7
Analog output	AOut 0 ... AOut 3	FO 0 ... FO 3	 PWM and Frequency Output	PWM with 4000 Hz

### 3.3 Status LEDs

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

LED	Indication
Power (green)	Power is applied.
DOut 7 (red)	Is directly related to the digital output DO 7 of the MicroMod and can be configured freely in its function for status indication. For example, you could implement an error indication with help of the MicroMod service "Constant Value / Statistic Data".
Activity (red)	Status of the MicroMod. During normal operation it blinks at a frequency of 1 Hz.

You can find further information about the MicroMod (configuration, status LED) in the corresponding documentation, e.g. the help for PCAN-MicroMod Configuration (Windows software).

## 4 Technical specifications

### Power supply

Operating voltage +U <sub>b</sub>	11 - 30 V DC ( $\pm 5\%$ ), w/o AOut: 8 - 30 V DC
Current consumption	Max. 200 mA, typ. 35 mA at 12 V w/o load
Reverse polarity protection	Yes, $\pm 30$ V
Overvoltage protection	$\pm 30$ V static, $\pm 500$ V surge
Ripple (5 V)	< 50 mV (+U <sub>b</sub> = 12 V, 200 mA load)
Ripple (analog)	< 20 mV

### Analog inputs

Measuring range	0 to 5 V, extendable
Resolution	10 bits
Source impedance	< 5 k $\Omega$
Overvoltage protection	$\pm 30$ V
Low-pass	$f_g = 300$ Hz
Special feature	Digital inputs of PCAN-MicroMod parallel (digital assessment w/o threshold switch possible)

### Analog outputs

Type	PWM based
Voltage range	0 to 10 V
Resolution	Full percentage steps (0 to 100 %)
Output current	15 mA, voltage deviation -3 % at 20 mA
Short circuit protection	Yes

### CAN

Type	High-speed, typ. 500 kBit/s, setup with PCAN-MicroMod Configuration (Windows software)
------	--

## Noise immunity

Tests	According to IEC 61000 and DIN EN 61 326
Peculiarity surge	$\pm 500$ V (specification industrial sector: $\pm 1$ kV) <sup>1</sup>
Peculiarity line-conducted HF compatibility	$10 V_{\text{eff}}$ (specification: $3 V_{\text{eff}}$ )

## Measures

Casing size (incl. connectors)	55 x 68 x 24 mm (3 1/16 x 1 5/8 x 13/16 Inches) (See also dimension drawing, Appendix B on page 15)
Weight	108 g (3.81 oz.)

## 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

<sup>1</sup> This specification could only be fulfilled with  $\pm 500$  V due to the available space. Therefore the motherboard should be used with a local power supply.

# Appendix A Certificates

## A.1 CE

PCAN-MicroMod Motherboard IPEH-002204 PEAK-System Technik GmbH	EC declaration of conformity	
<b>Notes on the CE Symbol</b>		
<b>EC Directive</b>	The following applies to the PCAN-MicroMod Motherboard product IPEH-002204.  This product fulfills the requirements of EC directive 89/336/EEC on "Electromagnetic Compatibility," and is designed for the following fields of application as per the CE marking:  <b>Electromagnetic immunity/emmission<sup>1</sup></b> DIN EN 61326, Release: 2004-05 Electrical equipment for measurement, control and laboratory use – EMC requirements (IEC 61326-1:1997 + IEC 61326-1/A1:1998 + IEC 61326/A2:2000 + Annex E & F of IEC 61326:2002 + corrigendum: 2002);  German version: 61326:1997 + EN1326/A1:1998 + EN61326/A2:2001 + EN61326/A3:2003	
<b>Declarations of Conformity</b>	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:  <b>PEAK-System Technik GmbH</b> Mr. Wilhelm Otto-Röhm-Str. 69 D-64293 Darmstadt Germany  phone: +49 6151 81 73-20 fax.: +49 6151 81 73-29 info@peak-system.com	
 Signed this 12 <sup>th</sup> day of September 2004		

## Appendix B Dimension Drawing

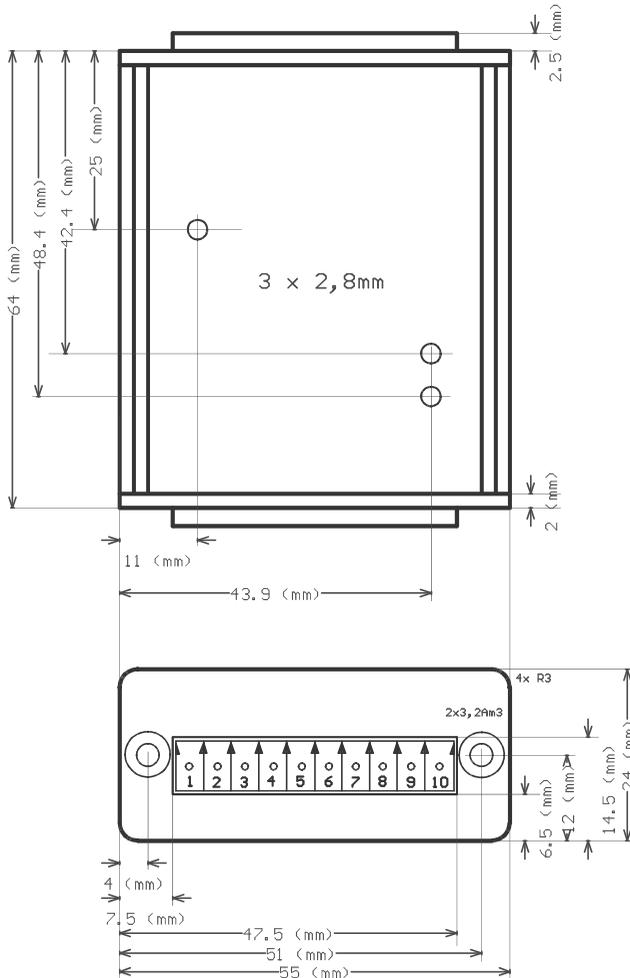


Figure 5: Top view and view of front side with connector

The figure doesn't show the actual size of the product.