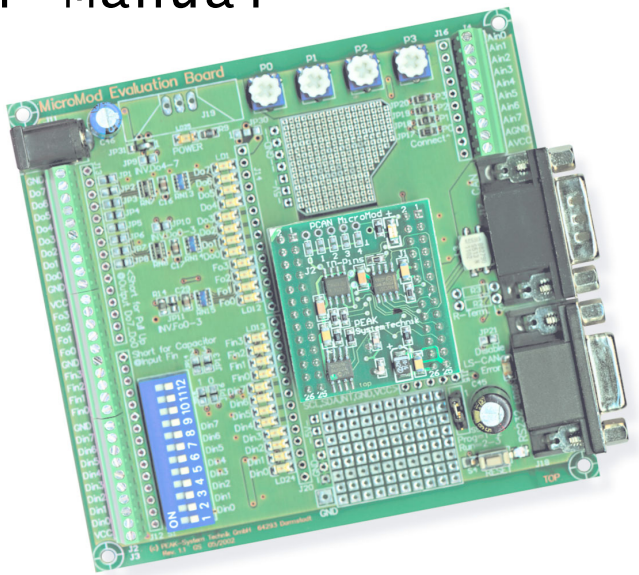
PCAN-MicroMod Evaluation Kit

Test and Development Environment for the PCAN-MicroMod

User Manual



PEAK System

Products taken into account

Product Name	Item Number	Model
PCAN-MicroMod Evaluation Kit (incl. PCAN-Dongle)	IPEH-002081	Evaluation Board Rev. 1.2
PCAN-MicroMod Evaluation Kit (incl. PCAN-USB)	IPEH-002079	Evaluation Board Rev. 1.2

The cover picture shows the MicroMod Evaluation Board with plugged on PCAN-MicroMod. This is only a part of the scope of supply (see section 1.3).

Last Updates

October 27, 2005

- Fully revised edition

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- Minor text changes

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Contents

1 Introduction

The PCAN-MicroMod Evaluation Kit makes it easy connecting hardware to the MicroMod and configuring it with your computer. The various I/O units on the Evaluation Board facilitate the development and the evaluation of the module's configuration functionality.

Note: This manual only refers to the Evaluation Kit itself. Separate hardware and software documentation is available for the PCAN-MicroMod and the supplied PC/CAN adapter (PCAN-Dongle or PCAN-USB).

1.1 Properties at a Glance

- Terminal strips and test pins for inputs and outputs
- Open collector drivers for the digital and the CMOS PWM outputs
- Protected digital outputs
- Low-pass for digital inputs
- LEDs for digital inputs and outputs
- Switches for status modification of the digital inputs
- Potentiometers for analog inputs
- Resistive dividers for voltages > 5 V
- Serial port for flash updates
- Optional insertion of a Low-speed CAN transceiver as alternative to the High-speed CAN transceiver on the MicroMod

1.2 Special Prerequisites for the Operation

For operating the Evaluation Board no special prerequisites are necessary. Please also observe the according notes in the other user manuals (PCAN-MicroMod, PCAN-Dongle / PCAN-USB).

1.3 Scope of Supply

The scope of supply normally consists of the following parts:

- MicroMod Evaluation Board
- PCAN-MicroMod
- Wall power supply
- CAN cable (2 m/7 ft.) incl. termination for HS-CAN on both sides (IPEH-003001)
- PCAN-Dongle (kit IPEH-002019) or PCAN-USB (kit IPEH-002021)

2 Startup of the Evaluation Kit

This chapter gives a quick overview of the needed steps for the straightforward startup of the Evaluation Kit. Please pay heed to the documentation for the single components, too.

Do the following for the startup:

1. Connect the PCAN-Dongle or the PCAN-USB adapter to the switched off PC.
2. If not already done, plug the MicroMod onto the Evaluation Board (see section 3.1).
3. Connect the PCAN-Adapter at the PC and the Evaluation Board using the CAN cable.
4. Connect the wall power supply and the Evaluation Board.
5. Switch on the PC and install the needed driver software under Windows (EXE file on diskette or CD-ROM with the name of the used PCAN adapter).
6. Setup the MicroMod Configuration Tool under Windows (file `Setup.exe` on diskette or CD-ROM).
7. Start the MicroMod Configuration Tool, create a configuration and finally send this configuration to the MicroMod (see help for the program).
8. You can now work with signals at the I/O ports as defined in the configuration. Please consider the explanations in the following chapter.

3 Components of the Evaluation Board

This chapter describes the primary function units and connectors of the Evaluation Board. For details you can also refer to the circuit diagram in Appendix B.

3.1 MicroMod (Mounting)

When you mount the MicroMod, take notice of the white triangular marks on each the Evaluation Board and the MicroMod (upper left corner). These marks must align. Another help may be the orientation of the labels. With mounted MicroMod the labels have the same orientation on both PCBs (not upside down).

3.2 Digital Inputs

The Evaluation Board has 8 digital inputs with TTL levels. The corresponding connector is J3 (screw terminal on the lower left). Each input has a pull-up resistor (10 kΩ) and is low-active, so the inputs are switched against GND. Each input status is indicated by an LED. For test purposes the input signal can be switched with the dip switch S1. The corresponding switches are labeled "Din0" to "Din7". The inputs have a low-pass filter with 100 kΩ/100 nF.

Signals leading directly to the **MicroMod** can be picked off at the measuring points on strip J20, positions 6 to 13 (position 1 is the upper one).

3.3 Digital Outputs

The Evaluation Board has 8 digital outputs. The corresponding connector is J1 (screw terminal on the upper left). The outputs are low-active and can drive up to 350 mA. The LEDs LD1 to LD8 indicate each status of the outputs. A lighting LED means that the output is active and is switched against mass.

With solder bridges on positions JP1 to JP8 a pull-up resistor (3.3 kΩ) can be engaged for each output (default: open). With this modification you gain **TTL** compatible output signals.

With a solder bridge on position JP10 the outputs 0 to 3 and on position JP9 the outputs 4 to 7 can be **inverted** by hardware (default: open).

3.4 Frequency Inputs

The Evaluation Board has 4 frequency inputs. The corresponding connector is J2 (Fin0 to Fin3, screw terminal on the mid left). The MicroMod can meter frequencies from 1 Hz to 10 kHz.

With solder bridges on positions JP13 to JP16 **low-pass filters** consisting of 100 kΩ/100 nF can be engaged for each input path.

Frequency Input	Solder bridge for low-pass on position
Fin0	JP16
Fin1	JP15
Fin2	JP14
Fin3	JP13

3.5 Frequency Outputs

The MicroMod can generate frequency signals and PWM signals. The corresponding connector on the Evaluation Board is J2 (Fo1 to Fo3, screw terminal on the mid left). The output signal is protected against short circuit with a series resistance of 82 Ω.

With a solder bridge on position JP11 the output signal can be **inverted** by hardware (default: open).

3.6 Analog Inputs

The Evaluation Board has 8 analog inputs. The corresponding connector is J4 (screw terminal on the upper right). The analog reference voltage is 5 V. The input impedance is 6.5 kΩ (3.2 kΩ analog input microcontroller, 3.3 kΩ series impedance in front of the microcontroller input).

The Evaluation Board has 4 **potentiometers** (P0 to P3) which can be used for simulating input signals. With solder bridges on positions JP17 to JP20 the potentiometers are connected to Ain0 to Ain3 (default: closed).

For **external sensors** the screw terminal has the positions AGND and AVCC.

3.7 Prototyping Areas

The Evaluation Board has prototyping areas with 50-mil and 100-mil grids. Small circuits can be added here to the inputs and outputs.

3.8 CAN

The pin assignment of the CAN connector corresponds to the CiA recommendation DS 102-1.

With solder bridges on the positions JP22 and JP25 on the bottom side of the Evaluation Board the ground can be connected to the **connector shield**.

On the Evaluation Board the High-speed CAN bus can be **terminated** with 2 x 60 Ω by closing the solder bridges on positions JP23 and JP24 (both solder bridges must be closed, default: open).

With solder bridges on position JP32 (default: open) a **5-Volt supply** can be routed either to pin 1, pin 9, or to both pins of the CAN connector. This way devices with a low power consumption (external transceivers or optocouplers for example) can be directly supplied via the CAN connector.

5-Volt supply →	**None**	**Pin 1**	**Pin 9**	**Pin 1 + Pin 9**
Solder bridge(s) on JP32	none	2-3	1-2	1-2-3

A **Low-speed CAN** transceiver TJA 1054 can be alternatively equipped on the Evaluation Board. Additionally following actions are necessary for according operation:

- The solder bridges on positions JP28 and JP29 must be set over from HS (High-speed) to LS (Low-speed).
- The 0-Ohm resistor on the MicroMod (above the CAN transceiver, on the lower right side of the label “4”) must be unsoldered.
- The Low-speed CAN bus is terminated with 5.6 kΩ. For lower termination resistance additional resistors can be equipped on positions R2 and R3.

The error condition of the Low-speed CAN transceiver is indicated by the LED LD26.

The equipped Low-speed CAN transceiver may be **deactivated** later on by setting a solder bridge on position JP21.

3.9 RS-232

The Evaluation Board has a serial port corresponding to the RS-232 standard with the signals TxD, RxD and GND. This port is used for uploading a firmware to the MicroMod. The connection to the PC is done with a serial extension cable (1:1). You can find information about a firmware upload in the user manual for the PCAN-MicroMod.

3.10 Power Supply

The Evaluation Board gets a DC voltage of 9 V from the included wall supply via connector J11 (upper left). The voltage regulator on the board provides the necessary supply for the MicroMod (JP31 shortened on position 1-2, default).

The **LED** LD25 indicates that the Evaluation Board is supplied.

At higher input voltages and higher environment temperatures at the same time (e.g. 12 V, above room temperature) an **alternative voltage regulator** 7805 with heat sink can be installed on position J19. Optionally the use of an **integrated switch regulator** (e.g. PT5101, PT78HT205, PT78ST105, each by Texas Instruments) is possible. For example, this is reasonable in an environment with raised input voltage (e.g. 24 V). In all cases each JP30 and JP31 must be shortened in position 2-3 (positions 1-2 stay open).

4 Frequently Asked Questions (FAQ)

Question	Answer
The **circuit diagram** for the PCAN-MicroMod is missing in the appendix.	Sorry, but this isn't published by us. You can find information about the assignment and functions of the connection pins in the user manual for the PCAN-MicroMod.
The MicroMod **doesn't start**.	Apart from the necessary power supply the MicroMod must be set up for normal operation mode (Run mode). This is done with the jumper S5 on the Evaluation Board (position „Run=1-2“).

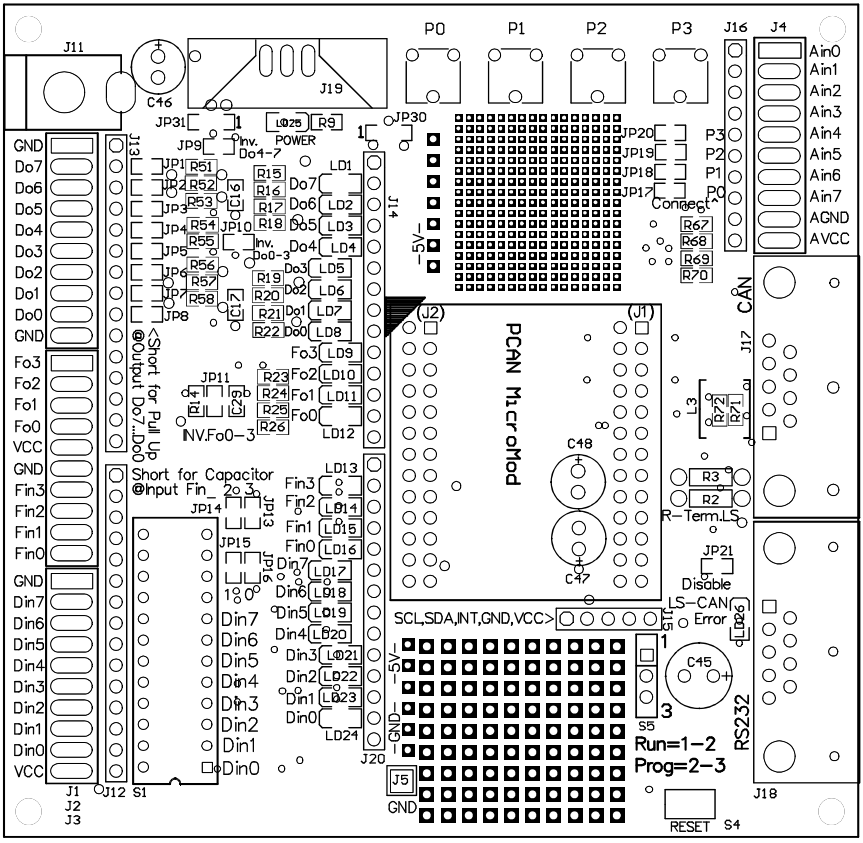
5 Technical Specifications

MicroMod Evaluation Board	
Supply voltage	6.4 – 12 V DC (with existing voltage regulator), for higher input voltages the use of an alternative voltage regulator or an integrated switch regulator is possible
Size of circuit board	100 x 102 mm (3 15/16 x 4 inches)
Digital inputs	8, TTL, low-active, input low-pass with 100 kΩ/100 nF
Digital outputs	8, TTL, low-active, max. 350 mA
Frequency inputs	4, TTL
Frequency outputs	4
Analog inputs	8, 0 – 5 V, input impedance 6.5 kΩ (combined impedance of Evaluation Board and MicroMod)
CAN	HS-CAN termination (120 Ω) can be engaged, LS-CAN transceiver can be equipped alternatively

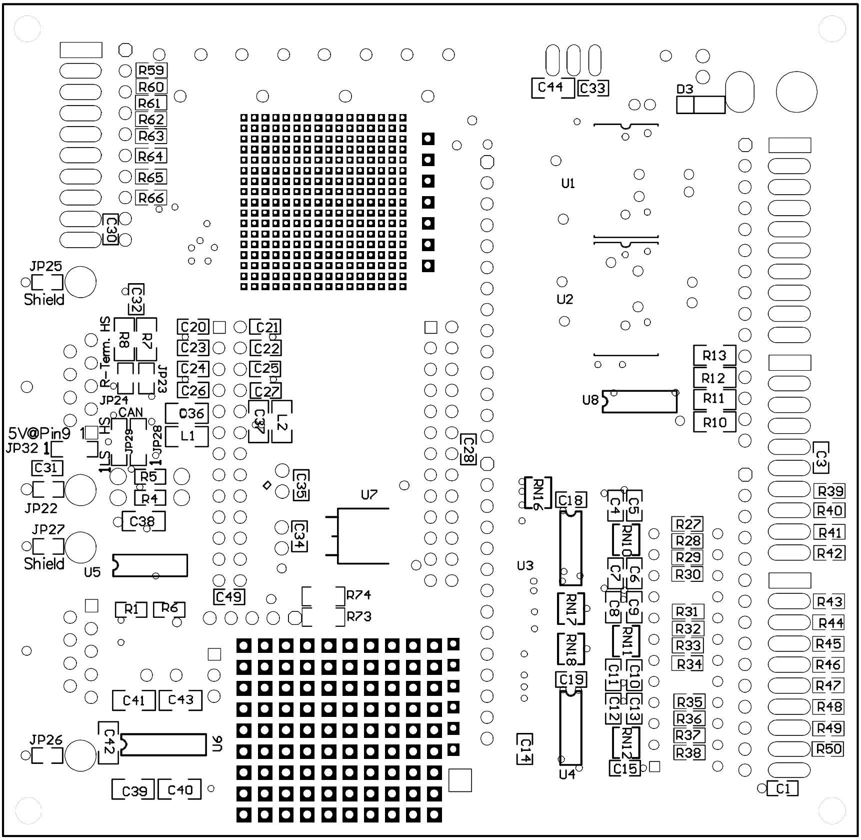
Design and specifications are subject to change without notice.

Appendix A Layout of the Evaluation Board

Top Side



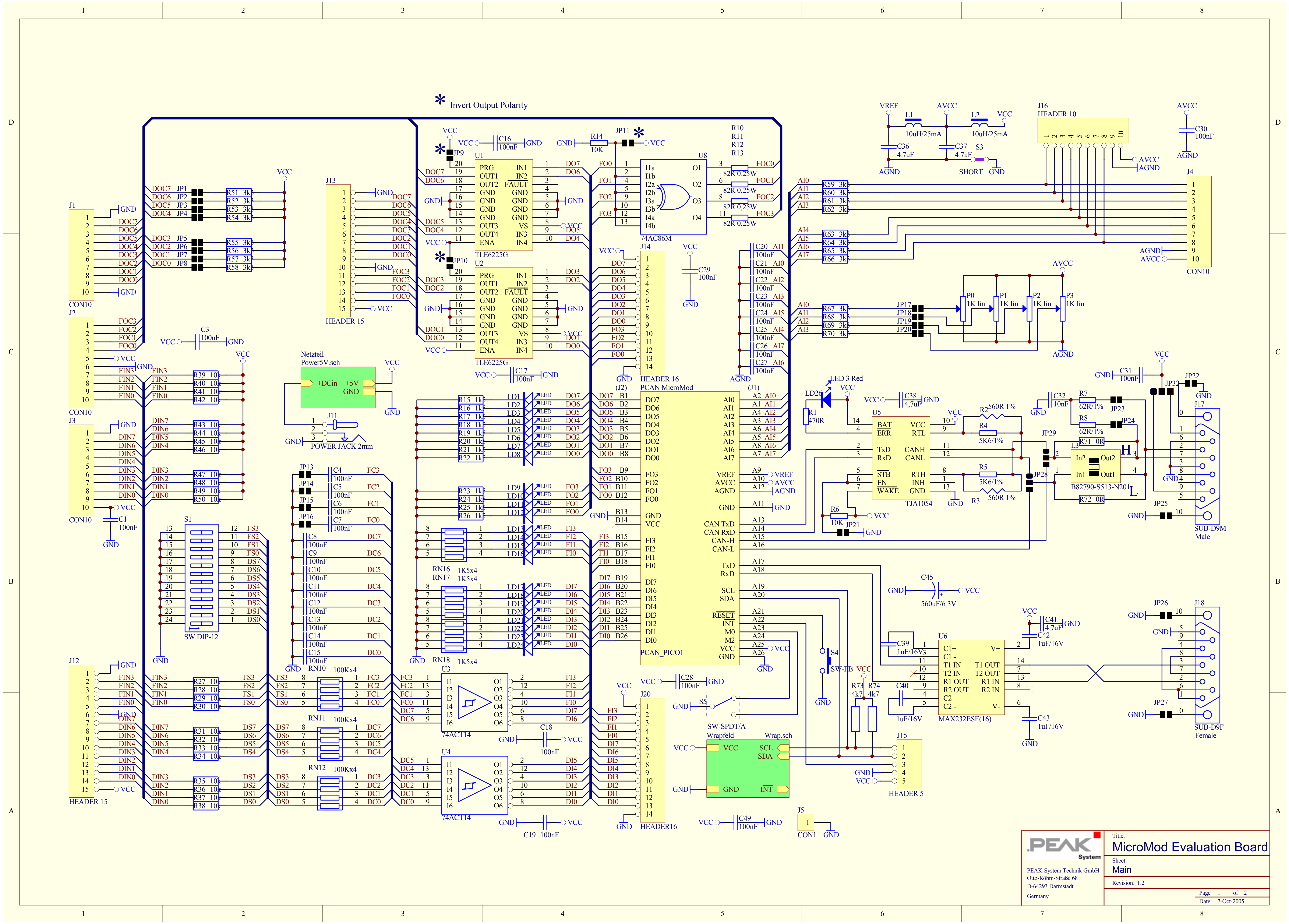
Bottom Side


R59
R60
R61
R62
R63
R64
R65
R66
C30
C44
C33
D3
U1
U2
U8
JP25
Shield
C32
SH
R8
R7
R-Term.
JP23
JP24
CAN
5V@Pin9
JP32
JP29
JP28
C20
C23
C24
C26
C36
L1
C21
C22
C25
C27
C37
L2
C28
C31
JP22
R5
R4
C35
U7
C38
JP27
Shield
C34
U5
C49
R74
R73
R1
R6
C41
C43
JP26
C42
U6
C39
C40
RN16
C18
U3
C4
C5
RN10
C7
C6
C8
C9
RN17
RN11
RN18
C19
C11
C10
C12
C13
RN12
C14
U4
C15
R13
R12
R11
R10
R27
R28
R29
R30
R31
R32
R33
R34
R35
R36
R37
R38
C3
R39
R40
R41
R42
R43
R44
R45
R46
R47
R48
R49
R50
C1

Appendix B Circuit Diagram of the Evaluation Board

See following pages:

- MicroMod Evaluation Board – Main, Page 1/2 (DIN A3)
- MicroMod Evaluation Board – Power, Page 2/2 (DIN A4)



Invert Output Polarity
J1 CON10
J2 CON10
J3 CON10
J12 HEADER 15
J13 HEADER 15
J14 HEADER 16
J20 HEADER16
J15 HEADER 5
J16 HEADER 10
J4 CON10
J5 CON1
J17 SUB-D9M Male
J18 SUB-D9F Female
U1 TLE6225G
U2 TLE6225G
U8 74AC86M
U3 74ACT14
U4 74ACT14
U5 TJA1054
U6 MAX232ESE(16)
L3 B82790-S513-N201
PCAN MicroMod
PCAN_PICO1
Netzteil Power5V.sch
POWER JACK 2mm
SW DIP-12
SW-SPDT/A
Wrapfeld Wrap.sch
LED 3 Red
SHORT
S4 SW-PB
C45 560uF/6,3V
L1 10uH/25mA
L2 10uH/25mA
P0 1K lin
P1 1K lin
P2 1K lin
P3 1K lin
RN16 1K5x4
RN17 1K5x4
RN18 1K5x4
RN10 100Kx4
RN11 100Kx4
RN12 100Kx4
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Title: MicroMod Evaluation Board
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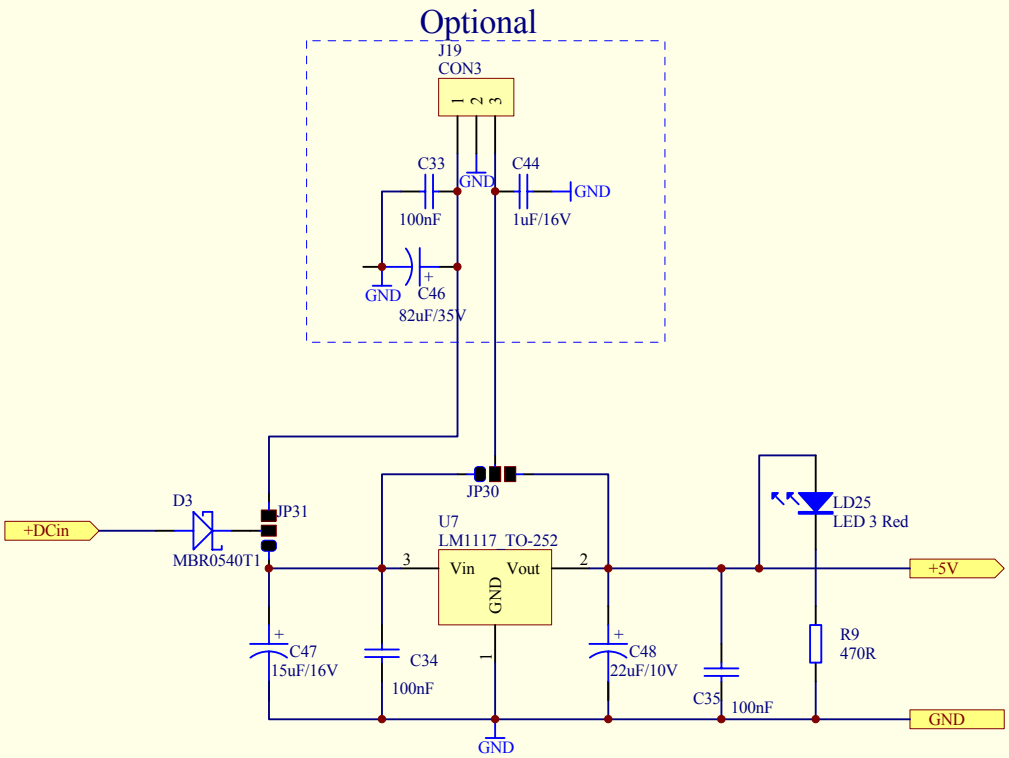
Date: 7-Oct-2005



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Title: MicoMod Evaluation Board

Sheet: Power

Revision: 1.2

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