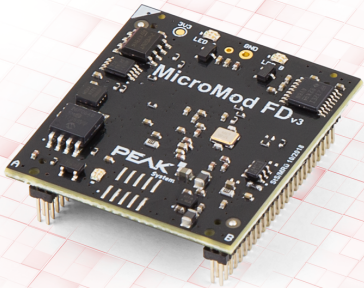
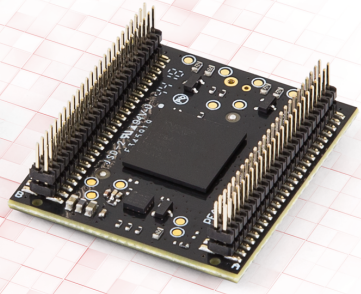
# PCAN-MicroMod FD

## User Manual



# Relevant Products

| Product designation | Model | Part no. |
|---|---|---|
| PCAN-MicroMod FD | | IPEH-003080 |
| PCAN-MicroMod FD Configuration | Configuration software for Windows | |

# Imprint



PEAK-System Technik GmbH
Leydheckerstraße 10
64293 Darmstadt
Germany

Phone: +49 6151 8173-20
Fax: +49 6151 8173-29

www.peak-system.com
info.peak@hms-networks.com

Document version 1.2.1 (2026-05-05)

# Contents

# 1 Introduction

The PCAN-MicroMod FD is a small plug-in board with CAN and CAN FD connection on the one side and various physical inputs and outputs on the other side. The logical linking of both sides is done by the microcontroller NXP LPC54618. With the MicroMod FD, electronics developers can easily integrate I/O functionality with CAN connection into their project.

The PCAN-MicroMod FD is configured using the supplied Windows software. In addition to simple I/O mapping to CAN IDs, function blocks are also available for processing the data. The configuration created on the computer is transferred via the CAN bus to the MicroMod FD which then runs as an independent CAN node. Multiple modules can be configured independently on a CAN bus.

For the PCAN-MicroMod FD, ready-to-use motherboards in an aluminum housing and an Evaluation Board for the development of own applications are available.

This document describes the hardware and the functions of the plug-in board PCAN-MicroMod FD. Separate documents exist for the motherboards from PEAK-System (e.g. Analog 1) and for the Evaluation Board.

## 1.1 Features Overview

- Plug-in board with 2 double pin strips of 50 pins each, 50 mil pitch (1.27 mm)
- NXP LPC54618 microcontroller with Arm® Cortex® M4 core

- High-speed CAN connection (ISO 11898-2)
  - Complies with CAN specifications 2.0 A/B and FD
  - CAN FD bit rates for the data field (max. 64 bytes) from 20 kbit/s up to 10 Mbit/s
  - CAN bit rates from 20 kbit/s up to 1 Mbit/s
  - Microchip CAN transceiver MCP2558FD
- 8 analog inputs
  - Measuring range unipolar 0 to 3 V
  - Resolution 12 bits, sample rate 1 kHz
- 8 digital inputs
  - 6 with frequency and duty cycle measurement capabilities
- 8 digital outputs
- 2 frequency outputs
- Selective configuration of up to 16 devices in a CAN network based on the module ID
- Supply voltage 3.3 V
- Dimensions 33 x 36 mm
- Extended operating temperature range from −40 to 85 °C (−40 to 185 °F)

## 1.2 Operation Requirements

- Board with socket strips or hole grid for mounting the PCAN-MicroMod FD (Evaluation Board, motherboard from PEAK-System or self-development), see also Appendix C *Dimension Drawings* on page 33.

  Possible socket strip (2 pieces) as counterpart to the PCAN-MicroMod FD: Amtek 5PS3MSA44-225GONPNRU-00

- For the creation and transfer of a configuration:
  Computer with Windows 11 (x64/ARM64), 10 (x64) and a PC-CAN interface from PEAK-System
  (Recommendation: PC-CAN interface with CAN FD capability, e.g. PCAN-USB FD)

## 1.3 Scope of Supply

- PCAN-MicroMod FD plug-in board
- Optional: Pin adapter for 100 mil pitch

**Download**

- Manual in PDF format
- Configuration software for Windows

# 2 Electrical Connection

This chapter covers the signal assignment of the pins on the PCAN-MicroMod FD and its possible circuitry.

## 2.1 Connectors

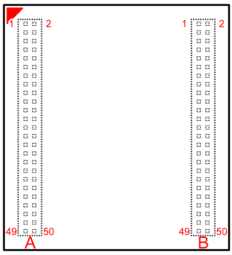
The PCAN-MicroMod FD has two double pin rows (A, B) with 50 pins each (first column in the following tables). Thus, the MicroMod FD can be plugged onto boards with matching socket strips (50-mil/1.27-mm grid, see also Appendix C *Dimension Drawings* on page 33).

Possible socket strip (2 pieces) as counterpart to the PCAN-MicroMod FD: Amtek 5PS3MSA44-225GONPNRU-00

On request, PEAK-System offers an adapter for circuit boards with 100-mil/2.54-mm grid). See also Appendix D *CPU Adapter for 2.54 mm Pitch* on page 34.

The MicroMod FD has a white mark on the upper left corner (pin A1) for better orientation when plugged in.

**Attention!** Electrostatic discharge (ESD) can damage or destroy components on the circuit board. Take precautions to avoid ESD when handling the circuit board.



Pin layout of the two double pin headers, direction of view from above through the circuit board (orientation when plugged in).

| Pin MMFD | Designation | Function |
|---|---|---|
| A1 | GND | Ground |
| A3 | LED-A_red | Open-drain outputs for external status LEDs |
| A5 | LED-A_green | |
| A7 | LED-B_red | |
| A9 | LED-B_green | |
| A11 | FC1_I2C-SDA | $I^2C$ 1: identification of the motherboard type via external EEPROM |
| A13 | FC1_I2C-SCL | |
| A15 | | Reserved |
| A17 | | Reserved |
| A19 | Ext-CAN-Sel# | Alternative, external CAN transceiver is used if put on ground |
| A21 | | Reserved |
| A23 | | Reserved |
| A25 | | Reserved |
| A27 | Dout-0 | Digital outputs 0 to 7 for switching external output drivers, 3.3 V level<br>Static state: 0, 1<br>PWM at 1 to 10,000 Hz (common frequency for all outputs) |
| A29 | Dout-1 | |
| A31 | Dout-2 | |
| A33 | Dout-3 | |
| A35 | Dout-4 | |
| A37 | Dout-5 | |
| A39 | Dout-6 | |
| A41 | Dout-7 | |
| A43 | CAN-H | High-speed CAN ISO 11898-2: differential signal High |
| A45 | CAN-L | High-speed CAN ISO 11898-2: differential signal Low |
| A47 | Reset-in# | Module reset, Low-active, internal pull-up 10 kΩ to 3.3 V |
| A49 | GND | Ground |

| Pin MMFD | Designation | Function |
|---|---|---|
| A2 | GND | Ground |
| A4 | | Reserved |
| A6 | | Reserved |
| A8 | | Reserved |
| A10 | | Reserved |
| A12 | | Reserved |
| A14 | | Reserved |
| A16 | | Reserved |
| A18 | | Reserved |
| A20 | | Reserved |
| A22 | | Reserved |
| A24 | | Reserved |
| A26 | | Reserved |
| A28 | | Reserved |
| A30 | | Reserved |
| A32 | Boot-CAN# | CAN bootloader is started if put on ground during start-up<br>(CAN pins: A43, A45) |
| A34 | | Reserved |
| A36 | | Reserved |
| A38 | | Reserved |
| A40 | | Reserved |
| A42 | Ext-CAN_M1 | Connection to alternative, external CAN transceiver (is enabled by pin A19) |
| A44 | Ext-CAN_M0 | |
| A46 | Ext-CAN_TxD | |
| A48 | Ext-CAN_RxD | |
| A50 | GND | Ground |

| Pin MMFD | Designation | Function |
|---|---|---|
| B1 | GND | Ground |
| B3 | FC0_V24_TxD | Serial RS-232 interface for firmware updates |
| B5 | FC0_V24_RxD | |
| B7 | FC0_V24_RTS | |
| B9 | FC0_V24_CTS | |
| B11 | | Reserved |
| B13 | | Reserved |
| B15 | ID_Bit-0# | Module ID (4 bits → values 0 to 15):<br>- Pin open (internal pull-up): 0<br>- Pin on ground: 1 |
| B17 | ID_Bit-1# | |
| B19 | ID_Bit-2# | |
| B21 | ID_Bit-3# | |
| B23 | Vbus | Connection to a USB host (PC) for firmware update |
| B25 | USB1_P | |
| B27 | USB1_N | |
| B29 | | Reserved |
| B31 | Din-0 | Digital inputs 0 to 7, level 3.3 V<br>Inputs 0 to 5: measurment of the frequency or the duty cycle possible |
| B33 | Din-1 | |
| B35 | Din-2 | |
| B37 | Din-3 | |
| B39 | Din-4 | |
| B41 | Din-5 | |
| B43 | Din-6 | |
| B45 | Din-7 | |
| B47 | 3V3in | Supply voltage input 3.3 V DC, 100 mA (connected to B48) |
| B49 | GND | Ground |

| Pin MMFD | Designation | Function |
|---|---|---|
| B2 | GND | Ground |

| Pin MMFD | Designation | Function |
|---|---|---|
| B4 | Boot-Serial# | Bootloader is started if put on ground during start-up<br>(RS-232 pins: B3, B5, B7, B9) |
| B6 | Boot-USB# | USB bootloader is started if put on ground during start-up<br>(USB pins: B23, B25, B27) |
| B8 | Fout-0 | Frequency outputs 0 and 1, level 3.3 V |
| B10 | Fout-1 | |
| B12 | | Reserved |
| B14 | | Reserved |
| B16 | | Reserved |
| B18 | | Reserved |
| B20 | | Reserved |
| B22 | | Reserved |
| B24 | | Reserved |
| B26 | | Reserved |
| B28 | Ain-0 | Analog inputs 0 to 7, resolution 12 bits |
| B30 | Ain-1 | |
| B32 | Ain-2 | |
| B34 | Ain-3 | |
| B36 | Ain-4 | |
| B38 | Ain-5 | |
| B40 | Ain-6 | |
| B42 | Ain-7 | |
| B44 | Vref-out | Reference voltage 3.0 V, can be connected to pin B46 as internal reference |
| B46 | Vref-in | Reference voltage input for 12-bit ADC, pin B44 recommended as source |
| B48 | 3V3in | Supply voltage input 3.3 V DC, 100mA (connected to B47) |
| B50 | GND | Ground |

## 2.2 Circuitry

For the basic operation of the PCAN-MicroMod FD, a **minimal circuitry** with the following components is required:

- Voltage supply 3.3 V DC
- CAN connection (CAN-High, CAN-Low)
- Pull-down for module ID inputs
- Feedback of the analog reference voltage
- Push button to ground for CAN flash mode (with pull-up resistor)
- Reset push button to ground

The minimum circuitry is shown in the circuit diagram in Appendix E *Minimum Circuitry* on page 41.

A **comprehensive circuit example** can be found in the circuit diagram for the separately available Evaluation Board. The circuit diagram is part of the corresponding user manual PCAN-MicroMod FD Evaluation Board.

**Tip:** When designing the circuitry for the PCAN-MicroMod FD, also observe the protection against overvoltage and reverse polarity at inputs.

# 3 Operation

## 3.1 CAN Operating Modes

PCAN-MicroMod FD products can be used in different operating modes with support for the communication protocols CAN (FD) or CANopen (FD), depending on firmware and model. Furthermore, the operation with custom firmware is possible as well.

### Support per Product

| Product | CAN<br>CAN FD | CANopen<br>CANopen FD | Custom firmware |
|---|---|---|---|
| PCAN-MicroMod FD Evaluation | ■ | ■ | ■ |
| PCAN-MicroMod FD Analog 1 | ■ | □ | ■ |
| PCAN-MicroMod FD Digital 1/2 | ■ | □ | ■ |
| PCAN-MicroMod FD ECU | ■ | — | — |
| PCAN-MicroMod FD DR CANopen Digital 1 | ■ | ■ | — |
| PCAN-MicroMod FD Custom Motherboard | ■ | — | — |

■ Operating mode active on delivery
■ Alternative operating mode, license included
□ Alternative operating mode, license purchase required
— Unsupported operating mode

### Usage

| Operating mode | Key features | Firmware | Configuration |
|---|---|---|---|
| CAN / CAN FD | ▪ CAN 2.0 A/B and CAN FD<br>▪ own definitions | Standard | with PCAN-MicroMod FD Configuration |
| CANopen / CANopen FD | ▪ Communication profiles CiA 301 and CiA 1301<br>▪ Device profiles CiA 401 and CiA 401-B/F | Standard | with third-party software for CANopen (FD) |
| Custom firmware | ▪ Creation possible with our free development package | own | according to the firmware definition |

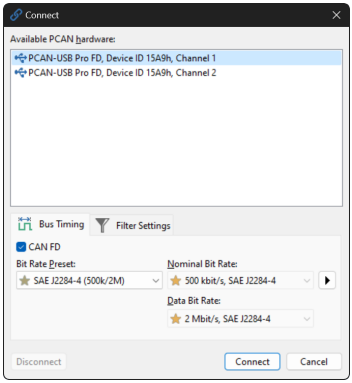
### 3.1.1 Determining the Current Operating Mode

(not applicable for custom firmware)

You can determine the current operating mode of a device of the PCAN-MicroMod FD series with the Windows program PCAN-MicroMod FD Configuration. For the prerequisites for using the program and for installation, see 4 *Configuration* on page 21.

**Establishing the connection:**

1. Connect a CAN interface of the PCAN series to your computer.
2. Connect the PCAN-MicroMod FD to the CAN interface via a terminated CAN bus.
3. In PCAN-MicroMod FD Configuration, click on *Connect* to establish a connection to the CAN bus.
   The *Connect* window appears.




4. In the *Available PCAN hardware* field, select your CAN interface and, if applicable, the used channel.
5. On the *Bit Timing* tab select the *Nominal Bit Rate* currently used by the PCAN-MicroMod FD, with CAN FD additionally the *Data Bit Rate*.
6. Confirm with *Connect*.

**Query status information:**

1. Select the menu command *Configuration* > *Read Firmware Information*.
   The *Active Modules* list appears, still empty. After a few seconds, the PCAN-MicroMod FD is listed.
2. From the *Firmware Mode* column, read the current operating mode.

### 3.1.2 Operating Mode for CAN and CAN FD

**Features**

- Use in CAN and CAN FD buses
- Complies with CAN specifications 2.0 A/B and CAN FD

**Prerequisite**

- Installed standard firmware

**Activation**

- Achieved by switch-over with the configuration software
- Activated for regular PCAN-MicroMod FD products on delivery

**Configuration**

- Done via CAN bus with the Windows software PCAN-MicroMod FD Configuration
- Manal definition of the transmit and receive CAN messages
- Mapping of I/O signals to the CAN messages

### 3.1.3 Operating Mode for CANopen and CANopen FD

**Features**

- Use in CANopen and CANopen FD networks
- Communication profiles according to CiA® 301 version 4.2.0 and CiA® 1301 version 1.0.0
- Device profiles according to CiA® 401 version 3.0.0 and CiA® 401-B/F (not yet published)
- CANopen EDS files available for all supported products

**Prerequisite**

- Installed standard firmware

**Activation**

- Achieved by switch-over with the configuration software
- Requires a one-time unlock via the internet with a license that is included or can be purchased from Embedded Systems Academy

**Configuration**

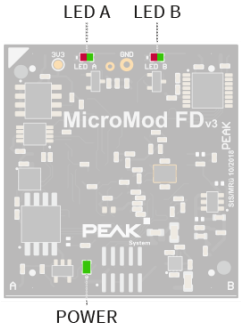
- Configuration of the bit rates, node ID, and vendor ID is done with the Windows software PCAN-MicroMod FD Configuration
- The behavior of the I/O functionality is specified by the firmware

### 3.1.4 Operation with Custom Firmware

The PCAN-MicroMod FD Evaluation Board can be freely programmed with help of our cost-free development package for ARM-based products. The included programming examples make it easier to start implementing own solutions.

See also: 6 *Creating Custom Firmware* on page 26

## 3.2 Status LEDs




Positions of status LEDs on the PCAN-MicroMod FD

The description of the LED status displays refers to the CAN/CAN FD operating mode of the standard firmware.

| LED | LED indication | Device status | Comment |
|---|---|---|---|
| LED B (upper right) | Green blinking (1 Hz) | Normal operation | |
| | Green flickering | Receiving configuration | |
| | Green and red alternately blinking | No configuration or wrong module ID | Possible causes: falsely set module ID, firmware updated. The PCAN-MicroMod FD is ready for receiving a configuration with 500 kbit/s. |
| | Orange quick blinking (4 Hz) | CAN bootloader active | Ready for transfer of new firmware.* |
| | Red blinking | Configuration invalid | Some parameters of the transmitted configuration are not supported, for example the bitrate |
| | Red on | No valid firmware | |

| LED | LED indication | Device status | Comment |
|---|---|---|---|
| Power (lower position) | Green on | Supply voltage present | |
| LED A (upper left) | No function | | |

## 3.3 Reserved CAN ID 7E7h

For configuring a product of the PCAN-MicroMod FD series and for firmware upload, the 11-bit CAN ID 7E7h is used. The corresponding programs from PEAK-System exchanges data with the module via the CAN bus using this CAN ID. When designing your CAN network, make sure not to use the CAN ID 7E7h in any way.

## 3.4 Overview of Services

The PCAN-MicroMod FD provides various functions, called services. The availability of services depends on the used motherboard.

| Service | Remark |
|---|---|
| Symbols (CAN messages) | Definition of the CAN messages used by the PCAN-MicroMod FD with Symbol names (CAN ID) and Variables resulting from Signals within the data bits. Signals can contain initial values and timeout periods (e.g. for CAN problems). |
| Digital Inputs | Assigned CAN messages can also be transmitted event-controlled. For this purpose, the type of signal change (positive edge, negative edge or both edges) is set as trigger. |
| Digital Outputs | A Signal has influence either on the state of a digital output or on the duty cycle at a preset frequency. |

| Service | Remark |
|---|---|
| Analog Inputs | An A/D value can be adjusted with scale and offset. Furthermore, a software low-pass can be activated. |
| Analog Outputs | This service is only available with a D/A converter being applied to the PCAN-MicroMod FD (e.g. using the Analog 1 motherboard). A D/A value can be adjusted with scale and offset. |
| Frequency Outputs | Frequency and duty cycle are controlled independently with one Signal each. |
| Digital Functions | The digital inputs can be logically combined with each other. The result can be passed on to a Signal, to a digital output, or internally as feedback to an input. |
| Statistics | Statistical data generated by the PCAN-MicroMod FD about the processing and the environment can be passed to Signals. |
| Curve Definitions/Curves (characteristic curves) | Analog input data can be converted with the help of curves. |
| Rotary Encoders | The service can process the signals of manual encoders connected to digital inputs (standard quadrature with 2 bits, max. 500 pulses/sec.). |
| Functions | A collection of functions that convert one Signal value and place the result on another Signal. Excerpt from the collection: Mult, Mod, And, Hysteresis, Limit, RS Flip Flop, Switch Delay, Greater Than. |

Find more details about the functionality and the application of the services in the help of the PCAN-MicroMod FD Configuration program.

# 4 Configuration

Configuring is done with the Windows software PCAN-MicroMod FD Configuration. This section covers the basic points for installing and using the configuration software.

## 4.1 Requirements for Transferring a Configuration via CAN

- Computer with operating system Windows 11 (x64/ARM64), 10 (x64)
- Installed configuration software PCAN-MicroMod FD Configuration
- CAN interface of the PCAN series for transferring the configuration to your hardware via CAN
- Installed CAN interface device driver
  (further information in the CAN interface manual)
- CAN cabling between the CAN interface and the PCAN-MicroMod FD with correct termination on both ends of the CAN bus, 120 Ohms each
- Knowledge of the bit rate currently used by the PCAN-MicroMod FD (CAN 2.0 with 500 kbit/s on delivery)

## 4.2 Installing the Configuration Software

Install PCAN-MicroMod FD Configuration on your computer as follows:

1. Download the configuration software PCAN-MicroMod FD Configuration.
   Download page: www.peak-system.com/quick/DL-Software-E
2. Unpack the file.

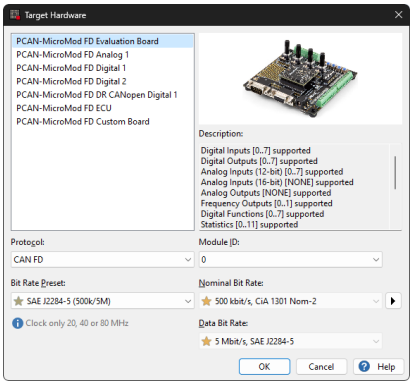
3. Double-click on the `.exe` file.
4. Follow the instructions of the installation program.

You now can start creating a configuration.

## 4.3 Creating a Configuration

Create a configuration as follows:

1. Start the PCAN-MicroMod FD Configuration software.
2. In the menu bar, select *File* > *New*.
   The *Target Hardware* window appears (here using the PCAN-MicroMod FD Evaluation Board as an example).




3. Select the device type PCAN-MicroMod FD from the list.
4. Indicate the CAN *Protocol* that your CAN bus uses.
5. Indicate the *Bit Rate* of the CAN bus on which the PCAN-MicroMod FD will later be used.
6. Indicate the previously set *Module ID* of your PCAN-MicroMod FD.
7. Confirm your settings with *OK*.
8. Save your configuration.

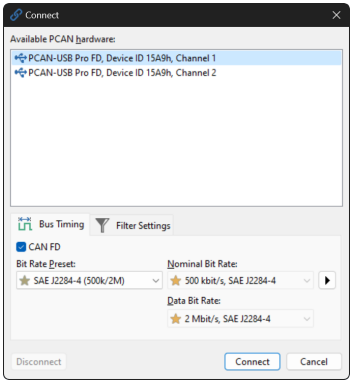
The configuration has been created and can be transferred to your PCAN-MicroMod FD as a next step.

**Tip:** There is a tutorial for the PCAN-MicroMod FD Configuration software that makes it easier for you to get started with the configuration of your device, available on the following web page in the I/O Modules section:
www.peak-system.com/quick/Documentation

## 4.4 Transferring a Configuration

**Establishing the connection:**

1. Connect a CAN interface of the PCAN series to your computer.
2. Connect the PCAN-MicroMod FD to the CAN interface via a terminated CAN bus.
3. In PCAN-MicroMod FD Configuration, click on *Connect* to establish a connection to the CAN bus.
   The *Connect* window appears.




4. In the *Available PCAN hardware* field, select your CAN interface and, if applicable, the used channel.

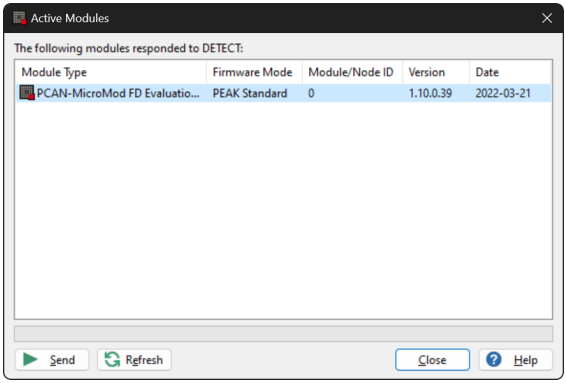
5. On the *Bit Timing* tab select the *Nominal Bit Rate* currently used by the PCAN-MicroMod FD, with CAN FD additionally the *Data Bit Rate*.

   > **Note:** The bit rates of the CAN bus via which you configure the PCAN-MicroMod FD may differ from the bit rates of the CAN bus in which the PCAN-MicroMod FD is to be used later.

6. Confirm with *Connect*.

**Send configuration:**

1. For sending the configuration, click on ▶ *Send Configuration*.
   The *Active Modules* window appears and after a short time displays the devices connected to the CAN bus.




   If your device is not shown, check the CAN cabling between the CAN interface and your device, if the device is powered up, and if the currently used bitrates in PCAN-MicroMod FD Configuration and in your device are the same (*Status: OK*).

2. Select your PCAN-MicroMod FD and click *Send*.

After a successful transfer of the configuration, you can use your PCAN-MicroMod FD with the new configuration.

# 5 Firmware Upload

Different ways are available in order to upload firmware to the PCAN-MicroMod FD.

| Way | Pins for transfer | Pin for flash mode* | File type | Required supplements |
|---|---|---|---|---|
| RS-232 | B3: TxD, B5: RxD | B4 | Hex | - Flash program Flash Magic for Windows |
| CAN | A43: CAN-H, A45: CAN-L | A32 (LED A blinks quickly orange) | Binary | - PC-CAN interface from PEAK-System<br>- PEAK-Flash for Windows (freely available) |
| USB | B23: Vbus, B25: USB1_P, B27: USB1_N | B6 | Binary | None |

* Must be connected to ground during switch-on.

**Tip:** In order to upload firmware, we recommend the use of the Evaluation Board for the PCAN-MicroMod FD (IPEH- 003081 or kit IPEH-003082). This simplifies the connection of the cabling on the one hand and the setting of the flash mode on the other hand.

# 6 Creating Custom Firmware

Using the PEAK-DevPack development package and the cost-free Visual Studio Code development environment (IDE) from Microsoft, you can create your own application-specific firmware for programmable hardware products from PEAK-System.

**Downloads**

- PEAK-DevPack (direct download): www.peak-system.com/quick/DLP-DevPack
- Visual Studio Code (homepage): code.visualstudio.com

**System Requirements**

- PC with Windows 11 (x64/ARM64), 10 (x64)
- CAN interface of the PCAN series to upload the firmware to your hardware via CAN

**Contents of the development package**

- `Build Tools\`

  Tools for automating the build process.
- `Compiler\`

  GNU Arm Embedded Toolchain for compiling the firmware code for supported hardware.
- `Hardware\`

  Subdirectories with various firmware examples, sorted by product. Use the examples to start your own firmware development.
- `PEAK-Flash\`

  Windows Software for uploading the firmware to your hardware via CAN. Start the software without further installation.
- `LiesMich.txt` and `ReadMe.txt`

  Short documentation in German and English on how to use the development package.

- `SetPath_for_VSCode.vbs`

  VBScript to modify the example directories for Visual Studio Code.

**Setup of the Environment and Firmware Creation**

1. Create a folder on your PC. We recommend to use a local drive.
2. Unzip the `PEAK-DevPack.zip` development package completely into your folder. No installation is required.
3. Run the `SetPath_for_VSCode.vbs` script.

   This script modifies the example directories for the Visual Studio Code IDE. Each example directory then has a folder called `.vscode` with the required files with local paths.
4. Install and start Visual Studio Code.
5. Via *File* > *Open folder*, select the folder of your code project, for example: `d:\PEAK-DevPack\Hardware\PCAN-Router_Pro_FD\Examples\01_ROUTING`
6. You can edit the C code and run commands for compilation via the menu *Terminal* > *Run Task*.
7. Compile your firmware with *Make All*.

The firmware is the file with the extension `.bin` in the `out` subdirectory of your project folder.

# 7 Technical Specifications

| Supply | |
|---|---|
| Supply voltage | 3.3 V DC |
| Current consumption | 180 mA max. |

| Connectors | |
|---|---|
| Connection strips | 2 double strips, each with 50 pins |
| Grid | 50 mil (1.27 mm) |
| | See also Appendix C *Dimension Drawings* on page 33 |

| Control and Communication | |
|---|---|
| Microcontroller | NXP LPC54618, Arm® Cortex® M4 Core |
| Standard firmware | Configuration via reserved CAN ID 7E7h |

| CAN | |
|---|---|
| Channels | 1 |
| Specification | ISO 11898-2, CAN 2.0 A/B and CAN FD |
| Transceiver | Microchip MCP2558FD |
| Nominal bitrates | 20 kbit/s to 1 Mbit/s |
| CAN FD data bitrates | 20 kbit/s to 10 Mbit/s |
| Galvanic isolation | none |
| Termination | none |

| Digital Inputs | |
|---|---|
| Count | 8 |
| Sampling functions | Static state: 0, 1<br>Frequency: 0 to 20 kHz (only inputs 0 to 5)<br>Duty cycle: 0.0 to 100.0 % (only inputs 0 to 5)<br><br>Manual rotary encoder (occupies 2 digital inputs each): standard quadrature with 2 bit, max. 500 pulses/sec. |
| Level | 3.3 V nominal |

| Analog Inputs | |
|---|---|
| Count | 8 |
| Voltage range | 0 to 3 V unipolar |
| Resolution | 12 bits |
| Sample rate | 1 kHz |

| Digital Outputs | |
|---|---|
| Count | 8 |
| Functions | Static state: 0, 1<br>PWM at 1 to 10,000 Hz (common frequency for all outputs) |

| Frequency/PWM Outputs | |
|---|---|
| Count | 2 |
| Frequency | 20 kHz max. |

| Temperature Sensor | |
|---|---|
| Design | integrated |
| Measuring range | –55 to +125 °C (–67 to +257 °F) |
| Accessed via configuration | Service “Statistics” |

| Additional Data Channels | |
|---|---|
| USB | For firmware update, only via separately available Evaluation Board |
| RS-232 | For firmware update, only via separately available Evaluation Board and with separate flash software |

| Measures | |
|---|---|
| Size of board | 33 x 36 mm |
| Height incl. pins | 13 mm |
| | See also Appendix C *Dimension Drawings* on page 33 |
| Weight | 9 g |

| Environment | |
|---|---|
| Operating temperature | –40 to +85 °C (–40 to +185 °F) |
| Temperature for storage and transport | –40 to +100 °C (–40 to +212 °F) |
| Relative humidity | 15 to 90 %, not condensing |

| Conformity | |
|---|---|
| RoHS | EU directive 2011/65/EU (RoHS 2) + EU directive 2015/863/EU (revised list of restricted substances)<br>DIN EN IEC 63000:2019-05 |
| EMC | EU directive 2014/30/EU<br>DIN EN 61326-1:2022-11 |

# Appendix A CE Certificate

## EU Declaration of Conformity

This declaration applies to the following product:

| | |
|---|---|
| Product name: | **PCAN-MicroMod FD** |
| Item number(s): | **IPEH-003080** |
| Manufacturer: | PEAK-System Technik GmbH<br>Leydheckerstraße 10<br>64293 Darmstadt<br>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) + 2015/863/EU (amended list of restricted substances)**

**DIN EN IEC 63000:2019-05**
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances (IEC 63000:2016);
German version of EN IEC 63000:2018

**EU Directive 2014/30/EU (Electromagnetic Compatibility)**

**DIN EN 61326-1:2022-11**
Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements (IEC 61326-1:2020);
German version of EN IEC 61326-1:2021

Darmstadt, 7 June 2024

Uwe Wilhelm, Managing Director

# Appendix B UKCA Certificate

## UK Declaration of Conformity

This declaration applies to the following product:

Product name: **PCAN-MicroMod FD**

Item number(s): **IPEH-003080**

**Manufacturer:**
PEAK-System Technik GmbH
Leydheckerstraße 10
64293 Darmstadt
Germany

**UK authorized representative:**
Control Technologies UK Ltd
Unit 1, Stoke Mill,
Mill Road, Sharnbrook,
Bedfordshire, MK44 1NN, UK

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

**The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012**

**DIN EN IEC 63000:2019-05**
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances (IEC 63000:2016);
German version of EN IEC 63000:2018

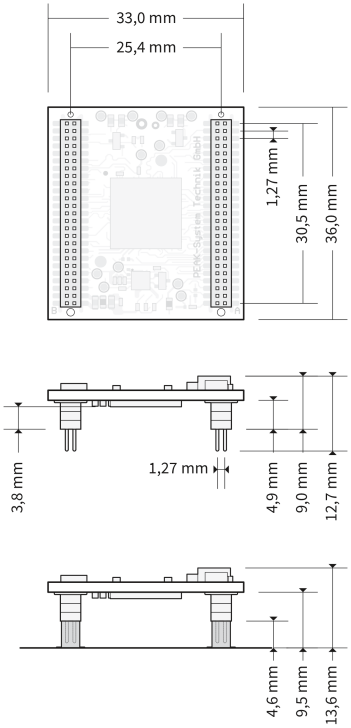
**Electromagnetic Compatibility Regulations 2016**

**DIN EN 61326-1:2022-11**
Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements (IEC 61326-1:2020);
German version of EN IEC 61326-1:2021

Darmstadt, 7 June 2024

Uwe Wilhelm, Managing Director

# Appendix C Dimension Drawings




The scale of the drawings differs from an 1-to-1 representation.

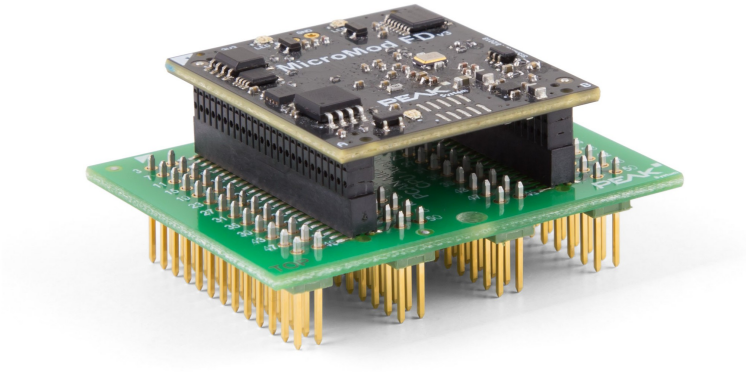
Pitch of connection pins: 50 mil ≙1.27 mm

Lower figure: example for plug-in positioning on a motherboard. Possible socket strip (2 pieces) as counterpart to the PCAN-MicroMod FD: Amtek 5PS3MSA44-225GONPNRU-00

# Appendix D CPU Adapter for 2.54 mm Pitch

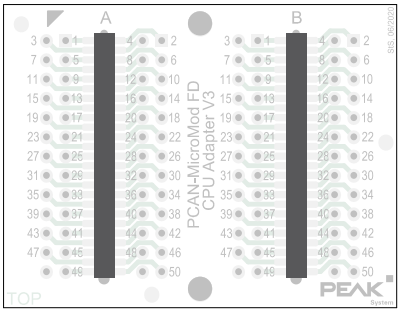
## D.1 Description CPU Adapter

The pin strips of the PCAN-MicroMod FD have a 50 mil/1.27 mm pitch. On request, PEAK-System offers an adapter for circuit boards with 100-mil/2.54-mm grid.

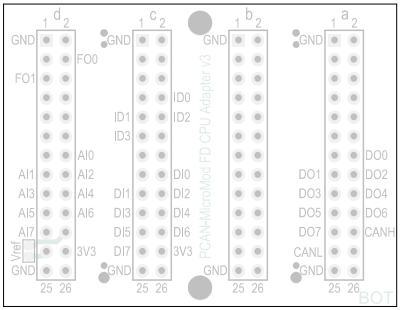


The CPU adapter has a circuit board with two socket strips for holding the PCAN-MicroMod FD and four pin strips with 100-mil-/2.54-mm pitch. The latter are supplied loose and can be plugged into the board and soldered if required.

# D.2 Pin Assignment CPU Adapter




Schematic view of the adapter from above (two socket strips for holding the PCAN-MicroMod FD)




Schematic view of the adapter from below (4 pin strips with 26 pins each, 100 mil/2.54 mm pitch)

| Pin MMFD | Pin Adapter | Designation | Function |
|---|---|---|---|
| A1 | a1 | GND | Ground |
| A3 | a2 | LED-A_red | Open-drain outputs for external status LEDs |
| A5 | a3 | LED-A_green | |
| A7 | a4 | LED-B_red | |
| A9 | a5 | LED-B_green | |
| A11 | a6 | FC1_I2C-SDA | $I^2C$ 1: identification of the motherboard type via external EEPROM |
| A13 | a7 | FC1_I2C-SCL | |
| A15 | a8 | | Reserved |

| Pin MMFD | Pin Adapter | Designation | Function |
|---|---|---|---|
| A17 | a9 | | Reserved |
| A19 | a10 | Ext-CAN-Sel# | Alternative, external CAN transceiver is used if put on ground |
| A21 | a11 | | Reserved |
| A23 | a12 | | Reserved |
| A25 | a13 | | Reserved |
| A27 | a14 | Dout-0 | Digital outputs 0 to 7 for switching external output drivers, 3.3 V level<br>Static state: 0, 1<br>PWM at 1 to 10,000 Hz (common frequency for all outputs) |
| A29 | a15 | Dout-1 | |
| A31 | a16 | Dout-2 | |
| A33 | a17 | Dout-3 | |
| A35 | a18 | Dout-4 | |
| A37 | a19 | Dout-5 | |
| A39 | a20 | Dout-6 | |
| A41 | a21 | Dout-7 | |
| A43 | a22 | CAN-H | High-speed CAN ISO 11898-2: differential signal High |
| A45 | a23 | CAN-L | High-speed CAN ISO 11898-2: differential signal Low |
| A47 | a24 | Reset-in# | Module reset, Low-active, internal pull-up 10 kΩ to 3.3 V |
| A49 | a25 | GND | Ground |

| Pin MMFD | Pin Adapter | Designation | Function |
|---|---|---|---|
| A2 | b1 | GND | Ground |
| A4 | b2 | | Reserved |
| A6 | b3 | | Reserved |
| A8 | b4 | | Reserved |
| A10 | b5 | | Reserved |
| A12 | b6 | | Reserved |
| A14 | b7 | | Reserved |

| Pin MMFD | Pin Adapter | Designation | Function |
|---|---|---|---|
| A16 | b8 | | Reserved |
| A18 | b9 | | Reserved |
| A20 | b10 | | Reserved |
| A22 | b11 | | Reserved |
| A24 | b12 | | Reserved |
| A26 | b13 | | Reserved |
| A28 | b14 | | Reserved |
| A30 | b15 | | Reserved |
| A32 | b16 | Boot-CAN# | CAN bootloader is started if put on ground during start-up (CAN pins: A43, A45) |
| A34 | b17 | | Reserved |
| A36 | b18 | | Reserved |
| A38 | b19 | | Reserved |
| A40 | b20 | | Reserved |
| A42 | b21 | Ext-CAN_M1 | Connection to alternative, external CAN transceiver (is enabled by pin A19) |
| A44 | b22 | Ext-CAN_M0 | |
| A46 | b23 | Ext-CAN_TxD | |
| A48 | b24 | Ext-CAN_RxD | |
| A50 | b25 | GND | Ground |

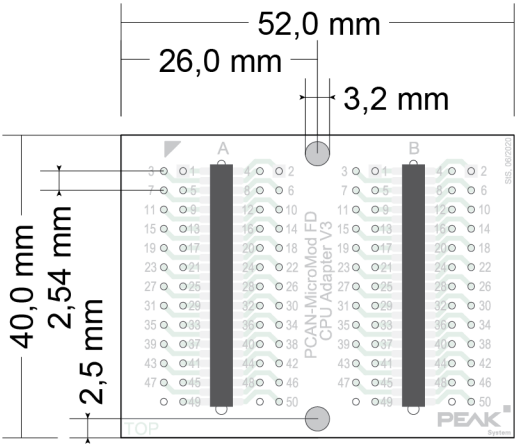
| Pin MMFD | Pin Adapter | Designation | Function |
|---|---|---|---|
| B1 | c1 | GND | Ground |
| B3 | c2 | FC0_V24_TxD | Serial RS-232 interface for firmware updates |
| B5 | c3 | FC0_V24_RxD | |
| B7 | c4 | FC0_V24_RTS | |
| B9 | c5 | FC0_V24_CTS | |
| B11 | c6 | | Reserved |

| Pin MMFD | Pin Adapter | Designation | Function |
|---|---|---|---|
| B13 | c7 | | Reserved |
| B15 | c8 | ID_Bit-0# | Module ID (4 bits → values 0 to 15):<br>- Pin open (internal pull-up): 0<br>- Pin on ground: 1 |
| B17 | c9 | ID_Bit-1# | |
| B19 | c10 | ID_Bit-2# | |
| B21 | c11 | ID_Bit-3# | |
| B23 | c12 | Vbus | Connection to a USB host (PC) for firmware update |
| B25 | c13 | USB1_P | |
| B27 | c14 | USB1_N | |
| B29 | c15 | | Reserved |
| B31 | c16 | Din-0 | Digital inputs 0 to 7, level 3.3 V<br>Inputs 0 to 5: measurment of the frequency or the duty cycle possible |
| B33 | c17 | Din-1 | |
| B35 | c18 | Din-2 | |
| B37 | c19 | Din-3 | |
| B39 | c20 | Din-4 | |
| B41 | c21 | Din-5 | |
| B43 | c22 | Din-6 | |
| B45 | c23 | Din-7 | |
| B47 | c24 | 3V3in | Supply voltage input 3.3 V DC, 100 mA (connected to B48) |
| B49 | c25 | GND | Ground |

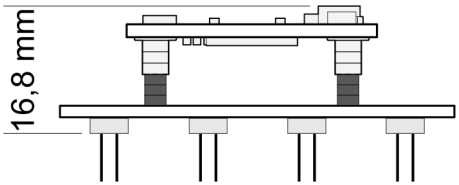
| Pin MMFD | Pin Adapter | Designation | Function |
|---|---|---|---|
| B2 | d1 | GND | Ground |
| B4 | d2 | Boot-Serial# | Bootloader is started if put on ground during start-up (RS-232 pins: B3, B5, B7, B9) |
| B6 | d3 | Boot-USB# | USB bootloader is started if put on ground during start-up (USB pins: B23, B25, B27) |

| Pin MMFD | Pin Adapter | Designation | Function |
|---|---|---|---|
| B8 | d4 | Fout-0 | Frequency outputs 0 and 1, level 3.3 V |
| B10 | d5 | Fout-1 | |
| B12 | d6 | | Reserved |
| B14 | d7 | | Reserved |
| B16 | d8 | | Reserved |
| B18 | d9 | | Reserved |
| B20 | d10 | | Reserved |
| B22 | d11 | | Reserved |
| B24 | d12 | | Reserved |
| B26 | d13 | | Reserved |
| B28 | d14 | Ain-0 | Analog inputs 0 to 7, resolution 12 bits |
| B30 | d15 | Ain-1 | |
| B32 | d16 | Ain-2 | |
| B34 | d17 | Ain-3 | |
| B36 | d18 | Ain-4 | |
| B38 | d19 | Ain-5 | |
| B40 | d20 | Ain-6 | |
| B42 | d21 | Ain-7 | |
| B44 | d22 | Vref-out | Reference voltage 3.0 V, can be connected to pin B46 as internal reference |
| B46 | d23 | Vref-in | Reference voltage input for 12-bit ADC, pin B44 recommended as source |
| B48 | d24 | 3V3in | Supply voltage input 3.3 V DC, 100mA (connected to B47) |
| B50 | d25 | GND | Ground |

# D.3 Dimension Drawings CPU Adapter




Dimensions of the CPU adapter (top view)




Height dimension of the CPU adapter including PCAN-MicroMod FD

# Appendix E Minimum Circuitry

The following diagram shows the minimum circuitry required to operate the PCAN-MicroMod FD.

**Tip:** The download area for the PCAN-MicroMod FD on our website contains additional library files (Altium Designer file formats) that can be used for simplified integration in own circuit diagrams with the MicroMod FD.

BOM1

MicroMod_FD

MicroMod FD

Open Collector Output

J1

LEDA Red
LEDA Green
LEDB Red
LEDB Green

FC1_IC2-SDA
FC1_IC2-SCL
FC5_IC2-SDA
FC5 IC2 SCL

Low = 0V ... +0.4V
High = +2.9V ... +3.3V

Pint 1
Pint 4
Pint 5

Digital Outputs

Dout 0
Dout 1
Dout 2
Dout 3
Dout 4
Dout 5
Dout 6
Dout 7

CAN Bus

J3

GND
GND

CAN H
CAN L

SUB-D 9 Male

CAN High
CAN Low

CAN Select
CAN Mode 1
CAN Mode 0
CAN TX
CAN RX

FC 7 SPI SCK
FC 7 SPI MOSI
FC 7 SPI MISO
FC 7 SPI SSEL0
FC 7 SPI SSEL1

FC 3 SPI SCK
FC 3 SPI MOSI
FC 3 SPI MISO
FC 3 SPI SSEL0
FC 3 SPI SSEL1
FC 3 SPI SSEL2
FC 3 SPI SSEL3

GPIO 0
GPIO 1
GPIO 3
GPIO 4
GPIO 5
GPIO 6

CAN Boot
Reset

3V3
R1
1k
S1
FSM2JSMLTR
GND

S2
FSM2JSMLTR
GND

GND
GND
GND
GND
GND

MicroMod_FD A

F HDR 25x2 1.27mm

J2

FC0 RS232 TXD
FC0 RS232 RXD
FC0 RS232 RTS
FC0 RS232 CTS

ISP0 (Serial Boot)
ISP1 (USB Boot)

Digital Frequency Outputs

Low = 0V ... +0.4V
High = +2.9V ... +3.3V

Fout 0
Fout 1
ClkOut

Pulldown ≙ IDx = 1
Pullup ≙ IDx = 0

FC4 RS232 RXD
FC4 RS232 TXD

Module ID

ID 0000(b)

3V3
R3 4.7k ID 0
R4 4.7k ID 1
R5 4.7k ID 2
R6 4.7k ID 3

ID 0
ID 1
ID 2
ID 3

SDIO D0
SDIO D1
SDIO D2
SDIO D3
SDIO SCK
SDIO Cmd
SDIO CardDet

Low = -0.5V ... +0.8V
Vdd=0V -> High = +2.0V ... +3.6V
Vdd =3.3V -> High = +2.0V ... +5.0V

VUSB1
USB1 D+
USB1 D-
USB1 UP-LED

Digital Inputs

Din0
Din1
Din2
Din3
Din4
Din5
Din6
Din7

Din 0
Din 1
Din 2
Din 3
Din 4
Din 5
Din 6/Pint 6
Din 7/Pint 7

Ain 0
Ain 1
Ain 2
Ain 3
Ain 4
Ain 5
Ain 6
Ain 7

Vain 0V ... 3.0V

Analog Inputs

Vref Out
Vref In

R2 0R

3V3
3V3
3V3

GND
GND
GND
GND
GND

MicroMod_FD B

F HDR 25x2 1.27mm



PEAK-System Technik GmbH
Otto-Röhm-Str. 69
D-64293 Darmstadt

Engineer: C.Eggers
Date: 05/05/2026
File: Minimum Circuitry Overview.SchDoc

Title: PCAN-MicroMod-FD Minimum Circuitry
Sheet: Minimum Circuitry Overview
Customer: Intern
Version: 1.0
Variant: [No Variations]
Page 1 of 1