PCAN-Optoadapter
Plug-on Adapter for Decoupling CAN Networks
User Manual
Relevant products

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Model</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCAN-Optoadapter</td>
<td></td>
<td>IPEH-002038</td>
</tr>
</tbody>
</table>

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1 Introduction

The PCAN-Optoadapter is a universal plug-on adapter to allow galvanic isolation of High-speed CAN bus systems. Its integrated logic means that decoupling can be installed at any point in the CAN network.

1.1 Properties at a Glance

- Plug-on adapter for decoupling a CAN bus for PEAK CAN interfaces
- Galvanic isolation by DC/DC converters up to 500 V
- Bit rates up to 1 Mbit/s
- High-speed CAN transceiver NXP PCA82C251
- CAN bus connection via D-Sub, 9-pin (in accordance with CiA® 303-1)
- 120 Ohm bus termination
- Power supply (5 V) through pin 1 of the High-speed CAN connection. Nearly all CAN interfaces by PEAK-System can provide the required supply
- Extended operating temperature range from -40 to 85 °C (-40 to 185 °F)

1.2 System Requirements

- The power supply is done via pin 1 of the 9-pin female D-Sub connector (primary side). Therefore the attached CAN interface must provide 5 Volts.
Since the PCAN-Optoadapter already contains a CAN bus termination on the primary side, the connected CAN adapter doesn’t need to be terminated separately on this side.

1.3 Scope of Supply

- Adapter in plastic casing
- Manual in PDF format
2 Connectors

2.1 Connection Primary Side

The PCAN-Optoadapter is directly connected to a CAN interface with its so called primary side (D-Sub female).
The lines for the differential CAN signal CAN_H and CAN_L are terminated on the adapter with a 120-Ω resistor (fixed). An additional termination at the CAN interface is not needed.

2.2 Connection Secondary Side

A High-speed CAN bus (ISO 11898-2) is connected to the 9-pin D-Sub connector. The pin assignment for CAN corresponds to the specification CiA® 303-1.

![Figure 3: Pin assignment at the secondary side (D-Sub male)]
3 Operation

3.1 Operation

A configuration of the PCAN-Optoadapter is not needed. You can use it instantly.

For general supply the adapter uses a direct voltage of +5 V. This must be applied to pin 1 of the CAN connector. The CAN interfaces of the PCAN series are able to provide 5 Volts on Pin 1.

When the 5 V supply is active, the LED on the PCAN-Optoadapter is green.

⚠️ **Attention! Risk of short circuit!** When you connect the PCAN-Optoadapter to or remove it from a CAN interface, latter must be turned off (without power supply). Otherwise the PCAN-Optoadapter or other electronic components may be damaged.
3.2 Signal Delay

The PCAN-Optoadapter has a transit time delay of approx. 80 ns. This corresponds to a cable length of 16 m. Therefore, you should consider the dependence of the maximum length of a CAN bus on the bit rate at the installation of the PCAN-Optoadapter. The following table shows the maximum possible CAN bus length at different bit rates:

<table>
<thead>
<tr>
<th>Bit rate</th>
<th>Bus length</th>
<th>Bus length with PCAN-Optoadapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Mbit/s</td>
<td>40 m</td>
<td>24 m</td>
</tr>
<tr>
<td>500 kbit/s</td>
<td>110 m</td>
<td>94 m</td>
</tr>
<tr>
<td>250 kbit/s</td>
<td>240 m</td>
<td>224 m</td>
</tr>
<tr>
<td>125 kbit/s</td>
<td>500 m</td>
<td>484 m</td>
</tr>
<tr>
<td>50 kbit/s</td>
<td>1.3 km</td>
<td>For small bit rates, the delay of the adapter can be neglected</td>
</tr>
<tr>
<td>20 kbit/s</td>
<td>3.3 km</td>
<td></td>
</tr>
<tr>
<td>10 kbit/s</td>
<td>6.6 km</td>
<td></td>
</tr>
<tr>
<td>5 kbit/s</td>
<td>13.0 km</td>
<td></td>
</tr>
</tbody>
</table>

The listed values have been calculated on the basis of an idealized system and can differ from reality.

3.3 Status LED

The status LED on the top of the adapter indicates, whether it is correct supplied. In this case, the LED is continuously **green**.
## 4 Technical Specification

### Connectors

| CAN | 
|---|---|
| **D-Sub (m), 9 pins** | 
| **Pin assignment according to specification CiA® 303-1** | 

### CAN

<table>
<thead>
<tr>
<th>Specification</th>
<th>ISO 11898-2, High-speed CAN 2.0A (standard format) and 2.0B (extended format)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bit rates</td>
<td>0 kbit/s - 1 Mbit/s</td>
</tr>
<tr>
<td>Transceiver</td>
<td>NXP PCA82C251</td>
</tr>
<tr>
<td>Galvanic isolation</td>
<td>Up to 500 V</td>
</tr>
<tr>
<td>Termination</td>
<td>120 Ω on the primary side, none on the secondary side</td>
</tr>
<tr>
<td>Signal delay</td>
<td>approx. 80 ns</td>
</tr>
</tbody>
</table>

### Power supply

<table>
<thead>
<tr>
<th>Supply voltage</th>
<th>+5 V = via pin 1 of D-Sub female (GND pin 3; pin 6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption</td>
<td>max 100 mA</td>
</tr>
</tbody>
</table>

### Measures

<table>
<thead>
<tr>
<th>Size</th>
<th>63 x 34 x 17 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>25 g</td>
</tr>
</tbody>
</table>

### Environment

<table>
<thead>
<tr>
<th>Operating temperature</th>
<th>-40 - +85 °C (-40 to 185 °F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature for storage and transport</td>
<td>-40 - +100 °C (-40 to 212 °F)</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>15 - 90 %, not condensing</td>
</tr>
</tbody>
</table>
### Conformity

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EMV</strong></td>
<td>Directive 2014/30/EU</td>
</tr>
<tr>
<td></td>
<td>DIN EN 55024:2016-05</td>
</tr>
<tr>
<td></td>
<td>DIN EN 55032:2016-02</td>
</tr>
<tr>
<td><strong>RoHS 2</strong></td>
<td>Directive 2011/65/EU</td>
</tr>
<tr>
<td></td>
<td>DIN EN 50581 VDE 0042-12:2013-02</td>
</tr>
</tbody>
</table>
Appendix A  CE-Certificate

EU Declaration of Conformity

This declaration applies to the following product:
Product name: PCAN-Optoadapter
Item number(s): IPEH-002038
Manufacturer: PEAK-System Technik GmbH
Otto-Roehm-Strasse 69
64293 Darmstadt
Germany

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 55024:2016-05
Information technology equipment – Immunity characteristics – Limits and methods of measurement (CISPR 24:2010 + Cor.:2011 + A1:2015);
German version EN 55024:2010 + A1:2015
DIN EN 55032:2016-02
Electromagnetic compatibility of multimedia equipment - Emission Requirements (CISPR 32:2015);
German version EN 55032:2015

Darmstadt, 22 February 2019

Uwe Wilhelm, Managing Director
The figure doesn’t show the actual size of the product.