PCAN-LIN

RS-232 to LIN/CAN Interface

User Manual

PEAK System

Products taken into account

Product Name	Model	Item Number
PCAN-LIN	High-speed CAN (HS-CAN)	IPEH-002025
PCAN-LIN	Low-speed CAN (LS-CAN)	IPEH-002028
PCAN-LIN	High-speed CAN, opto-decoupled	IPEH-002029

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Contents

1 Introduction

Tip: At the end of this manual (Appendix B) you can find a **Quick Reference** with brief information about the installation and operation of the PCAN-LIN module.

With the PCAN-LIN module data is exchanged between participants of LIN, CAN, and serial communication. Communication parameters are set up via the RS-232 connection (e.g. routing from CAN to LIN and vice versa, scheduling rules). You can easily do this with the provided Windows software.

LIN (Local Interconnect Network) is a competitive, serial communication system, designed for interconnecting simple electronic devices in an automobile. LIN is preferred where the capabilities of CAN (Controller Area Network) are not needed.

This user manual discusses the use of the PCAN-LIN hardware. The software supplied on CD is described in the corresponding help.

1.1 Properties of the PCAN-LIN Module at a Glance

- Interface in a compact case with two D-Sub connectors
- Universally usable gateway between
  - RS-232 and LIN
  - RS-232 and CAN
  - LIN and CAN (router, when using filtering functions)
- Compliant to LIN specification 2.0 (power management functions like sleep mode or wake-up signal are not implemented)
- Operation as Slave or Master/Slave in a LIN network

- Initiation of single LIN frames from CAN or RS-232 possible (while LIN scheduler is inactive)
- Modular configuration with Windows software via serial interface
- High-speed CAN transceiver / Low-speed CAN transceiver (according to PCAN-LIN model)
- Opto-decoupled RS-232 interface (item IPEH-002029 only)

1.2 System Requirements

The following prerequisites must be given, so that the PCAN-LIN module can be used properly:

- Supply voltage 8 – 18 V DC (e.g. car battery)
- When configuring via computer: RS-232 port (serial interface)
- For running the provided configuration software: Windows Vista, XP SP2, or 2000 SP4

1.3 Scope of Supply

The scope of supply normally consists of the following parts:

- PCAN-LIN module
- CD-ROM with documentation (PDF) and Windows software

Note: Since the application possibilities of the PCAN-LIN module are various, a special adapter for connecting the field busses and the power supply is not provided. Therefore you need a 9-pin D-Sub female connector for your appliances to be connected individually. See also the following chapter.

2 Hardware Installation

The PCAN-LIN module has two 9-pin D-Sub connectors:

- Male: LIN, CAN, power supply
- Female: RS-232

2.1 D-Sub Male Connector for LIN, CAN, Power Supply

The field busses and the power supply (e.g. a car battery) are connected via the D-Sub male connector at the PCAN-LIN module. The pin assignment of the connector is as follows:

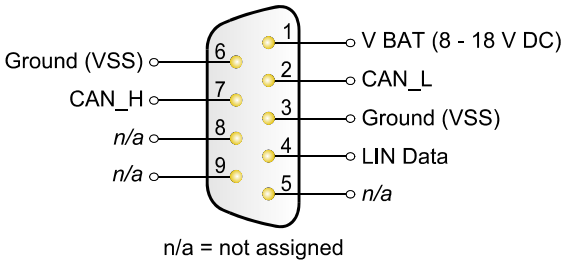

Figure 1: Pin assignment D-Sub male connector

Tip: If the PCAN-LIN module is operated at a common ground for bus systems and power supply (e.g. in a car), a separate ground connection for the LIN bus and the CAN bus is not needed. Connecting the data wires is sufficient in this case.

2.2 D-Sub Female Connector for RS-232

Via the serial interface (RS-232 specification) the PCAN-LIN module is linked to a computer or a different monitoring and controlling unit. A computer can be connected to the PCAN-LIN module via a normal serial cable with D-Sub connectors (1:1 connection, no null modem cable).

For the serial communication only the two data lines and the ground connection of the RS-232 interface are needed; handshake lines are not used.

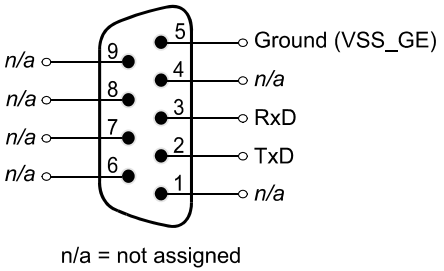

Figure 2: Pin assignment D-Sub female connector

Peculiarity of the Opto-decoupled Version

For this version of the PCAN-LIN module the Ground pin at the RS-232 connector (female D-Sub) is galvanically isolated from the Ground of the D-Sub male connector for the field busses and the power supply. This is marked by the extended name VSS_GE (instead of VSS). The PCAN-LIN version without opto-decoupling has a single Ground line for both connectors (here the name is VSS).

3 Software Setup

The scope of delivery of the PCAN-LIN package includes software running under Windows. It is used for comfortable configuring and easy monitoring of the PCAN-LIN module.

To start the setup procedure of the software do the following:

1. Please make sure that you are logged in as user with administrator privileges.
2. Insert the supplied CD-ROM into a drive of the computer. The navigation program for the CD-ROM usually starts automatically after a short moment. If not, start the program `Intro.exe` from the root directory of the CD-ROM manually.
3. In the category “Tools” of the navigation program you'll find the entry “PCAN-LIN Configuration Tool”. Klick on **Install** in order to start the setup program.

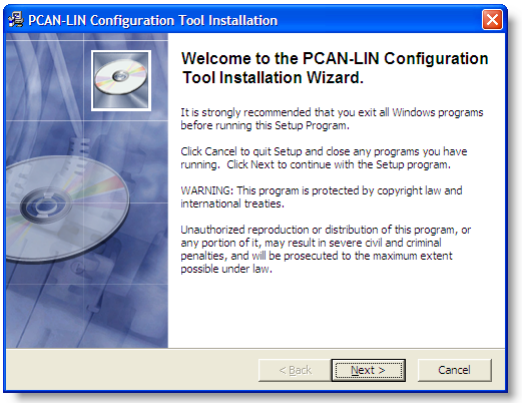

Figure 3: Initial dialog of the setup program for the PCAN-LIN Configuration Tool

4. Follow the instructions of the setup program.

After the software setup you can access the PCAN-LIN Configuration Tool via Windows' Start menu. Before, please follow the notes in the following chapter about the operation.

You can find further information about the use of the PCAN-LIN Configuration Tool in the help which you can invoke in the program.

4 Operation

As soon as a supply voltage is applied via the D-Sub male connector (see section 2.1 on page 6), the PCAN-LIN module is ready for use. This is indicated by a short blink of both LEDs (Status LED: green, Transmission/Error LED: green and red).

4.1 Configuring the Module

You can configure the PCAN-LIN module comfortably by software via the RS-232 interface. The module doesn't have any hardware switches. Configuring can be done either with the delivered Windows software PCAN-LIN Configuration Tool, a self developed software, or with a third-party tool.

In a separate manual you can find information about the **protocol definitions** regarding the communication via the RS-232 interface and about configuration possibilities for the PCAN-LIN module.

4.2 LEDs

The top of the PCAN-LIN module has two LEDs in the middle. These status indicators for the normal operation are mainly related to the LIN interface and have following meanings:

Green LED

If a LIN frame timout occurs, e.g. because of an “slave not responding error”, the LED is toggled (on/off).

Duo-LED

For the duration of the transmission of a LIN frame the LED is lit green.

If an error occurs during the transmission (checksum error / transmitted data byte doesn't correlate to the received one at LIN Request Frames) the LED shortly flashes red.

Further possibilities for a red LED flash are:

- CAN bus error (item IPEH-002028 with Low-speed CAN transceiver only)
- The receive and transmit error counter has reached a limit

5 Firmware Update

You can use the program Flash Magic to upload a new firmware to the PCAN-LIN module.

Prerequisites:

- You need a so called hex file containing the new firmware.
- The software Flash Magic must be setup on your computer.

Both can be obtained from PEAK-System Technik on request (contact data: see on page 2).

Do the following to update the firmware:

1. Start the PCAN-LIN Configuration Tool.
2. If the PCAN-LIN Configuration Wizard is shown, quit it by clicking the button **Close**.
3. Establish the communication to the connected PCAN-LIN module (menu item **Connection | Connection Dialog**).
4. In the main window select the tab **Upgrade of Module Firmware**.
5. Click the button **Set Flash Magic Values** for Flash Magic to be set up with specific parameters for the PCAN-LIN module.
6. Click the button **Set ISP mode**. Both LEDs on the PCAN-LIN module are lit green.
7. Open the program Flash Magic via Windows' Start menu. If an error message occurs after starting the program, click on the button **Cancel**.

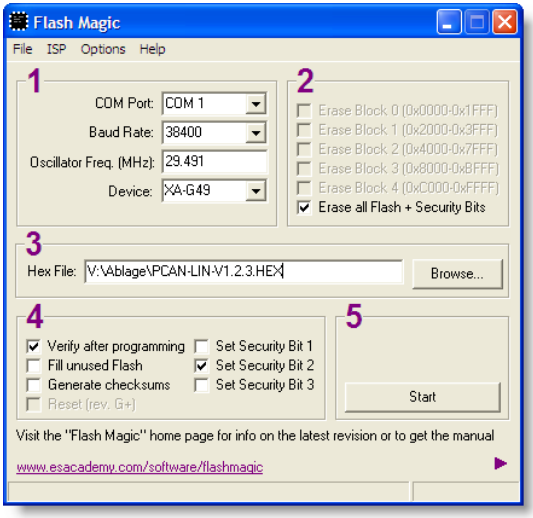

Figure 4: View of the program Flash Magic,
presettings for the PCAN-LIN module in areas 1, 2, and 4.

8. In area 3 choose the hex file with the new firmware by clicking the button **Browse**.

9. Click on the button **Start**. The update procedure is indicated in the status bar of the program.

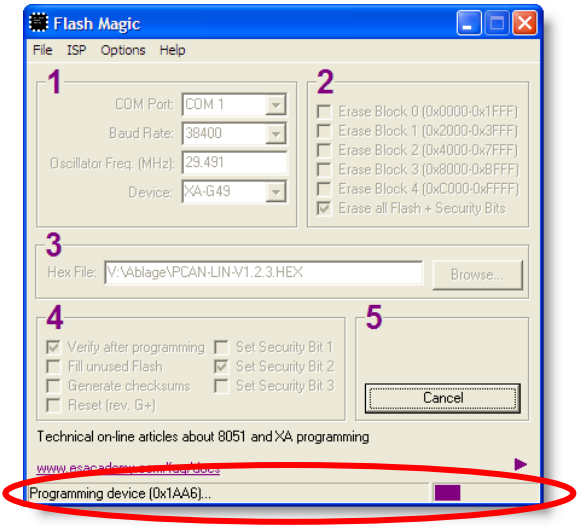

Figure 5: Flash Magic during the programming procedure (see status bar)

10. When the update procedure has ended successfully, quit the program Flash Magic and restart the PCAN-LIN module by interrupting the power supply for a moment.

6 Technical Specifications

Power supply	
Supply voltage	+8 ... +18 V DC (via Pin 1 of the D-Sub male connector)
Current consumption	PCAN-LIN HS-CAN: max. 130 mA PCAN-LIN LS-CAN: max. 130 mA PCAN-LIN HS-CAN opto-dec.: max. 140 mA

Interfaces	
Serial	RS-232 max. 57.600 kBit/s
LIN	ISO 15765-2 LIN 1.x and LIN 2.0 max. 19.200 kBit/s
CAN	PCAN-LIN HS-CAN (incl. opto-decoupled): ISO 11898-2 CAN transceiver Philips PCA82C251 max. 1 MBit/s PCAN-LIN LS-CAN: ISO 11898-3 CAN transceiver Philips TJA1054 max. 125 kBit/s All: CAN 2.0A (Standard format) and 2.0B (Extended format) CAN controller Philips SJA1000
Opto-decoupling	Only PCAN-LIN HS-CAN opto-decoupled: Galvanic isolation between RS-232 and LIN/CAN, max. 1 kV

Measures	
Size	92 x 44 x 22 mm (3 5/8 x 1 9/16 x 7/8 inches)
Weight	PCAN-LIN HS-CAN: 47 g (1.66 oz.) PCAN-LIN LS-CAN: 48 g (1.69 oz.) PCAN-LIN HS-CAN opto-dec.: 50 g (1.76 oz.)

Continued on the next page

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
EMC directives	EN 61000-6-3:2001 EN 61000-6-1:2001 EN 61000-6-4:2001 EN 61000-6-2:2001 EC directive 89/336/EEC
Marks of conformity	CE

Appendix A Certificates

A.1 CE

PCAN-LIN IPEH-002025/28/29 EC declaration of conformity
PEAK-System Technik GmbH

Notes on the CE Symbol CE

The following applies to the PCAN-LIN products IPEH-002025/28/29.

EC Directive

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:

Field of Application	Requirement for Emitted Interference	Requirement for Noise Immunity
Residential, commercial and small businesses	EN 61000-6-3: 2001	EN 61000-6-1: 2001
Industrial	EN 61000-6-4: 2001	EN 61000-6-2: 2001

Declarations of Conformity

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:

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Mr. Wilhelm
Otto-Röhm-Str. 69
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Germany

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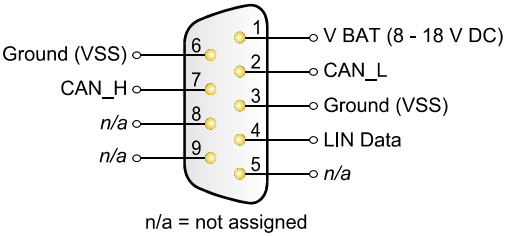
Signed this 8th day of August 2003

Appendix B Quick Reference

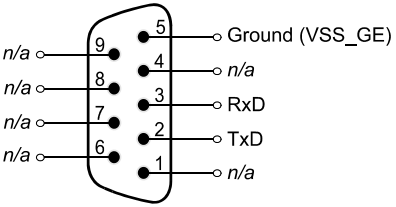
Connectors

D-Sub Male Connector for LIN, CAN, Power Supply



n/a = not assigned

D-Sub Female Connector for RS-232



n/a = not assigned

Operation

When applying the power supply, the operational readiness of the PCAN-LIN module is indicated by flashes of both LEDs (Status LED: green, Transmission/Error LED: green and red).

Configuration Tool (Windows)

For installation execute the setup program from the submenu “Tools” in the navigation program on the supplied CD-ROM (`Intro.exe`).