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PLIN-USB

LIN Interface for USB

User Manual



Document version 1.1.0 (2019-03-14)

PEAK System

Relevant products

Product Name	Model	Part number
PLIN-USB		IPEH-004052

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Contents

1 Introduction 4

1.1 Properties at a Glance 4

1.2 Operation Requirements 5

1.3 Scope of Supply 6

2 Installing Software and Hardware 7

2.1 Installing the Device Driver and PLIN-View Pro 7

2.2 Connecting the PLIN-USB 8

3 Operation 10

3.1 Status LED 10

3.2 Unplugging the USB Connection 10

3.3 Distinguishing Several PLIN-USB 10

4 Software 12

4.1 LIN Monitor PLIN-View Pro for Windows 12

4.1.1 Receive/Transmit Tab 14

4.1.2 Trace Tab 16

4.1.3 Status Bar 17

4.2 PLIN-API for the Connection of Self-created Programs 18

5 Technical Specifications 20

Appendix A CE Certificate 22

Appendix B Dimension Drawing 23

1 Introduction

The PLIN-USB enables the connection of a Windows computer to a LIN network via USB. The adapter supports the LIN protocol according to the standard ISO 17987 and complies with all LIN specifications up to version 2.2. The interface can be operated as a master or a slave.

The monitor software PLIN-View Pro and the PLIN programming interface for the development of applications with LIN connection are included in the scope of supply.

1.1 Properties at a Glance

- Adapter for High-Speed-USB 2.0 (compatible with USB 1.1 and USB 3.0)
- LIN connection (ISO 17987)
- Compliant with all LIN specifications (up to version 2.2)
- Bit rates from 1 kbit/s up to 20 kbit/s
- Can be used as a LIN master or slave
  (1 ms master task resolution)
- Automatic bit rate, frame length, and checksum type recognition
- Autonomous scheduler with support for unconditional, event, and sporadic frames
- LIN bus connection via D-Sub, 9-pin
- LIN connection short-circuit-proof against transceiver supply and ground
- TJA1028T LIN transceiver
- Galvanic isolation on the LIN connection up to 500 V

- Indicator LED for interface status
- Voltage supply via USB
- Adapter supply 5 V DC via USB port
- Transceiver supply 6 - 28 V DC via D-Sub, pin 9
- Extended operating temperature range from -40 to 85 °C (-40 to 185 °F)

1.2 Operation Requirements

- Vacant USB port on the computer (compatible to USB 1.1, 2.0, and 3.0)

Note: Do not use a USB extension cable for connecting the PLIN-USB to a computer. The use of an extension cable does not conform to the USB specification and may cause malfunction of the PLIN-USB.

- Operating system Windows 10, 8.1, 7 (32/64-bit)
- Additional DC voltage source 6 to 28 V to supply the LIN transceiver

1.3 Scope of Supply

- PLIN-USB in plastic casing (with 60 cm USB cable)
- LIN interface drivers for Windows 10, 8.1, 7 (32/64 bit)
- LIN monitor PLIN-View Pro for Windows
- Programming interface PLIN-API for developing applications with LIN connection
- Manual in PDF format

Optionally available accessories:

- LIN Connection Cable for PC LIN interfaces (IPEK-003013)

2 Installing Software and Hardware

This chapter covers the software setup for the PLIN-USB adapter under Windows and the connection of the adapter to a computer.

Install the driver before you connect the adapter to the computer.

2.1 Installing the Device Driver and PLIN-View Pro

In order to operate the PLIN-USB on a Windows PC, you must install the suitable device driver. This is available on the provided Product DVD. During the installation process, the LIN monitoring software PLIN-View Pro is installed automatically.

Do the following to install the device driver:

1. Start the `Intro.exe` software from the supplied Product DVD.

   The navigation program appears.

2. In the main menu, select **Drivers** and then click on **Install now**.

3. Confirm the message from the User Account Control related to “Installer database of PEAK-Drivers”.

   The driver setup starts.

4. Follow the program's instructions. When selecting components, select the **LIN device driver** (other components as needed).

   The LIN monitoring software PLIN-View Pro is installed automatically.

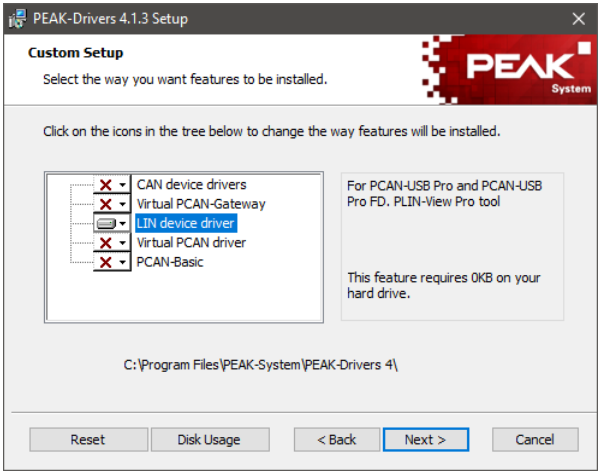


Figure 1: LIN device driver in PEAK-Drivers Setup

2.2 Connecting the PLIN-USB

LIN (D-Sub)

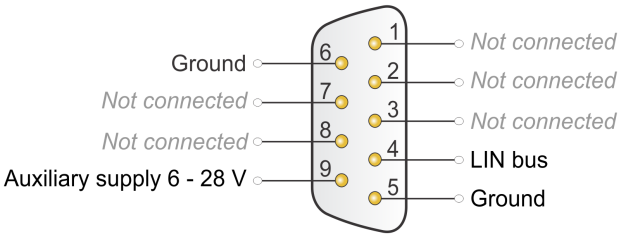


Figure 2: Assignment of the D-Sub connector on the PLIN-USB, auxiliary supply required for LIN transceiver

In addition to the connection to the LIN bus, the PLIN-USB requires an external DC power for operation in the range of 6 to 28 Volts. Apply it to pin 9.

To facilitate the connection, use the optional supply cable with D-Sub connectors (IPEK-003013).

USB

Connect the PLIN-USB with its USB plug (type A) to a USB port of a computer or of a USB hub. It does not matter whether the USB port complies electronically with the standard 1.1, 2.0, or 3.0.

Windows detects the new hardware and initializes the previously installed device driver. After the successful initialization, the status LED on the PLIN-USB is lit green (see also section 3.1 *Status* LED on page 10).

3 Operation

3.1 Status LED

For indication of operating conditions the PLIN-USB has an LED on its top.

LED status	Meaning
Green on	There's a connection to a driver of the operating system.
Green slow blinking	The LIN interface is initialized with a valid bitrate. A software application is connected to the LIN interface.
Green quick blinking	Data is transmitted via the connected LIN bus.

3.2 Unplugging the USB Connection

Under Windows the icon for removing hardware safely is not used with the PLIN-USB. You can unplug the PLIN-USB from the computer without any preparation.

3.3 Distinguishing Several PLIN-USB

You can operate several PLIN-USB on a single computer at the same time. To distinguish the interfaces in a software environment, you need to assign a hardware ID to each interface that is permanently saved in the interface. The hardware ID is independent of the LIN communication.

Do the following to set the hardware ID in the PLIN-USB:

1. Make sure that the PLIN-USB is connected to the PC and is initialized (status LED is lit green).

2. Open the Windows Start menu, type `peakcpl`, and press the Enter key.

   The **Properties of PEAK Hardware** window opens.

3. Change to the **LIN Hardware** tab and select the PLIN-USB interface from the list.

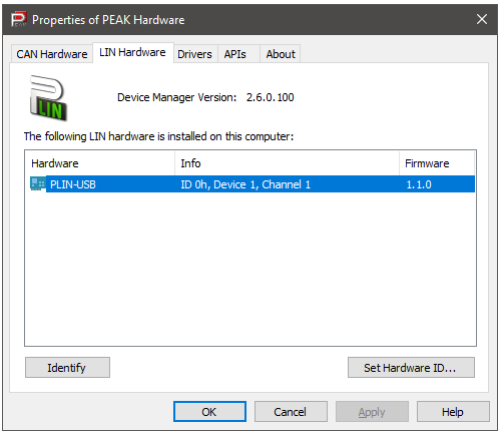


Figure 3: LIN hardware tab in the PEAKCPL software

4. Click on the **Set Hardware ID** button.
5. Enter a number (either decimal or hexadecimal with suffix "h") as the new hardware ID and confirm with **OK**.



Tip: Add the assigned hardware ID to the casing of the PLIN-USB, e.g. with a sticker, in order to quickly distinguish similar interfaces.

4 Software

4.1 LIN Monitor PLIN-View Pro for Windows

PLIN-View Pro for Windows is a display and monitoring program for LIN messages in connection with PC LIN interfaces from PEAK-System. The program is part of the device driver installation.

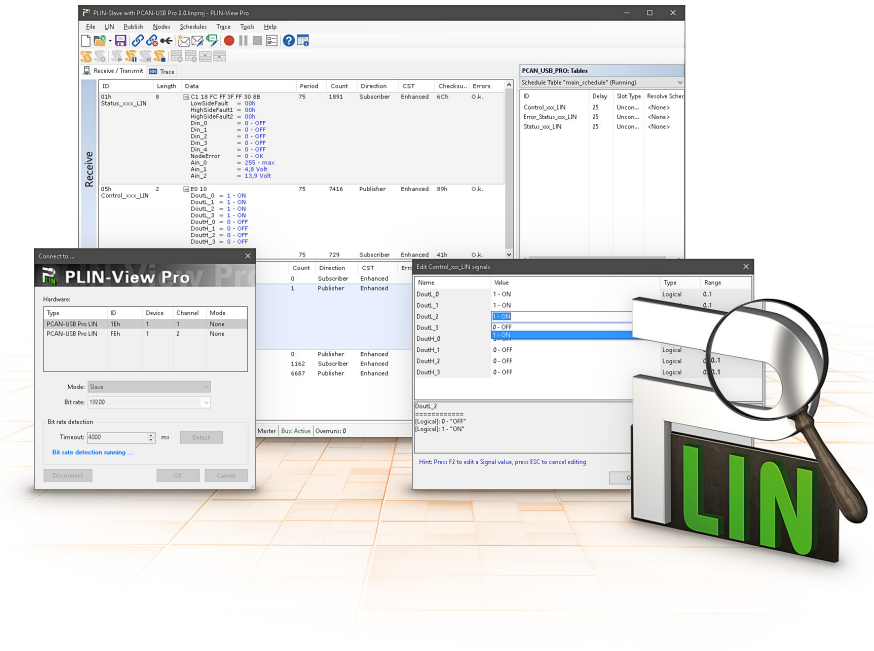


Figure 4: PLIN-View Pro for Windows

Do the following to start and initialize PLIN-View Pro:

1. From the Windows Start menu, select **PLIN-View Pro**.

The dialog box for selecting the LIN hardware and for setting the LIN parameters appears.

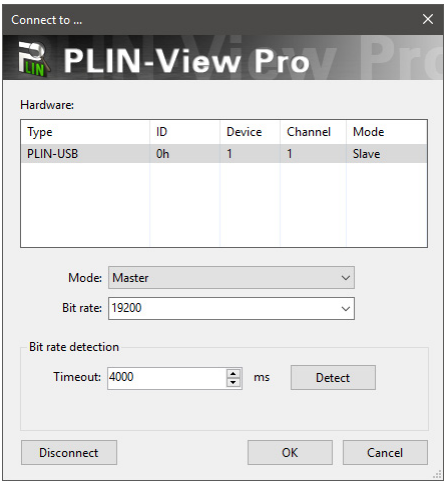


Figure 5: Connection with the PLIN-USB in PLIN-View Pro

2. From the **Hardware** list, select the LIN connection to be used.
3. Determine the operation **Mode** to be used for the LIN connection.
4. From the **Bit rate** list, select the bit rate that is used by all nodes on the LIN bus.
5. Finally confirm the settings in the dialog box with **OK**.

   The main window of PLIN-View Pro appears.

4.1.1 Receive/Transmit Tab

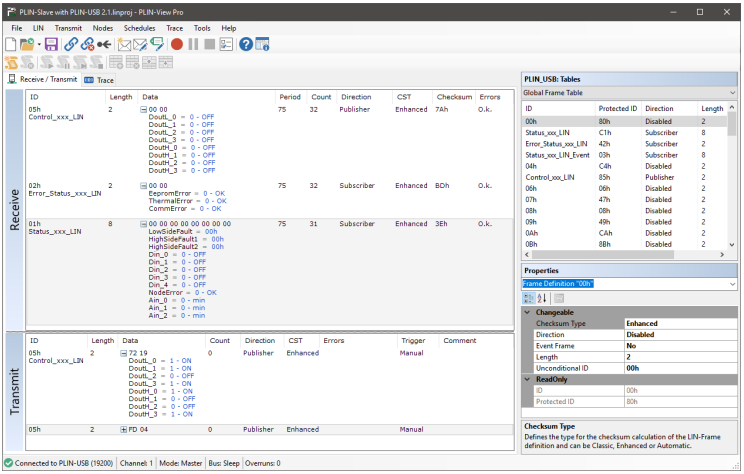


Figure 6: Receive/Transmit tab

The **Receive/Transmit** or **Receive/Publisher** tab is the main element of PLIN-View Pro. It contains two lists, one for received LIN messages and one for to be transmitted ones. In Master mode, Receive/Transmit appears and LIN messages can be transmitted onto the bus. In Slave mode, Receive/Publisher appears. In this case it is not possible to transmit messages.

If a Master requests data from a Slave, the Slave can publish the data within the LIN frame. The Global Frame Table contains all entries for defined LIN frames that can be used by the LIN interface. In order to transmit a LIN frame, the basic frame definition in the properties must be adapted.

Do the following to transmit a LIN frame with PLIN-View Pro:

1. From the **Global Frame Table**, select a frame.
2. Change the **Checksum Type** property to **Enhanced** or **Classic**.

3. Change the **Direction** property to Publisher.
4. Select the menu command **Transmit** > **New Frame**.

   The **New frame** dialog box appears.

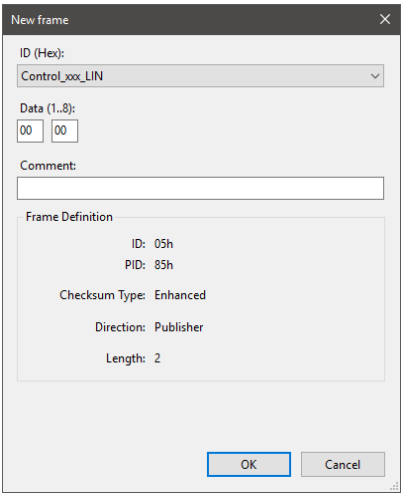


Figure 7: New frame dialog box

5. From the **ID** list, select the frame to be transmitted.
6. Enter the **Data** of the LIN frame in the corresponding field.
7. Confirm the entries with **OK**.
8. Transmit the selected frame with the menu command **Transmit** > **Send** (alternatively Space bar).

Note: You can also manage and activate schedule tables. Furthermore, you can open LDF files and use their information for managing schedule tables, displaying data in symbolic form, or validate and edit data.

Tip: In order to facilitate the work with the Global Frame table, the Transmit and Publisher lists and the schedule tables as well with LDF files, you can put those into a PLIN project file with the menu item **File** > **Save** and reload later on.

4.1.2 Trace Tab

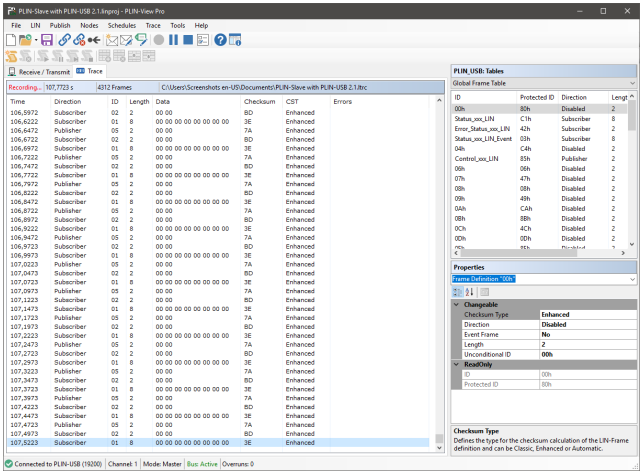


Figure 8: Trace tab

On the **Trace** tab, the tracer (data logger) of PLIN-View Pro is used to record and display the communication on a LIN bus.

On startup of the tracer, the **Save as** dialog box appears. Enter a file name for saving the recording. The recording is continued until the LIN tracer is stopped or until the free space on the selected medium isn't enough anymore.

The upper area of the tab has a bar with information to the tracer status: the current status of the LIN tracer, the total run time, the number of recorded LIN frames, and the name of the current trace file for recording.

4.1.3 Status Bar



Figure 9: Status bar

The status bar shows information about the current LIN hardware, the connected LIN channel, the mode of operation, the LIN bus status (Active/Sleep), and a counter for the unsent or unread LIN frames (Overruns).

You can find further information about the use of PLIN-View Pro in the help which you can invoke in the program via the **Help** menu or with the F1 key.

4.2 PLIN-API for the Connection of Self-created Programs

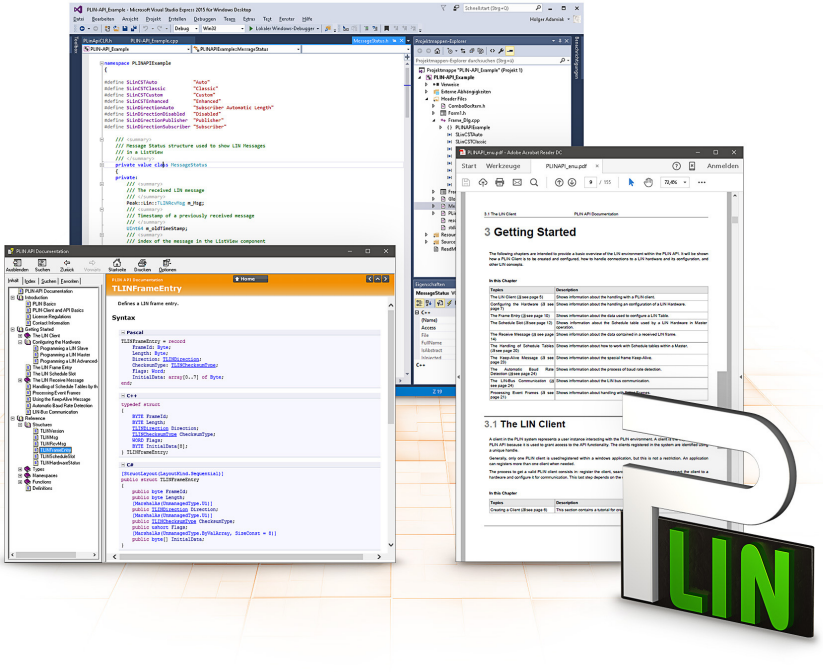


Figure 10: PLIN-API

On the provided DVD in the directory branch `Develop/PC interfaces/Windows/PLIN-API` are files of the PLIN-API. This provides basic functions for connecting your own programs to PC LIN interfaces from PEAK-System and can be used for the following operating systems:

- Windows 10, 8.1, 7 (32/64-Bit)

Furthermore, header files and programming examples (PLIN-View) are available for creating own applications in conjunction with the PLIN API for PC-LIN interfaces from PEAK-System. Read the detailed documentation of the interface (API) in each header file.



Note: You can find further information in the text and help files (file name extensions `.txt` and `.chm`).

Notes about the License

Device drivers, the PLIN interface DLL, and further files needed for linking are property of the PEAK-System Technik GmbH and may be used only in connection with a hardware component purchased from PEAK-System or one of its partners. If a LIN hardware component of third-party suppliers should be compatible to one of PEAK-System, then you are not allowed to use or to pass on the driver software of PEAK-System.

If a third-party supplier develops software based on the PLIN-API and problems occur during the use of this software, consult the software provider.

5 Technical Specifications

Power supply	
Supply voltage	5 V DC via USB port for PLIN-USB (without transceiver) 6 - 28 V DC via pin 9 D-Sub for transceiver (required)
Current consumption	USB: 30 mA Auxiliary supply: max. 20 mA at 12 V

USB	
USB mode	USB 2.0 Full-speed
USB port	Plug type A
Cable length	about 60 cm

LIN	
LIN standard	2.2, downward-compatible
LIN connection	D-Sub, 9-pin, LIN signal on pin 4, galvanic isolation up to 500 V
Transceiver	TJA1028T/3V3/20
Bitrates	1 - 20 kbit/s
Scheduler	Initialized by software, processed by hardware 8 schedule tables with 256 slots in all configurable

Measures	
Size	86 x 43 x 21 mm See also dimension drawing Appendix B on page 23
Length USB connection cable	about 60 cm
Weight	about 80 g (incl. cable)

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
Ingress protection (IEC 60529)	IP20

Conformity	
EMV	Directive 2014/30/EU DIN EN 55024:2016-05 DIN EN 55032:2016-02
RoHS 2	Directive 2011/65/EU DIN EN 50581 VDE 0042-12:2013-02

Appendix A CE Certificate

EU Declaration of Conformity

This declaration applies to the following product:

Product name: PLIN-USB

Item number(s): IPEH-004052

Manufacturer: PEAK-System Technik GmbH
Otto-Roehm-Strasse 69
64293 Darmstadt
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)

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

Appendix B Dimension Drawing

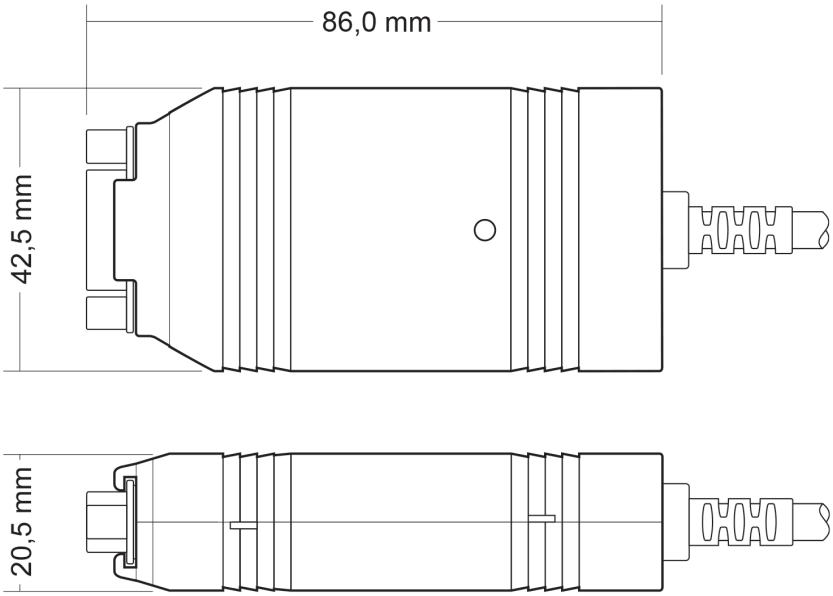


Figure 11: Dimension Drawing of the PLIN-USB

The figure does not show the original size.

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