



VN1614 / VN1615

Manual

Version 1.1 | English

Imprint

Vector Informatik GmbH
Ingersheimer Straße 24
D-70499 Stuttgart

The information and data given in this user manual can be changed without prior notice. No part of this manual may be reproduced in any form or by any means without the written permission of the publisher, regardless of which method or which instruments, electronic or mechanical, are used. All technical information, drafts, etc. are liable to law of copyright protection.

© Copyright 2025, Vector Informatik GmbH. All rights reserved.

Contents

1 Introduction	5
1.1 About this User Manual	6
1.1.1 Warranty	7
1.1.2 Registered Trademarks	7
1.2 Important Notes	8
2 Device Description	9
2.1 Introduction	10
2.2 VN1614	11
2.2.1 Scope of Delivery	11
2.2.2 Main Features	11
2.2.3 Connectors	12
2.2.4 LEDs	13
2.2.5 Technical Data	14
2.2.6 Electrical Isolation	15
2.2.7 Accessories	16
2.3 VN1615	17
2.3.1 Scope of Delivery	17
2.3.2 Main Features	17
2.3.3 Connectors	18
2.3.4 LEDs	19
2.3.5 Technical Data	20
2.3.6 Electrical Isolation	21
2.3.7 Accessories	22
3 Getting Started	23
3.1 Driver Installation	24
3.1.1 General Information	24
3.1.2 Installation Instructions	24
3.1.3 Command Line	26
3.2 Vector Hardware Manager	31
3.2.1 Hardware Configuration	31
3.2.2 Tool Location and Help	31
4 Time Synchronization	32
4.1 General Information	33
4.2 Software Sync	35
4.2.1 General Information	35

4.2.2 Configuration	35
5 Vehicle Electrics and Ground/Earth	36
5.1 General Information	37
5.2 Vehicle Battery Only (Closed System)	38
5.3 External Power Supplies (Test Bench)	39
6 Important Notes - Details	40
6.1 Safety Instructions and Hazard Warnings	41
6.1.1 Proper Use and Intended Purpose	41
6.1.2 Hazards	42
6.2 Disclaimer	43
6.3 Disposal of Vector Hardware	44
7 Wichtige Hinweise	45
7.1 Sicherheits- und Gefahrenhinweise	46
7.1.1 Sach- und bestimmungsgemäßer Gebrauch	46
7.1.2 Gefahren	47
7.2 Haftungsausschluss	48
7.3 Entsorgung von Vector Hardware	49

1 Introduction

In this chapter you find the following information:

1.1 About this User Manual	6
1.1.1 Warranty	7
1.1.2 Registered Trademarks	7
1.2 Important Notes	8

1.1 About this User Manual

Conventions

In the two following charts you will find the conventions used in the user manual regarding utilized spellings and symbols.

Style	Utilization
bold	Blocks, surface elements, window and dialog names of the software. Accentuation of warnings and advices. [OK] Push buttons in brackets File Save Notation for menus and menu entries
Source Code	File name and source code.
Hyperlink	Hyperlinks and references.
<CTRL>+<S>	Notation for shortcuts.

Symbol	Utilization
	This symbol calls your attention to warnings.
	Here you can obtain supplemental information.
	Here you can find additional information.
	Here is an example that has been prepared for you.
	Step-by-step instructions provide assistance at these points.
	Instructions on editing files are found at these points.
	This symbol warns you not to edit the specified file.

1.1.1 Warranty

Restriction of warranty

We reserve the right to change the contents of the documentation and the software without notice. Vector Informatik GmbH assumes no liability for correct contents or damages which are resulted from the usage of the documentation. We are grateful for references to mistakes or for suggestions for improvement to be able to offer you even more efficient products in the future.

1.1.2 Registered Trademarks

Registered trademarks

All trademarks mentioned in this documentation and if necessary third party registered are absolutely subject to the conditions of each valid label right and the rights of particular registered proprietor. All trademarks, trade names or company names are or can be trademarks or registered trademarks of their particular proprietors. All rights which are not expressly allowed are reserved. If an explicit label of trademarks, which are used in this documentation, fails, should not mean that a name is free of third party rights.

- ▶ Windows, Windows 7, Windows 8.1, Windows 10, Windows 11 are trademarks of the Microsoft Corporation.

1.2 Important Notes

**WARNING!**

We provide our important notes and safety instructions in several languages, including English (EN) and German (DE). For more details, see the relevant section:

- ▶ EN: [Important Notes - Details](#)
- ▶ DE: [Wichtige Hinweise](#)

2 Device Description

In this chapter you find the following information:

2.1 Introduction	10
2.2 VN1614	11
2.3 VN1615	17

2.1 Introduction

General information

The VN1614 and VN1615 are compact and cost-effective network interfaces for CAN and LIN applications. They offer high data throughput, low latency, and high-precision timestamping. Both devices connect to the host computer via USB 2.0 and receive power directly from the USB bus.

Use Cases

Use cases range from simple bus analysis to complex bus simulation, as well as diagnostics, calibration, and flash programming. Typical application environments include offices, laboratories, test benches, and the passenger compartment of vehicles.

2.2 VN1614

2.2.1 Scope of Delivery

Contents

The delivery includes:

- ▶ VN1614 CAN Interface
- ▶ USB Cable 3.1 Type C-C (Dual Screw Lock, part no. 05141)

2.2.2 Main Features

VN1614 features

The main features of the VN1614 interface are:

- ▶ 4x CAN/CAN FD channels
 - Support of CAN 2.0 and CAN FD
 - Support of Transport Protocol (TP) acceleration
 - On-board CAN Highspeed transceivers
- ▶ Synchronization of multiple devices and other bus systems with software time synchronization
- ▶ Multi-application support for CAN channels: different tools can use one channel simultaneously
- ▶ Licensor: provides Vector licenses
- ▶ Host connection via USB Type-C and screw connector
- ▶ USB bus-powered
- ▶ LEDs to indicate bus activity and status
- ▶ Single galvanic decoupling between the host connection and the bus channels, all of which have one common ground
- ▶ Robust and compact housing
- ▶ Operating temperature range: -40 °C ... +70 °C.



Figure 1: VN1614 CAN Interface

2.2.3 Connectors

► D-SUB15HD (CH1 ... CH4)

The VN1614 has a D-SUB15HD connector with four CAN channels. Use the VNcable 4Y to split the D-SUB15HD connector into four separate D-SUB9 connectors (CH A, CH B, CH C, and CH D). The pin assignment of the connectors is as follows:

VN1614			VNcable 4Y	
Channel	Assignment	D-SUB15HD	D-SUB9	Channel
1	CAN Low	1	2	A
	CAN High	6	7	
	GND	7	3	
	-	8	9	
2	CAN Low	3	2	B
	CAN High	4	7	
	GND	9	3	
	-	13	9	
3	GND	10	3	C
	CAN High	14	7	
	CAN Low	15	2	
4	GND	2	3	D
	CAN High	12	7	
	CAN Low	11	2	



WARNING!

The VNcable 3Y **cannot** be used for:

- VN1614
- VN1615

► USB (USB Type-C with Dual Screw Lock)

Connect your computer and the VN1614 via USB to install and to use the device with measurement applications (e. g. CANoe, CANalyzer). The screws on the USB Type-C socket enable better fixation/fastening of the USB cable.

2.2.4 LEDs

Description

The VN1614 has four LEDs indicating bus activities and status:

► CH1 ... CH4

Multicolored channel LEDs, each indicating the bus activity for CAN.

Color	Description
Green	Data frames have been sent or received correctly.
Orange	Error frames have been sent or received.
Red	Bus off.

CAN: The flashing frequency depends on the bus load.

► Status

Multicolored LED that indicates the status of the device.

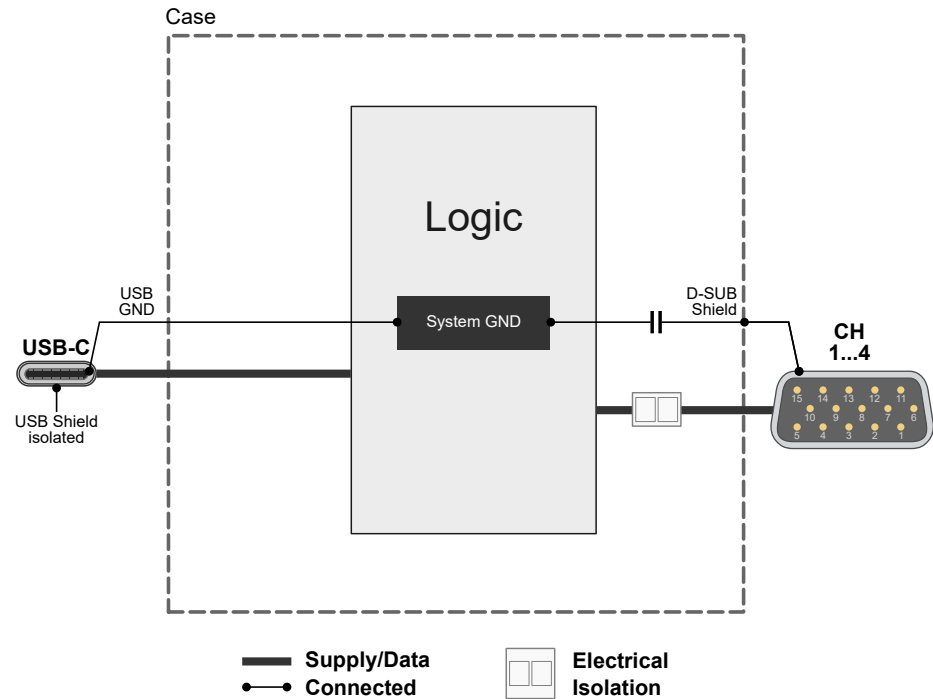
Color	Description
Green	Device is ready for operation/running measurement.
Orange	Initializing driver. Please wait.
Red	Error. Device not working.

2.2.5 Technical Data

CAN channels	4x on-board CAN/CAN FD (TJA1057BT transceiver) Bitrates - CAN: up to 1 Mbit/s (up to 2 Mbit/s depending on wiring and transceivers) - CAN FD: up to 5 Mbit/s (up to 8 Mbit/s depending on wiring and transceivers)
Time stamps	Accuracy (within one device): 1 μ s Accuracy software sync: typ. 50 μ s
Host computer connection	USB 2.0 via USB Type-C
Power supply	via USB Type-C
Power consumption	approx. 1.5 W
Temperature range	Operating: -40 °C ... +70 °C Shipping and storage: -40 °C ... +85 °C
Relative humidity of ambient air	15 %...95 %, non-condensing
Dimensions (LxWxH)	54 mm x 98 mm x 23 mm
Weight	110 g
Operating system requirements	Windows 11 (x64, 64 bit)
Software requirements	CANoe 18 SP3 or higher

2.2.6 Electrical Isolation

Electrical isolation
of the connectors



Note

Please note that the shield of the USB-C connector has the same potential as the logic ground of the device and that this is isolated from the housing ground of the device. This is to avoid ground loops when used with a computer system without an electrically isolated power supply.

2.2.7 Accessories



Reference

Information on available accessories can be found in the separate accessories manual on our [website](#).

Cables and connectors

- ▶ VNCable 4Y
- ▶ CANcable0
- ▶ CANcable1
- ▶ CANcableA
- ▶ CANterm 120
- ▶ CANcable Set Pro
- ▶ USB Cable 3.1 Type A-C (Dual Screw Lock)
- ▶ USB 3.2 Gen2x1 Hub

2.3 VN1615

2.3.1 Scope of Delivery

Contents

The delivery includes:

- ▶ VN1615 LIN/CAN Interface
- ▶ USB Cable 3.1 Type C-C (Dual Screw Lock, part no. 05141)

2.3.2 Main Features

VN1615 features

The main features of the VN1615 interface are:

- ▶ 2x CAN/CAN FD channels
 - Support of CAN 2.0 and CAN FD
 - Support of Transport Protocol (TP) acceleration
 - On-board CAN Highspeed transceivers
- ▶ 2x LIN
 - On-board LIN transceivers
- ▶ Synchronization of multiple devices and other bus systems with software time synchronization
- ▶ Multi-application support for CAN channels: different tools can use one channel simultaneously
- ▶ Licensor: provides Vector licenses
- ▶ Host connection via USB Type-C and screw connector
- ▶ USB bus-powered
- ▶ LEDs to indicate bus activity and status
- ▶ Single galvanic decoupling between the host connection and the bus channels, all of which have one common ground
- ▶ Robust and compact housing
- ▶ Operating temperature range: -40 °C ... +70 °C.



Figure 2: VN1615 LIN/CAN Interface

2.3.3 Connectors

► D-SUB15HD (CH1 ... CH4)

The VN1615 has a D-SUB15HD connector with two LIN and two CAN channels. Use the VNCable4Y to split the D-SUB15HD connector into four separate D-SUB9 connectors (CH A, CH B, CH C, and CH D). The pin assignment of the connectors is as follows:

VN1615			VNCable 4Y	
Channel	Assignment	D-SUB15HD	D-SUB9	Channel
1	Pdis	1	2	A
	LIN	6	7	
	GND	7	3	
	Vbatt	8	9	
2	Pdis	3	2	B
	LIN	4	7	
	GND	9	3	
	Vbatt	13	9	
3	GND	10	3	C
	CAN High	14	7	
	CAN Low	15	2	
4	GND	2	3	D
	CAN High	12	7	
	CAN Low	11	2	



WARNING!

The VNCable 3Y **cannot** be used for:

- VN1614
- VN1615

► USB (USB Type-C with Dual Screw Lock)

Connect your computer and the VN1615 via USB to install and to use the device with measurement applications (e. g. CANoe, CANalyzer). The screws on the USB Type-C socket enable better fixation/fastening of the USB cable.

2.3.4 LEDs

Description

The VN1615 has four LEDs indicating bus activities and status:

► CH1 ... CH4

Multicolored channel LEDs, each indicating the bus activity for a CAN or LIN.

Color	Description
Green	Data frames have been sent or received correctly.
Orange	► CAN: Error frames have been sent or received. ► LIN: Protocol errors as well as valid messages on the bus.
Red	► CAN: Bus off. ► LIN: Protocol errors on the bus.

CAN: The flashing frequency depends on the bus load.

► Status

Multicolored LED that indicates the status of the device.

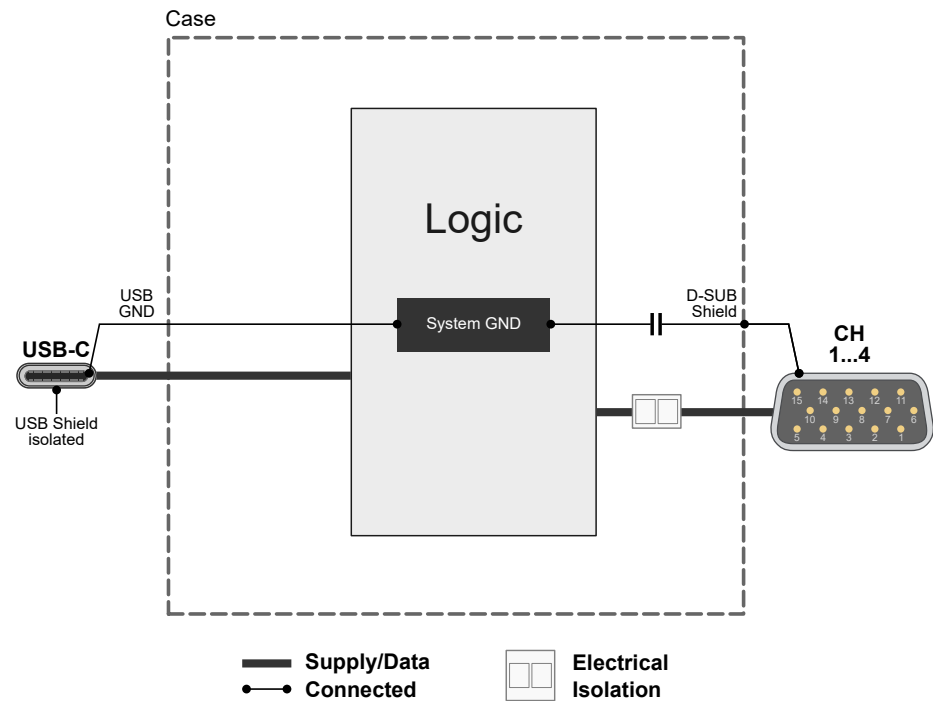
Color	Description
Green	Device is ready for operation/running measurement.
Orange	Initializing driver. Please wait.
Red	Error. Device not working.

2.3.5 Technical Data

CAN channels	2x on-board CAN/CAN FD (TJA1057BT transceiver) Bitrates - CAN: up to 1 Mbit/s (up to 2 Mbit/s depending on wiring and transceivers) - CAN FD: up to 5 Mbit/s (up to 8 Mbit/s depending on wiring and transceivers)
LIN channels	2x on-board LIN (TLE7259 transceiver) Bitrates - min. 2.4 kBit/s - Normal-Mode: up to 20 kBit/s - Flash-Mode: up to 115.2 kBit/s (depending on wiring higher bitrates are possible) Ext. supply voltage (between pin GND and Vbatt): max. 36 V DC.
Time stamps	Accuracy (within one device): 1 μs Accuracy software sync: typ. 50 μs
Host computer connection	USB 2.0 via USB Type-C
Power supply	via USB Type-C
Power consumption	approx. 1.5 W
Temperature range	Operating: -40 °C ... +70 °C Shipping and storage: -40 °C ... +85 °C
Relative humidity of ambient air	15 %...95 %, non-condensing
Dimensions (LxWxH)	54 mm x 98 mm x 23 mm
Weight	112 g
Operating system requirements	Windows 11 (x64, 64 bit)
Software requirements	CANoe 18 SP3 or higher

2.3.6 Electrical Isolation

Electrical isolation
of the connectors



Note

Please note that the shield of the USB-C connector has the same potential as the logic ground of the device and that this is isolated from the housing ground of the device. This is to avoid ground loops when used with a computer system without an electrically isolated power supply.

2.3.7 Accessories



Reference

Information on available accessories can be found in the separate accessories manual on our [website](#).

Cables and connectors

- ▶ VNCable 4Y
- ▶ CANcable0
- ▶ CANcable1
- ▶ CANcableA
- ▶ CANterm 120
- ▶ CANcable Set Pro
- ▶ USB Cable 3.1 Type A-C (Dual Screw Lock)
- ▶ USB 3.2 Gen2x1 Hub

3 Getting Started

In this chapter you find the following information:

3.1 Driver Installation	24
3.1.1 General Information	24
3.1.2 Installation Instructions	24
3.1.3 Command Line	26
3.2 Vector Hardware Manager	31
3.2.1 Hardware Configuration	31
3.2.2 Tool Location and Help	31

3.1 Driver Installation

3.1.1 General Information

The **Vector Driver Setup** allows the installation or the removal of Vector devices.



Note

Please note that you will need **Administrator Rights** for the following steps.

3.1.2 Installation Instructions



Step by Step Procedure

1. Execute the driver setup `\Drivers\Setup.exe` before the device is connected to the computer with the included USB cable.

If you have already connected the device to the computer, the **Windows found new Hardware** wizard appears. Close this wizard and then execute the driver setup.



Vector Informatik GmbH Driver Setup



Welcome to Vector Driver Setup!

This program will install Vector Drivers on your computer.

Click 'Next' to continue with the setup

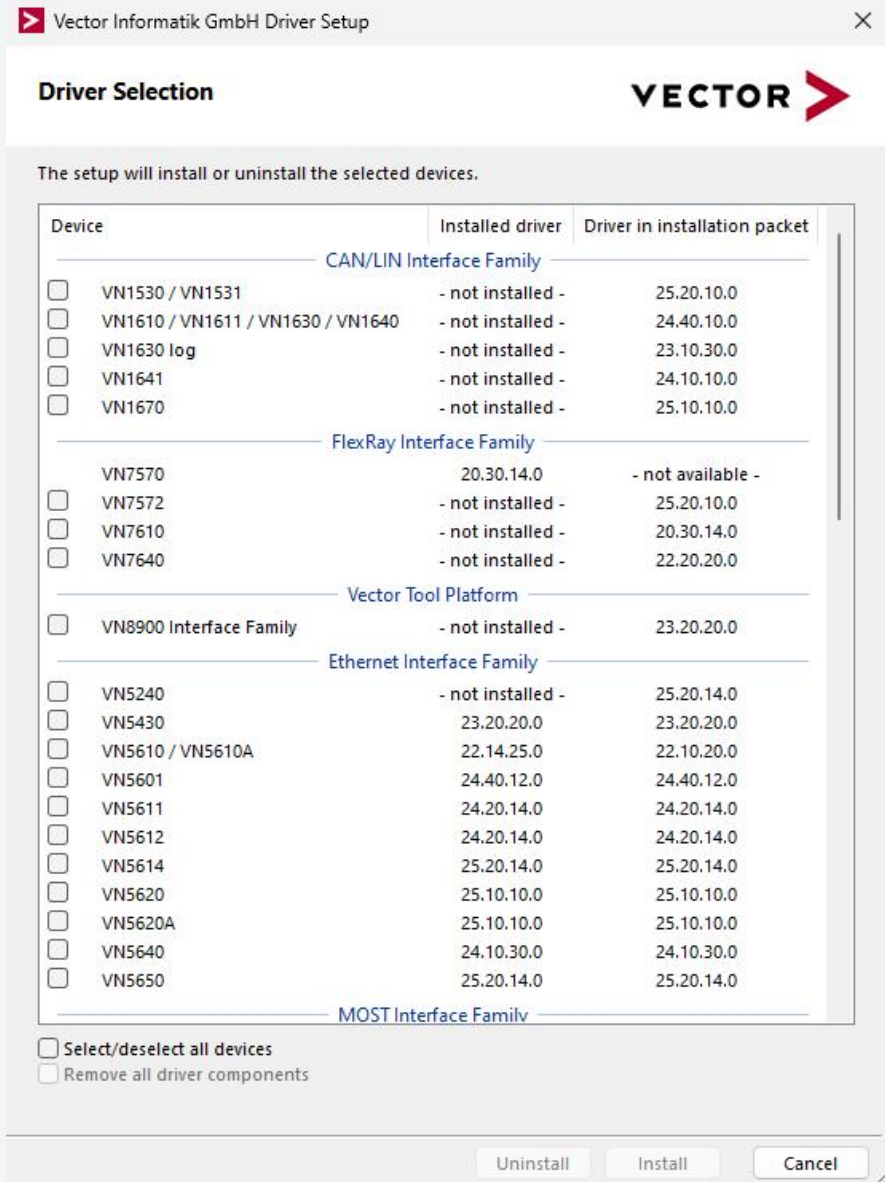
Please close all open applications before proceeding!

Next >

Cancel

2. Click **[Next]** in the driver setup dialog. The initialization process starts.

3. In the driver selection dialog, select your devices to be installed (or to be uninstalled).



4. Click **[Install]** to execute the driver installation, or **[Uninstall]** to remove existing drivers.
5. A confirmation dialog appears. Click **[Close]** to exit. After successful installation, the device is ready for operation and can be connected to the computer with the included USB cable.

3.1.3 Command Line

Command line installation is an important feature for administration purposes when new drivers need to be installed or updated in the background without user interaction.

This section describes how to use the command line for

▶ **Vector drivers**

3.1.3.1 Vector Driver

Prerequisites

Prerequisites

Administrative rights are required to use the `setup.exe` command line tool. If the device is not connected to the computer during installation, a pre-installation to the Windows Driver Store is performed. If the device is connected to the computer for the first time, the device driver installation must be completed. The requirements and actual behavior of this process varies between Windows operating systems (see section [Remarks](#) on page 30).

Options and Actions

The `setup.exe` can be found on the Vector Driver Disk and provides a command line interface as follows:

```
setup.exe [option] [action]
```

Options

Option	Command	Description
Silent mode	/s	Executes the driver setup in silent mode. No user interaction is required. This command cannot be used with uncertified Vector drivers. Use with the <code>/installCert</code> option under Windows 7/8 and above.
No virtual driver	/nv	Does not install any virtual driver (Virtual CAN Bus).
Update only	/uo	The setup is forced to install only a newer version of a driver located in the folder <code>\Drivers</code> .
Vector DLLs only	/dongleDLLsOnly	Use this option to install only the Vector Keyman API DLLs. The WIBU service of the dongle manufacturer will not be installed. Attention: This option is only valid if you actually install the Vector Keyman driver. This means using action: <code>/i keyman</code> .
Install certificate	/installCert	This option installs the Vector driver certificate in the local certificate store under trusted publishers. Use this option in conjunction with the <code>/s</code> option to silently install the Vector drivers under Windows 7/8 and above.
No CodeMeter runtime service	/ncmr	Does not install the WIBU service.

Actions

Action	Command	Description
Install	/i <driver name>	Installs the specified driver from the driver source path. The driver name is the name of the device (e. g. <code>vn1630</code>). Lower case and upper case will be ignored.
Install all	/i all	Installs all available interface drivers from the driver source path. Note: The following drivers are not auto-

Action	Command	Description
		atically installed with the <code>all</code> option: Vector Keyman VN8900 Ethernet driver (vnlpClient). They must be installed explicitly.
Install all and Vector Keyman	<code>/i all keyman</code>	Installs all available interface drivers from the driver source path and the Vector Keyman.
Install all and Vector Keyman	<code>/i all keyman</code>	Installs all available interface drivers from the driver source path and the Vector Keyman.
Uninstall	<code>/u <driver name></code>	Removes (uninstalls) the specified driver from the system. The driver name is the name of the device (e. g. <code>vn1630</code>). Lower case and upper case will be ignored.
Uninstall all	<code>/u all</code>	Removes (uninstalls) all interface drivers and driver components from the system. This action removes everything except for the Vector Keyman and the VN8900 Ethernet driver (vnlpClient).
Uninstall all and Vector Keyman	<code>/u all keyman</code>	Removes (uninstalls) all available interface drivers from the system including the Vector Keyman.
Info	<code>/info <file name></code>	Creates a new file containing information about the drivers, which are available in this installation package (e. g. the version number).
Install Vector Keyman	<code>/i keyman</code>	Installs only the Vector Keyman.
Install virtual driver and driver components only	<code>/i virtual</code>	Installs the virtual driver and the driver components only.
Uninstall Vector Keyman	<code>/u keyman</code>	Uninstalls the Vector Keyman.
Uninstall the virtual driver and driver components	<code>/u virtual</code>	Uninstalls the virtual driver and the driver components only.
No automatic update	<code>/noAutoUpdate <driver name></code>	Disables automatic updating of software running on the device when a driver is installed on the host system. The driver name is the name of the device (e. g. <code>vx1161.41</code>). Lower case and upper case will be ignored. If the specified driver does not support this feature, the action is silently ignored.
No automatic update all	<code>/noAutoUpdate all</code>	Disables automatic updating of software running on the device when a driver is installed on the host system for all drivers that support this feature.

Return Values

When executing `setup.exe` in command line mode, the following values may be returned:

Return Value	Description
0	The operation was successful.
1	The installation was not successful.
2	The uninstallation was not successful.
3	Restart of the system is required.
4	Command <code>/info</code> could not be executed.
5	User attempted to install/uninstall an unknown driver or component.

Examples

Action	Command
<code>setup.exe /s /installCert /i all</code>	Installs all interface drivers silently. Except for the Vector USB dongle, the Vector Keyman and the VN8900/VN8810 Ethernet drivers.
<code>setup.exe /s /installCert /i all vnipclient vnipc18800</code>	Installs all interface drivers silently including the VN8900/VN8810 Ethernet drivers.
<code>setup.exe /s /installCert /i all keyman</code>	Installs all interface drivers silently including the Vector Keyman.
<code>setup.exe /s /installCert /i vn1630</code>	Installs the driver for VN1630(A) silently.
<code>setup.exe /s /i keyman</code>	Installs the driver for the Vector Keyman silently.
<code>setup.exe /s /dongleDLLsOnly /i keyman</code>	Installs only the Vector Keyman API-DLLs silently. The CodeMeter runtime is not installed.
<code>setup.exe /s /dongleDLLsOnly /u keyman</code>	Uninstalls only the Vector Keyman API-DLLs silently. The CodeMeter runtime is not uninstalled.
<code>setup.exe /s /u vn1630</code>	Uninstalls the VN1630 driver from the system silently.
<code>setup.exe /info "Drivers.txt"</code>	Example output of <code>Drivers.txt</code> <pre>[Common] version=0x703001e root=C:\Drivers\ file1=setup.exe file2=DIFxAPI.dll file3=.\CommonFiles [CANboardXL] version=0x7030012 path=.\CANboardXL</pre>

3.1.3.2 Remarks

► **Windows 10 (64 bit) / Windows 11 (64 bit)**

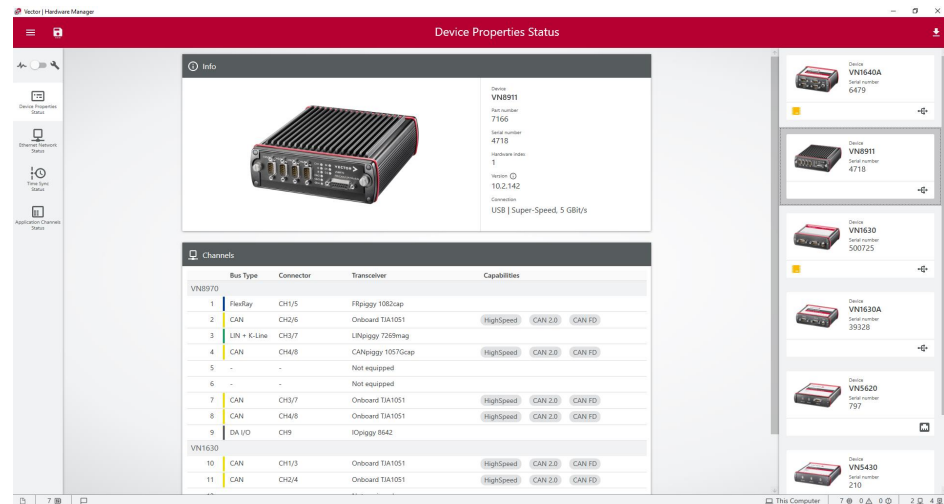
- Recommended installation command:
`setup.exe /installCert /s /i all`
- Recommended uninstallation command:
`setup.exe /s /u all`
- It is not possible to install the drivers from a network drive.
- It is possible to pre-install the drivers, if the hardware is currently not connected. In this case, the installation of the driver automatically completes after connecting the device.
- In order to use the silent mode (/s), the Vector certificate must be added to the trusted publishers. The Vector certificate can be added silently during the first installation by specifying the `/installCert` option. Any future installation of a Vector certified driver can be installed silently then.
- The Vector certificate can also be added to the trusted publishers during the first installation by hitting the checkbox **Always trust content from this publisher**. This installs the Vector certificate locally. Any future installation of a Vector certified driver can be installed silently then.

3.2 Vector Hardware Manager

3.2.1 Hardware Configuration

General information

The **Vector Hardware Manager** is the successor of the Vector Hardware Config tool and a newly developed configuration and diagnostic tool for your installed Vector devices. It is strongly needed to set up your Vector devices for use with your Vector applications (e. g. CANoe, CANalyzer, CANape, ...).



3.2.2 Tool Location and Help

After successful driver installation (see page 24) of your Vector device, you will find the Vector Hardware Manager in the Windows Start menu or in the installation folder:

`C:\Program Files (x86)\Vector Hardware Manager\vHardwareManager.exe`



Reference

Details, tips and instructions for the Vector Hardware Manager can be found in the supplied help.

- ▶ You can open the help by pressing **<F1>** in the Vector Hardware Manager or
- ▶ directly via:
`C:\Program Files (x86)\Vector Hardware Manager\Help01\HTML5\VectorHardwareManager.htm`
- ▶ The most recent version of the help is also available online:
<https://help.vector.com/VectorHardwareManager/index.php>

For a brief introduction, we recommend reading the sections **Basic Concept** and **Quick Start Guide**. Furthermore, we have provided additional information for you in the section **Tips and Tutorials**.

4 Time Synchronization

In this chapter you find the following information:

4.1 General Information	33
4.2 Software Sync	35
4.2.1 General Information	35
4.2.2 Configuration	35

4.1 General Information

Time stamps and events

Time stamps are useful when analyzing incoming or outgoing data or event sequences on a specific bus.

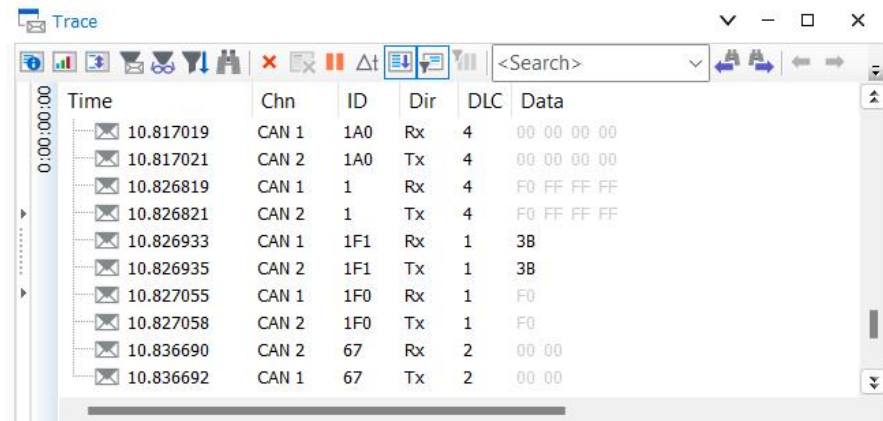


Figure 3: Time stamps of two CAN channels in CANoe

Generating time stamps

Each event which is sent or received by a Vector network interface has an accurate time stamp. Time stamps are generated for each channel in the Vector network interface. The base for these time stamps is a common hardware clock in the device.

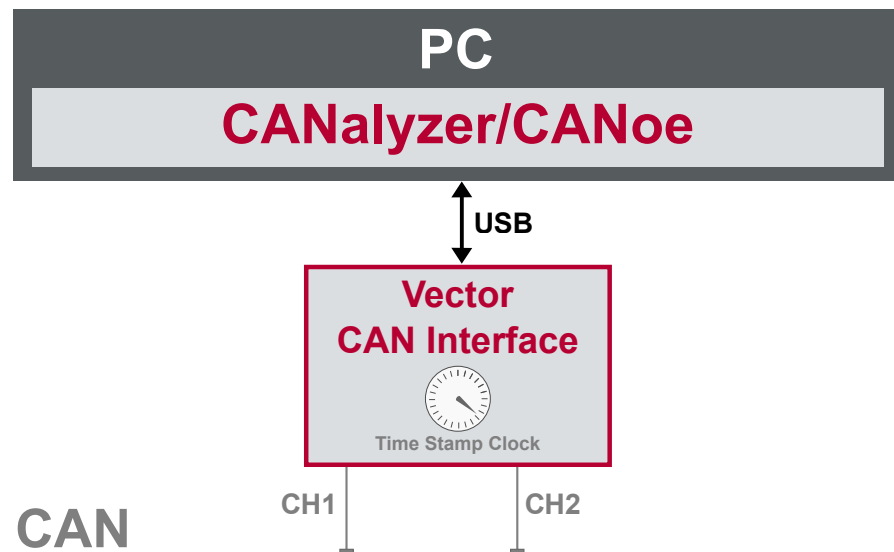


Figure 4: Common time stamp clock for each channel

If the measurement setup requires more than one Vector network interface, a synchronization of all connected interfaces and their hardware clocks is needed.

Due to manufacturing and temperature tolerances, the hardware clocks may vary in speed, so time stamps of various Vector devices drift over time.

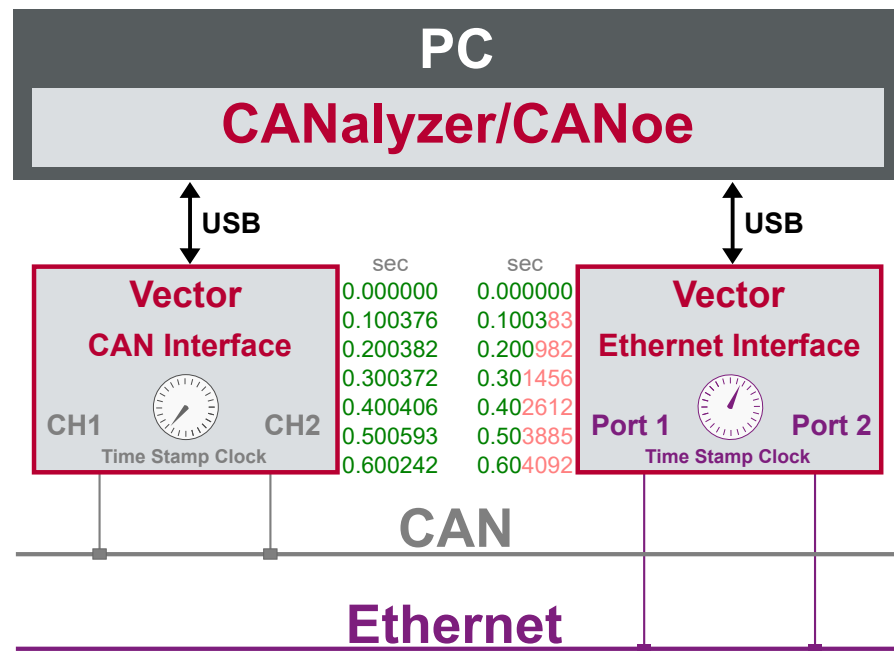


Figure 5: Example of unsynchronized network interfaces. Independent time stamps drift apart

To compensate for these time stamp deviations between the Vector network interfaces, the time stamps can be either synchronized by software, hardware, PTP or GNSS (capability depends on the Vector device).



Note

The accuracy of the software, hardware, PTP or GNSS sync depends on the interface. Further information on specific values can be found in the technical data of the respective devices.

4.2 Software Sync

4.2.1 General Information

Synchronization by software

The software time synchronization is driver-based and available for all applications without any restrictions. The time stamp deviations from different Vector network interfaces are calculated and synchronized to the common PC clock. For this purpose no further hardware setup is required.

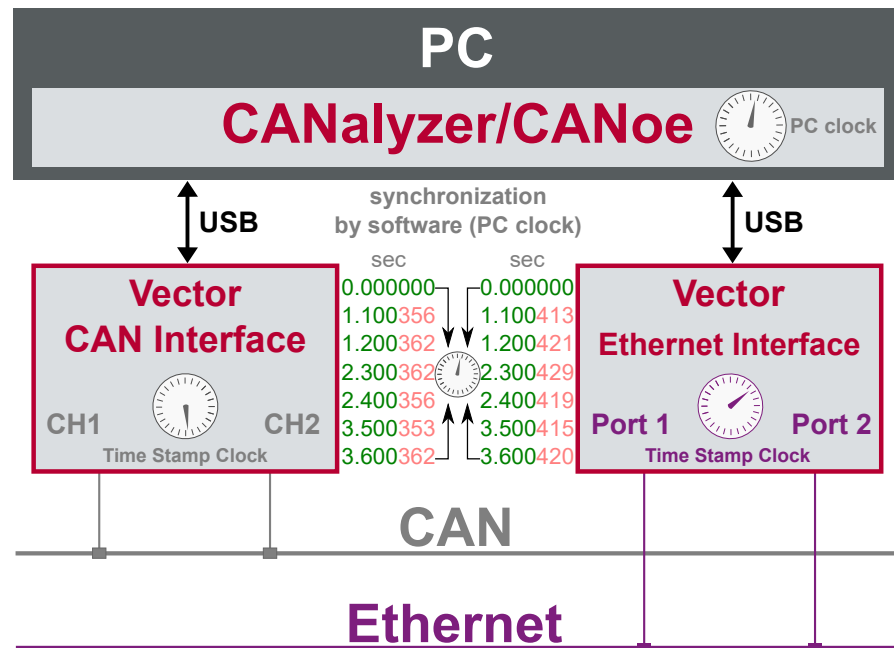


Figure 6: Time stamps of devices are synchronized to the PC clock



Note

Software time synchronization may lead to an increased latency for all connected Vector network interfaces. If a use case requires low latency, deactivate this option and use another synchronization mechanism.

4.2.2 Configuration

Vector Hardware Manager

Use the software synchronization if at least one device has no hardware sync connector. Also to synchronize the device clock to the computer time, use the software synchronization (legacy).



Reference

Further details and tips on the time sync configuration can be found in the Vector Hardware Manager help in section **User Interface | Navigation Rail | Time Sync**.

5 Vehicle Electrics and Ground/Earth

In this chapter you find the following information:

5.1 General Information	37
5.2 Vehicle Battery Only (Closed System)	38
5.3 External Power Supplies (Test Bench)	39

5.1 General Information

**WARNING!**

When using Vector devices, ensure that the power supply and earthing are correct. Failure to do so may result in damage to the vehicle electronics or the Vector devices due to overvoltage. Two typical scenarios are described below.

5.2 Vehicle Battery Only (Closed System)

In this scenario, the individual Vector devices are powered directly from the vehicle battery. A third device is powered via USB (e. g. from a notebook in battery mode or from the vehicle battery) or via PCIe (card mounted in a computer and powered from the vehicle battery). The system is therefore closed.

The common reference ground is the chassis, which is connected to the negative terminal of the vehicle battery. Vector devices that have a functional earth connection (FE) must also be connected to the reference ground.

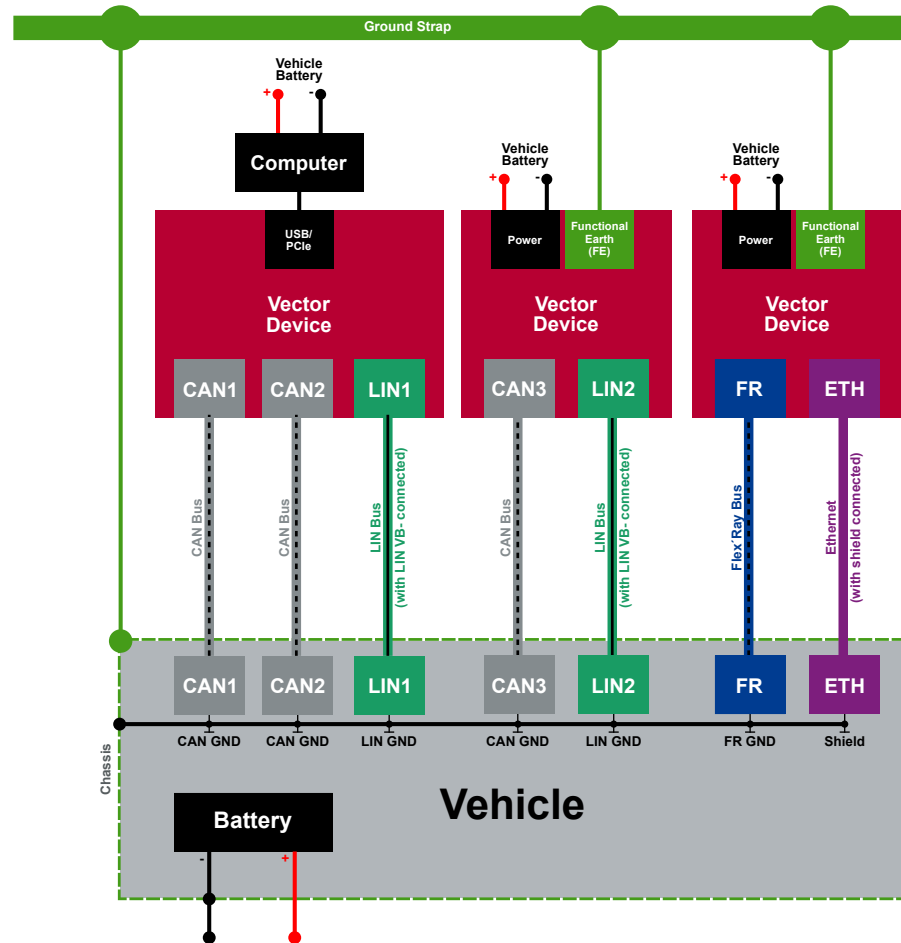


Figure 7: Vector devices powered by vehicle battery

The individual GNDs of the ECUs (in this example CAN, LIN, FlexRay) are connected to the chassis on the vehicle side. The shielding of the Ethernet connections is also connected to the chassis.

In this scenario, LIN VB- must be connected in the LIN signal path (LIN always requires VB- to be connected). For CAN and FlexRay it is recommended to connect all signal GNDs via their connectors (CAN GND, FlexRay VB-) to have the same reference ground from the vehicle battery.

5.3 External Power Supplies (Test Bench)

In this scenario, the individual Vector devices are powered by individual power supplies. A third device is powered via USB or PCIe. This is a typical test bench scenario.

The common reference ground is earth, which is also connected to the chassis and to the negative terminal of the vehicle battery. Vector devices that have a functional earth connection (FE) must also be connected to the reference ground.

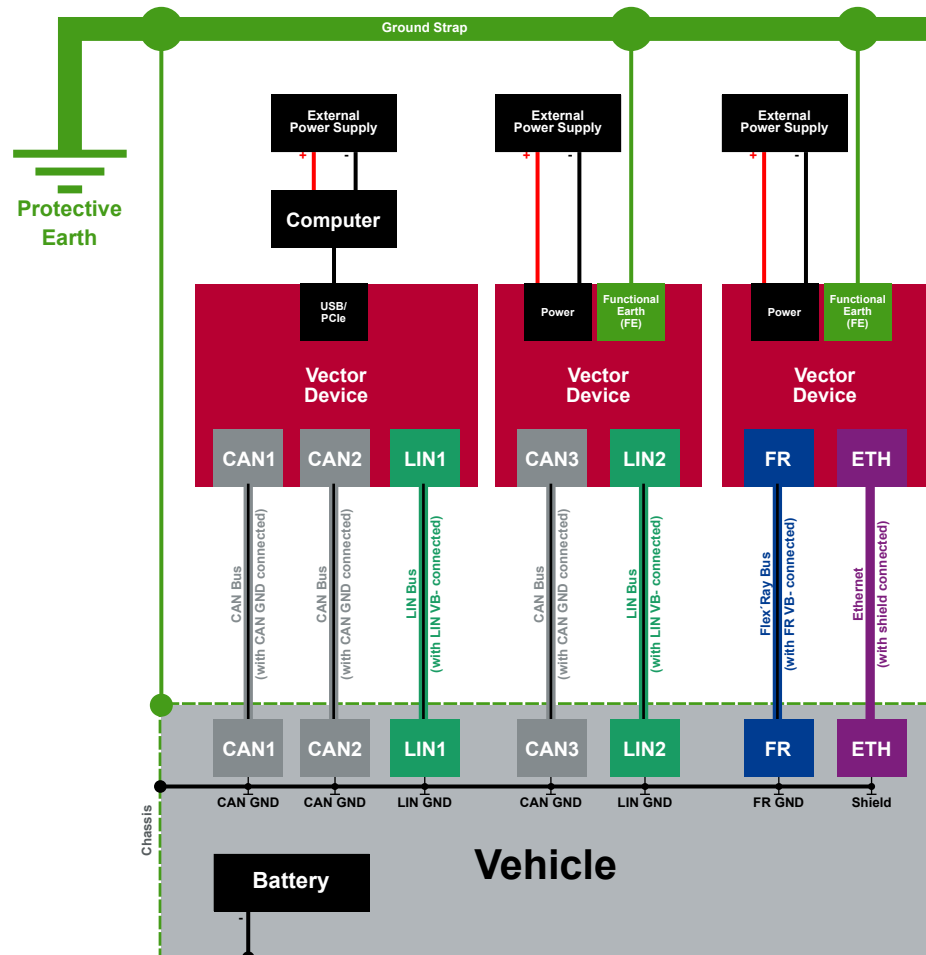


Figure 8: Test bench scenario

The individual GNDs of the ECUs (in this example CAN, LIN, FlexRay) are connected to the chassis on the vehicle side. The shielding of the Ethernet connections is also connected to the chassis.

In this scenario, all signal GNDs must be connected via their connectors (CAN GND, LIN VB-, FlexRay VB-) to have the same reference ground.

6 Important Notes - Details

In this chapter you find the following information:

6.1 Safety Instructions and Hazard Warnings	41
6.1.1 Proper Use and Intended Purpose	41
6.1.2 Hazards	42
6.2 Disclaimer	43
6.3 Disposal of Vector Hardware	44

6.1 Safety Instructions and Hazard Warnings

**WARNING!**

In order to avoid personal injuries and damage to property, you have to read and understand the following safety instructions and hazard warnings prior to installation and use of this interface. Keep this documentation (manual) always near the interface.

6.1.1 Proper Use and Intended Purpose

**WARNING!**

The interface is designed for analyzing, controlling and otherwise influencing control systems and electronic control units. This includes, inter alia, bus systems like CAN, LIN, K-Line, MOST, FlexRay, Ethernet, BroadR-Reach and/or ARINC 429.

The interface may only be operated in a closed state. In particular, printed circuits must not be visible. The interface may only be operated (i) according to the instructions and descriptions of this manual; (ii) with the electric power supply designed for the interface, e.g. USB-powered power supply; and (iii) with accessories manufactured or approved by Vector.

The interface is exclusively designed for use by skilled personnel as its operation may result in serious personal injuries and damage to property. Therefore, only those persons may operate the interface who (i) have understood the possible effects of the actions which may be caused by the interface; (ii) are specifically trained in the handling with the interface, bus systems and the system intended to be influenced; and (iii) have sufficient experience in using the interface safely.

The knowledge necessary for the operation of the interface can be acquired in work-shops and internal or external seminars offered by Vector. Additional and interface specific information, such as „Known Issues“, are available in the „Vector KnowledgeBase“ on Vector’s website at www.vector.com. Please consult the „Vector KnowledgeBase“ for updated information prior to the operation of the interface.

6.1.2 Hazards



WARNING!

The interface may control and/or otherwise influence the behavior of control systems and electronic control units. Serious hazards for life, body and property may arise, in particular, without limitation, by interventions in safety relevant systems (e.g. by deactivating or otherwise manipulating the engine management, steering, airbag and/or braking system) and/or if the interface is operated in public areas (e.g. public traffic, airspace). Therefore, you must always ensure that the interface is used in a safe manner. This includes, inter alia, the ability to put the system in which the interface is used into a safe state at any time (e.g. by „emergency shutdown“), in particular, without limitation, in the event of errors or hazards.

Comply with all safety standards and public regulations which are relevant for the operation of the system. Before you operate the system in public areas, it should be tested on a site which is not accessible to the public and specifically prepared for performing test drives in order to reduce hazards.

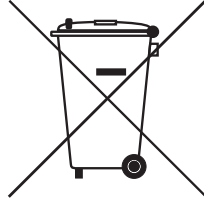
6.2 Disclaimer

**WARNING!**

Claims based on defects and liability claims against Vector are excluded to the extent damages or errors are caused by improper use of the interface or use not according to its intended purpose. The same applies to damages or errors arising from insufficient training or lack of experience of personnel using the interface.

6.3 Disposal of Vector Hardware

Please handle old devices responsibly and observe the environmental laws applicable in your country. Please dispose of the Vector hardware only at the designated places and not with the household waste.



Within the European Community, the Directive on Waste Electrical and Electronic Equipment (WEEE Directive) and the Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS Directive) apply.

For Germany and other EU countries, we offer free take-back of old Vector hardware.

Please carefully check the Vector hardware to be disposed of before shipping. Please remove all items that are not part of the original scope of delivery, e.g. storage media. The Vector hardware must also be free of licenses and must no longer contain any personal data. Vector does not perform any checks in this regard. Once the hardware has been shipped, it cannot be returned to you. By shipping the hardware to us, you have relinquished your rights to the hardware. Before shipping, please register your old device via:

<https://www.vector.com/int/en/support-downloads/return-registration-for-the-disposal-of-vector-hardware/>

7 Wichtige Hinweise

In diesem Kapitel finden Sie die folgenden Informationen:

7.1 Sicherheits- und Gefahrenhinweise	46
7.1.1 Sach- und bestimmungsgemäßer Gebrauch	46
7.1.2 Gefahren	47
7.2 Haftungsausschluss	48
7.3 Entsorgung von Vector Hardware	49

7.1 Sicherheits- und Gefahrenhinweise

**WARNUNG!**

Um Personen- und Sachschäden zu vermeiden, müssen Sie vor der Installation und dem Einsatz dieses Interfaces die nachfolgenden Sicherheits- und Gefahrenhinweise lesen und verstehen. Bewahren Sie diese Dokumentation (Handbuch) stets in der Nähe dieses Interfaces auf.

7.1.1 Sach- und bestimmungsgemäßer Gebrauch

**WARNUNG!**

Das Interface ist für die Analyse, die Steuerung sowie für die anderweitige Beeinflussung von Regelsystemen und Steuergeräten bestimmt. Das umfasst unter anderem die Bussysteme CAN, LIN, K-Line, MOST, FlexRay, Ethernet, BroadR-Reach oder ARINC 429.

Der Betrieb des Interfaces darf nur im geschlossenen Zustand erfolgen. Insbesondere dürfen keine Leiterplatten sichtbar sein. Das Interface ist entsprechend den Anweisungen und Beschreibungen dieses Handbuchs einzusetzen. Dabei darf nur die dafür vorgesehene Stromversorgung, wie z. B. USB-powered, Netzteil, und das Originalzubehör von Vector bzw. das von Vector freigegebene Zubehör verwendet werden.

Das Interface ist ausschließlich für den Einsatz durch geeignetes Personal bestimmt, da der Gebrauch dieses Interfaces zu erheblichen Personen- und Sachschäden führen kann. Deshalb dürfen nur solche Personen dieses Interface einsetzen, welche die möglichen Konsequenzen der Aktionen mit diesem Interface verstanden haben, speziell für den Umgang mit diesem Interface, den Bussystemen und dem zu beeinflussenden System geschult worden sind und ausreichende Erfahrung im sicheren Umgang mit dem Interface erlangt haben.

Die notwendigen Kenntnisse zum Einsatz dieses Interfaces können bei Vector über interne oder externe Seminare und Workshops erworben werden. Darüber hinausgehende und Interface-spezifische Informationen wie z. B. „Known Issues“ sind auf der Vector Webseite unter www.vector.com in der „Vector KnowledgeBase“ verfügbar. Bitte informieren Sie sich dort vor dem Betrieb des Interfaces über aktualisierte Hinweise.

7.1.2 Gefahren



WARNUNG!

Das Interface kann das Verhalten von Regelsystemen und Steuergeräten steuern und in anderweitiger Weise beeinflussen. Insbesondere durch Eingriffe in sicherheitsrelevante Bereiche (z. B. durch Deaktivierung oder sonstige Manipulation der Motorsteuerung, des Lenk-, Airbag-, oder Bremssystems) und/oder der Einsatz des Interfaces in öffentlichen Räumen (z. B. Straßenverkehr, Luftraum) können erhebliche Gefahren für Leib, Leben und Eigentum entstehen. Stellen Sie daher in jedem Fall eine gefahrfreie Verwendung sicher. Hierzu gehört unter anderem auch, dass das System, in dem das Interface eingesetzt wird, jederzeit, insbesondere bei Auftreten von Fehlern oder Gefahren, in einen sicheren Zustand geführt werden kann (z. B. durch Not-Abschaltung).

Beachten Sie alle sicherheitstechnischen Richtlinien und öffentlich-rechtlichen Vorschriften, die für den Einsatz des Systems relevant sind. Zur Verminderung von Gefahren sollte das System vor dem Einsatz in öffentlichen Räumen auf einem nicht-öffentlich zugänglichen und für Testfahrten bestimmten Gelände erprobt werden.

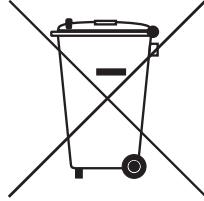
7.2 Haftungsausschluss

**WARNUNG!**

Soweit das Interface nicht sach- oder bestimmungsgemäß eingesetzt wird, übernimmt Vector keine Gewährleistung oder Haftung für dadurch verursachte Schäden oder Fehler. Das Gleiche gilt für Schäden oder Fehler, die auf einer mangelnden Schulung oder Erfahrung derjenigen Personen beruhen, die das Interface einsetzen.

7.3 Entsorgung von Vector Hardware

Bitte gehen Sie verantwortungsvoll mit Altgeräten um und beachten Sie die in Ihrem Land geltenden Umweltgesetze. Entsorgen Sie die Vector Hardware bitte nur bei den dafür vorgesehenen Stellen und nicht über den Hausmüll.



Innerhalb der Europäischen Gemeinschaft gelten die Richtlinie über Elektro- und Elektronik-Altgeräte (WEEE-Richtlinie) und die Richtlinie zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten (RoHS-Richtlinie).

Für Deutschland und andere EU-Länder bieten wir Ihnen eine kostenlose Rücknahme der alten Vector Hardware an.

Bitte überprüfen Sie die zu entsorgende Vector Hardware vor dem Versand sorgfältig. Bitte entfernen Sie alle Gegenstände, die nicht zum ursprünglichen Lieferumfang gehören, z. B. Speichermedien. Die Vector Hardware muss außerdem frei von Lizenzen sein und darf keine personenbezogenen Daten mehr enthalten. Vector führt keine Kontrollen diesbezüglich durch. Sobald die Hardware versandt wurde, kann sie nicht mehr an Sie zurück geliefert werden. Mit dem Versand der Hardware an uns haben Sie Ihre Rechte an der Hardware abgetreten. Bitte melden Sie vor dem Versand Ihr Altgerät an über:

<https://www.vector.com/de/de/support-downloads/return-registration-for-the-disposal-of-vector-hardware/>



Visit our website for:

- ▶ News
- ▶ Products
- ▶ Demo software
- ▶ Support
- ▶ Training classes
- ▶ Addresses