

VECTOR >

VN1600 Interface Family Manual

Version 6.0 | English



Imprint

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1 Introduction

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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.
	Warning of damage by electrostatic discharge (ESD = Electrostatically Sensitive Device).
	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 modify the contents of the documentation or the software without notice. Vector disclaims all liabilities for the completeness or correctness of the contents and for damage which may result from the use of this documentation.

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.



- > SD and SDHC are trademarks of the SD Card Association.

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 VN1600 Interface Family

In this chapter you find the following information:

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2.1 Introduction

General information

The VN1600 interface family is a flexible and cost-efficient solution for CAN, CAN FD, CAN XL, LIN, K-Line, J1708 and SENT (only VN1640A) applications. An excellent performance with minimal latency times and high time stamp accuracy is also guaranteed.

The multi-application functionality of the VN1600 interface family supports simultaneous operation of different applications on one channel, e. g. CANoe and CANape. Tasks range from simple bus analyses to complex remaining bus simulations also diagnostic, calibration and reprogramming tasks as well as LIN 2.1 compliance tests.

Bus types

Depending on the VN1600 interface, built-in transceivers as well as exchangeable CAN, LIN, J1708 and SENT transceivers can be used. The exchangeable transceivers are available as plug-in boards (piggybacks) and are inserted in the VN1600. A list of compatible piggybacks can be found in the accessories manual or on our website.

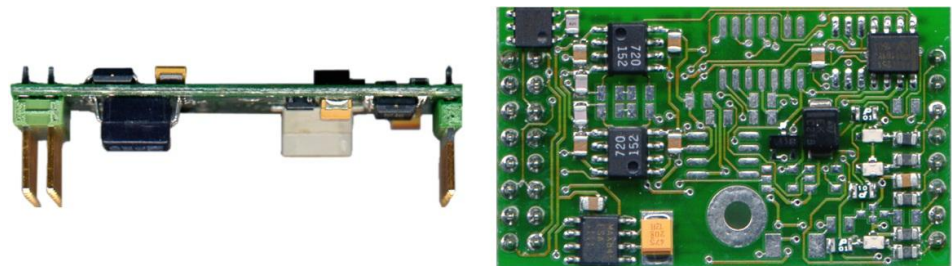


Figure 1: Piggyback

2.2 VN1610

2.2.1 Main Features

VN1610 features

The main features of the VN1610 interface are:

- > 2x CAN High-Speed 1051cap transceiver (capacitively decoupled)
- > Software sync



Figure 2: VN1610 CAN Interface

2.2.2 Connectors

> CH1/2 (D-SUB9)

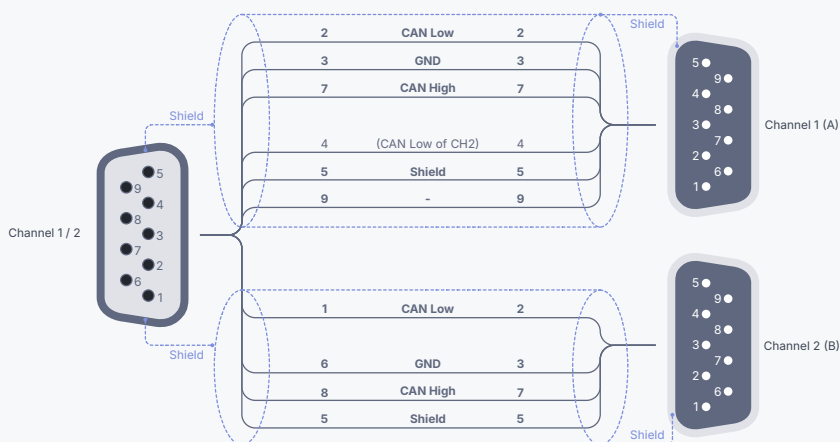
The VN1610 has a D-SUB9 connector with two CAN channels. The pin assignment is as follows:

Pin	Assignment
1	CH2 CAN Low
2	CH1 CAN Low
3	CH1 GND
4	CH2 CAN Low
5	CH1/2 Shield
6	CH2 GND
7	CH1 CAN High
8	CH2 CAN High
9	Not connected



Note

Use the CANcable 2Y to access both channels on separate D-SUB9 connectors (see accessories manual, part number 05075).



> USB

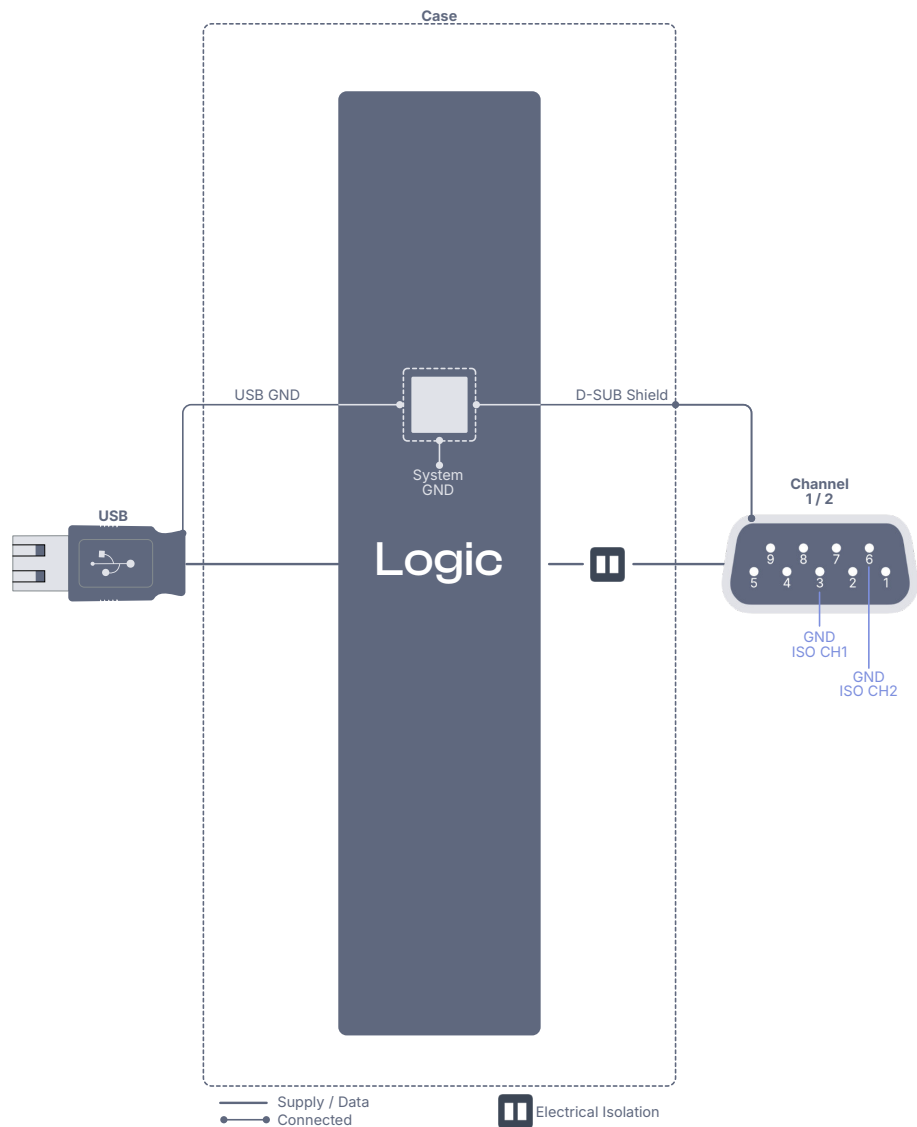
Connect your computer and the VN1610 via USB to install and to use the device with measurement applications (e. g. CANoe, CANalyzer).

2.2.3 Technical Data

CAN channels	2x CAN High-Speed 1051cap Bitrates <ul style="list-style-type: none"> > 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 µs Accuracy software sync: typ. 50 µs
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)	65 mm x 42 mm x 20 mm
Weight	80 g
Operating system requirements	Windows 10 (x64, 64 bit) Windows 11 (x64, 64 bit)

2.2.4 Electrical Isolation

Electrical isolation
of the connectors



Note

The electrical isolation of the interfaces is a functional isolation that is used to avoid ground loops and interference between the networks. The voltage difference between the isolated areas must not exceed 60 VDC (isolation voltage). The isolation voltage usually exceeds the maximum permissible voltage at a port (operating voltage).

2.2.5 Accessories



Note

Detailed information on the listed accessories can be found in the separate accessories manual on our [website](#).

Cables and connectors

- > CANcable0
- > CANcable1
- > CANcableA
- > CANcable Y
- > CANcable 2Y
- > CANterm 120
- > CANcable Set Pro
- > USBadapter 3.2 Gen 1 C-A SDSL (Single Screw Lock)

2.3 VN1611

2.3.1 Main Features

VN1611 features

The main features of the VN1611 interface are:

- > 1x LIN 7269cap transceiver (capacitively decoupled)
- > 1x CAN High-Speed 1051cap transceiver (capacitively decoupled)
- > Software sync



Figure 3: VN1611 LIN/CAN Interface



Note

The VN1611 does not support LIN 2.1 compliance tests. Please use the VN1630A or the VN1640A for these purposes.

2.3.2 Connectors

> CH1/2 (D-SUB9)

The VN1611 has a D-SUB9 connector with one LIN and one CAN channel. The pin assignment is as follows:

Pin	Assignment
1	CH2 CAN Low
2	Not connected
3	CH1 VB-
4	CH1 Pdis
5	CH1/2 Shield
6	CH2 GND
7	CH1 LIN
8	CH2 CAN High
9	CH1 VB+



Note

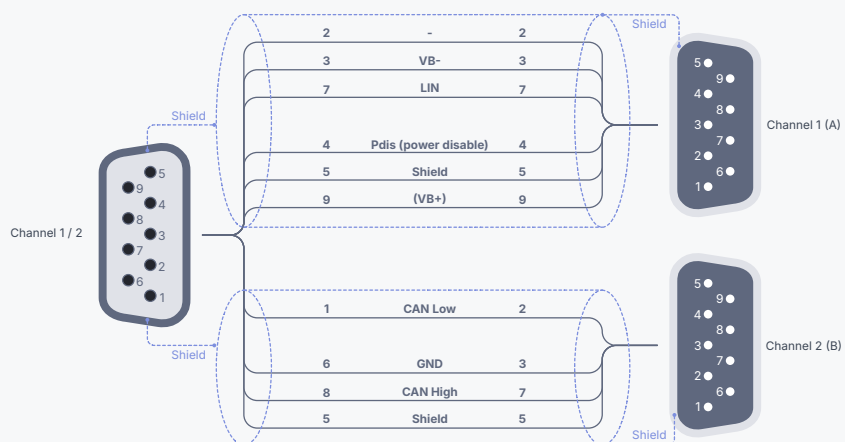
Please note that pin 3 (VB-) is the reference potential for pin 7 (7269cap LIN). So pin 3 could also be called "7269cap GND". It is electrically isolated from pin 6 (1051cap GND).

If pin 4 (Pdis) is connected to pin 3 (VB-), the internal power supply is disabled. In this case an external power supply is required at pin 9 (VB+).



Note

Use the CANcable 2Y to access both channels on separate D-SUB9 connectors (see accessories manual, part number 05075).



> **USB**

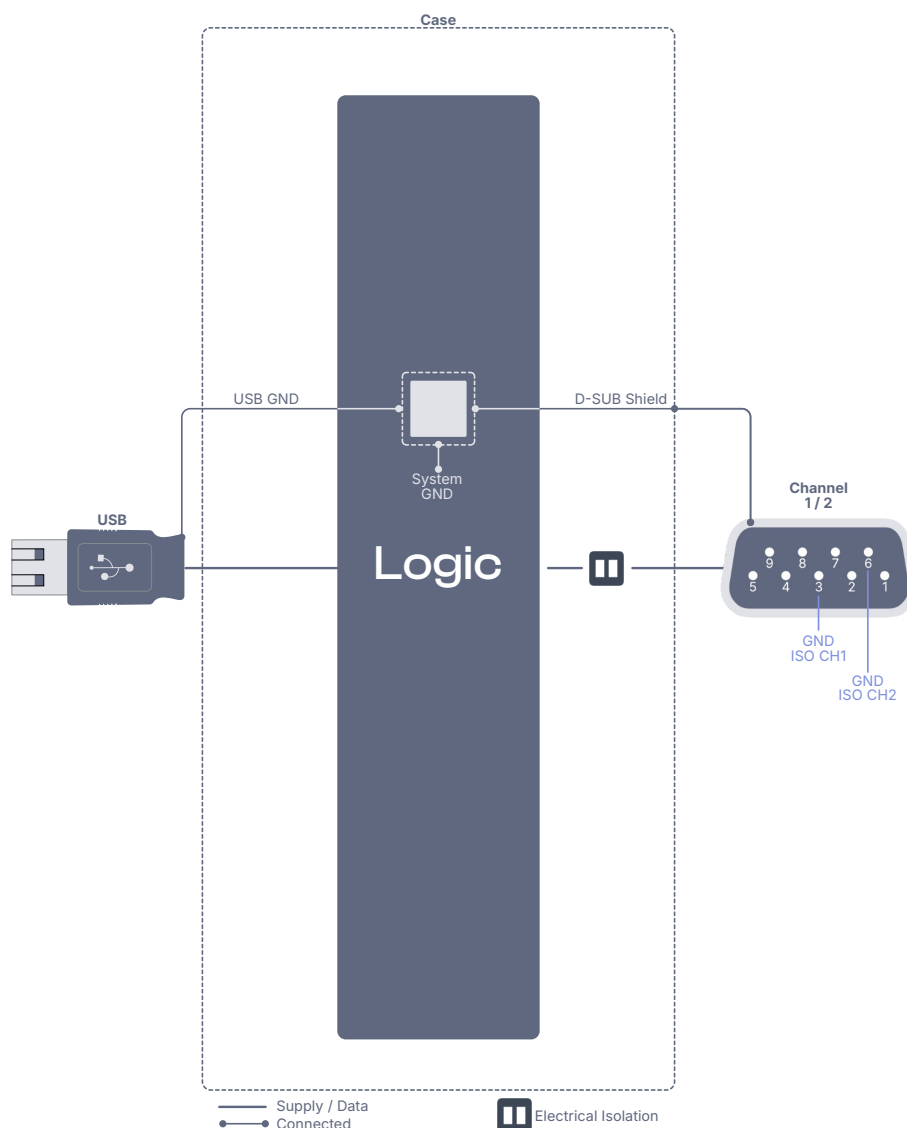
Connect your computer and the VN1611 via USB to install and to use the device with measurement applications (e. g. CANoe, CANalyzer).

2.3.3 Technical Data

CAN channels	<p>1x CAN High-Speed 1051cap</p> <p>Bitrates</p> <ul style="list-style-type: none"> > 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	<p>1x LIN 7269cap</p> <p>Bitrates</p> <ul style="list-style-type: none"> > Normal-Mode: up to 20 kbit/s > Flash-Mode: up to 115.2 kbit/s (depending on wiring higher bitrates are possible) <p>Ext. supply voltage (between pin 7269cap VB- and 7269cap VB+): max. 36 V DC.</p>
K-Line channels	1
Time stamps	<p>Accuracy (within one device): 1 µs</p> <p>Accuracy software sync: typ. 50 µs</p>
Temperature range	<p>Operating: -40 °C ... +70 °C</p> <p>Shipping and storage: -40 °C ... +85 °C</p>
Relative humidity of ambient air	15 % ... 95 %, non-condensing
Dimensions (LxWxH)	65 mm x 42 mm x 20 mm
Weight	80 g
Operating system requirements	<p>Windows 10 (x64, 64 bit)</p> <p>Windows 11 (x64, 64 bit)</p>

2.3.4 Electrical Isolation

Electrical isolation
of the connectors



Note

The electrical isolation of the interfaces is a functional isolation that is used to avoid ground loops and interference between the networks. The voltage difference between the isolated areas must not exceed 60 VDC (isolation voltage). The isolation voltage usually exceeds the maximum permissible voltage at a port (operating voltage).

2.3.5 Accessories



Note

Detailed information on the listed accessories can be found in the separate accessories manual on our [website](#).

Cables and connectors

- > CANcable0
- > CANcable1
- > CANcableA
- > CANcable Y
- > CANcable 2Y
- > CANterm 120
- > CANcable Set Pro
- > USBadapter 3.2 Gen 1 C-A SDSL (Single Screw Lock)

2.4 VN1630A

2.4.1 Scope of Delivery

Contents

The delivery includes:

- > VN1630A CAN/LIN Interface
- > USB 2.0 cable (part number 05011)
- > USB Protector Type 1 (part number 05142, see [page 84](#))

2.4.2 Main Features

VN1630A features

The main features of the VN1630A interface are:

- > 2x CAN High-Speed 1051cap transceiver (capacitively decoupled)
- > 2x additional plug-in location for CAN-/LINpiggies
- > Fifth channel for dedicated digital-analog input/output tasks
- > Five LEDs indicating bus activities and status
- > Software sync
- > Hardware sync (via SYNCcableXL)



Figure 4: VN1630A CAN/LIN Interface

2.4.3 Connectors Bus Side

Device connectors



Figure 5: VN1630A with D-SUB9 connectors and sync

> CH1/3 and CH2/4 (D-SUB9)

The VN1630A has two D-SUB9 connectors, each with up to two channels (CAN/CAN or LIN/CAN). Further information on the pin assignment for CH1/CH3 and CH2/CH4 can be found in [section Pin Assignment CH1/3 and CH2/4 on page 34](#).

> Sync (Binder connector)

This connector (Binder type 711) can be used for time synchronization of different Vector devices (see [section Time Synchronization on page 149](#)). **The sync connector is not intended to connect a power supply.**

Pin	Assignment
1	Not connected
2	Synchronization line
3	Ground



2.4.4 Connectors USB Side

Device connectors

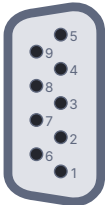


Figure 6: VN1630A with D-SUB9 connector and USB

> CH5-IO (D-SUB9)

The VN1630A has a D-SUB9 connector (CH5) for dedicated digital-analog input/output tasks. The pin assignment for CH5 is as follows:

Pin	Assignment
1	Analog input
2	Not connected
3	Not connected
4	Digital input 0
5	Digital input 1
6	Analog GND
7	Not connected
8	Digital output
9	Digital GND



Internal interconnection of digital input 0/1

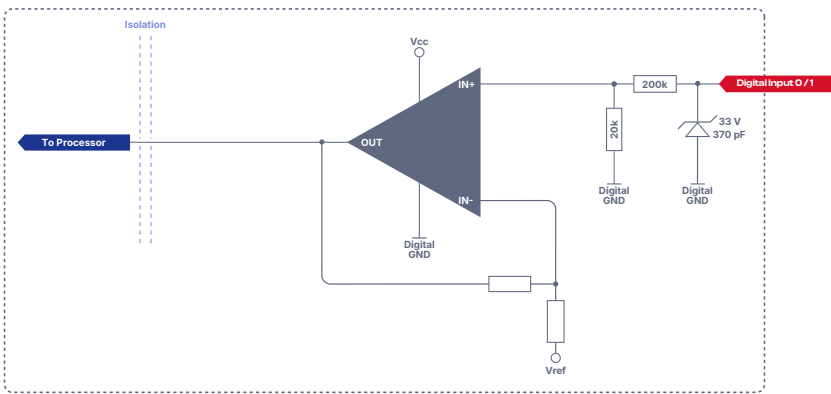


Figure 7: Digital input 0/1

Internal
interconnection of
digital output

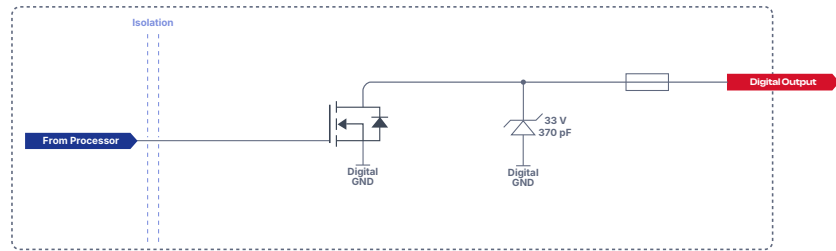


Figure 8: Digital output

Internal
interconnection of
analog input

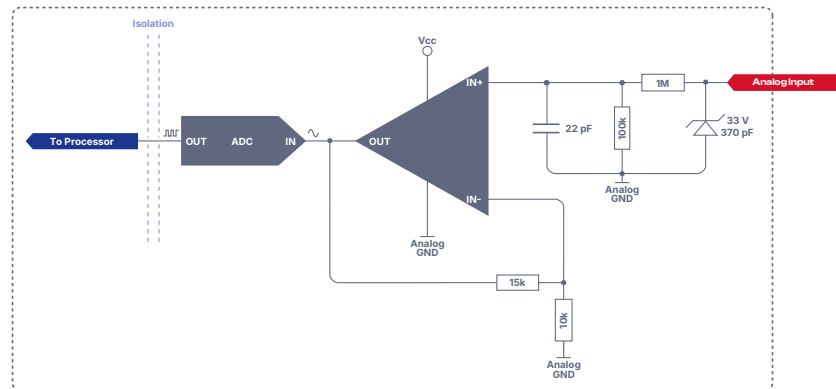


Figure 9: Analog input

Extended
measuring range of
the analog input

In normal operation, voltages up to 18 V can be applied and measured at the analog input. The cutoff frequency f_c (-3 dB) for AC voltages is approx. 7.2 kHz.

For measurements above 18 V (max. 50 V), an external series resistor has to be applied to the analog input. The series resistor R_{ext} depends on the maximum input voltage U_{input} to be measured and can be calculated as follows:

$$R_{ext} [k\Omega] = [(U_{input} * 0.61111) - 11] * 100$$

with $18 V < U_{input} \leq 50 V$

The cutoff frequency for AC voltages is also affected by the external series resistor:

$$f_c [Hz] = \frac{1}{2.33 * 10^{-6} * R_{ext} [k\Omega]}$$

Examples

	24 V	32 V	36 V	48 V
R_{ext}	367 k Ω	856 k Ω	1100 k Ω	1833 k Ω
R_{ext} (E96)	374 k Ω (24.12 V)	866 k Ω (32.17 V)	1100 k Ω (36.00 V)	1870 k Ω (48.60 V)
f_c (-3 dB)	1148 Hz	496 Hz	390 Hz	230 Hz

> **USB**

Connect your computer and the VN1630A via USB to install and to use the device with measurement applications (e. g. CANoe, CANalyzer). Use the USB 2.0 compliant cable found in the delivery (USB extension cables may generate faults between the computer and the device). Connect the device directly to USB at your computer or use a USB hub with its own power supply (self-powered). Depending on the used piggyback, the VN1630A requires the entire USB current (500 mA) which cannot be provided by a bus-powered USB hub.

2.4.5 LEDs

Description

The VN1630A has five LEDs indicating bus activities and status:

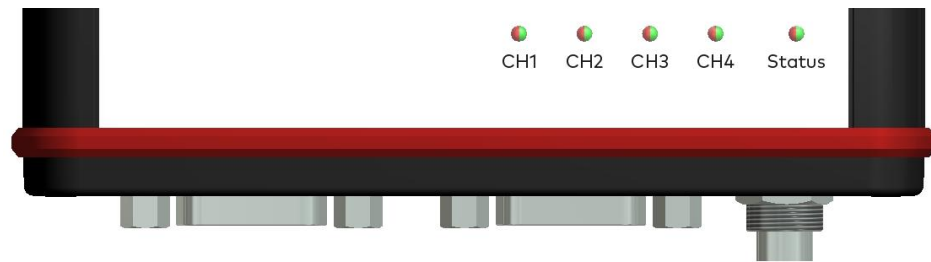


Figure 10: LEDs of the VN1630A

> CH1 ... CH4 (with CAN-/LINpiggies)

Multicolored channel LEDs, each indicating the bus activity for CAN, LIN or K-Line.

Color	Description
Green	Data frames have been sent or received correctly.
Orange	<ul style="list-style-type: none"> > CAN: Error frames have been sent or received. > LIN/K-Line: Protocol errors as well as valid messages on the bus.
Red	<ul style="list-style-type: none"> > CAN: Bus off. > LIN/K-Line: 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.

2.4.6 Bus Configuration

Piggybacks for CH1 and CH2

The VN1630A has two piggyback plug-in locations (primary channels CH1 and CH2). Depending on requirements, electrically decoupled CAN High-Speed, CAN Low-Speed, CAN Single Wire, J1708 or LIN transceivers may be used. In addition, two electrically decoupled built-in CAN TJA1051 (high-speed) transceivers are available (secondary channels CH3 and CH4). CH5 is reserved for dedicated IO tasks.



Note

A list of compatible piggybacks can be found in the [accessories manual](#) or on our [website](#).

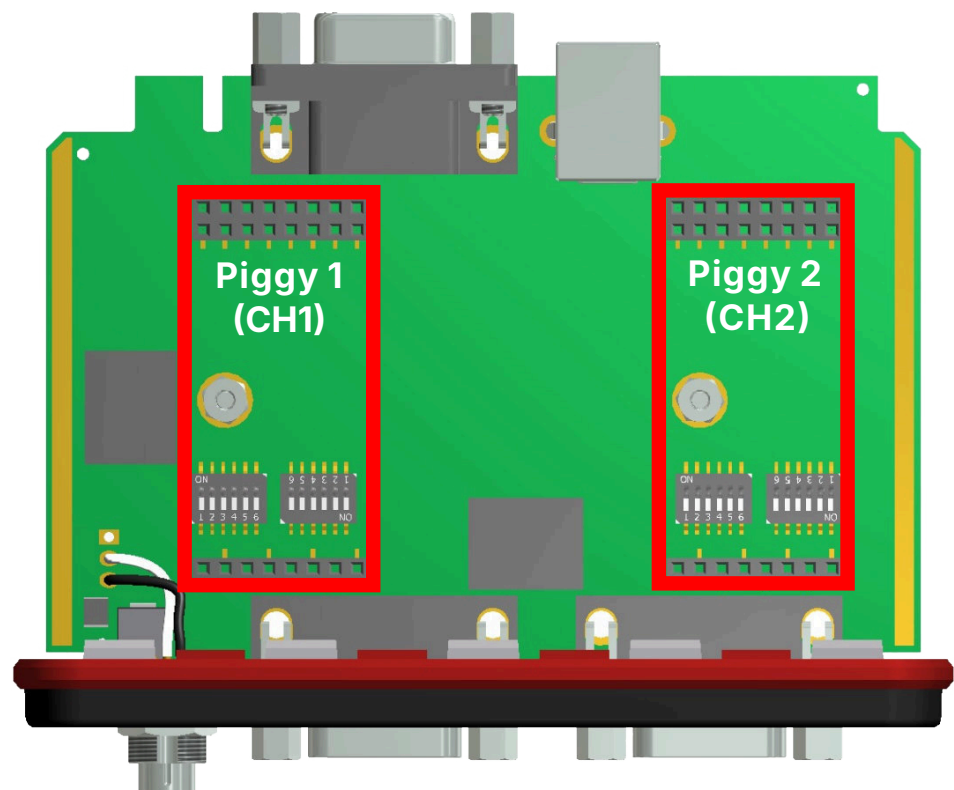


Figure 11: Piggyback plug-in locations for CH1 and CH2



Reference

Further information on DIP switches can be found in [section Pin Assignment CH1/3 and CH2/4 on page 34](#).



Note

LINpiggybacks have to be inserted before CANpiggybacks (in ascending order). If you intend to use only one LINpiggy, please use the first plug-in location (CH1). J1708 should be handled like CAN.

Primary	CH1	CH2
Piggyback	LIN1 or CAN2	LIN2 or CAN1

Each empty plug-in location is loaded with a built-in transceiver from the secondary channel according to the DIP switch settings.

Secondary	CH3	CH4
Built-in Transceiver	CAN 1051cap	CAN 1051cap

Examples

2x CAN without
piggybacks
1x IO

The following tables show examples of possible configurations:

	 CH1/CH3	 CH2/CH4	 CH5
Primary	CH1	CH2	CH5
Piggyback	-	-	-
	↑	↑	IO
Secondary	CH3	CH4	
Built-in Transceiver	CAN 1051cap	CAN 1051cap	

Configuration
CH1: no piggyback, built-in CAN 1051cap transceiver (CH3).
CH3: not usable.
CH2: no piggyback, built-in CAN 1051cap transceiver (CH4).
CH4: not usable.
CH5: on-board IO.

4x CAN
1x IO

	 CH1/CH3	 CH2/CH4	 CH5
Primary	CH1	CH2	CH5
Piggyback	CAN	CAN	-
			IO
Secondary	CH3	CH4	
Built-in Transceiver	CAN 1051cap	CAN 1051cap	

Configuration

CH1: CANpiggy.

CH3: built-in CAN 1051cap transceiver.

CH2: CANpiggy.

CH4: built-in CAN 1051cap transceiver.

CH5: on-board IO.

1x LIN
2x CAN
1x IO

	 CH1/CH3	 CH2/CH4	 CH5
Primary	CH1	CH2	CH5
Piggyback	LIN	-	-
		↑	IO
Secondary	CH3	CH4	
Built-in Transceiver	CAN 1051cap	CAN 1051cap	

Configuration

CH1: LINpiggy.

CH3: built-in CAN 1051cap transceiver.

CH2: no piggyback, built-in CAN 1051cap transceiver (CH4).

CH4: not usable.

CH5: on-board IO.

2.4.7 Pin Assignment CH1/3 and CH2/4

Double assignment
of D-SUB9
connectors
CH1 and CH2

Before installing a piggyback in the plug-in location (see section Replacing Piggybacks on page 37), the pin assignment of the D-SUB9 connector (CH1/CH3 and CH2/CH4) has to be selected via DIP switches, which can be found inside the device at the plug-in locations.

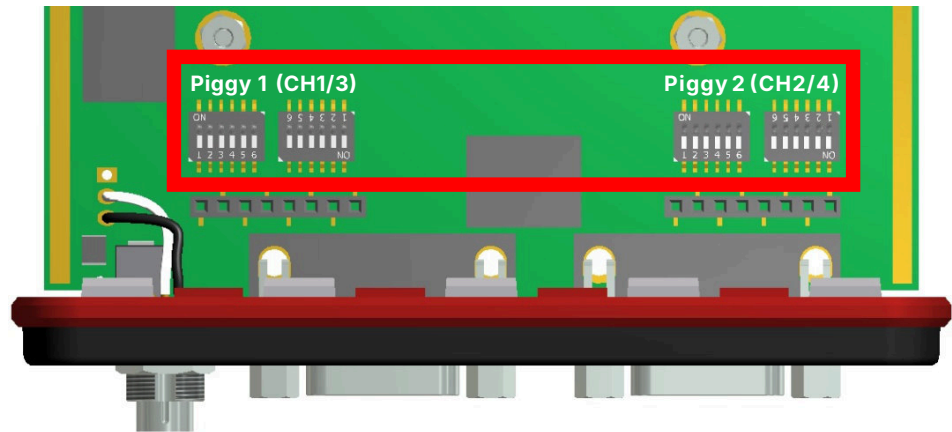


Figure 12: DIP switches (left: CH1/3, right: CH2/4)

Pin assignment
CH1 ... CH4

The pin assignments of the D-SUB9 connectors depend on the used bus transceiver configuration inside the VN1630A. A list of compatible piggybacks can be found in the accessories manual or on our website.

> No piggyback inserted

If no piggyback is inserted, only the built-in CAN transceiver at CH1 (CH2) is active (no double assignment of the D-SUB9 connector):

Pin	Assignment
1	Not connected
2	1051cap CAN Low
3	GND
4	Not connected
5	Shield
6	Not connected
7	1051cap CAN High
8	Not connected
9	Not connected

A: all ,OFF' / B: all ,ON'

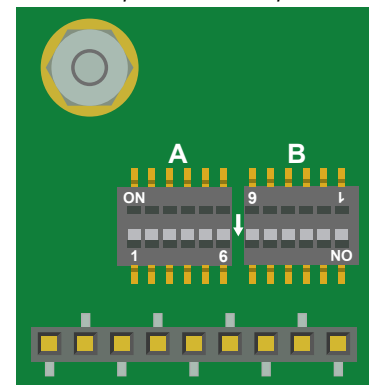


Figure 13: Configuration without piggyback

> **CAN/LIN piggyback inserted**

If a CAN- or LINpiggy is inserted, the piggyback is assigned to CH1 (CH2) and the built-in CAN transceiver is assigned to CH3 (CH4):

Pin	Assignment
1	1051cap CAN Low
2	Piggyback-dependent
3	Piggyback-dependent
4	Piggyback-dependent
5	Shield
6	GND
7	Piggyback-dependent
8	1051cap CAN High
9	Piggyback-dependent

A: all ,ON' / B: all ,OFF'

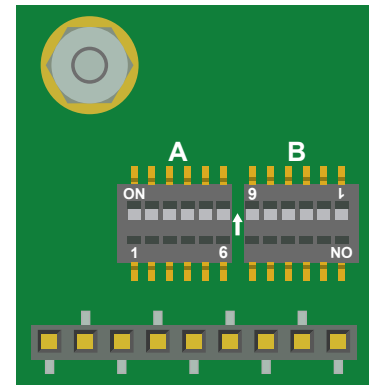


Figure 14: Configuration with piggy-back

**Example**

The following example shows the pin assignment of CH1/CH3 if a CANpiggy 1041mag is inserted in the plug-in location at channel 1.

Pin	Assignment
1	CH3 1051cap CAN Low
2	CH1 1041mag CAN Low
3	CH1 1041mag VB-
4	CH1 1041mag Split
5	CH1/3 Shield
6	CH3 1051cap GND
7	CH1 1041mag CAN High
8	CH3 1051cap CAN High
9	CH1 1041mag VB+

**Note**

The described pin assignment is also valid for CH2/CH4. A warning appears in the **Vector Hardware Manager** (page **Device Properties, Status** mode), if the DIP switch settings are improperly set. Check your DIP switch settings in this case.

CAN/LIN Y cable

Use the CANcable 2Y to access both channels on separate D-SUB9 connectors (see accessories manual, part number 05075). The pin assignments of the D-SUB9 connectors depend on the used bus transceiver configuration inside the VN1630A. A list of compatible piggybacks can be found in the accessories manual or on our website.

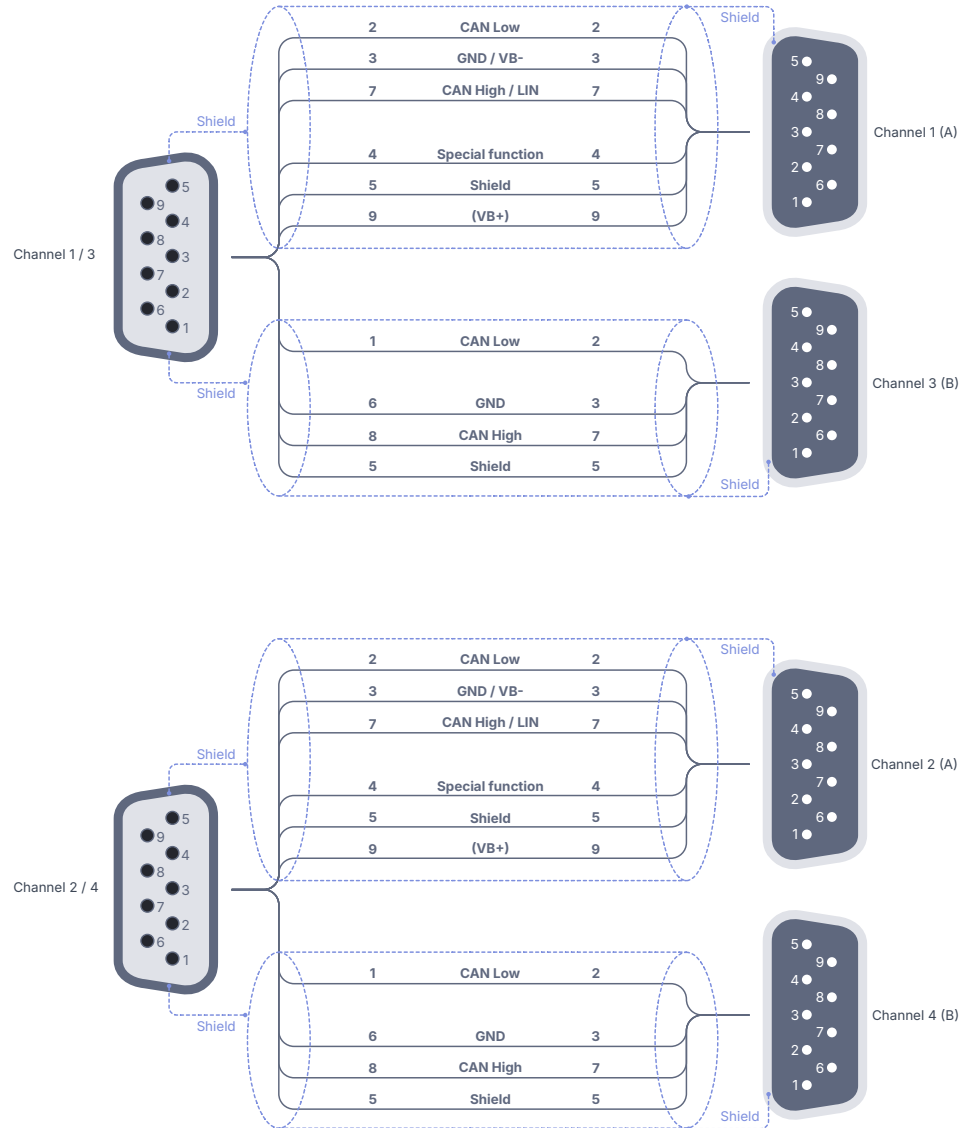


Figure 15: 2x CANcable 2Y connected to VN1630A

2.4.8 Replacing Piggybacks



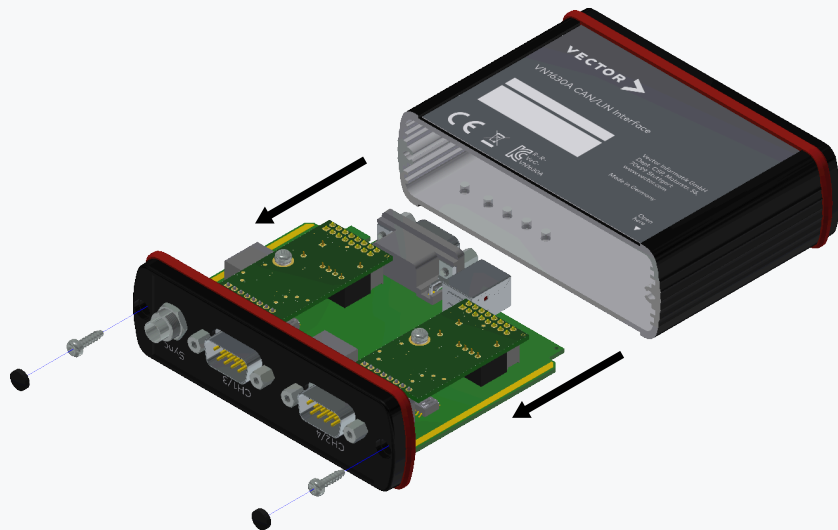
WARNING!

Ensure an ESD safe working environment during disassembly and assembly. Avoid touching the top, bottom or connectors of the boards during this process to avoid ESD damage.

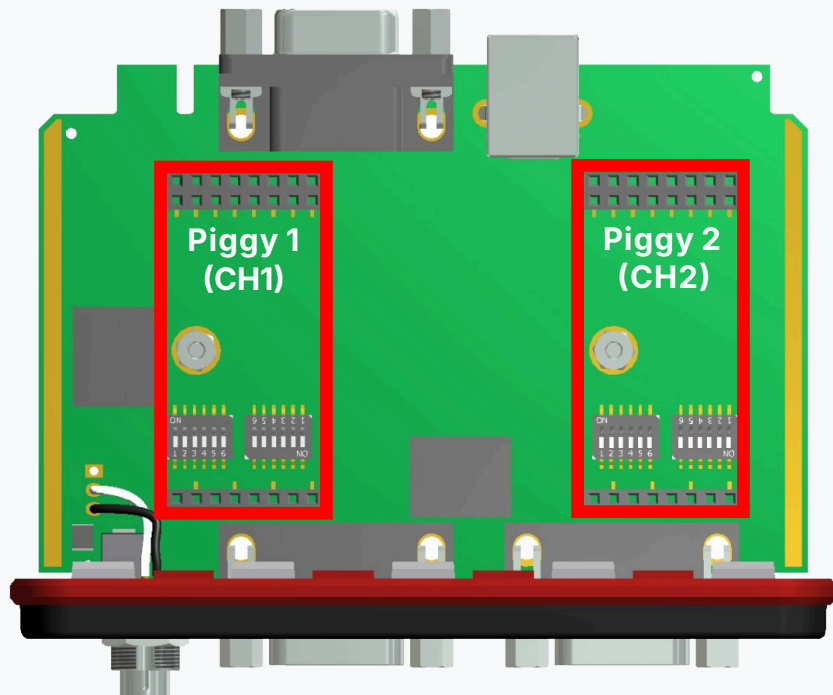


Step by Step Procedure

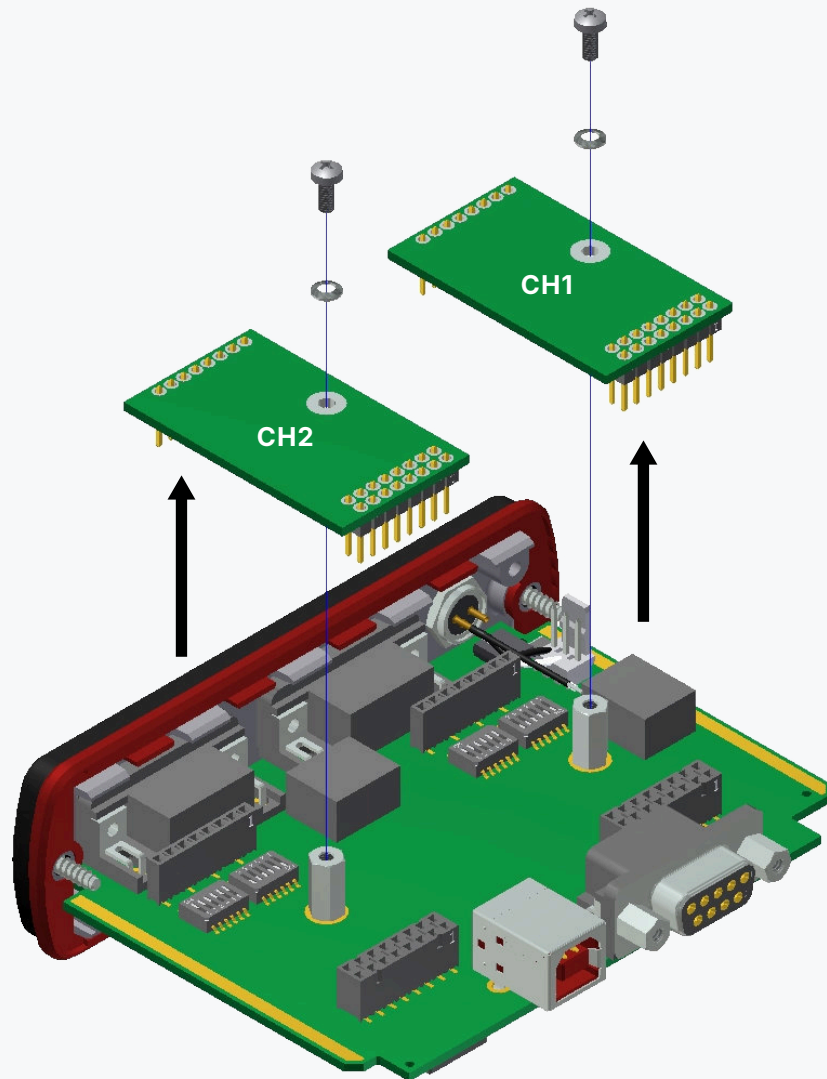
1. First, loosen the VN1630A housing screws on the side with the two D-SUB9 connectors. This requires removing the two black decorative caps. Then carefully pull the PC-board out of the housing.



2. You will find the plug-in location 1 (CH1) at the sync connector side and plug-in location 2 (CH2) at the edge of the PC-board.

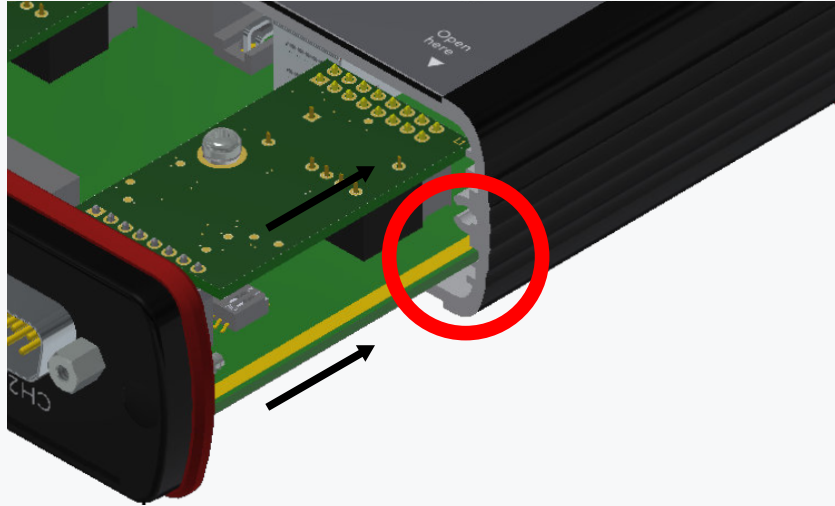


- Each piggyback is fastened by a screw and retainer. Please loosen the appropriate screw including the retainer and carefully remove the piggyback from the plug-in location.



- Set the DIP switches as described in [section Pin Assignment CH1/3 and CH2/4 on page 34](#).
- Insert the replacement piggyback. When doing this please make sure that the single and dual-row connectors are not laterally offset.
- Secure the new piggyback with the appropriate screw and retainer.

7. Place the VN1630A main board back in the housing. This operation involves placing the housing on a table with its back side (side with the bar code) facing upward. Then the main board with the piggy-backs facing upward is inserted into the second guide rails.



8. It should be possible to slide the main board in the housing up to a few millimeters from the end without forcing it in. Close the housing by applying light pressure and then secure it with the appropriate screw fasteners. The screws should be secure but not excessively tight.
9. Please also attach the two black decorative caps.
10. Connect the VN1630A and the computer via the USB cable and check the bus configuration in the **Vector Hardware Manager** (page **Device Properties, Status** mode).

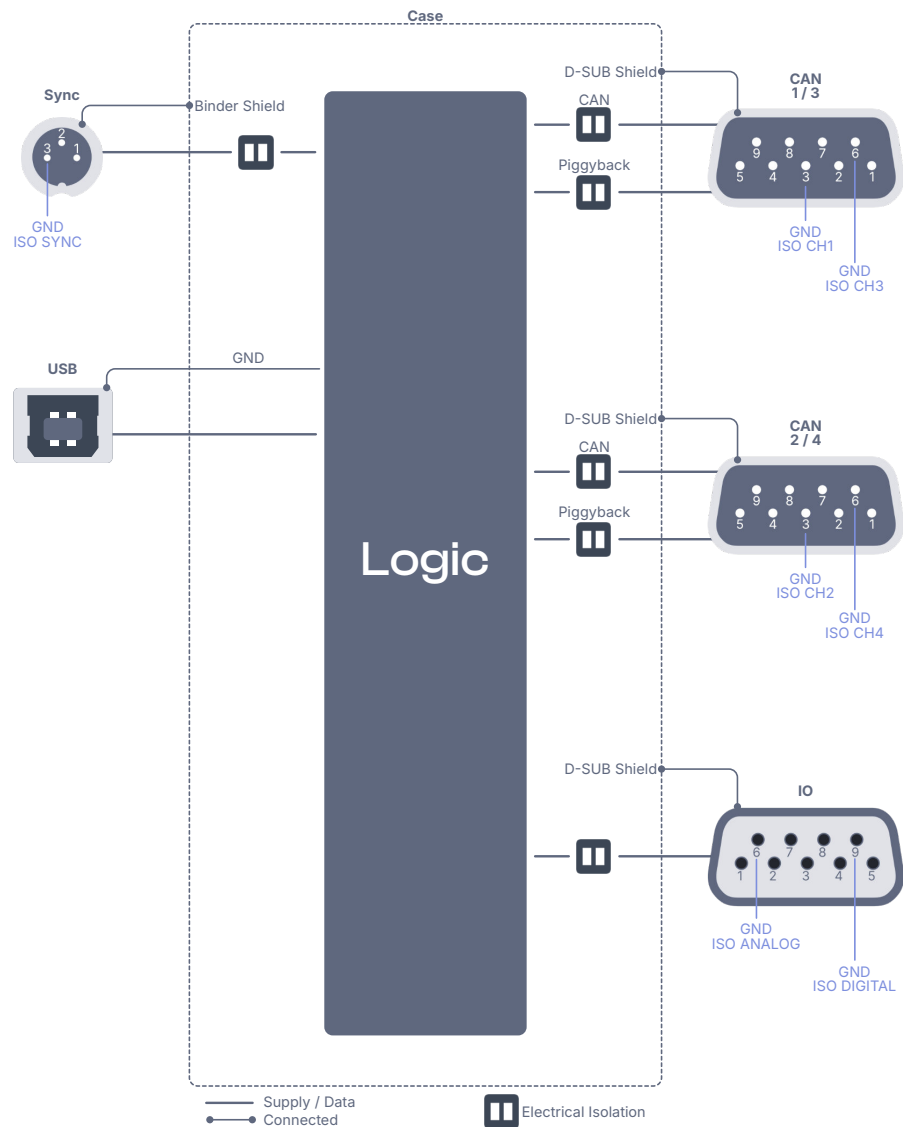
2.4.9 Technical Data

CAN channels	<p>Max. 4</p> <ul style="list-style-type: none"> > 2x CAN High-Speed 1051cap > 2x configurable via piggybacks <p>Bitrates</p> <ul style="list-style-type: none"> > 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	<p>Max. 2</p> <p>configurable via piggybacks</p> <p>Bitrates</p> <ul style="list-style-type: none"> > Normal-Mode: up to 20 kbit/s > Flash-Mode: up to 115.2 kbit/s (depending on wiring higher bitrates are possible)
K-Line channels	<p>Max. 2</p> <p>with LINpiggy 7269mag at CH1/CH2</p>
J1708 channels	<p>Max. 2</p> <p>configurable via piggybacks</p>
Analog input	<p>10 bit</p> <p>Input 0 V...18 V</p> <p>Voltage tolerance up to 50 V (with series resistor)</p> <p>Sampling rate up to 1 kHz</p>
Digital input	<p>Range 0 V...32 V</p> <p>Schmitt trigger high 2.7 V, low 2.2 V</p> <p>Hysteresis 0.5 V</p> <p>Input frequencies up to 1 kHz</p>
Digital output	<p>Open Drain</p> <p>External supply up to 32 V</p> <p>Current max. 500 mA</p> <p>Short circuit / overvoltage protected</p>
Time stamps	<p>Accuracy (within one device): 1 µs</p> <p>Accuracy software sync: typ. 50 µs</p> <p>Accuracy hardware sync: typ. 1 µs</p>
Power consumption	<p>Approx. 2.5 W</p>
Temperature range	<p>Operating: -40 °C ... +70 °C</p> <p>Shipping and storage: -40 °C ... +85 °C</p>

Relative humidity of ambient air	15 % ... 95 %, non-condensing
Dimensions (LxWxH)	Approx. 90 mm x 110 mm x 35 mm
Weight	230 g (without accessories)
Operating system requirements	Windows 10 (x64, 64 bit) Windows 11 (x64, 64 bit)

2.4.10 Electrical Isolation

Electrical isolation
of the connectors



Note

The electrical isolation of the interfaces is a functional isolation that is used to avoid ground loops and interference between the networks. The voltage difference between the isolated areas must not exceed 60 VDC (isolation voltage). The isolation voltage usually exceeds the maximum permissible voltage at a port (operating voltage).

2.4.11 USB Protector Type 1

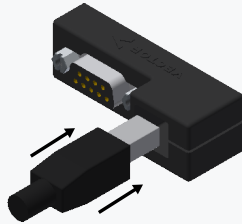
To protect the USB connector of VN1630A or VN1640A against mechanical damage, the USB Protector Type 1 (part number 05142) can be used. The USB Protector Type 1 is part of the standard delivery of VN1630A and VN1640A and available as accessory, too.



Step by Step Procedure

The following steps describe the mounting of the USB Protector:

1. Insert the USB cable into the USB Protector. Therefore, loosen the screw of the clamp.



2. Attach the USB Protector to the Vector network interface and connect the D-SUB9 connector as well as the USB connector.



3. Tighten the screws of the D-SUB9 connector.
4. Tighten the screw to fix the USB connector.

2.4.12 Accessories



Note

Detailed information on the listed accessories can be found in the separate accessories manual on our [website](#).

Bus transceiver

- > CAN-/LINpiggies
- > J1708 Piggyback

Cables and connectors

- > CANcable0
- > CANcable1
- > CANcableA
- > CANcable TnT (D-SUB9 to Bunch Plugs)
- > CANcable Y
- > CANcable 2Y
- > CANterm 120
- > CANcable Set Pro
- > Vector SYNCcableXL
- > Vector SYNCcable50
- > Multi SYNCbox external
- > Multi SYNCbox active
- > Cable Binder 3pol Connector with Pigtail
- > USB Cable 2.0

Miscellaneous

- > Fix Kit 32mm Device
- > USB Protector Type 1

2.5 VN1630 log

2.5.1 Main Features

VN1630 log features

The main features of the VN1630 log interface are:

- > 2x CAN High-Speed 1051cap transceiver (capacitively decoupled)
- > 2x additional plug-in location for CAN-/LINpiggies
- > Fifth channel for dedicated digital-analog input/output tasks
- > LEDs indicating bus activities and status
- > Software sync
- > Hardware sync (via SYNCcableXL)

The recording features are:

- > Recording data of CAN, CAN FD, LIN, digital and analog inputs
- > Data storage on SD/SDHC card
- > Separate LED for logging status
- > Filter and Trigger symbolically configurable
- > Real time clock for date/time information
- > External power supply for standalone mode



Figure 16: VN1630 log CAN/LIN Interface

2.5.2 Connectors Bus Side

Device connectors



Figure 17: VN1630 log with sync and D-SUB9 connectors

> CH1/3 and CH2/4 (D-SUB9)

The VN1630 log has two D-SUB9 connectors, each with up to two channels (CAN/CAN or LIN/CAN). Further information on the pin assignment for CH1/CH3 and CH2/CH4 can be found in [section Pin Assignment CH1/3 and CH2/4 on page 57](#).



WARNING!

It is recommended to connect the VN1630 log to the same voltage supply (e. g. battery of the vehicle) as the vehicle or test equipment. If two different voltage supplies are being used for the VN1630 log and the test equipment, the ground (GND) pins of the two voltage supplies must be connected.

> Power/hardware sync connector

The VN1630 log has two identical power/sync connectors (Binder type 711) which can be used for power or in Interface Mode for time synchronization of different Vector devices ([see section Time Synchronization on page 149](#)). It does not matter which connector is used to supply the device.

Pin	Assignment
1	Power supply (typ. 12 V)
2	Synchronization line (for Interface Mode)
3	Ground



2.5.3 Connectors USB Side

Device connectors

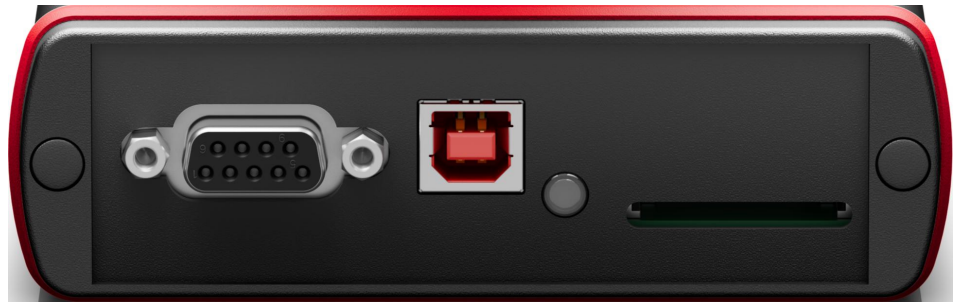
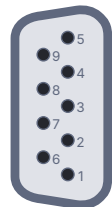


Figure 18: VN1630 log with SD card slot, LED push-button, USB and D-SUB9 connector

> CH5 (D-SUB9)

The VN1630 log has a D-SUB9 connector (CH5) for dedicated digital-analog input/output tasks. The pin assignment for CH5 is as follows:

Pin	Assignment
1	Analog input
2	Not connected
3	Not connected
4	Digital input 0
5	Digital input 1
6	Analog GND
7	Not connected
8	Digital output
9	Digital GND



Internal interconnection of digital input 0/1

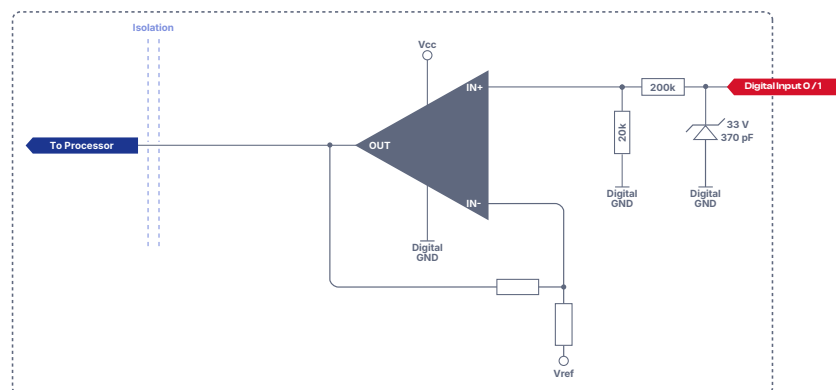


Figure 19: Digital input 0/1

Internal
interconnection of
digital output

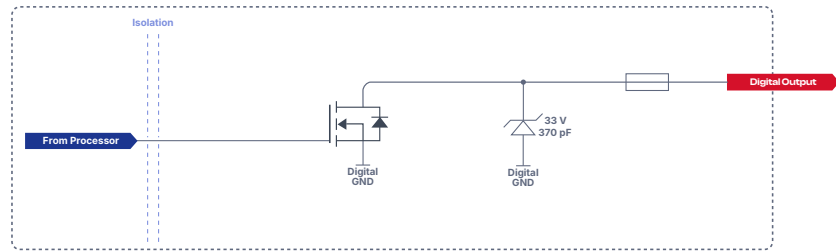


Figure 20: Digital output

Internal
interconnection of
analog input

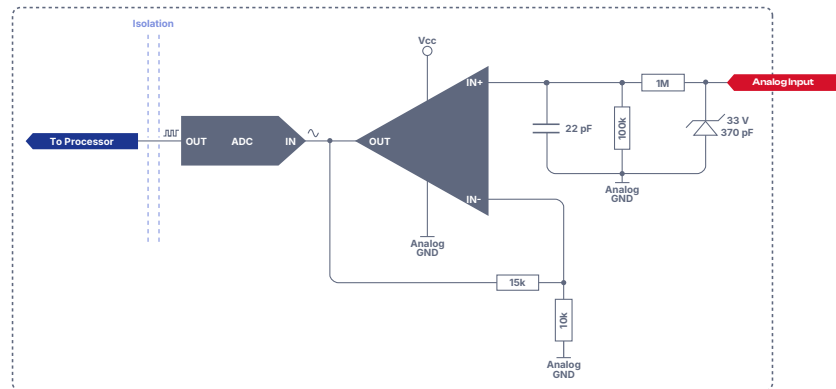


Figure 21: Analog input

Extended
measuring range of
the analog input

In normal operation, voltages up to 18 V can be applied and measured at the analog input. The cutoff frequency f_c (-3 dB) for AC voltages is approx. 7.2 kHz.

For measurements above 18 V (max. 50 V), an external series resistor has to be applied to the analog input. The series resistor R_{ext} depends on the maximum input voltage U_{input} to be measured and can be calculated as follows:

$$R_{ext} [k\Omega] = [(U_{input} * 0.61111) - 11] * 100$$

with $18 V < U_{input} \leq 50 V$

The cutoff frequency for AC voltages is also affected by the external series resistor:

$$f_c [Hz] = \frac{1}{2.33 * 10^{-6} * R_{ext} [k\Omega]}$$

Examples

	24 V	32 V	36 V	48 V
R_{ext}	367 k Ω	856 k Ω	1100 k Ω	1833 k Ω
R_{ext} (E96)	374 k Ω (24.12 V)	866 k Ω (32.17 V)	1100 k Ω (36.00 V)	1870 k Ω (48.60 V)
f_c (-3 dB)	1148 Hz	496 Hz	390 Hz	230 Hz

> **USB**

Connect your computer and the VN1630 log via USB to install, to configure and to use the device with measurement applications (e. g. CANoe, CANalyzer). Use the USB 2.0 compliant cable found in the delivery (USB extension cables may generate faults between the computer and the device). Connect the device directly to USB at your computer or use a USB hub with its own power supply (self-powered). Depending on the used piggyback, the VN1630 log requires the entire USB current (500 mA) which cannot be provided by a bus-powered USB hub. The VN1630 log also supports two operating modes which can be switched by using the USB connection and power supply respectively:

Mode	USB	External Power Supply
Interface Mode/ Logging configuration	connected to computer	optional
Logging Mode	not connected	yes

Interface Mode

In Interface Mode, the VN1630 log operates as a CAN/LIN interface between a computer and the bus. Messages can be received and sent over both channels with suitable tools (identical to VN1630A). The VN1630 log must be in the Interface Mode to configure the logging mode.

While used as interface by a Vector tool, recorded data can be read from the SD card. In this case the interface functionality has priority and the card access takes places with reduced speed.

Logging Mode

The Logging Mode enables the computer independent usage of the VN1630 log and allows the logging of CAN and LIN events. For this purpose, the VN1630 log must be unplugged from the USB connector of the computer and externally supplied via the Binder connector.

**WARNING!**

During logging, the VN1630 log must not be connected to the computer via the USB cable, since the logging mode would otherwise be exited!

**Reference**

Information on the configuration of the logging mode can be found in the separate manual provided with the **Vector Logger Suite** on the Vector Driver Disk in \Tools\VN1630_log.

> **LED push button**

LED that indicates the SD card status.

Color	Description
Green	SD card can be removed.
Yellow	<div><div>> On: SD card inserted and identified. Do not remove the SD card.</div><div>> Flashing: Logging in progress. Do not remove the SD card.</div></div>

> **SD card slot**

The VN1630 log has a push-and-pull card holder in which the SD card is inserted and removed. To insert a SD card push it until it latches in place securely. To securely remove the SD card, press the LED push button at least for three seconds. Remaining data in the ring buffer is copied to the SD card which can take approx. 15 seconds. During this time, the LED flashes yellow. Remove the SD card only if the LED lights green. During this sequence the VN1630 log must not be disconnected from the power supply. This protects the SD card from memory losses. Then unlatch the SD card by pushing it into the holder slot. Remove the card.

**WARNING!**

To avoid mechanical damage do not pull the SD card from the card holder forcefully.

2.5.4 LEDs

Description

The VN1630 log has five LEDs indicating bus activities and status as well one LED for Logging Mode.

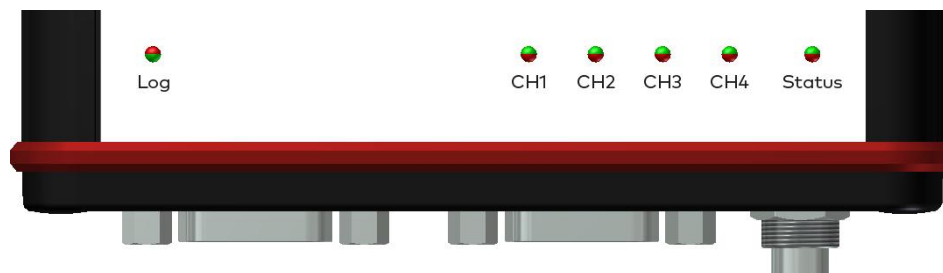


Figure 22: LEDs of the VN1630 log

> Log

Multicolored LED that indicates the status of the logging mode.

Color	Description
Green	Device is accessing the SD card.
Orange	<ul style="list-style-type: none"> > On: SD card full. > Flashing: Error while accessing SD card.
Red	<ul style="list-style-type: none"> > Flashing (1 Hz): Piggyback equipment not compatible with logging configuration. > Flashing (>1 Hz): Error while logging.

> CH1 ... CH4 (with CAN-/LINpiggies)

Multicolored channel LEDs, each indicating the bus activity for CAN, LIN or K-Line.

Color	Description
Green	Data frames have been sent or received correctly.
Orange	<ul style="list-style-type: none"> > CAN: Error frames have been sent or received. > LIN/K-Line: Protocol errors as well as valid messages on the bus.
Red	<ul style="list-style-type: none"> > CAN: Bus off. > LIN/K-Line: Protocol errors on the bus.

CAN: The flashing frequency depends on the bus load.

> **Status (Interface Mode)**

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.

> **Status (Logging Mode)**

Multicolored LED that indicates the status of the device.

Color	Description
Green	Device is ready for operation and logging configuration is started.
Orange	<ul style="list-style-type: none">> Flashing (slow): SD card not inserted.> Flashing (fast): Firmware update in progress.
Red	<ul style="list-style-type: none">> Error.> Flashing (slow): Device not working or logging firmware missing.> Flashing (fast): Logging configuration missing on SD card or incompatible with firmware.

2.5.5 Bus Configuration

Piggybacks for CH1 and CH2

The VN1630 log has two piggyback plug-in locations (primary channels CH1 and CH2). Depending on requirements, electrically decoupled CAN High-Speed, CAN Low-Speed, CAN Single Wire, J1708 or LIN transceivers may be used. In addition, two electrically decoupled built-in CAN TJA1051 (high-speed) transceivers are available (secondary channels CH3 and CH4). CH5 is reserved for dedicated IO tasks.



Note

A list of compatible piggybacks can be found in the [accessories manual](#) or on our [website](#).

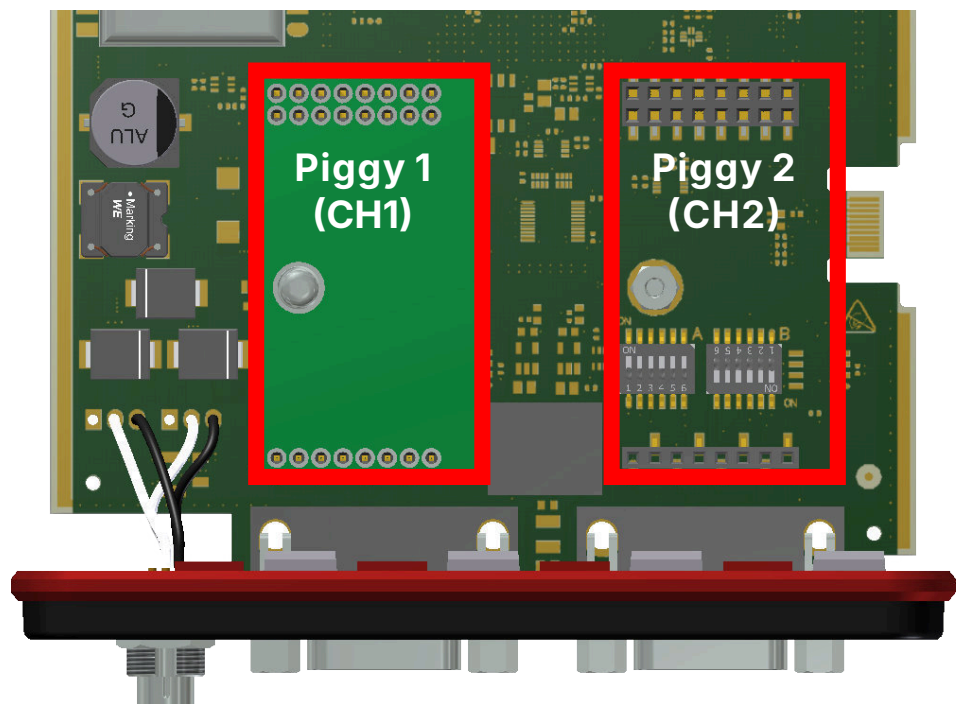


Figure 23: Piggyback plug-in locations for CH1 and CH2



Reference

Further information on DIP switches can be found in [section Pin Assignment CH1/3 and CH2/4 on page 57](#).



Note

LINpiggies have to be inserted before CANpiggies (in ascending order). If you intend to use only one LINpiggy, please use the first plug-in location (CH1). J1708 should be handled like CAN.

Primary	CH1	CH2
Piggyback	LIN1 or CAN2	LIN2 or CAN1

Each empty plug-in location is loaded with a built-in transceiver from the secondary channel according to the DIP switch settings.

Secondary	CH1	CH2
Built-in Transceiver	CAN 1051cap	CAN 1051cap

Examples

2x CAN without
piggybacks

1x IO

The following tables show examples of possible configurations:

	 CH1/CH3	 CH2/CH4	 CH5
Primary	CH1	CH2	CH5
Piggyback	-	-	-
	↑	↑	IO
Secondary	CH3	CH4	
Built-in Transceiver	CAN 1051cap	CAN 1051cap	

Configuration
CH1: no piggyback, built-in CAN 1051cap transceiver (CH3).
CH3: not usable.
CH2: no piggyback, built-in CAN 1051cap transceiver (CH4).
CH4: not usable.
CH5: on-board IO.

4x CAN
1x IO

	 CH1/CH3	 CH2/CH4	 CH5
Primary	CH1	CH2	CH5
Piggyback	CAN	CAN	-
			IO
Secondary	CH3	CH4	
Built-in Transceiver	CAN 1051cap	CAN 1051cap	

Configuration
CH1: CANpiggy.
CH3: built-in CAN 1051cap transceiver.
CH2: CANpiggy.
CH4: built-in CAN 1051cap transceiver.
CH5: on-board IO.

1x LIN
2x CAN
1x IO

	 CH1/CH3	 CH2/CH4	 CH5
Primary	CH1	CH2	CH5
Piggyback	LIN	-	-
		↑	IO
Secondary	CH3	CH4	
Built-in Transceiver	CAN 1051cap	CAN 1051cap	

Configuration
CH1: LINpiggy.
CH3: built-in CAN 1051cap transceiver.
CH2: no piggyback, built-in CAN 1051cap transceiver (CH4).
CH4: not usable.
CH5: on-board IO.

2.5.6 Pin Assignment CH1/3 and CH2/4

Double assignment
of D-SUB9
connectors
CH1 and CH2

Before installing a piggyback in the plug-in location (see section Replacing Piggybacks on page 60), the pin assignment of the D-SUB9 connector (CH1/CH3 and CH2/CH4) has to be selected via DIP switches, which can be found inside the device at the plug-in locations.

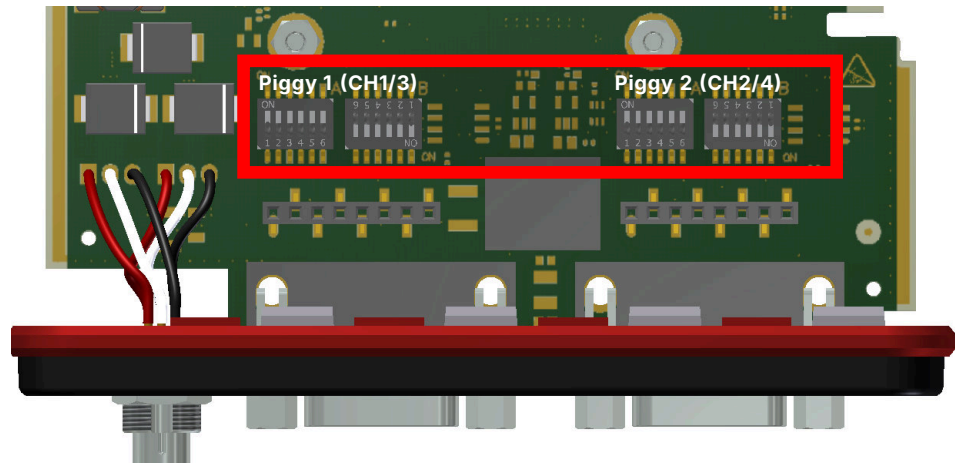


Figure 24: DIP switches (left: CH1/3, right: CH2/4)

Pin assignment
CH1 ... CH4

The pin assignments of the D-SUB9 connectors depend on the used bus transceiver configuration inside the VN1630 log. A list of compatible piggybacks can be found in the accessories manual or on our website.

> No piggyback inserted

If no piggyback is inserted, only the built-in CAN transceiver at CH1 (CH2) is active (no double assignment of the D-SUB9 connector):

Pin	Assignment
1	Not connected
2	1051cap CAN Low
3	GND
4	Not connected
5	Not connected
6	Not connected
7	1051cap CAN High
8	Not connected
9	Not connected

A: all ,OFF' / B: all ,ON'

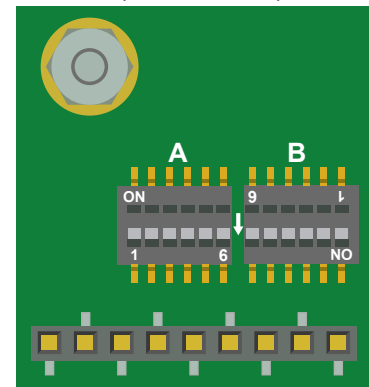


Figure 25: Configuration without piggyback

> **CAN/LIN piggyback inserted**

If a CAN- or LINpiggy is inserted, the piggyback is assigned to CH1 (CH2) and the built-in CAN transceiver is assigned to CH3 (CH4):

Pin	Assignment
1	1051cap CAN Low
2	Piggyback-dependent
3	Piggyback-dependent
4	Piggyback-dependent
5	Not connected
6	GND
7	Piggyback-dependent
8	1051cap CAN High
9	Piggyback-dependent

A: all ,ON' / B: all ,OFF'

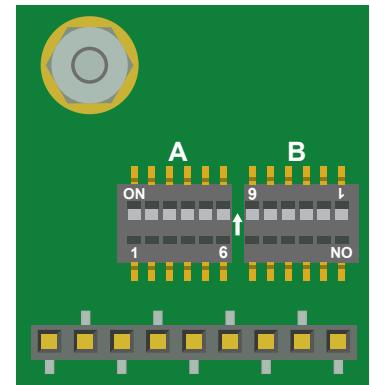


Figure 26: Configuration with piggy-back

**Example**

The following example shows the pin assignment of CH1/CH3 if a CANpiggy 1041mag is inserted in the plug-in location at channel 1.

Pin	Assignment
1	CH3 1051cap CAN Low
2	CH1 1041mag CAN Low
3	CH1 1041mag VB-
4	CH1 1041mag Split
5	Not connected
6	CH3 1051cap GND
7	CH1 1041mag CAN High
8	CH3 1051cap CAN High
9	CH1 1041mag VB+

**Note**

The described pin assignment is also valid for CH2/CH4. A warning appears in the **Vector Hardware Manager** (page **Device Properties, Status** mode), if the DIP switch settings are improperly set. Check your DIP switch settings in this case.

CAN/LIN Y cable

Use the CANcable 2Y to access both channels on separate D-SUB9 connectors (see accessories manual, part number 05075). The pin assignments of the D-SUB9 connectors depend on the used bus transceiver configuration inside the VN1630 log. A list of compatible piggybacks can be found in the accessories manual or on our website.

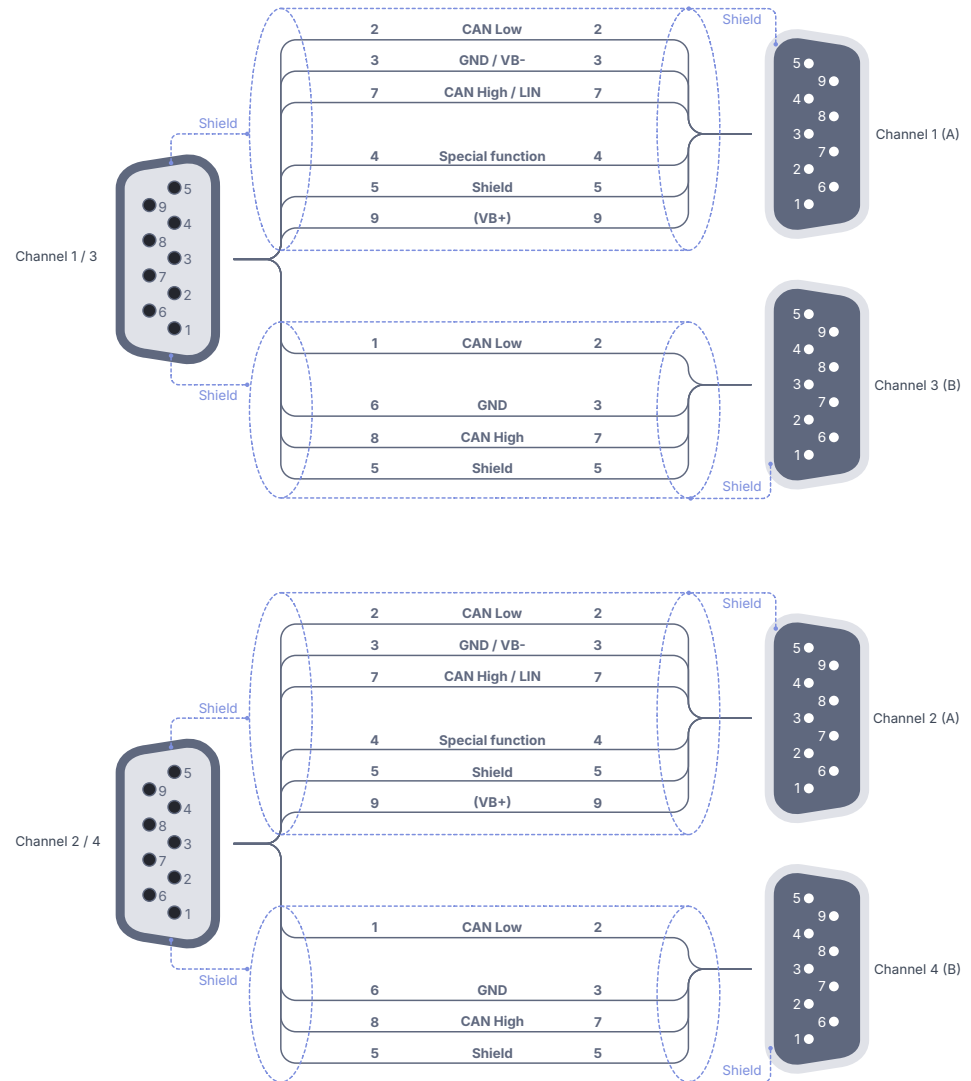


Figure 27: 2x CANcable 2Y connected to VN1630log

2.5.7 Replacing Piggybacks



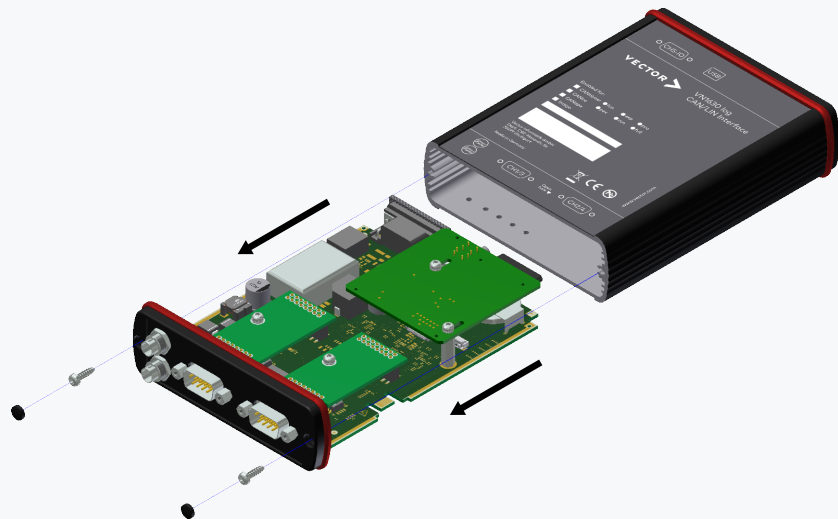
WARNING!

Ensure an ESD safe working environment during disassembly and assembly. Avoid touching the top, bottom or connectors of the boards during this process to avoid ESD damage.

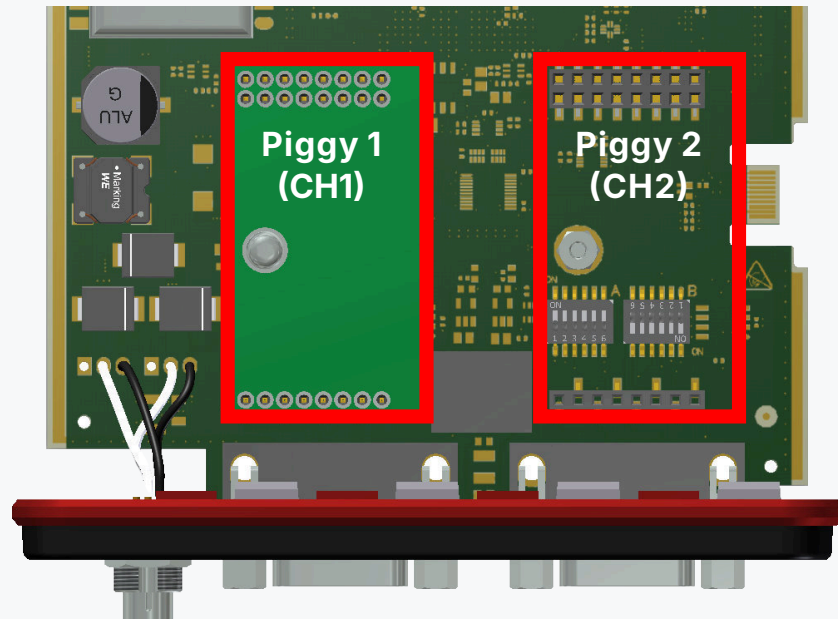


Step by Step Procedure

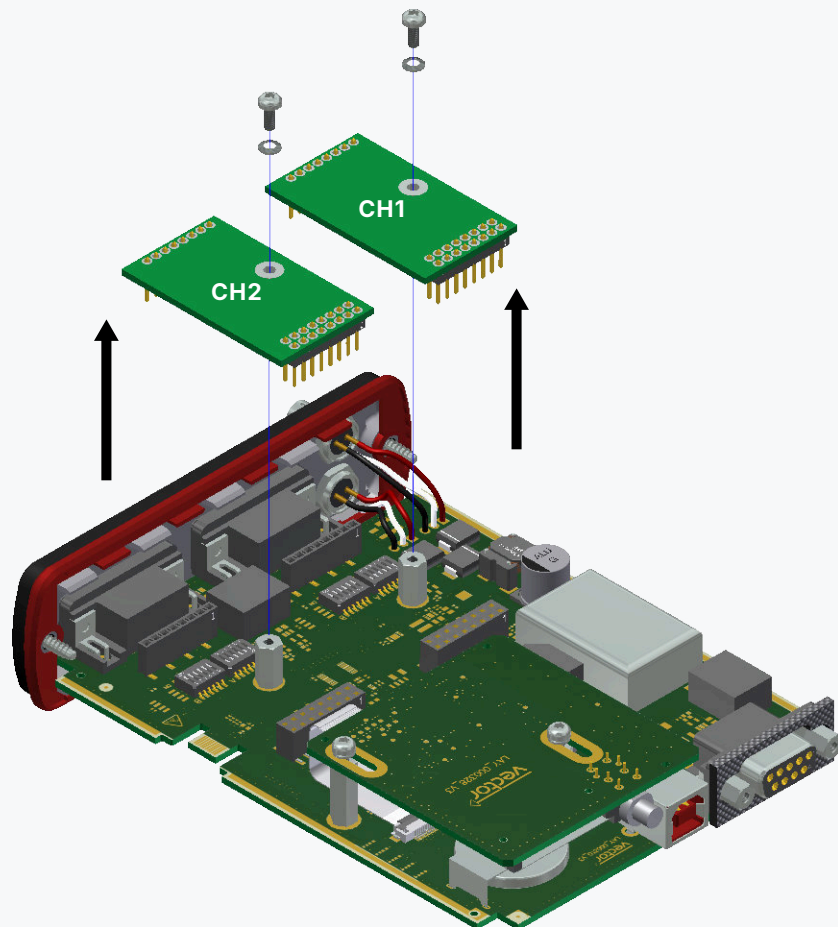
1. First, loosen the VN1630 log housing screws on the side with the two D-SUB9 connectors. This requires removing the two black decorative caps. Then carefully pull the PC-board out of the housing.



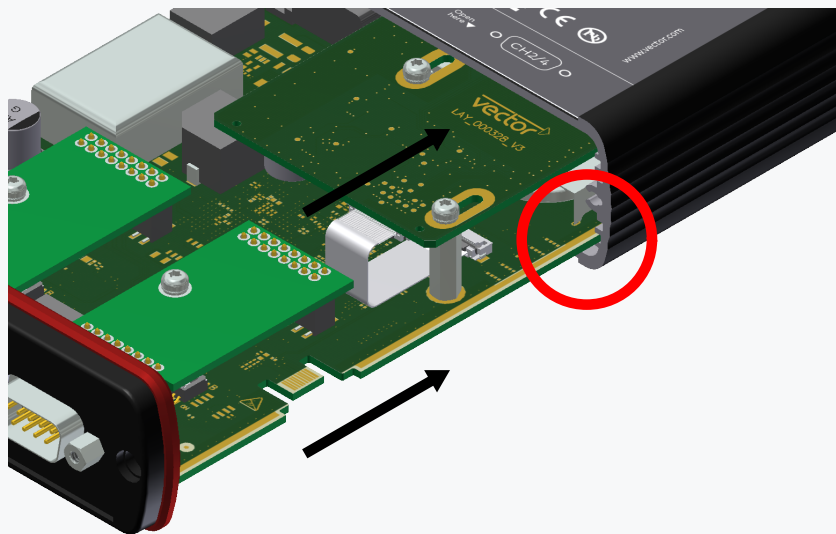
2. You will find the plug-in location 1 (CH1) at the sync connector side and plug-in location 2 (CH2) at the edge of the PC-board.



3. Each piggyback is fastened by a screw and retainer. Please loosen the appropriate screw including the retainer and carefully remove the piggyback from the plug-in location.



4. Set the DIP switches as described in section Pin Assignment CH1/3 and CH2/4 on page 57.
5. Insert the replacement piggyback. When doing this please make sure that the single and dual-row connectors are not laterally offset.
6. Secure the new piggyback with the appropriate screw and retainer.
7. Place the VN1630 log main board back in the housing. This operation involves placing the housing on a table with its back side (side with the bar code) facing upward. Then the main board with the piggybacks facing upward is inserted into the first guide rails.



8. It should be possible to slide the main board in the housing up to a few millimeters from the end without forcing it in. Close the housing by applying light pressure and then secure it with the appropriate screw fasteners. The screws should be secure but not excessively tight.
9. Please also attach the two black decorative caps.
10. Connect the VN1630 log and the computer via the USB cable and check the bus configuration in the **Vector Hardware Manager** (page **Device Properties, Status** mode).

2.5.8 SD/SDHC Memory Cards

SD/SDHC cards

The VN1630 log supports industrial grade SD/SDHC memory cards up to 32 GB. Recording stops when the memory card is full. This can be configured as error to make the VN1630 log beep.

Only industrial grade SD/SDHC cards approved by Vector are recommended for proper use:

- > Xmore Industrial 2 GB (SD-2G0-XIE82)
- > Xmore Industrial 8 GB (SD-8G0-XIE82)
- > Xmore Industrial 16 GB (SD-16G-XIE82)
- > Xmore Industrial 32 GB (SD032GXQI8C016Z)
- > SanDisk Industrial XT 32 GB (SDSDAF-032G-XI)



Note

The memory cards have to be FAT32 formatted. For optimum speed, we recommend FAT32 formatting with the maximum available cluster size.

2.5.9 Ring Buffer in RAM

Memory

The VN1630 log has an allocated ring buffer in its RAM (32 MB) which is used to buffer received data. During recording, the data is continually written to the SD card. When using a triggered recording, the data is only stored into the ring buffer until the trigger event occurs. The data is then copied from the ring buffer to the SD card according to the set pre-trigger time.

2.5.10 Real Time Clock

Description

The VN1630 log has a real time clock for date/time information while logging. The real time clock can be set up in the **Vector Logger Suite**. It is recommended to set the real time clock before first logging.

2.5.11 Battery

Lifetime

The VN1630 log is equipped with a lithium battery that powers the integrated real time clock. The battery has a typical durability of approx. 5 years.

2.5.12 Beep

Beep

The VN1630 log has an acoustic signal generator that alerts the user, for example, in the event of a trigger, overload and full SD card. The desired behavior can be set in the the **Vector Logger Suite**.

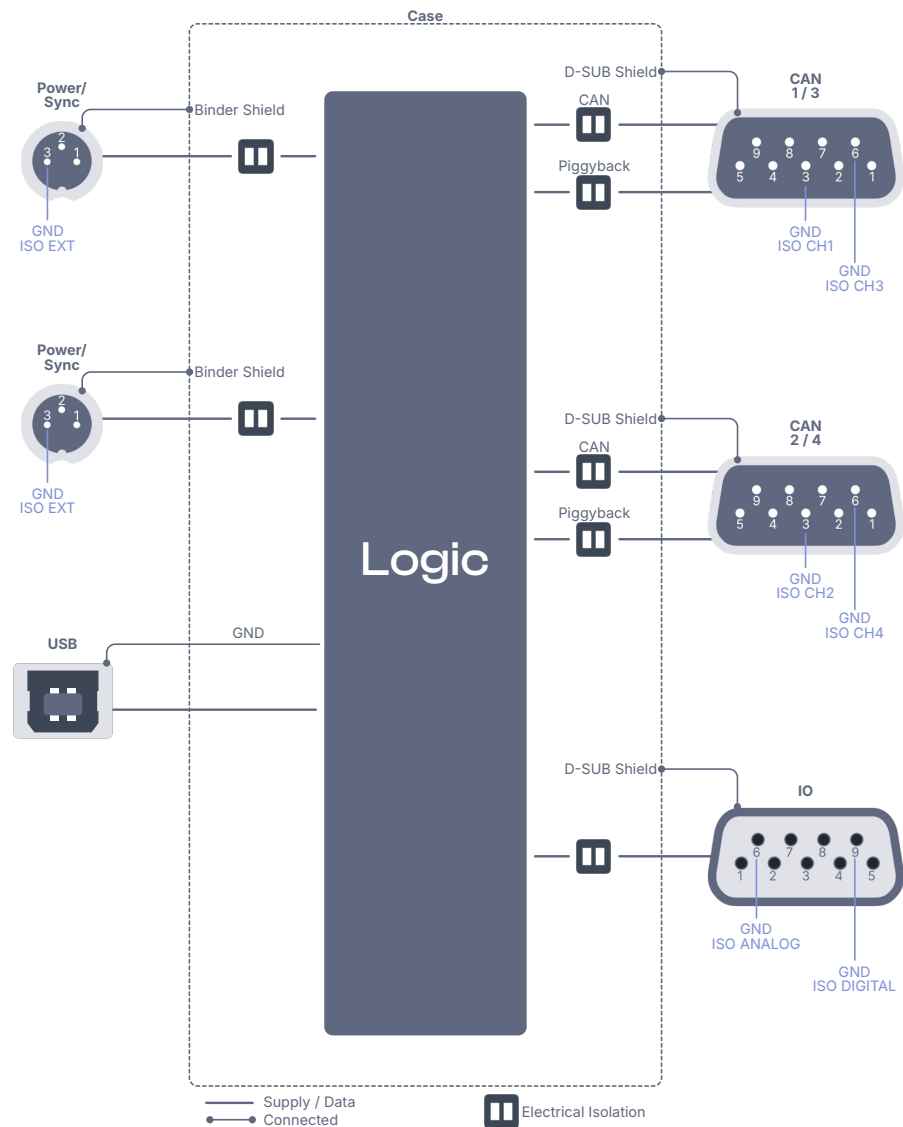
2.5.13 Technical Data

CAN channels	<p>Max. 4</p> <ul style="list-style-type: none"> > 2x CAN High-Speed 1051cap > 2x configurable via piggybacks <p>Bitrates</p> <ul style="list-style-type: none"> > 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	<p>Max. 2</p> <p>configurable via piggybacks</p> <p>Bitrates</p> <ul style="list-style-type: none"> > Normal-Mode: up to 20 kbit/s > Flash-Mode: up to 115.2 kbit/s (depending on wiring higher bitrates are possible)
K-Line channels	<p>Max. 2</p> <p>with LINpiggy 7269mag at CH1/CH2</p>
J1708 channels	<p>Max. 2</p> <p>configurable via piggybacks</p>
Analog input	<p>10 bit</p> <p>Input 0 V...18 V</p> <p>Voltage tolerance up to 50 V (with series resistor)</p> <p>Sampling rate up to 1 kHz</p>
Digital input	<p>Range 0 V...32 V</p> <p>Schmitt trigger high 2.7 V, low 2.2 V</p> <p>Hysteresis 0.5 V</p> <p>Input frequencies up to 1 kHz</p>
Digital output	<p>Open Drain</p> <p>External supply up to 32 V</p> <p>Current max. 500 mA</p> <p>Short circuit / overvoltage protected</p>
Time stamps	<p>Accuracy (within one device): 1 μs</p> <p>Accuracy software sync: typ. 50 μs</p> <p>Accuracy hardware sync: typ. 1 μs</p>
Operation mode	Interface and logging
Memory function	Logging on SD/SDHC card
Extras	Real time clock

Startup time (Logging Mode)	3 seconds after power-up
Battery	Lithium primary cell type BR2330A
Power supply	Interface Mode: via USB Logging Mode: 6 V...50 V
Power consumption	Approx. 2.5 W
Temperature range	Operating: -40 °C ... +65 °C Shipping and storage: -40 °C ... +85 °C
Relative humidity of ambient air	15 % ... 95 %, non-condensing
Dimensions (LxWxH)	Approx.150 mm x 110 mm x 35 mm
Weight	400 g (without accessories)
Operating system requirements	Windows 10 (x64, 64 bit) Windows 11 (x64, 64 bit)

2.5.14 Electrical Isolation

Electrical isolation
of the connectors



Note

The electrical isolation of the interfaces is a functional isolation that is used to avoid ground loops and interference between the networks. The voltage difference between the isolated areas must not exceed 60 VDC (isolation voltage). The isolation voltage usually exceeds the maximum permissible voltage at a port (operating voltage).

2.5.15 Accessories



Note

Detailed information on the listed accessories can be found in the separate accessories manual on our [website](#).

- | | |
|--|--|
| Bus transceiver | > CAN-/LINpiggies |
| Cables and connectors | > CANcable0 |
| | > CANcable1 |
| | > CANcableA |
| | > CANcable TnT (D-SUB9 to Bunch Plugs) |
| | > CANcable TnT Term |
| | > CANcable Y |
| | > CANcable 2Y |
| | > CANterm 120 |
| | > CANcable Set Pro |
| | > Vector SYNCcableXL |
| | > Vector SYNCcable50 |
| | > Multi SYNCbox external |
| | > Multi SYNCbox active |
| | > Cable Binder 3pol Connector with Pigtail |
| | > USB Cable 2.0 |
| | Power supply |
| > Cable Banana Plug <> Binder 3-pin | |
| > Car Power Supply Cable 12V with Binder | |
| Miscellaneous | > Fix Kit 32mm Device |
| | > SD/SDHC Memory Cards |

2.6 VN1640A

2.6.1 Scope of Delivery

Contents

The delivery includes:

- > VN1640A CAN/LIN Interface
- > USB 2.0 cable (part number 05011)
- > USB Protector Type 1 (part number 05142, see [page 84](#))

2.6.2 Main Features

VN1640A features

The main features of the VN1640A interface are:

- > 4x plug-in location for CAN-, LIN-, K-Line-, J1708piggybacks, and SENSORpiggy SENT
- > Fifth channel for dedicated digital-analog input/output tasks
- > 5x D-SUB9 connector
- > Five LEDs indicating bus activities and status
- > Software sync
- > Hardware sync (via SYNCcableXL)



Figure 28: VN1640A CAN/LIN Interface

2.6.3 Connectors Bus Side

Device connectors



Figure 29: VN1640A with D-SUB9 connectors and sync

> CH1...4 (D-SUB9)

The VN1640A has four D-SUB9 connectors, each assigned to a dedicated piggyback plug-in location. The pin assignments depend on the inserted piggybacks. A list of compatible piggybacks can be found in the accessories manual or on our website.



Example

The following example shows the pin assignment of CH1 if a CANpiggy 1041mag is inserted in the plug-in location at channel 1:

Pin	Assignment
1	Not connected
2	CH1 1041mag CAN Low
3	CH1 1041mag VB-
4	CH1 1041mag Split
5	CH1 Shield
6	Not connected
7	CH1 1041mag CAN High
8	Not connected
9	CH1 1041mag VB+



> **Sync (Binder connector)**

This connector (Binder type 711) can be used for time synchronization of different Vector devices (see section Time Synchronization on page 149).

The sync connector is not intended to connect a power supply.

Pin	Assignment
1	Not connected
2	Synchronization line
3	Ground



2.6.4 Connectors USB Side

Device connectors

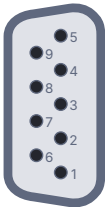


Figure 30: VN1640A with D-SUB9 connector and USB

> CH5-IO (D-SUB9)

The VN1640A has a D-SUB9 connector (CH5) for dedicated digital-analog input/output tasks. The pin assignment for CH5 is as follows:

Pin	Assignment
1	Analog input
2	Not connected
3	Not connected
4	Digital input 0
5	Digital input 1
6	Analog GND
7	Not connected
8	Digital output
9	Digital GND



Internal interconnection of digital input 0/1

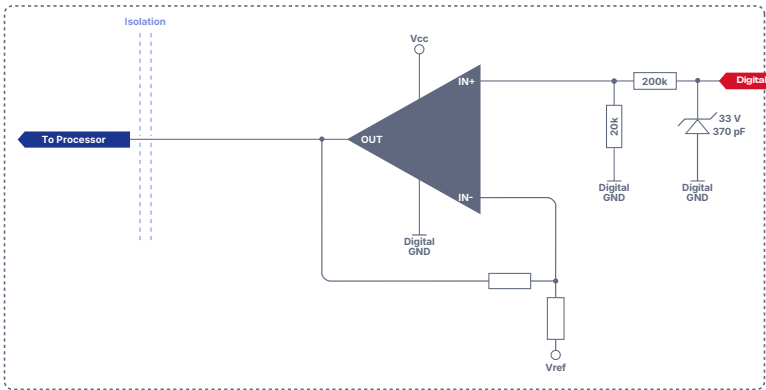


Figure 31: Digital input 0/1

Internal
interconnection of
digital output

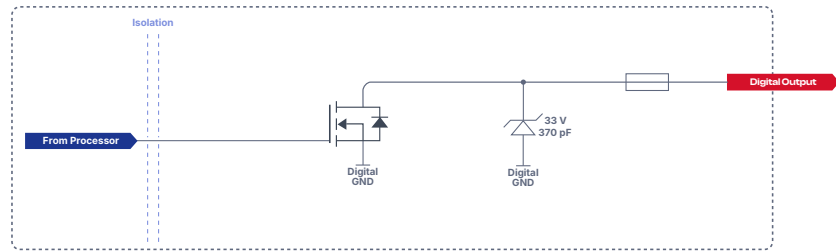


Figure 32: Digital output

Internal
interconnection of
analog input

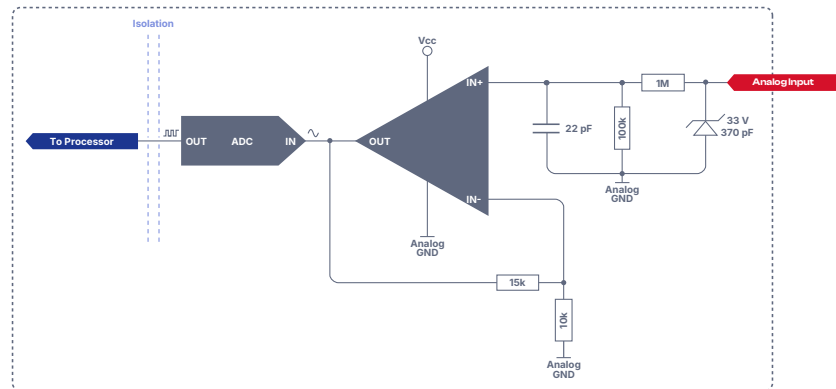


Figure 33: Analog input

Extended
measuring range of
the analog input

In normal operation, voltages up to 18 V can be applied and measured at the analog input. The cutoff frequency f_c (-3 dB) for AC voltages is approx. 7.2 kHz.

For measurements above 18 V (max. 50 V), an external series resistor has to be applied to the analog input. The series resistor R_{ext} depends on the maximum input voltage U_{input} to be measured and can be calculated as follows:

$$R_{ext} [k\Omega] = [(U_{input} * 0.61111) - 11] * 100$$

with $18 V < U_{input} \leq 50 V$

The cutoff frequency for AC voltages is also affected by the external series resistor:

$$f_c [Hz] = \frac{1}{2.33 * 10^{-6} * R_{ext} [k\Omega]}$$

Examples

	24 V	32 V	36 V	48 V
R_{ext}	367 k Ω	856 k Ω	1100 k Ω	1833 k Ω
R_{ext} (E96)	374 k Ω (24.12 V)	866 k Ω (32.17 V)	1100 k Ω (36.00 V)	1870 k Ω (48.60 V)
f_c (-3 dB)	1148 Hz	496 Hz	390 Hz	230 Hz

> **USB**

Connect your computer and the VN1640A via USB to install and to use the device with measurement applications (e. g. CANoe, CANalyzer). Use the USB 2.0 compliant cable found in the delivery (USB extension cables may generate faults between the computer and the device). Connect the device directly to USB at your computer or use a USB hub with its own power supply (self-powered). Depending on the used piggyback, the VN1640A requires the entire USB current (500 mA) which cannot be provided by a bus-powered USB hub.

2.6.5 LEDs**Description**

The VN1640A has five LEDs indicating bus activities and status:

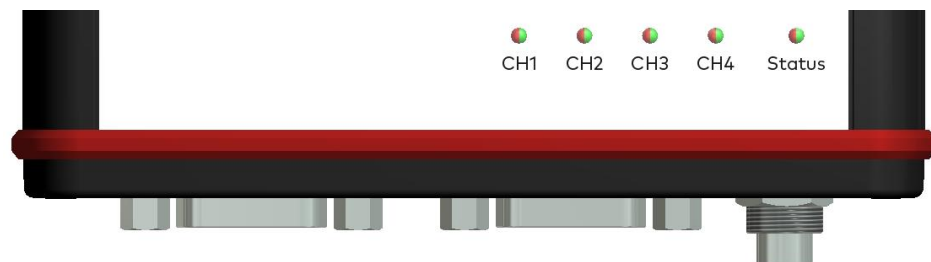


Figure 34: LEDs of the VN1640A

> **CH1 ... CH4 (with CAN-/LINpiggies)**

Multicolored channel LEDs, each indicating the bus activity for CAN, LIN or K-Line.

Color	Description
Green	Data frames have been sent or received correctly.
Orange	<ul style="list-style-type: none"> > CAN: Error frames have been sent or received. > LIN/K-Line: Protocol errors as well as valid messages on the bus.
Red	<ul style="list-style-type: none"> > CAN: Bus off. > LIN/K-Line: 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.

2.6.6 Bus Configuration

Piggybacks

The VN1640A has four piggyback plug-in locations (CH1...CH4). Depending on requirements, electrically decoupled CAN High-Speed, CAN Low-Speed, CAN Single Wire, J1708, LIN or SENT transceivers may be used. CH5 is reserved for dedicated IO tasks.



Note

A list of compatible piggybacks can be found in the [accessories manual](#) or on our [website](#).

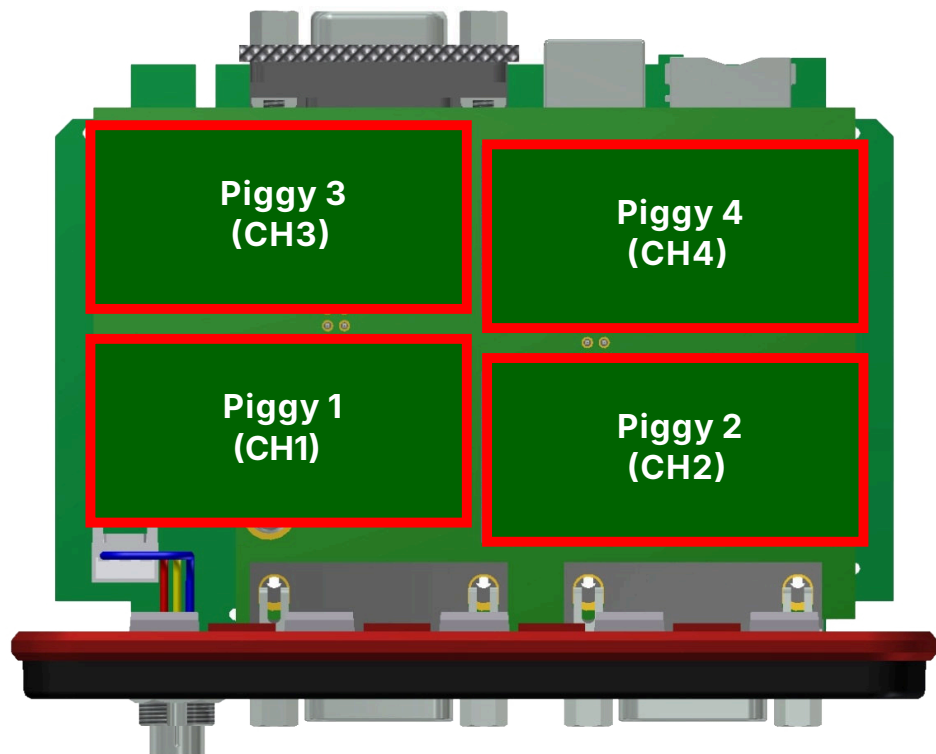


Figure 35: Piggyback plug-in locations for CH1...CH4



Note

LINpiggies have to be inserted before CANpiggies (in ascending order). If you intend to use only one LINpiggy, please use the first plug-in location (CH 1). J1708 should be handled like CAN. SENSORpiggies SENT have to be inserted between LINpiggies and CANpiggies.

Piggyback configurations

CH1	CH2	CH3	CH4
CAN1	CAN2	CAN3	CAN4
LIN1	CAN1	CAN2	CAN3
LIN1	LIN2	CAN1	CAN2
LIN1	LIN2	LIN3	CAN1
LIN1	LIN2	LIN3	LIN4

Examples

The following tables show examples of possible configurations:

1x CAN

CH1	CH2	CH3	CH4
CANpiggy 1	-	-	-

1x LIN

CH1	CH2	CH3	CH4
LINpiggy 1	-	-	-

1x LIN
1x CAN

CH1	CH2	CH3	CH4
LINpiggy 1	CANpiggy 1	-	-

2x LIN
1x CAN

CH1	CH2	CH3	CH4
LINpiggy 1	LINpiggy 2	CANpiggy 1	-

1x LIN
1x SENT
1x CAN

CH1	CH2	CH3	CH4
LINpiggy 1	SENSORpiggy SENT 1	CANpiggy 1	-

1x SENT
1x CAN

CH1	CH2	CH3	CH4
SENSORpiggy SENT 1	CANpiggy 1	-	-

1x LIN
1x SENT

CH1	CH2	CH3	CH4
LINpiggy 1	SENSORpiggy SENT 1	-	-

2.6.7 Replacing Piggybacks



WARNING!

Ensure an ESD safe working environment during disassembly and assembly. Avoid touching the top, bottom or connectors of the boards during this process to avoid ESD damage.

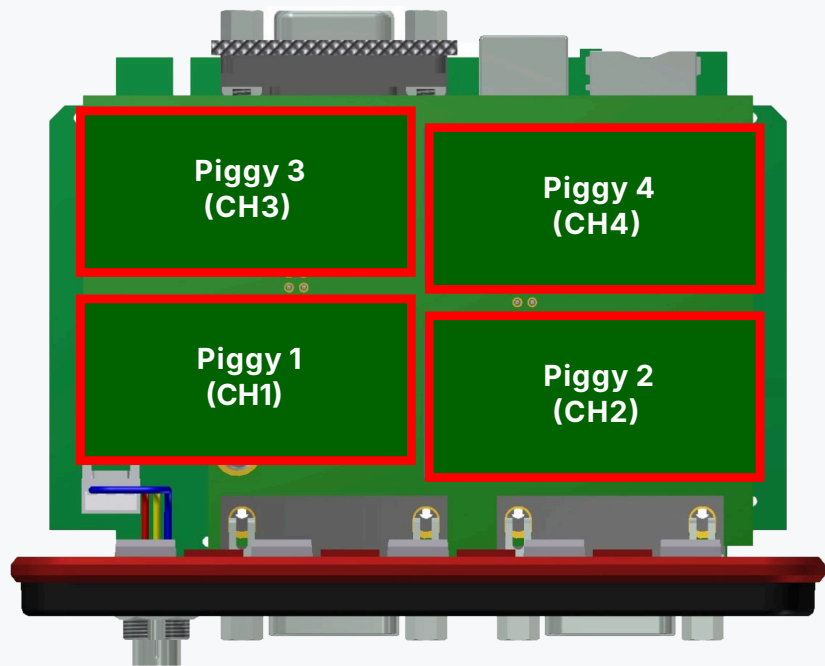


Step by Step Procedure

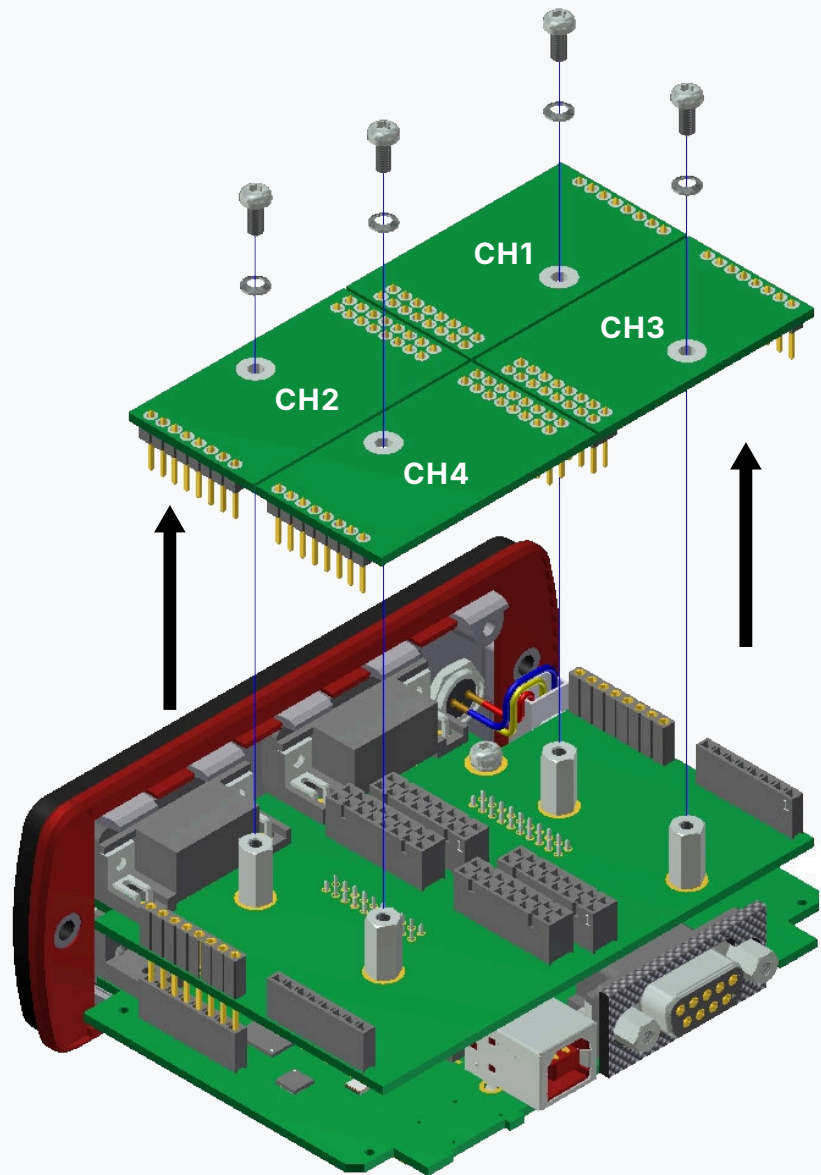
1. First, loosen the VN1640A housing screws on the side with the four D-SUB9 connectors. This requires removing the two black decorative caps. Then carefully pull the PC-board out of the housing.



2. The plug-in locations are defined as follows:

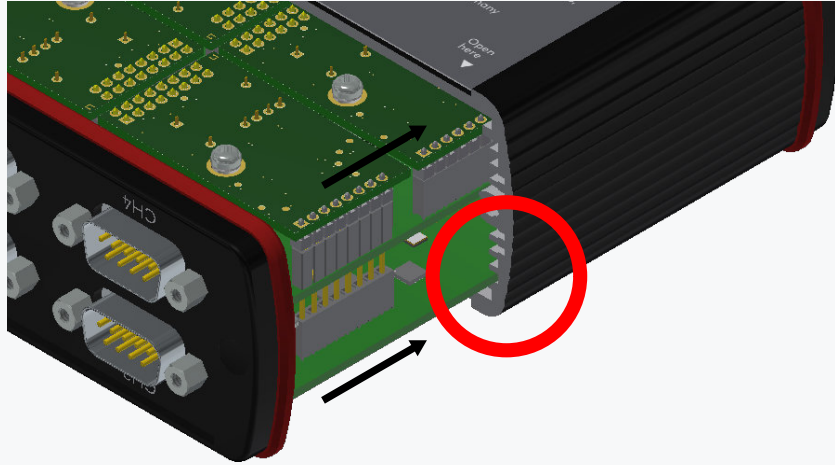


- Each piggyback is fastened by a screw and retainer. Please loosen the appropriate screw including the retainer and carefully remove the piggyback from the plug-in location.



- Insert the replacement piggyback. When doing this please make sure that the single and dual-row connectors are not laterally offset.
- Secure the new piggyback with the appropriate screw and retainer.

6. Place the VN1640A main board back in the housing. This operation involves placing the housing on a table with its back side (side with the bar code) facing upward. Then the main board with the piggybacks facing upward is inserted into the first guide rails.



7. It should be possible to slide the main board in the housing up to a few millimeters from the end without forcing it in. Close the housing by applying light pressure and then secure it with the appropriate screw fasteners. The screws should be secure but not excessively tight.
8. Please also attach the two black decorative caps.
9. Connect the VN1640A and the computer via the USB cable and check the bus configuration in the **Vector Hardware Manager** (page **Device Properties, Status** mode).

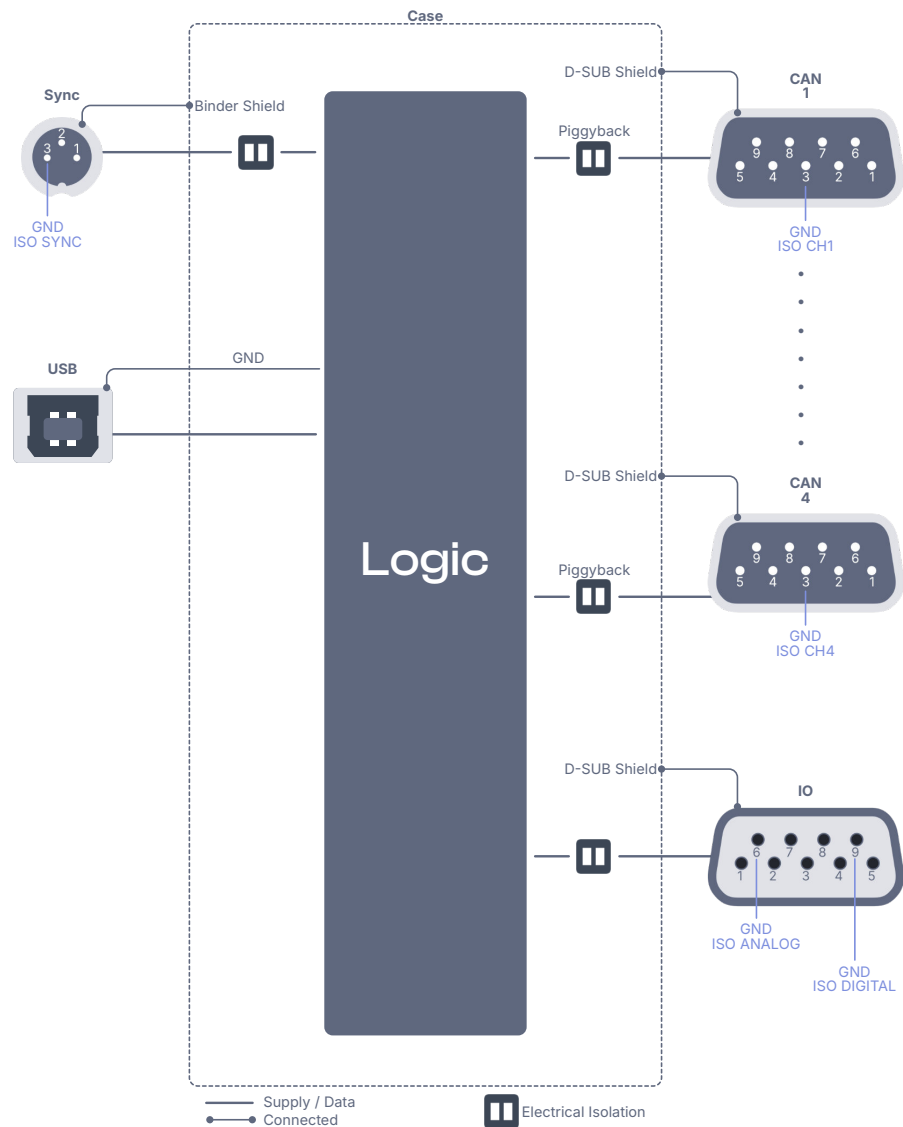
2.6.8 Technical Data

CAN channels	<p>Max. 4</p> <p>configurable via piggybacks</p> <p>Bitrates</p> <ul style="list-style-type: none"> > 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	<p>Max. 4</p> <p>Bitrates</p> <ul style="list-style-type: none"> > Normal-Mode: up to 20 kbit/s > Flash-Mode: up to 115.2 kbit/s (depending on wiring higher bitrates are possible)
K-Line channels	<p>Max. 2</p> <p>with LINpiggy 7269mag at CH1/CH2</p>
J1708 channels	<p>Max. 4</p> <p>configurable via piggybacks</p>
SENT channels	<p>Max. 4 with SENSORpiggy SENT</p>
Analog input	<p>10 bit</p> <p>Input 0 V...18 V</p> <p>Voltage tolerance up to 50 V (with series resistor)</p> <p>Sampling rate up to 1 kHz</p>
Digital input	<p>Range 0 V...32 V</p> <p>Schmitt trigger high 2.7 V, low 2.2 V</p> <p>Hysteresis 0.5 V</p> <p>Input frequencies up to 1 kHz</p>
Digital output	<p>Open Drain</p> <p>External supply up to 32 V</p> <p>Current max. 500 mA</p> <p>Short circuit / overvoltage protected</p>
Time stamps	<p>Accuracy (within one device): 1 µs</p> <p>Accuracy software sync: typ. 50 µs</p> <p>Accuracy hardware sync: typ. 1 µs</p>
Power consumption	<p>Approx. 2.5 W</p>
Temperature range	<p>Operating: -40 °C ... +70 °C</p> <p>Shipping and storage: -40 °C ... +85 °C</p>
Relative humidity	<p>15 % ... 95 %, non-condensing</p>

of ambient air	
Dimensions (LxWxH)	Approx. 88 mm x 111 mm x 45 mm
Weight	330 g (without accessories)
Operating system requirements	Windows 10 (x64, 64 bit) Windows 11 (x64, 64 bit)

2.6.9 Electrical Isolation

Electrical isolation
of the connectors



Note

The electrical isolation of the interfaces is a functional isolation that is used to avoid ground loops and interference between the networks. The voltage difference between the isolated areas must not exceed 60 VDC (isolation voltage). The isolation voltage usually exceeds the maximum permissible voltage at a port (operating voltage).

2.6.10 USB Protector Type 1

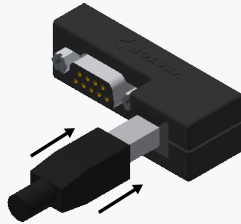
To protect the USB connector of VN1630A or VN1640A against mechanical damage, the USB Protector Type 1 (part number 05142) can be used. The USB Protector Type 1 is part of the standard delivery of VN1630A and VN1640A and available as accessory, too.



Step by Step Procedure

The following steps describe the mounting of the USB Protector:

1. Insert the USB cable into the USB Protector. Therefore, loosen the screw of the clamp.



2. Attach the USB Protector to the Vector network interface and connect the D-SUB9 connector as well as the USB connector.



3. Tighten the screws of the D-SUB9 connector.
4. Tighten the screw to fix the USB connector.

2.6.11 Accessories



Note

Detailed information on the listed accessories can be found in the separate accessories manual on our [website](#).

Bus transceiver

- > CAN-/LINpiggies
- > J1708 Piggyback
- > SENT Piggyback

Cables and connectors

- > CANcable0
- > CANcable1
- > CANcableA
- > CANcable TnT (D-SUB9 to Bunch Plugs)
- > CANcable Y
- > CANterm 120
- > CANcable Set Pro
- > Vector SYNCcableXL
- > Vector SYNCcable50
- > Multi SYNCbox external
- > Multi SYNCbox active
- > Cable Binder 3pol Connector with Pigtail
- > USB Cable 2.0

Miscellaneous

- > Fix Kit 42mm Device
- > USB Protector Type 1

2.7 VN1641

2.7.1 Scope of Delivery

Contents

The delivery includes:

- > VN1641 CAN XL Network Interface
- > USB Cable 3.1 Type C-C (Dual Screw Lock, part no. 05141)

2.7.2 Main Features



Figure 36: VN1641 CAN XL Network Interface

VN1641 features

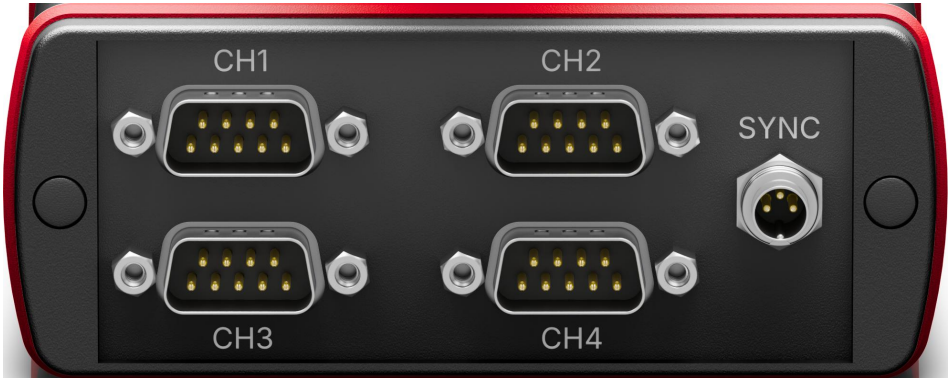
The main features of the VN1641 interface are:

- > Bus systems:
 - CAN XL, CAN FD, CAN 2.0
 - UART
- > Physical Layer:
 - CAN: SIC XL, SIC, FD, High Speed, Low Speed, Truck'n'Trailer
 - UART: TTL, RS232, RS485/422, UARToverCAN
- > CAN XL
 - Support of CAN XL Error Signaling Enabled and Error Signaling Disabled
 - Supported on all piggyback channels
- > CAN/CAN FD: Support of a Transport Protocol (TP) acceleration

- > 4x plug-in location for CANpiggies, SENSORpiggy SENT, SENSORpiggy UART, and SENSORpiggy UARToverCAN
- > Digital and analog inputs and outputs
 - 2x Digital In
 - 1x Digital Out
 - 1x Analog In
 - Dedicated D-SUB9 connector
- > Usable as CMP capture module (see Vector Hardware Manager help for further details).
Supported bus systems:
 - CAN
 - UART
- > LEDs indicating bus activities and status
- > Synchronization of multiple devices and other bus systems like CAN XL, CAN FD, CAN, LIN, FlexRay, MOST, Ethernet, UART:
 - Software time synchronization (with USB host connection)
 - Hardware time synchronization
 - PTP IEEE 1588 v2 (with Ethernet host connection)
- > Host connection
 - USB 3.2 Gen. 1 with USB Type-C and screwable connector
 - Ethernet Host Connection (Gigabit Ethernet 1000BASE-T)
- > Powered via USB Type-C connector
- > Configurable temperature limit to avoid device overheating (configurable via Vector Hardware Manager)
- > Transparent integration into the Vector tools (CANoe/CANalyzer, CANape, vFlash, ...)
- > Licensor: provides Vector licenses (USB host connection only)
- > Multi-application support for CAN XL/CAN FD/CAN channels: different tools can use one channel at the same time
- > Operating temperature range: -40 °C ... +55 °C
- > Kensington Lock: possibility to secure the VN1641 with a Kensington NanoSaver®
- > Functional Earth for optional connection of housing ground to system ground

2.7.3 Connectors Front Side

Device connectors



VN1641 connectors on the front

> CH1...4 (D-SUB9)

The VN1641 has four D-SUB9 connectors, each assigned to a dedicated piggyback plug-in location. The pin assignments depend on the inserted piggybacks. A list of compatible piggybacks can be found in the [accessories manual](#) or on our [website](#).



Example

The following example shows the pin assignment of CH1 if a CANpiggy 1057Gcap is inserted in the plug-in location at channel 1:

Pin	Assignment
1	Not connected
2	CH1 1057Gcap CAN Low
3	CH1 1057Gcap VB-
4	Not connected
5	Not connected
6	Not connected
7	CH1 1057Gcap CAN High
8	Not connected
9	Not connected



> **Sync (Binder connector)**

This connector (Binder type 711) can be used for time synchronization of different Vector devices (see section Time Synchronization on page 149).

The sync connector is not intended to connect a power supply.

Pin	Assignment
1	Not connected
2	Synchronization line
3	Ground



2.7.4 Connectors Back Side

Device connectors



Figure 37: VN1641 connectors on the back

> **Reset**

If the device configuration is corrupted, start it with pushed reset button. The reset button is located to the left of the USB port.

> **USB**

Connect your computer to the VN1641 via USB Type-C to use it with measurement applications (e. g. CANoe, CANalyzer) and to power it. For more details on the power supply, please refer to section [Power Supply Options on page 93](#).

> **Kensington Lock**

Mounting of Nano Kensington (NanoSaver).

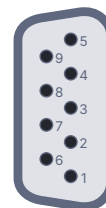
> **ETH (RJ45 connector)**

Connect your computer and the VN1641 via 100BASE-TX or 1000BASE-T to use the device with applications (e. g. CANoe, CANalyzer). The device must be powered from a USB Type-C power supply when using the Ethernet host connection (see section [Power Supply Options on page 93](#)).

> **CH5-IO (D-SUB9)**

The VN1641 has a D-SUB9 connector (CH5) for dedicated digital-analog input/output tasks. The pin assignment for CH5 is as follows:

Pin	Assignment
1	Analog input
2	Not connected
3	Not connected
4	Digital input 0
5	Digital input 1
6	Analog GND
7	Not connected
8	Digital output
9	Digital GND



Internal
interconnection of
digital input 0/1

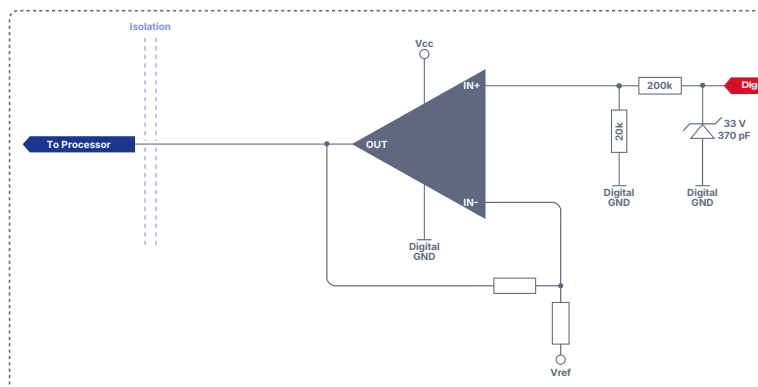


Figure 38: Digital input 0/1

Internal
interconnection of
digital output

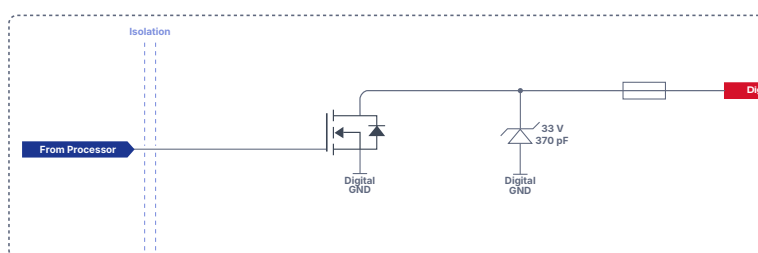


Figure 39: Digital output

Internal interconnection of analog input

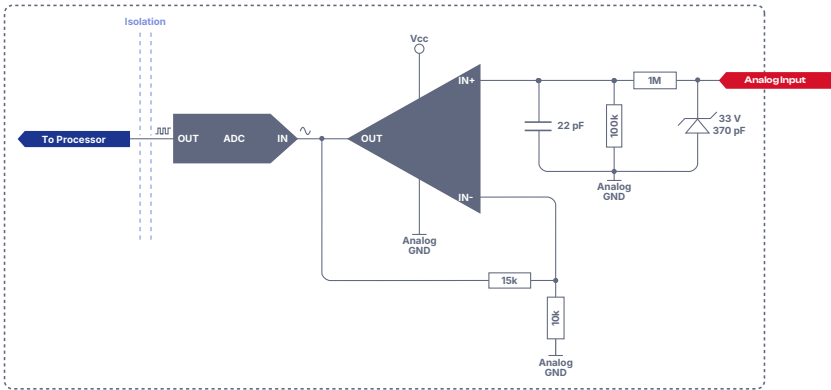


Figure 40: Analog input

Extended measuring range of the analog input

In normal operation, voltages up to 18 V can be applied and measured at the analog input. The cutoff frequency f_c (-3 dB) for AC voltages is approx. 7.2 kHz.

For measurements above 18 V (max. 50 V), an external series resistor has to be applied to the analog input. The series resistor R_{ext} depends on the maximum input voltage U_{input} to be measured and can be calculated as follows:

$$R_{ext} [k\Omega] = [(U_{input} * 0.61111) - 11] * 100$$

with $18 V < U_{input} \leq 50 V$

The cutoff frequency for AC voltages is also affected by the external series resistor:

$$f_c [Hz] = \frac{1}{2.33 * 10^{-6} * R_{ext} [k\Omega]}$$

Examples

	24 V	32 V	36 V	48 V
R_{ext}	367 kΩ	856 kΩ	1100 kΩ	1833 kΩ
R_{ext} (E96)	374 kΩ (24.12 V)	866 kΩ (32.17 V)	1100 kΩ (36.00 V)	1870 kΩ (48.60 V)
f_c (-3 dB)	1148 Hz	496 Hz	390 Hz	230 Hz

- > **Functional Earth (FE)**
Optional connection of housing ground to system ground.

2.7.5 Power Supply Options

The VN1641 is powered via USB Type-C, regardless of whether it is connected to the host via USB or Ethernet. Some examples of how to power the VN1641 are given below.

USB host connection

The VN1641 is USB bus powered when the USB host connection is used. This requires a USB 3.2 Gen. 1 USB Type-C port on the host that provides 7.5 W (1.5 A @ 5 V) or more power. A USB 3.1 Gen.1 Type C-C cable (included) must be used.

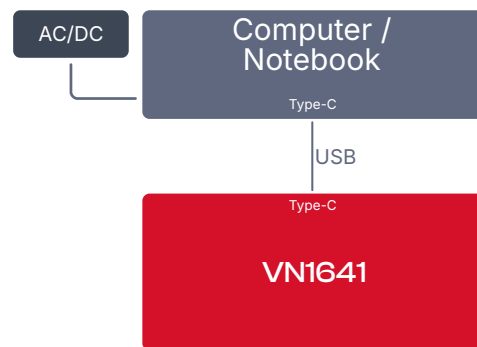


Figure 41: Power supply via host (directly)



Note

The VN1641 can only be used with a USB 3.1 Gen. 1 Type C-C cable that complies with the USB Type-C specification. Type A-C USB cables or any adapter cable cannot be used as they do not provide enough power.

If the USB port does not provide enough power, the status LED will light red.

USB hub connection

The VN1641 can be used with a USB 3 hub if the hub provides a USB 3.2 Gen. 1 Type-C port with 7.5 W (1.5 A @ 5 V) or more. This usually requires an externally powered hub. Vector offers a suitable hub as an accessory.

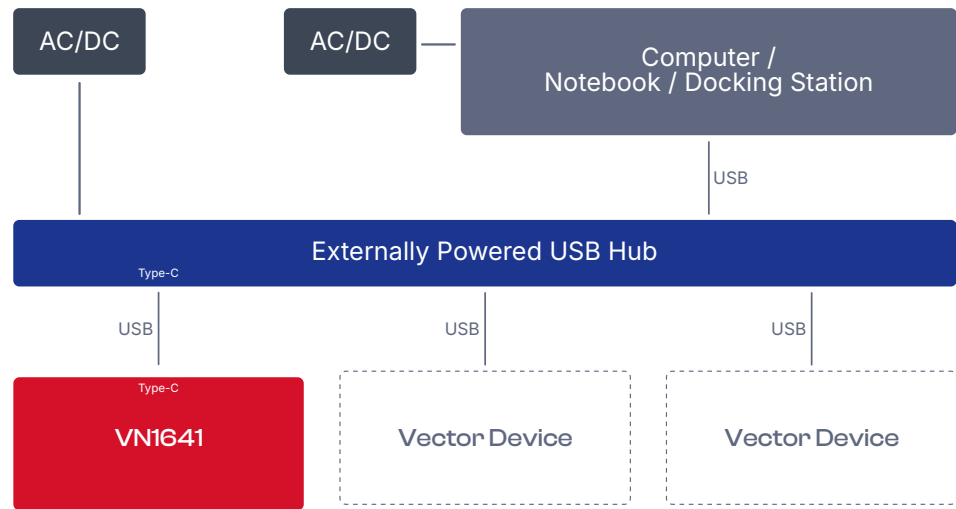


Figure 42: USB 3 hub with external power supply

Ethernet host connection

If the VN1641 is connected to the computer via Ethernet, the VN1641 requires an external USB Type-C power supply. Any standard USB Type-C power supply rated at 7.5 W (1.5 A @ 5 V) or higher can be used. Vector offers a suitable power supply as an accessory.

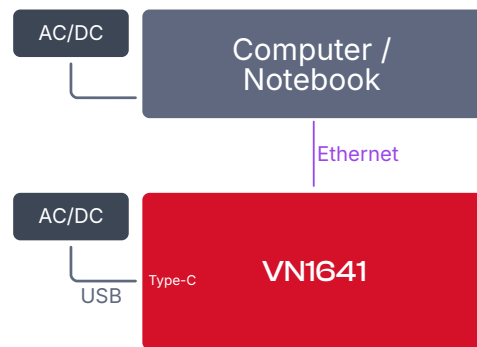


Figure 43: External power supply

Vehicle power

The following picture shows one way of powering the VN1641 for use in a vehicle.

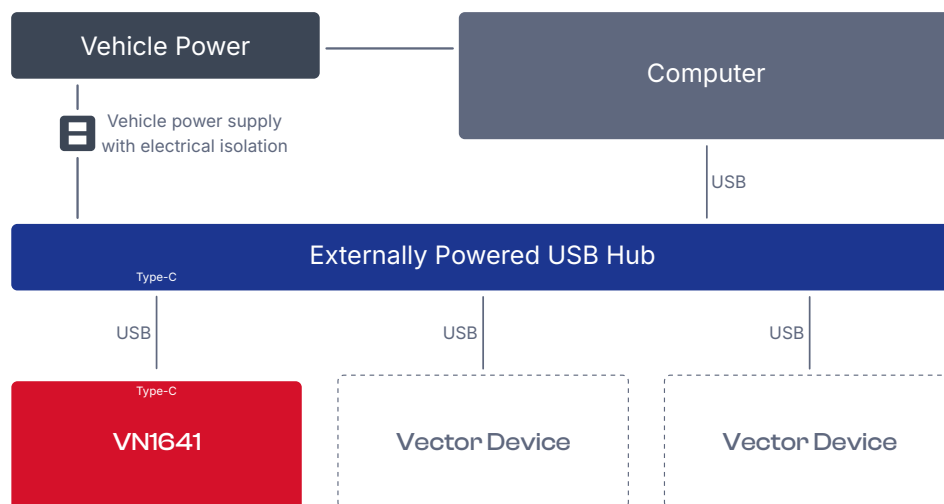


Figure 44: Vehicle power supply

**Note**

To avoid problems caused by ground offsets, the power supply to the hub must be **electrically isolated**. A Vector accessory for a electrically isolated vehicle power supply is planned; please contact Vector for availability.

2.7.6 LEDs

Description

The VN1641 has six LEDs indicating bus activities and status:



Figure 45: LEDs of the VN1641

> CH1 ... CH4 (with CAN-/SENSORpiggies)

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

Color	Description
Green	<ul style="list-style-type: none"> > CAN: Data frames have been sent or received correctly. > SENSOR: Channel active.
Orange	CAN: Error frames have been sent or received.
Red	CAN: Bus off.

CAN: The flashing frequency depends on the bus load.

> ⌚ Sync

LED illuminates if the device is synchronized.

Color	Sync State	Description
Off	Not configured.	No master or slave protocols are active for this device or no configuration has been loaded yet.
Orange	Configured, waiting for master.	A slave protocol is active, but no master could be found / assigned yet. The state is assumed when the PTP protocol Slave or Best-Master is activated in the firmware, i. e. when starting the PTP stack in the firmware or if one of the slave protocols was activated in the driver, i. e. when or after the configuration was applied by the Vector Timesync Service

Color	Sync State	Description
		(vTSS).
Green (flashing)	Pending.	<p>A slave protocol is active and a master was found or could be assigned. The SYNC condition / the steady state was not yet reached or was left again.</p> <ul style="list-style-type: none"> > PTP Transition to the Slave-With-Master state, but the SYNC condition has not yet been reached. > HW-SYNC Pulse and master time present, but the SYNC accuracy has not yet been reached. > SW-SYNC SYNC accuracy not yet reached.
Green	In-sync.	SYNC condition reached and is met or only master protocols active on the interface.
Red	Failure.	<ul style="list-style-type: none"> > PTP Master lost, SYNC accuracy not maintained. > HW-SYNC Missing pulse, missing time information of the master, SYNC accuracy not maintained. > SW-SYNC SYNC accuracy not maintained. <p>If the SYNC accuracy is not maintained but the master is present, this state is only maintained for three seconds, then the state changes to Pending.</p>

> Status

Multicolored LED indicating the device status.

Color	Description
Green	> Flashes 4x at power up and illuminates afterwards.

Color	Description
	<ul style="list-style-type: none">> Flashes quicker during an update progress. Please wait for the automatic reboot of the device after the update has been finished. Afterwards the LED is permanent on.
Red	<ul style="list-style-type: none">> An error has occurred.> Please use the included USB cable and also make sure it is receiving sufficient power via USB.> Please disconnect the USB cable. Reconnect the USB cable and try again.> Flashes when the max. temperature has been reached.

2.7.7 Bus Configuration

Piggybacks

The VN1641 has four piggyback plug-in locations (CH1...CH4). Depending on the use case, electrically decoupled CAN-/SENSORpiggybacks can be used.



Note

The piggybacks must be inserted in ascending order (CH1...CH4) without a gap.



Note

A list of compatible piggybacks can be found in the [accessories manual](#) or on our [website](#).

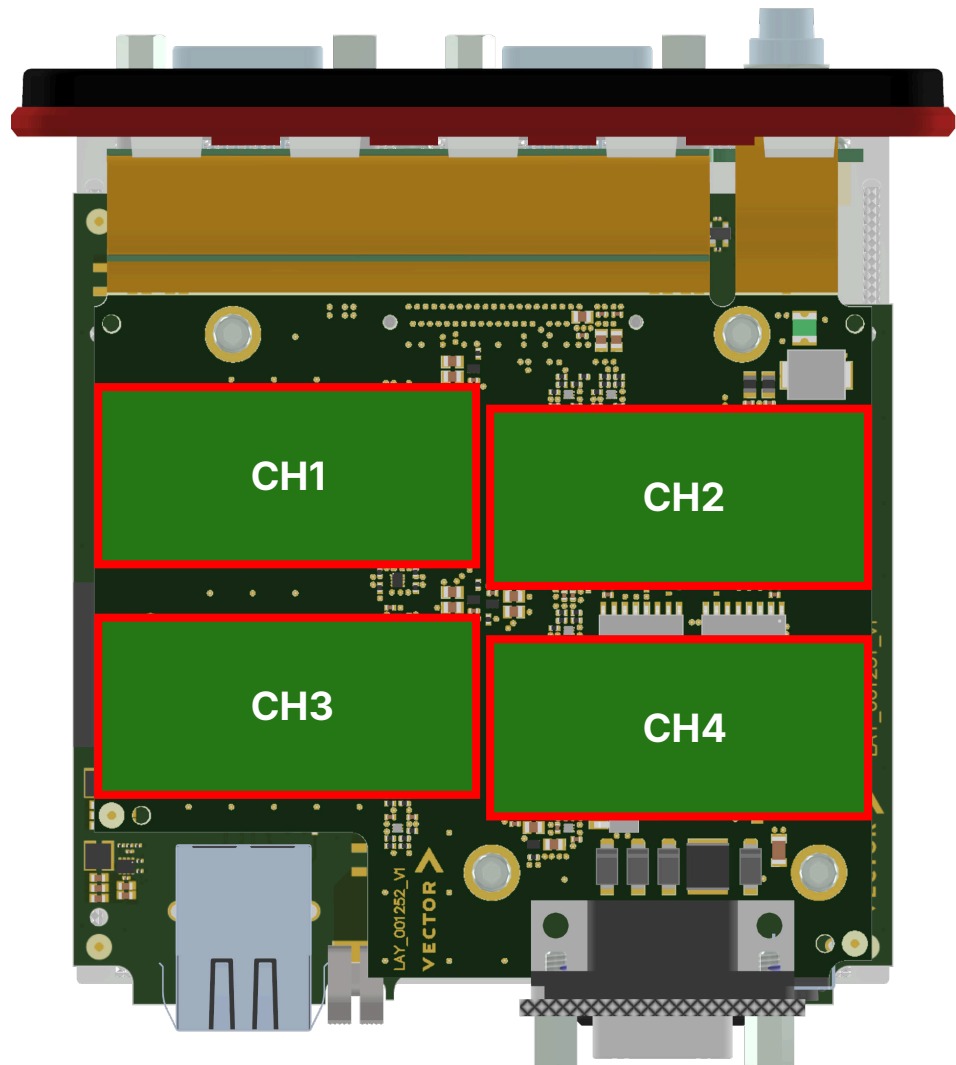


Figure 46: Piggyback plug-in locations for CH1...CH4

Insertion order

Depending on the transceiver, there is a specific order for inserting the piggybacks. This insertion order is defined as follows:

- > **CANpiggybacks**
Starting with piggyback socket 1 (CH1) up to piggyback socket 4 (CH4).
- > **SENSORpiggybacks**
After CAN.
- > Empty piggyback sockets after SENSOR are accepted.

2.7.8 Replacing Piggybacks



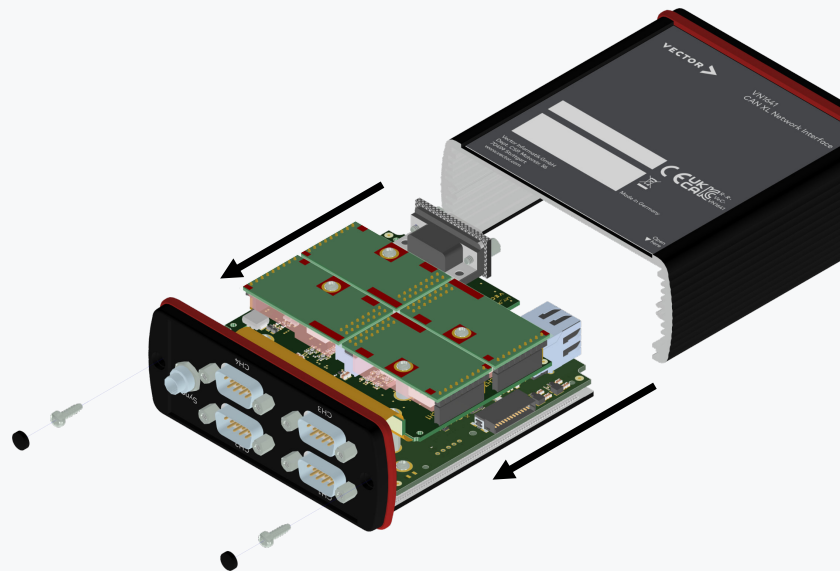
WARNING!

Ensure an ESD safe working environment during disassembly and assembly. Avoid touching the top, bottom or connectors of the boards during this process to avoid ESD damage.

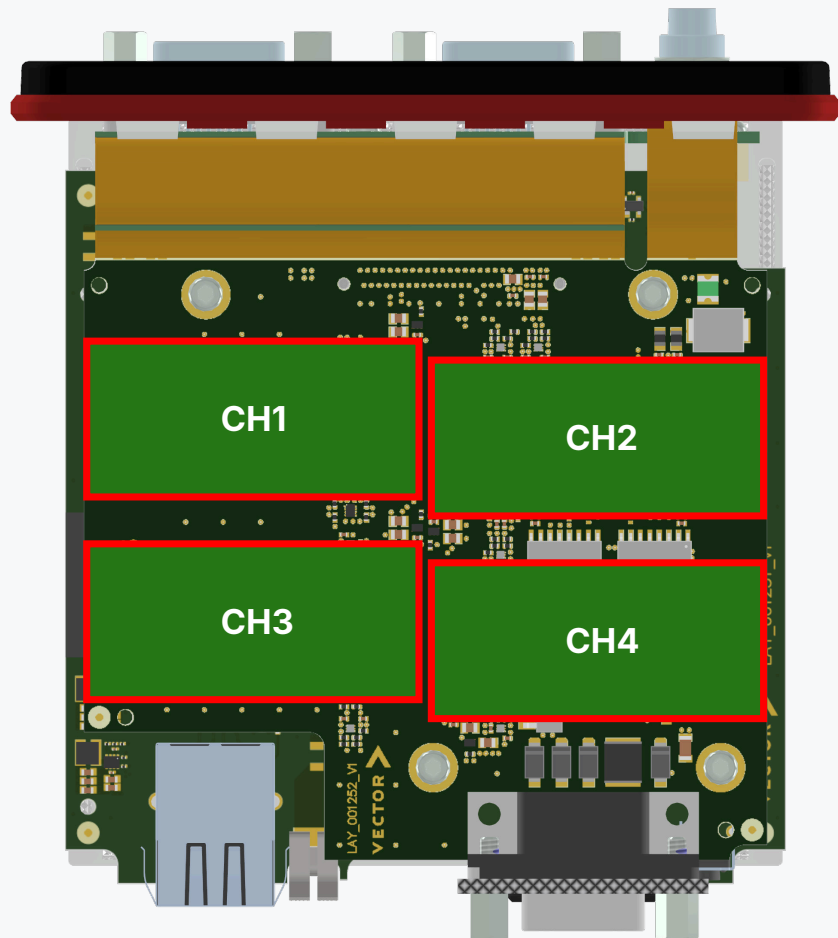


Step by Step Procedure

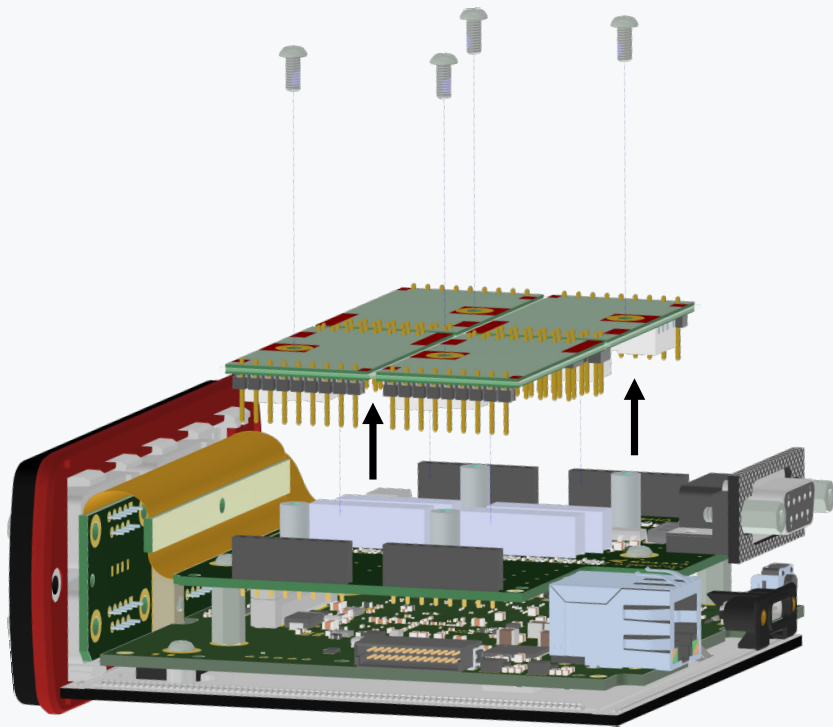
1. First, loosen the VN1641 housing screws on the side with the four D-SUB9 connectors. This requires removing the two black decorative caps. Then carefully pull the PC-board out of the housing.



2. The plug-in locations are defined as follows:

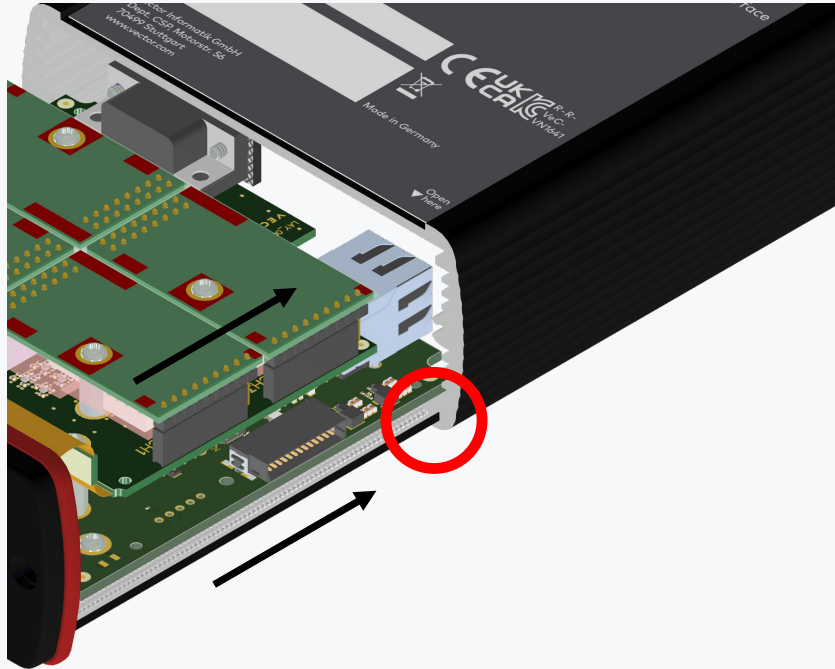


- Each piggyback is fastened by a screw and retainer. Please loosen the appropriate screw including the retainer and carefully remove the piggyback from the plug-in location.



- Insert the replacement piggyback. When doing this please make sure that the single and dual-row connectors are not laterally offset.
- Secure the new piggyback with the appropriate screw and retainer.

6. Place the VN1641 main board back in the housing. This operation involves placing the housing on a table with its back side (side with the bar code) facing upward. Then the main board with the piggybacks facing upward is inserted into the first guide rails.



7. Slide the main board into the housing a few millimeters without forcing it. Close the housing by applying light pressure and then secure it with the appropriate screw fasteners. The screws should be secure but not excessively tight.
8. Please also attach the two black decorative caps.
9. Connect the VN1641 and the computer via the USB cable and check the bus configuration in the **Vector Hardware Manager** (page **Device Properties, Status** mode).

2.7.9 Technical Data

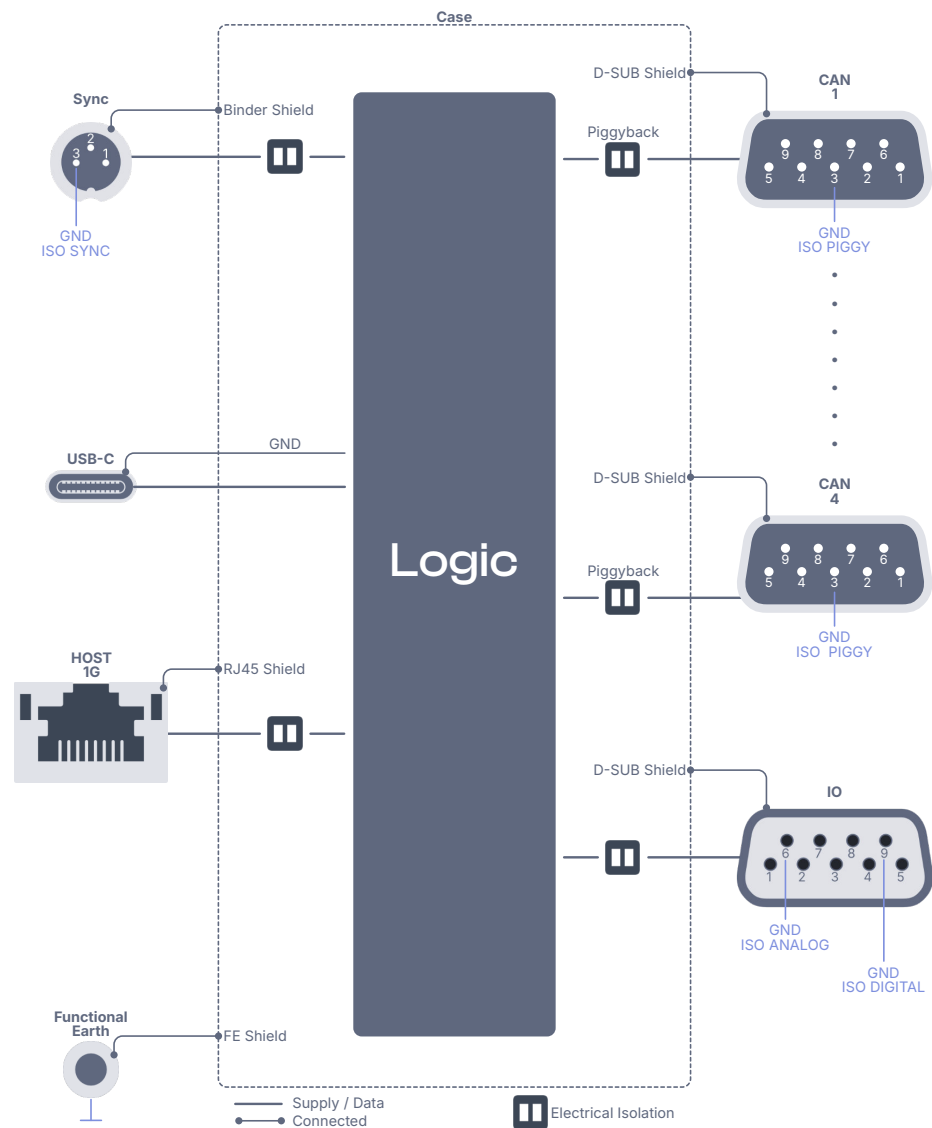
CAN channels	<p>Max. 4</p> <p>4x configurable via piggybacks</p> <p>Bitrates</p> <ul style="list-style-type: none"> > CAN: up to 1 Mbit/s (up to 2 Mbit/s depending on wiring and transceivers) > CAN FD: up to 5 Mbit/s (up to 8 Mbit/s depending on wiring and transceivers) > CAN XL: up to 16 Mbit/s (up to 20 Mbit/s depending on wiring and transceivers; for bitrates > 5 Mbit/s a CAN SIC XL transceiver is required)
SENSOR channels	<p>Max. 4, configurable via a piggyback.</p> <p>Operation modes:</p> <ul style="list-style-type: none"> > UART (max. 1 Mbit/s) > RS232 (max. 230 kbit/s) > RS485 (RS422; max. 16 Mbit/s) > UARToverCAN (max. 2 Mbit/s)
Analog input	<p>10 bit</p> <p>Input 0 V...18 V</p> <p>Voltage tolerance up to 50 V (with series resistor)</p> <p>Sampling rate up to 1 kHz</p>
Digital input	<p>Range 0 V...32 V</p> <p>Schmitt trigger high 2.7 V, low 2.2 V</p> <p>Hysteresis 0.5 V</p> <p>Input frequencies up to 1 kHz</p>
Digital output	<p>Open Drain</p> <p>External supply up to 32 V</p> <p>Current max. 500 mA</p> <p>Short circuit / overvoltage protected</p>
Time stamps	<p>Accuracy (within one device): 1 µs</p> <p>Accuracy software sync: typ. 50 µs</p> <p>Accuracy hardware sync: typ. 1 µs</p> <p>Accuracy IEEE 1588 – PTP: typ. 1 µs</p>
Host computer connection	<p>USB 3.2 Gen. 1 via USB Type-C</p> <p>Gigabit Ethernet 1000BASE-T</p>
Power supply	<p>USB connection: via USB</p> <p>Ethernet connection: external supply via USB</p>

	Type-C
Power consumption	Max. 7.5 W
Temperature range	Operating: -40 °C ... +55 °C Shipping and storage: -40 °C ... +85 °C
Relative humidity of ambient air	15 % ... 95 %, non-condensing
Dimensions (LxWxH)	Approx. 114 mm x 111 mm x 45 mm
Weight	450 g (without piggybacks)
Operating system requirements	Windows 11 (x64, 64 bit)

2.7.10 Electrical Isolation

2.7.10.1 Connectors

Electrical isolation
of the connectors



**Note**

The electrical isolation of the interfaces is a functional isolation that is used to avoid ground loops and interference between the networks. The voltage difference between the isolated areas must not exceed 60 VDC (isolation voltage). The isolation voltage usually exceeds the maximum permissible voltage at a port (operating voltage).

**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.

The FE socket of the device must be connected to the user-side system ground when the device is operated in the vehicle.

2.7.10.2 Piggybacks

**Reference**

For information on the electrical isolation of the piggybacks, please refer to the separate accessories manual.

2.7.11 Troubleshooting

Issue	Remedy
The device is not recognized by the computer.	<ul style="list-style-type: none">> Install the latest drivers from our website.> Perform a factory reset by pressing and holding the reset button on the back panel while powering up the device. Release the button when the Power LED starts flashing green.

2.7.12 Accessories



Note

Detailed information on the listed accessories can be found in the separate accessories manual on our [website](#).

- | | |
|-----------------------|--|
| Bus transceiver | > CANpiggies
> SENSORpiggies |
| Cables and connectors | > CANcable0
> CANcable1
> CANcableA
> CANcable TnT (D-SUB9 to Bunch Plugs)
> CANcable Y
> CANterm 120
> CANcable Set Pro
> Vector SYNCcableXL
> Vector SYNCcable50
> Multi SYNCbox external
> Multi SYNCbox active
> Cable Binder 3pol Connector with Pigtail
> USB Cable 3.1 Type C-C (Dual Screw Lock)
> USB 3.2 Gen2x1 Hub |
| Power supply | > Power Supply USB-C Basic |
| Miscellaneous | > Fix Kit 42mm Device |

2.8 VN1670

2.8.1 Scope of Delivery

Contents

The delivery includes:

- > VN1670 (incl. housing feets)
- > USB Cable 3.1 Type A-C (Dual Screw Lock, part no. 05140)
- > Vector Power Supply ODU Mini-Snap (part no. 05068)

2.8.2 Main Features



Figure 47: VN1670

VN1670 features

The main features of the VN1670 interface are:

- > Bus systems:
 - CAN XL, CAN FD, CAN 2.0
 - LIN
 - UART: UART, RS232, RS485 (RS422) and UARToverCAN
- > CAN XL
 - Support of CAN XL Error Signaling Enabled and Error Signaling Disabled
 - Supported on the piggyback channels
- > CAN/CAN FD: Support of a Transport Protocol (TP) acceleration
- > Max. 15 channels:
 - 5x on-board CAN/CAN FD channel (electrically decoupled)
 - 5x on-board LIN channel (electrically decoupled)
 - 5x additional plug-in location for CAN-/LINpiggy, SENSORpiggy UART, and SENSORpiggy UARToverCAN
- > Digital and analog inputs/outputs via the VNpiggy30 IO 8644

- > Usable as CMP capture module (see Vector Hardware Manager help for further details).
Supported bus systems:
 - CAN
 - LIN
 - UART
 - DA I/O
- > Synchronization of multiple devices and other bus systems like CAN XL, CAN FD, CAN, LIN, FlexRay, MOST, Ethernet, UART:
 - Software time synchronization (with USB host connection)
 - Hardware time synchronization
 - PTP IEEE 1588 v2 (with Ethernet host connection)
 - gPTP IEEE 802.1AS-2020
- > Possibilities for stacking and mounting the devices
- > Computer connection via
 - USB 3.2 Gen1 via USB Type-C connector with screw lock
 - Gigabit Ethernet 1000BASE-T
- > Standby mode for power saving (configurable via Vector Hardware Manager)
- > Configurable temperature limit to avoid device overheating (configurable via Vector Hardware Manager)
- > Transparent integration into the Vector tools (CANoe/CANalyzer, CANape, vFlash, ...)
- > Licensor: provides Vector licenses (USB host connection only)
- > Multi-application support for CAN XL/CAN FD/CAN channels: different tools can use one channel at the same time
- > Usage in car (passenger and luggage compartment)
- > Operating temperature range: -40 °C ... +65 °C
- > Kensington Lock: possibility to secure the VN1670 with a Kensington NanoSaver®
- > Functional Earth for optional connection of housing ground to system ground

2.8.3 Connectors Front Side

Device connectors

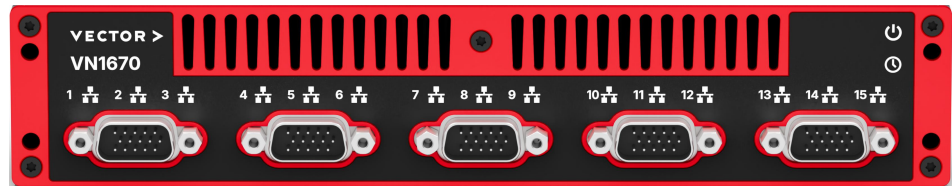


Figure 48: VN1670 connectors on front side

> CH1...CH15 (5x D-SUB15HD male)

The VN1670 has five D-SUB15HD connectors. Each connector provides three channels:

- 1x on-board CAN/CAN FD channel
- 1x on-board LIN channel
- 1x optional channel via a CAN-/LIN-/SENSOR piggyback.

D-SUB15HD	Channel	Channel Type
CH1/2/3	1	On-board CAN
	2	On-board LIN
	3	Optional piggyback
CH4/5/6	4	On-board CAN
	5	On-board LIN
	6	Optional piggyback
CH7/8/9	7	On-board CAN
	8	On-board LIN
	9	Optional piggyback
CH10/11/12	10	On-board CAN
	11	On-board LIN
	12	Optional piggyback
CH13/14/15	13	On-board CAN
	14	On-board LIN
	15	Optional piggyback

Pin assignment

Channel	VN1670		VNCable 3Y	
	Assignment	D-SUB15HD	D-SUB9	Channel
CAN	CAN Low	14	2	A
	GND	10	3	
	CAN High	15	7	
	N.C.	5	9	
LIN	Pdis	3	2	B
	GND	9	3	
	LIN	4	7	
	Vbatt	13	9	
Piggy	N.C.	2	1	C
	CAN Low/Pdis ¹⁾ RX/Line A ²⁾	1	2	
	GND	7	3	
	Pdis ²⁾	11	4	
	CAN High/LIN ¹⁾ TX/Line B ²⁾	6	7	
	N.C.	12	8	
	Vbatt ^{1, 2)}	8	9	

1) via CAN- or LINpiggy

2) via UARTpiggy

**Note**

Please use the VNCable3Y to split a D-SUB15HD connector into three separate D-SUB9 connectors (CAN: channel A, LIN: channel B and inserted piggyback at channel C). For more information, please refer to the accessories manual.

**Note**

For in-car-usage, ensure that the cables used for the CAN/LIN network access are appropriately fixed (not fixed by the VN1670 D-SUB connectors only).

2.8.4 Connectors Back Side

Device connectors



Figure 49: VN1670 connectors on back side

> Functional Earth (FE)

Optional connection of housing ground to system ground.

> Power (ODU)

For power supply, the VN1670 has a two-pin ODU connector (MINI-SNAP size 1, type GF1LOC-P02RP00-0000). Attach the enclosed power cable to power up the unit (matching ODU connector type S11LOC-P02NPL0-6200)

Pin	Assignment
1	Power supply (8 V ... 32 V)
2	Ground



> Sync (Binder)

The VN1670 has a sync connector (Binder type 711) which can be used for time synchronization of different Vector devices (see section Time Synchronization on page 149). In addition, a pin is available for standby operation (see section Standby Operation on page 127).

Pin	Assignment
1	Terminal 15 (12 V ... 32 V) for standby operation
2	Synchronization line
3	Ground Sync



> Kensington Lock

Mounting of Nano Kensington (NanoSaver).

> **IO (D-SUB15HD female)**

The VN1670 has a D-SUB15HD connector for the digital and analog input/output signals of the VNpiggy30 IO 8644. The pin assignment is as follows:

Pin	Assignment
1	Digital input/output 6
2	Digital input/output 4
3	Digital input/output 2
4	Analog GND
5	Analog input/output 1
6	Digital input/output 7
7	Digital input/output 5
8	Digital input/output 3
9	Digital GND
10	Analog input/output 2
11	Digital PWM
12	Digital input/output 0
13	Digital input/output 1
14	Analog input/output 3
15	Analog input/output 0

> **USB (Type-C)**

Connect your computer and the VN1670 via USB to install and to use the device with applications (e. g. CANoe, CANalyzer).

> **AUX (RJ45 connector)**

Reserved. Do not use.

> **HOST (RJ45 connector)**

Connect your computer and the VN1670 via 100BASE-TX or 1000BASE-T to use the device with applications (e. g. CANoe, CANalyzer).

2.8.5 LEDs

LEDs



Figure 50: LEDs on front side

> (CAN/LIN 1...15)

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

Color	Description
Green	<ul style="list-style-type: none"> > CAN/LIN: Data frames have been sent or received correctly. The flashing frequency varies according to the message rate. > SENSOR: Channel active.
Orange	<ul style="list-style-type: none"> > CAN: Error frames have been sent or received. LIN: Both valid and erroneous data were detected. > The flashing frequency varies according to the message rate.
Red	<ul style="list-style-type: none"> > CAN: Bus off. > LIN: Only erroneous data was detected.

> Sync

LED illuminates if the device is synchronized.

Color	Sync State	Description
Off	Not configured.	No master or slave protocols are active for this device or no configuration has been loaded yet.
Orange	Configured, waiting for master.	A slave protocol is active, but no master could be found / assigned yet. The state is assumed when the PTP protocol Slave or Best-Master is activated in the firmware, i. e. when starting the PTP stack in the firmware or if one of the slave protocols was activated in the driver, i. e. when or after the configuration was applied by the Vector Timesync Service

Color	Sync State	Description
		(vTSS).
Green (flashing)	Pending.	<p>A slave protocol is active and a master was found or could be assigned. The SYNC condition / the steady state was not yet reached or was left again.</p> <ul style="list-style-type: none"> > PTP Transition to the Slave-With-Master state, but the SYNC condition has not yet been reached. > HW-SYNC Pulse and master time present, but the SYNC accuracy has not yet been reached. > SW-SYNC SYNC accuracy not yet reached.
Green	In-sync.	SYNC condition reached and is met or only master protocols active on the interface.
Red	Failure.	<ul style="list-style-type: none"> > PTP Master lost, SYNC accuracy not maintained. > HW-SYNC Missing pulse, missing time information of the master, SYNC accuracy not maintained. > SW-SYNC SYNC accuracy not maintained. <p>If the SYNC accuracy is not maintained but the master is present, this state is only maintained for three seconds, then the state changes to Pending.</p>

> **⏻ Status**

Multicolored LED indicating the device status.

Color	Description
Green	<ul style="list-style-type: none"> > Flashes 4x at power up and illuminates afterwards. > Flashes quicker during an update progress. Please wait for the automatic reboot of the device after the update has been finished. Afterwards the LED is permanent on.
Red	An error has occurred. Please disconnect the power supply as well as the USB or Ethernet cable. Reconnect the power supply and the USB/Ethernet cable and try again. Flashes when the max. temperature has been reached.

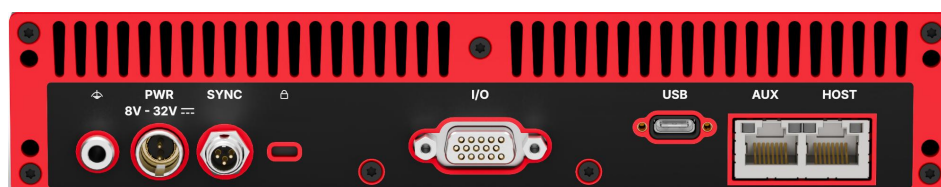


Figure 51: LEDs on back side

> **Ethernet HOST**

Multicolored LED indicating the Ethernet status.

Activity (left LED)	Description
Green	Activity.
Off	No activity.

Speed (right LED)	Description
Green	1000 Mbit/s
Orange	100 Mbit/s
Off	10 Mbit/s

2.8.6 Bus Configuration

Piggybacks

The VN1670 has five piggyback plug-in locations (CH3, CH6, CH9, CH12, CH15). Depending on use cases, electrically decoupled CAN SIC XL, CAN SIC, CAN High-Speed, CAN Low-Speed, LIN or SENSOR transceivers can be used.



Note

A list of compatible piggybacks can be found in the accessories manual or on our website.

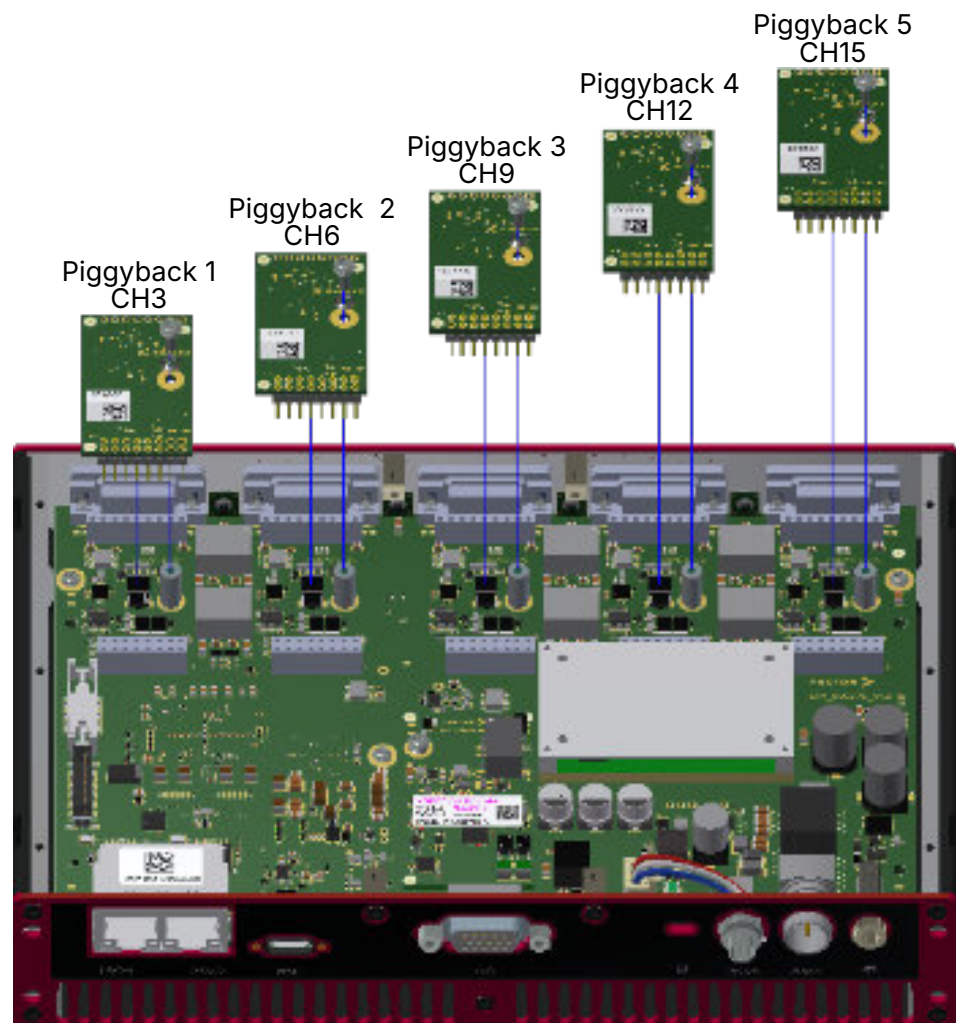


Figure 52: Piggyback plug-in locations

Insertion order

Depending on the transceiver, there is a specific order for inserting the piggybacks. This insertion order is defined as follows:

- > **CAN/SENSORpiggybacks**
Starting with piggyback socket 1 (CH3) up to piggyback socket 5 (CH15).
- > **SENSORpiggybacks**
After CAN and before LIN.
- > **LINpiggybacks**
Starting with piggyback socket 5 (CH15) up to piggyback socket 1 (CH3).
Empty piggyback sockets between CAN and LIN are accepted.
Empty piggyback sockets after SENSOR are accepted.

**Note**

Please use the VNCable3Y to split a D-SUB15HD connector into three separate D-SUB9 connectors (CAN: channel A, LIN: channel B and inserted piggyback at channel C). For more information, please refer to the accessories manual.

**Note****CAN XL Configuration**

The piggyback channels of the VN1670 support the CAN XL modes Error Signaling Enabled and Error Signaling Disabled:

- > **CAN XL mode Error Signaling Enabled**
This operating mode is intended for bitrates up to 5 Mbit/s. To use this mode, a CAN High-Speed, a CAN SIC or a CAN SIC XL piggyback can be used.
- > **CAN XL mode Error Signaling Disabled**
This operating mode is intended for bitrates above 5 Mbit/s. This requires a CAN SIC XL piggyback, which must be configured for transceiver Fast Mode.

The configuration of the CAN XL operating mode and the Fast Mode of the CAN SIC XL piggyback must be done in the application (e. g. CANoe, CANalyzer, CANape).

Please contact Vector for information on the planned availability of the CAN SIC XL piggyback.

**WARNING!****Operating a CAN SIC XL piggyback in Fast Mode**

When using a CAN SIC XL piggyback in Fast Mode, the VN1670 is fully compliant with the corresponding EMC regulations starting with **hardware revision 3**.

Previous hardware revisions are not fully compliant to EMC regulations regarding radiation and therefore do not support an operation in Fast Mode.

Please contact Vector for further options if you have a VN1670 with hardware revision < 3 and intend to use a CAN SIC XL piggyback in Fast Mode.

2.8.6.1 Configuration Examples

	Channels	Piggy 1	Piggy 2	Piggy 3	Piggy 4	Piggy 5
CAN/LIN	10x CAN 5x LIN	CAN1	CAN2	CAN3	CAN4	CAN5
	9x CAN 6x LIN	CAN1	CAN2	CAN3	CAN4	LIN1
	8x CAN 7x LIN	CAN1	CAN2	CAN3	LIN2	LIN1
	7x CAN 8x LIN	CAN1	CAN2	LIN3	LIN2	LIN1
	6x CAN 9x LIN	CAN1	LIN4	LIN3	LIN2	LIN1
	5x CAN 10x LIN	LIN5	LIN4	LIN3	LIN2	LIN1
SENSOR	5x CAN 5x SENSOR 5x LIN	SENSOR1	SENSOR2	SENSOR3	SENSOR4	SENSOR5
CAN/SENSOR	6x CAN 4x SENSOR 5x LIN	CAN1	SENSOR1	SENSOR2	SENSOR3	SENSOR4
	7x CAN 3x SENSOR 5x LIN	CAN1	CAN2	SENSOR1	SENSOR2	SENSOR3
SENSOR/LIN						
	5x CAN 4x SENSOR 6x LIN	SENSOR1	SENSOR2	SENSOR3	SENSOR4	LIN1
	5x CAN 3x SENSOR 7x LIN	SENSOR1	SENSOR2	SENSOR3	LIN2	LIN1
CAN/SENSOR/ LIN						
	6x CAN 3x SENSOR 6x LIN	CAN1	SENSOR1	SENSOR2	SENSOR3	LIN1
	7x CAN 1x SENSOR 7x LIN	CAN1	CAN2	SENSOR1	LIN2	LIN1

2.8.7 Replacing Piggybacks



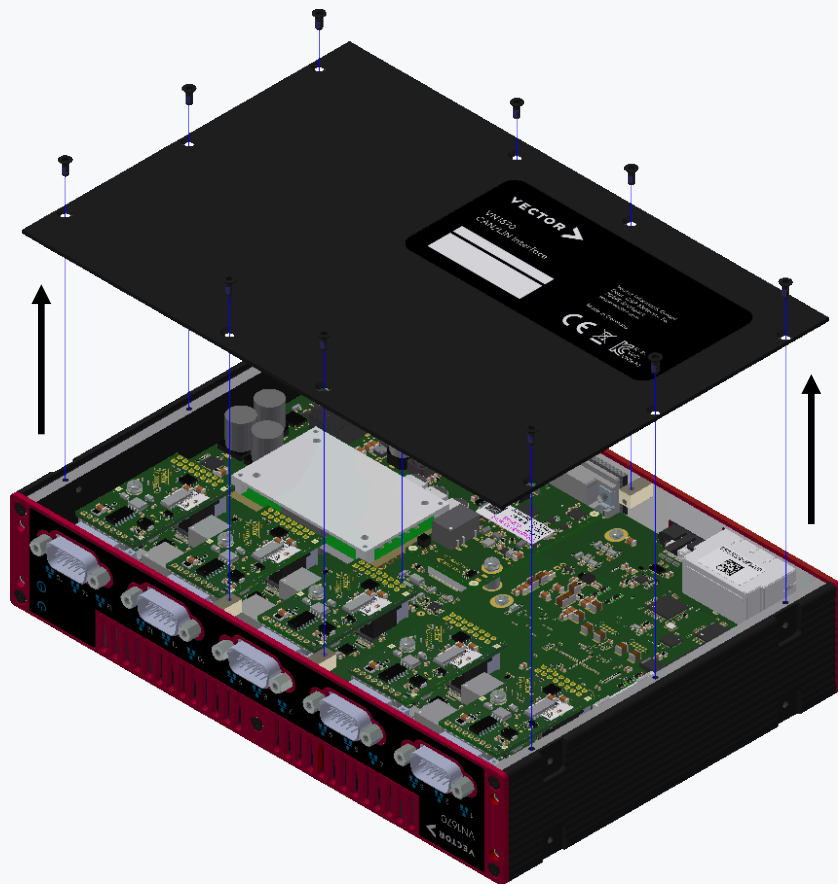
WARNING!

Ensure an ESD safe working environment during disassembly and assembly. Avoid touching the top, bottom or connectors of the boards during this process to avoid ESD damage.

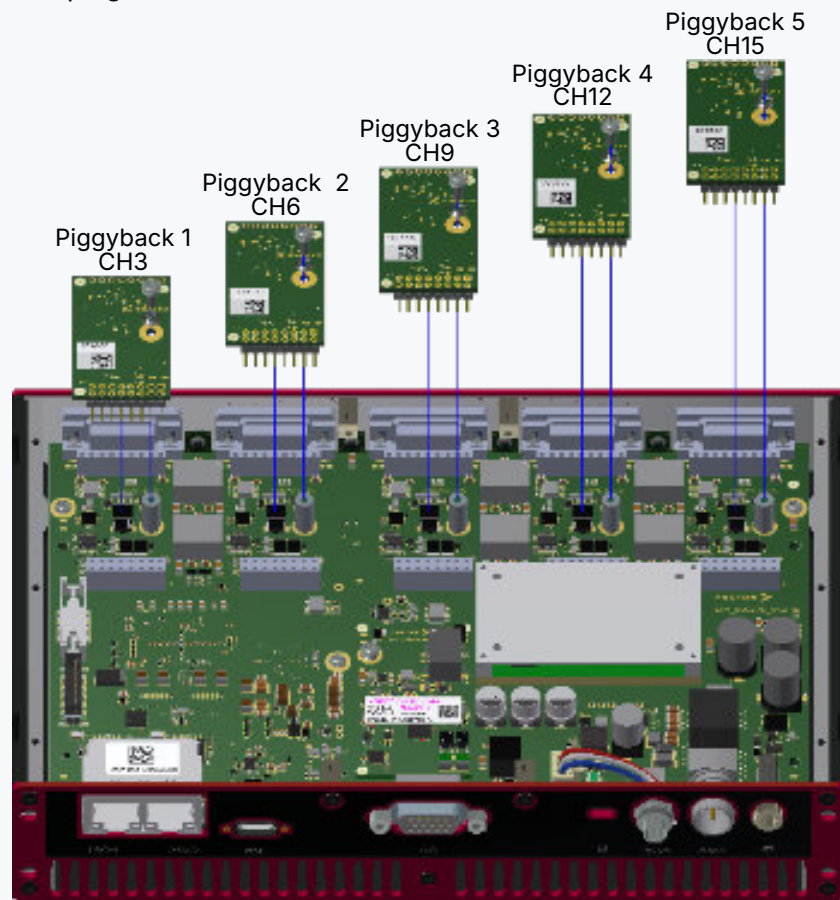
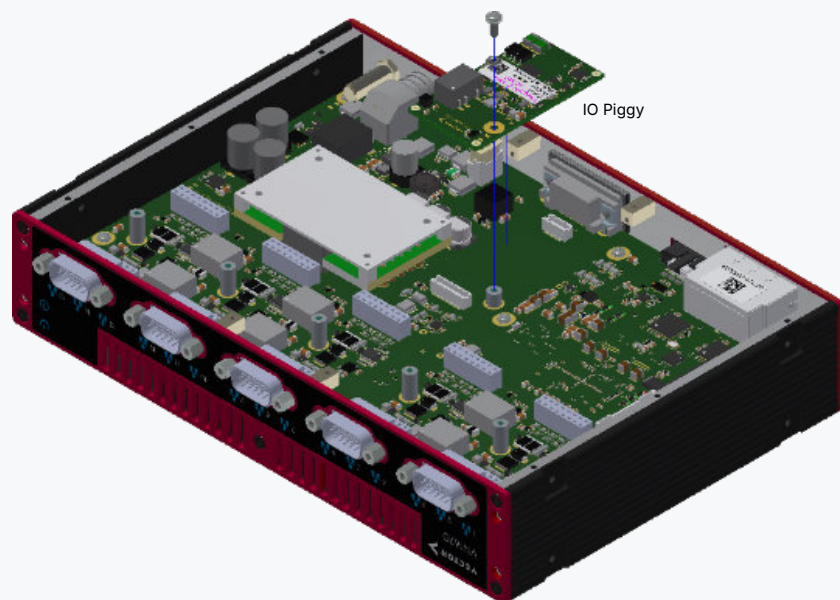


Step by Step Procedure

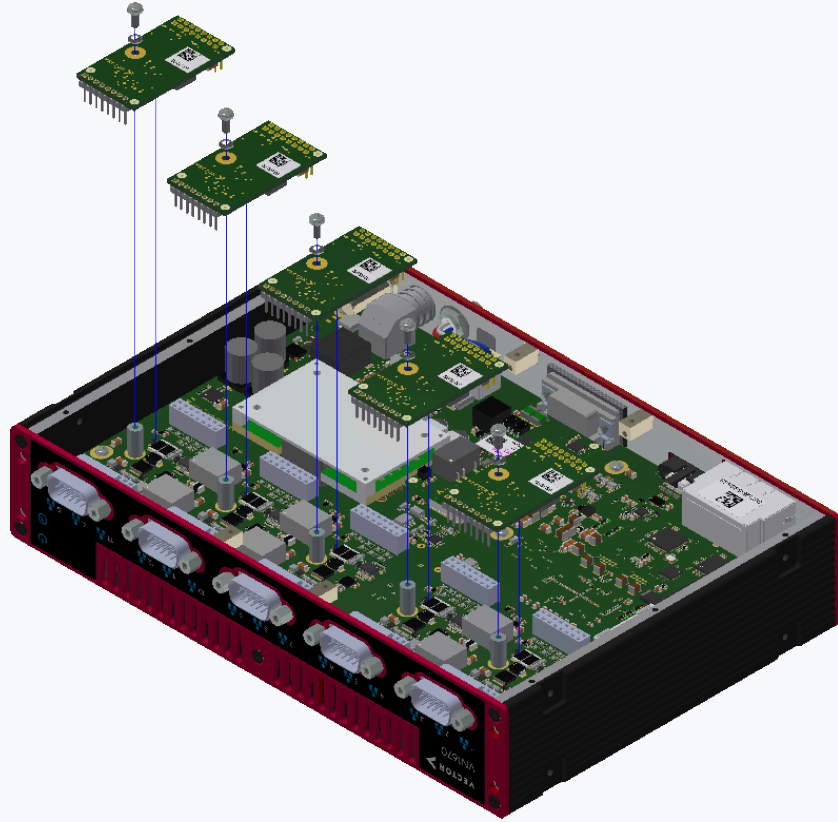
1. First, loosen the VN1670 housing screws on the bottom. Then carefully remove the cover.



2. The plug-in locations are defined as follows:



3. Each piggyback is fastened by a screw and retainer. Please loosen the appropriate screw including the retainer and carefully remove the piggyback from the plug-in location.



4. Insert the replacement piggyback. When doing this please make sure that the single and dual-row connectors are not laterally offset.
5. Secure the new piggyback with the appropriate screw and retainer.
6. Reattach the bottom cover and then secure it with the appropriate screw fasteners. The screws should be secure but not excessively tight.
7. Power the VN1670, connect the device with the host and check the bus configuration in the **Vector Hardware Manager** (page **Device Properties, Status** mode).

2.8.8 Standby Operation

Activating the standby feature

The device supports a standby mode which can be activated via the [Vector Hardware Manager | Device Properties Configuration](#).

The standby feature can be used by monitoring one of the following standby sources:

- > the USB (Type A) host interface (via USB Type A-C cable only),
- > the Ethernet host interface or
- > Terminal 15 pin on the **Sync** connector:

Pin	Assignment
1	Terminal 15 (12 V ... 32 V) for standby operation
2	Synchronization line
3	Ground Sync



If the USB or Ethernet connection is interrupted (e. g. cable disconnected) or terminal 15 is set (0 V), the interface is set to standby after a certain time. The timeout can be set in [Vector Hardware Manager | Device Properties Configuration](#).

If the USB or Ethernet connection is active again or terminal 15 is reset (rising edge to 12 V ... 32 V), the interface wakes up again.



Reference

Please find the power consumption values in section [Technical Data on page 129](#).



Note

Some Ethernet network adapters (e. g. Intel I219-LM) support an Ultra Low Power Mode (please check the power management settings of the Ethernet network adapter of your host computer).

If the Ultra Low Power Mode is enabled, the VN1670 will not wake up from standby. Therefore, the Ultra Low Power Mode of the host computer's Ethernet port must be disabled if Ethernet is configured as the standby source for VN1670.

2.8.9 Device Stacking

This Vector device can be directly stacked or mounted side-by-side with other Vector devices that also have a Vector System Housing (VSH). This is supported by the side recesses on the housing.

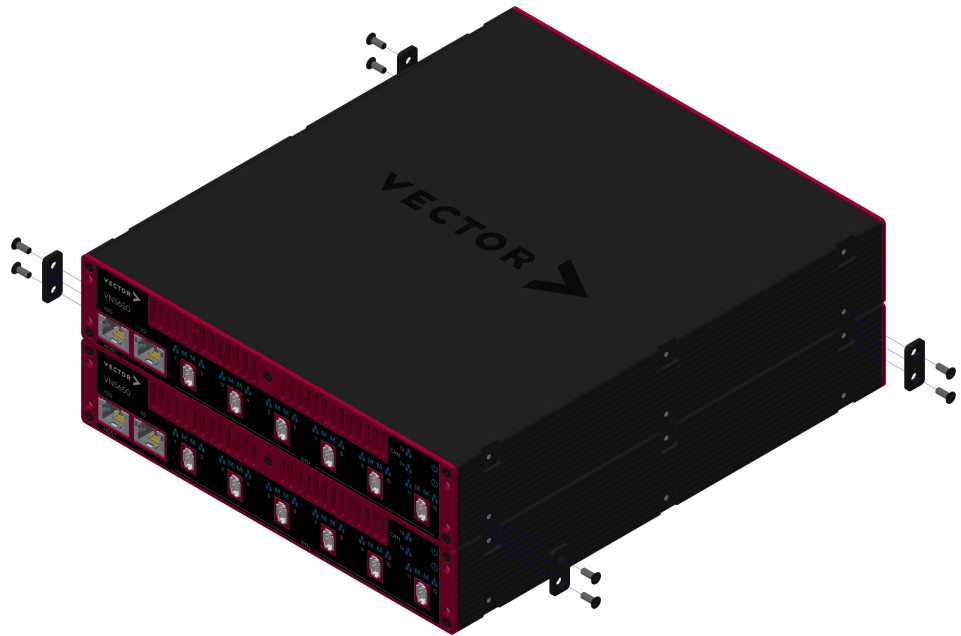


Figure 53: Stacked mounting (example with VN5650)

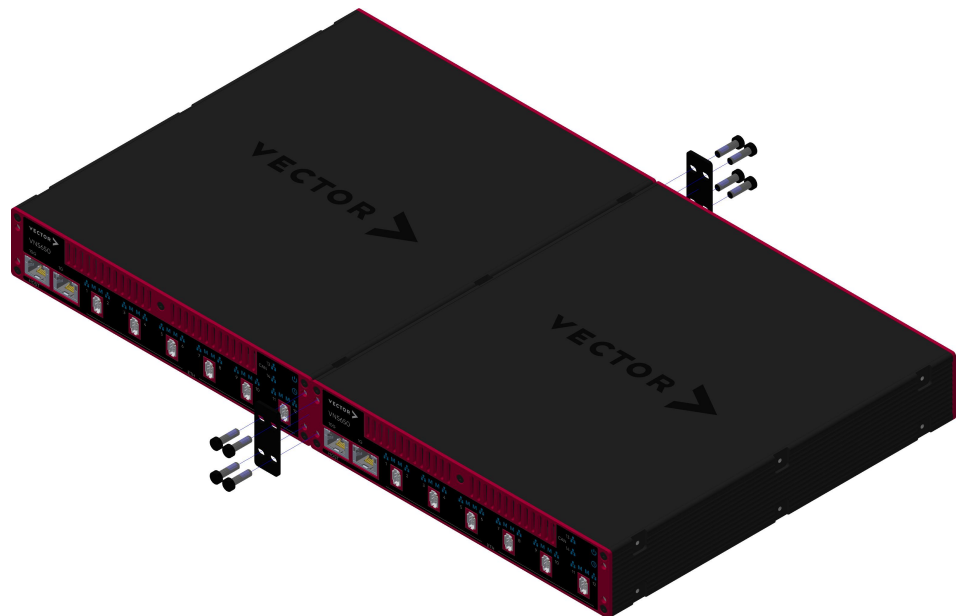


Figure 54: Side-by-side mounting (example with VN5650)

To further increase the mechanical stability of stacked devices, the mounted feet can be removed and replaced by the VSH Connecting Kit Vertical (see accessories manual, part number 05152).

2.8.10 Technical Data

CAN channels	<p>Max. 10</p> <ul style="list-style-type: none"> > 5x on-board CAN/CAN FD <ul style="list-style-type: none"> – hardware revision 2 or lower: NXP TJA1057GT – hardware revision 3 or higher: NXP TJA1057BT – electrically decoupled > 5x configurable via piggybacks <p>Bitrates</p> <ul style="list-style-type: none"> > 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) > CAN XL: up to 16 Mbit/s (up to 20 Mbit/s depending on wiring and transceivers; for bitrates > 5 Mbit/s a CAN SIC XL transceiver is required)
LIN channels	<p>Max. 10</p> <ul style="list-style-type: none"> > 5x on-board LIN <ul style="list-style-type: none"> – Infineon TLE7259-3 – electrically decoupled > 5x configurable via piggybacks <p>Bitrates</p> <ul style="list-style-type: none"> > Normal-Mode: up to 20 kbit/s > Flash-Mode: up to 115.2 kbit/s (depending on wiring higher bitrates are possible)
SENSOR channels	<p>Max. 5, configurable via a piggyback.</p> <p>Operation modes:</p> <ul style="list-style-type: none"> > UART (max. 1 Mbit/s) > RS232 (max. 230 kbit/s) > RS485 (RS422; max. 16 Mbit/s) > UARToverCAN (max. 2 Mbit/s)
Digital/analog input/output	Via VNpiggy30 IO 8644 (optional)
Time stamps	<p>Resolution: 15.625 ns</p> <p>Accuracy (within one device): 1 µs</p> <p>Accuracy software sync: typ. 50 µs</p>

	Accuracy hardware sync: typ. 1 μ s Accuracy IEEE 1588 – PTP: typ. 1 μ s
Host computer connection	USB 3.1 Gen. 1 via USB Type-C Gigabit Ethernet 1000BASE-T
Power supply	External 8 V...32 V (typ. 12 V)
Power consumption	Typ. 10 W ¹⁾ Max. 16 W ²⁾ Standby: 35 mW
Temperature range	Operation: -40 °C ... +65 °C Storage: -40 °C ... +85 °C
Relative humidity of ambient air	15 % ... 95 %, non-condensing
Dimensions (LxWxH)	159 mm x 216 mm x 42 mm (height without housing feet)
Weight	1.4 kg
Operating system requirements	Windows 10 (x64, 64 bit) Windows 11 (x64, 64 bit)
Required CANoe version	CANoe 15 SP3 or higher CANoe 17 or higher for CAN XL

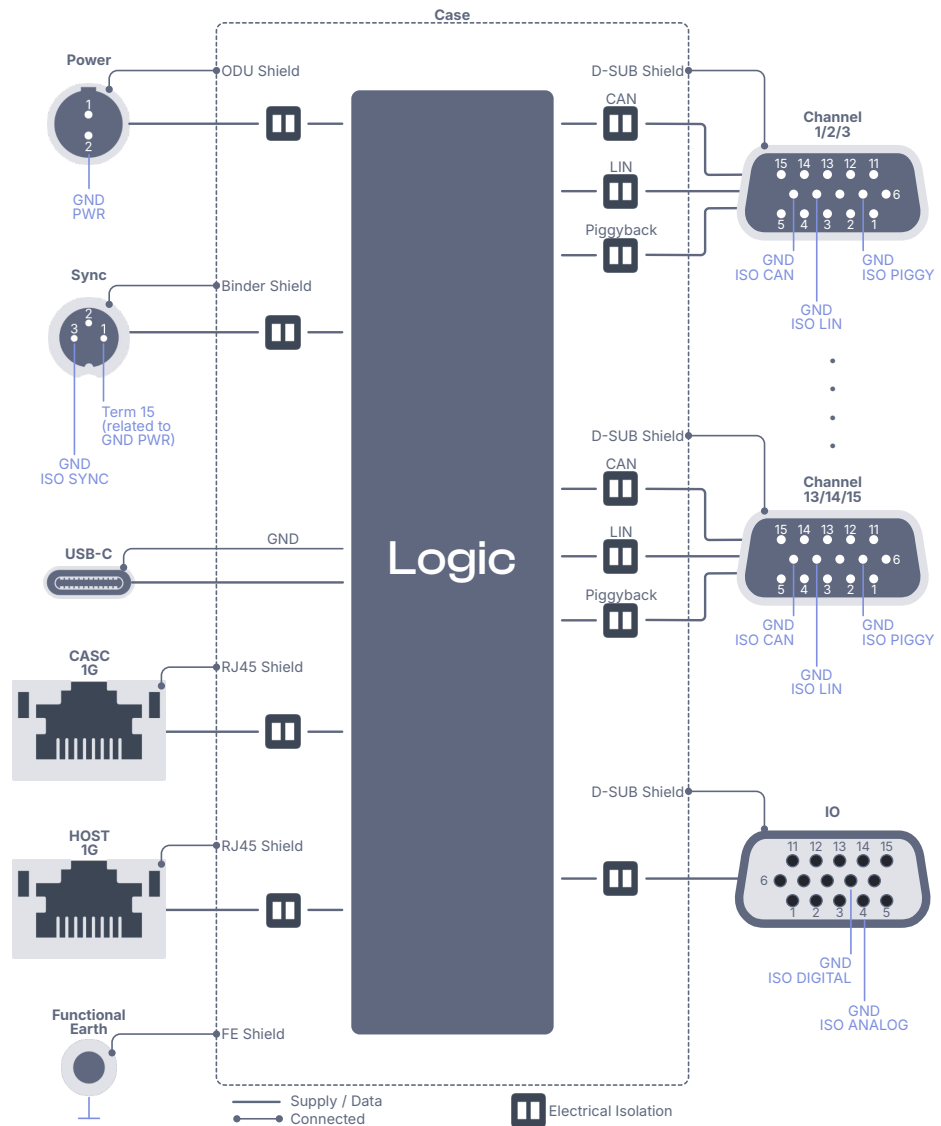
1) Setup: 10x CAN (1 Mbit/s, 100 % busload), 1x LIN, USB host connection, 25 °C ambient temperature, 12 V external supply.

2) Setup: 10x CAN (1 Mbit/s, 100 % busload), 5x LIN, Ethernet host connection, VNpigg30 IO 8644 at full load, cascading port at high load, +65 °C ambient temperature.

2.8.11 Electrical Isolation

2.8.11.1 Connectors

Electrical isolation
of the connectors



Note

The electrical isolation of the interfaces is a functional isolation that is used to avoid ground loops and interference between the networks. The voltage difference between the isolated areas must not exceed 60 VDC (isolation voltage). The isolation voltage usually exceeds the maximum permissible voltage at a port (operating voltage).



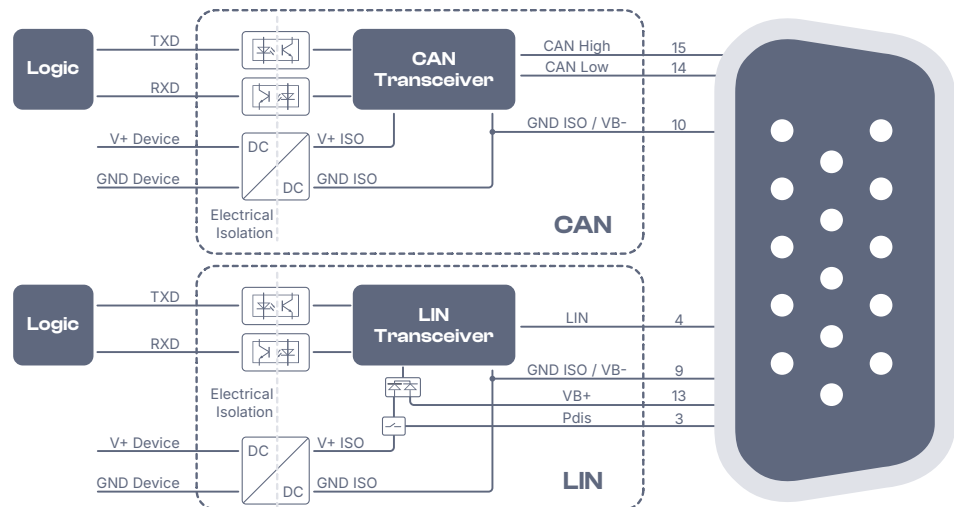
Note

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.

The FE socket of the device must be connected to the user-side system ground when the device is operated in the vehicle.

2.8.11.2 On-board Channels

Electrical isolation
of the on-board
channels



2.8.11.3 Piggybacks



Reference

For information on the electrical isolation of the piggybacks, please refer to the separate [accessories manual](#).

2.8.12 Troubleshooting

Issue	Remedy
Device turns off after some time.	> Check that the standby function is not activated. See the Standby section in this manual.

2.8.13 Accessories



Note

Detailed information on the listed accessories can be found in the separate accessories manual on our [website](#).

Bus transceiver

- > CAN-/LINpiggies
- > SENSORpiggies

Cables and connectors

- > VNCable 3Y
- > CANterm 120
- > Vector SYNCcableXL
- > Vector SYNCcable50
- > Multi SYNCbox external
- > Multi SYNCbox active
- > Cable Binder 3pol Connector with Pigtail
- > USB Cable 3.1 Type C-C (Dual Screw Lock)
- > Ethernet cables

Power supply

- > Vector Power Supply ODU Mini-Snap
- > Cable Vehicle Input <> ODU Mini-Snap
- > Cable Banana Plug <> ODU Mini-Snap

Miscellaneous

- > VSH Connecting Kit 19"
- > VSH Connecting Kit Horizontal
- > VSH Connecting Kit Vertical
- > VSH Equipment Foot Kit
- > VSH Mounting Flange

3 Getting Started

In this chapter you find the following information:

3.1	Driver Installation	136
3.1.1	General Information	136
3.1.2	Installation Instructions	136
3.1.3	Command Line	138
3.2	Vector Hardware Manager	144
3.2.1	Hardware Configuration	144
3.2.2	Tool Location and Help	144
3.2.3	For VN1630 log Users	145
3.3	Loop Tests	146
3.3.1	CAN	147

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

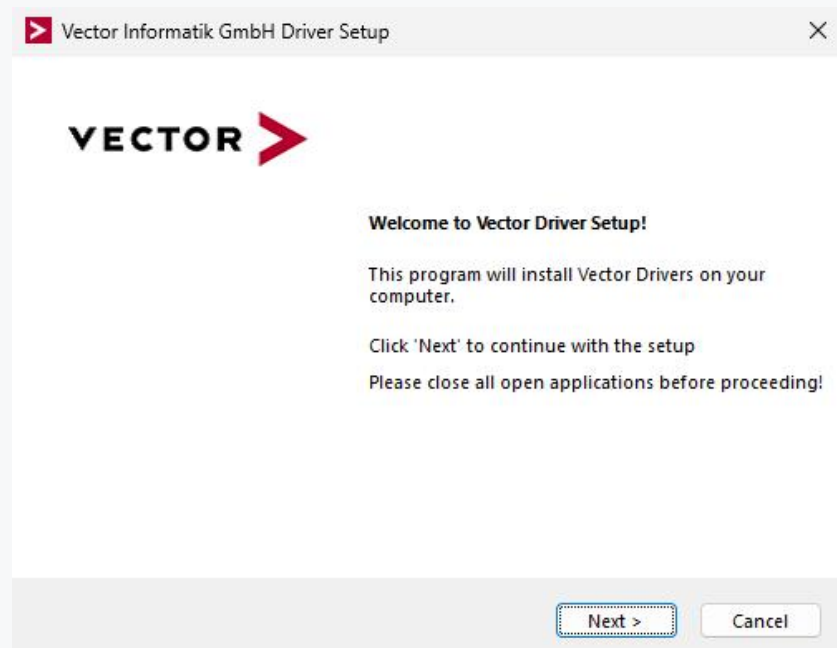
3.1.2 Installation Instructions



Step by Step Procedure

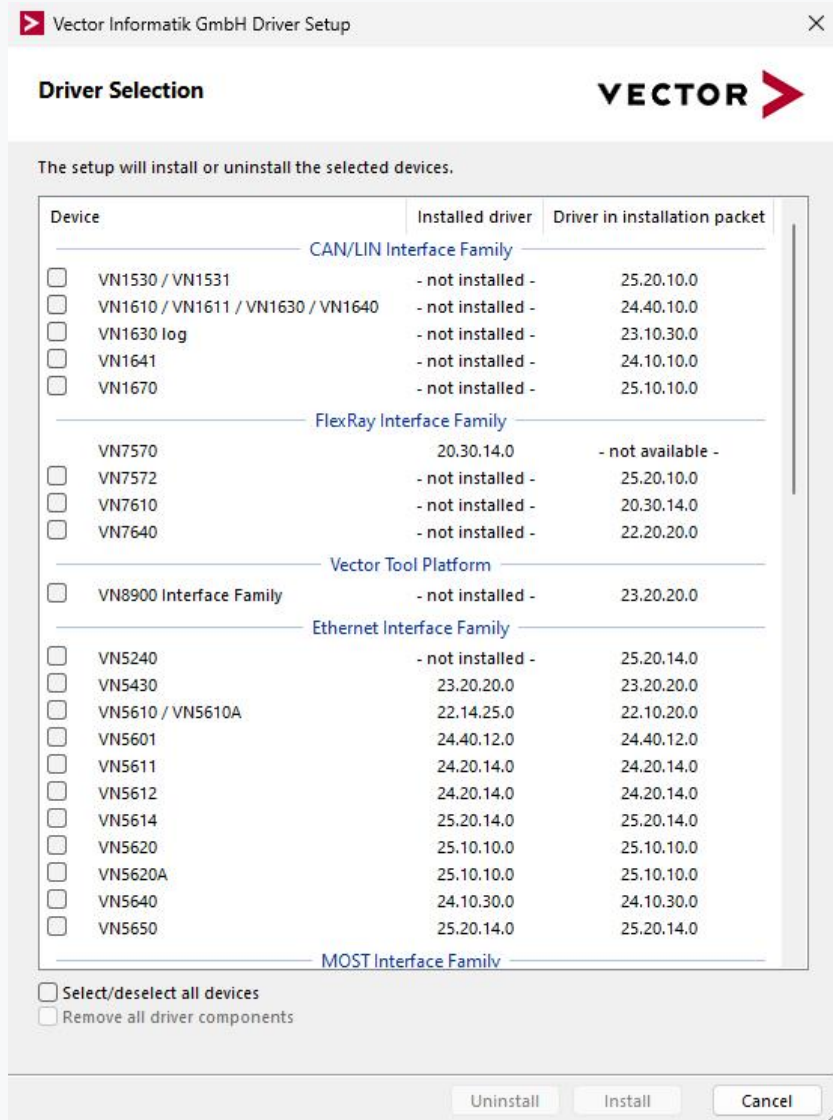
1. Execute the driver setup \Drivers\Setup.exe before the device is connected to the computer with the included USB cable.

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.



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.



Reference

If you want to connect your computer and the device via Ethernet instead of USB, the device must be configured via the Vector Hardware Manager. A detailed description can be found in section **Tips and Tutorials** of the Vector Hardware Manager help.

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 143).

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	<code>/s</code>	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	<code>/nv</code>	Does not install any virtual driver (Virtual CAN Bus).
Update only	<code>/uo</code>	The setup is forced to install only a newer version of a driver located in the folder <code>\Drivers</code> .
Vector DLLs only	<code>/dongleDLLsOnly</code>	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	<code>/installCert</code>	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	<code>/ncmr</code>	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. vn1630). 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 automatically installed with the all option: Vector Keyman VN8900 Ethernet driver (vnlpClient). They must be installed explicitly.
Install all and Vector Keyman	/i all keyman	Installs all available interface drivers from the driver source path and the Vector Keyman.
Install all and Vector Keyman	/i all keyman	Installs all available interface drivers from the driver source path and the Vector Keyman.
Uninstall	/u <driver name>	Removes (uninstalls) the specified driver from the system. The driver name is the name of the device (e. g. vn1630). Lower case and upper case will be ignored.
Uninstall all	/u all	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	/u all keyman	Removes (uninstalls) all available interface drivers from the system including the Vector Keyman.
Info	/info <file name>	Creates a new file containing information about the drivers, which are available in this installation package (e. g. the version number).
Install Vector Keyman	/i keyman	Installs only the Vector Keyman.
Install virtual driver and driver components only	/i virtual	Installs the virtual driver and the driver components only.
Uninstall Vector Keyman	/u keyman	Uninstalls the Vector Keyman.
Uninstall the virtual driver and driver components	/u virtual	Uninstalls the virtual driver and the driver components only.
No automatic update	/noAutoUpdate <driver name>	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. vx1161.41). 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	/noAutoUpdate all	Disables automatic updating of soft-

Action	Command	Description
		were 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.
6	The setup process was interrupted because the XLAPI DLL is still being used by another process.
7	The setup has been aborted because the driver package is missing mandatory components.

Examples

Command	Action
<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 vnipcl8800</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>	<p>Example output of <code>Drivers.txt</code></p> <pre>[Common] version=0x703001e root=C:\Drivers\ file1=setup.exe file2=DIFxAPI.dll file3=.\CommonFiles</pre>

Command	Action
	[CANboardXL] version=0x7030012 path=.\CANboardXL

3.1.3.2 Remarks

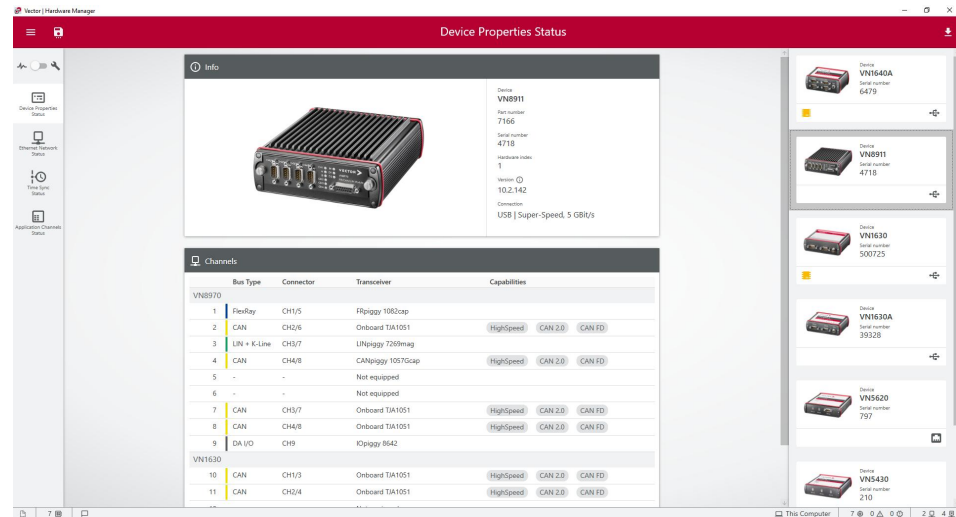
- > **Windows 10 (64 bit) / Windows 11 (64 bit)**
 - Recommended installation command:
`setup.exe /installCert /s /i all`
 - Recommended uninstallation command:
`setup.exe /s /u all`
 - It is not possible to install the drivers from a network drive.
 - It is possible to pre-install the drivers, if the 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 136) 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.

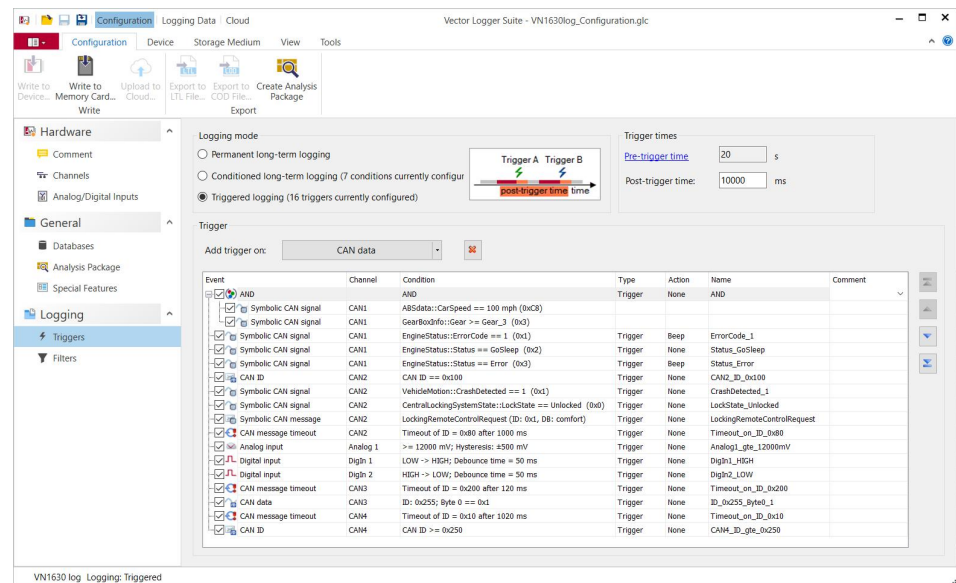
- > You can open the help by pressing **<F1>** in the Vector Hardware Manager or directly via:
- > C:\Program Files (x86)\Vector Hardware Manager-\Help01\HTML5\VectorHardwareManager.htm
- > The most recent version of the help is also available online:
<https://help.vector.com/VectorHardwareManager/index.php>

For a brief introduction, we recommend reading the sections **Basic Concept** and **Quick Start Guide**. Furthermore, we have provided addi-

tional information for you in the section **Tips and Tutorials**.

3.2.3 For VN1630 log Users

For logging, the VN1630 log requires an additional configuration tool (Vector Logger Suite). Please follow the instructions below to install the tool.



Step by Step Procedure

The Vector Logger Suite can be installed as a 64-bit program. Due to the larger address space, the 64 bit variant can process very extensive databases. The 64 bit version can only be installed on 64 bit operating systems.

The Vector Logger Suite is installed as follows:

1. Execute the setup, which is found in the download package.
.`\VLSuite\Setup_VLSuite_64Bit.exe`.
2. Please, follow the instructions in the setup program to complete the installation.
3. After successful installation, the Vector Logger Suite can be found in the start menu (if selected during installation).



Reference

Further information can be found in the separate manual provided with the **Vector Logger Suite**.

3.3 Loop Tests

Operation test

The test described here can be performed to check the functional integrity of the driver and the device. This test is identical for Windows 10 / Windows 11 and independent of the used application.

3.3.1 CAN

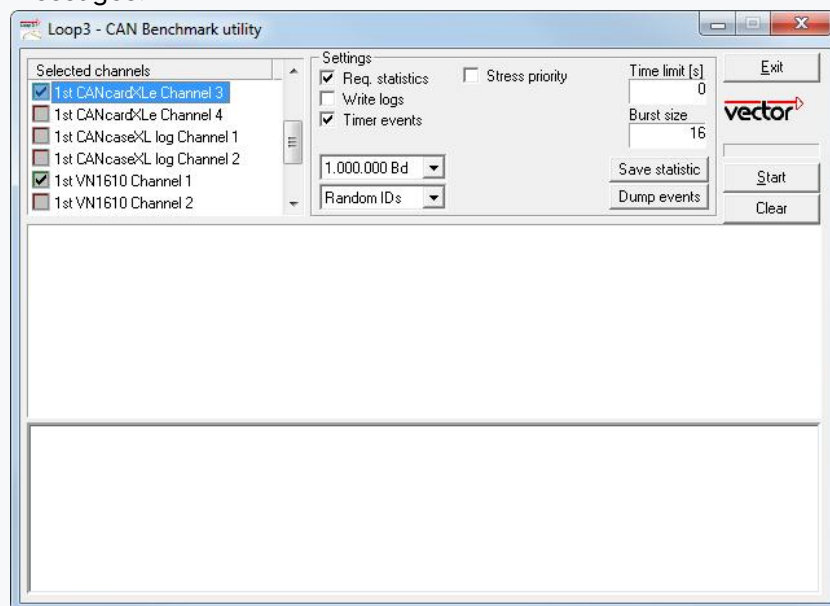
Device test

The operating test for CAN requires either two high-speed or two low-speed transceivers and can be executed as follows:



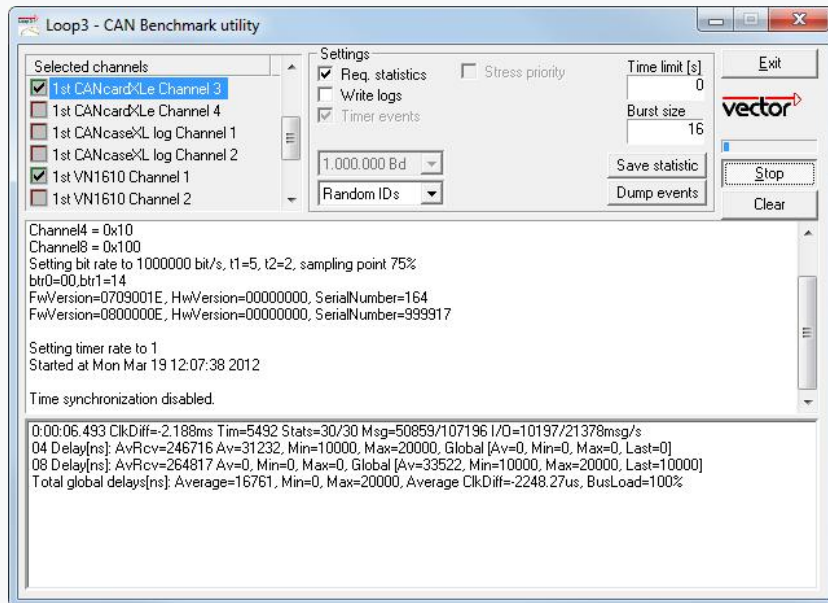
Step by Step Procedure

1. Connect two CAN channels with a suitable cable.
If two high-speed transceivers are being used, we recommend our **CANcable1** (**CANcable0** for low-speed transceivers).
2. Start `\Drivers\Common\Loop3.exe` from the Vector Driver Setup. This program accesses the Vector devices and transmits CAN messages.

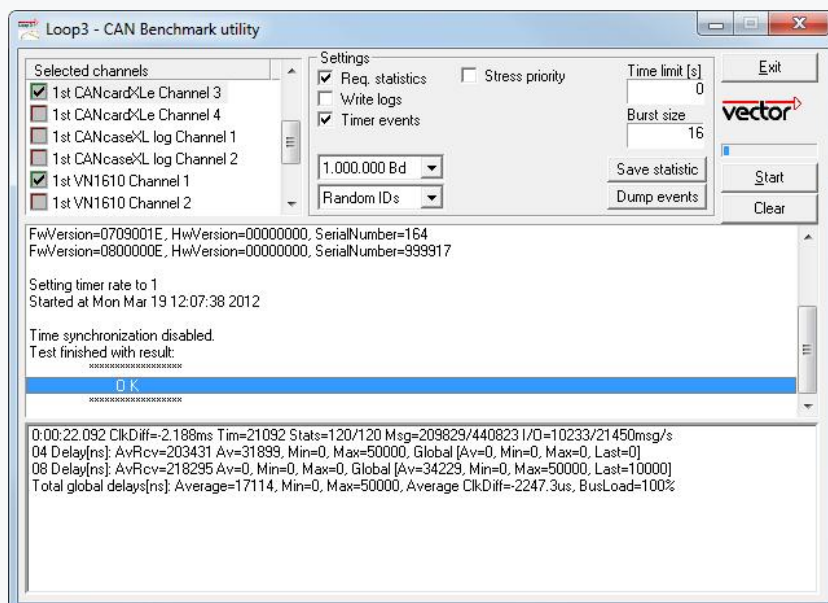


3. Select the connected CAN channels of the device(s) to be tested.
4. Set the appropriate baudrate depending on the transceiver being used (high-speed max. 1,000,000 Bd, low-speed max. 125,000 Bd).
5. Click **[Start]**.

6. You will see statistical data in the lower part of the window if the system has been configured properly.



7. The test procedure can be terminated with the **[Stop]** button. An **OK** should appear in the upper part of the window.



4 Time Synchronization

In this chapter you find the following information:

4.1	General Information	150
4.2	Software Sync	152
4.2.1	General Information	152
4.2.2	Configuration	152
4.3	Hardware Sync	153
4.3.1	General Information	153
4.3.2	Configuration	154
4.4	Precision Time Protocol Sync	155
4.4.1	General Information	155
4.4.2	Supported Features	155
4.4.3	Network Topology	156
4.4.4	Configuration	156

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.

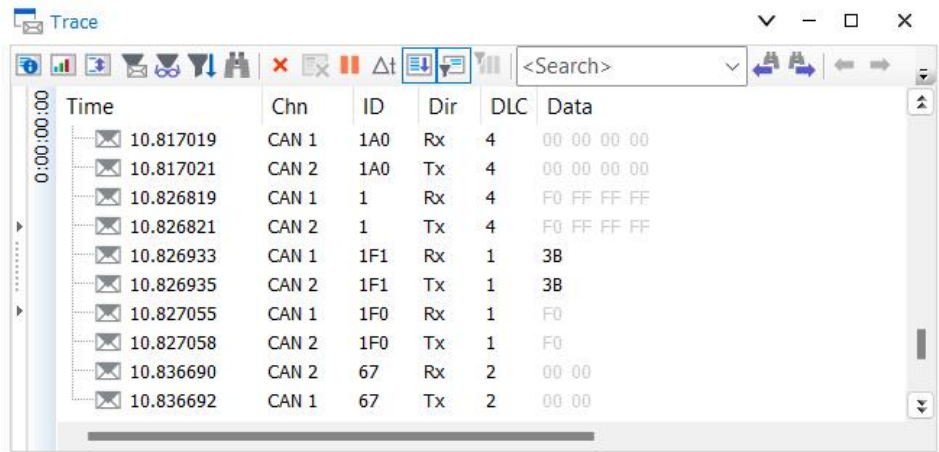


Figure 55: Time stamps of two CAN channels in CANoe

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.

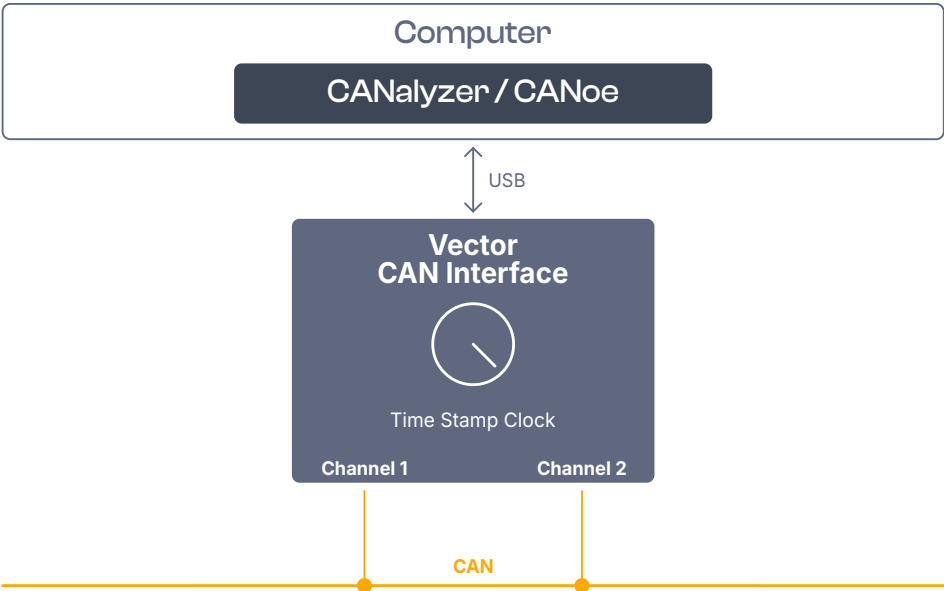


Figure 56: Common time stamp clock for each channel

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.

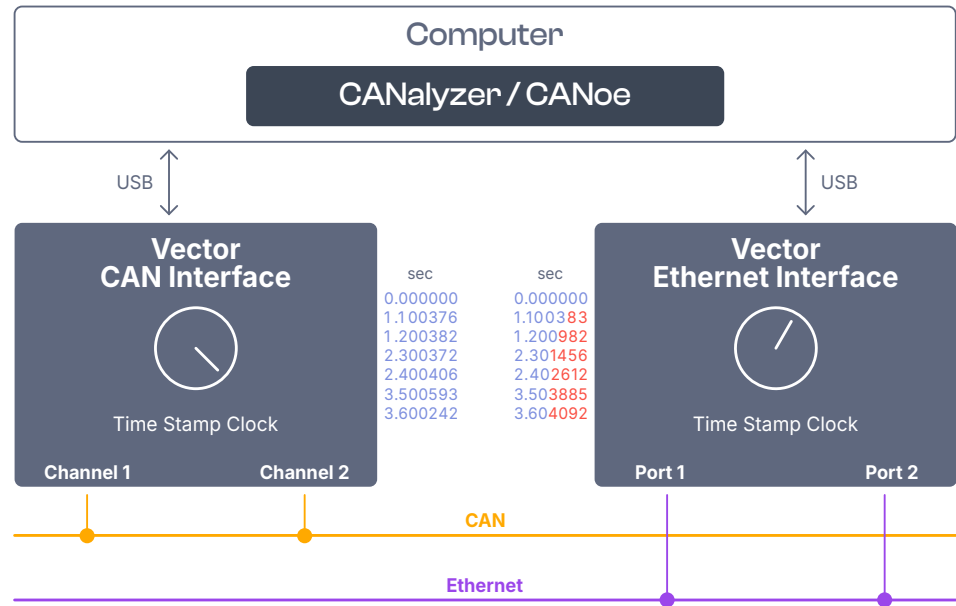


Figure 57: Example of unsynchronized network interfaces. Independent time stamps drift apart

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 computer clock. For this purpose no further hardware setup is required.

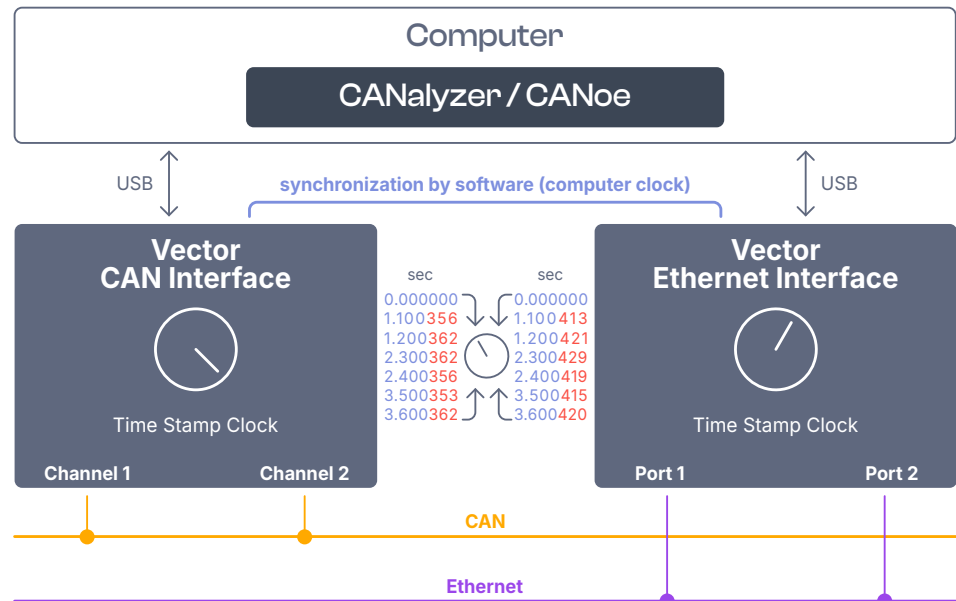


Figure 58: Time stamps of devices are synchronized to the computer clock



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**.

4.3 Hardware Sync

4.3.1 General Information

Synchronization by hardware

A more accurate time synchronization of multiple devices is provided by the hardware synchronization. Two Vector network interfaces can therefore be connected with the SYNCcableXL (see accessories manual, part number 05018).

In order to synchronize up to five devices at the same time, a distribution box is available (see accessories manual, part number 05085).

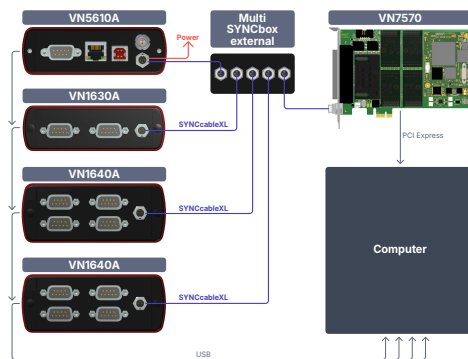


Figure 59: Example of a time synchronization with multiple devices

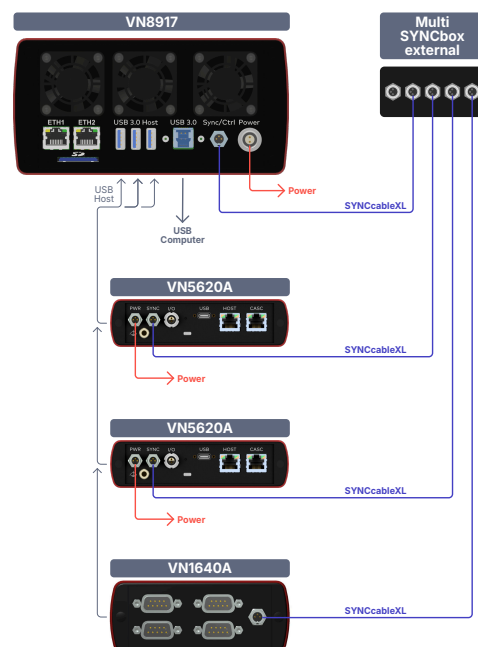


Figure 60: Example of a time synchronization with VN8917 and additional devices

At each falling edge on the sync line which is initiated by the driver, the Vector network interface generates a time stamp that is provided to the

driver. This allows the driver to calculate the deviations between the network interfaces and to synchronize the time stamps to a common time base (master clock) which can be defined by the user.

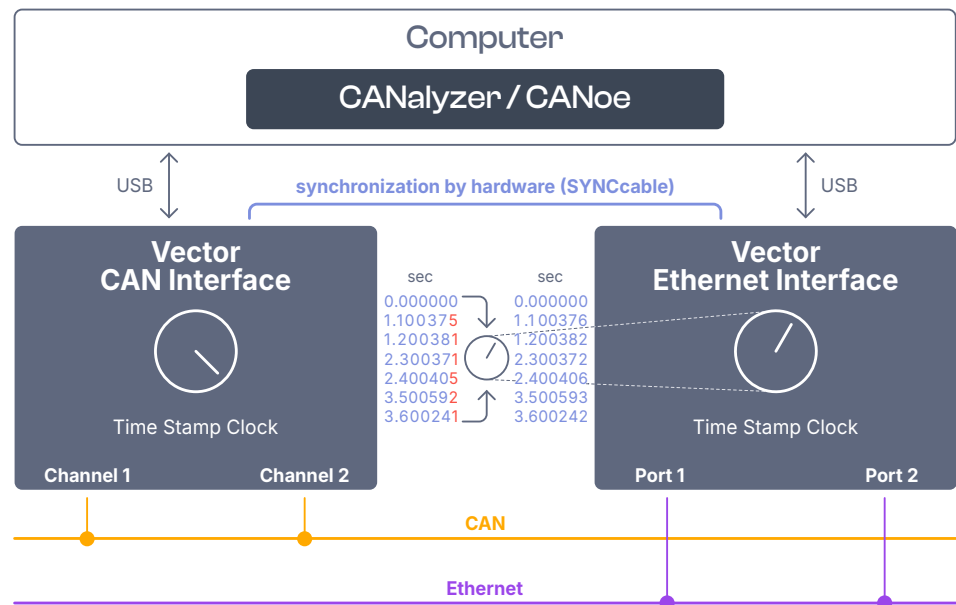


Figure 61: Time stamps are synchronized to the master clock

4.3.2 Configuration

Vector Hardware Manager

Use hardware synchronization if at least one device is connected with USB or PCIe to the PC and all devices are hardware sync capable. One device should be configured as master and all other devices as slaves. Therefore, all devices must be interconnected with SYNCCableXL and Multi SYNCbox external or SYNCbox active.



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**.

4.4 Precision Time Protocol Sync

4.4.1 General Information

Overview

The Precision Time Protocol (PTP) is a protocol used to synchronize clocks through a computer network. On a local area network, it achieves a synchronization accuracy in the sub-microsecond range, making it suitable for measurement and control systems.



Note

The PTP feature can only be used on the Ethernet host ports of these devices. Therefore, it can only be used, if the device is connected via Ethernet host port to the computer.

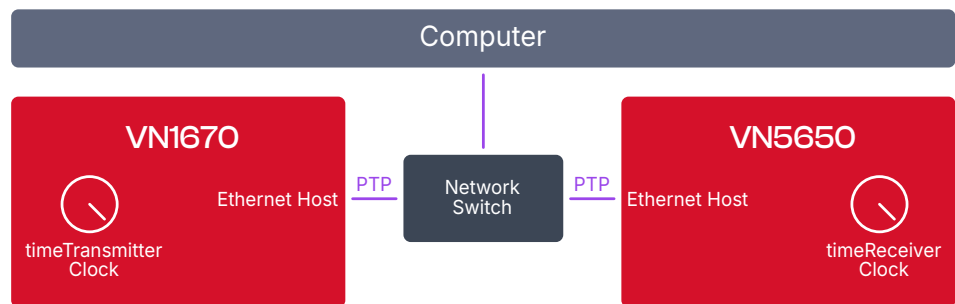


Figure 62: Setup example

4.4.2 Supported Features

Vector network interfaces support time synchronization with IEEE1588-2008 standard. The following IEEE1588 features are supported:

IEEE 1588 Features	VN Device Support
Clock Types	
Ordinary Clock timeTransmitter	✓
Ordinary Clock timeReceiver	✓
Synchronization	
2-step clock	✓
E2E	✓
Best TimeTransmitter Clock Algorithm (BTCA)	✓
Transport	
PTP over UDP with IPv4	✓
PTP over UDP with IPv6	-

IEEE 1588 Features	VN Device Support
Multicast timeTransmitter/timeReceiver	✓
Unicast timeTransmitter/timeReceiver	-
Synchronization accuracy	
1 μs	✓

4.4.3 Network Topology

Network switches To achieve a maximum accuracy, PTP needs transparent clock support in network equipment. Therefore, a PTP transparent clock capable network switch is strongly suggested.

4.4.4 Configuration

Vector Hardware Manager Use the PTP synchronization if all devices are connected via Ethernet host port to the PC and one device is configured as master and all other devices are configured as slaves.



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 GND/Earth

In this chapter you find the following information:

5.1	General Information	158
5.2	Vehicle Battery Only (Closed System)	159
5.3	External Power Supplies (Test Bench)	160

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.

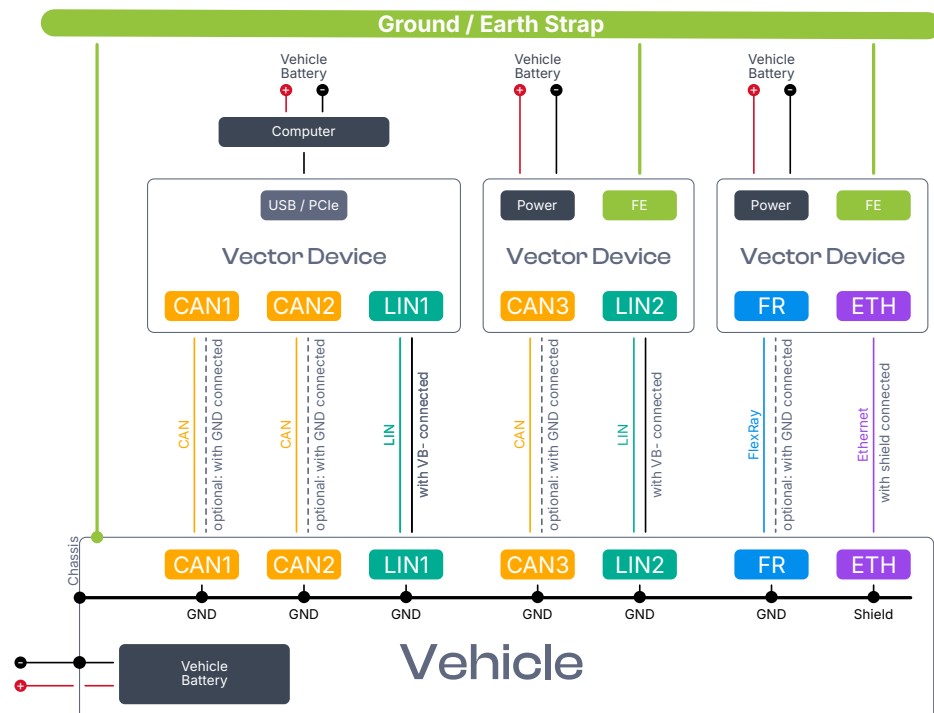


Figure 63: Vector devices powered by vehicle battery

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 GND) 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.

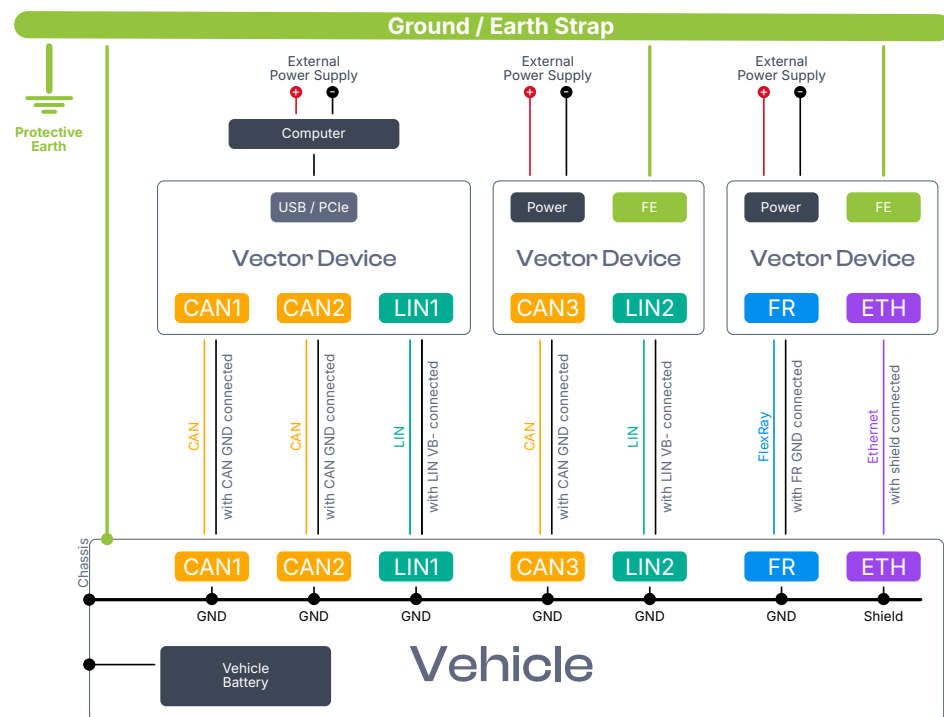


Figure 64: Test bench scenario

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 GND) to have the same reference ground.

6 Important Notes - Details

In this chapter you find the following information:

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6.1.1	Proper Use and Intended Purpose	162
6.1.2	Hazards	163
6.2	Disclaimer	164
6.3	Licenses	165
6.3.1	SEGGER emFile Module	165
6.4	CRA Related Information	166
6.5	Disposal of Vector Hardware	167

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 Licenses

6.3.1 SEGGER emFile Module

**WARNING!**

The firmware of the VN1630 log contains the copyright protected emFile module of SEGGER Microcontroller GmbH & Co. KG.

It should be noted that, in addition to the safety and hazard notes provided in section Important Notes - Details, the Licensing Terms of the Licensor expressly prohibit the use of the SEGGER emFile module in weapons/weapons systems and/or their deployment in same. A "weapons system" is to be understood as meaning, in particular, a system whose primary or material purpose is to injure, incapacitate or kill a person or an opponent, or to destroy or damage the property of a person or an opponent, or to threaten a person or an opponent, irrespective of whether the weapon or the weapon system can be used to attack, defend, threaten or protect.

6.4 CRA Related Information

If you suspect a security vulnerability or want to report a security incident, please contact us at the address below or use the contact form on our website:

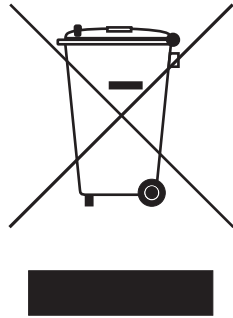
psirt@vector.com

www.vector.com

Vector Informatik GmbH
Ingersheimer Straße 24
70499 Stuttgart
GERMANY

6.5 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.

Please register your old device via [our website](#) before shipping it.

7 Wichtige Hinweise

In diesem Kapitel finden Sie die folgenden Informationen:

7.1	Sicherheits- und Gefahrenhinweise	169
7.1.1	Sach- und bestimmungsgemäßer Gebrauch	169
7.1.2	Gefahren	170
7.2	Haftungsausschluss	171
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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, über-nimmt 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 Lizenzen

7.3.1 SEGGER emFile Modul



WARNUNG!

Die Firmware des VN1630 log beinhaltet das urheberrechtlich geschützte Modul emFile der SEGGER Microcontroller GmbH & Co. KG.

Ergänzend zu den Sicherheits-und Gefahrenhinweisen in Abschnitt Wichtige Hinweise wird ausdrücklich darauf hingewiesen, dass gemäß den Lizenzbedingungen des Lizenzgebers die Nutzung des emFile Modules von Segger bzw. dessen Einsatz in Waffen/Waffensystemen verboten ist. Als Waffensystem ist insbesondere ein solches System zu verstehen, das den vorrangigen oder wesentlichen Zweck hat, eine Person oder ein Gegner zu verletzen, handlungsunfähig zu machen oder zu töten oder das Eigentum einer Person oder eines Gegners zu zerstören oder zu beschädigen oder eine Person oder einen Gegner zu bedrohen, unabhängig davon, ob die Waffe oder das Waffensystem zum Angriff, zur Verteidigung, zur Drohung oder zum Schutz genutzt werden kann.

7.4 Informationen bezüglich CRA

Wenn Sie eine Sicherheitslücke vermuten oder einen Sicherheitsvorfall melden möchten, kontaktieren Sie uns bitte über die unten angegebene Adresse oder über das Kontaktformular auf unserer Webseite:

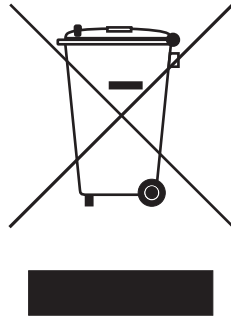
psirt@vector.com

www.vector.com

Vector Informatik GmbH
Ingersheimer Straße 24
70499 Stuttgart
GERMANY

7.5 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 über [unsere Webseite](#) an.



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