

Manual

CANboardXL Interface Family

Version 4.0

English

Imprint

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1 Introduction

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1.1 About this User Manual

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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
Microsoft	Legally protected proper names and side notes.
Source Code	File name and source code.
Hyperlink	Hyperlinks and references.
<CTRL>+<S>	Notation for shortcuts.

Symbol	Utilization
	Here you can obtain supplemental information.
	This symbol calls your attention to warnings.
	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.

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2 CANboardXL Interface Family

In this chapter you find the following information:

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	Hardware Sync	
2.4	Technical Data	page 11

2.1 Introduction

CANboardXL for PCI, PCIe und PXI

The CANboardXL is available in three variants that have identical functionalities

- PCI card for installation in desktop PCs
- PCI express card for installation in desktop PCs
- Compact PCI/PXI backplane card for installation in industrial PCs

All cards contain a powerful 32 bit 64MHz microcontroller from ATMEL with ARM7 core and two SJA1000 CAN controllers from Philips. The SJA1000 handles CAN messages with 11 bit as well as 29 bit identifiers. The reception and analysis of remote frames is possible without restrictions. The CANboardXL is able to detect and to generate error frames on the bus.

Configuration

The CANboardXL interface family can be configured with the **Vector Hardware Config** tool (**Windows | Start | Settings | Control Panel | Vector Hardware**). Further details about the tool can be found in the separate installation instructions at the end of this manual.

Bus types

Various transceivers are available to interface the CANboardXL to a particular type of bus. These CAN and LIN transceivers are available as plug-in boards (Piggybacks) and can be mounted on the CANboardXL. For information on installing transceivers please refer to chapter [Replacing Piggybacks](#) on page 15. A list of available Piggybacks is included in the accessories manual on the driver CD:

`\Documentation\Accessories_for_Network_Interfaces.pdf`

Connectors

The CANboardXL has the following connectors:

- Two D-SUB9 connectors for independent CAN and LIN operation
- Binder connector (type 712) for synchronization
- Internal sync connector (CANboardXL PCIe only)



Note: The pin assignments of the D-SUB9 connectors depend on the Piggybacks being used. Further information can be found in the accessories manual on the driver CD.

2.2 Driver Installation



Note: Information about the driver installation process can be found in the separate installation instructions at the end of this manual.

2.3 Synchronization

General information Time stamps, which are created during a measurement by two or more devices of the Vector interface family, can be synchronized by software or hardware.

2.3.1 Software Sync

Synchronization by software The software synchronization is driver-based and available for all applications without any restrictions. This kind of synchronization can be switched on in **Vector Hardware Config | General information | Settings | Software time synchronization**.

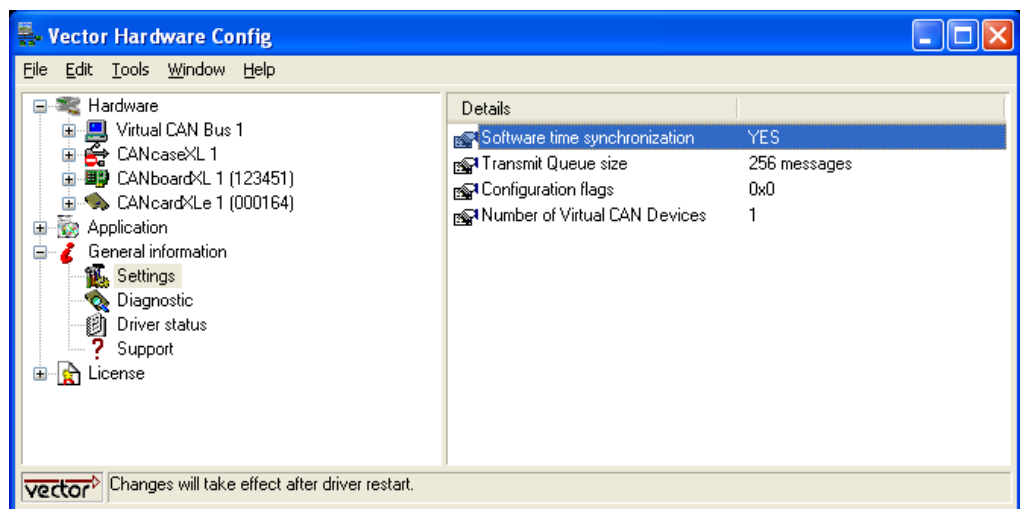


Figure 1: Switching on the software synchronization.

The accuracy of the time stamp correction depends on the device and is typically 50 μ s.

2.3.2 Hardware Sync

Synchronization by hardware

A more precise synchronization of multiple devices is possible via the hardware synchronization. The hardware synchronization with a maximum of four devices is done with the SYNCcableXL (see accessories manual, article number 05018) and has to be supported by the application. The accuracy of the time stamp correction depends on the application and is typically 1 μ s.

Functionality of the hardware synchronization

The devices to be synchronized must be interconnected by a two-wire bus (signals: SYNC and GND). The devices have a 3-pin connector for this use case (Binder type 712).

Pin	Assignment
1	Not connected
2	Synchronization line
3	Ground



At each high-low edge of the sync line the CANboardXL generates a time stamp that is provided to the application. This allows the application to synchronize the time stamps of different devices to a common time base.

The synchronization edges can be generated by the VN or the XL interface family.



Note: The hardware synchronization must be supported by the application. For further information please refer to the relevant manual. Please note that the software synchronization must be disabled (see **Vector Hardware Config | General information | Settings | Software time synchronization**) if the hardware synchronization is used.

Synchronization by sync connector (CANboardXL PCIe)

Multiple CANboardXL PCIe can be synchronized either by the Binder connector outside the PC housing or by the internal sync connector. The internal sync connector is a 10-pin connector (90° offset) and available next to the Piggyback slots. The synchronization is done with a ribbon cable and a 10-pin standard socket.

Time synchronization through PXI backplane

Additional to the synchronization described above, the CANboardXL pxi supports time synchronization through the PXI backplane.

In Figure 3 (see **Replacing Piggybacks** on page 15) you can see the switches (white circle) that are used to control the synchronization between the cards.

In position **ON**, the synchronization is active. The right and left end of the synchronization line, which is build with multiple CANboardXL pxi cards, has to be cut off. The cut off of the right end is done with switch 2, the cut off of the left end with switch 1.

Example

Time synchronization with three CANboardXL pxi:

CANboardXL pxi	Switch 1	Switch 2
1 (left)	OFF	ON
2 (middle)	ON	ON
3 (right)	ON	OFF

2.4 Technical Data

PC interface	CANboardXL : PCI CANboardXL PCIe : PCI Express CANboardXL pxi : Compact PCI / PXI
Channels	2 independent channels for CAN, LIN and J1708
Transceiver	Piggybacks
CAN controller	2 Phillips SJA 1000
Microcontroller	ATMEL AT91R40008 32bit 64MHz
Max. baudrate	1 Mbit/s
Time stamp accuracy	1 μ s
Error frame	Detection and generation
Power consumption	1W for CANboardXL/pxi without Piggybacks 2,5W for CANboardXL PCIe without Piggybacks
Configuration	Plug & Play
Dimensions	approx. 155 x 135 x 20 mm (PCI) approx. 145 x 105 x 17 mm (PCIe) approx. 210 x 135 x 20 mm (pxi)
Weight	approx. 210 g without Piggybacks (PCI) approx. 210 g without Piggybacks (PCIe) approx. 350 g without Piggybacks (pxi)
Temperature range	Operation: Standard -20...65 °C (PCI) Operation: Standard 0...65 °C (PCIe) Operation: Standard -20...75 °C (pxi) Transport and storage: -40... 85 °C
Relative humidity	15 %...95 %, not condensing
Software requirements	Windows XP (SP3) Windows Vista (SP1) Windows 7
Hardware requirements	IBM PC AT or 100 % compatible; Free PCI Slot (CANboardXL) Free PCIe Slot (CANboardXL PCIe) Free Compact PCI Slot (CANboardXL pxi)

3 Hardware Installation

In this chapter you find the following information:

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3.2	CANboardXL and CANboardXL PCIe	page 14
3.3	CANboardXL pxi	page 14
3.4	Replacing Piggybacks	page 15

3.1 General Notes



Caution: Turn off the main power supply and disconnect your computer's power cord. Otherwise systems using an ATX power supply unit with soft power off may still be powering the PCI slot. This can damage your PCI card when it is inserted into the slot



Caution: Do not force the CANboardXL into the slot. Make sure that the connectors of the card's PCI connector are aligned with the bus connector on the motherboard before you insert the card into the slot. If it does not fit properly, gently remove it and try again.



Note: Please observe all safety precautions prescribed by your PC manufacturer for card installation!



Note: Do not touch the bottom and the topside of the PCBs (CANboardXL main board and Piggybacks).

3.2 CANboardXL and CANboardXL PCIe



1. Turn off the computer and all peripheral devices. Unplug the power cord and open the case.
2. Touch a metal plate on your computer to ground yourself and to discharge any static electricity.
3. Remove the metal brackets from an unused slot.
4. Align the CANboardXL with the PCI/PCIe slot and press the card gently but firmly into the slot.
5. Replace the computer cover.
6. Plug in the power cord.

3.3 CANboardXL pxi



1. Turn off the computer and all peripheral devices. Unplug the power cord and open the case.
2. Touch a metal plate on your computer to ground yourself and to discharge any static electricity.
3. Align the CANboardXL pxi with the slot and press the card gently but firmly into the slot.
4. The CANboardXL pxi has to be fixed again with the screws.

3.4 Replacing Piggybacks



1. Unplug the power cord and open the case.
2. Touch a metal plate on your computer to ground yourself and to discharge any static electricity.
3. Unplug the CANboardXL.



Note: Each of the Piggybacks is fixed with a screw.

4. Detach the screw with the screw protection and remove the Piggyback **carefully**.
5. Plug in the alternative Piggyback.

CANboardXL

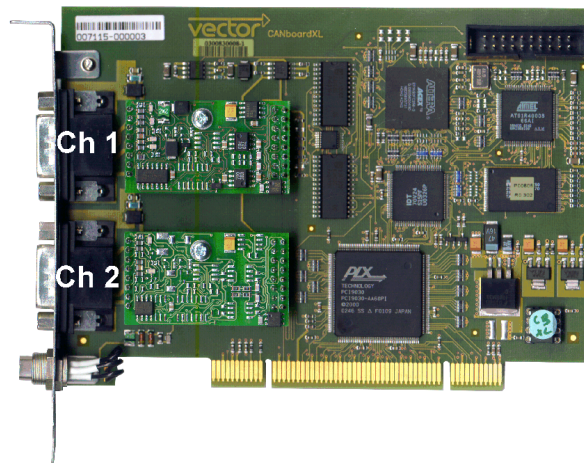


Figure 2: Channel 1 and 2 on CANboardXL.

CANboardXL pxi

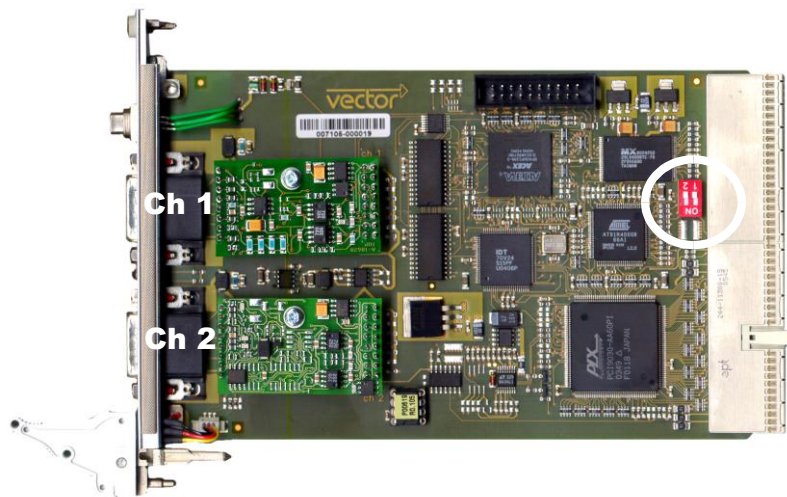


Figure 3: Channel 1 and 2 on CANboardXL pxi.



Info: The two-row connector and the one-row connector must fit and must not be displaced laterally.

6. The Piggyback has to be fixed again with the screw and the screw protection.
7. Firmly insert the card into the selected slot. Push down to ensure the card is fully seated.
8. Replace the computer cover.
9. Plug in the power cord.

4 CANboardXL Accessories

In this chapter you find the following information:

4.1 Accessories

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4.1 Accessories



Reference: Further information about the available accessories can be found in the separate accessories manual on the driver CD:
`\Documentation\Accessories_for_Network_Interfaces.pdf`

5 Appendix A: Addresses

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Manual

Installation Instructions

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1 Introduction

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2 Driver Installation

In this chapter you find the following information:

2.1	Minimum Requirements	page 8
2.3	Vector Driver Setup	page 9
2.4	Vector Hardware Configuration	page 11

2.1 Minimum Requirements

Hardware

CPU	Pentium 4 or higher
Memory	512 MB or more
Network interface	CANcardXL : PCMCIA CANcardXLe : ExpressCard 54 CANboardXL PCI : PCI CANboardXL PCIe : PCI Express 1x CANboardXL PXI : Compact PCI/PXI CANcaseXL : USB CANcaseXL log : USB VN1610 : USB VN1611 : USB VN1630 : USB VN2610 : USB VN2640 : USB VN3300 : PCI VN3600 : USB VN7600 : USB VN8910 : USB

Software

Operating system	Windows XP SP3 (32 bit) Windows Vista SP1 (32 bit) Windows 7 (32/64 bit)
Driver version	8.x
Measurement application	The devices can be run with several applications from Vector (e. g. CANoe, CANalyzer) or with measurement applications from other companies. Therefor the devices require a related license. Applications based on the Vector XL Driver Library can be run without a license.

2.2 Hints



Note: Many desktop PCs have power managers which block the CPU for a specific time. This impairs accuracy of the time system. If your application has stringent timing requirements (e. g. time-driven sending of messages or time-driven evaluations), you have to deactivate these power managers. Power management settings may be contained in the BIOS setup or on the Control Panel of **Windows XP / Vista / Windows 7** (e. g. Power options).

No further mention will be made of the power manager in this document.



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

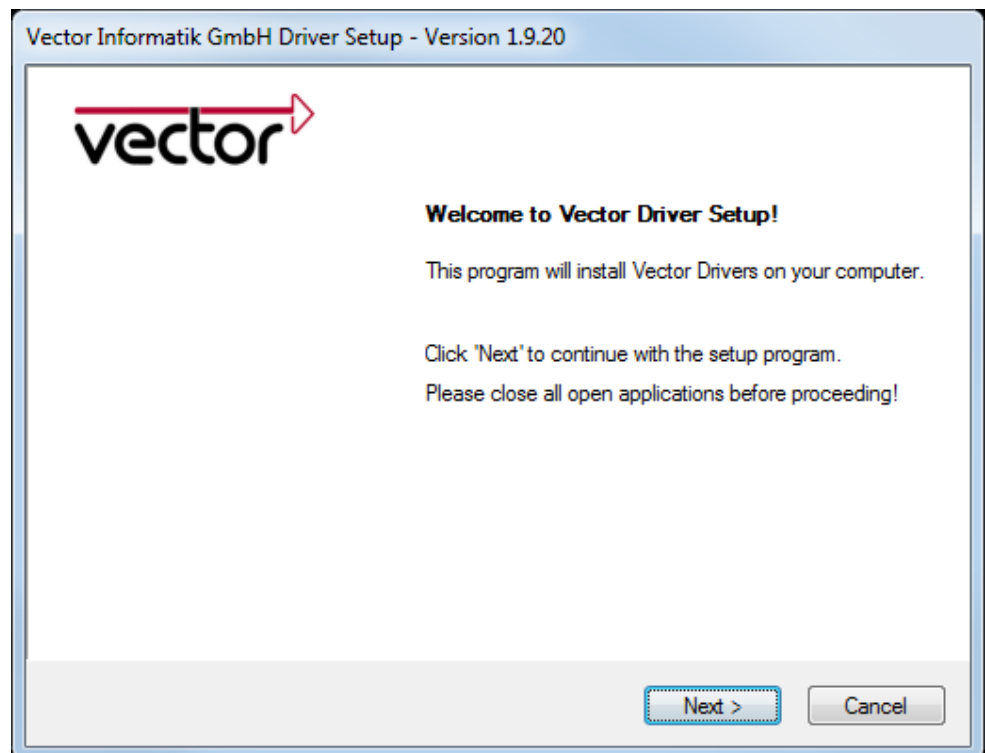
2.3 Vector Driver Setup

General information The Vector Driver Disk offers a driver setup which allows the installation or the removal of Vector devices.



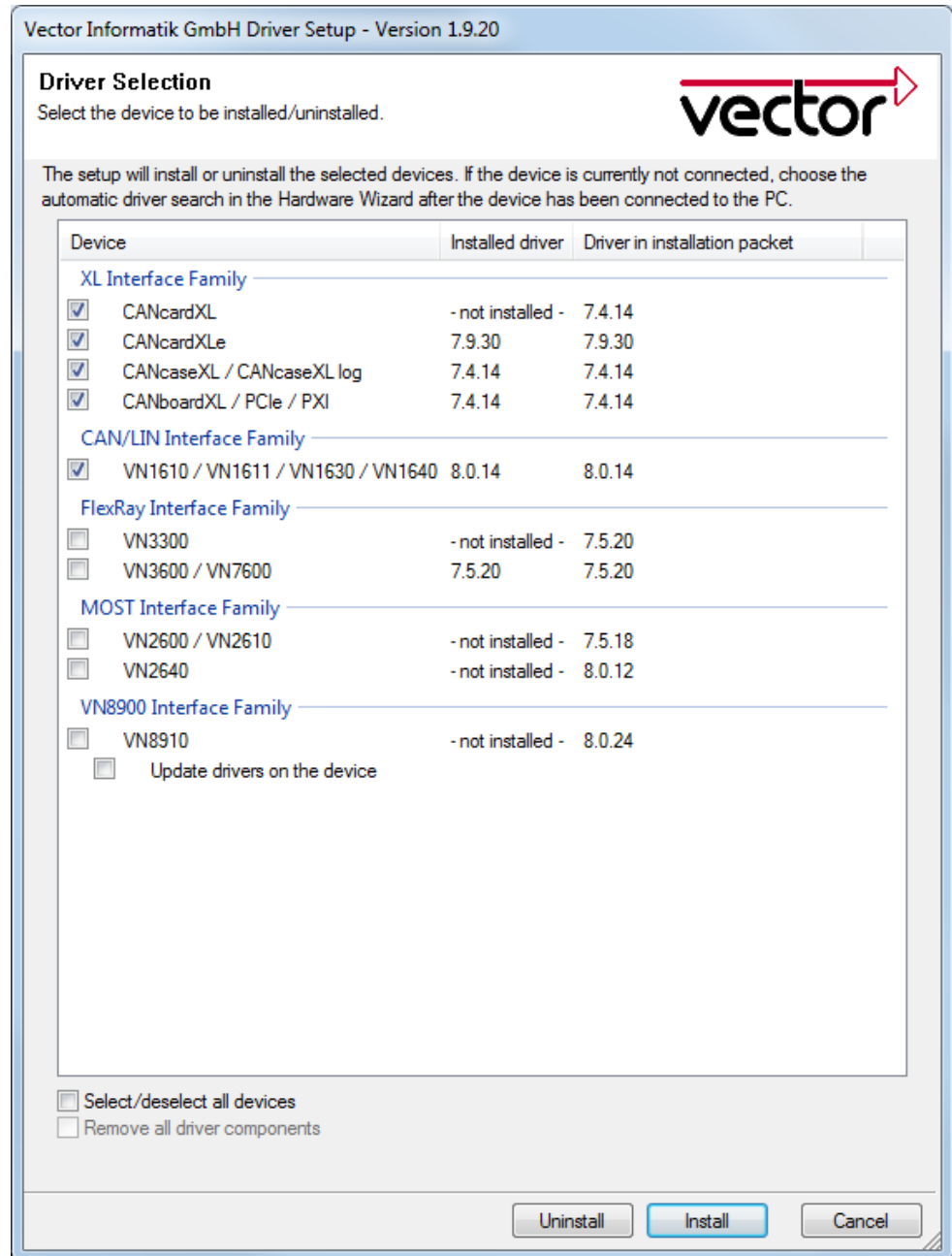
1. Execute the driver setup from the autostart menu or directly from `\Drivers\Setup.exe` before the device is inserted or connected to the PC with the included USB cable.

If you have already inserted or connected the device to the PC, 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.

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



- Click **[Install]** to execute the driver installation, or **[Uninstall]** to remove existing drivers.
- A confirmation dialog appears. Click **[Close]** to exit.
If the driver has been properly installed, the device can be inserted or connected to the PC with the included USB cable. The device is ready for operation now.
- For Windows XP users only:
If the **Windows found new Hardware** wizard appears, select the option for automatic driver search to complete the installation.

2.4 Vector Hardware Configuration

Executing Vector Hardware Config

After the successful installation you will find the configuration application **Vector Hardware** in the Control Panel (see below). The tool gives you information about the connected and installed Vector devices. There are also several settings that can be changed.

Control panel Windows XP

→ Category view
Start | (Settings) | Control Panel, click in the left part of the window for further Control Panel options followed by **Vector Hardware**.

→ Classic view
Start | (Settings) | Control Panel, click **Vector Hardware** in the list.

Control panel Windows Vista

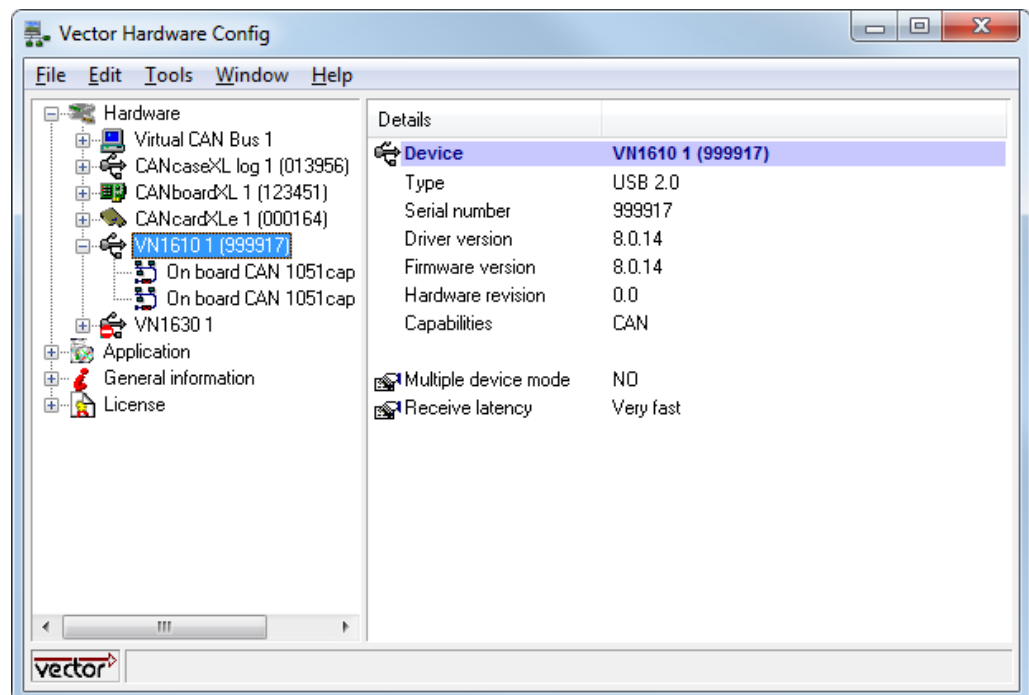
→ Category view
Start | (Settings) | Control Panel, click in the right part of the window for Additional Options followed by **Vector Hardware**.

→ Classic view
Start | (Settings) | Control Panel, click **Vector Hardware** in the list.

Control panel Windows 7

→ Category view
Start | Control Panel | Hardware and Sound, click **Vector Hardware** in the list.

→ Symbols view
Start | Control Panel, click **Vector Hardware** in the list.



The tool is split into two windows. The left window lets you access the installed Vector devices, the right window displays the details of the selection. The following nodes are available in the left window:

Hardware

Each installed Vector device is shown in **Hardware**. Additional details of available channels are shown in a tree view. Status information on the device components and the channels are also shown in this dialog.

Application

In **Application** all available applications are shown with their configured channels. If you click on an application, all of its channels are displayed in the right pane on the screen.

General information

The **General information** section contains general information on Vector devices and applications.

License

The **License** section contains information on all currently valid licenses.



Note: You will find a detailed description of **Vector Hardware Config** in the online help ([Help](#) | [Contents](#)).

3 Operating Test

In this chapter you find the following information:

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	FlexRay	
	MOST	

3.1 Loop Test

Operating 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 XP**, **Windows Vista**, **Windows 7** and independent of the application being used.

3.1.1 CAN

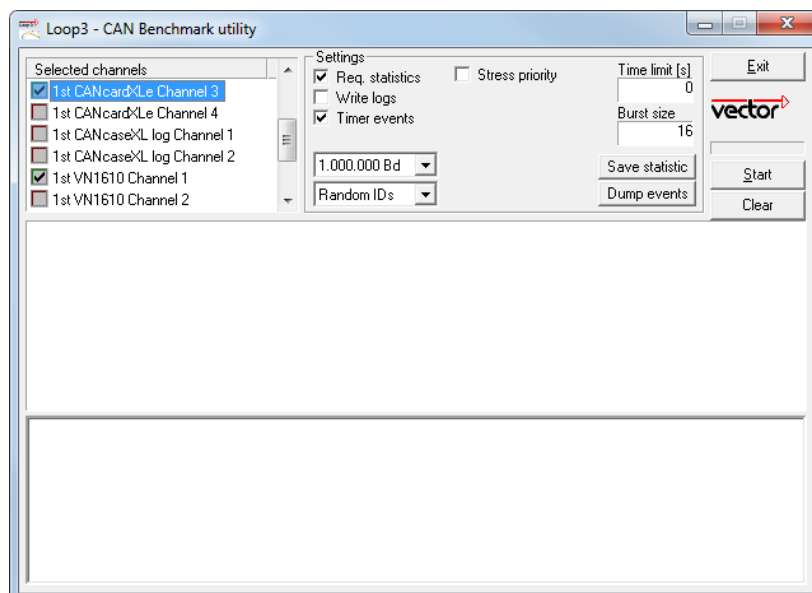
Device test The operating test for CAN can be executed with the following devices:

- CANcardXL
- CANcardXLLe
- CANcaseXL
- CANcaseXL log
- CANboardXL Family
- VN1610
- VN1630
- VN7600

Loop3.exe Either two High-Speed or two Low-Speed transceivers are necessary for this functional test:

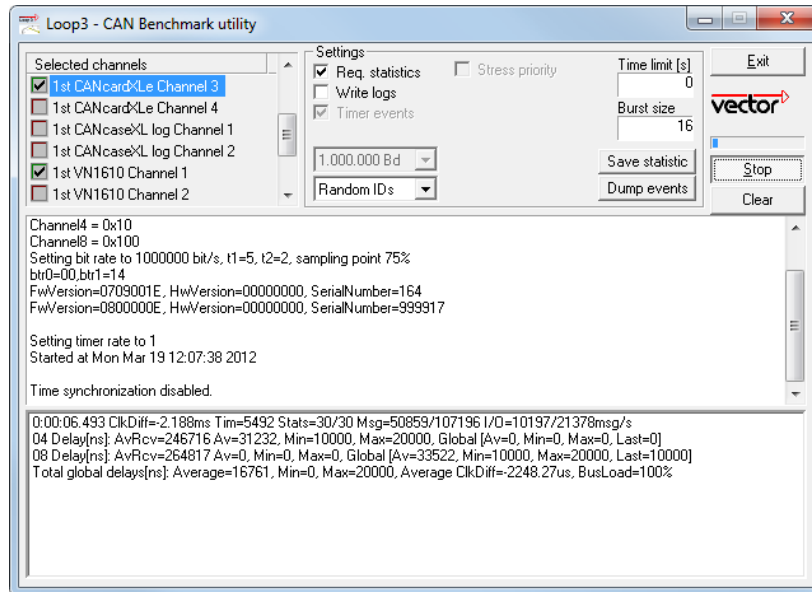


1. Connect two CAN channels with a suitable cable. If two High-Speed transceivers are being used, we recommend our **CANcable 1** (**CANcable 0** for Low-Speed transceivers).
2. Start `\Drivers\Common\Loop3.exe` from the driver CD. This program accesses the Vector devices and transmits CAN messages.
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]**.

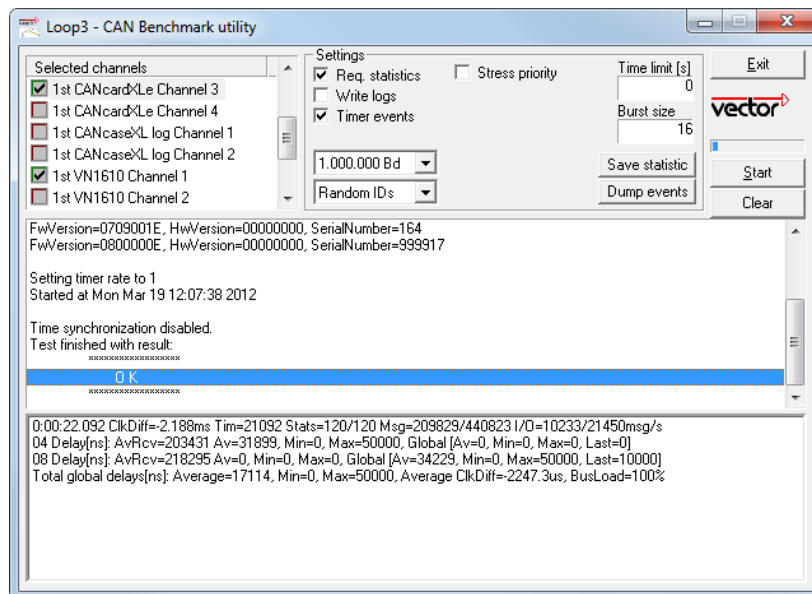


- You will see statistical data in the lower part of the window if the system has been configured properly.

Loop3 application



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



3.1.2 FlexRay

Device test

The operating test for FlexRay can be executed with the following devices:

- VN3300
- VN3600
- VN7600

FRLoop.exe

This operating test requires an inserted FRpiggy.



1. Remove the FlexRay cable if it is connected.
2. Start \Drivers\Common\FRLoop.exe from the driver CD.
3. Execute the test.
4. If no error messages occur, the operating test was successful.



3.1.3 MOST

Device test

The operating test for MOST can be executed with the following devices:

- VN2610
- VN2640

MLoop.exe

This functional test requires a MOST fiber optic cable and a fiber coupler for HFBR connectors.



1. VN2610
Start `\Drivers\Common\MLoop.exe` from the driver CD
- VN2640
Start `\Drivers\Common\M150Loop.exe` from the driver CD.
2. Select the VN2610/VN2640 to be tested from the list of detected devices.
3. Click **[Twinkle]** and check if the power LED of the VN2610/VN2640 is blinking at least for one second.
4. Connect the MOST fiber optic cable with the VN2610/VN2640 device, select **Master** mode and check if the program displays the status **Unlock**. Check if red light comes out of the Tx fiber of the MOST fiber optic cable.
5. Connect both ends of the fiber with one fiber coupler to a ring and check if the program displays the status **Lock**.
6. Close `MLoop.exe` with **[Exit]**.

4 Appendix A: Addresses

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