

Hardware Interfaces for FlexRay and CAN

FlexRay, the bus system for high data throughput in the automobile, requires high-performance interfaces. Benefit from using the Vector FlexRay interfaces for developing, simulating, testing, measuring or calibrating of FlexRay networks. Vector offers you with the innovative VN7600 an interface for developing FlexRay and CAN systems. The VN7600 provides the complete FlexRay and CAN functionality and offers you 2 FlexRay channels (A/B) as well as 3 CAN channels.

The FlexRay Highlights at a Glance:

- > Detailed analysis of the FlexRay communication through the FPGA-based communication controller
- > Simulation of comprehensive networks due to the 2MB transmission memory (parallel configuration of more than 1000 send messages)*
- > Coldstart of the FlexRay cluster without needing to add a network node
- > Analysis of the network startup via an independent monitoring unit
- > 2 FlexRay channels (channel A and B)
- > Updating to latest FlexRay specification by FPGA update
- > Connector for external time synchronization

*only VN3300, VN3600 and VN7600

Special CAN Features of the VN7600:

- > Detecting and generating error frames
- > Accurate measuring of bus load
- > Analysing the CAN bus without influencing it (silent mode)
- > Sending and receiving of data and remote frames

Application Areas

With the FlexRay interfaces, Vector provides you with powerful interfaces for accessing FlexRay networks. Use the FlexRay interfaces together with Vector's CANoe and CANalyzer tools (since V6.0 as well as V7.0 for VN7600) for:

- > flexible analysis of FlexRay networks and controllers,
- > precise time analysis of communication data,
- > analysing and testing of ECUs,
- > gateway applications with CAN, LIN, and MOST (multibus concept of CANoe and CANalyzer).

The FlexRay interfaces together with CANape (since V6.1 as well as V6.5 with SP for VN7600) also support you in calibrating via XCP on FlexRay.

Additionally, you can create custom applications by using FlexRay-specific libraries.

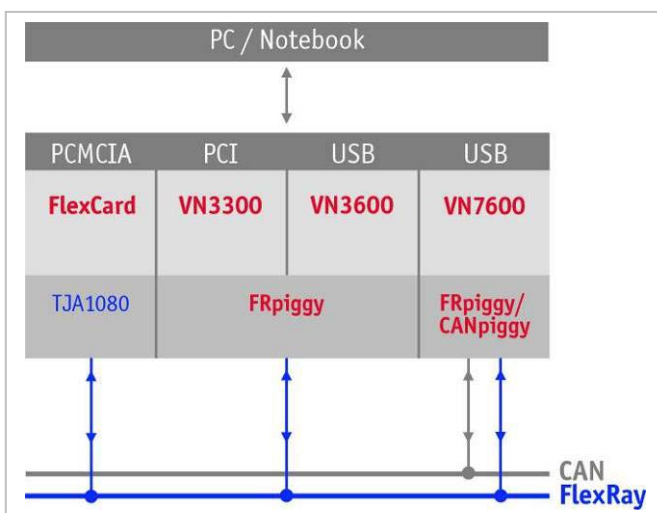
The FPGA-based Startup Monitoring is particularly helpful at the beginning of a FlexRay development. It allows you to detect FlexRay frames and symbols, even before the communication controller has synchronized itself to the bus. This also facilitates the analysis of problems in the bus configuration. Another advantage of the independent Startup Monitoring unit is that it can be operated at the same time as the communication controller. This allows you both Startup Monitoring and normal transmit operation without restart.

You can easily test non-coldstart nodes with only one interface. For this purpose VN3300, VN3600 and VN7600 offer you a second communication controller, and the FlexCard a FPGA-based send unit respectively.

Bus Transceivers

The FlexRay interfaces VN3300, VN3600 and VN7600 contain the bus transceivers on separate plug-in boards (FRpiggy). This guarantees the FlexRay interfaces to be flexible for future applications. If other bus drivers become established in the future, e.g. with Bus Guardians, it will only be necessary to replace the FRpiggyes.

For further information on the FRpiggy as well as on the CANpiggyes for VN7600 please refer to the bus transceiver overview.



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Technical Data	FlexCard Cyclone II SE/ E-Ray	VN3300	VN3600	VN7600
Number of channels	2 FlexRay	2 FlexRay	2 FlexRay	2 FlexRay/3 CAN
Area of application	Analysis, stimulation, simulation	Analysis, stimulation, simulation	Analysis, stimulation, simulation	Analysis, stimulation, simulation
Usage	mobile, stationary	stationary	mobile, stationary	mobile, stationary
PC interfaces	PCMCIA Type II 32 bit CardBus	PCI 32 bit, 33 MHz/66 MHz	USB 2.0	USB 2.0
FlexRay communication controller (analysis)	Bosch E-Ray (Altera Cyclone II EP2C70)	Bosch E-Ray (Altera Cyclone II EP2C70)	Bosch E-Ray (Altera Cyclone II EP2C70)	Bosch E-Ray (Altera Cyclone II EP2C70)
FlexRay communication controller (startup)	---	Fujitsu MB88121B	Fujitsu MB88121B	Fujitsu MB88121B
Transceiver	Integrated (NXP TJA1080)	FRpiggy (NXP TJA1080)	FRpiggy (NXP TJA1080)	FRpiggy (NXP TJA1080)
Memory for data transmission	8 kByte	2 MB	2 MB	2 MB
Temperature range				
Operation:	0..+60 °C	0..+55 °C	0..+55 °C	0..+55 °C
Storage:	-40..+70 °C	-40..+85 °C	-40..+85 °C	-40..+85 °C
Dimensions (mm)	85 x 54 x 5.5	167 x 107 x 15	151 x 110 x 35	151 x 110 x 45
Power consumption (typ.)	1.5 W	3.2 W	3 W	4.5 W
Driver library	TZM FlexCard Library	Vector XL-Driver-Library	Vector XL-Driver-Library	Vector XL-Driver-Library
Operating system requirements	Windows 2000, XP	Windows 2000, XP, Vista	Windows 2000, XP, Vista	Windows 2000, XP, Vista
Functions	FlexCard Cyclone II SE/ E-Ray	VN3300	VN3600	VN7600
Dynamic reconfiguration of the CC buffers	---	✓	✓	✓
Transmission and reception of data and null frames	✓	✓	✓	✓
Detection of invalid frames	✓	✓	✓	✓
Cycle multiplexing	✓	✓	✓	✓
Support of the maximum payload of 254 Byte	✓	✓	✓	✓
In-cycle response	✓	✓	✓	✓
Coldstart of the FlexRay cluster without additional node	✓	✓	✓	✓
Hardware-based incrementing of a payload area	---	✓	✓	✓
Support of PDUs	---	✓	✓	✓
Startup + asynchronous monitoring	✓	✓	✓	✓
Time synchronization with synchronization cable	✓	✓	✓	✓
Time synchronization without synchronization cable	---	✓	✓	✓
Trigger input and output	✓	✓	✓	✓
Low PC loading due to DMA (Direct Memory Access)	---	✓	✓	✓
Very short latency period	---	✓	---	---

FlexCard Cyclone II SE/E-Ray

Proven Reliability: The compact FlexRay Interface Card

Technical Data

Area of application	Analysis, stimulation, simulation
Usage	Mobile and stationary
Microcontroller	---
RAM	2 MB
FlexRay communication controller (analysis)	Bosch E-Ray (Altera Cyclone II EP2C70)
Additional coldstart node	FPGA based frame generator
Memory for data transmission	8 kByte
FlexRay cluster	1
FlexRay channels/connection	2 (channel A & B of a cluster), 2 x D-SUB9 (female)
Maximum payload	254 Bytes
Transceiver	Integrated (NXP TJA1080)
PC interface	PCMCIA Typ II – 32 bit CardBus
Temperature range	Operation: 0..+60 °C Storage: -40..+70 °C
Power consumption (typ.)	1.5 W
Dimensions (LxWxH)	85 x 54 x 5.5 mm
Operating system	Windows 2000, XP
Driver library	TZM FlexCard Library

Included with Delivery (standard)

- > FlexCard
- > 2 bus cables with D-SUB9 bus connectors
- > Drivers for Windows 2000, XP
- > Driver library FlexCard Library from TZM
- > Documentation



VN3300 – PCI Interface for FlexRay

Maximum Performance: The innovative FlexRay Plug-in Card

Technical Data	
Area of application	Analysis, stimulation, simulation
Usage	Stationary
Microcontroller	Intel PXA270 (312 MHz)
RAM	8 MB
FlexRay communication controller (analysis)	Bosch E-Ray (Altera Cyclone II EP2C70)
FlexRay communication controller (startup)	Fujitsu MB88121B
Memory for data transmission	2 MB
FlexRay cluster	1
FlexRay channels/connection	2 (channel A & B of a cluster); 1 x D-SUB9 (male)
Maximum payload	254 Bytes
Transceiver	FRpiggy 1080 or FRpiggy 1080mag (NXP TJA1080)
PC interface	PCI; 32 bit, 33 MHz/66 MHz, 3.3 V/5 V
Temperature range	Operation: 0..+55 °C Storage: -40..+85 °C
Power consumption (typical)	3.2 W
Dimensions (LxWxH)	167 x 107 x 15mm; Short PCI card
Operating system	Windows 2000, XP, Vista
Driver library	XL-Driver-Library

Included with Delivery (standard)

- > VN3300
- > Drivers for Windows 2000, XP, Vista
- > XL-Driver-Library (32 bit driver library for C++, C)
- > Documentation



VN3600 – USB Interface for FlexRay

Full Flexibility: The convenient USB Interface for FlexRay

Technical Data	
Area of application	Analysis, stimulation, simulation
Usage	Mobile and stationary
Microcontroller	Intel PXA270 (312 MHz)
RAM	8 MB
FlexRay communication controller (analysis)	Bosch E-Ray (Altera Cyclone II EP2C70)
FlexRay communication controller (startup)	Fujitsu MB88121B
Memory for data transmission	2 MB
FlexRay cluster	1
FlexRay channels/connection	2 (channel A & B of a cluster); 1 x D-SUB9 (male)
Maximum payload	254 Bytes
Transceiver	FRpiggy 1080 or FRpiggy 1080mag (NXP TJA1080)
PC interface	USB 2.0
Temperature range	Operation: 0..+55 °C Storage: -40..+85 °C
External power supply	5 V..50 V, startup at 8 V
Power consumption (typical)	3 W
Dimensions (LxWxH)	151 x 110 x 35 mm
Operating system	Windows 2000, XP, Vista
Driver library	XL-Driver-Library

Included with Delivery (standard)

- > VN3600
- > Power supply: 100 to 240 VAC
- > Power supply cable (1m, one end stripped)
- > USB 2.0 cable
- > Drivers for Windows 2000, XP, Vista
- > XL-Driver-Library (32 bit driver library for C++, C)
- > Documentation



VN7600 – USB Interface for FlexRay and CAN

Great Versatility: The most powerful USB Interface for FlexRay and CAN

Technical Data	
Area of application	Analysis, stimulation, simulation
Usage	Mobile and stationary
Microcontroller	Intel PXA270 (312 MHz)
RAM	8 MB
FlexRay communication controller (analysis)	Bosch E-Ray (Altera Cyclone II EP2C70)
FlexRay communication controller (startup)	Fujitsu MB88121B
Memory for data transmission	2 MB
FlexRay cluster	1
FlexRay channels/connection	2 (channel A and B of a cluster); 1 x D-SUB9 (male)
CAN channels/connection	3 independent channels, 3x D-SUB9 (male)
Maximum payload	254 Bytes
Transceiver	FRpiggy 1080 or FRpiggy 1080mag (NXP TJA1080) and CANpiggies (see bus transceiver data sheet)
PC interface	USB 2.0
Temperature range	Operation: 0..+55 °C Storage: -40..+85 °C
External power supply	6 V..50 V, startup at 8 V
Power consumption (typical)	4.5 W
Dimensions (LxWxH)	151 x 110 x 45 mm
Operating system	Windows 2000, XP, Vista
Driver library	XL-Driver-Library

Included with Delivery (standard)

- > VN7600
- > Power supply: 100 to 240 VAC
- > Power supply cable (with one stripped end)
- > USB 2.0 cable
- > Drivers for Windows 2000, XP, Vista
- > XL-Driver-Library (32 bit driver library for C++, C)
- > Documentation

