



FL3X

Device-PCle & -PXle

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BENEFITS

- 5x pluggable transceiver modules (2-6 channels per module depending on the bus system)
- Pluggable transceiver modules available for CAN-HS, CAN-FD, FlexRay, 100BASE-TX, LIN, SENT, 100BASE-T1, 1000BASE-T1
- Available in PCIe and PXle form factor
- Execution of real time gateways/ remaining bus simulations and parallel streaming of all communication channels to the PCIe host system
- Synchronous timestamp generation for most of the bus interfaces (resolution up to 1 μ s)

DRIVER

- Uniform FCBASE API (same API for FL3X Interface-PMC and FL3X Device-PXle/-PCle)
- CPU load reduction through DMA
- Driver Windows 64-bit (Windows 10)
- Driver Linux (Kernel 5.4)
- Linux Preempt-RT support

SOFTWARE SUPPORT

- The device is supported by FL3X Config starting with version 1.0 and the FCBASE API starting with S6V7-F

SCOPE OF DELIVERY

- FL3X Device-PCle or FL3X Device-PXle
- Documentation
- FL3X API driver

FL3X DEVICE-PXle & PCIE

The FL3X Device-PXle/-PCle combines a high-performance platform for real-time capable remaining bus simulations or gateways and a up to 30 channel* measuring interface for automotive bus systems in one device. This powerful combination provides manifold solutions for:

- gateways between different automotive bus systems
- interfacing of automotive bus systems
- remaining bus simulation
- signal manipulation
- data logging
- rapid prototyping

The FL3X Device-PXle/-PCle supports current and upcoming bus systems and has numerous variable interfaces, thus covering most of the application fields where bus interfaces are required. This device is appreciated by automotive developers since it facilitates the implementation and testing of even very tricky gateway applications and prototyping functionalities. Together with the comprehensive FL3X Config software family, the developers are enabled to set up and control their bus systems and ECU environment in a smart way.

*The number of channels depends on the used bus systems

TECHNICAL FEATURES

- PCIe Gen 1
- Integrated Altera Cyclone V SOC (ARM Cortex-A9 Dual Core CPU)
- 5 bus connectors that can be allocated flexible via pluggable transceivers
 - 2-6 bus interfaces are available on each bus connector
- Up to 4 FlexRay controllers (4 Bosch E-Ray Cores)*
- Up to 8 FlexRay channels (4 channel A and 4 channel B) available on the bus connectors*
- In any case, 2 FlexRay cores can be connected internally (SelfSync)
- Up to 10 CAN-HS bus interfaces*
- Up to 10 CAN-FD bus interfaces*
- Up to 7 separate 100BASE-T1 bus interfaces or 15 internally connected (switched) 100BASE-T1 channels*
- Switchable on-board bus termination
- Wake-up/sleep mode support (wake-up possible via FlexRay or CAN)
- Synchronous timestamp generation for all of the bus interfaces (resolution up to 1 µs)
- 2 Trigger inputs or outputs
- 3 different operating modes:
 - Pure FL3X Interface mode. Sending/receiving of bus data at the PCIe host system via the Windows driver
 - Pure FL3X Device mode. Execution of real time remaining bus simulations and gateways
 - Mixed mode. Execution of real time remaining bus simulations on the integrated ARM Cortex-A9 CPU and receiving of all bus data at the PCIe host system (PC)
- Gateway and/or remaining bus simulations executed on the integrated ARM Cortex-A9 CPU without influencing the PCIe host system (PC)
- Streaming of the bus data to the PCIe host system without influencing the gateways/remaining bus simulations executed on the ARM Cortex-A9 CPU

*several bus combinations are possible, please contact us regarding your desired bus configuration.

ABILITIES IN FL3X INTERFACE MODE

(STREAMING OF BUS DATA TO THE PCIE HOST SYSTEM)

ETHERNET

- FL3X Device-PXle/-PCle with Ethernet will be detected as standard Ethernet interface
- Access to the Ethernet packets by NDIS driver (raw sockets possible)
- Special WinPcap version allows access to the timestamps of the Ethernet packets
- External synchronization by trigger input possible

CAN-HS / CAN-FD

- Silent mode useable for listening without bus interference
- Transmit FIFO up to 512 messages
- Configurable TX-acknowledges
- Significant bus error messages

Physical characteristics

Connector	5 x Binder series 702/712 – 8pol.
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FLEXRAY

- Asynchronous monitoring mode allows listening without FlexRay synchronicity
- Combined asynchronous and synchronous monitoring mode (the procedure of a bus startup can be monitored and registered exactly)
- Configurable TX-acknowledges
- Network synchronicity will be reported immediately (with timestamp)
- Chronological correlation of bus messages with one timestamp base
- Extensive filter configuration available
- Significant bus error messages
- Triggering on the precise slot and cycle

ORDER INFORMATION FL3X DEVICE-PXIE /-PCIE

Product	Description	Order number
FL3X Device-PXle	The FL3X Device-PXle is a PXle bus interface card.	3-V0940A01
FL3X Device-PCle	The FL3X Device-PCle is a PCIe bus interface card.	3-V0950A01

ORDER INFORMATION ACCESSORIES

Product	Description	Order number
FL3X Config Standard Runtime 1 year	Standard Runtime license for 1 year. Required once per device.	3-01142A01
FL3X Config Extended Runtime 1 year	Extended Runtime license for 1 year. Required once per device.	3-01142H01
FL3X Tiny3 2*100BASE-T1	Pluggable transceiver module with two 100BASE-T1 transceivers (88Q2112-A2-NYD2A000, Marvell)	3-00882H02
FL3X Tiny3 2*100BASE-T1	Pluggable transceiver module with two 100BASE-T1 transceivers (BCM89810A2AMLG, Broadcom)	3-00882C02
FL3X Tiny3 3*100BASE-T1 switch	Pluggable transceiver module with three 100BASE-T1 switch (BCM89500BQLEG, Broadcom)	3-00882D01
FL3X Tiny3 2*100BASE-TX switch	Pluggable transceiver module with two 100BASE-TX switch (88E6350RA1-TFJ2I000, Marvell)	3-00882B01
FL3X Tiny3 2*FlexRay	Pluggable transceiver module with two FlexRay transceivers (TJA1081BTS, NXP)	3-00880A01
FL3X Tiny3 4*CAN-FD/HS	Pluggable transceiver module with four CAN-FD/HS transceivers (MCP2562FD, Micrel)	3-00881G02
FL3X Tiny3 2*CAN-FD/HS	Pluggable transceiver module with two CAN-FD/HS transceivers (TJA1145T/FD, NXP)	3-00881E01
FL3X Tiny3 4*LIN/2*SENT	Pluggable transceiver module with four LIN (TJA1021T, NXP) and two SENT transceivers	3-00884A02
FL3X Tiny3 1*K-Line/1*UART/1*SPI	Pluggable transceiver module with one K-Line (TJA1021T, NXP), one UART and one SPI transceivers	3-00884B01
BusCable 200 8M9m 9SUBDf CAN&FR	1. End: 8-pole M9 male connector, type 712 2. End: 9-pole SubD female connector Length: approx. 2 m	3-00341J02
BusCable 2Way 200 8M9m 9SUBDf CAN&FR	1. End: 8-pole BM9 male connector, type 712 2. End: 2 x 9-pole SubD female connector Length: approx. 2 m	3-00341L02
BusCable 200 8M9m 9SUBDf OABR	1. End: 8-pole M9 male connector, type 712 2. End: 9-pole SubD female connector (Pin 1,2/4,5) Length: approx. 2 m	3-00342P01
BusCable 2Way 200 8M9m 9SUBDf OABR	1. End: 8-pole M9 male connector, type 712 2. End: 2 x 9-pole SubD female connector (Pin 4,5) Length: approx. 2 m	3-00342Q01