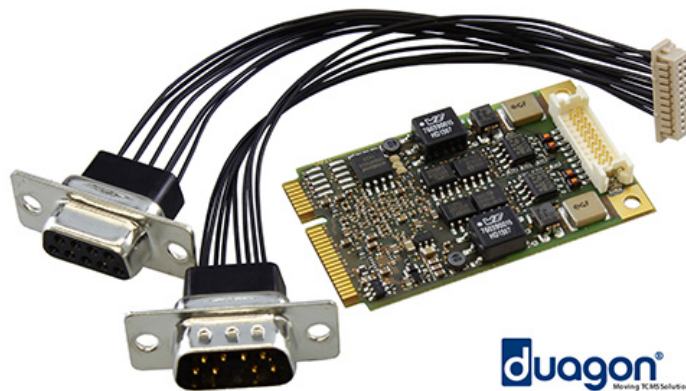# PX3 – Mini PCI Express® MVB Interface Card

- **32-bit RISC Processor**
- **MVB Interface EMD/ESD+ according to IEC 61375 (TCN Standard)**
- **MVB Bus Administrator**
- **4096 Process Data ports**
- **Message Data stack**
- **Driver support for WinXP, Win7 32/64bit and Linux**
- **-40 to +85°C with qualified components**

The PX3 is a MVB (Multifunction Vehicle Bus) to Mini PCI Express® interface and consists of a MVB controller, a local CPU and a Mini PCI Express® slave interface. It supports the wire based physical layers EMD (Electrical Middle Distance) or ESD+ (Electrical Short Distance), with galvanic isolation. As part of the TCN (Train Communication Network) railway standard IEC 61375, the PX3 is designed to operate under harsh environmental conditions of -40 to +85°C, as is in accordance with EN 50155.
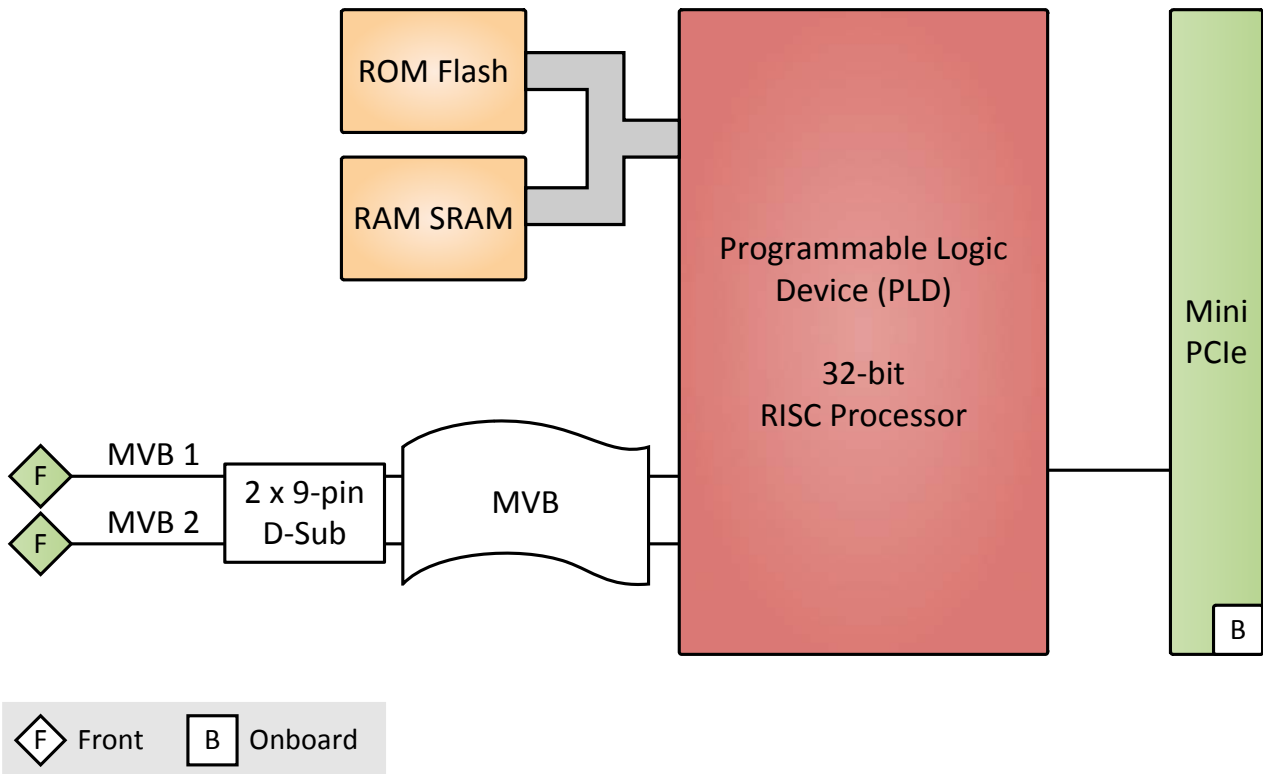
All features of the MVB architecture are supported and the PX3 is available in the configurations 'MDFULL', the passive MVB interface for Process Data (PD) communication, or 'SERVER', the active MVB interface for both Process Data and Message Data (MD) communication. A full range MVB bus administrator is available for all configurations.

The PX3 is equipped with a cable connector fieldbus to connect the MVB assembly interface, which features the two D-Sub connectors that can be mounted on a front panel and are used for the MVB connection.

The PX3 supports the operating systems Windows® XP, Windows® 7 and Linux. VxWorks® and QNX® are also available on request.

The PX3 is designed for use in railway applications and is fully compliant to the EN50155/EN50121 standards.

Diagram

ROM Flash

RAM SRAM

Programmable Logic Device (PLD)

32-bit RISC Processor

Mini PCIe

B

MVB 1

F

MVB 2

F

2 x 9-pin D-Sub

MVB

F Front   B Onboard

Technical Data

MVB Multifunction Vehicle Bus Interface	■ Data rate: 1.5 Mbit/s
	■ Data frame size: 16 - 256 bits
	■ Cyclic transmission of process data (PD) (broadcast)
	  □ Control and status information
	  □ Periodic broadcast communication: 16-512 ms, 1 ms possible (real-time)
	  □ Up to 4096 telegrams (ports), at max. 32 bytes each
	■ Event driven message data transfer (MD) (point-to-point)
	  □ For online diagnostics, passenger information in normal operation
	  □ For firmware download and collecting debugging data in field service
	  □ On demand communication
	  □ Destination addressed
	  □ Response time: > 0,5 sec
	■ Bus Administrator communication manager (BA)
	  □ Synchronous, time-multiplexed communication
	  □ Transmission data sequence organization (master_frame - slave_frame)
	■ Full redundancy support
	■ Physical layers
	  □ ESD + (Electrical Short Distance) or EMD (Electrical Middle Distance)
	  □ 200 m (ESD+ and EMD), 32 nodes
	  □ Galvanic isolation
	  □ Compliant to TCN standard IEC 61375
	■ MVB Connectors
	  □ Two 9-pin D-Sub interfaces via cable connected to the PCIe® Mini Card
	  □ Both male (MVB 1) and female (MVB 2) D-Sub connectors
	  □ M3 metric inner threading

Mini PCI Express® Interface	■ One PCIe® 2.0 Gen1 compliant lane (2.5 Gbps), x1 ■ For data communication path between PX3 and host

Memory	■ 256 KB SRAM
	  □ Traffic Memory for MVB interface
	■ 256 - 1280 KB SRAM
	  □ General purpose memory
	■ 1 MB Flash

Software Structure Configurations	■ MDFULL
	  □ Passive interface
	  □ Communication capabilities: PD and BA
	■ SERVER
	  □ Active interface
	  □ Communication capabilities: PD, MD and BA

Miscellaneous	■ Diagnostic by LED
	  □ 4 diagnostic LEDs
	  □ Used for self test purposes
	  □ Displays the test number
	  □ Indicates reason for failure
	■ Reset Mechanism
	  □ Onboard under-voltage supervision circuitry
	■ Power Up (PLD Loading)
	  □ Automatically loads the PLD chips after power-on

Mechanical Specifications	■ Dimensions (L x W x H): 51 mm x 30.2 ±0.1 mm x 12.5 mm ■ Weight Mini PCI Express® card: 18 g ■ Weight MVB assembly: 14 g

Technical Data

Environmental Specifications	■ Temperature range (operation): -40..+85°C
	■ Relative humidity: max. 95%
	■ Altitude: Max 1800 m
	■ Shock: 50 m/s² (duration 50 ms)
	■ Vibration:
	   □ 2 mm for 5 - 25 Hz
	   □ 50 m/s² for 25 - 150 Hz
	■ RFI susceptibility from 0,15 to 2000 MHz: 20 V/m (class FS2 in EN50155)
	■ Conformal coating (standard)

Operating Systems	■ Windows® XP ■ Windows® 7 ■ Linux (tested with Ubuntu 14.04 LTS) ■ VxWorks® (on request) ■ QNX® (on request) ■ For more information on supported operating system versions and drivers see Downloads.
Standards Conformity	■ EN 50121-3-2:2006: Electromagnetic compatibility ■ IEC 61375-1:2007: MVB physical layer isolation ■ EN 50155:2007 12.2.9: Isolation measurement test/voltage resistance test ■ EN 50155:2007 4.1.3: Shock and vibration ■ IEC 61375-1:2007: MVB (Clause 3, Multifunction Vehicle Bus) ■ EN 60068-2-30:2006: Humidity

Ordering Information

Standard PX3 Models		
	15PX03A00	MVB ESD+ Device, Process Data, -40..+85°C with qualified components, conformal coating
	15PX03A01	MVB ESD+ Device, Process and Message Data , -40..+85°C with qualified components, conformal coating
	15PX03A02	MVB ESD+ Bus Administrator, Process Data, -40..+85°C with qualified components, conformal coating
	15PX03A03	MVB ESD+ Bus Administrator, Process and Message Data , -40..+85°C with qualified components, conformal coating
	15PX03B00	MVB EMD Device, Process Data, -40..+85°C with qualified components, conformal coating
	15PX03B01	MVB EMD Device, Process and Message Data , -40..+85°C with qualified components, conformal coating
	15PX03B02	MVB EMD Bus Administrator, Process Data, -40..+85°C with qualified components, conformal coating
	15PX03B03	MVB EMD, Bus Administrator, Process and Message Data , -40..+85°C with qualified components, conformal coating
Software: Linux		This product is designed to work under Linux. See below for all available separate software packages.
	13F701-90	Linux MDFULL MVB driver (duagon)
	13F701-91	Linux SERVER MVB driver (duagon)
Software: Windows®		This product is designed to work under Windows®. See below for all available separate software packages.
	13F701-70	Windows® 7 MDFULL MVB driver (duagon)
	13F701-71	Windows® 7 SERVER MVB driver (duagon)
Software: Miscellaneous		For further information or additional documentation, please contact either MEN sales or duagon directly www.duagon.com.

For operating systems not mentioned here contact MEN sales.

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