

## General Features

The D013 is a multipurpose MVB Interface on a small 48 x 50 mm size footprint. It is a fully featured MVB communication chip including all features of the MVB architecture such as Process and Message Data, Bus Administrator, and both EMD or ESD+.

duagon's own MVB controller is implemented in an FPGA and supports all 4096 process data ports. An additional 32-bit softcore handles the complete message data stack with an easy-to-use interface.

The D013 is available in two configurations:

- MDFULL: passive MVB interface with duagon's MVB controller
- SERVER: active MVB interface including the Message Data Real Time Protocol stack (MD RTP). This approach minimizes the CPU requirements of the host system,

because the major part of the communication software is running on the duagon interface

The optionally includable Bus Administrator manages the complete MVB Network and can be configured using the duagon's proprietary network tool.

The D013 fully complies with the TCN standard IEC 61375 up to class 4. It is designed for the harsh traction environment and conforms to the EN 50121, EN 50155 and EN 61373 standards, e.g. by:

- -40 to +85°C operating temperature
- Coating against humidity
- Enhanced EMI and vibration robustness

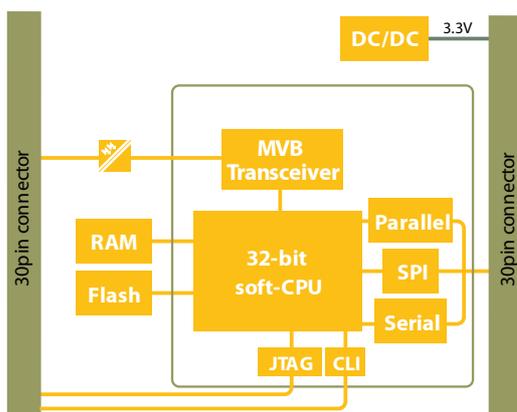
## Key Benefits

- Integrated MVB line transceivers (including galvanic insulation)
- Configurable to operate in 8-bit parallel or serial (UART) mode
- The D013 can be either soldered, plugged or pressed into the motherboard (press fit option)
- The module is compatible with EMD and ESD+ physical MVB layers
- MVB Bus administrator functionality available as option
- The D013 conforms with the EN50121, EN50155, EN 61373 and IEC61375 standards, and is designed for the harsh traction environment

## Application Examples

- Generic MVB interface featuring different MVB classes and physical MVB layers

## D013 Hardware Architecture



## D205 / D206 Evaluation Kit

This evaluation kit allows the development of the host software using either the serial (D205) or the parallel (D206) interface. The delivered adapter card enables the mounting of any D013.

A reference schematic and software examples help to speed up the integration time.

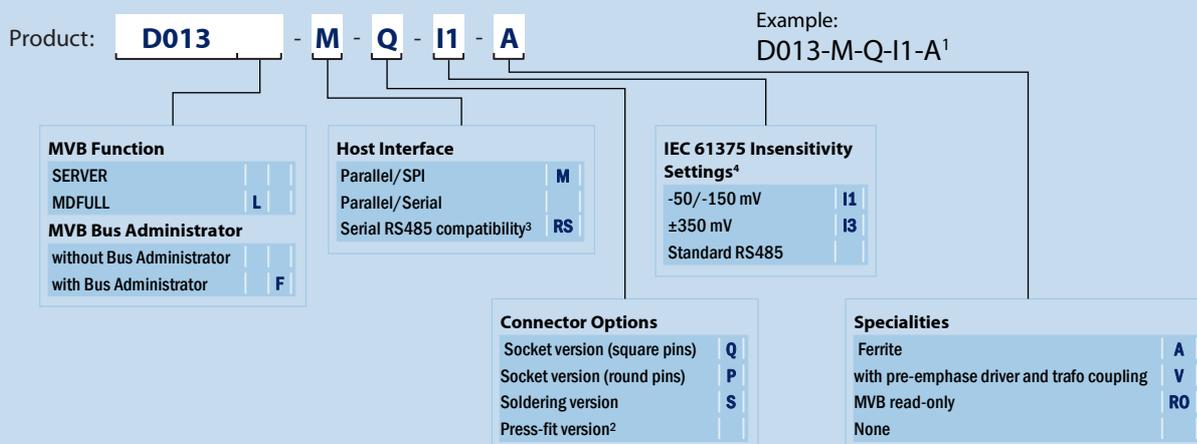
# Technical Data

<b>CPU base System</b>	<ul style="list-style-type: none"> <li>– 32-bit soft CPU</li> <li>– 128 MB RAM</li> <li>– Flash file system</li> </ul>
<b>MVB Interface</b>	<ul style="list-style-type: none"> <li>– Supports two redundant MVB lines A and B</li> <li>– MVB lines A and B are galvanically insulated from the logic/IO and from each other</li> <li>– MVB physical layers ESD+ or EMD</li> <li>– The software structure depends on the chosen configuration passive or active interface</li> </ul>
<b>MVB Software</b>	<ul style="list-style-type: none"> <li>– Available in MDFULL or SERVER configuration</li> <li>– Supports 8-Bit Parallel Host Interface UART</li> <li>– Passive and active MVB interface available</li> <li>– duagon UART emulation (2nd generation)</li> </ul>
<b>Diagnostic / Service</b>	<ul style="list-style-type: none"> <li>– Device status information/identification available through host interface</li> <li>– Firmware update via Ethernet</li> <li>– JTAG and serial line available</li> </ul>

<b>Supply Voltage</b>	<ul style="list-style-type: none"> <li>– Single power supply</li> <li>– 3.3 V</li> </ul>
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>– Typically, <math>P_{typ} = 1.3</math> W</li> </ul>
<b>Operating Conditions</b>	<ul style="list-style-type: none"> <li>– Ambient temperature: –40 to +85°C (EN 50155)</li> <li>– Relative humidity: 75%, max 95% for 30 days per year (conformal coating) according to EN 60068</li> <li>– Shock and vibration: According to IEC 61373 category 1, class B</li> <li>– EMI: According to EN 50121 and EN 50155</li> </ul>
<b>Dimensions / Weight</b>	<ul style="list-style-type: none"> <li>– 48 x 50 x 13 mm</li> <li>– approx. 20g</li> </ul>
<b>Environment</b>	<ul style="list-style-type: none"> <li>– Fully compliant with RoHS and REACH</li> </ul>

d-001051-037983

## Product Ordering Table



<sup>1</sup> duagon recommended order options

<sup>2</sup> duagon does not recommend the press-fit version

<sup>3</sup> see application note "RS485 host connection for D013 and for D013E" for more information about this possibility

<sup>4</sup> various train manufactures ask for different settings of the insensitivity. Please clarify this setting before you place an order. See application note "MVB physical layer order options" for detailed information about the MVB physical layer order options

## Related Documents

**Data Sheet D013**      D013\_DS.pdf  
**Product Ordering Guide**      order\_ug.pdf

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