



D013

Data Sheet

MVB Interface

Chip-sized Multipurpose MVB Communication Module for Railway Systems

- **Space-saving form factor (48 × 50 x 13 mm)**
- **Support for MVB devices up to class 4, including bus administrator functionality, process and message data**
- **Host interface configurable as 8-bit parallel, SPI or serial (UART)**
- **Compliant with IEC 61375, EN 50121, EN 50155 and EN 61373**
- **-40 °C to +85 °C operating temperature**

Product Description

Fully Featured MVB Communication Chip

The D013 is a chip-sized MVB controller component on a 48 x 50 x 13 mm footprint, designed for direct integration on a host system PCB. It provides a complete MVB communication solution and fully complies with IEC 61375 and EN 50155. All core elements of the MVB architecture are integrated in a single component, including process and message data, optional bus administrator functionality and EMD and ESD+ physical layer support.

MVB Controller

duagon's own MVB controller is implemented in an FPGA and supports all 4096 process data ports. The host interface is selectable by MODE pin configuration, offering an 8-bit parallel interface for maximum performance, or SPI and serial UART interfaces for simpler connections.

The D013 is available in two configurations: process data only, or process and message data. In the process and message data configuration, a soft CPU runs the optional message data stack directly on the component, minimizing the CPU requirements on the host system. In the process data only configuration, the MVB interface is controlled directly by the host. The optional bus administrator manages the complete MVB network and can be configured using duagon's proprietary network tool.

For Rolling Stock Environments

Designed for harsh rolling stock environments, the D013 meets railway requirements for temperature, humidity, vibration, and EMC. It operates reliably from -40 °C to +85 °C, features conformal coating against humidity, and provides enhanced EMI and vibration robustness in accordance with EN 50155, EN 50121, and EN 61373.



Technical Data

MVB Interface Functionality

- Capabilities
 - Process data
 - Optional: Message data
 - Optional: Bus administrator
- Physical layer: EMD, ESD+, EMD with pre-emphased signals, as options

Interfaces

- MVB: 1 × board to board
- Host interface options
 - 1 × Parallel/Serial, board to board or
 - 1 × Parallel/SPI, board to board
- Onboard diagnostic LEDs: system status, initialization, error

Electrical Specifications

- Supply voltage: +3.3 V
- Power consumption: 1.3 W max.

Mechanical Specifications

- Dimensions and weight may vary according to selected ordering options.
- Dimensions: (W) 50 mm, (D) 48 mm, (H) 13 mm
- Weight: 20 g

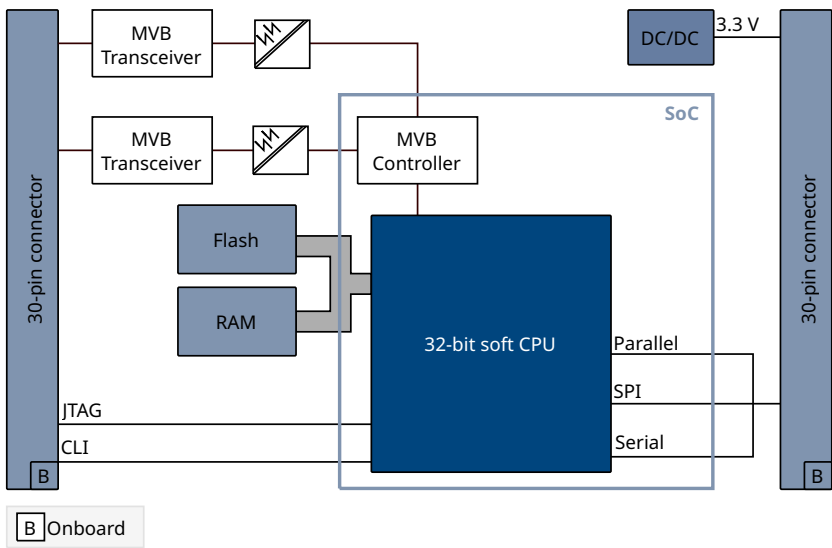
Product Compliance: Functions

- Train Communication Network (TCN)
 - Part 1: General architecture: IEC 61375-1:2012
 - Part 3: Multifunction Vehicle Bus (MVB): IEC 61375-3-1:2012, IEC 61375-3-2:2012

Product Compliance: Rail - Rolling Stock

- Operating temperature: -40 °C to +85 °C (EN 50155:2021, class OT6, ST0)
- Rapid temperature variations: EN 50155:2021, class H1, no requirements
- Storage temperature: -40 °C (EN 50155:2021) to +85 °C (EN 60068-2-2, Bb)
- Altitude: +1800 m max. (EN 50125-1:2014, class AX)
- Humidity: 75 % RH max. typ. yearly average, 95 % RH max. for 30 consecutive days/year (EN 60068-2-30)
- Pollution degree: EN 50124-1:2017, class PD2
- Overvoltage category: EN 50124-1:2017, class OV1
- Electrical safety: EN 50124-1:2017
- Fire protection: EN 45545-1:2013, EN 45545-2:2020 and EN 45545-5:2013+A1:2015, HL3
- Protective coatings: EN 50155:2021, class PC2 (Any PCB protected on both sides)
- Programmable component: EN 50155:2021, class M0
- Useful life: 20 years (EN 50155:2021, class L4)

Functional Diagram



Ordering Information

Ordering Options

D013 [1] [2] - [3] - [4] - [5] - [6]

D013 - M - Q - I1 - A (example)

Position	Description	Options	Code
1	MVB Capabilities	Process and message data	<empty>
		Process data only	L
2	MVB Bus Administrator	Without bus administrator	<empty>
		With bus administrator	F
3	Host Interface	Parallel/Serial	<empty>
		Parallel/SPI	-M
		Serial RS485 compatibility	-RS
4	Header Connector Type	Socket square	-Q
		Soldering	-S
5	MVB Receiver Insensitivity	-50 mV/-150 mV (standard)	-I1
		±350 mV	-I3
6	Miscellaneous Options	Ferrite	-A
		Pre-emphase driver and trafo coupling	-V

- 3
- RS: See application note "RS485 host connection for D013 and for D013E" for more information about this possibility.
- 5
- The default option is -I1. Option -I3 may be selected if required by the train manufacturer.
- 6
- Option -A is the default configuration for all orders that do not include pre-emphasis.

Note: It is the customer’s responsibility to check the train manufacturer's requirements before placing an order.