

# DC20

## Rugged 12.1" Panel PC with Touch Screen Rugged EN50155 Train Display Computer

- » 12.1" display with LED backlight
- » 1024 x 768 pixels resolution
- » Intel Atom E3900 series
- » All external interfaces on M12 connectors
- » -25 °C to +70 °C (+85 °C), fanless
- » Maintenance-free design
- » Compliant to IP65 (front) and EN 50155 (railway)
- » Linux and Windows support



### Robust Panel PC for Interactive Rail Applications

The DC20 panel PC is a rugged, fanless and maintenance-free human-machine interface (HMI) for railway applications. It features a 12.1" display and a touch screen. Its small, ultra-flat mechanical design and configuration options save space in the driver cabin and allow the panel to be tailored for all types of applications in different train models. In addition, its full software compatibility with the 10.4" DC19 panel PC both increases flexibility and lowers costs, e.g., if an upgrade to a larger panel is necessary.

### High-Quality, High-Resolution Display

The DC20 houses a robust impact-resistant XGA TFT LCD display with LED backlight. It also features LEDs and a light sensor at the front. Due to its high resolution and optimized usability, it is a perfect choice for, e.g., CCTV.

### Powerful & Energy-Efficient Computing

The DC20 is powered by an Intel Atom processor from the E3900 series running at up to 1.6 GHz and equipped with up to 8 GB RAM with ECC and a 32 GB soldered eMMC. Standard interfaces include two Gigabit Ethernet, one CAN, one audio, digital I/O and RS232/RS422/RS485 -

all available on M12 connectors at the back of the panel PC.

Two PCI Express Mini Card interfaces can control wireless communication functions like 2G, 3G, 4G and GNSS. Two micro-SIM card slots with dual-SIM functionality are accessible at the back of the panel.

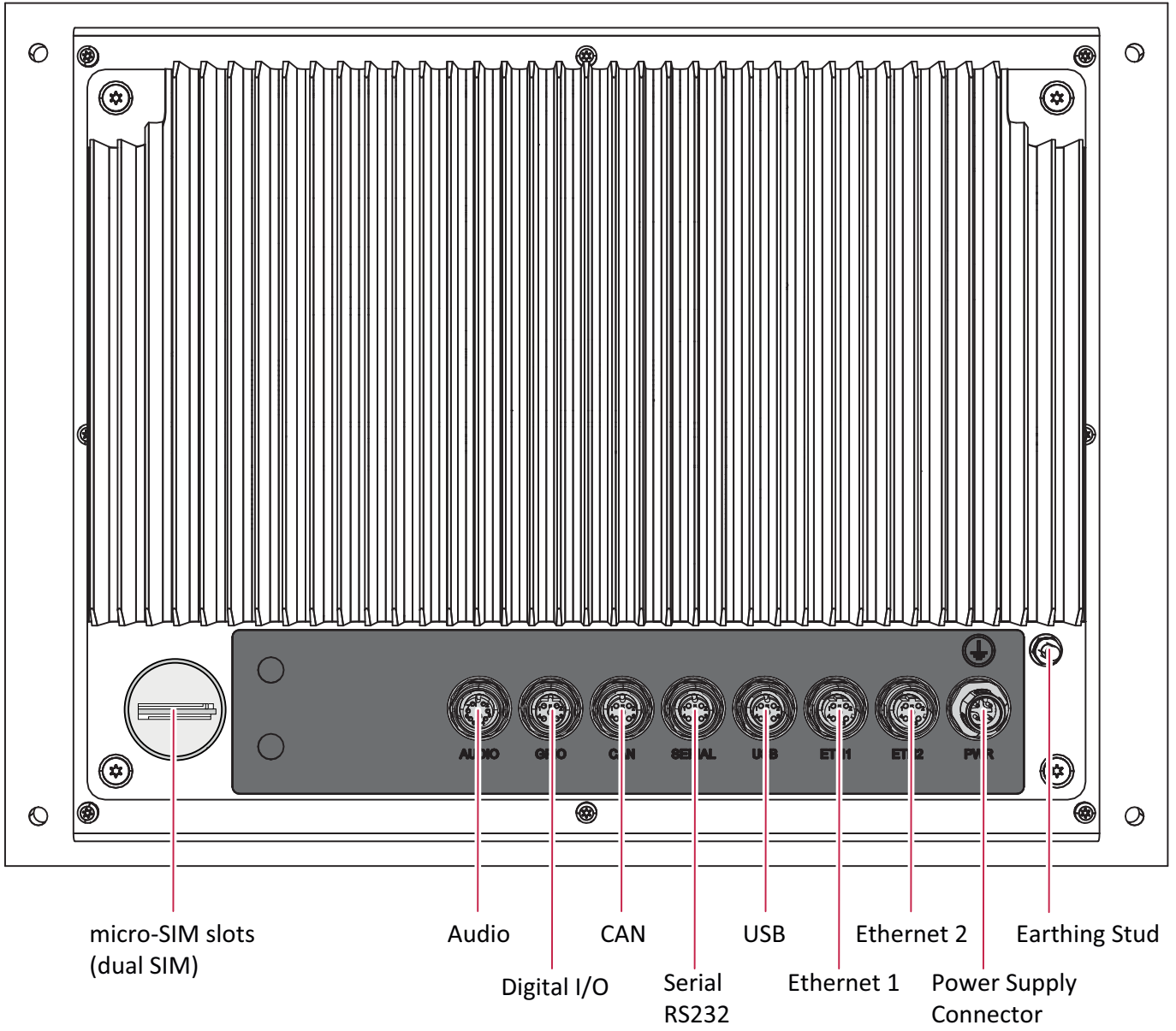
### Flexible Rail Network Connection Options

The DC20 can provide Multifunction Vehicle Bus (MVB) master or slave support where necessary, by adding an MVB PCI Express Mini Card. This makes the display scalable for different applications.

### Extremely Rugged, Perfectly Rail-Ready

The DC20 comes with an extremely rugged housing with an IP65 compliant front. It supports a railway-compliant power supply of 24 or 110 VDC, its internal PSU complying with EN 50155 class S2. Also in compliance with the standard, the DC20 operates in a -25 °C to +70 °C environment (+85 °C for 10 minutes), achieved through fanless conduction-cooling technology.

All electronic components are soldered to withstand shock and vibration, backed up by solid M12 connectors, and are protected by conformal coating. Long-term availability until 2027 ensures an extended product life and future-safety. The panel PC meets all important requirements for railway equipment for fast, competitive time-to-market even in mission-critical environments.



## Diagram

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## **CPU**

- The following CPU types are supported:
    - Intel Atom x5-E3930, 2 cores, 2 threads, 1.3 GHz, 1.8 GHz Turbo Boost, 6.5 W, 2 MB cache
    - Intel Atom x5-E3940, 4 cores, 4 threads, 1.6 GHz, 1.8 GHz Turbo Boost, 9.5 W, 2 MB cache
    - Intel Atom x7-E3950, 4 cores, 4 threads, 1.6 GHz, 2.0 GHz Turbo Boost, 12 W, 2 MB cache
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## **Display**

- Color depth: 16.2 M
  - Luminance: 350 cd/m<sup>2</sup>
  - Viewing angle: 80° / 80° / 80° / 80°
  - Size/Resolution: 12.1" (4:3) / 1024 × 768
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## **Memory**

- System RAM
    - Soldered DDR3, ECC
    - 8 GB max.
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## **Mass Storage**

- eMMC (soldered); 32 GB
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## **Wireless Functionality**

- Possible functions:
  - GNSS
  - LTE
  - WLAN

## Interfaces

- This product includes interface options
  - Variable I/O in cutouts
- Touch screen
  - Touch technology: PCAP
  - Touch mode: Multi-touch (2 points)
- Key interface
  - Number of keys: 32
- Light sensor
  - Light sensor position: top left
- Audio
  - 1 × M12, A-coded, receptacle
  - Stereo line input, single-ended
  - Stereo line output, differential
- USB
  - 1 × USB 2.0, M12, A-coded, receptacle
- Ethernet
  - 2 × 10/100/1000BASE-T, M12, X-coded, receptacle
- PCI Express Mini Card
  - 2 × PCI Express Mini Card slot
  - Slot 1: PCIe Full-Mini; PCIe x1, USB 2.0
  - Slot 2: PCIe Full-Mini; USB 2.0, PCIe x1
- SIM card
  - 2 × micro-SIM, externally accessible
- Digital I/O
  - 2 × digital input, isolated, M12, B-coded, receptacle
  - 2 × digital output, isolated, M12, B-coded, receptacle
- Serial
  - 1 × RS232/RS422/RS485, isolated, M12, A-coded, receptacle
- CAN bus
  - 1 × CAN isolated, M12, A-coded, receptacle
- LED
  - User configurable: 1 ×
  - Status: power status, system status
- Cutout
  - Antenna connector options: RP-SMA plug, RP-SMA receptacle, SMA plug, SMA receptacle
  - D-Sub options: MVB
- Power
  - 1 × power in, M12, A-coded, plug
- Earthing connection
  - M4 stud

## Supervision and Control

- Temperature measurement
- Board management controller
- Real-time clock, buffered by supercapacitor (3 days)

## Electrical Specifications

- Supply voltage: 24 V DC to 110 V DC nom. (EN 50155)
- Power consumption: 30 W

## Mechanical Specifications

- Dimensions: (W) 350 mm, (D) 260 mm, (H) 92 mm
- Weight: 4.5 kg
- Cooling: Air cooling, natural convection, airflow 0.4 m/s
- Protection rating: IP65 (front), IP20 (back and sides)

## Product Compliance: Rail - Rolling Stock

- Operating temperature: -25 °C to +70 °C, +85 °C for 10 min (EN 50155:2017, class OT3, ST1)
- Rapid temperature variations: EN 50155:2017, class H1, no requirements
- Storage temperature: -40 °C (EN 50155:2017) to +85 °C (EN 60068-2-2, Bb)
- Altitude: +3000 m max. (EN 50125-1:2014, class AX)
- Pollution degree: EN 50124-1:2017, class PD2
- Humidity: +55 °C and +25 °C, 100 % RH max. (EN 50155:2017)
- Shock: 30 ms @ 50 m/s<sup>2</sup> (EN 61373:2010/AC:2017-09, vehicle body, cat. 1, class B)
- Vibration: 10 min @ 2.02 m/s<sup>2</sup> (functional) and 5 h @ 11.44 m/s<sup>2</sup> (long-life) (EN 61373:2010/AC:2017-09, vehicle body, cat. 1, class B x 2)
- Power supply: Interruption of voltage supply: 10 ms (EN 50155:2017, class S2)
- Electrical safety
  - EN 50124-1:2017
  - EN 50153:2014 + A1:2017
  - EN 50155:2017
  - EN ISO 13732-1:2008
- Fire protection: EN 45545-2:2013 + A1:2015, HL3
- EMC emission
  - EN 50121-3-2:2016
  - Regelung Nr. EMV 06 :2014-07-29, Anhang E: Messung an Geräten
  - Regelwerk 50.02.01 :2016-12-01, 12.3.1. EMV - Funk
- EMC immunity: EN 50121-3-2:2016
- Protective coatings: EN 50155:2017, class PCX (As agreed between user and supplier)
- Useful life: 5 years (EN 50155:2017, class L1)
- Display compliance: UIC 612-01

## Reliability

- MTBF: 50 000 h predicted @ 40 °C according to IEC/TR 62380 (RDF 2000)

## BIOS/Boot Loader

- AMI Aptio UEFI Firmware

## Software Support

- Linux
  - Supported kernel: 4.8 or higher. For older kernels (e.g., 4.4.x), patches for the Apollo Lake platform are also available.
  - Driver support
  - Tool support
- Windows
  - Windows 10 IoT Enterprise 64-bit
  - Driver support
  - Tool support
  - Not all functions are supported
- See the product User Manual for details on software support
- See also Application Note Recommendations for a Robust Software Setup
- See section Software on the product web page for available packages

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