

DIN-RAIL COMPUTER WITH INTEL ATOM PROCESSOR FOR ROLLING STOCK

- Intel Atom E3900 series
- Up to 8 GB DDR3 RAM with ECC
- Trusted Platform Module
- M.2 NVMe slot for storage
- Gb Ethernet, USB 3.2 Gen 1x1, RS232, RS485/422, DisplayPort
- DIN rail, wall or 19" rack mounting
- Input voltage 24 V DC nom. or 48 V DC nom. with ignition
- Full range power supply 16 V DC to 60 V DC
- EN 50155 compliant (railways)
- -40 °C to +70 °C (+85 °C), fanless



LOW POWER CPU FOR IOT/NETWORK APPLICATIONS

The MC50M is a modular computer for embedded applications in transportation, e.g., trains, buses or commercial vehicles. The computing platform features an Intel Atom E3900 series CPU with low power dissipation and scalability in performance and memory.

The MC50M is the ideal basis for functions such as security gateway, predictive maintenance, CCTV or ticketing system, or to act as a diagnostics server.

MODULAR SYSTEM FOR EASY CONFIGURATION

The MC50M can be a stand-alone product, but due to the modular concept it offers flexible built-to-order configurations. The box can be easily combined with prefabricated extension modules, providing additional features and short delivery times.

In the modular system, the data transfer between the modules as well as the power distribution between the individual modules takes place via the extension connectors standardized by duagon.

Extension modules can provide application-specific functions like wireless communication (LTE advanced, WLAN, GNSS), MVB, CAN bus, or other I/O. A removable storage shuttle can support the integration of a 2.5" SATA HDD/SSD. With a PSU extension module, ultra wide range isolated power supply from 24 V DC to 110 V DC nominal (EN 50155) is available.

POWER SAVING DESIGN AND SECURITY FEATURES

The board management controller provides enhanced reliability and reduced downtime. The Trusted Platform Module supports security and encryption features. With the ignition switch for remote control of booting and shutdown, the platform provides additional features for power saving.

FLEXIBLE SYSTEM INSTALLATION

Various mounting options facilitate the integration of the box into an existing environment. The standard 35 mm DIN Rail mounting offers space saving mounting of all system modules on a single rail. Wall mounting and mounting in a 19" rack using adaption brackets are an option.

The aluminum housing with cooling fins allows fanless operation. MC50M has no moving parts, making it maintenance free.

ROLLING STOCK QUALIFIED AND LONG-TERM AVAILABILITY

The CPU module is qualified for rolling stock and wayside applications. Long term availability until 2027 minimizes life-cycle management by making the MC50M available at least for this period of time.

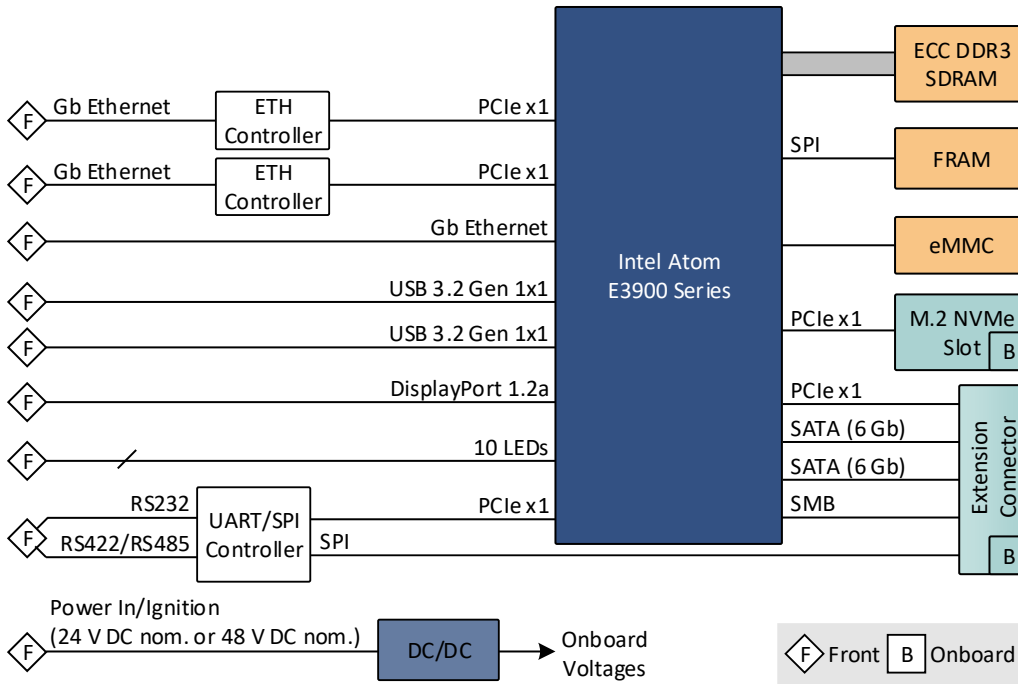


www.duagon.com/products/mc50m/

DATA SHEET



MC50M | DIAGRAM



MC50M | TECHNICAL DATA

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 x7-E3950, 4 cores, 4 threads, 1.6 GHz, 2.0 GHz Turbo Boost, 12 W, 2 MB cache

MEMORY

- System RAM
 - Soldered DDR3, ECC
 - 8 GB max.
- Non-volatile RAM (NVRAM): 64 Kbit (8 K × 8) FRAM

SECURITY

- Trusted Platform Module 2.0

MASS STORAGE

- eMMC (soldered); 64 GB max.

- The following mass storage devices can be assembled:
 - SSD M.2 (NVMe)

GRAPHICS

- Processor graphics
- Maximum resolution: 4096 x 2160 pixels @ 60 Hz, 24 bpp

INTERFACES

- SSD/HDD slot
 - 1 × M.2 2242/2260/2280 socket 3 Key M; NVMe (PCIe x1); internally accessible
- Video
 - 1 × DisplayPort 1.2, for service
- USB
 - 2 × USB 3.2 Gen 1x1, Type A, for service
- Ethernet
 - 3 × 10/100/1000BASE-T, M12, X-coded, receptacle



- Serial
 - 1 × RS232 isolated, D-Sub, 9-pin, plug
 - 1 × RS422/RS485, isolated, D-Sub, 9-pin, plug
- LED
 - Status: board status (BMC), power status
 - Ethernet: activity, link
 - User configurable: 2 ×
- Power
 - 1 × power in, M12, A-coded, plug
 - Ignition input
- Earthing connection
 - M4 screw

SUPERVISION AND CONTROL

- Board management controller
- Temperature measurement
- Watchdog timer
- Real-time clock, buffered by supercapacitor (5 days)

ELECTRICAL SPECIFICATIONS

- Supply voltage
 - 24 V DC nom.
 - 48 V DC nom.
- Power consumption: 10 to 15 W typ. (depending on CPU type and CPU load), 40 W max. (including ME modules)

MECHANICAL SPECIFICATIONS

- Dimensions: (W) 42 mm, (D) 144 mm, (H) 132 mm
- Weight: 760 g
- Mounting
 - DIN rail
 - Wall/flat surface
 - Rack in 19" cabinet
- Cooling: Air cooling, natural convection, airflow 0.4 m/s
- Protection rating: IP20

PRODUCT COMPLIANCE: RAIL - ROLLING STOCK

- Operating temperature: -40 °C to +70 °C, +85 °C for 10 min (EN 50155:2017, class OT4, 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 PD3
- Humidity: +55 °C and +25 °C, 100 % RH max. (EN 50155:2017)
- Shock: 30 ms @ 50 m/s² (EN 61373:2010/AC:2017-09, vehicle body, cat. 1, class B)
- Vibration: 10 min @ 2.02 m/s² (functional) and 5 h @ 11.44 m/s² (long-life) (EN 61373:2010/AC:2017-09, vehicle body, cat. 1, class B x 2)
- Power supply
 - General compliance with power supply requirements of EN 50155:2017
 - Interruption of voltage supply: 0 ms (EN 50155:2017, class S1)
- 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
- EMC immunity: EN 50121-3-2:2016
- Protective coatings: EN 50155:2017, class PC2 (Any PCB protected on both sides)
- Useful life: 20 years (EN 50155:2017, class L4)

PRODUCT COMPLIANCE: RAIL - WAYSIDE NON-SAFETY RELATED

- Operating temperature: -40 °C to +70 °C (EN 50125-3:2003, class T2, cubicle, with class T2 maximum extended by 5 °C)
- Storage temperature: -40 °C (EN 60068-2-1:2007, Ab) to +85 °C (EN 60068-2-2:2007, Bb)
- Altitude: +3000 m max. (EN 50125-3:2003, class AX)
- Humidity: 100 % RH max. (EN 50125-2:2002, control cabinet, class T1/T2/TX)
- Shock: 11 ms @ 20 m/s² (EN 50125-3:2003, in a switch cabinet 1 m to 3 m from the track)



- Vibration: 2.3 m/s² (EN 50125-3:2003, in a switch cabinet 1 m to 3 m from the track)
- Electrical safety
 - EN 50124-1:2017
 - EN 62368-1:2014 + AC:2015
- EMC emission
 - EN 50121-4:2016
 - EN 61000-6-4:2007 + A1:2011
- EMC immunity
 - EN 50121-4:2016
 - EN 61000-6-2:2005
- Restrictions: Service interfaces may only be used with a maximum cable length of 3 m for installations 10 m or less away from the track.

PRODUCT COMPLIANCE: ROAD VEHICLE

- EMC emission: ECE R10 Rev.5
- EMC immunity: ECE R10 Rev.5

RELIABILITY

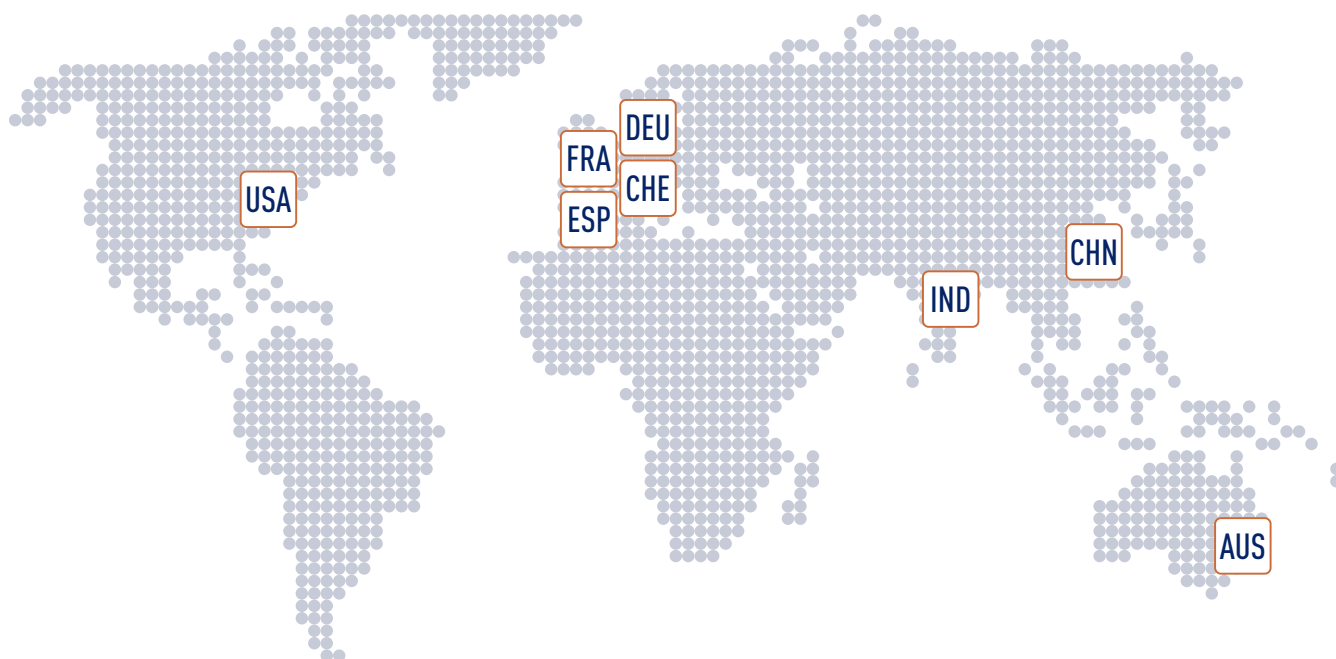
- MTBF: 421 000 h predicted @ 40 °C according to IEC/TR 62380 (RDF 2000)

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.
 - Yocto BSP
 - Driver support
 - Tool support
 - Tested with: Yocto BSP (Sumo 2.5, Linux kernel 4.15), Ubuntu 18.04 X LTS
- Windows
 - Windows 10 IoT Enterprise 64-bit
 - Driver support
 - Tool support
- ▶ See the product User Manual for details on software support: www.duagon.com/products/mc50m/#doc
- ▶ See also **Application Note Recommendations for a Robust Software Setup**
- ▶ See section Software on the product web page for available packages: www.duagon.com/products/mc50m/#downl



duagon | WORLDWIDE

duagon has a global presence with support and sales representatives across 8 countries. With three decentralized engineering and production sites, our customers take advantage of the added competence and flexibility.

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