

## 5G WIRELESS COMMUNICATION MODULE FOR EMBEDDED COMPUTER SYSTEM

- 5G via M.2
- 4 micro-SIM card slots
- WLAN via PCIe Mini Card
- GNSS receiver
- Conduction cooling of modems
- DIN rail, wall or 19" rack mounting
- -40 °C to +70 °C (+85 °C), fanless



### EXTENSION FOR VARIOUS APPLICATIONS

The ME10 is a modular extension for embedded applications in transportation, e.g., in trains or wayside and is the perfect solution for communication from the train to the back office. The module adds wireless connectivity to the system CPU. Main applications of the module include predictive maintenance, IoT gateway, diagnostics server, smart vehicle, passenger information and ticketing systems.

### 5G CONNECTIVITY

The ME10 comes with two M.2 slots. One of them is by default equipped with a 5G module, the second M.2 slot is prepared for redundant mode. For each M.2 slot, two front-accessible micro-SIM card slots are available. Two eSIM cards are available on request. The PCI Express Mini Card slot is equipped with a WLAN module. A high-precision GNSS receiver is also provided.

### MODULAR SYSTEM FOR EASY CONFIGURATION

Due to duagon's modular concept, the ME10 offers flexibility in built-to-order configurations. Via its extension connectors, the box can be easily combined with pre-fabricated CPU modules or other extension modules, for example a PSU or removable storage shuttles, 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 components takes place via the extension connectors standardized by duagon.

### 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. ME10 has no moving parts, making it maintenance free.

### ROLLING STOCK QUALIFIED AND LONG-TERM AVAILABILITY

The 5G communication module is qualified for rolling stock and wayside applications as well as for industrial automation applications. Long-term availability ensures an extended product life and future-safety.

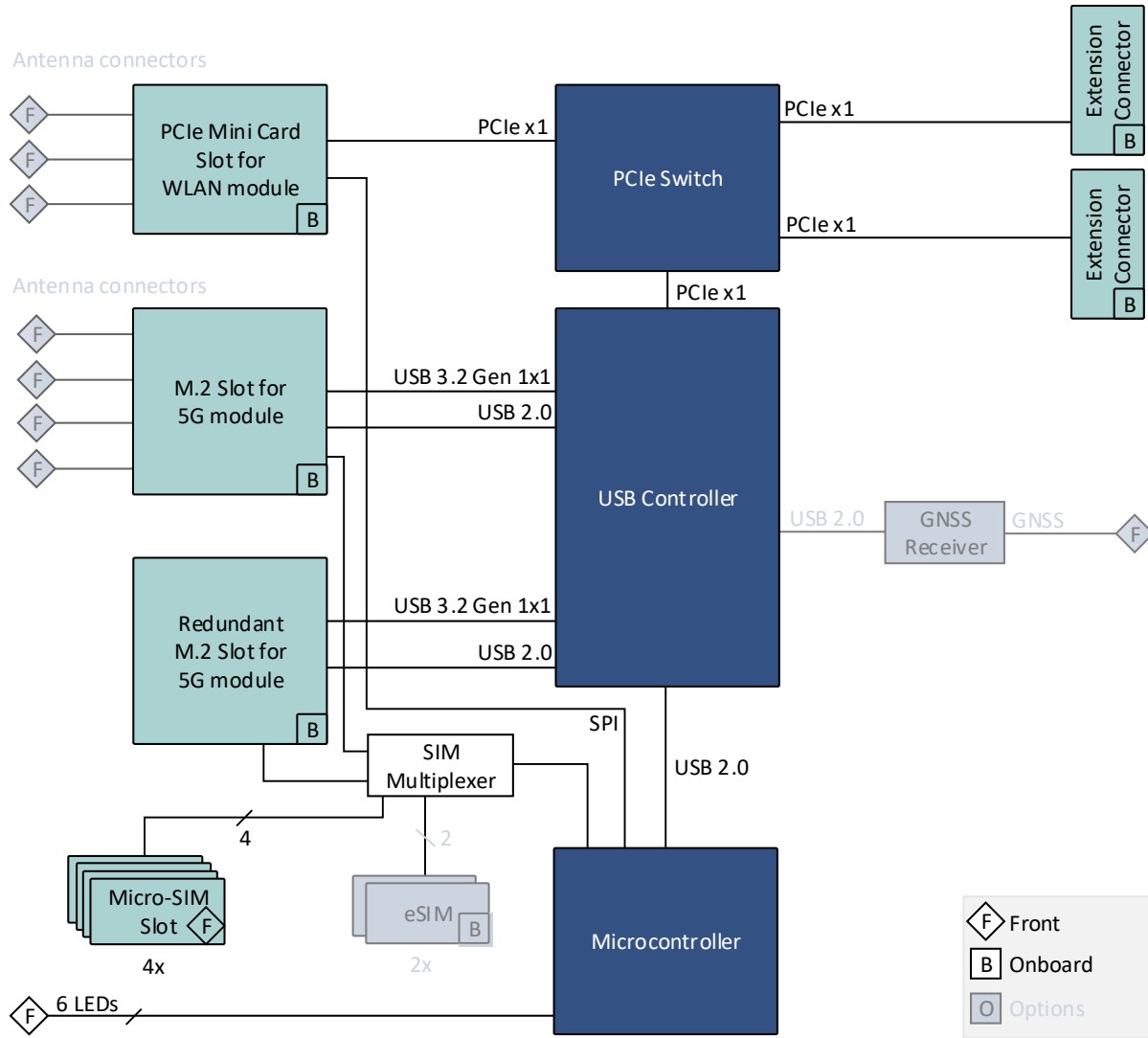


[www.duagon.com/products/me10/](http://www.duagon.com/products/me10/)

**DATA SHEET**



## ME10 | DIAGRAM



## ME10 | TECHNICAL DATA

### WIRELESS FUNCTIONALITY

- Possible functions:
  - 5G
  - WLAN
  - GNSS

### INTERFACES

- This product includes interface options
  - Different wireless functions depending on assembled wireless interface cards

- Wireless
  - 5G (Main) antenna connector: 1 × QLS receptacle (X4)
  - 5G (MIMO1) antenna connector: 1 × QLS receptacle (X3)
  - 5G (MIMO2) antenna connector: 1 × QLS receptacle (X2)
  - 5G (Aux) antenna connector: 1 × QLS receptacle (X1)
  - WLAN 1 antenna connector: 1 × QLS receptacle (X8)
  - WLAN 2 antenna connector: 1 × QLS receptacle (X7)
  - WLAN 3 antenna connector: 1 × Cutout (X6)
  - GNSS antenna connector: 1 × QLS receptacle (X5)



- M.2 Card
  - 2 × M.2 Card slot
  - Slot 1: M.2 3042 (5G) socket 2 Key B, M.2 3052 (5G) socket 2 Key B; USB 3.2 Gen 1x1, USB 2.0
  - Slot 2: M.2 3042 (5G) socket 2 Key B, M.2 3052 (5G) socket 2 Key B; USB 3.2 Gen 1x1, USB 2.0
  - Sierra Wireless EM9191 (optional, depending on ME10 model)
  - Telit Cinterion MV31-W (optional, depending on ME10 model)
  - Quectel RM500Q (on request)
- PCI Express Mini Card
  - 1 × PCI Express Mini Card slot
  - PCIe Full-Mini; PCIe x1, SPI
  - Assembled: SparkLAN WPEQ-261ACNI(BT), WLAN PCI Express Mini Card, 802.11ac/a/b/g/n, -40 °C to +85 °C
- SIM card
  - 4 × micro-SIM slot, externally accessible
  - 2 × eSIM (on request)
- LED
  - Status: power status
  - User configurable: 3 ×
- Cutout
  - Antenna connector options: QLS receptacle, RP-SMA receptacle, SMA receptacle

## ELECTRICAL SPECIFICATIONS

- Power consumption: 12 W max., with 1 × 5G + 1 × WLAN assembled

## MECHANICAL SPECIFICATIONS

- Dimensions: (W) 38 mm, (D) 144 mm, (H) 132 mm
- Weight: 450 g approx.
- Mounting
  - DIN rail
  - Rack in 19" cabinet
  - Wall/flat surface
- Cooling: Air cooling, natural convection, airflow 0.4 m/s
- Protection rating: IP20

## PRODUCT COMPLIANCE: RAIL - ROLLING STOCK

- Compliance level: This product is prepared for use in EN 50155 systems. Some parameters are system-dependent and are specified on system level.
- Operating temperature: -40 °C to +70 °C, +85 °C for 10 min (EN 50155:2021, class OT4, ST1)
- Equipment location: EN 50155:2021, location 2, cabin and interiors
- 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: +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 50155:2021)
- 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, double acceleration)
- Electrical safety
  - EN 50155:2021
  - EN 50153:2014 + A1:2017 + A2:2020
  - EN 50124-1:2017
  - EN ISO 13732-1:2008
- Fire protection: EN 45545-2:2020, EL9, HL3
- EMC emission
  - EN 50121-3-2:2016 + A1:2019
  - Regelung Nr. EMV 06 :2019-05-09 (2.0), Anhang E: Messung an Geräten, Schutzklasse S1
- EMC immunity: EN 50121-3-2:2016 + A1:2019
- Protective coatings
  - EN 50155:2021, class PCX (As agreed between user and supplier)
  - Wireless module carrier PCB is coated, wireless modules and GNSS are not coated
- Useful life: 20 years (EN 50155:2021, 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)
- Pollution degree: EN 50124-1:2017, class PD3
- Humidity: +55 °C and +25 °C, 90 % to 100 % RH (EN 60068-2-30:2005, Db)
- Humidity - Condensation: Non-condensing
- Shock: 11 ms @ 20 m/s<sup>2</sup> (EN 50125-3:2003, in a switch cabinet 1 m to 3 m from the track)
- Vibration: 2.3 m/s<sup>2</sup> (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

## PRODUCT COMPLIANCE: INFORMATION TECHNOLOGY EQUIPMENT

- Operating temperature: 0 °C (EN 60068-2-1:2007, Ae, temperature value in compliance with 6.6 b) to +60 °C (EN 60068-2-2:2007, Be)

- Storage temperature: -40 °C (EN 60068-2-1:2007, Ab) to +85 °C (EN 60068-2-2:2007, Bb)
- Altitude: +3000 m max. (EN 62368-1:2014 + AC:2015)
- Humidity: +55 °C and +25 °C, 90 % to 100 % RH (EN 60068-2-30:2005, Db)
- Humidity - Condensation: Non-condensing
- Electrical safety: EN 62368-1:2014 + AC:2015
- Flammability (PCBs): UL 94 V-0
- EMC emission
  - EN 55032:2015 (multimedia equipment), class A (industrial environments)
  - EN 61000-3-2:2014
  - EN 61000-3-3:2013
- EMC immunity
  - EN 55035:2017 (multimedia equipment)
  - EN 61000-6-2:2005 (generic standard, industrial environments)

## RELIABILITY

- MTBF: 217 000 h (06ME10-00) / 256 000 h (06ME10-01) predicted @ 40 °C according to IEC/TR 62380 (RDF 2000)

## SOFTWARE SUPPORT

- Linux
  - duagon Yocto BSP
  - Tested with: duagon Yocto BSP (Kirkstone 4.0, Linux kernel 5.15)
  - Tested with: Ubuntu 22.04.1 LTS
- Further Resources
  - See the product User Manual for details on software support: [www.duagon.com/products/me10/#doc](http://www.duagon.com/products/me10/#doc)

## ME10 | ORDERING INFORMATION

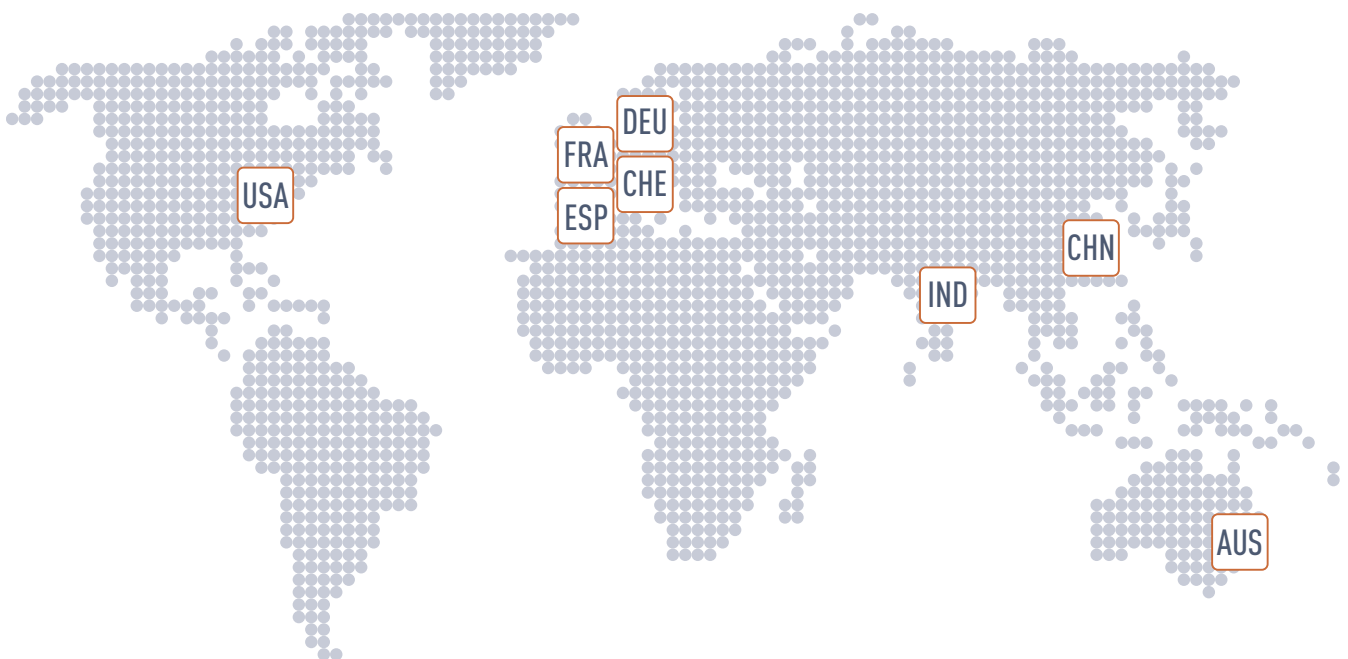
### STANDARD MODELS

- |                  |  |
|------------------|--|
| <b>06ME10-00</b> | ME10, 5G Sierra Wireless EM9191, WLAN SparkLAN WPEQ-261ACNI(BT), GNSS, QLS antenna connectors, -40 °C to +85 °C, conformal coating |
| <b>06ME10-01</b> | ME10, 5G Telit Cinterion MV31-W, WLAN SparkLAN WPEQ-261ACNI(BT), GNSS, QLS antenna connectors, -40 °C to +85 °C, conformal coating |



## duagon WORLDWIDE

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



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