

BC51R

Rugged IP65 Box PC for Transportation with Intel Atom Processor



LEADING THE EMBEDDED FUTURE

- Intel Atom E3900 series
- IP65-protected housing
- 4 GB DDR3 DRAM soldered, ECC
- 16 GB eMMC soldered
- WLAN, 4G LTE, GNSS
- 24 V DC nom. class S2 PSU, with ignition
- -40 °C to +70 °C (+85 °C), fanless
- Compliant to EN 50155 (railways)
- Compliant to ISO 7637-2 (E-mark for automotive)



Technical Data

CPU	■ Intel Atom x5-E3930, 2 cores, 2 threads, 1.3 GHz, 1.8 GHz Turbo Boost, 6.5 W, 2 MB cache
Memory	■ System RAM ■ Soldered DDR3 ■ 4 GB max.
Mass Storage	■ eMMC (soldered); 16 GB
Wireless Functionality	■ Possible functions: ■ LTE ■ WLAN/Bluetooth ■ GNSS
Interfaces	■ USB: 1 × USB 2.0, M12, A-coded, receptacle ■ Ethernet: 2 × 10/100/1000BASE-T, M12, X-coded, receptacle ■ Wireless ■ LTE (Main) antenna connector: 1 × SMA receptacle ■ WLAN 1 antenna connector: 1 × SMA receptacle ■ GNSS antenna connector: 1 × SMA receptacle

Data Sheet



- PCI Express Mini Card
 - 2 × PCI Express Mini Card slot
 - Slot 1: PCIe Half-Mini; PCIe x1, USB 2.0
 - Assembled: SparkLAN, WPEQ-261ACNI(BT), 802.11ac/a/b/g/n 2T2R Industrial-graded Wi-Fi, Half-Mini PCIe Module, -40 °C to +85 °C
 - Slot 2: PCIe Full-Mini; PCIe x1, USB 2.0
 - Assembled: Quectel, EG25-G, LTE cat 4, PCIe Mini Card, USB 2.0, GNSS, world wide version, -40 °C to +80 °C
- SIM card
 - 1 × eSIM slot, eSIM card on request
 - 1 × micro-SIM slot, internally accessible
- Digital I/O
 - 2 × digital input, isolated, M12, B-coded, receptacle
 - 2 × digital output, isolated, M12, B-coded, receptacle
- Serial: 2 × RS232, isolated, M12, A-coded, receptacle
- CAN bus: 2 × CAN isolated, M12, A-coded, receptacle
- LED
 - Status: power status, power status (wireless cards), board status (BMC)
 - 3 × user configurable LED
 - Ethernet: activity, link
 - CAN: activity, link
 - COM: activity, link
- Power
 - 1 × power in, M12, A-coded, plug
 - Ignition input
- Earthing connection: M4 stud

Supervision and Management

- Board management controller
- Temperature measurement
- Ignition watchdog
- Real-time clock, buffered by supercapacitor
- Trusted Platform Module 2.0

Electrical Specifications

- Supply voltage
 - 24 V DC nom. (EN 50155)
 - 24 V DC nom. (ISO 7637-2)
- Power consumption: max. 30 W

Mechanical Specifications

- Dimensions: (W) 250 mm, (D) 220 mm, (H) 48.1 mm
- Cooling: Air cooling, natural convection, airflow 0.4 m/s
- Protection rating: IP65

Product Compliance: Rail - Rolling Stock

- Operating temperature: -40 °C to +70 °C, +85 °C for 10 min (EN 50155:2021, class OT4, ST1)
- Equipment location
 - EN 50155:2021, location 1, closed electrical operating area
 - 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 PD2
- Humidity: +55 °C and +25 °C, 100 % RH max. (EN 50155:2021)



- 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, double acceleration)
- Power supply
 - General compliance with power supply requirements of EN 50155:2021
 - Interruption of voltage supply: 10 ms (EN 50155:2021, class S2)
 - Supply change-over: 100 ms @ 0.6 x Un (EN 50155:2021, class C1)
- 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
- EMC immunity: EN 50121-3-2:2016 + A1:2019
- Protective coatings
 - EN 50155:2021, class PCX (As agreed between user and supplier)
 - Parts without conformal coating: Wireless modules
- Useful life: 10 years (EN 50155:2021, class L2)

Product Compliance:
Road Vehicle

- Fire protection: ECE R118 Rev.2 + Amend.1
- EMC emission: ECE R10 Rev.5
- EMC immunity: ECE R10 Rev.5

Reliability

- MTBF: 240 148 h predicted @ 40 °C according to IEC/TR 62380 (RDF 2000)

BIOS/Boot Loader

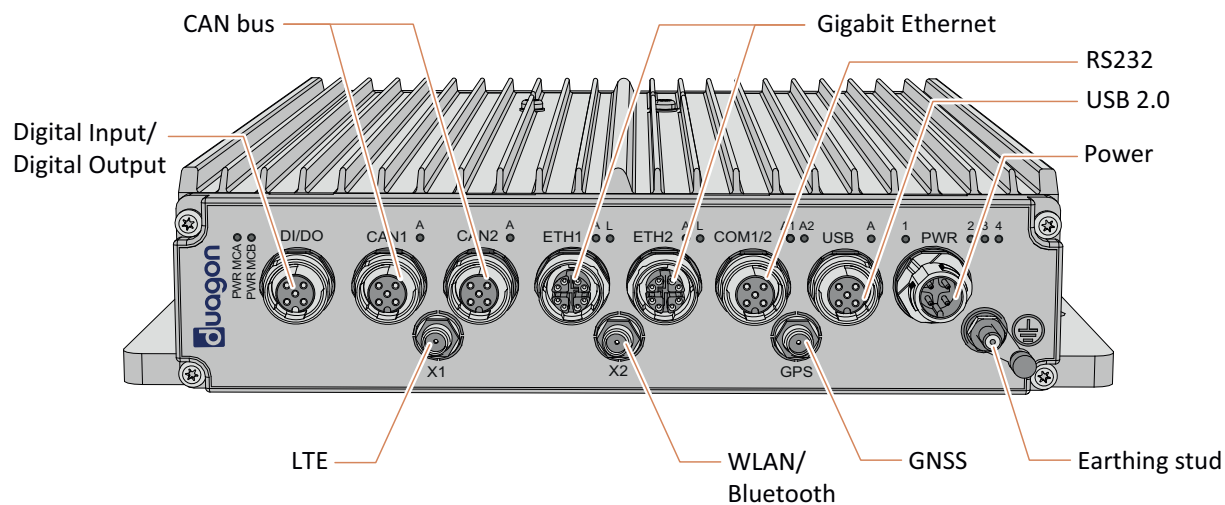
- AMI Aptio UEFI Firmware

Software Support

- Linux

- See also Application Note ***Recommendations for a Robust Software Setup***

Diagram



Ordering Information

Standard Models

09BC51R00

Intel Atom x5-E3930, 1.3 GHz, 4 GB DDR3 DRAM, ECC, 16 GB eMMC, 24 V DC nom. class S2 PSU with ignition, WLAN SparkLAN WPEQ-261ACNI(BT), LTE Quectel EG25-G, -40 °C to 70 °C (+85 °C), compliant to EN 50155 and ISO 7637-2 (E-mark for automotive)