

## RUGGED EMBEDDED BOX PC WITH AMD RYZEN FOR TRANSPORTATION

- AMD V1000 APU, up to 32 GB DDR4 DRAM
- WLAN, 4G LTE, GNSS
- 2.5" HDD/SSD, NVMe storage
- Gigabit Ethernet, USB 3.2 Gen 1x1, DisplayPort, Audio
- RS232, RS422/RS485, IBIS
- 1 PCIe Mini card slot for MVB, CAN
- Class S2 wide-range power supply, incl. ignition
- -40 °C to +70 °C (+85 °C), fanless
- Compliant to EN 50155 (railways)



### FOR IOT OR STORAGE-INTENSIVE APPLICATIONS

The BL72E is a fanless, maintenance-free box computer for embedded applications in transportation, e.g., in trains.

It offers a SATA HDD/SSD shuttle providing the storage capacity necessary for entertainment servers or video surveillance systems, plus eMMC memory and an M.2 slot for PCIe based storage (NVMe).

### COST-EFFICIENT HIGH-END PROCESSOR PERFORMANCE

The BL72E is based on AMD's Ryzen V1000 APU family featuring excellent power-per-watt performance and a Radeon Vega next-generation 3D graphics engine. With up to four high-performance processor cores and AMD virtualization support, and up to 32 GB soldered-down DDR4 SDRAM, the BL72E offers powerful computing for handling data intensive work loads efficiently, e.g. for implementation of complex algorithms for deep learning or machine intelligence.

### MULTI-TALENT FOR WIRELESS COMMUNICATION

The BL72E can take over typical on-board wireless functions, such as an Internet connection for passengers or locating the vehicle. A GNSS positioning interface is available. Two PCI Express Mini Card slots and two M.2 slots provide maximum flexibility in implementing mobile service standards up to 4G LTE or WLAN IEEE 802.11, and derivatives.

A total of eight externally accessible micro-SIM card slots is available.

### MULTITUDE OF I/O

The BL72E supports one DisplayPort interface with maximum 4K resolution. A multitude of other I/O is available, including four Gigabit Ethernet, audio, two USB 3.2 Gen 1x1, RS232, RS422/RS485, IBIS. Digital I/O, MVB or a CAN interface can optionally be implemented.

### RAILWAY-COMPLIANT PSU WITH IGNITION FUNCTION

The BL72E comes with a class S2 wide range power supply and complies to EN 50155. The power can be switched on and off using an ignition signal on the power connector.

### FANLESS OPERATION FOR MOBILE APPLICATIONS

The system offers long-term availability until 2029 and is designed for fanless operation at temperatures from -40 °C to +70 °C (+85 °C for up to 10 minutes). Its rugged aluminum housing with cooling fins serves as a heat sink and provides conduction cooling.



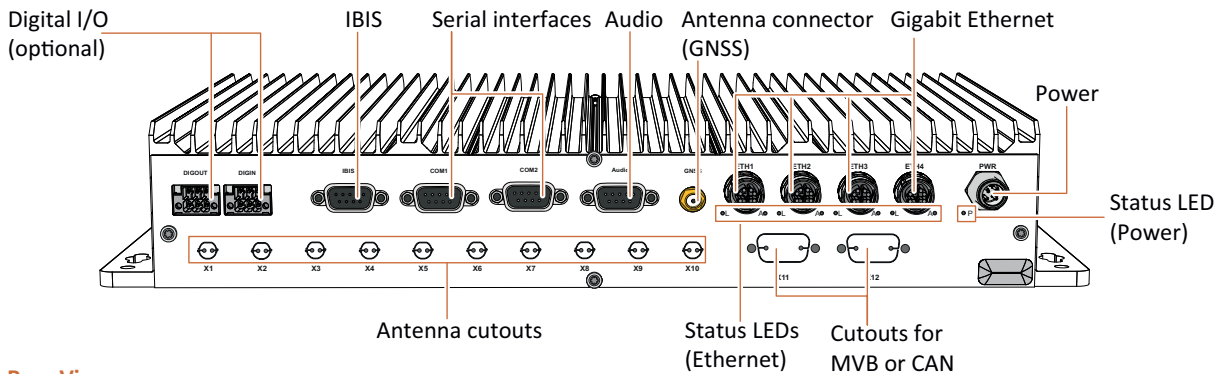
[www.duagon.com/products/bl72e/](http://www.duagon.com/products/bl72e/)

## DATA SHEET

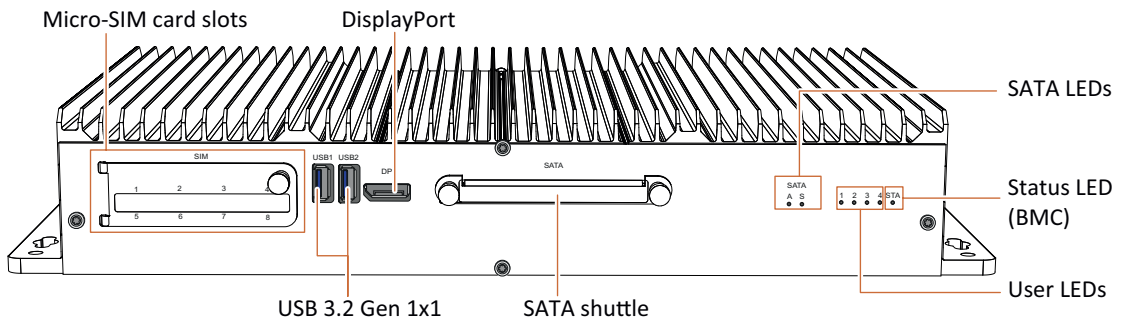


## BL72E | DIAGRAM

### Front View



### Rear View



## BL72E | TECHNICAL DATA

### CPU

- The following CPU types are supported:
  - AMD V1605B, 4 cores, 8 threads, 2.0 GHz base, 12-25 W, 2 MB cache, Vega GPU with 8 CUs
  - AMD V1404I, 4 cores, 8 threads, 2.0 GHz base, 12-25 W, 2 MB cache, Vega GPU with 8 CUs, iTemp

### MEMORY

- System RAM
  - Soldered DDR4, ECC
  - 32 GB max.

### MASS STORAGE

- eMMC (soldered); 16 GB

- The following mass storage devices can be assembled:
  - SSD/HDD 2.5" (SATA)
  - SSD M.2 (NVMe)

### GRAPHICS

- Processor graphics
- Maximum resolution: 3840 x 2160 pixels @ 30 Hz

### WIRELESS FUNCTIONALITY

- Possible functions:
  - GNSS
  - LTE
  - WLAN



## INTERFACES

- This product includes interface options
  - Different wireless functions depending on assembled wireless interface cards
  - Variable I/O in cutouts
- SSD/HDD slot
  - 1 × SATA 2.5"; SATA Revision 3.x; externally accessible (shuttle)
  - 1 × M.2 2280 socket 3 Key M; NVMe(PCIe x1); internally accessible
- Video
  - 1 × DisplayPort 1.2, for service
- Audio
  - 1 × D-Sub, 9-pin, plug
  - S/PDIF output
  - Stereo line output, differential
  - Stereo line input, single-ended
- USB
  - 2 × USB 3.2 Gen 1x1, Type A, for service
- Ethernet
  - 4 × 10/100/1000BASE-T, M12, X-coded, receptacle
- Wireless
  - GNSS antenna connector: 1 × SMA receptacle
- M.2 Card
  - 2 × M.2 Card slot
  - Slot 1: M.2 3042 (LTE) socket 2 Key B; USB 2.0, USB 3.2 Gen 1x1
  - Slot 2: M.2 3042 (LTE) socket 2 Key B; USB 2.0, USB 3.2 Gen 1x1
- PCI Express Mini Card
  - 2 × PCI Express Mini Card slot
  - Slot 3: PCIe Full-Mini; PCIe x1, USB 2.0
  - Slot 4: PCIe Full-Mini; PCIe x1, USB 2.0
- SIM card
  - 8 × micro-SIM card slot, externally accessible
- Digital I/O
  - 4 × digital output, isolated, PCB plug, 6-pin
  - 4 × digital input, isolated, PCB plug, 6-pin
  - 1 × odometer input, isolated, PCB plug, 6-pin
  - Note: The digital I/O connector is always assembled, even if the functional module is not included.

- Serial
  - 2 × RS422/RS485, isolated, D-Sub, 9-pin, plug
  - 2 × RS232, isolated, D-Sub, 9-pin, plug
- IBIS
  - 1 × IBIS Slave, isolated, D-Sub, 9-pin, receptacle
- LED
  - Status: board status (BMC), power status
  - Mass storage: power, activity
  - Ethernet: link, activity
  - User configurable: 4 ×
- Cutout
  - Antenna connector options: QLS receptacle, RP-SMA receptacle, SMA receptacle
  - D-Sub options: CAN bus, MVB
- Power
  - 1 × power in, M12, A-coded, plug
  - Ignition input
- Earthing connection
  - M6 screw

## SUPERVISION AND MANAGEMENT

- Board management controller
- Temperature measurement
- System watchdog (BMC)
- Ignition watchdog
- Real-time clock, buffered by supercapacitor (3 days)
- Trusted Platform Module 2.0

## ELECTRICAL SPECIFICATIONS

- Supply voltage: 24 V DC to 110 V DC nom. (EN 50155)
- Power consumption: 55 W max.

## MECHANICAL SPECIFICATIONS

- Dimensions: (W) 390 mm, (D) 215 mm, (H) 66 mm
- Weight: 5.3 kg typ.
- Mounting
  - 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/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
  - General compliance with power supply requirements of EN 50155:2017
  - Interruption of voltage supply: 10 ms (EN 50155:2017, class S2)
- Electrical safety
  - EN 50155:2017
  - EN 50153:2014 + A1:2017
  - EN 50124-1:2017
  - EN ISO 13732-1:2008
- Fire protection: EN 45545-2:2013 + A1:2015, HL3
- EMC emission
  - EN 50121-3-2:2016 + A1:2019
  - Regelung Nr. EMV 06:2019-05-09 (2.0), Anhang E: Messung an Geräten
- EMC immunity: EN 50121-3-2:2016 + A1:2019
- Protective coatings: EN 50155:2017, class PCX (As agreed between user and supplier)
- Useful life: 20 years (EN 50155:2017, class L4)

## RELIABILITY

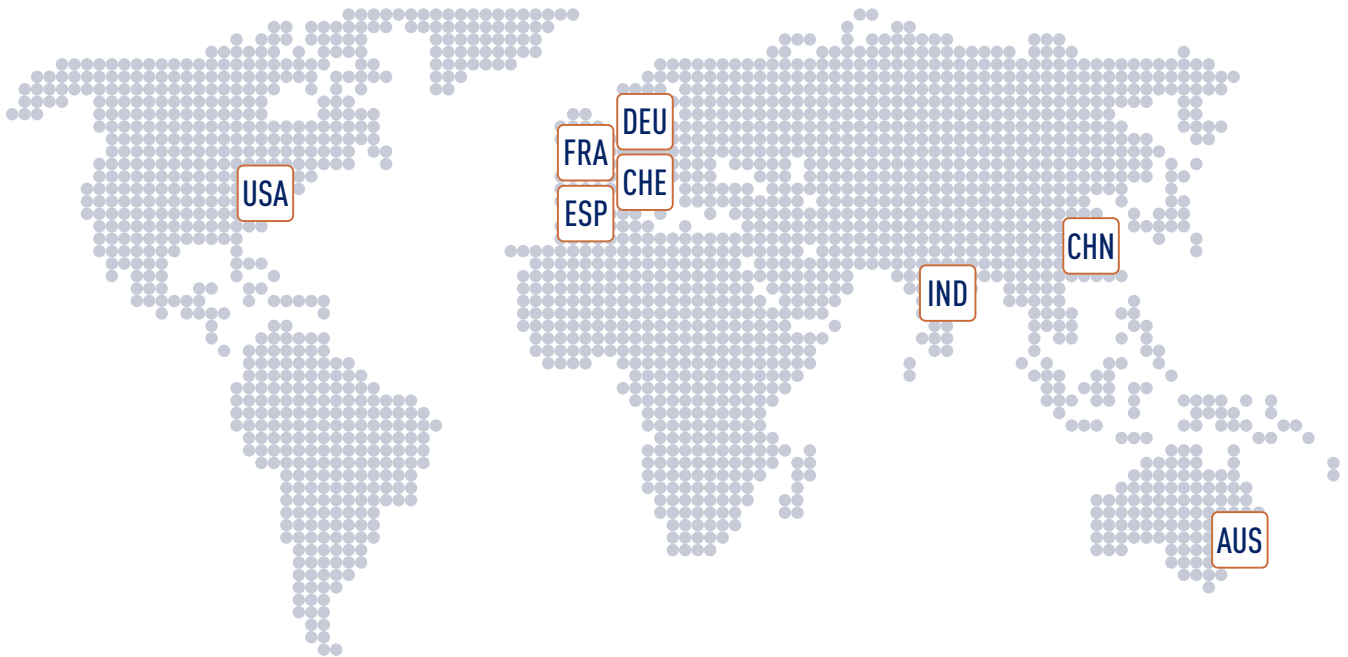
- MTBF: 210 067 h predicted @ 40 °C according to IEC/TR 62380 (RDF 2000)

## BIOS/BOOT LOADER

- AMI Aptio UEFI Firmware

## SOFTWARE SUPPORT

- Linux
  - Supported kernel: 4.14.71
  - Yocto BSP
  - Tested with: Yocto BSP (Sumo 2.5, Linux kernel 4.14.71), Ubuntu 20.04 LTS
- 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: [www.duagon.com/products/bl72e/#doc](http://www.duagon.com/products/bl72e/#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/bl72e/#downl](http://www.duagon.com/products/bl72e/#downl)



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