

BL51E

Rugged Box PC for Transportation with Intel Apollo Lake-I Railway & Automotive Embedded Computer for Communication & Control

- » Intel Atom E3900 series
- » Up to 8 GB DDR3 DRAM soldered, ECC
- » 1 HDD/SSD shuttle
- » 4 Gb Ethernet ports
- » 4 PCI Express Mini Card slots with micro-SIM slots
- » WLAN, 4G LTE, GPS or GLONASS
- » 2 USB 2.0, 2 DisplayPort, 1 CAN, 4 UARTs
- » 24 and 36 VDC nom. class S2 PSU, with ignition
- » -40 °C to +70 °C (+85 °C), fanless
- » Conformal coating of internal components
- » EN 50155 compliant (railways)
- » ISO 7637-2 compliant (E-mark for automotive)



For IoT or Storage-Intensive Applications

The BL51E is a fanless, maintenance-free box computer for embedded applications in transportation, e.g., in trains, buses or commercial vehicles. Its HDD/SSD shuttle provides the storage capacity necessary for entertainment servers or video surveillance systems. A vast number of I/O functions and options seamlessly link the BL51E to the IoT, making vehicles smart.

A Multi-Talent for Wireless Communication

The BL51E can take over typical on-board wireless functions, whether it is an Internet connection for passengers or locating the vehicle. A GNSS positioning interface supporting GPS and GLONASS is available. Four PCI Express Mini Card slots each with two micro-SIM slots and dual SIM support provide maximum flexibility in implementing mobile service standards up to 4G LTE or WLAN/WLAN IEEE 802.11, and derivatives.

Solid Processing Performance

The BL51E is powered by an Intel Atom E3950 running at 1.6 GHz. Other dual/quad core processors of the Intel Atom E3900 series can be used, giving high scalability in CPU performance. The box PC features 8 GB DDR3 SDRAM and offers an SD card and a SATA HDD/SSD shuttle both accessible at the rear, plus in-system eMMC memory.

Fanless Operation for Mobile Applications

The system 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 for the internal electronics and provides conduction cooling.

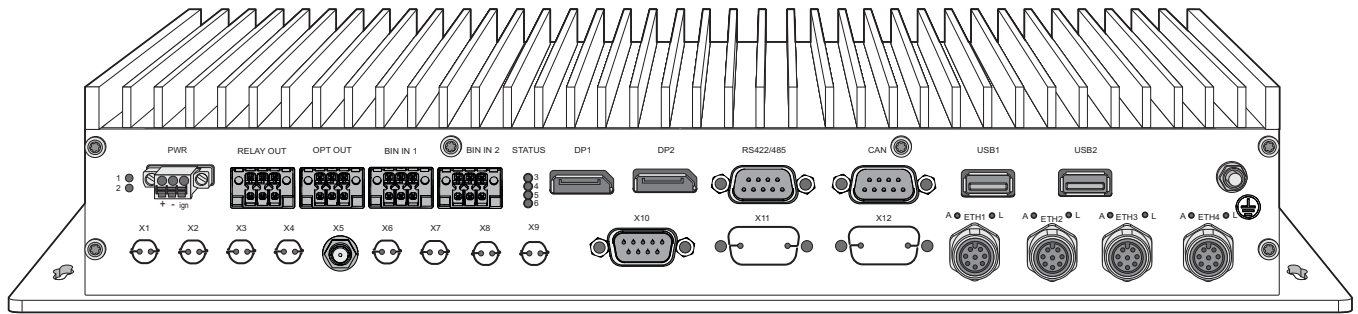
A Multitude of I/O

The BL51E supports two DisplayPort interfaces with maximum 4K resolution. A multitude of other I/O is available at the front, including four Gigabit Ethernet, two of them with PoE+ capability, two USB 2.0, one slot for legacy serial I/O (RS232) and one CAN bus, general purpose inputs and relay outputs.

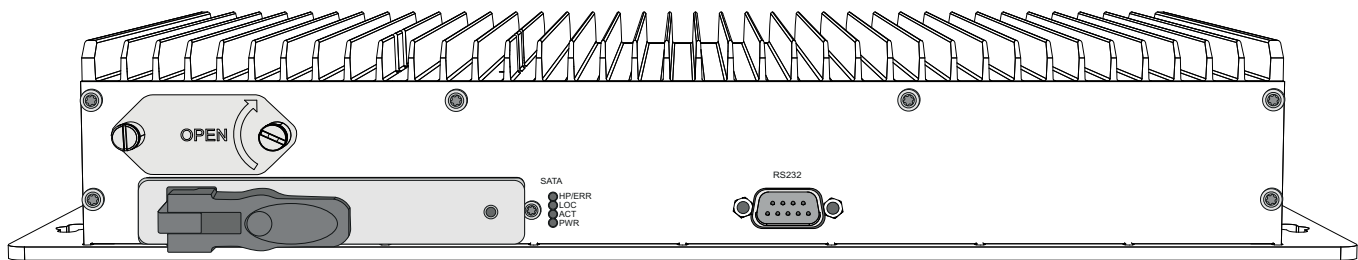
Railway-Compliant PSU with Ignition Function

The BL51E comes with its own integrated class S2 wide range power supply and is in compliance with EN 50155 and ISO 7637-2 (E-mark for automotive). Standard versions support 30 W with 24 V DC nom. (10 V to 50.4 V), and 110 V DC nom. is available as an option. The power can be switched on and off using an ignition signal on the power connector, and a run-down time after switching off the ignition signal can be adjusted by software.

Front View



Rear View



CPU

- The following CPU types are supported:
 - Intel Atom x5-E3930, dual core, 1.3 GHz, 6.5 W (on request)
 - Intel Atom x5-E3940, quad core, 1.6 GHz, 9.5 W (on request)
 - Intel Atom x7-E3950, quad core, 1.6 GHz, 12 W

Memory

- System RAM
 - Soldered DDR3, ECC
 - 8 GB max.

Security

- TPM (Trusted Platform Module 2.0)

Mass Storage

- The following mass storage devices can be assembled:
 - HDD/SSD 2.5" (SATA, via external shuttle)
 - SD card
- The following mass storage devices are assembled:
 - eMMC (soldered); 32 GB

Graphics

- Processor graphics
- Maximum resolution: 4096x2160 pixels @ 60 Hz, 24 bpp (DisplayPort 1.2a)

Wireless Functionality

- Possible wireless functions:
 - GNSS
 - LTE
 - WLAN

Power Over Ethernet (on request)

- PSE (Power Sourcing Equipment)
- Supply classes: 0, 1, 2, 3, 4
- Number of powered devices: 2 max. (30.8 W max. total)

Interfaces

- Video
 - 2x DisplayPort
- Audio
 - 1x, D-Sub, 9-pin, plug
 - Stereo line output, differential
- USB
 - 2x USB 2.0, Type A
- Ethernet
 - 4x 10/100/1000BASE-T, M12, X-coded, receptacle
 - Power over Ethernet PSE support on two ports (on request)
- PCI Express Mini Card
 - 4x PCI Express Mini Card slot
 - Slot A: PCIe Full-Mini; PCIe x1, USB 2.0
 - Slot B: PCIe Full-Mini; PCIe x1, USB 2.0
 - Slot C: PCIe Full-Mini; USB 2.0
 - Slot D: PCIe Full-Mini; USB 2.0
- SIM card
 - 8x micro-SIM card slot, internally accessible
- Digital I/O
 - 7x digital input, isolated, PCB plug, 6-pin
 - 2x relay output, isolated, PCB plug, 6-pin
 - 2x photocoupler, isolated, PCB plug, 6-pin
 - 1x odometer input, isolated, PCB plug, 6-pin
- IBIS slave interface
 - 1x, PCB plug, 6-pin
- GNSS interface
 - 1x, SMA antenna connector
- Serial
 - 1x RS232, non-isolated, D-Sub, 9-pin, plug
 - 1x RS422/RS485, isolated, D-Sub, 9-pin, receptacle
- CAN bus
 - 1x, non-isolated, D-Sub, 9-pin, plug
- Power input
 - 1x power inlet connector
 - Ignition input
 - Earthing connection
- LED
 - Status: board status, power status
 - Ethernet: link, activity
 - User configurable: 4x
- Cutout
 - Antenna connector: RP-SMA receptacle, RP-SMA plug, QMA receptacle, QMA plug, FME receptacle, FME plug
 - D-Sub options: Audio, RS232, RS422/RS484, CAN bus, digital I/O, real-time Ethernet, Profibus, IBIS master

Supervision and Control

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

Electrical Specifications

- Supply voltages
 - 24 V DC and 36 V DC nom. (EN 50155)
 - 48 V DC nom. (EN 50155)
 - 72 V DC nom. (EN 50155)
 - 110 V DC nom. (EN 50155)
 - 24 V DC nom. (ISO 7637-2)
 - Power interruption class S2 (10 ms) (EN 50155)

Mechanical Specifications

- Dimensions
 - (W) 390 mm, (D) 215 mm, (H) 66 mm
- Weight
 - Approx. 4.25 kg (box PC in standard housing)
 - Approx. 5.5 kg (box PC in 19" insertion frame)
- Protection rating
 - IP20 (IEC 60529)
 - Other IP protection classes possible on request

Environmental Specifications

- Temperature range (operation)
 - -40°C to +70°C, with up to +85°C for 10 minutes according to class TX (EN 50155)
- Temperature range (storage): -40°C to +85°C
- Cooling concept
 - Fanless operation, natural convection
- Humidity: EN 50155:2007 (+25/+55 °C, 90-100 %)
- Altitude: -300 m to +3000 m
- Shock: EN 61373:2010
 - Vehicle body (Cat.1, class B: 50 m/s²/30 ms)
- Vibration: EN 61373:2010
 - Vehicle body (Cat.1, class B: 10 min @ 1.01 m/s² and 5 h @ 5.72 m/s²)
 - Vehicle body (Cat.1, class A: 10 min @ 0.75 m/s² and 5 h @ 4.25 m/s²)

Reliability

- MTBF: 186 024 h @ 40°C according to IEC/TR 62380 (RDF 2000) (model 09BL51E00)

Safety

- Electrical Safety
 - EN 50155:2007
 - EN 50153:2014
 - EN 50124-1:2001 + A1:2003 + A2:2005
- Fire Protection
 - EN 45545-2:2013 + A1:2015, hazard level HL3 (railway)
 - ECE R118 (automotive)

EMC

- Railway
 - EN 50121-3-2:2015 (radiated emission)
 - EN 50121-3-2:2015 (conducted emission)
 - EN 50121-3-2:2015 (immunity)
- Automotive
 - ECE R10 Rev.5 (radiated emission)
 - ECE R10 Rev.5 (conducted emission)
 - ECE R10 Rev.5 (immunity)

BIOS

- AMI Aptio UEFI Firmware

Software Support

- Windows
 - Windows 10 IoT Enterprise
- Linux
- For more information on supported operating system versions and drivers see Software.

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