

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 +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.

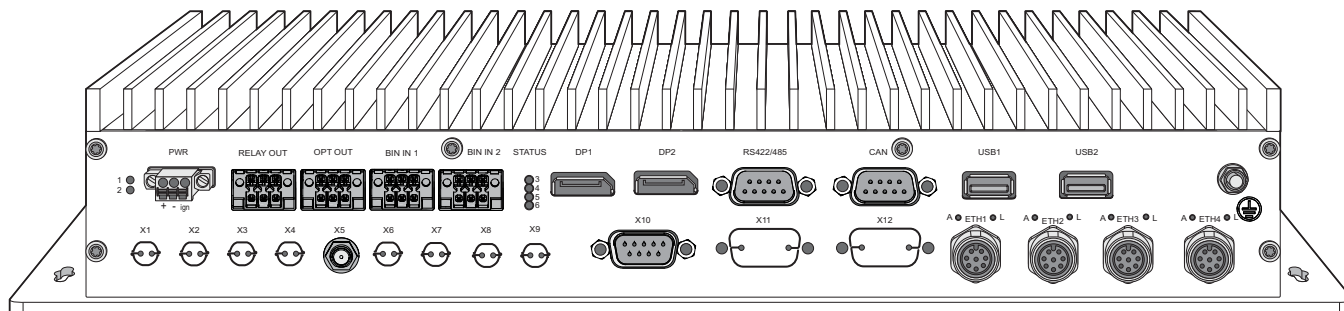
A Multitude of I/O

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.

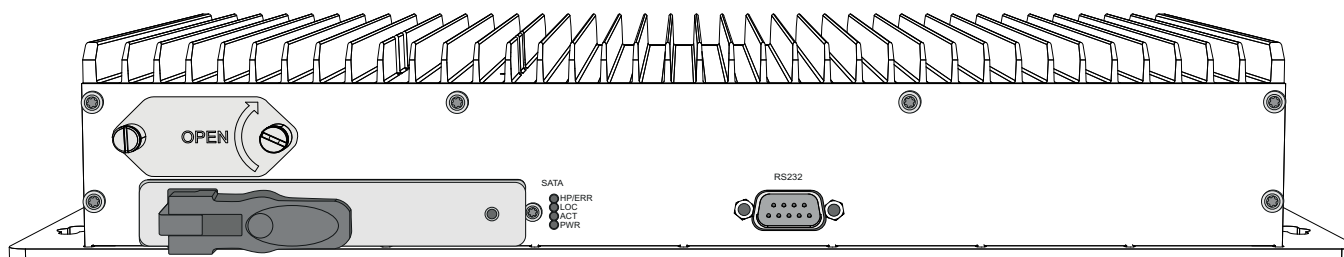
Railway-Compliant PSU with Ignition Function

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 VDC nom. (10 V to 50.4 V), and 110 VDC 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 power 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 Memory
 - Soldered DDR3, ECC
 - 8 GB max.

Mass Storage

- The following mass storage devices can be assembled:
 - SSD 2.5" (SATA)
 - SD card
 - HDD 2.5" (SATA)
- The following mass storage devices are assembled:
 - eMMC (soldered); 16 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)

Front Interfaces

- Video
 - Two DisplayPort connectors
- Audio
 - One 9-pin D-Sub connector
 - Audio line out
- USB
 - Two Type A connectors, host, USB 2.0
- Ethernet
 - Four 8-pin M12 connectors, X-coded, 1000BASE-T
 - Two link and activity LEDs per channel
 - Two ports with Power Over Ethernet (PoE) (on request)
- Digital inputs
 - Two 6-pin PCB plugs
 - Input voltage range: 0 V to 50.4 VDC, independent of the power supply input voltage
 - Electrically isolated
- Relay outputs
 - One 6-pin PCB plug
 - Two relay outputs
 - Electrically isolated
- Photocoupler outputs
 - One 6-pin PCB plug
 - Two photocoupler outputs
 - Used as shutters
 - Electrically isolated
- Odometer input
 - One 6-pin PCB plug
 - Electrically isolated
- IBIS slave interface
 - One 6-pin PCB plug
 - Electrically isolated
- GNSS interface
 - One SMA antenna connector
- Antenna connections (optional)
 - Eight antenna connector cutouts
 - Two for each wireless interface card
- Legacy serial I/O (optional)
 - Two D-Sub connector cutouts
 - For SA-Adapters for RS232, RS422/485, IBIS
- RS422/485
 - One 9-pin D-Sub connector
 - Full or half duplex
 - Electrically isolated
- CAN bus
 - One 9-pin D-Sub connector
 - Non-isolated
- Status LED
 - Two system status LEDs
 - Four user LEDs
- Power supply
 - One power inlet connector

In-System Interfaces

- PCI Express Mini Card
 - Four PCI Express Mini Card slots
 - Slot A: Full-Mini; PCIe, USB 2.0
 - Slot B: Full-Mini; PCIe, USB 2.0
 - Slot C: Full-Mini; USB 2.0
 - Slot D: Full-Mini; USB 2.0
- SIM card
 - Eight micro-SIM card slots, dual SIM

Rear Interfaces

- SATA
 - One 2.5" SATA HDD/SSD shuttle, SATA Revision 2.x, hot-pluggable
 - Four status LEDs
- SD card slot
- RS232
 - One 9-pin D-Sub connector
 - Non-isolated

Supervision and Control

- System controller
- Real-time clock with supercapacitor backup
 - Data retention of supercapacitor: 72 h
- Ignition input
 - Ignition input on power supply

Electrical Specifications

- Supply voltages
 - 24 V DC and 36 V DC nom. (EN 50155)
 - 24 V DC nom. (ISO 7637-2)
 - 48 V, 72 V, 110 V DC nom. (EN 50155) (on request)
 - Power interruption class S2 (10 ms) (EN 50155)
- Isolation voltage
 - 1500 V DC against shield

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)

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)
- Conformal coating of internal components
- Protection rating
 - IP20 (IEC 60529)
 - Other IP protection classes possible on request

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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www.men.de/products/bl51e/

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