

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.

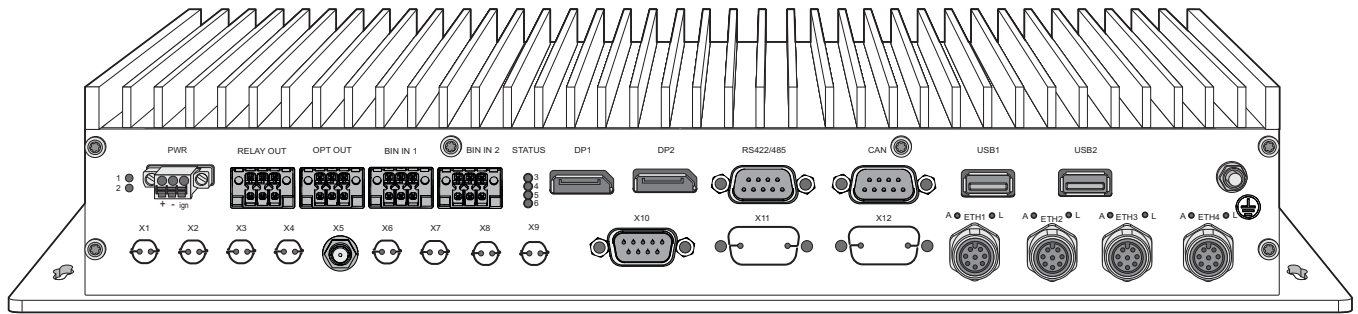
A Multitude of I/O

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.

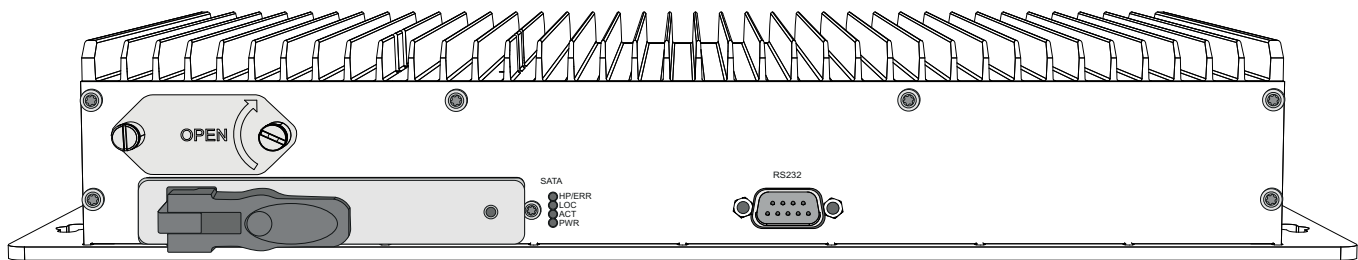
Railway-Compliant PSU with Ignition Function

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.

Germany

MEN Mikro Elektronik GmbH

Neuwieder Straße 3-7
90411 Nuremberg
Phone +49-911-99 33 5-0

sales@men.de
www.men.de

USA

MEN Micro Inc.

860 Penllyn Blue Bell Pike
Blue Bell, PA 19422
Phone 215-542-9575

sales@menmicro.com
www.menmicro.com

France

MEN Mikro Elektronik SAS

18, rue René Cassin
ZA de la Châtelaine
74240 Gaillard
Phone +33-450-955-312

sales@men-france.fr
www.men-france.fr

China

MEN Mikro Elektronik Co., Ltd.

Room 301A, #971 Dongfang Road
200122 Shanghai
Phone +86-21-5058-0963

sales@men-china.cn
www.men-china.cn

Up-to-date information, documentation and ordering information:
www.men.de/products/bl51e/

MEN is not responsible for the results of any actions taken on the basis of information in the publication, nor for any error in or omission from the publication. MEN expressly disclaims all and any liability and responsibility to any person, whether a reader of the publication or not, in respect of anything, and of the consequences of anything, done or omitted to be done by any such person in reliance, whether wholly or partially, on the whole or any part of the contents of the publication.

The correct function of MEN products in mission-critical and life-critical applications is limited to the environmental specification given for each product in the technical user manual. The correct function of MEN products under extended environmental conditions is limited to the individual requirement specification and subsequent validation documents for each product for the applicable use case and has to be agreed upon in writing by MEN and the customer. Should the customer purchase or use MEN products for any unintended or unauthorized application, the customer shall indemnify and hold MEN and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim or personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that MEN was negligent regarding the design or manufacture of the part.

In no case is MEN liable for the correct function of the technical installation where MEN products are a part of.

© 2018 MEN Mikro Elektronik GmbH