Basicline 2 compact box PC

User manual

UM EN BL2 BPC 1501

PHOENIX CONTACT
INSPIRING INNOVATIONS

User manual

Basicline 2 compact box PC

UM EN BL2 BPC 1501, Revision A 2019-11-27

This user manual is valid for:

Designation	Version	Order No.
BL2 BPC 1501S		1130682
BL2 BPC 1501S-W		1141904
BL2 BPC 1501E		1130669
BL2 BPC 1501E-W		1141843
BL2 BPC 1501E-64-W10		1158241
BL2 BPC 1501E-W-64-W10		1158252
BL2 BPC 1501E-128-W10		1158235
BL2 BPC 1501E-W-128-W10		1158245
BL2 BPC 1501E-64-W10-T		1158247
BL2 BPC 1501E-W-64-W10-T		1158244
BL2 BPC 1501E-128-W10-T		1158243
BL2 BPC 1501E-W-128-W10-T		1158231

4038_en_A

PHOENIX CONTACT GmbH & Co. KG • Flachsmarktstraße 8 • 32825 Blomberg • Germany
phoenixcontact.com

Table of contents

1 For your safety

Read this user manual carefully and keep it for future reference.

1.1 Labeling of warning notes

This symbol indicates hazards that could lead to personal injury.

There are three signal words indicating the severity of a potential injury.

DANGER
Indicates a hazard with a high risk level. If this hazardous situation is not avoided, it will result in death or serious injury.

WARNING
Indicates a hazard with a medium risk level. If this hazardous situation is not avoided, it could result in death or serious injury.

CAUTION
Indicates a hazard with a low risk level. If this hazardous situation is not avoided, it could result in minor or moderate injury.

This symbol together with the **NOTE** signal word alerts the reader to a situation which may cause damage or malfunction to the device, hardware/software, or surrounding property.

Here you will find additional information or detailed sources of information.

1.2 Qualification of users

The use of products described in this manual is oriented exclusively to electrically skilled persons or persons instructed by them. The users must be familiar with the relevant safety concepts of automation technology as well as applicable standards and other regulations.

1.3 Field of application of the product

1.3.1 Intended use

The products described in this document are designed for use in manufacturing and industrial environments.

The products are built according to the latest safety requirements. However, dangerous situations or damage to the products or other property can arise from misuse of this device.

The products fulfill the requirements of the EMC directives and harmonized European standards Any modifications to the systems can influence the EMC behavior.

The device contains valuable recyclable materials, which should be utilized. The electronic circuit board is fitted with a lithium battery.

Dispose of the device separately from other waste, i.e., via an appropriate collection site.

Radio interference

These products are Class A items of equipment (EN 61000-6-4). When using the equipment in residential areas, it may cause radio interference. In this case, the operator is obligated to implement appropriate measures.

1.3.2 Product changes

Changes or modifications to hardware and software of the device are not permitted.

Incorrect operation or modifications to the device can endanger your safety or damage the device. Do not repair the device yourself. If the device is defective, please contact Phoenix Contact.

2 Overview and ordering data

2.1 Description

The BL2 BPC 15… is a small footprint, configurable box PC (BPC). The small footprint allows it to be placed in applications where larger PCs do not fit or are not applicable.

Features

- Compact, IP30 housing
- Fanless design
- Intel® Celeron® N3350 processor
- DIN rail- and wall-mount options
- Two integrated RJ45 Ethernet ports
- DisplayPort for visual applications
- Optional configurable COM ports
- Optional WLAN capabilities

2.2 Ordering data

Products

Description	Type	Order No.	Pcs./Pkt.
Industrial box PC, Intel® Celeron® processor N3350 1.10/2.40 GHz, fanless, IP30, 32 GB eMMC data storage	BL2 BPC 1501S	1130682	1
Industrial box PC, Intel® Celeron® processor N3350 1.10/2.40 GHz, fanless, 32 GB eMMC data storage, IP30, WLAN	BL2 BPC 1501S-W	1141904	1
Industrial box PC, Intel® Celeron® processor N3350 1.10/2.40 GHz, fanless, 32 GB eMMC data storage, 2x COM ports, IP30	BL2 BPC 1501E	1130669	1
Industrial box PC, Intel® Celeron® processor N3350 1.10/2.40 GHz, fanless, 32 GB eMMC data storage, 2x COM ports, IP30, WLAN	BL2 BPC 1501E-W	1141843	1
Industrial box PC, Intel® Celeron® processor N3350 1.10/2.40 GHz, fanless, 32 GB eMMC data storage, 64 GB M.2 SSD, 2x COM ports, IP30, Windows 10 Enterprise 2019 LTSC operating system	BL2 BPC 1501E-64-W10	1158241	1
Industrial box PC, Intel® Celeron® processor N3350 1.10/2.40 GHz, fanless, 32 GB eMMC data storage, 64 GB M.2 SSD, 2x COM ports, IP30, WLAN, Windows 10 Enterprise 2019 LTSC operating system	BL2 BPC 1501E-W-64-W10	1158252	1
Industrial box PC, Intel® Celeron® processor N3350 1.10/2.40 GHz, fanless, 32 GB eMMC data storage, 128 GB M.2 SSD, 2x COM ports, IP30, Windows 10 Enterprise 2019 LTSC operating system	BL2 BPC 1501E-128-W10	1158235	1

Products

Description	Type	Order No.	Pcs./Pkt.
Industrial box PC, Intel® Celeron® processor N3350 1.10/2.40 GHz, fanless, 32 GB eMMC data storage, 128 GB M.2 SSD, 2x COM ports, IP30, WLAN, Windows 10 Enterprise 2019 LTSC operating system	BL2 BPC 1501E-W-128-W10	1158245	1
Industrial box PC, Intel® Celeron® processor N3350 1.10/2.40 GHz, fanless, 32 GB eMMC data storage, 128 GB M.2 SSD, 2x COM ports, IP30, Windows 10 Enterprise 2019 LTSC operating system, Trusted Platform Module (TPM)	BL2 BPC 1501E-64-W10-T	1158247	1
Industrial box PC, Intel® Celeron® processor N3350 1.10/2.40 GHz, fanless, 32 GB eMMC data storage, 64 GB M.2 SSD, 2x COM ports, IP30, WLAN, Windows 10 Enterprise 2019 LTSC operating system, Trusted Platform Module (TPM)	BL2 BPC 1501E-W-64-W10-T	1158244	1
Industrial box PC, Intel® Celeron® processor N3350 1.10/2.40 GHz, fanless, 32 GB eMMC data storage, 128 GB M.2 SSD, 2x COM ports, IP30, Windows 10 Enterprise 2019 LTSC operating system, Trusted Platform Module (TPM)	BL2 BPC 1501E-128-W10-T	1158243	1
Industrial box PC, Intel® Celeron® processor N3350 1.10/2.40 GHz, fanless, 32 GB eMMC data storage, 128 GB M.2 SSD, 2x COM ports, IP30, WLAN, Windows 10 Enterprise 2019 LTSC operating system, Trusted Platform Module (TPM)	BL2 BPC 1501E-W-128-W10-T	1158231	1

Accessories

Description	Type	Order No.	Pcs./Pkt.
Mount, wall bracket	BL2 BPC 1500 WALL MOUNT KIT	1147655	1
Mount, DIN rail bracket	BL2 BPC 1500 DIN RAIL KIT	1147464	
Service socket with USB (socket/plug), type A with 0.6 m cable	SI-SES-U1A/0,6	1404514	1
Adapter, DisplayPort to VGA video adapter	DP to VGA ADPTR	2400173	1
Adapter, DisplayPort to DVI-I video adapter	DP to DVI ADPTR	2400174	1
Cable, DisplayPort to DisplayPort, 2 m	VL 2.0M DP CABLE	2404774	1

Visit phoenixcontact.net/products for available accessories

Replacement parts

Description	Type	Order No.	Pcs./Pkt.
Connector, printed circuit board connector	MC 1,5/ 2-STF-3,5	1847055	1

2.3 Dimensions

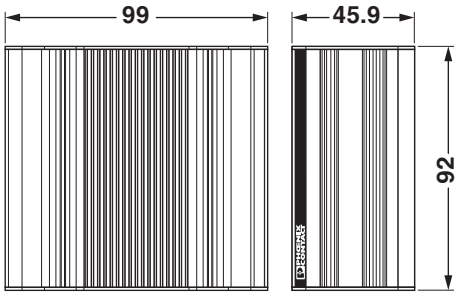


Figure 2-1 BL2 BPC 1501S… dimensions

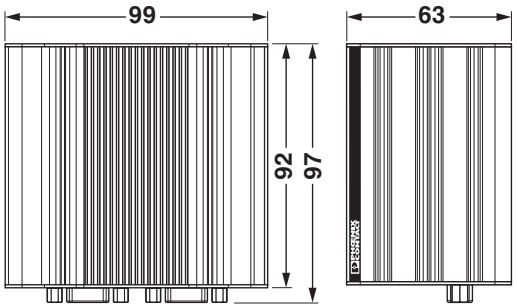


Figure 2-2 BL2 BPC 1501E… dimensions

3 Installation

3.1 Mounting

The BL2 BPC 15… can be mounted on a wall or NS35 DIN rail. Use the appropriate section below to mount the BL2 BPC 15….

NOTE:

Install the BL2 BPC 15… with adequate clearance around the heat sink to provide sufficient air flow such that ambient temperatures do not exceed the operating limits. Install cooling fan(s) in the enclosure, if necessary.

Connectors and switches must be accessible. A wall panel thickness of 1.9 mm (14 ga.) is required for correct mounting with IP65 protection.

When installing the BL2 BPC 15… in a cabinet, follow these general rules:

– Verify clearances within the cabinet. Typically, leave at least 5 cm (2 in.) on each side with 12.7 cm (5 in.) on the connector side.
– Drill all holes wand make all cuts before beginning installation. Be sure to protect already installed components from shavings during this procedure.
– Supporting panels must be at least 14 ga. to provide proper support.

3.1.1 Wall mount

The wall mount kit (Order no. 1147655) The BL2 BPC 15… can be attached to a flat surface in a wall-mount orientation using the four key holes. The mounting surface must be flat and not subject to vibration.

Installation

1. Place the wall brackets on the back of the PC.

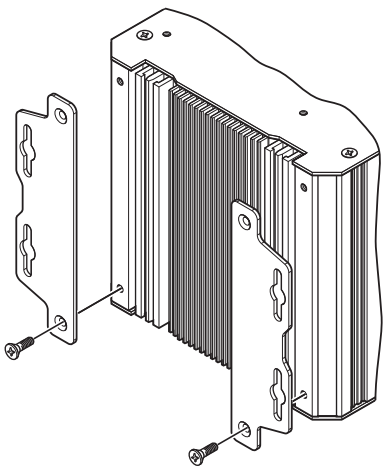


Figure 3-1 Wall bracket installation (BL2 BPC 1501S… shown)

2. Attach the two brackets to the BL2 BPC 15… using the included M3x5 screws. Torque the screws to 0.5 Nm.

NOTE:
Improper torque may damage the threads in the aluminum housing.

3. Use the BL2 BPC 15… as a template (or refer to Figure 3-2) and mark the locations of the mounting holes on the mounting surface.

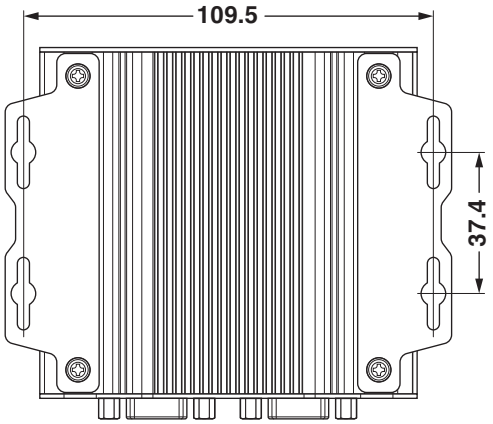


Figure 3-2 Wall-mount dimensions

4. Use the correct anchor type for the mounting surface and securely attach the BL2 BPC 15… to the wall. Ensure the attaching hardware is in the small section of the mounting holes.

DIN rail mount

The DIN rail mounting kit must be ordered separately (Order no. 1147464).

1. Install the mounting bracket on the BL2 BPC 15… with the included M3x5 screws so the connectors will be oriented downward after installation. Torque the screws to 0.5 Nm.

NOTE:
Improper torque may damage the threads in the aluminum housing.

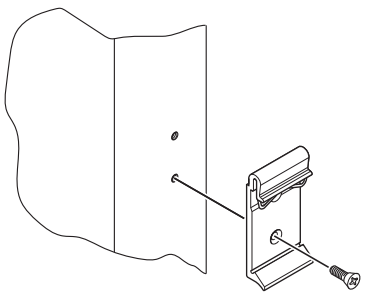


Figure 3-3 DIN rail mounting bracket

2. Angle the BL2 BPC 15… to the top edge of the mounting plate hangs on the top edge of the DIN rail (A).

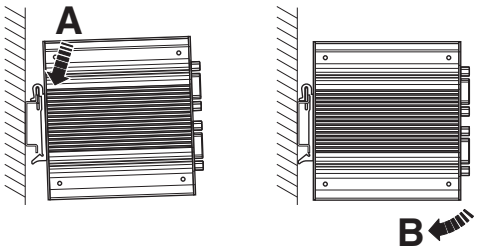


Figure 3-4 Installation on a DIN rail

3. Rotate the BL2 BPC 15… down against the lower edge of the DIN rail (B). Press in until the latch snaps closed.
4. Secure the device on the rail with rail clamps.
5. If necessary to remove, push down on the top of the unit and then tilt out.

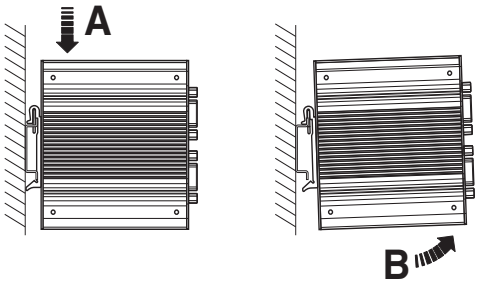
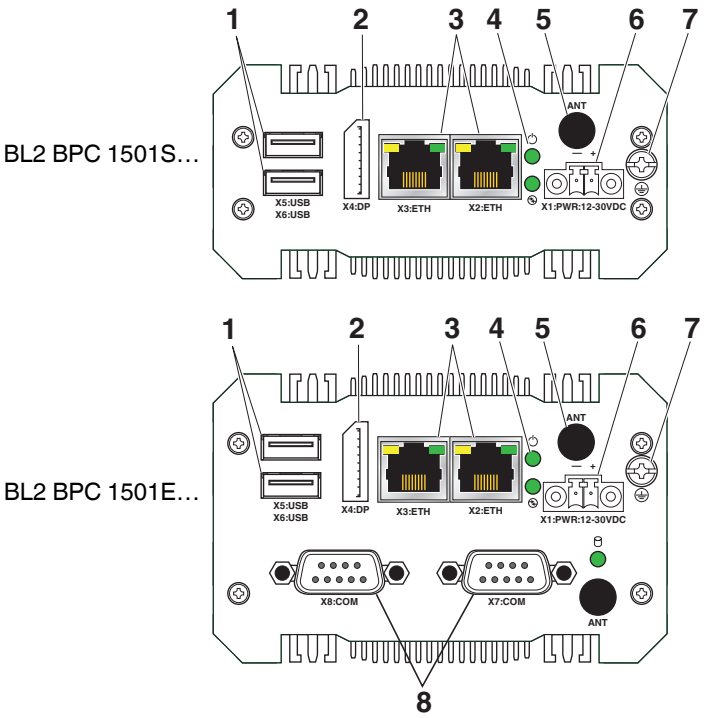


Figure 3-5 Removal from a DIN rail

3.2 Interfaces



1	USB ports	**5**	Antenna (BL2 BPC 1501…W… only)
2	DisplayPort connector	**6**	Power connector
3	Ethernet RJ45 ports	**7**	Earth/ground lug
4	LEDs	**8**	COM ports (BL2 BPC 1501E…)

Figure 3-6 Connectors and ports

After mounting the BL2 BPC 15…, make any necessary cable connections (see Figure 3-6).

The available connectors are:

– USB (USB): USB devices connect using Type A connectors. Both ports are USB 3.0 ports.

USB 3.0 ports utilize a blue connector.

– DisplayPort (DP): This port connects the BL2 BPC 15… to external digital displays with a corresponding DP++ connector
– Ethernet (ETH): Two RJ45 connectors allow the computer to communicate on a 10/100/1000 Base-T Ethernet network.
– Serial (COM): Two D-SUB 9 serial ports (BL2 BPC 1501E… only) are for serial communication. **X8: COM** may be configured as either RS-422, RS-485, or 5-wire RS-232, (see “Serial communication (BL2 BPC 1501E… only)” on page 16).

Eternal display

External displays can be connected to the DP++ port of the BL2 BPC 15…. The BL2 BPC 15… supports three external displays.

3.2.1 Power connection

A removable connector is provided for connecting power to the BL2 BPC 15….

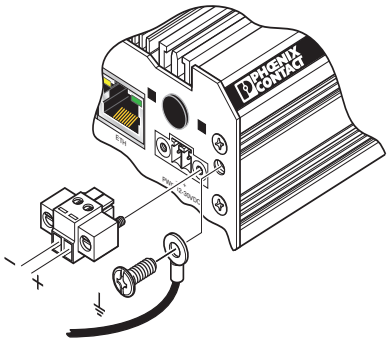


Figure 3-7 Power connection

Connect a power source to the two-position removable connector. The connector accepts wire sizes from 0.2 to 2.5 mm^2 (24 to 12 AWG). Torque the wire-retaining screws in the connector to 0.5 Nm (4.4 lb_f-in.).

A ground screw allows connection of the chassis to an earth/ground point.

Connect the BL2 BPC 15… to a 12 to 30 V DC power supply.

NOTE:

To ensure safe operation, use safety extra-low voltage (SELV) according to DIN EN 61131 as a supply voltage.

This device is protection class I item of equipment.

BIOS is set to boot on power, allowing the system to boot as soon as the power plug is installed. This can be changed in the BIOS.

3.2.2 Antenna installation

BL2 BPC 1501…W… models includes a factory-installed mini PCIe card and antenna (1) for wireless communication that connects to an antenna port (2).

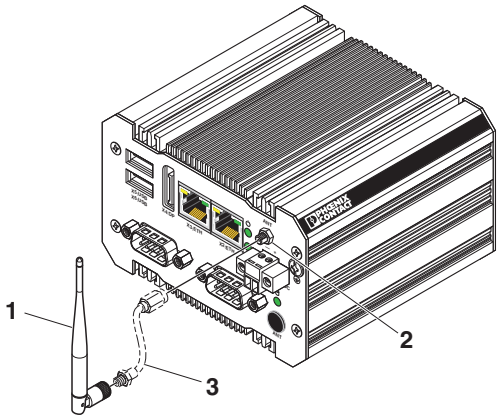


Figure 3-8 Antenna installation

Since the BL2 BPC 15… is often installed within an enclosure, it may be advisable to install the antenna on the exterior of the enclosure rather than directly on the IPC. To do this an appropriate length antenna cable (3) must be purchased separately.

The antenna or antenna threads onto the BL2 BPC 15…. For external antenna mounting, route and secure the antenna cable appropriately within the enclosure.

3.2.3 Serial communication (BL2 BPC 1501E… only)

The D-SUB 9 connectors can be configured to support RS-422, RS-485, or 5-wire RS-232 physical layer signal levels. The physical layer is set using the UEFI setup accessed during the boot sequence (see “Configurable D SUB-9 connector” on page 19.

The function of the pins in the D-SUB 9 connector varies with the different configuration settings.

Table 3-1 D-SUB 9 pinout

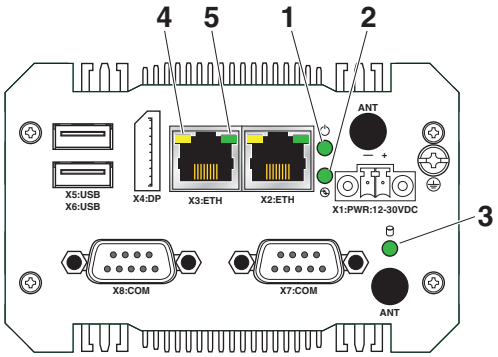
D-SUB 9 pin	RS-232[1]	RS-422	RS-485
1	–	TXD-	TXD-/RXD-
2	RXD	TXD+	TXD+/RXD+
3	TXD	RXD+	–
4	–	RXD-	–
5	GND	GND	GND
6	–	–	–
7	RTS	–	–
8	CTS	–	–
9	Wake on ring	Wake on ring	Wake on ring

1 This is a limited, 5-wire implementation of the RS-232 standard.

4 Operation

4.1 LED operation

Three LEDs provide information on the operating status of the BL2 BPC 15….



LED locations (BL2 BPC 1501E-WLAN shown)

Table 4-1 Device LED indicators

	LED	Indication	Description
1	PWR	Green	When 24 V DC is applied and the power switch is turned on
		Off	No power available or outside of the specified range
2	RUN	Flashes green	Programmable
3	HDD (BL2 BPC 1501E… only)	Flashes green	Indicates data storage activity

Table 4-2 Ethernet port LED indicators

		Status	Description
1	Activity Link	Off	No link
		Solid orange	Linked
		Flashing orange	Active data transfer
2	Speed	Off	10 Mbps connection
		Orange	100 Mbps connection
		Green	1000 Mbps connection

5 Maintenance

NOTE: Electrostatic discharge

Electrostatic discharge can damage or destroy components. When handling, observe the necessary safety precautions against electrostatic discharge (ESD) according to EN 61340-5-1 and IEC 61340-5-1.

5.1 UEFI

The UEFI configures the software to match the hardware contained in the industrial PC.

NOTE:

Changing UEFI parameters can lead to system instability and data loss. Therefore, it is recommended that only advanced users modify the UEFI settings

To access the UEFI setup utility, there must be an actual (physical) keyboard attached to one of the USB ports.

During the boot process, press the <F2> or <Delete> key continually before the operating system initiates. Once the main screen appears, follow the prompts. Use the arrow keys to navigate to the desired area.

5.1.1 Configurable D SUB-9 connector

1. During the power up process, press the <F2> or <Delete> key until the UEFI interface appears.
2. Navigate to the “Configuration/Super IO Configuration/Transceiver Mode” menu and follow the prompts.

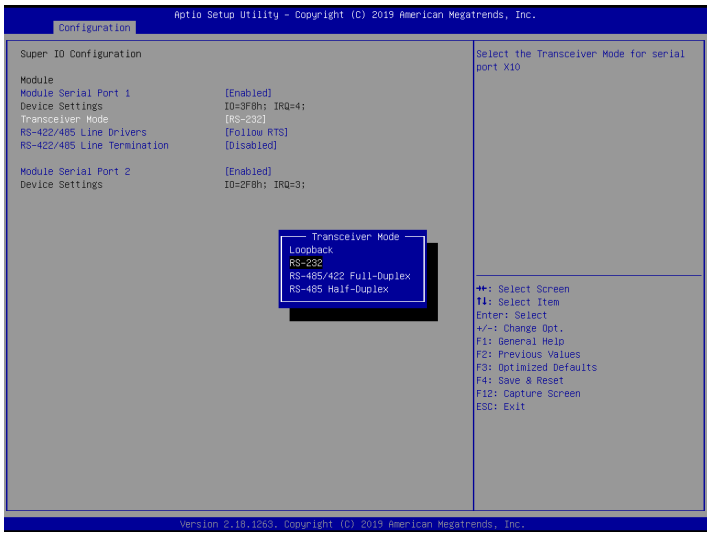


Figure 5-1 “Configuration/Super IO Configuration/Transceiver Mode” selection

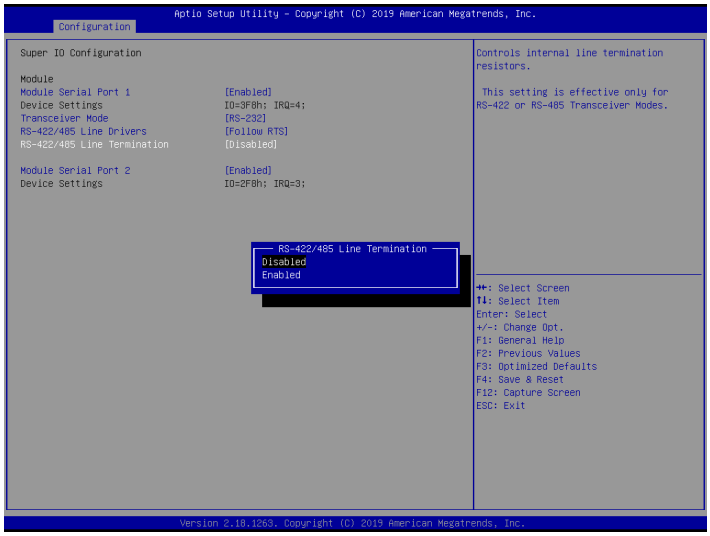


Figure 5-2 “Line Termination” settings

3. Make sure to adjust the RS-422/485 line driver settings accordingly.
4. When finished, save the changes and reboot the system.

A Technical appendix

A 1 Technical data

General data	
Overall, dimensions (width x height x depth)*	
BL2 BPC 1501S...	99 x 92 x 46 mm
BL2 BPC 1501E...	99 x 92 x 63 mm
Ambient temperature (operation)	0 … 50°C
Ambient temperature (storage/transport)	-40 … 85°C
Permissible humidity (relative)	5% … 85%, non-condensing
Weight	
BL2 BPC 1501S...	0.55 kg
BL2 BPC 1501E...	0.65 kg
Degree of protection	IP30
Mounting	Wall or DIN rail
LED indicators	Power, SATA, Run, Error

* Dimensions are overall, including bezel

Electrical data	
Power supply, nominal	12 … 30 V DC
Type of connection	Removable screw-type and screw lug
Conductor size	0.2 … 2.5 mm² (24 … 12 AWG)
Torque, wire clamping screw	0.5 … 0.6 Nm
RTC battery, typical life	BR2032, 5 years

Current and power data	
Current consumption @ 24 V*	
Typical	0.53
Maximum	0.70 A
Power, maximum @ 24 V*	
Typical	12.7 W
Maximum	16.8 W

* Windows 10, 32 GB M.2 drive, 4 GB RAM, loopback plugs in RS-232 and LAN ports, USB ports fully loaded, running Burn-in® tests at 100%

Operating systems	
Operating system (configuration option)	Windows® 10 IoT Enterprise LTSC 2019

Data storage	
Type (configurable option)	EMMC 32 GB
	Optional internal M.2 SSD
Number of bays	1
RAID support	None

Main memory	
RAM	
BL2 BPC 1501S...	2 GB LPDDR4
BL2 BPC 1501E...	4 GB LPDDR4

Processor data	
Processor	Intel Celeron N3350
Clock speed	1.10 GHz 2.40 GHz burst
Cache	2 MB
Number of cores	2
Number of threads	2
Maximum TDP	6 W
Number of memory channels	2

Interfaces	
USB	2x Type A USB 3.0
Serial connection, BL2 BPC 1501E… only	2x D-SUB 9 (male), UEFI selectable for RS-232/422/485*
Video out	1x DP++
Graphic processor	Intel HD Graphics 500
Number of Ethernet connectors	2
Ethernet connection	10/100/1000 Mbps
LAN chipset	2x Intel Ethernet controller i210

* This is a limited implementation of the EIA-232 standard.

Mechanical tests	
Shock test according to IEC 60068-2-27	15g with 11 ms impulse, 18 shocks total
Vibration resistance according to EN 60068-2-6	1g

Conformance with EMC directives
EN 61000-6-4, Class A
EN 61000-6-2

Approvals
CE compliant
FCC (CFR Title 47 Part 15 Subpart B: 2018 Class A)
EN 55022, EN 55024
EN 300 328 V2.2.2; EN 301 893 V2.1.1; EN 301 4899-1 V2.1.1; EN 301 489-17 V3.1.1

B Appendixes

B 1 List of figures

Section 2

Section 3

Section 5

B 2 List of tables

Section 3

Section 4

Please observe the following notes

General terms and conditions of use for technical documentation

Phoenix Contact reserves the right to alter, correct, and/or improve the technical documentation and the products described in the technical documentation at its own discretion and without giving prior notice, insofar as this is reasonable for the user. The same applies to any technical changes that serve the purpose of technical progress.

The receipt of technical documentation (in particular user documentation) does not constitute any further duty on the part of Phoenix Contact to furnish information on modifications to products and/or technical documentation. You are responsible to verify the suitability and intended use of the products in your specific application, in particular with regard to observing the applicable standards and regulations. All information made available in the technical data is supplied without any accompanying guarantee, whether expressly mentioned, implied or tacitly assumed.

In general, the provisions of the current standard Terms and Conditions of Phoenix Contact apply exclusively, in particular as concerns any warranty liability.

Phoenix Contact reserves the right to register its own intellectual property rights for the product identifications of Phoenix Contact products that are used here. Registration of such intellectual property rights by third parties is prohibited.

Other product identifications may be afforded legal protection, even where they may not be indicated as such.

How to contact us

Internet

Up-to-date information on Phoenix Contact products and our Terms and Conditions can be found on the Internet at:
phoenixcontact.com

Make sure you always use the latest documentation.
It can be downloaded at:
phoenixcontact.net/products

Subsidiaries

If there are any problems that cannot be solved using the documentation, please contact your Phoenix Contact subsidiary.
Subsidiary contact information is available at phoenixcontact.com.

Published by

PHOENIX CONTACT GmbH & Co. KG
Flachsmarktstraße 8
32825 Blomberg
GERMANY

PHOENIX CONTACT Development and Manufacturing, Inc.
586 Fulling Mill Road
Middletown, PA 17057
USA

Should you have any suggestions or recommendations for improvement of the contents and layout of our manuals, please send your comments to:
tecdoc@phoenixcontact.com