

**BTC12N-\***

**Box Thin Client for  
Industrial Applications**

**Manual**



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With regard to the supply of products, the current issue of the following document is applicable:  
The General Terms of Delivery for Products and Services of the Electrical Industry, published  
by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elek-  
troindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause:  
"Expanded reservation of proprietorship"

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## 1 History of the Manual

The following editions of the manual have been released:

Version	Comments
07/2022	Addition -N1 (Industrial temperature grade 0 ... 55 °C) variants Adaption description Ethernet port

## 2 Safety

### 2.1 Introduction

#### 2.1.1 Content of this Document

This document contains information that you need in order to use your product throughout the applicable stages of the product life cycle. These can include the following:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Dismounting
- Disposal

**Note**

This document does not substitute the instruction manual.

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**Note**

For full information on the product, refer to the instruction manual and further documentation on the Internet at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

---

**Note**

For specific device information such as the year of construction, scan the QR code on the device. As an alternative, enter the serial number in the serial number search at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

---

The documentation consists of the following parts:

- Present document
- Instruction manual
- Datasheet

Additionally, the following parts may belong to the documentation, if applicable:

- EU-type examination certificate
- EU declaration of conformity
- Attestation of conformity
- Certificates
- Control drawings
- Functional safety manual
- Additional documents

#### 2.1.2 Content of this Document

This document contains information required to use the product in the relevant phases of the product life cycle. This may include information on the following:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting

- Dismounting
- Disposal

**Note**

For full information on the product, refer to the further documentation on the Internet at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

**Note**

For specific device information such as the year of construction, scan the QR code on the device. As an alternative, enter the serial number in the serial number search at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

The documentation comprises the following parts:

- This document
- Datasheet

In addition, the documentation may comprise the following parts, if applicable:

- EU-type examination certificate
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- Certificates
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- Functional safety manual
- Other documents

**2.1.3****Content of this Document**

This document contains information that you need in order to use your product throughout the applicable stages of the product life cycle. These can include the following:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Dismounting
- Disposal

**Note**

This document does not substitute the instruction manual.

**Note**

For full information on the product, refer to the instruction manual and further documentation on the Internet at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

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- Present document
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- Instruction manual
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- EU-type examination certificate
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- Attestation of conformity
- Certificates
- Control drawings
- Functional safety manual
- Additional documents

## 2.1.4 Manufacturer

Pepperl+Fuchs Group Lilienthalstraße 200, 68307 Mannheim, Germany
Internet: <a href="http://www.pepperl-fuchs.com">www.pepperl-fuchs.com</a>

## 2.1.5 Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismantling lies with the plant operator.

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismantling of the product. The personnel must have read and understood the instruction manual and the further documentation.

Prior to using the product make yourself familiar with it. Read the document carefully.

## 2.1.6 Symbols Used

This document contains symbols for the identification of warning messages and of informative messages.

### Warning Messages

You will find warning messages, whenever dangers may arise from your actions. It is mandatory that you observe these warning messages for your personal safety and in order to avoid property damage.

Depending on the risk level, the warning messages are displayed in descending order as follows:



#### **Danger!**

This symbol indicates an imminent danger.

Non-observance will result in personal injury or death.



#### **Warning!**

This symbol indicates a possible fault or danger.

Non-observance may cause personal injury or serious property damage.



#### **Caution!**

This symbol indicates a possible fault.

Non-observance could interrupt the device and any connected systems and plants, or result in their complete failure.

## Informative Symbols

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### Note

This symbol brings important information to your attention.

---



### Action

1. This symbol indicates a paragraph with instructions. You are prompted to perform an action or a sequence of actions.



### 3 Product Description

#### 3.1 Application

The BTC12 is a rugged, industrial strength box thin client optimized for 24/7 operation. The BTC12 has been specially designed for immunity to shock, vibration, and temperatures within an optional extended range of -20°C to +60°C (standard temperature grade) and is characterized by a fanless construction and industrial strength components. This compact, stand alone computer features an N4200 series Intel® Pentium® processor and a modern integrated graphics card. Two DisplayPort™ interfaces support up to two monitors at Ultra HD resolution (4K at 60 Hz), making the BTC12 ideal for monitoring and control applications in factory and process automation.



#### Danger!

User access!

Warning. Do not open the device. The BTC12 is a closed unit with no user-accessible parts.



#### Note

##### Radio interference

This device has been tested and found to comply with the limits for a Class A digital device pursuant to part 15 of the FCC regulations. These limits are designed to provide reasonable protection against harmful interference when the device is used in a commercial environment. This device generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instruction manual, it may cause interference with wireless connections. Operation of this device in a residential area is likely to result in interference that the operator will have to correct at the operator's own expense.

#### Dual Monitor Setup



Figure 3.1 Two monitors with Ultra HD resolution (4K at 60 Hz)

The BTC12 is optimized for modern, Ultra HD-compatible monitors. In a standard scenario, up to two Ultra HD-capable monitors can be connected to the native DisplayPorts™.

The DP++ functionality in the DisplayPort™ interface also allows the connection of monitors with an HDMI interface. Passive DisplayPort™ to HDMI adapter cables can be used and are available as accessories. When using an adapter, the maximum supported resolution is limited to Full HD.

An active DisplayPort™ to HDMI 2.0 adapter is required to connect an Ultra HD-capable monitor or TV through an HDMI 2.0 interface. These adapters are available as accessories.

#### Triple Monitor Setup with DisplayPort™ MST

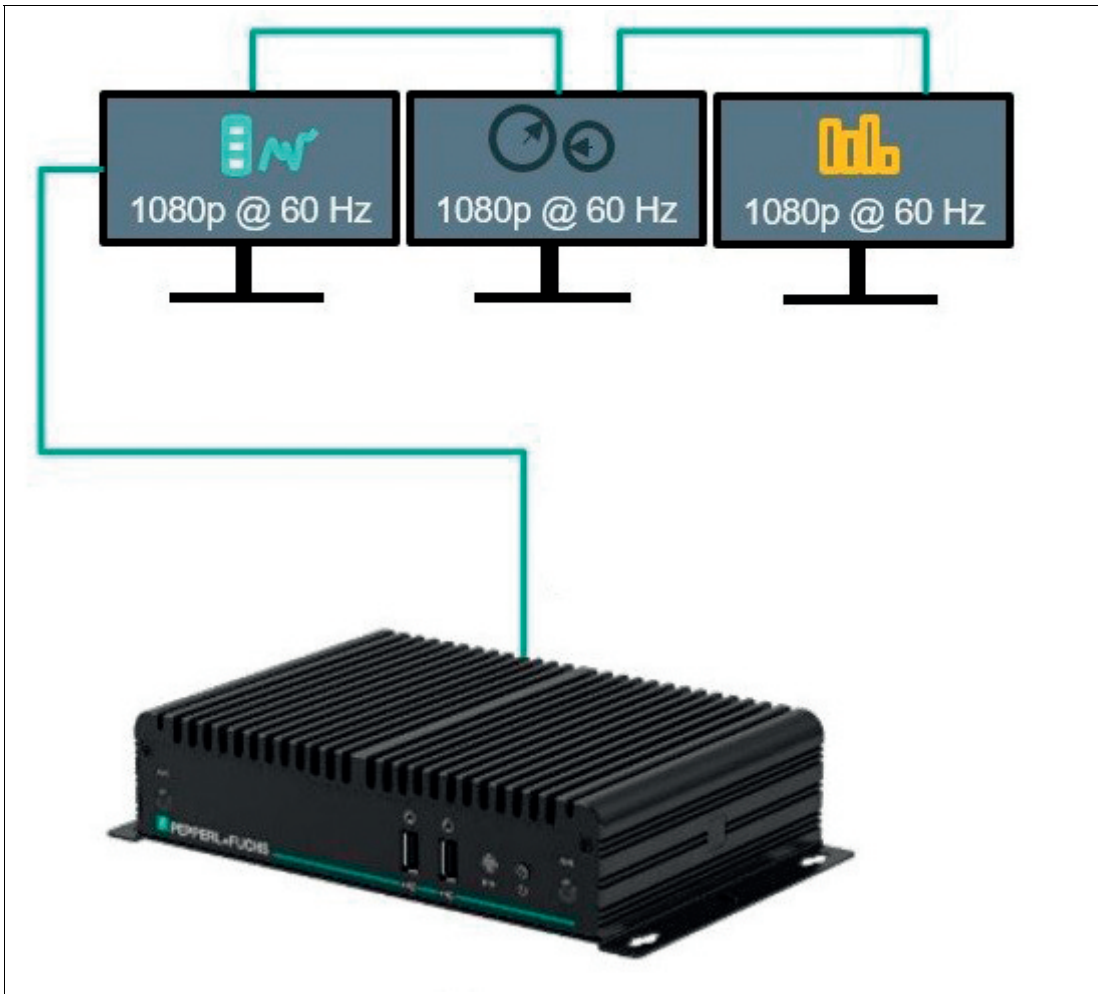


Figure 3.2 Series connection of up to three Multi-Stream Transport (MST) capable DisplayPort™ monitors

DisplayPort™ Multi-Stream Transport (MST) protocol technology allows a series connection of up to three monitors. This requires monitors that have a DisplayPort™ MST hub. Monitor 1 is connected direct to the BTC12 DisplayPort™ and the video signal is connected to monitor 2 and monitor 3 in series.

#### Note

The BTC12 allows a series connection of up to three monitors. When monitors are connected in series from one DisplayPort™, the second DisplayPort™ is disabled.



## 3.2

### UL Information

Suitable for use in CLASS I, DIVISION 2, GROUPS A, B, C and D hazardous locations, or non-hazardous locations only. This equipment is an OPEN-TYPE DEVICE meant to be installed in an enclosure suitable for the environment that is only accessible with the use of a tool.



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**Warning!**

Explosion hazard

Do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous!

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**Warning!**

Danger d'explosion

Ne pas brancher ou débrancher l'appareil sans avoir coupé l'alimentation électrique ou si la zone n'est pas dangereuse !

---

Explanations of symbols related to safety which are used on the equipment. The Audio connector is not for operational or maintenance use in hazardous locations. Use of the Audio connector in hazardous locations could result in an explosion. The RS232 connectors are mechanically secured by screws and the RJ45 connectors are mechanically secured by latching to prevent disconnection.

The device and its input and output circuits must be operated from a power supply that fulfills the requirements of PELV/SELV systems.

### 3.3 Firmware

#### VisuNet RM Shell 6

The VisuNet RM Shell firmware allows the user to easily access applications running on a host system via Ethernet (e.g., workplace PC or server). VisuNet RM Shell 6 is based on Windows® 10 IoT Enterprise 2021 LTSC, an embedded version of Windows® with long-term support that is compatible with the latest versions of popular remote protocols such as RDP 10 and VNC. Using these protocols, the BTC12 and other VisuNet Remote Monitors as well as mobile tablet thin clients can be easily integrated into all major process control systems, whether they are virtual or they depend on conventional, workstation-based setups.

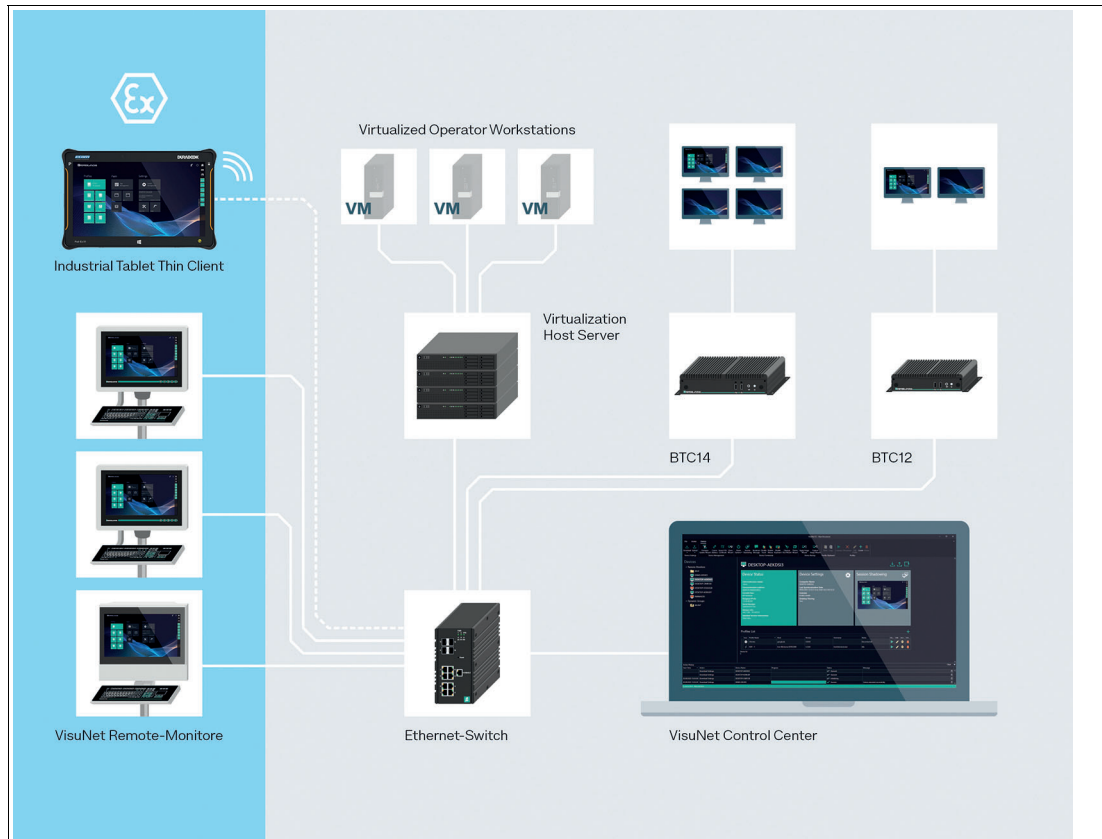


Figure 3.3

The additional VisuNet Control Center (VisuNet CC 6) is a software tool for the centralized management of Pepperl+Fuchs VisuNet Remote Monitors (RMs) and Box Thin Clients (BTCs). The software can be installed on any Windows®-based PC, such as a service Notebook or a virtualized Engineering Workstation. It allows remote setup, management, and maintenance of all RMs and BTCs that are connected to the same network infrastructure.

For more information about using VisuNet RM Shell 6, see the VisuNet RM Shell 6 manual.

#### Note

Visit [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com) regularly to check for the latest version of VisuNet RM Shell.



### ACP ThinManager Ready

As an alternative to the VisuNet RM Shell 6, the BTC12 can also be ordered as ACP ThinManager "Ready" option. The device is qualified, tested and listed with the following parameters:

Make/OEM	Model	OEM Model	Video Chipset	Package Compatibility
Pepperl+Fuchs	BTC12	BTC12	Intel HD Graphics 505	9

Figure 3.4

For further information please refer to the according ACP ThinManager documentation.

[https://kb.thinmanager.com/index.php/Supported\\_Hardware#Pepperl.2BFuchs](https://kb.thinmanager.com/index.php/Supported_Hardware#Pepperl.2BFuchs)

## 3.4 Technical Data



### Note

The standard versions of the BTC12 are BTC12N-GP-TS3-DP-N1 and BTC12N-GP-TS3-DP-N0.

GP-versions are for ordinary locations. D2-versions are for hazardous locations.

GN-versions are not UL listed.

### Hardware

Processor Intel® Apollo Lake N4200 series

RAM 4 GB DDR3L  
**Optional:**  
 PC3: 8 GB DDR3L  
 PC4: 8 GB DDR3L

Mass storage 32-GB eMMC MLC  
**Optional:**  
 PC2: additional 128 GB SSD  
 PC3: additional 240 GB SSD  
 PC4: additional 480 GB SSD

### Supply

Power supply Input voltage: 16 ... 28 V DC  
 Input current: max. 2 A - 1 A  
 Input via 2.5-mm power socket (with double insulation from the mains)

### Interface

Interface type Front side: 2 x USB 2.0, power button, audio line out  
 Back side: 2 x 1000BASE-T Ethernet, 2 x DisplayPort™ 1.2 (supports Ultra HD with 4K at 60 Hz), 1 x DC (DC jack 5.5 x 2.5 mm with lock mechanism), 2 x USB 3.1 (Super Speed), 1 x RS-232/RS-485 with DB-9 connector

### Directive conformity

#### Electromagnetic compatibility

Directive 2014/30/EU EN 61326-1:2013  
 EN 55032:2015, AC:2016

#### RoHS

Directive 2011/65/EU (RoHS) EN 50581:2012

Software	
Operating system	VisuNet RM Shell 6.x (based on Microsoft® Windows® 10 IoT Enterprise 2021 LTSC <b>Optional:</b> TTR: ACP Thin Manager ready PC2: Windows® 10 IoT 2016 LTSC PC3 and PC4: Windows® 10 IoT 2019 LTSC

Ambient conditions	
Operating temperature	<b>Temperature classes:</b> N1: Industrial temperature grade 0° ... 55° C (32 ... 131 °F) N0: Standard temperature grade -20 ... 60 °C (-4 ... 140 °F)
Storage temperature	-20 ... 60 °C (-4 ... 140 °F)
Relative humidity	≤ 95% at 40°C (non-condensing acc. to EN 60068-2-78)
Shock resistance	40 g (11 ms) when operating
Vibration resistance	3 g <sub>rms</sub> 5 ... 500 Hz

Mechanical specifications	
Housing material	Aluminum body and sheet metal, painted/powder-coated
Degree of protection	IP40
Mass	1.32 kg
Dimensions	216 mm x 130 mm x 47 mm
Mounting	Desktop or wall mounting, VESA mount (100 x 100 mm and 75 x 75 mm) and DIN rail mounting via optional adapter
Note	passive cooling, no moving parts <b>Power supply not included.</b>

International approvals	
UL approval	Standard (GP): UL Listed for Canada and USA, E223772 (NRAQ, NRAQ7) (Ordinary Locations) <b>Optional:</b> D2: UL Listed for Canada and USA, E492874 (NRAG, NRAG7) (Hazardous Locations)

### 3.5 Dimensions and Nameplates

#### Dimensions

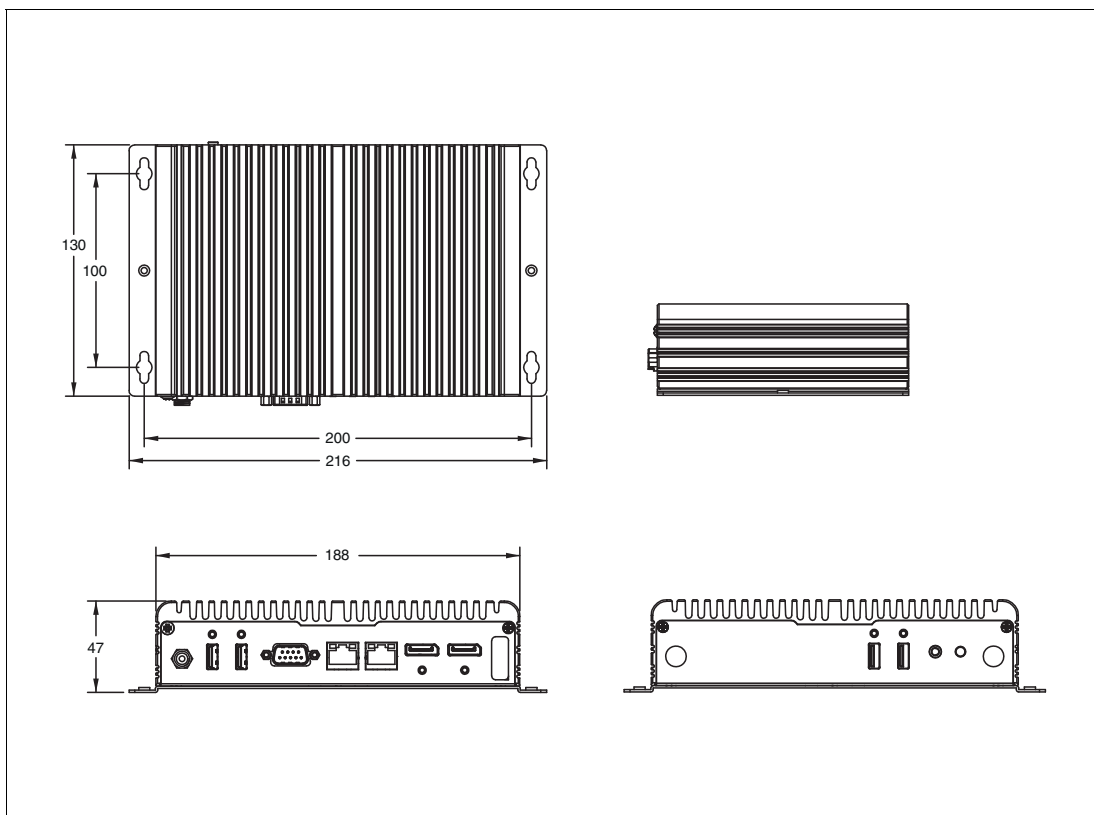


Figure 3.5 BTC12 dimensions

#### Labels

The following labels are attached to the BTC12.

Nameplate (Ordinary Location)

**PEPPERL+FUCHS** 68307 Mannheim, Germany www.pepperl-fuchs.com

**BTC12N-GP-TS2-DP-N0** Part No.: 548302 16-28V DC (2-1A)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:  
 (1) This device may not cause harmful interference, and  
 (2) this device must accept any interference received, including interference that may cause undesired operation.

Device complies with CAN ICES-3(A)/NMB-3(A)

UL LISTED Ind. Contr. Eq. E223772

CE, RoHS, WEEE, and Safety symbols

Serial No.: [ ]  
 Made in Taiwan Rev.: 1.1

Nameplate (Hazardous Location)

**PEPPERL+FUCHS** 68307 Mannheim, Germany www.pepperl-fuchs.com

**#NAME#** Part No. #ITEMNO#

Class I, Division 2, Groups A, B, C, D; T4  
 Class I, Zone 2, Group IIC T4  
 -20 °C ≤ Ta ≤ 60 °C

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:  
 (1) this device may not cause harmful interference and  
 (2) this device must accept any interference received, including interference that may cause undesired operation.

Device complies with CAN ICES-3(A)/NMB-3(A)

UL LISTED Ind. Contr. Eq. For Haz. Loc. E492874

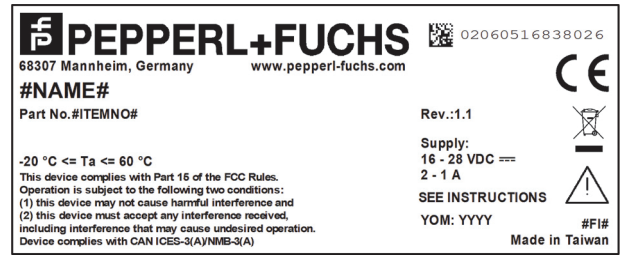
Rev.: 1.1  
 Supply: 16 - 28 VDC (2 - 1 A)  
 SEE INSTRUCTIONS  
 YOM: YYYY #FI#

CE, RoHS, WEEE, and Safety symbols

02060516838026  
 Made in Taiwan



Nameplate (General Purpose)



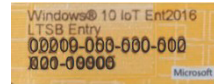
Operator needs consult this manual, all warnings as applicable need to be taken into consideration.



Hot surface



Certificate of Authenticity (COA)



The data can be found on the product marking and on the COA label. The product marking is located on the side of the device. The COA label is only available with pre-installed Windows® operating systems and is affixed to the back of the device.

## 4 Installation

### 4.1 Mounting



#### Warning!

Installation!

The device must be installed by competent personnel in accordance with the instructions. All applicable laws and regulations must be carefully observed.

#### Preparation for Installation

Check the package contents and all accessories ordered for completeness and signs of damage. If the contents are incomplete, damaged, or do not match your order, contact your delivery service immediately.

#### Mounting

The device is intended for indoor use. If placed in a suitable housing, the device can also be used outdoors.



#### Note

If the device is used in a manner not prescribed by the manufacturer, the built-in protective function of the device may be impaired.

The device is cooled passively. Natural airflow is required to ensure proper cooling. If the device is installed in a housing, power dissipation from the device must be taken into account (see chapter 4.2).

Vertical installation provides optimal cooling since air passes through the cooling fins.

Observe the following recommended distances to other electrical components or to a housing wall:

- Below the device (if mounted vertically):  $\pm 100$  mm
- All other sides:  $\pm 50$  mm

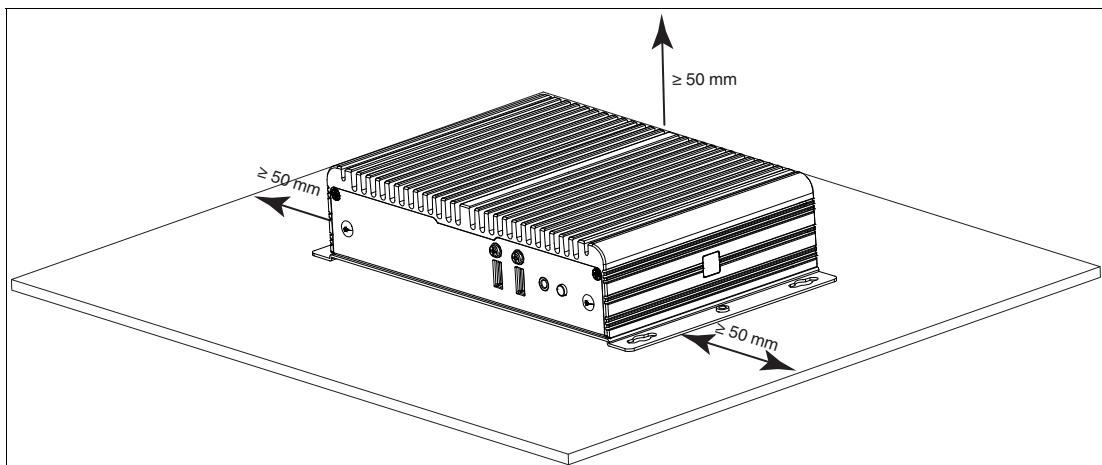


Figure 4.1 Horizontal mounting/desktop mounting

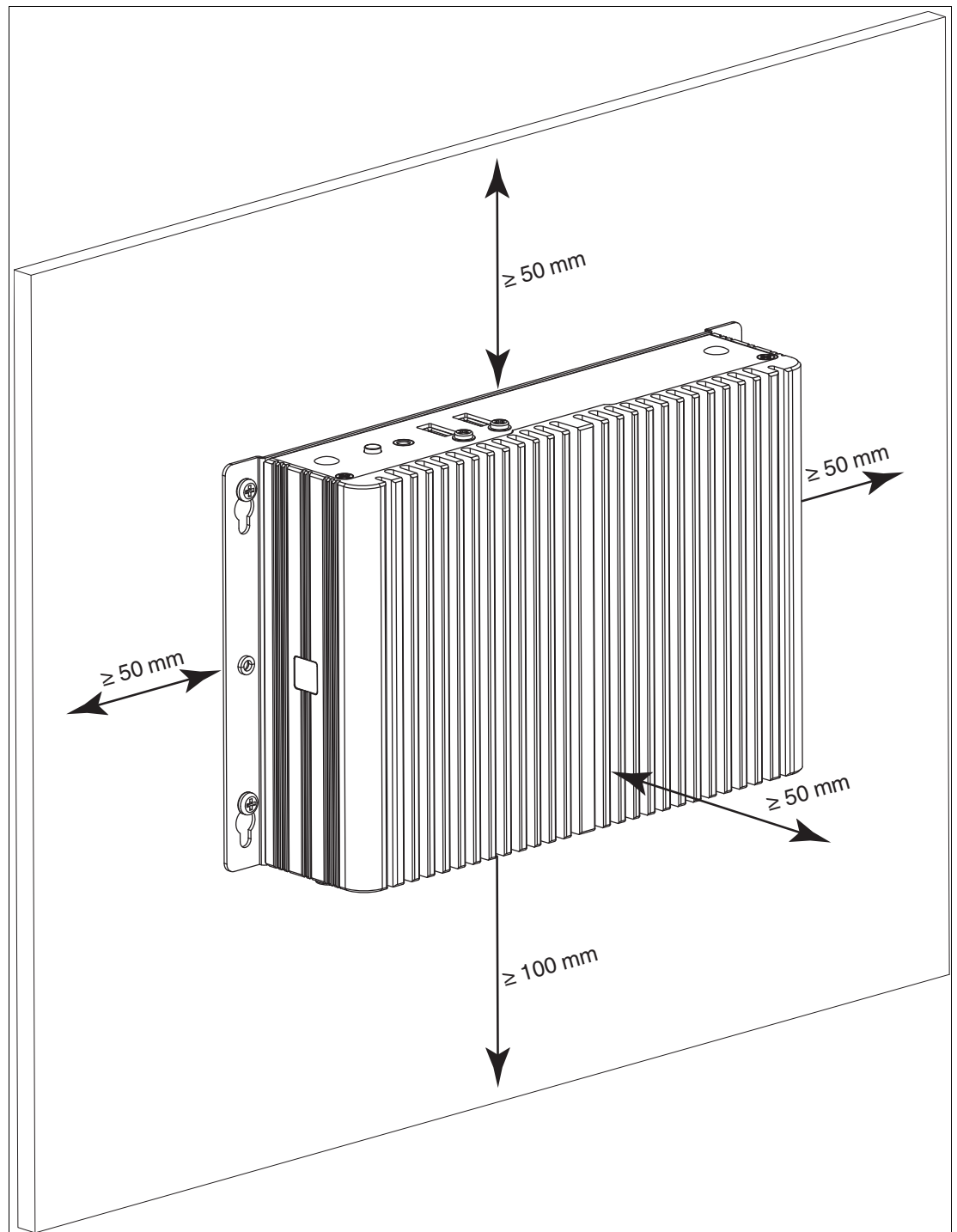


Figure 4.2 Vertical mounting

**Danger!**

Ambient conditions!

Do not operate the device outside the specified ambient temperature.

**Warning!**

Hot surface!

The surface of the device may become hot during operation.



## DIN Rail Mounting

Tools and installation materials required:

Screwdriver

4 anchors, 4 screws (included in scope of delivery)

1. Attach the DIN rail adapter to the back of the BTC12. Use the thread on the bottom of the BTC12 to secure the adapter. Tighten the supplied screws to a tightening torque of 0.4 Nm.

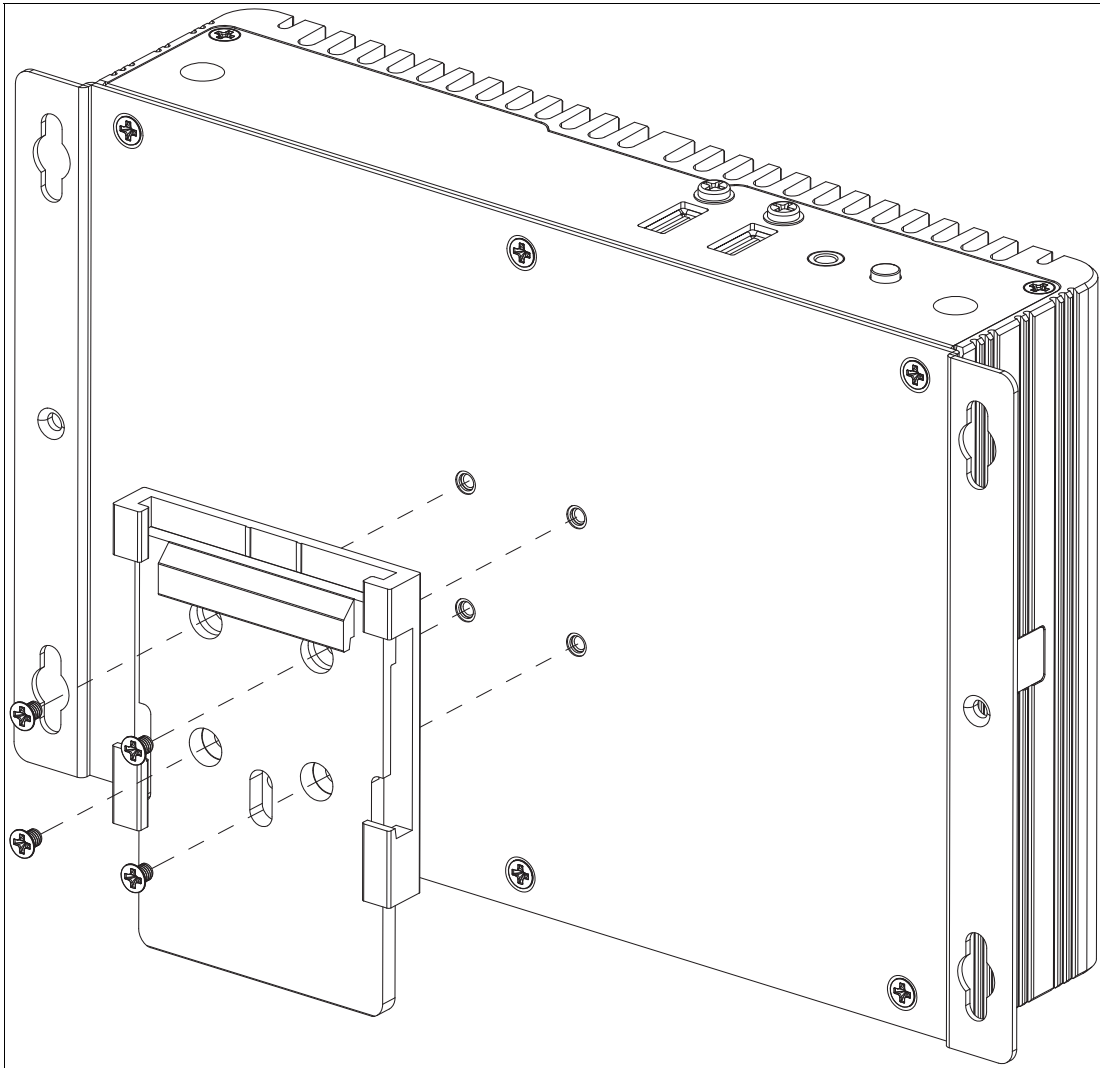


Figure 4.3

2. There is a movable clamp on the top of the DIN rail adapter. Install the BTC12 at a slight angle with the movable clamp over the DIN mounting rail. Apply light pressure to pull the BTC12 downward and clamp the adapter into the rail.

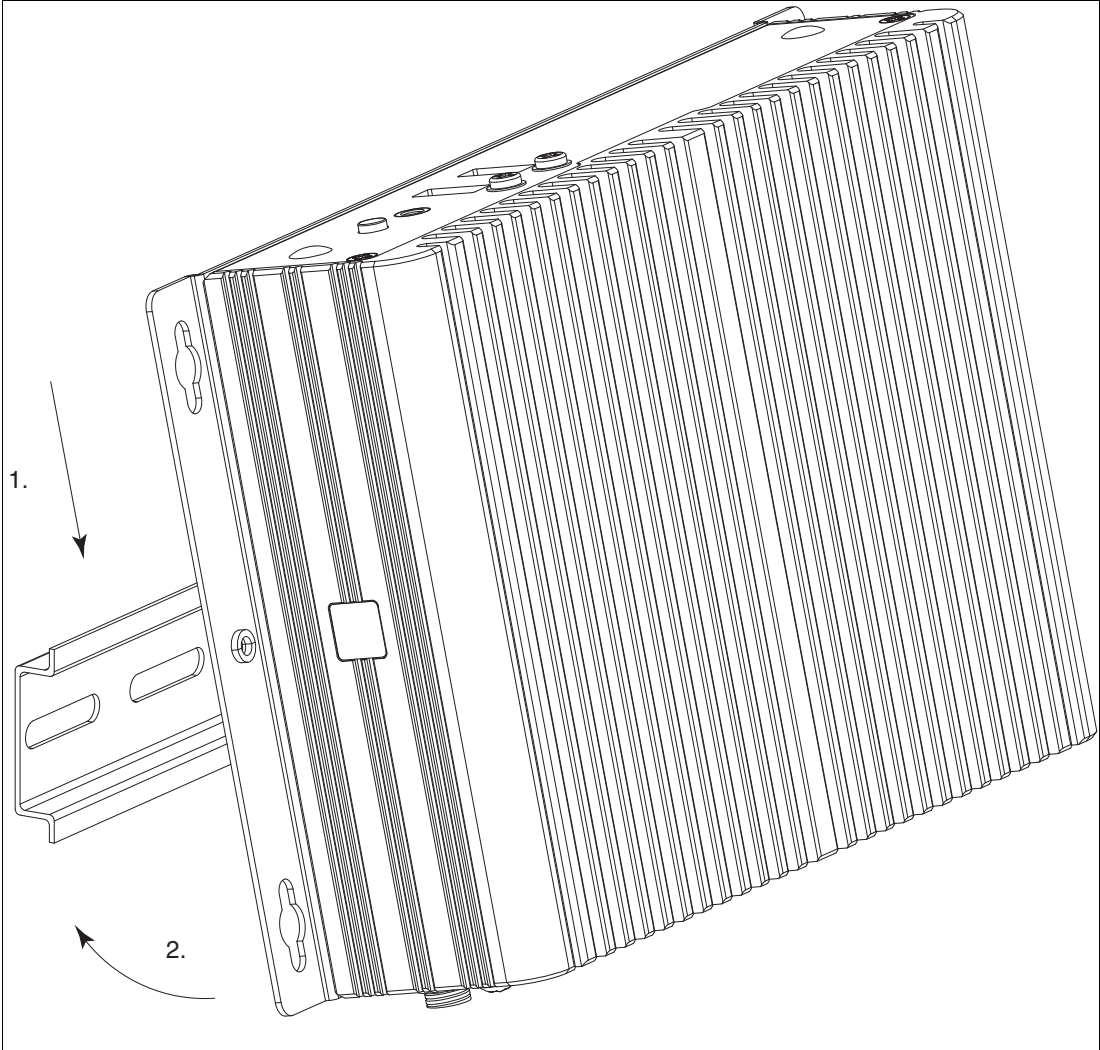


Figure 4.4

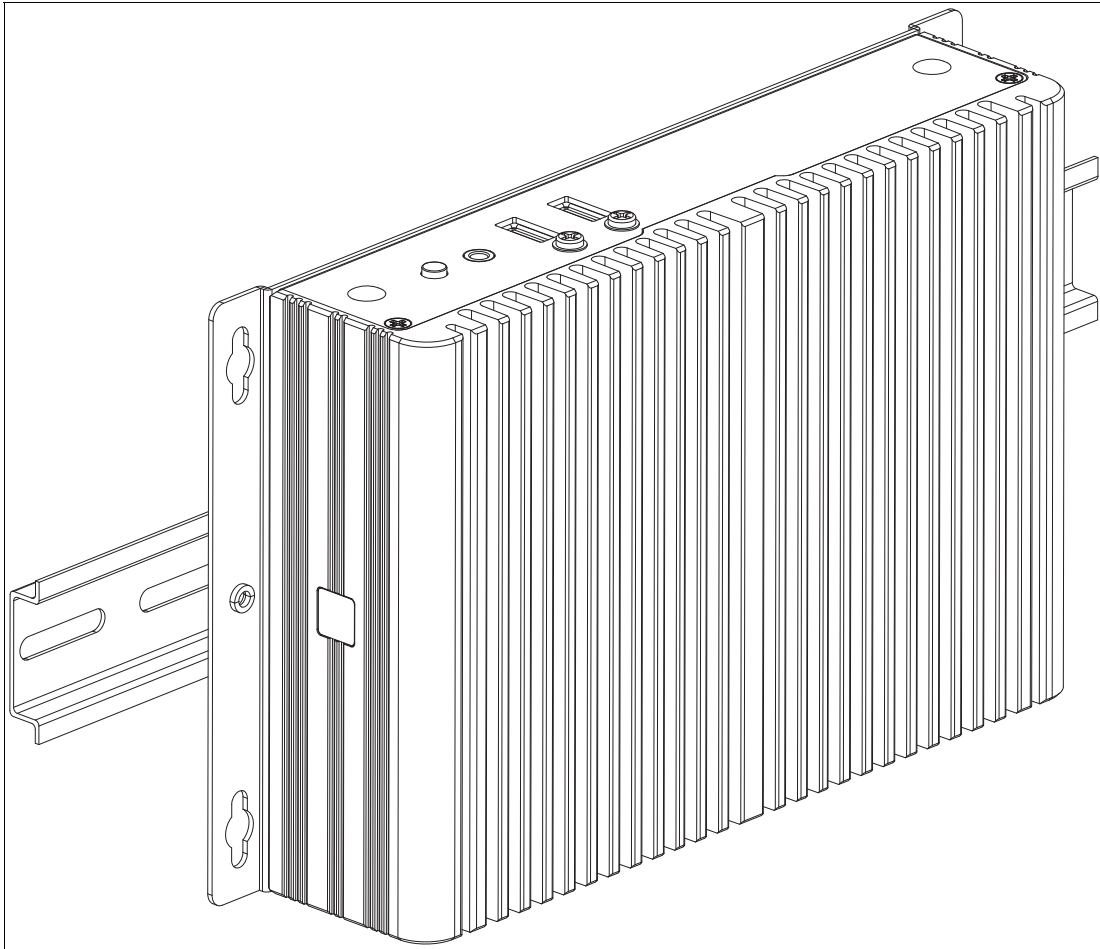


Figure 4.5



## Wall Mounting



### Caution!

Insufficient load capacity!

If the mounting surface for wall and vertical mounting does not have sufficient load capacity, the device may fall and be damaged.

It is the responsibility of the installer to select a suitable location with sufficient strength for the equipment.

Use suitable mounting screws with a diameter of 4 mm (not included in the scope of delivery) and the following installation diagram to secure the device to the wall. Use wall anchors if necessary.

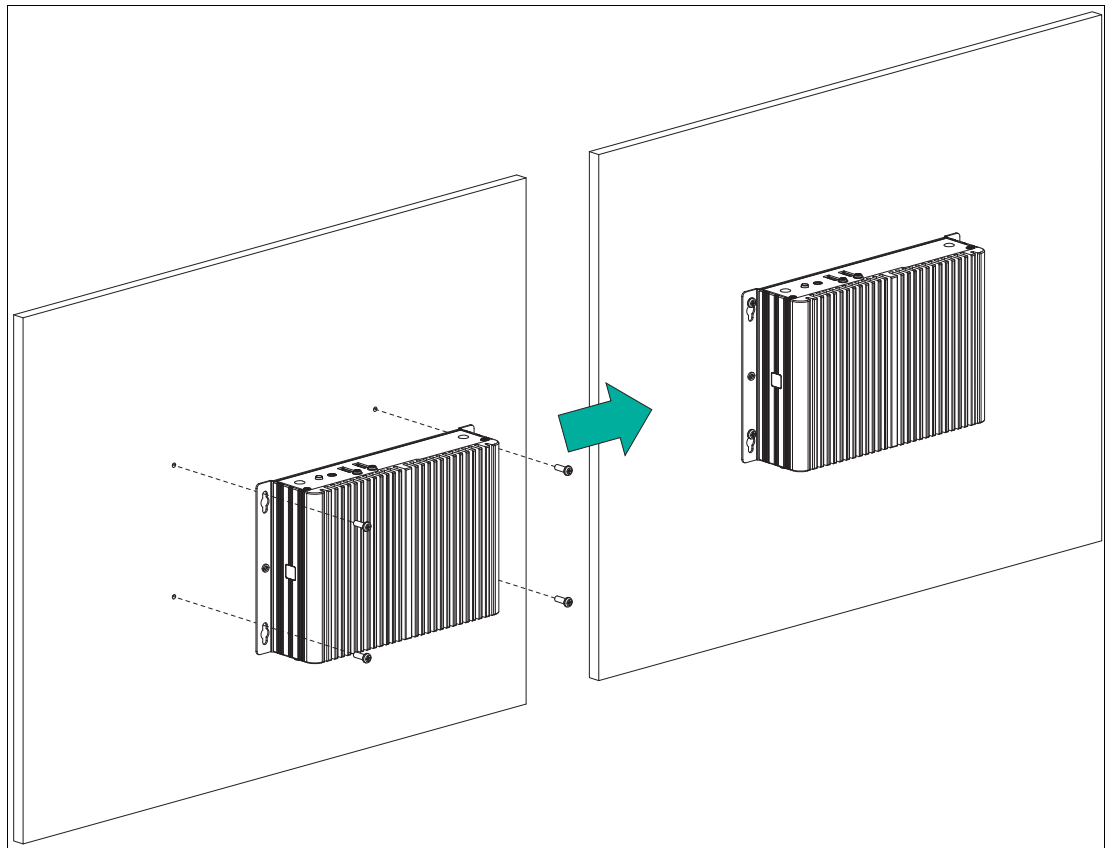


Figure 4.6

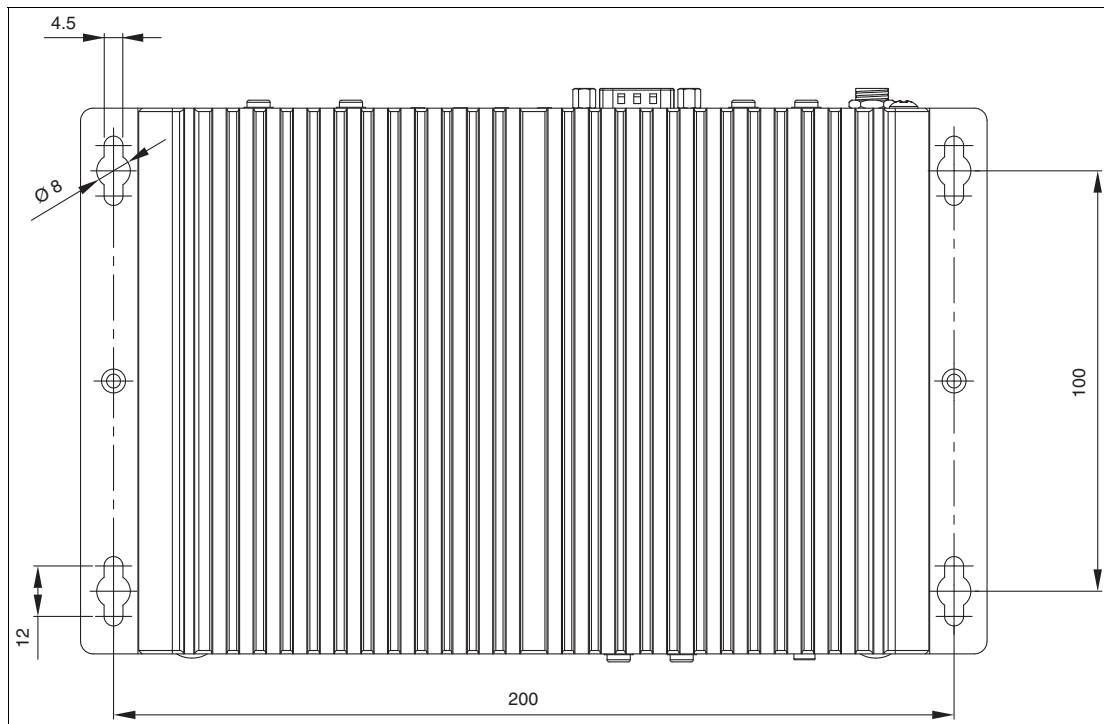


Figure 4.7 Installation diagram





### VESA Mounting

- 1. Attach the VESA fixture (100 x 100 mm or 75 x 75 mm) to the VESA arm or the back panel of the monitor (using the screws provided by the monitor manufacturer).

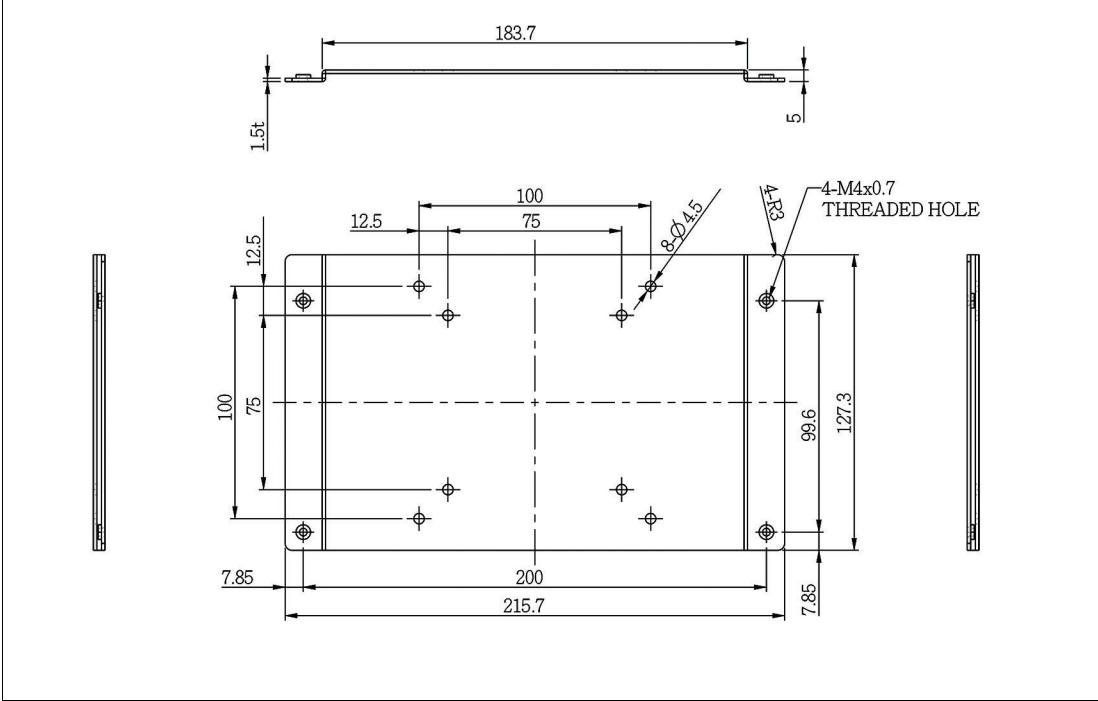


Figure 4.8

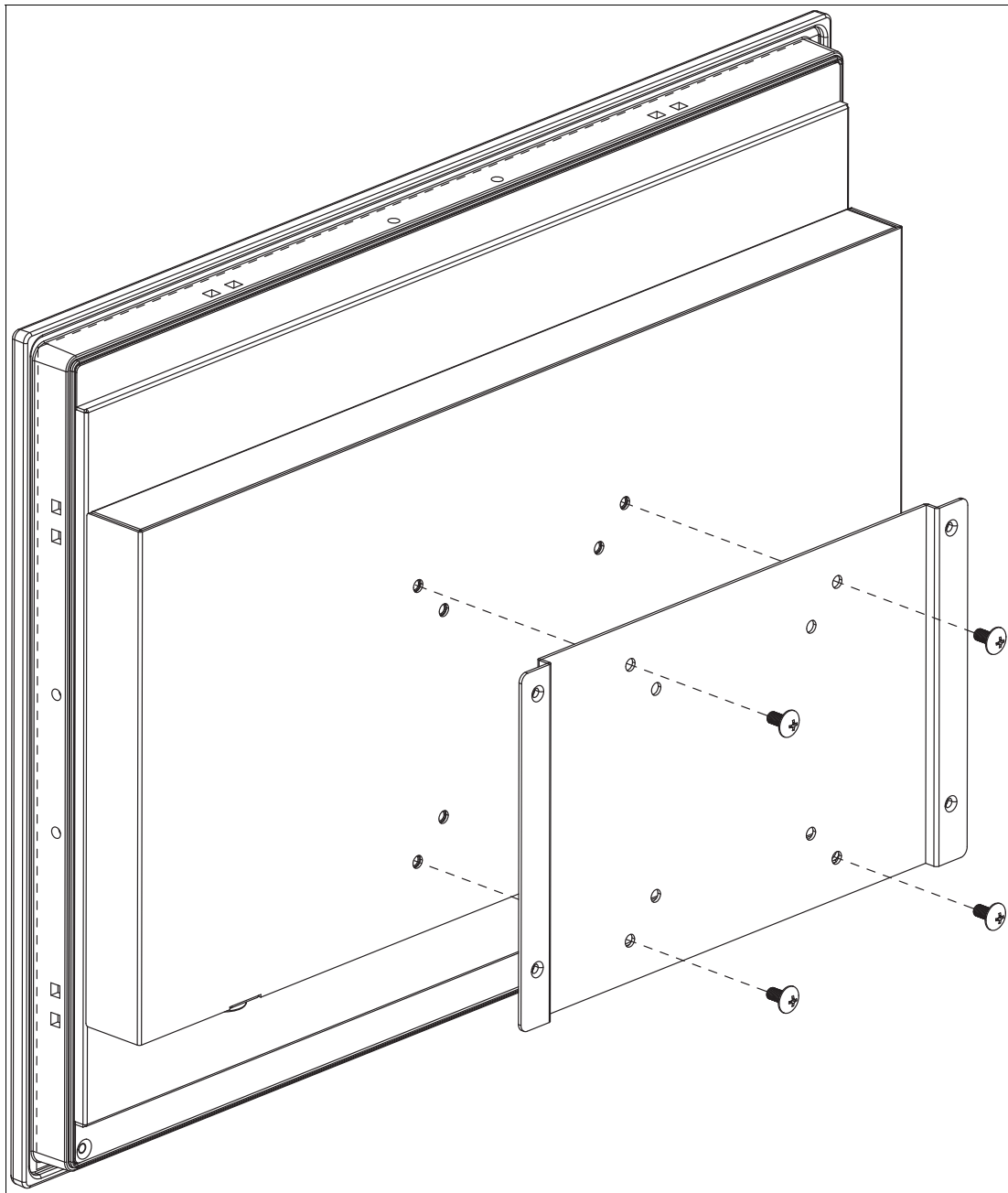


Figure 4.9

**Danger!**

Ambient temperature range

Warning. The ambient temperature range needs to be taken into consideration for use in hazardous locations.

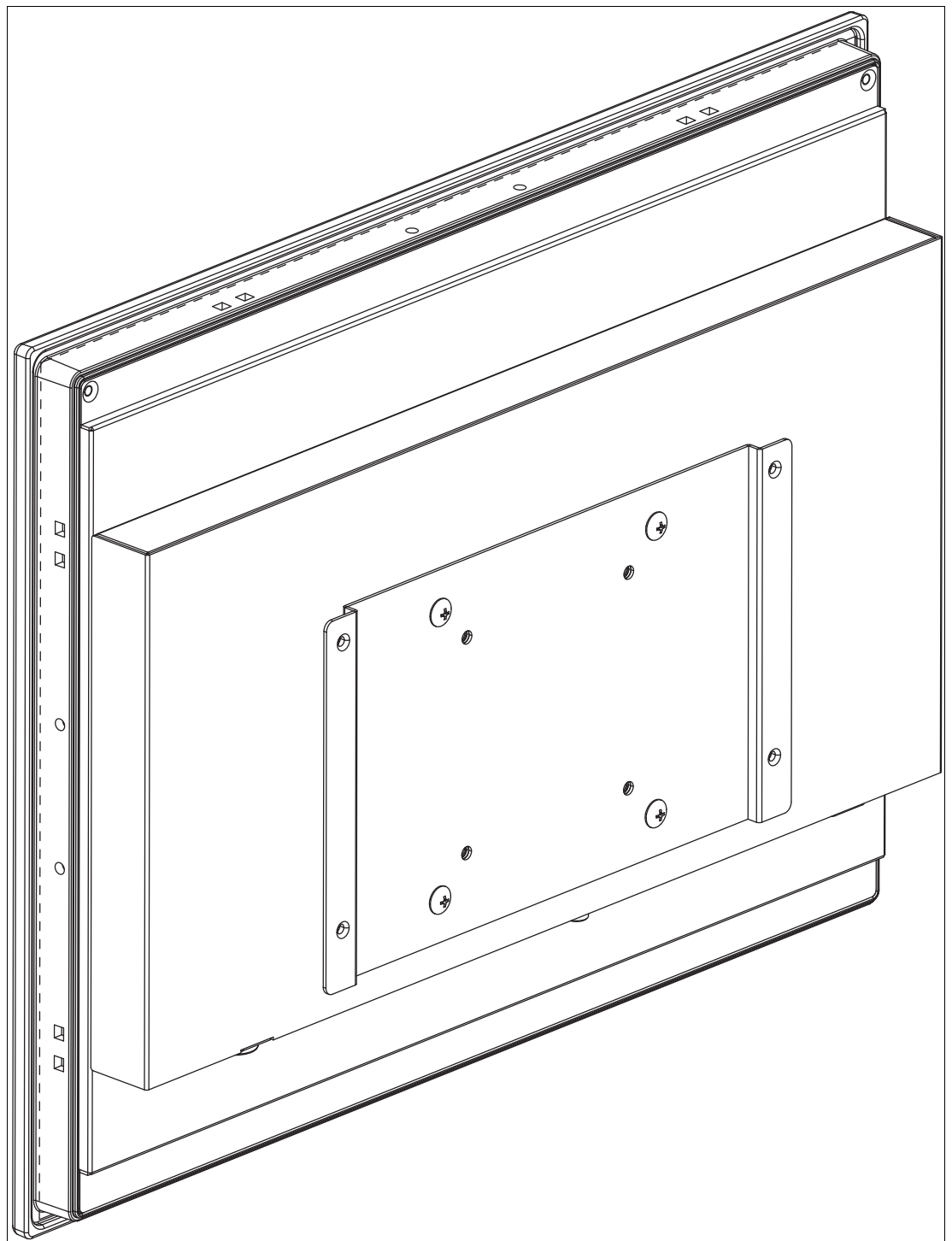


Figure 4.10

2. Secure the BTC12 to the VESA fixture using the supplied screws.
3. Screw M4, tightening torque:  $0.7 \pm 0.1$  Nm

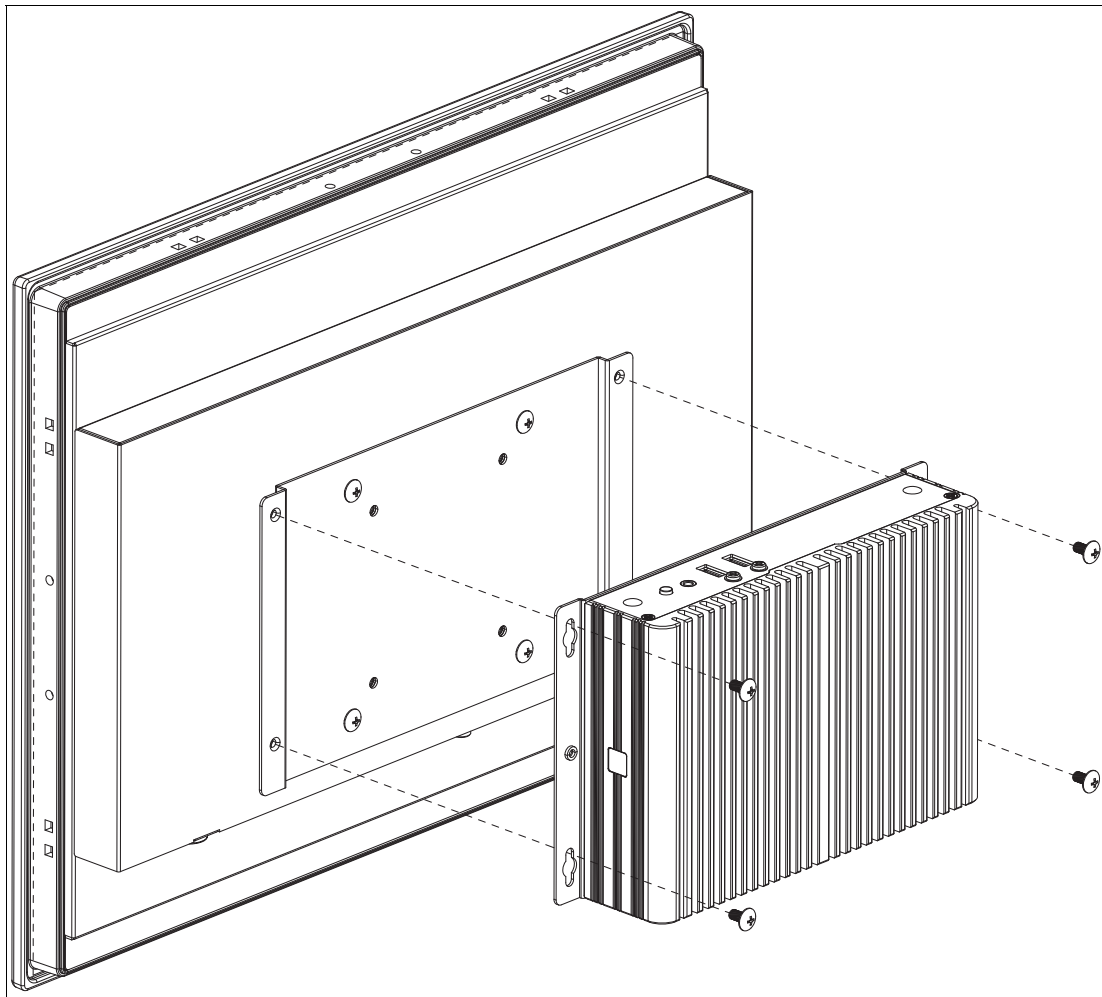


Figure 4.11

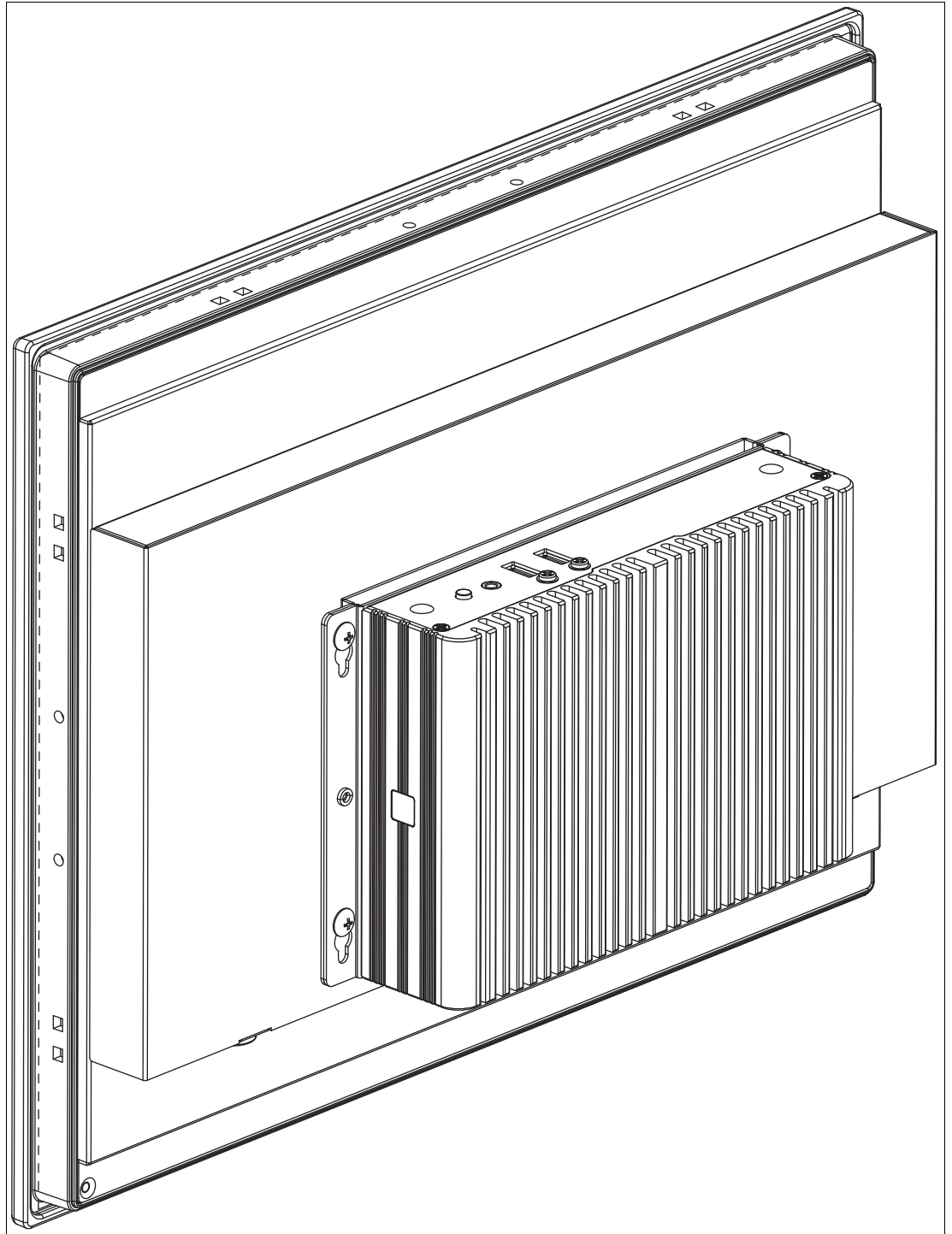


Figure 4.12

## 4.2 Electrical Connection

Power consumption at 28 V supply voltage:

- Maximum load: 31.6 W (CPU full load, 14 W total output power to USB ports)
- Normal operation: 16 W (CPU full load, "no additional electrical consumers")
- Standby: 3.4 W

Power dissipation:

- Maximum heat dissipation: 17.6 W (CPU full load, 14 W total output power to USB ports)
- Normal operation: power dissipation = power consumption

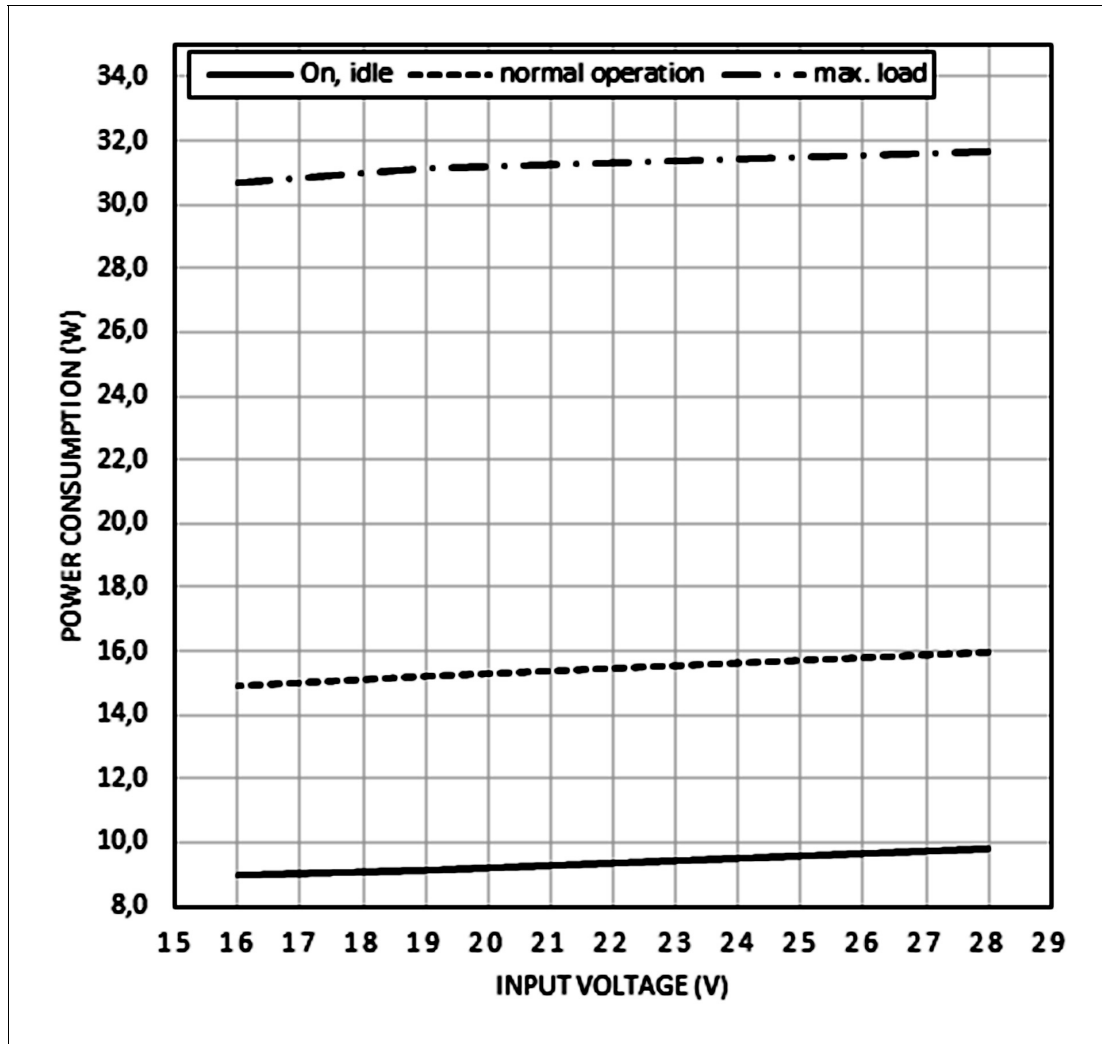


Figure 4.13



## Commissioning

1. Remove the dummy plugs from the ports where connections are to be made. To prevent dust ingress, leave the dummy plugs in ports that are not in use.
2. Connect the BTC12 to the network via the Ethernet port.
3. Connect the BTC12 to the mouse and keyboard via the USB 2.0 port.
4. Connect the BTC12 to the display via a DisplayPort™. The DisplayPort™ interface provides mechanical strain relief to protect against vibration. Locking mechanisms are available as accessories for additional strain relief.
5. Optional strain-relief locking mechanisms can also be attached to the USB ports.
6. Connect the BTC12 to the AC/DC power supply (e.g., FSP065-REBN2).



---

### Note

Strain-relief locking mechanisms are available as accessories. The screws required to secure the locking mechanisms are supplied in the scope of delivery for the BTC12.

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### 4.3 I/O Connection



**Tip**

Connections should be mechanically secured by e.g. the "yellow" cable retainer and/or the screws for each type of connection.

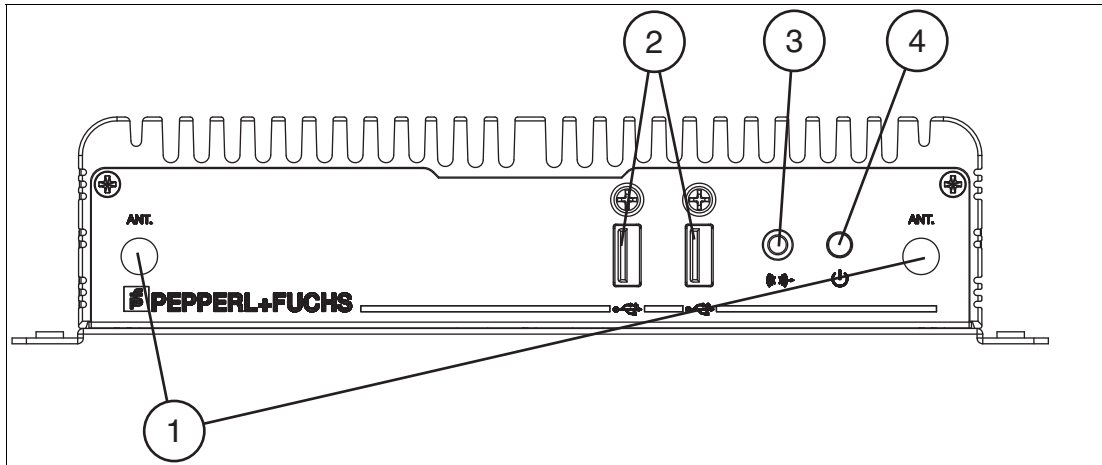


Figure 4.14 BTC12 ports, front

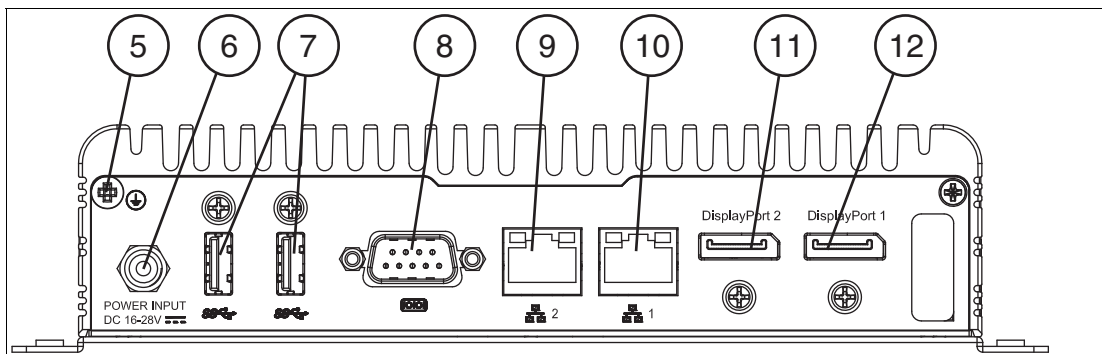



Figure 4.15 BTC12 ports, rear

**Port Overview**

Number	Interface type	Description
<b>Front</b>		
1	Antenna opening x 2 (dummy plug)	Dummy plug antenna connections, one on the left and one on the right
2	USB <sup>1</sup>	USB 2.0 x 2
3	Audio	Line output x 1 <sup>2</sup>
4	Symbol	On/off switch
<b>Back</b>		
5	Ground connection	Not required for standard installations

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Number	Interface type	Description
6	Power plug	5.5 x 2.5 mm DC jack bush with locking mechanism (M8 screw) 16 VDC to 28 VDC    Polarity
7	USB <sup>1</sup> <Default - <sup>1</sup> Font>	USB 3.1 (Super Speed) x 2
8	COM	RS-232/RS-485 port with DB-9 connector x 1
9	Ethernet 2 (Secondary port)	1000BaseT RJ45 plug
10	Ethernet 1 (Primary port)	
11	DisplayPort™ 2	DP 1.2 up to 2 x 4K (Ultra-HD) at 60 Hz (Up to 3 Full HD monitors via series connection)
12	DisplayPort™ 1	

1. Only four of these USB ports can be operated simultaneously in high-current mode, max. 14 W.

2. This port is not to be used in a hazardous location

### RS-232 Port

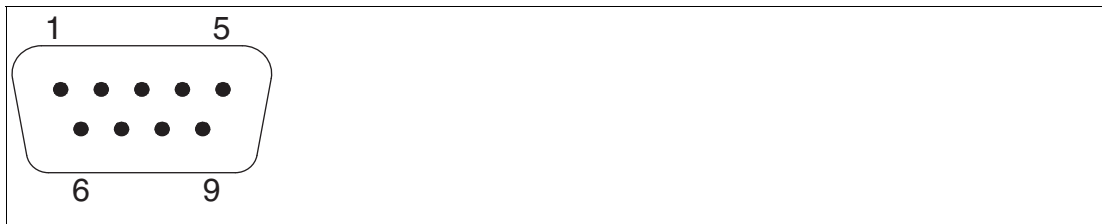


Figure 4.16

Pin	Type	Description
1	DCD	Data Carrier Detect (E)
2	RxD	Received Data (E)
3	TxD	Transmitted Data (A)
4	DTR	Data Terminal Ready (A)
5	GND	Ground
6	DSR	Data Set Ready (E)
7	RTS	Request to Send (A)
8	CTS	Clear to Send (E)
9	RI	Incoming Call (E)

### RS-485 Port

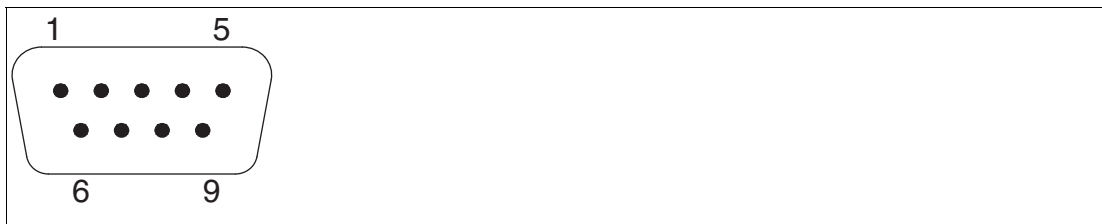


Figure 4.17

Pin	Type	Description
1	Data-	Transmit/receive data- (I/O) for half duplex mode
2	Data+	Transmit/receive data+ (I/O) for half duplex mode
3	Not connected	-
4	Not connected	-
5	M	Signal ground
6	Not connected	-
7	Not connected	-
8	Not connected	-
9	Not connected	-

### RJ45 Port



Figure 4.18 RJ45 pinout with LED display

Pin	Type	Color
1	Transceive Data+	WH/OR
2	Transceive Data-	OR/WH or OR
3	Receive Data+	WH/GN
4	Bidirectional Data+	BU/WH or BU
5	Bidirectional Data-	WH/BU
6	Receive Data-	GN/WH or GN
7	Bidirectional Data+	WH/BN
8	Bidirectional Data-	BN/WH or BN

### LED Indicator

No.	Type	Description
1	Right LED	Yellow Off – No Connection / No Link Yellow On – Connection / Link Established Yellow Flashing – Connection / Link Established with Data actively being transmitted
2	Left LED	LED Off – 10 Mbps Speed detected Green On – 100 Mbps Speed detected Orange – 1 Gbps Speed detected

## DisplayPort™



Figure 4.19

Pin	Type	Description	Input/output
1	ML_Lane0+	DP Data 0+	Output
2	GND	Ground	-
3	ML_Lane0-	DP Data 0-	Output
4	ML_Lane1+	DP Data 1+	Output
5	GND	Ground	-
6	ML_Lane1-	DP Data 1-	Output
7	ML_Lane2+	DP Data 2+	Output
8	GND	Ground	-
9	ML_Lane2-	DP Data 2-	Output
10	ML_Lane3+	DP Data 3+	Output
11	GND	Ground	-
12	ML_Lane3-	DP Data 3-	Output
13	CONFIG1 CAD	Cable-adapter detection	Input
14	CONFIG2	Ground (pull down)	-
15	AUX_CH+	Auxiliary channel+	Input/output
16	GND	Ground	-
17	AUX_CH-	Auxiliary channel-	Input/output
18	HPD	Hot Plug Detect	Input
19	GND	Ground	-
20	DP_PWR	+3.3 V (fused)	Output

### USB Ports

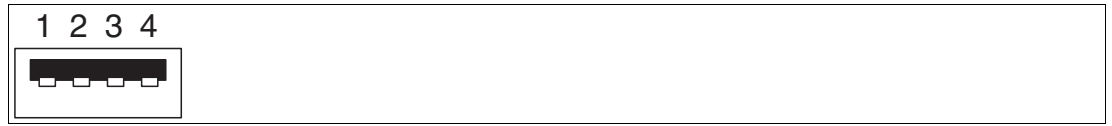


Figure 4.20 USB 2.0

Pin	Type	Description
1	USB_P5V_- fused (A)	+5 V (fused)
2	USB_D0M (I/O)	Data-
3	USB_D0P (I/O)	Data+
4	USB_GND	GND



Figure 4.21 USB 3.0

Pin	Type	Description	Input/output
1	VBUS	+ 5 V (fused)	Output
2	D-	Data channel USB 2.0	Input/output
3	D+	Data channel USB 2.0	Input/output
4	GND	Ground	-
5	RX-	Data channel USB 3.0	Input
6	RX+	Data channel USB 3.0	Input
7	GND	Ground	-
8	TX-	Data channel USB 3.0	Output
9	TX+	Data channel USB 3.0	Output

## Ethernet Port



Figure 4.22

Pin	Type	Description
1	BI_DA+	Bidirectional data A+, input/output
2	BI_DA-	Bidirectional data A-, input/output
3	BI_DB+	Bidirectional data B+, input/output
4	BI_DC+	Bidirectional data C+, input/output
5	BI_DC-	Bidirectional data C-, input/output
6	BI_DB-	Bidirectional data B-, input/output
7	BI_DD+	Bidirectional data D+, input/output
8	BI_DD-	Bidirectional data D-, input/output

### LED Indicator

No.	Type	Description
①	Right LED	Yellow Off – No Connection / No Link Yellow On – Connection / Link Established Yellow Flashing – Connection / Link Established with Data actively being transmitted
②	Left LED	LED Off – 10 Mbps Speed detected Green On – 100 Mbps Speed detected Orange – 1 Gbps Speed detected

## 5 BIOS Settings



### Caution!

#### Warranty

Access to the BIOS is prohibited. Any access to the BIOS is at your own risk and is not covered by the warranty for repairs. Arbitrary changes to BIOS settings may affect device functionality. The BIOS is set according to customer requirements by default.



### Note

All BIOS settings are optimized for standard applications (use cases of BTC12). The BIOS is protected by the default password: `pepper1`. You must enter the password each time you enter the BIOS. To prevent unauthorized access and changes to the BIOS, we advise you to set your own strong administrator password once you have installed the device.



### Getting Started

1. Switch on the device.
2. During power-on, press DELETE on the keyboard.
3. Enter "pepper!" for the password.
4. Press ENTER.

### Navigation

Shortcut	Function	Description
Left/right arrow keys	Select screen	Menu bar and select a BIOS setup page, e.g., the main page
Up/down arrow key and click	Select element	Select a BIOS setup element or a subpage
Enter/double-click	Select	Select an option to edit its value or access a submenu
+ -	Change option	Change the field value of a specific setup element, e.g., date, time
F1	General Help	Displays the general Help window.
F2	Previous values	Loads previous values into the BIOS setup menu
F9	Optimized default values	Loads optimized default values into the BIOS setup menu
F10	Save and exit	Saves the current configuration and exits the BIOS setup menu
ESC	Exit	The <ESC> key allows the user to discard all changes and exit the BIOS setup menu. Press the <ESC> key to exit the BIOS setup menu without saving any changes. The following screen appears: Press the <Enter> key to discard changes and exit the menu. Or use the arrow keys to select "No" and then press the <Enter> key to cancel this function and return to the previous screen.

## BIOS Setup Menu

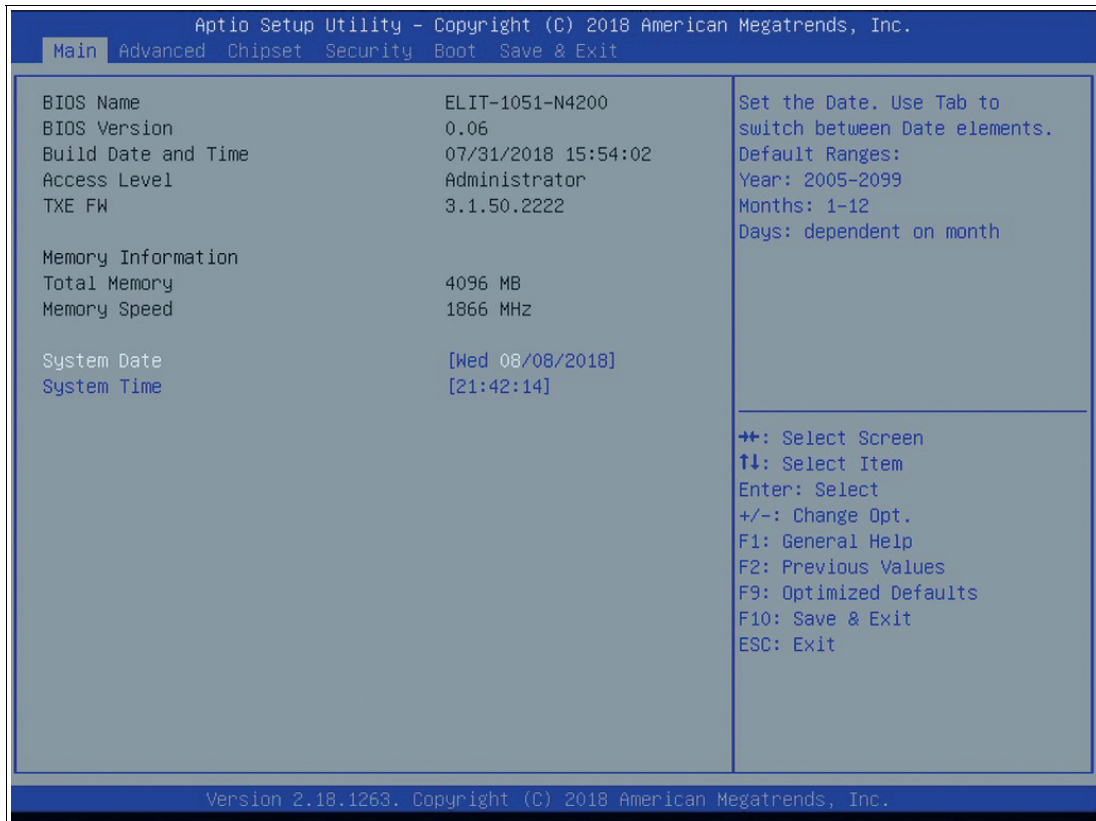


Figure 5.1 BIOS setup menu—home screen



### Setting the System Date

1. Use the arrow keys to set the date.
2. Navigate to month, day, and year in sequence. Enter the appropriate value. Press ENTER to move to the next field.
3. Press F10 to save the changes.



### Setting the System Time

1. Use the arrow buttons to set the time.
2. Navigate to hour, minute, and seconds in sequence. Enter the appropriate value. Press ENTER to move to the next field.
3. Press F10 to save the changes.



## 5.1 Creating a New BIOS Password

Select `Security` from the BIOS setup page to open the "Security" BIOS setup page.

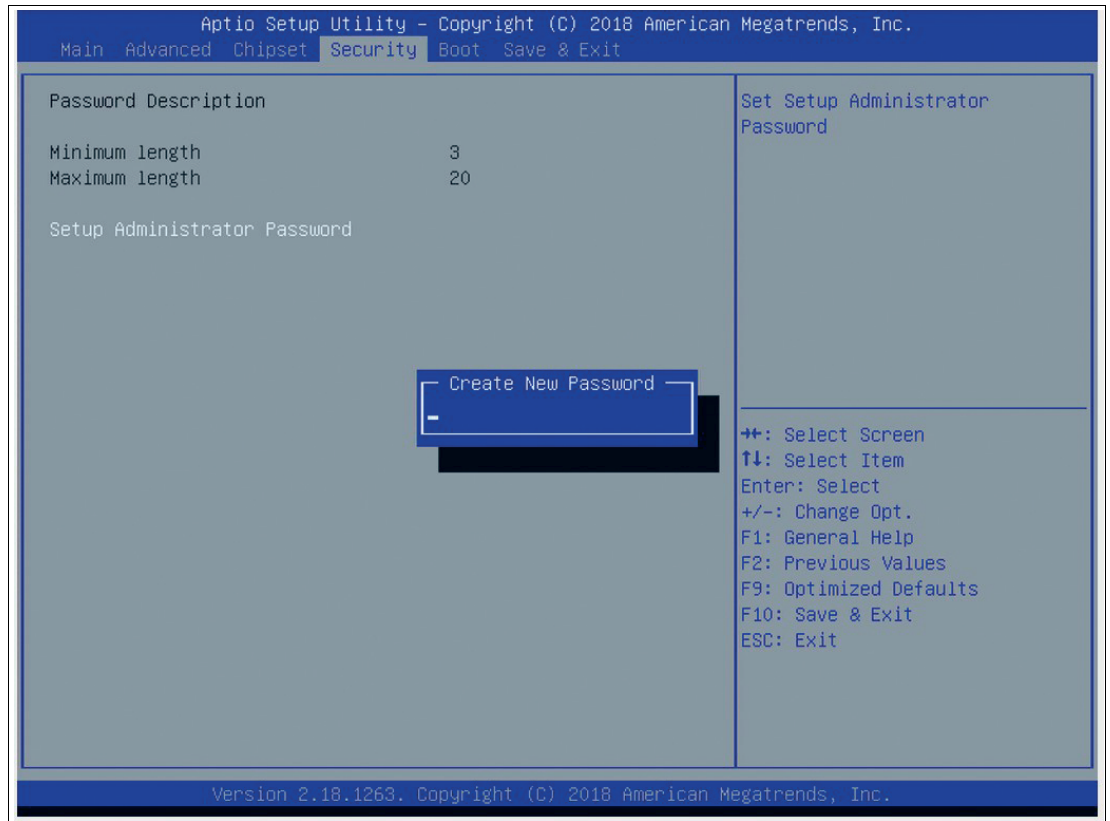


Figure 5.2 "Security" BIOS menu



### Changing the BIOS Password

The "Security" setup page allows you to set an administrator password for the BIOS.

1. Select `Setup Administrator Password` using the arrow keys and press `Enter`.
2. Enter a password of at least 3 characters. The password can be up to 20 characters long and is case sensitive.
3. Re-enter the password when the pop-up window appears prompting you to confirm the password.



#### Note

After changing, note down the password and keep it in a safe place. Pepperl+Fuchs assumes no liability in the event that the password is lost. If you forget the password, the device must be returned to Pepperl+Fuchs for a complete reset.

## 5.2 Changing Serial Interface Mode (RS-232, RS-485)

Select **Advanced** from the BIOS setup page.

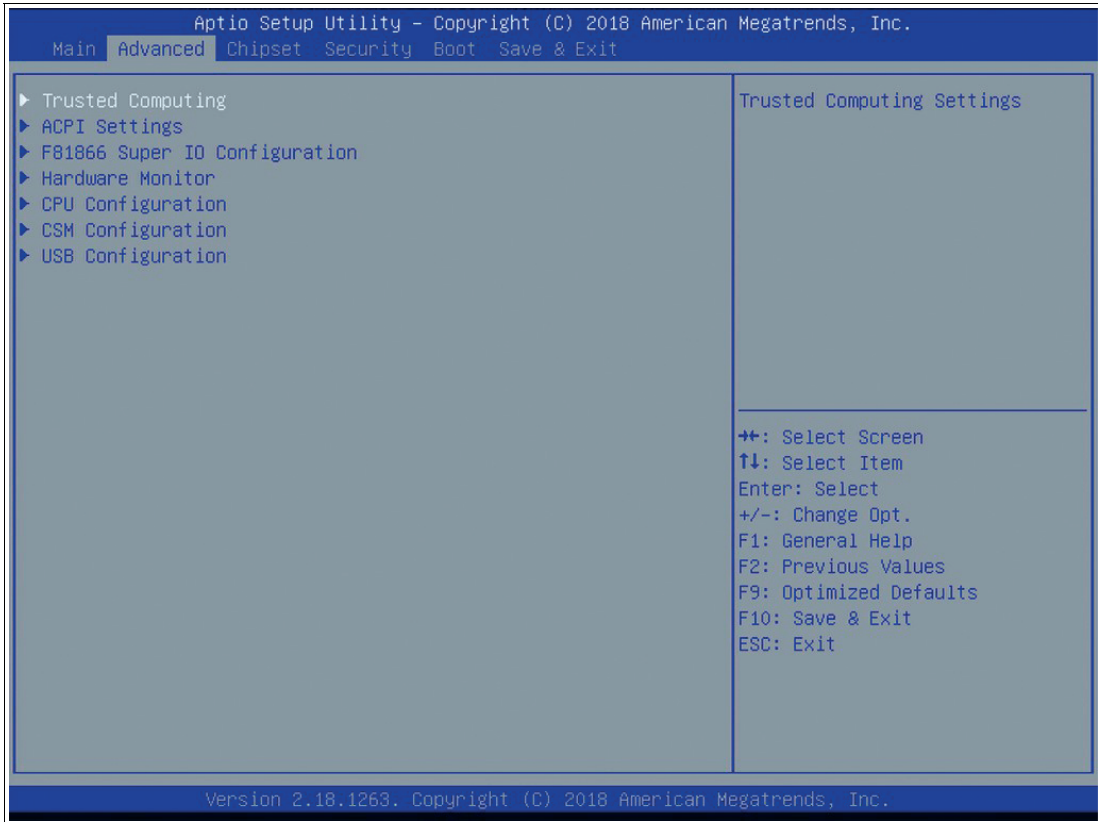


Figure 5.3 "Advanced" BIOS menu



## Configuring Advanced Settings

F81866 Super IO Configuration allows you to view and configure the Super I/O Chip parameters.

1. Select the port you want to set using the arrow keys. Press ENTER.
2. Select Enabled or Disabled. Press ENTER in the pop-up window.
3. The enabled port selects the appropriate setting change and device mode. Press ENTER.

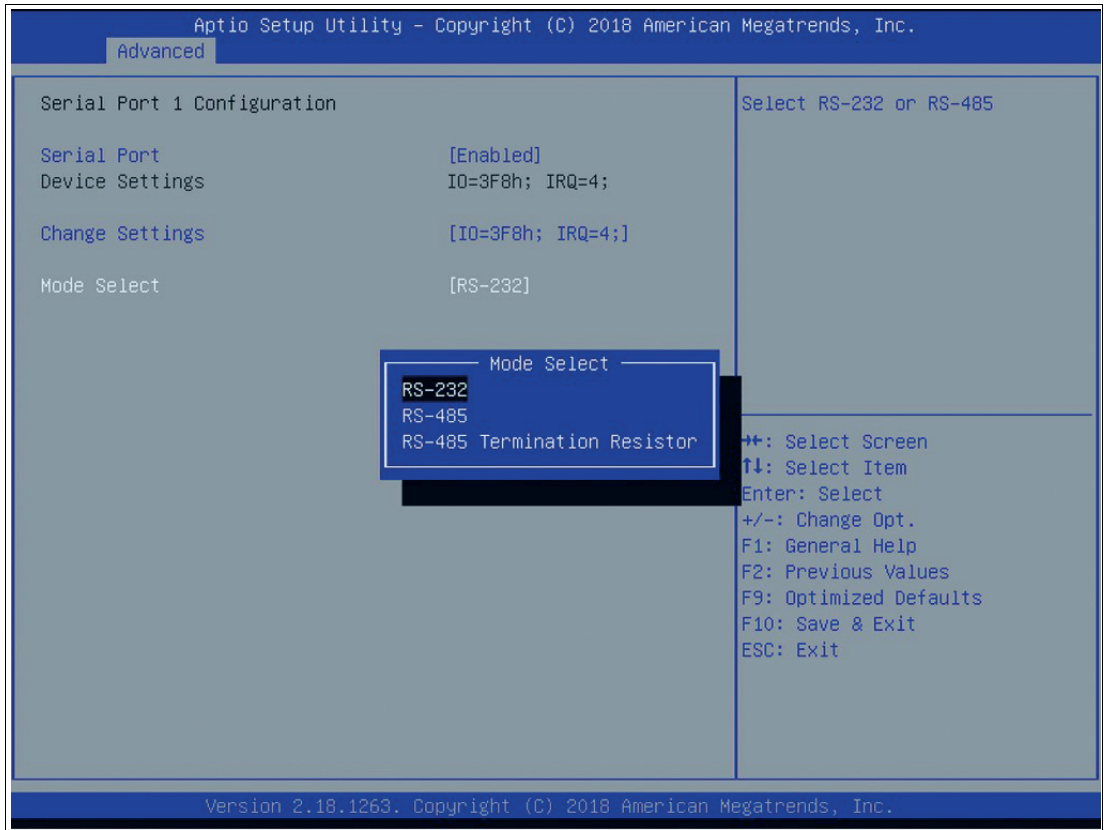


Figure 5.4 Select mode

### Settings for Serial Port 1

Device settings	Mode select
Auto IO=3F8h; IRQ=4; IO=3F8h; IRQ=10;11,12,15 IO=2F8h; IRQ=10;11,12,15 IO=3E8h; IRQ=10;11,12,15 IO=2E8h; IRQ=10;11,12,15	RS-232 RS-485 RS-485 Termination Resistor



#### Note

Serial port 2 cannot be used as an external interface.

### 5.3 USB Configuration

USB Configuration allows you to view and configure USB parameters.  
The USB device displays the USB device detected by the BIOS during the power-on self-test.

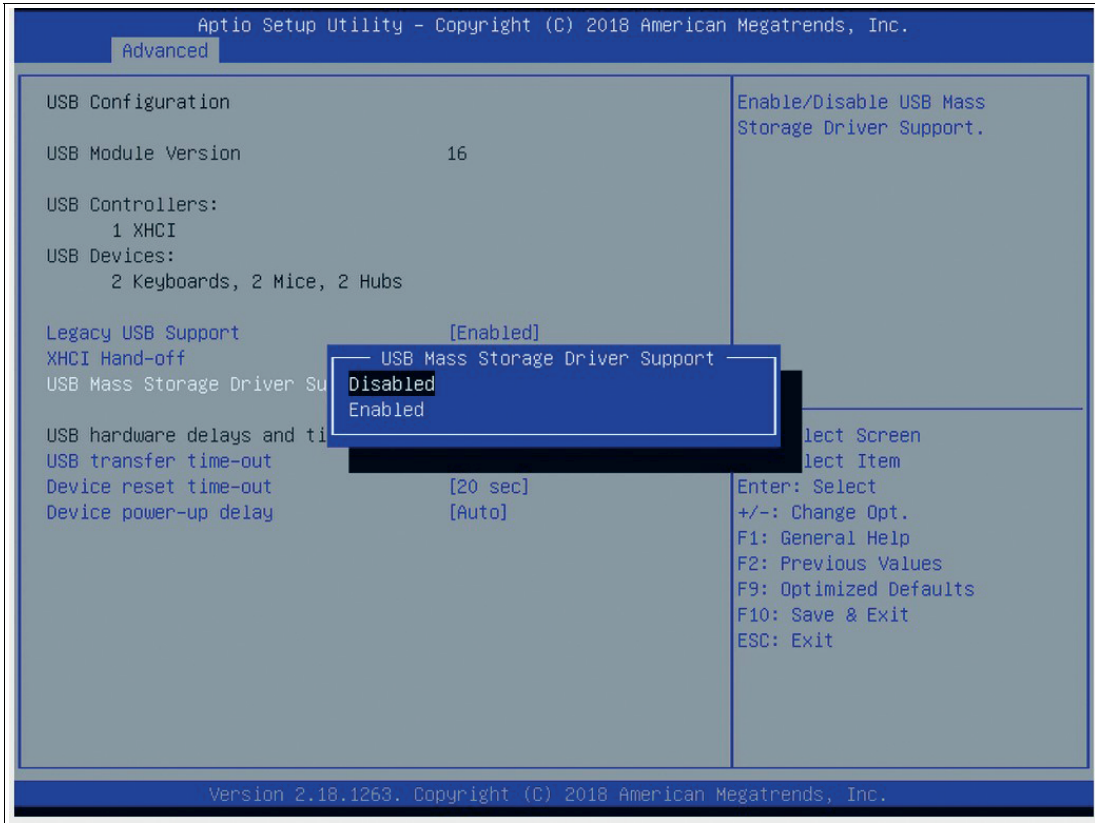


Figure 5.5 Enabling and disabling the USB device



#### Enabling and Disabling the USB Device

1. Select USB Mass Storage Driver Support using the arrow keys and press Enter.
2. Select Enabled or Disabled as needed. Press Enter in the pop-up window.

## 5.4 Turning Audio on/off via DisplayPort™

Select **Chipset** from the BIOS setup page.

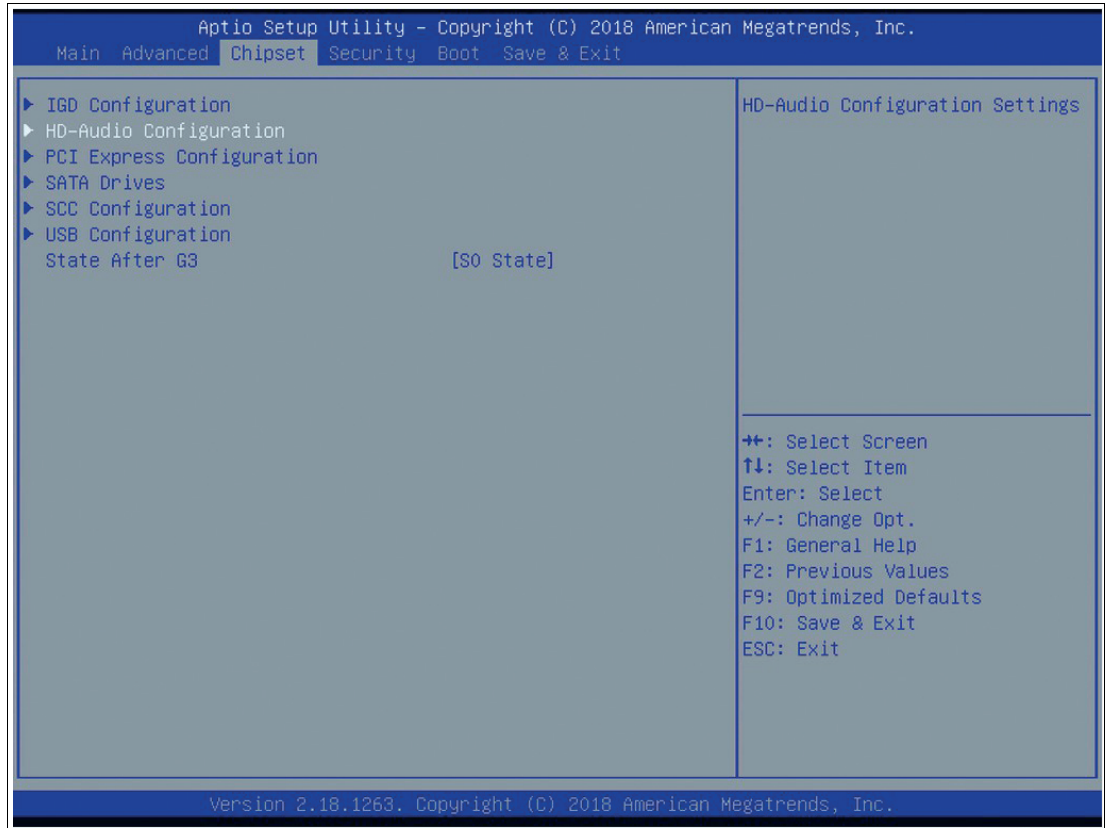


Figure 5.6 "Chipset" BIOS menu



### Changing Audio Configuration

HD Audio Configuration allows you to view and configure the DisplayPort™ audio controller. The analog signal cannot be configured.

1. Select **HD Audio Configuration** using the arrow keys. Press **ENTER**.
2. Select **Enabled** or **Disabled**. Press **ENTER**.

## 5.5 Boot Configuration

Select **Boot** from the BIOS setup page.



Figure 5.7 "Boot" BIOS menu

You can change the following settings on the "Boot" configuration page:

- **Setup Prompt Timeout:** Sets the time period within which the Delete key must be pressed to enter the BIOS at power-on.
- **BootUp NumLock State:** Enables and disables the numeric keys on the keyboard.

Set the PXE-ROM before changing boot options.



## Enabling Boot via LAN (PXE)

1. Select **Advanced** from the BIOS setup page.

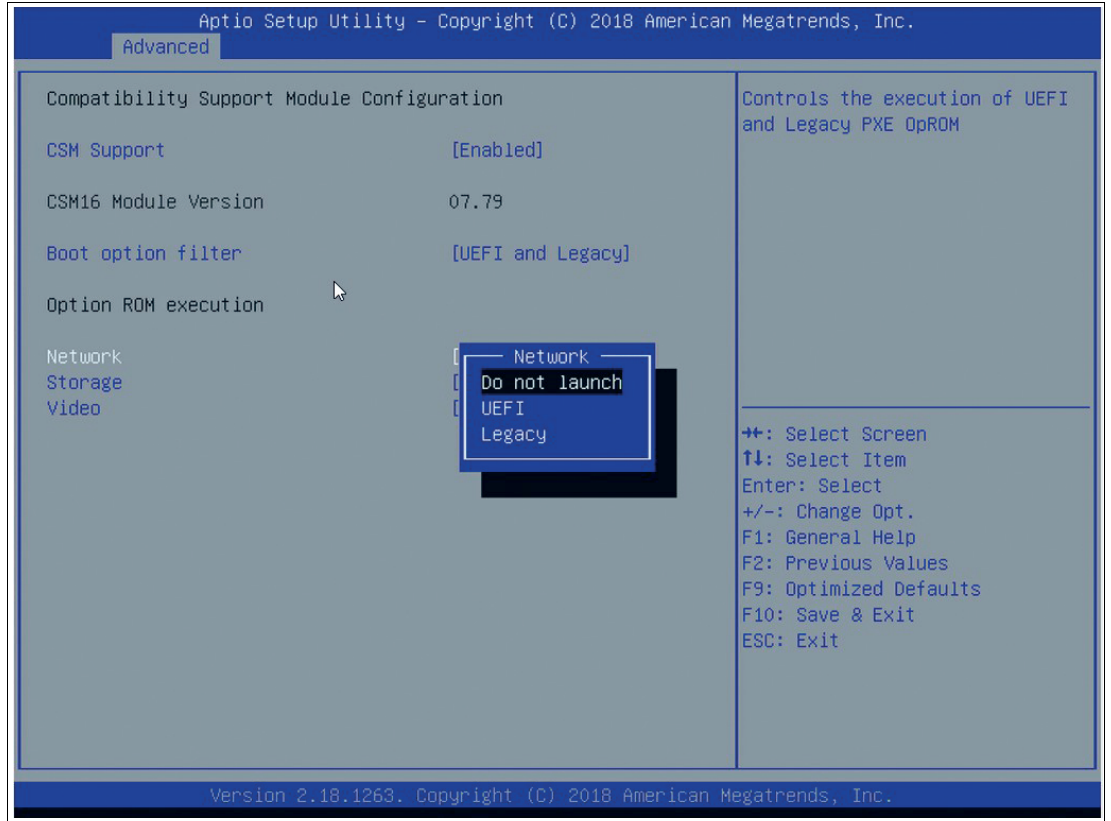


Figure 5.8 Configuring the compatibility support module

2. Select **CSM Configuration** with the arrow keys and press **ENTER**.
3. Select **Network** with the arrow keys. Press **ENTER**. Select **UEFI** or **Legacy**, depending on what your PXE server supports. Press **ENTER** in the pop-up window.



## Setting Priorities for Boot Options

The "Boot" page allows you to set the priority of all boot devices.

1. Using the arrow keys, select the `Boot Option Priority` you wish to change. Press `ENTER`. The options window will open.

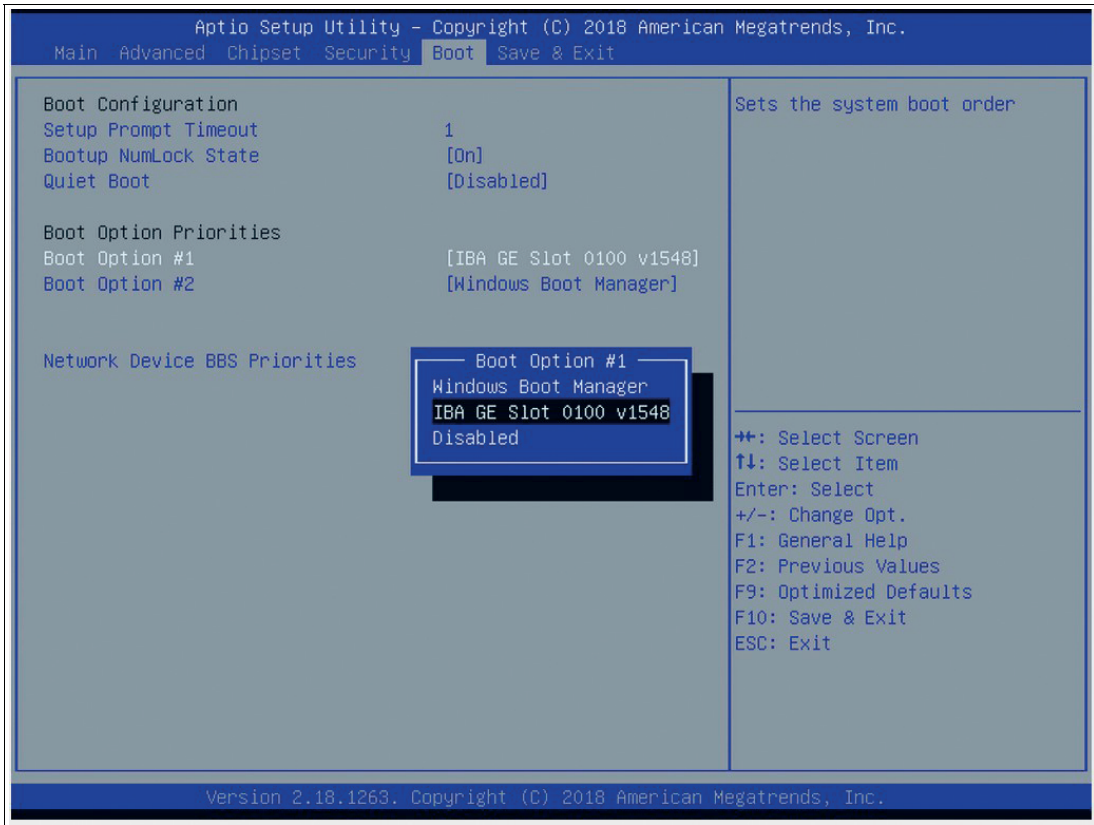


Figure 5.9 Boot option priorities

2. Select the equipment category `PXE= IBA GE Slot 0100 v1548` or `IBA GE Slot 0200 v1548` depending on the port being used. Press `ENTER`.

## Power Management

The system starts automatically when the power supply is turned on. In the event of a power failure, the device will also automatically power up after the power supply has been restored. This is a default setting that cannot be changed.



## Save Options

Select "Save & Exit" from the BIOS setup page.

Save the changes and exit the system.

When you have finished making changes to the system configuration, save the changes using the following instructions.



### Saving Configuration Changes

1. Select `Save Changes` and "Exit" using the arrow keys. Press ENTER.
2. Select `Yes`. Press ENTER to save the changes and exit the system.
3. Select `No` to exit the process without saving the changes.

The new system configuration settings take effect after the system is restarted.



### Discarding Changes and Exiting the System

Use the following instructions to exit the system without saving the changes.

1. Using the arrow keys, select `Discard Changes` and "Exit." Press ENTER.
2. Select `Yes`. Press ENTER to discard the changes and exit the system.
3. Select `No` to exit the process.

## 5.6 Resetting the BIOS to Factory Settings



### Restoring Default Settings

You can restore the system using the following instructions.

1. Use the arrow keys to select `Restore Defaults`. Press ENTER.
2. Select `Yes`. Press ENTER to load the optimized default settings.
3. Select `No` to exit the process.



### Restoring the Factory Settings with F9

1. Press F9: `Optimized Defaults`. Press ENTER.
2. Select `Yes`. Press ENTER to load the optimized default settings.
3. Select `No` to exit the process.

## 6 Service and Support

For more information about the products described in this document, visit [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

Please have the following information ready when contacting your local representative or technical support:

- Product name
- Serial number of the product
- Image version and RM shell version

## 7 Accessories

### Power Supply, Cables, and Connectors

Part number	Type code	Description
548328	FSP065-RBBN3	AC/DC power supply Input: 100 VAC – 240 VAC, 50 Hz – 60 Hz Output: 19 VDC Maximum current: 3.42 A Connector: 2.5 mm DC socket with locking mechanism Approvals: CE, FCC class B, UL listed, GS, CCC Power cable: 1 x EU type and 1 x US type
548400	ATEN-LockPro	Locking device for securing cables on the BTC12 Each pack contains 10 locks
70105588	S-BN-19/1800-UK1	Power supply cable with protective conductor Type: IEC-60320-C5 Country: United Kingdom, Ireland (Type G, BS 1363) Length: approx. 1.8 m
70105589	S-BN-19/1800-AU1	Power supply cable with protective conductor Type: IEC-60320-C5 Country: Australia (Type I, AS 3112) Length: approx. 1.8 m
70105590	S-BN-19/1800-CH1	Power supply cable with protective conductor Type: IEC-60320-C5 Country: Switzerland (Type J, SEV 1011) Length: approx. 1.8 m
70105591	S-BN-19/1800-IT1	Power supply cable with protective conductor Type: IEC-60320-C5 Country: Italy (Type L, CEI 23-16-VII) Length: approx. 1.8 m
70105592	S-BN-19/1800-DK1	Power supply cable with protective conductor Type: IEC-60320-C5 Country: Denmark (Type K, IEC 60906-1) Length: approx. 1.8 m
70100504	BTC12-CBL-DC-JACK-2100	Connector: 5.5/2.5 mm DC socket with locking mechanism Open cable ends with wire end ferrules Cable length: 2.1 m

### Mounting Aids

Part number	Type code	Description
548401	BTC12-KIT-DIN-RAIL	DIN rail mounting kit for BTC12
548402	BTC12-KIT-VESA-MOUNT	VESA mounting bracket kit for BTC12 (100 x 100mm and 75 x 75 mm)

## Video Cables and Video Adapters

Part number	Type code	Description
548403	CLUB3D-CAC-1073	Active adapter cable for BTC12 DisplayPort™ 1.2 connector to HDMI 2.0 UHD connector (4K at 60 Hz) Cable length: 3 m
548404	CLUB3D-CAC-1056	Passive adapter cable for BTC12 DisplayPort™ 1.1 connector to HDMI 1.4 socket Cable length: 0.2 m
548405	CLUB3D-CAC-2070	Active adapter cable for BTC12 DisplayPort™ 1.2 connector to HDMI 2.0 UHD socket (4K at 60 Hz) Cable length: 0.2 m
548406	STARTECH-DP2DVI2	Passive adapter cable for BTC12 DisplayPort™ 1.1 connector to DVI-D socket Cable length: 0.15 m
548407	STARTECH-DP2VGA3	Active adapter cable for BTC12 DisplayPort™ 1.1 connector to VGA socket Cable length: 0.23 m

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