Automation PC 510

User's Manual

Version: **1.01 (June 2012)**
Order no.: **MAAPC510-GER**

Chapter 1 • General information

1 Manual history

Version	Date	Change
0.10 Preliminary	26-Aug-11	• First version
1.00	08-May-12	• Chapter 4 "Software" updated. • Chapter 6 "Maintenance / Service" updated. • Terminal block 0TB1208.3100 (interface board plug) updated in Chapter 5 " Accessories". • New CompactFlash cards 5CFCRD.xxxx-06 updated in Chapter 5 " Accessories". CompactFlash cards 5CFCRD.xxxx-04 discontinued. • Interface board 5PP5IF.FETH-00 updated on page 5PP5IF.FETH-00. • Hard disk 5MMHDD.0250-00 updated on page 5MMHDD.0250-00. • Sections "Temperature specifications" on page 18, " Humidity specifications" on page 20 and "Power management" on page 21 updated in Chapter 2 "Technical data". • Section " Mounting orientation" on page 62 updated in Chapter 3 "Commissioning".
1.01	18-Jun-12	• Section "Cable lengths and resolutions for SDL transfer" on page 54 updated.

2 Safety guidelines

2.1 Intended use

Programmable logic controllers (PLCs), operating/monitoring devices (industrial PCs, Power Panels, Mobile Panels, etc.), and B&R uninterruptible power supplies have been designed, developed, and manufactured for conventional use in industrial environments. They were not designed, developed and manufactured for any use involving serious risks or hazards that could lead to death, injury, serious physical damage or loss of any kind without the implementation of exceptionally stringent safety precautions. In particular, such risks and hazards include the use of these devices to monitor nuclear reactions in nuclear power plants, their use in flight control or flight safety systems as well as in the control of mass transportation systems, medical life support systems or weapons systems.

2.2 Protection against electrostatic discharge

Electrical components that can be damaged by electrostatic discharge (ESD) must be handled accordingly.

2.2.1 Packaging

- **Electrical components with a housing**
  … do not require special ESD packaging but must be handled properly (see Section "Electrical components with housing").
- **Electrical components without a housing**
  … must be protected by ESD-suitable packaging.

2.2.2 Guidelines for proper ESD- handling

Electrical components with a housing

- Do not touch the connector contacts on connected cables.
- Do not touch the contact tips on circuit boards.

Electrical components without a housing

The following apply in addition to "Electrical components with housing":

- Any persons handling electrical components or devices with electrical components installed in them must be grounded.
- Components may only be touched on their narrow sides or front plate.
- Components should always be stored in a suitable medium (ESD packaging, conductive foam, etc.). Metallic surfaces are not suitable storage surfaces!
- Components should not be subjected to electrostatic discharge (e.g. through the use of charged plastics).
- Ensure a minimum distance of 10 cm from monitors and TV sets.
- Measurement devices and equipment must be grounded.
- Measurement probes on potential-free measurement devices must be discharged on sufficiently grounded surfaces before taking measurements.

Individual components

- ESD protective measures for individual components are thoroughly integrated at B&R (conductive floors, footwear, arm bands, etc.).
- These increased ESD protective measures for individual components are not necessary for customers handling B&R products.

2.3 Policies and procedures

Electronic devices are never completely failsafe. In the event of a failure on the programmable control system, operating/monitoring device or uninterruptible power supply, the user is responsible for ensuring that other devices that may be connected, e.g. motors, are brought to a safe state.

When using programmable logic controllers or operating/monitoring devices as control systems in conjunction with a Soft PLC (e.g. B&R Automation Runtime or comparable product) or slot PLC (e.g. B&R LS251 or comparable product), the safety precautions applying to industrial control systems (e.g. the provision of safety devices such as emergency stop circuits, etc.) must be observed in accordance with applicable national and international regulations. The same applies for all other devices connected to the system, such as drives.

All tasks such as installation, commissioning and maintenance are only permitted to be carried out by qualified personnel. Qualified personnel are those familiar with the transport, mounting, installation, commissioning and operation of the device who also have the appropriate qualifications (e.g. IEC 60364). National accident prevention regulations must be observed.
The safety notices, connection descriptions (type plate and documentation) and limit values listed in the technical data are to be read carefully before installation and commissioning and must be observed.

2.4 Transport and storage

During transport and storage, devices must be protected against undue stress (mechanical loads, temperature, humidity, aggressive atmospheres, etc.).

2.5 Mounting

- Installation must be performed according to this documentation using suitable equipment and tools.
- Devices may only be installed by qualified personnel without voltage applied. Before installation, voltage to the control cabinet must be switched off and prevented from being switched on again.
- General safety guidelines and national accident prevention regulations must be observed.
- Electrical installation must be carried out according to applicable guidelines (e.g. line cross-section, fuses, protective ground connections).

2.6 Operation

2.6.1 Protection against touching electrical parts

To operate programmable logic controllers, operating/monitoring devices or uninterruptible power supplies, certain components must carry dangerous voltage levels of over 42 VDC. Touching one of these parts can result in a life-threatening electric shock. This could lead to death, severe injury or damage to equipment.

Before turning on the programmable logic controller, operating/monitoring devices and the uninterruptible power supply, the housing must be properly grounded (PE rail). Ground connections must be established when testing operating/monitoring devices or the uninterruptible power supply even when operating them for only a short time!

Before turning the device on, all parts that carry voltage must be securely covered. During operation, all covers must remain closed.

2.6.2 Environmental conditions - Dust, humidity, aggressive gases

The use of operating/monitoring devices (e.g. industrial PCs, Power Panels, Mobile Panels, etc.) and uninterruptible power supplies in very dusty environments should be avoided. Dust collection on the devices can affect functionality and may prevent sufficient cooling, especially in systems with active cooling systems (fans).

The presence of aggressive gases can also lead to malfunctions. When combined with high temperature and humidity, aggressive gases – e.g. with sulfur, nitrogen and chlorine components – can induce chemical reactions that can damage electronic components very quickly. Signs of the presence of aggressive gases are blackened copper surfaces and cable ends on existing equipment.

For operation in dusty or humid conditions, correctly installed (cutout installation) operating/monitoring devices like the Automation Panel or Power Panel are protected on the front side. The rear side of all devices must be protected from dust and humidity and cleaned at suitable intervals.

2.6.3 Programs, viruses and dangerous programs

This system is subject to potential risk each time data is exchanged or software is installed from a data medium (e.g. diskette, CD-ROM, USB flash drive, etc.), a network connection or the Internet. The user is responsible for assessing these dangers, implementing preventive measures such as virus protection programs, firewalls, etc. and making sure that software is only obtained from trusted sources.

2.7 Environmentally friendly

All B&R programmable controllers, operating/monitoring devices and uninterruptible power supplies are designed to inflict as little harm as possible on the environment.

2.7.1 Separation of materials

It is necessary to separate different materials so the device can undergo an environmentally friendly recycling process.

Component	Disposal
Programmable logic controllers Operating/monitoring devices Uninterruptible power supply Batteries & rechargeable batteries Cables	Electronics recycling
Cardboard box / paper packaging	Paper / cardboard recycling
Plastic packaging	Plastic recycling

Table 1: Environmentally friendly separation of materials

Disposal must comply with applicable legal regulations.

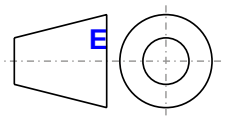
3 Organization of safety notices

The safety notices in this manual are organized as follows:

Safety notice	Description
Danger!	Disregarding safety regulations and notices can be life-threatening.
Caution!	Disregarding safety regulations and notices can result in severe injury or substantial damage to equipment.
Warning!	Disregarding safety guidelines and notices can result in injury or damage to equipment.
Information:	Important information for preventing errors.

Table 2: Organization of safety notices

4 Guidelines



European dimension standards apply to all dimension diagrams in this document.

All dimensions are specified in mm.

Nominal measurement area	General tolerance according to DIN ISO 2768 medium
Up to 6 mm	±0.1 mm
For 6 to 30 mm	±0.2 mm
For 30 to 120 mm	±0.3 mm
For 120 to 400 mm	±0.5 mm
For 400 to 1000 mm	±0.8 mm

Table 3: Nominal measurement areas

5 Overview

Product ID	Short description	on page
5PC510.SX01-00	APC510 System Unit connections for 1x RS232, 2x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; I/O board (5PP5IO.GMAC-00) and 24 VDC plug for supply voltage (screw clamp: 0TB103.9; cage clamp: 0TB103.91) must be ordered separetely.	32
5PP5IO.GMAC-00	APC510 I/O board connections for 2x USB 2.0, 1x RS232/422/485, HDA sound, Smart Display Link/DVI-D; optional Hard Disk	53
	Automation Runtime	
1A4600.10-5	B&R Automation Runtime ARwin, incl. License Label	139
1A4601.06-5	B&R Automation Runtime ARemb, incl. License Label	139
1A4601.06-T	B&R Automation Runtime ARemb Terminal, incl. License Label	139
	Batteries	
0AC201.91	Lithium batteries 4 pieces, 3 V / 950 mAh button cell Hereby we declare that the Lithium cells contained in this shipment qualify as „partly regulated“. Handle with care. If the package is damaged, inspect cells, repack intact cells and protect cells against short circuits. For emergency information, call RENATA SA at + 41 61 319 28 27	146
4A0006.00-000	Lithium battery, 3 V / 950 mAh, button cell	146
	CPU boards	
5PP5CP.US15-00	Intel Atom Z510 CPU board, 1100 MHz, single-core, 400 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 module	36
5PP5CP.US15-01	Intel Atom Z520 CPU board, 1330 MHz, single-core, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 module	36
5PP5CP.US15-02	Intel Atom Z530 CPU board, 1600 MHz, single-core, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 module	36
	CompactFlash	
5CFCRD.0064-03	CompactFlash 64 MB Western Digital (SLC)	155
5CFCRD.0128-03	CompactFlash 128 MB Western Digital (SLC)	155
5CFCRD.016G-06	CompactFlash 16 GB B&R (SLC)	151
5CFCRD.0256-03	CompactFlash 256 MB Western Digital (SLC)	155
5CFCRD.0512-03	CompactFlash 512 MB Western Digital (SLC)	155
5CFCRD.0512-06	CompactFlash 512 MB B&R (SLC)	151
5CFCRD.1024-03	CompactFlash 1 GB Western Digital (SLC)	155
5CFCRD.1024-06	CompactFlash 1 GB B&R (SLC)	151
5CFCRD.2048-03	CompactFlash 2 GB Western Digital (SLC)	155
5CFCRD.2048-06	CompactFlash 2 GB B&R (SLC)	151
5CFCRD.4096-03	CompactFlash 4 GB Western Digital (SLC)	155
5CFCRD.4096-06	CompactFlash 4 GB B&R (SLC)	151
5CFCRD.8192-03	CompactFlash 8 GB Western Digital (SLC)	155
5CFCRD.8192-06	CompactFlash 8 GB B&R (SLC)	151
	DVI cables	
5CADVI.0018-00	DVI-D cable, 1.8 m.	161
5CADVI.0050-00	DVI-D cable, 5 m.	161
5CADVI.0100-00	DVI-D cable, 10 m.	161
	Drives	
5MMHDD.0250-00	250 GB SATA Hard Disk Spare part for 5AC801.HDDI-03 and 5ACPCI.RAIC-05; Remark: Please see manual for proper use of the hard disk.	59
	Interface boards	
5PP5IF.CETH-00	PP500 interface board; connection for 1x Ethernet 10/100/1000	38
5PP5IF.CHDA-00	PP500 interface board; connection for 1x MIC, 1x Line IN, 1x Line OUT	40
5PP5IF.FCAN-00	PP500 interface board; connection for 1x CAN master, 512 kB SRAM; order plug separately (cage clamp: 0TB1208.3100)	47
5PP5IF.FETH-00	PP500 interface board; connection for 1x Ethernet 10/100/1000, 512 kB SRAM	42
5PP5IF.FPLM-00	PP500 interface board; connections for 2x POWERLINK (with integrated hub); 512 kB SRAM.	44
5PP5IF.FX2X-00	PP500 interface board; connection for 1x X2X master, 512 kB SRAM; order plug separately (cage clamp: 0TB1208.3100)	49
5PP5IF.FXCM-00	PP500 interface board; connection for 1x CAN master, 1x X2X master, 512 kByte SRAM; order plug separately (cage clamp: 0TB1208.3100)	51
	Main memory	
5MMDDR.0512-01	SO-DIMM DDR2 RAM 512 MB PC2-5300	37
5MMDDR.1024-01	SO-DIMM DDR2 RAM 1024 MB PC2-5300	37
5MMDDR.2048-01	SO-DIMM DDR2 RAM 2048 MB PC2-5300	37
	RS232 cables	
9A0014.02	RS232 extension cable for remote operating of a display unit with touch screen, 1.8 m.	178
9A0014.05	RS232 extension cable for remote operating of a display unit with touch screen, 5 m.	178
9A0014.10	RS232 extension cable for remote operating of a display unit with touch screen, 10 m.	178
	SDL cables	
5CASDL.0018-00	SDL cable, 1.8 m.	164
5CASDL.0050-00	SDL cable, 5 m.	164
5CASDL.0100-00	SDL cable, 10 m.	164
5CASDL.0150-00	SDL cable, 15 m.	164
5CASDL.0200-00	SDL cable, 20 m.	164
5CASDL.0250-00	SDL cable, 25 m.	164
5CASDL.0300-00	SDL cable, 30 m.	164
	SDL cables: 45° connectors	
5CASDL.0018-01	SDL cable; 45° connector, 1.8 m.	167
5CASDL.0050-01	SDL cable; 45° connector, 5 m.	167
5CASDL.0100-01	SDL cable; 45° connector, 10 m.	167

Product ID	Short description	on page
5CASDL.0150-01	SDL cable; 45° connector, 15 m.	167
	SDL flex cables	
5CASDL.0018-03	SDL Cable flex, 1.8 m.	170
5CASDL.0050-03	SDL cable flex, 5 m.	170
5CASDL.0100-03	SDL cable flex, 10 m.	170
5CASDL.0150-03	SDL cable flex, 15 m.	170
5CASDL.0200-03	SDL cable flex, 20 m.	170
5CASDL.0250-03	SDL cable flex, 25 m.	170
5CASDL.0300-03	SDL cable flex, 30 m.	170
5CASDL.0300-13	SDL cable flex with extender, 30 m.	173
5CASDL.0400-13	SDL cable flex with extender, 40 m.	173
5CASDL.0430-13	SDL Cable flex with extender, 43 m.	173
	Terminal blocks	
0TB103.9	Connector, 24 VDC, 3-pin female, screw clamps 3.31 mm², protected against vibration by the screw flange	147
0TB103.91	Connector, 24 VDC, 3-pin female, cage clamps 3.31 mm², protected against vibration by the screw flange	147
0TB1208.3100	Connector, 8-pin, cage clamp, 1 mm², protected against vibration by the screw flange.	148
	USB accessories	
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R	159
	USB cables	
5CAUSB.0018-00	USB 2.0 connecting cable type A - type B, 1.8 m.	177
5CAUSB.0050-00	USB 2.0 connecting cable type A - type B, 5 m.	177
	Windows 7	
5SWWI7.0100-ENG	Microsoft OEM Windows 7 Professional 32-bit, DVD, English. Only available with a new device.	132
5SWWI7.0100-GER	Microsoft OEM Windows 7 Professional 32-bit, DVD, German. Only available with a new device.	132
5SWWI7.0300-MUL	Microsoft OEM Windows 7 Ultimate 32-bit, DVD, multilaguange. Only available with a new device.	132
	Windows CE 6.0	
5SWWCE.0837-ENG	Microsoft OEM Windows CE 6.0 Professional, English; for APC510; please order CompactFlash separately (minimum 128 MB).	137
	Windows Embedded Standard 7	
5SWWI7.0537-ENG	Microsoft OEM Windows Embedded Standard 7 32-bit, English; for APC510; please order CompactFlash separately (minimum 8 GB).	135
5SWWI7.0737-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, multilanguage; for APC510; please order CompactFlash separately (minimum 8 GB).	135
	Windows XP Professional	
5SWWXP.0600-ENG	Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a B&R device.	131
5SWWXP.0600-GER	Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a device.	131
5SWWXP.0600-MUL	Microsoft OEM Windows XP Professional Service Pack 3, CD, multilanguage. Only available with a B&R device.	131

Chapter 2 • Technical data

1 Introduction

The APC510 and APC511 are the first choices when it comes to running applications where good performance needs to be combined with particularly compact dimensions. These devices are based on Intel Atom processors, which are optimized for minimum power dissipation. In the consumer area, this means extended battery life for laptops; for usage in industrial environments, however, the strength of Atom processors lies in their ability to reach the upper end of the temperature scale without requiring the use of fans. B&R is able to draw on many years of experience in the area of heat balancing, which makes it possible to operate even selected Core2 Duo processors fan-free. The most important factor considered when designing the APC510 and APC511 was keeping their dimensions to an absolute minimum, and this meant doing away with the space normally taken up by fans. Another factor that contributes to their compact design is the absence of slots for PCI and PCI Express cards, as well as for standard drives such as CD/DVD-ROM. Despite this, however, these Automation PCs are not limited at all in terms of modularity and flexibility. A gigabit Ethernet interface, USB 2.0 ports and serial interfaces are all part of the standard package, along with sound output (High Definition Audio) and a removable external CompactFlash card.

The APC510 builds on the proven design of the Automation PC series. Its book form and minimal footprint means that it requires very little of the valuable space in the control cabinet. The CompactFlash slot, CMOS battery as well as the power and reset buttons are easily accessible behind the front cover.

1.1 Features

- Intel® Atom™ Z510, Z520 or Z530 processor
- Up to 2 GB SDRAM
- 2x USB 2.0
- 1x RS232
- 1x Ethernet 10/100/1000 Mbit/s
- Optional interface boards
- 1 CompactFlash slot (type I)
- 24 VDC supply voltage
- Operation without fan or heat sink
- BIOS (Insyde)
- Real-time clock (RTC, battery-backed)

1.2 System components / configuration

The APC510 system can be assembled to meet individual requirements and operating conditions.

The following components are absolutely essential for operation:

- System unit
- CPU board
- Main memory
- I/O board
- Drive (mass storage device such as CompactFlash card) for the operating system
- Power connector (terminal block)

1.2.1 Configuration – Base system

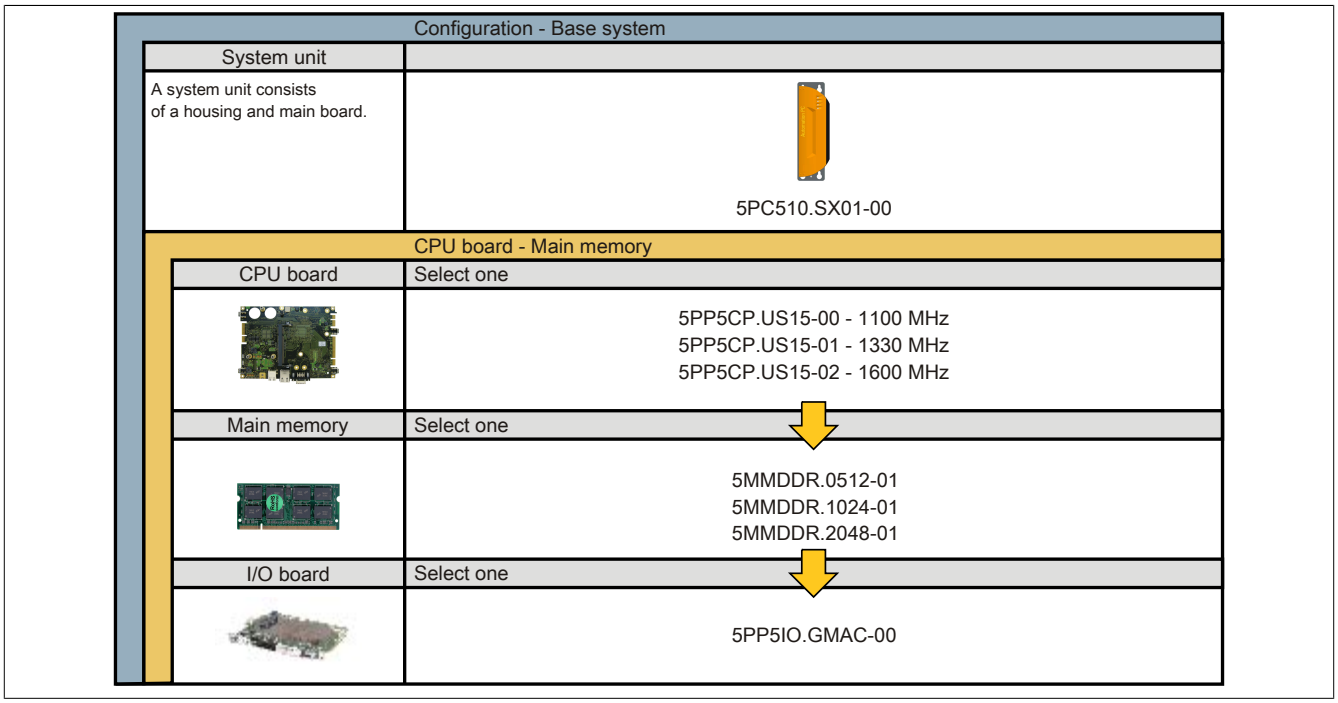


Image 1: Configuration - Base system

1.2.2 Configuration - Software and accessories

Configuration - Software and accessories	
System unit	
A system unit consists of a housing and main board.	 5PC510.SX01-00
Hard disk	Select one
	5MMHDD.0250-00 - SATA-HDD 250 GB
Interface board	Select one
	5PP5IF.CETH-00 - 1x ETH 10/100/100 5PP5IF.CHDA-00 - 1x HDA sound 5PP5IF.FETH-00 - 1x ETH 10/100/100, SRAM 5PP5IF.FPLM-00 - 2x POWERLINK, SRAM 5PP5IF.FCAN-00 - 1x CAN, SRAM 5PP5IF.FX2X-00 - 1x X2X, SRAM 5PP5IF.FXCM-00 - 1x CAN, 1x X2X, SRAM
CompactFlash	Select one
	5CFCRD.0512-06 5CFCRD.4096-06 5CFCRD.1024-06 5CFCRD.8192-06 5CFCRD.2048-06 5CFCRD.016G-06
USB accessories	Select one
	5MMUSB.2048-01
Software	Select one
Windows XP, Windows 7, Automation Runtime, Windows Embedded Standard 2009, Windows Embedded Standard 7, Windows CE	**Windows XP** 5SWWXP.0600-ENG 5SWWXP.0600-GER 5SWWXP.0600-MUL **Windows 7** 5SWWI7.0100-ENG 5SWWI7.0100-GER 5SWWI7.0300-MUL **Automation Runtime** 1A4600.10-5 1A4601.06-5 1A4601.06-T **Windows Embedded Standard 2009** 5SWWI7.0537-ENG **Windows Embedded Standard 7** 5SWWI7.0537-ENG 5SWWI7.0737-MUL **Windows CE 6.0** 5SWWCE.0837-ENG
Terminal blocks	Select 1 each
	**Power connectors** 0TB103.9 0TB103.91 **Interface board connection** 0TB1208.3100

Image 2: Configuration - Software and accessories

2 Complete device

2.1 Temperature specifications

Temperature specifications must take both the permissible temperature range of the system unit as well as that of the installed components into consideration. The latter can be found in the technical data for the individual components.

The permissible temperature ranges based on the type of installation must also be taken into consideration. For more information about this, refer to the section " Mounting orientation" on page 62.

Information regarding worst-case conditions

- Thermal Analysis Tool (TAT V2.02) from Intel for simulating a 100% processor load
- BurnInTest tool (BurnInTest V4.0 Pro from Passmark Software) for simulating a 100% load on the interface via loop back adapters (serial interfaces, USB ports)
- Maximum system expansion and power consumption

2.1.1 Temperature sensor locations

Sensors monitor temperature values at various locations (USB ports, main memory) inside the APC510. These temperatures[1)] can be read in Microsoft Windows operating systems using the B&R Control Center[2)] or in Automation Runtime using data points in Automation Studio.

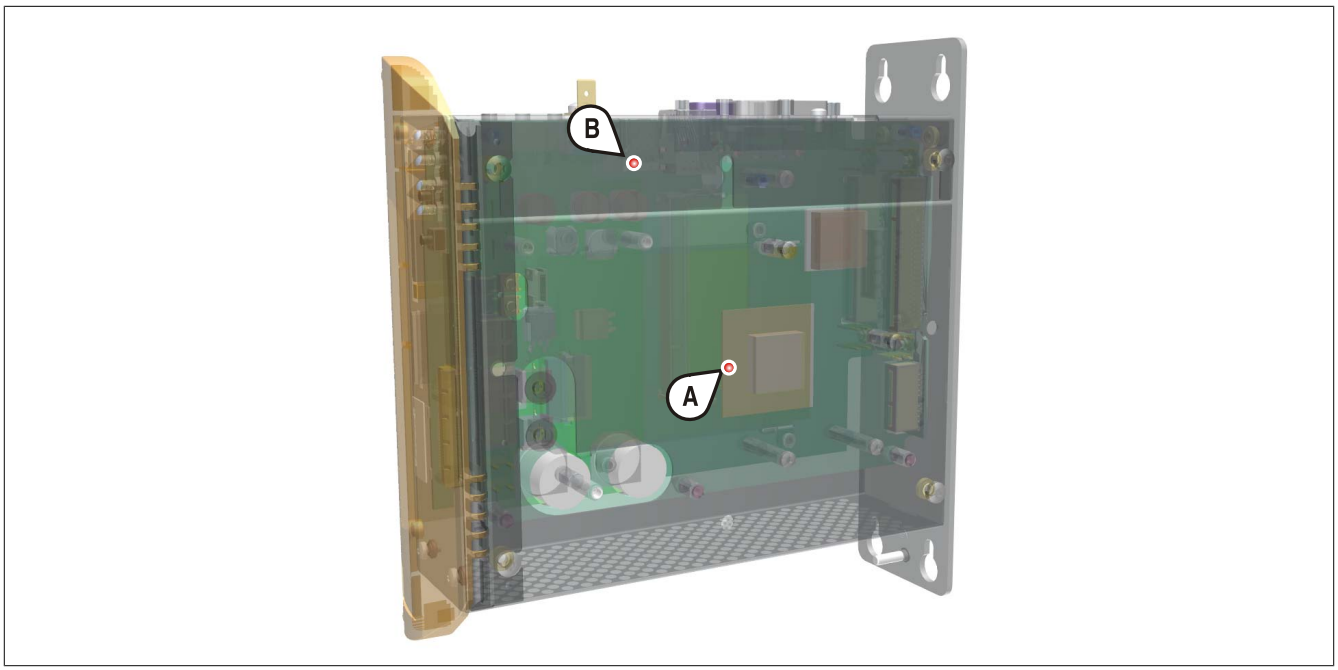


Image 3: Temperature sensor locations

Position	Measurement point for	measurement	Max. specified
A	CPU	Ambient temperature of the processor (sensor integrated in the processor)	100°C: 5PP5CP.US15-00, 5PP5CP.US15-01 90°C: 5PP5CP.US15-02
A	Main memory	Ambient temperature of the main memory (sensor integrated in the processor)	80°C
B	Interfaces	Temperature of the interfaces (sensor integrated next to the USB ports).	80°C
	Interface board	Temperature of an interface board (sensor integrated on the interface board)	Board-specific
	I/O board	Temperature of an I/O board (sensor integrated on the I/O board)	Board-specific

Table 4: Temperature sensor locations

1) The temperature measured approximates the immediate ambient temperature but may also be influenced by neighboring components.
2) The B&R Control Center is included in the ADI driver, which is available in the Downloads section of the B&R website (www.br-automation.com).

2.1.2 Temperature monitoring

Sensors monitor temperature values in various places (CPU, interfaces, interface board, I/O board) inside the APC510. The locations of the temperature sensors can be seen in "Image 3: Temperature sensor locations" on page 18. The values listed in the table represent the defined maximum temperature[3)] for the respective measurement point. An alarm is not triggered if this temperature is exceeded. These temperatures can be read in BIOS or in approved Microsoft Windows operating system together with Automation Runtime and the B&R Control Center.

3) The temperature measured approximates the immediate ambient temperature but may also be influenced by neighboring components.

2.2 Humidity specifications

The following table displays the minimum and maximum relative humidity for the individual components that are relevant for the humidity limitations of the entire device. The lowest and highest common values are always used when establishing these limits.

Component		Operation[1)]	Storage / Transport[1)]
System units		5 to 90%	5 to 95%
US15W - CPU boards		5 to 90%	5 to 95%
Main memory for CPU boards		10 to 90%	5 to 95%
Interface boards	5PP5IF.CETH-00	5 to 90%	5 to 95%
	5PP5IF.CHDA-00	5 to 90%	5 to 95%
	5PP5IF.FETH-00	5 to 90%	5 to 95%
	5PP5IF.FPLM-00	5 to 90%	5 to 95%
	5PP5IF.FCAN-00	5 to 90%	5 to 95%
	5PP5IF.FETH-00	5 to 90%	5 to 95%
	5PP5IF.FX2X-00	5 to 90%	5 to 95%
	5PP5IF.FXCM-00	5 to 90%	5 to 95%
I/O boards	5PP5IO.GMAC-00	5 to 90%	5 to 95%
Accessories	5CFCRD.xxxx-06 CompactFlash cards	85%	85%
	5CFCRD.xxxx-04 CompactFlash cards	85%	85%
	5CFCRD.xxxx-03 CompactFlash cards	8 to 95%	8 to 95%
	5MMUSB.2048-01 flash drive	10 to 90%	5 to 90%

Table 5: Overview of humidity specifications for individual components

1) Specifications correspond to non-condensing relative humidity.

The listed specifications correspond to the relative humidity at an ambient temperature of 30°C. More detailed information about the specific temperature-dependent humidity values can be found in the technical data for the individual components.

2.3 Power management

2.3.1 Block diagram - Supply voltage

The following block diagram illustrates the simplified structure of the supply voltage for system units.

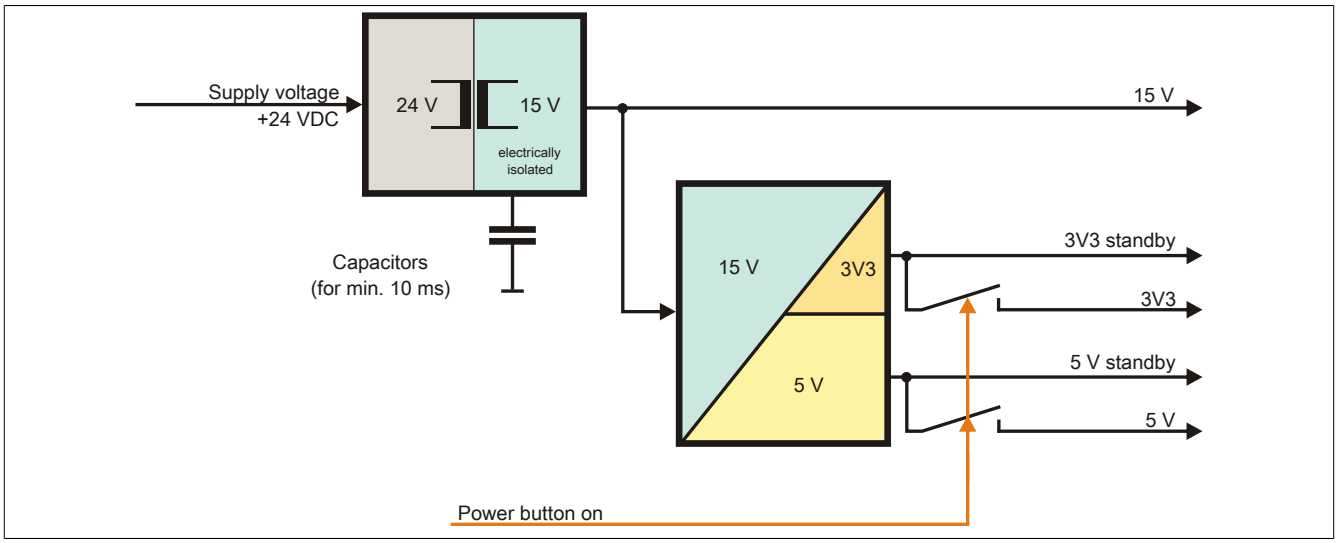


Image 4: Supply voltage for system units

Description

15 V is generated from the supply voltage using a DC/DC converter. This electrically isolated 15 V supplies further DC/DC converters, which generate the remaining voltage.

After the system is turned on (e.g. using the power button), the 3V3 and 5 V voltages are active on the system.

2.4 Device interfaces

2.4.1 Overview of device interfaces

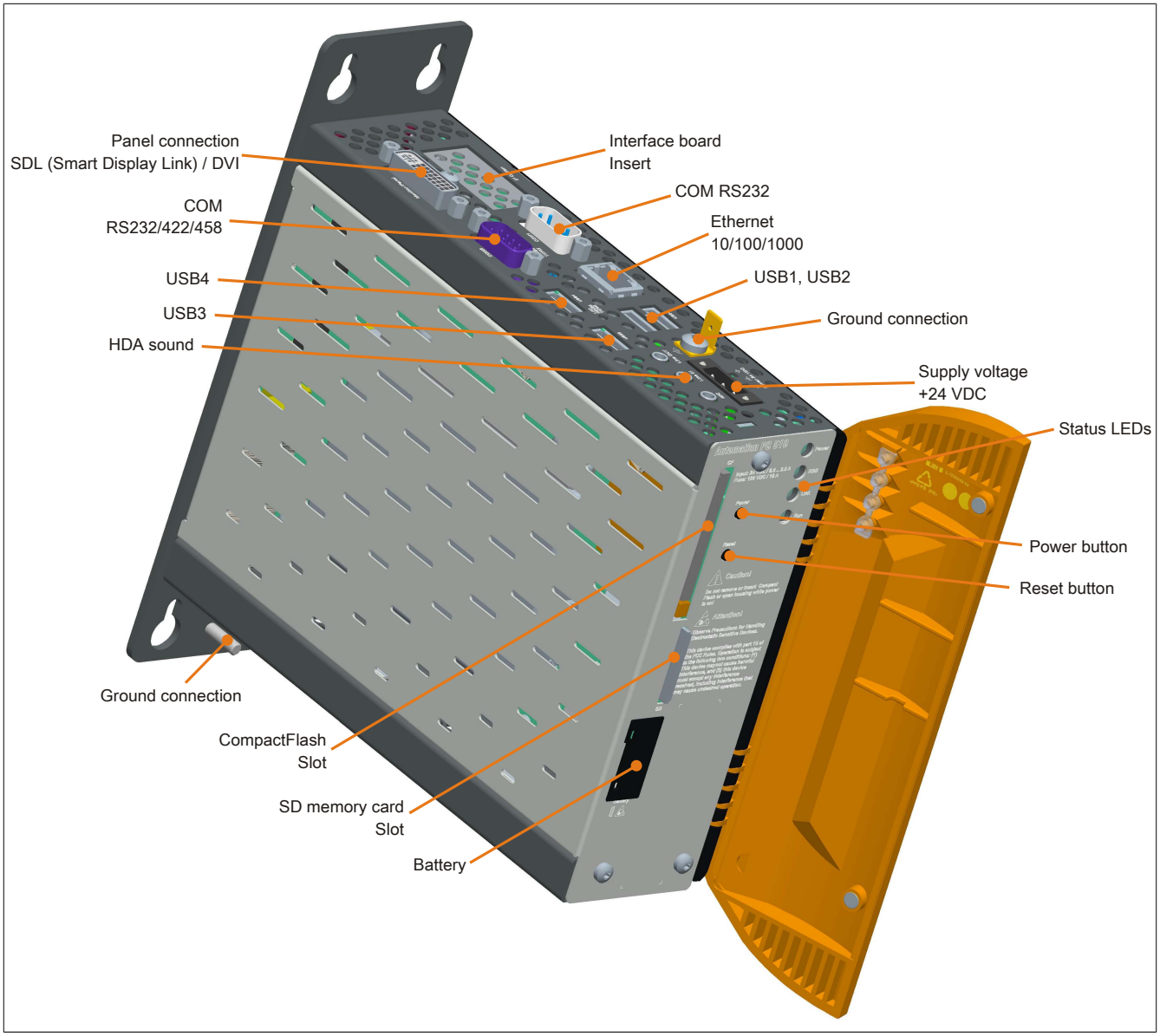


Image 5: Overview of interfaces with an inserted I/O board

2.4.2 Supply voltage +24 VDC

The 3-pin socket required for the supply voltage connection is not included in delivery. This can be ordered from B&R using model number 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp).

The pinout can be found either in the following table or printed on the APC510 housing. The supply voltage is protected internally by a soldered fuse (10 A, fast-acting) so that the device cannot be damaged if an overload occurs (fuse replacement necessary) or the voltage supply is connected incorrectly (reverse polarity protection - fuse replacement not necessary). The device must be returned to B&R for repairs if the fuse is blown due to an error.

Supply voltage		
Protected against reverse polarity		3-pin, male
Pin	**Description**	
1	+	
2	Functional ground	
3	-	
Model number	**Short description**	
	Terminal blocks	
0TB103.9	Connector 24 V 5.08 3-pin screw clamp	
0TB103.91	Connector 24 V 5.08 3-pin cage clamp	

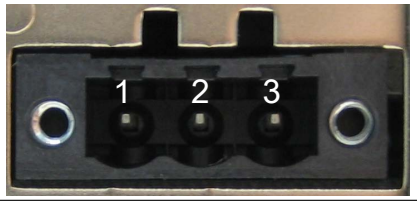


Table 6: 24 VDC supply voltage connection

Ground

Caution!

The pin's connection to the functional ground (pin 2) should be as short a path as possible (e.g. in the control cabinet). We recommend using the largest possible conductor cross section on the supply plug.

The grounding connection is located on the bottom of APC510 systems.

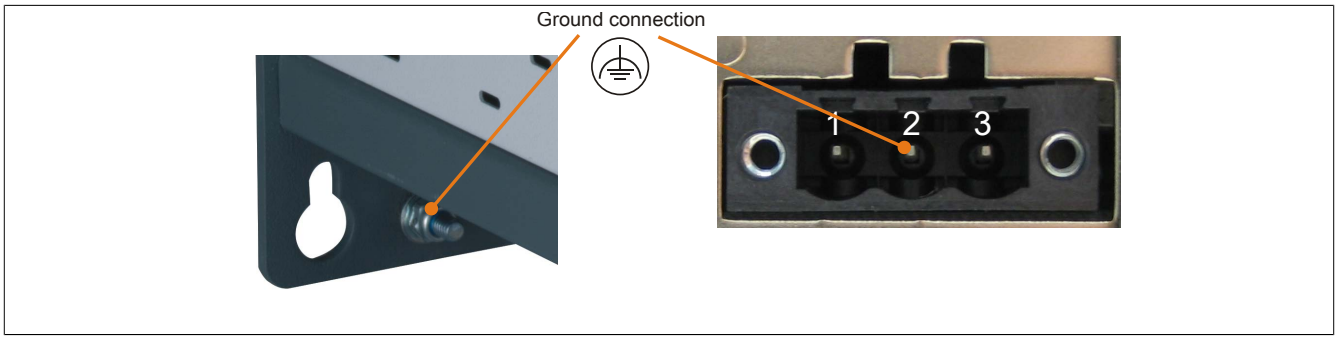


Image 6: Ground connection

The M4 self-locking nut can be used, for example, to fasten a copper strip that is built into the APC510 at a central grounding point in the control cabinet or system. The largest possible conductor cross section should be used (at least 2.5 mm²).

2.4.3 Serial interface COM1

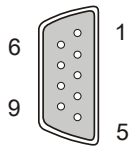
COM1 serial interface		
	RS232	9-pin DSUB plug 
Type	RS232, modem-capable, not electrically isolated	
UART	16550-compatible, 16-byte FIFO	
Transfer rate	Max. 115 kBaud	
Cable length	Max. 15 meters	
Pin	**assignment**	
1	DCD	
2	RXD	
3	TXD	
4	DTR	
5	GND	
6	DSR	
7	RTS	
8	CTS	
9	RI	

Table 7: Pinout - COM1

2.4.4 Ethernet (ETH)

This Ethernet controller is integrated in the CPU board and connected to external devices via the CPU board.

Ethernet connection (ETH)			
Controller	Intel 82574		RJ45 twisted pair (10BaseT/100BaseT), female
Cabling	S/STP (Cat5e)		
Transfer rate	10/100/1000 Mbit/s[1)]		
Cable length	Max. 100 m (min. Cat5e)		
Speed LED	**On**	**Off**	
Green	100 Mbit/s	10 Mbit/s[2)]	
Orange	1000 Mbit/s	-	
Link LED	**On**	**Off**	
Orange	Link (Ethernet network connection available)	Activity (blinking - data transfer in progress)	

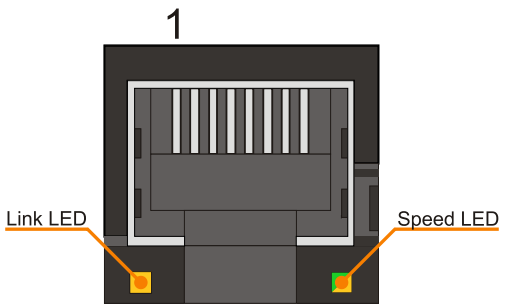


Table 8: Ethernet connection (ETH)

1) Switching takes place automatically.
2) The 10 Mbit/s transfer speed / connection is only present if the Link LED is also lit at the same time.

Driver support

A special driver is required in order to operate the Intel 82574 Ethernet controller. Drivers for approved operating systems are available in the Downloads area of the B&R website (www.br-automation.com).

Information:

Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.

2.4.5 USB ports (USB1, USB2)

The APC510 features a USB 2.0 (Universal Serial Bus) host controller with multiple USB ports, two of which are accessible externally for easy user access.

Warning!

Peripheral USB devices can be connected to the USB interfaces. Due to the vast number of USB devices available on the market, B&R cannot guarantee their performance. B&R does ensure the performance of all USB devices that they provide.

Caution!

Because this interface is designed according to general PC specifications, extreme care should be exercised with regard to EMC, cable routing, etc.

USB1, USB2 ports

Universal Serial Bus (USB1, USB2)[1]		
Type	USB 2.0	2x USB Type A, female
Design	Type A	
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)	
Current load[2] USB1, USB2	Max. 1 A	
Cable length	Max. 5 m (without hub)	

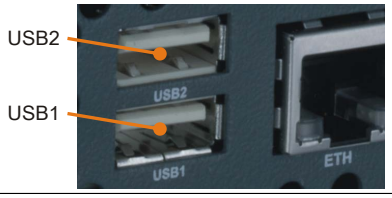


Table 9: USB1, USB2 ports

1) The interfaces, etc. available on the device or module have been numbered as such for easy identification. This numbering can differ from that used by the particular operating system.
2) Each USB port is secured with a maintenance-free "USB current-limiting circuit breaker" (max. 500 mA or 1 A).

2.4.6 Battery

The lithium battery (3 V, 950 mAh) buffers both the internal real-time clock (RTC) as well as data stored in the SRAM of interface cards. It is located behind the black cover on the front of the device. The battery's buffer lifespan is at least 4 years (at 50°C, 8.5 µA for the components being supplied and a self-discharge of 40%; if an interface board with SRAM is installed, then the lifespan is reduced to 2½ years). The battery has a limited lifespan and should be replaced regularly (after the specified service life at the latest).

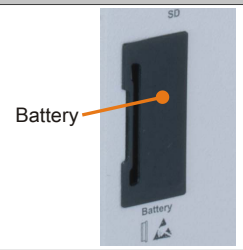
Battery		
Battery Type Removable Lifespan	 Renata 950 mAh Yes, accessible from the outside 4 years[1)]	
Model number	**Short description**	
	Batteries	
0AC201.91	Lithium batteries, 4 pcs., 3 V / 950 mAh, button cell	
4A0006.00-000	Lithium battery, 1 pc., 3 V / 950 mAh, button cell	

Table 10: Battery

1) At 50°C, 8.5 µA for the components being supplied and a self-discharge of 40%. If an interface board with SRAM is installed, then the lifespan is reduced to 2½ years.

Battery status evaluation

The status of the battery is determined immediately after the device is started and subsequently checked by the system every 24 hours. During this measurement, the battery is subjected to a brief (approximately 1 second) load and then evaluated. Once determined, the battery status is displayed in BIOS (under OEM Features - CPU Board Features - CPU Board Monitor) and in the B&R Control Center (ADI driver); it can also be read in a customer application using the ADI library.

Battery status	Meaning
N/A	The hardware or firmware being used is too old and does not support reading the battery status.
GOOD	Data buffering is provided.
BAD	Data buffering is provided for approximately another 500 hours from the point when battery capacity is recognized as insufficient (BAD).

Table 11: Meaning of the battery status

Data buffering is provided for approximately another 500 hours from the point when battery capacity is recognized as insufficient. When replacing the battery, data is buffered for approximately 10 minutes by a gold leaf capacitor.

2.4.7 CompactFlash slot

This CompactFlash slot is connected to the chipset internally via PATA IDE. Type I CompactFlash cards are supported.

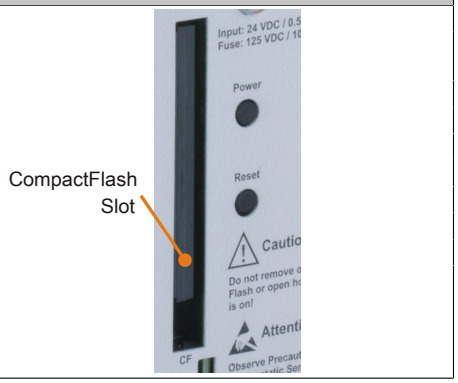
CompactFlash slot		
Connection	PATA Master	
CompactFlash Type	Type I	
Model number	**Short description**	
	CompactFlash	
5CFCRD.0512-06	B&R CompactFlash 512 MB	
5CFCRD.1024-06	B&R CompactFlash 1024 MB	
5CFCRD.2048-06	B&R CompactFlash 2048 MB	
5CFCRD.4096-06	B&R CompactFlash 4096 MB	
5CFCRD.8192-06	B&R CompactFlash 8192 MB	
5CFCRD.016G-06	B&R CompactFlash 16 GB	

Table 12: CompactFlash slot

Warning!

Turn off power before inserting or removing the CompactFlash card!

2.4.8 SD memory card slot

The SD memory card slot only supports SD memory cards, not SDHC cards. SD memory cards are only permitted for use as a mass storage device. It is not possible to boot from an SD card.

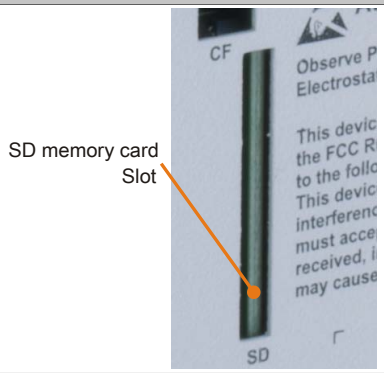
SD memory card slot		
		

Table 13: SD memory card slot

2.4.9 Power button

The power button provides a wide range of ATX power supply functions.

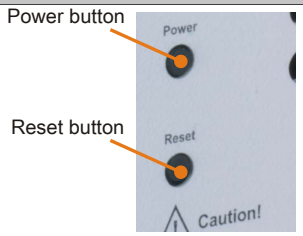
Power button	
The power button acts like the on/off switch on a normal desktop PC with an ATX power supply: **Press and release** ... Switches on the APC510 or shuts down the operating system and switches off the APC510 **Press and hold** ... Switches off the ATX power supply without shutting down the APC510 (could result in lost data!) Pressing the power button does not reset the MTCX processor.	

Table 14: Power button

2.4.10 Reset button

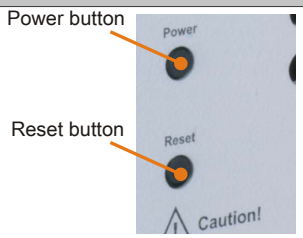
Reset button	
Pushing the reset button triggers a hardware and PCI reset. The APC510 is restarted (cold restart). Pressing the reset button does not reset the MTCX processor.	

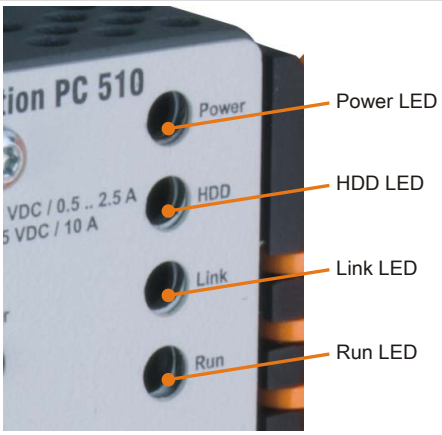
Table 15: Reset button

Warning!

A system reset can result in lost data!

2.4.11 Status LEDs

Status LEDs are located behind the device's orange front cover.



The following timing is used for the status LEDs:
Block size: 250 ms
Repeat interval: 500 ms; 2 boxes represent one interval

LED	Color	Status	Meaning	LED indicators
Power	Green	On	Supply voltage OK	
		Blinking	The device has booted, the battery status is "BAD".	
			Information: **For more information, see " Battery" on page 27.**	
	Red	On	The system is in standby mode (S5: soft-off mode or S4: hibernate mode - suspend-to-disk)	
		Blinking	The MTCX is running, the battery status is "BAD". The system is in standby mode (S5: soft-off mode or S4: hibernate mode - suspend-to-disk).	
	Red / green	Blinking	Faulty or incomplete BIOS, MTCX or I/O FPGA update, battery status OK, power supply OK	
			Faulty or incomplete BIOS, MTCX or I/O FPGA update, battery status OK, standby mode (S5: soft-off mode or S4: hibernate mode - suspend-to-disk)	
			Faulty or incomplete BIOS, MTCX or I/O FPGA update, battery status BAD, power supply OK	
			Faulty or incomplete BIOS, MTCX or I/O FPGA update, battery status BAD, standby mode (S5: soft-off mode or S4: hibernate mode - suspend-to-disk)	
			Information: **An update must be performed again.**	
CF	Yellow	On	Indicates IDE drive access (CF)	
Link	Yellow	On	Indicates an active SDL connection on the panel plug	
		Blinking	An active SDL connection has been interrupted by a loss of power to the display unit.	
			Information: **Check the power supply / power connector for the connected display unit.**	
Run	Green	Blinking	Automation Runtime booting Handled by Automation Runtime (ARemb and ARwin)	
	Green	On	Application running Handled by Automation Runtime (ARemb and ARwin)	
	Red	On	Application in service mode Handled by Automation Runtime (ARemb and ARwin)	

Table 16: Data - Status LEDs

2.4.12 Interface board slot

Interface board slot	
Model number	**Short description**
	Interface boards
5PP5IF.CETH-00	PP500 interface board; connection for 1x Ethernet 10/100/1000
5PP5IF.CHDA-00	PP500 interface board; connection for 1x MIC, 1x Line IN, 1x Line OUT
5PP5IF.FETH-00	PP500 interface board; connection for 1x Ethernet 10/100/1000, 512 kB SRAM
5PP5IF.FPLM-00	PP500 interface board; connections for 2x POWERLINK
5PP5IF.FCAN-00	PP500 interface board; connection for 1x CAN master, 512 kB SRAM
5PP5IF.FX2X-00	PP500 interface board; connection for 1x X2X master, 512 kB SRAM
5PP5IF.FXCM-00	PP500 interface board; connection for 1x CAN master, 1x X2X master, 512 kB SRAM

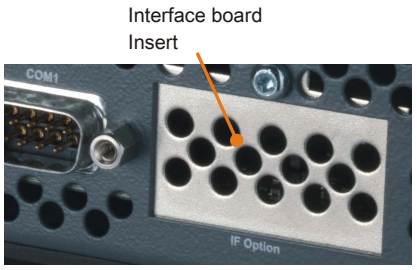


Table 17: Interface board slot

Information:

Installation and replacement of interface boards ONLY possible at the B&R plant.

3 Individual components

3.1 System units

3.1.1 5PC510.SX01-00

General information

- Intel® Atom™ technology
- Fan-free operation
- Can be expanded by adding an interface board
- Compact dimensions for tight space in the control cabinet

Order data

Model number	Short description	Image
5PC510.SX01-00	APC510 System Unit connections for 1x RS232, 2x USB 2.0, 1x Ethernet 10/100/1000; can be expanded with interface board; I/O board (5PP5IO.GMAC-00) and 24 VDC plug for supply voltage (screw clamp: 0TB103.9; cage clamp: 0TB103.91) must be ordered separetely.	

Table 18: 5PC510.SX01-00 - Order data

Technical data

Product ID	5PC510.SX01-00
General information	
Cooling	Fan-free
LEDs	Power, CF, Link, Run
B&R ID code	$C645
Battery	
Type	Renata 950 mAh
Lifespan	4 years[1)]
Removable	Yes, accessible from the outside
Design	Lithium ion
Power button	Yes
Reset button	Yes
Buzzer	Yes
Controllers	
Bootloader	BIOS
Watchdog	MTCX
Power failure logic	
Controllers	MTCX[2)]
Buffer time	10 ms
Graphics	
Controllers	Intel® Graphics Media Accelerator 500
Memory	
Type	DDR2 SDRAM
Size	Max. 2 GB
Interfaces	
COM1	
Type	RS232, modem-capable, not electrically isolated
Design	9-pin DSUB plug
UART	16550-compatible, 16-byte FIFO
Max. baud rate	115 kbit/s
CompactFlash slot 1	
Amount	1
Type	Type I
SD memory card slot	

Table 19: 5PC510.SX01-00 - Technical data

Product ID	5PC510.SX01-00
Type	SD card
USB	
Amount	2
Type	USB 2.0
Design	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s)
Current load	Max. 1 A per connection
Ethernet	
Amount	1
Controllers	Intel 82574
Design	Shielded RJ45 port
Transfer rate	10/100/1000 Mbit/s
Inserts	
Interface board	Yes
I/O board	Yes
Electrical properties	
Rated voltage	24 VDC ±25%
Rated current	1.5 A[3)]
Starting current	Typ. 3 A, max. 50 A for <300 µs
Power consumption	35 W[4)]
Electrical isolation	Yes
Operating conditions	
EN 60529 protection	IP20 (only with installed CompactFlash card, inserted IF board or optional IF cover)
Environmental conditions	
Temperature	
Operation	0 to 50°C
Storage	-20 to 60°C
Transport	-20 to 60°C
Relative humidity	
Operation	5 to 90%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration	
Operation (continuous)	2 to 9 Hz: 1.75 mm amplitude / 9 to 200 Hz: 0.5 g
Operation (occasional)	2 to 9 Hz: 3.5 mm amplitude / 9 to 200 Hz: 1 g
Storage	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Transport	2 to 8 Hz: 7.5 mm amplitude / 8 to 200 Hz: 2 g / 200 to 500 Hz: 4 g
Shock	
Operation	15 g, 11 ms
Storage	30 g, 15 ms
Transport	30 g, 15 ms
Altitude	
Operation	Max. 3000 m (component-dependent)[5)]
Mechanical characteristics	
Housing	
Material	Galvanized plate, plastic
Front cover	Colored orange plastic (similar to Pantone 144CV)
Paint	Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV)
Dimensions	
Width	58 mm
Height	210 mm
Depth	202.4 mm
Weight	1600 g

Table 19: 5PC510.SX01-00 - Technical data

1) At 50°C, 8.5 µA for the supplied components and a self-discharge of 40%. If an interface board with SRAM is installed, then the service life equals 2½ years.
2) Maintenance Controller Extended
3) The value specified is valid for a nominal voltage of 24 VDC.
4) The specified value applies to a system unit with a CPU board and I/O board, but without an interface board.
5) Derating of the maximum ambient temperature is typically 1°C per 1,000 meters (beginning at 500 meters above sea level).

Dimensions

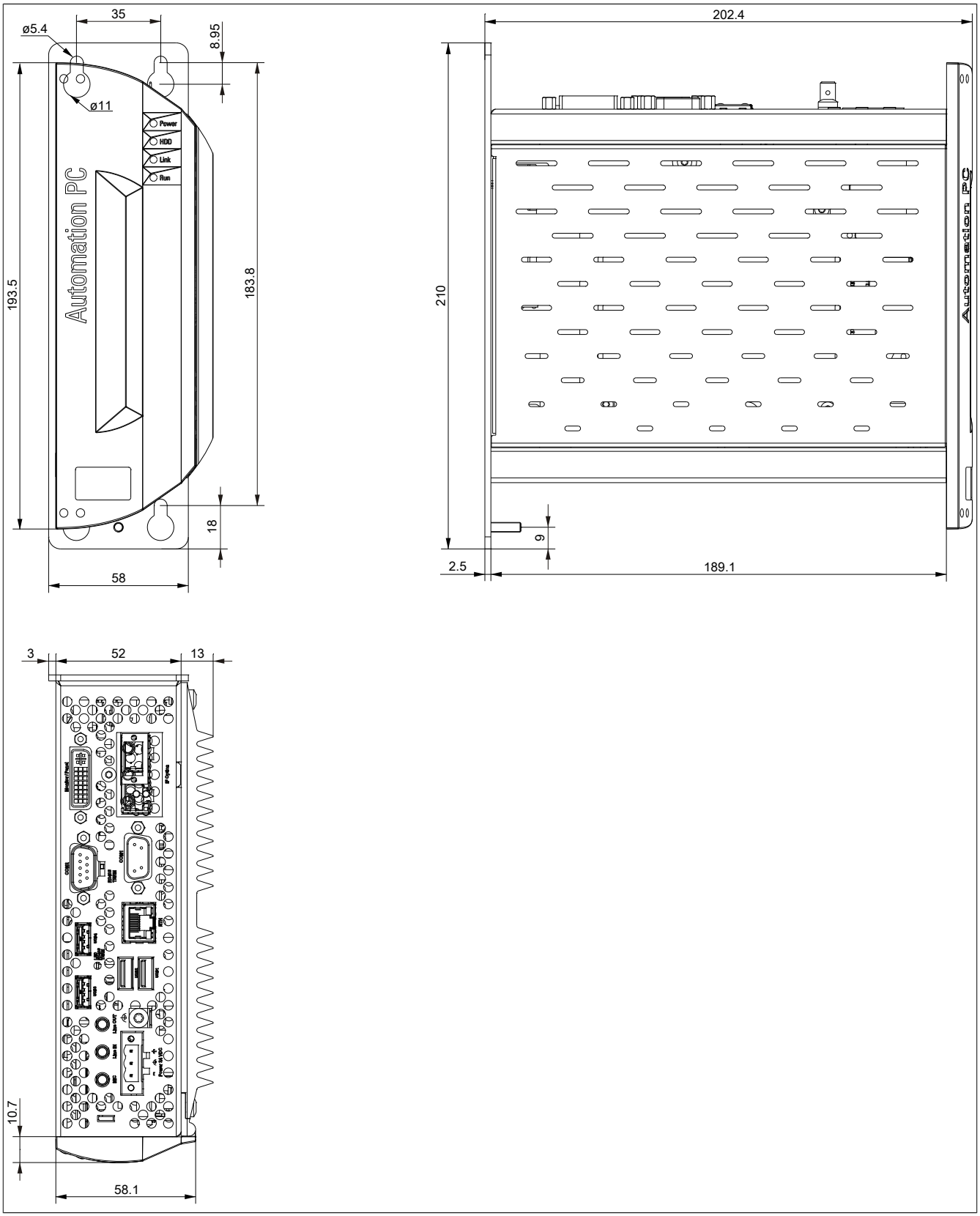


Image 7: 5PC510.SX01-00 - Dimensions

Drilling template

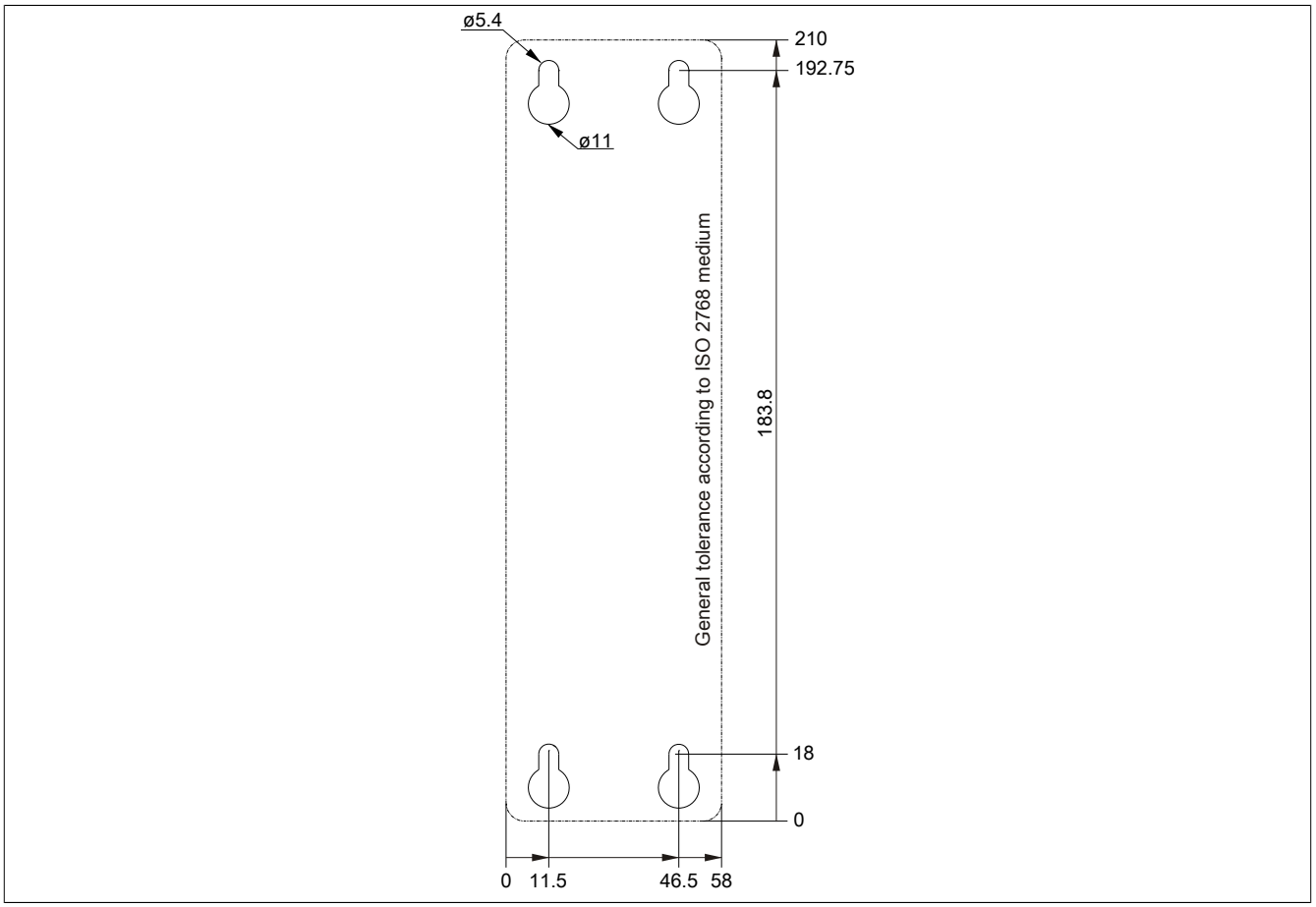


Image 8: 5PC510.SX01-00 - Drilling template

3.2 US15W - CPU boards

3.2.1 General information

CPU boards are based on the Intel® US15W chipset and contain one DDR2 memory location for a maximum of 2 GB. Additionally, the Intel® GMA 500 with 128 MB RAM is also integrated.

- Intel® Atom™ technology
- Intel® US15W chipset
- Insyde BIOS
- 1x DDR2 memory socket
- Intel® GMA 500
- Gigabit Ethernet

3.2.2 Order data

Model number	Short description	Image
	CPU boards	
5PP5CP.US15-00	Intel Atom Z510 CPU board, 1100 MHz, single-core, 400 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 module	
5PP5CP.US15-01	Intel Atom Z520 CPU board, 1330 MHz, single-core, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 module	
5PP5CP.US15-02	Intel Atom Z530 CPU board, 1600 MHz, single-core, 533 MHz FSB, 512 kB L2 cache; chipset US15W; 1 socket for SO-DIMM DDR2 module	
	Required accessories	
	Main memory	
5MMDDR.0512-01	SO-DIMM DDR2 RAM 512 MB PC2-5300	
5MMDDR.1024-01	SO-DIMM DDR2 RAM 1024 MB PC2-5300	
5MMDDR.2048-01	SO-DIMM DDR2 RAM 2048 MB PC2-5300	

Table 20: 5PP5CP.US15-00, 5PP5CP.US15-01, 5PP5CP.US15-02 - Order data

3.2.3 Technical data

Product ID	5PP5CP.US15-00	5PP5CP.US15-01	5PP5CP.US15-02
General information			
Certification			
CE		Yes	
Controllers			
Bootloader		BIOS Insyde	
Processor			
Type	Intel® Atom™ Z510	Intel® Atom™ Z520	Intel® Atom™ Z530
Clock frequency	1100 MHz	1330 MHz	1600 MHz
Architectures		45 nm	
L1 cache		32 kB	
L2 cache		512 kB	
External bus	400 MHz	533 MHz	533 MHz
Intel® 64 Architecture		No	
Expanded command set		Intel® virtualization technology, enhanced SpeedStep technology SSE, SSE2, SSE3	
Chipset		Intel® US15W	
Real-time clock			
Accuracy		At 25°C: typ. 12 ppm (1 second) per day[1)]	
Battery-buffered		Yes	
Memory socket			
Type		DDR2	
Size		Max. 2 GB	
Graphics			
Controllers		Intel® Graphics Media Accelerator 500	
Memory		Up to 256 MB[2)]	
Color depth		Max. 32-bit	
Resolution			
DVI		Depends on the system unit used	
Power management		ACPI 3.0	

Table 21: 5PP5CP.US15-00, 5PP5CP.US15-01, 5PP5CP.US15-02 - Technical data

1) At 50°C, 8.5 µA for the components being supplied and a self-discharge of 40%.
2) Allocated in main memory

3.3 Main memory

3.3.1 Order data

Model number	Short description	Image
	Main memory	
5MMDDR.0512-01	SO-DIMM DDR2 RAM 512 MB PC2-5300	
5MMDDR.1024-01	SO-DIMM DDR2 RAM 1024 MB PC2-5300	
5MMDDR.2048-01	SO-DIMM DDR2 RAM 2048 MB PC2-5300	

Table 22: 5MMDDR.0512-01, 5MMDDR.1024-01, 5MMDDR.2048-01 - Order data

3.3.2 Technical data

Product ID	5MMDDR.0512-01	5MMDDR.1024-01	5MMDDR.2048-01
General information			
Type	SO-DIMM DDR2 SDRAM		
Memory size	512 MB	1 GB	2 GB
Construction	200-pin		
Organization	64M x 64 bit	128M x 64 bit	256M x 64-bit
Speed	DDR2-667 (PC2-5300)		
Certification CE	Yes		

Table 23: 5MMDDR.0512-01, 5MMDDR.1024-01, 5MMDDR.2048-01 - Technical data

Information:

A main memory module can only be replaced at the B&R plant.

3.4 Interface boards

Information:

Installation and replacement of interface boards ONLY possible at the B&R plant.

3.4.1 5PP5IF.CETH-00

General information

The interface board 5PP5IF.CETH-00 has a 10/100/1000 Mbit/sec network connection as well as 512 kB SRAM and can be used as an additional network interface in a Power Panel 500, Automation PC 510 or Automation PC 511.

- 1 network connection (10/100/1000 Mbit/s)
- Compatible with PP500, APC510, APC511

The interface board can be operated using Automation Runtime in Automation Studio 3.0.90.18 or higher and Automation Runtime D4.01.

Order data

Model number	Short description	Image
	Interface boards	
5PP5IF.CETH-00	PP500 interface board; connection for 1x Ethernet 10/100/1000	

Table 24: 5PP5IF.CETH-00 - Order data

Technical data

Product ID	5PP5IF.CETH-00
General information	
B&R ID code	$B4D5
Diagnostics	
Data transfer	Yes, with status LED
Certification	
CE	Yes
Interfaces	
Ethernet	
Amount	1
Controllers	Intel 82574
Design	Shielded RJ45 port
Transfer rate	10/100/1000 Mbit/s
Cable length	Max. 100 m between two stations (segment length)
Electrical properties	
Power consumption	2 W
Environmental conditions	
Temperature	
Operation	0 to 55°C
Storage	-20 to 60°C
Transport	-20 to 60°C
Relative humidity	
Operation	5 to 90%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing

Table 25: 5PP5IF.CETH-00 - Technical data

Ethernet interface (ETH)

Ethernet connection		
Controller	Intel 82574	
Cabling	S/STP (Cat5e)	
Transfer rate	10/100/1000 Mbit/s[1)]	
Cable length	Max. 100 m (min. Cat5e)	
Speed LED	**On**	**Off**
Green	100 Mbit/s	10 Mbit/s[2)]
Orange	1000 Mbit/s	-
Link LED	**On**	**Off**
Orange	Link (Ethernet network connection available)	Activity (blinking - data transfer in progress)

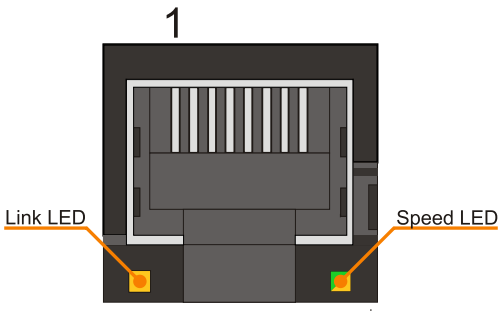


Table 26: 5PP5IF.CETH-00 - Ethernet connection

1) Switching takes place automatically.
2) The 10 Mbit/s transfer speed / connection is only present if the IF slot Link LED is also lit at the same time.

A special driver is required in order to operate the Intel 82574 Ethernet controller. Drivers for approved operating systems are available in the Downloads area of the B&R website (www.br-automation.com).

Information:

Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.

3.4.2 5PP5IF.CHDA-00

General information

The interface board 5PP5IF.CHDA-00 has an HDA sound chip with externally accessible MIC, Line IN and Line OUT channels.

- 1x MIC
- 1x Line IN
- 1x Line OUT
- Compatible with PP500, APC510, APC511

The interface board can be operated using Automation Runtime in Automation Studio 3.0.90.18 or higher and Automation Runtime A4.01.

Order data

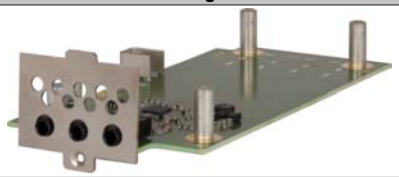
Model number	Short description	Image
	Interface boards	
5PP5IF.CHDA-00	PP500 interface board; connection for 1x MIC, 1x Line IN, 1x Line OUT	

Table 27: 5PP5IF.CHDA-00 - Order data

Technical data

Product ID	5PP5IF.CHDA-00
General information	
B&R ID code	$B4D6
Certification	
CE	Yes
Interfaces	
Audio	
Type	HDA sound
Controllers	Realtek ALC 662
Inputs	Microphone, Line in
Outputs	Line Out
Electrical properties	
Power consumption	2 W
Environmental conditions	
Temperature	
Operation	0 to 55°C
Storage	-20 to 60°C
Transport	-20 to 60°C
Relative humidity	
Operation	5 to 90%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing

Table 28: 5PP5IF.CHDA-00 - Technical data

MIC, Line IN, Line OUT

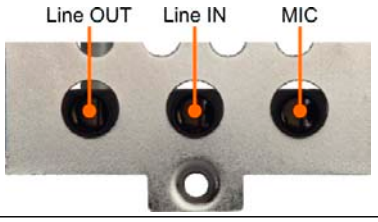
MIC, Line IN, Line OUT		
Controller	Realtek ALC 662	3.5 mm socket, female 
MIC	Connection of a mono microphone with a 3.5 mm jack.	
Line IN	Stereo Line IN signal supplied via a 3.5 mm jack.	
Line OUT	Connection of a stereo sound device (e.g. amplifier) via a 3.5 mm jack.	

Table 29: MIC, Line IN, Line OUT

A special driver is required in order to operate the audio controller. Drivers for approved operating systems are available in the Downloads area of the B&R website (www.br-automation.com).

Information:

Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.

3.4.3 5PP5IF.FETH-00

General information

The interface board 5PP5IF.FETH-00 has a 10/100/1000 Mbit/sec network connection as well as 512 kB SRAM and can be used as an additional network interface in a Power Panel 500, Automation PC 510 or Automation PC 511.

- 1 network connection (10/100/1000 Mbit/s)
- 512 KB SRAM
- Compatible with PP500, APC510, APC511

The interface board can only be operated using Automation Runtime (in Automation Studio 3.0.90.18 or higher and Automation Runtime D4.01).

Order data

Model number	Short description	Image
	Interface boards	
5PP5IF.FETH-00	PP500 interface board; connection for 1x Ethernet 10/100/1000, 512 kB SRAM	

Table 30: 5PP5IF.FETH-00 - Order data

Technical data

Product ID	5PP5IF.FETH-00
General information	
B&R ID code	$B7C4
Diagnostics	
Data transfer	Yes, with status LED
Certification	
CE	Yes
Controllers	
SRAM	
Size	512 kB
Battery-buffered	Yes
Interfaces	
Ethernet	
Amount	1
Controllers	Intel 82574
Design	Shielded RJ45 port
Transfer rate	10/100/1000 Mbit/s
Cable length	Max. 100 m between two stations (segment length)
Electrical properties	
Power consumption	4 W
Environmental conditions	
Temperature	
Operation	0 to 50°C
Storage	-20 to 60°C
Transport	-20 to 60°C
Relative humidity	
Operation	5 to 90%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing

Table 31: 5PP5IF.FETH-00 - Technical data

Ethernet interface (ETH)

Ethernet connection		
Controller	Intel 82574	
Cabling	S/STP (Cat5e)	
Transfer rate	10/100/1000 Mbit/s[1)]	
Cable length	Max. 100 m (min. Cat5e)	
Speed LED	**On**	**Off**
Green	100 Mbit/s	10 Mbit/s[2)]
Orange	1000 Mbit/s	-
Link LED	**On**	**Off**
Orange	Link (Ethernet network connection available)	Activity (blinking - data transfer in progress)

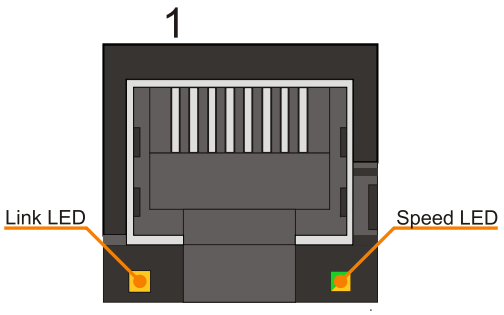


Table 32: 5PP5IF.FETH-00 - Ethernet connection

1) Switching takes place automatically.
2) The 10 Mbit/s transfer speed / connection is only present if the IF slot Link LED is also lit at the same time.

A special driver is required in order to operate the Intel 82574 Ethernet controller. Drivers for approved operating systems are available in the Downloads area of the B&R website (www.br-automation.com).

Information:

Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.

3.4.4 5PP5IF.FPLM-00

General information

The interface board 5PP5IF.FPLM-00 has two POWERLINK connections and 512 kB SRAM.

The integrated hub allows for the easiest possible implementation of a simple tree structure or optional ring-redundancy without extra effort.

With pollresponse chaining, the module also offers a solution for the highest demands in regard to response time and the shortest cycle times. When combined with the B&R control system, poll response chaining provides ideal performance, particularly for central control tasks.

- 2x POWERLINK V1/V2 connections
- 512 KB SRAM
- Integrated hub for efficient cabling
- Configurable ring redundancy
- Poll response chaining
- Compatible with PP500, APC510, APC511

The interface board can only be operated under Automation Runtime.

Order data

Model number	Short description	Image
	Interface boards	
5PP5IF.FPLM-00	PP500 interface board; connections for 2x POWERLINK (with integrated hub); 512 kB SRAM.	

Table 33: 5PP5IF.FPLM-00 - Order data

Technical data

Product ID	5PP5IF.FPLM-00
General information	
B&R ID code	$B4D8
Diagnostics	
Data transfer	Yes, with status LED
Certification	
CE	Yes
Controllers	
SRAM	
Size	512 kB
Battery-buffered	Yes
Interfaces	
POWERLINK	
Amount	2
Transmission	100 Base-T (ANSI/IEEE 802.3)
Type	Type 4
Design	Internal 2x hub, 2x shielded RJ45 port
Transfer rate	100 Mbit/s
Cable length	Max. 100 m between two stations (segment length)
Electrical properties	
Power consumption	3 W
Environmental conditions	
Temperature	
Operation	0 to 55°C
Storage	-20 to 60°C
Transport	-20 to 60°C
Relative humidity	
Operation	5 to 90%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing

Table 34: 5PP5IF.FPLM-00 - Technical data

POWERLINK interface

POWERLINK interface board, 2 connections		
Cabling	S/STP (Cat5e)	
Cable length	Max. 100 m (min. Cat5e)	
Speed LED	**On**	**Off**
Green / red	see Status / Error LED	
Link LED	**On**	**Off**
Yellow	Link (POWERLINK network connection available)	Activity (blinking - data transfer in progress)

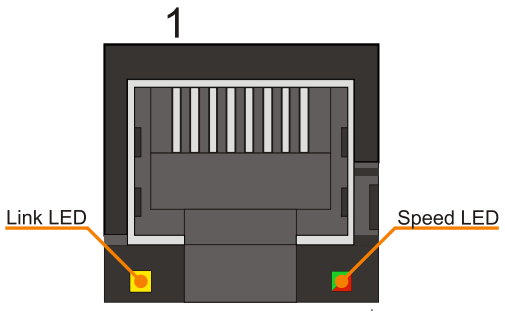


Table 35: POWERLINK interface board, 2-port connection

LED STATUS

The status/error LED is a green/red dual LED. The status LEDs can have different meanings depending on operating mode.

Ethernet TCP/IP mode

The interface can be operated purely as an Ethernet TCP/IP interface.

Green - status	Description
On	The POWERLINK interface is operated purely as an Ethernet TCP/IP interface.

Table 36: Status/Error LED - Ethernet TCP/IP operating mode

POWERLINK V1

Status LED		Status of the POWERLINK station
Green	**Red**	
On	Off	The POWERLINK station is running with no errors.
Off	On	A fatal system error has occurred. The error type can be read using the PLC logbook. An irreparable problem has occurred. The system cannot properly carry out its tasks. This status can only be changed by resetting the module.
Blinking alternately		The POWERLINK managing node failed. This error code can only occur in controlled node operation.
Off	Blinking	System failure. The red blinking LED signals a certain type of error using a blink code (see section " System failure error codes" on page 46).

Table 37: Status/error LED - POWERLINK V1 operating mode

POWERLINK V2

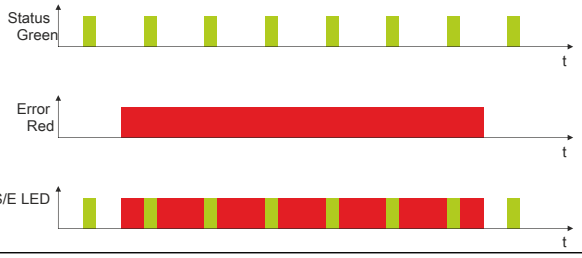
Red - error	Description
On	The POWERLINK interface has encountered an error (failed Ethernet frames, increased number of collisions on the network, etc.). If an error occurs in the following states, then the green LED blinks over the red LED: • BASIC_ETHERNET • PRE_OPERATIONAL_1 • PRE_OPERATIONAL_2 • READY_TO_OPERATE 

Table 38: Status / Error LED as error LED - POWERLINK operating mode

Green - status	Description
Off NOT_ACTIVE	**Managing Node (MN)** The bus is monitored for POWERLINK frames. If a frame is not received within the configured time window (timeout), the interface goes directly into PRE_OPERATIONAL_1 status (single flash). If, however, POWERLINK communication is detected before this time passes, the interface goes directly into the BASIC_ETHERNET status (flickering). **Controlled Node (CN)** The bus is monitored for POWERLINK frames. If a frame is not received within the configured time window (timeout), the interface goes directly into BASIC_ETHERNET status (flickering). If, however, POWERLINK communication is detected during this time, the interface goes directly into the PRE_OPERATIONAL_1 status (single flash).
Green flickering (approx. 10 Hz) BASIC_ETHERNET	The interface is in BASIC_ETHERNET status, and is operated purely as an Ethernet TCP/IP interface. **Managing Node (MN)** This status can only be changed by resetting the interface. **Controlled Node (CN)** If POWERLINK communication is detected while in this status, the interface goes into the PRE_OPERATIONAL_1 state (single flash).
Single flash (approx. 1 Hz) PRE_OPERATIONAL_1	The interface status is PRE_OPERATIONAL_1. **Managing Node (MN)** The MN starts the operation of the "reduced cycle". Collisions are allowed on the bus. There is not yet any cyclic communication. **Controlled Node (CN)** The CN waits until it receives an SoC frame and then switches to PRE_OPERATIONAL_2 status (double flash).
Double flash (approx. 1 Hz) PRE_OPERATIONAL_2	The interface status is PRE_OPERATIONAL_2. **Managing Node (MN)** The MN begins with the cyclic communication (cyclic input data is not yet evaluated). The CNs are configured in this status. **Controlled Node (CN)** In this status, the interface is normally configured by the manager. Once complete, a command changes the status to PRE_OPERATIONAL_3 (triple flash).
Triple flash (approx. 1 Hz) READY_TO_OPERATE	The interface status is READY_TO_OPERATE. **Managing Node (MN)** Normal cyclic and asynchronous communication. Received PDO data is ignored. **Controlled Node (CN)** The configuration of the interface is complete. Normal cyclic and asynchronous communication. The PDO data sent corresponds to the PDO mapping used. However, cyclic data is not yet evaluated.
On OPERATIONAL	The interface status is OPERATIONAL.
Blinking (approx. 2.5 Hz) STOPPED	The interface status is STOPPED. **Managing Node (MN)** This status is not possible for the MN. **Controlled Node (CN)** No output data is produced and no input data is received. Only the appropriate command from the manager can enter or leave this state.

Table 39: Status/Error LED as status LED - POWERLINK operating mode

System failure error codes

Incorrect configuration or defective hardware can cause a system failure error.

The error is indicated via the red error LED using four switch-on phases. The switch-on phases are either 150 ms or 600 ms long. Error code outputs are repeated cyclically after 2 seconds.

Legend: • ... 150 ms
− ... 600 ms
Delay ... 2 sec. delay

Error description	Error code displayed by red status LED									
RAM Errors	•	•	•	-	Break	•	•	•	-	Break
Hardware errors	-	•	•	-	Break	-	•	•	-	Break

Table 40: Status/error LED as error LED - system failure error codes

Firmware update

The firmware is a component of Automation Studio. The module is automatically changed to this version.

To update the firmware included in Automation Studio, you must upgrade the hardware (see the Help system under "Project Management - Automation Studio Upgrade").

3.4.5 5PP5IF.FCAN-00

General information

The interface board 5PP5IF.FCAN-00 contains one CAN master interface and 512 kB SRAM.

- 1x CAN master interface
- 512 KB SRAM
- Compatible with PP500, APC510, APC511

The interface board can only be operated under Automation Runtime.

Order data

Model number	Short description	Image
	Interface boards	
5PP5IF.FCAN-00	PP500 interface board; connection for 1x CAN master, 512 kB SRAM; order plug separately (cage clamp: 0TB1208.3100)	
	Required accessories	
	Terminal blocks	
0TB1208.3100	Connector, 8-pin, cage clamp, 1 mm², protected against vibration by the screw flange.	

Table 41: 5PP5IF.FCAN-00 - Order data

Technical data

Product ID	5PP5IF.FCAN-00
General information	
B&R ID code	$B4DA
Diagnostics	
Module status	Yes, with status LED
Data transfer	Yes, with status LED
Terminating resistors	Yes, with status LED
Certification	
CE	Yes
Controllers	
SRAM	
Size	512 kB
Battery-buffered	Yes
Interfaces	
CAN	
Amount	1
Design	8-pin multipoint plug
Transfer rate	Max. 500 kbit/s
Terminating resistors	
Type	Can be enabled and disabled using a sliding switch
Default setting	Disabled
Electrical properties	
Power consumption	3 W
Environmental conditions	
Temperature	
Operation	0 to 55°C
Storage	-20 to 60°C
Transport	-20 to 60°C
Relative humidity	
Operation	5 to 90%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing

Table 42: 5PP5IF.FCAN-00 - Technical data

CAN interface

CAN bus		
The electrically isolated CAN bus interface is a 8-pin multipoint plug.		8-pin multipoint plug
Transfer rate	Max. 500 kbit/s	
Cable length	Max. 1000 meters	
Pin	**CAN bus**	
1	-	
2	-	
3	-	

Table 43: 5PP5IF.FCAN-00 - CAN interface

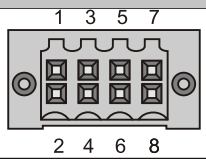
CAN bus		
4	CAN⊥ (CAN ground)	
5	SHLD (shield)	
6	SHLD (shield)	
7	CAN_L (CAN Low)	
8	CAN_H (CAN High)	

Table 43: 5PP5IF.FCAN-00 - CAN interface

Status LEDs

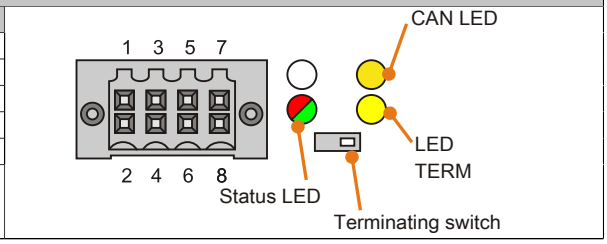
Status LEDs				
LED	**Color**	**Status**	**Description**	
CAN	Yellow	On	Sending data	
		Off	Receiving data	
Status LED	Green	On	Interface module is active	
	Red	On	CPU starting up	
LED TERM	Yellow	On	The terminating resistor is switched on	
		Off	The terminating resistor is switched off	

Table 44: 5PP5IF.FCAN-00 - Status LEDs

CAN terminating switch

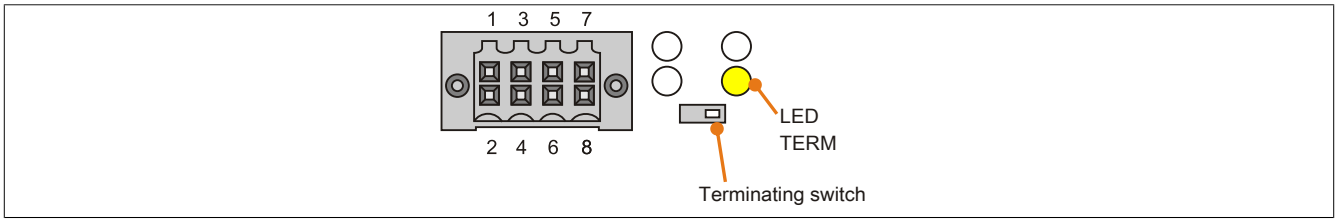


Image 9: CAN terminating switch

A CAN terminating resistor is integrated on the interface board. It is turned on and off with a switch on the front side. An active terminating resistor is indicated by the TERM LED.

Firmware update

The firmware is a component of Automation Studio. The module is automatically changed to this version.

To update the firmware included in Automation Studio, you must upgrade the hardware (see the Help system under "Project Management - Automation Studio Upgrade").

3.4.6 5PP5IF.FX2X-00

General information

The interface board 5PP5IF.FX2X-00 contains one X2X Link master interface and 512 kB SRAM.

- 1x X2X Link master interface
- 512 KB SRAM
- Compatible with PP500, APC510, APC511

The interface board can only be operated under Automation Runtime.

Order data

Model number	Short description	Image
	Interface boards	
5PP5IF.FX2X-00	PP500 interface board; connection for 1x X2X master, 512 kB SRAM; order plug separately (cage clamp: 0TB1208.3100)	
	Required accessories	
	Terminal blocks	
0TB1208.3100	Connector, 8-pin, cage clamp, 1 mm², protected against vibration by the screw flange.	

Table 45: 5PP5IF.FX2X-00 - Order data

Technical data

Product ID	5PP5IF.FX2X-00
General information	
B&R ID code	$B4D9
Diagnostics	
Module status	Yes, with status LED
Data transfer	Yes, with status LED
Certification	
CE	Yes
Controllers	
SRAM	
Size	512 kB
Battery-buffered	Yes
Interfaces	
X2X	
Type	X2X Link master
Amount	1
Design	8-pin multipoint plug
Electrical properties	
Power consumption	3 W
Environmental conditions	
Temperature	
Operation	0 to 55°C
Storage	-20 to 60°C
Transport	-20 to 60°C
Relative humidity	
Operation	5 to 90%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing

Table 46: 5PP5IF.FX2X-00 - Technical data

X2X interface

X2X Link Master connection	
The electrically isolated X2X Link is a 8-pin multipoint plug.	
Pin	**X2X Link**
1	X2X\
2	X2X
3	X2X⊥
4	-
5	SHLD (shield)
6	SHLD (shield)
7	-
8	-

8-pin multipoint plug

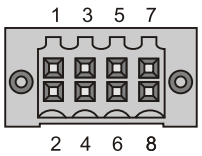


Table 47: 5PP5IF.FX2X-00 - X2X interface

Status LEDs

Status LEDs			
LED	**Color**	**Status**	**Description**
X2X	Yellow	On	Sending data
		Off	Receiving data
Status LED	Green	On	Interface module is active
	Red	On	CPU starting up

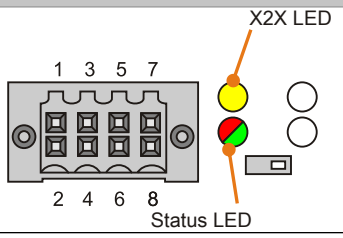


Table 48: 5PP5IF.FX2X-00 - Status LEDs

Firmware update

The firmware is a component of Automation Studio. The module is automatically changed to this version.

To update the firmware included in Automation Studio, you must upgrade the hardware (see the Help system under "Project Management - Automation Studio Upgrade").

3.4.7 5PP5IF.FXCM-00

General information

The interface board 5PP5IF.FXCM-00 has one combined CAN master and one X2X Link master interface and 512 kB SRAM.

- 1x CAN master interface
- 1x X2X master interface
- 512 KB SRAM
- Compatible with PP500, APC510, APC511

The interface board can only be operated under Automation Runtime.

Order data

Model number	Short description	Image
	Interface boards	
5PP5IF.FXCM-00	PP500 interface board; connection for 1x CAN master, 1x X2X master, 512 kByte SRAM; order plug separately (cage clamp: 0TB1208.3100)	
	Required accessories	
	Terminal blocks	
0TB1208.3100	Connector, 8-pin, cage clamp, 1 mm², protected against vibration by the screw flange.	

Table 49: 5PP5IF.FXCM-00 - Order data

Technical data

Product ID	5PP5IF.FXCM-00
General information	
B&R ID code	$BB9D
Diagnostics	
Module status	Yes, with status LED
Data transfer	Yes, with status LED
Terminating resistors	Yes, with status LED
Certification	
CE	Yes
Controllers	
SRAM	
Size	512 kB
Battery-buffered	Yes
Interfaces	
CAN	
Amount	1
Design	8-pin multipoint plug
Transfer rate	Max. 500 kbit/s
Terminating resistors	
Type	Can be enabled and disabled using a sliding switch
Default setting	Disabled
X2X	
Type	X2X Link master
Amount	1
Design	8-pin multipoint plug
Electrical properties	
Power consumption	3 W
Environmental conditions	
Temperature	
Operation	0 to 55°C
Storage	-20 to 60°C
Transport	-20 to 60°C
Relative humidity	
Operation	5 to 90%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing

Table 50: 5PP5IF.FXCM-00 - Technical data

CAN interface

CAN bus	
The electrically isolated CAN bus interface is a 8-pin multipoint plug.	
Transfer rate	Max. 500 kbit/s
Cable length	Max. 1000 meters
Pin	**CAN bus**
1	-
2	-
3	-
4	CAN⊥ (CAN ground)
5	SHLD (shield)
6	SHLD (shield)
7	CAN_L (CAN Low)
8	CAN_H (CAN High)

8-pin multipoint plug

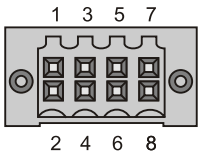


Table 51: 5PP5IF.FCAN-00 - CAN interface

X2X interface

X2X Link Master connection	
The electrically isolated X2X Link is a 8-pin multipoint plug.	
Pin	**X2X Link**
1	X2X\
2	X2X
3	X2X⊥
4	-
5	SHLD (shield)
6	SHLD (shield)
7	-
8	-

8-pin multipoint plug

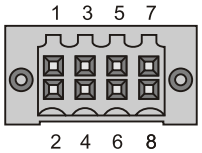


Table 52: 5PP5IF.FX2X-00 - X2X interface

Status LEDs

Status LEDs			
LED	**Color**	**Status**	**Description**
X2X	Yellow	On	Sending data
		Off	Receiving data
CAN	Yellow	On	Sending data
		Off	Receiving data
Status LED	Green	On	Interface module is active
	Red	On	CPU starting up
LED TERM	Yellow	On	The terminating resistor is switched on
		Off	The terminating resistor is switched off

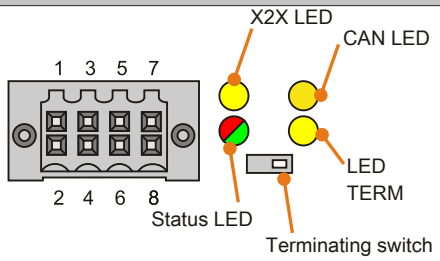


Table 53: 5PP5IF.FXCM-00 - Status LEDs

CAN terminating switch

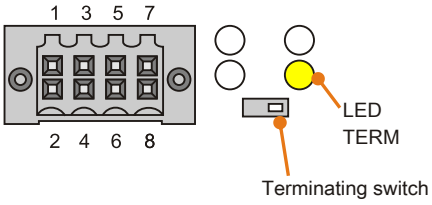


Image 10: CAN terminating switch

A CAN terminating resistor is integrated on the interface board. It is turned on and off with a switch on the front side. An active terminating resistor is indicated by the TERM LED.

Firmware update

The firmware is a component of Automation Studio. The module is automatically changed to this version.

To update the firmware included in Automation Studio, you must upgrade the hardware (see the Help system under "Project Management - Automation Studio Upgrade").

3.5 I/O boards

Information:

Installation and replacement of I/O boards ONLY possible at the B&R plant.

3.5.1 5PP5IO.GMAC-00

General information

The APC510 I/O board 5PP5IO.GMAC-00 has 1x RS232/422/485 interface, 2x USB 2.0 connection, 1x HDA sound connection and 1x Smart Display Link/DVI socket. An optional hard disk is also available. The I/O board can be operated with Automation PC 510 devices.

- 2x USB 2.0
- 1x RS232/422/485
- 1x HDA sound
- 1x Smart Display Link/DVI
- Optional hard disk
- Compatible with the APC510

Order data

Model number	Short description	Image
5PP5IO.GMAC-00	APC510 I/O board connections for 2x USB 2.0, 1x RS232/422/485, HDA sound, Smart Display Link/DVI-D; optional Hard Disk	

Table 54: 5PP5IO.GMAC-00 - Order data

Technical data

Product ID	5PP5IO.GMAC-00
General information	
B&R ID code	$CB0B
Certification	
CE	Yes
Interfaces	
COM1	
Type	RS232/422/485, electrically isolated
Design	9-pin DSUB plug
UART	16550-compatible, 16-byte FIFO
Max. baud rate	115 kbit/s
USB	
Amount	2
Type	USB 2.0
Design	Type A
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s)
Current load	Max. 1 A
Panel/Monitor interface	
Design	DVI-I socket
Type	SDL/DVI
Audio	
Type	HDA sound
Inputs	Microphone, Line in
Outputs	Line Out
Electrical properties	
Power consumption	12 W
Environmental conditions	
Temperature	
Operation	0 to 50°C
Storage	-20 to 60°C
Transport	-20 to 60°C

Table 55: 5PP5IO.GMAC-00 - Technical data

Product ID	5PP5IO.GMAC-00
Relative humidity	
Operation	5 to 90%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing

Table 55: 5PP5IO.GMAC-00 - Technical data

Panel connection - SDL (Smart Display Link / DVI)

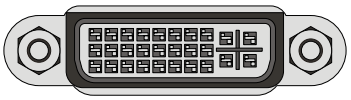
Panel connection - SDL (Smart Display Link / DVI)	
The following overview lists the video signals available on the panel output. For details, see the technical data for the CPU board being used.	
CPU board	**Video signals with all system unit variants**
5PP5CP.US15-00	DVI, SDL
5PP5CP.US15-01	DVI, SDL
5PP5CP.US15-02	DVI, SDL

Table 56: Panel connection - DVI, SDL

Information:

Only digital panels can be connected to the panel connection (analog monitors not permitted).

Pinout

Pin	Assignment	Description	Pin	Assignment	Description
1	TMDS Data 2-	DVI lane 2 (negative)	16	HPD	Hot plug detect
2	TMDS Data 2+	DVI lane 2 (positive)	17	TMDS Data 0-	DVI lane 0 (negative)
3	TMDS Data 2/4 SHIELD	Shield for data pair 2 and 4	18	TMDS Data 0+	DVI lane 0 (positive)
4	SDL-	SDL lane (negative)	19	TMDS Data 0/ XUSB1 SHIELD	Shield for data pair 0 and USB1
5	SDL+	SDL lane (positive)	20	XUSB1-	USB lane 1 (negative)
6	DDC Clock	DDC-based control signal (clock)	21	XUSB1+	USB lane 1 (positive)
7	DDC Data	DDC-based control signal (data)	22	TMDS Clock Shield	Shield for clock pair
8	n.c.	Not connected	23	TMDS Clock+	DVI clock (positive)
9	TMDS Data 1-	DVI lane 1 (negative)	24	TMDS Clock -	DVI clock (negative)
10	TMDS DATA 1+	DVI lane 1 (negative) HDMI clock (positive)	C1	ANALOG RED	Analog red
11	TMDS DATA 1/ XUSB0 SHIELD	Shield for data pair 1 and USB0	"c2"	ANALOG GREEN	Analog green
12	XUSB0-	USB lane 0 (negative)	C3	ANALOG BLUE	Analog blue
13	XUSB0+	USB lane 0 (positive)	C4	ANALOG HORZ SYNC	Analog horizontal synchro-nization
14	+5 V Power[1)]	+5 V power supply	C5	ANALOG GND	Analog ground (return for R, G and B signals)
15	Ground (return for +5 V, HSync and VSync)	Ground			

DVI 24-pin, female

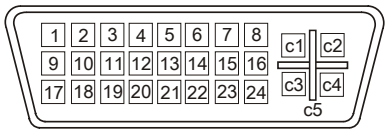


Table 57: Pinout - DVI connection

1) Protected internally by a multifuse

Cable lengths and resolutions for SDL transfer

The following table lists the relationship between segment lengths and maximum resolution depending on the SDL cable used:

SDL cables	Resolution					
Segment length [m]	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200	FHD 1920 x 1080
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	- - -	- - 5CASDL.0150-03

Table 58: Cable lengths and resolutions for SDL transfer

SDL cables Segment length [m]	Resolution					
	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200	FHD 1920 x 1080
20	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	- -	- 5CASDL.0200-03
25	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	- -	- -	- -
30	5CASDL.0300-00 5CASDL.0300-03	5CASDL.0300-00 5CASDL.0300-03	- 5CASDL.0300-13	- 5CASDL.0300-13	- -	- 5CASDL.0300-13
40	5CASDL.0400-13	5CASDL.0400-13	5CASDL.0400-13	5CASDL.0400-13	-	5CASDL.0400-13

Table 58: Cable lengths and resolutions for SDL transfer

Serial interface COM2

Serial interface COM2		
	RS232	RS422/485
Type	RS232; not modem capable; electrically isolated	
UART	16550-compatible, 16-byte FIFO	
Transfer rate	Max. 115 kbit/s	
Bus length	Max. 15 m	Max. 1200 m
Pin	**RS232 pinout**	**RS422 pinout**
1	n.c.	TXD\
2	RXD	n.c.
3	TXD	n.c.
4	n.c.	TXD
5	GND	GND
6	n.c.	RXD\
7	RTS	n.c.
8	CTS	n.c.
9	n.c.	RXD

9-pin DSUB socket

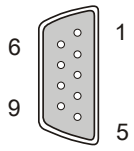


Table 59: Pinout - COM2

I/O address and IRQ

Resource	Default setting	Additional setting options
I/O address	2E8h	238h, 2F8h, 328h, 338h, 3E8h, 3F8h[1)]
IRQ	10	3, 4, 5, 6, 11, 12[1)]

Table 60: RS232/422/485 - I/O address and IRQ

1) If these settings are not already used in the system.

Bus length and cable type RS232

The maximum transfer rate of 115 kbit/s depends on the cable type being used.

Extension	Transfer rate
≤ 15 m	Typ. 64 kbit/s
≤ 10 m	Typ. 115 kbit/s
≤ 5 m	Typ. 115 kbit/s

Table 61: RS232 - Bus length and transfer rate

The material used for the cable should preferably have all or most of the following properties in order to reach an optimal transfer rate.

RS232 cable	Property
Signal lines	
Cable cross section	4x 0.16 mm² (26AWG), tinned Cu wire
Wire insulation	PE
Conductor resistance	≤ 82 Ω/ km
Stranding	Wires stranded in pairs
Shield	Paired shield with aluminum foil
Grounding line	
Cable cross section	1x 0.34 mm² (22AWG/19), tinned Cu wire
Wire insulation	PE
Conductor resistance	≤59 Ω/km
Outer sheathing	
Material	PUR mixture
Features	Halogen free
Cable shielding	From tinned cu wires

Table 62: RS232 - Cable requirements

RS422 - Bus length and cable type

The RTS line must be switched on to activate the sender.

The maximum transfer rate of 115 kbit/s depends on the cable type being used.

Extension	Transfer rate
1200 m	Typ. 115 kbit/s

Table 63: RS422 - Bus length and transfer rate

The material used for the cable should preferably have all or most of the following properties in order to reach an optimal transfer rate.

RS422 cable	Property
Signal lines	
Cable cross section	4x 0.25 mm² (24AWG/19), tinned Cu wire
Wire insulation	PE
Conductor resistance	≤82 Ω/km
Stranding	Wires stranded in pairs
Shield	Paired shield with aluminum foil
Grounding line	
Cable cross section	1x 0.34 mm² (22AWG/19), tinned Cu wire
Wire insulation	PE
Conductor resistance	≤59 Ω/km
Outer sheathing	
Material	PUR mixture
Features	Halogen free
Cable shielding	From tinned cu wires

Table 64: RS422 - Cable requirements

RS485 - Bus length and cable type

The maximum transfer rate of 115 kbit/s depends on the cable type being used.

Extension	Transfer rate
1200 m	Typ. 115 kbit/s

Table 65: RS485 - Bus length and transfer rate

The material used for the cable should preferably have all or most of the following properties in order to reach an optimal transfer rate.

RS485 cable	Property
Signal lines	
Cable cross section	4x 0.25 mm² (24AWG/19), tinned Cu wire
Wire insulation	PE
Conductor resistance	≤82 Ω/km
Stranding	Wires stranded in pairs
Shield	Paired shield with aluminum foil
Grounding line	
Cable cross section	1x 0.34 mm² (22AWG/19), tinned Cu wire
Wire insulation	PE
Conductor cross section	≤59 Ω/km
Outer sheathing	
Material	PUR mixture
Features	Halogen free
Cable shielding	From tinned cu wires

Table 66: RS485 - Cable requirements

When used as an RS485 interface

The pins of the RS422 default interface (1, 4, 6 and 9) should be used for operation. The pins should be connected as shown.

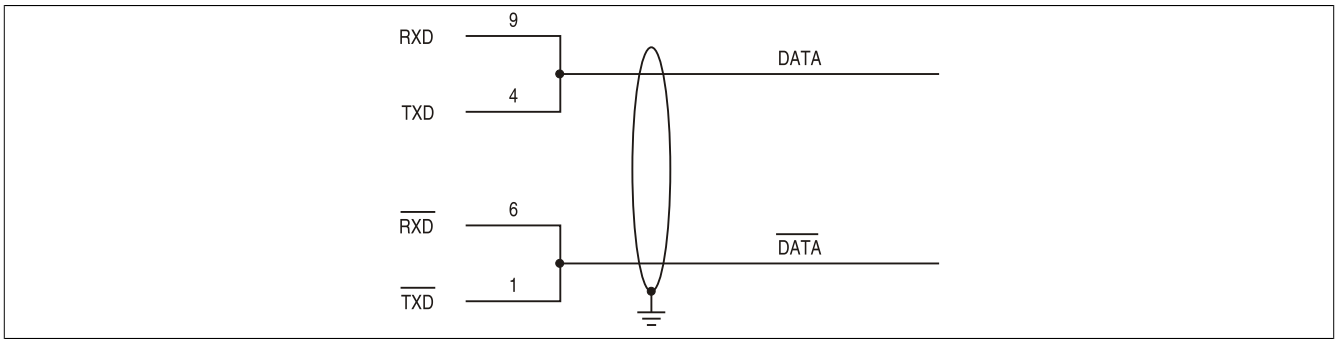


Image 11: RS232/422/485 interface - operated in RS485 mode

The RTS line must be switched each time the driver is sent and received; there is no automatic switch back. This cannot be configured in Windows.

The voltage drop caused by long line lengths can lead to greater potential differences between the bus stations, which can hinder communication. This can be improved by running ground wire with the others.

The line ends of the RS485 interface should (at least for longer line lengths or larger transfer rates) be closed. Normally a passive terminator can be used on the bus ends by connecting each of the signal lines with 120 Ω resistor.

RS485 - Bus length and cable type

The maximum transfer rate of 115 kbit/s depends on the cable type being used.

Extension	Transfer rate
1200 m	Typ. 115 kbit/s

Table 67: RS485 - Bus length and transfer rate

The material used for the cable should preferably have all or most of the following properties in order to reach an optimal transfer rate.

RS485 cable	Property
Signal lines	
Cable cross section	4x 0.25 mm² (24AWG/19), tinned Cu wire
Wire insulation	PE
Conductor resistance	≤82 Ω/km
Stranding	Wires stranded in pairs
Shield	Paired shield with aluminum foil
Grounding line	
Cable cross section	1x 0.34 mm² (22AWG/19), tinned Cu wire
Wire insulation	PE
Conductor cross section	≤59 Ω/km
Outer sheathing	
Material	PUR mixture
Features	Halogen free
Cable shielding	From tinned cu wires

Table 68: RS485 - Cable requirements

Terminating resistor

A RS485 TERM terminating resistor for the COM2 serial interface is already integrated on the I/O board. This terminating resistor can be switched on or off with a switch located between the COM2 and COM1 serial interfaces. An active terminating resistor is indicated by a yellow RS485 TERM LED.

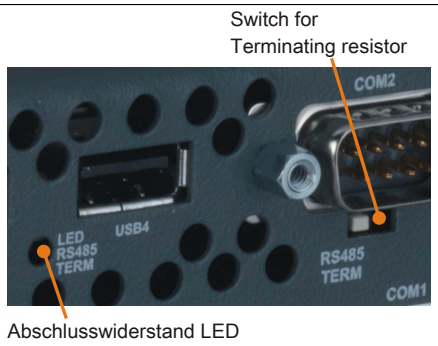


Image 12: Serial interface (COM) terminating resistor

USB ports (USB3, 4)

The APC510 I/O board features a USB 2.0 (Universal Serial Bus) host controller with multiple USB ports, two of which are accessible externally for easy user access.

Warning!

Peripheral USB devices can be connected to the USB interfaces. Due to the vast number of USB devices available on the market, B&R cannot guarantee their performance. B&R does ensure the performance of all USB devices that they provide.

Caution!

Because this interface is designed according to general PC specifications, extreme care should be exercised with regard to EMC, cable routing, etc.

USB3, USB4

Universal Serial Bus (USB3, USB4)[1]		
Type	USB 2.0	2x USB Type A, female
Design	Type A	
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s)	
Current load[2] USB3, USB4	Max. 0.5 A	
Cable length	Max. 5 m (without hub)	

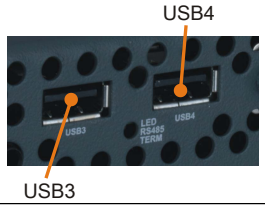


Table 69: USB3, USB4 connection

1) The interfaces, etc. available on the device or module have been numbered as such for easy identification. This numbering can differ from that used by the particular operating system.
2) Each USB port is secured with a maintenance-free "USB current-limiting circuit breaker" (max. 1 A).

MIC, Line IN, Line OUT

MIC, Line IN, Line OUT		
Controller	Realtek ALC 662	3.5 mm socket, female
MIC	Connection of a mono microphone with a 3.5 mm jack.	
Line IN	Stereo Line IN signal supplied via a 3.5 mm jack.	
Line OUT	Connection of a stereo sound device (e.g. amplifier) via a 3.5 mm jack.	

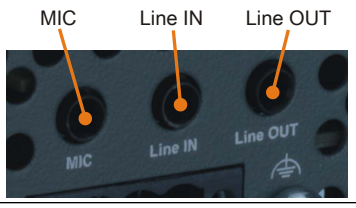


Table 70: MIC, Line IN, Line OUT

A special driver is required in order to operate the audio controller. Drivers for approved operating systems are available in the Downloads area of the B&R website (www.br-automation.com).

Information:

Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.

3.6 Drives

3.6.1 5MMHDD.0250-00

General information

The hard disk can be used as replacement for a HDD in a PCI SATA RAID controller 5ACPCI.RAIC-05.

Order data

Model number	Short description	Image
	Drives	
5MMHDD.0250-00	250 GB SATA Hard Disk Spare part for 5AC801.HDDI-03 and 5ACPCI.RAIC-05; Remark: Please see manual for proper use of the hard disk.	

Table 71: 5MMHDD.0250-00 - Order data

Technical data

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those specified for the entire device. For the entire device in which this individual component is used, refer to the data given specifically for the entire device.

Product ID	5MMHDD.0250-00
Hard Disk	
Capacity	250 GB
Number of heads	1
Number of sectors	488,397,168
Bytes per sector	512
Cache	8 MB
Speed	5400 rpm ±0.2%
Startup time	Typ. 3.6 s (from 0 rpm to read access)
MTBF	550,000 POH[1)]
S.M.A.R.T. support	Yes
Interface	SATA
Access time	5.56 ms
Supported transfer modes	SATA 1.0, Serial ATA Revision 2.6 PIO Modus 0-4, Multiword DMA Mode 0-2, UDMA Mode 0-6
Data transfer rate	
Internal	Max. 1175 Mbits/s
To/from host	Max. 150 MB/s (SATA I), max. 300 MB/s (SATA II)
Positioning time	
Minimum (track to track)	1 ms
Nominal (read only)	14 ms
Maximum (read only)	30 ms
Environmental conditions	
Temperature[3)]	
Operation[2)]	0 to 60°C
24-hour operation[4)]	0 to 60°C
Storage	-40 to 70°C
Transport	-40 to 70°C
Relative humidity[5)]	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration	
Operation	5 to 500 Hz: 0.5 g; no unrecoverable errors
Storage	5 to 500 Hz: 5 g; no unrecoverable errors
Transport	5 to 500 Hz: 5 g; no unrecoverable errors
Shock	
Operation	350 g and 2 ms duration; no unrecoverable errors
Storage	800 g and 2 ms duration, no unrecoverable errors 1000 g and 1 ms duration, no unrecoverable errors 600 g and 0.5 ms duration, no unrecoverable errors

Table 72: 5MMHDD.0250-00 - Technical data

Product ID	5MMHDD.0250-00
Transport	800 g and 2 ms duration, no unrecoverable errors 1000 g and 1 ms duration, no unrecoverable errors 600 g and 0.5 ms duration, no unrecoverable errors
Altitude	
Operation	-300 to 3048 m
Storage	-300 to 12192 m
Manufacturer information	
Manufacturer	Seagate
Manufacturer's product ID	ST9250315AS

Table 72: 5MMHDD.0250-00 - Technical data

1) At 8760 POH (power-on hours) per year and 25°C surface temperature
2) Standard operation means 333 POH (power-on hours) per month.
3) Temperature values for 305 meter altitude. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 20°C per hour.
4) 24-hour operation means 732 POH (power-on hours) per month.
5) Humidity gradient: Maximum 30% per hour

Temperature humidity diagram

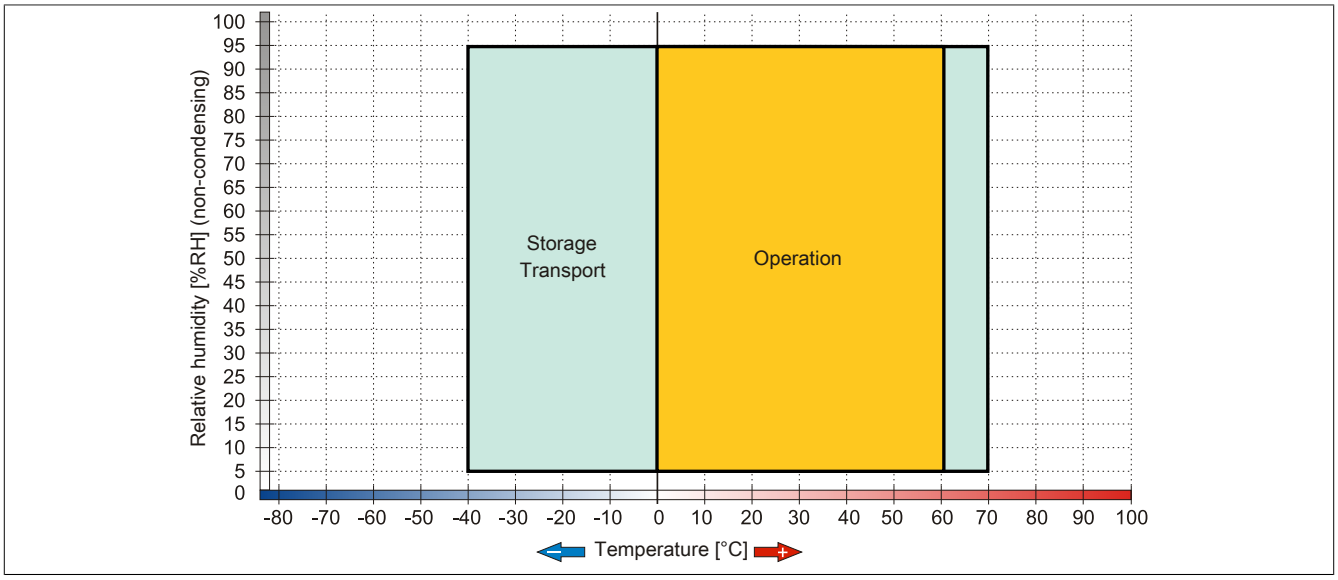


Image 13: 5MMHDD.0250-00 - Temperature humidity diagram

Chapter 3 • Commissioning

1 Installation

Devices are installed using the mounting plates found on the housing. These plates are designed for M5 screws.

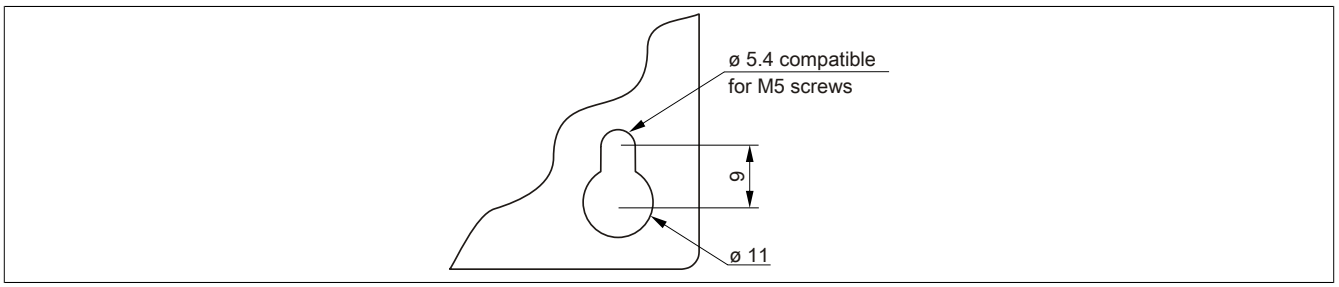


Image 14: Mounting plates

The exact positioning of the mounting holes can be seen in the following drilling templates.

1.1 Procedure

1. Drill the necessary holes in the control cabinet. The exact positioning of the mounting holes can be seen in the drilling templates.
2. Mount the B&R Industrial PC to the control cabinet using M5 screws.

1.2 Important mounting information

- Environmental conditions must be taken into consideration.
- This device must be mounted to a flat surface.
- This device is only certified for operation in closed rooms.
- This device must not be subjected to direct sunlight.
- The ventilation holes must not be covered.
- This device must be mounted in one of the approved orientations.
- The wall or control cabinet must be able to withstand four times the total weight of the device.
- When connecting cables (DVI, SDL, USB, etc.), the flex radius must not be exceeded.

1.3 Mounting orientation

The following diagrams show approved mounting orientations for the Automation PC 510 device.

1.3.1 Mounting orientation 0°

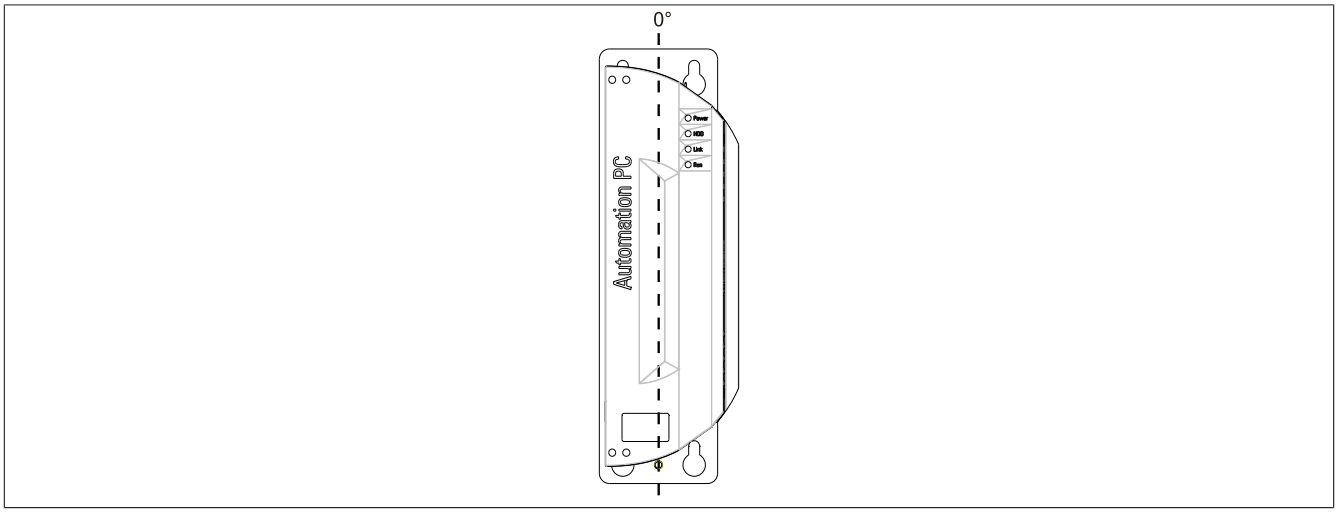


Image 15: Mounting orientation 0°

1.3.2 Mounting orientation 90°

The maximum ambient temperature specification must be **reduced by 5°C** when using a 90° mounting orientation (horizontal).

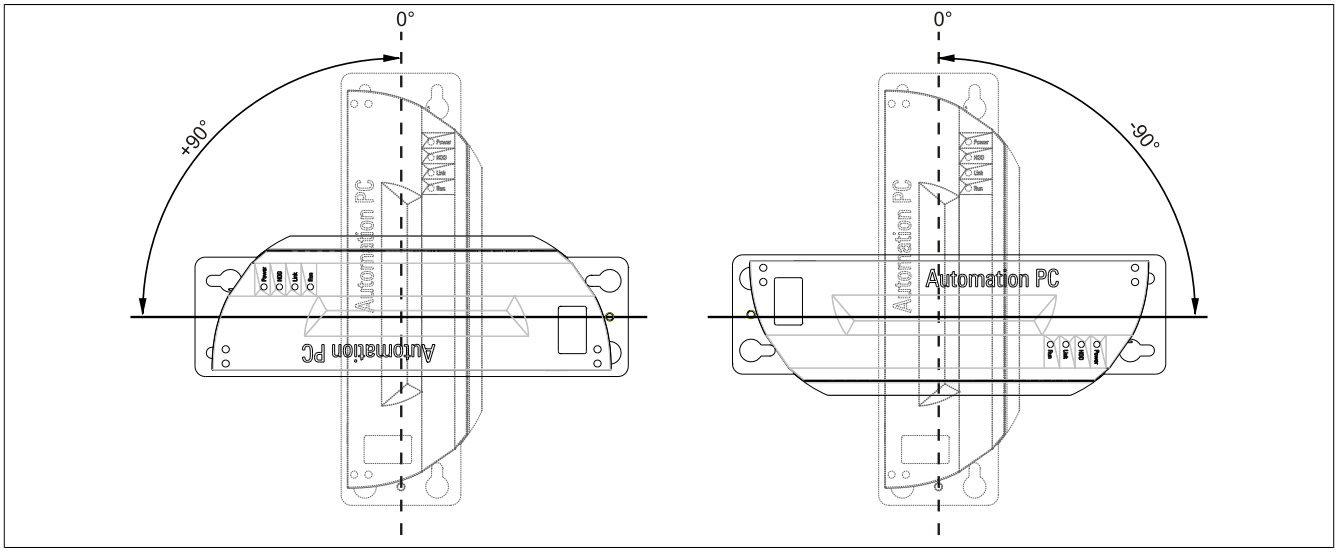


Image 16: Mounting orientation -90° or +90°.

1.3.3 Mounting orientation 180°

There are no limitations regarding ambient temperature when mounted at 180°.

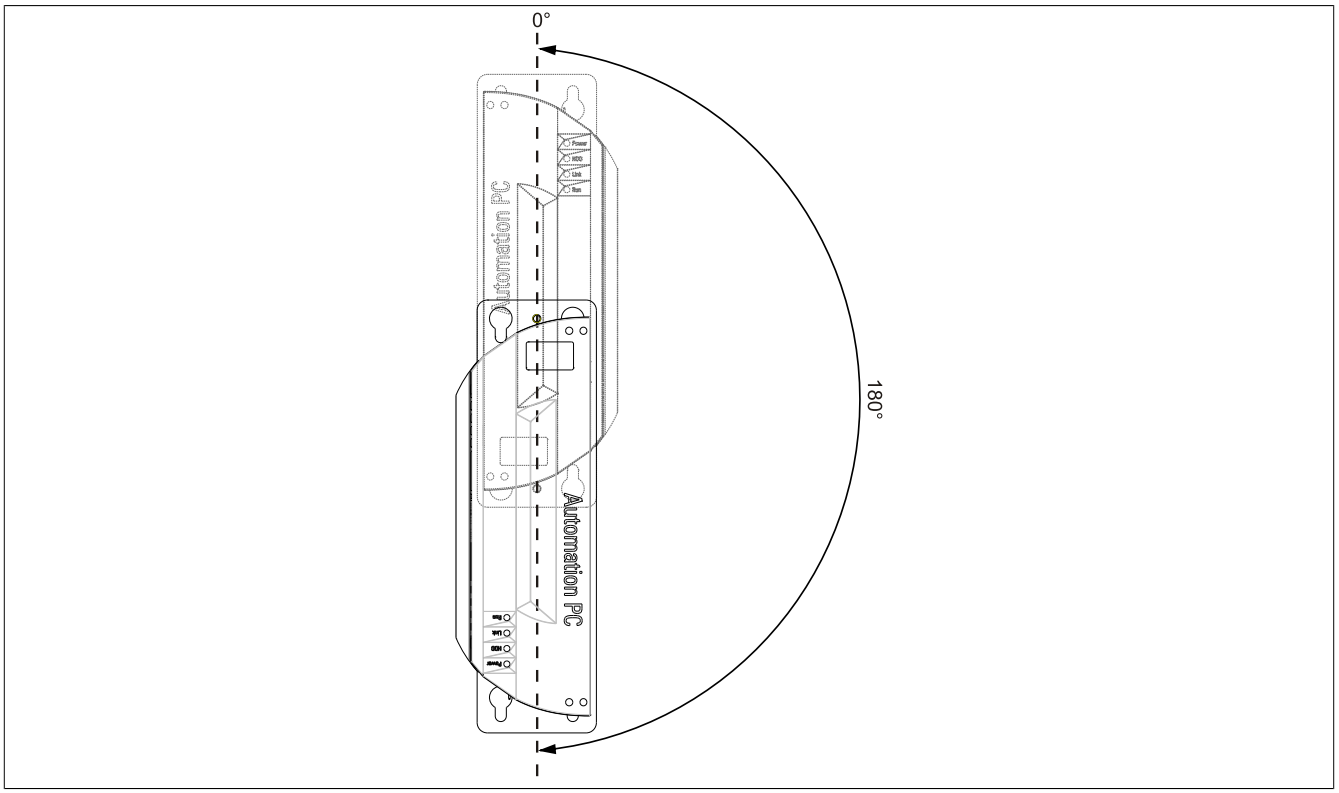


Image 17: Mounting orientation 180°

1.4 Spacing for air circulation

In order to ensure sufficient air circulation, allow the specified amount of space above, below, behind and on the sides of the Automation PC 510. The minimum specified free space can be seen in the diagram below.

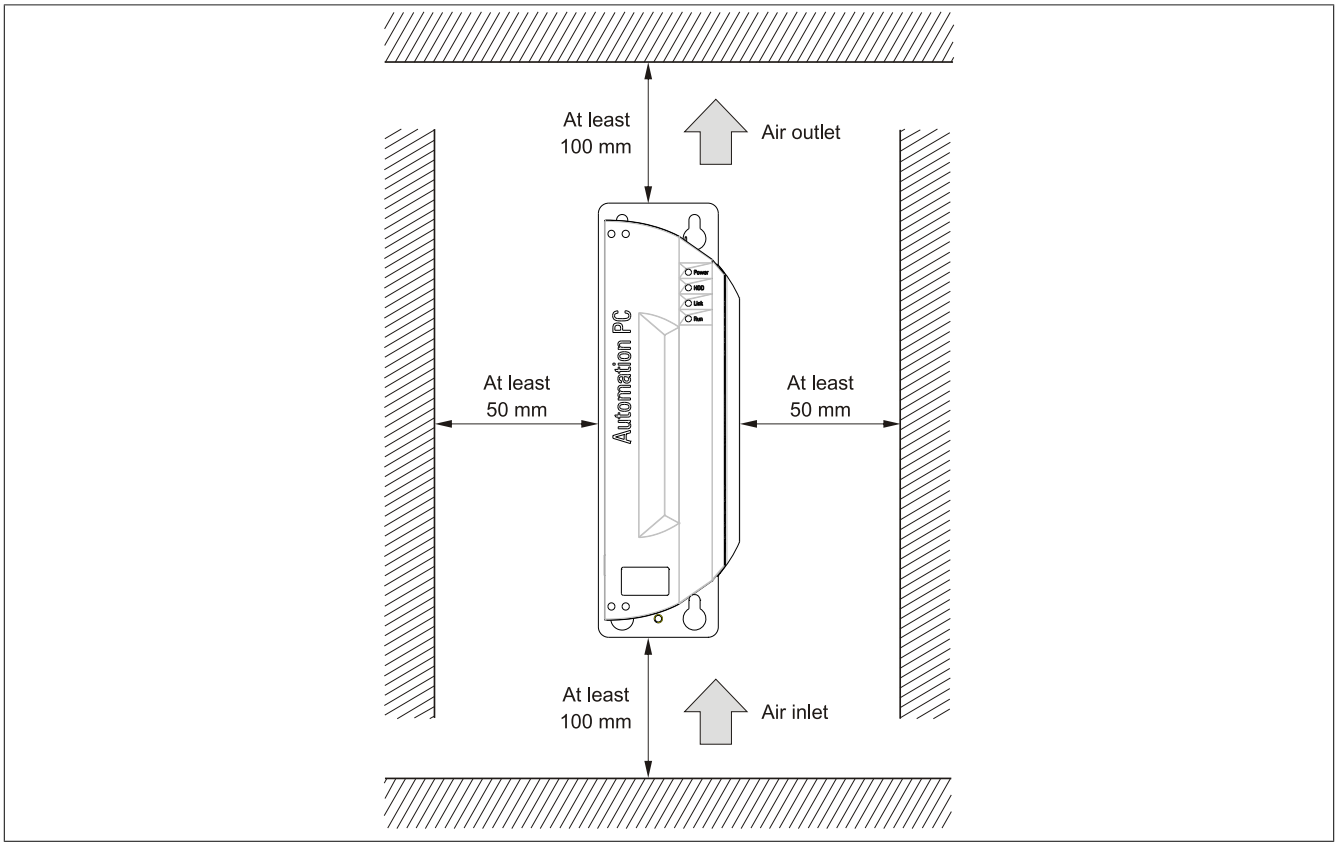


Image 18: Spacing for air circulation

2 Cable connections

When connecting and laying cables, it is not permitted to have a flex radius smaller than the minimum value specified.

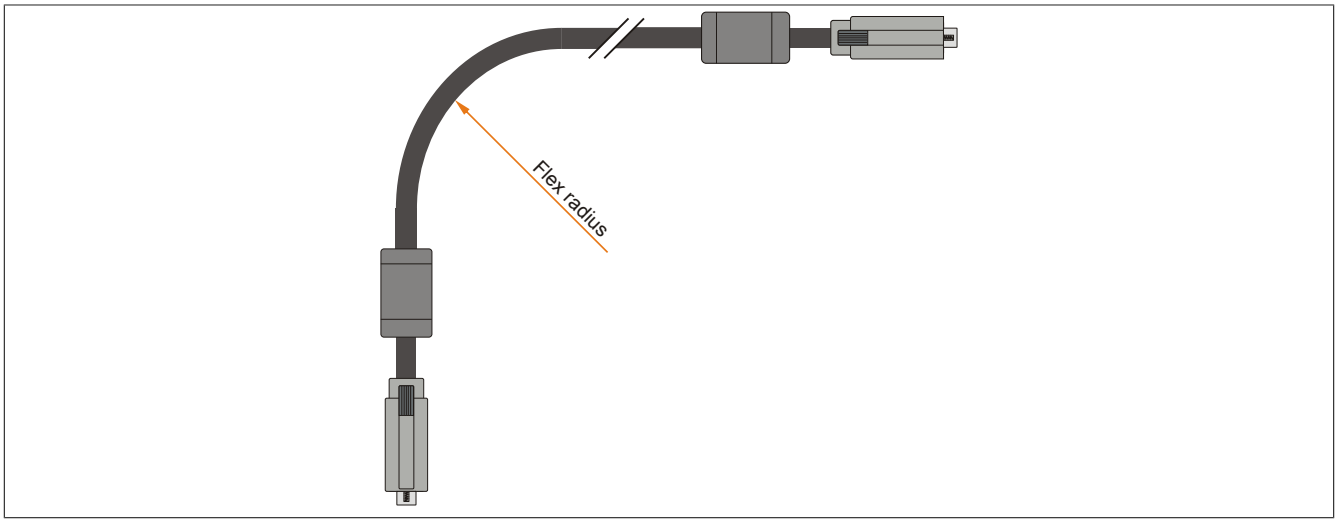


Image 19: Flex radius - Cable connection

Information:

The specified flex radius can be found in the Automation Panel 800 or Automation Panel 900 User's Manual, which can be downloaded as a .PDF file from the B&R website (www.br-automation.com).

3 Grounding concept

Functional ground is a current path of low impedance between electrical circuits and ground. It is used, for example, to improve immunity to disturbances and not necessarily as a protective measure. It therefore serves only to deflect disturbances, not to provide any kind of protection against electric shock.

The functional ground on the device has 2 connections:

- Supply voltage
- Ground connection

To guarantee secure dissipation of electric disturbances, the following points should be observed:

- The device should be connected to the central grounding point in the control cabinet using the shortest route possible.
- Use a cable with a minimum cross section of 2.5 mm² per connection.
- Note the line shielding concept, all connected data cables are used as shielded lines.

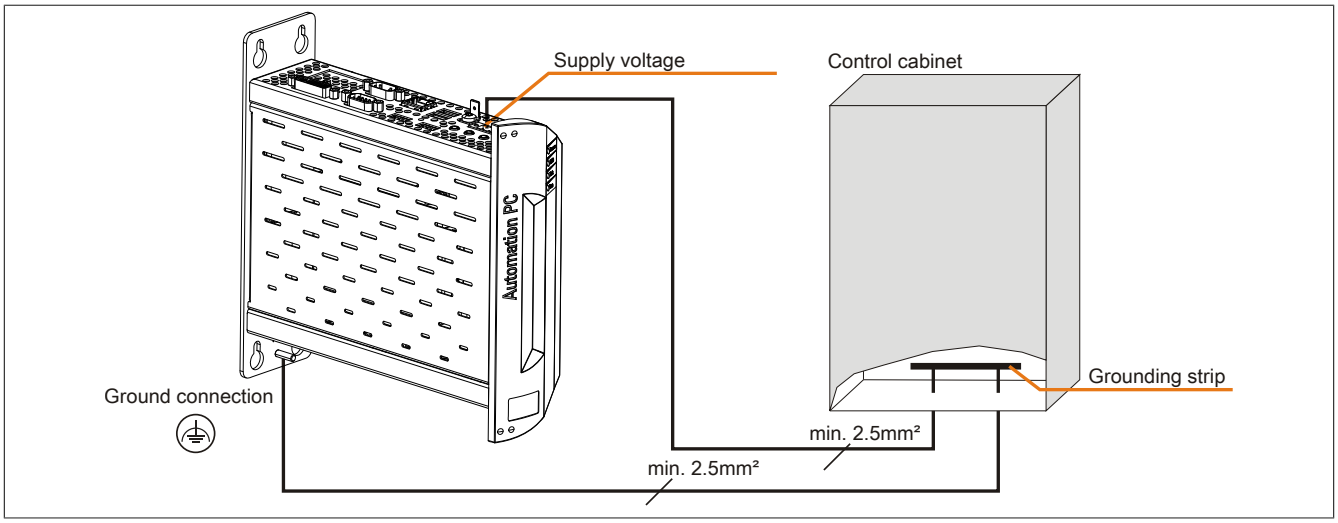


Image 20: Grounding concept

Chapter 4 • Software

1 BIOS options

Information:

The following diagrams, BIOS menu items and their descriptions refer to BIOS version 1.00. It is therefore possible that these diagrams and BIOS descriptions do not correspond with the installed BIOS version.

1.1 General information

BIOS stands for "Basic Input Output System". It is the most basic standardized communication between the user and the system (hardware). The BIOS system used in this B&R industrial PC is produced by Insyde.

The BIOS Setup Utility lets you modify basic system configuration settings. These settings are stored in CMOS and in EEPROM (as a backup).

The CMOS data is buffered by a battery (if present), and remains in the B&R industrial PC even when the power is turned off (no 24 VDC supply).

1.2 BIOS setup and boot procedure

BIOS is immediately activated when switching on the power supply of the B&R industrial PC or pressing the power button. The system checks if the setup data from the EEPROM is "OK". If the data is "OK", then it is transferred to the CMOS. If the data is "not OK", then the CMOS data is checked for validity. An error message is output if the CMOS data contains errors and the boot procedure can be continued by pressing the <F1> key. To prevent the error message from appearing at each restart, open the BIOS setup by pressing the <Del> key and re-save the settings.

BIOS reads the system configuration information in CMOS RAM, checks the system, and configures it using the Power On Self Test (POST).

When these "preliminaries" are finished, BIOS seeks an operating system in the data storage devices available (hard drive, floppy drive, etc.). BIOS launches the operating system and hands over control of system operations to it.

To enter BIOS Setup, the <F2> key must be pressed after the USB controller has been initialized as soon as the following message appears on the monitor (during POST): "Press F2 to go to Setup Utility"

Information:

The POST screen is only displayed for a fraction of a second due to optimized boot procedures. It is however, still possible to enter BIOS.

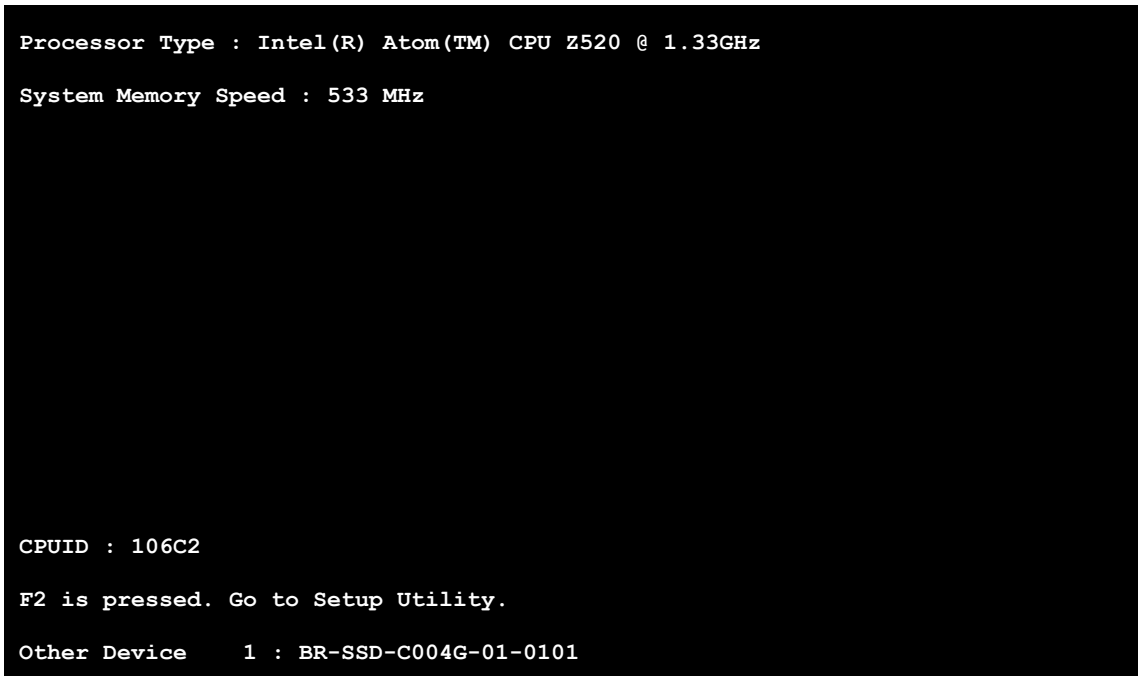


Image 21: Boot screen

1.2.1 BIOS setup keys

The following keys are enabled during the POST:

Information:

The key signals from the USB keyboard are only registered after the USB controller has been initialized.

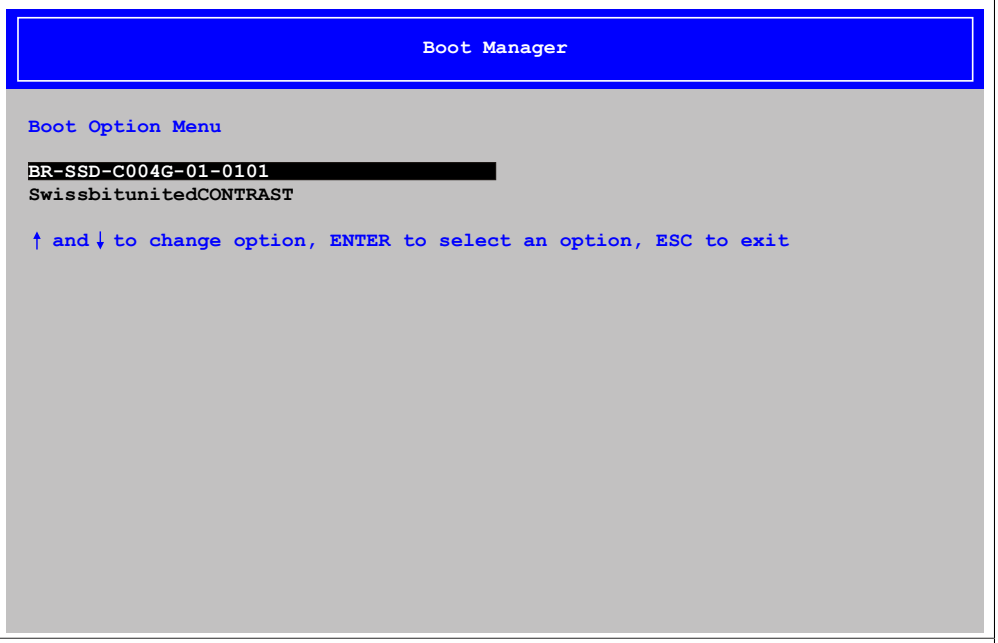
Keys	Function
F2	Enters the BIOS setup menu.
F12	Cues the boot menu. Lists all bootable devices that are connected to the system. Select the device to boot from with cursor ↑, cursor ↓ and <ENTER>. Use the ESC key to exit the boot menu. 
<Pause>	Pressing the <Pause> key stops the POST. Press any other key to resume the POST.

Table 73: BIOS-relevant keys for POST

The following keys can be used after entering the BIOS setup:

Key	Function
F1	General help
Cursor ↑	Moves to the previous item
Cursor ↓	Go to the next item
Cursor ←	Moves to the previous menu
Cursor →	Go to the next menu
F5/F6	Change BIOS settings
Enter	Changes to the selected menu
F9	These settings are loaded for all BIOS configurations.
F10	Save and close
ESC	Exits the submenu

Table 74: BIOS-relevant keys in the BIOS menu

1.3 Main

Immediately after the <F2> key is pressed during startup, the main BIOS setup menu appears.

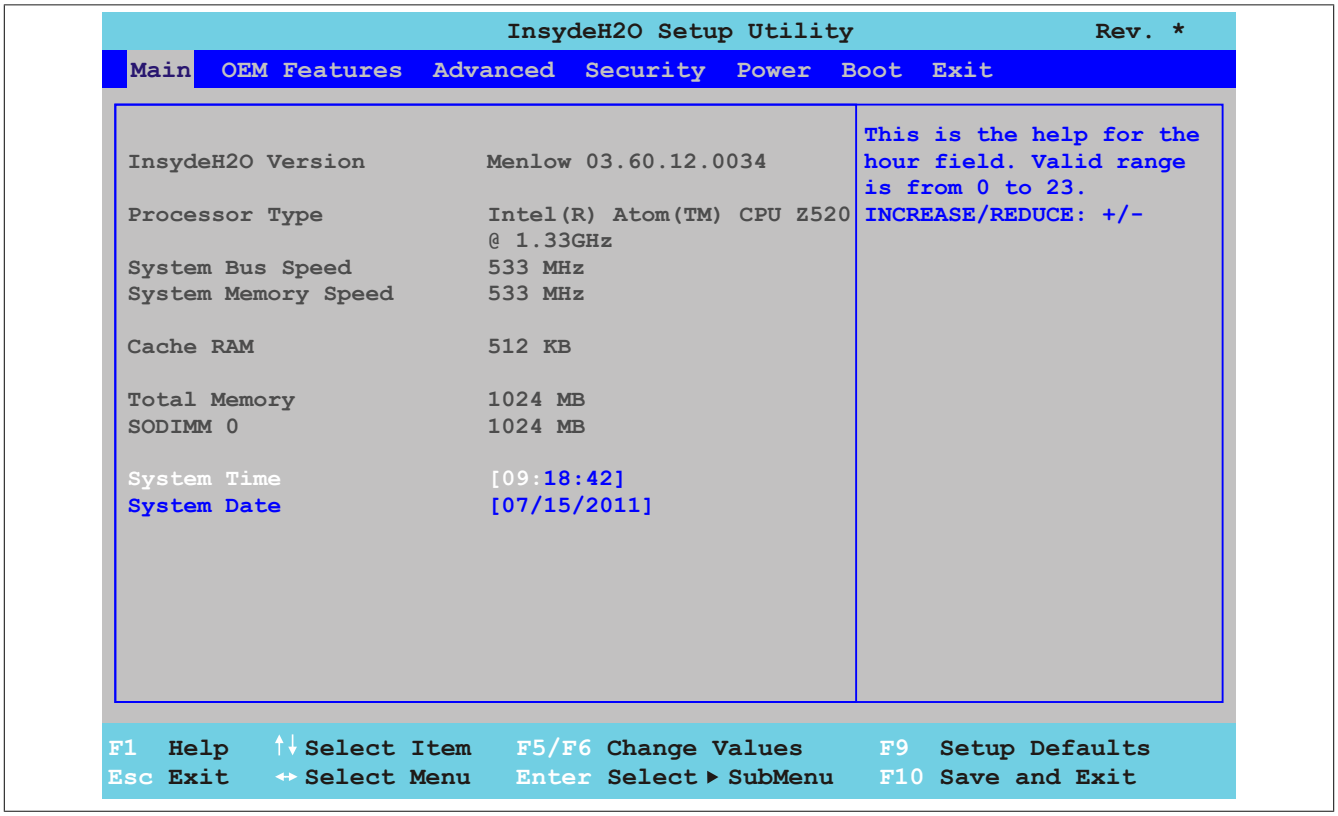


Image 22: US15W Main - Menu

BIOS setting	Meaning	Setting options	Effect
InsydeH2O Version	Displays the BIOS InsydeH2O version.	None	-
Processor Type	Displays the processor type.	None	-
System Bus Speed	Displays the System Bus speed		
System Memory Speed	Displays the system memory speed.	None	-
Cache RAM	Displays the Cache RAM in the system.	None	-
Total Memory	Displays the entire system memory size.	None	-
SODIMM 0	Displays the amount of RAM in the SODIMM 0 slot.	None	-
System Time	This is the current system time setting. Buffered by a battery (CMOS battery) after the system has been switched off.	Adjustment of the system time	Sets the system time in the format Hour:Minute:Second (hh:mm:ss).
System Date	This is the current system date setting. Buffered by a battery (CMOS battery) after the system has been switched off.	Changes to the system date	Sets the system date in the format Month:Day:Year (mm:dd:yyyy).

Table 75: US15W - Main menu setting options

1.4 OEM features

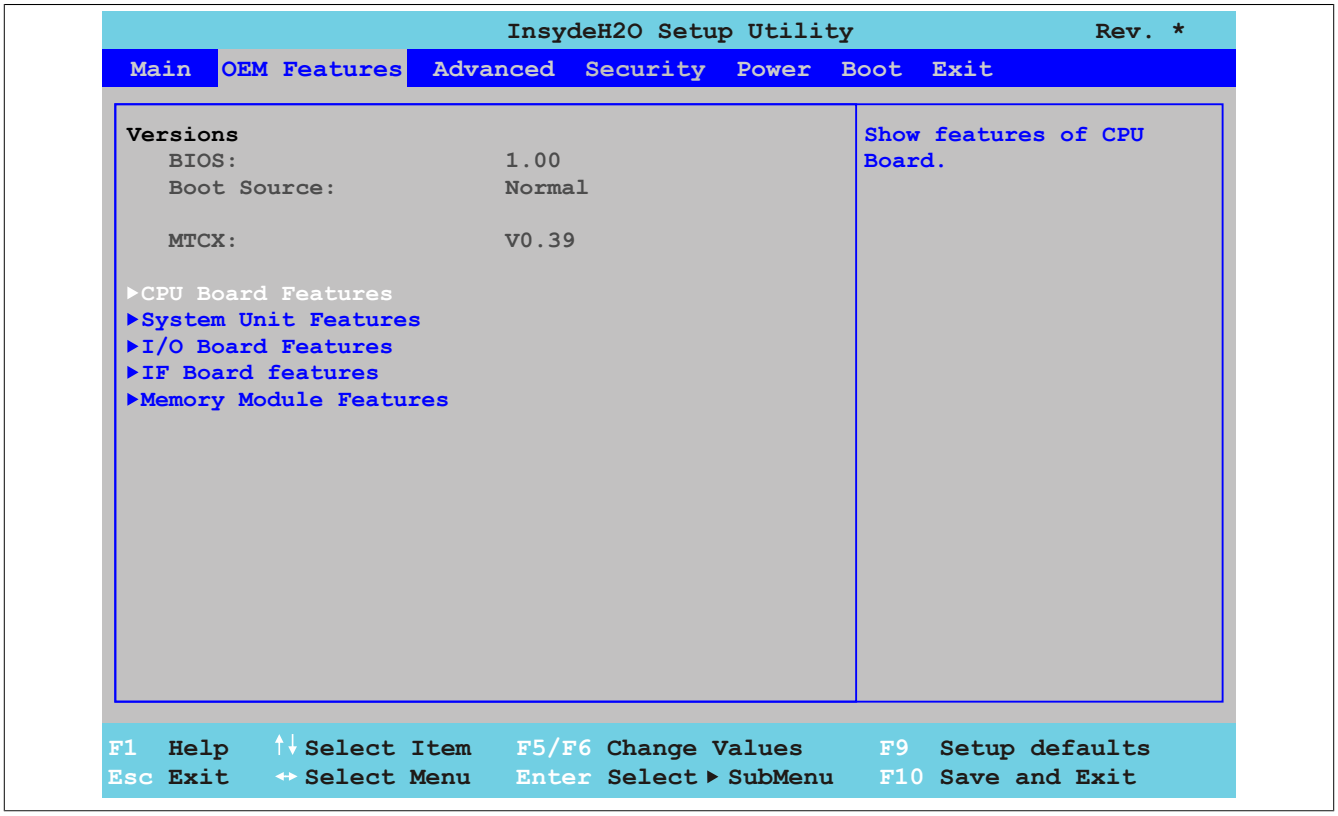


Image 23: US15W OEM Features - Menu

BIOS setting	Meaning	Setting options	Effect
BIOS	Displays the B&R BIOS boot version.	None	-
Boot Source	Displays whether the Normal BIOS version or the backup BIOS version (backup) is booted.		**Information:** **If a BIOS update failed, then the back-up BIOS will be loaded automatically. The BIOS update can then be attempt-ed again.**
MTCX	Displays the MTCX version that is installed.	None	-
CPU Board Features	Displays device-specific information and setup of device specific values for the CPU board.	Enter	Opens the submenu See " CPU board features" on page 72
System Unit Features	Displays device-specific information and setup of device specific values for the system unit.	Enter	Opens the submenu See " System unit features" on page 77
I/O Board Features[1)]	Displays device-specific information for the I/O board.	Enter	Opens the submenu See " I/O board features" on page 81
IF Board Features[2)]	Displays device-specific information for the IF board.	Enter	Opens the submenu See " IF board features" on page 86
Memory Module Features	Displays device-specific information for the main memory.	Enter	Opens the submenu See " Memory module features" on page 88

Table 76: US15W OEM Features - Menu setting options

1) This submenu is only displayed when there is an I/O board connected to the system unit.
2) This submenu is only displayed when there is an interface board connected to the system unit.

1.4.1 CPU board features

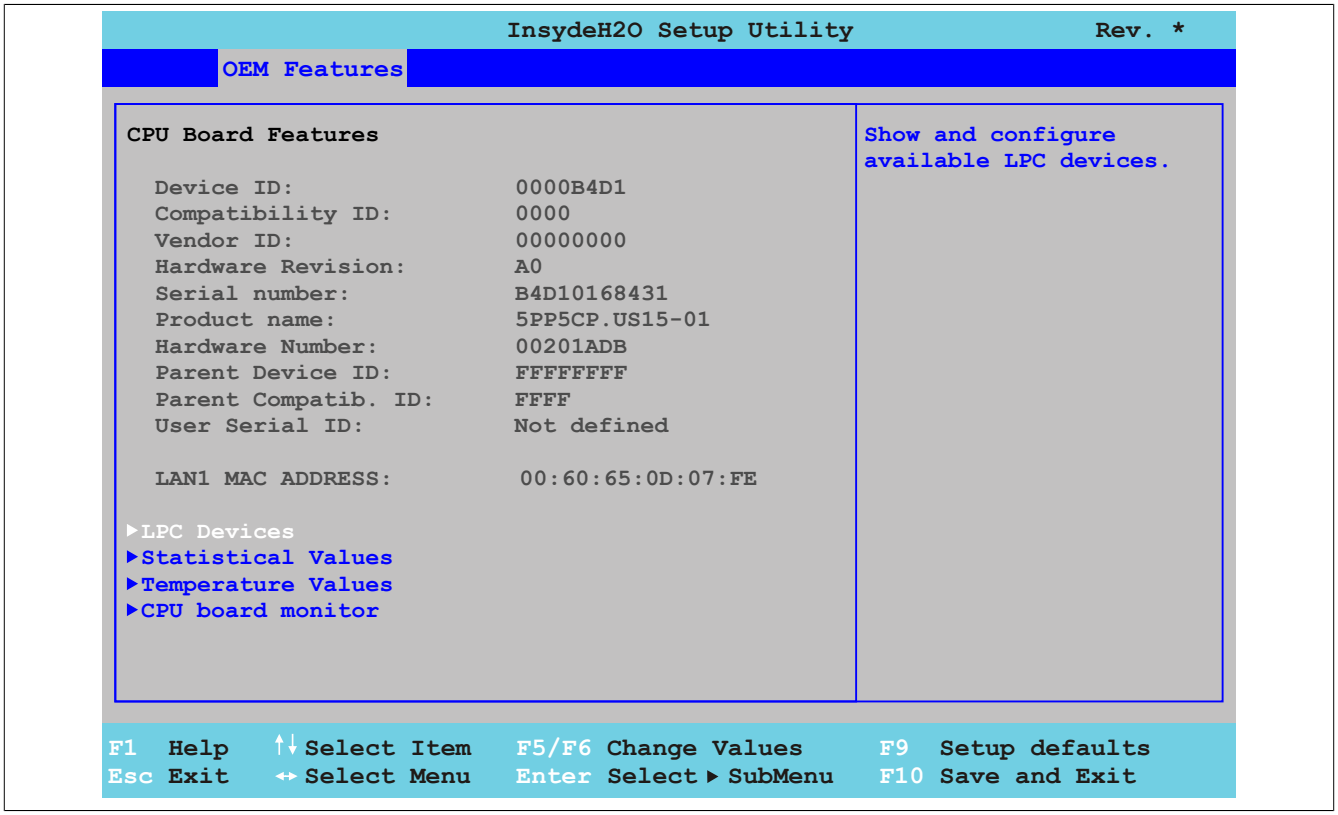


Image 24: US15W OEM Features - CPU Board Features

BIOS setting	Meaning	Setting options	Effect
Device ID	Displays the device ID of the CPU board.	None	-
Compatibility ID	Displays the version of the device within the same B&R device code. This ID is needed for Automation Runtime.	None	-
Vendor ID	Displays the Vendor ID	None	-
Hardware Revision	Displays the CPU board hardware revision.	None	-
Serial Number	Displays the B&R serial number	None	-
Product Name	Displays the B&R model number	None	-
Hardware Number	Displays the CPU board hardware number.	None	-
Parent Device ID	Displays the manufacturer number	None	-
Parent Compatib. ID	Displays the manufacturer ID	None	-
User Serial ID	Displays the user serial ID. This 8-digit hex value can be freely assigned by the user (e.g. to give the device a unique ID) and can only be changed with using the "B&R Control Center" via the ADI driver.	None	-
LAN1 MAC ADDRESS	Displays the MAC addresses assigned for the ETH interface.	None	-
LPC devices	Configuration of the LPC Devices.	Enter	Opens the submenu See " LPC devices" on page 73
Statistical values	Displays the statistical values.	Enter	Opens the submenu See " Statistical values" on page 74
Temperature values	Displays the current temperature values.	Enter	Opens the submenu See " Temperature values" on page 75
CPU Board Monitor	Displays the current voltage values on the CPU board being used.	Enter	Opens the submenu See " CPU board monitor" on page 76

Table 77: US15W OEM Features - CPU Board Features setting options

LPC devices

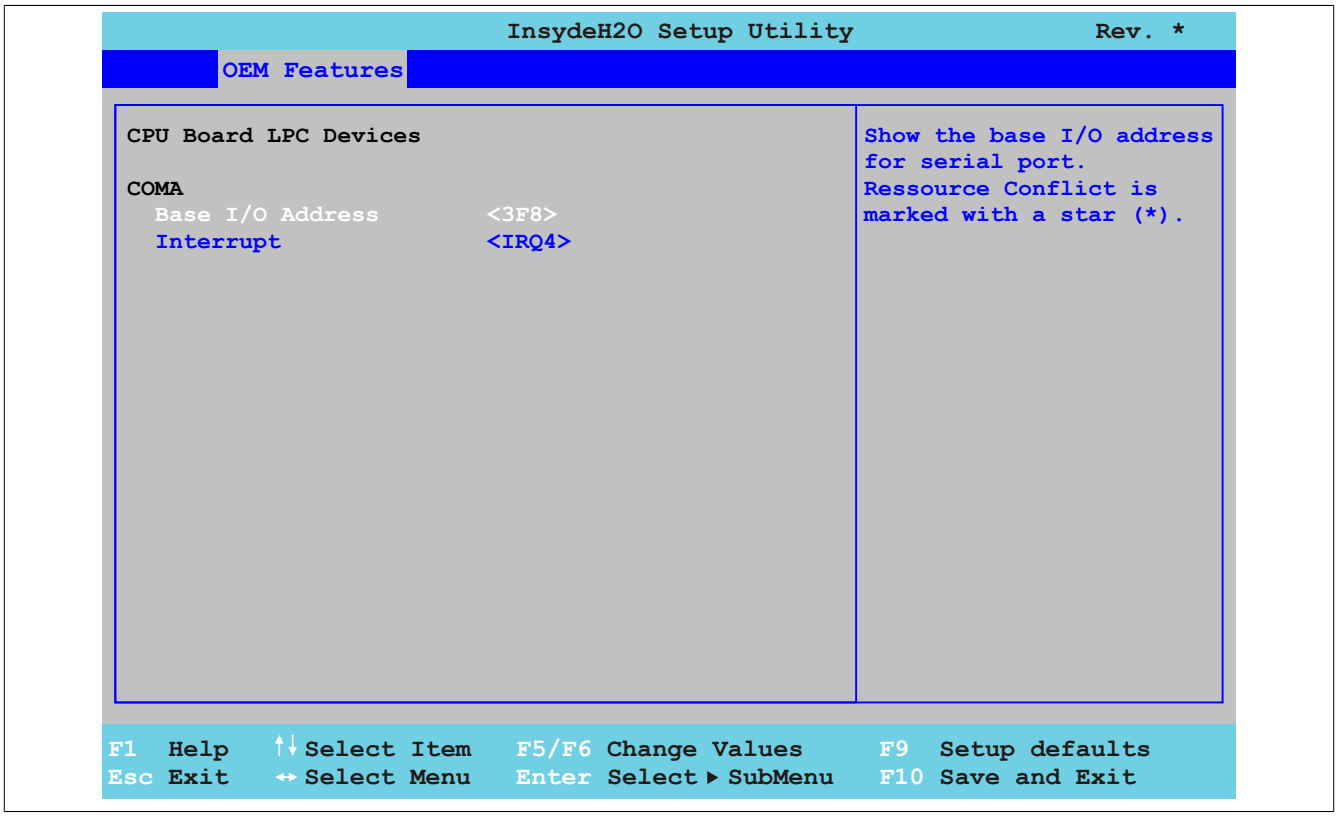


Image 25: US15W OEM features - CPU board features - LPC devices

BIOS setting	Meaning	Setting options	Effect
COMA	Settings for the COM serial interface in the system.	None	-
Base I/O Address	Selects the base I/O address for the COM port	Disabled, 238, 2E8, 2F8, 328, 338, 3E8, 3F8	Disables or assigns the selected base I/O address.
Interrupt	Selection of the interrupt for the COM port.	IRQ3, IRQ4, IRQ5, IRQ6, IRQ10, IRQ11, IRQ12	Selected interrupt is assigned.

Table 78: US15W OEM Features - CPU Board Features - LPC Devices setting options

Information:

A resource conflict can occur regarding the Base I/O address or Interrupt settings, which will cause a warning. In order to make the settings anyways, the setting must first be made on the Base I/O address or Interrupt being that is used.

Statistical values

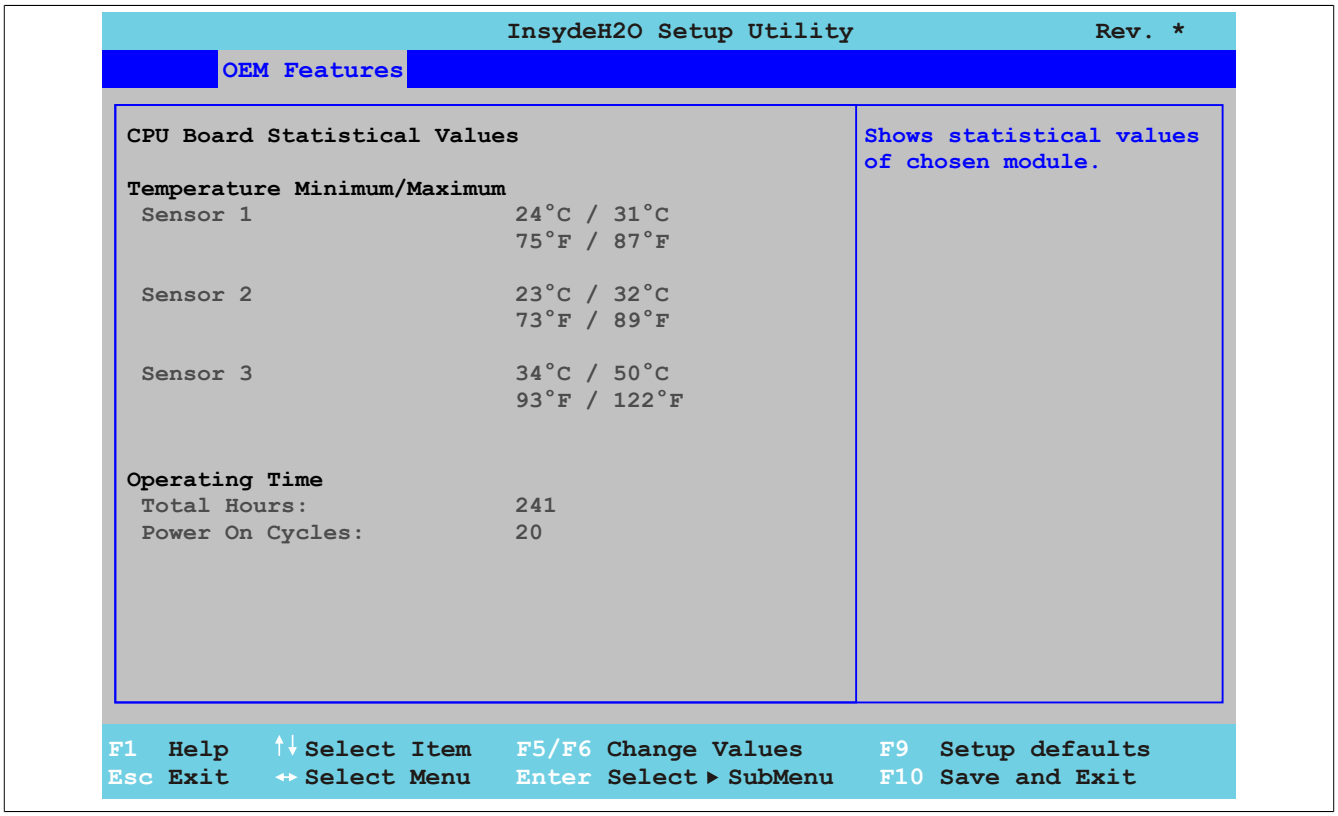


Image 26: US15W OEM features - CPU board features- Statistical values

BIOS setting	Meaning	Setting options	Effect
Sensor 1	Displays the minimum and maximum temperature of sensor 1 (interfaces) in °C and °F.	None	-
Sensor 2	Displays the minimum and maximum temperature of sensor 2 (CPU) in °C and °F.	None	-
Sensor 3	Displays the minimum and maximum temperature of sensor 3 (main memory) in °C and °F.	None	-
Total Hours	Displays the runtime in whole hours.	None	-
Power on cycles	Displays the Power On Cycles - each restart increases the counter by one.	None	-

Table 79: US15W OEM Features - CPU Board Features - Statistical Values setting options

Temperature values

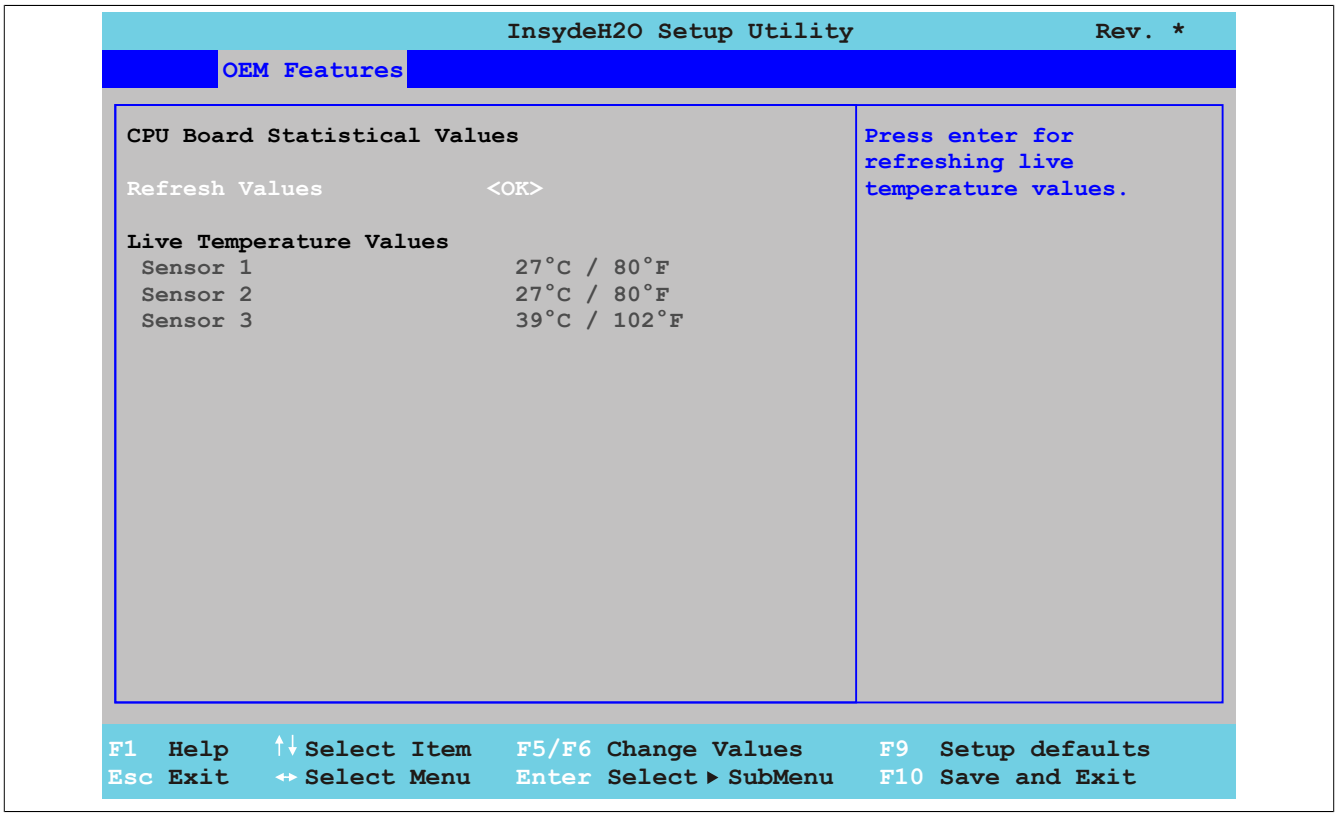


Image 27: US15W OEM features - CPU board features- Temperature values

BIOS setting	Meaning	Setting options	Effect
Refresh values	Option for refreshing the temperature values.	OK	Refreshes the temperature values shown below.
Sensor 1	Displays the current temperature of Sensor 1 (interfaces) in °C and °F.	None	-
Sensor 2	Displays the current temperature of sensor 2 (CPU) in °C and °F.	None	-
Sensor 3	Displays the current temperature of sensor 3 (main memory) in °C and °F.	None	-

Table 80: US15W OEM Features - CPU Board Features - Temperature Values setting options

CPU board monitor

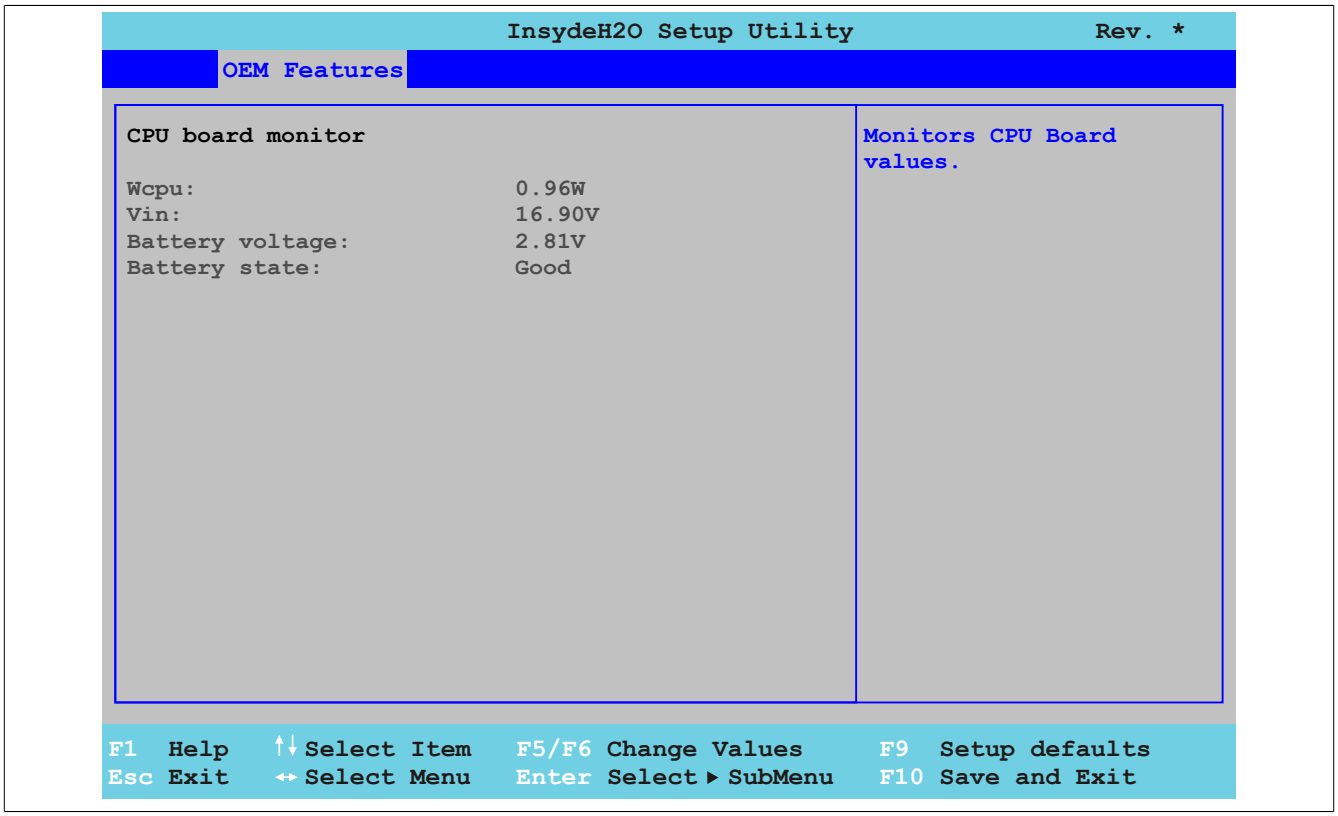


Image 28: US15W OEM Features - CPU Board Features - CPU Board Monitor

BIOS setting	Meaning	Setting options	Effect
Wcpu:	Displays the CPU power consumption in watts.	None	-
Vin:	Displays the current voltage of the power supply in volts.	None	-
Battery voltage:	Displays the battery voltage (in volts).	None	-
Battery state:	Displays the battery status.	None	-

Table 81: US15W OEM Features - CPU Board Features - CPU Board Monitor setting options

1.4.2 System unit features

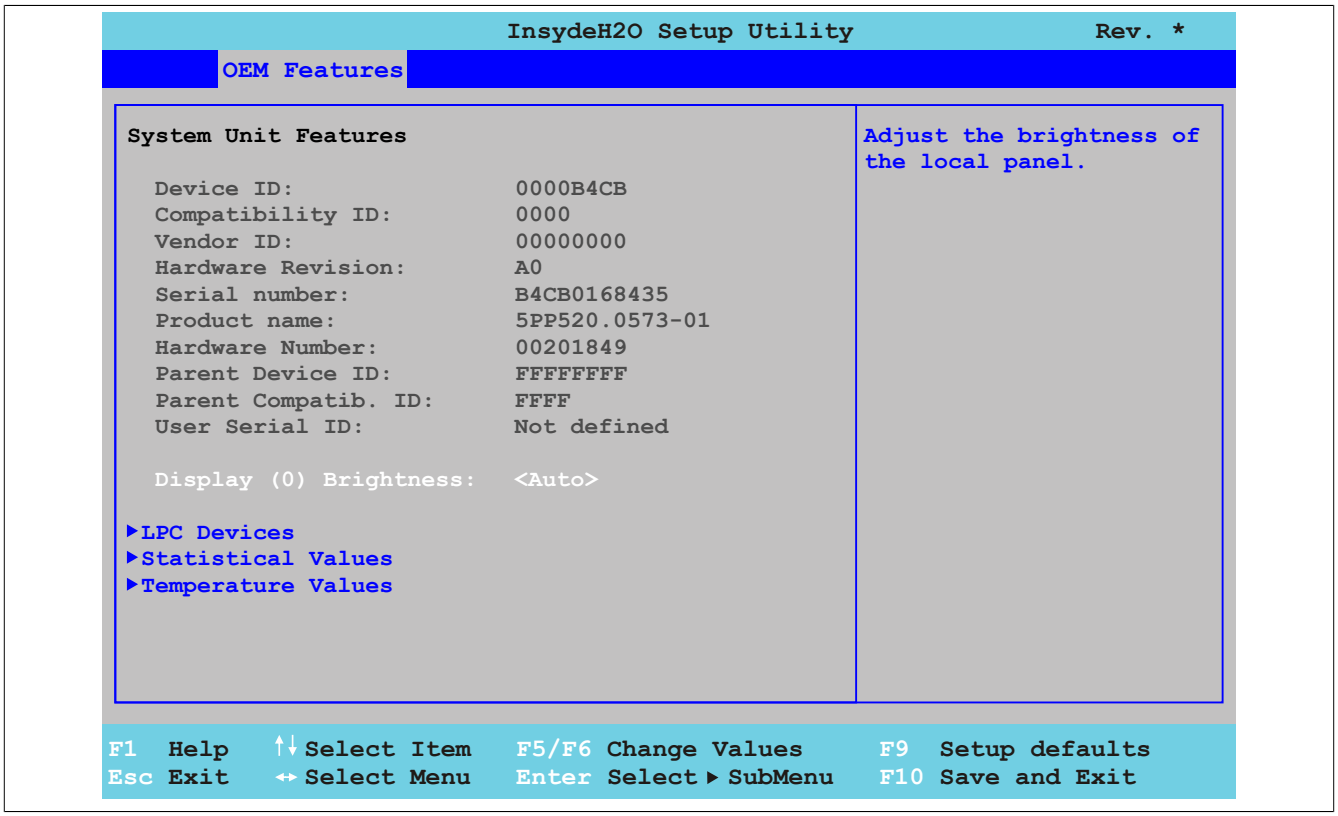


Image 29: US15W OEM Features - System Unit Features

BIOS setting	Meaning	Setting options	Effect
Device ID	Displays the device code of the Power Panel device	None	-
Compatibility ID	Displays the version of the device within the same B&R device code. This ID is needed for Automation Runtime.	None	-
Vendor ID	Displays the Vendor ID	None	-
Hardware Revision	Displays the system unit hardware revision	None	-
Serial Number	Displays the B&R serial number	None	-
Product Name	Displays the B&R model number	None	-
Hardware Number	Displays the system unit hardware number	None	-
Parent Device ID	Displays the manufacturer number	None	-
Parent Compatib. ID	Displays the manufacturer ID	None	-
User Serial ID	Displays the user serial ID. This 8-digit hex value can be freely assigned by the user (e.g. to give the device a unique ID) and can only be changed with using the "B&R Control Center" via the ADI driver.	None	-
Display (0) Brightness[1)]	Option for setting the backlighting of the display.	Auto	The optimal brightness is automatically configured using the factory settings. A brightness value between 100% and 0% is set.
		0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%	Manual setting of the desired brightness within factory settings limits.
LPC devices	Configuration of the LPC Devices.	Enter	Opens the submenu See " LPC devices" on page 78
Statistical values	Displays the statistical values.	Enter	Opens the submenu See " Statistical values" on page 79
Temperature values	Displays the current temperature values.	Enter	Opens the submenu See " Temperature values" on page 80

Table 82: US15W OEM Features - System Unit Features setting options

1) This setting is only available for PP500 system units.

LPC devices

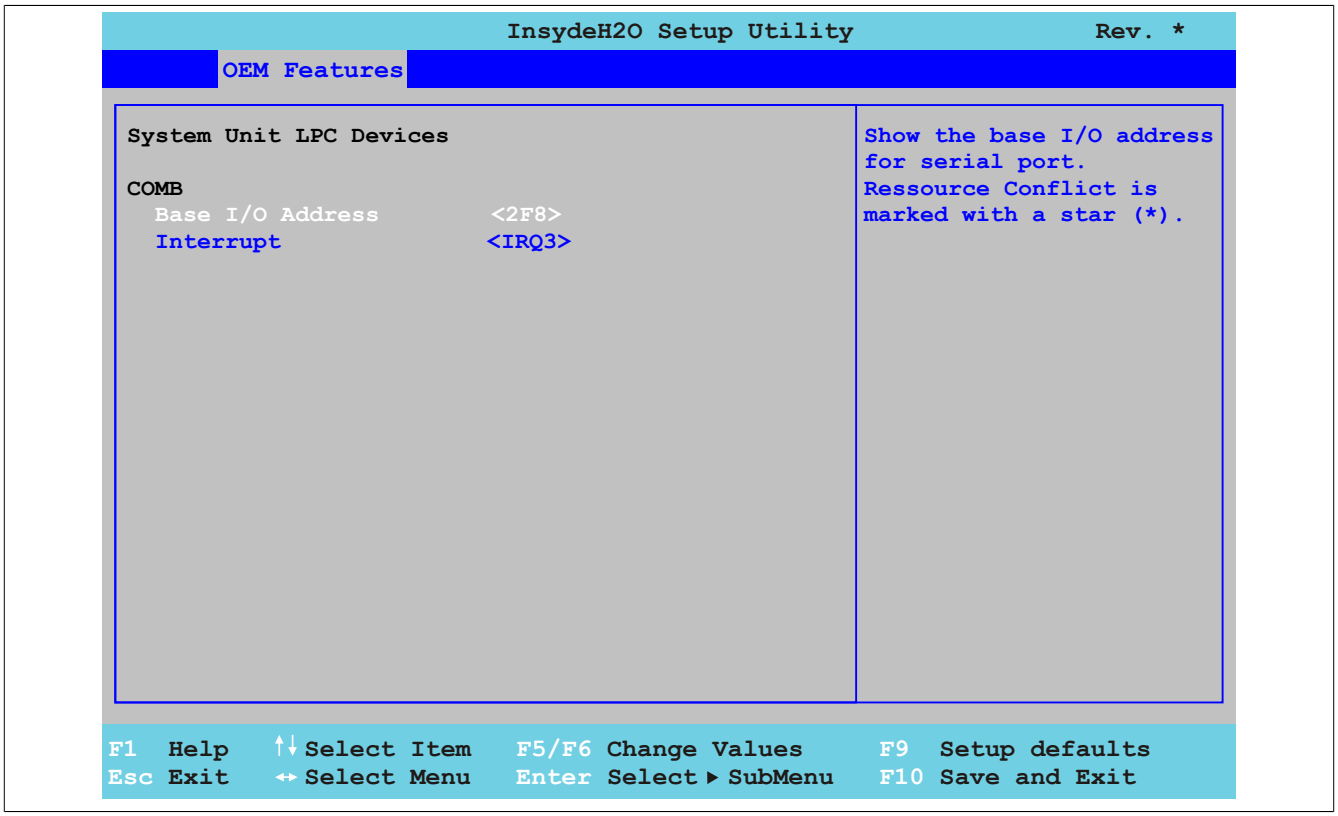


Image 30: US15W OEM Features - System Unit Features - LPC Devices

BIOS setting	Meaning	Setting options	Effect
COMB	Settings for the COM serial interface in the system.	None	-
Base I/O Address	Selects the base I/O address for the COM port	Disabled, 238, 2E8, 2F8, 328, 338, 3E8, 3F8	Disables or assigns the selected base I/O address.
Interrupt	Selection of the interrupt for the COM port.	IRQ3, IRQ4, IRQ5, IRQ6, IRQ10, IRQ11, IRQ12	Selected interrupt is assigned.

Table 83: US15W OEM Features - System Unit Features - LPC Devices setting options

Information:

A resource conflict can occur regarding the Base I/O address or Interrupt settings, which will cause a warning. In order to make the settings anyways, the setting must first be made on the Base I/O address or Interrupt being that is used.

Statistical values

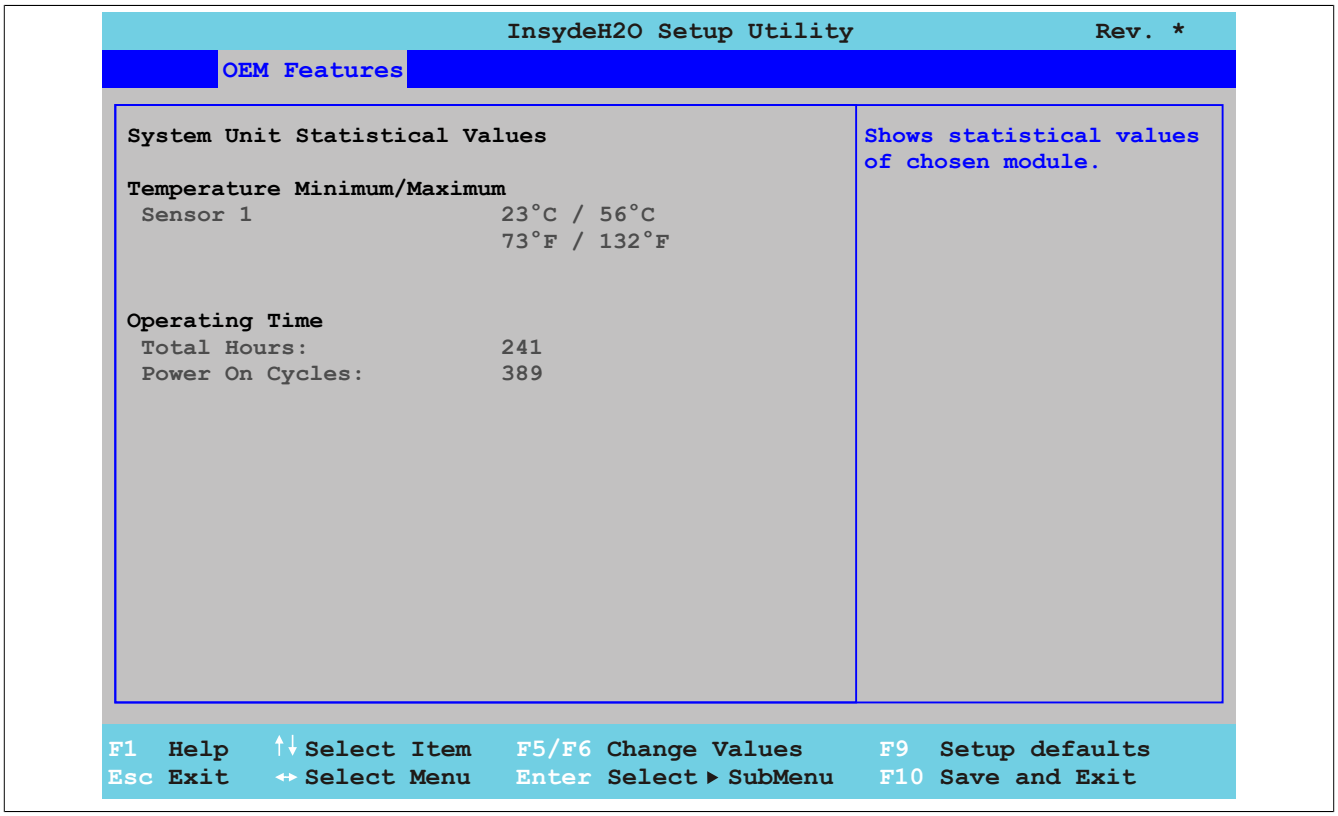


Image 31: US15W OEM features - System unit features- Statistical values

BIOS setting	Meaning	Setting options	Effect
Sensor 1	Displays the minimum and maximum sensor temperature 1 in °C and °F.	None	-
Total Hours	Displays the runtime in whole hours.	None	-
Power on cycles	Displays the Power On Cycles - each restart increases the counter by one.	None	-

Table 84: US15W OEM Features - System Unit Features - Statistical Values setting options

Temperature values

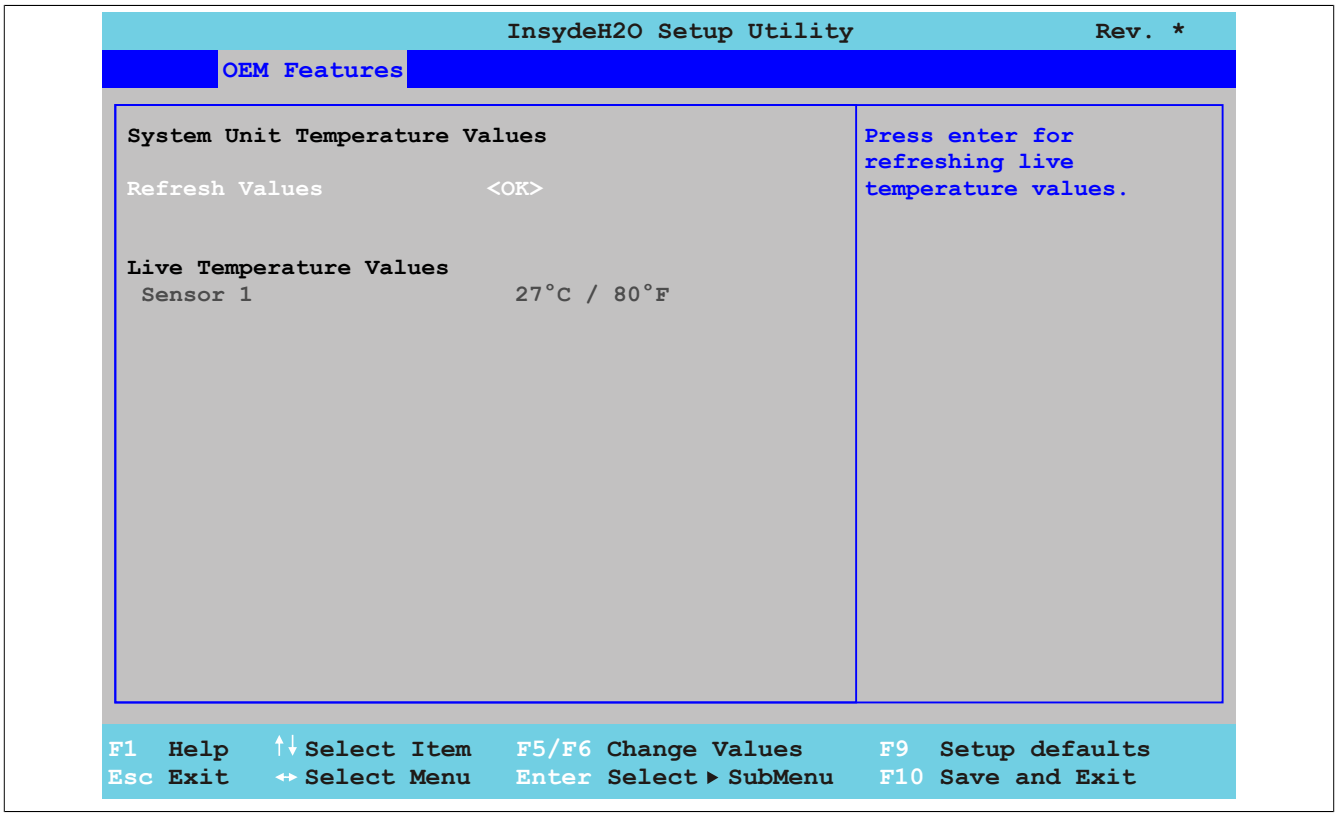


Image 32: US15W OEM features - System unit features- Temperature values

BIOS setting	Meaning	Setting options	Effect
Refresh values	Option for refreshing the temperature values.	OK	Refreshes the temperature values shown below.
Sensor 1	Displays the current sensor temperature 1 in °C and °F.	None	-

Table 85: US15W OEM Features - System Unit Features - Temperature Values setting options

1.4.3 I/O board features

Information:

The values and menus shown may vary depending on which I/O board is connected.

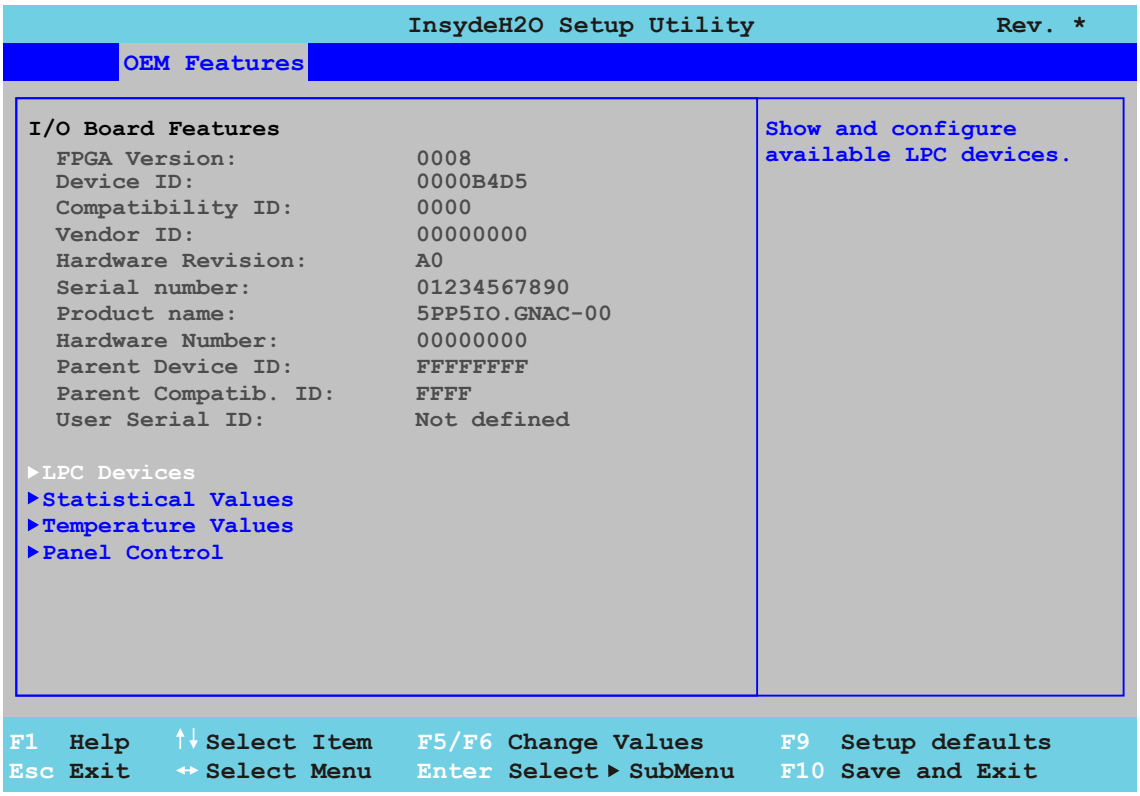


Image 33: US15W OEM Features - I/O Board Features

BIOS setting	Meaning	Setting options	Effect
FPGA Version	Shows the FPGA version of the I/O board.	None	-
Device ID	Displays the device ID of the I/O board.	None	-
Compatibility ID	Displays the version of the device within the same B&R device code. This ID is needed for Automation Runtime.	None	-
Vendor ID	Displays the Vendor ID	None	-
Hardware Revision	Displays the hardware revision of the I/O board.	None	-
Serial Number	Displays the B&R serial number	None	-
Product Name	Displays the B&R model number	None	-
Hardware Number	Displays the hardware number of the I/O board.	None	-
Parent Device ID	Displays the manufacturer number	None	-
Parent Compatib. ID	Displays the manufacturer ID	None	-
User Serial ID	Displays the user serial ID. This 8-digit hex value can be freely assigned by the user (e.g. to give the device a unique ID) and can only be changed with using the "B&R Control Center" via the ADI driver.	None	-
LPC devices	Configuration of the LPC Devices.	Enter	Opens the submenu See " LPC devices" on page 82
Statistical values	Displays the statistical values.	Enter	Opens the submenu See " Statistical values" on page 83
Temperature values	Displays the current temperature values.	Enter	Opens the submenu See " Temperature values" on page 84
Panel control	For special setup of connected panels (display units).	Enter	Opens the submenu See " Panel control" on page 85

Table 86: US15W OEM Features - I/O Board Features setting options

LPC devices

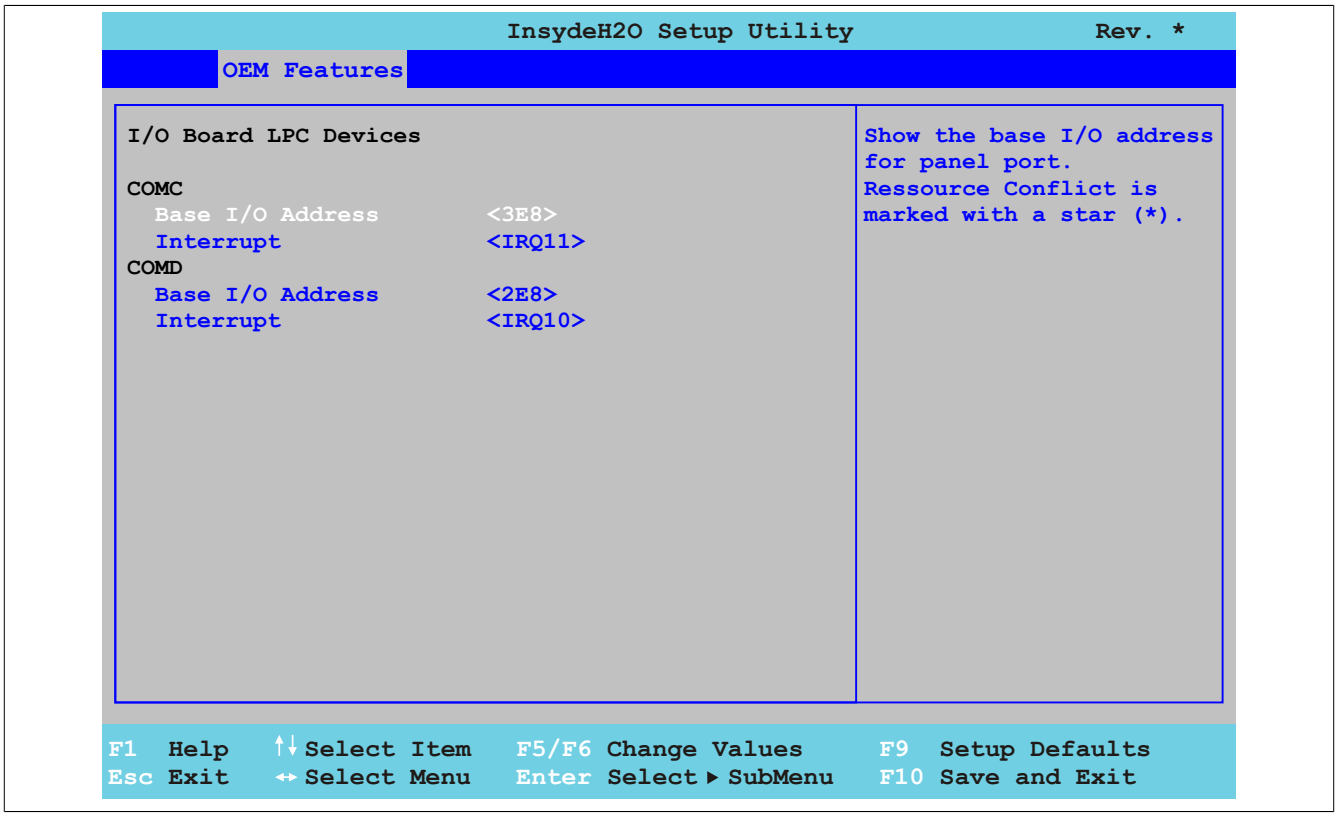


Image 34: US15W OEM Features - I/O Board Features - LPC Devices

BIOS setting	Meaning	Setting options	Effect
COMC	Setting for the panel interface on the I/O board.	None	-
Base I/O Address	Selects the base I/O address for the COM port	Disabled, 238, 2E8, 2F8, 328, 338, 3E8, 3F8	Disables or assigns the selected base I/O address.
Interrupt	Selection of the interrupt for the COM port.	IRQ3, IRQ4, IRQ5, IRQ6, IRQ10, IRQ11, IRQ12	Selected interrupt is assigned.
COMD	Setting for the serial interface (COM) on the I/O board.	None	-
Base I/O Address	Selects the base I/O address for the COM port	Disabled, 238, 2E8, 2F8, 328, 338, 3E8, 3F8	Disables or assigns the selected base I/O address.
Interrupt	Selection of the interrupt for the COM port.	IRQ3, IRQ4, IRQ5, IRQ6, IRQ10, IRQ11, IRQ12	Selected interrupt is assigned.

Table 87: US15W OEM Features - I/O Board Features - LPC Devices setting options

Information:

A resource conflict can occur regarding the Base I/O address or Interrupt settings, which will cause a warning. In order to make the settings anyways, the setting must first be made on the Base I/O address or Interrupt being that is used.

Statistical values

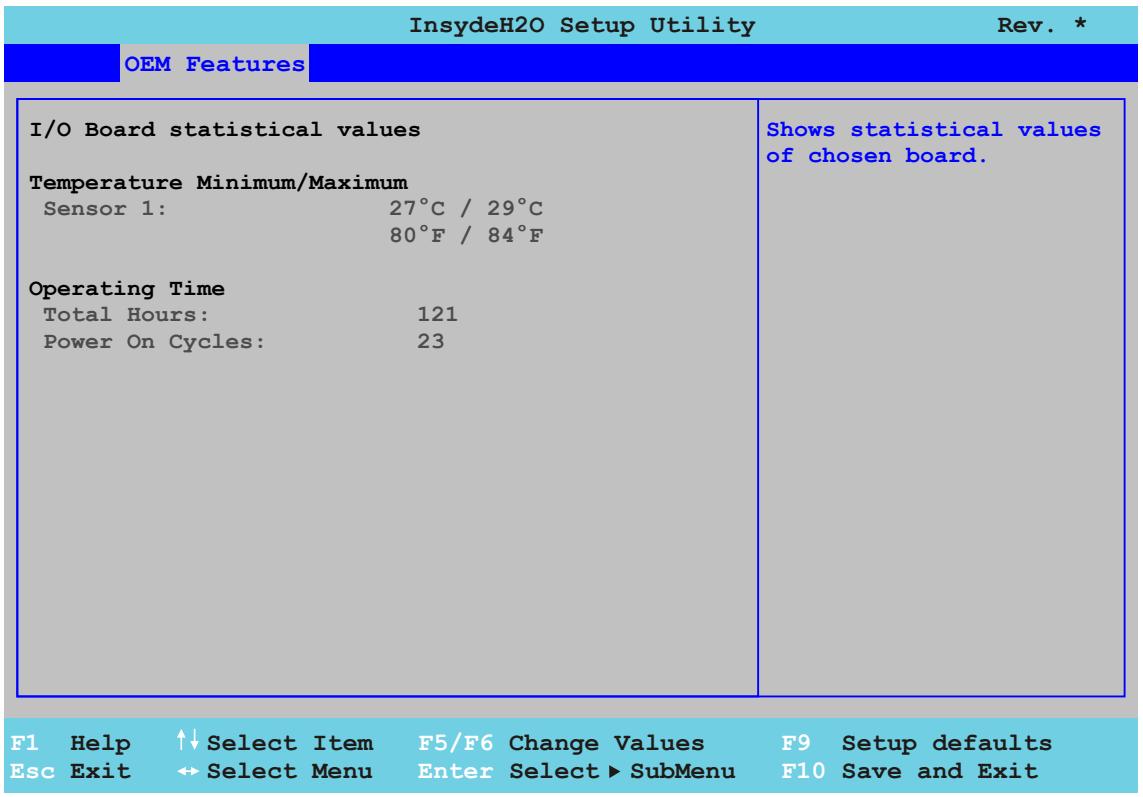


Image 35: US15W OEM Features - I/O Board Features - Statistical Values

BIOS setting	Meaning	Setting options	Effect
Sensor 1	Displays the minimum and maximum sensor temperature 1 in °C and °F.		
Total Hours	Displays the runtime in whole hours.	None	-
Power on cycles	Displays the Power On Cycles - each restart increases the counter by one.	None	-

Table 88: US15W OEM Features - I/O Board Features - Statistical Values setting options

Temperature values

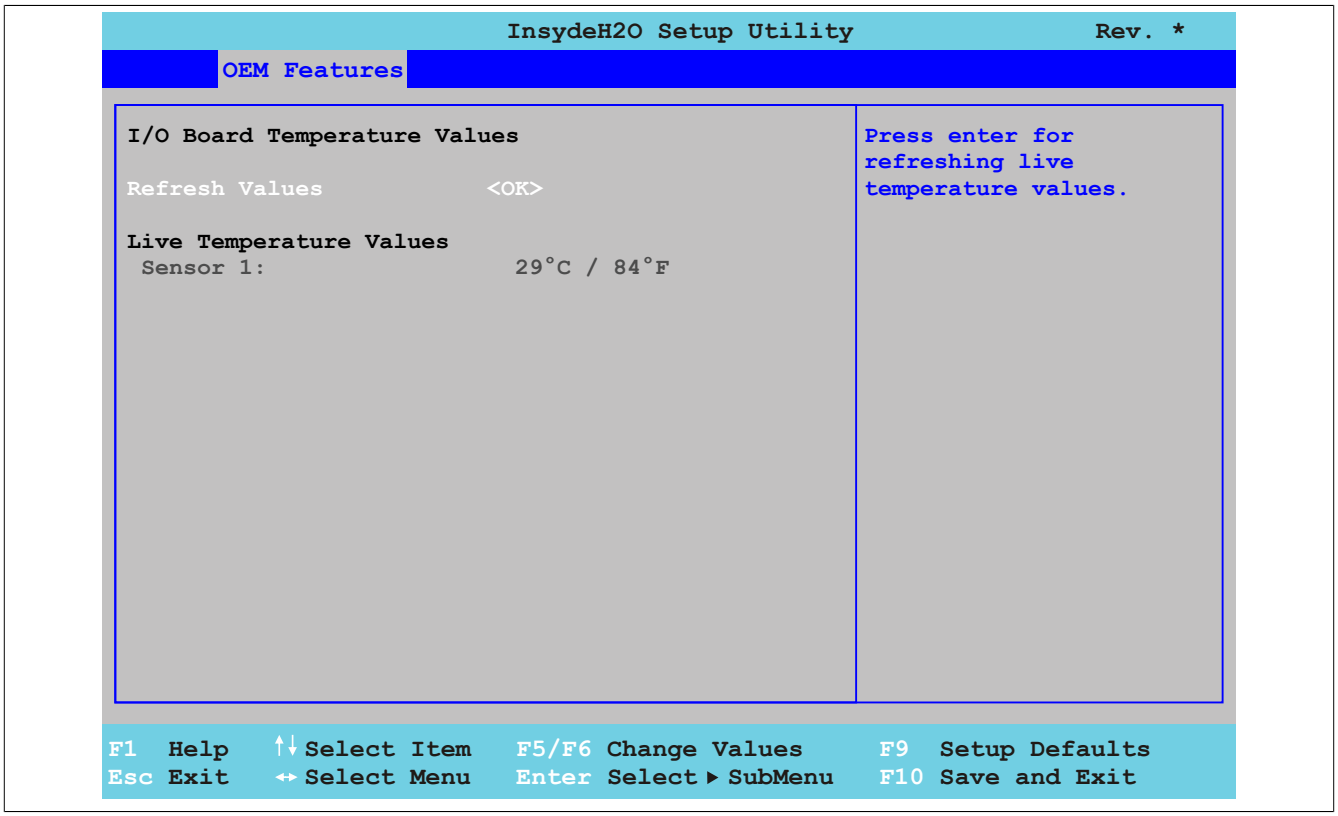


Image 36: US15W OEM Features - I/O Board Features - Temperature Values

BIOS setting	Meaning	Setting options	Effect
Refresh values	Option for refreshing the temperature values.	OK	Refreshes the temperature values shown below.
Sensor 1	Displays the current temperature of Sensor 1 (interfaces) in °C and °F.	None	-

Table 89: US15W OEM Features - I/O Board Features - Temperature Values setting options

Panel control

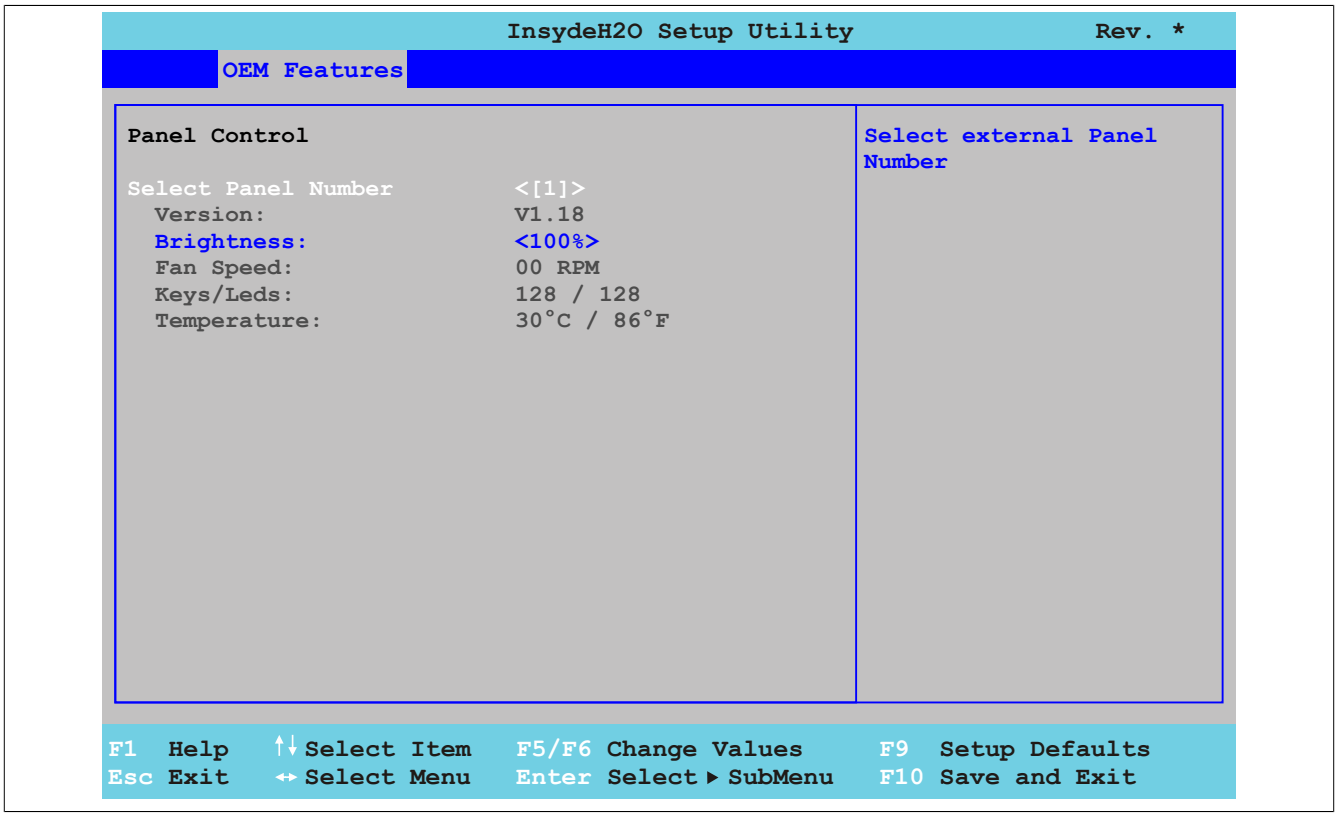


Image 37: US15W OEM Features - I/O Board Features - Panel Control

BIOS setting	Meaning	Setting options	Effect
Select panel number	Selection of the panel number for which the values should be read out and/or changed.	0...15	Selection of panel 0 ... 15.
Version	Displays the firmware version of the SDLR controller.	None	-
Brightness	For setting the brightness of the selected panel.	0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%	For setting the brightness (in %) of the selected panel. Changes take effect after saving and restarting the system (e.g. by pressing <F10>).
Fan speed	Displays the fan speed of the selected panel.	None	-
Keys/LEDs	Displays the available keys and LEDs on the selected panel.	None	-
Temperature	Displays the selected panel's temperature (in °C and °F).	None	-

Table 90: US15W OEM Features - I/O Board Features - Panel Control setting options

1.4.4 IF board features

Information:

The values and menus shown may vary depending on which interface board is connected.

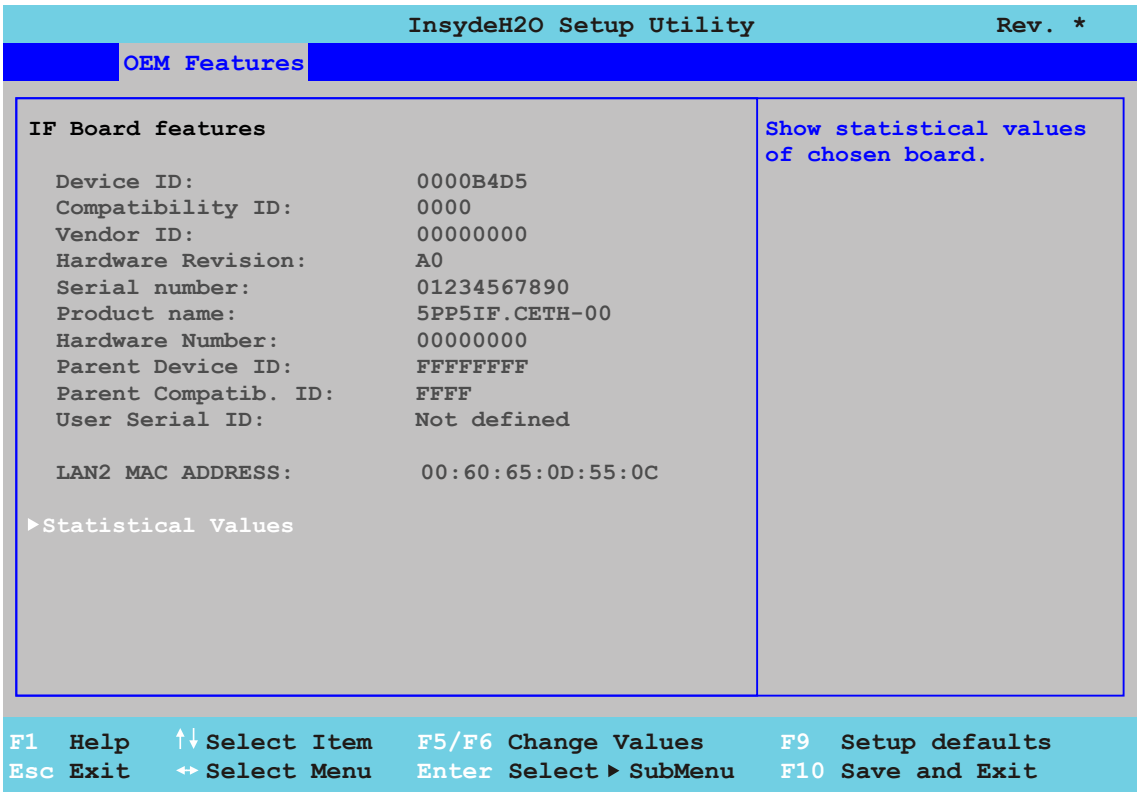


Image 38: US15W OEM Features - IF Board Features

BIOS setting	Meaning	Setting options	Effect
Device ID	Displays the device ID of the IF board.	None	-
Compatibility ID	Displays the version of the device within the same B&R device code. This ID is needed for Automation Runtime.	None	-
Vendor ID	Displays the Vendor ID	None	-
Hardware Revision	Displays the IF board hardware revision.	None	-
Serial Number	Displays the B&R serial number	None	-
Product Name	Displays the B&R model number	None	-
Hardware Number	Displays the IF board hardware number.	None	-
Parent Device ID	Displays the manufacturer number	None	-
Parent Compatib. ID	Displays the manufacturer ID	None	-
User Serial ID	Displays the user serial ID. This 8-digit hex value can be freely assigned by the user (e.g. to give the device a unique ID) and can only be changed with using the "B&R Control Center" via the ADI driver.	None	-
LAN2 MAC ADDRESS[1)]	Displays the MAC addresses assigned for the ETH interface.	None	-
Statistical values	Displays the statistical values.	Enter	Opens the submenu See " Statistical values" on page 87

Table 91: US15W OEM Features - IF Board Features setting options

1) The *LAN2 MAC ADDRESS* is only displayed with the interface board 5PP5IF.CETH-00.

Statistical values

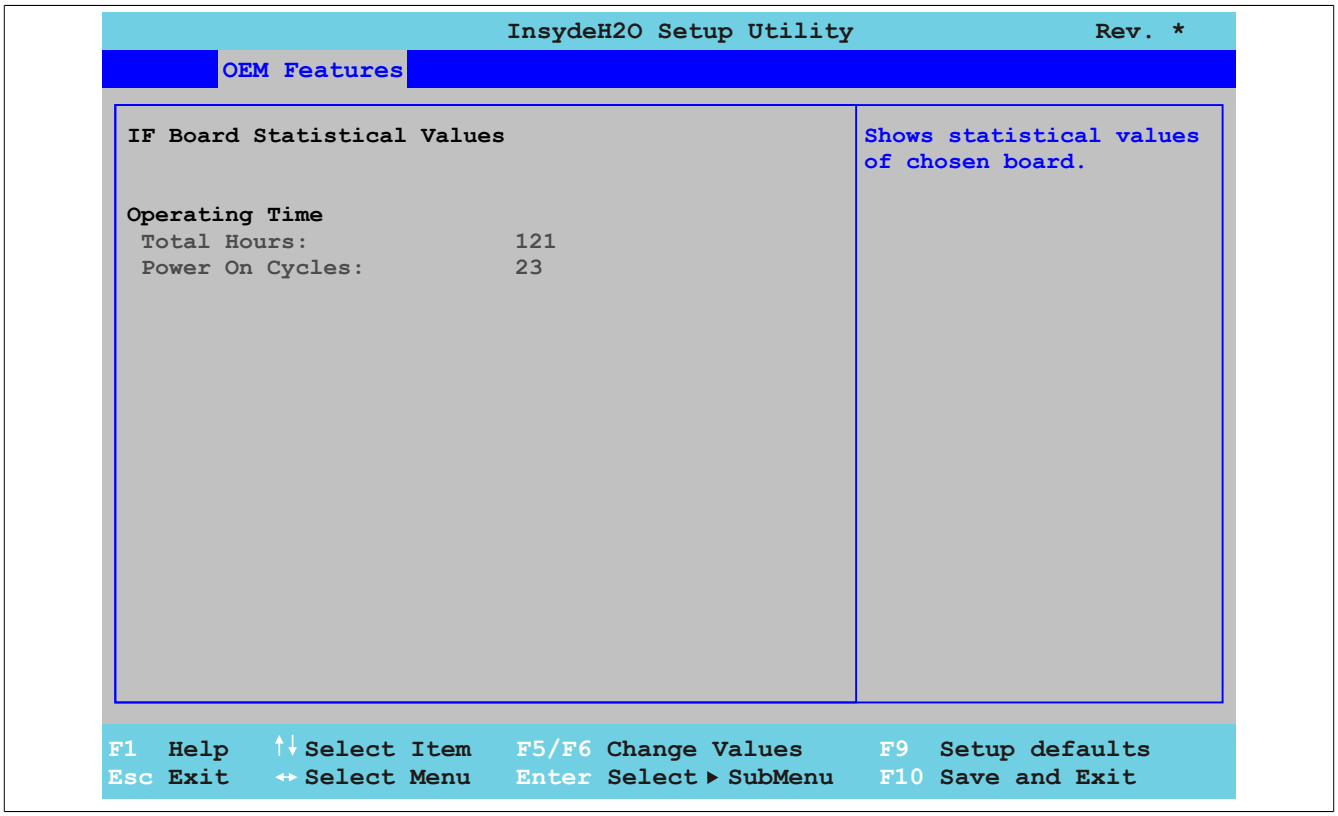


Image 39: US15W OEM Features - IF Board Features - Statistical Values

BIOS setting	Meaning	Setting options	Effect
Total Hours	Displays the runtime in whole hours.	None	-
Power on cycles	Displays the Power On Cycles - each restart increases the counter by one.	None	-

Table 92: US15W OEM Features - IF Board Features - Statistical Values setting options

1.4.5 Memory module features

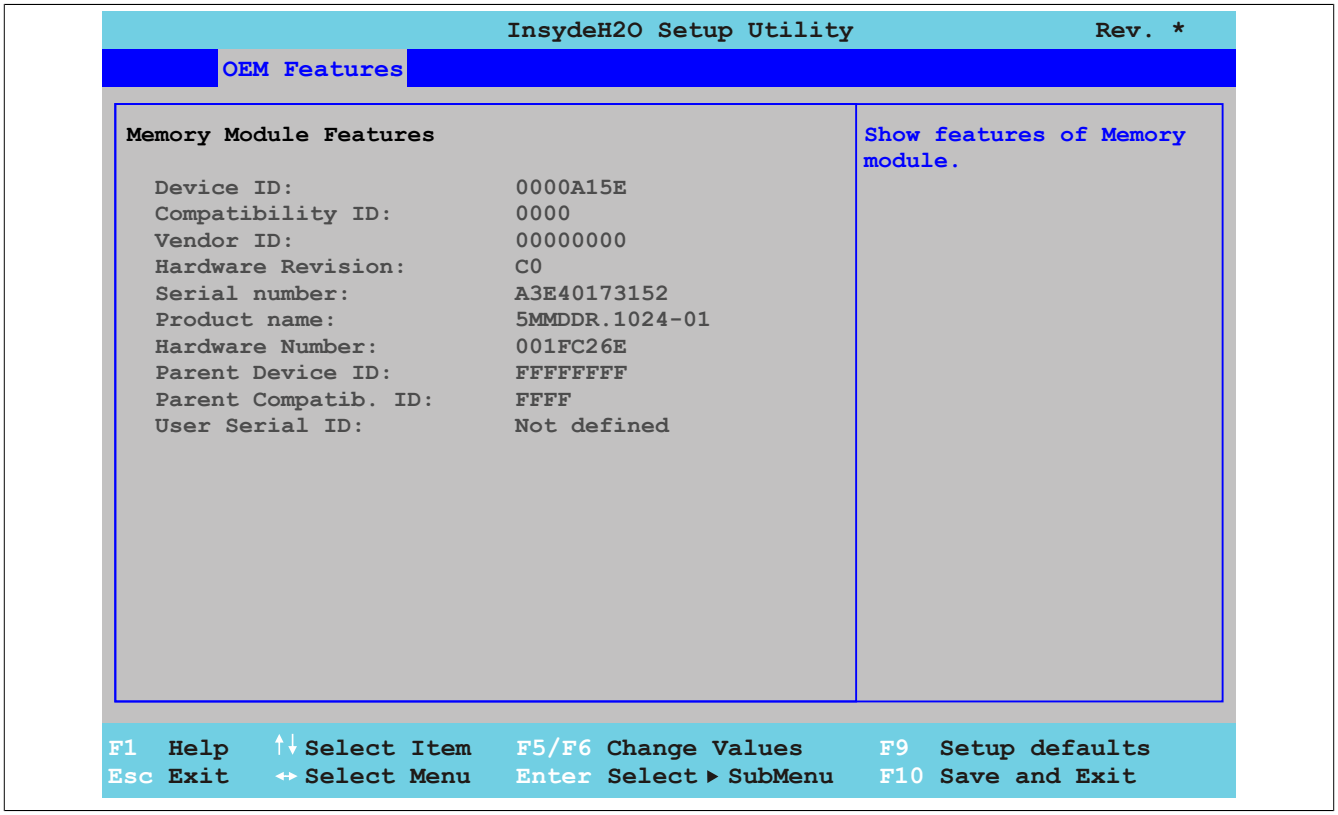


Image 40: US15W OEM Features - Memory Module Features

BIOS setting	Meaning	Setting options	Effect
Device ID	Displays the device ID of the RAM.	None	-
Compatibility ID	Displays the version of the device within the same B&R device code. This ID is needed for Automation Runtime.	None	-
Vendor ID	Displays the Vendor ID	None	-
Hardware Revision	Displays the main memory hardware revision.	None	-
Serial Number	Displays the B&R serial number	None	-
Product Name	Displays the B&R model number	None	-
Hardware Number	Displays the main memory hardware number.	None	-
Parent Device ID	Displays the manufacturer number	None	-
Parent Compatib. ID	Displays the manufacturer ID	None	-
User Serial ID	Displays the user serial ID. This 8-digit hex value can be freely assigned by the user (e.g. to give the device a unique ID) and can only be changed with using the "B&R Control Center" via the ADI driver.	None	-

Table 93: US15W OEM Features - Memory Module Features setting options

1.5 Advanced

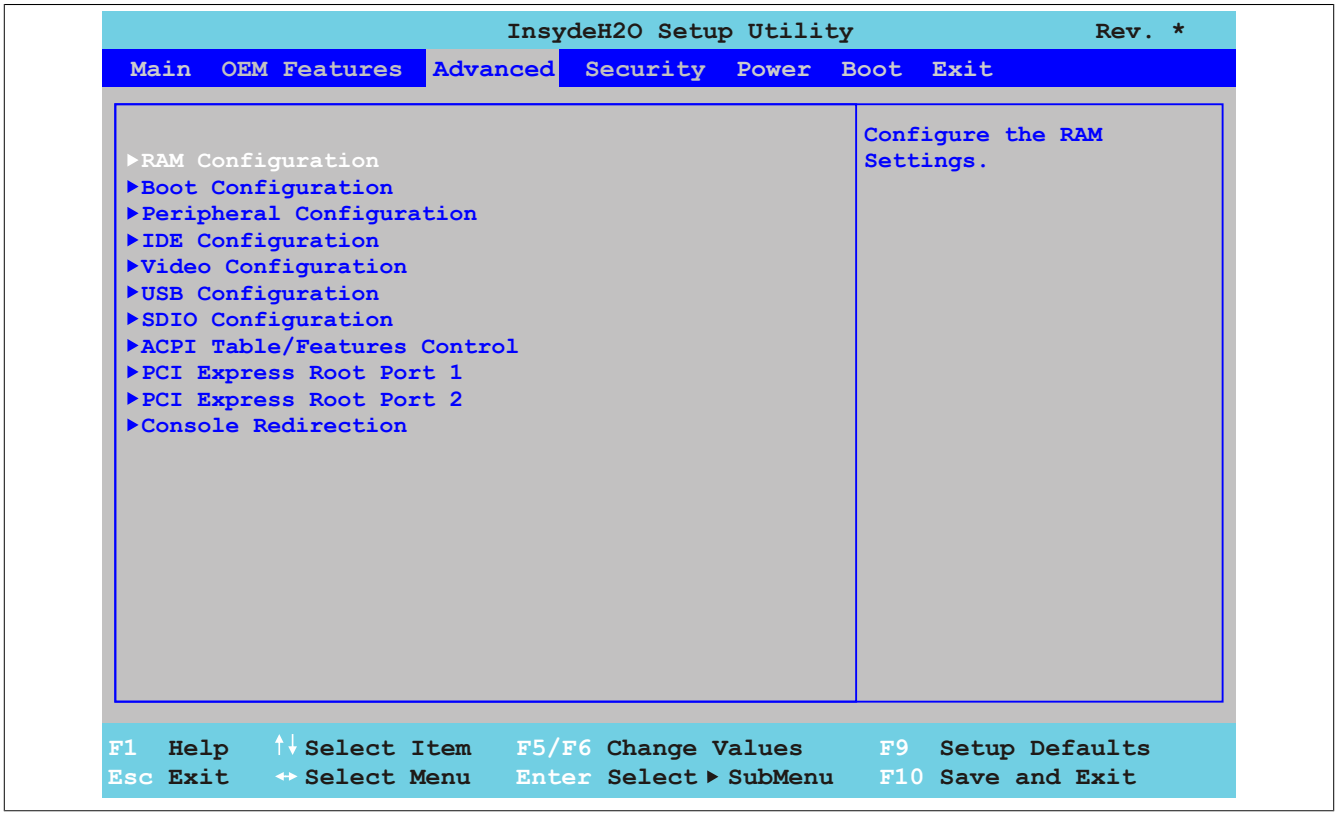


Image 41: US15W Advanced - Menu

BIOS setting	Meaning	Setting options	Effect
RAM Configuration	Configures RAM settings	Enter	Opens the submenu See " RAM configuration" on page 90
Boot Configuration	Configures boot settings	Enter	Opens the submenu See " Boot configuration" on page 91
Peripheral Configuration[1)]	Configures peripheral settings	Enter	Opens the submenu See " Peripheral configuration" on page 92
IDE Configuration	Configures IDE functions	Enter	Opens the submenu See " IDE configuration" on page 93
Video Configuration	Configures graphics settings	Enter	Opens the submenu See " Video configuration" on page 96
USB configuration	Configures USB settings	Enter	Opens the submenu See " USB configuration" on page 97
SDIO Configuration[2)]	Configures SDIO settings	Enter	Opens the submenu See " SDIO configuration" on page 98
ACPI table/features control configuration	Configures ACPI table/features	Enter	Opens the submenu See " ACPI table/features control" on page 99
PCI Express Root Port 1	Configures the PCI Express settings on Port 1. **Warning!** **Making improper settings can cause instability or device problems. It is therefore strongly recommended that these settings only be changed by experienced users.**	Enter	Opens the submenu See " PCI Express root port 1" on page 99

Table 94: US15W Advanced - Menu setting options

BIOS setting	Meaning	Setting options	Effect
PCI Express Root Port 2	Configures the PCI Express settings on Port 2. **Warning!** **Making improper settings can cause instability or device problems. It is therefore strongly recommended that these settings only be changed by experienced users.**	Enter	Opens the submenu See " PCI Express root port 2" on page 102
Console Redirection[3]	Remote Console configuration.	Enter	Opens the submenu See " Console redirection" on page 103

Table 94: US15W Advanced - Menu setting options

1) This menu option is only available if there is an audio connection.
2) SDIO - Secure Digital Input Output
3) These settings are only visible to Automation PC 511 system units without I/O board. The mode/node switches must be set to "00" (default).

1.5.1 RAM configuration

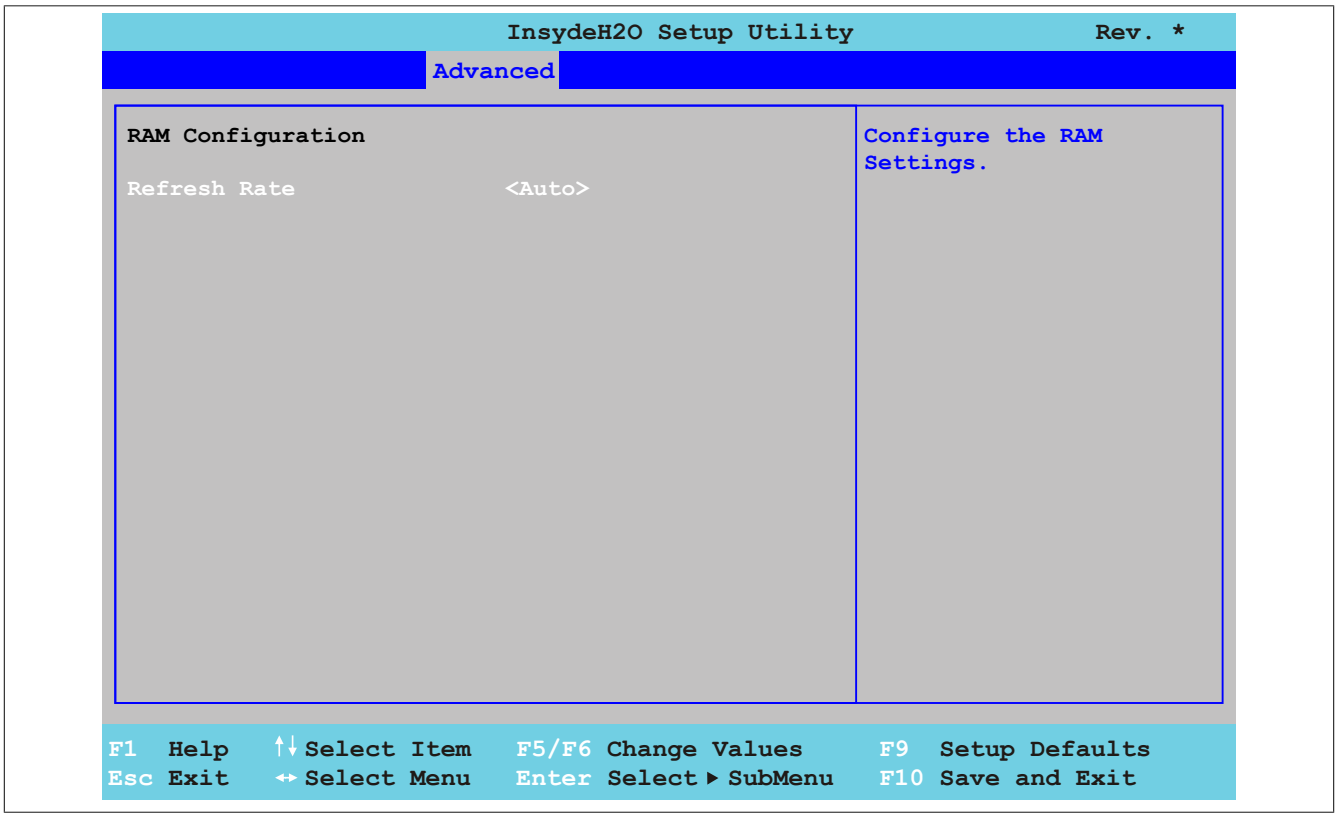


Image 42: US15W Advanced - RAM Configuration

BIOS setting	Meaning	Setting options	Effect
Refresh rate	Option for setting the DRAM refresh rate.	Auto	DRAM Refresh Rate is read from the SPD data of the DRAM module.
		7.8µs	Manual setting for the DRAM refresh rate.
		3.9µs	Manual setting for the DRAM refresh rate.

Table 95: US15W Advanced - RAM Configuration setting options

1.5.2 Boot configuration

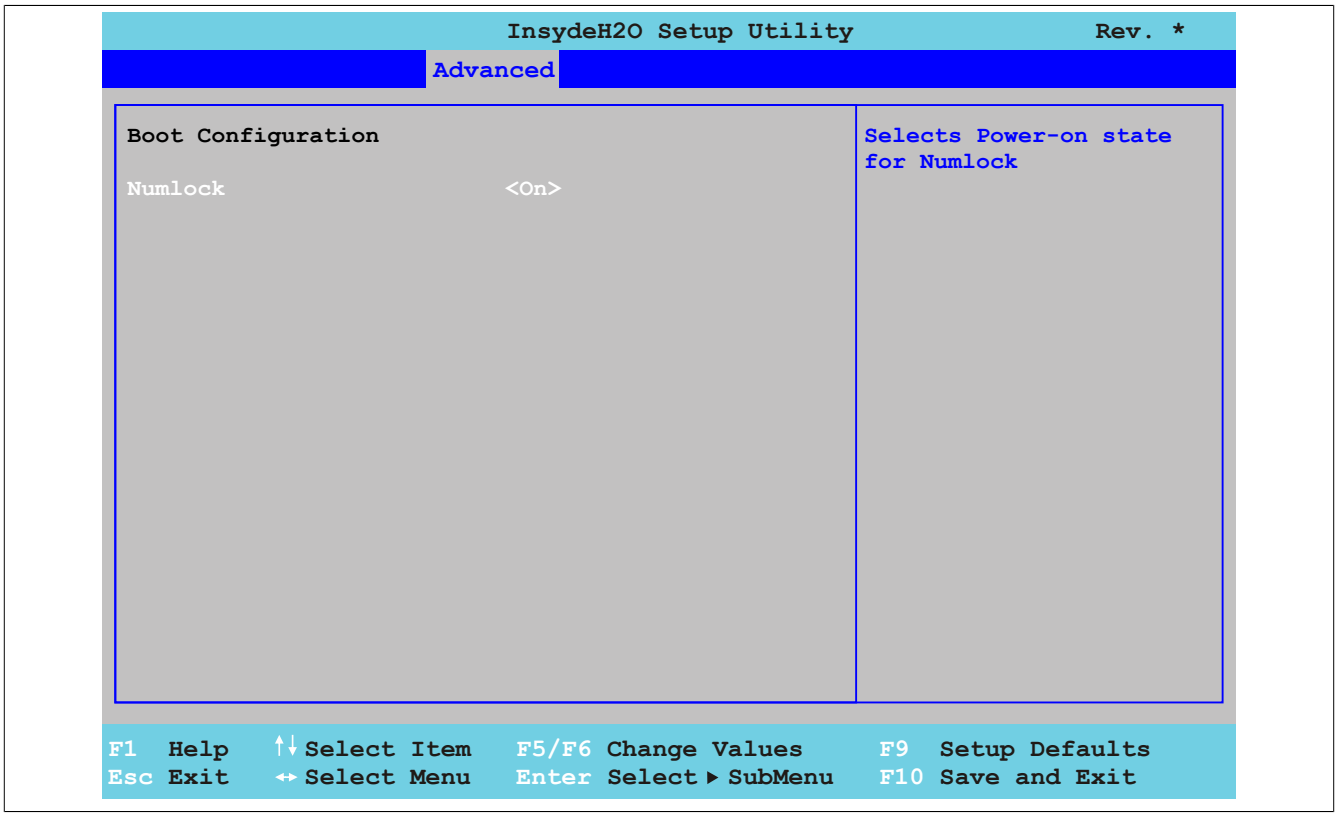


Image 43: US15W Advanced - Boot Configuration

BIOS setting	Meaning	Setting options	Effect
NumLock	With this field you can define the state of the Num-Lock key when booting.	On	Numeric keypad is enabled.
		Off	Only the cursor functions of the numerical key-pad are activated.

Table 96: US15W Advanced - Boot Configuration setting options

1.5.3 Peripheral configuration

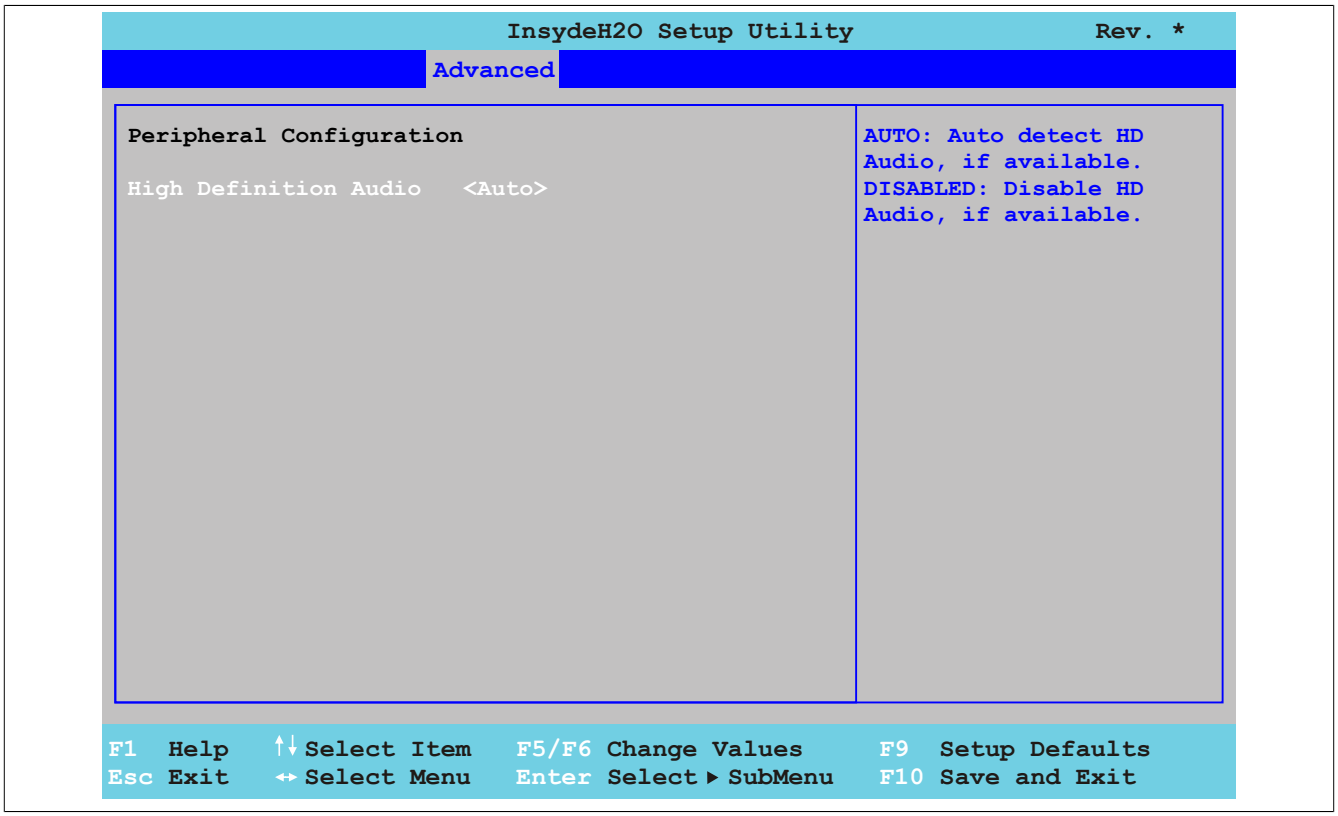


Image 44: US15W Advanced - Peripheral Configuration

BIOS setting	Meaning	Setting options	Effect
High Definition Audio	The audio mode support can be turned on or off here.	Disabled	Disables the audio controller.
		Auto	Enables High Definition Audio (HDA) Sound. The HDA controller automatically detects installed audio devices.

Table 97: US15W Advanced - Peripheral Configuration setting options

Information:

The menu option "Peripheral Configuration" is only shown if there is an Audio connection.

1.5.4 IDE configuration

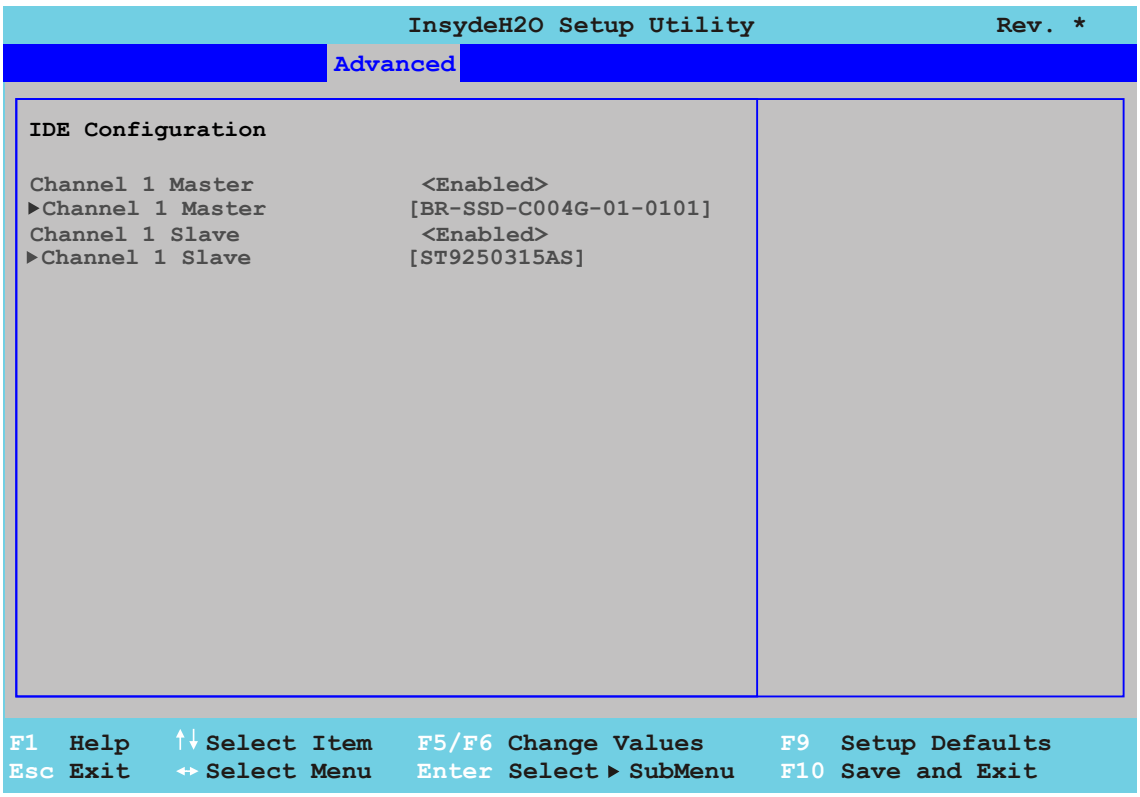


Image 45: US15W Advanced - IDE Configuration

BIOS setting	Meaning	Setting options	Effect
Channel 1 Master	Option to enable/disable the drive connected to the Channel 1 Master.	Disabled	Disables mass memory
		Enabled	Enables mass memory
Channel 1 Master	Displays the drive that is connected to Channel 1 Master.	Enter	Opens the submenu See " Channel 1 master" on page 94
Channel 1 Slave	Option to enable/disable the drive connected to the Channel 1 Slave.	Disabled	Disables mass memory
		Enabled	Enables mass memory
Channel 1 Slave	Displays the drive that is connected to Channel 1 Slave.	Enter	Opens the submenu See " Channel 1 slave" on page 95

Table 98: US15W Advanced - IDE Configuration setting options

Channel 1 master

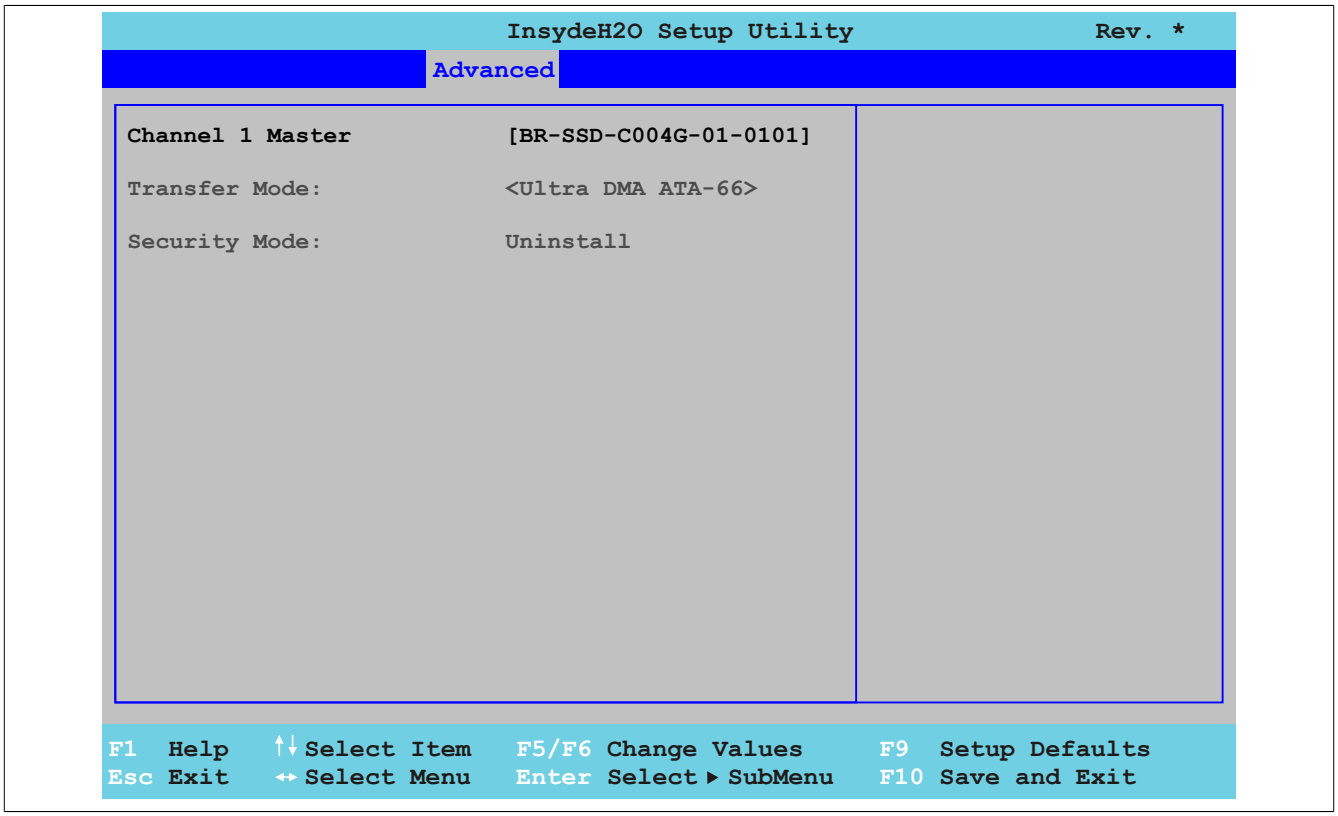


Image 46: US15W Advanced - IDE Configuration - Channel 1 Master

BIOS setting	Meaning	Setting options	Effect
Transfer mode	Displays the communication path between the Channel 1 Master drive and the system memory.	None	-
Security Mode		None	-

Table 99: US15W Advanced - IDE Configuration - Channel 1 Master setting options

Channel 1 slave

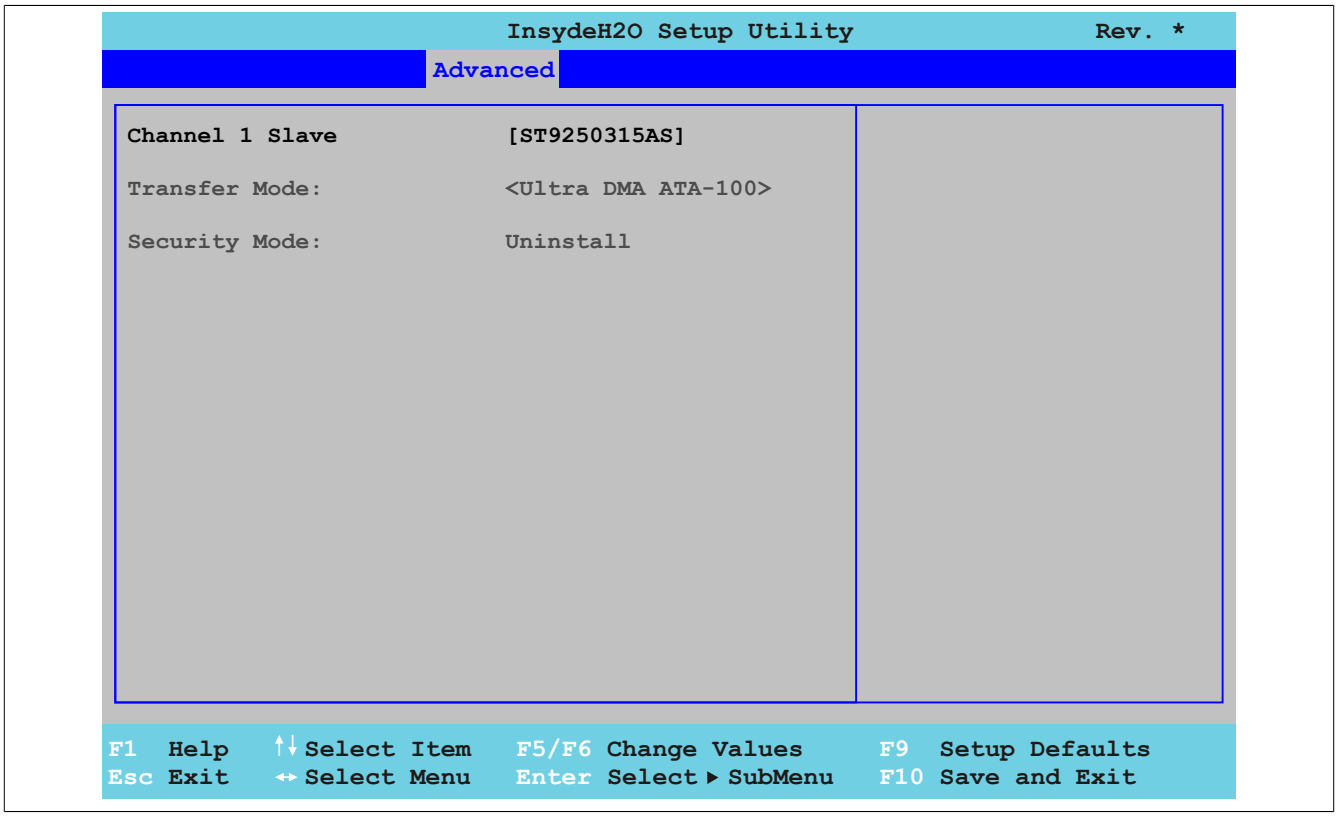


Image 47: US15W Advanced - IDE Configuration - Channel 1 Slave

BIOS setting	Meaning	Setting options	Effect
Transfer mode	Displays the communication path between the Channel 1 Slave drive and the system memory.	None	-
Security Mode		None	-

Table 100: US15W Advanced - IDE Configuration - Channel 1 Slave setting options

1.5.5 Video configuration

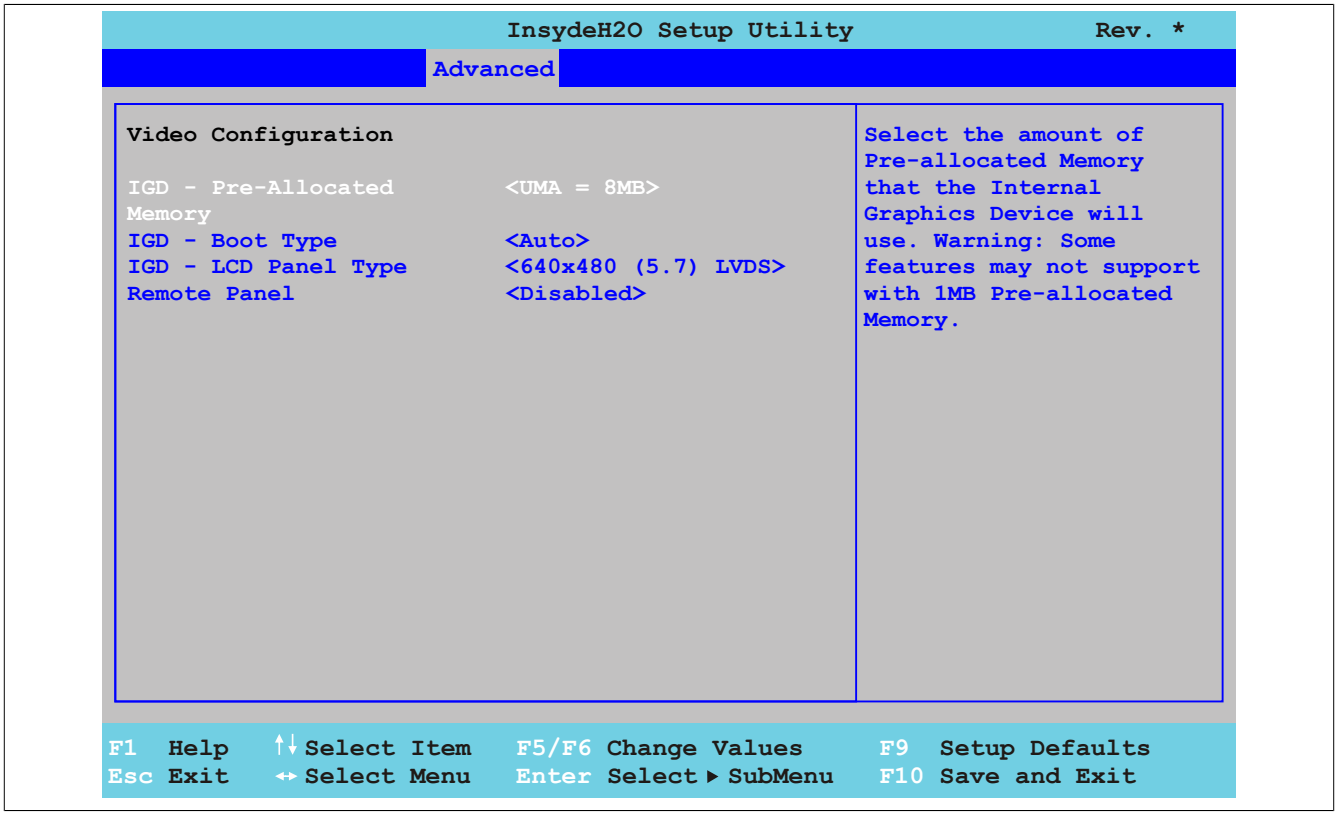


Image 48: US15W Advanced - Video Configuration

BIOS setting	Meaning	Setting options	Effect
IGD - Pre-allocated memory	Option for setting the memory size that can be used for the internal graphics controller. **Information:** **Some functions are not supported with the setting "UMA = 1 MB".**	UMA = 1 MB	Allocates 1 MB main memory
		UMA = 4 MB	Allocates 4 MB main memory
		UMA = 8 MB	Allocates 8 MB main memory
IGD - Boot Type	Option to define the enabled panel during the POST.	Auto	One of the panels listed under "IGD - LCD Panel Type" will be automatically selected.
		LFP(LVDS)	The POST is shown on the display of the Power Panel 500 (LFP = Local Flat Panel).
		EFP(SDL or DVI)	The POST is shown on an external panel (EFP = External Flat Panel).
IGD - LCD Panel Type[1)]	Option for setting the display resolution. **Information:** **If the display setting is present in the EPROM data, then this setting has no effect on the display resolution because the EPROM data is loaded each time the system is restarted and the BIOS setting is overwritten.**	640x480 (5.7) LVDS	Resolution with 640 x 480 pixels (for 5.7" display)
		800x480 (7.0) LVDS	Resolution with 800 x 480 pixels (for 7" display)
		800x600 (8.4) LVDS	Resolution with 800 x 600 pixels (for 8.4" display)
		640x480 (10.4) LVDS	Resolution with 640 x 480 pixels (for 10.4" display)
		800x600 (12.0) LVDS	Resolution with 800 x 600 pixels (for 12.0" display)
		1024x768 (15.0) LVDS	Resolution with 1024 x 768 pixels (for 15" display)
Remote Panel[2)]	Option to control the device remotely (with no display connected) from another PC via the Ethernet interface. This makes it possible to make BIOS settings.	Enabled	Enables this function.
		Disabled	Disables this function.

Table 101: US15W Advanced - Video Configuration setting options

1) This setting is only available for PP500 system units.
2) This setting is hidden unless an I/O board is installed. This option does not appear if a display is connected or integrated. On APC511 system units it is also shown even if no I/O board is installed.

1.5.6 USB configuration

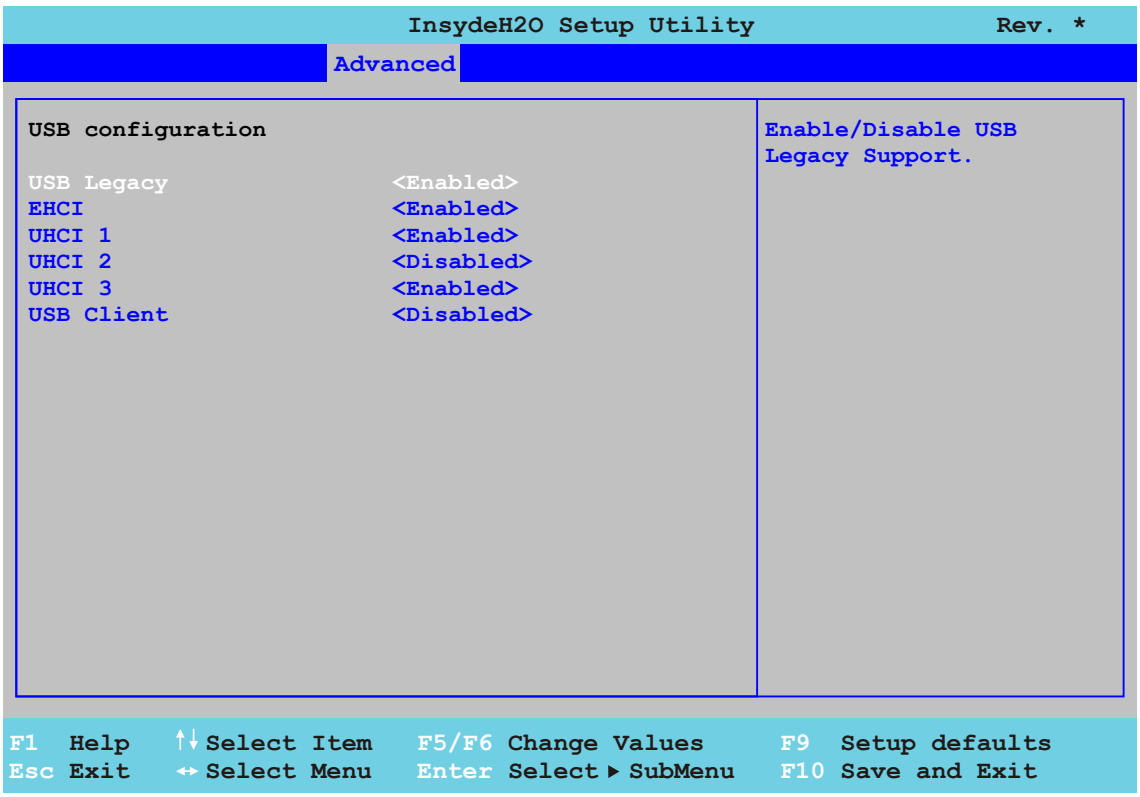


Image 49: US15W Advanced - USB Configuration

BIOS setting	Meaning	Setting options	Effect
USB Legacy	Legacy USB support can be enabled/disabled here. USB ports do not function during startup. USB is supported again after the operating system has started. A USB keyboard is still recognized during the POST.	Enabled	Enables this function.
		Disabled	Disables this function.
EHCI	The support for the operating system can be set up without the fully automatic EHCI function.	Enabled	Enables USB support. USB 2.0 support is enabled as soon as a USB 2.0 device is connected to the interface.
		Disabled	Disables USB 2.0 support.
UHCI 1	Configuration of the USB UHCI controller 1 for USB port 2 and 3.	Enabled	Enables USB support.
		Disabled	Disables USB support. **Warning!** **If this setting is *Disabled*, then the settings *UHCI 2* and *UHCI 3* will also be set to *Disabled* and all USB ports will be disabled. As a result, it will no longer be possible to enter BIOS.** **However, if UHCI 1 has been disabled, then you can use the Backup BIOS to once again enter BIOS. For more information, see " OEM features" on page 71.**
UHCI 2[1)]	Configuration of the USB UHCI controller 2 for USB ports on the I/O board.	Enabled	Enables USB support.
		Disabled	Disables USB support.
UHCI 3[1)]	Configuration of the USB UHCI controller 3 for USB port 3.	Enabled	Enables USB support.
		Disabled	Disables USB support.
USB client	Setting for USB Client support.	Enabled	Enables USB Client support.
		Disabled	Disables USB Client support.

Table 102: US15W Advanced - USB Configuration setting options

1) These settings are only possible if *UHCI 1* is set to *Enabled*.

1.5.7 SDIO configuration

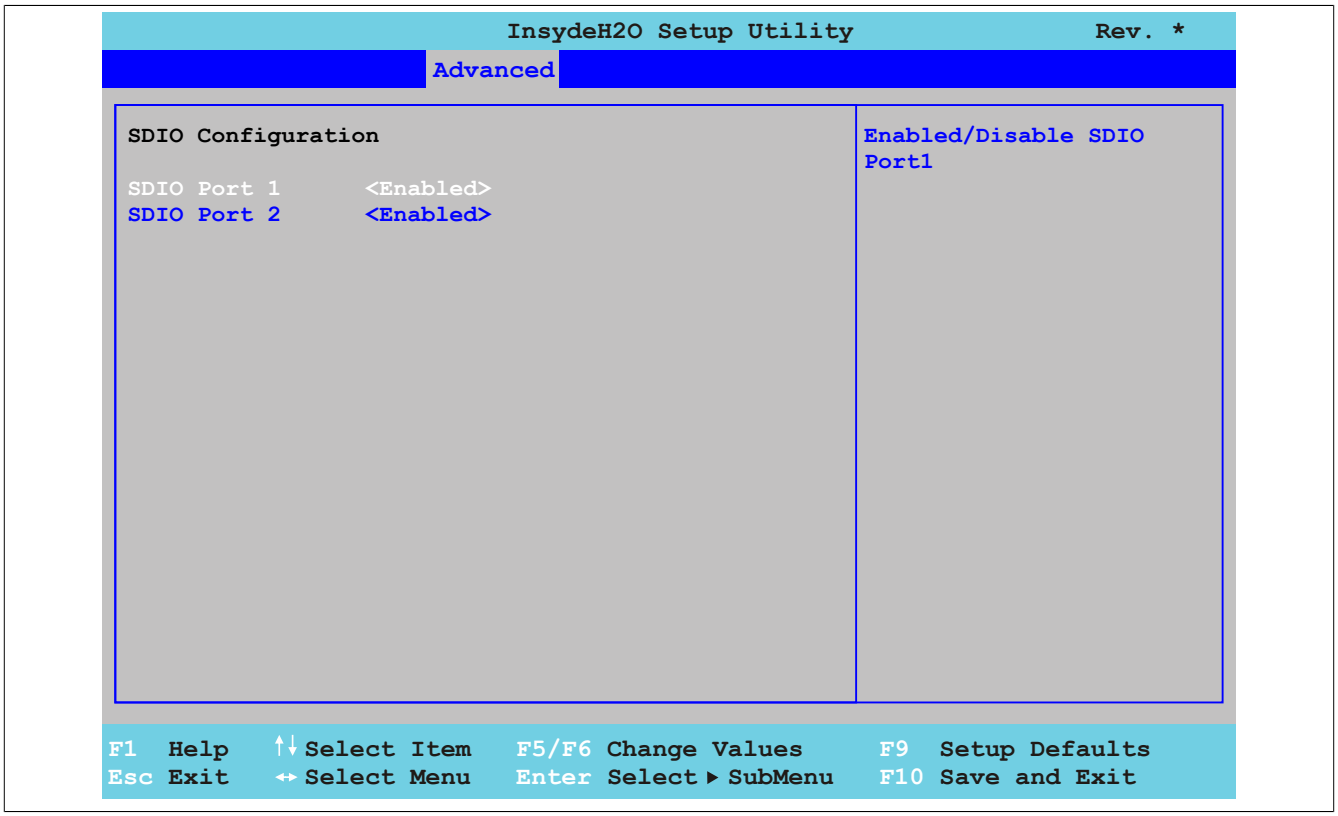


Image 50: US15W Advanced - SDIO Configuration

BIOS setting	Meaning	Setting options	Effect
SDIO Port 1	SDIO Port 1 (Secure Digital Input Output - SD Memory Card Slot) can be enabled / disabled here.	Enabled	Enables this function.
		Disabled	Disables this function.
SDIO Port 2	SDIO Port 2 (Secure Digital Input Output - SD Memory Card Slot) can be enabled / disabled here.	Enabled	Enables this function.
		Disabled	Disables this function.

Table 103: US15W Advanced - SDIO Configuration setting options

1.5.8 ACPI table/features control

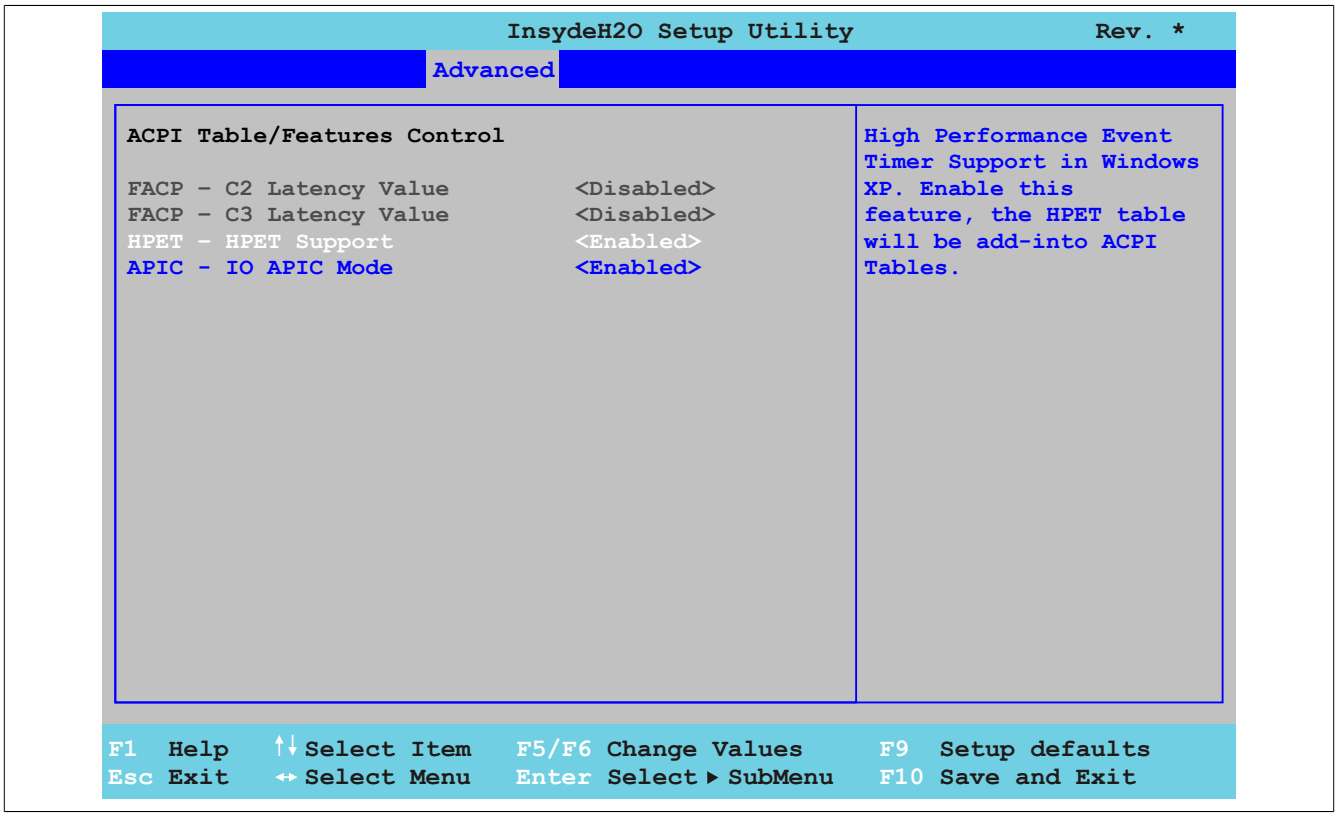


Image 51: US15W Advanced - ACPI Table/Features Control

BIOS setting	Meaning	Setting options	Effect
FACP – C2 Latency Value[1)]	Option for setting a latency period in the C2 state.	Enabled	Enables this function. A latency of 1 µs is set (i.e. the C2 state will be entered within 1 µs and exited again within 1 µs).
		Disabled	Disables this function.
FACP – C3 Latency Value[1)]	Option for setting a latency period in the C3 state.	Enabled	Enables this function. A latency of 85 µs is set (i.e. the C3 state will be entered within 85 µs and exited again within 85 µs).
		Disabled	Disables this function.
HPET – HPET Support	The HPET is a timer inside the PC. It is able to trigger an interrupt with a high degree of accuracy, which allows other programs to better synchronize a variety of applications.	Enabled	Enables this function. This function is recommended for multimedia applications.
		Disabled	Disables this function.
APIC - I/O APIC mode	This option controls the support of the advanced programmable interrupt controller in the processor.	Enabled	Enables this function.
		Disabled	Disables this function. **Warning!** **Windows XP will not be started if this setting is disabled.**

Table 104: US15W Advanced - ACPI Table/Features Control setting options

1) These settings are only possible if *C-States* under the *Advanced CPU control* menu item is set to *Enabled*.

1.5.9 PCI Express root port 1

Warning!

Making improper settings can cause instability or device problems. It is therefore strongly recommended that these settings only be changed by experienced users.

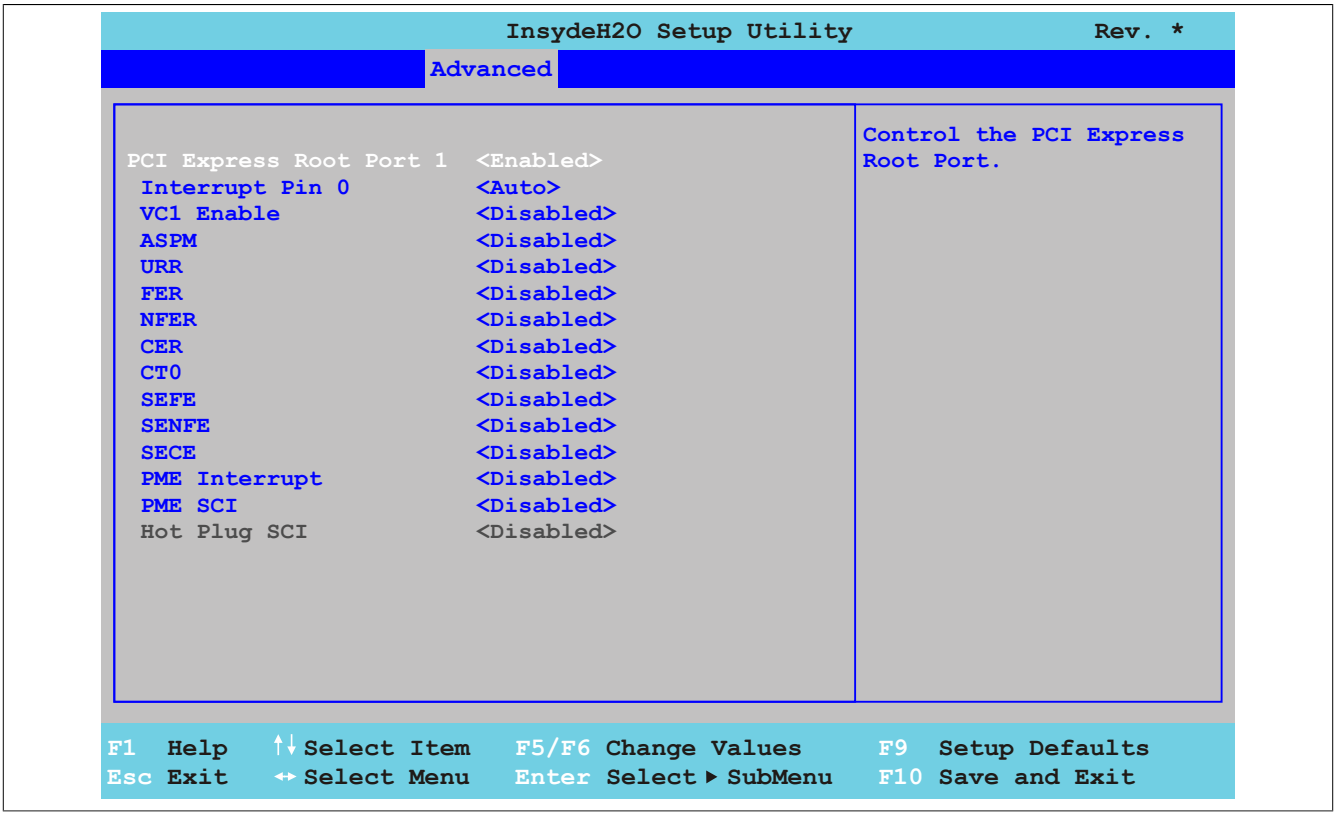


Image 52: US15W Advanced - PCI Express Root Port 1

BIOS setting	Meaning	Setting options	Effect
PCI Express Root Port 1	This option is used to enable/disable PCI Express Root Port 1.	Enabled	PCI Express Root Port 1 enabled.
		Disabled	PCI Express Root Port 1 and 2 disabled.
Interrupt pin 0		Auto	IRQ enabled for Root Port 1.
		Disabled	IRQ disabled for Root Port 1.
VC1 Enable	Virtual Channel 1	Auto	Setting the mapping via the BIOS setting "VC1/TC Mapping".
		Disabled	Disables this function. The TC0 Traffic class is automatically used and mapped to the VC0 Virtual Channel.
VC1/TC Mapping[1)]	This option is used to define which traffic will be mapped to which Virtual Channel.	TC0	TBD
		TC1	The TC1 traffic class is mapped manually to the VC1 Virtual Channel.
		TC2	The TC2 traffic class is mapped manually to the VC1 Virtual Channel.
		TC3	The TC3 traffic class is mapped manually to the VC1 Virtual Channel.
		TC4	The TC4 traffic class is mapped manually to the VC1 Virtual Channel.
		TC5	The TC5 traffic class is mapped manually to the VC1 Virtual Channel.
		TC6	The TC6 traffic class is mapped manually to the VC1 Virtual Channel.
		TC7	The TC7 traffic class is mapped manually to the VC1 Virtual Channel.
ASPM	*Active state power management* Option for setting a power saving function (L0s/L1) for PCIE links if they do not require full power.	Enabled	Enables this function.
		Disabled	Disables this function.
Automatic ASPM[2)]	Option for configuring automatic or manual assignment of the ASPM.	Auto	Automatic assignment by the BIOS and operating system.
		Manual	Setting for assignment under the BIOS setting "ASPM L0s" and "ASPM L1".
ASPM L0s[3)]	Option for setting the L0 power saving function.	Disabled	Disables this function.
		Root Port Only	Enables the power saving function for the Root port.
		Endpoint Port Only	Enables the power saving function for the Endpoint port.
		Root&Endpoint Ports	Enables the power saving function for the Root and Endpoint ports.
ASPM L1[3)]	Option for setting the L1 power saving function. Power consumption is lower than with L0, but the exit latency higher.	Enabled	Enables this function.
		Disabled	Disables this function.
URR	*Unsupported Request (UR) reporting*	Enabled	Enables this function.

Table 105: US15W Advanced - PCI Express Root Port 1 setting options

BIOS setting	Meaning	Setting options	Effect
	Option for reporting unsupported requests. Logging of error messages received by the Root Port is controlled exclusively by the Root Control Register.	Disabled	Disables this function.
FER	*Fatal error reporting* Option for reporting fatal errors. All of the functions in a multifunction device will be monitored. The report for the Root Port takes place internally inside the Root Complex.	Enabled	Enables this function.
		Disabled	Disables this function.
NFER	*Non-fatal error reporting* Option for reporting non-fatal errors. All of the functions in a multifunction device will be monitored. The report for the Root Port takes place internally inside the Root Complex.	Enabled	Enables this function.
		Disabled	Disables this function.
CER	*Correctable error reporting* Option for reporting non-fatal errors. All of the functions in a multifunction device will be monitored. The report for the Root Port takes place internally inside the Root Complex.	Enabled	Enables this function.
		Disabled	Disables this function.
CT0	*PCI Express completion timer T0* This option is used to enable/disable PCI Express Completion Timer. **Information:** **If the system detected an ROB (Processor Reorder Buffer) Timeout, then this setting should be set to Enabled.**	Enabled	Enables this function.
		Disabled	Disables this function.
SEFE	*System error on fatal error* Option for generating a System Error, if a fatal error is registered by a device on the Root Port or on the Root Port itself.	Enabled	Enables this function.
		Disabled	Disables this function.
SENFE	*System error on non-fatal error* Option for generating a System Error, if a non-fatal error is registered by a device on the Root Port or on the Root Port itself.	Enabled	Enables this function.
		Disabled	Disables this function.
SECE	*System error on correctable error* Option for generating a System Error, if a correctable error is registered by a device on the Root Port or on the Root Port itself.	Enabled	Enables this function.
		Disabled	Disables this function.
PME Interrupt	*Power management event interrupt* Option for generating a PME Interrupt. An Interrupt is generated when a PME Message is received from a PCIe device.	Enabled	Enables this function. A PME Interrupt is generated when a PME message is received.
		Disabled	Disables this function.
PME SCI	Option for generating an SCI if Power Management is detected.	Enabled	Enables this function. The Root Port is enabled to generate SCI if Power Management is detected.
		Disabled	Disables this function.
Hot Plug SCI	Option for generating an SCI if a Hot Plug is detected.	Enabled	Enables this function. The Root Port is enabled to generate SCI if a Hot Plug is detected.
		Disabled	Disables this function.

Table 105: US15W Advanced - PCI Express Root Port 1 setting options

1) These settings are only possible if *VC1 Enable* is set to *Auto*.
2) These settings are only possible if *ASPM* is set to *Enabled*.
3) These settings are only possible if *Automatic ASPM* is set to *Enabled*.

1.5.10 PCI Express root port 2

Warning!

Making improper settings can cause instability or device problems. It is therefore strongly recommended that these settings only be changed by experienced users.

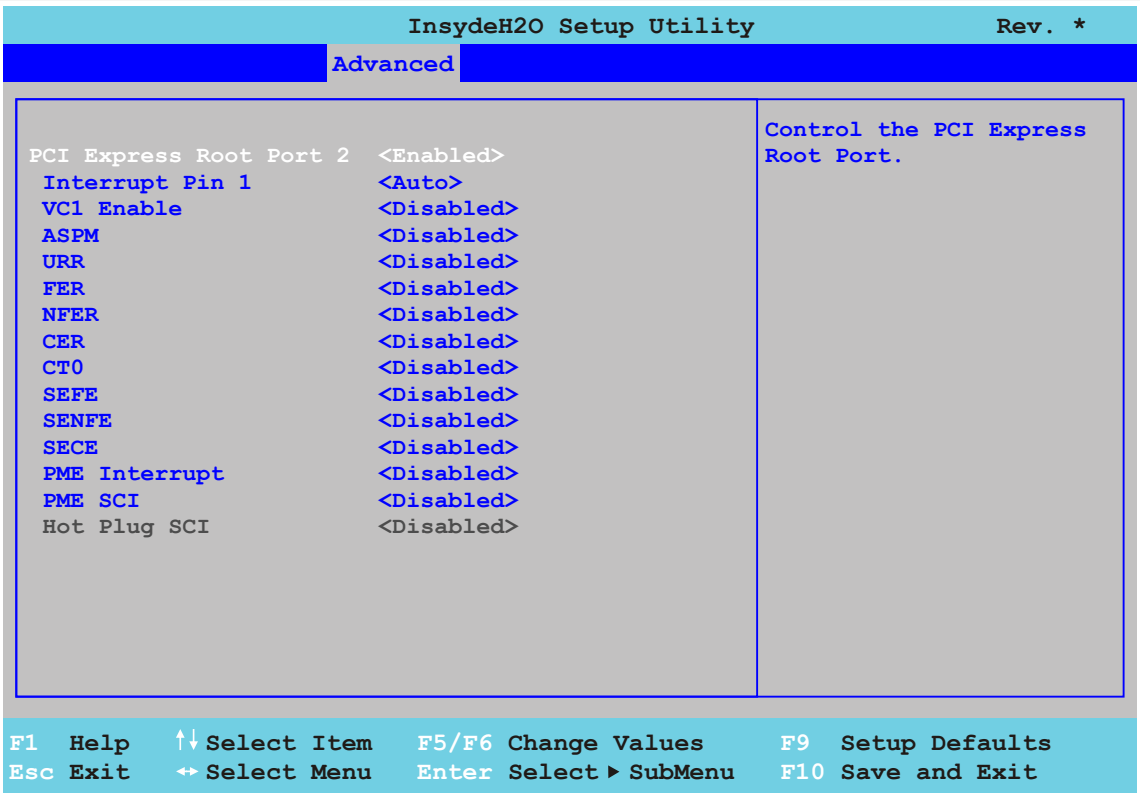


Image 53: US15W Advanced - PCI Express Root Port 2

BIOS setting	Meaning	Setting options	Effect
PCI Express Root Port 2	This option is used to enable/disable PCI Express Root Port 2.	Enabled	PCI Express Root Port 2 enabled.
		Disabled	PCI Express Root Port 2 disabled.
Interrupt pin 1	**Information:** **This function is disabled by default when using ARwin and/or a fieldbus card. The function must be disabled in order to use a fieldbus card.**	Auto	IRQ enabled for Root Port 2.
		Disabled	IRQ disabled for Root Port 2.
VC1 Enable	Virtual Channel 1	Auto	Setting the mapping via the BIOS setting "VC1/TC Mapping".
		Disabled	Disables this function. The TC0 Traffic class is automatically used and mapped to the VC0 Virtual Channel.
VC1/TC Mapping[1)]	This option is used to define which traffic will be mapped to which Virtual Channel.	TC0	TBD
		TC1	The TC1 traffic class is mapped manually to the VC1 Virtual Channel.
		TC2	The TC2 traffic class is mapped manually to the VC1 Virtual Channel.
		TC3	The TC3 traffic class is mapped manually to the VC1 Virtual Channel.
		TC4	The TC4 traffic class is mapped manually to the VC1 Virtual Channel.
		TC5	The TC5 traffic class is mapped manually to the VC1 Virtual Channel.
		TC6	The TC6 traffic class is mapped manually to the VC1 Virtual Channel.
		TC7	The TC7 traffic class is mapped manually to the VC1 Virtual Channel.
ASPM	*Active state power management* Option for setting a power saving function (L0s/L1) for PCIE links if they do not require full power.	Enabled	Enables this function.
		Disabled	Disables this function.
Automatic ASPM[2)]	Option for configuring automatic or manual assignment of the ASPM.	Auto	Automatic assignment by the BIOS and operating system.

Table 106: US15W Advanced - PCI Express Root Port 2 setting options

BIOS setting	Meaning	Setting options	Effect
		Manual	Setting for assignment under the BIOS setting "ASPM L0s" and "ASPM L1".
ASPM L0s[3]	Option for setting the L0 power saving function.	Disabled	Disables this function.
		Root Port Only	Enables the power saving function for the Root port.
		Endpoint Port Only	Enables the power saving function for the Endpoint port.
		Root&Endpoint Ports	Enables the power saving function for the Root and Endpoint ports.
ASPM L1[3]	Option for setting the L1 power saving function. Power consumption is lower than with L0, but the exit latency higher.	Enabled	Enables this function.
		Disabled	Disables this function.
URR	*Unsupported Request (UR) reporting* Option for reporting unsupported requests. Logging of error messages received by the Root Port is controlled exclusively by the Root Control Register.	Enabled	Enables this function.
		Disabled	Disables this function.
FER	*Fatal error reporting* Option for reporting fatal errors. All of the functions in a multifunction device will be monitored. The report for the Root Port takes place internally inside the Root Complex.	Enabled	Enables this function.
		Disabled	Disables this function.
NFER	*Non-fatal error reporting* Option for reporting non-fatal errors. All of the functions in a multifunction device will be monitored. The report for the Root Port takes place internally inside the Root Complex.	Enabled	Enables this function.
		Disabled	Disables this function.
CER	*Correctable error reporting* Option for reporting non-fatal errors. All of the functions in a multifunction device will be monitored. The report for the Root Port takes place internally inside the Root Complex.	Enabled	Enables this function.
		Disabled	Disables this function.
CT0	*PCI Express completion timer T0* This option is used to enable/disable PCI Express Completion Timer. **Information: If the system detected an ROB (Processor Reorder Buffer) Timeout, then this setting should be set to Enabled.**	Enabled	Enables this function.
		Disabled	Disables this function.
SEFE	*System error on fatal error* Option for generating a System Error, if a fatal error is registered by a device on the Root Port or on the Root Port itself.	Enabled	Enables this function.
		Disabled	Disables this function.
SENFE	*System error on non-fatal error* Option for generating a System Error, if a non-fatal error is registered by a device on the Root Port or on the Root Port itself.	Enabled	Enables this function.
		Disabled	Disables this function.
SECE	*System error on correctable error* Option for generating a System Error, if a correctable error is registered by a device on the Root Port or on the Root Port itself.	Enabled	Enables this function.
		Disabled	Disables this function.
PME Interrupt	*Power management event interrupt* Option for generating a PME Interrupt. An Interrupt is generated when a PME Message is received from a PCIe device.	Enabled	Enables this function. A PME Interrupt is generated when a PME message is received.
		Disabled	Disables this function.
PME SCI	Option for generating an SCI if Power Management is detected.	Enabled	Enables this function. The Root Port is enabled to generate SCI if Power Management is detected.
		Disabled	Disables this function.
Hot Plug SCI	Option for generating an SCI if a Hot Plug is detected.	Enabled	Enables this function. The Root Port is enabled to generate SCI if a Hot Plug is detected.
		Disabled	Disables this function.

Table 106: US15W Advanced - PCI Express Root Port 2 setting options

1) These settings are only possible if *VC1 Enable* is set to *Auto*.
2) These settings are only possible if *ASPM* is set to *Enabled*.
3) These settings are only possible if *Automatic ASPM* is set to *Enabled*.

1.5.11 Console redirection

Information:

These settings are only visible to Automation PC 511 system units without I/O board. The mode/node switches must be set to "00" (default).

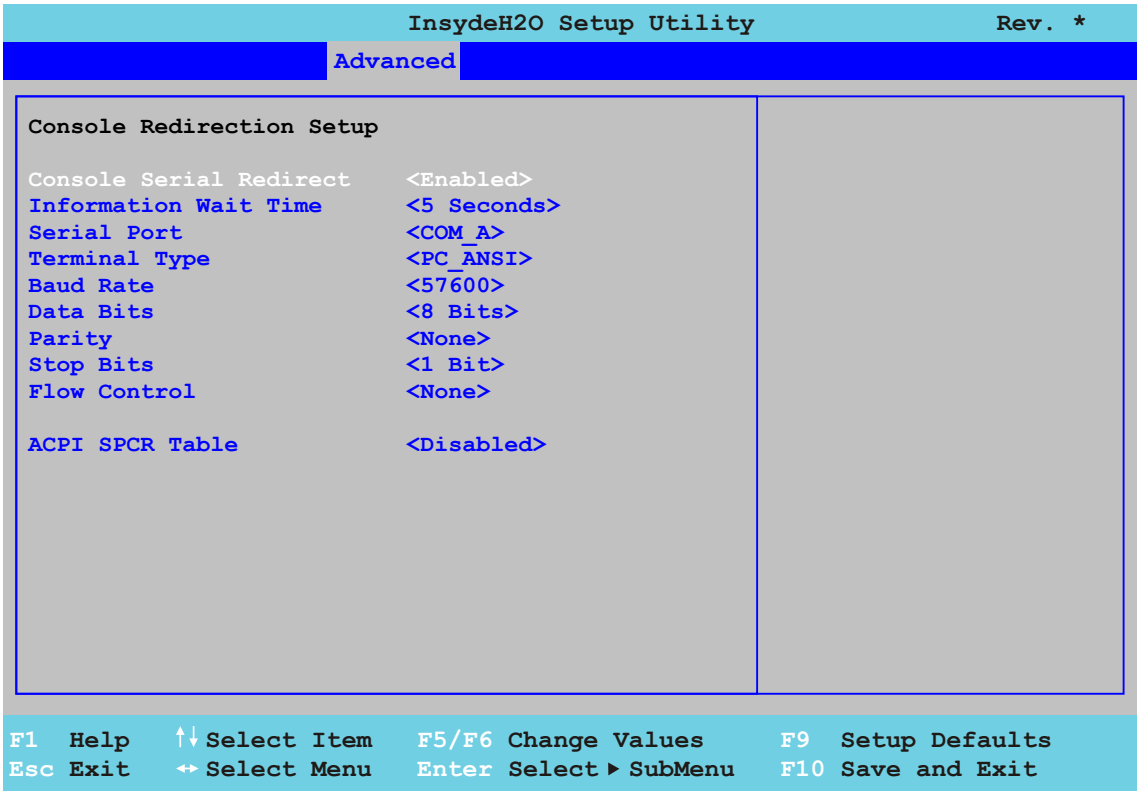


Image 54: US15W Advanced - Console Redirection

BIOS setting	Meaning	Setting options	Effect
Console Serial Redirect	Option for setting the remote console. The Remote Console enables you to access the BIOS setup via the serial interface using a terminal emulator (PuTTY or HyperTerminal). **Information:** **This setting is automatically enabled when using an APC511 without I/O board and the mode/node switch position "00" (default).**	Enabled	Enables this function.
		Disabled	Disables this function.
Information Wait Time	Option for setting the amount of time for the Remote Console to wait before accessing the BIOS for the first time.	0 Seconds, 2 Seconds, 5 Seconds, 10 Seconds, 30 Seconds	The Remote Console waits x seconds before accessing the BIOS for the first time.
Serial port	Option for setting the serial interface.	COM_A	Access via the COMA serial interface.
		COM_B	Access via the COMB serial interface.
		COM_C	Access via the COMC serial interface.
		COM_D	Access via the COMD serial interface.
		All Ports	TBD
Terminal type	Option for setting the keyboard input.	VT_100	Disables the VT100 convention (ASCII character set).
		VT_100+	Enables the VT100+ convention (ASCII character set and support for color, function keys, etc).
		VT_UTF8	Enables the VT-UTF8 convention (uses UTF8-coding, to assign Unicode characters one or more bytes).
		PC_ANSI	Enables the PC ANSI convention (extended ASCII character set).
Baud rate	Option for setting the transfer rate of the serial interface (bits per second).	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	A transfer rate of x bit is enabled.
Data bits	Option for setting the character length (data bits) to use for serial communication.	7 bits	Character length with 7 bits
		8 bits	Character length with 8 bits
Parity	Option for setting the parity bit to use for serial communication.	None	No parity bit used.
		Even	An even number of parity bits is used.
		Odd	An odd number of parity bits is used.
Stop bits	Option for setting the stop bits to use for serial communication.	1-bit	1 bit is used as stop bit.
		2-bit	2 bits are used as stop bit.
Flow control	Option for configuring the data flow control.	None	Data flow control not enabled.

Table 107: US15W Advanced - Console Redirection setting options

BIOS setting	Meaning	Setting options	Effect
		RTS/CTS	Hardware handshake enabled.
		XON/XOFF	Software handshake enabled.
ACPI SPCR Table	Option for setting ACPI Serial Port Console Redirection (SPCR).	Enabled	Enables this function.
		Disabled	Disables this function.

Table 107: US15W Advanced - Console Redirection setting options

1.6 Security

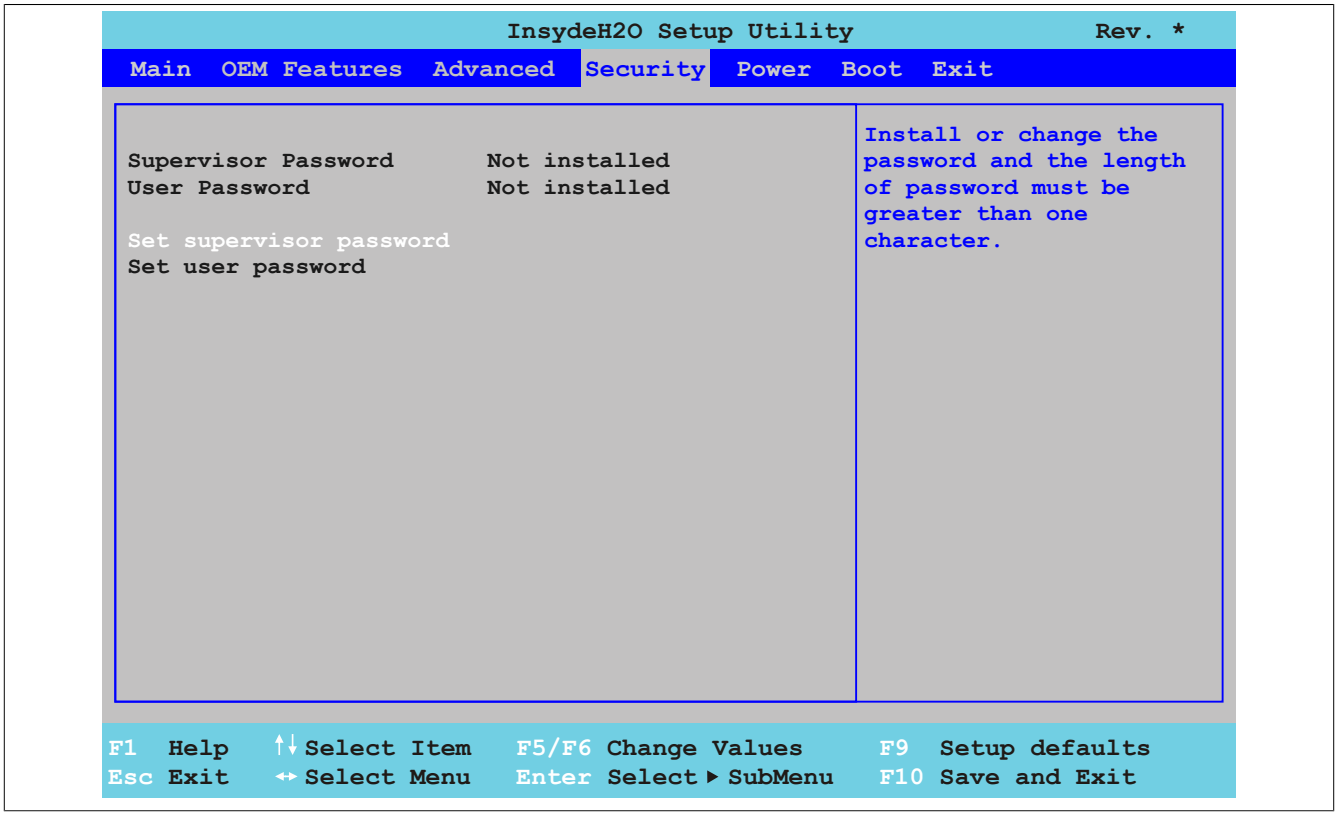


Image 55: US15W Security - Menu

BIOS setting	Meaning	Setting options	Effect
Supervisor Password	Displays whether or not a supervisor password has been set.	None	-
User Password	Displays whether or not a user password has been set.	None	-
Set supervisor password	Option for entering/changing a supervisor password. A supervisor password is necessary to edit all BIOS settings.	Enter	Enter password.
Set User Password	Option for entering/changing a user password. A user password allows the user to edit only certain BIOS settings.	Enter	Enter password.

Table 108: US15W Security - Menu setting options

1.6.1 Set supervisor password

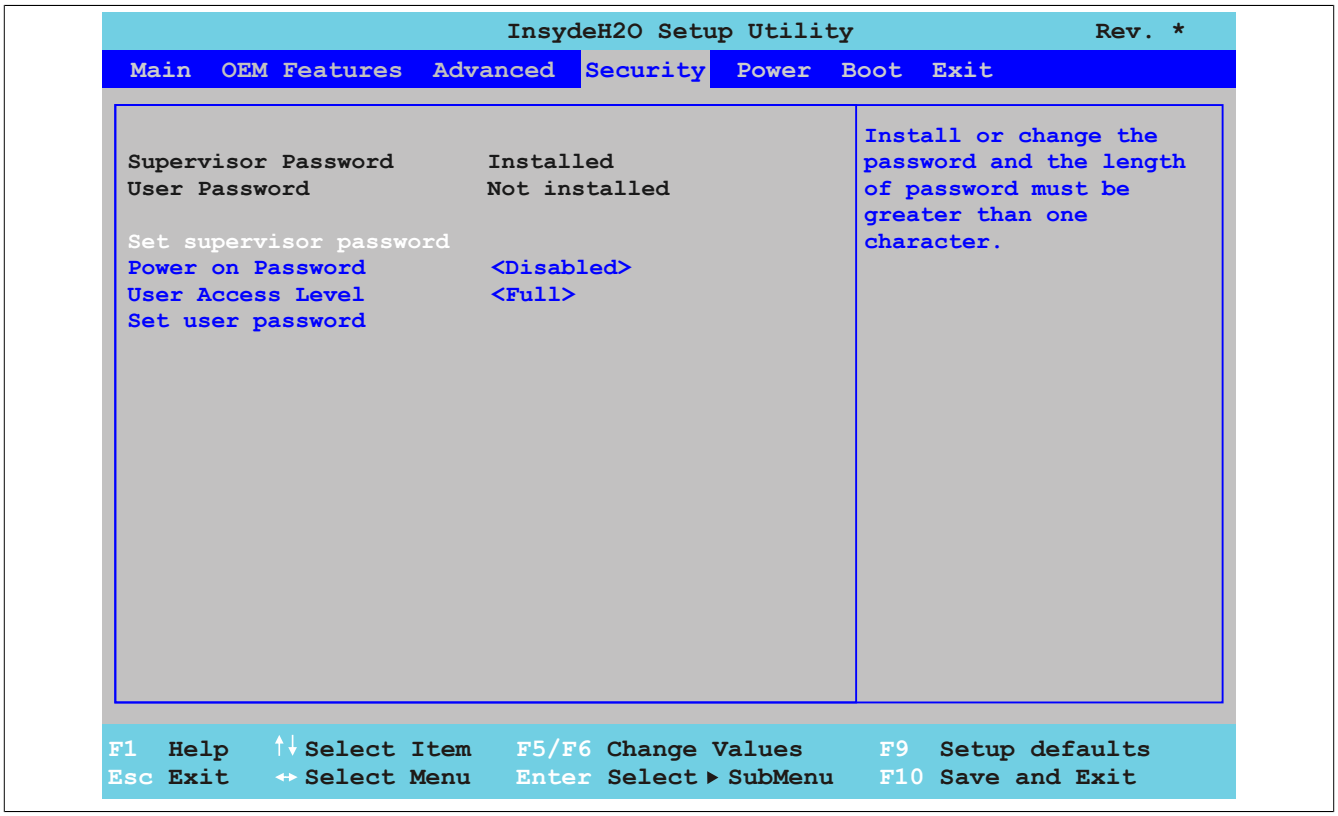


Image 56: US15W Security - Set Supervisor Password

BIOS setting	Meaning	Setting options	Effect
Supervisor Password	Displays whether or not a supervisor password has been set.	None	-
User Password	Displays whether or not a user password has been set.	None	-
Set supervisor password	Option for entering/changing a supervisor password. A supervisor password is necessary to edit all BIOS settings.	Enter	Enter password.
Power on Password	Entering BIOS or starting the operating system requires a password to be entered.	Enabled	POST requires the Supervisor Password to be entered.
		Disabled	Entering BIOS requires the Supervisor Password to be entered, but the operating system can be started without a password.
User Access Level	Assigning editing permissions in BIOS. These settings are only relevant if a user password has been created.	View Only	User can only view BIOS settings (cannot make any changes).
		Limited	User can view all BIOS settings, but only make some changes. Settings that the user can change: Main - System Time, Main - System Date, Advanced - Boot Configuration - Numlock
		Full	User has full access to BIOS and can make any changes.

Table 109: US15W Security - Set Supervisor Password setting options

1.6.2 Set user password

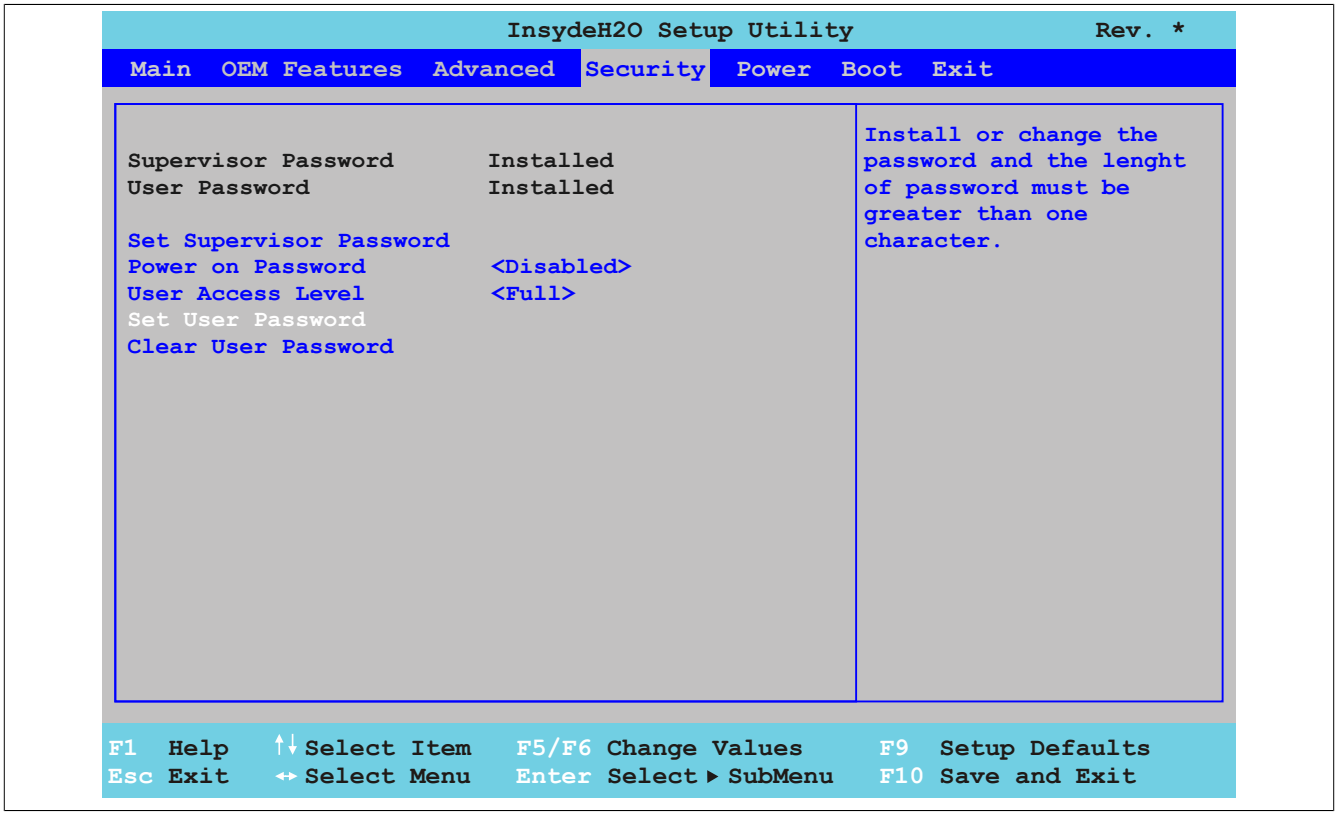


Image 57: US15W Security - Set User Password

BIOS setting	Meaning	Setting options	Effect
Supervisor Password	Displays whether or not a supervisor password has been set.	None	-
User Password	Displays whether or not a user password has been set.	None	-
Set User Password	Option for entering/changing a user password. A user password allows the user to edit only certain BIOS settings.	Enter	Enter password.
Clear User Password[1)]	Option for clearing the user password.		Clears user password.

Table 110: US15W Security - Set User Password - Setting options

1) This setting is only visible if a user password was created with *Set user password*.

1.7 Power

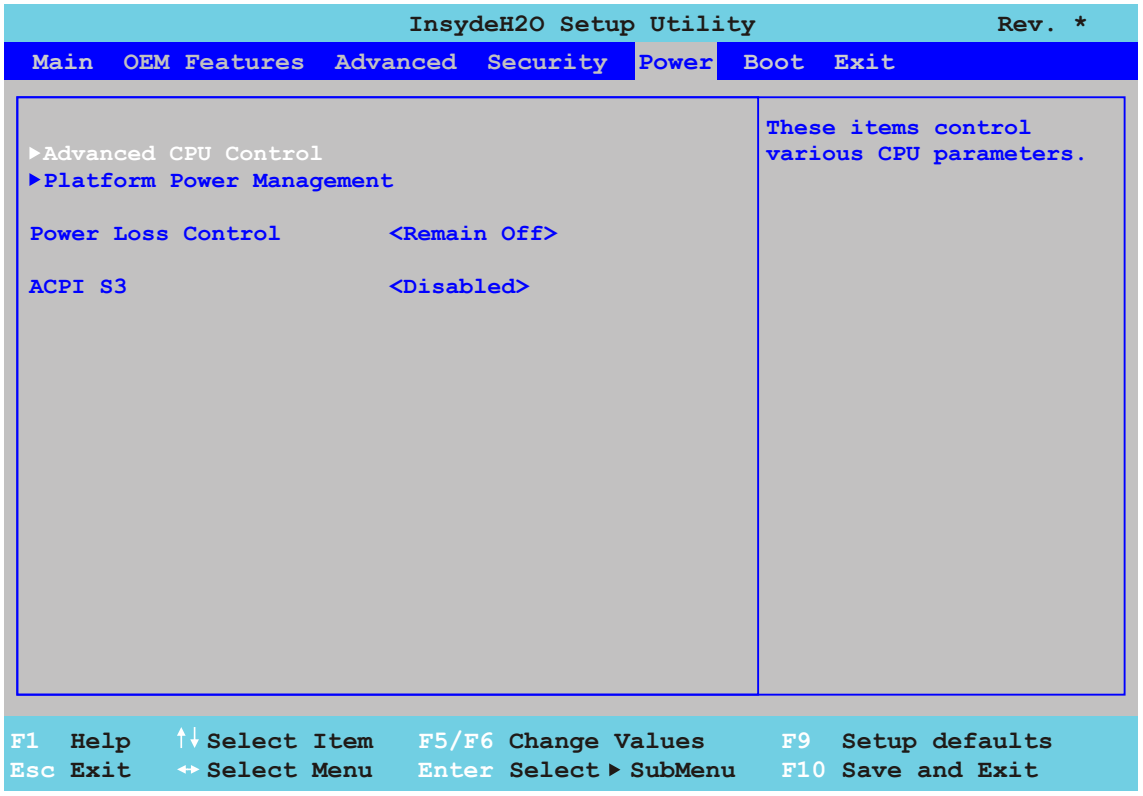


Image 58: US15W Power - Menu

BIOS setting	Meaning	Setting options	Effect
Advanced CPU Control	Configuration of the Advanced CPU Control settings.	None	Opens the submenu See " Advanced CPU control" on page 110
Platform Power Management	Configuration of the Platform Power Management settings.	None	Opens the submenu See " Platform power management" on page 113
Power Loss Control	This option determines what should occur after a power failure.	Remain Off	Device remains off.
		Turn On	The device turns back on.
ACPI S3	This option is used to determine whether or not the operating system should be written to the RAM, in which case only the RAM should be supplied with power.	Enabled	Enables this function.
		Disabled	Disables the function

Table 111: US15W Power - Menu setting options

1.7.1 Advanced CPU control

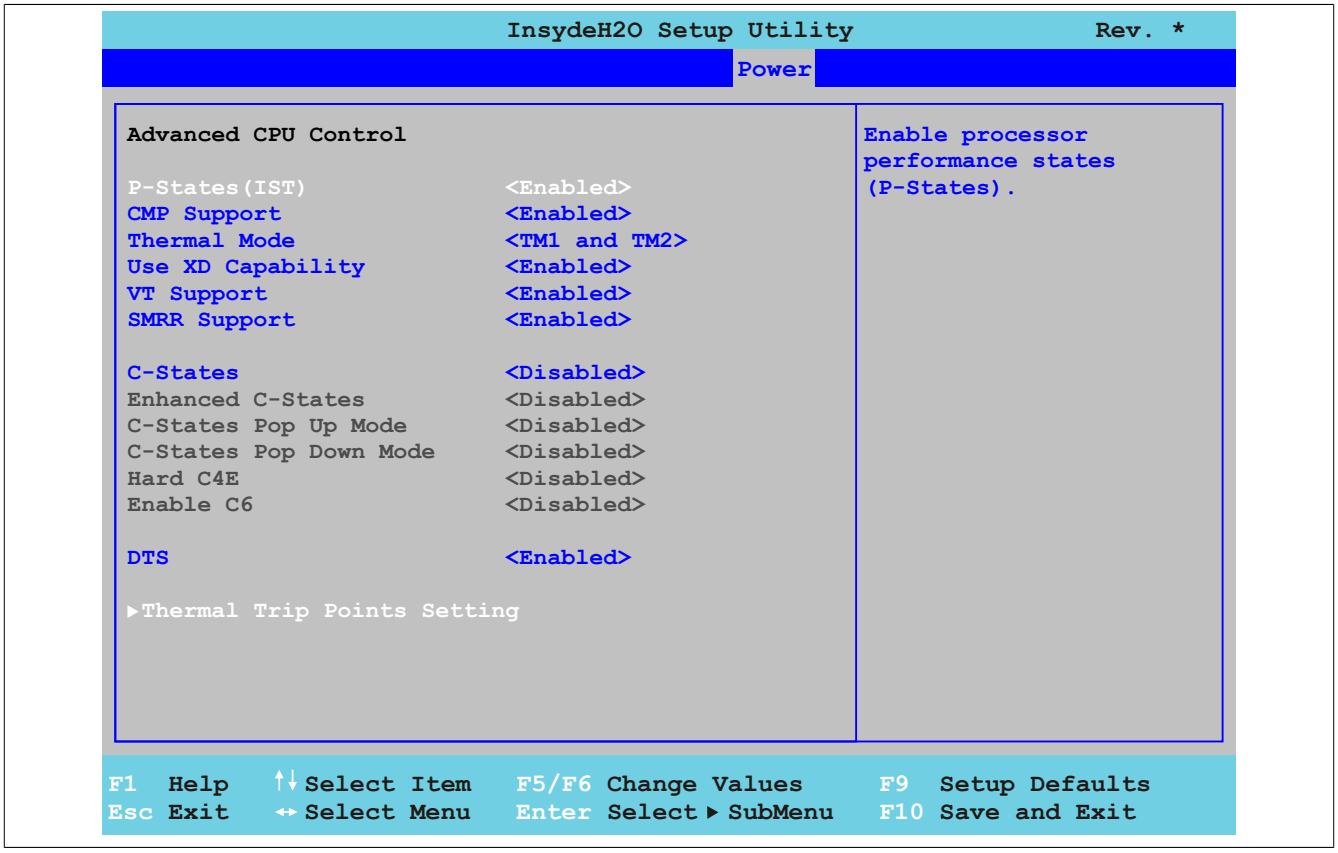


Image 59: US15W Power - Advanced - CPU Control

BIOS setting	Meaning	Setting options	Effect
P-States(IST)	Option for controlling the Intel(R) SpeedStep(TM) technology. The processor clock speed is increased or decreased according to the amount of calculations that must be made. As a result, the power consumption depends largely on the processor load.	Enabled	The processor speed is regulated by the operating system.
		Disabled	Disables SpeedStep technology.
CMP Support	This option supports the use of multiple CPUs (CMP=core multi-processing). **Information:** **In order to use ARwin, CMP support must be switched off to avoid runtime violations.**	Enabled	Enables this function.
		Disabled	Disables this function.
Thermal Mode[1)]	Option for configuring the temperature monitoring. **Information:** **To operate the processor within the specified values, we recommend not changing the default setting (TM1 and TM2).**	Disabled	Temperature monitoring disabled.
		TM1	Intel Thermal Mode 1 enabled. If the CPU reaches excessive temperatures, the processor speed will be reduced by 50%.
		TM2	Intel Thermal Mode 2 enabled. If the CPU reaches excessive temperatures, the Intel SpeedStep technology will be activated.
		TM1 and TM2	Intel Thermal Mode 1 and 2 enabled. If the CPU reaches excessive temperatures, TM1 reduces the processor speed by 50% and TM2 activates the Intel SpeedStep technology.
Use XD Capability	This option is a safety feature that protects specific data regions of the system memory from potentially damaging code.	Enabled	Enables this function.
		Disabled	Disables this function.
VT Support	Option for activating or deactivating a virtual machine. **Information:** **You must restart in order to apply changes made to this setting.**	Enabled	If the function is enabled, a virtual machine can use the additional hardware capacity.
		Disabled	Disables this function.

Table 112: US15W Power - Advanced CPU Control setting options

BIOS setting	Meaning	Setting options	Effect
SMRR Support	The SMRR (System Management Range Register) limits cacheable references of addresses in SMRAM in order to keep the code running in SMM (System Management Mode). In some circumstances, an intruder who is logged on as administrator could configure the Intel processor to gain access to the SMM. Implementation of SMRR reduces this risk of unauthorized access.	Enabled	Enables this function.
		Disabled	Disables this function.
C-States	This setting allows the operating system to set processor clock rates on its own, thereby saving energy.	Enabled	Enables this function. The processors are run at different frequencies, thereby saving energy.
		Disabled	Disables this function. Both processors are run at the same frequency.
Enhanced C-States[2)]	This setting allows the operating system to set processor clock rates on its own, thereby saving energy.	Enabled	Enables this function.
		Disabled	Disables this function.
C-State Pop Up Mode	This setting makes it possible to detect Bus Master requests and to assign processor clock frequencies. This can be done to save energy.	Enabled	If ICH receives a Bus Master request, then the system changes from C3/C4 state to C2 state and the Bus Master is automatically activated.
		Disabled	Bus Master data transfer is a Break Event and ICH will attempt to return to the C0 state.
C-State Pop Down Mode[3)]	This setting makes it possible to detect Bus Master requests and to assign processor clock frequencies. This can be done to save energy.	Enabled	If ICH does not receive a Bus Master request, then the system will be set back to C3/C4 state.
		Disabled	ICH will not attempt to automatically return to C3/C4 state.
Hard C4E[4)]	Power Management for the Intel Atom processor - Enhanced C4 support.	Enabled	Enables this function. CPU voltage is reduced and the Memory Cache is turned off.
		Disabled	Disables this function.
Enable C6	Power Management for the Intel Atom processor - C6 support.	Enabled	Enables this function. The internal CPU voltage is reduced (can also be 0 V).
		Disabled	Disables this function.
DTS	Option for enabling or disabling the CPU Digital Thermal Sensor function.	Enabled	Enables this function.
		Disabled	Disables this function.
Thermal Trip Points Setting[5)]	Configuration of the Thermal Trip Points settings.	Enter	Opens the submenu See " Thermal trip points settings" on page 112

Table 112: US15W Power - Advanced CPU Control setting options

1) These settings are only possible if *P-States (IST)* is set to *Enabled*.
2) These settings are only possible if *C-States* is set to *Enabled*.
3) These settings are only possible if *C-States Pop Up Mode* is set to *Enabled*.
4) These settings are only possible if *Enhanced C-States* is set to *Enabled*.
5) These settings are only possible if *DTS* is set to *Enabled*.

Thermal trip points settings

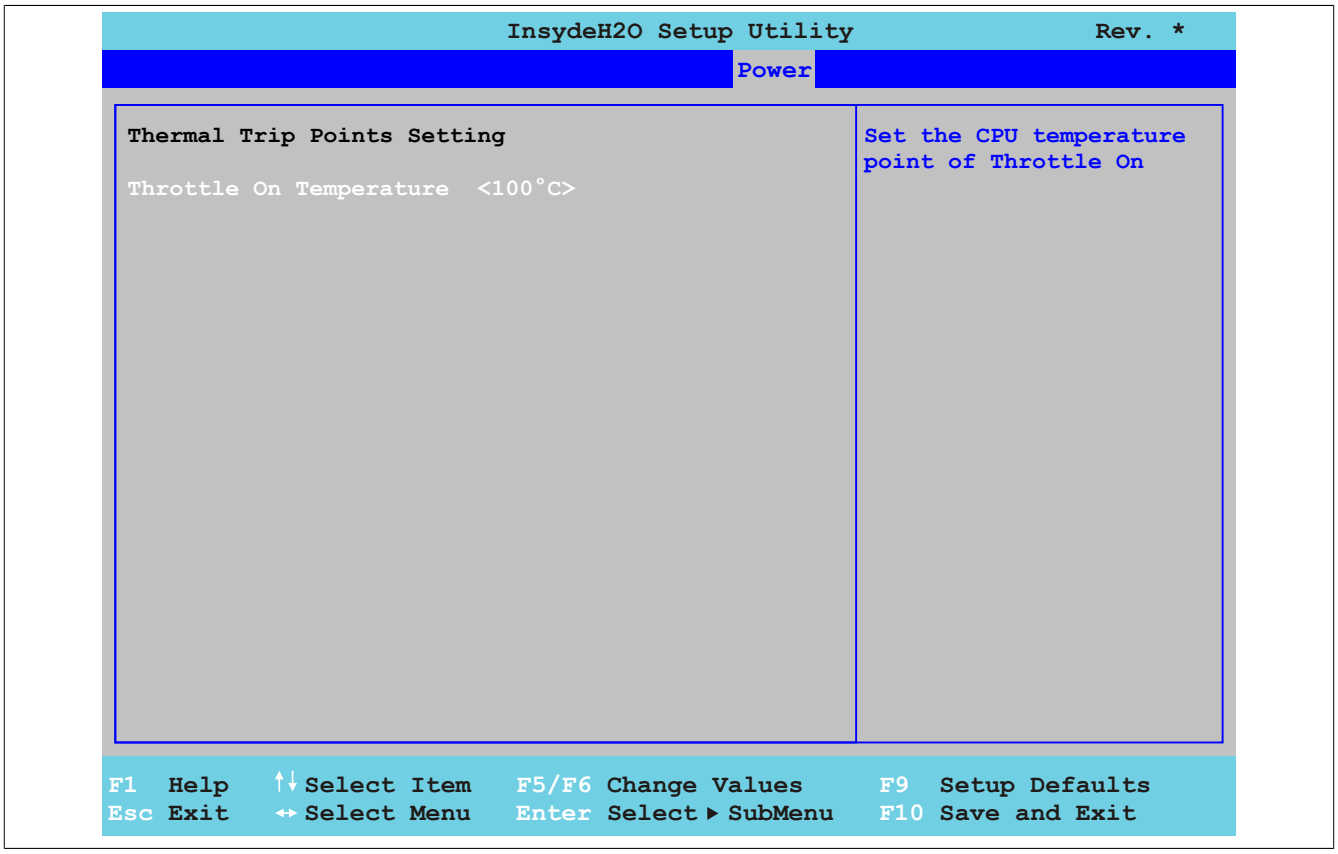


Image 60: US15W Power - Advanced - CPU Control - Thermal Trip Points Settings

BIOS setting	Meaning	Setting options	Effect
Throttle On Temperature	This function can be used to set a temperature at which the operating system throttles the system.	40°C, 45°C, 50°C, 55°C, 60°C, 65°C, 70°C, 75°C, 80°C, 85°C, 90°C, 95°C, 100°C	Temperature setting for the thermal trip point. Can be set in 5 degree increments.

Table 113: US15W Power - Advanced CPU Control - Thermal Trip Points Settings options

1.7.2 Platform power management

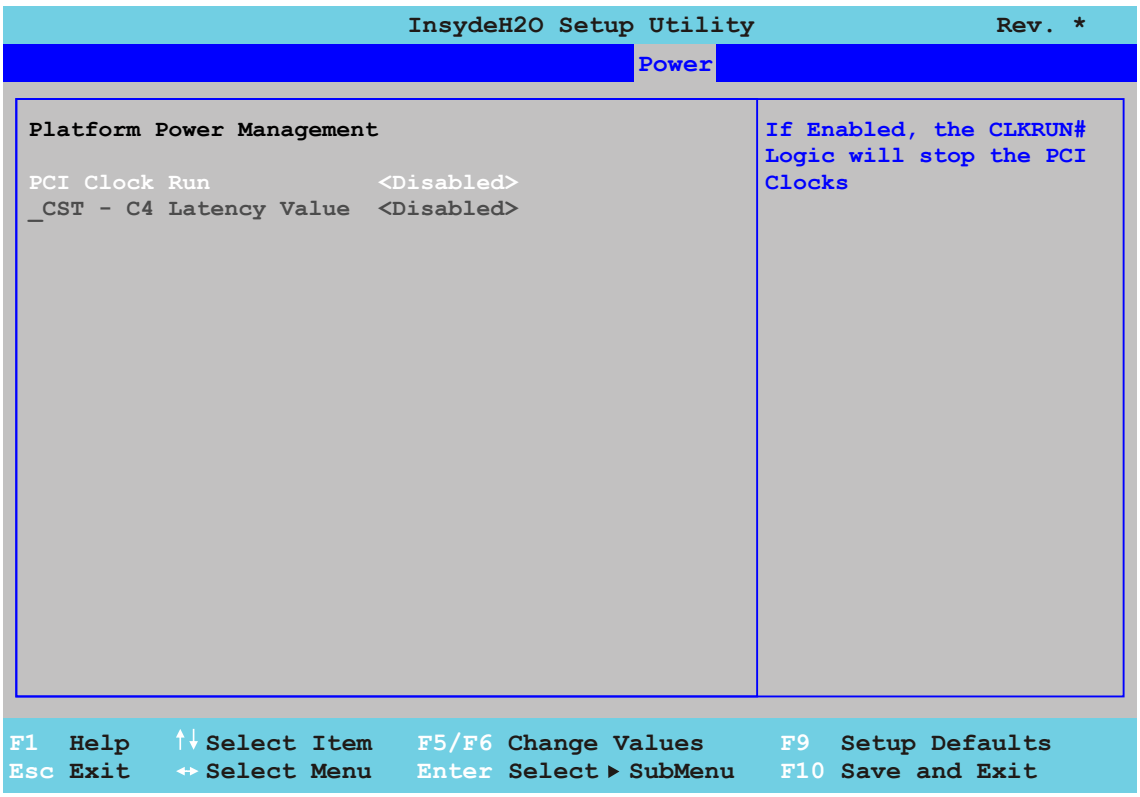


Image 61: US15W Power - Platform Power Management

BIOS setting	Meaning	Setting options	Effect
PCI Clock Run	Option for enabling / disabling the PCI Clocks to save energy.	Enabled	Enables this function.
		Disabled	Disables this function.
_CST - C4 Latency Value[1)]	Option for enabling / disabling the latency period for C4 C-States in the ACPI _CST object. **Information:** **For more detailed information about this setting, see the ACPI specification (www.acpi.info).**	Enabled	Enables this function.
		Disabled	Disables this function.
C4 on C3 - Deeper Sleep[2)]	Fine-tunes the power saving function on an ACPI operating system.	Enabled	Processor is needed in C4 if the operating system is initiated in a C3 state.
		Disabled	Disables this function.

Table 114: US15W Power - Platform Power Management setting options

1) These settings are only possible if *C-States* under the *Advanced CPU control* menu item is set to *Enabled*.
2) These settings are only possible if *_CST - C4 latency value* is set to *Enabled*.

1.8 Boot

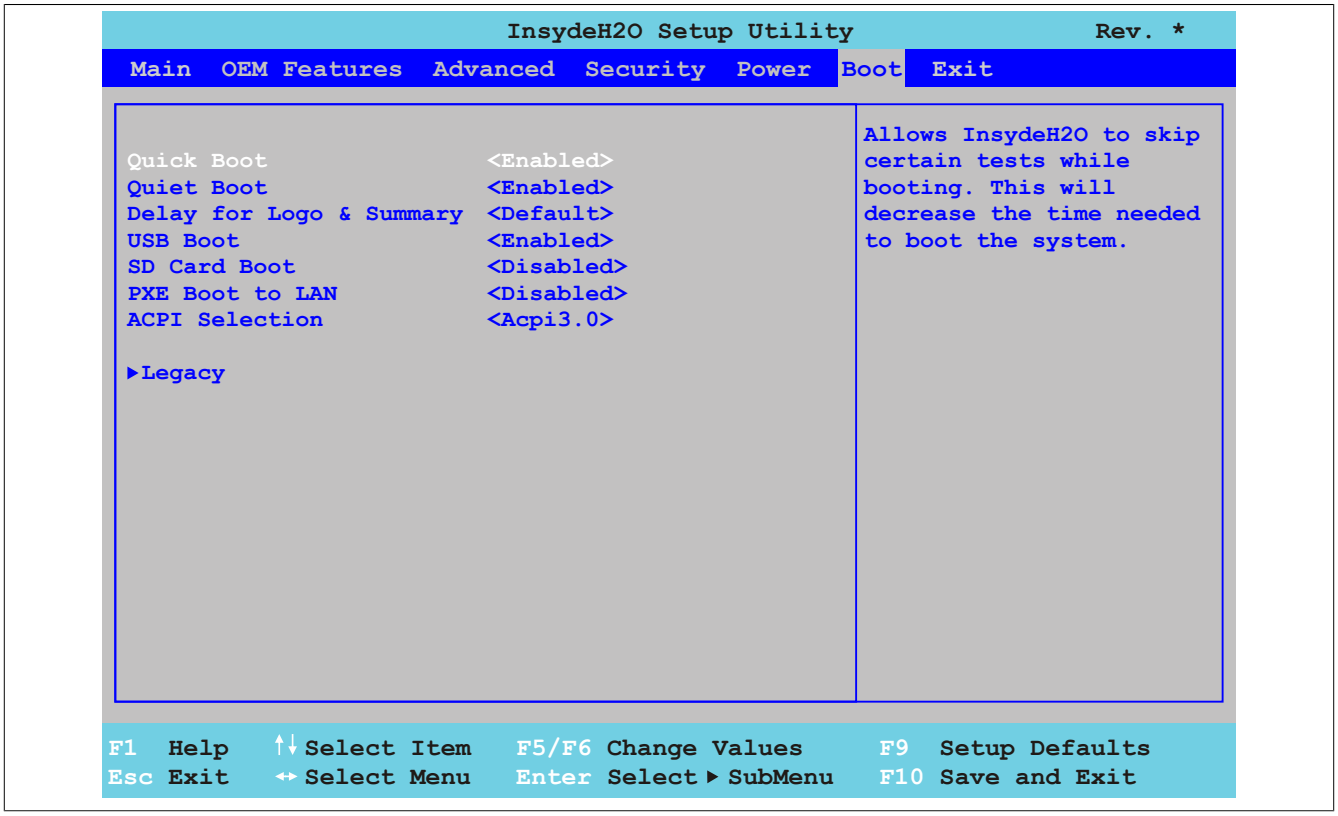


Image 62: US15W Boot - Menu

BIOS setting	Meaning	Setting options	Effect
Quick Boot	This function reduces the boot time by skipping some POST tests.	Enabled	Enables this function.
		Disabled	Disables this function.
Quiet Boot	Determines if POST message or OEM logo (default = black background) is displayed.	Enabled	OEM logo display instead of POST message.
		Disabled	POST message display.
Delay for Logo & Summary	Option for setting the display duration of the logo and summary screen.	Default	The display duration is minimized for a quick boot procedure.
		1 Sec., 1.5 Sec., 2 Sec., 2.5 Sec., 3 Sec., 4 Sec., 5 Sec., 10 Sec., 20 Sec.	A display duration of x seconds can be defined.
USB Boot	This function can be used to enable / disable the option of booting from USB devices.	Enabled	Enables this function.
		Disabled	Disables this function.
SD Card Boot	This function can be used to enable / disable the option of booting from SD cards. **Warning!** **SD memory cards are only permitted for use as a mass storage device. It is not possible to boot from an SD card.**	Enabled	Enables this function.
		Disabled	Disables this function.
PXE Boot to LAN	This function can be used to enable / disable the option of booting from LAN (ETH).	Enabled	Enables this function.
		Disabled	Disables this function.
ACPI Selection	Option for setting the power option specifications to be supported. The ACPI functions must be supported by the drivers and operating systems being used.	Acpi 1.0B	ACPI functions in accordance with v1.0B
		Acpi 3.0	ACPI functions in accordance with v3.0
		Acpi 4.0	ACPI functions in accordance with v4.0
Legacy	Boot order configuration and display	Enter	Opens the submenu See " Legacy" on page 115

Table 115: US15W Boot - Menu setting options

1.8.1 Legacy

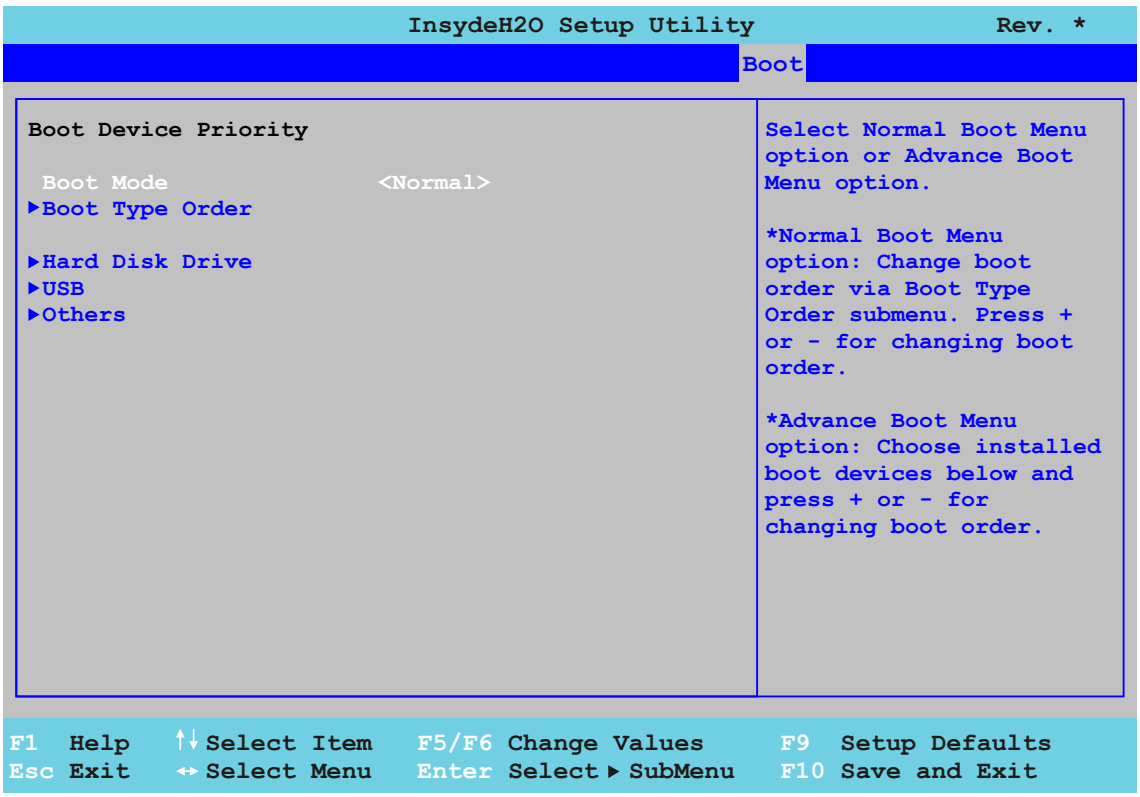


Image 63: US15W Boot - Legacy

BIOS setting	Meaning	Setting options	Effect
Boot mode	Boot mode configuration.	Normal	Displays the submenus for changing the boot sequence settings.
		Advanced	Displays only the product names of the bootable connected devices. The boot sequence can be defined right here.
Boot type order[1)]	Configuration of Boot Type Order settings.	Enter	Opens the submenu See " Boot type order" on page 116
Hard Disk Drive[1)2)]	Displays the inserted CompactFlash cards.	Enter	Opens the submenu See " Hard disk drive" on page 117
USB[1)3)]	Displays connected USB flash drives.	Enter	Opens the submenu See " USB" on page 117
Others[1)4)]	Displays the CPU Boards / Baseboards for PXE Boot with the onboard Ethernet interfaces.	Enter	Opens the submenu See " Other" on page 118

Table 116: US15W Boot - Legacy setting options

1) These submenus are only shown if *Normal boot mode* is set to *Normal*.
2) Only shown if a CompactFlash card is connected.
3) Only shown if a USB flash drive is connected.
4) Only shown if *PXE boot to LAN* is set to *Enabled* in the boot menu.

Boot type order

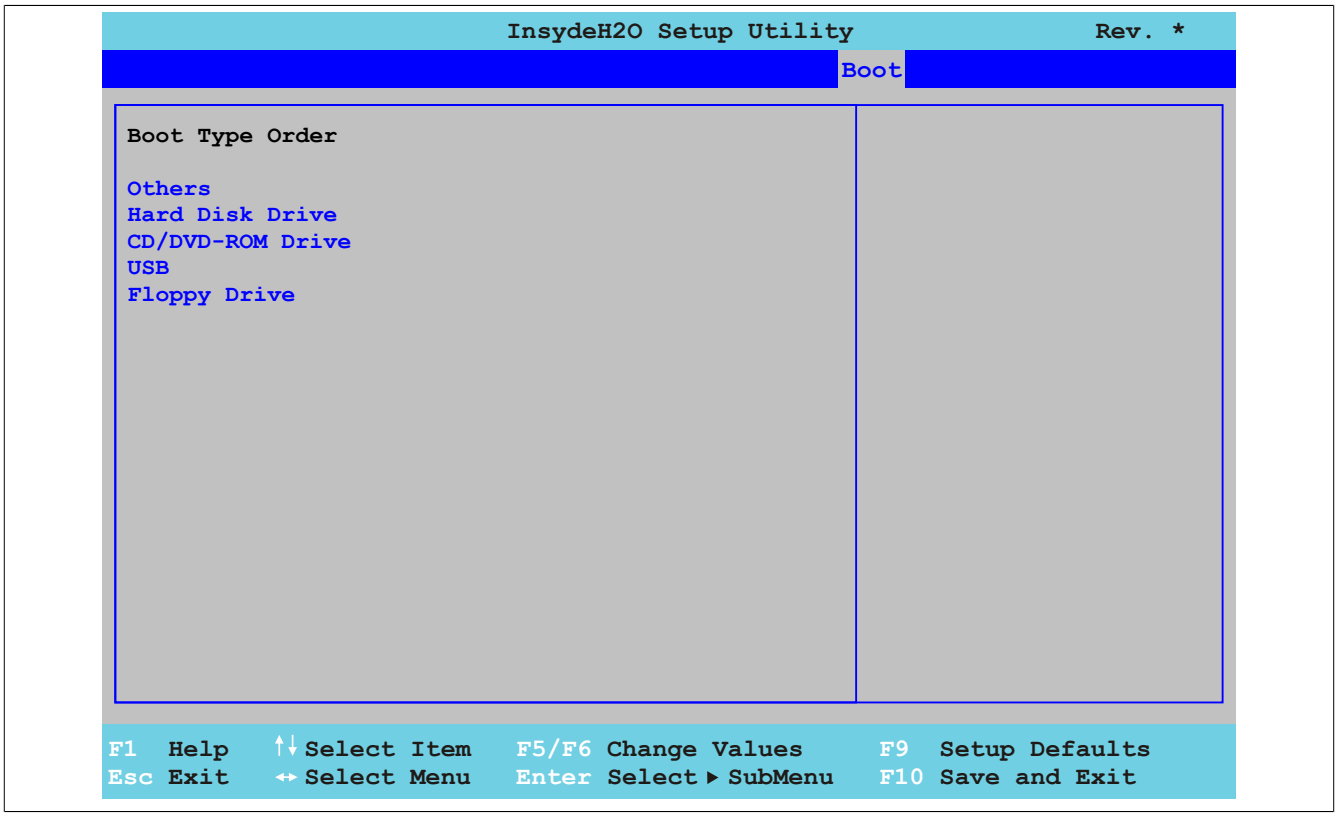


Image 64: US15W Boot - Legacy - Boot Type Order

BIOS setting	Meaning	Setting options	Effect
Others	The boot drives can be set using this option.	Others	Selects the desired sequence.
Hard Disk Drive		Hard Disk Drive	
CD/DVD ROM drive		CD/DVD ROM drive	
USB		USB	
Floppy Drive		Floppy Drive	

Table 117: US15W Boot - Legacy - Boot Type Order setting options

Hard disk drive

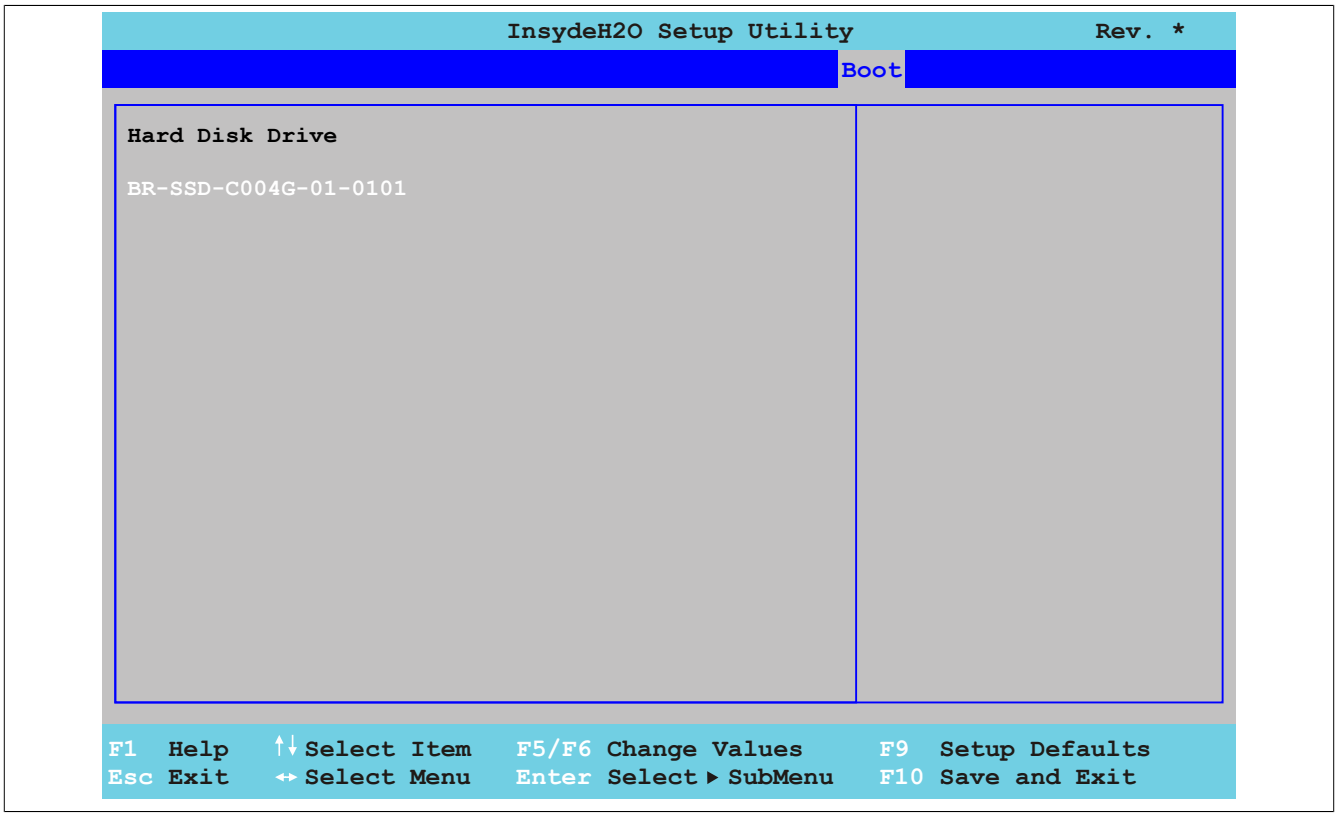


Image 65: US15W Boot - Legacy - Hard Disk Drive

BIOS setting	Meaning	Setting options	Effect
	Displays the inserted CompactFlash cards.	None	-

Table 118: US15W Boot - Legacy - Hard Disk Drive setting options

USB

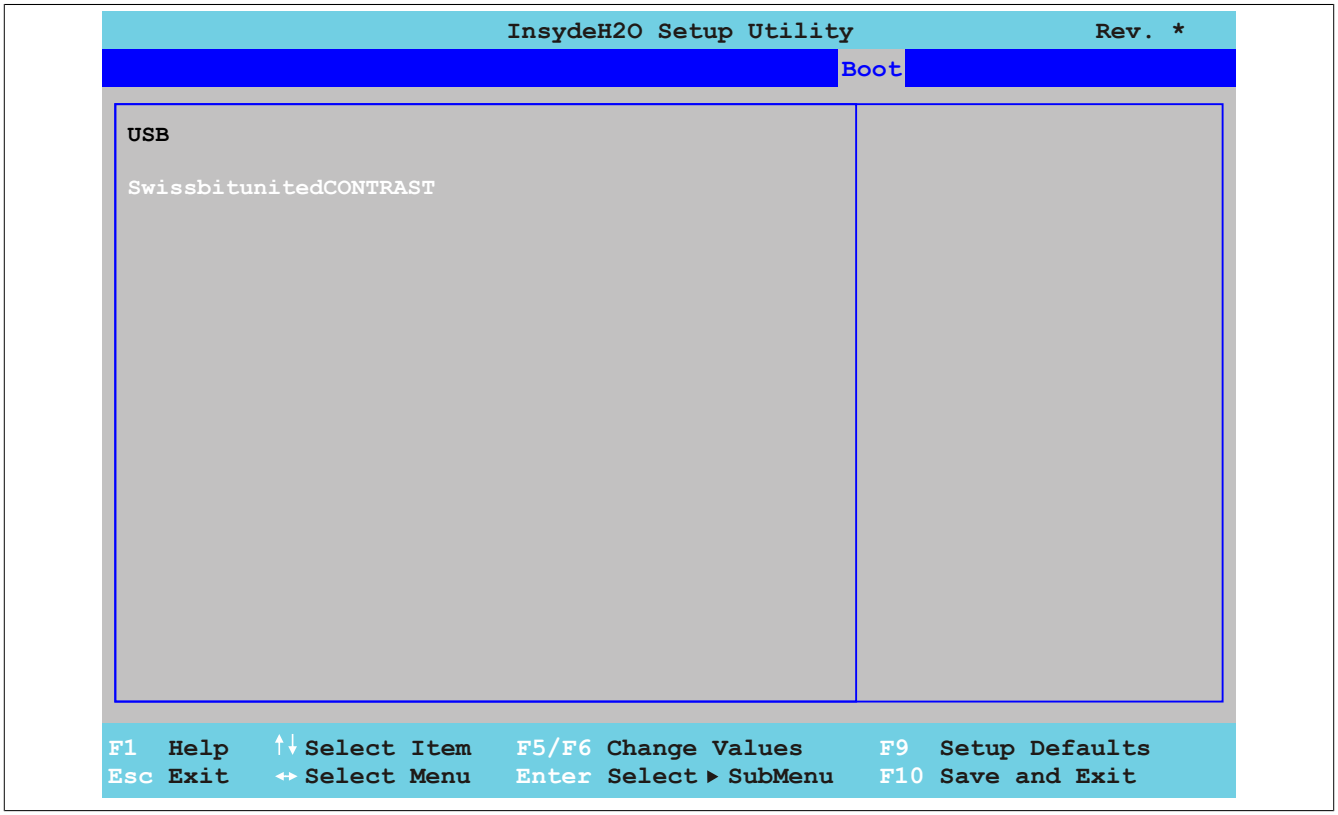


Image 66: US15W Boot - Legacy - USB

BIOS setting	Meaning	Setting options	Effect
	Displays connected USB flash drives.	None	-

Table 119: US15W Boot - Legacy - USB setting options

Other

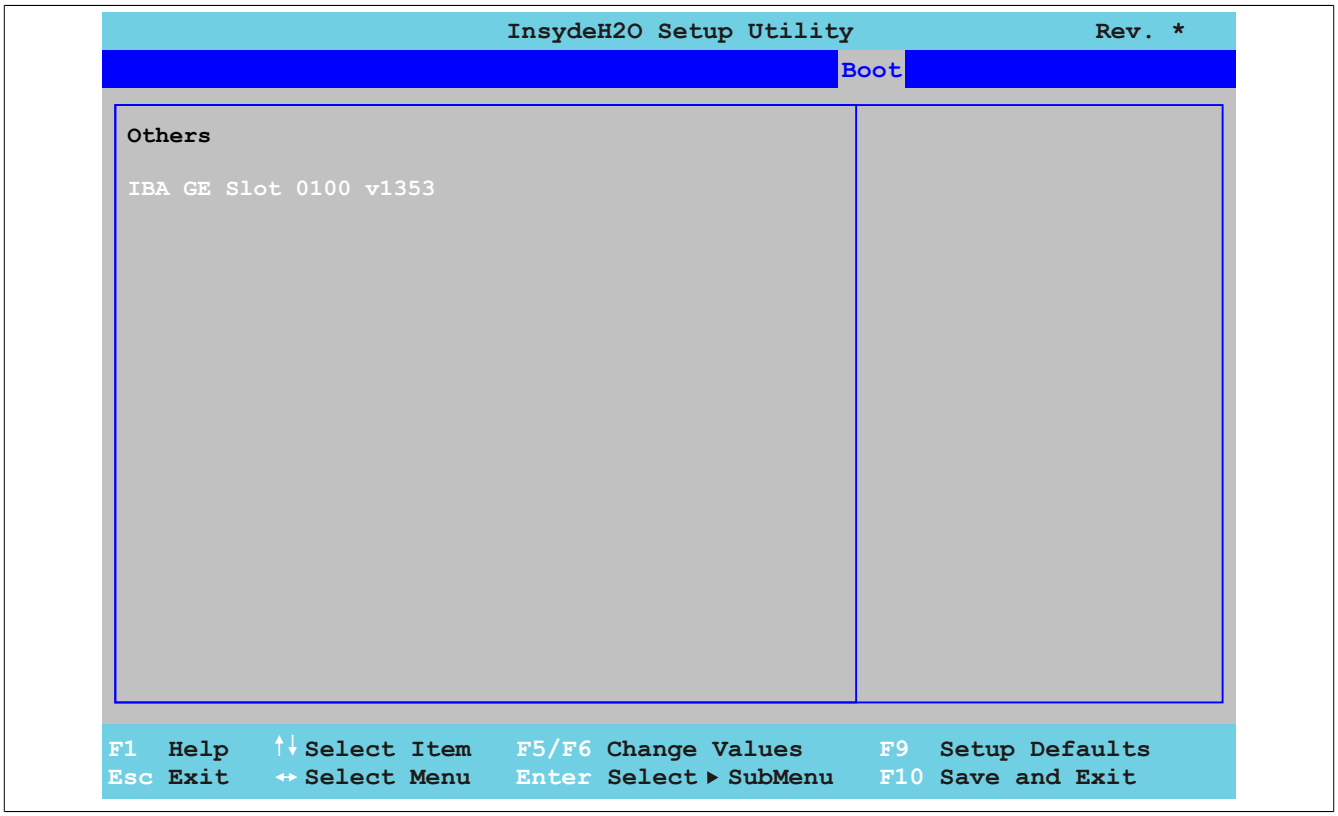


Image 67: US15W Boot - Legacy - Others

BIOS setting	Meaning	Setting options	Effect
-	Displays the CPU Boards / Baseboards for PXE Boot with the onboard Ethernet interfaces.	None	-

Table 120: US15W Boot - Legacy - Others setting options

1.9 Exit

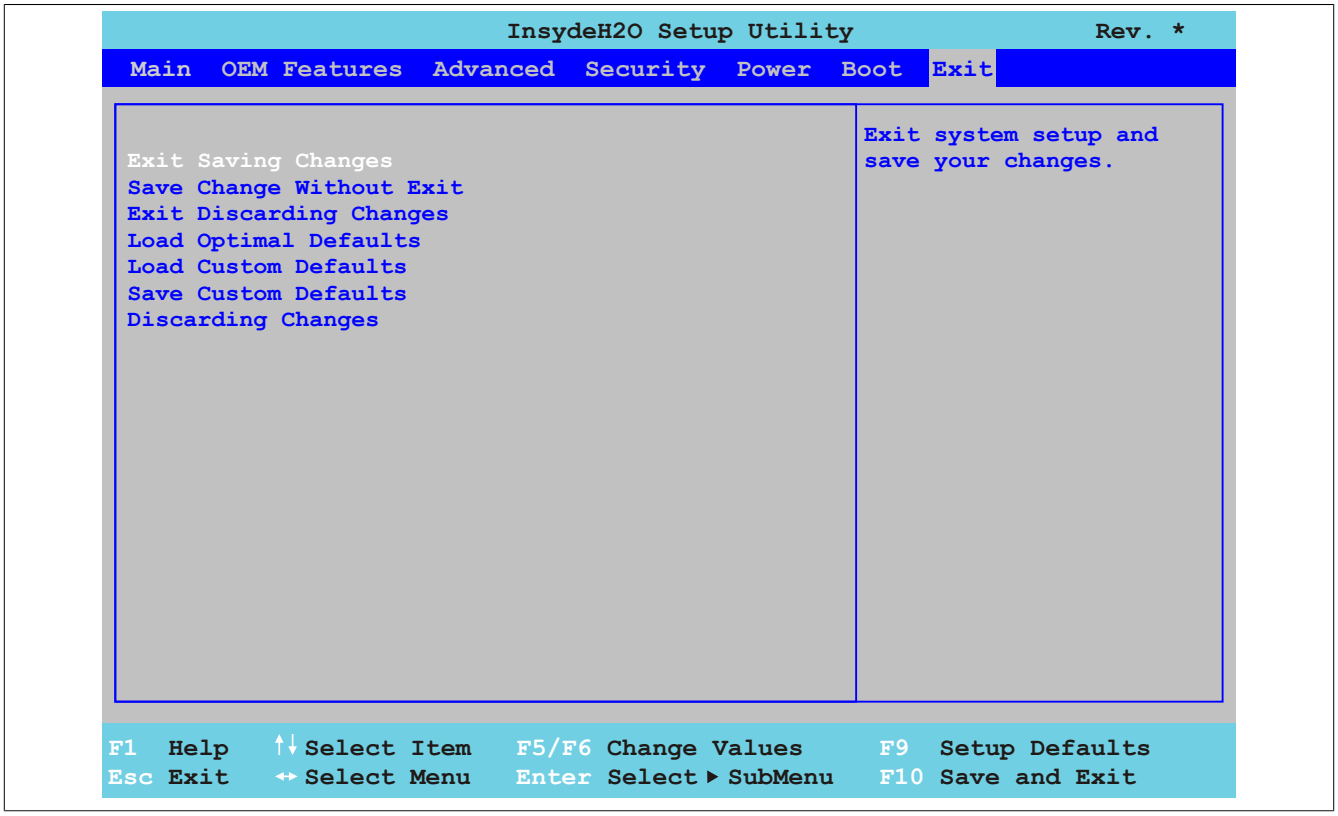


Image 68: US15W Exit - Menu

BIOS setting	Meaning	Setting options	Effect
Exit saving changes	BIOS setup is closed with this item. Changes made are saved in CMOS after confirmation, and the system is rebooted.	OK / Cancel	
Save Change Without Exit	After this is confirmed, any changes that have been made will be saved to the CMOS.	OK / Cancel	
Exit discarding changes	With this item you can close BIOS setup without saving the changes made. The system is then re-booted.	OK / Cancel	
Load Optimal Defaults	This item loads the CMOS default values, which are defined by the Mode / Node switch settings. These settings are loaded for all BIOS configura-tions.	OK / Cancel	
Load Custom Defaults	This item loads the CMOS values, which are de-fined by the Mode / Node switch settings. These settings are loaded for all BIOS configurations.	OK / Cancel	
Save Custom Defaults	This saves defined CMOS vales. These settings are saved for all BIOS configurations.	OK / Cancel	
Discarding Changes	In the event that settings were made that the user can no longer remember, they can be reset as long as they haven't been saved.	OK / Cancel	

Table 121: US15W Exit - Menu setting options

1.10 BIOS default settings

If the function "load setup defaults" is chosen in the main BIOS setup menu, or if exit is selected (or <F9> is pressed) in the individual setup screens, the following BIOS settings are the optimized values that will be used.

1.10.1 Main

Setting / View	Profile 0	My setting
InsydeH2O Version	-	
Processor Type	-	
System Bus Speed	-	
System Memory Speed	-	
Cache RAM	-	
Total Memory	-	
SODIMM 0	-	
System Time	-	
System Date	-	

Table 122: US15W - Main profile setting overview

1.10.2 OEM Features

Setting / View	Profile 0	My setting
BIOS	-	
Boot Source	-	
MTCX	-	

Table 123: US15W - OEM Features profile setting overview

CPU Board Features

Setting / View	Profile 0	My setting
Device ID	-	
Compatibility ID	-	
Vendor ID	-	
Hardware Revision	-	
Serial Number	-	
Product Name	-	
Hardware Number	-	
Parent Device ID	-	
Parent Compatib. ID	-	
User Serial ID	-	
LAN1 MAC ADDRESS	-	
LPC devices		
COMA	-	
Base I/O Address	3F8	
Interrupt	IRQ4	
Statistical values		
Sensor 1	-	
Sensor 2	-	
Sensor 3	-	
Total Hours	-	
Power On Cycles	-	
Temperature values		
Refresh values	-	
Sensor 1	-	
Sensor 2	-	
Sensor 3	-	
Temperature values		
Wcpu	-	
Vin	-	
Battery voltage	-	
Battery state	-	

Table 124: US15W - CPU Board Features profile setting overview

System Unit Features

Setting / View	Profile 0	My setting
Device ID	-	
Compatibility ID	-	
Vendor ID	-	
Hardware Revision	-	
Serial Number	-	
Product Name	-	
Hardware Number	-	
Parent Device ID	-	
Parent Compatib. ID	-	
User Serial ID	-	
Display (0) Brightness	Auto	
LPC devices		
COMB	-	
Base I/O Address	2F8	
Interrupt	IRQ3	
Statistical values		
Sensor 1	-	
Total Hours	-	
Power on cycles	-	
Temperature values		
Refresh values	-	
Sensor 1	-	

Table 125: US15W - System Unit Features profile setting overview

I/O board features

Setting / View	Profile 0	My setting
FPGA Version	-	
Device ID	-	
Compatibility ID	-	
Vendor ID	-	
Hardware Revision	-	
Serial Number	-	
Product Name	-	
Hardware Number	-	
Parent Device ID	-	
Parent Compatib. ID	-	
User Serial ID	-	
I/O board LPC devices		
COMC		
Base I/O Address	3E8	
Interrupt	IRQ11	
COMD		
Base I/O Address	2E8	
Interrupt	IRQ10	
Statistical values		
Sensor 1	-	
Total Hours	-	
Power on cycles	-	
Refresh Values		
Sensor 1	-	
Panel control		
Select panel number	1	
Version	-	
Brightness	100%	
Fan speed	-	
Keys/LEDs	-	
Temperature	-	

Table 126: US15W - I/O Board Features profile setting overview

IF board features

Setting / View	Profile 0	My setting
Device ID	-	
Compatibility ID	-	
Vendor ID	-	
Hardware Revision	-	

Table 127: US15W - IF Board Features profile setting overview

Setting / View	Profile 0	My setting
Serial Number	-	
Product Name	-	
Hardware Number	-	
Parent Device ID	-	
Parent Compatib. ID	-	
User Serial ID	-	
LAN2 MAC ADDRESS	-	
Statistical values		
Total Hours	-	
Power on cycles	-	

Table 127: US15W - IF Board Features profile setting overview

Memory Module Features

Setting / View	Profile 0	My setting
Device ID	-	
Compatibility ID	-	
Vendor ID	-	
Hardware Revision	-	
Serial Number	-	
Product Name	-	
Hardware Number	-	
Parent Device ID	-	
Parent Compatib. ID	-	
User Serial ID	-	

Table 128: US15W - Memory Module Features profile setting overview

1.10.3 Advanced

RAM Configuration

Setting / View	Profile 0	My setting
Refresh rate	Auto	

Table 129: US15W - RAM Configuration profile setting overview

Boot Configuration

Setting / View	Profile 0	My setting
NumLock	On	

Table 130: US15W - Boot Configuration profile setting overview

Peripheral Configuration

Setting / View	Profile 0	My setting
High Definition Audio[1)]	Auto	

Table 131: US15W - Peripheral Configuration profile setting overview

1) This menu option is only available if there is an audio connection.

IDE Configuration

Setting / View	Profile 0	My setting
Channel 1 Master	Enabled[1)]	
Channel 1 Master		
Transfer mode	-	
Security Mode	-	
Channel 1 Slave	Enabled[1)]	
Channel 1 Slave		
Transfer mode	-	
Security Mode	-	

Table 132: US15W - IDE Configuration profile setting overview

1) Only with drive installed.

Video Configuration

Setting / View	Profile 0	My setting
IGD - Pre-allocated memory	UMA = 8 MB	
IGD - Boot Type	Auto	
IGD - LCD Panel Type[1)]	640x480 (5.7) LVDS	
Remote Panel	Disabled[2)]	

Table 133: US15W - Video Configuration profile setting overview

1) This setting is only available for PP500 system units.
2) On APC511 system units with no I/O board, this option is enabled by default.

USB Configuration

Setting / View	Profile 0	My setting
USB Legacy	Enabled	
EHCI	Enabled	
UHCI 1	Enabled	
UHCI 2	If an I/O board is not connected: Disabled If an I/O board is connected: Enabled	
UHCI 3	Enabled	
USB client	Disabled	

Table 134: US15W - USB Configuration profile setting overview

SDIO Configuration

Setting / View	Profile 0	My setting
SDIO Port 1	Enabled	
SDIO Port 2	Enabled	

Table 135: US15W - SDIO Configuration profile setting overview

ACPI Table/Features Control

Setting / View	Profile 0	My setting
FACP - C2 Latency Value	Disabled	
FACP - C3 Latency Value	Disabled	
HPET - HPET support	Enabled	
APIC - I/O APIC mode	Enabled	

Table 136: US15W - ACPI Table/Features Control profile setting overview

PCI Express Root Port 1

Setting / View	Profile 0	My setting
PCI Express Root Port 1	Enabled	
Interrupt pin 0	Auto	
VC1 Enable	Disabled	
VC1/TC Mapping	Disabled	
ASPM	Disabled	
Automatic ASPM	Disabled	
ASPM L0s	Disabled	
ASPM L1s	Disabled	
URR	Disabled	
FER	Disabled	
NFER	Disabled	
CER	Disabled	
CT0	Disabled	
SEFE	Disabled	
SENFE	Disabled	
SECE	Disabled	
PME Interrupt	Disabled	
PME SCI	Disabled	
Hot Plug SCI	Disabled	

Table 137: US15W - PCI Express Root Port 1 profile setting overview

PCI Express Root Port 2

Setting / View	Profile 0	My setting
PCI Express Root Port 2	Enabled	
Interrupt pin 1	If a fieldbus card is not connected: Auto If a fieldbus card is connected: Disabled	
VC1 Enable	Disabled	
VC1/TC Mapping	Disabled	
ASPM	Disabled	
Automatic ASPM	Disabled	
ASPM L0s	Disabled	
ASPM L1s	Disabled	
URR	Disabled	
FER	Disabled	
NFER	Disabled	
CER	Disabled	
CT0	Disabled	
SEFE	Disabled	
SENFE	Disabled	
SECE	Disabled	
PME Interrupt	Disabled	
PME SCI	Disabled	
Hot Plug SCI	Disabled	

Table 138: US15W - PCI Express Root Port 2 profile setting overview

Console Redirection

Setting / View	Profile 0	My setting
Console Serial Redirect	Enabled	
Information Wait Time	5 seconds	
Serial port	COM_A	
Terminal type	PC_ANSI	
Baud rate	57600	
Data bits	8 bits	
Parity	None	
Stop bits	1-bit	
Flow control	None	
ACPI SPCR Table	Disabled	

Table 139: US15W - Console Redirection - profile setting overview

1.10.4 Power

Setting / View	Profile 0	My setting
Power Loss Control	Read from the EEPROM data	
ACPI S3	Disabled	

Table 140: US15W - Power profile setting overview

Advanced CPU Control

Setting / View	Profile 0	My setting
P-States(IST)	Enabled	
CMP Support	Enabled	
Thermal Mode	TM1 and TM2	
Use XD Capability	Enabled	
VT Support	Enabled	
SMRR Support	Enabled	
C-States	Disabled	
Enhanced C-States	Disabled	
C-States Pop Up Mode	Disabled	
C-States Pop Down Mode	Disabled	
Hard C4E	Disabled	
Enable C6	Disabled	
DTS	Enabled	
Thermal trip point settings		
Throttle On Temperature	100°C	

Table 141: US15W - Advanced CPU Control profile setting overview

Platform Power Management

Setting / View	Profile 0	My setting
PCI Clock Run	Disabled	
_CST - C4 Latency Value	Disabled	
C4 on C3 - Deeper Sleep	Disabled	

Table 142: US15W - Platform Power Management profile setting overview

1.10.5 Boot

Setting / View	Profile 0	My setting
Quick Boot	Enabled	
Quiet Boot	Enabled	
Delay for Logo & Summary	Default	
USB Boot	Enabled	
SD Card Boot	Disabled	
PXE Boot to LAN	Disabled	
ACPI Selection	Acpi3.0	

Table 143: US15W - Boot profile setting overview

1.11 Distribution of resources

1.11.1 RAM address assignment

RAM address	Address in Hex	Resource
(TOM - FB[1]) – TOM[2]	N.A.	ACPI reclaim, MPS and NVS area[3]
(TOM - FB - TSEG[4]) – (TOM FB)	N.A.	VGA frame buffer[5]
1024 kB – (TOM - 8 MB - 192 kB)	100000h - N.A.	Extended memory
896 kB – 1024 kB	0E0000h - 0FFFFFh	Runtime BIOS
832 kB – 896 kB	0D0000h - 0DFFFFh	Upper memory
640 kB – 832 kB	0A0000h - 0CFFFFh	Video memory and BIOS
639 kB – 640 kB	09FC00h - 09FFFFh	Extended BIOS data
0 - 639 kB	000000h - 09FC00h	Conventional memory

Table 144: RAM address assignment

1) FB - VGA frame buffer
2) TOM - Top of memory: max. installed DRAM
3) Only if ACPI Aware OS is set to "YES" in the setup.
4) TSEG - Intended internally for SMI handling in system BIOS.
5) The VGA frame buffer can be reduced to 1 MB in the setup.

1.11.2 I/O address assignment

I/O address	Resource
0000h - 00FFh	Motherboard resources
01F0h - 01F7h	Primary IDE channel
03B0h - 03DFh	Video system
03F6h - 03F6h	Primary IDE channel command port
03F7h - 03F7h	Primary IDE channel status port
03F8h - 03FFh	COM1
0480h - 04BFh	Motherboard resources
04D0h - 04D1h	Motherboard resources
0800h - 087Fh	Motherboard resources
0CF8h - 0CFBh	PCI config address register
0CFCh - 0CFFh	PCI config data register
0D00h - FFFFh	PCI / PCI Express bus[1]
4100h - 417Fh	MTCX
FF00h - FF07h	IDE bus master register

Table 145: I/O address assignment

1) The BIOS assigns the PCI and PCI Express Bus I/O resources from FFF0h downward. Devices that are not compatible with PnP/PCI/PCI Express cannot use the I/O resources in this area.

1.11.3 Interrupt allocations in PIC mode

IRQ	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	NMI	NONE
System timer	●																	
Keyboard		●																
IRQ cascade			●															
COM1 (Serial port A)				○	●	○	○				○	○	○					
COM2 (Serial port B)				●	○	○	○				○	○	○					
ACPI[1]										●								
Real-time clock									●									
Coprocessor (FPU)														●				
Primary IDE channel															●			
Secondary IDE channel																●		

Table 146: IRQ interrupt assignments PIC Mode

1) **A**dvanced **C**onfiguration and **P**ower **I**nterface.

● ... Default setting
○ ... Optional setting

1.11.4 Interrupt assignments in APIC mode

A total of 23 IRQs are available in APIC (**A**dvanced **P**rogrammable **I**nterrupt **C**ontroller) mode. The activation of this option is only effective if it takes place before the operating system is activated.

IRQ	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	NMI	NONE
System timer	●																									
Keyboard		●																								
IRQ cascade			●																							
COM1 (Serial port A)				○	●	○	○				○	○	○													
COM2 (Serial port B)				●	○	○	○				○	○	○													
ACPI[1]										●																
Real-time clock									●																	
Coprocessor (FPU)														●												
Primary IDE channel															●											
Secondary IDE channel																●										
PIRQ A[2]																	●									
PIRQ B[3]																		●								
PIRQ C[4]																			●							
PIRQ D[5]																				●						
PIRQ E[6]																					●					
PIRQ F[7]																						●				
PIRQ G[8]																							●			
PIRQ H[9]																								●		

Table 147: IRQ interrupt assignments in APIC mode

1) **A**dvanced **C**onfiguration and **P**ower **I**nterface.
2) PIRQ A: for IF board; GMA500 graphics controller, LPC, root port 1, Ethernet controller, USB client
3) PIRQ B: for IF board; root port 2
4) PIRQ C: for IF board
5) PIRQ D: for IF board; HD audio
6) PIRQ E: UHCI host controller 0, SDIO 0 controller
7) PIRQ F: UHCI host controller 1, SDIO 1 controller
8) PIRQ G: UHCI host controller 2, SDIO 2 controller
9) PIRQ H: EHCI host controller

● ... Default setting
○ ... Optional setting

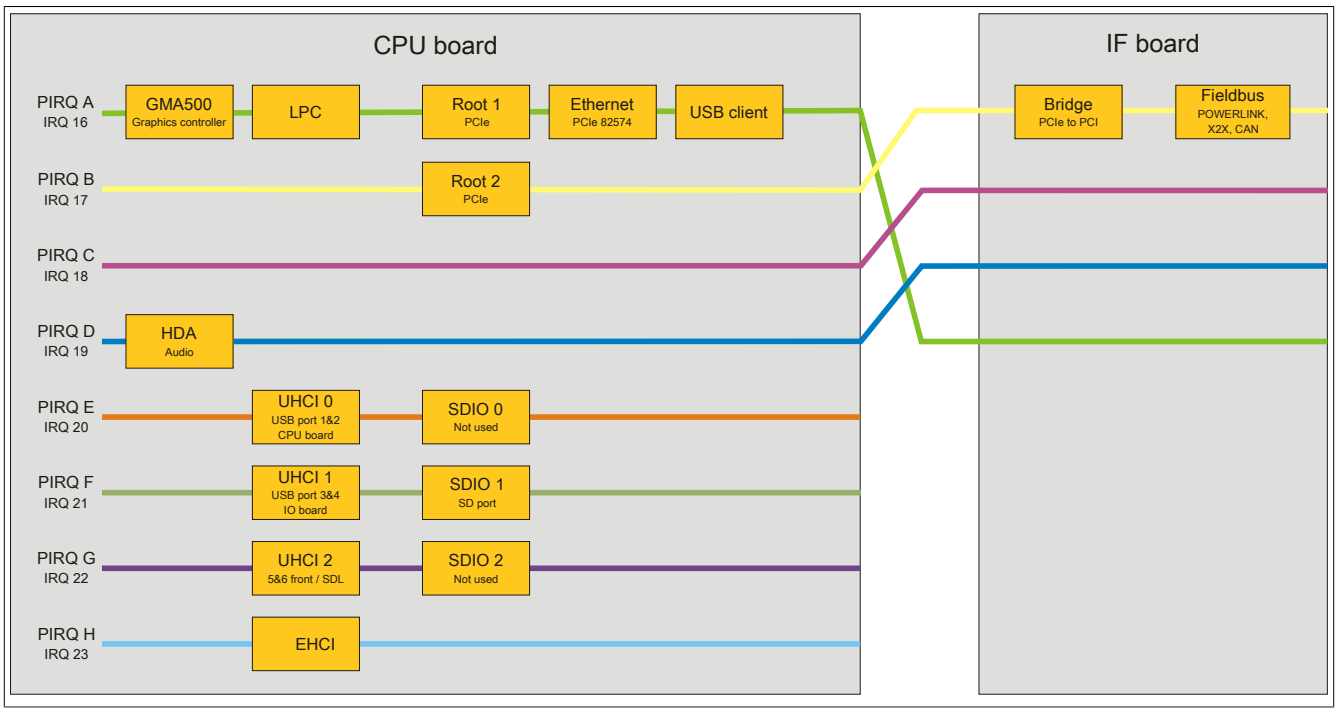


Image 69: Interrupt Routing with activated APIC -Beginning with BIOS version N0.15

2 Upgrade information

Warning!

The BIOS and firmware on B&R devices must be kept current. New versions can be downloaded from the B&R homepage (www.br-automation.com).

2.1 BIOS upgrade

An upgrade might be necessary for the following reason:

- To update implemented functions or to add newly implemented functions or components to the BIOS setup (information about changes can be found in the Readme files of the BIOS upgrade).

2.1.1 What information do I need?

Information:

Individually saved BIOS settings are deleted when upgrading the BIOS.

Before you begin the upgrade, it helps to determine the various software versions.

Which BIOS version and firmware are already installed on the device?

This information can be found on the following BIOS setup page:

- After switching on the device, you can get to the BIOS Setup by pressing "F2".
- The current BIOS and MTCX version can be viewed in the BIOS main menu under "OEM Features".

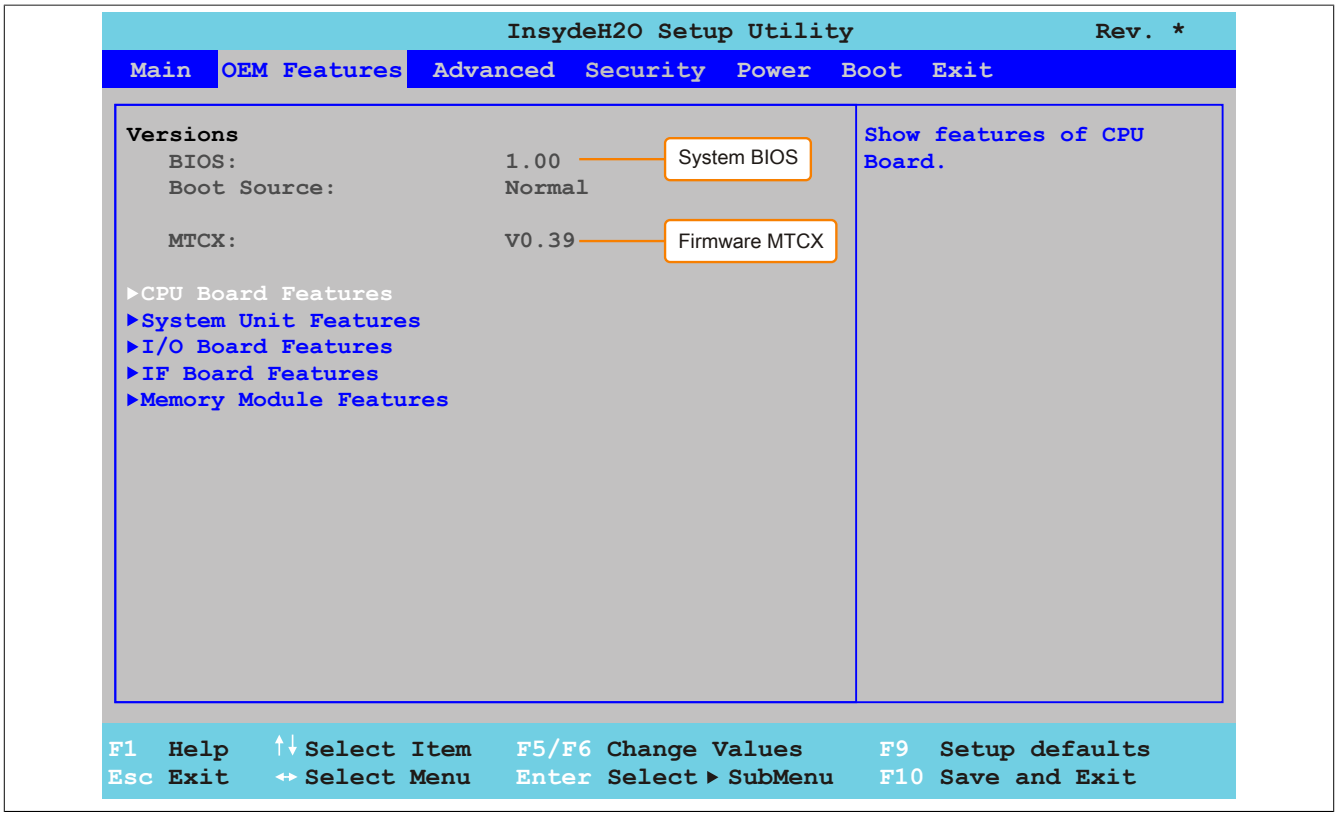


Image 70: BIOS and MTCX software versions

Information about the BIOS and firmware versions can also be found in the Control Center (Start->Control Panel->Control Center->Versions).

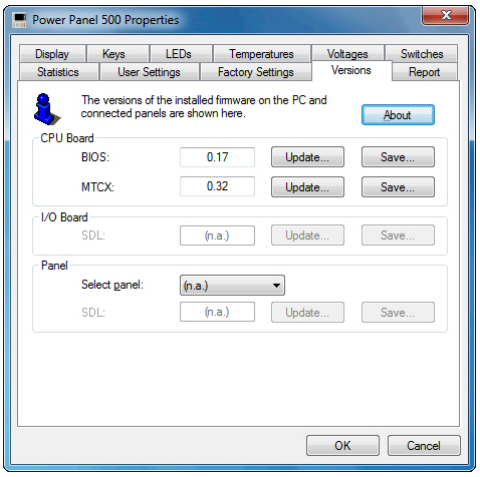


Image 71: BIOS and MTCX software versions - Control Center

2.1.2 Using the Control Center

1. Download the .ZIP file from the B&R website (www.br-automation.com).
2. Open the **Control Center** in the Control Panel.
3. Then select the **Versions** tab.
4. Click on **Update** under **CPU board(BIOS)**. This brings up the "Open" dialog box.
5. Enter the name of the BIOS file or select the file under **Filename**.
6. Click on **open**. This brings up the "Open" dialog box.

The transfer can be canceled by clicking on **Cancel**. Cancel is disabled when the flash memory is being written to.

Deleting the data in flash memory can take several seconds depending on the memory block being used. The progress indicator is not updated during this time.

Information:

The system must be restarted for the BIOS to take effect and for the updated version to be displayed. The user is prompted to restart the system when closing the Control Center.

Information:

For more information about saving and updating the BIOS, please refer to the help files for the Control Center.

2.2 Firmware upgrade

Current "PP500/APC510/APC511 Firmware Upgrade" software can be downloaded directly from the service area of the B&R website (www.br-automation.com).

2.2.1 Procedure

1. Download the .ZIP file from the B&R website (www.br-automation.com).
2. Open the **Control Center** in the Control Panel.
3. Then select the **Versions** tab.
4. Click on **Update** under **CPU board(MTCX)**. This brings up the "Open" dialog box.
5. Enter the name of the firmware file or select the file under **Filename**.
6. Click on **open**. This brings up the "Open" dialog box.

The transfer can be canceled by clicking on **Cancel**. **Cancel** is disabled when the flash memory is being written to.

> **Warning!**
>
> **Do not press any panel keys while the firmware is being transferred! This can disrupt the procedure.**

Deleting the data in flash memory can take several seconds depending on the memory block being used. The progress indicator is not updated during this time.

> **Information:**
>
> **Power to the PC must be shut off and turned back on for the new firmware to become effective and for the updated version to be displayed. The user is prompted to do this when closing the Control Center.**

> **Information:**
>
> **For more information about saving and updating the firmware, please refer to the help files for the Control Center.**

2.3 Upgrade problems

Potential upgrade problems are listed in the Readme.txt files on the upgrade disks.

3 Windows XP Professional

3.1 Order data

Model number	Short description	Image
	Windows XP Professional	
5SWWXP.0600-ENG	Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a B&R device.	
5SWWXP.0600-GER	Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a device.	
5SWWXP.0600-MUL	Microsoft OEM Windows XP Professional Service Pack 3, CD, multilanguage. Only available with a B&R device.	
	Required accessories	
	CompactFlash	
5CFCRD.016G-06	CompactFlash 16 GB B&R (SLC)	
5CFCRD.4096-03	CompactFlash 4 GB Western Digital (SLC)	
5CFCRD.4096-06	CompactFlash 4 GB B&R (SLC)	
5CFCRD.8192-03	CompactFlash 8 GB Western Digital (SLC)	
5CFCRD.8192-06	CompactFlash 8 GB B&R (SLC)	

Table 148: 5SWWXP.0600-ENG, 5SWWXP.0600-GER, 5SWWXP.0600-MUL - Order data

3.2 Overview

Model number	Edition	Target system	Chipset	Service Pack	Language	Preinstalled	Memory required on CF/ HDD	Minimum amount of RAM
5SWWXP.0600-ENG	Professional	APC510 APC511 APC620 APC810 APC820 PPC700 PPC725 PPC800 PP500	945GME GM45 US15W	SP3	English	Optional	≤ 2.1 GB	128 MB
5SWWXP.0600-GER	Professional	APC510 APC511 APC620 APC810 APC820 PPC700 PPC725 PPC800 PP500	945GME GM45 US15W	SP3	German	Optional	≤ 2.1 GB	128 MB
5SWWXP.0600-MUL	Professional	APC510 APC511 APC620 APC810 APC820 PPC700 PPC725 PPC800 PP500	945GME GM45 US15W	SP3	Multilanguage	Optional	≤ 2.1 GB	128 MB

3.3 Installation

Upon request, B&R can pre-install the required Windows XP Professional version on the desired mass storage device (e.g. CompactFlash card, etc.). All of the drivers required for operation (graphics, network, etc.) are also installed when doing so.

3.4 Drivers

The latest drivers for all approved operating systems can be found in the Download area (Service / Material-related downloads - BIOS / Drivers / Updates) of the B&R website (www.br-automation.com).

Information:

Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.

4 Windows 7

4.1 General information

Windows® 7 offers a wealth of innovative features and performance improvements. Faster switching to power saving mode, quicker restores, less memory usage and high-speed detection of USB devices are just a few of the advantages provided by Windows® 7. Both German and English are available in Windows® 7 Professional, while Windows® 7 Ultimate supports up to 35 different languages. Product activation is not necessary on B&R PCs, which is a huge advantage for simple logistical procedures relating to machine automation.

All of the Windows® operating systems offered by B&R are from the Microsoft Embedded division. This guarantees much longer availability, especially when compared to products offered on the consumer market.

4.2 Order data

Model number	Short description	Image
	Windows 7	
5SWWI7.0100-ENG	Microsoft OEM Windows 7 Professional 32-bit, DVD, English. Only available with a new device.	
5SWWI7.0100-GER	Microsoft OEM Windows 7 Professional 32-bit, DVD, German. Only available with a new device.	
5SWWI7.0300-MUL	Microsoft OEM Windows 7 Ultimate 32-bit, DVD, multilaguange. Only available with a new device.	

Table 149: 5SWWI7.0100-ENG, 5SWWI7.0100-GER, 5SWWI7.0300-MUL - Order data

4.3 Overview

Model number	Edition	Target system	Chipset	Architectures	Language	Preinstalled	Minimum size of CF/HDD	Minimum amount of RAM
5SWWI7.0100-ENG	Professional	APC510 APC511 APC810 PPC800 PP500	945GME GM45 US15W	32-bit	English	Optional	16 GB	1 GB
5SWWI7.0100-GER	Professional	APC510 APC511 APC810 PPC800 PP500	945GME GM45 US15W	32-bit	German	Optional	16 GB	1 GB
5SWWI7.0300-MUL	Ultimate	APC510 APC511 APC810 PPC800 PP500	945GME GM45 US15W	32-bit	Multilanguage	Optional	16 GB	1 GB

4.4 Installation

Upon request, B&R can pre-install the required Windows 7 version on the desired mass storage device (e.g. CompactFlash card, etc.). All of the drivers required for operation (graphics, network, etc.) are also installed when doing so.

4.5 Drivers

The latest drivers for all approved operating systems can be found in the Download area (Service / Material-related downloads - BIOS / Drivers / Updates) of the B&R website (www.br-automation.com).

Information:

Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.

4.6 Special considerations, limitations

- Windows 7 does not contain a Beep.sys file, which means that audible signal is no longer played (i.e. when touching a key or button).
- Windows 7 system classification is not currently supported (does not apply to PP500, APC510 and APC511 devices).

5 Windows Embedded Standard 2009

5.1 General information

Windows® Embedded Standard 2009 is the modular version of Windows® XP Professional. It's used if XP applications require a smaller operating system size to run. Together with CompactFlash memory, Windows® Embedded Standard 2009 makes it possible to use the Microsoft desktop operating system in rough environmental conditions. In addition to the familiar features included in Windows® XP Professional, Windows® Embedded Standard 2009 has been improved with regard to dependability by adding a write filter for individual memory partitions. By protecting individual partitions such as the boot partition, the PC system can be started without any problems, even after an unexpected power failure. B&R offers complete images for industrial PCs, Power Panel and Mobile Panel devices to make the transition to Windows® Embedded Standard 2009 as easy as possible. In addition to Windows® Embedded Standard 2009, the standard Windows® XP Professional operating system is also available in English, German and multilingual.

Windows® Embedded Standard 2009 is based on the same binary files as Windows® XP Professional with Service Pack 3 and is optimally tailored to the hardware being used. In other words, only the functions and modules required by the respective device are included. Windows® Embedded Standard 2009 is also based on the same reliable code as Windows® XP Professional with SP3. It provides industry with leading reliability, improvements in security and performance, and the latest technology for Web browsing and extensive device support.

5.2 Order data

Model number	Short description	Image
	Windows Embedded Standard 7	
5SWWI7.0537-ENG	Microsoft OEM Windows Embedded Standard 7 32-bit, English; for APC510; please order CompactFlash separately (minimum 8 GB).	
	Required accessories	
	CompactFlash	
5CFCRD.016G-06	CompactFlash 16 GB B&R (SLC)	
5CFCRD.8192-06	CompactFlash 8 GB B&R (SLC)	

Table 150: 5SWWI7.0537-ENG - Order data

5.3 Overview

Model number	Edition	Target system	Chipset	Architectures	Language	Preinstalled	Minimum size of CF/HDD	Minimum amount of RAM
5SWWI7.0537-ENG	Embedded	APC510	US15W	32-bit	English	Optional	8 GB	1 GB

5.4 Features with WES2009 (Windows Embedded Standard 2009)

The feature list shows the most important device functions in Windows Embedded Standard 2009.

Function	Present
Enhanced Write Filter (EWF)	✓
File Based Write Filter (FBWF)	✓
Page file	Configurable
Administrator account	✓
User account	Configurable
Explorer shell	✓
Registry filter	✓
Internet Explorer 8.0	✓
Internet information service (IIS)	-
Terminal service	✓
Windows Firewall	✓
MSN Explorer	-
Outlook Express	-
Administrative Tools	✓
Remote Desktop	✓
Remote Assistance	-
.NET Framework	-
ASP.NET	-
OpenGL support	✓
Local Network Bridge	✓
Codepages/User Locale/Keyboard	✓
Disk Management Service	✓
Windows Installer Service	✓

Table 151: Device functions in Windows Embedded Standard 2009

Function	Present
Class Installer	✓
CoDevice Installer	✓
Media Player 6.4	✓
DirectX 9.0c	✓
Accessories	✓
Number of fonts	89

Table 151: Device functions in Windows Embedded Standard 2009

5.5 Touch screen driver

The touch screen driver is installed automatically during Windows Embedded Standard 2009 setup. If an Automation Panel 800/900 is connected later on, the additional touch screen interface needs to be selected in the touch screen settings in the Windows Control Panel. When doing so, be sure that the Enhanced Write Filter (EWF) or File Based Write Filter (FBWF) are not enabled.

Information:

Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.

5.6 Installation

Upon request, Windows Embedded Standard 2009 can be preinstalled at B&R Austria on a suitable CompactFlash card (min. 1 GB). The system is then automatically configured when it is switched on for the first time. This procedure takes approximately 10 minutes, and the device will be rebooted a number of times.

5.7 Drivers

All drivers required for operation are preinstalled on the operating system. If an older version of the driver is still being used, the latest version can be downloaded from the B&R website (www.br-automation.com) and installed over it. Be sure to check whether the "Enhanced Write Filter (EWF)" is enabled.

5.7.1 Touch screen driver

The touch screen driver is installed automatically during Windows Embedded Standard 2009 setup. If an Automation Panel 800/900 is connected later on, the additional touch screen interface needs to be selected in the touch screen settings in the Windows Control Panel. When doing so, be sure that the Enhanced Write Filter (EWF) or File Based Write Filter (FBWF) are not enabled.

Information:

Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.

6 Windows Embedded Standard 7

6.1 General information

The successor to Windows® XP Embedded has been given the name Windows® Embedded Standard 7. As with previous versions, this embedded operating system offers full system support of Automation PC 810, Panel PC 800 and Power Panel 500 devices. In addition to brand new features that are also included in Windows® 7 Professional, Windows® Embedded Standard 7 includes embedded components such as Enhanced Write Filter, File-Based Write Filter, Registry Filter and USB Boot. Windows® Embedded Standard 7 is available in two different versions. The main difference between them has to do with multilingual support. Windows® Embedded Standard 7 is only available in a single language, whereas Windows® Embedded Standard 7 Premium supports the installation of several languages simultaneously.

With Windows® Embedded Standard 7, Microsoft has made substantial improvements in the area of security. The AppLocker program, available in the premium version, can prevent the execution of unknown or potentially unwanted applications that should be installed over a network or from drives that are directly connected. A tiered approach allows the differentiation between scripts (.ps1, .bat, .cmd, .vbs and .js), installer files (.msi, .msp) and libraries (.dll, .ocx). AppLocker can also be configured to record undesired activity and display it in the Event Viewer. Windows® Embedded Standard 7 is available in both 32-bit and 64-bit versions. This also provides support for challenging 64-bit applications.

6.2 Order data

Model number	Short description	Image
	Windows Embedded Standard 7	
5SWWI7.0537-ENG	Microsoft OEM Windows Embedded Standard 7 32-bit, English; for APC510; please order CompactFlash separately (minimum 8 GB).	
5SWWI7.0737-MUL	Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, multilanguage; for APC510; please order CompactFlash separately (minimum 8 GB).	
	Required accessories	
	CompactFlash	
5CFCRD.016G-06	CompactFlash 16 GB B&R (SLC)	
5CFCRD.8192-06	CompactFlash 8 GB B&R (SLC)	
	Optional accessories	
	Windows Embedded Standard 7	
5SWWI7.0900-MUL	WES7P 32bit Language Pack DVD	

Table 152: 5SWWI7.0537-ENG, 5SWWI7.0737-MUL - Order data

6.3 Overview

Model number	Edition	Target system	Chipset	Architectures	Language	Preinstalled	Minimum size of CF/HDD	Minimum amount of RAM
5SWWI7.0537-ENG	Embedded	APC510	US15W	32-bit	English	Optional	8 GB	1 GB
5SWWI7.0737-MUL	Premium	APC510	US15W	32-bit	Multilanguage	Optional	8 GB	1 GB

6.4 Features with WES7 (Windows Embedded Standard 7)

The feature list displays the essential device functions and differences in Windows Embedded Standard 7 and Windows Embedded Standard 7 Premium.

Function	Windows Embedded Standard 7	Windows Embedded Standard 7 Premium
Enhanced Write Filter (EWF)	✓	✓
File Based Write Filter (FBWF)	✓	✓
Administrator account	✓	✓
User account	Configurable	Configurable
Windows Explorer Shell	✓	✓
Registry filter	✓	✓
Internet Explorer 8.0	✓	✓
Internet Information Service (IIS) 7.0	✓	✓
AntiMalware (Windows Defender)	-	✓
Add-ons (Snipping tool, Sticky Notes)	-	✓
Windows Firewall	✓	✓
.NET Framework 3.5	✓	✓
Remote Desktop Protocol 7.0	✓	✓
File Compression Utility	✓	✓
Windows Installer Service	✓	✓
Windows XP Mode	-	-
Media Player 12	✓	✓
DirectX	✓	✓
Multilingual User Interface Packs in the same image	-	✓
International Components and Language Services	✓	✓
Language Pack Setup	✓	✓
Windows Update	Configurable	Configurable
Windows PowerShell 2.0	✓	✓
BitLocker	-	✓
Applocker	-	✓
Tablet PC Support	-	✓
Windows Touch	-	✓
Boot from USB Stick	✓	✓
Accessories	✓	✓
Page file	Configurable	Configurable
Number of fonts	134	134

Table 153: Device functions in Windows Embedded Standard 7

6.5 Installation

Upon request, Windows Embedded Standard 7 can be preinstalled at B&R Austria on a suitable CompactFlash card (min. 8 GB). The system is then automatically configured when it is switched on for the first time. This procedure takes approximately 30 minutes, and the device will be rebooted a number of times.

6.6 Drivers

All drivers required for operation are preinstalled on the operating system. If an older version of the driver is still being used, the latest version can be downloaded from the B&R website (www.br-automation.com) and installed over it. Be sure to check whether the Enhanced Write Filter (EWF) is enabled.

6.6.1 Touch screen driver

A touch screen driver will be automatically installed if a touch controller is detected during the Windows Embedded Standard 7 setup. If a touch controller is not detected during Windows Embedded Standard 7 setup, or if an Automation Panel 800/900 is connected later on, the touch screen driver needs to be installed or the additional touch screen interface needs to be selected in the touch screen settings in the Windows Control Panel. The driver is available in the Download area of the B&R website (www.br-automation.com). When doing so, be sure that the Enhanced Write Filter (EWF) or File Based Write Filter (FBWF) are not enabled.

Information:

Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.

7 Windows CE

7.1 General information

B&R Windows CE is an operating system which is optimally tailored to B&R's devices. It includes only the functions and modules which are required by each device. This makes this operating system extremely robust and stable. A further advantage of B&R Windows CE compared to other operating systems are the low licensing costs.

7.2 Order data

Model number	Short description	Image
	Windows CE 6.0	
5SWWCE.0837-ENG	Microsoft OEM Windows CE 6.0 Professional, English; for APC510; please order CompactFlash separately (minimum 128 MB).	
	Required accessories	
	CompactFlash	
5CFCRD.0128-03	CompactFlash 128 MB Western Digital (SLC)	
5CFCRD.016G-06	CompactFlash 16 GB B&R (SLC)	
5CFCRD.0256-03	CompactFlash 256 MB Western Digital (SLC)	
5CFCRD.0512-03	CompactFlash 512 MB Western Digital (SLC)	
5CFCRD.0512-06	CompactFlash 512 MB B&R (SLC)	
5CFCRD.1024-03	CompactFlash 1 GB Western Digital (SLC)	
5CFCRD.1024-06	CompactFlash 1 GB B&R (SLC)	
5CFCRD.2048-03	CompactFlash 2 GB Western Digital (SLC)	
5CFCRD.2048-06	CompactFlash 2 GB B&R (SLC)	
5CFCRD.4096-03	CompactFlash 4 GB Western Digital (SLC)	
5CFCRD.4096-06	CompactFlash 4 GB B&R (SLC)	
5CFCRD.8192-03	CompactFlash 8 GB Western Digital (SLC)	
5CFCRD.8192-06	CompactFlash 8 GB B&R (SLC)	

Table 154: 5SWWCE.0837-ENG - Order data

7.3 Overview

Model number	Type	Target system	Chipset	Language	Preinstalled	Minimum size of CF/HDD	Minimum amount of RAM
5SWWCE.0837-ENG	WinCE6.0 Pro APC510 US15W	APC510	US15W	English	Yes	128 MB	128 MB

7.4 Windows CE 6.0 features

Detailed information about Windows CE for B&R devices is available in the Downloads area of the B&R website (www.br-automation.com).

Features	Windows CE 6.0
Supported screen resolutions	WVGA (TFT), VGA (TFT), SVGA (TFT), XGA (TFT)
Chipset	Intel US15W
Color depth	16-bit or 65,536 colors[1)]
Graphics card driver	Intel(R) embedded graphics driver
Main memory	Automatic detection and use of up to 512 MB RAM
Boot time / Startup time	Approx. 25 seconds
Screen rotation	Not supported
Web browser	Internet Explorer
.NET	Compact Framework
Image size	Approx. 40 MB[2)], decompressed
Custom keys	Supported
PVI	Supported
Automation Device Interface	Supported
Remote Desktop Protocol for thin clients	Supported
B&R VNC Viewer	Supported
B&R Task Manager	Supported
B&R Picture Viewer	Supported
Compatible with zenOn	Yes
Compatible with Wonderware	No
Serial interfaces for any use	2
DirectX	No
Audio ports	"Line OUT" and "MIC" are supported. "Line IN" is not supported.

Table 155: Windows CE 6.0 features

1) The color depth depends on the display used.
2) Use the function "Compress Windows CE Image" in the B&R Embedded OS Installer to reduce the image size.

7.5 Requirements

The device must fulfill the following criteria to be able run the Windows CE operating system.

- At least 128 MB main memory
- At least one 128 MB CompactFlash card (size should be specified when ordered)

7.6 Installation

Windows CE is usually preinstalled at the B&R plant.

7.7 B&R Embedded OS Installer

The B&R Embedded OS Installer allows you to install existing B&R Windows CE images. The 4 files (NK.BIN, BLDR, LOGOXRES.BMP, and LOGOQVGA.BMP) must be provided from an already functioning B&R Windows CE installation.

The B&R Embedded OS Installer is available in the Downloads section of the B&R website (www.br-automation.com). Further information is available in the online help for the B&R Embedded OS Installer.

8 Automation Runtime

8.1 General information

A integral component of Automation Studio is the real-time operating system. This real-time operating system makes up the software kernel which allows applications to run on a target system.

- Guaranteed highest possible performance for the hardware being used
- Runs on all B&R target systems
- Makes the application hardware-independent
- Applications can be easily ported between B&R target systems
- Cyclic runtime system guarantees deterministic behavior
- Multitasking according to deterministic runtime rules
- Configure priorities, time classes, and jitter tolerance
- Up to eight different time classes with any subprograms
- Guaranteed response to time and jitter tolerance violations
- Exception handling
- Configurable jitter tolerance in all task classes
- Supports all relevant programming language such as IEC 61131-3 and ANSI C
- Extensive function library conforming to IEC 61131-3 as well as the expanded Automation library
- Access to all networks and bus systems via function calls or the Automation Studio configuration

B&R Automation Runtime is fully embedded in the corresponding target system (this is the hardware where Automation Runtime is installed). It allows application programs to access I/O systems (e.g. via fieldbus) and other devices (interfaces, networks, etc.).

8.2 Order data

Model number	Short description	Image
	Automation Runtime	
1A4600.10-5	B&R Automation Runtime ARwin, incl. License Label	
1A4601.06-5	B&R Automation Runtime ARemb, incl. License Label	
1A4601.06-T	B&R Automation Runtime ARemb Terminal, incl. License Label	

Table 156: 1A4600.10-5, 1A4601.06-5, 1A4601.06-T - Order data

8.3 Automation Runtime Windows (ARwin)

The system is supported by ARwin with an AS 3.0.90 / AR 4.00 upgrade.

8.4 Automation Runtime Embedded (ARemb)

The system is supported by ARemb with an AS 3.0.90 / AR 4.00 upgrade.

9 B&R Automation Device Interface (ADI) - Control Center

The ADI (Automation Device Interface) enables access to specific functions of B&R devices. Settings for this device can be read and edited using the B&R Control Center applet in the control panel.

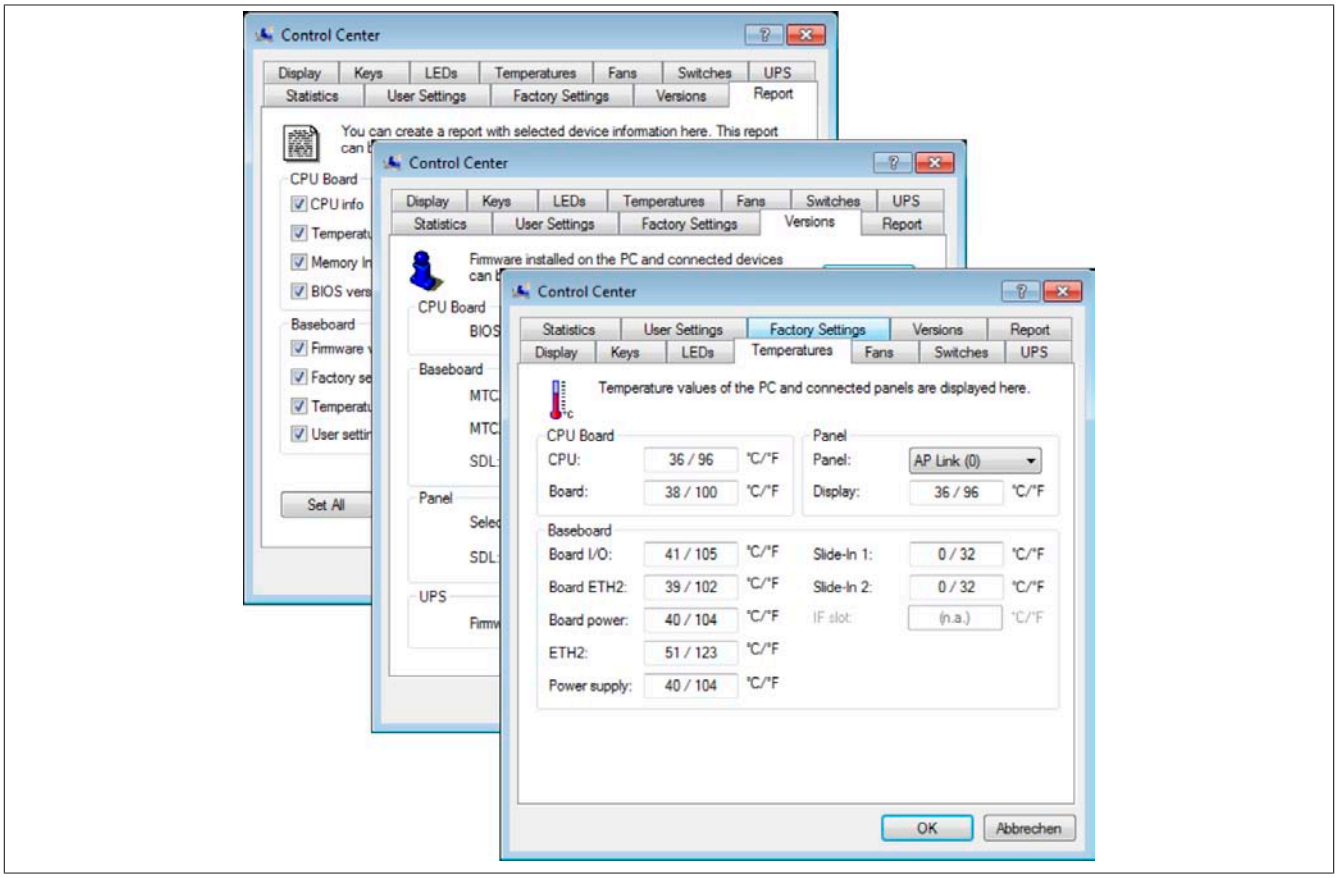


Image 72: ADI Control Center screenshots - Examples (symbol photo)

Information:

The displayed temperature and voltage values (e.g. CPU temperature, core voltage, battery voltage) on the corresponding ADI page represent uncalibrated information values. These cannot be used to draw any conclusions about any hardware alarms or error conditions. The hardware components used have automatic diagnostics functions that can be applied in the event of error.

9.1 Functions

Information:

The functions provided by the Automation Device Interface (ADI) - Control Center vary according to device series.

- Changing display-specific parameters
- Reading device-specific keys
- Updating the key configuration
- Activating device-specific LEDs on a membrane keypad
- Read or calibrate the entry devices (e.g. key switch, handwheel, joystick, potentiometer)
- Reading temperatures, fan speeds, statistical data and switch settings
- Read the operating hours (power on hours)
- Reading user and factory settings
- Reading software versions
- Updating and securing BIOS and firmware
- Creating reports for the current system (support assistance)
- Setting the SDL equalizer value for the SDL cable adjustment
- Changing the User Serial ID

Supports the following systems:

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Panel PC 300
- Panel PC 700
- Panel PC 725
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500
- Mobile Panel 40/50
- Mobile Panel 100/200
- Connected Automation Panel 800
- Connected Automation Panel 900

9.2 Installation

A detailed description of the Control Center can be found in the integrated online help. The B&R Automation Device Interface (ADI) driver (also contains Control Center) is available in the Downloads section of the B&R website (www.br-automation.com).

1. Download and unzip the ZIP archive
2. Close all applications
3. Run the Setup.exe file (e.g. double-click on it in Explorer).

Information:

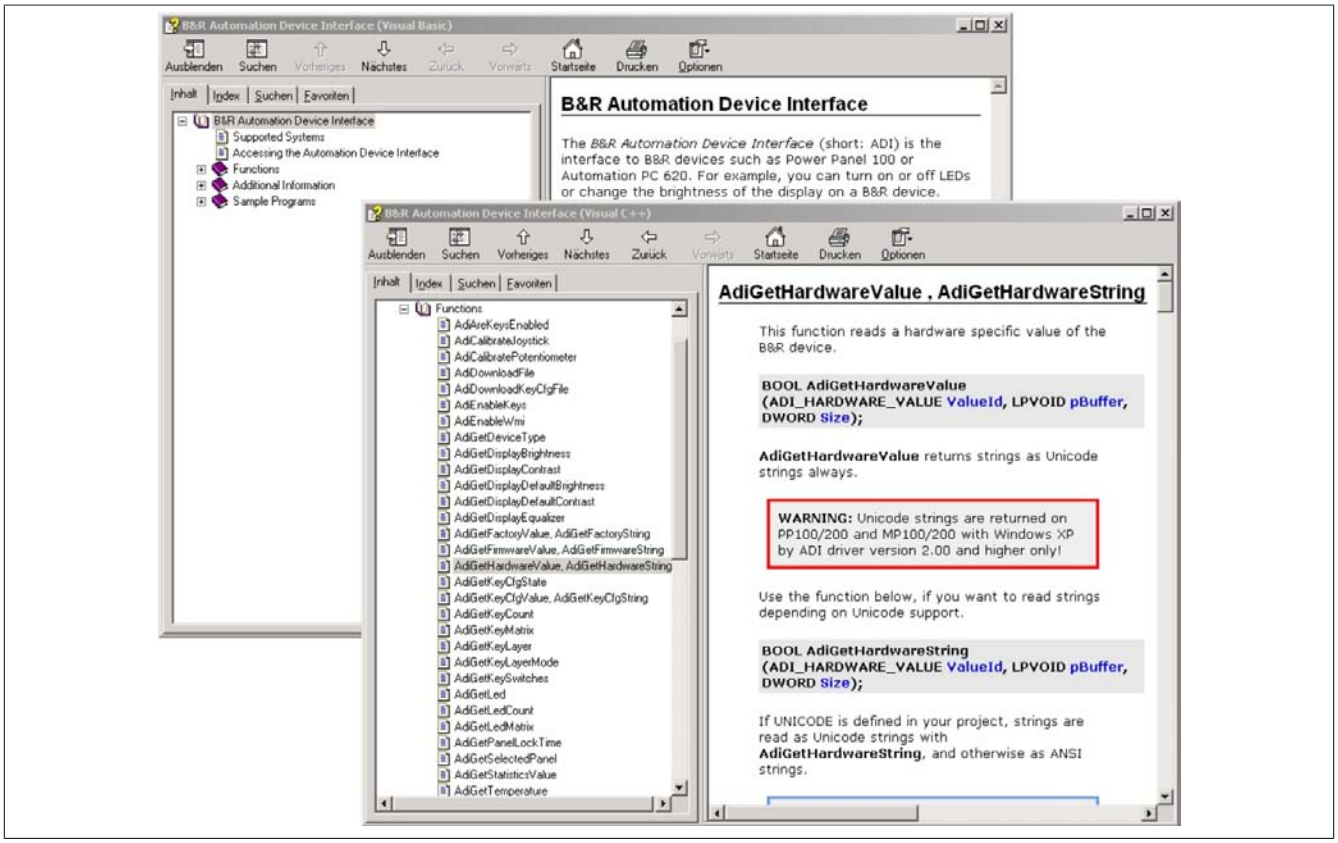
The ADI driver is already included in the B&R images of embedded operating systems.

If a more current ADI driver version exists (see the Downloads area of the B&R website), it can be installed later. A potentially activated "Enhanced Write Filter (EWF)" must be taken into consideration when installing.

10 B&R Automation Device Interface (ADI) Development Kit

This software can be used to activate functions in the B&R Automation Device Interface (ADI) from Windows applications, which were created using a development environment such as one of the following.

- Microsoft Visual C++ 6.0
- Microsoft Visual Basic 6.0
- Microsoft Embedded Visual C++ 4.0
- Microsoft Visual Studio 2005 (or newer)



Features:

- One Microsoft Visual Basic module with declarations for the ADI functions.
- Header files and Import libraries for Microsoft Visual C++
- Help files for Visual Basic and Visual C++.
- Sample projects for Visual Basic and Visual C++.
- ADI DLL (for testing the applications, if no ADI drive is installed).

Supports the following systems (Version 3.10 and higher):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500
- Mobile Panel 40/50
- Mobile Panel 100/200

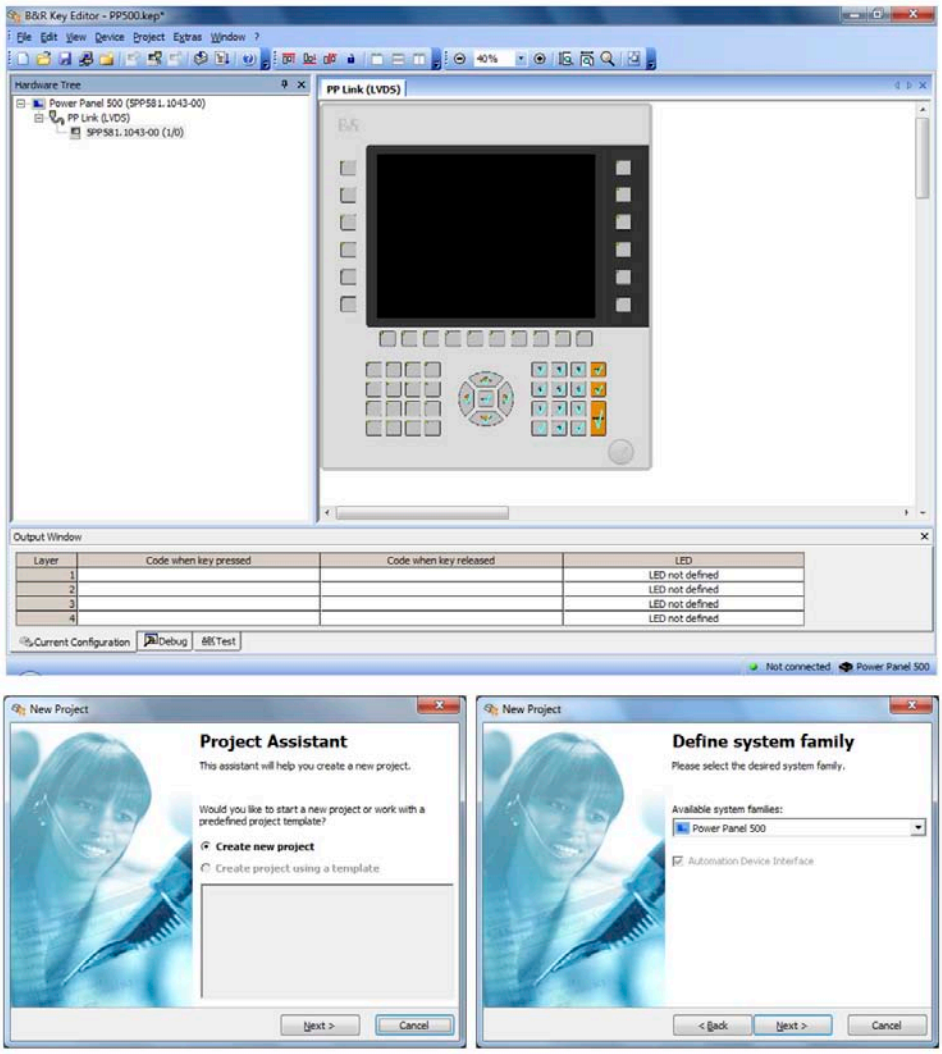
The ADI driver suitable for the device must be installed on the stated product series. The ADI driver is already included in the B&R images of embedded operating systems.

A detailed description of using the ADI functions can be found in the online help system.

The B&R Automation Device Interface (ADI) Development Kit is available in the Download area of the B&R website (www.br-automation.com).

11 B&R Key Editor

On display units, it is often necessary to adjust the function keys and LEDs for the application software being used. The B&R Key Editor makes it quick and easy to adapt the application to a unique configuration.



Features:

- Configuration of normal keys like on a keyboard (A, B, C, etc.)
- Keyboard shortcuts (CTRL+C, SHIFT+DEL, etc.) using only one key
- Special key functions (change brightness, etc.)
- Assign functions to LEDs (HDD access, power, etc.)
- 4 assignments per key possible (using layer function)
- Configuration of panel locking time when multiple Automation Panel 900 devices are connected to Automation PC and Panel PC devices

Supports the following systems (Version 3.20):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation Panel 800
- Automation Panel 900
- IPC2000, IPC2001, IPC2002
- IPC5000, IPC5600
- IPC5000C, IPC5600C

- Mobile Panel 40/50
- Mobile Panel 100/200
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500

A detailed guide for configuring keys and LEDs can be found in the B&R Key Editor's Online Help documentation. The B&R Key Editor is available in the Downloads section of the B&R website (www.br-automation.com). It can also be found on the B&R HMI Drivers & Utilities DVD (model number 5SWHMI.0000-00).

Chapter 5 • Accessories

The following accessories have passed B&R's functional testing and are approved for use with this device. Nevertheless, it is important to observe any limitations that may apply to the complete device when operated with different components. When operating the complete device, it is the specifications for the individual components that must be adhered to.

All components listed in this manual have been subjected to extensive system and compatibility testing and are approved for use. B&R can make no guarantee regarding the functionality of non-approved accessories.

1 Replacement CMOS batteries

1.1 0AC201.91 / 4A0006.00-000

1.1.1 General information

This lithium battery is needed to back BIOS CMOS data and the real-time clock (RTC).

The battery is subject to wear and must be replaced when the battery power ("Bad" status) is insufficient.

1.1.2 Order data

Model number	Short description	Image
	Batteries	
0AC201.91	Lithium batteries 4 pieces, 3 V / 950 mAh button cell Hereby we declare that the Lithium cells contained in this shipment qualify as „partly regulated“. Handle with care. If the package is damaged, inspect cells, repack intact cells and protect cells against short circuits. For emergency information, call RENATA SA at + 41 61 319 28 27	
4A0006.00-000	Lithium battery, 3 V / 950 mAh, button cell	

Table 157: 0AC201.91, 4A0006.00-000 - Order data

1.1.3 Technical data

Warning!

Replace battery with Renata, type CR2477N only. Use of another battery may present a risk of fire or explosion.

Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

Information:

The following characteristics, features and limit values only apply to this accesory and can deviate from those specified for the entire device.

Product ID	0AC201.91	4A0006.00-000
General information		
Storage time	Max. 3 years at 30°C	
Electrical properties		
Capacity	950 mAh	
Self discharging	<1% per year (at 23°C)	
Voltage range	3V	
Environmental conditions		
Temperature Storage	-20 to 60°C	
Relative humidity Operation Storage Transport	0 to 95% 0 to 95% 0 to 95%	

Table 158: 0AC201.91, 4A0006.00-000 - Technical data

2 Power connectors

2.1 0TB103.9x

2.1.1 General information

The single row 3-pin terminal block TB103 is used to connect the supply voltage.

2.1.2 Order data

Model number	Short description	Image
	Terminal blocks	
0TB103.9	Connector, 24 VDC, 3-pin female, screw clamps 3.31 mm², protected against vibration by the screw flange	
0TB103.91	Connector, 24 VDC, 3-pin female, cage clamps 3.31 mm², protected against vibration by the screw flange	

Table 159: 0TB103.9, 0TB103.91 - Order data

2.1.3 Technical data

Information:

The following characteristics, features and limit values only apply to this accesory and can deviate from those specified for the entire device.

Product ID	0TB103.9	0TB103.91
Terminal block		
Note	Protected against vibration by the screw flange Rated values according to UL	
Number of pins	3 (female)	
Type of terminal	Screw clamps	Cage clamps[2)]
Cable type	Copper wires only (no aluminum wires!)	
Distance between contacts	5.08 mm	
Connection cross section		
AWG wire	26 to 12 AWG	
Wire tip sleeves with plastic covering	0.20 to 1.50 mm²	
Solid wire line	0.20 to 2.50 mm²	
Fine wire line	0.20 to 1.50 mm²	0.20 to 2.50 mm²
With wire tip sleeves	0.20 to 1.50 mm²	
Mounting torque	0.4 Nm	-
Electrical properties		
Rated voltage	300 V	
Rated current[1)]	10 A / contact	
Contact resistance	≤ 5 mΩ	

Table 160: 0TB103.9, 0TB103.91 - Technical data

1) Please take the respective limit data for the I/O modules into consideration!
2) Cage clamp terminal blocks cannot be strung together.

3 Interface board connection

3.1 0TB1208.3100

3.1.1 General information

The 2-row 8-pin terminal block TB1208 is used to connect to various Power Panel 500 interface boards.

3.1.2 Order data

Model number	Short description	Image
	Terminal blocks	
0TB1208.3100	Connector, 8-pin, cage clamp, 1 mm², protected against vibration by the screw flange.	

Table 161: 0TB1208.3100 - Order data

3.1.3 Technical data

Product ID	0TB1208.3100
Terminal block	
Note	Rated values according to UL
Number of pins	8 (female)
Type of terminal	Tension spring connection
Cable type	Copper wires only (no aluminum wires!)
Distance between contacts	3.5 mm
Connection cross section	
AWG wire	28 to 18 AWG
Wire tip sleeves with plastic covering	0.13 to 0.34 mm²
Solid wire line	0.20 to 1 mm²
Fine wire line	0.20 to 1 mm²
With wire tip sleeves	0.13 to 0.34 mm²
Electrical properties	
Rated voltage	300 V
Rated current[1)]	10 A / contact

Table 162: 0TB1208.3100 - Technical data

1) Please take the respective limit data for the I/O modules into consideration!

4 CompactFlash cards

4.1 General information

CompactFlash cards are easy-to-exchange storage media. Due to their robustness against environmental influences (e.g. temperature, shock, vibration, etc.), CompactFlash cards are ideal for use as storage media in industrial environments.

4.2 Basic information

In order to be suited for use in industrial automation, CompactFlash cards must be highly reliable. To make this possible, the following is very important:

- Flash technology used
- Efficient algorithm for maximizing the lifespan
- Good mechanisms for detecting and fixing errors in the flash memory

4.2.1 Flash technology

Currently, CompactFlash cards are available with MLC (Multi Level Cell) and SLC (Single Level Cell) flash blocks. SLC flash memory has a lifespan that is 10 times longer than MLC, which is why only CompactFlash cards with SLC flash blocks are suited for industrial applications.

4.2.2 Wear leveling

Wear leveling is an algorithm that can be used to maximize the lifespan of a CompactFlash card. There are three different algorithms:

- No wear leveling
- Dynamic wear leveling
- Static wear leveling

The basic idea behind wear leveling is to distribute data over a broad area of blocks or cells on the data carrier so that the same areas don't have to be cleared and reprogrammed over and over again.

No wear leveling

The earliest CompactFlash cards didn't have an algorithm for maximizing the lifespan. The lifespan of a CompactFlash card was determined only by the guaranteed lifespan of the flash blocks.

Dynamic wear leveling

Dynamic wear leveling makes it possible to utilize unused flash blocks when writing to a file.
If the data carrier is 80% full with files, then only 20% can be used for wear leveling.
The lifespan of the CompactFlash card is therefore dependent on the amount of unused flash blocks.

Static wear leveling

Static wear leveling also monitors which data is rarely changed. From time to time, the controller then moves this data to blocks that have already been frequently programmed in order to prevent further wear on those cells.

4.2.3 ECC error correction

Bit errors can be caused by inactivity or when a certain cell is operated. Error Correction Coding (ECC) implemented via hardware or software can detect and correct many errors of this type.

4.2.4 S.M.A.R.T. support

Self-Monitoring, Analysis and Reporting Technology (S.M.A.R.T. for short) is an industry standard for mass storage devices that has been introduced to monitor important parameters and quickly detect imminent failures. Critical performance and calibration data is monitored and stored in order to help predict the probability of errors.

4.2.5 Maximum reliability

CompactFlash cards used by B&R use SLC flash blocks and static wear leveling together with a powerful ECC algorithm to provide maximum reliability.

4.3 5CFCRD.xxxx-06

4.3.1 General information

Information:

B&R CompactFlash cards 5CFCRD.xxxx-06 and CompactFlash cards from a different manufacturer cannot be used in the same system at the same time. Due to differences in technology (older vs. newer technologies), problems can occur during system startup that are caused by the different boot times.

see "Known problems / issues" on page 158

Information:

The 5CFCRD.xxxx-06 CompactFlash cards are supported on B&R devices with WinCE version ≥ 6.0 or higher.

4.3.2 Order data

Model number	Short description	Image
	CompactFlash	
5CFCRD.0512-06	CompactFlash 512 MB B&R (SLC)	
5CFCRD.1024-06	CompactFlash 1 GB B&R (SLC)	
5CFCRD.2048-06	CompactFlash 2 GB B&R (SLC)	
5CFCRD.4096-06	CompactFlash 4 GB B&R (SLC)	
5CFCRD.8192-06	CompactFlash 8 GB B&R (SLC)	
5CFCRD.016G-06	CompactFlash 16 GB B&R (SLC)	

Table 163: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06 - Order data

4.3.3 Technical data

Caution!

A sudden loss of power can cause data to be lost! In very rare cases, the mass storage device may also become damaged.

To prevent damage and loss of data, it is recommended to use a UPS device.

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate those specified for the complete device. For the complete device where this accessory is installed, refer to the data provided specifically for the complete device.

Product ID	5CFCRD.0512-06	5CFCRD.1024-06	5CFCRD.2048-06	5CFCRD.4096-06	5CFCRD.8192-06	5CFCRD.016G-06
General information						
Capacity	512 MB	1 GB	2 GB	4 GB	8 GB	16 GB
Data retention	10 years					
Data reliability	< 1 unrecoverable error in 10¹⁴ bit read accesses					
Lifetime monitoring	Yes					
MTBF	> 3,000,000 hours (at 25°C)					
Maintenance	None					
Supported operating modes	PIO mode 0-6, Multiword DMA mode 0-4, Ultra DMA mode 0-4					
Continuous reading						
Typical	33 MB/s	33 MB/s	33 MB/s	33 MB/s	33 MB/s	36 MB/s
Maximum	35 MB/s	35 MB/s	35 MB/s	34 MB/s	34 MB/s	37 MB/s
Continuous writing						
Typical	15 MB/s	15 MB/s	15 MB/s	14 MB/s	14 MB/s	28 MB/s
Maximum	18 MB/s	18 MB/s	18 MB/s	17 MB/s	17 MB/s	30 MB/s

Table 164: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06 - Technical data

Product ID	5CFCRD.0512-06	5CFCRD.1024-06	5CFCRD.2048-06	5CFCRD.4096-06	5CFCRD.8192-06	5CFCRD.016G-06
Certification						
CE	Yes					
Endurance						
Guaranteed amount of data						
Guaranteed[1)]	50 TB	100 TB	200 TB	400 TB	800 TB	1600 TB
Results in 5 years[1)]	27.40 GB/day	54.79 GB/day	109.9 GB/day	219.8 GB/day	438.6 GB/day	876.72 GB/day
Clear/write cycles						
Guaranteed	100,000					
SLC-Flash	Yes					
Wear leveling	Static					
Error Correction Coding (ECC)	Yes					
S.M.A.R.T. support	Yes					
Support						
Hardware	PP300/400, PP500, PPC300, PPC700, PPC725, PPC800, APC620, APC810, APC820					
Operating systems						
Windows 7 32-bit	No	No	No	No	No	Yes
Windows 7 64-bit	No					
Windows Embedded Standard 7, 32-bit	No	No	No	No	Yes	Yes
Windows Embedded Standard 7, 64-bit	No	No	No	No	No	Yes
Windows XP Professional	No	No	No	Yes	Yes	Yes
Windows XP Embedded	Yes					
Windows Embedded Standard 2009	No	Yes	Yes	Yes	Yes	Yes
Windows CE 6.0	Yes	Yes	Yes	Yes	Yes	Yes[2)]
Windows CE 5.0	No					
Software						
PVI Transfer Tool	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011)	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011)	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011)	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011)	≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011)	No
B&R Embedded OS Installer	≥ V3.10	≥ V3.10	≥ V3.10	≥ V3.10	≥ V3.10	≥ V3.20
Environmental conditions						
Temperature						
Operation	0 to 70°C					
Storage	-65 to 150°C					
Transport	-65 to 150°C					
Relative humidity						
Operation	Max. 85% at 85°C					
Storage	Max. 85% at 85°C					
Transport	Max. 85% at 85°C					
Vibration						
Operation	20 g peak, 20 to 2000 Hz, 4 in each direction (JEDEC JESD22, method B103) 5.35 g RMS, 15 min per level (IEC 68-2-6)					
Storage	20 g peak, 20 to 2000 Hz, 4 in each direction (JEDEC JESD22, method B103) 5.35 g RMS, 15 min per level (IEC 68-2-6)					
Transport	20 g peak, 20 to 2000 Hz, 4 in each direction (JEDEC JESD22, method B103) 5.35 g RMS, 15 min per level (IEC 68-2-6)					
Shock						
Operation	1.5 kg peak, 0-5 ms 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27)					
Storage	1.5 kg peak, 0-5 ms 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27)					
Transport	1.5 kg peak, 0-5 ms 5x (JEDEC JESD22, B110 method) 30 g, 11 ms 1x (IEC 68-2-27)					
Altitude						
Operation	Max. 4,572 m					
Mechanical characteristics						
Dimensions						
Width	42.8 ± 0.10 mm					
Length	36.4 ± 0.15 mm					
Height	3.3 ± 0.10 mm					
Weight	10 g					

Table 164: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06 - Technical data

1) Endurance of B&R CFs (with linear written block size ≥ 128 kB)
2) Not supported by B&R Embedded OS installer.

4.3.4 Temperature humidity diagram

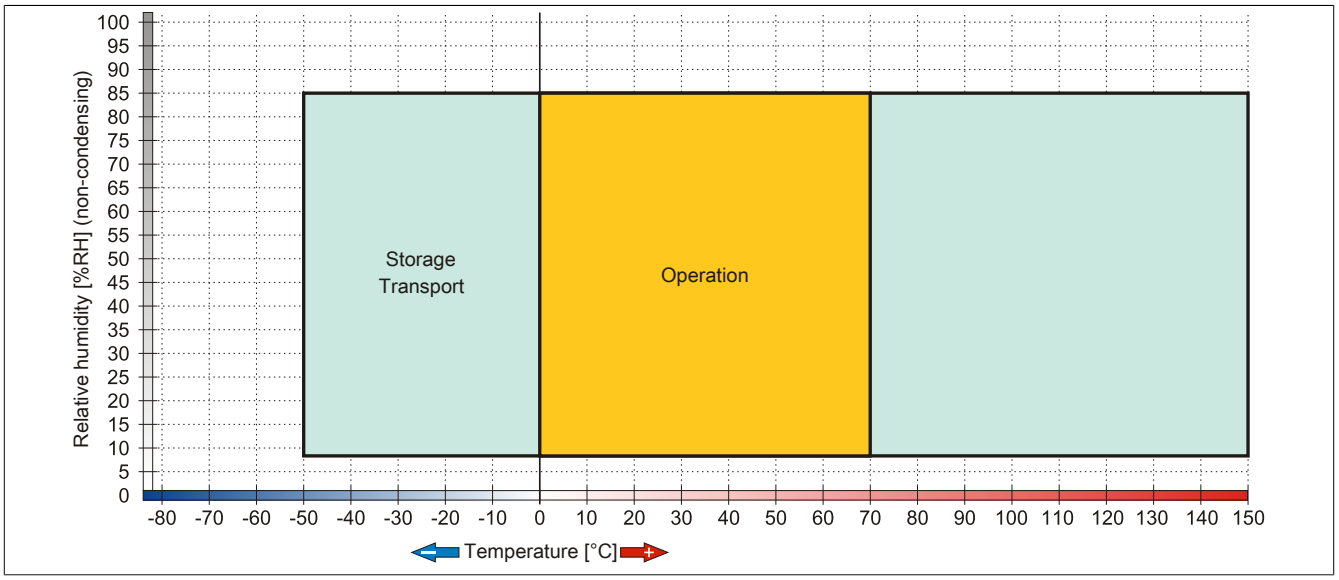


Image 73: 5CFCRD.xxxx-06 - Temperature humidity diagram for CompactFlash cards

4.3.5 Dimensions

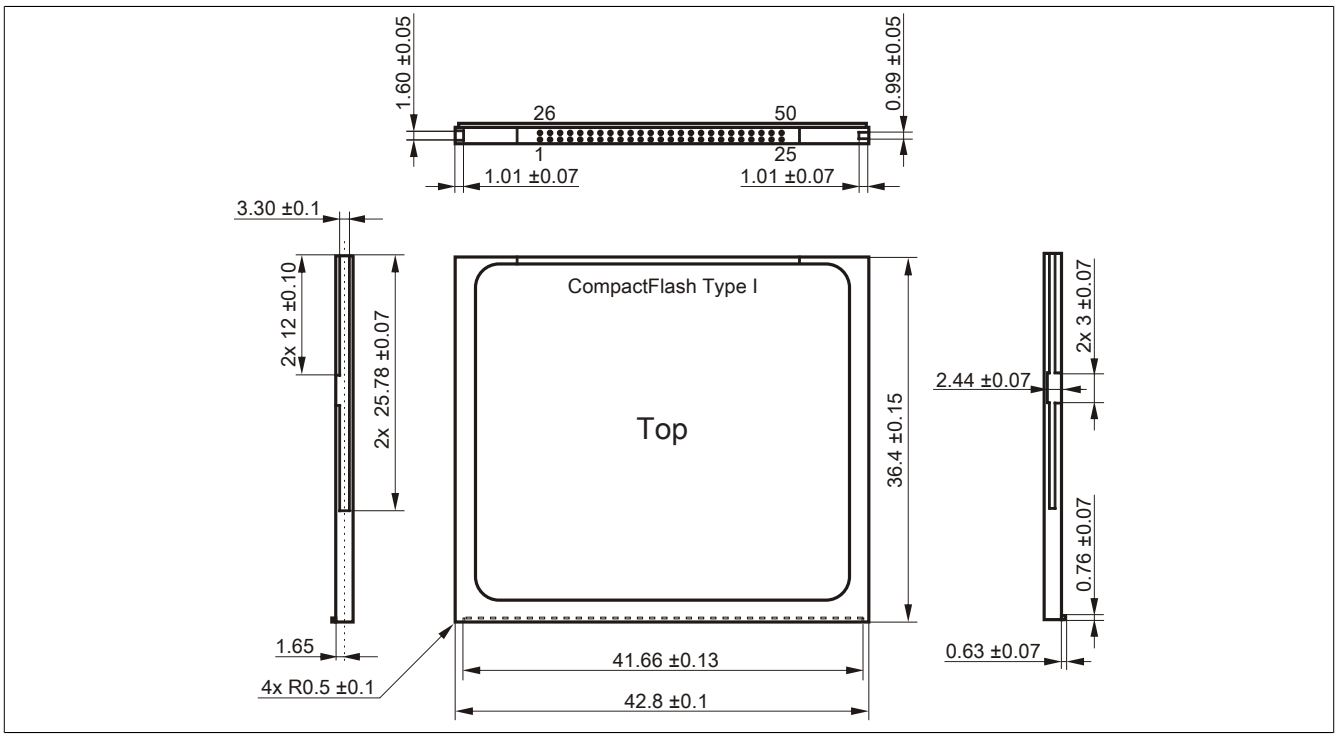


Image 74: Dimensions - CompactFlash card Type I

4.3.6 Benchmark

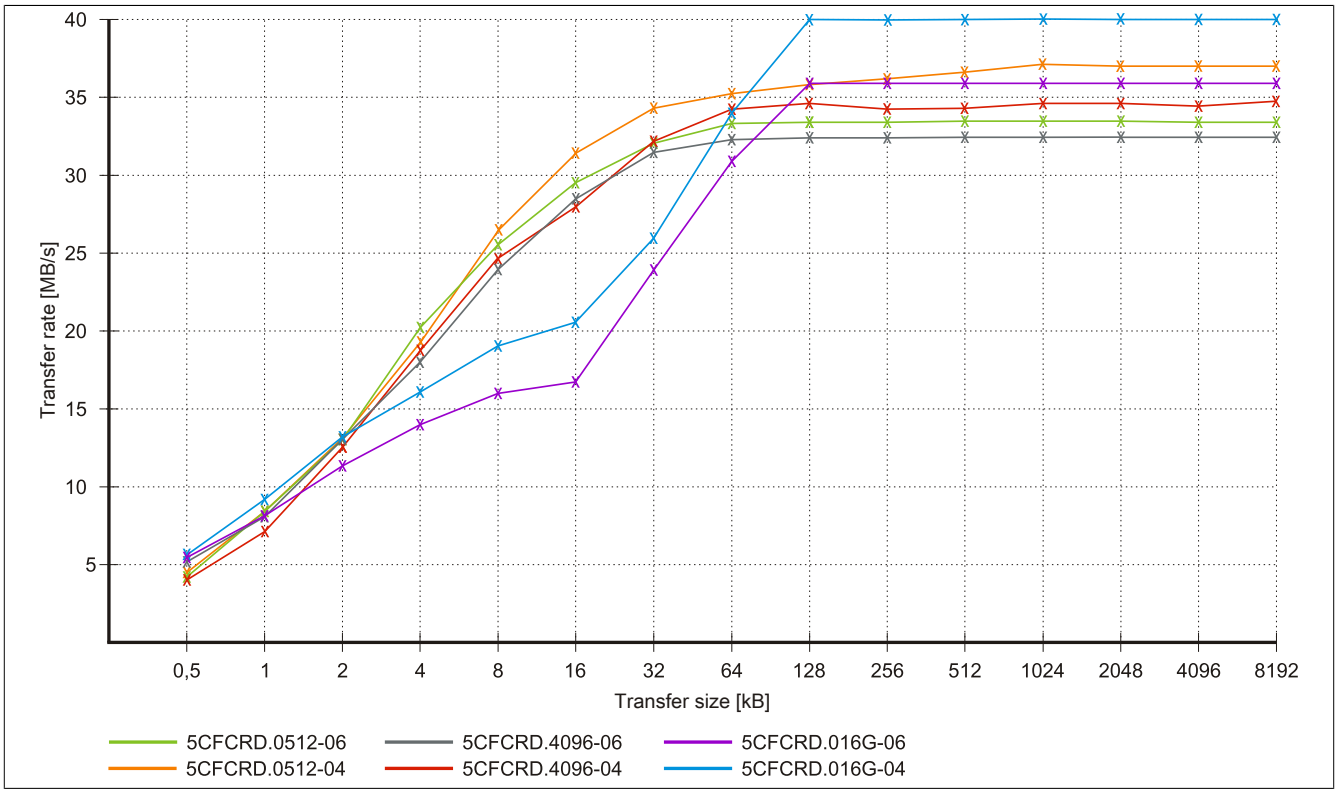


Image 75: ATTO Disk Benchmark v2.34 comparison when reading - 5CFCRD.xxxx-04 with 5CFCRD.xxxx-06

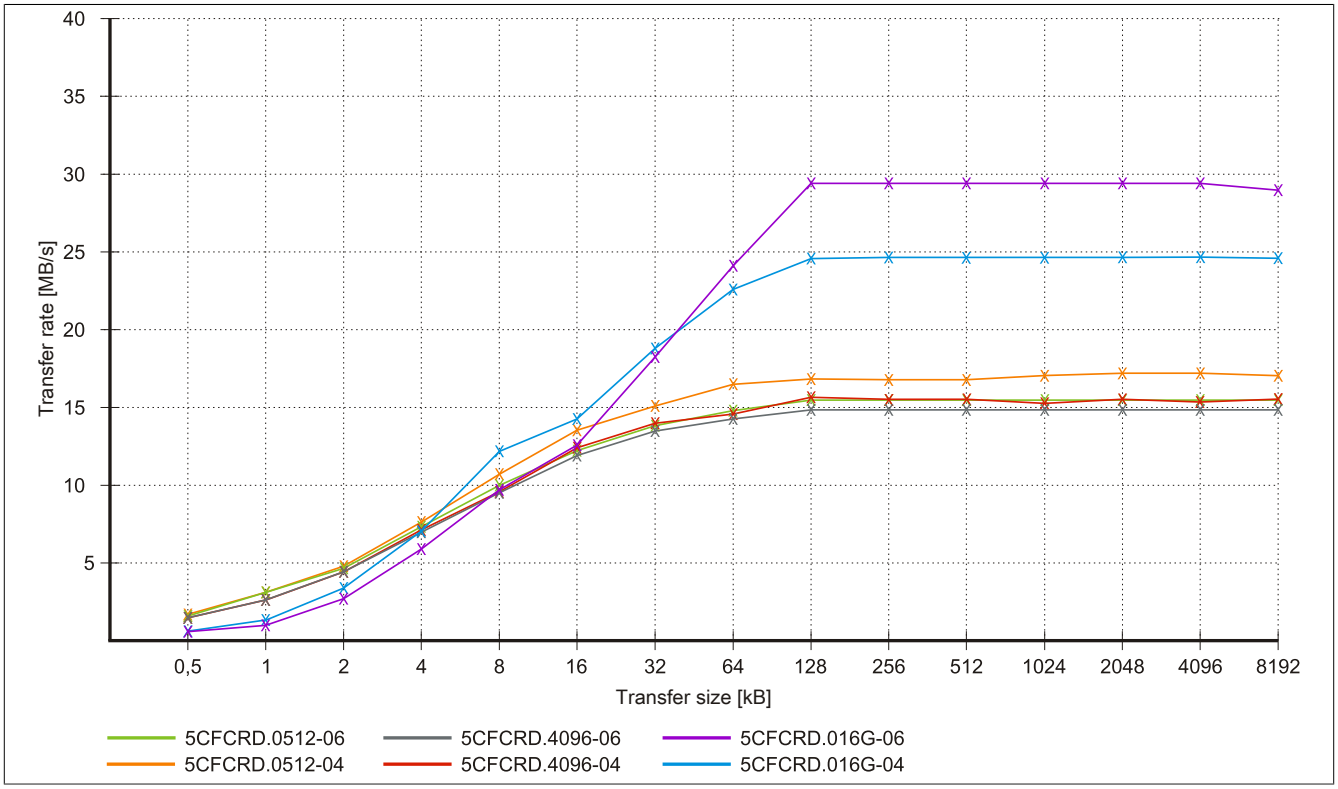


Image 76: ATTO Disk Benchmark v2.34 comparison when writing - 5CFCRD.xxxx-04 with 5CFCRD.xxxx-06

4.4 5CFCRD.xxxx-03

4.4.1 General information

Information:

Western Digital CompactFlash cards 5CFCRD.xxxx- 03 and CompactFlash cards from a different manufacturer cannot be used in the same system at the same time. Due to differences in technology (older vs. newer technologies), problems can occur during system startup that are caused by the different boot times.

see "Known problems / issues" on page 158

Information:

On Windows CE 5.0 devices, 5CFCRD.xxxx-03 CompactFlash cards up to 1 GB are supported.

Information:

On CompactFlash cards 5CFCRD.xxxx-03, only the sticker and the description have changed. The technical data has not bee changed.

4.4.2 Order data

Model number	Short description	Image
	CompactFlash	
5CFCRD.0064-03	CompactFlash 64 MB Western Digital (SLC)	
5CFCRD.0128-03	CompactFlash 128 MB Western Digital (SLC)	
5CFCRD.0256-03	CompactFlash 256 MB Western Digital (SLC)	
5CFCRD.0512-03	CompactFlash 512 MB Western Digital (SLC)	
5CFCRD.1024-03	CompactFlash 1 GB Western Digital (SLC)	
5CFCRD.2048-03	CompactFlash 2 GB Western Digital (SLC)	
5CFCRD.4096-03	CompactFlash 4 GB Western Digital (SLC)	
5CFCRD.8192-03	CompactFlash 8 GB Western Digital (SLC)	

Table 165: 5CFCRD.0064-03, 5CFCRD.0128-03, 5CFCRD.0256-03, 5CFCRD.0512-03, 5CFCRD.1024-03, 5CFCRD.2048-03, 5CFCRD.4096-03, 5CFCRD.8192-03 - Order data

4.4.3 Technical data

Caution!

A sudden loss of power can cause data to be lost! In very rare cases, the mass storage device may also become damaged.

To prevent damage and loss of data, B&R recommends that you use a UPS device.

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate those specified for the complete device. For the complete device where this accessory is installed, refer to the data provided specifically for the complete device.

Product ID	5CFCRD. 0064-03	5CFCRD. 0128-03	5CFCRD. 0256-03	5CFCRD. 0512-03	5CFCRD. 1024-03	5CFCRD. 2048-03	5CFCRD. 4096-03	5CFCRD. 8192-03
General information								
Capacity	64 MB	128 MB	256 MB	512 MB	1 GB	2 GB	4 GB	8 GB
Data retention	10 years							
Data reliability	< 1 unrecoverable error in 10¹⁴ bit read accesses							
Lifetime monitoring	Yes							
MTBF	> 4,000,000 hours (at 25°C)							

Table 166: 5CFCRD.0064-03, 5CFCRD.0128-03, 5CFCRD.0256-03, 5CFCRD.0512-03, 5CFCRD.1024-03, 5CFCRD.2048-03, 5CFCRD.4096-03, 5CFCRD.8192-03 - Technical data

Product ID	5CFCRD.0064-03	5CFCRD.0128-03	5CFCRD.0256-03	5CFCRD.0512-03	5CFCRD.1024-03	5CFCRD.2048-03	5CFCRD.4096-03	5CFCRD.8192-03
Maintenance	None							
Supported operating modes	PIO mode 0-4, Multiword DMA mode 0-2							
Continuous reading								
Typical	8 MB/s							
Continuous writing								
Typical	6 MB/s							
Certification								
CE	Yes							
Endurance								
Clear/write cycles								
Typical	> 2,000,000							
SLC-Flash	Yes							
Wear leveling	Static							
Error Correction Coding (ECC)	Yes							
S.M.A.R.T. support	No							
Support								
Hardware	MP100/200, PP100/200, PP300/400, PP500, PPC300, PPC700, PPC725, PPC800, Provit 2000, Provit 5000, APC620, APC680, APC810, APC820							
Operating systems								
Windows 7 32-bit	No							
Windows 7 64-bit	No							
Windows Embedded Standard 7, 32-bit	No	No	No	No	No	No	No	Yes
Windows Embedded Standard 7, 64-bit	No							
Windows XP Professional	No	No	No	No	No	No	Yes	Yes
Windows XP Embedded	No	No	No	Yes	Yes	Yes	Yes	Yes
Windows Embedded Standard 2009	No	No	No	No	Yes	Yes	Yes	Yes
Windows CE 6.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes[1)]
Windows CE 5.0	Yes	Yes	Yes	Yes	Yes	No	No	No
Software								
PVI Transfer Tool	≥ V2.57 (part of PVI Development Setup ≥ V2.5.3.3005)							
B&R Embedded OS Installer	≥ V2.21							
Environmental conditions								
Temperature								
Operation	0 to 70°C							
Storage	-50 to 100°C							
Transport	-50 to 100°C							
Relative humidity								
Operation	8 to 95%, non-condensing							
Storage	8 to 95%, non-condensing							
Transport	8 to 95%, non-condensing							
Vibration								
Operation	Max. 16.3 g (159 m/s² 0-peak)							
Storage	Max. 30 g (294 m/s² 0-peak)							
Transport	Max. 30 g (294 m/s² 0-peak)							
Shock								
Operation	Max. 1000 g (9810 m/s² 0-peak)							
Storage	Max. 3000 g (29430 m/s² 0-peak)							
Transport	Max. 3000 g (29430 m/s² 0-peak)							
Altitude								
Operation	Max. 24.383 m							
Mechanical characteristics								
Dimensions								
Width	42.8 ± 0.10 mm							
Length	36.4 ± 0.15 mm							
Height	3.3 ± 0.10 mm							
Weight	11.4 g							

Table 166: 5CFCRD.0064-03, 5CFCRD.0128-03, 5CFCRD.0256-03, 5CFCRD.0512-03, 5CFCRD.1024-03, 5CFCRD.2048-03, 5CFCRD.4096-03, 5CFCRD.8192-03 - Technical data

1) Not supported by B&R Embedded OS installer.

4.4.4 Temperature humidity diagram

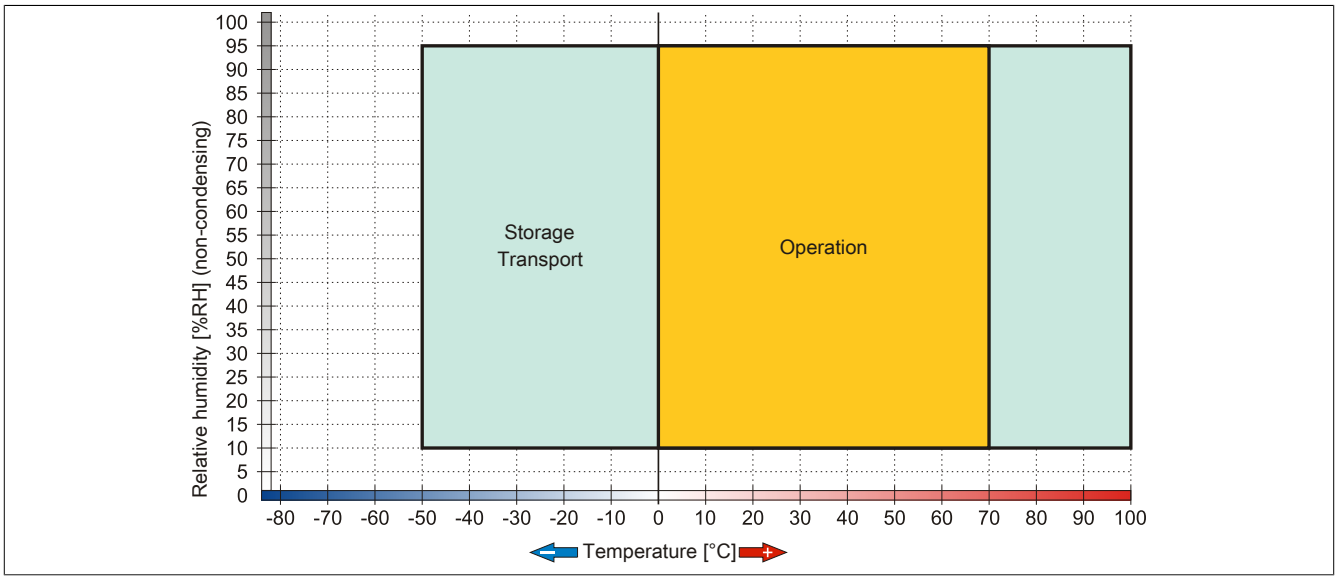


Image 77: 5CFCRD.xxxx-03 - Temperature humidity diagram for CompactFlash cards

4.4.5 Dimensions

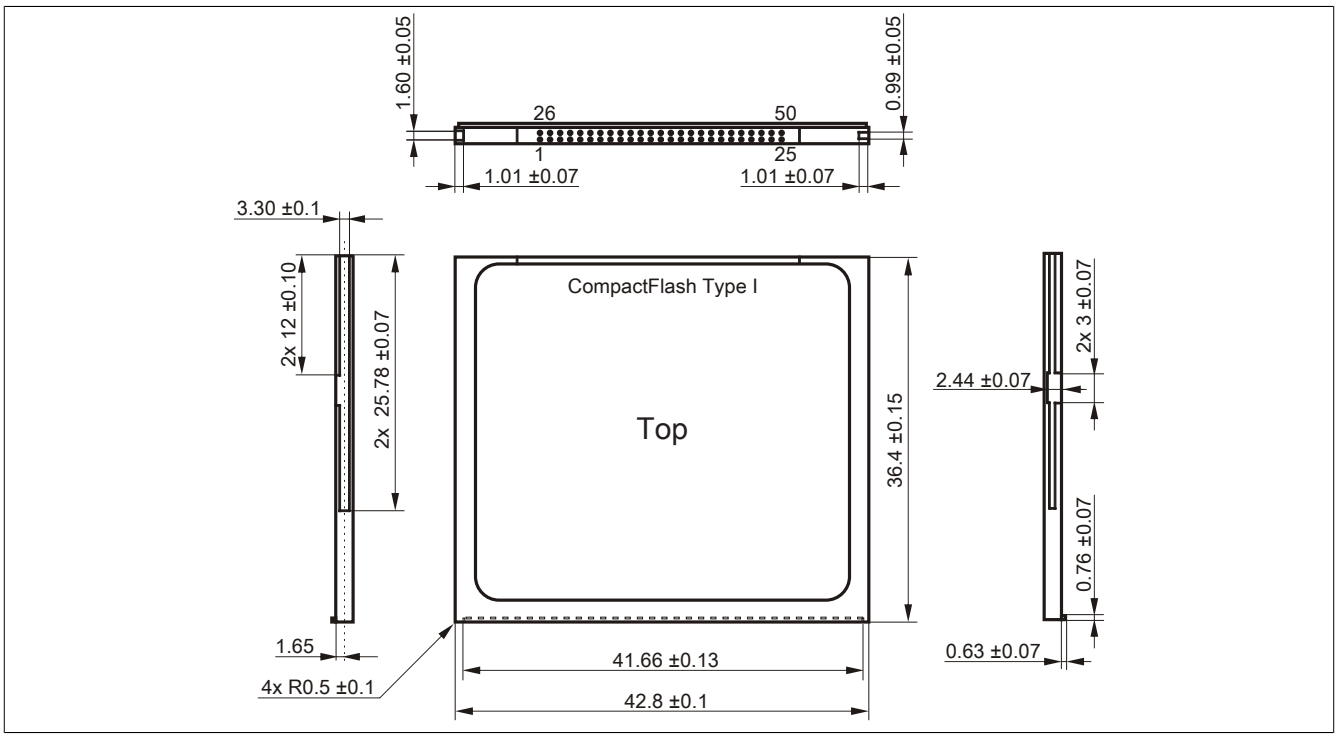


Image 78: Dimensions - CompactFlash card Type I

4.5 Known problems / issues

The following is a known issue for devices with two CompactFlash slots:

- Using two different types of CompactFlash cards can cause problems in Automation PCs and Panel PCs. This can result in one of the two cards not being detected during system startup. This is caused by varying startup speeds. CompactFlash cards with older technology require significantly more time during system startup than CompactFlash cards with newer technology. This behavior occurs near the limits of the time frame provided for startup. This can occur because the startup time for the CompactFlash cards fluctuates due to the variance of the components being used. Depending on the CompactFlash cards being used, this error may occur never, sometimes or always.

5 USB flash drive

5.1 5MMUSB.2048-01

5.1.1 General information

USB flash drives are storage media that are easy to replace. Because of their fast data transfer (USB 2.0), USB flash drives are ideal for use as portable data storage. Without requiring additional drivers ("Hot Plug & Play" - except with Windows 98SE), the USB flash drive can immediately act as an additional drive where data can be read or written.

Information:

We reserve the right to supply alternative products due to the vast quantity of flash drives available on the market and their corresponding short product lifecycle. Therefore, the following measures might be necessary in order to boot from these flash drives:

- **The flash drive must be reformatted or in some cases even re-partitioned (set active partition).**
- **The flash drive must be at the top of the BIOS boot order, or alternatively the IDE controllers can also be deactivated in the BIOS. This can be avoided in most cases if a "fdisk /mbr" command is also executed on the USB flash drive.**

- USB 1.1, USB 2.0
- High transfer rate
- High data storage
- Ambient temperature during operation: 0 to 70°C

5.1.2 Order data

Model number	Short description	Image
	USB accessories	
5MMUSB.2048-01	USB 2.0 flash drive 2048 MB B&R	

Table 167: 5MMUSB.2048-01 - Order data

5.1.3 Technical data

Product ID	5MMUSB.2048-01
General information	
Data retention	> 10 years
LEDs	1 LED (green), signals data transfer (send and receive)[1)]
MTBF	> 3,000,000 hours
Type	USB 1.1, USB 2.0
Maintenance	None
Certification	
CE	Yes
Interfaces	
USB	
Type	USB 1.1, USB 2.0
Connection	To each USB type A interface
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s)
Sequential reading	Max. 31 MB/s
Sequential writing	Max. 30 MB/s
Support	
Operating systems	
Windows 7	Yes
Windows XP Professional	Yes
Windows XP Embedded	Yes
Windows ME	Yes
Windows 2000	Yes
Windows CE 5.0	Yes
Windows CE 4.2	Yes
Electrical properties	
Current requirements	Max. 500 µA sleep mode, max. 120 mA read/write
Environmental conditions	
Temperature	

Table 168: 5MMUSB.2048-01 - Technical data

Product ID	5MMUSB.2048-01
Operation	0 to 70°C
Storage	-50 to 100°C
Transport	-50 to 100°C
Relative humidity	
Operation	85%, non-condensing
Storage	85%, non-condensing
Transport	85%, non-condensing
Vibration	
Operation	20 to 2000 Hz: 20 g (peak)
Storage	20 to 2000 Hz: 20 g (peak)
Transport	20 to 2000 Hz: 20 g (peak)
Shock	
Operation	Max. 1500 g (peak)
Storage	Max. 1500 g (peak)
Transport	Max. 1500 g (peak)
Altitude	
Operation	Max. 3048 m
Storage	Max. 12192 m
Transport	Max. 12192 m
Mechanical characteristics	
Dimensions	
Width	17.97 mm
Length	67.85 mm
Height	8.35 mm

Table 168: 5MMUSB.2048-01 - Technical data

1) Signals data transfer (send and receive).

5.1.4 Temperature humidity diagram

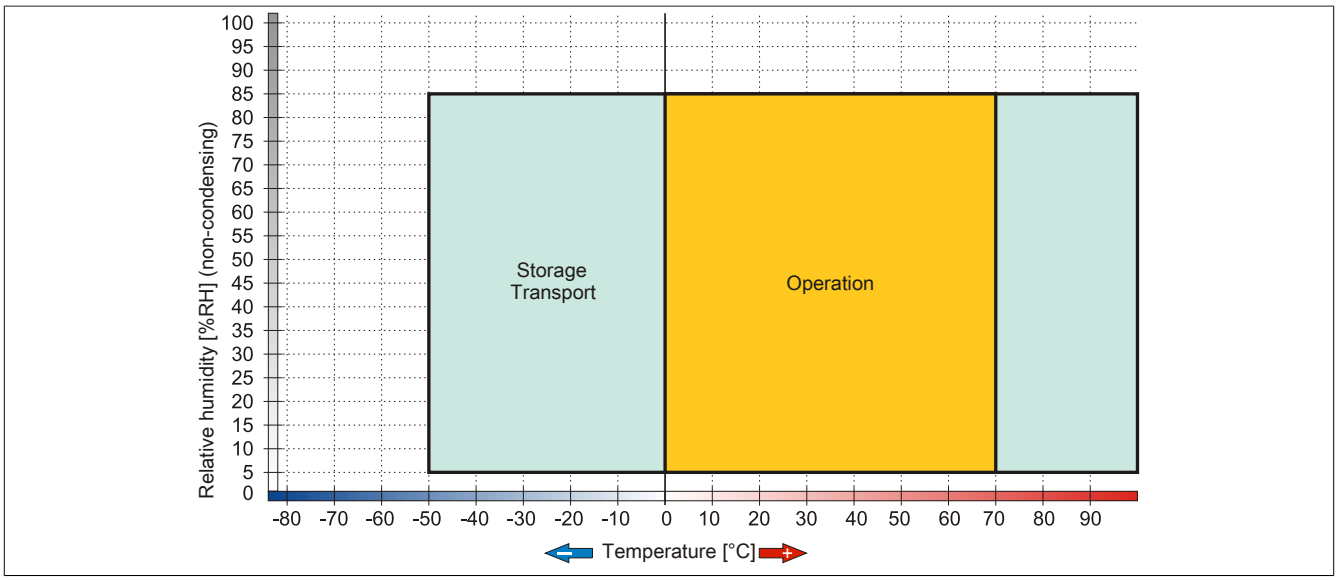


Image 79: 5MMUSB.2048-01 - Temperature humidity diagram

6 Cables

6.1 DVI cables

6.1.1 5CADVI.0xxx-00

General information

The DVI cables 5CADVI.0xxx-00 are designed for fixed layout.

> **Caution!**
>
> **Cable can only be plugged in and unplugged when the device is turned off.**

Order data

Model number	Short description	Image
	DVI cables	
5CADVI.0018-00	DVI-D cable, 1.8 m.	
5CADVI.0050-00	DVI-D cable, 5 m.	
5CADVI.0100-00	DVI-D cable, 10 m.	

Table 169: 5CADVI.0018-00, 5CADVI.0050-00, 5CADVI.0100-00 - Order data

Technical data

Product ID	5CADVI.0018-00	5CADVI.0050-00	5CADVI.0100-00
General information			
Certification			
CE	Yes		
c-UL-us	Yes		
Cable structure			
Wire cross section	AWG 28		
Shield	Individual cable pairs and entire cable		
Cable shielding	Tinned CU mesh, optical coverage >86%		Tinned Cu mesh, optical coverage >86%
Outer sheathing			
Material	PVC		
Color	Beige		
Labeling	AWM STYLE 20276 80°C 30V VW1 DVI DIGITAL SINGLE LINK DER AN		
Connector			
Type	2x DVI-D (18+1), male		
Connection cycles	100		
Electrical properties			
Conductor resistance	Max. 237 Ω/km		
Insulation resistance	Min. 100 MΩ/km		
Mechanical characteristics			
Dimensions			
Length	1.8 m ±50 mm	5 m ± 80 mm	10 m ±100 mm
Diameter	Max. 8.5 mm		
Flex radius	≥ 5x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)		
Weight	Approx. 260 g	Approx. 460 g	Approx. 790 g

Table 170: 5CADVI.0018-00, 5CADVI.0050-00, 5CADVI.0100-00 - Technical data

Flex radius specification

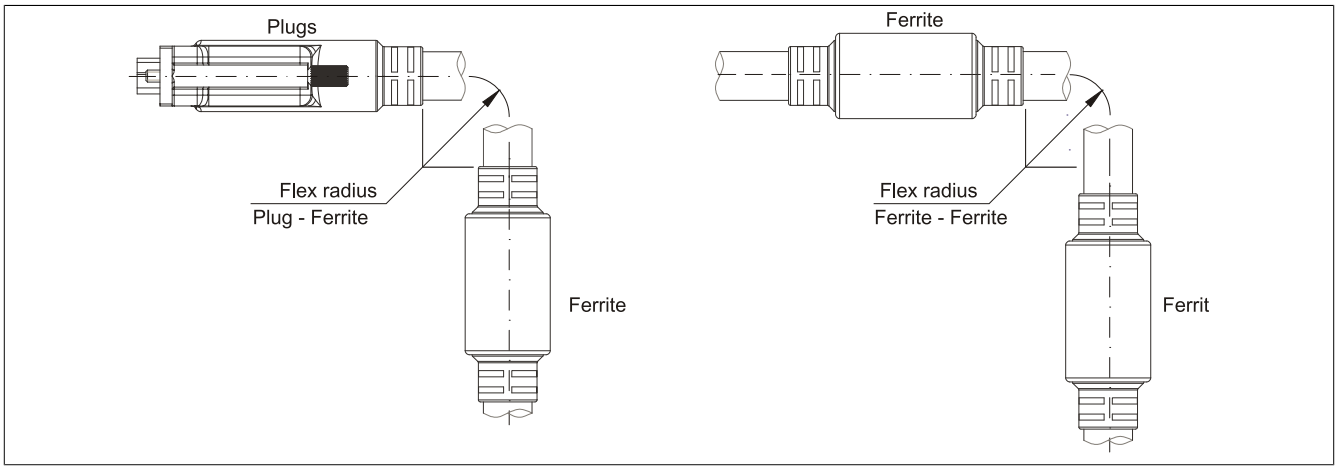


Image 80: Flex radius specification

Dimensions

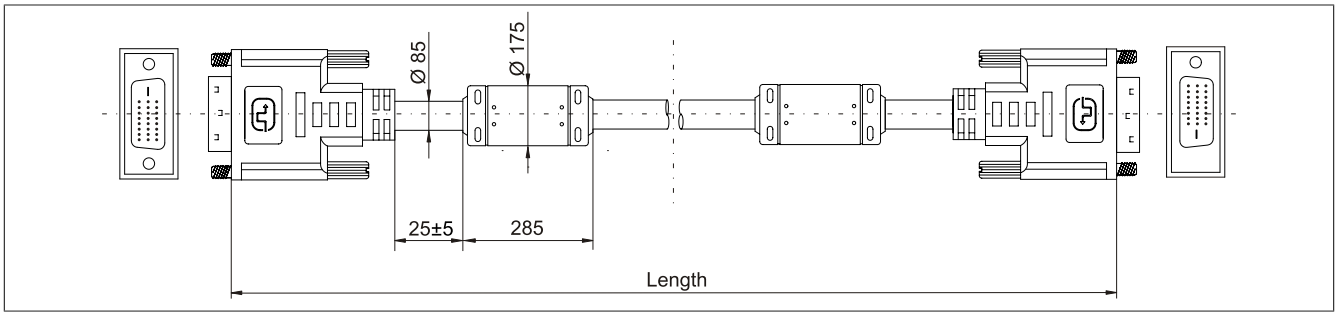


Image 81: 5CADVI.0xxx-00 - Dimensions

Cable specifications

Warning!

If you want to build a suitable cable yourself, it should be wired according to these specifications.

If a self-built cable is used, B&R cannot guarantee that it will function properly. B&R guarantees the performance of all cables that they provide.

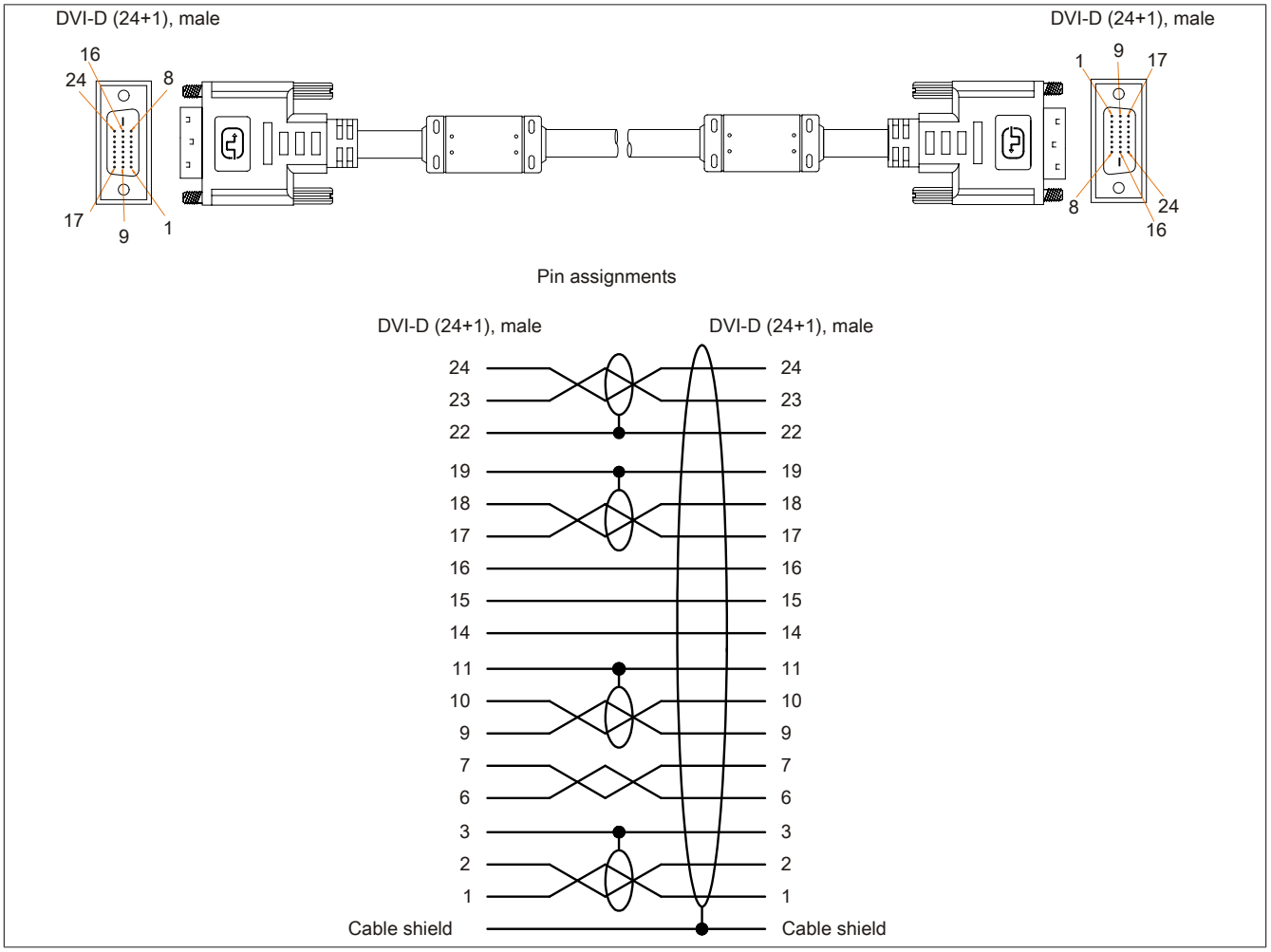


Image 82: 5CADVI.0xxx-00 - Pinout

6.2 SDL cables

6.2.1 5CASDL.0xxx-00

General information

The SDL cables 5CASDL.0xxx-00 are designed for fixed layout. Use of the SDL flex cable 5CASDL.0xxx-03 is required for a flexible installation (e.g. in swing arm systems).

Caution!

Cable can only be plugged in and unplugged when the device is turned off.

Order data

Model number	Short description	Image
	SDL cables	
5CASDL.0018-00	SDL cable, 1.8 m.	
5CASDL.0050-00	SDL cable, 5 m.	
5CASDL.0100-00	SDL cable, 10 m.	
5CASDL.0150-00	SDL cable, 15 m.	
5CASDL.0200-00	SDL cable, 20 m.	
5CASDL.0250-00	SDL cable, 25 m.	
5CASDL.0300-00	SDL cable, 30 m.	

Table 171: 5CASDL.0018-00, 5CASDL.0050-00, 5CASDL.0100-00, 5CASDL.0150-00, 5CASDL.0200-00, 5CASDL.0250-00, 5CASDL.0300-00 - Order data

Technical data

Product ID	5CASDL. 0018-00	5CASDL. 0050-00	5CASDL. 0100-00	5CASDL. 0150-00	5CASDL. 0200-00	5CASDL. 0250-00	5CASDL. 0300-00
General information							
Certification							
CE	Yes						
c-UL-us	Yes						
Cable structure							
Wire cross section	AWG 28		AWG 24				
Shield	Individual cable pairs and entire cable						
Cable shielding	Tinned Cu mesh, optical coverage >85%						
Outer sheathing							
Material	PVC						
Color	Black						
Labeling	E74020-C (UL) AWM STYLE 20176 80°C 30V VW-1 DVI DIGITAL LINK						
Connector							
Type	2x DVI-D (24+1), male						
Connection cycles	100						
Contacts	Gold plated						
Mechanical protection	Metal cover with crimped stress relief						
Electrical properties							
Conductor resistance							
AWG 24	-		≤93 Ω/km				
AWG 28	≤237 Ω/km		-				
Insulation resistance	Min. 10 MΩ/km						
Mechanical characteristics							
Dimensions							
Length	1.8 m ±30 mm	5 m ± 30 mm	10 m ±50 mm	15 m ±100 mm	20 m ±100 mm	25 m ± 100 mm	30 m ± 100 mm
Diameter	Typ. 8.6 ± 0.2 mm Max. 9 mm		Typ. 11 ± 0.2 mm Max. 11.5 mm				
Flex radius	≥ 5x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)						
Flexibility	Limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5x cable diameter, 20 cycles / minute)						
Weight	Approx. 300 g	Approx. 580 g	Approx. 1500 g	Approx. 2250 g	Approx. 2880 g	Approx. 4800 g	Approx. 5520 g

Table 172: 5CASDL.0018-00, 5CASDL.0050-00, 5CASDL.0100-00, 5CASDL.0150-00, 5CASDL.0200-00, 5CASDL.0250-00, 5CASDL.0300-00 - Technical data

Flex radius specification

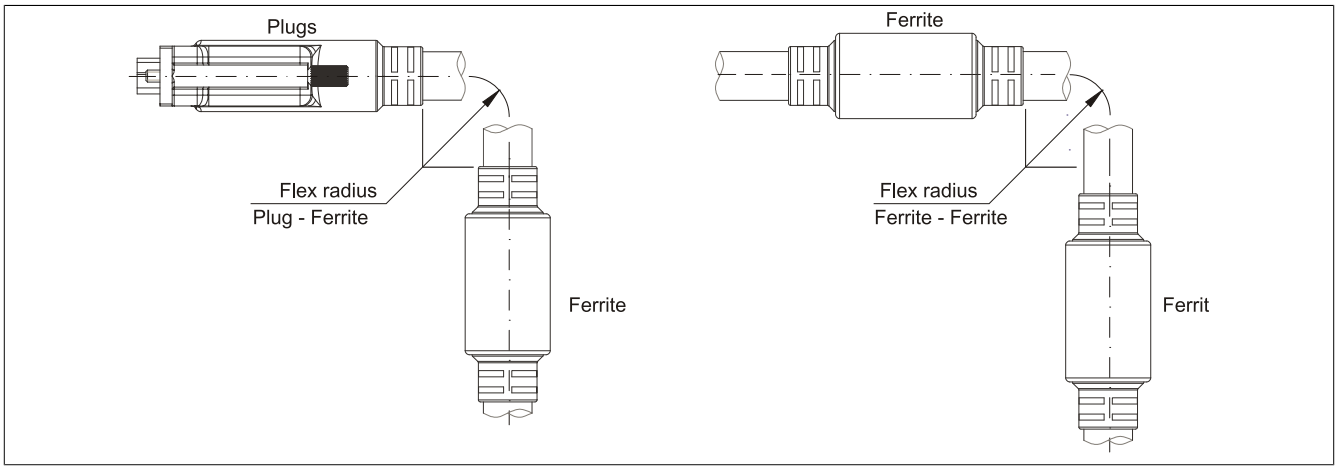


Image 83: Flex radius specification

Dimensions

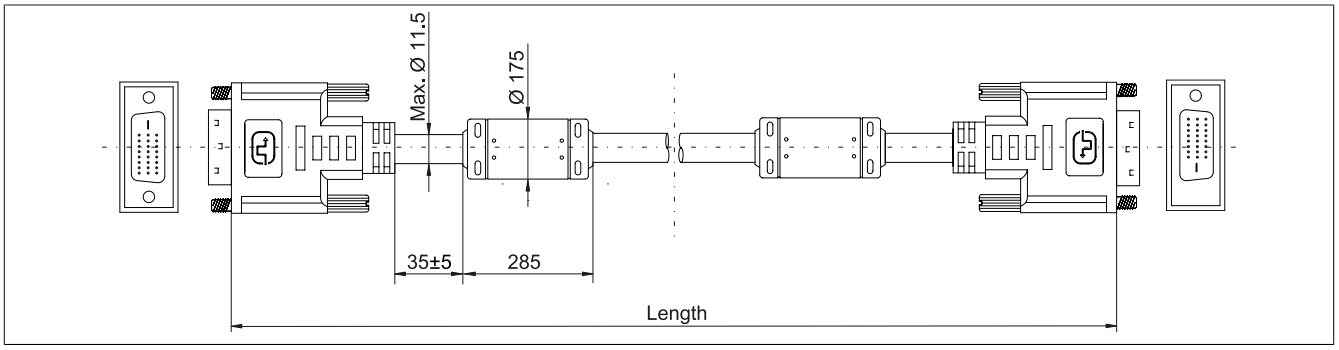


Image 84: 5CASDL.0xxx-00- Dimensions

Cable specifications

Warning!

If you want to build a suitable cable yourself, it should be wired according to these specifications.

If a self-built cable is used, B&R cannot guarantee that it will function properly. B&R guarantees the performance of all cables that they provide.

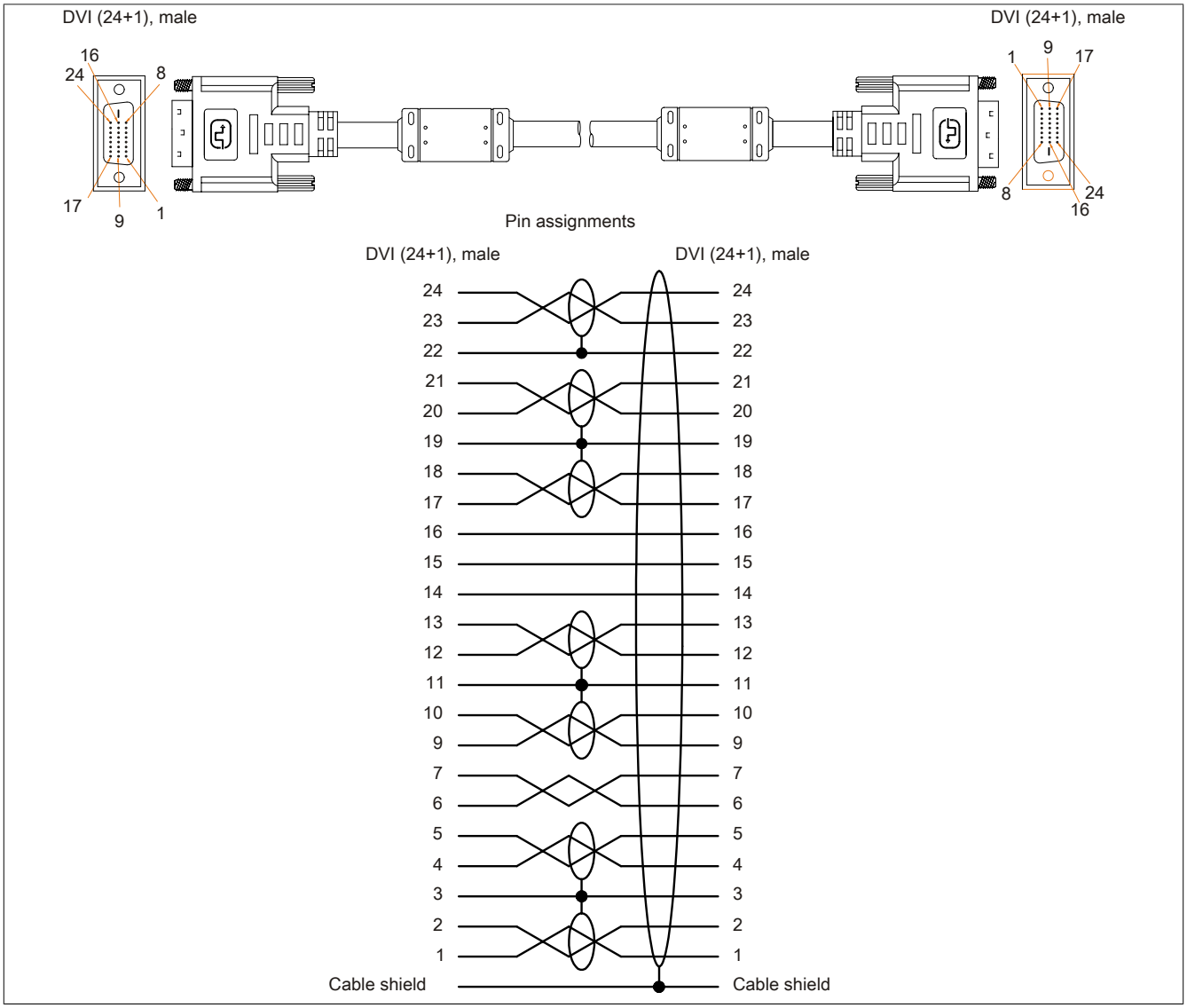


Image 85: 5CASDL.0xxx-00- Pinout

6.3 SDL cables with 45° plugs

6.3.1 5CASDL.0xxx-01

General information

The 5CASDL.xxxx-01 SDL cables with 45° plug are designed for fixed layout.

> **Caution!**
>
> **Cable can only be plugged in and unplugged when the device is turned off.**

Order data

Model number	Short description	Image
	SDL cables: 45° connectors	
5CASDL.0018-01	SDL cable; 45° connector, 1.8 m.	
5CASDL.0050-01	SDL cable; 45° connector, 5 m.	
5CASDL.0100-01	SDL cable; 45° connector, 10 m.	
5CASDL.0150-01	SDL cable; 45° connector, 15 m.	

Table 173: 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 - Order data

Technical data

Product ID	5CASDL.0018-01	5CASDL.0050-01	5CASDL.0100-01	5CASDL.0150-01
General information				
Certification				
CE	Yes			
c-UL-us	Yes			
Cable structure				
Wire cross section	AWG 28		AWG 24	
Shield	Individual cable pairs and entire cable			
Cable shielding	Tinned Cu mesh, optical coverage >85%			
Outer sheathing				
Material	PVC			
Color	Black			
Connector				
Type	2x DVI-D (24+1), male			
Connection cycles	100			
Contacts	Gold plated			
Mechanical protection	Metal cover with crimped stress relief			
Electrical properties				
Conductor resistance				
AWG 24	-		≤93 Ω/km	
AWG 28	≤237 Ω/km		-	
Insulation resistance	Min. 10 MΩ/km			
Mechanical characteristics				
Dimensions				
Length	1.8 m ±30 mm	5 m ± 50 mm	10 m ±100 mm	15 m ±100 mm
Diameter	Max. 9 mm		Max. 11.5 mm	
Flex radius				
Fixed installation	≥ 5x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)			
Flexibility	Limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5x cable diameter, 20 cycles / minute)			
Weight	Approx. 300 g	Approx. 590 g	Approx. 2800 g	Approx. 2860 g

Table 174: 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 - Technical data

Flex radius specification

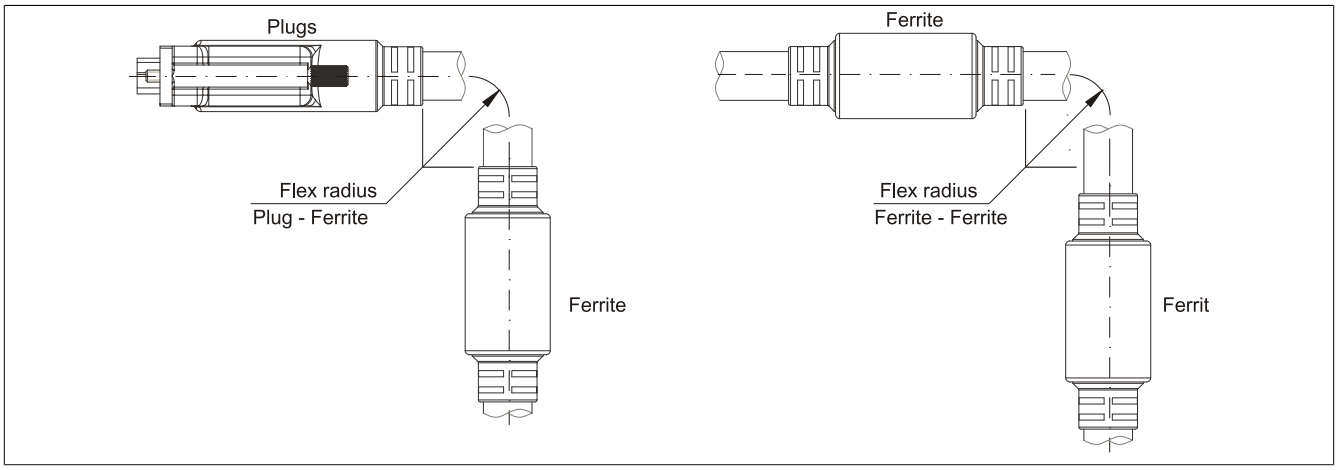


Image 86: Flex radius specification

Dimensions

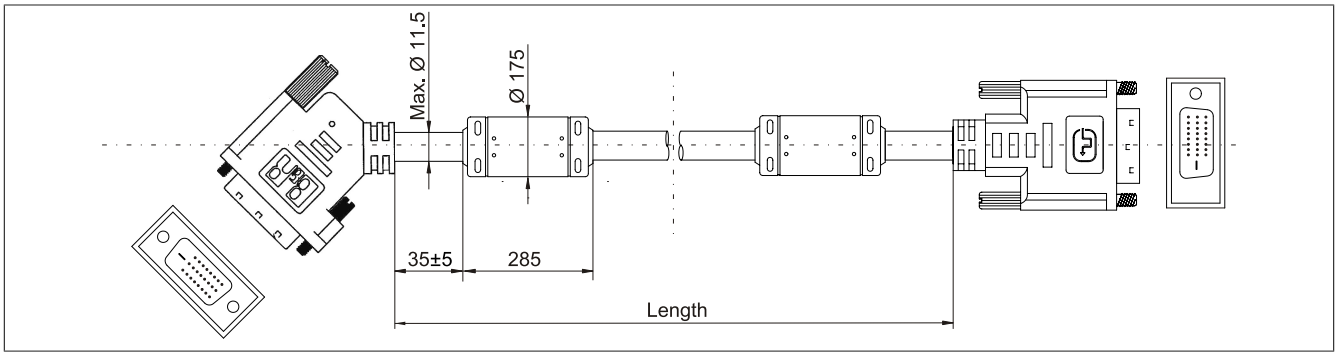


Image 87: 5CASDL.0xxx-01 - Dimensions

Cable specifications

Warning!

If you want to build a suitable cable yourself, it should be wired according to these specifications.

If a self-built cable is used, B&R cannot guarantee that it will function properly. B&R guarantees the performance of all cables that they provide.

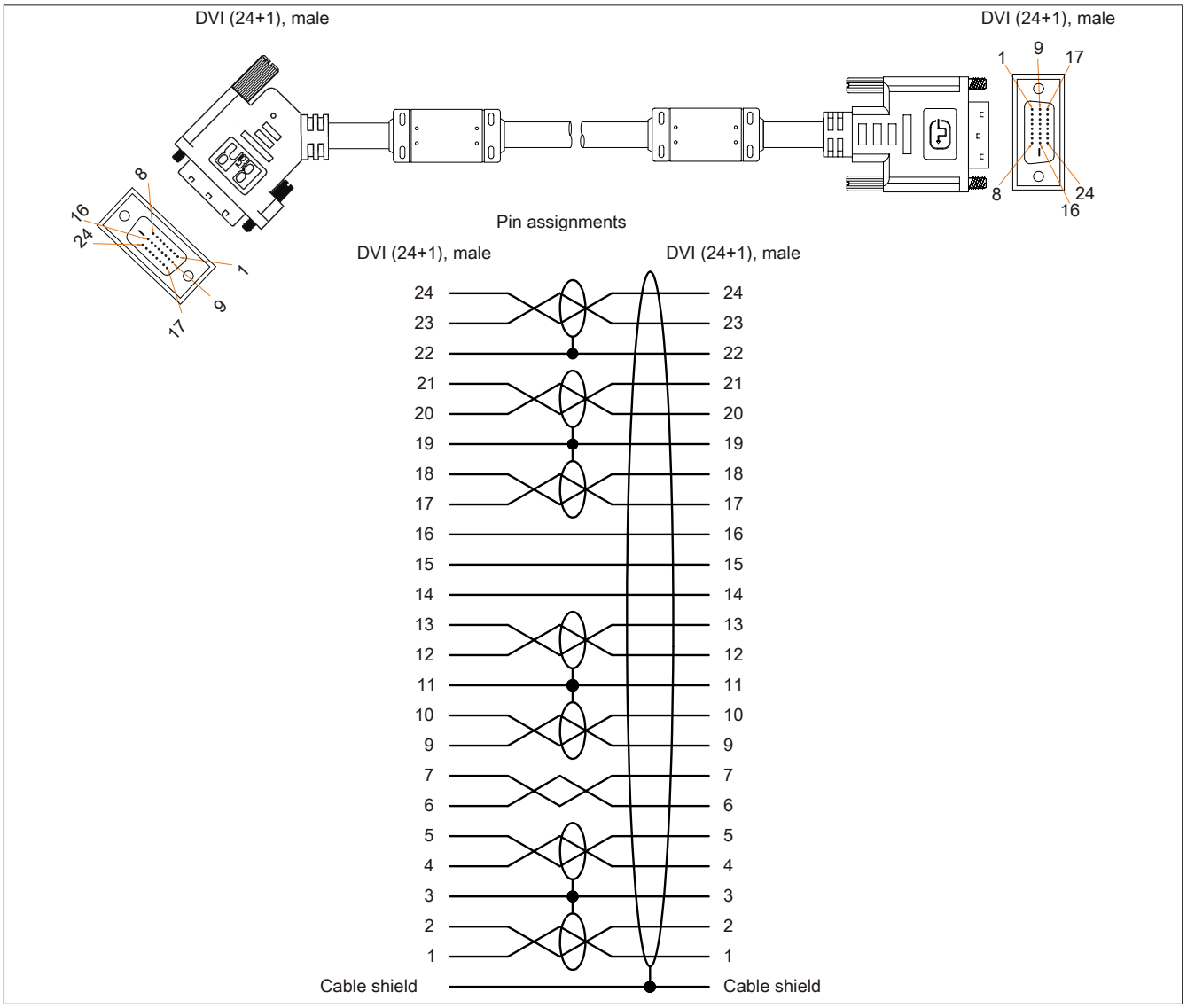


Image 88: 5CASDL.0xxx-01 - Pinout

6.4 SDL flex cables

6.4.1 5CASDL.0xxx-03

General information

The 5CASDL.0xxx-03 SDL flex cables are designed for use in both fixed and flexible installations (e.g. in swing arm systems).

> **Caution!**
>
> **Cable can only be plugged in and unplugged when the device is turned off.**

Order data

Model number	Short description	Image
	SDL flex cables	
5CASDL.0018-03	SDL Cable flex, 1.8 m.	
5CASDL.0050-03	SDL cable flex, 5 m.	
5CASDL.0100-03	SDL cable flex, 10 m.	
5CASDL.0150-03	SDL cable flex, 15 m.	
5CASDL.0200-03	SDL cable flex, 20 m.	
5CASDL.0250-03	SDL cable flex, 25 m.	
5CASDL.0300-03	SDL cable flex, 30 m.	

Table 175: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Order data

Technical data

Product ID	5CASDL. 0018-03	5CASDL. 0050-03	5CASDL. 0100-03	5CASDL. 0150-03	5CASDL. 0200-03	5CASDL. 0250-03	5CASDL. 0300-03
General information							
Certification							
CE	Yes						
c-UL-us	Yes						
Cable structure							
Wire cross section	26 AWG (control wires) 26 AWG (DVI, USB, data)						
Characteristics	Free of halogen and silicon						
Shield	Individual cable pairs and entire cable						
Cable shielding	Aluminum foil clad + tinned copper mesh						
Outer sheathing							
Material	Special TMPU - semi gloss						
Color	Black						
Labeling	(B&R) SDL cable (UL) AWM 20236 80°C 30V E 63216						
Connector							
Type	2x DVI-D (24+1), male						
Connection cycles	Min. 200						
Contacts	Gold plated						
Mechanical protection	Metal cover with crimped stress relief						
Electrical properties							
Operating voltage	≤30 V						
Test voltage							
Wire/wire	1 kV						
Wire/shield	0.5 kV						
Wave impedance	100 ±10 Ω						
Conductor resistance							
AWG 24	≤95 Ω/km						
AWG 26	≤145 Ω/km						
Insulation resistance	> 200 MΩ/km						
Operating conditions							
Approbation	UL AWM 20236 80°C 30V						
Flame resistant	In accordance with UL758 (cable vertical flame test)						
Oil and hydrolysis resistance	According to VDE 0282-10						
Environmental conditions							
Temperature							
Storage	-20 to 80°C						
Moving	-5 to 60°C						
Fixed installation	-20 to 80°C						

Table 176: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Technical data

Product ID	5CASDL. 0018-03	5CASDL. 0050-03	5CASDL. 0100-03	5CASDL. 0150-03	5CASDL. 0200-03	5CASDL. 0250-03	5CASDL. 0300-03
Mechanical characteristics							
Dimensions							
Length	1.8 m ±20 mm	5 m ± 45 mm	10 m ±90 mm	15 m ±135 mm	20 m ± 180 mm	25 m ± 225 mm	30 m ± 270 mm
Diameter	Max. 12 mm						
Flex radius							
Fixed installation	≥ 6x cable diameter (from plug - ferrite magnet) ≥ 10x cable diameter (from ferrite magnet - ferrite magnet)						
Flexible installation	≥ 15x cable diameter (from ferrite magnet - ferrite magnet)						
Flexibility	Flexible; valid for ferrite magnet - ferrite magnet (tested 300,000 cycles with 15x cable diameter, 4800 cycles / hour)						
Drag chain data							
Flex cycles	300.000						
Speed	4800 cycles / hour						
Flex radius	180 mm;15x cable diameter						
Hub	460 mm						
Weight	Approx. 460 g	Approx. 1020 g	Approx. 1940 g	Approx. 2840 g	Approx. 3740 g	Approx. 4560 g	Approx. 5590 g
Tension							
In operation	≤50 N						
During installation	≤400 N						

Table 176: 5CASDL.0018-03, 5CASDL.0050-03, 5CASDL.0100-03, 5CASDL.0150-03, 5CASDL.0200-03, 5CASDL.0250-03, 5CASDL.0300-03 - Technical data

Flex radius specification

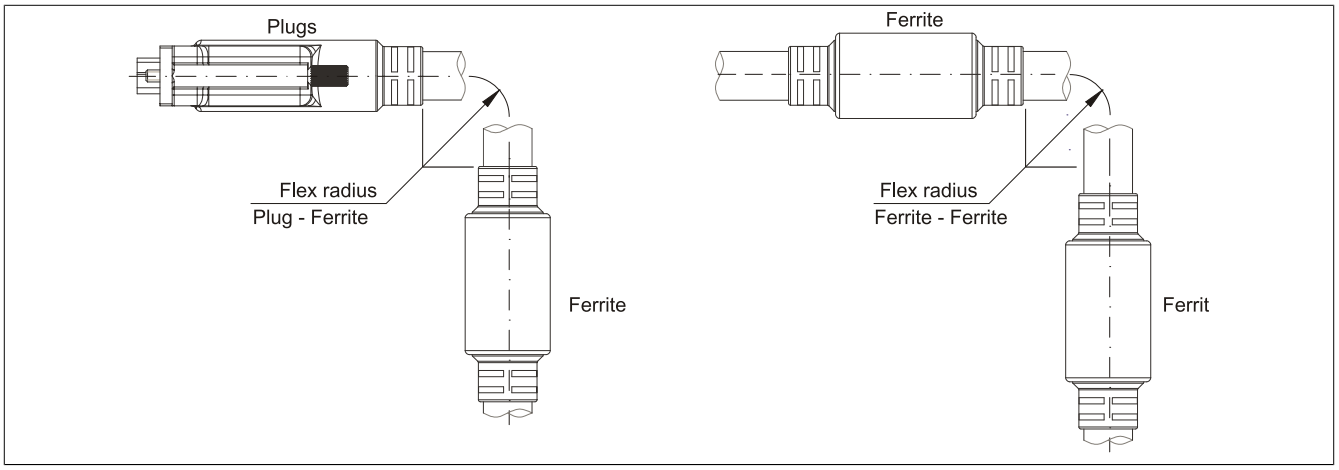


Image 89: Flex radius specification

Dimensions

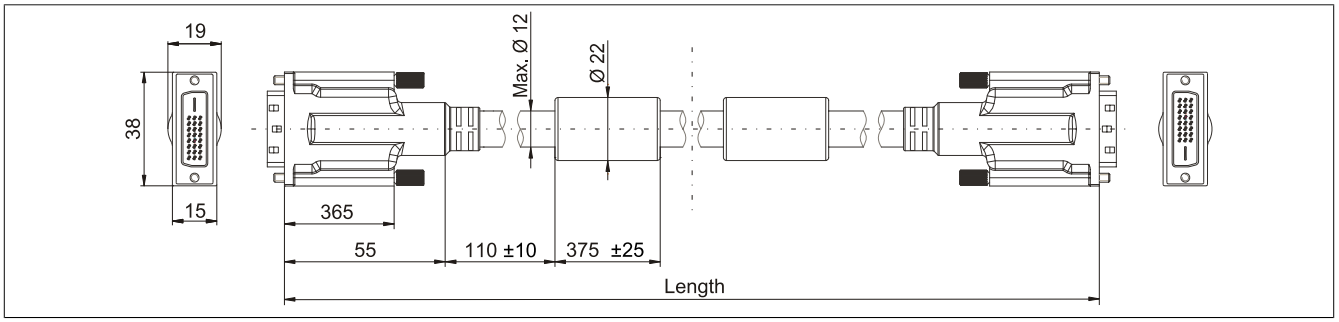


Image 90: 5CASDL.0xxx-03 - Dimensions

Layout

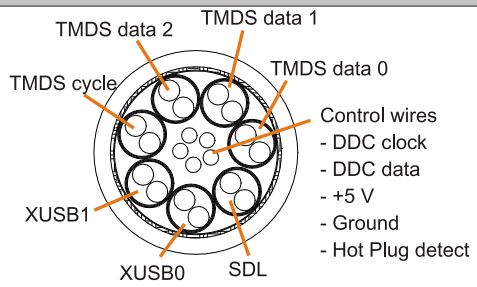
Element	Assignment	Cross section	
DVI	TMDS data 0	26 AWG	
	TMDS data 1	26 AWG	
	TMDS data 2	26 AWG	
	TMDS cycle	26 AWG	
USB	XUSB0	26 AWG	
	XUSB1	26 AWG	
Data	SDL	26 AWG	
Control wires	DDC cycle	24 AWG	
	DDC data	24 AWG	
	+5 V	24 AWG	
	Mass	24 AWG	
	Hot Plug detect	24 AWG	

Table 177: Structure - SDL flex cable 5CASDL.0xxx-03

Cable specifications

Warning!

If you want to build a suitable cable yourself, it should be wired according to these specifications.

If a self-built cable is used, B&R cannot guarantee that it will function properly. B&R guarantees the performance of all cables that they provide.

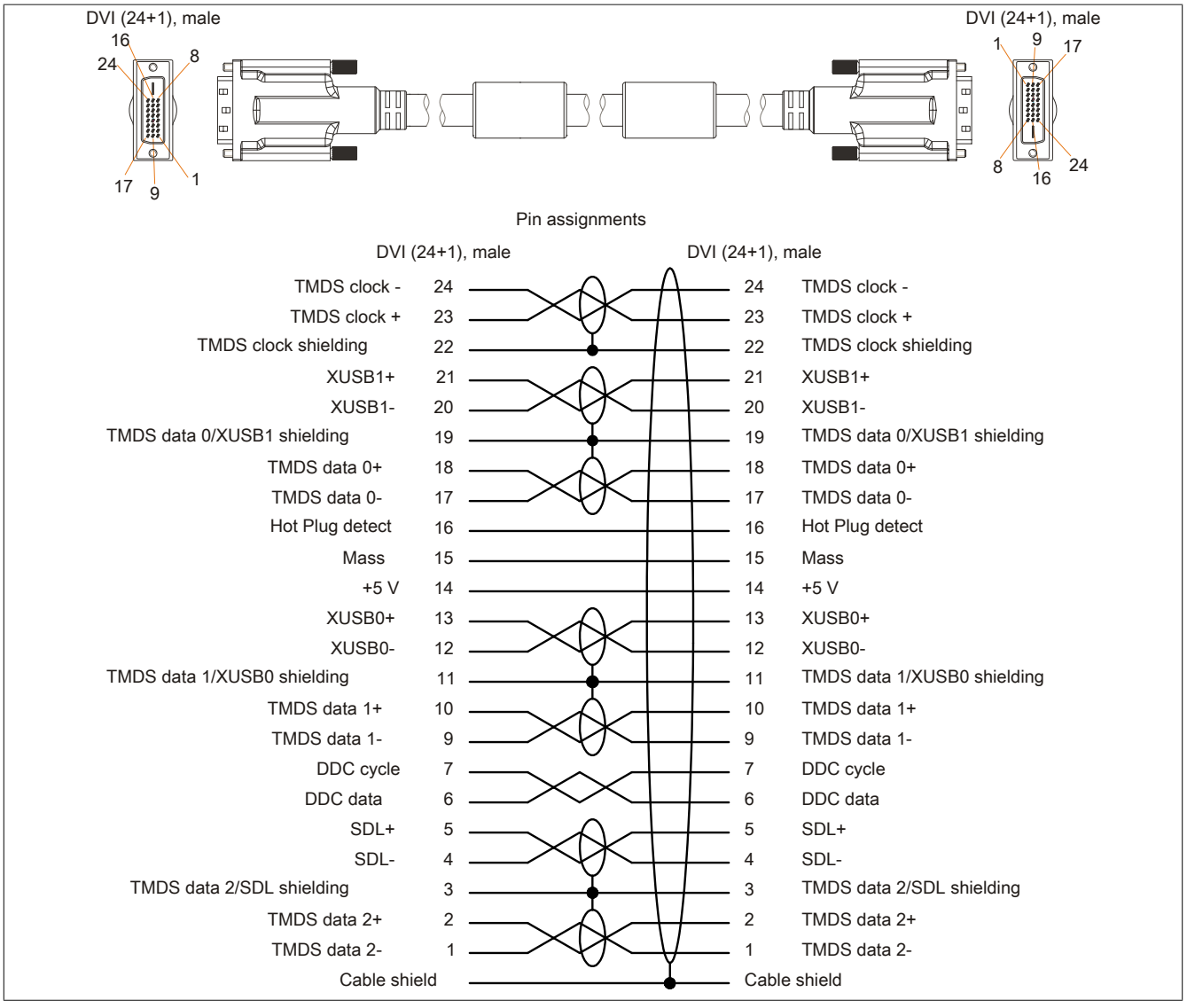


Image 91: 5CASDL.0xxx-03- Pinout

6.5 SDL flex cables with extender

6.5.1 5CASDL.0xx0-13

General information

The 5CASDL.xxxx-13 SDL flex cables with extender are designed for use in both fixed and flexible installations (e.g. in swing arm systems).

Caution!

Cable can only be plugged in and unplugged when the device is turned off.

Order data

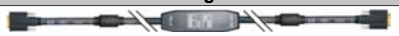
Model number	Short description	Image
	SDL flex cables	
5CASDL.0300-13	SDL cable flex with extender, 30 m.	
5CASDL.0400-13	SDL cable flex with extender, 40 m.	
5CASDL.0430-13	SDL Cable flex with extender, 43 m.	

Table 178: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Order data

Technical data

Product ID	5CASDL.0300-13	5CASDL.0400-13	5CASDL.0430-13
General information			
Certification			
CE		Yes	
c-UL-us		Yes	
Cable structure			
Wire cross section		26 AWG (control wires) 26 AWG (DVI, USB, data)	
Characteristics		Free of halogen and silicon	
Shield		Individual cable pairs and entire cable	
Cable shielding		Aluminum foil clad + tinned copper mesh	
Outer sheathing			
Material		Special TMPU - semi gloss	
Color		Black	
Labeling		(B&R) SDL cable (UL) AWM 20236 80°C 30V E63216	
Connector			
Type		2x DVI-D (24+1), male	
Connection cycles		Min. 200	
Contacts		Gold plated	
Mechanical protection		Metal cover with crimped stress relief	
Electrical properties			
Operating voltage		≤30 V	
Test voltage			
Wire/wire		1 kV	
Wire/shield		0.5 kV	
Wave impedance		100 ±10 Ω	
Conductor resistance			
AWG 24		≤95 Ω/km	
AWG 26		≤145 Ω/km	
Insulation resistance		> 200 MΩ/km	
Operating conditions			
Approbation		UL AWM 20236 80°C 30V	
Flame resistant		In accordance with UL758 (cable vertical flame test)	
Oil and hydrolysis resistance		According to VDE 0282-10	
Environmental conditions			
Temperature			
Storage		-20 to 60°C	
Moving		-5 to 60°C	
Fixed installation		-20 to 60°C	
Mechanical characteristics			
Dimensions			
Length	30 m ± 280 mm	40 m ± 380 mm	43 m ± 410 mm
Diameter		Max. 12 mm	
Extender box			
Width		35 mm	
Length		125 mm	

Table 179: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Technical data

Product ID	5CASDL.0300-13	5CASDL.0400-13	5CASDL.0430-13
Height	18.5 mm		
Flex radius			
Fixed installation	≥ 6x cable diameter (from plug - ferrite magnet) ≥ 10x cable diameter (from ferrite magnet - ferrite magnet)		
Flexible installation	≥ 15x cable diameter (from ferrite magnet - ferrite magnet)		
Flexibility	Flexible; valid for ferrite magnet - ferrite magnet (tested 300,000 cycles with 15x cable diameter, 4800 cycles / hour)		
Drag chain data			
Flex cycles	300.000		
Speed	4800 cycles / hour		
Flex radius	180 mm;15x cable diameter		
Hub	460 mm		
Weight	Approx. 5430 g	Approx. 7200 g	Approx. 7790 g
Tension			
In operation	≤50 N		
During installation	≤400 N		

Table 179: 5CASDL.0300-13, 5CASDL.0400-13, 5CASDL.0430-13 - Technical data

Flex radius specification

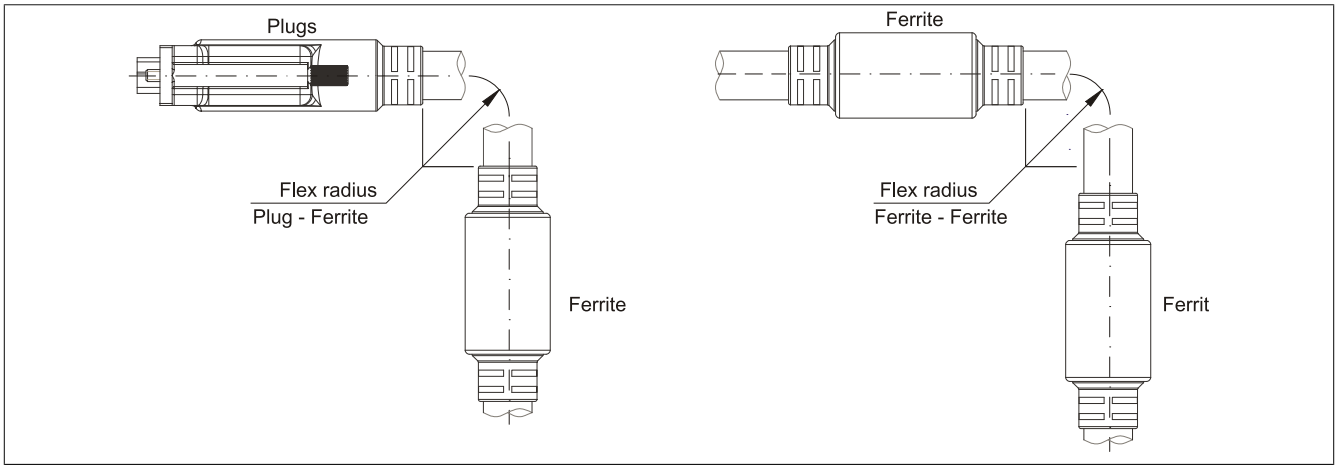


Image 92: Flex radius specification

Dimensions

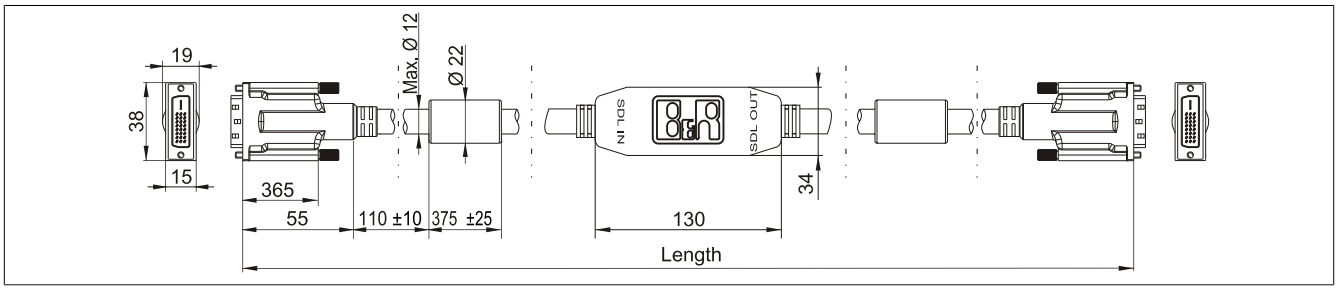


Image 93: 5CASDL.0xx0-13- Dimensions

Cable specifications

Warning!

If you want to build a suitable cable yourself, it should be wired according to these specifications.

If a self-built cable is used, B&R cannot guarantee that it will function properly. B&R guarantees the performance of all cables that they provide.

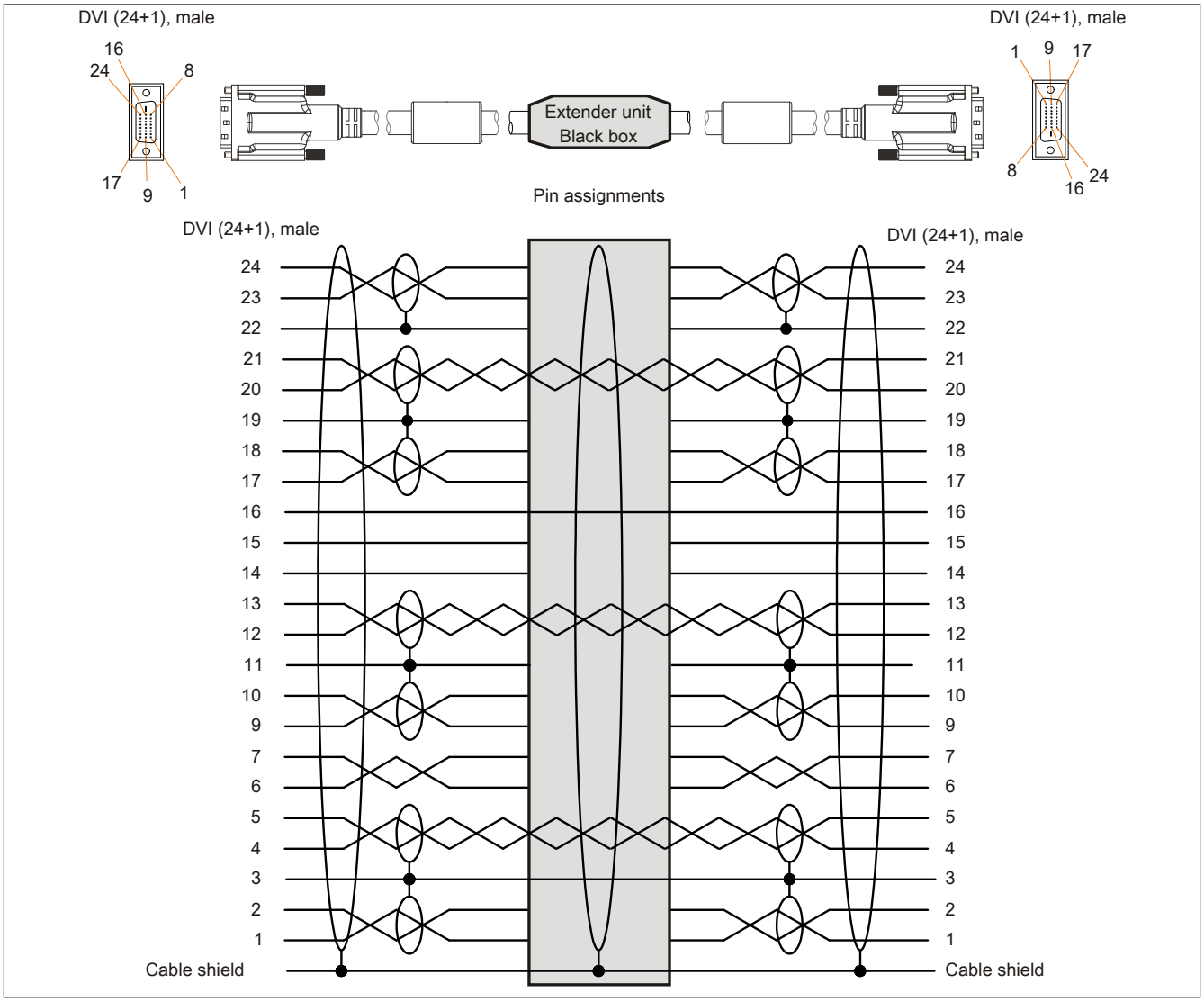


Image 94: 5CASDL.0xx0-13 - Pinout

Cable connection

SDL flex cables with extenders must be connected between the industrial PC and Automation Panel 900 display unit in the correct direction. The signal direction is indicated on the extender unit for this purpose.

• Connect the end labeled "SDL IN" with the video output of e.g. the APC 820 (monitor/panel output) or Panel OUT of an AP900 AP Link card.

• The "SDL OUT" end should be connected to the display unit (e.g. Automation Panel 900) via the Automation Panel Link insert card (Panel IN).

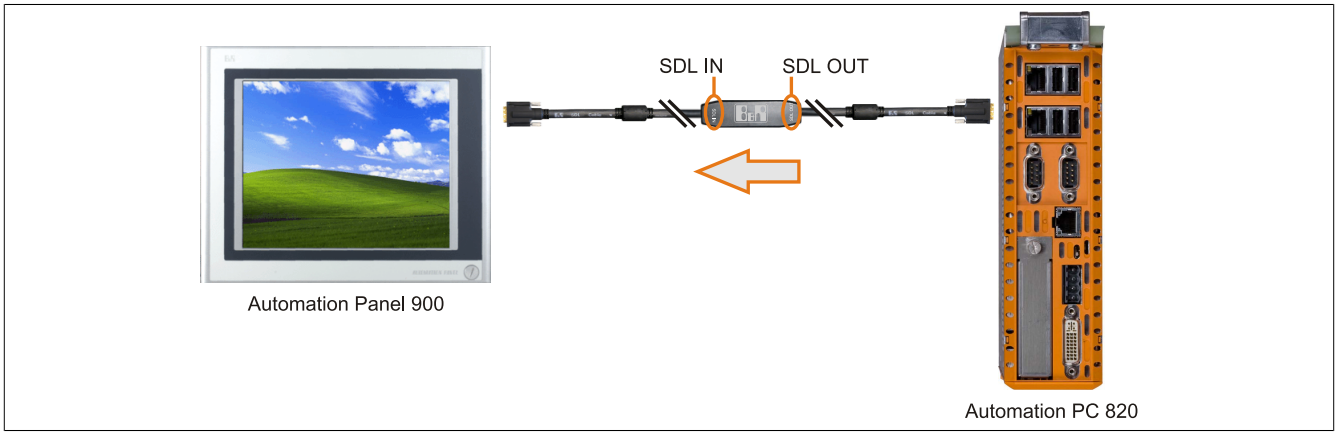


Image 95: Example of signal direction for the SDL flex cable with extender - APC820

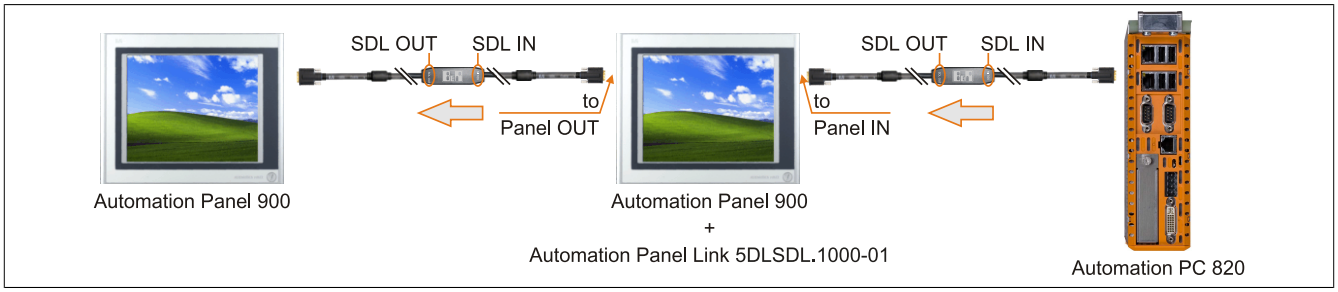


Image 96: Example of signal direction display - SDL flex cable with extender

6.6 USB cables

6.6.1 5CAUSB.00xx-00

General information

USB cables are designed to achieve USB 2.0 transfer speeds.

Order data

Model number	Short description	Image
	USB cables	
5CAUSB.0018-00	USB 2.0 connecting cable type A - type B, 1.8 m.	
5CAUSB.0050-00	USB 2.0 connecting cable type A - type B, 5 m.	

Table 180: 5CAUSB.0018-00, 5CAUSB.0050-00 - Order data

Technical data

Product ID	5CAUSB.0018-00	5CAUSB.0050-00
General information		
Certification		
CE	Yes	
c-UL-us	Yes	
Cable structure		
Wire cross section	AWG 24, 28	
Shield	Entire cable	
Outer sheathing		
Color	Beige	
Connector		
Type	USB type A male and USB type B male	
Mechanical characteristics		
Dimensions		
Length	1.8 m ±30 mm	5 m ± 50 mm
Diameter	Max. 5 mm	
Flex radius	Min. 100 mm	

Table 181: 5CAUSB.0018-00, 5CAUSB.0050-00 - Technical data

Cable specifications

Warning!

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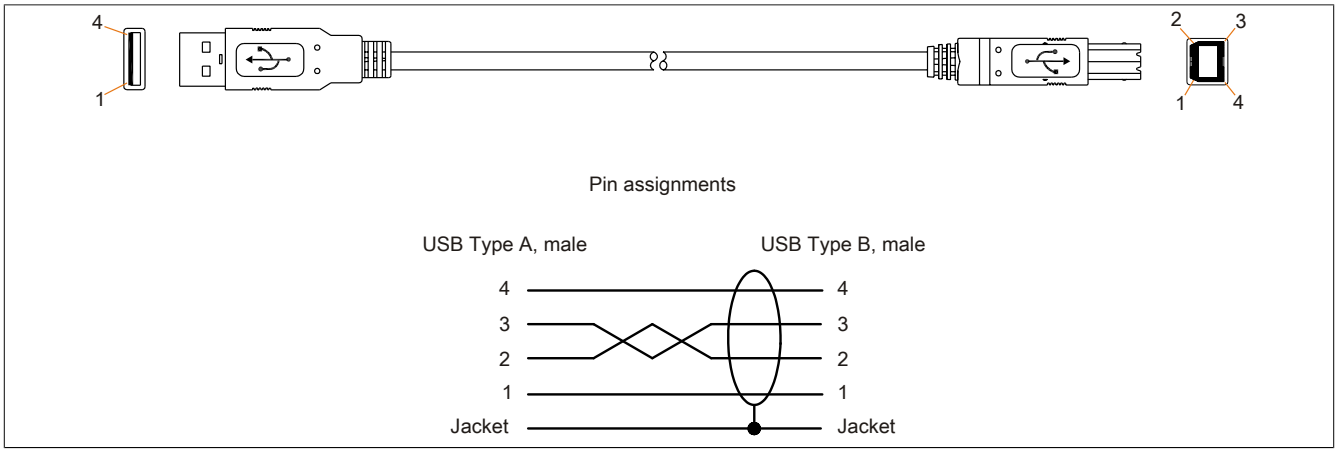


Image 97: 5CAUSB.00xx-00 - USB cable pinout

6.7 RS232 cables

6.7.1 9A0014.xx

Order data

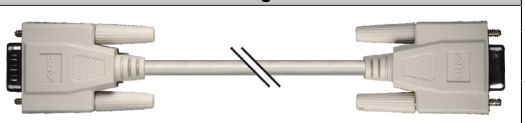
Model number	Short description	Image
	RS232 cables	
9A0014.02	RS232 extension cable for remote operating of a display unit with touch screen, 1.8 m.	
9A0014.05	RS232 extension cable for remote operating of a display unit with touch screen, 5 m.	
9A0014.10	RS232 extension cable for remote operating of a display unit with touch screen, 10 m.	

Table 182: 9A0014.02, 9A0014.05, 9A0014.10 - Order data

Technical data

Product ID	9A0014.02	9A0014.05	9A0014.10
General information			
Certification			
CE		Yes	
Cable structure			
Wire cross section		AWG 26	
Shield		Entire cable	
Outer sheathing			
Color		Beige	
Connector			
Type		9-pin DSUB socket, male / female	
Mechanical characteristics			
Dimensions			
Length	1.8 m ±50 mm	5 m ± 80 mm	10 m ±100 mm
Diameter		Max. 5 mm	
Flex radius		Min. 70 mm	

Table 183: 9A0014.02, 9A0014.05, 9A0014.10 - Technical data

Cable specifications

Warning!

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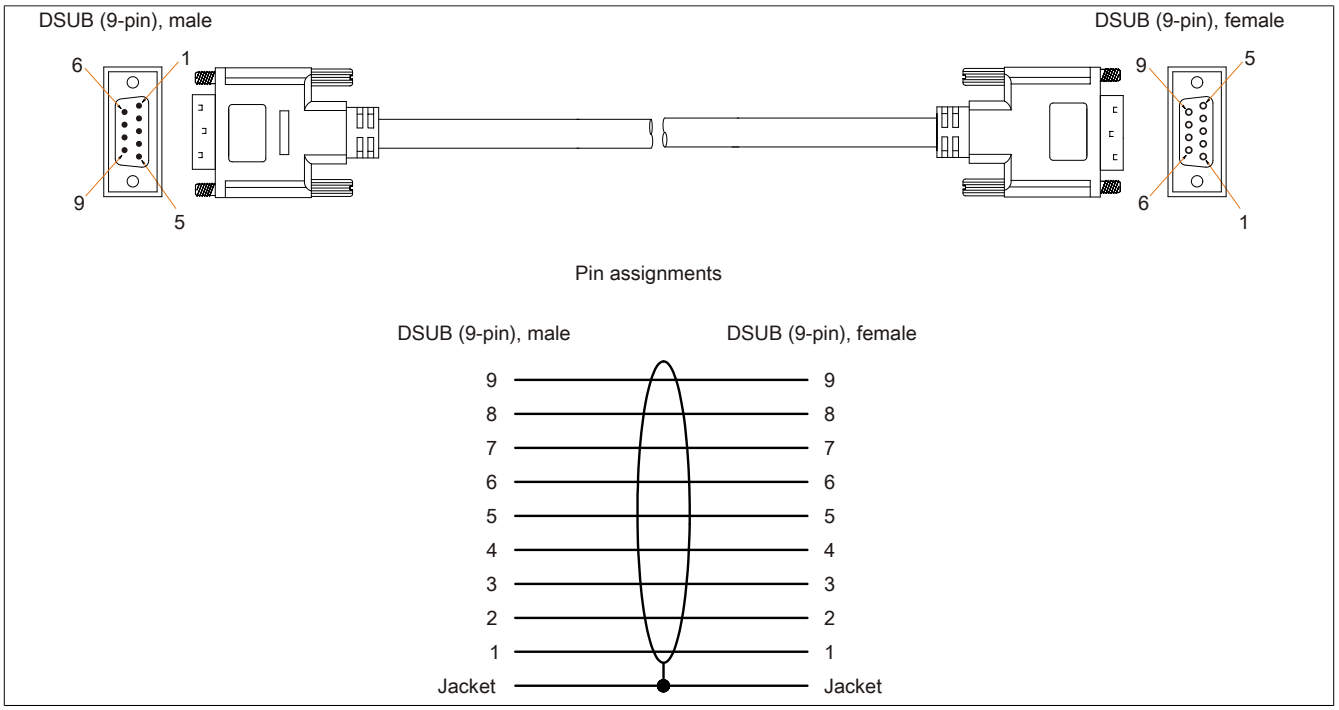

Image 98: 9A0014.xx - RS232 cable pinout

Chapter 6 • Maintenance / Service

The following chapter describes service/maintenance work that can be carried out by a trained, qualified user.

1 Replacing the CompactFlash card

Caution!

Turn off the power before replacing the CompactFlash card!

The CompactFlash card can be exchanged quickly and easily by pressing the ejector (see image) with a pointed object such as a pen.

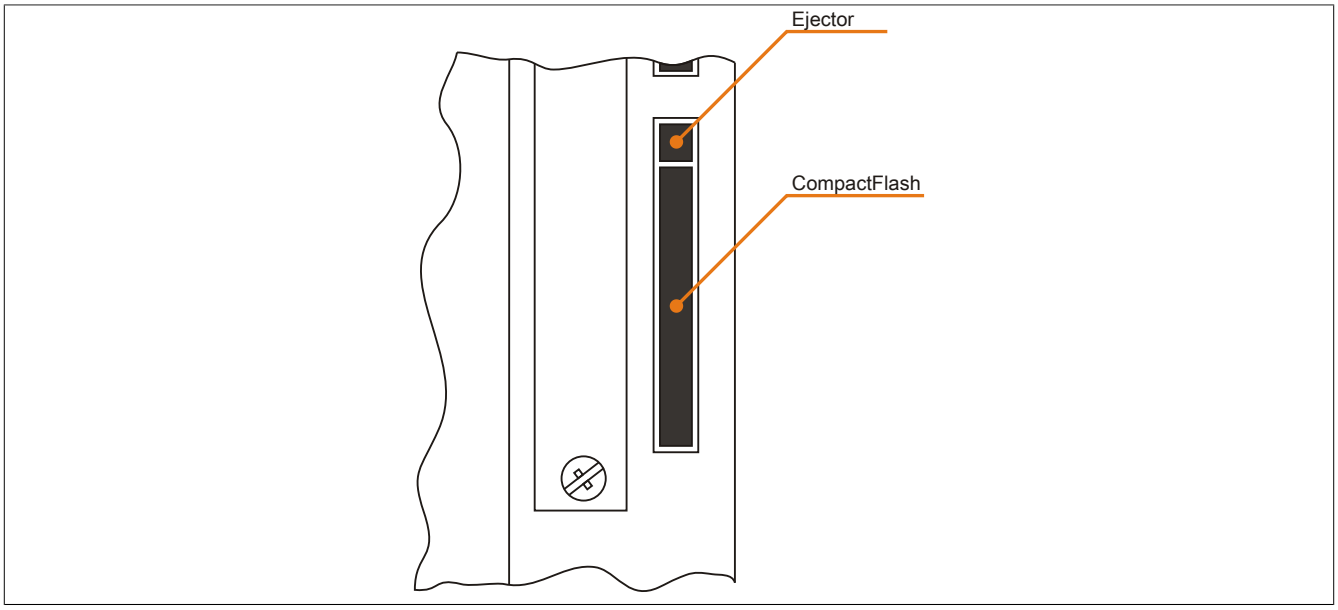

Image 99: CompactFlash + ejector (sample photo)

Appendix A

1 Abbreviations

Abbreviation	Stands for	Description
NC	Normally closed	A normally closed (N.C.) relay contact.
	Not connected	Used in the description of pinout if a terminal or pin is not connected to a module.
ND	Not defined	In data tables, this stands for a value that has not been defined. Because a cable manufacturer does not provide certain technical data, for example.
NO	Normally open	A normally open (N.O.) relay contact.
TBD	To be defined	Used in technical data tables when certain information is not yet available. The value will be provided later.

Table 184: Abbreviations used in this user's manual

A

B

C

D

E

F

H

I

L

M

P

R

S

T

U

W

X