

Panel PC 725

User's Manual

Version: **1.17 (March 2015)**

Model no.: **MAPPC725-ENGPPC725**

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Chapter 1 • General information

1 Manual history

| Version | Date | Change |
|---------|------------|---|
| 1.00 | 06-Jul-10 | <ul style="list-style-type: none"> • First version |
| 1.01 | 22-Oct-10 | <ul style="list-style-type: none"> • Corrected flange dimensions, see 3.4.4 "Dimensions" on page 44. |
| 1.02 | 03-Feb-11 | <ul style="list-style-type: none"> • Updated BIOS to version 1.14. • 6 "Windows 7" on page 121 updated. • 7 "Windows Embedded Standard 7" on page 123 updated. • Updated section 8 "Pixel errors" on page 66. |
| 1.03 | 04-Mar-11 | <ul style="list-style-type: none"> • Changed Windows Embedded Standard 7 model number from 5SWWI7.0729-ENG to 5SWWI7.0729-MUL. |
| 1.04 | 08-Jun-11 | <ul style="list-style-type: none"> • Corrected chipset information of "X945 CPU board" on page 41. • Updated information about worst case conditions on page Temperature specifications and corrected the version number of the Thermal Analysis Tool. • Revised "Configuration - Optional components" on page 18. • Revised sections "B&R Automation Device Interface (ADI) - Control Center" on page 128, "HMI Drivers & Utilities DVD" on page 164 and "B&R Automation Device Interface (ADI) Development Kit" on page 130. • Updated section "B&R Automation Device Interface (ADI) .NET SDK" on page 132. • Corrected information about Windows XP mode in "Features with WES7 (Windows Embedded Standard 7)" on page 124. |
| 1.10 | 29-Apr-13 | <ul style="list-style-type: none"> • Moved section 2.1.3 "Temperature sensor locations" on page 20 to 2 "Technical data". • Moved section "B&R Automation Device Interface (ADI) Development Kit" to 4 "Software". • Revised section "CompactFlash cards". • Revised "Base system configuration" on page 17. • Revised "X945 Advanced - Baseboard/Panel Features - Legacy Devices" on page 93. • Modified "Organization of safety notices" on page 13. Updated descriptions for cautions and warnings. • Added new CompactFlash cards 5CFCRD.xxxx-06 in 6 "Accessories". Discontinued CompactFlash cards 5CFCRD.xxxx-04. • Updated Windows 7 Service Pack 1 (see "Windows 7" on page 121). • Updated Windows Embedded Standard 7 Service Pack 1 (see "Windows Embedded Standard 7" on page 123). • Updated "B&R Automation Device Interface (ADI) - Control Center" on page 128. • Updated "B&R Automation Device Interface (ADI) Development Kit" on page 130 to version 3.40. • Updated "B&R Automation Device Interface (ADI) .NET SDK" on page 132 to version 1.80. • Updated "B&R Key Editor" on page 134 to version 3.30. • Revised entire manual according to current formatting standards. • Revised 5 "Standards and certifications". • Updated drives "5MMSSD.0128-00" on page 53 and "5AC600.SSDI-00" on page 45 in section "Individual components". |
| 1.15 | 26-Mar-14 | <ul style="list-style-type: none"> • Updated B&R USB flash drive 5MMUSB.4096-00, see "USB flash drives" on page 157. • Updated GOST-R certification information in the technical data. • Updated section "GOST-R" on page 137. • Added information about the discontinuation of support for the "Windows XP Professional" on page 117 operating system. • Updated "B&R Automation Device Interface (ADI) - Control Center" on page 128. • Updated "B&R Automation Device Interface (ADI) Development Kit" on page 130. • Updated "B&R Automation Device Interface (ADI) .NET SDK" on page 132. • Updated "B&R Key Editor" on page 134 to version 3.40. • Updated technical data for add-on drive "5AC600.SSDI-00" on page 45. • Changed touch screen controller from Elo to B&R, see technical data for the "System units" on page 31. • Updated section "5-wire AMT touch screen" on page 172. • Updated technical data for "USB flash drives" on page 157. |
| 1.16 | 10/15/2014 | <ul style="list-style-type: none"> • Added new revisions of 5CFCRD.xxxx-06 CompactFlash cards, see "5CFCRD.xxxx-06" on page 143. • Added new revisions of the 5PC725.1505-00 and 5PC725.1505-01 system units, see "System units" on page 31. |
| 1.17 | 2015-03-10 | <ul style="list-style-type: none"> • Updated new revisions of drives "5AC600.SSDI-00" on page 45 and "5MMSSD.0128-00" on page 53 in the section "Individual components". • Updated section "Maximum ambient temperature" on page 19. |

Table 1: Manual history

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 "Electrical components with a housing").
- **Electrical components without a housing**
...are 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 applies in addition to the points listed under "Electrical components with a housing":

- Any persons handling electrical components or devices with installed electrical components must be grounded.
- Components are only permitted to 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.
- Measuring instruments and equipment must be grounded.
- Probes on potential-free measuring instruments 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. If the programmable control system, operating/monitoring device or uninterruptible power supply fails, the user is responsible for ensuring that other connected devices, e.g. motors, are brought to a secure state.

When using programmable logic controllers or operating/monitoring devices as control systems together with a soft PLC (e.g. B&R Automation Runtime or comparable product) or slot PLC (e.g. B&R LS251 or comparable product), safety precautions relevant 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 the installation, commissioning and servicing of devices are only permitted to be carried out by qualified personnel. Qualified personnel are those familiar with the transport, mounting, installation, commissioning and operation of devices 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, moisture, corrosive atmospheres, etc.).

2.5 Installation

- These devices are not ready for use upon delivery and must be installed and wired according to the specifications in this documentation in order for the EMC limit values to apply.
- Installation must be performed according to this documentation using suitable equipment and tools.
- Devices are only permitted to 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 in accordance with applicable guidelines (e.g. line cross sections, fuses, protective ground connections).

2.6 Operation

2.6.1 Protection against touching electrical parts

To operate programmable logic controllers, operating and monitoring devices, and uninterruptible power supplies, certain components must carry dangerous voltage levels. 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 or uninterruptible power supply, the housing must be properly grounded (PE rail). Ground connections must be established even when testing or operating operating/monitoring devices or the uninterruptible power supply for 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, moisture, corrosive 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 corrosive gases can also lead to malfunctions. When combined with high temperature and humidity, corrosive 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 corrosive gases are blackened copper surfaces and cable ends on existing equipment.

For operation in dusty or moist conditions, correctly installed (e.g. cutout installations) operating/monitoring devices like the Automation Panel or Power Panel are protected on the front. The back of all devices must be protected from dust and moisture and cleaned at suitable intervals.

2.6.3 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 disposal

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 and rechargeable batteries Cables | Electronics recycling |
| Cardboard box / Paper packaging | Cardboard box / Paper recycling |
| Plastic packaging | Plastic recycling |

Table 2: Environmentally friendly separation of materials

Disposal must comply with applicable legal regulations.

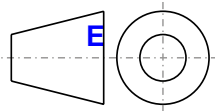
3 Organization of safety notices

Safety notices in this manual are organized as follows:

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

Table 3: Description of the safety notices used in this documentation

4 Guidelines



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

All dimensions are specified in mm.

| Range of nominal sizes | 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 4: Range of nominal sizes

5 Overview

| Product ID | Short description | on page |
|---------------------------|--|---------|
| Batteries | | |
| 0AC201.91 | Lithium batteries 4 pcs., 3 V / 950 mAh button cell We hereby state that the lithium cells contained in this shipment qualify as "partly regulated". Handle with care. If the package is damaged, inspect the cells, repack intact cells and protect the cells against short circuit. For emergency information, call RENATA SA at +41 61 319 28 27. | 138 |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | 138 |
| CPU boards | | |
| 5PC600.X945-00 | CPU board Intel Atom, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 1 slot for SO-DIMM DDR2 RAM module | 41 |
| CompactFlash | | |
| 5CFCRD.016G-06 | CompactFlash 16 GB B&R (SLC) ≤ Rev. D0 | 143 |
| 5CFCRD.032G-06 | CompactFlash 32 GB B&R (SLC) ≤ Rev. C0 | 143 |
| 5CFCRD.0512-06 | CompactFlash 512 MB B&R (SLC) ≤ Rev. E0 | 143 |
| 5CFCRD.1024-06 | CompactFlash 1 GB B&R (SLC) ≤ Rev. E0 | 143 |
| 5CFCRD.2048-06 | CompactFlash 2 GB B&R (SLC) ≤ Rev. E0 | 143 |
| 5CFCRD.4096-06 | CompactFlash 4 GB B&R (SLC) ≤ Rev. E0 | 143 |
| 5CFCRD.8192-06 | CompactFlash 8 GB B&R (SLC) ≤ Rev. E0 | 143 |
| CompactFlash-cards | | |
| 5CFCRD.0064-03 | CompactFlash 64 MB Western Digital (SLC) | 153 |
| 5CFCRD.0128-03 | CompactFlash 128 MB Western Digital (SLC) | 153 |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R (SLC) | 149 |
| 5CFCRD.0256-03 | CompactFlash 256 MB Western Digital (SLC) | 153 |
| 5CFCRD.0512-03 | CompactFlash 512 MB Western Digital (SLC) | 153 |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R (SLC) | 149 |
| 5CFCRD.1024-03 | CompactFlash 1 GB Western Digital (SLC) | 153 |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R (SLC) | 149 |
| 5CFCRD.2048-03 | CompactFlash 2 GB Western Digital (SLC) | 153 |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R (SLC) | 149 |
| 5CFCRD.4096-03 | CompactFlash 4 GB Western Digital (SLC) | 153 |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R (SLC) | 149 |
| 5CFCRD.8192-03 | CompactFlash 8 GB Western Digital (SLC) | 153 |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R (SLC) | 149 |
| Drives | | |
| 5AC600.CFSI-00 | CompactFlash slot (add-on) for installation in an APC620 or Panel PC | 52 |
| 5AC600.HDDI-05 | 40 GB hard disk (add-on) 24/7 operation with extended temperature range. For APC620 and PPC700. Note: Please see the manual for information about using this hard disk. | 48 |
| 5AC600.HDDI-06 | 80 GB Hard Disk (add-on) 24/7 hard disk with extended temperature range. For APC620 and PPC700. Remark: Please see manual for proper use of the hard disk. | 50 |
| 5AC600.SSDI-00 | 128 GB SATA SSD (MLC), add-on; for APC620 and PPC700. Note: Please see the manual for information about using this SSD. | 45 |
| 5MMSSD.0128-00 | 128 GB SSD MLC - Transcend - PATA | 53 |
| Flanges | | |
| 5AC725.FLGC-00 | PPC725 flange coupling | 44 |
| MS-DOS | | |
| 9S0000.01-010 | OEM Microsoft MS-DOS 6.22, German floppy disks, only supplied together with a new PC | 116 |
| 9S0000.01-020 | OEM Microsoft MS-DOS 6.22, English floppy disks, only supplied together with a new PC | 116 |
| Main memory | | |
| 5MMDDR.0512-01 | SO-DIMM DDR2 RAM 512 MB PC2-5300 | 43 |
| 5MMDDR.1024-01 | SO-DIMM DDR2 RAM 1024 MB PC2-5300 | 43 |
| 5MMDDR.2048-01 | SO-DIMM DDR2 RAM 2048 MB PC2-5300 | 43 |
| Other | | |
| 5SWHMI.0000-00 | HMI Drivers & Utilities DVD | 164 |
| RS232 cables | | |
| 9A0014.02 | RS232 extension cable for remote operation of a display unit with touch screen, 1.8 m | 162 |
| 9A0014.05 | RS232 extension cable for remote operation of a display unit with touch screen, 5 m | 162 |
| 9A0014.10 | RS232 extension cable for remote operation of a display unit with touch screen, 10 m | 162 |
| System units | | |
| 5PC725.1505-00 | Panel PC 725 15" XGA; 15" XGA color TFT display with touch screen (resistive); connections for 1x RS232, 3x USB 2.0, 2x Ethernet 10/100, IP65 protection; 24 VDC. Flange mounting on the top. Order connector for power supply separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91). | 31 |
| 5PC725.1505-01 | Panel PC 725 15" XGA; 15" XGA color TFT display with touch screen (resistive); connections for 1x RS232, 3x USB 2.0, 2x Ethernet 10/100, IP65 protection; 24 VDC. Flange mounting on the bottom. Order connector for power supply separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91). | 36 |
| Terminal blocks | | |
| 0TB103.9 | Connector 24 VDC - 3-pin female - Screw clamps 3.31 mm ² | 140 |
| 0TB103.91 | Connector 24 VDC - 3-pin female - Cage clamps 3.31 mm ² | 140 |
| USB accessories | | |
| 5MMUSB.2048-00 | USB 2.0 flash drive, 2048 MB | 157 |
| 5MMUSB.2048-01 | USB 2.0 flash drive, 2048 MB, B&R | 159 |
| 5MMUSB.4096-01 | USB 2.0 flash drive, 4096 MB, B&R | 159 |
| USB cables | | |
| 5CAUSB.0018-00 | USB 2.0 connection cable type A - type B, 1.8 m | 161 |
| 5CAUSB.0050-00 | USB 2.0 connection cable type A - type B, 5 m | 161 |

| Product ID | Short description | on page |
|--|---|---------|
| Windows 7 Professional/Ultimate | | |
| 5SWWI7.0100-ENG | Windows 7 Professional - 32-bit - English - DVD | 121 |
| 5SWWI7.0100-GER | Windows 7 Professional - 32-bit - German - DVD | 121 |
| 5SWWI7.0300-MUL | Windows 7 Professional - 32-bit - Multilingual - DVD | 121 |
| 5SWWI7.1100-ENG | Windows 7 Professional SP1 - 32-bit - English - DVD | 121 |
| 5SWWI7.1100-GER | Windows 7 Professional SP1 - 32-bit - German - DVD | 121 |
| 5SWWI7.1300-MUL | Windows 7 Ultimate SP1 - 32-bit - Multilingual - DVD | 121 |
| Windows CE 6.0 | | |
| 5SWWCE.0829-ENG | Microsoft OEM Windows CE 6.0 Professional, English; for PPC700 with 945GME chipset; order CompactFlash separately (at least 128 MB) | 126 |
| Windows Embedded Standard 2009 | | |
| 5SWWXP.0729-ENG | Microsoft OEM Windows Embedded Standard 2009, English; for PPC700 with 945GME chipset; order CompactFlash separately (at least 1 GB). | 119 |
| Windows Embedded Standard 7 | | |
| 5SWWI7.0529-ENG | Microsoft OEM Windows Embedded Standard 7 32-bit, English; for PPC700 with 945GME chipset; order CompactFlash separately (at least 8 GB) | 123 |
| 5SWWI7.0729-MUL | Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, multilingual; for PPC700 with 945GME chipset; order CompactFlash separately (at least 8 GB) | 123 |
| 5SWWI7.1529-ENG | Microsoft OEM Windows Embedded Standard 7 32-bit, Service Pack 1, English; for PPC700 with 945GME chipset; order CompactFlash separately (at least 16 GB). | 123 |
| 5SWWI7.1729-MUL | Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, Service Pack 1, multilingual; for PPC700 with 945GME chipset; order CompactFlash separately (at least 16 GB). | 123 |
| Windows XP Professional | | |
| 5SWWXP.0500-ENG | Microsoft OEM Windows XP Professional Service Pack 2c, CD, English. Only available with a new device. | 117 |
| 5SWWXP.0500-GER | Microsoft OEM Windows XP Professional Service Pack 2c, CD, German. Only available with a new device. | 117 |
| 5SWWXP.0500-MUL | Microsoft OEM Windows XP Professional Service Pack 2c, CD, multilingual. Only available with a new device. | 117 |
| 5SWWXP.0600-ENG | Windows XP Professional SP3 - English - CD | 117 |
| 5SWWXP.0600-GER | Windows XP Professional SP3 - German - CD | 117 |
| 5SWWXP.0600-MUL | Windows XP Professional SP3 - Multilingual - CD | 117 |

Chapter 2 • Technical data

1 Introduction

The Panel PC 725 is designed exclusively for operation in the field. Built with IP65 protection from all sides, it can easily handle splashed water, impacts and vibrations. Support arm mounting allows flexible positioning, providing an ergonomic user interface even in cramped spaces. Panel PCs with IP65 protection usually require expensive IP65 connectors, whereas the cabling for the Panel PC 725 is fed through the flange. This makes it possible to use inexpensive standard cables.

The Panel PC 725 provides extensive PC resources in a highly compact design. With two Ethernet interfaces, three USB 2.0 ports and a serial interface, communication is ensured both at the machine level as well as across the company network. Interfaces are easy to access behind the flange cover. A separate cover conceals the battery and CompactFlash card, making servicing a cinch.



1.1 Features

- 15" diagonal
- Intel® Atom™ N270 1.6 GHz processor
- CompactFlash slot (type I)
- 24 VDC supply voltage
- 3x USB 2.0
- 2x Ethernet 10/100 Mbit interfaces
- 1x RS232 interface, modem-compatible
- Add-on interface options
- Up to 2 GB main memory
- Optional built-in add-on drive
- Flange output on top or bottom
- Real-time clock (RTC, battery-backed)
- Fanless operation
- IP65 protection

1.2 System components / Configuration

The PPC725 system can be assembled to meet individual requirements and operating conditions.

The following components are absolutely essential for operation:

- System unit (with flange on top or bottom)
- CPU board
- Main memory
- Drive (mass storage device such as CompactFlash card or hard disk) for the operating system
- Flange
- Operating system

1.2.1 Configuration - Base system


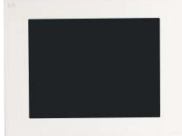



| Base system configuration | | |
|--|---|--|
| System unit | Select one | |
| A system unit consists of a housing and a mainboard. |  5PC725.1505-00 Flange mounting on the top |  5PC725.1505-01 Flange mounting on the bottom |
| | CPU board - Main memory - Flange | |
| CPU board | Select one | |
|  | 5PC600.X945-00 - Atom™ N270, 1.6 GHz | |
| Main memory | Select 1 (max. 2 GB can be used) |  |
| | | 5MMDDR.0512-01 - 512 MB 5MMDDR.1024-01 - 1 GB 5MMDDR.2048-01 - 2 GB |
| Flange | Select one |  |
| | | 5AC725.FLGC-00 |

Figure 1: Base system configuration

1.2.2 Configuration - Optional components











| Configuration - Software and accessories | | | | | | | |
|---|---|---|--|--------------------------------------|---|--|---|
| System unit Select one A system unit consists of a housing and a main board. | <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  5PC725.1505-00 Flange mounting on the top </div> <div style="text-align: center;">  5PC725.1505-01 Flange mounting on the bottom </div> </div> | | | | | | |
| Drives  | Select one 5AC600.SSDI-00 (128 GB SSD) 5AC600.HDDI-06 (80 GB HDD) 5AC600.CFSI-00 (CompactFlash Slot) | | | | | | |
| CompactFlash  | Select one or two 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06 5CFCRD.032G-06 | | | | | | |
| Software      | Select one <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;"> Windows XP 5SWWXP.0500-ENG 5SWWXP.0500-GER 5SWWXP.0500-MUL 5SWWXP.0600-ENG 5SWWXP.0600-GER 5SWWXP.0600-MUL </td> <td style="vertical-align: top;"> Windows Embedded Standard 2009 5SWWXP.0729-ENG </td> <td style="vertical-align: top;"> Windows CE 5SWWCE.0829-ENG </td> </tr> <tr> <td style="vertical-align: top;"> Windows 7 5SWWI7.1100-ENG 5SWWI7.1100-GER 5SWWI7.1300-MUL </td> <td style="vertical-align: top;"> Windows Embedded Standard 7 5SWWI7.1529-ENG 5SWWI7.1729-MUL </td> <td style="vertical-align: top;"> MS-DOS 9S0000.01-010 9S0000.01-020 </td> </tr> </table> | Windows XP 5SWWXP.0500-ENG 5SWWXP.0500-GER 5SWWXP.0500-MUL 5SWWXP.0600-ENG 5SWWXP.0600-GER 5SWWXP.0600-MUL | Windows Embedded Standard 2009 5SWWXP.0729-ENG | Windows CE 5SWWCE.0829-ENG | Windows 7 5SWWI7.1100-ENG 5SWWI7.1100-GER 5SWWI7.1300-MUL | Windows Embedded Standard 7 5SWWI7.1529-ENG 5SWWI7.1729-MUL | MS-DOS 9S0000.01-010 9S0000.01-020 |
| Windows XP 5SWWXP.0500-ENG 5SWWXP.0500-GER 5SWWXP.0500-MUL 5SWWXP.0600-ENG 5SWWXP.0600-GER 5SWWXP.0600-MUL | Windows Embedded Standard 2009 5SWWXP.0729-ENG | Windows CE 5SWWCE.0829-ENG | | | | | |
| Windows 7 5SWWI7.1100-ENG 5SWWI7.1100-GER 5SWWI7.1300-MUL | Windows Embedded Standard 7 5SWWI7.1529-ENG 5SWWI7.1729-MUL | MS-DOS 9S0000.01-010 9S0000.01-020 | | | | | |
| Terminal blocks  | Select one Supply voltage plug 0TB103.9 0TB103.91 | | | | | | |

Figure 2: Configuration - Optional components

2 Complete system

2.1 Temperature specifications

CPU boards can be combined with various other components such as drives, main memory, additional plug-in cards, etc. depending on the system unit. The many different configurations possible result in varying maximum ambient temperatures, which can be seen in the following table in this section.

Information:

The maximum specified ambient temperatures for operation with and without a fan kit have been determined under worst-case conditions. Experience has shown that higher ambient temperatures can be reached in typical applications, e.g. those in Microsoft Windows. Testing and evaluation must be performed on-site by the user (temperatures can be read in BIOS or with the B&R Control Center).

Information regarding worst-case conditions

- Thermal Analysis Tool (TAT V3.8.1) 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 interface, USB interfaces)
- Maximum system expansion and power consumption

2.1.1 Maximum ambient temperature

| | | All temperature values in degrees Celsius (°C) at 500 meters above sea level. | | | |
|----------------------|------------------------------------|---|----|--------------|--|
| | | The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level). | | | |
| | | Maximum ambient temperature | | 50 | |
| | | What else can also be operated at the max. ambient temperature, or are there any limits? | | | |
| Add-on drives | Onboard CompactFlash ¹⁾ | ✓ | 80 | Board I/O | |
| | 5AC600.SSDI-00 ≤ Rev. D0 | ✓ | 75 | | |
| | 5AC600.SSDI-00 ≥ Rev. E0 | ✓ | 80 | | |
| | 5AC600.CFSI-00 | ✓ | 80 | | |
| | 5AC600.HDDI-05 | ✓ | 80 | | |
| | 5AC600.HDDI-06 | ✓ | 80 | | |
| Main memory | 5MMDDR.0512-01 | ✓ | - | | |
| | 5MMDDR.1024-01 | ✓ | - | | |
| | 5MMDDR.2048-01 | ✓ | - | | |
| System units | 5PC725.1505-00 | ✓ | 76 | Power supply | |
| | 5PC725.1505-01 | ✓ | 76 | | |

1) Only possible with a CompactFlash card from B&R that is compatible with the device.

Table 5: Ambient temperatures

2.1.1.1 How is the maximum ambient temperature determined?

1. The lines under "Maximum ambient temperature" shows the maximum ambient temperature for a fully assembled device (= system unit + CPU board).

Information:

Maximum temperature data is for operation at 500 meters. The maximum ambient temperature is typically derated by 1°C per 1000 meters (starting at 500 meters above sea level).

2. Incorporating additional drives (add-on) can change the temperature limits of a Panel PC system.

If there is a "✓" next to the component, it can be used at the maximum ambient temperature of the complete system without problems.

If there is a specific temperature, for example "35", next to the component, then the ambient temperature of the complete Panel PC 725 system cannot exceed this temperature.

2.1.2 Temperature monitoring

Sensors monitor temperature values at different locations in the PPC725 (inside CPU, CPU board, power supply, board I/O). The location of these temperature sensors can be seen in 2.1.3 "Temperature sensor locations" on page 20. The value listed in the table represents the defined maximum temperature for this measurement point. An alarm is not triggered if this temperature is exceeded. The temperatures¹⁾ can be read in BIOS (menu item Advanced - Baseboard/Panel Features - Baseboard Monitor) or in approved Microsoft Windows operating systems using the B&R Control Center.

In addition, the hard disks for PPC725 systems available from B&R are equipped with S.M.A.R.T, or Self-Monitoring, Analysis, and Reporting Technology. This makes it possible to read various parameters, e.g. temperature, using software (such as HDD Thermometer, a freeware program) on approved Microsoft operating systems (except Windows CE).

2.1.3 Temperature sensor locations

Sensors monitor temperature values at different locations in the PPC725 (inside CPU, CPU board, power supply, board I/O). The temperatures¹⁾ can be read in BIOS (Advanced - Baseboard/Panel features) or in Microsoft Windows operating systems via the B&R Control Center²⁾.

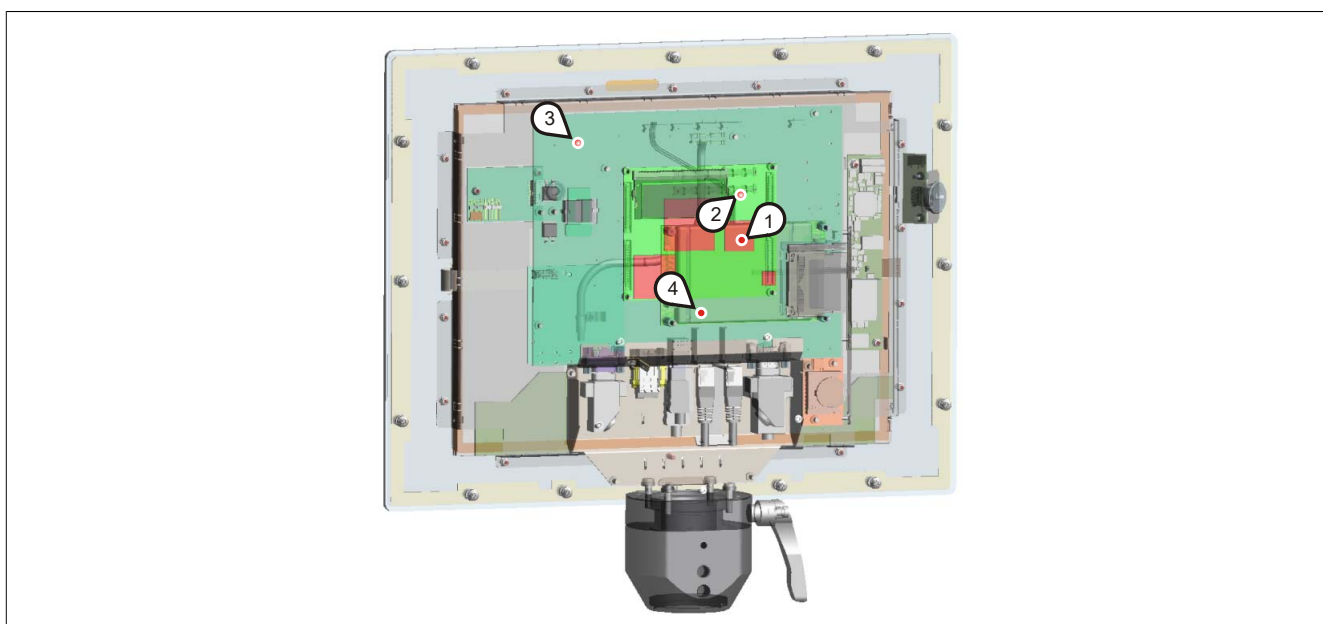


Figure 3: Temperature sensor positions

| Position | Measurement point for | Measurement | Max. specified |
|----------|-----------------------|---|----------------|
| 1 | CPU internal | Ambient temperature of the processor (sensor integrated in the processor) | 84°C |
| 2 | CPU board | CPU board temperature (sensor integrated in the CPU board). | 91°C |
| 3 | Power supply | Power supply temperature (sensor on the power supply) | 76°C |
| 4 | Board I/O | Board I/O area temperature (sensor on the baseboard, close to the ETH2 controller). | 75°C |

Table 6: Temperature sensor locations

¹⁾ The measured temperature approximates the immediate ambient temperature, but can be influenced by neighboring components.

¹⁾ The temperature measured approximates the immediate ambient temperature but may also be influenced by neighboring components.

²⁾ The ADI driver that includes the B&R Control Center is available in the Downloads section of the B&R website (www.br-automation.com).

2.2 Humidity specifications

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

| Component | | Operation | Storage / Transport |
|---------------------------|-----------------------------------|-----------|---------------------|
| X945 CPU board | | 10 to 90% | 5 to 95% |
| Main memory for CPU board | | 10 to 90% | 5 to 95% |
| Add-on drives | 5AC600.SSDI-00 ≤ Rev. D0 | 0 to 95% | 0 to 95% |
| | 5AC600.SSDI-00 ≥ Rev. E0 | 10 to 95% | 10 to 95% |
| | 5AC600.HDDI-05 | 5 to 90% | 5 to 95% |
| | 5AC600.HDDI-06 | 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-xx flash drive | 10 to 90% | 5 to 90% |

Table 7: Humidity specifications

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

2.3 Power management

2.3.1 Voltage supply block diagram

The following block diagram illustrates the simplified structure of the PPC725 voltage supply.

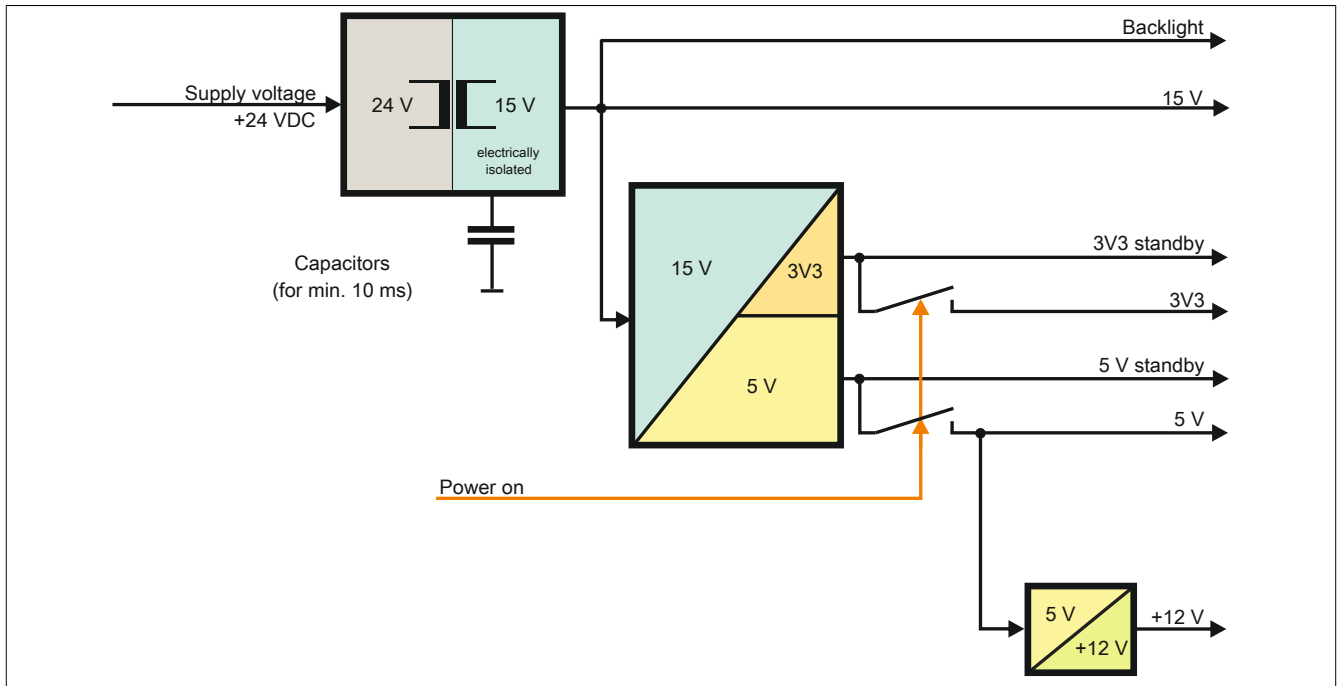


Figure 4: Supply voltage block diagram

Description

15 V is generated from the supply voltage using a DC-to-DC converter. This electrically isolated 15 V supplies additional DC-to-DC converters that generate the remaining voltage.

After the system is turned on (e.g. using the power button), the 3V3 and 5 V voltages are applied to the bus. An additional DC-to-DC converter generates +12 V.

2.4 Device interfaces and slots

2.4.1 +24 VDC power supply

PPC725 system units have a 24 VDC ATX compatible power supply.

The 3-pin male connector required for the power supply interface is not included in delivery. It can be ordered from B&R using model number 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp). The pinout is listed in the following table. The supply voltage is protected internally (10 A fast-acting fuse) 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).

| Power supply | |
|------------------------------------|---|
| Protected against reverse polarity | |
| Pin | Description |
| 1 | + |
| 2 | Functional ground |
| 3 | - |
| Model number | Short description |
| Terminal blocks | |
| 0TB103.9 | Male connector 24 V 5.08 3-pin screw clamps |
| 0TB103.91 | Male connector 24 V 5.08 3-pin cage clamps |

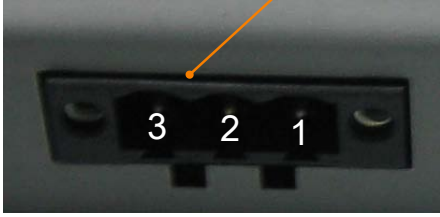


Table 8: Supply voltage connection

2.4.2 Grounding

Caution!

Functional ground (pin 2 of power supply and ground connection) must be kept as short as possible and connected to the largest possible wire cross section at the central grounding point (e.g. the control cabinet or system).

A functional grounding clip is located next to the supply voltage connector. This grounding clip (functional ground) must be connected to a central grounding point on the control cabinet using a 6.3 mm tab connector and the shortest possible line with the least resistance possible (e.g. copper strip, at least 2.5 mm²).



Figure 5: Grounding clip

2.4.3 COM serial interface

| COM serial interface | |
|----------------------|---|
| RS232 | |
| Type | RS232, modem-capable, not electrically isolated |
| UART | 16550-compatible, 16-byte FIFO |
| Transfer rate | Max. 115 kbit/s |
| Bus length | Max. 15 m |
| Pin | Assignment |
| 1 | DCD |
| 2 | RXD |
| 3 | TXD |
| 4 | DTR |
| 5 | GND |
| 6 | DSR |
| 7 | RTS |
| 8 | CTS |
| 9 | RI |

9-pin male DSUB connector

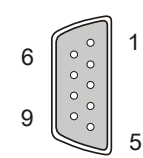


Table 9: COM - Pinout

I/O address and IRQ

| Resource | Default setting | Additional setting options |
|-------------|-----------------|----------------------------|
| I/O address | 2F8 | 3F8, 2E8 |
| IRQ | IRQ3 | IRQ4 |

Table 10: COM - I/O address and IRQ

The setting for the I/O address and IRQ can be changed in BIOS (Advanced - I/O device configuration - Serial port 2). It is possible for conflicts with other resources to occur when changing this setting.

2.4.4 Ethernet 1 (ETH1)

This Ethernet interface is integrated in the CPU board being used.

| Ethernet 1 interface (ETH1 ¹⁾) | | |
|--|--|---|
| Controller | Intel 82562 | |
| Cabling | S/STP (Cat 5e) | |
| Transfer rate | 10/100 Mbit/s ²⁾ | |
| Cable length | Max. 100 m (min. Cat 5e) | |
| LED | On | Off |
| Green | 100 Mbit/s | 10 Mbit/s |
| Orange | Link (Ethernet network connection available) | Activity (blinking) (data transfer in progress) |

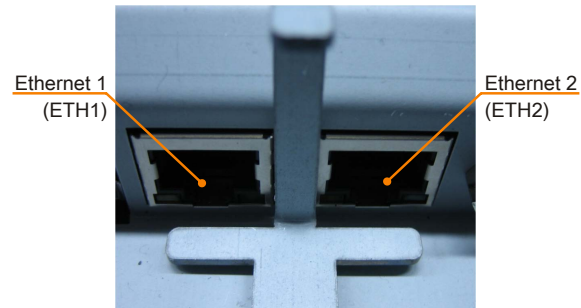


Table 11: Ethernet interface (ETH1)

- 1) The interfaces, etc. available on the device or module have been numbered as such for easy identification. This numbering may differ from that used by the particular operating system.
- 2) Both operating modes possible. Switching takes place automatically.

Driver support

A special driver is required in order to operate the Intel 82562 Ethernet controller. Drivers for approved operating systems are available in the Downloads section of the B&R website www.br-automation.com.

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

2.4.5 Ethernet 2 (ETH2)

This Ethernet interface is integrated in the system unit.

| Ethernet 2 interface (ETH2 ¹⁾) | | |
|--|--|---|
| Controller | Intel 82551ER | |
| Cabling | S/STP (Cat 5e) | |
| Transfer rate | 10/100 Mbit/s ²⁾ | |
| Cable length | Max. 100 m (min. Cat 5e) | |
| Speed LED | On | Off |
| Green | 100 Mbit/s | 10 Mbit/s |
| Orange | Link (Ethernet network connection available) | Activity (blinking) (data transfer in progress) |

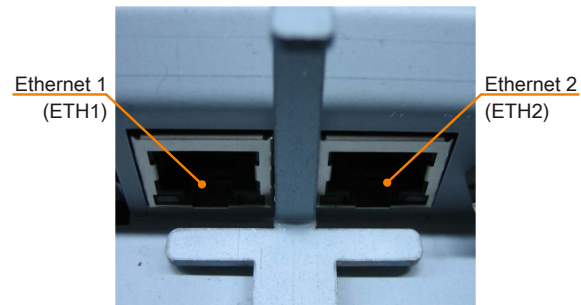


Table 12: Ethernet interface (ETH1)

- 1) The interfaces, etc. available on the device or module have been numbered as such for easy identification. This numbering may differ from that used by the particular operating system.
- 2) Both operating modes possible. Switching takes place automatically.

Driver support

A special driver is required in order to operate the Intel 82551ER Ethernet controller. Drivers for approved operating systems are available in the Downloads section of the B&R website www.br-automation.com.

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

2.4.6 USB interfaces

The PPC725 features a USB 2.0 (Universal Serial Bus) host controller with multiple USB interfaces, 3 of which are accessible externally for the user.

Warning!

Peripheral USB devices can be connected to the USB interfaces on this device. Due to the vast number of USB devices available on the market, B&R cannot guarantee their performance. All USB devices provided by B&R are guaranteed to function properly.

Warning!

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

2.4.6.1 USB1, 2

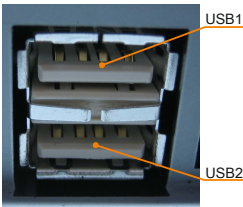
| Universal Serial Bus (USB1 and USB2 ¹⁾) | | |
|---|---|---|
| Type | USB 2.0 | USB type A, female  |
| Design | Type A | |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) | |
| Current load USB1, USB2 | Max. 500 mA ²⁾ | |
| Cable length | Max. 5 m (without hub) | |
| | | |

Table 13: USB connection (back)

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

2.4.6.2 USB3

The USB 3 port is on the side of the PPC725 behind the cover.


| Universal Serial Bus (USB3 ¹⁾) | | |
|--|---|--|
| Type | USB 2.0 | 1x 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) | |
| Power supply ²⁾ USB3 | Max. 500 mA | |
| Cable length | Max. 5 m (without hub) | |
| | | |

Table 14: USB3 interface

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

Driver support

For optimal functionality of USB 2.0 (transfer speed up to 480 Mbit/s) with Windows XP, Service Pack 1 or higher must be installed. Without this Service Pack, Windows XP will only support USB 1.1.

USB 2.0 is already integrated in B&R's Windows XP Embedded and Windows Embedded Standard 2009 operating systems.

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

2.4.7 CompactFlash slot (CF1)

This CompactFlash slot is a standard component of an PPC725 system and is defined in BIOS as the primary master drive.

| CompactFlash slot (CF1) | |
|-------------------------|---------------------------|
| Connection | Primary master IDE device |
| CompactFlash Type | Type I |
| Model number | Short description |
| CompactFlash | |
| 5CFCRD.0512-06 | CompactFlash 512 MB B&R |
| 5CFCRD.1024-06 | CompactFlash 1024 MB B&R |
| 5CFCRD.2048-06 | CompactFlash 2048 MB B&R |
| 5CFCRD.4096-06 | CompactFlash 4096 MB B&R |
| 5CFCRD.8192-06 | CompactFlash 8192 MB B&R |
| 5CFCRD.016G-06 | CompactFlash 16 GB B&R |
| 5CFCRD.032G-06 | CompactFlash 32 GB B&R |
| 5CFCRD.0064-03 | CompactFlash 64 MB WD |
| 5CFCRD.0128-03 | CompactFlash 128 MB WD |
| 5CFCRD.0256-03 | CompactFlash 256 MB WD |
| 5CFCRD.0512-03 | CompactFlash 512 MB WD |
| 5CFCRD.1024-03 | CompactFlash 1024 MB WD |
| 5CFCRD.2048-03 | CompactFlash 2048 MB WD |
| 5CFCRD.4096-03 | CompactFlash 4096 MB WD |
| 5CFCRD.8192-03 | CompactFlash 8192 MB WD |

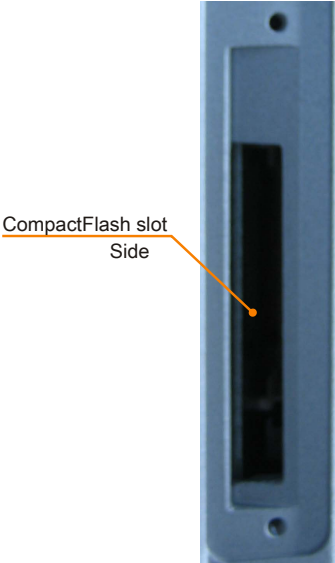


Table 15: CompactFlash slot (CF1)

Warning!

Power must be turned off before inserting or removing CompactFlash cards.

2.4.8 Hard disk / CompactFlash slot (HDD/CF2)

This slot allows a hard disk or second CompactFlash slot to be installed as a so-called add-on drive. An add-on drive is managed as the primary slave drive in BIOS.

Information:

Add-on drives can only be installed at B&R. Therefore, they need to be requested when placing an order.

| Hard disk / CompactFlash slot (HDD/CF2) | |
|---|---------------------------------------|
| Connection | Primary slave IDE device |
| Model number | Short description |
| | Drives |
| 5AC600.SSDI-00 | Add-on solid state drive (MLC) 128 GB |
| 5AC600.HDDI-05 | Add-on hard disk 40 GB ET, 24/7 |
| 5AC600.HDDI-06 | Add-on hard disk 80 GB ET, 24/7 |
| | |
| CompactFlash Type | Type I |
| Model number | Short description |
| | Drives |
| 5AC600.CFSI-00 | Add-on CompactFlash slot |
| | CompactFlash |
| 5CFCRD.0512-06 | CompactFlash 512 MB B&R |
| 5CFCRD.1024-06 | CompactFlash 1024 MB B&R |
| 5CFCRD.2048-06 | CompactFlash 2048 MB B&R |
| 5CFCRD.4096-06 | CompactFlash 4096 MB B&R |
| 5CFCRD.8192-06 | CompactFlash 8192 MB B&R |
| 5CFCRD.016G-06 | CompactFlash 16 GB B&R |
| 5CFCRD.032G-06 | CompactFlash 32 GB B&R |
| 5CFCRD.0064-03 | CompactFlash 64 MB WD |
| 5CFCRD.0128-03 | CompactFlash 128 MB WD |
| 5CFCRD.0256-03 | CompactFlash 256 MB WD |
| 5CFCRD.0512-03 | CompactFlash 512 MB WD |
| 5CFCRD.1024-03 | CompactFlash 1024 MB WD |
| 5CFCRD.2048-03 | CompactFlash 2048 MB WD |
| 5CFCRD.4096-03 | CompactFlash 4096 MB WD |
| 5CFCRD.8192-03 | CompactFlash 8192 MB WD |



Table 16: Hard disk / CompactFlash slot (HDD/CF2)

2.4.9 Battery

The lithium battery (3 V, 950 mAh) buffers the internal real-time clock (RTC) and individually stored BIOS settings. It is located behind the CF battery 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%). The battery has a limited service life and should be replaced regularly (after the specified service life at the latest).

| Battery | |
|---------------|---|
| Battery Type | Renata 950 mAh |
| Removable | Yes, accessible from the outside |
| Service life | 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 |

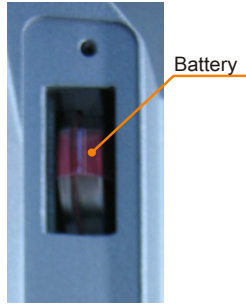


Table 17: Battery

1) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%.

For more on changing the lithium battery, see Maintenance and service, section "Replacing the battery" on page 167.

For technical information on the battery, see 6 "Accessories", section "Replacement CMOS batteries" on page 138.

Evaluating the battery status

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 load (approximately 1 second) and then evaluated. Once determined, the battery status is displayed in BIOS (Advanced - OEM features - System board features - Voltage values) and in the B&R Control Center (ADI driver); it can also be read in a customer application using the ADI library.

| Battery status | Function |
|----------------|---|
| N/A | The hardware or firmware being used is too old and does not support reading the battery status. |
| GOOD | Data buffering is intact. |
| BAD | From the point when battery capacity is recognized as insufficient (BAD), data buffering is intact for approximately another 500 hours. |

Table 18: Battery status

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

2.4.10 Add-on interface slot

An optional add-on interface can be installed here.

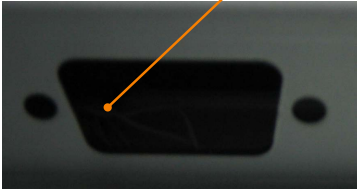
| Add-on interface slot | |
|--|--|
| Available add-on interfaces |  |
| Add-on interfaces are not currently available. | |

Table 19: Add-on interface slot

Information:

An add-on interface module can only be installed at B&R.

2.5 Serial number sticker

A unique serial number sticker with a barcode (Code 128) is affixed to each B&R device for identification purposes. This serial number represents all of the individual components built into the system (model number, name, revision, serial number, delivery date and duration of warranty).



Figure 6: PPC725 - Serial number sticker

This information can also be found on the B&R website by entering the serial number of the complete system in the search field tab (after selecting the "Serial number" option) at the top of the website (www.br-automation.com). The search provides a detailed list of installed components.

Serial number entered here e.g. B0460168438

Switching to the option "Serial number"

List of installed components shown after searching for a serial num

| SERIAL | MATERIAL | REVISION | LIEFERUNG | GEWÄHRLEISTUNGSENDE |
|-------------|----------------|----------|-----------|---------------------|
| B0460168438 | 5PC725.1505-00 | A0 | *N/V | *N/A |
| ACEB0168422 | 5PC600.X945-00 | A0 | *N/V | *N/A |
| A3E40170335 | 5MMDDR.2048-01 | C0 | *N/V | *N/A |
| B0920168422 | 5AC725.FLGC-00 | A0 | *N/V | *N/A |

3 Individual components

3.1 System units

3.1.1 5PC725.1505-00

3.1.1.1 General information

- 15" TFT XGA color display
- Analog resistive touch screen
- IP65 protection
- Fan-free operation
- Flange output on top for mounting on a support arm system

3.1.1.2 Order data

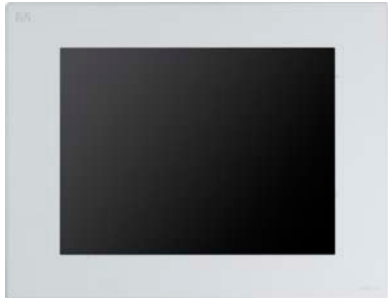
| Model number | Short description | Figure |
|-----------------------------|---|--|
| System units | |  |
| 5PC725.1505-00 | Panel PC 725 15" XGA; 15" XGA color TFT display with touch screen (resistive); connections for 1x RS232, 3x USB 2.0, 2x Ethernet 10/100, IP65 protection; 24 VDC. Flange mounting on the top. Order connector for power supply separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91). | |
| Required accessories | | |
| CPU boards | | |
| 5PC600.X945-00 | CPU board Intel Atom, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 1 slot for SO-DIMM DDR2 RAM module | |
| Flanges | | |
| 5AC725.FLGC-00 | PPC725 flange coupling | |
| 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 | |
| Terminal blocks | | |
| 0TB103.9 | Connector 24 VDC - 3-pin female - Screw clamps 3.31 mm ² | |
| 0TB103.91 | Connector 24 VDC - 3-pin female - Cage clamps 3.31 mm ² | |
| Optional accessories | | |
| Drives | | |
| 5AC600.CFSI-00 | CompactFlash slot (add-on) for installation in an APC620 or Panel PC | |
| 5AC600.HDDI-05 | 40 GB hard disk (add-on) 24/7 operation with extended temperature range. For APC620 and PPC700. Note: Please see the manual for information about using this hard disk. | |
| 5AC600.HDDI-06 | 80 GB hard disk (add-on) 24/7 hard disk with extended temperature range. For APC620 and PPC700. Note: Please see the manual for information about using this hard disk. | |
| 5AC600.SSDI-00 | 128 GB SATA SSD (MLC), add-on; for APC620 and PPC700. Note: Please see the manual for information about using this SSD. | |

Table 20: 5PC725.1505-00 - Order data

3.1.1.3 Interfaces

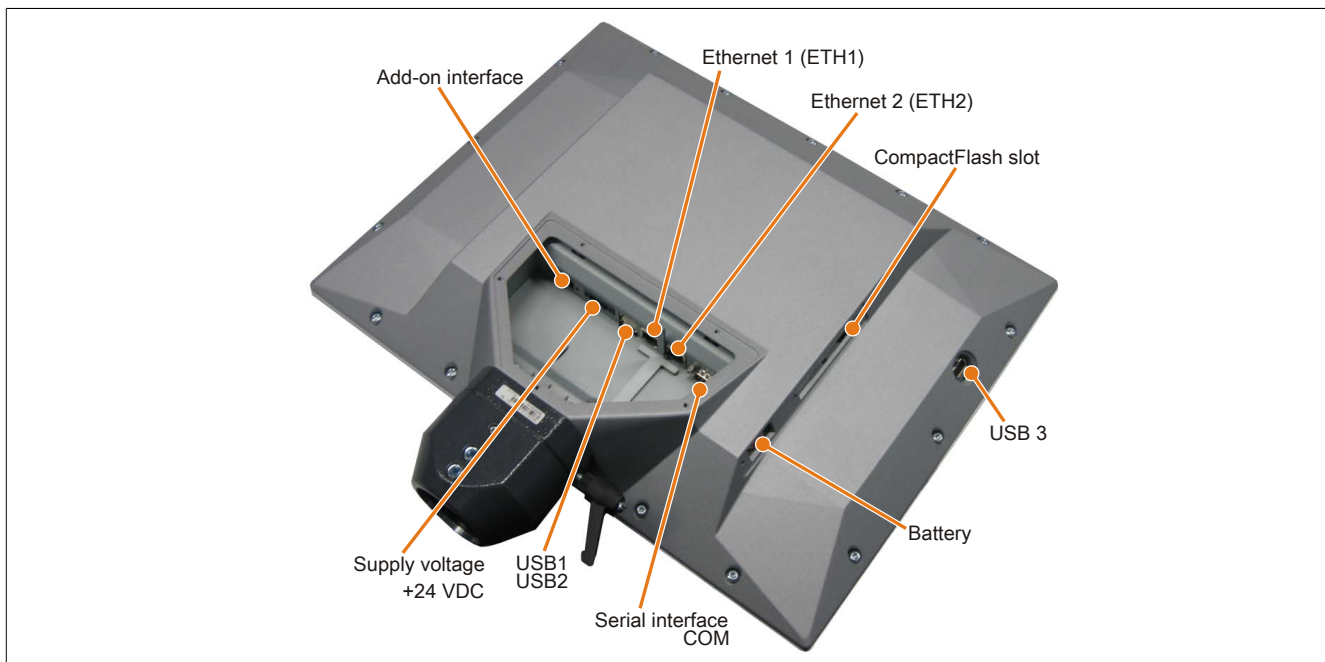


Figure 7: PPC725 - Rear view

3.1.1.4 Technical data

| Product ID | 5PC725.1505-00 | | |
|----------------------------|----------------|----------------------------------|----|
| Revision | C0 | D0 | E0 |
| General information | | | |
| LEDs | | No | |
| B&R ID code | | 0xB046 | |
| Battery | | | |
| Type | | Renata 950 mAh | |
| Service life | | 4 years ¹⁾ | |
| Removable | | Yes, accessible from the outside | |
| Execution | | Lithium ion | |
| Power button | | No | |
| Reset button | | No | |
| Buzzer | | Yes | |
| Certification | | | |
| CE | | Yes | |
| cULus | | Yes | |
| GOST-R | | Yes | |
| Controller | | | |
| Boot loader | | BIOS AMI | |
| Power failure logic | | | |
| Controller | | MTCX | |
| Buffer time | | 10 ms | |
| Graphics | | | |
| Controller | | Depends on the component | |
| SRAM | | | |
| Value | | - | |
| Battery backed | | - | |
| Memory | | | |
| Type | | DDR2 SDRAM | |
| Memory size | | Max. 2 GB | |
| Interfaces | | | |
| COM1 | | | |
| Type | | RS232, modem capable | |
| Execution | | 9-pin male DSUB connector | |
| UART | | 16550-compatible, 16-byte FIFO | |
| Max. baud rate | | 115 kbit/s | |
| CompactFlash slot 1 | | | |
| Type | | Type I | |

Table 21: 5PC725.1505-00, 5PC725.1505-00, 5PC725.1505-00 - Technical data

| Product ID | | 5PC725.1505-00 | |
|------------------------------------|--|---|-----------------------|
| USB | | | |
| Quantity | | 3 (2x back, 1x side) | |
| Type | | USB 2.0 | |
| Execution | | Type A | |
| Transfer rate | | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) | |
| Ethernet | | | |
| Quantity | | 2 | |
| Transfer rate | | 10/100 Mbit/s | |
| Max. baud rate | | 100 Mbit/s | |
| Add-on interface slot | | | |
| Quantity | | 1 | |
| Display | | | |
| Type | | Color TFT | |
| Display size | | 15" (381 mm) | |
| Colors | | 16 million | |
| Resolution | | XGA, 1024 x 768 pixels | |
| Contrast | | 550:1 | 800:1 |
| Viewing angles | | | |
| Horizontal | | Direction R / Direction L = 60° | |
| Vertical | | Direction U = 45° / Direction D = 55° | |
| | | Direction R / Direction L = 80° | |
| | | Direction U / Direction D = 80° | |
| Backlight | | | |
| Type | | CCFL | LED |
| Brightness | | 250 cd/m ² | 350 cd/m ² |
| Half-brightness time ²⁾ | | 50,000 h | |
| Touch screen | | | |
| Type ³⁾ | | AMT | |
| Technology | | Analog, resistive | |
| Controller | | Elo, serial, 12-bit | B&R, serial, 12-bit |
| Transmittance | | 81% ±3% | |
| Electrical characteristics | | | |
| Nominal voltage | | 24 VDC ±25% | |
| Nominal current | | 1.4 A | |
| Starting current | | Typ. 10 A, max. 40 A for <300 µs | |
| Power consumption | | 28.5 W | |
| Electrical isolation | | Yes | |
| Operating conditions | | | |
| EN 60529 protection | | All sides: IP65 (only with closed housing) | |
| Environmental conditions | | | |
| Temperature | | | |
| Operation | | 0 to 50°C | |
| Storage | | -20 to 60°C | |
| Transport | | -20 to 60°C | |
| Relative humidity | | | |
| Operation | | T ≤ 40°C: 5 to 90%, non-condensing T > 40°C: <90%, non-condensing | |
| Storage | | T ≤ 40°C: 5 to 90%, non-condensing T > 40°C: <90%, non-condensing | |
| Transport | | T ≤ 40°C: 5 to 90%, non-condensing T > 40°C: <90%, non-condensing | |
| Vibration | | | |
| Operation | | 2 to 9 Hz: 3 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, 6 ms | |
| Transport | | 30 g, 6 ms | |
| Mechanical characteristics | | | |
| Housing | | | |
| Material | | Aluminum paint | |
| Front | | | |
| Frame | | Naturally anodized aluminum ⁴⁾ | |
| Design | | Gray | |
| Panel overlay | | | |
| Material | | Polyester | |
| Gasket | | Metamoll | |
| Flange output | | Top | |

Table 21: 5PC725.1505-00, 5PC725.1505-00, 5PC725.1505-00 - Technical data

| Product ID | 5PC725.1505-00 |
|------------|---|
| Dimensions | |
| Width | 426 mm |
| Height | 330 mm (without flange) 402 mm (with flange) |
| Depth | 58.7 mm (without flange) 83.2 mm (with flange) |
| Weight | 6.27 kg (without flange) |

Table 21: 5PC725.1505-00, 5PC725.1505-00, 5PC725.1505-00 - Technical data

- 1) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%.
- 2) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.
- 3) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
- 4) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.1.5 Temperature humidity diagram

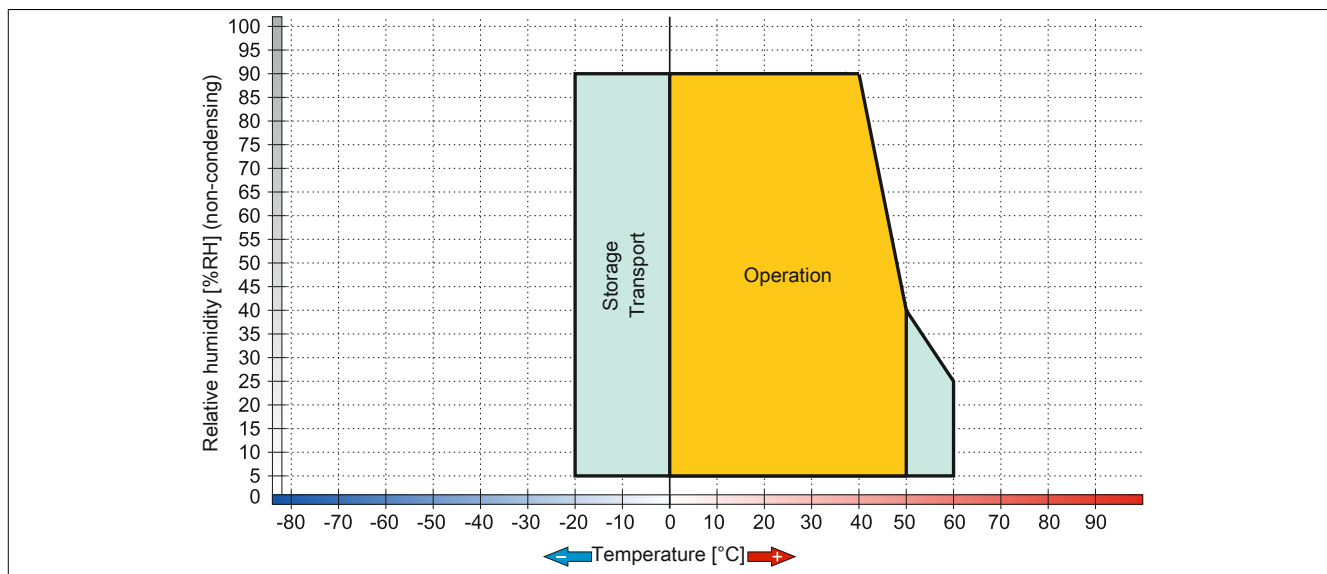


Figure 8: 5PC725.1505-00 - Temperature/Humidity diagram

3.1.1.6 Dimensions

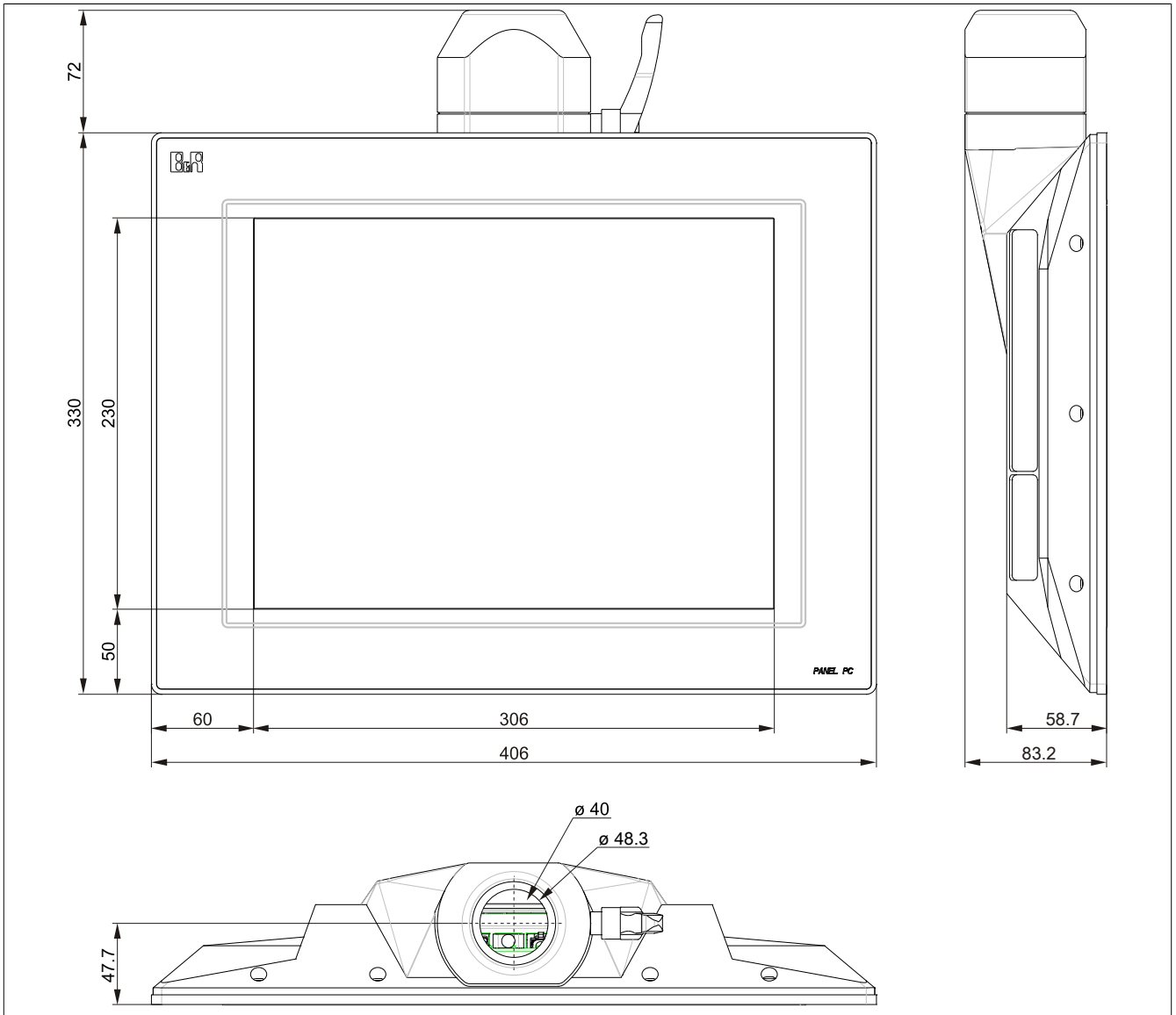


Figure 9: 5PC725.1505-00 - Dimensions

3.1.2 5PC725.1505-01

3.1.2.1 General information

- 15" TFT XGA color display
- Analog resistive touch screen
- IP65 protection
- Fan-free operation
- Flange output on bottom for mounting on a support arm system

3.1.2.2 Order data

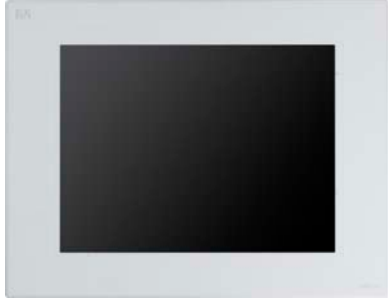
| Model number | Short description | Figure |
|----------------|--|---|
| | System units |  |
| 5PC725.1505-01 | Panel PC 725 15" XGA; 15" XGA color TFT display with touch screen (resistive); connections for 1x RS232, 3x USB 2.0, 2x Ethernet 10/100, IP65 protection; 24 VDC. Flange mounting on the bottom. Order connector for power supply separately (screw clamp: 0TB103.9; cage clamp: 0TB103.91). | |
| | Required accessories | |
| | CPU boards | |
| 5PC600.X945-00 | CPU board Intel Atom, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 1 slot for SO-DIMM DDR2 RAM module | |
| | Flanges | |
| 5AC725.FLGC-00 | PPC725 flange coupling | |
| | 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 | |
| | Terminal blocks | |
| 0TB103.9 | Connector 24 VDC - 3-pin female - Screw clamps 3.31 mm ² | |
| 0TB103.91 | Connector 24 VDC - 3-pin female - Cage clamps 3.31 mm ² | |
| | Optional accessories | |
| | Drives | |
| 5AC600.CFSI-00 | CompactFlash slot (add-on) for installation in an APC620 or Panel PC | |
| 5AC600.HDDI-05 | 40 GB hard disk (add-on) 24/7 operation with extended temperature range. For APC620 and PPC700. Note: Please see the manual for information about using this hard disk. | |
| 5AC600.HDDI-06 | 80 GB hard disk (add-on) 24/7 hard disk with extended temperature range. For APC620 and PPC700. Note: Please see the manual for information about using this hard disk. | |
| 5AC600.SSDI-00 | 128 GB SATA SSD (MLC), add-on; for APC620 and PPC700. Note: Please see the manual for information about using this SSD. | |

Table 22: 5PC725.1505-01 - Order data

3.1.2.3 Interfaces

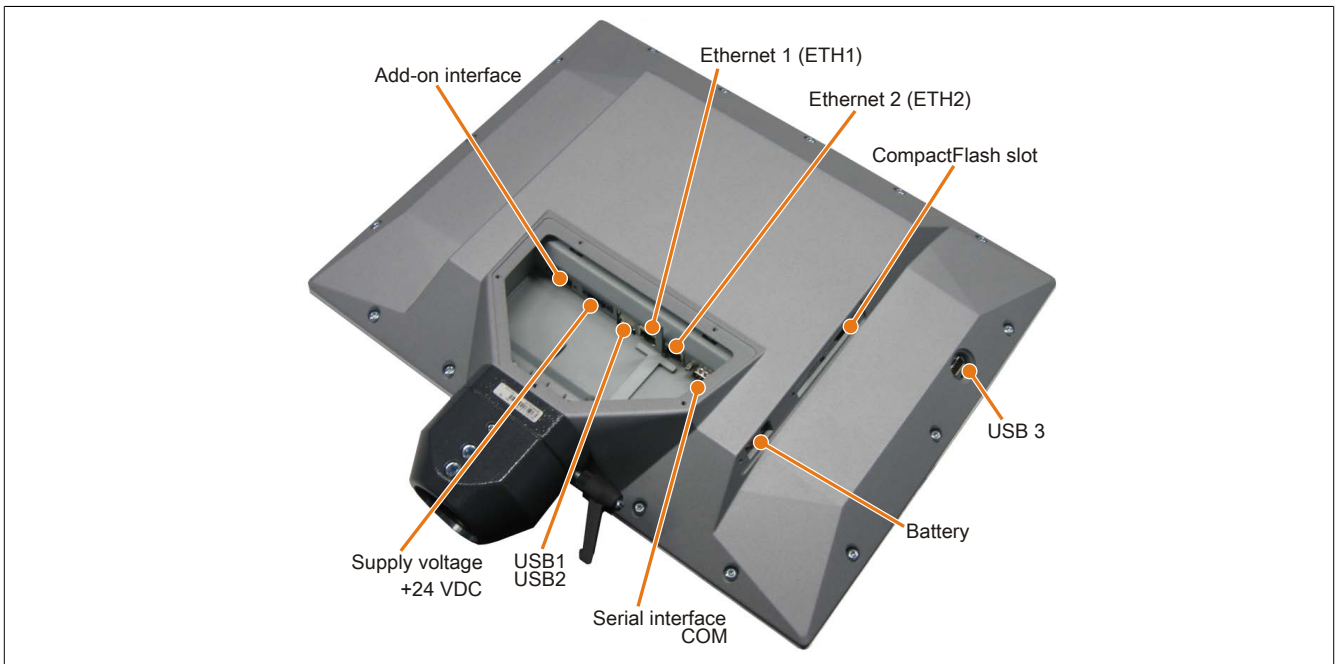


Figure 10: PPC725 - Rear view

3.1.2.4 Technical data

| Product ID | 5PC725.1505-01 | | |
|----------------------------|----------------|----------------------------------|----|
| Revision | C0 | D0 | E0 |
| General information | | | |
| LEDs | | No | |
| B&R ID code | | 0xB0EC | |
| Battery | | | |
| Type | | Renata 950 mAh | |
| Service life | | 4 years ¹⁾ | |
| Removable | | Yes, accessible from the outside | |
| Execution | | Lithium ion | |
| Power button | | No | |
| Reset button | | No | |
| Buzzer | | Yes | |
| Certification | | | |
| CE | | Yes | |
| cULus | | Yes | |
| GOST-R | | Yes | |
| Controller | | | |
| Boot loader | | BIOS AMI | |
| Power failure logic | | | |
| Controller | | MTCX | |
| Buffer time | | 10 ms | |
| Graphics | | | |
| Controller | | Depends on the component | |
| SRAM | | | |
| Value | | - | |
| Battery backed | | - | |
| Memory | | | |
| Type | | DDR2 SDRAM | |
| Memory size | | Max. 2 GB | |
| Interfaces | | | |
| COM1 | | | |
| Type | | RS232, modem capable | |
| Execution | | 9-pin male DSUB connector | |
| UART | | 16550-compatible, 16-byte FIFO | |
| Max. baud rate | | 115 kbit/s | |
| CompactFlash slot 1 | | | |
| Type | | Type I | |

Table 23: 5PC725.1505-01, 5PC725.1505-01, 5PC725.1505-01 - Technical data

Technical data • Individual components

| Product ID | | 5PC725.1505-01 | |
|------------------------------------|--|---|-----------------------|
| USB | | | |
| Quantity | | 3 (2x back, 1x side) | |
| Type | | USB 2.0 | |
| Execution | | Type A | |
| Transfer rate | | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) | |
| Ethernet | | | |
| Quantity | | 2 | |
| Transfer rate | | 10/100 Mbit/s | |
| Max. baud rate | | 100 Mbit/s | |
| Add-on interface slot | | | |
| Quantity | | 1 | |
| Display | | | |
| Type | | Color TFT | |
| Display size | | 15" (381 mm) | |
| Colors | | 16 million | |
| Resolution | | XGA, 1024 x 768 pixels | |
| Contrast | | 550:1 | 800:1 |
| Viewing angles | | | |
| Horizontal | | Direction R / Direction L = 60° | |
| Vertical | | Direction U = 45° / Direction D = 55° | |
| | | Direction R / Direction L = 80° | |
| | | Direction U / Direction D = 80° | |
| Backlight | | | |
| Type | | CCFL | LED |
| Brightness | | 250 cd/m ² | 350 cd/m ² |
| Half-brightness time ²⁾ | | 50,000 h | |
| Touch screen | | | |
| Type ³⁾ | | AMT | |
| Technology | | Analog, resistive | |
| Controller | | Elo, serial, 12-bit | B&R, serial, 12-bit |
| Transmittance | | 81% ±3% | |
| Electrical characteristics | | | |
| Nominal voltage | | 24 VDC ±25% | |
| Nominal current | | 1.4 A | |
| Starting current | | Typ. 10 A, max. 40 A for <300 µs | |
| Power consumption | | 28.5 W | |
| Electrical isolation | | Yes | |
| Operating conditions | | | |
| EN 60529 protection | | All sides: IP65 (only with closed housing) | |
| Environmental conditions | | | |
| Temperature | | | |
| Operation | | 0 to 50°C | |
| Storage | | -20 to 60°C | |
| Transport | | -20 to 60°C | |
| Relative humidity | | | |
| Operation | | T ≤ 40°C: 5 to 90%, non-condensing T > 40°C: <90%, non-condensing | |
| Storage | | T ≤ 40°C: 5 to 90%, non-condensing T > 40°C: <90%, non-condensing | |
| Transport | | T ≤ 40°C: 5 to 90%, non-condensing T > 40°C: <90%, non-condensing | |
| Vibration | | | |
| Operation | | 2 to 9 Hz: 3 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, 6 ms | |
| Transport | | 30 g, 6 ms | |
| Mechanical characteristics | | | |
| Housing | | | |
| Material | | Aluminum paint | |
| Front | | | |
| Frame | | Naturally anodized aluminum ⁴⁾ | |
| Design | | Gray | |
| Panel overlay | | | |
| Material | | Polyester | |
| Gasket | | Metamoll | |
| Flange output | | Bottom | |

Table 23: 5PC725.1505-01, 5PC725.1505-01, 5PC725.1505-01 - Technical data

| Product ID | 5PC725.1505-01 |
|------------|---|
| Dimensions | |
| Width | 426 mm |
| Height | 330 mm (without flange) 402 mm (with flange) |
| Depth | 58.7 mm (without flange) 83.2 mm (with flange) |
| Weight | 6.27 kg (without flange) |

Table 23: 5PC725.1505-01, 5PC725.1505-01, 5PC725.1505-01 - Technical data

- 1) At 50°C, 8.5 µA of the supplied components and a self-discharge of 40%.
- 2) At an ambient temperature of 25°C. Reducing the brightness by 50% can result in an approximately 50% increase in the half-brightness time.
- 3) Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website.
- 4) There may be visible deviations in the color and surface appearance depending on the process or batch.

3.1.2.5 Temperature/Humidity diagram



Figure 11: 5PC725.1505-01 - Temperature/Humidity diagram

3.1.2.6 Dimensions

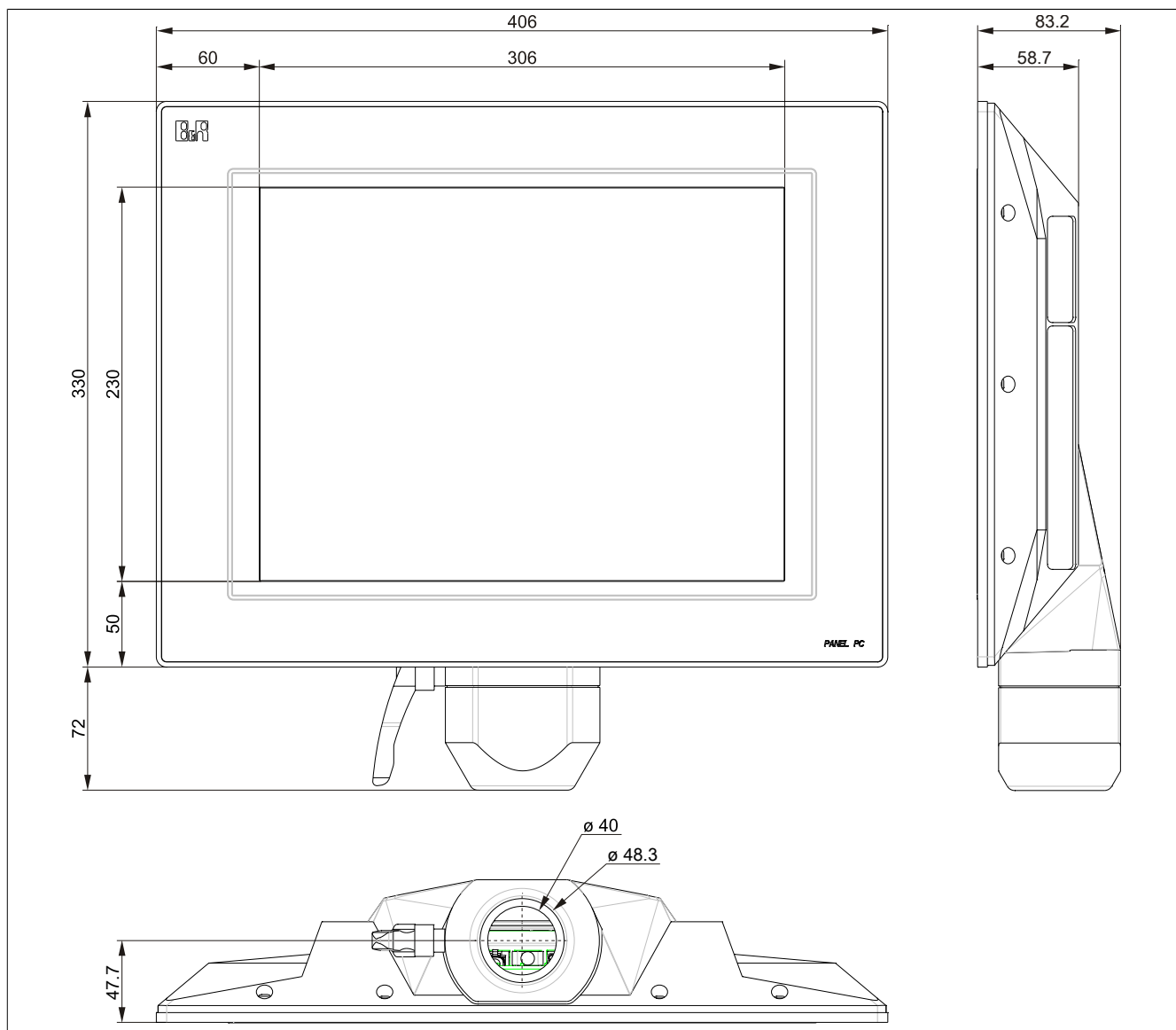


Figure 12: 5PC725.1505-01 - Dimensions

3.2 X945 CPU board

3.2.1 5PC600.X945-00

3.2.1.1 General information

- Intel® Atom™ N270 1.6 GHz
- Intel® 945GME chipset
- 2x DDR2 memory slot
- Intel® GMA 950
- AMI BIOS

3.2.1.2 Order data


| Model number | Short description | Figure |
|----------------|--|---|
| | CPU boards |  |
| 5PC600.X945-00 | CPU board Intel Atom, 1600 MHz, 533 MHz FSB, 512 kB L2 cache; 945GME chipset; 1 slot for SO-DIMM DDR2 RAM 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 24: 5PC600.X945-00 - Order data

3.2.1.3 Technical data

| Product ID | 5PC600.X945-00 |
|----------------------------|---|
| General information | |
| Certification | |
| CE | Yes |
| GOST-R | Yes |
| GL | Yes ¹⁾ |
| Controller | |
| Boot loader | BIOS AMI |
| Processor | |
| Type | Intel® Atom™ N270 |
| Clock frequency | 1600 MHz |
| Architectures | 45 nm |
| L1 cache | 512 kB |
| L2 cache | 512 kB |
| External bus | 533 MHz |
| Intel® 64 Architecture | No |
| Expanded command set | Hyper-threading technology, enhanced speed step SSE, SSE2, SSE3 (Streaming SIMD extensions) |
| Chipset | Intel® 945GME Intel® 82801GBM (ICH7-M) |
| Real-time clock | |
| Precision | At 25°C: typ. 12 ppm (1 seconds) per day ²⁾ |
| Battery backed | Yes |
| Memory slot | |
| Type | DDR2 |
| Memory size | Max. 2 GB |
| Graphics | |
| Controller | Intel® Graphics Media Accelerator 950 |
| Memory | Up to 224 MB ³⁾ |
| Color depth | Max. 32-bit |
| Resolution | |
| RGB | 400 MHz RAMDAC, resolutions up to 2048 x 1536 @ 75 Hz (QXGA) and 1920 x 1080 @ 85 Hz (HDTV) |
| GE1 = LVDS ⁴⁾ | Resolutions from 640 x 480 up to 1920 x 1200 (Embedded Panel Interface based on VESA EDID™ 1.3) |
| Mass memory management | 1x EIDE |

Table 25: 5PC600.X945-00 - Technical data

- 1) Yes, although applies only if all components installed within the complete system have this certification
- 2) At max. specified ambient temperature: typically 58 ppm (5 seconds) - worst-case 220 ppm (19 seconds).
- 3) Allocated in main memory.
- 4) GE = Graphics Engine.

3.2.1.4 Driver support

In order for the CPU board with the Intel 945GME chipset to work properly, it is necessary to install the Intel chipset driver (e.g. special USB driver) and the graphics chip. Drivers for approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com).

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

3.3 Main memory

3.3.1 General information

These 200-pin DDR2 main memory modules operate at 677 MHz and are available in sizes of 512 MB, 1 GB and 2 GB.

If two RAM modules with the same size (e.g. 1 GB) are inserted, then dual-channel memory technology is supported. This technology is not supported if two modules of different sizes (e.g. 1 GB and 2 GB) are inserted.

If two 2 GB modules are inserted, only 3 GB of main memory can be used.

3.3.2 Order data


| Model number | Short description | Figure |
|----------------|-----------------------------------|---|
| | 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 26: 5MMDDR.0512-01, 5MMDDR.1024-01, 5MMDDR.2048-01 - Order data

3.3.3 Technical data

| Product ID | 5MMDDR.0512-01 | 5MMDDR.1024-01 | 5MMDDR.2048-01 |
|----------------------------|----------------|---------------------|----------------|
| General information | | | |
| Certification | | | |
| CE | | Yes | |
| cULus | | Yes | |
| GOST-R | | Yes | |
| GL | | Yes ¹⁾ | |
| Controller | | | |
| Memory | | | |
| 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) | |

Table 27: 5MMDDR.0512-01, 5MMDDR.1024-01, 5MMDDR.2048-01 - Technical data

1) Yes, although applies only if all components installed within the complete system have this certification

Information:

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

3.4 5AC725.FLGC-00

3.4.1 General information

The flange is used to mount the Panel PC 725 on a support arm system.

3.4.2 Order data


| Model number | Short description | Figure |
|----------------|------------------------|---|
| | Flanges | |
| 5AC725.FLGC-00 | PPC725 flange coupling |  |

Table 28: 5AC725.FLGC-00 - Order data

3.4.3 Technical data

| Product ID | 5AC725.FLGC-00 |
|-----------------------------------|------------------|
| General information | |
| Certification | |
| CE | Yes |
| GOST-R | Yes |
| Mechanical characteristics | |
| Housing | |
| Material | Zinc die casting |
| Paint | RAL 7024 |
| Dimensions | |
| Width | 90 mm |
| Height | 81 mm |
| Depth | 71 mm |
| Weight | Approx. 1,100 g |

Table 29: 5AC725.FLGC-00 - Technical data

3.4.4 Dimensions

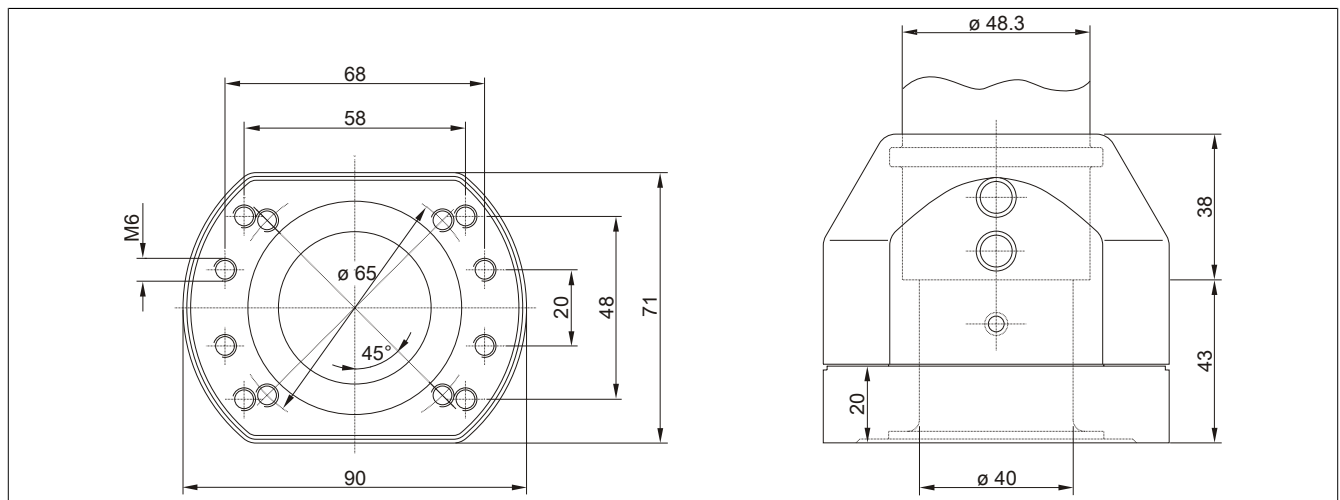


Figure 13: 5AC725.FLGC-00 - Dimensions

3.5 Drives

3.5.1 5AC600.SSDI-00

3.5.1.1 General information

This 128 GB add-on SSD (solid-state drive) is based on MLC (multi-level cell) technology, ATA/ATAPI compatible and can be used in APC620, PPC700 and PPC725 system units.

- 128 GB solid-state drive
- MLC flash
- PATA support
- Add-on
- ATA/ATAPI compatible

Information:

Add-on drives can only be installed at B&R. Therefore, they need to be requested when placing an order.

3.5.1.2 Order data

| Model number | Short description | Figure |
|----------------|---|--------|
| | Drives | |
| 5AC600.SSDI-00 | 128 GB SATA SSD (MLC), add-on; for APC620 and PPC700. Note: Please see the manual for information about using this SSD. | |
| | Optional accessories | |
| | Drives | |
| 5MMSSD.0128-00 | 128 GB SSD MLC - Transcend - PATA | |

Table 30: 5AC600.SSDI-00 - Order data

3.5.1.3 Technical data

Caution!

A sudden power failure may result in data loss! In very rare cases, the mass storage device may also become damaged.

To prevent damage and loss of data, the use of a UPS is recommended.

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the complete system. The data specifications for the complete system take precedence over those of individual components.

With revision E0, simultaneous operation with a CompactFlash card in the CompactFlash1 slot is not permitted.

Technical data • Individual components

| Product ID | 5AC600.SSDI-00 | | |
|-----------------------------------|---|---------------------------|-------------------|
| Revision | C0 | D0 | E0 |
| General information | | | |
| Certification | | | |
| CE | Yes | | |
| GOST-R | Yes | | |
| Solid-state drive | | | |
| Capacity | 128 GB | | |
| MTBF | 1,000,000 hours | | |
| S.M.A.R.T. support | Yes | | |
| Interface | PATA | | |
| Maintenance | None | | |
| Sequential read | Max. 103.7 MB/s | Max. 118.4 MB/s | Max. 90 MB/s |
| Sequential write | Max. 93.15 MB/s | Max. 92.75 MB/s | Max. 90 MB/s |
| IOPS ¹⁾ | | | |
| 4k read | 7.733 MB/s | 13.09 MB/s | - |
| 4k write | 0.722 MB/s | 1.225 MB/s | - |
| Endurance | | | |
| MLC flash | Yes | | |
| Guaranteed data volume | | | |
| Guaranteed | 80 TBW ²⁾ | 345.6 TBW ³⁾ | |
| Data reliability | <1 unrecoverable error in 10 ¹⁶ bit read accesses | | |
| Compatibility | PATA (ATA/ATAPI 8) SSD Enhanced SMART ATA feature set Ultra DMA Mode 0-6 Multi-Word DMA Mode 0-2 PIO Mode 0-4 | | |
| Environmental conditions | | | |
| Temperature | | | |
| Operation | 0 to 70°C | -40 to 85°C | |
| Storage | -40 to 85°C | -55 to 95°C | |
| Transport | -40 to 85°C | -55 to 95°C | |
| Relative humidity | | | |
| Operation | 0 to 95%, non-condensing | 10 to 95%, non-condensing | |
| Storage | 0 to 95%, non-condensing | 10 to 95%, non-condensing | |
| Transport | 0 to 95%, non-condensing | 10 to 95%, non-condensing | |
| Vibration | | | |
| Operation | 20 to 2000 Hz: 20 g | 7 to 2000 Hz: 20 g | |
| Storage | 20 to 2000 Hz: 20 g | 7 to 2000 Hz: 20 g | |
| Transport | 20 to 2000 Hz: 20 g | 7 to 2000 Hz: 20 g | |
| Shock | | | |
| Operation | 1500 g, 0.5 ms | | |
| Storage | 1500 g, 0.5 ms | | |
| Transport | 1500 g, 0.5 ms | | |
| Altitude | | | |
| Operation | -300 to 12192 m | | |
| Storage | -300 to 12192 m | | |
| Transport | -300 to 12192 m | | |
| Mechanical characteristics | | | |
| Installation | Fixed ⁴⁾ | | |
| Dimensions ⁵⁾ | | | |
| Width | 69.85 mm | | |
| Height | 7.40 mm | 9.20 mm | |
| Depth | 100.3 mm | 99.85 mm | |
| Weight ⁶⁾ | 55 g | | |
| Manufacturer information | | | |
| Manufacturer | Transcend | | Innodisk |
| Manufacturer's product ID | TS128GPSD320 | TS128GPSD330 | DEP25-A28D06SWH88 |

Table 31: 5AC600.SSDI-00, 5AC600.SSDI-00, 5AC600.SSDI-00 - Technical data

- 1) IOPS: Random read and write input/output operations per second.
- 2) TBW: Terabytes written
- 3) TBW: Terabytes written.
- 4) Add-on mounting
- 5) Dimensions without add-on
- 6) Weight without add-on

3.5.1.4 Temperature humidity diagram

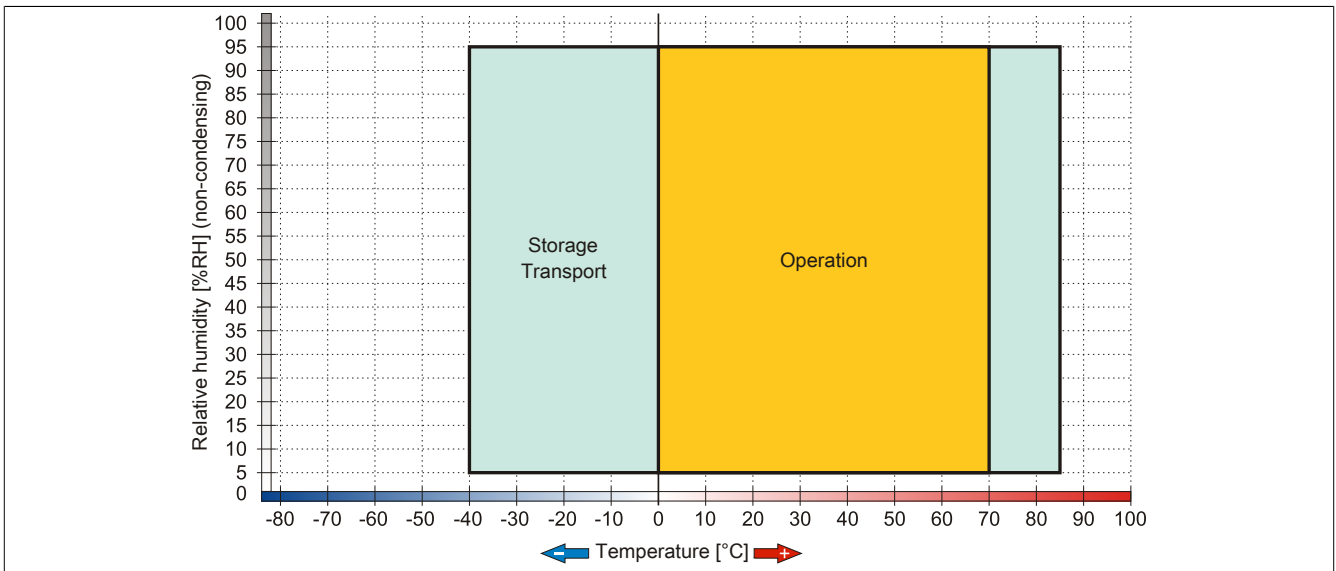


Figure 14: 5AC600.SSDI-00 - Temperature/Humidity diagram ≤ Rev. D0

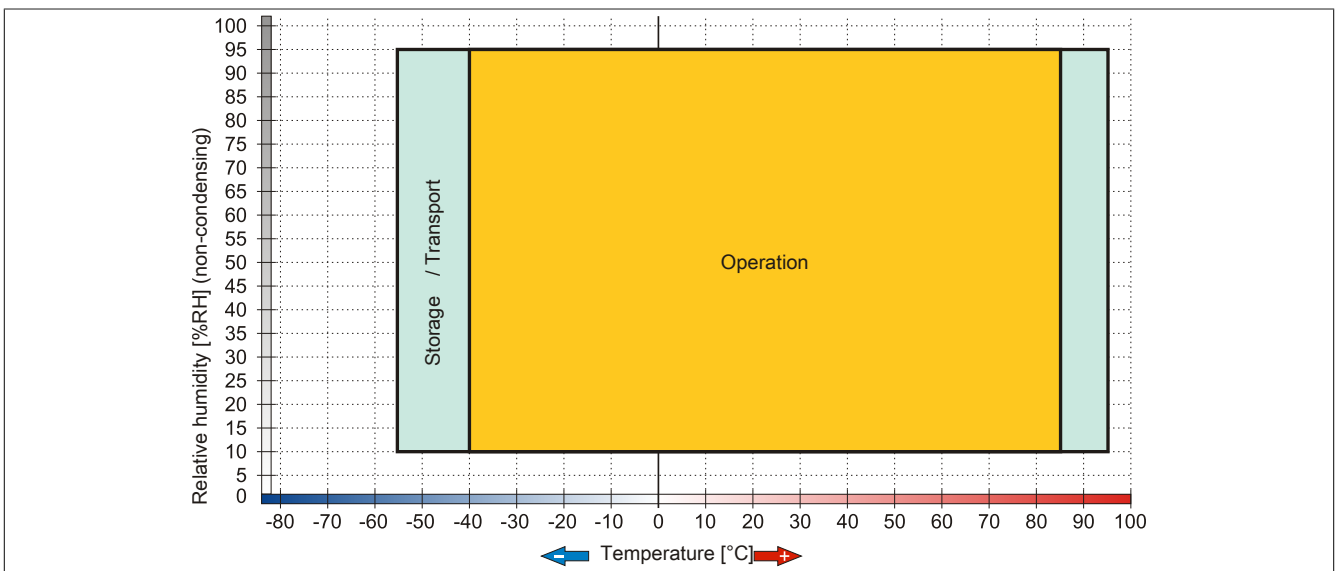


Figure 15: 5AC600.SSDI-00 - Temperature/Humidity diagram ≥ Rev. E0

3.5.2 5AC600.HDDI-05

3.5.2.1 General information

This add-on drive provides a slot for a CompactFlash card.

A CompactFlash card inserted in the add-on drive is referred to internally as the "primary slave drive."

Information:

Add-on drives can only be installed at B&R. Therefore, they need to be requested when placing an order.

Caution!

Power must be turned off before inserting or removing CompactFlash cards.

3.5.2.2 Order data


| Model number | Short description | Figure |
|----------------|---|---|
| | Drives | |
| 5AC600.HDDI-05 | 40 GB hard disk (add-on) 24/7 operation with extended temperature range. For APC620 and PPC700. Note: Please see the manual for information about using this hard disk. |  |

Table 32: 5AC600.HDDI-05 - Order data

3.5.2.3 Technical data

Information:

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

| Product ID | 5AC600.HDDI-05 |
|---------------------------------|--------------------------------------|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| GOST-R | Yes |
| Hard disk drive | |
| Capacity | 40 GB |
| Number of heads | 2 |
| Number of sectors | 78,140,160 |
| Bytes per sector | 512 |
| Cache | 8 MB |
| Speed | 5400 rpm \pm 1% |
| Startup time | Typ. 3 s (from 0 rpm to read access) |
| MTBF | 750,000 POH ¹⁾ |
| S.M.A.R.T. support | Yes |
| Interface | ATA-6 |
| Access time | 12.5 ms |
| Data transfer rate | |
| Internal | Max. 450 Mbit/s |
| To/From host | Max. 100 MB/s (Ultra DMA mode 5) |
| Positioning time | |
| Minimum (track to track) | 1 ms |
| Nominal (read only) | 12.5 ms |
| Maximum (read only) | 22 ms |
| Environmental conditions | |
| Temperature ²⁾ | |
| Operation ³⁾ | -30 to 85°C |
| 24-hour operation ⁴⁾ | -30 to 85°C |
| Storage | -40 to 95°C |
| Transport | -40 to 95°C |

Table 33: 5AC600.HDDI-05 - Technical data

| Product ID | 5AC600.HDDI-05 |
|-----------------------------------|--|
| Relative humidity | |
| Operation | 5 to 90% |
| Storage | 5 to 95% |
| Transport | 5 to 95% |
| Vibration | |
| Operation | 5 to 500 Hz: 2 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 | Max. 300 g, 2 ms; no unrecoverable errors |
| Storage | Max. 150 g, 11 ms; no unrecoverable errors |
| Transport | Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage |
| Altitude | |
| Operation | -300 to 5000 m |
| Storage | -300 to 12192 m |
| Mechanical characteristics | |
| Installation | Fixed ⁵⁾ |
| Dimensions | |
| Width | 13 mm |
| Length | 128 mm |
| Height | 98 mm |
| Weight | 100 g |
| Manufacturer information | |
| Manufacturer | Seagate |
| Manufacturer's product ID | ST940817AM |

Table 33: 5AC600.HDDI-05 - Technical data

- 1) With 8760 POH (power on hours) per year and 70°C surface temperature.
- 2) 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 3°C per minute.
- 3) Standard operation means 250 POH (power-on hours) per month.
- 4) 24-hour operation means 732 POH (power-on hours) per month.
- 5) Add-on mounting.

3.5.2.4 Temperature humidity diagram

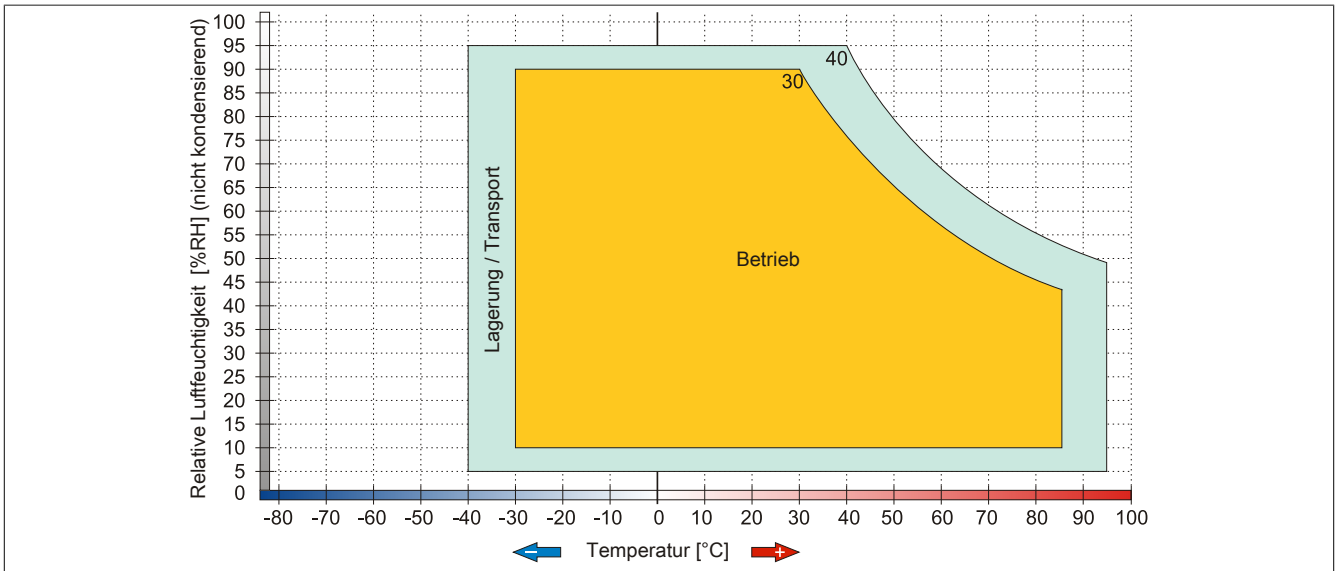


Figure 16: 5AC600.HDDI-05 - Temperature humidity diagram of add-on hard disk

3.5.3 5AC600.HDDI-06

3.5.3.1 General information

This 80 GB hard disk is specified for 24-hour operation and also features an extended temperature range.

The add-on drive is managed internally as the primary slave drive.

Information:

Add-on drives can only be installed at B&R. Therefore, they need to be requested when placing an order.

3.5.3.2 Order data


| Model number | Short description | Figure |
|----------------|--|---|
| | Drives | |
| 5AC600.HDDI-06 | 80 GB Hard Disk (add-on) 24/7 hard disk with extended temperature range. For APC620 and PPC700. Remark: Please see manual for proper use of the hard disk. |  |

Table 34: 5AC600.HDDI-06 - Order data

3.5.3.3 Technical data

Information:

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

| Product ID | 5AC600.HDDI-06 |
|---------------------------------|--------------------------------------|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| Hard disk drive | |
| Capacity | 80 GB |
| Number of heads | 2 |
| Number of sectors | 156,301,488 |
| Bytes per sector | 512 |
| Cache | 8 MB |
| Speed | 5400 rpm \pm 1% |
| Startup time | Typ. 4 s (from 0 rpm to read access) |
| MTBF | 750,000 POH ¹⁾ |
| S.M.A.R.T. support | Yes |
| Interface | ATA-6 |
| Access time | 10 ms |
| Data transfer rate | |
| Internal | Max. 450 Mbit/s |
| To/From host | Max. 100 MB/s (Ultra DMA mode 5) |
| Positioning time | |
| Minimum (track to track) | 1 ms |
| Nominal (read only) | 12.5 ms |
| Maximum (read only) | 22 ms |
| Environmental conditions | |
| Temperature ²⁾ | |
| Operation | -30 to 85°C |
| 24-hour operation ³⁾ | -30 to 85°C |
| Storage ⁴⁾ | -40 to 95°C |
| Transport | -40 to 95°C |
| Relative humidity | |
| Operation | 5 to 90% |
| Storage | 5 to 95% |
| Transport | 5 to 95% |

Table 35: 5AC600.HDDI-06 - Technical data

| | |
|-----------------------------------|---|
| Product ID | 5AC600.HDDI-06 |
| Vibration | |
| Operation | 5 to 500 Hz: 2 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 | Max. 300 g, 2 ms; no unrecoverable errors Max. 150 g, 11 ms; no unrecoverable errors |
| Storage | Max. 800 g, 2 ms; no damage |
| Transport | Max. 400 g, 0.5 ms; no damage Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage |
| Altitude | |
| Operation | -300 to 5000 m |
| Storage | -300 to 12192 m |
| Mechanical characteristics | |
| Installation | Fixed ⁵⁾ |
| Dimensions | |
| Width | 13 mm |
| Length | 130 mm |
| Height | 98 mm |
| Weight | 120 g |
| Manufacturer information | |
| Manufacturer | Seagate |
| Manufacturer's product ID | ST980817AM |

Table 35: 5AC600.HDDI-06 - Technical data

- 1) With 8760 POH (power on hours) per year and 70°C surface temperature.
- 2) 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 3°C per minute.
- 3) 24-hour operation means 732 POH (power-on hours) per month.
- 4) Standard operation means 250 POH (power-on hours) per month.
- 5) Add-on mounting.

3.5.3.4 Temperature humidity diagram

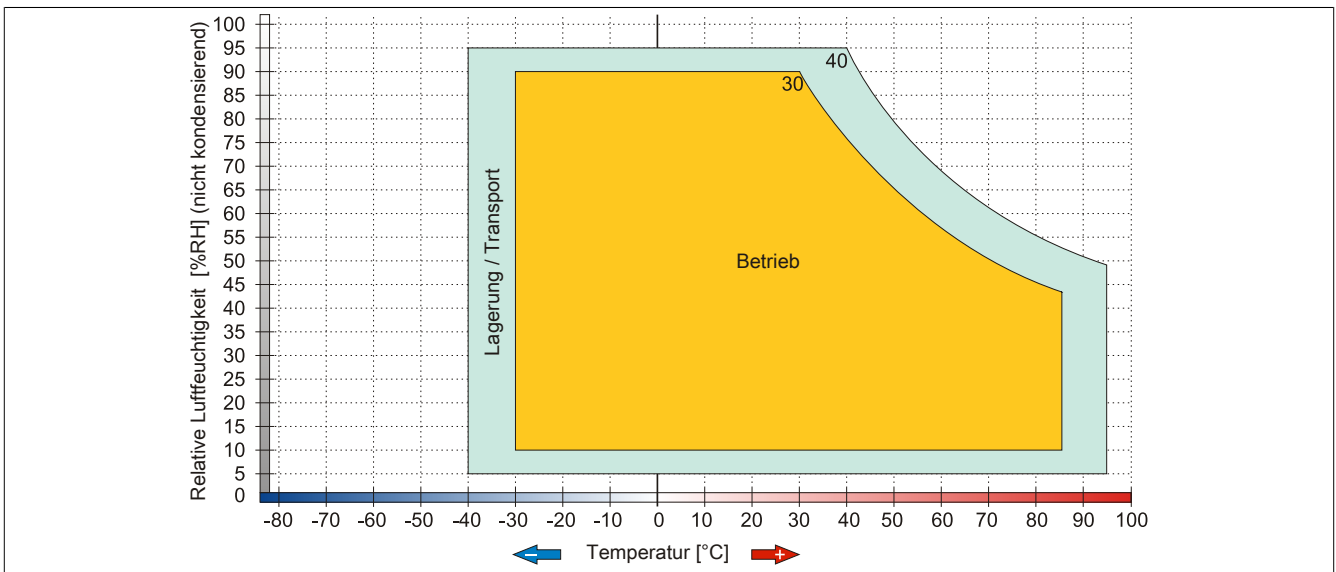


Figure 17: 5AC600.HDDI-06 - Temperature humidity diagram of add-on hard disk

3.5.4 5AC600.CFSI-00

3.5.4.1 General information

This add-on drive provides a slot for a CompactFlash card.

A CompactFlash card inserted in the add-on drive is referred to internally as the "primary slave drive."

Information:

Add-on drives can only be installed at B&R. Therefore, they need to be requested when placing an order.

Caution!

Power must be turned off before inserting or removing CompactFlash cards.

3.5.4.2 Order data


| Model number | Short description | Figure |
|----------------|--|---|
| 5AC600.CFSI-00 | CompactFlash slot (add-on) for installation in an APC620 or Panel PC |  |
| | Drives | |
| | Optional accessories | |
| | CompactFlash-cards | |
| 5CFCRD.0064-03 | CompactFlash 64 MB Western Digital (SLC) | |
| 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.032G-06 | CompactFlash 32 GB B&R (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 36: 5AC600.CFSI-00 - Order data

3.5.4.3 Technical data

Information:

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

| Product ID | 5AC600.CFSI-00 |
|-----------------------------------|----------------|
| General information | |
| Certification | |
| CE | Yes |
| cULus | Yes |
| GOST-R | Yes |
| Interfaces | |
| CompactFlash slot 1 | |
| Quantity | 1 |
| Type | Type I |
| Connection | Primary Slave |
| Mechanical characteristics | |
| Weight | 100 g |

Table 37: 5AC600.CFSI-00 - Technical data

3.5.5 5MMSSD.0128-00

3.5.5.1 General information

This 128 GB solid-state drive can be used as a replacement part for the 5AC600.SSDI-00 SSD.

- 128 GB solid-state drive
- MLC flash
- PATA support
- Replacement SSD for 5AC600.SSDI-00
- ATA/ATAPI compatible

Information:

Add-on drives can only be installed at B&R. Therefore, they need to be requested when placing an order.

3.5.5.2 Order data

| Model number | Short description | Figure |
|----------------|-----------------------------------|---|
| | Drives | |
| 5MMSSD.0128-00 | 128 GB SSD MLC - Transcend - PATA |  |

Table 38: 5MMSSD.0128-00 - Order data

3.5.5.3 Technical data

Caution!

A sudden power failure may result in data loss! In very rare cases, the mass storage device may also become damaged.

To prevent damage and loss of data, the use of a UPS is recommended.

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the complete system. The data specifications for the complete system take precedence over those of individual components.

| Product ID | 5MMSSD.0128-00 | | |
|---------------------------------|----------------|-------------------|----|
| Revision | C0 | D0 | E0 |
| General information | | | |
| Certification | | | |
| CE | | Yes | |
| cULus | | Yes | |
| cULus HazLoc Class 1 Division 2 | | Yes ¹⁾ | |
| GOST-R | | Yes | |

Table 39: 5MMSSD.0128-00, 5MMSSD.0128-00, 5MMSSD.0128-00 - Technical data

Technical data • Individual components

| Product ID | 5MMSSD.0128-00 | | |
|-----------------------------------|---|-----------------|---------------------------|
| Solid-state drive | | | |
| Capacity | 128 GB | | |
| MTBF | 1,000,000 hours | | |
| S.M.A.R.T. support | Yes | | |
| Interface | PATA | | |
| Maintenance | None | | |
| Sequential read | Max. 103.7 MB/s | Max. 118.4 MB/s | Max. 90 MB/s |
| Sequential write | Max. 93.15 MB/s | Max. 92.75 MB/s | Max. 90 MB/s |
| IOPS ²⁾ | | | |
| 4k read | 7.733 MB/s | 13.09 MB/s | - |
| 4k write | 0.722 MB/s | 1.225 MB/s | - |
| Endurance | | | |
| MLC flash | Yes | | |
| Guaranteed data volume | | | |
| Guaranteed | 80 TBW | | 345.6 TBW |
| Data reliability | <1 unrecoverable error in 10 ¹⁶ bit read accesses | | |
| Compatibility | PATA (ATA/ATAPI 8) SSD Enhanced SMART ATA feature set Ultra DMA Mode 0-6 Multi-Word DMA Mode 0-2 PIO Mode 0-4 | | |
| Environmental conditions | | | |
| Temperature | | | |
| Operation | 0 to 70°C | | -40 to 85°C |
| Storage | -40 to 85°C | | -55 to 95°C |
| Transport | -40 to 85°C | | -55 to 95°C |
| Relative humidity | | | |
| Operation | 0 to 95%, non-condensing | | 10 to 95%, non-condensing |
| Storage | 0 to 95%, non-condensing | | 10 to 95%, non-condensing |
| Transport | 0 to 95%, non-condensing | | 10 to 95%, non-condensing |
| Vibration | | | |
| Operation | 20 to 2000 Hz: 20 g | | 7 to 2000 Hz: 20 g |
| Storage | 20 to 2000 Hz: 20 g | | 7 to 2000 Hz: 20 g |
| Transport | 20 to 2000 Hz: 20 g | | 7 to 2000 Hz: 20 g |
| Shock | | | |
| Operation | | 1500 g, 0.5 ms | |
| Storage | | 1500 g, 0.5 ms | |
| Transport | | 1500 g, 0.5 ms | |
| Altitude | | | |
| Operation | | -300 to 12192 m | |
| Storage | | -300 to 12192 m | |
| Transport | | -300 to 12192 m | |
| Mechanical characteristics | | | |
| Dimensions | | | |
| Width | | 69.85 mm | |
| Height | 7.40 mm | | 9.20 mm |
| Depth | 100.3 mm | | 99.85 mm |
| Weight | | 55 g | 100 g |
| Manufacturer information | | | |
| Manufacturer | Transcend | | Innodisk |
| Manufacturer's product ID | TS128GPSD320 | TS128GPSD330 | DEP25-A28D06SWH88 |

Table 39: 5MMSSD.0128-00, 5MMSSD.0128-00, 5MMSSD.0128-00 - Technical data

- 1) Yes, although applies only if all components installed within the complete system have this certification
- 2) IOPS: Random read and write input/output operations per second.

3.5.5.4 Temperature humidity diagram

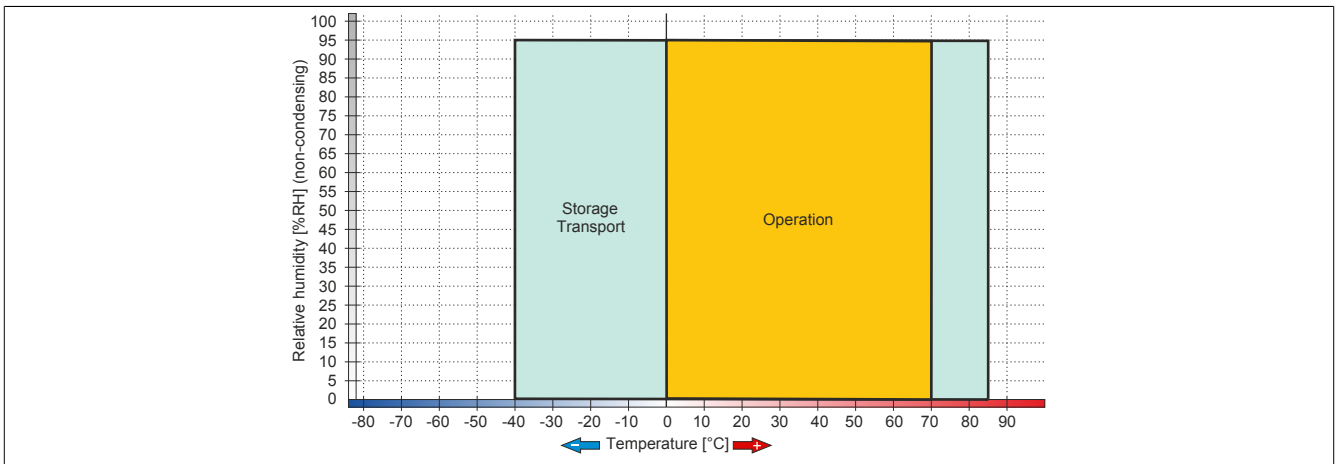


Figure 18: 5MMSSD.0128-00 - Temperature/Humidity diagram ≤ Rev. D0

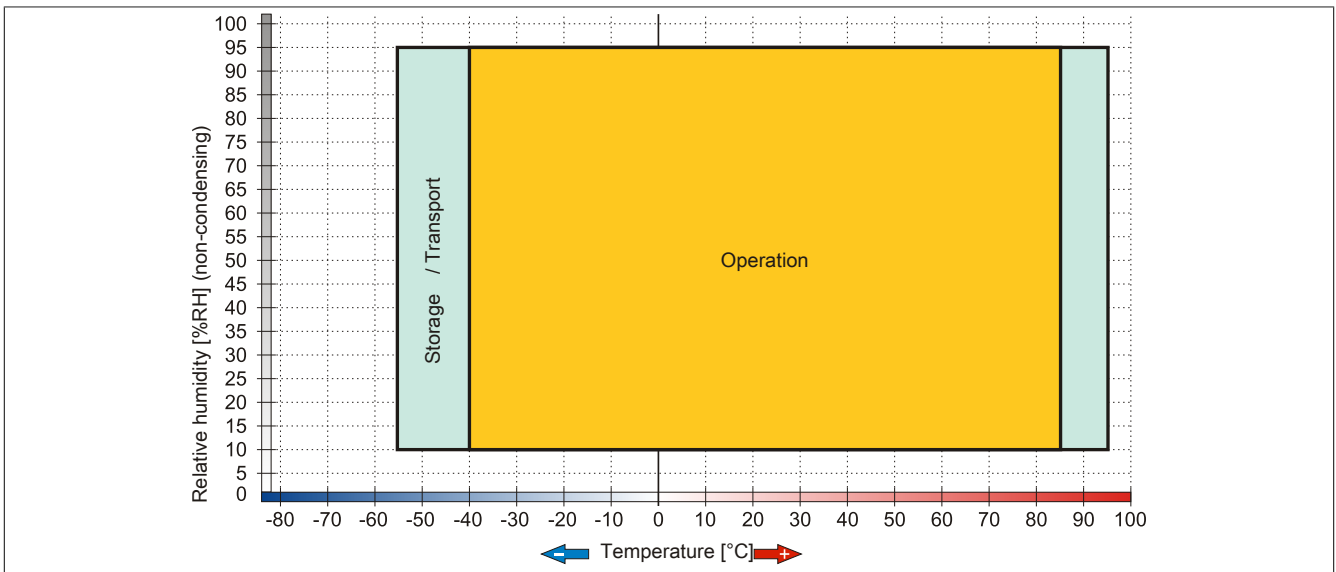


Figure 19: 5MMSSD.0128-00 - Temperature/Humidity diagram ≥ Rev. E0

Chapter 3 • Installation

1 Installation

Panel PC 725 devices are best mounted on a swing arm system using the flange output found on the housing.



1.1 Important installation information

- This installation requires a swing arm system.
- Environmental conditions must be taken into consideration.
- The PPC725 is only certified for operation in closed rooms.
- The PPC725 cannot be situated in direct sunlight.
- The protective caps must be attached to the PPC725 before startup, see section 1.2 "Mounting the protective caps" on page 57.

1.2 Mounting the protective caps

Panel PC 725 units are delivered with protective caps for the interfaces, which are not yet attached to the device. Therefore, these caps must be attached to the unit before startup to ensure proper operation and IP65 protection.

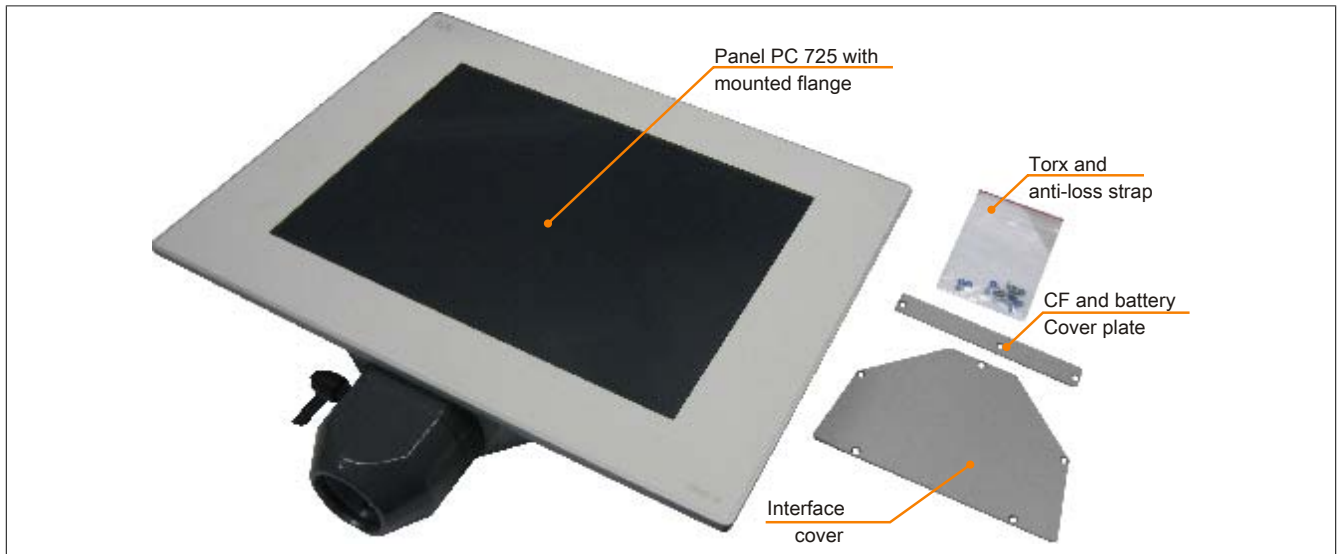


Figure 20: Contents of delivery

- The blue rings included in delivery must be attached to the Torx screws on the covers to help prevent them from getting lost, and should therefore not be removed.

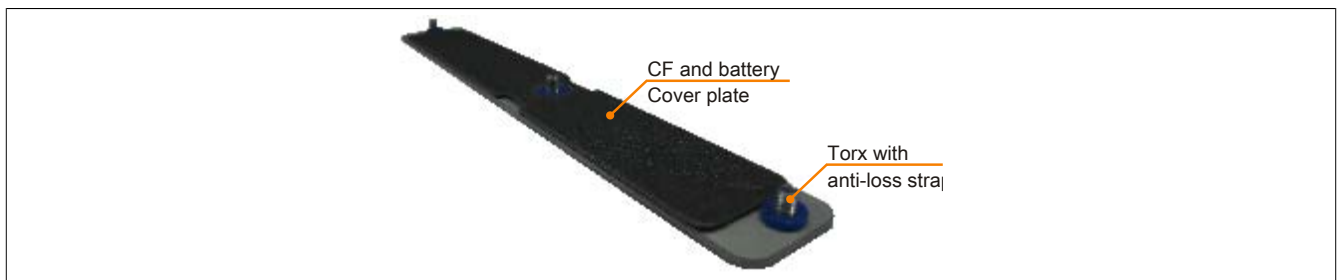


Figure 21: Cover with Torx screws and anti-loss strap

- Attach protective caps to the PPC725. Tighten the Torx screws (TX10) with a torque of 0.7 Nm.

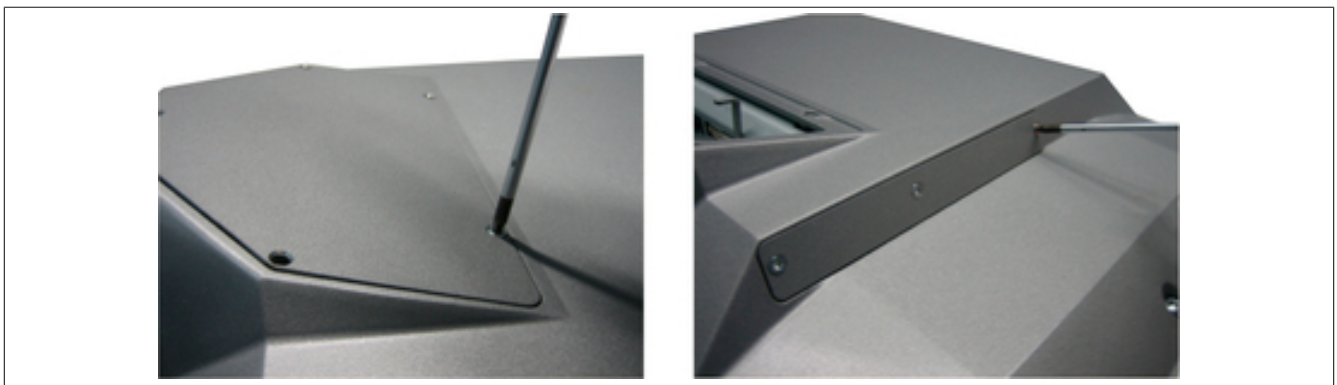


Figure 22: Mounting the protective caps

- The screws included in delivery must be manually attached to the flange. They are then used for mounting the Panel PC 725 to the support arm system.



Figure 23: Mounting the screws on the flange

2 Information regarding operation

- The seals on the Panel PC 725 must be kept clean at all times to prevent dirt and moisture from entering the device.
- Make sure to follow the information and instructions provided by the manufacturer of the swing arm system.
- Make sure that water cannot enter the PC via the swing arm system. In addition, air circulation must be prevented to avoid condensation.

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.

This device comes equipped with two functional ground connections:

- Power supply
- Ground connection

To guarantee safe conductance of electric disturbances, the following points must be observed:

- The device must be connected to the central grounding point in the control cabinet using the shortest route possible.
- A cable with a minimum cross section of 2.5 mm^2 per connection should be used. If a cable with wire end sleeves is connected to the 0TB103.9 or 0TB103.91 terminal block, then a cable with maximum 1.5 mm^2 per connection is possible.
- Note the line shielding concept. All data cables connected to the device must be shielded.

Symbol indicating functional ground on the B&R device: 

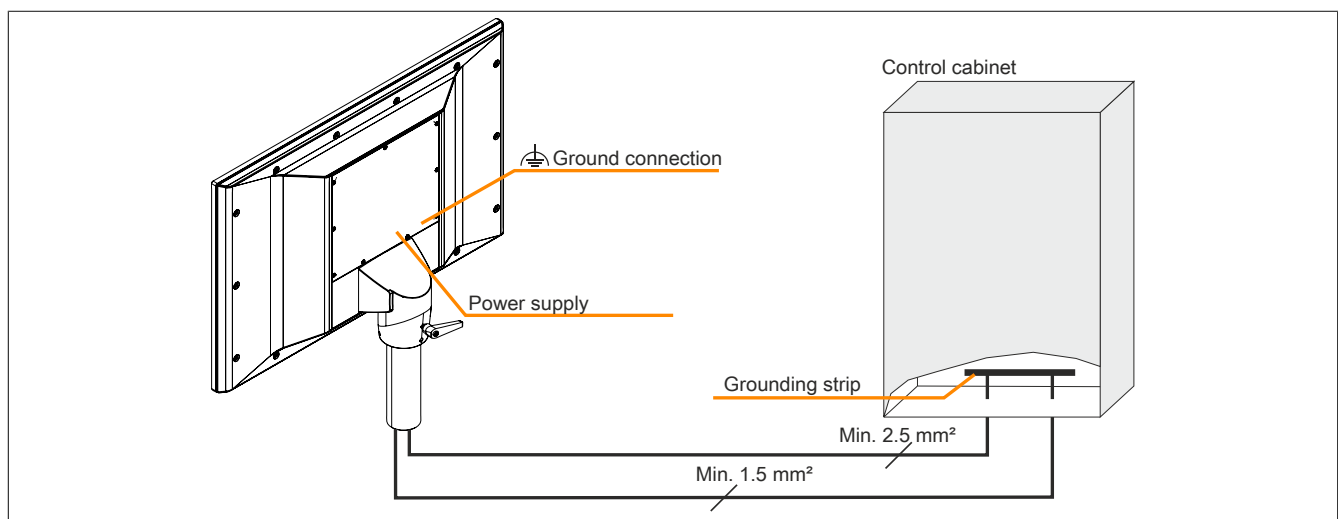


Figure 24: Panel PC 725 - Grounding concept

4 General instructions for performing temperature testing

The purpose of these instructions is to explain general procedures for performing application-specific temperature testing on B&R Industrial PCs and Power Panels. Nevertheless, these instructions are meant to serve only as a guideline.

4.1 Procedure

In order to obtain accurate results, the testing conditions should match the conditions in the field. This means that for the duration of the temperature tests, the target application should be running, the PC should be installed in the control cabinet that will be used, etc.

In addition, a temperature sensor should be installed for the device being tested to provide live monitoring of the ambient temperature. In order to obtain accurate measurements, this sensor should be installed at a distance of 5 to 10 cm from the B&R Industrial PC near the air intake (not near the exhaust).

All B&R Industrial PCs and Power Panels are equipped with internal temperature sensors. These are installed in different locations for each series. The number of sensors and the temperature limits also vary from series to series.

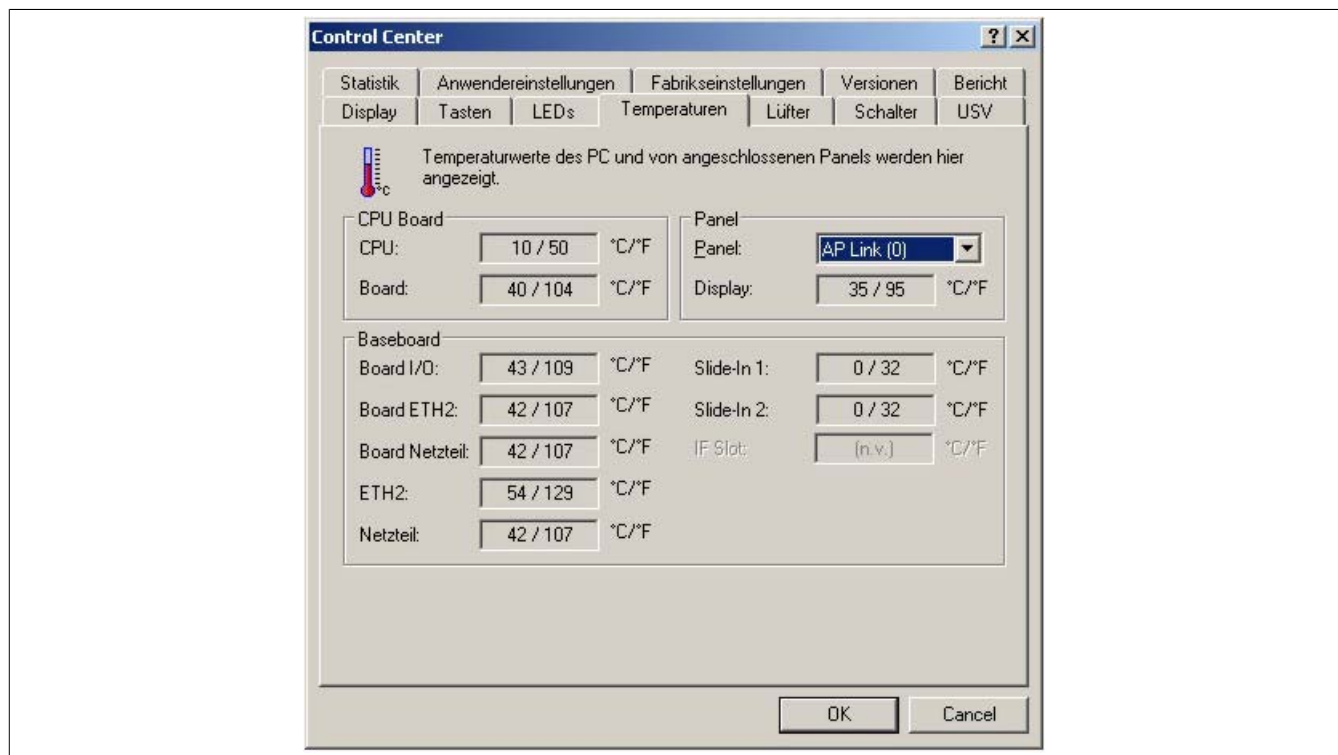
For information about the locations of temperature sensors and the maximum specified values, please see section "Temperature sensor locations" in chapter 2 "Technical data".

To ensure that the thermal situation is evaluated reliably, a minimum of 8 hours is recommended for testing.

4.2 Evaluating temperatures in Windows operating systems

4.2.1 Evaluating with the B&R Control Center

The B&R Control Center can be used to evaluate the temperatures. Temperatures can be viewed on the "Temperatures" property page. The B&R Control Center is available at no cost in the Downloads section of the B&R website (www.br-automation.com). The B&R Control Center uses the B&R Automation Device Interface (ADI).



A separate application can be developed if it is necessary to collect historical data.

Information:

Software development kits such as the ADI .NET SDK are available on the B&R website (www.br-automation.com).

4.2.2 Evaluating with the BurnInTest tool from Passmark

If a separate application is not created or used to evaluate the temperature, then B&R recommends using the BurnInTest software tool from Passmark.

Standard and Professional versions of BurnInTest are available. In addition to the software package, there are also various loopback plugs (serial, parallel, USB, etc.) and test CDs/DVDs available. The exact software and loopback plugs used will determine the corresponding load that can be generated on the system and peripheral devices.

Information:

Loopback plugs are also available from Passmark. More information is available at www.passmark.com.

The following screenshots are based on Passmark BurnInTest Pro V4 and a 2-slot APC810 with DVD.

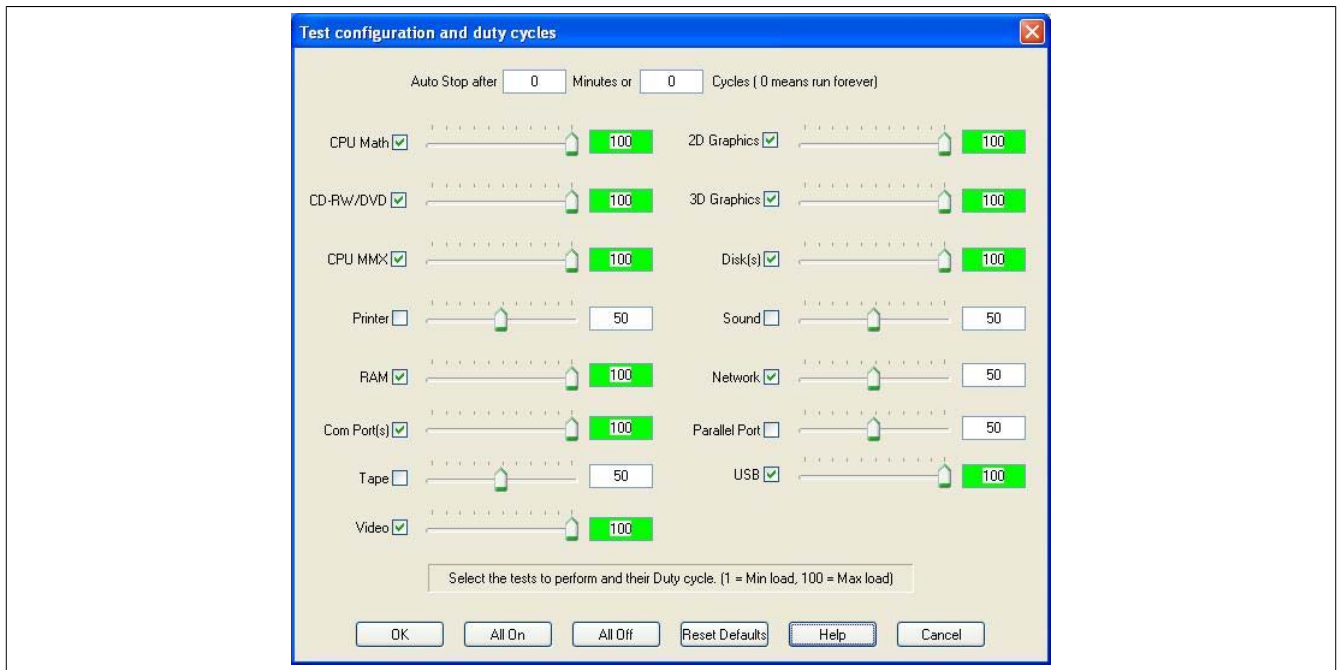


Figure 25: Settings for Passmark BurnInTest Pro V4 and a 2-slot APC810 with DVD

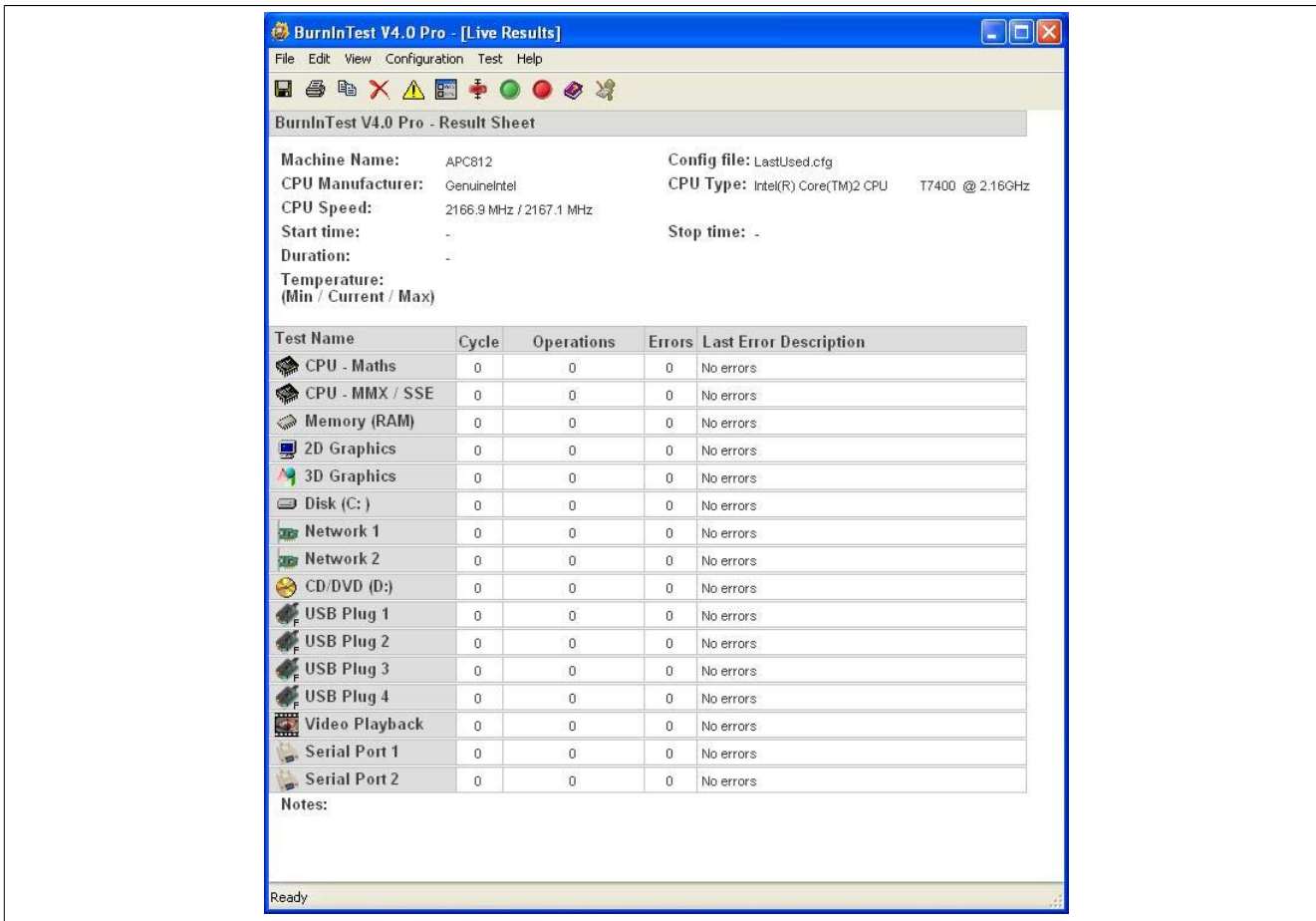


Figure 26: Test overview of a 2-slot APC810 with DVD

The respective test properties may need to be fine-tuned depending on the availability of a loopback plug and DVDs.

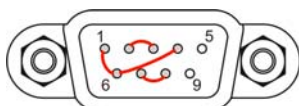
Information:

USB flash drives can also be used if a USB loopback plug is not available. The USB flash drives must be detected as formatted drives in Windows. The test USB must then be deselected, and the USB flash drives must be configured as the testing device in the disk properties.



Information:

Serial loopback plugs are relatively easy to create. Simply connect several pins on the serial interface with wires.



4.3 Evaluating temperatures in operating systems other than Windows

For applications that don't use Windows, temperatures can be evaluated with the help of the B&R implementation guide. In addition to the implementation guide, there are also programs available in MS-DOS.

The implementation guide only describes device-specific functions and not the main functions of the example programs.

If code from the example programs is used, it is important to observe the notes in the implementation guide regarding TODO statements, I/O access functions, etc.

Information:

Example programs and implementation guides for all B&R Industrial PCs and Power Panels are available at no cost from the B&R website (www.br-automation.com).

4.4 Evaluating the measurement results

The maximum temperature value recorded by each sensor must not exceed the temperature limits specified in the user's manuals.

If the temperature tests cannot be performed in a climate-controlled chamber, they can still be performed in an office environment. In this case, however, it is necessary to measure the ambient temperature. Experience at B&R has shown that values measured on passive systems (systems without a fan kit) can be projected linearly based on the ambient temperature. In order to be able to project the temperature values for systems with a fan kit, the fans must be running. It is also important to take values such as speed into consideration.

If the temperature tests are performed in a climate-controlled chamber with fans, the fans will cool the devices and skew the results. Measurement results for passive devices would therefore be unusable in this case. In order to obtain accurate results in climate-controlled chambers with fans, the fans must be turned off and the device must be allowed to run for a sufficient amount of time (several hours) before beginning the test.

Example using a 2-slot APC810

The following example is only valid if the instructions for installation and mounting orientation provided in the user's manual are observed.

| Temperature sensor | Measured temperature | Projected temperature | |
|---------------------|----------------------|-----------------------|------|
| Ambient temperature | 20°C | 35°C | 45°C |
| CPU | 48°C | 63°C | 73°C |
| CPU board | 51°C | 66°C | 76°C |
| Board I/O | 51°C | 66°C | 76°C |
| Board ETH2 | 52°C | 67°C | 77°C |
| Board power supply | 51°C | 66°C | 76°C |
| ETH2 | 65°C | 80°C | 90°C |
| Power supply | 51°C | 66°C | 76°C |

Table 40: Evaluation example using a 2-slot APC810

5 Touch screen calibration

B&R touch screen devices are equipped with a touch controller that supports hardware calibration. As a result, devices are pre-calibrated when delivered. This is an advantageous feature when replacing devices of the same model or type since it avoids having to recalibrate the new device. Nevertheless, calibrating the device is still recommended in order to achieve the best results and to better adapt the touch screen to the user's preferences.

Regardless of this, the touch screen will have to be calibrated once during or following the installation of the touch screen driver.

5.1 Windows XP Professional

After installing Windows XP Professional on the device, the touch screen driver must be installed in order to operate the touch screen. The necessary driver is available in the Downloads section of the B&R website (www.br-automation.com).

5.2 Windows XP Embedded

After starting Windows XP Embedded on the device for the first time (first boot agent), the touch screen driver must be installed in order to operate the touch screen. The necessary driver is available in the Downloads section of the B&R website www.br-automation.com.

5.3 Windows Embedded Standard 2009

After starting Windows Embedded Standard 2009 on the Panel PC or Power Panel for the first time (first boot agent), the corresponding touch screen driver is installed automatically.

On all other devices, the touch screen driver must be installed in order to operate the touch screen. The necessary driver is available in the Downloads section of the B&R website (www.br-automation.com).

5.4 Windows Embedded Standard 7 Embedded / Premium

A touch screen driver will be installed automatically if a touch controller is detected during the Windows Embedded Standard 7 installation.

The touch screen driver must be installed manually if a touch controller was not detected during the Windows Embedded Standard 7 setup or if an Automation Panel 800/900/9x3/9xD has been connected after setup. The necessary driver is available in the Downloads section of the B&R website (www.br-automation.com).

5.5 Windows 7 Professional / Ultimate

After installing Windows 7 on the device, the touch screen driver must be installed in order to operate the touch screen. The necessary driver is available in the Downloads section of the B&R website (www.br-automation.com).

5.6 Windows CE

Windows CE starts the touch screen calibration sequence during its first boot in its default configuration (i.e. delivered state).

5.7 Automation Runtime / Visual Components

The touch screen must be calibrated once for the customer application when commissioning the device and project.

6 Connecting USB peripheral devices

Warning!

Peripheral USB devices can be connected to the USB interfaces on this device. Due to the vast number of USB devices available on the market, B&R cannot guarantee their performance. USB devices from B&R are guaranteed to function properly, however.

6.1 Locally on the PPC725

Many different peripheral USB devices can be connected to the 3 USB interfaces on the Panel PC 725. These can each handle a load of 500 mA. The maximum transfer rate is USB 2.0.

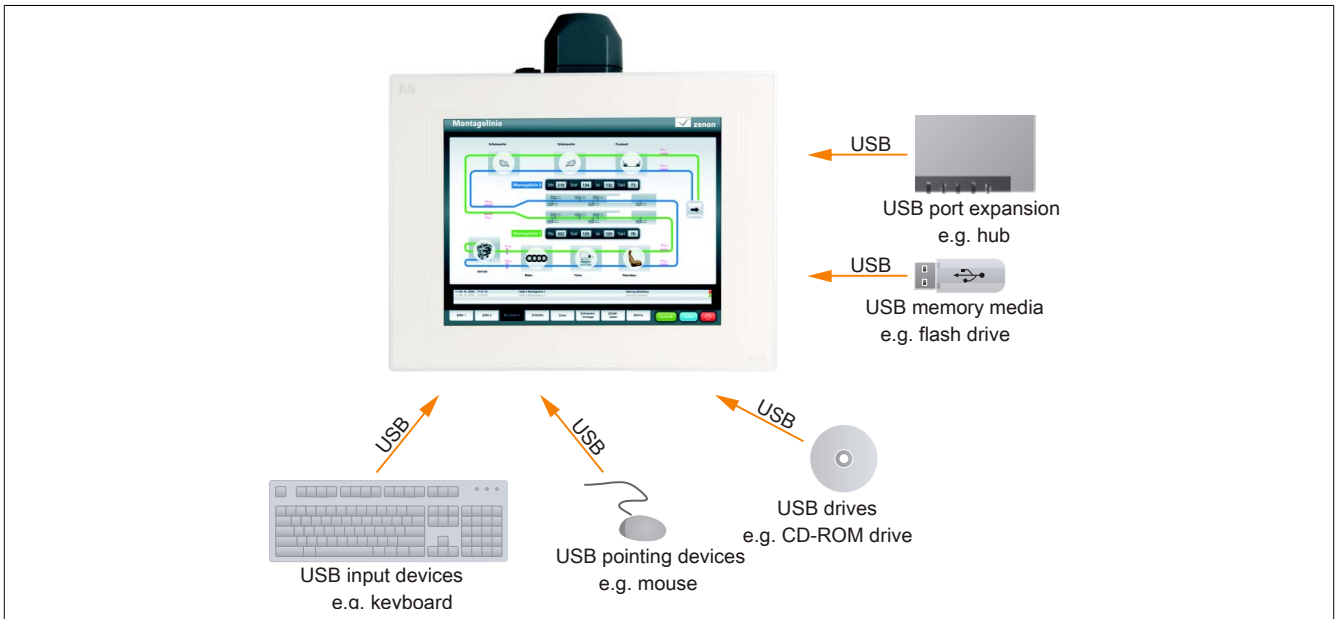


Figure 27: Connecting USB peripheral devices locally to the PPC 725

7 Tips for extending the service life of the display

7.1 Backlight

The service life of the backlight is specified by its "half-brightness time". For example, a specified operating time of 50,000 hours means that the display would still retain 50% of its brightness after this time.

7.1.1 How can the service life of the backlight be extended?

- By setting the display brightness to the lowest value that is still comfortable for the eyes
- By using dark images
- By reducing the brightness by 50%, which can result in an approximately 50% increase in the half-brightness time

7.2 Screen burn-in

Screen burn-in refers to the "burning in" of a static image on a display after being displayed for a prolonged period of time. Nevertheless, static images are not the only cause of screen burn-in. Screen burn-in is also referred to as burn-in effect, image retention, memory effect, memory sticking or ghost image.

There are basically two types:

- Area type: This type of screen burn-in is indicated by a dark gray image. The effect will disappear if the display is switched off for a long period of time.
- Line type: This type of screen burn-in can cause lasting damage.

7.2.1 What causes screen burn-in?

- Static images
- No screensaver
- Sharp transitions in contrast (e.g. black/white)
- High ambient temperatures
- Operation outside of specifications

7.2.2 How can screen burn-in be avoided?

- By constantly changing between static and dynamic images
- By avoiding excessive brightness differences between foreground and background elements
- By using colors with similar brightness
- By using complementary colors in follow-up images
- By using a screensaver

8 Pixel errors

Information:

Displays may contain defective pixels (dead/stuck pixels) that result from the manufacturing process. These flaws are not grounds for reclamation or initiating a warranty claim.

9 Known problems/issues

The following issue for the PPC725 devices is known:

- In Windows XP, the Windows Standby mode is not supported in combination with the add-on hard disk (5AC600.HDDI-05 and 5AC600.HDDI-06) in IDE Slave Only mode. A blue screen or Windows crash can occur sporadically when returning from Windows Standby mode. Windows Standby mode will function if a CompactFlash card is connected to the IDE Master in addition the HDD on the slave slot. The same problem also occurs if the hard disk is switched off under Control panel - Power options.
- If the Intel GMA driver (Graphics Media Accelerator) is installed in the system (e.g. in Windows XP), then an analog RGB monitor will always be detected, regardless of whether one is connected or not.
- Using two different types of CompactFlash cards can cause problems with Automation PCs and Panel PCs. For example, it is possible that one of the two cards is not detected during system startup. This is caused by different 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 end of the time frame provided for startup. The problem described can occur because the startup time for the CompactFlash cards fluctuates due to the different components being used. Depending on the CompactFlash cards being used, this error may occur never, sometimes or always.
- Beginning with Revision E0 of the 5AC600.SSDI-00 drive, the simultaneous operation with a CompactFlash card in the CompactFlash1 slot is no longer recommended since the CompactFlash card is only operated in UDMA2 mode. Revision E0 of the 5AC600.SSDI-00 drive can only be used in standalone operation.

Chapter 4 • Software

1 BIOS options

Information:

- The following diagrams and BIOS menu items including descriptions refer to BIOS version 1.14. It is therefore possible that these diagrams and BIOS descriptions will not correspond with the BIOS version actually installed.
- The setup defaults are the settings recommended by B&R. The setup defaults depend on the DIP switch configuration on the baseboard (see see "BIOS default settings" on page 100).

1.1 General information

BIOS is an acronym for "Basic Input/Output System". It is the most basic standardized interface between the user and the system (hardware). The BIOS system used in this B&R Industrial PC was developed by American Megatrends Inc.

The BIOS Setup utility can be used to modify basic system configuration settings. These settings are stored in CMOS and EEPROM memory (as a backup).

CMOS data is buffered by a battery (if present) and remains stored on 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 activated immediately when switching on the power supply or pressing the power button on the B&R Industrial PC. The system checks if the setup data from EEPROM memory is "OK". If the data is "OK", then it is transferred to CMOS. If the data is "Not OK", then the CMOS data is checked to see whether it is valid. An error message is output if the CMOS data contains errors, and the boot procedure can be continued by pressing <F1>. To prevent an error message from appearing on each restart, the BIOS Setup utility can be opened by pressing . The settings can then be re-saved.

BIOS reads the system configuration information, checks and configures the system with the Power-On Self-Test (POST).

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

To enter BIOS Setup, press the key after the USB controller has been initialized as soon as the following message appears on the screen (during POST): "Press DEL to run SETUP".

```
AMIBIOS (C) 2005 American Megatrends, Inc.  
[APC7R114] Bernecker + Rainer Industrie-Elektronik L1.14  
Serial Number : 316862  
CPU : Intel(R) Atom(TM) CPU N270 @ 1.16GHz  
Speed : 1.60 Ghz  
  
Press DEL to run Setup  
Press F11 for BIOS POPUP  
The MCH is operating with DDR2-533/CL4 in Single-Channel Mode  
Initializing USB Controllers .. Done.  
1016MB OK  
USB Device(s) : 2 Hubs  
Auto-Detecting Pri Slave...ATAPI CDROM  
Auto-Detecting Sec Slave...IDE Hard Disk  
Pri Slave : DW-224E-A V.RA  
Ultra DMA Mode-2  
Sec Slave : ST980817AM 3.AAB  
Ultra DMA Mode-5, S.M.A.R.T Capable and Status OK  
Auto-detecting USB Mass Storage Devices ..  
00 USB mass storage devices found and configured.
```

Figure 28: X945 Boot Screen

1.2.1 BIOS Setup keys

The following keys are enabled during POST:

Information:

Key signals from USB keyboards will only be registered after the USB controller has been initialized.

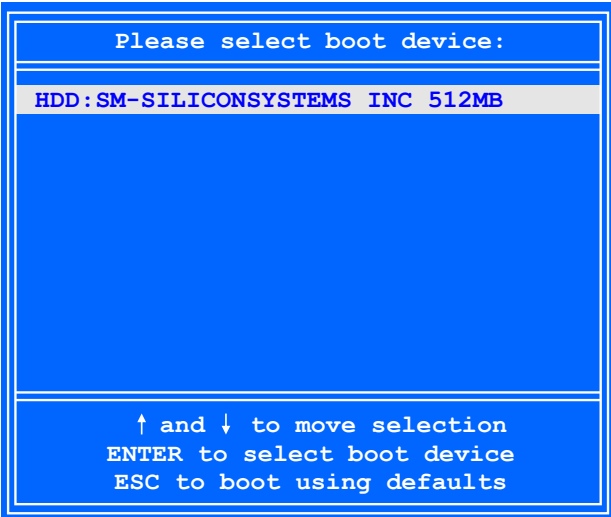
| Keys | Function |
|---------|--|
| Del | Opens the main BIOS Setup screen |
| F12 | Network boot |
| F11 | Opens the boot menu. This lists all bootable devices that are connected to the system. Selecting a device with cursor ↑, cursor ↓ and the pressing <ENTER> will boot from that device. |
| |  |
| <Pause> | Pauses POST. Pressing any other key resumes POST. |

Table 41: BIOS-relevant keys for POST

The following keys can be used once inside BIOS Setup:

| Key | Function |
|----------|--|
| F1 | Opens general help information |
| Cursor ↑ | Moves to the previous item |
| Cursor ↓ | Moves to the next item |
| Cursor ← | Moves to the previous item |
| Cursor → | Moves to the next item |
| +/- | Changes the setting for the selected function |
| Enter | Changes to the selected screen |
| Page ↑ | Changes to the previous page |
| Page ↓ | Changes to the next page |
| Pos 1 | Jumps to the first BIOS menu item or object |
| End | Jumps to the last BIOS menu item or object |
| F2 / F3 | Changes the colors of BIOS Setup |
| F7 | Resets any changes |
| F9 | Loads and configures CMOS default values for all BIOS settings |
| F10 | Saves and exits |
| ESC | Exits a submenu |

Table 42: BIOS-relevant keys

1.3 Main

The main BIOS Setup screen appears immediately after the button is pressed during startup.

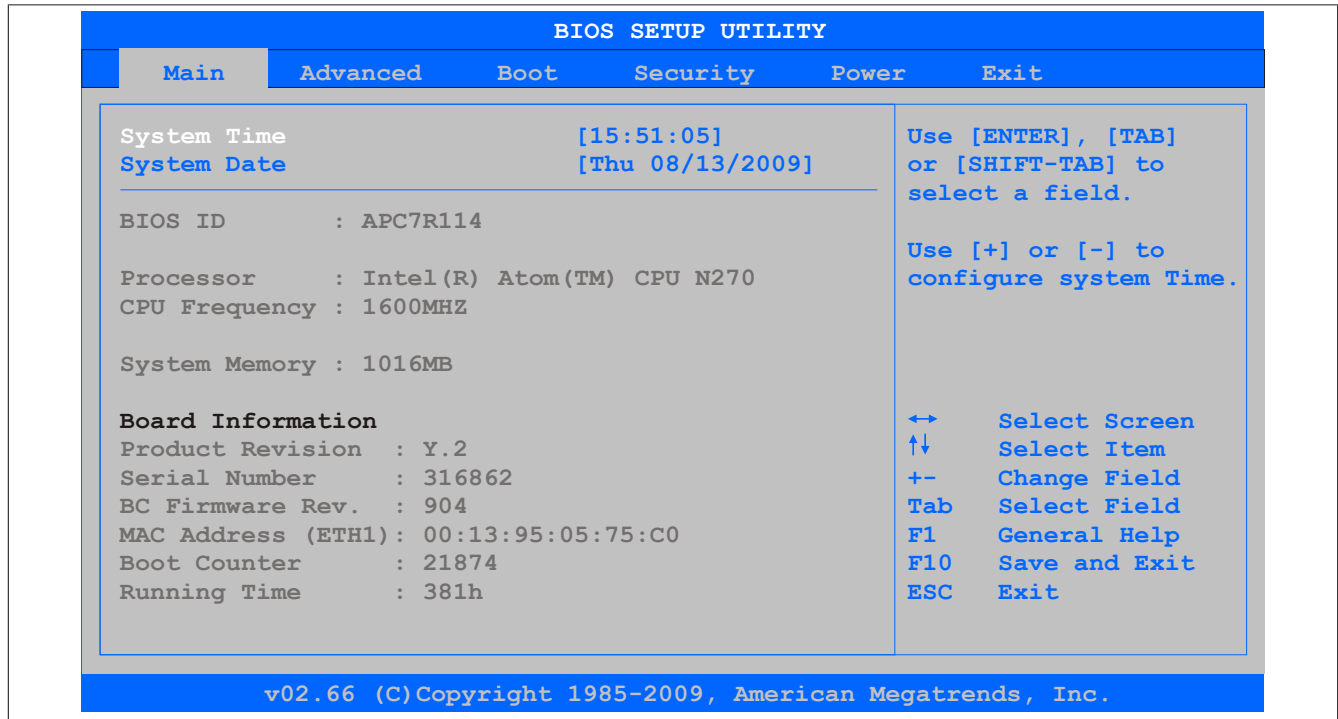


Figure 29: X945 Main - Menü

| BIOS setting | Function | Configuration options | Effect |
|--------------------|---|-------------------------|--|
| System time | The currently configured system time setting. This is buffered by the CMOS battery when the system is switched off. | Changes the system time | Sets the system time in the format Hour:Minute:Second (hh:mm:ss) |
| System date | The currently configured system date. This is buffered by the CMOS battery when the system is switched off. | Changes the system date | Sets the system date in the format Month:Day:Year (mm:dd:yyyy) |
| BIOS ID | Displays the BIOS version | None | - |
| Processor | Displays the processor type | None | - |
| CPU frequency | Displays the processor frequency | None | - |
| System memory | Displays the system memory size | None | - |
| Product revision | Displays the hardware revision of the CPU board | None | - |
| Serial number | Displays the serial number of the CPU board | None | - |
| BC firmware rev. | Displays the firmware revision of the CPU board controller | None | - |
| MAC address (ETH1) | Displays the assigned MAC address for the ETH1 interface | None | - |
| Boot counter | Displays the boot counter; each restart increases the counter by one (max. 16777215) | None | - |
| Running time | Displays the runtime in hours (max. 65535) | None | - |

Table 43: X945 Main menu - Configuration options

1.4 Advanced

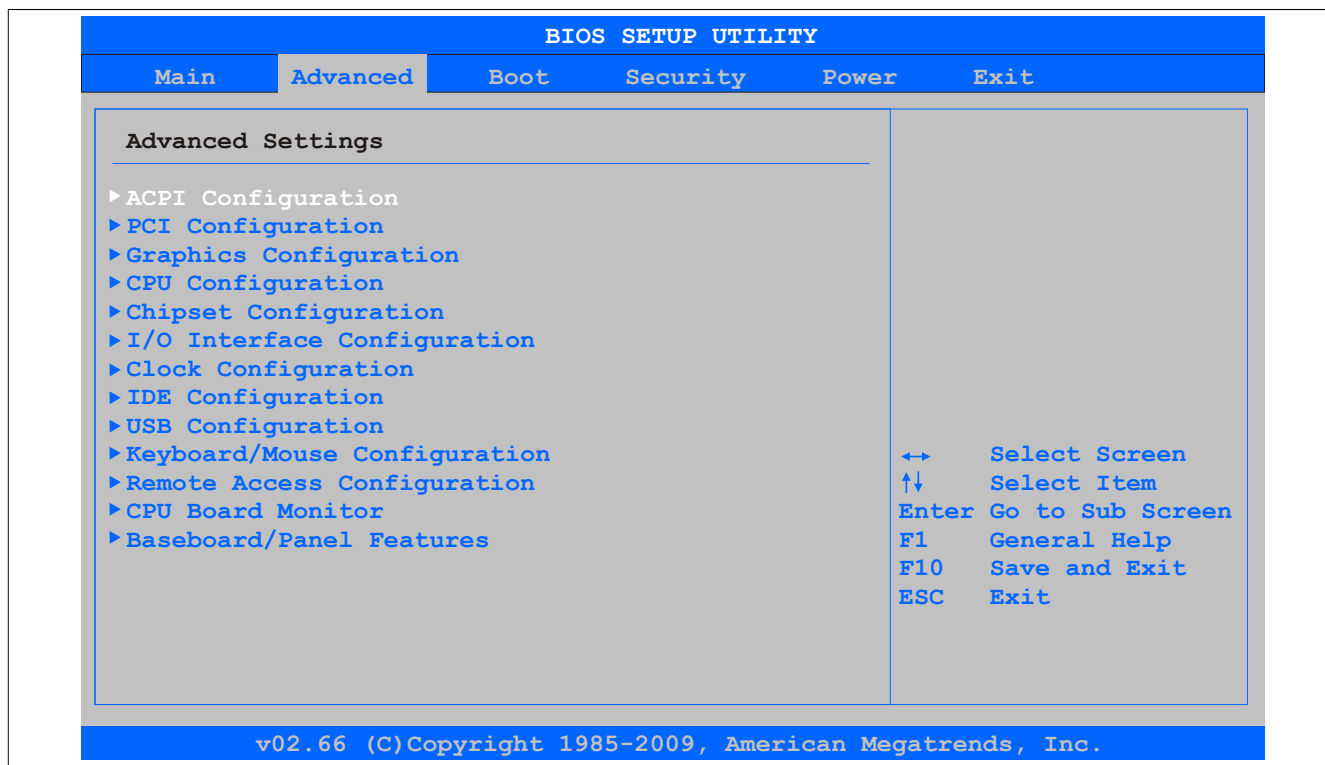


Figure 30: X945 Advanced - Menü

| BIOS setting | Function | Configuration options | Effect |
|-------------------------------------|---|-----------------------|--|
| ACPI configuration | Configures ACPI devices | Enter | Opens the submenu see "ACPI configuration" on page 73 |
| PCI configuration | Configures PCI devices | Enter | Opens the submenu see "PCI configuration" on page 74 |
| Graphics configuration | Configures graphics settings | Enter | Opens the submenu see "Graphics configuration" on page 77 |
| CPU configuration | Configures CPU settings | Enter | Opens the submenu see "CPU configuration" on page 78 |
| Chipset configuration | Configures chipset functions | Enter | Opens the submenu see "Chipset settings" on page 80 |
| I/O interface configuration | Configures I/O devices | Enter | Opens the submenu see "I/O interface configuration" on page 81 |
| Clock configuration | Configures clock settings | Enter | Opens the submenu see "Clock configuration" on page 82 |
| IDE configuration | Configures IDE functions | Enter | Opens the submenu see "IDE configuration" on page 82 |
| USB configuration | Configures USB settings | Enter | Opens the submenu see "USB configuration" on page 85 |
| Keyboard/Mouse configuration | Configures keyboard/mouse options | Enter | Opens the submenu see "Keyboard/Mouse configuration" on page 86 |
| Remote access configuration | Configures remote access settings | Enter | Opens the submenu see "Remote access configuration" on page 87 |
| CPU board monitor | Displays the current voltages and temperature of the processor in use | Enter | Opens the submenu see "CPU board monitor" on page 89 |
| Baseboard/Panel features | Displays and configures device-specific settings | Enter | Opens the submenu see "Baseboard/Panel features" on page 90 |

Table 44: X945 Advanced menu - Configuration options

1.4.1 ACPI configuration

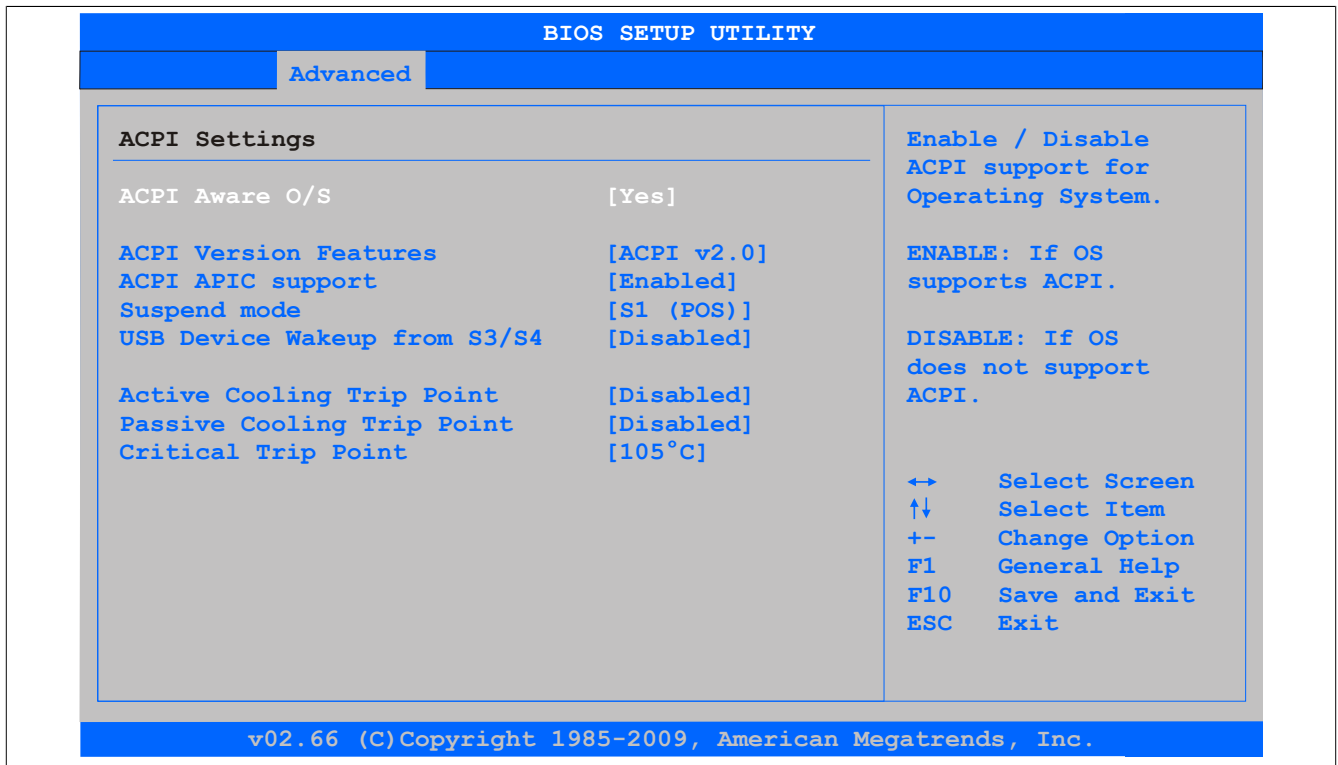


Figure 31: X945 Advanced - ACPI Configuration

| BIOS setting | Function | Configuration options | Effect |
|------------------------------|---|---|--|
| ACPI aware O/S | This function determines if the operating system supports the ACPI function (Advanced Configuration and Power Interface). | Yes | The operating system supports ACPI. |
| | | No | The operating system does not support ACPI. |
| ACPI version features | 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 v1.0 | Uses ACPI functions in accordance with v1.0 |
| | | ACPI v2.0 | Uses ACPI functions in accordance with v2.0 |
| | | ACPI v3.0 | Uses ACPI functions in accordance with v3.0 |
| ACPI APIC support | This option controls the support of the advanced programmable interrupt controller in the processor. | Enabled | Enables this function |
| | | Disabled | Disables this function |
| Suspend mode | Selects the ACPI status to be used when Suspend mode is enabled | S1 (POS) | Sets S1 as Suspend mode. Only a few functions are disabled and are available again at the touch of a button. |
| | | S3 (STR) | Sets S3 as Suspend mode. The current state of the operating system is written to RAM, which is then the only component to receive power. |
| USB device wakeup from S3/S4 | This option makes it possible for activity on a connected USB device to wake the system up from S3/S4 standby mode. | Enabled | Enables this function |
| | | Disabled | Disables this function |
| Active cooling trip point | This function can be used to switch on an optional CPU fan via the operating system when the CPU reaches the set temperature. | Disabled | Disables this function |
| | | 50°C, 60°C, 70°C, 80°C, 90°C | Temperature setting for the active cooling trip point. Configurable in increments of 10 degrees. |
| Passive cooling trip point | Option for configuring a CPU temperature at which the operating system throttles the CPU speed | Disabled | Disables this function |
| | | 50°C, 60°C, 70°C, 80°C, 90°C | Temperature setting for the passive cooling trip point. Configurable in increments of 10 degrees. |
| Critical trip point | Option for configuring a CPU temperature at which the operating system automatically shuts down | 80°C, 85°C, 90°C, 95°C, 100°C, 105°C, 110°C | Temperature setting for the critical trip point. Configurable in increments of 5 degrees. |

Table 45: X945 Advanced - ACPI configuration - Configuration options

1.4.2 PCI configuration

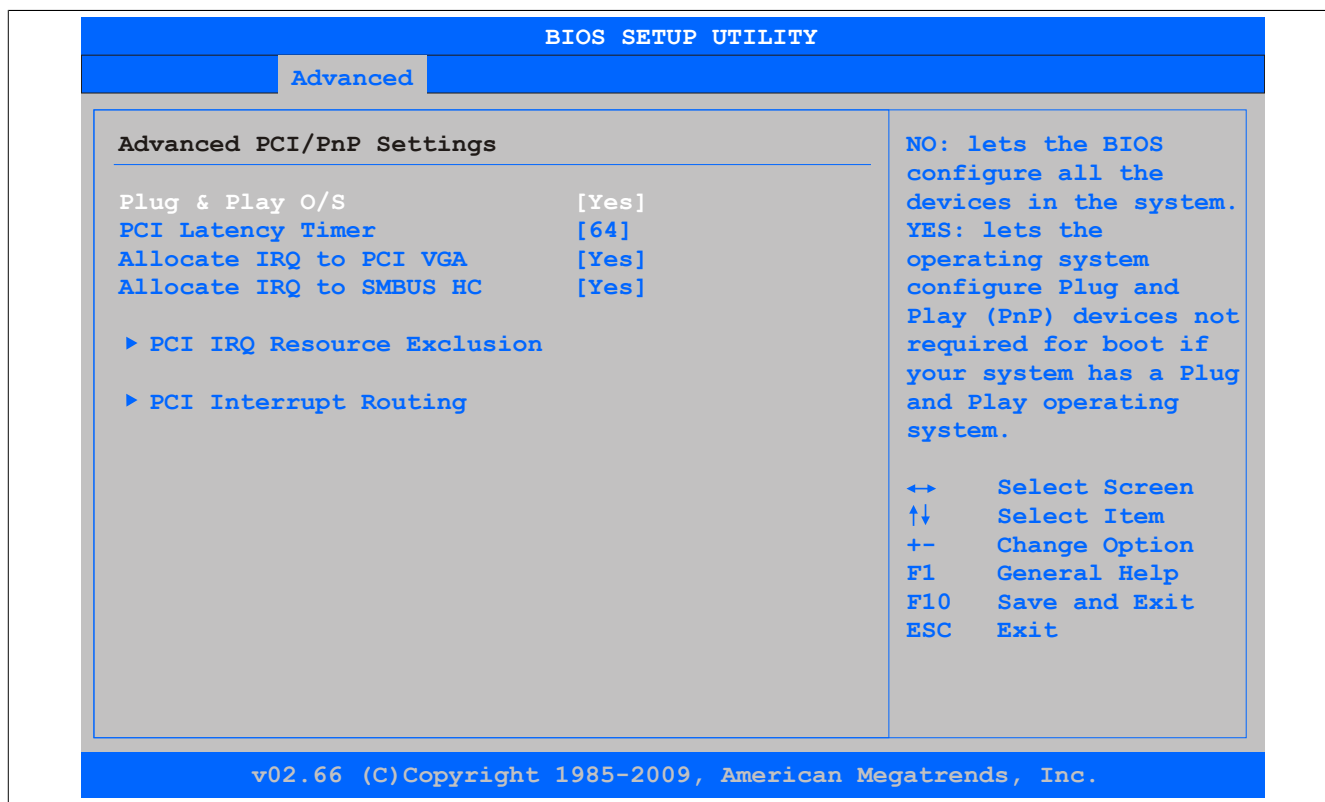


Figure 32: X945 Advanced - PCI Configuration

| BIOS setting | Function | Configuration options | Effect |
|-----------------------------------|--|-------------------------------------|---|
| Plug & Play O/S | Informs BIOS if the operating system is capable of handling plug and play | Yes | Resource allocation handled by the operating system |
| | | No | Resource allocation handled by BIOS |
| PCI latency timer | Option for controlling how long (in PCI ticks) one PCI bus card can continue to use the master after another PCI card has requested access | 32, 64, 96, 128, 160, 192, 224, 248 | Manually sets the value in PCI ticks |
| Allocate IRQ to PCI VGA | This function is used to determine if an interrupt is assigned to the PCI VGA. | Yes | Interrupt assigned automatically |
| | | No | Interrupt not assigned |
| Allocate IRQ to SMBUS HC | This function is used to set whether the SM (system management) bus controller is assigned a PCI interrupt. | Yes | PCI interrupt assigned automatically |
| | | No | Interrupt not assigned |
| PCI IRQ resource exclusion | Configures the PCI IRQ resource settings for ISA Legacy devices | Enter | Opens the submenu see "PCI IRQ resource exclusion" on page 75 |
| PCI interrupt routing | Configures PCI interrupt routing | Enter | Opens the submenu see "PCI interrupt routing" on page 76 |

Table 46: X945 Advanced - PCI configuration - Configuration options

1.4.2.1 PCI IRQ resource exclusion

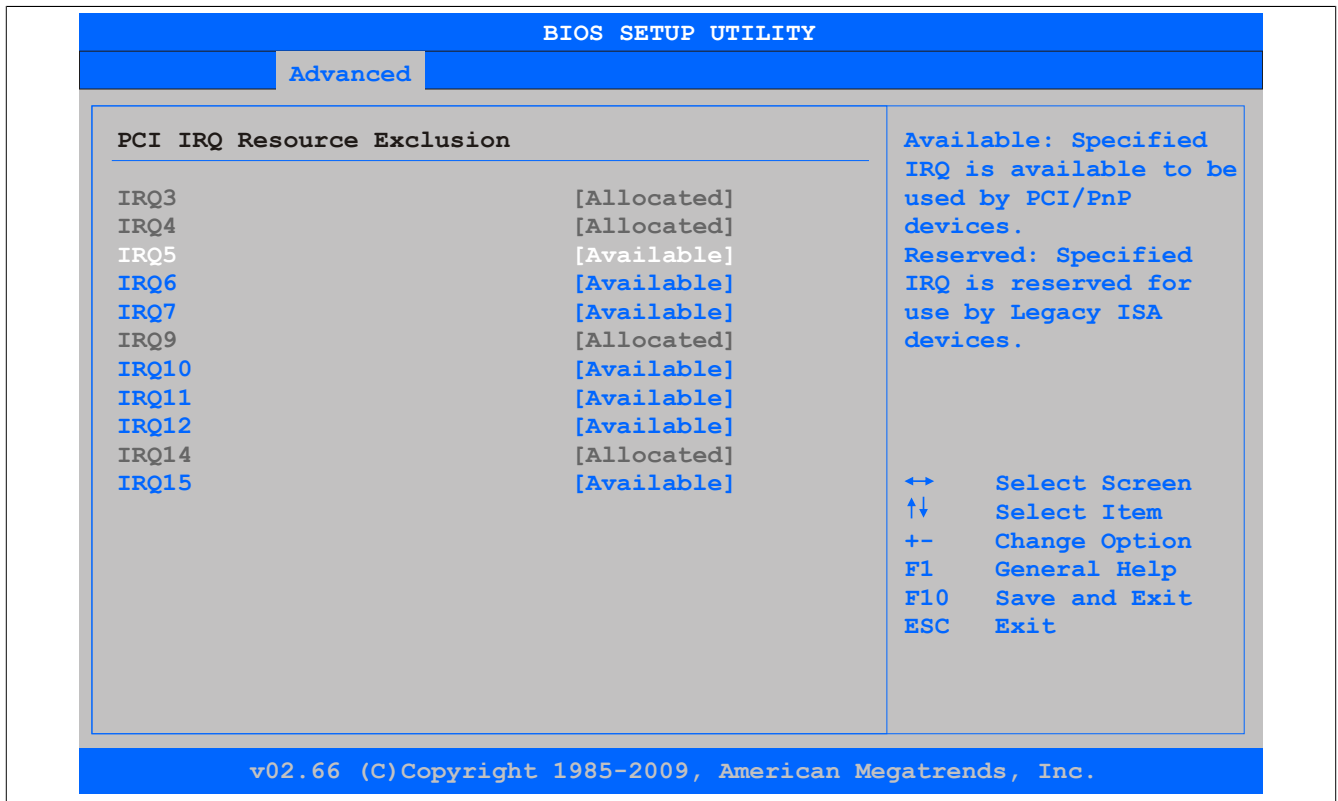


Figure 33: X945 Advanced - PCI Configuration - PCI IRQ Resource Exclusion

| BIOS setting | Function | Configuration options | Effect |
|--------------|--|-----------------------|--|
| IRQx | IRQ interrupt routing for Legacy ISA devices | Allocated | Allocated by the system - cannot be used |
| | | Available | Available - can be used |
| | | Reserved | Reserved - cannot be used |

Table 47: X945 Advanced - PCI IRQ resource exclusion - Configuration options

1.4.2.2 PCI interrupt routing

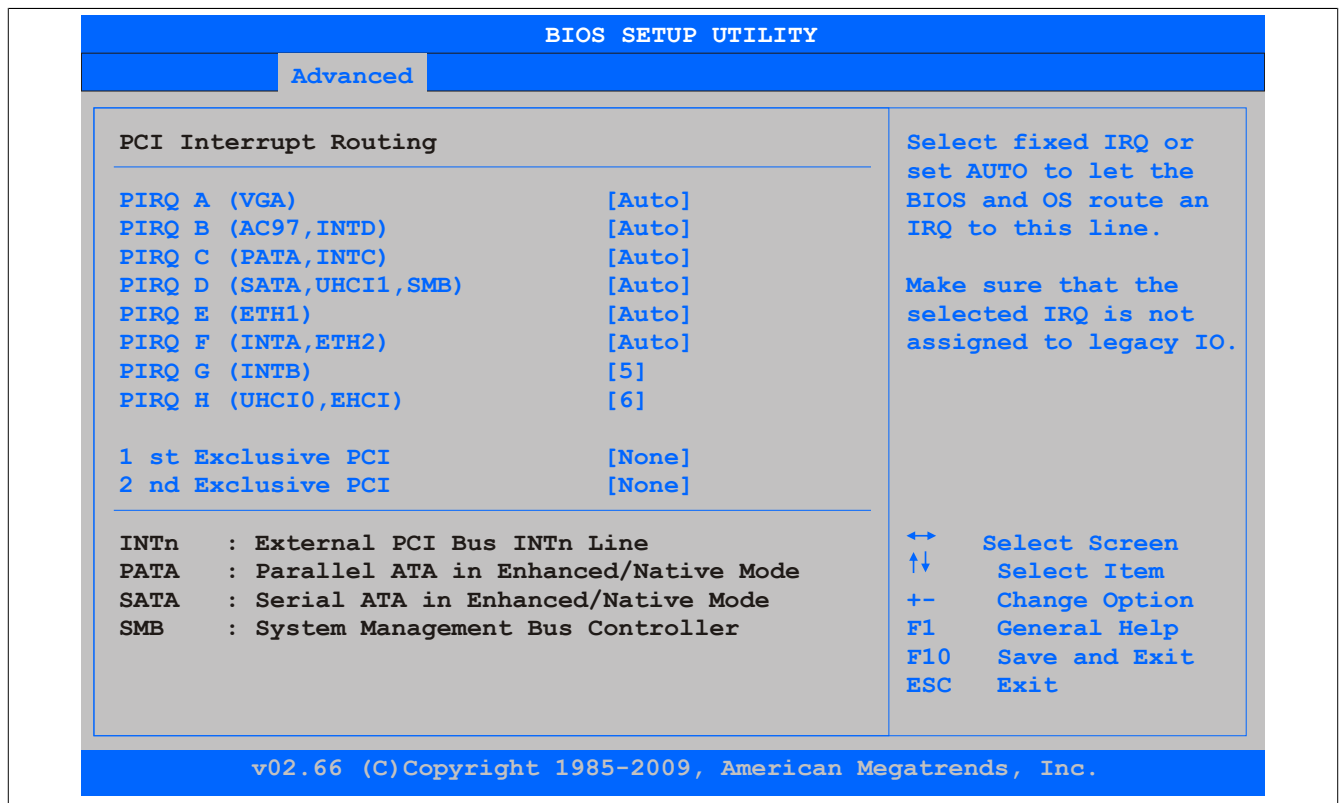


Figure 34: X945 Advanced - PCI Configuration - PCI Interrupt Routing

| BIOS setting | Function | Configuration options | Effect |
|-------------------------|--|-----------------------|---|
| PIRQ A (VGA) | Option for configuring PIRQ A | Auto | Automatic assignment by BIOS and the operating system |
| | | 5,6,7,9,10,11,12 | Manual assignment |
| PIRQ B (AC97, INTD) | Option for configuring PIRQ B | Auto | Automatic assignment by BIOS and the operating system |
| | | 5,6,7,9,10,11,12 | Manual assignment |
| PIRQ C (PATA,INTC) | Option for configuring PIRQ C | Auto | Automatic assignment by BIOS and the operating system |
| | | 5,6,7,9,10,11,12 | Manual assignment |
| PIRQ D (SATA,UHCI1,SMB) | Option for configuring PIRQ D | Auto | Automatic assignment by BIOS and the operating system |
| | | 5,6,7,9,10,11,12 | Manual assignment |
| PIRQ E (ETH1) | Option for configuring PIRQ E | Auto | Automatic assignment by BIOS and the operating system |
| | | 5,6,7,9,10,11,12 | Manual assignment |
| PIRQ F (INTA, ETH2) | Option for configuring PIRQ F | Auto | Automatic assignment by BIOS and the operating system |
| | | 5,6,7,9,10,11,12 | Manual assignment |
| PIRQ G (INTB) | Option for configuring PIRQ G | Auto | Automatic assignment by BIOS and the operating system |
| | | 5,6,7,9,10,11,12 | Manual assignment |
| PIRQ H (UHCI0, EHCI) | Option for configuring PIRQ H | Auto | Automatic assignment by BIOS and the operating system |
| | | 5,6,7,9,10,11,12 | Manual assignment |
| 1st exclusive PCI | This option is used to determine if the IRQ listed under PIRQ x is handled exclusively (no IRQ sharing). Information: This is only displayed if a PIRQ is configured manually (e.g. 5). | None | No interrupt assigned |
| | | x | Assigns the PIRQ as the 1st exclusive PCI IRQ |

Table 48: X945 Advanced - PCI interrupt routing - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|-------------------|--|-----------------------|---|
| 2nd exclusive PCI | This option is used to determine if the IRQ listed under PIRQ x is handled exclusively (no IRQ sharing). Information: This is only displayed if two PIRQs are configured manually. | None | No interrupt assigned |
| | | x | Assigns the PIRQ as the 2nd exclusive PCI IRQ |
| 3rd exclusive PCI | This option is used to determine if the IRQ listed under PIRQ x is handled exclusively (no IRQ sharing). Information: Only displayed in connection with an APC620e and if three PIRQs are set manually. | None | No interrupt assigned |
| | | x | Assigns the PIRQ as the 3rd exclusive PCI IRQ |

Table 48: X945 Advanced - PCI interrupt routing - Configuration options

1.4.3 Graphics configuration

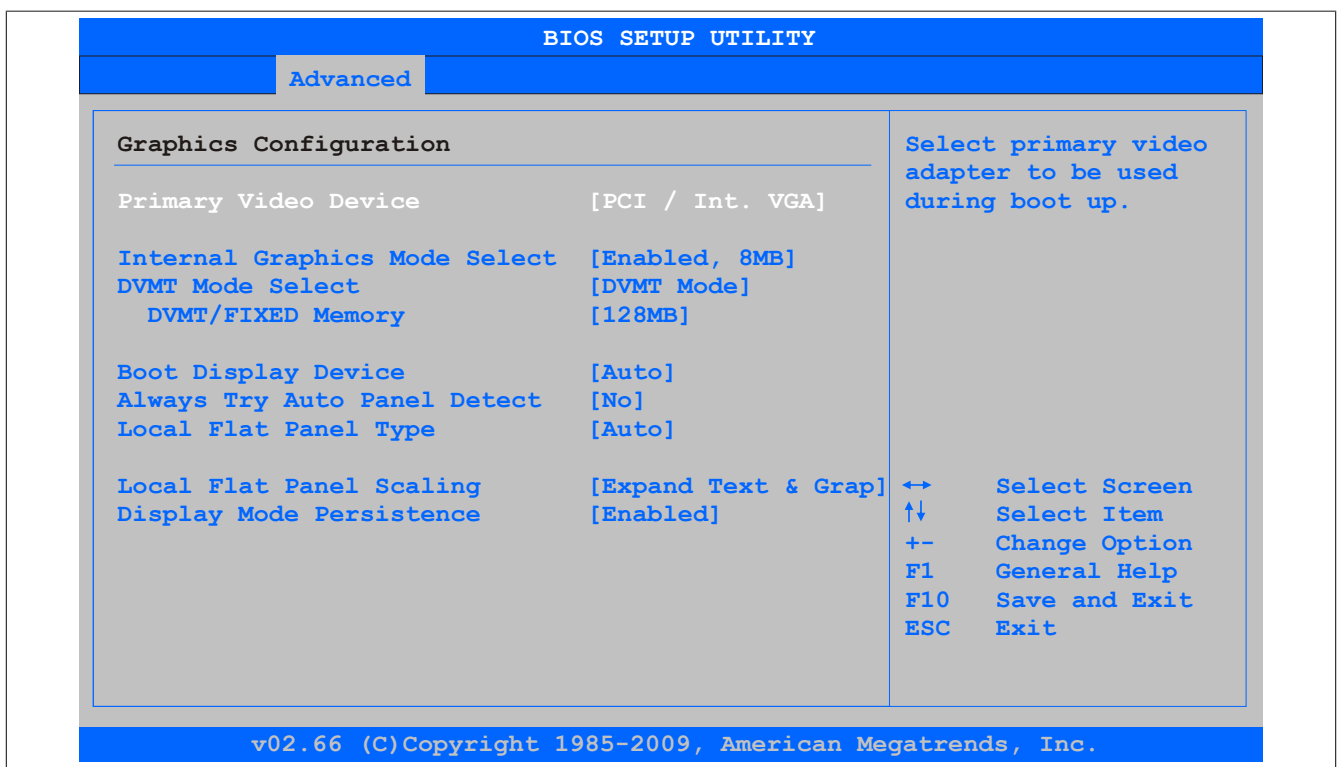


Figure 35: X945 Advanced - Graphics Configuration

| BIOS setting | Function | Configuration options | Effect |
|-------------------------------|--|-----------------------|--|
| Primary video device | Option for selecting the primary display device | Internal VGA | Uses the internal graphics chip on the CPU board as the video device (monitor/panel interface) |
| | | PCI / Int. VGA | Uses the graphics chip of a connected graphics card as the display device |
| Internal graphics mode select | Option for setting the amount of memory used for the internal graphics controller | Disabled | Nothing reserved, disables the graphics controller |
| | | Enabled, 1MB | Provides 1 MB main memory |
| | | Enabled, 8MB | Provides 8 MB main memory |
| DVMT mode select | Option for determining the DVMT mode (Dynamic Video Memory Technology) of the DVMT graphics driver | Fixed mode | Allocates a fixed amount of memory to the graphics chip, which is then no longer available to the PC |
| | | DVMT mode | Memory consumption controlled dynamically by the DVMT graphics driver. Only the amount of memory that is required is reserved. |
| | | Combo mode | At least 64 MB reserved by the DVMT graphics driver (up to 224 MB possible) |
| DVMT/FIXED memory | Option for setting the amount of memory used for DVMT mode | 64 MB | Allows 64 MB of main memory to be used |
| | | 128 MB | Allows 128 MB of main memory to be used |

Table 49: X945 Advanced - Graphics configuration - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|------------------------------|--|------------------------|---|
| | | Maximum DVMT | Allows the remaining available main memory to be used |
| Boot display device | Determines which video channel should be enabled for a display device during booting | Auto | Automatic selection |
| | | CRT only | Uses only the CRT (Cathode Ray Tube) channel |
| | | LFP only | Uses only the LFP (Local Flat Panel) channel |
| | | CRT + LFP | Uses the CRT and LFP channel |
| Always try auto panel detect | This option first searches for EDID data in an external EEPROM to configure the LFP. If no EDID data is found, then the data selected under "Local flat panel type" is used. | No | Disables this function |
| | | Yes | Enables this function |
| Local flat panel type | This option can be used to set a predefined profile for the LVDS channel. | Auto | Automatic detection and configuration using the EDID data |
| | | VGA 1x18 (002h) | 640 x 480 |
| | | VGA 1x18 (013h) | 640 x 480 |
| | | SVGA 1x18 (01Ah) | 800 x 600 |
| | | XGA 1x18 (006h) | 1024 x 768 |
| | | XGA 2x18 (007h) | 1024 x 768 |
| | | XGA 1x24 (008h) | 1024 x 768 |
| | | XGA 2x24 (012h) | 1024 x 768 |
| | | SXGA 2x24 (00Ah) | 1280 x 1024 |
| | | SXGA 2x24 (018h) | 1280 x 1024 |
| | | UXGA 2x24 (00Ch) | 1600 x 1200 |
| | | Customized EDID 1 | User-defined profile |
| | | Customized EDID 2 | User-defined profile |
| Customized EDID 3 | User-defined profile | | |
| Local flat panel scaling | Determines the screen content should be output depending on the configured local flat panel type | Centering | Centers the screen contents on the display |
| | | Expand text | Expands text across the entire display |
| | | Expand graphics | Expands graphics across the entire display |
| | | Expand text & graphics | Expands text and graphics across the entire display |
| Display mode persistence | If enabled, the operating system's graphics driver attempts to restore the last set configuration. | Enabled | Enables this function |
| | | Disabled | Disables this function |

Table 49: X945 Advanced - Graphics configuration - Configuration options

1.4.4 CPU configuration

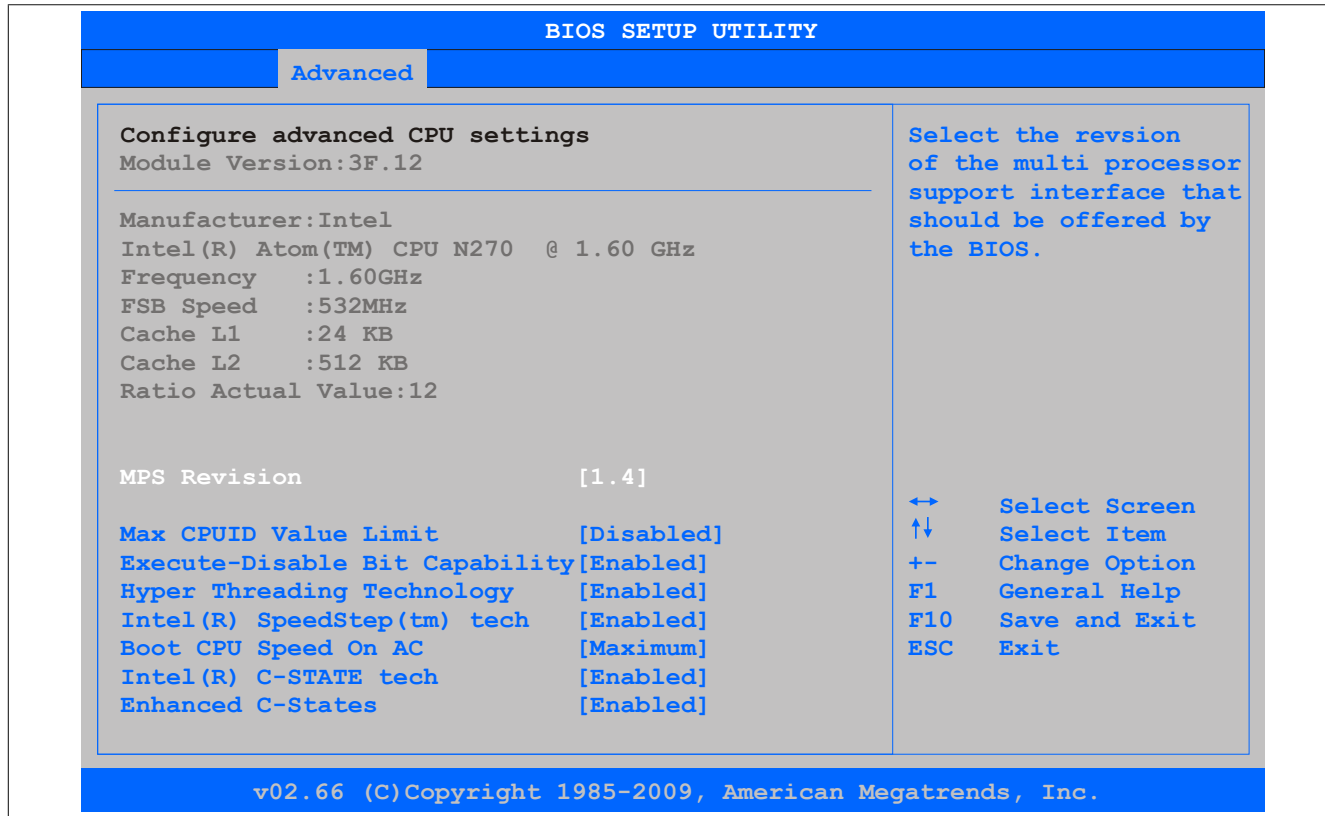


Figure 36: X945 Advanced - CPU Configuration

| BIOS setting | Function | Configuration options | Effect |
|---|--|-----------------------|--|
| Module version | BIOS Module Version | None | - |
| Manufacturer | Manufacturer's display. | None | - |
| Frequency | Processor speed display | None | - |
| FSB speed | Cycle display of all addressed components. (Front side bus) | None | - |
| Cache L1 | Displays first level cache memory area. | None | - |
| Cache L2 | Displays first level cache memory area. | None | - |
| Ratio actual value | Displays the Ratio Actual Value. | None | - |
| MPS revision | This option supports the use of multiple CPUs (MPS=multiprocessor system). | 1.1 | Sets MPS support to Revision 1.1 |
| | | 1.4 | Sets MPS support to Revision 1.4 |
| Max CPUID value limit | Option for limiting the CPUID input value. This may be necessary for older operating systems. | Enabled | The processor limits the maximum CPUID input value to 03h if necessary if the processor supports a higher value. |
| | | Disabled | The processor returns the current maximum value when the CPUID input value is requested. |
| Execute-Disable bit capability | Option for enabling/disabling hardware support for prevention of data execution | Enabled | Enables this function |
| | | Disabled | Disables this function |
| Hyper Threading Technology | Hyper threading technology enables a single physical processor to appear as a multitude of logical processors. This technology allows the operating system to get more out of the internal processor resources, which in turns leads to increased performance. | Enabled | Enables this function |
| | | Disabled | Disables this function |
| <p>Information:</p> <p>This setting should only be disabled when using an operating system older than Windows XP.</p> | | | |
| Intel(R) SpeedStep (tm) tech | Option for controlling the Intel(R) SpeedStep(TM) technology. The processor clock speed is increased or decreased according to the number of calculations that must be made. As a result, the power consumption depends largely on the processor load. | Enabled | SpeedStep technology enabled. |
| | | Disabled | Disables SpeedStep technology |
| Boot CPU Speed On AC | This setting is used to define the maximum or minimum CPU speed during the boot procedure. However, the operating system can change the speed during operation. | Minimum | CPU starts with minimum speed during the boot procedure. |
| | | Maximum | CPU starts with maximum speed during the boot procedure. |
| Intel(R) C-STATE tech | This setting allows the operating system to set the processor clock speed on its own, thereby saving energy. | Enabled | Enables this function The processors are operated at different frequencies to save energy. |
| | | Disabled | Disables this function Both processors are operated at the same frequency. |
| Enhanced C-States ¹⁾ | This setting allows the operating system to set the processor clock speed on its own, thereby saving energy. | Enabled | Enables this function |
| | | Disabled | Disables this function |

Table 50: X945 Advanced - CPU configuration - Configuration options

1) This setting is only shown if *Intel(R) C-State tech.* is set to *Enabled*.

1.4.5 Chipset settings

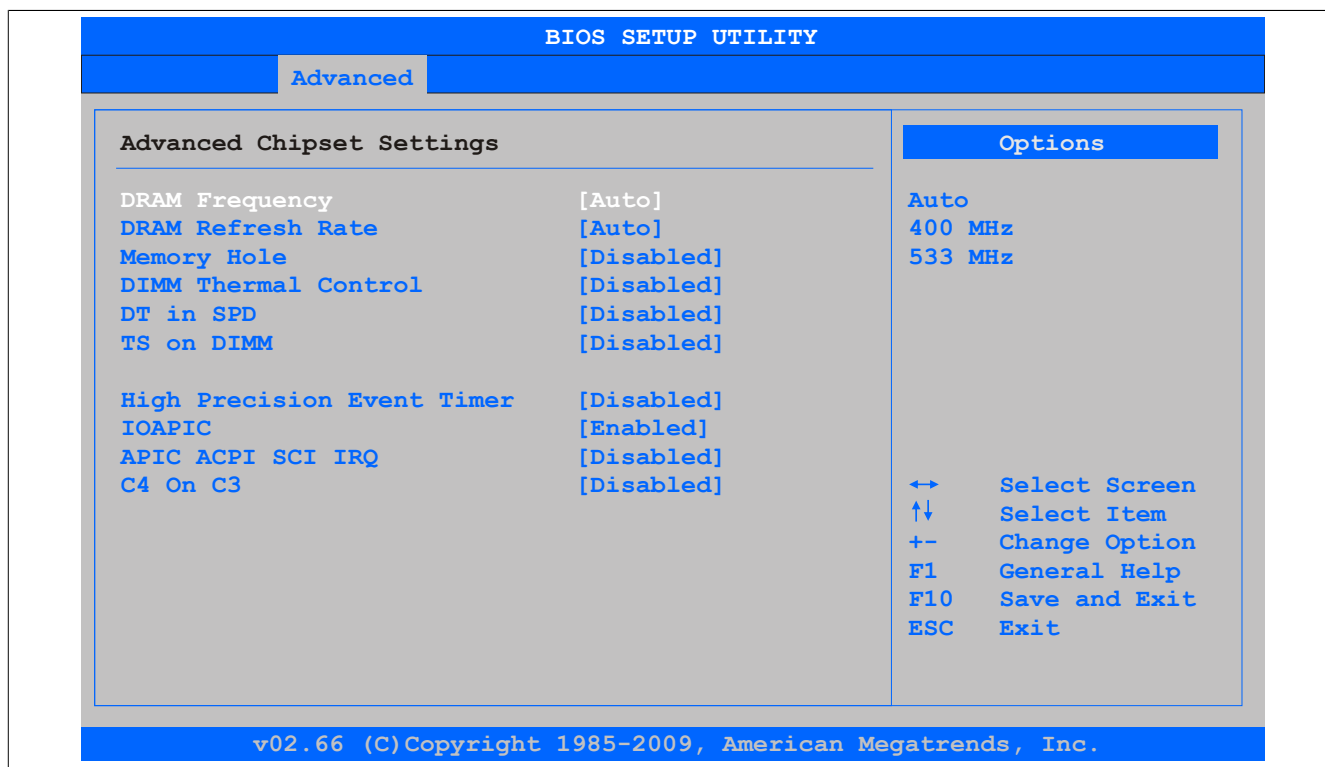


Figure 37: X945 Advanced - Chipset Configuration

| BIOS setting | Function | Configuration options | Effect |
|----------------------------|---|--|--|
| DRAM frequency | Option for setting the RAM frequency | Auto | BIOS sets the frequency automatically. |
| | | 400, 533 MHz | The desired clock frequency is set manually. |
| DRAM refresh rate | Option for configuring the DRAM refresh rate | Auto | Reads the DRAM refresh rate from the SPD data of the DRAM module |
| | | 7.8 μs | The DRAM refresh rate is set manually. |
| | | 3.9 μs | The DRAM refresh rate is set manually. |
| Memory hole | Option for ISA cards with a frame buffer. This does not apply to the PPC725. | Disabled | Disables this function |
| | | 15MB-16MB | Reserves the address range |
| DIMM thermal control | Option for setting the maximum surface temperature of the DIMM module. The module is cooled by limiting the memory bandwidth if the defined surface temperature is reached. | Disabled | Surface temperature not limited |
| | | 40°C, 50°C, 60°C, 70°C, 80°C, 85°C, 90°C | Temperature limit value for the limitation |
| DT in SPD | Option to determine whether the GMCH (graphics and memory controller hub) supports DT (delta temperature) in the SPD (serial presence detect) management algorithm of the DIMM module | Disabled | Disables this function |
| | | Enabled | Enables this function |
| TS on DIMM | Option to determine whether the GMCH (graphics and memory controller hub) supports the TS (thermal sensor) in the thermal management algorithm of the DIMM module | Disabled | Disables this function |
| | | Enabled | Enables this function |
| High precision event timer | 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. | Disabled | Disables this function |
| | | Enabled | Enables this function This function is recommended for multimedia applications. |
| IOAPIC | This option is used to enable or disable the APIC (Advanced Programmable Interrupt Controller). | Disabled | Disables this function |
| | | Enabled | The IRQ resources available to the system are expanded when APIC mode is enabled. |
| APIC ACPI SCI IRQ | This option is used to modify the SCI IRQ when in APIC (Advanced Programmable Interrupt Controller) mode. | Disabled | Uses IRQ9 for SCI. |
| | | Enabled | Uses IRQ20 for SCI |
| C4 on C3 | Fine-tunes the power saving function on an ACPI operating system | Disabled | Disables this function |
| | | Enabled | Brings the processor to C4 if the operating system is initiated in a C3 state |

Table 51: X945 Advanced - Chipset settings - Configuration options

1.4.6 I/O interface configuration

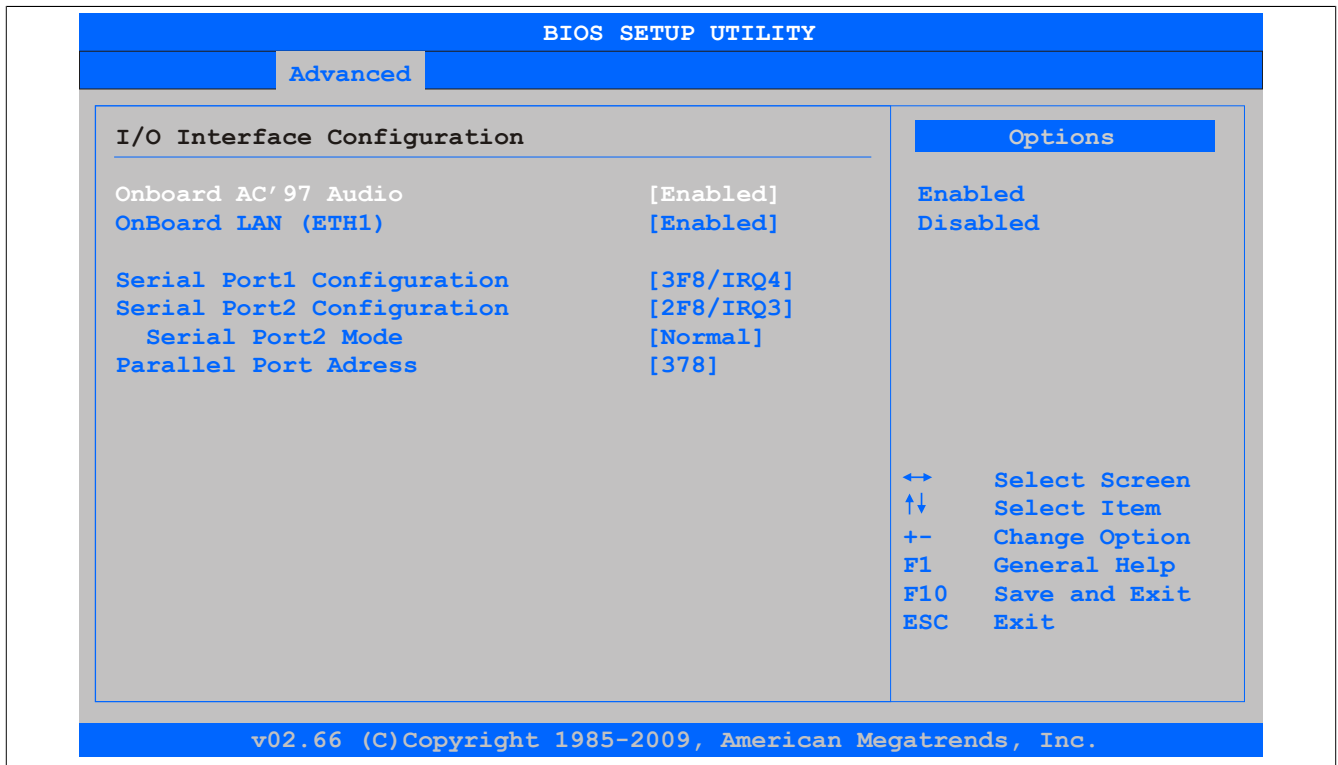


Figure 38: X945 Advanced - I/O Interface Configuration

| BIOS setting | Function | Configuration options | Effect |
|-----------------------------|--|-----------------------|---|
| Onboard AC'97 Audio | For turning the AC97 Sound on and off. Information: This setting is not relevant for the PPC725 because it does not contain an audio interface. | Enabled | Enables AC'97 sound |
| | | Disabled | Disables AC'97 sound. |
| Onboard LAN (ETH1) | For turning the on-board LAN controller (for ETH1) on and off. | Enabled | Activates the LAN controller or the ETH1 interface. |
| | | Disabled | Deactivates the LAN controller or the ETH1 interface. |
| Serial port 1 configuration | For the configuration of serial port 1 (COM1). Information: This setting is not relevant for the PPC725 because it only has one serial interface. | Disabled | Port 1 disabled. |
| | | 3F8/IRQ4 | Assigns the base I/O address and interrupt |
| | | 3E8/IRQ4 | Assigns the base I/O address and interrupt |
| Serial Port2 configuration | For the configuration of serial port 2 (COM2). | Disabled | Port 1 disabled. |
| | | 2F8/IRQ3 | Assigns the base I/O address and interrupt |
| | | 2E8/IRQ3 | Assigns the base I/O address and interrupt |
| Serial port 2 mode | This option is for setting the serial port B as either a standard interface or as an infrared interface (not currently supported). | Normal | Standard interface. |
| | | IrDA | IrDA interface (compliant serial infrared port). |
| | | ASK IR | Interface for IR devices (amplitude shift keyed infrared port). |
| Parallel port address | The address of the parallel interface can be defined with this option. Information: Address is automatically set, even if the function is disabled. | Disabled | Deactivates the port. |
| | | 378, 278, 3BC | Manual assignment of the port address. |

Table 52: X945 Advanced - I/O interface configuration - Configuration options

1.4.7 Clock configuration

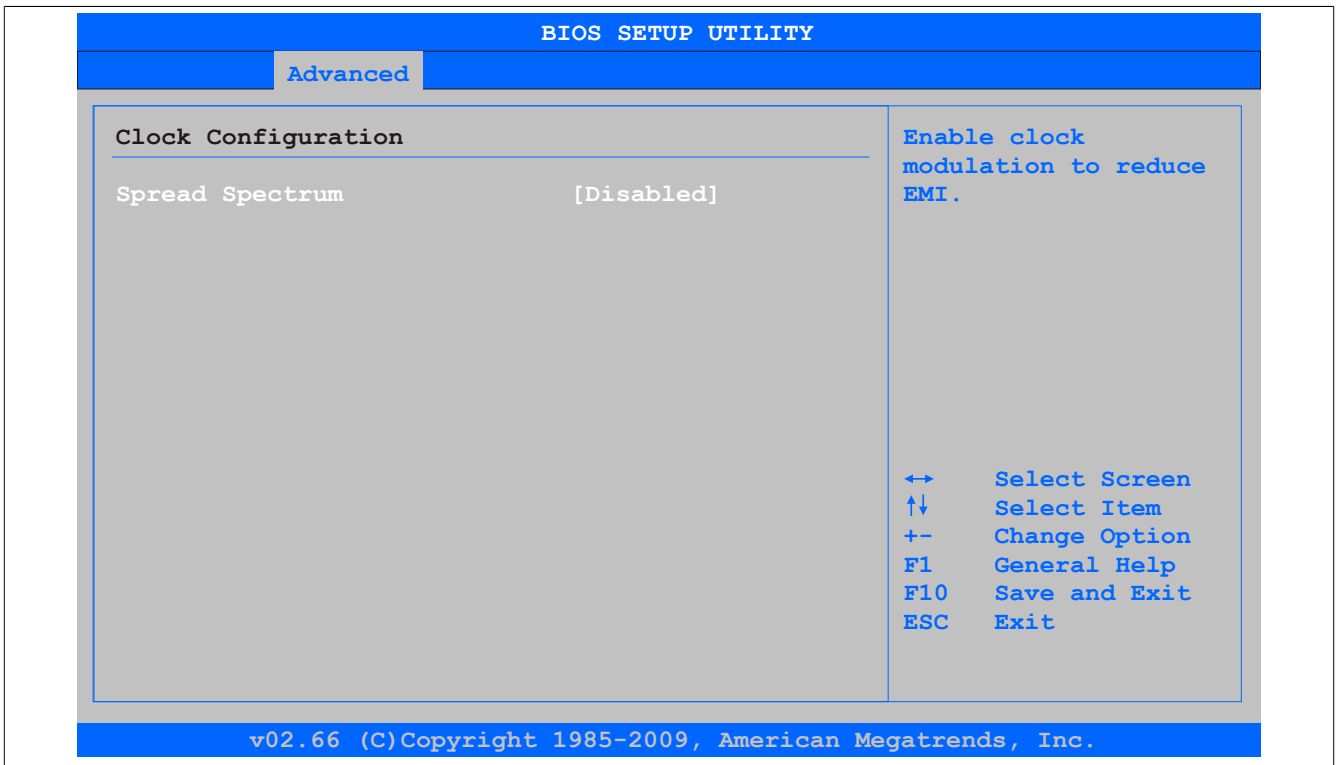


Figure 39: X945 Advanced - Clock Configuration

| BIOS setting | Function | Configuration options | Effect |
|-----------------|--|-----------------------|------------------------|
| Spread spectrum | This option is used to modulate the cycle frequency to slightly reduce electromagnetic interference. | Enabled | Enables this function |
| | | Disabled | Disables this function |

Table 53: X945 Advanced - Clock configuration - Configuration options

1.4.8 IDE configuration

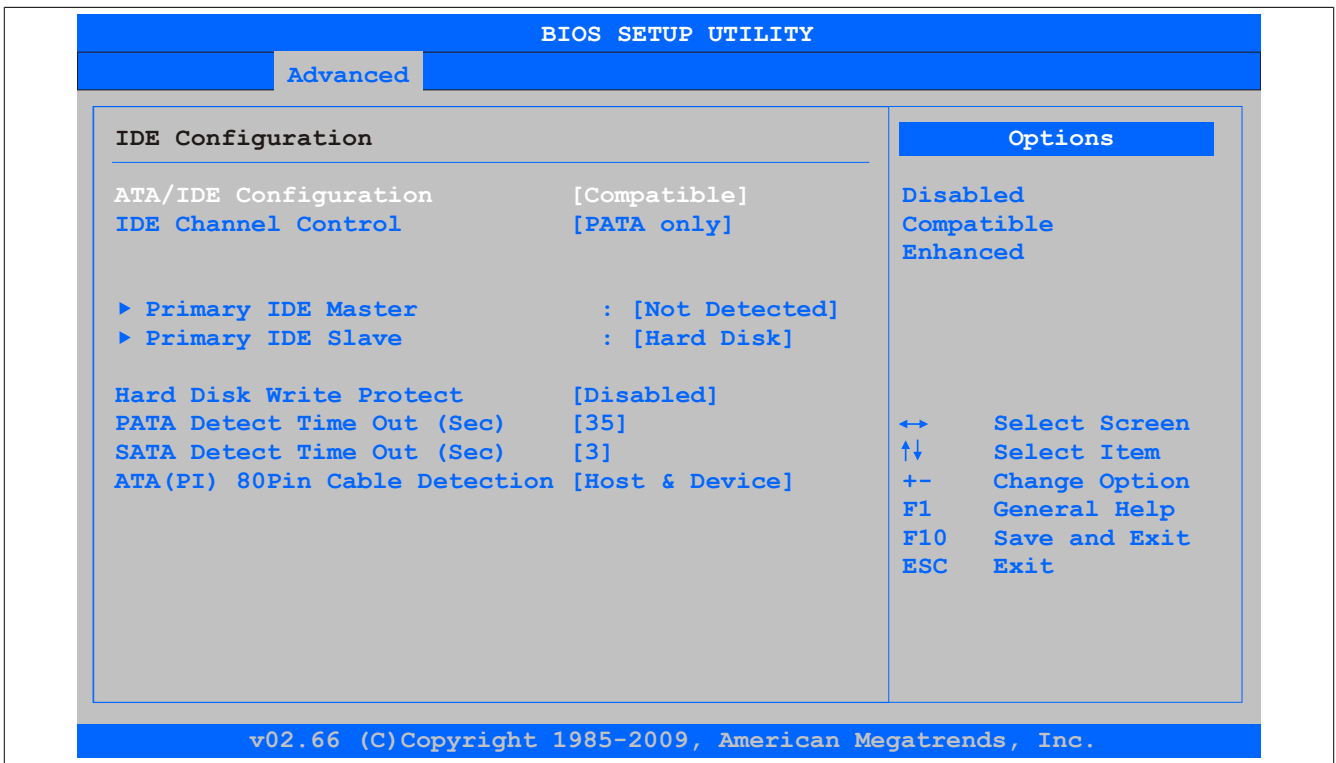


Figure 40: X945 Advanced - IDE Configuration

| BIOS setting | Function | Configuration options | Effect |
|--|---|------------------------------|---|
| ATA/IDE configuration | Option for configuring the integrated PATA and SATA controllers | Disabled | Disables both controllers |
| | | Compatible | Both controllers run in Legacy or Compatible mode. |
| | | Enhanced | Both controllers run in Enhanced or Native mode. |
| IDE channel control ¹⁾ | Option for configuring the IDE channels in "Compatible" mode. | SATA only | Uses SATA drives only |
| | | SATA Pri, PATA Sec | Assigns SATA drives as primary and PATA drives as secondary |
| | | PATA only ²⁾ | Uses PATA drives only |
| Primary IDE master | Option for configuring the drive in the system that is connected to the IDE primary master port | Enter | Opens the submenu see "Primary IDE master" on page 83 |
| Primary IDE slave | Option for configuring the drive in the system that is connected to the IDE primary slave port | Enter | Opens the submenu see "Primary IDE slave" on page 84 |
| Secondary IDE master | Option for configuring the drive in the system that is connected to the IDE secondary master port | Enter | Opens the submenu |
| Secondary IDE slave | Option for configuring the drive in the system that is connected to the IDE secondary slave port | Enter | Opens the submenu |
| Third IDE master ³⁾ | Option for configuring the drive in the system that is connected to the IDE tertiary master port | Enter | Opens the submenu |
| Third IDE slave ⁴⁾ | Option for configuring the drive in the system that is connected to the IDE tertiary slave port | Enter | Opens the submenu |
| Hard disk write protect | Option for enabling/disabling write protection for the hard drive | Disabled | Disables this function |
| | | Enabled | Enables this function |
| PATA detect time out (sec) | Configures the time overrun limit for PATA device detection. | 0, 5, 10, 15, 20, 25, 30, 35 | Sets the value manually |
| SATA detect time out (sec) | Configures the time overrun limit for SATA device detection. | 0, 1, 2, 3, 5, 10, 15, 30 | Sets the value manually |
| ATA(PI) 80-pin cable detection | Detects whether an 80 pin cable is connected to the drive, the controller or to both. | Host & device | Uses both IDE controllers (motherboard, disk drive) |
| | | Host | Uses the IDE controller on the motherboard |
| | | Device | Uses the IDE controller on the disk drive |
| <p>Information:</p> <p>This option is not available on the PPC725 CPU board. This setting therefore does not apply.</p> | | | |

Table 54: X945 Advanced - IDE configuration - Configuration options

- 1) These settings are only possible if *ATA/IDE configuration* is set to *Compatible* or *Enhanced*.
- 2) If this setting is enabled and *ATA/IDE configuration* is set to *Compatible*, then only the submenus *Primary IDE master* and *Primary IDE slave* will be shown.
- 3) This submenu is only open if *ATA/IDE configuration* is set to *Enhanced*.
- 4) This submenu is only open if *ATA/IDE configuration* is set to *Enhanced*.

1.4.8.1 Primary IDE master

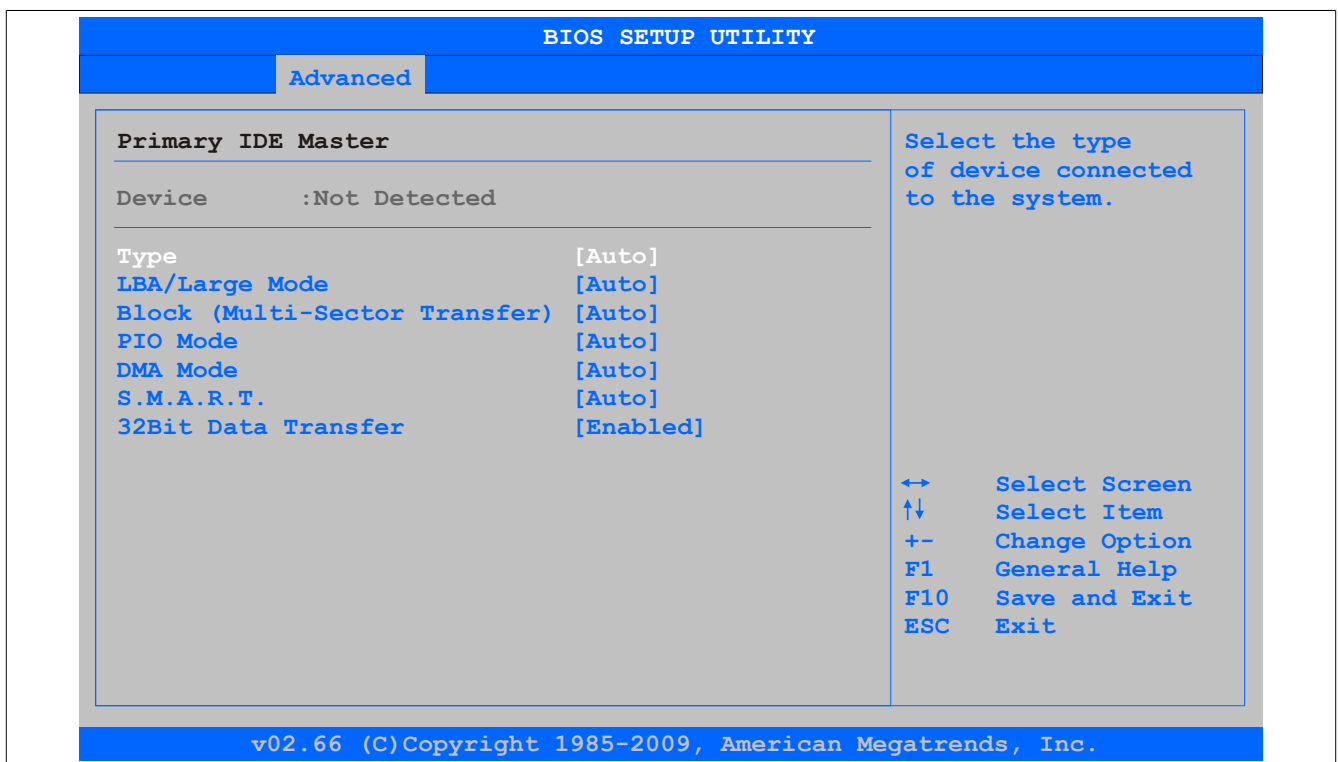


Figure 41: X945 Advanced - IDE Configuration - Primary IDE Master

| BIOS setting | Function | Configuration options | Effect |
|-------------------------------|--|-----------------------|---|
| Type | Configures the type of drive connected to the primary master | Not installed | No drive installed |
| | | Auto | Automatically detects the drive and configures the necessary values |
| | | CD/DVD | CD/DVD drive |
| | | ARMD | ARMD drive (zip drive) |
| LBA/Large mode | This option enables IDE logical block addressing / large mode. | Disabled | Disables this function |
| | | Auto | Automatically enables this function if supported by the system |
| Block (multi-sector transfer) | This option enables block mode for IDE hard drives. If this option is enabled, the number of blocks per request is read from the configuration sector of the hard drive. | Disabled | Disables this function |
| | | Auto | Automatically enables this function if supported by the system |
| PIO mode | PIO mode determines the data rate of the hard drive. Information: This option is not available on the PPC725. This setting therefore does not apply. | Auto | Configures PIO mode automatically |
| | | 0, 1, 2, 3, 4 | Configures PIO mode manually |
| DMA mode | Defines the data transfer rate to and from the primary master drive. DMA mode must be enabled activated in the Windows Device Manager in order to guarantee maximum performance. This is only possible when manually setting up the drive. | Auto | Defines the transfer rate automatically |
| | | Disabled | Defines the transfer rate manually |
| S.M.A.R.T. | Monitoring function for hard drives (Self-Monitoring, Analysis and Reporting Technology) | Auto | Detected and enabled automatically |
| | | Disabled | Disables this function |
| | | Enabled | Enables this function |
| 32 bit data transfer | Enables 32-bit data transfer | Disabled | Disables this function |
| | | Enabled | Enables this function |

Table 55: X945 Advanced - Primary IDE master - Configuration options

1.4.8.2 Primary IDE slave

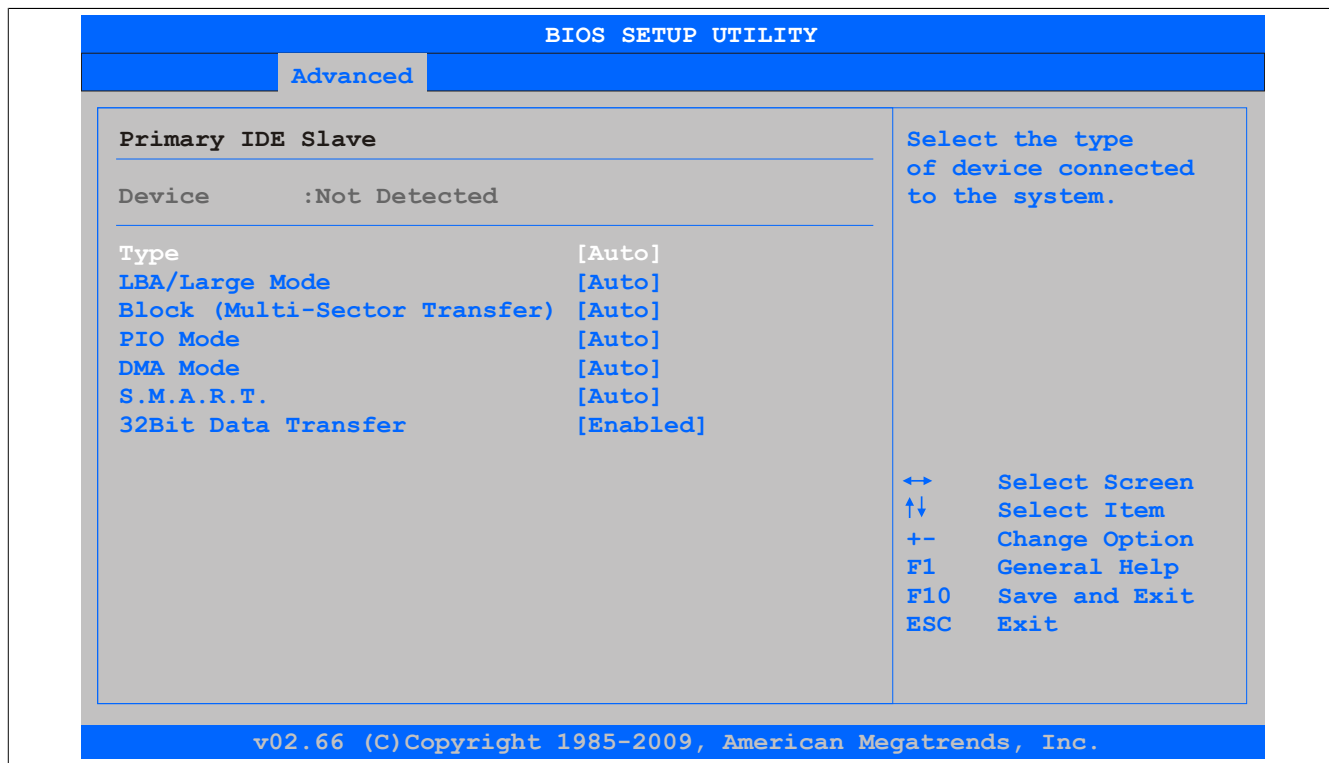


Figure 42: X945 Advanced - IDE Configuration - Primary IDE Slave

| BIOS setting | Function | Configuration options | Effect |
|--------------|---|-----------------------|---|
| Type | Configures the type of drive connected to the primary slave | Not installed | No drive installed |
| | | Auto | Automatically detects the drive and configures the necessary values |
| | | CD/DVD | CD/DVD drive |
| | | ARMD | ARMD drive (zip drive) |

Table 56: X945 Advanced - Primary IDE slave - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|-------------------------------|---|-----------------------|--|
| LBA/Large mode | This option enables IDE logical block addressing / large mode. | Disabled | Disables this function |
| | | Auto | Automatically enables this function if supported by the system |
| Block (multi-sector transfer) | This option enables block mode for IDE hard drives. If this option is enabled, the number of blocks per request is read from the configuration sector of the hard drive. | Disabled | Disables this function |
| | | Auto | Automatically enables this function if supported by the system |
| PIO mode | PIO mode determines the data rate of the hard drive. Information: This option is not available on the PPC725. This setting therefore does not apply. | Auto | Configures PIO mode automatically |
| | | 0, 1, 2, 3, 4 | Configures PIO mode manually |
| DMA mode | Defines the data transfer rate to and from the primary master drive. DMA mode must be enabled activated in the Windows Device Manager in order to guarantee maximum performance. This is only possible when manually setting up the drive. | Auto | Defines the transfer rate automatically |
| | | Disabled | Defines the transfer rate manually |
| S.M.A.R.T. | Monitoring function for hard drives (Self-Monitoring, Analysis and Reporting Technology) | Auto | Detected and enabled automatically |
| | | Disabled | Disables this function |
| | | Enabled | Enables this function |
| 32 bit data transfer | Enables 32-bit data transfer | Disabled | Disables this function |
| | | Enabled | Enables this function |

Table 56: X945 Advanced - Primary IDE slave - Configuration options

1.4.9 USB configuration

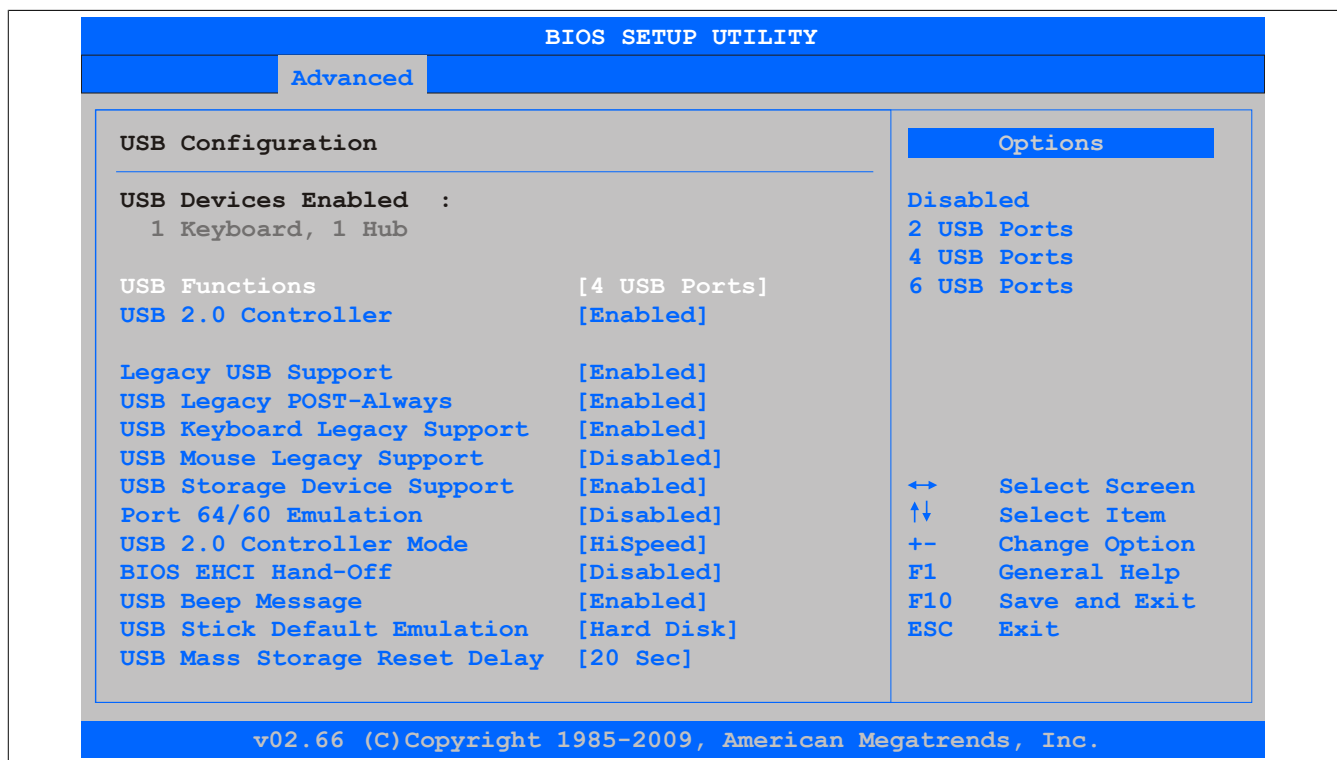


Figure 43: X945 Advanced - USB Configuration

| BIOS setting | Function | Configuration options | Effect |
|--------------------|---|-----------------------|---|
| USB function | Enables/Disables USB ports | Disabled | Disables the USB port |
| | | 2 USB ports | Enables USB1 and USB3 |
| | | 4 USB ports | Enables USB1, USB2, USB3 and USB4 |
| | | 6 USB ports | Enables USB1, USB2, USB3, USB4 and USB5 |
| | | 8 USB ports | Enables USB1, USB2, USB3, USB4, USB5 and USB on an AP via SDL |
| USB 2.0 controller | Option for enabling or disabling USB 2.0 mode | Enabled | Uses USB 2.0 for all USB ports |
| | | Disabled | Uses USB 1.1 for all USB ports |

Table 57: X945 Advanced - USB configuration - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|------------------------------|---|--------------------------------|--|
| Legacy USB support | Enables/Disables Legacy USB support. USB ports do not function during startup. USB support is available again after the operating system has started. A USB keyboard is still recognized during POST. | Disabled | Disables this function |
| | | Enabled | Enables this function |
| | | Auto | Automatic enabling |
| USB Legacy POST-always | Option to enable Legacy USB support during POST (power-on self test) regardless of the setting made for Legacy USB support | Enabled | Allows BIOS Setup to be opened during POST using a USB keyboard |
| | | Disabled | Disables this function |
| USB keyboard Legacy support | Enables/Disables USB keyboard support | Disabled | Disables this function |
| | | Enabled | Enables this function |
| USB mouse Legacy support | Enables/Disables USB mouse support | Disabled | Disables this function |
| | | Enabled | Enables this function |
| USB storage device support | Enables/Disables USB mass storage device support | Disabled | Disables this function |
| | | Enabled | Enables this function |
| Port 64/60 emulation | Enables/Disables port 64/60 emulation | Disabled | Allows USB keyboard functionality on all systems except Windows NT |
| | | Enabled | Allows USB keyboard functionality in Windows NT |
| USB 2.0 controller mode | Configures the USB controller | Full speed | 12 MBps |
| | | Hi speed | 480 MBps |
| BIOS EHCI hand-off | Allows support for operating systems to be set up without the fully automatic EHCI function | Disabled | Disables this function |
| | | Enabled | Enables this function |
| USB beep message | Option for emitting a tone each time a USB device is detected by BIOS during POST. | Disabled | Disables this function |
| | | Enabled | Enables this function |
| USB stick default emulation | Configures how a USB device is to be used | Auto | USB devices with less than 530 MB of memory are simulated as floppy disk drives. Devices with larger memory capacity are simulated as hard drives. |
| | | Hard disk drive | An HDD-formatted drive can be used as an FDD (e.g. zip drive) to start the system. |
| USB mass storage reset delay | Option for configuring the time that POST waits for USB memory storage devices after the device start command is issued Information: The message "No USB mass storage device detected" is displayed if a USB memory device has not been installed. | 10 sec, 20 sec, 30 sec, 40 sec | Sets the value manually |

Table 57: X945 Advanced - USB configuration - Configuration options

1.4.10 Keyboard/Mouse configuration

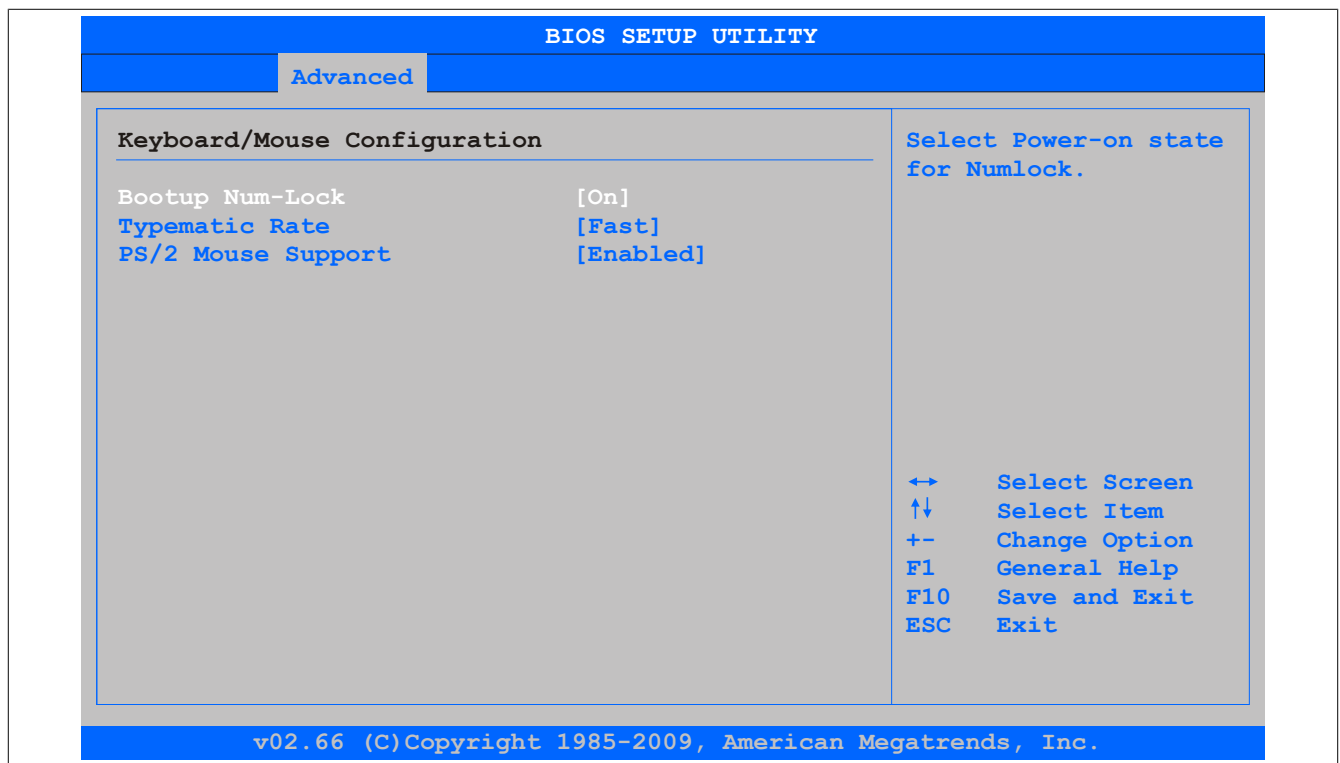


Figure 44: X945 Advanced - Keyboard/Mouse Configuration

| BIOS setting | Function | Configuration options | Effect |
|--------------------|---|-----------------------|---|
| Bootup Num-lock | Defines the state of the NumLock key on the numeric keypad when booting | Off | Only enables the cursor (movement) functions of the numeric keypad |
| | | On | Enables the numeric keypad |
| Typematic rate | Configures the key repeat function | Slow | Slow key repeat |
| | | Fast | Fast key repeat |
| PS/2 mouse support | Sets whether the PS/2 mouse port should be activated. | Disabled | Disables this function |
| | | Enabled | Enables this function |
| | | Auto | Automatic activation of the function if PS/2 mouse port is supported. |

Table 58: X945 Advanced - Keyboard/Mouse configuration - Configuration options

1.4.11 Remote access configuration

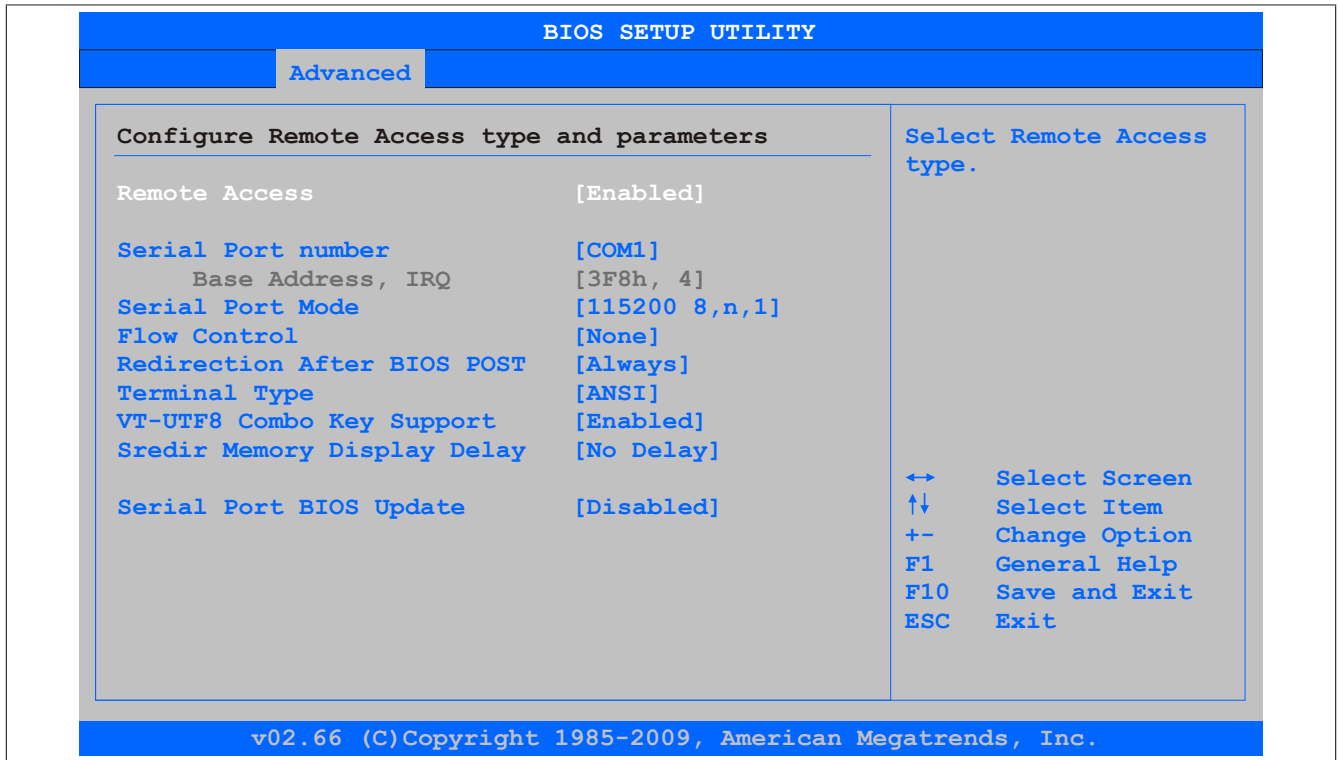


Figure 45: X945 Advanced - Remote Access Configuration (Enabled)

| BIOS setting | Function | Configuration options | Effect |
|---|---|--|---|
| Remote access | Enables/Disables the remote access function | Disabled | Disables this function |
| | | Enabled | Enables this function |
| Serial port number | This option is used to configure the serial interface as long as <i>Remote access</i> is not set to "Disabled". | COM1 | Enables the COM1 interface as a remote access interface |
| | | COM2 | Enables the COM2 interface as a remote access interface |
| Base address, IRQ | Displays the logical address and interrupt for the serial port as long as <i>Remote access</i> is not set to "Disabled" | None | - |
| Serial port mode | Defines the serial port transfer rate as long as <i>Remote access</i> is not set to "Disabled" | 115200 8,n,1 57600 8,n,1 38400 8,n,1 19200 8,n,1 09600 8,n,1 | Sets the value manually |
| Flow control | Determines how the transfer is controlled via the interface | None | Operates the interface without transfer control |
| | | Hardware | Uses hardware for interface transfer control. This mode must be supported by the cable. |
| | | Software | Uses software for interface transfer control |
| Information: The setting must be the same on the terminal and the server. | | | |
| Redirection After BIOS POST | Configures redirection after startup as long as <i>Remote access</i> is not set to "Disabled" | Disabled | Disables redirection after startup |
| | | Boot loader | Enables redirection during system startup and when charging |
| | | Always | Keeps redirection enabled permanently |
| Terminal type | Configures the type of connection as long as <i>Remote access</i> is not set to "Disabled". | ANSI, VT100, VT-UTF8 | Configures the connection type manually |

Table 59: X945 Advanced - Remote access configuration - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|-----------------------------|--|---------------------------------------|-------------------------|
| VT-UTF8 combo key support | This option can be used to enable VT-UTF8 combo key support for ANSI and VT100 interfaces as long as Remote access is not set to "Disabled". | Disabled | Disables this function |
| | | Enabled | Enables this function |
| Sredir memory display delay | The memory output delay can be set using this option as long as "Disabled" is not entered in the "Remote access" field (Sredir -> serial redirection). | No delay | No delay |
| | | Delay 1 sec, Delay 2 sec, Delay 4 sec | Sets the value manually |
| Serial port BIOS update | Loads updates to the processor via the serial interface during system startup | Disabled | Disables this function |
| | | Enabled | Enables this function |

Information:

Disabling this option reduces the boot time.

Table 59: X945 Advanced - Remote access configuration - Configuration options

1.4.12 CPU board monitor

Information:

The voltage values (e.g. core voltage, battery voltage) displayed on this BIOS Setup screen represent uncalibrated values for informational purposes. They cannot be used to draw any conclusions about hardware alarms or error conditions. The hardware components used have automatic diagnostic functions that can be applied in the event of error.

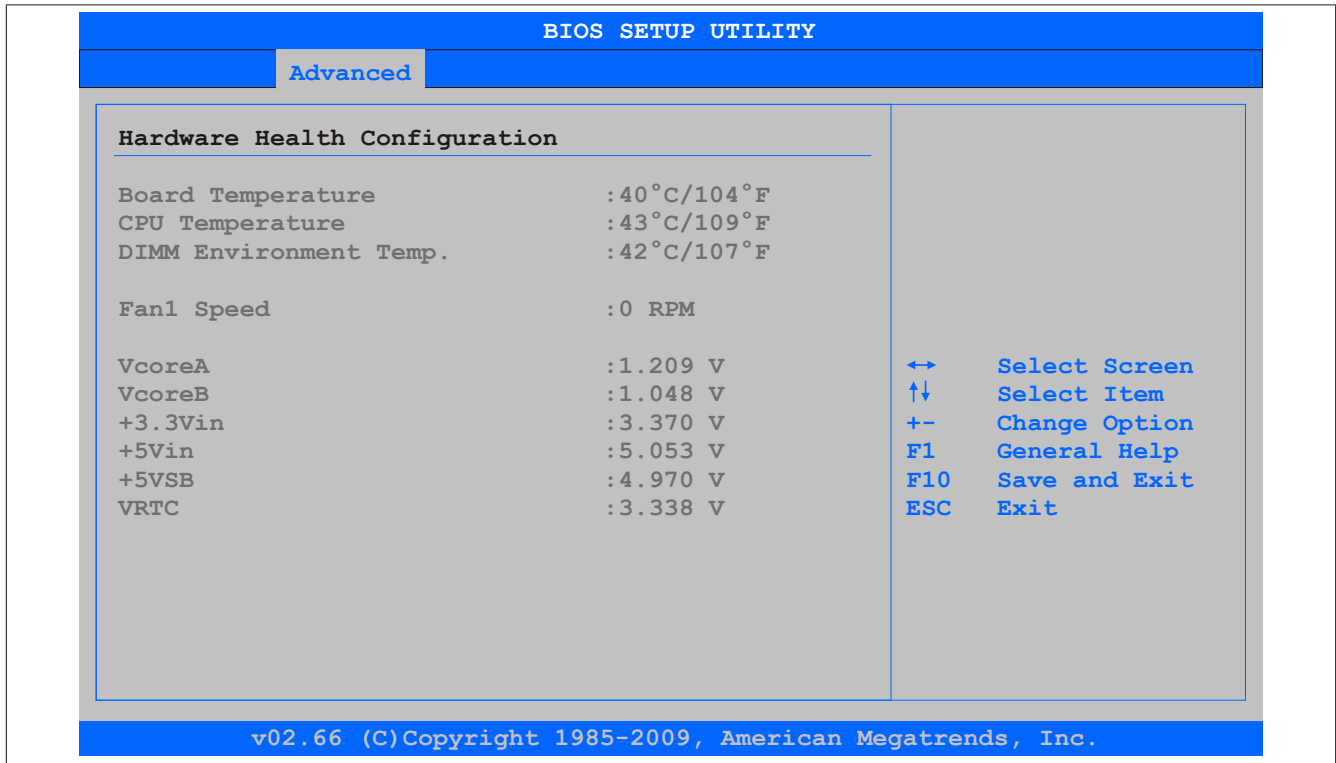


Figure 46: X945 Advanced - CPU Board Monitor

| BIOS setting | Function | Configuration options | Effect |
|------------------------|--|-----------------------|--------|
| Board temperature | Displays the board temperature in degrees Celsius and Fahrenheit | None | - |
| CPU temperature | Displays the processor's temperature (in degrees Celsius and Fahrenheit) | None | - |
| DIMM environment temp. | Displays the temperature of the DRAM module. | None | - |
| Fan1 Speed | Displays the speed of the processor fan | None | - |
| VcoreA | Displays the processor core voltage A in volts | None | - |
| VcoreB | Displays the DDR's core voltage B in volts. | None | - |
| +3.3 Vin | Displays the current voltage of the 3.3 volt supply | None | - |
| +5 Vin | Displays the current voltage of the 5 volt supply | None | - |
| +5VSB | Displays the current level of the jumper. | None | - |
| VRTC | Displays the battery voltage in volts | None | - |

Table 60: X945 Advanced - CPU board monitor

1.4.13 Baseboard/Panel features

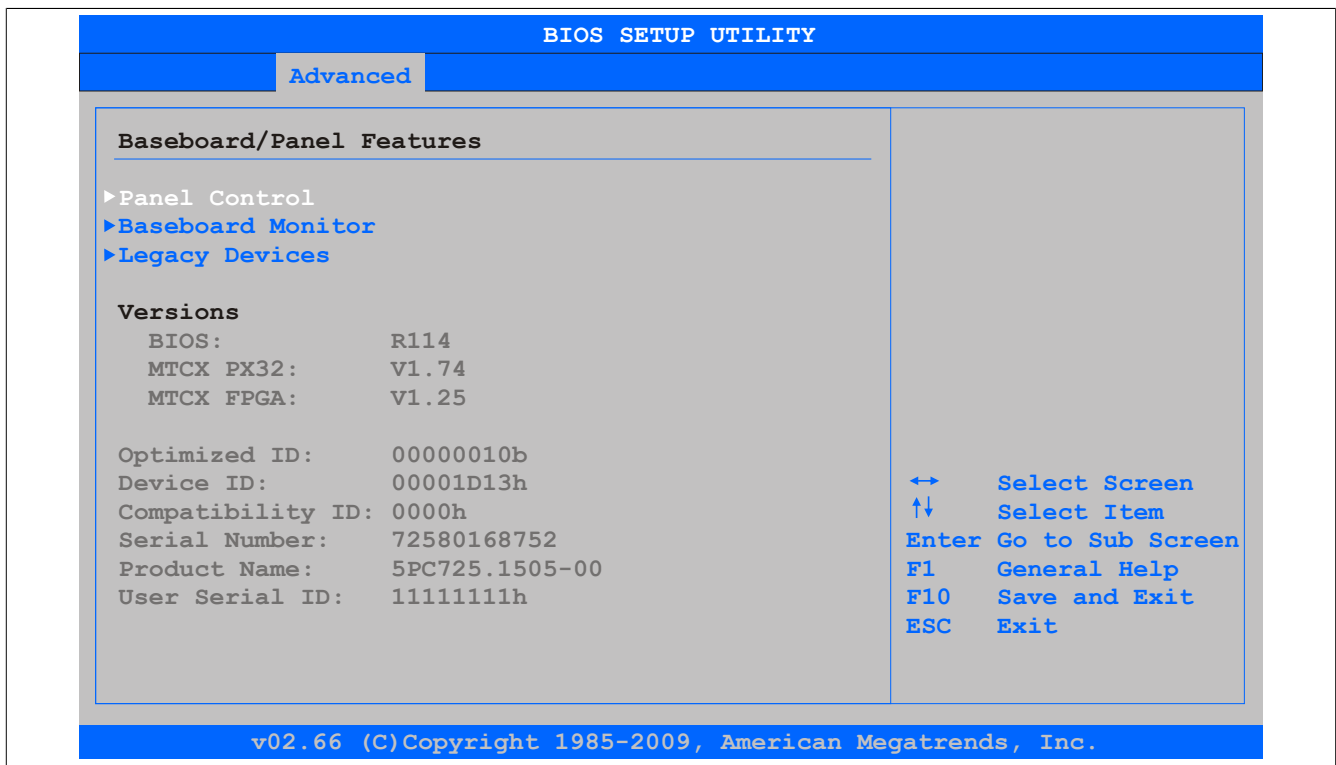


Figure 47: X945 Advanced - Baseboard/Panel Features

| BIOS setting | Function | Configuration options | Effect |
|--------------------------|--|-----------------------|--|
| Panel control | Configures special settings for connected panels (display units) | Enter | Opens the submenu see "Panel control" on page 91 |
| Baseboard monitor | Displays various temperatures and fan speeds | Enter | Opens the submenu see "Baseboard monitor" on page 92 |
| Legacy devices | Configures special settings for interfaces | Enter | Opens the submenu see "Legacy devices" on page 93 |
| BIOS | Displays the BIOS version | None | - |
| MTCX PX32 | Displays the MTCX PX32 firmware version | None | - |
| MTCX FPGA | Displays the MTCX FPGA firmware version | None | - |
| Optimized ID | Displays the DIP switch setting of the configuration switch. | None | - |
| Device ID | Displays the hexadecimal value of the hardware device ID | None | - |
| Compatibility ID | Displays the version of the device within the same B&R device ID. This ID is needed for Automation Runtime. | None | - |
| Serial number | Displays the B&R serial number | None | - |
| Product name | Displays the B&R model number | None | - |
| User serial ID | Displays the user serial ID. This 8-digit hexadecimal value can be freely specified by the user (e.g. to give the device a unique ID) and can only be changed using the "B&R Control Center" included with the ADI driver. | None | - |

Table 61: X945 Advanced - Baseboard/Panel features - Configuration options

1.4.13.1 Panel control

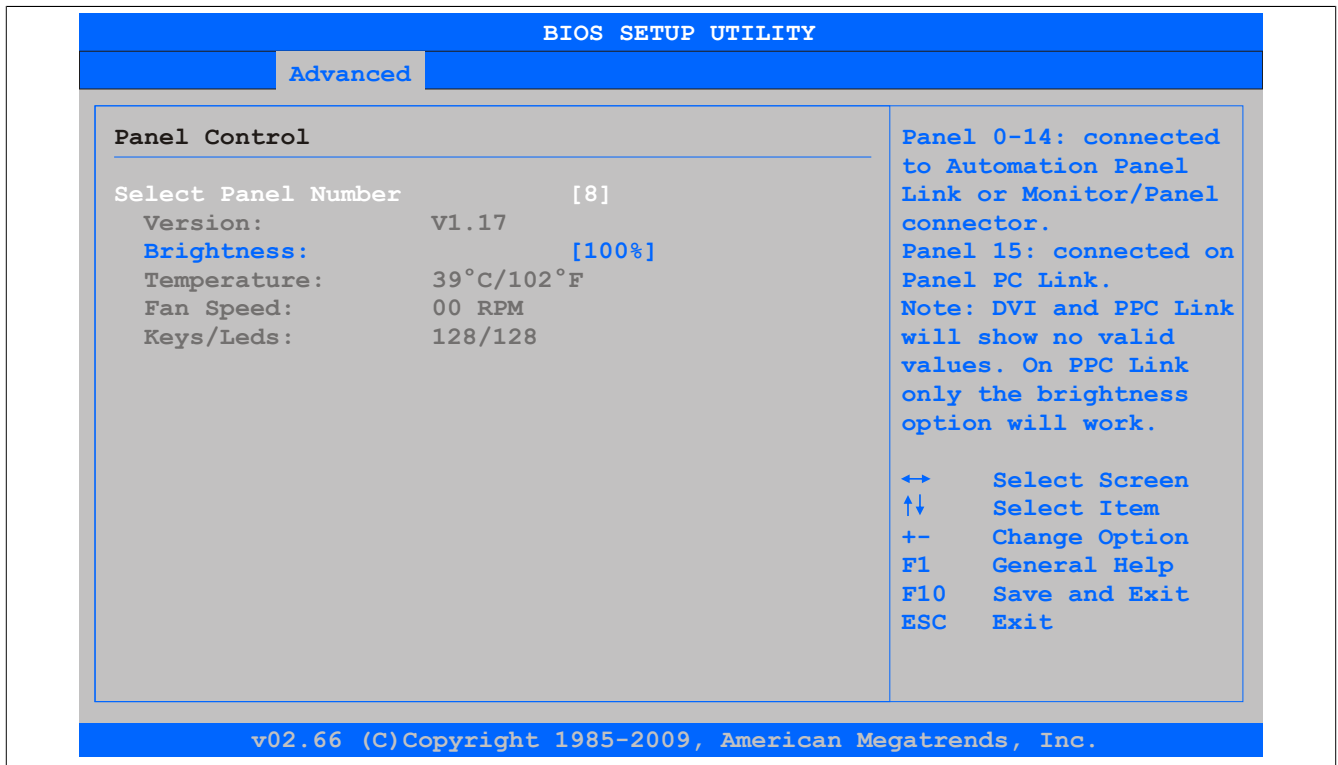


Figure 48: X945 Advanced - Baseboard/Panel Features - Panel Control

| BIOS setting | Function | Configuration options | Effect |
|---------------------|--|---|--|
| Select panel number | Selects the panel number for which the values should be displayed and/or changed | 0...15 | Selects panel 0-15 Panel 15 is specifically intended for Panel PC 700 systems. |
| Version | Displays the firmware version of the SDLR controller | None | - |
| Brightness | Sets the brightness of the selected panel | 0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100% | Sets the brightness (in %) of the selected panel Changes take effect after saving and restarting the system (e.g. by pressing <F10>). |
| Temperature | Displays the selected panel's temperature in degrees Celsius and Fahrenheit | None | - |
| Fan speed | Displays the fan speed for the selected panel | None | - |
| Keys/LEDs | Displays the available keys and LEDs on the selected panel | None | - |

Table 62: X945 Advanced - Panel control - Configuration options

1.4.13.2 Baseboard monitor

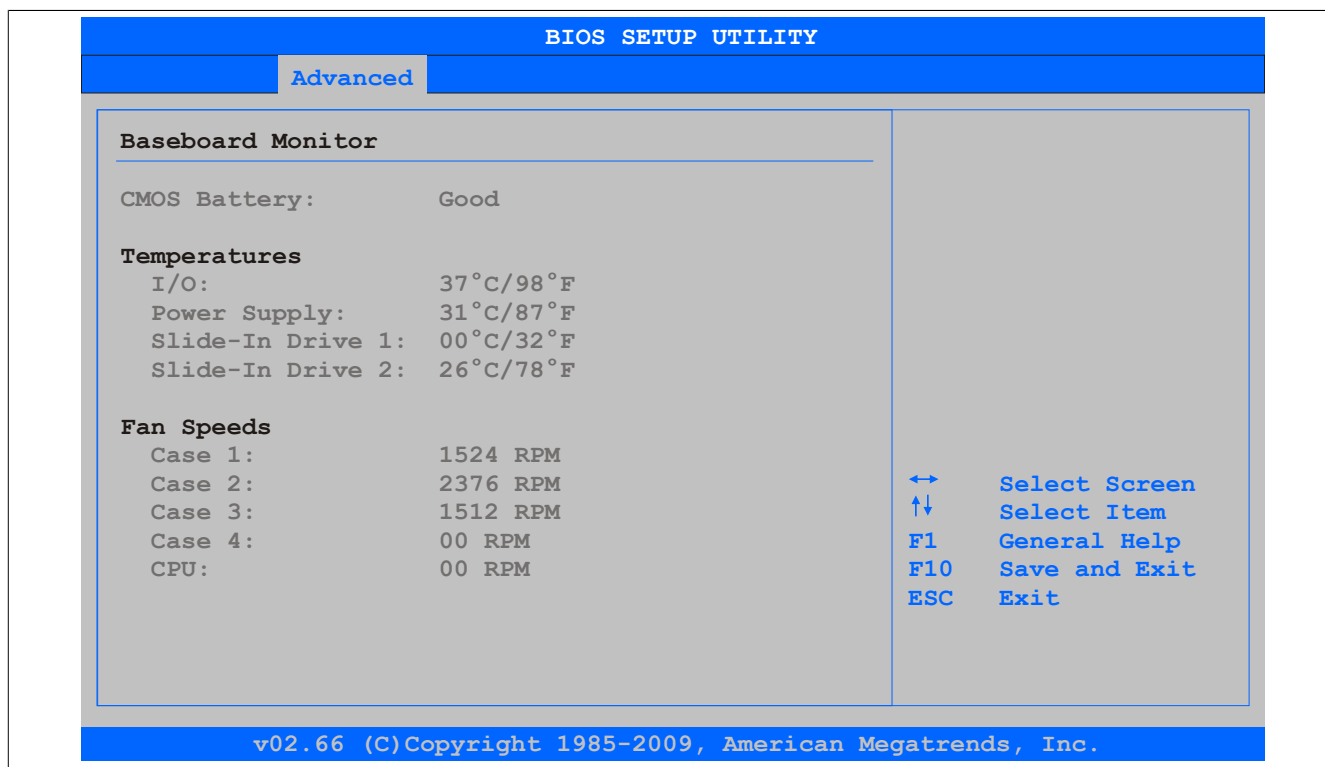


Figure 49: X945 Advanced - Baseboard/Panel Features - Baseboard Monitor

| BIOS setting | Function | Configuration options | Effect |
|------------------|---|-----------------------|--------|
| CMOS battery | Displays the battery status n.a. - Not available Good - Battery OK Bad - Battery not OK | None | - |
| I/O | Displays the temperature in the I/O area in degrees Celsius and Fahrenheit | None | - |
| Power supply | Displays the temperature in the power supply in degrees Celsius and Fahrenheit | None | - |
| Slide-in drive 1 | Displays the temperature of slide-in drive 1 in degrees Celsius and Fahrenheit | None | - |
| Slide-in drive 2 | Displays the temperature of slide-in drive 2 in degrees Celsius and Fahrenheit | None | - |
| Case 1 | Displays the speed of housing fan 1 | None | - |
| Case 2 | Displays the speed of housing fan 2 | None | - |
| Case 3 | Displays the speed of housing fan 3 | None | - |
| Case 4 | Displays the speed of housing fan 4 | None | - |
| CPU | Displays the rotational speed of the CPU fan. | None | - |

Table 63: X945 Advanced - Baseboard monitor - Configuration options

1.4.13.3 Legacy devices

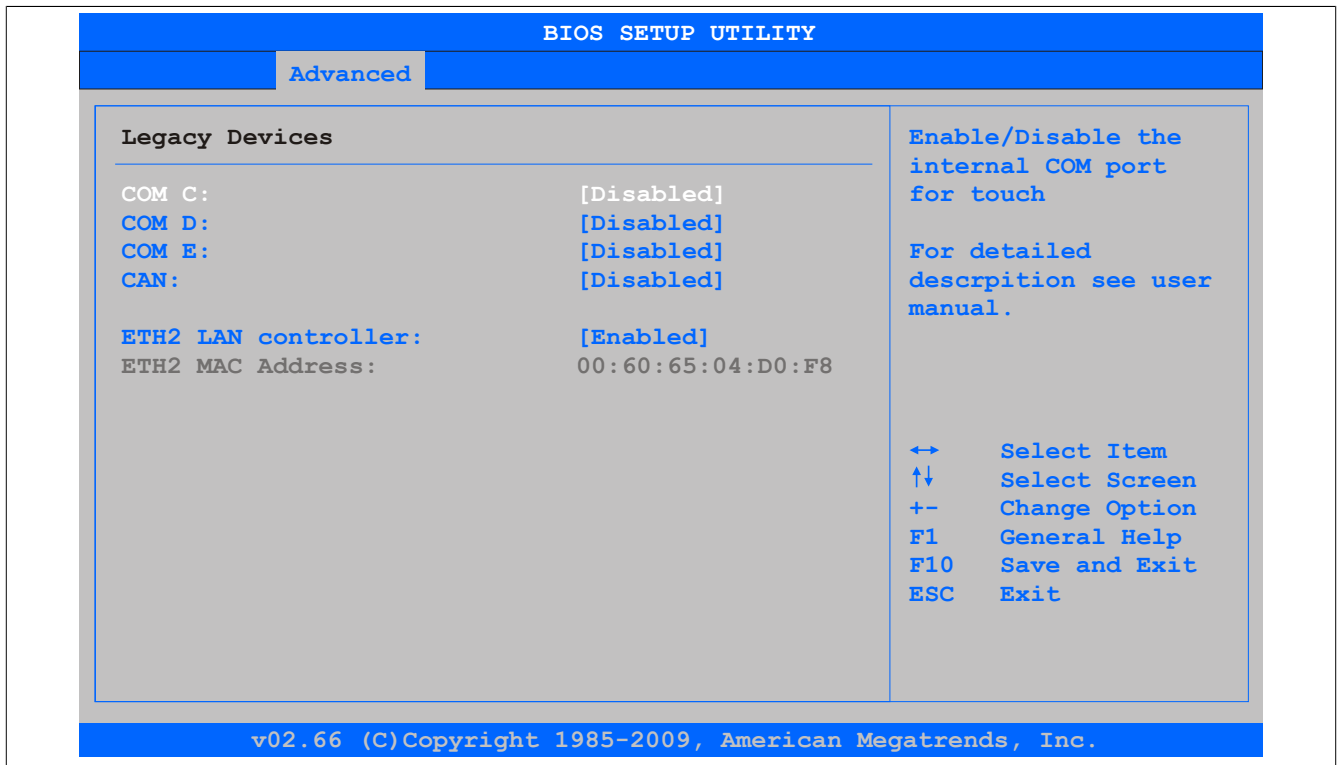


Figure 50: X945 Advanced - Baseboard/Panel Features - Legacy Devices

| BIOS setting | Function | Configuration options | Effect |
|---------------------|---|-------------------------------------|---------------------------------------|
| COM C | Sets the COM port for the touch screen connected to the monitor/panel interface | Disabled | Disables the interface |
| | | Enabled | Enables the interface |
| Base I/O address | Selects the base I/O address of the COM port | 238, 2E8, 328, 338, 3E8 | Assigns the selected base I/O address |
| Interrupt | Selects the interrupt for the COM port | IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11 | Assigns the selected interrupt |
| COM D | Sets the COM port for the touch screen on the AP Link connector. | Disabled | Disables the interface |
| | | Enabled | Enables the interface |
| Base I/O address | Selects the base I/O address of the COM port | 238, 2E8, 328, 338, 3E8 | Assigns the selected base I/O address |
| Interrupt | Selects the interrupt for the COM port | IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11 | Assigns the selected interrupt |
| COM E | Configures the COM port of the 5AC600.4851-00 B&R add-on interface (IF option) | Disabled | Disables the interface |
| | | Enabled | Enables the interface |
| Base I/O address | Selects the base I/O address of the COM port | 238, 2E8, 328, 338, 3E8 | Assigns the selected base I/O address |
| Interrupt | Selects the interrupt for the COM port | IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11 | Assigns the selected interrupt |
| CAN | Configures the CAN port on the 5AC600.CANI-00 B&R add-on CAN interface card (IF option) | Disabled | Disables the interface |
| | | Enabled | Enables the interface |
| Base I/O address | Displays the base I/O address of the CAN port | None | - |
| Interrupt | Selects the interrupt for the CAN port | IRQ 10, NMI | Assigns the selected interrupt |
| ETH2 LAN controller | Option for turning the onboard LAN controller (ETH2) on and off | Disabled | Disables the controller |
| | | Enabled | Enables the controller |
| ETH2 MAC address | Displays the MAC address of the Ethernet 2 controller | None | - |

Table 64: X945 Advanced - Legacy devices - Configuration options

1.5 Boot

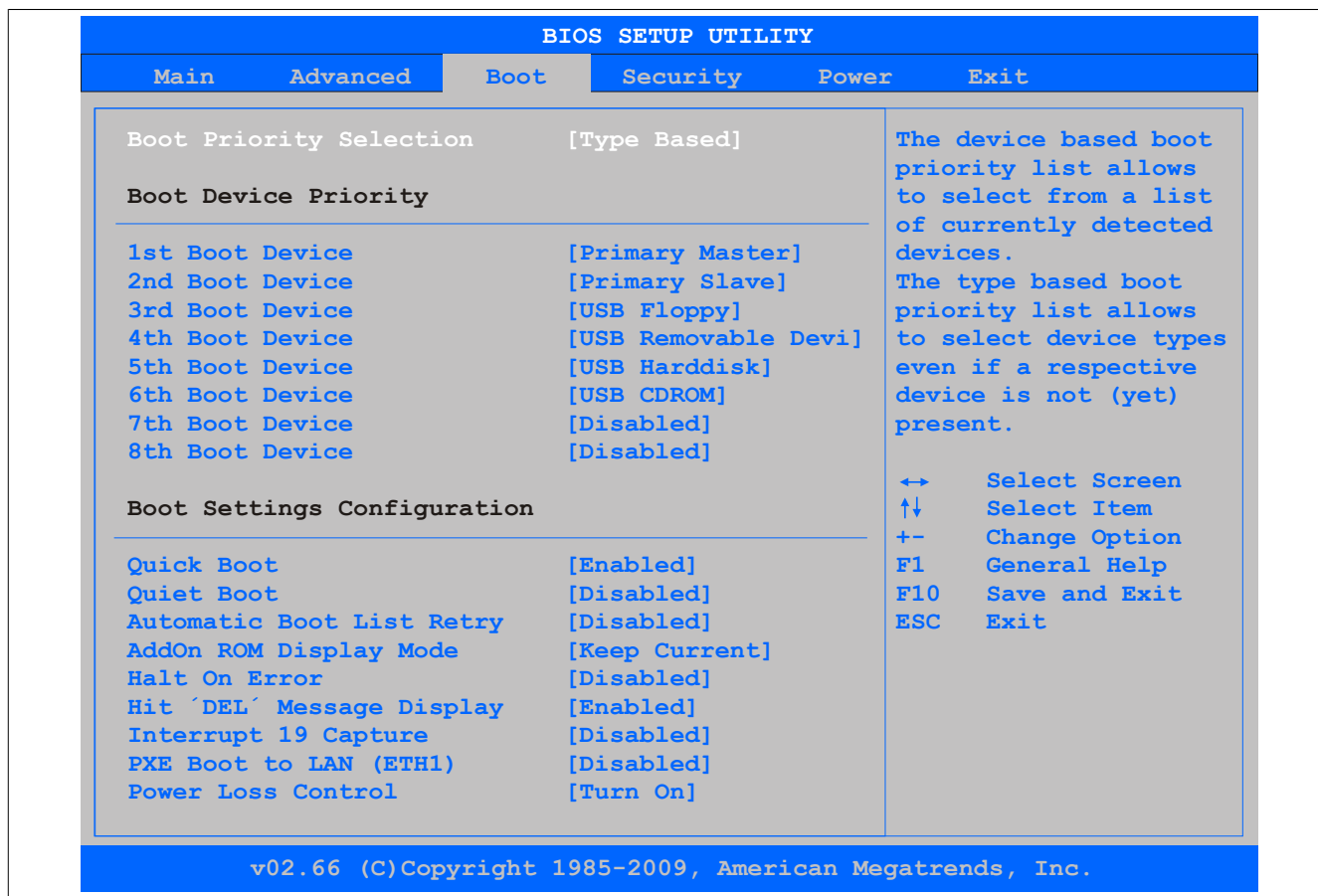


Figure 51: X945 Boot - Menü

| BIOS setting | Function | Configuration options | Effect |
|---------------------------|---|---|--|
| Boot priority selection | Option for determining the method for how drives should be booted | Device based | Only lists devices that are recognized by the system. The order of devices in this list can be changed. Information: It is only possible to use either "Device based" or "Type based". Using both together is not permitted. |
| | | Type based | The boot sequence of a device type list can be changed. It is also possible to add device types that are not connected to this list. Information: It is only possible to use either "Device based" or "Type based". Using both together is not permitted. |
| 1st boot device | Option for selecting drives to be used for booting | Disabled, Primary master, Primary slave, Secondary master, Secondary slave, Legacy floppy, USB floppy, USB hard disk, USB CDROM, USB removable device, Onboard LAN, External LAN, PCI mass storage, PCI SCSI card, Any PCI BEV device, Third master, Third slave, PCI RAID, Local BEV ROM | Specifies the desired boot sequence |
| 2nd boot device | | | |
| 2nd boot device | | | |
| 4th boot device | | | |
| 5th boot device | | | |
| 6th boot device | | | |
| 7th boot device | | | |
| 8th boot device | | | |
| Quick boot | This function reduces the boot time by skipping some POST procedures. | Disabled Enabled | Disables this function Enables this function |
| Quiet boot | Determines whether the POST message or the OEM logo (default = black background) is displayed | Disabled | Displays the POST message |
| | | Enabled | Displays the OEM logo instead of the POST message |
| Automatic boot list retry | This option can be used to attempt to restart the operating system automatically if it fails to start the first time. | Disabled | Disables this function |
| | | Enabled | Enables this function |

Table 65: X945 Boot menu - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|---------------------------|--|-----------------------|---|
| Add-on ROM display mode | Sets the display mode for the ROM (during the booting procedure) | Force BIOS | Displays an additional part of BIOS |
| | | Keep current | Displays BIOS information |
| Halt on error | This option determines the system should resume after a startup error during POST. | Disabled | Does not pause the system. All errors are ignored. |
| | | Enabled | Pauses the system. The system pauses each time an error occurs. |
| Hit 'DEL' message display | Configures settings for the "Hit 'DEL'" message | Disabled | Does not display the message |
| | | Enabled | Displays the message |
| | Information: The message is not displayed if "Quiet boot" is enabled. | | |
| Interrupt 19 capture | This function can be used to include BIOS interruptions. | Disabled | Disables this function |
| | | Enabled | Enables this function |
| PXE boot to LAN (ETH1) | Enables/disables the function to boot from LAN (ETH1) | Disabled | Disables this function |
| | | Enabled | Enables this function |
| Power loss control | Specifies whether the system should be on/off following power loss | Remain off | System remains off |
| | | Turn on | System powered on |
| | | Turn on | Enables the previous state |

Table 65: X945 Boot menu - Configuration options

1.6 Security

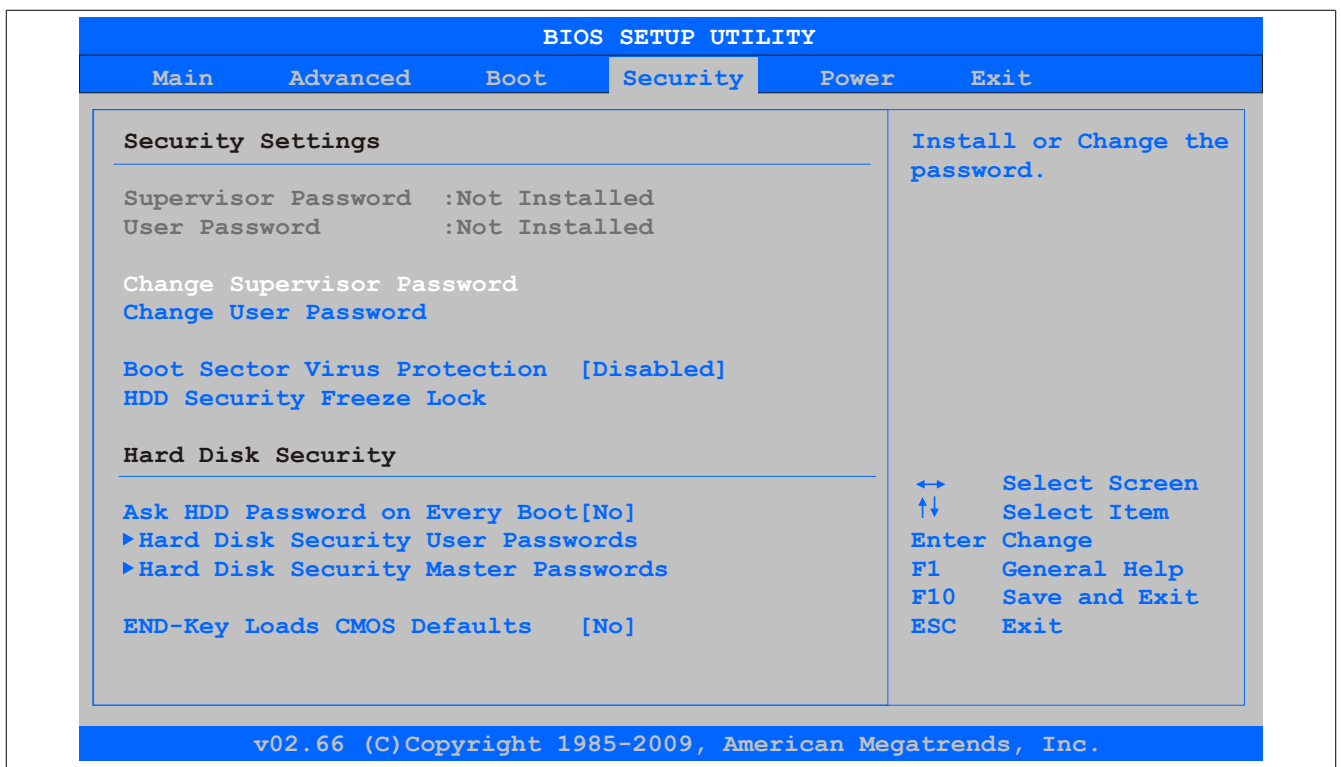


Figure 52: X945 Security - Menü

| BIOS setting | Function | Configuration options | Effect |
|------------------------------|---|-----------------------|------------------------|
| Supervisor password | Displays whether a supervisor password has been set | None | |
| User password | Displays whether a user password has been set | None | |
| Change supervisor password | Function for entering/changing a supervisor password. A supervisor password is necessary to edit all BIOS settings. | Enter | Password entry |
| Change user password | Function for entering/changing a user password. The user password allows the user to edit only certain BIOS settings. | Enter | Password entry |
| Boot sector virus protection | This option is used to issue a warning when the boot sector is accessed by a program or virus. | Disabled | Disables this function |
| | | Enabled | Enables this function |
| | Information: This option only protects the boot sector, not the entire hard drive. | | |

Table 66: X945 Security menu - Configuration options

| BIOS setting | Function | Configuration options | Effect |
|-------------------------------------|--|-----------------------|---|
| HDD Security Freeze Lock | This option can be used to define whether the BIOS sends the HDD Security Freeze Lock command to every connected hard disk that supports the Security command. This prevents the setting or changing of a hard disk password after POST. | Disabled | Disables this function |
| | | Enabled | Enables this function |
| Ask HDD Password on Every Boot | This function can be used to select whether the hard disk password must be entered each time the system boots. Information: Can only be used if a hard disk user password has been created. | Yes | Enables this function |
| | | No | Disables this function |
| Hard disk security user passwords | Creates the hard disk security user password | Enter | Opens the submenu see "Hard disk security user password" on page 96 |
| Hard disk security master passwords | Creates the hard disk security master password | Enter | Opens the submenu see "Hard disk security master password" on page 97 |
| End-key load CMOS defaults | Using this function, CMOS can be loaded by pressing the END key during POST. | No | Disables this function |
| | | Yes | Enables this function |

Table 66: X945 Security menu - Configuration options

1.6.1 Hard disk security user password

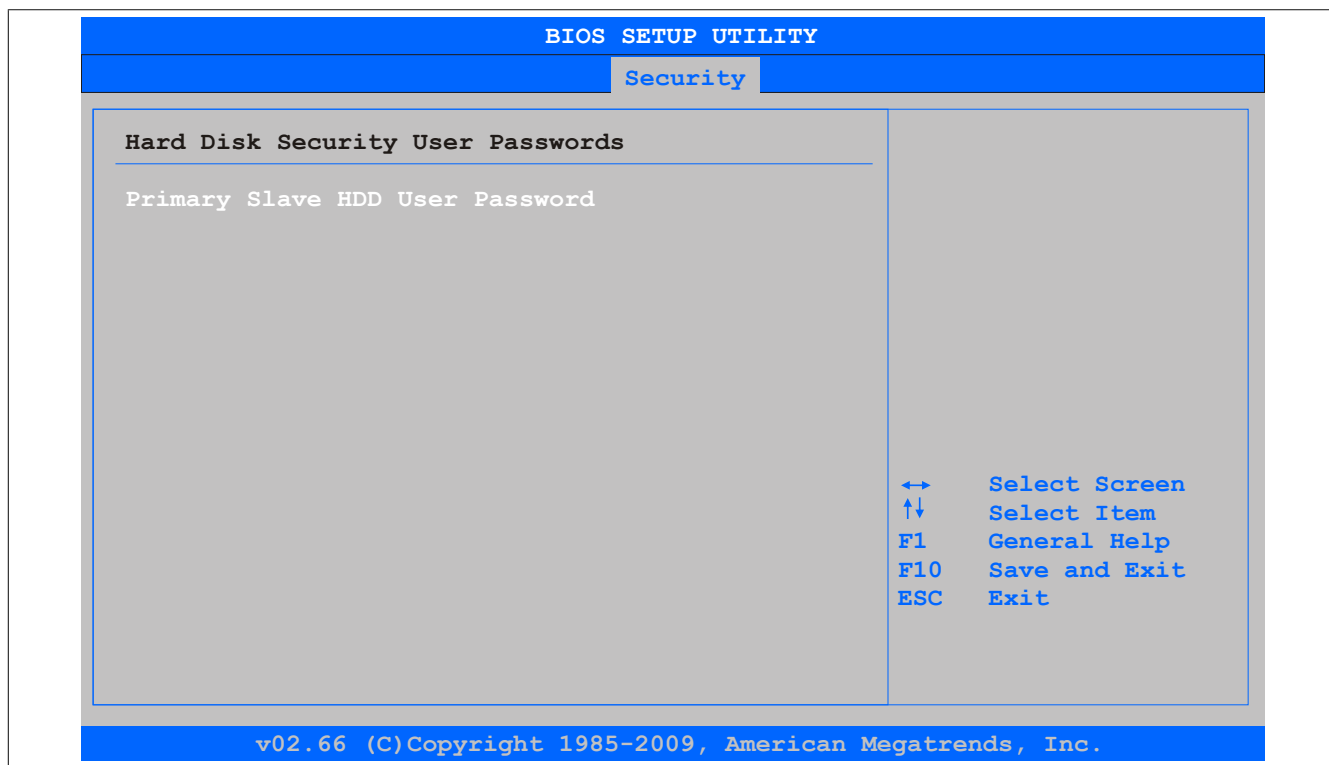


Figure 53: X945 Security - Hard Disk Security User Password

| BIOS setting | Function | Configuration options | Effect |
|---------------------------------|---|-----------------------|----------------|
| Primary slave HDD user password | This function makes it possible to configure or change the user password for each hard drive without having to reboot the device. The user password allows the user to edit only certain BIOS settings. | Enter | Password entry |

Table 67: X945 Security - Hard disk security user password

1.6.2 Hard disk security master password

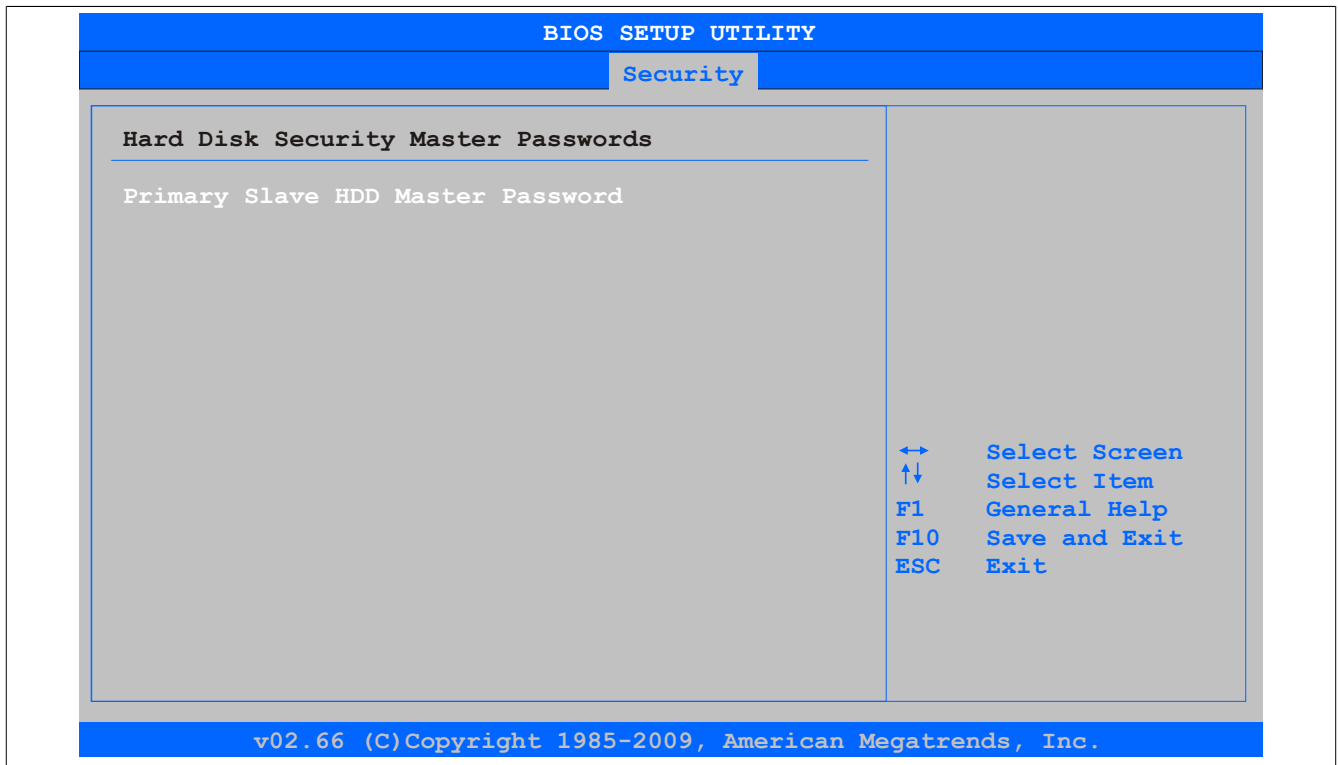


Figure 54: X945 Security - Hard Disk Security Master Password

| BIOS setting | Function | Configuration options | Effect |
|-----------------------------------|---|-----------------------|----------------|
| Primary slave HDD master password | This function makes it possible to configure or change the master password for each hard drive without having to reboot the device. | Enter | Password entry |

Table 68: X945 Security - Hard disk security master password

1.7 Power

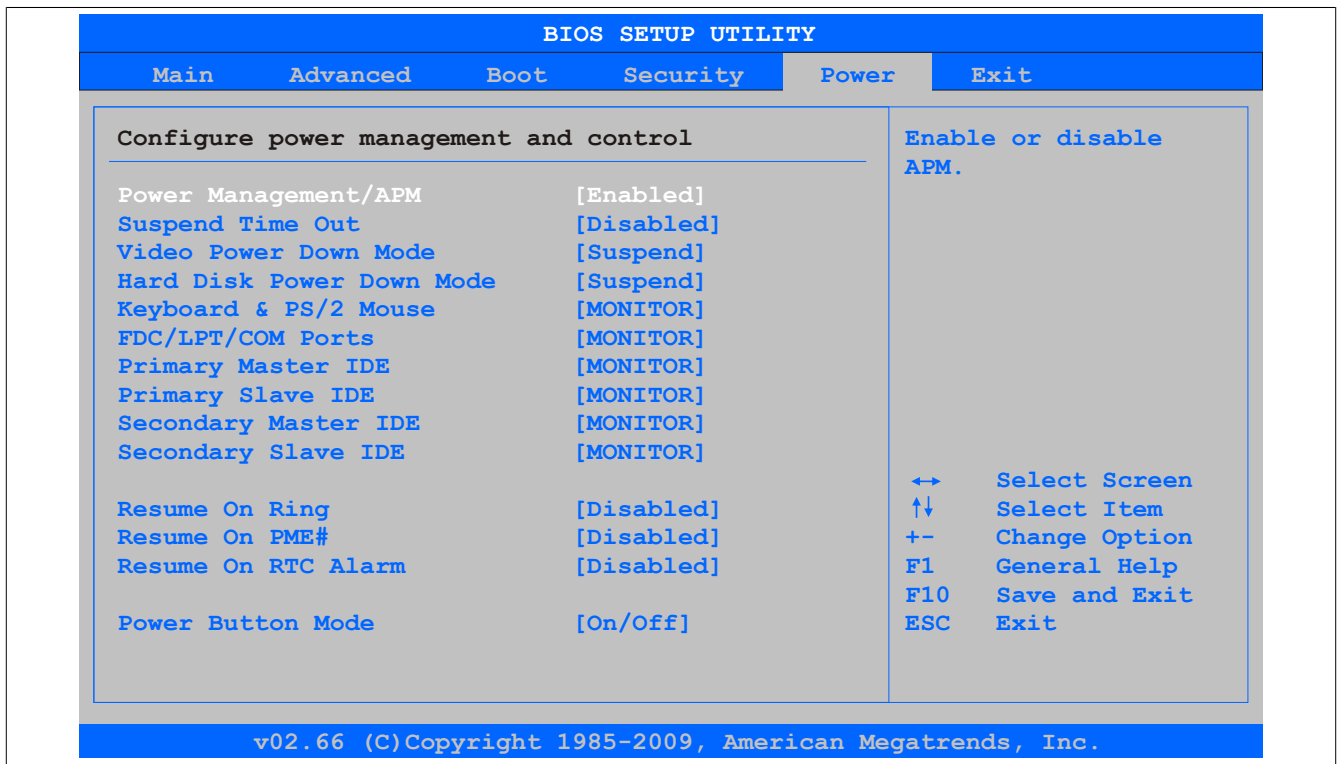


Figure 55: X945 Power - Menü

| BIOS setting | Function | Configuration options | Effect |
|---------------------------|--|--|---|
| Power Management / APM | This option enables or disables APM functionality. This is advanced plug and play and power management functionality. | Disabled | Disables this function |
| | | Enabled | Enables this function |
| Suspend time out | This option can be used to configure how long the system must be inactive before entering suspend mode (all components except the CPU are shut down as far as possible). | Disabled | Disables this function |
| | | 1 min, 2 min, 4 min, 8 min, 10 min, 20 min, 30 min, 40 min, 50 min, 60 min | Sets the value manually |
| Video power down mode | This option can be used to set the energy saving mode for the monitor. | Disabled | Does not switch off the monitor |
| | | Standby | Switches the monitor to standby mode |
| | | Suspend | Switches the monitor to suspend mode |
| Hard disk power down mode | This option is used to set the energy saving mode for the hard drive. | Disabled | Do not switch off the hard drive. |
| | | Standby | Monitor goes to standby mode. |
| | | Suspend | Hard drive goes to suspend mode. |
| Keyboard & PS/2 mouse | Configures the monitoring of activity during energy saving mode | MONITOR | Returns the system to its normal state from the respective energy saving mode when activity is detected on the keyboard or PS/2 mouse |
| | | IGNORE | Ignores activity |
| FDC/LPT/COM ports | Configures the monitoring of activity during energy saving mode | MONITOR | Returns the system to its normal state from the respective energy saving mode when activity is detected on the parallel port, serial port 1&2 or the floppy drive port. |
| | | IGNORE | Ignores activity |
| Primary master IDE | Configures the monitoring of activity during energy saving mode | MONITOR | Returns the system to its normal state from the respective energy saving mode when activity is detected on the IRQ of the respective interface or device |
| | | IGNORE | Ignores activity |
| Primary slave IDE | Configures the monitoring of activity during energy saving mode | MONITOR | Returns the system to its normal state from the respective energy saving mode when activity is detected on the IRQ of the respective interface or device |
| | | IGNORE | Ignores activity |
| Secondary master IDE | Configures the monitoring of activity during energy saving mode | MONITOR | Returns the system to its normal state from the respective energy saving mode when activity is detected on the IRQ of the respective interface or device |
| | | IGNORE | Ignores activity |
| Secondary slave IDE | Configures the monitoring of activity during energy saving mode | MONITOR | Returns the system to its normal state from the respective energy saving mode when activity is detected on the IRQ of the respective interface or device |
| | | IGNORE | Ignores activity |
| Resume on ring | Returns the PC from energy saving mode when the modem receives an incoming call | Disabled | Disables this function |
| | | Enabled | Enables this function |
| Resume on PME# | Configures whether the PME wakeup function is enabled or disabled | Disabled | Disables this function |
| | | Enabled | Enables this function |
| Resume on RTC alarm | This option can be used to enable the alarm and enter the date and time during system startup. | Disabled | Disables this function |
| | | Enabled | Enables this function |
| Power button mode | This function determines what the power button does. | On/Off | Switches the system on/off |
| | | Suspend | Suppresses this function |

Table 69: X945 Power menu - Configuration options

1.8 Exit

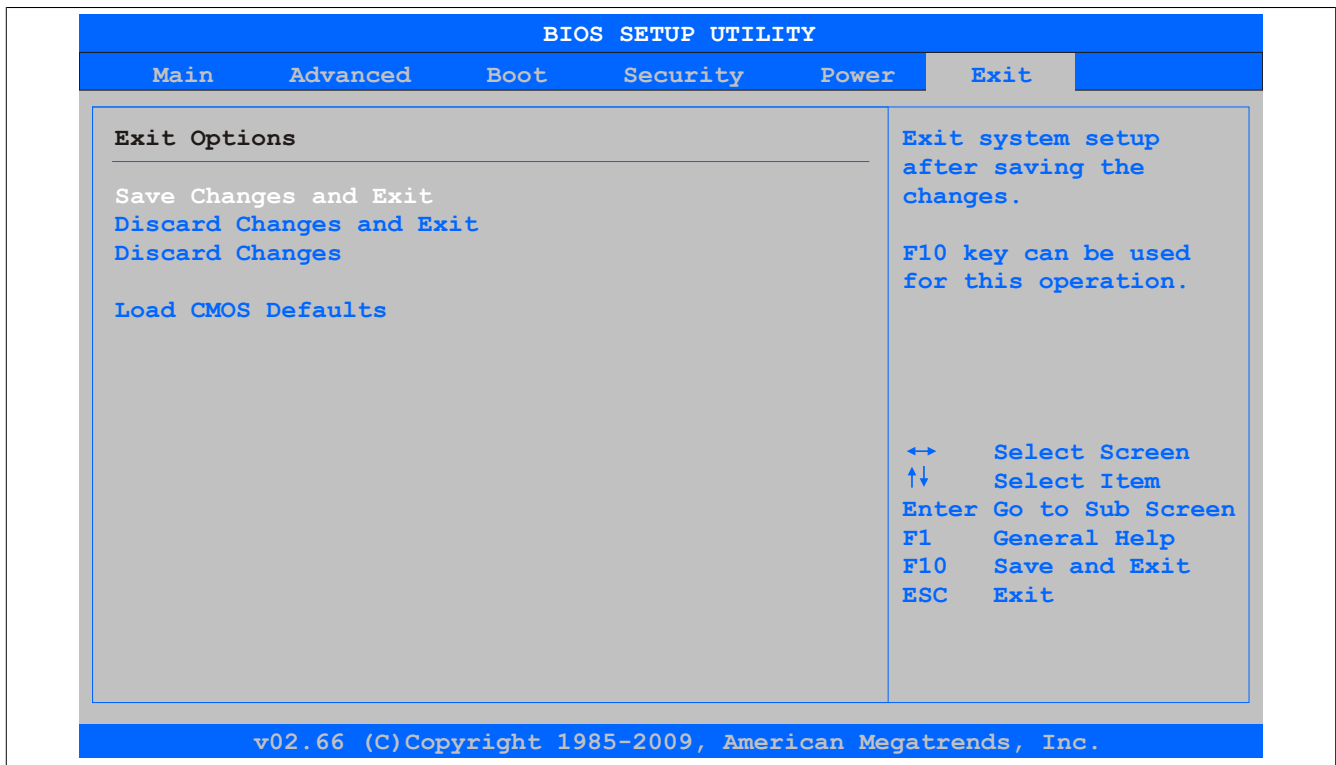


Figure 56: X945 Exit - Menü

| BIOS setting | Function | Configuration options | Effect |
|--------------------------|--|-----------------------|--------|
| Save changes and exit | Selecting this option closes BIOS Setup. Any changes made are saved to CMOS after confirmation, and the system is rebooted. | OK / Cancel | |
| Discard changes and exit | Selecting this option closes BIOS Setup without saving any changes made. | OK / Cancel | |
| Discard changes | This option can be used to reset any settings that may have been made but have been forgotten in the meantime (provided they have not yet been saved). | OK / Cancel | |
| Load CMOS defaults | This option loads the CMOS default values defined by the DIP switch settings. These values are loaded for all BIOS settings. | OK / Cancel | |

Table 70: X945 Exit menu - Configuration options

1.9 BIOS default settings

The various positions of the CMOS profile hex switch can be used to load predefined BIOS profile settings.

Information:

The factory default switch position represents the optimal BIOS default values for this system and should therefore not be changed.

If the "Load setup defaults" function is selected in the main BIOS Setup screen, 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.

The first six DIP switches (1-6) are used to set the profiles. The rest (7,8) are reserved.

| Profile number | Optimized for | DIP switch setting | | | | | | | | |
|----------------|--|--------------------|-----|-----|-----|-----|-----|-----------------|-----------------|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 ¹⁾ | 8 ¹⁾ | |
| Profile 0 | Automation PC 620 system units 5PC600.SX01-00. | Off | Off | Off | Off | Off | Off | Off | - | - |
| Profile 1 | Reserved | On | Off | Off | Off | Off | Off | Off | - | - |
| Profile 2 | Automation PC 620 system units 5PC600.SX02-00, 5PC600.SX02-01, 5PC600.SF03-00, 5PC600.SX05-00 and 5PC600.SX05-01. | Off | On | Off | Off | Off | Off | Off | - | - |
| Profile 3 | Panel PC 700 system units 5PC720.1043-00, 5PC720.1214-00, 5PC720.1505-00, 5PC720.1706-00, 5PC720.1906-00, 5PC781.1043-00, 5PC781.1505-00 and 5PC782.1043-00. | On | On | Off | Off | Off | Off | Off | - | - |
| Profile 4 | Panel PC 700 system units 5PC720.1043-01, 5PC720.1214-01, 5PC720.1505-01 and 5PC720.1505-02. | Off | Off | On | Off | Off | Off | Off | - | - |
| Profile 5 | Automation PC 620 embedded system units 5PC600.SE00-00 and 5PC600.SE00-01. | On | Off | On | Off | Off | Off | Off | - | - |
| Profile 6 | Panel PC 725 system units 5PC725.1505-00 and 5PC725.1505-01 | Off | On | On | Off | Off | Off | Off | - | - |

Table 71: Profile overview

1) Reserved

The following pages provide an overview of the BIOS default settings for the different CMOS profile switch positions. Settings highlighted in yellow are variations from the BIOS default profile (=profile 0).

1.9.2 Main

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| System time | - | - | - | - | - | - | - | |
| System date | - | - | - | - | - | - | - | |
| BIOS ID | - | - | - | - | - | - | - | |
| Processor | - | - | - | - | - | - | - | |
| CPU frequency | - | - | - | - | - | - | - | |
| System memory | - | - | - | - | - | - | - | |
| Product revision | - | - | - | - | - | - | - | |
| Serial number | - | - | - | - | - | - | - | |
| BC firmware rev. | - | - | - | - | - | - | - | |
| MAC address (ETH1) | - | - | - | - | - | - | - | |
| Boot counter | - | - | - | - | - | - | - | |
| Running time | - | - | - | - | - | - | - | |

Table 72: X945 Main - Overview of profile settings

1.9.3 Advanced

1.9.3.1 ACPI configuration

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| ACPI aware O/S | Yes | Yes | Yes | Yes | Yes | Yes | Yes | |
| ACPI version features | ACPI v2.0 | ACPI v2.0 | ACPI v2.0 | ACPI v2.0 | ACPI v2.0 | ACPI v2.0 | ACPI v2.0 | |
| ACPI APIC support | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| Suspend mode | S1 (POS) | S1 (POS) | S1 (POS) | S1 (POS) | S1 (POS) | S1 (POS) | S1 (POS) | |
| USB device wakeup from S3/S4 | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Active cooling trip point | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Passive cooling trip point | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Critical trip point | 105°C | 105°C | 105°C | 105°C | 105°C | 105°C | 105°C | |

Table 73: X945 Advanced - ACPI configuration - Overview of profile settings

1.9.3.2 PCI configuration

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|-----------------------------------|-----------|------------------|-----------|------------------|------------------|------------------|-----------|------------|
| Plug & Play O/S | Yes | No | Yes | Yes | Yes | Yes | Yes | |
| PCI latency timer | 64 | 64 | 64 | 64 | 64 | 64 | 64 | |
| Allocate IRQ to PCI VGA | Yes | Yes | Yes | Yes | Yes | Yes | Yes | |
| Allocate IRQ to SMBUS HC | Yes | Yes | Yes | Yes | Yes | Yes | Yes | |
| PCI IRQ resource exclusion | | | | | | | | |
| IRQ3 | Allocated | Allocated | Allocated | Allocated | Allocated | Allocated | Allocated | |
| IRQ4 | Allocated | Allocated | Allocated | Allocated | Allocated | Allocated | Allocated | |
| IRQ5 | Available | Available | Available | Available | Available | Allocated | Available | |
| IRQ6 | Available | Available | Available | Available | Available | Allocated | Available | |
| IRQ7 | Available | Available | Available | Available | Available | Allocated | Available | |
| IRQ9 | Allocated | Allocated | Allocated | Allocated | Allocated | Allocated | Allocated | |
| IRQ10 | Available | Available | Available | Available | Available | Available | Available | |
| IRQ11 | Available | Allocated | Available | Allocated | Allocated | Available | Available | |
| IRQ12 | Available | Allocated | Available | Available | Available | Available | Available | |
| IRQ14 | Allocated | Allocated | Allocated | Allocated | Allocated | Allocated | Allocated | |
| IRQ15 | Available | Available | Available | Available | Available | Available | Available | |
| PCI interrupt routing | | | | | | | | |
| PIRQ A (VGA) | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| PIRQ B (AC97, INTD) | Auto | Auto | Auto | Auto | Auto | 7 | Auto | |
| PIRQ C (PATA, INTC) | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| PIRQ D (SATA, UHCI1, SMB) | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| PIRQ E (ETH1) | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| PIRQ F (INTA, ETH2) | Auto | Auto | Auto | Auto | Auto | 5 | Auto | |
| PIRQ G (INTB) | Auto | Auto | Auto | Auto | Auto | 6 | Auto | |
| PIRQ H (UHCI0, EHCI) | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| 1st exclusive PCI | - | - | - | - | - | 5 | - | |
| 2nd exclusive PCI | - | - | - | - | - | 6 | - | |
| 3rd exclusive PCI | - | - | - | - | - | 7 | - | |

Table 74: X945 Advanced - PCI configuration - Overview of profile settings

1.9.3.3 Graphics configuration

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|-------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------|
| Primary video device | Internal VGA | Internal VGA | Internal VGA | Internal VGA | Internal VGA | Internal VGA | Internal VGA | |
| Internal graphics mode select | Enabled, 8MB | Enabled, 8MB | Enabled, 8MB | Enabled, 8MB | Enabled, 8MB | Enabled, 8MB | Enabled, 8MB | |
| DVMT mode select | DVMT mode | DVMT mode | DVMT mode | DVMT mode | DVMT mode | DVMT mode | DVMT mode | |
| DVMT/FIXED memory | 128 MB | 128 MB | 128 MB | 128 MB | 128 MB | 128 MB | 128 MB | |
| Boot display device | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| Always try auto panel detect | No | No | No | No | No | No | No | |
| Local flat panel type | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| Local flat panel scaling | Expand text & graphics | Expand text & graphics | Expand text & graphics | Expand text & graphics | Expand text & graphics | Expand text & graphics | Expand text & graphics | |
| Display mode persistence | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |

Table 75: X945 Advanced - Graphics configuration - Overview of profile settings

1.9.3.4 CPU configuration

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| Module version | - | - | - | - | - | - | - | |
| Manufacturer | - | - | - | - | - | - | - | |
| Frequency | - | - | - | - | - | - | - | |
| FSB speed | - | - | - | - | - | - | - | |
| Cache L1 | - | - | - | - | - | - | - | |
| Cache L2 | - | - | - | - | - | - | - | |
| Ratio actual value | - | - | - | - | - | - | - | |
| MPS revision | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | |
| Max CPUID value limit | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Execute disable bit capability | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| Hyper Threading Technology | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| Intel(R) SpeedStep(tm) tech. | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| Boot CPU Speed On AC | Maximum | Maximum | Maximum | Maximum | Maximum | Maximum | Maximum | |
| Intel(R) C-STATE tech | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Enhanced C-States | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |

Table 76: X945 Advanced - CPU configuration - Overview of profile settings

1.9.3.5 Chipset configuration

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| DRAM frequency | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| DRAM refresh rate | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| Memory hole | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| DIMM thermal control | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| DT in SPD | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| TS on DIMM | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| High precision event timer | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| IOAPIC | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| APIC ACPI SCI IRQ | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| C4 on C3 | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |

Table 77: X945 Advanced - Chipset configuration - Overview of profile settings

1.9.3.6 I/O interface configuration

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|-----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| Onboard AC'97 audio | Enabled | Enabled | Enabled | Enabled | Enabled | Disabled | Disabled | |
| Onboard LAN (ETH1) | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| Serial port 1 configuration | 3F8/IRQ4 | 3F8/IRQ4 | 3F8/IRQ4 | 3F8/IRQ4 | 3F8/IRQ4 | 3F8/IRQ4 | Disabled | |
| Serial Port2 configuration | 2F8/IRQ3 | 2F8/IRQ3 | 2F8/IRQ3 | 2F8/IRQ3 | 2F8/IRQ3 | 2F8/IRQ3 | 2F8/IRQ3 | |
| Serial port 2 mode | Normal | Normal | Normal | Normal | Normal | Normal | Normal | |
| Parallel port address | 378 | 378 | 378 | 378 | 378 | 378 | Disabled | |

Table 78: X945 Advanced - I/O interface configuration - Overview of profile settings

1.9.3.7 Clock configuration

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|-----------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| Spread spectrum | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |

Table 79: X945 Advanced - Clock configuration - Overview of profile settings

1.9.3.8 IDE configuration

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|--------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------------|
| ATA/IDE configuration | Compatible | Compatible | Compatible | Compatible | Compatible | Compatible | Compatible | |
| Legacy IDE channels | PATA only | PATA only | PATA only | PATA only | PATA only | PATA only | PATA only | |
| Hard disk write protect | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| PATA detect timeout (sec) | 35 | 35 | 35 | 35 | 35 | 35 | 35 | |
| SATA detect time out (sec) | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| ATA(PI) 80-pin cable detection | Host & device | Host & device | Host & device | Host & device | Host & device | Host & device | Host & device | |
| Primary IDE master | | | | | | | | |
| Type | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| LBA/Large mode | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| Block (multi-sector transfer) | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| PIO mode | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| DMA mode | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| S.M.A.R.T. | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| 32Bit data transfer | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| Primary IDE slave | | | | | | | | |
| Type | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| LBA/Large mode | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| Block (multi-sector transfer) | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| PIO mode | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| DMA mode | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| S.M.A.R.T. | Auto | Auto | Auto | Auto | Auto | Auto | Auto | |
| 32Bit data transfer | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |

Table 80: X945 Advanced - IDE configuration - Overview of profile settings

1.9.3.9 USB configuration

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------------------|-----------------|------------|
| USB function | 4 USB ports | 4 USB ports | 4 USB ports | 4 USB ports | 4 USB ports | 6 USB ports | 4 USB ports | |
| USB 2.0 controller | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| Legacy USB support | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| USB Legacy POST-always | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| USB keyboard Legacy support | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| USB mouse Legacy support | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| USB storage device support | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| Port 64/60 emulation | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| USB 2.0 controller mode | HiSpeed | HiSpeed | HiSpeed | HiSpeed | HiSpeed | HiSpeed | HiSpeed | |
| BIOS EHCI hand-off | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| USB beep message | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| USB stick default emulation | Hard disk drive | Hard disk drive | Hard disk drive | Hard disk drive | Hard disk drive | Hard disk drive | Hard disk drive | |
| USB mass storage reset delay | 20 Sec | 20 Sec | 20 Sec | 20 Sec | 20 Sec | 20 Sec | 20 Sec | |

Table 81: X945 Advanced - USB configuration - Overview of profile settings

1.9.3.10 Keyboard/Mouse configuration

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|--------------------|-----------|----------------|-----------|-----------|-----------|-----------|-----------|------------|
| Bootup Num-lock | On | On | On | On | On | On | On | |
| Typematic rate | Fast | Fast | Fast | Fast | Fast | Fast | Fast | |
| PS/2 mouse support | Disabled | Enabled | Disabled | Disabled | Disabled | Disabled | Disabled | |

Table 82: X945 Advanced - Keyboard/Mouse configuration - Overview of profile settings

1.9.3.11 Remote access configuration

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|-------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| Remote access | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Serial port BIOS update | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |

Table 83: X945 Advanced Remote Access Configuration profile setting overview

1.9.3.12 CPU board monitor

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| Board temperature | - | - | - | - | - | - | - | |
| CPU temperature | - | - | - | - | - | - | - | |
| DIMM environment temp. | - | - | - | - | - | - | - | |
| Fan1 Speed | - | - | - | - | - | - | - | |
| VcoreA | - | - | - | - | - | - | - | |
| VcoreB | - | - | - | - | - | - | - | |
| +3.3 Vin | - | - | - | - | - | - | - | |
| +5 Vin | - | - | - | - | - | - | - | |
| +5VSB | - | - | - | - | - | - | - | |
| VRTC | - | - | - | - | - | - | - | |

Table 84: X945 Advanced - CPU board monitor - Overview of profile settings

1.9.3.13 Baseboard/Panel features

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|--------------------------|-----------|----------------|-----------|----------------|----------------|-----------|----------------|------------|
| BIOS | - | - | - | - | - | - | - | |
| MTCX PX32 | - | - | - | - | - | - | - | |
| MTCX FPGA | - | - | - | - | - | - | - | |
| Optimized ID | - | - | - | - | - | - | - | |
| Device ID | - | - | - | - | - | - | - | |
| Compatibility ID | - | - | - | - | - | - | - | |
| Serial number | - | - | - | - | - | - | - | |
| Product name | - | - | - | - | - | - | - | |
| User serial ID | - | - | - | - | - | - | - | |
| Panel control | | | | | | | | |
| Select panel number | - | - | - | - | - | - | - | |
| Version | - | - | - | - | - | - | - | |
| Brightness | 100% | 100% | 100% | 100% | 100% | 100% | 100% | |
| Temperature | - | - | - | - | - | - | - | |
| Fan speed | - | - | - | - | - | - | - | |
| Keys/LEDs | - | - | - | - | - | - | - | |
| Baseboard monitor | | | | | | | | |
| CMOS battery | - | - | - | - | - | - | - | |
| I/O | - | - | - | - | - | - | - | |
| Power supply | - | - | - | - | - | - | - | |
| Slide-in drive 1 | - | - | - | - | - | - | - | |
| Slide-in drive 2 | - | - | - | - | - | - | - | |
| Case 1 | - | - | - | - | - | - | - | |
| Case 2 | - | - | - | - | - | - | - | |
| Case 3 | - | - | - | - | - | - | - | |
| Case 4 | - | - | - | - | - | - | - | |
| CPU | - | - | - | - | - | - | - | |
| Legacy devices | | | | | | | | |
| COM C | Disabled | Enabled | Disabled | Enabled | Enabled | Disabled | Enabled | |
| Base I/O address | - | 3E8 | - | 3E8 | 3E8 | - | 3E8 | |
| Interrupt | - | IRQ11 | - | IRQ11 | IRQ11 | - | IRQ11 | |
| COM D | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Base I/O address | - | - | - | - | - | - | - | |
| Interrupt | - | - | - | - | - | - | - | |
| COM E | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Base I/O address | - | - | - | - | - | - | - | |
| Interrupt | - | - | - | - | - | - | - | |
| CAN | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Base I/O address | - | - | - | - | - | - | - | |
| Interrupt | - | - | - | - | - | - | - | |
| ETH2 LAN Controller | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| ETH2 MAC Address | - | - | - | - | - | - | - | |

Table 85: X945 Advanced - Baseboard/Panel features - Overview of profile settings

1.9.4 Boot

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|-------------------------|----------------|-----------------------|----------------|----------------|----------------|----------------|----------------|------------|
| Boot priority selection | Type based | Type based | Type based | Type based | Type based | Type based | Type based | |
| 1st boot device | Primary master | Onboard LAN | Primary master | Primary master | Primary master | Primary master | Primary master | |
| 2nd boot device | Primary slave | Primary Master | Primary slave | Primary slave | Primary slave | Primary slave | Primary slave | |

Table 86: X945 Main - Overview of profile settings

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|---------------------------|----------------------|-----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------|
| 3rd boot device | USB floppy | Primary Slave | USB floppy | USB floppy | USB floppy | USB floppy | USB floppy | |
| 4th boot device | USB removable device | USB floppy | USB removable device | USB removable device | USB removable device | USB removable device | USB removable device | |
| 5th boot device | USB hard disk | USB removable device | USB hard disk | USB hard disk | USB hard disk | USB hard disk | USB hard disk | |
| 6th boot device | USB CDROM | USB HDD | USB CDROM | USB CDROM | USB CDROM | USB CDROM | USB CDROM | |
| 7th boot device | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| 8th boot device | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Quick boot | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| Quiet boot | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Automatic boot list retry | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Add-on ROM display mode | Keep current | Keep current | Keep current | Keep current | Keep current | Keep current | Keep current | |
| Halt on error | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Hit "DEL" message display | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| Interrupt 19 capture | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| PXE boot to LAN | Disabled | Enabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Power loss control | Turn on | Turn on | Turn on | Turn on | Turn on | Turn on | Turn on | |

Table 86: X945 Main - Overview of profile settings

1.9.5 Security

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| Supervisor password | - | - | - | - | - | - | - | |
| User password | - | - | - | - | - | - | - | |
| Boot sector virus protection | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| HDD Security Freeze Lock | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| Ask HDD Password on Every Boot | No | No | No | No | No | No | No | |
| Hard disk security user password | - | - | - | - | - | - | - | |
| Hard disk security master password | - | - | - | - | - | - | - | |
| END-key loads CMOS defaults | No | No | No | No | No | No | No | |

Table 87: X945 Security - Overview of profile settings

1.9.6 Power

| Setting/Option | Profile 0 | Profile 1 | Profile 2 | Profile 3 | Profile 4 | Profile 5 | Profile 6 | My setting |
|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| Power management/APM | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | Enabled | |
| Suspend time out | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Video power down mode | Suspend | Suspend | Suspend | Suspend | Suspend | Suspend | Suspend | |
| Hard disk power down mode | Suspend | Suspend | Suspend | Suspend | Suspend | Suspend | Suspend | |
| Keyboard & PS/2 mouse | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | |
| FDC/LPT/COM ports | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | |
| Primary master IDE | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | |
| Primary slave IDE | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | |
| Secondary master IDE | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | |
| Secondary slave IDE | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | MONITOR | |
| Resume on ring | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Resume on PME# | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Resume on RTC alarm | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | Disabled | |
| Power button mode | On/Off | On/Off | On/Off | On/Off | On/Off | On/Off | On/Off | |

Table 88: X945 Power - Overview of profile settings

1.10 BIOS error signals (beep codes)

While the B&R Industrial PC is booting, the following messages and errors can occur with BIOS. These errors are signaled by different beep codes.

| Beep code | Description | Necessary user action |
|-----------|--|---|
| 1x short | Memory refresh failed | Load BIOS defaults. If the error persists, send the industrial PC to B&R for testing. |
| 2x short | Parity error: POST error (error in one of the hardware testing procedures) | Load BIOS defaults. If the error persists, send the industrial PC to B&R for testing. |
| 3x short | Base 64 kB memory failure: Basic memory error, RAM error within the initial 64 kB | Check that the card has been inserted properly. If the error persists, send the industrial PC to B&R for testing. |
| 4x short | Timer not operational: System timer | Send the industrial PC to B&R for testing. |
| 5x short | Processor error: Defective processor | Send the industrial PC to B&R for testing. |
| 6x short | 8042 gate A20 failure: Defective keyboard controller (block 8042/gate A20). The processor cannot switch to protected mode. | Send the industrial PC to B&R for testing. |
| 7x short | Processor exception interrupt error: Virtual mode exception error (CPU generated an interrupt error) | Send the industrial PC to B&R for testing. |
| 8x short | Display memory read/write error: Video memory not accessible, defective graphics card or not installed (not a fatal error) | Check that the graphics card has been inserted correctly, replace if necessary. If the error persists, send the industrial PC to B&R for testing. |

Table 89: 945GME BIOS - POST messages

1.11 Allocation of resources

1.11.1 RAM address assignment

| RAM address | Resource |
|--|--|
| 000000h - 0003FFh | Interrupt vectors |
| 000400h - 09FBFFh | MS-DOS program area |
| 09FC00h - 09FFFFh | Advanced BIOS data |
| 0A0000h - 0CFFFFh | VGA BIOS and memory |
| 0D0000h - 0DFFFFh | Available |
| 0E0000h - 0FFFFFFh | System BIOS (AMI) |
| 100000h - (TOM ¹⁾ -8MB-192kB) | SDRAM |
| (TOM-8MB-192kB) - (TOM-192kB) | VGA frame buffer ²⁾ |
| (TOM-192kB) - TOM | ACPI reclaim, MPS and NVS area ³⁾ |

Table 90: RAM address assignment

- 1) TOM - Top of memory: max. installed DRAM
- 2) The VGA frame buffer can be reduced to 1 MB in the setup.
- 3) Only if ACPI Aware OS is set to YES in the setup.

1.11.2 DMA channel assignment

| DMA channel | Resource |
|-------------|-----------------------------------|
| 0 | Available |
| 1 | Available |
| 2 | Floppy disk drive (FDC) |
| 3 | LPT (ECP) ¹⁾ |
| 4 | Reserved (Cascade DMA Controller) |
| 5 | Available |
| 6 | Available |
| 7 | Available |

Table 91: DMA channel assignment

- 1) Not available if the parallel port is not used in ECP mode.

1.11.3 I/O address assignments

| I/O address | Resource |
|---------------|---------------------------------|
| 0000h - 001Fh | DMA controller 1 |
| 0020h - 003Fh | Interrupt controller 1 |
| 0040h - 005Fh | Timer |
| 0060h - 006Fh | Keyboard controller |
| 0070h - 0071h | Real-time clock, NMI mask, CMOS |
| 0080h | Debug port (POST code) |
| 0081h - 009Fh | Page register - DMA controller |
| 00A0h - 00BFh | Interrupt controller 2 |
| 00C0h - 00DFh | DMA controller 2 |
| 00F0h - 00FFh | FPU |
| 0170h - 0177h | Secondary hard disk IDE channel |
| 01F0h - 01F7h | Primary hard disk IDE channel |
| 02E8h - 02EFh | COM4 |
| 02F8h - 02FFh | COM2 |
| 0376h - 0376h | Secondary hard disk IDE channel |
| 0384h - 0385h | CAN controller |
| 03B0h - 03BBh | VGA controller |
| 3C0h - 3DFh | VGA controller |
| 03E8h - 03EFh | COM3 |
| 03F6h - 03F6h | Primary hard disk IDE channel |
| 03F0h - 03F7h | FDD controller |
| 0CF8h - 0CFBh | PCI config address register |
| 0CFCh - 0CFFh | PCI config data register |
| 4100h - 417Fh | MTCX |
| FF00h - FF07h | IDE bus master register |

Table 92: I/O address assignment

1.11.4 Interrupt assignments 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 | | | • | | | | | | | | | | | | | | | | |
| COM2 (serial port B) | | | | • | ○ | | | | | | | | | | | | | | |
| ACPI ¹⁾ | | | | | | | | | | • | | | | | | | | | |
| FDD | | | | | | | ○ | | | | | | | | | | | • | |
| Real-time clock | | | | | | | | | • | | | | | | | | | | |
| Coprocessor (FPU) | | | | | | | | | | | | | | • | | | | | |
| Primary IDE channel | | | | | | | | | | | | | | | • | | | | |
| Secondary IDE channel | | | | | | | | | | | | | | | | ○ | | | |
| B&R | | COM3 (COM C) | | | ○ | ○ | ○ | | ○ | | | ○ | ○ | ○ | | | | | • |
| | | COM4 (COM E) | | | ○ | ○ | ○ | | ○ | | | ○ | ○ | ○ | | | | | • |
| | | CAN | | | | | | | | | | ○ | | | | | | ○ | • |
| | | | | | | | | | | | | | | | | | | | |

Table 93: IRQ interrupt assignments in PIC mode

1) Advanced Configuration and Power Interface.

- ... Default setting
- ... Optional setting

1.11.5 Interrupt assignments in APIC mode

A total of 23 IRQs are available in APIC (Advanced Programmable Interrupt Controller) mode. Enabling this option is only effective if done before the operating system (Windows XP) is installed.

| 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 | | | • | | | | | | | | | | | | | | | | | | | | | | | | |
| COM2 (serial port B) | | | | • | ○ | | | | | | | | | | | | | | | | | | | | | | |
| ACPI ¹⁾ | | | | | | | | | | • | | | | | | | | | | | | | | | | | |
| FDD | | | | | | | ○ | | | | | | | | | | | | | | | | | | | • | |
| Real-time clock | | | | | | | | | • | | | | | | | | | | | | | | | | | | |
| Coprocessor (FPU) | | | | | | | | | | | | | | • | | | | | | | | | | | | | |
| Primary IDE channel | | | | | | | | | | | | | | | • | | | | | | | | | | | | |
| Secondary IDE channel | | | | | | | | | | | | | | | | ○ | | | | | | | | | | | |
| B&R | | COM3 (COM C) | | | ○ | ○ | ○ | | ○ | | | ○ | ○ | ○ | | | | | | | | | | | | | • |
| | | COM4 (COM E) | | | ○ | ○ | ○ | | ○ | | | ○ | ○ | ○ | | | | | | | | | | | | | • |
| | | CAN | | | | | | | | | | ○ | | | | | | | | | | | | | | ○ | • |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 94: IRQ interrupt assignments in APIC mode

- 1) Advanced Configuration and Power Interface.
- 2) PIRQ A: Graphics controller
- 3) PIRQ B: INTD
- 4) PIRQ C: INTC + Native IDE
- 5) PIRQ D: USB UHCI controller #1 + SM bus
- 6) PIRQ E: LAN controller
- 7) PIRQ F: INTA + ETH2
- 8) PIRQ G: INTB
- 9) PIRQ H: USB EHCI controller + UHCI0

- ... Default setting
- ... Optional setting

The PCI resources are assigned to fixed IRQ lines when the APIC function is enabled. The following image shows the connections to the individual PCI slots.

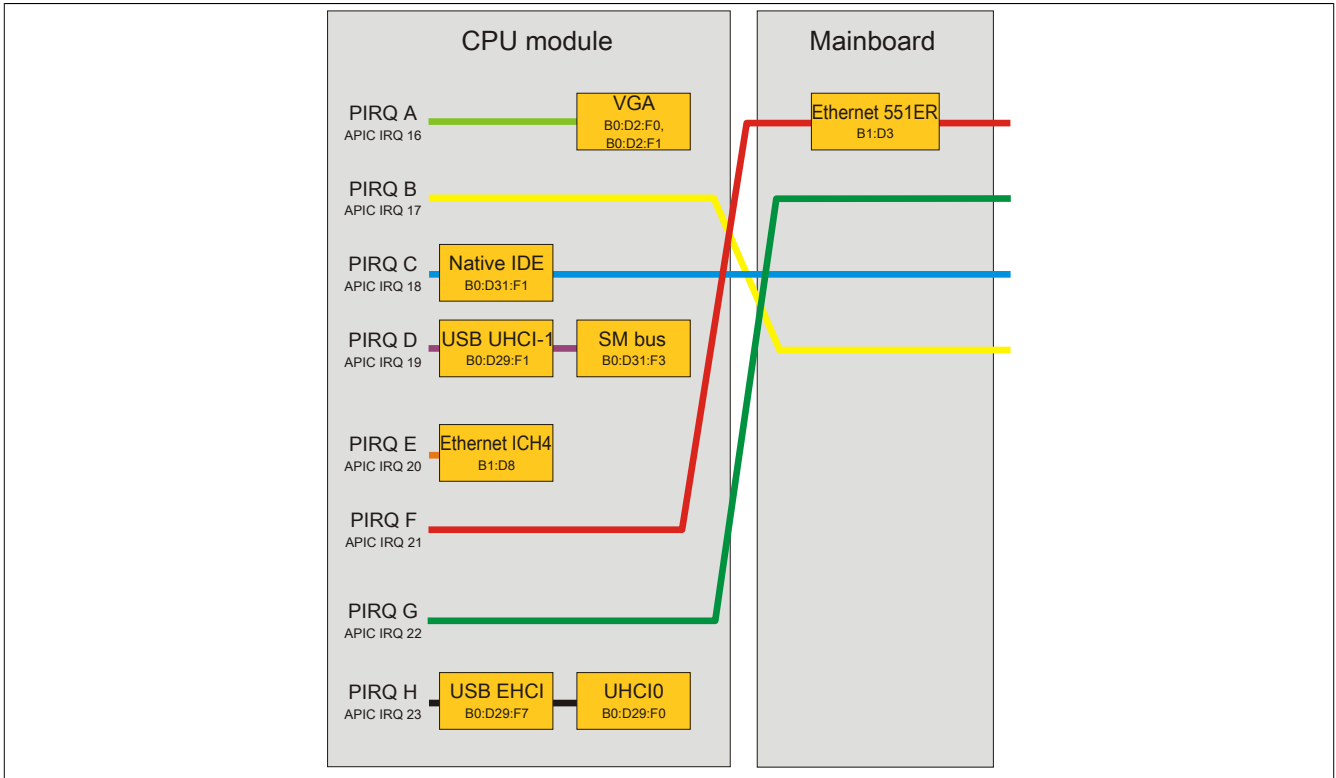


Figure 57: PCI Routing with activated APIC CPU board X945

1.11.6 Inter-IC (I²C) bus

| I ² C address | Resource | Note |
|--------------------------|----------|---------------------------------------|
| A0h | EEPROM | EEPROM for CMOS data - cannot be used |
| B0h | Reserved | Cannot be used |
| 58h | Reserved | Cannot be used |

Table 95: Inter-IC (I²C) bus resources

1.11.7 System management (SM) bus

| SM Bus address | SM device | Note |
|----------------|-----------------|------|
| 12h | SMART_CHARGER | |
| 14h | SMART_SELECTOR | |
| 16h | SMART_BATTERY | |
| D2h | Clock generator | |

Table 96: Inter-IC (I²C) bus resources

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 website (www.br-automation.com).

2.1 BIOS upgrade

An upgrade may be necessary in order to accomplish the following:

- Updating implemented functions or adding newly implemented functions or components to BIOS Setup (information about changes can be found in the Readme file for the BIOS upgrade).

2.1.1 Important information

Information:

Customized BIOS settings are deleted when upgrading BIOS.

Before starting an upgrade, it helps to determine the various software versions.

2.1.1.1 Which BIOS version and firmware are already installed on the PPC725?

This information can be found on the same BIOS setup page for both the X945 CPU boards:

- After switching on the PPC725, you can get to the BIOS Setup by pressing "F2" or "DEL".
- From the BIOS main menu "advanced" (top), select "baseboard/panel features" (bottom):

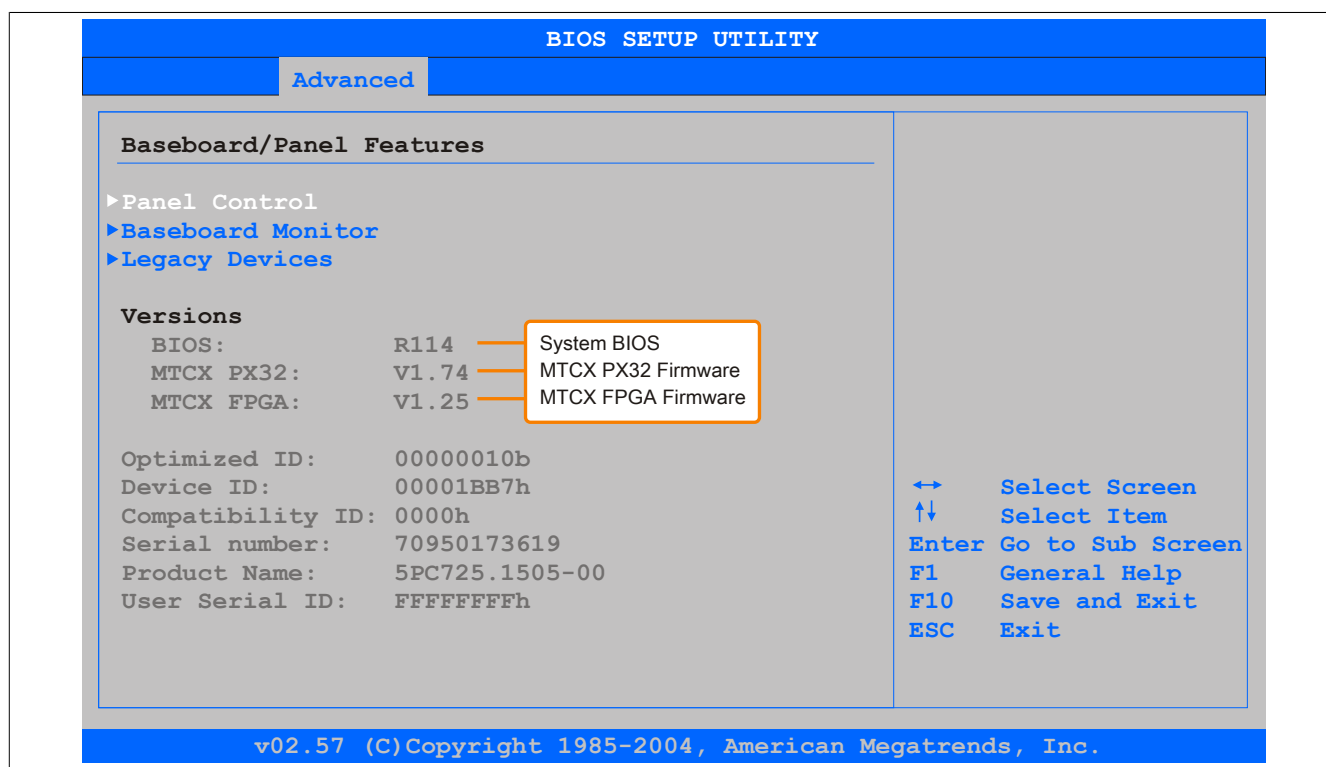


Figure 58: Softwareversionen

2.1.2 Procedure with MS-DOS

1. Download the .zip file from the B&R website (www.br-automation.com).
2. Create bootable media.

Information:

In MS-DOS, Win95 and Win98, a blank HD disk can be made bootable by typing "sys a:" or "format a: /s" on the command line.

Information about creating a bootable diskette in Windows XP can be found on page 112.

Information on creating a USB flash drive for a B&R upgrade can be found on page 114.

Information on creating a CompactFlash card for a B&R upgrade can be found on page 115.

3. Copy the contents of the .zip file to the bootable media. If the B&R upgrade was already added when creating the bootable media with the B&R Embedded OS Installer, then this step is not necessary.
4. Connect the bootable media to the B&R device and reboot.
5. The following boot menu will be shown after startup:

```
1. Upgrade AMI BIOS for X945/N270 (5PC600.X945-xx)
2. Exit to MS-DOS
```

Item 1:

BIOS is automatically upgraded (default after 5 seconds).

Item 2:

Returns to the shell (MS-DOS)

6. The system must be rebooted after a successful upgrade.
7. Reboot and press to enter BIOS Setup and load the setup defaults, then select "Save changes and exit".

2.1.3 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. Select the **Versions** tab.
4. Under **CPU board**, click on **Update for 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 writing to flash memory.

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 settings 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 BIOS, please refer to the help documentation for the Control Center.

2.2 Creating an MS-DOS boot diskette in Windows XP

1. Insert a blank 1.44 MB HD diskette into the disk drive.
2. Open Windows Explorer.
3. Right-click on the 3½ floppy diskette icon and select "Format".

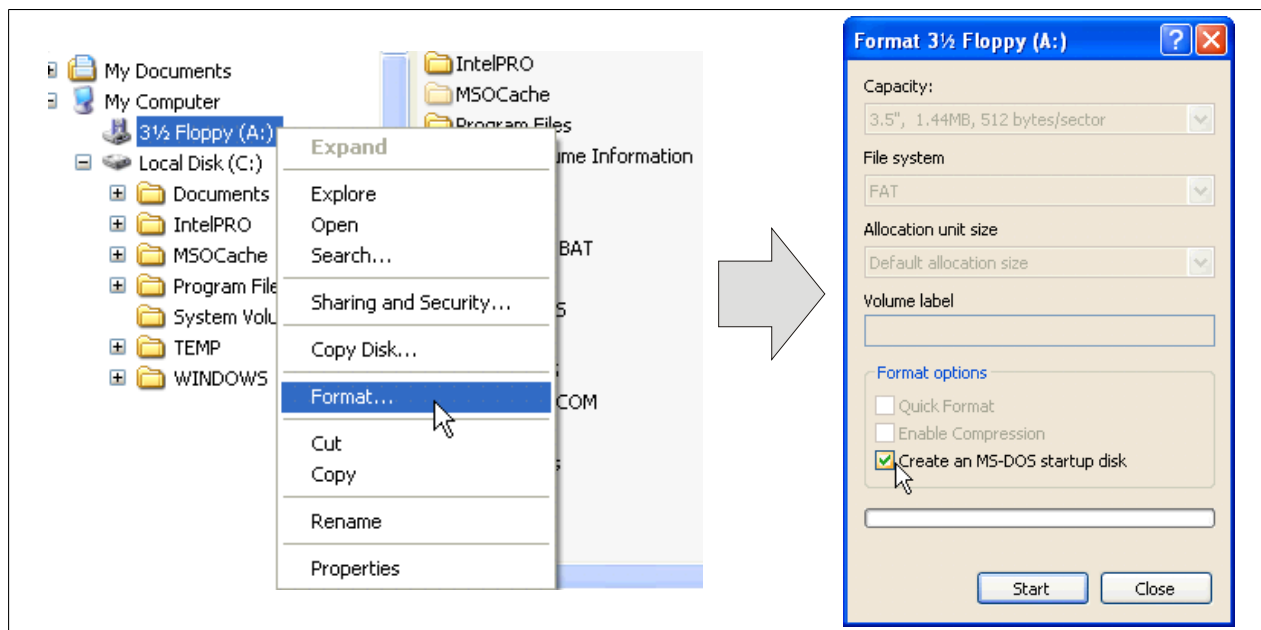


Figure 59: Creating a bootable diskette in Windows XP - Step 1

4. Select the **"Create an MS-DOS startup disk"** option, click on **"Start"** and acknowledge the warning message with "OK".

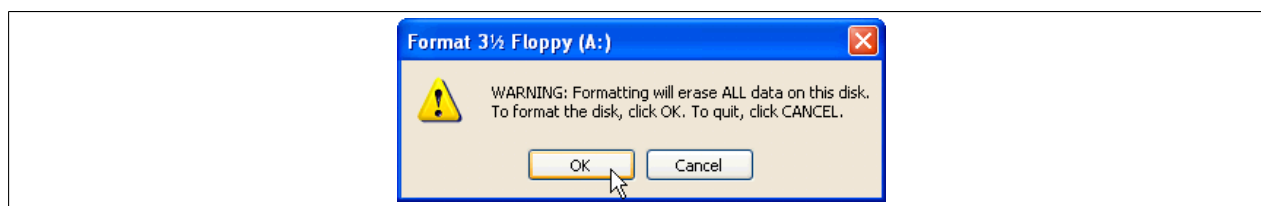


Figure 60: Creating a bootable diskette in Windows XP - Step 2

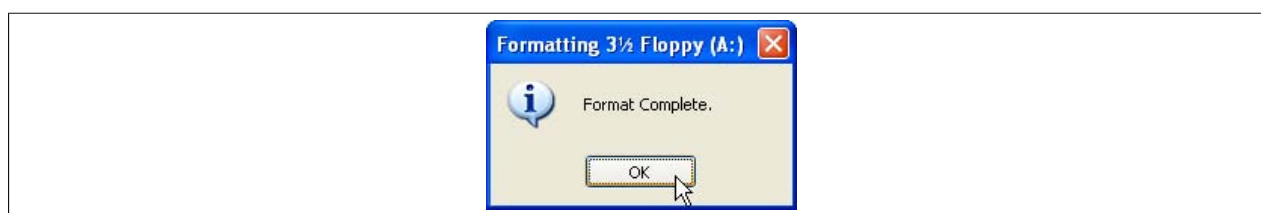


Figure 61: Creating a bootable diskette in Windows XP - Step 3

After creating the startup disk, some of the files must be deleted because of the size of the update.

To do this, all files (hidden system files, etc.) must be visible on the diskette.

In Windows Explorer, go to the "Tools" menu, select "Folder options" and open the "View" tab. Then deselect the option "Hide protected operating system files (Recommended)" (enabled by default) and enable the option "Show hidden files and folders".

| before | | | | after | | | |
|--------------|-------|--------------------|------------------|--------------|--------|--------------------|--------------------|
| Name | Size | Type | Date Modified | Name | Size | Type | Date Modified |
| DISPLAY.SYS | 17 KB | System file | 6/8/2000 5:00 PM | AUTOEXEC.BAT | 0 KB | MS-DOS Batch File | 3/22/2006 10:08 AM |
| EGA2.CPI | 58 KB | CPI File | 6/8/2000 5:00 PM | COMMAND.COM | 91 KB | MS-DOS Application | 6/8/2000 5:00 PM |
| EGA3.CPI | 58 KB | CPI File | 6/8/2000 5:00 PM | CONFIG.SYS | 0 KB | System file | 3/22/2006 10:08 AM |
| EGA.CPI | 58 KB | CPI File | 6/8/2000 5:00 PM | DISPLAY.SYS | 17 KB | System file | 6/8/2000 5:00 PM |
| KEYB.COM | 22 KB | MS-DOS Application | 6/8/2000 5:00 PM | EGA2.CPI | 58 KB | CPI File | 6/8/2000 5:00 PM |
| KEYBOARD.SYS | 34 KB | System file | 6/8/2000 5:00 PM | EGA3.CPI | 58 KB | CPI File | 6/8/2000 5:00 PM |
| KEYBRD2.SYS | 32 KB | System file | 6/8/2000 5:00 PM | EGA.CPI | 58 KB | CPI File | 6/8/2000 5:00 PM |
| KEYBRD3.SYS | 31 KB | System file | 6/8/2000 5:00 PM | IO.SYS | 114 KB | System file | 5/15/2001 6:57 PM |
| KEYBRD4.SYS | 13 KB | System file | 6/8/2000 5:00 PM | KEYB.COM | 22 KB | MS-DOS Application | 6/8/2000 5:00 PM |
| MODE.COM | 29 KB | MS-DOS Application | 6/8/2000 5:00 PM | KEYBOARD.SYS | 34 KB | System file | 6/8/2000 5:00 PM |
| | | | | KEYBRD2.SYS | 32 KB | System file | 6/8/2000 5:00 PM |
| | | | | KEYBRD3.SYS | 31 KB | System file | 6/8/2000 5:00 PM |
| | | | | KEYBRD4.SYS | 13 KB | System file | 6/8/2000 5:00 PM |
| | | | | MODE.COM | 29 KB | MS-DOS Application | 6/8/2000 5:00 PM |
| | | | | MSDOS.SYS | 1 KB | System file | 4/7/2001 1:40 PM |

Figure 62: Creating a bootable diskette in Windows XP - Step 4

| Name | Size | Type | Date Modified |
|--------------|--------|--------------------|--------------------|
| AUTOEXEC.BAT | 0 KB | MS-DOS Batch File | 3/22/2006 10:08 AM |
| COMMAND.COM | 91 KB | MS-DOS Application | 6/8/2000 5:00 PM |
| CONFIG.SYS | 0 KB | System file | 3/22/2006 10:08 AM |
| DISPLAY.SYS | 17 KB | System file | 6/8/2000 5:00 PM |
| EGA2.CPI | 58 KB | CPI File | 6/8/2000 5:00 PM |
| EGA3.CPI | 58 KB | CPI File | 6/8/2000 5:00 PM |
| EGA.CPI | 58 KB | CPI File | 6/8/2000 5:00 PM |
| IO.SYS | 114 KB | System file | 5/15/2001 6:57 PM |
| KEYB.COM | 22 KB | MS-DOS Application | 6/8/2000 5:00 PM |
| KEYBOARD.SYS | 34 KB | System file | 6/8/2000 5:00 PM |
| KEYBRD2.SYS | 32 KB | System file | 6/8/2000 5:00 PM |
| KEYBRD3.SYS | 31 KB | System file | 6/8/2000 5:00 PM |
| KEYBRD4.SYS | 13 KB | System file | 6/8/2000 5:00 PM |
| MODE.COM | 29 KB | MS-DOS Application | 6/8/2000 5:00 PM |
| MSDOS.SYS | 1 KB | System file | 4/7/2001 1:40 PM |

Figure 63: Creating a bootable diskette in Windows XP - Step 5

Now all files (selected) except Command.com, IO.sys and MSDOS.sys can be deleted.

2.3 Creating a bootable USB flash drive for B&R upgrade files

When used in connection with a B&R Industrial PC, it is possible to upgrade (e.g. BIOS) from one of the USB flash drives available from B&R. To do this, the USB flash drive must be prepared accordingly. This is done with the B&R Embedded OS Installer, which can be downloaded at no cost from the B&R website (www.br-automation.com).

2.3.1 Requirements

The following is required to create a bootable USB flash drive:

- B&R USB flash drive
- B&R Industrial PC
- USB media drive
- B&R Embedded OS Installer (V3.00 or higher)

2.3.2 Procedure

1. Connect the USB flash drive to the PC.
2. If the drive list is not refreshed automatically, update the list using the **Drives > Refresh** command.
3. Select the desired USB flash drive in the drive list.
4. Change to the **Action** tab and select **Install a B&R update to a USB flash drive** as the type of action.
5. Enter the path to the MS-DOS operating system files. If the files are part of a .zip archive, then click on the button **From .zip file**. If the files are stored in a directory on the hard drive, then click on the button **From folder**.
6. In the **B&R upgrade** text box, it is also possible to enter the path to the .zip file for the B&R upgrade disk and select the file.
7. Click on the **Start action** button in the toolbar.

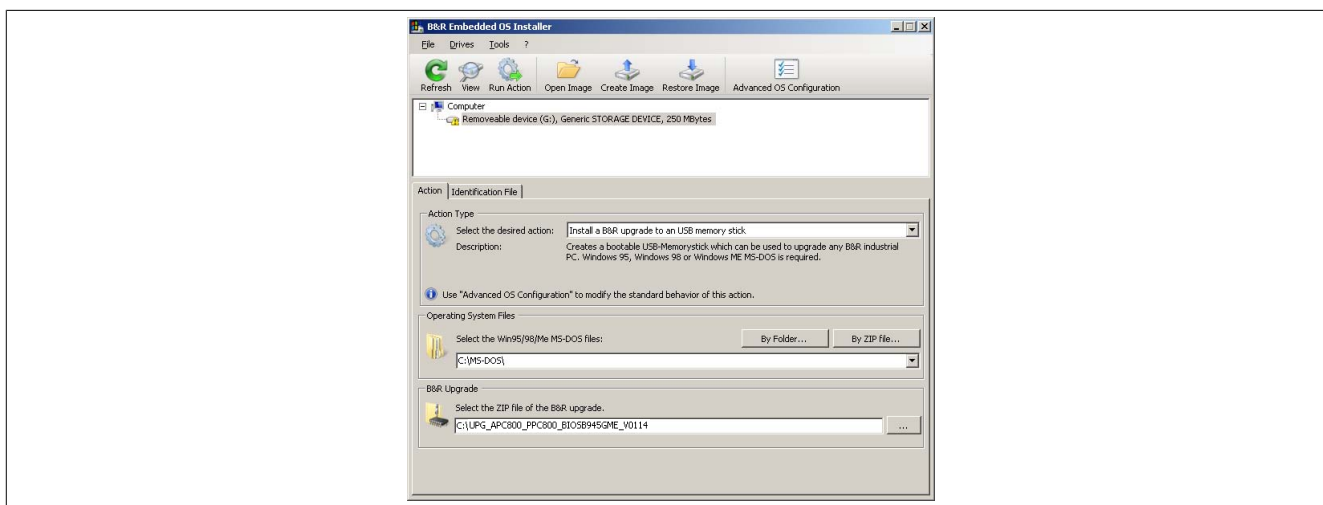


Figure 64: Creating a USB flash drive for B&R upgrade files

2.3.3 How to access MS-DOS

Information about creating an MS-DOS boot diskette can be found in section see "Creating an MS-DOS boot diskette in Windows XP" on page 112. The files from the diskette are then copied to the hard drive.

2.4 Creating a bootable CompactFlash card for B&R upgrade files

When used in connection with a B&R industrial PC, it is possible to upgrade (e.g. upgrade BIOS) from one of the CompactFlash cards available from B&R. To do this, the CompactFlash card must be prepared accordingly. This is done with the B&R Embedded OS Installer, which can be downloaded at no cost from the B&R website (www.br-automation.com).

2.4.1 Requirements

The following peripherals are required for creating a bootable CompactFlash card:

- CompactFlash card
- B&R Industrial PC
- USB media drive
- B&R Embedded OS Installer (at least V3.10)

2.4.2 Procedure

1. Insert the CompactFlash card in the CF slot on the industrial PC.
2. If the drive list is not refreshed automatically, the list can be updated using the command **Drives > Refresh**.
3. Select the desired CompactFlash card from the drive list.
4. Change to the **Action** tab and select **Install a B&R Update to a CompactFlash card** as the type of action.
5. Enter the path to the MS-DOS operating system files. If the files are part of a .zip archive, then click on the button **From .zip file**. If the files are stored in a directory on the hard drive, then click on the button **From folder**.
6. In the **B&R upgrade** text box, it is also possible to enter the path to the .zip file for the B&R upgrade disk and select the file.
7. Click on the **Start action** button in the toolbar.

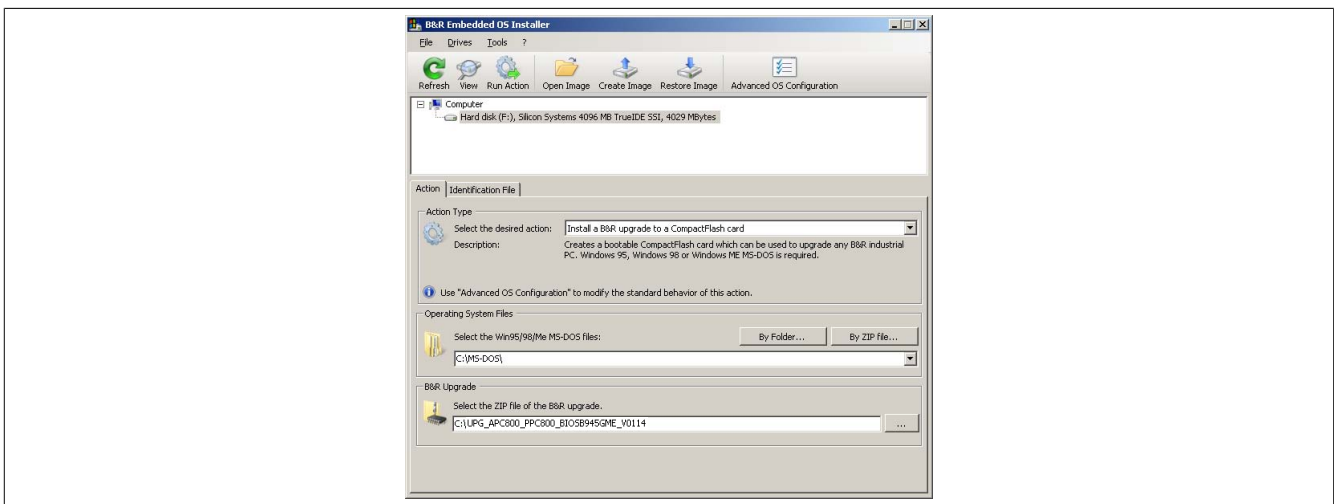


Figure 65: Creating a CompactFlash card for B&R upgrade files

2.4.3 How to access MS-DOS

Information about creating an MS-DOS boot diskette can be found in section see "Creating an MS-DOS boot diskette in Windows XP" on page 112. The files from the diskette are then copied to the hard drive.

3 Microsoft DOS

3.1 Order data

| Model number | Short description | Figure |
|---------------|---|--------|
| 9S0000.01-010 | OEM Microsoft MS-DOS 6.22, German floppy disks, only supplied together with a new PC | |
| 9S0000.01-020 | OEM Microsoft MS-DOS 6.22, English floppy disks, only supplied together with a new PC | |

Table 97: 9S0000.01-010, 9S0000.01-020 - Order data

3.2 Known problems

Either no drivers are available for the following hardware components or only with limitations:

- USB 2.0: only USB 1.1 rates can be achieved.
- Some "ACPI control" functions in BIOS cannot be used.

4 Windows XP Professional

4.1 General information

Information:

Discontinuation of support for Windows XP by Microsoft:

After *April 8th, 2014*, Microsoft will no longer be providing any security updates, hotfixes, support (free or paid) or technical resources for Windows XP.

4.2 Order data


| Model number | Short description | Figure |
|-----------------|--|---|
| | Windows XP Professional |  |
| 5SWWXP.0600-GER | Windows XP Professional SP3 - German - CD | |
| 5SWWXP.0600-ENG | Windows XP Professional SP3 - English - CD | |
| 5SWWXP.0600-MUL | Windows XP Professional SP3 - Multilingual - CD | |
| 5SWWXP.0500-GER | Microsoft OEM Windows XP Professional Service Pack 2c, CD, German. Only available with a new device. | |
| 5SWWXP.0500-ENG | Microsoft OEM Windows XP Professional Service Pack 2c, CD, English. Only available with a new device. | |
| 5SWWXP.0500-MUL | Microsoft OEM Windows XP Professional Service Pack 2c, CD, multilingual. Only available with a new device. | |

Table 98: 5SWWXP.0600-GER, 5SWWXP.0600-ENG, 5SWWXP.0600-MUL, 5SWWXP.0500-GER, 5SWWXP.0500-ENG, 5SWWXP.0500-MUL - Order data

4.3 Overview

| Model number | Edition | Target system | Chipset | Service pack | Language | Minimum hard disk space required | Minimum RAM required |
|-----------------|--------------|---|--|--------------|--------------|----------------------------------|----------------------|
| 5SWWXP.0600-GER | Professional | APC510 APC511 APC620 APC810 APC820 APC910 PPC700 PPC725 PPC800 PPC900 PP500 | 945GME GM45 QM77/HM76 NM10 US15W | SP3 | German | ≤2.1 GB | 128 MB |
| 5SWWXP.0600-ENG | Professional | APC510 APC511 APC620 APC810 APC820 APC910 PPC700 PPC725 PPC800 PPC900 PP500 | 945GME GM45 QM77/HM76 NM10 US15W | SP3 | English | ≤2.1 GB | 128 MB |
| 5SWWXP.0600-MUL | Professional | APC510 APC511 APC620 APC810 APC820 APC910 PPC700 PPC725 PPC800 PPC900 PP500 | 945GME GM45 QM77/HM76 NM10 US15W | SP3 | Multilingual | ≤2.1 GB | 128 MB |
| 5SWWXP.0500-GER | Professional | APC620 APC810 APC820 PPC700 PPC725 PPC800 | 945GME GM45 | SP2c | German | ≤2.1 GB | 128 MB |
| 5SWWXP.0500-ENG | Professional | APC620 APC810 APC820 PPC700 PPC725 PPC800 | 945GME GM45 | SP2c | English | ≤2.1 GB | 128 MB |

| Model number | Edition | Target system | Chipset | Service pack | Language | Minimum hard disk space required | Minimum RAM required |
|-----------------|--------------|--|----------------|--------------|--------------|----------------------------------|----------------------|
| 5SWWXP.0500-MUL | Professional | APC620 APC810 APC820 PPC700 PPC725 PPC800 | 945GME GM45 | SP2c | Multilingual | ≤2.1 GB | 128 MB |

4.4 Installation

B&R preinstalls the required Windows XP Professional version on the desired storage device (e.g. CompactFlash card, etc.). All of the drivers required for operation (graphics, network, etc.) are also installed in this process.

4.5 Drivers

Current drivers for all approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com).

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

4.6 Supported display resolutions

In accordance with Microsoft requirements, Windows XP Professional requires SVGA resolution (800 x 600) or higher in order to allow unimpeded operation of the Windows user interface (including system dialog boxes and apps, etc.). A lower resolution can be selected for applications.

5 Windows Embedded Standard 2009

5.1 General information

Windows® Embedded Standard 2009 is the modular version of Windows® XP Professional. It is used if XP applications should be executed with a minimal operating system size. Together with CompactFlash memory, Windows® Embedded Standard 2009 makes it possible to use the Microsoft desktop operating system in harsh 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 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 a multilingual version.

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, security and performance improvements as well as the latest technology for web browsing and extensive device support.

5.2 Order data


| Model number | Short description | Figure |
|-----------------|---|---|
| | Windows Embedded Standard 2009 |  |
| 5SWWXP.0729-ENG | Microsoft OEM Windows Embedded Standard 2009, English; for PPC700 with 945GME chipset; order CompactFlash separately (at least 1 GB). | |
| | Required accessories | |
| | CompactFlash-cards | |
| 5CFCRD.016G-06 | CompactFlash 16 GB B&R (SLC) | |
| 5CFCRD.032G-06 | CompactFlash 32 GB 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) | |

Table 99: 5SWWXP.0729-ENG - Order data

5.3 Overview

| Model number | Target system | Chipset | Language | Minimum disk size | Minimum RAM required |
|-----------------|------------------|---------|----------|-------------------|----------------------|
| 5SWWXP.0729-ENG | PPC700 PPC725 | 945GME | English | 1 GB | 256 MB |

5.4 Features with WES2009 (Windows Embedded Standard 2009)

The following list of features shows the most important device functions included in Windows Embedded Standard 2009.

| Function | Present |
|------------------------------------|--------------|
| Enhanced Write Filter (EWF) | ✓ |
| File-Based Write Filter (FBWF) | ✓ |
| Page file | Configurable |
| Administrator accounts | ✓ |
| User accounts | Configurable |
| Explorer shell | ✓ |
| Registry filter | ✓ |
| Internet Explorer 7.0 | ✓ |
| Internet information service (IIS) | - |
| Terminal service | ✓ |
| Windows Firewall | ✓ |
| MSN Explorer | - |
| Outlook Express | - |
| Administrative Tools | ✓ |
| Remote Desktop | ✓ |
| Remote Assistance | - |
| .NET Framework | - |
| ASP.NET | - |

Table 100: Device functions in Windows Embedded Standard 2009

| Function | Present |
|--------------------------------------|---------|
| Local network bridge | ✓ |
| Codepages / User locales / Keyboards | ✓ |
| Disk Management Service | ✓ |
| Windows Installer Service | ✓ |
| Class Installer | ✓ |
| CoDevice Installer | ✓ |
| Media Player 6.4 | ✓ |
| DirectX 9.0c | ✓ |
| Accessories | ✓ |
| Number of fonts | 89 |

Table 100: Device functions in Windows Embedded Standard 2009

5.5 Installation

Windows Embedded Standard 2009 is already preinstalled on a suitable CompactFlash card by B&R (minimum 1 GB). The system is then automatically configured when it is switched on for the first time. This procedure takes approximately 10 minutes, with the device being rebooted a number of times.

5.6 Drivers

All drivers required for operation are preinstalled along with the operating system. If an older version of a driver is still being used, its latest version can be downloaded and installed from the B&R website (www.br-automation.com). It is important that Enhanced Write Filter (EWF) is disabled for this.

5.6.1 Touch screen driver

In order to operate Automation Panel 800 or Automation Panel 900 touch screen devices, the touch screen driver must be installed manually or the touch screen interface updated in the device manager. The driver is available in the Downloads section of the B&R website (www.br-automation.com). It is important that Enhanced Write Filter (EWF) is enabled for this.

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

5.7 Supported display resolutions

In accordance with Microsoft requirements, Windows Embedded Standard 2009 requires SVGA resolution (800 x 600) or higher in order to allow unimpeded operation of the Windows user interface (including system dialog boxes, etc.). A lower resolution can be selected for applications.

6 Windows 7

6.1 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 English and German are available in Windows® 7 Professional, while Windows® 7 Ultimate supports up to 35 different languages (up to 36 languages in Service Pack 1). 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 compared to products offered on the consumer market.

6.2 Order data


| Model number | Short description | Figure |
|-----------------|--|---|
| | Windows 7 Professional/Ultimate |  |
| 5SWWI7.0100-GER | Windows 7 Professional - 32-bit - German - DVD | |
| 5SWWI7.1100-GER | Windows 7 Professional SP1 - 32-bit - German - DVD | |
| 5SWWI7.0100-ENG | Windows 7 Professional - 32-bit - English - DVD | |
| 5SWWI7.1100-ENG | Windows 7 Professional SP1 - 32-bit - English - DVD | |
| 5SWWI7.0300-MUL | Windows 7 Professional - 32-bit - Multilingual - DVD | |
| 5SWWI7.1300-MUL | Windows 7 Ultimate SP1 - 32-bit - Multilingual - DVD | |

Table 101: 5SWWI7.0100-GER, 5SWWI7.1100-GER, 5SWWI7.0100-ENG, 5SWWI7.1100-ENG, 5SWWI7.0300-MUL, 5SWWI7.1300-MUL - Order data

6.3 Overview

| Model number | Edition | Target system | Chipset | Service pack | Architecture | Language | Minimum hard disk space required | Minimum RAM required |
|-----------------|--------------|---|---|--------------|--------------|--------------|----------------------------------|----------------------|
| 5SWWI7.0100-GER | Professional | APC510 APC511 APC810 APC910 PPC800 PP500 | 945GME GM45 QM77/HM76 US15W | | 32-bit | German | 16 GB | 1 GB |
| 5SWWI7.1100-GER | Professional | APC510 APC511 APC810 APC910 APC2100 PPC800 PPC900 PPC2100 PP500 | 945GME GM45 QM77/HM76 NM10 US15W Bay Trail | SP1 | 32-bit | German | 16 GB | 1 GB |
| 5SWWI7.0100-ENG | Professional | APC510 APC511 APC810 APC910 PPC800 PP500 | 945GME GM45 QM77/HM76 US15W | | 32-bit | English | 16 GB | 1 GB |
| 5SWWI7.1100-ENG | Professional | APC510 APC511 APC810 APC910 APC2100 PPC800 PPC900 PPC2100 PP500 | 945GME GM45 QM77/HM76 NM10 US15W Bay Trail | SP1 | 32-bit | English | 16 GB | 1 GB |
| 5SWWI7.0300-MUL | Ultimate | APC510 APC511 APC810 APC910 PPC800 PP500 | 945GME GM45 QM77/HM76 US15W | | 32-bit | Multilingual | 16 GB ¹⁾ | 1 GB |
| 5SWWI7.1300-MUL | Ultimate | APC510 APC511 APC810 APC910 APC2100 PPC800 PPC900 PPC2100 PP500 | 945GME GM45 QM77/HM76 NM10 US15W Bay Trail | SP1 | 32-bit | Multilingual | 16 GB ¹⁾ | 1 GB |

1) The memory used by additional language packs is not taken into account in the minimum size of the disk.

6.4 Installation

B&R preinstalls the required Windows 7 version on the desired storage device (e.g. CompactFlash card, CFast card, etc.). All of the drivers required for operation (graphics, network, etc.) are also installed in this process.

6.5 Drivers

Current drivers for all approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com).

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

6.6 Special considerations, limitations

- Windows 7 does not contain a Beep.sys file, which means that an audible signal is not sounded when pressing a key, for example.
- There is currently no support for the Windows 7 system rating (although this does not apply to PP500, APC2100, APC510, APC511, APC910, PPC2100 or PPC800 devices with an NM10 chipset).

Information:

32-bit operating systems are not recommended for system units with 4 GB or more of main memory. More information can be found in the section "Miscellaneous configuration" on page under "PCI MMIO size".

6.7 Supported display resolutions

In accordance with Microsoft requirements, Windows 7 requires XGA resolution (1024 x 768) or higher in order to allow unimpeded operation of the Windows user interface (including system dialog boxes, etc.). A lower resolution can be selected for applications.

7 Windows Embedded Standard 7

7.1 General information

The successor to Windows® XP Embedded is Windows® Embedded Standard 7. As with previous versions, this embedded operating system offers full system support for B&R Industrial PCs. 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 undesired applications that are being 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), installation 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 as both a 32-bit and 64-bit version¹⁾, which ensures that even the most demanding applications have the level of support they need.

7.2 Order data


| Model number | Short description | Figure |
|-----------------|---|---|
| | Windows Embedded Standard 7 |  |
| 5SWWI7.0529-ENG | Microsoft OEM Windows Embedded Standard 7 32-bit, English; for PPC700 with 945GME chipset; order CompactFlash separately (at least 8 GB) | |
| 5SWWI7.1529-ENG | Microsoft OEM Windows Embedded Standard 7 32-bit, Service Pack 1, English; for PPC700 with 945GME chipset; order CompactFlash separately (at least 16 GB). | |
| 5SWWI7.0729-MUL | Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, multilingual; for PPC700 with 945GME chipset; order CompactFlash separately (at least 8 GB) | |
| 5SWWI7.1729-MUL | Microsoft OEM Windows Embedded Standard 7 Premium 32-bit, Service Pack 1, multilingual; for PPC700 with 945GME chipset; order CompactFlash separately (at least 16 GB). | |
| | Required accessories | |
| | CompactFlash-cards | |
| 5CFCRD.016G-06 | CompactFlash 16 GB B&R (SLC) | |
| 5CFCRD.032G-06 | CompactFlash 32 GB B&R (SLC) | |
| 5CFCRD.8192-06 | CompactFlash 8 GB B&R (SLC) | |
| | Optional accessories | |
| | Windows Embedded Standard 7 | |
| 5SWWI7.0900-MUL | Windows Embedded Standard 7 - 32-bit - Language Pack - DVD | |
| 5SWWI7.1900-MUL | Windows Embedded Standard 7 SP1 - 32-bit - Language Pack DVD | |

Table 102: 5SWWI7.0529-ENG, 5SWWI7.1529-ENG, 5SWWI7.0729-MUL, 5SWWI7.1729-MUL - Order data

7.3 Overview

| Model number | Edition | Target system | Chipset | Service pack | Architecture | Language | Minimum disk size | Minimum RAM required |
|-----------------|----------|------------------|---------|--------------|--------------|--------------|---------------------|----------------------|
| 5SWWI7.0529-ENG | Embedded | PPC700 PPC725 | 945GME | | 32-bit | English | 8 GB | 1 GB |
| 5SWWI7.1529-ENG | Embedded | PPC700 PPC725 | 945GME | SP1 | 32-bit | English | 16 GB | 1 GB |
| 5SWWI7.0729-MUL | Premium | PPC700 PPC725 | 945GME | | 32-bit | Multilingual | 8 GB ¹⁾ | 1 GB |
| 5SWWI7.1729-MUL | Premium | PPC700 PPC725 | 945GME | SP1 | 32-bit | Multilingual | 16 GB ¹⁾ | 1 GB |

1) The memory used by additional language packs is not taken into account in the minimum size of the disk.

¹⁾ 64-bit versions are not supported by all systems.

7.4 Features with WES7 (Windows Embedded Standard 7)

The following list of features shows the most important device functions included in Windows Embedded Standard 7.

| Function | Windows Embedded Standard 7 | Windows Embedded Standard 7 Premium |
|---|-----------------------------|-------------------------------------|
| Enhanced Write Filter (EWF) | ✓ | ✓ |
| File-Based Write Filter (FBWF) | ✓ | ✓ |
| Administrator accounts | ✓ | ✓ |
| User accounts | Configurable | Configurable |
| Windows Explorer shell | ✓ | ✓ |
| Registry filter | ✓ | ✓ |
| Internet Explorer 8.0 | ✓ | ✓ |
| Internet Explorer 11.0 | | |
| Internet Information Service (IIS) 7.0 | ✓ | ✓ |
| Anti-malware (Windows Defender) | - | ✓ |
| Add-ons (Snipping Tool, Sticky Notes) | - | ✓ |
| Windows Firewall | ✓ | ✓ |
| .NET Framework 3.5 | ✓ | ✓ |
| 32-bit and 64-bit | ✓ | ✓ |
| 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 | - | ✓ |
| Multi-touch support | - | ✓ |
| Boot from USB flash drive | ✓ | ✓ |
| Accessories | ✓ | ✓ |
| Page file | Configurable | Configurable |
| Number of fonts | 134 | 134 |

Table 103: Device functions in Windows Embedded Standard 7

7.5 Installation

Windows Embedded Standard 7 is already preinstalled on a suitable CompactFlash card by B&R (32-bit: minimum 8 or 16 GB, 64-bit: minimum 16 GB). The system is then automatically configured when it is switched on for the first time. This procedure takes approximately 30 minutes, with the device being rebooted a number of times.

Information:

If Enhanced Write Filter (EWF) should be used, all mass storage devices should be disconnected from the system during installation or SYSPREP (except for the boot drive). It is also possible to disable additional mass storage devices in BIOS.

7.6 Drivers

All drivers required for operation are preinstalled along with the operating system. If an older version of a driver is still being used, its latest version can be downloaded and installed from the B&R website (www.br-automation.com). It is important that Enhanced Write Filter (EWF) is disabled for this.

7.6.1 Touch screen driver

A touch screen driver will be installed automatically if a touch controller is detected during the Windows Embedded Standard 7 installation. If a touch controller is not detected during Windows Embedded Standard 7 installation or a B&R Automation Panel is connected at a later time, then the touch screen driver needs to be installed manually or the additional touch screen interface must be selected in the touch screen settings in the Windows Control Panel. The driver is available in the Downloads section of the B&R website (www.br-automation.com). It is important that both Enhanced Write Filter (EWF) and File Based Write Filter (FBWF) are disabled for this.

Information:

Required drivers can only be downloaded from the B&R website, not from manufacturer websites.

7.7 Supported display resolutions

In accordance with Microsoft requirements, Windows Embedded Standard 7 requires XGA resolution (1024 x 768) or higher in order to allow unimpeded operation of the Windows user interface (including system dialog boxes and apps, etc.). A lower resolution can be selected for applications.

8 Windows CE

8.1 General information

B&R Windows CE is an operating system that is optimally tailored to B&R's devices, i.e. it includes only the functions and modules that 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.

8.2 Order data


| Model number | Short description | Figure |
|-----------------|---|---|
| | Windows CE 6.0 |  |
| 5SWWCE.0829-ENG | Microsoft OEM Windows CE 6.0 Professional, English; for PPC700 with 945GME chipset; order CompactFlash separately (at least 128 MB) | |
| | Required accessories | |
| | CompactFlash-cards | |
| 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.032G-06 | CompactFlash 32 GB B&R (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 104: 5SWWCE.0829-ENG - Order data

8.3 Overview

| Model number | Target system | Chipset | Language | Minimum disk size | Minimum RAM required |
|-----------------|------------------|---------|----------|-------------------|----------------------|
| 5SWWCE.0829-ENG | PPC700 PPC725 | 945GME | English | 128 MB | 128 MB |

8.4 Windows CE 6.0 features

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

| Features | Windows CE 6.0 |
|--|---|
| Supported screen resolutions | VGA (TFT), SVGA (TFT), XGA (TFT) |
| Chipset | Intel 945GME |
| 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. 38 MB ²⁾ , uncompressed |
| 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 | 3 |
| DirectX | No |
| Audio ports | "Line OUT" and "MIC" are supported. "Line IN" is not supported. |

Table 105: Windows CE 6.0 features

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

8.5 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)

8.6 Installation

Windows CE is usually preinstalled at B&R.

8.7 B&R Embedded OS Installer

The B&R Embedded OS Installer makes it possible to install existing B&R Windows CE images. The 4 files NK.BIN, BLDR, LOGOXRES.BMP and LOGOQVGA.BMP must be available 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). Additional information is available in the online help documentation for the B&R Embedded OS Installer.

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

The ADI (Automation Device Interface) enables access to specific functions on B&R devices. Settings for devices can be read and configured using the B&R Control Center applet in the Control Panel.

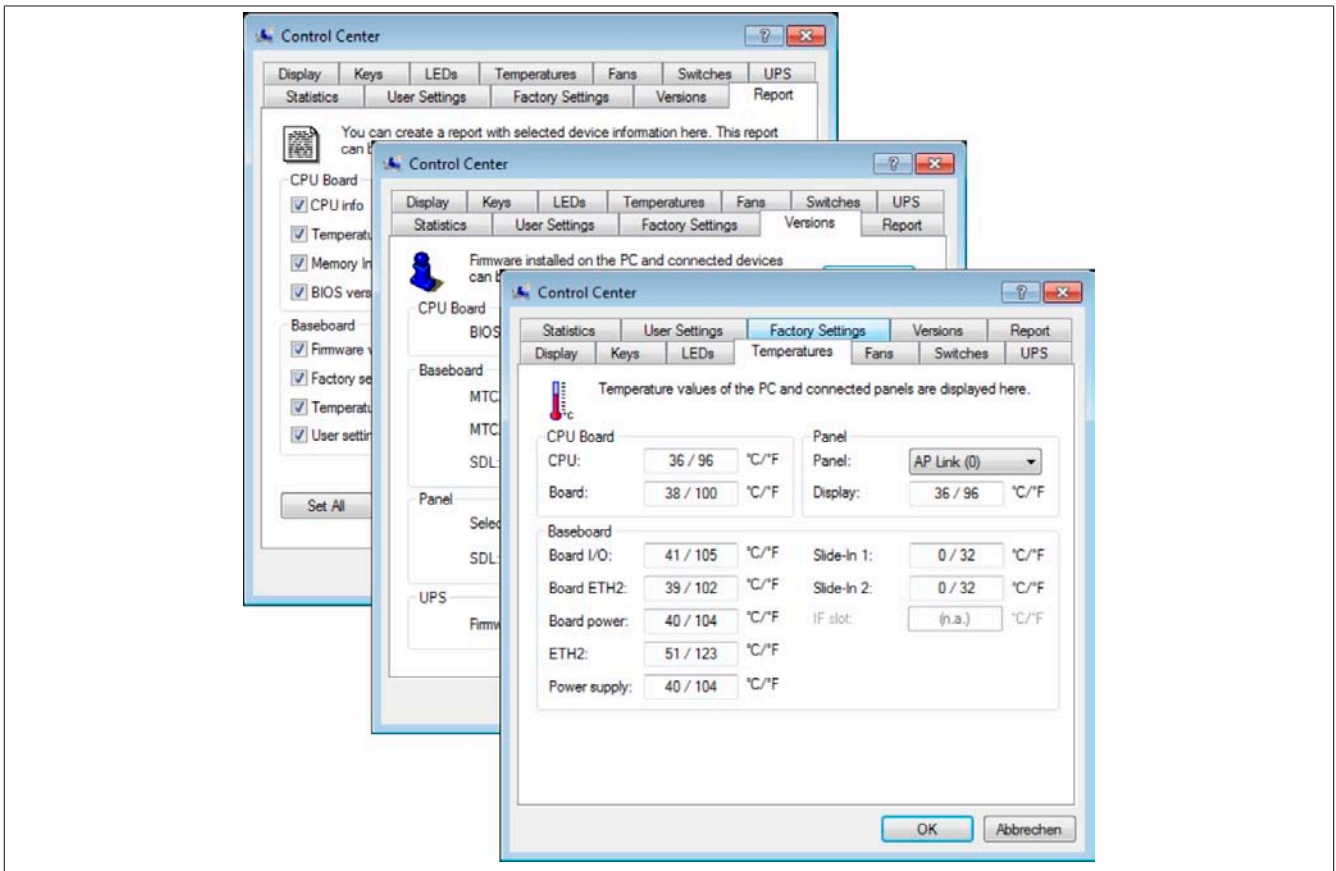


Figure 66: ADI Control Center screenshots - Examples

Information:

The temperature and voltage values (e.g. CPU temperature, core voltage, battery voltage) shown in the corresponding ADI window represent uncalibrated values for informational purposes. They cannot be used to draw any conclusions about hardware alarms or error conditions. The hardware components used have automatic diagnostic 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 the device series.

- Changing display-specific parameters
- Reading device-specific keys
- Updating the key configuration
- Enabling device-specific LEDs on a membrane keypad or keys
- Reading and calibrating control devices (e.g. key switches, handwheels, joysticks, potentiometers)
- Reading temperatures, fan speeds, statistical data and switch settings
- Reading operating hours (power-on hours)
- Reading user and factory settings
- Reading software versions
- Updating and backing up BIOS and firmware
- Creating reports about the current system (support assistance)
- Setting the SDL equalizer value when adjusting SDL cables
- Changing the user serial ID

Supports the following systems:

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Automation PC 2100
- Panel PC 300
- Panel PC 700
- Panel PC 725
- Panel PC 800
- Panel PC 900
- Panel PC 2100
- 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 help system. The B&R Automation Device Interface (ADI) driver (also contains Control Center) is available at no charge 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 B&R images of embedded operating systems.

If a more current ADI driver version exists (see the Downloads section of the B&R website), it can be installed later. It is important that Enhanced Write Filter (EWF) is disabled for this.

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

This software can be used to access B&R Automation Device Interface (ADI) functions directly from Windows applications created in one of the following development environments:

- Microsoft Visual C++ 6.0
- Microsoft Visual Basic 6.0
- Microsoft Embedded Visual C++ 4.0
- Microsoft Visual Studio 2008 (or newer)

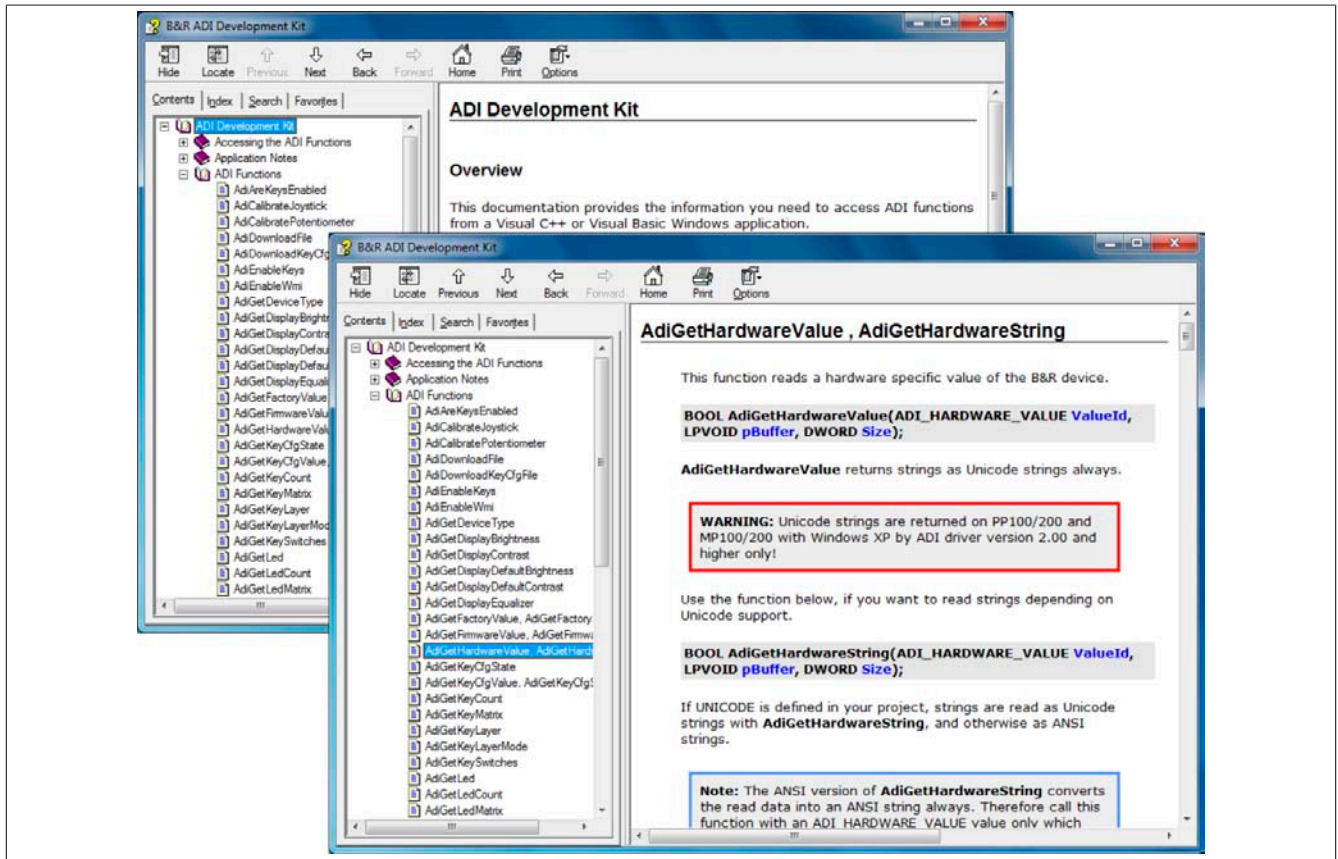


Figure 67: ADI Development Kit Screenshots (Version 3.70)

Features:

- One Microsoft Visual Basic module with ADI function declarations
- 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 application testing if no ADI driver is installed)

The following systems are supported (version 3.70 and higher):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Automation PC 2100
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Panel PC 900
- Panel PC 2100

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

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

A detailed description of how to use ADI functions can be found in the help system.

The B&R Automation Device Interface (ADI) development kit is available at no cost in the Downloads section of the B&R website (www.br-automation.com).

11 B&R Automation Device Interface (ADI) .NET SDK

This software can be used to access B&R Automation Device Interface (ADI) functions directly from .NET applications created using Microsoft Visual Studio 2005 or later.

Supported programming languages:

- Visual Basic
- Visual C++
- Visual C#

System requirements

- Development system: PC with Windows XP or Windows 7 and
 - Microsoft Visual Studio 2005 (or newer)
 - Microsoft .NET Framework 2.0 and/or Microsoft .NET Compact Framework 2.0 (or newer)

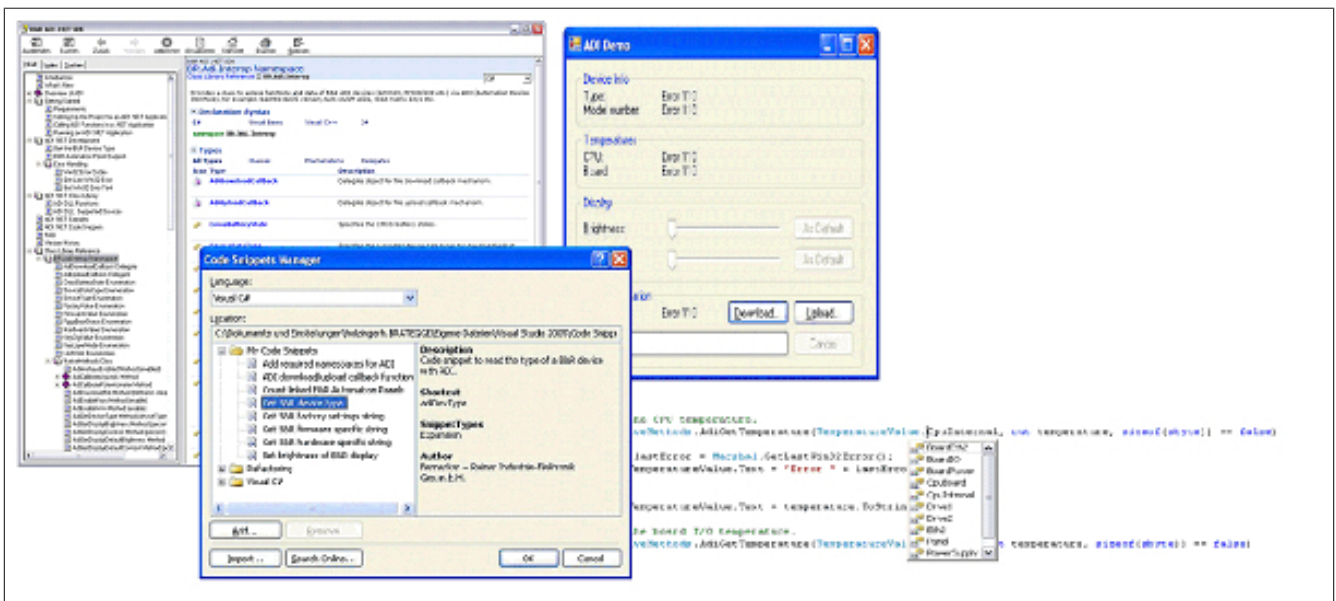


Figure 68: ADI .NET SDK screenshots (version 2.10)

Features (version 2.10 and higher)

- ADI .NET class library
- Help files in HTML Help 1.0 format (.chm), MS Help 2.0 format (.HxS) and MS Help Viewer format (.MSHC) (help documentation is in English only)
- Sample projects and code snippets for Visual Basic, Visual C++ and Visual C#
- ADI DLL (for application testing if no ADI driver is installed)

The following systems are supported (version 2.10 and higher):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Automation PC 2100
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Panel PC 900
- Panel PC 2100
- Power Panel 100/200
- Power Panel 300/400

- Power Panel 500
- Mobile Panel 40/50
- Mobile Panel 100/200

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

A detailed description of how to use ADI functions can be found in the help system.

The ADI .NET SDK is available in the Downloads section of the B&R website (www.br-automation.com).

12 B&R Key Editor

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

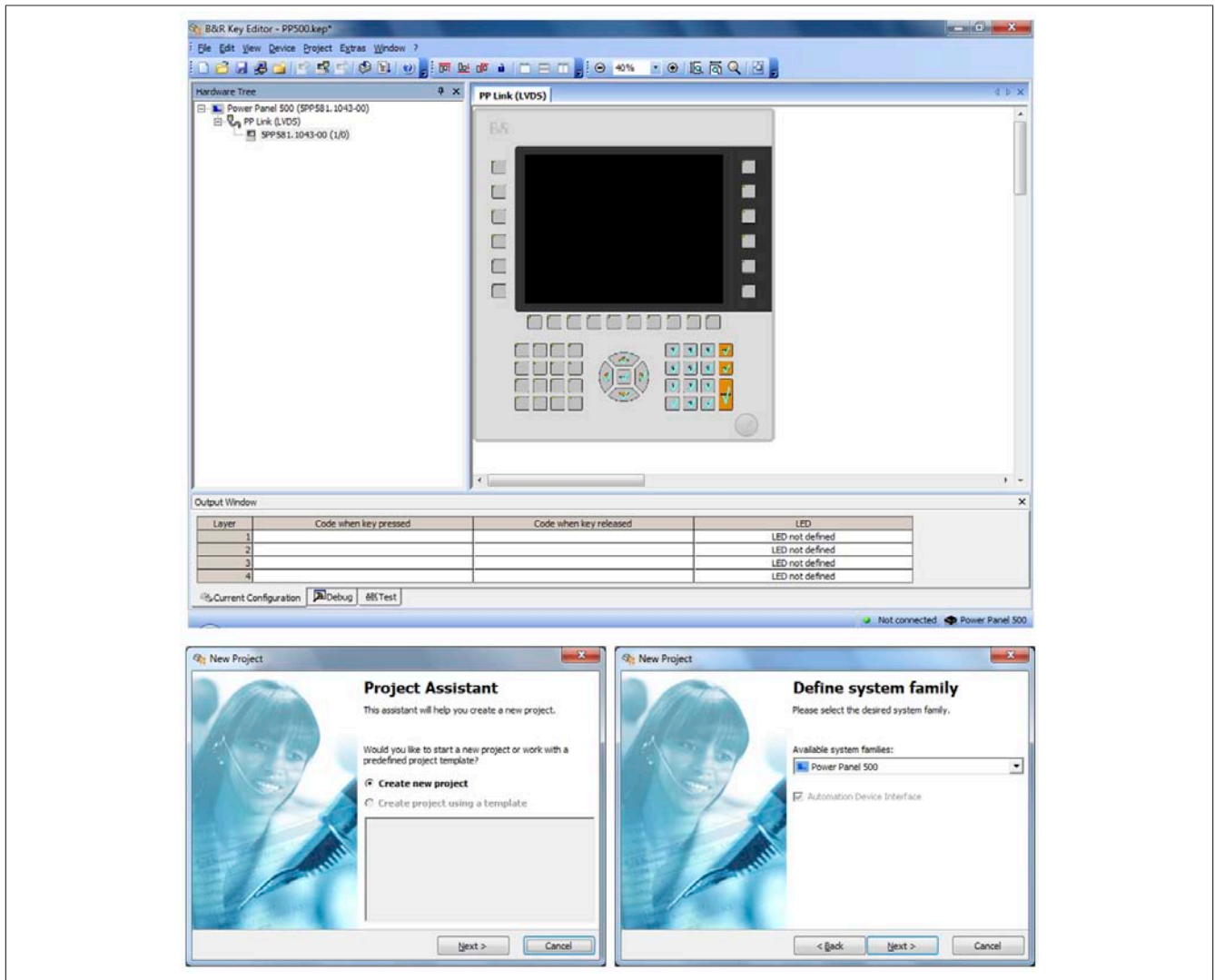


Figure 69: B&R Key Editor screenshots (version 3.50)

Features:

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

The following systems are supported (version 3.50):

- Automation PC 510
- Automation PC 511
- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation PC 910
- Automation PC 2100
- Automation Panel 800
- Automation Panel 830

- Automation Panel 900
- Automation Panel 9x3 / 9xD
- IPC2000, IPC2001, IPC2002
- IPC5000, IPC5600
- IPC5000C, IPC5600C
- Mobile Panel 40/50
- Mobile Panel 100/200
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Panel PC 900
- Panel PC 2100
- 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 help system. The B&R Key Editor is available at no cost 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 • Standards and certifications

1 Standards and guidelines

1.1 CE mark



Product complies with all applicable directives and their harmonized EN standards.

1.2 EMC directive

These devices meet the requirements of EC directive "2004/108/EC Electromagnetic compatibility" and are designed for the following areas:

| | |
|--------------------|---|
| EN 61131-2:2007 | Programmable logic controllers - Part 2: Equipment requirements and tests |
| EN 61000-6 -2:2005 | Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments |
| EN 61000-6 -4:2007 | Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments |

1.3 Low voltage directive

These devices satisfy the requirements of EC directive "2006/95/EC Low voltage directive" and are designed for the following areas:

| | |
|---------------------------|---|
| EN 61131-2:2007 | Programmable logic controllers - Part 2: Equipment requirements and tests |
| EN 60204-1:2006 + A1:2009 | Safety of machinery - Electrical equipment of machines - Part 1: General requirements |

2 Certifications

Danger!

A complete system can only receive certification if ALL of the individual components it includes have the applicable certifications. If an individual component is being used that DOES NOT have an applicable certification, then the complete system WILL NOT receive certification.

B&R products and services comply with applicable standards. This includes international standards from organizations such as ISO, IEC and CENELEC, as well as national standards from organizations such as UL, CSA, FCC, VDE, ÖVE, etc. We are committed to ensuring the reliability of our products in an industrial environment.

Unless otherwise specified, the following certifications apply:

2.1 UL certification



Products with this mark have been tested by Underwriters Laboratories and are listed as "Industrial Control Equipment". This mark is valid for the USA and Canada and simplifies the certification of your machines and systems in these areas.

Underwriters Laboratories (UL) in accordance with the UL508 standard - 17th Edition
Canadian (CSA) standard in accordance with C22.2 No. 142-M1987

2.2 GOST-R



Products with this mark have been certified by an accredited testing laboratory and have been approved for import to the Russian Federation (based on CE compliance).

Chapter 6 • Accessories

The following accessories have successfully completed functional testing at B&R and are approved for use with this device. Nevertheless, it is important to observe any limitations that may apply to the complete system when operated with other individual components. When operating the complete system, the specifications for the individual components must be observed.

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 is insufficient ("Bad" status).

1.1.2 Order data


| Model number | Short description | Figure |
|---------------|--|--|
| | Batteries | |
| 0AC201.91 | Lithium batteries 4 pcs., 3 V / 950 mAh button cell We hereby state that the lithium cells contained in this shipment qualify as "partly regulated". Handle with care. If the package is damaged, inspect the cells, repack intact cells and protect the cells against short circuit. For emergency information, call RENATA SA at +41 61 319 28 27. |  |
| 4A0006.00-000 | Lithium battery, 3 V / 950 mAh, button cell | |

Table 106: 0AC201.91, 4A0006.00-000 - Order data

1.1.3 Technical data

Warning!

The battery is only permitted to be replaced by a Renata CR2477N battery. The use of another battery may present a risk of fire or explosion.

The battery may explode if handled improperly. Do not recharge, disassemble or dispose of in fire.

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the complete system. The data specifications for the complete system take precedence over those of individual components.

| Product ID | 0AC201.91 | 4A0006.00-000 |
|-----------------------------------|------------------------|---------------|
| General information | | |
| Storage time | Max. 3 years at 30°C | |
| Certification | | |
| CE | Yes | |
| cULus | Yes | |
| Electrical characteristics | | |
| Capacity | 950 mAh | |
| Self-discharging | <1% per year (at 23°C) | |
| Voltage range | 3 V | |

Table 107: 0AC201.91, 4A0006.00-000 - Technical data

| Product ID | 0AC201.91 | 4A0006.00-000 |
|---------------------------------|-------------|---------------|
| Environmental conditions | | |
| Temperature Storage | -20 to 60°C | |
| Relative humidity Operation | 0 to 95% | |
| Storage | 0 to 95% | |
| Transport | 0 to 95% | |

Table 107: 0AC201.91, 4A0006.00-000 - Technical data

2 Power connectors

2.1 0TB103.9x

2.1.1 General information

This single-row, 3-pin 0TB103 terminal block is used to connect the voltage supply.

2.1.2 Order data


| Model number | Short description | Figure |
|--------------|---|---|
| | Terminal blocks |  |
| 0TB103.9 | Connector 24 VDC - 3-pin female - Screw clamps 3.31 mm ² | |
| 0TB103.91 | Connector 24 VDC - 3-pin female - Cage clamps 3.31 mm ² | |

Table 108: 0TB103.9, 0TB103.91 - Order data

2.1.3 Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the complete system. The data specifications for the complete system take precedence over those of individual components.

| Product ID | 0TB103.9 | 0TB103.91 |
|--|---|---|
| General information | | |
| Certification | | |
| CE | | Yes |
| cULus | | Yes |
| cULus HazLoc Class 1 Division 2 | Yes ¹⁾ | Yes ²⁾ |
| GL | Yes ¹⁾ | Yes ³⁾ |
| Terminal block | | |
| Note | Protected against vibration by the screw flange Nominal values according to UL | Protected against vibration by the screw flange Nominal values according to UL |
| Number of pins | 3 (female) | |
| Type of terminal clamp | Screw clamps | Cage clamps ⁴⁾ |
| Cable type | Only copper wires (no aluminum wires!) | |
| Distance between contacts | 5.08 mm | |
| Connection cross section | | |
| AWG wire | 26 to 14 AWG | 26 to 12 AWG |
| Wire end sleeves with plastic covering | | 0.20 to 1.50 mm ² |
| Solid wires | | 0.20 to 2.50 mm ² |
| Fine strand wires | 0.20 to 1.50 mm ² | 0.20 to 2.50 mm ² |
| With wire end sleeves | | 0.20 to 1.50 mm ² |
| Tightening torque | 0.4 Nm | - |
| Electrical characteristics | | |
| Nominal voltage | 300 V | |
| Nominal current ⁵⁾ | 10 A / contact | |
| Contact resistance | ≤5 mΩ | |

Table 109: 0TB103.9, 0TB103.91 - Technical data

- 1) Yes, although applies only if all components installed within the complete system have this certification
- 2) Yes, although applies only if all components installed within the complete system have this certification and the complete system itself carries the corresponding mark.
- 3) Yes, although applies only if all components installed within the complete system have this certification.
- 4) Cage clamp terminal blocks cannot be used side-by-side.
- 5) The limit data for each I/O module must be taken into consideration.

3 CompactFlash cards

3.1 General information

CompactFlash cards are storage media that are easy to replace. 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.

3.2 General information

In order to be suited for use in industrial automation, CompactFlash cards must be highly reliable. The following items are very important to achieving the necessary level of reliability:

- The flash technology used
- An efficient algorithm for maximizing service life
- Good mechanisms for detecting and fixing errors in the flash memory

3.2.1 Flash technology

Currently, CompactFlash cards are available with MLC (multi-level cell) and SLC (single-level cell) flash blocks. SLC flash memory has a service life 10 times longer than MLC, which is why only CompactFlash cards with SLC flash blocks are suited for industrial applications.

3.2.2 Wear leveling

Wear leveling is an algorithm that can be used to maximize the service life 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 disk so that the same areas don't have to be cleared and reprogrammed over and over again.

3.2.2.1 No wear leveling

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

3.2.2.2 Dynamic wear leveling

Dynamic wear leveling makes it possible to utilize unused flash blocks when writing to a file.

If the disk is 80% full with files, then only 20% can be used for wear leveling.

The service life of the CompactFlash card is therefore dependent on the amount of unused flash blocks.

3.2.2.3 Static wear leveling

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

3.2.3 ECC error correction

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

3.2.4 S.M.A.R.T. support

Self-Monitoring, Analysis and Reporting Technology (S.M.A.R.T.) 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.

3.2.5 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.

3.3 5CFCRD.xxxx-06

3.3.1 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 different boot times.

see "Known problems/issues" on page 156

Information:

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

3.3.2 Order data


| Model number | Short description | Figure |
|----------------|--|--|
| | CompactFlash |  |
| 5CFCRD.0512-06 | CompactFlash 512 MB B&R (SLC) \geq Rev. F0 | |
| 5CFCRD.1024-06 | CompactFlash 1 GB B&R (SLC) \geq Rev. F0 | |
| 5CFCRD.2048-06 | CompactFlash 2 GB B&R (SLC) \geq Rev. F0 | |
| 5CFCRD.4096-06 | CompactFlash 4 GB B&R (SLC) \geq Rev. F0 | |
| 5CFCRD.8192-06 | CompactFlash 8 GB B&R (SLC) \geq Rev. F0 | |
| 5CFCRD.016G-06 | CompactFlash 16 GB B&R (SLC) \geq Rev. E0 | |
| 5CFCRD.032G-06 | CompactFlash 32 GB B&R (SLC) \geq Rev. D0 | |

Table 110: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06, 5CFCRD.032G-06 - Order data


| Model number | Short description | Figure |
|----------------|--|---|
| | CompactFlash |  |
| 5CFCRD.0512-06 | CompactFlash 512 MB B&R (SLC) \leq Rev. E0 | |
| 5CFCRD.1024-06 | CompactFlash 1 GB B&R (SLC) \leq Rev. E0 | |
| 5CFCRD.2048-06 | CompactFlash 2 GB B&R (SLC) \leq Rev. E0 | |
| 5CFCRD.4096-06 | CompactFlash 4 GB B&R (SLC) \leq Rev. E0 | |
| 5CFCRD.8192-06 | CompactFlash 8 GB B&R (SLC) \leq Rev. E0 | |
| 5CFCRD.016G-06 | CompactFlash 16 GB B&R (SLC) \leq Rev. D0 | |
| 5CFCRD.032G-06 | CompactFlash 32 GB B&R (SLC) \leq Rev. C0 | |

Table 111: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06, 5CFCRD.032G-06 - Order data

3.3.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, the mass storage device may also become damaged.

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

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the complete system. The data specifications for the complete system take precedence over those of individual components.

| Product ID | 5CFCRD. 0512-06 ≥ Rev. F0 | 5CFCRD. 1024-06 ≥ Rev. F0 | 5CFCRD. 2048-06 ≥ Rev. F0 | 5CFCRD. 4096-06 ≥ Rev. F0 | 5CFCRD. 8192-06 ≥ Rev. F0 | 5CFCRD. 016G-06 ≥ Rev. E0 | 5CFCRD. 032G-06 ≥ Rev. D0 |
|--|--|--|--|--|--|---|--|
| General information | | | | | | | |
| Capacity | 512 MB | 1 GB | 2 GB | 4 GB | 8 GB | 16 GB | 32 GB |
| Data retention | 10 years | | | | | | |
| Data reliability | <1 unrecoverable error in 10 ¹⁴ 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 | 50 MB/s | 50 MB/s | 59 MB/s | 59 MB/s | 59 MB/s | 59 MB/s | 58 MB/s |
| Maximum | 53 MB/s | 53 MB/s | 65 MB/s | 65 MB/s | 65 MB/s | 65 MB/s | 65 MB/s |
| Continuous writing | | | | | | | |
| Typical | 25 MB/s | 25 MB/s | 31 MB/s | 31 MB/s | 31 MB/s | 31 MB/s | 31 MB/s |
| Maximum | 27 MB/s | 27 MB/s | 35 MB/s | 35 MB/s | 35 MB/s | 35 MB/s | 35 MB/s |
| Certification | | | | | | | |
| CE | Yes | | | | | | |
| cULus | Yes | | | | | | |
| cULus HazLoc Class 1 Division 2 | - | - | - | - | - | Yes ¹⁾ | - |
| ATEX Zone 22 | - | - | - | - | - | Yes ¹⁾ | - |
| GOST-R | Yes | | | | | | |
| GL | Yes ¹⁾ | | | | | | |
| Endurance | | | | | | | |
| SLC flash | Yes | | | | | | |
| Guaranteed data volume | | | | | | | |
| Guaranteed ²⁾ | 50 TB | 100 TB | 200 TB | 400 TB | 800 TB | 1600 TB | 3200 TB |
| Over 5 years, equates to ²⁾ | 27.40 GB/day | 54.79 GB/day | 109.9 GB/day | 219.8 GB/day | 438.6 GB/day | 876.72 GB/day | 1753.44 GB/day |
| Clear/Write cycles | | | | | | | |
| Guaranteed | 100,000 | | | | | | |
| 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 | Yes |
| Windows 7 64-bit | No | No | No | No | No | No | Yes |
| Windows Embedded Standard 7 32-bit | No | No | No | No | Yes | Yes | Yes |
| Windows Embedded Standard 7 64-bit | No | No | No | No | No | Yes | Yes |
| Windows XP Professional | No | No | No | Yes | Yes | Yes | Yes |
| Windows XP Embedded | Yes | | | | | | |
| Windows Embedded Standard 2009 | No | Yes | Yes | Yes | Yes | Yes | Yes |
| Windows CE 6.0 | Yes | Yes | Yes | Yes | Yes | Yes ³⁾ | Yes ³⁾ |
| Windows CE 5.0 | No | | | | | | |
| Software | | | | | | | |
| PVI Transfer | ≥ 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) | ≥ V3.6.8.40 (part of PVI Development Setup ≥ V3.0.0.3020) | ≥ V4.0.0.8 (part of PVI Development Setup ≥ V3.0.2.3014) |
| B&R Embedded OS Installer | ≥V3.10 | ≥V3.10 | ≥V3.10 | ≥V3.10 | ≥V3.10 | ≥V3.20 | ≥V3.21 |

Table 112: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06, 5CFCRD.032G-06 - Technical data

| Product ID | 5CFCRD. 0512-06 ≥ Rev. F0 | 5CFCRD. 1024-06 ≥ Rev. F0 | 5CFCRD. 2048-06 ≥ Rev. F0 | 5CFCRD. 4096-06 ≥ Rev. F0 | 5CFCRD. 8192-06 ≥ Rev. F0 | 5CFCRD. 016G-06 ≥ Rev. E0 | 5CFCRD. 032G-06 ≥ Rev. D0 |
|-----------------------------------|--|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Environmental conditions | | | | | | | |
| Temperature | | | | | | | |
| Operation | 0 to 70°C | | | | | | |
| Storage | -50 to 100°C | | | | | | |
| Transport | -50 to 100°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 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27) | | | | | | |
| Storage | 1.5 kg peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27) | | | | | | |
| Transport | 1.5 kg peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27) | | | | | | |
| Altitude | | | | | | | |
| Operation | Max. 4572 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 112: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06, 5CFCRD.032G-06 - Technical data

- 1) Yes, although applies only if all components installed within the complete system have this certification
- 2) Endurance of B&R CFs (with linear written block size ≥128 kB).
- 3) Not supported by the B&R Embedded OS Installer.

Caution!

A sudden loss of power may result in data loss! In very rare cases, the mass storage device may also become damaged.

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

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the complete system. The data specifications for the complete system take precedence over those of individual components.

| Product ID | 5CFCRD. 0512-06 ≤ Rev. E0 | 5CFCRD. 1024-06 ≤ Rev. E0 | 5CFCRD. 2048-06 ≤ Rev. E0 | 5CFCRD. 4096-06 ≤ Rev. E0 | 5CFCRD. 8192-06 ≤ Rev. E0 | 5CFCRD. 016G-06 ≤ Rev. D0 | 5CFCRD. 032G-06 ≤ Rev. C0 |
|----------------------------|--|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| General information | | | | | | | |
| Capacity | 512 MB | 1 GB | 2 GB | 4 GB | 8 GB | 16 GB | 32 GB |
| Data retention | 10 years | | | | | | |
| Data reliability | <1 unrecoverable error in 10 ¹⁴ 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 | 36 MB/s |
| Maximum | 35 MB/s | 35 MB/s | 35 MB/s | 34 MB/s | 34 MB/s | 37 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 | 28 MB/s |
| Maximum | 18 MB/s | 18 MB/s | 18 MB/s | 17 MB/s | 17 MB/s | 30 MB/s | 30 MB/s |

Table 113: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06, 5CFCRD.032G-06 - Technical data

Accessories • CompactFlash cards

| Product ID | 5CFCRD.0512-06 ≤ Rev. E0 | 5CFCRD.1024-06 ≤ Rev. E0 | 5CFCRD.2048-06 ≤ Rev. E0 | 5CFCRD.4096-06 ≤ Rev. E0 | 5CFCRD.8192-06 ≤ Rev. E0 | 5CFCRD.016G-06 ≤ Rev. D0 | 5CFCRD.032G-06 ≤ Rev. C0 | |
|--|--|--|--|--|--|--|---|--|
| Certification | | | | | | | | |
| CE | | | | | Yes | | | |
| cULus | | | | | Yes | | | |
| cULus HazLoc Class 1 Division 2 | - | - | - | - | - | Yes ¹⁾ | - | |
| ATEX Zone 22 | - | - | - | - | - | Yes ¹⁾ | - | |
| GOST-R | | | | | Yes | | | |
| GL | | | | | Yes ¹⁾ | | | |
| Endurance | | | | | | | | |
| SLC flash | Yes | | | | | | | |
| Guaranteed data volume | | | | | | | | |
| Guaranteed ²⁾ | 50 TB | 100 TB | 200 TB | 400 TB | 800 TB | 1600 TB | 3200 TB | |
| Over 5 years, equates to ²⁾ | 27.40 GB/day | 54.79 GB/day | 109.9 GB/day | 219.8 GB/day | 438.6 GB/day | 876.72 GB/day | 1753.44 GB/day | |
| Clear/Write cycles | | | | | | | | |
| Guaranteed | 100,000 | | | | | | | |
| 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 | Yes | |
| Windows 7 64-bit | No | No | No | No | No | No | Yes | |
| Windows Embedded Standard 7 32-bit | No | No | No | No | Yes | Yes | Yes | |
| Windows Embedded Standard 7 64-bit | No | No | No | No | No | Yes | Yes | |
| Windows XP Professional | No | No | No | Yes | Yes | Yes | Yes | |
| Windows XP Embedded | | | | Yes | | | | |
| Windows Embedded Standard 2009 | No | Yes | Yes | Yes | Yes | Yes | Yes | |
| Windows CE 6.0 | Yes | Yes | Yes | Yes | Yes | Yes ³⁾ | Yes ³⁾ | |
| Windows CE 5.0 | | | | No | | | | |
| Software | | | | | | | | |
| PVI Transfer | ≥ 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) | ≥ V3.2.3.8 (part of PVI Development Setup ≥ V2.06.00.3011) | ≥ V3.6.8.40 (part of PVI Development Setup ≥ V3.0.0.3020) | ≥ V4.0.0.8 (part of PVI Development Setup ≥ V3.0.2.3014) |
| B&R Embedded OS Installer | ≥V3.10 | ≥V3.10 | ≥V3.10 | ≥V3.10 | ≥V3.10 | ≥V3.10 | ≥V3.20 | ≥V3.21 |
| Environmental conditions | | | | | | | | |
| Temperature | | | | | | | | |
| Operation | 0 to 70°C | | | | | | | |
| Storage | -50 to 100°C | | | | | | | |
| Transport | -50 to 100°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 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27) | | | | | | | |
| Storage | 1.5 kg peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27) | | | | | | | |
| Transport | 1.5 kg peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27) | | | | | | | |
| Altitude | | | | | | | | |
| Operation | Max. 4572 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 113: 5CFCRD.0512-06, 5CFCRD.1024-06, 5CFCRD.2048-06, 5CFCRD.4096-06, 5CFCRD.8192-06, 5CFCRD.016G-06, 5CFCRD.032G-06 - Technical data

- 1) Yes, although applies only if all components installed within the complete system have this certification
- 2) Endurance of B&R CFs (with linear written block size ≥128 kB).
- 3) Not supported by the B&R Embedded OS Installer.

3.3.4 Temperature/Humidity diagram

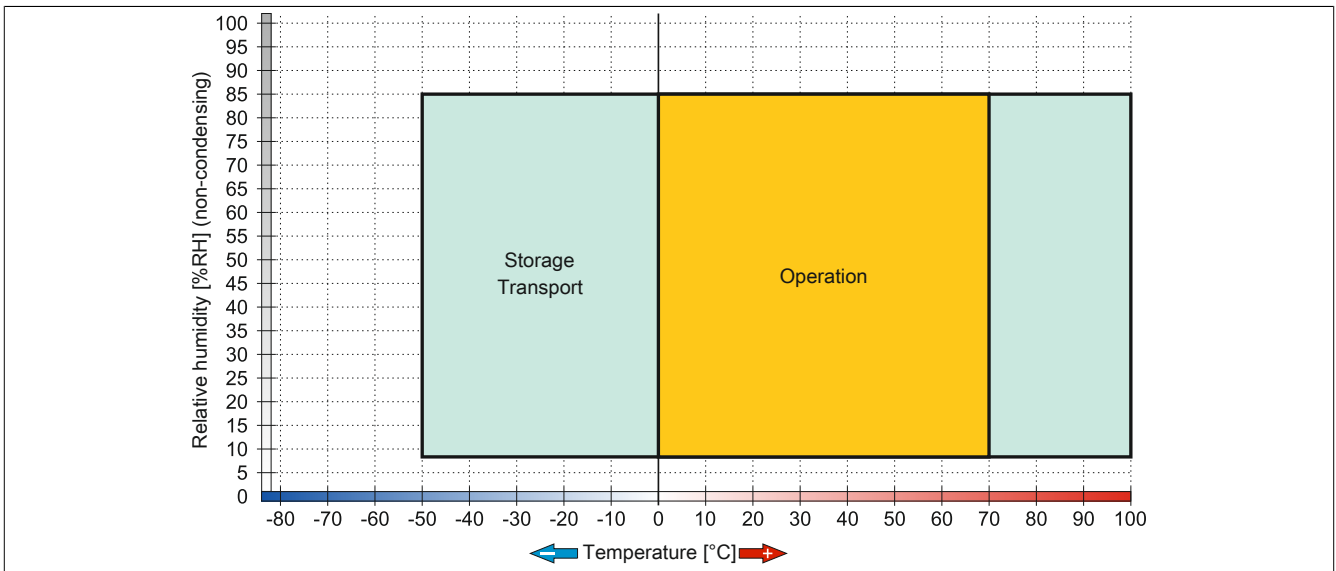


Figure 70: 5CFCRD.xxxx-06 - Temperature/Humidity diagram for CompactFlash cards

3.3.5 Dimensions

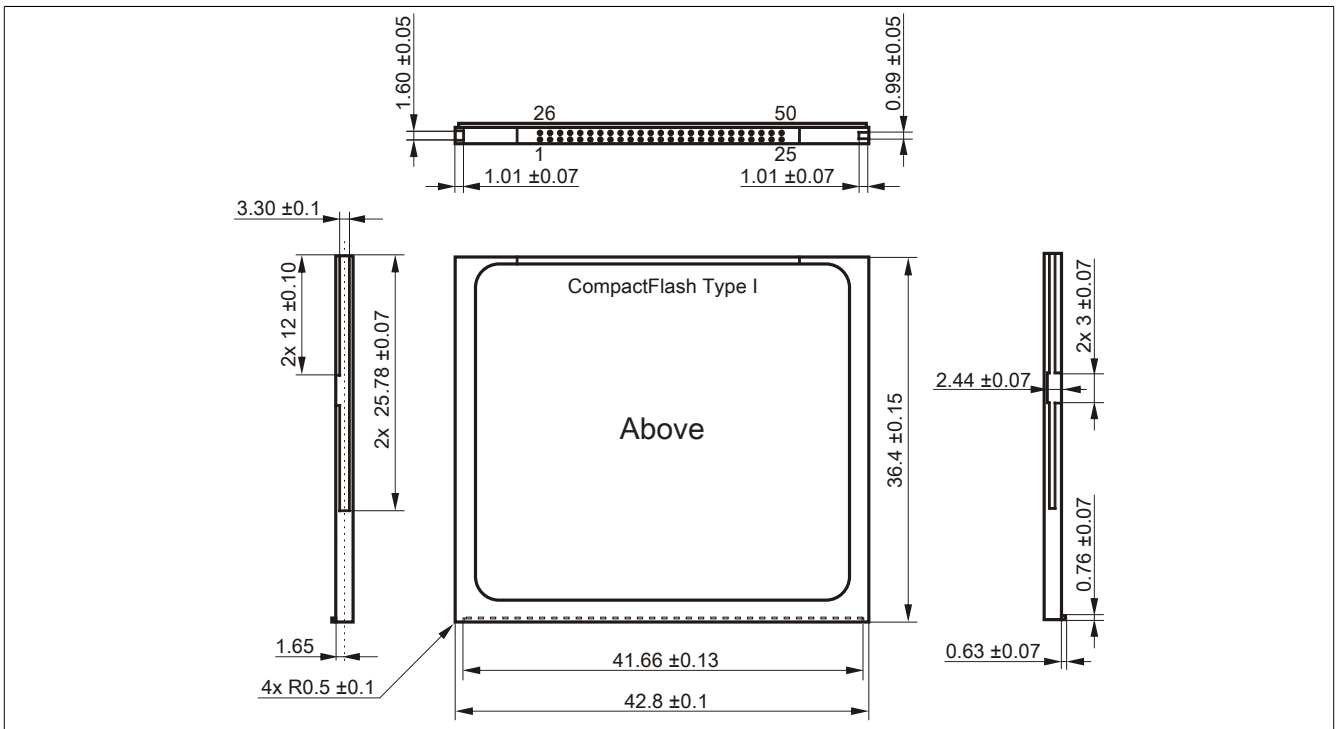


Figure 71: Type I CompactFlash card - Dimensions

3.3.6 Benchmark

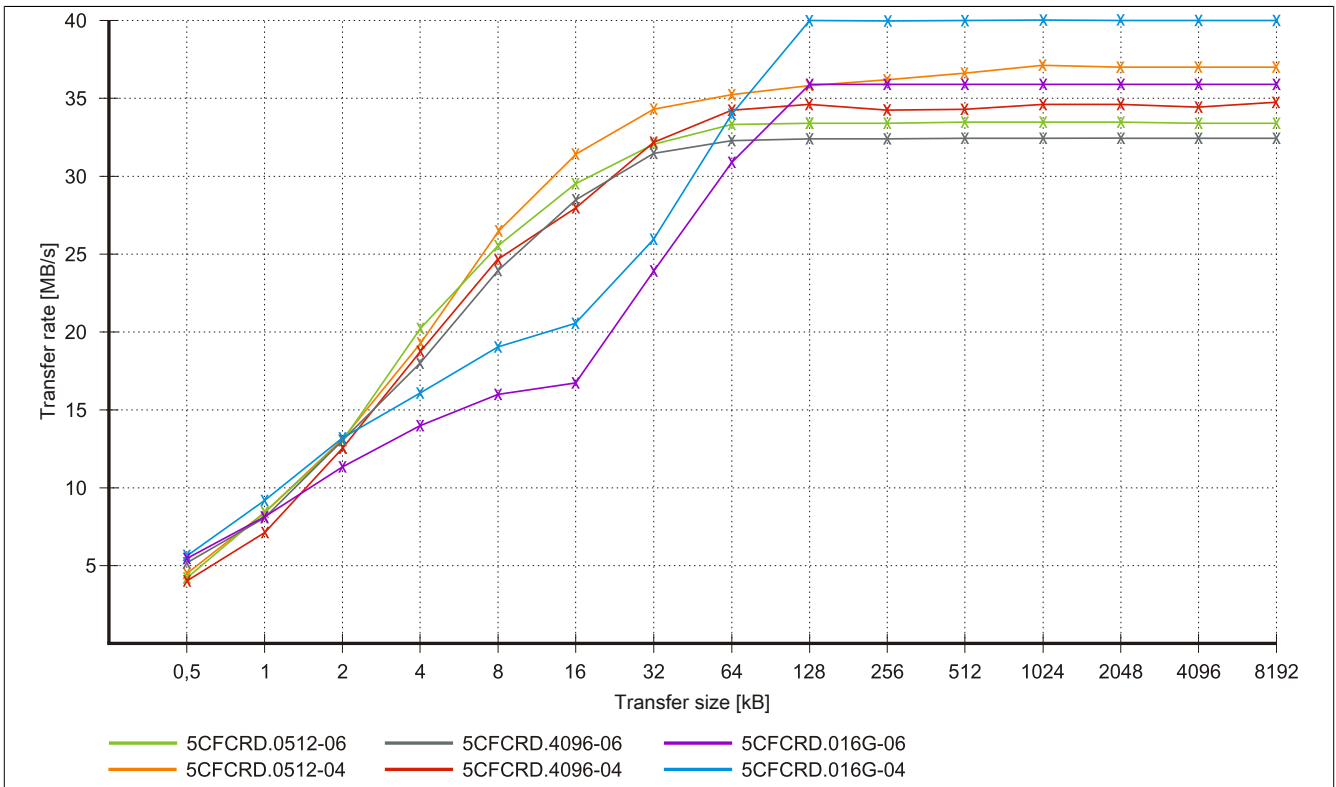


Figure 72: ATTO Disk Benchmark v2.34 read comparison - 5CFCRD.xxxx-04 and 5CFCRD.xxxx-06

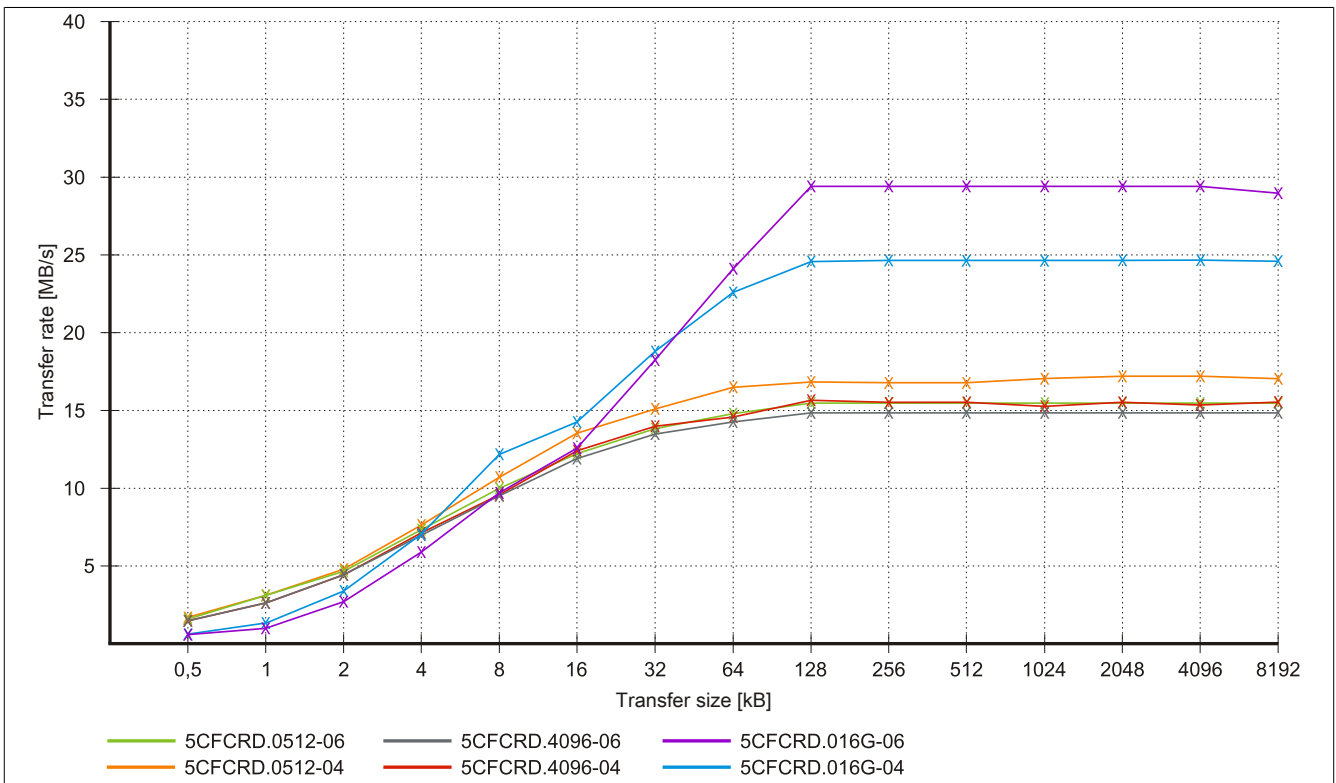


Figure 73: ATTO Disk Benchmark v2.34 write comparison - 5CFCRD.xxxx-04 and 5CFCRD.xxxx-06

3.4 5CFCRD.xxxx-04

3.4.1 General information

Information:

B&R CompactFlash cards 5CFCRD.xxxx-04 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 different boot times.

see "Known problems/issues" on page 156

Information:

5CFCRD.xxxx-04 CompactFlash cards are supported on B&R devices with WinCE version ≥ 6.0 .

3.4.2 Order data


| Model number | Short description | Figure |
|----------------|-------------------------------|--|
| | CompactFlash-cards |  |
| 5CFCRD.0512-04 | CompactFlash 512 MB B&R (SLC) | |
| 5CFCRD.1024-04 | CompactFlash 1 GB B&R (SLC) | |
| 5CFCRD.2048-04 | CompactFlash 2 GB B&R (SLC) | |
| 5CFCRD.4096-04 | CompactFlash 4 GB B&R (SLC) | |
| 5CFCRD.8192-04 | CompactFlash 8 GB B&R (SLC) | |
| 5CFCRD.016G-04 | CompactFlash 16 GB B&R (SLC) | |

Table 114: 5CFCRD.0512-04, 5CFCRD.1024-04, 5CFCRD.2048-04, 5CFCRD.4096-04, 5CFCRD.8192-04, 5CFCRD.016G-04 - Order data

3.4.3 Technical data

Caution!

A sudden loss of power may result in data loss! In very rare cases, the mass storage device may also become damaged.

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

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the complete system. The data specifications for the complete system take precedence over those of individual components.

| Product ID | 5CFCRD.0512-04 | 5CFCRD.1024-04 | 5CFCRD.2048-04 | 5CFCRD.4096-04 | 5CFCRD.8192-04 | 5CFCRD.016G-04 |
|----------------------------|--|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| 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 10 ¹⁴ 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 | | | | | |
| Sequential read | | | | | | |
| Typical | 35 MB/s (240X) ¹⁾ | 35 MB/s (240X) ¹⁾ | 35 MB/s (240X) ¹⁾ | 33 MB/s (220X) ¹⁾ | 27 MB/s (180X) ¹⁾ | 36 MB/s (240X) ¹⁾ |
| Maximum | 37 MB/s (260X) ¹⁾ | 37 MB/s (260X) ¹⁾ | 37 MB/s (260X) ¹⁾ | 34 MB/s (226X) ¹⁾ | 28 MB/s (186X) ¹⁾ | 37 MB/s (247X) ¹⁾ |

Table 115: 5CFCRD.0512-04, 5CFCRD.1024-04, 5CFCRD.2048-04, 5CFCRD.4096-04, 5CFCRD.8192-04, 5CFCRD.016G-04 - Technical data

Accessories • CompactFlash cards

| Product ID | 5CFCRD.0512-04 | 5CFCRD.1024-04 | 5CFCRD.2048-04 | 5CFCRD.4096-04 | 5CFCRD.8192-04 | 5CFCRD.016G-04 |
|-------------------------------------|--|--|--|--|--|---|
| Sequential write | | | | | | |
| Typical | 17 MB/s (110X) | 17 MB/s (110X) | 17 MB/s (110X) | 16 MB/s (106X) | 15 MB/s (100X) | 18 MB/s (120X) |
| Maximum | 20 MB/s (133X) | 20 MB/s (133X) | 20 MB/s (133X) | 18 MB/s (120X) | 17 MB/s (110X) | 19 MB/s (126X) |
| Certification | | | | Yes | | |
| CE | | | | Yes | | |
| cULus | | | | Yes | | |
| GOST-R | - | Yes | Yes | Yes | Yes | Yes |
| GL | | | | Yes ²⁾ | | |
| Endurance | | | | | | |
| SLC flash | Yes | | | | | |
| Guaranteed data volume | | | | | | |
| Guaranteed ³⁾ | 50 TB | 100 TB | 200 TB | 400 TB | 800 TB | 1600 TB |
| Results for 5 years ³⁾ | 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 | | | | | | |
| Typical ⁴⁾ | 2,000,000 | | | | | |
| Guaranteed | 100,000 | | | | | |
| Wear leveling | Static | | | | | |
| Error correction coding (ECC) | Yes | | | | | |
| S.M.A.R.T. support | No | | | | | |
| 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 ⁵⁾ |
| Windows CE 5.0 | | | | No | | |
| Software | | | | | | |
| PVI Transfer | ≥ 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) | ≥ V3.6.8.40 (part of PVI Development Setup ≥ V3.0.0.3020) |
| 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 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27) | | | | | |
| Storage | 1.5 kg peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27) | | | | | |
| Transport | 1.5 kg peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 g, 11 ms 1 times (IEC 68-2-27) | | | | | |
| Altitude | | | | | | |
| Operation | Max. 4572 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 115: 5CFCRD.0512-04, 5CFCRD.1024-04, 5CFCRD.2048-04, 5CFCRD.4096-04, 5CFCRD.8192-04, 5CFCRD.016G-04 - Technical data

- Speed specification with 1X = 150 Kb/s. All specifications refer to Samsung flash chips, CompactFlash cards in UDMA mode 4 and 30 ns cycle time in True IDE mode with sequential write/read test.
- Yes, although applies only if all components installed within the complete system have this certification

- 3) Endurance of B&R CFs (with linear written block size ≥ 128 kB).
- 4) Depends on the average file size.
- 5) Not supported by the B&R Embedded OS Installer.

3.4.4 Temperature/Humidity diagram

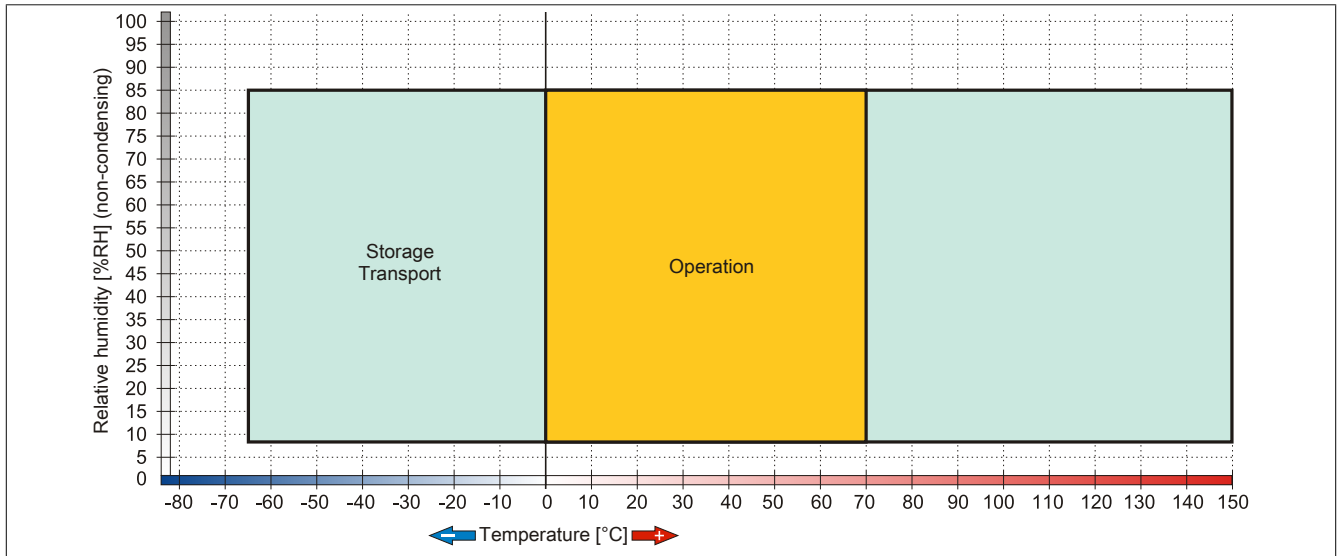


Figure 74: 5CFCRD.xxxx-04 - Temperature/Humidity diagram for CompactFlash cards

3.4.5 Dimensions

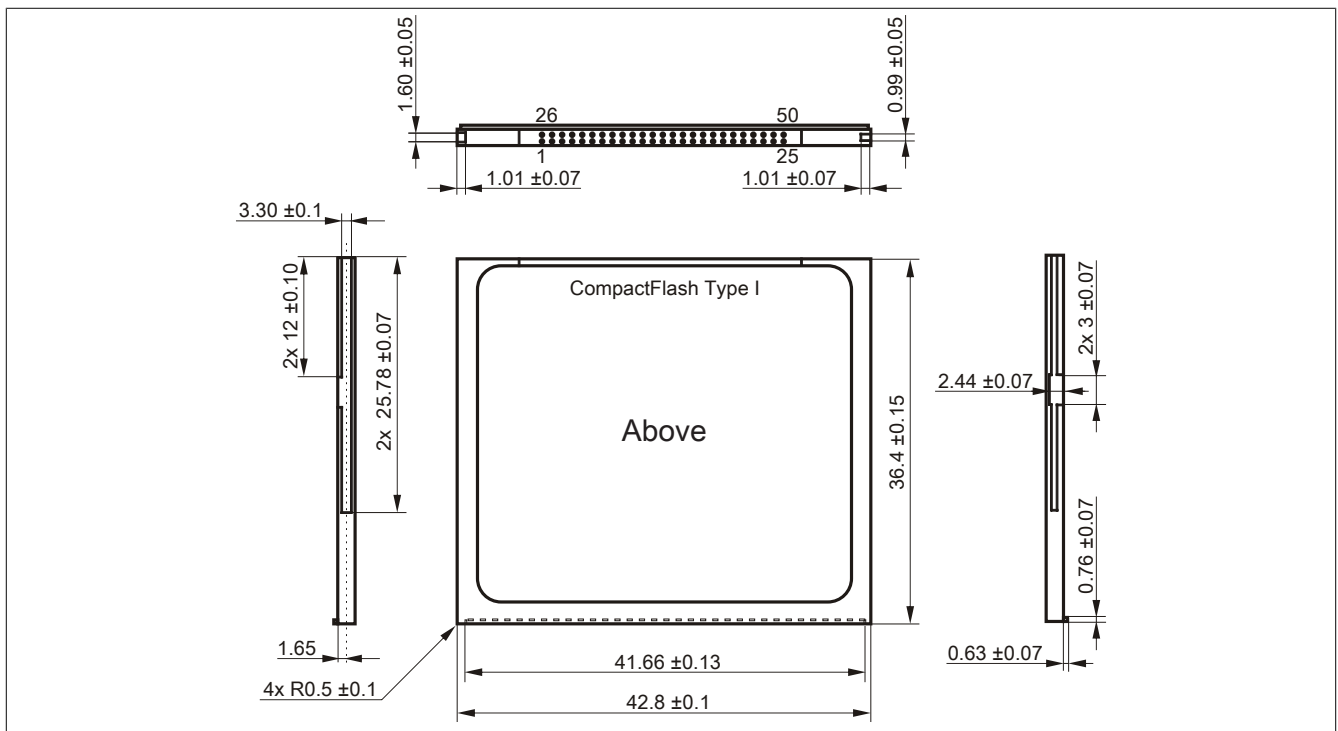


Figure 75: Type I CompactFlash card - Dimensions

3.4.6 Benchmark

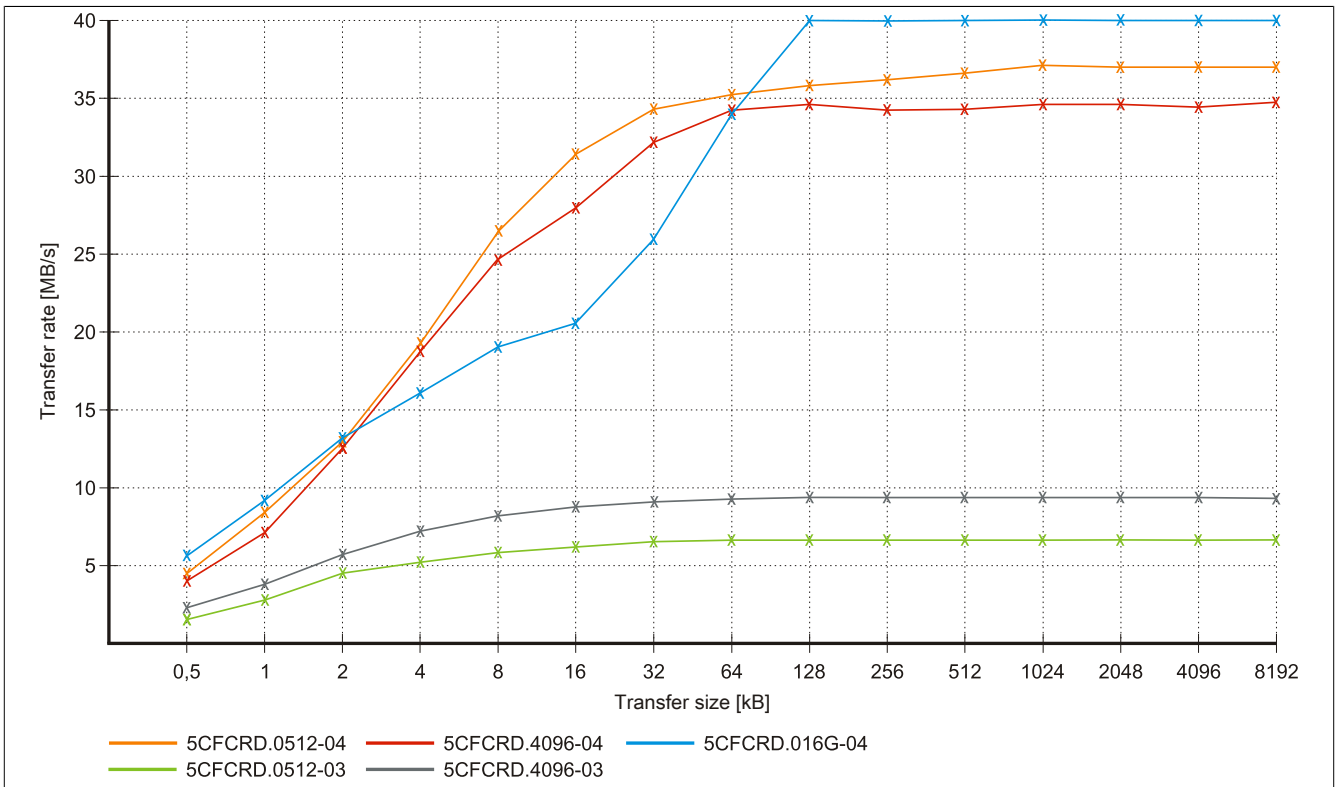


Figure 76: ATTO Disk Benchmark v2.34 read comparison - 5CFCRD.xxxx-03 and 5CFCRD.xxxx-04

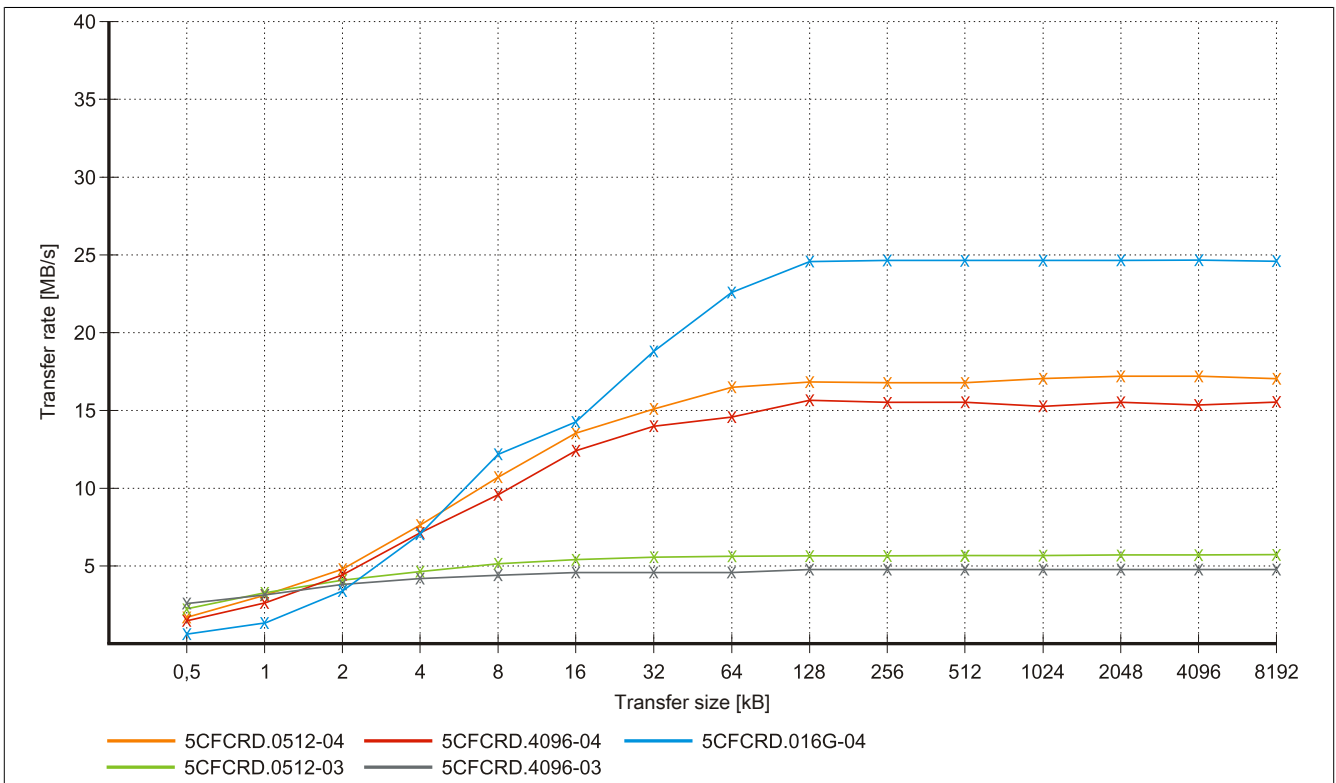


Figure 77: ATTO Disk Benchmark v2.34 write comparison - 5CFCRD.xxxx-03 and 5CFCRD.xxxx-04

3.5 5CFCRD.xxxx-03

3.5.1 General information

Information:

Western Digital CompactFlash cards 5CFCRD.xxxx 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 different boot times.

see "Known problems/issues" on page 156

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 been changed.

3.5.2 Order data


| Model number | Short description | Figure |
|----------------|---|--|
| | CompactFlash-cards |  |
| 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 116: 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

3.5.3 Technical data

Caution!

A sudden loss of power may result in data loss! 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 from those specified for the complete system. The data specifications for the complete system take precedence over those of individual components.

| 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 10 ¹⁴ bit read accesses | | | | | | | |
| Lifetime monitoring | Yes | | | | | | | |

Table 117: 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

Accessories • CompactFlash cards

| 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 |
|--|--|----------------|----------------|----------------|----------------|----------------|----------------|-------------------|
| MTBF | >4,000,000 hours (at 25°C) | | | | | | | |
| Maintenance | None | | | | | | | |
| Supported operating modes | PIO Mode 0-4, Multiword DMA Mode 0-2 | | | | | | | |
| Sequential read Typical | 8 MB/s | | | | | | | |
| Sequential write Typical | 6 MB/s | | | | | | | |
| Certification CE cULus GOST-R GL | Yes Yes Yes Yes ¹⁾ | | | | | | | |
| Endurance | | | | | | | | |
| SLC flash | Yes | | | | | | | |
| Clear/Write cycles Typical | >2,000,000 | | | | | | | |
| 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 ²⁾ |
| Windows CE 5.0 | Yes | Yes | Yes | Yes | Yes | No | No | No |
| Software | | | | | | | | |
| PVI Transfer | ≥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/s ² 0-peak) | | | | | | | |
| Storage | Max. 30 g (294 m/s ² 0-peak) | | | | | | | |
| Transport | Max. 30 g (294 m/s ² 0-peak) | | | | | | | |
| Shock | | | | | | | | |
| Operation | Max. 1000 g (9810 m/s ² 0-peak) | | | | | | | |
| Storage | Max. 3000 g (29430 m/s ² 0-peak) | | | | | | | |
| Transport | Max. 3000 g (29430 m/s ² 0-peak) | | | | | | | |
| Altitude | | | | | | | | |
| Operation | Max. 24383 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 117: 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) Yes, although applies only if all components installed within the complete system have this certification
- 2) Not supported by the B&R Embedded OS Installer.

3.5.4 Temperature/Humidity diagram

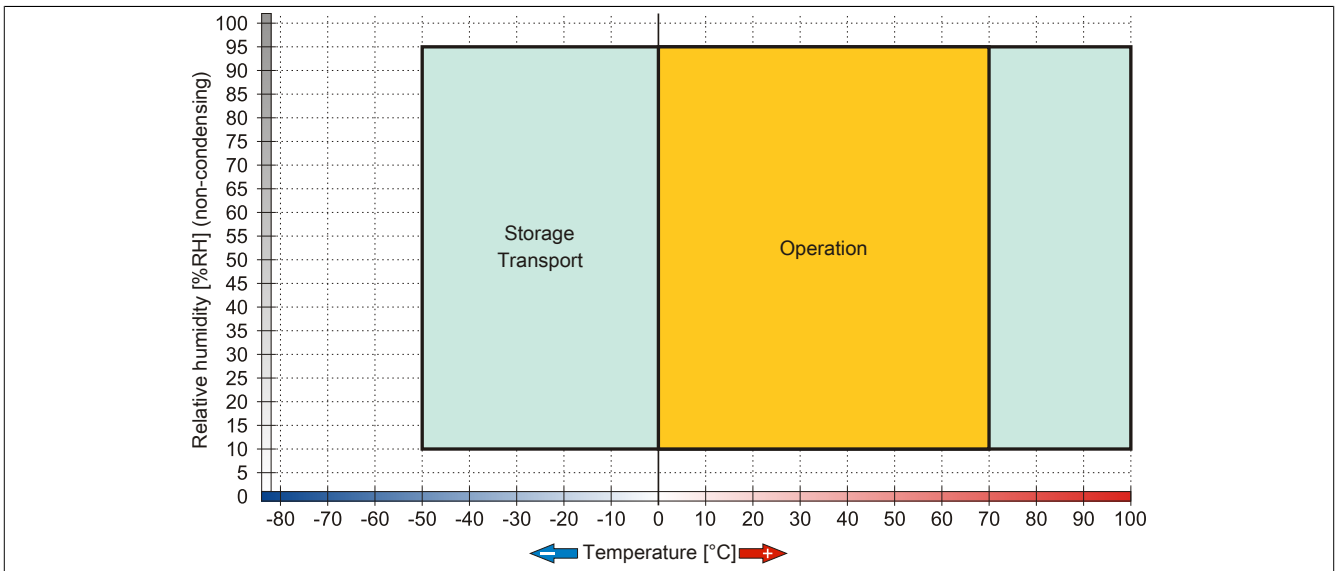


Figure 78: 5CFCRD.xxxx-03 - Temperature/Humidity diagram for CompactFlash cards

3.5.5 Dimensions

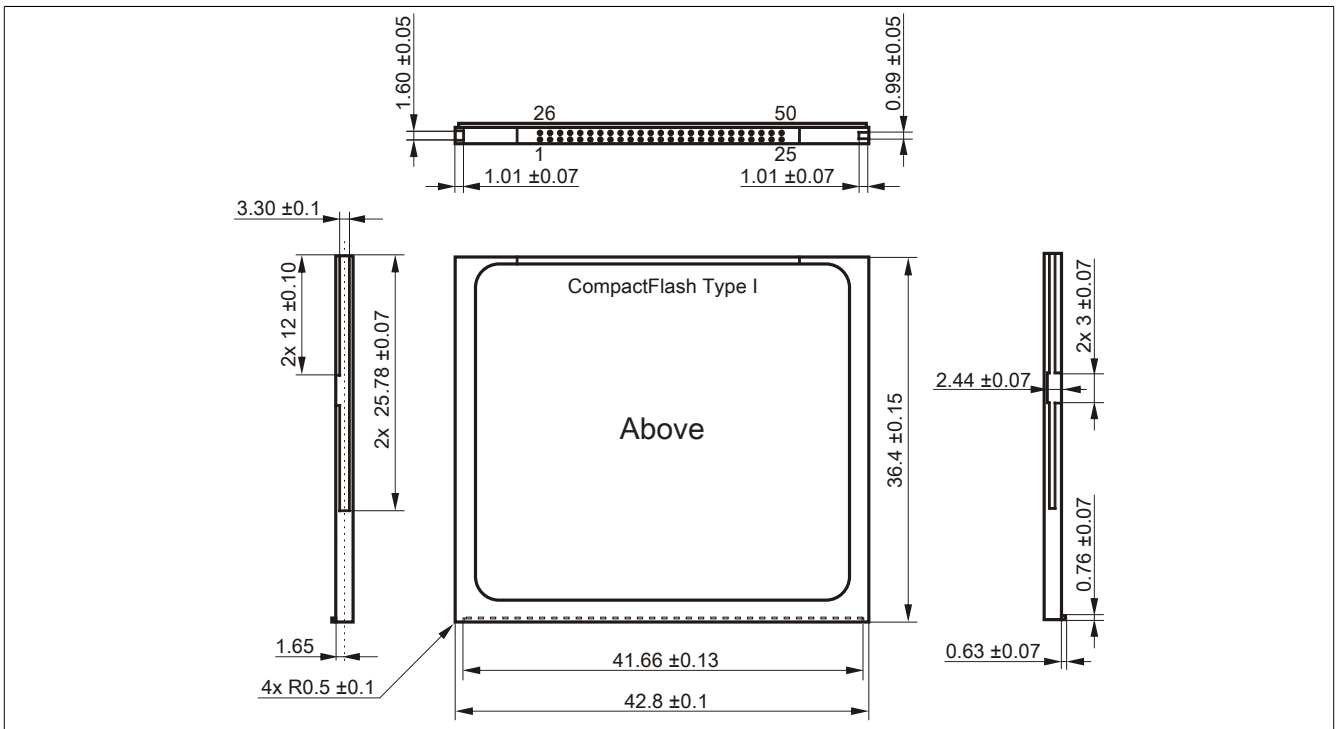


Figure 79: Type I CompactFlash card - Dimensions

3.6 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 with Automation PCs and Panel PCs. For example, it is possible that one of the two cards is not detected during system startup. This is caused by different 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 end of the time frame provided for startup. The problem described can occur because the startup time for the CompactFlash cards fluctuates due to the different components being used. Depending on the CompactFlash card being used, this error might never, sometimes or always occur.

4 USB flash drives

4.1 5MMUSB.2048-00

4.1.1 General information

USB flash drives are storage media that are easy to exchange. 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 plugging", except in the case of Windows 98SE), the USB flash drive can immediately act as an additional drive for reading or writing data.

Information:

Due to the vast quantity of USB flash drives available on the market as well as their short product life cycle, we reserve the right to supply alternative products at any time. The following measures may therefore be necessary in order to boot from these flash drives as well:

- The flash drive must be reformatted or in some cases even repartitioned (set active partition).
- The flash drive must be the first bootable device in the BIOS boot order; alternatively, the IDE controllers can be disabled in BIOS. This can be avoided in most cases if the "fdisk /mbr" command is additionally executed on the USB flash drive.

4.1.2 Order data


| Model number | Short description | Figure |
|----------------|------------------------------|--|
| | USB accessories | |
| 5MMUSB.2048-00 | USB 2.0 flash drive, 2048 MB |  |

Table 118: 5MMUSB.2048-00 - Order data

4.1.3 Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those specified for the complete system. The data specifications for the complete system take precedence over those of individual components.

| Product ID | 5MMUSB.2048-00 |
|-----------------------------------|---|
| General information | |
| Data retention | 10 years |
| LEDs | 1 LED (green) ¹⁾ |
| MTBF | 100,000 hours (at 25°C) |
| Type | USB 1.1, USB 2.0 |
| Maintenance | None |
| Certification CE | Yes |
| Interfaces | |
| USB | |
| Type | USB 1.1, USB 2.0 |
| Connection | To any USB type A interface |
| Transfer rate | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) |
| Sequential reading | Max. 8.7 MB/s |
| Sequential writing | Max. 1.7 MB/s |
| Support | |
| Operating systems | |
| 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 characteristics | |
| Power consumption | 650 µA sleep mode, 150 mA read/write |

Table 119: 5MMUSB.2048-00 - Technical data

| Product ID | 5MMUSB.2048-00 |
|-----------------------------------|---|
| Environmental conditions | |
| Temperature | |
| Operation | 0 to 45°C |
| Storage | -20 to 60°C |
| Transport | -20 to 60°C |
| Relative humidity | |
| Operation | 10 to 90%, non-condensing |
| Storage | 5 to 90%, non-condensing |
| Transport | 5 to 90%, non-condensing |
| Vibration | |
| Operation | 10 to 500 Hz: 2 g (19.6 m/s ² 0-peak), oscillation rate 1/minute |
| Storage | 10 to 500 Hz: 2 g (19.6 m/s ² 0-peak), oscillation rate 1/minute |
| Transport | 10 to 500 Hz: 2 g (19.6 m/s ² 0-peak), oscillation rate 1/minute |
| Shock | |
| Operation | Max. 40 g (392 m/s ² 0-peak) and 11 ms duration |
| Storage | Max. 80 g (784 m/s ² 0-peak) and 11 ms duration |
| Transport | Max. 80 g (784 m/s ² 0-peak) and 11 ms duration |
| Altitude | |
| Operation | Max. 3048 m |
| Storage | Max. 12192 m |
| Transport | Max. 12192 m |
| Mechanical characteristics | |
| Dimensions | |
| Width | 19 mm |
| Length | 52.2 mm |
| Height | 7.9 mm |

Table 119: 5MMUSB.2048-00 - Technical data

1) Indicates data being transferred (sending and receiving).

4.1.4 Temperature/Humidity diagram

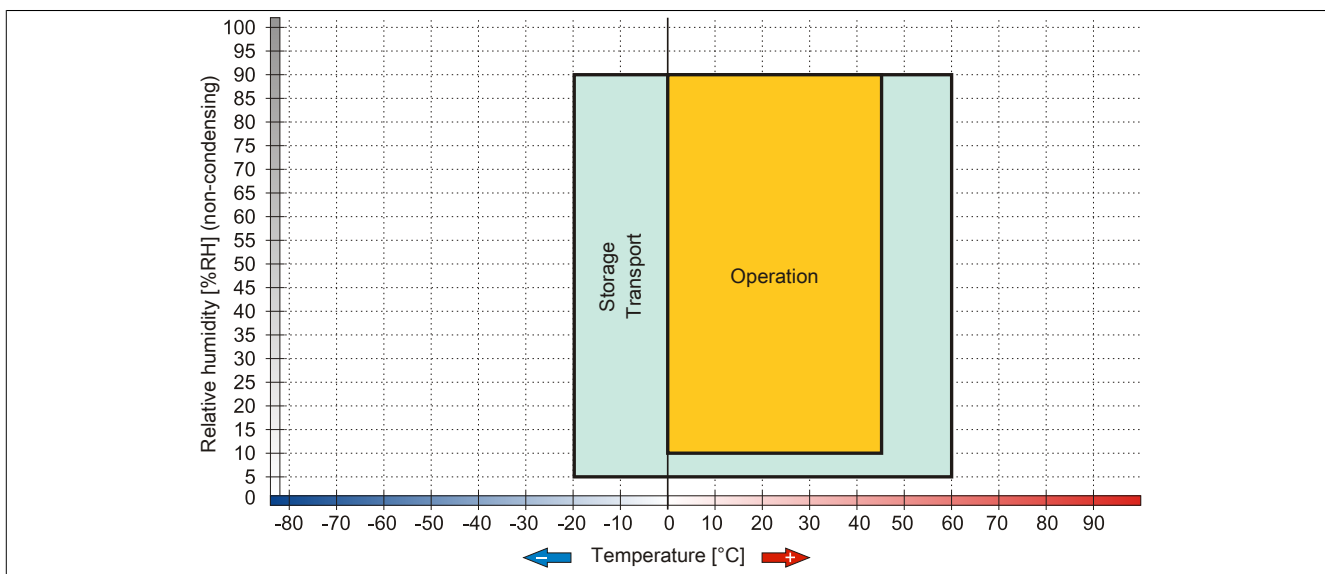


Figure 80: 5MMUSB.2048-00 - Temperature/Humidity diagram

4.2 5MMUSB.xxxx-01

4.2.1 General information

USB flash drives are storage media that are easy to exchange. 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 plugging", except in the case of Windows 98SE), the USB flash drive can immediately act as an additional drive for reading or writing data.

Information:

Due to the vast quantity of USB flash drives available on the market as well as their short product life cycle, we reserve the right to supply alternative products at any time. The following measures may therefore be necessary in order to boot from these flash drives as well:

- The flash drive must be reformatted or in some cases even repartitioned (set active partition).
- The flash drive must be the first bootable device in the BIOS boot order; alternatively, the IDE controllers can be disabled in BIOS. This can be avoided in most cases if the "fdisk /mbr" command is additionally executed on the USB flash drive.

4.2.2 Order data


| Model number | Short description | Figure |
|----------------|-----------------------------------|---|
| | USB accessories |  |
| 5MMUSB.2048-01 | USB 2.0 flash drive, 2048 MB, B&R | |
| 5MMUSB.4096-01 | USB 2.0 flash drive, 4096 MB, B&R | |

Table 120: 5MMUSB.2048-01, 5MMUSB.4096-01 - Order data

4.2.3 Technical data

| Product ID | 5MMUSB.2048-01 | 5MMUSB.4096-01 |
|-----------------------------------|---|----------------|
| General information | | |
| Capacity | 2 GB | 4 GB |
| LEDs | 1 LED (green) ¹⁾ | |
| MTBF | >3,000,000 hours | |
| Type | USB 1.1, USB 2.0 | |
| Maintenance | None | |
| Default file system | FAT16 | FAT32 |
| Certification | | |
| CE | Yes | |
| GOST-R | Yes | |
| Interfaces | | |
| USB | USB 1.1, USB 2.0 | |
| Type | To any USB type A interface | |
| Connection | Low speed (1.5 Mbit/s), full speed (12 Mbit/s), high speed (480 Mbit/s) | |
| Transfer rate | Full speed max. 1 MB/s, High speed max. 32 MB/s | |
| Sequential reading | Full speed max. 0.9 MB/s, High speed max. 23 MB/s | |
| Sequential writing | | |
| Endurance | | |
| SLC flash | Yes | |
| Data retention | >10 years | |
| Data reliability | <1 unrecoverable error in 10 ¹⁴ bit read accesses | |
| Connection cycles | >1,500 | |
| 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 characteristics | | |
| Current consumption | Max. 500 µA sleep mode, max. 120 mA read/write | |

Table 121: 5MMUSB.2048-01, 5MMUSB.4096-01 - Technical data

| Product ID | 5MMUSB.2048-01 | 5MMUSB.4096-01 |
|-----------------------------------|----------------------------|----------------|
| Environmental conditions | | |
| Temperature | | |
| 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 121: 5MMUSB.2048-01, 5MMUSB.4096-01 - Technical data

1) Indicates data being transferred (sending and receiving).

4.2.4 Temperature/Humidity diagram

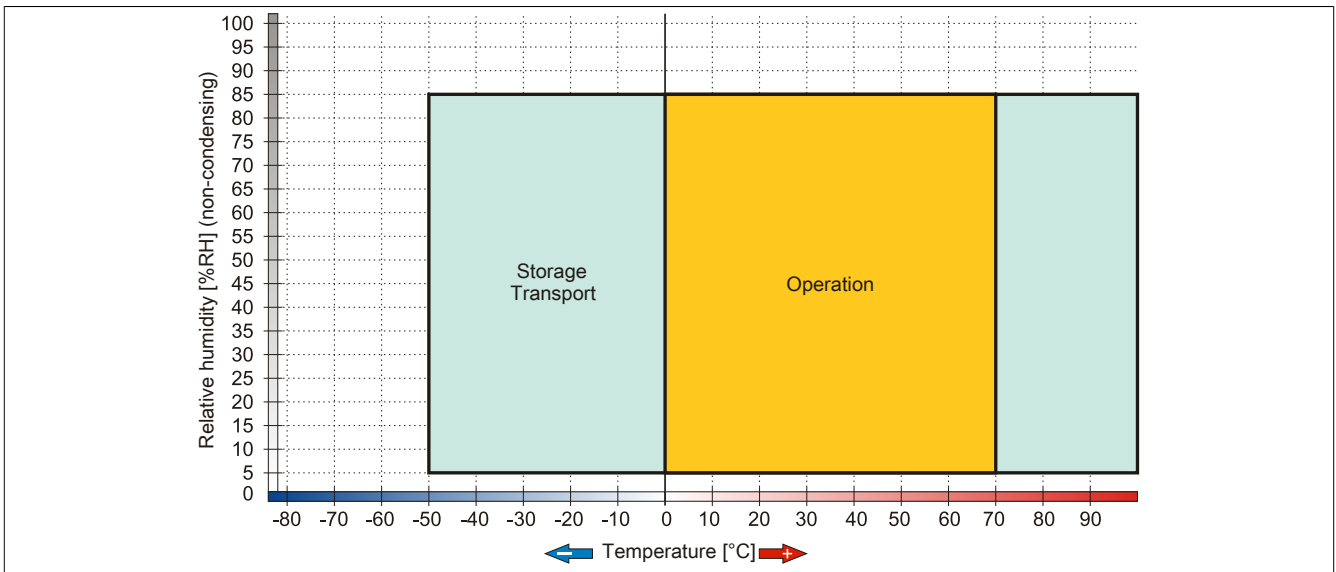


Figure 81: 5MMUSB.xxxx-01 - Temperature/Humidity diagram

5 Cables

5.1 USB cables

5.1.1 5CAUSB.00xx-00

5.1.1.1 General information

USB cables are designed to achieve USB 2.0 transfer speeds.

5.1.1.2 Order data


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

Table 122: 5CAUSB.0018-00, 5CAUSB.0050-00 - Order data

5.1.1.3 Technical data

| Product ID | 5CAUSB.0018-00 | 5CAUSB.0050-00 |
|-----------------------------------|-------------------------------------|----------------|
| General information | | |
| Certification | | |
| CE | | Yes |
| cULus | | Yes |
| GOST-R | | Yes |
| Cable construction | | |
| 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 123: 5CAUSB.0018-00, 5CAUSB.0050-00 - Technical data

5.1.1.4 Cable pinout

Warning!

Field-assembled cables must be wired according to these specifications.

If a field-assembled cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly, however.

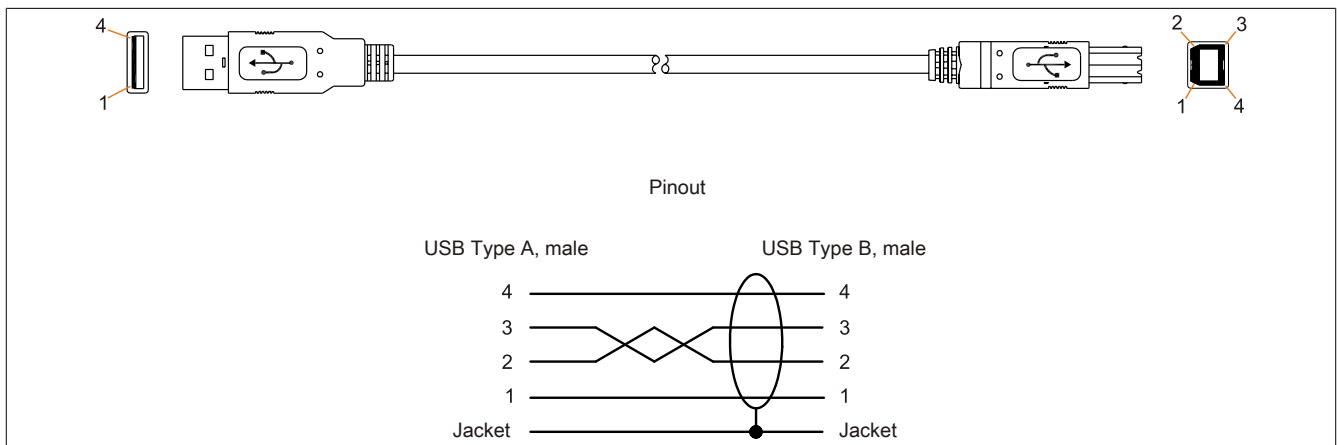


Figure 82: 5CAUSB.00xx-00 USB cables - Pinout

5.2 RS232 cables

5.2.1 9A0014.xx

5.2.1.1 General information

RS232 cables are used as extension cables between two RS232 interfaces.

5.2.1.2 Order data


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

Table 124: 9A0014.02, 9A0014.05, 9A0014.10 - Order data

5.2.1.3 Technical data

| Product ID | 9A0014.02 | 9A0014.05 | 9A0014.10 |
|-----------------------------------|--------------|----------------------------------|--------------|
| General information | | | |
| Certification | | Yes | Yes |
| CE | | | |
| GOST-R | - | | |
| Cable construction | | | |
| Wire cross section | | AWG 26 | |
| Shield | | Entire cable | |
| Outer sheathing | | | |
| Color | | Beige | |
| Connector | | | |
| Type | | 9-pin male/female DSUB connector | |
| Locating screw tightening torque | | Max. 0.5 Nm | |
| 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 125: 9A0014.02, 9A0014.05, 9A0014.10 - Technical data

5.2.1.4 Cable pinout

Warning!

Field-assembled cables must be wired according to these specifications.

If a field-assembled cable is used, B&R cannot guarantee that it will function properly. All cables provided by B&R are guaranteed to function properly, however.

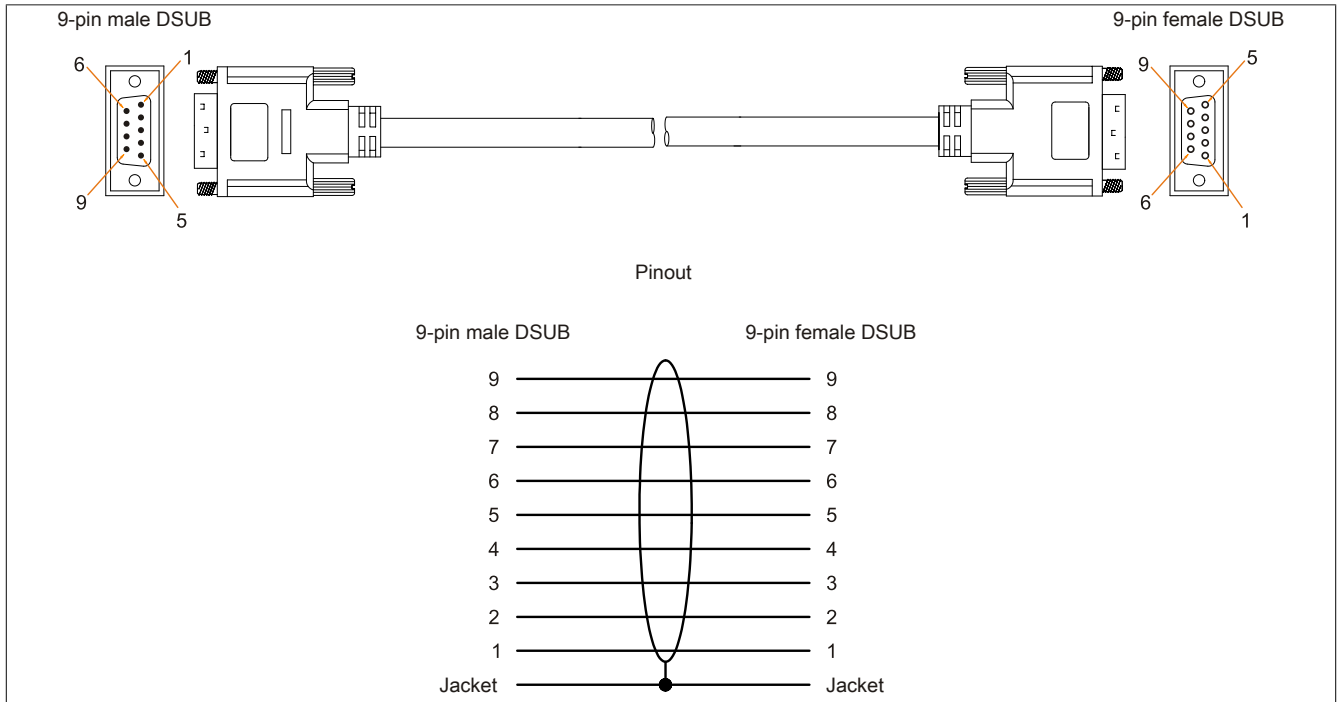


Figure 83: 9A0014.xx RS232 cables - Pinout

6 HMI Drivers & Utilities DVD

6.1 5SWHMI.0000-00

6.1.1 General information

This DVD contains drivers, utilities, software upgrades and user's manuals for B&R panel system products (see the "Industrial PCs" or "Visualization and operation" section of the B&R website at www.br-automation.com).

When the DVD is created, its contents are identical to the files found in the Downloads section of the B&R website (Service / Material-related downloads).

6.1.2 Order data


| Model number | Short description | Figure |
|----------------|--|---|
| 5SWHMI.0000-00 | <p>Other</p> <p>HMI Drivers & Utilities DVD</p> |  |

Table 126: 5SWHMI.0000-00 - Order data

6.1.3 Contents (V2.20)

BIOS product upgrades

- Automation PC 620 / Panel PC 700 CPU board 815E and 855GME BIOS
- Automation PC 620 / Panel PC 700 CPU board X855GME BIOS
- Automation PC 620 / Panel PC 700 CPU board 945GME BIOS
- Automation PC 620 / Panel PC 700 CPU board 945GME N270 BIOS
- Automation PC 680
- Automation PC 810 / Automation PC 820 / Panel PC 800 B945GME BIOS
- Automation PC 810 / Panel PC 800 945GME N270 CPU board BIOS
- Automation PC 810 / Panel PC 800 GM45 CPU board BIOS
- Provit 2000 product family - IPC2000/2001/2002
- Provit 5000 product family - IPC5000/5600/5000C/5600C
- Power Panel 100 BIOS devices
- Mobile Panel 100 BIOS devices
- Power Panel 100 / Mobile Panel 100 user boot logo
- Power Panel 100 / Mobile Panel 100 REMHOST utility
- Power Panel 300/400 BIOS devices
- Power Panel 300/400 BIOS user boot logo
- Power Panel 500 / Automation PC 510 / Automation PC 511 BIOS
- Panel PC 310

Device drivers

- Automation Device Interface (ADI)
- Audio
- Chipset
- CD-ROM
- LS120

- Graphics
- Network
- PCI / SATA RAID controller
- Touch screen
- Touchpad
- Interface board

Firmware upgrades

- Automation PC 620 / Panel PC 700 (MTCX, SDLR, SDLT)
- Automation PC 810 (MTCX, SDLR, SDLT)
- Automation PC 820 (MTCX, SDLR, SDLT)
- Mobile Panel 100 (SMCX)
- Panel PC 300 (MTCX)
- Power Panel 100 (aPCI)
- Power Panel 300/400 (aPCI)
- Power Panel 300/400 (MTCX)
- Power Panel 500 / Automation PC 510 / Automation PC 511 (MTCX, SDLR, I/O board)
- Panel PC 800 (MTCX, SDLR, SDLT)
- UPS firmware

Utilities/Tools

- B&R Embedded OS Installer
- Windows CE Tools
- User boot logo conversion program
- SATA RAID Installation Utility
- Automation Device Interface (ADI)
- CompactFlash service life calculator (Silicon Systems)
- Miscellaneous
- MTC utilities
- B&R Key Editor
- MTC & Mkey utilities
- Mkey utilities
- UPS configuration software
- ICU ISA configuration
- Intel PCI NIC boot ROM
- Diagnostic programs

Windows

- Windows CE 6.0
- Windows CE 5.0
- Windows CE 4.2
- Windows CE 4.1
- Windows CE Tools
- Windows Embedded Standard 2009
- Windows Embedded Standard 7
- Thin client
- Windows NT Embedded
- Windows XP Embedded
- VNC viewer

MCAD templates for

- Industrial PCs

- Visualization and operating devices
- Slide-in label templates
- Custom designs

ECAD templates for

- Industrial PCs
- Automation PCs
- Automation Panel 900
- Panels (Power Panel)

Documentation for

- Automation PC 511
- Automation PC 620
- Automation PC 680
- Automation PC 810
- Automation PC 820
- Automation Panel 800
- Automation Panel 900
- Panel PC 310
- Panel PC 700
- Panel PC 725
- Panel PC 800
- Power Panel 15/21/35/41
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500
- Mobile Panel 40/50
- Mobile Panel 100/200
- Mobile Panel connection box
- Provit 2000
- Provit 3030
- Provit 4000
- Provit 5000
- Provit Benchmark
- Provit Mkey
- Windows CE 5.0 help documentation
- Windows CE 6.0 help documentation
- Windows NT Embedded application guide
- Windows XP Embedded application guide
- Uninterruptible power supply
- Implementation guides
- B&R Hilscher fieldbus cards (CANopen, DeviceNet, PROFIBUS, PROFINET)

Service tools

- Acrobat Reader 5.0.5 (freeware in German, English and French)
- Power Archiver 6.0 (freeware in German, English and French)
- Internet Explorer 5.0 (German and English)
- Internet Explorer 6.0 (German and English)

Chapter 7 • Maintenance and service

This chapter describes service/maintenance work that can be carried out by a qualified end user.

1 Replacing the battery

The lithium battery buffers the internal real-time clock (RTC) and CMOS data.

Information:

- The product design allows the battery to be changed with the B&R device switched either on or off. In some countries, safety regulations do not allow batteries to be changed while the module is switched on.
- Any BIOS settings that have been made will remain when the battery is changed with the power turned off (stored in nonvolatile EEPROM). The date and time must be reset later since this data is lost when the battery is changed.
- The battery should only be replaced by qualified personnel.

Warning!

The battery is only permitted to be replaced by a Renata CR2477N battery. The use of another battery may present a risk of fire or explosion.

The battery may explode if handled improperly. Do not recharge, disassemble or dispose of in fire.

The following replacement lithium batteries are available: 4A0006.00-000 (1 pc.) and 0AC201.91 (4 pcs.).

1.1 Evaluating the battery status

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 load (approximately 1 second) and then evaluated. Once determined, the battery status is displayed in BIOS (Advanced - OEM features - System board features - Voltage values) and in the B&R Control Center (ADI driver); it can also be read in a customer application using the ADI library.

| Battery status | Function |
|----------------|---|
| N/A | The hardware or firmware being used is too old and does not support reading the battery status. |
| GOOD | Data buffering is intact. |
| BAD | From the point when battery capacity is recognized as insufficient (BAD), data buffering is intact for approximately another 500 hours. |

Table 127: Battery status

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

1.2 Procedure

- Disconnect the power supply to the B&R Industrial PC.
- Touch the housing or ground connection in order to discharge any electrostatic charge from your body.
- Remove the cover from the battery compartment and carefully pull out the battery using the removal strip.

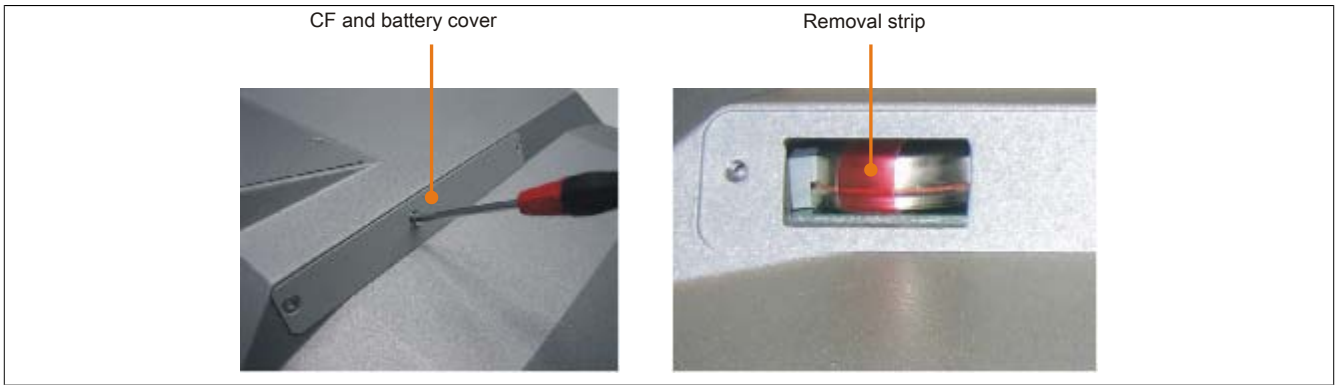


Figure 84: Removing the battery

- The battery should not be held by its edges. Insulated tweezers may also be used to insert the battery.

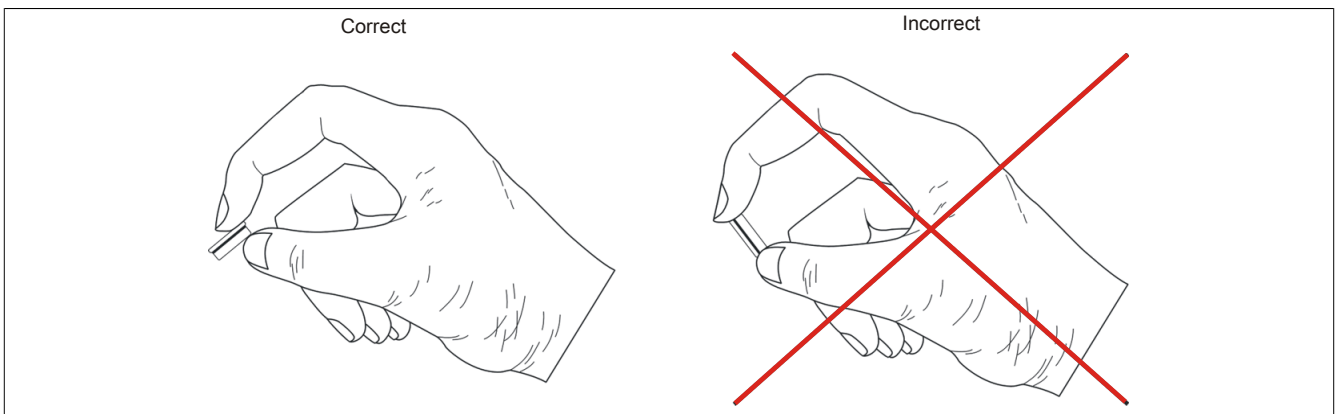


Figure 85: Battery handling

- Insert the new battery with the correct polarity.

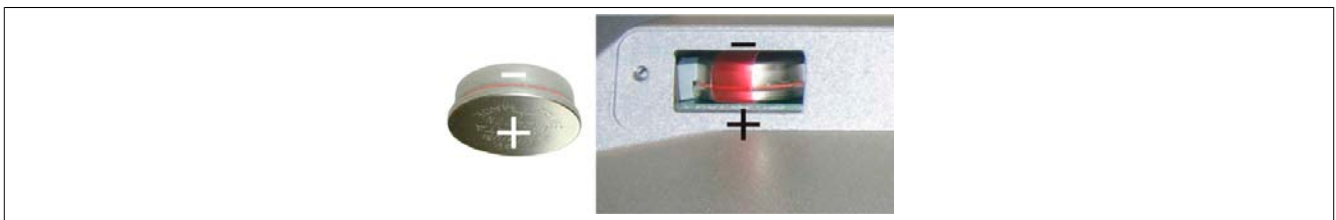


Figure 86: Battery polarity

- To make the next battery replacement easier, be sure the removal strip is in place when inserting the battery.
- Reconnect the power supply to the B&R Industrial PC (plug in the power cable).
- Reset the date and time in BIOS.

Warning!

Lithium batteries are considered hazardous waste. Used batteries should be disposed of in accordance with applicable local regulations.

2 Cleaning

Danger!

This device can only be cleaned when switched off in order to prevent unintended functions from being triggered when handling the touch screen or pressing keys.

This device should be cleaned with a moist cloth. The cloth should be moistened with water and detergent, a screen cleaning agent or alcohol (ethanol). The cleaning agent should be applied to the cloth beforehand, not sprayed directly on the device! Aggressive solvents, chemicals, scouring agents, pressurized air or steam jets should never be used.

Information:

Displays with a touch screen should be cleaned regularly.

Appendix A

Appendix A • Appendix A

1 Maintenance Controller Extended (MTCX)

The MTCX controller (FPGA processor) is located on the main board (part of every system unit) of Panel PC 725 devices.

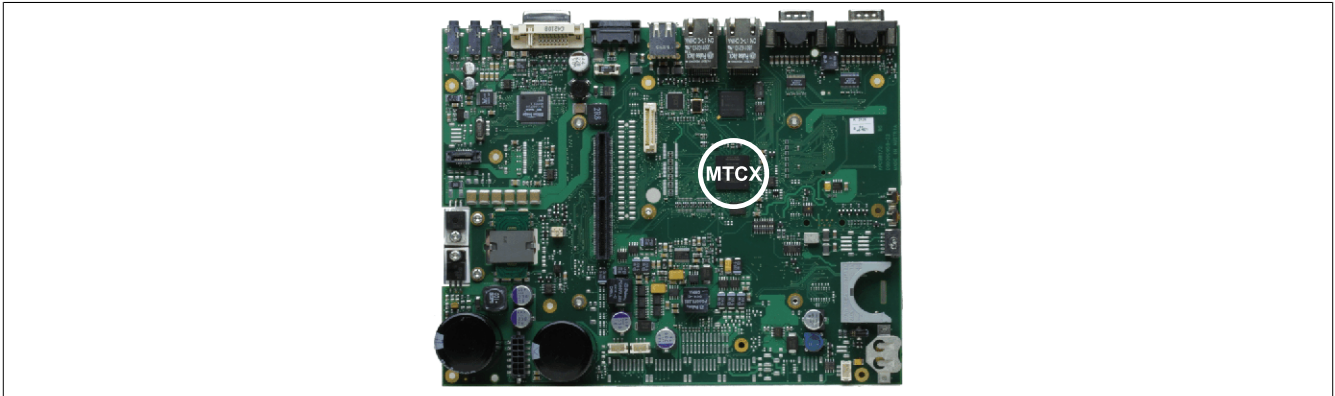


Figure 87: MTCX controller location

The MTCX is responsible for the following monitoring and control functions:

- Power on (power OK sequencing) and power failure logic
- Watchdog handling (NMI and reset handling)
- Temperature monitoring (CPU internal, CPU board, power supply, board I/O)
- Panel locking mechanism (can be configured using B&R Control Center - ADI driver)
- Statistical data recording (power cycles - records every switch-on, power on and fan hour; each full hour is counted, i.e. not increased at 50 minutes)

Extended MTCX functions are available by upgrading firmware ¹⁾. The version can be read in BIOS ("Advanced" - Baseboard/Panel Features) or in approved Microsoft Windows operating systems with the B&R Control Center.

¹⁾ Available in the Downloads section of the B&R website (www.br-automation.com).

2 5-wire AMT touch screen

2.1 Technical data

Information:

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

| Product ID | 5-wire AMT touch screen |
|-----------------------------------|--|
| General information | |
| Certification | |
| CE | Yes |
| c-UL-us | Yes |
| Manufacturer | AMT |
| Release pressure | < 1 N |
| Light permeability | 81 ±3% |
| Environmental conditions | |
| Temperature | |
| Operation | - 20 to 70°C |
| Storage | - 40 to 80°C |
| Transport | - 40 to 80°C |
| Relative humidity | |
| Operation | 90% at max. 50°C |
| Storage | 90% RH at max. 60°C for 504 hours |
| Transport | 90% RH at max. 60°C for 504 hours |
| Operating conditions | |
| Service life | 36 million touch operations at the same position (release pressure: 250 g, interval: 2x per second) |
| Chemical resistance ¹⁾ | Acetone, methylene chloride, methyl ethyl ketone, isopropyl alcohol, hexane, turpentine, mineral spirits, unleaded gasoline, diesel, motor oil, gear lubricating oil, antifreeze, ammonia-based glass cleaner, chemical cleaning agents, household cleaning agents, vinegar, coffee, tea, lubricant, cooking oil, salt |
| Enabling driver | Finger, pointer, credit card, glove |
| | Touch screen drivers for approved operating systems are available in the Downloads section of the B&R website (www.br-automation.com). |

Table 128: 5-wire AMT touch screen - Technical data

1) The active area of the touch screen is resistant to these chemicals for a period of one hour at 25°C.

2.2 Temperature/Humidity diagram

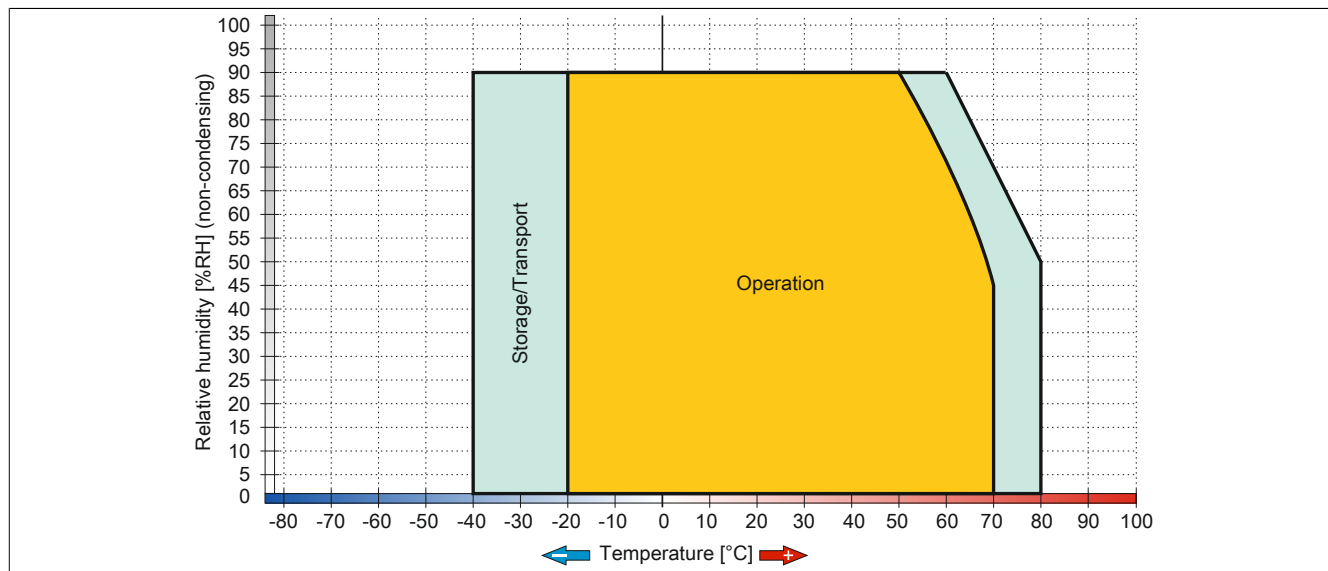


Figure 88: 5-wire AMT touch screen - Temperature/Humidity diagram

2.3 Cleaning

Danger!

This device can only be cleaned when switched off in order to prevent unintended functions from being triggered when handling the touch screen or pressing keys.

This device should be cleaned with a moist cloth. The cloth should be moistened with water and detergent, a screen cleaning agent or alcohol (ethanol). The cleaning agent should be applied to the cloth beforehand, not sprayed directly on the device! Aggressive solvents, chemicals, scouring agents, pressurized air or steam jets should never be used.

Information:

Displays with a touch screen should be cleaned regularly.

3 Panel overlay

The panel overlay conforms to DIN 42115 (Part 2). This means it is resistant to exposure to the following chemicals for a 24-hour period with no visible signs of damage:

Information:

The following characteristics, features and limit values only apply to this individual component and can deviate from those specified for the complete system.

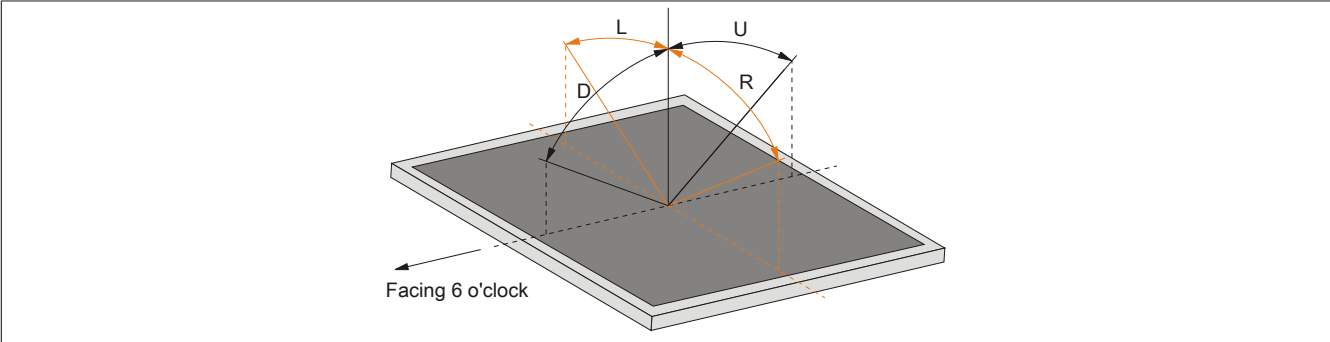
| | | |
|--|---|--|
| Ethanol Cyclohexanol Diacetone alcohol Glycol Isopropanol Glycerine Methanol Triacetin Dowandol DRM/PM | Formaldehyde 37 to 42% Acetaldehyde Aliphatic hydrocarbons Toluene Xylene White spirits | Trichloroethane Ethyl acetate Diethyl ether N-Butyl acetate Amyl acetate Butylcellosolve Ether |
| Acetone Methyl ethyl ketone Dioxan Cyclohexanone MIBK Isophorone | Formic acid < 50% Acetic acid < 50% Phosphoric acid < 30% Hydrochloric acid < 36% Nitric acid < 10% Trichloroacetic acid < 50% Sulphuric acid < 10% | Sodium hypochlorite < 20% Hydrogen peroxide < 25% Potassium carbonate Washing agents Tenside Fabric conditioner Ferrous chloride (FeCl ₂) Ferrous chloride (FeCl ₃) Dibutyl phthalate Dioctyl phthalate Sodium carbonate |
| Ammonia < 40% Caustic soda < 40% Potassium hydroxide Alkali carbonate Bichromate Potassium Acetonitrile Sodium bisulphate | Cutting oil Diesel oil Linseed oil Paraffin oil Blown castor oil Silicon oil Turpentine oil substitute Brake fluid Aviation fuel Gasoline Water Sea water Decon | |

Table 129: Chemical resistance of the panel overlay

The panel overlay conforms to DIN 42115 section 2 for exposure to glacial acetic acid for less than one hour without visible damage.

4 Viewing angles

Viewing angle specifications (R, L, U, D) for the display types are listed in the technical data for each device.



5 Glossary

| | |
|-----------------------------|---|
| Address | An address is a character string for identifying a memory location or a memory area, where data is stored and can be retrieved. It is also a symbol (e.g. with numerical controllers) for identifying a function unit for which subsequent geometrical or technological data are determined by the symbol. |
| Algorithms | <p>According to DIN 19226: Algorithms are a finite series of well-defined regulations. The desired output quantities are created from permitted system input quantities. It describes how something is to be done. A procedure must at least satisfy the following requirements to be valid as an algorithm in a mathematical context.</p> <p><i>Discreteness:</i> An algorithm is made up of a finite series of steps.</p> <p><i>Determinacy:</i> Under the same start conditions, it always creates the same end result.</p> <p><i>Clearness:</i> The series of steps is clearly defined.</p> <p><i>Finiteness:</i> It ends after a finite number of steps.</p> <p>From a quantity theory perspective, an algorithm is clearly defined by a set of sizes [input, intermediate and output sizes], a set of elementary operations and also by a regulation, which specifies when and in what sequence certain operations should be carried out. From a functional perspective, it transfers a set of input sizes into a set of output sizes. It can be represented in text form in a natural or artificial formal language or using graphic representations [graph, program flow chart, structured chart, Petri Nets etc.].</p> |
| ANSI | American National Standards Institute > this organization promotes and manages American industrial standards. |
| Application software | Software, which is not used for operation by the computer itself, but rather when a computer is used to process a concrete application problem. It sets up the system software and uses this for fulfilling individual tasks. Application software can be accommodated in standard software used by a large number of customers in a wide range of industries. Common examples are Word, Excel, PowerPoint, Paint, Matlab etc. Industrial software tailored to the respective problems of a certain industry and individual software created for solving the particular problems of an individual user. |
| Automation | According to Brockhaus: The application of technical means, using specific programs that (either partially or totally) do not require human intervention to perform operations. |
| Automation Runtime | A uniform runtime system for all B&R automation components. |
| Failure | Failure according to IEC 61508: A function unit loses the ability to perform a required function. In regards to safety-oriented systems, a distinction is made between dangerous and safe failures. This depends on whether the status of the system failure is considered dangerous or safe. The cause of the failure may be load related or age-related, and therefore a random failure, or related to a flaw inherent in the system. In this case, it is known as a systematic failure. |

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