Automation PC 620

User's Manual

Version: **2.63 (June 2011)**
Model number: **MAAPC620-ENG**

Chapter 7: Maintenance / Servicing

Appendix A

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Chapter 1 • General information

Information:

B&R does its best to keep the printed versions of its user's manuals as current as possible. However, any newer versions of the User's Manual can always be downloaded in electronic form (pdf) from the B&R homepage www.br-automation.com.

1. Manual history

Version	Date	Change
1.0 Preliminary	2004-07-21	- First version
1.1 Preliminary	2004-11-12	- Drilling templates for the APC620 1 and 2 PCI slot variations added. - New overview images added for the APC620 1 and 2 PCI slot variations. - New dimension diagrams added for the APC620 1 and 2 PCI slot variations. - Model number overview revised. - Interface descriptions added (behind the front cover). - "Software" chapter has been updated. - "Accessories" chapter has been updated. - System unit with 5 PCI slots added. - Technical data for all individual components was expanded.
1.2 Preliminary	2004-11-23	- Pictures of the interfaces from the front have been updated. - General descriptions of device interfaces have been revised. - New CPU boards and system units added. - USB media device and fitting front cover added.
1.3 Preliminary	2004-12-27	- New column "My settings" (815E and 855GME BIOS) added to the BIOS profile settings table. - Chapter 7 "Maintenance / Servicing", on page 609 updated. - APC620 interface cover 5AC600.ICOV-00 updated (see section "Interface cover 5AC600.ICOV-00", on page 528). - Information for the maximum color depth for the CPU board added. - Error correction in the BIOS description for Legacy Devices Com D, COM E, LPT.
1.4 Preliminary	2005-03-07	- Cover for the slide-in USB disk drive updated (see figure 65 "Slide-in USB FDD - 5AC600.FDDS-00", on page 160). - Chapter 4 (Software) updated for new BIOS versions. (815E BIOS Version 1.15, 855GME BIOS Version V1.14). - Fan kit (5PC600.HS05-00) for APC620 system with 5 PCI slots (see section "Fan kit 5 PCI - 5PC600.FA05-00", on page 203) and installation (see section 2.4 "Procedure for APC620 with 5 PCI slot", on page 623) updated. - Mounting orientations more precisely specified, see the "Commissioning" chapter, section 1.3 "Mounting orientation", on page 214. - Temperature specifications for the 815E CPU boards added. -Temperature specifications for the 855GME CPU boards added.

Table 1: Manual history

Version	Date	Change
		- Power management for the APC620 systems updated (see the section "Power management for APC620 systems 1 and 2 PCI slots", on page 76). - RAID System updated (see the section "RAID System", on page 172).
1.5 Preliminary	2005-03-16	- Temperature and performance table design changed. - Mounting orientation more precisely specified.
1.6 Preliminary	2005-07-04	- System unit weights added. - Add-on interface cards CAN (5AC600.CANI-00) and RS232/422/485 (5AC600.485I-00) added. - Model numbers for Microsoft Windows XP Embedded with SP2 added. - Cables (DVI, SDL, USB, RS232) added to accessories chapter. - AP Link cards added. - Slide-in CF 2-slot 5AC600.CFSS-00 added. - Configuration and selection guide for APC620 systems added (see chapter "Technical data", section 1.2 "Structure / configuration", on page 44). - Key Editor brief info section added (see Appendix A, "B&R Key Editor Information" section on page 658). - Automation Device Interface (ADI), Control Center, and Development Kit: brief info section added (see "Software" chapter, from page 486). - Information added: battery compartment, real-time clock (RTC). - Temperature sensor locations for APC620 devices added (see Appendix A, "Temperature sensor positions" section, on page 653). - Ambient temperatures for PM 1600 (5PC600.E855-01) and PM 1800 (5PC600.E855-03) added. - "Appendix A" chapter updated. - Real-time clock (RTC) specifications about the system unit added. - Index modifications.
1.70	2006-03-08	- Conductor cross section and AWG change for the supply plug. - Meaning of standard and 24-hour hard disk operation specified more precisely. - Procedure for creating a bootable USB flash drive (see section "Creating a bootable USB flash drive", on page 568). - Slide-in DVD-R/RW, DVD+R/RW drive 5AC600.DVRS-00 updated (see section "Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00", on page 153). - Maintenance Controller Extended (MTCX) information added (see the section "Maintenance Controller Extended (MTCX)", on page 655). - Technical data about the SDL cable (flex radius, AWG) modified due to new specifications. - Information about general tolerances according to DIN ISO 2768 medium added to dimension diagrams. - BIOS distribution of resources added (see section "Resource distribution", on page 437). - Testing conditions added for the determined ambient temperature specifications. - Slide-in drive installation and exchange description updated (see the section "Slide-in drive installation and exchange", on page 628). - 5CAMSC.0001-00 cable for connecting external devices updated (see the section "APC620 internal supply cable 5CAMSC.0001-00", on page 574). - Information about connecting an external device updated (see the section "Connection of an external device to the main board", on page 654). - Filter clasp information added for the fan kits for 2 and 5 PCI system units. - Safety guidelines revised (EBG information). - Supply voltage fuse (type change to "non self healing"). - Environmental temperature adjustments for systems with 815E and 855GME CPU boards (temperature limits for slide-in DVD-R/RW and 24-hour hard disk). - Firmware upgrade information updated (see the section "Firmware upgrade", on page 453). - Intel 815E CPU boards (5PC600.E815-0x) canceled. - BIOS function "Max CPU frequency" described. - Description of the SDL timing for communication between display unit and MTCX added (see the section "SDL timing", page 656). - APC620 with 5 PCI slots with orange front cover (previously light gray) - photos modified. - Information about changing the battery revised (see the section "Changing the battery", on page 609). - Pin assignments for the monitor / panel plug and the optional AP Link plug-in card added. - Important information added for installation of the touch screen driver (located under Software

Table 1: Manual history (Forts.)

Version	Date	Change
		- Touch screen driver installation). - 1 GB flash drive (5MMUSB.1024-00) added (128 MB - 5MMUSB.0128-00 cancelled). - Silicon Systems CompactFlash cards 5CFCRD.xxxx-03 updated (see the section "USB flash drive 5MMUSB.0xxx-00", on page 564). - Serial number sticker information updated (see the section "Serial number sticker", on page 119). - Additional technical data about the PCI bus added. - A general device interface photo (version with 5 PCI slots) added (see the section "Device interfaces", on page 90). - Information about the minimum ambient temperature added (component-dependent). - Block diagrams of entire device for all system units with 855GME CPU boards added. - SDL cable with 45° plug 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 added (see the section "SDL cable with 45° plug 5CASDL.0xxx-01", on page 578. - SDL cable with extender 5CASD.0300-10 and 5CASDL.0400-10 added (see the section "SDL cable with extender 5CASDL.0x00-10", on page 581). - System unit support for buffering (10 ms) with Automation Runtime added (see the section "Automation PC 620 with Automation Runtime", on page 461). - Explanation of terminology added in the form of a glossary (see the "Glossary" section, on page 662). - "855GME (ETX) BIOS description" section on page 325 adapted to BIOS version 1.21. - "Firmware upgrade" section on page 453 adapted to the APC620 / Panel PC Firmware upgrade (MTCX, SDLR, SDLT) version 1.13. - Humidity table according to the individual components added (see the "Humidity specifications" section, on page 89.) - Information about starting current added. - Section Automation PC 620 with Windows CE (9S0001.29-020) updated (see section "Automation PC 620 with Windows CE", on page 483). - New chapter "Standards and specifications", on page 497" updated. - Known problems using MS-DOS added (see the "Known problems" section, on page 462). - Automation Panel 900 connection examples expanded (see "Automation Panel 900 connection examples" on page 194). - Technical data table for all device versions (1, 2 and 5 PCI slots) added. - Progress information about the BIOS boot procedure added. - Topic "Power options and touch screen" added.
1.80	2006-04-21	- Corrections to chapter "Standards and Certifications". - The footnote "Depending on the process or batch, there may be visual deviations in the color and surface structure." was added for housing and color specifications. - PCI RAID hard disk 5ACPCI.RAIS-01 (60 GB) added. - Information regarding the new 512 MB and 1 GB SanDisk Cruzer Micro flash drives added. - Temperature specifications for the PCI RAID hard disk 5ACPCI.RAIS-00 added. - HMI Drivers & Utilities DVD 5SWHMI.0000-00 added.
1.90	2006-08-29	- Corrections to chapter "Standards and Certifications" - section "Emission requirements" - standards were listed twice. - The manual history has been corrected. - Vibration values were switched for 'continuous' and 'occasional' operation. - "Cable connections" section on page 223 (flex radius) updated. - Name change for CompactFlash short text. - Name change of chapter "Installation" to "Commissioning". - Restructuring of section "Automation Panel 900 - connection examples" - it is now located in chapter "Commissioning". - BIOS postcode messages added. - USB Media Drive 5MD900.USB2-00 added. - New technical data added for slide-in drive 5AC600.DVRS-00 revision D0 and later. - New image for PCI routing. - List of delivery contents removed for some components (e.g. cable). - Vibration and shock values changed for the PCI RAID controller hard discs.

Table 1: Manual history (Forts.)

Version	Date	Change
2.00	2006-12-13	- New configuration diagrams for Automation Panel 900 connection examples (USB information added). - Panel locking time information modified. - New model number for the APC620 documentation MAAPC620-ENG - Nominal current specification for 1, 2 and 5 PCI systems added. - Font symbol assigned to the character format symbol. - Description of the BIOS function "Legacy USB Support" updated. - Information about Ethernet cable length support for ETH1 added. - Name modifications SDLT FPGA: from "Firmware on the AP Link SDL transceiver" to "SDLT FPGA Firmware on the AP Link SDL transmitter". SDLR FPGA: from "Firmware on the AP Link SDL receiver" to "Firmware on the AP Link SDL receiver and transceiver" - USB flash drive 2 GB SanDisk 5MMUSB.2048-00 added. - PCI SATA RAID controller 5ACPCI.RAIC-01 added (adjustment made to the ambient temperature determination with 855GME boards). - Add-on hard disk 40 GB ET, 24x7 - 5AC600.HDDI-05 added (adjustment made to the ambient temperature determination with 855GME boards). - Slide-in hard disk 40 GB ET, 24x7 - 5AC600.HDDS-02 added (adjustment made to the ambient temperature determination with 855GME boards).
2.10	2007-01-23	- New dimension diagram for the APC620 1 PCI variant with add-on UPS module (see the section 6 "APC620 1 PCI slot variant dimensions", on page 52) updated. - New dimension diagram for the APC620 2 PCI variant with add-on UPS module (see the section 9 "APC620 2 PCI slot variant dimensions", on page 57) updated. - New dimension diagram for the APC620 5 PCI variant with add-on UPS module (see the section 15 "APC620 5 PCI slot variant dimensions", on page 67) updated. - SDL cable flex 5CASDL.0xxx-03 added (see section "SDL cable flex 5CASDL.0xxx-03", on page 584). - SDL cable flex with extender 5CASDL.0xxx-13 added (see the section "SDL cable with extender 5CASDL.0x00-13", on page 588). 8 GB CompactFlash card 5CFCRD.8192-03 added. - 5A5003.03 front cover description added to the 5MD900.USB2-00 and 5M900.USB2-01 product descriptions. - Document now includes the chm tag "Filename". - New Windows CE 5.0 model numbers added. - APC620 UPS model numbers added (UPS module, battery, cable). - APC620 overview images updated (with slot for UPS add-on module). - Descriptions of interfaces updated to include slot for add-on UPS module (see "Add-on UPS module slot", on page 106). - SATA RAID description updated (new image + new footnote for vibration and shock data (performance problems) + known limitations). - Figure "Selection guide - Optional components", on page 46 updated.
2.10	2007-01-22	- Graphics in the section "Power management for APC620 systems 1 and 2 PCI slots", on page 76 and "Power management for APC620 systems 5 PCI slots", on page 83 updated (add-on UPS module). - Status LED description on page 109 updated (battery operation). - Section "Firmware upgrade", on page 453 updated (new APC620 / Panel PC Firmware upgrade V1.16). - Section "B&R Automation Device Interface (ADI) driver - Control Center" moved from "Appendix A" to chapter 4 "Software" (see page 486). - Configuration of UPS with B&R Control Center added (see the "UPS configuration" section on page 488).
2.20	2007-02-12	- Figure "ADI Control Center UPS settings", on page 488 updated.

Table 1: Manual history (Forts.)

Version	Date	Change
2.30	2007-09-10	- USB Memory Sticks 256 MB (5MMUSB.0256-00) and 1 GB (5MMUSB.1024-00) cancelled. - UPS module + accessories short descriptions changed (page 45). Description of UPS configuration revised beginning on page 579. - Section "SDL flex cable - test description", on page 609 expanded (cable drag chain and torsion test). - Section "USB flash drive", on page 657 updated. - General information in section "Automation PC 620 with Automation Runtime", on page 544 updated. - Section "Automation Panel 900 connection examples" changed to "Connection examples" and expanded to include Automation Panel 800 connection examples - Section "Grounding concept", on page 293 added - Section "Configuration of a SATA RAID array", on page 337 added - Section "B&R Automation Device Interface (ADI) driver - Control Center", on page 575 updated (screenshots, UL compliant operation) - Section "Uninterruptible power supply", on page 695 updated (description, technical data, temperature lifespan diagram up to 20% battery capacity, deep discharge cycles added). - New model numbers for Windows CE and Windows XPe expanded. - Section "Automation PC 620 with Windows XP embedded", on page 564 updated. . System unit 5PC600.SF03-00 expanded. - Fan kit 5PC600.FA03-00 expanded. - Replacement fan filters 5AC600.FA01-00, 5AC600.FA02-00, 5AC600.FA03-00, 5AC600.FA05-00 (see section "Replacement fan", on page 712) updated. - Maintenance interval information for the UPS battery (5AC600.UPSB-00) updated. - 855GME CPU board 5PC600.E855-05 (1 GHz Celeron) L2 cache entry changed from 1MB to 512 kB. - Standard Full-size PCI card size expanded (see section "PCI slots", on page 147). - The optional UPS module added to all block diagrams for the entire device (see Section "Block diagram", on page 165). - Drilling template for 5PC600.SF03-00 expanded (see section "Drilling templates", on page 280). - 815E CPU boards BIOS description updated to version 1.23 (see "Software" chapter, section "815E (ETX) BIOS description", on page 351). - 855GME CPU boards BIOS description updated to version 1.26 (see "Software" chapter, section "855GME (ETX) BIOS description", on page 405). - Name change from 815E to 815E (ETX) and 855GME to 855GME (ETX). - CPU boards 855GME (XTX) model numbers expanded (see Section "CPU boards 855GME (XTX)", on page 38). - Safety guidelines updated to include "Environmental conditions - dust, humidity, aggressive gases", on page 33. - 855GME (XTX) CPU boards (BIOS Version 1.14) BIOS description updated (see "Software" chapter, section 1.3 "855GME (XTX) BIOS description", on page 461). - Add-On UPS module pin assignments and UPS battery unit updated (see Section "Uninterruptible power supply", on page 695). - UPS battery unit deep discharge cycle diagram updated (see image 355 "Deep discharge cycles", on page 702). - SRAM module 5AC600.SRAM-00 added (see section "SRAM module - 5AC600.SRAM-00", on page 713). - Battery and real-time clock entries (RTC) revised. - Power consumption values adjusted in the revision of the system units. - Number added to information on interface numbering.

Table 1: Manual history (Forts.)

Version	Date	Change
2.40	2008-02-25	- CAN interface description added. - Ethernet interface description added. - Description of the "Advanced USB Configuration USB" for 855GME (XTX) changed. - Replacement SATA RAID HDD 5PCPCI.RAIC-02 (see section "Replacement SATA HDD 60 GB - 5ACPCI.RAIC-02", on page 248) + instructions for exchanging added. - 855GME (XTX) BIOS description adjusted to the BIOS version 1.16. - Vibration and shock data for the complete devices revised. - Possible upgrade problems and version dependencies updated (see page 528). - DVI / SDL cable descriptions revised. - Color specifications of the orange front doors changed from Pantone 151CV to Pantone 144CV. - Additions to the address and data register for the CAN add-on interface (5AC600.CANI-00) - Section "Power management for APC620 system units" revised. - "SRAM module - 5AC600.SRAM-00", on page 713 description updated. - Information about voltage and temperature indicators in BIOS Setup and ADI Control Center pages added. - Text change from "Compact Flash" to "CompactFlash". - Automation PC 620 embedded devices 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02 added - Section "Heat sink", on page 185 revised. - Block diagram with system unit 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02 added. - Section "Compatibility / improvement from 855GME (XTX) to 855GME (ETX)", on page 348 added - Add-on hard disk 5AC600.HDDI-06 added (see section "Add-on hard disk 80 GB 24x7 ET - 5AC600.HDDI-06", on page 205). - Technical data for the hard disk 5AC600.HDDI-05 updated due to Revision D0. - Technical data for the hard disk 5AC600.HDDS-02 updated due to Revision D0. - PCI SATA RAID 2 x 160 GB - 5ACPCI.RAIC-03 (see the section "PCI SATA RAID 2 x 160 GB 24x7 ET - 5ACPCI.RAIC-03", on page 251) added. - Replacement SATA HDD 160 GB 5ACPCI.RAIC-04 added (see the section "Replacement SATA HDD 160 GB - 5ACPCI.RAIC-04", on page 256). - The section 5 "Configuration of a SATA RAID array" in the 3 "Commissioning" chapter updated. - The section 6 "Exchanging a PCI SATA RAID hard disk" in the 7 "Maintenance / Servicing" chapter updated.
2.41	2008-08-11	- Revision of the AP900 connection examples (cable selection tables) in Chapter 3. - APC620e and APC620f for UPS support expanded. - Compatibility note in which the Bosch CC770 CAN controller supplements Intels 82527 for the add-on CAN interface 5AC600.CANI-00. - Description edited for operating the add-on RS232/422/485 interface module 5AC600.485I-00 as an RS485 interface. - New Windows XP Pro version with SP3 - 5SWWXP.0600-DEU (German), 5SWWXP.0600-ENG (English) and 5SWWXP.0600-MUL (Multi-language) added. - Manual updated to include Section "Replacing the front cover", on page 762. - User serial ID description expanded. - Graphic 5 "Selection guide - APC620 optional components with 1, 2, 3, and 5 PCI slots" adjusted (cancelled products removed). - B&R power supplies updated (see Section "Power supplies", on page 716). - PCI Ethernet cards 5ACPCI.ETH1-01 and 5ACPCI.ETH3-01 added (see Section 708). - Technical data - add-on hard disk - 5AC600.HDDI-02, 5AC600.HDDI-03 and 5AC600.HDDI-06 expanded. - Section "Connection of USB peripheral devices", on page 345 added - Section "Visual Components graphic engine support", on page 545 added - Graphic "Ambient temperatures for systems with an 855GME CPU board (ETX / XTX)", on page 93 updated to include the APC620e system units 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02.

Table 1: Manual history (Forts.)

Version	Date	Change
2.50	2009-04-23	- Footnotes in section 4.3 "An Automation Panel 900 via SDL (onboard)" - "Cable lengths and resolutions for SDL transfer", on page 301 added. - ADI driver description -> Windows 2000 removed and Automation Panel 800 added. - Information regarding SATA HDD exchange added. - Information "Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages" added. - Temperature humidity diagram for 5AC600.CDXS-00 corrected. - Section 6 "Typical topologies", on page 50 in chapter 1 "General information" added. - 5ACPCI.RAIC-00 cancelled. - Fan control information expanded in Appendix A, section 3.2 "Temperature monitoring - Fan control", on page 772. - External UPS added to accessories - see section 16 "External UPS", on page 706. - B&R Key Editor information updated. - ADI Development Kit information updated. - Section 2.7 "Environmentally-friendly disposal" in chapter 1 "General information" added. - Image of Silicon Systems CF card changed. - Contents of delivery for USB flash drives removed. - 0TB704.91 and 0TB704.9 added in Chapter 6 "Accessories". - Information about the BIOS setting in the connection examples with an AP900 via SDL (onboard) changed. - Information about firmware upgrade updated. - WinCE features updated. - Temperature humidity diagram for USB flash drive corrected. - B&R CompactFlash card added. - Technical data for Silicon Systems CFs revised. - PCI routing for APC620e added to Chapter 4 "Software". - Maximum ambient temperature for APC620 embedded added. - Section "Installation on PCI SATA RAID controller - 5ACPCI.RAIC-03", on page 549 added
2.60	2010-08-24	- Model number text for the CPU board 5PC600.E855-05 corrected. - Processor architecture for the CPU boards 5PC600.E855-02, 5PC600.E855-03, 5PC600.X855-02 and 5PC600.X855-03 corrected. - CompactFlash cards 5CFCRD.xxxx-02 moved to page 634. - Section "Installation on PCI SATA RAID controller - 5ACPCI.RAIC-03", on page 549 added - Graphic resolutions for the CPU boards added to the technical data. - Text change from "Compact Flash" to "CompactFlash" (in the images). - Table 333 "RAM address assignment", on page 519 corrected. - 6. Line - "0D0000h - 0CFFFFh VGA BIOS available." changed to "0D0000h - 0DFFFFh available.". - Text change from "Ethernet POWERLINK" to "POWERLINK". - WinXP Pro SP 2c (5SWWXP.0500-DEU, 5SWWXP.0500-ENG, 5SWWXP.0500-MUL) updated. - WinCE Pro 6.0 (5SWWCE.0812-ENG, 5SWWCE.0813-ENG) updated. - Sections 8.3 "Windows CE 6.0 features", on page 573 and 8.4 "Differences between Windows CE 6.0 and Windows CE 5.0", on page 573 updated. - Table 29 "Overview of humidity specifications for individual components", on page 119 updated. - BIOS default settings for "I/O Device Configuration", on page 456 and "Boot", on page 460 corrected. - Height of the APC620 embedded heat sink corrected. - Section 2 "Upgrade information", on page 527 added - The section "Creating a bootable USB flash drive" removed. - Info text for B&R CompactFlash cards updated. - Section 8 "Known problems / issues", on page 349 added - Information in section 1 "Temperature sensor locations", on page 767 expanded. - Table 337 "IRQ interrupt assignments in APIC mode", on page 522 corrected. - CompactFlash card 5CFCRD.016G-04 added. - Section "Automation PC 620 with BIOS" in Chapter 4 "Software" changed to "BIOS Options". - Section 7 "Automation PC 620 with Windows Embedded Standard 2009", on page 568 added - Section 9 "B&R Automation Device Interface (ADI) driver - Control Center", on page 575 updated. - Chapter 5 "Standards and certifications", on page 589 updated. - B&R USB flash drive added to the chapter 6 "Accessories" on page 660. - B&R ID codes for system units added.

Table 1: Manual history (Forts.)

Version	Date	Change
		- 855GME (ETX) BIOS decription V1.26 updated to V1.30, see page 405 - the actions "Save Optimized Defaults" and "Load Optimized Defaults" were added to the menu item "Exit". - Technical data "Remanent variables for AR (Automation Runtime) in Power Fail Mode" added for the APC620 embedded system units and for the SRAM module 5AC600.SRAM-00.
2.61	2011-01-27	- The appellation „AR010“ was changed to „ARwin“. - The appellation „AR106“ was changed to „ARemb“.
2.62	2011-03-03	- Technical Data of the system unit 5PC600.SE00-01 was changed - the Monitor / Panel interface is a DVI-A female connector.
2.63	2011-06-15	- "Power calculation with 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02", on page 118 added. - Sections "B&R Automation Device Interface (ADI) driver - Control Center", on page 575, "HMI Drivers & Utilities DVD 5SWHMI.0000-00", on page 662, "B&R Key Editor information", on page 773 and "B&R Automation Device Interface (ADI) development kit", on page 775 updated. - Section "B&R Automation Device Interface (ADI) .NET SDK", on page 777 added. - Table "Starting currents in the voltage supply to the system units", on page 136 and table "System unit revisions for any turn-off times", on page 137 updated to include the APC620e system units 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02.

Table 1: Manual history (Forts.)

2. Safety notices

2.1 Intended use

Programmable logic controllers (PLCs), operating and 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 industry. 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, as well as flight control systems, flight safety, the control of mass transit systems, medical life support systems and the control of weapons systems.

2.2 Protection against electrostatic discharges

Electrical components that are vulnerable to electrostatic discharge (ESD) must be handled accordingly.

2.2.1 Packaging

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

2.2.2 Guidelines for proper ESD handling

Electrical components with housing

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

Electrical components without housing

The following is valid in addition to "Electrical components with housing"

- Any persons handling electrical components or devices that will be installed in the electrical components must be grounded.
- Components can only be touched on the small sides or on the front plate.
- Components should always be stored in a suitable medium (ESD packaging, conductive foam, etc.).
  Metallic surfaces are not suitable storage surfaces!

- Electrostatic discharges should be avoided on the components (e.g. through charged plastics).
- A minimum distance of 10 cm must be kept from monitors and TV sets.
- Measurement devices and equipment must be grounded.
- Measurement probes on potential-free measurement devices must be discharged on sufficiently grounded surfaces before taking measurements.

Individual components

- ESD protective measures for individual components are thoroughly integrated at B&R (conductive floors, footwear, arm bands, etc.).

The increased ESD protective measures for individual components are not necessary for our customers for handling B&R products.

2.3 Policy and procedures

Electronic devices are generally not failsafe. In the event of a failure on the programmable control system operating or monitoring device, or uninterruptible power supply, the user is responsible for ensuring that other devices that may be connected, e.g. motors, are in a secure state.

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

All tasks such as installation, commissioning, and maintenance are only permitted to be carried out by qualified personnel. Qualified personnel are persons familiar with transport, ounting, installation, commissioning, and operation of the product who also have the respective qualifications (e.g. IEC 60364). National accident prevention guidelines must be followed.
The safety guidelines, 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 from excessive stress (mechanical load, temperature, humidity, aggressive atmospheres, etc.).

2.5 Installation

- Installation must take place according to the documentation, using suitable equipment and tools.
- Devices must be installed without voltage applied and by qualified personnel.
- General safety regulations and nationally applicable accident prevention guidelines must be observed.
- Electrical installation must be carried out according to the relevant guidelines (e.g. line cross section, fuse, protective ground connection).

2.6 Operation

2.6.1 Protection against touching electrical parts

To operate programmable logic controllers, operating and monitoring devices or uninterruptible power supplies, certain components must carry dangerous voltage levels of over 42 VDC. A life-threatening electrical shock could occur if you come into contact with these parts. This could result in death, severe injury or material damage.

Before turning on the programmable logic controller, the operating and monitoring devices and the uninterruptible power supply, ensure that the housing is properly grounded (PE rail). The ground connection must be established when testing the operating and monitoring devices or the uninterruptible power supply, even when operating them for only a short time.

Before turning the device on, make sure that all parts with voltage applied are securely covered. During operation, all covers must remain closed.

2.6.2 Environmental conditions - dust, humidity, aggressive gases

Use of operating and 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 influences their function and, especially in systems with active cooling (fans), sufficient cooling cannot be guaranteed.

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

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

2.6.3 Programs, viruses, and dangerous programs

The system is subject to potential danger 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 preventative measures such as virus protection programs, firewalls, etc. and obtaining software from reliable sources.

2.7 Environmentally-friendly disposal

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

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 and monitoring devices Uninterruptible power supply Cables	Electronics recycling
Cardboard box / paper packaging	Paper / cardboard recycling
Plastic packaging	Plastic recycling

Table 2: Environmentally-friendly separation of materials

Disposal must comply with the respective legal regulations.

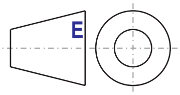
3. Organization of safety notices

The safety notices in this manual are organized as follows:

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

Table 3: Organization of safety notices

4. Directives



European dimension standards apply to all dimensions (e.g. dimension diagrams, etc.).

5. Model numbers

5.1 System units

Model number	Short description	Note
5PC600.SX01-00	**System 1 PCI** APC620 system unit 1 half size PCI slot, connection for 2 x RS232, 2 x USB 2.0, Short Display Link, 2 x ETH 10/100, AC97 sound, PS/2 keyboard/mouse; UPS module[1] ; 24 VDC (order 0TB103.9 screw clamp or 0TB103.91 cage clamp terminals separately).	See page 60
5PC600.SX02-00	**System 2 PCI, 1 disk drive slot, 1 AP Link slot** APC620 system unit 2 half size PCI slots, 1 drive slot, 1 slot for Automation Panel link transmitter; connections for 2 x RS232, 2 x USB 2.0, Short Display Link, 2 x ETH 10/100, AC97 sound, PS/2 keyboard/mouse, UPS module[2] ; 24 VDC (order 0TB103.9 screw clamp or 0TB103.91 cage clamp terminals separately).	See page 66
5PC600.SX02-01	**System 2 PCI, 1 disk drive slot** APC620 system unit 2 half size PCI slots, 1 drive slot; connections for 2 x RS232, 2 x USB 2.0, Short Display Link, 2 x ETH 10/100, AC97 sound, PS/2 keyboard/mouse, UPS module[1] ; 24 VDC (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	See page 66
5PC600.SF03-00	**System 3 PCI, 1 disk drive, 1 AP Link slot** APC620 system unit, 3 full-size PCI slots; 1 slot for Automation Panel link transmitter; 1 drive slot; Smart Display Link / DVI / monitor, connections for 2 x RS232, 2 x USB 2.0, 2 x ETH 10/100, AC97 sound, PS/2 keyboard/mouse; 24 VDC (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	See page 72
5PC600.SX05-00	**System 5 PCI, 2 disk drive slots, 1 AP Link slot** APC620 system unit 5 half size PCI slots, 2 drive slot; 1 slot for Automation Panel Link Transmitter; connections for 2 x RS232, 2 x USB 2.0, Short Display Link, 2 x ETH 10/100, AC97 sound, PS/2 keyboard/mouse, UPS module[3] ; 24 VDC (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	See page 77
5PC600.SX05-01	**System 5 PCI, 2 disk drive slots** APC620 system unit 5 half size PCI slots, 2 drive slots; connections for 2 x RS232, 2 x USB 2.0, Short Display Link, 2 x ETH 10/100, AC97 sound, PS/2 keyboard/mouse, UPS module[3] ; 24 VDC (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	See page 77
5PC600.SE00-00	**APC620e System SDL EPL X2X CAN 512kB** APC620 embedded system unit, connections for 2x RS232, 4x USB 2.0, Smart Display Link, 1x ETH 10/100, 1x POWERLINK, 1x CAN, 1x X2X, UPS module, 512kB SRAM; (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	See page 83
5PC600.SE00-01	**APC620e System CRT EPL X2X CAN 512KB** APC620 embedded system unit, connections for 2x RS232, 4x USB 2.0, CRT, 1x ETH 10/100, 1x POWERLINK, 1x CAN, 1x X2X, UPS module, 512kB SRAM; (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	See page 83
5PC600.SE00-02	**APC620e System SDL EPL X2X CAN 1MB** APC620 embedded system unit, connections for 2x RS232, 4x USB 2.0, Smart Display Link, 1x ETH 10/100, 1x POWERLINK, 1x CAN, 1x X2X, UPS module, 1MB SRAM; (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	See page 83

Table 4: Model numbers - system units

1) Slot only available on system units with revision H0 or later.

2) Slot only available on system units with revision G0 or later.

3) Slot only available on system units with revision F0 or later.

5.2 CPU boards 815E (ETX)

Model number	Short description	Note
5PC600.E815-00	**CPU board 815E C3-400** CPU board Intel Celeron 3, 400 MHz, 100 MHz FSB, 256 kB L2 cache, 815E chipset; 1 socket for SO-DIMM SDRAM module.	Cancelled since 10/2005 Replaced by 855GME (ETX / XTX) CPU boards See page 179
5PC600.E815-02	**CPU board 815E C3-733** CPU board Intel Celeron 3, 733 MHz, 133 MHz FSB, 256 kB L2 cache, 815E chipset; 1 socket for SO-DIMM SDRAM module.	
5PC600.E815-03	**CPU board 815E C3-1000** CPU board Intel Celeron 3, 1000 MHz, 133 MHz FSB, 256 kB L2 cache, 815E chipset; 1 socket for SO-DIMM SDRAM module.	

Table 5: Model numbers - 815E (ETX) CPU boards

5.3 CPU boards 855GME (ETX)

Model number	Short description	Note
5PC600.E855-00	**CPU board 855GME PM-1100** CPU board Intel Pentium M, 1100 MHz, 400 MHz FSB, 1 MB L2 cache; 855GME chipset; 1 socket for SO-DIMM DDR RAM module.	See page 181
5PC600.E855-01	**CPU board 855GME PM-1600** CPU board Intel Pentium M, 1600 MHz, 400 MHz FSB, 1 MB L2 cache; 855GME chipset; 1 socket for SO-DIMM DDR RAM module.	See page 181
5PC600.E855-02	**CPU board 855GME PM-1400** CPU board Intel Pentium M, 1400 MHz, 400 MHz FSB, 2 MB L2 cache; 855GME chipset; 1 socket for SO-DIMM DDR RAM module.	See page 181
5PC600.E855-03	**CPU board 855GME PM-1800** CPU board Intel Pentium M, 1800 MHz, 400 MHz FSB, 2 MB L2 cache; 855GME chipset; 1 socket for SO-DIMM DDR RAM module.	See page 181
5PC600.E855-04	**CPU board 855GME CM-600** CPU board Intel Celerom M, 600 MHz, 400 MHz FSB, 512 kB L2 cache; 855GME chipset; 1 socket for SO-DIMM DDR RAM module.	See page 181
5PC600.E855-05	**CPU board 855GME CM-1000** CPU board Intel Celeron M, 1000 MHz, 400 MHz FSB, 512 kB L2 cache; 855GME chipset; 1 socket for SO-DIMM DDR module.	See page 181

Table 6: Model numbers - 855GME (ETX) CPU boards

5.4 CPU boards 855GME (XTX)

Model number	Short description	Note
5PC600.X855-00	**CPU board 855GME PM-1100** CPU board Intel Pentium M, 1100 MHz, 400 MHz FSB, 1 MB L2 cache; 855GME chipset; 1 socket for SO-DIMM DDR RAM module.	See page 183
5PC600.X855-01	**CPU board 855GME PM-1600** CPU board Intel Pentium M, 1600 MHz, 400 MHz FSB, 1 MB L2 cache; 855GME chipset; 1 socket for SO-DIMM DDR RAM module.	See page 183
5PC600.X855-02	**CPU board 855GME PM-1400** CPU board Intel Pentium M, 1400 MHz, 400 MHz FSB, 2 MB L2 cache; 855GME chipset; 1 socket for SO-DIMM DDR RAM module.	See page 183
5PC600.X855-03	**CPU board 855GME PM-1800** CPU board Intel Pentium M, 1800 MHz, 400 MHz FSB, 2 MB L2 cache; 855GME chipset; 1 socket for SO-DIMM DDR RAM module.	See page 183
5PC600.X855-04	**CPU board 855GME CM-600** CPU board Intel Celerom M, 600 MHz, 400 MHz FSB, 512 kB L2 cache; 855GME chipset; 1 socket for SO-DIMM DDR RAM module.	See page 183
5PC600.X855-05	**CPU board 855GME CM-1000** CPU board Intel Pentium M, 1000 MHz, 400 MHz FSB, 512 kB L2 cache; 855GME chipset; 1 socket for SO-DIMM DDR RAM module.	See page 183

Table 7: Model numbers - 855GME (XTX) CPU boards

5.5 Heat sink

Model number	Short description	Note
5AC600.HS01-00	**APC620 heat sink 815E (ETX) 12.8mm** For APC620 system units with Intel 815E CPU Boards (ETX) with Celeron 3 400 MHz, Celeron 3 733 MHz, Celeron 3 1000 MHz.	Cancelled since 10/2005 Replaced by heat sinks for 855GME boards (ETX / XTX) See page 185
5AC600.HS01-01	**APC620 heat sink 855GME (ETX / XTX) 12.8mm** For APC620 system units with Intel 855GME CPU boards (ETX / XTX) with Celeron M 600 MHz, Celeron M 1000, Pentium M 1100 MHz, Pentium M 1400 MHz.	See page 185
5AC600.HS01-02	**APC620 heat sink 855GME (ETX / XTX) 28mm** for APC620 system units with Intel 855GME CPU boards (ETX / XTX) with Pentium M 1600 MHz, Pentium M 1800 MHz.	See page 185
5AC600.HS02-01	**APC620f heat sink 855GME (ETX / XTX) 12.8mm** For APC620 full-size system units with Intel 855GME CPU boards (ETX / XTX) with Celeron M 600 MHz, Celeron M 1000, Pentium M 1100 MHz, Pentium M 1400 MHz.	See page 185
5AC600.HS02-02	**APC620f heat sink 855GME (ETX / XTX) 28mm** for APC620 full-size system units with Intel 855GME CPU boards (ETX / XTX) with Pentium M 1600 MHz, Pentium M 1800 MHz.	See page 185
5AC600.HS03-01	**APC620 embedded heat sink (855GME XTX) 12.8 mm** Heat sink for APC620 embedded system units with Celeron® M 600 MHz (5PC600.X855-04), Celeron® M 1000 MHz (5PC600.X855-05), Pentium® M 1100 MHz (5PC600.X855-00) and Pentium® M 1400 MHz (5PC600.X855-02).	See page 185

Table 8: Model numbers - Heat sinks

5.6 Main memory

Model number	Short description	Note
5MMSDR.0128-01	**SO-DIMM SDRAM, 128 MB PC133** SO-DIMM SDRAM 128 MB PC133 for 815E CPU boards (ETX).	Cancelled since 10/2005 Replaced by main memory for 855GME boards (ETX / XTX) See page 186
5MMSDR.0256-01	**SO-DIMM SDRAM, 256 MB PC133** SO-DIMM SDRAM 256 MB PC133 for 815E CPU boards (ETX).	
5MMSDR.0512-01	**SO-DIMM SDRAM, 512 MB PC133** SO-DIMM SDRAM 512 MB PC133 for 815E CPU boards (ETX).	
5MMDDR.0256-00	**SO-DIMM DDR-SDRAM 256 MB PC2700** SO-DIMM DDR-SDRAM 256 MB PC2700 for 855GME CPU boards (ETX / XTX).	See page 186
5MMDDR.0512-00	**SO-DIMM DDR-SDRAM 512 MB PC2700** SO-DIMM DDR-SDRAM 512 MB PC2700 for 855GME CPU boards (ETX / XTX).	See page 186
5MMDDR.1024-00	**SO-DIMM DDR-SDRAM 1024 MB PC2700** SO-DIMM DDR-SDRAM 1024 MB PC2700 for 855GME CPU boards (ETX / XTX).	See page 186

Table 9: Model numbers - Main memory

5.7 Drives

Model number	Short description	Note
5AC600.HDDI-00	**Add-on hard disk 30 GB 24x7** 30 GB hard disk (add-on); ideal for 24 hour operation (24x7). For installation in an APC620 or PPC700.	Cancelled since 04/2007. Replaced by: 5AC600.HDDI-05. See page 190
5AC600.HDDI-01	**Add-on hard disk 20 GB ET** 20 GB hard disk (add-on), with expanded temperature range (ET). For installation in an APC620 or PPC700.	Cancelled since 04/2007. Replaced by: 5AC600.HDDI-05. See page 190
5AC600.HDDI-02	**Add-on hard disk 40 GB 24x7** 40 GB hard disk (add-on); ideal for 24 hour operation (24x7). For installation in an APC620 or PPC700.	Cancelled since 08/2006. Replaced by: 5AC600.HDDI-05. See page 193
5AC600.HDDI-03	**Add-on hard disk 60 GB 24x7** 60 GB hard disk (add-on); ideal for 24 hour operation (24x7). For installation in an APC620 or PPC700.	Cancelled since 10/2007. Replaced by: 5AC600.HDDI-06. See page 196
5AC600.HDDI-04	**Add-on hard disk 80 GB 24x7** 80 GB hard disk (add-on); ideal for 24 hour operation (24x7). For installation in an APC620 or PPC700.	Cancelled since 10/2007. Replaced by: 5AC600.HDDI-06. See page 199
5AC600.HDDI-05	**Add-on hard disk 40 GB, 24x7, ET** 40 GB hard disk (add-on); Suitable for 24 hour operation (24x7) as well as for operation in the extended temperature range (ET). For installation in an APC620 or PPC700.	See page 202
5AC600.HDDI-06	**Add-on hard disk 80 GB, 24x7, ET** 80 GB hard disk (add-on); Suitable for 24 hour operation (24x7) as well as for operation in the extended temperature range (ET). For installation in an APC620 or PPC700.	See page 205
5AC600.CDXS-00	**Slide-in CD-ROM** CD-ROM drive (slide-in); for operation in a slide-in drive slot in an APC620 or PPC700 system.	See page 209
5AC600.CFSI-00	**Add-on CompactFlash slot** CompactFlash slot (add-on); for installation in an APC620 or PPC700.	See page 208

Table 10: Model numbers - Drives

Model number	Short description	Note
5AC600.CFSS-00	**Slide-in CF 2-slot** Slide-in CompactFlash adapter for 2 CompactFlash cards (via IDE and USB 2.0)	See page 220
5AC600.DVDS-00	**Slide-in DVD-ROM/CD-RW** DVD-ROM/CD-RW drive (slide-in); for operation in a slide-in drive slot in an APC620 or PPC700 system.	See page 212
5AC600.DVRS-00	**Slide-in DVD-R/RW, DVD+R/RW** DVD-RW drive (slide-in); for operation in a drive slot in an APC620 or PPC700 system.	See page 215
5AC600.FDDS-00	**Slide-in USB floppy disk drive** FDD drive (slide-in); for operation in a slide-in drive slot in an APC620 or PPC700 system.	See page 222
5AC600.HDDS-00	**30 GB 24/7 slide-in hard disk** 30 GB hard disk (slide-in); ideal for 24 hour operation (24x7). For use in a slide-in drive slot in an APC620 or PPC700 system.	Cancelled since 04/2007. Replaced by: 5AC600.HDDS-02. See page 225
5AC600.HDDS-01	**20 GB ET slide-in hard disk** 20 GB hard disk (slide-in); with expanded temperature range (ET). For use in a slide-in drive slot in an APC620 or PPC700 system.	Cancelled since 04/2007. Replaced by: 5AC600.HDDS-02. See page 228
5AC600.HDDS-02	**40 GB 24x7 ET slide-in hard disk** 40 GB hard disk (add-on); Suitable for 24 hour operation (24x7) as well as for operation in the extended temperature range (ET). For use in a slide-in drive slot in an APC620 or PPC700 system.	See page 231
5ACPCI.RAIC-00	**PCI RAID controller ATA/100** PCI Raid controller	Cancelled since 07/2007. Replaced by: 5ACPCI.RAIC-03. See page 235
5ACPCI.RAIC-01	**PCI SATA RAID system 2 x 60 GB 24x7** PCI Raid controller + 2 x 60 GB SATA hard disk; ideal for 24 hour operation (24x7). Requires a free PCI slot.	Cancelled since 04/2008 Replacement type 5ACPCI.RAIC-03 See page 243
5ACPCI.RAIC-02	**Replacement SATA-HDD 60 GB** 1 piece Hard disk 60 GB SATA, replacement part for 5ACPCI.RAIC-01	See page 248
5ACPCI.RAIC-03	**PCI SATA RAID system 2 x 160 GB 24x7, ET** PCI Raid controller + 2 x 160 GB SATA hard disk; Suitable for 24 hour operation (24x7) as well as for operation in the extended temperature range (ET). Requires a free PCI slot.	See page 251
5ACPCI.RAIC-04	**Replacement SATA-HDD 160 GB** 1 piece Hard disk 160 GB SATA, replacement part for 5ACPCI.RAIC-03	See page 256
5ACPCI.RAIS-00	**PCI RAID storage 2 x 40 GB** PCI Raid hard disk 2 x 40 GB	Cancelled since 06/2006 Replacement type 5ACPCI.RAIC-03 See page 237
5ACPCI.RAIS-01	**PCI RAID storage 2 x 60 GB** PCI Raid hard disk 2 x 60 GB	Cancelled since 01/2007 Replacement type 5ACPCI.RAIC-03 See page 240

Table 10: Model numbers - Drives (Forts.)

5.8 Interface options

Model number	Short description	Note
5AC600.CANI-00	**Add-on CAN interface** CAN interface for installation in an APC620 or PPC700.	See page 259
5AC600.485I-00	**Add-on RS232/422/485 interface** Add-on RS232/422/485 interface for installation in an APC620 and PPC700.	See page 263

Table 11: Model numbers - Interfaces

5.9 Fan kits

Model number	Short description	Note
5PC600.FA01-00	**Fan kit 1PCI** APC620 fan kit, for system units with 1 PCI slot.	See page 267
5PC600.FA02-00	**Fan kit 2PCI** APC620 fan kit + filter clasp for system units with 2 PCI slots.	See page 268
5PC600.FA03-00	**Fan kit 3PCI** APC620 fan kit + filter clasp for system units with 3 PCI slots.	See page 270
5PC600.FA05-00	**Fan kit 5PCI** APC620 fan kit + filter clasp for system units with 5 PCI slots.	See page 271

Table 12: Model numbers - Fan kits

5.10 AP Link cards

Model number	Short description	Note
5AC600.SDL0-00	**AP Link SDL transmitter** APC620 Smart Display Link Transmitter, to connect an Automation Panel via SDL to an APC620.	See page 273

Table 13: Model numbers - AP Link graphics adapter

5.11 Accessories

5.11.1 Supply voltage connectors

Model number	Short description	Note
0TB103.9	**Plug 24V 5.08 3-pin screw clamps** 24 VDC 3-pin connector, female. Screw clamp, 3.31mm²; protected against vibration by the screw flange.	See page 618
0TB103.91	**Plug 24V 5.08 3-pin cage clamps** 24 VDC 3-pin connector, female. cage clamps, 3.31mm²; protected against vibration by the screw flange.	See page 618

Table 14: Model numbers - Supply voltage connectors

5.11.2 X2X and CAN plugs

Model number	Short description	Note
0TB704.9	**Terminal block, 4-pin,** Screw clamp, 1.5 mm²	See page 620
0TB704.91	**Terminal block, 4-pin,** cage clamps, 2.5 mm²	See page 620

Table 15: Model numbers - X2X and CAN plug

5.11.3 Batteries

Model number	Short description	Note
0AC201.91	**Lithium batteries, 4 pcs**. Lithium batteries, 4 pcs., 3 V / 950 mAh, button cell	See page 621
4A0006.00-000	**Lithium battery, 1 pc.** Lithium batteries, 1 pcs., 3 V / 950 mAh, button cell	See page 621

Table 16: Model numbers - Batteries

5.11.4 CompactFlash cards

Model number	Short description	Note
5CFCRD.0512-04	**CompactFlash 512 MB B&R** CompactFlash card with 512 MB SLC NAND flash and IDE/ATA interface	See page 625
5CFCRD.1024-04	**CompactFlash 1024 MB B&R** CompactFlash card with 1024 MB SLC NAND flash and IDE/ATA interface	See page 625
5CFCRD.2048-04	**CompactFlash 2048 MB B&R** CompactFlash card with 2048 MB SLC NAND flash and IDE/ATA interface	See page 625
5CFCRD.4096-04	**CompactFlash 4096 MB B&R** CompactFlash card with 4096 MB SLC NAND flash and IDE/ATA interface	See page 625
5CFCRD.8192-04	**CompactFlash 8192 MB B&R** CompactFlash card with 8192 MB SLC NAND flash and IDE/ATA interface	See page 625
5CFCRD.016G-04	**CompactFlash 16 GB B&R** CompactFlash card with 16 GB SLC NAND flash and IDE/ATA interface	See page 625
5CFCRD.0064-03	**CompactFlash 64 MB SSI** CompactFlash card with 64 MB SLC NAND flash and IDE/ATA interface	See page 630
5CFCRD.0128-03	**CompactFlash 128 MB SSI** CompactFlash card with 128 MB SLC NAND flash and IDE/ATA interface	See page 630
5CFCRD.0256-03	**CompactFlash 256 MB SSI** CompactFlash card with 256 MB SLC NAND flash and IDE/ATA interface	See page 630
5CFCRD.0512-03	**CompactFlash 512 MB SSI** CompactFlash card with 512 MB SLC NAND flash and IDE/ATA interface	See page 630
5CFCRD.1024-03	**CompactFlash 1024 MB SSI** CompactFlash card with 1024 MB SLC NAND flash and IDE/ATA interface	See page 630
5CFCRD.2048-03	**CompactFlash 2048 MB SSI** CompactFlash card with 2048 MB SLC NAND flash and IDE/ATA interface	See page 630
5CFCRD.4096-03	**CompactFlash 4096 MB SSI** CompactFlash card with 4096 MB SLC NAND flash and IDE/ATA interface	See page 630
5CFCRD.8192-03	**CompactFlash 8192 MB SSI** CompactFlash card with 8192 MB SLC NAND flash and IDE/ATA interface	See page 630
5CFCRD.0032-02	**CompactFlash 32 MB SanDisk/A** CompactFlash card with 32 MB NAND flash and IDE/ATA interface.	Cancelled since 12/2005 Replaced by 5CFCRD.0064-03 See page 634
5CFCRD.0064-02	**CompactFlash 64 MB SanDisk/A** CompactFlash card with 64 MB NAND flash and IDE/ATA interface.	Cancelled since 12/2005 Replaced by 5CFCRD.0064-03 See page 634

Table 17: Model numbers - CompactFlash cards

Model number	Short description	Note
5CFCRD.0128-02	**CompactFlash 128 MB SanDisk/A** CompactFlash card with 128 MB NAND flash and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.0128-03 See page 634
5CFCRD.0256-02	**CompactFlash 256 MB SanDisk/A** CompactFlash card with 256 MB NAND flash and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.0256-03 See page 634
5CFCRD.0512-02	**CompactFlash 512 MB SanDisk/A** CompactFlash card with 512 MB NAND flash and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.0512-03 See page 634
5CFCRD.1024-02	**CompactFlash 1024 MB SanDisk/A** CompactFlash card with 1024 MB NAND flash and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.1024-03 See page 634
5CFCRD.2048-02	**CompactFlash 2048 MB SanDisk/A** CompactFlash card with 2048 MB NAND flash and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.2048-03 See page 634

Table 17: Model numbers - CompactFlash cards (Forts.)

5.11.5 USB flash drives

Model number	Short description	Note
5MMUSB.0128-00	**USB flash drive 128 MB SanDisk** USB 2.0 flash drive 128 MB	Cancelled since 12/2005 Replaced by 5MMUSB.2048-00 See page 657
5MMUSB.0256-00	**USB flash drive 256 MB SanDisk** USB 2.0 flash drive 256 MB	Cancelled since 03/2007 Replaced by 5MMUSB.2048-00 See page 657
5MMUSB.0512-00	**USB flash drive 512 MB SanDisk** USB 2.0 flash drive 512 MB	Cancelled since 07/2007 Replaced by 5MMUSB.2048-00 See page 657
5MMUSB.1024-00	**USB flash drive 1 GB SanDisk** USB 2.0 flash drive 1 GB	Cancelled since 03/2007 Replaced by 5MMUSB.2048-00 See page 657
5MMUSB.2048-00	**USB flash drive 2 GB SanDisk** USB 2.0 flash drive 2 GB	See page 657
5MMUSB.2048-01	**USB flash drive 2 GB B&R** USB 2.0 flash drive 2 GB	See page 660

Table 18: Model numbers - USB flash drives

5.11.6 Cables

Model number	Description	Note
5CAMSC.0001-00	**APC620 internal supply cable**	See page 667
5CADVI.0018-00	**DVI-D cable 1.8 m** Single cable, DVI-D/m:DVI-D/m; length: 1.8 m	See page 668

Table 19: Model numbers - Cables

Model number	Description	Note
5CADVI.0050-00	**DVI-D cable 5 m** Single cable, DVI-D/m:DVI-D/m; length: 5 m	See page 668
5CADVI.0100-00	**DVI-D cable 10 m** Single cable, DVI-D/m:DVI-D/m; length: 10 m	See page 668
5CASDL.0018-00	**SDL cable 1.8 m** SDL cable for a fixed type of layout; length: 1.8 m	See page 671
5CASDL.0018-01	**SDL cable 1.8 m 45°** SDL cable for fixed type of layout with one-sided 45° plug; length: 1.8 m	See page 674
5CASDL.0018-03	**1.8 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 1.8 m	See page 681
5CASDL.0050-00	**SDL cable 5 m** SDL cable for a fixed type of layout; length: 5 m	See page 671
5CASDL.0050-01	**SDL cable 5 m 45°** SDL cable for fixed type of layout with one-sided 45° plug; length: 5 m	See page 674
5CASDL.0050-03	**5 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 5 m	See page 681
5CASDL.0100-00	**SDL cable 10 m** SDL cable for a fixed type of layout; length: 10 m	See page 671
5CASDL.0100-01	**SDL cable 10 m 45°** SDL cable for fixed type of layout with one-sided 45° plug; length: 10 m	See page 674
5CASDL.0100-03	**10 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 10 m	See page 681
5CASDL.0150-00	**SDL cable 15 m** SDL cable for a fixed type of layout; length: 15 m	See page 671
5CASDL.0150-01	**SDL cable 15 m 45°** SDL cable for fixed type of layout with one-sided 45° plug; length: 15 m	See page 674
5CASDL.0150-03	**15 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 15 m	See page 681
5CASDL.0200-00	**SDL cable 20 m** SDL cable for a fixed type of layout; length: 20 m	See page 671
5CASDL.0200-03	**20 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 20 m	See page 681
5CASDL.0250-00	**SDL cable 25 m** SDL cable for a fixed type of layout; length: 25 m	See page 671
5CASDL.0250-03	**25 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 25 m	See page 681
5CASDL.0300-00	**SDL cable 30 m** SDL cable for a fixed type of layout; length: 30 m	See page 671
5CASDL.0300-03	**30 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 30 m	See page 681
5CASDL.0300-10	**30 m SDL cable with extender** SDL cable with extender for a fixed type of layout; length 30 m	Cancelled since 12/2006 Replaced by 5CASDL.0300-13 See page 677
5CASDL.0300-13	**30 m SDL flex cable with extender** SDL cable with extender for fixed and flexible type of layout; length: 30 m	See page 686

Table 19: Model numbers - Cables (Forts.)

Model number	Description	Note
5CASDL.0400-10	**40 m SDL cable with extender** SDL cable with extender for a fixed type of layout; length 40 m	Cancelled since 12/2006 Replaced by 5CASDL.0400-13 See page 677
5CASDL.0400-13	**40 m SDL flex cable with extender** SDL cable with extender for fixed and flexible type of layout; length: 40 m	See page 686
5CAUSB.0018-00	**USB 2.0 cable, A/m:B/m 1.8 m** USB 2.0 connection cable; plug type A - type B; length 1.8 m	See page 693
5CAUSB.0050-00	**USB 2.0 cable, A/m:B/m 5 m** USB 2.0 connection cable; plug type A - type B; length 5 m	See page 693
9A0014.02	**RS232 cable DB9/f:DB9/m 1.8 m** RS232 extension cable for remote operation of a display unit with touch screen, length 1.8 m.	See page 691
9A0014.05	**RS232 cable DB9/f:DB9/m 5 m** RS232 extension cable for remote operation of a display unit with touch screen, length 5 m.	See page 691
9A0014.10	**RS232 cable DB9/f:DB9/m 10 m** RS232 extension cable for remote operation of a display unit with touch screen, length 10 m.	See page 691

Table 19: Model numbers - Cables (Forts.)

5.11.7 UPS module + accessories

Model number	Short description	Note
5AC600.UPSI-00	**Add-on UPS module** UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (starting with Rev. H0), 5PC600.SX02-00 (starting with Rev. G0), 5PC600.SX02-01 (starting with Rev. H0), 5PC600.SX05-00 (starting with Rev. F0), 5PC600.SX05-01 (starting with Rev. F0), 5PC600.SF03-00 (starting with Rev. A0), 5PC810.SX*. 5PC820.1505-00, 5PC820.1906-00 Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately.	See page 699
5AC600.UPSB-00	**Battery unit 5 Ah** Battery unit 5Ah; for APC620, APC810 or PPC800 UPS.	See page 701
5CAUPS.0005-00	**APC620 UPS cable 0.5 m** Connection cable between add-on UPS module and UPS battery unit, length 0.5 meters	See page 705
5CAUPS.0030-00	**APC620 UPS cable 3 m** Connection cable between add-on UPS module and UPS battery unit, length 3 meters	See page 705

Table 20: Model numbers - UPS module + accessories

5.11.8 PCI Ethernet cards

Model number	Short description	Note
5ACPCI.ETH1-01	**PCI Ethernet card 10/100** half size PCI Ethernet card, 1 Ethernet connection	See page 708
5ACPCI.ETH3-01	**PCI Ethernet card 10/100 3port** half size PCI Ethernet card, 3 Ethernet connections	See page 710

Table 21: Model numbers - PCI Ethernet cards

5.11.9 Miscellaneous

Model number	Short description	Note
5A5003.03	**Front cover** Front cover for the USB 2.0 Media Drive 5MD900.USB2-00.	See page 655
5AC600.ICOV-00	**Interface covers** Interface covers for APC620 and PPC700 devices; 5 pieces	See page 623
5AC900.1000-00	**Adapter DVI-A/m to CRT DB15HD/f** Adapter DVI (plug) to CRT (socket), for connecting a standard monitor to a DVI-I interface.	See page 624
5AC600.SRAM-00	**APC620/PPC700 SRAM module 512kB** SRAM module for APC620 and PPC700 512 KB.	See page 713
5MD900.USB2-00	**USB 2.0 drive DVD-ROM/CD-RW FDD CF USB** USB 2.0 drive combination, consists of DVD-ROM/CD-RW, FDD, CompactFlash slot (type II), USB connection (type A front, type B back); 24 V DC.	Cancelled since 10/2006 Replacement type 5MD900.USB2-01 See page 643
5MD900.USB2-01	**USB 2.0 drive DVD-RW/CD-RW FDD CF USB** USB 2.0 drive combination, consists of DVD-R/RW/DVD+R/RW/CD-RW, FDD, CompactFlash slot (type II), USB connection (type A front, type B back); 24 V DC.	See page 650
5AC600.FA01-00	**APC620 replacement fan filter 1PCI 5 piece** APC620 replacement fan filter for system unit with 1 PCI Slot (5PC600.SX01-00).	See page 712
5AC600.FA02-00	**APC620 replacement fan filter 1PCI 5 piece** APC620 replacement fan filter for system unit with 2 PCI slot (5PC600.SX02-00, 5PC600.SX02-01).	See page 712
5AC600.FA03-00	**APC620f replacement fan filter 1PCI 5 piece** APC620 replacement fan filter for system unit with 3 PCI Slots (5PC600.SF03-00).	See page 712
5AC600.FA05-00	**APC620 replacement fan filter 1PCI 5 piece** APC620 replacement fan filter for system units with 5 PCI slot (5PC600.SX02-00, 5PC600.SX02-01).	See page 712
0PS102.0	**Power supply, 1-phase, 2.1 A** 24 VDC power supply, 1-phase, 2.1 A, input 100-240 VAC, wide range, DIN rail mounting	See page 716
0PS104.0	**Power supply, 1-phase, 4.2 A** 24 VDC power supply, 1 phase, 4.2 A, input 115/230 VAC, auto select, DIN rail mounting	See page 716
0PS105.1	**Power supply, 1-phase, 5 A** 24 VDC power supply, 1 phase, 5 A, input 115/230 VAC, manual select, DIN rail mounting	See page 716
0PS105.2	**Power supply, 1-phase, 5 A, redundant** 24 VDC power supply, 1 phase, 5 A, redundant through parallel operation, input 115/230 VAC, manual select, DIN rail mounting	See page 716
0PS110.1	**Power supply, 1-phase, 10 A** 24 VDC power supply, 1 phase, 10 A, input 115/230 VAC, manual select, DIN rail mounting	See page 716
0PS110.2	**Power supply, 1-phase, 10 A, redundant** 24 VDC power supply, 1 phase, 10 A, redundant through parallel operation, input 115/230 VAC, manual select, DIN rail mounting	See page 716
0PS120.1	**Power supply, 1-phase, 20 A** 24 VDC power supply, 1 phase, 20 A, input 115/230 VAC, auto select, DIN rail mounting	See page 716
0PS305.1	**Power supply, 3-phase, 5 A** 24 VDC power supply, 3-phase, 5 A, input 400..500 VAC (3 phases), wide range, DIN rail mounting	See page 716

Table 22: Model numbers - Other items

Model number	Short description	Note
0PS310.1	**Power supply, 3-phase, 10 A** 24 VDC power supply, 3-phase, 10 A, input 400..500 VAC (3 phases), wide range, DIN rail mounting	See page 716
0PS320.1	**Power supply, 3-phase, 20 A** 24 VDC power supply, 3-phase, 20 A, input 400..500 VAC (3 phases), wide range, DIN rail mounting	See page 716
0PS340.1	**Power supply, 1-phase, 40 A** 24 VDC power supply, 3 phase, 40 A, input 115/230 VAC, auto select, DIN rail mounting	See page 716
5SWHMI.0000-00	**HMI Drivers & Utilities DVD**	See page 662

Table 22: Model numbers - Other items (Forts.)

5.12 Software

Model number	Short description	Note
9S0000.01-010	**OEM MS-DOS 6.22 German (disk)** OEM MS-DOS 6.22 German disks Only delivered with a new PC.	See page 546
9S0000.01-020	**OEM MS-DOS 6.22 English (disk)** OEM MS-DOS 6.22 English disks Only delivered with a new PC.	See page 546
9S0000.08-010	**OEM Microsoft Windows XP Professional** CD, German; Only delivered with a new PC.	Cancelled since 10/2008 See page 548
9S0000.08-020	**OEM Microsoft Windows XP Professional** CD, English; Only delivered with a new PC.	Cancelled since 10/2008 See page 548
9S0000.09-090	**OEM Microsoft Windows XP Professional Multilanguage** CDs; Only delivered with a new PC.	Cancelled since 10/2008 See page 548
5SWWXP.0600-GER	**WinXP Professional with SP3, CD German** Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a new device.	See page 548
5SWWXP.0600-ENG	**WinXP Professional with SP3, CD English** Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a new device.	See page 548
5SWWXP.0600-MUL	**WinXP Professional with SP3, CD, Multi-language** Microsoft OEM Windows XP Professional Service Pack 3, CD, multi-language. Only available with a new device.	See page 548
5SWWXP.0500-GER	**WinXP Professional with SP2c, CD German** Microsoft OEM Windows XP Professional Service Pack 2c, CD, German. Only available with a new device.	See page 548
5SWWXP.0500-ENG	**WinXP Professional with SP2c, CD English** Microsoft OEM Windows XP Professional Service Pack 2c, CD, English. Only available with a new device.	See page 548
5SWWXP.0500-MUL	**WinXP Professional with SP2c, CD, Multi-language** Microsoft OEM Windows XP Professional Service Pack 2c, CD, multi-language. Only available with a new device.	See page 548

Table 23: Model numbers - Software

Model number	Short description	Note
9S0001.19-020	**OEM Microsoft Windows XP Embedded APC620 815E w/CF, English** 512 MB CompactFlash card with Windows XP Embedded image for APC620 systems with a 815E CPU board. Only delivered with a new PC.	Cancelled since 10/2005 See page 564
9S0001.20-020	**OEM Microsoft Windows XP Embedded APC620 855GME w/CF, English** 512 MB CompactFlash card with Windows XP Embedded image for APC620 systems with a 855GME CPU board. Only delivered with a new PC.	Cancelled since 10/2007 Replacement type 5SWWXP.0412-ENG See page 564
9S0001.27-020	**OEM Microsoft Windows XP Embedded (incl. SP2) APC620 815E w/CF, English** 512 MB CompactFlash card with Windows XP Embedded image including SP2 for APC620 systems with a 815E CPU board. Only delivered with a new PC.	Canceled since 10/2005 See page 564
9S0001.28-020	**OEM Microsoft Windows XP Embedded (incl. SP2) APC620 855GME w/CF, English** 512 MB CompactFlash card with Windows XP Embedded image including SP2 for APC620 systems with a 855GME CPU board. Only delivered with a new PC.	Cancelled since 10/2007 Replacement type 5SWWXP.0412-ENG See page 564
5SWWXP.0412-ENG	**WinXPe FP2007 APC620 E855GME** Order Microsoft Windows XP Embedded English, Feature Pack 2007, for APC620 with CPU boards 5PC600.E855-00, 5PC600.E855-01, 5PC600.E855-02, 5PC600.E855-03, 5PC600.E855-04, 5PC600.E855-05; CompactFlash separately (at least 512 MB). Only delivered with a new PC.	See page 564
5SWWXP.0413-ENG1)	**WinXPe FP2007 APC620 X855GME** Order Microsoft Windows XP Embedded English, Feature Pack 2007, for APC620 with CPU boards 5PC600.X855-00, 5PC600.X855-01, 5PC600.X855-02, 5PC600.X855-03, 5PC600.X855-04, 5PC600.X855-05; CompactFlash separately (at least 512 MB). Only delivered with a new PC.	See page 564
5SWWXP.0712-ENG	**Windows Embedded Standard 2009 APC620 855GME ETX** Microsoft OEM Windows Embedded, Standard 2009, English; for APC620 with ETX CPU board with 855GME chipset; order CompactFlash separately (at least 1 GB).	See page 568
5SWWXP.0713-ENG	**Windows Embedded Standard 2009 APC620 855GME XTX** Microsoft OEM Windows Embedded, Standard 2009, English; for APC620 with XTX CPU board with 855GME chipset; order CompactFlash separately (at least 1 GB).	See page 568
9S0001.29-020	**WinCE5.0 Pro license** OEM Microsoft Windows CE 5.0 Professional, English, license, only supplied together with a device.	Cancelled since 07/2007 See page 571
9S0001.32-020	**WinCE5.0 Pro APC620,PPC700** OEM Microsoft Windows CE 5.0 Professional; for APC620 and PPC700 with Intel 855GME chipset, English; preinstalled on 128 MB CompactFlash card.	Cancelled since 07/2007 Replacement type: 5SWWCE.0512-ENG See page 571
5SWWCE.0512-ENG	**WinCE5.0 Pro APC620 E855GME** Order Microsoft Windows CE 5.0 Professional, English, including license, for APC620 with CPU boards 5PC600.E855-00, 5PC600.E855-01, 5PC600.E855-02, 5PC600.E855-03, 5PC600.E855-04, 5PC600.E855-05; CompactFlash separately (at least 128 MB).	See page 571
5SWWCE.0513-ENG	**WinCE5.0 Pro APC620 X855GME** Order Microsoft Windows CE 5.0 Professional, English, including license, for APC620 with CPU boards 5PC600.X855-00, 5PC600.X855-01, 5PC600.X855-02, 5PC600.X855-03, 5PC600.X855-04, 5PC600.X855-05; CompactFlash separately (at least 128 MB).	See page 571
9S0001.34-020	**WinCE5.0 ProPlus APC620,PPC700** OEM Microsoft Windows CE 5.0 Professional plus; for APC620 and PPC700 with Intel 855GME chipset, English; preinstalled on 128 MB CompactFlash card.	Cancelled since 07/2007 Replacement type: 5SWWCE.0612-ENG See page 571
9S0001.36-020	**WinCE5.0 ProPlus license** OEM Microsoft Windows CE 5.0 Professional plus, English, license, only supplied together with a device.	Cancelled since 07/2007 See page 571

Table 23: Model numbers - Software (Forts.)

Model number	Short description	Note
5SWWCE.0612-ENG	**WinCE5.0 ProPlus APC620 E855GME** Order Microsoft Windows CE 5.0 Professional Plus, English, including license, for APC620 with CPU boards 5PC600.E855-00, 5PC600.E855-01, 5PC600.E855-02, 5PC600.E855-03, 5PC600.E855-04, 5PC600.E855-05; CompactFlash separately (at least 128 MB).	See page 571
5SWWCE.0613-ENG	**WinCE5.0 ProPlus APC620 X855GME** Order Microsoft Windows CE 5.0 Professional Plus, English, including license, for APC620 with CPU boards 5PC600.X855-00, 5PC600.X855-01, 5PC600.X855-02, 5PC600.X855-03, 5PC600.X855-04, 5PC600.X855-05; CompactFlash separately (at least 128 MB).	See page 571
5SWWCE.0812-ENG	**WinCE6.0 Pro APC620 E855GME** Order Microsoft Windows CE 6.0 Professional, English, including license, for APC620 with CPU boards 5PC600.E855-00, 5PC600.E855-01, 5PC600.E855-02, 5PC600.E855-03, 5PC600.E855-04, 5PC600.E855-05; CompactFlash separately (at least 128 MB).	See page 571
5SWWCE.0813-ENG	**WinCE6.0 Pro APC620 X855GME** Order Microsoft Windows CE 6.0 Professional, English, including license, for APC620 with CPU boards 5PC600.X855-00, 5PC600.X855-01, 5PC600.X855-02, 5PC600.X855-03, 5PC600.X855-04, 5PC600.X855-05; CompactFlash separately (at least 128 MB).	See page 571

Table 23: Model numbers - Software (Forts.)

1) Support for Automation PC 620 embedded system units starting with Revision D0.

6. Typical topologies

6.1 APC620 embedded for central control and visualization

The control program runs on the APC620 embedded. The visualization project is integrated with Visual Components. A display unit is connected to the PC. The PC is networked via Ethernet TCP/IP; additional Power Panel-based operator terminals can also be connected via Ethernet. Communication to I/O systems with axes is handled via fieldbus systems (CAN bus, POWERLINK).

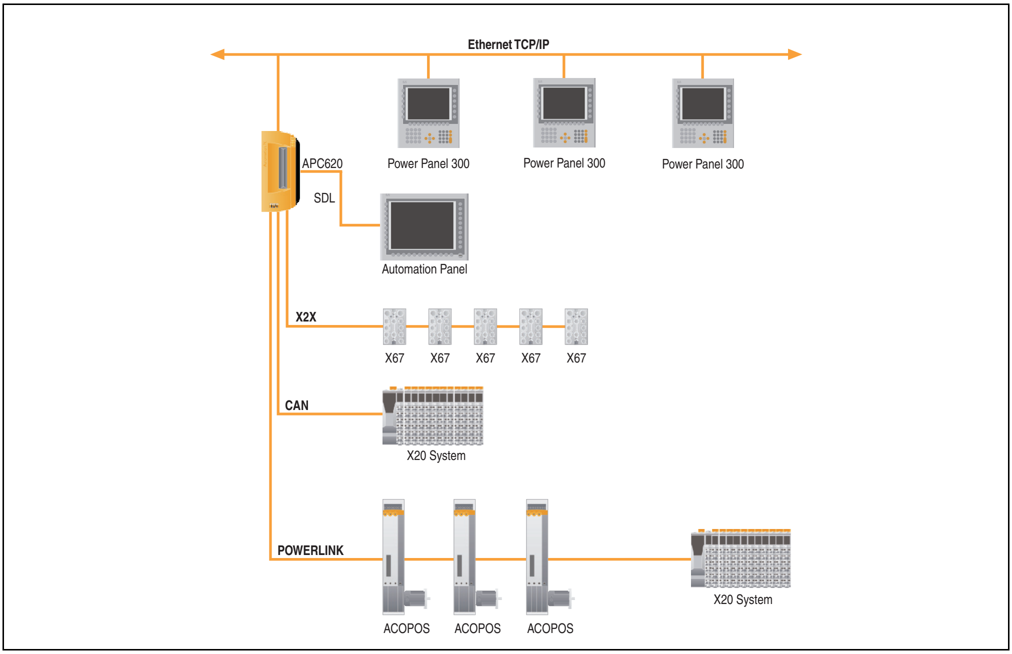


Figure 1: APC620 embedded for central control and visualization

6.2 APC620 as visualization device

The visualization runs on the APC620 as a SCADA application. Two display units are connected to the PC either locally or remotely. The control tasks interact with one or more underlying PLC stations where I/O systems and drives are connected locally or remotely over fieldbus systems. Additional SCADA stations can be networked via Ethernet TCP/IP.

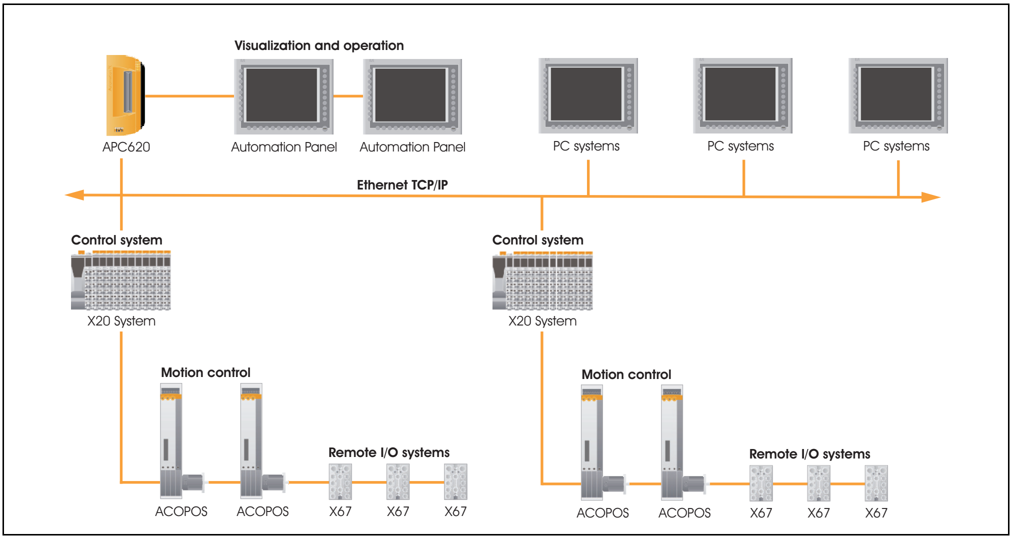


Figure 2: APC620 as visualization device

Chapter 2 • Technical Data

1. Introduction

With its structure, its many slots and well thought-out placement of interfaces and drives, the APC620 provides optimal adaptability and ergonomics. The APC620 saves space in the switching cabinet. Drive inserts (HDD, CD-ROM, DVD, burner, etc.) and up to two CompactFlash slots are hidden behind a cover on the front of the device.
The APC620 embedded additionally unites the fieldbus interfaces POWERLINK, CAN and X2X in a compact housing.

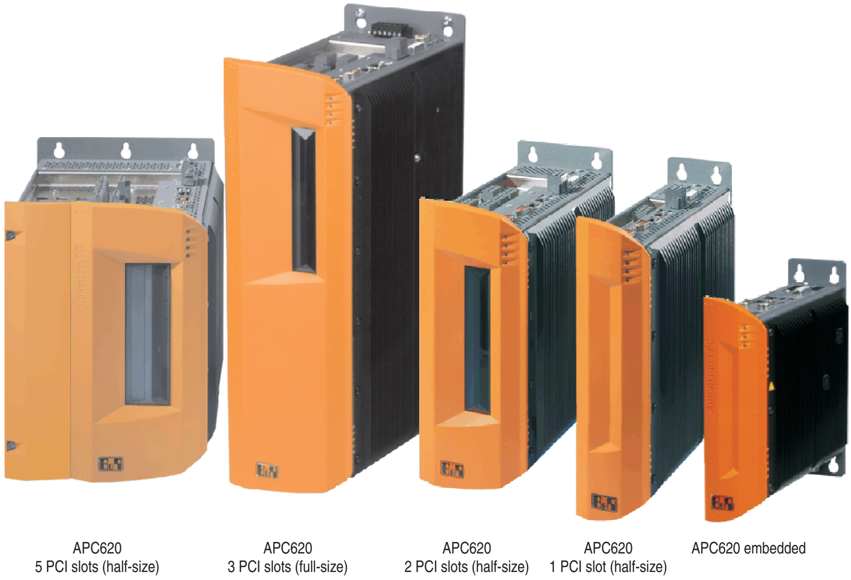


Figure 3: Automation PC 620 system overview

The APC620 with an Intel® Pentium® M processor and Intel® 855GME chipset is available for high-performance applications that require a powerful processor. These processors, developed specially for mobile computing, offer many advantages for industrial applications as well. They combine high computing capacity with low power consumption. The chipset contains an integrated graphic solution which provides optimal use of memory for the system and graphics.

1.1 Features

- Processors up to Pentium M 1.8 GHz (APC620 embedded only possible up to 1.4 GHz)
- CompactFlash slot (type I)
- Half-size / full-size PCI slots (PCI standard 2.2, 32-bit, PCI bus speed 33 MHz)
- AC97 sound
- USB 2.0
- 24 VDC supply voltage
- 2x Ethernet 10/100 MBit interfaces
- 2x RS232 Interface, modem compatible
- PS/2 keyboard/mouse (combined)
- CAN add-on interface
- Fieldbus interfaces[1] (POWERLINK, CAN and X2X)
- RS232/422/485 add-on interface
- Fan-free operation[2]
- BIOS
- Real-time clock, (RTC) battery-buffered
- Up to 1 GB main memory
- Connection of various display devices to the "Monitor/Panel" video output (supports RGB, DVI, and SDL - Smart Display Link - signals)
- Optional installation of add-on UPS APC620 module[3]
- Optional SRAM module[4] battery backed

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[1] Only on APC620 embedded system units.

[2] Dependent on the device configuration and the ambient temperature.

[3] Installation depends on the revision of the system unit: 5PC600.SX01-00 from Rev. H0, 5PC600.SX02-00 from Rev. G0, 5PC600.SX02-01 from Rev. H0, 5PC600.SX05-00 from Rev. F0, 5PC600.SX05-01 from Rev. F0.

[4] Installation depends on the revision of the system unit: 5PC600.SX01-00 from Rev. I0, 5PC600.SX02-00 from Rev. H0, 5PC600.SX02-01 from Rev. K0, 5PC600.SX05-00 from Rev. H0, 5PC600.SX05-01 from Rev. H0.

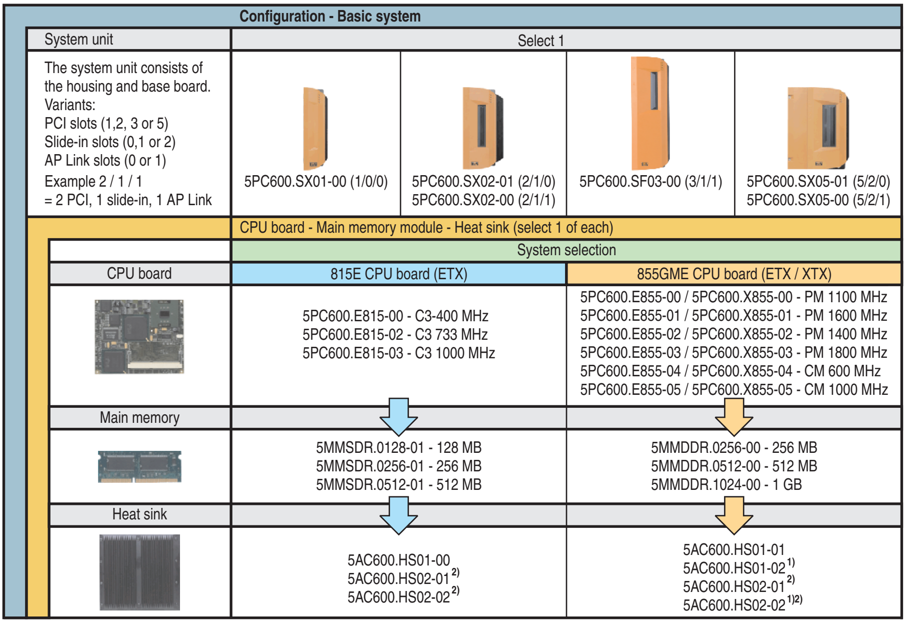
1.2 Structure / configuration APC620 with 1, 2, 3 and 5 PCI slots

The APC620 system can be assembled to meet individual requirements and operational conditions.

The following components are absolutely essential for operation:

- System unit
- CPU board
- Heat sink (CPU board dependent)
- Main memory (CPU board dependent)
- Drive (mass memory such as CompactFlash card or hard disk) for the operating system
- Software

1.2.1 Selection guide - basic system



Configuration - Basic system

System unit	Select 1			
The system unit consists of the housing and base board. Variants: PCI slots (1,2, 3 or 5) Slide-in slots (0,1 or 2) AP Link slots (0 or 1) Example 2 / 1 / 1 = 2 PCI, 1 slide-in, 1 AP Link	5PC600.SX01-00 (1/0/0)	5PC600.SX02-01 (2/1/0) 5PC600.SX02-00 (2/1/1)	5PC600.SF03-00 (3/1/1)	5PC600.SX05-01 (5/2/0) 5PC600.SX05-00 (5/2/1)

CPU board - Main memory module - Heat sink (select 1 of each)

	System selection	
CPU board	815E CPU board (ETX)	855GME CPU board (ETX / XTX)
	5PC600.E815-00 - C3-400 MHz 5PC600.E815-02 - C3 733 MHz 5PC600.E815-03 - C3 1000 MHz	5PC600.E855-00 / 5PC600.X855-00 - PM 1100 MHz 5PC600.E855-01 / 5PC600.X855-01 - PM 1600 MHz 5PC600.E855-02 / 5PC600.X855-02 - PM 1400 MHz 5PC600.E855-03 / 5PC600.X855-03 - PM 1800 MHz 5PC600.E855-04 / 5PC600.X855-04 - CM 600 MHz 5PC600.E855-05 / 5PC600.X855-05 - CM 1000 MHz
Main memory		
	5MMSDR.0128-01 - 128 MB 5MMSDR.0256-01 - 256 MB 5MMSDR.0512-01 - 512 MB	5MMDDR.0256-00 - 256 MB 5MMDDR.0512-00 - 512 MB 5MMDDR.1024-00 - 1 GB
Heat sink		
	5AC600.HS01-00 5AC600.HS02-01 2) 5AC600.HS02-02 2)	5AC600.HS01-01 5AC600.HS01-02 1) 5AC600.HS02-01 2) 5AC600.HS02-02 1)2)

1) Is required when using 855GME CPU boards 5PC600.E855-01 / 5PC600.X855-01 and 5PC600.E855-03 / 5PC600.X855-03.
2) Is required when using system unit 5PC600.SF03-00.

Figure 4: Selection guide - APC620 basic system with 1, 2, 3, and 5 PCI slots

Explanation:

1) Select a system unit.

2) System selection - Choose a CPU board variant (815E - ETX or 855GME - ETX / XTX).

3) Select one each of main memory and heat sink, based on selected CPU board.

4) Select optional components, based on selected system unit (see section 1.2.2 "Selection guide - Optional components", on page 57).

1.2.2 Selection guide - Optional components

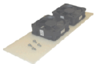
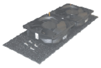
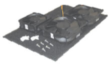
Configuration - optional				
System unit	Select 1			
The system unit consists of the housing and base board. Variants: PCI slots (1,2, 3 or 5) Slide-in slots (0,1 or 2) AP Link slots (0 or 1) Example 2 / 1 / 1 = 2 PCI, 1 slide-in, 1 AP Link	 5PC600.SX01-00 (1/0/0)	 5PC600.SX02-01 (2/1/0) 5PC600.SX02-00 (2/1/1)	 5PC600.SF03-00 (3/1/1)	 5PC600.SX05-01 (5/2/0) 5PC600.SX05-00 (5/2/1)
Fan kit (select 1)				
A fan kit may be required for some system configurations	 5PC600.FA01-00	 5PC600.FA02-00	 5PC600.FA03-00	 5PC600.FA05-00
Add-on drive	Select 1			
	5AC600.HDDI-05 (40 GB HDD - 24x7 operation and extended temp. range) 5AC600.HDDI-06 (80 GB HDD - 24x7 operation and extended temperature range) 5AC600.CFSI-00 (CompactFlash slot)			
Slide-in drives	not possible	Select max. 1		Select max. 2
		5AC600.CFSS-00 (2 CompactFlash slots) 5AC600.CDXS-00 (CD-ROM) 5AC600.DVDS-00 (DVD-ROM/CD-RW) 5AC600.DVRS-00 (DVD-R/RW DVD+R/RW) 5AC600.FDDS-00 (USB Floppy) 5AC600.HDDS-02 (40 GB HDD - 24x7 hours and extended temperature range)		
AP Link insert cards	not possible	Select 1		
for a second graphics line		5AC600.SDL0-00 Only possible when using a 5PC600.SX02-00, 5PC600.SX05-00 or 5PC600.SF03-00 together with an 855GME CPU board.		
RAID system	Select 1			
	5ACPCI.RAIC-03 (occupies 1 PCI Slot)			
Optional interface	Select 1			
	5AC600.CANI-00 (CAN) 5AC600.485I-00 (combined RS232/RS422/RS485)			
UPS module	Select 1			
	5AC600.UPSI-00 (Add-on UPS modul) Can only be installed starting with the following system unit revisions: 5PC600.SX01-00 Rev. H0, 5PC600.SX02 Rev. G0, 5PC600.SX02-01 Rev. H0, 5PC600.SX05-00 Rev. F0, 5PC600.SX05-01 Rev. F0			
SRAM module	Select 1			
	5AC600.SRAM-00 (Add-On SRAM Modul 512kB) Can only be installed starting with the following system unit revisions: 5PC600.SX01-00 Rev. I0, 5PC600.SX02 Rev. H0, 5PC600.SX02-01 Rev. K0, 5PC600.SX05-00 Rev. H0, 5PC600.SX05-01 Rev. H0			
Supply voltage plugs	Select 1			
	0TB103.9 (screw clamp) 0TB103.91 (cage clamp)			

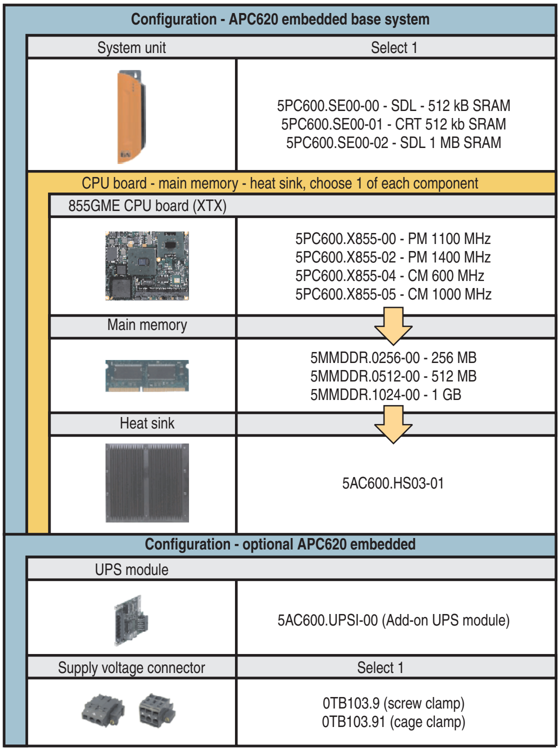
Figure 5: Selection guide - APC620 optional components with 1, 2, 3, and 5 PCI slots

Information:

- Depending on the system unit, a compatible fan kit can be installed in the APC620. Required for certain system configurations and ambient temperatures (see also sections 2.6 "Ambient temperatures for systems with an 815E CPU board (ETX)", on page 89 and 2.7 "Ambient temperatures for systems with an 855GME CPU board (ETX / XTX)", on page 93).
- Select optional drive(s) (add-on / slide-in), based on the system unit. One add-on drive can be installed in each system unit. Slide-in drives (1 or 2) are only available in certain system units.
- AP Link cards create a second graphics line (possibility of extended desktop or display clone operation) on the APC620. Only possible with system units 5PC600.SX02-00, 5PC600.SX05-00, 5PC600.SF03-00 and with an 855GME CPU board.
- An add-on interface adds an optional connection possibility.
- Depending on the revision of the system unit (see graphic), an optional integrated UPS add-on module can be installed.
- Depending on the revision of the system unit (see graphic), an optional integrated SRAM module (battery backed) can be installed.
- The appropriate power supply plugs ensure simple connection to the power supply.

1.3 Structure / configuration APC620 embedded

The following components are absolutely essential for operation: System unit, CPU board, main memory and heat sink.



Configuration - APC620 embedded base system

System unit	Select 1
	5PC600.SE00-00 - SDL - 512 kB SRAM 5PC600.SE00-01 - CRT 512 kb SRAM 5PC600.SE00-02 - SDL 1 MB SRAM

CPU board - main memory - heat sink, choose 1 of each component

855GME CPU board (XTX)	
	5PC600.X855-00 - PM 1100 MHz 5PC600.X855-02 - PM 1400 MHz 5PC600.X855-04 - CM 600 MHz 5PC600.X855-05 - CM 1000 MHz
Main memory	
	5MMDDR.0256-00 - 256 MB 5MMDDR.0512-00 - 512 MB 5MMDDR.1024-00 - 1 GB
Heat sink	
	5AC600.HS03-01

Configuration - optional APC620 embedded

UPS module	
	5AC600.UPSI-00 (Add-on UPS module)
Supply voltage connector	Select 1
	0TB103.9 (screw clamp) 0TB103.91 (cage clamp)

Figure 6: Selection guide - Basic system and optional components APC620 embedded

Explanation:

1) Select a system unit.

2) Select CPU board (select 1).

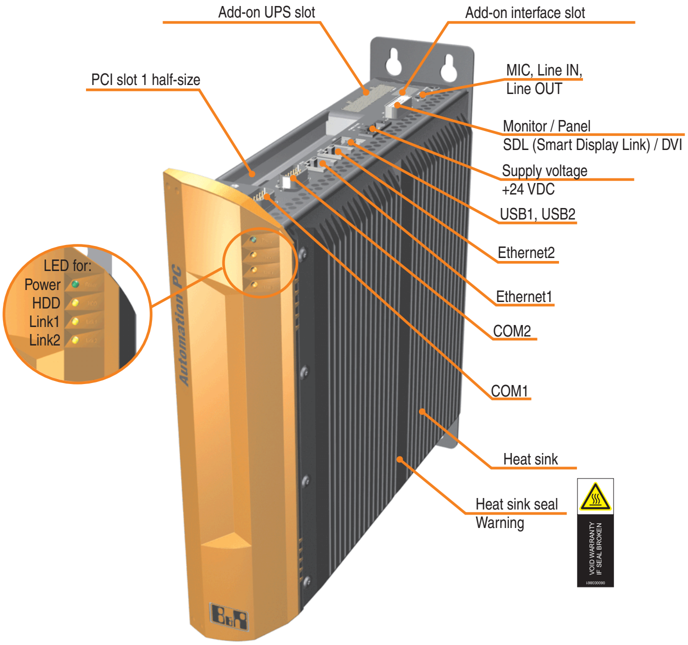
3) Select main memory and heat sink (selection 1 each).

4) Select optional components.

2. Entire device

2.1 APC620, 1 PCI slot variant

2.1.1 Interfaces



1) Slot only present on 5PC600.SX01-00 devices with Rev. H0 or higher.

Figure 7: Interface overview - APC620, 1 PCI slot variant (top)

Warning!

Do not remove the mounting screws from the heat sink, as it is connected to the processor and chipset by a thermal coupling. Should this connection be broken, the APC620 must be sent for repair. Removal of the mounting screws, which can be determined by a broken seal, voids all warranty.

During operation, surface temperatures of the heat sink may reach 70°C (warning "hot surface").

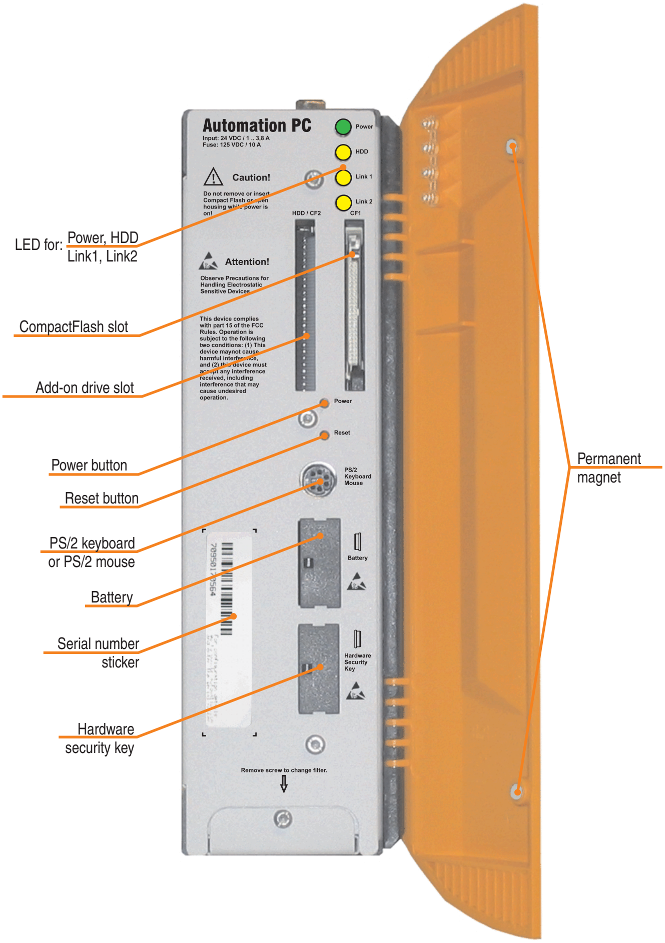


Figure 8: Interface overview - APC620, 1 PCI slot variant (front)

Information:

The orange front doors contain two permanent magnets. Contact between a data carrier that saves data magnetically (hard disk, diskette, the magnetic strip of a credit card, etc.) and a magnet can cause loss of data.

2.1.2 Technical data

Features	APC620, 1 PCI slot variant
B&R ID code	Component-dependent, see 3.1 "System units", on page 174
Boot loader / Operating system	BIOS / see the chapter 4 "Software", on page 351
Processor Cooling Method	Component-dependent, see technical data for the CPU board Passive via heat sink and optionally supported with an active fan kit
Main memory	max. 512 MB with 815E CPU board, max. 1 GB with 855GME CPU board
Graphics Controller	 Component-dependent, see technical data for the CPU board
Power failure logic Controller Buffer time	 MTCX1) (see also page 769) 10 ms, dependent on the system unit revision (see page 544)
Real-time clock Battery-buffered Accuracy	 Yes Component-dependent, see technical data for the CPU board
Battery Type Removable Lifespan	See also page 158 Renata 950 mAh Yes, accessible behind the orange cover 4 years2) 3)
Ethernet Controller Amount	 See also page 130 or page 132 2
CAN bus	Optional using add-on interface (5AC600.CANI-00)
CompactFlash Type Amount	See also page 152 or page 153 Type I 1 (max. 4 using optional components)
Serial interface Amount Type UART Transfer rate Connection	See also page 123 or page 124 2 RS232, modem-capable, not electrically isolated 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB
USB interface Type Amount Transfer rate Connection Current load	See also section "USB port", on page 133 USB 2.0 2 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s) Type A Max. 500 mA per connection
Reset button	Yes, accessible behind the orange cover
LEDs	4 directed outwards via fiber optic lines, also see section "Status LEDs", on page 150
PCI slots half-size full-size	See also section "PCI slots", on page 147 1 -
Add-on UPS internal slot	Yes 5PC600.SX01-00 starting with revision H0 See also section "Add-on UPS module slot", on page 146

Table 24: Technical data - APC620, 1 PCI slot variant

Features	APC620, 1 PCI slot variant
SRAM internal slot options	Yes 5PC600.SX01-00 starting with revision I0
Electrical characteristics	
Power supply	
Rated voltage	24 VDC ±25%
Rated current	3.8 A
Starting current	Typ. 7 A, max. 40 A for < 300 µs
Power consumption	Component-dependent, see section 2.8 "Power management APC620 system unit with 1 PCI slot"
Mechanical characteristics	
Housing[4)]	
Item	Galvanized plate, plastic
Paint	Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV)
Front cover	Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See "Dimensions", on page 65
Weight	Approx. 3.4 kg (component-dependent)
Environmental characteristics	
Ambient temperature	
Operation	Component-dependent, see the section about ambient temperature on page 89 and page 93
Bearings	-20 to +60°C
Transport	-20 to +60°C
Relative humidity	
Operation	Component-dependent, see section "Humidity specifications", on page 119
Bearings	Component-dependent, see section "Humidity specifications", on page 119
Transport	Component-dependent, see section "Humidity specifications", on page 119
Vibration[5)]	
Operation (continuous)	2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g
Operation (occasional)	2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g
Bearings	2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Transport	2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock[5)]	
Operation	15 g, 11 ms
Bearings	30 g, 15 ms
Transport	30 g, 15 ms
Protection type	IP20
Altitude	
Operation	max. 3000 m[6)] (component-dependent)
Electromagnetic compatibility	
Emissions	
Network-related emissions	EN 61000-6-4, EN 55022 A
Emissions	EN 61000-6-4, EN 55011 class A, EN 55022 class A, EN 61131-2, 47 CFR Part 15

Table 24: Technical data - APC620, 1 PCI slot variant (Forts.)

Electromagnetic compatibility	APC620, 1 PCI slot variant
Immunity	
Electrostatic discharge (ESD)	EN 61000-6-2, EN 61131-2, EN 55024
High-frequency electromagnetic fields	EN 61000-6-2, EN 61131-2, EN 55024
High-speed transient disturbances (Burst)	EN 61000-6-2, EN 61131-2, EN 55024
Surges	EN 61000-6-2, EN 61131-2, EN 55024
Conducted values	EN 61000-6-2, EN 61131-2, EN 55024
Magnetic fields with electrical frequencies	EN 61000-6-2, EN 61131-2, EN 55024
Voltage dips, interruptions	EN 61000-6-2, EN 61131-2, EN 55024
Damped vibration	EN 61000-6-2, EN 61131-2, EN 55024

Table 24: Technical data - APC620, 1 PCI slot variant (Forts.)

1) Maintenance controller extended.

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

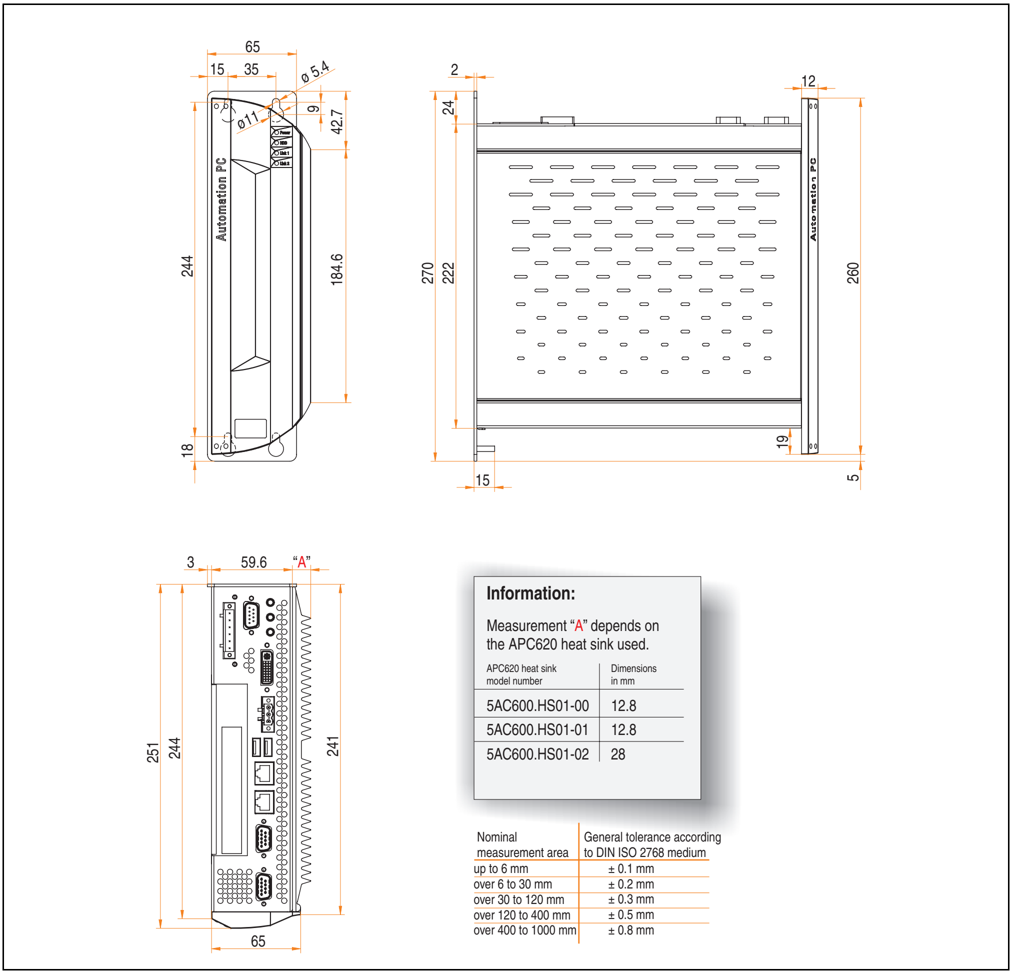
3) If an SRAM module (Mod. No. 5AC600.SRAM-00) is installed, the buffer duration is 2½ years.

4) Depending on the process or batch, there may be visible deviations in the color and surface structure.

5) Maximum values, as long as no other individual component specifies any other.

6) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

2.1.3 Dimensions



Information:

Measurement "A" depends on the APC620 heat sink used.

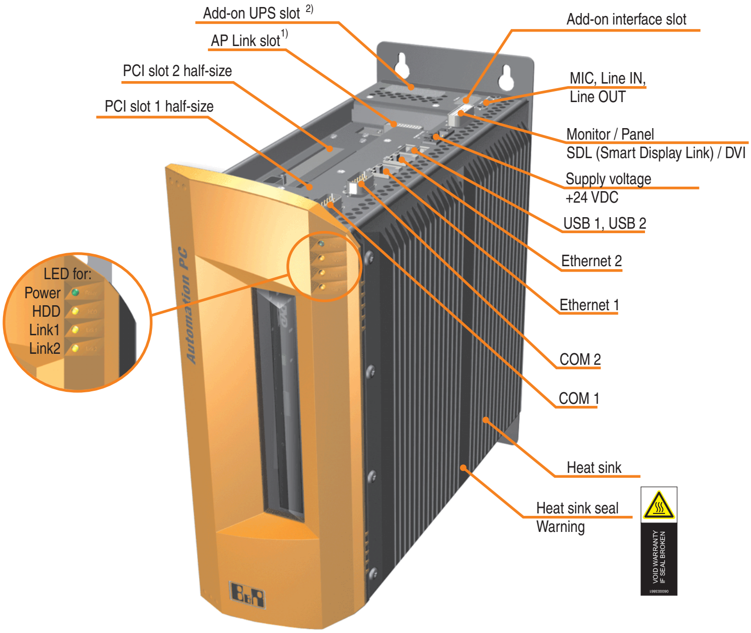
APC620 heat sink model number	Dimensions in mm
5AC600.HS01-00	12.8
5AC600.HS01-01	12.8
5AC600.HS01-02	28

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

Figure 9: Dimensions - APC620, 1 PCI slot variant

2.2 APC620, 2 PCI slot variant

2.2.1 Interfaces



1) Can only be used with system unit 5PC600.SX02-00

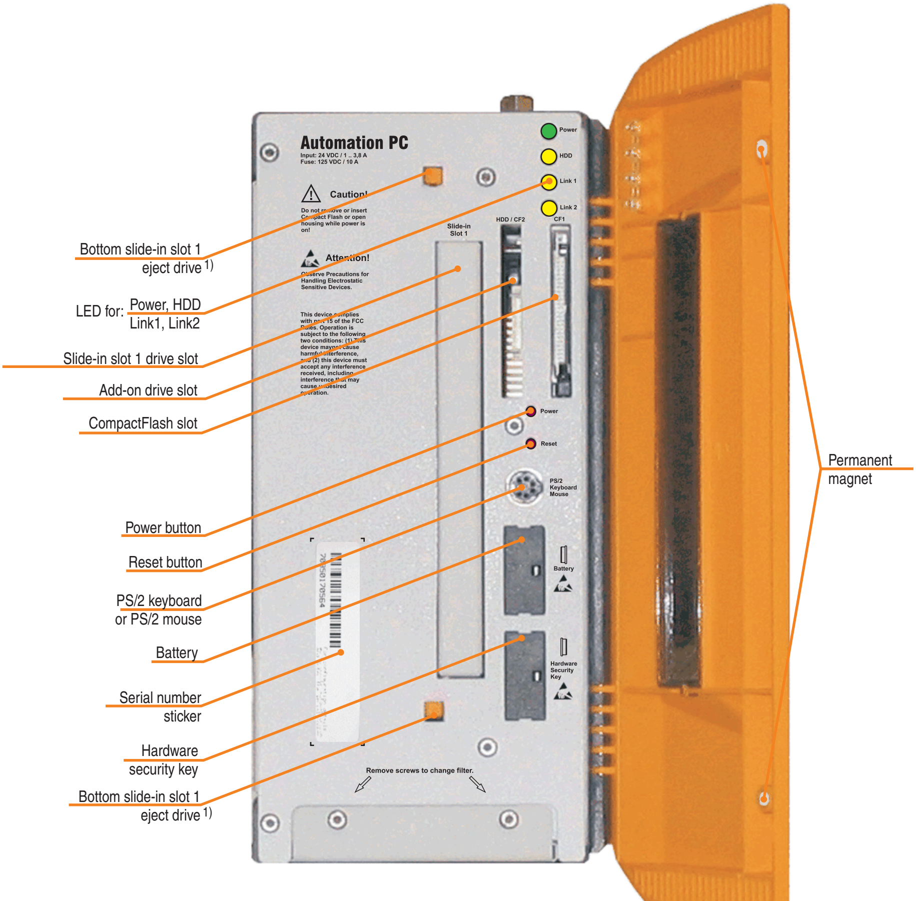
2) Slot is standard starting with 5PC600.SX02-00, Rev. G0 and 5PC600.SX02-01 Rev. H0

Figure 10: Interface overview - APC620, 2 PCI slot variant (top)

Warning!

Do not remove mounting screws from the heat sink, as it is connected to the processor and chipset by a thermal coupling. Should this connection be broken, the APC620 must be sent for repair. Removal of the mounting screws, which can be determined by a broken seal, voids all warranty.

During operation, surface temperatures of the heat sink may reach 70°C (warning "hot surface").



1) The side cover of the PC 620 must be opened before ejecting a drive.

Figure 11: Interface overview - APC620, 2 PCI slot variant (front)

Information:

The orange front doors contain two permanent magnets. Contact between a data carrier that saves data magnetically (hard disk, diskette, the magnetic strip of a credit card, etc.) and a magnet can cause loss of data.

2.2.2 Technical data

Features	APC620, 2 PCI slot variant
B&R ID code	Component-dependent, see 3.1 "System units", on page 174
Boot loader / Operating system	BIOS / see the chapter 4 "Software", on page 351
Processor	Component-dependent, see technical data for the CPU board
Cooling	
Method	Passive via heat sink and optionally supported with an active fan kit
Main memory	Max. 512 MB with 815E CPU board, max. 1 GB with 855GME CPU board
Graphics	
Controller	Component-dependent, see technical data for the CPU board
Power failure logic	
Controller	MTCX[1] (see also page 769)
Buffer time	10 ms, dependent on the system unit revision (see page 544)
Real-time clock	
Battery-buffered	Yes
Accuracy	Component-dependent, see technical data for the CPU board
Battery	See also page 158
Type	Renata 950 mAh
Removable	Yes, accessible behind the orange cover
Lifespan	4 years[2] [3]
Ethernet	
Controller	See also page 130 or page 132
Amount	2
CAN bus	Optional using add-on interface (5AC600.CANI-00)
CompactFlash	See also page 152 or page 153
Type	Type I
Amount	2 (max. 4 using optional components)
Serial interface	See also page 123 or page 124
Amount	2
Type	RS232, modem-capable, not electrically isolated
UART	16550 compatible, 16 byte FIFO
Transfer rate	Max. 115 kBaud
Connection	9-pin DSUB
USB interface	See also section "USB port", on page 133
Type	USB 2.0
Amount	2
Transfer rate	Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)
Connection	Type A
Current load	Max. 500 mA per connection
Reset button	Yes, accessible behind the orange cover
LEDs	4 directed outwards via fiber optic lines, also see section "Status LEDs", on page 150
PCI slots	See also section "PCI slots", on page 147
half-size	2
full-size	-
Add-on UPS internal slot	Yes 5PC600.SX02-00 starting with revision G0, 5PC600.SX02-01 starting with revision H0 present See also section "Add-on UPS module slot", on page 146

Table 25: Technical data - APC620, 2 PCI slot variant

Features	APC620, 2 PCI slot variant
SRAM internal slot options	Yes 5PC600.SX02-00 starting with revision H0, 5PC600.SX02-01 starting with revision K0 present
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption	 24 VDC ±25% 3.8 A Typ. 7 A, max. 40 A for < 300 µs Component-dependent, see section 2.8 "Power management APC620 system unit with 1 PCI slot"
Mechanical characteristics	
Housing[4)] Item Paint Front cover	 Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See "Dimensions", on page 71
Weight	Approx. 4.5 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Bearings Transport	 Component-dependent, see the section about ambient temperature on page 89 and page 93 -20 to +60°C -20 to +60°C
Relative humidity Operation Bearings Transport	 Component-dependent, see section "Humidity specifications", on page 119 Component-dependent, see section "Humidity specifications", on page 119 Component-dependent, see section "Humidity specifications", on page 119
Vibration[5)] Operation (continuous) Operation (occasional) Bearings Transport	 2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock[5)] Operation Bearings Transport	 15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Protection type	IP20
Altitude Operation	 max. 3000 m[6)] (component-dependent)
Electromagnetic compatibility	
Emissions Network-related emissions Emissions	 EN 61000-6-4, EN 55022 A EN 61000-6-4, EN 55011 class A, EN 55022 class A, EN 61131-2, 47 CFR Part 15

Table 25: Technical data - APC620, 2 PCI slot variant (Forts.)

Electromagnetic compatibility	APC620, 2 PCI slot variant
Immunity	
Electrostatic discharge (ESD)	EN 61000-6-2, EN 61131-2, EN 55024
High-frequency electromagnetic fields	EN 61000-6-2, EN 61131-2, EN 55024
High-speed transient disturbances (Burst)	EN 61000-6-2, EN 61131-2, EN 55024
Surges	EN 61000-6-2, EN 61131-2, EN 55024
Conducted values	EN 61000-6-2, EN 61131-2, EN 55024
Magnetic fields with electrical frequencies	EN 61000-6-2, EN 61131-2, EN 55024
Voltage dips, interruptions	EN 61000-6-2, EN 61131-2, EN 55024
Damped vibration	EN 61000-6-2, EN 61131-2, EN 55024

Table 25: Technical data - APC620, 2 PCI slot variant (Forts.)

1) Maintenance controller extended.

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

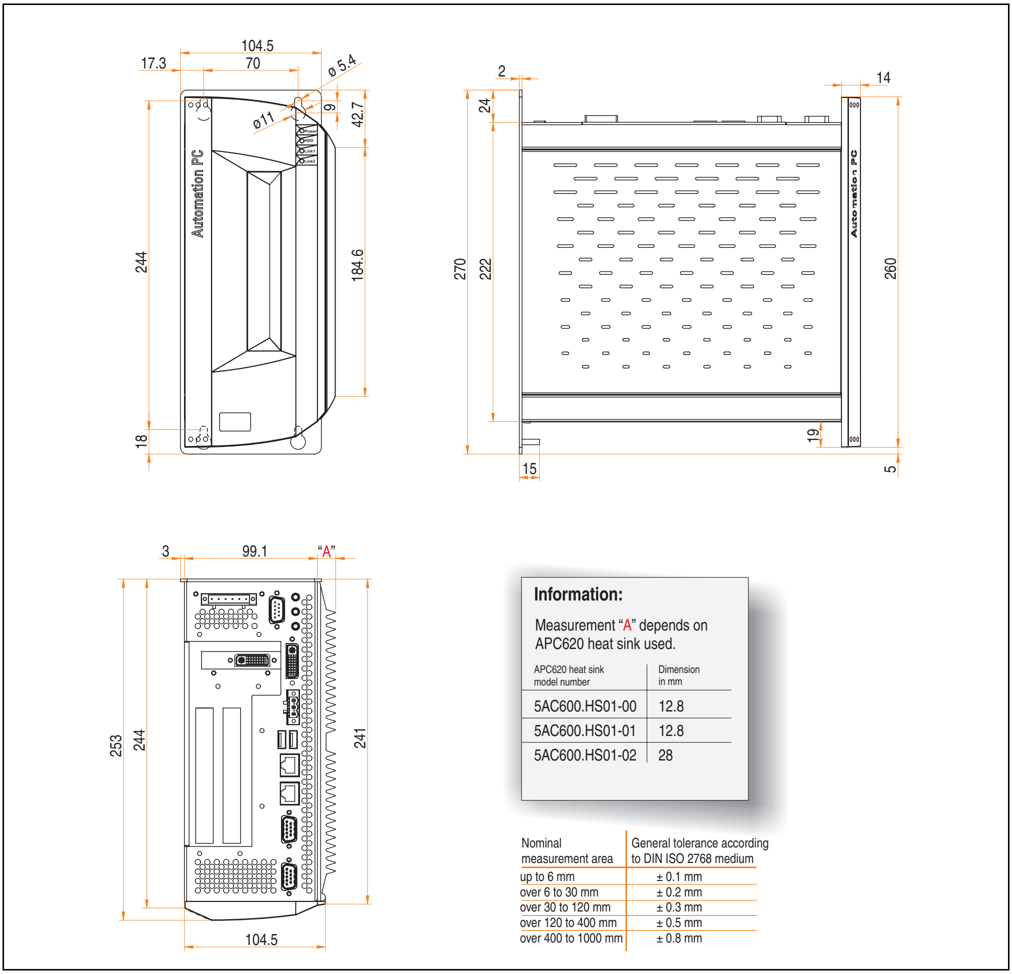
3) If an SRAM module (Mod. No. 5AC600.SRAM-00) is installed, the buffer duration is 2½ years.

4) Depending on the process or batch, there may be visible deviations in the color and surface structure.

5) Maximum values, as long as no other individual component specifies any other.

6) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

2.2.3 Dimensions



Information:

Measurement "A" depends on APC620 heat sink used.

APC620 heat sink model number	Dimension in mm
5AC600.HS01-00	12.8
5AC600.HS01-01	12.8
5AC600.HS01-02	28

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

Figure 12: Dimensions - APC620, 2 PCI slot variant

2.3 APC620, 3 PCI slot variant

2.3.1 Interfaces

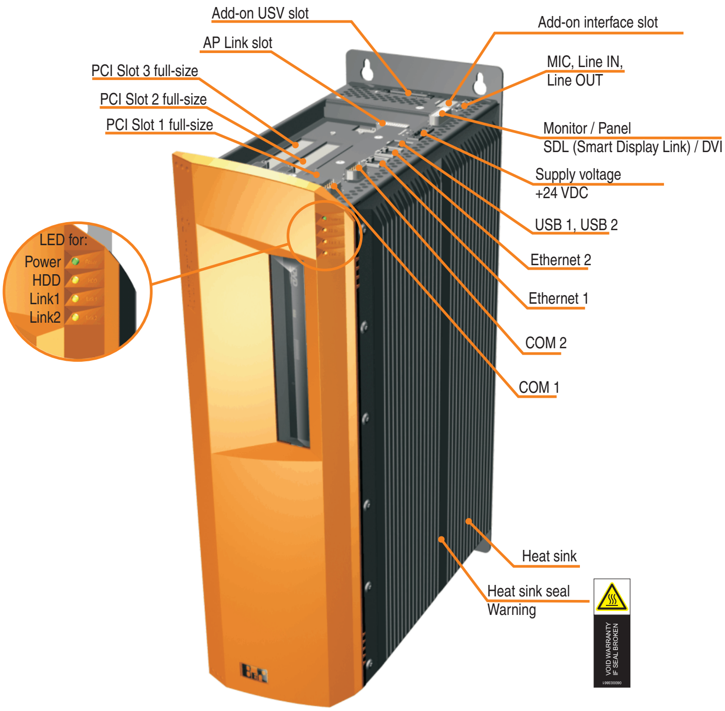
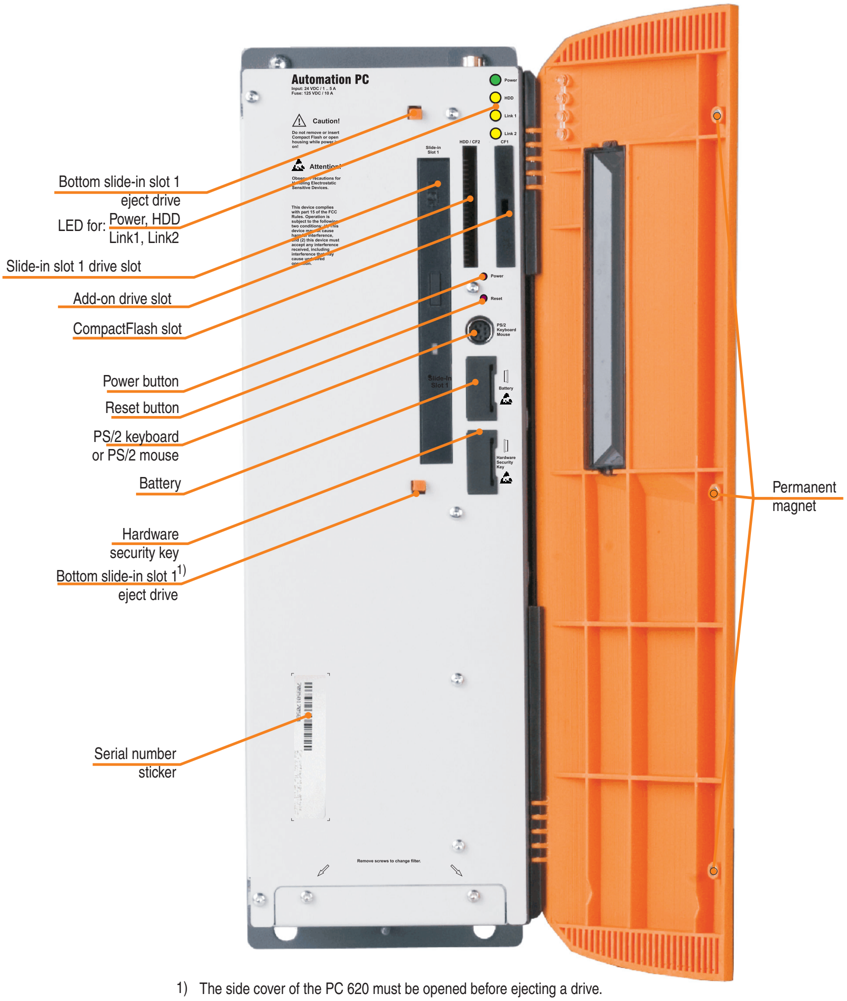


Figure 13: Interface overview - APC620, 3 PCI slot variant (top)

Warning!

Do not remove mounting screws from the heat sink, as it is connected to the processor and chipset by a thermal coupling. Should this connection be broken, the APC620 must be sent for repair. Removal of the mounting screws, which can be determined by a broken seal, voids all warranty.

During operation, surface temperatures of the heat sink may reach 70°C (warning "hot surface").



1) The side cover of the PC 620 must be opened before ejecting a drive.

Figure 14: Interface overview - APC620, 3 PCI slot variant (front)

Information:

The orange front doors contain three permanent magnets. Contact between a data carrier that saves data magnetically (hard disk, diskette, the magnetic strip of a credit card, etc.) and a magnet can cause loss of data.

2.3.2 Technical data

Features	APC620, 3 PCI slot variant
B&R ID code	Component-dependent, see 3.1 "System units", on page 174
Boot loader / Operating system	BIOS / see the chapter 4 "Software", on page 351
Processor	Component-dependent, see technical data for the CPU board
Cooling	
Method	Passive via heat sink and optionally supported with an active fan kit
Main memory	Max. 1 GB with 855GME CPU board
Graphics	
Controller	Component-dependent, see technical data for the CPU board
Power failure logic	
Controller	MTCX1) (see also page 769)
Buffer time	10 ms, dependent on the system unit revision (see page 544)
Real-time clock	
Battery-buffered	Yes
Accuracy	Component-dependent, see technical data for the CPU board
Battery	See also page 158
Type	Renata 950 mAh
Removable	Yes, accessible behind the orange cover
Lifespan	4 years2) 3)
Ethernet	
Controller	See also page 130 or page 132
Amount	2
CAN bus	Optional using add-on interface (5AC600.CANI-00)
CompactFlash	See also page 152 or page 153
Type	Type I
Amount	2 (max. 4 using optional components)
Serial interface	See also page 123 or page 124
Amount	2
Type	RS232, modem-capable, not electrically isolated
UART	16550 compatible, 16 byte FIFO
Transfer rate	Max. 115 kBaud
Connection	9-pin DSUB
USB interface	See also section "USB port", on page 133
Type	USB 2.0
Amount	2
Transfer rate	Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)
Connection	Type A
Current load	Max. 500 mA per connection
Reset button	Yes, accessible behind the orange cover
LEDs	4 directed outwards via fiber optic lines, also see section "Status LEDs", on page 150
PCI slots	See also section "PCI slots", on page 147
half-size	-
full-size	3
Add-on UPS internal slot	Yes See also section "Add-on UPS module slot", on page 146
SRAM internal slot options	Yes

Table 26: Technical data - APC620, 3 PCI slot variant

Electrical characteristics	APC620, 3 PCI slot variant
Power supply Rated voltage Rated current Starting current Power consumption	 24 VDC ±25% 5 A Typ. 10 A, max. 40 A for < 300 µs Component-dependent, see section 2.10 "Power management APC620 system unit with 3 PCI slots"
Mechanical characteristics	
Housing[4] Item Paint Front cover	 Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See "Dimensions", on page 76
Weight	Approx. 4.5 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Bearings Transport	 Component-dependent, see the section about ambient temperature on page 93 -20 to +60°C -20 to +60°C
Relative humidity Operation Bearings Transport	 Component-dependent, see section "Humidity specifications", on page 119 Component-dependent, see section "Humidity specifications", on page 119 Component-dependent, see section "Humidity specifications", on page 119
Vibration[5] Operation (continuous) Operation (occasional) Bearings Transport	 2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock[5] Operation Bearings Transport	 15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Protection type	IP20
Altitude Operation	 max. 3000 m[6] (component-dependent)
Electromagnetic compatibility	
Emissions Network-related emissions Emissions	 EN 61000-6-4, EN 55022 A EN 61000-6-4, EN 55011 class A, EN 55022 class A, EN 61131-2, 47 CFR Part 15
Immunity Electrostatic discharge (ESD) High-frequency electromagnetic fields High-speed transient disturbances (Burst) Surges Conducted values Magnetic fields with electrical frequencies Voltage dips, interruptions Damped vibration	 EN 61000-6-2, EN 61131-2, EN 55024 EN 61000-6-2, EN 61131-2, EN 55024 EN 61000-6-2, EN 61131-2, EN 55024 EN 61000-6-2, EN 61131-2, EN 55024 EN 61000-6-2, EN 61131-2, EN 55024 EN 61000-6-2, EN 61131-2, EN 55024 EN 61000-6-2, EN 61131-2, EN 55024 EN 61000-6-2, EN 61131-2, EN 55024

Table 26: Technical data - APC620, 3 PCI slot variant (Forts.)

1) Maintenance controller extended.

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

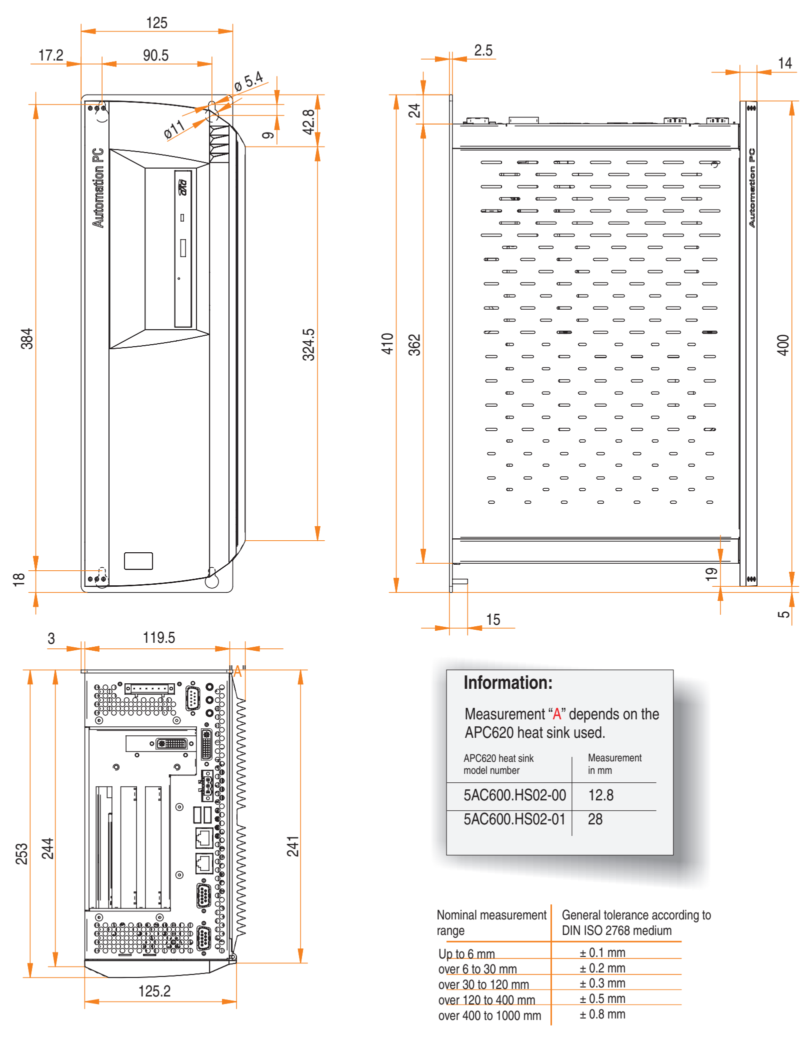
3) If an SRAM module (Mod. No. 5AC600.SRAM-00) is installed, the buffer duration is 2½ years.

4) Depending on the process or batch, there may be visible deviations in the color and surface structure.

5) Maximum values, as long as no other individual component specifies any other.

6) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

2.3.3 Dimensions



Information:

Measurement "A" depends on the APC620 heat sink used.

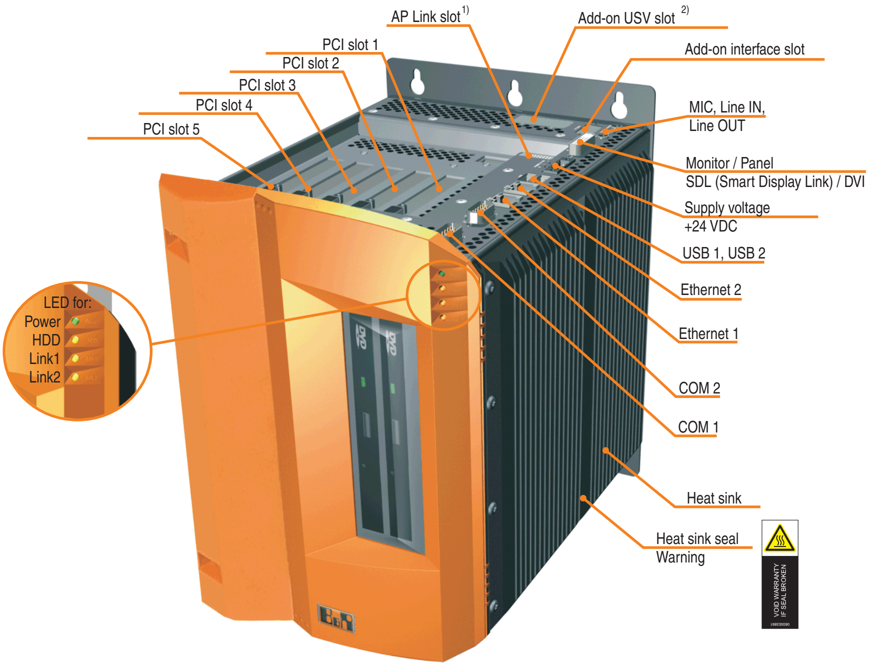
APC620 heat sink model number	Measurement in mm
5AC600.HS02-00	12.8
5AC600.HS02-01	28

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

Figure 15: Dimensions - APC620, 3 PCI slot variant

2.4 APC620, 5 PCI slot variant

2.4.1 Interfaces



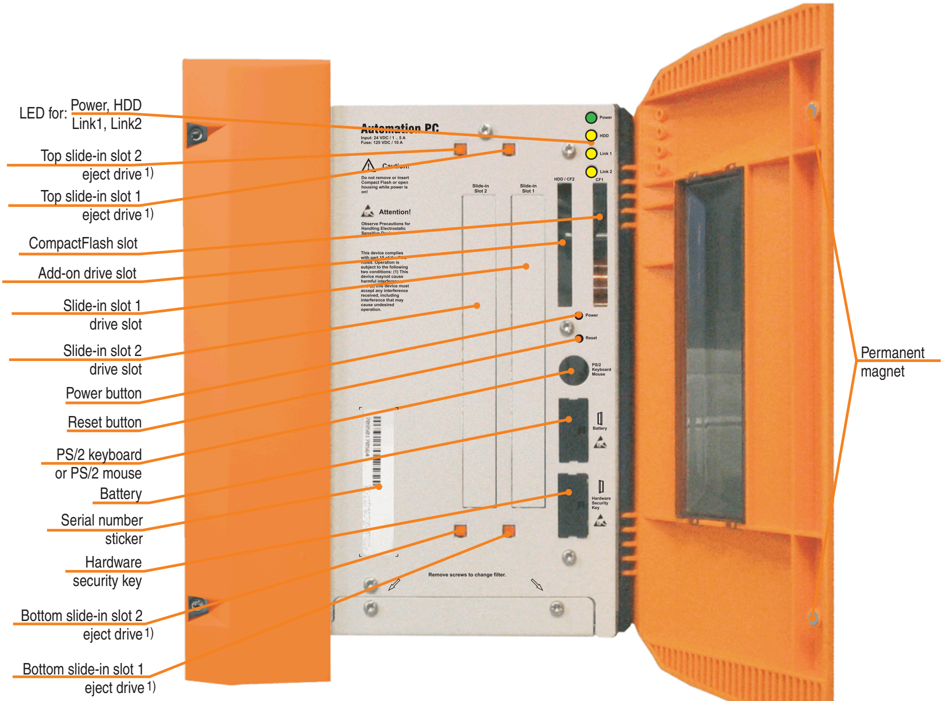
1) Can only be used with a 5PC600.SX05-00 system unit.
2) Slot standard on 5PC600.SX05-00 starting with Rev. F0 and on 5PC600.SX05-01 starting with Rev. F0 .

Figure 16: Interface overview - APC620, 5 PCI slot variant (top)

Warning!

Do not remove the mounting screws from the heat sink, as it is connected to the processor and chipset by a thermal coupling. Should this connection be broken, the APC620 must be sent for repair. Removal of the mounting screws, which can be determined by a broken seal, voids all warranty.

During operation, surface temperatures of the heat sink may reach 70°C (warning "hot surface").



1) Before ejecting a drive the cover of the Automation PC 620 must be opened

Figure 17: Interface overview - APC620, 5 PCI slot variant (front)

Information:

The orange front doors contain two permanent magnets. Contact between a data carrier that saves data magnetically (hard disk, diskette, the magnetic strip of a credit card, etc.) and a magnet can cause loss of data.

2.4.2 Technical data

Features	APC620, 5 PCI slot variant
B&R ID code	Component-dependent, see 3.1 "System units", on page 174
Boot loader / Operating system	BIOS / see the chapter 4 "Software", on page 351
Processor Cooling Method	Component-dependent, see technical data for the CPU board Passive via heat sink and optionally supported with an active fan kit
Main memory	Max. 512 MB with 815E CPU board, max. 1 GB with 855GME CPU board
Graphics Controller	 Component-dependent, see technical data for the CPU board
Power failure logic Controller Buffer time	 MTCX[1] (see also page 769) 10 ms, dependent on the system unit revision (see page 544)
Real-time clock Battery-buffered Accuracy	 Yes Component-dependent, see technical data for the CPU board
Battery Type Removable Lifespan	See also page 158 Renata 950 mAh Yes, accessible behind the orange cover 4 years[2] [3]
Ethernet Controller Amount	 See also page 130 or page 132 2
CAN bus	Optional using add-on interface (5AC600.CANI-00)
CompactFlash Type Amount	See also page 152 or page 153 Type I 2 (max. 4 using optional components)
Serial interface Amount Type UART Transfer rate Connection	See also page 123 or page 124 2 RS232, modem-capable, not electrically isolated 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB
USB interface Type Amount Transfer rate Connection Current load	See also section "USB port", on page 133 USB 2.0 2 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s) Type A Max. 500 mA per connection
Reset button	Yes, accessible behind the orange cover
LEDs	4 directed outwards via fiber optic lines, also see section "Status LEDs", on page 150
PCI slots half-size full-size	See also section "PCI slots", on page 147 5 -
Add-on UPS internal slot	Yes 5PC600.SX05-00 starting with revision F0, 5PC600.SX05-01 starting with revision F0 present See also section "Add-on UPS module slot", on page 146

Table 27: Technical data - APC620, 5 PCI slot variant

Features	APC620, 5 PCI slot variant
SRAM internal slot options	Yes 5PC600.SX05-00 starting with revision H0, 5PC600.SX05-01 starting with revision H0 present
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption	 24 VDC ±25% 5 A Typ. 10 A, max. 40 A for < 300 µs Component-dependent, see section 2.11 "Power management APC620 system units with 5 PCI slots"
Mechanical characteristics	
Housing[4)] Item Paint Front cover	 Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See "Dimensions", on page 82
Weight	Approx. 5.7 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Bearings Transport	 Component-dependent, see the section about ambient temperature on page 89 and page 93 -20 to +60°C -20 to +60°C
Relative humidity Operation Bearings Transport	 Component-dependent, see section "Humidity specifications", on page 119 Component-dependent, see section "Humidity specifications", on page 119 Component-dependent, see section "Humidity specifications", on page 119
Vibration[5)] Operation (continuous) Operation (occasional) Bearings Transport	 2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock[5)] Operation Bearings Transport	 15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Protection type	IP20
Altitude Operation	 max. 3000 m[6)] (component-dependent)
Electromagnetic compatibility	
Emissions Network-related emissions Emissions	 EN 61000-6-4, EN 55022 A EN 61000-6-4, EN 55011 class A, EN 55022 class A, EN 61131-2, 47 CFR Part 15

Table 27: Technical data - APC620, 5 PCI slot variant (Forts.)

Electromagnetic compatibility	APC620, 5 PCI slot variant
Immunity	
Electrostatic discharge (ESD)	EN 61000-6-2, EN 61131-2, EN 55024
High-frequency electromagnetic fields	EN 61000-6-2, EN 61131-2, EN 55024
High-speed transient disturbances (Burst)	EN 61000-6-2, EN 61131-2, EN 55024
Surges	EN 61000-6-2, EN 61131-2, EN 55024
Conducted values	EN 61000-6-2, EN 61131-2, EN 55024
Magnetic fields with electrical frequencies	EN 61000-6-2, EN 61131-2, EN 55024
Voltage dips, interruptions	EN 61000-6-2, EN 61131-2, EN 55024
Damped vibration	EN 61000-6-2, EN 61131-2, EN 55024

Table 27: Technical data - APC620, 5 PCI slot variant (Forts.)

1) Maintenance controller extended.

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

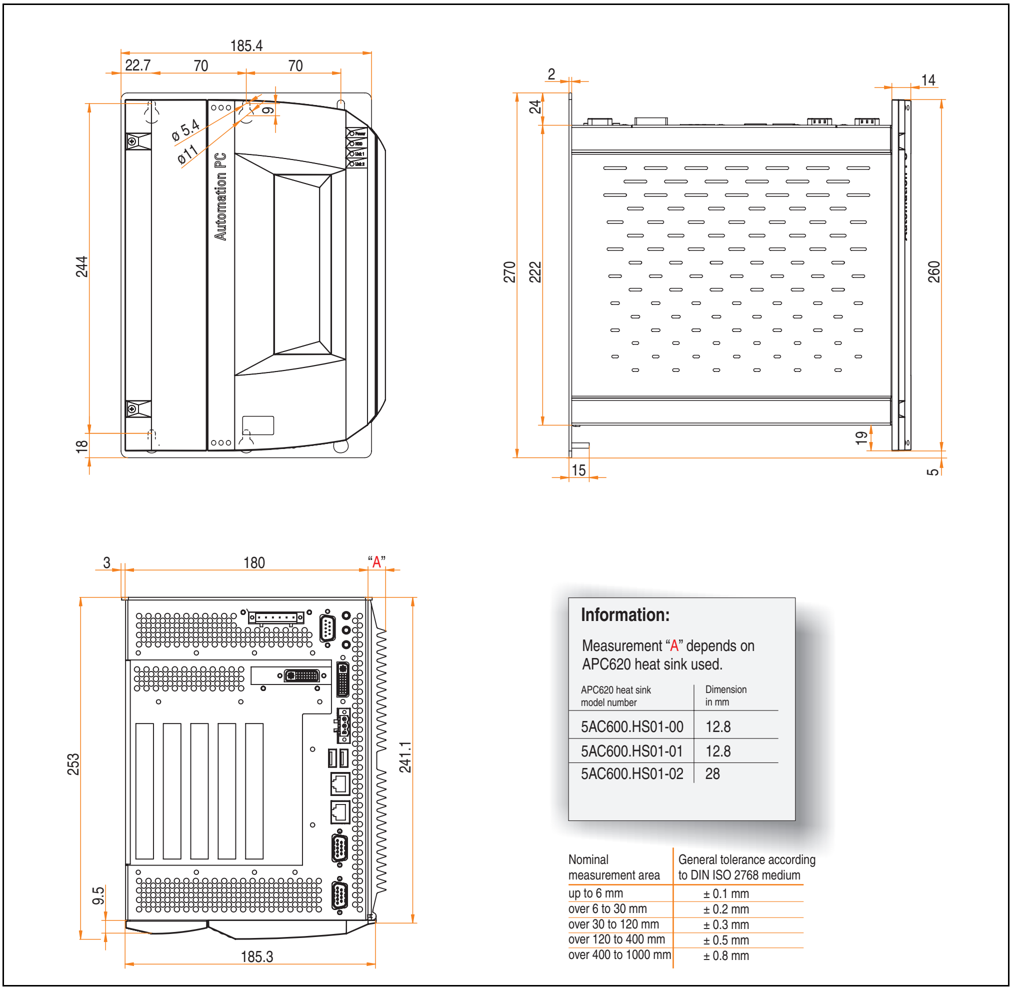
3) If an SRAM module (Mod. No. 5AC600.SRAM-00) is installed, the buffer duration is 2½ years.

4) Depending on the process or batch, there may be visible deviations in the color and surface structure.

5) Maximum values, as long as no other individual component specifies any other.

6) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

2.4.3 Dimensions



Information:

Measurement "A" depends on APC620 heat sink used.

APC620 heat sink model number	Dimension in mm
5AC600.HS01-00	12.8
5AC600.HS01-01	12.8
5AC600.HS01-02	28

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

Figure 18: Dimensions - APC620, 5 PCI slot variant

2.5 APC620 embedded variant

2.5.1 Interfaces

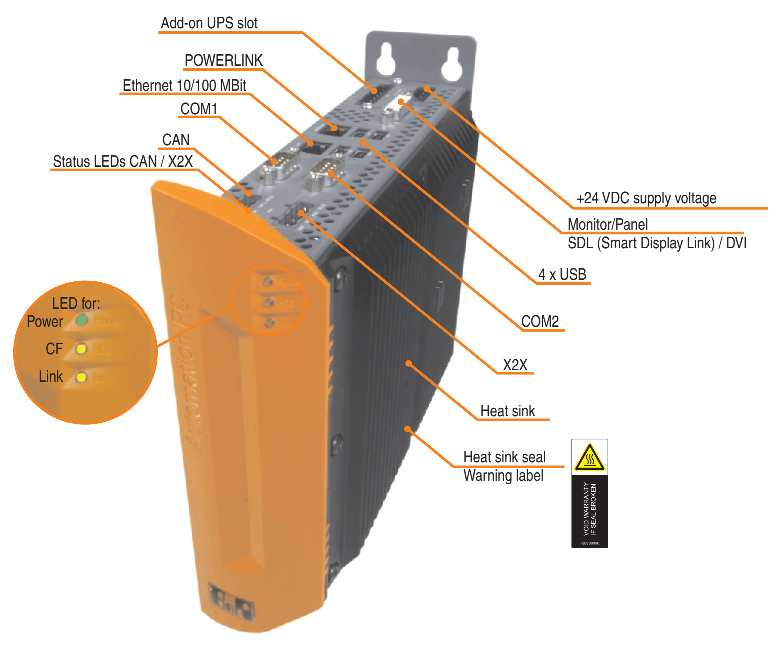


Figure 19: APC620 embedded variant interface overview - top side

Warning!

Do not remove the mounting screws from the heat sink, as it is connected to the processor and chipset by a thermal coupling. Should this connection be broken, the APC620 embedded must be sent for repair. Removal of the mounting screws, which can be determined by a broken seal, voids all warranty.

During operation, surface temperatures of the heat sink may reach 70°C (warning "hot surface").

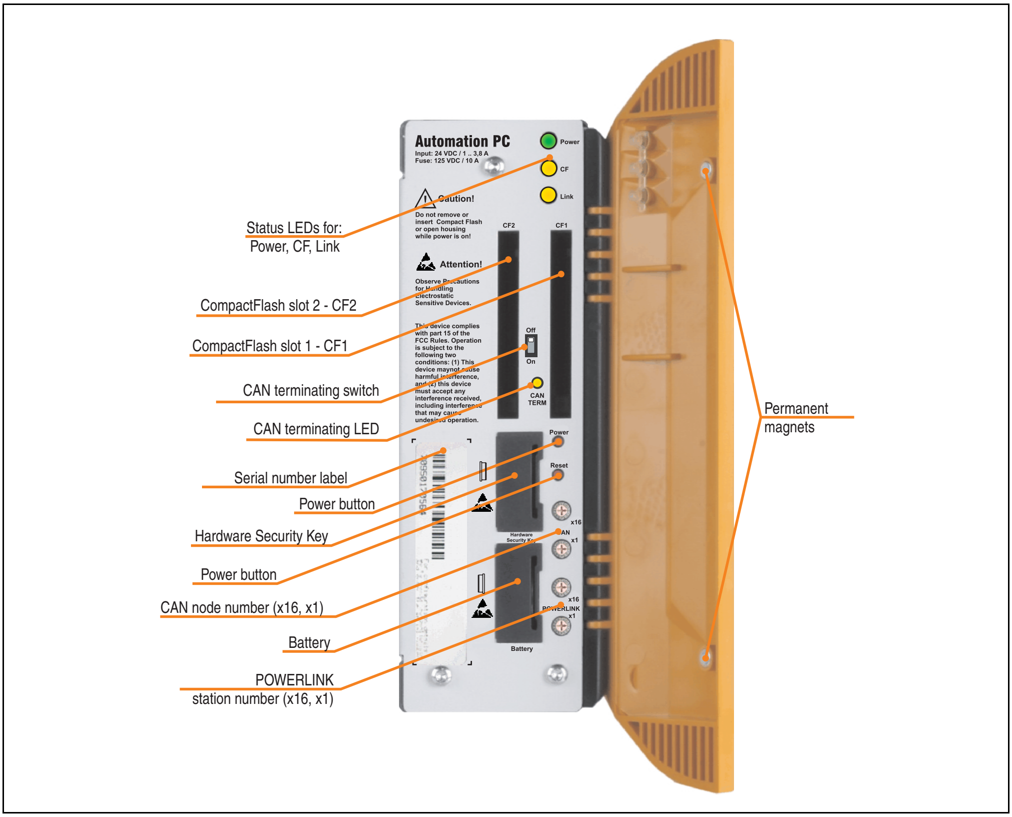


Figure 20: APC620 embedded variant interface overview - front side

Information:

The orange front doors contain two permanent magnets. Contact between a data carrier that saves data magnetically (hard disk, diskette, the magnetic strip of a credit card, etc.) and a magnet can cause loss of data.

2.5.2 Technical data

Features	APC620 embedded variant
B&R ID code	Component-dependent, see 3.1 "System units", on page 174
Boot loader / Operating system	BIOS / see the chapter 4 "Software", on page 351
Processor Cooling Method	Component-dependent, see technical data for the CPU board Passive via heat sink
Main memory	Max. 1 GB with 855GME CPU board
Graphics Controller	 Component-dependent, see technical data for the CPU board on page 183
Power failure logic Controller Buffer time	 MTCX[1] (see also page 769) 10 ms, dependent on the system unit revision (see page 544)
Real-time clock Battery-buffered Accuracy	 Yes Component-dependent, see technical data for the 855GME (XTX) CPU board
Battery Type Removable Lifespan	See also page 158 Renata 950 mAh Yes, accessible behind the orange cover 2½ years[2]
Ethernet Controller Amount	Yes See also page 129 1
POWERLINK Amount Station Number Dial	Yes, also see page 127 1 2 pcs.
X2X Link Amount Status LED	Yes, also see page 125 1 Yes, see page 127
CAN bus Amount Transfer rate Node switch Terminating resistor Status LED	See also page 125 1 Max. 500 kBit/s Yes Yes, can be activated using a switch Yes, see page 127
CompactFlash Type Amount	See also page 155 Type I 2
Serial interface Amount Type UART Transfer rate Connection	See also page 123 or page 124 2 RS232, modem-capable, not electrically isolated 16550-compatible, 16-byte FIFO Max. 115 kBaud 9-pin DSUB
USB interface Type Amount Transfer rate Connection Current load	See also page 134 USB 2.0 4 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s) Type A Max. 500 mA or 1 A per connection

Table 28: Technical data - APC620 embedded variant

Features	APC620 embedded variant
Reset button	Yes, accessible behind the orange cover
LEDs	3 directed outwards via fiber optic lines, also see section "Status LEDs Power, CF, Link (only APC620 embedded)", on page 151
Add-on UPS slot	Yes
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption	 24 VDC ±25% 3.8 A Typ. 7 A, max. 40 A for < 300 μs Component-dependent, see section 2.12 "Power management for the APC620 embedded system unit"
Mechanical characteristics	
Housing[3)] Item Paint Front cover	 Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See "Dimensions", on page 88
Weight	Approx. 1.4 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Bearings Transport	 Component-dependent, see the section about ambient temperature on page 93 -20 to +60°C -20 to +60°C
Relative humidity Operation Bearings Transport	 Component-dependent, see section "Humidity specifications", on page 119 Component-dependent, see section "Humidity specifications", on page 119 Component-dependent, see section "Humidity specifications", on page 119
Vibration[4)] Operation (continuous) Operation (occasional) Bearings Transport	 2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock[5)] Operation Bearings Transport	 15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Protection type	IP20
Altitude Operation	 max. 3000 m[5)] (component-dependent)
Electromagnetic compatibility	
Emissions Network-related emissions Emissions	 EN 61000-6-4, EN 55022 A EN 61000-6-4, EN 55011 class A, EN 55022 class A, EN 61131-2, 47 CFR Part 15

Table 28: Technical data - APC620 embedded variant (Forts.)

Electromagnetic compatibility	**APC620 embedded variant**
Immunity	
Electrostatic discharge (ESD)	EN 61000-6-2, EN 61131-2, EN 55024
High-frequency electromagnetic fields	EN 61000-6-2, EN 61131-2, EN 55024
High-speed transient disturbances (Burst)	EN 61000-6-2, EN 61131-2, EN 55024
Surges	EN 61000-6-2, EN 61131-2, EN 55024
Conducted values	EN 61000-6-2, EN 61131-2, EN 55024
Magnetic fields with electrical frequencies	EN 61000-6-2, EN 61131-2, EN 55024
Voltage dips, interruptions	EN 61000-6-2, EN 61131-2, EN 55024
Damped vibration	EN 61000-6-2, EN 61131-2, EN 55024

Table 28: Technical data - APC620 embedded variant (Forts.)

1) Maintenance controller extended.

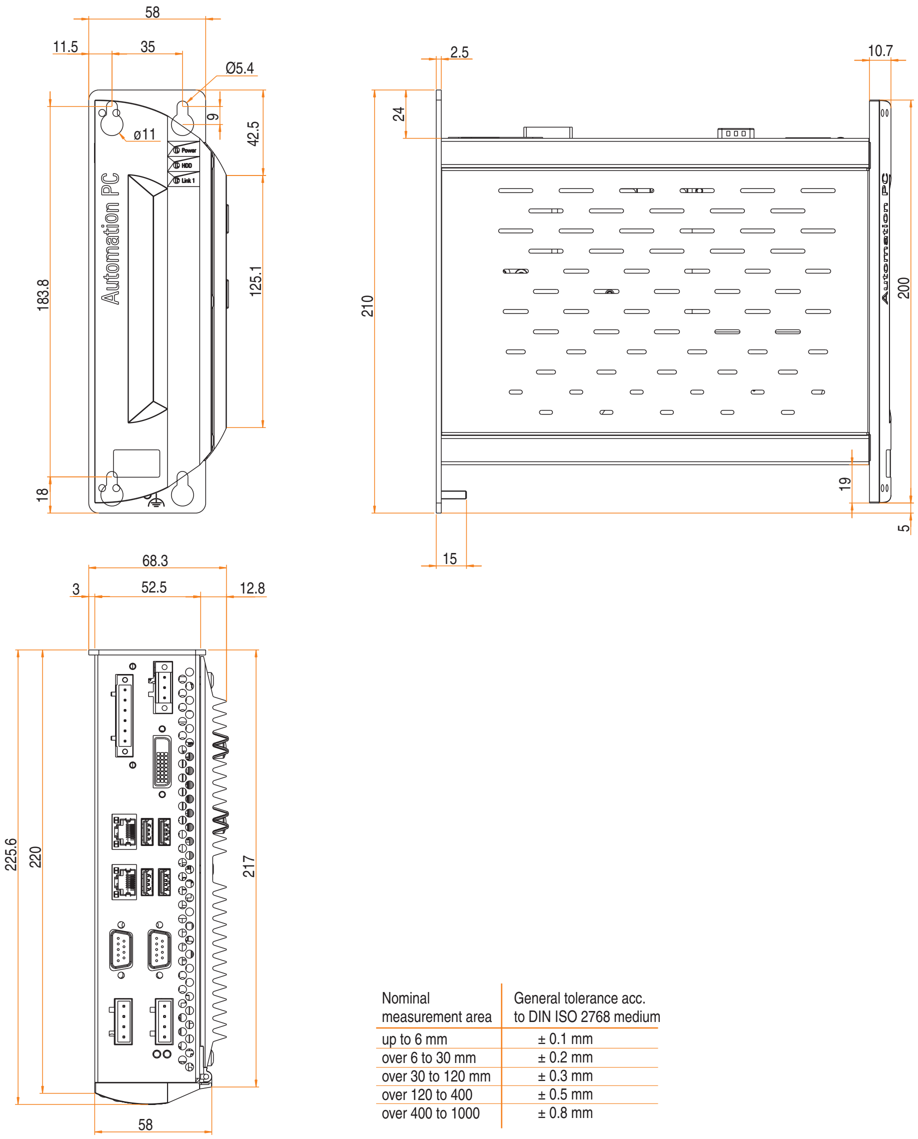
2) At 50°C, 8.5 µA of the supplied components and a self discharge of 40%.

3) Depending on the process or batch, there may be visible deviations in the color and surface structure.

4) Maximum values, as long as no other individual component specifies any other.

5) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

2.5.3 Dimensions



Nominal measurement area	General tolerance acc. to DIN ISO 2768 medium
up to 6 mm	± 0.1 mm
over 6 to 30 mm	± 0.2 mm
over 30 to 120 mm	± 0.3 mm
over 120 to 400	± 0.5 mm
over 400 to 1000	± 0.8 mm

Figure 21: APC620 embedded variant - dimensions

2.6 Ambient temperatures for systems with an 815E CPU board (ETX)

It is possible to combine CPU boards with various other components, such as drives, main memory, additional insert cards, etc. dependent on system unit and fan kit. The various configurations result in varying maximum possible ambient temperatures, which can be seen in the following graphic (see figure 23 "Ambient temperatures for systems with an 815E CPU board (ETX)", on page 90).

Information:

The maximum specified ambient temperatures were determined under worst-case conditions.

Experience has shown that higher ambient temperatures can be reached under typical conditions, e.g. using Microsoft Windows. The testing and evaluation is to be done on-site by the user (temperatures can be read in BIOS or using the B&R Control Center, see the chapter 4 "Software", on page 351).

Worst-case conditions for systems with an 815E CPU board (ETX)

- HiPower V3.0 from Intel for simulating 100% processor load.
- BurnIn testing tool (BurnIn V4.0 Pro from Passmark Software) to simulate a 100% load on the interface via loop-back adapters (serial interfaces, add-on and slide-in drives, USB interfaces, audio outputs).
- Maximum system extension and power consumption.

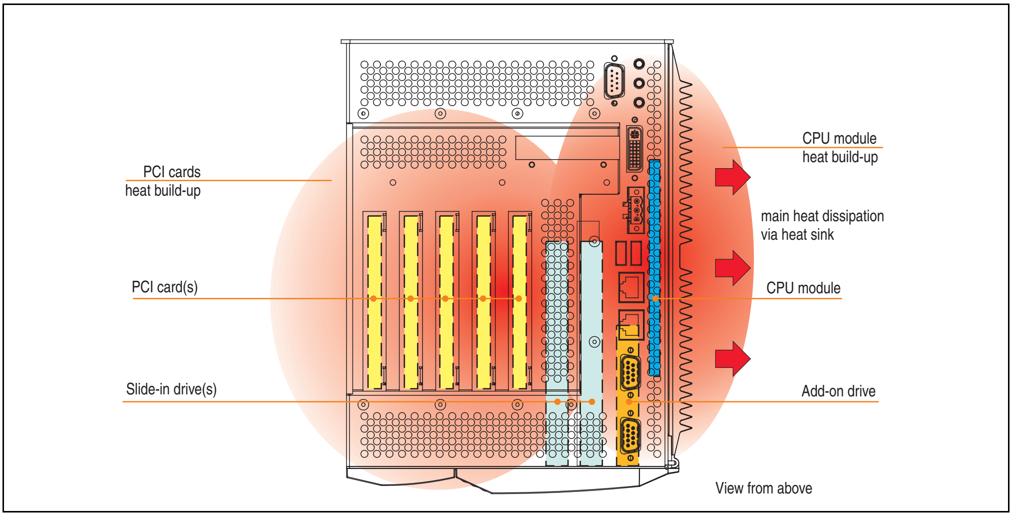
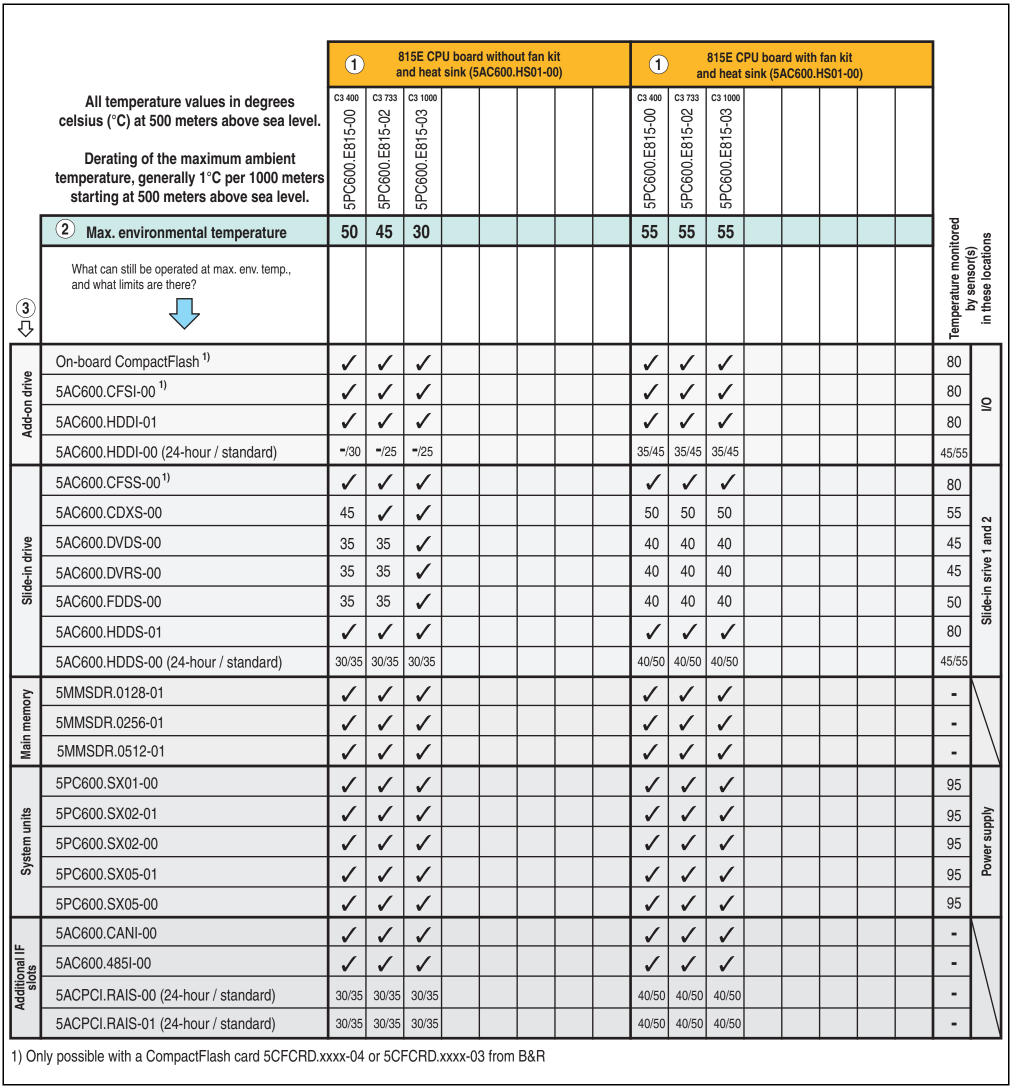


Figure 22: Example of worst-case conditions for temperature measurement

2.6.1 Maximum ambient temperature



All temperature values in degrees celsius (°C) at 500 meters above sea level.

Derating of the maximum ambient temperature, generally 1°C per 1000 meters starting at 500 meters above sea level.

What can still be operated at max. env. temp., and what limits are there?

③

		① 815E CPU board without fan kit and heat sink (5AC600.HS01-00)			① 815E CPU board with fan kit and heat sink (5AC600.HS01-00)			Temperature monitored by sensor(s) in these locations	
		C3 400 5PC600.E815-00	C3 733 5PC600.E815-02	C3 1000 5PC600.E815-03	C3 400 5PC600.E815-00	C3 733 5PC600.E815-02	C3 1000 5PC600.E815-03		
	② Max. environmental temperature	50	45	30	55	55	55		
Add-on drive	On-board CompactFlash 1)	✓	✓	✓	✓	✓	✓	80	I/O
	5AC600.CFSI-00 1)	✓	✓	✓	✓	✓	✓	80	
	5AC600.HDDI-01	✓	✓	✓	✓	✓	✓	80	
	5AC600.HDDI-00 (24-hour / standard)	-/30	-/25	-/25	35/45	35/45	35/45	45/55	
Slide-in drive	5AC600.CFSS-00 1)	✓	✓	✓	✓	✓	✓	80	Slide-in srive 1 and 2
	5AC600.CDXS-00	45	✓	✓	50	50	50	55	
	5AC600.DVDS-00	35	35	✓	40	40	40	45	
	5AC600.DVRS-00	35	35	✓	40	40	40	45	
	5AC600.FDDS-00	35	35	✓	40	40	40	50	
	5AC600.HDDS-01	✓	✓	✓	✓	✓	✓	80	
	5AC600.HDDS-00 (24-hour / standard)	30/35	30/35	30/35	40/50	40/50	40/50	45/55	
Main memory	5MMSDR.0128-01	✓	✓	✓	✓	✓	✓	-	
	5MMSDR.0256-01	✓	✓	✓	✓	✓	✓	-	
	5MMSDR.0512-01	✓	✓	✓	✓	✓	✓	-	
System units	5PC600.SX01-00	✓	✓	✓	✓	✓	✓	95	Power supply
	5PC600.SX02-01	✓	✓	✓	✓	✓	✓	95	
	5PC600.SX02-00	✓	✓	✓	✓	✓	✓	95	
	5PC600.SX05-01	✓	✓	✓	✓	✓	✓	95	
	5PC600.SX05-00	✓	✓	✓	✓	✓	✓	95	
Additional IF slots	5AC600.CANI-00	✓	✓	✓	✓	✓	✓	-	
	5AC600.485I-00	✓	✓	✓	✓	✓	✓	-	
	5ACPCI.RAIS-00 (24-hour / standard)	30/35	30/35	30/35	40/50	40/50	40/50	-	
	5ACPCI.RAIS-01 (24-hour / standard)	30/35	30/35	30/35	40/50	40/50	40/50	-	

1) Only possible with a CompactFlash card 5CFCRD.xxxx-04 or 5CFCRD.xxxx-03 from B&R

Figure 23: Ambient temperatures for systems with an 815E CPU board (ETX)

See the following page for a description of the graphic.

2.6.2 Minimum ambient temperature

For systems containing one of the following components, the minimum ambient temperature is +5°C: 5AC600.HDDI-00, 5AC600.CDXS-00, 5AC600.DVDS-00, 5AC600.DVRS-00, 5AC600.FDDS-00, 5AC600.HDDS-00, 5ACPCI.RAIS-00, 5ACPCI.RAIS-01.
If none of these components are used, then the minimum ambient temperature is 0°C.

2.6.3 How do you determine the maximum ambient temperature?

1) Selection of the CPU board (use **with** or **without** fan kit).

2) The "maximum ambient temperature" line shows the maximum ambient temperature for the entire system when using this CPU board.

Information:

Maximum temperature data is for operation at 500 meters. Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

3) Incorporating additional drives (add-on, slide-in), main memory, additional insert cards, etc. can change the temperature limits of an APC620 system.

If there is a ✓ (checkmark) next to the component, it can be used at the maximum ambient temperature of the whole system without problems.

If there is a specific temperature, for example "35", next to the component, then the ambient temperature of the whole APC620 system cannot exceed this temperature.

Special case: 5AC600.HDDI-00, 5AC600.HDDS-00 and RAID hard disks

For these hard disks, the limits will depend on whether the system is intended for 24-hour[1] or standard[1] operation.

Example 1: A temperature limit of "30/35" means
30°C for 24-hour operation and 35°C for standard operation.

Example 2: A temperature limit of "-/25" means
not intended for 24-hour operation and 25°C for standard operation.

Information:

It is generally recommended to use a fan kit when using hard disks 5AC600.HDDI-00, 5AC600.HDDS-00 and the RAID hard disks.

---

[1] 24-hour operation = 732 POH (Power On Hours) per month, standard operation = 250 POH or 333 POH (Power On Hours) per month.

2.6.4 Temperature monitoring

The APC620 has temperature sensors in various places (I/O, power supply, slide-in drive 1, slide-in drive 2). The locations of the temperature sensors can be found in the figure "Temperature sensor locations", on page 767. The value listed in the table represents the defined maximum temperature for this measurement point1). An alarm is not triggered when this temperature is exceeded. The temperatures1) can be read in BIOS (menu item "Advanced" - Main board/panel features - Main board monitor) or in Microsoft Windows XP/embedded, using the B&R Control Center.

Additionally, the hard disks for APC620 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, for example the temperature, using software (e.g. HDD thermometer - freeware) in Microsoft Windows XP/embedded.

---

1) The measured temperature is a guideline for the immediate ambient temperature, but can be influenced by neighboring components.

2.7 Ambient temperatures for systems with an 855GME CPU board (ETX / XTX)

It is possible to combine CPU boards with various other components, such as drives, main memory, additional insert cards, etc. dependent on system unit and fan kit. The various configurations result in varying maximum possible ambient temperatures, which can be seen in the following graphic (see figure 25 "Ambient temperatures for systems with an 855GME CPU board (ETX / XTX)", on page 94).

Information:

The maximum specified ambient temperatures were determined under worst-case conditions.

Experience has shown that higher ambient temperatures can be reached under typical conditions, e.g. using Microsoft Windows. The testing and evaluation is to be done on-site by the user (temperatures can be read in BIOS or using the B&R Control Center, see the chapter 4 "Software", on page 351).

Worst-case conditions for systems with an 855GME CPU board (ETX / XTX)

- Thermal Analysis Tool V1.4 from Intel for simulating 100% processor load.
- BurnIn testing tool (BurnIn V4.0 Pro from Passmark Software) to simulate a 100% load on the interface via loop-back adapters (serial interfaces, add-on and slide-in drives, USB interfaces, audio outputs)
- Maximum system extension and power consumption.

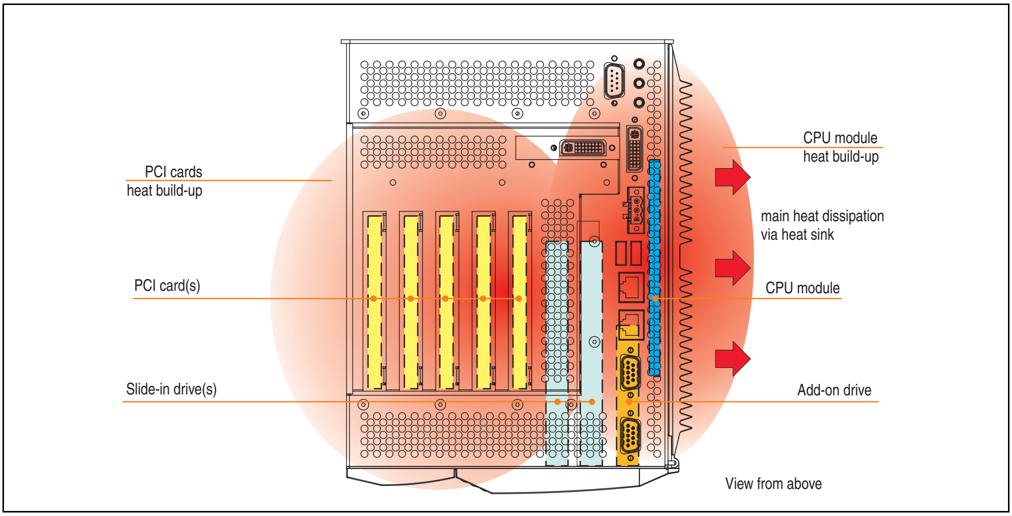


Figure 24: Example of worst-case conditions for temperature measurement

2.7.1 Maximum ambient temperature

All temperatures in °C
at 500 m above sea level

Derating of the maximum
ambient temperatrure typically 1°C
per 1000 m after 500 m above sea level

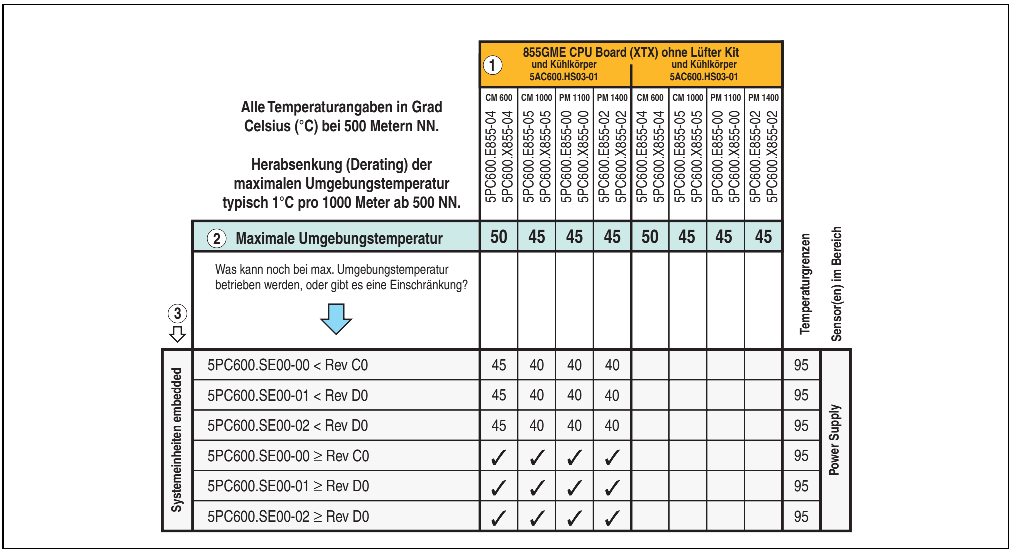
What can still be operated at max. ambient temp.?
What are the limitations?

③

		① 855GME CPU board (ETX / XTX) without fan kit								① 855GME CPU board (ETX / XTX) with fan kit									
		and heat sink 5AC600.HS01-01				and heat sink 5AC600.HS01-02				and heat sink 5AC600.HS01-01				and heat sink 5AC600.HS01-02					
		CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800			CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800				
		5PC600.E855-04 5PC600.X855-04	5PC600.E855-05 5PC600.X855-05	5PC600.E855-00 5PC600.X855-00	5PC600.E855-02 5PC600.X855-02	5PC600.E855-01 5PC600.X855-01	5PC600.E855-03 5PC600.X855-03			5PC600.E855-04 5PC600.X855-04	5PC600.E855-05 5PC600.X855-05	5PC600.E855-00 5PC600.X855-00	5PC600.E855-02 5PC600.X855-02	5PC600.E855-01 5PC600.X855-01	5PC600.E855-03 5PC600.X855-03			Temp. Monitored by sensors located in	
	② Maximum ambient temperature	50	45	45	45	/	/			55	55	55	55	45	45				
Add-on drive	Onboard CompactFlash [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
	5AC600.CFSI-00 [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	
	5AC600.HDDI-01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	
	5AC600.HDDI-00 (24-hour/Standard)	-/30	-/25	-/25	-/25					30/40	30/40	30/40	30/40	-/35	-/35			45/55	
	5AC600.HDDI-05	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	
	5AC600.HDDI-06	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓				
Slide-in drive	5AC600.CFSS-00 [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	Slide-in drive 1 and 2
	5AC600.CDXS-00	45	40	40	40					50	50	50	50	40	40			55	
	5AC600.DVDS-00	30	30	30	30					40	40	40	40	30	30			45	
	5AC600.DVRS-00	30	30	30	30					40	40	40	40	30	30			45	
	5AC600.FDDS-00	40	35	35	35					45	45	45	45	35	35			50	
	5AC600.HDDS-01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	
	5AC600.HDDS-00 (24-hour/Standard)	35/45	30/40	30/40	30/40					40/50	40/50	40/50	40/50	30/40	30/40			45/55	
	5AC600.HDDS-02	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	
Main memory	5MMDDR.0256-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
	5MMDDR.0512-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
	5MMDDR.1024-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
System units	5PC600.SX01-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			95	Power supply
	5PC600.SX02-00 / -01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			95	
	5PC600.SF03-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			95	
	5PC600.SX05-00 / -01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			95	
Additional insert cards Interfaces / AP Link	5AC600.CANI-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
	5AC600.485I-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
	5AC600.SDL0-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
	5ACPCI.RAIS-00 (24-hour/Standard)	35/45	30/40	30/40	30/40					40/50	40/50	40/50	40/50	30/40	30/40			-	
	5ACPCI.RAIS-01 (24-hour/Standard)	35/45	30/40	30/40	30/40					40/50	40/50	40/50	40/50	30/40	30/40			-	
	5ACPCI.RAIC-01 (24-hour/Standard)	35/45	30/40	30/40	30/40					40/50	40/50	40/50	40/50	30/40	30/40			-	
	5ACPCI.RAIC-03 (24-hour/Standard)	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	

1) Only possible with a CompactFlash card 5CFCRD.xxxx-04 or 5CFCRD.xxxx-03 from B&R

Figure 25: Ambient temperatures for systems with an 855GME CPU board (ETX / XTX)



Alle Temperaturangaben in Grad Celsius (°C) bei 500 Metern NN.

Herabsenkung (Derating) der maximalen Umgebungstemperatur typisch 1°C pro 1000 Meter ab 500 NN.

	① 855GME CPU Board (XTX) ohne Lüfter Kit und Kühlkörper 5AC600.HS03-01				und Kühlkörper 5AC600.HS03-01				Temperaturgrenzen	Sensor(en) im Bereich
	CM 600 5PC600.E855-04 5PC600.X855-04	CM 1000 5PC600.E855-05 5PC600.X855-05	PM 1100 5PC600.E855-00 5PC600.X855-00	PM 1400 5PC600.E855-02 5PC600.X855-02	CM 600 5PC600.E855-04 5PC600.X855-04	CM 1000 5PC600.E855-05 5PC600.X855-05	PM 1100 5PC600.E855-00 5PC600.X855-00	PM 1400 5PC600.E855-02 5PC600.X855-02		
② Maximale Umgebungstemperatur	50	45	45	45	50	45	45	45		
Was kann noch bei max. Umgebungstemperatur betrieben werden, oder gibt es eine Einschränkung?										
③ Systemeinheiten embedded										
5PC600.SE00-00 < Rev C0	45	40	40	40					95	Power Supply
5PC600.SE00-01 < Rev D0	45	40	40	40					95	
5PC600.SE00-02 < Rev D0	45	40	40	40					95	
5PC600.SE00-00 ≥ Rev C0	✓	✓	✓	✓					95	
5PC600.SE00-01 ≥ Rev D0	✓	✓	✓	✓					95	
5PC600.SE00-02 ≥ Rev D0	✓	✓	✓	✓					95	

Figure 26: Ambient temperatures for embedded systems with an 855GME CPU board (ETX / XTX)

2.7.2 Minimum ambient temperature

For systems containing one of the following components, the minimum ambient temperature is +5°C: 5AC600.HDDI-00, 5AC600.CDXS-00, 5AC600.DVDS-00, 5AC600.DVRS-00, 5AC600.FDDS-00, 5AC600.HDDS-00, 5ACPCI.RAIS-00, 5ACPCI.RAIS-01, 5ACPCI.RAIC-01. If none of these components are used, then the minimum ambient temperature is 0°C.

2.7.3 How do you determine the maximum ambient temperature?

1) Selection of the CPU board (use **with** or **without** fan kit).

2) The "maximum ambient temperature" line shows the maximum ambient temperature for the entire system when using this CPU board.

> **Information:**
>
> **Maximum temperature data is for operation at 500 meters. Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).**

3) Incorporating additional drives (add-on, slide-in), main memory, additional insert cards, etc. can change the temperature limits of an APC620 system.

If there is a ✓ (checkmark) next to the component, it can be used at the maximum ambient temperature of the whole system without problems.

If there is a specific temperature, for example "35", next to the component, then the ambient temperature of the whole APC620 system cannot exceed this temperature.

Special case: 5AC600.HDDI-00, 5AC600.HDDS-00 and RAID hard disks

For these hard disks, the limits will depend on whether the system is intended for 24-hour[1] or standard[1] operation.

Example 1: A temperature limit of "30/35" means
30°C for 24-hour operation and 35°C for standard operation.

Example 2: A temperature limit of "-/25" means
not intended for 24-hour operation and 25°C for standard operation.

> ## Information:
>
> **It is generally recommended to use a fan kit when using hard disks 5AC600.HDDI-00, 5AC600.HDDS-00 and the RAID hard disks 5ACPCI.RAIS-00, 5ACPCI.RAIS-01, 5ACPCI.RAIC-01 and 5ACPCI.RAIC-03.**

2.7.4 Temperature monitoring

The APC620 has temperature sensors in various places (I/O, power supply, slide-in drive 1, slide-in drive 2). The locations of the temperature sensors can be found in the figure "Temperature sensor locations", on page 767. The value listed in the table represents the defined maximum temperature for this measurement point[2] . An alarm is not triggered when this temperature is exceeded. The temperatures[2] can be read in BIOS (menu item "Advanced" - Baseboard/panel features - Baseboard monitor) or in Microsoft Windows XP/Embedded, using the B&R Control Center.
Additionally, the hard disks for APC620 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, for example the temperature, using software (e.g. HDD thermometer - freeware) in Microsoft Windows XP/Embedded.

---

[1] 24-hour operation = 732 POH (Power On Hours) per month, standard operation = 250 POH or 333 POH (Power On Hours) per month.

[2] The measured temperature is a guideline for the immediate ambient temperature, but can be influenced by neighboring components.

2.8 Power management APC620 system unit with 1 PCI slot

2.8.1 Supply voltage for the 5PC600.SX01-00 revision >= I0

The following block diagram presents the simplified structure of the APC620 supply voltage for 5PC600.SX01-00 system units starting with revision I0.

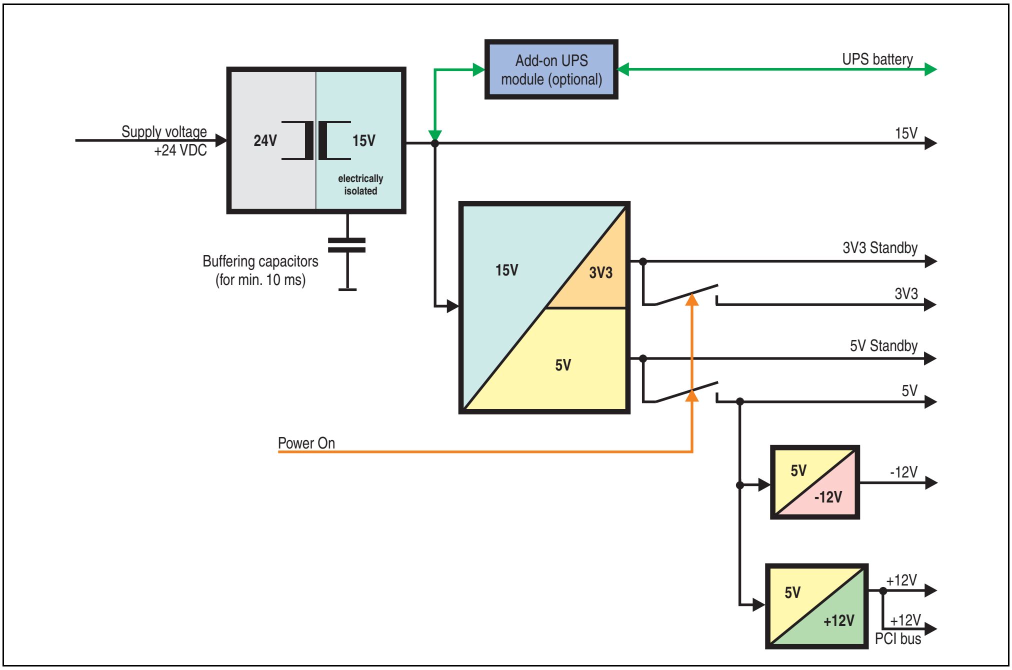


Figure 27: Supply voltage for the 5PC600.SX01-00 revision >= I0

Explanation:

The supply voltage is converted to 15 V with a DC/DC converter. These electrically isolated 15 V feed four further DC/DC converters, which generate the remaining voltages.

After the system is turned on (e.g. using the power button), the voltages 3V3 and 5 V are placed on the bus. Two additional DC/DC converters at the 5 V output generate
-12 V and -12 V, which is then applied to the bus.

The optional APC620 add-on UPS and battery unit is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

2.8.2 Power calculation with 5PC600.SX01-00 revision >= I0

		Information:	**APC620 System unit 5PC600.SX01-00**									**This system**
		All entries in watts The entries for the **Generator** are maximum values. Entries for the **Device** are determined maximum values, but not peak values.	C3 400 5PC600.E815-00	C3 733 5PC600.E815-02	C3 1000 5PC600.E815-03	CM 600 5PC600.E855-04 5PC600.X855-04	CM 1000 5PC600.E855-05 5PC600.X855-05	PM 1100 5PC600.E855-00 5PC600.X855-00	PM 1400 5PC600.E855-02 5PC600.X855-02	PM 1600 5PC600.E855-01 5PC600.X855-01	PM 1800 5PC600.E855-03 5PC600.X855-03	Enter values in this columns ⇩
Total power supply		**Total power supply (max.)**										**70**
		Add-on UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
	5V	**max. possible at 5V**										**70**
		CPU Board, fixed device	14	18	25	17	21	23	23	37	37	
		per CompactFlash, optional (add-on, slide-in)	1	1	1	1	1	1	1	1	1	
		Hard Disk, optional (add-on, slide-in)	4	4	4	4	4	4	4	4	4	
		External keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
		USB Peripheral, optional (max. 2,5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
		Interface option (add-on interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
		PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
		External device, optional (via BaseBoard)	5	5	5	5	5	5	5	5	5	
		Devices 5V ∑										
	+12V	**max. possible at +12V**										**12**
		Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
		External device, optional (via BaseBoard)	10	10	10	10	10	10	10	10	10	
		PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)1)										
		Devices total +12V ∑										
	-12V	**max. possible at -12V**										**1.2**
		PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit)1)										
		Devices total -12V ∑										
		Devices total 5V ∑										
	3V3	**max. possible at 3V3**										**23**
		System unit, fixed device	4	4	4	4	4	4	4	4	4	
		Interface option (add-on interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
		PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
		Devices 3V3 ∑										
		Devices total ∑										

1) The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan kit.

See section "Starting current", on page 136 for starting current values.

2.8.3 Supply voltage for the 5PC600.SX01-00 revision < I0

The following block diagram presents the simplified structure of the APC620 supply voltage for 5PC600.SX01-00 system units starting with revision < I0.

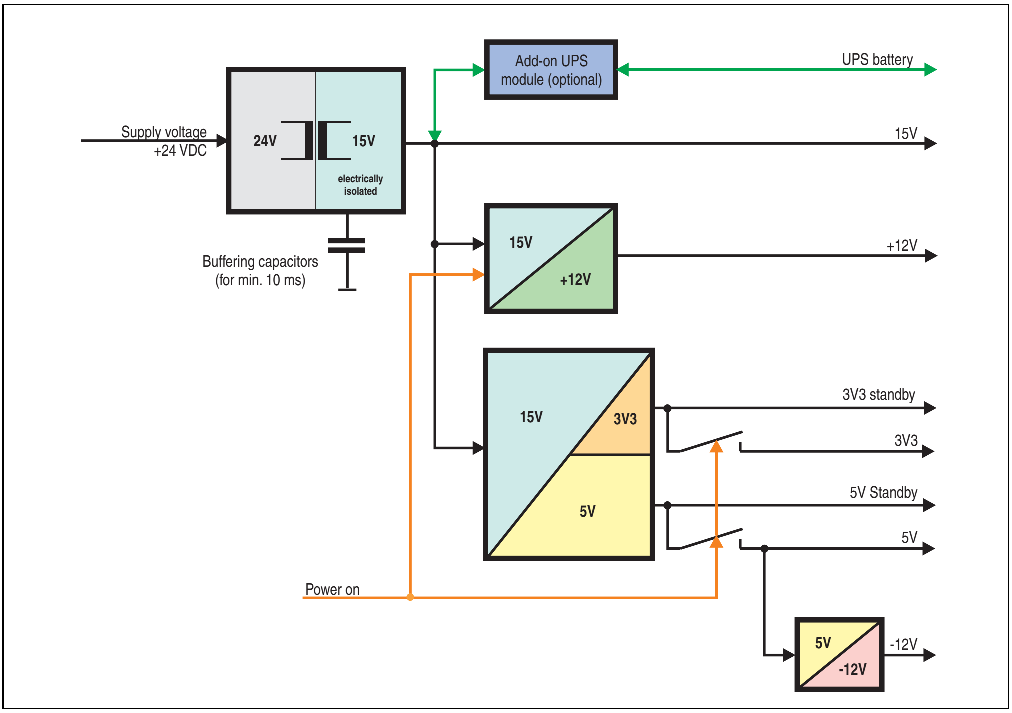


Figure 28: Supply voltage for the 5PC600.SX01-00 revision < I0

Explanation:

The supply voltage is converted to 15 V with a DC/DC converter. These electrically isolated 15 volts feed two further DC/DC converters. One generates +12 V, and the other 3V3 and 5V standby.

After the system is turned on (e.g. using the power button), the voltages 3V3, 5 V, +12 V are placed on the bus. At the 5 V output, yet another DC/DC converter generates -12 V, and places these on the bus.

The optional APC620 add-on UPS and battery unit is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

2.8.4 Power calculation with 5PC600.SX01-00 revision < I0

Information:

All entries in watts
The entries for the **Generator** are maximum values.
Entries for the **Device** are determined maximum values, but not peak values.

		APC620 System unit 5PC600.SX01-00									This system
		C3 400 5PC600.E815-00	C3 733 5PC600.E815-02	C3 1000 5PC600.E815-03	CM 600 5PC600.E855-04 5PC600.X855-04	CM 1000 5PC600.E855-05 5PC600.X855-05	PM 1100 5PC600.E855-00 5PC600.X855-00	PM 1400 5PC600.E855-02 5PC600.X855-02	PM 1600 5PC600.E855-01 5PC600.X855-01	PM 1800 5PC600.E855-03 5PC600.X855-03	Enter values in this columns ⇩
Total power supply	**Total power supply (max.)**										**70**
	Add-on UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
5V	**max. possible at 5V**										**70**
	CPU Board, fixed device	14	18	25	17	21	23	23	37	37	
	per CompactFlash, optional (add-on, slide-in)	1	1	1	1	1	1	1	1	1	
	Hard Disk, optional (add-on, slide-in)	4	4	4	4	4	4	4	4	4	
	External keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
	USB Peripheral, optional (max. 2,5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
	Interface option (add-on interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) [1]										
	External device, optional (via BaseBoard)	5	5	5	5	5	5	5	5	5	
	Devices 5V ∑										
-12V	**max. possible at -12V**										**1.2**
	PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit)[1]										
	Devices -12V ∑										
	Devices total 5V ∑										
3V3	**max. possible at3V3**										**23**
	System unit, fixed device	4	4	4	4	4	4	4	4	4	
	Interface option (add-on interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) [1]										
	Devices 3V3 ∑										
+12V	**max. possible at +12V**										**12**
	Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
	External device, optional (via BaseBoard)	10	10	10	10	10	10	10	10	10	
	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)[1]										
	Devices +12V ∑										
	Devices total ∑										

1) The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan kit.

See section "Starting current", on page 136 for starting current values.

2.9 Power management APC620 system units with 2 PCI slots

2.9.1 Supply voltage for the 5PC600.SX02-00 revision >= H0 and 5PC600.SX02-01 revision >= K0)

The following block diagram presents the simplified structure of the APC620 supply voltage for system units 5PC600.SX02-00 (revision H0 and higher), 5PC600.SX02-01 (revision K0 and higher).

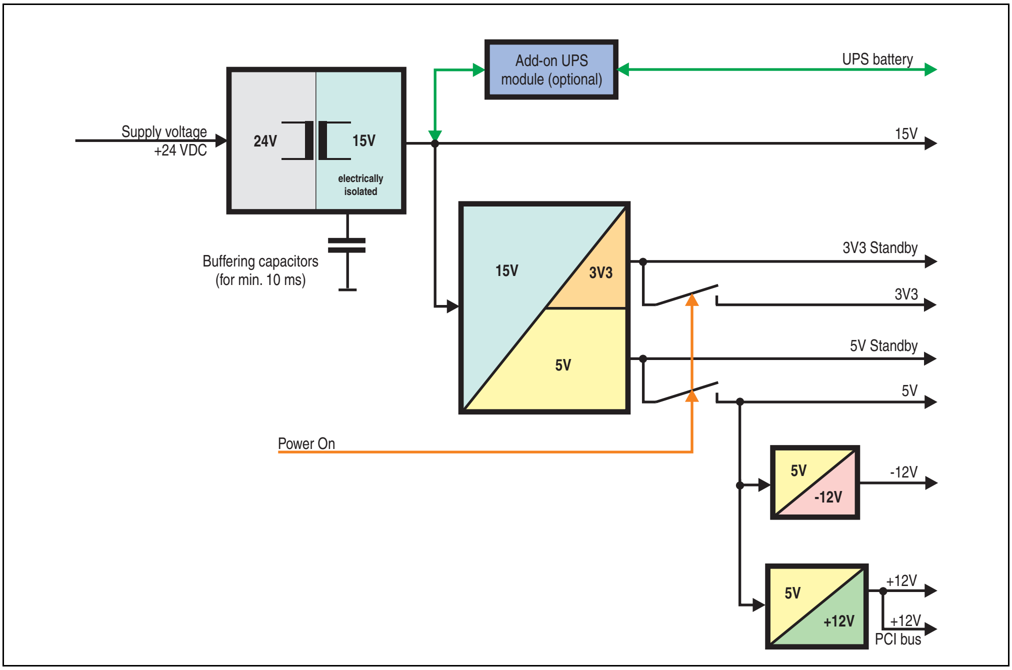


Figure 29: Supply voltage for the 2 PCI slots (dependent on system unit version)

Explanation:

The supply voltage is converted to 15 V with a DC/DC converter. These electrically isolated 15 V feed four further DC/DC converters, which generate the remaining voltages.

After the system is turned on (e.g. using the power button), the voltages 3V3 and 5 V are placed on the bus. Two additional DC/DC converters at the 5 V output generate
-12 V and -12 V, which is then applied to the bus.

The optional APC620 add-on UPS and battery unit is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

2.9.2 Power calculation with 5PC600.SX02-00 revision >= H0

Information:

All entries in watts
The entries for the **Generator** are maximum values.
Entries for the **Device** are determined maximum values, but not peak values.

		APC620 System unit 5PC600.SX02-00									This system
		C3 400 5PC600.E815-00	C3 733 5PC600.E815-02	C3 1000 5PC600.E815-03	CM 600 5PC600.E855-04 5PC600.X855-04	CM 1000 5PC600.E855-05 5PC600.X855-05	PM 1100 5PC600.E855-00 5PC600.X855-00	PM 1400 5PC600.E855-02 5PC600.X855-02	PM 1600 5PC600.E855-01 5PC600.X855-01	PM 1800 5PC600.E855-03 5PC600.X855-03	Enter values in this columns
Total power supply	**Total power supply (max.)**										**70**
	Add-on UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
5V	**max. possible at 5V**										**70**
	CPU Board, fixed device	14	18	25	17	21	23	23	37	37	
	per CompactFlash, optional (add-on, slide-in)	1	1	1	1	1	1	1	1	1	
	Hard Disk, optional (add-on, slide-in)	4	4	4	4	4	4	4	4	4	
	per drive, optional (slide-in CD,DVD CD-RW)	4	4	4	4	4	4	4	4	4	
	External keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
	USB Peripheral, optional (max. 2,5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
	Interface option (add-on interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
	Graphics adapter (AP Link), optional	5	5	5	5	5	5	5	5	5	
	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) [1]										
	External device, optional (via BaseBoard)	5	5	5	5	5	5	5	5	5	
	Devices 5V ∑										
+12V	**max. possible at +12V**										**12**
	Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
	External device, optional (via BaseBoard)	10	10	10	10	10	10	10	10	10	
	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)[1]										
	Devices total +12V ∑										
-12V	**max. possible at -12V**										**1.2**
	PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit)[1]										
	Devices total -12V ∑										
	Devices total 5V ∑										
3V3	**max. possible at 3V3**										**23**
	System unit, fixed device	4	4	4	4	4	4	4	4	4	
	Graphics adapter (AP Link), optional	5	5	5	5	5	5	5	5	5	
	Interface option (add-on interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) [1]										
	Devices 3V3 ∑										
	Devices total ∑										

1) The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan kit.

See section "Starting current", on page 136 for starting current values.

2.9.3 Power calculation with 5PC600.SX02-01 revision >= K0

	Information:	APC620 System unit 5PC600.SX02-01									This system
	All entries in watts The entries for the **Generator** are maximum values. Entries for the **Device** are determined maximum values, but not peak values.	C3 400 5PC600.E815-00	C3 733 5PC600.E815-02	C3 1000 5PC600.E815-03	CM 600 5PC600.E855-04 5PC600.X855-04	CM 1000 5PC600.E855-05 5PC600.X855-05	PM 1100 5PC600.E855-00 5PC600.X855-00	PM 1400 5PC600.E855-02 5PC600.X855-02	PM 1600 5PC600.E855-01 5PC600.X855-01	PM 1800 5PC600.E855-03 5PC600.X855-03	Enter values in this columns
Total power supply	**Total power supply (max.)**										**70**
Total power supply	Add-on UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
5V	**max. possible at 5V**										**70**
5V	CPU Board, fixed device	14	18	25	17	21	23	23	37	37	
5V	per CompactFlash, optional (add-on, slide-in)	1	1	1	1	1	1	1	1	1	
5V	Hard Disk, optional (add-on, slide-in)	4	4	4	4	4	4	4	4	4	
5V	per Drive, optional (slide-in CD,DVD CD-RW)	4	4	4	4	4	4	4	4	4	
5V	External keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
5V	USB Peripheral, optional (max. 2,5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
5V	Interface option (add-on interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
5V	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
5V	External device, optional (via BaseBoard)	5	5	5	5	5	5	5	5	5	
5V	**Devices 5V ∑**										
-12V	**max. possible at -12V**										**1.2**
-12V	PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit)1)										
-12V	**Devices -12V ∑**										
5V	**Devices total 5V ∑**										
3V3	**max. possible at 3V3**										**23**
3V3	System unit, fixed device	4	4	4	4	4	4	4	4	4	
3V3	Interface option (add-on interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
3V3	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
3V3	**Devices 3V3 ∑**										
+12V	**max. possible at +12V**										**12**
+12V	Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
+12V	External device, optional (via BaseBoard)	10	10	10	10	10	10	10	10	10	
+12V	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)1)										
+12V	**Devices +12V ∑**										
Total power supply	**Devices total ∑**										

1) The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan kit.

See section "Starting current", on page 136 for starting current values.

2.9.4 Supply voltage for the 5PC600.SX02-00 revision < H0 and 5PC600.SX02-01 revision < K0)

The following block diagram presents the simplified structure of the APC620 supply voltage for system units 5PC600.SX02-00 (revision < H0 and higher), 5PC600.SX02-01 (revision < K0 and higher).

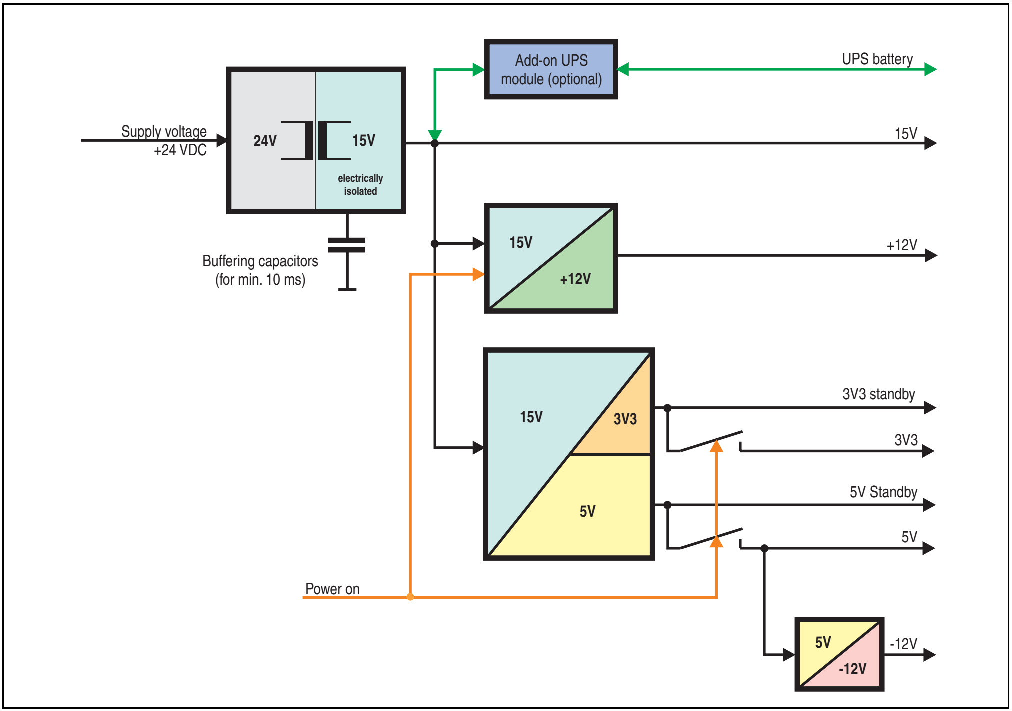


Figure 30: Supply voltage for the 2 PCI slots (dependent on system unit version)

<u>Explanation:</u>

The supply voltage is converted to 15 V with a DC/DC converter. These electrically isolated 15 volts feed two further DC/DC converters. One generates +12 V, and the other 3V3 and 5V standby.

After the system is turned on (e.g. using the power button), the voltages 3V3, 5 V, +12 V are placed on the bus. At the 5 V output, yet another DC/DC converter generates -12 V, and places these on the bus.

The optional APC620 add-on UPS and battery unit is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

2.9.5 Power calculation with 5PC600.SX02-00 revision < H0

	Information: **All entries in watts** The entries for the **Generator** are maximum values. Entries for the **Device** are determined maximum values, but not peak values.	APC620 System unit 5PC600.SX02-00									This system
		C3 400 5PC600.E815-00	C3 733 5PC600.E815-02	C3 1000 5PC600.E815-03	CM 600 5PC600.E855-04 5PC600.X855-04	CM 1000 5PC600.E855-05 5PC600.X855-05	PM 1100 5PC600.E855-00 5PC600.X855-00	PM 1400 5PC600.E855-02 5PC600.X855-02	PM 1600 5PC600.E855-01 5PC600.X855-01	PM 1800 5PC600.E855-03 5PC600.X855-03	Enter values in this columns
Total power supply	Total power supply (max.)										70
	Add-on UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
5V	max. possible at 5V										55
	CPU Board, fixed device	14	18	25	17	21	23	23	37	37	
	per CompactFlash, optional (add-on, slide-in)	1	1	1	1	1	1	1	1	1	
	Hard Disk, optional (add-on, slide-in)	4	4	4	4	4	4	4	4	4	
	per Drive, optional (slide-in CD,DVD CD-RW)	4	4	4	4	4	4	4	4	4	
	External keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
	USB Peripheral, optional (max. 2,5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
	Interface option (add-on interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
	Graphics adapter (AP Link), optional	5	5	5	5	5	5	5	5	5	
	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) [1]										
	External device, optional (via BaseBoard)	5	5	5	5	5	5	5	5	5	
	Devices 5V ∑										
-12V	max. possible at -12V										1.2
	PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit)[1]										
	Devices -12V ∑										
	Devices total 5V ∑										
3V3	max. possible at 3V3										23
	System unit, fixed device	4	4	4	4	4	4	4	4	4	
	Graphics adapter (AP Link), optional	5	5	5	5	5	5	5	5	5	
	Interface option (add-on interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) [1]										
	Devices 3V3 ∑										
+12V	max. possible at +12V										12
	Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
	External device, optional (via BaseBoard)	10	10	10	10	10	10	10	10	10	
	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)[1]										
	Devices +12V ∑										
	Devices total ∑										

1) The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan kit.

See section "Starting current", on page 136 for starting current values.

2.9.6 Power calculation with 5PC600.SX02-01 revision < K0

		Information: **All entries in watts** The entries for the **Generator** are maximum values. Entries for the **Device** are determined maximum values, but not peak values.	**APC620 System unit 5PC600.SX02-01**									**This system**
			C3 400 5PC600.E815-00	C3 733 5PC600.E815-02	C3 1000 5PC600.E815-03	CM 600 5PC600.E855-04 5PC600.X855-04	CM 1000 5PC600.E855-05 5PC600.X855-05	PM 1100 5PC600.E855-00 5PC600.X855-00	PM 1400 5PC600.E855-02 5PC600.X855-02	PM 1600 5PC600.E855-01 5PC600.X855-01	PM 1800 5PC600.E855-03 5PC600.X855-03	Enter values in this columns ⇩
Total power supply		**Total power supply (max.)**										**70**
		Add-on UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
	5V	**max. possible at 5V**										**55**
		CPU Board, fixed device	14	18	25	17	21	23	23	37	37	
		per CompactFlash, optional (add-on, slide-in)	1	1	1	1	1	1	1	1	1	
		Hard Disk, optional (add-on, slide-in)	4	4	4	4	4	4	4	4	4	
		per Drive, optional (slide-in CD,DVD CD-RW)	4	4	4	4	4	4	4	4	4	
		External keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
		USB Peripheral, optional (max. 2,5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
		Interface option (add-on interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
		PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) [1]										
		External device, optional (via BaseBoard)	5	5	5	5	5	5	5	5	5	
		Devices 5V ∑										
	-12V	**max. possible at -12V**										**1.2**
		PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit)[1]										
		Devices -12V ∑										
		Devices total 5V ∑										
	3V3	**max. possible at 3V3**										**23**
		System unit, fixed device	4	4	4	4	4	4	4	4	4	
		Interface option (add-on interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
		PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) [1]										
		Devices 3V3 ∑										
	+12V	**max. possible at +12V**										**12**
		Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
		External device, optional (via BaseBoard)	10	10	10	10	10	10	10	10	10	
		PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)[1]										
		Devices +12V ∑										
		Devices total ∑										

1) The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan kit.

See section "Starting current", on page 136 for starting current values.

2.10 Power management APC620 system unit with 3 PCI slots

2.10.1 5PC600.SF03-00 supply voltage

The following block diagram presents the simplified structure of the APC620 supply voltage for system units 5PC600.SF03-00.

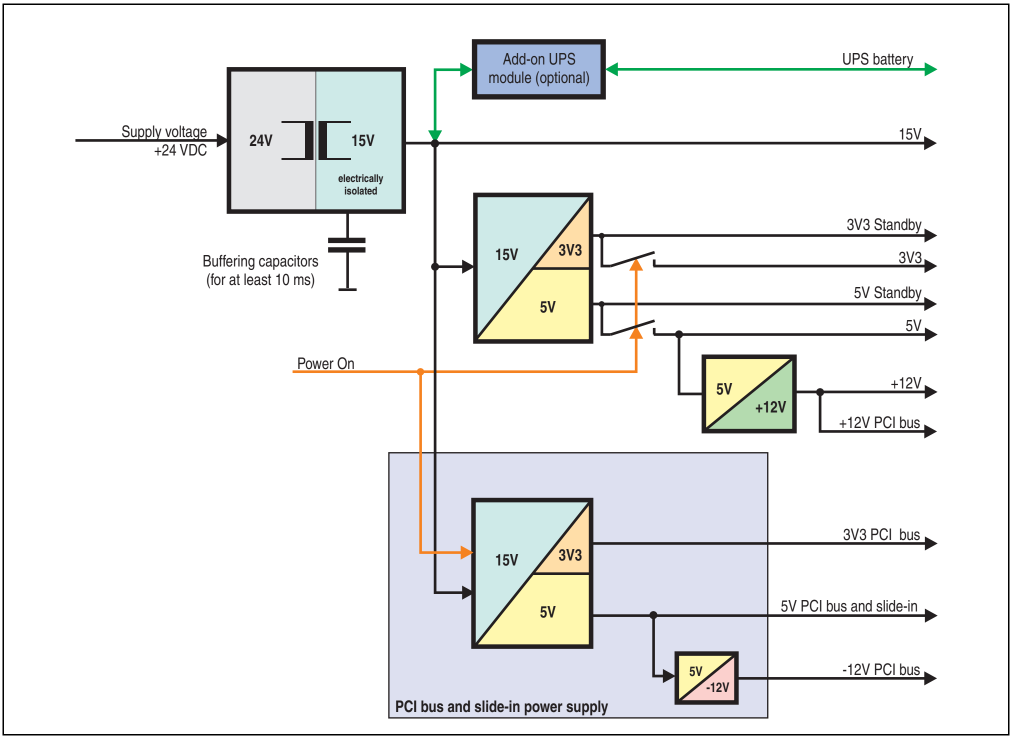


Figure 31: Supply voltage block diagram 3 PCI slots

Explanation:

Systems with 3 PCI slots have an additional power supply for the PCI buses and the slide-in drive. The supply voltage is converted to 15 V with a DC/DC converter. These electrically isolated 15 volts feed two further DC/DC converters. One generates 5 V for an additional DC/DC converter, which produces +12 V and +12V PCI bus voltage. The other DC/DC converter produces 3V3 and 5V standby.
After the system is turned on (e.g. using the power button), the voltages 3V3, 5 V, +12 V are placed on the bus. At the 5 V output, yet another DC/DC converter generates -12 V, and places these on the bus.

The optional APC620 add-on UPS and battery unit is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

2.10.2 Power calculation with system unit 5PC600.SF03-00

	Information: **All entries in watts** The entries for the **Generator** are maximum values. Entries for the **Device** are determined maximum values, but not peak values.	**APC620 System unit 5PC600.SF03-00**									**This system**
		CM 600 5PC600.E855-04 5PC600.X855-04	CM 1000 5PC600.E855-05 5PC600.X855-05	PM 1100 5PC600.E855-00 5PC600.X855-00	PM 1400 5PC600.E855-02 5PC600.X855-02	PM 1600 5PC600.E855-01 5PC600.X855-01	PM 1800 5PC600.E855-03 5PC600.X855-03				Enter values in this column
Total power supply	**Total power supply (max.)**										**110**
	Add-on UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5				
5V	**max. possible at 5V**										**70**
	CPU Board, fixed device	17	21	23	23	37	37				
	per CompactFlash, optional (add-on)	1	1	1	1	1	1				
	Hard Disk, optional (add-on)	4	4	4	4	4	4				
	External keyboard PS/2, optional	1	1	1	1	1	1				
	USB Peripheral, optional (max. 2,5 watts per USB1 and USB2 connection)	5	5	5	5	5	5				
	Interface option (add-on interface), optional	0.5	0.5	0.5	0.5	0.5	0.5				
	Graphics adapter (AP Link), optional	5	5	5	5	5	5				
	External device, optional (via BaseBoard)	5	5	5	5	5	5				
+12V	**max. possible at +12V**										**24**
	Fan Kit, optional	2.5	2.5	2.5	2.5	2.5	2.5				
	External device, optional (via BaseBoard)	10	10	10	10	10	10				
	PCI manufacturer limits, optional 1) (max. 3 watts without fan kit, max. 12 watts with fan kit)										
	Devices total 5V ∑										
3V3	**max. possible at 3V3**										**23**
	System unit, fixed device	4	4	4	4	4	4				
	Graphics adapter (AP Link), optional	5	5	5	5	5	5				
	Interface option (add-on interface), optional	0.25	0.25	0.25	0.25	0.25	0.25				
	Devices ∑										
PCI bus and slide-in power supply	**PCI bus and slide-in power supply (max.)**										**50**
5V	**max. possible at 5V PCI bus and slide-in**										**50**
	per CompactFlash, optional (slide-in)	1	1	1	1	1	1				
	per Hard Disk, optional (slide-in)	4	4	4	4	4	4				
	per drive, optional (slide-in - CD/DVD)	4	4	4	4	4	4				
	PCI manufacturer limits, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
-12V	**max. possible at -12V PCI bus and slide-in**										**1.2**
	PCI manufacturer limits, optional (max. 1.2 watts without and with fan kit) 1)										
	Devices -12V ∑										
	Devices total 5V ∑										
3V3	**max. possible at 3V3 PCI bus and slide-in**										**23**
	PCI manufacturer limits, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
	Devices 3V3 ∑										
	Total PCI bus and slide-in ∑										
	Devices total ∑										

1) The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan kit.

See section "Starting current", on page 136 for starting current values.

2.11 Power management APC620 system units with 5 PCI slots

2.11.1 Supply voltage for the 5PC600.SX05-00 (revision >= H0) and 5PC600.SX05-01 (revision >= H0)

The following block diagram presents the simplified structure of the APC620 supply voltage for system units 5PC600.SX05-00 (Revision H0), 5PC600.SX05-01 (Revision H0).

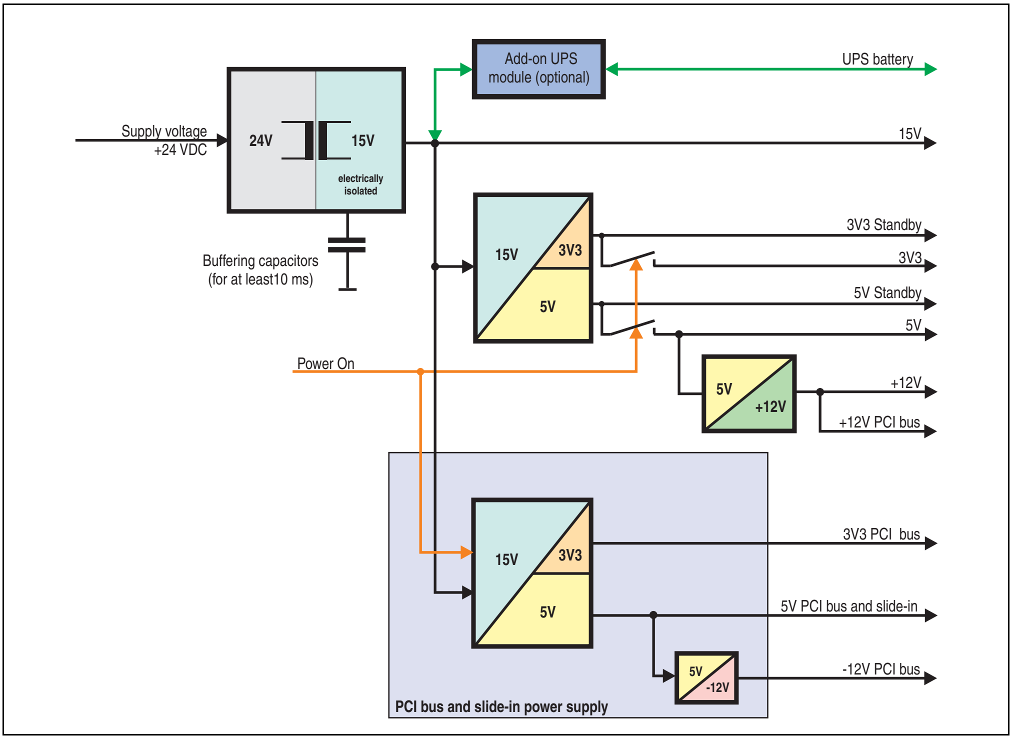


Figure 32: Supply voltage for the 5 PCI slots (dependent on system unit version)

<u>Explanation:</u>

Systems with 5 PCI slots have an additional power supply for the PCI buses and the slide-in drive. The supply voltage is converted to 15 V with a DC/DC converter. These electrically isolated 15 volts feed two further DC/DC converters. One generates 5 V for an additional DC/DC converter, which produces +12 V and +12V PCI bus voltage. The other DC/DC converter produces 3V3 and 5V standby.

After the system is turned on (e.g. using the power button), the voltages 3V3, 5 V, +12 V are placed on the bus. At the 5 V output, yet another DC/DC converter generates -12 V, and places these on the bus.

The optional APC620 add-on UPS and battery unit is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

2.11.2 Power calculation with system unit 5PC600.SX05-00 (revision >= H0)

Information:

All entries in watts
The entries for the **Generator** are maximum values.
Entries for the **Device** are determined maximum values, but not peak values.

		APC620 System unit 5PC600.SX05-00									This system
		C3 400 5PC600.E815-00	C3 733 5PC600.E815-02	C3 1000 5PC600.E815-03	CM 600 5PC600.E855-04 5PC600.X855-04	CM 1000 5PC600.E855-05 5PC600.X855-05	PM 1100 5PC600.E855-00 5PC600.X855-00	PM 1400 5PC600.E855-02 5PC600.X855-02	PM 1600 5PC600.E855-01 5PC600.X855-01	PM 1800 5PC600.E855-03 5PC600.X855-03	Enter values in this columns ⇩
Total power supply	**Total power supply (max.)**										**110**
	Add-on UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
5V	**max. possible at 5V**										**70**
	CPU Board, fixed device	14	18	25	17	21	23	23	37	37	
	per CompactFlash, optional (add-on, slide-in)	1	1	1	1	1	1	1	1	1	
	Hard Disk, optional (add-on, slide-in)	4	4	4	4	4	4	4	4	4	
	External keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
	USB Peripheral, optional (max. 2,5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
	Interface option (add-on interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
	Graphics adapter (AP Link), optional	5	5	5	5	5	5	5	5	5	
	External device, optional (via BaseBoard)	5	5	5	5	5	5	5	5	5	
+12V	**max. possible at +12V**										**24**
	Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
	External device, optional (via BaseBoard)	10	10	10	10	10	10	10	10	10	
	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit) 1)										
	Devices total 5V ∑										
3V3	**max. possible at 3V3**										**23**
	System unit, fixed device	4	4	4	4	4	4	4	4	4	
	Graphics adapter (AP Link), optional	5	5	5	5	5	5	5	5	5	
	Interface option (add-on interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
	Devices 3V3 ∑										
PCI bus and slide-in power supply	**PCI bus and slide-in power supply (max.)**										**50**
5V	**max. possible at 5V PCI bus and slide-in**										**50**
	per CompactFlash, optional (slide-in)	1	1	1	1	1	1	1	1	1	
	per Hard Disk, optional (slide-in)	4	4	4	4	4	4	4	4	4	
	per Drive, optional (slide-in CD,DVD)	4	4	4	4	4	4	4	4	4	
	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
	Devices 5V ∑										
-12V	**max. possible at -12V PCI bus**										**1.2**
	PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit) 1)										
	Devices -12V ∑										
	Devices total +5V ∑										
3V3	**max. possible at 3V3 PCI bus**										**23**
	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
	Devices 3V3 ∑										
	Total PCI bus and slide-in ∑										
	Devices total ∑										

1) The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan kit.

See section "Starting current", on page 136 for starting current values.

2.11.3 Power calculation with system unit 5PC600.SX05-01 (revision >= H0)

			Information: **All entries in watts** The entries for the **Generator** are maximum values. Entries for the **Device** are determined maximum values, but not peak values.	**APC620 System unit 5PC600.SX05-01**									**This system**
				C3 400 5PC600.E815-00	C3 733 5PC600.E815-02	C3 1000 5PC600.E815-03	CM 600 5PC600.E855-04 5PC600.X855-04	CM 1000 5PC600.E855-05 5PC600.X855-05	PM 1100 5PC600.E855-00 5PC600.X855-00	PM 1400 5PC600.E855-02 5PC600.X855-02	PM 1600 5PC600.E855-01 5PC600.X855-01	PM 1800 5PC600.E855-03 5PC600.X855-03	Enter values in this columns ⇩
Total power supply			**Total power supply (max.)**										**110**
			Add-on UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
	5V		**max. possible at 5V**										**70**
			CPU Board, fixed device	14	18	25	17	21	23	23	37	37	
			per CompactFlash, optional (add-on, slide-in)	1	1	1	1	1	1	1	1	1	
			Hard Disk, optional (add-on, slide-in)	4	4	4	4	4	4	4	4	4	
			External keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
			USB Peripheral, optional (max. 2,5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
			Interface option (add-on interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
			External device, optional (via BaseBoard)	5	5	5	5	5	5	5	5	5	
		+12V	**max. possible at +12V**										**24**
			Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
			External device, optional (via BaseBoard)	10	10	10	10	10	10	10	10	10	
			PCI card manufacturer limit, optional 1) (max. 3 watts without fan kit, max. 12 watts with fan kit)										
			Devices total 5V ∑										
	3V3		**max. possible at 3V3**										**23**
			System unit, fixed device	4	4	4	4	4	4	4	4	4	
			Interface option (add-on interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
			Devices 3V3 ∑										
	PCI bus and slide-in power supply		**PCI bus and slide-in power supply (max.)**										**50**
		5V	**max. possible at 5V PCI bus and slide-in**										**50**
			per CompactFlash, optional (slide-in)	1	1	1	1	1	1	1	1	1	
			per Hard Disk, optional (slide-in)	4	4	4	4	4	4	4	4	4	
			per Drive, optional (slide-in CD,DVD)	4	4	4	4	4	4	4	4	4	
			PCI card manufacturer limit, optional 1) (max. 3 watts without fan kit, max. 17 watts with fan kit)										
		-12V	**max. possible at -12V PCI bus and slide-in**										**1.2**
			PCI card manufacturer limit, optional 1) (max. 1.2 watts without and with fan kit)										
			Devices -12V ∑										
			Devices total +5V ∑										
		3V3	**max. possible at 3V3 PCI bus and slide-in**										**23**
			PCI card manufacturer limit, optional 1) (max. 3 watts without fan kit, max. 17 watts with fan kit)										
			Devices 3V3 ∑										
			Total PCI bus and slide-in ∑										
			Devices total ∑										

1) The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan kit.

See section "Starting current", on page 136 for starting current values.

2.11.4 Supply voltage for the 5PC600.SX05-00 (revision < H0) and 5PC600.SX05-01 (revision <= H0)

The following block diagram presents the simplified structure of the APC620 supply voltage for system units 5PC600.SX05-00 (Revision < H0), 5PC600.SX05-01 (Revision < H0).

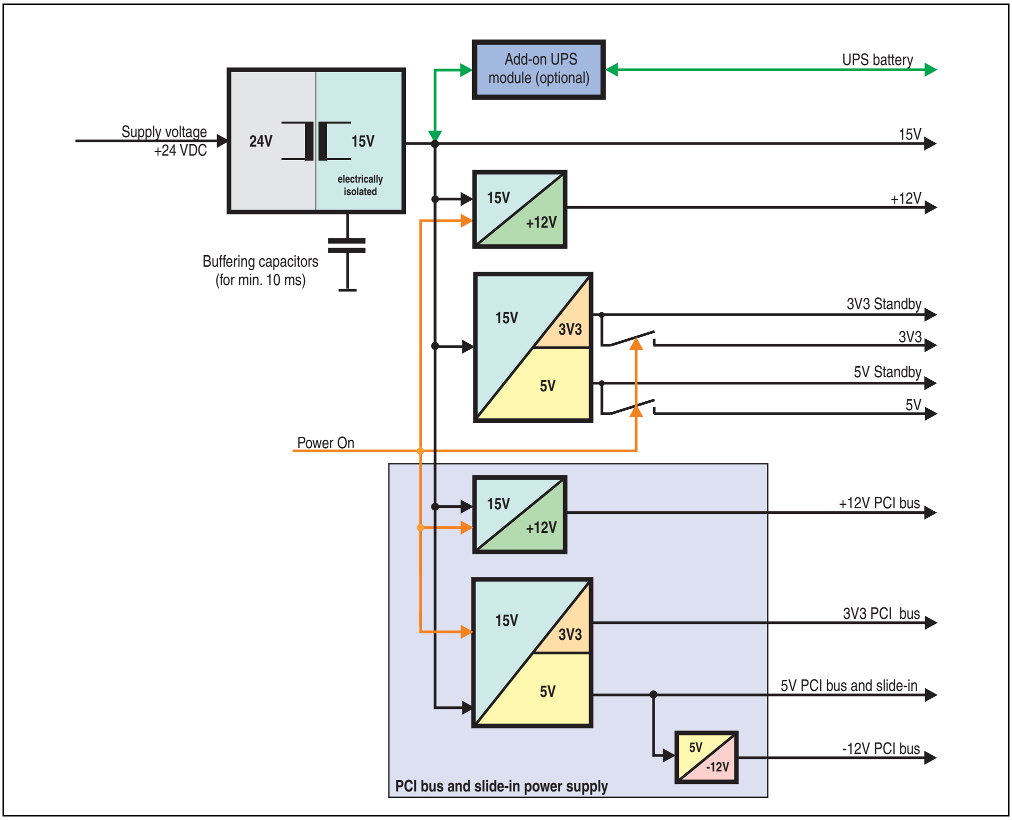


Figure 33: Supply voltage block diagram 5 PCI slots (dependent on system unit version)

Explanation:

Systems with 5 PCI slots have two additional power supplies for the PCI bus and the slide-in drives. The supply voltage is converted to 15 V with a DC/DC converter. These electrically isolated 15 V feed four further DC/DC converters. Two generate +12 V, and the others generate 3V3 and 5V standby. After the system is turned on (e.g. using the power button), the voltages 3V3, 5 V, +12 V are placed on the bus. At the 5 V output, yet another DC/DC converter generates -12 V , and places these on the bus.

The optional APC620 add-on UPS and battery unit is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

2.11.5 Power calculation with system unit 5PC600.SX05-05 revision < H0

Information: **All entries in watts** The entries for the **Generator** are maximum values. Entries for the **Device** are determined maximum values, but not peak values.			APC620 System unit 5PC600.SX05-00									This system
			C3 400 5PC600.E815-00	C3 733 5PC600.E815-02	C3 1000 5PC600.E815-03	CM 600 5PC600.E855-04 5PC600.X855-04	CM 1000 5PC600.E855-05 5PC600.X855-05	PM 1100 5PC600.E855-00 5PC600.X855-00	PM 1400 5PC600.E855-02 5PC600.X855-02	PM 1600 5PC600.E855-01 5PC600.X855-01	PM 1800 5PC600.E855-03 5PC600.X855-03	Enter values in this columns
Total power supply		Total power supply (max.)										110
		Add-on UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
	5V	max. possible at 5V										55
		CPU Board, fixed device	14	18	25	17	21	23	23	37	37	
		per CompactFlash, optional (add-on, slide-in)	1	1	1	1	1	1	1	1	1	
		Hard Disk, optional (add-on, slide-in)	4	4	4	4	4	4	4	4	4	
		External keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
		USB Peripheral, optional (max. 2,5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
		Interface option (add-on interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
		Graphics adapter (AP Link), optional	5	5	5	5	5	5	5	5	5	
		External device, optional (via BaseBoard)	5	5	5	5	5	5	5	5	5	
			Devices 5V ∑									
	3V3	max. possible at 3V3										23
		System unit, fixed device	4	4	4	4	4	4	4	4	4	
		Graphics adapter (AP Link), optional	5	5	5	5	5	5	5	5	5	
		Interface option (add-on interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
			Devices 3V3 ∑									
	+12V	max. possible at +12V										12
		Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
		External device, optional (via BaseBoard)	10	10	10	10	10	10	10	10	10	
			Devices +12V ∑									
	PCI bus and slide-in power supply	PCI bus and slide-in power supply (max.)										50
	5V	max. possible at 5V PCI bus and slide-in										50
		per CompactFlash, optional (slide-in)	1	1	1	1	1	1	1	1	1	
		per Hard Disk, optional (slide-in)	4	4	4	4	4	4	4	4	4	
		per Drive, optional (slide-in CD,DVD)	4	4	4	4	4	4	4	4	4	
		PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit)1)										
	-12V	max. possible at -12V PCI bus and slide-in										1.2
		PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit)1)										
			Devices total 5V ∑									
	3V3	max. possible at 3V3 PCI bus and slide-in										23
		PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit)1)										
			Devices 3V3 ∑									
	+12V	max. possible at +12V PCI bus and slide-in										12
		PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)1)										
			Devices +12V ∑									
			Total PCI bus and slide-in ∑									
			Devices total ∑									

1) The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan kit.

See section "Starting current", on page 136 for starting current values.

2.11.6 Power calculation with system unit 5PC600.SX05-01 revision < H0

	Information: **All entries in watts** The entries for the **Generator** are maximum values. Entries for the **Device** are determined maximum values, but not peak values.	**APC620 System unit 5PC600.SX05-01**									**This system**
		C3 400 5PC600.E815-00	C3 733 5PC600.E815-02	C3 1000 5PC600.E815-03	CM 600 5PC600.E855-04 5PC600.X855-04	CM 1000 5PC600.E855-05 5PC600.X855-05	PM 1100 5PC600.E855-00 5PC600.X855-00	PM 1400 5PC600.E855-02 5PC600.X855-02	PM 1600 5PC600.E855-01 5PC600.X855-01	PM 1800 5PC600.E855-03 5PC600.X855-03	Enter values in this columns
Total power supply	**Total power supply (max.)**										**110**
	Add-on UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
5V	**max. possible at 5V**										**55**
	CPU Board, fixed device	14	18	25	17	21	23	23	37	37	
	per CompactFlash, optional (add-on, slide-in)	1	1	1	1	1	1	1	1	1	
	Hard Disk, optional (add-on, slide-in)	4	4	4	4	4	4	4	4	4	
	External keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
	USB Peripheral, optional (max. 2,5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
	Interface option (add-on interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
	External device, optional (via BaseBoard)	5	5	5	5	5	5	5	5	5	
	Devices 5V ∑										
3V3	**max. possible at 3V3**										**23**
	System unit, fixed device	4	4	4	4	4	4	4	4	4	
	Interface option (add-on interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
	Devices 3V3 ∑										
+12V	**max. possible at +12V**										**12**
	Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
	External device, optional (via BaseBoard)	10	10	10	10	10	10	10	10	10	
	Devices +12V ∑										
PCI bus and slide-in power supply	**PCI bus and slide-in power supply (max.)**										**50**
5V	**max. possible at 5V PCI bus and slide-in**										**50**
	per CompactFlash, optional (slide-in)	1	1	1	1	1	1	1	1	1	
	per Hard Disk, optional (slide-in)	4	4	4	4	4	4	4	4	4	
	per Drive, optional (slide-in CD,DVD)	4	4	4	4	4	4	4	4	4	
	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit)[1]										
-12V	**max. possible at -12V PCI bus and slide-in**										**1.2**
	PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit)[1]										
	Devices total 5V ∑										
3V3	**max. possible at 3V3 PCI bus and slide-in**										**23**
	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit)[1]										
	Devices 3V3 ∑										
+12V	**max. possible at +12V PCI bus and slide-in**										**12**
	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)[1]										
	Devices +12V ∑										
	Total PCI bus and slide-in ∑										
	Devices total ∑										

[1] The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan kit.

See section "Starting current", on page 136 for starting current values.

2.12 Power management for the APC620 embedded system unit

2.12.1 Supply voltage for the 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02

The following block diagram presents the simplified structure of the APC620 embedded supply voltage for system units 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02.

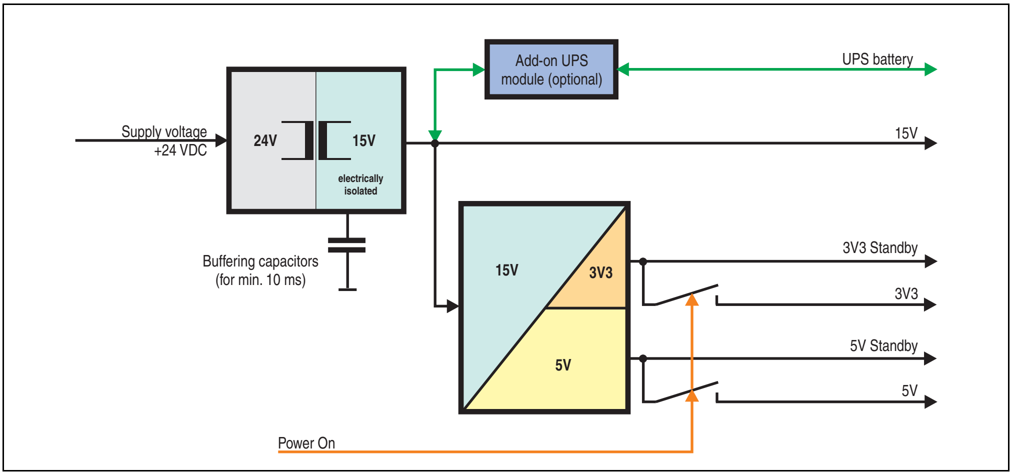


Figure 34: Supply voltage for the 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02

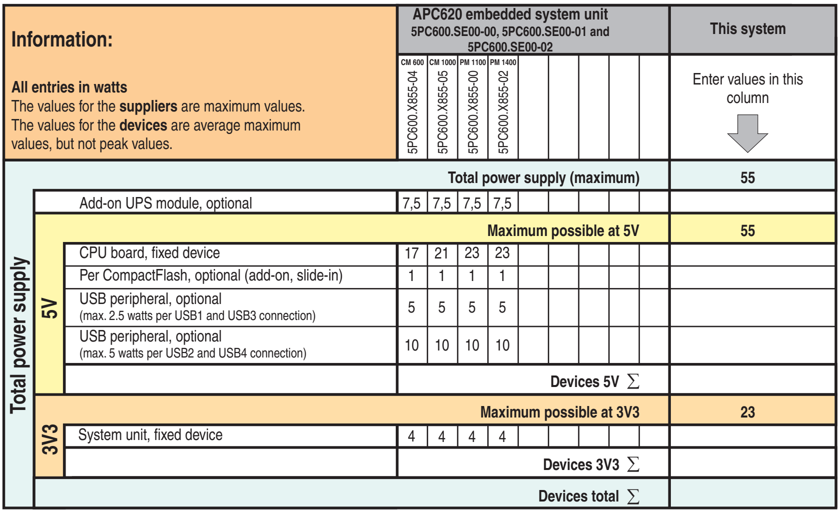
Explanation:

The supply voltage is converted to 15 V with a DC/DC converter. These electrically isolated 15 V feed four further DC/DC converters, which generate the remaining voltages.

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

The optional APC620 add-on UPS and battery unit is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

2.12.2 Power calculation with 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02



		Information:	**APC620 embedded system unit** **5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02**								**This system**
		All entries in watts The values for the **suppliers** are maximum values. The values for the **devices** are average maximum values, but not peak values.	CM 600 5PC600.X855-04	CM 1000 5PC600.X855-05	PM 1100 5PC600.X855-00	PM 1400 5PC600.X855-02					Enter values in this column
Total power supply		**Total power supply (maximum)**									**55**
		Add-on UPS module, optional	7,5	7,5	7,5	7,5					
	5V	**Maximum possible at 5V**									**55**
		CPU board, fixed device	17	21	23	23					
		Per CompactFlash, optional (add-on, slide-in)	1	1	1	1					
		USB peripheral, optional (max. 2.5 watts per USB1 and USB3 connection)	5	5	5	5					
		USB peripheral, optional (max. 5 watts per USB2 and USB4 connection)	10	10	10	10					
		Devices 5V ∑									
	3V3	**Maximum possible at 3V3**									**23**
		System unit, fixed device	4	4	4	4					
		Devices 3V3 ∑									
		Devices total ∑									

See section "Starting current", on page 136 for starting current values.

2.13 Humidity specifications

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

Component		Operation	Storage / Transport
CPU boards 815E (ETX)		10 - 90%	5 - 95%
CPU boards 855GME (ETX / XTX)		10 - 90%	5 - 95%
System units (all models)		5- 90%	5 - 95%
Main memory for CPU boards		10 - 90%	5 - 95%
Add-on drives	5AC600.HDDI-00 (24 hours/default)	8 - 90%	5 - 95%
	5AC600.HDDI-01 (ET)	8 - 90%	5 - 95%
	5AC600.HDDI-02 (ET)	8 - 90%	5 - 95%
	5AC600.HDDI-03 (ET)	8 - 90%	5 - 95%
	5AC600.HDDI-04 (ET)	8 - 90%	5 - 95%
	5AC600.HDDI-05 (ET, 24x7)	5 - 90%	5 - 95%
	5AC600.HDDI-06 (ET, 24x7)	5 - 90%	5 - 95%
Slide-in drives	5AC600.CDXS-00	8 - 80%	5 - 95%
	5AC600.DVDS-00	8 - 80%	5 - 95%
	5AC600.DVRS-00	8 - 80%	5 - 95%
	5AC600.FDDS-00	20 - 80%	5 - 90%
	5AC600.HDDS-00 (ET, 24x7)	8 - 90%	5 - 95%
	5AC600.HDDS-01 (ET)	8 - 90%	5 - 95%
	5AC600.HDDS-02 (ET, 24x7)	5 - 90%	5 - 95%
Additional insert cards Interfaces AP Link	5AC600.CANI-00	5 - 90%	5 - 95%
	5AC600.485I-00	5 - 90%	5 - 95%
	5AC600.SDL0-00	5 - 90%	5 - 95%
	5ACPCI.RAIS-00 (24 hours/default)	8 - 90%	5 - 95%
	5ACPCI.RAIS-01 (24 hours/default)	8 - 90%	5 - 95%
	5ACPCI.RAIC-01 (24 hours/default)	5 - 90%	5 - 95%
	5ACPCI.RAIC-02 (24 hours/default)	5 - 90%	5 - 95%
	5ACPCI.RAIC-03 (24 hours/default)	8 - 90%	5 - 95%
	5ACPCI.RAIC-04 (24 hours/default)	8 - 90%	5 - 95%
Accessories	CompactFlash cards 5CFCRD.xxxx-04	85%	85%
	CompactFlash cards - 5CFCRD.xxxx-03	8 - 95%	8 - 95%
	Flash drive 5MMUSB.xxxx-00	10 - 90%	5 - 90%
	Flash drive 5MMUSB.2048-01	10 - 90%	5 - 90%
	USB Media Drive 5MD900.USB2-00	20 - 80%	5 - 90%
	USB Media Drive 5MD900.USB2-01	20 - 80%	5 - 90%

Table 29: Overview of humidity specifications for individual components

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

2.14 Device interfaces

The following two graphics show the general and optional device interfaces on an APC620 complete device with 5 PCI slots or an APC620 embedded device.

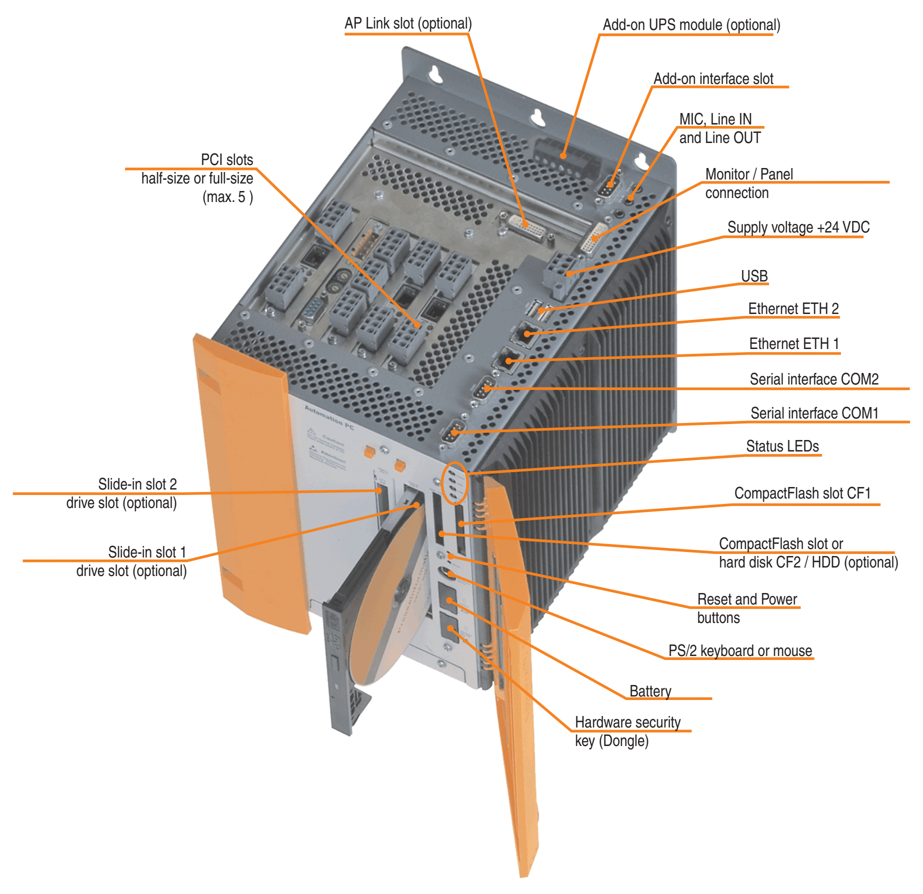

AP Link slot (optional)
Add-on UPS module (optional)
Add-on interface slot
MIC, Line IN and Line OUT
PCI slots half-size or full-size (max. 5)
Monitor / Panel connection
Supply voltage +24 VDC
USB
Ethernet ETH 2
Ethernet ETH 1
Serial interface COM2
Serial interface COM1
Status LEDs
Slide-in slot 2 drive slot (optional)
CompactFlash slot CF1
Slide-in slot 1 drive slot (optional)
CompactFlash slot or hard disk CF2 / HDD (optional)
Reset and Power buttons
PS/2 keyboard or mouse
Battery
Hardware security key (Dongle)

Figure 35: General device interfaces example - APC620 with 5 PCI slots

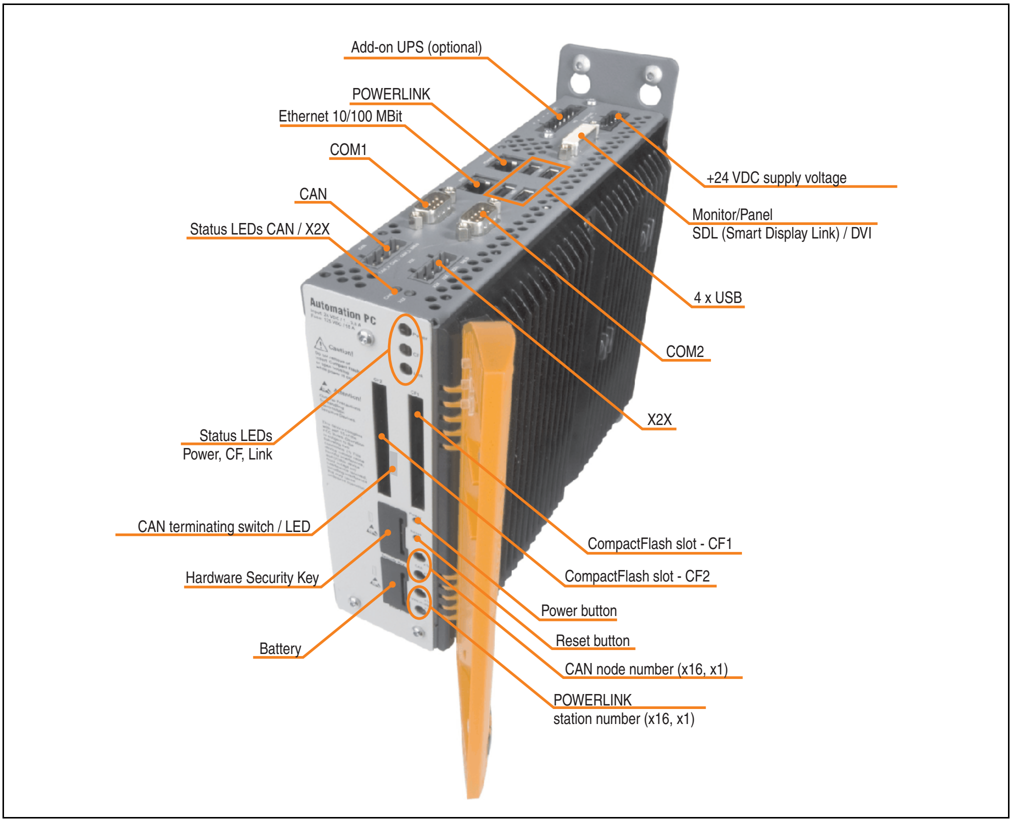


Figure 36: General device interfaces example - APC620 embedded

Each individual device interface is explained in greater detail on the following pages.

2.14.1 Serial interface COM1

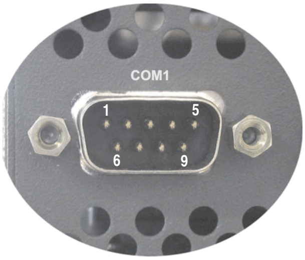
Serial interfaces COM1[1]		
Type	RS232, modem-capable, not electrically isolated	9-pin DSUB, male 
UART	16550-compatible, 16-byte FIFO	
Transfer rate	Max. 115 kBaud	
Cable length	Max. 15 meters	
Pin	**Assignment**	
1	DCD	
2	RXD	
3	TXD	
4	DTR	
5	GND	
6	DSR	
7	RTS	
8	CTS	
9	RI	

Table 30: Pin assignments - COM1

[1] The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.

I/O address and IRQ

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

Table 31: COM1 - I/O address and IRQ

The setting for the I/O address and the IRQ can be changed in the BIOS setup (under "Advanced" - submenu "I/O Device Configuration" setting "Serial port A"). Please note any potential conflicts with other resources when changing this setting.

2.14.2 Serial interface COM2

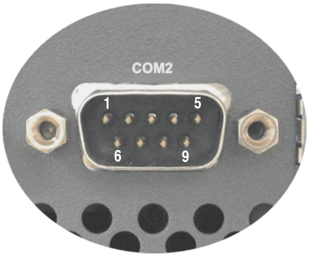
Serial interfaces COM2[1]		
Type	RS232, modem-capable, not electrically isolated	9-pin DSUB, male 
UART	16550 compatible, 16 byte FIFO	
Transfer rate	Max. 115 kBaud	
Cable length	Max. 15 meters	
Pin	**Assignment**	
1	DCD	
2	RXD	
3	TXD	
4	DTR	
5	GND	
6	DSR	
7	RTS	
8	CTS	
9	RI	

Table 32: Pin assignments - COM2

[1] The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.

I/O address and IRQ

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

Table 33: COM2 - I/O address and IRQ

The setting for the I/O address and the IRQ can be changed in the BIOS setup (under "Advanced" - submenu "I/O Device Configuration" setting "Serial port B"). Please note any potential conflicts with other resources when changing this setting.

2.14.3 X2X (only APC620 embedded)

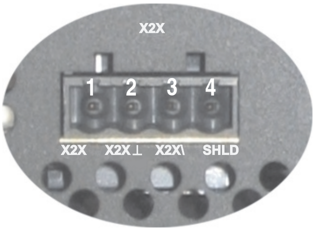
<table>
<tr><th colspan="3">X2X Link interface (only APC620 embedded)</th></tr>
<tr><td colspan="2">The electrically isolated X2X Link is a 4-pin multipoint connector.</td><td rowspan="7">
</td></tr>
<tr><th>Pin</th><th>X2X Link</th></tr>
<tr><td>1</td><td>X2X</td></tr>
<tr><td>2</td><td>X2X⊥</td></tr>
<tr><td>3</td><td>X2X\</td></tr>
<tr><td>4</td><td>SHLD (shield)</td></tr>
<tr><td></td><td></td></tr>
</table>

Table 34: X2X pin assignments (only APC620 embedded)

Driver support

The fieldbus interface X2X is only supported together with Automation Runtime (for more information, see section "Automation PC 620 with Automation Runtime", on page 544).

2.14.4 CAN (only APC620 embedded)

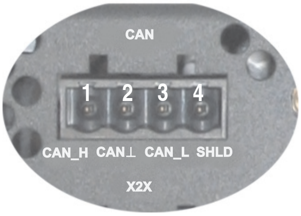
<table>
<tr><th colspan="3">CAN</th></tr>
<tr><td colspan="2">The electrically isolated CAN bus interface is a 4-pin multipoint connector.</td><td rowspan="8">
</td></tr>
<tr><td>Transfer rate</td><td>Max. 500 kBit/s</td></tr>
<tr><td>Bus length</td><td>Max. 1000 meters</td></tr>
<tr><th>Pin</th><th>CAN bus</th></tr>
<tr><td>1</td><td>CAN_H (CAN High)</td></tr>
<tr><td>2</td><td>CAN⊥ (CAN ground)</td></tr>
<tr><td>3</td><td>CAN_L (CAN Low)</td></tr>
<tr><td>4</td><td>SHLD (shield)</td></tr>
</table>

Table 35: CAN pin assignments (only APC620 embedded)

Driver support

The fieldbus interface CAN is only supported together with Automation Runtime (for more information, see section "Automation PC 620 with Automation Runtime", on page 544).

2.14.5 CAN node number (only APC620 embedded)

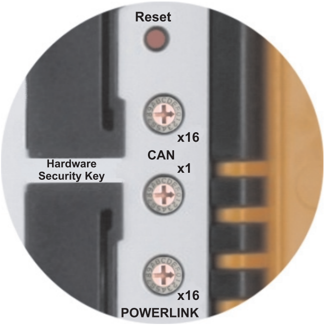
<table>
<tr><th colspan="4">CAN node number switch (x1, x16) - only APC620 embedded</th></tr>
<tr><td colspan="3">Both of these hex switches (x16, x1) are used to configure the node number for the CAN interface.</td><td rowspan="6">
</td></tr>
<tr><th colspan="3">Switch position</th></tr>
<tr><th>x16</th><th>x1</th><th>Description</th></tr>
<tr><td>0 ... F</td><td>0 ... F</td><td>Any</td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Table 36: CAN node number switch (x1, x16) - only APC620 embedded

2.14.6 CAN terminating switch / LED (only APC620 embedded)

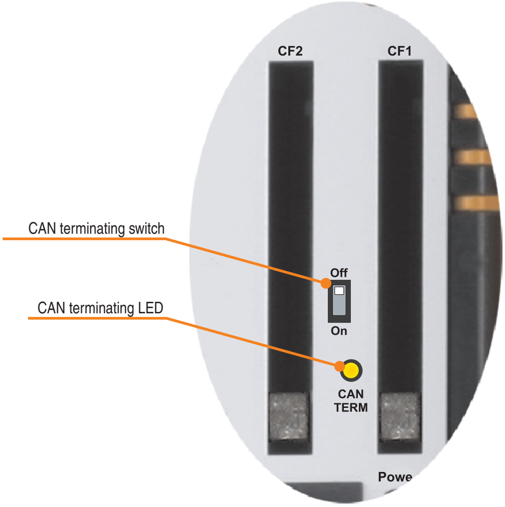
<table>
<tr><th colspan="4">CAN terminating switch / LED (only APC620 embedded)</th></tr>
<tr><td colspan="3">CAN networks are cabled using a bus structure where both ends of the bus are equipped with terminating resistors.
The APC620 embedded has an integrated terminating resistor (delivery state: disabled with the setting "Off").</td><td rowspan="7">
</td></tr>
<tr><th>LED</th><th>On</th><th>Off</th></tr>
<tr><td>Yellow</td><td>The terminating resistor integrated in the bus controller is turned on.</td><td>The terminating resistor integrated in the bus controller is turned off.</td></tr>
<tr><th>CAN terminating switch</th><th>Position Off</th><th>Position On</th></tr>
<tr><td>Can be pressed using a pointed object.</td><td>Terminating resistor is turned off.</td><td>Terminating resistor is turned on.</td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Table 37: CAN terminating switch / LED (only APC620 embedded)

2.14.7 Status LEDs CAN / X2X (only APC620 embedded)

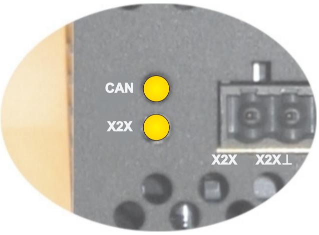
Status LEDs CAN / X2X (only APC620 embedded)			
			
Yellow LED for	**On**	**Off**	
CAN	Sends data	Receives data	
X2X	Sends data	Receives data	

Table 38: Status LEDs CAN / X2X (only APC620 embedded)

2.14.8 POWERLINK (only APC620 embedded)

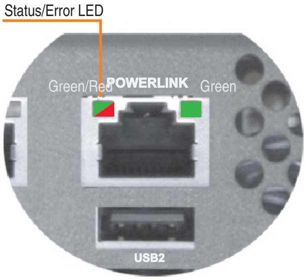
POWERLINK (only APC620 embedded)			
Controller			
Cabling	S/STP (Cat5e)		
Transfer rate			
Cable length	max. 100 m (min. Cat5e)		
LED color	**On**	**Off**	
Green/red	see Status / Error LED		
Green	Link (POWERLINK network connection available)	Activity (blinking) (Data transfer in progress)	

Table 39: POWERLINK (only APC620 embedded)

Driver support

The fieldbus interface POWERLINK is only supported together with Automation Runtime (for more information, see section "Automation PC 620 with Automation Runtime", on page 544).

Status / Error LED

The status/error LED is a green/red dual LED. The color green (status) is superimposed on the color red (error).

Red - error	Description
On	The POWERLINK interface has encountered an error (failed Ethernet frames, increased number of collisions on the network, etc.).

Table 40: Status / Error LED as error LED - POWERLINK V2 operating mode

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

Table 41: Status/Error LED as status LED - POWERLINK V2 operating mode

2.14.9 POWERLINK station number (only APC620 embedded)

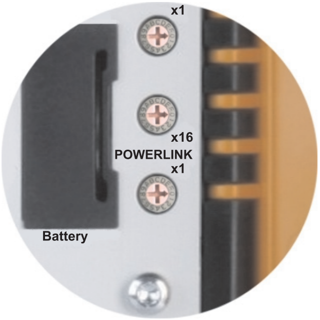
<table>
<tr><th colspan="4">POWERLINK station number (x1, x16)</th></tr>
<tr><td colspan="3">Both of these hex switches (x16, x1) are used to configure the station number for the POWERLINK. Station numbers are permitted between #00 and #FD.</td><td rowspan="8">
</td></tr>
<tr><th colspan="3">Switch position</th></tr>
<tr><th>x16</th><th>x1</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>Operation as managing node</td></tr>
<tr><td>0 ... F</td><td>1 ... D</td><td>station number Operation as controlled node</td></tr>
<tr><td>F</td><td>E</td><td>Reserved</td></tr>
<tr><td>F</td><td>F</td><td>Reserved</td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Table 42: POWERLINK station number (x1, x16) - only APC620 embedded

2.14.10 Ethernet connection ETH (only APC620 embedded)

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

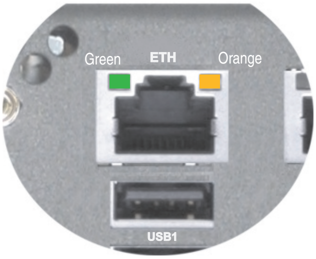
<table>
<tr><th colspan="4">Ethernet connection ETH (only APC620 embedded)</th></tr>
<tr><td>Controller</td><td colspan="2">Intel 82562</td><td rowspan="7">RJ45 twisted pair (10BaseT/100BaseT), female

</td></tr>
<tr><td>Cabling</td><td colspan="2">S/STP (Cat5e)</td></tr>
<tr><td>Transfer rate</td><td colspan="2">10/100 MBit/s 1)</td></tr>
<tr><td>Cable length</td><td colspan="2">max. 100 m (min. Cat5e)</td></tr>
<tr><th>LED</th><th>On</th><th>Off</th></tr>
<tr><td>Green</td><td>100 Mbit/s</td><td>10 Mbit/s</td></tr>
<tr><td>Orange</td><td>Link
(Ethernet network connection available)</td><td>Activity (blinking)
(Data transfer in progress)</td></tr>
</table>

Table 43: Ethernet connection ETH (only APC620 embedded)

1) Both operating modes possible. Change-over takes place automatically.

2.14.11 Ethernet connection ETH1

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

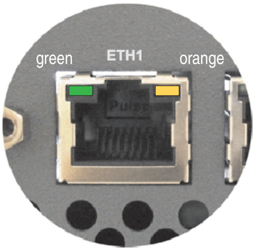
Ethernet connection (ETH1[1])			
Controller	Intel 82562		RJ45 twisted pair (10BaseT/100BaseT), female 
Cabling	S/STP (Cat5e)		
Transfer rate	10/100 MBit/s [2]		
Cable length	See table45 "Ethernet cable length in conjunction with 5PC600.E855-xx CPU boards (ETX)", on page 131 and table 46 "Ethernet cable length in conjunction with 5PC600.E855-xx CPU boards", on page 131.		
LED	**On**	**Off**	
Green	100 Mbit/s	10 Mbit/s	
Orange	Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)	

Table 44: Ethernet connection (ETH1)

[1] The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.

[2] Both operating modes possible. Change-over takes place automatically.

Driver support

A special driver is necessary for operating the Intel Ethernet controller 82562. Drivers for Windows XP Professional, Windows XP Embedded, Windows Embedded Standard 2009 and DOS are available for download on the B&R Homepage in the download area (**www.br-automation.com**).

Information:

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

Ethernet cable length when 855GME (ETX) CPU boards are used.

The supported cable length depends on the system unit revision when using Intel 855GME CPU boards (5PC600.E855-xx (ETX)).

System unit	Cable length with CAT5e cable	
	Up to 50 meters	Up to 80 meters[1]
5PC600.SX01-00	Revision < H0	Starting with Revision H0
5PC600.SX02-00	Revision < F5	Starting with Revision F5
5PC600.SX02-01	Revision < G5	Starting with revision G5
5PC600.SF03-00	-	Starting with revision A0
5PC600.SX05-00	Revision < G0	Starting with revision G0
5PC600.SX05-01	Revision < G0	Starting with revision G0

Table 45: Ethernet cable length in conjunction with 5PC600.E855-xx CPU boards (ETX)

1) When higher quality cable is used (e.g.: category CAT7), greater distances are possible.

Ethernet cable length when 855GME (XTX) CPU boards are used.

The supported cable length depends on the system unit revision when using Intel 855GME CPU boards (5PC600.E855-xx (XTX)).

System unit	Cable length with CAT5e cable	
	Up to 50 meters	Up to 100 meters
5PC600.SX01-00	Revision < H0	Starting with Revision H0
5PC600.SX02-00	Revision < F5	Starting with Revision F5
5PC600.SX02-01	Revision < G5	Starting with revision G5
5PC600.SF03-00	-	Starting with Revision A0
5PC600.SX05-00	Revision < G0	Starting with revision G0
5PC600.SX05-01	Revision < G0	Starting with revision G0

Table 46: Ethernet cable length in conjunction with 5PC600.E855-xx CPU boards

Special features when 855GME (XTX) CPU boards are used.

The hardware supports Auto MDX, which means an integrated switch automatically determines if the connected cable is crossed or not and adjusts itself accordingly. However, Auto MDX must be supported by the Ethernet driver used by the operating system.

B&R recommends not using the Auto MDX function during cabling, and instead using it only as a diagnostics or testing feature.

2.14.12 Ethernet connection ETH2

This Ethernet connection is integrated in the system unit.

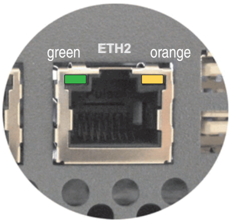
<table>
<tr><th colspan="4">Ethernet connection (ETH2[1]))</th></tr>
<tr><td>Controller</td><td colspan="2">Intel 82551ER</td><td rowspan="7">RJ45 twisted pair (10BaseT/100BaseT), female
 </td></tr>
<tr><td>Cabling</td><td colspan="2">S/STP (Cat5e)</td></tr>
<tr><td>Transfer rate</td><td colspan="2">10/100 MBit/s [2]</td></tr>
<tr><td>Cable length</td><td colspan="2">max. 100 m (min. Cat5e)</td></tr>
<tr><td><b>LED</b></td><td><b>On</b></td><td><b>Off</b></td></tr>
<tr><td>Green</td><td>100 Mbit/s</td><td>10 Mbit/s</td></tr>
<tr><td>Orange</td><td>Link
(Ethernet network connection available)</td><td>Activity (blinking)
(Data transfer in progress)</td></tr>
</table>

Table 47: Ethernet connection (ETH2)

1) The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.

2) Both operating modes possible. Change-over takes place automatically.

Driver support

A special driver is necessary for operating the Intel Ethernet controller 82551ER. Drivers for Windows XP Professional, Windows XP Embedded, Windows Embedded Standard 2009 and DOS are available for download on the B&R Homepage in the download area (**www.br-automation.com**).

> ## Information:
>
> **Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.**

2.14.13 USB port

The APC620 devices have a USB 2.0 (Universal Serial Bus) host controller with multiple USB ports, two of which are on the outside for easy user access.

See the section "USB connection (only APC620 embedded)", on page 134 for a description of the USB connections on APC620 embedded devices.

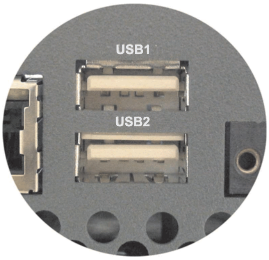
Universal Serial Bus (USB1 und USB2)[1]		
Transfer rate	Low speed (1.5 MBit/s), Full speed (12 MBit/s) up to High speed (480 MBit/s)	2x USB Type A, female 
Power supply	Max. 500 mA per port[2]	
Maximum Cable length	5 m (without hub)	

Table 48: USB port

---

[1] The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.

[2] For safety, every USB port is equipped with a maintenance free "USB current-limiting circuit breaker" (max. 500 mA)

Warning!

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

Warning!

Because of general PC specifications, this interface should be handled with extreme care with regard to EMC, location of cables, etc.

Driver support

For optimal functionality of USB 2.0 (transfer speed up to 480 Mbit/s) with Windows XP, at least Service Pack 1 must be installed. Without Service Pack 1, Windows XP will only support USB 1.1.
USB 2.0 comes already integrated in B&R's XP embedded operating systems.

2.14.14 USB connection (only APC620 embedded)

The APC620 embedded devices have a USB 2.0 (Universal Serial Bus) host controller with multiple USB ports, two of which are on the outside for easy access.

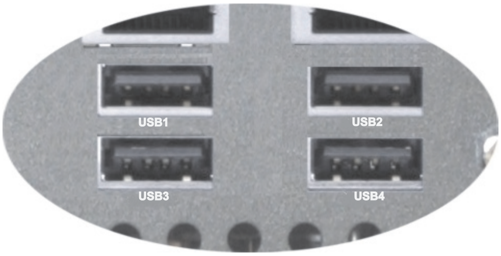
Universal Serial Bus (USB1, USB2, USB3, USB4)[1] - only APC620 embedded		
Transfer rate	Low speed (1.5 MBit/s), Full speed (12 MBit/s) up to High speed (480 Mbit/s)	4 x USB type A, female 
Power supply[2] USB1, USB3 USB2, USB4	 Max. 500 mA Max. 1 A	
Maximum Cable length	5 m (without hub)	

Table 49: USB connections 4 x - only APC620 embedded

1) The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.

2) For safety, every USB port is equipped with a maintenance free "USB current-limiting circuit breaker" (max. 500 mA or 1 A). The sum of all 4 USB ports must not exceed the limit of 2 A.

Warning!

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

Warning!

Because of general PC specifications, this interface should be handled with extreme care with regard to EMC, location of cables, etc.

2.14.15 +24 VDC supply voltage

The Automation PC 620 has a 24 VDC ATX compatible power supply. Depending on the system unit, the power supply provides the following maximum performances (in watts).

System unit	Max. power at + 5 V	Max. power at + 3V3	Max. power at + 12 V	Max. power at - 12 V	Max. total power
5PC600.SX01-00	55	23	12	1.2	70
5PC600.SX02-00	55	23	12	1.2	70
5PC600.SX02-01	55	23	12	1.2	70
5PC600.SF03-00	105	46	24	1.2	110
5PC600.SX05-00	105	46	24	1.2	110
5PC600.SX05-01	105	46	24	1.2	110
5PC600.SE00-00	55	23	12	1.2	55
5PC600.SE00-01	55	23	12	1.2	55
5PC600.SE00-02	55	23	12	1.2	55

Table 50: Power supply depending on the system unit

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

The pin assignments can be found either in the following table or printed on the APC620 housing. The supply voltage is internally protected (10A, fast-acting), so that the device cannot be damaged if there is an overload (fuse replacement necessary) or if the voltage supply is connected incorrectly (reverse polarity protection - fuse replacement not necessary).

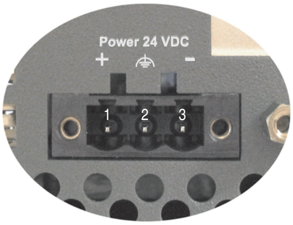
<table>
<tr><th colspan="3">Supply voltage</th></tr>
<tr><td colspan="2">Protected against reverse polarity</td><td rowspan="8">3-pin, male
 </td></tr>
<tr><th>Pin</th><th>Description</th></tr>
<tr><td>1</td><td>+</td></tr>
<tr><td>2</td><td>Functional ground</td></tr>
<tr><td>3</td><td>-</td></tr>
<tr><th colspan="2">Accessories</th></tr>
<tr><td>0TB103.9</td><td>Plug 24 V 5.08 3p screw clamps</td></tr>
<tr><td>0TB103.91</td><td>Plug 24 V 5.08 3p cage clamps</td></tr>
</table>

Figure 37: Supply voltage connection

Ground

Caution!

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

The grounding connection can be found on the bottom of the APC620 systems. The M4 self-locking nut can be used, for example, to fasten a copper strip that is built into the APC620 at a central grounding point in the switching cabinet or system. The largest possible conductor cross section should be used (at least 2.5 mm²).

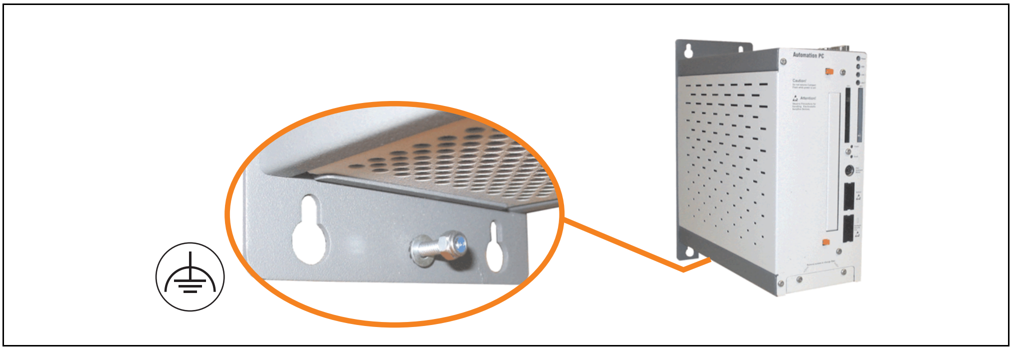


Figure 38: Ground connection

Also see the section "Grounding concept", on page 293.

Starting current

System unit	Typical	Maximum
5PC600.SX01-00	7 A	40 A (time < 300 µs)
5PC600.SX02-00	7 A	40 A (time < 300 µs)
5PC600.SX02-01	7 A	40 A (time < 300 µs)
5PC600.SF03-00	10 A	40 A (time < 300 µs)
5PC600.SX05-00	10 A	40 A (time < 300 µs)
5PC600.SX05-01	10 A	40 A (time < 300 µs)
5PC600.SE00-00	7 A	40 A (time < 300 µs)
5PC600.SE00-01	7 A	40 A (time < 300 µs)
5PC600.SE00-02	7 A	40 A (time < 300 µs)

Table 51: Starting currents in the voltage supply to the system units

Quick switching on/off of the power supply

If the APC620 is in Standby mode (e.g. Windows XP shutdown), then buffering takes a little more time due to capacitors and low power consumption. If the "Power Loss Control" option is set to "Power On" or "Last State" in BIOS, then a system with one of the system unit revisions in table 52 "System unit revisions for at least 10 seconds turn-off time" might not restart because a Power Off/On was not detected. To make sure that these system units will restart after a Power Off/On, the turn-off time should be set to at least 10 seconds.

Model number	Description	Revision
5PC600.SX01-00	System 1 PCI	Starting with revision B0
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Starting with revision B0
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Starting with revision B0
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Starting with revision A0
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Starting with revision A0

Table 52: System unit revisions for at least 10 seconds turn-off time

Thanks to a workaround, the turn-off time can be set as needed in systems with one of the following system unit revisions or higher.

Model number	Description	Revision
5PC600.SX01-00	System 1 PCI	Starting with F0
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Starting with revision E0
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Starting with F0
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Starting with revision A0
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Starting with revision D0
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Starting with revision D0
5PC600.SE00-00	APC60 embedded variation, 512 KB	Starting with revision A0
5PC600.SE00-01	APC60 embedded variation, 512 KB	Starting with revision A0
5PC600.SE00-02	APC60 embedded variation, 1 MB	Starting with revision A0

Table 53: System unit revisions for any turn-off times

2.14.16 Monitor / Panel connection

When using this video output, understand that the video signals that are available (RGB, DVI, and SDL - Smart Display Link) will vary depending on the system unit and CPU board.

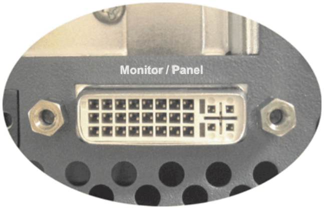
<table>
<tr><th colspan="4">Monitor / Panel</th></tr>
<tr><td colspan="3">The following will provide an overview of the video signals available with different system units and CPU boards.
For details, see technical data for the CPU board being used.</td><td rowspan="11">24-pin DVI-I with special functions, female
 </td></tr>
<tr><th>System unit</th><th>815E board (ETX)</th><th>855GME board (ETX / XTX)</th></tr>
<tr><td>5PC600.SX01-00</td><td>RGB, DVI, SDL</td><td>RGB, DVI, SDL (GE1)</td></tr>
<tr><td>5PC600.SX02-00</td><td>RGB</td><td>RGB, DVI, SDL (GE1)</td></tr>
<tr><td>5PC600.SX02-01</td><td>RGB, DVI, SDL</td><td>RGB, DVI, SDL (GE2)</td></tr>
<tr><td>5PC600.SF03-00</td><td>RGB, DVI, SDL</td><td>RGB, DVI, SDL (GE2)</td></tr>
<tr><td>5PC600.SX05-00</td><td>RGB</td><td>RGB, DVI, SDL (GE1)</td></tr>
<tr><td>5PC600.SX05-01</td><td>RGB, DVI, SDL</td><td>RGB, DVI, SDL (GE1)</td></tr>
<tr><td>5PC600.SE00-00</td><td>-</td><td>RGB, DVI, SDL (GE1)</td></tr>
<tr><td>5PC600.SE00-01</td><td>-</td><td>RGB</td></tr>
<tr><td>5PC600.SE00-02</td><td>-</td><td>RGB, DVI, SDL (GE1)</td></tr>
</table>

Figure 39: Monitor / Panel connection

Hotplug for a display device is not supported in any combination. The plugs are specified for 100 connection cycles.

Caution!

The RGB, DVI and SDL cables can only be plugged in and unplugged when the APC620 and display device (Automation Panel 900, Automation Panel 800, monitor) are turned off.

See "Definitions for RGB, DVI, SDL", on page 142 for descriptions of RGB, DVI and SDL.

Pin assignments

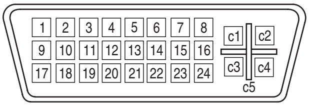
Pin	Assignment	Pin	Assignment	
1	T.M.D.S. Data 2-	16	Hot Plug detect	DVI-I 24 pin, female  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 c1 c2 c3 c4 c5
2	T.M.D.S. Data 2+	17	T.M.D.S. Data 0-	
3	T.M.D.S. Data 2/SDL Shield	18	T.M.D.S. Data 0+	
4	SDL-	19	T.M.D.S. DATA 0/XUSB1 Shield	
5	SDL+	20	XUSB1-	
6	DDC clock	21	XUSB1+	
7	DDC data	22	T.M.D.S. Clock Shield	
8	Analog vertical sync	23	T.M.D.S. Clock +	
9	T.M.D.S. DATA 1-	24	T.M.D.S. Clock -	
10	T.M.D.S. DATA 1+	c1	Analog red video out	
11	T.M.D.S. DATA 1/XUBS0 Shield	c2	Analog green video out	
12	XUSB0-	c3	Analog blue video out	
13	XUSB0+	c4	Analog horizontal sync	
14	+ 5 V power [1]	c5	Analog ground (analog R, G and B return)	
15	Ground (return for + 5V, HSync and VSync)			

Table 54: Pin assignments - Monitor / panel connection

[1] Protected internally by a multifuse

Cable lengths and resolutions for SDL transfer

The following table shows the relationship between segment lengths and the maximum resolution according to the SDL cable used:

Cables	Resolution				
Segment length [m]	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00[1] 5CASDL.0100-01[1] 5CASDL.0100-03[1]

Table 55: Segment lengths, resolutions and SDL cables

Cables	Resolution				
Segment length [m]	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 1) 5CASDL.0150-01 1) 5CASDL.0150-03 1)	- - -
20	5CASDL.0200-00 1) 5CASDL.0200-03 1)	5CASDL.0200-00 1) 5CASDL.0200-03 1)	5CASDL.0200-00 1) 5CASDL.0200-03 1)	5CASDL.0200-00 1) 5CASDL.0200-03 1)	-
25	5CASDL.0250-00 1) 5CASDL.0250-03 1)	5CASDL.0250-00 1) 5CASDL.0250-03 1)	5CASDL.0250-00 1) 5CASDL.0250-03 1)	- -	- -
30	5CASDL.0300-00 1) 5CASDL.0300-03 1)	5CASDL.0300-00 1) 5CASDL.0300-03 1)	5CASDL.0300-10 2) 5CASDL.0300-13 2)	5CASDL.0300-10 2) 5CASDL.0300-13 2)	- -
40	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	- -

Table 55: Segment lengths, resolutions and SDL cables (Forts.)

1) See table 56 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 140

2) See table 57 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 141

The cable types and resolutions shown with a footnote 1) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	
Hardware	**Name**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 56: Requirements for SDL cable with automatic cable adjustment (equalizer)

The cable types and resolutions shown with a footnote 2) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	
Hardware	**Name**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. D0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. D0	
5AC600.SDL0-00	AP Link SDL transmitter	Rev. B3	
5PC600.SX01-00	System 1 PCI	Rev. E0	
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0	
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0	
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Rev. C0	
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0	

Table 57: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

Definitions for RGB, DVI, SDL

RGB means:

- It is possible to connect RGB monitors (with adapter, model nr. 5AC900.1000-00) and office RGB TFT displays.

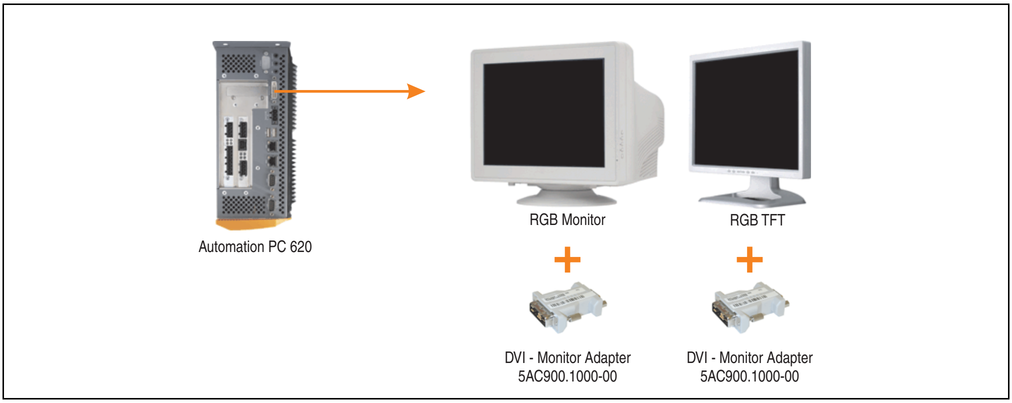


Figure 40: Monitor / Panel connection with RGB video signal

DVI means:

- Connection of B&R Automation Panel 900 display units with Automation Panel Link DVI Receiver (Model nr. 5DLDVI.1000-01), Office Digital/DVI Monitors and Office DVI TFT Displays is possible.

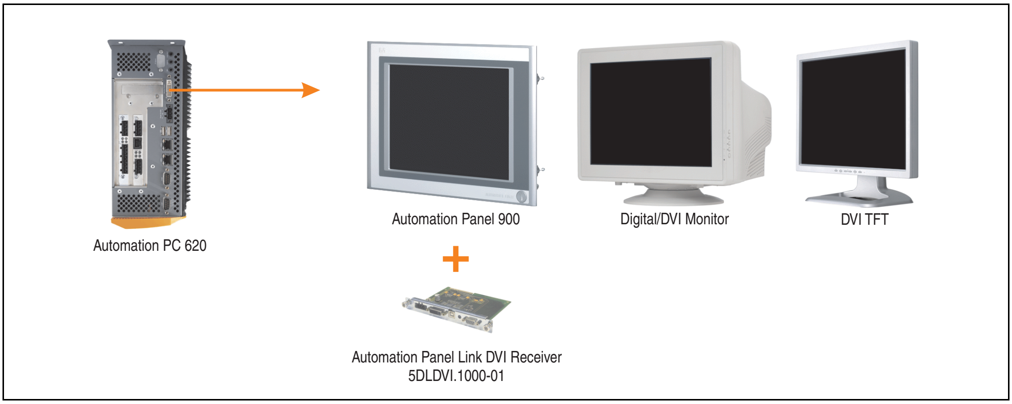


Figure 41: Monitor / Panel connection with DVI video signal

For examples and possibilities for connecting Automation Panel 900 display units via DVI, see Appendix A, chapter 3 "Commissioning", section 4 "Connection examples", starting on page 294.

SDL (Smart Display Link) means:

- Connection of B&R Automation Panel 800 and Automation Panel 900 display units with Automation Panel Link SDL receiver (Model nr. 5DLSDL.1000-01) or SDL transceiver (Model nr. 5DLSDL.1000-01).

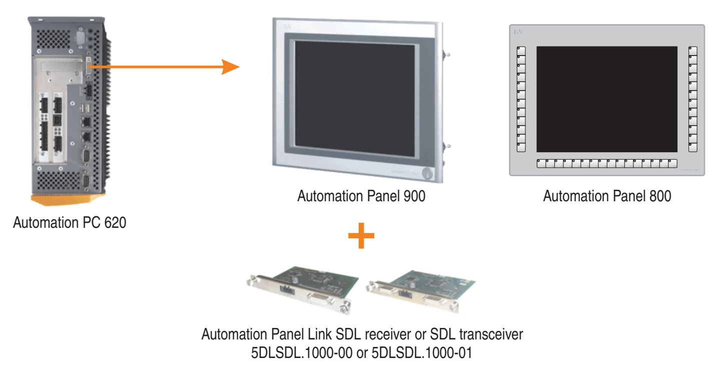

Automation Panel 900
Automation Panel 800
Automation PC 620
Automation Panel Link SDL receiver or SDL transceiver
5DLSDL.1000-00 or 5DLSDL.1000-01

Figure 42: Monitor / Panel connection with SDL video signal

For examples and possibilities for connecting Automation Panel 900 and Automation Panel 800 display units via SDL, see Appendix A, chapter 3 "Commissioning", section 4 "Connection examples", starting on page 294.

2.14.17 MIC, Line IN and Line OUT ports

All APC620 systems include an AC97 (specification 2.2) compatible sound chip with access to the channels MIC, Line IN and Line OUT from the outside.

Information:

APC620 embedded devices do not have these connections.

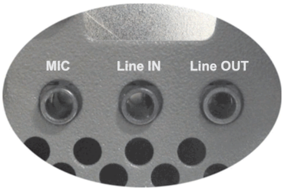
MIC, Line IN and Line OUT		
Controller	Realtek AC97	3.5 mm socket, female
MIC	Connection of a mono microphone with a 3.5 mm stereo (headphone) jack.	
Line IN	Stereo Line IN signal supplied via 3.5 mm jack.	
Line OUT	Connection of a stereo sound device (e.g. amplifier) via a 3.5 mm jack.	

Table 58: Technical data - MIC, Line IN and Line OUT port

Driver support

A special driver is necessary for operating the AC97 sound chip (Realtek). Drivers for Windows XP Professional, Windows XP Embedded, Windows Embedded Standard 2009 are available for download on the B&R Homepage in the download area (www.br-automation.com).

Information:

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

2.14.18 Add-on interface slot

An optional add-on interface (e.g. CAN, RS485) can be installed here. See also section 3.9 "Interface options", on page 259.

Information:

APC620 embedded devices do not have this option.

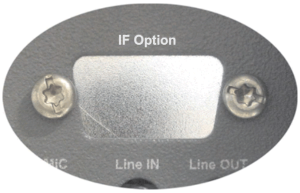
<table>
<tr><th colspan="3">Add-on interface slot</th></tr>
<tr><td colspan="2"></td><td rowspan="5">
</td></tr>
<tr><td colspan="2"><b>Available add-on interfaces</b></td></tr>
<tr><td>5AC600.CANI-00</td><td>Add-on CAN interface</td></tr>
<tr><td>5AC600.485I-00</td><td>Add-on RS232/422/485 interface</td></tr>
<tr><td></td><td></td></tr>
</table>

Table 59: Add-on interface slot

Information:

An add-on interface module is only available factory-installed.

2.14.19 Add-on UPS module slot

An optional APC620 add-on UPS module can be installed here.

Add-on UPS module slot		
APC620 add-on UPS module + accessories		
5AC600.UPSI-00	Add-on UPS module	
5AC600.UPSB-00	Battery unit 5 Ah	
5CAUPS.0005-00	APC620 UPS cable 0.5 m	
5CAUPS.0030-00	APC620 UPS cable 3 m	

Table 60: Add-on UPS module slot

Information:

An add-on UPS module can be installed with the following system unit revisions or later:

- **5PC600.SX01-00 starting with H0**
- **5PC600.SX02-00 starting with G0**
- **5PC600.SX02-01 starting with H0**
- **5PC600.SF03-00 starting with A0**
- **5PC600.SX05-00 starting with F0**
- **5PC600.SX05-01 starting with F0**
- **5PC600.SE00-00 starting with A0**
- **5PC600.SE00-01 starting with A0**
- **5PC600.SE00-02 starting with A0**

For more on the UPS module, see chapter 6 "Accessories", section 15 "Uninterruptible power supply", on page 695.

For info on configuring the UPS module, see chapter 4 "Software", section 9.4 "UPS configuration", on page 579.

For info on installing the UPS module, see chapter 7 "Maintenance / Servicing", section 4 "Installing the UPS module", on page 740.

2.14.20 AP Link Slot

The option of inserting and using an AP Link card is only possible with system units 5PC600.SX02-00, 5PC600.SF03-00 and 5PC600.SX05-00.

For more information see section 3.11 "AP Link cards", on page 273.

Information:

APC620 embedded devices do not have this option.

2.14.21 PCI slots

Information:

APC620 embedded devices do not have a PCI slot.

Up to 5 PCI slots are available, depending on the system unit. 5-volt cards or universal cards that comply with the PCI half-size standard 2.2, and that do not exceed the following dimensions can be inserted.

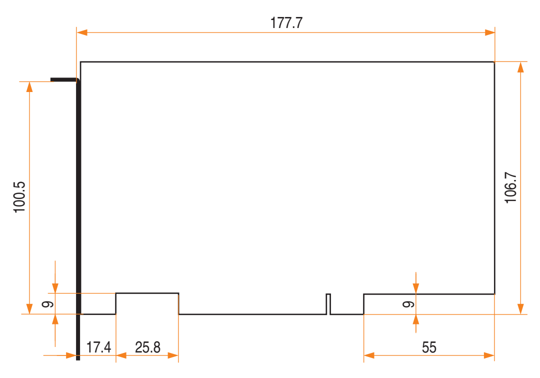


Figure 43: Dimensions - Standard half-size PCI cards

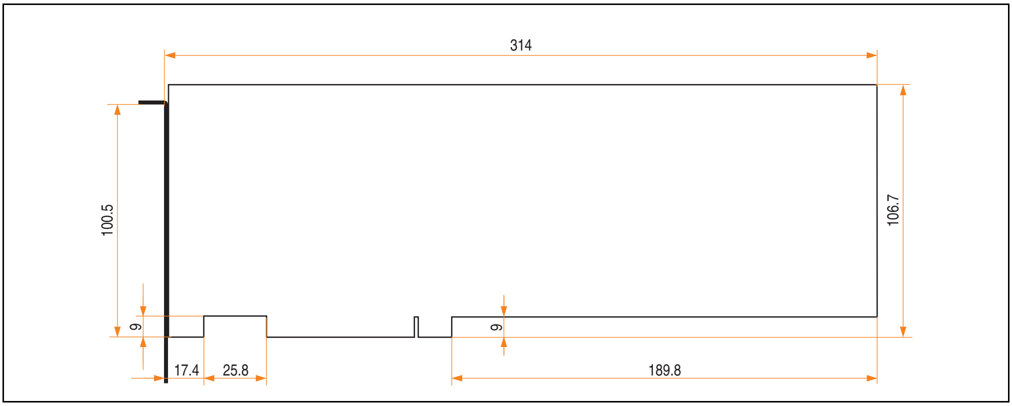


Figure 44: Dimensions - Standard full-size PCI cards

Information:

The total performance of one PCI card per PCI slot should not exceed the limit with or without a fan kit (see section "Power management APC620 system unit with 1 PCI slot", on page 97 or section "Power management APC620 system unit with 3 PCI slots", on page 107 and "Power management APC620 system units with 5 PCI slots", on page 109).

Technical data

Features	PCI bus properties
Default	PCI 2.2
Design	Half-size PCI or full-size PCI[1] 5 Volt connector
PCI bus type	32-bit
PCI bus speed	33 MHz

Table 61: Technical data - PCI bus

1) Only in conjunction with system unit 5PC600.SF03-00.

Voltages on the PCI slot plug (plug-in PCI cards)

The plug design for the PCI slot is the same as the design for a 5-volt PCI plug. The supply is applied at 3.3 volts and 5 volts on the actual plug.

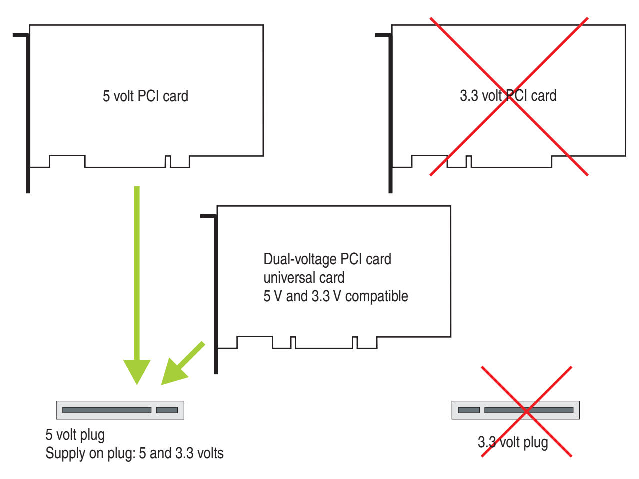


Figure 45: PCI connector type: 5 volt

2.14.22 Status LEDs

The status LEDs are integrated in the system unit behind the orange front cover.

See the section "Status LEDs Power, CF, Link (only APC620 embedded)", on page 151 for a description of the status LEDs on APC620 embedded devices.

Status LEDs

LED	Color		Meaning
Power	Green	On	Supply voltage OK
	Red	On	The system is in standby mode (S5: soft-off mode or S4: Hibernate mode -Suspend-to-Disk)
	Orange 1)	On	Supply voltage not OK; the system is operating on battery power.
HDD	Yellow	On	Signals IDE drive access (CF, HDD, CD, etc.)
Link 1	Yellow	On	Active SDL connection.
		blinking	An active SDL connection has been interrupted by a loss of power in the display unit.
		Off	No active SDL connection available.
Link 2	Yellow	On	Active SDL connection on the AP Link slot.
		blinking	An active SDL connection on the AP Link slot has been interrupted by a loss of power in the display unit.
		Off	No active SDL connection on the AP Link slot available.

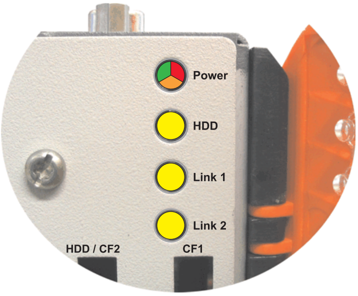


Table 62: Technical data - Status LEDs

1) Only lit when add-on UPS module is installed.

The light for the status LEDs is fed to the front cover via fiber optic lines.

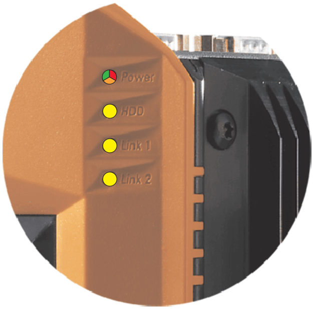


Figure 46: Front-side status LEDs

2.14.23 Status LEDs Power, CF, Link (only APC620 embedded)

The status LEDs are integrated in the system unit behind the orange front cover.

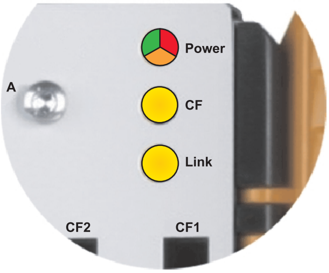
Status LEDs Power, CF, Link (only APC620 embedded)				
LED	**Color**		**Meaning**	
Power	Green	On	Supply voltage OK	
	Red	On	The system is in standby mode (S5: soft-off mode or S4: Hibernate mode -Suspend-to-Disk)	
	Orange 1)	On	Supply voltage not OK; the system is operating on battery power.	
CF	Yellow	On	Indicates access to CompactFlash (read or write)	
Link	Yellow	On	Active SDL connection on the monitor/panel connection	
		blinking	An active SDL connection has been interrupted by a loss of power in the display unit.	
		Off	No active SDL connection available.	

Table 63: Status LEDs Power, CF, Link (only APC620 embedded)

1) Only lit when add-on UPS module is installed.

2.14.24 CompactFlash slot (CF1)

This CompactFlash slot is a fixed component of an APC620 system, and is defined in BIOS as the primary master drive. Type I CompactFlash cards are supported. Available CompactFlash cards - see table 17 "Model numbers - CompactFlash cards", on page 42.

See the section "CompactFlash slots (only APC620 embedded)", on page 155 for a description of the CompactFlash slots on APC620 embedded devices.

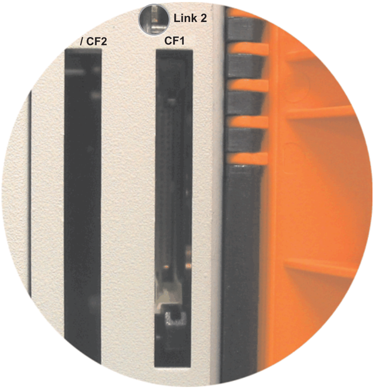
CompactFlash slot (CF1)		
Connection	Primary master IDE device	
CompactFlash Type	Type I	
Accessories	**Short description**	
5CFCRD.0512-04	512 MB B&R CompactFlash card	
5CFCRD.1024-04	1024 MB B&R CompactFlash card	
5CFCRD.2048-04	2048 MB B&R CompactFlash card	
5CFCRD.4096-04	4096 MB B&R CompactFlash card	
5CFCRD.8192-04	8192 MB B&R CompactFlash card	
5CFCRD.016G-04	16 GB B&R CompactFlash card	
5CFCRD.0064-03	CompactFlash 64 MB SSI	
5CFCRD.0128-03	CompactFlash 128 MB SSI	
5CFCRD.0256-03	CompactFlash 256 MB SSI	
5CFCRD.0512-03	CompactFlash 512 MB SSI	
5CFCRD.1024-03	CompactFlash 1024 MB SSI	
5CFCRD.2048-03	CompactFlash 2048 MB SSI	
5CFCRD.4096-03	CompactFlash 4096 MB SSI	
5CFCRD.8192-03	CompactFlash 8192 MB SSI	

Table 64: Technical data - CompactFlash slot (CF1)

Warning!

Inserting and removing the CompactFlash card can only take place without power applied!

2.14.25 Hard disk / CompactFlash slot (HDD/CF2)

This slot allows for the installation of a hard disk or a second CompactFlash slot (type I CompactFlash card) as add-on drives (see table 5.7 "Drives" for available add-on drives). The add-on drive is referred to in BIOS as the primary slave drive.

See the section "CompactFlash slots (only APC620 embedded)", on page 155 for a description of the CompactFlash slots on APC620 embedded devices.

Information:

Add-on drives are only available factory-installed. Therefore, they need to be requested when placing an order.

<table>
<tr><th colspan="3">Hard disk / CompactFlash slot (HDD/CF2)</th></tr>
<tr><td>Connection</td><td>Primary slave IDE device</td><td rowspan="22">
</td></tr>
<tr><td colspan="2"><b>Add-on hard disks 2.5" drive (internal)</b></td></tr>
<tr><td>5AC600.HDDI-05</td><td>Add-on hard disk 40 GB ET, 24/7</td></tr>
<tr><td>5AC600.HDDI-06</td><td>Add-on hard disk 80 GB ET, 24/7</td></tr>
<tr><td colspan="2"><b>Add-on CompactFlash slot</b></td></tr>
<tr><td>5AC600.CFSI-00</td><td>Add-on CompactFlash slot</td></tr>
<tr><td>CompactFlash Type</td><td>Type I</td></tr>
<tr><td><b>Accessories</b></td><td><b>Short description</b></td></tr>
<tr><td>5CFCRD.0512-04</td><td>512 MB B&R CompactFlash card</td></tr>
<tr><td>5CFCRD.1024-04</td><td>1024 MB B&R CompactFlash card</td></tr>
<tr><td>5CFCRD.2048-04</td><td>2048 MB B&R CompactFlash card</td></tr>
<tr><td>5CFCRD.4096-04</td><td>4096 MB B&R CompactFlash card</td></tr>
<tr><td>5CFCRD.8192-04</td><td>8192 MB B&R CompactFlash card</td></tr>
<tr><td>5CFCRD.016G-04</td><td>16 GB B&R CompactFlash card</td></tr>
<tr><td>5CFCRD.0064-03</td><td>CompactFlash 64 MB SSI</td></tr>
<tr><td>5CFCRD.0128-03</td><td>CompactFlash 128 MB SSI</td></tr>
<tr><td>5CFCRD.0256-03</td><td>CompactFlash 256 MB SSI</td></tr>
<tr><td>5CFCRD.0512-03</td><td>CompactFlash 512 MB SSI</td></tr>
<tr><td>5CFCRD.1024-03</td><td>CompactFlash 1024 MB SSI</td></tr>
<tr><td>5CFCRD.2048-03</td><td>CompactFlash 2048 MB SSI</td></tr>
<tr><td>5CFCRD.4096-03</td><td>CompactFlash 4096 MB SSI</td></tr>
<tr><td>5CFCRD.8192-03</td><td>CompactFlash 8192 MB SSI</td></tr>
</table>

Table 65: Technical data - Hard disk / CompactFlash slot (HDD/CF2)

Warning!

Inserting and removing the CompactFlash card can only take place without power applied!

2.14.26 CompactFlash slots (only APC620 embedded)

These CompactFlash slots are a fixed part of an APC620 embedded system and are defined in the BIOS as Primary Master (CF1) and Primary Slave (CF2) drive. Type I CompactFlash cards are supported.

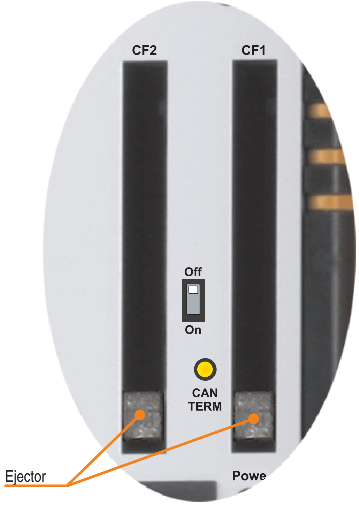
<table>
<tr><th colspan="3">CompactFlash slot (CF1 / CF2)</th></tr>
<tr><td>Connection
CF1
CF2</td><td>Primary master IDE device
Primary slave IDE device</td><td rowspan="16">
</td></tr>
<tr><td>CompactFlash
Type</td><td>Type I</td></tr>
<tr><td><b>Accessories</b></td><td><b>Short description</b></td></tr>
<tr><td>5CFCRD.0512-04</td><td>512 MB B&R CompactFlash card</td></tr>
<tr><td>5CFCRD.1024-04</td><td>1024 MB B&R CompactFlash card</td></tr>
<tr><td>5CFCRD.2048-04</td><td>2048 MB B&R CompactFlash card</td></tr>
<tr><td>5CFCRD.4096-04</td><td>4096 MB B&R CompactFlash card</td></tr>
<tr><td>5CFCRD.8192-04</td><td>8192 MB B&R CompactFlash card</td></tr>
<tr><td>5CFCRD.016G-04</td><td>16 GB B&R CompactFlash card</td></tr>
<tr><td>5CFCRD.0064-03</td><td>CompactFlash 64 MB SSI</td></tr>
<tr><td>5CFCRD.0128-03</td><td>CompactFlash 128 MB SSI</td></tr>
<tr><td>5CFCRD.0256-03</td><td>CompactFlash 256 MB SSI</td></tr>
<tr><td>5CFCRD.0512-03</td><td>CompactFlash 512 MB SSI</td></tr>
<tr><td>5CFCRD.1024-03</td><td>CompactFlash 1024 MB SSI</td></tr>
<tr><td>5CFCRD.2048-03</td><td>CompactFlash 2048 MB SSI</td></tr>
<tr><td>5CFCRD.4096-03</td><td>CompactFlash 4096 MB SSI</td></tr>
<tr><td>5CFCRD.8192-03</td><td>CompactFlash 8192 MB SSI</td></tr>
</table>

Table 66: CompactFlash slots (CF1 / CF2) - APC620 embedded

Warning!

Inserting and removing the CompactFlash card can only take place without power applied!

2.14.27 Power button

Due to the complete ATX power supply support, the power button serves various functions. These functions can be configured either in the BIOS setup (see BIOS function "Power button function" in section "Power", on page 389 for 815E CPU boards (ETX), or section "Power", on page 445 for 855GME CPU boards (ETX) or section "Power", on page 503 for 855GME CPU boards (XTX)) or, for example, in the operating system Windows XP.

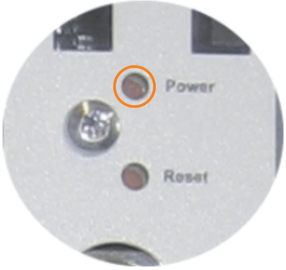
Power button	
The power button can be pressed with a pointed object (i.e. paper clip or tip of a pen). The power button acts like the on/off switch on a normal desktop PC with ATX power supply: **Press and release** ... Switches on APC620 or shuts down operating system and switches off the APC620. **Press and hold** ... ATX power supply switches off without shutting down the APC620 (**data could be lost!**). Pressing the power button does not reset the MTCX processor.	

Table 67: Technical data - Power button

2.14.28 Reset button

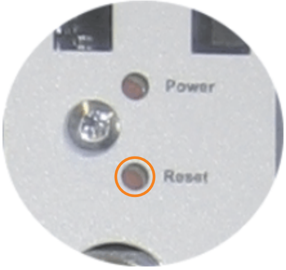
Reset button	
The reset button can be pressed with a pointed object (i.e. paper clip or tip of a pen). Pushing the reset button results in a hardware-reset, PCI-reset. The APC620 is restarted (cold restart). The MTCX processor is not reset when the reset button is pressed.	

Table 68: Technical data - Reset button

Warning!

A system reset can cause data to be lost!

2.14.29 PS/2 keyboard/mouse

Slot for a standard PS/2 mouse or a PS/2 AT-Enhanced keyboard. BIOS automatically determines whether a mouse or a keyboard has been connected, and transfers this information to the operating system.

Information:

APC620 embedded devices do not have a PS/2 interface.

With a PS/2 Y-cable, both keyboard and mouse can be operated simultaneously. They must be connected before the system is switched on.

This interface has a Hot-Plug function for PS/2 keyboards (only when no PS/2 mouse has ever been connected and used!).

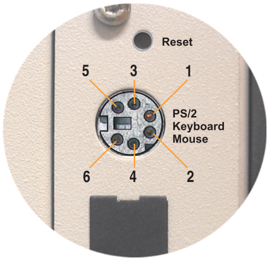
Connection for keyboard/mouse (PS/2)		
Pin	**Assignment**	PS/2 socket, female
1	DATA 0	 Reset 5 3 1 PS/2 Keyboard Mouse 6 4 2
2	DATA 1	
3	GND	
4	+5 V1)	
5	CLK 0	
6	CLK 1	

Table 69: Technical data - PS/2 keyboard/mouse (external PS/2)

1) The PS/2 keyboard/mouse interface is protected by a multifuse (1 A).

Warning!

Because of general PC specifications, this interface should be used with extreme care concerning EMC, location of cables, etc.. It should therefore only be used for service!

Information:

The BIOS setup defaults only allow for the operation of a PS/2 keyboard. If a PS/2 mouse is connected, it must be activated in BIOS. In order to do this, set "PS/2 mouse" in the BIOS setup menu to "enabled" and save. (Located under Advanced - Miscellaneous - Item "PS/2 mouse").

2.14.30 Battery

The lithium battery (3 V, 950 mAh) buffers the internal real-time clock (RTC) as well as the individually saved BIOS settings and is located behind the black cover. The buffer duration of the battery is at least 4 years (2½ years with the SRAM module model number 5AC600.SRAM-00 or with an APC620 embedded system unit and at 50°C, 8.5 mA current requirements of the supplied components and a self discharge of 40%). The battery is subject to wear and should be replaced regularly (at least following the specified buffer duration).

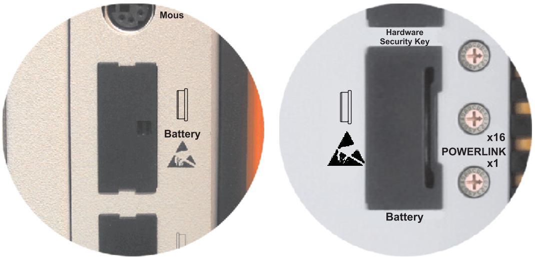
Battery		
Battery Type Removable Lifespan	 Renata 950 mAh Yes, accessible from the outside 4 years[1] [2]	 Mous Battery Hardware Security Key x16 POWERLINK x1 Battery APC620 with 1, 2, 3 and 5 PCI slots APC620 embedded
Accessories	**Short description**	
0AC201.91	**Lithium batteries, 4 pcs.** Lithium batteries (4 pcs.), 3 V / 950 mAh, button cell	
4A0006.00-000	**Lithium battery, 1 pc.** Lithium battery (1 pcs.), 3 V / 950 mAh, button cell	

Table 70: Technical data - battery

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

[2] The buffer duration is 2½ years if a SRAM module (Mod.Nr. 5AC600.SRAM-00) is installed or in conjunction with an APC620 embedded system unit.

For more on changing the lithium battery, see chapter 7 "Maintenance / Servicing", section "Changing the battery", on page 719.

For technical information on the lithium battery, see chapter 6 "Accessories", section 4 "Replacement CMOS batteries", on page 621.

Battery status evaluation

The battery status is evaluated immediately following start-up of the device and is subsequently checked by the system every 24 hours. The battery is subjected to a brief load (1 second) during the measurement and then evaluated. The evaluated battery status is displayed in the BIOS Setup pages (under Advanced - Baseboard monitor) and in the B&R Control Center (ADI driver), but can also be read in a customer application via the ADI Library.

Battery status	Meaning
N/A	Hardware, i.e. firmware used is too old and does not support read.
GOOD	Data buffering is guaranteed

Table 71: Meaning of battery status

Battery status	Meaning
BAD	Data buffering is guaranteed for approx. another 500 hours from the point in time that the battery capacity is determined to be BAD (insufficient).

Table 71: Meaning of battery status

Hardware requirements (system unit)

- 5PC600.SX01-00 starting with Rev I0
- 5PC600.SX01-00 starting with Rev. H0
- 5PC600.SX02-01 starting with Rev. K0
- 5PC600.SF03-00 starting with Rev. A0
- 5PC600.SX05-00 starting with Rev. H0
- 5PC600.SX05-01 starting with Rev. H0

Firmware / BIOS requirements

- APC620 / Panel PC 700 Firmware Upgrade V1.19 (MTCX PX32: V1.63, MTCX FPGA V1.19)
- BIOS 855GME (ETX) V1.26, BIOS 855GME (XTX) V1.14

2.14.31 Hardware Security Key

B&R recommends a hardware security key (dongle) based on the DS1425 from MAXIM (previously Dallas Semiconductors) for software copy protection.

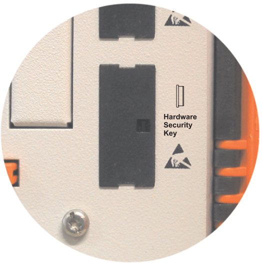
Hardware Security Key	
A hardware security key (dongle) can be inserted behind the black cover.	

Table 72: Technical data - Hardware security key

Warning!

Turn off power before removing or adding the hardware security key.

I/O address and IRQ

Resource	Default setting	Additional setting options
I/O address	378	278, 3BC
IRQ	-	-

Table 73: Hardware security key - I/O address and IRQ

The setting for the I/O address and the IRQ can be changed in the BIOS setup (under "Advanced" - submenu "I/O device configuration" setting "Parallel port").

2.14.32 Slide-in slot 1 drive slot

The "slide-in slot 1" drive slot exists only in APC620 system units with 2, 3 or 5 PCI slots. It is possible to insert a number of slide-in drives into it. See table for available slide-in drives 10 "Model numbers - Drives", on page 39.

For instructions about installing and replacing a slide-in, see chapter 7 "Maintenance / Servicing", section 3 "Slide-in drive - installation and exchange", on page 737.

The slide-in CD-ROM (5AC600.CDXS-00) and the slide-in DVD-ROM/CD-RW (5AC600.DVDS-00) and DVD-R/RW, DVD+R/RW (5AC600.DVRS-00) drive are referred to in BIOS as "secondary slave". The slide-in USB FDD drive (5AC600.FDDS-00) is referred to as USB.

Information:

- **It is possible to add, remove, or modify the slide-in drive at any time.**
- **In system units with 5 PCI slots, the slide-in USB FDD (5AC600.FDDS-00) drive must be inserted in slide-in slot 1 for mechanical reasons. The slide-in drive 5AC600.CFSS-00 (slide-in CF 2-slot) should only be operated in slide-in slot 2.**

Caution!

Turn off power before adding or removing a slide-in drive.

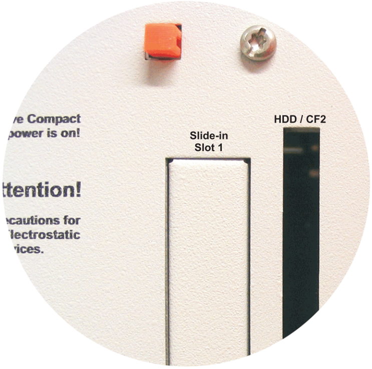
Slide-in slot 1		
Connection	Secondary slave IDE device	
Accessories	**Short description**	
5AC600.CDXS-00	Slide-in CD-ROM	
5AC600.CFSS-00	Slide-in CF 2-slot	
5AC600.DVDS-00	Slide-in DVD-ROM/CD-RW	
5AC600.DVRS-00	Slide-in DVD-R/RW, DVD+R/RW	
5AC600.FDDS-00	Slide-in USB FDD	
5AC600.HDDS-02	40 GB 24x7 ET slide-in hard disk	

Table 74: Technical data - Slide-in slot 1

2.14.33 Slide-in slot 2 drive slot

The "slide-in slot 2" drive slot exists only in APC620 system units with 5 PCI slots. It is possible to insert a number of slide-in drives into it. See table for available slide-in drives 10 "Model numbers - Drives", on page 39.

For instructions about installing and replacing a slide-in, see chapter 7 "Maintenance / Servicing", section 3 "Slide-in drive - installation and exchange", on page 737.

The slide-in CD-ROM (5AC600.CDXS-00) and the slide-in DVD-ROM/CD-RW (5AC600.DVDS-00) and DVD-R/RW, DVD+R/RW (5AC600.DVRS-00) drive are referred to in BIOS as "secondary master". The slide-in USB FDD drive (5AC600.FDDS-00) is referred to as USB.

Information:

- **It is possible to add or remove a slide-in drive at any time.**
- **In system units with 5 PCI slots, the slide-in USB FDD (5AC600.FDDS-00) drive must be inserted in slide-in slot 1 for mechanical reasons. The slide-in drive 5AC600.CFSS-00 (slide-in CF 2-slot) should only be operated in slide-in slot 2.**

Caution!

Turn off power before adding or removing a slide-in drive.

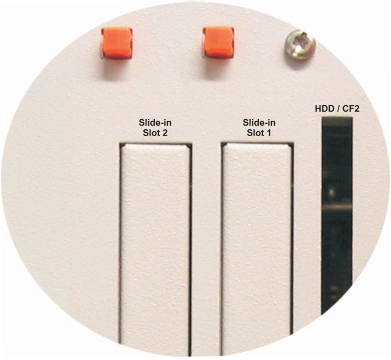
Slide-in slot 2		
Connection	Secondary master IDE device	
Accessories	**Short description**	
5AC600.CDXS-00	Slide-in CD-ROM	
5AC600.CFSS-00	Slide-in CF 2-slot	
5AC600.DVDS-00	Slide-in DVD-ROM/CD-RW	
5AC600.DVRS-00	Slide-in DVD-R/RW, DVD+R/RW	
5AC600.FDDS-00	Slide-in USB FDD	
5AC600.HDDS-02	Slide-in hard disk 40 GB 24x7, ET	

Table 75: Technical data - Slide-in slot 2

2.15 Serial number sticker

Each B&R device is assigned a unique serial number label with a bar code (type 128), which allows the device to be clearly identified.

The serial number for the entire device is located behind the front door. This serial number represents all of the components built into the system (model number, name, revision, serial number, delivery date and duration of warranty).

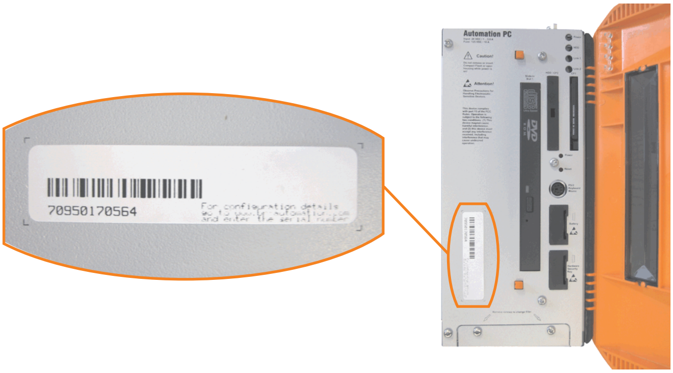

70950170564
For configuration details
go to www.br-automation.com
and enter the serial number
Automation PC

Figure 47: APC620 serial number sticker on front-side

A sticker with detailed information about the individual components can also be found on the back side of the mounting plate.

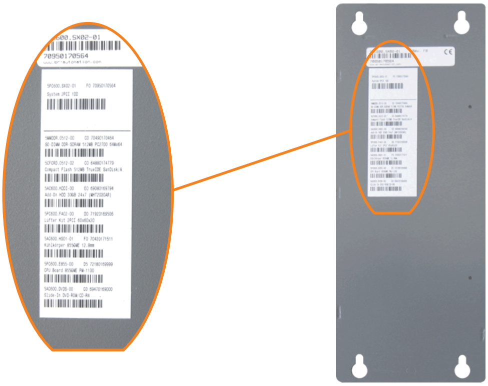
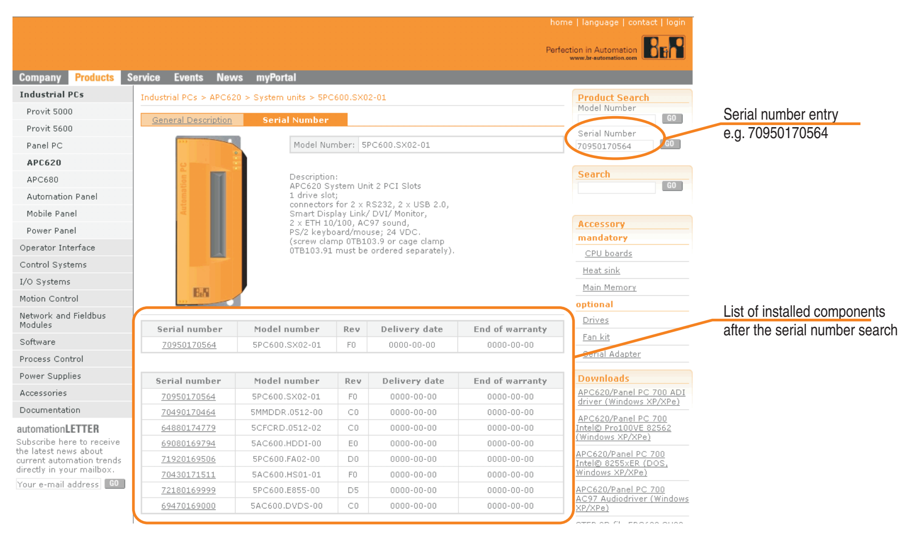


Figure 48: APC620 serial number sticker on back-side

This information can also be found on the B&R homepage. Enter the serial number of the entire device (found behind the front door) in the serial number search field on the start page www.br-automation.com. The search provides you with a detailed list of the individual components.



Serial Number: 70950170564

Model Number: 5PC600.SX02-01

Description:
APC620 System Unit 2 PCI Slots
1 drive slot;
connectors for 2 x RS232, 2 x USB 2.0,
Smart Display Link/ DVI/ Monitor,
2 x ETH 10/100, AC97 sound,
PS/2 keyboard/mouse; 24 VDC.
(screw clamp 0TB103.9 or cage clamp
0TB103.91 must be ordered separately).

Serial number	Model number	Rev	Delivery date	End of warranty
70950170564	5PC600.SX02-01	F0	0000-00-00	0000-00-00

Serial number	Model number	Rev	Delivery date	End of warranty
70950170564	5PC600.SX02-01	F0	0000-00-00	0000-00-00
70490170464	5MMDDR.0512-00	C0	0000-00-00	0000-00-00
64880174779	5CFCRD.0512-02	C0	0000-00-00	0000-00-00
69080169794	5AC600.HDDI-00	E0	0000-00-00	0000-00-00
71920169506	5PC600.FA02-00	D0	0000-00-00	0000-00-00
70430171511	5AC600.HS01-01	F0	0000-00-00	0000-00-00
72180169999	5PC600.E855-00	D5	0000-00-00	0000-00-00
69470169000	5AC600.DVDS-00	C0	0000-00-00	0000-00-00

Serial number entry
e.g. 70950170564

List of installed components
after the serial number search

Figure 49: Example of serial number search: 70950170564

2.16 Block diagram

The following block diagrams show the simplified structure according to the system unit being used with a 855GME CPU board (ETX / XTX).

2.16.1 Entire device with system unit 5PC600.SX01-00

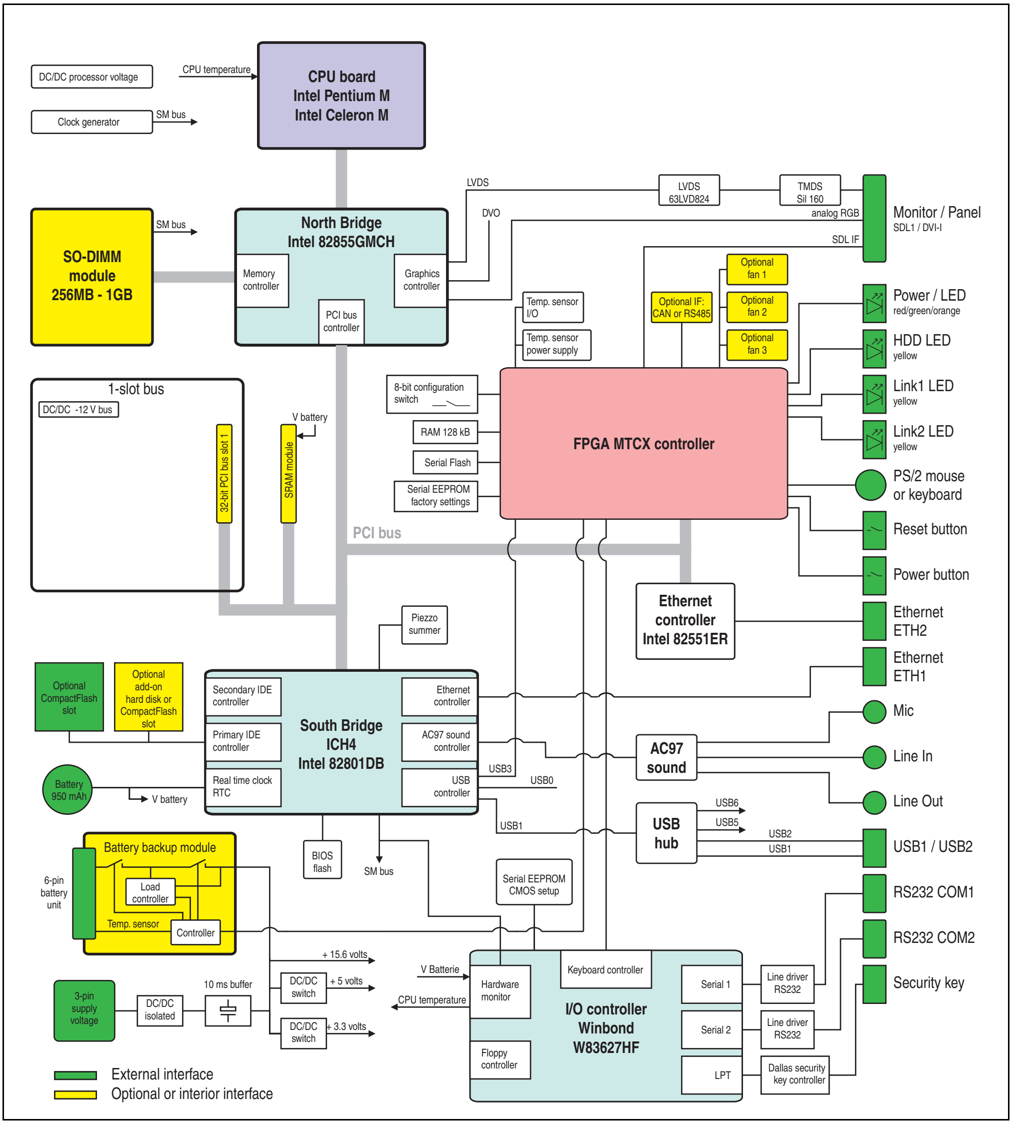


Figure 50: Block diagram of entire device with system unit 5PC600.SX01-00 and 855GME CPU board

2.16.2 Entire device with system unit 5PC600.SX02-00

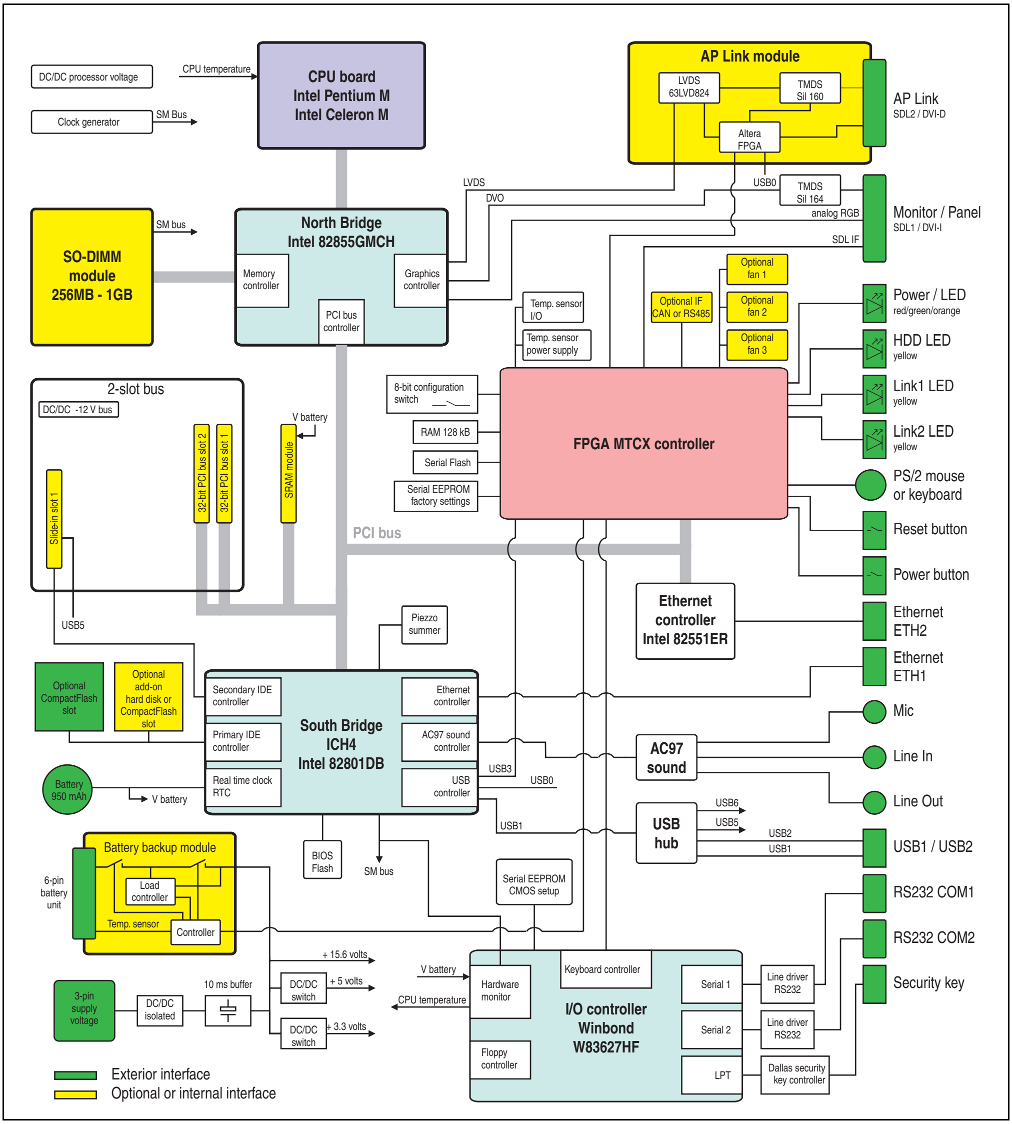


Figure 51: Block diagram of entire device with system unit 5PC600.SX02-00 and 855GME CPU board

2.16.3 Entire device with system unit 5PC600.SX02-01

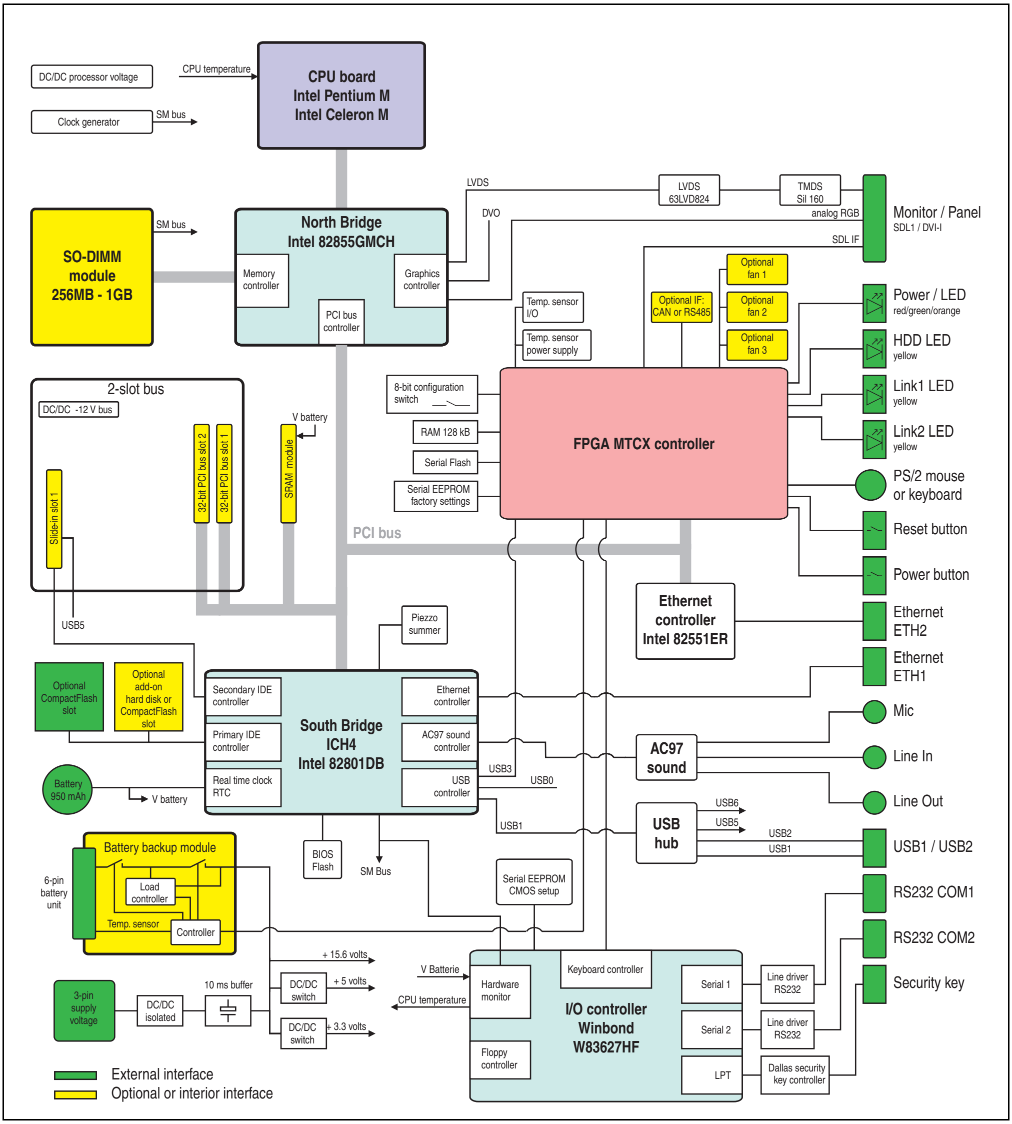


Figure 52: Block diagram of entire device with system unit 5PC600.SX02-01 and 855GME CPU board

2.16.4 Entire device with system unit 5PC600.SF03-00

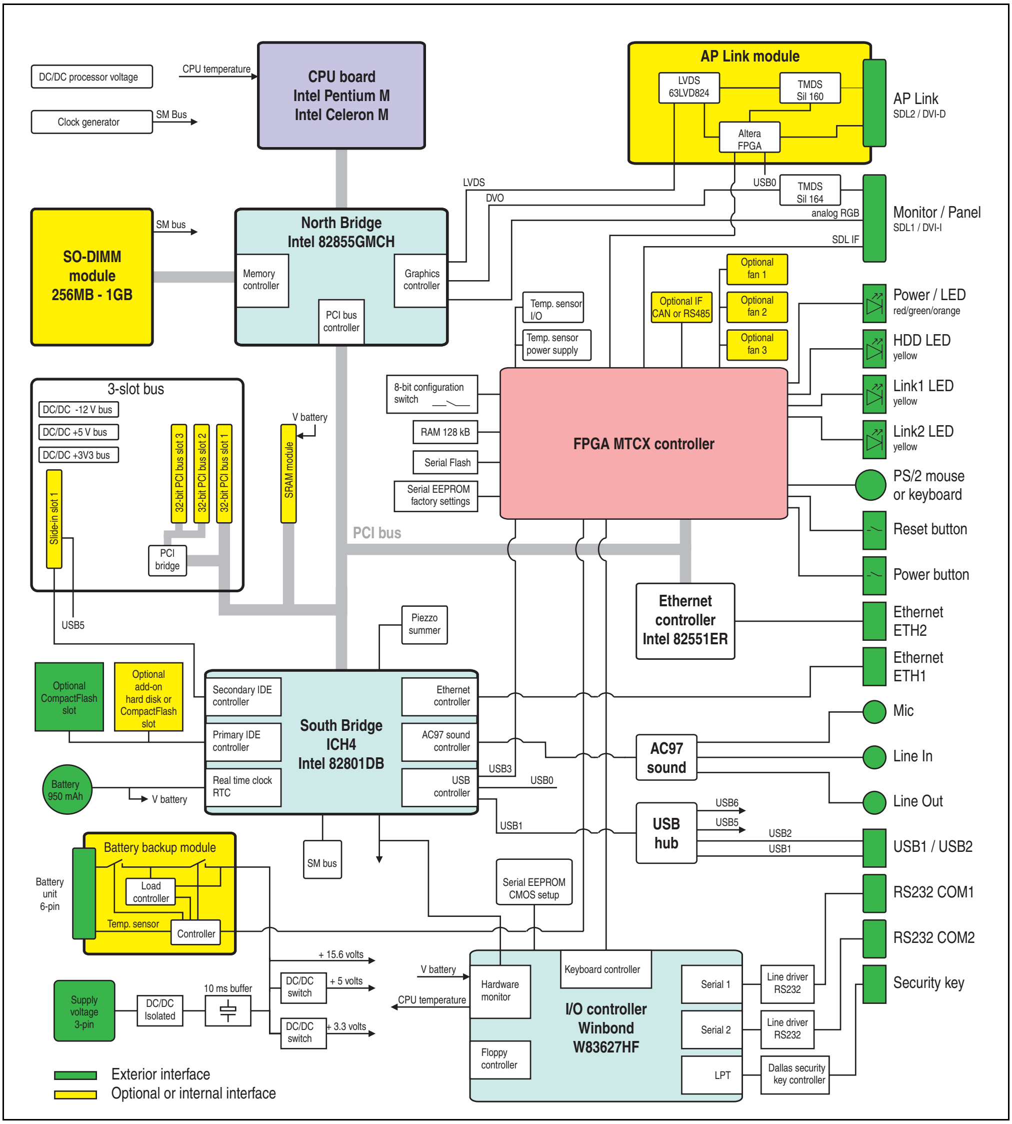


Figure 53: Block diagram of entire device with system unit 5PC600.SF03-00 and 855GME CPU board

2.16.5 Entire device with system unit 5PC600.SX05-00

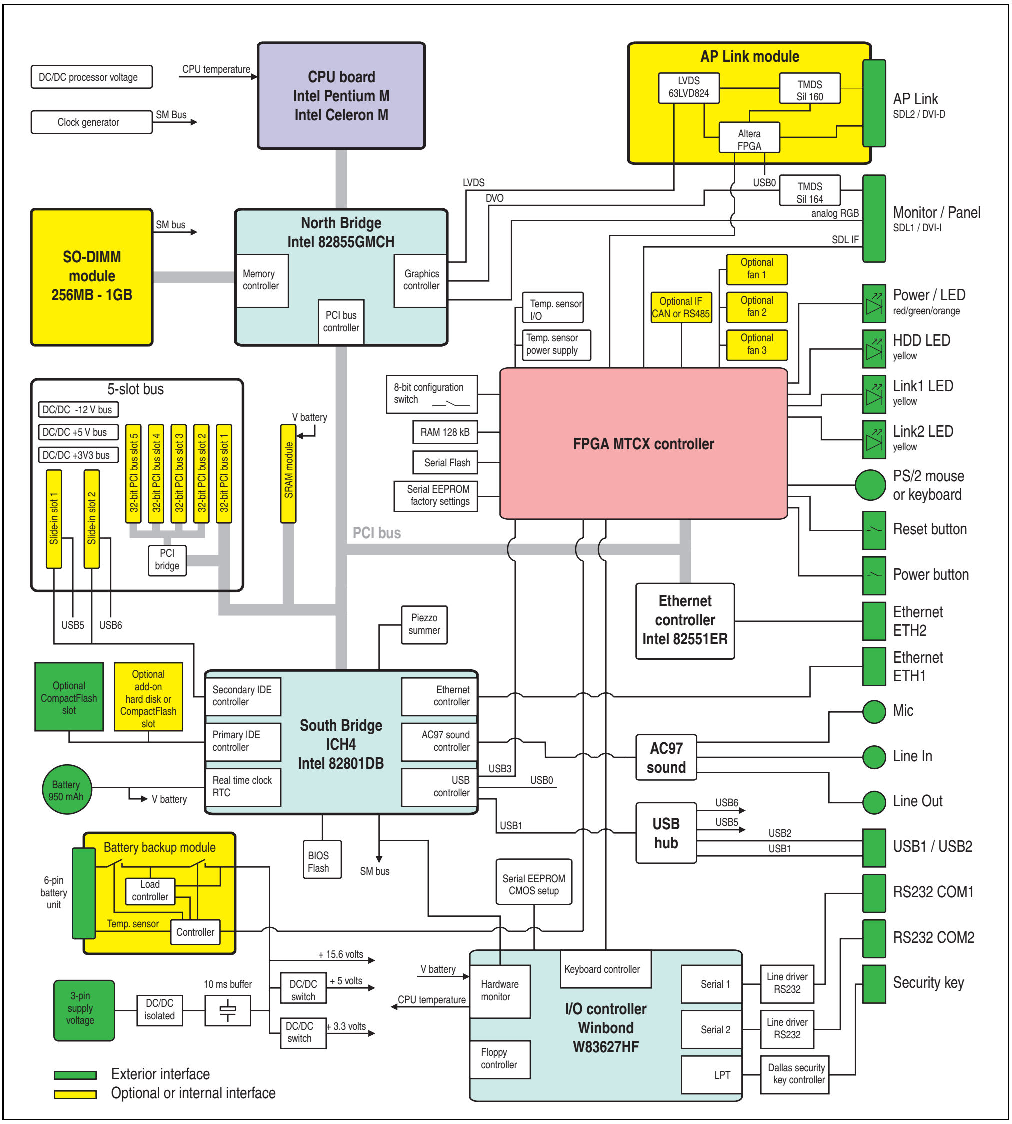


Figure 54: Block diagram of entire device with system unit 5PC600.SX05-00 and 855GME CPU board

2.16.6 Entire device with system unit 5PC600.SX05-01

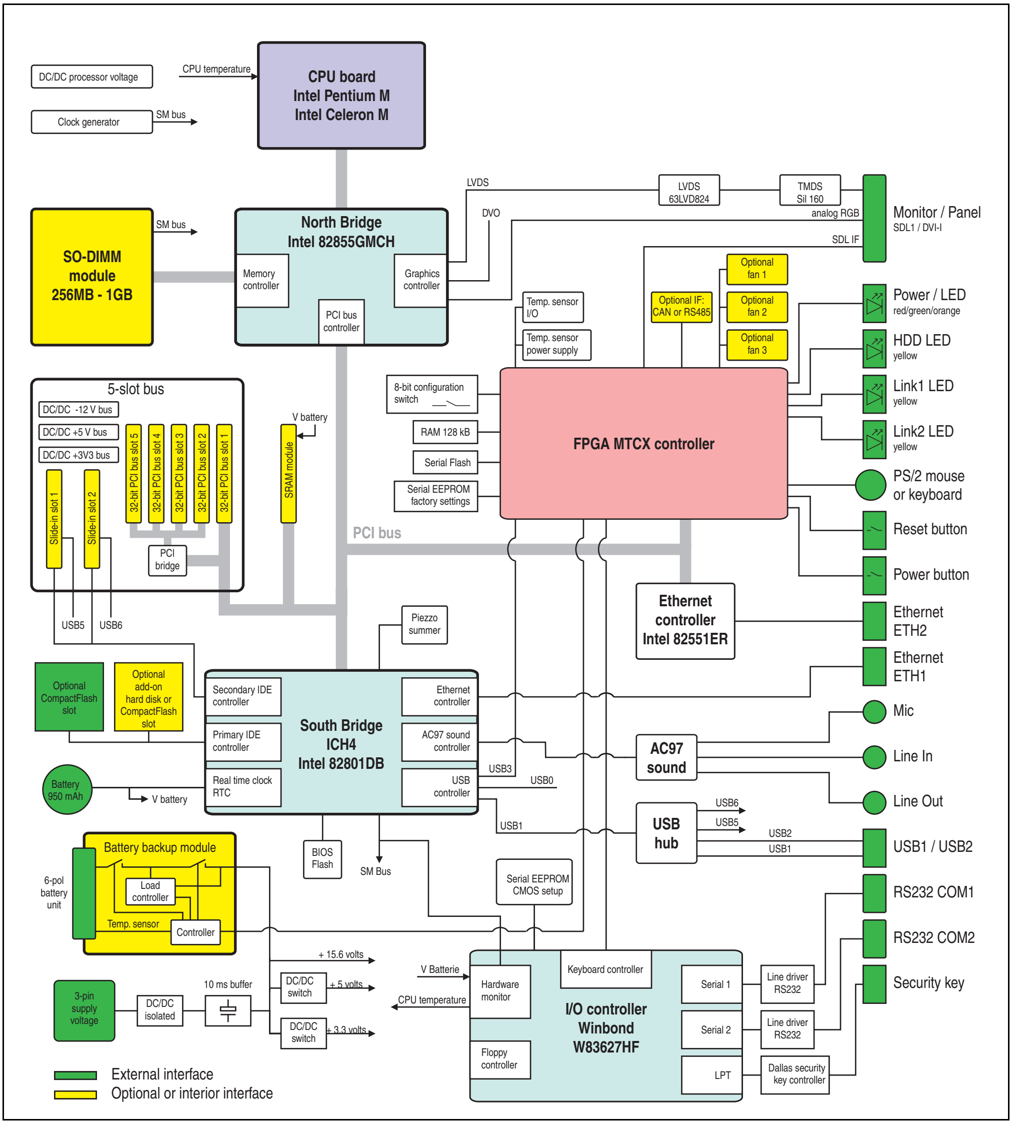


Figure 55: Block diagram of entire device with system unit 5PC600.SX05-01 and 855GME CPU board

2.16.7 Entire device with system unit 5PC600.SE00-00

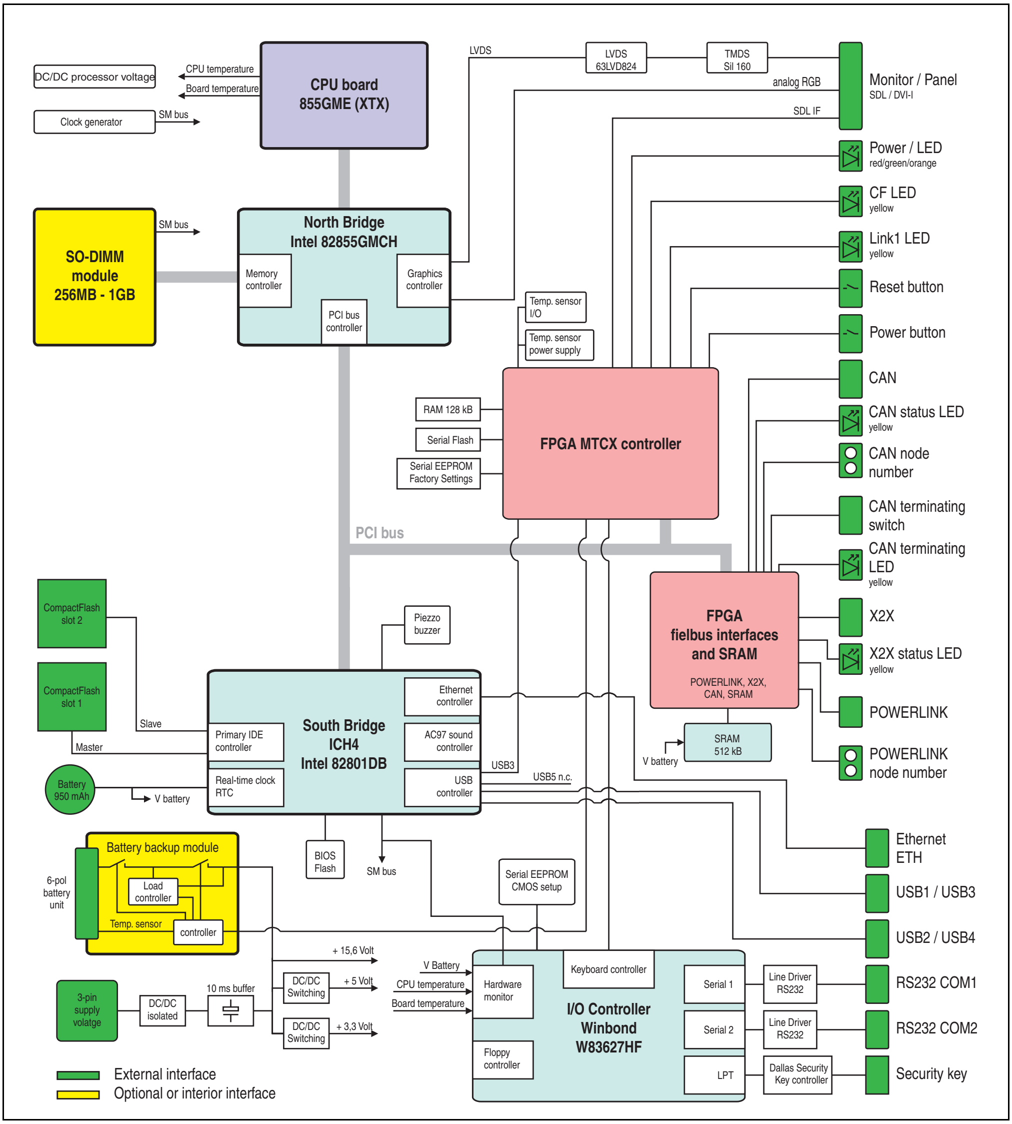


Figure 56: Block diagram of entire device with system unit 5PC600.SE00-00 and 855GME CPU board

2.16.8 Entire device with system unit 5PC600.SE00-01

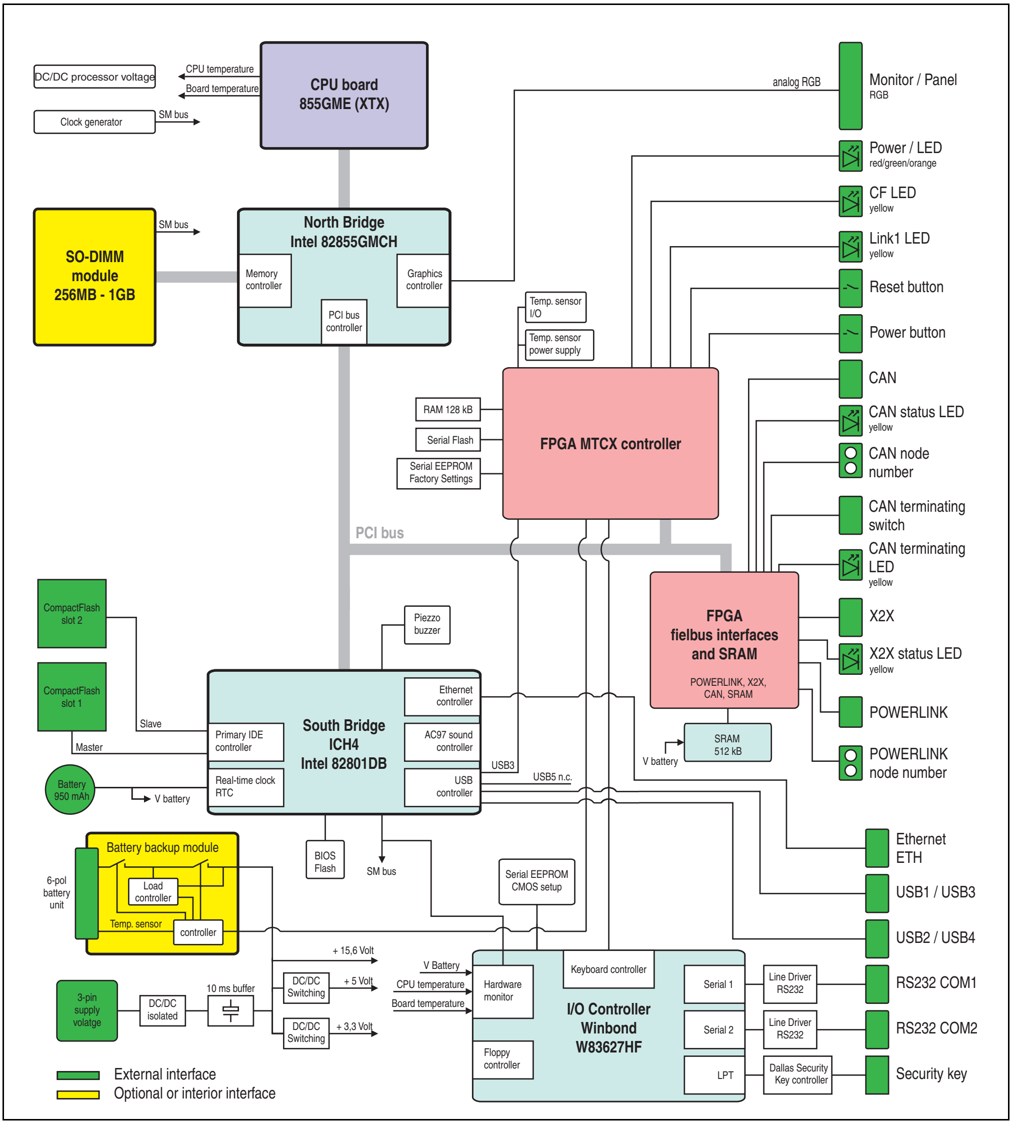


Figure 57: Block diagram of entire device with system unit 5PC600.SE00-01 and 855GME CPU board

2.16.9 Entire device with system unit 5PC600.SE00-02

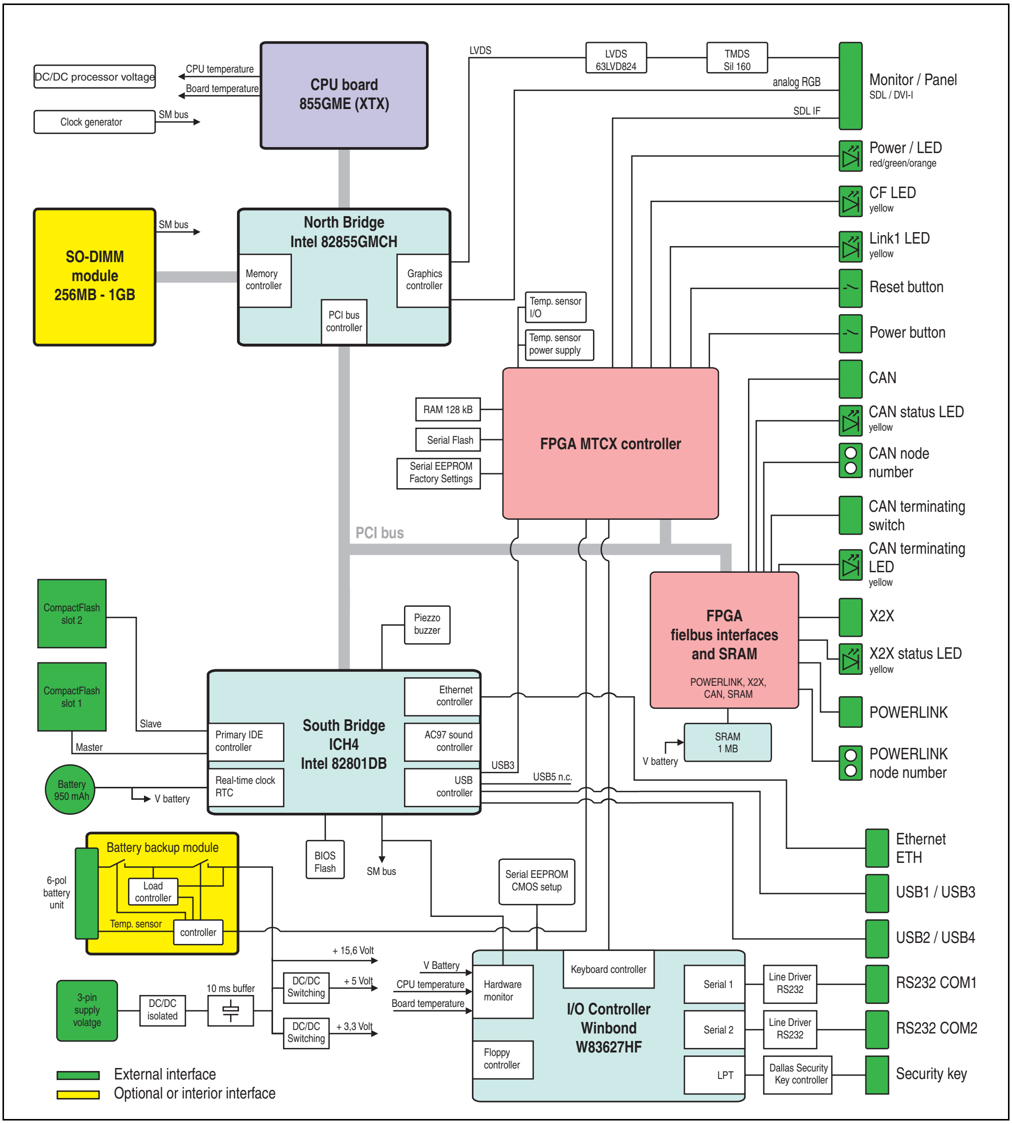


Figure 58: Block diagram of entire device with system unit 5PC600.SE00-02 and 855GME CPU board

3. Individual components

3.1 System units

All of the individual components of the Automation PC620 system come together inside the system unit. The system unit consists of an APC620 housing with an integrated main board. The housing units are available in variations with 1, 2, 3 and 5 PCI slots and in APC620 embedded. Units with 2, 3 or 5 PCI slots have an additional 1 or 2 slide-in drives, respectively.

3.1.1 APC620 with 1, 2, 3 and 5 PCI slots

Features	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01
Photo						
B&R ID code	$1B7D	$1BB6	$1BB7	$A0B7	$1D13	$1D14
Serial interfaces Type Amount UART Transfer rate Connection	 RS232, modem capable 2 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB, male					
Ethernet Controller Transfer rate Connection	 See "Ethernet connection ETH1", on page 130 and "Ethernet connection ETH2", on page 132 10/100 Mbit/s RJ45 twisted pair (10 Base T / 100 Base T)					
USB interface Type Amount Transfer rate Connection	 USB 2.0 2 Up to 480 MBit (high speed) Type A					
Monitor / Panel	DVI-I, female					
AC97 sound	Mic., line in, line out					
IF optional slot	1					
PCI slots half-size full-size PCI standard Bus speed	 1 - 2.2 33 MHz	 2 - 2.2 33 MHz		 - 3 2.2 33 MHz	 5 - 2.2 33 MHz	
CompactFlash slot 1 (CF1) Internal organization	integrated Primary master					

Table 76: Technical data - 1, 2, 3 and 5 PCI slot types

Features	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01
Combined CompactFlash slot 2 / hard disk (HDD/CF2) Internal organization	Yes, optional add-on CompactFlash slot or add-on hard disk Primary slave					
Insert for slide-in drive 1 Internal organization	-	Yes Secondary slave				
Insert for slide-in drive 2 Internal organization	-	-	-	-	Yes Secondary master	
APC620 UPS module optional	Yes, starting with Rev. H0	Yes, starting with Rev. G0	Yes, starting with Rev. H0	Yes	Yes, starting with Rev. F0	Yes, starting with Rev. H0
SRAM module optional	Yes, starting with Rev. I0	Yes, starting with Rev. H0	Yes, starting with Rev. K0	Yes	Yes, starting with Rev. H0	Yes, starting with Rev. H0
Reset button	Yes					
Power button	Yes					
PS/2 keyboard / mouse	Yes, combined, will be automatically detected					
Battery slot	Yes					
Hardware security key slot	Yes (DS1425 from MAXIM/Dallas)					
Fan slot	Yes					
Automation Panel link slot	-	1	-	1	1	-
Status LEDs	Power, HDD, Link1, Link2					
Real-time clock (RTC) Battery-buffered Accuracy	Yes See the technical data for CPU boards					
MTCX[1]	Yes					
Electrical characteristics						
Power supply Rated voltage Starting current Power consumption	24 VDC ±25% Typically 7A Maximum 40 A for < 300 µs See 2.8 "Power management APC620 system unit with 1 PCI slot"			24 VDC ±25% Typically 10 A Maximum 40 A for < 300 µs See section 2.10 "Power management APC620 system unit with 3 PCI slots" or 2.11 "Power management APC620 system units with 5 PCI slots"		
Mechanical characteristics						
Housing[2] Item Paint Front cover	Galvanized steel plate Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored plastic (similar to Pantone 144CV)					
Outer dimensions Width Length Height	65 mm 251 mm 270 mm	104.5 mm 253 mm 270 mm		125 mm 253 mm 410 mm	185.4 mm 253 mm 270 mm	
Weight	Approx. 1.5 kg	Approx. 2.6 kg		Approx. 4.5 kg	Approx. 3.8 kg	
Mounting plates (for M4 screws)	4			4	6	
Drilling templates for mounting	(see chapter 3 "Commissioning", section 1.2 "Drilling templates")					

Table 76: Technical data - 1, 2, 3 and 5 PCI slot types (Forts.)

[1] **M**ain**t**enance **C**ontroller E**x**tended, for more information, see the section "Maintenance Controller Extended (MTCX)", on page 769.

[2] Depending on the process or batch, there may be visible deviations in the color and surface structure.

3.1.2 APC620 embedded variations

Features	5PC600.SE00-00	5PC600.SE00-01	5PC600.SE00-02
Photo			
B&R ID code	$A3BA	$A3BB	$A52B
Serial interfaces Type Amount UART Transfer rate Connection	 RS232, modem capable 2 16550-compatible, 16-byte FIFO Max. 115 kBaud 9-pin DSUB, male		
Ethernet Controller Transfer rate Connection	 See "Ethernet connection ETH (only APC620 embedded)", on page 129 10/100 Mbit/s RJ45 twisted pair (10 Base T / 100 Base T)		
POWERLINK Amount Station Number Dial	 1 2 pcs.		
X2X Link Amount Status LED	 1 Yes, see page 127		
CAN bus Amount Transfer rate Node switch Terminating resistor Status LED	See also page 125 1 Max. 500 kBit/s Yes Yes, can be activated using a switch Yes, see page 127		
USB interface Type Amount Transfer rate Connection	 USB 2.0 4 Up to 480 MBit (high speed) Type A		
Monitor / Panel	DVI-I, female	DVI-A, female	DVI-I, female
AC97 sound	-		
IF optional slot	-		
PCI slots half-size full-size PCI standard Bus speed	-		
CompactFlash slot 1 (CF1) Internal organization	integrated Primary master		

Table 77: Technical data - APC620 embedded variations

Features	5PC600.SE00-00	5PC600.SE00-01	5PC600.SE00-02
CompactFlash slot 2 (CF2) Internal organization	integrated Primary slave		
Insert for slide-in drive 1 Internal organization	-		
Insert for slide-in drive 2 Internal organization	-		
APC620 UPS module optional	Yes		
SRAM Quantity Remanent variables for AR (Automation Runtime) in power fail mode	Yes 512 kB 256 kB with CPU board 5PC600.X855-xx 192 kB with CPU board 5PC600.X945-00		Yes 1 MB 256 kB with CPU board 5PC600.X855-xx 192 kB with CPU board 5PC600.X945-00
Reset button	Yes		
Power button	Yes		
PS/2 keyboard / mouse	-		
Battery slot	Yes		
Hardware security key slot	Yes (DS1425 from MAXIM/Dallas)		
Fan slot	-		
Automation Panel link slot	-		
Status LEDs	Power, HDD, Link1		
Real-time clock (RTC) Battery-buffered Accuracy	Yes See the technical data for the CPU board		
MTCX[1]	Yes		
Electrical characteristics			
Power supply Rated voltage Starting current Power consumption	24 VDC ±25% Typically 7 A maximum 40 A for < 300 µs See 2.12 "Power management for the APC620 embedded system unit"		
Mechanical characteristics			
Housing[2] Item Paint Front cover	Galvanized steel plate Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored plastic (similar to Pantone 144CV)		
Outer dimensions Width Length Height	68.3 mm 225.6 mm 210 mm		
Weight	Approx. 1.3 kg		
Mounting plates (for M4 screws)	4		
Drilling templates for mounting	(see chapter 3 "Commissioning", section 1.2 "Drilling templates")		

Table 77: Technical data - APC620 embedded variations (Forts.)

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1) **M**ain**t**enance **C**ontroller E**x**tended, for more information, see the section "Maintenance Controller Extended (MTCX)", on page 769.

2) Depending on the process or batch, there may be visible deviations in the color and surface structure.

3.2 CPU boards 815E (ETX)

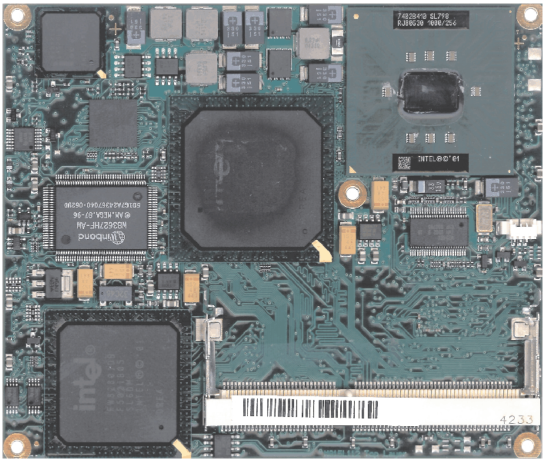


Figure 59: CPU boards 815E (ETX)

Information:

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

Features	5PC600.E815-00	5PC600.E815-02	5PC600.E815-03
Boot loader / Operating system	BIOS Phoenix (see section "815E (ETX) BIOS description", on page 351)		
Processor Architectures Type Clock frequency Expanded command set L1 cache L2 cache Floating point unit (FPU)	 0.13 µm Intel Celeron 3 400 MHz MMX technology, streaming SIMD extension 16 kB 256 kB Yes	 0.13 µm Intel Celeron 3 733 MHz MMX technology, streaming SIMD extension 16 kB 256 kB Yes	 0.13 µm Intel Celeron 1 GHz MMX technology, streaming SIMD extension 16 kB 256 kB Yes
Chipset	Intel 82815E (GMCH) Intel 82801DB (ICH4)		
Real-time clock (RTC) Battery-buffered Accuracy	 Yes at 25°C typ. 24 ppm (2 seconds) [1] per day		
Front side bus	100 Mhz	133 Mhz	133 MHz

Table 78: Technical data - 815E CPU boards (ETX)

Features	5PC600.E815-00	5PC600.E815-02	5PC600.E815-03
Mass memory management	2 IDE ports, UDMA 100		
Memory Type Quantity Socket	 SDRAM Max. 512 MB SO-DIMM 144-pin		
Graphics Controller Memory Color depth Resolution RGB GE1[2]	Support up to SXGA display units Intel 82815 (integrated in the Chipset) 32 MB shared memory (reserved in the main memory) Max. 24 bit up to 1280 x 1024 @ 85 Hz 24 bit, up to 1600 x 1200 @ 75 Hz 8 bit up to 1280 x 1024 @ 85 Hz 24 bit		

Table 78: Technical data - 815E CPU boards (ETX) (Forts.)

1) At max. specified ambient temperature: typically 70 ppm (6 seconds) - worst-case 220 ppm (19 seconds).

2) GE = Graphics Engine

Driver support

In order for the CPU board with the Intel 82815E chipset to work properly, it is necessary to install the Intel chipset driver (e.g. special USB driver) and the graphics chip. The necessary software can be downloaded from the download area on the B&R homepage (www.br-automation.com).

> ## Information:
>
> **Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.**

3.3 CPU boards 855GME (ETX)

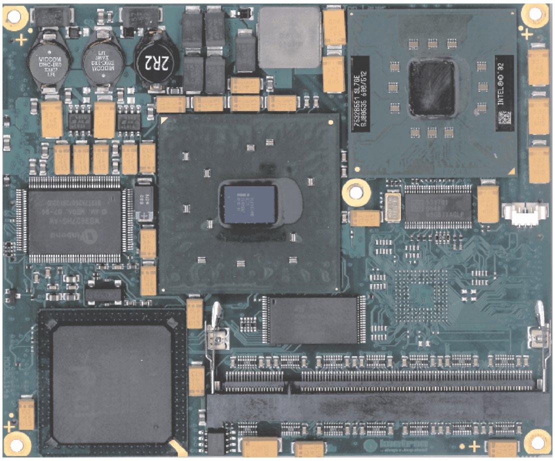


Figure 60: CPU boards 855GME (ETX)

Information:

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

Features	5PC600.E855-00	5PC600.E855-01	5PC600.E855-02	5PC600.E855-03	5PC600.E855-04	5PC600.E855-05
Boot loader / Operating system	BIOS Phoenix (see BIOS section "855GME (ETX) BIOS description", on page 405)					
Processor						
Architectures	0.13 µm	0.13 µm	90 nm	90 nm	0.13 µm	0.13 µm
Type	Intel Pentium M	Intel Pentium M	Intel Pentium M	Intel Pentium M	Intel Celeron M	Intel Celeron M
Clock frequency	1.1 GHz	1.6 GHz	1.4 GHz	1.8 GHz	600 MHz	1000 MHz
Expanded command set	MMX technology, streaming SIMD extension	MMX technology, streaming SIMD extension	MMX technology, streaming SIMD extension	MMX technology, streaming SIMD extension	MMX technology, streaming SIMD extension	MMX technology, streaming SIMD extension
	2	2	2	2	2	2
L1 cache	32 kB	32 kB	32 kB	32 kB	32 kB	32 kB
L2 cache	1 MB	1 MB	2 MB	2 MB	512 kB	512 kB
Floating point unit (FPU)	Yes	Yes	Yes	Yes	Yes	Yes
Chipset	Intel 82855GME (GMHC) Intel 82801DB (ICH4)					

Table 79: Technical data - CPU boards 855GME (ETX)

Features	5PC600.E855-00	5PC600.E855-01	5PC600.E855-02	5PC600.E855-03	5PC600.E855-04	5PC600.E855-05
Real-time clock (RTC)						
Battery-buffered	Yes					
Accuracy	At 25°C typ. 12 ppm (1 second)[1] per day					
Front side bus	400 Mhz					
Mass memory management	2 IDE ports, UDMA 100					
Memory						
Type	DDRAM					
Quantity	Max. 1 GB					
Socket	SO-DIMM 200-pin					
Graphics						
Controller	Intel Extreme Graphics 2 (integrated in the chipset)					
Memory	64 MB shared memory (reserved in the main memory)					
Color depth	Max. 32 bit					
Resolution						
RGB	350 MHz RAMDAC, up to 2048 x 1536 @ 60 Hz (QXGA) including 1920 x 1080 @ 85 Hz (HDTV)					
GE1[2] = LVDS	2x 112 MHz LVDS transmitter, from 640 x 480 up to 1600 x 1200 (Embedded Panel interface based on VESA EDID™ 1.3)					
GE2[2] = DVO	Intel compliant DVO 2.0 port (12-bit DDR) supports external DVI transmitters with a bandwidth up to 165 MHz, 1600 x 1200 (UXGA)					

Table 79: Technical data - CPU boards 855GME (ETX) (Forts.)

1) At max. specified ambient temperature: typically 58 ppm (5 seconds) - worst-case 220 ppm (19 seconds).

2) GE = Graphics Engine

Driver support

In order for the CPU board with the Intel 82855GME chipset to work properly, it is necessary to install the Intel chipset driver (e.g. special USB driver) and the graphics chip. The necessary software can be downloaded from the download area on the B&R homepage (www.br-automation.com).

Information:

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

3.4 CPU boards 855GME (XTX)

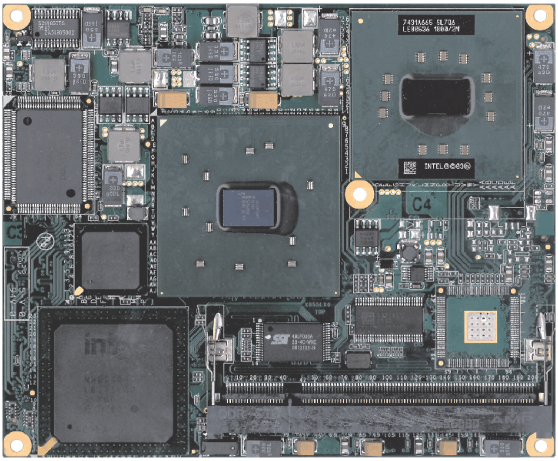


Figure 61: CPU boards 855GME (XTX)

Information:

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

Features	5PC600.X855-00	5PC600.X855-01	5PC600.X855-02	5PC600.X855-03	5PC600.X855-04	5PC600.X855-05
Boot loader / Operating system	BIOS AMI (see BIOS section "855GME (XTX) BIOS description", on page 461)					
Processor						
Architectures	0.13 µm	0.13 µm	90 nm	90 nm	0.13 µm	0.13 µm
Type	Intel Pentium M	Intel Pentium M	Intel Pentium M	Intel Pentium M	Intel Celeron M	Intel Celeron M
Clock frequency	1.1 GHz	1.6 GHz	1.4 GHz	1.8 GHz	600 MHz	1000 MHz
Expanded command set	MMX technology, streaming SIMD extension 2	MMX technology, streaming SIMD extension 2	MMX technology, streaming SIMD extension 2	MMX technology, streaming SIMD extension 2	MMX technology, streaming SIMD extension 2	MMX technology, streaming SIMD extension 2
L1 cache	32 kB	32 kB	32 kB	32 kB	32 kB	32 kB
L2 cache	1 MB	1 MB	2 MB	2 MB	512 kB	512 kB
Floating point unit (FPU)	Yes	Yes	Yes	Yes	Yes	Yes
Chipset	Intel 82855GME (GMHC) Intel 82801DB (ICH4)					

Table 80: Technical data - CPU boards 855GME (XTX)

Features	5PC600.X855-00	5PC600.X855-01	5PC600.X855-02	5PC600.X855-03	5PC600.X855-04	5PC600.X855-05
Real-time clock (RTC) Battery-buffered Accuracy	 Yes At 25°C typ. 12 ppm (1 second)[1] per day					
Front side bus	400 Mhz					
Mass memory management	2 IDE ports, UDMA 100					
Memory Type Quantity Socket	 DDRAM Max. 1 GB SO-DIMM 200-pin					
Graphics Controller Memory Color depth Resolution RGB GE1[2] = LVDS GE2[2] = DVO	 Intel Extreme Graphics 2 (integrated in the chipset) Up to 64 MB shared memory (reserved in the main memory) Max. 32 bit 350 MHz RAMDAC, up to 2048 x 1536 @ 60 Hz (QXGA) including 1920 x 1080 @ 85 Hz (HDTV) 2x 112 MHz LVDS transmitter, from 640 x 480 up to 1600 x 1200 (Embedded Panel interface based on VESA EDID™ 1.3) Intel compliant DVO 2.0 port (12-bit DDR) supports external DVI transmitters with a bandwidth up to 165 MHz, 1600 x 1200 (UXGA)					

Table 80: Technical data - CPU boards 855GME (XTX) (Forts.)

[1] At max. specified ambient temperature: typically 58 ppm (5 seconds) - worst-case 220 ppm (19 seconds).

[2] GE = Graphics Engine

Driver support

In order for the CPU board with the Intel 82855GME chipset to work properly, it is necessary to install the Intel chipset driver (e.g. special USB driver) and the graphics chip. The necessary software can be downloaded from the download area on the B&R homepage (www.br-automation.com).

Information:

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

3.5 Heat sink

There are a number of heat sink variants available to be used with different CPU boards.

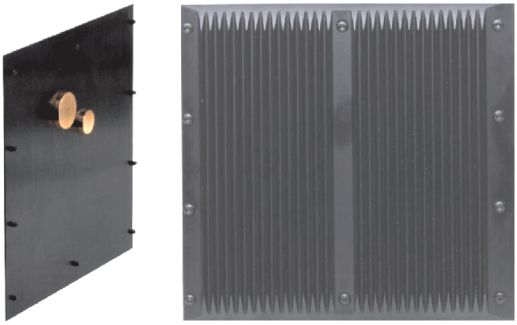


Figure 62: Heat sink

Information:

A heat sink can only be replaced at the B&R plant.

Mechanical characteristics	5AC600.HS01-00	5AC600.HS01-01	5AC600.HS01-02	5AC600.HS02-01	5AC600.HS02-02	5AC600.HS03-01
Ideal for CPU boards	5PC600.E815-00 5PC600.E815-02 5PC600.E815-03	5PC600.E855-00 5PC600.E855-02 5PC600.E855-04 5PC600.E855-05 5PC600.X855-00 5PC600.X855-02 5PC600.X855-04 5PC600.X855-05	5PC600.E855-01 5PC600.E855-03 5PC600.X855-01 5PC600.X855-03	5PC600.E855-00 5PC600.E855-02 5PC600.E855-04 5PC600.E855-05 5PC600.X855-00 5PC600.X855-02 5PC600.X855-04 5PC600.X855-05	5PC600.E855-01 5PC600.E855-03 5PC600.X855-01 5PC600.X855-03	5PC600.X855-04 5PC600.X855-05 5PC600.X855-00 5PC600.X855-02
Suitable for the following system units	5PC600.SX01-00 5PC600.SX02-00 5PC600.SX02-01 5PC600.SX05-00 5PC600.SX05-01	5PC600.SX01-00 5PC600.SX02-00 5PC600.SX02-01 5PC600.SX05-00 5PC600.SX05-01	5PC600.SX01-00 5PC600.SX02-00 5PC600.SX02-01 5PC600.SX05-00 5PC600.SX05-01	5PC600.SF03-00	5PC600.SF03-00	5PC600.SE00-00 5PC600.SE00-01 5PC600.SE00-02
Item	Black-coated aluminum					
Outer dimensions Width Height Depth	228.7 mm 218 mm 12.8 mm		228.7 mm 218 mm 28 mm	228.7 mm 358 mm 12.8 mm	228.7 mm 358 mm 28 mm	203.9 mm 158 mm 12.8 mm
Weight	Approx. 1340 g		Approx. 1640 g	Approx. 2000 g	Approx. 3200 g	Approx. 900 g

Table 81: Technical data - Heat sink

3.6 Main memory

The CPU boards (815E, 855GME) are each equipped with a socket for memory modules. When choosing a main memory, it is important to consider both the maximum memory capacity (for 815E (ETX) CPU Boards 512 MB, and for 855GME (ETX or XTX) CPU Boards 1 GB) and the correct type.

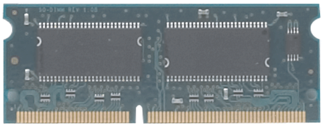


Figure 63: Main memory module

Information:

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

Features	5MMSDR.0128-01	5MMSDR.0256-01	5MMSDR.0512-01	5MMDDR.0256-00	5MMDDR.0512-00	5MMDDR.1024-00
Ideal for CPU boards	815E (ETX)			855GME (ETX / XTX)		
Quantity Construction Type	128 MB 144-pin SO-DIMM SDRAM	256 MB 144-pin SO-DIMM SDRAM	512 MB 144-pin SO-DIMM SDRAM	256 MB 200-pin SO-DIMM DDR-SDRAM	512 MB 200-pin SO-DIMM DDR-SDRAM	1 GB 200-pin SO-DIMM DDR-SDRAM
Organization	16Mx64	32x64	64Mx64	32Mx64	64Mx64	128Mx64

Table 82: Technical data - Main memory

3.7 Drives

3.7.1 Add-on hard disk 30 GB 24x7 - 5AC600.HDDI-00

This hard disk is specified for 24-hour operation (24x7). The add-on drive is referred to internally as the primary slave drive.

Information:

Add-on drives are only available factory-installed. Therefore, they need to be requested when placing an order.

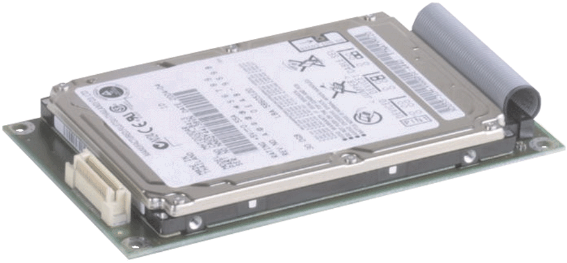


Figure 64: Add-on hard disk 30 GB 24x7 - 5AC600.HDDI-00

Technical data

Information:

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

Features	5AC600.HDDI-00
Manufacturer's product ID	Fujitsu MHT2030AR
Formatted capacity	30 GB
Number of heads	2
Number of sectors (user)	58,605,120
Bytes per sector	512
Revolution speed	4200 rpm ±1%
Access time (average)	7.14 ms

Table 83: Technical data - Add-on hard disk 5AC600.HDDI-00

Features	5AC600.HDDI-00
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum	 1.5 ms 12 ms 22 ms
Starting time (0 rpm to read access)	5 seconds (typically)
Interface	ATA-6
Data transfer rate On the medium To/from host	 26.1 to 36.2 MB/s Max. 100 MB/s (ultra-DMA mode 5)
Cache	2 MB
Noise level (idle mode)	Approx. 24 dBA at 30 cm
Electrical characteristics	
Lifespan	5 years or 20,000 POH (Power-On Hours)
MTBF	300,000 hours
Mechanical characteristics	
Add-on mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature1) Operation - standard 2) Operation - 24-hour 3) Bearings Transport	 +5 to +55°C +5 to +44°C -40 to +65°C -40 to +65°C
Relative humidity Operation Bearings Transport	 8 to 90%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings	 No non-recovered errors at max. 5 - 500 Hz and 1 g (9.8 m/s^2 0-peak) No damage at max. 5 - 500 Hz and 5 g (49 m/s ^{2} 0-peak)
Shock (pulse with a sine half-wave) Operation Bearings	 No non-recovered errors at max. 225 g (2207 m/s^2 0-peak) and 2 ms duration No damage at max. 900 g (8820 m/s^2 0-peak) and 1 ms duration No damage at max. 120 g (1176 m/s^2 0-peak) and 11 ms duration
Altitude Operation Bearings	 - 300 to 3000 meters - 300 to 12000 meters

Table 83: Technical data - Add-on hard disk 5AC600.HDDI-00 (Forts.)

1) Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

2) Standard operation means 250 POH (power-on hours) per month.

3) 24-hour operation means 732 POH (power-on hours) per month.

Temperature humidity diagram

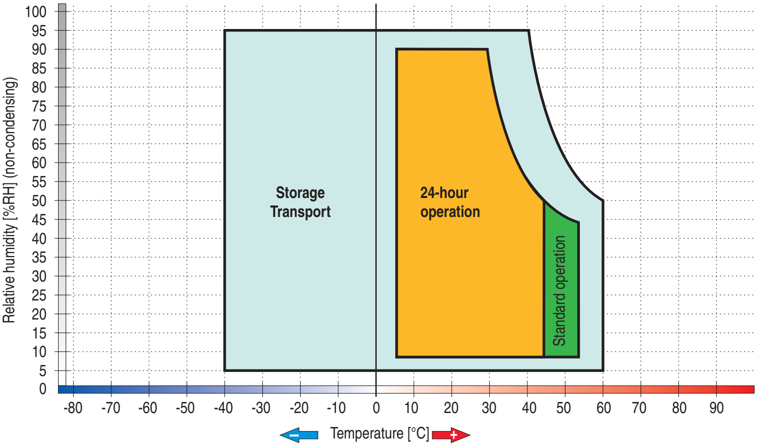


Figure 65: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-00

3.7.2 Add-on hard disk 20 GB ET - 5AC600.HDDI-01

This hard disk has an extended temperature specification (ET), but is not permitted for 24 hour operation. The add-on drive is referred to internally as the primary slave drive.

Information:

Add-on drives are only available factory-installed. Therefore, they need to be requested when placing an order.

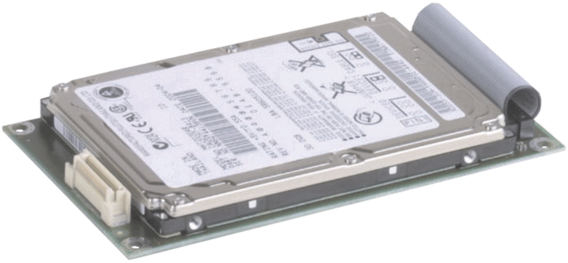


Figure 66: Add-on hard disk 20 GB - 5AC600.HDDI-01

Technical data

Information:

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

Features	5AC600.HDDI-01
Manufacturer's product ID	Fujitsu MHT2020AC
Formatted capacity	20 GB
Number of heads	2
Number of sectors (user)	39,070,080
Bytes per sector	512
Revolution speed	4200 rpm ±1%
Access time (average)	7.14 ms

Table 84: Technical data - Add-on hard disk 5AC600.HDDI-01

Features	5AC600.HDDI-01
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum	 1.5 ms 12 ms 22 ms
Starting time (0 rpm to read access)	5 seconds (typically)
Interface	ATA-6
Data transfer rate On the medium To/from host	 Up to 28.9 MB/s Max. 100 MB/s (ultra-DMA mode 5)
Cache	2 MB
Noise level (idle mode)	Approx. 22 dBA at 30 cm
Electrical characteristics	
Lifespan	5 years or 20,000 POH (Power-On Hours)
MTBF	300,000 hours
Mechanical characteristics	
Add-on mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature(1) Operation(2) Bearings Transport	 -20 to +80°C -40 to +85°C -40 to +85°C
Relative humidity Operation Bearings Transport	 8 to 90%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings	 No non-recovered errors at max. 5 - 500 Hz and 1 g (9.8 m/s^2 0-peak) No damage at max. 5 - 500 Hz and 5 g (49 m/s ^{2} 0-peak)
Shock (pulse with a sine half-wave) Operation Bearings	 No non-recovered errors at max. 225 g (2207 m/s^2 0-peak) and 2 ms duration No damage at max. 900 g (8820 m/s^2 0-peak) and 1 ms duration No damage at max. 120 g (1176 m/s^2 0-peak) and 11 ms duration
Altitude Operation Bearings	 - 300 to 3000 meters - 300 to 12000 meters

Table 84: Technical data - Add-on hard disk 5AC600.HDDI-01 (Forts.)

1) Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

2) Standard operation means 250 POH (power-on hours) per month.

Temperature humidity diagram

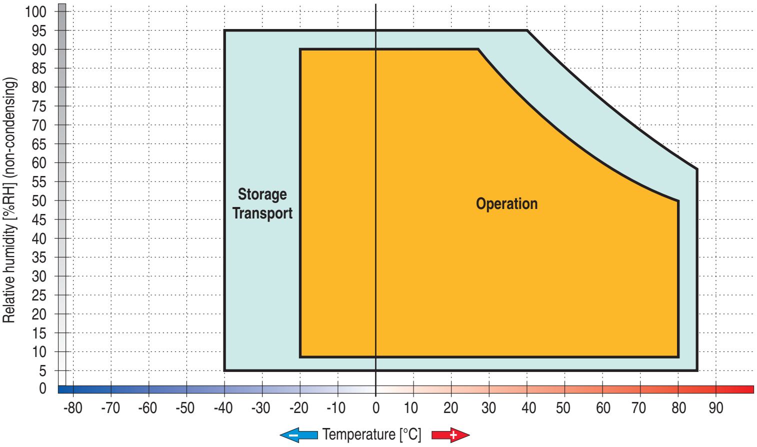


Figure 67: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-01

3.7.3 Add-on hard disk 40 GB 24x7 - 5AC600.HDDI-02

This hard disk is specified for 24-hour operation (24x7). The add-on drive is referred to internally as the primary slave drive.

Information:

Add-on drives are only available factory-installed. Therefore, they need to be requested when placing an order.

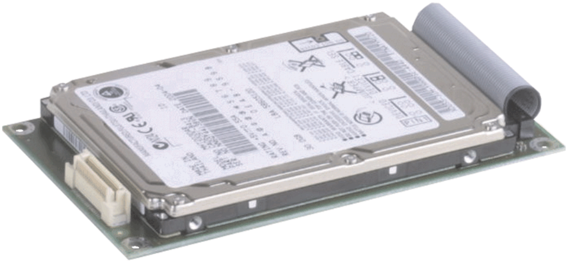


Figure 68: Add-on hard disk 40 GB - 5AC600.HDDI-02

Technical data

Information:

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

Features	5AC600.HDDI-02
Manufacturer's product ID	Hitachi HTE726040M9AT00
Formatted capacity	40 GB
Number of heads	4
Number of sectors (user)	78,140,160
Bytes per sector	512
Revolution speed	7200 rpm ±1%
Access time (average)	10 ms

Table 85: Technical data - add-on hard disk - 5AC600.HDDI-02

Features	5AC600.HDDI-02
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	 1 ms 10 ms 16 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Interface	ATA-6
Data transfer rate On the medium To/from host	 236 to 507 MBit/s Max. 100 MB/s (ultra-DMA mode 5)
Cache	8 MB
Electrical characteristics	
Lifespan	5 years or 30,000 POH (Power-On Hours)
MTBF	477,000 hours1)
Mechanical characteristics	
Add-on mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature2) Operation - standard 3) Operation - 24-hour4) Bearings Transport	 +5 to +55°C +5 to +40°C -40 to +65°C -40 to +65°C
Relative humidity Operation Bearings Transport	 8 to 90%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings	 5 - 500 Hz: 1 g (9.8 m/s^2 0-peak) duration 2 octaves per minute; no non-recovered errors 5 - 500 Hz: 5 g (49 m/s^2 0-peak) duration 0.5 oct./min.; no damage
Shock (pulse with a sine half-wave) Operation Bearings	 No non-recovered errors at max. 200 g (1960 m/s^2 0-peak) and 2 ms duration No non-recovered errors at max. 15 g (147 m/s^2 0-peak) and 11 ms duration No damage at max. 980 g (9800 m/s^2 0-peak) and 1 ms duration No damage at max. 120 g (1176 m/s^2 0-peak) and 11 ms duration
Altitude Operation Bearings	 - 300 to 3048 meters - 300 to 12192 meters

Table 85: Technical data - add-on hard disk - 5AC600.HDDI-02 (Forts.)

1) Manufacturer specification at + 40°C ambient temperature.

2) Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

3) Standard operation means 333 POH (power-on hours) per month.

4) 24-hour operation means 732 POH (power-on hours) per month.

Temperature humidity diagram

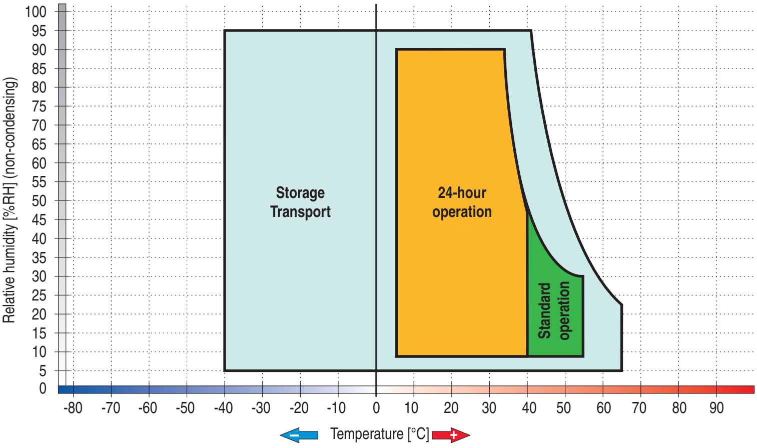


Figure 69: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-02

3.7.4 Add-on hard disk 60 GB 24x7 - 5AC600.HDDI-03

This hard disk is specified for 24-hour operation (24x7). The add-on drive is referred to internally as the primary slave drive.

Information:

Add-on drives are only available factory-installed. Therefore, they need to be requested when placing an order.

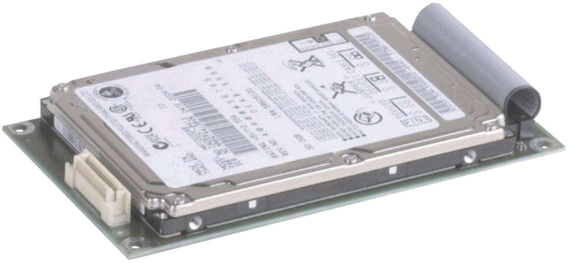


Figure 70: Add-on hard disk 60 GB - 5AC600.HDDI-03

Technical data

Information:

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

Features	5AC600.HDDI-03
Manufacturer's product ID	Hitachi HTE721060G9AT00
Formatted capacity	60 GB
Number of heads	3
Number of sectors (user)	117,210,240
Bytes per sector	512
Revolution speed	7200 rpm ±1%
Access time (average)	10 ms

Table 86: Technical data - add-on hard disk - 5AC600.HDDI-03

Features	5AC600.HDDI-03
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	 1 ms 10 ms 16 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Interface	ATA-6
Data transfer rate On the medium To/from host	 267 to 629 MBit/s Max. 100 MB/s (ultra-DMA mode 5)
Cache	8 MB
Electrical characteristics	
Lifespan	5 years or 30,000 POH (Power-On Hours)
MTBF	550,000 hours1)
Mechanical characteristics	
Add-on mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature2) Operation - standard 3) Operation - 24-hour4) Bearings Transport	 +5 to +55°C +5 to +40°C -40 to +65°C -40 to +65°C
Relative humidity Operation Bearings Transport	 8 to 90%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings	 5 - 500 Hz: 1 g (9.8 m/s^2 0-peak) duration 1 octave per minute; no non-recovered errors 10 - 500 Hz: 5 g (49 m/s^2 0-peak) duration 0.5 oct./min.; no damage
Shock (pulse with a sine half-wave) Operation Bearings	 No non-recovered errors at max. 160 g (1568 m/s^2 0-peak) and 1 ms duration No non-recovered errors at max. 300 g (2900 m/s^2 0-peak) and 2 ms duration No non-recovered errors at max. 15 g (147 m/s^2 0-peak) and 11 ms duration No damage at max. 1000 g (9800 m/s^2 0-peak) and 1 ms duration No damage at max. 120 g (1176 m/s^2 0-peak) and 11 ms duration
Altitude Operation Bearings	 - 300 to 3048 meters - 300 to 12192 meters

Table 86: Technical data - add-on hard disk - 5AC600.HDDI-03 (Forts.)

1) Manufacturer specification at + 40°C ambient temperature.

2) Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

3) Standard operation means 333 POH (power-on hours) per month.

4) 24-hour operation means 732 POH (power-on hours) per month.

Temperature humidity diagram

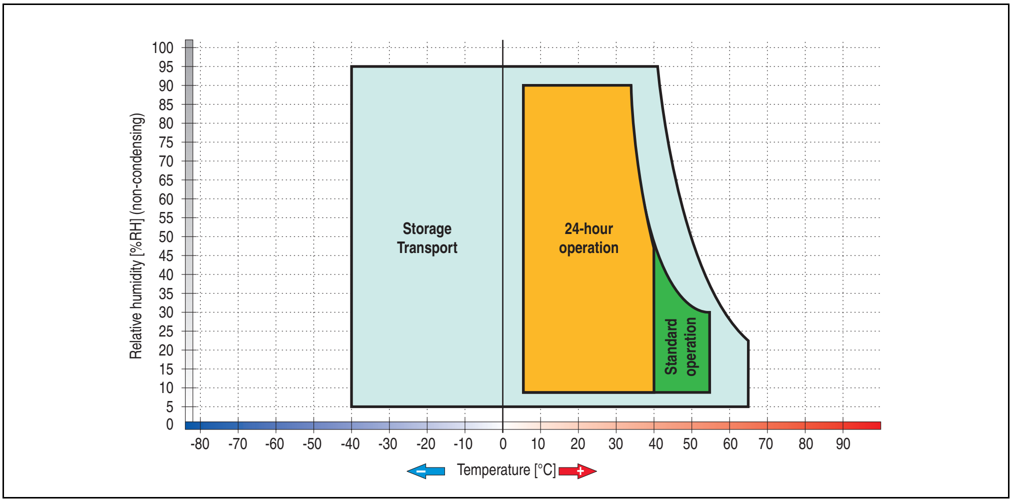


Figure 71: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-03

3.7.5 Add-on hard disk 80 GB 24x7 - 5AC600.HDDI-04

This hard disk is specified for 24-hour operation (24x7). The add-on drive is referred to internally as the primary slave drive.

Information:

Add-on drives are only available factory-installed. Therefore, they need to be requested when placing an order.

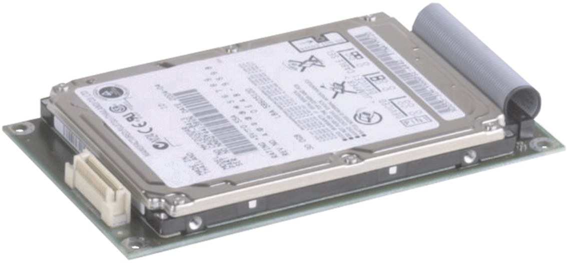


Figure 72: Add-on hard disk 80 GB - 5AC600.HDDI-04

Technical data

Information:

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

Features	5AC600.HDDI-04
Manufacturer's product ID	Hitachi HTE721080G9AT00
Formatted capacity	80 GB
Number of heads	4
Number of sectors (user)	156,301,488
Bytes per sector	512
Revolution speed	7200 rpm ±1%
Access time (average)	10 ms

Table 87: Technical data - add-on hard disk - 5AC600.HDDI-04

Features	**5AC600.HDDI-04**
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	 1 ms 10 ms 16 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Interface	ATA-6
Data transfer rate On the medium To/from host	 267 to 629 MBit/s Max. 100 MB/s (ultra-DMA mode 5)
Cache	8 MB
Electrical characteristics	
Lifespan	5 years or 30,000 POH (Power-On Hours)
MTBF	550,000 hours1)
Mechanical characteristics	
Add-on mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature2) Operation - standard 3) Operation - 24-hour4) Bearings Transport	 +5 to +55°C +5 to +40°C -40 to +65°C -40 to +65°C
Relative humidity Operation Bearings Transport	 8 to 90%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings	 5 - 500 Hz: 1 g (9.8 m/s^2 0-peak) duration 1 octave per minute; no non-recovered errors 10 - 500 Hz: 5 g (49 m/s^2 0-peak) duration 0.5 oct./min.; no damage
Shock (pulse with a sine half-wave) Operation Bearings	 No non-recovered errors at max. 160 g (1568 m/s^2 0-peak) and 1 ms duration No non-recovered errors at max. 300 g (2900 m/s^2 0-peak) and 2 ms duration No non-recovered errors at max. 15 g (147 m/s^2 0-peak) and 11 ms duration No damage at max. 1000 g (9800 m/s^2 0-peak) and 1 ms duration No damage at max. 120 g (1176 m/s^2 0-peak) and 11 ms duration
Altitude Operation Bearings	 - 300 to 3048 meters - 300 to 12192 meters

Table 87: Technical data - add-on hard disk - 5AC600.HDDI-04 (Forts.)

1) Manufacturer specification at + 40°C ambient temperature.

2) Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

3) Standard operation means 333 POH (power-on hours) per month.

4) 24-hour operation means 732 POH (power-on hours) per month.

Temperature humidity diagram

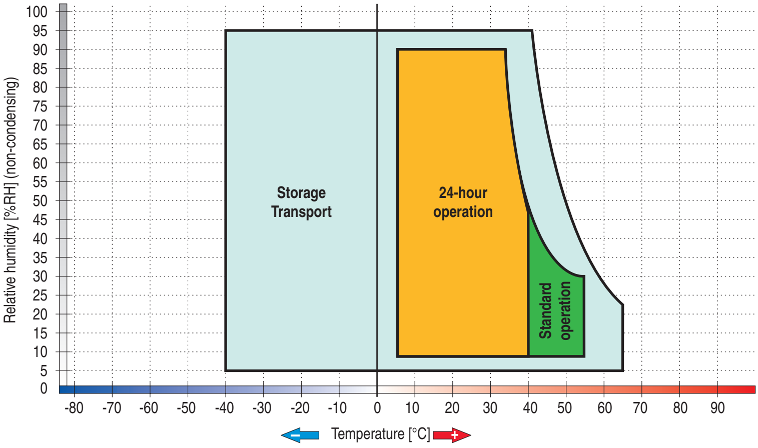


Figure 73: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-04

3.7.6 Add-on hard disk 40 GB 24x7 ET - 5AC600.HDDI-05

This hard disk is specified for 24-hour operation (24x7) and also provides an extended temperature specification (ET). The add-on drive is referred to internally as the primary slave drive.

Information:

Add-on drives are only available factory-installed. Therefore, they need to be requested when placing an order.

Figure 74: Add-on hard disk 40 GB - 5AC600.HDDI-05

Technical data

Information:

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

Features	5AC600.HDDI-05 < Revision D0	5AC600.HDDI-05 Revision D0
Manufacturer's product ID	Seagate ST940813AM	Seagate ST940817AM
Formatted capacity	40 GB	
Number of heads	2	
Number of sectors (user)	78,140,160	
Bytes per sector	512	
Revolution speed	5400 rpm ±1%	
Access time (average)	12.5 ms	

Table 88: Technical data - Add-on hard disk 5AC600.HDDI-05

Features	5AC600.HDDI-05 < Revision D0	5AC600.HDDI-05 Revision D0
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1 ms 12.5 ms 22 ms	
Starting time (0 rpm to read access)	3 seconds (typically)	
Interface	ATA-6	
Data transfer rate On the medium To/from host	Max. 321 MBit/s Max. 100 MB/s (Ultra-DMA Mode 5)	Max. 450 MBit/s Max. 100 MB/s (Ultra-DMA Mode 5)
Cache	8 MB	
S.M.A.R.T. Support	Yes	
MTBF	550,000 hours[1)]	750,000 hours[1)]
Mechanical characteristics		
Add-on mounting	Fixed	
Outer dimensions (without slide-in) Width Length Height	70 mm 100 mm 9.5 mm	
Weight	100 g	
Environmental characteristics		
Ambient temperature[2)] Operation - Standard / 24-hour Bearings Transport	-30 to +85°C -40 to +95°C -40 to +95°C	
Relative humidity Operation Bearings Transport	5 to 90%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing	
Vibration Operation Bearings	10 - 500 Hz: 1 g; no non-recovered errors 5 - 500 Hz: 5 g; no non-recovered errors	5 - 500 Hz: 2 g; no non-recovered errors 5 - 500 Hz: 5 g; no non-recovered errors
Shock (pulse with a sine half-wave) Operation Bearings	Max. 200 g, 2 ms; no non-recovered errors Max. 110 g, 11 ms; no non-recovered errors Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage	Max. 300 g, 2 ms; no non-recovered errors Max. 150 g, 11 ms; no non-recovered errors Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage
Altitude Operation Bearings	- 300 to 4419 meters - 300 to 12192 meters	- 300 to 5000 meters - 300 to 12192 meters

Table 88: Technical data - Add-on hard disk 5AC600.HDDI-05 (Forts.)

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.

Temperature humidity diagram

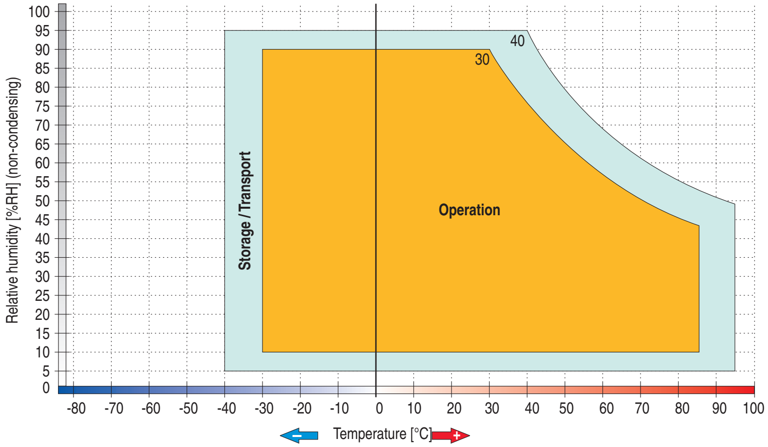


Figure 75: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-05

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.

3.7.7 Add-on hard disk 80 GB 24x7 ET - 5AC600.HDDI-06

This hard disk is specified for 24-hour operation (24x7) and also provides an extended temperature specification (ET). The add-on drive is referred to internally as the primary slave drive.

Information:

Add-on drives are only available factory-installed. Therefore, they need to be requested when placing an order.

Figure 76: Add-on hard disk 80 GB - 5AC600.HDDI-06

Technical data

Information:

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

Features	5AC600.HDDI-06
Manufacturer's product ID	Seagate ST980817AM
Formatted capacity	80 GB
Number of heads	2
Number of sectors (user)	156,301,488
Bytes per sector	512
Revolution speed	5400 rpm ±1%
Access time (average)	10 ms

Table 89: Technical data - add-on hard disk - 5AC600.HDDI-06

Features	5AC600.HDDI-06
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	 1 ms 12.5 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Interface	ATA-6
Data transfer rate On the medium To/from host	 Max. 450 MBit/s Max. 100 MB/s (Ultra-DMA Mode 5)
S.M.A.R.T. Support	Yes
Cache	8 MB
MTBF	750,000 hours1)
Mechanical characteristics	
Add-on mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature2) Operation - Standard / 24-hour Bearings Transport	 -30 to +85°C -40 to +95°C -40 to +95°C
Relative humidity Operation Bearings Transport	 5 to 90%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings	 5 - 500 Hz: 2 g; no non-recovered errors 5 - 500 Hz: 5 g; no non-recovered errors
Shock (pulse with a sine half-wave) Operation Bearings	 Max. 300 g, 2 ms; no non-recovered errors Max. 150 g, 11 ms; no non-recovered errors Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage
Altitude Operation Bearings	 - 300 to 5000 meters - 300 to 12192 meters

Table 89: Technical data - add-on hard disk - 5AC600.HDDI-06 (Forts.)

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.

Temperature humidity diagram

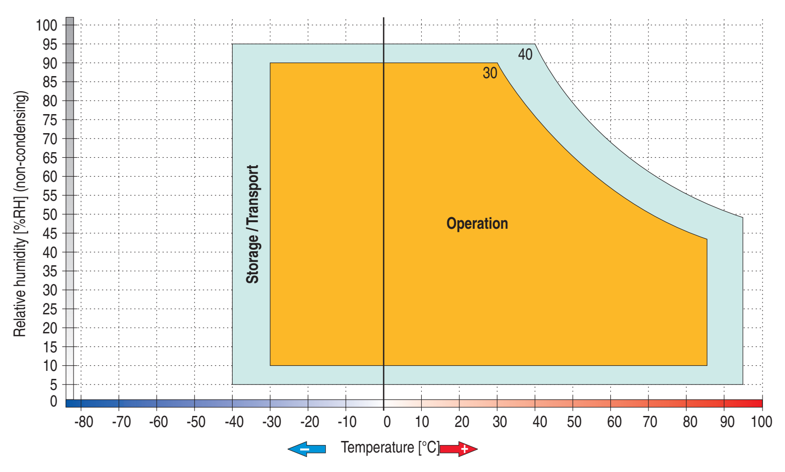


Figure 77: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-06

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.

3.7.8 Add-on CompactFlash slot - 5AC600.CFSI-00

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

Information:

Add-on drives are only available factory-installed. Therefore, they need to be requested when placing an order.

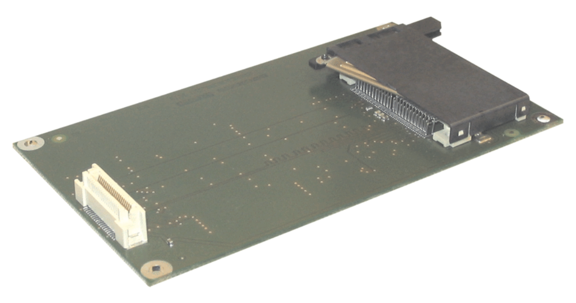


Figure 78: Add-on CompactFlash slot - 5AC600.CFSI-00

Technical data

Features	5AC600.CFSI-00
CompactFlash	
Type	Type I
Amount	1 slot
Connection	Primary slave
Weight	100 g

Table 90: Technical data - Add-on CompactFlash slot 5AC600.CFSI-00

Warning!

Inserting and removing the CompactFlash card can only take place without power applied!

3.7.9 Slide-in CD-ROM - 5AC600.CDXS-00

The slide-in drive can be used in system units with 2, 3 or 5 PCI slots. When inserted in slide-in slot 1 it is referred to internally as "secondary slave" and when in slide-in slot 2 as "secondary master."

Information:

It is possible to add or remove a slide-in drive at any time.

Caution!

Turn off power before adding or removing a slide-in drive.

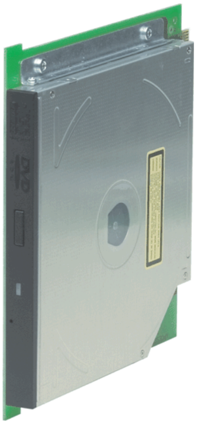


Figure 79: Slide-in CD-ROM - 5AC600.CDXS-00

Technical data

Information:

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

Features	**5AC600.CDXS-00**
Reading rate	24x
Data transfer rate	Max. 33.3 MB/s
Access time (average)	115 ms
Revolution speed	Max. 5136 rpm ±1%
Starting time (0 rpm to read access)	10 seconds (maximum)
Host interface	IDE (ATAPI)
Readable CD media	CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session) Enhanced CD
Cache	128 kB
Noise level (complete read access)	Approx. 45 dBA at 50 cm
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10,000 times
Environmental characteristics	
Ambient temperature[1] Operation Bearings Transport	 -5 to +60°C[2] -20 to +60°C -40 to +65°C
Relative humidity Operation Bearings Transport	 8 to 80%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings Transport	 At max. 5 - 500 Hz and 0.3 g At max. 5 - 500 Hz and 2 g At max. 5 - 500 Hz and 5 g
Shock (pulse with a sine half-wave) Operation Bearings Transport	 At max. 7 g for 11 ms At max. 60 g for 11 ms At max. 200 g for 2 ms At max. 60 g for 11 ms At max. 200 g for 2 ms

Table 91: Technical data - Slide-in CD-ROM 5AC600.CDXS-00

1) Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

2) Drive surface temperature

Temperature humidity diagram

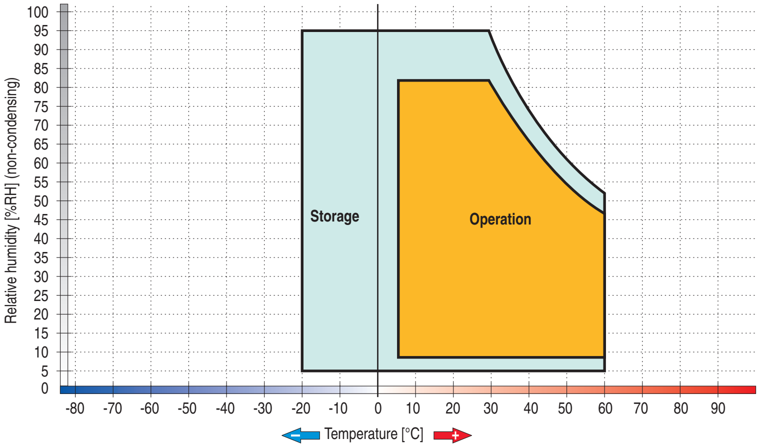


Figure 80: Temperature humidity diagram - Slide-in CD-ROM 5AC600.CDXS-00

3.7.10 Slide-in DVD-ROM/CD-RW - 5AC600.DVDS-00

The slide-in drive can be used in system units with 2, 3 or 5 PCI slots. When inserted in slide-in slot 1 it is referred to internally as "secondary slave" and when in slide-in slot 2 as "secondary master."

Information:

It is possible to add or remove a slide-in drive at any time.

Caution!

Turn off power before adding or removing a slide-in drive.

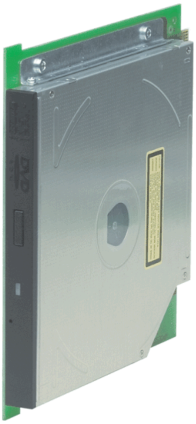


Figure 81: Slide-in DVD-ROM/CD-RW - 5AC600.DVDS-00

Technical data

Information:

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

Features	5AC600.DVDS-00
Write speed CD-R CD-RW	 24x, 16x, 10x and 4x 10x and 4x
Reading rate CD DVD	 24x 8x
Data transfer rate	Max. 33.3 MB/s
Access time (average) CD DVD	 85 ms 110 ms
Revolution speed	Max. 5136 rpm ±1%
Starting time (0 rpm to read access)	19 seconds (maximum)
Host interface	IDE (ATAPI)
Readable media CD DVD	 CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW DVD-ROM, DVD-R, DVD-RW, DVD-RAM
Non-write protected media CD	 CD-R, CD-RW
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session) Enhanced CD, CD text DVD-ROM, DVD-R, DVD-Video (double layer) DVD-RAM (4.7 GB, 2.6 GB)
Write-methods	Disk at once, session at once, packet write, track at once
Laser class	Class 1 laser
Data buffer capacity	2 MB
Noise level (complete read access)	Approx. 45 dBA at 50 cm
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10,000 times
Environmental characteristics	
Ambient temperature[1)] Operation Bearings Transport	 +5 to +50°C[2)] -20 to +60°C -40 to +65°C
Relative humidity Operation Bearings Transport	 8 to 80%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings Transport	 At max. 5 - 500 Hz and 0.2 g At max. 5 - 500 Hz and 2 g At max. 5 - 500 Hz and 2 g

Table 92: Technical data - Slide-in DVD-ROM/CD-RW 5AC600.DVDS-00

Features	5AC600.DVDS-00
Shock (pulse with a sine half-wave)	
Operation	At max. 5 g for 11 ms
Bearings	At max. 60 g for 11 ms At max. 200 g for 2 ms
Transport	At max. 60 g for 11 ms At max. 200 g for 2 ms

Table 92: Technical data - Slide-in DVD-ROM/CD-RW 5AC600.DVDS-00 (Forts.)

1) Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

2) Drive surface temperature

Temperature humidity diagram

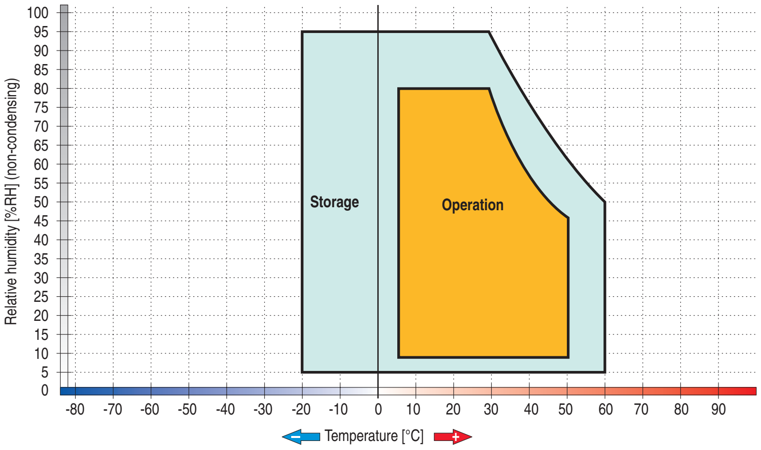


Figure 82: Temperature humidity diagram - Slide-in DVD-ROM/CD-RW 5AC600.DVDS-00

3.7.11 Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00

The slide-in drive can be used in system units with 2, 3 or 5 PCI slots. When inserted in slide-in slot 1 it is referred to internally as "secondary slave" and when in slide-in slot 2 as "secondary master."

Information:

It is possible to add or remove a slide-in drive at any time.

Caution!

Turn off power before adding or removing a slide-in drive.

Figure 83: Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00

Technical data - Revision D0 and higher

Information:

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

Features	5AC600.DVRS-00 revision D0 and higher
Write speed CD-R CD-RW DVD-R DVD-RW DVD-RAM[1)] DVD+R DVD+R (double layer) DVD+RW	 24x, 16x, 10x and 4x 10x and 4x 8x, 4x and 2x 4x and 2x 3x and 2x 8x, 4x and 2x 2x,4x 4x and 2x
Reading rate CD DVD	 24x 8x
Data transfer rate	Max. 33.3 MB/s
Access time (average) CD DVD	 130 ms (24x) 130 ms (8x)
Revolution speed	Max. 5090 rpm ±1%
Starting time (0 rpm to read access) CD DVD	 14 seconds (maximum) 15 seconds (maximum)
Host interface	IDE (ATAPI)
Readable media CD DVD	 CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW DVD-ROM, DVD-R, DVD-RW. DVD-RAM, DVD+R, DVD+R (double layer), DVD+RW
Non-write protected media CD DVD	 CD-R, CD-RW DVD-R/RW, DVD-RAM (4.7 GB), DVD+R/RW, DVD+R (double layer)
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session), Enhanced CD, CD text DVD-ROM, DVD-R, DVD-RW, DVD-Video DVD-RAM (4.7 GB, 2.6 GB) DVD+R, DVD+R (double layer), DVD+RW
Write-methods CD DVD	 Disk at once, session at once, packet write, track at once Disk at once, incremental, over-write, sequential, multi-session
Laser class	Class 1 laser
Data buffer capacity	8 MB
Noise level (complete read access)	Approx. 48 dBA at 50 cm
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10,000 times
Environmental characteristics	
Ambient temperature[2)] Operation Bearings Transport	 +5 to +55°C[3)] -20 to +60°C -40 to +65°C

Table 93: Technical data - slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 revision D0 and higher

Features	5AC600.DVRS-00 revision D0 and higher
Relative humidity Operation Bearings Transport	 8 to 80%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings Transport	 At max. 5 - 500 Hz and 0.2 g At max. 5 - 500 Hz and 2 g At max. 5 - 500 Hz and 2 g
Shock (pulse with a sine half-wave) Operation Bearings Transport	 At max. 5 g for 11 ms At max. 60 g for 11 ms At max. 200 g for 2 ms At max. 60 g for 11 ms At max. 200 g for 2 ms

Table 93: Technical data - slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 revision D0 and higher (Forts.)

1) RAM drivers are not provided by the manufacturer. Support of RAM function by the burning software "Nero" (model number 5SWUTI.0000-00) or other burning software packages and drivers from third party providers.

2) Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

3) Drive surface temperature

Technical data - revision D0 or lower

Features	5AC600.DVRS-00 revision D0 and lower
Write speed CD-R CD-RW DVD-R DVD-RW DVD+R DVD+RW	 24x, 16x, 10x and 4x 10x and 4x 8x, 4x and 2x 4x and 2x 8x, 4x and 2x 4x and 2x
Reading rate CD DVD	 24x 8x
Data transfer rate	Max. 33.3 MB/s
Access time (average) CD DVD	 130 ms (24x) 130 ms (8x)
Revolution speed	Max. 5090 rpm ±1%
Starting time (0 rpm to read access) CD DVD	 14 seconds (maximum) 15 seconds (maximum)
Host interface	IDE (ATAPI)
Readable media CD DVD	 CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW DVD-ROM, DVD-R, DVD-RW

Table 94: Technical data - slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 revision D0 and lower

Features	5AC600.DVRS-00 revision D0 and lower
Non-write protected media CD DVD	 CD-R, CD-RW DVD-R/RW, DVD+R/RW
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session) Enhanced CD, CD text DVD-ROM, DVD-R, DVD-Video (double layer), DVD-RW DVD+R, DVD+R (double layer), DVD+RW
Write-methods CD DVD	 Disk at once, session at once, packet write, track at once Disk at once, incremental, over-write, sequential, multi-session
Laser class	Class 1 laser
Data buffer capacity	8 MB
Noise level (complete read access)	Approx. 48 dBA at 50 cm
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10,000 times
Environmental characteristics	
Ambient temperature[1] Operation Bearings Transport	 +5 to +55°C[2] -20 to +60°C -40 to +65°C
Relative humidity Operation Bearings Transport	 8 to 80%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings Transport	 At max. 5 - 500 Hz and 0.2 g At max. 5 - 500 Hz and 2 g At max. 5 - 500 Hz and 2 g
Shock (pulse with a sine half-wave) Operation Bearings Transport	 At max. 5 g for 11 ms At max. 60 g for 11 ms At max. 200 g for 2 ms At max. 60 g for 11 ms At max. 200 g for 2 ms

Table 94: Technical data - slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 revision D0 and lower (Forts.)

[1] Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

[2] Drive surface temperature

Temperature humidity diagram

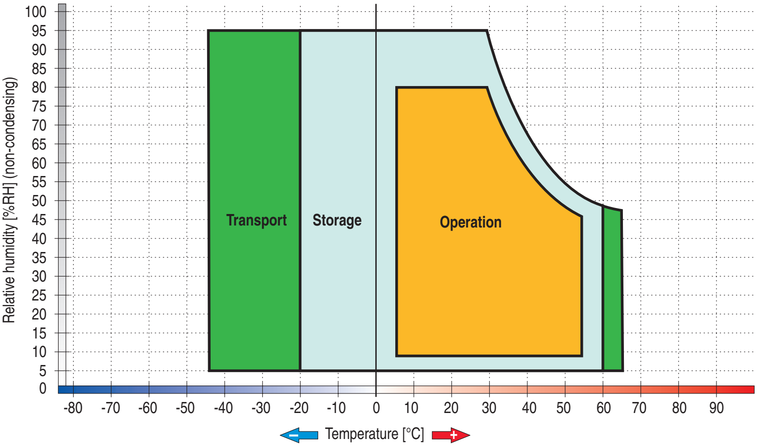


Figure 84: Temperature humidity diagram - Slide-in DVD-R/RW, DVD+R/RW 5AC600.DVRS-00

3.7.12 Slide-in CF 2 slot - 5AC600.CFSS-00

The slide-in drive can be used in system units with 2, 3 or 5 PCI slots. When inserted in slide-in slot 1, the CompactFlash slot CF3 is referred to internally as "secondary slave" and when in slide-in slot 2 as "secondary master." CompactFlash slot CF4 is always accessed via USB.

Information:

- **It is possible to add or remove a slide-in drive at any time.**
- **In system units with 5 PCI slots, the slide-in USB FDD drive (5AC600.FDDS-00) must be inserted in slide-in slot 1.**
  The double CompactFlash slide-in drive (5AC600.CFSS-00) should only be used in slide-in slot 2.

Caution!

Turn off power before adding or removing a slide-in drive.

Warning!

The CompactFlash card can only be inserted in and removed from the CF3 IDE CompactFlash slot can only take place without power applied to the APC620!

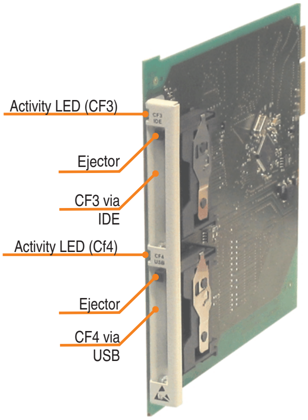


Figure 85: Slide-in CF 2-slot - 5AC600.CFSS-00

Technical data

Features	5AC600.CFSS-00
CompactFlash (CF3)	
Type	Type I and II
Amount	1 slot
Connection	IDE - Secondary slave in slide-in slot 1 IDE - Secondary master in slide-in slot 2
Activity LED	Yes
CompactFlash (CF4)	
Type	Type I and II
Amount	1 slot
Connection	Via USB 2.0
Activity LED	Yes

Table 95: Technical data - Slide-in CF slot 2 - 5AC600.CFSS-00

3.7.13 Slide-in USB FDD - 5AC600.FDDS-00

The slide-in drive can be used in system units with 2, 3 or 5 PCI slots. In these units it is connected to the system via USB.

Information:

- **It is possible to add, remove, or modify the slide-in drive at any time.**
- **In system units with 5 PCI slots, the slide-in USB FDD drive must be inserted in slide-in slot 1 for mechanical reasons.**

Caution!

Turn off power before adding or removing a slide-in drive.

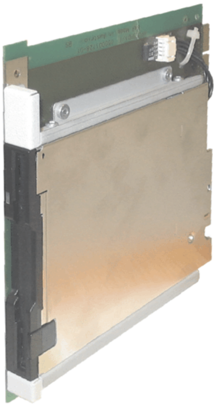


Figure 86: Slide-in USB FDD - 5AC600.FDDS-00

Technical data

Information:

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

Features	**5AC600.FDDS-00**
Data capacity	720 KB / 1.25 MB / 1.44 MB (formatted)
USB transfer rate	Full speed (12 Mbps)
Data transfer rate	250 kbits (720 KB) or 500 kbits (1.25 MB and 1.44 MB)
Rotation speed	Up to 360 rpm
Diskette media	High density (2HD) or normal density (2DD) 3.5" diskettes
MTBF	30,000 POH (Power-On Hours)
Environmental characteristics	
Ambient temperature[1] Operation Bearings Transport	 +4 to +50°C -20 to +60°C -20 to +60°C
Relative humidity Operation Bearings Transport	 20 to 80%, non-condensing 5 to 90%, non-condensing 5 to 90%, non-condensing
Vibration Operation Bearings Transport	 At max. 5 - 500 Hz and 0.3 g At max. 10 - 100 Hz and 2 g At max. 10 - 100 Hz and 2 g
Shock (pulse with a sine half-wave) Operation Bearings Transport	 At max. 5 g for 11 ms At max. 60 g for 11 ms At max. 60 g for 11 ms
Altitude	Max. 3000 meters

Table 96: Technical data - Slide-in USB diskette drive - 5AC600.FDDS-00

1) Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

Temperature humidity diagram

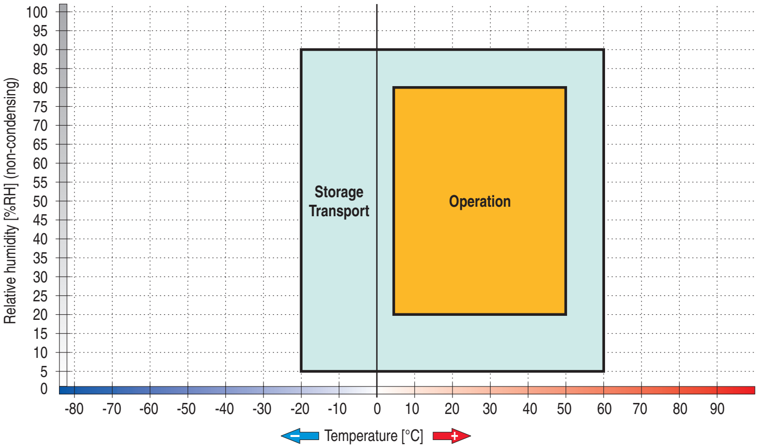


Figure 87: Temperature humidity diagram - Slide-in USB diskette drive 5AC600.FDDS-00

3.7.14 Slide-in hard disk 30 GB 24x7 - 5AC600.HDDS-00

This hard disk is specified for 24-hour operation (24x7). The slide-in drive can be used in system units with 2, 3 or 5 PCI slots. When inserted in slide-in slot 1 it is referred to internally as "secondary slave" and when in slide-in slot 2 as "secondary master."

Information:

It is possible to add or remove a slide-in drive at any time.

Caution!

Turn off power before adding or removing a slide-in drive.

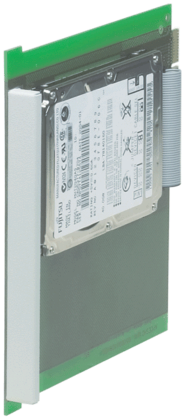


Figure 88: Slide-in hard disk 30 GB - 5AC600.HDDS-00

Technical data

Information:

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

Features	5AC600.HDDS-00
Manufacturer's product ID	Fujitsu MHT2030AR
Formatted capacity	30 GB
Number of heads	2
Number of sectors (user)	58,605,120
Bytes per sector	512
Revolution speed	4200 rpm ±1%
Access time (average)	7.14 ms
Positioning time (seek, typical values)	
Minimum (track to track)	1.5 ms
Average (read access)	12 ms
Maximum	22 ms
Starting time (0 rpm to read access)	5 seconds (typically)
Interface	ATA-6
Data transfer rate	
On the medium	26.1 to 36.2 MB/s
To/from host	Max. 100 MB/s (ultra-DMA mode 5)
Cache	2 MB
Noise level (idle mode)	Approx. 24 dBA at 30 cm
Electrical characteristics	
Lifespan	5 years or 20,000 POH (Power-On Hours)
MTBF	300,000 hours
Mechanical characteristics	
Slide-in mounting	Fixed
Outer dimensions (without slide-in)	
Width	70 mm
Length	100 mm
Height	9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature1)	
Operation - standard 2)	+5 to +55°C
Operation - 24-hour 3)	+5 to +44°C
Bearings	-40 to +60°C
Transport	-40 to +60°C
Relative humidity	
Operation	8 to 90%, non-condensing
Bearings	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration	
Operation	No non-recovered errors at max. 5 - 500 Hz and 1 g (9.8 m/s^2 0-peak)
Bearings	No damage at max. 5 - 500 Hz and 5 g (49 m/s ^{2} 0-peak)

Table 97: Technical data - Slide-in hard disk - 5AC600.HDDS-00

Environmental characteristics	5AC600.HDDS-00
Shock (pulse with a sine half-wave) Operation Bearings	No non-recovered errors at max. 225 g (2207 m/s^2 0-peak) and 2 ms duration No damage at max. 900 g (8820 m/s^2 0-peak) and 1 ms duration No damage at max. 120 g (1176 m/s^2 0-peak) and 11 ms duration
Altitude Operation Bearings	- 300 to 3000 meters - 300 to 12000 meters

Table 97: Technical data - Slide-in hard disk - 5AC600.HDDS-00 (Forts.)

1) Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

2) Standard operation means 250 POH (power-on hours) per month.

3) 24-hour operation means 732 POH (power-on hours) per month.

Temperature humidity diagram

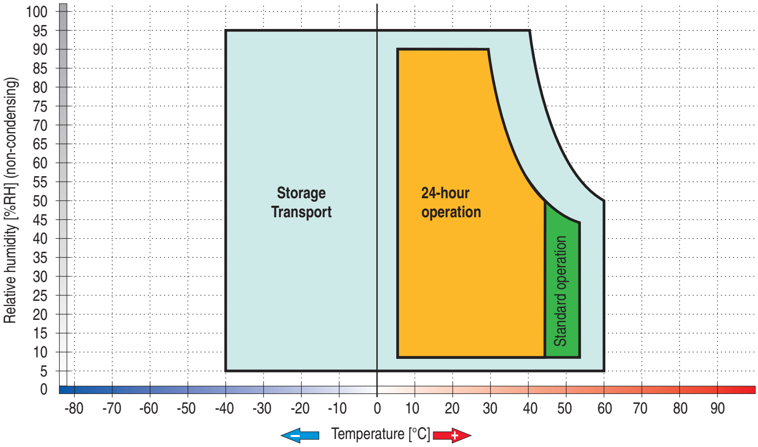


Figure 89: Temperature humidity diagram - Slide-in hard disk 5AC600.HDDS-00

3.7.15 Slide-in hard disk 20 GB ET - 5AC600.HDDS-01

This hard disk has an extended temperature specification (ET), but is not permitted for 24 hour operation. The slide-in drive can be used in system units with 2, 3 or 5 PCI slots. When inserted in slide-in slot 1 it is referred to internally as "secondary slave" and when in slide-in slot 2 as "secondary master."

Information:

It is possible to add or remove a slide-in drive at any time.

Caution!

Turn off power before adding or removing a slide-in drive.

Figure 90: Slide-in hard disk 20 GB - 5AC600.HDDS-01

Technical data

Information:

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

Features	**5AC600.HDDS-01**
Manufacturer's product ID	Fujitsu MHT2020AC
Formatted capacity	20 GB
Number of heads	2
Number of sectors (user)	39,070,080
Bytes per sector	512
Revolution speed	4200 rpm ±1%
Access time (average)	7.14 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum	 1.5 ms 12 ms 22 ms
Starting time (0 rpm to read access)	5 seconds (typically)
Interface	ATA-6
Data transfer rate On the medium To/from host	 Up to 28.9 MB/s Max. 100 MB/s (ultra-DMA mode 5)
Cache	2 MB
Noise level (idle mode)	Approx. 22 dBA at 30 cm
Electrical characteristics	
Lifespan	5 years or 20,000 POH (Power-On Hours)
MTBF	300,000 hours
Mechanical characteristics	
Slide-in mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature1) Operation2) Bearings Transport	 -20 to +80°C -40 to +85°C -40 to +85°C
Relative humidity Operation Bearings Transport	 8 to 90%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings	 No non-recovered errors at max. 5 - 500 Hz and 1 g (9.8 m/s^2 0-peak) No damage at max. 5 - 500 Hz and 5 g (49 m/s^2 0-peak)
Shock (pulse with a sine half-wave) Operation Bearings	 No non-recovered errors at max. 225 g (2207 m/s^2 0-peak) and 2 ms duration No damage at max. 900 g (8820 m/s^2 0-peak) and 1 ms duration No damage at max. 120 g (1176 m/s^2 0-peak) and 11 ms duration

Table 98: Technical data - Slide-in hard disk - 5AC600.HDDS-01

Features	5AC600.HDDS-01
Altitude Operation Bearings	 - 300 to 3000 meters - 300 to 12000 meters

Table 98: Technical data - Slide-in hard disk - 5AC600.HDDS-01 (Forts.)

1) Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

2) Standard operation means 250 POH (power-on hours) per month.

Temperature humidity diagram

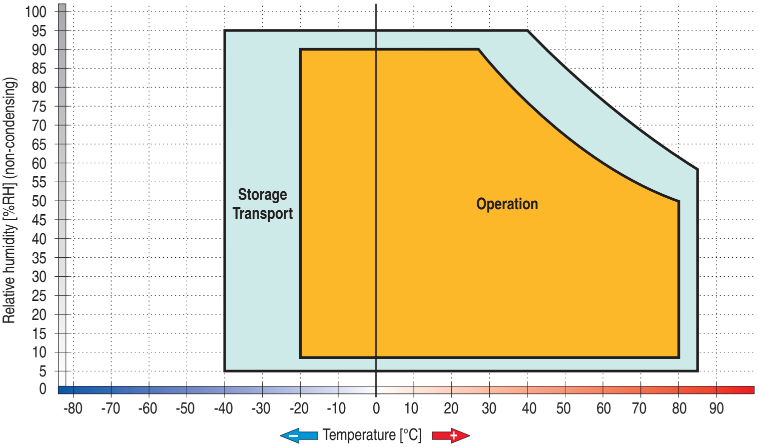


Figure 91: Temperature humidity diagram - Slide-in hard disk 5AC600.HDDS-01

3.7.16 Slide-in hard disk 40 GB ET - 5AC600.HDDS-02

This hard disk is specified for 24-hour operation (24x7) and also provides an extended temperature specification (ET). The slide-in drive can be used in system units with 2, 3 or 5 PCI slots. When inserted in slide-in slot 1 it is referred to internally as "secondary slave" and when in slide-in slot 2 as "secondary master."

Information:

It is possible to add or remove a slide-in drive at any time.

Caution!

Turn off power before adding or removing a slide-in drive.

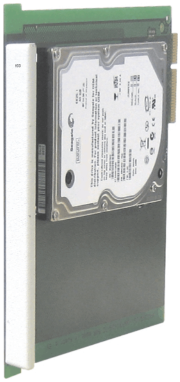


Figure 92: Slide-in hard disk 40 GB - 5AC600.HDDS-02

Technical data

Information:

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

Features	5AC600.HDDS-02 < Revision D0	5AC600.HDDS-02 Revision D0
Manufacturer's product ID	Seagate ST940813AM	Seagate ST940817AM
Formatted capacity	40 GB	
Number of heads	2	
Number of sectors (user)	78,140,160	
Bytes per sector	512	
Revolution speed	5400 rpm ±1%	
Access time (average)	12.5 ms	
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	 1 ms 12.5 ms 22 ms	
Starting time (0 rpm to read access)	3 seconds (typically)	
Interface	ATA-6	
Data transfer rate On the medium To/from host	 Max. 321 MBit/s Max. 100 MB/s (Ultra-DMA Mode 5)	 Max. 450 MBit/s Max. 100 MB/s (Ultra-DMA Mode 5)
Cache	8 MB	
S.M.A.R.T. Support	Yes	
MTBF	550,000 hours[1)]	750,000 hours[1)]
Mechanical characteristics		
Slide-in mounting	Fixed	
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm	
Weight	100 g	
Environmental characteristics		
Ambient temperature[2)] Operation - Standard / 24-hour Bearings Transport	 -30 to +85°C -40 to +95°C -40 to +95°C	

Table 99: Technical data - Slide-in hard disk - 5AC600.HDDS-02

Environmental characteristics	5AC600.HDDS-02 < Revision D0	5AC600.HDDS-02 Revision D0
Relative humidity Operation Bearings Transport	5 to 90%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing	
Vibration Operation Bearings	10 - 500 Hz: 1 g; no non-recovered errors 5 - 500 Hz: 5 g; no non-recovered errors	5 - 500 Hz: 2 g; no non-recovered errors 5 - 500 Hz: 5 g; no non-recovered errors
Shock (pulse with a sine half-wave) Operation Bearings	Max. 200 g, 2 ms; no non-recovered errors Max. 110 g, 11 ms; no non-recovered errors Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage	Max. 300 g, 2 ms; no non-recovered errors Max. 150 g, 11 ms; no non-recovered errors Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage
Altitude Operation Bearings	- 300 to 4419 meters - 300 to 12192 meters	- 300 to 5000 meters - 300 to 12192 meters

Table 99: Technical data - Slide-in hard disk - 5AC600.HDDS-02 (Forts.)

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.

Temperature humidity diagram

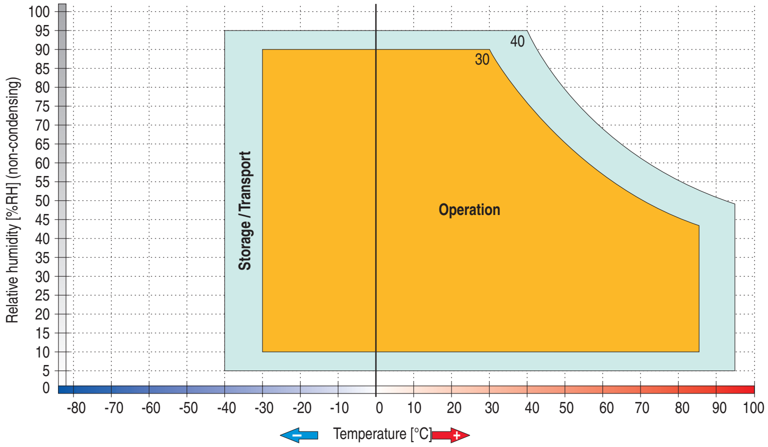


Figure 93: Temperature humidity diagram - Slide-in hard disk 5AC600.HDDS-02

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.

3.8 RAID system

Sometimes it is simply not possible to avoid using hard disks due to the amount of data that needs to be saved. In this case, a RAID provides high system availability. All data is simultaneously and automatically stored on two hard drives. This double data storage means that when one hard disk fails, the system will continue to run on the second hard disk.

Advantages for the user:

- No data loss when hard drive fails.
- The system continues to run with a hard disk.
- Data redundancy is automatically restored by the system when the faulty hard disk has been replaced.

Depending on the type, the RAID 1 system is designed in the form of 1 or 2 PCI cards.

1 PCI slot: PCI SATA RAID controller 5ACPCI.RAIC-01 (2x60GB) or 5ACPCI.RAIC-03 (2x160GB)

2 PCI slot: PCI RAID controller (5ACPCI.RAIC-00) and PCI card with two hard disks (5ACPCI.RAIS-00 or 5ACPCI.RAIS-01)

The system can be flexibly implemented in all APC620 und PPC700s with 1 free PCI slot (depending on the RAID system design). The system also supports RAID 0 applications. As a result, parallel access to two hard drives with a relatively high data throughput is the main focus, in addition to the high availability.

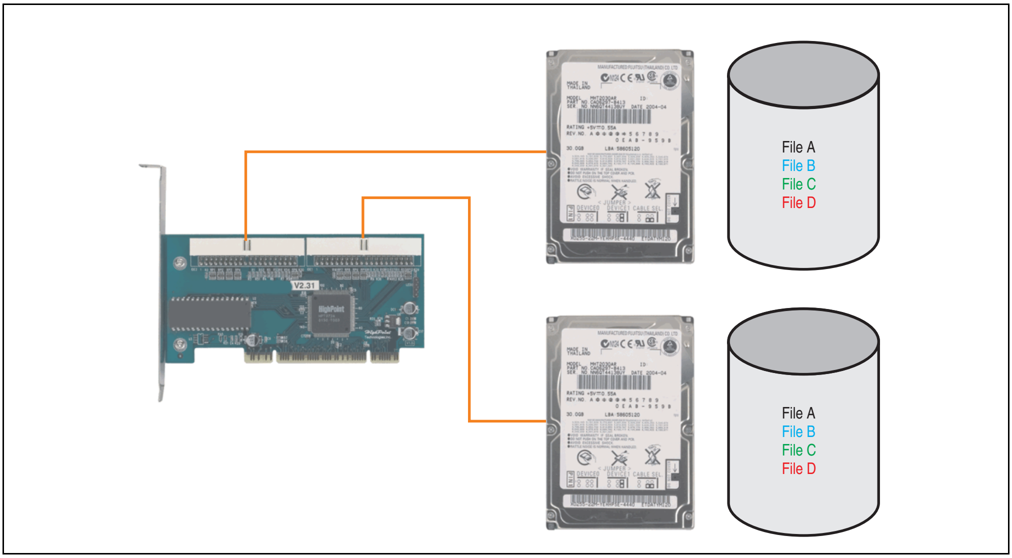


Figure 94: RAID 1 system schematic

3.8.1 PCI RAID Controller ATA/100 - 5ACPCI.RAIC-00

Information:

PCI RAID controllers are only available factory-installed. Therefore, this needs to be requested when placing the order.

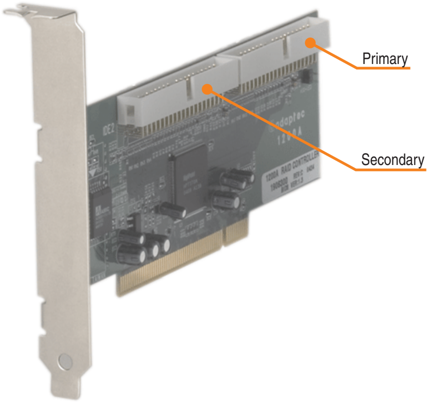


Figure 95: RAID controller - 5ACPCI.RAIC-00

Technical data

Information:

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

Features	**5ACPCI.RAIC-00**
Manufacturer's product ID	Adaptec ATA RAID 1200A
Data transfer rate	up to 100 MB/s per channel
RAID level	Supports RAID 0, 1, 0/1 and JBOD
Internal connections	Two 40-pin connections
Electrical characteristics	
Power consumption	0.15 A at 5 V (PCI bus)

Table 100: Technical data - RAID controller - 5ACPCI.RAIC-00

Mechanical characteristics	5ACPCI.RAIC-00
Outer dimensions Length Height	 168 mm 64 mm
Environmental characteristics	
Ambient temperature Operation Bearings Transport	 0 to +55°C -20 to +60°C -20 to +60°C

Table 100: Technical data - RAID controller - 5ACPCI.RAIC-00 (Forts.)

Driver support

Drivers for the approved operating systems can be downloaded from the download area on the B&R homepage (**www.br-automation.com**).

Information:

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

Contents of delivery

Amount	Component
1	Adaptec ATA RAID 1200A controller
2	ATA RAID connection cable (length 130 mm)

Table 101: Contents of delivery - 5ACPCI.RAIC-00

3.8.2 PCI RAID storage 2 x 40 GB 24x7 - 5ACPCI.RAIS-00

The hard disks that are used are specified for 24-hour operation (24x7).

Information:

PCI RAID storage drives are only available factory-installed. Therefore, this needs to be requested when placing the order.

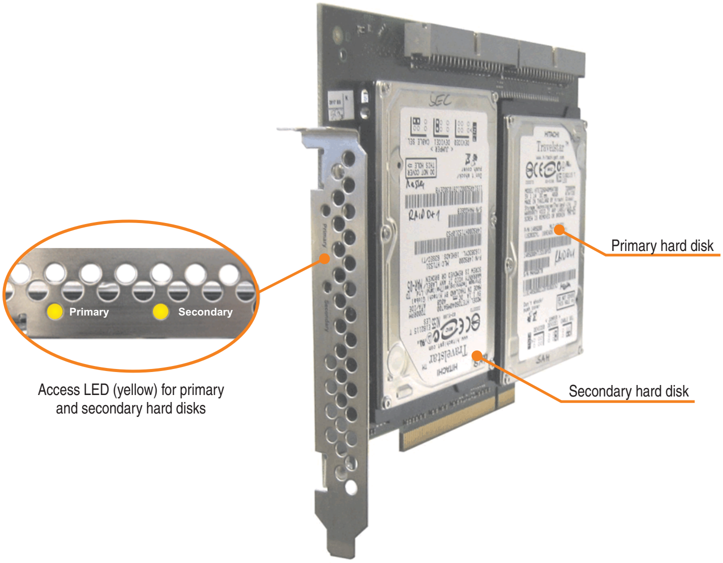


Figure 96: PCI RAID storage - 5ACPCI.RAIS-00

Technical data

Information:

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

Features	5ACPCI.RAIS-00
Manufacturer's product ID	Hitachi Travelstar HTE726040M9AT00
Formatted capacity	40 GB
Number of heads	4
Number of sectors (user)	78,140,160
Bytes per sector	512
Revolution speed	7200 rpm ±1%
Access time (average)	4.2 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	 1 ms 10 ms 16 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Interface	ATA-6
Data transfer rate On the medium To/from host	 236 to 507 MBit/s Max. 100 MB/s (ultra-DMA mode 5)
Cache	8 MB
Electrical characteristics	
Lifespan	5 years or 30,000 POH (Power-On Hours)
MTBF	477,000 hours1)
Mechanical characteristics	
Mounted on PCI insert	Fixed
Outer dimensions (without PCI card) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	350 g
Environmental characteristics	
Ambient temperature2) Operation - standard 3) Operation - 24-hour4) Bearings Transport	 +5 to +55°C +5 to +40°C -40 to +65°C -40 to +65°C

Table 102: Technical data - RAID hard disk - 5ACPCI.RAIS-00

Environmental characteristics	5ACPCI.RAIS-00
Relative humidity Operation Bearings Transport	 8 to 90%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration Operation (continuous) Operation (occasional) Bearings Transport	 No damage at max. 5 - 500 Hz and 0.125 g (1.225 m/s^2 0-peak) duration 1 oct/min No damage at max. 5 - 500 Hz and 0.25 g (2.45 m/s^2 0-peak) duration 1 oct/min No damage at max. 10 - 500 Hz and 5 g (49 m/s^2 0-peak) duration 0.5 oct/min No damage at max. 10 - 500 Hz and 5 g (49 m/s^2 0-peak) duration 0.5 oct/min
Shock (pulse with a sine half-wave) Operation Bearings	 No non-recovered errors at max. 80 g (784 m/s^2 0-peak) and 1 ms duration No non-recovered errors at max. 150 g (1450 m/s^2 0-peak) and 2 ms duration No non-recovered errors at max. 7 g (68 m/s^2 0-peak) and 11 ms duration No damage at max. 500 g (4900 m/s^2 0-peak) and 1 ms duration No damage at max. 60 g (588 m/s^2 0-peak) and 11 ms duration
Altitude Operation Bearings	 - 300 to 3048 meters - 300 to 12192 meters

Table 102: Technical data - RAID hard disk - 5ACPCI.RAIS-00 (Forts.)

1) Manufacturer specification at + 40°C ambient temperature.
2) Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).
3) Standard operation means 333 POH (power-on hours) per month.
4) 24-hour operation means 732 POH (power-on hours) per month.

Temperature humidity diagram

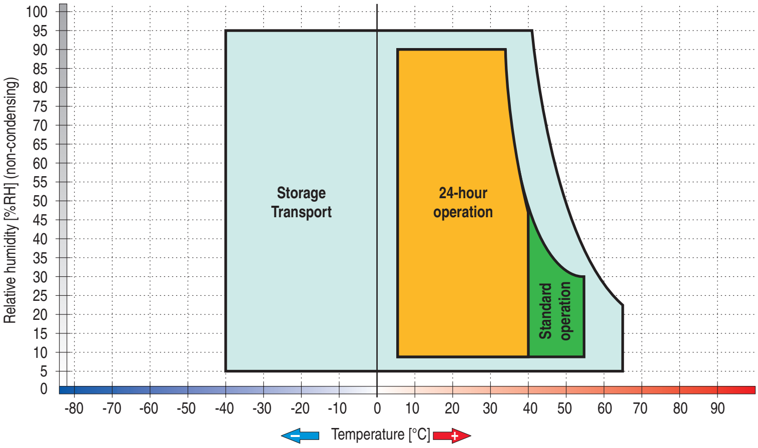


Figure 97: Temperature humidity diagram - RAID hard disk 5ACPCI.RAIS-00

3.8.3 PCI RAID storage 2 x 60 GB 24x7 - 5ACPCI.RAIS-01

The hard disks that are used are specified for 24-hour operation (24x7).

Information:

PCI RAID storage drives are only available factory-installed. Therefore, this needs to be requested when placing the order.

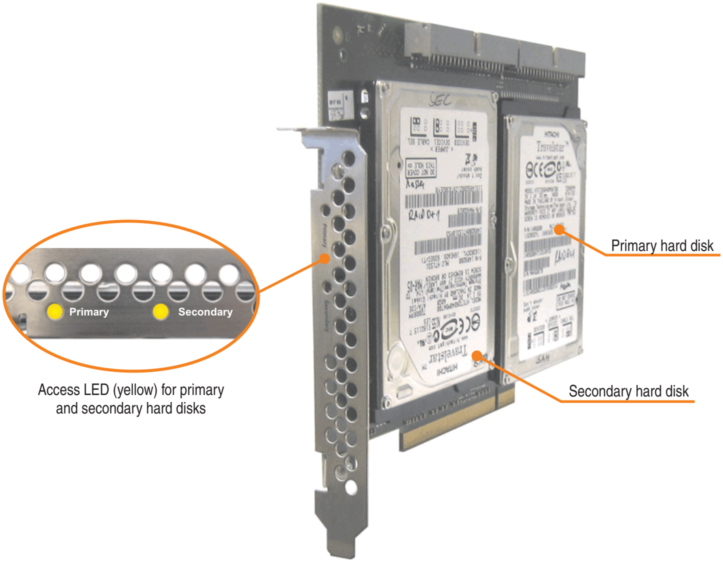


Figure 98: PCI RAID storage - 5ACPCI.RAIS-01

Technical data

Information:

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

Features	**5ACPCI.RAIS-01**
Manufacturer's product ID	Hitachi HTE721060G9AT00
Formatted capacity	60 GB
Number of heads	3
Number of sectors (user)	117,210,240
Bytes per sector	512
Revolution speed	7200 rpm ±1%
Access time (average)	10 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	 1 ms 10 ms 16 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Interface	ATA-6
Data transfer rate On the medium To/from host	 267 to 629 MBit/s Max. 100 MB/s (ultra-DMA mode 5)
Cache	8 MB
Electrical characteristics	
Lifespan	5 years or 30,000 POH (Power-On Hours)
MTBF	550,000 hours[1)]
Mechanical characteristics	
Mounted on PCI insert	Fixed
Outer dimensions (without PCI card) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature[2)] Operation - standard [3)] Operation - 24-hour[4)] Bearings Transport	 +5 to +55°C +5 to +40°C -40 to +65°C -40 to +65°C

Table 103: Technical data - RAID hard disk - 5ACPCI.RAIS-01

Environmental characteristics	5ACPCI.RAIS-01
Relative humidity	
Operation	8 to 90%, non-condensing
Bearings	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration	
Operation (continuous)	No damage at max. 5 - 500 Hz and 0.125 g (1.225 m/s^2 0-peak) duration 1 oct/min
Operation (occasional)	No damage at max. 5 - 500 Hz and 0.25 g (2.45 m/s^2 0-peak) duration 1 oct/min
Bearings	No damage at max. 10 - 500 Hz and 5 g (49 m/s^2 0-peak) duration 0.5 oct/min
Transport	No damage at max. 10 - 500 Hz and 5 g (49 m/s^2 0-peak) duration 0.5 oct/min
Shock (pulse with a sine half-wave)	
Operation	No non-recovered errors at max. 80 g (784 m/s^2 0-peak) and 1 ms duration No non-recovered errors at max. 150 g (1450 m/s^2 0-peak) and 2 ms duration No non-recovered errors at max. 7 g (68 m/s^2 0-peak) and 11 ms duration
Bearings	No damage at max. 500 g (4900 m/s^2 0-peak) and 1 ms duration No damage at max. 60 g (588 m/s^2 0-peak) and 11 ms duration
Altitude	
Operation	- 300 to 3048 meters
Bearings	- 300 to 12192 meters

Table 103: Technical data - RAID hard disk - 5ACPCI.RAIS-01 (Forts.)

1) Manufacturer specification at + 40°C ambient temperature.

2) Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

3) Standard operation means 333 POH (power-on hours) per month.

4) 24-hour operation means 732 POH (power-on hours) per month.

Temperature humidity diagram

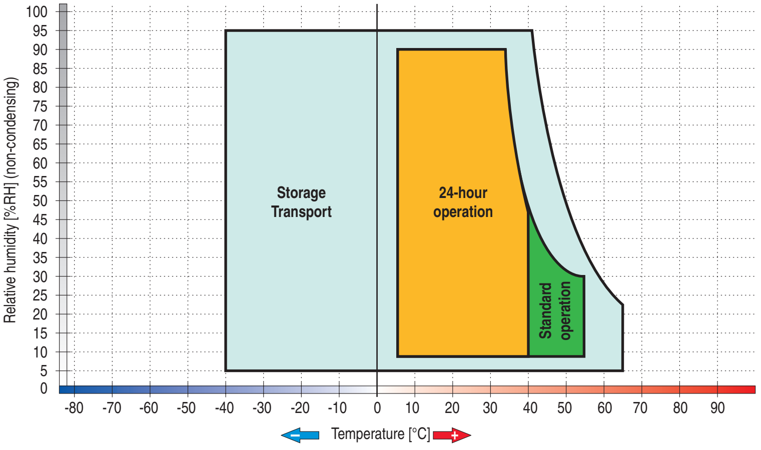


Figure 99: Temperature humidity diagram - RAID hard disk 5ACPCI.RAIS-01

3.8.4 PCI SATA RAID 2 x 60 GB 24x7 - 5ACPCI.RAIC-01

The hard disks that are used are specified for 24-hour operation (24x7).

Features

- SATA RAID controller
- RAID Level 0 (striped) and 1 (mirrored)
- 2 SATA hard disk drives (suitable for 24 hour operation)
- Only requires 1 PCI slot
- Transfer rates up to 150 MB/s

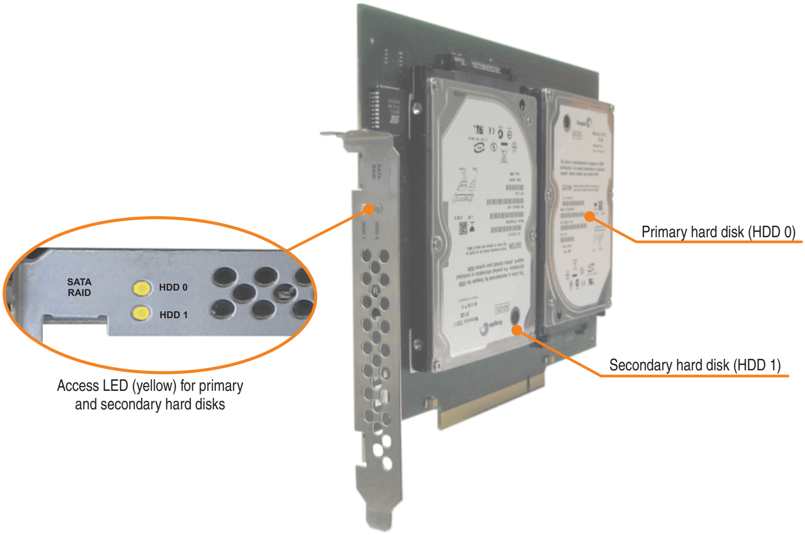

SATA
RAID
HDD 0
HDD 1
Primary hard disk (HDD 0)
Secondary hard disk (HDD 1)
Access LED (yellow) for primary
and secondary hard disks

Figure 100: PCI SATA RAID controller - 5ACPCI.RAIC-01

Information:

The PCI SATA RAID controller can not be used in place of a Universal Power Supply (UPS). If the operating system is shut down improperly, the next time it is started it is detected as an error by the RAID 1, and a complete rebuild is executed. This generally takes at least 50 minutes (configurable) to complete.

Technical data

Information:

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

Features	5ACPCI.RAIC-01
SATA RAID controller Type Specifications Data transfer rate RAID level BIOS Extension ROM - requirements	 Sil 3512 SATA link Serial ATA 1.0 Max. 1.5 GB/s (150 MB/s) Supports RAID 0, 1 ca. 32 KB
Hard disks Amount	Seagate Momentus 7200.1 ST96023AS 2
Formatted capacity (512 bytes/sector)	60 GB
Number of heads	3
Number of sectors (user)	117,210,240
Bytes per sector	512
Revolution speed	7200 rpm ±1%
Access time (average)	4.2 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	 1.5 ms 10.5 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Supported transfer mode	SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5
Data transfer rate On the medium To/from host	 max. 539 MBit/s Max. 150 MB/s
Cache	8 MB
S.M.A.R.T. Support	Yes
Lifespan	5 years
Electrical characteristics	
Power consumption	0.3 A at 3.3 V (PCI bus) 1 A at 5 V (PCI bus)
Mechanical characteristics	
Mounted on PCI insert	Fixed
Weight	350 g

Table 104: Technical data - RAID hard disk - 5ACPCI.RAIC-01

Environmental characteristics	5ACPCI.RAIC-01
Ambient temperature[1]	
Operation - standard [2]	+5 to +55°C
Operation - 24-hour[3]	+5 to +40°C
Bearings	-40 to +70°C
Transport	-40 to +70°C
Relative humidity	
Operation	5 to 90%, non-condensing
Bearings	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration[4]	
Operation (continuous)	No damage at max. 5 - 500 Hz and 0.125 g (1.225 m/s^2 0-peak) duration 1 oct/min
Operation (occasional)	No damage at max. 5 - 500 Hz and 0.25 g (2.45 m/s^2 0-peak) duration 1 oct/min
Bearings	No damage at max. 5 - 500 Hz and 5 g (49 m/s^2 0-peak) duration 0.5 oct/min
Transport	No damage at max. 5 - 500 Hz and 5 g (49 m/s^2 0-peak) duration 0.5 oct/min
Shock [4] (pulse with a sine half-wave)	
Operation	No non-recovered errors at max. 125 g (1226 m/s^2 0-peak) and 2 ms duration
Bearings	No damage at max. 400 g (3924 m/s^2 0-peak) and 2 ms duration No damage at max. 450 g (4424 m/s^2 0-peak) and 1 ms duration No damage at max. 200 g (1962 m/s^2 0-peak) and 0.5 ms duration
Altitude	
Operation	- 300 to 3048 meters
Bearings	- 300 to 12192 meters

Table 104: Technical data - RAID hard disk - 5ACPCI.RAIC-01 (Forts.)

1) 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.

2) Standard operation means 333 POH (power-on hours) per month.

3) 24-hour operation means 732 POH (power-on hours) per month.

4) Operation in areas prone to vibration and shock can affect performance negatively (reduction of transfer rate).

Temperature humidity diagram

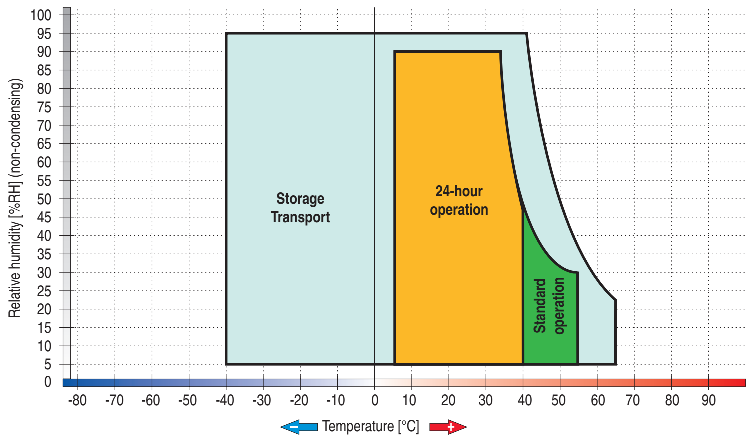


Figure 101: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-01

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.

Driver support

Special drivers are necessary for operating the PCI SATA RAID controller. Drivers for Windows XP Professional, Windows XP Embedded and Windows Embedded Standard 2009 are available for download on the B&R Homepage in the download area (**www.br-automation.com**).

The .NET-based SATARaid™ serial ATA RAID management software can also be found on the B&R homepage.

> ## Information:
>
> **Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.**

Known limitations in a RAID 1 configuration

If one of the two hard disks is physically damaged, when the system is booted the SATA RAID BIOS displays the following error message for approx. 5 seconds: "RAID1 set is in critical status". After this time the operating system is automatically started on the functioning hard disk. The installed SATA Raid™ serial ATA RAID management software does not detect this error status. After repairing the cause of the error (e.g. replacing the hard disk) the SATARaid™ Serial ATA RAID management software automatically executes a rebuild (mirroring of the hard disk). This process takes approximately 50 minutes to complete, regardless of the amount of data and with the highest possible setting for "Rebuild rate".

A hard disk that becomes faulty during operation is detected by the SATA Raid™ Serial ATA RAID management software and indicated with an error message.

Important notes / BIOS Extension ROM

For PCI cards with BIOS Extension ROM, there is a limited area of 64 KB available in the Phoenix BIOS. A B&R PCI SATA RAID controller requires a free area of approx. 32 KB. The remaining area can be used as desired.

If a PCI card requiring BIOS extension ROM is plugged into PCI slot 1 on an AP620 with 5 PCI slots (see figure 102 "PCI slot numbering on APC620 systems with 5 PCI slots") and the B&R PCI SATA RAID controller is plugged-in at a different position (e.g. PCI slot 4), then the BIOS menu item *Advanced* - *PCI/PnP Configuration* - *PCI Device, Slot #2* must be set from "*Option ROM Scan*" to "*Disabled*" so that this device can be used for booting. The BIOS default setting is to always attempt to load the BIOS Extension ROM from the PCI slot 1. Alternatively, the two PCI cards can be switched.

This setting does not have to be changed if a PCI card without BIOS extension ROM is plugged-in.

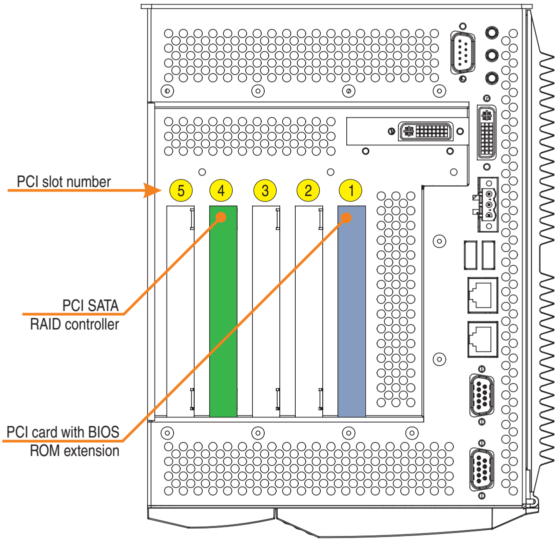


Figure 102: PCI slot numbering on APC620 systems with 5 PCI slots

Configuration of a PCI SATA RAID array

Instructions for configuration of a PCI SATA RAID array using RAID BIOS can be found in chapter 3 "Commissioning", section "Configuration of a SATA RAID array", on page 337.

3.8.5 Replacement SATA HDD 60 GB - 5ACPCI.RAIC-02

The hard disk can be used as a replacement part for 5ACPCI.RAIC-01.

Figure 103: Replacement SATA HDD 60 GB - 5ACPCI.RAIC-02

Technical data

Information:

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

Features	5ACPCI.RAIC-02
Hard disks Amount	Seagate Momentus 7200.1 ST96023AS 1
Formatted capacity (512 bytes/sector)	60 GB
Number of heads	3
Number of sectors (user)	117,210,240
Bytes per sector	512
Revolution speed	7200 rpm ±1%
Access time (average)	4.2 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	 1.5 ms 10.5 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Supported transfer mode	SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5
Data transfer rate On the medium To/from host	 max. 539 MBit/s Max. 150 MB/s

Table 105: Technical data - RAID hard disk - 5ACPCI.RAIC-02

Features	5ACPCI.RAIC-02
Cache	8 MB
S.M.A.R.T. Support	Yes
Lifespan	5 years
Environmental characteristics	
Ambient temperature[1]	
Operation - standard [2]	+5 to +55°C
Operation - 24-hour[3]	+5 to +40°C
Bearings	-40 to +70°C
Transport	-40 to +70°C
Relative humidity	
Operation	5 to 90%, non-condensing
Bearings	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Vibration[4]	
Operation (continuous)	No damage at max. 5 - 500 Hz and 0.125 g (1.225 m/s^2 0-peak) duration 1 oct/min
Operation (occasional)	No damage at max. 5 - 500 Hz and 0.25 g (2.45 m/s^2 0-peak) duration 1 oct/min
Bearings	No damage at max. 5 - 500 Hz and 5 g (49 m/s^2 0-peak) duration 0.5 oct/min
Transport	No damage at max. 5 - 500 Hz and 5 g (49 m/s^2 0-peak) duration 0.5 oct/min
Shock [4] (pulse with a sine half-wave)	
Operation	No non-recovered errors at max. 125 g (1226 m/s^2 0-peak) and 2 ms duration
Bearings	No damage at max. 400 g (3924 m/s^2 0-peak) and 2 ms duration
	No damage at max. 450 g (4424 m/s^2 0-peak) and 1 ms duration
	No damage at max. 200 g (1962 m/s^2 0-peak) and 0.5 ms duration
Altitude	
Operation	- 300 to 3048 meters
Bearings	- 300 to 12192 meters

Table 105: Technical data - RAID hard disk - 5ACPCI.RAIC-02 (Forts.)

1) 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.

2) Standard operation means 333 POH (power-on hours) per month.

3) 24-hour operation means 732 POH (power-on hours) per month.

4) Operation in areas prone to vibration and shock can affect performance negatively (reduction of transfer rate).

Temperature humidity diagram

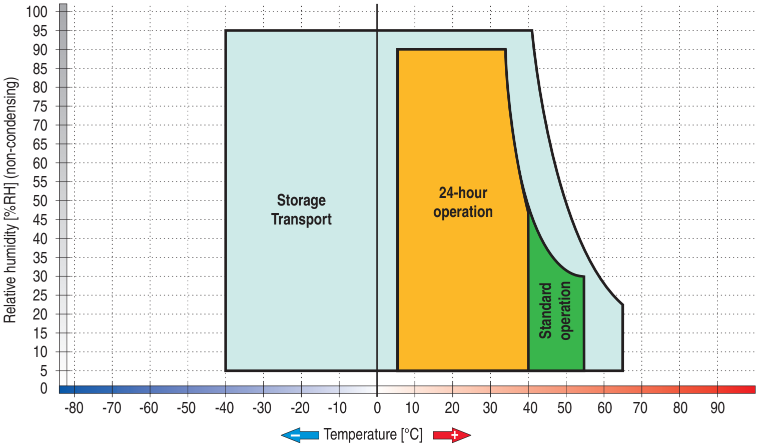


Figure 104: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-02

Exchanging a PCI SATA RAID hard disk

Instructions for exchanging a SATA hard disk can be found in chapter 7 "Maintenance / Servicing", section "Exchanging a PCI SATA RAID hard disk", on page 760.

3.8.6 PCI SATA RAID 2 x 160 GB 24x7 ET - 5ACPCI.RAIC-03

The hard disks being used are specified for 24-hour operation (24x7) and also provides an extended temperature specification (ET).

Features

- SATA RAID controller
- RAID Level 0 (striped) and 1 (mirrored)
- 2 SATA hard disk drives (suitable for 24 hour operation)
- Only requires 1 PCI slot
- Transfer rates up to 150 MB/s

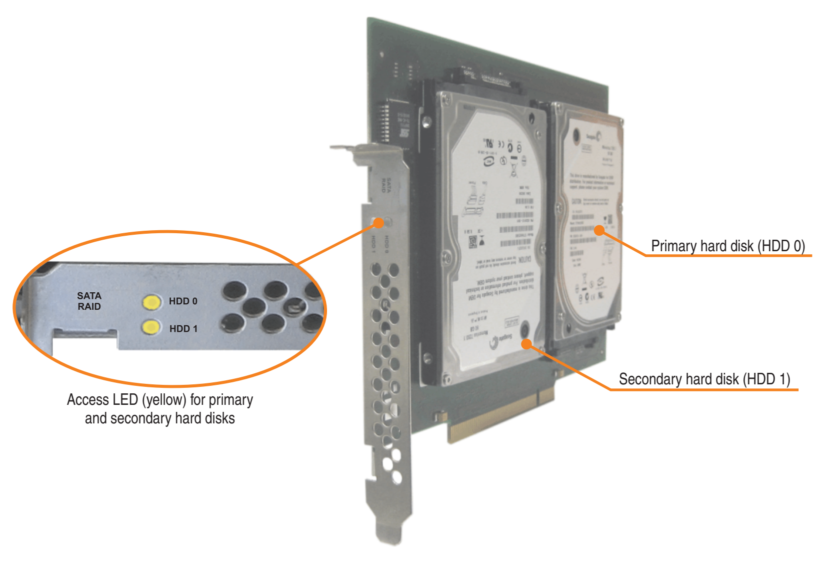

SATA
RAID
HDD 0
HDD 1
Primary hard disk (HDD 0)
Secondary hard disk (HDD 1)
Access LED (yellow) for primary
and secondary hard disks

Figure 105: PCI SATA RAID controller - 5ACPCI.RAIC-03

Information:

The PCI SATA RAID controller can not be used in place of a Universal Power Supply (UPS). If the operating system is shut down improperly, the next time it is started it is detected as an error by the RAID 1, and a complete rebuild is executed. This generally takes at least 50 minutes (configurable) to complete.

Technical data

Information:

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

Features	**5ACPCI.RAIC-03**
SATA RAID controller Type Specifications Data transfer rate RAID level BIOS Extension ROM - requirements	 Sil 3512 SATA link Serial ATA 1.0 Max. 1.5 GB/s (150 MB/s) Supports RAID 0, 1 Approx. 32 KB
Hard disks Amount	Fujitsu M120-ESW MHY2160BH-ESW 2
Formatted capacity (512 bytes/sector)	160 GB
Number of heads	3
Number of sectors (user)	312,581,808
Bytes per sector	512
Revolution speed	5400 rpm ±1%
Access time (average)	5.56 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	 1.5 ms 12 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Supported transfer mode	SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5
Data transfer rate On the medium To/from host	 Max. 84.6 MBit/s Max. 150 MB/s
Cache	8 MB
S.M.A.R.T. Support	Yes
Lifespan	5 years
Electrical characteristics	
Power consumption	0.3 A at 3.3 V (PCI bus) 1 A at 5 V (PCI bus)
Mechanical characteristics	
Mounted on PCI insert	Fixed
Weight	350 g

Table 106: Technical data - RAID hard disk - 5ACPCI.RAIC-03

Environmental characteristics	5ACPCI.RAIC-03
Ambient temperature1)	
Operation - Standard / 24-hour2)	-15 to +80°C
Bearings	-40 to +95°C
Transport	-40 to +95°C
Relative humidity	
Operation	8 to 90% non-condensing (maximum humidity at +29°C)
Bearings	5 to 95% non-condensing (maximum humidity at +40°C)
Transport	5 to 95% non-condensing (maximum humidity at +40°C)
Vibration3)	
Operation (continuous)	5 - 500 Hz: max. 0.125 g; duration 1 octave per minute; no unrecoverable errors
Operation (occasional)	5 - 500 Hz: max. 0.25 g; duration 1 octave per minute; no unrecoverable errors
Bearings	5 - 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage
Transport	5 - 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage
Shock 4) (pulse with a sine half-wave)	
Operation	Max. 125 g, 2 ms; no unrecoverable errors
Bearings	Max. 400 g, 2 ms; no damage Max. 450 g, 1 ms; no damage Max. 200 g, 0.5 ms; no damage
Altitude	
Operation	- 300 to 3048 meters
Bearings	- 300 to 12192 meters

Table 106: Technical data - RAID hard disk - 5ACPCI.RAIC-03 (Forts.)

1) 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.

2) 24-hour operation means 732 POH (power-on hours) per month.

3) Operation in areas prone to vibration and shock can affect performance negatively (reduction of transfer rate).

Temperature humidity diagram

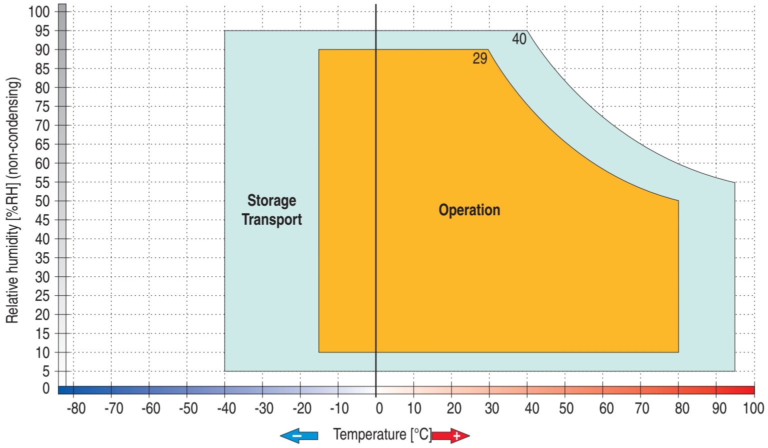


Figure 106: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-03

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.

Driver support

Special drivers are necessary for operating the PCI SATA RAID controller. Drivers for Windows XP Professional, Windows XP Embedded and Windows Embedded Standard 2009 are available for download on the B&R Homepage in the download area (**www.br-automation.com**).

The .NET-based SATARaid™ serial ATA RAID management software can also be found on the B&R homepage.

> ## Information:
>
> **Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.**

Known limitations in a RAID 1 configuration

If one of the two hard disks is physically damaged, when the system is booted the SATA RAID BIOS displays the following error message for approx. 5 seconds: "RAID1 set is in critical status". After this time the operating system is automatically started on the functioning hard disk. The installed SATA Raid™ serial ATA RAID management software does not detect this error status. After repairing the cause of the error (e.g. replacing the hard disk) the SATARaid™ Serial ATA RAID management software automatically executes a rebuild (mirroring of the hard disk). This process takes approximately 50 minutes to complete, regardless of the amount of data and with the highest possible setting for "Rebuild rate".

A hard disk that becomes faulty during operation is detected by the SATA Raid™ Serial ATA RAID management software and indicated with an error message.

Important notes / BIOS Extension ROM

For PCI cards with BIOS Extension ROM, there is a limited area of 64 KB available in the Phoenix BIOS. A B&R PCI SATA RAID controller requires a free area of approx. 32 KB. The remaining area can be used as desired.

If a PCI card requiring BIOS extension ROM is plugged into PCI slot 1 on an AP620 with 5 PCI slots (see figure 102 "PCI slot numbering on APC620 systems with 5 PCI slots") and the B&R PCI SATA RAID controller is plugged-in at a different position (e.g. PCI slot 4), then the BIOS menu item *Advanced* - *PCI/PnP Configuration* - *PCI Device, Slot #2* must be set from "*Option ROM Scan*" to "*Disabled*" so that this device can be used for booting. The BIOS default setting is to always attempt to load the BIOS Extension ROM from the PCI slot 1. Alternatively, the two PCI cards can be switched.

This setting does not have to be changed if a PCI card without BIOS extension ROM is plugged-in.

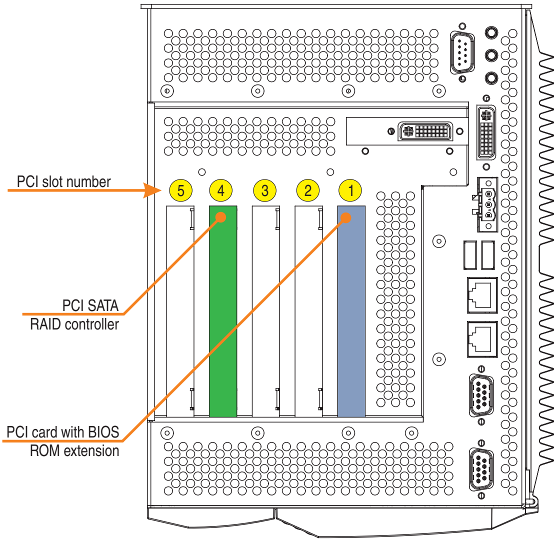


Figure 107: PCI slot numbering on APC620 systems with 5 PCI slots

Configuration of a PCI SATA RAID array

Instructions for configuration of a PCI SATA RAID array using RAID BIOS can be found in chapter 3 "Commissioning", section "Configuration of a SATA RAID array", on page 337.

3.8.7 Replacement SATA HDD 160 GB - 5ACPCI.RAIC-04

The hard disk can be used as a replacement part for 5ACPCI.RAIC-03.

Figure 108: Replacement SATA HDD 160 GB - 5ACPCI.RAIC-04

Technical data

Information:

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

Features	5ACPCI.RAIC-04
Hard disks Amount	Fujitsu M120-ESW MHY2160BH-ESW 1
Formatted capacity (512 bytes/sector)	160 GB
Number of heads	3
Number of sectors (user)	312,581,808
Bytes per sector	512
Revolution speed	5400 rpm ±1%
Access time (average)	5.56 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	 1.5 ms 12 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Supported transfer mode	SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5
Data transfer rate On the medium To/from host	 Max. 84.6 MBit/s Max. 150 MB/s

Table 107: Technical data - RAID hard disk - 5ACPCI.RAIC-04

Features	5ACPCI.RAIC-04
Cache	8 MB
S.M.A.R.T. Support	Yes
Lifespan	5 years
Environmental characteristics	
Ambient temperature[1] Operation - Standard / 24-hour[2] Bearings Transport	 -15 to +80°C -40 to +95°C -40 to +95°C
Relative humidity Operation Bearings Transport	 8 to 90% non-condensing (maximum humidity at +29°C) 5 to 95% non-condensing (maximum humidity at +40°C) 5 to 95% non-condensing (maximum humidity at +40°C)
Vibration[3] Operation (continuous) Operation (occasional) Bearings Transport	 5 - 500 Hz: max. 0.125 g; duration 1 octave per minute; no unrecoverable errors 5 - 500 Hz: max. 0.25 g; duration 1 octave per minute; no unrecoverable errors 5 - 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage 5 - 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage
Shock [4] (pulse with a sine half-wave) Operation Bearings	 Max. 125 g, 2 ms; no unrecoverable errors Max. 400 g, 2 ms; no damage Max. 450 g, 1 ms; no damage Max. 200 g, 0.5 ms; no damage
Altitude Operation Bearings	 - 300 to 3048 meters - 300 to 12192 meters

Table 107: Technical data - RAID hard disk - 5ACPCI.RAIC-04 (Forts.)

1) 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.

2) 24-hour operation means 732 POH (power-on hours) per month.

3) Operation in areas prone to vibration and shock can affect performance negatively (reduction of transfer rate).

Temperature humidity diagram

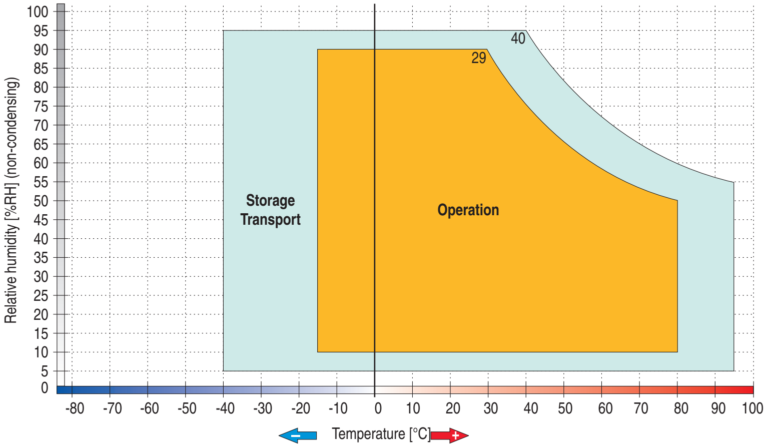


Figure 109: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-04

Exchanging a PCI SATA RAID hard disk

Instructions for exchanging a SATA hard disk can be found in chapter 7 "Maintenance / Servicing", section "Exchanging a PCI SATA RAID hard disk", on page 760.

3.9 Interface options

An add-on interface (CAN or combined RS232/422/485) can be inserted.

Information:

It is possible to add or remove an add-on interface at any time.

Caution!

Turn off power before adding or removing an add-on interface.

3.9.1 Add-on CAN interface - 5AC600.CANI-00

The add-on CAN interface is equipped with a Bosch CC770 CAN controller (compatible with an Intel 82527 CAN controller), which conforms to CAN specifications 2.0 part A/B. The CAN controller can trigger an NMI (non-maskable interrupt).

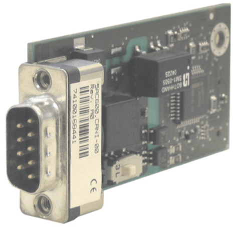


Figure 110: Add-on CAN interface - 5AC600.CANI-00

Technical data

Features	**5AC600.CANI-00**
CAN interface Controller Amount Connection	 Bosch CC770 (compatible with Intel 82527 CAN controller) 1 9-pin DSUB, male
Terminating resistor Default setting	Can be activated and deactivated using a sliding switch Disabled

Table 108: Technical data - Add-on CAN interface - 5AC600.CANI-00

Pin assignments

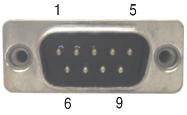
Add-on CAN		
Type	Electrically isolated	9-pin DSUB connector 
Transfer rate	Max. 500 kBit/s	
Bus length	Max. 1000 Meter	
Pin	**Assignment**	
1	n.c.	
2	CAN low	
3	GND	
4	n.c.	
5	n.c.	
6	Reserved	
7	CAN high	
8	n.c.	
9	n.c.	

Table 109: Pin assignments - CAN

I/O address and IRQ

Resource	Default setting	Additional setting options
I/O address	384 / 385	-
IRQ	IRQ10	NMI 1)

Table 110: Add-on CAN - I/O Adresse und IRQ

1) NMI = Non Maskable Interrupt.

The setting for the IRQ can be changed in the BIOS setup (under "Advanced" - submenu "Baseboard/Panel Features" - submenu "Legacy Devices", setting "CAN"). Please note any potential conflicts with other resources when changing this setting.

I/O address	Register	Function
384h	Address register	Defines the register number to access.
385h	Data register	Access to the register defined in the address register.

Table 111: CAN address register

Bus length and cable type

The type of cable used depends largely on the required bus length and the number of nodes. The bus length is mainly determined by the bit rate. In accordance with CiA (CAN in Automation) the maximum bus length is 1000 meters.

The following bus lengths are permitted with a maximum oscillator tolerance of 0.121%:

Distance [m]	Transfer rate [kBit/s]
≤ 1000	Typ. 50
≤ 200	Typ. 250
≤ 60	Typ. 500

Table 112: Bus length and transfer rate - CAN

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

CAN cable	Property
Signal lines Cable cross section Wire insulation Conductor resistance Stranding Shield	 2 x 0.25 mm² (24AWG/19), tinned Cu wire PE ≤ 82 Ω / km Wires stranded in pairs Paired shield with aluminum foil
Grounding line Cable cross section Wire insulation Conductor resistance	 1 x 0.34 mm² (22AWG/19), tinned Cu wire PE ≤ 59 Ω / km
Outer sheathing Item Characteristics Entire shielding	 PUR mixture Halogen free From tinned cu wires

Table 113: CAN cable requirements

Terminating resistor

CAN networks are cabled using a bus structure where both ends of the bus are equipped with terminating resistors. The add-on CAN interface has an integrated terminating resistor (delivery state: disabled with the setting "Off").

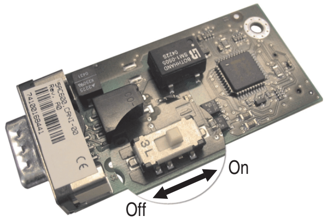


Figure 111: Terminating resistor - Add-on CAN interface 5AC600.CANI-00

Contents of delivery

The screws included in the mounting kit are to be used for installation.

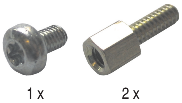


Figure 112: Contents of the delivery / mounting material - 5AC600.CANI-00

3.9.2 Add-on RS232/422/485 interface - 5AC600.485I-00

The serial interface is a combined RS232/RS422/RS485 interface. The operating mode (RS232/RS422/RS485) is selected automatically, depending on the electrical connection.

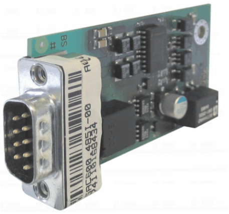


Figure 113: Add-on RS232/422/485 interface - 5AC600.485I-00

Pin assignments

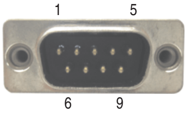
Add-on RS232/422/485			
Features	**RS232**	**RS422/485**	9-pin DSUB connector 
Type	RS232 not modem compatible; Electrically isolated		
UART	16550 compatible, 16 byte FIFO		
Transfer rate	Max. 115 kBit/s		
Bus length	Max. 15 meters	Max. 1200 meters	
Pin	**Assignments (RS232)**	**Assignments (RS422)**	
1	n.c.	TXD/	
2	RXD	n.c.	
3	TXD	n.c.	
4	n.c.	TXD	
5	GND	GND	
6	n.c.	RXD/	
7	RTS	n.c.	
8	CTS	n.c.	
9	n.c.	RXD	

Table 114: Pin assignments - RS232/RS422

I/O address and IRQ

Resource	Default setting	Additional setting options
I/O address	2E8	238, 2F8, 338, 3E8, 3F8
IRQ	IRQ10	IRQ 3, 4, 5, 7, 11, 12

Table 115: Add-on RS232/422/485 - I/O address and IRQ

The setting for the I/O address and the IRQ can be changed in the BIOS setup (under "Advanced" - submenu "Main board/Panel Features" - submenu "Legacy Devices", setting "COM E"). Please note any potential conflicts with other resources when changing this setting.

Bus length and cable type RS232

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

Distance [m]	Transfer rate [kBit/s]
≤ 15	Typ. 64
≤ 10	Typ. 115
≤ 5	Typ. 115

Table 116: RS232 - Bus length and transfer rate

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

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

Table 117: RS232 - Cable requirements

RS422 - Bus length and cable type

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

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

Distance [m]	Transfer rate [kBit/s]
1200	Typ. 115

Table 118: RS422 - Bus length and transfer rate

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

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

Table 119: RS422 - Cable requirements

RS485 interface operation

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

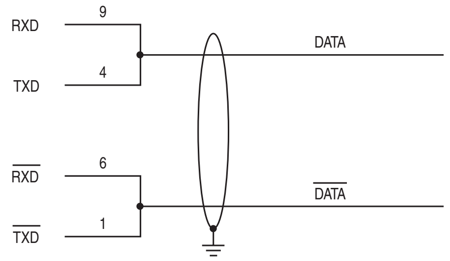


Figure 114: Add-on RS232/422/485 interface - operated in RS485 mode

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

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

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

RS485 - Bus length and cable type

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

Distance [m]	Transfer rate [kBit/s]
1200	Typ. 115

Table 120: RS485 - Bus length and transfer rate

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

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

Table 121: RS485 - Cable requirements

Contents of delivery

The screws included in the mounting kit are to be used for installation.

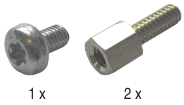


Figure 115: Contents of the delivery / mounting material - 5AC600.485I-00

3.10 Fan kits

Information:

Fans are necessary when using components which must work within certain temperature limits, e.g. hard disks, DVD combos, PCI cards, etc.

The fan and dust filter are subject to wear and must be checked with appropriate frequency and cleaned or replaced when not functioning properly (e.g. due to dirt and grime).

3.10.1 Fan kit 1 PCI - 5PC600.FA01-00

This fan kit is an optional addition for system units with 1 PCI slots. For available replacement dust filters for this fan kit, see section "Replacement fan", on page 712.

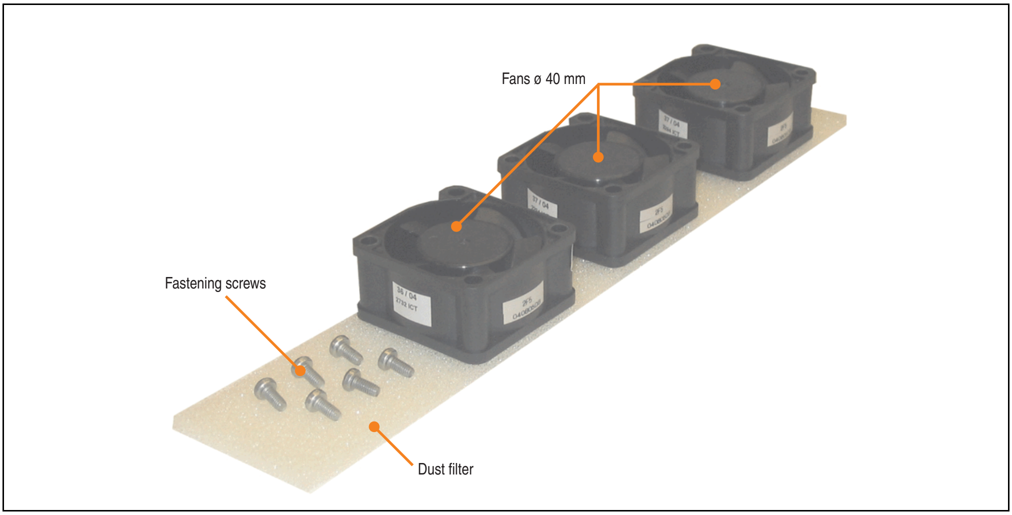


Figure 116: Fan kit - 5PC600.FA01-00

Technical data

Features	5PC600.FA01-00
Fan type Width Length Height	Double ball bearings 40 mm 40 mm 20 mm
Revolution speed	5600 rpm ±10%
Noise level	24 dB
Lifespan	80,000 hours at 30°C

Table 122: Technical data - 5PC600.FA01-00

Features	5PC600.FA01-00
Maintenance interval	The fans are subject to wear. Depending on the work environment, the dust filter should be checked with appropriate frequency to determine whether the air flow provides sufficient cooling. An exchange or cleaning of the filter kit is appropriate at that time.

Table 122: Technical data - 5PC600.FA01-00 (Forts.)

Contents of delivery

Amount	Component
3	Fans with 40 mm diameter
1	Dust filter
6	Mounting screws

Table 123: Contents of delivery - 5PC600.FA01-00

Installation

For a description of how to install the fan kit, see chapter 7 "Maintenance / Servicing", section 2 "Fan kit installation and replacement", starting on page 722.

3.10.2 Fan kit 2 PCI - 5PC600.FA02-00

This fan kit is an optional addition for system units with 2 PCI slots. For available replacement dust filters for this fan kit, see section "Replacement fan", on page 712.

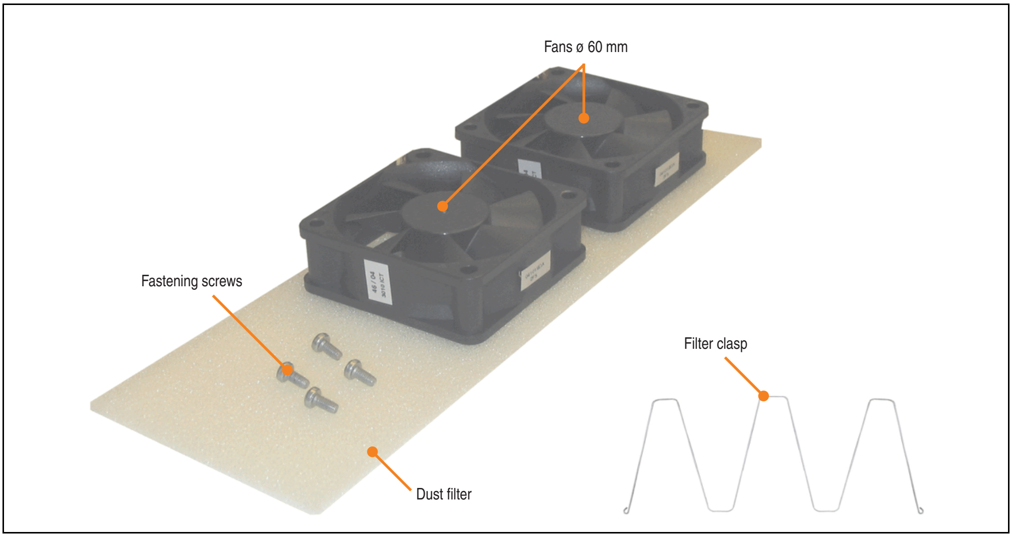


Figure 117: Fan kit - 5PC600.FA02-00

Technical data

Features	5PC600.FA02-00
Fan type Width Length Height	Double ball bearings 60 mm 60 mm 20 mm
Revolution speed	3600 rpm ±10%
Noise level	30.5 dB
Lifespan	80,000 hours at 30°C
Maintenance interval	The fans are subject to wear. Depending on the work environment, the dust filter should be checked with appropriate frequency to determine whether the air flow provides sufficient cooling. An exchange or cleaning of the filter kit is appropriate at that time.

Table 124: Technical data - 5PC600.FA02-00

Contents of delivery

Amount	Component
2	Fans with 60 mm diameter
1	Dust filter
1	Filter clasp
4	Mounting screws

Table 125: Contents of delivery - 5PC600.FA02-00

Installation

For a description of how to install the fan kit, see chapter 7 "Maintenance / Servicing", section 2 "Fan kit installation and replacement", starting on page 725.

3.10.3 Fan kit 3PCI - 5PC600.FA03-00

This fan kit is an optional addition for system units with 3 PCI slots. For available replacement dust filters for this fan kit, see section "Replacement fan", on page 712.

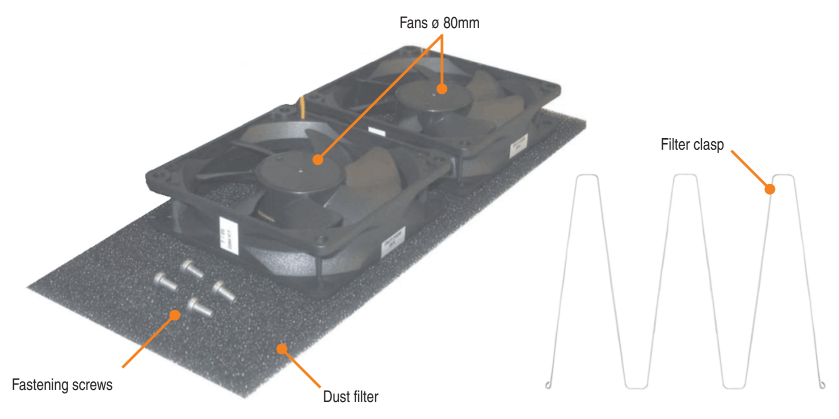


Figure 118: Fan kit - 5PC600.FA03-00

Technical data

Features	5PC600.FA03-00
Fan type Amount Width Length Height	Double ball bearings 2 80 mm 80 mm 20 mm
Revolution speed	2600 rpm ±10%
Noise level	27 dB
Lifespan	80,000 hours at 30°C
Maintenance interval	The fans are subject to wear. Depending on the work environment, the dust filter should be checked with appropriate frequency to determine whether the air flow provides sufficient cooling. An exchange or cleaning of the filter kit is appropriate at that time.

Table 126: Technical data - 5PC600.FA03-00

Contents of delivery

Amount	Component
2	Fans with 80 mm diameter
1	Dust filter
1	Filter clasp
4	Mounting screws

Table 127: Contents of delivery - 5PC600.FA03-00

Amount	Component
2	Cable fastener

Table 127: Contents of delivery - 5PC600.FA03-00

Installation

For a description of how to install the fan kit, see chapter 7 "Maintenance / Servicing", section 2 "Fan kit installation and replacement", starting on page 728.

3.10.4 Fan kit 5 PCI - 5PC600.FA05-00

This fan kit is an optional addition for system units with 5 PCI slots. For available replacement dust filters for this fan kit, see section "Replacement fan", on page 712.

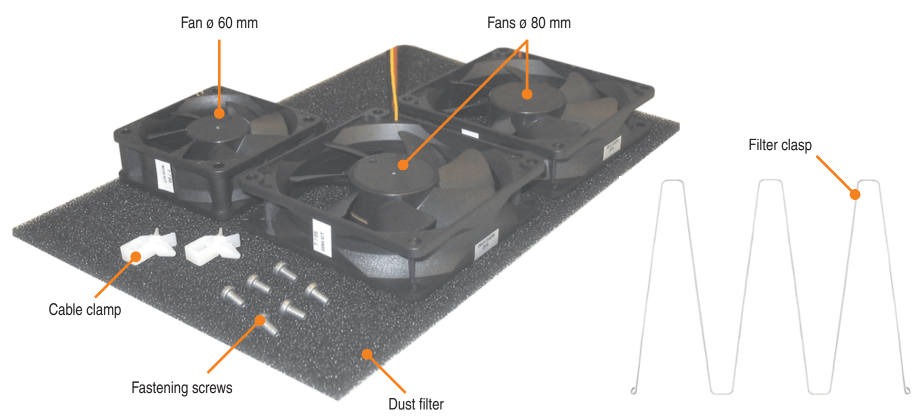


Figure 119: Fan kit - 5PC600.FA05-00

Technical data

Features	5PC600.FA05-00	
Fan type Amount Width Length Height	Double ball bearings 1 60 mm 60 mm 20 mm	Double ball bearings 2 80 mm 80 mm 20 mm
Revolution speed	3600 rpm ±10%	2600 rpm ±10%
Noise level	30.5 dB	27 dB
Lifespan	80,000 hours at 30°C	
Maintenance interval	The fans are subject to wear. Depending on the work environment, the dust filter should be checked with appropriate frequency to determine whether the air flow provides sufficient cooling. An exchange or cleaning of the filter kit is appropriate at that time.	

Table 128: Technical data - 5PC600.FA05-00

Contents of delivery

Amount	Component
1	Fans with 60 mm diameter
2	Fans with 80 mm diameter
1	Dust filter
1	Filter clasp
4	Mounting screws
2	Cable fastener

Table 129: Contents of delivery - 5PC600.FA05-00

Installation

For a description of how to install the fan kit, see chapter 7 "Maintenance / Servicing", section 2 "Fan kit installation and replacement", starting on page 732.

3.11 AP Link cards

For the APC620 system units 5PC600.SX02-00, 5PC600.SF03-00 and 5PC600.SX05-00 and an 855GME CPU board, a second graphics line can be created using the AP Link graphics adapter cards.

3.11.1 AP Link SDL transmitter - 5AC600.SDL0-00

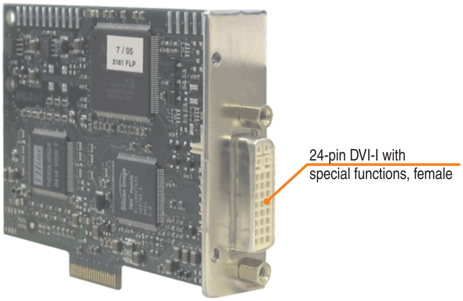


Figure 120: AP Link card

Model number	Short description	Note
5AC600.SDL0-00	AP Link SDL transmitter	

Table 130: Model numbers - AP Link graphics adapter

The following video signals are available via AP Link and monitor/panel output. The plugs are specified for 100 connection cycles.

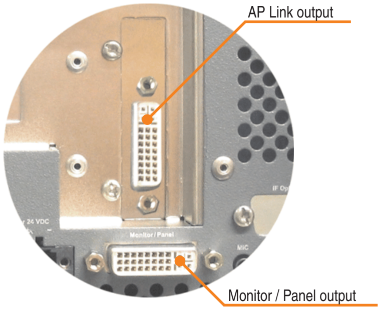
<table>
<tr><th colspan="4">AP Link slot (AP Link card inserted)</th></tr>
<tr><td colspan="3">For details, see technical data for the CPU board being used.</td><td rowspan="5">
</td></tr>
<tr><th rowspan="2">AP Link card</th><th colspan="2">Signal with 855GME (ETX / XTX) board on</th></tr>
<tr><th>AP Link</th><th>Monitor/Panel</th></tr>
<tr><td>5AC600.SDL0-00</td><td>DVI, SDL (GE1)</td><td>RGB, DVI, SDL (GE2)</td></tr>
<tr><td colspan="3"></td></tr>
</table>

Table 131: AP Link slot (AP Link card inserted)

Hotplug for a display device is not supported in any combination.

Caution!

The RGB, DVI and SDL cables can only be plugged in and unplugged when the APC620 and display device (Automation Panel 900, Automation Panel 800, monitor) are turned off.

Pin assignments

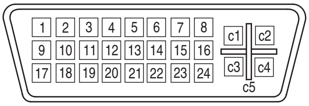
Pin	Assignment	Pin	Assignment	
1	T.M.D.S. Data 2-	16	Hot Plug detect	DVI-I 24 pin, female  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 c1 c2 c3 c4 c5
2	T.M.D.S. Data 2+	17	T.M.D.S. Data 0-	
3	T.M.D.S. Data 2/SDL Shield	18	T.M.D.S. Data 0+	
4	SDL-	19	T.M.D.S. DATA 0/XUSB1 Shield	
5	SDL+	20	XUSB1-	
6	DDC clock	21	XUSB1+	
7	DDC data	22	T.M.D.S. Clock Shield	
8	n.c.	23	T.M.D.S. Clock +	
9	T.M.D.S. DATA 1-	24	T.M.D.S. Clock -	
10	T.M.D.S. DATA 1+	c1	n.c.	
11	T.M.D.S. DATA 1/XUBS0 Shield	c2	n.c.	
12	XUSB0-	c3	n.c.	
13	XUSB0+	c4	n.c.	
14	+ 5 V power [1]	c5	n.c.	
15	Ground (return for + 5V, HSync and VSync)			

Table 132: Pin assignment for AP Link connection

1) Protected internally by a multifuse

Cable lengths and resolutions for SDL transfer

The following table shows the relationship between segment lengths and the maximum resolution according to the SDL cable used:

Cables	Resolution				
Segment length [m]	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 1) 5CASDL.0100-01 1) 5CASDL.0100-03 1)
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 1) 5CASDL.0150-01 1) 5CASDL.0150-03 1)	- - -
20	5CASDL.0200-00 1) 5CASDL.0200-30 1)	5CASDL.0200-00 1) 5CASDL.0200-30 1)	5CASDL.0200-00 1) 5CASDL.0200-30 1)	5CASDL.0200-00 1) 5CASDL.0200-30 1)	- -
25	5CASDL.0250-00 1) 5CASDL.0250-30 1)	5CASDL.0250-00 1) 5CASDL.0250-30 1)	5CASDL.0250-00 1) 5CASDL.0250-30 1)	- -	- -
30	5CASDL.0300-00 1) 5CASDL.0300-03 1)	5CASDL.0300-00 1) 5CASDL.0300-03 1)	5CASDL.0300-10 2) 5CASDL.0300-13 2)	5CASDL.0300-10 2) 5CASDL.0300-13 2)	-
40	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	- -

Table 133: Segment lengths, resolutions and SDL cables

1) See table 134 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 275

2) See table 135 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 276

The cable types and resolutions shown with a footnote 1) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	
Hardware	**Name**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 134: Requirements for SDL cable with automatic cable adjustment (equalizer)

The cable types and resolutions shown with a footnote 2) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	
Hardware	**Name**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. D0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. D0	
5AC600.SDL0-00	AP Link SDL transmitter	Rev. B3	
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0	
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Rev. C0	

Table 135: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

DVI, SDL description

DVI means:

- Connection of B&R Automation Panel 900 display units with Automation Panel Link DVI Receiver (Model nr. 5DLDVI.1000-01), Office Digital/DVI Monitors and Office DVI TFT Displays is possible.

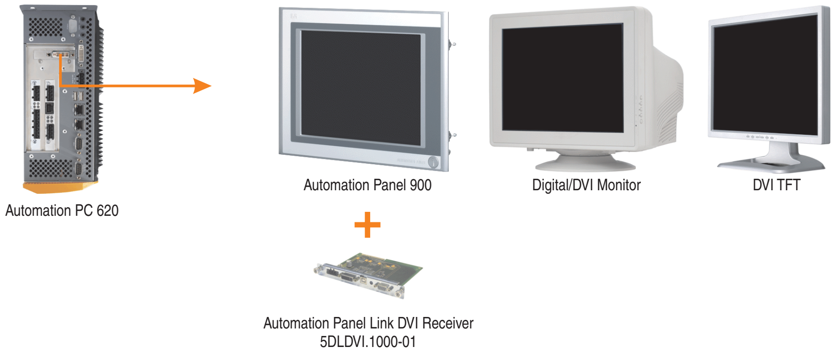


Figure 121: AP Link device connection with DVI video signal

For examples and possibilities for connecting Automation Panel 900 display units via DVI, see Appendix A, chapter 3 "Commissioning", section 4 "Connection examples", starting on page 294.

SDL (Smart Display Link) means:

- Connection of B&R Automation Panel 900 display units with Automation Panel Link SDL receiver (Model nr. 5DLSDL.1000-01) or SDL transceiver (Model nr. 5DLSDL.1000-01).

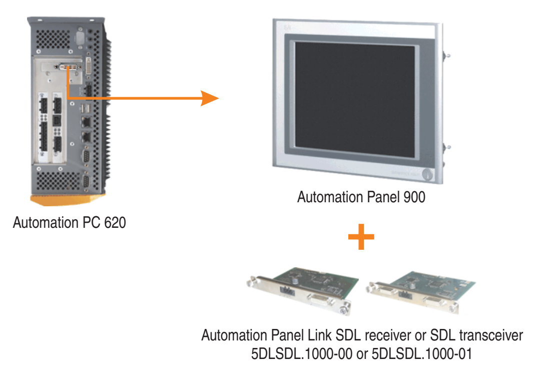

Automation PC 620
Automation Panel 900
+
Automation Panel Link SDL receiver or SDL transceiver
5DLSDL.1000-00 or 5DLSDL.1000-01

Figure 122: AP Link device connection with SDL video signal

For examples and possibilities for connecting Automation Panel 900 and Automation Panel 800 display units via SDL, see Appendix A, chapter 3 "Commissioning", section 4 "Connection examples", starting on page 294.

Chapter 3 • Commissioning

1. Installation

The APC620 systems are mounted with the mounting plates found on the housing. The plates are designed for M5 screws.

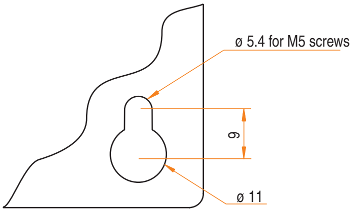


Figure 123: Mounting plates for the APC620

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

1.1 Important mounting information

- The environmental conditions must be taken into consideration (see chapter 2 "Technical Data", section 2.6 "Ambient temperatures for systems with an 815E CPU board (ETX)", on page 89, and section 2.7 "Ambient temperatures for systems with an 855GME CPU board (ETX / XTX)", on page 93).
- The APC620 is only for operation in closed rooms.
- The APC620 cannot be situated in direct sunlight.
- The ventilation holes cannot be covered.
- When mounting the device, be sure to adhere to the allowable mounting orientations (see section 1.3 "Mounting orientation", on page 283).
- Be sure the wall or switching cabinet can withstand four times the total weight of the the PC620.
- When connecting certain cable types (DVI, SDL, USB, etc.), keep the flex radius in mind. (see section 2 "Cable connections", on page 292).

1.2 Drilling templates

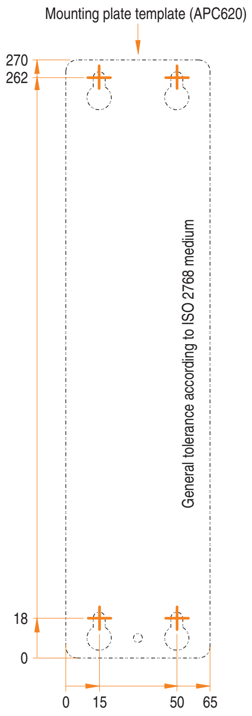
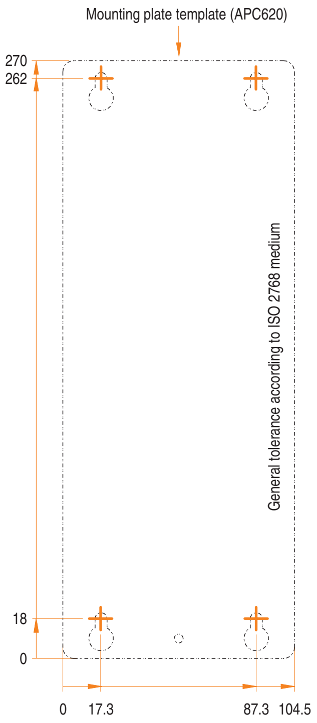
APC620 with 1 PCI slot	APC620 with 2 PCI slots
 Mounting plate template (APC620) 270 262 18 0 0 15 50 65 General tolerance according to ISO 2768 medium	 Mounting plate template (APC620) 270 262 18 0 0 17.3 87.3 104.5 General tolerance according to ISO 2768 medium

Table 136: Drilling templates - 1 and 2 PCI slots

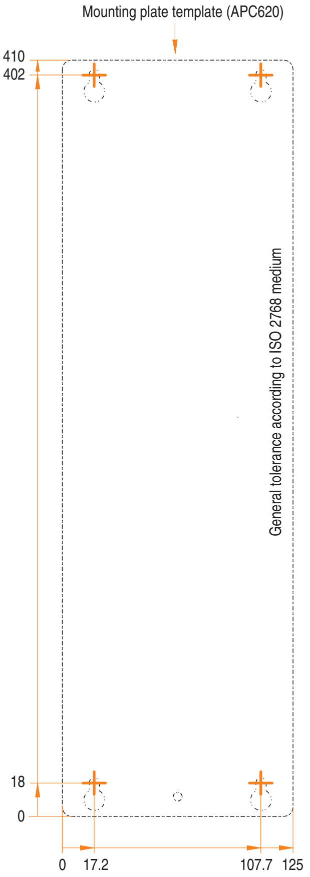
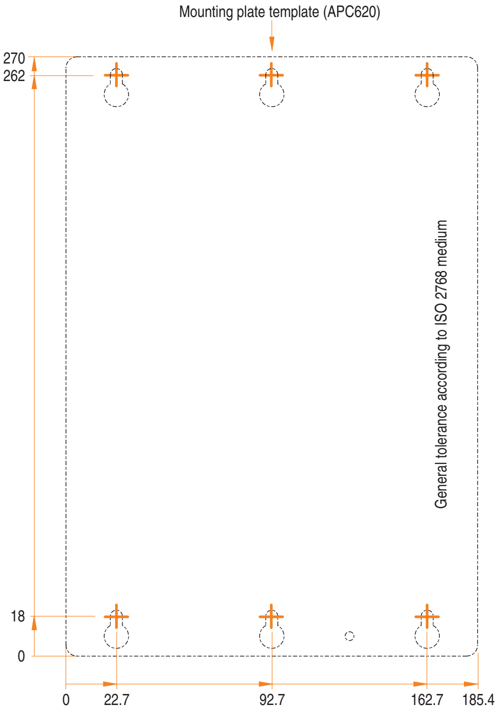
APC620 with 3 PCI slots	APC620 with 5 PCI slots
 Mounting plate template (APC620) General tolerance according to ISO 2768 medium 410 402 18 0 0 17.2 107.7 125	 Mounting plate template (APC620) General tolerance according to ISO 2768 medium 270 262 18 0 0 22.7 92.7 162.7 185.4

Table 137: Drilling templates - 3 and 5 PCI slots

APC620 embedded

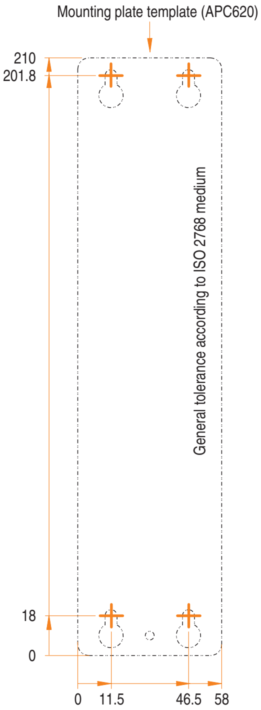

Mounting plate template (APC620)
210
201.8
18
0
0
11.5
46.5
58
General tolerance according to ISO 2768 medium

Table 138: Drilling templates - APC620 embedded

1.3 Mounting orientation

The Automation PC620 system must be mounted as described in the following sections.

1.3.1 Standard mounting

Standard mounting refers to vertical mounting orientation.

APC620 systems with and without fan kit can be mounted this way.

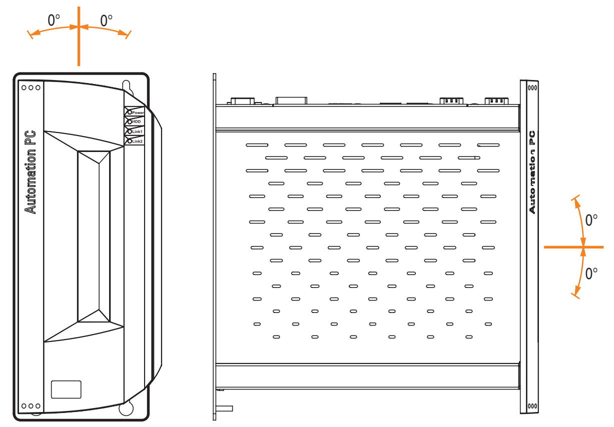


Figure 124: Mounting orientation - Standard

In order to guarantee natural air circulation, mount the system so that the spacing on the top, bottom, and sides is as follows.

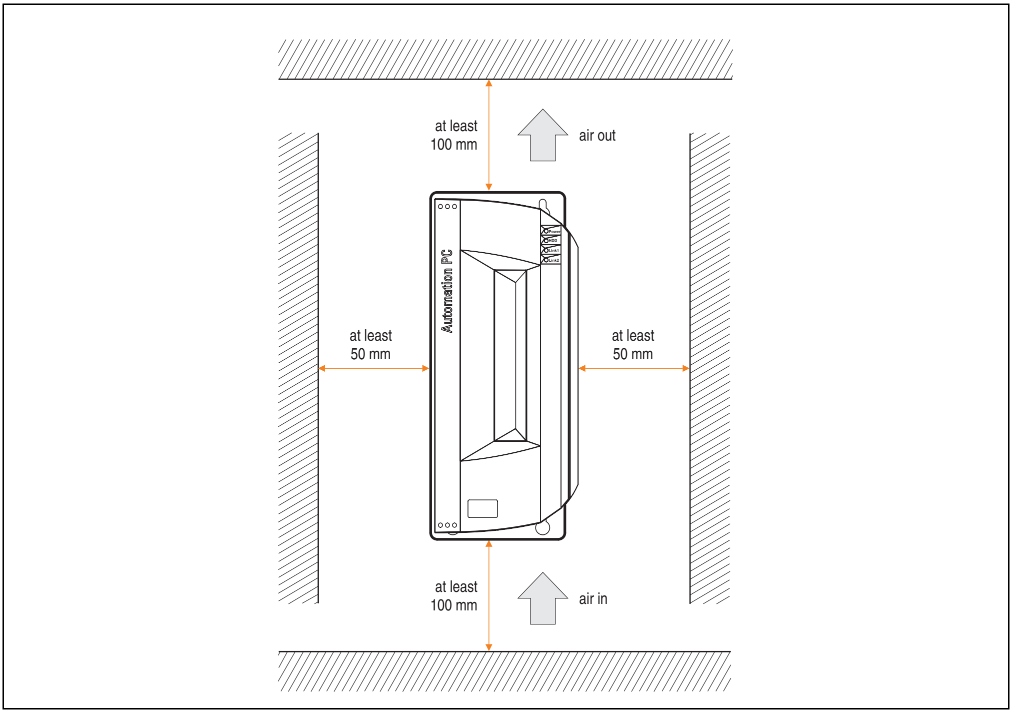


Figure 125: Air circulation spacing - Standard

1.3.2 Optional mounting orientations

Caution!

A fan kit must be used if the system is mounted in the following orientations. In addition, it is important to be sure that the components used are installed in a way that complies with the specifications of the drives being used (CD-ROM, DVD/CD-RW, hard disk, etc.). See the following pages for information regarding the specifications for mounting orientation.

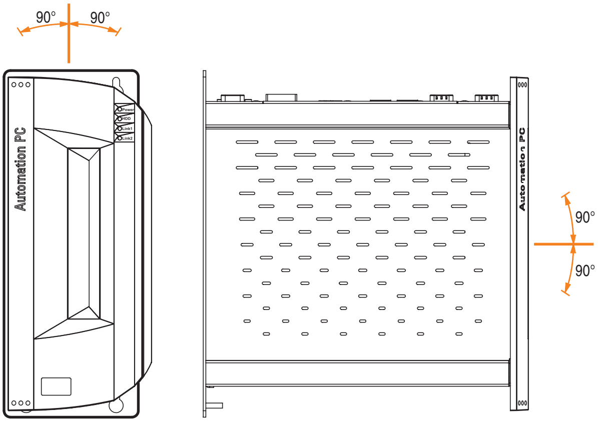


Figure 126: Mounting orientation - Optional

In order to guarantee natural air circulation, mount the system so that the spacing on the top, bottom, and sides is as follows.

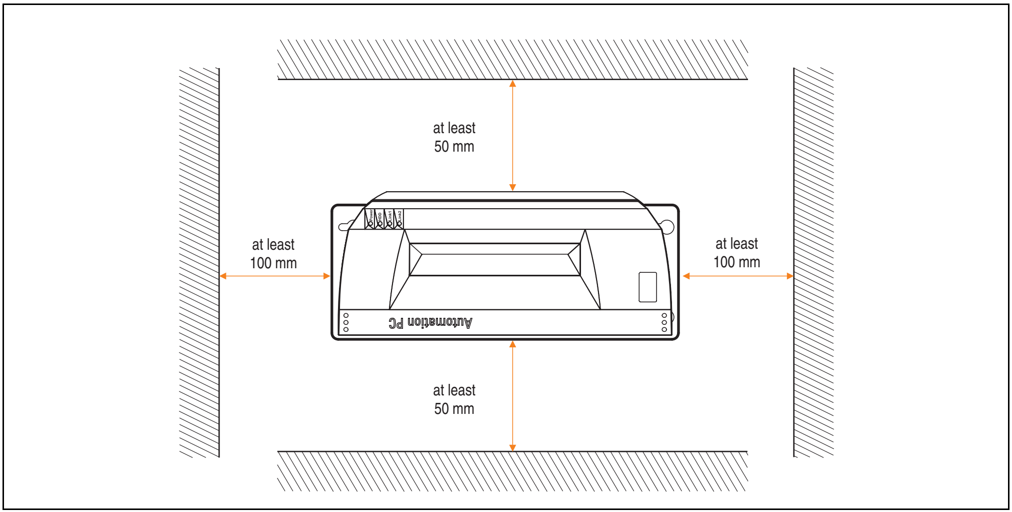


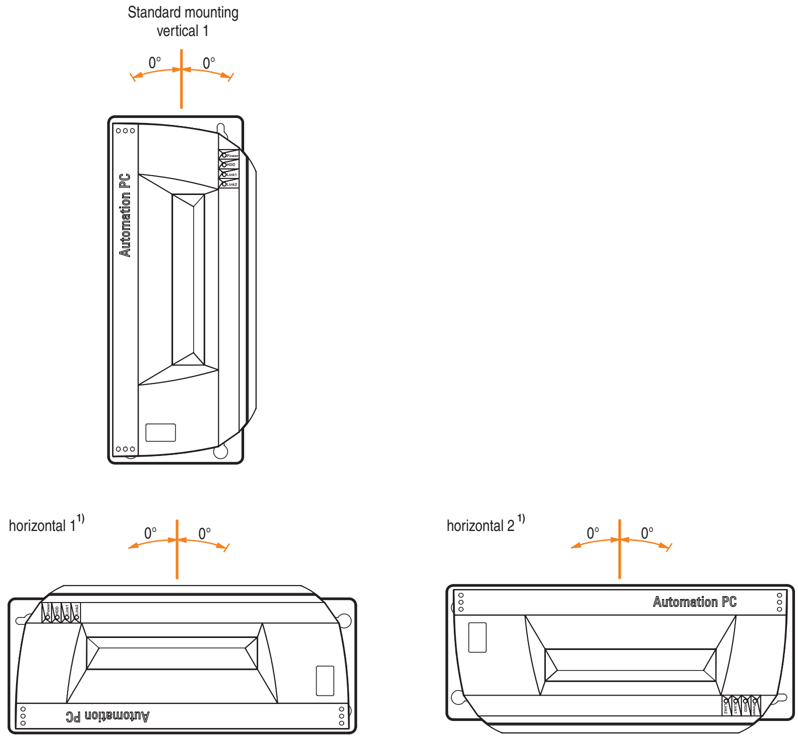
Figure 127: Optional circulation spacing

CompactFlash slot, add-on or slide-in

No limitation on mounting orientation. Permissible mounting orientations are shown in figure 126 "Mounting orientation - Optional", on page 285.

Add-on or slide-in hard disks 20, 30 and 40 GB.

The following figure shows the possible mounting orientations for an APC620 device with an add-on (5AC600.HDDI-00 or 5AC600.HDDI-01) or slide-in hard disk (5AC600.HDDS-00 or 5AC600.HDDS-02).



1) Only allowed when a fan kit is used.

Figure 128: Mounting orientations for an APC620 with hard disk drive

The mounting orientations "horizontal 1" and "horizontal 2" require the use of a fan kit.

Slide-in CD-ROM drive

The following figure shows the possible mounting orientations for an APC620 device with a slide-in CD-ROM drive (5AC600.CDXS-00).

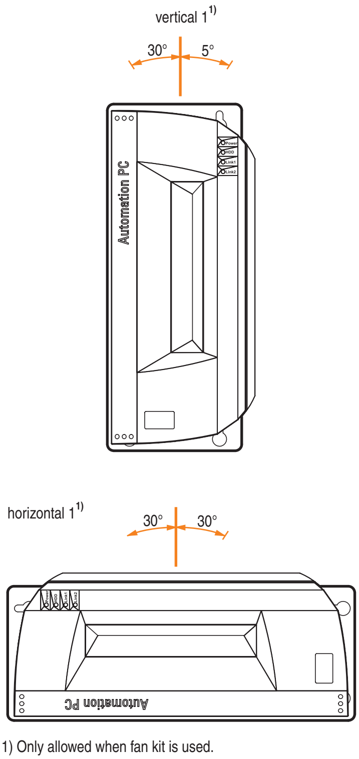


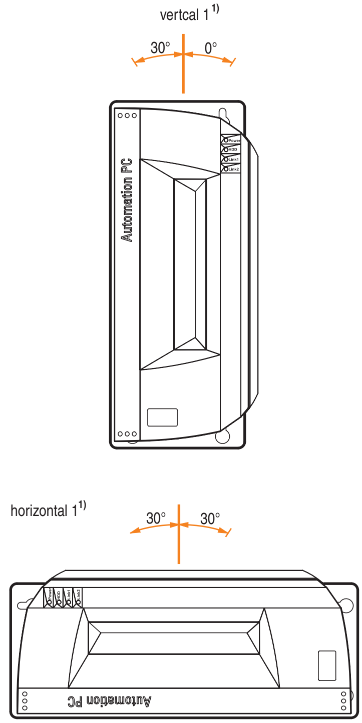
Figure 129: Mounting orientations for an APC 620 with a slide-in CD-ROM drive

The mounting orientation "horizontal 1" requires the use of a fan kit.

Mounting orientation "vertical 1" can also be used at 0° without a fan kit.

Slide-in DVD-ROM/CD-RW drive

The following figure shows the possible mounting orientations for an APC620 device with a slide-in DVD-ROM/CD-RW drive 5AC600.DVDS-00).



1) Only allowed when fan kit is used.

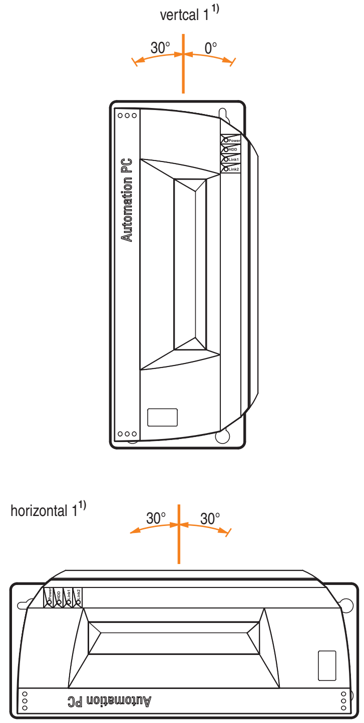
Figure 130: Mounting orientations for an APC620 with a slide-in DVD-ROM/CD-RW drive

The mounting orientation "horizontal 1" requires the use of a fan kit.

Mounting orientation "vertical 1" can also be used at 0° without a fan kit.

Slide-in DVD-R/RW/DVD+R/RW

The following figure shows the possible mounting orientations for an APC620 device with a slide-in DVD-R/RW / DVD+R/RW drive (5AC600.DVRS-00).



1) Only allowed when fan kit is used.

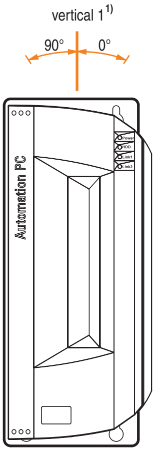
Figure 131: Mounting orientations for an APC620 with a slide-in DVD-R/RW / DVD+R/RW drive

The mounting orientation "horizontal 1" requires the use of a fan kit.

Mounting orientation "vertical 1" can also be used at 0° without a fan kit.

Slide-in USB FDD

The following figure shows the possible mounting orientations for an APC620 device with a slide-in USB FDD drive (5AC600.FDDS-00).



1) Only allowed when a fan kit is used.

Figure 132: Mounting orientations for an APC620 with a slide-in USB FDD drive

Mounting orientation "vertical 1" can also be used at 0° without a fan kit.

2. Cable connections

When making cable connections and installing cables, it is not permitted to have a flex radius smaller than the minimum value specified.

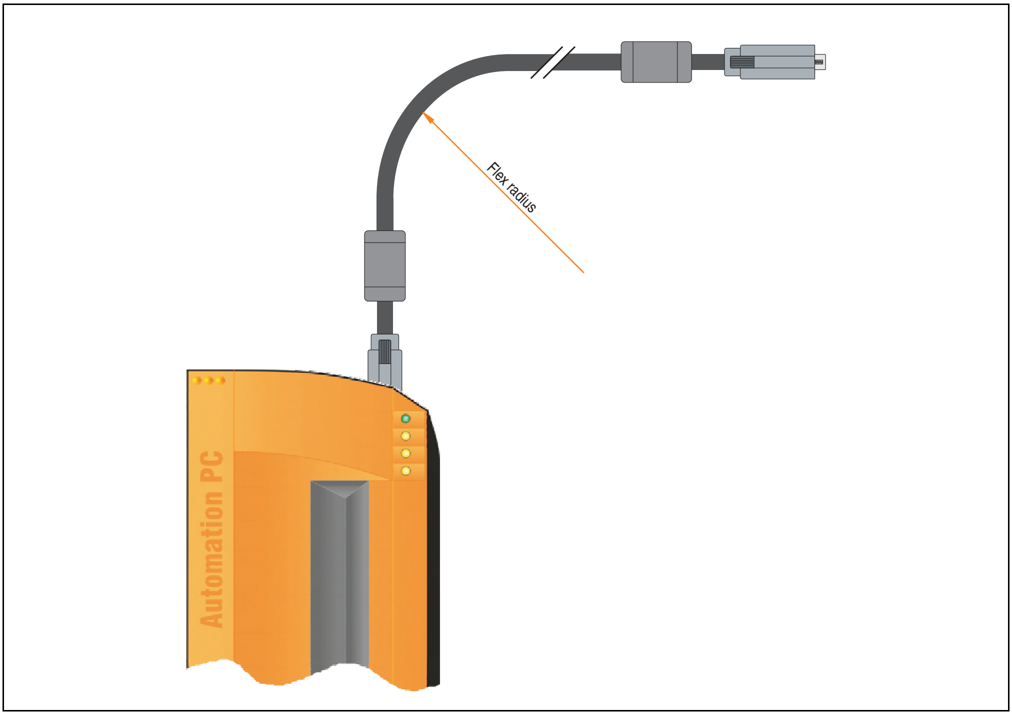


Figure 133: Flex radius - Cable connection

Information:

The value specified for the minimum flex radius can be found in the technical data for the cable that is being used.

2.1 Ethernet cable lengths for ETH1

For error free data transfer, take note of the cable length information in section "Ethernet connection ETH1", on page 130.

3. Grounding concept

The functional ground is a current path with low impedance between isolated circuits and ground, which is not a protective measure, but rather provides e.g. increased immunity to disturbances. It serves only as disturbance dissipation and not as contact protection for persons.

The APC620 functional ground has 2 connections:

- Supply voltage
- Ground connection

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

- The device should be connected to the ground using the shortest route possible.
- Use cable with a minimum cross section of 2.5 mm^2 per connection.
- Note the line shielding concept, all connected data cables are used as shielded lines.

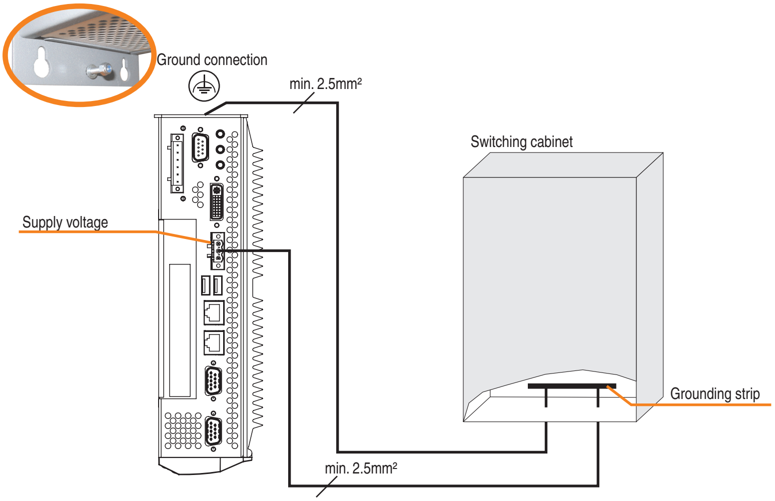


Figure 134: Grounding concept

4. Connection examples

The following examples provide an overview of the configuration options for connecting Automation Panel 800 and Automation Panel 900 and/or Automation Panel 800 devices with the APC620. The following questions will be answered:

- How are Automation Panel 900 devices connected to the monitor / panel output of the APC620, and what needs to be considered?
- How are Automation Panel 800 devices connected to the monitor / panel output of the APC620, and what needs to be considered?
- How are Automation Panel 900 devices connected simultaneously to the Monitor / Panel output on the optional SDL AP Link of the APC620 and what needs to be considered?
- What are "Display Clone" and "Extended Desktop" modes?
- How many Automation Panel 900 devices can be connected per line?
- How many Automation Panel 900 devices can be connected to an Automation Panel 800 device per line?
- How are the connected devices internally numbered?
- Are there limitations to the segment length and if so, what are they?
- What cables and link modules are needed?
- Do BIOS settings have to be changed for a specific configuration?

Information:

An RGB monitor / flat-screen can always be connected to the monitor / panel output of the APC620 (necessary DVI to CRT adapter can be ordered under the model number 5AC900.1000-00).

4.1 Selecting the display units

If an Automation Panel 800 and an Automation Panel 900 should be connected on the same line, the devices must have the same display type.
The following table lists the AP900 devices that can be connected on the same line with an AP800 device.

Automation Panel 800	Automation Panel 900
5AP820.1505-00	5AP920.1505-01 5AP951.1505-01 5AP980.1505-01 5AP981.1505-01
5AP880.1505-00	5AP920.1505-01 5AP951.1505-01 5AP980.1505-01 5AP981.1505-01

Table 139: Selecting the display units

4.2 One Automation Panel 900 via DVI (onboard)

An Automation Panel 900 with max. SXGA resolution is connected to the integrated DVI interface (onboard). As an alternative, an office TFT with DVI interface or an analog monitor (using adapter with model no. 5AC900.1000-00) can also be operated. A separate cable is used for touch screen and USB. If USB devices are to be operated on the Automation Panel 900, the maximum distance is 5 meters. USB devices can only be connected directly to the Automation Panel (without a hub).

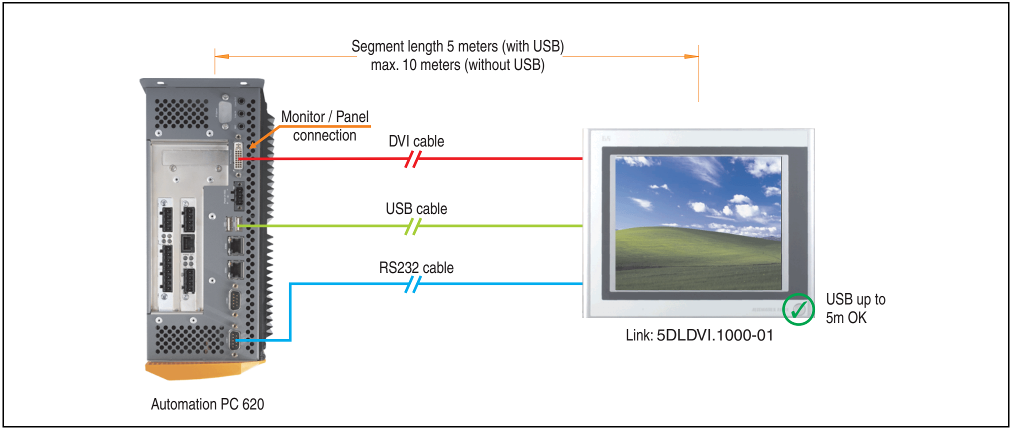

Segment length 5 meters (with USB)
max. 10 meters (without USB)
Monitor / Panel connection
DVI cable
USB cable
RS232 cable
USB up to 5m OK
Link: 5DLDVI.1000-01
Automation PC 620

Figure 135: Configuration - One Automation Panel 900 via DVI (onboard)

4.2.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table (e.g. for connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit						Restriction Resolution
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	
5PC600.E855-00 5PC600.X855-00	✓	✓	✓	✓	✓	✓	Max. SXGA
5PC600.E855-01 5PC600.X855-01	✓	✓	✓	✓	✓	✓	Max. SXGA
5PC600.E855-02 5PC600.X855-02	✓	✓	✓	✓	✓	✓	Max. SXGA
5PC600.E855-03 5PC600.X855-03	✓	✓	✓	✓	✓	✓	Max. SXGA
5PC600.E855-04 5PC600.X855-04	✓	✓	✓	✓	✓	✓	Max. SXGA
5PC600.E855-05 5PC600.X855-05	✓	✓	✓	✓	✓	✓	Max. SXGA

Table 140: Possible combinations of system unit and CPU board

4.2.2 Link modules

Model number	Description	Note
5DLDVI.1000-01	**Automation Panel Link DVI receiver** connections for DVI-D, RS232 and USB 2.0 (Type B); 24VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900

Table 141: Link module for the configuration - One Automation Panel 900 via DVI

4.2.3 Cables

Select one cable each from the 3 required types.

Model number	Type	Length
5CADVI.0018-00	DVI cable	1.8 m
5CADVI.0050-00	DVI cable	5 m
5CADVI.0100-00	DVI cable	10 m[1)]
9A0014.02	Touch screen cable - serial	1.8 m
9A0014.05	Touch screen cable - serial	5 m
9A0014.10	Touch screen cable - serial	10 m[1)]
5CAUSB.0018-00	USB cable	1.8 m
5CAUSB.0050-00	USB cable	5 m

Table 142: Cables for DVI configurations

1) USB support is not possible on the Automation Panel 900 because USB is limited to 5 m.

4.2.4 Possible Automation Panel units, resolutions und segment lengths

The following Automation Panel 900 units can be used. In rare cases, the segment length is limited according to the resolution.

Model number	Diagonal	Resolution	Touch screen	Keys	Max. segment length
5AP920.1043-01	10.4“	VGA	✓	-	5 m / 10 m[1)]
5AP920.1214-01	12.1“	SVGA	✓	-	5 m / 10 m[1)]
5AP920.1505-01	15.0“	XGA	✓	-	5 m / 10 m[1)]
5AP920.1706-01	17.0“	SXGA	✓	-	5 m / 10 m[1)]
5AP920.1906-01	19.0“	SXGA	✓	-	5 m / 10 m[1)]

Table 143: Possible Automation Panel units, resolutions und segment lengths

1) USB support is not possible on the Automation Panel 900 because USB is limited to 5 m.

Information:

The DVI transfer mode does not allow reading statistical values on Automation Panel 900 units.

4.2.5 BIOS settings

No special BIOS settings are necessary for operation.

4.2.6 Windows graphics driver settings

See chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.2.7 Windows touch screen driver settings

See chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.3 An Automation Panel 900 via SDL (onboard)

An Automation Panel 900 is connected to the integrated SDL interface (onboard) via an SDL cable. USB devices can only be connected directly to the Automation Panel (without a hub).

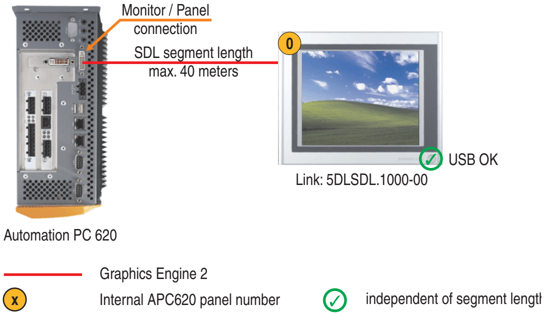

Monitor / Panel connection
SDL segment length max. 40 meters
0
USB OK
Link: 5DLSDL.1000-00
Automation PC 620
Graphics Engine 2
x
Internal APC620 panel number
independent of segment lengtl

Figure 136: Configuration - An Automation Panel 900 via SDL (onboard)

4.3.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table (e.g. for connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit						Restriction
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	Resolution
5PC600.E855-00 5PC600.X855-00	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC600.E855-01 5PC600.X855-01	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC600.E855-02 5PC600.X855-02	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC600.E855-03 5PC600.X855-03	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC600.E855-04 5PC600.X855-04	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC600.E855-05 5PC600.X855-05	✓	✓	✓	✓	✓	✓	Max. UXGA

Table 144: Possible combinations of system unit and CPU board

4.3.2 Link modules

Model number	Description	Note
5DLSDL.1000-00	**Automation Panel Link SDL receiver** Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900

Table 145: Link module for the configuration - One Automation Panel 900 via SDL

4.3.3 Cables

Select a cable from the following table.

Model number	Type	Length
5CASDL.0018-00	SDL cable for a fixed type of layout	1.8 m
5CASDL.0018-01	SDL cable with 45° plug for fixed type of layout	1.8 m
5CASDL.0018-03	SDL cable for fixed and flexible type of layout	1.8 m
5CASDL.0050-00	SDL cable for a fixed type of layout	5 m
5CASDL.0050-01	SDL cable with 45° plug for fixed type of layout	5 m
5CASDL.0050-03	SDL cable for fixed and flexible type of layout	5 m
5CASDL.0100-00	SDL cable for a fixed type of layout	10 m
5CASDL.0100-01	SDL cable with 45° plug for fixed type of layout	10 m
5CASDL.0100-03	SDL cable for fixed and flexible type of layout	10 m
5CASDL.0150-00	SDL cable for a fixed type of layout	15 m
5CASDL.0150-01	SDL cable with 45° plug for fixed type of layout	15 m
5CASDL.0150-03	SDL cable for fixed and flexible type of layout	15 m
5CASDL.0200-00	SDL cable for a fixed type of layout	20 m
5CASDL.0200-03	SDL cable for fixed and flexible type of layout	20 m
5CASDL.0250-00	SDL cable for a fixed type of layout	25 m
5CASDL.0250-30	SDL cable for fixed and flexible type of layout	25 m
5CASDL.0300-00	SDL cable for a fixed type of layout	30 m
5CASDL.0300-03	SDL cable for fixed and flexible type of layout	30 m
5CASDL.0300-10	SDL cable with extender for a fixed type of layout	30 m
5CASDL.0300-13	SDL cable with extender for fixed and flexible type of layout	30 m
5CASDL.0400-10	SDL cable with extender for a fixed type of layout	40 m
5CASDL.0400-13	SDL cable with extender for fixed and flexible type of layout	40 m

Table 146: Cables for SDL configurations

Cable lengths and resolutions for SDL transfer

The following table shows the relationship between segment lengths and the maximum resolution according to the SDL cable used:

Cables	Resolution				
Segment length [m]	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00[1] 5CASDL.0100-01[1] 5CASDL.0100-03[1]
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00[1] 5CASDL.0150-01[1] 5CASDL.0150-03[1]	- - -
20	5CASDL.0200-00[1] 5CASDL.0200-03[1]	5CASDL.0200-00[1] 5CASDL.0200-03[1]	5CASDL.0200-00[1] 5CASDL.0200-03[1]	5CASDL.0200-00[1] 5CASDL.0200-03[1]	- -
25	5CASDL.0250-00[1] 5CASDL.0250-03[1]	5CASDL.0250-00[1] 5CASDL.0250-03[1]	5CASDL.0250-00[1] 5CASDL.0250-03[1]	- -	- -
30	5CASDL.0300-00[1] 5CASDL.0300-03[1]	5CASDL.0300-00[1] 5CASDL.0300-03[1]	5CASDL.0300-10[2] 5CASDL.0300-13[2]	5CASDL.0300-10[2] 5CASDL.0300-13[2]	- -
40	5CASDL.0400-10[2] 5CASDL.0400-13[2]	5CASDL.0400-10[2] 5CASDL.0400-13[2]	5CASDL.0400-10[2] 5CASDL.0400-13[2]	5CASDL.0400-10[2] 5CASDL.0400-13[2]	- -

Table 147: Segment lengths, resolutions and SDL cables

1) See table 148 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 301

2) See table 149 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 302

The cable types and resolutions shown with a footnote 1) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	
Hardware	**Name**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 148: Requirements for SDL cable with automatic cable adjustment (equalizer)

The cable types and resolutions shown with a footnote 2) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	
Hardware	**Name**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. D0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. D0	
5AC600.SDL0-00	AP Link SDL transmitter	Rev. B3	
5PC600.SX01-00	System 1 PCI	Rev. E0	
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0	
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0	
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Rev. C0	
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0	

Table 149: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

4.3.4 BIOS settings

No special BIOS settings are necessary for operation without touch.

To operate Automation Panel 900 panels with a touch screen (Extended Desktop or Dual Display Clone), the serial interfaces COM C and COM D must be activated in BIOS (BIOS default setting = disabled).

4.3.5 Windows graphics driver settings

"Digital display" must be defined as output device in the graphics driver.

For more information on this, see chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.3.6 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.4 An Automation Panel 800 via SDL (onboard)

An Automation Panel 800 is connected to the integrated SDL interface (onboard) via an SDL cable. USB devices can only be connected directly to the extension keyboard (without a hub).

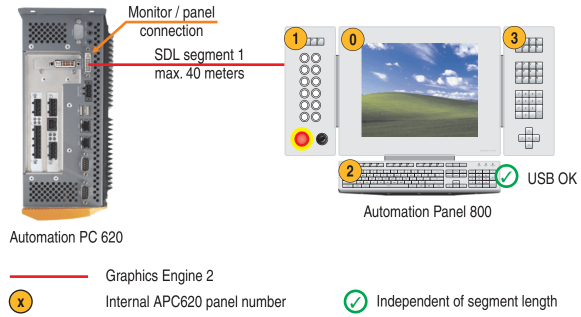


Figure 137: Configuration - An Automation Panel 800 via SDL (onboard)

4.4.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table.

CPU board	with system unit						Restriction Resolution
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	
5PC600.E855-00 5PC600.X855-00	✓	✓	✓	✓	✓	✓	max. XGA
5PC600.E855-01 5PC600.X855-01	✓	✓	✓	✓	✓	✓	max. XGA
5PC600.E855-02 5PC600.X855-02	✓	✓	✓	✓	✓	✓	max. XGA
5PC600.E855-03 5PC600.X855-03	✓	✓	✓	✓	✓	✓	max. XGA
5PC600.E855-04 5PC600.X855-04	✓	✓	✓	✓	✓	✓	max. XGA
5PC600.E855-05 5PC600.X855-05	✓	✓	✓	✓	✓	✓	max. XGA

Table 150: Possible combinations of system unit and CPU board

4.4.2 Cables

Select an SDL cable from the following table.

Model number	Type	Length
5CASDL.0018-20	SDL w/o extender	1.8 m
5CASDL.0050-20	SDL w/o extender	5 m
5CASDL.0100-20	SDL w/o extender	10 m
5CASDL.0150-20	SDL w/o extender	15 m
5CASDL.0200-20	SDL w/o extender	20 m
5CASDL.0250-20	SDL w/o extender	25 m
5CASDL.0300-30	SDL w/ extender	30 m
5CASDL.0400-30	SDL w/ extender	40 m

Table 151: Cables for SDL configurations

Cable lengths and resolutions for SDL transfer

The following table shows the relationship between segment lengths and the maximum resolution according to the SDL cable used:

Cables	Resolution
Segment length [m]	XGA 1024 x 768
1.8	5CASDL.0018-20
5	5CASDL.0050-20
10	5CASDL.0100-20
15	5CASDL.0150-20
20	5CASDL.0200-20(1)
25	5CASDL.0250-20(1)
30	5CASDL.0300-30(2)
40	5CASDL.0400-30(2)

Table 152: Segment lengths, resolutions and SDL cables

1) See table 153 "Requirements for SDL cable with automatic cable adjustment (equalizer)"

2) See table 154 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)"

The cable types and resolutions shown with a footnote 1) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	

Table 153: Requirements for SDL cable with automatic cable adjustment (equalizer)

The cable types and resolutions shown with a footnote 2) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
Hardware	**Name**	**Revision**	**Note**
5PC600.SX01-00	System 1 PCI	Rev. E0	-
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	-
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0	-
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0	
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Rev. C0	-
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0	-

Table 154: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

Section 3
Commissioning

4.4.3 BIOS settings

No special BIOS settings are necessary for operation.

4.4.4 Windows graphics driver settings

"Digital display" must be defined as output device in the graphics driver.

For more information on this, see chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.4.5 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.5 An AP900 and an AP800 via SDL (onboard)

An Automation Panel 900 and an Automation Panel 800 are connected to the integrated SDL interface (onboard) via SDL.

USB is supported up to a maximum distance (segment 1 + segment 2) of 30 m on the two displays. Starting at a distance of 30 m, USB is only available on the first display (front and back) up to a maximum of 40 m. USB devices can only be connected directly to the Automation Panel 900 or extension keyboard (without a hub).

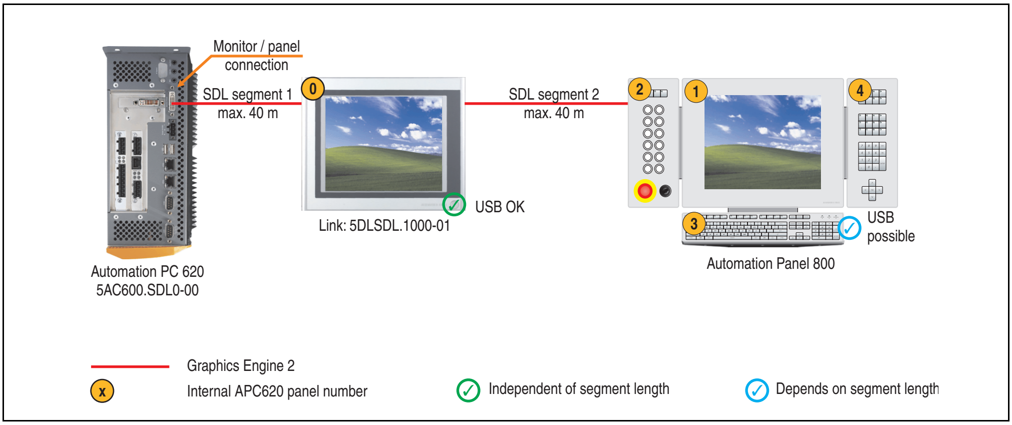


Figure 138: Configuration - One AP900 and an AP800 via SDL (onboard)

4.5.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table.

CPU board	with system unit						Restriction Resolution
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	
5PC600.E855-00 5PC600.X855-00	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC600.E855-01 5PC600.X855-01	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC600.E855-02 5PC600.X855-02	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC600.E855-03 5PC600.X855-03	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC600.E855-04 5PC600.X855-04	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC600.E855-05 5PC600.X855-05	✓	✓	✓	✓	✓	✓	Max. UXGA

Table 155: Possible combinations of system unit and CPU board

4.5.2 Cables

How to select an SDL cable for connecting the AP900 display to the AP900 display 4.3 "An Automation Panel 900 via SDL (onboard)".

How to select an SDL cable for connecting the AP800 display to the AP900 display4.4 "An Automation Panel 800 via SDL (onboard)".

Cable lengths and resolutions for SDL transfer

The following table shows the relationship between segment lengths and the maximum resolution according to the SDL cable used:

Cables	Resolution
Segment length [m]	XGA 1024 x 768
1.8	5CASDL.0018-20
5	5CASDL.0050-20
10	5CASDL.0100-20
15	5CASDL.0150-20
20	5CASDL.0200-20 1)
25	5CASDL.0250-20 1)
30	5CASDL.0300-30 2)
40	5CASDL.0400-30 2)

Table 156: Segment lengths, resolutions and SDL cables

1) See table 157 "Requirements for SDL cable with automatic cable adjustment (equalizer)"

2) See table 158 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)"

The cable types and resolutions shown with a footnote 1) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	

Table 157: Requirements for SDL cable with automatic cable adjustment (equalizer)

The cable types and resolutions shown with a footnote 2) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
Hardware	**Name**	**Revision**	**Note**
5PC600.SX01-00	System 1 PCI	Rev. E0	-
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	-
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0	-
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0	
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Rev. C0	-
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0	-

Table 158: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

4.5.3 BIOS settings

No special BIOS settings are necessary for operation.

4.5.4 Windows graphics driver settings

"Digital display" must be defined as output device in the graphics driver.

For more information on this, see chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.5.5 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.6 Four Automation Panel 900 units via SDL (onboard)

An Automation Panel 900 is connected to the integrated SDL interface (onboard) via an SDL cable. Up to three other Automation Panels of the same type are connected to this Automation Panel and operated via SDL. All four panels show the same content (Display Clone).

USB is supported up to a maximum distance (SDL segment 1 + SDL segment 2) of 30 m on the first two panels (front and back side). From a distance of 30 m and longer, USB is only available for the first panel (front and back side). USB devices can only be connected directly to the Automation Panel (without a hub).

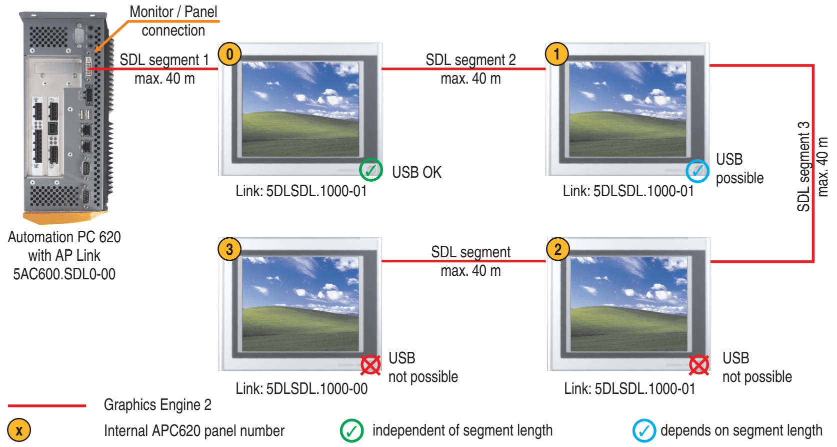


Figure 139: Configuration - Four Automation Panel 900 units via SDL (onboard)

4.6.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table (e.g. for connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit						Restriction Resolution
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	
5PC600.E855-00 5PC600.X855-00	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC600.E855-01 5PC600.X855-01	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC600.E855-02 5PC600.X855-02	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC600.E855-03 5PC600.X855-03	✓	✓	✓	✓	✓	✓	Max. UXGA

Table 159: Possible combinations of system unit and CPU board

CPU board	with system unit						Restriction Resolution
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	
5PC600.E855-04 5PC600.X855-04	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC600.E855-05 5PC600.X855-05	✓	✓	✓	✓	✓	✓	Max. UXGA

Table 159: Possible combinations of system unit and CPU board (Forts.)

4.6.2 Link modules

Model number	Description	Note
5DLSDL.1000-00	**Automation Panel Link SDL receiver** Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
5DLSDL.1000-01	**Automation Panel Link SDL transceiver** Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 3 pieces required

Table 160: Link modules for the configuration: 4 Automation Panel 900 via SDL on 1 line

4.6.3 Cables

Select an Automation Panel 900 cable from the following table.

Model number	Type	Length
5CASDL.0018-00	SDL cable for a fixed type of layout	1.8 m
5CASDL.0018-01	SDL cable with 45° plug for fixed type of layout	1.8 m
5CASDL.0018-03	SDL cable for fixed and flexible type of layout	1.8 m
5CASDL.0050-00	SDL cable for a fixed type of layout	5 m
5CASDL.0050-01	SDL cable with 45° plug for fixed type of layout	5 m
5CASDL.0050-03	SDL cable for fixed and flexible type of layout	5 m
5CASDL.0100-00	SDL cable for a fixed type of layout	10 m
5CASDL.0100-01	SDL cable with 45° plug for fixed type of layout	10 m
5CASDL.0100-03	SDL cable for fixed and flexible type of layout	10 m
5CASDL.0150-00	SDL cable for a fixed type of layout	15 m
5CASDL.0150-01	SDL cable with 45° plug for fixed type of layout	15 m
5CASDL.0150-03	SDL cable for fixed and flexible type of layout	15 m
5CASDL.0200-00	SDL cable for a fixed type of layout	20 m
5CASDL.0200-03	SDL cable for fixed and flexible type of layout	20 m
5CASDL.0250-00	SDL cable for a fixed type of layout	25 m
5CASDL.0250-30	SDL cable for fixed and flexible type of layout	25 m
5CASDL.0300-00	SDL cable for a fixed type of layout	30 m
5CASDL.0300-03	SDL cable for fixed and flexible type of layout	30 m

Table 161: Cables for SDL configurations

Model number	Type	Length
5CASDL.0300-10	SDL cable with extender for a fixed type of layout	30 m
5CASDL.0300-13	SDL cable with extender for fixed and flexible type of layout	30 m
5CASDL.0400-10	SDL cable with extender for a fixed type of layout	40 m
5CASDL.0400-13	SDL cable with extender for fixed and flexible type of layout	40 m

Table 161: Cables for SDL configurations

Cable lengths and resolutions for SDL transfer

The following table shows the relationship between segment lengths and the maximum resolution according to the SDL cable used:

Cables	Resolution				
Segment length [m]	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 1) 5CASDL.0100-01 1) 5CASDL.0100-03 1)
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 1) 5CASDL.0150-01 1) 5CASDL.0150-03 1)	- - -
20	5CASDL.0200-00 1) 5CASDL.0200-03 1)	5CASDL.0200-00 1) 5CASDL.0200-03 1)	5CASDL.0200-00 1) 5CASDL.0200-03 1)	5CASDL.0200-00 1) 5CASDL.0200-03 1)	--
25	5CASDL.0250-00 1) 5CASDL.0250-03 1)	5CASDL.0250-00 1) 5CASDL.0250-03 1)	5CASDL.0250-00 1) 5CASDL.0250-03 1)	- -	- -
30	5CASDL.0300-00 1) 5CASDL.0300-03 1)	5CASDL.0300-00 1) 5CASDL.0300-03 1)	5CASDL.0300-10 2) 5CASDL.0300-13 2)	5CASDL.0300-10 2) 5CASDL.0300-13 2)	-
40	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	-

Table 162: Segment lengths, resolutions and SDL cables

1) See table 163 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 312

2) See table 164 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 312

The cable types and resolutions shown with a footnote 1) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	
Hardware	**Name**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 163: Requirements for SDL cable with automatic cable adjustment (equalizer)

The cable types and resolutions shown with a footnote 2) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	
Hardware	**Name**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. D0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. D0	
5AC600.SDL0-00	AP Link SDL transmitter	Rev. B3	
5PC600.SX01-00	System 1 PCI	Rev. E0	
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0	
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0	
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Rev. C0	
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0	

Table 164: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

4.6.4 BIOS settings

No special BIOS settings are necessary for operation.

4.6.5 Windows graphics driver settings

"Display Clone" must be defined as output device in the graphics driver, with "Digital Display" as primary device.

For more information on this, see chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.6.6 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.7 One Automation Panel 900 unit via SDL (AP Link)

An Automation Panel 900 unit is connected to the optional SDL transmitter (AP Link) via an SDL cable. USB devices can only be connected directly to the Automation Panel (without a hub).

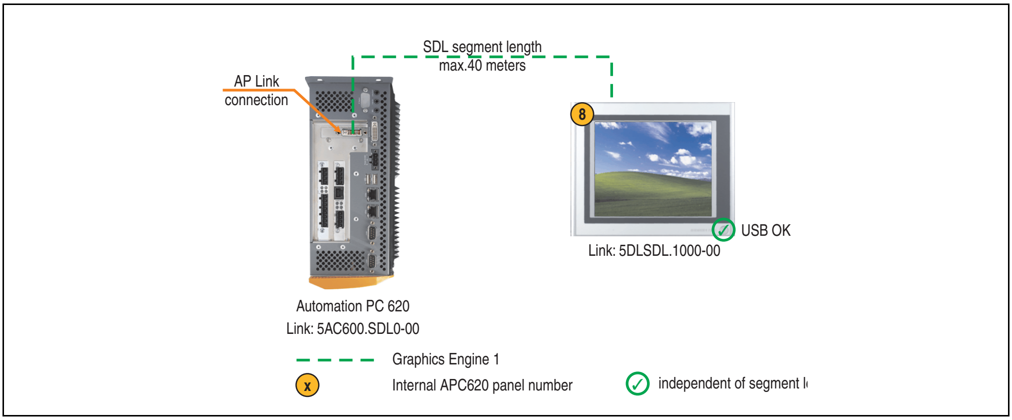


Figure 140: Configuration - One Automation Panel 900 via SDL (AP Link)

4.7.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table (e.g. for connecting a non-B&R Automation Panel 900 device).

CPU board	**with system unit**						Restriction Resolution
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	
5PC600.E855-00 5PC600.X855-00	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-01 5PC600.X855-01	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-02 5PC600.X855-02	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-03 5PC600.X855-03	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-04 5PC600.X855-04	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-05 5PC600.X855-05	-	✓	-	✓	✓	-	Max. UXGA

Table 165: Possible combinations of system unit and CPU board

4.7.2 Link modules

Model number	Description	Note
5DLSDL.1000-00	**Automation Panel Link SDL receiver** Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
5AC600.SDL0-00	**APC620 Smart Display Link transmitter** For connecting Automation Panels to an APC620 via SDL.	For Automation PC 620

Table 166: Link modules for the configuration: 1 Automation Panel 900 via SDL (optional)

4.7.3 Cables

Select a cable from the following table.

Model number	Type	Length
5CASDL.0018-00	SDL cable for a fixed type of layout	1.8 m
5CASDL.0018-01	SDL cable with 45° plug for fixed type of layout	1.8 m
5CASDL.0018-03	SDL cable for fixed and flexible type of layout	1.8 m
5CASDL.0050-00	SDL cable for a fixed type of layout	5 m
5CASDL.0050-01	SDL cable with 45° plug for fixed type of layout	5 m
5CASDL.0050-03	SDL cable for fixed and flexible type of layout	5 m
5CASDL.0100-00	SDL cable for a fixed type of layout	10 m
5CASDL.0100-01	SDL cable with 45° plug for fixed type of layout	10 m
5CASDL.0100-03	SDL cable for fixed and flexible type of layout	10 m
5CASDL.0150-00	SDL cable for a fixed type of layout	15 m
5CASDL.0150-01	SDL cable with 45° plug for fixed type of layout	15 m
5CASDL.0150-03	SDL cable for fixed and flexible type of layout	15 m
5CASDL.0200-00	SDL cable for a fixed type of layout	20 m
5CASDL.0200-03	SDL cable for fixed and flexible type of layout	20 m
5CASDL.0250-00	SDL cable for a fixed type of layout	25 m
5CASDL.0250-30	SDL cable for fixed and flexible type of layout	25 m
5CASDL.0300-00	SDL cable for a fixed type of layout	30 m
5CASDL.0300-03	SDL cable for fixed and flexible type of layout	30 m
5CASDL.0300-10	SDL cable with extender for a fixed type of layout	30 m
5CASDL.0300-13	SDL cable with extender for fixed and flexible type of layout	30 m
5CASDL.0400-10	SDL cable with extender for a fixed type of layout	40 m
5CASDL.0400-13	SDL cable with extender for fixed and flexible type of layout	40 m

Table 167: Cables for SDL configurations

Cable lengths and resolutions for SDL transfer

The following table shows the relationship between segment lengths and the maximum resolution according to the SDL cable used:

Cables Segment length [m]	Resolution VGA 640 x 480	 SVGA 800 x 600	 XGA 1024 x 768	 SXGA 1280 x 1024	 UXGA 1600 x 1200
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 1) 5CASDL.0100-01 1) 5CASDL.0100-03 1)
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-0 1) 5CASDL.0150-01 1) 5CASDL.0150-03 1)	- - -
20	5CASDL.0200-00 1) 5CASDL.0200-03 1)	5CASDL.0200-00 1) 5CASDL.0200-03 1)	5CASDL.0200-00 1) 5CASDL.0200-03 1)	5CASDL.0200-00 1) 5CASDL.0200-03 1)	- -
25	5CASDL.0250-00 1) 5CASDL.0250-03 1)	5CASDL.0250-00 1) 5CASDL.0250-03 1)	5CASDL.0250-00 1) 5CASDL.0250-03 1)	- -	- -
30	5CASDL.0300-00 1) 5CASDL.0300-03 1)	5CASDL.0300-00 1) 5CASDL.0300-03 1)	5CASDL.0300-10 2) 5CASDL.0300-13 2)	5CASDL.0300-10 2) 5CASDL.0300-13 2)	- -
40	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	- -

Table 168: Segment lengths, resolutions and SDL cables

1) See table 169 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 316

2) See table 170 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 317

The cable types and resolutions shown with a footnote 1) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	
Hardware	**Name**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 169: Requirements for SDL cable with automatic cable adjustment (equalizer)

The cable types and resolutions shown with a footnote 2) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	
Hardware	**Name**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. D0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. D0	
5AC600.SDL0-00	AP Link SDL transmitter	Rev. B3	
5PC600.SX01-00	System 1 PCI	Rev. E0	
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0	
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0	
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Rev. C0	
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0	

Table 170: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

4.7.4 BIOS settings

No special BIOS settings are necessary for operation without touch.

To operate Automation Panel 900 panels with a touch screen (Extended Desktop or Dual Display Clone), the serial interfaces COM C and COM D must be activated in BIOS (BIOS default setting = disabled).

4.7.5 Windows graphics driver settings

"Notebook" must be defined as output device in the graphics driver.

For more information on this, see chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.7.6 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.8 Four Automation Panel 900 units via SDL (AP Link)

An Automation Panel 900 unit is connected to the optional SDL transmitter (AP Link) via an SDL cable. Three other Automation Panels of the same type are connected to this Automation Panel and operated via SDL. All four panels show the same content (Display Clone).

USB is supported up to a maximum distance (SDL segment 1 + SDL segment 2) of 30 m on the first two panels (front and back side). From a distance of 30 m and longer, USB is only available for the first panel (front and back side). USB devices can only be connected directly to the Automation Panel (without a hub).

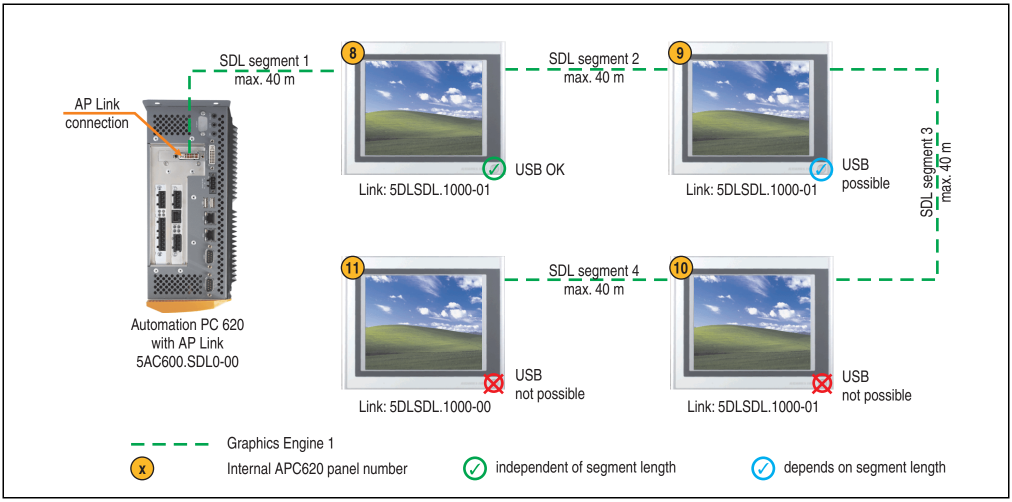


Figure 141: Configuration - 4 Automation Panel 900 units via SDL (AP Link)

4.8.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table (e.g. for connecting a non-B&R Automation Panel 900 device).

CPU board	**with system unit**						Restriction Resolution
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	
5PC600.E855-00 5PC600.X855-00	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-01 5PC600.X855-01	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-02 5PC600.X855-02	-	✓	-	✓	✓	-	Max. UXGA

Table 171: Possible combinations of system unit and CPU board

CPU board	with system unit						Restriction Resolution
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	
5PC600.E855-03 5PC600.X855-03	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-04 5PC600.X855-04	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-05 5PC600.X855-05	-	✓	-	✓	✓	-	Max. UXGA

Table 171: Possible combinations of system unit and CPU board (Forts.)

4.8.2 Link modules

Model number	Description	Note
5DLSDL.1000-00	**Automation Panel Link SDL receiver** Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
5DLSDL.1000-01	**Automation Panel Link SDL transceiver** Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 3 pieces required
5AC600.SDL0-00	**APC620 Smart Display Link transmitter** For connecting Automation Panels to an APC620 via SDL.	For Automation PC 620

Table 172: Link modules for configuration: 4 Automation Panel 900 units via SDL (optional) on 1 line

4.8.3 Cables

Selection of 4 cables from the following tables.

Model number	Type	Length
5CASDL.0018-00	SDL cable for a fixed type of layout	1.8 m
5CASDL.0018-01	SDL cable with 45° plug for fixed type of layout	1.8 m
5CASDL.0018-03	SDL cable for fixed and flexible type of layout	1.8 m
5CASDL.0050-00	SDL cable for a fixed type of layout	5 m
5CASDL.0050-01	SDL cable with 45° plug for fixed type of layout	5 m
5CASDL.0050-03	SDL cable for fixed and flexible type of layout	5 m
5CASDL.0100-00	SDL cable for a fixed type of layout	10 m
5CASDL.0100-01	SDL cable with 45° plug for fixed type of layout	10 m
5CASDL.0100-03	SDL cable for fixed and flexible type of layout	10 m
5CASDL.0150-00	SDL cable for a fixed type of layout	15 m
5CASDL.0150-01	SDL cable with 45° plug for fixed type of layout	15 m
5CASDL.0150-03	SDL cable for fixed and flexible type of layout	15 m
5CASDL.0200-00	SDL cable for a fixed type of layout	20 m
5CASDL.0200-03	SDL cable for fixed and flexible type of layout	20 m
5CASDL.0250-00	SDL cable for a fixed type of layout	25 m

Table 173: Cables for SDL configurations

Model number	Type	Length
5CASDL.0250-30	SDL cable for fixed and flexible type of layout	25 m
5CASDL.0300-00	SDL cable for a fixed type of layout	30 m
5CASDL.0300-03	SDL cable for fixed and flexible type of layout	30 m
5CASDL.0300-10	SDL cable with extender for a fixed type of layout	30 m
5CASDL.0300-13	SDL cable with extender for fixed and flexible type of layout	30 m
5CASDL.0400-10	SDL cable with extender for a fixed type of layout	40 m
5CASDL.0400-13	SDL cable with extender for fixed and flexible type of layout	40 m

Table 173: Cables for SDL configurations

Cable lengths and resolutions for SDL transfer

The following table shows the relationship between segment lengths and the maximum resolution according to the SDL cable used:

Cables Segment length [m]	Resolution				
	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 1) 5CASDL.0100-01 1) 5CASDL.0100-03 1)
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 1) 5CASDL.0150-01 1) 5CASDL.0150-03 1)	- - -
20	5CASDL.0200-00 1) 5CASDL.0200-03 1)	5CASDL.0200-00 1) 5CASDL.0200-03 1)	5CASDL.0200-00 1) 5CASDL.0200-03 1)	5CASDL.0200-00 1) 5CASDL.0200-03 1)	- -
25	5CASDL.0250-00 1) 5CASDL.0250-03 1)	5CASDL.0250-00 1) 5CASDL.0250-03 1)	5CASDL.0250-00 1) 5CASDL.0250-03 1)	- -	- -
30	5CASDL.0300-00 1) 5CASDL.0300-03 1)	5CASDL.0300-00 1) 5CASDL.0300-03 1)	5CASDL.0300-10 2) 5CASDL.0300-13 2)	5CASDL.0300-10 2) 5CASDL.0300-13 2)	-
40	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	-

Table 174: Segment lengths, resolutions and SDL cables

1) See table 175 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 321

2) See table 176 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 321

The cable types and resolutions shown with a footnote 1) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	
Hardware	**Name**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 175: Requirements for SDL cable with automatic cable adjustment (equalizer)

The cable types and resolutions shown with a footnote 2) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	
Hardware	**Name**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. D0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. D0	
5AC600.SDL0-00	AP Link SDL transmitter	Rev. B3	
5PC600.SX01-00	System 1 PCI	Rev. E0	
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0	
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0	
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Rev. C0	
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0	

Table 176: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

4.8.4 BIOS settings

No special BIOS settings are necessary for operation.

4.8.5 Windows graphics driver settings

"Notebook" must be defined as output device in the graphics driver.

For more information on this, see chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.8.6 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.9 Two Automation Panel 900 units via SDL (onboard) and SDL (AP Link)

An Automation Panel 900 (max. UXGA) is connected to the integrated SDL interface (onboard) via an SDL cable. A second Automation Panel 900 (max. UXGA) is connected to the optional SDL transmitter (AP Link) via an SDL cable. The Automation Panels show different content (Extended Desktop) and can be different types.

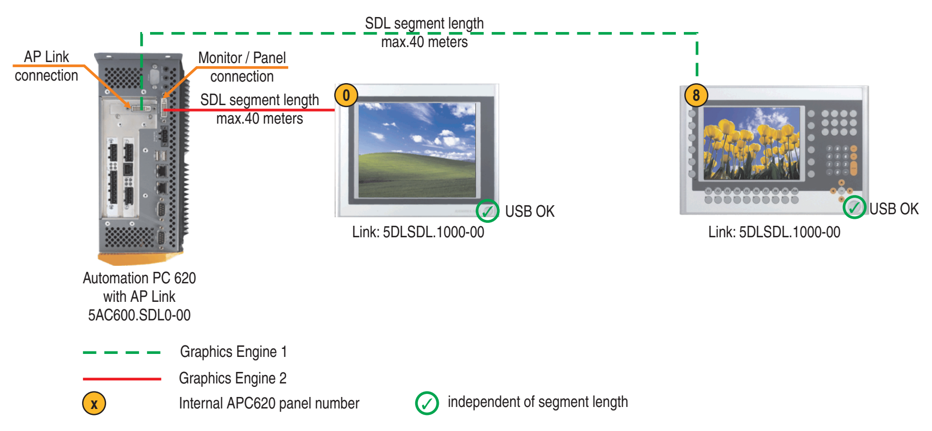


Figure 142: Configuration - Two Automation Panel 900 units via SDL (onboard) and SDL (AP Link)

4.9.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table (e.g. for connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit						Restriction Resolution
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	
5PC600.E855-00 5PC600.X855-00	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-01 5PC600.X855-01	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-02 5PC600.X855-02	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-03 5PC600.X855-03	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-04 5PC600.X855-04	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-05 5PC600.X855-05	-	✓	-	✓	✓	-	Max. UXGA

Table 177: Possible combinations of system unit and CPU board

4.9.2 Link modules

Model number	Description	Note
5DLSDL.1000-00	**Automation Panel Link SDL receiver** Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 2 pieces required
5AC600.SDL0-00	**APC620 Smart Display Link transmitter** For connecting Automation Panels to an APC620 via SDL.	For Automation PC 620

Table 178: Link modules for the configuration: 2 Automation Panel 900 units via SDL and SDL (optional)

4.9.3 Cables

Selection of 2 cables from the following tables.

Model number	Type	Length
5CASDL.0018-00	SDL cable for a fixed type of layout	1.8 m
5CASDL.0018-01	SDL cable with 45° plug for fixed type of layout	1.8 m
5CASDL.0018-03	SDL cable for fixed and flexible type of layout	1.8 m
5CASDL.0050-00	SDL cable for a fixed type of layout	5 m
5CASDL.0050-01	SDL cable with 45° plug for fixed type of layout	5 m
5CASDL.0050-03	SDL cable for fixed and flexible type of layout	5 m
5CASDL.0100-00	SDL cable for a fixed type of layout	10 m
5CASDL.0100-01	SDL cable with 45° plug for fixed type of layout	10 m
5CASDL.0100-03	SDL cable for fixed and flexible type of layout	10 m
5CASDL.0150-00	SDL cable for a fixed type of layout	15 m
5CASDL.0150-01	SDL cable with 45° plug for fixed type of layout	15 m
5CASDL.0150-03	SDL cable for fixed and flexible type of layout	15 m
5CASDL.0200-00	SDL cable for a fixed type of layout	20 m
5CASDL.0200-03	SDL cable for fixed and flexible type of layout	20 m
5CASDL.0250-00	SDL cable for a fixed type of layout	25 m
5CASDL.0250-30	SDL cable for fixed and flexible type of layout	25 m
5CASDL.0300-00	SDL cable for a fixed type of layout	30 m
5CASDL.0300-03	SDL cable for fixed and flexible type of layout	30 m
5CASDL.0300-10	SDL cable with extender for a fixed type of layout	30 m
5CASDL.0300-13	SDL cable with extender for fixed and flexible type of layout	30 m
5CASDL.0400-10	SDL cable with extender for a fixed type of layout	40 m
5CASDL.0400-13	SDL cable with extender for fixed and flexible type of layout	40 m

Table 179: Cables for SDL configurations

Cable lengths and resolutions for SDL transfer

The following table shows the relationship between segment lengths and the maximum resolution according to the SDL cable used:

Cables Segment length [m]	Resolution				
	VGA 640 x 480	**SVGA 800 x 600**	**XGA 1024 x 768**	**SXGA 1280 x 1024**	**UXGA 1600 x 1200**
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00[1] 5CASDL.0100-01[1] 5CASDL.0100-03[1]
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00[1] 5CASDL.0150-01[1] 5CASDL.0150-03[1]	- - -
20	5CASDL.0200-00[1] 5CASDL.0200-03[1]	5CASDL.0200-00[1] 5CASDL.0200-03[1]	5CASDL.0200-00[1] 5CASDL.0200-03[1]	5CASDL.0200-00[1] 5CASDL.0200-03[1]	- -
25	5CASDL.0250-00[1] 5CASDL.0250-03[1]	5CASDL.0250-00[1] 5CASDL.0250-03[1]	5CASDL.0250-00[1] 5CASDL.0250-03[1]	- -	- -
30	5CASDL.0300-00[1] 5CASDL.0300-03[1]	5CASDL.0300-00[1] 5CASDL.0300-03[1]	5CASDL.0300-10[2] 5CASDL.0300-13[2]	5CASDL.0300-10[2] 5CASDL.0300-13[2]	- -
40	5CASDL.0400-10[2] 5CASDL.0400-13[2]	5CASDL.0400-10[2] 5CASDL.0400-13[2]	5CASDL.0400-10[2] 5CASDL.0400-13[2]	5CASDL.0400-10[2] 5CASDL.0400-13[2]	- -

Table 180: Segment lengths, resolutions and SDL cables

1) See table 181 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 325

2) See table 182 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 326

The cable types and resolutions shown with a footnote 1) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	**Name**	**Version**	**Note**
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	
Hardware	**Name**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 181: Requirements for SDL cable with automatic cable adjustment (equalizer)

The cable types and resolutions shown with a footnote 2) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	
Hardware	**Name**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. D0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. D0	
5AC600.SDL0-00	AP Link SDL transmitter	Rev. B3	
5PC600.SX01-00	System 1 PCI	Rev. E0	
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0	
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0	
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Rev. C0	
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0	

Table 182: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

4.9.4 BIOS settings

No special BIOS settings are necessary for operation without touch.

To operate Automation Panel 900 panels with a touch screen (Extended Desktop or Dual Display Clone), the serial interfaces COM C and COM D must be activated in BIOS (BIOS default setting = disabled).

4.9.5 Windows graphics driver settings

See chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

If all connected Automation Panel 900 panels (line 1 + line 2) should display the same content, then "Dual Display Clone" mode must be set in the graphics driver (see chapter 4 "Software", section 5.2.4 "Graphics settings for Dual Display Clone", on page 555).

If all connected Automation Panel 900 panels (line 1 + line 2) should display the same content, then "Dual Display Clone" mode must be set in the graphics driver (see chapter 4 "Software", section 5.2.3 "Graphics settings for Extended Desktop", on page 553).

4.9.6 Windows touch screen driver settings

See chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.10 Eight Automation Panel 900 units via SDL (onboard) and SDL (AP Link)

Four Automation Panel 900 units (max. UXGA) are connected to the integrated SDL interface (onboard) via SDL. Four additional Automation Panel 900 units (max. UXGA) are connected to the optional SDL transmitter (AP Link). The Automation Panels in each line must be the same type. The two lines display different content (Extended Desktop), but panels in the same line show the same content (Display Clone).

USB is supported up to a maximum distance (SDL segment 1 + SDL segment 2) of 30 m on the first two panels (front and back side). From a distance of 30 m and longer, USB is only available for the first panel on each line. USB devices can only be connected directly to the Automation Panel (without hub).

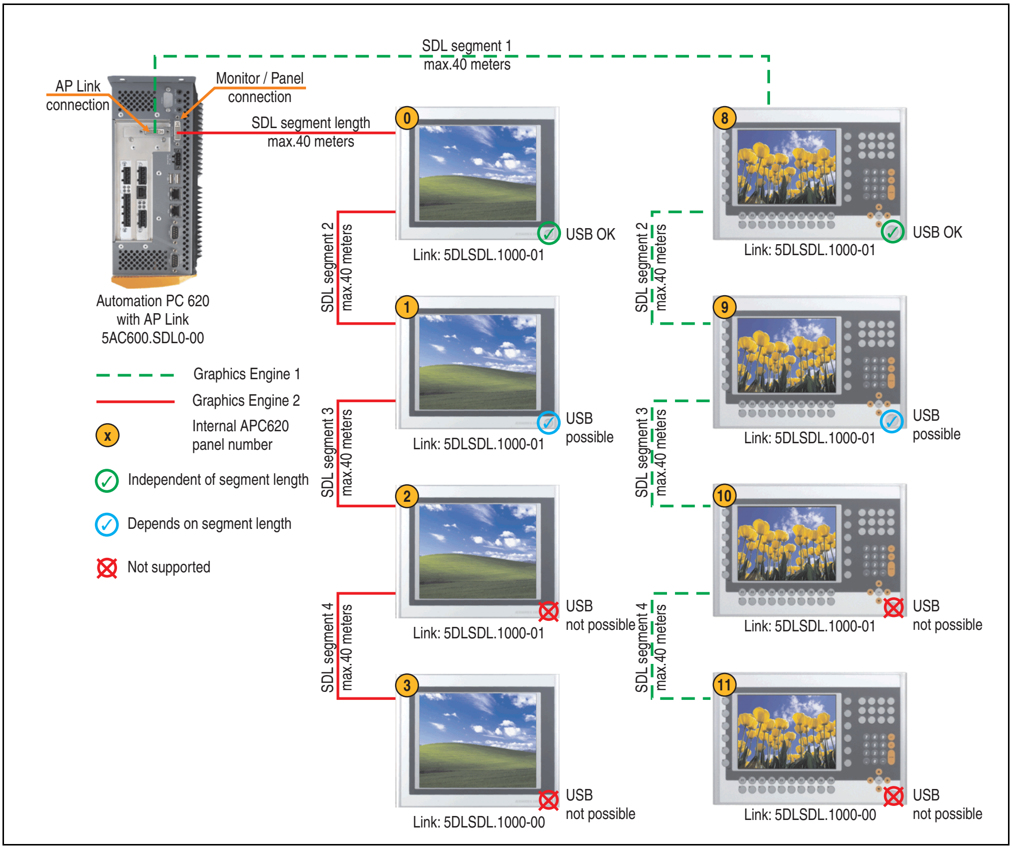


Figure 143: Configuration - Eight Automation Panel 900 units via SDL (onboard) and SDL (AP Link)

4.10.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table (e.g. for connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit						Restriction Resolution
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	
5PC600.E855-00 5PC600.X855-00	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-01 5PC600.X855-01	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-02 5PC600.X855-02	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-03 5PC600.X855-03	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-04 5PC600.X855-04	-	✓	-	✓	✓	-	Max. UXGA
5PC600.E855-05 5PC600.X855-05	-	✓	-	✓	✓	-	Max. UXGA

Table 183: Possible combinations of system unit and CPU board

4.10.2 Link modules

Model number	Description	Note
5DLSDL.1000-00	**Automation Panel Link SDL receiver** Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 2 pieces required
5DLSDL.1000-01	**Automation Panel Link SDL transceiver** Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 6 pieces required
5AC600.SDL0-00	**APC620 Smart Display Link transmitter** For connecting Automation Panels to an APC620 via SDL.	For Automation PC 620 1 pieces required

Table 184: Link modules for configuration: 8 Automation Panel 900 units via SDL and SDL (optional)

4.10.3 Cables

Selection of 8 cables from the following tables.

Model number	Type	Length
5CASDL.0018-00	SDL cable for a fixed type of layout	1.8 m
5CASDL.0018-01	SDL cable with 45° plug for fixed type of layout	1.8 m
5CASDL.0018-03	SDL cable for fixed and flexible type of layout	1.8 m
5CASDL.0050-00	SDL cable for a fixed type of layout	5 m
5CASDL.0050-01	SDL cable with 45° plug for fixed type of layout	5 m
5CASDL.0050-03	SDL cable for fixed and flexible type of layout	5 m
5CASDL.0100-00	SDL cable for a fixed type of layout	10 m
5CASDL.0100-01	SDL cable with 45° plug for fixed type of layout	10 m
5CASDL.0100-03	SDL cable for fixed and flexible type of layout	10 m
5CASDL.0150-00	SDL cable for a fixed type of layout	15 m
5CASDL.0150-01	SDL cable with 45° plug for fixed type of layout	15 m
5CASDL.0150-03	SDL cable for fixed and flexible type of layout	15 m
5CASDL.0200-00	SDL cable for a fixed type of layout	20 m
5CASDL.0200-03	SDL cable for fixed and flexible type of layout	20 m
5CASDL.0250-00	SDL cable for a fixed type of layout	25 m
5CASDL.0250-30	SDL cable for fixed and flexible type of layout	25 m
5CASDL.0300-00	SDL cable for a fixed type of layout	30 m
5CASDL.0300-03	SDL cable for fixed and flexible type of layout	30 m
5CASDL.0300-10	SDL cable with extender for a fixed type of layout	30 m
5CASDL.0300-13	SDL cable with extender for fixed and flexible type of layout	30 m
5CASDL.0400-10	SDL cable with extender for a fixed type of layout	40 m
5CASDL.0400-13	SDL cable with extender for fixed and flexible type of layout	40 m

Table 185: Cables for SDL configurations

Cable lengths and resolutions for SDL transfer

The following table shows the relationship between segment lengths and the maximum resolution according to the SDL cable used:

Cables Segment length [m]	Resolution				
	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03

Table 186: Segment lengths, resolutions and SDL cables

Cables Segment length [m]	Resolution				
	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 1) 5CASDL.0100-01 1) 5CASDL.0100-03 1)
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 1) 5CASDL.0150-01 1) 5CASDL.0150-03 1)	- - -
20	5CASDL.0200-00 1) 5CASDL.0200-03 1)	5CASDL.0200-00 1) 5CASDL.0200-03 1)	5CASDL.0200-00 1) 5CASDL.0200-03 1)	5CASDL.0200-00 1) 5CASDL.0200-03 1)	- -
25	5CASDL.0250-00 1) 5CASDL.0250-03 1)	5CASDL.0250-00 1) 5CASDL.0250-03 1)	5CASDL.0250-00 1) 5CASDL.0250-03 1)	- -	- -
30	5CASDL.0300-00 1) 5CASDL.0300-03 1)	5CASDL.0300-00 1) 5CASDL.0300-03 1)	5CASDL.0300-10 2) 5CASDL.0300-13 2)	5CASDL.0300-10 2) 5CASDL.0300-13 2)	- -
40	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	5CASDL.0400-10 2) 5CASDL.0400-13 2)	- -

Table 186: Segment lengths, resolutions and SDL cables (Forts.)

1) See table 187 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 330

2) See table 188 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 331

The cable types and resolutions shown with a footnote 1) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	
Hardware	**Name**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 187: Requirements for SDL cable with automatic cable adjustment (equalizer)

The cable types and resolutions shown with a footnote 2) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	
Hardware	**Name**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. D0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. D0	
5AC600.SDL0-00	AP Link SDL transmitter	Rev. B3	
5PC600.SX01-00	System 1 PCI	Rev. E0	
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0	
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0	
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Rev. C0	
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0	

Table 188: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

4.10.4 BIOS settings

No special BIOS settings are necessary for operation without touch.

To operate Automation Panel 900 panels with a touch screen (Extended Desktop or Dual Display Clone), the serial interfaces COM C and COM D must be activated in BIOS (BIOS default setting = disabled).

4.10.5 Windows graphics driver settings

See chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

If all connected Automation Panel 900 panels (line 1 + line 2) should display the same content, then "Dual Display Clone" mode must be set in the graphics driver (see chapter 4 "Software", section 5.2.4 "Graphics settings for Dual Display Clone", on page 555).

4.10.6 Windows touch screen driver settings

See chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.11 Six AP900 and two AP800 devices via SDL (onboard) and SDL (AP Link)

Three Automation Panel 900 (max. UXGA) units and one Automation Panel 800 are connected to the integrated SDL interface (onboard) via SDL. Additionally, three Automation Panel 900 (max. UXGA) units and one Automation Panel 800 are operated on the optional SDL transmitters. The Automation Panels in each line must be the same type. The two lines display different content (Extended Desktop), but displays in the same line show the same content (Display Clone).

USB is supported up to a maximum distance (segment 1 + segment 2) of 30 m on the first two displays. Starting at a distance of 30 m, USB is only available on the first display (front and back) up to a maximum of 40 m. USB devices can only be connected directly to Automation Panel 900 devices (without a hub).

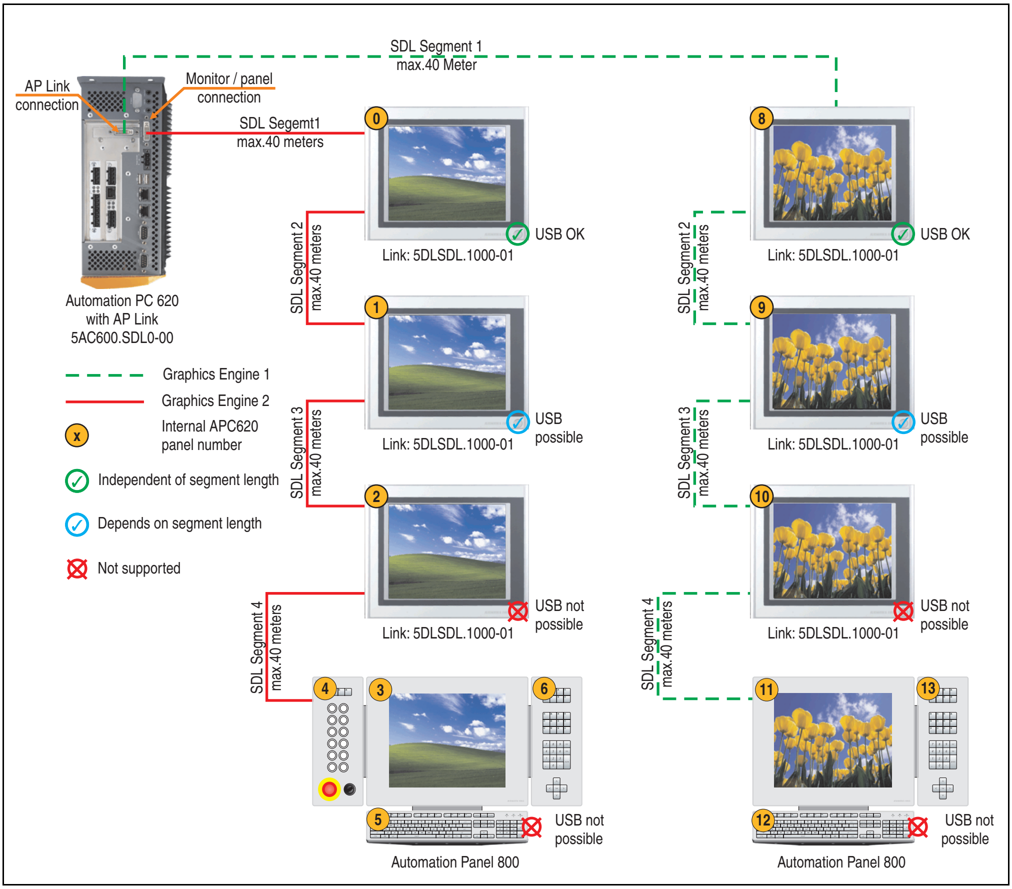


Figure 144: Configuration - Six AP900 and two AP800 devices via SDL (onboard) and SDL (AP Link)

4.11.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table.

If an Automation Panel 800 and an Automation Panel 900 should be connected on the same line, the devices must have the same display type.

CPU board	**with system unit**						Restriction Resolution
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	
5PC600.E855-00 5PC600.X855-00	-	✓	-	✓	✓	-	max. XGA
5PC600.E855-01 5PC600.X855-01	-	✓	-	✓	✓	-	max. XGA
5PC600.E855-02 5PC600.X855-02	-	✓	-	✓	✓	-	max. XGA
5PC600.E855-03 5PC600.X855-03	-	✓	-	✓	✓	-	max. XGA
5PC600.E855-04 5PC600.X855-04	-	✓	-	✓	✓	-	max. XGA
5PC600.E855-05 5PC600.X855-05	-	✓	-	✓	✓	-	max. XGA

Table 189: Possible combinations of system unit and CPU board

4.11.2 Link modules

Model number	**Description**	**Note**
5DLSDL.1000-01	**Automation Panel Link SDL transceiver** Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 6 pieces required
5AC600.SDL0-00	**APC620 Smart Display Link transmitter** For connecting Automation Panels to an APC620 via SDL.	For Automation PC 620 1 pieces required

Table 190: Link modules for configuration: 6 Automation Panel 900 units via SDL and SDL (optional)

4.11.3 Cables

How to select an SDL cable for connecting the AP900 display to the AP900 display 4.3 "An Automation Panel 900 via SDL (onboard)".

How to select an SDL cable for connecting the AP800 display to the AP900 display4.4 "An Automation Panel 800 via SDL (onboard)".

Cable lengths and resolutions for SDL transfer

The following table shows the relationship between segment lengths and the maximum resolution according to the SDL cable used:

Cables Segment length [m]	Resolution VGA 640 x 480	 SVGA 800 x 600	 XGA 1024 x 768	 SXGA 1280 x 1024	 UXGA 1600 x 1200
1.8	- - - -	- - - -	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-20 5CASDL.0018-03	- - - -	- - - -
5	- - - -	- - - -	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-02 5CASDL.0050-03	- - - -	- - - -
10	- - - -	- - - -	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-02 5CASDL.0100-03	- - - -	- - - -
15	- - - -	- - - -	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-02 5CASDL.0150-03	- - - -	- - - -
20	- - -	- - -	5CASDL.0200-00 1) 5CASDL.0200-02 1) 5CASDL.0200-03 1)	- - -	- - -
25	- - -	- - -	5CASDL.0250-00 1) 5CASDL.0250-02 1) 5CASDL.0250-03 1)	- - -	- - -
30	- - -	- - -	5CASDL.0300-10 1) 5CASDL.0300-13 2) 5CASDL.0300-30 2)	- - -	- - -
40	- -	- -	5CASDL.0400-10 2) 5CASDL.0400-13 2) 5CASDL.0400-30 2)	- -	- -

Table 191: Segment lengths, resolutions and SDL cables

1) See table 192 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 334

2) See table 193 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 335

The cable types and resolutions shown with a footnote 1) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	

Table 192: Requirements for SDL cable with automatic cable adjustment (equalizer)

The cable types and resolutions shown with a footnote 2) in the previous table can only be implemented starting with the following firmware and hardware versions:

Firmware	**Name**	**Version**	**Note**
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description. Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on the APC620	v 01.55	
Hardware	**Name**	**Revision**	**Note**
5PC600.SX01-00	System 1 PCI	Rev. E0	-
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	-
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0	-
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0	-
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Rev. C0	-
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0	-

Table 193: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

4.11.4 BIOS settings

No special BIOS settings are necessary for operation without touch.

To operate Automation Panel 900 panels with a touch screen (Extended Desktop or Dual Display Clone), the serial interfaces COM C and COM D must be activated in BIOS (BIOS default setting = disabled).

4.11.5 Windows graphics driver settings

See chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

If all connected Automation Panel 900 panels and Automation Panel 800 panels (line 1 + line 2) should display the same content, then "Dual Display Clone" mode must be set in the graphics driver (see chapter 4 "Software", section 5.2.4 "Graphics settings for Dual Display Clone", on page 555).

4.11.6 Windows touch screen driver settings

See chapter 4 "Software", section 5 "Automation PC 620 with Windows XP Professional", on page 548.

4.12 Internal numbering of extension units in AP800 devices

An extension unit for an AP800 device is numbered like another device. The numbering of the extension units starts from the display unit and goes in the counter-clockwise direction; all extension unit slots that are not used are left out.
The following graphic shows numbering examples.

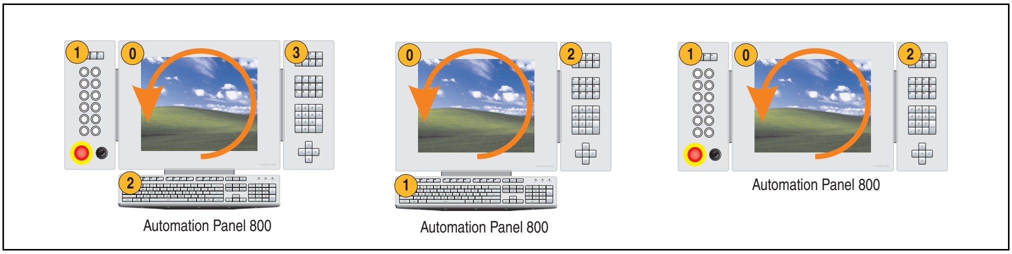
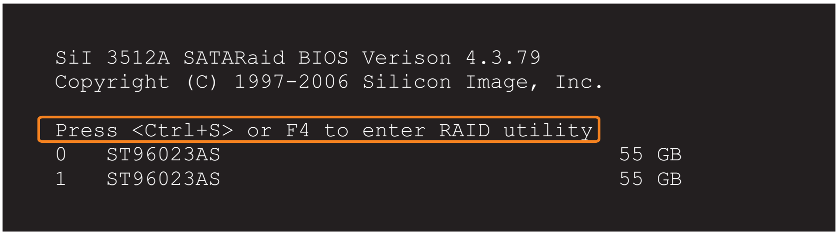


Figure 145: Examples - internal numbering of the extension units

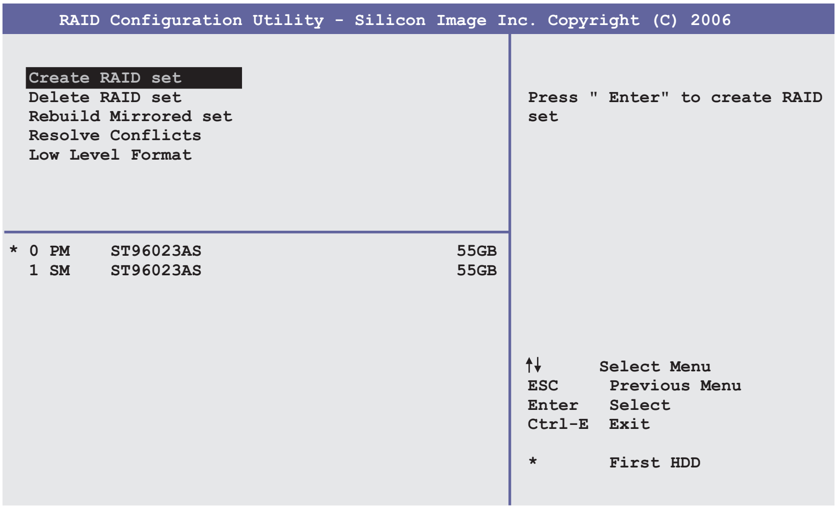
5. Configuration of a SATA RAID array

You must enter the BIOS "RAID Configuration Utility" in order to make the necessary settings. After the POST, enter <Ctrl+S> or <F4> to open RAID BIOS.



```
SiI 3512A SATARaid BIOS Verison 4.3.79
Copyright (C) 1997-2006 Silicon Image, Inc.

Press <Ctrl+S> or F4 to enter RAID utility
0   ST96023AS                                 55 GB
1   ST96023AS                                 55 GB
```

Figure 146: Open the RAID Configuration Utility



```
  RAID Configuration Utility - Silicon Image Inc. Copyright (C) 2006

 Create RAID set
 Delete RAID set                              Press " Enter" to create RAID
 Rebuild Mirrored set                         set
 Resolve Conflicts
 Low Level Format

* 0 PM    ST96023AS                    55GB
  1 SM    ST96023AS                    55GB

                                              ↑↓       Select Menu
                                              ESC      Previous Menu
                                              Enter    Select
                                              Ctrl-E   Exit

                                              *        First HDD
```

Figure 147: RAID Configuration Utility - Menu

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

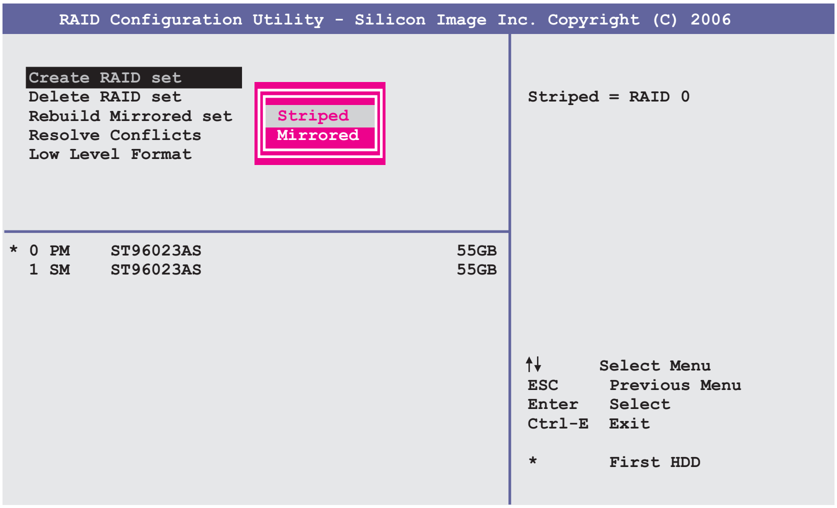
Key	Function
Cursor ↑	Go to previous item.
Cursor ↓	Go to the next item.
Enter	Select an item or open a submenu.

Table 194: BIOS-relevant keys in the RAID Configuration Utility

Key	Function
ESC	Go back to previous menu.
Ctrl+E	Exit setup and save the changed settings.

Table 194: BIOS-relevant keys in the RAID Configuration Utility

5.1 Create RAID set

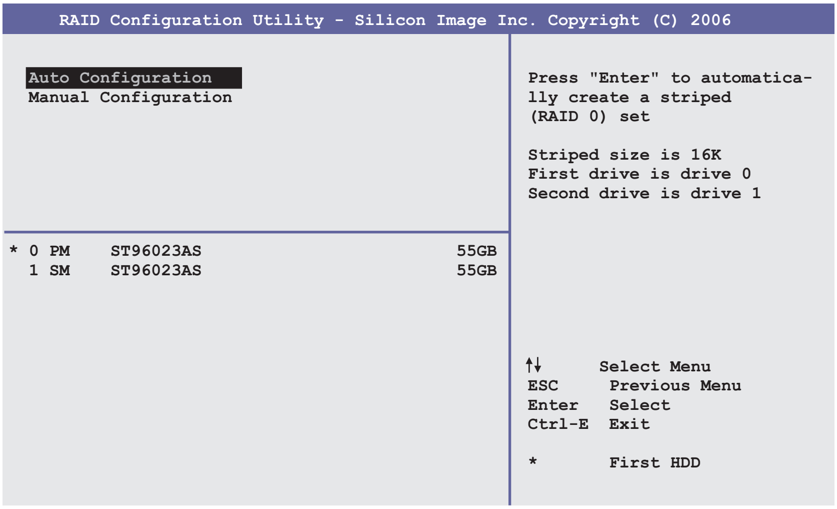


```
     RAID Configuration Utility - Silicon Image Inc. Copyright (C) 2006

  Create RAID set                               Striped = RAID 0
  Delete RAID set          Striped
  Rebuild Mirrored set     Mirrored
  Resolve Conflicts
  Low Level Format

* 0 PM    ST96023AS                     55GB
  1 SM    ST96023AS                     55GB

                                                ↑↓      Select Menu
                                                ESC     Previous Menu
                                                Enter   Select
                                                Ctrl-E  Exit

                                                *       First HDD
```

Figure 148: RAID Configuration Utility - Menu

The RAID system can be recreated as "Striped" = RAID0 or "Mirrored" = RAID1 using the menu "Create RAID set".

5.1.1 Create RAID set - Striped



```
    RAID Configuration Utility - Silicon Image Inc. Copyright (C) 2006

  Auto Configuration                        Press "Enter" to automatica-
  Manual Configuration                      lly create a striped
                                            (RAID 0) set

                                            Striped size is 16K
                                            First drive is drive 0
                                            Second drive is drive 1

* 0 PM    ST96023AS                  55GB
  1 SM    ST96023AS                  55GB




                                            ↑↓      Select Menu
                                            ESC      Previous Menu
                                            Enter    Select
                                            Ctrl-E   Exit

                                            *        First HDD
```

Figure 149: RAID Configuration Utility - Create RAID set - Striped

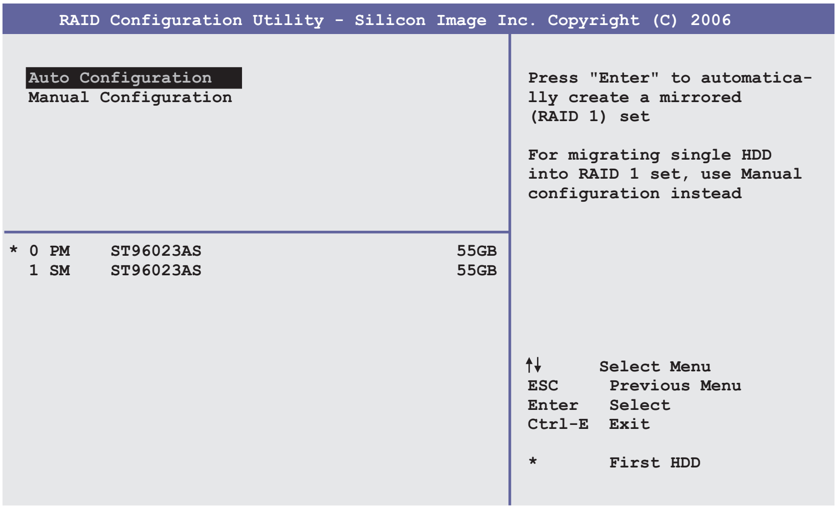
Auto Configuration

Auto Configuration optimizes all settings.

Manual Configuration

It is possible to specify the first and second HDD as well as the "Chunk Size" (= block size, application-dependent).

5.1.2 Create RAID set - Mirrored



RAID Configuration Utility - Silicon Image Inc. Copyright (C) 2006
Auto Configuration
Manual Configuration

```
Press "Enter" to automatica-
lly create a mirrored
(RAID 1) set

For migrating single HDD
into RAID 1 set, use Manual
configuration instead
```

```
* 0 PM    ST96023AS                          55GB
  1 SM    ST96023AS                          55GB
```

Figure 150: RAID Configuration Utility - Create RAID set - Mirrored

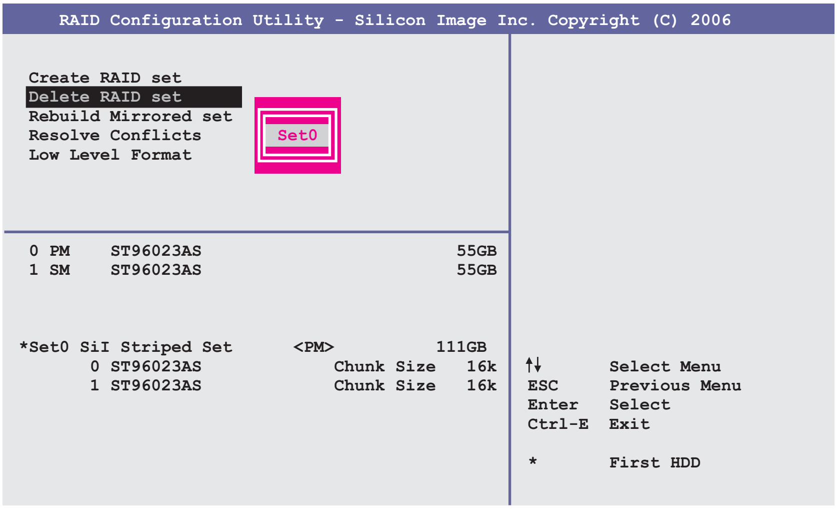
Auto Configuration

Auto Configuration optimizes all settings.

Manual Configuration

It is possible to specify the "Source" and "Target" HDD, and also to specify whether a rebuild (mirror) should be performed immediately (approx. 50 minutes).

5.2 Delete RAID set

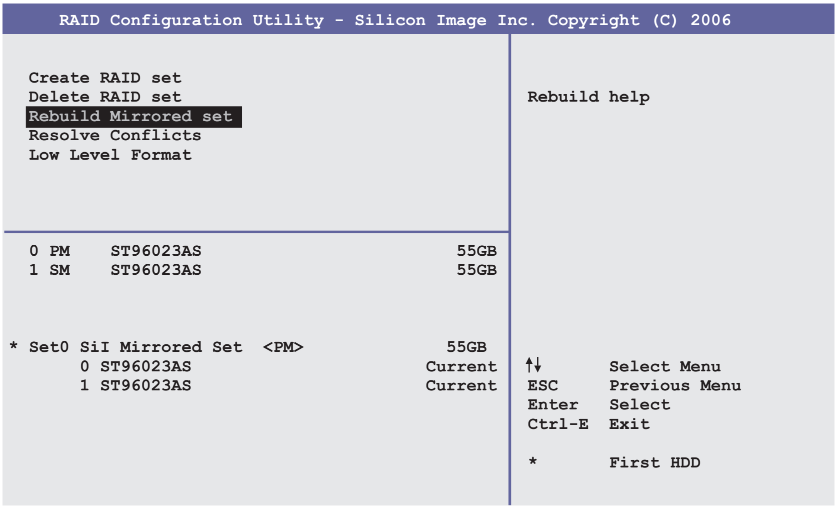


```
   RAID Configuration Utility - Silicon Image Inc. Copyright (C) 2006

  Create RAID set
  Delete RAID set
  Rebuild Mirrored set      Set0
  Resolve Conflicts
  Low Level Format

  0 PM    ST96023AS                        55GB
  1 SM    ST96023AS                        55GB


 *Set0 SiI Striped Set       <PM>        111GB
        0 ST96023AS             Chunk Size   16k    ↑↓       Select Menu
        1 ST96023AS             Chunk Size   16k    ESC      Previous Menu
                                                    Enter    Select
                                                    Ctrl-E   Exit

                                                    *        First HDD
```

Figure 151: RAID Configuration Utility - Delete RAID set

An existing RAID set can be deleted using the menu "Delete RAID set".

5.3 Rebuild mirrored set



```
    RAID Configuration Utility - Silicon Image Inc. Copyright (C) 2006

  Create RAID set
  Delete RAID set                                Rebuild help
  Rebuild Mirrored set
  Resolve Conflicts
  Low Level Format

  0 PM    ST96023AS                        55GB
  1 SM    ST96023AS                        55GB


* Set0 SiI Mirrored Set  <PM>             55GB
       0 ST96023AS                      Current   ↑↓       Select Menu
       1 ST96023AS                      Current   ESC      Previous Menu
                                                  Enter    Select
                                                  Ctrl-E   Exit

                                                  *        First HDD
```

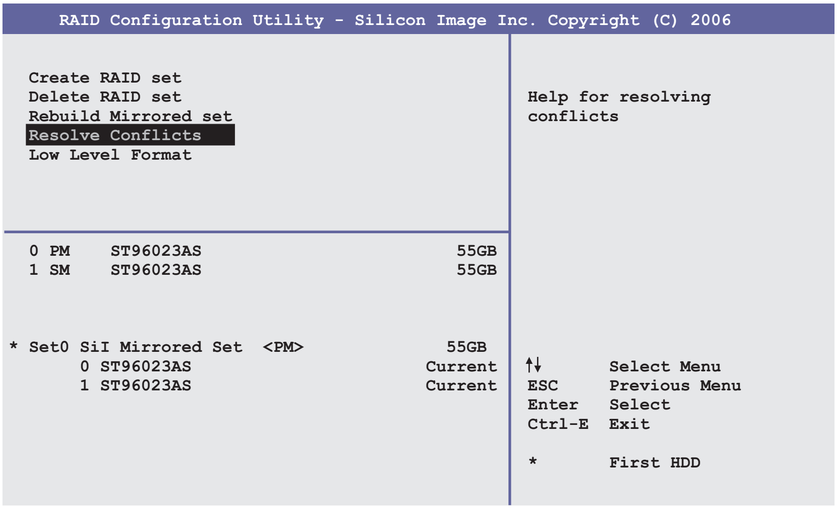
Figure 152: RAID Configuration Utility - Rebuild mirrored set

The "Rebuild mirrored set" menu can be used to restart a rebuild procedure in a RAID 1 network if an error occurs, after first interrupting the rebuild procedure or when exchanging a hard disk.

If "onlinerebuild" is selected, then the rebuild is executed during operation after the system is booted. E.g. an event pop-up is displayed by the installed SATA RAID configuration program: `SATARaid detected a new event` and the rebuild is started. The entire rebuild lasts approximately 50 minutes.

If "offlinerebuild" is selected, then a rebuild is performed immediately before starting the operating system (lasts approximately 30 minutes).

5.4 Resolve conflicts

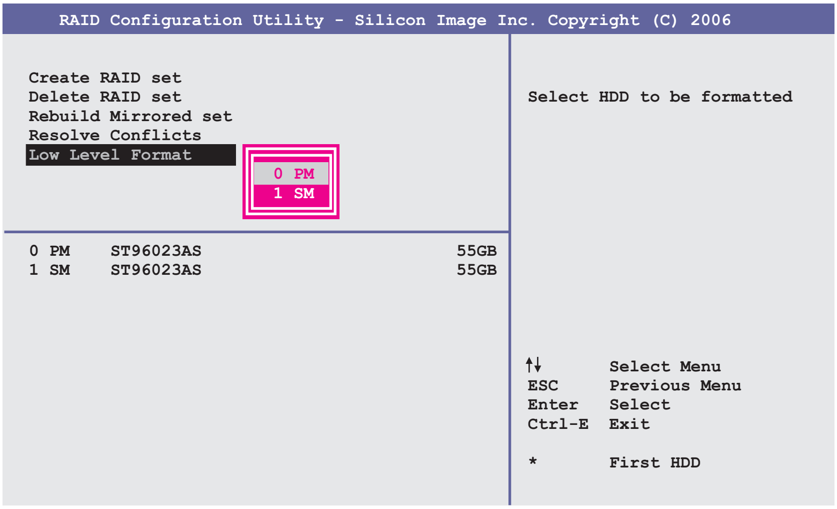


```
     RAID Configuration Utility - Silicon Image Inc. Copyright (C) 2006

  Create RAID set
  Delete RAID set                                   Help for resolving
  Rebuild Mirrored set                              conflicts
  Resolve Conflicts
  Low Level Format



  0  PM     ST96023AS                         55GB
  1  SM     ST96023AS                         55GB



* Set0 SiI Mirrored Set  <PM>                55GB
       0  ST96023AS                        Current  ↑↓       Select Menu
       1  ST96023AS                        Current  ESC      Previous Menu
                                                    Enter    Select
                                                    Ctrl-E   Exit

                                                    *        First HDD
```

Figure 153: RAID Configuration Utility - Resolve conflicts

Conflicts in a RAID set can be resolved using the "Resolve conflicts" menu. This function is only available if the status of the hard disk is "conflict".

5.5 Low level format



```
RAID Configuration Utility - Silicon Image Inc. Copyright (C) 2006

Create RAID set                                   Select HDD to be formatted
Delete RAID set
Rebuild Mirrored set
Resolve Conflicts
Low Level Format
                        0  PM
                        1  SM

0  PM    ST96023AS                        55GB
1  SM    ST96023AS                        55GB

                                                  ↑↓       Select Menu
                                                  ESC      Previous Menu
                                                  Enter    Select
                                                  Ctrl-E   Exit

                                                  *        First HDD
```

Figure 154: RAID Configuration Utility - Low level format

Individual hard disks can be configured using the "Low Level Format" menu. This can only be done if a RAID set is not configured. A low level format of a hard disk takes approx. 40 minutes.

6. Connection of USB peripheral devices

Warning!

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

6.1 Local on the APC620

Many different peripheral USB devices can be connected to the 2 or 4 (APC embedded) USB interfaces. The maximum current load values and transfer speeds can be found in Sections "USB port", on page 133 and "USB connection (only APC620 embedded)", on page 134.

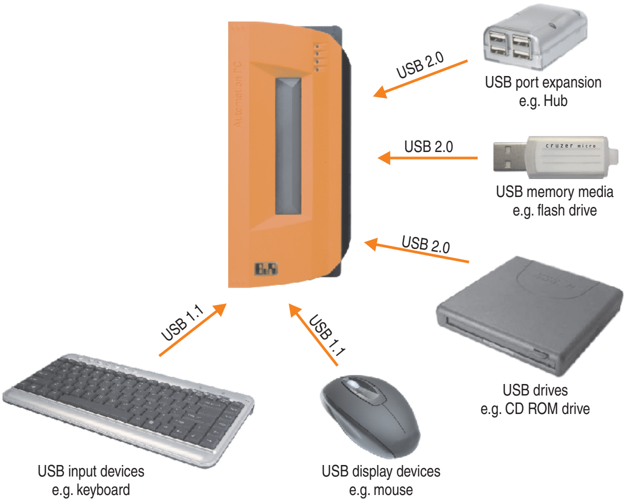


Figure 155: Local connection of USB peripheral devices on the APC620

6.2 Remote connection to Automation Panel 900 via DVI

Many different peripheral USB devices can be connected to the 2 or 3 USB interfaces on the Automation Panel 900. These can each handle a load of 500 mA. The maximum transfer rate is USB 2.0.

Information:

Only end devices (no hubs) can be connected to the Automation Panel 900.

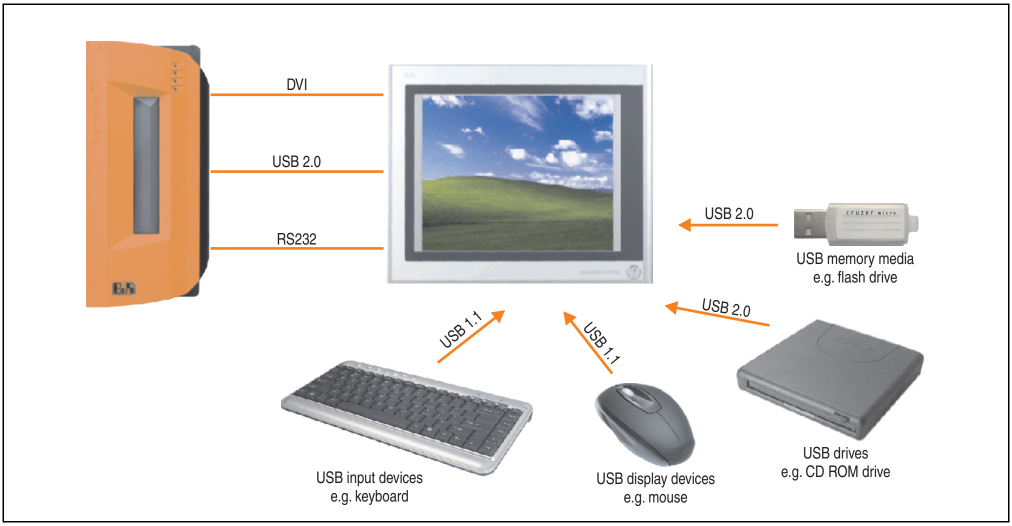


Figure 156: Remote connection of USB peripheral devices to the APC900 via DVI

6.3 Remote connection to Automation Panel 800/900 via SDL

Many different peripheral USB devices can be connected to the 2 or 3 USB interfaces on Automation Panel 900 and/or USB connections on the Automation Panel 800 devices. These can each handle a load of 500 mA. The maximum transfer rate is USB 1.1.

Information:

Only end devices (no hubs) can be connected to the Automation Panel 800/900.

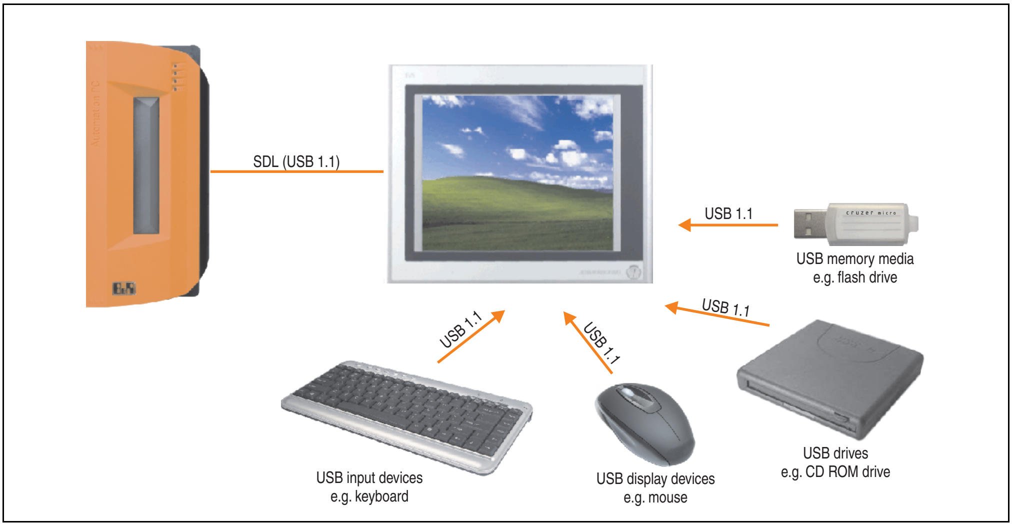


Figure 157: Remote connection of USB peripheral devices to the APC800/900 via SDL

7. Compatibility / improvement from 855GME (XTX) to 855GME (ETX)

The following table shows the compatibilities and improvements from 855GME (XTX) 5PC600.X855-0x to 855GME (ETX) 5PC600.E855-0x CPU boards.

Property	Compatibility / improvement
Hardware compatibility	Yes
Power	Equal to
Software compatibility	
Hardware driver	Yes
BIOS	No - AMI BIOS
Windows XP Professional	No - Reinstall required
Windows XP Embedded	No - New image required (see model number overview)
Windows Embedded Standard 2009	No - New image required (see model number overview)
Automation Runtime	No - New version of Automation Runtime required
Improvements	No limitation of ETH1 cable length Better and more even distribution of IRQ load and distribution on the PCI bus USB 2.0 is already supported when booting Easier configuration of an "Exclusive PCI IRQ" Support for creating custom boot logos Better detection of connected display devices (e.g. Automation Panel 800, Automation Panel 900, standard TFT monitor, etc.)

Table 195: Compatibility / improvements from 855GME (XTX) to 855GME (ETX)

8. Known problems / issues

The following issue for the APC620 devices is known:

- Using two different types of CompactFlash cards can cause problems in Automation PCs and Panel PCs. This can result in one of the two cards not being detected during system startup. This is caused by varying startup speeds. CompactFlash cards with older technology require significantly more time during system startup than CompactFlash cards with newer technology. This behavior occurs near the limits of the time frame provided for startup. The problem described above can occur because the startup time for the CompactFlash cards fluctuates due to the variance of the components being used. Depending on the CompactFlash cards being used, this error might never, sometimes or always occur.
- During daisy chain operation of multiple AP800/AP900 devices via SDL, it's possible that the touch controller status shows a red "X" in the Control Center applet for the touch screen driver when the touch controller is detected. The functionality of the touch system is not affected by this. This can be avoided by setting a panel locking time of 50 ms. The panel locking time can be configured with the B&R Key Editor.

Chapter 4 • Software

1. BIOS options

The available BIOS settings in various CPU boards 815E (ETX), 855GME (ETX) and 855GME (XTX) are described in the following sections.

1.1 815E (ETX) BIOS description

Information:

- **The following diagrams and BIOS menu items including descriptions refer to BIOS version 1.23. It is therefore possible that these diagrams and BIOS descriptions do not correspond with the installed BIOS version.**
- **The setup defaults are the settings recommended by B&R. The setup defaults are dependant on the DIP switch configuration on the baseboard (see section 1.1.10 "Profile overview - BIOS default settings - 815E (ETX)", on page 396).**

1.1.1 General information

BIOS stands for "Basic Input Output System". It is the most basic standardized communication between the user and the system (hardware). The BIOS system used in the Automation PC 620 systems is produced by Phoenix.

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

The CMOS data is buffered by a battery, and remains in the APC620 even when the power is turned off (no 24 VDC supply) .

1.1.2 BIOS setup and boot procedure

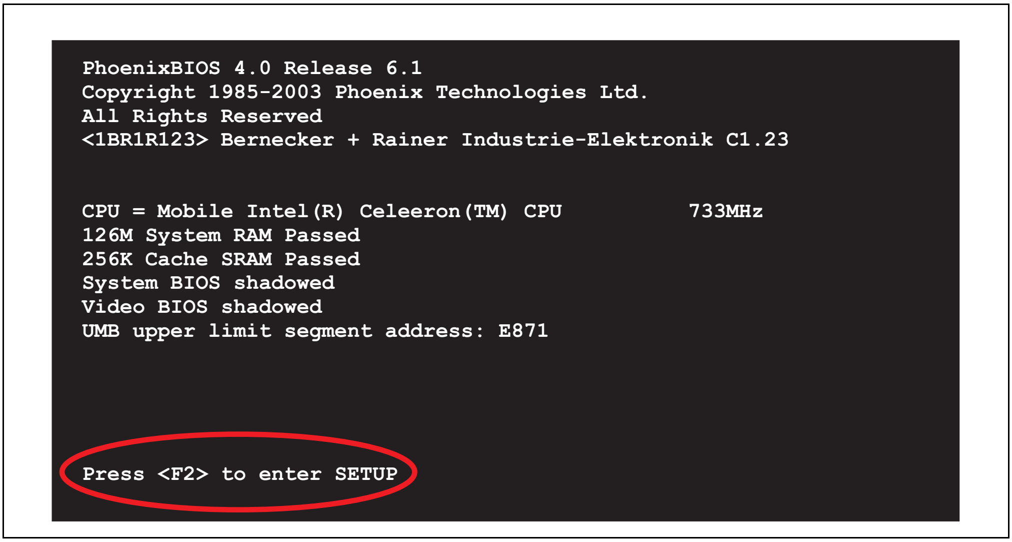
BIOS is immediately activated when switching on the power supply of the Automation PC 620 system or pressing the power button. The system checks if the setup data from the EEPROM is "OK". If the data is "OK", then it is transferred to the CMOS. If the data is "not OK", then the CMOS data is checked for validity. An error message is output if the CMOS data contains errors and the boot procedure can be continued by pressing the <F1> key. To prevent the error message from appearing at each restart, open the BIOS setup by pressing the <F2> key and re-save the settings.

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

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

To enter BIOS setup, the F2 key must be pressed as soon as the following message appears on the lower margin of the display (during POST):

"Press <F2> to enter SETUP"

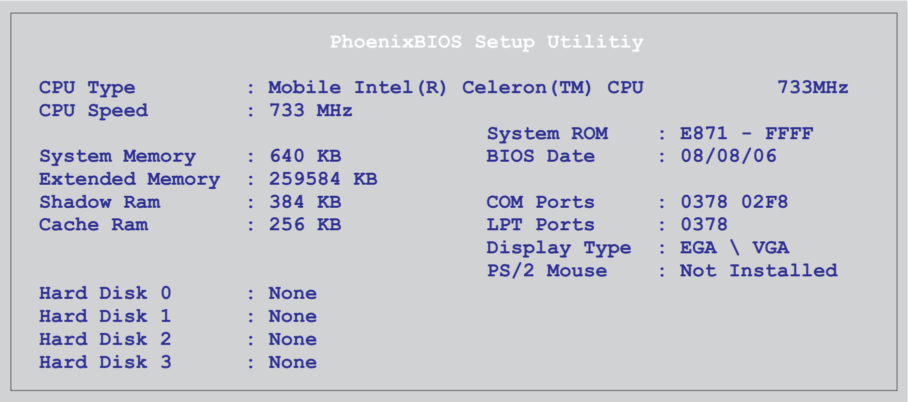


```
PhoenixBIOS 4.0 Release 6.1
Copyright 1985-2003 Phoenix Technologies Ltd.
All Rights Reserved
<1BR1R123> Bernecker + Rainer Industrie-Elektronik C1.23


CPU = Mobile Intel(R) Celeeron(TM) CPU          733MHz
126M System RAM Passed
256K Cache SRAM Passed
System BIOS shadowed
Video BIOS shadowed
UMB upper limit segment address: E871




Press <F2> to enter SETUP
```

Figure 158: 815E (ETX) BIOS diagnostic screen

Summary screen

After the POST, the summary screen displays the most important system characteristics.



```
                     PhoenixBIOS Setup Utilitiy

CPU Type           : Mobile Intel(R) Celeron(TM) CPU           733MHz
CPU Speed          : 733 MHz
                                         System ROM     : E871 - FFFF
System Memory      : 640 KB              BIOS Date      : 08/08/06
Extended Memory    : 259584 KB
Shadow Ram         : 384 KB              COM Ports      : 0378 02F8
Cache Ram          : 256 KB              LPT Ports      : 0378
                                         Display Type   : EGA \ VGA
                                         PS/2 Mouse     : Not Installed
Hard Disk 0        : None
Hard Disk 1        : None
Hard Disk 2        : None
Hard Disk 3        : None
```

Figure 159: 815E (ETX) BIOS Summary screen

1.1.3 BIOS setup keys

The following keys are active during the POST:

Key	Function
F2	Enters the BIOS setup menu.
ESC	Cues the boot menu. Lists all bootable devices that are connected to the system. With cursor ↑ and cursor ↓ and by pressing <ENTER>, select the device from which will be booted.
<Spacebar>	Pressing the spacebar skips the system RAM check.
<Pause>	Pressing the <pause> key stops the POST. Press any other key to resume the POST.

Table 196: Keys relevant to 815E (ETX) BIOS during POST

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

Key	Function
Cursor ↑	Moves to the previous item.
Cursor ↓	Go to the next item.
Cursor ←	Move to the item on the left.
Cursor →	Move to the item on the right.
<ESC>	Exits the submenu.
PageUp ↑	Moves the cursor to the top of the current BIOS setup page.
PageDown ↓	Moves the cursor to the bottom of the current BIOS setup page.

Table 197: Keys relevant to 815E (ETX) BIOS

Key	Function
<F1> or <Alt+H>	Opens a help window showing the key assignments.
<F5> or <->	Scrolls to the previous option for the selected BIOS setting.
<F6> or <+> or <spacebar>	Scrolls to the next option for the selected BIOS setting.
<F9>	Loads setup defaults for the current BIOS setup screen.
<F10>	Saves settings and closes BIOS setup.
<Enter>	Opens submenu for a BIOS setup menu item, or displays the configurable values of a BIOS setup item.

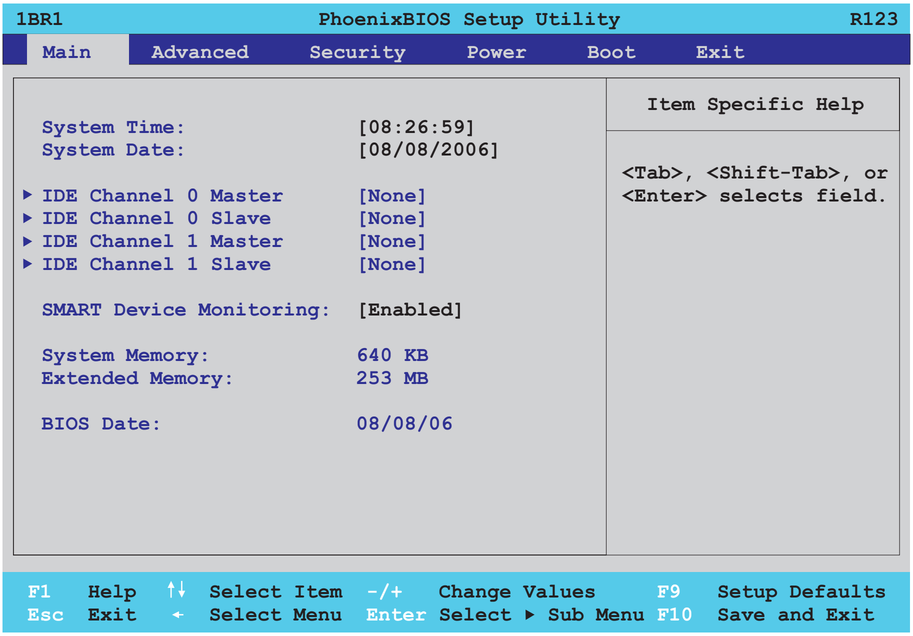
Table 197: Keys relevant to 815E (ETX) BIOS (Forts.)

The following sections explain the individual BIOS setup menu items in detail.

BIOS setup menu item	Function	From page
Main	The basic system configurations (e.g. time, date, hard disk parameters) can be set in this menu.	355
Advanced	Advanced BIOS options such as cache areas, PnP, keyboard repeat rate, as well as settings specific to B&R integrated hardware, can be configured here.	364
Security	For setting up the system's security functions.	387
Power	Setup of various APM (Advanced Power Management) options.	389
Boot	The boot order can be set here.	394
Exit	To end the BIOS setup.	395

Table 198: Overview of 815E (ETX) BIOS menu items

1.1.4 Main



```
1BR1                 PhoenixBIOS Setup Utility                    R123
  Main    Advanced     Security     Power     Boot     Exit

                                                  Item Specific Help
  System Time:                [08:26:59]
  System Date:                [08/08/2006]
                                                 <Tab>, <Shift-Tab>, or
▶ IDE Channel 0 Master        [None]             <Enter> selects field.
▶ IDE Channel 0 Slave         [None]
▶ IDE Channel 1 Master        [None]
▶ IDE Channel 1 Slave         [None]

  SMART Device Monitoring:    [Enabled]

  System Memory:              640 KB
  Extended Memory:            253 MB

  BIOS Date:                  08/08/06

 F1   Help  ↑↓ Select Item  -/+   Change Values      F9   Setup Defaults
 Esc  Exit  ←  Select Menu  Enter Select ▶ Sub Menu  F10  Save and Exit
```

Figure 160: 815E (ETX) Main Menu

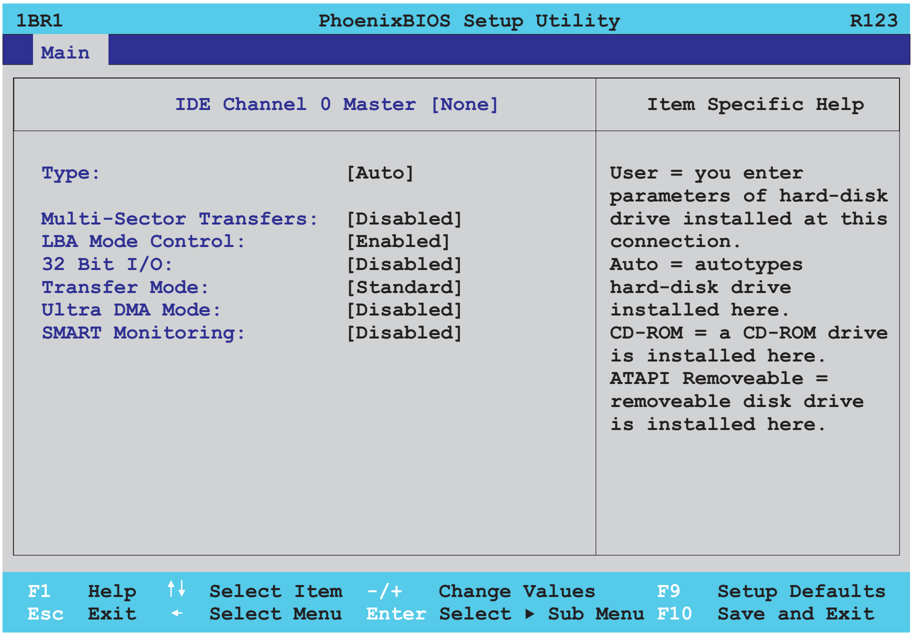
BIOS setting	Meaning	Setting options	Effect
System Time	This is the current system time setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Changes the System time	Set the system time in the format (hh:mm:ss).
System Date	This is the current system date setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Changes the system date	Set the system date in the format (mm:dd:yyyy).
IDE channel 0 master	The drive in the system that is connected to the IDE primary master port is configured here.	Enter	Opens the submenu See "IDE channel 0 master", on page 356.
IDE channel 0 slave	The drive in the system that is connected to the IDE primary slave port is configured here.	Enter	Opens the submenu See "IDE channel 0 slave", on page 358.
IDE channel 1 master	The drive in the system that is connected to the IDE secondary master port is configured here.	Enter	Opens the submenu See "IDE channel 1 master", on page 360.
IDE channel 1 slave	The drive in the system that is connected to the IDE secondary slave port is configured here.	Enter	Opens the submenu See "IDE channel 1 slave", on page 362.

Table 199: 815E (ETX) Main setting options

BIOS setting	Meaning	Setting options	Effect
Smart device monitoring	S.M.A.R.T. (Self Monitoring Analysis and Reporting Technology) is implemented in the today's hard drives. This technology allows you to detect reading or rotational problems with the hard drive, and much more.	Enabled	Activates this function. In the future, a message regarding impending errors is produced.
		Disabled	Deactivates this function.
System Memory	Displays the amount of main memory installed. Between 0 and 640 KB.	None	-
Extended memory	Displays the available main memory from the first MB to the maximum memory capacity.	None	-
BIOS Date	BIOS creation date	None	-

Table 199: 815E (ETX) Main setting options (Forts.)

IDE channel 0 master



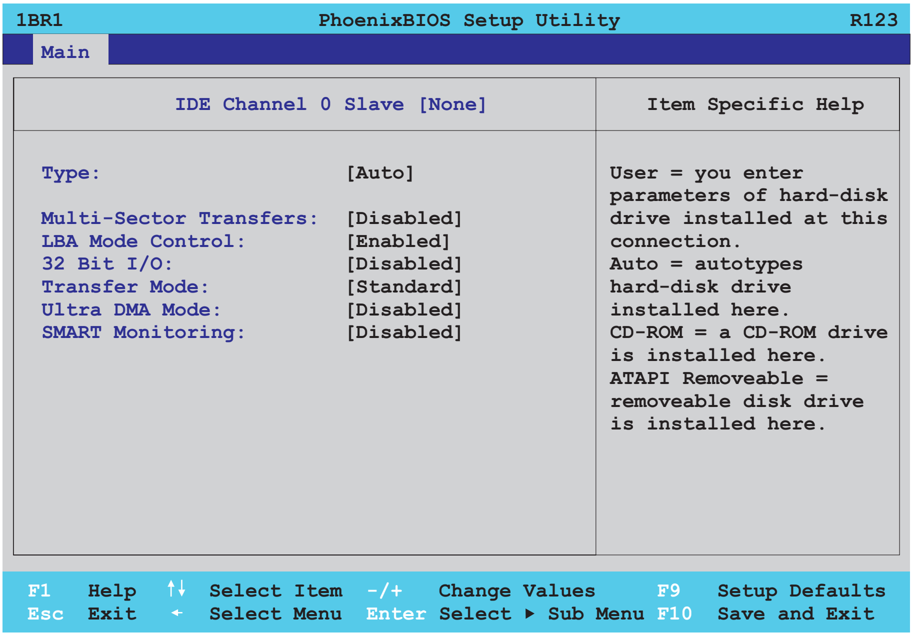
```
1BR1                 PhoenixBIOS Setup Utility                  R123
  Main

             IDE Channel 0 Master [None]            Item Specific Help

  Type:                          [Auto]          User = you enter
                                                 parameters of hard-disk
  Multi-Sector Transfers:        [Disabled]      drive installed at this
  LBA Mode Control:              [Enabled]       connection.
  32 Bit I/O:                    [Disabled]      Auto = autotypes
  Transfer Mode:                 [Standard]      hard-disk drive
  Ultra DMA Mode:                [Disabled]      installed here.
  SMART Monitoring:              [Disabled]      CD-ROM = a CD-ROM drive
                                                 is installed here.
                                                 ATAPI Removeable =
                                                 removeable disk drive
                                                 is installed here.

 F1   Help  ↑↓  Select Item  -/+    Change Values      F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter  Select ▸ Sub Menu  F10  Save and Exit
```

Figure 161: 815E (ETX) IDE Channel 0 Master

BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the primary master is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		User	Manual setup of the drive (number of cylinders, heads, and sectors).
		Other ATAPI	Use this option for IDE disk drives that are not mentioned here.
		CD-ROM	CD-ROM = CD-ROM drive
		ATAPI removable	The removable media drive is treated as a hard drive or floppy drive.
		IDE removable	The IDE removable drive is treated as a hard drive.
Multi-sector transfer	This option determines the number of sectors per block. Only possible when manually setting up the drive.	Disabled	Disables this function.
		2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Disabled	Disables this function.
		Enabled	Enables this function.
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the primary master drive and the system memory is defined here. Only possible when manually setting up the drive.	Default	Default setting.
		Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the primary master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Disables this function. Do not use UDMA mode.
		Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the primary master drive supports SMART technology.	Disabled	No drive support, and function is deactivated.
		Enabled	Drive support present, and function is activated.

Table 200: 815E (ETX) IDE Channel 0 Master setting options

IDE channel 0 slave



```
1BR1                    PhoenixBIOS Setup Utility                    R123
  Main

           IDE Channel 0 Slave [None]                 Item Specific Help

  Type:                         [Auto]             User = you enter
                                                   parameters of hard-disk
  Multi-Sector Transfers:       [Disabled]         drive installed at this
  LBA Mode Control:             [Enabled]          connection.
  32 Bit I/O:                   [Disabled]         Auto = autotypes
  Transfer Mode:                [Standard]         hard-disk drive
  Ultra DMA Mode:               [Disabled]         installed here.
  SMART Monitoring:             [Disabled]         CD-ROM = a CD-ROM drive
                                                   is installed here.
                                                   ATAPI Removeable =
                                                   removeable disk drive
                                                   is installed here.

 F1   Help   ↑↓  Select Item  -/+    Change Values      F9   Setup Defaults
 Esc  Exit   ←   Select Menu  Enter  Select ▸ Sub Menu  F10  Save and Exit
```

Figure 162: 815E (ETX) IDE Channel 0

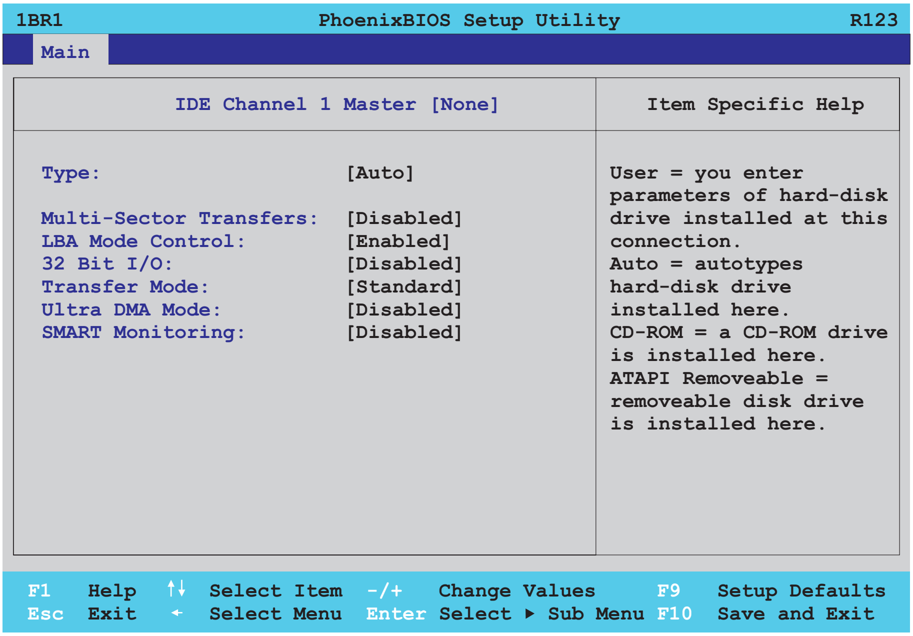
BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the primary slave is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		User	Manual setup of the drive (number of cylinders, heads, and sectors).
		Other ATAPI	Use this option for IDE disk drives that are not mentioned here.
		CD-ROM	CD-ROM = CD-ROM drive
		ATAPI removable	The removable media drive is treated as a hard drive or floppy drive.
		IDE removable	The IDE removable drive is treated as a hard drive.
Multi-sector transfer	This option determines the number of sectors per block. Only possible when manually setting up the drive.	Disabled	Disables this function.
		2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 201: 815E (ETX) IDE Channel 0 Slave setting options

BIOS setting	Meaning	Setting options	Effect
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the primary slave drive and the system memory is defined here. Only possible when manually setting up the drive.	Default	Default setting.
		Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the primary slave drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Disables this function. Do not use UDMA mode.
		Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the primary slave drive supports SMART technology.	Disabled	No drive support, and function is deactivated.
		Enabled	Drive support present, and function is activated.

Table 201: 815E (ETX) IDE Channel 0 Slave setting options (Forts.)

IDE channel 1 master



```
1BR1                   PhoenixBIOS Setup Utility                   R123
  Main

          IDE Channel 1 Master [None]             Item Specific Help

  Type:                        [Auto]           User = you enter
                                                parameters of hard-disk
  Multi-Sector Transfers:      [Disabled]       drive installed at this
  LBA Mode Control:            [Enabled]        connection.
  32 Bit I/O:                  [Disabled]       Auto = autotypes
  Transfer Mode:               [Standard]       hard-disk drive
  Ultra DMA Mode:              [Disabled]       installed here.
  SMART Monitoring:            [Disabled]       CD-ROM = a CD-ROM drive
                                                is installed here.
                                                ATAPI Removeable =
                                                removeable disk drive
                                                is installed here.

 F1   Help  ↑↓  Select Item  -/+   Change Values      F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter Select ▸ Sub Menu  F10  Save and Exit
```

Figure 163: 815E (ETX) IDE Channel 1 Master

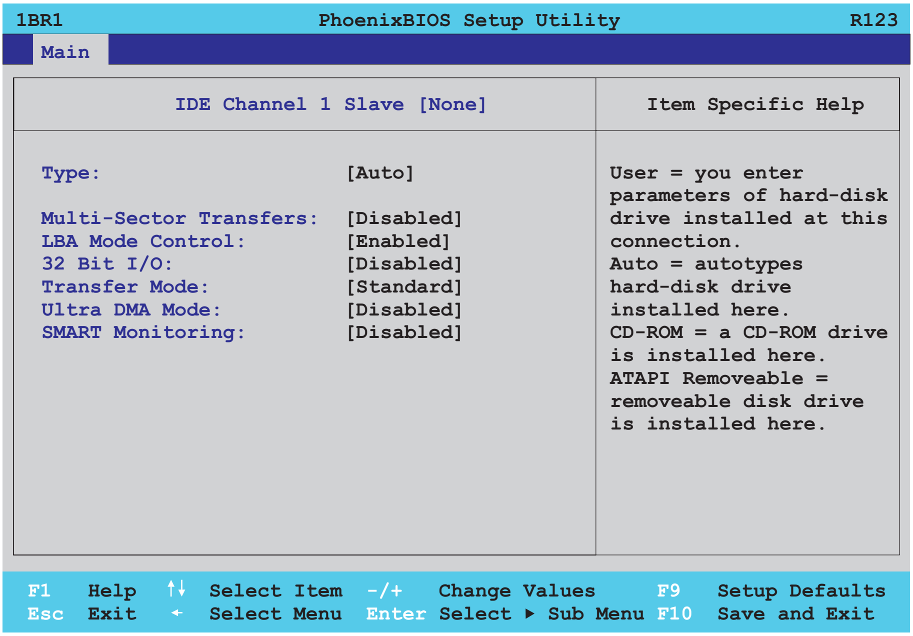
BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the secondary master is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		User	Manual setup of the drive (number of cylinders, heads, and sectors).
		Other ATAPI	Use this option for IDE disk drives that are not mentioned here.
		CD-ROM	CD-ROM = CD-ROM drive
		ATAPI removable	The removable media drive is treated as a hard drive or floppy drive.
		IDE removable	The IDE removable drive is treated as a hard drive.
Multi-sector transfer	This option determines the number of sectors per block. Only possible when manually setting up the drive.	Disabled	Disables this function.
		2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 202: 815E (ETX) IDE Channel 1 Master setting options

BIOS setting	Meaning	Setting options	Effect
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the secondary master drive and the system memory is defined here. Only possible when manually setting up the drive.	Default	Default setting.
		Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the secondary master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Disables this function. Do not use UDMA mode.
		Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the secondary master drive supports SMART technology.	Disabled	No drive support, and function is deactivated.
		Enabled	Drive support present, and function is activated.

Table 202: 815E (ETX) IDE Channel 1 Master setting options (Forts.)

IDE channel 1 slave



```
1BR1                    PhoenixBIOS Setup Utility                    R123
 Main

           IDE Channel 1 Slave [None]              Item Specific Help

  Type:                          [Auto]         User = you enter
                                                parameters of hard-disk
  Multi-Sector Transfers:        [Disabled]     drive installed at this
  LBA Mode Control:              [Enabled]      connection.
  32 Bit I/O:                    [Disabled]     Auto = autotypes
  Transfer Mode:                 [Standard]     hard-disk drive
  Ultra DMA Mode:                [Disabled]     installed here.
  SMART Monitoring:              [Disabled]     CD-ROM = a CD-ROM drive
                                                is installed here.
                                                ATAPI Removeable =
                                                removeable disk drive
                                                is installed here.

 F1   Help  ↑↓  Select Item  -/+   Change Values     F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter Select ▶ Sub Menu F10  Save and Exit
```

Figure 164: 815E (ETX) IDE Channel 1 Slave

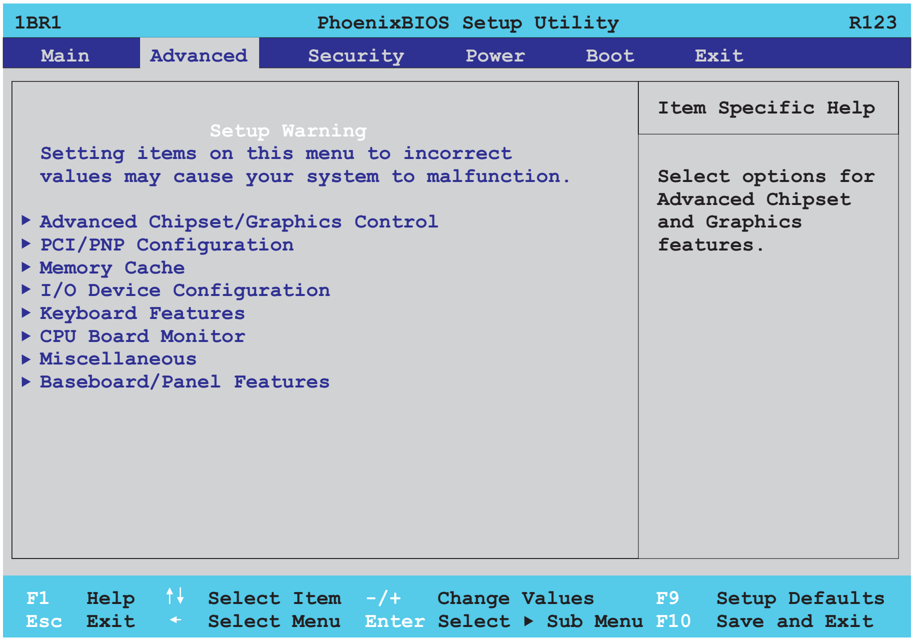
BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the secondary slave is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		User	Manual setup of the drive (number of cylinders, heads, and sectors).
		Other ATAPI	Use this option for IDE disk drives that are not mentioned here.
		CD-ROM	CD-ROM = CD-ROM drive
		ATAPI removable	The removable media drive is treated as a hard drive or floppy drive.
		IDE removable	The IDE removable drive is treated as a hard drive.
Multi-sector transfer	This option determines the number of sectors per block. Only possible when manually setting up the drive.	Disabled	Disables this function.
		2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 203: 815E (ETX) IDE Channel 1 Slave setting options

BIOS setting	Meaning	Setting options	Effect
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the secondary slave drive and the system memory is defined here. Only possible when manually setting up the drive.	Default	Default setting.
		Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the secondary slave is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Disables this function. Do not use UDMA mode.
		Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the secondary slave drive supports SMART technology.	Disabled	No drive support, and function is deactivated.
		Enabled	Drive support present, and function is activated.

Table 203: 815E (ETX) IDE Channel 1 Slave setting options (Forts.)

1.1.5 Advanced



```
1BR1                PhoenixBIOS Setup Utility                R123
   Main    Advanced    Security    Power    Boot    Exit

                Setup Warning                   Item Specific Help
  Setting items on this menu to incorrect
  values may cause your system to malfunction.   Select options for
                                                 Advanced Chipset
▶ Advanced Chipset/Graphics Control              and Graphics
▶ PCI/PNP Configuration                          features.
▶ Memory Cache
▶ I/O Device Configuration
▶ Keyboard Features
▶ CPU Board Monitor
▶ Miscellaneous
▶ Baseboard/Panel Features

 F1   Help  ↑↓  Select Item  -/+   Change Values      F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter Select ▶ Sub Menu  F10  Save and Exit
```

Figure 165: 815E (ETX) Advanced Menu

BIOS setup menu	Meaning	Setting options	Effect
Advanced chipset/graphics control	Setup of advanced chipset and graphics functions.	Enter	Opens the submenu See "Advanced chipset/graphics control", on page 365.
PCI/PNP Configuration	Configures PCI devices.	Enter	Opens the submenu See "PCI/PNP Configuration", on page 367.
Memory cache	Configuration of the memory cache resources.	Enter	Opens the submenu See "Memory cache", on page 373.
I/O Device Configuration	Configures the I/O devices.	Enter	Opens the submenu See "I/O Device Configuration", on page 375.
Keyboard features	Configuration of the keyboard options.	Enter	Opens the submenu See "Keyboard features", on page 378.
CPU board monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens the submenu See "CPU board monitor", on page 379.
Miscellaneous	Configuration of various BIOS settings (summary screen, halt on errors, etc.).	Enter	Opens the submenu See "Miscellaneous", on page 380.
Main Board/Panel Features	Displays device specific information and setup of device specific values.	Enter	Opens the submenu See "Main Board/Panel Features", on page 381.

Table 204: 815E (ETX) Advanced Menu setting options

Advanced chipset/graphics control

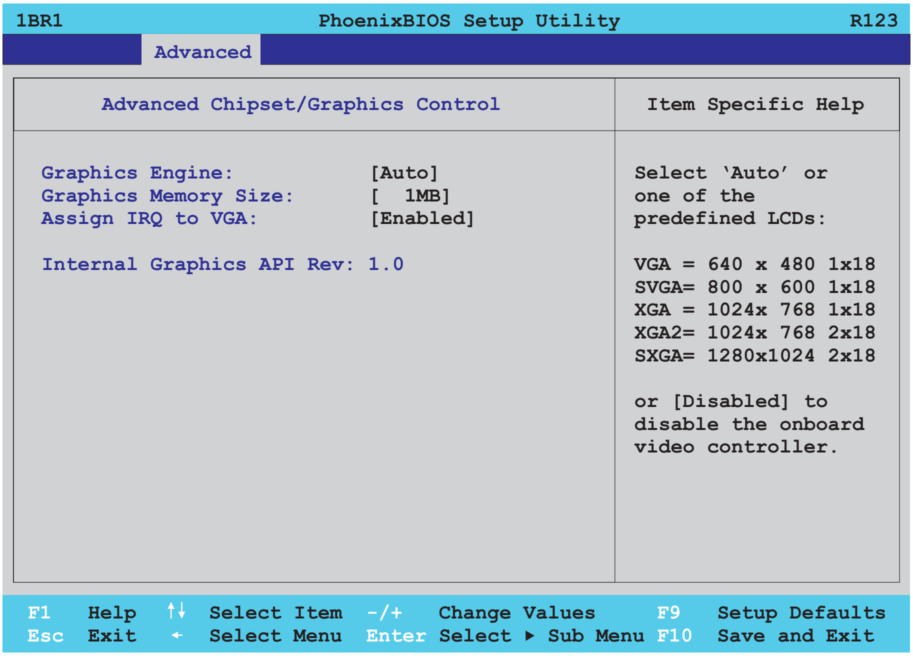

```
1BR1                 PhoenixBIOS Setup Utility                  R123
            Advanced

     Advanced Chipset/Graphics Control           Item Specific Help

  Graphics Engine:            [Auto]             Select 'Auto' or
  Graphics Memory Size:       [  1MB]            one of the
  Assign IRQ to VGA:          [Enabled]          predefined LCDs:

  Internal Graphics API Rev: 1.0                 VGA = 640 x 480 1x18
                                                 SVGA= 800 x 600 1x18
                                                 XGA = 1024x 768 1x18
                                                 XGA2= 1024x 768 2x18
                                                 SXGA= 1280x1024 2x18

                                                 or [Disabled] to
                                                 disable the onboard
                                                 video controller.

 F1   Help  ↑↓  Select Item  -/+   Change Values      F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter Select ▸ Sub Menu  F10  Save and Exit
```

Figure 166: 815E (ETX) Advanced Chipset/Graphics Control

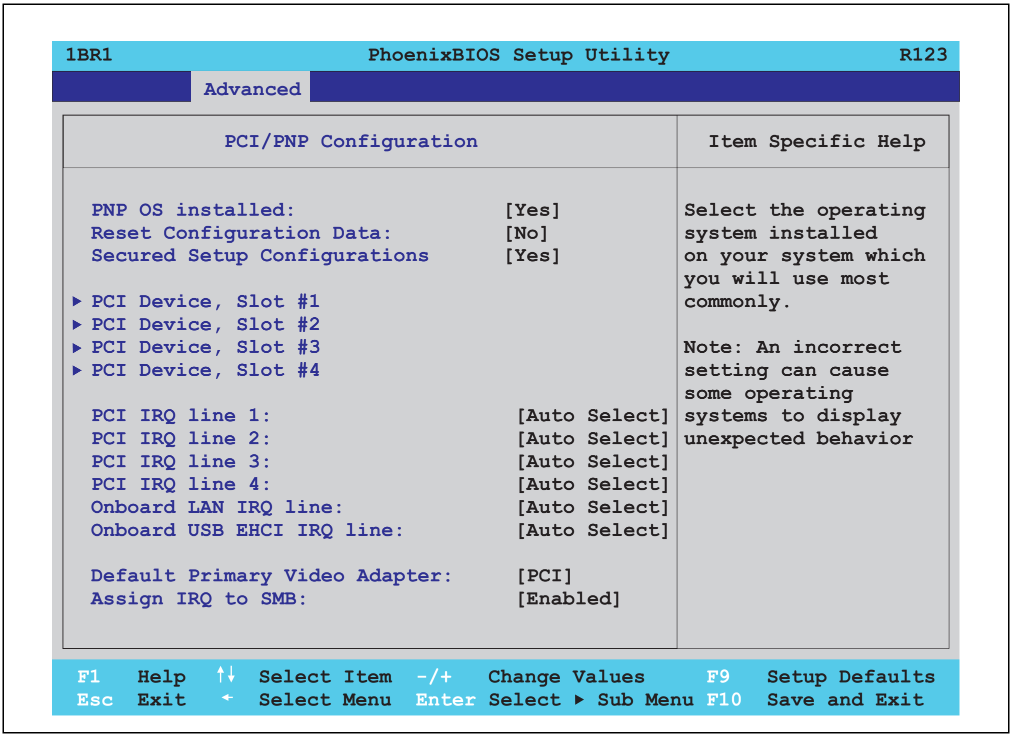
BIOS setting	Meaning	Setting options	Effect
Graphics engine	Settings can be made for the onboard video controller.	Auto	Automatic setting of the resolution (using a read-out of the connected panel's EDID data).

		VGA, SVGA, XGA, XGA2, SXGA	VGA = 640 x 480 resolution
			SVGA = 800 x 600 resolution
			XGA = 1024 x 768 resolution
			XGA2 = 1024 x 768 resolution
			SXGA = 1280 x 1024 resolution

		Disabled	**Information:** **The onboard video must be activated to make video output possible. Deactivate only for use of an external PCI graphics card.**
Graphics memory size	Reserves a memory location in the RAM for the onboard graphics controller, into which the memory access will be directed.	1 MB	1 MB main memory is reserved for the onboard video controller.
		512kB	512 k main memory is reserved for the onboard video controller.
Assign IRQ to VGA	This is where an IRQ is reserved and automatically assigned for the CPU board's onboard graphics.	Enabled	Enables this function.
		Disabled	Disables this function.
Internal graphics API Rev	Displays the internal graphics API (Application Programmer Interface) version number.	None	-

Table 205: 815E (ETX) Advanced Chipset/Graphics Control setting options

PCI/PNP Configuration



```
1BR1                 PhoenixBIOS Setup Utility                 R123
            Advanced
        PCI/PNP Configuration              Item Specific Help

  PNP OS installed:                 [Yes]          Select the operating
  Reset Configuration Data:         [No]           system installed
  Secured Setup Configurations      [Yes]          on your system which
                                                   you will use most
▶ PCI Device, Slot #1                              commonly.
▶ PCI Device, Slot #2
▶ PCI Device, Slot #3                              Note: An incorrect
▶ PCI Device, Slot #4                              setting can cause
                                                   some operating
  PCI IRQ line 1:                    [Auto Select] systems to display
  PCI IRQ line 2:                    [Auto Select] unexpected behavior
  PCI IRQ line 3:                    [Auto Select]
  PCI IRQ line 4:                    [Auto Select]
  Onboard LAN IRQ line:              [Auto Select]
  Onboard USB EHCI IRQ line:         [Auto Select]

  Default Primary Video Adapter:     [PCI]
  Assign IRQ to SMB:                 [Enabled]

 F1   Help  ↑↓ Select Item  -/+   Change Values      F9   Setup Defaults
 Esc  Exit  ←  Select Menu  Enter Select ▶ Sub Menu  F10  Save and Exit
```

Figure 167: 815E (ETX) PCI/PNP Configuration

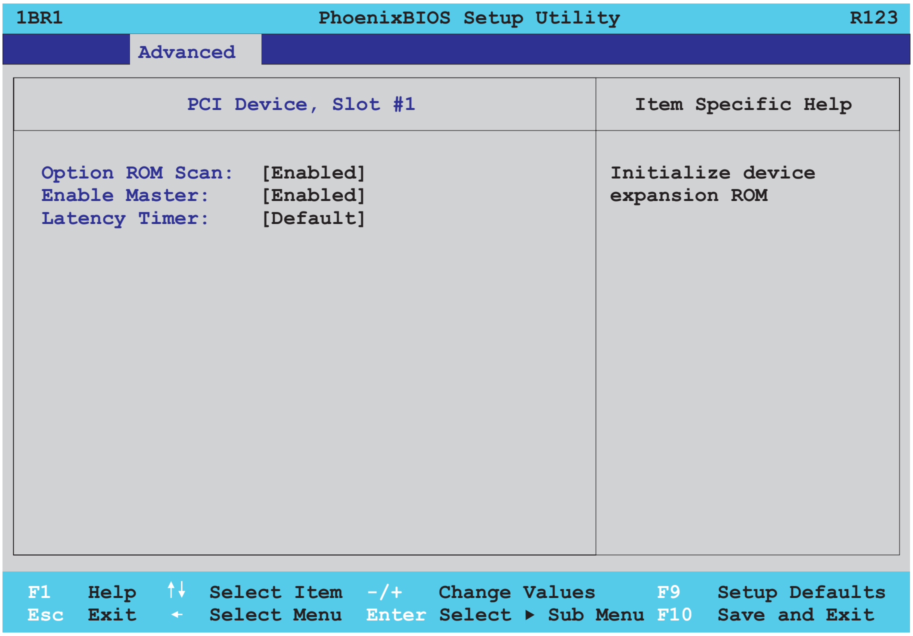
BIOS setting	Meaning	Setting options	Effect
PNP OS installed	If the operating system is plug & play capable, then this option informs BIOS that the operating system will handle the distribution of resources in the future.	Yes	The ISA PnP resources are not assigned. The resource assignment sequence is as follows: 1.) Motherboard devices 2. PCI devices
		No	The resource assignment sequence is as follows: 1. Motherboard devices 2. ISA PnP devices 3. PCI devices
Reset configuration data	During booting, the assigned resources are stored in Flash (ESCD).	Yes	When the system is reset after leaving the BIOS setup, all ECSD entries (extended system configuration data) are deleted.
		No	Disables this function. Resources are not reset.
Secured setup configuration	This option protects the setup configuration from interference from a PnP operating system.	Yes	Prevents a PnP operating system from changing system settings.
		No	Disables this function. Changes are allowed.

Table 206: 815E (ETX) PCI/PNP Configuration setting options

BIOS setting	Meaning	Setting options	Effect
PCI device, slot #1	Advanced configuration of the PCI slot number 1.	Enter	Opens the submenu See "PCI device, slot #1", on page 369
PCI device, slot #2	Advanced configuration of the PCI slot number 2.	Enter	Opens the submenu See "PCI device, slot #2", on page 370
PCI device, slot #3	Advanced configuration of the PCI slot number 3.	Enter	Opens the submenu See "PCI device, slot #3", on page 371
PCI device, slot #4	Advanced configuration of the PCI slot number 4.	Enter	Opens the submenu See "PCI device, slot #4", on page 372
PCI IRQ line 1	Under this option, the external PCI interrupt 1 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 2	Under this option, the external PCI interrupt 2 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 3	Under this option, the external PCI interrupt 3 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 4	Under this option, the external PCI interrupt 4 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
Onboard LAN IRQ line	Under this option, the onboard LAN interrupt is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
Onboard USB EHCI IRQ line	Under this option, the USB EHCI interrupt is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
Default primary video adapter	This option sets the default graphics card (either an existing AGP or the PCI graphics card).	PCI	A PCI graphics card is set as the default display device.
		AGP	An AGP graphics card is set as the default display device.
Assign IRQ to SMB	Use this function to set whether or not the SM (System Management) bus controller is assigned a PCI interrupt.	Enabled	Automatic assignment of a PCI interrupt.
		Disabled	No assignment of an interrupt.

Table 206: 815E (ETX) PCI/PNP Configuration setting options (Forts.)

PCI device, slot #1



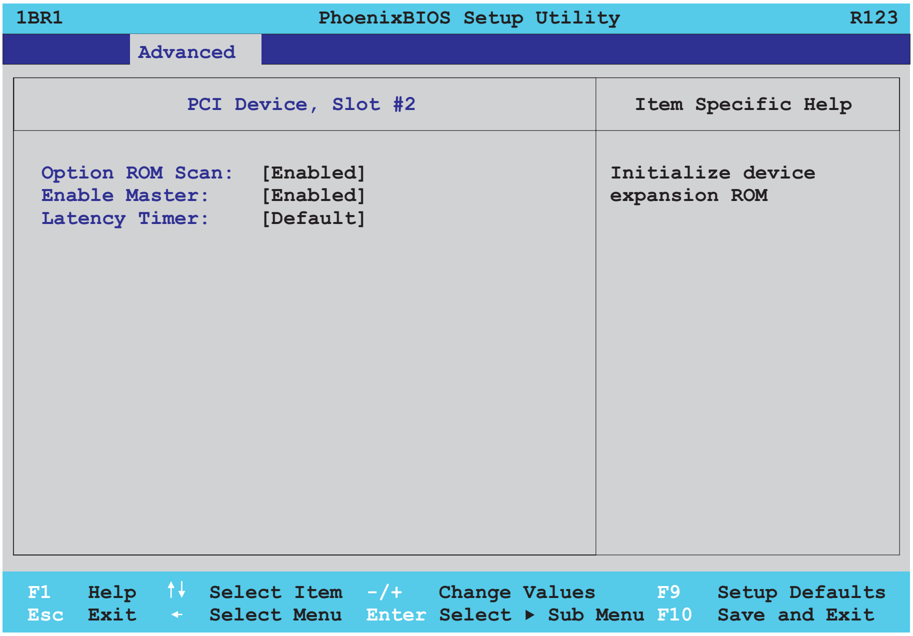
```
1BR1                 PhoenixBIOS Setup Utility                    R123
            Advanced

                PCI Device, Slot #1                Item Specific Help

  Option ROM Scan:   [Enabled]                   Initialize device
  Enable Master:     [Enabled]                   expansion ROM
  Latency Timer:     [Default]

 F1   Help  ↑↓  Select Item  -/+    Change Values      F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter  Select ▸ Sub Menu  F10  Save and Exit
```

Figure 168: 815E (ETX) PCI device, slot #1

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be treated as the PCI bus master. Not all PCI devices can function as PCI bus master! Check device description.	Enabled	Enables this function.
		Disabled	Disables this function.
Latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Default
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Value set manually.

Table 207: 815E (ETX) PCI device, slot #1 setting options

PCI device, slot #2



PCI Device, Slot #2

Option ROM Scan: [Enabled]
Enable Master: [Enabled]
Latency Timer: [Default]

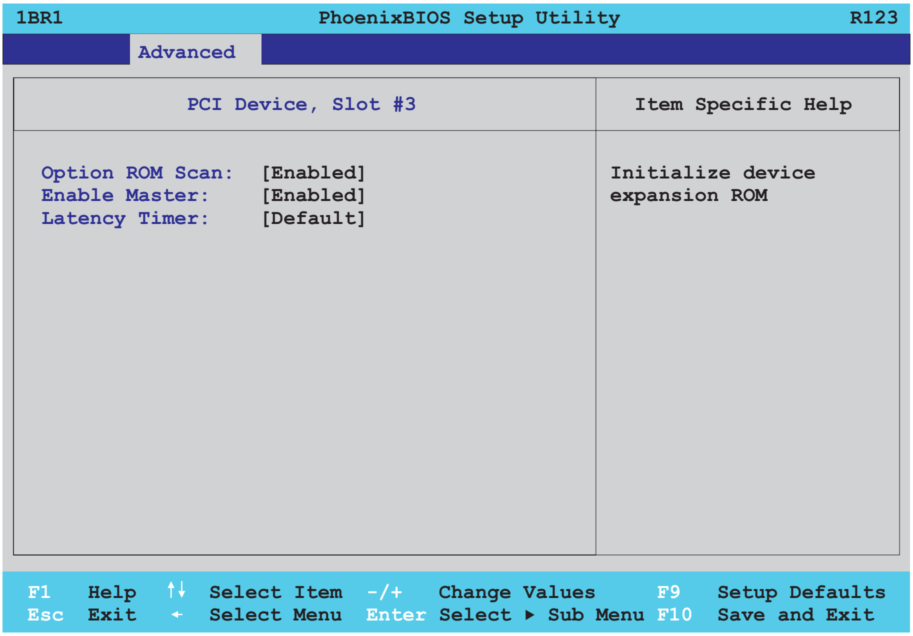
Initialize device expansion ROM

Figure 169: 815E (ETX) PCI device, slot #2

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be treated as the PCI bus master. Not all PCI devices can function as PCI bus master! Check device description.	Enabled	Enables this function.
		Disabled	Disables this function.
Latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Default
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Value set manually.

Table 208: 815E (ETX) PCI device, slot #2 setting options

PCI device, slot #3



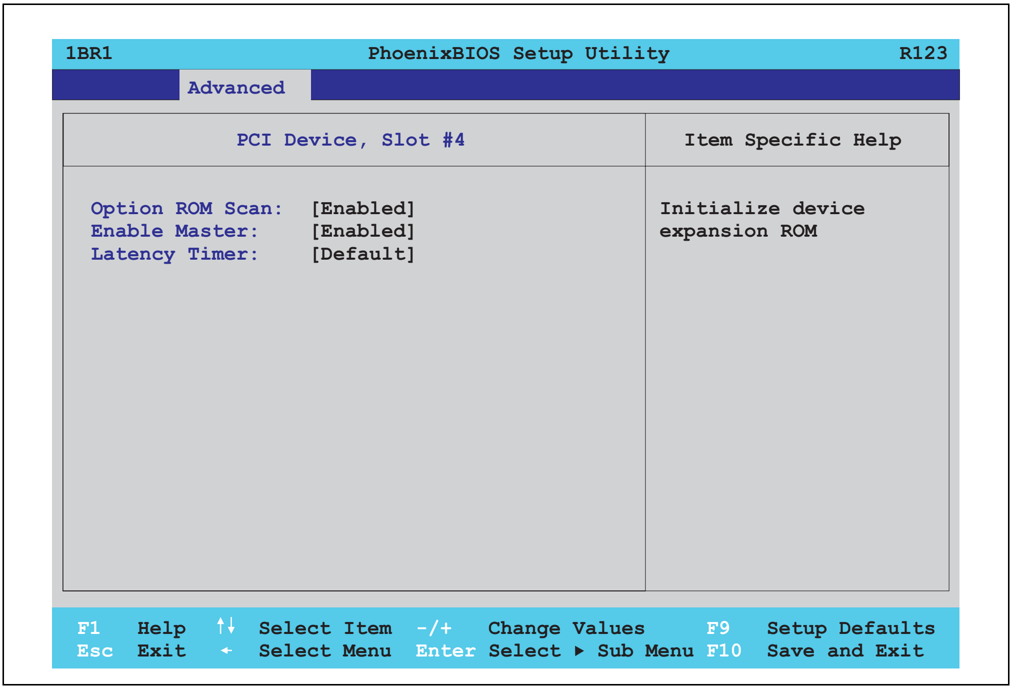
```
1BR1                  PhoenixBIOS Setup Utility                  R123
            Advanced

           PCI Device, Slot #3              Item Specific Help

  Option ROM Scan:   [Enabled]            Initialize device
  Enable Master:     [Enabled]            expansion ROM
  Latency Timer:     [Default]
```

Figure 170: 815E (ETX) PCI device, slot #3

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be treated as the PCI bus master. Not all PCI devices can function as PCI bus master! Check device description.	Enabled	Enables this function.
		Disabled	Disables this function.
Latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Default
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Value set manually.

Table 209: 815E (ETX) PCI device, slot #3 setting options

PCI device, slot #4


1BR1
PhoenixBIOS Setup Utility
R123
Advanced
PCI Device, Slot #4
Item Specific Help

Option ROM Scan: [Enabled]
Enable Master: [Enabled]
Latency Timer: [Default]

Initialize device expansion ROM

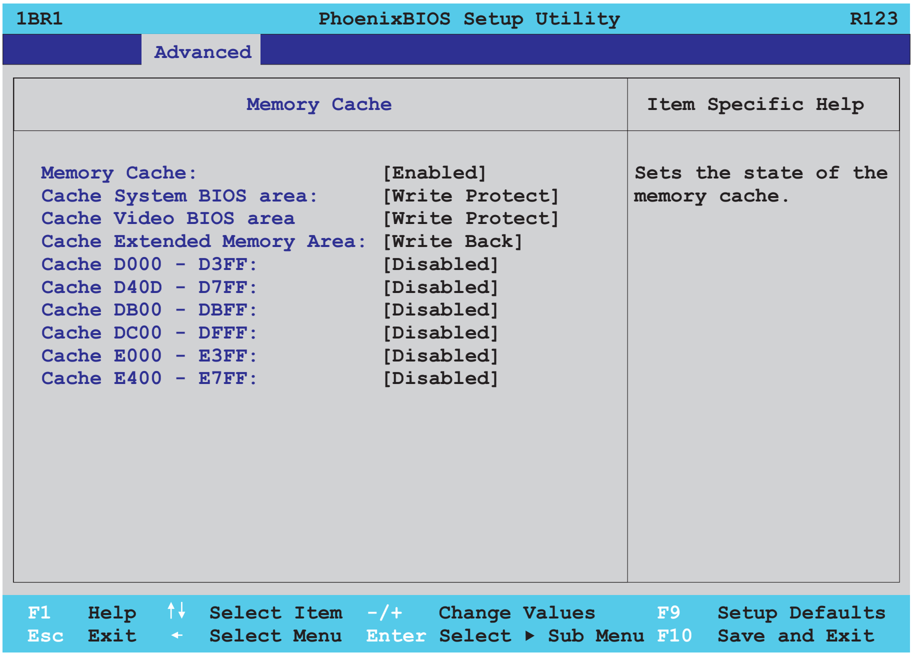
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit ← Select Menu Enter Select ▸ Sub Menu F10 Save and Exit

Figure 171: 815E (ETX) PCI device, slot #4

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be treated as the PCI bus master. Not all PCI devices can function as PCI bus master! Check device description.	Enabled	Enables this function.
		Disabled	Disables this function.
Latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Default
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Value set manually.

Table 210: 815E (ETX) PCI device, slot #4 setting options

Memory cache



```
1BR1                  PhoenixBIOS Setup Utility                 R123
          Advanced

                Memory Cache                     Item Specific Help

  Memory Cache:                 [Enabled]        Sets the state of the
  Cache System BIOS area:       [Write Protect]  memory cache.
  Cache Video BIOS area         [Write Protect]
  Cache Extended Memory Area:   [Write Back]
  Cache D000 - D3FF:            [Disabled]
  Cache D40D - D7FF:            [Disabled]
  Cache DB00 - DBFF:            [Disabled]
  Cache DC00 - DFFF:            [Disabled]
  Cache E000 - E3FF:            [Disabled]
  Cache E400 - E7FF:            [Disabled]

 F1   Help  ↑↓ Select Item  -/+   Change Values      F9   Setup Defaults
 Esc  Exit  ←  Select Menu  Enter Select ► Sub Menu  F10  Save and Exit
```

Figure 172: 815E (ETX) Memory Cache

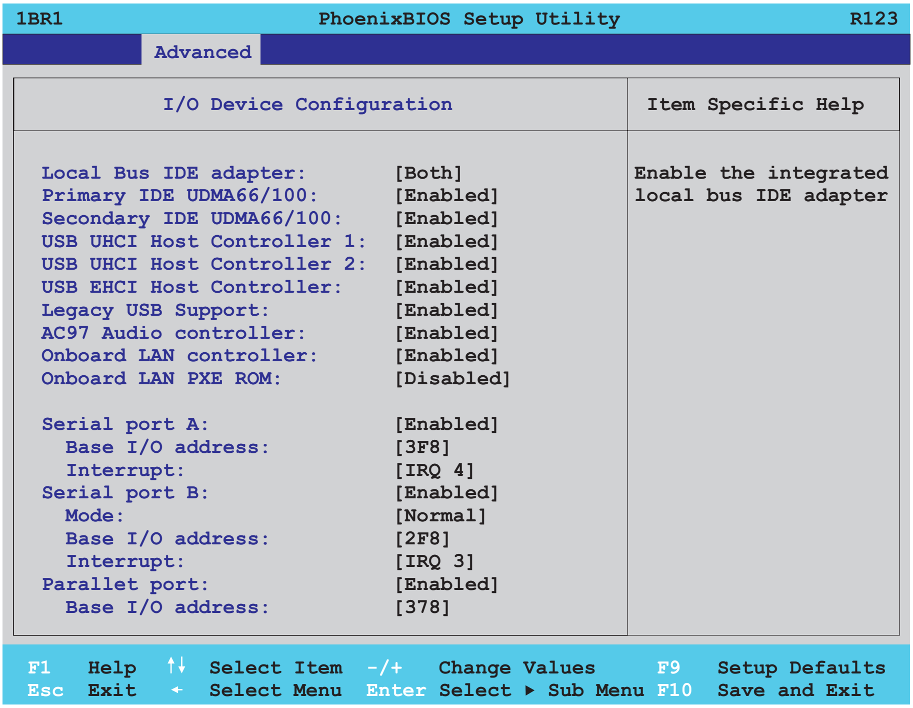
BIOS setting	Meaning	Setting options	Effect
Memory cache	Enable/ disable utilization of the L2 cache.	Enabled	Enables this function.
		Disabled	Disables this function.
Cache system BIOS area	Set whether or not the system BIOS should be buffered.	Write protect	System BIOS is mapped in the cache.
		Uncached	System BIOS is not mapped in the cache.
Cache video BIOS area	Set whether or not the video BIOS should be buffered.	Write protect	Video BIOS is mapped in the cache.
		Uncached	Video BIOS is not mapped in the cache.
Cache extended memory area	Configure how the memory content of the system memory above 1MB should be mapped.	Uncached	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.

Table 211: 815E (ETX) Memory Cache setting options

BIOS setting	Meaning	Setting options	Effect
Cache D000 - D3FF	Configure how the memory content of D000-D3FF should be mapped.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache D400 - D7FF	Configure how the memory content of D400-D7FF should be mapped.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache D800 - DBFF	Configure how the memory content of D800-DBFF should be mapped.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache DC00 - DFFF	Configure how the memory content of DC00-DFFF should be mapped.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache E000 - E3FF	Configure how the memory content of E000-E3FF should be mapped.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache E400 - E7FF	Configure how the memory content of E400-E7FF should be mapped.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.

Table 211: 815E (ETX) Memory Cache setting options (Forts.)

I/O Device Configuration



```
1BR1                    PhoenixBIOS Setup Utility                    R123
            Advanced

            I/O Device Configuration                   Item Specific Help

  Local Bus IDE adapter:          [Both]           Enable the integrated
  Primary IDE UDMA66/100:         [Enabled]        local bus IDE adapter
  Secondary IDE UDMA66/100:       [Enabled]
  USB UHCI Host Controller 1:     [Enabled]
  USB UHCI Host Controller 2:     [Enabled]
  USB EHCI Host Controller:       [Enabled]
  Legacy USB Support:             [Enabled]
  AC97 Audio controller:          [Enabled]
  Onboard LAN controller:         [Enabled]
  Onboard LAN PXE ROM:            [Disabled]

  Serial port A:                  [Enabled]
    Base I/O address:             [3F8]
    Interrupt:                    [IRQ 4]
  Serial port B:                  [Enabled]
    Mode:                         [Normal]
    Base I/O address:             [2F8]
    Interrupt:                    [IRQ 3]
  Parallel port:                  [Enabled]
    Base I/O address:             [378]

 F1   Help  ↑↓  Select Item  -/+    Change Values      F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter  Select ▶ Sub Menu  F10  Save and Exit
```

Figure 173: 815E (ETX) I/O Device Configuration

BIOS setting	Meaning	Setting options	Effect
Local bus IDE adapter	Enable or disable one or both of the PCI IDE controllers (primary and secondary).	Disabled	Deactivates both PCI IDE controllers (primary and secondary).
		Primary	Activates the primary IDE controller only.
		Secondary	Activates the secondary IDE controller only.
		Both	Activates both PCI IDE controllers (primary and secondary).
Primary IDE UDMA66/100	Setup the data transfer rate for a device connected to the primary IDE channel. This option is only available when a primary IDE drive is connected.	Disabled	The maximum data transfer rate is UDMA33.
		Enabled	The maximum data transfer rate is UDMA66 or higher.
Secondary IDE UDMA66/100	Setup the data transfer rate for a device connected to the secondary IDE channel. This option is only available when a secondary IDE drive is connected.	Disabled	The maximum data transfer rate is UDMA33.
		Enabled	The maximum data transfer rate is UDMA66.

Table 212: 815E (ETX) I/O Device Configuration setting options

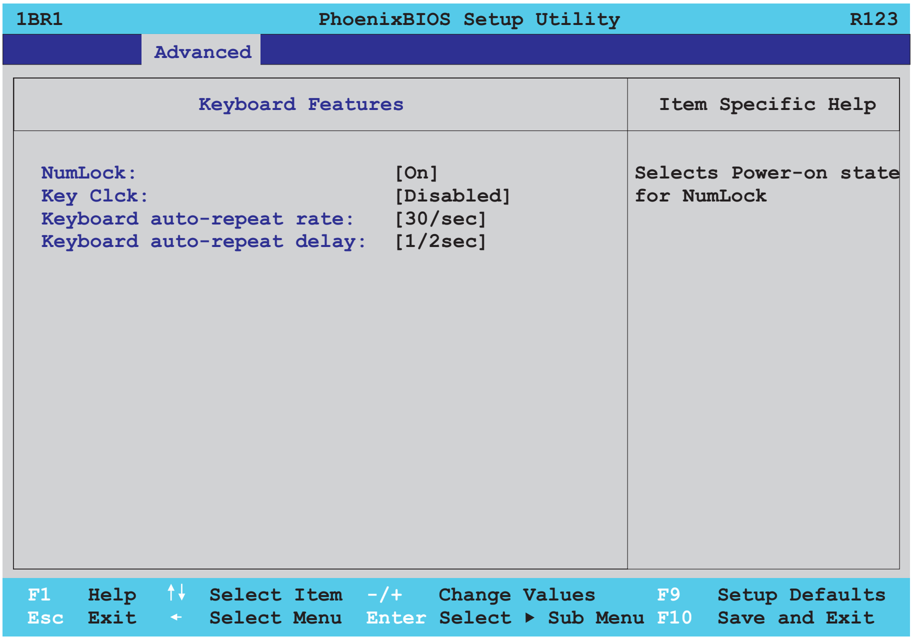
BIOS setting	Meaning	Setting options	Effect
USB UHCI host controller 1	Configuration of USB UHCI controller 1 for USB port 0 und 1.	Disabled	Deactivates the USB support.
		Enabled	Activates the USB support.
USB UHCI host controller 2	Configuration of the USB UHCI controller 1 for USB port 2 and 3. Can only be configured if the USB UHCI controller 1 is activated.	Disabled	Deactivates the USB support.
		Enabled	Activates the USB support.
USB UHCI host controller	Configuration of the USB EHCI controller. Can only be configured if the USB UHCI controller 1 is activated.	Disabled	Deactivates the USB support.
		Enabled	When enabled, the USB 2.0 support is activated as soon as a USB 2.0 device is connected to the interface.
Legacy USB Support	Here IRQs are assigned to the USB connections.	Disabled	No IRQ assigned. It is not possible to boot from a USB device (USB stick, USB floppy, USB CD ROM, etc.)! However, a connected USB keyboard can be used to access and configure the BIOS setup, boot menu or optional RAID boot menu. USB devices will not function after completing the BIOS POST routine. USB devices only work after starting the operating system with USB support (e.g. Windows XP). MS-DOS does not support the use of USB devices.
		Enabled	IRQ assigned. Booting from USB devices is now possible. Supported USB devices work with MS-DOS (e.g. USB keyboard, etc).
AC97 audio controller	For turning the AC97 audio controller on and off.	Disabled	AC97 sound is deactivated.
		Enabled	AC97 sound is activated.
Onboard LAN controller	For turning the ICH4 on-board LAN controller (for ETH1) on and off.	Disabled	Deactivates the LAN controller or the ETH1 interface.
		Enabled	Activates the LAN controller or the ETH1 interface.
Onboard LAN PXE ROM	For turning the remote boot BIOS extension for the onboard LAN controller (ETH1) on and off.	Disabled	Disables this function.
		Enabled	Enables this function.
Serial port A	For the configuration of serial port A (COM1).	Disabled	Port A deactivated.
		Enabled	Port A activated. The base I/O addresses and the interrupt must then be configured manually.
		Auto	Either BIOS or the operating system configures the port automatically.
Base I/O address	Selection of the base I/O address for port A. A yellow star indicates a conflict with another device.	3F8, 2F8, 3E8, 2E8	Base I/O address is manually assigned.
Interrupt	Selection of the interrupt for port A. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4	Manual assignment of the interrupt.

Table 212: 815E (ETX) I/O Device Configuration setting options (Forts.)

BIOS setting	Meaning	Setting options	Effect
Serial port B	For the configuration of serial port B (COM2).	Disabled	Port B deactivated.
		Enabled	Port A activated. The base I/O addresses and the interrupt must then be configured manually.
		Auto	Either BIOS or the operating system configures the port automatically.
Mode	This option is for setting the serial port B as either a standard interface or as an infrared interface.	Normal	Serial port B is used as a standard interface.
		IR	The serial interface is used as an infrared interface, and allows data transfers up to 115 kBit/s.
Base I/O address	Selection of the base I/O address for port B. A yellow star indicates a conflict with another device.	3F8, 2F8, 3E8, 2E8	Selected base I/O address is manually assigned.
Interrupt	Selection of the interrupt for port B. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4	Selected interrupt is manually assigned.
Parallel port	For configuring the hardware security key (dongle), which accessed internally through the parallel interface.	Disabled	Deactivates the port.
		Enabled	Activates the port. The base I/O address must then be set.
		Auto	First BIOS and then the operating system configure the port automatically.
Base I/O address	Selection of the base I/O address for the parallel port.	378, 278, 3BC	Base I/O address is manually assigned.

Table 212: 815E (ETX) I/O Device Configuration setting options (Forts.)

Keyboard features



1BR1 PhoenixBIOS Setup Utility R123

Keyboard Features

NumLock: [On]
Key Clck: [Disabled]
Keyboard auto-repeat rate: [30/sec]
Keyboard auto-repeat delay: [1/2sec]

Item Specific Help

Selects Power-on state for NumLock

Figure 174: 815E (ETX) Keyboard Features

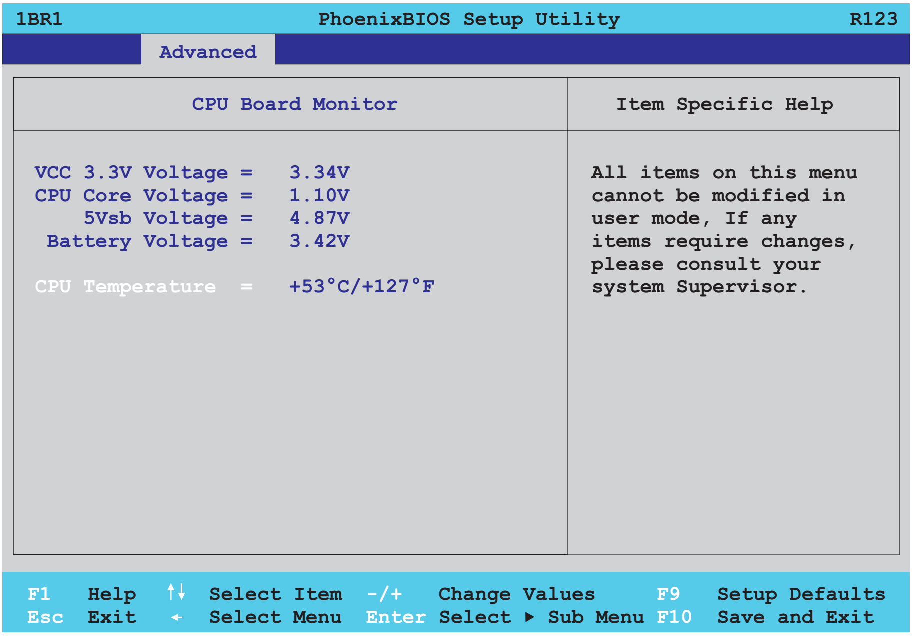
BIOS setting	Meaning	Setting options	Effect
NumLock	This option sets the status of the numeric keypad when the the system is booted.	On	Numeric keypad is enabled.
		Off	Only the cursor functions of the numerical keypad are activated.
		Auto	Numeric keypad is activated, if present.
Key click	Using this option, the clicking of the keys can be turned on or off.	Disabled	Disables this function.
		Enabled	Enables this function.
Keyboard auto-repeat rate	For setting the speed of repetition when a key is held down.	30/sec, 26.7/sec, 21.8/sec, 18.5/sec, 13.3/sec, 10/sec, 6/sec, 2/sec	Settings from 2 to 30 characters per second.
Keyboard auto-repeat delay	For setting the amount of delay after the key is pressed before the auto-repeat begins.	1/4 sec, 1/2 sec, 3/4 sec, 1 sec	Setting of the desired delay.

Table 213: 815E (ETX) Keyboard Features setting options

CPU board monitor

Information:

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



```
1BR1                  PhoenixBIOS Setup Utility                 R123
            Advanced

           CPU Board Monitor                 Item Specific Help

 VCC 3.3V Voltage =    3.34V               All items on this menu
 CPU Core Voltage =    1.10V               cannot be modified in
     5Vsb Voltage =    4.87V               user mode, If any
  Battery Voltage =    3.42V               items require changes,
                                           please consult your
 CPU Temperature  =    +53°C/+127°F        system Supervisor.
```

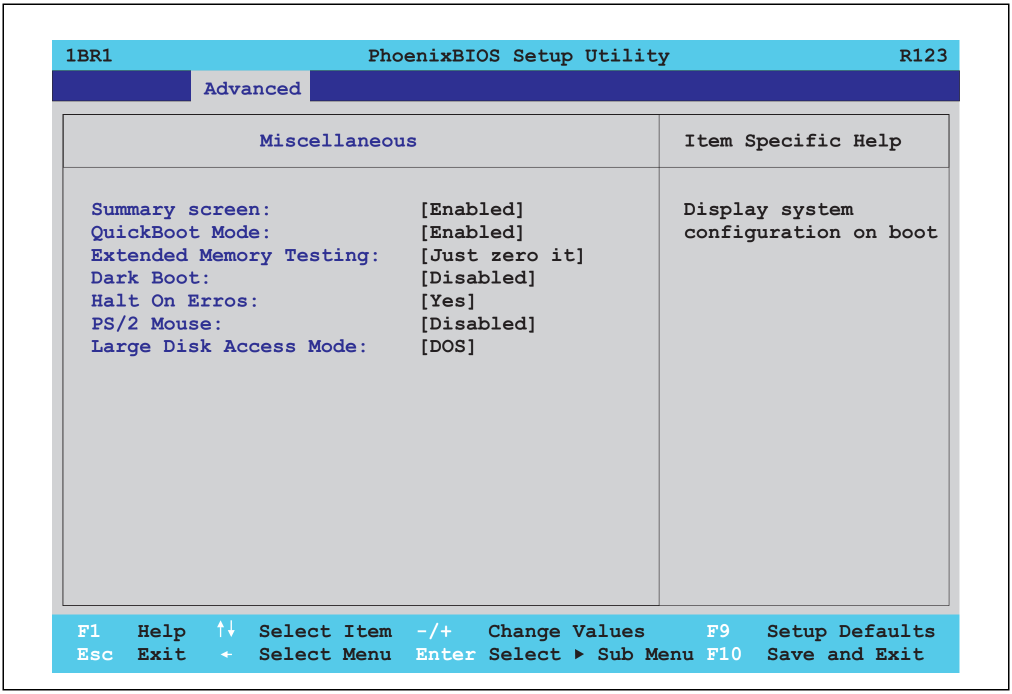
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit ← Select Menu Enter Select ▸ Sub Menu F10 Save and Exit

Figure 175: 815E (ETX) CPU Board Monitor

BIOS setting	Meaning	Setting options	Effect
VCC 3.3V voltage	Displays the current voltage of the 3.3 volt supply (in volts).	None	
CPU core voltage	Displays the processor's core voltage (in volts).	None	
5Vsb voltage	Displays the 5 V standby voltage (in volts).	None	
Battery voltage	Displays the battery voltage (in volts).	None	
CPU temperature	Displays the processor's temperature (in degrees Celsius and Fahrenheit).	None	

Table 214: 815E (ETX) CPU Board Monitor setting options

Miscellaneous



```
1BR1                    PhoenixBIOS Setup Utility                    R123
                 Advanced

              Miscellaneous                       Item Specific Help

  Summary screen:              [Enabled]          Display system
  QuickBoot Mode:              [Enabled]          configuration on boot
  Extended Memory Testing:     [Just zero it]
  Dark Boot:                   [Disabled]
  Halt On Erros:               [Yes]
  PS/2 Mouse:                  [Disabled]
  Large Disk Access Mode:      [DOS]

 F1   Help  ↑↓  Select Item  -/+   Change Values       F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter Select ▸ Sub Menu   F10  Save and Exit
```

Figure 176: 815E (ETX) Miscellaneous

BIOS setting	Meaning	Setting options	Effect
Summary screen	Set whether or not the system summary screen should open when the system is started (see figure 159 "815E (ETX) BIOS Summary screen", on page 353).	Enabled	Enables this function.
		Disabled	Disables this function.
QuickBoot mode	Speeds up the booting process by skipping several tests.	Enabled	Enables this function.
		Disabled	Disables this function.
Extended memory testing	This function determines the method by which the main memory over 1 MB is tested.	Just zero it	The main memory is quickly tested.
		None	The main memory is not tested at all.
		Normal	This option is only available when the function "QuickBoot Mode" has been set to "disabled." The main memory is tested more slowly than with "Just zero It."
Dark boot	Sets whether the diagnostics screen (see figure 158 "815E (ETX) BIOS diagnostic screen", on page 352) should be displayed when the system is started.	Enabled	Enables this function. The diagnostics screen is not displayed.
		Disabled	Disables this function. The diagnostics screen is displayed.

Table 215: 815E (ETX) Miscellaneous setting options

BIOS setting	Meaning	Setting options	Effect
Halt on errors	This option sets whether the system should pause the Power On Self Test (POST) when it encounters an error.	Yes	The system pauses. The system pauses every time an error is encountered.
		No	The system does not pause. All errors are ignored.
PS/2 mouse	Sets whether the PS/2 mouse port should be activated.	Disabled	Deactivates the port.
		Enabled	Activates the port. The IRQ12 is reserved, and is not available for other components.
Large disk access mode	This option is intended for hard discs with more than 1024 cylinders, 16 heads, and more than 63 sectors per track. Setting options: DOS	Other	For non-compatible access (e.g. Novell, SCO Unix.)
		DOS	For MS DOS compatible access.

Table 215: 815E (ETX) Miscellaneous setting options (Forts.)

Main Board/Panel Features

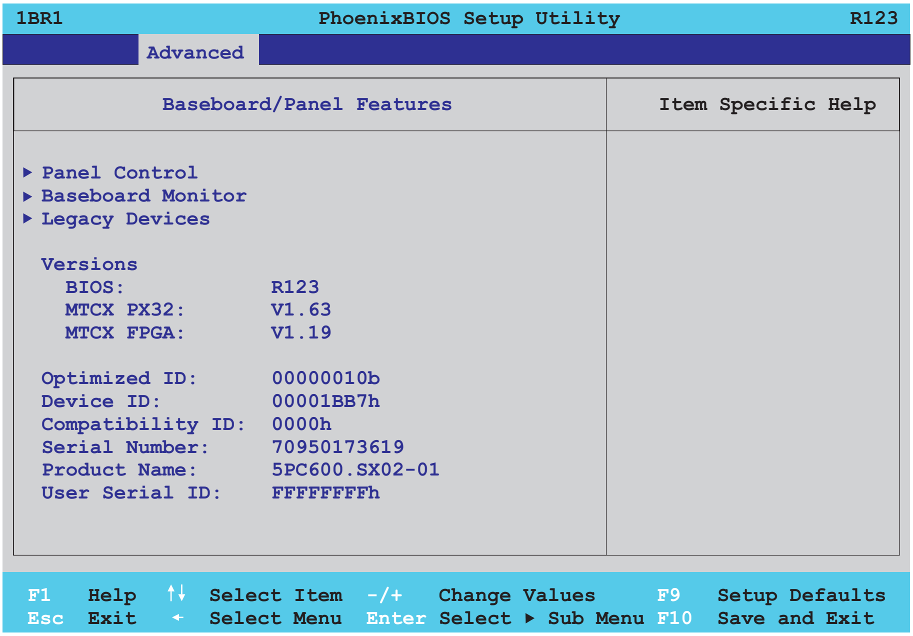

```
1BR1                 PhoenixBIOS Setup Utility                 R123
           Advanced

          Baseboard/Panel Features             Item Specific Help

▶ Panel Control
▶ Baseboard Monitor
▶ Legacy Devices

  Versions
    BIOS:              R123
    MTCX PX32:         V1.63
    MTCX FPGA:         V1.19

  Optimized ID:        00000010b
  Device ID:           00001BB7h
  Compatibility ID:    0000h
  Serial Number:       70950173619
  Product Name:        5PC600.SX02-01
  User Serial ID:      FFFFFFFFh

 F1   Help  ↑↓ Select Item  -/+   Change Values      F9   Setup Defaults
 Esc  Exit  ←  Select Menu  Enter Select ▶ Sub Menu  F10  Save and Exit
```

Figure 177: 815E (ETX) Baseboard/Panel Features

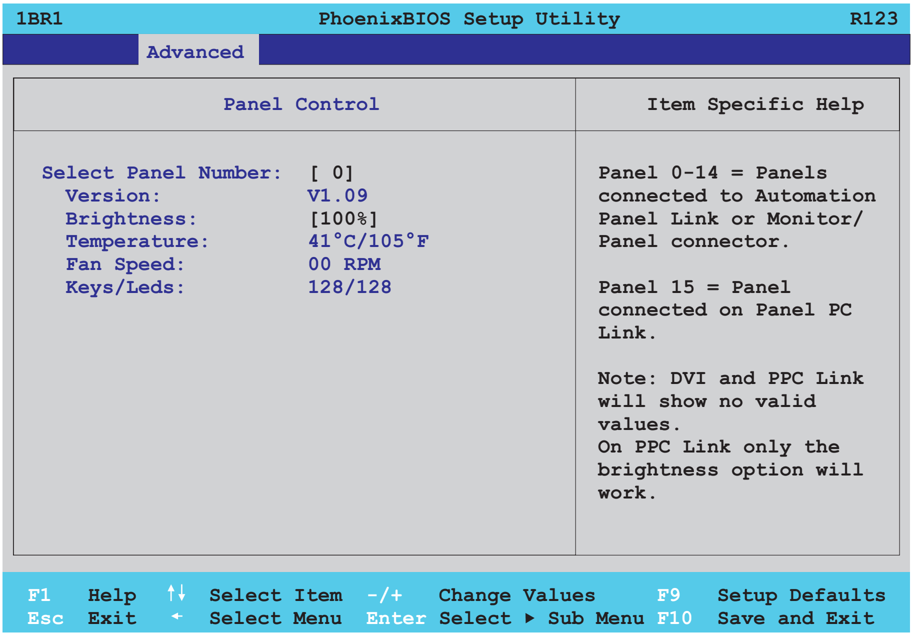
BIOS setting	Meaning	Setting options	Effect
Panel control	For special setup of connected panels (display units).	Enter	Opens the submenu See "Panel control", on page 383
Main board monitor	Display of various temperatures and fan speeds.	Enter	Opens the submenu See "Main board monitor", on page 384

Table 216: 815E (ETX) Baseboard/Panel Features setting options

BIOS setting	Meaning	Setting options	Effect
Legacy devices		Enter	Opens the submenu See "Legacy devices", on page 385
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 code. 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 hex value can be freely assigned by the user (e.g. to give the device a unique ID) and can only be changed with using the "B&R Control Center" via the ADI driver.	None	

Table 216: 815E (ETX) Baseboard/Panel Features setting options

Panel control



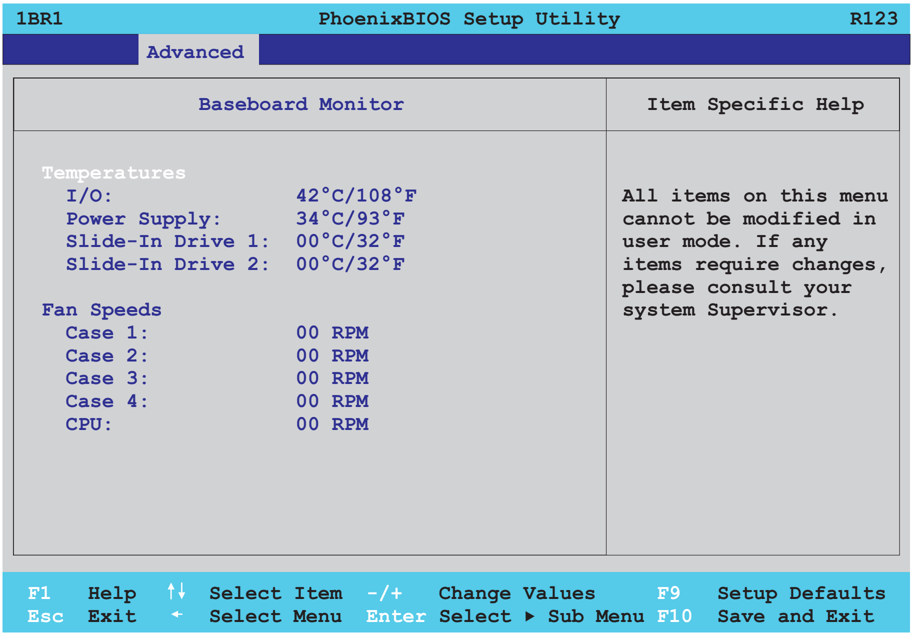
```
 1BR1                  PhoenixBIOS Setup Utility                  R123
            Advanced

                  Panel Control                 |   Item Specific Help
                                                |
  Select Panel Number:   [ 0]                   | Panel 0-14 = Panels
    Version:             V1.09                  | connected to Automation
    Brightness:          [100%]                 | Panel Link or Monitor/
    Temperature:         41°C/105°F             | Panel connector.
    Fan Speed:           00 RPM                 |
    Keys/Leds:           128/128                | Panel 15 = Panel
                                                | connected on Panel PC
                                                | Link.
                                                |
                                                | Note: DVI and PPC Link
                                                | will show no valid
                                                | values.
                                                | On PPC Link only the
                                                | brightness option will
                                                | work.

  F1   Help  ↑↓ Select Item  -/+   Change Values      F9   Setup Defaults
  Esc  Exit  ←  Select Menu  Enter Select ▸ Sub Menu  F10  Save and Exit
```

Figure 178: 815E (ETX) Panel Control

BIOS setting	Meaning	Setting options	Effect
Select panel number	Selection of the panel number for which the values should be read out and/or changed.	0 ... 15	Selection of panel 0 ... 15. Panel 15 is specifically intended for panel PC 700 systems.
Version	Displays the firmware version of the SDLR controller.	None	
Brightness	For setting the brightness of the selected panel.	0%, 25%, 50%, 75%, 100%	For setting 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 fan speed for the selected panel.	None	
Keys/LEDs	Displays the available keys and LEDs on the selected panel.	None	

Table 217: 815E (ETX) Panel Control setting options

Main board monitor



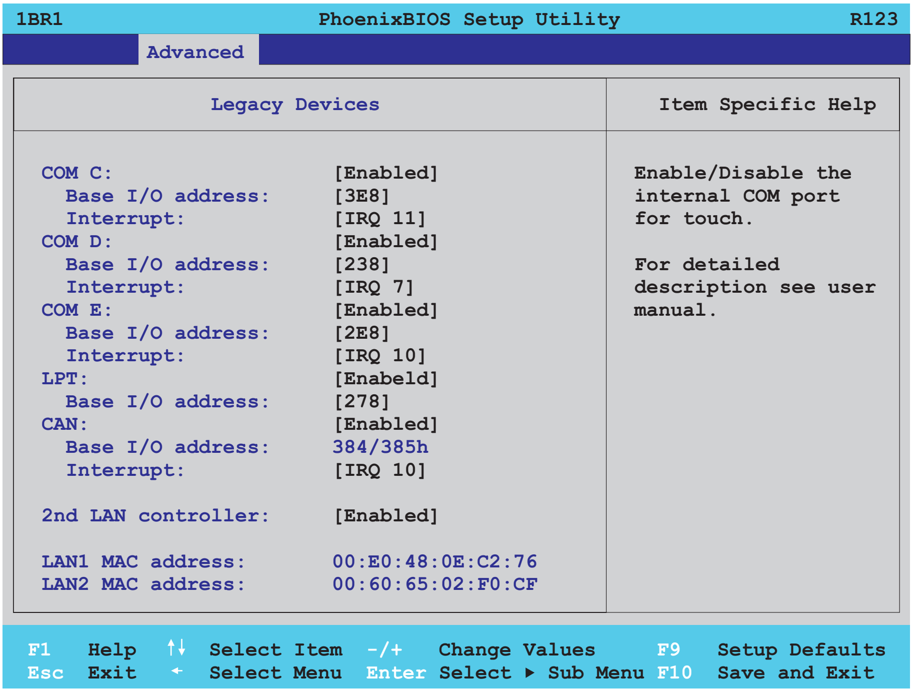
```
1BR1                 PhoenixBIOS Setup Utility                 R123
             Advanced

              Baseboard Monitor                  Item Specific Help

  Temperatures
    I/O:                  42°C/108°F           All items on this menu
    Power Supply:         34°C/93°F            cannot be modified in
    Slide-In Drive 1:     00°C/32°F            user mode. If any
    Slide-In Drive 2:     00°C/32°F            items require changes,
                                               please consult your
  Fan Speeds                                   system Supervisor.
    Case 1:               00 RPM
    Case 2:               00 RPM
    Case 3:               00 RPM
    Case 4:               00 RPM
    CPU:                  00 RPM

 F1   Help  ↑↓ Select Item  -/+   Change Values      F9   Setup Defaults
 Esc  Exit  ←  Select Menu  Enter Select ▸ Sub Menu  F10  Save and Exit
```

Figure 179: 815E (ETX) Baseboard Monitor

BIOS setting	Meaning	Setting options	Effect
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 area in degrees Celsius and Fahrenheit.	None	
Slide-in drive 1	Displays the temperature of the slide-in drive 1 in degrees Celsius and Fahrenheit.	None	
Slide-in drive 2	Displays the temperature of the slide-in drive 2 in degrees Celsius and Fahrenheit.	None	
Case 1	Displays the fan speed of housing fan 1.	None	
Case 2	Displays the fan speed of housing fan 2.	None	
Case 3	Displays the fan speed of housing fan 3.	None	
Case 4	Displays the fan speed of housing fan 4.	None	
CPU	Displays the fan speed of the processor fan.	None	

Table 218: 815E (ETX) Baseboard Monitor setting options

Legacy devices



```
1BR1                PhoenixBIOS Setup Utility                R123
              Advanced

                Legacy Devices                  Item Specific Help

  COM C:                      [Enabled]          Enable/Disable the
    Base I/O address:         [3E8]              internal COM port
    Interrupt:                [IRQ 11]           for touch.
  COM D:                      [Enabled]
    Base I/O address:         [238]              For detailed
    Interrupt:                [IRQ 7]            description see user
  COM E:                      [Enabled]          manual.
    Base I/O address:         [2E8]
    Interrupt:                [IRQ 10]
  LPT:                        [Enabeld]
    Base I/O address:         [278]
  CAN:                        [Enabled]
    Base I/O address:         384/385h
    Interrupt:                [IRQ 10]

  2nd LAN controller:         [Enabled]

  LAN1 MAC address:           00:E0:48:0E:C2:76
  LAN2 MAC address:           00:60:65:02:F0:CF

 F1   Help  ↑↓ Select Item  -/+   Change Values      F9   Setup Defaults
 Esc  Exit  ←  Select Menu  Enter Select ▶ Sub Menu F10  Save and Exit
```

Figure 180: 815E (ETX) Legacy Devices

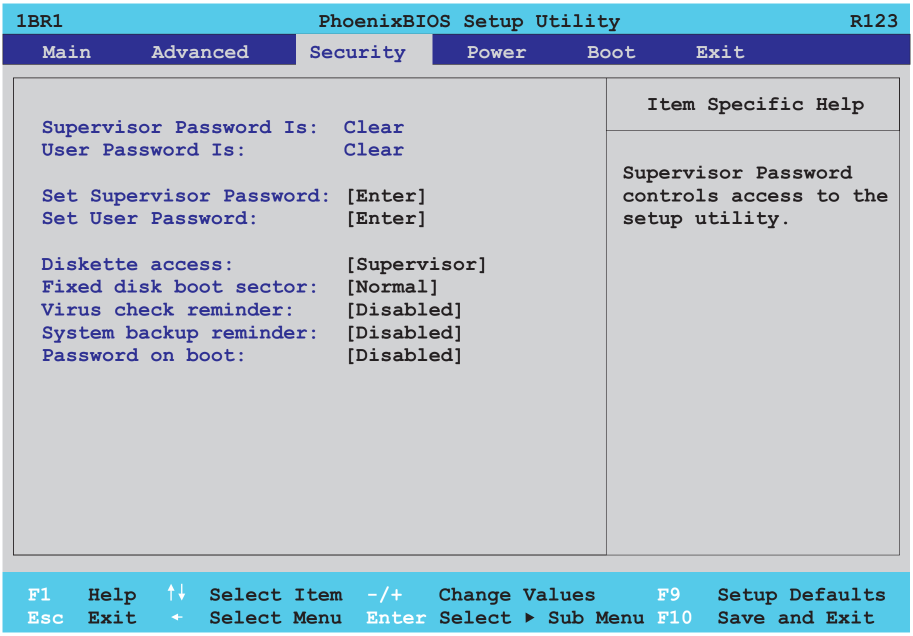
BIOS setting	Meaning	Setting options	Effect
COM C	Settings for the internal serial interfaces in the system. This setting activates the touch screen in panel PC 700 systems, and, using SDL transfer technology, also in Automation Panel 900 display units.	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the COM C port. A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM C port. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 10, IRQ 11, IRQ 12, IRQ 15	Selected interrupt is assigned.
COM D	Configuration of the COM D port for the serial interface of an automation panel link slot. The interface is used to operate the touch screen on connected Automation Panel 900 units.	Disabled	Disables the interface.
		Enabled	Enables the interface.

Table 219: 815E (ETX) Legacy Devices setting options

BIOS setting	Meaning	Setting options	Effect
Base I/O address	Configuration of the base I/O address for the serial COM D port. A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM D port. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 10, IRQ 11, IRQ 12, IRQ 15	Selected interrupt is assigned.
COM E	Configuration of the optional COM E port on a B&R add-on interface (IF option).	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Configuration of the base I/O address for the serial COM E port. A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM E port. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 10, IRQ 11, IRQ 12, IRQ 15	Selected interrupt is assigned.
LPT	This setting is specific to B&R and should not be changed.	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Configuration of the base I/O address for the optional LPT. A yellow star indicates a conflict with another device.	278, 378, 3BC	Selected base I/O address is assigned.
CAN	Configuration of the CAN port of a B&R add-on CAN interface card (IF option).	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	384/385h	None	-
Interrupt	Selection of the interrupt for the CAN port.	IRQ 10	Selected interrupt is assigned.
		NMI	NMI interrupt is assigned.
2nd LAN controller	For turning the onboard LAN controller (ETH2) on and off.	Disabled	Disables the controller.
		Enabled	Enables the controller.
LAN1 MAC address	Displays the MAC addresses for the ETH1 network controller.	-	
LAN2 MAC address	Displays the MAC addresses for the ETH2 network controller.	-	

Table 219: 815E (ETX) Legacy Devices setting options (Forts.)

1.1.6 Security



```
Supervisor Password Is:   Clear
User Password Is:         Clear

Set Supervisor Password:  [Enter]
Set User Password:        [Enter]

Diskette access:          [Supervisor]
Fixed disk boot sector:   [Normal]
Virus check reminder:     [Disabled]
System backup reminder:   [Disabled]
Password on boot:         [Disabled]
```

Supervisor Password controls access to the setup utility.

Figure 181: 815E (ETX) Security Menu

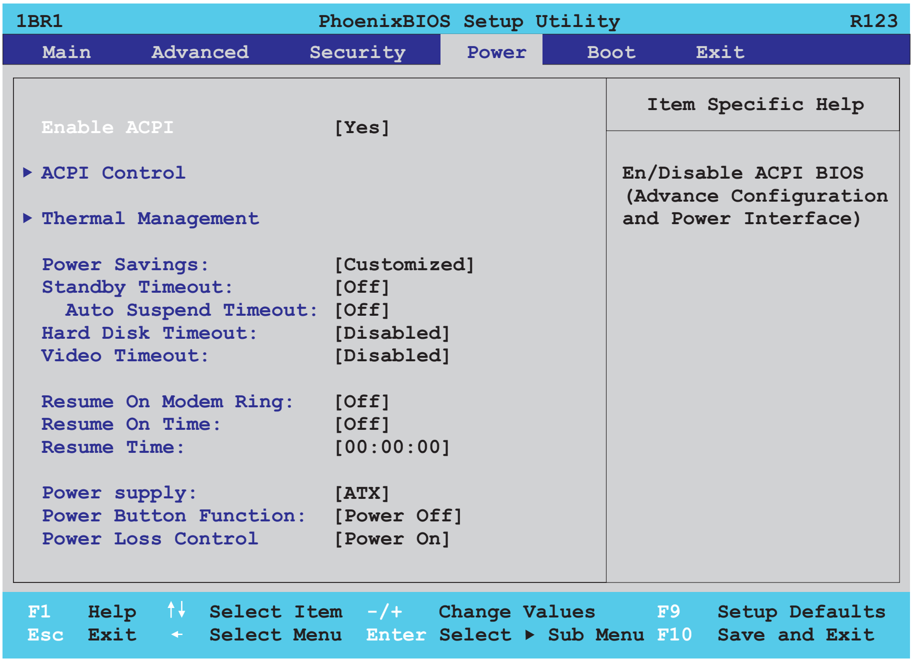
BIOS setting	Meaning	Setting options	Effect
Supervisor password is	Displays whether or not a supervisor password has been set.	None	Display **set**: A supervisor password has been set. Display **clear**: No supervisor password has been set.
User password is	Displays whether or not a user password has been set.	None	Display **set**: A user password has been set. Display **clear**: No user password has been set.
Set supervisor password	To enter/change a supervisor password. A supervisor password is necessary to edit all BIOS settings.	Enter maximum 7 alphanumeric characters - not case sensitive.	Press Enter and enter password two times. The password must be 7 alphanumeric characters or less. Needed to enter BIOS setup. To change the password, enter the old password once and then the new password twice.
Set user password	To enter/change a user password. A user password allows the user to edit only certain BIOS settings.	Enter maximum 7 alphanumeric characters - not case sensitive.	Press Enter and enter password two times. The password must be 7 alphanumeric characters or less. Needed to enter BIOS setup. To change the password, enter the old password once and then the new password twice.

Table 220: 815E (ETX) Security setting options

BIOS setting	Meaning	Setting options	Effect
Diskette access	Access to the diskette drive is controlled here. Either or the supervisor or the user has access to it. Does not work with USB diskette drives.	Supervisor	Supervisor password is needed to access a diskette drive.
		User	User password is needed to access a diskette drive.
Fixed disk boot sector	The boot sector of the primary hard drive can be write protected against viruses with this option.	Normal	Write access allowed.
		Write protect	Boot sector is write protected.
Virus check reminder	This function opens a reminder when the system is started to scan for viruses.	Disabled	Disables this function.
		Daily	A reminder appears every day when the system is started.
		Weekly	A reminder appears the first time the system is started after every Sunday.
		Monthly	A reminder appears the first time the system is started each month.
System backup reminder	This function opens a reminder when the system is started to create a system backup.	Disabled	Disables this function.
		Daily	A reminder appears every day when the system is started.
		Weekly	A reminder appears the first time the system is started after every Sunday.
		Monthly	A reminder appears the first time the system is started each month.
Password at boot	This function requires a supervisor or user password when the system is started. Only possible when a supervisor or user password is enabled.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 220: 815E (ETX) Security setting options (Forts.)

1.1.7 Power



```
1BR1                 PhoenixBIOS Setup Utility                     R123
   Main     Advanced     Security     Power     Boot     Exit

  Enable ACPI                [Yes]                 Item Specific Help

▶ ACPI Control                                   En/Disable ACPI BIOS
                                                  (Advance Configuration
▶ Thermal Management                             and Power Interface)

  Power Savings:             [Customized]
  Standby Timeout:           [Off]
    Auto Suspend Timeout:    [Off]
  Hard Disk Timeout:         [Disabled]
  Video Timeout:             [Disabled]

  Resume On Modem Ring:      [Off]
  Resume On Time:            [Off]
  Resume Time:               [00:00:00]

  Power supply:              [ATX]
  Power Button Function:     [Power Off]
  Power Loss Control         [Power On]

 F1   Help  ↑↓  Select Item  -/+    Change Values      F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter  Select ▶ Sub Menu  F10  Save and Exit
```

Figure 182: 815E (ETX) Power Menu

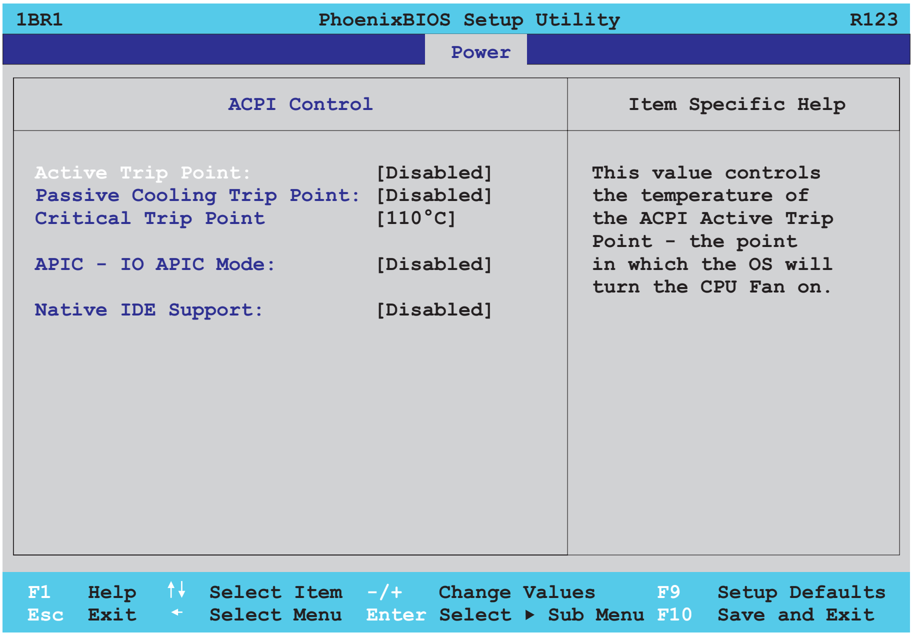
BIOS setting	Meaning	Setting options	Effect
Enable ACPI	This option turns the ACPI function (Advanced Configuration and Power Interface) on or off. This is an advanced plug & play and power management functionality.	Yes	Enables this function.
		No	Disables this function.
ACPI control	Configuration of specific limits.	Enter	Opens the submenu See "ACPI control", on page 391
Thermal management	Configuration of specific CPU limits.	Enter	Opens the submenu See "Thermal management", on page 392
Power savings	This function determines if and how the power save function is used.	Disabled	Deactivates the power savings function.
		Customized	Power management is configured by adjusting the individual settings.
		Maximum power Savings	Maximum power savings function.
		Maximum performance	Power savings function to maximize performance.

Table 221: 815E (ETX) Power setting options

BIOS setting	Meaning	Setting options	Effect
Standby timeout	Set here when the system should enter standby mode. During standby, various devices and the display will be deactivated. This option only available when "power savings" is set to customized.	Off	No standby.
		1, 2, 4, 8 minutes	Time in minutes until standby.
Auto suspend timeout	Set here when the system should enter suspend mode to save electricity. This option only available when "power savings" is set to customized.	Off	No standby.
		5, 10, 15, 20, 30, 40, 60 Minutes	Time in minutes until standby.
Hard disk timeout	Set here how long after the last access the hard disk should enter standby mode. This option only available when "power savings" is set to customized.	Disabled	Disables this function.
		10, 15, 30, 45 seconds	Time in seconds until standby.
		1, 2, 4, 6, 8, 10, 15 Minutes	Time in minutes until standby.
Video timeout		Disabled	
Resume on modem ring	If an external modem is connected to a serial port and the telephone rings, the system starts up.	Off	Disables this function.
		On	Enables this function.
Resume on time	This function enables the system to start at the time set under "resume time."	Off	Disables this function.
		On	Enables this function.
Resume time	Time setting for the option "resume on time" (when the system should start up).	[00:00:00]	Personal setting of the time in the format (hh:mm:ss).
Power supply	The type of power supply being used can be entered here.	ATX	An ATX compatible power supply is being used. **Information:** **Since the APC620 contains an ATX power supply, ATX should be selected.**
		AT	An AT compatible power supply is being used.
Power button Function	This option determines the function of the power button.	Power off	Shuts down the system.
		Sleep	The system enters sleep mode.
Power Loss Control	This option determines how the system reacts to a power outage.	Stay off	The system does not turn back on. The system remains off until the power button is pressed.
		Power-on	The system turns back on.
		Last State	The system resumes the last state it was in before the power outage.

Table 221: 815E (ETX) Power setting options (Forts.)

ACPI control



```
1BR1                    PhoenixBIOS Setup Utility                   R123
                                   Power
                ACPI Control                       Item Specific Help

  Active Trip Point:            [Disabled]      This value controls
  Passive Cooling Trip Point:   [Disabled]      the temperature of
  Critical Trip Point           [110°C]         the ACPI Active Trip
                                                Point - the point
  APIC - IO APIC Mode:          [Disabled]      in which the OS will
                                                turn the CPU Fan on.
  Native IDE Support:           [Disabled]

 F1   Help  ↑↓  Select Item  -/+    Change Values       F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter  Select ▸ Sub Menu   F10  Save and Exit
```

Figure 183: 815E (ETX) ACPI Control

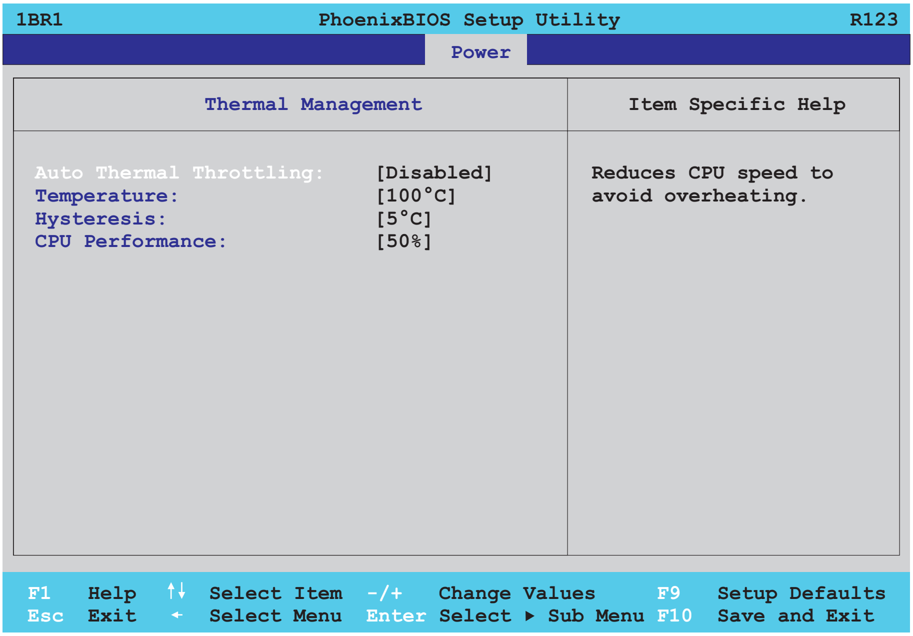
BIOS setting	Meaning	Setting options	Effect
Active trip point	With this function, an optional CPU fan above the operating system can be set to turn on when the CPU reaches the set temperature.	Disabled	Disables this function.
		40 to 100°C	Temperature setting for the active trip point. Can be set in increments of 5°C.
Passive Cooling Trip Point	With this function, a temperature can be set at which the CPU automatically reduces its speed.	Disabled	Disables this function.
		40 to 100°C	Temperature setting for the passive cooling trip point. Can be set in increments of 5°C.
Critical Trip Point	With this function, a temperature can be set at which the operating system automatically shuts itself down. **Warning!** **This function should never be deactivated, as this would allow the CPU to rise above the temperature specifications.**	Disabled	Disables this function.
		40 to 110°C	Temperature setting for the critical trip point. Can be set in increments of 5°C.

Table 222: 815E (ETX) ACPI Control setting options

BIOS setting	Meaning	Setting options	Effect
APIC - I/O APIC mode	This option controls the functionality of the advanced interrupt controller in the processor.	Disabled	Disables the function
		Enabled	Enables this function. The activation of this option is only effective if it takes place before the operating system (Windows XP) is activated. There are then 23 IRQs available.
Native IDE support	The native IDE support offers the possibility to make 4 hard disk controllers (2 x primary ATA for a total of 4 devices, and 2 x secondary ATA for another 2 devices) accessible through Windows XP.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 222: 815E (ETX) ACPI Control setting options (Forts.)

Thermal management



```
1BR1                    PhoenixBIOS Setup Utility                    R123
                                 Power

            Thermal Management                   Item Specific Help

  Auto Thermal Throttling:     [Disabled]      Reduces CPU speed to
  Temperature:                 [100°C]         avoid overheating.
  Hysteresis:                  [5°C]
  CPU Performance:             [50%]

 F1   Help  ↑↓  Select Item  -/+    Change Values        F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter  Select ▸ Sub Menu    F10  Save and Exit
```

Figure 184: 815E (ETX) Thermal Management

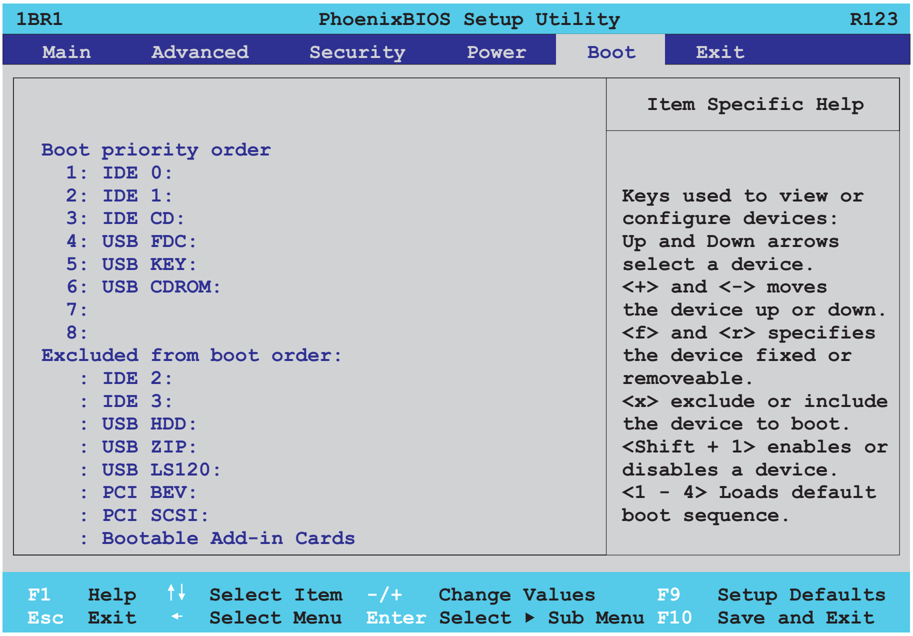
BIOS setting	Meaning	Setting options	Effect
Auto thermal throttling	Reduces the CPU speed when it exceeds the limit set in the "temperature" option by the amount set in the "CPU performance" option.	Enabled	Enables this function.
		Disabled	Disables this function.

Table 223: 815E (ETX) Thermal Management

BIOS setting	Meaning	Setting options	Effect
Temperature	Temperature limit for the setting "auto thermal throttling."	75 to 110°C	Can be set in increments of 5?.
Hysteresis	When auto thermal throttling has been activated and the temperature sinks by the number of degrees in this setting, the processor resumes 100% performance.	3 to 6°C	Can be set in increments of 1°C.
CPU performance	When the CPU reaches the temperature set in the "temperature" option, the CPU is throttled by the amount (in percent) set in this option.	13%, 25%, 50%, 75%	CPU performance throttled by amount selected, in percent.

Table 223: 815E (ETX) Thermal Management (Forts.)

1.1.8 Boot



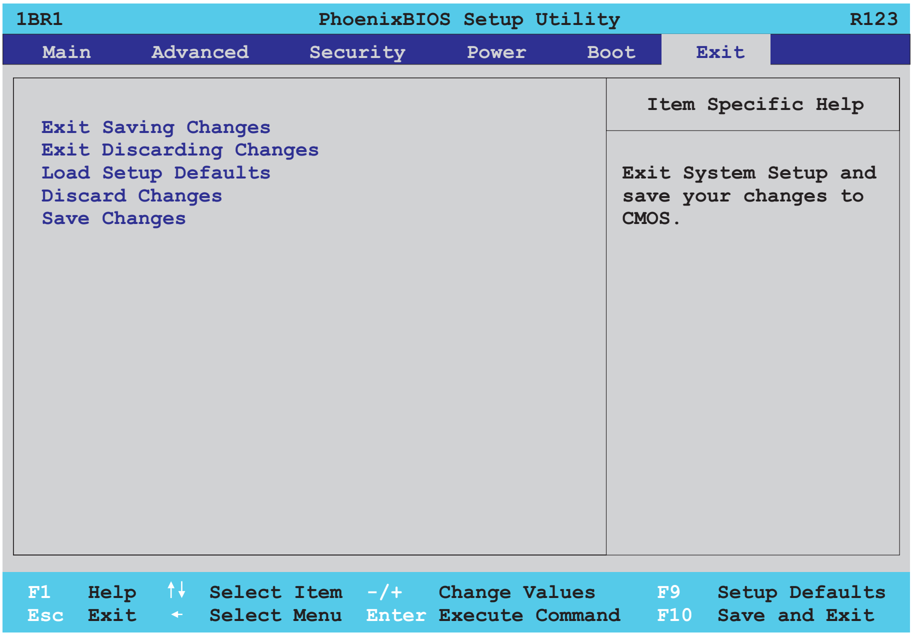
```
1BR1                    PhoenixBIOS Setup Utility                    R123
  Main     Advanced     Security     Power     Boot     Exit

                                               Item Specific Help

 Boot priority order
   1: IDE 0:                                  Keys used to view or
   2: IDE 1:                                  configure devices:
   3: IDE CD:                                 Up and Down arrows
   4: USB FDC:                                select a device.
   5: USB KEY:                                <+> and <-> moves
   6: USB CDROM:                              the device up or down.
   7:                                         <f> and <r> specifies
   8:                                         the device fixed or
 Excluded from boot order:                    removeable.
    : IDE 2:                                  <x> exclude or include
    : IDE 3:                                  the device to boot.
    : USB HDD:                                <Shift + 1> enables or
    : USB ZIP:                                disables a device.
    : USB LS120:                              <1 - 4> Loads default
    : PCI BEV:                                boot sequence.
    : PCI SCSI:
    : Bootable Add-in Cards

 F1   Help  ↑↓  Select Item  -/+    Change Values        F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter  Select ▶ Sub Menu    F10  Save and Exit
```

Figure 185: 815E (ETX) Boot Menu

BIOS setting	Meaning	Setting options	Effect
1:		IDE 0, IDE 1, IDE 2, IDE 3, IDE CD USB FDC, USB KEY USB CDROM USB HDD, USB ZIP USB LS120, PCI BEV, PCI SCSI, bootable add-in cards	Use the up arrow ↑ and down arrow ↓, to select a device. Then, use the <+> und <-> keys to change the boot priority of the drive. To add a device to the "boot priority order" list from the "excluded from boot order" list, use the <x> key. In the same way, the <x> key can move boot devices down out of the boot priority order. The keys 1 - 4 can load preset boot sequences.
2:			
3:			
4:			
5:			
6:			
7:			
8:			

Table 224: 815E (ETX) Boot setting options

1.1.9 Exit



Exit System Setup and save your changes to CMOS.

Figure 186: 815E (ETX) Exit Menu

BIOS setting	Meaning	Setting options	Effect
Exit saving changes	BIOS setup is closed with this item. Changes made are saved in CMOS after confirmation, and the system is rebooted.	Yes / No	
Exit discarding changes	With this item you can close BIOS setup without saving the changes made. The system is then rebooted.	Yes / No	
Load setup defaults	This item loads the BIOS setup defaults, which are defined by the DIP switch settings. These settings are loaded for all BIOS configurations.	Yes / No	
Discard Changes	Should unknown changes have been made and not yet saved, they can be discarded.	Yes / No	
Save changes	Settings are saved, and the system is not restarted.	Yes / No	

Table 225: 815E (ETX) Exit setting options

1.1.10 Profile overview - BIOS default settings - 815E (ETX)

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

DIP switch position see Section 1.6 "Location of the DIP switch in APC620 system units", on page 526).

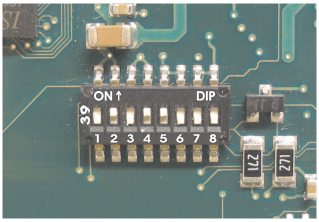


Figure 187: DIP switch on system unit

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

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	-	-
Profile 1	Reserved	On	Off	Off	Off	Off	Off	-	-
Profile 2	Automation PC 620 system units 5PC600.SX02-00, 5PC600.SX02-01, 5PC600.SX05-00 and 5PC600.SX05-01.	Off	On	Off	Off	Off	Off	-	-
Profile 3	Panel PC 700 system unit 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	-	-
Profile 4	Panel PC 700 system unit 5PC720.1043-01, 5PC720.1214-01, 5PC720.1505-01 and 5PC720.1505-02.	Off	Off	On	Off	Off	Off	-	-

Table 226: 815E (ETX) Profile overview

[1] Reserved.

The following pages provide an overview of the BIOS default settings for the different DIP switch configurations.

Personal settings

If changes have been made to the BIOS defaults, they can be entered in the following tables for backup.

Main

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
System Time	-	-	-	-	-	
System Date	-	-	-	-	-	
SMART device monitoring	Enabled	Enabled	Enabled	Enabled	Enabled	
BIOS Date	-	-	-	-	-	
IDE channel 0 master						
Type	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	
IDE channel 0 slave						
Type	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	
IDE channel 1 master						
Type	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	
IDE channel 1 slave						
Type	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 227: 815E (ETX) Main Profile settings overview

Advanced

Advanced chipset/graphics control

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Graphics engine 1	Auto	Auto	Auto	Auto	Auto	
Graphics memory size	1MB	1MB	1MB	1MB	1MB	
Enable memory gap	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 228: 815E (ETX) Advanced Chipset/Graphics Control Profile settings overview

PCI/PNP Configuration

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
PNP OS installed	Yes	Yes	Yes	Yes	Yes	
Reset configuration data	No	No	No	No	No	
Secured setup configuration	Yes	Yes	Yes	Yes	Yes	
PCI IRQ line 1	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
PCI IRQ line 2	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
PCI IRQ line 3	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
PCI IRQ line 4	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
Onboard LAN IRQ line	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
Onboard USB EHCI IRQ line	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
Default primary video adapter	PCI	PCI	PCI	PCI	PCI	
Assign IRQ to SMB	Enabled	Enabled	Enabled	Enabled	Enabled	
PCI device, slot #1						
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Enabled	Enabled	Enabled	Enabled	Enabled	
Latency timer	Default	Default	Default	Default	Default	
PCI device, slot #2						
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Enabled	Enabled	Enabled	Enabled	Enabled	
Latency timer	Default	Default	Default	Default	Default	
PCI device, slot #3						
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Enabled	Enabled	Enabled	Enabled	Enabled	
Latency timer	Default	Default	Default	Default	Default	

Table 229: 815E (ETX) PCI/PNP Configuration Profile settings overview

PCI device, slot #4	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Enabled	Enabled	Enabled	Enabled	Enabled	
Latency timer	Default	Default	Default	Default	Default	

Table 229: 815E (ETX) PCI/PNP Configuration Profile settings overview (Forts.)

Memory cache

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Memory cache	Enabled	Enabled	Enabled	Enabled	Enabled	
Cache system BIOS area	Write protect	Write protect	Write protect	Write protect	Write protect	
Cache video BIOS area	Write protect	Write protect	Write protect	Write protect	Write protect	
Cache extended memory area	Write back	Write back	Write back	Write back	Write back	
Cache D000 - D3FF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache D400 - D7FF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache D800 - DBFF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache DC00 - DFFF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache E000 - E3FF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache E400 - E7FF	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 230: 815E (ETX) Memory Cache Profile settings overview

I/O Device Configuration

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Local bus IDE adapter	Primary	**Both**	**Both**	Primary	**Both**	
Primary IDE UDMA66/100	Enabled	Enabled	Enabled	Enabled	Enabled	
USB UHCI host controller 1	Enabled	Enabled	Enabled	Enabled	Enabled	
USB UHCI host controller 2	Enabled	Enabled	Enabled	Enabled	Enabled	
USB UHCI host controller	Enabled	Enabled	Enabled	Enabled	Enabled	
Legacy USB Support	Enabled	Enabled	Enabled	Enabled	Enabled	
AC97 audio controller	Enabled	Enabled	Enabled	Enabled	Enabled	
Onboard LAN controller	Enabled	Enabled	Enabled	Enabled	Enabled	
Onboard LAN PXE ROM	Disabled	**Enabled**	Disabled	Disabled	Disabled	
Serial port A	Enabled	Enabled	Enabled	Enabled	Enabled	
Base I/O address	3F8	3F8	3F8	3F8	2F8	
Interrupt	IRQ 4	IRQ 4	IRQ 4	IRQ 4	IRQ 4	
Serial port B	Enabled	Enabled	Enabled	Enabled	Enabled	
Mode	Normal	Normal	Normal	Normal	Normal	

Table 231: 815E (ETX) I/O Device Configuration Profile settings overview

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Base I/O address	3F8	3F8	3F8	3F8	**2F8**	
Interrupt	IRQ 3	IRQ 3	IRQ 3	IRQ 3	IRQ 3	
Parallel port	Enabled	Enabled	Enabled	Enabled	Enabled	
Base I/O address	378	378	378	378	378	

Table 231: 815E (ETX) I/O Device Configuration Profile settings overview (Forts.)

Keyboard features

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
NumLock	On	On	On	On	On	
Key click	Disabled	Disabled	Disabled	Disabled	Disabled	
Keyboard auto-repeat rate	30/sec	30/sec	30/sec	30/sec	30/sec	
Keyboard auto-repeat delay	1/2 sec	1/2 sec	1/2 sec	1/2 sec	1/2 sec	

Table 232: 815E (ETX) Keyboard Features Profile settings overview

CPU board monitor

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
VCC 3.3V voltage	-	-	-	-	-	
CPU core voltage	-	-	-	-	-	
5Vsb voltage	-	-	-	-	-	
Battery voltage	-	-	-	-	-	
CPU temperature	-	-	-	-	-	

Table 233: 815E (ETX) CPU Board Monitor Profile settings overview

Miscellaneous

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Summary screen	Enabled	Enabled	Enabled	Enabled	Enabled	
QuickBoot mode	Enabled	Enabled	Enabled	Enabled	Enabled	
Extended memory testing	Just zero it	Just zero it	Just zero it	Just zero it	Just zero it	
Dark boot	Disabled	Disabled	Disabled	Disabled	Disabled	
Halt on errors	Yes	Yes	Yes	Yes	Yes	
PS/2 mouse	Disabled	**Enabled**	Disabled	Disabled	Disabled	
Large disk access mode	DOS	DOS	DOS	DOS	DOS	

Table 234: 815E (ETX) Miscellaneous Profile settings overview

Main Board/Panel Features

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Versions	-	-	-	-	-	
BIOS	-	-	-	-	-	
MTCX	-	-	-	-	-	
FPGA	-	-	-	-	-	
Optimized ID	-	-	-	-	-	
Device ID	-	-	-	-	-	
Compatibility ID	-	-	-	-	-	
Serial Number	-	-	-	-	-	
Product name	-	-	-	-	-	
User serial ID	-	-	-	-	-	
Panel control						
Select panel number	0	0	0	**15**	**15**	
Version	-	-	-	-	-	
Brightness	100%	100%	100%	100%	100%	
Temperature	-	-	-	-	-	
Fan speed	-	-	-	-	-	
Keys/LEDs	-	-	-	-	-	
Main board monitor						
Temperatures	-	-	-	-	-	
I/O	-	-	-	-	-	
Power supply	-	-	-	-	-	
Slide-in drive 1	-	-	-	-	-	
Slide-in drive 2	-	-	-	-	-	
Fan speeds	-	-	-	-	-	
Case 1	-	-	-	-	-	
Case 2	-	-	-	-	-	
Case 3	-	-	-	-	-	
Case 4	-	-	-	-	-	
CPU	-	-	-	-	-	
Legacy devices						
COM C	Disabled	Disabled	Disabled	**Enabled**	**Enabled**	
Base I/O address	-	-	-	**3E8h**	**3E8h**	
Interrupt	-	-	-	**11**	**11**	
COM D	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-	-	-	

Table 235: 815E (ETX) Baseboard/Panel Features Profile settings overview

Legacy devices	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
COM E	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-	-	-	
LPT	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
CAN	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-	-	-	
2nd LAN controller	Enabled	Enabled	Enabled	Enabled	Enabled	
LAN1 MAC address	-	-	-	-	-	
LAN2 MAC address	-	-	-	-	-	

Table 235: 815E (ETX) Baseboard/Panel Features Profile settings overview (Forts.)

Security

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Supervisor password is	Clear	Clear	Clear	Clear	Clear	
User password is	Clear	Clear	Clear	Clear	Clear	
Set supervisor password	-	-	-	-	-	
Set user password	-	-	-	-	-	
Diskette access	Supervisor	Supervisor	Supervisor	Supervisor	Supervisor	
Fixed disk boot sector	Normal	Normal	Normal	Normal	Normal	
Virus check reminder	Disabled	Disabled	Disabled	Disabled	Disabled	
System backup reminder	Disabled	Disabled	Disabled	Disabled	Disabled	
Password at boot	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 236: 815E (ETX) Security Profile settings overview

Power

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Enable ACPI	Yes	Yes	Yes	Yes	Yes	
Power savings	Disabled	Disabled	Disabled	Disabled	Disabled	
Standby timeout	-	-	-	-	-	
Auto suspend timeout	-	-	-	-	-	
Hard disk timeout	Disabled	Disabled	Disabled	Disabled	Disabled	
Video timeout	Disabled	Disabled	Disabled	Disabled	Disabled	
Resume on modem ring	Off	Off	Off	Off	Off	
Resume on time	Off	Off	Off	Off	Off	
Resume time	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	
Power supply	ATX	ATX	ATX	ATX	ATX	
Power button function	Power off	Power off	Power off	Power off	Power off	
Power Loss Control	Power-on	Power-on	Power-on	Power-on	Power-on	
ACPI control						
Active trip point	Disabled	Disabled	Disabled	Disabled	Disabled	
Passive Cooling Trip Point	Disabled	Disabled	Disabled	Disabled	Disabled	
Critical Trip Point	110°C	110°C	110°C	110°C	110°C	
APIC - I/O APIC mode	Disabled	**Enabled**	Disabled	Disabled	Disabled	
Native IDE support	Disabled	Disabled	Disabled	Disabled	Disabled	
Thermal management						
Auto thermal throttling	Enabled	Enabled	Enabled	Enabled	Enabled	
Temperature	100°C	100°C	100°C	100°C	100°C	
Hysteresis	5°C	5°C	5°C	5°C	5°C	
CPU performance	50%	50%	50%	50%	50%	

Table 237: 815E (ETX) Power Profile settings overview

Boot

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Boot priority order						
1:	IDE 0	**PCI BEV**	IDE 0	IDE 0	IDE 0	
2:	IDE 1	**IDE 0**	IDE 1	IDE 1	IDE 1	
3:	IDE CD	**IDE 1**	IDE CD	IDE CD	IDE CD	
4:	USB FDC	**IDE CD**	USB FDC	USB FDC	**USB FDD**	
5:	USB KEY	**USB FDC**	USB KEY	USB KEY	USB KEY	
6:	USB CDROM	**USB KEY**	USB CDROM	USB CDROM	USB CDROM	
7:	-	**USB CDROM**	**IDE 2**	-	**IDE 2**	
8:	-	-	**IDE 3**	-	**IDE 3**	
Excluded from boot order						
:	IDE 2	IDE 2	**USB HDD**	IDE 2	**USB HDD**	
:	IDE 3	IDE 3	**USB ZIP**	IDE 3	**USB ZIP**	
:	USB HDD	USB HDD	**USB LS120**	USB HDD	**USB LS120**	
:	USB ZIP	USB ZIP	**PCI BEV**	USB ZIP	**PCI BEV**	
:	USB LS120	USB LS120	**PCI SCSI**	USB LS120	**PCI SCSI**	
:	PCI BEV	**PCI SCSI**	**Bootable add-in cards**	PCI BEV	**Bootable add-in cards**	
:	PCI SCSI	**Bootable add-in cards**		PCI SCSI		
:	Bootable add-in cards			Bootable add-in cards		

Table 238: 815E (ETX) Boot Profile settings overview

1.2 855GME (ETX) BIOS description

Information:

- **The following diagrams and BIOS menu items including descriptions refer to BIOS version 1.30. It is therefore possible that these diagrams and BIOS descriptions do not correspond with the installed BIOS version.**
- **The setup defaults are the settings recommended by B&R. The setup defaults are dependant on the DIP switch configuration on the baseboard (see section 1.2.10 "Profile overview - BIOS default settings - 855GME (ETX)", on page 452).**

1.2.1 General information

BIOS stands for "Basic Input Output System". It is the most basic standardized communication between the user and the system (hardware). The BIOS system used in the Automation PC 620 systems is produced by Phoenix.

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

The CMOS data is buffered by a battery, and remains in the APC620 even when the power is turned off (no 24 VDC supply) .

1.2.2 BIOS setup and boot procedure

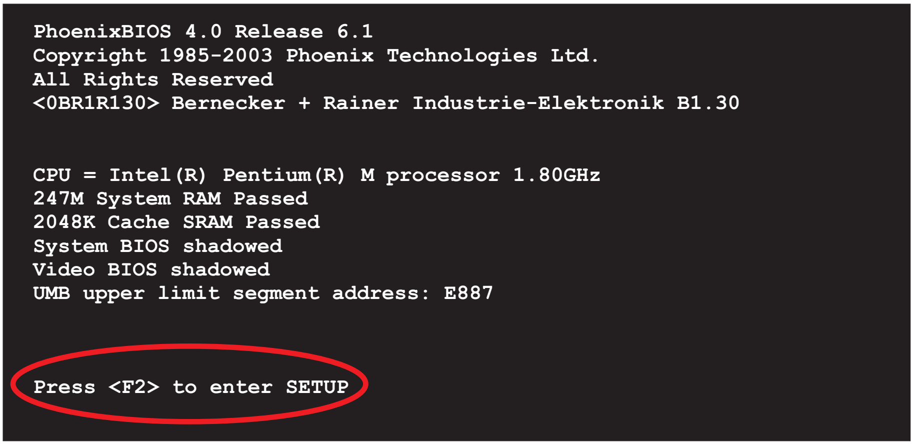
BIOS is immediately activated when switching on the power supply of the Automation PC 620 system or pressing the power button. The system checks if the setup data from the EEPROM is "OK". If the data is "OK", then it is transferred to the CMOS. If the data is "not OK", then the CMOS data is checked for validity. An error message is output if the CMOS data contains errors and the boot procedure can be continued by pressing the <F1> key. To prevent the error message from appearing at each restart, open the BIOS setup by pressing the <F2> key and re-save the settings.

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

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

To enter BIOS setup, the F2 key must be pressed as soon as the following message appears on the lower margin of the display (during POST):

"Press <F2> to enter SETUP"

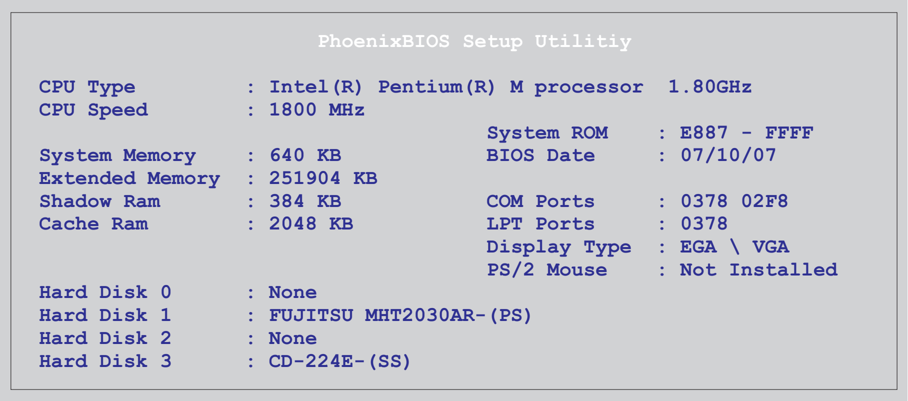


```
PhoenixBIOS 4.0 Release 6.1
Copyright 1985-2003 Phoenix Technologies Ltd.
All Rights Reserved
<0BR1R130> Bernecker + Rainer Industrie-Elektronik B1.30


CPU = Intel(R) Pentium(R) M processor 1.80GHz
247M System RAM Passed
2048K Cache SRAM Passed
System BIOS shadowed
Video BIOS shadowed
UMB upper limit segment address: E887



Press <F2> to enter SETUP
```

Figure 188: 855GME (ETX) BIOS Diagnostics Screen

Summary screen

After the POST, the summary screen displays the most important system characteristics.



```
                     PhoenixBIOS Setup Utilitiy

CPU Type         : Intel(R) Pentium(R) M processor  1.80GHz
CPU Speed        : 1800 MHz
                                       System ROM    : E887 - FFFF
System Memory    : 640 KB              BIOS Date     : 07/10/07
Extended Memory  : 251904 KB
Shadow Ram       : 384 KB              COM Ports     : 0378 02F8
Cache Ram        : 2048 KB             LPT Ports     : 0378
                                       Display Type  : EGA \ VGA
                                       PS/2 Mouse    : Not Installed
Hard Disk 0      : None
Hard Disk 1      : FUJITSU MHT2030AR-(PS)
Hard Disk 2      : None
Hard Disk 3      : CD-224E-(SS)
```

Figure 189: 855GME (ETX) BIOS Summary Screen

1.2.3 BIOS setup keys

The following keys are active during the POST:

Key	Function
F2	Enters the BIOS setup menu.
ESC	Cues the boot menu. Lists all bootable devices that are connected to the system. With cursor ↑ and cursor ↓ and by pressing <ENTER>, select the device from which will be booted.
<Spacebar>	Pressing the spacebar skips the system RAM check.
<Pause>	Pressing the <pause> key stops the POST. Press any other key to resume the POST.

Table 239: Keys relevant to 855GME (ETX) BIOS during POST

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

Key	Function
Cursor ↑	Moves to the previous item.
Cursor ↓	Go to the next item.
Cursor ←	Move to the item on the left.
Cursor →	Move to the item on the right.
<ESC>	Exits the submenu.
PageUp ↑	Moves the cursor to the top of the current BIOS setup page.
PageDown ↓	Moves the cursor to the bottom of the current BIOS setup page.
<F1> or <Alt+H>	Opens a help window showing the key assignments.
<F5> or <->	Scrolls to the previous option for the selected BIOS setting.
<F6> or <+> or <spacebar>	Scrolls to the next option for the selected BIOS setting.
<F8>	Load optimized default values for all pages.
<F9>	Load setup default values for all pages.
<F10>	Saves settings and closes BIOS setup.
<Enter>	Opens submenu for a BIOS setup menu item, or displays the configurable values of a BIOS setup item.

Table 240: 855GME (ETX) - BIOS relevant keys

The following sections explain the individual BIOS setup menu items in detail.

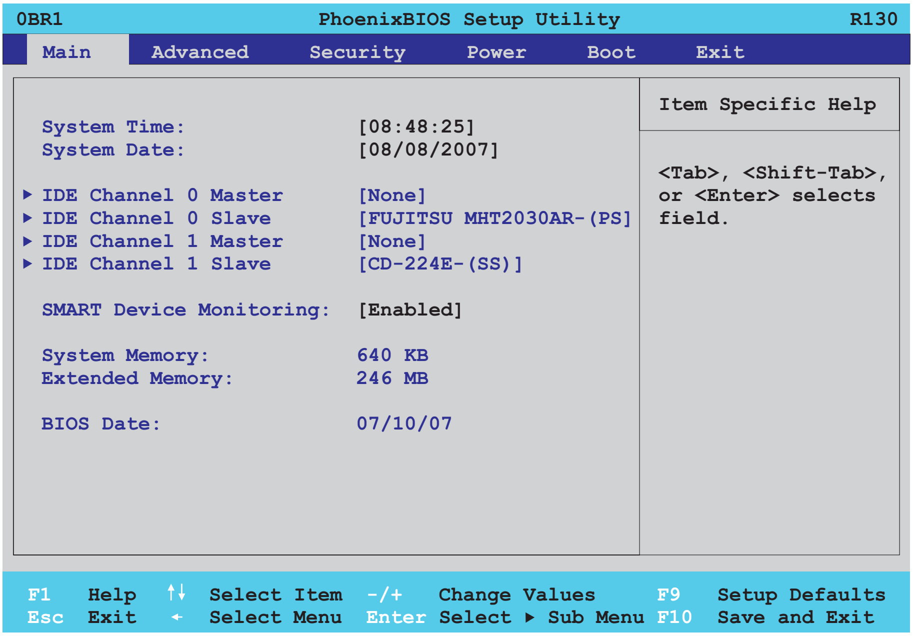
BIOS setup menu item	Function	From page
Main	The basic system configurations (e.g. time, date, hard disk parameters) can be set in this menu.	408
Advanced	Advanced BIOS options such as cache areas, PnP, keyboard repeat rate, as well as settings specific to B&R integrated hardware, can be configured here.	418
Security	For setting up the system's security functions.	443
Power	Setup of various APM (Advanced Power Management) options.	445
Boot	The boot order can be set here.	449

Table 241: Overview of 855GME (ETX) BIOS menu items

BIOS setup menu item	Function	From page
Exit	To end the BIOS setup.	450

Table 241: Overview of 855GME (ETX) BIOS menu items (Forts.)

1.2.4 Main



```
  System Time:                [08:48:25]
  System Date:                [08/08/2007]

▸ IDE Channel 0 Master        [None]
▸ IDE Channel 0 Slave         [FUJITSU MHT2030AR-(PS]
▸ IDE Channel 1 Master        [None]
▸ IDE Channel 1 Slave         [CD-224E-(SS)]

  SMART Device Monitoring:    [Enabled]

  System Memory:              640 KB
  Extended Memory:            246 MB

  BIOS Date:                  07/10/07
```

<Tab>, <Shift-Tab>, or <Enter> selects field.

Figure 190: 855GME (ETX) Main

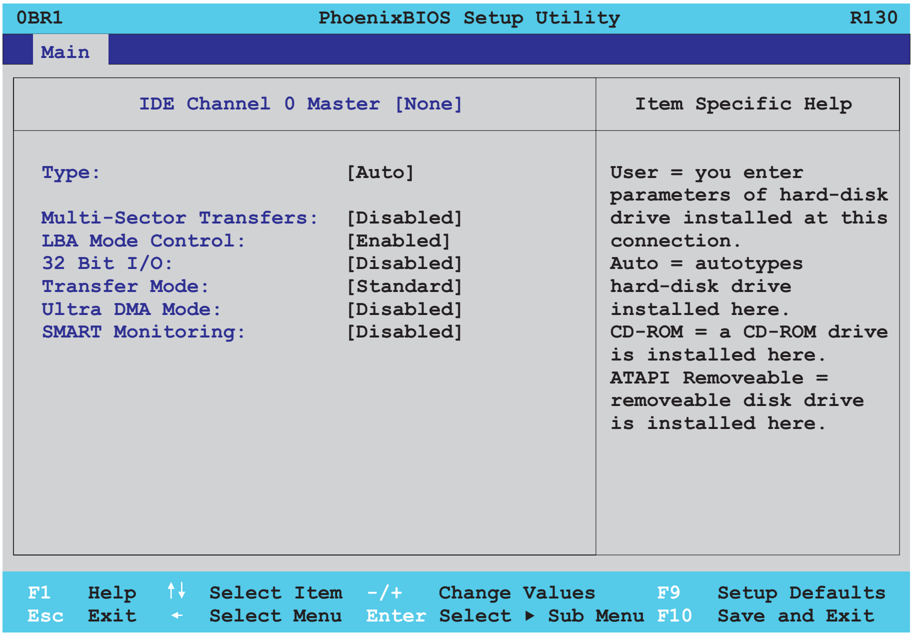
BIOS setting	Meaning	Setting options	Effect
System Time	This is the current system time setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Changes the System time	Set the system time in the format (hh:mm:ss).
System Date	This is the current system date setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Changes the system date	Set the system date in the format (mm:dd:yyyy).
IDE Channel 0 Master	The drive in the system that is connected to the IDE channel 0 master (previously "primary master") port is configured here.	Enter	Opens the submenu See "IDE channel 0 master", on page 410.
IDE Channel 0 Slave	The drive in the system that is connected to the IDE channel 0 slave (previously "primary slave") port is configured here.	Enter	Opens the submenu See "IDE channel 0 slave", on page 412.

Table 242: 855GME (ETX) Main setting options

BIOS setting	Meaning	Setting options	Effect
IDE Channel 1 Master	The drive in the system that is connected to the IDE channel 1 master (previously "secondary master") port is configured here.	Enter	Opens the submenu See "IDE channel 1 master", on page 414.
IDE Channel 1 Slave	The drive in the system that is connected to the IDE channel 1 slave (previously "secondary slave") port is configured here.	Enter	Opens the submenu See "IDE channel 1 slave", on page 416.
Smart device monitoring	S.M.A.R.T. (Self Monitoring Analysis and Reporting Technology) is implemented in the today's hard drives. This technology allows you to detect reading or rotational problems with the hard drive, and much more.	Enabled	Activates this function. In the future, a message regarding impending errors is produced.
		Disabled	Deactivates this function.
System Memory	Displays the amount of main memory installed. Between 0 and 640 KB.	None	-
Extended memory	Displays the available main memory from the first MB to the maximum memory capacity.	None	-
BIOS Date	BIOS creation date	None	-

Table 242: 855GME (ETX) Main setting options (Forts.)

IDE channel 0 master



```
0BR1                 PhoenixBIOS Setup Utility                    R130
  Main

         IDE Channel 0 Master [None]             Item Specific Help

  Type:                         [Auto]          User = you enter
                                                parameters of hard-disk
  Multi-Sector Transfers:       [Disabled]      drive installed at this
  LBA Mode Control:             [Enabled]       connection.
  32 Bit I/O:                   [Disabled]      Auto = autotypes
  Transfer Mode:                [Standard]      hard-disk drive
  Ultra DMA Mode:               [Disabled]      installed here.
  SMART Monitoring:             [Disabled]      CD-ROM = a CD-ROM drive
                                                is installed here.
                                                ATAPI Removeable =
                                                removeable disk drive
                                                is installed here.

 F1   Help  ↑↓  Select Item  -/+   Change Values      F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter Select ► Sub Menu  F10  Save and Exit
```

Figure 191: 855GME (ETX) IDE Channel 0 Master Setup

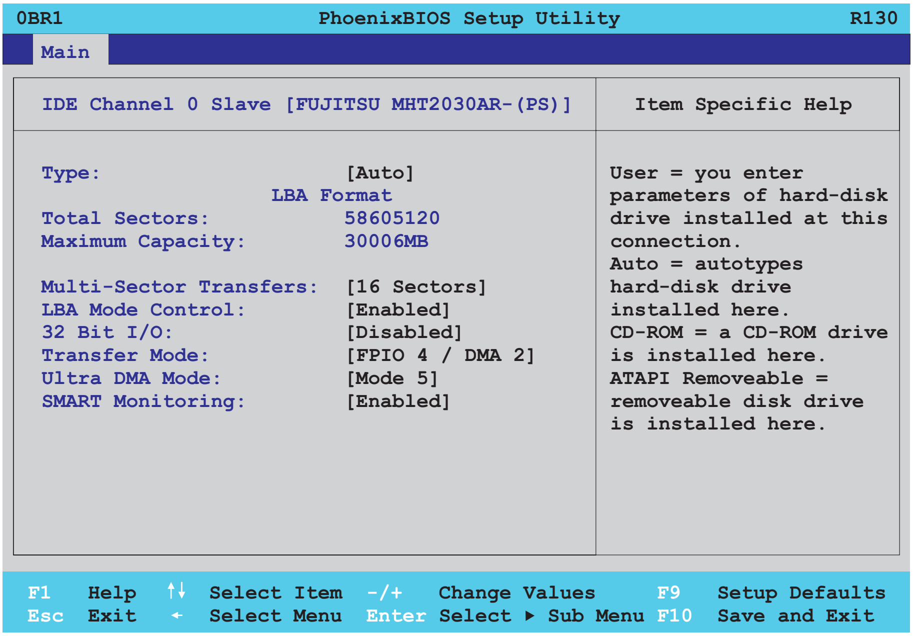
BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the IDE channel 0 master (previously "primary master") is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		User	Manual setup of the drive (number of cylinders, heads, and sectors).
		Other ATAPI	Use this option for IDE disk drives that are not mentioned here.
		CD-ROM	CD-ROM = CD-ROM drive
		ATAPI removable	The removable media drive is treated as a hard drive or floppy drive.
		IDE removable	The IDE removable drive is treated as a hard drive.
Multi-sector transfer	This option determines the number of sectors per block. Only possible when manually setting up the drive.	Disabled	Disables this function.
		2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 243: 855GME (ETX) IDE Channel 0 Master setting options

BIOS setting	Meaning	Setting options	Effect
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the IDE channel 0 master drive and the system memory is defined here. Only possible when manually setting up the drive.	Default	Default setting.
		Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the IDE channel 0 master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Disables this function. Do not use UDMA mode.
		Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the IDE channel 0 master drive supports SMART technology.	Disabled	No drive support, and function is deactivated.
		Enabled	Drive support present, and function is activated.

Table 243: 855GME (ETX) IDE Channel 0 Master setting options (Forts.)

IDE channel 0 slave



```
IDE Channel 0 Slave [FUJITSU MHT2030AR-(PS)]        Item Specific Help

Type:                        [Auto]                 User = you enter
                       LBA Format                   parameters of hard-disk
Total Sectors:               58605120               drive installed at this
Maximum Capacity:            30006MB                connection.
                                                    Auto = autotypes
Multi-Sector Transfers:      [16 Sectors]           hard-disk drive
LBA Mode Control:            [Enabled]              installed here.
32 Bit I/O:                  [Disabled]             CD-ROM = a CD-ROM drive
Transfer Mode:               [FPIO 4 / DMA 2]       is installed here.
Ultra DMA Mode:              [Mode 5]               ATAPI Removeable =
SMART Monitoring:            [Enabled]              removeable disk drive
                                                    is installed here.
```

F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit ← Select Menu Enter Select ▶ Sub Menu F10 Save and Exit

Figure 192: 855GME (ETX) IDE channel 0 slave setup

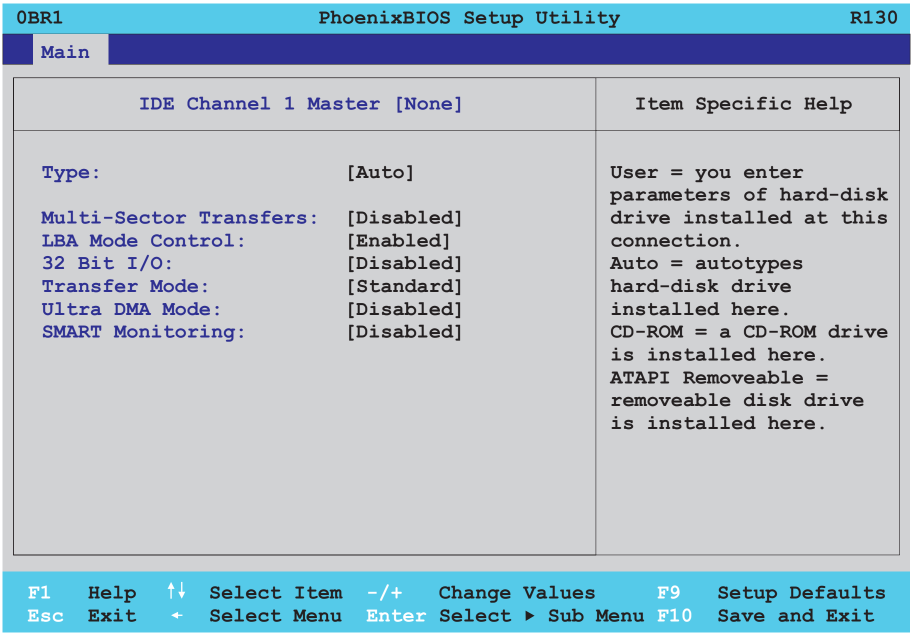
BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the IDE channel 0 slave (previously "primary slave") is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		User	Manual setup of the drive (number of cylinders, heads, and sectors).
		Other ATAPI	Use this option for IDE disk drives that are not mentioned here.
		CD-ROM	CD-ROM = CD-ROM drive
		ATAPI removable	The removable media drive is treated as a hard drive or floppy drive.
		IDE removable	The IDE removable drive is treated as a hard drive.
Multi-sector transfer	This option determines the number of sectors per block. Only possible when manually setting up the drive.	Disabled	Disables this function.
		2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 244: 855GME (ETX) IDE Channel 0 Slave setting options

BIOS setting	Meaning	Setting options	Effect
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the IDE channel 0 slave and the system memory is defined here. Only possible when manually setting up the drive.	Default	Default setting.
		Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the IDE channel 0 slave drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Disables this function. Do not use UDMA mode.
		Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the IDE channel 0 slave drive supports SMART technology.	Disabled	No drive support, and function is deactivated.
		Enabled	Drive support present, and function is activated.

Table 244: 855GME (ETX) IDE Channel 0 Slave setting options (Forts.)

IDE channel 1 master



```
0BR1                 PhoenixBIOS Setup Utility                  R130
  Main

            IDE Channel 1 Master [None]          Item Specific Help

  Type:                          [Auto]          User = you enter
                                                 parameters of hard-disk
  Multi-Sector Transfers:        [Disabled]      drive installed at this
  LBA Mode Control:              [Enabled]       connection.
  32 Bit I/O:                    [Disabled]      Auto = autotypes
  Transfer Mode:                 [Standard]      hard-disk drive
  Ultra DMA Mode:                [Disabled]      installed here.
  SMART Monitoring:              [Disabled]      CD-ROM = a CD-ROM drive
                                                 is installed here.
                                                 ATAPI Removeable =
                                                 removeable disk drive
                                                 is installed here.

 F1   Help  ↑↓  Select Item  -/+   Change Values        F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter Select ► Sub Menu    F10  Save and Exit
```

Figure 193: 855GME (ETX) IDE Channel 1 Master Setup

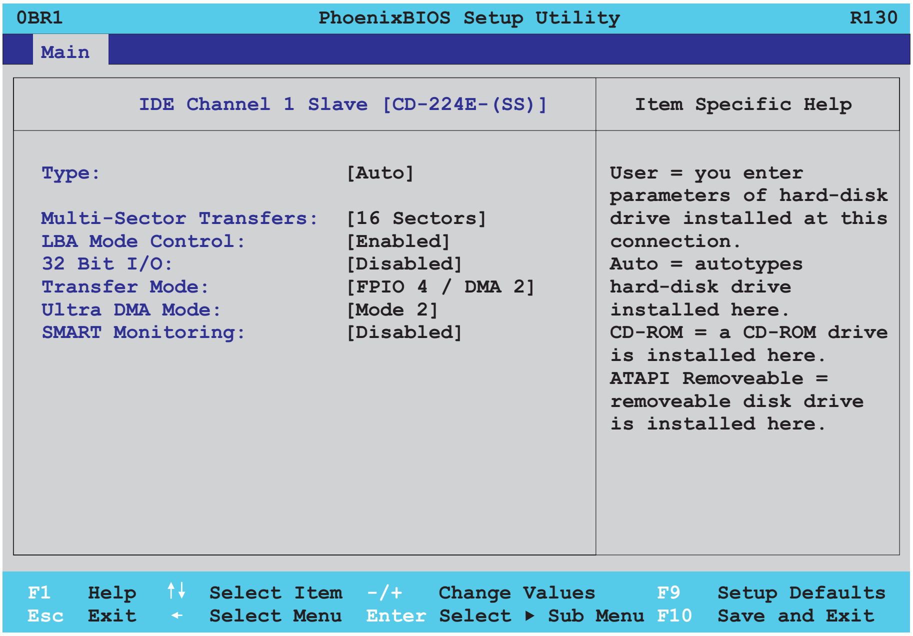
BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the IDE channel 1 master (previously "secondary master") is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		User	Manual setup of the drive (number of cylinders, heads, and sectors).
		Other ATAPI	Use this option for IDE disk drives that are not mentioned here.
		CD-ROM	CD-ROM = CD-ROM drive
		ATAPI removable	The removable media drive is treated as a hard drive or floppy drive.
		IDE removable	The IDE removable drive is treated as a hard drive.
Multi-sector transfer	This option determines the number of sectors per block. Only possible when manually setting up the drive.	Disabled	Disables this function.
		2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 245: 855GME (ETX) IDE Channel 1 Master setting options

BIOS setting	Meaning	Setting options	Effect
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the IDE channel 1 master and the system memory is defined here. Only possible when manually setting up the drive.	Default	Default setting.
		Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the IDE channel 1 master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Disables this function. Do not use UDMA mode.
		Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the IDE channel 1 master drive supports SMART technology.	Disabled	No drive support, and function is deactivated.
		Enabled	Drive support present, and function is activated.

Table 245: 855GME (ETX) IDE Channel 1 Master setting options (Forts.)

IDE channel 1 slave



```
0BR1                PhoenixBIOS Setup Utility                 R130
 Main
      IDE Channel 1 Slave [CD-224E-(SS)]        Item Specific Help

  Type:                         [Auto]          User = you enter
                                                parameters of hard-disk
  Multi-Sector Transfers:       [16 Sectors]    drive installed at this
  LBA Mode Control:             [Enabled]       connection.
  32 Bit I/O:                   [Disabled]      Auto = autotypes
  Transfer Mode:                [FPIO 4 / DMA 2] hard-disk drive
  Ultra DMA Mode:               [Mode 2]        installed here.
  SMART Monitoring:             [Disabled]      CD-ROM = a CD-ROM drive
                                                is installed here.
                                                ATAPI Removeable =
                                                removeable disk drive
                                                is installed here.

  F1   Help  ↑↓ Select Item  -/+   Change Values      F9   Setup Defaults
  Esc  Exit  ←  Select Menu  Enter Select ▸ Sub Menu  F10  Save and Exit
```

Figure 194: 855GME (ETX) IDE channel 1 slave setup

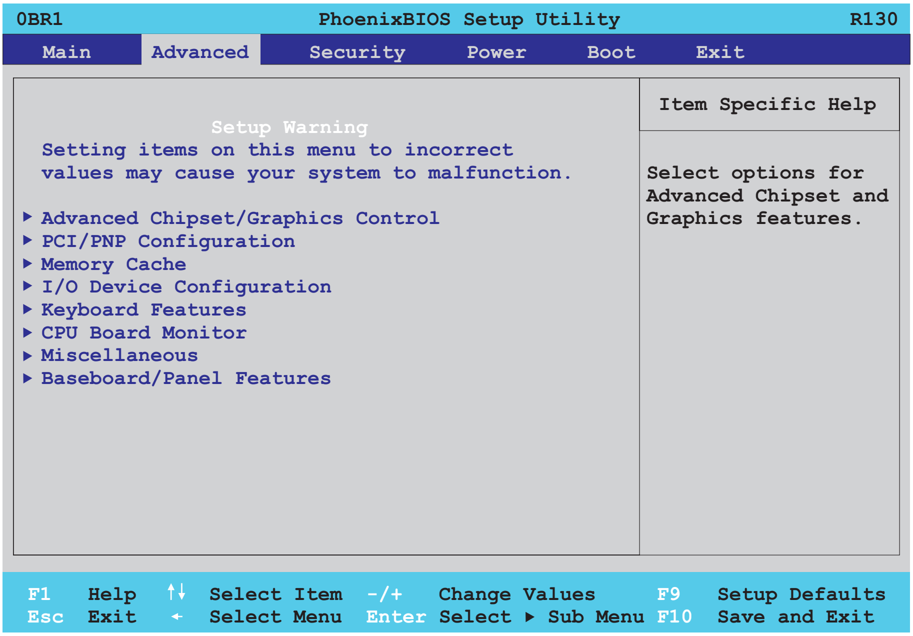
BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the IDE channel 1 slave (previously "secondary slave") is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		User	Manual setup of the drive (number of cylinders, heads, and sectors).
		Other ATAPI	Use this option for IDE disk drives that are not mentioned here.
		CD-ROM	CD-ROM = CD-ROM drive
		ATAPI removable	The removable media drive is treated as a hard drive or floppy drive.
		IDE removable	The IDE removable drive is treated as a hard drive.
Multi-sector transfer	This option determines the number of sectors per block. Only possible when manually setting up the drive.	Disabled	Disables this function.
		2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 246: 855GME (ETX) IDE Channel 1 Slave setting options

BIOS setting	Meaning	Setting options	Effect
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the IDE channel 1 slave drive and the system memory is defined here. Only possible when manually setting up the drive.	Default	Default setting.
		Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the IDE channel 1 slave drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Disables this function. Do not use UDMA mode.
		Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the IDE channel 1 slave drive supports SMART technology.	Disabled	No drive support, and function is deactivated.
		Enabled	Drive support present, and function is activated.

Table 246: 855GME (ETX) IDE Channel 1 Slave setting options (Forts.)

1.2.5 Advanced



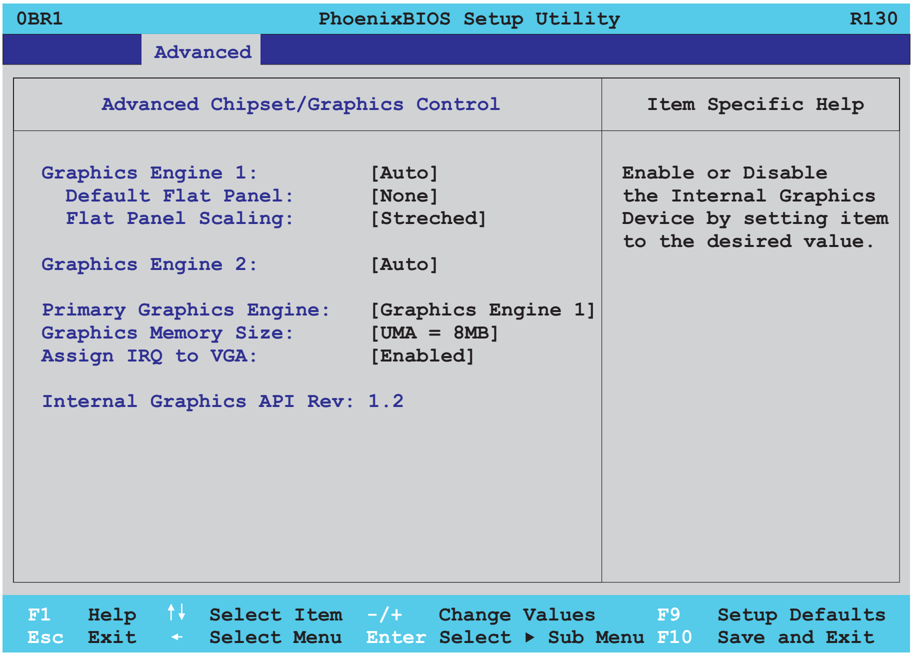
```
0BR1                    PhoenixBIOS Setup Utility                    R130
   Main     Advanced      Security      Power      Boot      Exit

                 Setup Warning                          Item Specific Help
  Setting items on this menu to incorrect
  values may cause your system to malfunction.        Select options for
                                                      Advanced Chipset and
▶ Advanced Chipset/Graphics Control                   Graphics features.
▶ PCI/PNP Configuration
▶ Memory Cache
▶ I/O Device Configuration
▶ Keyboard Features
▶ CPU Board Monitor
▶ Miscellaneous
▶ Baseboard/Panel Features

 F1   Help  ↑↓  Select Item  -/+   Change Values      F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter Select ▶ Sub Menu  F10  Save and Exit
```

Figure 195: 855GME - advanced setup menu - overview

BIOS setup menu	Meaning	Setting options	Effect
Advanced chipset/graphics control	Setup of advanced chipset and graphics functions.	Enter	Opens the submenu See "Advanced chipset/graphics control", on page 419.
PCI/PNP Configuration	Configures PCI devices.	Enter	Opens the submenu See "PCI/PNP Configuration", on page 421.
Memory cache	Configuration of the memory cache resources.	Enter	Opens the submenu See "Memory cache", on page 428.
I/O Device Configuration	Configures the I/O devices.	Enter	Opens the submenu See "I/O Device Configuration", on page 430.
Keyboard features	Configuration of the keyboard options.	Enter	Opens the submenu See "Keyboard features", on page 433.
CPU board monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens the submenu See "CPU board monitor", on page 434.
Miscellaneous	Configuration of various BIOS settings (summary screen, halt on errors, etc.).	Enter	Opens the submenu See "Miscellaneous", on page 435.
Main Board/Panel Features	Displays device specific information and setup of device specific values.	Enter	Opens the submenu See "Main Board/Panel Features", on page 436.

Table 247: 855GME (ETX) Advanced Menu setting options

Advanced chipset/graphics control



```
0BR1                 PhoenixBIOS Setup Utility                  R130
            Advanced

       Advanced Chipset/Graphics Control           Item Specific Help

  Graphics Engine 1:           [Auto]               Enable or Disable
    Default Flat Panel:        [None]               the Internal Graphics
    Flat Panel Scaling:        [Streched]           Device by setting item
                                                    to the desired value.
  Graphics Engine 2:           [Auto]

  Primary Graphics Engine:     [Graphics Engine 1]
  Graphics Memory Size:        [UMA = 8MB]
  Assign IRQ to VGA:           [Enabled]

  Internal Graphics API Rev: 1.2

 F1   Help  ↑↓  Select Item  -/+   Change Values       F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter Select ► Sub Menu   F10  Save and Exit
```

Figure 196: 855GME (ETX) - advanced chipset control

BIOS setting	Meaning	Setting options	Effect
Graphics engine 1	Settings can be made for the onboard video controller (internal graphics device).	Auto	Automatic setting of Graphic Engine 1. The resolution is set using a read-out of the connected panel's EDID data. **Information:** **If EDID data older than V1.1 is read, it is not passed on to the VGA BIOS**
		Disabled	Disable graphics controller. **Information.** **The onboard video controller must be activated to make video output possible. Deactivate only for use of an external PCI graphics card.**

Table 248: 855GME (ETX) Advanced Chipset Control setting options

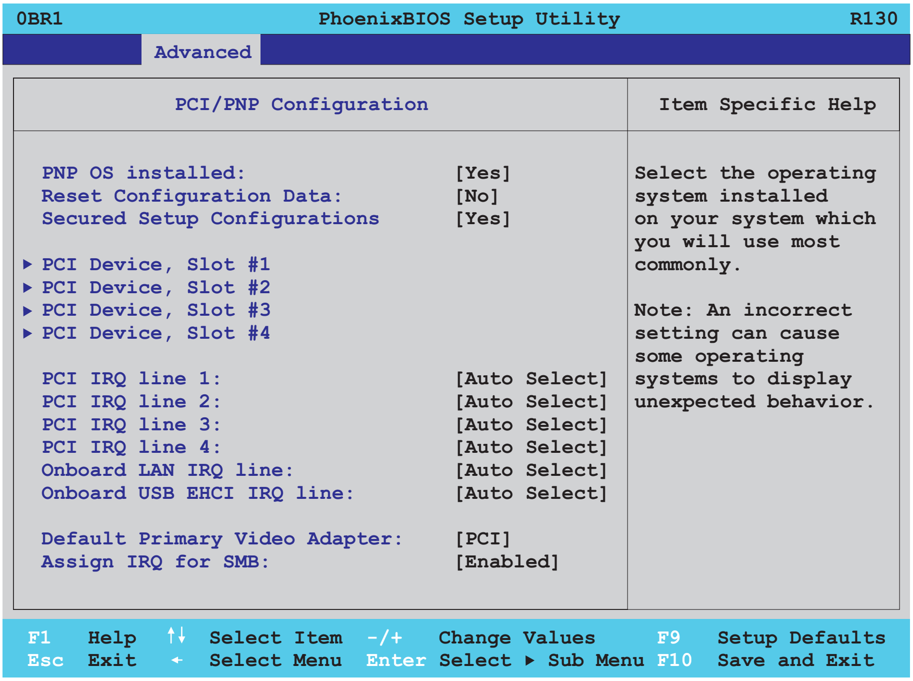
BIOS setting	Meaning	Setting options	Effect
Default flat panel	Should the connected panel fail to be automatically recognized, a predefined resolution can be set manually here.	None	A predefined resolution has not been set.

		VGA, SVGA, XGA, XGA2, SXGA, UXGA	VGA = 640 x 480 resolution
			SVGA = 800 x 600 resolution
			XGA = 1024 x 768 resolution
			XGA2 = 1024 x 768 resolution
			SXGA = 1280 x 1024 resolution
			UXGA = 1600 x 1200 resolution

Flat panel scaling	For setting whether the video signal should be centered on the panel (stamp format), or fill the entire display (stretched).	Centered	Display is centered.
		Stretched	Display is stretched to fit screen.
Graphics engine 2	Settings can be made for the second onboard video controller (only with an AP Link card).	Auto	Automatic setting of Graphic Engine 2. The resolution is set using a read-out of the connected panel's EDID data.
		Disabled	Deactivates the graphics interface.
Graphics engine	Selection of the primary video output line - depending on the system unit being used. with 5PC600.SX01-00, 5PC600.SX02-01 and 5PC600.SX05-01 - Graphics engine 1: Monitor / Panel - Graphics engine 2 : not supported with 5PC600.SX02-00 and 5CP600.SX05-00 - Graphics engine 1: AP Link output - Graphics engine 2: Monitor / Panel **Information:** **The "Primary graphics engine" setting is only relevant from the booting of the system until a graphics driver is started (e.g. in Windows).**	Graphics engine 1	The primary video outputs are the display devices on the monitor/panel plug with system units 5PC600.SX01-00, 5PC600.SX02-01 and 5PC600.SX05-01, or the AP Link output with system units 5PC600.SX02-00 and 5CP600.SX05-00.
		Graphics engine 2	The primary video outputs are the display devices on the monitor/panel plug with system units 5PC600.SX02-00 and 5CP600.SX05-00.
Graphics memory size	For setting how much of the main memory (in MB) the graphics controller can use.	1 MB	1 MB main memory to be used by the graphics controller.
		UMA = 8 MB	8 MB main memory to be used by the graphics controller.
		UMA = 16 MB	16 MB main memory to be used by the graphics controller.
		UMA = 32 MB	32 MB main memory to be used by the graphics controller.
Assign IRQ to VGA	This is where an IRQ is reserved and automatically assigned for the CPU board's onboard graphics.	Enabled	Enables this function.
		Disabled	Disables this function.
Internal graphics API Rev	Displays the internal graphics API version number.	-	

Table 248: 855GME (ETX) Advanced Chipset Control setting options (Forts.)

PCI/PNP Configuration



```
0BR1                     PhoenixBIOS Setup Utility                    R130
            Advanced
                PCI/PNP Configuration                    Item Specific Help

   PNP OS installed:                   [Yes]         Select the operating
   Reset Configuration Data:           [No]          system installed
   Secured Setup Configurations        [Yes]         on your system which
                                                     you will use most
 ▶ PCI Device, Slot #1                               commonly.
 ▶ PCI Device, Slot #2
 ▶ PCI Device, Slot #3                               Note: An incorrect
 ▶ PCI Device, Slot #4                               setting can cause
                                                     some operating
   PCI IRQ line 1:                     [Auto Select] systems to display
   PCI IRQ line 2:                     [Auto Select] unexpected behavior.
   PCI IRQ line 3:                     [Auto Select]
   PCI IRQ line 4:                     [Auto Select]
   Onboard LAN IRQ line:               [Auto Select]
   Onboard USB EHCI IRQ line:          [Auto Select]

   Default Primary Video Adapter:      [PCI]
   Assign IRQ for SMB:                 [Enabled]

 F1   Help  ↑↓  Select Item  -/+   Change Values       F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter Select ▶ Sub Menu   F10  Save and Exit
```

Figure 197: 815GME (ETX) - PCI/PNP configuration

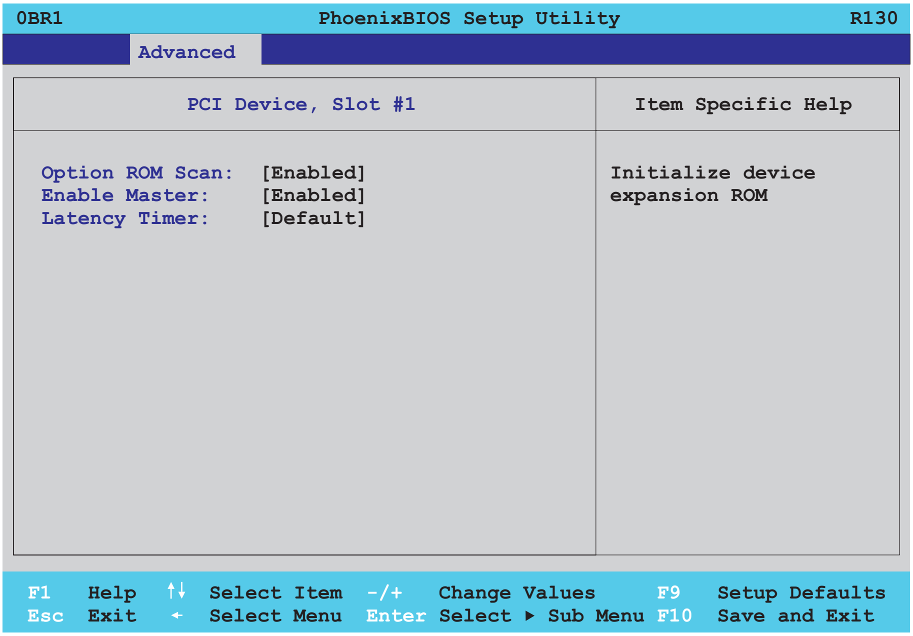
BIOS setting	Meaning	Setting options	Effect
PNP OS installed	If the operating system is plug & play capable, then this option informs BIOS that the operating system will handle the distribution of resources in the future.	Yes	The ISA PnP resources are not assigned. The resource assignment sequence is as follows: 1. Motherboard devices 2. PCI devices
		No	The resource assignment sequence is as follows: 1. Motherboard devices 2. ISA PnP devices 3. PCI devices
Reset configuration data	During booting, the assigned resources are stored in Flash (ESCD).	Yes	When the system is reset after leaving the BIOS setup, all ECSD entries (extended system configuration data) are deleted.
		No	Disables this function. Resources are not reset.
Secured setup configuration	This option protects the setup configuration from interference from a PnP operating system.	Yes	Prevents a PnP operating system from changing system settings.
		No	Disables this function. Changes are allowed.
PCI device, slot #1	Advanced configuration of the PCI slot number 1.	Enter	Opens the submenu See "PCI device, slot #1", on page 424
PCI device, slot #2	Advanced configuration of the PCI slot number 2.	Enter	Opens the submenu See "PCI device, slot #2", on page 425
PCI device, slot #3	Advanced configuration of the PCI slot number 3.	Enter	Opens the submenu See "PCI device, slot #3", on page 426
PCI device, slot #4	Advanced configuration of the PCI slot number 4.	Enter	Opens the submenu See "PCI device, slot #4", on page 427
PCI IRQ line 1	Under this option, the external PCI interrupt 1 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 2	Under this option, the external PCI interrupt 2 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 3	Under this option, the external PCI interrupt 3 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 4	Under this option, the external PCI interrupt 4 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.

Table 249: 855GME (ETX) PCI/PNP Configuration setting options

BIOS setting	Meaning	Setting options	Effect
Onboard LAN IRQ line	Under this option, the onboard LAN interrupt is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
Onboard USB EHCI IRQ line	Under this option, the USB EHCI interrupt is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
Default primary video adapter	This option sets the first activated graphics card (either an existing AGP or the PCI graphics card).	PCI	A PCI graphics card is set as the default display device.
		AGP	An AGP graphics card is set as the default display device.
Assign IRQ to SMB	Use this function to set whether or not the SM (System Management) bus controller is assigned a PCI interrupt.	Enabled	Automatic assignment of a PCI interrupt.
		Disabled	No assignment of an interrupt.

Table 249: 855GME (ETX) PCI/PNP Configuration setting options (Forts.)

PCI device, slot #1



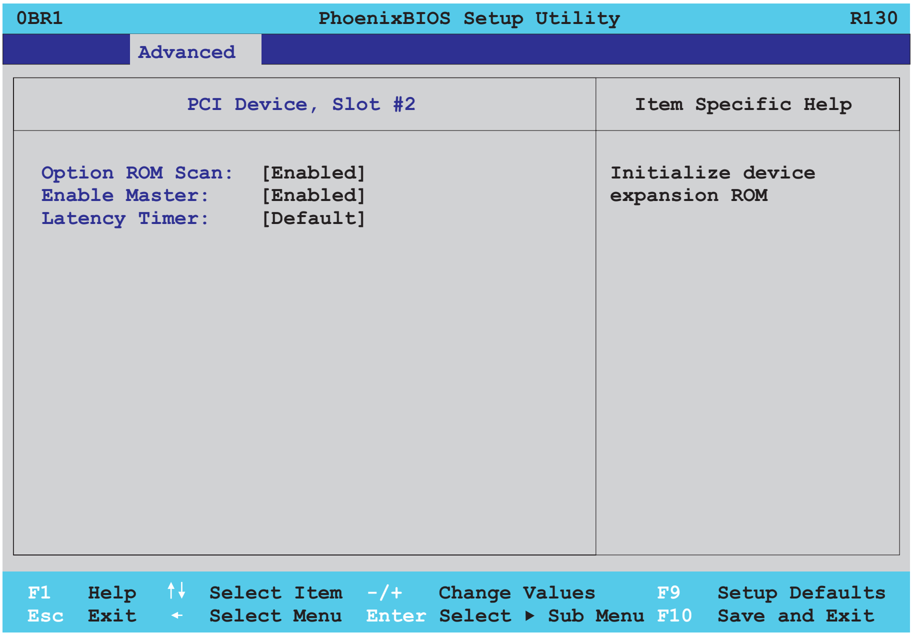
```
0BR1                    PhoenixBIOS Setup Utility                    R130
          Advanced
                 PCI Device, Slot #1                  Item Specific Help

  Option ROM Scan:   [Enabled]                      Initialize device
  Enable Master:     [Enabled]                      expansion ROM
  Latency Timer:     [Default]

 F1   Help  ↑↓  Select Item  -/+    Change Values      F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter  Select ▸ Sub Menu  F10  Save and Exit
```

Figure 198: 855GME (ETX) - PCI device, slot #1

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be treated as the PCI bus master. Not all PCI devices can function as PCI bus master! Check device description.	Enabled	Enables this function.
		Disabled	Disables this function.
Latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Default
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Value set manually.

Table 250: 855GME (ETX) - PCI device, slot #1 - setting options

PCI device, slot #2



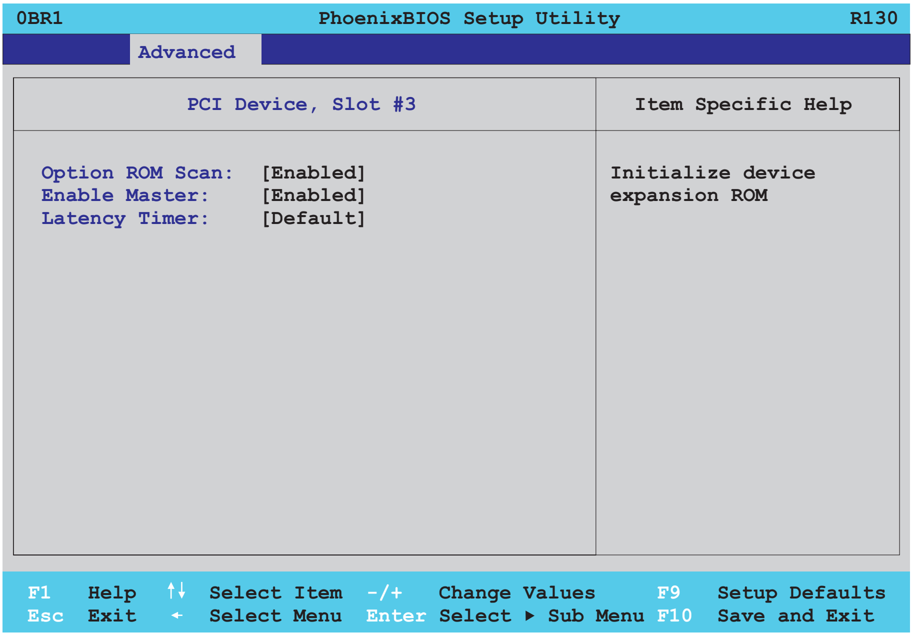
```
0BR1                 PhoenixBIOS Setup Utility                 R130
          Advanced

             PCI Device, Slot #2              Item Specific Help

  Option ROM Scan:   [Enabled]              Initialize device
  Enable Master:     [Enabled]              expansion ROM
  Latency Timer:     [Default]

 F1   Help  ↑↓  Select Item  -/+   Change Values       F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter Select ► Sub Menu  F10  Save and Exit
```

Figure 199: 855GME (ETX) - PCI device, slot #2

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be treated as the PCI bus master. Not all PCI devices can function as PCI bus master! Check device description.	Enabled	Enables this function.
		Disabled	Disables this function.
Latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Default
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Value set manually.

Table 251: 855GME (ETX) - PCI device, slot #2 - setting options

PCI device, slot #3


0BR1
PhoenixBIOS Setup Utility
R130
Advanced
PCI Device, Slot #3
Item Specific Help
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit ← Select Menu Enter Select ▸ Sub Menu F10 Save and Exit

Option ROM Scan: [Enabled]
Enable Master: [Enabled]
Latency Timer: [Default]

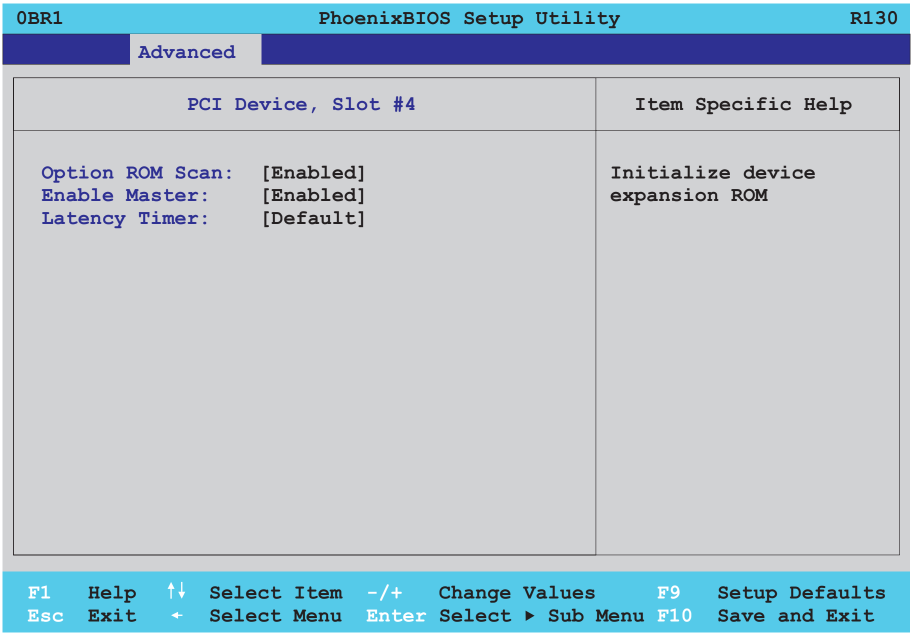
Initialize device expansion ROM

Figure 200: 855GME (ETX) - PCI device, slot #3

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be treated as the PCI bus master. Not all PCI devices can function as PCI bus master! Check device description.	Enabled	Enables this function.
		Disabled	Disables this function.
Latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Default
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Value set manually.

Table 252: 855GME (ETX) - PCI device, slot #3 - setting options

PCI device, slot #4



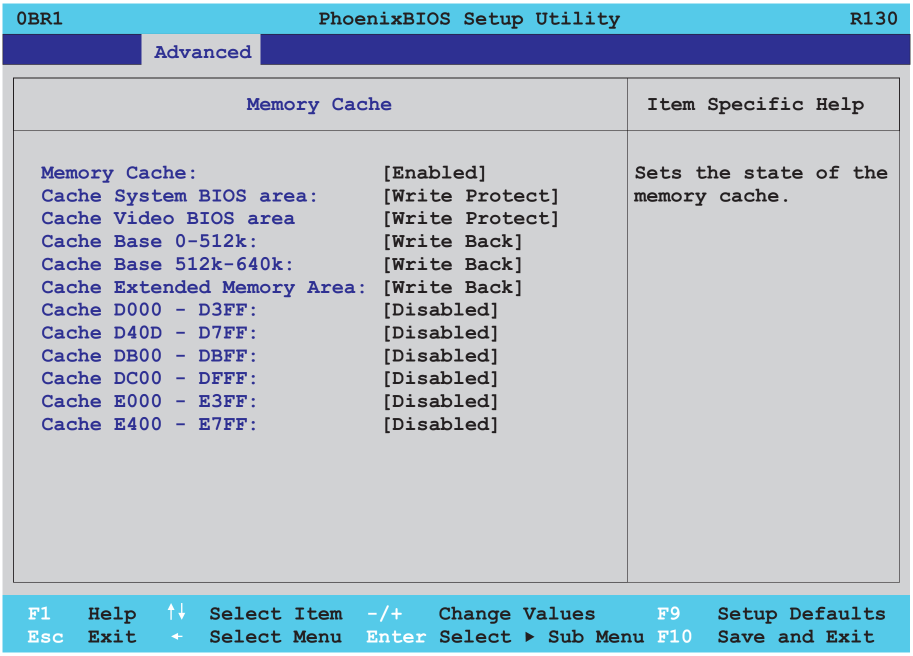
```
0BR1                    PhoenixBIOS Setup Utility                    R130
           Advanced

           PCI Device, Slot #4                    Item Specific Help

  Option ROM Scan:    [Enabled]               Initialize device
  Enable Master:      [Enabled]               expansion ROM
  Latency Timer:      [Default]

 F1   Help  ↑↓  Select Item  -/+    Change Values       F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter  Select ▸ Sub Menu   F10  Save and Exit
```

Figure 201: 855GME (ETX) - PCI device, slot #4

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be treated as the PCI bus master. Not all PCI devices can function as PCI bus master! Check device description.	Enabled	Enables this function.
		Disabled	Disables this function.
Latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Default
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Value set manually.

Table 253: 855GME (ETX) - PCI device, slot #4 - setting options

Memory cache


0BR1
PhoenixBIOS Setup Utility
R130
Advanced
Memory Cache
Item Specific Help
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit ← Select Menu Enter Select ▸ Sub Menu F10 Save and Exit

```
Memory Cache:                 [Enabled]
Cache System BIOS area:       [Write Protect]
Cache Video BIOS area         [Write Protect]
Cache Base 0-512k:            [Write Back]
Cache Base 512k-640k:         [Write Back]
Cache Extended Memory Area:   [Write Back]
Cache D000 - D3FF:            [Disabled]
Cache D40D - D7FF:            [Disabled]
Cache DB00 - DBFF:            [Disabled]
Cache DC00 - DFFF:            [Disabled]
Cache E000 - E3FF:            [Disabled]
Cache E400 - E7FF:            [Disabled]
```

Sets the state of the memory cache.

Figure 202: 855GME (ETX) - memory cache

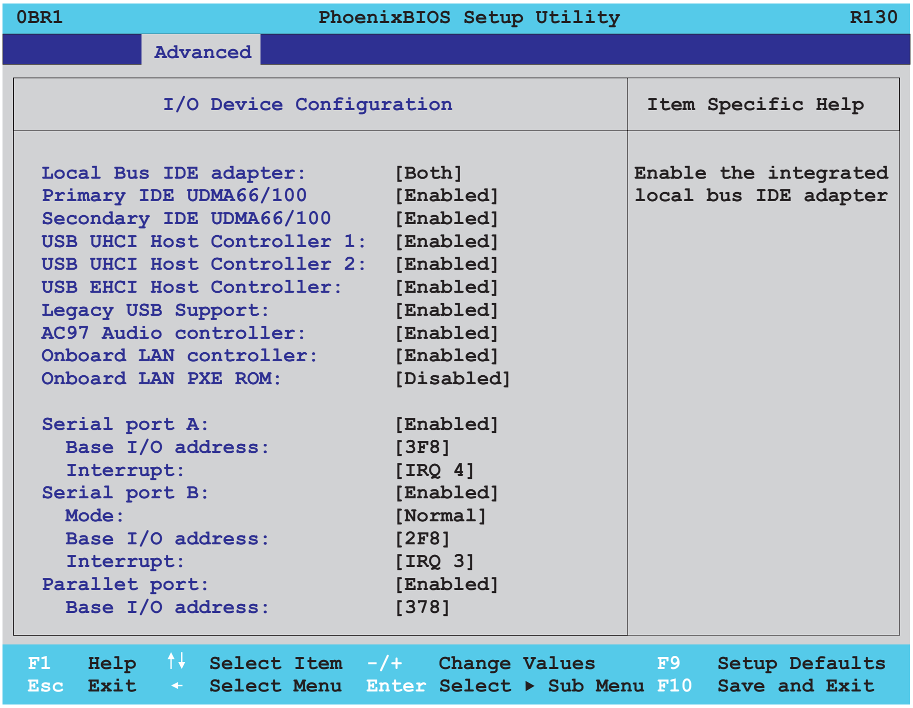
BIOS setting	Meaning	Setting options	Effect
Memory cache	Enable/ disable utilization of the L2 cache.	Enabled	Enables this function.
		Disabled	Disables this function.
Cache system BIOS area	Set whether or not the system BIOS should be buffered.	Write protect	System BIOS is mapped in the cache.
		Uncached	System BIOS is not mapped in the cache.
Cache video BIOS area	Set whether or not the video BIOS should be buffered.	Write protect	Video BIOS is mapped in the cache.
		Uncached	Video BIOS is not mapped in the cache.
Cache base 0-512k	Set whether the memory content should be mapped in the cache (0-512k), and when necessary, written in the main memory.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.

Table 254: 855GME (ETX) Memory Cache setting options

BIOS setting	Meaning	Setting options	Effect
Cache base 512-640k	Set whether the memory content should be mapped in the cache (512-640k), and when necessary, written in the main memory.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache extended memory area	Configure how the memory content of the system memory above 1MB should be mapped.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache D000 - D3FF	Configure how the memory content of D000-D3FF should be mapped.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache D400 - D7FF	Configure how the memory content of D400-D7FF should be mapped.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache D800 - DBFF	Configure how the memory content of D800-DBFF should be mapped.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache DC00 - DFFF	Configure how the memory content of DC00-DFFF should be mapped.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache E000 - E3FF	Configure how the memory content of E00-E3FF should be mapped.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache E400 - E7FF	Configure how the memory content of E400-E7FF should be mapped.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.

Table 254: 855GME (ETX) Memory Cache setting options (Forts.)

I/O Device Configuration



```
0BR1                PhoenixBIOS Setup Utility                R130
            Advanced
         I/O Device Configuration                 Item Specific Help

  Local Bus IDE adapter:        [Both]            Enable the integrated
  Primary IDE UDMA66/100        [Enabled]         local bus IDE adapter
  Secondary IDE UDMA66/100      [Enabled]
  USB UHCI Host Controller 1:   [Enabled]
  USB UHCI Host Controller 2:   [Enabled]
  USB EHCI Host Controller:     [Enabled]
  Legacy USB Support:           [Enabled]
  AC97 Audio controller:        [Enabled]
  Onboard LAN controller:       [Enabled]
  Onboard LAN PXE ROM:          [Disabled]

  Serial port A:                [Enabled]
    Base I/O address:           [3F8]
    Interrupt:                  [IRQ 4]
  Serial port B:                [Enabled]
    Mode:                       [Normal]
    Base I/O address:           [2F8]
    Interrupt:                  [IRQ 3]
  Parallel port:                [Enabled]
    Base I/O address:           [378]

 F1   Help  ↑↓ Select Item  -/+   Change Values        F9   Setup Defaults
 Esc  Exit  ↔  Select Menu  Enter Select ▸ Sub Menu   F10  Save and Exit
```

Figure 203: 855GME (ETX) - I/O device configuration

BIOS setting	Meaning	Setting options	Effect
Local bus IDE adapter	Enable or disable one or both of the PCI IDE controllers (primary and secondary).	Disabled	Deactivates both PCI IDE controllers (primary and secondary).
		Primary	Activates the primary IDE controller only.
		Secondary	Activates the secondary IDE controller only.
		Both	Activates both PCI IDE controllers (primary and secondary).
Primary IDE UDMA66/100	Setup the data transfer rate for a device connected to the primary IDE channel. This option is only available when a primary IDE drive is connected.	Disabled	The maximum data transfer rate is UDMA33.
		Enabled	The maximum data transfer rate is UDMA66 or higher.
Secondary IDE UDMA66/100	Setup the data transfer rate for a device connected to the secondary IDE channel. This option is only available when a secondary IDE drive is connected.	Disabled	The maximum data transfer rate is UDMA33.
		Enabled	The maximum data transfer rate is UDMA66.

Table 255: 855GME (ETX) I/O Device Configuration setting options

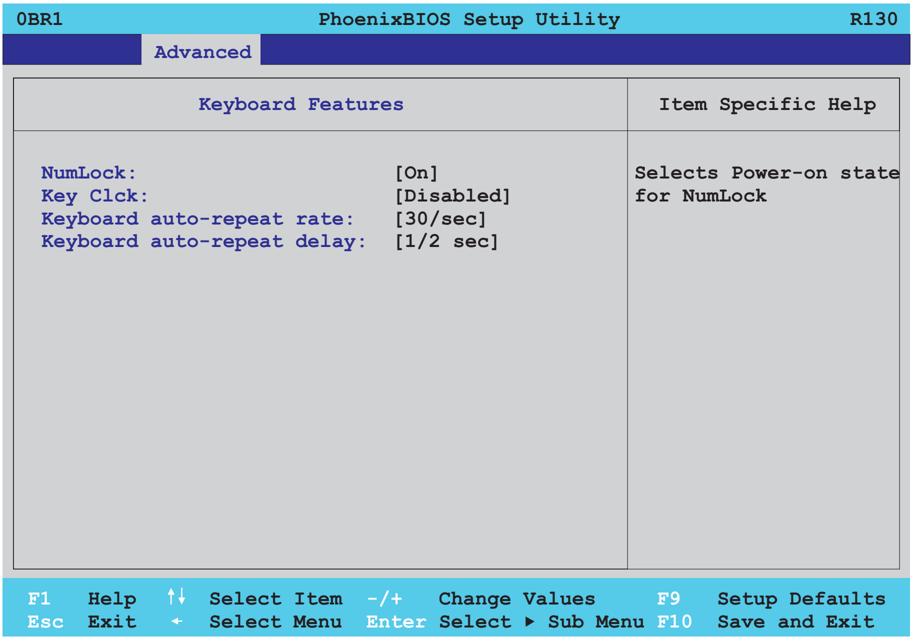
BIOS setting	Meaning	Setting options	Effect
USB UHCI host controller 1	Configuration of USB UHCI controller 1 for USB port 0 und 1.	Disabled	Deactivates the USB support.
		Enabled	Activates the USB support.
USB UHCI host controller 2	Configuration of the USB UHCI controller 1 for USB port 2 and 3. Can only be configured if the USB UHCI controller 1 is activated.	Disabled	Deactivates the USB support.
		Enabled	Activates the USB support.
USB UHCI host controller	Configuration of the USB EHCI controller. Can only be configured if the USB UHCI controller 1 is activated.	Disabled	Deactivates the USB support.
		Enabled	When enabled, the USB 2.0 support is activated as soon as a USB 2.0 device is connected to the interface.
Legacy USB Support	Here IRQs are assigned to the USB connections.	Disabled	No IRQ assigned. It is not possible to boot from a USB device (USB stick, USB floppy, USB CD ROM, etc.)! However, a connected USB keyboard can be used to access and configure the BIOS setup, boot menu or optional RAID boot menu. USB devices will not function after completing the BIOS POST routine. USB devices only work after starting the operating system with USB support (e.g. Windows XP). MS-DOS does not support the use of USB devices.
		Enabled	IRQ assigned. Booting from USB devices is now possible. Supported USB devices work with MS-DOS (e.g. USB keyboard, etc).
AC97 audio controller	For turning the AC97 audio controller on and off.	Disabled	AC97 sound is deactivated.
		Enabled	AC97 sound is activated.
Onboard LAN controller	For turning the ICH4 on-board LAN controller (for ETH1) on and off.	Disabled	Deactivates the LAN controller or the ETH1 interface.
		Enabled	Activates the LAN controller or the ETH1 interface.
Onboard LAN PXE ROM	For turning the remote boot BIOS extension for the onboard LAN controller (ETH1) on and off.	Disabled	Disables this function.
		Enabled	Enables this function.
Serial port A	For the configuration of serial port A (COM1).	Disabled	Port A deactivated.
		Enabled	Port A activated. The base I/O addresses and the interrupt must then be configured manually.
		Auto	Either BIOS or the operating system configures the port automatically.
Base I/O address	Selection of the base I/O address for port A. A yellow star indicates a conflict with another device.	3F8, 2F8, 3E8, 2E8	Base I/O address is manually assigned.
Interrupt	Selection of the interrupt for port A. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4	Manual assignment of the interrupt.

Table 255: 855GME (ETX) I/O Device Configuration setting options (Forts.)

BIOS setting	Meaning	Setting options	Effect
Serial port B	For the configuration of serial port B (COM2).	Disabled	Port B deactivated.
		Enabled	Port A activated. The base I/O addresses and the interrupt must then be configured manually.
		Auto	Either BIOS or the operating system configures the port automatically.
Mode	This option is for setting the serial port B as either a standard interface or as an infrared interface.	Normal	Serial port B is used as a standard interface.
		IR	The serial interface is used as an infrared interface, and allows data transfers up to 115 kBit/s.
Base I/O address	Selection of the base I/O address for port B. A yellow star indicates a conflict with another device.	3F8, 2F8, 3E8, 2E8	Selected base I/O address is manually assigned.
Interrupt	Selection of the interrupt for port B. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4	Selected interrupt is assigned.
Parallel port	For configuring the hardware security key (dongle), which accessed internally through the parallel interface.	Disabled	Deactivates the port.
		Enabled	Activates the port. The base I/O address must then be set.
		Auto	First BIOS and then the operating system configure the port automatically.
Base I/O address	Selection of the base I/O address for the parallel port.	378, 278, 3BC	Base I/O address is manually assigned.

Table 255: 855GME (ETX) I/O Device Configuration setting options (Forts.)

Keyboard features



```
0BR1                    PhoenixBIOS Setup Utility                    R130
            Advanced

              Keyboard Features                    Item Specific Help

  NumLock:                      [On]               Selects Power-on state
  Key Clck:                     [Disabled]         for NumLock
  Keyboard auto-repeat rate:    [30/sec]
  Keyboard auto-repeat delay:   [1/2 sec]

 F1   Help  ↑↓  Select Item  -/+    Change Values      F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter  Select ▸ Sub Menu  F10  Save and Exit
```

Figure 204: 855GME (ETX) Keyboard Features

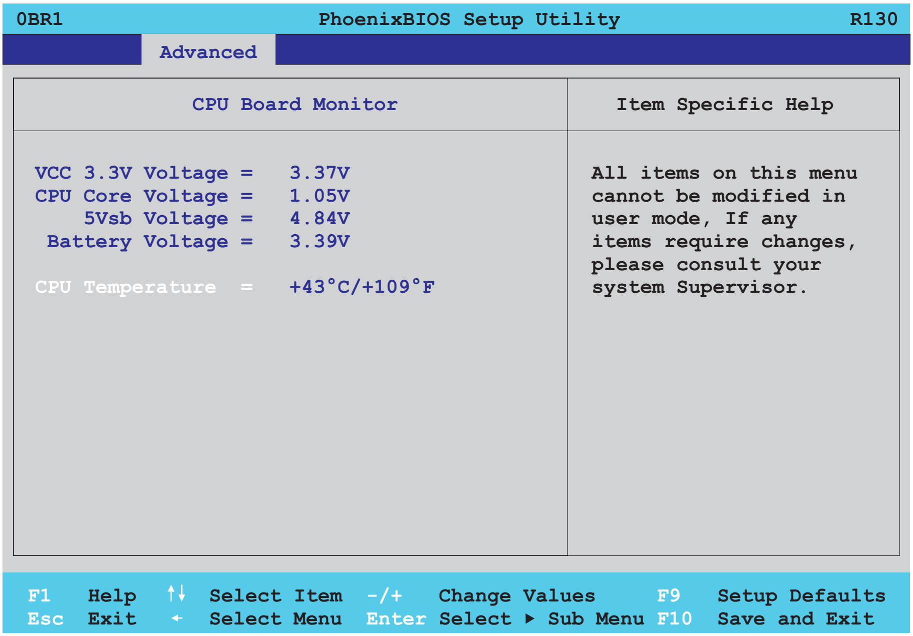
BIOS setting	Meaning	Setting options	Effect
NumLock	This option sets the status of the numeric keypad when the the system is booted.	On	Numeric keypad is enabled.
		Off	Only the cursor functions of the numerical keypad are activated.
		Auto	Numeric keypad is activated, if present.
Key click	Using this option, the clicking of the keys can be turned on or off.	Disabled	Disables this function.
		Enabled	Enables this function.
Keyboard auto-repeat rate	For setting the speed of repetition when a key is held down.	30/sec, 26.7/sec, 21.8/sec, 18.5/sec, 13.3/sec, 10/sec, 6/sec, 2/sec	Settings from 2 to 30 characters per second.
Keyboard auto-repeat delay	For setting the amount of delay after the key is pressed before the auto-repeat begins.	1/4 sec, 1/2 sec, 3/4 sec, 1 sec	Setting of the desired delay.

Table 256: 855GME (ETX) Keyboard Features setting options

CPU board monitor

Information:

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



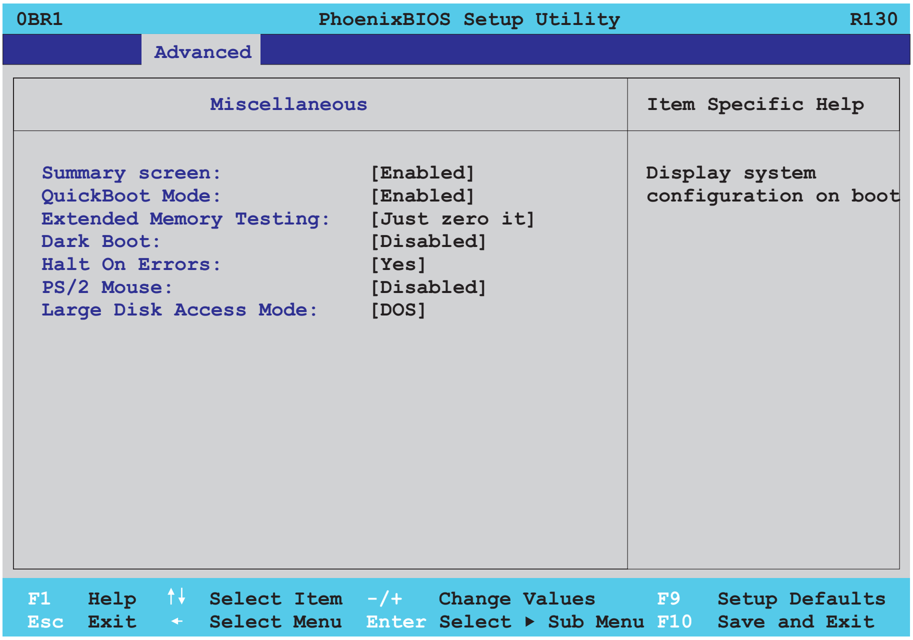
```
0BR1                   PhoenixBIOS Setup Utility                    R130
                 Advanced
            CPU Board Monitor                   Item Specific Help

 VCC 3.3V Voltage =    3.37V                All items on this menu
 CPU Core Voltage =    1.05V                cannot be modified in
     5Vsb Voltage =    4.84V                user mode, If any
  Battery Voltage =    3.39V                items require changes,
                                            please consult your
 CPU Temperature  =    +43°C/+109°F         system Supervisor.

F1   Help  ↑↓  Select Item  -/+   Change Values      F9   Setup Defaults
Esc  Exit  ←   Select Menu  Enter Select ▸ Sub Menu  F10  Save and Exit
```

Figure 205: 855GME (ETX) - CPU board monitor

BIOS setting	Meaning	Setting options	Effect
VCC 3.3V voltage	Displays the current voltage of the 3.3 volt supply (in volts).	None	
CPU core voltage	Displays the processor's core voltage (in volts).	None	
5Vsb voltage	Displays the 5 V standby voltage (in volts).	None	
Battery voltage	Displays the battery voltage (in volts).	None	
CPU temperature	Displays the processor's temperature (in degrees Celsius and Fahrenheit).	None	

Table 257: 855GME (ETX) - CPU board monitor - setting options

Miscellaneous



```
0BR1                    PhoenixBIOS Setup Utility                  R130
            Advanced

                 Miscellaneous                        Item Specific Help

  Summary screen:               [Enabled]            Display system
  QuickBoot Mode:               [Enabled]            configuration on boot
  Extended Memory Testing:      [Just zero it]
  Dark Boot:                    [Disabled]
  Halt On Errors:               [Yes]
  PS/2 Mouse:                   [Disabled]
  Large Disk Access Mode:       [DOS]

 F1   Help  ↑↓  Select Item  -/+   Change Values       F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter Select ▸ Sub Menu  F10  Save and Exit
```

Figure 206: 855GME (ETX) miscellaneous

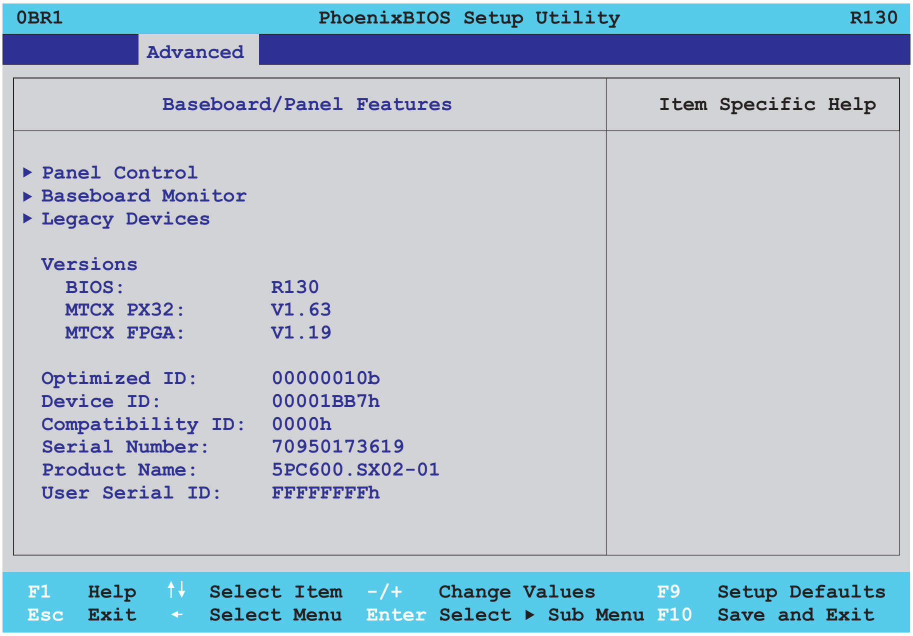
BIOS setting	Meaning	Setting options	Effect
Summary screen	Set whether or not the system summary screen should open when the system is started (see figure 189 "855GME (ETX) BIOS Summary Screen", on page 406).	Enabled	Enables this function.
		Disabled	Disables this function.
QuickBoot mode	Speeds up the booting process by skipping several tests.	Enabled	Enables this function.
		Disabled	Disables this function.
Extended memory testing	This function determines the method by which the main memory over 1 MB is tested.	Just zero it	The main memory is quickly tested.
		None	The main memory is not tested at all.
		Normal	This option is only available when the function "QuickBoot Mode" has been set to "disabled." The main memory is tested more slowly than with "Just zero It."
Dark boot	Sets whether the diagnostics screen (see figure 188 "855GME (ETX) BIOS Diagnostics Screen", on page 406) should be displayed when the system is started.	Enabled	Enables this function. The diagnostics screen is not displayed.
		Disabled	Disables this function. The diagnostics screen is displayed.

Table 258: 855GME (ETX) miscellaneous - setting options

BIOS setting	Meaning	Setting options	Effect
Halt on errors	This option sets whether the system should pause the Power On Self Test (POST) when it encounters an error.	Yes	The system pauses. The system pauses every time an error is encountered.
		No	The system does not pause. All errors are ignored.
PS/2 mouse	Sets whether the PS/2 mouse port should be activated.	Disabled	Deactivates the port.
		Enabled	Activates the port. The IRQ12 is reserved, and is not available for other components.
Large disk access mode	This option is intended for hard discs with more than 1024 cylinders, 16 heads, and more than 63 sectors per track. Setting options: DOS	Other	For non-compatible access (e.g. Novell, SCO Unix.)
		DOS	For MS DOS compatible access.

Table 258: 855GME (ETX) miscellaneous - setting options

Main Board/Panel Features


0BR1
PhoenixBIOS Setup Utility
R130
Advanced
Baseboard/Panel Features
Item Specific Help
▶ Panel Control
▶ Baseboard Monitor
▶ Legacy Devices
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit ← Select Menu Enter Select ▶ Sub Menu F10 Save and Exit

```
Versions
  BIOS:               R130
  MTCX PX32:          V1.63
  MTCX FPGA:          V1.19

Optimized ID:         00000010b
Device ID:            00001BB7h
Compatibility ID:     0000h
Serial Number:        70950173619
Product Name:         5PC600.SX02-01
User Serial ID:       FFFFFFFFh
```

Figure 207: 855GME (ETX) Baseboard/Panel Features

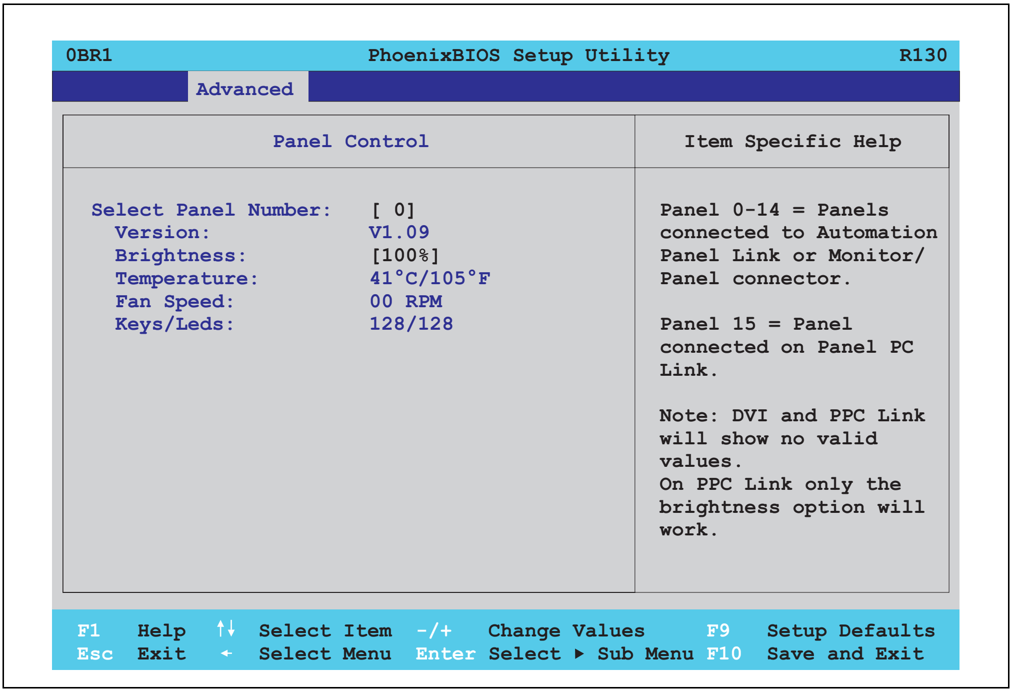
BIOS setting	Meaning	Setting options	Effect
Panel control	For special setup of connected panels.	Enter	Opens the submenu See "Panel control", on page 438.
Main board monitor	Display of various temperatures and fan speeds.	Enter	Opens the submenu See "Main board monitor", on page 439.

Table 259: 855GME (ETX) Baseboard/Panel Features setting options

BIOS setting	Meaning	Setting options	Effect
Legacy devices		Enter	Opens the submenu See "Legacy devices", on page 441.
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 code. 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 hex value can be freely assigned by the user (e.g. to give the device a unique ID) and can only be changed with using the "B&R Control Center" via the ADI driver.	None	-

Table 259: 855GME (ETX) Baseboard/Panel Features setting options (Forts.)

Panel control



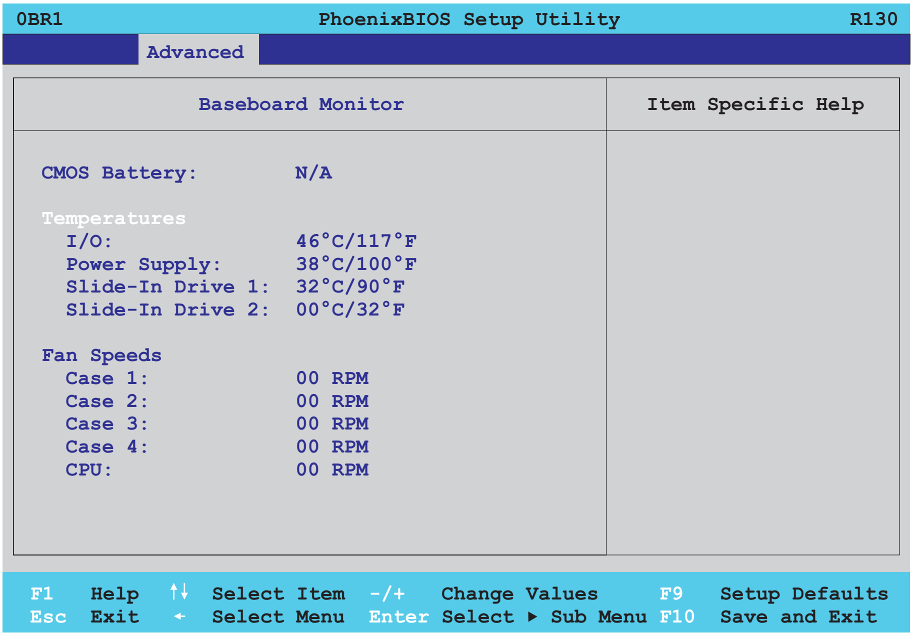
```
0BR1                     PhoenixBIOS Setup Utility                    R130
            Advanced

                 Panel Control                    Item Specific Help

  Select Panel Number:      [ 0]               Panel 0-14 = Panels
    Version:                V1.09              connected to Automation
    Brightness:             [100%]             Panel Link or Monitor/
    Temperature:            41°C/105°F         Panel connector.
    Fan Speed:              00 RPM
    Keys/Leds:              128/128            Panel 15 = Panel
                                               connected on Panel PC
                                               Link.

                                               Note: DVI and PPC Link
                                               will show no valid
                                               values.
                                               On PPC Link only the
                                               brightness option will
                                               work.

 F1   Help  ↑↓  Select Item  -/+   Change Values      F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter Select ► Sub Menu  F10  Save and Exit
```

Figure 208: 855GME (ETX) Panel Control

BIOS setting	Meaning	Setting options	Effect
Select panel number	Selection of the panel number for which the values should be read out and/or changed.	0 ... 15	Selection of panel 0 ... 15. Panel 15 is specifically intended for panel PC 700 systems.
Version	Displays the firmware version of the SDLR controller.	None	-
Brightness	For setting the brightness of the selected panel.	0%, 25%, 50%, 75%, 100%	For setting 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 fan speed for the selected panel.	None	-
Keys/LEDs	Displays the available keys and LEDs on the selected panel.	None	-

Table 260: 855GME (ETX) Panel Control setting options

Main board monitor



```
0BR1                  PhoenixBIOS Setup Utility                   R130
            Advanced

             Baseboard Monitor                    Item Specific Help

  CMOS Battery:          N/A

  Temperatures
    I/O:                 46°C/117°F
    Power Supply:        38°C/100°F
    Slide-In Drive 1:    32°C/90°F
    Slide-In Drive 2:    00°C/32°F

  Fan Speeds
    Case 1:              00 RPM
    Case 2:              00 RPM
    Case 3:              00 RPM
    Case 4:              00 RPM
    CPU:                 00 RPM

 F1   Help  ↑↓  Select Item  -/+    Change Values      F9   Setup Defaults
 Esc  Exit  ↔   Select Menu  Enter  Select ▶ Sub Menu  F10  Save and Exit
```

Figure 209: 855GME (ETX) - baseboard monitor

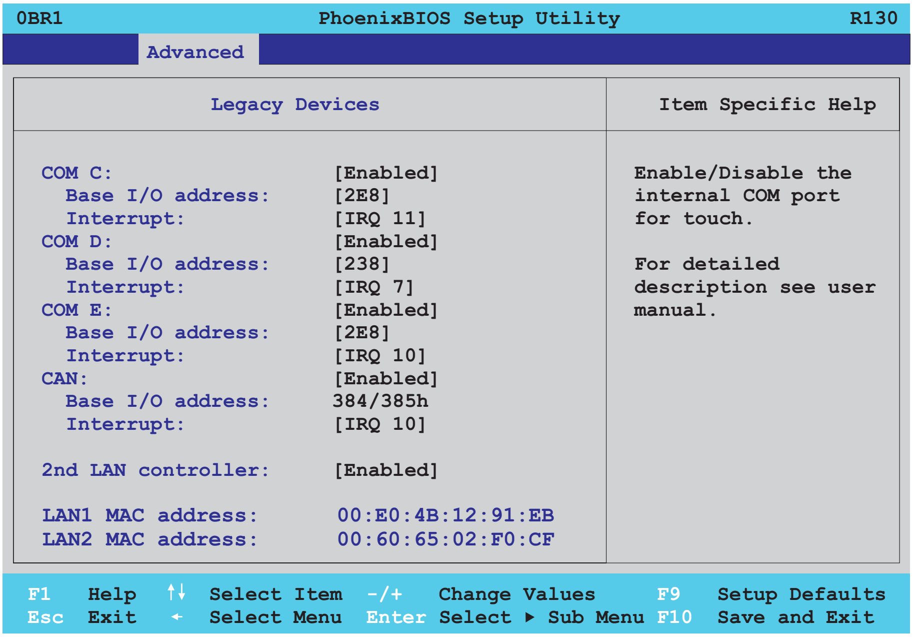
BIOS setting	Meaning	Setting options	Effect
CMOS battery	The status of the built-in CMOS battery is displayed here. Possible displays: **N/A** - Not Available, **GOOD** - Battery OK, **BAD** - Battery must be replaced. For additional information on when status displays are shown, see "Battery", on page 158	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 area in degrees Celsius and Fahrenheit.	None	-
Slide-in drive 1	Displays the temperature of the slide-in drive 1 in degrees Celsius and Fahrenheit.	None	-
Slide-in drive 2	Displays the temperature of the slide-in drive 2 in degrees Celsius and Fahrenheit.	None	-
Case 1	Displays the fan speed of housing fan 1.	None	-
Case 2	Displays the fan speed of housing fan 2.	None	-

Table 261: 855GME (ETX) - baseboard monitor - setting options

BIOS setting	Meaning	Setting options	Effect
Case 3	Displays the fan speed of housing fan 3.	None	-
Case 4	Displays the fan speed of housing fan 4.	None	-
CPU	Displays the fan speed of the processor fan.	None	-

Table 261: 855GME (ETX) - baseboard monitor - setting options (Forts.)

Legacy devices



```
0BR1                    PhoenixBIOS Setup Utility                    R130
            Advanced

                  Legacy Devices                   Item Specific Help

  COM C:                      [Enabled]            Enable/Disable the
    Base I/O address:         [2E8]                internal COM port
    Interrupt:                [IRQ 11]             for touch.
  COM D:                      [Enabled]
    Base I/O address:         [238]                For detailed
    Interrupt:                [IRQ 7]              description see user
  COM E:                      [Enabled]            manual.
    Base I/O address:         [2E8]
    Interrupt:                [IRQ 10]
  CAN:                        [Enabled]
    Base I/O address:         384/385h
    Interrupt:                [IRQ 10]

  2nd LAN controller:         [Enabled]

  LAN1 MAC address:           00:E0:4B:12:91:EB
  LAN2 MAC address:           00:60:65:02:F0:CF

 F1   Help  ↑↓ Select Item  -/+   Change Values       F9   Setup Defaults
 Esc  Exit  ↔  Select Menu  Enter Select ▸ Sub Menu   F10  Save and Exit
```

Figure 210: 855GME (ETX) Legacy Devices

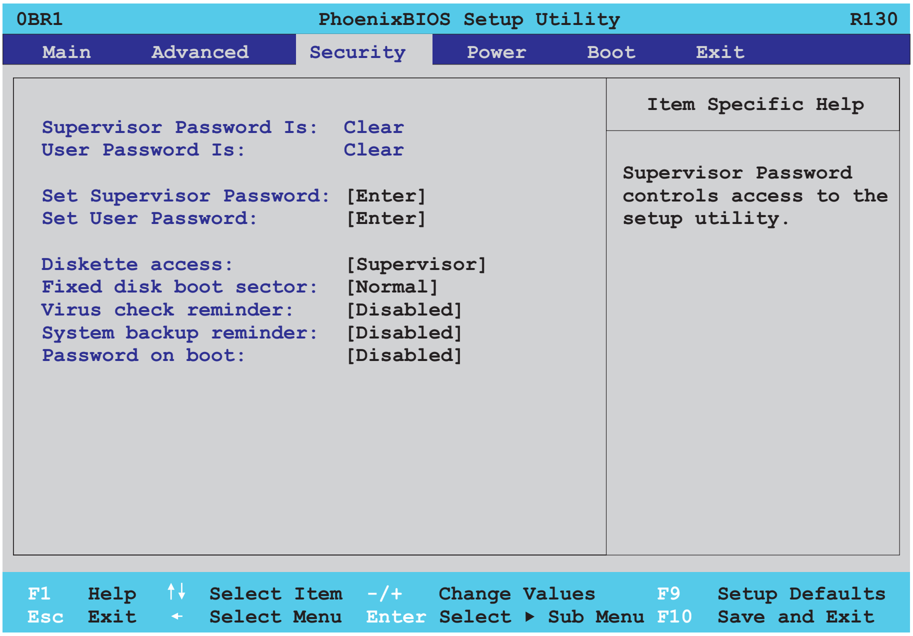
BIOS setting	Meaning	Setting options	Effect
COM C	Settings for the internal serial interfaces in the system. This setting activates the touch screen in panel PC 700 systems, and, using SDL transfer technology, also in Automation Panel 900 display units.	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the COM C port. A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM C port. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
COM D	Configuration of the COM D port for the serial interface of an automation panel link slot. The interface is used to operate the touch screen on connected Automation Panel 900 units.	Disabled	Disables the interface.
		Enabled	Enables the interface.

Table 262: 855GME (ETX) Legacy Devices setting options

BIOS setting	Meaning	Setting options	Effect
Base I/O address	Configuration of the base I/O address for the serial COM D port. A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM D port. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
COM E	Configuration of the optional COM E port on a B&R add-on interface (IF option).	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Configuration of the base I/O address for the serial COM E port. A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM E port. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
LPT	This setting is specific to B&R and should not be changed.	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Configuration of the base I/O address for the optional LPT. A yellow star indicates a conflict with another device.	278, 378, 3BC	Selected base I/O address is assigned.
CAN	Configuration of the CAN port of a B&R add-on interface card.	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	384/385h	None	-
Interrupt	Selection of the interrupt for the CAN port.	IRQ 10	Selected interrupt is assigned.
		NMI	NMI interrupt is assigned.
2nd LAN controller	For turning the onboard LAN controller (ETH2) on and off.	Disabled	Disables the controller.
		Enabled	Enables the controller.
LAN1 MAC address	Displays the MAC addresses for the ETH1 network controller.	None	-
LAN2 MAC address	Displays the MAC addresses for the ETH2 network controller.	None	-

Table 262: 855GME (ETX) Legacy Devices setting options (Forts.)

1.2.6 Security



```
Supervisor Password Is:   Clear
User Password Is:         Clear

Set Supervisor Password:  [Enter]
Set User Password:        [Enter]

Diskette access:          [Supervisor]
Fixed disk boot sector:   [Normal]
Virus check reminder:     [Disabled]
System backup reminder:   [Disabled]
Password on boot:         [Disabled]
```

```
Supervisor Password
controls access to the
setup utility.
```

Figure 211: 855GME (ETX) Security Menu

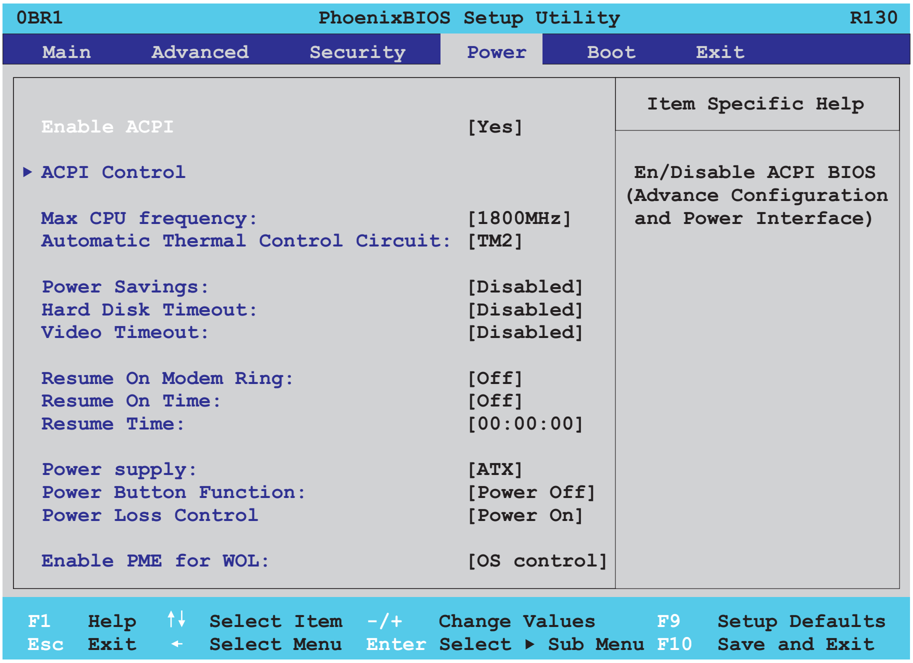
BIOS setting	Meaning	Setting options	Effect
Supervisor password is	Displays whether or not a supervisor password has been set.	None	Display **set**: A supervisor password has been set. Display **clear**: No supervisor password has been set.
User password is	Displays whether or not a user password has been set.	None	Display **set**: A user password has been set. Display **clear**: No user password has been set.
Set supervisor password	To enter/change a supervisor password. A supervisor password is necessary to edit all BIOS settings.	Enter maximum 7 alphanumeric characters - not case sensitive.	Press Enter and enter password two times. The password must be 7 alphanumeric characters or less. Needed to enter BIOS setup. To change the password, enter the old password once and then the new password twice.
Set user password	To enter/change a user password. A user password allows the user to edit only certain BIOS settings.	Enter maximum 7 alphanumeric characters - not case sensitive.	Press Enter and enter password two times. The password must be 7 alphanumeric characters or less. Needed to enter BIOS setup. To change the password, enter the old password once and then the new password twice.

Table 263: 855GME (ETX) Security setting options

BIOS setting	Meaning	Setting options	Effect
Diskette access	Access to the diskette drive is controlled here. Either or the supervisor or the user has access to it. Does not work with USB diskette drives.	Supervisor	Supervisor password is needed to access a diskette drive.
		User	User password is needed to access a diskette drive.
Fixed disk boot sector	The boot sector of the primary hard drive can be write protected against viruses with this option.	Normal	Write access allowed.
		Write protect	Boot sector is write protected.
Virus check reminder	This function opens a reminder when the system is started to scan for viruses.	Disabled	Disables this function.
		Daily	A reminder appears every day when the system is started.
		Weekly	A reminder appears the first time the system is started after every Sunday.
		Monthly	A reminder appears the first time the system is started each month.
System backup reminder	This function opens a reminder when the system is started to create a system backup.	Disabled	Disables this function.
		Daily	A reminder appears every day when the system is started.
		Weekly	A reminder appears the first time the system is started after every Sunday.
		Monthly	A reminder appears the first time the system is started each month.
Password at boot	This function requires a supervisor or user password when the system is started. Only possible when a supervisor or user password is enabled.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 263: 855GME (ETX) Security setting options (Forts.)

1.2.7 Power



```
0BR1                  PhoenixBIOS Setup Utility                    R130
   Main     Advanced     Security     Power     Boot     Exit

                                                  Item Specific Help
  Enable ACPI                          [Yes]
                                                  En/Disable ACPI BIOS
► ACPI Control                                   (Advance Configuration
                                                  and Power Interface)
  Max CPU frequency:                   [1800MHz]
  Automatic Thermal Control Circuit:   [TM2]

  Power Savings:                       [Disabled]
  Hard Disk Timeout:                   [Disabled]
  Video Timeout:                       [Disabled]

  Resume On Modem Ring:                [Off]
  Resume On Time:                      [Off]
  Resume Time:                         [00:00:00]

  Power supply:                        [ATX]
  Power Button Function:               [Power Off]
  Power Loss Control                   [Power On]

  Enable PME for WOL:                  [OS control]

 F1   Help  ↑↓  Select Item  -/+    Change Values       F9   Setup Defaults
 Esc  Exit  ↔   Select Menu  Enter  Select ► Sub Menu  F10  Save and Exit
```

Figure 212: 855GME (ETX) Power menu

BIOS setting	Meaning	Setting options	Effect
Enable ACPI	This option turns the ACPI function (Advanced Configuration and Power Interface) on or off. This is an advanced plug & play and power management functionality.	Yes	Enables this function.
		No	Disables this function.
ACPI control	Configuration of specific limits.	Enter	Opens the submenu See "ACPI control", on page 447
Max CPU frequency	This option makes it possible to determine the maximum CPU frequency for Pentium M processors. This option is not shown for Celeron M processors.	MHz processor frequency steps - depending on the processor being used	Determining the frequency. Low heat build-up, therefore low processing power.
Automatic thermal control circuit	This function monitors the CPUs temperature. If the maximum operating temperature of the CPU is exceeded, the performance of the processor is throttled.	Disabled	Disables this function.
		TM1	Operation with 50% load.
		TM2	Operation in accordance with Intel's Geyserville specifications.

Table 264: 855GME (ETX) Main setting options

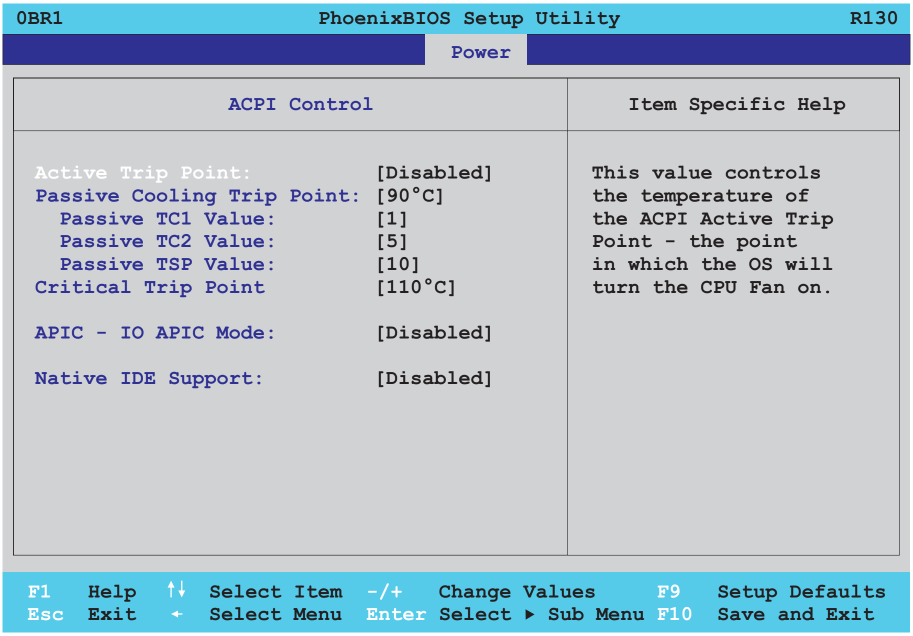
BIOS setting	Meaning	Setting options	Effect
Power savings	This function determines if and how the power save function is used.	Disabled	Deactivates the power savings function.
		Customized	Power management is configured by adjusting the individual settings.
		Maximum power Savings	Maximum power savings function.
		Maximum performance	Power savings function to maximize performance.
Standby timeout	Set here when the system should enter standby mode. During standby, various devices and the display will be deactivated. This option only available when "power savings" is set to customized.	Off	No standby.
		1, 2, 4, 8 minutes	Time in minutes until standby.
Auto suspend timeout	Set here when the system should enter suspend mode to save electricity. This option only available when "power savings" is set to customized.	Off	No standby.
		5, 10, 15, 20, 30, 40, 60 Minutes	Time in minutes until standby.
Hard disk timeout	Set here how long after the last access the hard disk should enter standby mode. This option only available when "power savings" is set to customized.	Disabled	Disables this function.
		10, 15, 30, 45 seconds	Time in seconds until standby.
		1, 2, 4, 6, 8, 10, 15 Minutes	Time in minutes until standby.
Video timeout		Disabled	
Resume on modem ring	If an external modem is connected to a serial port and the telephone rings, the system starts up.	Off	Disables this function.
		On	Enables this function.
Resume on time	This function enables the system to start at the time set under "resume time."	Off	Disables this function.
		On	Enables this function.
Resume time	Time setting for the option "resume on time" (when the system should start up).	[00:00:00]	Personal setting of the time in the format (hh:mm:ss).
Power supply	The type of power supply being used can be entered here.	ATX	An ATX compatible power supply is being used.
		AT	An AT compatible power supply is being used.
Power button Function	This option determines the function of the power button.	Power off	Shuts down the system.
		Sleep	The system enters sleep mode.
Power Loss Control	This option determines how the system reacts to a power outage.	Stay off	The system does not turn back on. The system remains off until the power button is pressed.
		Power-on	The system turns back on.
		Last State	The system resumes the last state it was in before the power outage.

Table 264: 855GME (ETX) Main setting options (Forts.)

BIOS setting	Meaning	Setting options	Effect
Enable PME for WOL	This option enables the PME (Power Management Event) signal for controlling the WOL (Wake On LAN) function for the operating system. This setting affects both Ethernet interfaces (ETH1 and ETH2).	OS control	Evaluation of the PME signal is only active if it has been accordingly activated in the operating system driver. The system can only be woken up from the S4: hibernate mode - Suspend-to-Disk status.
		Enabled	The function, WOL and the evaluation of the PME signal is always enabled.
		Disabled	Disables the function - no WOL possible.

Table 264: 855GME (ETX) Main setting options (Forts.)

ACPI control



```
0BR1                 PhoenixBIOS Setup Utility                 R130
                                Power

            ACPI Control                      Item Specific Help

  Active Trip Point:            [Disabled]    This value controls
  Passive Cooling Trip Point:   [90°C]        the temperature of
    Passive TC1 Value:          [1]           the ACPI Active Trip
    Passive TC2 Value:          [5]           Point - the point
    Passive TSP Value:          [10]          in which the OS will
  Critical Trip Point           [110°C]       turn the CPU Fan on.

  APIC - IO APIC Mode:          [Disabled]

  Native IDE Support:           [Disabled]

 F1   Help  ↑↓  Select Item  -/+   Change Values      F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter Select ▸ Sub Menu  F10  Save and Exit
```

Figure 213: 855GME (ETX) ACPI Control

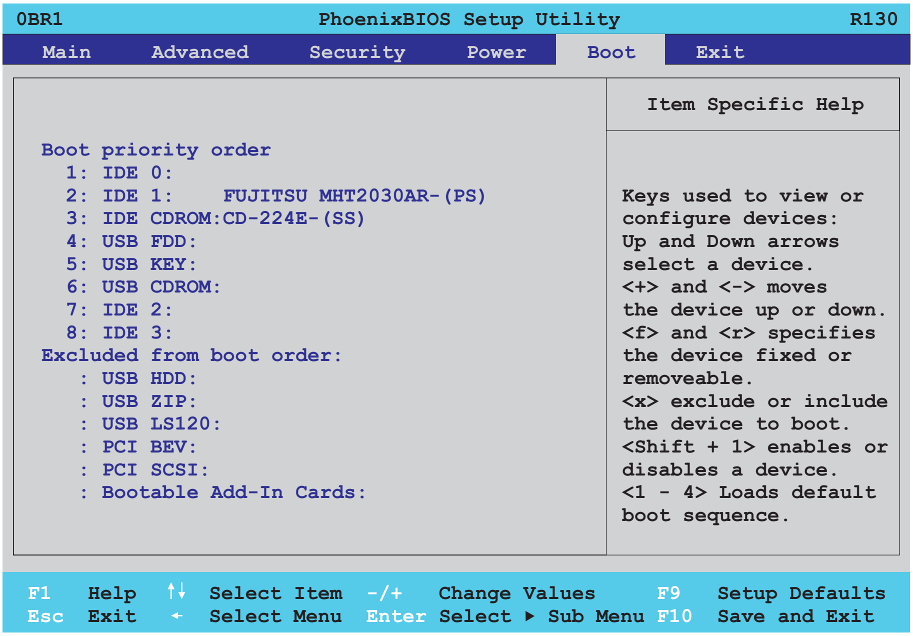
BIOS setting	Meaning	Setting options	Effect
Active trip point	With this function, an optional CPU fan above the operating system can be set to turn on when the CPU reaches the set temperature. **Information:** **This function is not supported by MS-DOS.**	Disabled	Disables this function.
		40 to 100°C	Temperature setting for the active trip point. Can be set in increments of 5°C.

Table 265: 855GME (ETX) ACPI Control setting options

BIOS setting	Meaning	Setting options	Effect
Passive Cooling Trip Point	With this function, a temperature can be set at which the CPU automatically reduces its speed. **Information:** **This function is not supported by MS-DOS.**	Disabled	Disables this function.
		40 to 100°C	Temperature setting for the passive cooling trip point. Can be set in increments of 5°C.
Passive TC1 Value	Can only be set if a value was defined manually under the item "Passive cooling trip point".	1 .. 16	Can be defined in single steps
Passive TC2 Value	Can only be set if a value was defined manually under the item "Passive cooling trip point".	1 .. 16	Can be defined in single steps
Passive TSP Value	Can only be set if a value was defined manually under the item "Passive cooling trip point".	2 .. 30	Can be defined in double steps
Critical Trip Point	With this function, a temperature can be set at which the operating system automatically shuts itself down. **Information:** **This function is not supported by MS-DOS.**	40 to 110°C	Temperature setting for the critical trip point. Can be set in increments of 5°C.
APIC - I/O APIC mode	This option controls the functionality of the advanced interrupt controller in the processor.	Disabled	Disables the function
		Enabled	Enables this function. The activation of this option is only effective if it takes place before the operating system (Windows XP) is activated. There are then 23 IRQs available.
Native IDE support	The native IDE support offers the possibility to make 4 hard disk controllers (2 x primary ATA for a total of 4 devices, and 2 x secondary ATA for another 2 devices) accessible through Windows XP. **Information:** **This function is not supported by MS-DOS.**	Disabled	Disables this function.
		Enabled	Enables this function.

Table 265: 855GME (ETX) ACPI Control setting options (Forts.)

1.2.8 Boot



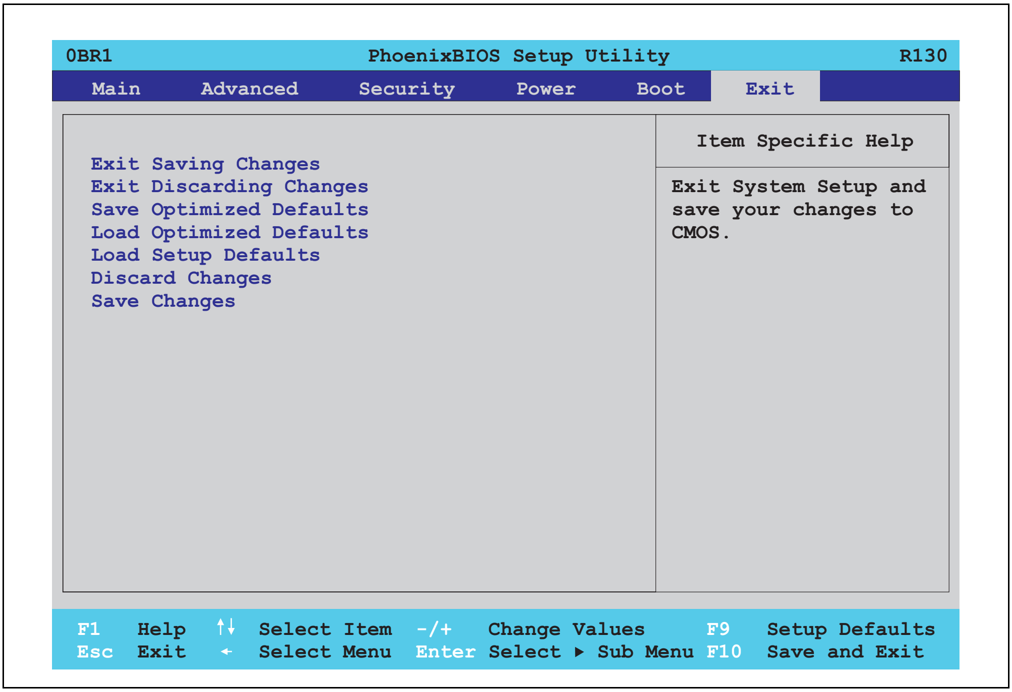
```
0BR1                  PhoenixBIOS Setup Utility                    R130
   Main      Advanced     Security     Power     Boot     Exit

                                              Item Specific Help

  Boot priority order
    1:  IDE 0:                                Keys used to view or
    2:  IDE 1:     FUJITSU MHT2030AR-(PS)     configure devices:
    3:  IDE CDROM:CD-224E-(SS)                Up and Down arrows
    4:  USB FDD:                              select a device.
    5:  USB KEY:                              <+> and <-> moves
    6:  USB CDROM:                            the device up or down.
    7:  IDE 2:                                <f> and <r> specifies
    8:  IDE 3:                                the device fixed or
  Excluded from boot order:                   removeable.
     :  USB HDD:                              <x> exclude or include
     :  USB ZIP:                              the device to boot.
     :  USB LS120:                            <Shift + 1> enables or
     :  PCI BEV:                              disables a device.
     :  PCI SCSI:                             <1 - 4> Loads default
     :  Bootable Add-In Cards:                boot sequence.

  F1   Help  ↑↓  Select Item  -/+   Change Values       F9   Setup Defaults
  Esc  Exit  ←   Select Menu  Enter Select ► Sub Menu   F10  Save and Exit
```

Figure 214: 855GME (ETX) Boot menu

BIOS setting	Meaning	Setting options	Effect
1:		IDE 0, IDE 1, IDE 2, IDE 3, IDE CD USB FDC, USB KEY USB CDROM USB HDD, USB ZIP USB LS120, PCI BEV, PCI SCSI, bootable add-in cards	Use the up arrow ↑ and down arrow ↓, to select a device. Then, use the <+> und <-> keys to change the boot priority of the drive. To add a device to the "boot priority order" list from the "excluded from boot order" list, use the <x> key. In the same way, the <x> key can move boot devices down out of the boot priority order. The keys 1 - 4 can load preset boot sequences.
2:			
3:			
4:			
5:			
6:			
7:			
8:			

Table 266: 855GME (ETX) Boot setting options

1.2.9 Exit



```
0BR1                  PhoenixBIOS Setup Utility                  R130
  Main      Advanced      Security      Power      Boot      Exit

  Exit Saving Changes                           Item Specific Help
  Exit Discarding Changes
  Save Optimized Defaults                    Exit System Setup and
  Load Optimized Defaults                    save your changes to
  Load Setup Defaults                        CMOS.
  Discard Changes
  Save Changes

 F1   Help   ↑↓  Select Item  -/+    Change Values       F9   Setup Defaults
 Esc  Exit   ←   Select Menu  Enter  Select ▸ Sub Menu   F10  Save and Exit
```

Figure 215: 855GME (ETX) - exit menu

BIOS setting	Meaning	Setting options	Effect
Exit saving changes	BIOS setup is closed with this item. Changes made are saved in CMOS after confirmation, and the system is rebooted.	Yes / No	
Exit discarding changes	With this item you can close BIOS setup without saving the changes made. The system is then rebooted.	Yes / No	
Save optimized defaults	Saves the BIOS values entered by the customer.	Yes / No	
Load optimized defaults	Loads into CMOS the BIOS values saved by the customer. **Information:** **Only shown if "Save Optimized Defaults" has been executed.**	Yes / No	
Load setup defaults	This item loads the BIOS setup defaults, which are defined by the DIP switch settings. These settings are loaded for all BIOS configurations.	Yes / No	

Table 267: 855GME (ETX) - exit menu - setting options

BIOS setting	Meaning	Setting options	Effect
Discard Changes	Should unknown changes have been made and not yet saved, they can be discarded.	Yes / No	
Save changes	Settings are saved, and the system is not restarted.	Yes / No	

Table 267: 855GME (ETX) - exit menu - setting options

1.2.10 Profile overview - BIOS default settings - 855GME (ETX)

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

DIP switch position see Section 1.6 "Location of the DIP switch in APC620 system units", on page 526).

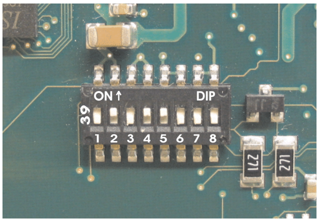


Figure 216: DIP switch on system unit

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

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	-	-
Profile 1	Reserved	On	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	-	-
Profile 3	Panel PC 700 system unit 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	-	-
Profile 4	Panel PC 700 system unit 5PC720.1043-01, 5PC720.1214-01, 5PC720.1505-01 and 5PC720.1505-02.	Off	Off	On	Off	Off	Off	-	-

Table 268: 855GME (XTX) profile overview

1) Reserved.

The following pages provide an overview of the BIOS default settings for the different DIP switch configurations.

Personal settings

If changes have been made to the BIOS defaults, they can be entered in the following tables for backup.

Main

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
System Time	-	-	-	-	-	
System Date	-	-	-	-	-	
SMART device monitoring	Enabled	Enabled	Enabled	Enabled	Enabled	
IDE channel 0 master						
Type	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	
IDE channel 0 slave						
Type	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	
IDE channel 1 master						
Type	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	
IDE channel 1 slave						
Type	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
IDE channel 1 slave						
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 269: 855GME (ETX) - main - profile setting overview

Advanced

Advanced chipset/graphics control

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Graphics engine 1	Auto	Auto	Auto	Auto	Auto	
Default flat panel	None	None	None	None	None	
Flat panel scaling	Stretched	Stretched	Stretched	Stretched	Stretched	
Graphics engine 2	Auto	Auto	Auto	Auto	Auto	
Graphics engine	Graphics engine 1	Graphics engine 1	Graphics engine 1	Graphics engine 1	Graphics engine 1	
Graphics memory size	UMA = 8 MB	UMA = 8 MB	UMA = 8 MB	UMA = 8 MB	UMA = 8 MB	
Assign IRQ to VGA	Enabled	Enabled	Enabled	Enabled	Enabled	
Internal graphics API Rev	-	-	-	-	-	

Table 270: 855GME (ETX) - advanced chipset/graphics control - profile settings overview

PCI/PNP Configuration

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
PNP OS installed	Yes	**No**	Yes	Yes	Yes	
Reset configuration data	No	No	No	No	No	
Secured setup configuration	Yes	Yes	Yes	Yes	Yes	
PCI IRQ line 1	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
PCI IRQ line 2	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
PCI IRQ line 3	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
PCI IRQ line 4	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
Onboard LAN IRQ line	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
Onboard USB EHCI IRQ line	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
Default primary video adapter	PCI	PCI	PCI	PCI	PCI	
Assign IRQ to SMB	Enabled	Enabled	Enabled	Enabled	Enabled	

PCI device, slot #1	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Enabled	Enabled	Enabled	Enabled	Enabled	
Latency timer	Default	Default	Default	Default	Default	
PCI device, slot #2						
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Enabled	Enabled	Enabled	Enabled	Enabled	

Table 271: 855GME (ETX) PCI/PNP Configuration Profile settings overview

Latency timer	Default	Default	Default	Default	Default	
PCI device, slot #3						
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Enabled	Enabled	Enabled	Enabled	Enabled	
Latency timer	Default	Default	Default	Default	Default	
PCI device, slot #4						
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Enabled	Enabled	Enabled	Enabled	Enabled	
Latency timer	Default	Default	Default	Default	Default	

Table 271: 855GME (ETX) PCI/PNP Configuration Profile settings overview (Forts.)

Memory cache

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Memory cache	Enabled	Enabled	Enabled	Enabled	Enabled	
Cache system BIOS area	Write protect	Write protect	Write protect	Write protect	Write protect	
Cache video BIOS area	Write protect	Write protect	Write protect	Write protect	Write protect	
Cache base 0-512k	Write back	Write back	Write back	Write back	Write back	
Cache base 512-640k	Write back	Write back	Write back	Write back	Write back	
Cache extended memory area	Write back	Write back	Write back	Write back	Write back	
Cache D000 - D3FF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache D400 - D7FF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache D800 - DBFF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache DC00 - DFFF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache E000 - E3FF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache E400 - E7FF	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 272: 855GME (ETX) - memory cache - profile settings overview

I/O Device Configuration

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Local bus IDE adapter	Primary	**Both**	**Both**	Primary	**Both**	
Primary IDE UDMA66/100	Enabled	Enabled	Enabled	Enabled	Enabled	
Secondary IDE UDMA66/100	Enabled	Enabled	Enabled	Enabled	Enabled	
USB UHCI host controller 1	Enabled	Enabled	Enabled	Enabled	Enabled	
USB UHCI host controller 2	Enabled	Enabled	Enabled	Enabled	Enabled	
USB UHCI host controller	Enabled	Enabled	Enabled	Enabled	Enabled	
Legacy USB Support	Enabled	Enabled	Enabled	Enabled	Enabled	
AC97 audio controller	Enabled	Enabled	Enabled	Enabled	Enabled	
Onboard LAN controller	Enabled	Enabled	Enabled	Enabled	Enabled	
Onboard LAN PXE ROM	Disabled	**Enabled**	Disabled	Disabled	Disabled	
Serial port A	Enabled	Enabled	Enabled	Enabled	Enabled	
Base I/O address	3F8	3F8	3F8	3F8	3F8	
Interrupt	IRQ 4	IRQ 4	IRQ 4	IRQ 4	IRQ 4	
Serial port B	Enabled	Enabled	Enabled	Enabled	Enabled	
Mode	Normal	Normal	Normal	Normal	Normal	
Base I/O address	2F8	2F8	2F8	2F8	2F8	
Interrupt	IRQ 3	IRQ 3	IRQ 3	IRQ 3	IRQ 3	
Parallel port	Enabled	Enabled	Enabled	Enabled	Enabled	
Base I/O address	378	378	378	378	378	

Table 273: 855GME (ETX) I/O Device Configuration Profile settings overview

Keyboard features

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
NumLock	On	On	On	On	On	
Key click	Disabled	Disabled	Disabled	Disabled	Disabled	
Keyboard auto-repeat rate	30/sec	30/sec	30/sec	30/sec	30/sec	
Keyboard auto-repeat delay	1/2 sec	1/2 sec	1/2 sec	1/2 sec	1/2 sec	

Table 274: 855GME (ETX) - keyboard features - profile setting overview

CPU board monitor

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
VCC 3.3V voltage	-	-	-	-	-	
CPU core voltage	-	-	-	-	-	
5Vsb voltage	-	-	-	-	-	
Battery voltage	-	-	-	-	-	
CPU temperature	-	-	-	-	-	

Table 275: 855GME (ETX) - CPU board monitor - profile setting overview

Miscellaneous

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Summary screen	Enabled	Enabled	Enabled	Enabled	Enabled	
QuickBoot mode	Enabled	Enabled	Enabled	Enabled	Enabled	
Extended memory testing	Just zero it	Just zero it	Just zero it	Just zero it	Just zero it	
Dark boot	Disabled	Disabled	Disabled	Disabled	Disabled	
Halt on errors	Yes	Yes	Yes	Yes	Yes	
PS/2 mouse	Disabled	**Enabled**	Disabled	Disabled	Disabled	
Large disk access mode	DOS	DOS	DOS	DOS	DOS	

Table 276: 855GME (ETX) - miscellaneous - profile setting overview

Main Board/Panel Features

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Versions	-	-	-	-	-	
BIOS	-	-	-	-	-	
MTCX	-	-	-	-	-	
FPGA	-	-	-	-	-	
Optimized ID	-	-	-	-	-	
Device ID	-	-	-	-	-	
Compatibility ID	-	-	-	-	-	
Serial Number	-	-	-	-	-	
Product name	-	-	-	-	-	
User serial ID	-	-	-	-	-	
Panel control						
Select panel number	0	0	0	0	0	
Version	-	-	-	-	-	
Brightness	100%	100%	100%	100%	100%	

Table 277: 855GME (ETX) Baseboard/Panel Features profile settings overview

Panel control	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Temperature	-	-	-	-	-	
Fan speed	-	-	-	-	-	
Keys/LEDs	-	-	-	-	-	
Main board monitor						
CMOS battery	-	-	-	-	-	
Temperatures	-	-	-	-	-	
I/O	-	-	-	-	-	
Power supply	-	-	-	-	-	
Slide-in drive 1	-	-	-	-	-	
Slide-in drive 2	-	-	-	-	-	
Fan speeds	-	-	-	-	-	
Case 1	-	-	-	-	-	
Case 2	-	-	-	-	-	
Case 3	-	-	-	-	-	
Case 4	-	-	-	-	-	
CPU	-	-	-	-	-	
Legacy devices						
COM C	Disabled	**Enabled**	Disabled	**Enabled**	**Enabled**	
Base I/O address	-	**3E8h**	-	**3E8h**	**3E8h**	
Interrupt	-	**11**	-	**11**	**11**	
COM D	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-	-	-	
COM E	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-	-	-	
LPT	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
CAN	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-	-	-	
2nd LAN controller	Enabled	Enabled	Enabled	Enabled	Enabled	
LAN1 MAC address	-	-	-	-	-	
LAN2 MAC address	-	-	-	-	-	

Table 277: 855GME (ETX) Baseboard/Panel Features profile settings overview (Forts.)

Security

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Supervisor password is	Clear	Clear	Clear	Clear	Clear	
User password is	Clear	Clear	Clear	Clear	Clear	
Set supervisor password	-	-	-	-	-	
Set user password	-	-	-	-	-	
Diskette access	Supervisor	Supervisor	Supervisor	Supervisor	Supervisor	
Fixed disk boot sector	Normal	Normal	Normal	Normal	Normal	
Virus check reminder	Disabled	Disabled	Disabled	Disabled	Disabled	
System backup reminder	Disabled	Disabled	Disabled	Disabled	Disabled	
Password at boot	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 278: 855GME (ETX) Security profile settings overview

Power

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Enable ACPI	Yes	Yes	Yes	Yes	Yes	
Max CPU frequency	Dependant on processor	Dependant on processor	Dependant on processor	Dependant on processor	Dependant on processor	
Automatic thermal control circuit	TM2	TM2	TM2	TM2	TM2	
Power savings	Disabled	Disabled	Disabled	Disabled	Disabled	
Standby timeout	-	-	-	-	-	
Auto suspend timeout	-	-	-	-	-	
Hard disk timeout	Disabled	Disabled	Disabled	Disabled	Disabled	
Video timeout	Disabled	Disabled	Disabled	Disabled	Disabled	
Resume on modem ring	Off	Off	Off	Off	Off	
Resume on time	Off	Off	Off	Off	Off	
Resume time	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	
Power supply	ATX	ATX	ATX	ATX	ATX	
Power button function	Power off	Power off	Power off	Power off	Power off	
Power Loss Control	Power-on	Power-on	Power-on	Power-on	Power-on	
Enable PME for WOL	OS control	OS control	OS control	OS control	OS control	
ACPI control						
Active trip point	Disabled	Disabled	Disabled	Disabled	Disabled	
Passive Cooling Trip Point	Disabled	Disabled	Disabled	Disabled	Disabled	
Critical Trip Point	110°C	110°C	110°C	110°C	110°C	
APIC - I/O APIC mode	Disabled	**Enabled**	Disabled	Disabled	Disabled	
Native IDE support	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 279: 855GME (ETX) - power - profile setting overview

Boot

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Boot priority order						
1:	IDE 0	**PCI BEV**	IDE 0	IDE 0	IDE 0	
2:	IDE 1	**IDE 0**	IDE 1	IDE 1	IDE 1	
3:	IDE CD	**IDE 1**	IDE CD	IDE CD	IDE CD	
4:	USB FDD	**IDE CD**	USB FDD	USB FDD	**USB FDD**	
5:	USB KEY	**USB FDD**	USB KEY	USB KEY	USB KEY	
6:	USB CDROM	**USB KEY**	USB CDROM	USB CDROM	USB CDROM	
7:	-	**USB CDROM**	**IDE 2**	-	**IDE 2**	
8:	-	-	**IDE 3**	-	**IDE 3**	
Excluded from boot order						
:	IDE 2	IDE 2	**USB HDD**	IDE 2	**USB HDD**	
:	IDE 3	IDE 3	**USB ZIP**	IDE 3	**USB ZIP**	
:	USB HDD	USB HDD	**USB LS120**	USB HDD	**USB LS120**	
:	USB ZIP	USB ZIP	**PCI BEV**	USB ZIP	**PCI BEV**	
:	USB LS120	USB LS120	**PCI SCSI**	USB LS120	**PCI SCSI**	
:	PCI BEV	**PCI SCSI**	**Bootable add-in cards**	PCI BEV	**Bootable add-in cards**	
:	PCI SCSI	**Bootable add-in cards**	-	PCI SCSI		
:	Bootable add-in cards		-	Bootable add-in cards		

Table 280: 855GME (ETX) - boot - profile setting overview

1.3 855GME (XTX) BIOS description

Information:

- **The following diagrams and BIOS menu items including descriptions refer to BIOS version 1.16. It is therefore possible that these diagrams and BIOS descriptions do not correspond with the installed BIOS version.**
- **The setup defaults are the settings recommended by B&R. The setup defaults are dependant on the DIP switch configuration on the baseboard (see section 1.3.10 "Profile overview - BIOS default settings - 855GME (XTX)", on page 507).**

1.3.1 General information

BIOS stands for "Basic Input Output System". It is the most basic standardized communication between the user and the system (hardware). The BIOS system used in the Automation PC 620 systems is produced by American Megatrends Inc.

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

The CMOS data is buffered by a battery, and remains in the APC620 even when the power is turned off (no 24VDC supply).

1.3.2 BIOS setup and boot procedure

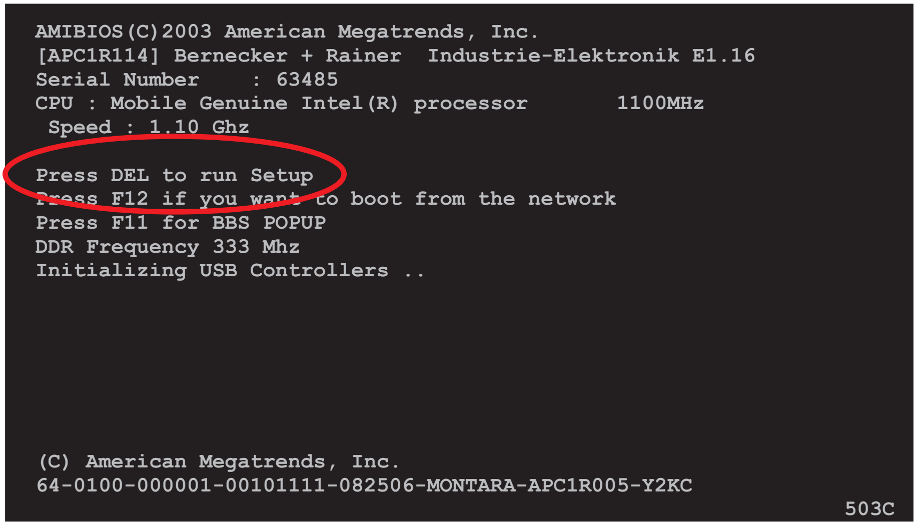
BIOS is immediately activated when switching on the power supply of the Automation PC 620 system or pressing the power button. The system checks if the setup data from the EEPROM is "OK". If the data is "OK", then it is transferred to the CMOS. If the data is "not OK", then the CMOS data is checked for validity. An error message is output if the CMOS data contains errors and the boot procedure can be continued by pressing the <F1> key. To prevent the error message from appearing at each restart, open the BIOS setup by pressing the <Del> key and re-save the settings.

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

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

To enter BIOS Setup, the DEL key must be pressed as soon as the following message appears on the monitor (during POST):

"Press DEL to run SETUP"



```
AMIBIOS(C)2003 American Megatrends, Inc.
[APC1R114] Bernecker + Rainer  Industrie-Elektronik E1.16
Serial Number     : 63485
CPU : Mobile Genuine Intel(R) processor       1100MHz
 Speed : 1.10 Ghz

Press DEL to run Setup
Press F12 if you want to boot from the network
Press F11 for BBS POPUP
DDR Frequency 333 Mhz
Initializing USB Controllers ..






(C) American Megatrends, Inc.
64-0100-000001-00101111-082506-MONTARA-APC1R005-Y2KC
                                                        503C
```

Figure 217: 855GME (XTX) - BIOS diagnostics screen

1.3.3 BIOS setup keys

The following keys are enabled during the POST:

Key	Function
ESC	The system RAM check can be skipped by pressing ESC.
Del	Enters the BIOS setup menu.
F12	Using the F12 key, you can boot from the network.
F11	Cues the boot menu. Lists all bootable devices that are connected to the system. With cursor ↑ and cursor ↓ and by pressing <ENTER>, select the device from which will be booted.
<Pause>	Pressing the <pause> key stops the POST. Press any other key to resume the POST.

Table 281: 855GME (XTX) - keys relevant to BIOS during POST

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

Key	Function
F1	General help
Cursor ↑	Moves to the previous item.
Cursor ↓	Go to the next item.
Cursor ←	Moves to the previous item.
Cursor →	Go to the next item.
+ -	Changes the setting of the selected function.

Table 282: 855GME (XTX) keys relevant to BIOS in the BIOS menu

Key	Function
Enter	Changes to the selected menu.
PageUp ↑	Change to the previous page.
PageDown ↓	Change to the previous page.
Pos 1	Jumps to the first BIOS menu item or object.
End	Jumps to the last BIOS menu item or object.
F2 / F3	The colors of the BIOS Setup are switched.
F7	Changes are reset.
F9	These settings are loaded for all BIOS configurations.
F10	Save and close.
Esc	Exits the submenu.

Table 282: 855GME (XTX) keys relevant to BIOS in the BIOS menu (Forts.)

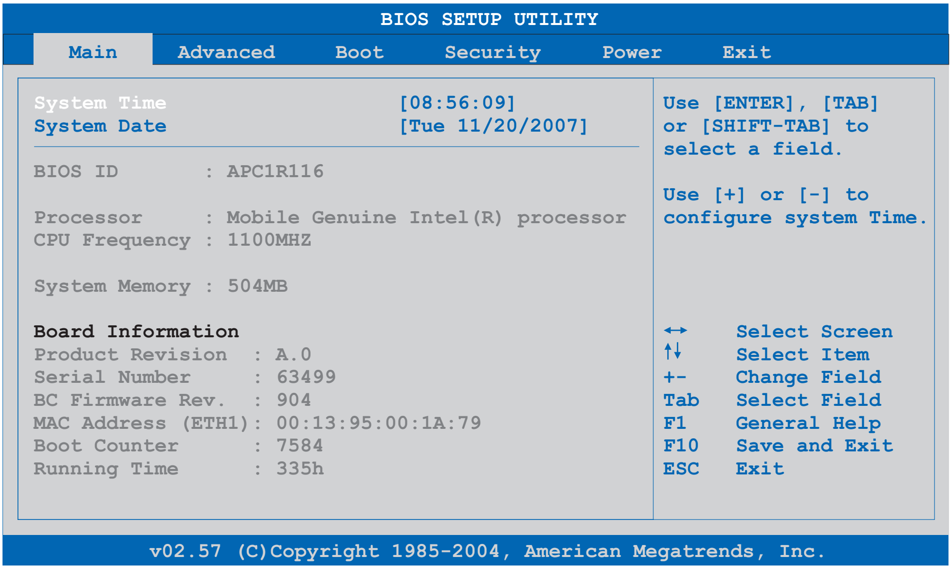
The following sections explain the individual BIOS main menu items in detail.

BIOS setup menu item	Function	From page
Main	You can configure the ground configuration time and date in this menu.	464
Advanced	Advanced BIOS options such as cache areas, PnP, keyboard repeat rate, as well as settings specific to B&R integrated hardware, can be configured here.	465
Boot	The boot order can be set here.	498
Security	For setting up the system's security functions.	500
Power	Setup of various APM (Advanced Power Management) options.	503
Exit	To end the BIOS setup.	505

Table 283: Overview of 855GME (XTX) BIOS menu items

1.3.4 Main

Immediately after the DEL button is pressed during startup, the main BIOS setup menu appears.



```
                         BIOS SETUP UTILITY
   Main      Advanced     Boot     Security     Power     Exit

 System Time                  [08:56:09]          Use [ENTER], [TAB]
 System Date                  [Tue 11/20/2007]    or [SHIFT-TAB] to
                                                  select a field.
 BIOS ID        : APC1R116
                                                  Use [+] or [-] to
 Processor      : Mobile Genuine Intel(R) processor configure system Time.
 CPU Frequency  : 1100MHZ

 System Memory  : 504MB

 Board Information                                ↔     Select Screen
 Product Revision   : A.0                         ↑↓    Select Item
 Serial Number      : 63499                       +-    Change Field
 BC Firmware Rev.   : 904                         Tab   Select Field
 MAC Address (ETH1) : 00:13:95:00:1A:79           F1    General Help
 Boot Counter       : 7584                        F10   Save and Exit
 Running Time       : 335h                        ESC   Exit

        v02.57 (C)Copyright 1985-2004, American Megatrends, Inc.
```

Figure 218: 855GME (XTX) BIOS Main menu

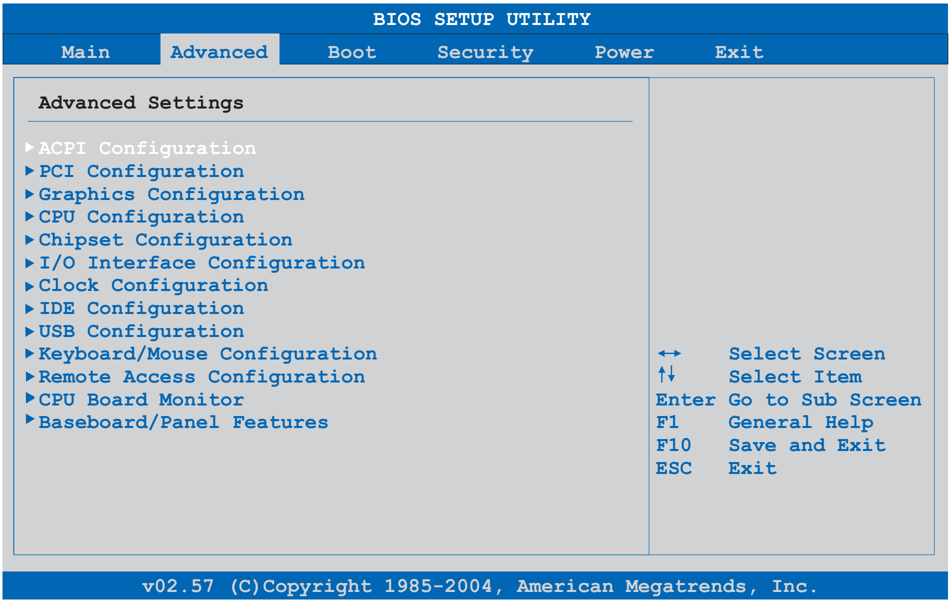
BIOS setting	Meaning	Setting options	Effect
System Time	This is the current system time setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Changes the System time	Set the system time in the format (hh:mm:ss).
System Date	This is the current system date setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Changes the system date	Set the system date in the format (mm:dd:yyyy).
BIOS ID	Displays the BIOS recognition.	None	-
Processor	Processor display.	None	-
CPU Frequency	CPU frequency display.	None	-
System Memory	System memory display.	None	-
Product Revision	Displays the CPU board HW revision.	None	-
Serial Number	Displays the CPU board serial number.	None	-
BC Firmware Rev.	Displays the CPU board controller firmware revision.	None	-
MAC Address (ETH1)	Displays the assigned MAC address.	None	-

Table 284: 855GME (XTX) Main menu setting options

BIOS setting	Meaning	Setting options	Effect
Boot Counter	Boot counter display.	None	-
Running Time	Runtime display.	None	-

Table 284: 855GME (XTX) Main menu setting options (Forts.)

1.3.5 Advanced



```
                         BIOS SETUP UTILITY
   Main    Advanced    Boot    Security    Power    Exit

  Advanced Settings
 ▶ACPI Configuration
 ▶PCI Configuration
 ▶Graphics Configuration
 ▶CPU Configuration
 ▶Chipset Configuration
 ▶I/O Interface Configuration
 ▶Clock Configuration
 ▶IDE Configuration
 ▶USB Configuration
 ▶Keyboard/Mouse Configuration             ↔     Select Screen
 ▶Remote Access Configuration              ↑↓    Select Item
 ▶CPU Board Monitor                        Enter Go to Sub Screen
 ▶Baseboard/Panel Features                 F1    General Help
                                           F10   Save and Exit
                                           ESC   Exit

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```

Figure 219: 855GME (XTX) Advanced menu

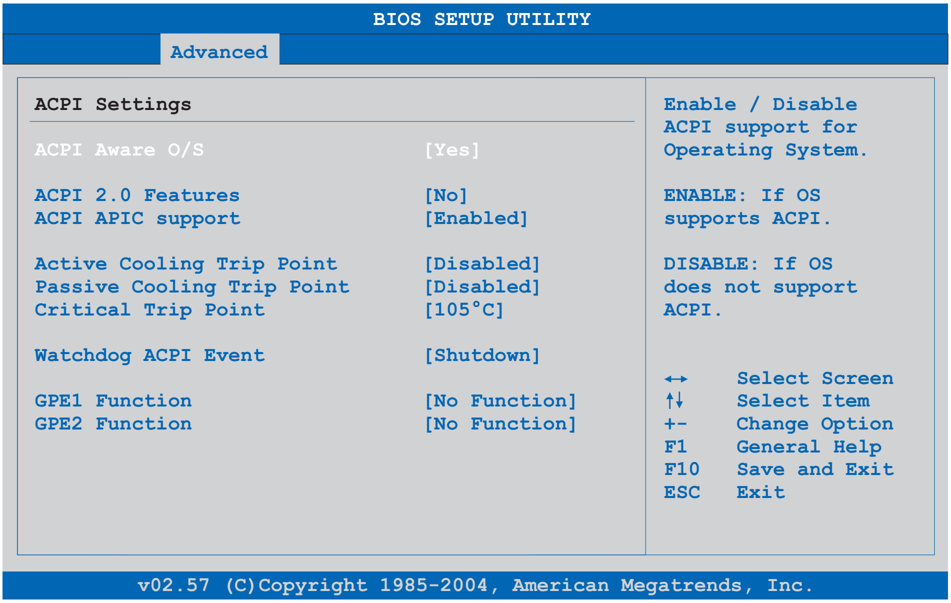
BIOS setting	Meaning	Setting options	Effect
ACPI configuration	Configures the APCI devices.	Enter	Opens the submenu See "ACPI configuration", on page 466
PCI Configuration	Configures PCI devices.	Enter	Opens the submenu See "PCI Configuration", on page 468
Graphics configuration	Configures the graphics settings.	Enter	Opens the submenu See "Graphics configuration", on page 470
CPU configuration	Configures the CPU settings.	Enter	Opens the submenu See "CPU configuration", on page 472
Chipset configuration	Configures the chipset functions.	Enter	Opens the submenu See "Chipset configuration", on page 473
I/O interface configuration	Configures the I/O devices.	Enter	Opens the submenu See "I/O interface configuration", on page 474

Table 285: 855GME (XTX) Advanced menu setting options

BIOS setting	Meaning	Setting options	Effect
Clock Configuration	Configures the clock settings.	Enter	Opens the submenu See "Clock Configuration", on page 476
IDE Configuration	Configures the IDE functions.	Enter	Opens the submenu See "IDE Configuration", on page 477
USB configuration	Configures USB settings	Enter	Opens the submenu See "USB configuration", on page 484
Keyboard/mouse configuration	Configures the keyboard/mouse options.	Enter	Opens the submenu See "Keyboard/mouse configuration", on page 488
Remote access configuration	Configures the remote access settings	Enter	Opens the submenu See "Remote access configuration", on page 489
CPU board monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens the submenu See "CPU board monitor", on page 491
Main Board/Panel Features	Displays device specific information and setup of device specific values.	Enter	Opens the submenu See "Main Board/Panel Features", on page 492

Table 285: 855GME (XTX) Advanced menu setting options (Forts.)

ACPI configuration



```
                         BIOS SETUP UTILITY
              Advanced

  ACPI Settings                                  Enable / Disable
                                                 ACPI support for
  ACPI Aware O/S                 [Yes]           Operating System.

  ACPI 2.0 Features              [No]            ENABLE: If OS
  ACPI APIC support              [Enabled]       supports ACPI.

  Active Cooling Trip Point      [Disabled]      DISABLE: If OS
  Passive Cooling Trip Point     [Disabled]      does not support
  Critical Trip Point            [105°C]         ACPI.

  Watchdog ACPI Event            [Shutdown]
                                                 ↔      Select Screen
  GPE1 Function                  [No Function]   ↑↓     Select Item
  GPE2 Function                  [No Function]   +-     Change Option
                                                 F1     General Help
                                                 F10    Save and Exit
                                                 ESC    Exit

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```
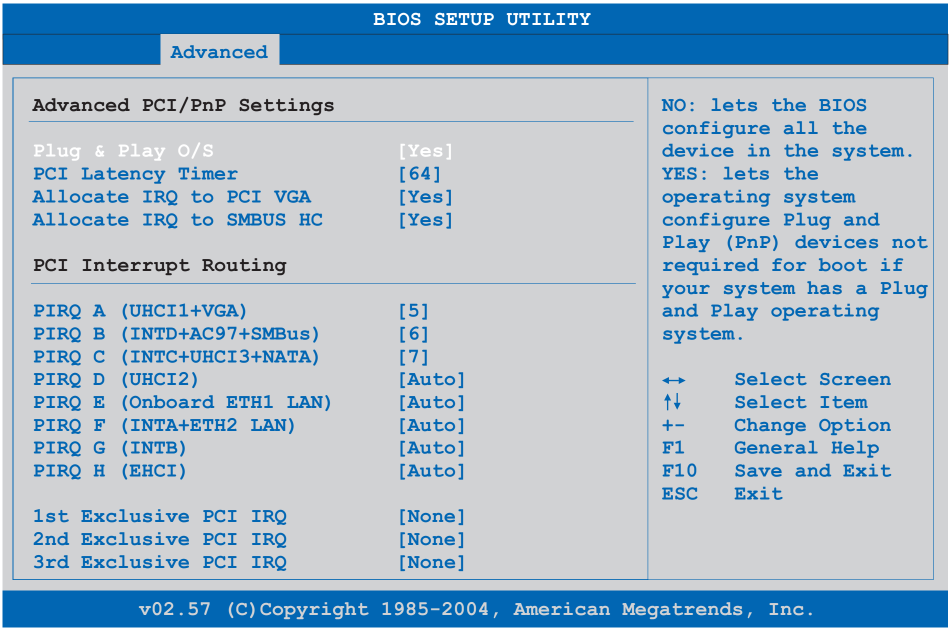

Figure 220: 855GME (XTX) Advanced ACPI Configuration

BIOS setting	Meaning	Setting 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 2.0 features	This function determines if the operating system supports the ACPI 2.0 specifications.	Yes	The operating system supports ACPI 2.0.
		No	The operating system does not support ACPI 2.0.
ACPI APIC support	This option controls the support of the advanced programmable interrupt controller in the processor.	Enabled	Enables this function.
		Disabled	Disables the function
Active Cooling Trip Point	With this function, an optional CPU fan above the operating system can be set to turn on 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 trip point. Can be set in increments of 10°C.
Passive Cooling Trip Point	With this function, a temperature can be set at which the CPU automatically reduces its speed.	Disabled	Disables this function.
		50°C, 60°C, 70°C, 80°C, 90°C	Temperature setting for the active trip point. Can be set in increments of 10°C.
Critical Trip Point	With this function, a temperature can be set at which the system automatically shuts itself down.	80°C, 85°C, 90°C, 95°C, 100°C, 105°C, 110°C	Temperature setting for the critical trip point. Can be set in increments of 5°C.
Watchdog ACPI event	System monitoring of the ACPI function.	Shutdown	The system is shut down.
		Restart	Restarts the system.
GPE1 function	Setting the GPE1 function.	No function	Not used.
		Lid switch	-
GPE2 function	Setting the GPE2 function.	No function	Not used.
		Sleep button	-

Table 286: 855GME (XTX) Advanced ACPI Configuration setting options

PCI Configuration



```
                          BIOS SETUP UTILITY
                Advanced
 Advanced PCI/PnP Settings                      NO: lets the BIOS
                                                configure all the
 Plug & Play O/S               [Yes]            device in the system.
 PCI Latency Timer             [64]             YES: lets the
 Allocate IRQ to PCI VGA       [Yes]            operating system
 Allocate IRQ to SMBUS HC      [Yes]            configure Plug and
                                                Play (PnP) devices not
 PCI Interrupt Routing                          required for boot if
                                                your system has a Plug
 PIRQ A (UHCI1+VGA)            [5]              and Play operating
 PIRQ B (INTD+AC97+SMBus)      [6]              system.
 PIRQ C (INTC+UHCI3+NATA)      [7]
 PIRQ D (UHCI2)                [Auto]           ←→     Select Screen
 PIRQ E (Onboard ETH1 LAN)     [Auto]           ↑↓     Select Item
 PIRQ F (INTA+ETH2 LAN)        [Auto]           +-     Change Option
 PIRQ G (INTB)                 [Auto]           F1     General Help
 PIRQ H (EHCI)                 [Auto]           F10    Save and Exit
                                                ESC    Exit
 1st Exclusive PCI IRQ         [None]
 2nd Exclusive PCI IRQ         [None]
 3rd Exclusive PCI IRQ         [None]

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```

Figure 221: 855GME (XTX) Advanced PCI Configuration

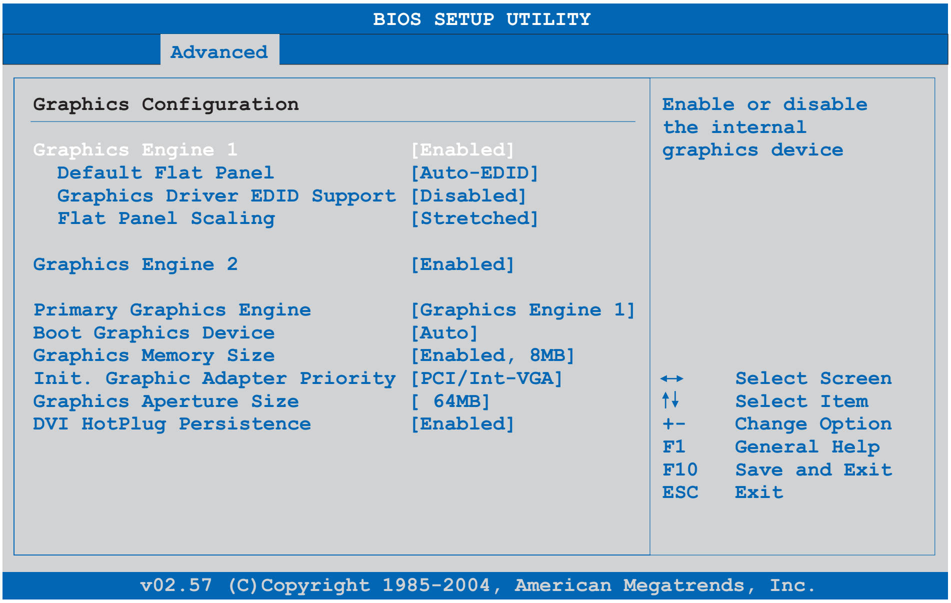
BIOS setting	Meaning	Setting options	Effect
Plug & Play O/S	BIOS is informed if Plug & Play is capable on the operating system.	Yes	The operating system handles the distribution of resources.
		No	BIOS handles the distribution of resources.
PCI Latency Timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	32, 64, 96, 128, 160, 192, 224, 248	Value set manually.
Allocate IRQ to PCI VGA	This function is used to determine if an interrupt is assigned to the PCI VGA.	Yes	Automatic assignment of an interrupt.
		No	No assignment of an interrupt.
Allocate IRQ to SMBUS HC	Use this function to set whether or not the SM (System Management) bus controller is assigned a PCI interrupt.	Yes	Automatic assignment of a PCI interrupt.
		No	No assignment of an interrupt.
PIRQ A (UHCI1+VGA)	Under this option, the external PCI interrupt A is assigned to an ISA interrupt.	Auto	The interrupt is automatically assigned according to Plug & Play guidelines.
		5, 6, 7, 8, 9, 10, 11, 12	Manual configuration of the IRQ.
PIRQ B (INTD+AC97+SMBus)	Under this option, the external PCI interrupt B is assigned to and ISA interrupt.	Auto	The interrupt is automatically assigned according to Plug & Play guidelines.
		5, 6, 7, 8, 9, 10, 11, 12	Manual configuration of the IRQ.

Table 287: 855GME (XTX) Advanced PCI Configuration setting options

BIOS setting	Meaning	Setting options	Effect
PIRQ C (INTC+UHCI3+NATA)	Under this option, the external PCI interrupt C is assigned to and ISA interrupt.	Auto	The interrupt is automatically assigned according to Plug & Play guidelines.
		5, 6, 7, 8, 9, 10, 11, 12	Manual configuration of the IRQ.
PIRQ D (UHCI2)	Under this option, the external PCI interrupt D is assigned to and ISA interrupt.	Auto	The interrupt is automatically assigned according to Plug & Play guidelines.
		5, 6, 7, 8, 9, 10, 11, 12	Manual configuration of the IRQ.
PIRQ E (Onboard ETH1 LAN)	Under this option, the external PCI interrupt E is assigned to an ISA interrupt.	Auto	The interrupt is automatically assigned according to Plug & Play guidelines.
		5, 6, 7, 8, 9, 10, 11, 12	Manual configuration of the IRQ.
PIRQ F (INTA+ETH2 LAN)	Under this option, the external PCI interrupt F is assigned to an ISA interrupt.	Auto	The interrupt is automatically assigned according to Plug & Play guidelines.
		5, 6, 7, 8, 9, 10, 11, 12	Manual configuration of the IRQ.
PIRQ G (INTB)	Under this option, the external PCI interrupt G is assigned to an ISA interrupt.	Auto	The interrupt is automatically assigned according to Plug & Play guidelines.
		5, 6, 7, 8, 9, 10, 11, 12	Manual configuration of the IRQ.
PIRQ H (EHCI)	Under this option, the external PCI interrupt H is assigned to an ISA interrupt.	Auto	The interrupt is automatically assigned according to Plug & Play guidelines.
		5, 6, 7, 8, 9, 10, 11, 12	Manual configuration of the IRQ.
1st exclusive PCI IRQ	With this option you can determine if the IRQ assigned to the PIRQ x is handled exclusively (no IRQ sharing). **Information:** **Is only displayed if a PIRQ is manually set (e.g. 5).**	None	No interrupt is assigned.
		x	Assigns the PIRQ as 1st exclusive PCI IRQ.
2nd exclusive PCI IRQ	With this option you can determine if the IRQ assigned to the PIRQ x is handled exclusively (no IRQ sharing). **Information:** **Only displayed when two PIRQs are set manually.**	None	No interrupt is assigned.
		x	Assigns the PIRQ as 2nd exclusive PCI IRQ.
3rd exclusive PCI IRQ	With this option you can determine if the IRQ assigned to the PIRQ x is handled exclusively (no IRQ sharing). **Information:** **Only displayed in connection with "Profile 5" and if three PIRQs are set manually.**	None	No interrupt is assigned.
		x	Assigns the PIRQ as 3rd exclusive PCI IRQ.

Table 287: 855GME (XTX) Advanced PCI Configuration setting options (Forts.)

Graphics configuration



```
                         BIOS SETUP UTILITY
            Advanced

 Graphics Configuration                          Enable or disable
                                                 the internal
 Graphics Engine 1               [Enabled]       graphics device
   Default Flat Panel            [Auto-EDID]
   Graphics Driver EDID Support  [Disabled]
   Flat Panel Scaling            [Stretched]

 Graphics Engine 2               [Enabled]

 Primary Graphics Engine         [Graphics Engine 1]
 Boot Graphics Device            [Auto]
 Graphics Memory Size            [Enabled, 8MB]
 Init. Graphic Adapter Priority  [PCI/Int-VGA]   ↔     Select Screen
 Graphics Aperture Size          [ 64MB]         ↑↓    Select Item
 DVI HotPlug Persistence         [Enabled]       +-    Change Option
                                                 F1    General Help
                                                 F10   Save and Exit
                                                 ESC   Exit

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```

Figure 222: 855GME (XTX) Advanced Graphics Configuration

BIOS setting	Meaning	Setting options	Effect
Graphics engine 1	The onboard graphics controller 1 is activated/deactivated here.	Enabled	Enables this function.
		Disabled	Disables this function.
Default flat panel	Settings can be made for the resolution.	Auto-EDID	Automatic setting of the resolution (using a read-out of the connected panel's EDID data).

		VGA 1x18 (002h)
		VGA 1x18 (013h)
		SVGA 1x18 (004h)
		XGA 1x18 (006h)
		XGA 2x18 (007h)
		XGA 1x24 (008h)
		XGA 2x24 (012h)
		SXGA 2x24 (00Ah)
		UXGA 2x24 (00Ch)
			VGA = 640 x 480 resolution
			SVGA = 800 x 600 resolution
			XGA = 1024 x 768 resolution
			SXGA = 1280 x 1024 resolution
			UXGA = 1600 x 1200 resolution

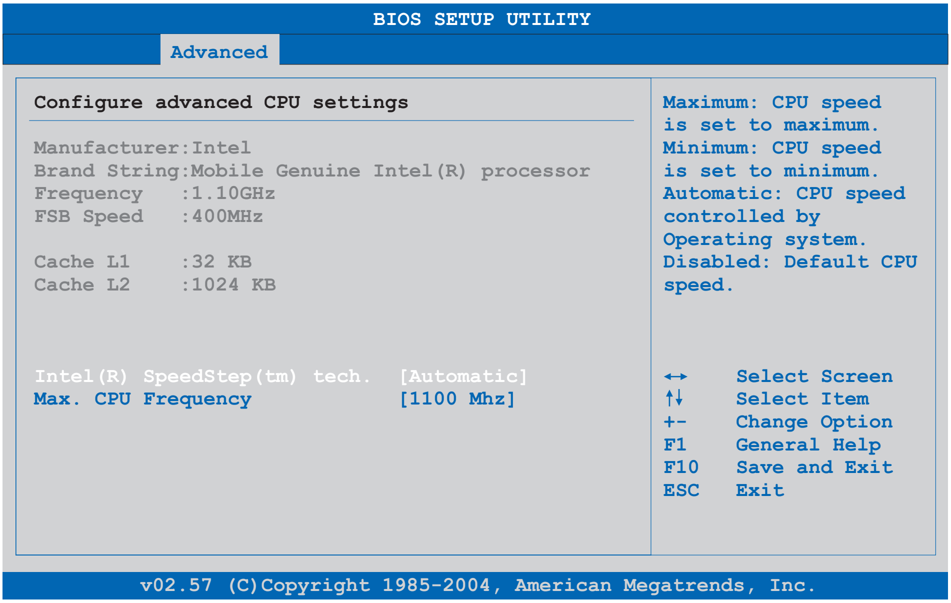
		Customized EDID 1	Graphics card reads the EDID 1 data.
		Customized EDID 2	Graphics card reads the EDID 2 data.
		Customized EDID 3	Graphics card reads the EDID 3 data.
Graphics driver EDID support	If this function is enabled, the following operating system graphics driver can read EDID data on its own. When disabled, the VGA data is taken over by BIOS.	Enabled	Enables this function.
		Disabled	Disables this function.

Table 288: 855GME (XTX) Advanced Graphics Configuration setting options

BIOS setting	Meaning	Setting options	Effect
Flat panel scaling	The screen optimization of the flat screen is determined here.	Centered	Screen output centered.
		Stretched	Screen output adjusted.
Graphics engine 2	Settings can be made for the onboard graphics controller 2.	Enabled	Enables this function.
		Disabled	Disables this function.
Graphics engine	The primary onboard graphics controller can be selected here.	Graphics engine 1	Activation of graphics engine 1
		Graphics engine 2	Activation of graphics engine 2
Boot graphics device	You can select which display mode should be booted here.	Auto	Display mode selected automatically.
		CRT only	Only CRT is booted.
		Engine 2 only	Only engine 2 is booted.
		CRT + Engine 2	CRT and engine 2 are booted.
		Engine 1 only	Only engine 1 is booted.
		CRT + Engine 1	CRT and engine 1 are booted.
Graphics memory size	Reserves a memory location in the RAM for the onboard graphics controller, into which the memory access will be directed.	Enabled, 1MB	1 MB main memory is reserved for the onboard video controller. Controller reserved.
		Enabled, 4MB	4 MB main memory is reserved for the onboard video controller. Controller reserved.
		Enabled, 8MB	8 MB main memory is reserved for the onboard video controller. Controller reserved.
		Enabled, 16MB	16 MB main memory is reserved for the onboard video controller.
		Enabled, 32MB	32 MB main memory is reserved for the onboard video controller.
Init. Graphic adapter priority	This option allows you to set which graphics card should be initialized first.	PCI/Int-VGA	PCI/Int-VGA adapter is first installed.
		Internal VGA	Internal VGA adapter is first installed.
Graphics aperture size	Reserves a memory location in the RAM for the graphics card. **Information:** **The size with the best performance is the same size as the working memory.**	64MB, 128MB, 256MB	Value set manually.
DVI HotPlug persistence	Affects both graphics engines. When enabled, the operating system graphics driver attempts to restore the most recent configuration.	Enabled	Enables this function.
		Disabled	Disables this function.

Table 288: 855GME (XTX) Advanced Graphics Configuration setting options (Forts.)

CPU configuration



```
                         BIOS SETUP UTILITY
           Advanced
 Configure advanced CPU settings                   Maximum: CPU speed
                                                   is set to maximum.
 Manufacturer:Intel                                Minimum: CPU speed
 Brand String:Mobile Genuine Intel(R) processor    is set to minimum.
 Frequency    :1.10GHz                             Automatic: CPU speed
 FSB Speed    :400MHz                              controlled by
                                                   Operating system.
 Cache L1     :32 KB                               Disabled: Default CPU
 Cache L2     :1024 KB                             speed.



 Intel(R) SpeedStep(tm) tech.   [Automatic]        ←→     Select Screen
 Max. CPU Frequency             [1100 Mhz]         ↑↓     Select Item
                                                   +-     Change Option
                                                   F1     General Help
                                                   F10    Save and Exit
                                                   ESC    Exit

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```
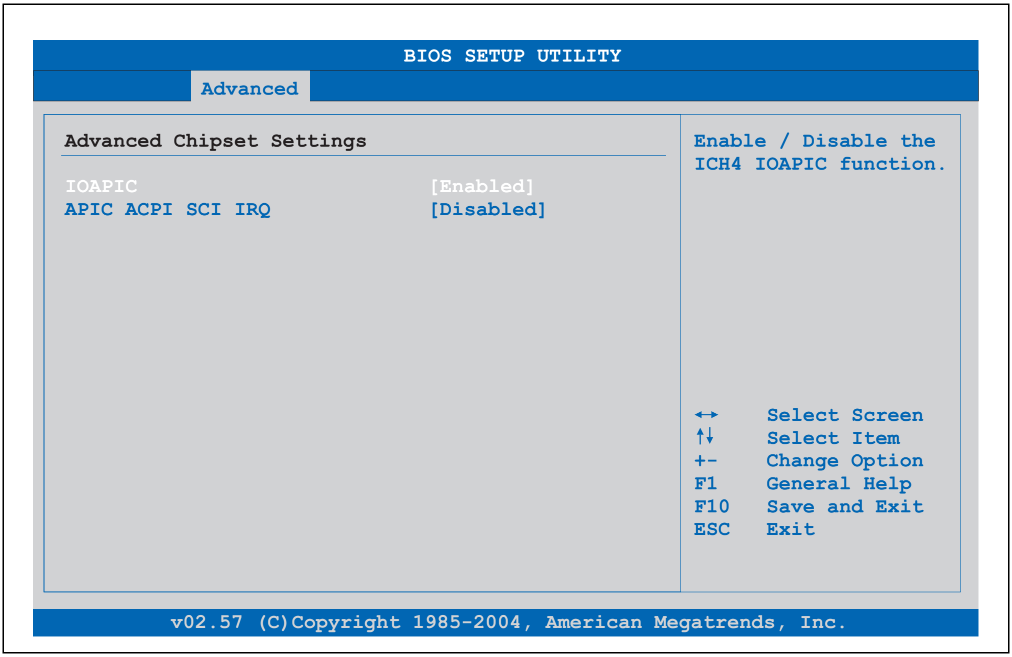

Figure 223: 855GME (XTX) Advanced CPU Configuration

BIOS setting	Meaning	Setting options	Effect
Manufacturer	Manufacturer's display.	None	-
Brand string	Display of CPU values	None	-
Frequency	Processor speed display	None	-
FSB speed	Cycle display of all addressed components. (Front side bus)	None	-
L1 cache	Displays first level cache memory area.	None	-
L2 cache	Displays first level cache memory area.	None	-
Intel (R) SpeedStep (tm) tech.	The computing capacity can be set with this option.	Maximum speed	Maximum computing capacity
		Minimum speed	Minimum computing capacity.
		Automatic	Computing capacity selected automatically.
		Disabled	Disables this function.
Max. CPU frequency	The maximum CPU speed can be set here. **Information:** **Is only visible if the "Intel (R) SpeedStep (tm) tech." option is set to automatic or maximum speed.**	1100 MHz, 1000 MHz, 900 MHz, 800 MHz, 600 MHz;	Value set manually.

Table 289: 855GME (XTX) Advanced CPU Configuration setting options

Chipset configuration



Advanced Chipset Settings

IOAPIC [Enabled]
APIC ACPI SCI IRQ [Disabled]

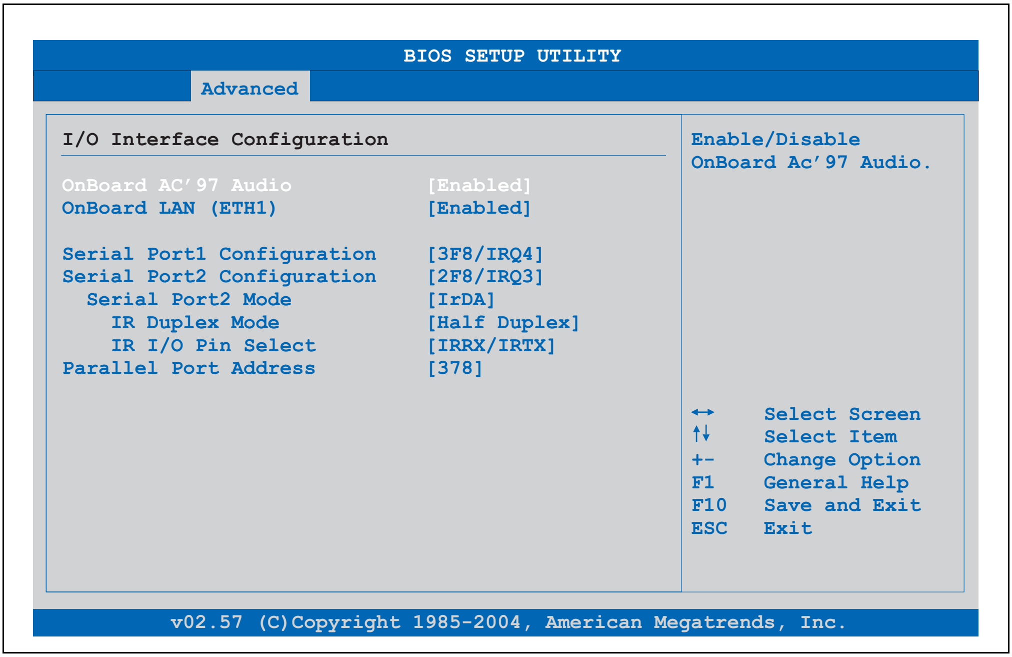
Enable / Disable the ICH4 IOAPIC function.

Figure 224: 855GME (XTX) - advanced chipset configuration

BIOS setting	Meaning	Setting options	Effect
IOAPIC	This option is used to activate or deactivate the APIC (Advanced Programmable Interrupt Controller). **Information:** **The IRQ resources available to the system are expanded when the APIC mode is enabled.**	Disabled	Deactivates this function.
		Enabled	Activates this function.
APIC ACPI SCI IRQ	This option is used to activate or deactivate the APIC (Advanced Programmable Interrupt Controller). **Information:** **The IRQ resources available to the system are expanded when the APIC mode is enabled.**	Disabled	Deactivates this function.
		Enabled	Activates this function.

Table 290: 855GME (XTX) - advanced chipset - setting options

I/O interface configuration



```
                     BIOS SETUP UTILITY
          Advanced

I/O Interface Configuration                       Enable/Disable
                                                  OnBoard Ac'97 Audio.
OnBoard AC'97 Audio             [Enabled]
OnBoard LAN (ETH1)              [Enabled]

Serial Port1 Configuration      [3F8/IRQ4]
Serial Port2 Configuration      [2F8/IRQ3]
  Serial Port2 Mode             [IrDA]
    IR Duplex Mode              [Half Duplex]
    IR I/O Pin Select           [IRRX/IRTX]
Parallel Port Address           [378]

                                                  ↔     Select Screen
                                                  ↑↓    Select Item
                                                  +-    Change Option
                                                  F1    General Help
                                                  F10   Save and Exit
                                                  ESC   Exit

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```

Figure 225: 855GME (XTX) I/O Interface Configuration

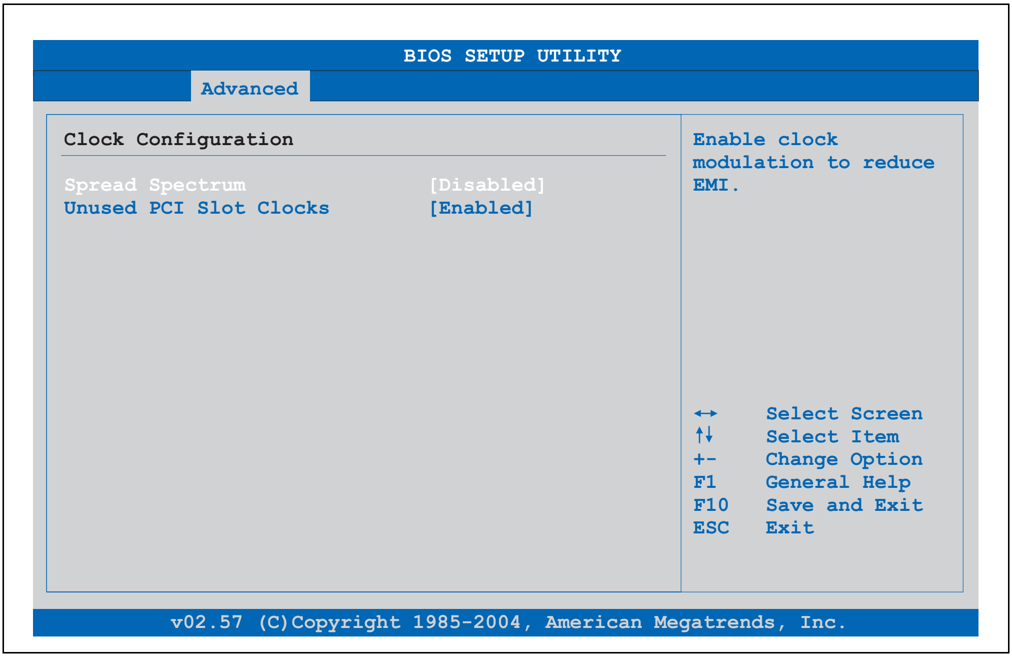
BIOS setting	Meaning	Setting options	Effect
OnBoard AC'97 Audio	For turning the Onboard AC'97 audio controller on and off.	Enabled	Enables AC'97 sound.
		Disabled	Disables AC'97 sound.
Onboard LAN (ETH1)	For turning the on-board LAN controller (for ETH1) on and off.	Disabled	Deactivates the LAN controller or the ETH1 interface. ETH1 interface.
		Enabled	Deactivates the LAN controller or the ETH1 interface. ETH1 interface.
Serial port 1 configuration	For the configuration of serial port 1 (COM1).	Disabled	Port 1 deactivated.
		3F8/IRQ4	Assignment of the base I/O address and the interrupt.
		3E8 / IRQ4	Assignment of the base I/O address and the interrupt.
Serial port 2 configuration	For the configuration of serial port 2 (COM1).	Disabled	Port 1 deactivated.
		2F8/IRQ3	Assignment of the base I/O address and the interrupt.
		2E8 / IRQ3	Assignment of the base I/O address and the interrupt.

Table 291: 855GME (XTX) Advanced I/O Interface Configuration setting options

BIOS setting	Meaning	Setting options	Effect
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).
IR duplex mode	The interface duplex drive can be configured with this option. **Information:** **Only visible if the "Serial Port2 Mode" function is set to IrDA or ASK IR.**	Half-duplex	Half-duplex drive.
		Full-duplex	Full-duplex drive.
IR I/O pin select	With this option, the infrared (IR) function on the on-board I/O chip can be determined. **Information:** **Only visible if the "Serial Port2 Mode" function is set to IrDA or ASK IR.**	IRRX/IRTX	An internal infrared device is used.
		SINB/SOUTB	An external infrared device is used.
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 291: 855GME (XTX) Advanced I/O Interface Configuration setting options (Forts.)

Clock Configuration



```
                         BIOS SETUP UTILITY
             Advanced

 Clock Configuration                              Enable clock
                                                  modulation to reduce
 Spread Spectrum              [Disabled]          EMI.
 Unused PCI Slot Clocks       [Enabled]

                                                  ←→     Select Screen
                                                  ↑↓     Select Item
                                                  +-     Change Option
                                                  F1     General Help
                                                  F10    Save and Exit
                                                  ESC    Exit

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```
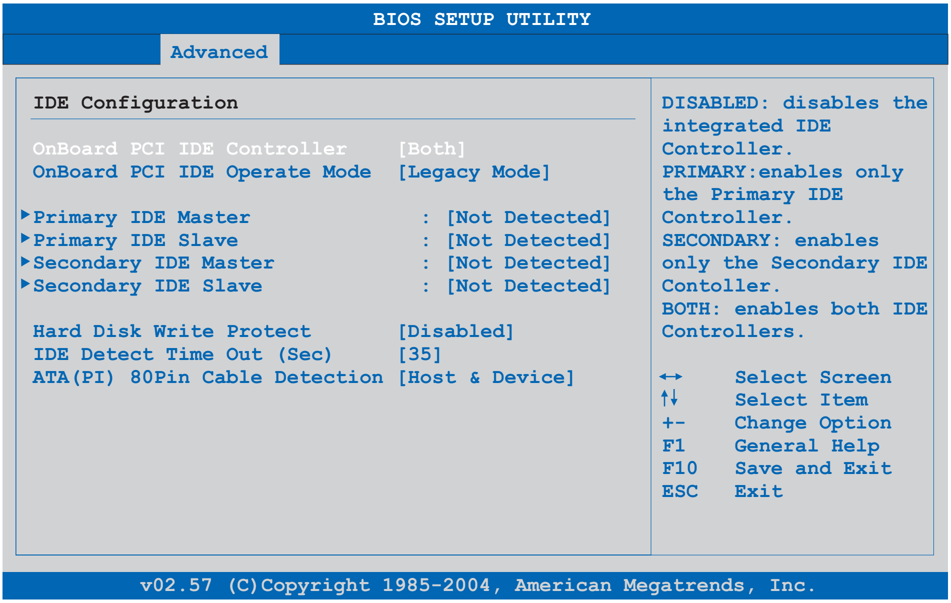

Figure 226: 855GME (XTX) Advanced Clock Configuration

BIOS setting	Meaning	Setting options	Effect
Spread spectrum	With this option, the cycle frequency can be modulated by reducing electromagnetic disturbances.	Disabled	Disables this function.
		Enabled	Enables this function.
Unused PCI slot clocks	This option activates or deactivates the unused PCI slot cycle.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 292: 855GME (XTX) Advanced Clock Configuration setting options

IDE Configuration



```
                         BIOS SETUP UTILITY
            Advanced
 IDE Configuration                                DISABLED: disables the
                                                  integrated IDE
 OnBoard PCI IDE Controller    [Both]             Controller.
 OnBoard PCI IDE Operate Mode  [Legacy Mode]      PRIMARY:enables only
                                                  the Primary IDE
▶Primary IDE Master              : [Not Detected] Controller.
▶Primary IDE Slave               : [Not Detected] SECONDARY: enables
▶Secondary IDE Master            : [Not Detected] only the Secondary IDE
▶Secondary IDE Slave             : [Not Detected] Contoller.
                                                  BOTH: enables both IDE
 Hard Disk Write Protect       [Disabled]         Controllers.
 IDE Detect Time Out (Sec)     [35]
 ATA(PI) 80Pin Cable Detection [Host & Device]    ↔      Select Screen
                                                  ↑↓     Select Item
                                                  +-     Change Option
                                                  F1     General Help
                                                  F10    Save and Exit
                                                  ESC    Exit

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```

Figure 227: 855GME (XTX) Advanced IDE Configuration

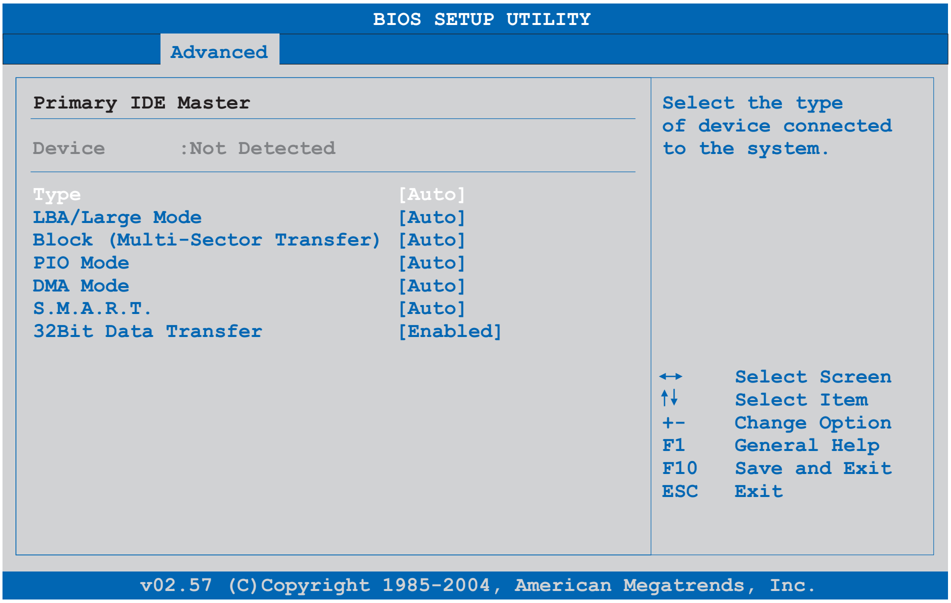
BIOS setting	Meaning	Setting options	Effect
OnBoard PCI IDE controller	Both the IDE controllers found on the board can be configured here.	Disabled	Disables this function.
		Primary	Activates the primary IDE channel.
		Secondary	Activates the secondary IDE channel.
		Both	Activates both IDE channels (primary and secondary).
OnBoard PCI IDE operate mode	The PCI IDE operate mode found on the board is configured here.	Legacy mode	Activates legacy mode
		Native mode	Activates the native mode (suited for Windows XP and Windows 2000).
Primary IDE Master	The drive in the system that is connected to the IDE primary master port is configured here.	Enter	Opens the submenu See "Primary IDE Master", on page 478
Primary IDE slave	The drive in the system that is connected to the IDE primary slave port is configured here.	Enter	Opens the submenu See "Primary IDE slave", on page 480
Secondary IDE Master	The drive in the system that is connected to the IDE secondary master port is configured here.	Enter	Opens the submenu See "Secondary IDE Master", on page 481

Table 293: 855GME (XTX) Advanced IDE Configuration setting options

BIOS setting	Meaning	Setting options	Effect
Secondary IDE slave	The drive in the system that is connected to the IDE secondary slave port is configured here.	Enter	Opens the submenu See "Secondary IDE slave", on page 483
Hard disk write protect	Write protection for the hard drive can be enabled/disabled here.	Disabled	Disables this function.
		Enabled	Enables this function.
IDE Detect Time Out (Sec)	Configuring the time overrun limit value for the ATA/ATAPI device identification.	0, 5, 10, 15, 20, 25, 30, 35	Value set manually.
ATA (PI) 80 pin cable detection	Detects whether an 80 pin cable is connected to the drive, the controller or to both. **Information:** **This cable should be used whenever possible, otherwise error messages will appear.**	Host & device	Using both IDE controllers (motherboard, disk drive).
		Host	Using the IDE controller motherboard.
		Device	Using the IDE disk drive controller.

Table 293: 855GME (XTX) Advanced IDE Configuration setting options (Forts.)

Primary IDE Master



```
                         BIOS SETUP UTILITY
           Advanced
 Primary IDE Master                               Select the type
                                                  of device connected
 Device       :Not Detected                       to the system.

 Type                             [Auto]
 LBA/Large Mode                   [Auto]
 Block (Multi-Sector Transfer)    [Auto]
 PIO Mode                         [Auto]
 DMA Mode                         [Auto]
 S.M.A.R.T.                       [Auto]
 32Bit Data Transfer              [Enabled]

                                                  ↔      Select Screen
                                                  ↑↓     Select Item
                                                  +-     Change Option
                                                  F1     General Help
                                                  F10    Save and Exit
                                                  ESC    Exit

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```
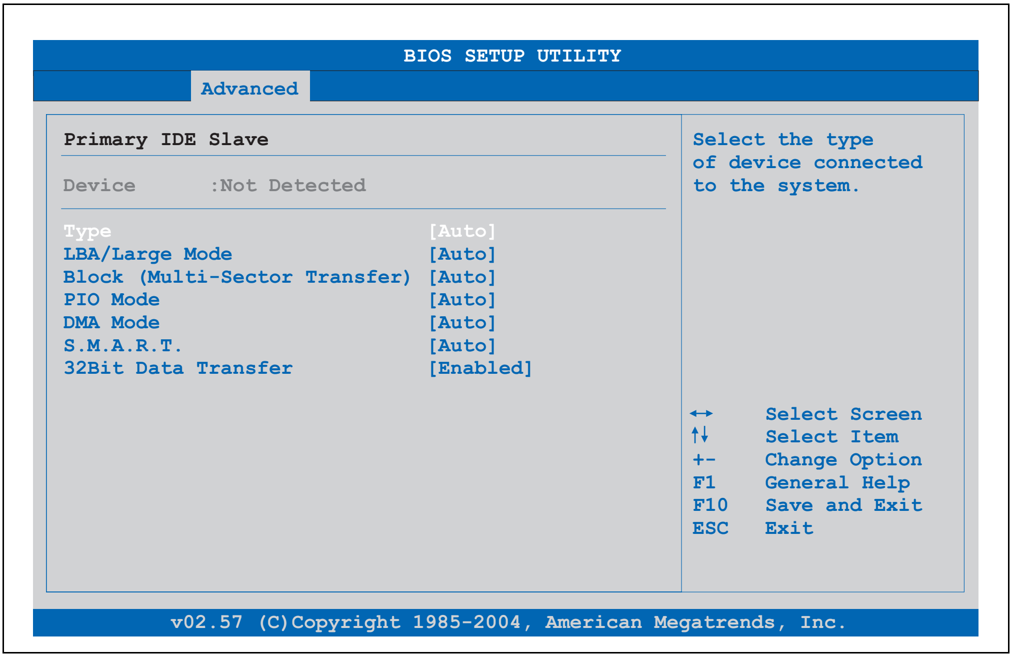

Figure 228: 855GME (XTX) Primary IDE Master

BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the primary master is configured here.	Not installed	No drive installed.
		Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive.
		ARMD	ARMD - drive (zip drive)
LBA/Large Mode	This option activates the logical block addressing / large mode for IDE.	Disabled	Disables this function.
		Auto	Automatic enabling of this function when supported by the system.
Block (Multi-Sector Transfer)	This option enables the block mode for IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Disabled	Disables this function.
		Auto	Automatic enabling of this function when supported by the system.
PIO Mode	The PIO mode determines the data rate of the hard drive. **Information:** **The higher the PIO mode, the shorter the data cable must be.**	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.
DMA Mode	The data transfer rate to and from the primary master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Auto	Automatic definition of the transfer rate.
		SWDMA0, SWDMA1, SWDAM2, MWDMA0, MWDMA1, MWDMA2;	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives (self-monitoring, analysis and reporting technology).	Auto	Automatic detection and enabling.
		Disabled	Disables this function.
		Enabled	Enables this function.
32 Bit Data Transfer	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 294: 855GME (XTX) Primary IDE Master setting options

Primary IDE slave



BIOS SETUP UTILITY

Advanced

Primary IDE Slave

Device :Not Detected

Type [Auto]
LBA/Large Mode [Auto]
Block (Multi-Sector Transfer) [Auto]
PIO Mode [Auto]
DMA Mode [Auto]
S.M.A.R.T. [Auto]
32Bit Data Transfer [Enabled]

Select the type of device connected to the system.

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Figure 229: 855GME (XTX) - primary IDE slave

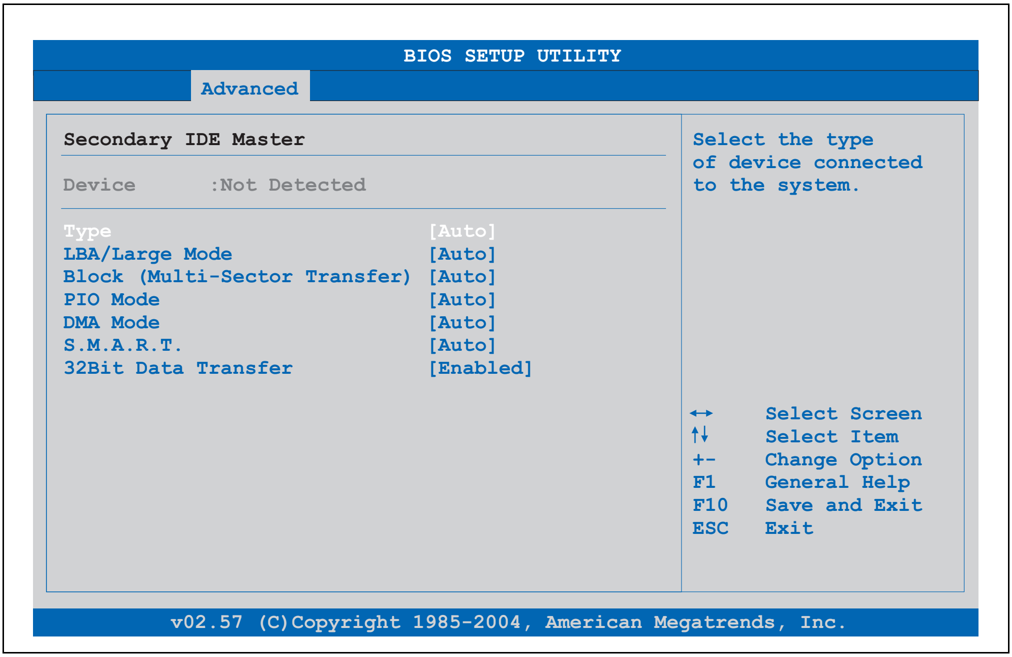
BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the primary slave is configured here.	Not installed	No drive installed.
		Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive
		ARMD	ARMD - drive (zip drive)
LBA/Large Mode	This option activates the logical block addressing / large mode for IDE.	Disabled	Disables this function.
		Auto	Automatic enabling of this function when supported by the system.
Block (Multi-Sector Transfer)	This option enables the block mode for IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Disabled	Disables this function.
		Auto	Automatic enabling of this function when supported by the system.
PIO Mode	The PIO mode determines the data rate of the hard drive. **Information:** **The higher the PIO mode, the shorter the data cable must be.**	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.

Table 295: 855GME (XTX) - primary IDE slave - setting options

BIOS setting	Meaning	Setting options	Effect
DMA Mode	The data transfer rate to and from the primary slave drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Auto	Automatic definition of the transfer rate.
		SWDMA0, SWDMA1, SWDAM2, MWDMA0, MWDMA1, MWDMA2;	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives (self-monitoring, analysis and reporting technology).	Auto	Automatic detection and enabling.
		Disabled	Disables this function.
		Enabled	Enables this function.
32 Bit Data Transfer	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 295: 855GME (XTX) - primary IDE slave - setting options

Secondary IDE Master



```
Secondary IDE Master

Device       :Not Detected

Type                          [Auto]
LBA/Large Mode                [Auto]
Block (Multi-Sector Transfer) [Auto]
PIO Mode                      [Auto]
DMA Mode                      [Auto]
S.M.A.R.T.                    [Auto]
32Bit Data Transfer           [Enabled]
```

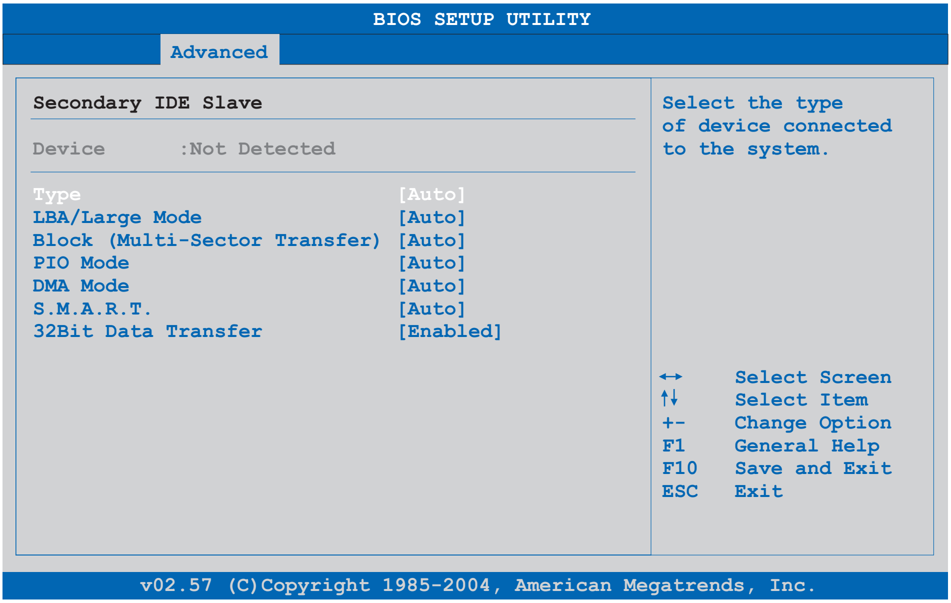
Select the type of device connected to the system.

Figure 230: 855GME (XTX) Secondary IDE Master

BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the secondary master is configured here.	Not installed	No drive installed.
		Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive
		ARMD	ARMD - drive (zip drive)
LBA/Large Mode	This option activates the logical block addressing / large mode for IDE.	Disabled	Disables this function.
		Auto	Automatic enabling of this function when supported by the system.
Block (Multi-Sector Transfer)	This option enables the block mode for IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Disabled	Disables this function.
		Auto	Automatic enabling of this function when supported by the system.
PIO Mode	The PIO mode determines the data rate of the hard drive. **Information:** **The higher the PIO mode, the shorter the data cable must be.**	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.
DMA Mode	The data transfer rate to and from the secondary master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Auto	Automatic definition of the transfer rate.
		SWDMA0, SWDMA1, SWDAM2, MWDMA0, MWDMA1, MWDMA2;	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives (self-monitoring, analysis and reporting technology).	Auto	Automatic detection and enabling.
		Disabled	Disables this function.
		Enabled	Enables this function.
32 Bit Data Transfer	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 296: 855GME (XTX) Secondary IDE Master setting options

Secondary IDE slave



```
                         BIOS SETUP UTILITY
              Advanced
 Secondary IDE Slave                            Select the type
                                                of device connected
 Device       :Not Detected                     to the system.

 Type                             [Auto]
 LBA/Large Mode                   [Auto]
 Block (Multi-Sector Transfer)    [Auto]
 PIO Mode                         [Auto]
 DMA Mode                         [Auto]
 S.M.A.R.T.                       [Auto]
 32Bit Data Transfer              [Enabled]

                                                ↔     Select Screen
                                                ↑↓    Select Item
                                                +-    Change Option
                                                F1    General Help
                                                F10   Save and Exit
                                                ESC   Exit

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```

Figure 231: 855GME (XTX) Secondary IDE Slave

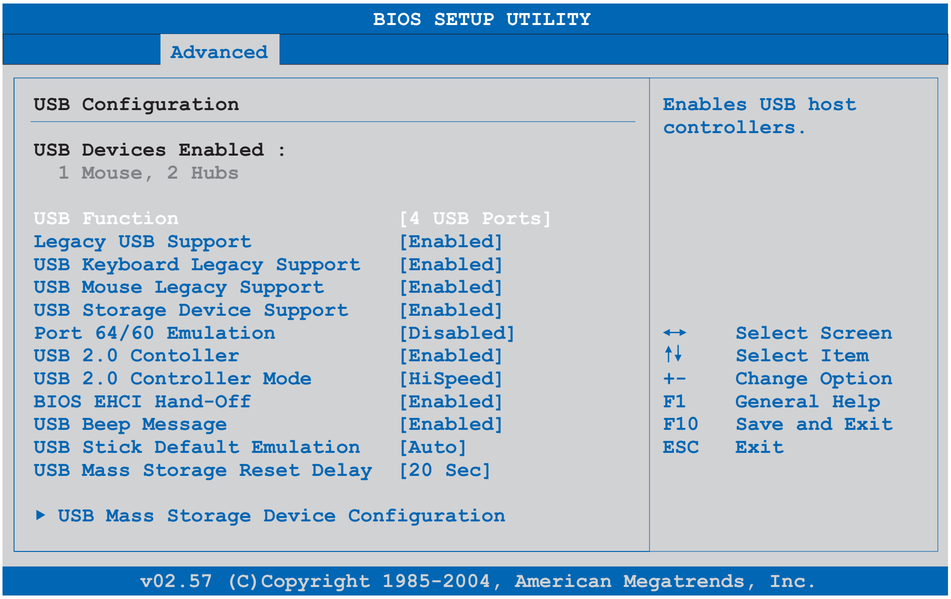
BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the secondary slave is configured here.	Not installed	No drive installed.
		Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive
		ARMD	ARMD - drive (zip drive)
LBA/Large Mode	This option activates the logical block addressing / large mode for IDE.	Disabled	Disables this function.
		Auto	Automatic enabling of this function when supported by the system.
Block (Multi-Sector Transfer)	This option enables the block mode for IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Disabled	Disables this function.
		Auto	Automatic enabling of this function when supported by the system.
PIO Mode	The PIO mode determines the data rate of the hard drive. **Information:** **The higher the PIO mode, the shorter the data cable must be.**	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.

Table 297: 855GME (XTX) Secondary IDE Slave setting options

BIOS setting	Meaning	Setting options	Effect
DMA Mode	The data transfer rate to and from the secondary slave is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Auto	Automatic definition of the transfer rate.
		SWDMA0, SWDMA1, SWDAM2, MWDMA0, MWDMA1, MWDMA2;	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives (self-monitoring, analysis and reporting technology).	Auto	Automatic detection and enabling.
		Disabled	Disables this function.
		Enabled	Enables this function.
32 Bit Data Transfer	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 297: 855GME (XTX) Secondary IDE Slave setting options (Forts.)

USB configuration



```
                         BIOS SETUP UTILITY
             Advanced
 USB Configuration                                   Enables USB host
                                                     controllers.
 USB Devices Enabled :
   1 Mouse, 2 Hubs

 USB Function                  [4 USB Ports]
 Legacy USB Support            [Enabled]
 USB Keyboard Legacy Support   [Enabled]
 USB Mouse Legacy Support      [Enabled]
 USB Storage Device Support    [Enabled]
 Port 64/60 Emulation          [Disabled]            ←→    Select Screen
 USB 2.0 Contoller             [Enabled]             ↑↓    Select Item
 USB 2.0 Controller Mode       [HiSpeed]             +-    Change Option
 BIOS EHCI Hand-Off            [Enabled]             F1    General Help
 USB Beep Message              [Enabled]             F10   Save and Exit
 USB Stick Default Emulation   [Auto]                ESC   Exit
 USB Mass Storage Reset Delay  [20 Sec]

 ▸ USB Mass Storage Device Configuration

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```

Figure 232: 855GME (XTX) Advanced USB Configuration

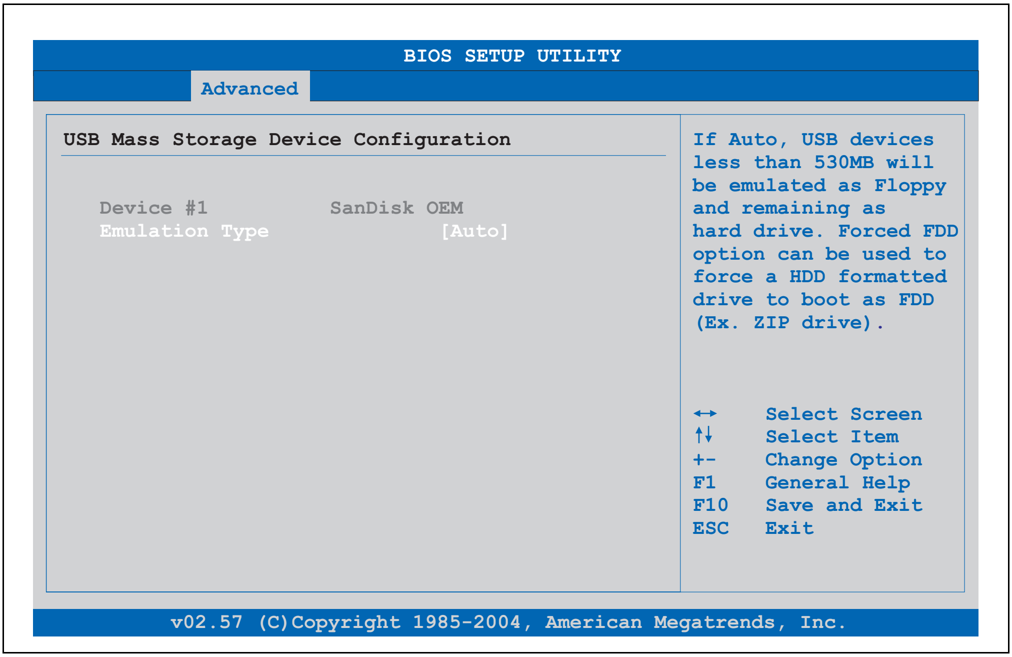
BIOS setting	Meaning	Setting options	Effect
USB Function	USB ports can be enabled/disabled here.	Disabled	Disables the USB port.
		2 USB ports, 4 USB ports, 6 USB ports (not supported by APC620 / PPC700).	Manual selection of the USB port.
Legacy USB Support	Legacy USB support can be enabled/disabled here. USB interfaces do not function during startup. USB is supported again after the operating system has started. A USB keyboard is still recognized during the POST.	Disabled	Disables this function.
		Enabled	Enables this function.
		Auto	Automatic enabling.
USB Keyboard Legacy Support	USB keyboard support can be enabled/disabled here. **Information:** **If this function is disabled, a USB keyboard is also not supported during the POST.**	Disabled	Disables this function.
		Enabled	Enables this function.
USB Mouse Legacy Support	USB mouse support can be enabled/disabled here.	Disabled	Disables this function.
		Enabled	Enables this function.
USB Storage Device Support	USB storage device support can be enabled/disabled here.	Disabled	Disables this function.
		Enabled	Enables this function.
Port 64/60 Emulation	Port 64/60 emulation can be enabled/disabled here.	Disabled	USB keyboard functions in all systems excluding Windows NT.
		Enabled	USB keyboard functions in Windows NT.
USB 2.0 Controller	USB 2.0 mode can be activated/deactivated here.	Enabled	Enables this function.
		Disabled	Disables this function.
USB 2.0 Controller Mode	Settings can be made for the USB controller.	Full Speed	12 MBps
		Hi Speed	480 MBps
BIOS EHCI Hand-Off	The support for the operating system can be set up without the fully automatic EHCI function.	Disabled	Disables the function
		Enabled	Enables this function.
USB Beep Message	The warning tone can be activated/deactivated here.	Disabled	Disables this function.
		Enabled	Enables this function.
USB Stick Default Emulation	You can set how the USB device is to be used.	Auto	USB devices with fewer than 530MB of memory are simulated as floppy disk drives and devices with larger capacities are simulated as hard drives.
		Hard Disk	An HDD-formatted drive can be used as an FDD (e.g. zip drive) for starting the system.

Table 298: 855GME (XTX) Advanced USB Configuration setting options

BIOS setting	Meaning	Setting options	Effect
USB Mass Storage Reset Delay	The waiting time that the USB device POST requires after the device start command can be set. **Information:** **The message "No USB mass storage device detected" is displayed if no USB memory device has been installed.**	10 Sec, 20 Sec, 30 Sec, 40 Sec	Value set manually.
USB mass storage device configuration	This is where the USB mass memory device is configured. **Information:** **Is only visible when the "USB stick default emulation" function is set to AUTO.**	Enter	Opens the submenu See "USB mass storage device configuration", on page 487

Table 298: 855GME (XTX) Advanced USB Configuration setting options (Forts.)

USB mass storage device configuration



```
                         BIOS SETUP UTILITY
            Advanced
 USB Mass Storage Device Configuration      If Auto, USB devices
                                            less than 530MB will
                                            be emulated as Floppy
    Device #1          SanDisk OEM          and remaining as
    Emulation Type              [Auto]      hard drive. Forced FDD
                                            option can be used to
                                            force a HDD formatted
                                            drive to boot as FDD
                                            (Ex. ZIP drive).

                                            ←→    Select Screen
                                            ↑↓    Select Item
                                            +-    Change Option
                                            F1    General Help
                                            F10   Save and Exit
                                            ESC   Exit
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```
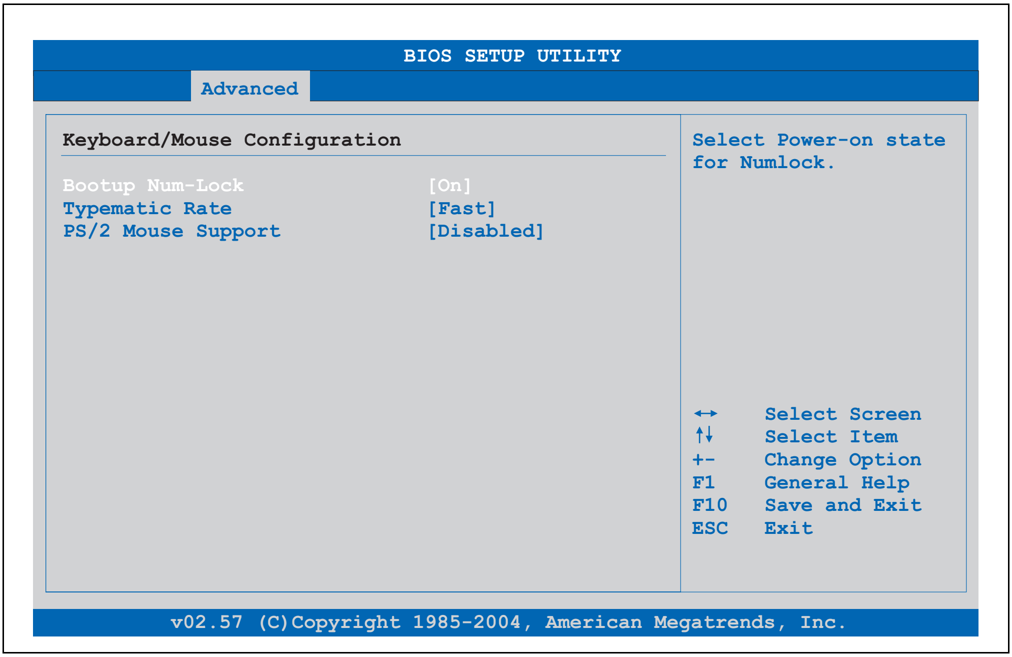

Figure 233: 855GME (XTX) USB mass storage device configuration

BIOS setting	Meaning	Setting options	Effect
Emulation type	With this option, the device to be plugged into the USB interface can be selected.	Auto	Automatic selection of the function.
		Floppy	Using a floppy disk drive.
		Forced FDD	A hard disk image is connected as a floppy image. Functions only in the FAT12, FAT16 or FAT32 formats.
		Hard Disk	Using a hard disk
		CDROM	Using a CD-ROM drive, it is assumed as 'bootable'.

Table 299: 855GME (XTX) USB mass storage device configuration

Keyboard/mouse configuration



BIOS SETUP UTILITY

Advanced

Keyboard/Mouse Configuration

Bootup Num-Lock [On]
Typematic Rate [Fast]
PS/2 Mouse Support [Disabled]

Select Power-on state for Numlock.

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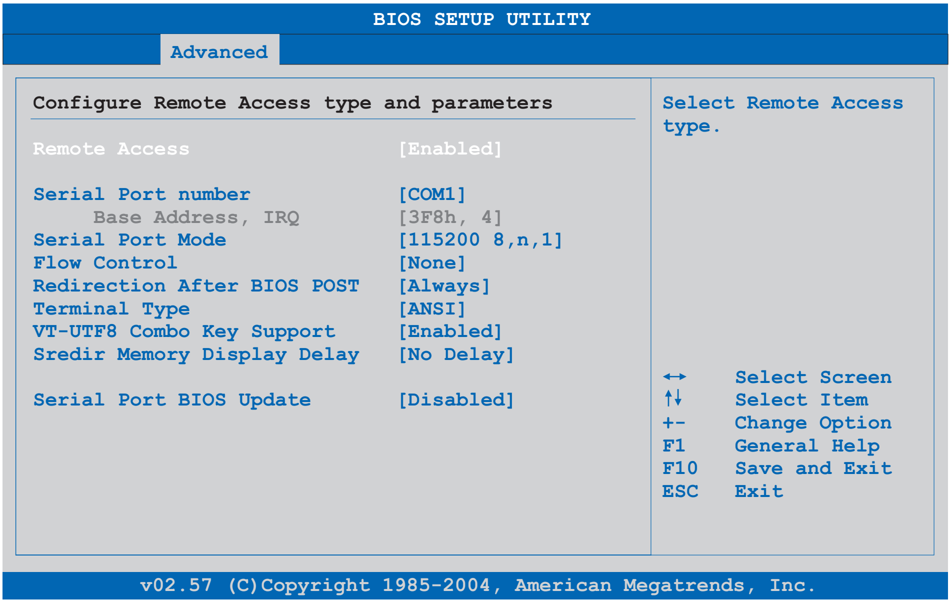
Figure 234: 855GME (XTX) - advanced keyboard/mouse configuration

BIOS setting	Meaning	Setting options	Effect
Boot-up Num-lock	With this field you can define the state of the NumLock key when booting.	Off	Only the cursor functions of the numerical keypad are enabled.
		On	Numeric keypad is enabled.
Typematic rate	The key repeat function is set here.	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 300: 855GME (XTX) - advanced keyboard/mouse configuration - setting options

Remote access configuration



```
                          BIOS SETUP UTILITY
           Advanced
 Configure Remote Access type and parameters    Select Remote Access
                                                type.
 Remote Access                  [Enabled]

 Serial Port number             [COM1]
      Base Address, IRQ         [3F8h, 4]
 Serial Port Mode               [115200 8,n,1]
 Flow Control                   [None]
 Redirection After BIOS POST    [Always]
 Terminal Type                  [ANSI]
 VT-UTF8 Combo Key Support      [Enabled]
 Sredir Memory Display Delay    [No Delay]
                                                ←→    Select Screen
 Serial Port BIOS Update        [Disabled]      ↑↓    Select Item
                                                +-    Change Option
                                                F1    General Help
                                                F10   Save and Exit
                                                ESC   Exit

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```

Figure 235: 855GME (XTX) - advanced remote access configuration

BIOS setting	Meaning	Setting options	Effect
Remote access	The remote access function can be enabled/disabled here.	Disabled	Disables this function.
		Enabled	Enables this function.
Serial port number	The serial interface can be set using this option, as long as disabled is not entered in the remote access field.	COM1	Activates the COM1 interface.
		COM2	Activates the COM2 interface.
Base address, IRQ	Serial connection display for the logical address and interrupt, as long as disabled is not entered in the remote access field.	None	-
Serial port mode	The serial interface transfer rate is defined here, as long as disabled is not entered in the remote access field.	115200 8,n,1 57600 8,n,1 38400 8,n,1 19200 8,n,1 09600 8,n,1	Value set manually.

Table 301: 855GME (XTX) - advanced remote access configuration - setting options

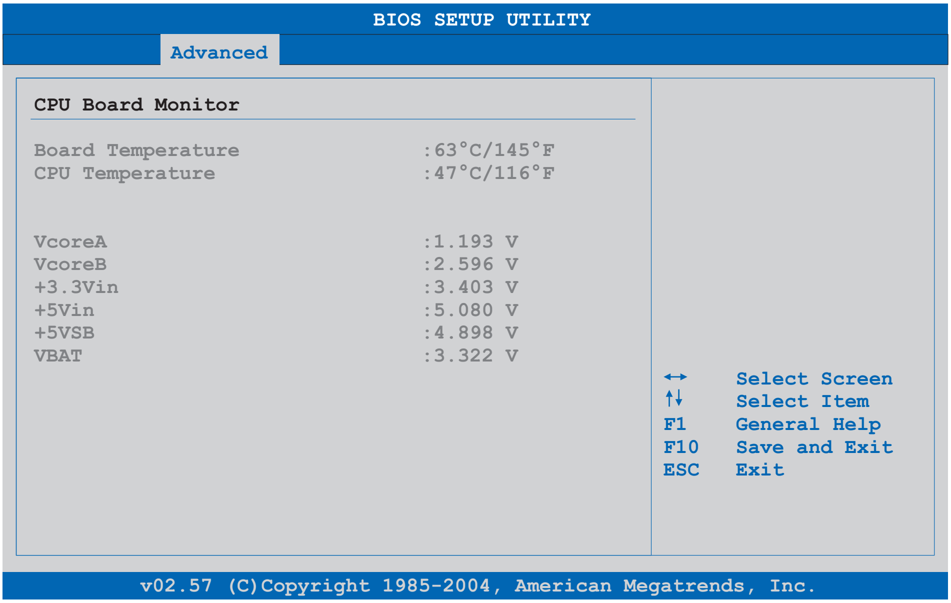
BIOS setting	Meaning	Setting options	Effect
Flow control	The interface configuration is carried out here, as long as disabled is not entered in the remote access field. This setting determines how the transfer is controlled via the interface. **Information:** **The setting must be the same on the terminal and the server.**	None	The interface is operated without transfer control.
		Hardware	The interface transfer control is carried out through hardware. This mode must be supported by a cable.
		Software	The interface transfer control is carried out through software.
Redirection after BIOS POST	The redirection after start up can be set here, as long as disabled is not entered in the remote access field.	Disabled	The redirection is switched off after start up.
		Boot loader	Redirection is enabled during system start up and charging.
		Always	Redirection is always enabled.
Terminal type	The type of connection can be chosen here, as long as disabled is not entered in the remote access field.	ANSI, VT100, VT-UTF8	Manual configuration of the connection type.
VT-UTF8 Combo Key Support	With this option, the VT-UTF8 Combo Key Support for the ANSI and VT100 connections can be enabled, as long as disabled is not entered in the remote access field.	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	Value set manually.
Serial port BIOS update	During system start up, the update is loaded via the serial interface in the processor. **Information:** **If this option is disabled, the boot time is reduced.**	Disabled	Disables this function.
		Enabled	Enables this function.

Table 301: 855GME (XTX) - advanced remote access configuration - setting options (Forts.)

CPU board monitor

Information:

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



```
                         BIOS SETUP UTILITY
              Advanced

CPU Board Monitor

Board Temperature                 :63°C/145°F
CPU Temperature                   :47°C/116°F


VcoreA                            :1.193 V
VcoreB                            :2.596 V
+3.3Vin                           :3.403 V
+5Vin                             :5.080 V
+5VSB                             :4.898 V
VBAT                              :3.322 V
                                                ↔     Select Screen
                                                ↑↓    Select Item
                                                F1    General Help
                                                F10   Save and Exit
                                                ESC   Exit

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```

Figure 236: 855GME (XTX) - advanced CPU board monitor

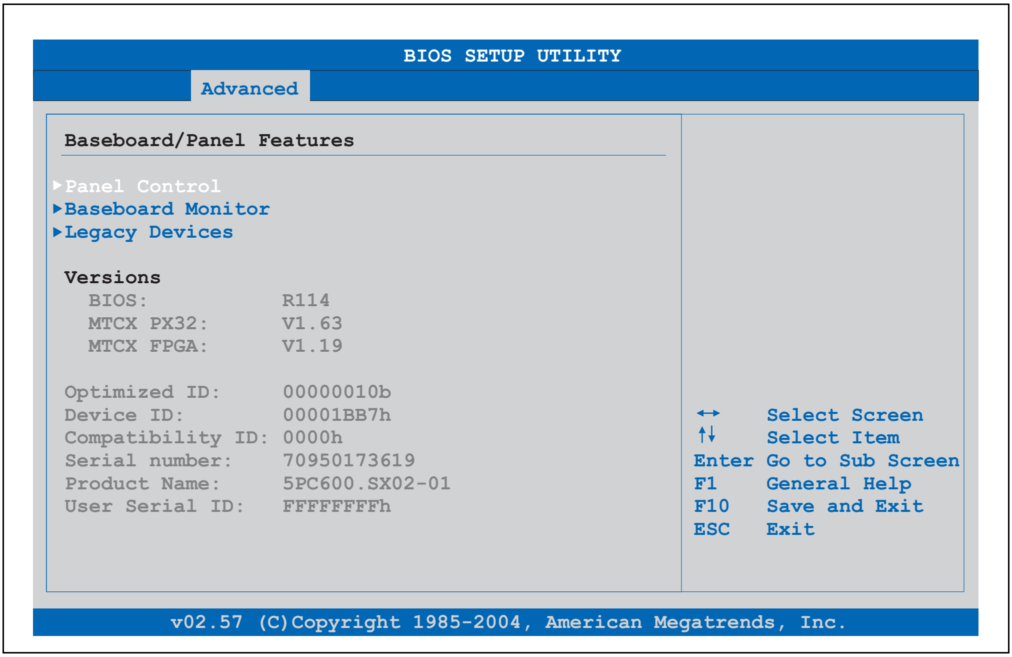
BIOS setting	Meaning	Setting options	Effect
Board temperature	Displays the selected panel's temperature (in degrees Celsius and Fahrenheit).	None	-
CPU temperature	Displays the processor's temperature (in degrees Celsius and Fahrenheit).	None	-
VcoreA	Displays the processor's core voltage A in volts.	None	-
VcoreB	Displays the DDR's core voltage B in volts.	None	-
+3.3Vin	Displays the current voltage of the 3.3 volt supply.	None	-

Table 302: 855GME (XTX) - advanced remote access configuration - setting options

BIOS setting	Meaning	Setting options	Effect
+5Vin	Displays the current voltage of the 5 volt supply.	None	-
+5VSB	Displays the current level of the jumper.	None	-
VBAT	Displays the battery voltage (in volts).	None	-

Table 302: 855GME (XTX) - advanced remote access configuration - setting options

Main Board/Panel Features



```
Versions
   BIOS:             R114
   MTCX PX32:        V1.63
   MTCX FPGA:        V1.19

Optimized ID:      00000010b
Device ID:         00001BB7h
Compatibility ID:  0000h
Serial number:     70950173619
Product Name:      5PC600.SX02-01
User Serial ID:    FFFFFFFFh
```

Figure 237: 855GME (XTX) Advanced Baseboard/Panel Features

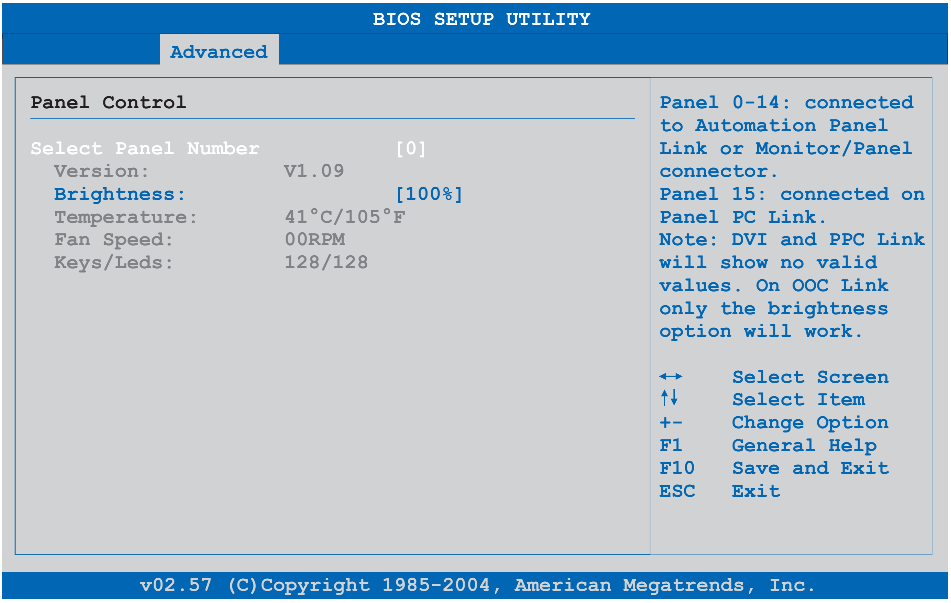
BIOS setting	Meaning	Setting options	Effect
Panel control	For special setup of connected panels (display units).	Enter	Opens the submenu See "Panel control", on page 494
Main board monitor	Display of various temperatures and fan speeds.	Enter	Opens the submenu See "Main board monitor", on page 495
Legacy devices	Special settings for the interface can be changed here.	Enter	Opens the submenu See "Legacy devices", on page 496
BIOS	Displays the BIOS version.	None	-
MTCX PX32	Displays the MTCX PX32 firmware version.	None	-
MTCX FPGA	Displays the MTCX FPGA firmware version.	None	-

Table 303: 855GME (XTX) Advanced Baseboard/Panel Features setting options

BIOS setting	Meaning	Setting options	Effect
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 code. 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 hex value can be freely assigned by the user (e.g. to give the device a unique ID) and can only be changed with using the "B&R Control Center" via the ADI driver.	None	-

Table 303: 855GME (XTX) Advanced Baseboard/Panel Features setting options (Forts.)

Panel control



```
                         BIOS SETUP UTILITY
              Advanced

 Panel Control                                   Panel 0-14: connected
                                                 to Automation Panel
 Select Panel Number            [0]              Link or Monitor/Panel
   Version:             V1.09                    connector.
   Brightness:                  [100%]           Panel 15: connected on
   Temperature:         41°C/105°F               Panel PC Link.
   Fan Speed:           00RPM                    Note: DVI and PPC Link
   Keys/Leds:           128/128                  will show no valid
                                                 values. On OOC Link
                                                 only the brightness
                                                 option will work.

                                                 ↔     Select Screen
                                                 ↑↓    Select Item
                                                 +-    Change Option
                                                 F1    General Help
                                                 F10   Save and Exit
                                                 ESC   Exit

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```
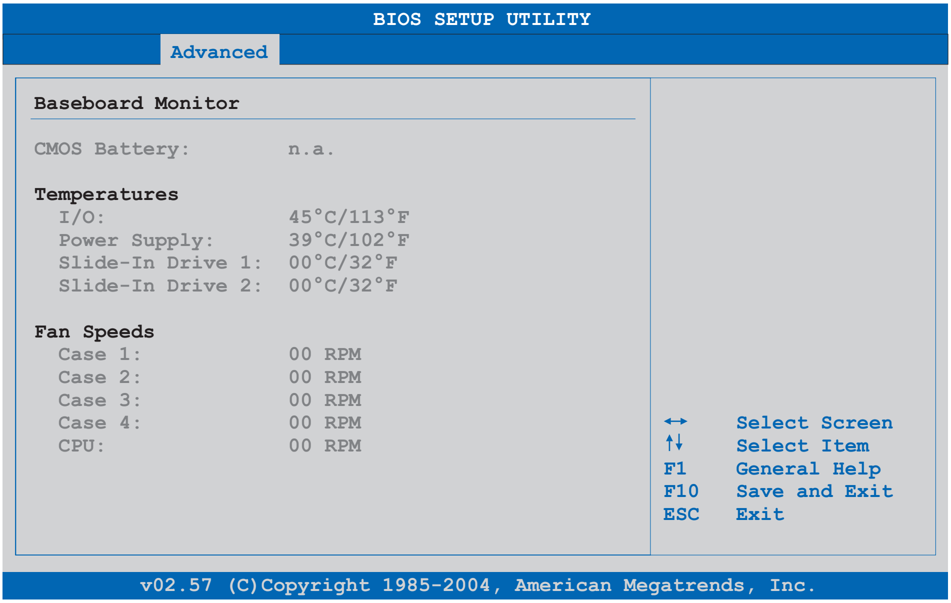

Figure 238: 855GME (XTX) Panel Control

BIOS setting	Meaning	Setting options	Effect
Select panel number	Selection of the panel number for which the values should be read out and/or changed.	0...15	Selection of panel 0 ... 15. Panel 15 is specifically intended for panel PC 700 systems.
Version	Displays the firmware version of the SDLR controller.	None	-
Brightness	For setting the brightness of the selected panel.	00%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%	For setting the brightness (in %) of the selected panel. Changes take effect after saving and restarting the system (e.g. by pressing <F10>).
Temperature	Displays the selected panel's temperature (in degrees Celsius and Fahrenheit).	None	-
Fan speed	Displays fan speed for the selected panel.	None	-
Keys/LEDs	Displays the available keys and LEDs on the selected panel.	None	-

Table 304: 855GME (XTX) Panel Control setting options

Main board monitor



```
BIOS SETUP UTILITY
Advanced

Baseboard Monitor

CMOS Battery:           n.a.

Temperatures
  I/O:                  45°C/113°F
  Power Supply:         39°C/102°F
  Slide-In Drive 1:     00°C/32°F
  Slide-In Drive 2:     00°C/32°F

Fan Speeds
  Case 1:               00 RPM
  Case 2:               00 RPM
  Case 3:               00 RPM
  Case 4:               00 RPM
  CPU:                  00 RPM

                                         ↔     Select Screen
                                         ↑↓    Select Item
                                         F1    General Help
                                         F10   Save and Exit
                                         ESC   Exit

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```

Figure 239: 855GME (XTX) - baseboard monitor

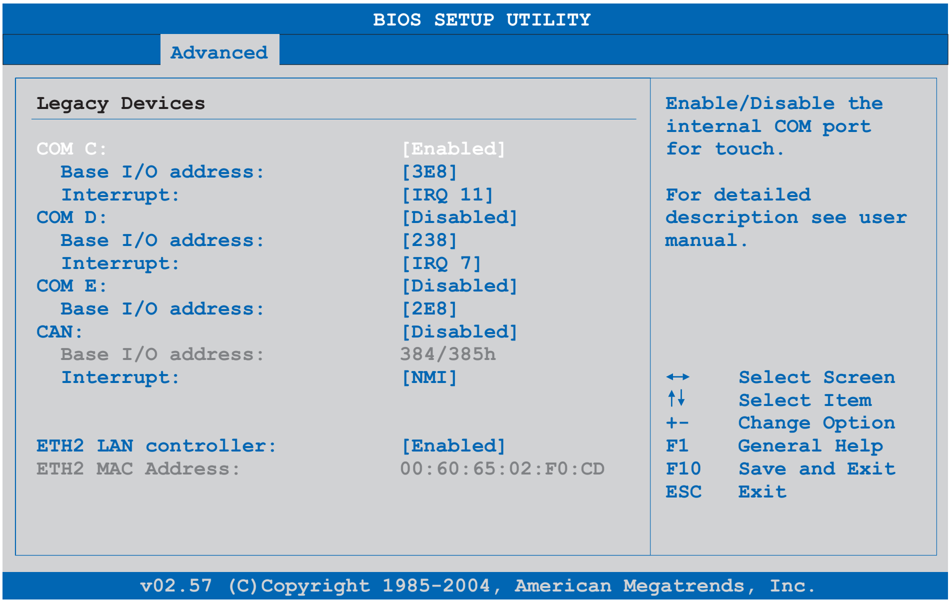
BIOS setting	Meaning	Setting options	Effect
CMOS battery	Displays the battery status. **n.a.** - not available, either MTCX does not support the firmware (starting with these versions "Main Board/Panel Features", on page 492) or the hardware is too old. **Good** - Battery is OK **Bad** - Battery is damaged.	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 area in degrees Celsius and Fahrenheit.	None	-
Slide-in drive 1	Displays the temperature of the slide-in drive 1 in degrees Celsius and Fahrenheit.	None	-
Slide-in drive 2	Displays the temperature of the slide-in drive 2 in degrees Celsius and Fahrenheit.	None	-
Case 1	Displays the fan speed of housing fan 1.	None	-
Case 2	Displays the fan speed of housing fan 2.	None	-
Case 3	Displays the fan speed of housing fan 3.	None	-
Case 4	Displays the fan speed of housing fan 4.	None	-

Table 305: 855GME (XTX) - baseboard monitor setting options

BIOS setting	Meaning	Setting options	Effect
CPU	Displays the fan speed of the processor fan.	None	-

Table 305: 855GME (XTX) - baseboard monitor setting options

Legacy devices



```
                          BIOS SETUP UTILITY
             Advanced
  Legacy Devices                                    Enable/Disable the
                                                    internal COM port
  COM C:                        [Enabled]           for touch.
    Base I/O address:           [3E8]
    Interrupt:                  [IRQ 11]            For detailed
  COM D:                        [Disabled]          description see user
    Base I/O address:           [238]               manual.
    Interrupt:                  [IRQ 7]
  COM E:                        [Disabled]
    Base I/O address:           [2E8]
  CAN:                          [Disabled]
    Base I/O address:           384/385h
    Interrupt:                  [NMI]               ←→     Select Screen
                                                    ↑↓     Select Item
                                                    +-     Change Option
  ETH2 LAN controller:          [Enabled]           F1     General Help
  ETH2 MAC Address:             00:60:65:02:F0:CD   F10    Save and Exit
                                                    ESC    Exit

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```

Figure 240: 855GME (XTX) - Legacy devices

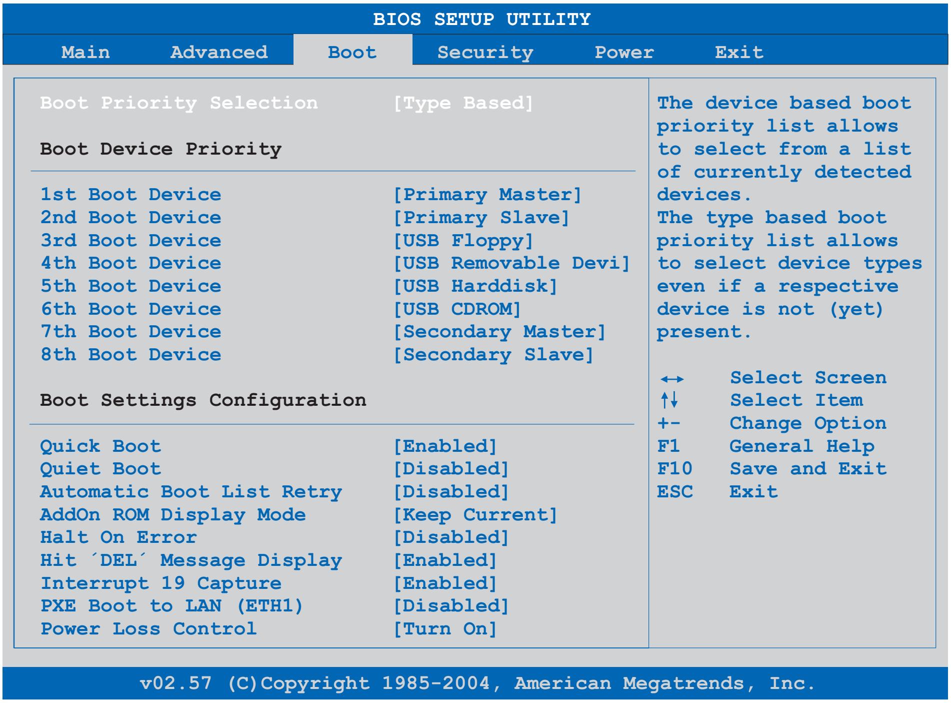
BIOS setting	Meaning	Setting options	Effect
COM C	Settings for the internal serial interfaces in the system. This setting activates the touch screen in panel PC 700 systems, and, using SDL transfer technology, also in Automation Panel 900 display units.	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the COM C port. A yellow star indicates a conflict with another device.	328, 338, 3E8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM C port. A yellow star indicates a conflict with another device.	IRQ 5, IRQ 6, IRQ 11, IRQ 12	Selected interrupt is assigned.

Table 306: 855GME (XTX) Legacy Devices setting options

BIOS setting	Meaning	Setting options	Effect
COM D	Setting for the COM D port for the serial interface of an Automation Panel Link slot. The interface is used to operate the touch screen on connected Automation Panel 900 units.	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the COM D port. A yellow star indicates a conflict with another device.	238, 328, 338	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM D port. A yellow star indicates a conflict with another device.	IRQ 5, IRQ 6, IRQ 7, IRQ 12	Selected interrupt is assigned.
COM E	Configuration of the optional COM E port on a B&R add-on interface (IF option).	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the COM E port. A yellow star indicates a conflict with another device.	2E8, 328, 338	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM E port. A yellow star indicates a conflict with another device.	IRQ 5, IRQ 6, IRQ 10, IRQ 12	Selected interrupt is assigned.
CAN	Configuration of the CAN port of a B&R add-on CAN interface card (IF option).	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the CAN port.	None	-
Interrupt	Selection of the interrupt for the CAN port. A yellow star indicates a conflict with another device.	IRQ 10 and NMI	Selected interrupt is assigned.
ETH2 LAN controller	For turning the onboard LAN controller (ETH2) on and off.	Disabled	Disables the controller.
		Enabled	Enables the controller.
ETH2 MAC Address	Displays the Ethernet 2 controller MAC address.	None	-

Table 306: 855GME (XTX) Legacy Devices setting options (Forts.)

1.3.6 Boot



```
                         BIOS SETUP UTILITY
    Main     Advanced     Boot     Security     Power     Exit

  Boot Priority Selection      [Type Based]          The device based boot
                                                     priority list allows
  Boot Device Priority                               to select from a list
                                                     of currently detected
  1st Boot Device              [Primary Master]      devices.
  2nd Boot Device              [Primary Slave]       The type based boot
  3rd Boot Device              [USB Floppy]          priority list allows
  4th Boot Device              [USB Removable Devi]  to select device types
  5th Boot Device              [USB Harddisk]        even if a respective
  6th Boot Device              [USB CDROM]           device is not (yet)
  7th Boot Device              [Secondary Master]    present.
  8th Boot Device              [Secondary Slave]
                                                     ↔      Select Screen
  Boot Settings Configuration                        ↑↓     Select Item
                                                     +-     Change Option
  Quick Boot                   [Enabled]             F1     General Help
  Quiet Boot                   [Disabled]            F10    Save and Exit
  Automatic Boot List Retry    [Disabled]            ESC    Exit
  AddOn ROM Display Mode       [Keep Current]
  Halt On Error                [Disabled]
  Hit ´DEL´ Message Display    [Enabled]
  Interrupt 19 Capture         [Enabled]
  PXE Boot to LAN (ETH1)       [Disabled]
  Power Loss Control           [Turn On]

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```

Figure 241: 855GME (XTX) Boot menu

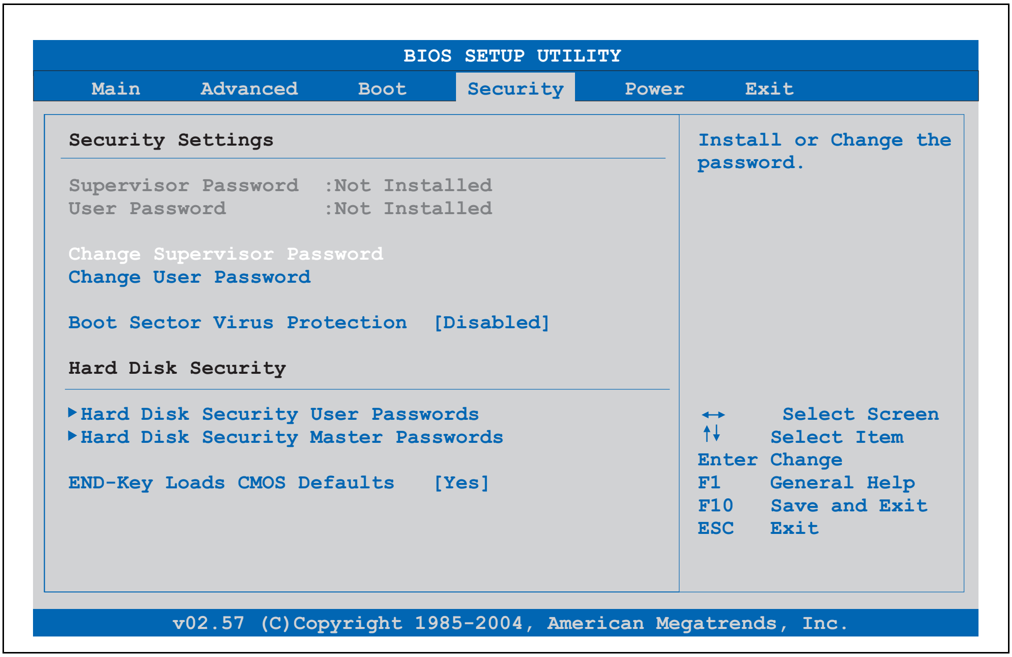
BIOS setting	Meaning	Setting options	Effect
Boot Priority Selection	The priority for when the drives should be booted can be set here.	Device Based	Selection from a list of determined equipment.
		Type Based	Allows the selection of unavailable equipment.
1st Boot Device	The boot drives can be set using this option.	Disabled, primary master, primary slave, secondary master, secondary slave, Legacy floppy, USB floppy, USB harddisk, USB CDROM, USB removable device, onboard LAN (ETH1), external LAN, PCI mass storage PCI SCSI Card, Any PCI BEV Device, Onboard PCI SATA, Third Master Third Slave	Selecting the desired function.
2nd Boot Device			
3rd 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 lines.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 307: 855GME (XTX) Boot menu setting options

BIOS setting	Meaning	Setting options	Effect
Quiet Boot	Determines if POST message or OEM logo is displayed.	Disabled	POST message display.
		Enabled	OEM logo display instead of POST message.
Automatic Boot List Retry	With this option, the operating system automatically restarts following startup failure.	Disabled	Disables this function.
		Enabled	Enables this function.
Add-On ROM Display Mode	Sets the display mode for the ROM (during the booting procedure).	Force BIOS	An additional BIOS part can be displayed.
		Keep Current	BIOS information is displayed.
Halt On Error	This option sets whether the system should pause the Power On Self Test (POST) when it encounters an error.	Disabled	The system does not pause. All errors are ignored.
		Enabled	The system pauses. The system pauses every time an error is encountered.
Hit 'DEL' Message Display	Settings can be made here for the "Hit 'DEL' Message" display. **Information:** **When quiet boot is activated the message is not displayed.**	Disabled	The message is not displayed.
		Enabled	The message is displayed.
Interrupt 19 Capture	This function can be used to incorporate the BIOS interrupt.	Disabled	Disables this function.
		Enabled	Enables this function.
PXE boot to LAN (ETH1)	Activating/Deactivating the function to boot from LAN.	Disabled	Disables this function.
		Enabled	Enables this function.
Power Loss Control	Determines if the system is on/off following power loss.	Remain Off	Remains off.
		Turn On	Powers on.
		Last State	Enables the previous state.

Table 307: 855GME (XTX) Boot menu setting options (Forts.)

1.3.7 Security



```
                         BIOS SETUP UTILITY
   Main     Advanced     Boot     Security     Power     Exit

 Security Settings                              Install or Change the
                                                password.
 Supervisor Password   :Not Installed
 User Password         :Not Installed

 Change Supervisor Password
 Change User Password

 Boot Sector Virus Protection  [Disabled]

 Hard Disk Security

▶Hard Disk Security User Passwords              ↔      Select Screen
▶Hard Disk Security Master Passwords            ↑↓    Select Item
                                                Enter Change
 END-Key Loads CMOS Defaults   [Yes]            F1    General Help
                                                F10   Save and Exit
                                                ESC   Exit

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```

Figure 242: 855GME (XTX) Security menu

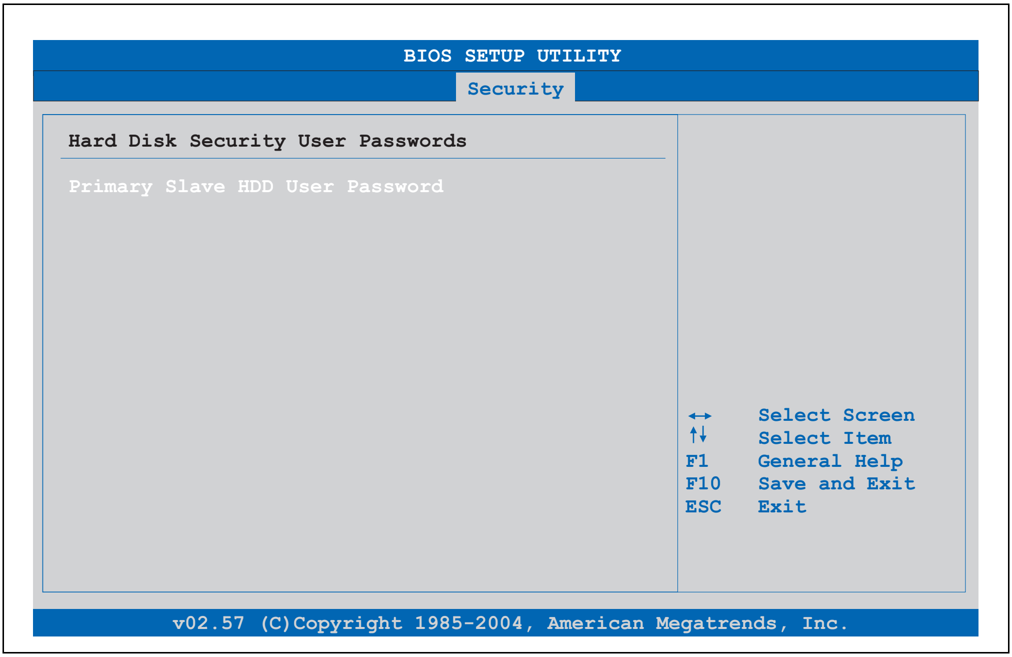
BIOS setting	Meaning	Setting options	Effect
Supervisor Password	Displays whether or not a supervisor password has been set.	None	-
User Password	Displays whether or not a user password has been set.	None	-
Change Supervisor Password	To enter/change a supervisor password. A supervisor password is necessary to edit all BIOS settings.	Enter	Enter password.
Change User Password	To enter/change a user password. A user password allows the user to edit only certain BIOS settings.	Enter	Enter password.
Boot Sector Virus Protection	With this option, a warning is issued when the boot sector is accessed through a program or virus. **Information:** **With this option, only the boot sector is protected, not the entire hard drive.**	Disabled	Disables this function.
		Enabled	Enables this function.
Hard disk security user password	The hard disk security user password can be created here.	Enter	Opens the submenu See "Hard disk security user password", on page 501

Table 308: 855GME (XTX) Security menu setting options

BIOS setting	Meaning	Setting options	Effect
Hard disk security master password	The hard disk security master password can be created here.	Enter	Opens the submenu See "Hard disk security master password", on page 502
END-key loads CMOS defaults	Using this function, CMOS can be loaded by pressing the END key during POST.	Yes	Enables this function.
		No	Disables this function.

Table 308: 855GME (XTX) Security menu setting options (Forts.)

Hard disk security user password



BIOS SETUP UTILITY

Hard Disk Security User Passwords

Primary Slave HDD User Password

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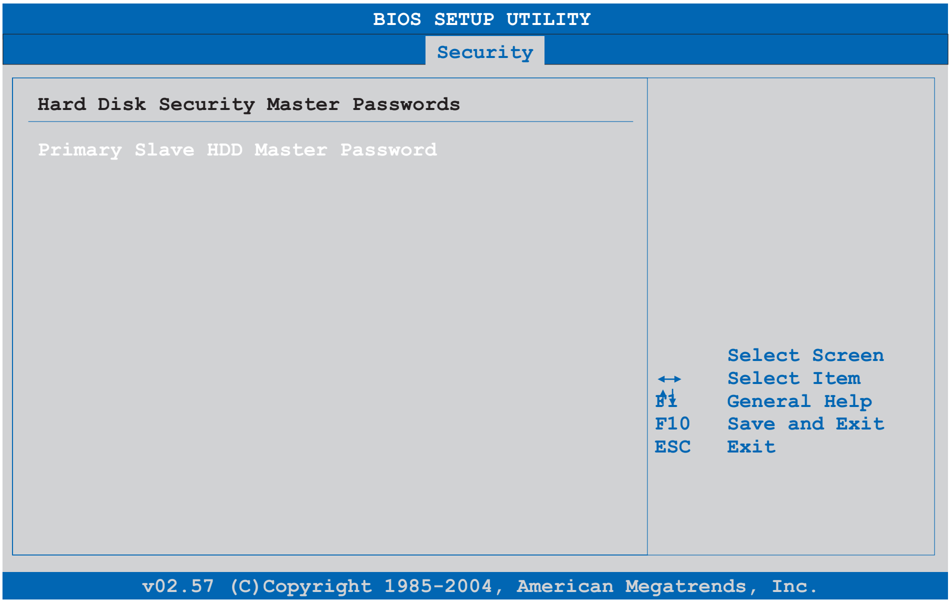
Figure 243: 855GME (XTX) Hard disk security user password

BIOS setting	Meaning	Setting options	Effect
Primary slave HDD user password	This function makes it possible to use the user password to change or configure each hard drive without having to reboot the device. A user password allows the user to edit only certain BIOS settings.	Enter	Enter password.

Table 309: 855GME (XTX) Hard disk security user password

Hard disk security master password



Hard Disk Security Master Passwords

Primary Slave HDD Master Password

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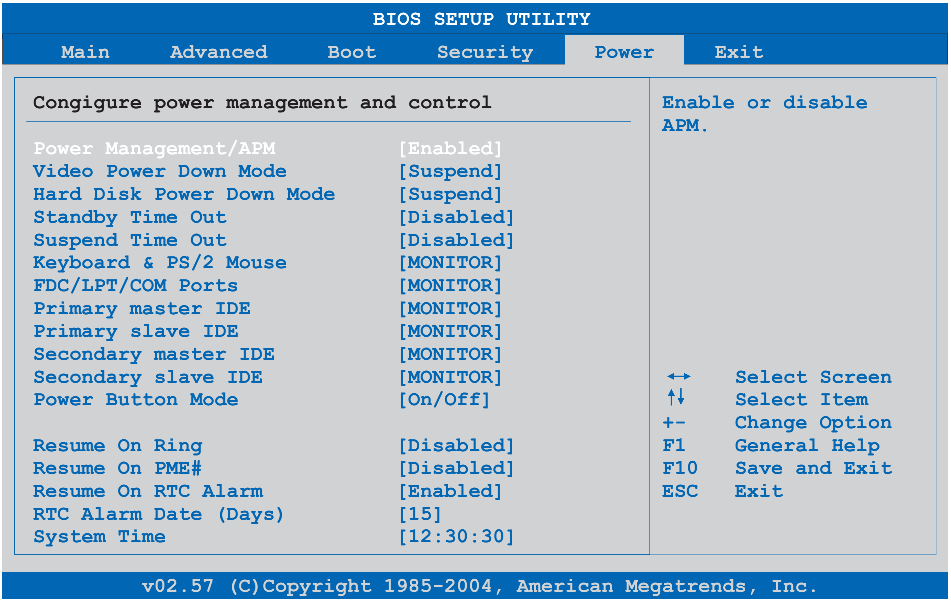
Figure 244: 855GME (XTX) Hard disk security master password

BIOS setting	Meaning	Setting options	Effect
Primary Slave HDD Master Password	This function makes it possible to use the user password to change or configure each hard drive without having to reboot the device.	Enter	Enter password.

Table 310: 855GME (XTX) Hard disk security master password

1.3.8 Power



```
                              BIOS SETUP UTILITY
   Main    Advanced    Boot    Security    Power    Exit

 Congigure power management and control          Enable or disable
                                                  APM.
 Power Management/APM           [Enabled]
 Video Power Down Mode          [Suspend]
 Hard Disk Power Down Mode      [Suspend]
 Standby Time Out               [Disabled]
 Suspend Time Out               [Disabled]
 Keyboard & PS/2 Mouse          [MONITOR]
 FDC/LPT/COM Ports              [MONITOR]
 Primary master IDE             [MONITOR]
 Primary slave IDE              [MONITOR]
 Secondary master IDE           [MONITOR]
 Secondary slave IDE            [MONITOR]        ↔     Select Screen
 Power Button Mode              [On/Off]         ↑↓    Select Item
                                                 +-    Change Option
 Resume On Ring                 [Disabled]       F1    General Help
 Resume On PME#                 [Disabled]       F10   Save and Exit
 Resume On RTC Alarm            [Enabled]        ESC   Exit
 RTC Alarm Date (Days)          [15]
 System Time                    [12:30:30]

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```

Figure 245: 855GME (XTX) Power menu

BIOS setting	Meaning	Setting options	Effect
Power Management/APM	This option switches the APM function on or off. This is an advanced plug & play and power management functionality.	Disabled	Disables this function.
		Enabled	Enables this function.
Video Power Down Mode	This option allows you to set the energy saving mode for the monitor.	Disabled	Do not switch off the monitor.
		Standby	Monitor goes to standby mode.
		Suspend	Monitor goes to suspend mode.
Hard Disk Power Down Mode	This option allows you 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.
Standby time out	Using this option, you can configure how long the system stays inactive until standby mode is executed.	Disabled	Disables this function.
		1 min, 2 min, 4 min, 8 min, 10 min, 20 min 30 min, 40 min;	Value set manually.

Table 311: 855GME (XTX) Power menu setting options

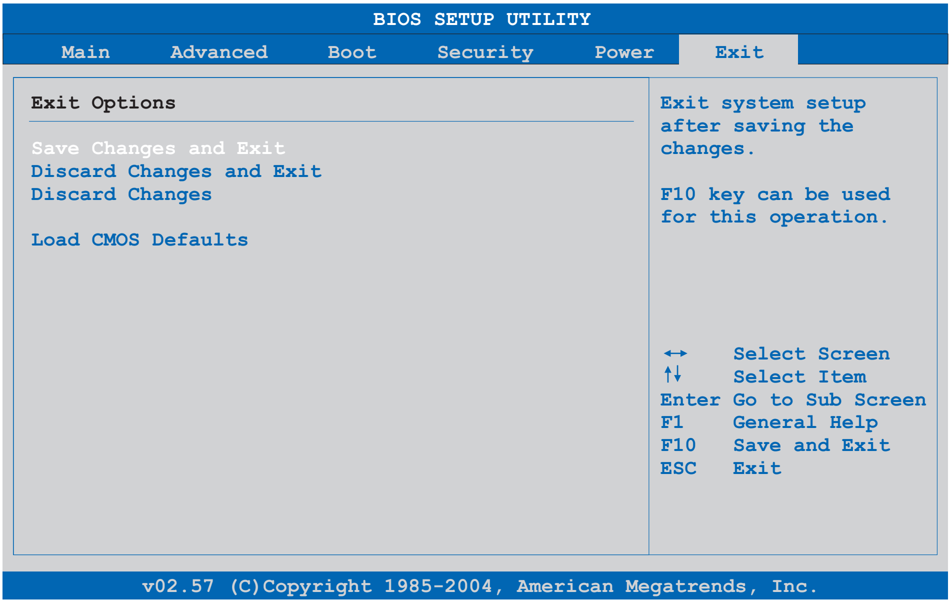
BIOS setting	Meaning	Setting options	Effect
Suspend Time Out	Using this option, you can configure how long the system stays inactive (all components but the CPU are shut off, if possible) before entering suspend mode.	Disabled	Disables this function.
		1 min, 2 min, 4 min, 8 min, 10 min, 20 min 30 min, 40 min, 50 min, 60 min;	Value set manually.
Keyboard & PS/2 Mouse	The monitoring of activities during power saving mode is determined here.	MONITOR	Keyboard or PS/2 mouse activities return the system to its normal state from a particular energy saving mode.
		IGNORE	Activities are ignored.
FDC/LPT/COM ports	The monitoring of activities during power saving mode is determined here.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Primary master IDE	This option is used to determine whether or not BIOS monitors the activities of these components.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Primary slave IDE	This option is used to determine whether or not BIOS monitors the activities of these components.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Secondary master IDE	This option is used to determine whether or not BIOS monitors the activities of these components.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Secondary slave IDE	This option is used to determine whether or not BIOS monitors the activities of these components.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Power Button Mode	This function determines the function of the power button.	On/Off	Power button switches on/off.
		Suspend	Power button switches power saving mode on.
Resume On Ring	When the modem receives an incoming call, the PC is brought out of power saving mode.	Disabled	Disables this function.
		Enabled	Enables this function.
Resume on PME#	With this option, you can switch the PME wakeup function on or off.	Disabled	Disables this function.
		Enabled	Enables this function.
Resume On RTC Alarm	With this option, you can activate the alarm and enter the date and time for the system start.	Disabled	Disables this function.
		Enabled	Enables this function.
RTC alarm date (days)	Setting the date for the system start. **Information:** **Setting with "+"/"-".**	Every day	System starts daily.
		01-31	System start takes place on the manually set date.

Table 311: 855GME (XTX) Power menu setting options (Forts.)

BIOS setting	Meaning	Setting options	Effect
System Time	Setting the time for the system start.	Changing the time	Individually setting the system time in (hh:mm:ss) format. (hh:mm:ss).

Table 311: 855GME (XTX) Power menu setting options (Forts.)

1.3.9 Exit


```
                         BIOS SETUP UTILITY
   Main    Advanced    Boot    Security    Power    Exit

 Exit Options                                   Exit system setup
                                                after saving the
 Save Changes and Exit                          changes.
 Discard Changes and Exit
 Discard Changes                                F10 key can be used
                                                for this operation.
 Load CMOS Defaults




                                                ←→     Select Screen
                                                ↑↓     Select Item
                                                Enter  Go to Sub Screen
                                                F1     General Help
                                                F10    Save and Exit
                                                ESC    Exit

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```

Figure 246: 855GME (XTX) - Exit menu

BIOS setting	Meaning	Setting options	Effect
Save Changes and Exit	BIOS setup is closed with this item. Changes made are saved in CMOS after confirmation, and the system is rebooted.	OK / Cancel	
Discard Changes and Exit	With this item you can close BIOS setup without saving the changes made. The system is then rebooted.	OK / Cancel	
Discard Changes	In the event that settings were made which the user can no longer remember, changes can be reset as long as they haven't been saved.	OK / Cancel	

Table 312: 855GME - (XTX) Exit menu - Setting options

BIOS setting	Meaning	Setting options	Effect
Load CMOS Defaults	This item loads the CMOS default values, which are defined by the DIP switch settings. These settings are loaded for all BIOS configurations.	OK / Cancel	

Table 312: 855GME - (XTX) Exit menu - Setting options (Forts.)

1.3.10 Profile overview - BIOS default settings - 855GME (XTX)

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

DIP switch position see Section 1.6 "Location of the DIP switch in APC620 system units", on page 526).

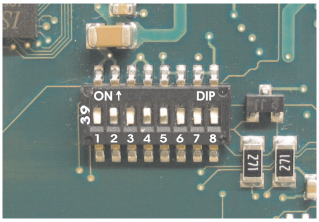


Figure 247: DIP switch on system unit

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

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	-	-
Profile 1	Reserved	On	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	-	-
Profile 3	Panel PC 700 system unit 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	-	-
Profile 4	Panel PC 700 system unit 5PC720.1043-01, 5PC720.1214-01, 5PC720.1505-01 and 5PC720.1505-02.	Off	Off	On	Off	Off	Off	-	-
Profile 5	Automation PC 620 embedded system units 5PC600.SE00-00 und 5PC600.SE00-01	On	Off	On	Off	Off	Off	-	-

Table 313: 855GME (XTX) Profile overview

[1] Reserved.

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

Personal settings

If changes have been made to the BIOS defaults, they can be entered in the following tables for backup.

Main

Main	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
System Time	-	-	-	-	-	-	
System Date	-	-	-	-	-	-	
BIOS ID	-	-	-	-	-	-	
Processor	-	-	-	-	-	-	
CPU Frequency	-	-	-	-	-	-	
System Memory	-	-	-	-	-	-	
Product Revision	-	-	-	-	-	-	
Serial Number	-	-	-	-	-	-	
BC Firmware Rev.	-	-	-	-	-	-	
Mac address (ETH1)	-	-	-	-	-	-	
Boot Counter	-	-	-	-	-	-	
Running times	-	-	-	-	-	-	

Table 314: 855GME (XTX) Main profile settings overview

Advanced

ACPI settings

ACPI settings	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
ACPI Aware O/S	Yes	Yes	Yes	Yes	Yes	Yes	
ACPI 2.0 features	No	No	No	No	No	No	
ACPI APIC support	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Active Cooling Trip Point	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Passive Cooling Trip Point	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Critical Trip Point	105	105	105	105	105	105	
Watching ACPI	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	
GPE1 function	No function	No function	No function	No function	No function	No function	
GPE2 function	No function	No function	No function	No function	No function	No function	

Table 315: 855GME (XTX) - advanced profile setting options

PCI Configuration

PCI Configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Plug & Play O/S	Yes	**No**	Yes	Yes	Yes	Yes	
PCI latency timer	64	64	64	64	64	64	
Allocate IRQ to PCI VGA	Yes	Yes	Yes	Yes	Yes	Yes	
Allocate IRQ to SM-BUS HC	Yes	Yes	Yes	Yes	Yes	**No**	
PIRQ A (UHCI1+VGA)	Auto	Auto	Auto	Auto	Auto	Auto	
PIRQ B (INTD+AC97+SMBus)	Auto	Auto	Auto	Auto	Auto	**7**	
PIRQ C (INTC+UHCI3+NATA)	Auto	Auto	Auto	Auto	Auto	Auto	
PIRQ D (UHCI2)	Auto	Auto	Auto	Auto	Auto	Auto	
PIRQ E (Onboard ETH1 LAN)	Auto	Auto	Auto	Auto	Auto	Auto	
PIRQ F (INTA+ETH2 LAN)	Auto	Auto	Auto	Auto	Auto	**5**	
PIRQ G (INTB)	Auto	Auto	Auto	Auto	Auto	**6**	
PIRQ H (EHCI)	Auto	Auto	Auto	Auto	Auto	Auto	
1st Exclusive PCI IRQ	-	-	-	-	-	**5**	
2nd Exclusive PCI IRQ	-	-	-	-	-	**6**	
3rd exclusive PCI IRQ	-	-	-	-	-	**7**	

Table 316: 855GME - (XTX) PCI configuration - profile setting overview

Graphics configuration

Graphics configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Graphics engine 1	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Default flat panel	Auto-EDID	Auto-EDID	Auto-EDID	Auto-EDID	Auto-EDID	Auto-EDID	
Graphics driver EDID support	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Flat panel scaling	Stretched	Stretched	Stretched	Stretched	Stretched	Stretched	
Graphics engine 2	Enabled	Enabled	Enabled	Enabled	Enabled	**Disabled**	
Graphics engine	Graphics engine 1	Graphics engine 1	Graphics engine 1	Graphics engine 1	Graphics engine 1	Graphics engine 1	
Boot graphics device	Auto	Auto	Auto	Auto	Auto	Auto	
Graphics memory size	Enabled, 8MB	Enabled, 8MB	Enabled, 8MB	Enabled, 8MB	Enabled, 8MB	Enabled, 8MB	
Init. Graphic adapter priority	PCI/Int-VGA	PCI/Int-VGA	PCI/Int-VGA	PCI/Int-VGA	PCI/Int-VGA	PCI/Int-VGA	
Graphics aperture size	64MB	64MB	64MB	64MB	64MB	64MB	
DVI HotPlug persistence	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	

Table 317: 855GME - (XTX) Graphics configuration - profile setting overview

CPU configuration

CPU configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Manufacture:	-	-	-	-	-	-	
Brand string	-	-	-	-	-	-	
Frequency	-	-	-	-	-	-	
FSB speed	-	-	-	-	-	-	
L1 cache	-	-	-	-	-	-	
L2 cache	-	-	-	-	-	-	
Intel (R) SpeedStep (tm) tech	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	
Max. CPU frequency	-	-	-	-	-	-	

Table 318: 855GME - (XTX) CPU configuration - profile setting overview

Chipset configuration

Chipset configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
IOAPIC	Disabled	**Enabled**	Disabled	Disabled	Disabled	Disabled	
APIC ACPI SCI IRQ	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 319: 855GME - (XTX) Chipset configuration - profile setting overview

I/O interface configuration

I/O interface configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
OnBoard AC97 audio	Enabled	Enabled	Enabled	Enabled	Enabled	**Disabled**	
Onboard LAN (ETH1)	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Serial port 1 configuration	3F8/IRQ4	3F8/IRQ4	3F8/IRQ4	3F8/IRQ4	3F8/IRQ4	3F8/IRQ4	
Serial port 2 configuration	2F8/IRQ3	2F8/IRQ3	2F8/IRQ3	2F8/IRQ3	2F8/IRQ3	2F8/IRQ3	
Serial port 2 mode	Normal	Normal	Normal	Normal	Normal	Normal	
Parallel port address	378	378	378	378	378	378	

Table 320: 855GME (XTX) - I/O interface configuration - profile settings overview

Clock Configuration

Clock Configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Spread spectrum	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Unused PCI slot clocks	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	

Table 321: 855GME - (XTX) Clock configuration - profile setting overview

IDE Configuration

IDE Configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
OnBoard PCI IDE controller	Primary	**Both**	**Both**	Primary	**Both**	Primary	
Onboard PCI IDE operate mode	Legacy mode	Legacy mode	Legacy mode	Legacy mode	Legacy mode	Legacy mode	
Hard disk write protect	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
IDE Detect Time Out (Sec)	35	35	35	35	35	35	
ATA(PI) 80 pin cable detection	Host & device	Host & device	Host & device	Host & device	Host & device	Host & device	
Primary IDE Master							
Type	Auto	Auto	Auto	Auto	Auto	Auto	
LBA/Large Mode	Auto	Auto	Auto	Auto	Auto	Auto	
Block (Multi-Sector Transfer)	Auto	Auto	Auto	Auto	Auto	Auto	
PIO Mode	Auto	Auto	Auto	Auto	Auto	Auto	
DMA Mode	Auto	Auto	Auto	Auto	Auto	Auto	
S.M.A.R.T.	Auto	Auto	Auto	Auto	Auto	Auto	
32Bit data transfer	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Primary IDE slave							
Type	Auto	Auto	Auto	Auto	Auto	Auto	
LBA/Large Mode	Auto	Auto	Auto	Auto	Auto	Auto	
Block (Multi-Sector Transfer)	Auto	Auto	Auto	Auto	Auto	Auto	
PIO Mode	Auto	Auto	Auto	Auto	Auto	Auto	
DMA Mode	Auto	Auto	Auto	Auto	Auto	Auto	
S.M.A.R.T.	Auto	Auto	Auto	Auto	Auto	Auto	
32Bit data transfer	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Secondary IDE Master							
Type	Auto	Auto	Auto	Auto	Auto	Auto	
LBA/Large Mode	Auto	Auto	Auto	Auto	Auto	Auto	
Block (Multi-Sector Transfer)	Auto	Auto	Auto	Auto	Auto	Auto	
PIO Mode	Auto	Auto	Auto	Auto	Auto	Auto	
DMA Mode	Auto	Auto	Auto	Auto	Auto	Auto	
S.M.A.R.T.	Auto	Auto	Auto	Auto	Auto	Auto	
32Bit data transfer	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Secondary IDE slave							
Type	Auto	Auto	Auto	Auto	Auto	Auto	
LBA/Large Mode	Auto	Auto	Auto	Auto	Auto	Auto	

Table 322: 855GME - (XTX) IDE configuration - profile setting overview

Secondary IDE slave	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Block (Multi-Sector Transfer)	Auto	Auto	Auto	Auto	Auto	Auto	
PIO Mode	Auto	Auto	Auto	Auto	Auto	Auto	
DMA Mode	Auto	Auto	Auto	Auto	Auto	Auto	
S.M.A.R.T.	Auto	Auto	Auto	Auto	Auto	Auto	
32Bit data transfer	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	

Table 322: 855GME - (XTX) IDE configuration - profile setting overview

USB configuration

USB configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
USB Function	4 USB Ports	4 USB Ports	4 USB Ports	4 USB Ports	4 USB Ports	**6 USB Ports**	
Legacy USB Support	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
USB Keyboard Legacy Support	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
USB Mouse Legacy Support	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
USB Storage Device Support	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Port 64/60 Emulation	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
USB 2.0 Controller	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
USB 2.0 Controller Mode	HiSpeed	HiSpeed	HiSpeed	HiSpeed	HiSpeed	HiSpeed	
BIOS EHCI Hand-Off	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
USB Beep Message	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
USB Stick Default Emulation	Hard Disk	Hard Disk	Hard Disk	Hard Disk	Hard Disk	Hard Disk	
USB Mass Storage Reset Delay	20 Sec	20 Sec	20 Sec	20 Sec	20 Sec	20 Sec	

Table 323: 855GME - (XTX) USB configuration - profile setting overview

Keyboard/mouse configuration

Keyboard/mouse configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Boot-up Num-lock	On	On	On	On	On	On	
Typematic rate	Fast	Fast	Fast	Fast	Fast	Fast	
PS/2 mouse support	Disabled	**Enabled**	Disabled	Disabled	Disabled	Disabled	

Table 324: 855GME (XTX) - keyboard/mouse configuration - profile setting overview

Remote access configuration

Remote access configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Remote access	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Serial port BIOS update	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 325: 855GME - (XTX) remote access configuration - profile setting overview

CPU board monitor

CPU board monitor	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Board temperature	-	-	-	-	-	-	
CPU temperature	-	-	-	-	-	-	
VcoreA	-	-	-	-	-	-	
VcoreB	-	-	-	-	-	-	
+3.3Vin	-	-	-	-	-	-	
+5Vin	-	-	-	-	-	-	
+5VSB	-	-	-	-	-	-	
VBAT	-	-	-	-	-	-	

Table 326: 855GME (XTX) - CPU board monitor - profile setting overview

Main Board/Panel Features

Main Board/Panel Features	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Panel control							
Select panel number	-	-	-	-	-	-	
Version	-	-	-	-	-	-	
Brightness	100	100	100	100	100	100	
Temperature		-	-	-	-	-	
Fan speed	-	-	-	-	-	-	
Keys/LEDs	-	-	-	-	-	-	
Main board monitor							
CMOS battery	-	-	-	-	-	-	
I/O	-	-	-	-	-	-	
Power supply	-	-	-	-	-	-	
Slide-in drive 1	-	-	-	-	-	-	
Slide-in drive 2	-	-	-	-	-	-	
Case 1	-	-	-	-	-	-	
Case 2	-	-	-	-	-	-	

Table 327: 855GME (XTX) - baseboard/panel features -profile setting overview

Main board monitor	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Case 3	-	-	-	-	-	-	
Case 4	-	-	-	-	-	-	
CPU	-	-	-	-	-	-	
Legacy devices							
COM C	Disabled	**Enabled**	Disabled	**Enabled**	**Enabled**	Disabled	
Base I/O address	-	**3E8h**	-	**3E8h**	**3E8h**	-	
Interrupt	-	**11**	-	**11**	**11**	-	
COM D	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address							
Interrupt							
COM E	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address							
Interrupt							
CAN	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address							
Interrupt							
ETH2 LAN controller	Enabled	Enabled	Enabled	Enabled	Enabled	**Disabled**	
ETH2 MAC Address	-	-	-	-	-	-	
Versions							
BIOS	-	-	-	-	-	-	
MTCX PX32	-	-	-	-	-	-	
MTCX FPGA	-	-	-	-	-	-	
Optimized ID	-	-	-	-	-	-	
Device ID	-	-	-	-	-	-	
Compatibility ID	-	-	-	-	-	-	
Serial number	-	-	-	-	-	-	
Product name	-	-	-	-	-	-	
User serial OD	-	-	-	-	-	-	

Table 327: 855GME (XTX) - baseboard/panel features -profile setting overview

Boot

Boot	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Boot Priority Selection	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	
2nd Boot Device	Primary slave	**Primary master**	Primary slave	Primary slave	Primary slave	Primary slave	
3rd Boot Device	USB floppy	**Primary slave**	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	
5th Boot Device	USB hard disk	**USB removable device**	USB hard disk	USB hard disk	USB hard disk	USB hard disk	
6th Boot Device	USB CDROM	**USB CDROM**	USB CDROM	USB CDROM	USB CDROM	USB CDROM	
7th Boot Device	Disabled	**Secondary master**	**Secondary master**	Disabled	**Secondary master**	Disabled	
8th Boot Device	Disabled	Disabled	**Secondary slave**	Disabled	**Secondary slave**	Disabled	
Quick Boot	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Quiet Boot	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Automatic Boot List Retry	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Add-On ROM Display Mode	Keep Current	Keep Current	Keep Current	Keep Current	Keep Current	Keep Current	
Halt On Error	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Hit 'DEL' Message Display	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Interrupt 19 Capture	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
PXE boot to LAN (ETH1)	Disabled	**Enabled**	Disabled	Disabled	Disabled	Disabled	
Power Loss Control	Turn On	Turn On	Turn On	Turn On	Turn On	Turn On	

Table 328: 855GME (XTX) - boot - profile setting overview

Security

Security	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Supervisor Password	-	-	-	-	-	-	
User Password	-	-	-	-	-	-	
Change Supervisor Password	-	-	-	-	-	-	
Change User Password	-	-	-	-	-	-	
Boot Sector Virus Protection	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Hard disk security user password	-	-	-	-	-	-	
Hard disk security master password	-	-	-	-	-	-	

Table 329: 855GME (XTX) - security - profile setting options

END-key loads CMOS default	Yes	Yes	Yes	Yes	Yes	Yes	

Table 329: 855GME (XTX) - security - profile setting options

Power

Power	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Power Management/APM	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Video Power Down Mode	Suspend	Suspend	Suspend	Suspend	Suspend	Suspend	
Hard Disk Power Down Mode	Suspend	Suspend	Suspend	Suspend	Suspend	Suspend	
Standby time out	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Suspend Time Out	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Keyboard & PS/2 Mouse	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	
FDC/LPT/COM ports	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	
Primary master IDE	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	
Primary slave IDE	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	
Secondary master IDE	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	
Secondary slave IDE	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	
Power Button Mode	On/Off	On/Off	On/Off	On/Off	On/Off	On/Off	
Resume On Ring	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Resume on PME#	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Resume On RTC Alarm	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 330: 855GME (XTX) - power - profile setting overview

1.4 BIOS Error signals (beep codes)

While the Automation PC 620 is booting, the following messages and errors can occur with BIOS. These errors are signaled by different beeping codes.

1.4.1 BIOS 815E (ETX) and 855GME (ETX)

Beeping code	Meaning	Necessary user action
1	Everything OK	-
1-2	1x long 2x short - checksum error in the ROM	BIOS updates
1-2-2-3	BIOS checksum error	BIOS updates.
1-3-1-1	Test DRAM refresh, DRAM module is not set properly.	Send industrial PC to B&R for checking.
1-3-1-3	Test 8742 keyboard controller, self test of the keyboard controller failed.	Send industrial PC to B&R for checking.
1-3-4-1	RAM error at address xxxx	Send industrial PC to B&R for checking.
1-3-4-3	RAM error at data bit xxxx, at the lowest bit of the memory bus	Send industrial PC to B&R for checking.
1-4-1-1	RAM error at data bit xxxx, at the highest bit of the memory bus	Send industrial PC to B&R for checking.
2-1-2-3	ROM copyright has an error	Send industrial PC to B&R for checking.
2-2-3-1	Unexpected interrupt	Check interrupt settings in BIOS.

Table 331: BIOS post code messages BIOS 815E (ETX) and 855GME (ETX)

1.4.2 BIOS 855GME (XTX)

Beeping code	Meaning	Necessary user action
1 x short	Memory refresh failed.	Load BIOS defaults. In the event that the error persists, send industrial PC to B&R for testing.
2 x short	Parity error: POST error (error in one of the hardware testing procedures)	Check the placement of the inserted card. In the event that the error persists, send industrial PC to B&R for testing.
3 x short	Base 64 KB memory failure: Basic memory defect, RAM error within the initial 64 KB.	Send industrial PC to B&R for checking.
4 x short	Timer not operational: System timer.	Send industrial PC to B&R for checking.
5 x short	Processor error: Processor defect.	Send industrial PC to B&R for checking.
6 x short	8042 gate A20 failure: Keyboard controller defect (block 8042/ A20 gate). Processor cannot switch to protected mode.	Send industrial PC to B&R for checking.
7 x short	Processor exception interrupt error: Virtual mode exception error (CPU generated an interrupt error.	Send industrial PC to B&R for checking.
8 x short	Display memory read/write error: Video memory not accessible; graphic card defect or not built in (no fatal error).	Check inserted graphic card position and eventually exchange. In the event that the error persists, send industrial PC to B&R for testing.
9 x short	ROM-checksum error: ROM-BIOS-checksum incorrect, EPROM, EEPROM or Flash-ROM component defect, BIOS defect or incorrectly updated.	Send industrial PC to B&R for checking.

Table 332: BIOS post code messages BIOS 855GME (XTX)

Beeping code	Meaning	Necessary user action
10 x short	CMOS shutdown register read/write error: CMOS cannot be read/written.	Send industrial PC to B&R for checking.
11 x short	Cache Error / external Cache bad: L2 - Cache on the mainboard is defected.	Send industrial PC to B&R for checking.

Table 332: BIOS post code messages BIOS 855GME (XTX) (Forts.)

1.5 Distribution of resources

1.5.1 RAM address assignment

RAM address	Resource
000000h - 0003FFh	Interrupt vectors
000400h - 09FFFFh	MS-DOS program area
0A0000h - 0AFFFFh	VGA graphics
0B8000h - 0BBFFFh	VGA Text Mode
0C0000h - 0CFFFFh	VGA BIOS
0D0000h - 0DFFFFh	Available.
0E0000h - 0EBFFFh	USB
0E4000h - 0FFFFFh	System BIOS (Phoenix)
100000h -	SDRAM

Table 333: RAM address assignment

1.5.2 DMA channel assignment

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

Table 334: DMA channel assignment

1) Available if LPT is not being operated in ECP mode.

1.5.3 I/O address assignment

I/O address	Resource
000h -01Fh	DMA controller 1
020h - 03Fh	Interrupt controller 1
040h - 05Fh	Timer
060h - 06Fh	Keyboard controller
070h - 071h	Real-time clock, NMI mask, CMOS
080h	Debug port (POST code)
081h - 09Fh	Page register - DMA controller
0A0h - 0BFh	Interrupt controller 2
0C0h - 0DFh	DMA controller 2
0F0h - 0FFh	FPU
170h - 177h	Secondary Hard Disk IDE channel
1F0h - 1F7h	Primary Hard Disk IDE channel
238h - 023F	COM5
278h - 27Fh	Hardware Security Key (LPT2)
2E8h - 2EFh	COM4
2F8h - 2FFh	COM2
376h - 376h	Secondary Hard Disk IDE channel
378h - 37Fh	LPT1 (printer connection)
384h - 385h	CAN controller
3B0h - 3BBh	VGA controller
3BCh - 3BFh	LPT3
3C0h - 3DFh	VGA controller
3E8h - 3EFh	COM3
3F6h - 3F6h	Primary Hard Disk IDE channel
3F0h - 3F7h	FDD controller
3F8h - 3FFh	COM1
LPT1 + 400h	ECP Port, LPT+400h
CF8h - CFBh	PCI config address register
CFCh - CFFh	PCI config data register
4100h - 417Fh	MTCX
FF00h - FF07h	IDE bus master register

Table 335: I/O address assignment

1.5.4 Interrupt assignments in PCI mode

IRQ		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	NMI	NONE
System timer		●																	
Keyboard			●																
IRQ cascade				●															
COM1 (Serial port A)					❍	●													
COM2 (Serial port B)					●	❍													
LPT1					❍	❍	❍	❍	❍		❍	❍	❍	❍		❍			●
LPT2					❍	❍	❍	❍	❍		❍	❍	❍	❍		❍			●
LPT3					❍	❍	❍	❍	❍		❍	❍	❍	❍		❍			●
PS/2 mouse														●					
ACPI[1]											●								
FDD								●											❍
Real-time clock										●									
Coprocessor (FPU)															●				
Primary IDE channel																●			
Secondary IDE channel																	●		
B&R	COM3 (COM C)				❍	❍	❍		❍			❍	❍	❍					●
	COM4 (COM D)				❍	❍	❍		❍			❍	❍	❍					●
	COM5 (COM E)				❍	❍	❍		❍			❍	❍	❍					●
	CAN											❍						❍	●

Table 336: IRQ interrupt assignments in PCI mode

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

● ... Default setting
❍ ... Optional setting

1.5.5 Interrupt assignments in APIC mode

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

IRQ		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	NMI	NONE
System timer		●																									
Keyboard			●																								
IRQ cascade				●																							
COM1 (Serial port A)					❍	●																					
COM2 (Serial port B)					●	❍																					
LPT1					❍	❍	❍	❍	❍		❍	❍	❍	❍		❍											●
LPT2					❍	❍	❍	❍	❍		❍	❍	❍	❍		❍											●
LPT3					❍	❍	❍	❍	❍		❍	❍	❍	❍		❍											●
PS/2 mouse														●													
ACPI[1]											●																
FDD								●																			❍
Real-time clock										●																	
Coprocessor (FPU)															●												
Primary IDE channel																●											
Secondary IDE channel																	●										
B&R	COM3 (COM C)				❍	❍	❍		❍			❍	❍	❍													●
	COM4 (COM D)				❍	❍	❍		❍			❍	❍	❍													●
	COM5 (COM E)				❍	❍	❍		❍			❍	❍	❍													●
	CAN											❍														❍	●
PIRQ A [2]																		●									
PIRQ B [3]																			●								
PIRQ C [4]																				●							
PIRQ D [5]																					●						
PIRQ E [6]																						●					
PIRQ F																							●				
PIRQ G																								●			

Table 337: IRQ interrupt assignments in APIC mode

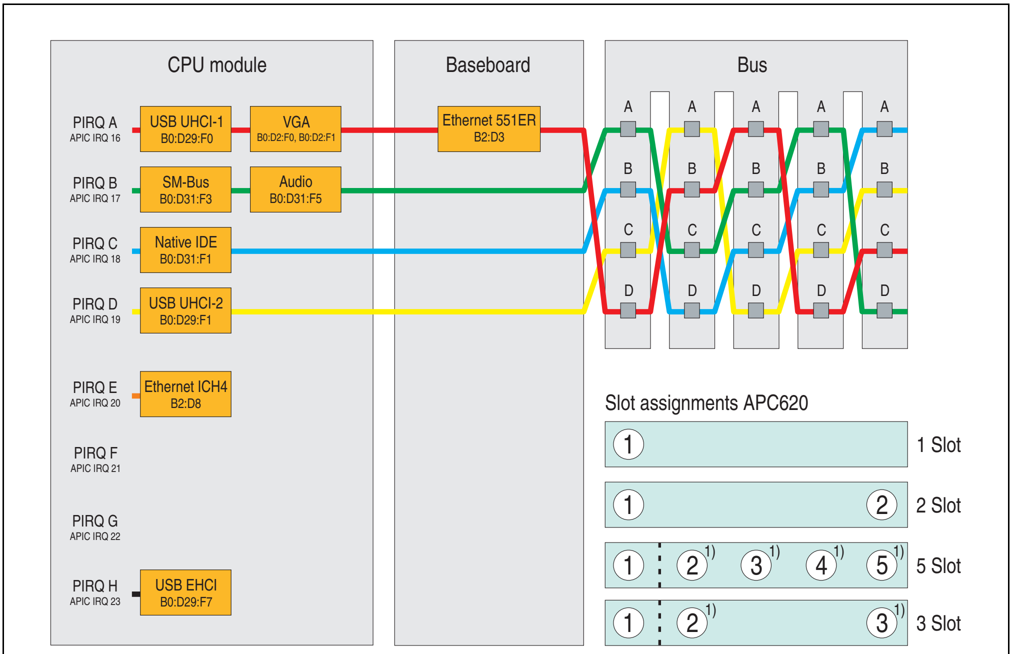
IRQ	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	NMI	NONE
PIRQ H 7)																								●		

Table 337: IRQ interrupt assignments in APIC mode (Forts.)

1) **A**dvanced **C**onfiguration and **P**ower **I**nterface.
2) PIRQ A: for PCI; PCI IRQ line 1 + USB UHCI controller #1 + graphics controller.
3) PIRQ B: for PCI; PCI IRQ line 2 + AC97 Audio controller + SM Bus.
4) PIRQ C: for PCI; PCI RIQ line 3 + USB UHCI controller #3 + native IDE.
5) PIRQ D: for PCI; PCI IRQ line 4 + USB UHCI controller #2.
6) PIRQ E: LAN controller.
7) PIRQ H: USB EHCI controller.

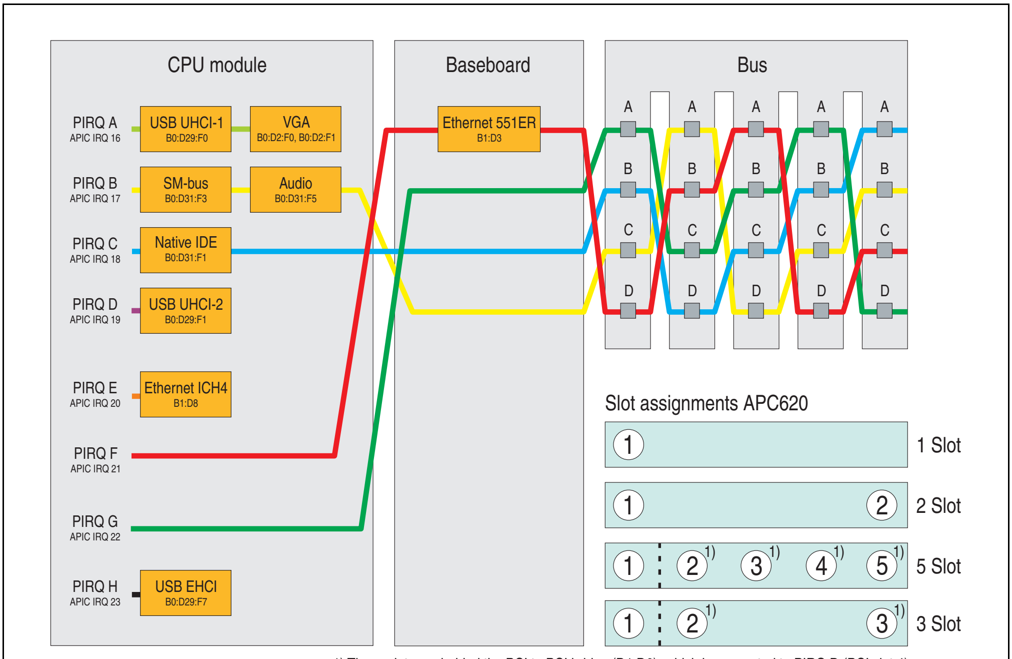
● ... Default setting
❍ ... Optional setting

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.



1) These slots are behind the PCI to PCI bridge (B2:D6), which is connected to PIRQ D (PCI slot 4).

Figure 248: PCI routing with activated APIC CPU boards 815E (ETX), 855GME (ETX)



1) These slots are behind the PCI to PCI bridge (D1:D6), which is connected to PIRQ D (PCI slot 4).

Figure 249: PCI routing with activated APIC CPU boards 855GME (XTX)

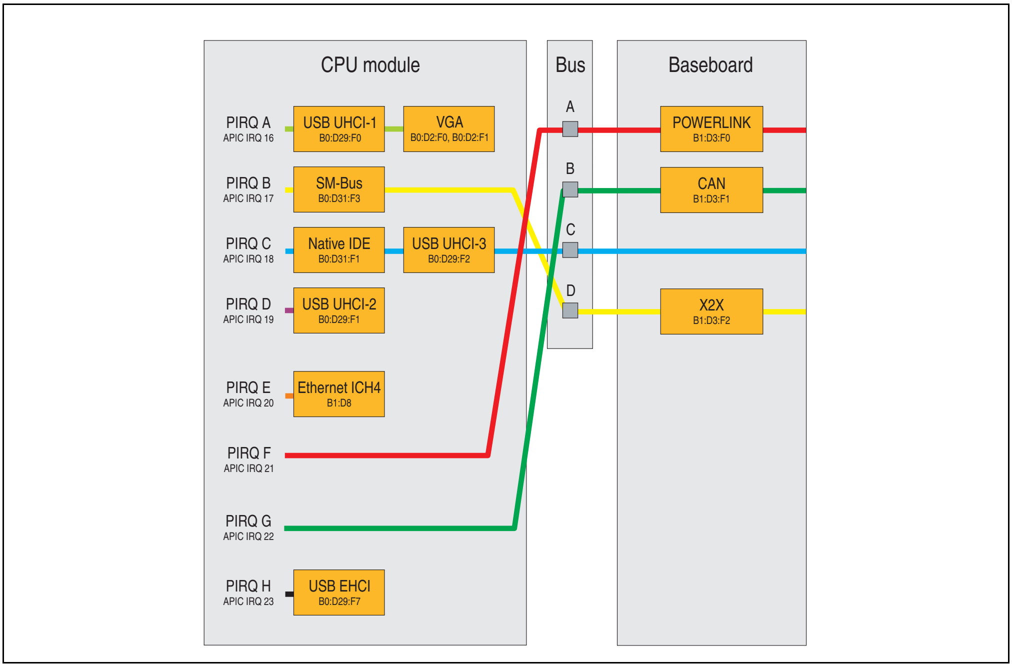


Figure 250: PCI routing with activated APIC CPU boards 855GME (XTX) on the APC620e

1.5.6 Inter-IC (I²C) bus

I²C address	Resource	Note
A0h	EEPROM	EEPROM for CMOS data - cannot be used
B0h	Reserved	Cannot be used
58h	Reserved	Cannot be used

Table 338: Inter-IC (I²C) bus resources

1.5.7 System Management (SM) bus

SM Bus address	SM device	Note
12h	SMART_CHARGER	
14h	SMART_SELECTOR	
16h	SMART_BATTERY	
D2h	Clock Generator	

Table 339: Inter-IC (I²C) bus resources

1.6 Location of the DIP switch in APC620 system units

Warning!

The following procedure is only permitted with the power switched off and the supply voltage disconnected!

To get to the DIP switches, it is necessary to open the front cover. To do this, loosen the five Torx screws (T10) marked and pull the cover off towards the front. Then the DIP switches can be accessed at the location marked in yellow. The setting can now be made using a pointed object. If the system has a slide-in drive, it must be removed first to get to the DIP switches.

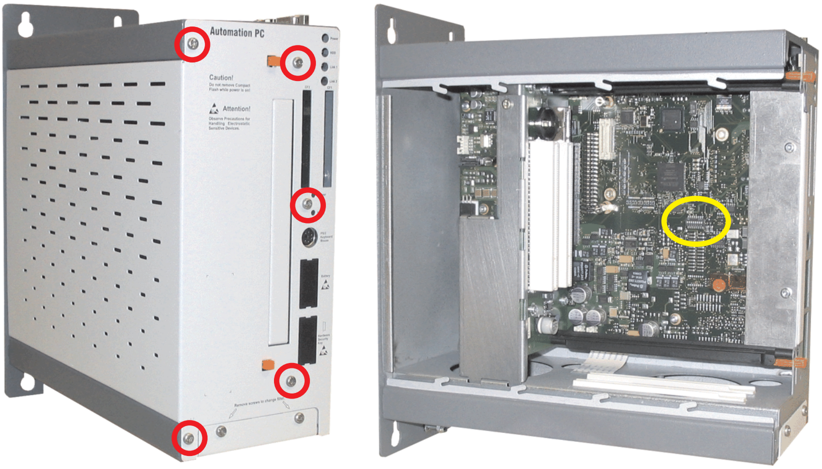


Figure 251: Location of DIP switch

2. Upgrade information

2.1 BIOS upgrade

Warning!

The upgrade procedures described in the following pages must be carried out for all APC620 systems with software versions lower than those listed in the following table.

CPU board software	815E (ETX)	855GME (ETX)
BIOS	< R017	< R007
MTCX PX32 firmware	< V1.19	< V1.19
MTCX FPGA firmware	< V1.06	< V1.06

Table 340: CPU board software versions

Automation Panel Link	Transceiver (5DLSDL.1000-01)	Receiver (5DLSDL.1000-00)
SDLR version	< V0.03	< V0.03

Table 341: Automation panel link software versions

An upgrade might be necessary for the following reason:

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

2.1.1 What information do I need?

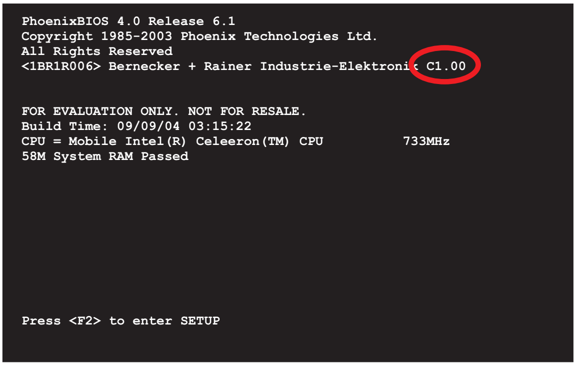
Information:

Individually saved BIOS settings are deleted when upgrading the BIOS.

Before starting the upgrade, you should know the CPU board type (815E or 855GME) and the various software versions.

Which CPU board do I have?

After switching on the APC620, the installed CPU board can be identified by the letters "B", "C" or „E“.



```
PhoenixBIOS 4.0 Release 6.1
Copyright 1985-2003 Phoenix Technologies Ltd.
All Rights Reserved
<1BR1R006> Bernecker + Rainer Industrie-Elektronik C1.00


FOR EVALUATION ONLY. NOT FOR RESALE.
Build Time: 09/09/04 03:15:22
CPU = Mobile Intel(R) Celeeron(TM) CPU          733MHz
58M System RAM Passed










Press <F2> to enter SETUP
```

Figure 252: Differentiating between 815E and 855GME CPU boards

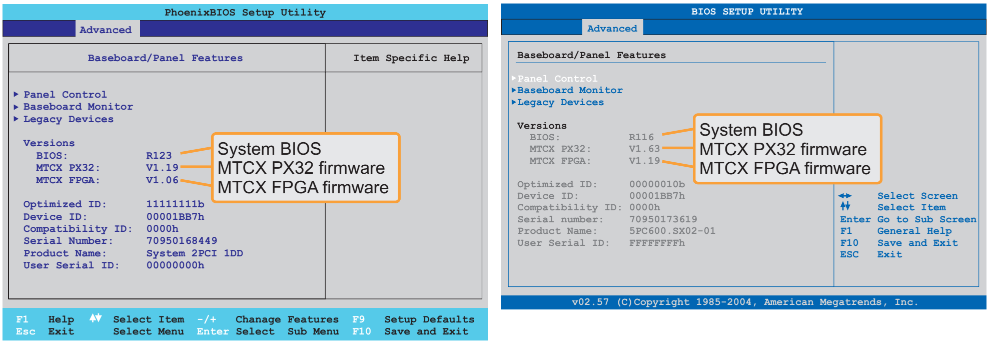
Letter	CPU board	Model number
B	855GME (ETX)	5PC600.E855-00 5PC600.E855-01 5PC600.E855-02 5PC600.E855-03 5PC600.E855-04 5PC600.E855-05
C	815E (ETX)	5PC600.E815-00 5PC600.E815-02 5PC600.E815-03
E	855GME (XTX)	5PC600.X855-00 5PC600.X855-01 5PC600.X855-02 5PC600.X855-03 5PC600.X855-04 5PC600.X855-05

Table 342: Differentiating between 815E (ETX) and 855GME (ETX / XTX) CPU boards

Which BIOS version and firmware are already installed on the APC620?

This information can be found on the same BIOS setup page for both the 815E (ETX) and the 855GME (ETX / XTX)CPU boards:

- After switching on the APC620, you can get to the BIOS Setup by pressing "F2" or "DEL".
- From the BIOS main menu "advanced" (top), select "baseboard/panel features" (bottom):



CPU boards 815E (ETX) and 855GME (ETX)

```
                    PhoenixBIOS Setup Utility
            Advanced
      Baseboard/Panel Features              Item Specific Help

▸ Panel Control
▸ Baseboard Monitor
▸ Legacy Devices

  Versions
    BIOS:              R123
    MTCX PX32:         V1.19
    MTCX FPGA:         V1.06

  Optimized ID:        11111111b
  Device ID:           00001BB7h
  Compatibility ID:    0000h
  Serial Number:       70950168449
  Product Name:        System 2PCI 1DD
  User Serial ID:      00000000h

 F1   Help  ↑↓  Select Item  -/+   Chanage Features  F9   Setup Defaults
 Esc  Exit      Select Menu  Enter Select  Sub Menu  F10  Save and Exit
```

CPU boards 855GME (XTX)

```
                       BIOS SETUP UTILITY
            Advanced
 Baseboard/Panel Features

▸Panel Control
▸Baseboard Monitor
▸Legacy Devices

 Versions
   BIOS:            R116
   MTCX PX32:       V1.63
   MTCX FPGA:       V1.19

 Optimized ID:      00000010b
 Device ID:         00001BB7h                  ↔      Select Screen
 Compatibility ID:  0000h                      ↑↓     Select Item
 Serial number:     70950173619                Enter  Go to Sub Screen
 Product Name:      5PC600.SX02-01             F1     General Help
 User Serial ID:    FFFFFFFFh                  F10    Save and Exit
                                               ESC    Exit

      v02.57 (C)Copyright 1985-2004, American Megatrends, Inc.
```

Figure 253: Software versions

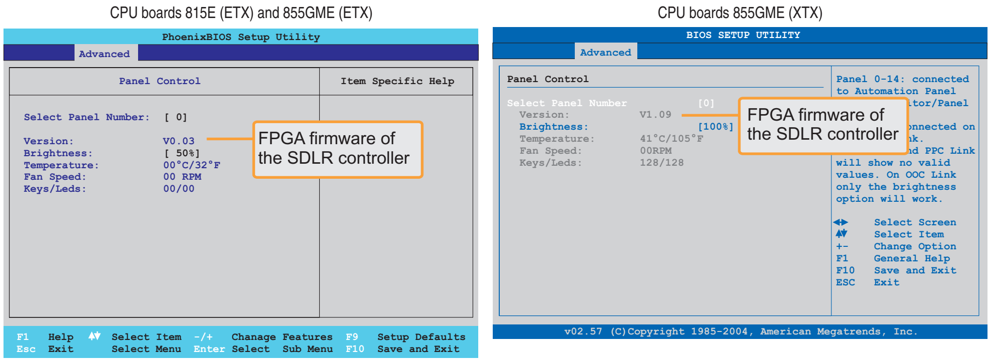
Which firmware is installed on the Automation Panel Link transceiver/receiver?

This information can be found on the same BIOS setup page for both the 815E (ETX) and the 855GME (ETX / XTX)CPU boards:

- After switching on the APC620, you can get to the BIOS Setup by pressing "F2" or "DEL".
- From the BIOS main menu "advanced" (top), select "baseboard/panel features" (bottom) and then "panel control":

Information:

The version can only be shown if an Automation Panel with Automation Panel Link SDL transceiver (5DLSDL.1000-01) and Automation Panel Link SDL receiver (5DLSDL.1000-00) is connected.



CPU boards 815E (ETX) and 855GME (ETX)

```
Select Panel Number:   [ 0]

Version:               V0.03
Brightness:            [ 50%]
Temperature:           00°C/32°F
Fan Speed:             00 RPM
Keys/Leds:             00/00
```

FPGA firmware of the SDLR controller

CPU boards 855GME (XTX)

```
Select Panel Number            [0]
  Version:             V1.09
  Brightness:                  [100%]
  Temperature:         41°C/105°F
  Fan Speed:           00RPM
  Keys/Leds:           128/128
```

FPGA firmware of the SDLR controller

```
Panel 0-14: connected
to Automation Panel
              itor/Panel

           onnected on
           nk.
           nd PPC Link
will show no valid
values. On OOC Link
only the brightness
option will work.
```

Figure 254: Firmware version of Automation Panel Link SDL transceiver/receiver

2.1.2 Upgrade BIOS for 815E (ETX)

- Download and unzip the zip file from the B&R homepage.
- Create bootable media.

Information:

In MS-DOS, Win95 and Win98, a blank HD disk can be made bootable using the command line command "sys a:" or "format a: /s".
Information concerning creating a bootable diskette in Windows XP cab be found on page 538.

- Copy the contents of the *.zip file to the bootable media. If the B&R upgrade was already added when the bootable media was created using the B&R Embedded OS Installer, then this step is not necessary.
- Connect the bootable media to the APC620 and reboot the device.
- The following boot menu will be shown after startup:

```
1. Upgrade PHOENIX BIOS for i815E (5PC600.E815-xx)

2. Exit to MS-DOS
```

Concerning point 1:
BIOS is automatically upgraded (default after 5 seconds).

Concerning point 2:
Returns to the shell (MS-DOS).

- The system must be rebooted after a successful upgrade.

Information:

When the system has rebooted, setup default values must be reloaded after the message, "`System CMOS checksum bad`" (press F1 or select "load setup defaults" in the BIOS setup "exit" menu). Afterwards, the time and date must be set again.

2.1.3 Upgrade BIOS for 855GME (ETX)

- Download and unzip the zip file from the B&R homepage.
- Create bootable media.

Information:

In MS-DOS, Win95 and Win98, a blank HD disk can be made bootable using the command line command "sys a:" or "format a: /s".
Information concerning creating a bootable diskette in Windows XP cab be found on page 538.

Information concerning creating a USB flash drive for a B&R upgrade can be found on page 540.

Information concerning creating a CompactFlash card for a B&R upgrade can be found on page 542.

- Copy the contents of the *.zip file to the bootable media. If the B&R upgrade was already added when the bootable media was created using the B&R Embedded OS Installer, then this step is not necessary.
- Connect the bootable media to the APC620 and reboot the device.
- The following boot menu will be shown after startup:

```
1. Upgrade PHOENIX BIOS for i855GME (5PC600.E855-xx)

2. Exit to MS-DOS
```

Concerning point 1:
BIOS is automatically upgraded (default after 5 seconds).

Concerning point 2:
Returns to the shell (MS-DOS).

- The system must be rebooted after a successful upgrade.

Information:

When the system has rebooted, setup default values must be reloaded after the message, "`System CMOS checksum bad`" (press F1 or select "load setup defaults" in the BIOS setup "exit" menu).

Starting with BIOS version V1.15, the time and date no longer has to be set again after a BIOS upgrade (stays the same).

2.1.4 Upgrade BIOS for 855GME (XTX)

- Download and unzip the zip file from the B&R homepage.
- Create bootable media.

Information:

In MS-DOS, Win95 and Win98, a blank HD disk can be made bootable using the command line command "sys a:" or "format a: /s".
Information concerning creating a bootable diskette in Windows XP cab be found on page 538.

Information concerning creating a USB flash drive for a B&R upgrade can be found on page 540.

Information concerning creating a CompactFlash card for a B&R upgrade can be found on page 542.

- Copy the contents of the *.zip file to the bootable media. If the B&R upgrade was already added when the bootable media was created using the B&R Embedded OS Installer, then this step is not necessary.
- Connect the bootable media to the APC620 and reboot the device.
- The following boot menu will be shown after startup:

```
1. Upgrade PHOENIX BIOS for i855GME (5PC600.X855-xx)

2. Exit to MS-DOS
```

Concerning point 1:
BIOS is automatically upgraded (default after 5 seconds).

Concerning point 2:
Returns to the shell (MS-DOS).

- The system must be rebooted after a successful upgrade.

Information:

After the system restart, the warning "CMOS checksum BAD" is displayed, but BIOS boots through it. The setup can be opened using the "Del" key and the setup defaults must be loaded again and saved using either the "F9" key or the menu item "Exit" - "Load CMOS defaults".

2.1.5 Windows XP Embedded and BIOS upgrade

If the following error message appears after upgrading BIOS:

`"Copy Error"`

`"Setup cannot copy the file Audio3d.dll"`

then the audio driver must be reinstalled.

To do this, use the audio driver from the B&R Homepage (www.br-automation.com).

During the installation of the audio driver, the following 2 files must be manually selected from the following directories.

`ksuser.dll` `in the directory ...\Windows\system32`

`ks.sys` `in the directory ...\Windows\system32\drivers`

This applies to 815E and 855ME CPU boards.

In order to be able to set up all possible resolutions when using an 815E CPU board, the graphics driver must be reinstalled (see 5.2.1 "Installing the graphics driver for 815E (ETX) CPU boards").

2.2 Upgrade the firmware

With the APC620 / Panel PC firmware upgrade (MTCX, SDLR, SDLT), the firmware of a number of controllers (MTCX, SDLR, SDLT, UPS) can be updated, depending on the construction of the APC620 system.

2.2.1 Procedure

- Download and unzip the zip file from the B&R homepage.
- Create bootable media.

> ## Information:
>
> **In MS-DOS, Win95 and Win98, a blank HD disk can be made bootable using the command line command "sys a:" or "format a: /s".**
> **Information concerning creating a bootable diskette in Windows XP cab be found on page 538.**
>
> **Information concerning creating a USB flash drive for a B&R upgrade can be found on page 540.**
>
> **Information concerning creating a CompactFlash card for a B&R upgrade can be found on page 542.**

- Copy the contents of the *.zip file to the bootable media. If the B&R upgrade was already added when the bootable media was created using the B&R Embedded OS Installer, then this step is not necessary.
- Connect the bootable media to the APC620 and reboot the device.
- The following boot menu will be shown after startup:

> ## Information:
>
> **The following boot menu options including descriptions are based on version 1.27 of the APC620 / Panel PC Firmware upgrade (MTCX, SDLR, SDLT) disk. In some cases, these descriptions might not match the version you are currently using.**

Boot menu options:

```
1. Upgrade MTCX (APC620/PPC700) PX32 and FPGA

2. Upgrade SDLT (APC620) only

3. Upgrade SDLR (AP800/AP900) on monitor/panel

   3.1 Upgrade SDLR on AP 0 (AP800/AP900)

   3.2 Upgrade SDLR on AP 1 (AP800/AP900)
   3.3 Upgrade SDLR on AP 2 (AP800/AP900)

   3.4 Upgrade SDLR on AP 3 (AP800/AP900)

   3.5 Upgrade all SDLR (AP800/AP900)

   3.6 Return to main menu

4. Upgrade SDLR (AP800/AP900) on AP link slot

   4.1 Upgrade SDLR on AP 8 (AP800/AP900)

   4.2 Upgrade SDLR on AP 9 (AP800/AP900)

   4.3 Upgrade SDLR on AP 10 (AP800/AP900)

   4.4 Upgrade SDLR on AP 11 (AP800/AP900)

   4.5 Upgrade all SDLR (AP800/AP900)

   4.6 Return to main menu

5. Upgrade add-on UPS (firmware and battery settings)

   5.1 Upgrade Add-on UPS Firmware (5AC600.UPSI-00)

   5.2 Upgrade Battery Settings (5AC600.UPSB-00)

   5.3 Return to main menu

6. Exit
```

Concerning point 1:
Automatically upgrade PX32 and FPGA for MTCX (default after 5 seconds).

Concerning point 2:
The FPGA of the SDLT controller on the AP Link slot is automatically updated.

Concerning point 3:
A submenu is opened for upgrading the SDLR controller on the Monitor/Panel plug.

3.1. Upgrade SDLR on AP 0 (AP800/AP900)
The SDLR controller is automatically updated on Automation Panel 0.

3.2 Upgrade SDLR on AP 1 (AP800/AP900)
The SDLR controller is automatically updated on Automation Panel 1.

3.3 Upgrade SDLR on AP 2 (AP800/AP900)
The SDLR controller is automatically updated on Automation Panel 2.

3.4 Upgrade SDLR on AP 3 (AP800/AP900)
The SDLR controller is automatically updated on Automation Panel 3.

3.5. Upgrade all SDLR (AP800/AP900)
All SDLR controllers are automatically updated on all Automation Panels on the Monitor/Panel
(default after 5 sec).

3.6. Return to main menu
Returns to the main menu.

Concerning point 4:
A submenu is opened for upgrading the SDLR controller on the AP Link slot.

4.1. Upgrade SDLR on AP 8 (AP800/AP900)
The SDLR controller is automatically updated on Automation Panel 8.

4.2. Upgrade SDLR on AP 9 (AP800/AP900)
The SDLR controller is automatically updated on Automation Panel 9.

4.3 Upgrade SDLR on AP 10 (AP800/AP900)
The SDLR controller is automatically updated on Automation Panel 10.

4.4 Upgrade SDLR on AP 11 (AP800/AP900)
The SDLR controller is automatically updated on Automation Panel 11.

4.5 Upgrade all SDLR (AP800/AP900)
All SDLR controllers are automatically updated on all Automation Panels on the AP Link slot Monitor/Panel (default after 5 sec).

4.6 Return to main menu
Returns to the main menu.

Concerning point 5:
The submenu for the add-on UPS firmware and upgrade and the battery settings upgrade is opened - this is irrelevant for PPC700 systems.

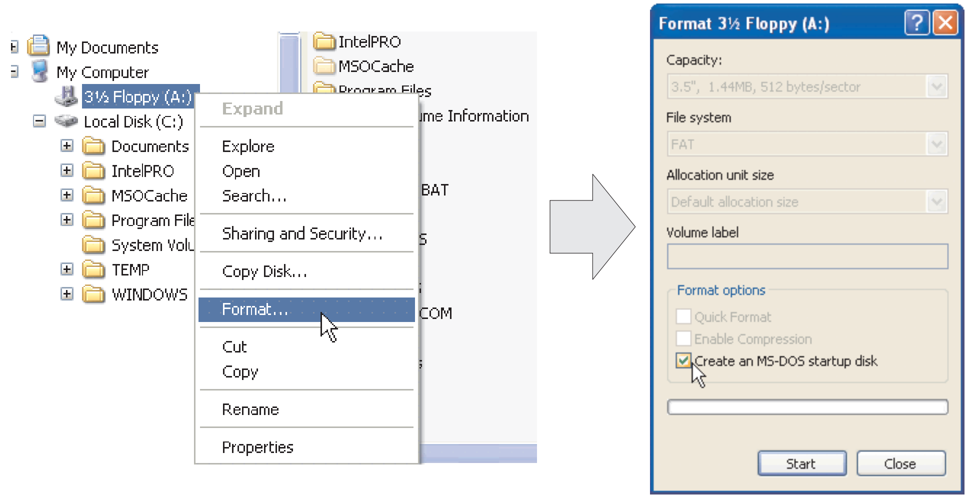
Concerning point 6:
Returns to the shell (MS-DOS).

Information:

The system must be powered off and on again after a successful controller upgrade.

2.3 Creating an MS-DOS boot diskette in Windows XP

- Place an empty 1.44 MB HD diskette in the disk drive
- Open Windows Explorer
- Right-click on the 3½" floppy icon and select "**Format...**".



Format 3½ Floppy (A:)

Capacity: 3.5", 1.44MB, 512 bytes/sector

File system: FAT

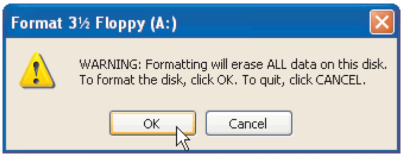
Allocation unit size: Default allocation size

Volume label:

Format options
☐ Quick Format
☐ Enable Compression
☑ Create an MS-DOS startup disk

Figure 255: Creating a bootable diskette in Windows XP - step 1

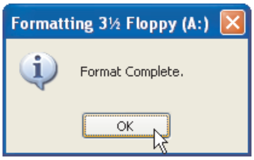
- Then select the checkbox "**Create an MS-DOS startup disk**", press "**Start**" and acknowledge the warning message with "OK".



Format 3½ Floppy (A:)

WARNING: Formatting will erase ALL data on this disk.
To format the disk, click OK. To quit, click CANCEL.

Figure 256: Creating a bootable diskette in Windows XP - step 2



Formatting 3½ Floppy (A:)

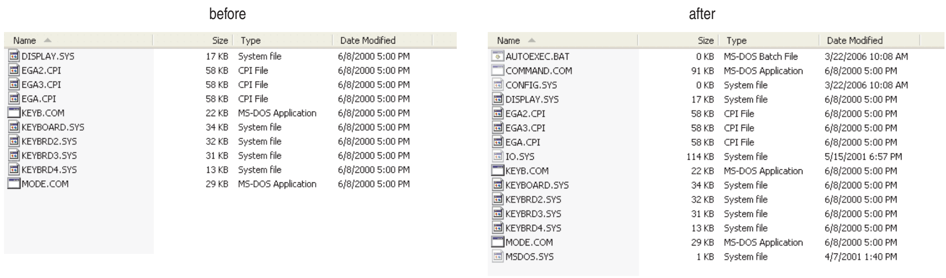
Format Complete.

Figure 257: 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.

When doing this, all files (hidden, system files, etc.) must be shown on the diskette.

In Explorer, go to the Tools menu, select Folder Options... and open the View tab. Now deactivate the option Hide protected operating system files (Recommended) (activated by default) and activate the option Show hidden files and folders.



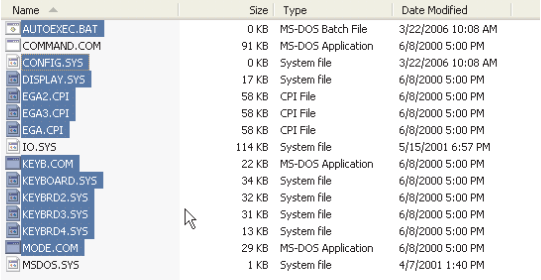
before

Name	Size	Type	Date Modified
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
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

after

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 258: 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 259: Creating a bootable diskette in Windows XP - step 5

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

2.4 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 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 for free from the B&R homepage (**www.br-automation.com**).

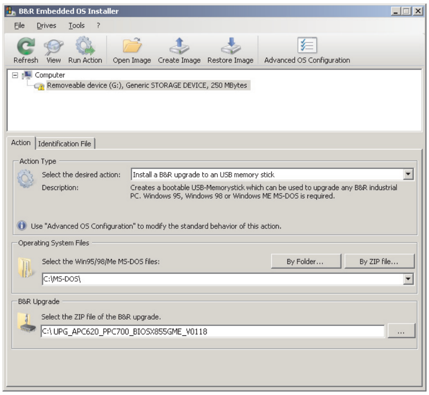
2.4.1 Requirements

The following peripherals are required for creating 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)

2.4.2 Procedure

- Connect the USB flash drive to the PC.
- If the drive list is not refreshed automatically, the list must be updated using the command **Drives > Refresh**.
- Mark the desired USB flash drive in the drive list.
- Change to the **Action** tab and select **Install a B&R Update to a USB flash drive** as type of action.
- Enter the path to the MS-DOS operating system files. If the files are part of a ZIP archive, then click on the button **By ZIP file...**. If the files are stored in a directory on the hard drive, then click on the button **By folder...**.
- In the **B&R Upgrade** text box, it's also possible to enter the path to the ZIP file for the B&R Upgrade Disk and select the file.
- Click on the **Start action** button in the toolbar.



Computer
Removeable device (G:), Generic STORAGE DEVICE, 250 MBytes

Action Type

Select the desired action: Install a B&R upgrade to an USB memory stick

Description: Creates a bootable USB-Memorystick which can be used to upgrade any B&R industrial PC. Windows 95, Windows 98 or Windows ME MS-DOS is required.

Use "Advanced OS Configuration" to modify the standard behavior of this action.

Operating System Files

Select the Win95/98/Me MS-DOS files: C:\MS-DOS\

B&R Upgrade

Select the ZIP file of the B&R upgrade. C:\ UPG_APC620_PPC700_BIOSX855GME_V0118

Figure 260: Creating a USB flash drive for B&R upgrade files

2.4.3 Where do I get MS-DOS?

Information concerning creating an MS-DOS boot diskette can be found in section 2.3 "Creating an MS-DOS boot diskette in Windows XP", on page 538. Then the files from the diskette are to be copied to your hard drive.

2.5 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 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 for free from the B&R homepage (**www.br-automation.com**).

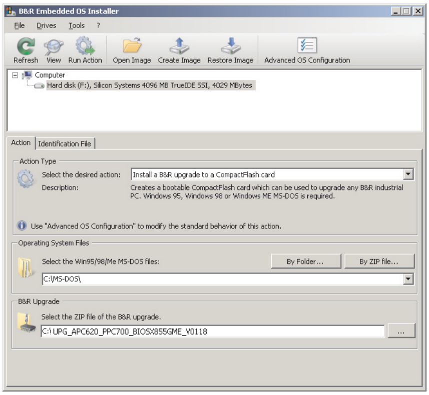
2.5.1 Requirements

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

- CompactFlash card
- B&R Industrial PC
- B&R Embedded OS Installer (V3.10 or higher)

2.5.2 Procedure

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



Hard disk (F:), Silicon Systems 4096 MB TrueIDE SSI, 4029 MBytes

Action Type

Select the desired action: Install a B&R upgrade to a CompactFlash card

Description: Creates a bootable CompactFlash card which can be used to upgrade any B&R industrial PC. Windows 95, Windows 98 or Windows ME MS-DOS is required.

Use "Advanced OS Configuration" to modify the standard behavior of this action.

Operating System Files

Select the Win95/98/Me MS-DOS files: C:\MS-DOS\

B&R Upgrade

Select the ZIP file of the B&R upgrade. C:\ UPG_APC620_PPC700_BIOSX855GME_V0118

Figure 261: Creating a CompactFlash card for B&R upgrade files

2.5.3 Where do I get MS-DOS?

Information concerning creating an MS-DOS boot diskette can be found in section 2.3 "Creating an MS-DOS boot diskette in Windows XP", on page 538. Then the files from the diskette are to be copied to your hard drive.

2.6 Upgrade problems

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

3. Automation PC 620 with Automation Runtime

3.1 General information

An integral component of Automation Studio™ is Automation Runtime, the software kernel which allows applications to run on a target system. This runtime environment offers numerous important advantages:

- Guaranteed highest possible performance for the hardware being used
- Runs on all B&R target systems
- Makes the application hardware-independent
- Applications can be easily ported between B&R target systems
- Cyclic system guarantees deterministic behavior
- Configurable jitter tolerance in all task classes
- Supports all relevant programming language such as IEC 61131-3 and C
- Extensive function library conforming to IEC 61131-3 as well as the expanded B&R Automation library
- Integrated into Automation NET. Access to all networks and bus systems via function calls or the Automation Studio™ configuration

3.2 Support for Automation PC 620 embedded

3.2.1 ARwin

The fieldbus interfaces CAN, X2X, and POWERLINK are supported by ARwin with an AS 2.6 upgrade.

3.2.2 ARemb

The fieldbus interfaces CAN, X2X, and POWERLINK are supported by AR 2.94 together with an AS 2.7.

3.3 Selection of devices

Power supply buffering of 10 ms is guaranteed starting with the following system unit revisions:

Model number	Description	Revision
5PC600.SX01-00	System 1 PCI	B0
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	B0
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	B0
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	A0

Table 343: System unit support for buffering with Automation Runtime

Model number	Description	Revision
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	A0
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	A0
5PC600.SE00-00	APC620e System SDL EPL X2X CAN 512kB	A0
5PC600.SE00-01	APC620e System CRT EPL X2X CAN 512KB	A0
5PC600.SE00-02	APC620e System SDL EPL X2X CAN 1MB	A0

Table 343: System unit support for buffering with Automation Runtime (Forts.)

3.4 Visual Components graphic engine support

The output of graphics with Visual Components is only supported by graphic engine 1. Graphic engine 2 is not supported. The following table should clarify the mapping and stretching function of the graphic engine in connection with the different system unit variations.

System unit	Graphic engine (GE) Number	Graphic engine number on		Stretch support on graphic connection
		Monitor / Panel	AP Link slot (5AC600.SDL0-00)	
5PC600.SX01-00	1	GE1	-	Monitor / Panel
5PC600.SX02-00	2	GE2	GE1	AP Link slot (5AC600.SDL0-00)
5PC600.SX02-01	1	GE1	-	Monitor / Panel
5PC600.SF03-00	2	GE2	GE1	AP Link slot (5AC600.SDL0-00)
5PC600.SX05-00	2	GE2	GE1	AP Link slot (5AC600.SDL0-00)
5PC600.SX05-01	1	GE1	-	Monitor / Panel
5PC600.SE00-00	1	GE1	-	Monitor / Panel
5PC600.SE00-01	1	GE1	-	Monitor / Panel
5PC600.SE00-02	1	GE1	-	Monitor / Panel

Table 344: Visual Components video output with different system units

A graphic engine 1 (GE1) is only available in connection with AP Link SDL transmitter 5AC600.SDL0-00 for system units 5PC600.SX02-00, 5PC600.SX05-00 and 5PC600.SF03-00. If no AP Link SDL transmitter is present in the system units listed, then video output is not possible with Visual Components.

4. Automation PC 620 with MS-DOS

DOS622 Deutsch
Diskette 1 - Setup

Perfection in Automation

Recovery Diskette

Darf nur für Backup oder Archivierungszwecke für B&R Automatisierungsgeräte verwendet werden!

www.br-automation.com

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060000129

Figure 262: Automation PC 620 with MS-DOS

Model number	Short description	Note
9S0000.01-010	**OEM MS-DOS 6.22 German (disk)** OEM MS-DOS 6.22 German disks Only delivered with a new PC.	
9S0000.01-020	**OEM MS-DOS 6.22 English (disk)** OEM MS-DOS 6.22 English disks Only delivered with a new PC.	

Table 345: Model numbers - MS-DOS

4.1 Known problems

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

- AC97 Sound - no support
- USB 2.0 - only USB 1.1 rates can be reached.
- Limited drive support for the slide-in drives 5AC600.DVDS-00 and 5AC600.DVRS-00 - no write functions.
- "Graphics Engine 2" and therefore Extended Desktop mode also cannot be used.
- A few "ACPI control" BIOS functions cannot be used.

The following table shows the tested resolutions and color depths on the Monitor / Panel connector with 855GME CPU boards.

Resolutions for DVI	**Color depth**		
	8-bit	**16-bit**	**24-bit**
640 x 480	✓	✓	✓
800 x 600	✓	✓	✓
1024 x 768	✓	✓	✓
1280 x 1024	✓	✓	✓
Resolutions for RGB	**Color depth**		
	8-bit	**16-bit**	**24-bit**
640 x 480	✓	✓	✓
800 x 600	✓	✓	✓
1024 x 768	✓	✓	✓
1280 x 1024	✓	✓	✓
1600 x 1200	✓	✓	✓
1920 x 1440	✓	✓	

Table 346: Tested resolutions and color depths for DVI and RGB signals

5. Automation PC 620 with Windows XP Professional

Figure 263: Windows XP Professional Logo

Model number	Short description	Note
9S0000.08-010	**OEM Microsoft Windows XP Professional** CD, German; Only delivered with a new PC.	Cancelled since 10/2008
9S0000.08-020	**OEM Microsoft Windows XP Professional** CD, English; Only delivered with a new PC.	Cancelled since 10/2008
9S0000.09-090	**OEM Microsoft Windows XP Professional Multilanguage** CDs; Only delivered with a new PC.	Cancelled since 07/2009
5SWWXP.0600-GER	**WinXP Professional with SP3, CD German** Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a new device.	
5SWWXP.0600-ENG	**WinXP Professional with SP3, CD English** Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a new device.	
5SWWXP.0600-MUL	**WinXP Professional with SP3, CD, Multi-language** Microsoft OEM Windows XP Professional Service Pack 3, CD, multi-language. Only available with a new device.	
5SWWXP.0500-GER	**WinXP Professional with SP2c, CD German** Microsoft OEM Windows XP Professional Service Pack 2c, CD, German. Only available with a new device.	
5SWWXP.0500-ENG	**WinXP Professional with SP2c, CD English** Microsoft OEM Windows XP Professional Service Pack 2c, CD, English. Only available with a new device.	
5SWWXP.0500-MUL	**WinXP Professional with SP2c, CD, Multi-language** Microsoft OEM Windows XP Professional Service Pack 2c, CD, multi-language. Only available with a new device.	

Table 347: Model numbers - Windows XP Professional

5.1 Installation

Upon request, B&R will pre-install Windows XP Professional on the desired mass memory (add-on hard disk, slide-in hard disk). All of the drivers required for operation (graphics, network, etc.) are also installed when doing so.

5.1.1 FAQ

How do I install Windows XP on systems with 815E CPU boards?

Windows XP can be installed on APC620 systems with 815E CPU boards **only** together with a connected **external monitor (RGB)**. An Automation Panel 900 is switched off in the Windows hardware recognition if connected via SDL or DVI during the installation. Video output via SDL and DVI is only supported after installing the 815E graphics driver.

Installation on PCI SATA RAID controller - 5ACPCI.RAIC-03

The following steps are necessary for installing Windows XP Professional on the PCI SATA RAID controller:

1) Download the RAID driver from the B&R homepage (**www.br-automation.com**) and copy the files to a diskette.
2) Connect the Media Drive (5MD900.USB2-01 or 5MD900.USB2-00) to the USB port.
3) Insert the diskette and Windows XP Professional CD in the the Media Drive and boot from the CD.
4) Press the F6 key during setup to install a third-party SCSI or a driver.
5) Press the "s" key when asked about installing an additional drive. Insert the disk in the floppy drive. Press "Enter" and select the driver.
6) Follow the setup instructions.
7) The setup copies the files to the Windows XP Professional folder and restarts the APC620.

For 5PCI slot model

The following steps are necessary when installing to a slide-in HDD being operated in the slide-in slot 2 (located behind the PCI to SATA Bridge) on the APC620:

1) Download the Si3531 SATA driver from the B&R homepage (**www.br-automation.com**) and copy the files to a diskette.
2) Connect the Media Drive (5MD900.USB2-01 or 5MD900.USB2-00) to the USB port.
3) Insert the diskette and Windows XP Professional CD in the the Media Drive and boot from the CD.

4) Press the F6 key during setup to install a third-party SCSI or a driver.

5) Press the "s" key when asked about installing an additional drive. Insert the disk in the floppy drive. Press "Enter" and select the driver.

6) Follow the setup instructions.

7) The setup copies the files to the Windows XP Professional folder and restarts the Automation PC 620.

5.2 Graphics drivers

For operation modes "extended desktop" and "dual display clone", the Intel Extreme graphics chip driver must be installed. Graphics drivers for 815E and 855GME CPU boards are available for approved operating systems in the download area (Service - Material Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (**www.br-automation.com**).

5.2.1 Installing the graphics driver for 815E (ETX) CPU boards

The following must be observed when installing the graphics chip driver for the graphics chip integrated in the 815E chip set:

- The driver available from Intel is NOT permitted to be used, only the driver available from B&R (**www.br-automation.com**).
- After unpacking the *.zip file, the driver must be updated using the Windows Device Manager "Start - Control Panel - System - Hardware - Device Manager - Update Driver". When doing this, use the file **i81xnt5.inf**.
- The initial installation of the driver can **only** be carried out with an **external monitor (RGB)** connected. After successfully installing the B&R driver, an Automation Panel 900 be operated via SDL or DVI without problems.

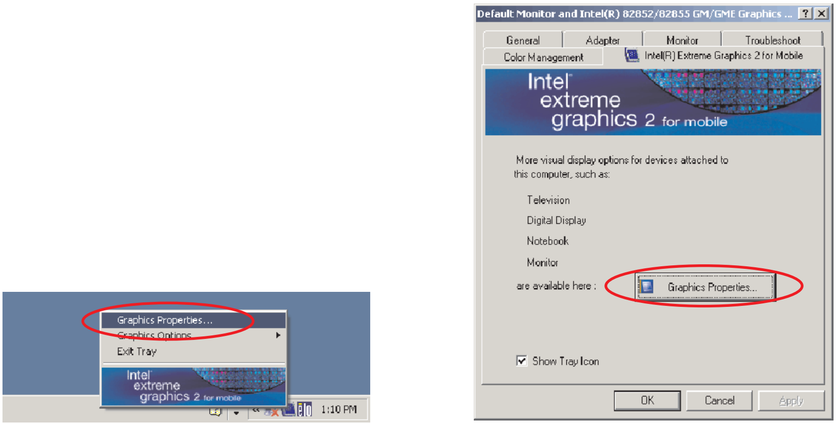
Caution!

Presently, this driver is only approved for the Windows XP Professional and Windows XP embedded operating systems.

Information:

The following screenshots and descriptions refer to the graphics driver version 6.13.01.3175 for 815E CPU boards. Therefore, it is possible that the screenshots and descriptions might not correspond with the installed driver version.

After the driver is installed, it can be configured in the Control Panel (called up through the icon in the taskbar or Start - Control Panel - Display - Settings - Advanced).



Graphics Properties...
Graphics Options
Exit Tray
Intel extreme graphics 2 for mobile
1:10 PM
Default Monitor and Intel(R) 82852/82855 GM/GME Graphics ...
General
Adapter
Monitor
Troubleshoot
Color Management
Intel(R) Extreme Graphics 2 for Mobile
Intel extreme graphics 2 for mobile
Graphics Properties...
OK
Cancel
Apply

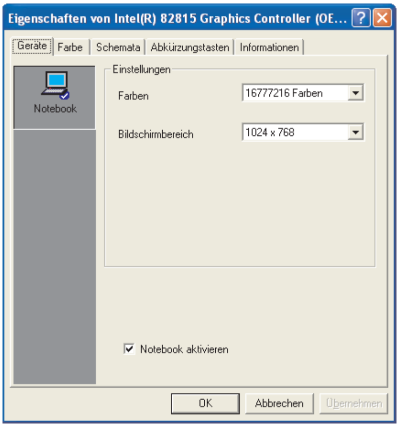
More visual display options for devices attached to this computer, such as:

Television
Digital Display
Notebook
Monitor

are available here :

☑ Show Tray Icon

Figure 264: Graphics driver for 815E Control Panel access



Farben: 16777216 Farben

Bildschirmbereich: 1024 x 768

☑ Notebook aktivieren

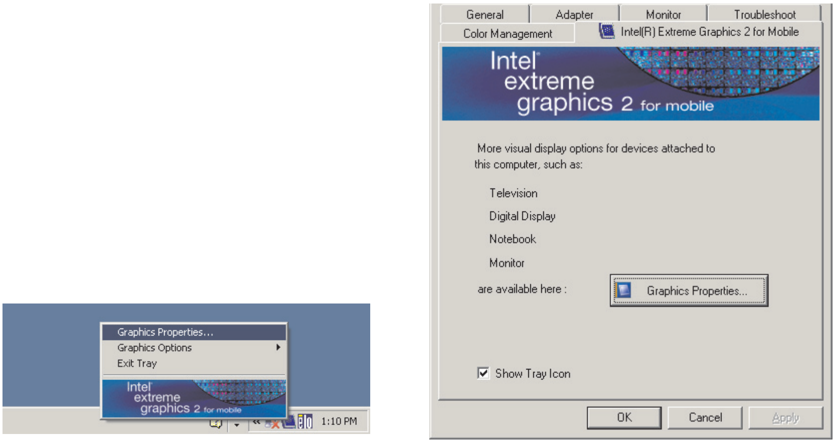
Figure 265: Graphics driver for 815E settings

5.2.2 Graphics driver installation - 855GME (ETX / XTX) CPU boards

Information:

The following screenshots and descriptions refer to the graphics driver version 14.11 for 855GME CPU boards. Therefore, it is possible that the screenshots and descriptions might not correspond with the installed driver version.

After the driver is installed, it can be configured in the Control Panel (called up through the icon in the taskbar or Start - Control Panel - Display - Settings - Advanced).


Graphics Properties...
Graphics Options
Exit Tray
Intel extreme graphics 2 for mobile
1:10 PM
General
Adapter
Monitor
Troubleshoot
Color Management
Intel(R) Extreme Graphics 2 for Mobile
Intel extreme graphics 2 for mobile

More visual display options for devices attached to this computer, such as:

Television
Digital Display
Notebook
Monitor

are available here : Graphics Properties...

☑ Show Tray Icon

Figure 266: Accessing the graphics driver via Control Panel

Information:

The connected Automation Panel 900 is still not activated after installing the graphics driver.
See the FAQ for information on this topic: "My Automation Panel 900 is still not activated after installing the graphics driver.", on page 556.

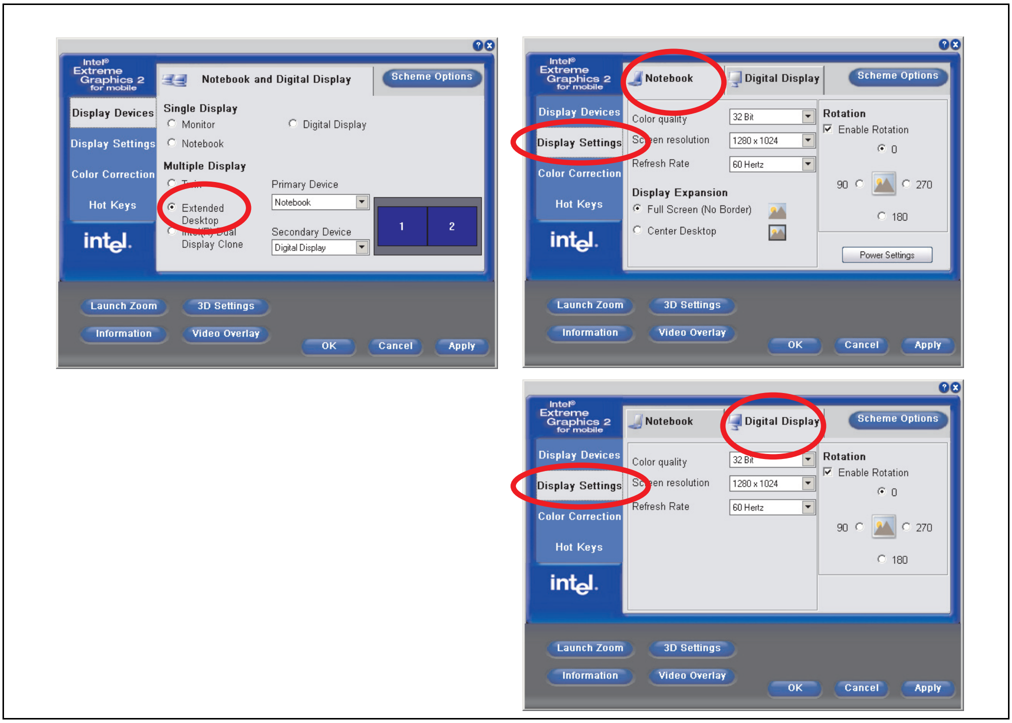
5.2.3 Graphics settings for Extended Desktop

Under the "Extended desktop" settings, "Notebook" can be set as the primary device (Graphics Engine 1) and "Digital display" as secondary device (Graphics Engine 2). The two lines display different content (Extended Desktop).

Driver settings		Effect on APC620	
Primary device	Notebook	AP Link output	Graphics engine 1
Secondary device	Digital display	Monitor / Panel	Graphics engine 2
Primary device	Digital display	Monitor / Panel	Graphics engine 2
Secondary device	Notebook	AP Link output	Graphics engine 1

Table 348: Relationship between driver settings and graphics engine

Resolution and color depth can be configured separately for each line via the device settings for notebook and digital display.



Single Display
○ Monitor
○ Notebook
○ Digital Display

Multiple Display
○ Twin
● Extended Desktop
○ Intel(R) Dual Display Clone

Primary Device: Notebook
Secondary Device: Digital Display

Color quality: 32 Bit
Screen resolution: 1280 x 1024
Refresh Rate: 60 Hertz

Display Expansion
● Full Screen (No Border)
○ Center Desktop

Rotation
☑ Enable Rotation
● 0 ○ 90 ○ 270 ○ 180

Figure 267: Extended desktop settings - primary and secondary device

Due to the operation of two different lines, for each line one of the internal serial interfaces COM C and COM D on the APC620 must be activated in BIOS (under Advanced - Baseboard/Panel Features - Legacy Devices) for the Automation 900 devices' touch screens. See the section 5.3.1 "Installation for Extended Desktop", on page 558 for information about installing the touch screen driver.

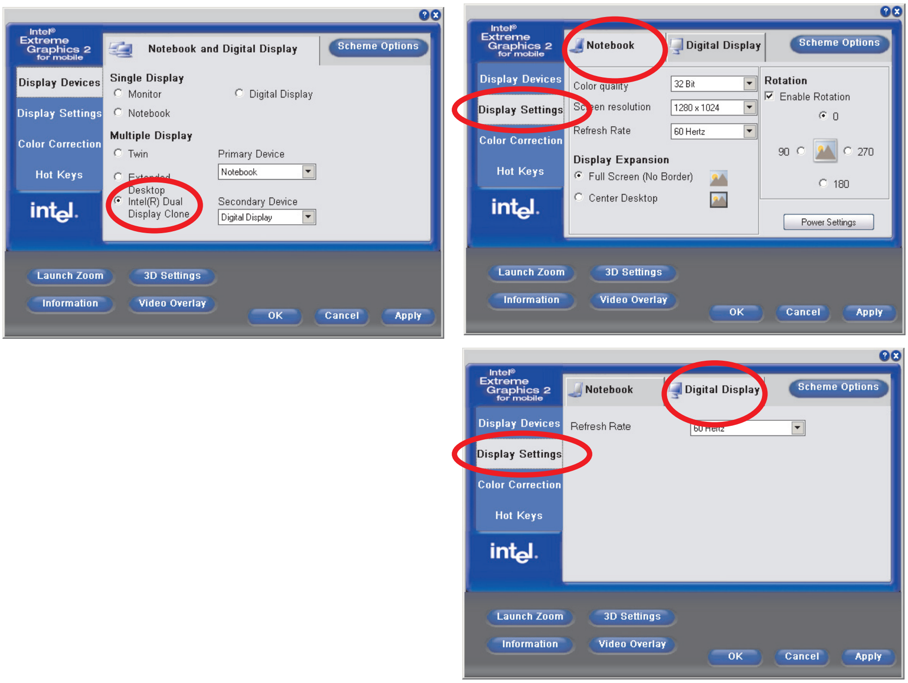
5.2.4 Graphics settings for Dual Display Clone

In "Dual display clone" mode, the same content is displayed on every connected Automation Panel 900 unit on both lines (Graphics Engine 1 and Graphics Engine 2). This enables operation of the application from every display.

Driver settings		Effect on APC620	
Primary device	Notebook	AP Link output	Graphics engine 1
Secondary device	Digital display	Monitor / Panel	Graphics engine 2
Primary device	Digital display	Monitor / Panel	Graphics engine 2
Secondary device	Notebook	AP Link output	Graphics engine 1

Table 349: Relationship between driver settings and graphics engine

Resolution and color depth can only be set on the line designated as the primary device.



Multiple Display: Intel(R) Dual Display Clone

Primary Device: Notebook

Secondary Device: Digital Display

Color quality: 32 Bit

Screen resolution: 1280 x 1024

Refresh Rate: 60 Hertz

Display Expansion: Full Screen (No Border)

Rotation: Enable Rotation, 0

Figure 268: Dual display clone settings - primary and secondary device

The internal serial interface COM C on the APC620 must be activated in BIOS (under Advanced - Baseboard/Panel Features - Legacy Devices) for the Automation 900 devices' touch screens. See the section 5.3.2 "Installation for Dual Display Clone", on page 560 for information about installing the touch screen driver.

A panel locking time can be set in the B&R Control Center to prevent simultaneous operation of the Automation Panel 900 (see the .chm help file for the B&R Control Center).

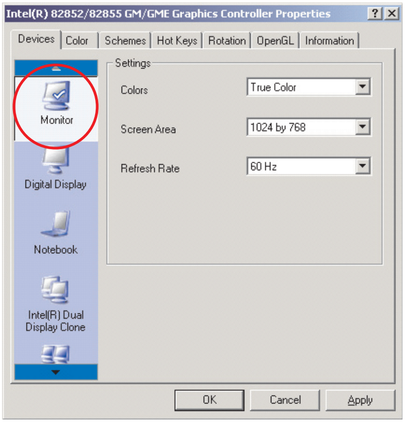
Information:

- **The panel locking time is reset to the value configured in the key configuration (KCF - Key Configuration File) when the system is restarted.**

5.2.5 FAQ

My Automation Panel 900 is still not activated after installing the graphics driver.

After installation, the graphics driver is automatically set to the analog output - RGB (monitor). As a result, any Automation Panel 900 connected via SDL (Smart Display Link) or DVI remains switched-off after loading the Intel graphics driver in Windows XP.

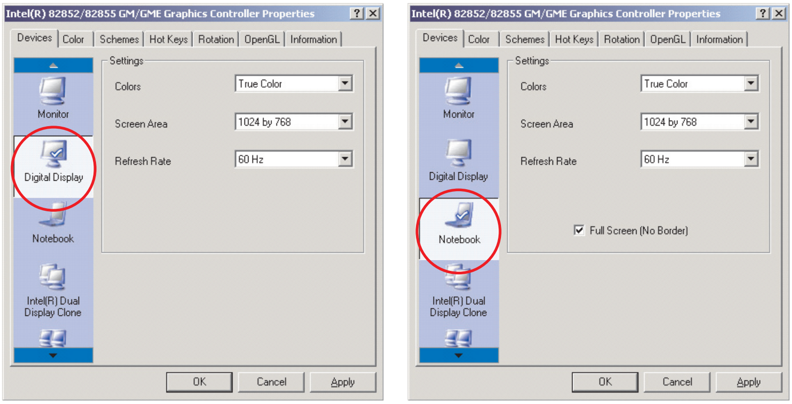


Colors: True Color
Screen Area: 1024 by 768
Refresh Rate: 60 Hz

Is set to "Monitor" after installation

Figure 269: Settings after installing the graphics driver

To correct this problem, an analog monitor (RGB) must be connected to the monitor/panel, to re-activate the settings for digital output (digital display for the monitor/panel output or notebook for the AP Link output).



Settings

Colors: True Color

Screen Area: 1024 by 768

Refresh Rate: 60 Hz

☑ Full Screen (No Border)

Digital display for Monitor / Panel output

Notebook for AP Link output

Figure 270: Settings for adjustment

5.3 Touch screen driver

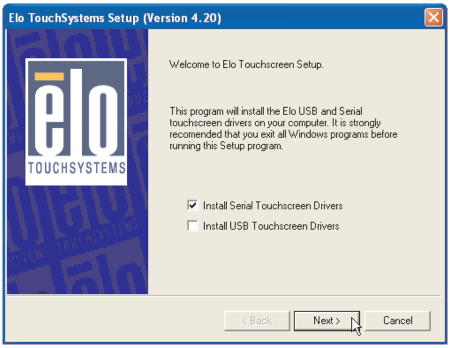
For operation modes "extended desktop" and "dual display clone", the Elo touch screen driver must be installed. This can be found in the download area (Service - Material Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (**www.br-automation.com**).

> # Information:
>
> **The touch screen drivers are based on the Windows mouse system. That means that either a mouse (USB or PS/2) must have been connected during the Windows installation or the mouse drivers must be installed additionally (e.g. automatically installed when later connecting a USB mouse). The BIOS function "PS/2 Mouse" must be set to "Enabled" when using a PS/2 mouse. This is located on the BIOS setup page "Advanced" - "Miscellaneous" (the default setting is "Disabled").**

5.3.1 Installation for Extended Desktop

> # Information:
>
> - Activate COM C and COM D in BIOS.
> - During installation the panel locking time must be set to 0 ms ("Auto detect" of the driver could only recognize 1 touch screen).

- Executing setup
- The Automation Panel 900 unit's touch screen is connected with the APC620 serially, so the serial touch screen drivers must be installed.



Elo TouchSystems Setup (Version 4.20)

Welcome to Elo Touchscreen Setup.

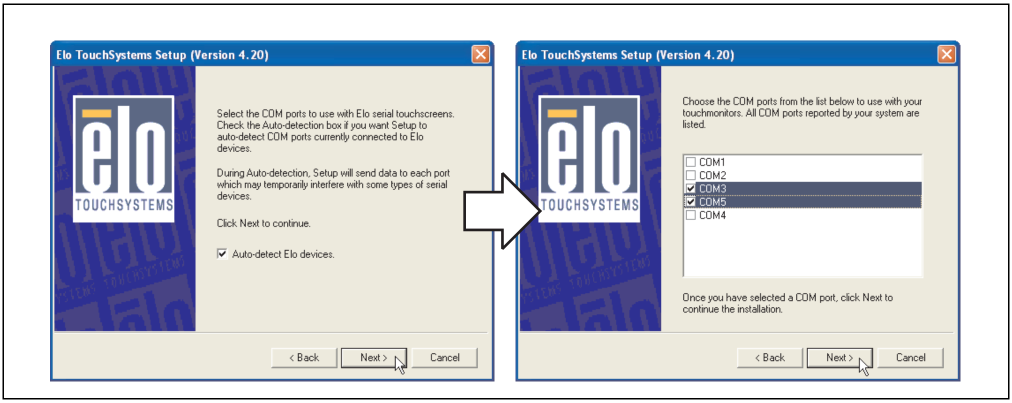
This program will install the Elo USB and Serial touchscreen drivers on your computer. It is strongly recomended that you exit all Windows programs before running this Setup program.

☑ Install Serial Touchscreen Drivers

☐ Install USB Touchscreen Drivers

Figure 271: Touch screen driver - serial touch screen

- The driver's auto-detect function sends data packets to every existing serial interface. It then returns a list of all the ports on which an Elo touch screen is connected. The panel locking time must be set to 0 ms (auto-detect only found 1 touch screen)



Select the COM ports to use with Elo serial touchscreens. Check the Auto-detection box if you want Setup to auto-detect COM ports currently connected to Elo devices.

During Auto-detection, Setup will send data to each port which may temporarily interfere with some types of serial devices.

Click Next to continue.

☑ Auto-detect Elo devices.

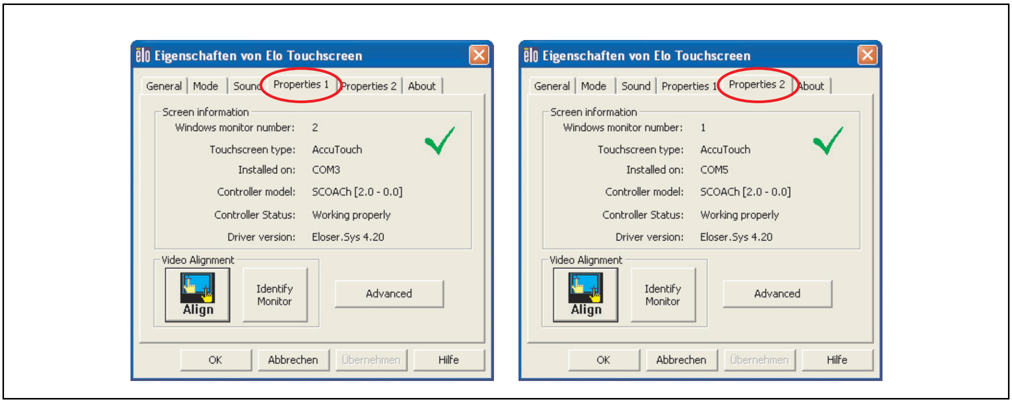
Choose the COM ports from the list below to use with your touchmonitors. All COM ports reported by your system are listed.

☐ COM1
☐ COM2
☑ COM3
☑ COM5
☐ COM4

Once you have selected a COM port, click Next to continue the installation.

Figure 272: Touch screen driver - auto-detect

- After selecting the COM ports on which Elo touch screens are connected, the system must be rebooted.
- After restarting, each line of touch screens must be calibrated separately. This is done in the menus "Properties 1" and "Properties 2" with the "Align" button. When one touch screen is being calibrated, the others are automatically locked.



Windows monitor number: 2
Touchscreen type: AccuTouch
Installed on: COM3
Controller model: SCOACh [2.0 - 0.0]
Controller Status: Working properly
Driver version: Eloser.Sys 4.20

Windows monitor number: 1
Touchscreen type: AccuTouch
Installed on: COM5
Controller model: SCOACh [2.0 - 0.0]
Controller Status: Working properly
Driver version: Eloser.Sys 4.20

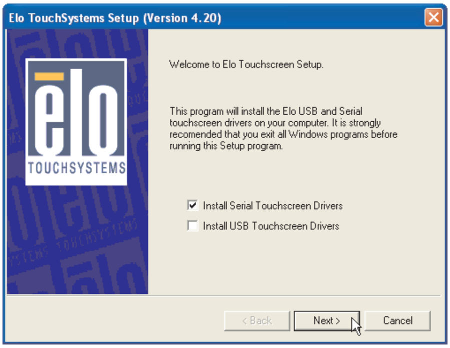
Figure 273: Touch screen calibration

5.3.2 Installation for Dual Display Clone

Information:

- Activate COM C in BIOS.
- During installation the panel locking time must be set to 0 ms ("Auto detect" of the driver could only recognize 1 touch screen).

- Executing setup
- The Automation Panel 900 unit's touch screen is connected with the APC620 serially, so the serial touch screen drivers must be installed.



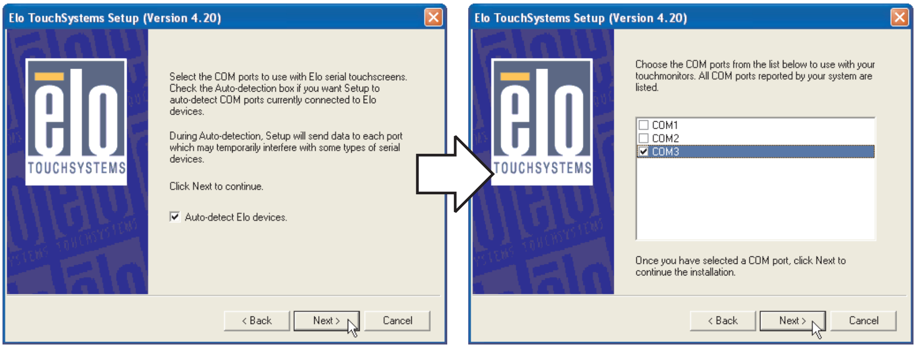
Welcome to Elo Touchscreen Setup.

This program will install the Elo USB and Serial touchscreen drivers on your computer. It is strongly recomended that you exit all Windows programs before running this Setup program.

☑ Install Serial Touchscreen Drivers
☐ Install USB Touchscreen Drivers

Figure 274: Touch screen driver - serial touch screen

- The driver's auto-detect function sends data packets to every existing serial interface. It then returns a list of all the ports on which an Elo touch screen is connected. The panel locking time must be set to 0 ms (auto-detect only found 1 touch screen)


Elo TouchSystems Setup (Version 4.20)
TOUCHSYSTEMS
< Back
Next >
Cancel
Elo TouchSystems Setup (Version 4.20)
TOUCHSYSTEMS
< Back
Next >
Cancel

Select the COM ports to use with Elo serial touchscreens. Check the Auto-detection box if you want Setup to auto-detect COM ports currently connected to Elo devices.

During Auto-detection, Setup will send data to each port which may temporarily interfere with some types of serial devices.

Click Next to continue.

☑ Auto-detect Elo devices.

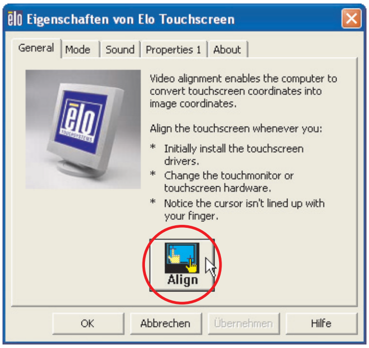
Choose the COM ports from the list below to use with your touchmonitors. All COM ports reported by your system are listed.

☐ COM1
☐ COM2
☑ COM3

Once you have selected a COM port, click Next to continue the installation.

Figure 275: Touch screen driver - auto-detect

- After selecting the COM ports on which Elo touch screens are connected, the system must be rebooted.
- After restarting, only one touch screen must be calibrated. These settings are then applied to other touch screens.



Video alignment enables the computer to convert touchscreen coordinates into image coordinates.

Align the touchscreen whenever you:

* Initially install the touchscreen drivers.
* Change the touchmonitor or touchscreen hardware.
* Notice the cursor isn't lined up with your finger.

Figure 276: Touch screen calibration

5.3.3 FAQ

Power options and touch screen

The power options allow a few different settings (e.g. Turn off monitor, Turn off hard disks and System standby for a Windows XP system).

Caution!

If the "Turn off monitor" function is enabled and a time has been set, then touching the dark touch display after the time has expired presents the risk of "blindly" activating one of the commands in the application and unintentionally triggering functions.

This can be avoided by activating a screen saver. As a result, the next time the touch screen is touched, the screen saver is deactivated.

5.4 Audio driver

An audio driver can be found in the download area (Service - Material Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (**www.br-automation.com**).

See the section "MIC, Line IN and Line OUT ports", on page 144 for information about the audio driver type.

5.4.1 Installation

Execute the downloaded setup.

Information:

The option "AC97 Audio controller" must be set to "Enabled" (default setting) in BIOS under Advanced - I/O Device Configuration.

5.5 Network driver

The APC620 has 2 different networks controllers. Drivers for both network connections (ETH1 and ETH2) are available for approved operating systems in the download area (Service - Material Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (**www.br-automation.com**).

See the sections "Ethernet connection ETH1", on page 130 and "Ethernet connection ETH2", on page 132 for information about network controller types.

5.5.1 Installation ETH1

Execute the downloaded setup.

5.5.2 Installation ETH2

Installation is performed via the Windows device manager using the Net559ER.inf file.

5.6 Automation PC 620 embedded

The fieldbus interfaces CAN, X2X and POWERLINK are not supported by Microsoft Windows XP (no drivers present).

6. Automation PC 620 with Windows XP embedded

Figure 277: Windows XP Embedded Logo

Model number	Short description	Note
9S0001.19-020	**OEM Microsoft Windows XP Embedded APC620 815E w/CF, English** 512 MB CompactFlash card with Windows XP Embedded image for APC620 systems with a 815E CPU board. Only delivered with a new PC.	Cancelled since 10/2005 Replacement type: 5SWWXP.0412-ENG
9S0001.20-020	**OEM Microsoft Windows XP Embedded APC620 855GME w/CF, English** 512 MB CompactFlash card with Windows XP Embedded image for APC620 systems with a 855GME CPU board. Only delivered with a new PC.	Cancelled since 10/2007 Replacement type: 5SWWXP.0412-ENG
9S0001.27-020	**OEM Microsoft Windows XP Embedded (incl. SP2) APC620 815E w/CF, English** 512 MB CompactFlash card with Windows XP Embedded image including SP2 for APC620 systems with a 815E CPU board. Only delivered with a new PC.	Cancelled since 10/2005 Replacement type: 5SWWXP.0412-ENG
9S0001.28-020	**OEM Microsoft Windows XP Embedded (incl. SP2) APC620 855GME w/CF, English** 512 MB CompactFlash card with Windows XP Embedded image including SP2 for APC620 systems with a 855GME CPU board. Only delivered with a new PC.	Cancelled since 10/2007 Replacement type: 5SWWXP.0412-ENG
5SWWXP.0412-ENG	**WinXPe FP2007 APC620 E855GME** Order Microsoft Windows XP Embedded English, Feature Pack 2007, for APC620 with CPU boards 5PC600.E855-00, 5PC600.E855-01, 5PC600.E855-02, 5PC600.E855-03, 5PC600.E855-04, 5PC600.E855-05; CompactFlash separately (at least 512 MB). Only delivered with a new PC.	
5SWWXP.0413-ENG	**WinXPe FP2007 APC620 X855GME** Order Microsoft Windows XP Embedded English, Feature Pack 2007, for APC620 with CPU boards 5PC600.X855-00, 5PC600.X855-01, 5PC600.X855-02, 5PC600.X855-03, 5PC600.X855-04, 5PC600.X855-05; CompactFlash separately (at least 512 MB). Only delivered with a new PC.	

Table 350: Model numbers - Windows XP Embedded

6.1 General information

Windows XP Embedded is the modular version of the desktop operating system Windows XP Professional. Windows XP Embedded is based on the same binary files as Windows XP Professional 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 XP Embedded is also based on the same reliable code as Windows XP Professional. It provides industry with leading reliability, improvements in security and performance, and the latest technology for Web browsing and extensive device support.

The Windows XP Embedded available from B&R was developed for APC620 systems with 815E and 855GME CPU board units.

6.2 Features with FP2007 (Feature Pack 2007)

The feature list shows the most important device functions in Windows XP Embedded with Feature Pack 2007 (FP2007).

Function	Present
Enhanced write filter (EWF)	✓
File Based Write Filter	✓
Page file	Configurable
Administrator account	✓
User account	Configurable
Explorer shell	✓
Registry filter	✓
Internet Explorer 6.0 + SP2	✓
Internet information service (IIS)	-
Terminal service	✓
Windows Firewall	✓
MSN-Explorer	-
Outlook Express	-
Administrative Tools	✓
Remote Desktop	✓
Remote Assistance	-
.NET Framework	-
ASP.NET	-
Codepages/User Locale/Keyboard	✓
Disk Management Service	✓
Windows Installer Service	✓
Class Installer	✓
CoDevice Installer	✓
Media Player	-
DirectX	-
Accessories	✓
Number of fonts	89

Table 351: Device functions in Windows XP Embedded with FP2007

6.3 Installation

Upon request, Windows XP Embedded can be preinstalled at B&R Austria on a suitable CompactFlash card (min. 512 MB). The APC620 system is then automatically configured after it has been switched on for the first time. This procedure takes approximately 30 minutes, and the device will be rebooted a number of times.

Brief instructions for creating your own Windows XP Embedded images or a suitable Target Designer export file for 815E or 855GME CPU boards can be downloaded from the download area on the B&R homepage (**www.br-automation.com**).

6.4 Graphics drivers

Already included in the B&R Windows XP Embedded image for 815E and 855GME CPU boards.

6.5 Touch screen driver

The touch screen driver must be manually installed in order to operate Automation Panel 900 touch screen devices. The driver installation is identical to the driver installation for Windows XP Professional Systems. For more information, see 5.3 "Touch screen driver", on page 558

The driver can be downloaded from the download area on the B&R homepage (**www.br-automation.com**).

6.6 Audio driver

Already integrated in the B&R Windows XP Embedded image for 815E and 855GME CPU boards.

6.6.1 After a BIOS upgrade

If the following error message appears after upgrading BIOS:

`"Copy Error"`

`"Setup cannot copy the file Audio3d.dll"`

then the audio driver must be reinstalled.

To do this, use the audio driver from the B&R Homepage (**www.br-automation.com**).

During the installation of the audio driver, the following 2 files must be manually selected from the following directories.

`ksuser.dll` `in the directory ...\Windows\system32`

`ks.sys` `in the directory ...\Windows\system32\drivers`

This applies to 815E and 855ME CPU boards.

The graphics driver must be re-installed to enable all possible resolutions when using an 815E CPU board (see 5.2.1 "Installing the graphics driver for 815E (ETX) CPU boards").

6.7 Network driver

Already integrated in the B&R Windows XP Embedded image for 815E and 855GME CPU boards.

6.8 FAQ

6.8.1 Why does the B&R device restart when shutdown?

If the APC620 is connected with a B&R device, then the option "USB root hubs" must be disabled in the Windows XP Embedded device manager under "Universal Serial Bus controllers" using the following dialog box: **Properities > Power Management > Allow the computer to turn off this device to save power**.

7. Automation PC 620 with Windows Embedded Standard 2009

Windows® Embedded
Standard 2009

Figure 278: Windows Embedded Standard 2009 Logo

Model number	Short description	Note
5SWWXP.0712-ENG	**Windows Embedded Standard 2009 APC620 855GME ETX** Microsoft OEM Windows Embedded, Standard 2009, English; for APC620 with ETX CPU board with 855GME chipset; order CompactFlash separately (at least 1 GB).	
5SWWXP.0713-ENG	**Windows Embedded Standard 2009 APC620 855GME XTX** Microsoft OEM Windows Embedded, Standard 2009, English; for APC620 with XTX CPU board with 855GME chipset; order CompactFlash separately (at least 1 GB).	

Table 352: Model numbers - Windows Embedded Standard 2009

7.1 General information

Windows XP Embedded Standard 2009 is the modular version of the desktop operating system Windows XP Professional with Service Pack 3. Windows XP 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 XP Embedded Standard 2009 is also based on the same reliable code as Windows XP Professional with SP3. It provides industry with leading reliability, improvements in security and performance, and the latest technology for Web browsing and extensive device support.

7.2 Features with WES2009 (Windows Embedded Standard 2009)

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

Function	Present
Enhanced write filter (EWF)	✓
File Based Write Filter	✓
Page file	Configurable
Administrator account	✓
User account	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	-
Local Network Bridge	✓
Codepages/User Locale/Keyboard	✓
Disk Management Service	✓
Windows Installer Service	✓
Class Installer	✓
CoDevice Installer	✓
Media Player 6.4	✓
DirectX 9.0c	✓
Accessories	✓
Number of fonts	89

Table 353: Device functions in Windows Embedded Standard 2009

7.3 Installation

Upon request, Windows Embedded Standard 2009 can be preinstalled at B&R Austria on a suitable CompactFlash card (min. 1GB). The APC620 system is then automatically configured after it has been switched on for the first time. This procedure takes approximately 30 minutes, and the device will be rebooted a number of times.

7.4 Drivers

All drivers required for operation are preinstalled on the operating system. If an older driver version is installed, the latest version can be downloaded from the B&R homepage (**www.br-automation.com**) and installed. A potentially activated "Enhanced Write Filter (EWF)" must be taken into consideration.

7.4.1 Touch screen driver

The touch screen driver must be manually installed in order to operate Automation Panel 800 or Automation Panel 900 touch screen devices. The driver can be downloaded from the download area on the B&R homepage (**www.br-automation.com**). A potentially activated "Enhanced Write Filter (EWF)" must be taken into consideration.

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

8. Automation PC 620 with Windows CE

Microsoft®
Windows CE™

Model number	Short description	Note
5SWWCE.0512-ENG	**WinCE5.0 Pro APC620 E855GME** Order Microsoft Windows CE 5.0 Professional, English, including license, for APC620 with CPU boards 5PC600.E855-00, 5PC600.E855-01, 5PC600.E855-02, 5PC600.E855-03, 5PC600.E855-04, 5PC600.E855-05; CompactFlash separately (at least 128 MB).	
5SWWCE.0513-ENG	**WinCE5.0 Pro APC620 X855GME** Order Microsoft Windows CE 5.0 Professional, English, including license, for APC620 with CPU boards 5PC600.X855-00, 5PC600.X855-01, 5PC600.X855-02, 5PC600.X855-03, 5PC600.X855-04, 5PC600.X855-05; CompactFlash separately (at least 128 MB).	
5SWWCE.0612-ENG	**WinCE5.0 ProPlus APC620 E855GME** Order Microsoft Windows CE 5.0 Professional Plus, English, including license, for APC620 with CPU boards 5PC600.E855-00, 5PC600.E855-01, 5PC600.E855-02, 5PC600.E855-03, 5PC600.E855-04, 5PC600.E855-05; CompactFlash separately (at least 128 MB).	
5SWWCE.0613-ENG	**WinCE5.0 ProPlus APC620 X855GME** Order Microsoft Windows CE 5.0 Professional Plus, English, including license, for APC620 with CPU boards 5PC600.X855-00, 5PC600.X855-01, 5PC600.X855-02, 5PC600.X855-03, 5PC600.X855-04, 5PC600.X855-05; CompactFlash separately (at least 128 MB).	
5SWWCE.0812-ENG	**WinCE6.0 Pro APC620 E855GME** Order Microsoft Windows CE 6.0 Professional, English, including license, for APC620 with CPU boards 5PC600.E855-00, 5PC600.E855-01, 5PC600.E855-02, 5PC600.E855-03, 5PC600.E855-04, 5PC600.E855-05; CompactFlash separately (at least 128 MB).	
5SWWCE.0813-ENG	**WinCE6.0 Pro APC620 X855GME** Order Microsoft Windows CE 6.0 Professional, English, including license, for APC620 with CPU boards 5PC600.X855-00, 5PC600.X855-01, 5PC600.X855-02, 5PC600.X855-03, 5PC600.X855-04, 5PC600.X855-05; CompactFlash separately (at least 128 MB).	

Table 354: Model numbers - Windows CE

8.1 General information

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

8.2 Windows CE 5.0 features

Detailed information about Windows CE for B&R devices can be downloaded in the download area on the B&R homepage (www.br-automation.com).

Features	Windows CE 5.0
Supported screen resolutions	VGA (TFT), SVGA (TFT), XGA (TFT)
Chipset	Intel 855GME
Color depth	16 bit or 65536 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. 39 seconds
Screen rotation	not supported
Web browser	Internet Explorer
.NET	Compact Framework
Image size	Approx. 31 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 355: Windows CE 5.0 features

1) The color depth depends on the display used.

2) Use the function *"Compress Windows CE Image"* in the B&R Embedded OS Installer to reduce the image size.

8.3 Windows CE 6.0 features

Detailed information about Windows CE for B&R devices can be downloaded in the download area on the B&R homepage (**www.br-automation.com**).

Features	Windows CE 6.0
Supported screen resolutions	VGA (TFT), SVGA (TFT), XGA (TFT)
Chipset	Intel 855GME
Color depth	16 bit or 65536 colors[1)]
Graphics card driver	Intel® embedded graphics driver
Main memory	Automatic detection and use of up to 512 MB RAM
Boot time / Startup time	Approx. 20 seconds
Screen rotation	not supported
Web browser	Internet Explorer
.NET	Compact Framework
Image size	Approx. 33 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 356: Windows CE 6.0 features

1) The color depth depends on the display used.

2) Use the function *"Compress Windows CE Image"* in the B&R Embedded OS Installer to reduce the image size.

8.4 Differences between Windows CE 6.0 and Windows CE 5.0

- 2 GB of virtual RAM per process (Windows CE 5.0: 32 MB).
- Simultaneous operation of up to 32,000 processes (Windows CE 5.0: 32 processes).

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 the B&R plant.

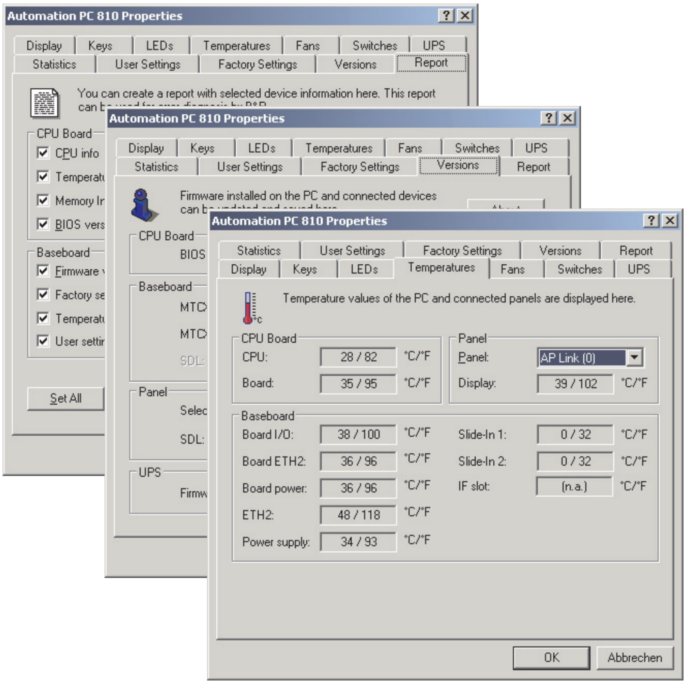
8.6.1 B&R Embedded OS Installer

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

The B&R Embedded OS Installer can be downloaded from the download area on the B&R homepage (**www.br-automation.com**). Further information is available in the online help for the B&R Embedded OS Installer.

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

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



You can create a report with selected device information here. This report

Temperature values of the PC and connected panels are displayed here.

CPU Board
CPU: 28 / 82 °C/°F
Board: 35 / 95 °C/°F

Panel
Panel: AP Link (0)
Display: 39 / 102 °C/°F

Baseboard
Board I/O: 38 / 100 °C/°F
Board ETH2: 36 / 96 °C/°F
Board power: 36 / 96 °C/°F
ETH2: 48 / 118 °C/°F
Power supply: 34 / 93 °C/°F
Slide-In 1: 0 / 32 °C/°F
Slide-In 2: 0 / 32 °C/°F
IF slot: (n.a.) °C/°F

Figure 279: ADI Control Center screenshots - Example (symbol photo)

Information:

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

9.1 Features

Information:

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

- Adjusting the display-specific parameters of connected Panels
- Reading of device-specific keys
- Activation of device specific LEDs on a foil keypad
- Reading temperatures, fan speeds, statistical data, and switch settings
- Reading user settings and factory settings
- Reading software versions
- Updating and securing firmware
- Creating reports about the current system (support assistance)
- Setting the SDL equalizer value for the SDL cable adjustment
- Configuring an optional mounted UPS
- Change the user serial ID.

Supports following systems:

- Automation PC 620
- Automation PC 810
- Automation PC 820
- Panel PC 300
- Panel PC 700
- Panel PC 725
- Panel PC 800
- Power Panel 300/400 BIOS Geräte
- Power Panel 500
- Mobile Panel BIOS Geräte
- Automation Panel 800 (in connection with Automation PCs and Panel PCs)
- Automation Panel 900 (in connection with Automation PCs and Panel PCs)

9.2 Installation

A detailed description of the Control Center can be found in the integrated online help. The B&R Automation Device Interface (ADI) driver (also contains Control Center) can be downloaded for free from the download area on the B&R homepage (www.br-automation.com).

1. Download and unzip the ZIP archive

2. Close all applications

3. Run BrSetup.exe (e.g. double-click on it in Explorer).

- or -

1. Right click on BrSetup.inf in explorer and select "Install".

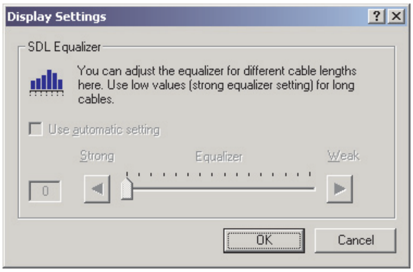
> ## Information:
>
> **The ADI driver is already included in the B&R images of embedded operating systems.**
>
> **If a more current ADI driver version exists (see the B&R homepage download area), it can be installed later. A potentially activated "Enhanced Write Filter (EWF)" must be taken into consideration when installing.**

9.3 SDL equalizer setting

1) Start the **Control Center** in the **Control Panel**.

2) Then select the **Display** tab.

3) Click on **Settings**. This opens the following dialog box:



Display Settings

SDL Equalizer

You can adjust the equalizer for different cable lengths here. Use low values (strong equalizer setting) for long cables.

☐ Use automatic setting

0

Figure 280: ADI Control Center - SDL equalizer settings

You can change the display's SDL equalizer settings in this dialog box. The equalizer is integrated in the Automation Panel and adapts the DVI signal to various cable lengths. The equalizer value is automatically calculated based on the cable length: You may set a different equalizer value in order to obtain the best possible display quality (e.g. with low-quality cables or poor DVI signal quality).

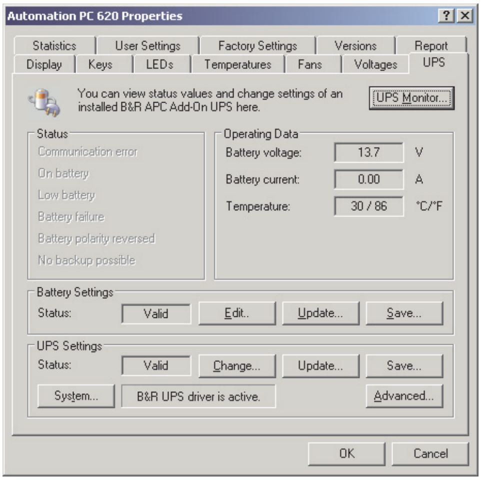
The value is optimally defined for the cable length when using the "Automatic setting".

Information:

The equalizer value can only be changed if the function is supported by the panel (panel firmware version 1.04 or higher) and if MTCX PX32 version 1.54 or higher is installed. Otherwise, the dialog fields are disabled.

9.4 UPS configuration

Here you can view the status values for an optionally installed B&R APC add-on UPS as well as change, update or save the battery settings for the UPS. You can also configure the system settings for the UPS.



Automation PC 620 Properties

You can view status values and change settings of an installed B&R APC Add-On UPS here.

Battery voltage: 13.7 V

Battery current: 0.00 A

Temperature: 30 / 86 °C/°F

Battery Settings Status: Valid

UPS Settings Status: Valid

B&R UPS driver is active.

Figure 281: ADI Control Center - UPS settings

Caution!

The installed UPS must be selected and configured in the Control Panel using the energy options in order for battery operation to be supported.

Information for Windows XP Embedded:

The UPS service is supported starting with B&R Windows Embedded Version 2.10 or higher.

9.4.1 Installing the UPS service for the B&R APC add-on UPS

1) Open the **Control Center** in the **Control Panel**.

2) Select **UPS** tab.

3) Click on **System** under **UPS settings**. This opens the **Power Options** in the **Control Panel**. (The **Power Options** can also be opened directly from the **Control Panel**.)

4) Select the **UPS** tab and click **Select...**.

5) Choose 'Bernecker + Rainer' as manufacturer and 'APC Add-On UPS' as model and then click **Finish**. The value for the COM connection is only required for a serially connected UPS and is ignored by the APC add-on UPS driver.

6) Click on **Apply** to begin UPS operation. After a few seconds the UPS status and details are displayed.

7) Click **OK**.

8) The text field beside **System** (on the **UPS** tab in the **Control Center**) also indicates whether the B&R UPS driver is active.

> **Information:**
>
> - **Administrator rights are required in order to change the energy options or display the UPS status.**

9.4.2 Displaying UPS status values

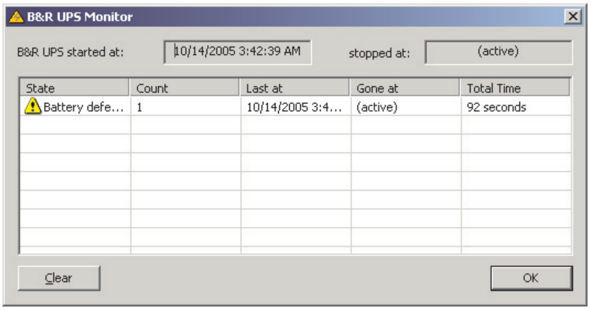
1) Open the **Control Center** in the **Control Panel**.

2) Select **UPS** tab.

The displayed values are updated automatically.

> **Information:**
>
> **The "reversed battery polarity" status is only displayed in UPS firmware version 1.08 or higher.**
>
> **In UPS firmware Version 1.07 or smaller, a change between battery operation and normal operation can lead to communication errors.**

3) **Select UPS monitor** to display UPS status changes since the last time the system or UPS driver was started.



B&R UPS started at: 10/14/2005 3:42:39 AM

stopped at: (active)

State	Count	Last at	Gone at	Total Time
⚠ Battery defe...	1	10/14/2005 3:4...	(active)	92 seconds

Figure 282: ADI Control Center - UPS monitor

The dialog box is updated automatically when the status changes.

To remove a status from the list, click on **delete**.

Information:

The current status of the UPS is also displayed when the UPS service is started in the Windows Control Panel on the UPS page in the energy options.

Information:

In a German version of Windows XP Professional the battery status is displayed as "low" in the energy options, even if the battery is OK (Windows error). In an English version, three battery status levels are displayed: unknown, OK, replace A low battery status is never displayed.

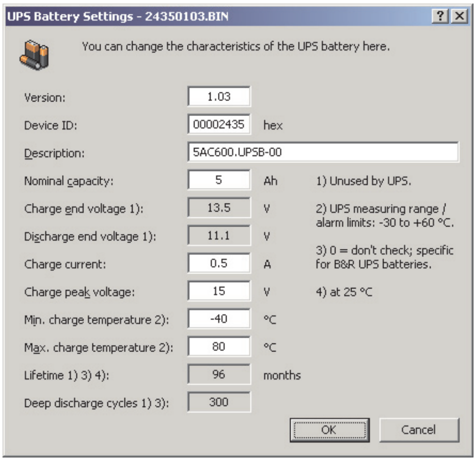
9.4.3 Changing UPS battery settings

1) Open the **Control Center** in the **Control Panel**.

2) Select **UPS** tab.

3) Under "Battery settings," click on **Edit**. Clicking on "Open" opens a dialog box.

4) Select and **open** the file containing the battery settings.



UPS Battery Settings - 24350103.BIN

You can change the characteristics of the UPS battery here.

Version: 1.03

Device ID: 00002435 hex

Description: 5AC600.UPSB-00

Nominal capacity: 5 Ah

Charge end voltage 1): 13.5 V

Discharge end voltage 1): 11.1 V

Charge current: 0.5 A

Charge peak voltage: 15 V

Min. charge temperature 2): -40 °C

Max. charge temperature 2): 80 °C

Lifetime 1) 3) 4): 96 months

Deep discharge cycles 1) 3): 300

1) Unused by UPS.

2) UPS measuring range / alarm limits: -30 to +60 °C.

3) 0 = don't check; specific for B&R UPS batteries.

4) at 25 °C

Figure 283: ADI Control Center - UPS battery settings

In this dialog box you can change the settings for the UPS battery.

The changed settings are written to the file by clicking on the **OK** button. The battery settings for the UPS can then be updated with this file.

Information:

To make settings for batteries not from B&R, it is best to make a copy of a file with battery settings from B&R under a new name and make adjust the settings in this file for the battery being used.

Current files with settings for batteries from B&R can be found on the B&R APC620 / PPC700 firmware upgrade disk (starting with V1.16) and can also be updated using these.

Information:

- **The current UPS firmware version 1.10 does not use charge end voltage, deep discharge voltage, lifespan and deep discharge cycles.**
- **Lifespan is only included in version 2 (and higher) of the UPS battery settings and only valid for B&R UPS batteries at 25°C ambient temperature.**
- **Deep discharge cycles are only included in version 3 (and higher) of the UPS battery settings and only valid for B&R UPS batteries.**

Information:

If you would like to change the current battery settings on the UPS, they must first be saved in a file.

9.4.4 Updating UPS battery settings

1) Open the **Control Center** in the **Control Panel**.
2) Select **UPS** tab.
3) Under **Battery settings**, click on **Update**. Clicking on "Open" opens a dialog box.
4) Select and **open** the file containing the battery settings. The "Download" dialog box is opened.

The transfer can be aborted by clicking on **Cancel** in the Download dialog box. **Cancel** is disabled when the flash memory is being written to.

Caution!

- **The UPS cannot be operated while updating the battery settings.**
- **If the transfer is interrupted, then the procedure must be repeated until the battery settings have been updated successfully. Otherwise battery operation will no longer be possible.**

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 UPS is automatically restarted after a successful download. This can cause a brief failure in the UPS communication.

9.4.5 Saving UPS battery settings

1) Open the **Control Center** in the **Control Panel**.

2) Select **UPS** tab.

3) Under "Battery settings", click on **Save**. Clicking on "Save under" opens a dialog box.

4) Enter a file name or select an existing file and click on **Save**.

Information:

UPS settings can only be saved using UPS firmware version 1.10 and higher.

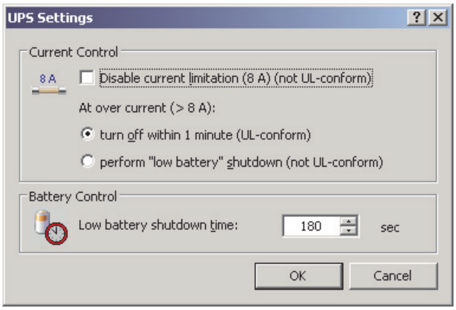
The transfer can be aborted by clicking on **Cancel** in the Download dialog box.

9.4.6 Configuring UPS system settings

1) Open the **Control Center** in the **Control Panel**.

2) Select **UPS** tab.

3) Click on **System** under **UPS settings**. The energy options dialog box in the Control Panel is opened.



☐ Disable current limitation (8 A) (not UL-conform)

At over current (> 8 A):

● turn off within 1 minute (UL-conform)

○ perform "low battery" shutdown (not UL-conform)

Low battery shutdown time: 180 sec

Figure 284: ADI Control Center - UPS settings

Further information regarding the UPD system settings can be found in the Windows help.

Information:

- **UPS settings can only be changed using UPS firmware version 1.10 and higher. If there are no changed settings on the UPS, then the factory or default settings are used.**
- **The UPS is automatically restarted after UPS settings have been changed. This can cause a brief disruption in communication with the UPS.**
- **Administrator rights are required in order to change the energy options or display the UPS status.**

Disabling 8 A current limitation

Information:

It is not UL compliant to switch off the 8 A current limitation on devices during battery operation!

"Low Battery" shutdown caused by an over-current of > 8 A on devices during battery operation is not UL compliant!

Select the checkbox **Disable current limitation (8 A)**.

If current limitation is enabled (checkbox deselected), then the UPS uses battery operation to check whether the UPS battery is discharged with 8 A for longer than 16 seconds. If so, then an overcurrent alarm is sent to the PC.

Information:

Current limitation is only supported with UPS firmware version 1.10 and higher.

Enabling one of the two following options determines how the UPS should perform when an overcurrent alarm occurs:

If **Turn-off within 1 minute** is selected, then the UPS will turn-off within one when an overcurrent alarm occurs.

Warning!

The operating system will not be properly shut down if an overcurrent alarm occurs!

If **Perform "low battery" shutdown** is selected, then the UPS will also signal a "Low battery alarm" in addition to the overcurrent alarm and will turn off after the defined **Low battery shutdown time**. This will allow the operating system to shut down properly when UPS service is enabled.

Changing the UPS shutdown time when battery is low

Enter the **"Low Battery" shutdown time** in seconds. This is the amount of time that the UPS will wait before shutting off the power supply when the battery level is low.

This prevents the UPS battery from becoming too discharged if the Windows UPS service is not enabled and the UPS is therefore not turned off by the operating system.

If the UPS service is enabled, then the UPS will be turned off by the operating system when the battery level is low, based on the Windows UPS service **Turn-off delay** (see 9.4.7 "Changing additional UPS settings"). The **low battery shutdown time** will then be ignored.

Information:

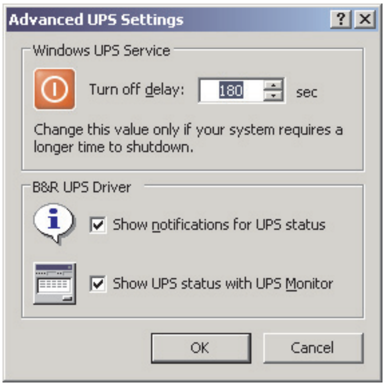
- **The low battery shutdown time must be set to at least 60 seconds, so that the operating system has enough time to send the shutdown command to the UPS when the battery level is low (normally occurs after approximately 30 seconds).**
- **The low battery shutdown time can only be set in UPS firmware version 1.10 and later. UPS firmware version 1.08 always uses a turn off delay time of 180 seconds. UPS firmware versions earlier than 1.08 do not shut down automatically when the battery level is low.**

9.4.7 Changing additional UPS settings

1) Open the **Control Center** in the **Control Panel**.

2) Select **UPS** tab.

3) Click on **Advanced** under **UPS settings**. This opens the following dialog box:



Turn off delay: 180 sec

Change this value only if your system requires a longer time to shutdown.

☑ Show notifications for UPS status

☑ Show UPS status with UPS Monitor

Figure 285: ADI Control Center - Advanced UPS settings

Information:

Administer rights are required in order to display this dialog box.

Change turn-off time for UPS

The **Shutdown time** can be specified in seconds under **Windows UPS service**. This is the length of time that the UPS waits before switching off the power supply. When a critical alarm occurs (e.g. at low battery level), the Windows UPS service will send a shutdown command with the turn off delay time to the UPS and will shut down the system.

Information:

This time is evaluated by the Windows UPS Service, but can not be set in the UPS system settings of the energy options. This value should only be changed if the system requires longer than the default setting of 180 seconds to shut down.

Caution!

The time entered must be longer than the time required to shut down the operating system.

Activate UPS messages

Under "B&R UPS driver", activate the checkbox "UPS status messages". Any changes to the UPS status will then trigger a message from the B&R UPS driver.

Information:

Shutting down the system is only reported by the Windows UPS Service. The UPS Service also sends other messages if they are activated in the UPS system settings energy options. These messages are only displayed when the Windows Alerter and Windows Messenger[1] are active and the PC is logged on to a network. Additionally, some conditions of the B&R APC620 UPS are not detected by the Windows UPS Service, and are therefore do not trigger messages (e.g. when there are no battery settings on the UPS). The Windows Services can be found in the Control Panel under Administrative Tools - Services.

[1] The Windows Alerter is supported starting with B&R Windows Embedded Version 2.10 or higher.

If the checkbox **Display UPS status with UPS monitor** is also activated, a new message is not displayed for every change, but only a general message and request for you to start the B&R UPS monitor. As long as the UPS monitor is active, no new messages are displayed.

Information:

Regardless of these options, all changes to the UPS status are logged in Windows event protocol (under "Application").

9.4.8 Procedure following power failure

Over-current shutdown

If an over-current >8 A is present during battery operation for a duration of 16 seconds, the over-current shutdown is executed. A turn-off time of one minute is available to the system.

If the supply is regenerated during this time, then the shut down process is aborted.

Information:

The over-current shutdown has the highest priority.

Low battery shutdown

If the LowBatteryFlag is set during power failure, then the "low battery" shutdown is executed, preventing the battery from fully discharging. Once the turn-off time expires (3 minutes by default), the UPS shuts down.

If an "over-current" shutdown or "standard" shutdown is detected during the shutdown process, the "low battery" shutdown is replaced by the respective process.

Standard shutdown

The standard shutdown is effective when the UPS service is active, the turn-off time is 3 minutes by default.

If the supply voltage returns during the turn-off time, then the shutdown procedure will be stopped.

If the supply voltage returns during the shutdown process, then the shutdown timer will run until the APC620 enters standby mode and will then reboot the system.

Chapter 5 • Standards and certifications

1. Applicable European directives

- EMC directive 2004/108/EG
- Low-voltage directive 2006/95/EG
- Machine directives 98/37/EG beginning 12/29/2009: 2006/42/EG

2. Overview of standards

Standard	Description
EN 55011 Class A	Electromagnetic compatibility (EMC), radio disturbance product standard, industrial, scientific, and medical high-frequency devices (ISM devices), limit values and measurement procedure; group 1 (devices that do not create HF during material processing) and group 2 (devices that create HF during material processing)
EN 55022 Class A	Electromagnetic compatibility (EMC), radio disturbance characteristics, information technology equipment (ITE devices), limits and methods of measurement
EN 60060-1	High-voltage test techniques - part 1: General specifications and testing conditions
EN 60068-2-1	Environmental testing - part 2: Tests; test A: Dry cold
EN 60068-2-2	Environmental testing - part 2: Tests; test B: Dry heat
EN 60068-2-3	Environmental testing - part 2: Tests; test and guidance: Damp heat, constant
EN 60068-2-6	Environmental testing - part 2: Tests; test: Vibration (sinusoidal)
EN 60068-2-14	Environmental testing - part 2: Tests; test N: Change of temperature
EN 60068-2-27	Environmental testing - part 2: Tests; test and guidance: Shock
EN 60068-2-30	Environmental testing - part 2: Tests; test and guidance: Damp heat, cyclic
EN 60068-2-31	Environmental testing - part 2: Tests; test: Drop and topple, primarily for equipment-type specimens
EN 60068-2-32	Environmental testing - part 2: Tests; test: Free fall
EN 60204-1	Safety of machinery, electrical equipment on machines - part 1: General requirements
EN 60529	Degrees of protection provided by enclosures (IP code)
EN 60664-1	Insulation coordination for equipment within low-voltage systems - part 1: Principles, requirements and tests
EN 60721-3-2	Classification of environmental conditions - part 3: Classification of groups of environmental parameters and their severities, section 2: Transport
EN 60721-3-3	Classification of environmental conditions - part 3: Classification of groups of environmental parameters and their severities, section 3: Stationary use at weather-protected locations

Table 357: Overview of standards

Standard	Description
EN 61000-4-2	Electromagnetic compatibility (EMC) - part 4-2: Testing and measuring techniques; electrostatic discharge immunity test
EN 61000-4-3	Electromagnetic compatibility (EMC) - part 4-3: Testing and measuring techniques; radiated radio-frequency electromagnetic field immunity test
EN 61000-4-4	Electromagnetic compatibility (EMC) - part 4-4: Testing and measuring techniques; electrical fast transient/burst immunity test
EN 61000-4-5	Electromagnetic compatibility (EMC) - part 4-5: Testing and measuring techniques; surge immunity test
EN 61000-4-6	Electromagnetic compatibility (EMC) - part 4-6: Testing and measuring techniques; immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-8	Electromagnetic compatibility (EMC) - part 4-8: Testing and measuring techniques; power frequency magnetic field immunity test
EN 61000-4-11	Electromagnetic compatibility (EMC) - part 4-11: Testing and measuring techniques; voltage dips, short interruptions and voltage variations immunity tests
EN 61000-4-12	Electromagnetic compatibility (EMC) - part 4-12: Testing and measuring techniques; oscillatory waves immunity test
EN 61000-4-17	Electromagnetic compatibility (EMC) - part 4-12: Testing and measuring techniques; ripple on DC input power port immunity test
EN 61000-4-29	Electromagnetic compatibility (EMC) - part 4-29: Testing and measuring techniques; voltage dips, short interruptions and voltage variations on DC input power port immunity tests
EN 61000-6-2	Electromagnetic compatibility (EMC), generic immunity standard - part 2: industrial environment
EN 61000-6-4	Electromagnetic compatibility (EMC), generic emission standard - part 2: industrial environment
EN 61131-2	Product standard, programmable logic controllers - part 2: Equipment requirements and tests
UL 508	Industrial control equipment (UL = Underwriters Laboratories)
47 CFR	Federal Communications Commission (FCC), 47 CFR Part 15 Subpart B Class A

Table 357: Overview of standards (Forts.)

3. Emission requirements (emission)

Emissions	Test carried out according to	Limits according to
Network-related emissions	EN 55011 / EN 55022	EN 61000-6-4: Generic standard (industrial areas)
		EN 55011: Industrial, scientific, and medical (ISM) radio-frequency equipment, class A (industrial areas)
		EN 55022: Information technology equipment (ITE devices), class A (industrial areas)
		EN 61131-2: Programmable logic controllers
		47 CFR Part 15 Subpart B Class A (FCC)
Emissions, Electromagnetic emissions	EN 55011 / EN 55022	EN 61000-6-4: Generic standard (industrial areas)
		EN 55011: Industrial, scientific, and medical (ISM) radio-frequency equipment, class A (industrial areas)
		EN 55022: Information technology equipment (ITE devices), class A (industrial areas)
		EN 61131-2: Programmable logic controllers
		47 CFR Part 15 Subpart B Class A (FCC)

Table 358: Overview of limits and testing guidelines for emissions

3.1 Network-related emissions

Test carried out according to EN 55011 / EN 55022	**Limits according to EN 61000-6-4**	**Limits according to EN 55011 Class A**	**Limits according to EN 55022 Class A**
Power mains connections 150 kHz - 500 kHz	-	79 dB (µV) Quasi-peak value 66 dB (µV) Average	79 dB (µV) Quasi-peak value 66 dB (µV) Average
Power mains connections 500 kHz - 30 MHz	-	73 dB (µV) Quasi-peak value 60 dB (µV) Average	73 dB (µV) Quasi-peak value 60 dB (µV) Average
AC mains connections 150 kHz - 500 kHz	79 dB (µV) Quasi-peak value 66 dB (µV) Average	-	-
AC mains connections 500 kHz - 30 MHz	73 dB (µV) Quasi-peak value 60 dB (µV) Average	-	-
Other connections 150 kHz - 500 kHz	-	-	97 - 87 dB (µV) und 53 - 43 dB (µA) Quasi-peak value 84 - 74 dB (µV) und 40 - 30 dB (µA) Average
Other connections 500 kHz - 30 MHz	-	-	87 dB (µV) and 43 dB (µA) Quasi-peak value 74 dB (µV) and 30 dB (µA) Average
Test carried out according to EN 55011 / EN 55022	**Limits according to EN 61131-2**	**Limits according to 47 CFR Part 15 Subpart B class A**	
Power mains connections [1)] 150 kHz - 500 kHz	79 dB (µV) Quasi-peak value 66 dB (µV) Average	-	
Power mains connections 500 kHz - 30 MHz	73 dB (µV) Quasi-peak value 60 dB (µV) Average	-	
AC mains connections 150 kHz - 500 kHz	-	79 dB (µV) Quasi-peak value 66 dB (µV) Average	
AC mains connections 500 kHz - 30 MHz	-	73 dB (µV) Quasi-peak value 60 dB (µV) Average	

Table 359: Test requirements - Network-related emissions for industrial areas

Other connections 150 kHz - 500 kHz	Only informative for cable lengths > 10 m 40 - 30 dB (µA) Quasi-peak value 30 - 20 dB (µA) Average	-	-
Other connections 500 kHz - 30 MHz	Only informative for cable lengths > 10 m 30 dB (µA) Quasi-peak value 20 dB (µA) Average	-	-

Table 359: Test requirements - Network-related emissions for industrial areas (Forts.)

1) AC network connections only with EN 61131-2

3.2 Emissions, electromagnetic emissions

Test carried out according to EN 55011 / EN 55022	**Limits according to EN 61000-6-4**	**Limits according to EN 55011 Class A**	**Limits according to EN 55022 Class A**
30 MHz - 230 MHz measured at a distance of 10 m	< 40 dB (µV/m) Quasi-peak value	< 40 dB (µV/m) Quasi-peak value	< 40 dB (µV/m) Quasi-peak value
230 MHz - 1 GHz measured at a distance of 10 m	< 47 dB (µV/m) Quasi-peak value	< 47 dB (µV/m) Quasi-peak value	< 47 dB (µV/m) Quasi-peak value
Test carried out according to EN 55011 / EN 55022	**Limits according to EN 61131-2**		
30 MHz - 230 MHz measured at a distance of 10 m	< 40 dB (µV/m) Quasi-peak value		
230 MHz - 1 GHz measured at a distance of 10 m	< 47 dB (µV/m) Quasi-peak value		
Test carried out	**Limits according to 47 CFR Part 15 Subpart B class A**		
30 MHz - 88 MHz measured at a distance of 10 m	< 90 dB (µV/m) Quasi-peak value		
88 MHz - 216 MHz measured at a distance of 10 m	< 150 dB (µV/m) Quasi-peak value		
216 MHz - 960 MHz measured at a distance of 10 m	< 210 dB (µV/m) Quasi-peak value		
> 960 MHz measured at a distance of 10 m	< 300 dB (µV/m) Quasi-peak value		

Table 360: : Test requirements - Electromagnetic emissions for industrial areas

4. Requirements for immunity to disturbances (immunity)

Immunity	Test carried out according to	Limits according to
Electrostatic discharge (ESD)	EN 61000-4-2	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
Immunity against high-frequency electromagnetic fields (HF field)	EN 61000-4-3	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
Immunity to high-speed transient electrical disturbances (burst)	EN 61000-4-4	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
Immunity to surge voltages	EN 61000-4-5	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
Immunity to conducted disturbances	EN 61000-4-6	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
Immunity against magnetic fields with electrical frequencies	EN 61000-4-8	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
Immunity to voltage dips, short-term interruptions and voltage fluctuations	EN 61000-4-11	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
Immunity to damped vibration	EN 61000-4-12	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers

Table 361: Overview of limits and testing guidelines for immunity

Evaluation criteria according to EN 61000-6-2

Criteria A:
The operating equipment must continue to work as intended **during** the test. There should be no interference in the operating behavior and no system failures below a minimum operating quality as defined by the manufacturer.

Criteria B:
The operating equipment must continue to work as directed **after** the test. There should be no interference in the operating behavior and no system failures below a minimum operating quality as defined by the manufacturer.

Criteria C:
A temporary function failure is permitted if the function restores itself, or the function can be restored by activating configuration and control elements.

Criteria D:
Impairment or failure of the function, which can no longer be established (operating equipment destroyed).

4.1 Electrostatic discharge (ESD)

Test carried out according to EN 61000-4-2	Limits according to EN 61000-6-2	Limits according to EN 61131-2	
Contact discharge to powder-coated and bare metal housing parts	±4 kV, 10 discharges, criteria B	±4 kV, 10 discharges, criteria B	
Discharge through the air to plastic housing parts	±8 kV, 10 discharges, criteria B	±8 kV, 10 discharges, criteria B	

Table 362: Test requirements - Electrostatic discharge (ESD)

4.2 High-frequency electromagnetic fields (HF field)

Test carried out according to EN 61000-4-3	Limits according to EN 61000-6-2	Limits according to EN 61131-2	
Housing, completely wired	80 MHz - 1 GHz, 10 V/m, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	2 GHz - 2.7 GHz, 1 V/m, 1.4 GHz - 2 GHz, 3 V/m, 80 MHz - 1 GHz, 10 V/m, 80% amplitude modulation at 1 kHz, duration 3 seconds, criteria A	

Table 363: Test requirements - High-frequency electromagnetic fields (HF field)

4.3 High-speed transient electrical disturbances (burst)

Test carried out according to EN 61000-4-4	Limits according to EN 61000-6-2	Limits according to EN 61131-2	
AC power I/O	±2 kV, criteria B	-	
AC power inputs	-	±2 kV, criteria B	
AC power outputs	-	±1 kV, criteria B	
DC power I/O >10 m 1)	±2 kV, criteria B	-	
DC power inputs >10 m	-	±2 kV, criteria B	
DC power outputs >10 m	-	±1 kV, criteria B	
Functional ground connections, signal lines and I/Os >3 m	±1 kV, criteria B	±1 kV, criteria B	
Unshielded AC I/O >3 m	-	±2 kV, criteria B	
Analog I/O	±1 kV, criteria B	±1 kV, criteria B	

Table 364: Test requirements - High-speed transient electrical disturbances (burst)

1) For EN 55024 without length limitation.

4.4 Surges (surge)

Test carried out according to EN 61000-4-5	Limits according to EN 61000-6-2	Limits according to EN 61131-2	
AC power I/O, L to L	±1 kV, criteria B	±1 kV, criteria B	
AC power I/O, L to PE	±2 kV, criteria B	±2 kV, criteria B	
DC power I/O, L+ to L-, >10 m	±0.5 kV, criteria B	-	
DC power I/O, L to PE, >10 m	±0.5 kV, criteria B	-	
DC power inputs, L+ to L-	-	±0.5 kV, criteria B	
DC power inputs, L to PE	-	±1 kV, criteria B	
DC power outputs, L+ to L-	-	±0.5 kV, criteria B	
DC power outputs, L to PE	-	±0.5 kV, criteria B	
Signal connections >30 m	±1 kV, criteria B	±1 kV, criteria B	
All shielded cables	-	±1 kV, criteria B	

Table 365: Test requirements - Surge voltages

4.5 Conducted disturbances

Test carried out according to EN 61000-4-6	Limits according to EN 61000-6-2	Limits according to EN 61131-2	
AC power I/O	150 kHz - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	

Table 366: Test requirements - Conducted disturbances

Test carried out according to EN 61000-4-6	Limits according to EN 61000-6-2	Limits according to EN 61131-2	
DC power I/O	150 kHz - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	
Functional ground connections	0.15 - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, Length 3 seconds, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	
Signal connections >3 m	0.15 - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, Length 3 seconds, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	

Table 366: Test requirements - Conducted disturbances (Forts.)

4.6 Magnetic fields with electrical frequencies

Test carried out according to EN 61000-4-8	Limits according to EN 61000-6-2	Limits according to EN 61131-2	
Test direction x, test in the field of an induction coil 1 m x 1 m	30 A/m, criteria A	30 A/m, criteria A	
Test direction y, test in the field of an induction coil 1 m x 1 m	30 A/m, criteria A	30 A/m, criteria A	
Test direction z, test in the field of an induction coil 1 m x 1 m	30 A/m, criteria A	30 A/m, criteria A	

Table 367: Test requirements - Magnetic fields with electrical frequencies

4.7 Voltage dips, fluctuations and short-term interruptions

Test carried out according to EN 61000-4-11	Limits according to EN 61000-6-2	Limits according to EN 61131-2	
AC power inputs	Voltage dip 70% (30% reduction), 0.5 periods, criteria B	-	
AC power inputs	Voltage dip 40% (60% reduction), 5 periods, criteria C	-	
AC power inputs	Voltage dip 40% (60% reduction), 50 periods, criteria C	-	
AC power inputs	Voltage interruptions < 5% (> 95% reduction), 250 periods, criteria C	-	
AC power inputs	-	20 interruptions, 0.5 periods, criteria A	
DC power inputs	-	20 interruptions for 10 ms < UN - 15%, criteria A	

Table 368: Test requirements - Voltage dips, fluctuations, and short-term interruptions

4.8 Damped vibration

Test carried out according to EN 61000-4-12	Limits according to EN 61131-2		
Power I/O, L to L	±1 kV, 1 MHz, repeat rate 400/seconds, length 2 seconds, connection lengths 2 m, criteria B		
Power I/O, L to PE	±2.5 kV, 1 MHz, repeat rate 400/seconds, length 2 seconds, connection lengths 2 m, criteria B		

Table 369: Test requirements - Damped vibration

5. Mechanical conditions

Vibration	Test carried out according to	Limits according to
Vibration operation	EN 60068-2-6	EN 61131-2: Programmable logic controllers
		EN 60721-3-3 class 3M4
Vibration during transport (packaged)	EN 60068-2-6	EN 60721-3-2 class 2M1
		EN 60721-3-2 class 2M2
		EN 60721-3-2 class 2M3
Shock during operation	EN 60068-2-27	EN 61131-2: Programmable logic controllers
		EN 60721-3-3 class 3M4
Shock during transport (packaged)	EN 60068-2-27	EN 60721-3-2 class 2M1
		EN 60721-3-2 class 2M2
		EN 60721-3-2 class 2M3
Toppling (packaged)	EN 60068-2-31	EN 60721-3-2 class 2M1
		EN 60721-3-2 class 2M2
		EN 60721-3-2 class 2M3
Free fall (packaged)	EN 60068-2-32	EN 61131-2: Programmable logic controllers

Table 370: Overview of limits and testing guidelines for vibration

5.1 Vibration operation

Test carried out according to EN 60068-2-6	Limits according to EN 61131-2		Limits according to EN 60721-3-3 class 3M4		
Vibration during operation: Uninterrupted duty with moveable frequency in all 3 axes (x, y, z), 1 octave per minute	10 sweeps for each axis		10 sweeps for each axis		
	Frequency	**Limit value**	**Frequency**	**Limit value**	
	5 - 9 Hz	Amplitude 3.5 mm	2 - 9 Hz	Amplitude 3 mm	
	9 - 150 Hz	Acceleration 1 g	9 - 200 Hz	Acceleration 1 g	

Table 371: Test requirements - Vibration during operation

5.2 Vibration during transport (packaged)

Test carried out according to EN 60068-2-6	**Limits according to EN 60721-3-2 class 2M1**		**Limits according to EN 60721-3-2 class 2M2**		**Limits according to EN 60721-3-2 class 2M3**	
Vibration during transport: Uninterrupted duty with moveable frequency in all 3 axes (x, y, z)	10 sweeps for each axis, packaged		10 sweeps for each axis, packaged		10 sweeps for each axis, packaged	
	Frequency	**Limit value**	**Frequency**	**Limit value**	**Frequency**	**Limit value**
	2 - 9 Hz	Amplitude 3.5 mm	2 - 9 Hz	Amplitude 3.5 mm	2 - 8 Hz	Amplitude 7.5 mm
	9 - 200 Hz	Acceleration 1 g	9 - 200 Hz	Acceleration 1 g	8 - 200 Hz	Acceleration 2 g
	200 - 500 Hz	Acceleration 1.5 g	200 - 500 Hz	Acceleration 1.5 g	200 - 500 Hz	Acceleration 4 g

Table 372: Test requirements - Vibration during transport (packaged)

5.3 Shock during operation

Test carried out according to EN 60068-2-27	**Limits according to EN 61131-2**	**Limits according to EN 60721-3-3 class 3M4**	
Shock during operation: Pulse (half-sine) stress in all 3 axes (x, y, z)	Acceleration 15 g, duration 11 ms, 18 shocks	Acceleration 15 g, duration 11 ms	

Table 373: Test requirements - Shock during operation

5.4 Shock during transport (packaged)

Test carried out according to EN 60068-2-27	**Limits according to EN 60721-3-2 class 2M1**	**Limits according to EN 60721-3-2 class 2M2**	**Limits according to EN 60721-3-2 class 2M3**
Pulse (half-sine) stress in all 3 axes (x, y, z)	Acceleration 10 g, Length 11 ms, each 3 shocks, packaged	Acceleration 30 g, Length 6 ms, each 3 shocks, packaged	Acceleration 100 g, Length 6 ms, each 3 shocks, packaged

Table 374: Test requirements - Shock during transport

5.5 Toppling

Test carried out according to EN 60068-2-31	**Limits according to EN 60721-3-2 class 2M1**		**Limits according to EN 60721-3-2 class 2M2**		**Limits according to EN 60721-3-2 class 2M3**	
Drop and topple	Devices: Drop/topple on each edge		Devices: Drop/topple on each edge		Devices: Drop/topple on each edge	
	Weight	**Required**	**Weight**	**Required**	**Weight**	**Required**
	<20 kg	Yes	<20 kg	Yes	<20 kg	Yes
	20 - 100 kg	-	20 - 100 kg	Yes	20 - 100 kg	Yes
	>100 kg	-	>100 kg	-	>100 kg	Yes

Table 375: Test requirements - Toppling

5.6 Free fall (packaged)

Test carried out according to EN 60068-2-32	Limits according to EN 61131-2		Limits according to EN 60721-3-2 class 2M1		Limits according to EN 60721-3-2 class 2M2		Limits according to EN 60721-3-2 class 2M3	
Free fall	Devices with delivery packaging each with 5 fall tests		Devices packaged		Devices packaged		Devices packaged	
	Weight	**Height**	**Weight**	**Height**	**Weight**	**Height**	**Weight**	**Height**
	<10 kg	1.0 m	<20 kg	0.25 m	<20 kg	1.2 m	<20 kg	1.5 m
	10 - 40 kg	0.5 m	20 - 100 kg	0.25 m	20 - 100 kg	1.0 m	20 - 100 kg	1.2 m
	> 40 kg	0.25 m	>100 kg	0.1 m	>100 kg	0.25 m	>100 kg	0.5 m
	Devices with product packaging each with 5 fall tests							
	Weight	**Height**						
	<10 kg	0.3 m						
	10 - 40 kg	0.3 m						
	> 40 kg	0.25 m						

Table 376: Test requirements - Toppling

6. Climate conditions

Temperature / humidity	Test carried out according to	Limits according to
Worst case operation	UL 508	UL 508: Industrial control equipment EN 61131-2: Programmable logic controllers
Dry heat	EN 60068-2-2	EN 61131-2: Programmable logic controllers
Dry cold	EN 60068-2-1	EN 61131-2: Programmable logic controllers
Large temperature fluctuations	EN 60068-2-14	EN 61131-2: Programmable logic controllers
Temperature fluctuations in operation	EN 60068-2-14	EN 61131-2: Programmable logic controllers
Humid heat, cyclic	EN 60068-2-30	EN 61131-2: Programmable logic controllers
Humid heat, constant (storage)	EN 60068-2-3	EN 61131-2: Programmable logic controllers

Table 377: Overview of limits and testing guidelines for temperature and humidity

6.1 Worst case operation

Test carried out according to UL 508	Limits according to UL 508	Limits according to EN 61131-2	
Worst case during operation. Operation of the device with the max. ambient temperature specified in the data sheet at the max. specified load	3 hours at max. ambient temperature (min. +40°C) duration approx. 5 hours	3 hours at max. ambient temperature (min. +40°C) duration approx. 5 hours	

Table 378: Test requirements - Worst case during operation

6.2 Dry heat

Test carried out according to EN 60068-2-2	Limits according to EN 61131-2		
Dry heat	16 hours at +70°C for 1 cycle, then 1 hour acclimatization and function testing, duration approximately 17 hours		

Table 379: Test requirements - Dry heat

6.3 Dry cold

Test carried out according to EN 60068-2-1	Limits according to EN 61131-2		
Dry cold	16 hours at -40°C for 1 cycle, then 1 hour acclimatization and function testing, duration approximately 17 hours		

Table 380: Test requirements - Dry cold

6.4 Large temperature fluctuations

Test carried out according to EN 60068-2-14	Limits according to EN 61131-2		
Large temperature fluctuations	3 hours at -40°C and 3 hours at +70°C, 2 cycles, then 2 hours acclimatization and function testing, duration approximately 14 hours		

Table 381: Test requirements - Large temperature fluctuations

6.5 Temperature fluctuations in operation

Test carried out according to EN 60068-2-14	Limits according to EN 61131-2		
Open devices: These can also have a housing and are installed in switching cabinets	3 hours at +5°C and 3 hours at 55°C, 5 cycles, temperature gradient 3°C / min, the unit is occasionally supplied with voltage during testing, duration approximately 30 hours		
Closed devices: These are devices whose data sheet specifies a surrounding housing (enclosure) with the corresponding safety precautions	3 hours at +5°C and 3 hours at +55°C, 5 cycles, temperature gradient 3°C / min, the unit is occasionally supplied with voltage during testing, duration approximately 30 hours		

Table 382: Test requirements - Temperature fluctuations during operation

6.6 Humid heat, cyclic

Test carried out according to EN 60068-2-30	Limits according to EN 61131-2		
Alternating climate	24 hours at +25°C / +55°C and 97% / 83% RH, 2 cycles, then 2 hours acclimatization, function testing and insulation, duration approximately 50 hours		

Table 383: Test requirements - Humid heat, cyclic

6.7 Humid heat, constant (storage)

Test carried out according to EN 60068-2-3	Limits according to EN 61131-2		
Humid heat, constant (storage)	48 hours at +40°C and 92.5% RH, then insulation test within 3 hours, duration approximately 49 hours		

Table 384: Test requirements - Humid heat, constant (storage)

7. Safety

Safety	Test carried out according to	Limits according to
Ground resistance	EN 61131-2	EN 60204-1: Electrical equipment of machines
		EN 61131-2: Programmable logic controllers
Insulation resistance		EN 60204-1: Electrical equipment of machines
High voltage	EN 60060-1	EN 61131-2: Programmable logic controllers
		UL 508: Industrial control equipment
Residual voltage	EN 61131-2	EN 60204-1: Electrical equipment of machines
		EN 61131-2: Programmable logic controllers
Leakage current		VDE 0701-1: Service, changes and testing of electrical devices
Overload	UL 508	EN 61131-2: Programmable logic controllers
		UL 508: Industrial control equipment
Simulation component defect	UL 508	EN 61131-2: Programmable logic controllers
		UL 508: Industrial control equipment
Voltage range		EN 61131-2: Programmable logic controllers

Table 385: Overview of limits and testing guidelines for safety

7.1 Ground resistance

Test carried out according to EN 61131-2	Limits according to EN 60204-1 1)		Limits according to EN 61131-2
Ground resistance: housing (from any metal part to the ground terminal)	Smallest effective cross section of the protective ground conductor for the branch being tested	Maximum measured voltage drop at a test current of 10 A	Test current 30 A for 2 min, < 0.1 Ω
	1.0 mm^2	3.3 V	
	1.5 mm^2	2.6 V	
	2.5 mm^2	1.9 V	
	4.0 mm^2	1.4 V	
	> 6.0 mm^2	1.0 V	

Table 386: Test requirements - Ground resistance

1) See EN 60204-1:1997 page 62, table 9.

7.2 Insulation resistance

Test carried out	Limits according to EN 60204-1 1)		
Insulation resistance: main circuits to protective ground conductor	> 1 MΩ at 500 V DC voltage		

Table 387: Test requirements - Insulation resistance

1) See EN 60204-1:1997 page 62, table 9.

7.3 High voltage

Test carried out according to EN 60060-1	**Limits according to EN 61131-2[1]**				**Limits according to UL 508**		
High voltage: Primary circuit to secondary circuit and to protective ground circuit (transformers, coils, varistors, capacitors and components used to protect against over-voltage can be removed before the test)	Input voltage	Test voltage			Input voltage	Test voltage	
		1.2/50 µs voltage surge peak	**AC, 1 min**	**DC, 1 min**		**AC, 1 min**	**DC, 1 min**
	0 - 50 VAC 0 - 60 VDC	850 V	510 V	720 V	≤ 50 V	500 V	707 V
	50 - 100 VAC 60 - 100 VDC	1360 V	740 V	1050 V	> 50 V	1000 V + 2 x U_N	(1000 V + 2 x U_N) x 1.414
	100 - 150 VAC 100 - 150 VDC	2550 V	1400 V	1950 V			
	150 - 300 VAC 150 - 300 VDC	4250 V	2300 V	3250 V			
	300 - 600 VAC 300 - 600 VDC	6800 V	3700 V	5250 V			
	600 - 1000 VAC 600 - 1000 VDC	10200 V	5550 V	7850 V			

Table 388: Test requirements - High voltage

[1] See EN 61131-2:2003 page 104, table 59.

7.4 Residual voltage

Test carried out according to EN 61131-2	**Limits according to EN 60204-1**	**Limits according to EN 61131-2**	
Residual voltage after switching off	< 60 V after 5 sec (active parts) < 60 V after 1 sec (plug pins)	< 60 V after 5 sec (active parts) < 60 V after 1 sec (plug pins)	

Table 389: Test requirements - Residual voltage

7.5 Leakage current

Test carried out	**Limits according to VDE 0701-1**		
Leakage current: Phase to ground	< 3.5 mA		

Table 390: Test requirements - Leakage current

7.6 Overload

Test carried out according to UL 508	Limits according to EN 61131-2	Limits according to UL 508	
Overload of transistor outputs	50 switches, 1.5 I_N, 1 sec on / 9 sec off	50 switches, 1.5 I_N, 1 sec on / 9 sec off	

Table 391: Test requirements - Overload

7.7 Defective component

Test carried out according to UL 508	Limits according to EN 61131-2	Limits according to UL 508	
Simulation of how components in power supply became defective	Non-flammable surrounding cloth No contact with conductive parts	Non-flammable surrounding cloth No contact with conductive parts	

Table 392: Test requirements - Defective component

7.8 Voltage range

Test carried out according to	Limits according to EN 61131-2			
Supply voltage	**Measurement value**	**Tolerance min/max**		
	24 VDC 48 VDC 125 VDC	-15% +20%		
	24 VAC 48 VAC 100 VAC 110 VAC 120 VAC 200 VAC 230 VAC 240 VAC 400 VAC	-15% +10%		

Table 393: Test requirements - Voltage range

8. Other tests

Other tests	Test carried out according to	Limits according to
Protection type	-	EN 60529: Degrees of protection provided by enclosures (IP code)
Degree of pollution	-	EN 60664-1: Insulation coordination for equipment within low-voltage systems - part 1: Principles, requirements and tests

Table 394: Overview of limits and testing guidelines for other tests

8.1 Protection type

Test carried out according to	Limits according to EN 60529	Limits according to EN 60529	
Protection of the operating equipment	IP2. Protection against large solid foreign bodies =12.5 mm diameter	IP.6 Protection against large solid foreign bodies: Dust-proof	
Protection of personnel	IP2. Protection against touching dangerous parts with finger	IP.6 Protection against touching dangerous parts with conductor	
Protection against water permeation with damaging consequences	IP.0 Not protected	IP.5 Protected against sprayed water	

Table 395: Test requirements - Protection

8.2 Degree of pollution

Test carried out according to	Limits according to EN 60664-1		
Definition	Degree of pollution II		

Table 396: Test requirements - Degree of pollution

9. SDL flex cable - test description

9.1 Torsion

9.1.1 Test structure

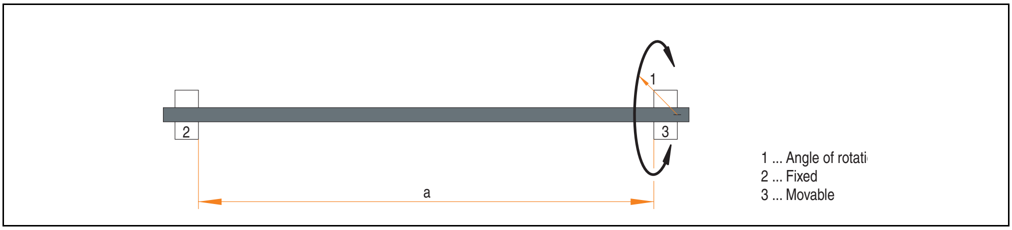


Figure 286: Test structure - torsion

9.1.2 Test conditions

Distance a:	450 mm
Rotation angle:	±85°
Velocity:	50 cycles / minute
Special feature:	The cable was clamped down twice in the machine.

9.1.3 Individual tests

- Visible pixel errors: At the beginning of the test, the minimum equalizer setting was determined. This is the value between 0-15 at which no more pixel errors are visible. If the equalizer setting is changed due to the mechanical load, this is noted.
- Touch screen for function (with a 21.3" Automation Panel - 5AP920.2138-01)
- USB mouse function
- Hot plug function tested by unplugging the USB plug
- After a test duration of 15000 cycles, the test was ended with a result of "OK".

9.2 Cable drag chain

9.2.1 Test structure

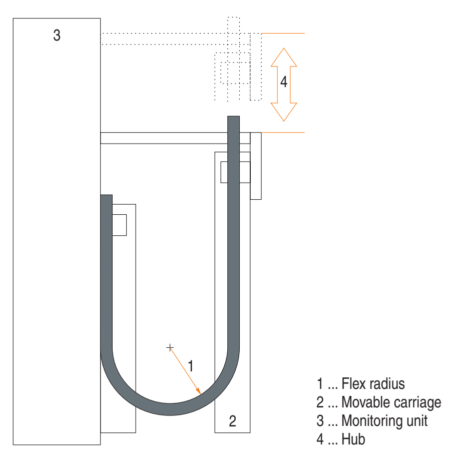


Figure 287: Test structure - Cable drag chain

9.2.2 Test conditions

- Flex radius: 180 mm (= 15 x cable diameter)
- Hub: 460 mm
- Velocity: 4800 cycles / hour
- Special feature: The cable was clamped down twice in the machine.

9.2.3 Individual tests:

- Visible pixel errors: At the beginning of the test, the minimum equalizer setting is determined. This is the value between 0-15 at which no more pixel errors are visible. If the equalizer setting is changed due to the mechanical load, this is noted.
- Touch screen for function (with a 21.3" Automation Panel - 5AP920.2138-01)
- USB mouse function
- Hot plug function tested by unplugging the USB plug
- After a test duration of 30,000 cycles, the test was ended with a result of "OK".

10. International certifications

B&R products and services comply with applicable standards. They are 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 give special consideration to the reliability of our products in an industrial environment.

Certifications	
USA and Canada	All important B&R products are tested and listed by Underwriters Laboratories and checked quarterly by a UL inspector. This mark is valid for the USA and Canada and simplifies certification of your machines and systems in these areas.
Europe	All harmonized EN standards for the applicable directives are met.

Table 397: International Certifications

Chapter 6 • Accessories

1. Overview

Model number	Short description	Note
0AC201.91	**Lithium batteries, 4 pcs**. Lithium batteries, 4 pcs., 3 V / 950 mAh, button cell	
4A0006.00-000	**Lithium battery, 1 pc.** Lithium battery, 1 pc., 3 V / 950 mAh, button cell	
0TB103.9	**Plug 24V 5.08 3-pin screw clamps** 24 VDC 3-pin connector, female. Screw clamps, 3.31 mm², protected against vibration by the screw flange	
0TB103.91	**Plug 24V 5.08 3-pin cage clamps** 24 VDC 3-pin connector, female. Cage clamps, 3.31 mm², protected against vibration by the screw flange	
0TB704.9	**Terminal block, 4-pin,** Screw clamp, 1.5 mm²	
0TB704.91	**Terminal block, 4-pin,** cage clamps, 2.5 mm²	
5A5003.03	**Front cover** Front cover for the USB 2.0 Media Drive 5MD900.USB2-00.	
5AC600.ICOV-00	**Interface covers** Interface covers for APC620 and PPC700 devices; 5 pieces	
5AC600.UPSI-00	**Add-on UPS module** UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (starting with Rev. H0), 5PC600.SX02-00 (starting with Rev. G0), 5PC600.SX02-01 (starting with Rev. H0), 5PC600.SX05-00 (starting with Rev. F0), 5PC600.SX05-01 (starting with Rev. F0), 5PC600.SF03-00 (starting with Rev. A0), 5PC810.SX*. 5PC820.1505-00, 5PC820.1906-00 Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately.	
5AC600.UPSB-00	**Battery unit 5 Ah** Battery unit 5Ah; for APC620, APC810 or PPC800 UPS.	
5ACPCI.ETH1-01	**PCI Ethernet card 10/100** half size PCI Ethernet card, 1 Ethernet connection	
5ACPCI.ETH3-01	**PCI Ethernet card 10/100 3port** half size PCI Ethernet card, 3 Ethernet connections	
5AC900.1000-00	**Adapter DVI-A/m to CRT** Adapter DVI (plug) to CRT (socket), for connecting a standard monitor to a DVI-I interface.	
5AC600.SRAM-00	**APC620/PPC700 SRAM module 512kB** SRAM module for APC620 and PPC700 512 KB.	
5CAMSC.0001-00	**APC620 internal supply cable**	

Table 398: Model numbers - Accessories

Model number	Short description	Note
5CADVI.0018-00	**DVI-D cable 1.8 m** Single cable, DVI-D/m:DVI-D/m; length: 1.8 m	
5CADVI.0050-00	**DVI-D cable 5 m** Single cable, DVI-D/m:DVI-D/m; length: 5 m	
5CADVI.0100-00	**DVI-D cable 10 m** Single cable, DVI-D/m:DVI-D/m; length: 10 m	
5CASDL.0018-00	**SDL cable 1.8 m** SDL cable for a fixed type of layout; length: 1.8 m	
5CASDL.0018-01	**SDL cable 1.8 m 45°** SDL cable for fixed type of layout with one-sided 45° plug; length: 1.8 m	
5CASDL.0018-03	**SDL flex cable 1.8 m** SDL cable for fixed and flexible type of layout; length: 1.8 m	
5CASDL.0050-00	**SDL cable 5 m** SDL cable for a fixed type of layout; length: 5 m	
5CASDL.0050-01	**SDL cable 5 m 45°** SDL cable for fixed type of layout with one-sided 45° plug; length: 5 m	
5CASDL.0050-03	**SDL flex cable 5 m** SDL cable for fixed and flexible type of layout; length: 5 m	
5CASDL.0100-00	**SDL cable 10 m** SDL cable for a fixed type of layout; length: 10 m	
5CASDL.0100-01	**SDL cable 10 m 45°** SDL cable for fixed type of layout with one-sided 45° plug; length: 10 m	
5CASDL.0100-03	**SDL flex cable 10 m** SDL cable for fixed and flexible type of layout; length: 10 m	
5CASDL.0150-00	**SDL cable 15 m** SDL cable for a fixed type of layout; length: 15 m	
5CASDL.0150-01	**SDL cable 15 m 45°** SDL cable for fixed type of layout with one-sided 45° plug; length: 15 m	
5CASDL.0150-03	**SDL flex cable 15 m** SDL cable for fixed and flexible type of layout; length: 15 m	
5CASDL.0200-00	**SDL cable 20 m** SDL cable for a fixed type of layout; length: 20 m	
5CASDL.0200-03	**SDL flex cable 20 m** SDL cable for fixed and flexible type of layout; length: 20 m	
5CASDL.0250-00	**SDL cable 25 m** SDL cable for a fixed type of layout; length: 25 m	
5CASDL.0250-03	**SDL flex cable 25 m** SDL cable for fixed and flexible type of layout; length: 25 m	
5CASDL.0300-00	**SDL cable 30 m** SDL cable for a fixed type of layout; length: 30 m	
5CASDL.0300-03	**SDL flex cable 30 m** SDL cable for fixed and flexible type of layout; length: 30 m	
5CASDL.0300-10	**SDL cable with extender 30 m** SDL cable with extender for a fixed type of layout; length 30 m	Cancelled since 12/2006 Replaced by 5CASDL.0300-13
5CASDL.0300-13	**SDL flex cable with extender 30 m** SDL cable with extender for fixed and flexible type of layout; length: 30 m	

Table 398: Model numbers - Accessories (Forts.)

Model number	Short description	Note
5CASDL.0400-10	**SDL cable with extender 40 m** SDL cable with extender for a fixed type of layout; length 40 m	Cancelled since 12/2006 Replaced by 5CASDL.0400-13
5CASDL.0400-13	**SDL flex cable with extender 40 m** SDL cable with extender for fixed and flexible type of layout; length: 40 m	
5CAUPS.0005-00	**APC620 UPS cable 0.5 m** Connection cable between add-on UPS module and UPS battery unit, length 0.5 meters	
5CAUPS.0030-00	**APC620 UPS cable 3 m** Connection cable between add-on UPS module and UPS battery unit, length 3 meters	
5CAUSB.0018-00	**USB 2.0 cable, A/m:B/m 1.8 m** USB 2.0 connection cable; plug type A - type B; length 1.8 m	
5CAUSB.0050-00	**USB 2.0 cable, A/m:B/m 5 m** USB 2.0 connection cable; plug type A - type B; length 5 m	
9A0014.02	**RS232 cable DB9/f:DB9/m 1.8 m** RS232 extension cable for remote operation of a display unit with touch screen, length 1.8 m.	
9A0014.05	**RS232 cable DB9/f:DB9/m 5 m** RS232 extension cable for remote operation of a display unit with touch screen, length 5 m.	
9A0014.10	**RS232 cable DB9/f:DB9/m 10 m** RS232 extension cable for remote operation of a display unit with touch screen, length 10 m.	
5CFCRD.0512-04	**CompactFlash 512 MB B&R** CompactFlash card with 512 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.1024-04	**CompactFlash 1024 MB B&R** CompactFlash card with 1024 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.2048-04	**CompactFlash 2048 MB B&R** CompactFlash card with 2048 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.4096-04	**CompactFlash 4096 MB B&R** CompactFlash card with 4096 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.8192-04	**CompactFlash 8192 MB B&R** CompactFlash card with 8192 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.016G-04	**CompactFlash 16 GB B&R** CompactFlash card with 16 GB SLC NAND flash and IDE/ATA interface	
5CFCRD.0064-03	**CompactFlash 64 MB SSI** CompactFlash card with 64 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.0128-03	**CompactFlash 128 MB SSI** CompactFlash card with 128 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.0256-03	**CompactFlash 256 MB SSI** CompactFlash card with 256 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.0512-03	**CompactFlash 512 MB SSI** CompactFlash card with 512 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.1024-03	**CompactFlash 1024 MB SSI** CompactFlash card with 1024 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.2048-03	**CompactFlash 2048 MB SSI** CompactFlash card with 2048 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.4096-03	**CompactFlash 4096 MB SSI** CompactFlash card with 4096 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.8192-03	**CompactFlash 8192 MB SSI** CompactFlash card with 8192 MB SLC NAND flash and IDE/ATA interface	

Table 398: Model numbers - Accessories (Forts.)

Model number	Short description	Note
5CFCRD.0032-02	**CompactFlash 32 MB SanDisk/A** CompactFlash card with 32 MB flash PROM and IDE/ATA interface.	Cancelled since 12/2005 Replaced by 5CFCRD.0064-03
5CFCRD.0064-02	**CompactFlash 64 MB SanDisk/A** CompactFlash card with 64 MB flash PROM and IDE/ATA interface.	Cancelled since 12/2005 Replaced by 5CFCRD.0064-03
5CFCRD.0128-02	**CompactFlash 128 MB SanDisk/A** CompactFlash card with 128 MB flash PROM and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.0128-03
5CFCRD.0256-02	**CompactFlash 256 MB SanDisk/A** CompactFlash card with 256 MB flash PROM and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.0256-03
5CFCRD.0512-02	**CompactFlash 512 MB SanDisk/A** CompactFlash card with 512 MB flash PROM and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.0512-03
5CFCRD.1024-02	**CompactFlash 1024 MB SanDisk/A** CompactFlash card with 1024 MB flash PROM and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.1024-03
5CFCRD.2048-02	**CompactFlash 2048 MB SanDisk/A** CompactFlash card with 2048 MB flash PROM and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.2048-03
5MD900.USB2-00	**USB 2.0 drive DVD-ROM/CD-RW FDD CF USB** USB 2.0 drive combination, consists of DVD-ROM/CD-RW, FDD, CompactFlash slot (type II), USB connection (type A front, type B back); 24 V DC.	Cancelled since 10/2006 Replacement type 5MD900.USB-01
5MD900.USB2-01	**USB 2.0 drive DVD-RW/CD-RW FDD CF USB** USB 2.0 drive combination, consists of DVD-R/RW/DVD+R/RW/CD-RW, FDD, CompactFlash slot (type II), USB connection (type A front, type B back); 24 V DC.	
5MMUSB.0128-00	**USB flash drive 128 MB SanDisk** USB 2.0 flash drive 128 MB	Cancelled since 12/2005 Replaced by 5MMUSB.2048-00
5MMUSB.0256-00	**USB flash drive 256 MB SanDisk** USB 2.0 flash drive 256 MB	Cancelled since 03/2007 Replaced by 5MMUSB.2048-00
5MMUSB.0512-00	**USB flash drive 512 MB SanDisk** USB 2.0 flash drive 512 MB	Cancelled since 07/2007 Replaced by 5MMUSB.2048-00
5MMUSB.1024-00	**USB flash drive 1 GB SanDisk** USB 2.0 flash drive 1 GB	Cancelled since 03/2007 Replaced by 5MMUSB.2048-00
5MMUSB.2048-00	**USB flash drive 2 GB SanDisk** USB 2.0 flash drive 2 GB	
5MMUSB.2048-01	**USB flash drive 2 GB B&R** USB 2.0 flash drive 2 GB	
5SWHMI.0000-00	**HMI Drivers & Utilities DVD**	
5AC600.FA01-00	**APC620 replacement fan filter 1PCI 5 piece** APC620 replacement fan filter for system unit with 1 PCI Slot (5PC600.SX01-00).	
5AC600.FA02-00	**APC620 replacement fan filter 1PCI 5 piece** APC620 replacement fan filter for system unit with 2 PCI slot (5PC600.SX02-00, 5PC600.SX02-01).	
5AC600.FA03-00	**APC620f replacement fan filter 1PCI 5 piece** APC620 replacement fan filter for system unit with 3 PCI Slots (5PC600.SF03-00).	
5AC600.FA05-00	**APC620 replacement fan filter 1PCI 5 piece** APC620 replacement fan filter for system units with 5 PCI slot (5PC600.SX02-00, 5PC600.SX02-01).	

Table 398: Model numbers - Accessories (Forts.)

Model number	Short description	Note
0PS102.0	**Power supply, 1-phase, 2.1 A** 24 VDC power supply, 1-phase, 2.1 A, input 100-240 VAC, wide range, DIN rail mounting	
0PS104.0	**Power supply, 1-phase, 4.2 A** 24 VDC power supply, 1 phase, 4.2 A, input 115/230 VAC, auto select, DIN rail mounting	
0PS105.1	**Power supply, 1-phase, 5 A** 24 VDC power supply, 1 phase, 5 A, input 115/230 VAC, manual select, DIN rail mounting	
0PS105.2	**Power supply, 1-phase, 5 A, redundant** 24 VDC power supply, 1 phase, 5 A, redundant through parallel operation, input 115/230 VAC, manual select, DIN rail mounting	
0PS110.1	**Power supply, 1-phase, 10 A** 24 VDC power supply, 1 phase, 10 A, input 115/230 VAC, manual select, DIN rail mounting	
0PS110.2	**Power supply, 1-phase, 10 A, redundant** 24 VDC power supply, 1 phase, 10 A, redundant through parallel operation, input 115/230 VAC, manual select, DIN rail mounting	
0PS120.1	**Power supply, 1-phase, 20 A** 24 VDC power supply, 1 phase, 20 A, input 115/230 VAC, auto select, DIN rail mounting	
0PS305.1	**Power supply, 3-phase, 5 A** 24 VDC power supply, 3-phase, 5 A, input 400..500 VAC (3 phases), wide range, DIN rail mounting	
0PS310.1	**Power supply, 3-phase, 10 A** 24 VDC power supply, 3-phase, 10 A, input 400..500 VAC (3 phases), wide range, DIN rail mounting	
0PS320.1	**Power supply, 3-phase, 20 A** 24 VDC power supply, 3-phase, 20 A, input 400..500 VAC (3 phases), wide range, DIN rail mounting	
0PS340.1	**Power supply, 1-phase, 40 A** 24 VDC power supply, 3 phase, 40 A, input 115/230 VAC, auto select, DIN rail mounting	

Table 398: Model numbers - Accessories (Forts.)

2. Supply voltage connector (TB103 3-pin)

2.1 General information

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

2.2 Order data

Model number	Description	Figure
0TB103.9	Plug for the 24 V supply voltage (screw clamps)	 0TB103.9 0TB103.91
0TB103.91	Plug for the 24 V supply voltage (cage clamps)	

Table 399: Order data - TB103

2.3 Technical data

Information:

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

Name	0TB103.9	0TB103.91
Number of pins	3	
Type of terminal	Screw clamps	Cage clamps

Table 400: Technical data - TB103 supply plug

Name	0TB103.9	0TB103.91
Distance between contacts	5.08 mm	
Resistance between contacts	≤ 5 mΩ	
Nominal voltage according to VDE / UL,CSA	250 V / 300 V	
Current load according to VDE / UL,CSA	14.5 A / 10 A per contact	
Terminal size	0.08 mm² - 3.31 mm²	
Cable type	Copper wires only (no aluminum wires!)	

Table 400: Technical data - TB103 supply plug (Forts.)

3. X2X and CAN plugs (4-pin)

3.1 General information

This 4-pin plug is needed for connecting to the X2X and CAN interface.

3.2 Order data

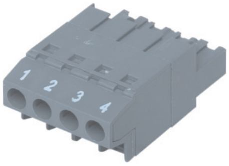
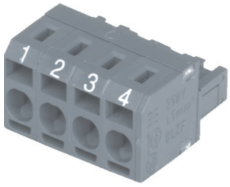
Model number	Description	Figure
0TB704.9	4-pin screw clamp	 0TB704.9  0TB704.91
0TB704.91	4-pin cage clamps	

Table 401: Order data - 0TB704.9 and 0TB704.91

3.3 Technical data

Information:

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

Name	0TB704.9	0TB704.91
Number of pins	4	
Type of terminal	Screw clamps	Cage clamps

Table 402: Technical data - TB103 supply plug

4. Replacement CMOS batteries

The lithium battery is needed for buffering the BIOS CMOS data, the real-time clock, and SRAM data. The battery is subject to wear and should be replaced regularly (at least following the specified buffer duration).

4.1 Order data

Model number	Description	Figure
0AC201.91	Lithium batteries, 5 pcs., 3 V / 950 mAh button cell	
4A0006.00-000	Lithium battery, 1 piece, 3 V / 950 mAh button cell	

Table 403: Order data - Lithium batteries

4.2 Technical data

Warning!

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

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

Information:

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

Features	0AC201.91	4A0006.00-000
Capacity	950 mAh	
Voltage	3 V	
Self discharge at 23°C	< 1% per year	
Storage time	Max. 3 years at 30° C	

Table 404: Technical data - Lithium batteries

Features	0AC201.91	4A0006.00-000
Environmental characteristics		
Storage temperature	-20 to +60°C	
Relative humidity	0 to 95% (non-condensing)	

Table 404: Technical data - Lithium batteries (Forts.)

5. Interface covers 5AC600.ICOV-00

The interface covers protect interfaces from dirt and dust when not in use.

5.1 Order data

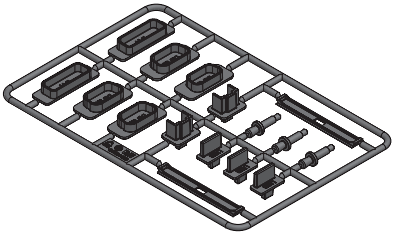
Model number	Description	Figure
5AC600.ICOV-00	**Interface covers** Interface covers for APC620 and PPC700 devices; 5 pieces	

Table 405: Order data - APC620 interface cover

5.2 Contents of delivery

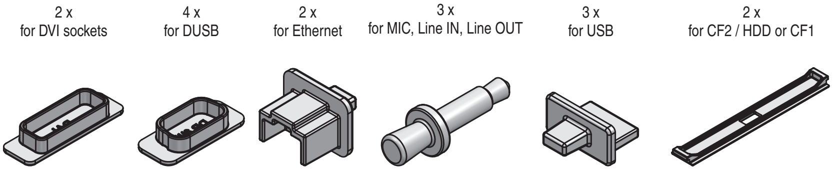


Figure 288: Contents of delivery - interface cover

6. DVI - monitor adapter 5AC900.1000-00

This adapter enables a standard monitor to be connected to the DVI-I interface.

6.1 Order data

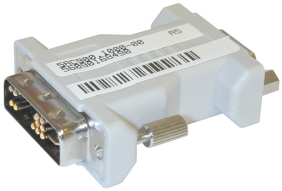
Model number	Description	Figure
5AC900.1000-00	**Adapter DVI-A/m to CRT DB15HD/f** Adapter DVI (plug) to CRT (socket), for connecting a standard monitor to a DVI-I interface.	

Table 406: Order data - DVI - CRT adapter

7. CompactFlash cards 5CFCRD.xxxx-04

7.1 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 the different boot times.

See chapter 3 "Commissioning", section 8 "Known problems / issues", on page 349.

Information:

The 5CFCRD.xxxx-04 CompactFlash cards are supported on B&R devices with WinCE Version 6.0 or higher.

7.2 Order data

Model number	Description	Figure
5CFCRD.0512-04	512 MB B&R CompactFlash card	CompactFlash card
5CFCRD.1024-04	1024 MB B&R CompactFlash card	
5CFCRD.2048-04	2048 MB B&R CompactFlash card	
5CFCRD.4096-04	4096 MB B&R CompactFlash card	
5CFCRD.8192-04	8192 MB B&R CompactFlash card	
5CFCRD.016G-04	16 GB B&R CompactFlash card	

Table 407: Order data - CompactFlash cards

7.3 Technical data

Caution!

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

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

Information:

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

Features	**5CFCRD.0512-04**	**5CFCRD.1024-04**	**5CFCRD.2048-04**	**5CFCRD.4096-04**	**5CFCRD.8192-04**	**5CFCRD.016G-04**
MTBF (at 25°C)	> 3,000,000 hours					
Maintenance	None					
Data reliability	< 1 unrecoverable error in 10^{14} bit read accesses					
Data retention	10 years					
Lifetime monitoring	Yes					
Supported operating modes	PIO Mode 0-6, Multiword DMA Mode 0-4, Ultra DMA Mode 0-4					
Continuous reading	Typically 35 MB/s(240X) 1) 2) Max. 37 MB/s (260X) 1) 2)	Typically 35 MB/s (240X) 1) 2) Max. 37 MB/s (260X) 1) 2)	Typically 35 MB/s (240X) 1) 2) Max. 37 MB/s (260X) 1) 2)	Typically 33 MB/s (220X) 1) 2) Max. 34 MB/s (226X) 1) 2)	Typically 27 MB/s (180X) 1) 2) Max. 28 MB/s (186X) 1) 2)	Typically 36 MB/s (240X) 1) 2) Max. 37 MB/s (247X) 1) 2)
Continuous writing	Typically 17 MB/s (110X) Max. 20 MB/s (133X)	Typically 17 MB/s (110X) Max. 20 MB/s (133X)	Typically 17 MB/s (110X) Max. 20 MB/s (133X)	Typically 16 MB/s (106X) Max. 18 MB/s (120X)	Typically 15 MB/s (100X) Max. 17 MB/s (110X)	Typically 18 MB/s (120X) Max. 19 MB/s (126X)
Endurance						
Guaranteed amount of data 3) Results in 5 years 3)	50 TB 27.40 GB/day	100 TB 54.79 GB/day	200 TB 109.59 GB/day	400 TB 219.18 GB/day	800 TB 438.36 GB/day	1600 TB 876.72 GB/day
Clear/write cycles Guaranteed Typical 4)	 100,000 2,000,000					
SLC flash	Yes					
Wear leveling	Static					
Error Correction Coding (ECC)	Yes					

Table 408: Technical data - CompactFlash cards 5CFCRD.xxxx-04

Support	**5CFCRD.0512-04**	**5CFCRD.1024-04**	**5CFCRD.2048-04**	**5CFCRD.4096-04**	**5CFCRD.8192-04**	**5CFCRD.016G-04**
Hardware	PP300/400, PPC300, PPC700, PPC725, PPC800, APC620, APC810, APC820					
Windows XP Professional	-	-	-	Yes	Yes	Yes
Windows XP Embedded	Yes	Yes	Yes	Yes	Yes	Yes
Windows Embedded Standard 2009	-	Yes	Yes	Yes	Yes	Yes
Windows CE 6.0	Yes	Yes	Yes	Yes	Yes	Yes [5)]
Windows CE 5.0	-	-	-	-	-	-
PVI Transfer Tool	V3.2.3.8 (part of PVI Development Setup V2.06.00.3011)					-
B&R Embedded OS Installer	V3.10					-
Mechanical characteristics						
Dimensions Length Width Thickness	36.4 ±0.15 mm 42.8 ±0.10 mm 3.3 ±0.10 mm					
Weight	10 g					
Environmental characteristics						
Ambient temperature Operation Bearings Transport	0 to +70°C -65 to +150°C -65 to +150°C					
Relative humidity Operation/Storage/Transport	Max. 85% at 85°C					
Vibration Operation/Storage/Transport	20 G peak, 20- 2000 Hz, 4 in each direction (JEDEC JESD22, method B103) 5.35 G RMS, 15 min per level (IEC 68-2-6)					
Shock Operation/Storage/Transport	1.5k G peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 G, 11 ms 1 time (IEC 68-2-27)					
Altitude	Max. 15,000 feet (4,572 m)					

Table 408: Technical data - CompactFlash cards 5CFCRD.xxxx-04 (Forts.)

1) Speed specification with 1X = 150 KB/s. All specifications refer to the Samsung Flash chips, CompactFlash cards in UDMA mode 4, 30 ns cycle time in True-IDE mode with sequential write/read test.

2) The file is written/read sequentially in True IDE mode with the DOS program Thruput.exe.

3) Endurance of B&R CF cards (linear written block size with 128 KB)

4) Depending on the average file size.

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

7.3.1 Temperature humidity diagram

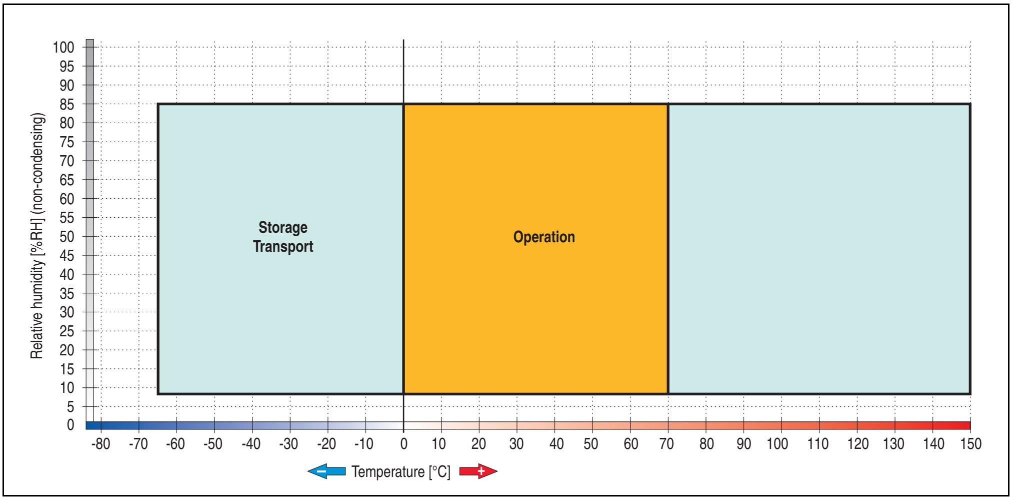


Figure 289: Temperature humidity diagram - CompactFlash cards 5CFCRD.xxxx-04

7.4 Dimensions

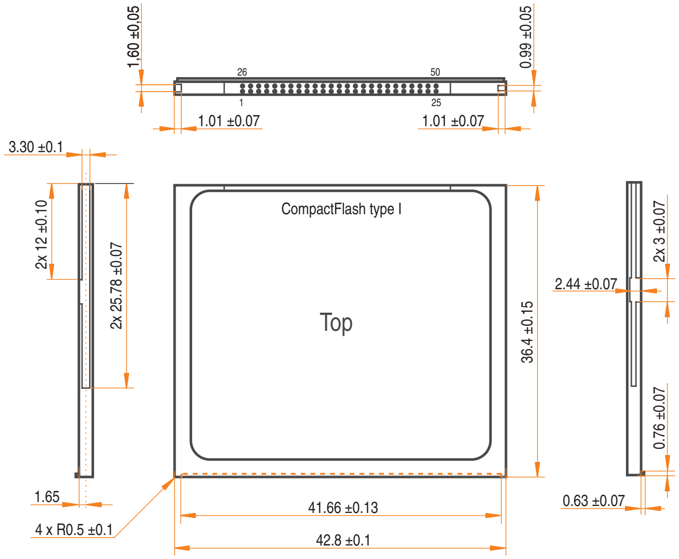


Figure 290: Dimensions - CompactFlash card Type I

7.5 Benchmark

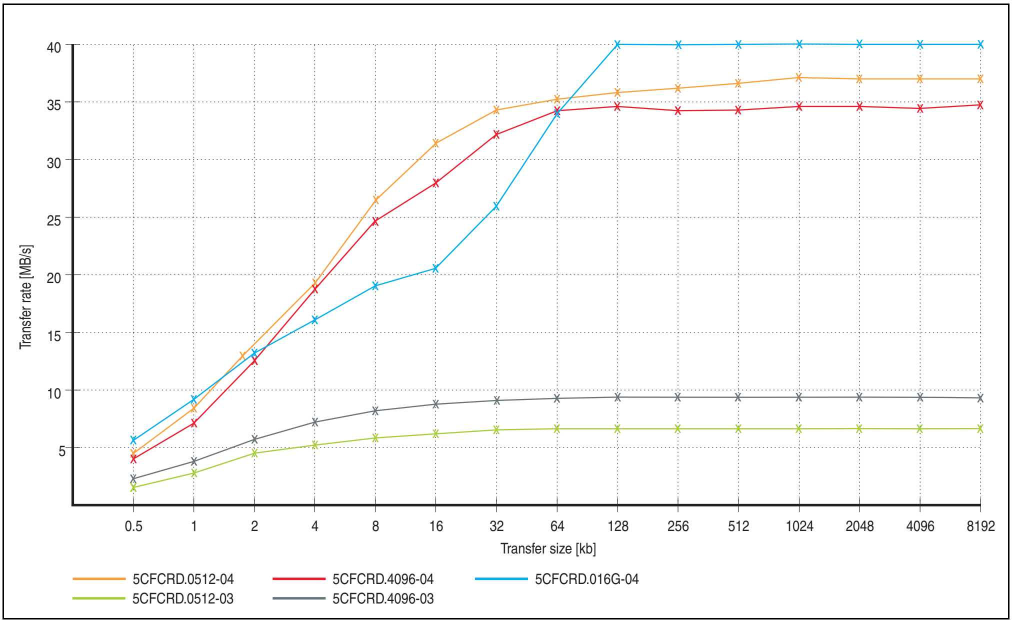


Figure 291: ATTO disk benchmark v2.34 comparison (reading)

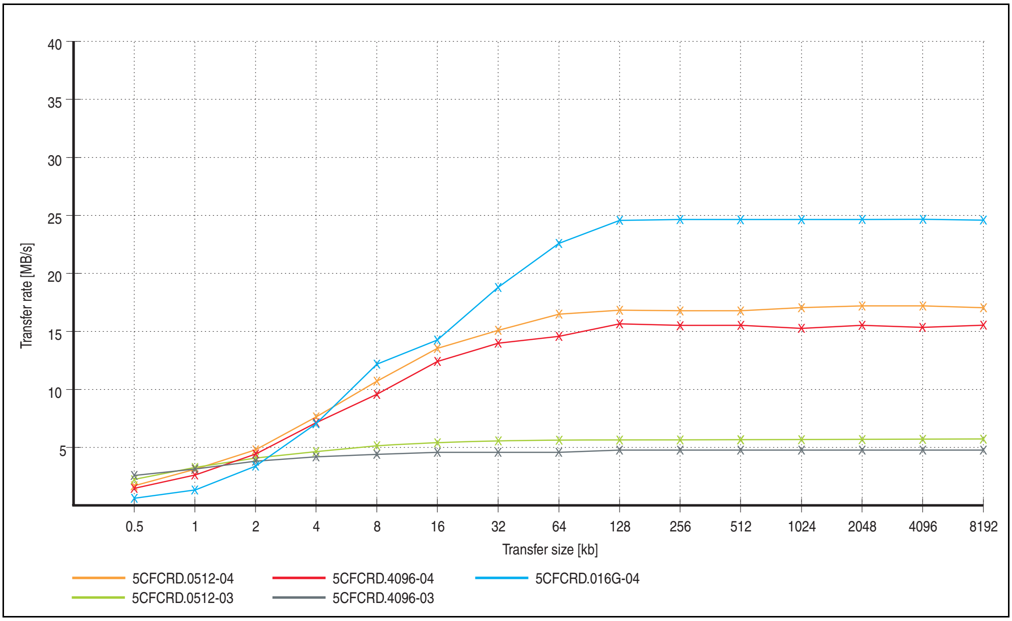


Figure 292: ATTO disk benchmark v2.34 comparison (writing)

8. CompactFlash cards - 5CFCRD.xxxx-03

8.1 General information

Information:

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

See chapter 3 "Commissioning", section 8 "Known problems / issues", on page 349.

Information:

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

8.2 Order data

Model number	Description	Figure
5CFCRD.0064-03	CompactFlash 64 MB SSI	 SiliconDrive™ CF SSD-CXXX-3576 19968/3576 Mfg. Date 08/09 SILICON SYSTEMS CompactFlash card
5CFCRD.0128-03	CompactFlash 128 MB SSI	
5CFCRD.0256-03	CompactFlash 256 MB SSI	
5CFCRD.0512-03	CompactFlash 512 MB SSI	
5CFCRD.1024-03	CompactFlash 1024 MB SSI	
5CFCRD.2048-03	CompactFlash 2048 MB SSI	
5CFCRD.4096-03	CompactFlash 4096 MB SSI	
5CFCRD.8192-03	CompactFlash 8192 MB SSI	

Table 409: Order data - CompactFlash cards

8.3 Technical data

Caution!

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

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

Information:

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

Features	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 (at 25°C)	> 4,000,000 hours							
Maintenance	None							
Data reliability	< 1 unrecoverable error in 10^{14} bit read accesses							
Data retention	10 years							
Lifetime monitoring	Yes							
Supported operating modes	PIO Mode 0-4, Multiword DMA Mode 0-2							
Continuous reading	Typically 8 MB/s							
Continuous writing	Typically 6 MB/s							
Endurance								
Clear/write cycles Typical	> 2,000,000							
SLC flash	Yes							
Wear leveling	Static							
Error Correction Coding (ECC)	Yes							
Support								
Hardware	MP100/200, PP100/200, PP300/400, PPC300, PPC700, PPC725, PPC800, Provit 2000, Provit 5000, APC620, APC680, APC810, APC820							
Windows XP Professional	-	-	-	-	-	-	Yes	Yes
Windows XP Embedded	-	-	-	Yes	Yes	Yes	Yes	Yes
Windows Embedded Standard 2009	-	-	-	-	Yes	Yes	Yes	Yes
Windows CE 6.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes[1]

Table 410: Technical data - CompactFlash cards 5CFCRD.xxxx-03

Support	**5CFCRD. 0064-03**	**5CFCRD. 0128-03**	**5CFCRD. 0256-03**	**5CFCRD. 0512-03**	**5CFCRD. 1024-03**	**5CFCRD. 2048-03**	**5CFCRD. 4096-03**	**5CFCRD. 8192-03**
Windows CE 5.0	Yes	Yes	Yes	Yes	Yes	-	-	-
PVI Transfer Tool	V2.57 (part of PVI Development Setup V2.5.3.3005)							
B&R Embedded OS Installer	V2.21							
Mechanical characteristics								
Dimensions Length Width Thickness	36.4 ±0.15 mm 42.8 ±0.10 mm 3.3 ±0.10 mm							
Weight	11.4 g							
Environmental characteristics								
Ambient temperature Operation Bearings Transport	0 to +70°C -50 to +100°C -50 to +100°C							
Relative humidity Operation/Storage/Transport	8 to 95%, non-condensing							
Vibration Operation Storage/Transport	max. 16.3 g (159 m/s^2 0-peak) max. 30 g (294 m/s^2 0-peak)							
Shock Operation Storage/Transport	Max. 1000 g (9810 m/s^2 0-peak) Max. 3000 g (29430 m/s^2 0-peak)							
Altitude	Maximum 80,000 feet (24,383 meters)							

Table 410: Technical data - CompactFlash cards 5CFCRD.xxxx-03 (Forts.)

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

8.3.1 Temperature humidity diagram

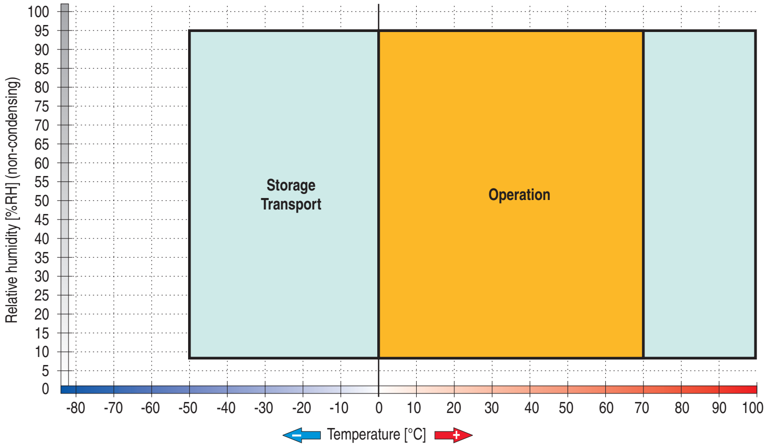


Figure 293: Temperature humidity diagram - CompactFlash cards 5CFCRD.xxxx-03

8.4 Dimensions

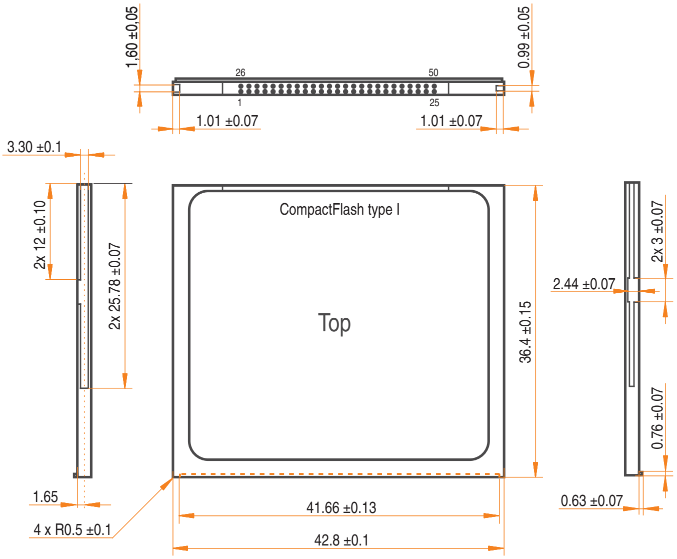


Figure 294: Dimensions - CompactFlash card Type I

9. CompactFlash cards 5CFCRD.xxxx-02

9.1 General information

Information:

SanDisk CompactFlash cards 5CFCRD.xxxx-02 and CompactFlash cards from a different manufacturer cannot be used in the same system at the same time. Due to differences in technology (older vs. newer technologies), problems can occur during system startup that are caused by the different boot times.

See chapter 3 "Commissioning", section 8 "Known problems / issues", on page 349.

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

9.2 Order data

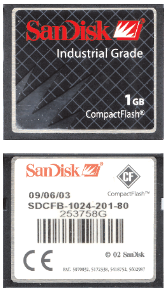
Model number	Description	Figure
5CFCRD.0032-02	CompactFlash 32 MB SanDisk/A	 SanDisk Industrial Grade 1GB CompactFlash® SanDisk CF CompactFlash™ 09/06/03 SDCFB-1024-201-80 253758G © 02 SanDisk CE
5CFCRD.0064-02	CompactFlash 64 MB SanDisk/A	
5CFCRD.0128-02	CompactFlash 128 MB SanDisk/A	
5CFCRD.0256-02	CompactFlash 256 MB SanDisk/A	
5CFCRD.0512-02	CompactFlash 512 MB SanDisk/A	
5CFCRD.1024-02	CompactFlash 1024 MB SanDisk/A	
5CFCRD.2048-02	CompactFlash 2048 MB SanDisk/A	

Table 411: Order data - CompactFlash cards 5CFCRD.xxxx-02

9.3 Technical data

Information:

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

Features	5CFCRD.xxxx-02
MTBF (@ 25°C)	> 3,000,000 hours
Maintenance	None
Data reliability	< 1 unrecoverable error in 10^{14}bit read accesses < 1 faulty correction in 10^{20}bit read accesses
Write/erase procedures	> 2,000,000 times
Mechanical characteristics	
Dimensions	
Length	36.4 ±0.15 mm
Width	42.8 ±0.10 mm
Thickness	3.3 mm ±0.10 mm
Weight	11.4 g
Environmental characteristics	
Ambient temperature	
Operation	0 to +70°C
Bearings	-25 to +85°C
Transport	-25 to +85°C
Relative humidity	
Operation / Storage	8 to 95%, non-condensing
Vibration	
Operation / Storage	Maximum 30 g (point to point)
Shock	
Operation / Storage	Maximum 3,000 g
Altitude	24,000 meters

Table 412: Technical data - CompactFlash cards 5CFCRD.xxxx-02

9.4 Dimensions

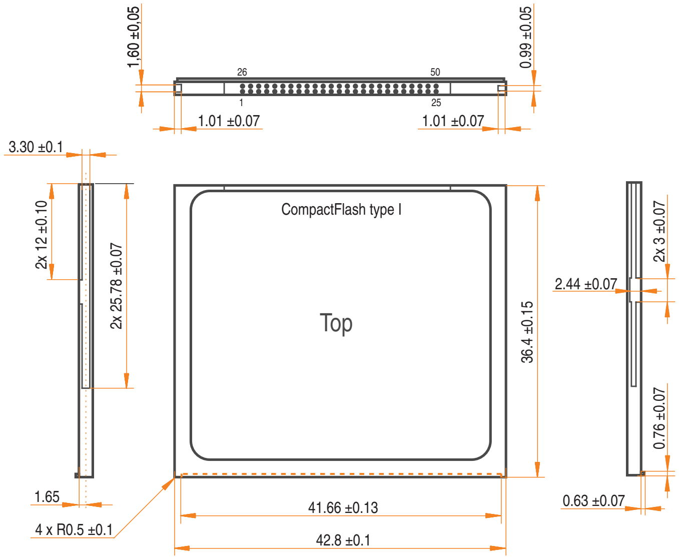
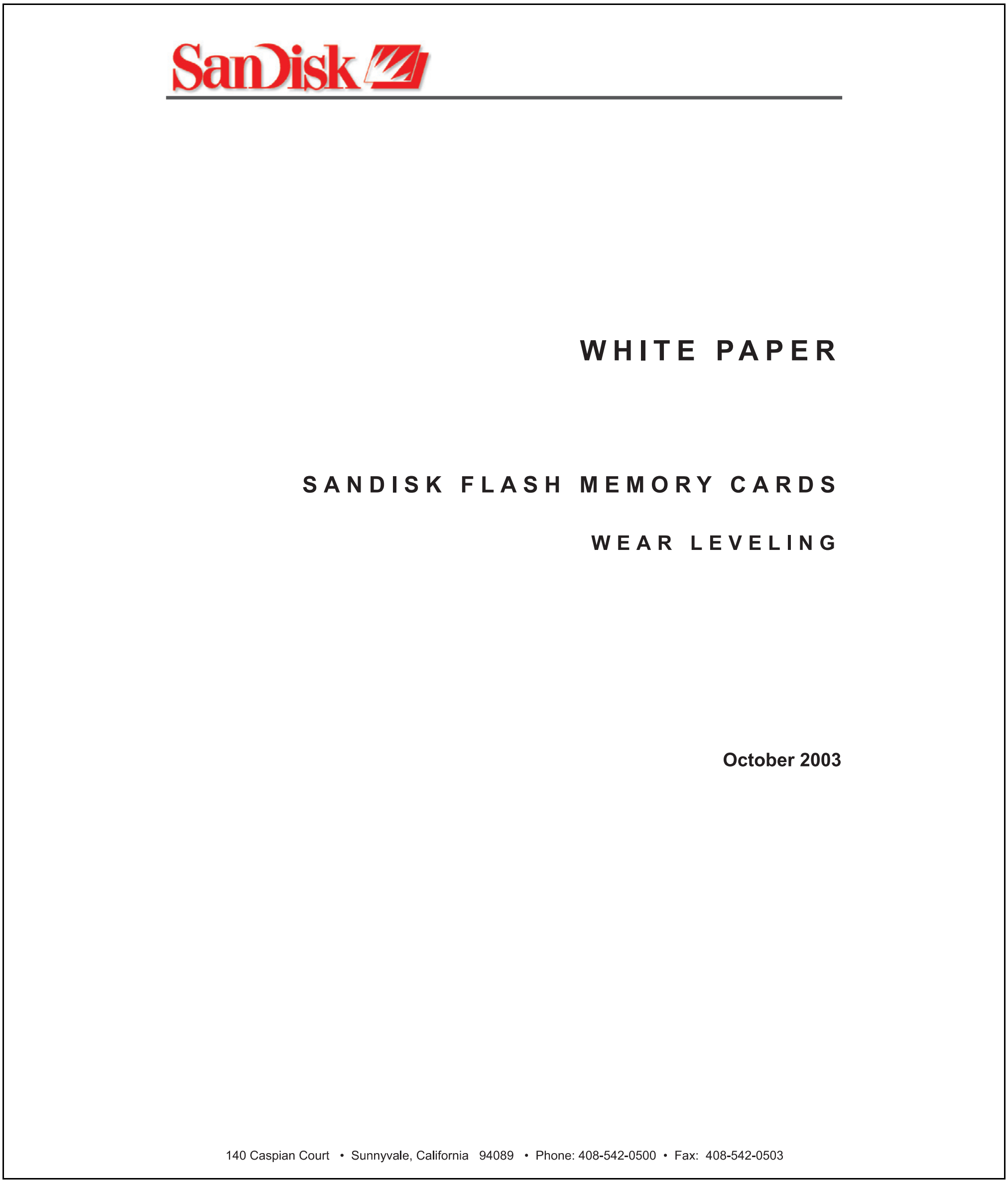


Figure 295: Dimensions - CompactFlash card Type I

9.5 Calculating the lifespan

SanDisk provides a 6-page "white paper" for the lifespan calculation of CompactFlash cards (see following pages). This document can also be found on the SanDisk homepage.



SanDisk

WHITE PAPER

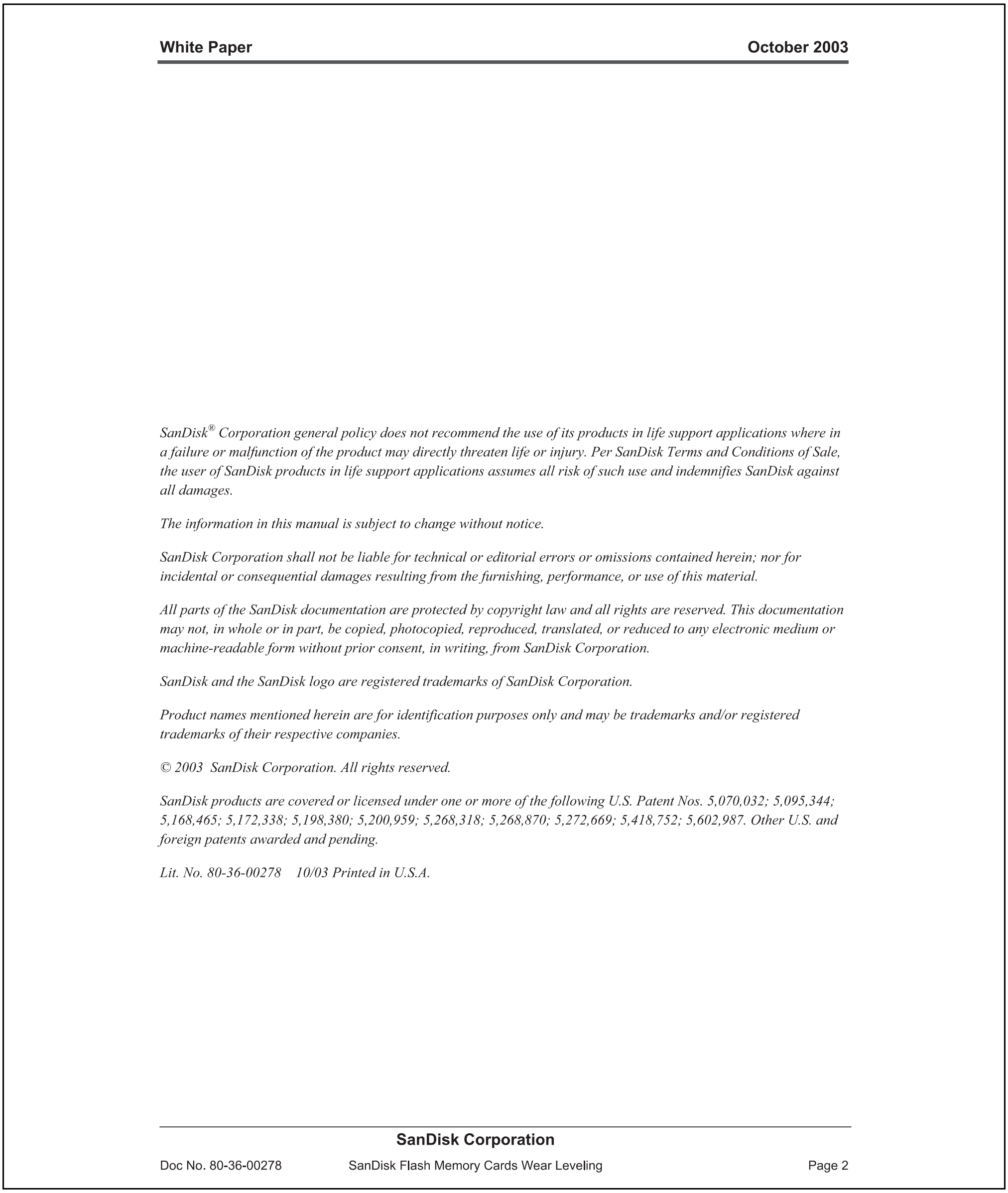
SANDISK FLASH MEMORY CARDS

WEAR LEVELING

October 2003

140 Caspian Court • Sunnyvale, California 94089 • Phone: 408-542-0500 • Fax: 408-542-0503

Figure 296: SanDisk white paper - page 1 of 6



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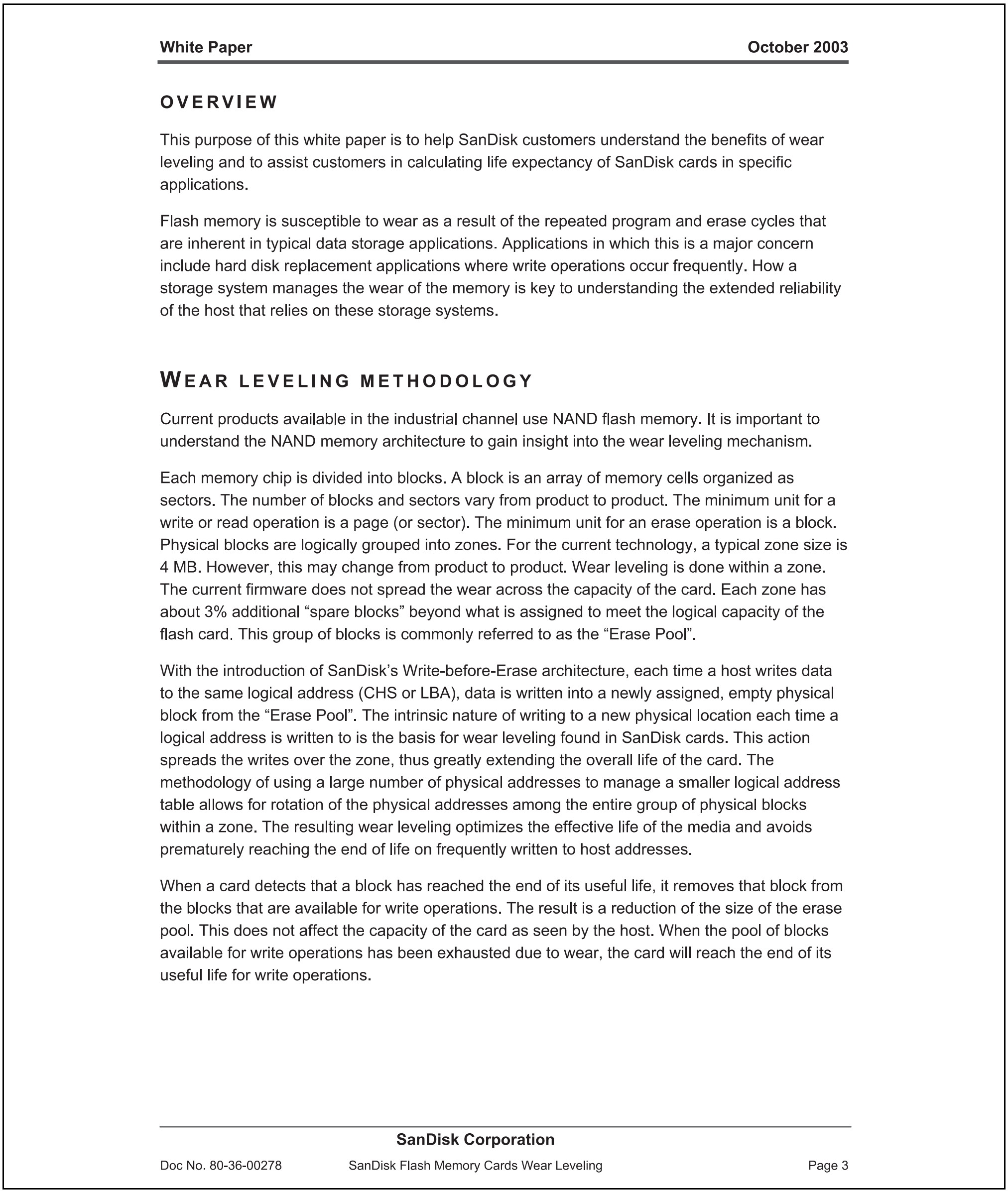
Lit. No. 80-36-00278 10/03 Printed in U.S.A.

SanDisk Corporation

Doc No. 80-36-00278 SanDisk Flash Memory Cards Wear Leveling Page 2

Figure 297: SanDisk white paper - page 2 of 6



OVERVIEW

This purpose of this white paper is to help SanDisk customers understand the benefits of wear leveling and to assist customers in calculating life expectancy of SanDisk cards in specific applications.

Flash memory is susceptible to wear as a result of the repeated program and erase cycles that are inherent in typical data storage applications. Applications in which this is a major concern include hard disk replacement applications where write operations occur frequently. How a storage system manages the wear of the memory is key to understanding the extended reliability of the host that relies on these storage systems.

WEAR LEVELING METHODOLOGY

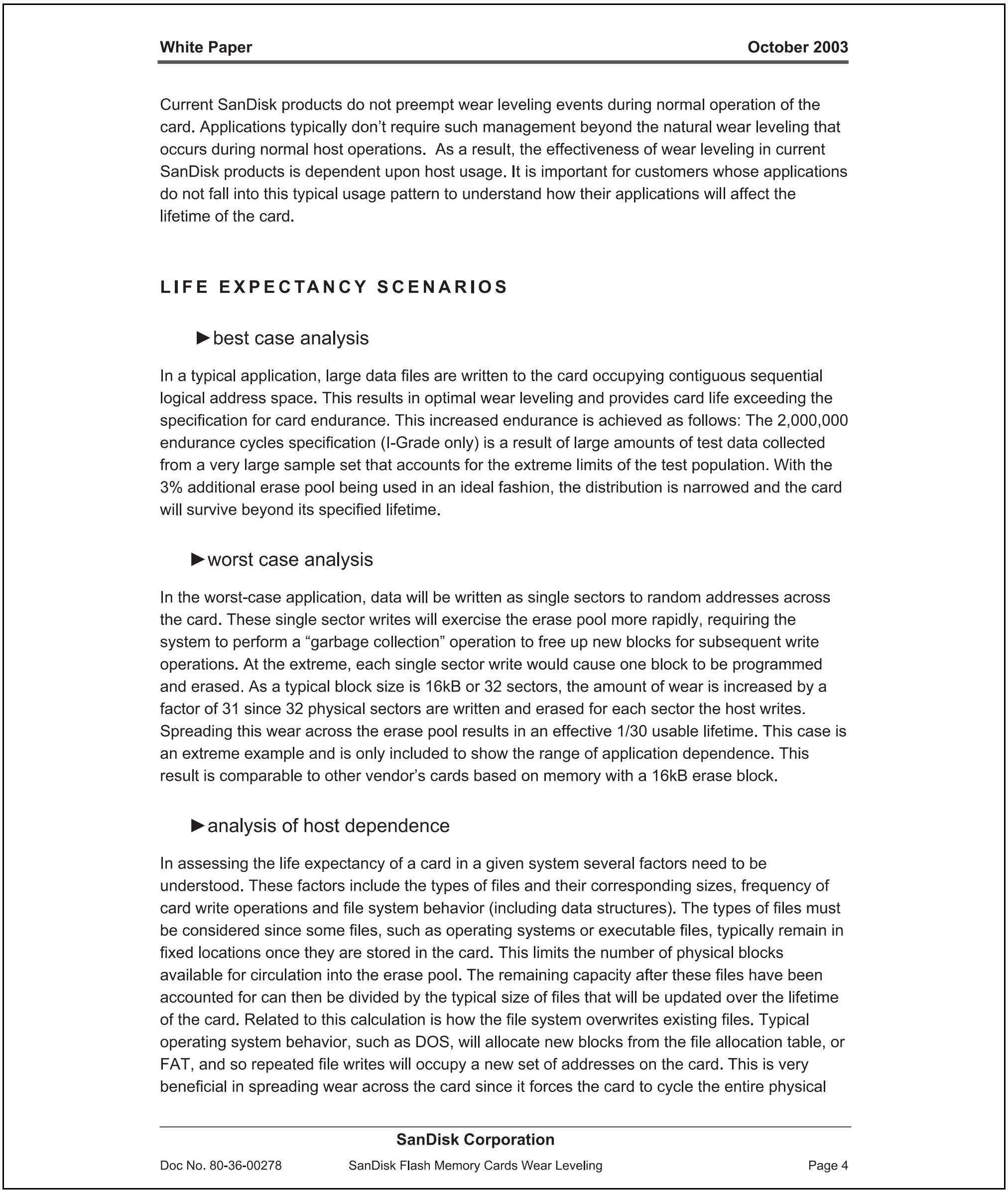
Current products available in the industrial channel use NAND flash memory. It is important to understand the NAND memory architecture to gain insight into the wear leveling mechanism.

Each memory chip is divided into blocks. A block is an array of memory cells organized as sectors. The number of blocks and sectors vary from product to product. The minimum unit for a write or read operation is a page (or sector). The minimum unit for an erase operation is a block. Physical blocks are logically grouped into zones. For the current technology, a typical zone size is 4 MB. However, this may change from product to product. Wear leveling is done within a zone. The current firmware does not spread the wear across the capacity of the card. Each zone has about 3% additional “spare blocks” beyond what is assigned to meet the logical capacity of the flash card. This group of blocks is commonly referred to as the “Erase Pool”.

With the introduction of SanDisk’s Write-before-Erase architecture, each time a host writes data to the same logical address (CHS or LBA), data is written into a newly assigned, empty physical block from the “Erase Pool”. The intrinsic nature of writing to a new physical location each time a logical address is written to is the basis for wear leveling found in SanDisk cards. This action spreads the writes over the zone, thus greatly extending the overall life of the card. The methodology of using a large number of physical addresses to manage a smaller logical address table allows for rotation of the physical addresses among the entire group of physical blocks within a zone. The resulting wear leveling optimizes the effective life of the media and avoids prematurely reaching the end of life on frequently written to host addresses.

When a card detects that a block has reached the end of its useful life, it removes that block from the blocks that are available for write operations. The result is a reduction of the size of the erase pool. This does not affect the capacity of the card as seen by the host. When the pool of blocks available for write operations has been exhausted due to wear, the card will reach the end of its useful life for write operations.

Figure 298: SanDisk white paper - page 3 of 6



Current SanDisk products do not preempt wear leveling events during normal operation of the card. Applications typically don't require such management beyond the natural wear leveling that occurs during normal host operations. As a result, the effectiveness of wear leveling in current SanDisk products is dependent upon host usage. It is important for customers whose applications do not fall into this typical usage pattern to understand how their applications will affect the lifetime of the card.

LIFE EXPECTANCY SCENARIOS

►best case analysis

In a typical application, large data files are written to the card occupying contiguous sequential logical address space. This results in optimal wear leveling and provides card life exceeding the specification for card endurance. This increased endurance is achieved as follows: The 2,000,000 endurance cycles specification (I-Grade only) is a result of large amounts of test data collected from a very large sample set that accounts for the extreme limits of the test population. With the 3% additional erase pool being used in an ideal fashion, the distribution is narrowed and the card will survive beyond its specified lifetime.

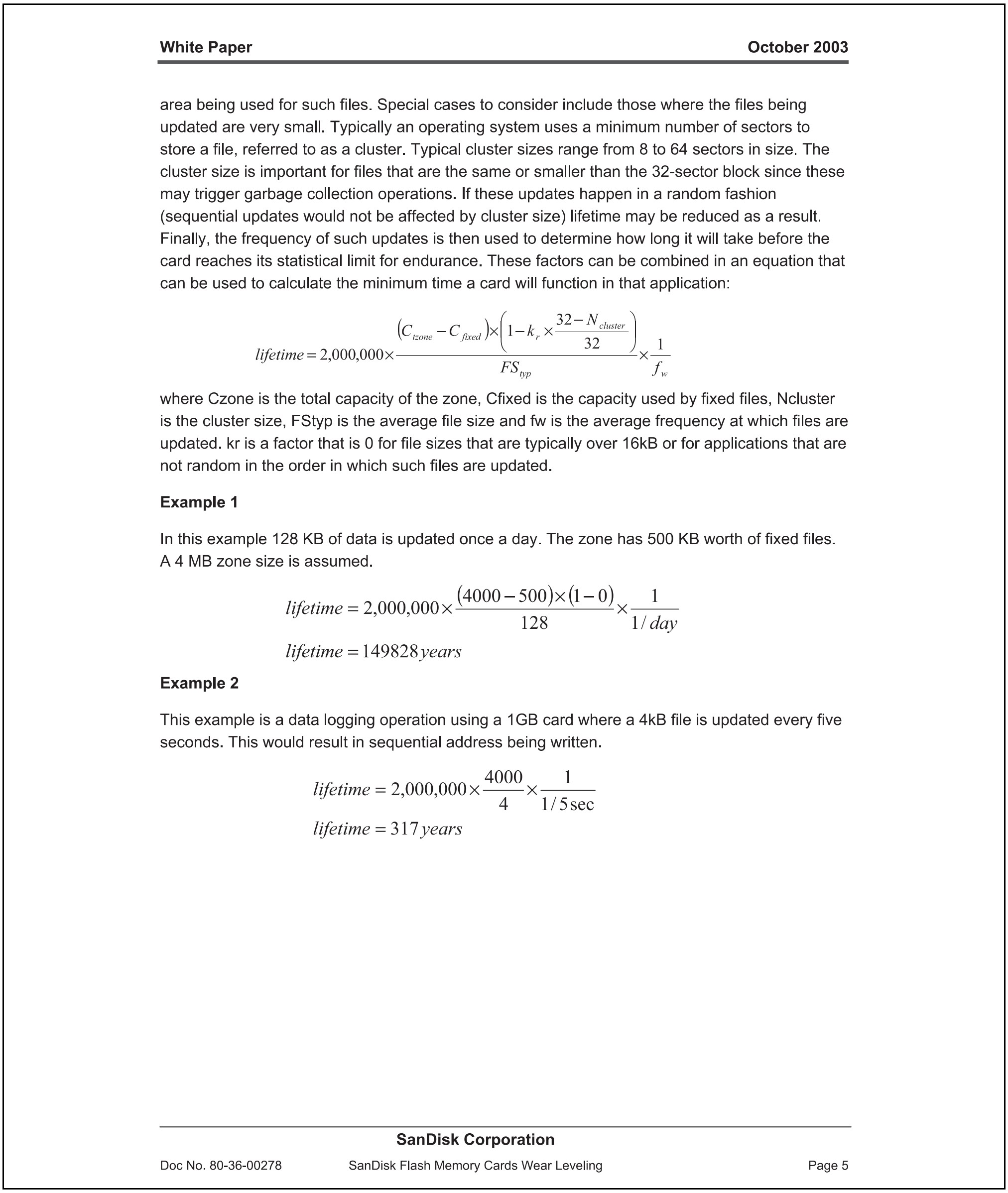
►worst case analysis

In the worst-case application, data will be written as single sectors to random addresses across the card. These single sector writes will exercise the erase pool more rapidly, requiring the system to perform a "garbage collection" operation to free up new blocks for subsequent write operations. At the extreme, each single sector write would cause one block to be programmed and erased. As a typical block size is 16kB or 32 sectors, the amount of wear is increased by a factor of 31 since 32 physical sectors are written and erased for each sector the host writes. Spreading this wear across the erase pool results in an effective 1/30 usable lifetime. This case is an extreme example and is only included to show the range of application dependence. This result is comparable to other vendor's cards based on memory with a 16kB erase block.

►analysis of host dependence

In assessing the life expectancy of a card in a given system several factors need to be understood. These factors include the types of files and their corresponding sizes, frequency of card write operations and file system behavior (including data structures). The types of files must be considered since some files, such as operating systems or executable files, typically remain in fixed locations once they are stored in the card. This limits the number of physical blocks available for circulation into the erase pool. The remaining capacity after these files have been accounted for can then be divided by the typical size of files that will be updated over the lifetime of the card. Related to this calculation is how the file system overwrites existing files. Typical operating system behavior, such as DOS, will allocate new blocks from the file allocation table, or FAT, and so repeated file writes will occupy a new set of addresses on the card. This is very beneficial in spreading wear across the card since it forces the card to cycle the entire physical

Figure 299: SanDisk white paper - page 4 of 6



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area being used for such files. Special cases to consider include those where the files being updated are very small. Typically an operating system uses a minimum number of sectors to store a file, referred to as a cluster. Typical cluster sizes range from 8 to 64 sectors in size. The cluster size is important for files that are the same or smaller than the 32-sector block since these may trigger garbage collection operations. If these updates happen in a random fashion (sequential updates would not be affected by cluster size) lifetime may be reduced as a result. Finally, the frequency of such updates is then used to determine how long it will take before the card reaches its statistical limit for endurance. These factors can be combined in an equation that can be used to calculate the minimum time a card will function in that application:

$$lifetime = 2{,}000{,}000 \times \frac{\left(C_{tzone} - C_{fixed}\right) \times \left(1 - k_r \times \frac{32 - N_{cluster}}{32}\right)}{FS_{typ}} \times \frac{1}{f_w}$$

where Czone is the total capacity of the zone, Cfixed is the capacity used by fixed files, Ncluster is the cluster size, FStyp is the average file size and fw is the average frequency at which files are updated. kr is a factor that is 0 for file sizes that are typically over 16kB or for applications that are not random in the order in which such files are updated.

Example 1

In this example 128 KB of data is updated once a day. The zone has 500 KB worth of fixed files. A 4 MB zone size is assumed.

$$lifetime = 2{,}000{,}000 \times \frac{(4000 - 500) \times (1 - 0)}{128} \times \frac{1}{1/day}$$

$$lifetime = 149828\,years$$

Example 2

This example is a data logging operation using a 1GB card where a 4kB file is updated every five seconds. This would result in sequential address being written.

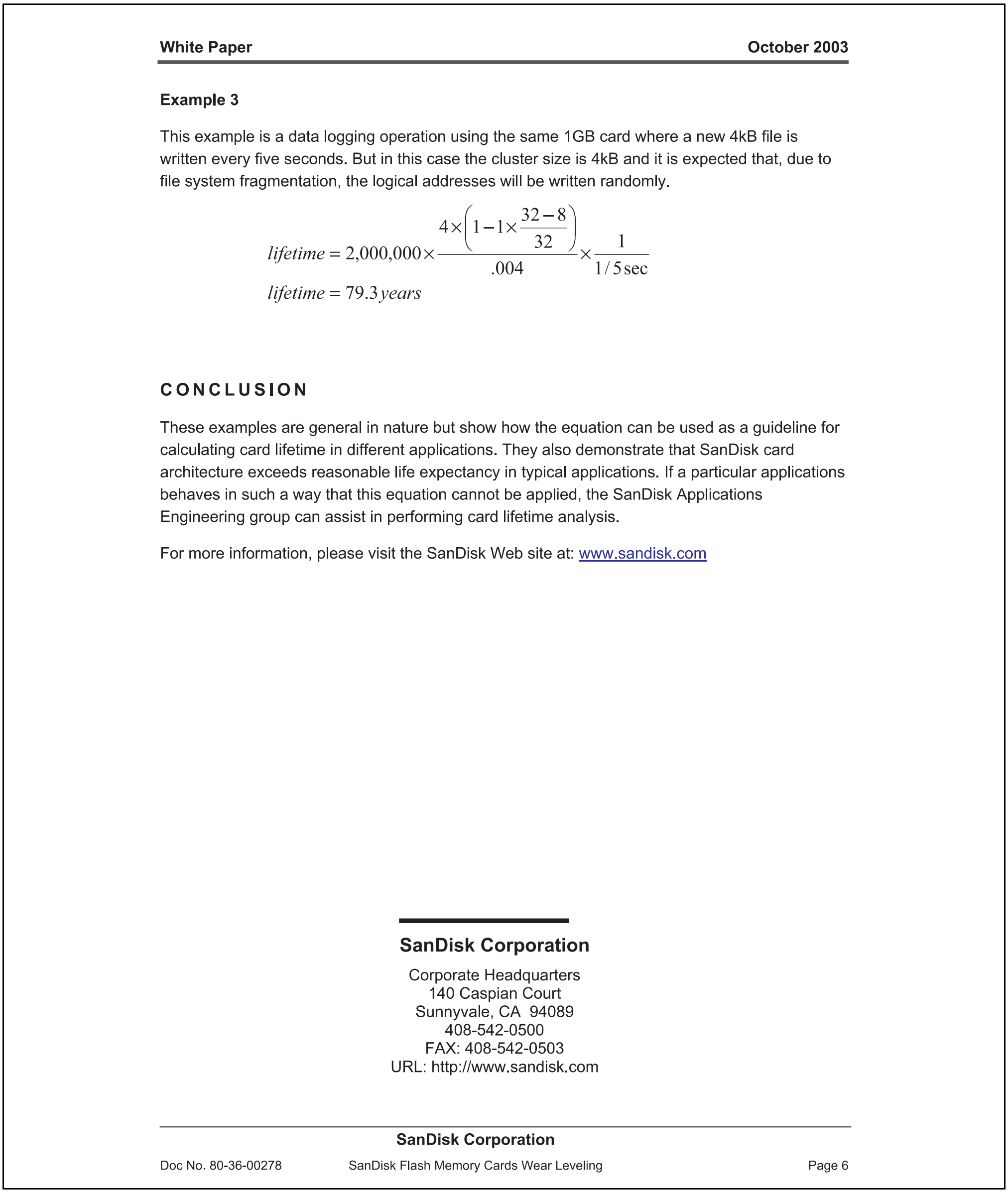
$$lifetime = 2{,}000{,}000 \times \frac{4000}{4} \times \frac{1}{1/5\sec}$$

$$lifetime = 317\,years$$

SanDisk Corporation

Doc No. 80-36-00278 SanDisk Flash Memory Cards Wear Leveling Page 5

Figure 300: SanDisk white paper - page 5 of 6



Example 3

This example is a data logging operation using the same 1GB card where a new 4kB file is written every five seconds. But in this case the cluster size is 4kB and it is expected that, due to file system fragmentation, the logical addresses will be written randomly.

$$lifetime = 2{,}000{,}000 \times \frac{4 \times \left(1 - 1 \times \frac{32-8}{32}\right)}{.004} \times \frac{1}{1/5\,\mathrm{sec}}$$

$$lifetime = 79.3\,years$$

CONCLUSION

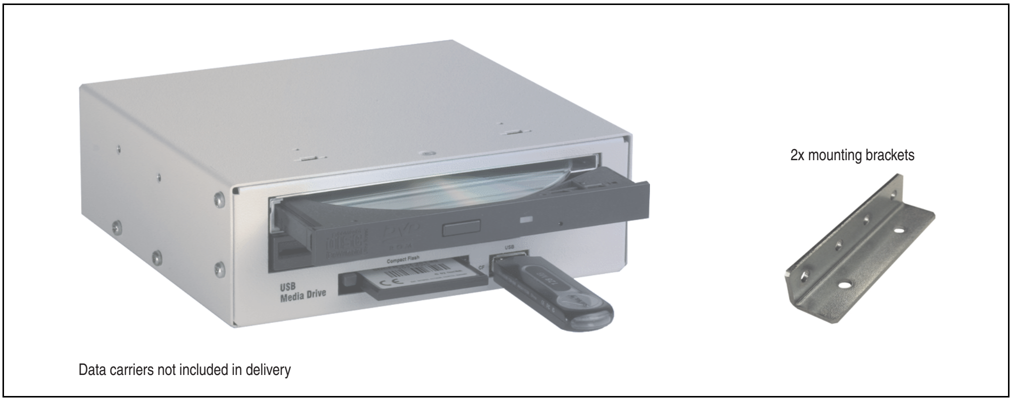
These examples are general in nature but show how the equation can be used as a guideline for calculating card lifetime in different applications. They also demonstrate that SanDisk card architecture exceeds reasonable life expectancy in typical applications. If a particular applications behaves in such a way that this equation cannot be applied, the SanDisk Applications Engineering group can assist in performing card lifetime analysis.

For more information, please visit the SanDisk Web site at: www.sandisk.com

SanDisk Corporation
Corporate Headquarters
140 Caspian Court
Sunnyvale, CA 94089
408-542-0500
FAX: 408-542-0503
URL: http://www.sandisk.com

Figure 301: SanDisk white paper - page 6 of 6

10. USB Media Drive 5MD900.USB2-00



2x mounting brackets

Data carriers not included in delivery

Figure 302: USB Media Drive 5MD900.USB2-00

10.1 Features

- Desk-top or rack-mount operation (mounting rail brackets)
- Integrated USB diskette drive
- Integrated DVD-ROM/CD-RW drive
- Integrated CompactFlash slot IDE/ATAPI (Hot Plug capable)
- Integrated USB 2.0 connection (up to 480 MBit high speed)
- +24 VDC supply (back side)
- USB/B 2.0 connection (back side)
- Optional front cover (model number 5A5003.03 see also section 10.8 "Front cover 5A5003.03 for the USB Media Drive", on page 648)

10.2 Technical data

Information:

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

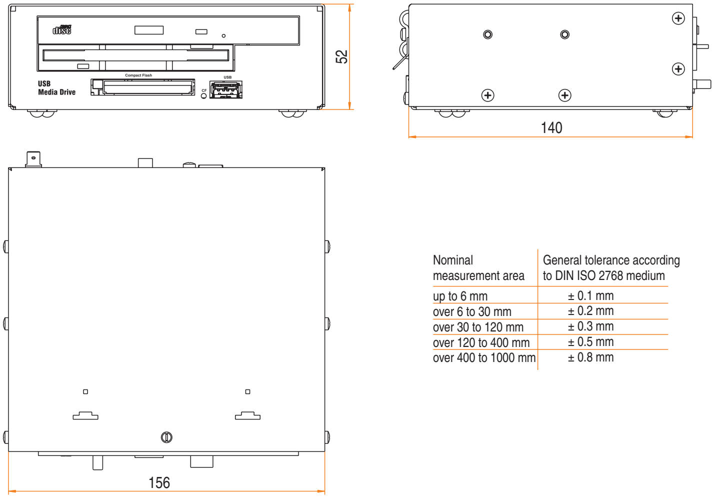
Features - entire device	**5MD900.USB2-00**
Transfer rate	Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)
Maximum cable length	5 m (not including hub)
Power supply Rated voltage	 24 VDC ±25%
Features - diskette drive	
Data capacity	720 KB / 1.25 MB / 1.44 MB (formatted)
Data transfer rate	250 kbit/s (720 KB) or 500 kbit/s (1.25 MB and 1.44 MB)
Rotation speed	Up to 360 rpm
Diskette media	High density (2HD) or normal density (2DD) 3.5" diskettes
MTBF	30,000 POH (Power-On Hours)
Features - DVD-ROM/CD-RW drive	
Write speed CD-R CD-RW	 24x, 16x, 10x and 4x 10x and 4x
Reading rate CD DVD	 24x 8x
Data transfer rate	Max. 33.3 MB/s
Access time (average) CD DVD	 85 ms 110 ms
Revolution speed	Max. 5136 rpm ±1%
Starting time (0 rpm to read access)	19 seconds (maximum)
Host interface	IDE (ATAPI)
Readable media CD DVD	 CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW DVD-ROM, DVD-R, DVD-RW, DVD-RAM
Non-write protected media CD	 CD-R, CD-RW
Write-methods	Disk at once, session at once, packet write, track at once
Laser class	Class 1 laser
Data buffer capacity	2 MB

Table 413: Technical data - USB Media Drive 5MD900.USB2-00

Features - DVD-ROM/CD-RW drive	**5MD900.USB2-00**
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session) Enhanced CD, CD text DVD-ROM, DVD-R, DVD-Video (double layer) DVD-RAM (4.7 GB, 2.6 GB)
Noise level (complete read access)	Approx. 45 dBA at 50 cm
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10,000 times
CompactFlash slot layout	
CompactFlash Type Amount Connection	 Type I 1 slot IDE/ATAPI
CompactFlash LED	Signals read or write access to an inserted CompactFlash card
Hot Plug capable	Yes
Features - USB connections	
USB A on the front side Power supply	Connection of further peripheral devices Max. 500 mA
USB B back side	Connection to the system
Mechanical characteristics	
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	Approx. 1.1 kg (without front cover)
Environmental characteristics	
Ambient temperature Operation Bearings Transport	 +5 to +45°C -20 to +60°C -40 to +60°C
Relative humidity Operation Bearings Transport	 20 to 80%, non-condensing 5 to 90%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings Transport	 At max. 5 - 500 Hz and 0.3 g At max. 10 - 100 Hz and 2 g At max. 10 - 100 Hz and 2 g
Shock (pulse with a sine half-wave) Operation Storage (packaged) Transport (packaged)	 At max. 5 g for 11 ms At max. 60 g for 11 ms At max. 60 g for 11 ms
Altitude	Max. 3000 meters

Table 413: Technical data - USB Media Drive 5MD900.USB2-00 (Forts.)

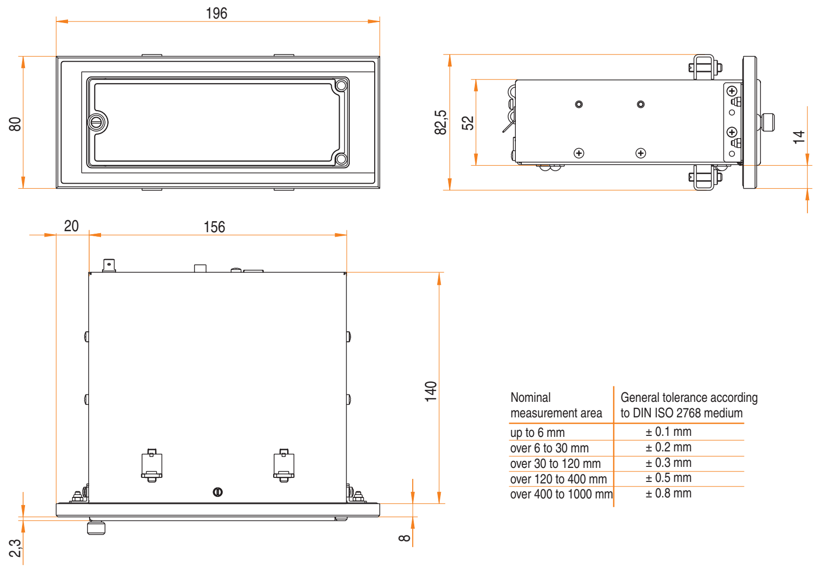
10.3 Dimensions



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

Figure 303: Dimensions for USB Media Drive 5MD900.USB2-00

10.4 Dimensions with front cover



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

Figure 304: Dimensions - USB Media Drive with front cover

10.5 Contents of delivery

Amount	Component
1	USB Media Drive complete unit
2	Mounting rail brackets

Table 414: Contents of delivery - USB Media Drive 5MD900.USB2-00

10.6 Interfaces

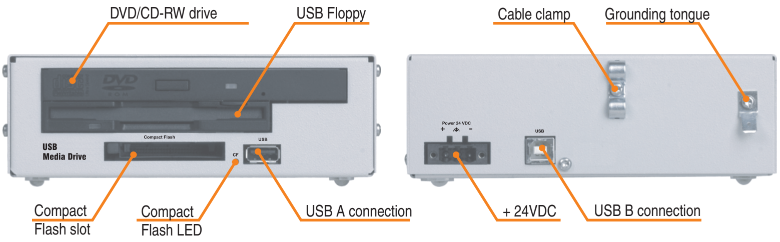


Figure 305: Interfaces for USB Media Drive 5MD900.USB2-00

10.7 Installation

The USB Media Drive can be operated as a desk-top device (rubber feet) or as a rack-mount device (2 mounting rail brackets included).

10.7.1 Mounting orientation

Because of limits to the mounting orientation with the components used (floppy, DVD-CDRW drive), the USB media drive is only permitted to be mounted and operated as shown in the following figure.

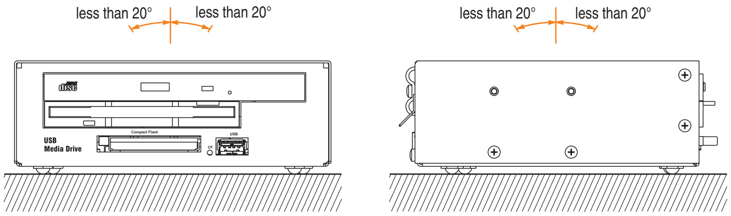


Figure 306: Mounting orientation of USB Media Drive 5MD900.USB2-00

10.8 Front cover 5A5003.03 for the USB Media Drive

This front cover can also be mounted on the front of the USB media drive (model number 5MD900.USB2-00 or 5MD900.USB2-01) to protect the interface.

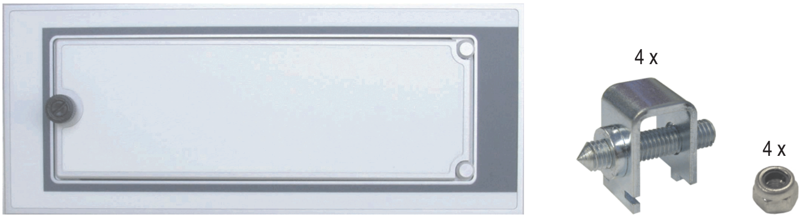


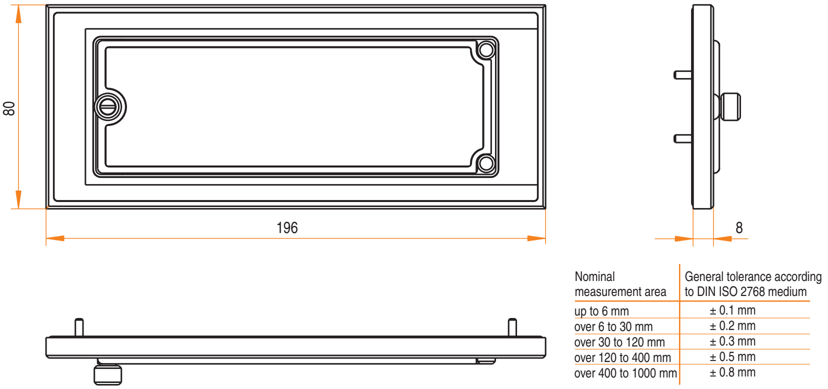
Figure 307: Front cover 5A5003.03

10.8.1 Technical data

Features	5A5003.03
Front cover design / colors	
Dark gray border around the cover	Similar to Pantone432CV
Light gray background	Similar to Pantone 427CV

Table 415: Technical data - 5A5003.03

10.8.2 Dimensions

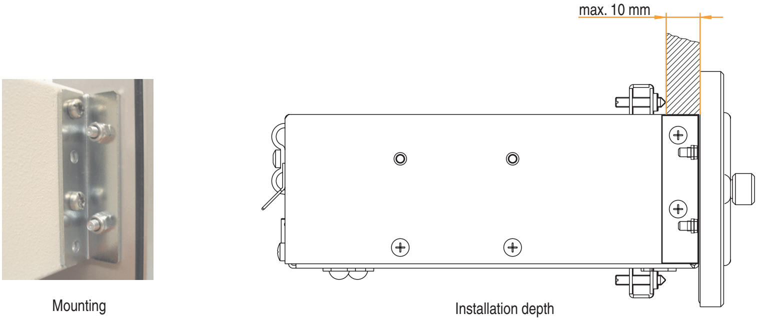


Nominal measurement area	General tolerance according to DIN ISO 2768 medium
up to 6 mm	± 0.1 mm
over 6 to 30 mm	± 0.2 mm
over 30 to 120 mm	± 0.3 mm
over 120 to 400 mm	± 0.5 mm
over 400 to 1000 mm	± 0.8 mm

Figure 308: Dimensions - 5A5003.03

10.8.3 Installation

The front cover is attached with 2 mounting rail brackets (included with USB Media Drive) and 4 locknuts. The USB media drive and front cover can be mounted as a whole in (for example) a switching cabinet door.



Mounting

Installation depth

Figure 309: Front cover mounting and installation depth

11. USB Media Drive - 5MD900.USB2-01

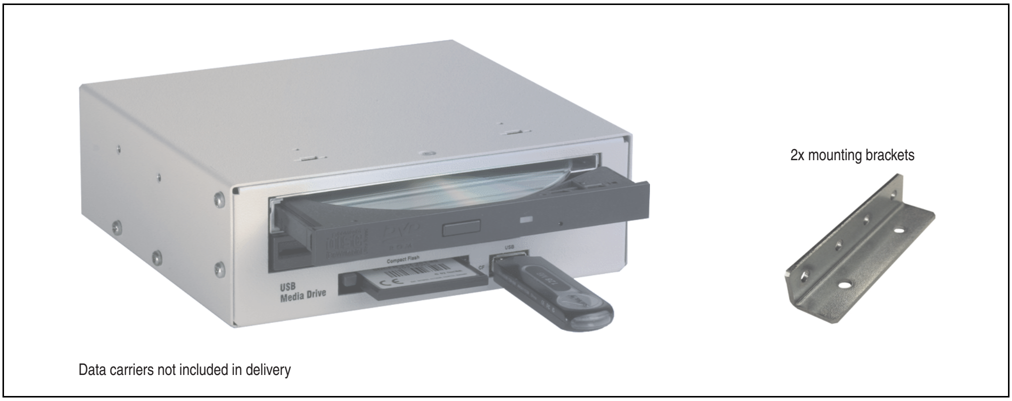


Figure 310: USB Media Drive - 5MD900.USB2-01

11.1 Features

- Desk-top or rack-mount operation (mounting rail brackets)
- Integrated USB diskette drive
- Integrated DVD-RW/CD-RW drive
- Integrated CompactFlash slot IDE/ATAPI (Hot Plug capable)
- Integrated USB 2.0 connection (up to 480 MBit high speed)
- +24 VDC supply (back side)
- USB/B 2.0 connection (back side)
- Optional front cover (model number 5A5003.03 see also section 11.8 "Front cover 5A5003.03 for the USB Media Drive", on page 655)

11.2 Technical data

Information:

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

Features - entire device	5MD900.USB2-01
Transfer rate	Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)
Maximum cable length	5 m (not including hub)
Power supply Rated voltage	 24 VDC ±25%
Features - diskette drive	
Data capacity	720 KB / 1.25 MB / 1.44 MB (formatted)
Data transfer rate	250 kbit/s (720 KB) or 500 kbit/s (1.25 MB and 1.44 MB)
Rotation speed	Up to 360 rpm
Diskette media	High density (2HD) or normal density (2DD) 3.5" diskettes
MTBF	30,000 POH (Power-On Hours)
Features - DVD-RW/CD-RW drive	
Write speed CD-R CD-RW DVD-R DVD-RW DVD-RAM[1)] DVD+R DVD+R (double layer) DVD+RW	 24x, 16x, 10x and 4x 10x and 4x 8x, 4x and 2x 4x and 2x 3x and 2x 8x, 4x and 2x 2x,4x 4x and 2x
Reading rate CD DVD	 24x 8x
Data transfer rate	Max. 33.3 MB/s
Access time (average) CD DVD	 130 ms (24x) 130 ms (8x)
Revolution speed	Max. 5090 rpm ±1%
Starting time (0 rpm to read access) CD DVD	 14 seconds (maximum) 15 seconds (maximum)
Host interface	IDE (ATAPI)
Laser class	Class 1 laser

Table 416: Technical data - USB Media Drive 5MD900.USB2-01

Features - DVD-ROM/CD-RW drive	5MD900.USB2-01
Readable media CD DVD	 CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW DVD-ROM, DVD-R, DVD-RW. DVD-RAM, DVD+R, DVD+R (double layer), DVD+RW
Non-write protected media CD DVD	 CD-R, CD-RW DVD-R/RW, DVD-RAM (4.7 GB), DVD+R/RW, DVD+R (double layer)
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session), Enhanced CD, CD text DVD-ROM, DVD-R, DVD-RW, DVD-Video DVD-RAM (4.7 GB, 2.6 GB) DVD+R, DVD+R (double layer), DVD+RW
Write-methods CD DVD	 Disk at once, session at once, packet write, track at once Disk at once, incremental, over-write, sequential, multi-session
Data buffer capacity	8 MB
Noise level (complete read access)	Approx. 48 dBA at 50 cm
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10,000 times
CompactFlash slot layout	
CompactFlash Type Amount Connection	 Type I 1 slot IDE/ATAPI
CompactFlash LED	Signals read or write access to an inserted CompactFlash card
Hot Plug capable	Yes
Features - USB connections	
USB A on the front side Power supply Type Transfer rate	Connection of further peripheral devices Max. 500 mA 2.0 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)
USB B back side	Connection to the system
Mechanical characteristics	
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	Approx. 1.1 kg (without front cover)
Environmental characteristics	
Ambient temperature Operation Bearings Transport	 +5 to +45°C -20 to +60°C -40 to +60°C

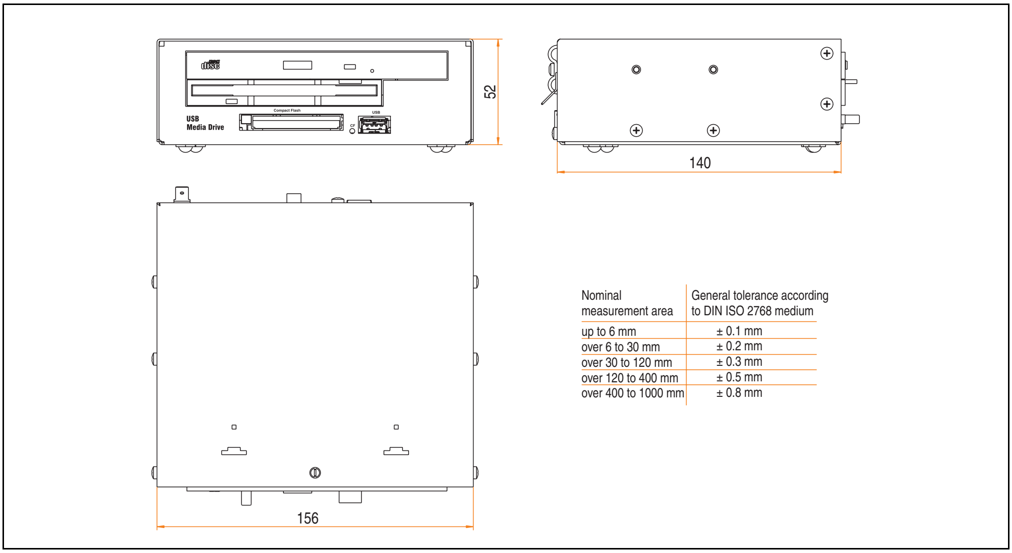
Table 416: Technical data - USB Media Drive 5MD900.USB2-01 (Forts.)

Environmental characteristics	5MD900.USB2-01
Relative humidity Operation Bearings Transport	 20 to 80%, non-condensing 5 to 90%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings Transport	 At max. 5 - 500 Hz and 0.3 g At max. 10 - 100 Hz and 2 g At max. 10 - 100 Hz and 2 g
Shock (pulse with a sine half-wave) Operation Storage (packaged) Transport (packaged)	 At max. 5 g for 11 ms At max. 60 g for 11 ms At max. 60 g for 11 ms
Altitude	Max. 3000 meters

Table 416: Technical data - USB Media Drive 5MD900.USB2-01 (Forts.)

1) RAM drivers are not provided by the manufacturer. Support of RAM function by the burning software "Nero" (model number 5SWUTI.0000-00) or other burning software packages and drivers from third party providers.

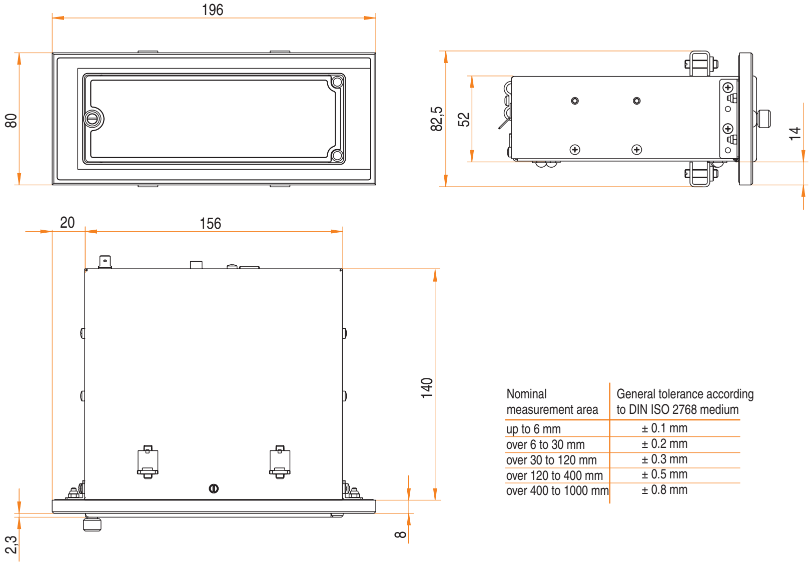
11.3 Dimensions



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

Figure 311: Dimensions - 5MD900.USB2-01

11.4 Dimensions with front cover



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

Figure 312: Dimensions - USB Media Drive with front cover

11.5 Contents of delivery

Amount	Component
1	USB Media Drive complete unit
2	Mounting rail brackets

Table 417: Contents of delivery - USB Media Drive - 5MD900.USB2-01

11.6 Interfaces

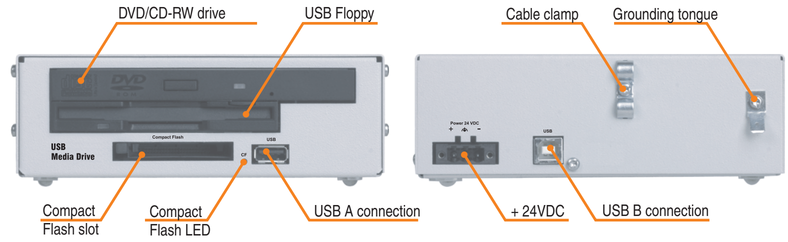


Figure 313: Interfaces - 5MD900.USB2-01

11.7 Installation

The USB Media Drive can be operated as a desk-top device (rubber feet) or as a rack-mount device (2 mounting rail brackets included).

11.7.1 Mounting orientation

Because of limits to the mounting orientation with the components used (floppy, DVD-CDRW drive), the USB media drive is only permitted to be mounted and operated as shown in the following figure.

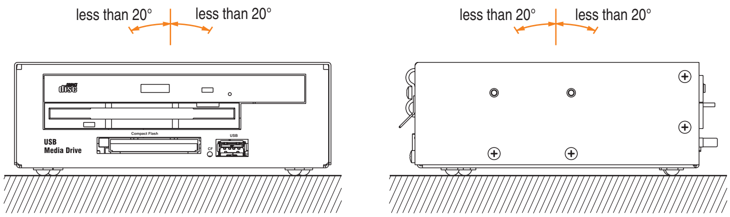


Figure 314: Mounting orientation - 5MD900.USB2-01

11.8 Front cover 5A5003.03 for the USB Media Drive

This front cover can also be mounted on the front of the USB media drive (model number 5MD900.USB2-00 or 5MD900.USB2-01) to protect the interface.

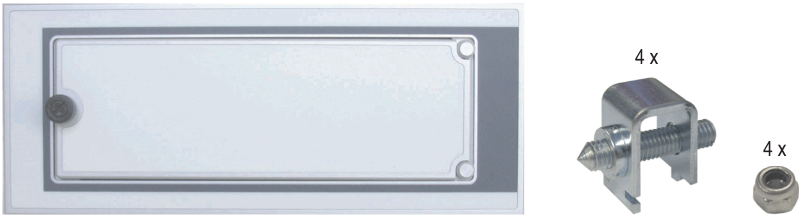


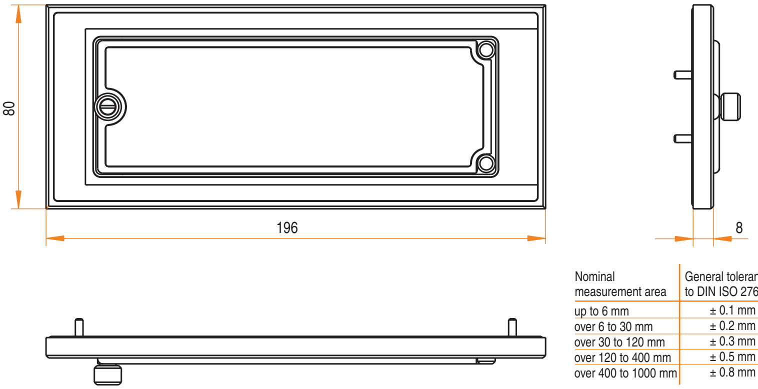
Figure 315: Front cover 5A5003.03

11.8.1 Technical data

Features	5A5003.03
Front cover design / colors Dark gray border around the cover Light gray background	 Similar to Pantone432CV Similar to Pantone 427CV

Table 418: Technical data - 5A5003.03

11.8.2 Dimensions

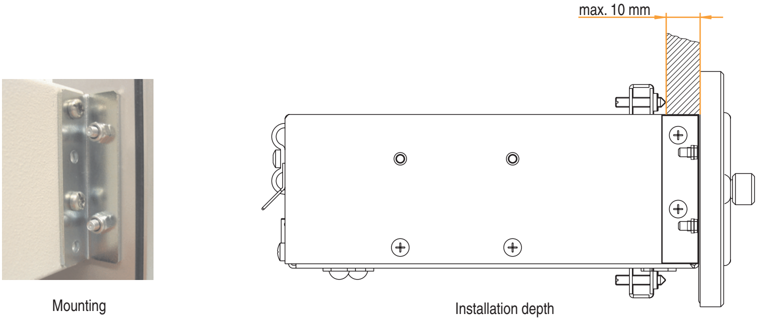


Nominal measurement area	General tolerance according to DIN ISO 2768 medium
up to 6 mm	± 0.1 mm
over 6 to 30 mm	± 0.2 mm
over 30 to 120 mm	± 0.3 mm
over 120 to 400 mm	± 0.5 mm
over 400 to 1000 mm	± 0.8 mm

Figure 316: Dimensions - 5A5003.03

11.8.3 Installation

The front cover is attached with 2 mounting rail brackets (included with USB Media Drive) and 4 locknuts. The USB media drive and front cover can be mounted as a whole in (for example) a switching cabinet door.



Mounting

Installation depth

Figure 317: Front cover mounting and installation depth

12. USB flash drive

Information:

We reserve the right to supply alternative products due to the vast quantity of flash drives available on the market and their corresponding short product lifecycle. Therefore, the following measures might be necessary in order to boot from these flash drives (e.g. the SanDisk Cruzer Micro flash drive with 512 MB):

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

12.1 General information

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

12.2 Order data

Model number	Description	Figure
5MMUSB.0128-00	USB flash drive 128 MB SanDisk Cruzer Mini	SanDisk Cruzer® Mini SanDisk Cruzer® Micro B&R USB Memory Stick
5MMUSB.0256-00	USB flash drive 256 MB SanDisk Cruzer Mini	
5MMUSB.0512-00	USB flash drive 512 MB SanDisk Cruzer Mini up to Rev. E0 or Cruzer Micro starting with Rev. E0	
5MMUSB.1024-00	USB flash drive 1 GB SanDisk Cruzer Mini up to Rev. E0 or Cruzer Micro starting with Rev. E0	
5MMUSB.2048-00	USB flash drive 2 GB SanDisk Cruzer Micro	
5MMUSB.2048-01	USB flash drive 2 GB B&R	

Table 419: Order data - USB flash drives

12.3 Technical data - 5MMUSB.xxxx-00

Information:

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

Features	5MMUSB.0128-00	5MMUSB.0256-00	5MMUSB.0512-00	5MMUSB.1024-00	5MMUSB.2048-00
LED Cruzer Mini / Cruzer Micro	1 LED (green), signals data transfer (send and receive)				
Power supply Current requirements Cruzer Mini / Cruzer Micro	Via the USB port 650 µA in sleep mode, 150 mA read/write				
Interface Cruzer Mini / Cruzer Micro Type Transfer rate Sequential reading Sequential writing Connection	USB specification 2.0 high speed device, mass storage class, USB-IF and WHQL certified USB 1.1 and 2.0 compatible Up to 480 MBit (high speed) Max. 8.7 MB/second Max. 1.7 MB/second To each USB type A interface				
MTBF (at 25°C) Cruzer Mini / Cruzer Micro	100,000 hours				
Data retention Cruzer Mini / Cruzer Micro	10 years				
Maintenance Cruzer Mini / Cruzer Micro	None				
Operating system support Cruzer Mini Cruzer Micro	Windows CE 4.1, CE 4.2, 98SE1) , ME, 2000, XP, Mac OS 9.1.x and Mac OS X 10.1.2 Windows CE 4.2, CE 5.0, ME, 2000, XP and Mac OS 9.1.x+, OS X v10.1.2+				
Mechanical characteristics					
Dimensions Height - Cruzer Mini / Cruzer Micro Width - Cruzer Mini / Cruzer Micro Depth - Cruzer Mini / Cruzer Micro	62 mm / 52.2 mm 19 mm / 19 mm 11 mm / 7.9 mm				
Environmental characteristics					
Environmental temperature Cruzer Mini / Cruzer Micro2) Operation Bearings Transport	0 to +45°C -20 to +60°C -20 to +60°C				
Humidity Cruzer Mini / Cruzer Micro Operation Bearings Transport	10 to 90%, non-condensing 5 to 90%, non-condensing 5 to 90%, non-condensing				

Table 420: Technical data - USB flash drive 5MMUSB.xxxx-00

Features	5MMUSB.0128-00	5MMUSB.0256-00	5MMUSB.0512-00	5MMUSB.1024-00	5MMUSB.2048-00
Vibration Cruzer Mini / Cruzer Micro					
Operation	At 10 - 500 Hz: 2 g (19.6 m/s^2 0-peak), oscillation rate 1/minute				
Bearings	At 10 - 500 Hz: 4 g (39.2 m/s^2 0-peak), oscillation rate 1/minute				
Transport	At 10 - 500 Hz: 4 g (39.2 m/s^2 0-peak), oscillation rate 1/minute				
Shock Cruzer Mini / Cruzer Micro					
Operation	Max. 40 g (392 m/s^2 0-peak) and 11 ms length				
Bearings	Max. 80 g (784 m/s^2 0-peak) and 11 ms length				
Transport	Max. 80 g (784 m/s^2 0-peak) and 11 ms length				
Altitude Cruzer Mini / Cruzer Micro					
Operation	3,048 meters				
Bearings	12,192 meters				
Transport	12,192 meters				

Table 420: Technical data - USB flash drive 5MMUSB.xxxx-00 (Forts.)

1) For Win 98SE, a driver can be downloaded from the SanDisk homepage.

2) Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

12.3.1 Temperature humidity diagram

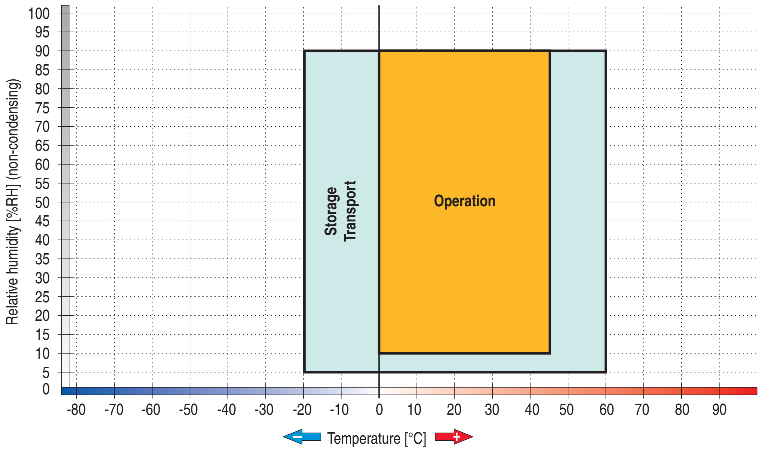


Figure 318: Temperature humidity diagram for flash drives 5MMUSB.xxxx-00

12.4 Technical data - 5MMUSB.2048-01

Information:

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

Features	5MMUSB.2048-01
LED	1 LED (green), signals data transfer (send and receive)
Power supply Current requirements	Via the USB port max. 500 µA sleep mode, max. 120 mA read/write
Interface Type Transfer rate Sequential reading Sequential writing Connection	USB specification 2.0 high speed device, mass storage class, USB-IF and WHQL certified USB 1.1 and 2.0 compatible Up to 480 MBit (high speed) Max. 31 MB/second Max. 30 MB/second To each USB type A interface
MTBF	> 3,000,000 hours
Data retention	> 10 years
Maintenance	None
Operating system support	Windows CE, ME, 2000, XP, Vista und Mac OS 9 or newer, Linux 2.4 or newer
Mechanical characteristics	
Dimensions Length Width Thickness	 67.85 mm 17.97 mm 8.35 mm
Environmental characteristics	
Ambient temperature Operation Bearings Transport	 0 to +70°C -50 to +100°C -50 to +100°C
Relative humidity Operation Bearings Transport	 85%, non-condensing 85%, non-condensing 85%, non-condensing
Vibration Operation Bearings Transport	 At 20 - 2000 Hz: 20 g (peak) At 20 - 2000 Hz: 20 g (peak) At 20 - 2000 Hz: 20 g (peak)
Shock Operation Bearings Transport	 max. 1500 g (peak) max. 1500 g (peak) max. 1500 g (peak)

Table 421: Technical data - USB flash drive 5MMUSB.2048-01

Environmental characteristics	5MMUSB.2048-01
Altitude Operation Bearings Transport	 3,048 meters 12,192 meters 12,192 meters

Table 421: Technical data - USB flash drive 5MMUSB.2048-01 (Forts.)

12.4.1 Temperature humidity diagram

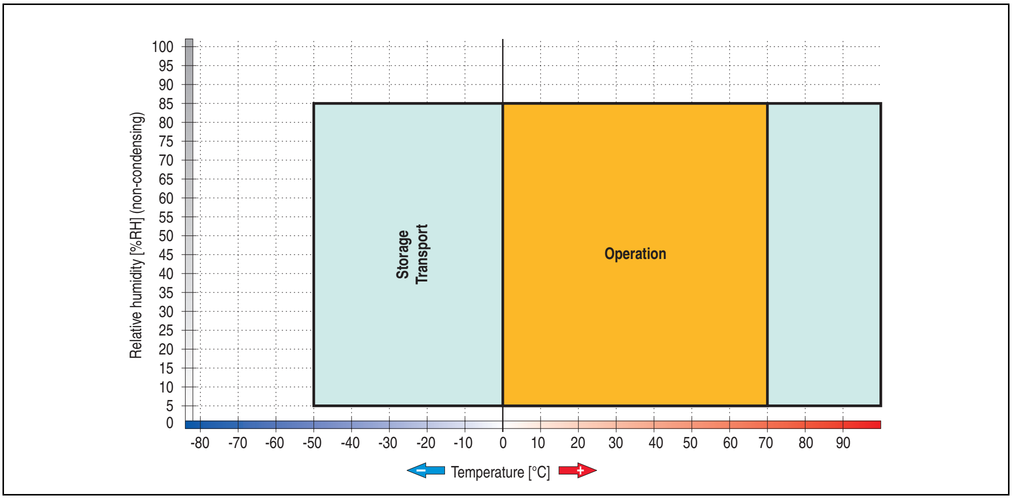


Figure 319: Temperature humidity diagram - USB flash drive - 5MMUSB.2048-01

Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

13. HMI Drivers & Utilities DVD 5SWHMI.0000-00

Figure 320: HMI Drivers & Utilities DVD 5SWHMI.0000-00

Model number	Short description	Note
5SWHMI.0000-00	**HMI Drivers & Utilities DVD**	

Table 422: Model number - HMI Drivers & Utilities DVD

This DVD contains drivers, utilities, software upgrades and user's manuals for B&R Panel system products (see B&R homepage www.br-automation.com – Industrial PCs, Visualization and Operation).

At the time of its creation, the content on the DVD is identical to the files found in the download area of the B&R homepage (under Service – “Material Related Downloads”).

BIOS upgrades for the products

- Automation PC 620 / Panel PC 700 CPU Board 815E und 855GME BIOS
- Automation PC 620 / Panel PC 700 CPU Board X855GME 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 products - IPC2000/2001/2002

- Provit 5000 products - 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
- Panel PC 310

Drivers for the devices

- Automation Device Interface (ADI)
- Audio
- Chipset
- CD-ROM
- LS120
- Graphics
- Network
- PCI / SATA RAID controller
- Touch screen
- Touchpad
- Interfacecard

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)
- Panel PC 800 (MTCX, SDLR, SDLT)
- UPS firmware

Utilities / Tools

- B&R Embedded OS Installer
- Windows CE Tools
- User Boot Logo Conversion Utility
- SATA RAID Installations Utility
- Automation Device Interface (ADI)
- CompactFlash endurance calculator (Silicon Systems)
- Miscellaneous
- MTC Utilities
- Key Editor
- MTC & Mkey Utilities
- Mkey Utilities
- UPS configuration software
- ICU ISA configuration
- Intel PCI NIC Boot ROM
- Diagnostic Utilities

Windows

- Windows CE 6.0
- Windows CE 5.0
- Windows CE 4.2
- Windows CE 4.1
- Windows CE Tools
- Windows Embedded Standard 2009
- Thin Client
- Windows NT Embedded
- Windows XP Embedded
- VNC Viewer

MCAD templates for

- Industrial PCs
- Operator Interface devices
- Legend Strips templates
- Customized designs

ECAD templates for

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

Documentation for

- 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
- 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
- Windows CE 6.0 help
- Windows NT Embedded application guide
- Windows XP Embedded application guide
- UPS - uninterruptible power supply

- Implementation instructions
- B&R Hilscher feldbus 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)

14. Cables

14.1 APC620 internal supply cable 5CAMSC.0001-00

This supply cable is used internally e.g. to supply special PCI cards. It is connected to the APC620 main board. For requirements and procedures, see appendix A, section "Connection of an external device to the main board", on page 768.

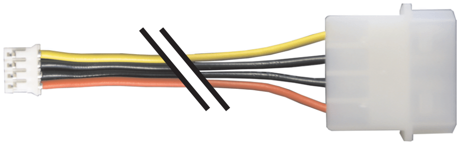


Figure 321: APC620 internal supply cable 5CAMSC.0001-00

14.1.1 Order data

Model number	Description	Note
5CAMSC.0001-00	**APC620 internal supply cable**	

Table 423: Model number - APC620 internal supply cable

14.1.2 Technical data

Features	5CAMSC.0001-00
Length	100 mm ±5 mm
Connector type	1x 4-pin male disk drive power plug, 1x 4-pin female plug housing
Wire cross section	AWG 22
Flexibility	Flexible

Table 424: Technical data - 5CAMSC.0001-00

14.2 DVI cable 5CADVI.0xxx-00

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

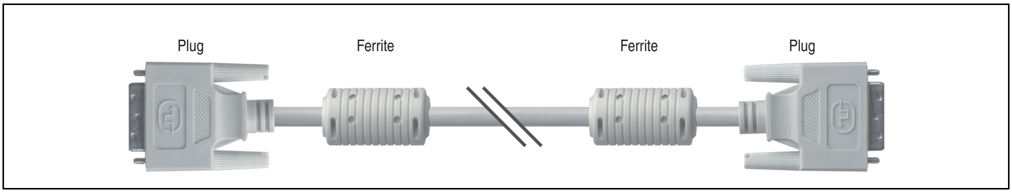


Figure 322: DVI extension cable (similar)

Caution!

DVI cables can only be plugged in and unplugged when the APC620 and display device (Automation Panel 900, monitor) are turned off.

14.2.1 Order data

Model number	Description	Note
5CADVI.0018-00	**DVI-D cable 1.8 m** Single cable, DVI-D/m:DVI-D/m; length: 1.8 m	
5CADVI.0050-00	**DVI-D cable 5 m** Single cable, DVI-D/m:DVI-D/m; length: 5 m	
5CADVI.0100-00	**DVI-D cable 10 m** Single cable, DVI-D/m:DVI-D/m; length: 10 m	

Table 425: Model numbers - DVI cables

14.2.2 Technical data

Features	5CADVI.0018-00	5CADVI.0050-00	5CADVI.0100-00
Length Tolerance	1.8 m ±30 mm	5 m ±50 mm	10 m ±100 mm
Cable diameter Maximum	8.5 mm		
Shielding	Individual cable pairs and entire cable		
Connector type Connection cycles	2x DVI-D (18+1), male 100		
Wire cross section	AWG 28		
Line resistance	Max. 237 Ω/km		
Insulation resistance	Min. 100 MΩ/km		
Flexibility	Limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5x cable diameter, 20 cycles / minute)		
Flex radius Fixed layout	See figure "Flex radius specification", on page 669 5x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)		
Weight	Approx. 300 g	Approx. 590 g	Approx. 2100 g

Table 426: Technical data - DVI cable 5CADVI.0xxx-00

14.2.3 Flex radius specification

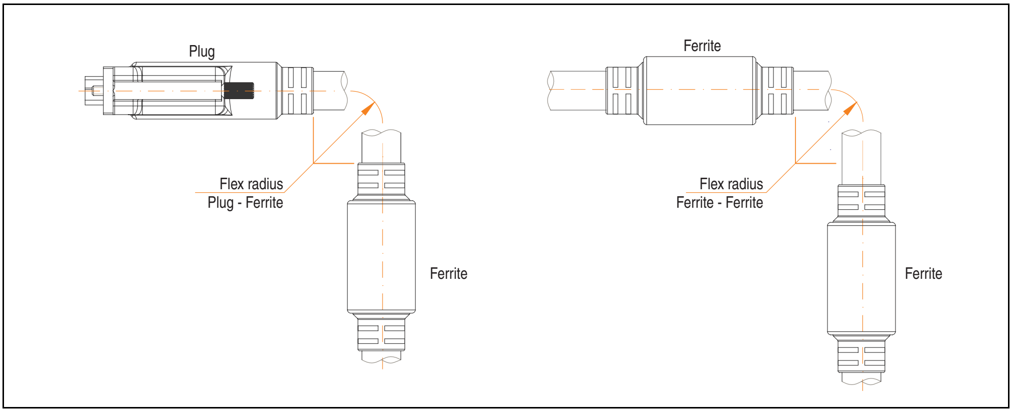


Figure 323: Flex radius specification

14.2.4 Cable specifications

The following figure shows the pin assignments for the DVI cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly.

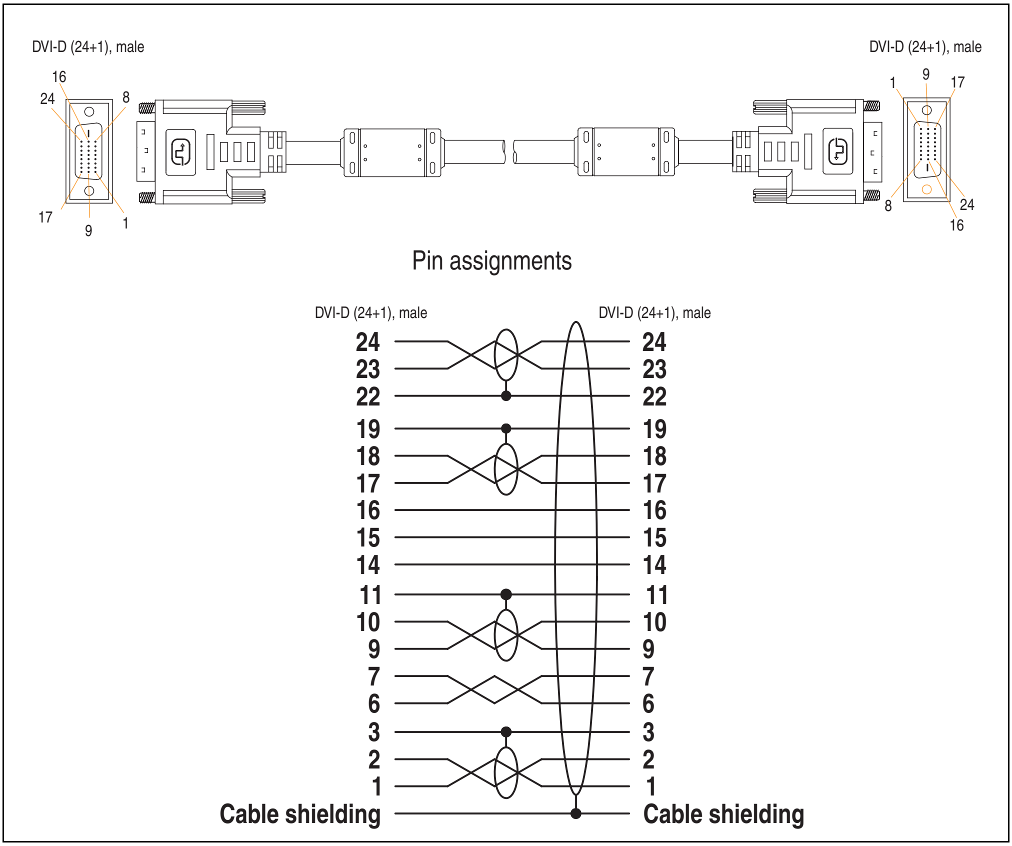


Figure 324: Pin assignments - DVI cable

14.3 SDL cable 5CASDL.0xxx-00

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

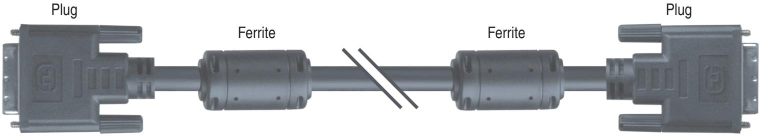


Figure 325: SDL extension cable (similar)

Caution!

The SDl cable can only be plugged in and unplugged when the device is turned off.

14.3.1 Order data

Model number	Description	Note
5CASDL.0018-00	**SDL cable 1.8 m** SDL cable for a fixed type of layout; length: 1.8 m	
5CASDL.0050-00	**SDL cable 5 m** SDL cable for a fixed type of layout; length: 5 m	
5CASDL.0100-00	**SDL cable 10 m** SDL cable for a fixed type of layout; length: 10 m	
5CASDL.0150-00	**SDL cable 15 m** SDL cable for a fixed type of layout; length: 15 m	
5CASDL.0200-00	**SDL cable 20 m** SDL cable for a fixed type of layout; length: 20 m	
5CASDL.0250-00	**SDL cable 25 m** SDL cable for a fixed type of layout; length: 25 m	
5CASDL.0300-00	**SDL cable 30 m** SDL cable for a fixed type of layout; length: 30 m	

Table 427: Model numbers - SDL cables

14.3.2 Technical data

Features	**5CASDL.0018-00**	**5CASDL.0050-00**	**5CASDL.0100-00**	**5CASDL.0150-00**	**5CASDL.0200-00**	**5CASDL.0250-00**	**5CASDL.0300-00**
Length Tolerance	1.8 m ±50 mm	5 m ±80 mm	10 m ±100 mm	15 m ±120 mm	20 m ±150 mm	25 m ±200 mm	30 m ±200 mm
Cable diameter Typical Maximum	8.6 ±0.2 mm 9 mm		11 ±0.2 mm 11.5 mm				
Shielding	Individual cable pairs and entire cable						
Connector type Connection cycles	2x DVI-D (24+1), male 100						
Wire cross section	AWG 28		AWG 24				
Line resistance	Max. 237 Ω/km		Max. 93 Ω/km				
Insulation resistance	Min. 10 MΩ/km						
Flexibility	Limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5x cable diameter, 20 cycles / minute)						
Halogen-free	No						
Flex radius Fixed layout	See figure "Flex radius specification", on page 672 5x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)						
Weight	Approx. 300 g	Approx. 590 g	Approx. 2100 g	Approx. 3000 g	Approx. 4100 g	Approx. 5100 g	Approx. 6100 g

Table 428: Technical data - SDL cables 5CASDL.0xxx-00

14.3.3 Flex radius specification

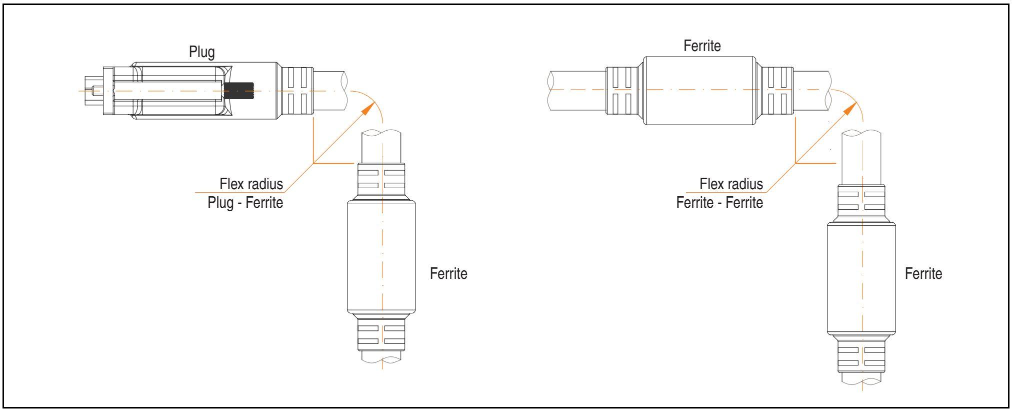


Figure 326: Flex radius specification

14.3.4 Cable specifications

The following figure shows the pin assignments for the SDL cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly.

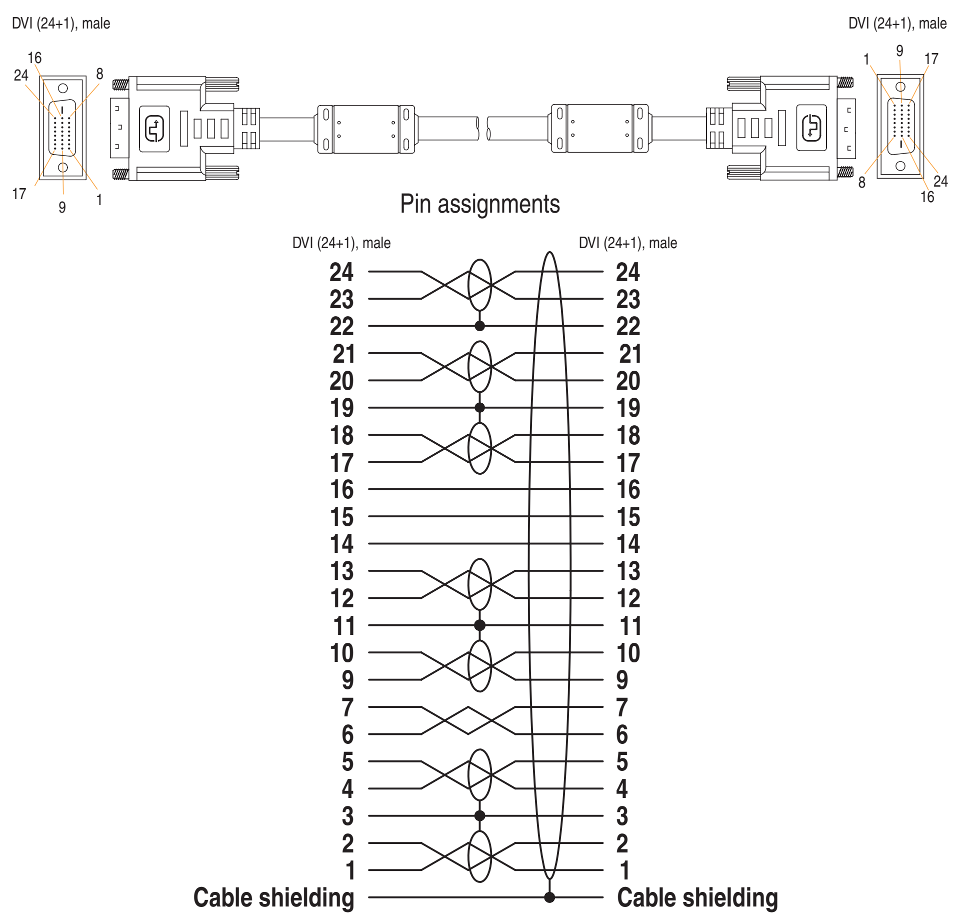


Figure 327: Pin assignments - SDL cable 5CASDL.0xxx-00

14.4 SDL cable with 45° plug 5CASDL.0xxx-01

The SDL cables 5CASDL.0xxx-01 are designed for fixed layout.

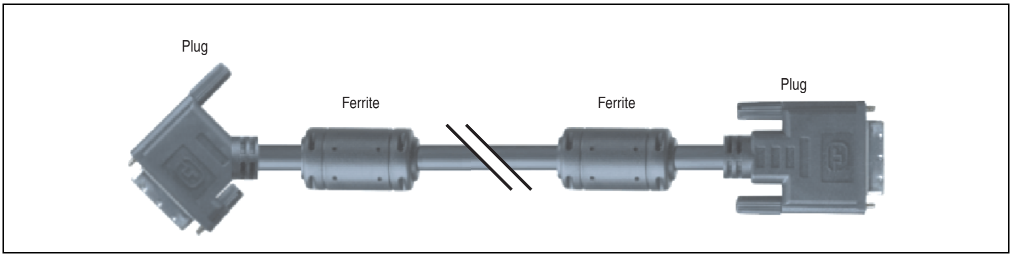


Figure 328: SDL cable with 45° plug (similar)

Caution!

The SDI cable can only be plugged in and unplugged when the device is turned off.

14.4.1 Order data

Model number	Description	Note
5CASDL.0018-01	**SDL cable 1.8 m 45°** SDL cable for fixed type of layout with one-sided 45° plug; length: 1.8 m	
5CASDL.0050-01	**SDL cable 5 m 45°** SDL cable for fixed type of layout with one-sided 45° plug; length: 5 m	
5CASDL.0100-01	**SDL cable 10 m 45°** SDL cable for fixed type of layout with one-sided 45° plug; length: 10 m	
5CASDL.0150-01	**SDL cable 15 m 45°** SDL cable for fixed type of layout with one-sided 45° plug; length: 15 m	

Table 429: Model numbers - SDL cables with 45° plug

14.4.2 Technical data

Features	5CASDL.0018-01	5CASDL.0050-01	5CASDL.0100-01	5CASDL.0150-01
Length Tolerance	1.8 m ±50 mm	5 m ±80 mm	10 m ±100 mm	15 m ±120 mm
Cable diameter Maximum	9 mm		11.5 mm	
Shielding	Individual cable pairs and entire cable			
Connector type Connection cycles	2x DVI-D (24+1), male 100			
Wire cross section	AWG 28		AWG 24	
Line resistance	Max. 237 Ω/km		Max. 93 Ω/km	
Insulation resistance	Min. 10 MΩ/km			
Flexibility	Limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5x cable diameter, 20 cycles / minute)			
Halogen-free	No			
Flex radius Fixed layout	See figure "Flex radius specification", on page 675 5x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)			
Weight	Approx. 300 g	Approx. 590 g	Approx. 2100 g	Approx. 3000 g

Table 430: Technical data - SDL cable with 45° plug 5CASDL.0xxx-01

14.4.3 Flex radius specification

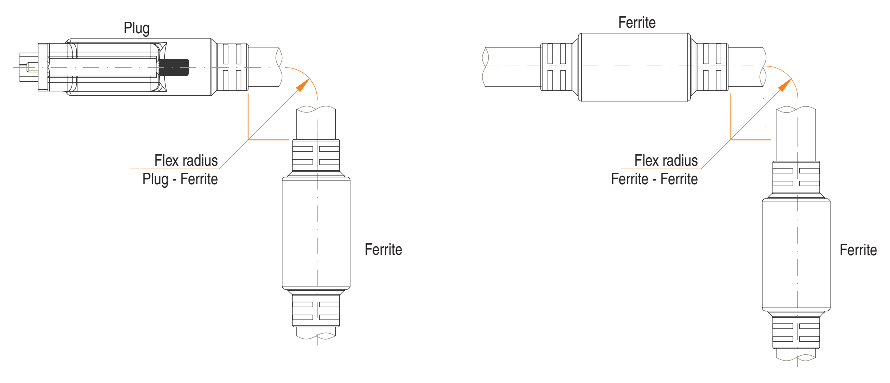


Figure 329: Flex radius specification

14.4.4 Cable specifications

The following figure shows the pin assignments for the SDL cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly.

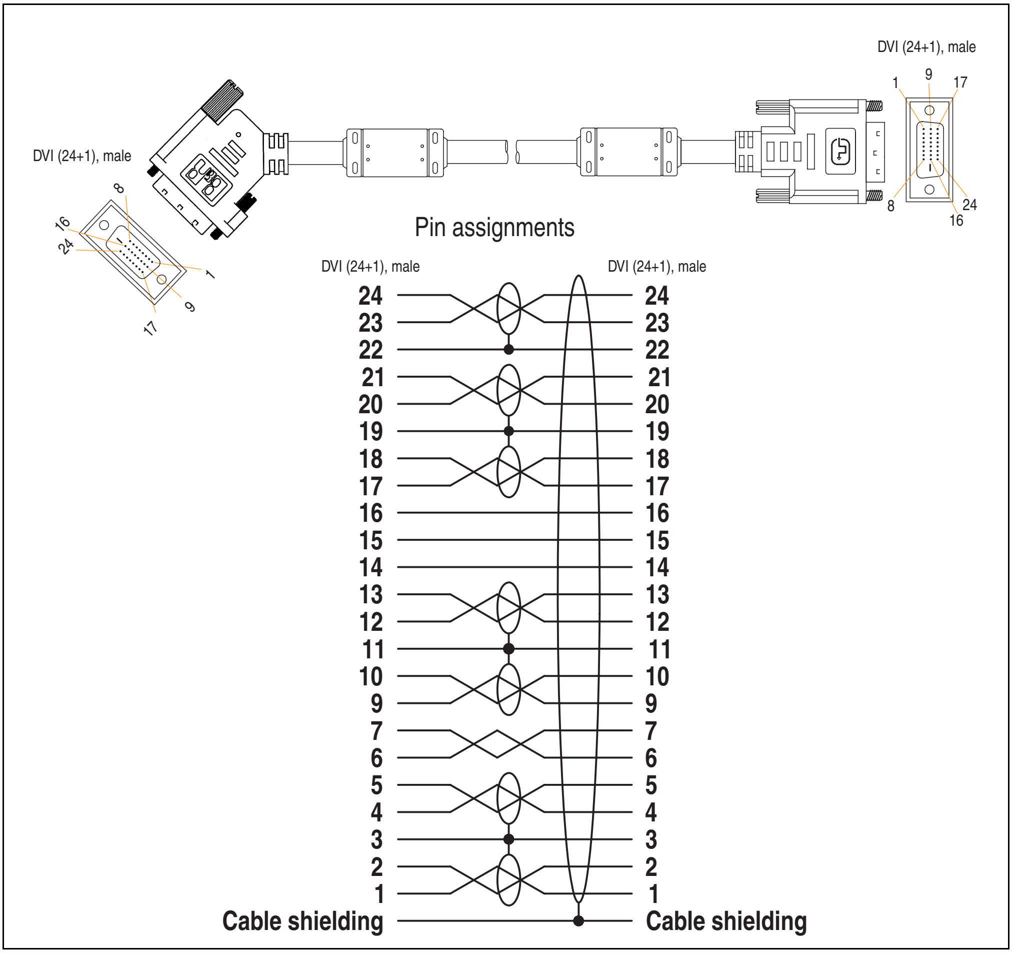


Figure 330: Pin assignments - SDL cable with 45° plug 5CASDL.0xxx-01

14.5 SDL cable with extender 5CASDL.0x00-10

The SDL cables (with extender) 5CASDL.0xxx-10 are designed for fixed layout. Use of the SDL flex cable (with extender) 5CASDL.0x00-13 is required for a flexible installation (e.g. in swing arm systems).

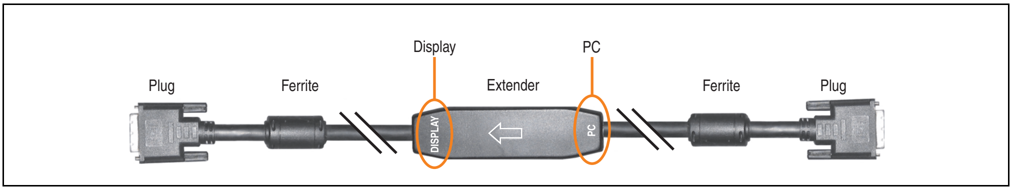


Figure 331: SDL cable with extender (similar)

Caution!

SDL cables with extender can only be plugged in and unplugged when the device is turned off. The correct direction of connection (Display, PC) for the wiring is illustrated on the middle of the extender.

14.5.1 Order data

Model number	Description	Note
5CASDL.0300-10	**30 m SDL cable with extender** SDL cable with extender for a fixed type of layout; length 30 m	Cancelled since 12/2006 Replaced by 5CASDL.0300-13
5CASDL.0400-10	**40 m SDL cable with extender** SDL cable with extender for a fixed type of layout; length 40 m	Cancelled since 12/2006 Replaced by 5CASDL.0400-13

Table 431: Model numbers - SDL cable with extender

14.5.2 Technical data

Features	5CASDL.0300-10	5CASDL.0400-10
Length Tolerance	30 m ±200 mm	40 m ±200 mm
Dimensions - Extender box	Height 18.5 mm, width 35 mm, length 125 mm	
Cable diameter Maximum	11.5 mm	
Shielding	Individual cable pairs and entire cable	
Connector type Connection cycles	2x DVI-D (24+1), male 100	
Wire cross section	AWG 24	
Line resistance	Max. 93 Ω/km	
Insulation resistance	Min. 10 MΩ/km	
Flexibility	Limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5x cable diameter, 20 cycles / minute)	
Flex radius Fixed layout	See figure "Flex radius specification", on page 678 5 x cable diameter (of plug - ferrite magnet and ferrite magnet - extender)	
Weight	Approx. 6100 g	Approx. 8100 g

Table 432: Technical data - SDL cable with extender 5CASDL.0x00-10

14.5.3 Flex radius specification

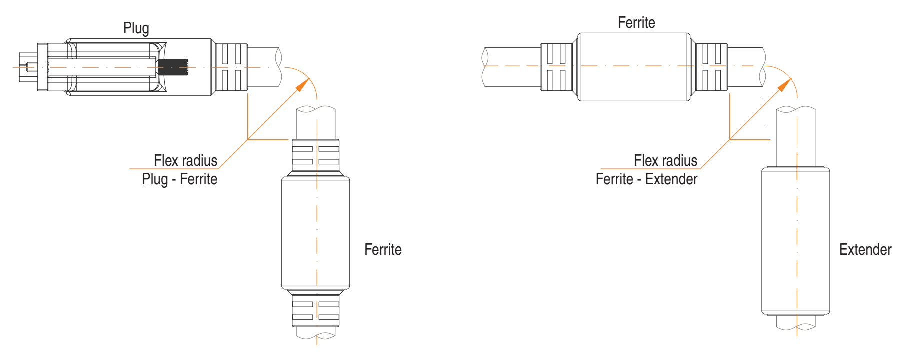


Figure 332: Flex radius specification

14.5.4 Cable connection

The SDL cable with extender must be connected between the Automation PC 620 and Automation Panel 900 display unit in the correct direction. The correct signal direction is indicated on the extender unit for this purpose:

- Connect the end labeled "PC" with the video output of the Automation PC 620.
- The "Display" end should be connected to the display unit Automation Panel 900.

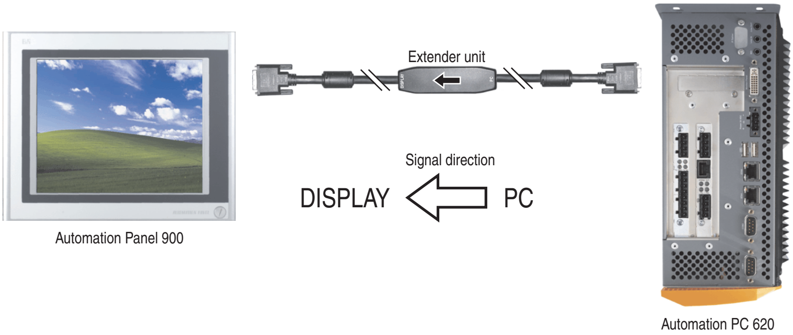


Figure 333: Example of the signal direction for the SDL cable with extender

14.5.5 Cable specifications

The following figure shows the pin assignments for the SDL cable with extender available at B&R.

Information:

Only B&R SDL cables with extender can be used.

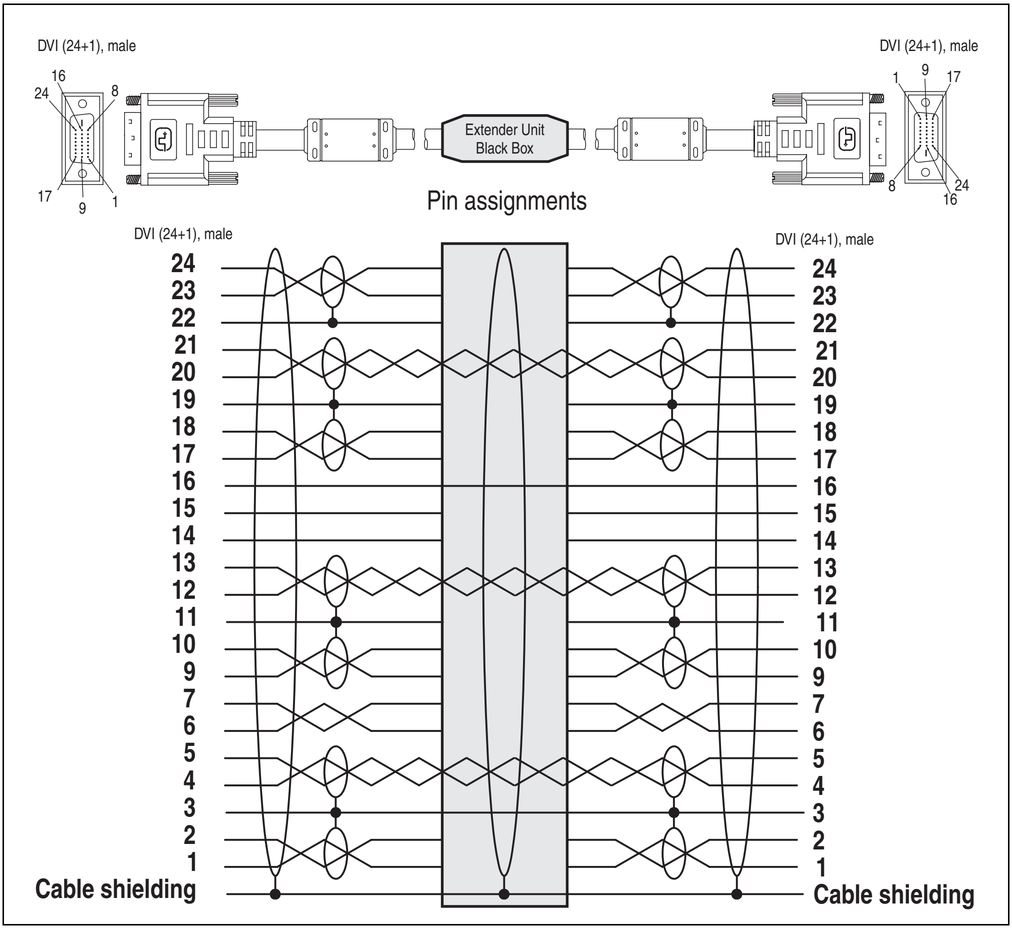


Figure 334: Pin assignments - SDL cable with extender 5CASDL.0x00-10

14.6 SDL flex cable 5CASDL.0xxx-03

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

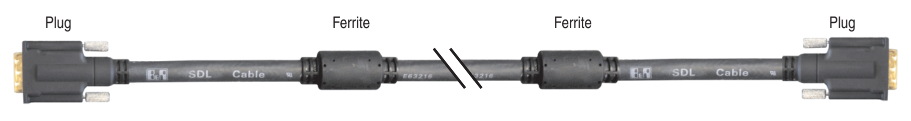


Figure 335: SDL cable 5CASDL.0xxx-03 (similar)

Caution!

The SDI cable can only be plugged in and unplugged when the device is turned off.

14.6.1 Order data

Model number	Description	Note
5CASDL.0018-03	**1.8 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 1.8 m	
5CASDL.0050-03	**5 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 5 m	
5CASDL.0100-03	**10 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 10 m	
5CASDL.0150-03	**15 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 15 m	
5CASDL.0200-03	**20 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 20 m	
5CASDL.0250-03	**25 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 25 m	
5CASDL.0300-03	**30 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 30 m	

Table 433: Model numbers - SDL cable 5CASDL.0xxx-03

14.6.2 Technical data

Mechanical characteristics	**5CASDL.0018-03**	**5CASDL.0050-03**	**5CASDL.0100-03**	**5CASDL.0150-03**	**5CASDL.0200-03**	**5CASDL.0250-03**	**5CASDL.0300-03**
Length Tolerance	1.8 m ±20 mm	5 m ±45 mm	10 m ±90 mm	15 m ±135 mm	20 m ±180 mm	25 m ±225 mm	30 m ±270 mm
Cable diameter Maximum	12 mm						
Shielding	Individual cable pairs and entire cable						
Connector type Connection cycles Contacts Mechanical protection	2x DVI-D (24+1), male Min. 200 Gold plated Metal cover with crimped stress relief						
Max. tension During installation During operation	≤ 400 N ≤ 50 N						
Materials Cable shield Color	RoHS compliant Aluminum foil clad + tinned copper mesh Black (similar to RAL 9005)						
Flexibility	Flexible; valid for ferrite magnet - ferrite magnet (tested 300,000 cycles with 15x cable diameter, 4800 cycles / hour)						
Halogen-free	Yes						
Flex radius Fixed layout flexible installation	See figure "Flex radius specification", on page 683 6x cable diameter (of plug - ferrite magnet) 10x cable diameter (of ferrite magnet - ferrite magnet) 15x cable diameter (of ferrite magnet - ferrite magnet)						
Weight	Approx. 450 g	Approx. 1000 g	Approx. 2000 g	Approx. 3000 g	Approx. 4000 g	Approx. 5000 g	Approx. 6000 g
Electrical properties (at +20°C)							
Wire cross section	24 AWG (control wires) 26 AWG (DVI, USB, data)						
Line resistance 24 AWG 26 AWG	≤ 95 Ω/km ≤ 145 Ω/km						
Insulation resistance	> 200 MΩ/km						
Wave impedance	100 ±10 Ω						
Test voltage Wire / wire Wire / shield	1 kV_{eff} 0.5 kV_{eff}						
Operating voltage	≤ 30 V						
Environmental characteristics							
Temperature resistance Fixed installation Moving Bearings	-20 to +80°C -5 to +60°C -20 to +80°C						
Fire resistance	Fire resistant according to UL758 (cable vertical flame test)						

Table 434: Technical data - SDL cable 5CASDL.0xxx-03

Standards and certifications	5CASDL.0018-03	5CASDL.0050-03	5CASDL.0100-03	5CASDL.0150-03	5CASDL.0200-03	5CASDL.0250-03	5CASDL.0300-03
Torsion load	100,000 cycles (tested angle of rotation: ±85° speed: 50 cycles / minute)						
Cable drag chain	300,000 cycles Tested flex radius: 180 mm;15x cable diameter; hub: 460 mm; speed: 4800 cycles / hour						
Approbation	UL AWM 20236 80°C 30 V						
Oil and hydrolysis resistance	According to VDE 0282-10						

Table 434: Technical data - SDL cable 5CASDL.0xxx-03 (Forts.)

14.6.3 Flex radius specification

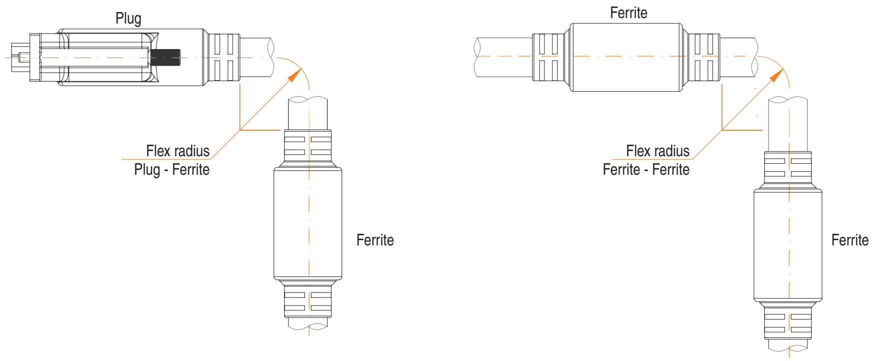


Figure 336: Flex radius specification

14.6.4 Dimensions

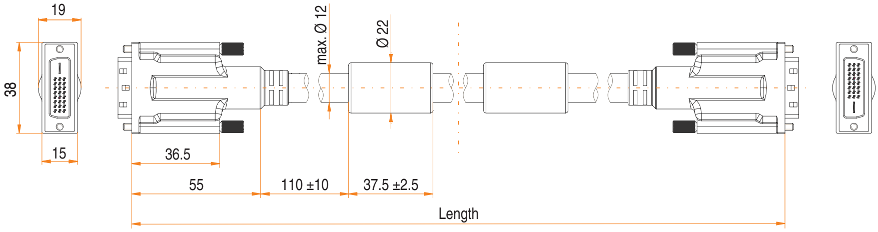


Figure 337: Dimensions - SDL cable 5CASDL.0xxx-03

14.6.5 Structure

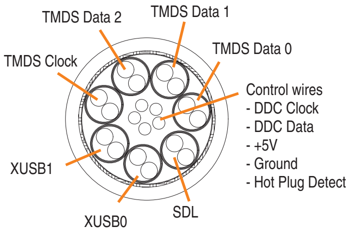
Element	Assignment	Cross section	
DVI	TMDS data 0	26 AWG	 TMDS Data 2 TMDS Data 1 TMDS Data 0 TMDS Clock Control wires - DDC Clock - DDC Data - +5V - Ground - Hot Plug Detect XUSB1 XUSB0 SDL Schematic display
	TMDS data 1	26 AWG	
	TMDS data 2	26 AWG	
	TMDS cycle	26 AWG	
USB	XUSB0	26 AWG	
	XUSB1	26 AWG	
Data	SDL	26 AWG	
Control wires	DDC cycle	24 AWG	
	DDC data	24 AWG	
	+ 5 V	24 AWG	
	mass	24 AWG	
	Hot Plug detect	24 AWG	

Table 435: Structure - SDL cable 5CASDL.0xxx-03

14.6.6 Cable specifications

The following figure shows the pin assignments for the SDL cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly.

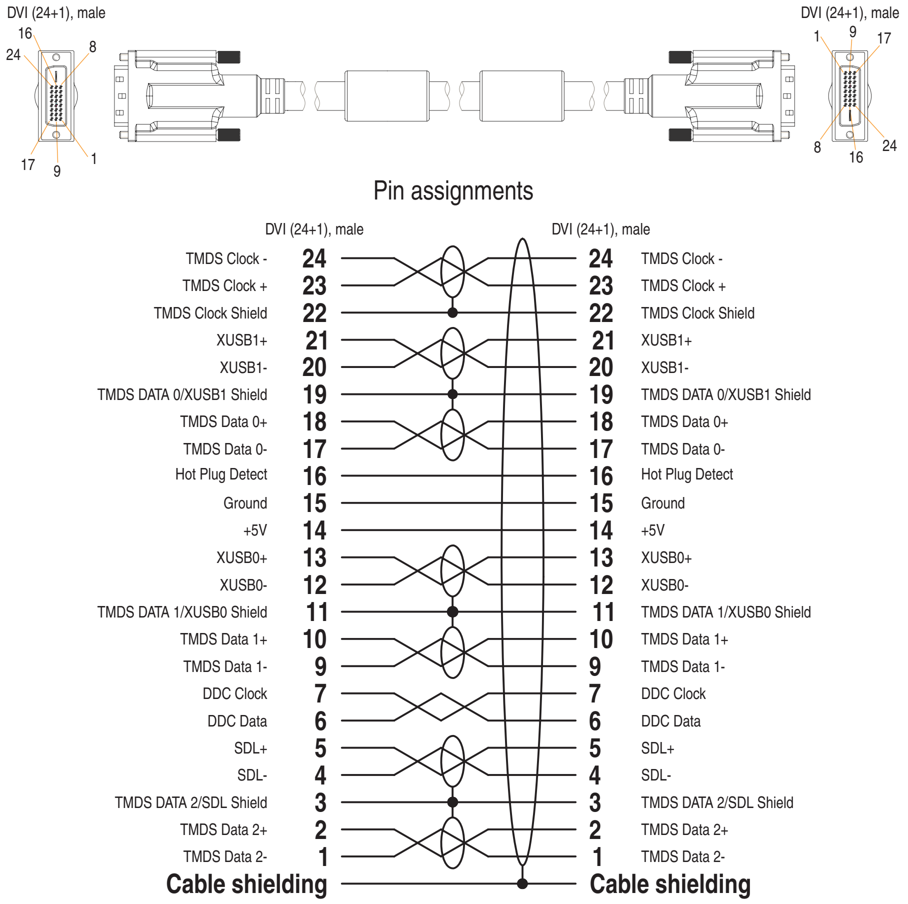

DVI (24+1), male
16
24
8
17
9
1
DVI (24+1), male
1
9
17
8
16
24
Pin assignments
DVI (24+1), male
DVI (24+1), male
TMDS Clock - 24 — 24 TMDS Clock -
TMDS Clock + 23 — 23 TMDS Clock +
TMDS Clock Shield 22 — 22 TMDS Clock Shield
XUSB1+ 21 — 21 XUSB1+
XUSB1- 20 — 20 XUSB1-
TMDS DATA 0/XUSB1 Shield 19 — 19 TMDS DATA 0/XUSB1 Shield
TMDS Data 0+ 18 — 18 TMDS Data 0+
TMDS Data 0- 17 — 17 TMDS Data 0-
Hot Plug Detect 16 — 16 Hot Plug Detect
Ground 15 — 15 Ground
+5V 14 — 14 +5V
XUSB0+ 13 — 13 XUSB0+
XUSB0- 12 — 12 XUSB0-
TMDS DATA 1/XUSB0 Shield 11 — 11 TMDS DATA 1/XUSB0 Shield
TMDS Data 1+ 10 — 10 TMDS Data 1+
TMDS Data 1- 9 — 9 TMDS Data 1-
DDC Clock 7 — 7 DDC Clock
DDC Data 6 — 6 DDC Data
SDL+ 5 — 5 SDL+
SDL- 4 — 4 SDL-
TMDS DATA 2/SDL Shield 3 — 3 TMDS DATA 2/SDL Shield
TMDS Data 2+ 2 — 2 TMDS Data 2+
TMDS Data 2- 1 — 1 TMDS Data 2-
Cable shielding — Cable shielding

Figure 338: Pin assignments - SDL cable 5CASDL.0xxx-03

14.7 SDL flex cable with extender 5CASDL.0x00-13

The SDL flex cables (with extender) 5CASDL.0x00-13 are designed for both fixed and flexible installations (e.g. in swing arm systems).

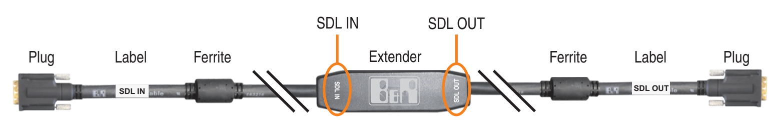


Figure 339: SDL flex cable with extender - 5CASDL.0x00-13 (similar)

Caution!

SDL cables with extender can only be plugged in and unplugged when the device is turned off. The correct direction of connection (SDL IN, SDL OUT) for the wiring is illustrated on the middle of the extender and between the ferrite magnet and plug (with a sticker).

14.7.1 Order data

Model number	Description	Note
5CASDL.0300-13	**30 m SDL flex cable with extender** SDL cable with extender for fixed and flexible type of layout; length: 30 m	
5CASDL.0400-13	**40 m SDL flex cable with extender** SDL cable with extender for fixed and flexible type of layout; length: 40 m	

Table 436: Model numbers - SDL flex cable with extender

14.7.2 Technical data

Features	5CASDL.0300-13	5CASDL.0400-13
Length Tolerance	30 m ±200 mm	40 m ±200 mm
Dimensions - Extender box	Height 18.5 mm, width 35 mm, length 125 mm	
Cable diameter Maximum	12 mm	
Shielding	Individual cable pairs and entire cable	
Connector type Connection cycles Contacts Mechanical protection	2x DVI-D (24+1), male Min. 200 Gold plated Metal cover with crimped stress relief	
Max. tension During installation During operation	≤ 400 N ≤ 50 N	
Materials Cable shield Color	RoHS compliant Aluminum foil clad + tinned copper mesh Black (similar to RAL 9005)	
Flexibility	Flexible; valid for ferrite magnet - ferrite magnet (tested 300,000 cycles with 15x cable diameter, 4800 cycles / hour)	
Halogen-free	Yes	
Flex radius Fixed layout flexible installation	See figure "Flex radius specification", on page 688 6x cable diameter (of plug - ferrite magnet) 10x cable diameter (of ferrite magnet - extender) 15x cable diameter (of ferrite magnet - ferrite magnet)	
Weight	Approx. 6200 g	Approx. 8000 g
Electrical properties (at +20°C)		
Wire cross section	24 AWG (control wires) 26 AWG (DVI, USB, data)	
Line resistance 24 AWG 26 AWG	≤ 95 Ω/km ≤ 145 Ω/km	
Insulation resistance	> 200 MΩ/km	
Wave impedance	100 ±10 Ω	
Test voltage Wire / wire Wire / shield	1 kV_{eff} 0.5 kV_{eff}	
Operating voltage	≤ 30 V	
Environmental characteristics		
Temperature resistance Fixed installation Moving Bearings	-20 to +60°C -5 to +60°C -20 to +60°C	
Fire resistance	Fire resistant according to UL758 (cable vertical flame test)	

Table 437: Technical data - SDL flex cable with extender 5CASDL.0x00-13

Standards and certifications	5CASDL.0300-13	5CASDL.0400-13
Torsion load	100,000 cycles (tested angle of rotation: ±85° speed: 50 cycles / minute)	
Cable drag chain	300,000 cycles Tested flex radius: 180 mm;15x cable diameter; hub: 460 mm; speed: 4800 cycles / hour	
Approbation	UL AWM 20236 80°C 30 V	
Oil and hydrolysis resistance	According to VDE 0282-10	

Table 437: Technical data - SDL flex cable with extender 5CASDL.0x00-13 (Forts.)

14.7.3 Flex radius specification

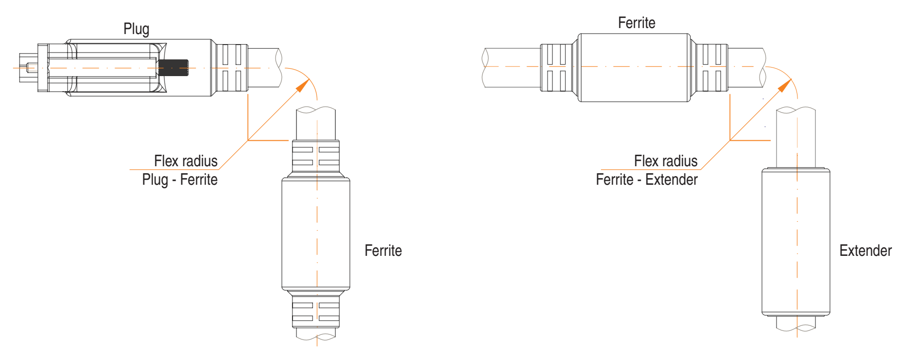


Figure 340: Flex radius specification

14.7.4 Dimensions

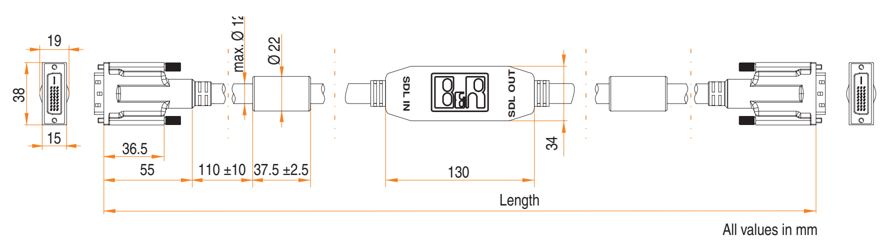


Figure 341: Dimensions - SDL flex cable with extender 5CASDL.0x00-13

14.7.5 Cable connection

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

- Connect the end labeled "SDL IN" with the video output of the Automation PC 620 or Panel PC 700 (monitor/panel output) or Panel OUT of an AP900 AP Link card.
- The "SDL OUT" end should be connected to the display unit (e.g. Automation Panel 900) via the Automation Panel Link insert card (Panel IN).

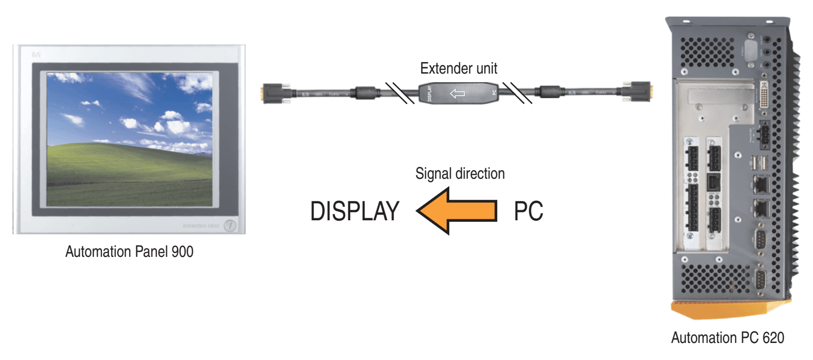


Figure 342: Example of the signal direction for the SDL flex cable with extender - APC620

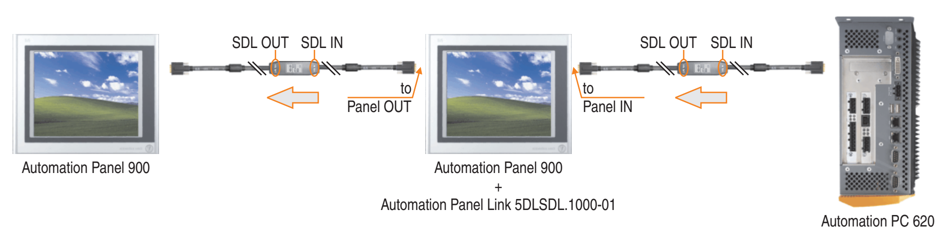


Figure 343: Example of signal direction display - SDL flex cable with extender

14.7.6 Cable specifications

The following figure shows the pin assignments for the SDL flex cable with extender available at B&R.

Information:

Only B&R SDL flex cables with extender can be used.

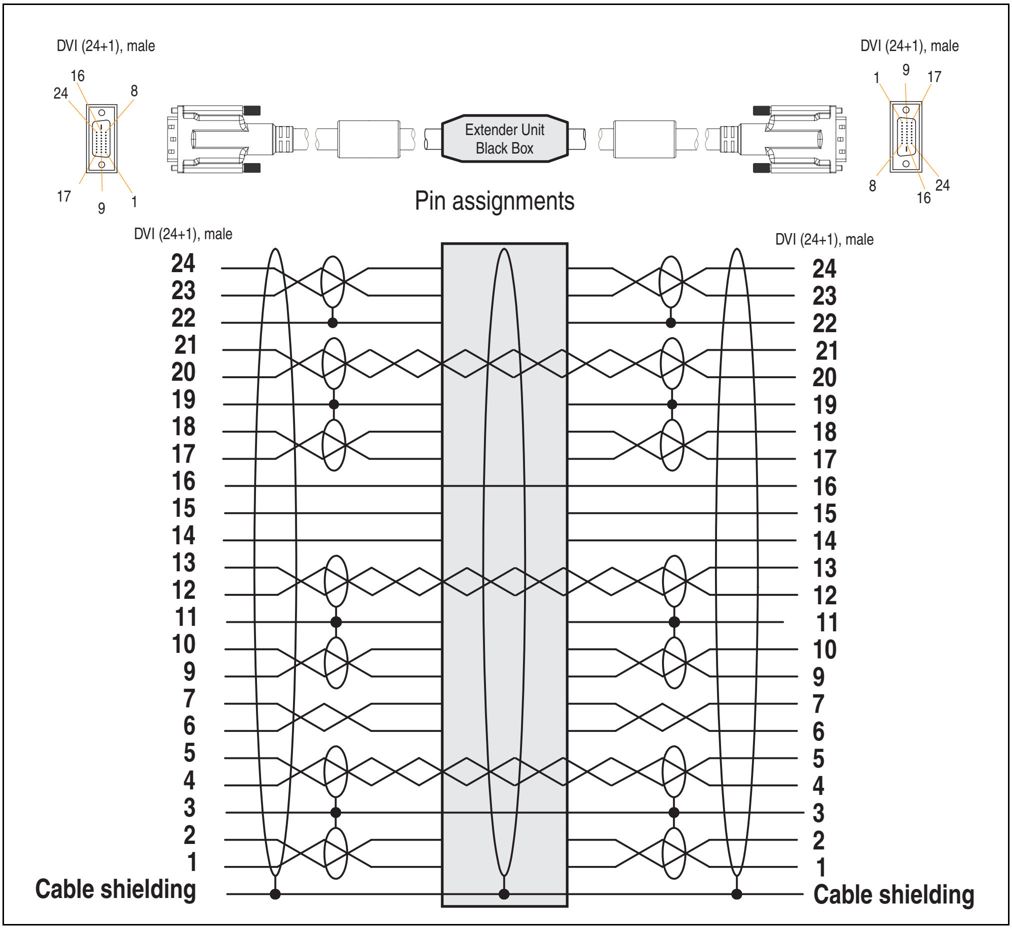


Figure 344: Pin assignments - SDL flex cable with extender 5CASDL.0x00-13

14.8 RS232 cable 9A0014-xx

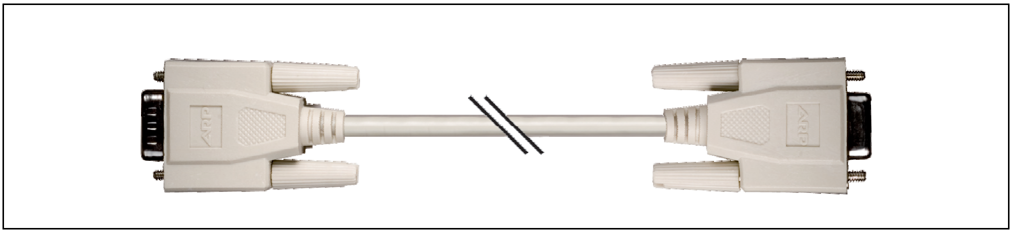


Figure 345: RS232 extension cable (similar)

14.8.1 Order data

Model number	Description	Note
9A0014.02	**RS232 cable DB9/f:DB9/m 1.8 m** RS232 extension cable for remote operation of a display unit with touch screen, length 1.8 m.	
9A0014.05	**RS232 cable DB9/f:DB9/m 5 m** RS232 extension cable for remote operation of a display unit with touch screen, length 5 m.	
9A0014.10	**RS232 cable DB9/f:DB9/m 10 m** RS232 extension cable for remote operation of a display unit with touch screen, length 10 m.	

Table 438: Model numbers - RS232 cables

14.8.2 Technical data

Features	9A0014.02	9A0014.05	9A0014.10
Length Tolerance	1.8 m ±50 mm	5 m ±80 mm	10 m ±100 mm
Outer diameter	Max. 5 mm		
Shielding	Entire cable		
Connector type	DSUB (9-pin), male / female		
Wire cross section	AWG 26		
Flexibility	Flexible		
Flex radius	Min. 70 mm		

Table 439: Technical data - RS232 cables

14.8.3 Cable specifications

The following figure shows the pin assignments for the RS232 cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly.

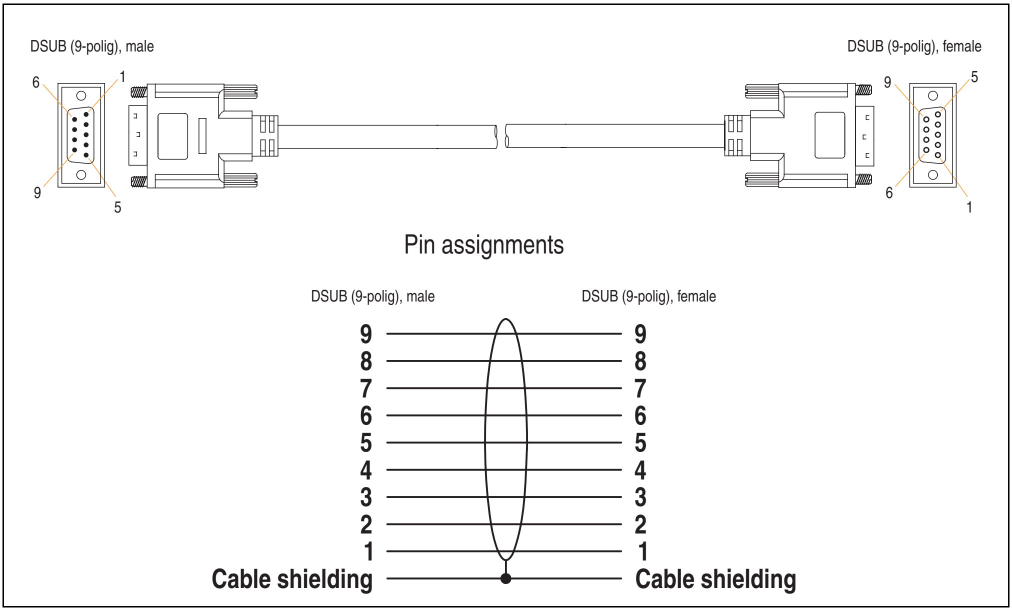


Figure 346: Pin assignments - RS232 cable

14.9 USB cable 5CAUSB.00xx-00

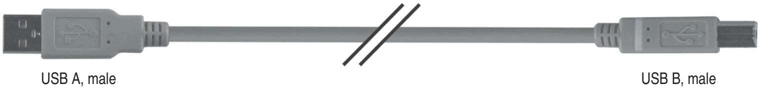


Figure 347: USB extension cable (similar)

14.9.1 Order data

Model number	Description	Note
5CAUSB.0018-00	**USB 2.0 cable, A/m:B/m 1.8 m** USB 2.0 connection cable; plug type A - type B; length 1.8 m	
5CAUSB.0050-00	**USB 2.0 cable, A/m:B/m 5 m** USB 2.0 connection cable; plug type A - type B; length 5 m	

Table 440: Model numbers - USB cables

14.9.2 Technical data

Features	5CAUSB.0018-00	5CAUSB.0050-00
Length	1.8 m	5 m
Tolerance	±30 mm	±50 mm
Outer diameter	Max. 5 mm	
Shielding	Entire cable	
Connector type	USB type A male and USB type B male	
Wire cross section	AWG 24, 28	
Flexibility	Flexible	
Flex radius	Min. 100 mm	

Table 441: Technical data - USB cables

14.9.3 Cable specifications

The following figure shows the pin assignments for the USB cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly.

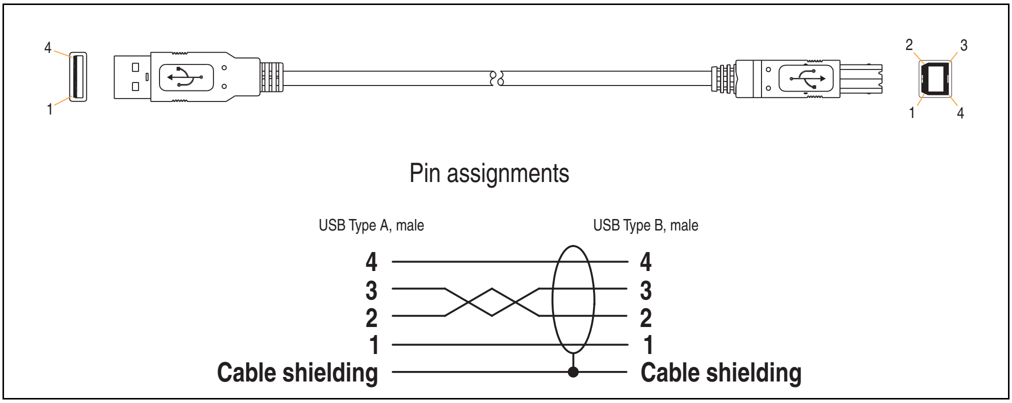


Figure 348: Pin assignments - USB cable

15. Uninterruptible power supply

With the optionally integrated UPS, the Automation PC 620 makes sure that the PC system completes write operations even after a power failure occurs. When the UPS detects a power failure, it switches to battery operation immediately without interruption. This means that all running programs will be ended properly by the UPS software. This prevents the possibility of inconsistent data (only functions if the UPC is already configured and the driver is activated).

Information:

More detailed information about uninterruptible power supplies can be found in the UPS manual. This can be downloaded from the B&R homepage.

Information:

The monitor is not buffered by the UPS and will shut off when the power fails.

By integrating the charging circuit in the Automation PC 620 housing, the installation has been reduced to merely attaching the connection cable to the battery unit mounted next to the PC.

Special emphasis was placed on ease of maintenance when the battery unit was designed. The batteries are easily accessible from the front and can be switched in just a few moments when servicing.

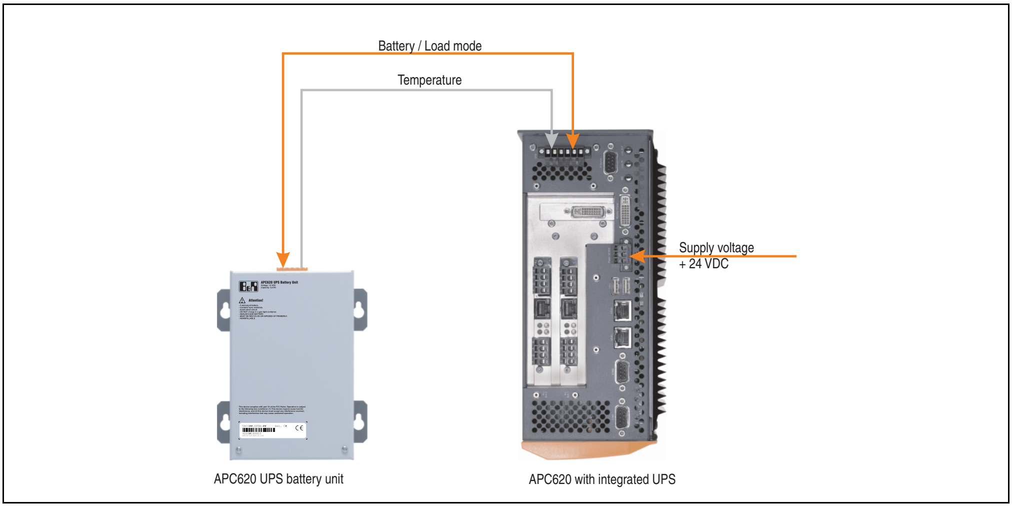


Figure 349: UPS principle

15.1 Order data

Model number	Description	Note
5AC600.UPSI-00	**Add-on UPS module** Order UPS module for Automation PC, cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately.	
5AC600.UPSB-00	**5Ah battery unit** UPS battery unit for the add-on UPS module	
5CAUPS.0005-00	**0.5 meter UPS cable** Connection cable between add-on UPS module and UPS battery unit, length 0.5 meters	
5CAUPS.0030-00	**3 meter UPS cable** Connection cable between add-on UPS module and UPS battery unit, length 3 meters	

Table 442: Order data - Uninterruptible power supply

15.2 Features

- Long-lasting, maintenance-free rechargeable batteries
- Communication via integrated interfaces
- Temperature sensor
- Driver software
- Deep discharge protection

15.3 Requirements

1) An appropriate system unit.
The add-on UPS module (5AC600.UPSI-00) can only be installed with the following APC620 system unit revisions:

System unit	Revision
5PC600.SX01-00	Starting with revision H0
5PC600.SX02-00	Starting with revision G0
5PC600.SX02-01	Starting with revision H0
5PC600.SX05-00	Starting with F0
5PC600.SX05-01	Starting with F0
5PC600.SF03-00	Starting with revision A0
5PC600.SE00-00	Starting with revision A0
5PC600.SE00-01	Starting with revision A0
5PC600.SE00-02	Starting with revision A0
5PC810.SX*.	Starting with revision A0

Table 443: System unit revisions - Add-on UPS module

2) Add-on UPS module 5AC600.UPSI-00
For more on installing the add-on modules, see chapter 7 "Maintenance / Servicing", section 4 "Installing the UPS module", on page 740.

3) Battery unit 5AC600.UPSB-00

4) UPS connection cable 0.5 m (5CAUPS.0005-00) or 3 m (5CAUPS.0030-00)

5) APC620 firmware versions:
To read the status or make changes to the settings of the APC620 add-on UPS (5AC600.UPSI-00) and the APC620 battery unit (5AC600.UPSB-00), the following software components are necessary:

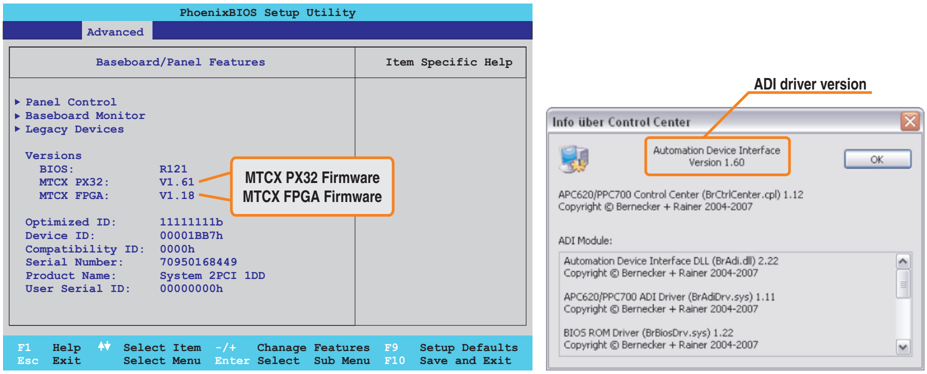
Software name	Type	Version
MTCX PX32[1]	Firmware	1.61 or higher
MTCX FPGA[1]	Firmware	1.18 or higher
ADI Control Center[1]	Driver / Control Center	1.60 or higher

Table 444: Firmware and software required for the UPS

[1] The software can be downloaded from the B&R homepage (**www.br-automation.com**).

For info regarding upgrading the firmware, see chapter 4 "Software", section 2.2 "Upgrade the firmware", on page 535.

The APC620 firmware version can be read in BIOS under the main menu item "Advanced", submenu item "Baseboard/Panel Features", or in the B&R Control Center.



```
                    PhoenixBIOS Setup Utility
          Advanced
          Baseboard/Panel Features              Item Specific Help

 ▸ Panel Control
 ▸ Baseboard Monitor
 ▸ Legacy Devices

   Versions
     BIOS:            R121
     MTCX PX32:       V1.61
     MTCX FPGA:       V1.18

   Optimized ID:      11111111b
   Device ID:         00001BB7h
   Compatibility ID:  0000h
   Serial Number:     70950168449
   Product Name:      System 2PCI 1DD
   User Serial ID:    00000000h

 F1   Help  ↑↓  Select Item  -/+    Change Features  F9   Setup Defaults
 Esc  Exit  ↔   Select Menu  Enter  Select ▸ Sub Menu  F10  Save and Exit
```

Info über Control Center

Automation Device Interface
Version 1.60

APC620/PPC700 Control Center (BrCtrlCenter.cpl) 1.12
Copyright © Bernecker + Rainer 2004-2007

ADI Module:

Automation Device Interface DLL (BrAdi.dll) 2.22
Copyright © Bernecker + Rainer 2004-2007

APC620/PPC700 ADI Driver (BrAdiDrv.sys) 1.11
Copyright © Bernecker + Rainer 2004-2007

BIOS ROM Driver (BrBiosDrv.sys) 1.22
Copyright © Bernecker + Rainer 2004-2007

Figure 350: Firmware and software required for the UPS

The required firmware versions can be found in the APC620 / Panel PC firmware upgrade (MTCX, SDLR, SDLT) V1.16[1] .

---

[1] The software can be downloaded from the B&R homepage (**www.br-automation.com**).

6) To configure: Automation Device Interface driver version 1.60 or higher (for the ADI Control Center)

   For info regarding configuration of the B&R UPS using the ADI Control Center, see chapter 4 "Software", section 9.4 "UPS configuration", on page 579.

15.4 Individual components

15.4.1 Add-on UPS module 5AC600.UPSI-00

The add-on UPS module can easily be installed in an appropriate APC620 system unit (List of required revisions: see section "Requirements", on page 696).

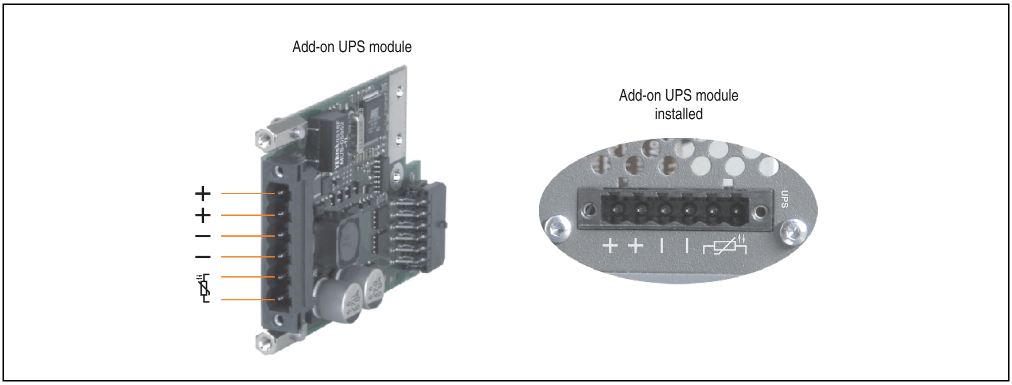


Figure 351: Add-on UPS module 5AC600.UPSI-00

Technical data

Features	5AC600.UPSI-00
Switching threshold mains / battery operation	15 / 13 V
Mains failure bridging	Max. 20 min at 150 W load
Charging current	Max. 0.5 A
Deep discharge protection	Yes, at 10 V on the battery unit
Short circuit protection	No
Power requirements	Max. 7.5 W
Status indicators	Via the ADI Control Center (see section "UPS configuration", on page 579)
Configuration	Via the ADI Control Center (see section "UPS configuration", on page 579)

Table 445: Technical data - 5AC600.UPSI-00

Installation

The module is installed using the materials included in the delivery. For installation instructions, see chapter 7 "Maintenance / Servicing", section 4 "Installing the UPS module", on page 740.

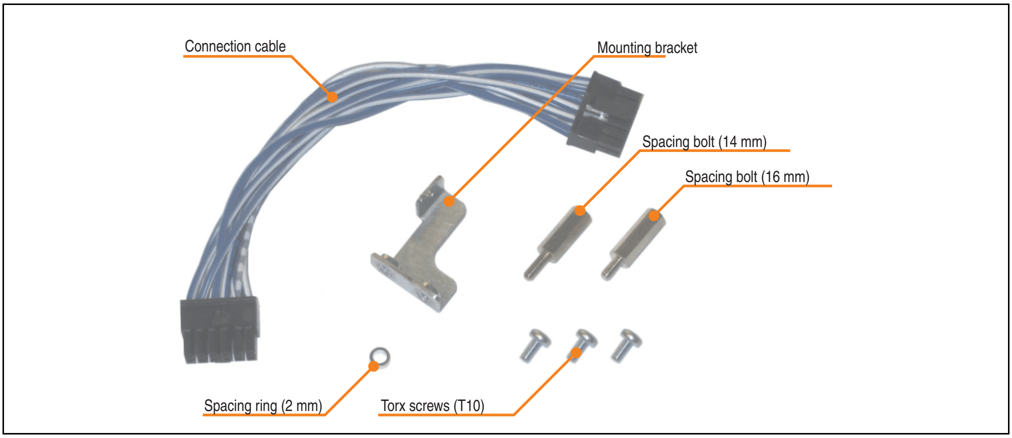


Figure 352: Add-on UPS module 5AC600.UPSI-00 - Installation materials

15.4.2 Battery unit 5AC600.UPSB-00

The battery unit is subject to wear and should be replaced regularly (at least following the specified lifespan).

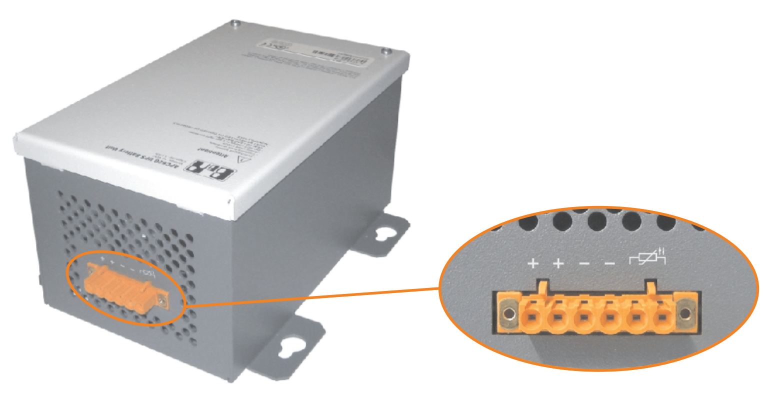


Figure 353: Battery unit 5AC600.UPSB-00

Technical data

Features	5AC600.UPSB-00
Battery Type Method	 Enersys Cyclon 2 V 5 Ah; (6 connected in series) Single cell (X cell)
Operating current	Max. 8 A
Deep discharge voltage	10 V
Dimensions (W x H x D)	Figure 356 "Dimensions - 5AC600.UPSB-00", on page 703
Temperature sensor	NTC resistance
Weight	Approx. 3.2 kg
Ambient temperature Operation Bearings Transport	 -40 to +80°C -65 to +80°C -65 to +80°C
Relative humidity Operation Bearings Transport	 5 to 95% (non-condensing) 5 to 95% (non-condensing) 5 to 95% (non-condensing)
Altitude	Max. 3000 meters
Mounting instructions	See "Mounting instructions", on page 704
Lifespan	10 years at 25°C (up to 80% battery capacity)
Maintenance interval during storage	6 month interval between charges

Table 446: Technical data - 5AC600.UPSB-00

Temperature life span diagram up to 20% battery capacity.

Temperature	Lifespan (days)
25	14600
30	9467
35	6139
40	3980
45	2581
50	1674
55	1085
60	704
65	456
70	296
75	192
80	124

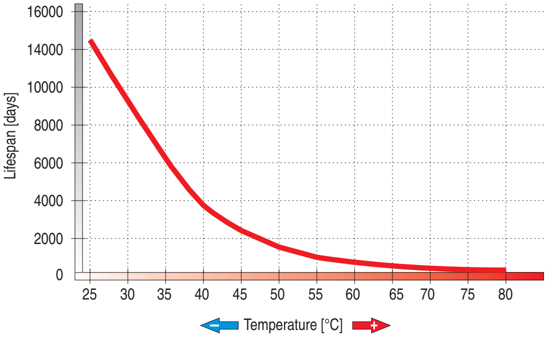


Figure 354: Temperature life span diagram

Deep discharge cycles

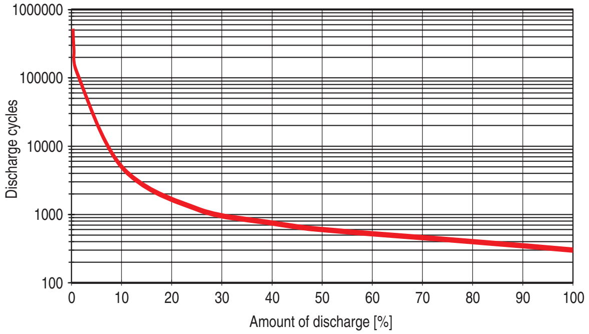


Figure 355: Deep discharge cycles

Dimensions

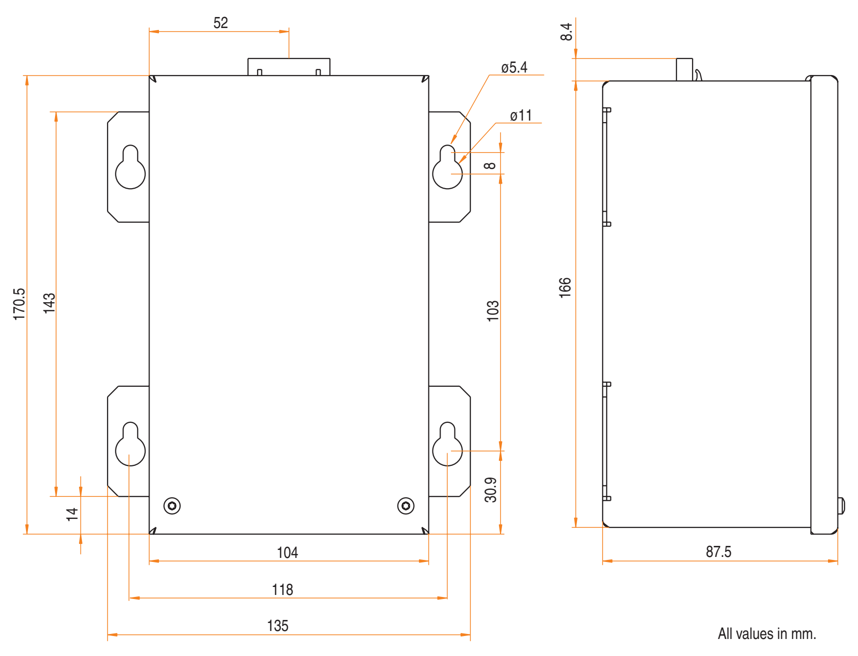


Figure 356: Dimensions - 5AC600.UPSB-00

Drilling template

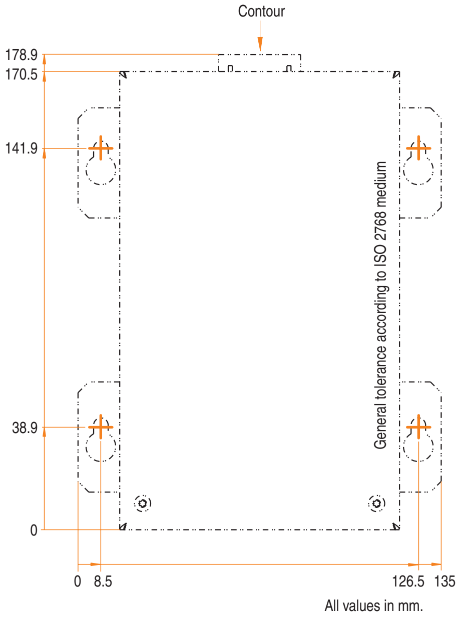


Figure 357: Drilling template for the battery unit

Mounting instructions

Due to the unique construction of these batteries, they can be stored and operated in any position.

15.4.3 UPS connection cable

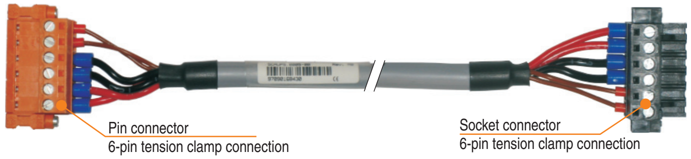

Pin connector
6-pin tension clamp connection
Socket connector
6-pin tension clamp connection

Figure 358: UPS connection cable

Technical data

Features	5CAUPS.0005-00	5CAUPS.0030-00
Length	0.5 m	3 m
Outer diameter	8.5 mm ±0.2 mm	
Connector type	6-pin plug connectors, tension clamp connection / 6-pin socket connectors, tension clamp connection	
Wire cross section Temperature sensor wire Voltage wire	 2 x 0.5 mm^2 (AWG 20) 4 x 2.5 mm^2 (AWG 13)	
Line resistance 0.5 mm^2 2.5 mm^2	 Max. 39 Ω/km Max. 7.98 Ω/km	
Flex radius Fixed installation Free-moving	 5 x wire cross-section 10 x wire cross-section	
Temperature range Moving Non-moving	 -5 to +80°C -30 to +80°C	
Weight	Approx. 143 kg/km	
Materials Cable shield Color	 Thermoplastic PVC-based material Window gray (similar to RAL 7040)	
Peak operating voltage	12 V DC	
Testing AC voltage Wire / wire	 1500 V	
Operating voltage	Max. 300 V	
Current load	10 A at +20°C	

Table 447: Technical data - UPS connection cable

16. External UPS

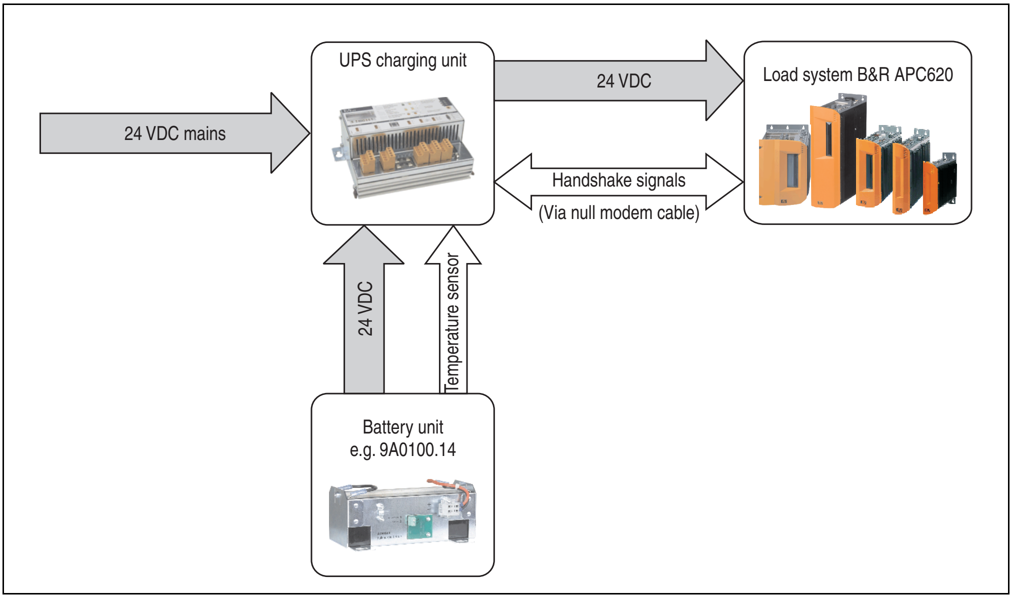


Figure 359: Block diagram of the UPS

16.1 General information

For supply with an external UPS, a UPS charging unit, a battery unit and a null modem cable are required.

In normal operation, the 24 VDC supply voltage is put straight through to the load system. If the supply voltage fails, the rechargeable UPS batteries power the PC to allow controlled shutdown without loss of data.

Data and commands are exchanged between the UPS and the load system via the handshake signals for an RS232 interface.

More information concerning an external UPS is available in the "UPS manual", which can be downloaded from the B&R homepage (www.br-automation.com).

16.2 Order data

Model number	Description	Note
9A0100.11	**UPS 24 VDC** 24 VDC input, 24 VDC output, serial interface	
9A0100.14	**UPS battery unit type B** 24 V; 2.2 Ah; including battery cage	
9A0100.15	**UPS battery unit type B (replacement part)** 2 x 12 V; 2.2 Ah; for battery unit 9A0100.14	
9A0017.01	**RS232 Null Modem Cable, 0.6 m** To connect UPS and load system (9-pin DSUB socket - 9-pin DSUB socket)	
9A0017.02	**RS232 Null Modem Cable, 1.8 m** To connect UPS and load system (9-pin DSUB socket - 9-pin DSUB socket)	

Table 448: UPS - Order data

17. PCI Ethernet cards

17.1 PCI Ethernet card 10/100 - 5ACPCI.ETH1-01

The universal (3.3 V and 5 V) half-size PCI Ethernet card has a 10/100 MBit/s network connection and can be inserted in a 16-bit PCI slot and operated as an additional network interface.

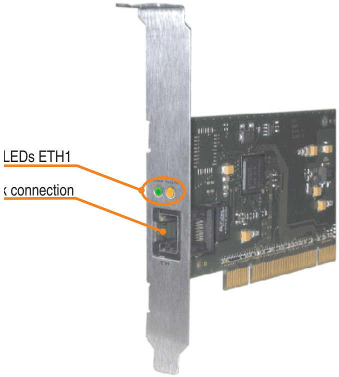


Figure 360: PCI Ethernet card 10/100 - 5ACPCI.ETH1-01

17.1.1 Technical data

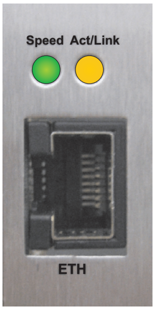
<table>
<tr><th colspan="4">Ethernet connection</th></tr>
<tr><td>Controller</td><td colspan="2">Intel 82551ER</td><td rowspan="8">RJ45 twisted pair (10BaseT/100BaseT), female
 </td></tr>
<tr><td>Power supply</td><td colspan="2">Universal card (2 notches)
for 3.3 V or 5 V</td></tr>
<tr><td>Cabling</td><td colspan="2">S/STP (Cat5e)</td></tr>
<tr><td>Transfer rate</td><td colspan="2">10/100 MBit/s 1)</td></tr>
<tr><td>Cable length</td><td colspan="2">max. 100 m (min. Cat5e)</td></tr>
<tr><th>LED</th><th>On</th><th>Off</th></tr>
<tr><td>Green</td><td>100 Mbit/s</td><td>10 Mbit/s</td></tr>
<tr><td>Orange</td><td>Link (Ethernet network connection available)</td><td>Activity (blinking) (Data transfer in progress)</td></tr>
</table>

Table 449: Ethernet connection ETH

1) Both operating modes possible. Change-over takes place automatically.

17.1.2 Driver support

A special driver is necessary for operating the Intel Ethernet controller 82551ER. Drivers for Windows XP Professional, Windows XP Embedded, and DOS are available for download on the B&R Homepage in the download area (www.br-automation.com).

Information:

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

17.1.3 Dimensions

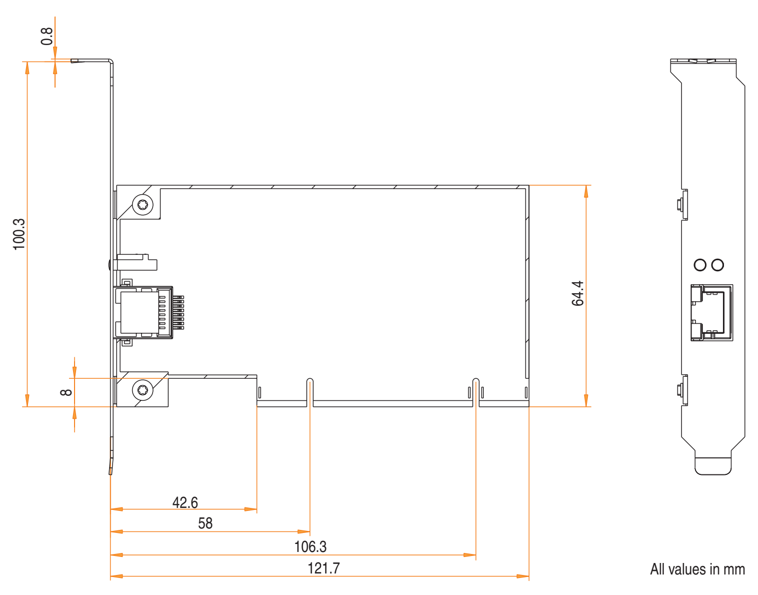


Figure 361: Dimensions - 5ACPCI.ETH1-01

17.2 PCI Ethernet card 10/100 - 5ACPCI.ETH3-01

The universal (3.3 V and 5 V) half-size PCI Ethernet card has three 10/100 MBit/s network connections and can be inserted in a 16-bit PCI slot and operated as an additional network interface.

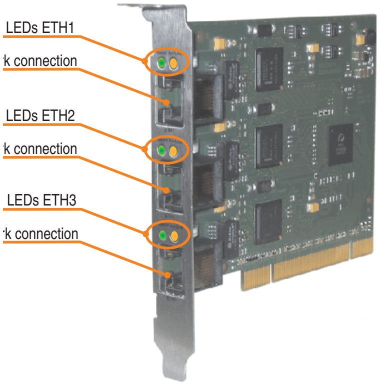


Figure 362: PCI Ethernet card 10/100 - 5ACPCI.ETH3-01

17.2.1 Technical data

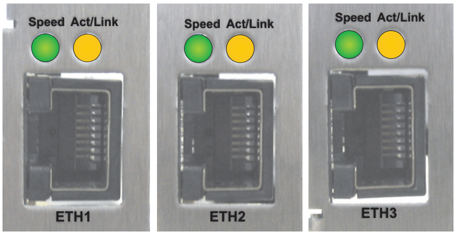
<table>
<tr><th colspan="4">Ethernet connections</th></tr>
<tr><td>Controller</td><td colspan="2">each with Intel 82551ER</td><td rowspan="8">3 x RJ45 twisted pair (10BaseT/100BaseT), female
 </td></tr>
<tr><td>Power supply</td><td colspan="2">Universal card (2 notches)
for 3.3 V or 5 V</td></tr>
<tr><td>Cabling</td><td colspan="2">each S/STP (Cat5e)</td></tr>
<tr><td>Transfer rate</td><td colspan="2">each 10/100 MBit/s [1]</td></tr>
<tr><td>Cable length</td><td colspan="2">each max. 100 m (min. Cat5e)</td></tr>
<tr><th>LED</th><th>On</th><th>Off</th></tr>
<tr><td>Green</td><td>100 Mbit/s</td><td>10 Mbit/s</td></tr>
<tr><td>Orange</td><td>Link
(Ethernet network connection available)</td><td>Activity (blinking)
(Data transfer in progress)</td></tr>
</table>

Table 450: Ethernet connections ETH1, ETH2, ETH3

1) Both operating modes possible. Change-over takes place automatically.

17.2.2 Driver support

A special driver is necessary for operating the Intel Ethernet controller 82551ER. Drivers for Windows XP Professional, Windows XP Embedded, and DOS are available for download on the B&R Homepage in the download area (www.br-automation.com).

Information:

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

17.2.3 Dimensions

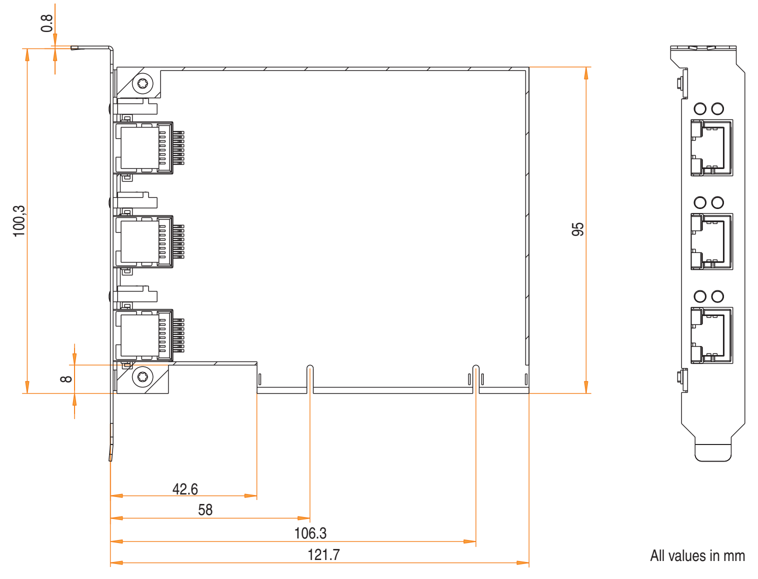


Figure 363: Dimensions - 5ACPCI.ETH3-01

18. Replacement fan

Information:

The fan filters are subject to wear , and should be checked with appropriate frequency to determine whether the air flow provides sufficient cooling. An exchange or cleaning of the filter kit is appropriate at that time.

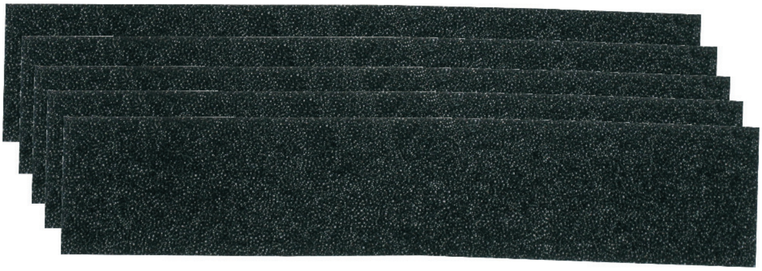


Figure 364: Replacement fan

Model number	Short description	Note
5AC600.FA01-00	**APC620 replacement fan filter 1PCI 5 piece** This fan filter is an optional addition for system units with 1 PCL slot (5PC600.SX01-00).	
5AC600.FA02-00	**APC620 replacement fan filter 1PCI 5 piece** This fan filter is an optional addition for system units with 2 PCL slots (5PC600.SX02-00, 5PC600.SX02-01).	
5AC600.FA03-00	**APC620 replacement fan filter 3PCI 5 piece** This fan filter is an optional addition for system units with 3 PCL slots (5PC600.SF03-00).	
5AC600.FA05-00	**APC620 replacement fan filter 1PCI 5 piece** This fan filter is an optional addition for system units with 5 PCL slots (5PC600.SX05-00, 5PC600.SX05-01).	

Table 451: Model numbers - Replacement fan filters

19. SRAM module - 5AC600.SRAM-00

The 512 KB SRAM module increases APC620 application possibilities. It is inserted internally on the baseboard (depending on revision) and doesn't require a PCI slot. Nonvolatile data can be stored on it. The module is backed up by the APC620 battery.

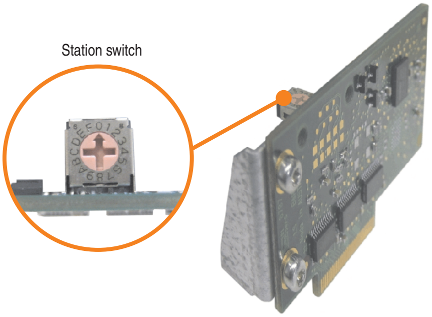


Figure 365: 5AC600.SRAM-00

The following system unit hardware revisions are required before mounting the SRAM module:

- 5PC600.SX01-00 starting with Rev I0
- 5PC600.SX01-00 starting with Rev. H0
- 5PC600.SX02-01 starting with Rev. K0
- 5PC600.SF03-00 all revisions
- 5PC600.SX05-00 starting with Rev. H0
- 5PC600.SX05-01 starting with Rev. H0

19.1 Technical data

Features	5AC600.SRAM-00
Connection to system	via the PCI bus (PCI PnP)
Memory Quantity Battery-buffered Remanent variables for AR (Automation Runtime) in power fail mode	SRAM 512 kB Yes 256 kB with CPU board 5PC600.E855-xx and 5PC600.X855-xx 192 kB with CPU board 5PC600.X945-00
Station switch	16 digits (0-F)
Data rate	Up to 31 MB/s for write access Up to 25 MB/s for read access

Table 452: Technical data - 5AC600.SRAM-00

Features	5AC600.SRAM-00	
PCI configuration space	**Value**	**Meaning**
Vendor ID Device ID Status HeaderType	1677h A085h 0200h 00h	B & R 5AC600.SRAM-00 DEVSEL timing medium Single function device
The card is registered in the PCI Configuration Space as Single Function Device	**Value**	**Meaning**
Device 0 Base class Sub class Command IRQ BAR0 BAR1	 05h 00h 0000h - 512 4	 Memory controller RAM Bus master (not used) Not used kByte memory area Byte I/O area

Table 452: Technical data - 5AC600.SRAM-00

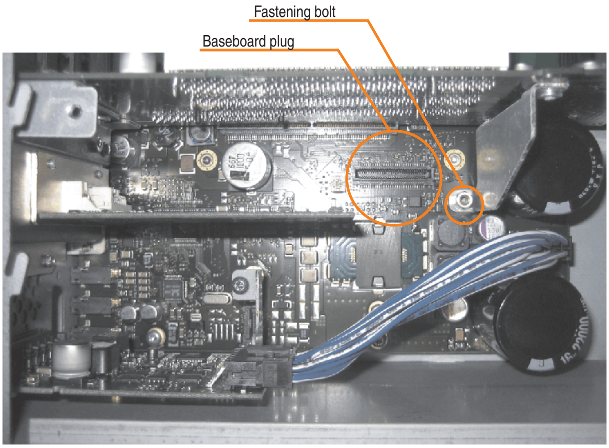
19.2 Driver support

The module is presently only supported in an Automation Runtime environment. Driver for other operating systems (e.g. Windows XP) are available upon request.

19.3 Installation

Installation is described in the example with system unit 5PC600.SF03-00 with inserted AP Link cards and APC620 UPS module.

- Remove side cover from APC620 (see chapter 7 "Maintenance / Servicing", section 5 "Mounting the side cover", on page 756).
- Screw on the M3x5 Torx included in the delivery to the baseboard of the module.



SRAM module installed

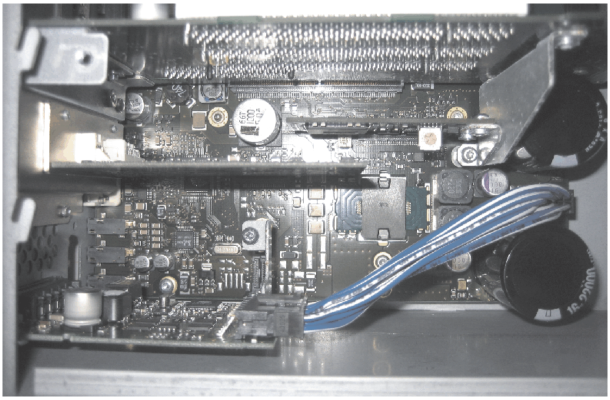


Figure 366: SRAM module installation

20. Power supplies

In order to meet demands for complete, comprehensive system solutions, power supplies are available in the B&R product line for mounting rail installation. This extensive spectrum ranges from single-phase power supplies that supply 2.1 A up to three-phase power supplies that supply 40 A. All switching power supplies can manage a wide range of AC and DC input voltages. This input ranges from 100 to 240 VAC or 400 to 500 VAC and from 85 to 375 VDC. Devices are protected against short circuit, overload, and open circuit, which allows them to be operated without functional limitations or derating even when overloads between 15% and 25% occur.

Figure 367: B&R power supplies (examples)

Two mini power supplies (PS102 and PS104) in robust plastic housing are available in the lower performance range. A well-designed cooling concept allows several different mounting orientations. The functional DIN rail allows fast mounting and removal. Wiring is essentially performed in seconds thanks to the spring clamps being used. The compact design, easy mounting and several different mounting orientations make the two smallest power supplies in this product line components that can be used practically anywhere.

20.1 Model numbers and brief technical overview

The technical data listed in the following tables should act as a brief selection guide. For more detailed technical data, data sheets are available for download from production description section of the B&R homepage (**www.br-automation.com**).

20.1.1 Single-phase power supplies

Features	0PS102.0	0PS104.0	0PS105.1	0PS105.2	0PS110.1	0PS110.2	0PS120.1
Output power	50 W	100 W	120 W	120 W	240 W	240 W	480 W
AC input voltage	85-264 V	85-132 V 184-264 V	85-132 V 176-264 V	85-132 V 176-264 V	85-132 V 176-264 V	85-132 V 176-264 V	85-132 V 176-264 V
DC input voltage	85-375 V	220-375 V	210-375 V	210-375 V	210-375 V	210-375 V	-
Output voltage	24-28 V	24-28 V	24 V	24 V	24-28 V	24-28 V	24-28 V
Output current at 24 V	2.1 A	4.2 A	5 A	5 A	10 A	10 A	20 A
Parallel operation	No	Yes	Yes	Yes	Yes	Yes	Yes
Current balancing	No	Yes	No	Yes	No	Yes	Yes

Table 453: Single-phase power supplies

20.1.2 Three-phase power supplies

Features	0PS305.1	0PS310.1	0PS320.1	0PS340.1
Output power	120 W	240 W	490 W	960 W
AC input voltage	340-576 V	340-576 V	340-576 V	340-576 V
DC input voltage	450-820 V	450-820 V	450-820 V	450-820 V
Output voltage	24-28 V	24-28 V	24 V	24 V
Output current at 24 V	5 A	10 A	20 A	40 A
Parallel operation	Yes	Yes	Yes	Yes
Current balancing	No	Yes	Yes	Yes

Table 454: Three-phase power supplies

Chapter 7 • Maintenance / Servicing

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

1. Changing the battery

The lithium battery buffers the internal real-time clock (RTC) and the CMOS data. The buffer duration of the battery is at least 4 years (2½ years with the SRAM module model number 5AC600.SRAM-00 and at 50°C, 8.5 mA current requirements of the supplied components and a self discharge of 40%).

Information:

- **The product design allows the battery to be changed with the APC620 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 non-volatile EEPROM). The date and time must be reset later because this data is lost when the battery is changed.**
- **The battery should only be changed by qualified personnel.**

Warning!

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

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

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

1.1 Battery status evaluation

The battery status is evaluated immediately following start-up of the device and is subsequently checked by the system every 24 hours. The battery is subjected to a brief load (1 second) during the measurement and then evaluated. The evaluated battery status is displayed in the BIOS Setup pages (under Advanced - Baseboard monitor) and in the B&R Control Center (ADI driver), but can also be read in a customer application via the ADI Library.

Battery status	Meaning
N/A	Hardware, i.e. firmware used is too old and does not support read.
GOOD	Data buffering is guaranteed
BAD	Data buffering is guaranteed for approx. another 500 hours from the point in time that the battery capacity is determined to be BAD (insufficient).

Table 455: Meaning of battery status

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

1.2 Procedure

- Disconnect the power supply to the Automation PC 620 (also see information on page 719).
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Remove the black plastic cover from the battery compartment and carefully pull out the battery using the removal strips.

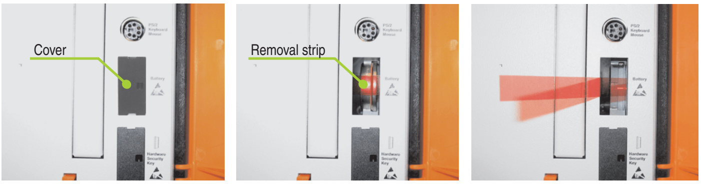


Figure 368: Battery removal

- Insert the new battery with correct polarity. The battery should not be held by its edges. Insulated tweezers may also be used for inserting the battery.

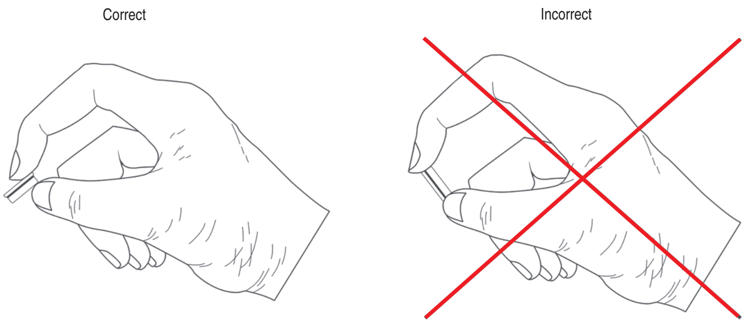


Figure 369: Battery handling

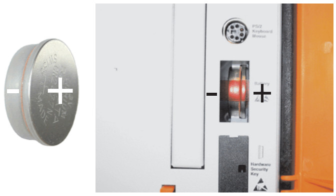


Figure 370: Battery polarity

- To make the next battery change easier, be sure the removal strip is in place when inserting battery.
- Reconnect the power supply to the PC 620 by plugging the power cable back in and pressing the power button (also see information on page 719).
- Reset the data and time in BIOS (see information on page 719).

Warning!

Lithium batteries are considered hazardous waste. Used batteries should be disposed of according to local requirements.

2. Fan kit installation and replacement

2.1 Procedure for APC620 with 1 PCI slot

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 4 Torx screws (T10) that must be removed.

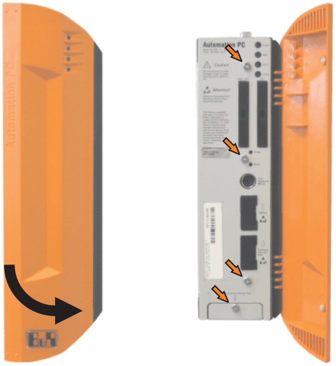


Figure 371: APC620 1PCI slot - Remove screws to install/ remove filter kit

- After the screws have been removed, the side cover and the fan kit cover can be removed toward the front.

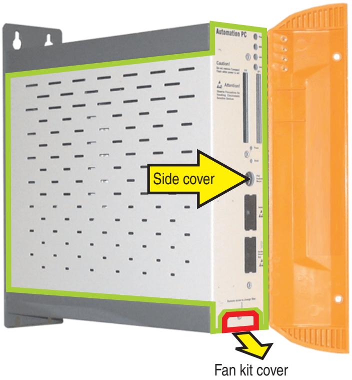


Figure 372: APC620 1PCI slot - Remove side cover and fan kit cover

- If a PCI card is in place, it must be removed before moving on to the next step.

- There are two arrows on the fans that indicate the direction of air flow and the direction of fan rotation.

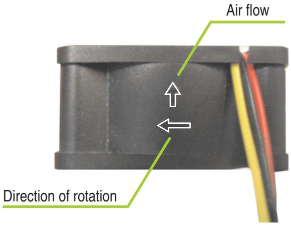


Figure 373: Markings for direction of airflow / fan rotation

Warning!

The fans must be inserted so that the air flows toward the inside of the housing.

- Align fans over the fastening bolts (see arrows). Feed cables through the openings in the housing (see circles) into the main board of the APC620.

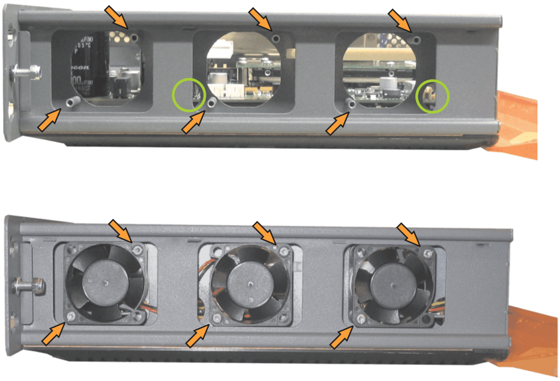


Figure 374: APC620 1PCI slot - Fan installation

- Secure fans with the 6 included Torx (T10) screws.

- The fan connection cable must be connected to the main circuit board at the right position (fan 1 at position 1, fan 2 at position 2, fan 3 at position 3).

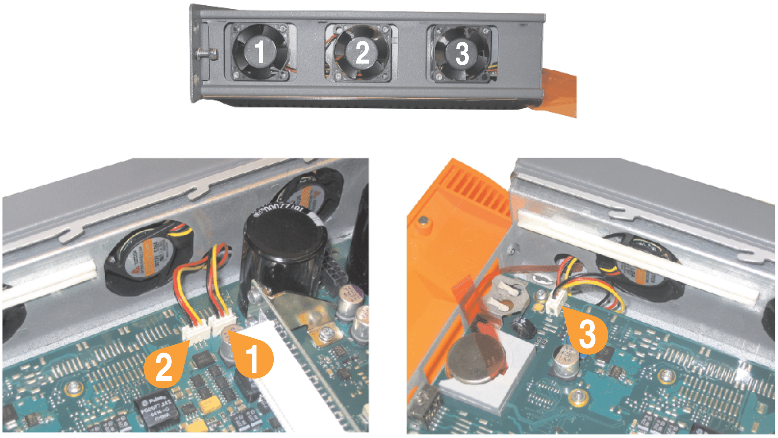


Figure 375: APC620 1PCI slot - Fan cable connection to the main board

- If a PCI card was previously in place, it can now be re-inserted.
- Place dust filter in the fan kit cover and replace removed components (filter kit cover, side cover) in reverse order.

2.2 Procedure for APC620 with 2 PCI slot

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 4 Torx screws (T10) that must be removed.

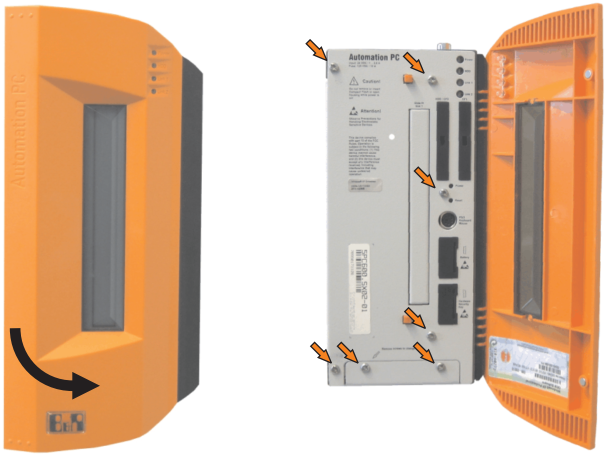


Figure 376: APC620 2PCI slots - Remove screws to install/ remove filter kit

- After the screws have been removed, the side cover and the fan kit cover can be removed toward the front.

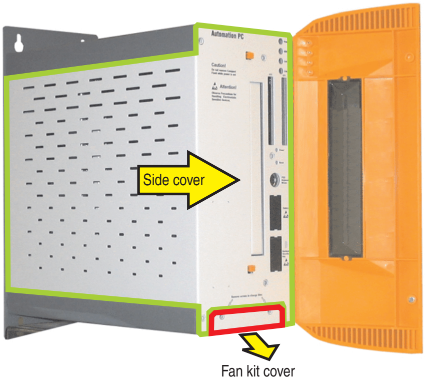


Figure 377: APC620 2PCI slots - Remove side cover and fan kit cover

- If one or more PCI cards are in place, they must be removed before moving on to the next step.
- If a slide-in drive is in place, it also must be removed before moving on to the next step.
- There are two arrows on the fans that indicate the direction of air flow and the direction of fan rotation.

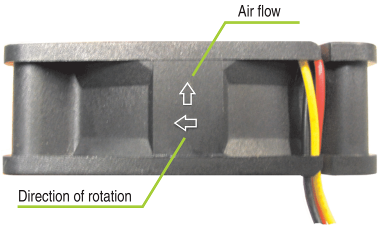


Figure 378: Markings for direction of airflow / fan rotation

Warning!

The fans must be inserted so that the air flows toward the inside of the housing.

- Align fans over the fastening bolts (see arrows). Feed cables through the openings in the housing (see circles) into the main board of the APC620.

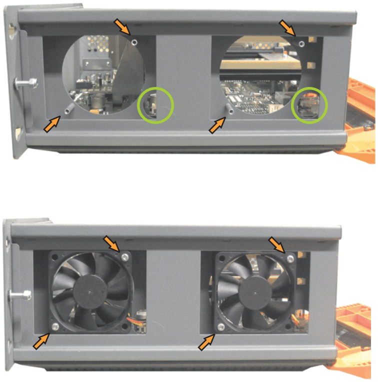


Figure 379: APC620 2PCI slots - Fan installation

- Secure fans with the 4 included Torx (T10) screws.

- The fan connection cable must be connected to the main circuit board at the right position (fan 1 at position 1, fan 2 at position 2).

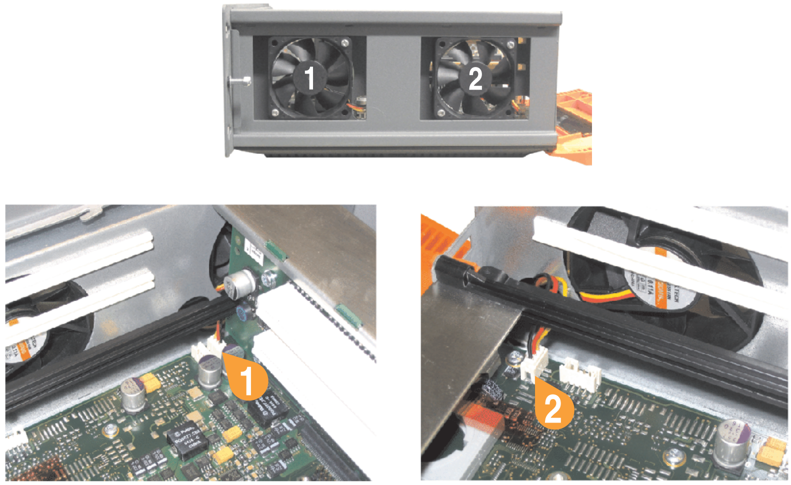


Figure 380: APC620 2PCI slots - Fan cable connection to the main board

- If one or more PCI cards were previously in place, they can now be re-inserted.
- If a slide-in drive was previously in place, it too can now be re-inserted.
- Place the dust filter in the fan kit cover and secure with the filter clasp.

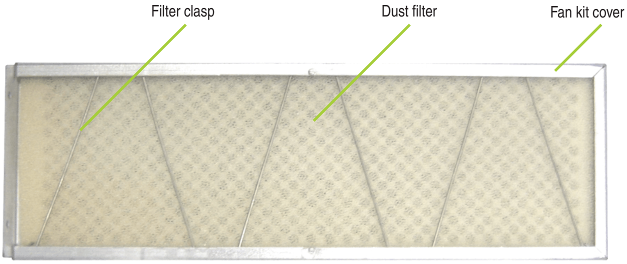


Figure 381: Dust filter in the fan kit cover and filter clasp

- Replace any removed components (filter kit cover, side cover) in the reverse order.

2.3 Procedure for APC620 with 3 PCI slot

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 4 Torx screws (T10) that must be removed.

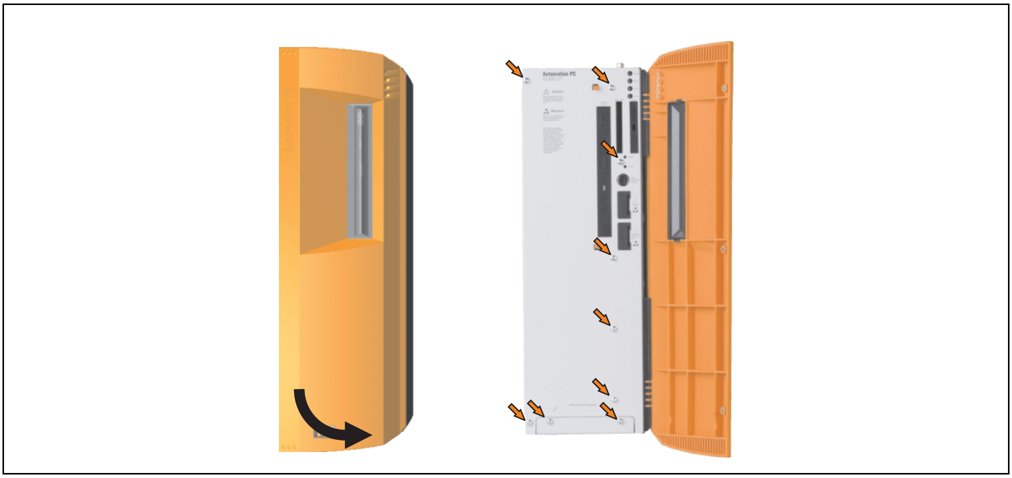


Figure 382: APC620 3PCI slot - Remove screws to install/ remove filter kit

- After the screws have been removed, the side cover and the fan kit cover can be removed toward the front.

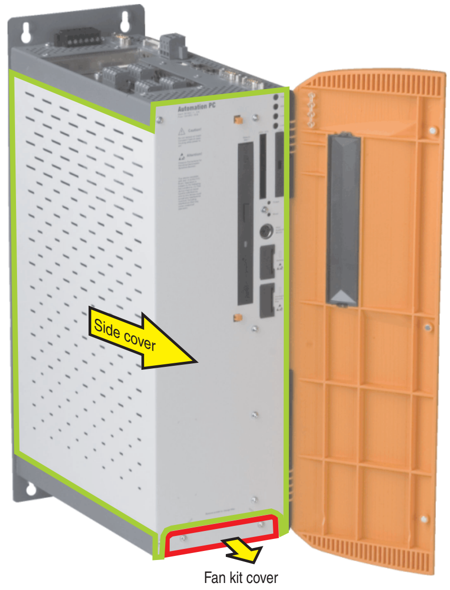


Figure 383: APC620 3PCI slots - Remove side cover and fan kit cover

- There are two arrows on the fans that indicate the direction of air flow and the direction of fan rotation.

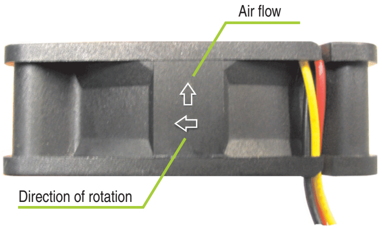


Figure 384: Markings for direction of airflow / fan rotation

Warning!

The fans must be inserted so that the air flows toward the inside of the housing.

- Align fans over the fastening bolts (see arrows). Feed cables through the openings in the housing (see circles) into the main board of the APC620.

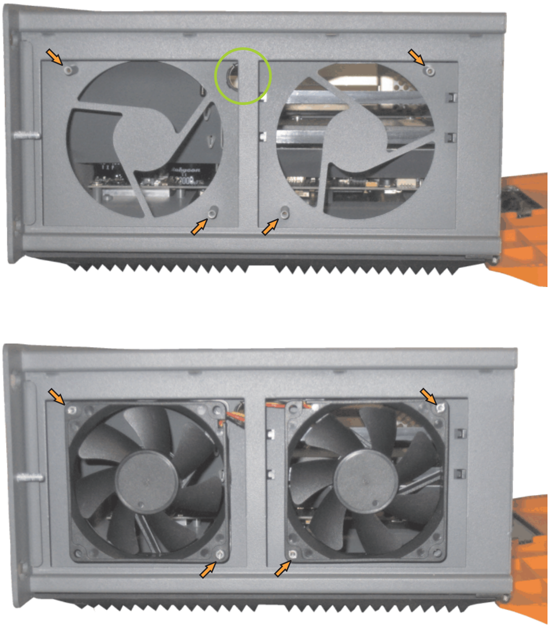


Figure 385: APC620 3PCI slot - Fan installation

- Secure fans with the 4 included Torx (T10) screws.

- The fan connection cable must be connected to the main circuit board at the right position (fan 1 at position 1, fan 2 at position 2).

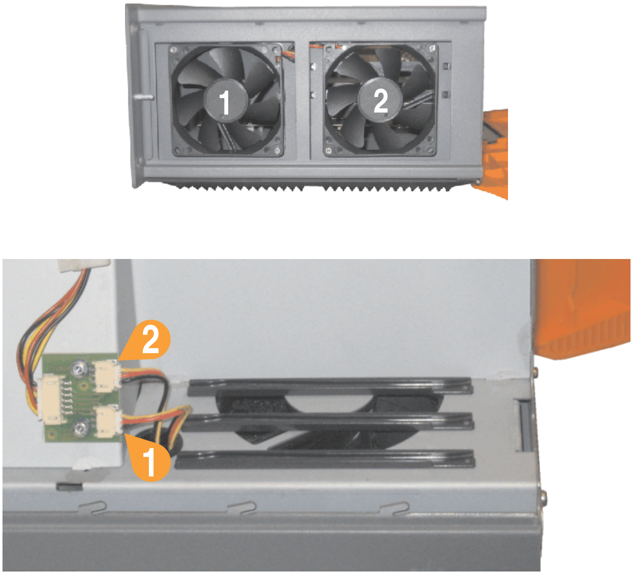


Figure 386: APC620 3PCI slot - Fan cable connection to the main board

- Place the dust filter in the fan kit cover and secure with the filter clasp.

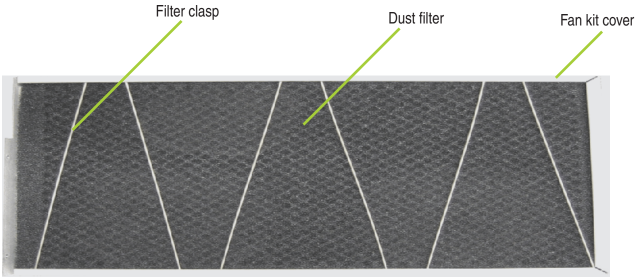


Figure 387: Dust filter in the fan kit cover and filter clasp

- Replace any removed components (filter kit cover, side cover) in the reverse order.

2.4 Procedure for APC620 with 5 PCI slot

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 4 Torx screws (T10) that must be removed.

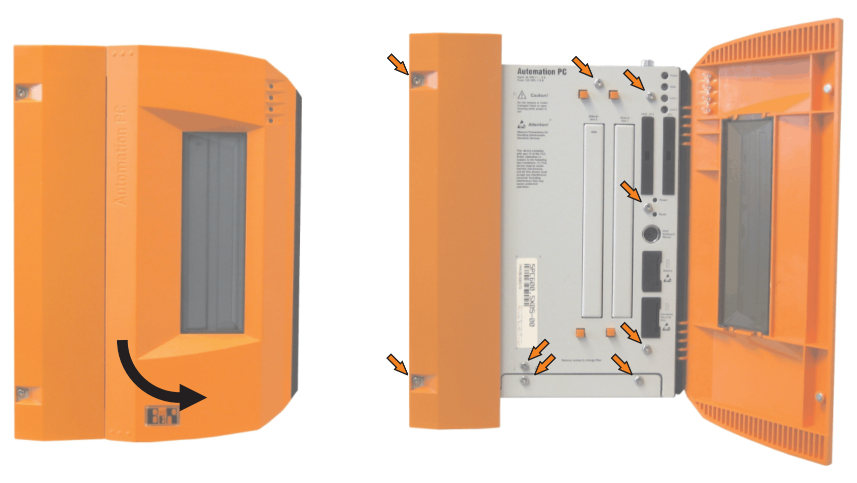


Figure 388: APC620 5PCI slot - Remove screws to install/ remove filter kit

- After the screws have been removed, the side cover and the fan kit cover can be removed toward the front.

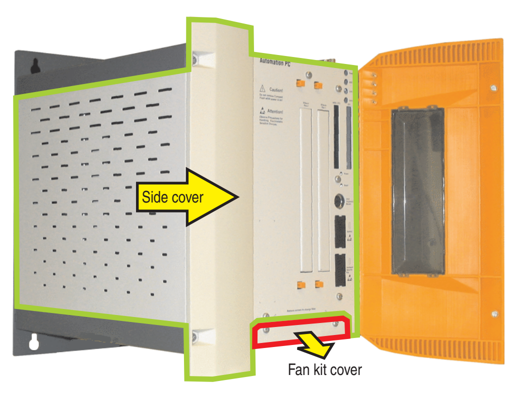


Figure 389: APC620 5PCI slot - Remove side cover and fan kit cover

- If one or more PCI cards are in place, they must be removed before moving on to the next step.

- If a slide-in drive is in place, it also must be removed before moving on to the next step.
- Attach the two included cable fasteners in the appropriate holes.

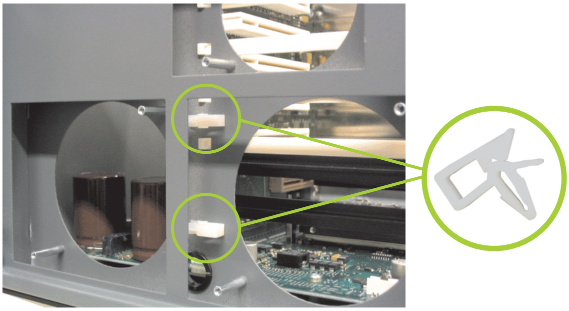


Figure 390: APC620 5PCI attach cable fasteners

- There are two arrows on the fans that indicate the direction of air flow and the direction of fan rotation.

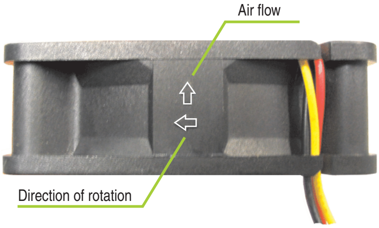


Figure 391: Markings for direction of airflow / fan rotation

Warning!

The fans must be inserted so that the air flows toward the inside of the housing.

- Align fans over the fastening bolts (see arrows). Feed cables through the openings in the housing (see circles) into the main board of the APC620.
  The fan connector cable for the 40 mm fan should be placed in the cable fastener.

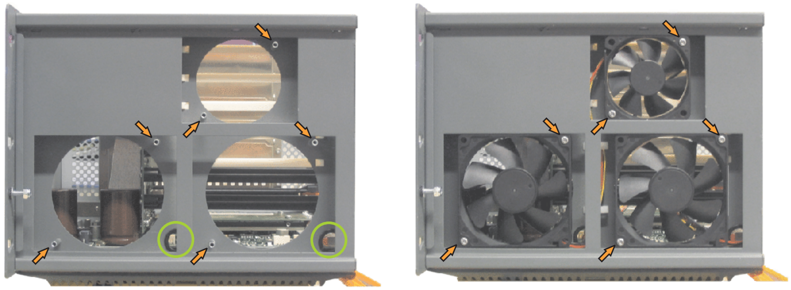


Figure 392: APC620 5PCI slot - Fan installation

- Secure fans with the 6 included Torx (T10) screws.

- The fan connection cable must be connected to the main circuit board at the right position (fan 1 at position 1, fan 2 at position 2, fan 3 at position 3).

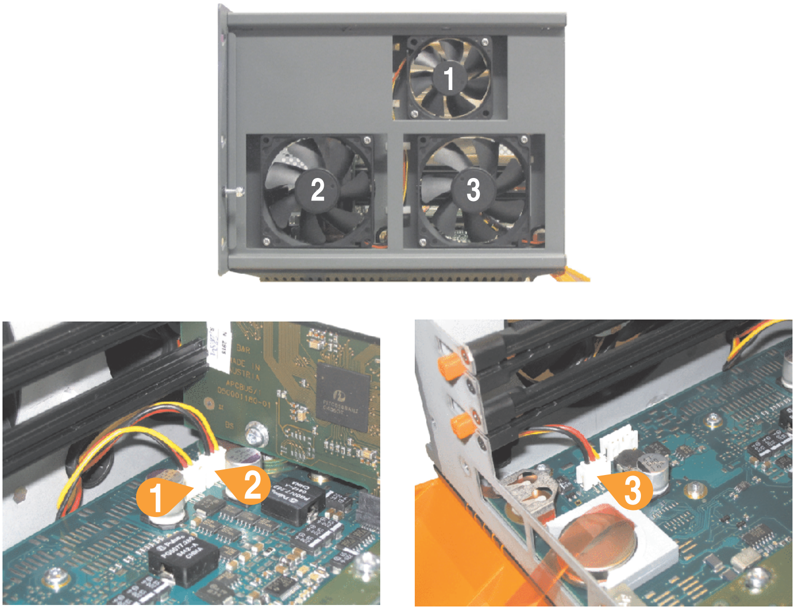


Figure 393: APC620 5PCI slot - Fan cable connection to the main board

- If one or more PCI cards were previously in place, they can now be re-inserted.
- If a slide-in drive was previously in place, it too can now be re-inserted.

- Place the dust filter in the fan kit cover and secure with the filter clasp.

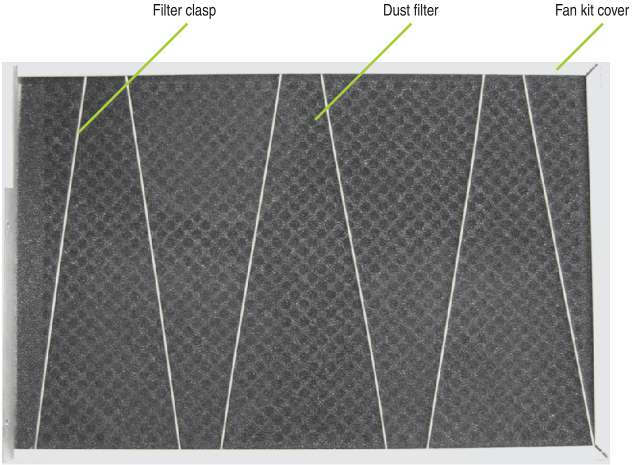


Figure 394: Dust filter in the fan kit cover and filter clasp

- Replace any removed components (filter kit cover, side cover) in the reverse order.

3. Slide-in drive - installation and exchange

Slide-in drives can be installed and exchanged in system units with 2 or 5 PCI slots.

3.1 Installation procedure

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Remove the side cover, see section 5 "Mounting the side cover", on page 756.
- Remove the slide-in dummy module.

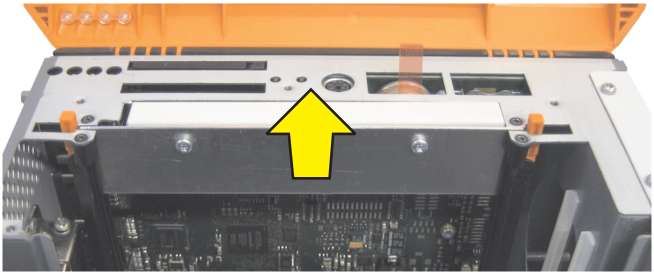


Figure 395: Removing the slide-in dummy module

- Insert the slide-in drive.

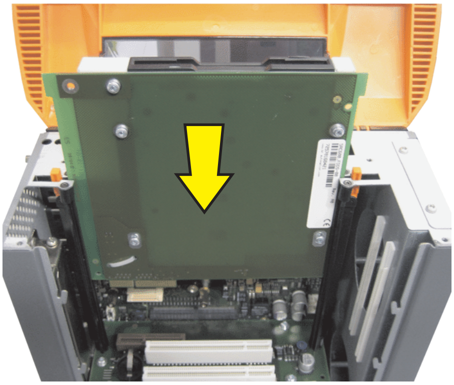


Figure 396: Installing the slide-in drive

- Attach the side cover.

3.2 Exchange procedure

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Remove the side cover, see section 5 "Mounting the side cover", on page 756.
- Simultaneously remove both slide-in slot releasing mechanisms outwards The slide-in drive is pushed a few mm upwards for easy removal.

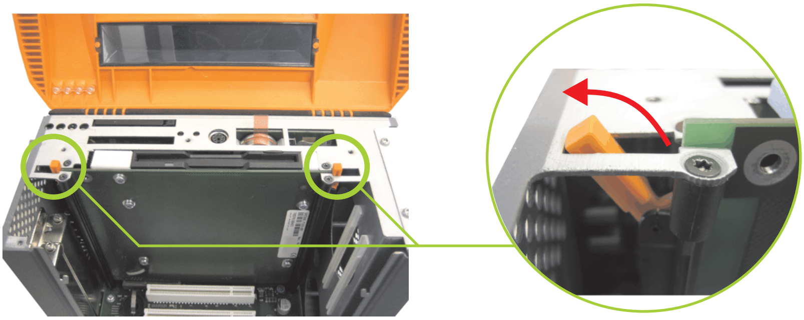


Figure 397: Release the slide-in slot releasing mechanisms

- Removing the slide-in drive.

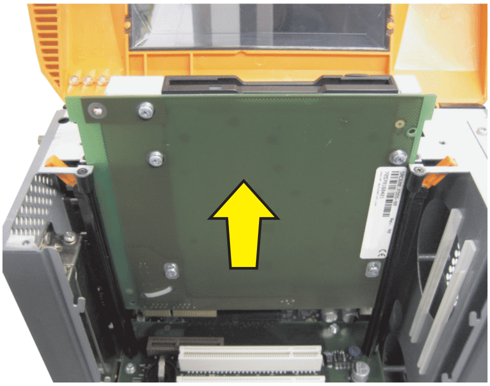


Figure 398: Removing the slide-in drive

- Move the slide-in slot releasing mechanisms to the start position.

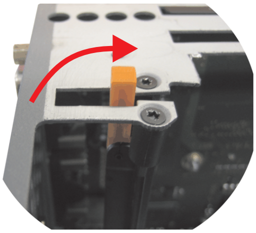


Figure 399: Slide-in slot releasing mechanism start position

- Insert the new slide-in drive or re-attach the side cover.

4. Installing the UPS module

The module is installed using the materials included in the delivery. Different parts are used depending on the system unit and whether the add-on interface module is **installed** (description starting on page 749) or **not installed** (description follows).

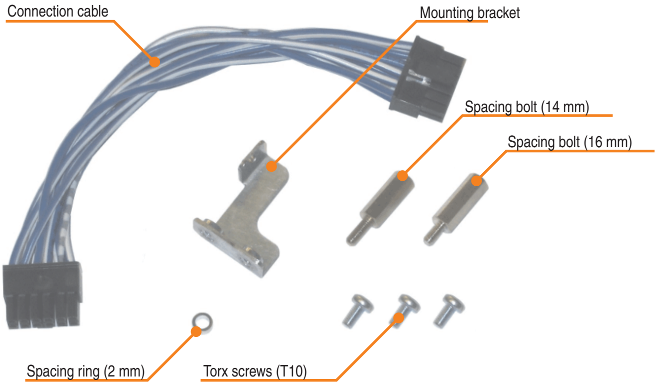


Figure 400: Add-on UPS module 5AC600.UPSI-00 - Installation materials

4.1 Automation PC 620 without add-on interface module

4.1.1 APC620, 1 PCI slot

- Remove side cover (see section 5 "Mounting the side cover", on page 756).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).

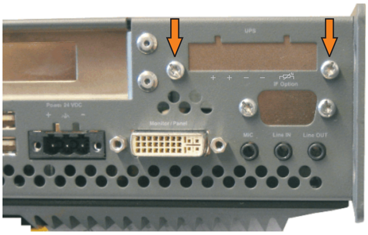


Figure 401: Remove UPS module cover

- Screw in spacing bolt and spacing ring (using M5 hex socket screwdriver).

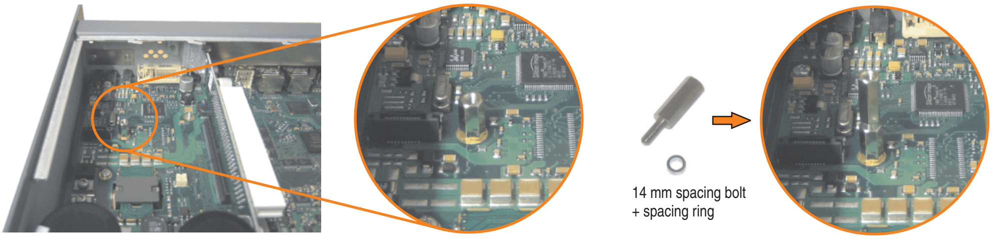


Figure 402: Screw in spacing bolt and spacing ring

- Install UPS module with 2 Torx screws (T10) and 1 Torx screw (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.

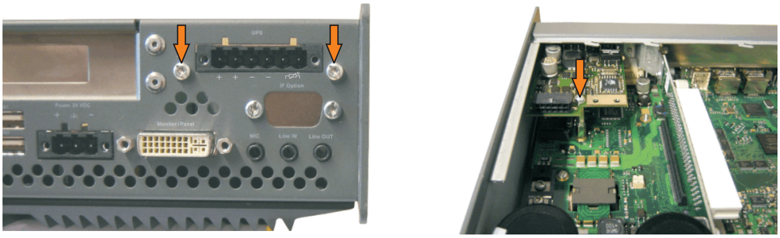


Figure 403: Install UPS module

- Plug in connection cable (see marked socket).

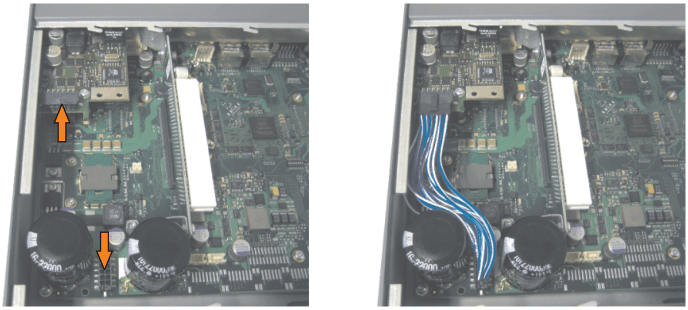


Figure 404: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.

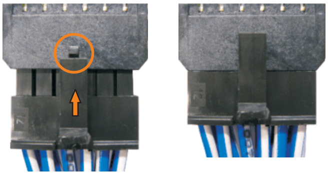


Figure 405: Connector locking mechanism

- Attach the side cover.

4.1.2 APC620, 2 PCI slot

- Remove side cover (see section 5 "Mounting the side cover", on page 756).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).

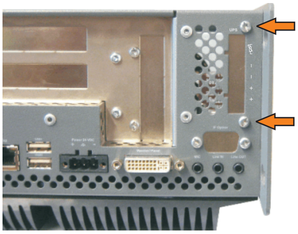


Figure 406: Remove UPS module cover

- Remove cover plate by removing the marked Torx screw (T10).

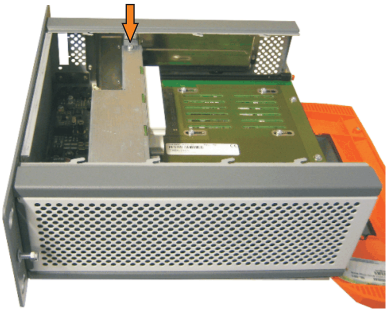


Figure 407: Remove cover plate

- Screw in spacing bolt and spacing ring (using M5 hex socket screwdriver).

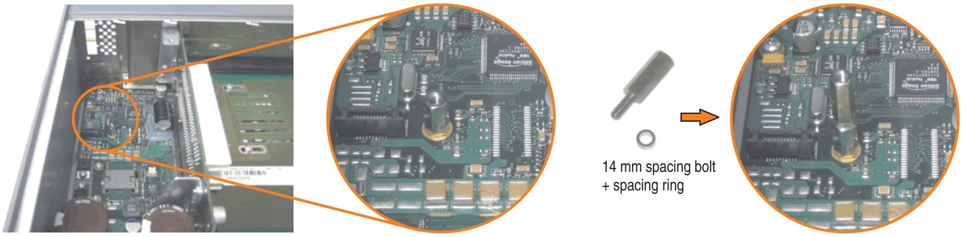


Figure 408: Screw in spacing bolt and spacing ring

- Install mounting bracket on UPS module using 2 Torx screws (T10).

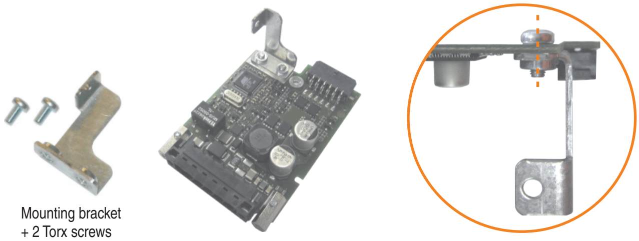


Figure 409: Install mounting bracket

- Install UPS module with 2 Torx screws (T10) and 1 Torx screw (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.

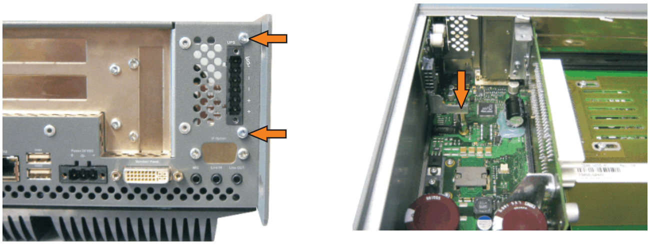


Figure 410: Install UPS module

- Plug in connection cable (see marked socket).

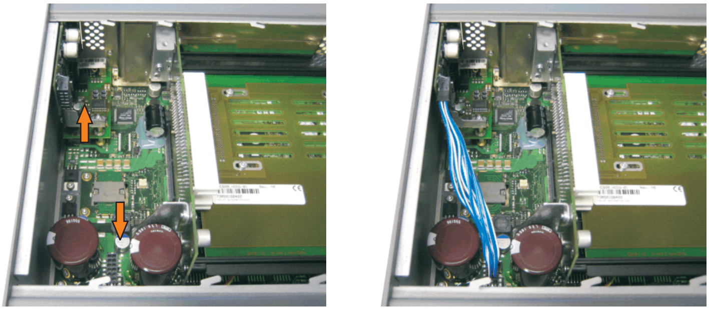


Figure 411: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.

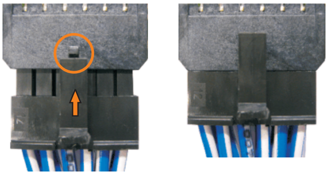


Figure 412: Connector locking mechanism

- Attach cover plate and side cover.

4.1.3 APC620, 5 PCI slot

- Remove side cover (see section 5 "Mounting the side cover", on page 756).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).

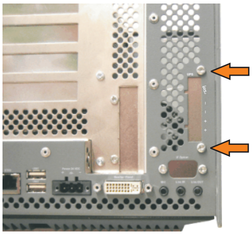


Figure 413: Remove UPS module cover

- Remove cover plate by removing the marked Torx screw (T10).

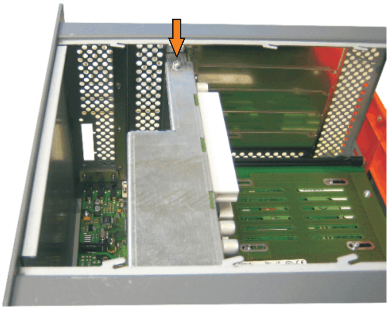


Figure 414: Remove cover plate

- Screw in spacing bolt and spacing ring (using M5 hex socket screwdriver).

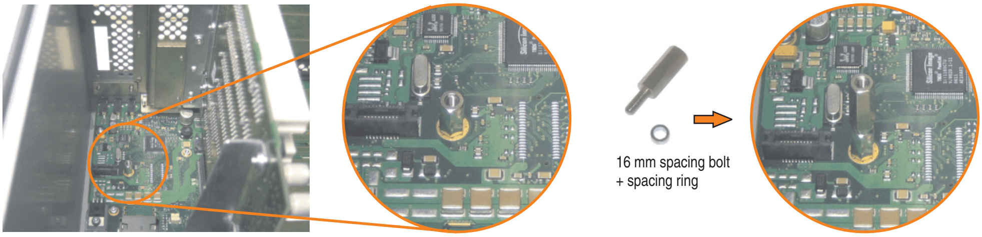


Figure 415: Screw in spacing bolt and spacing ring

- Install mounting bracket on UPS module using 2 Torx screws (T10).

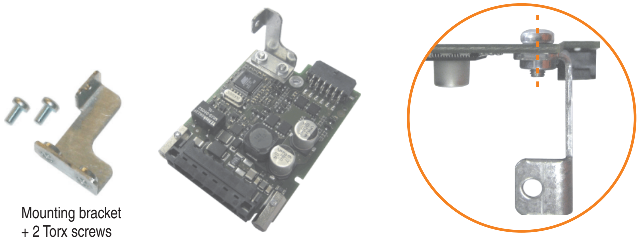


Figure 416: Install mounting bracket

- Install UPS module with 2 Torx screws (T10) and 1 Torx screw (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.

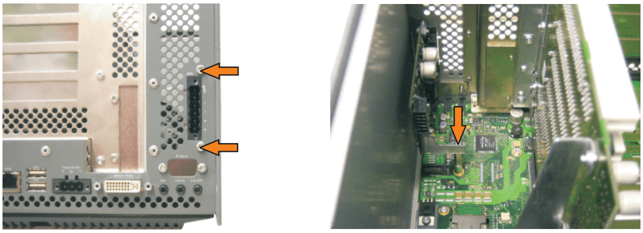


Figure 417: Install UPS module

- Attach connection cable (see marked socket).

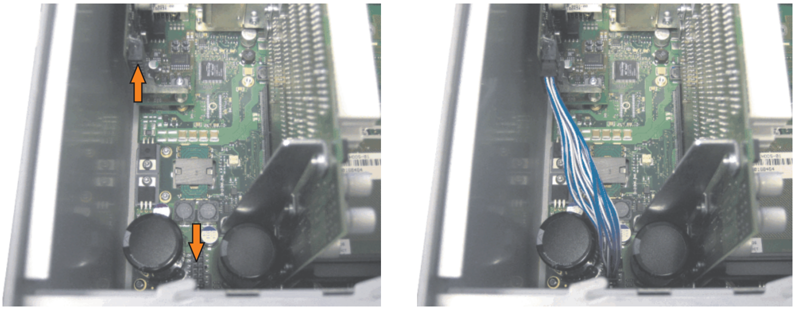


Figure 418: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.

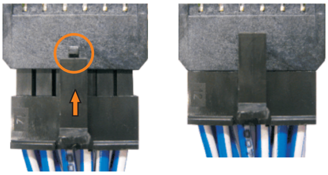


Figure 419: Connector locking mechanism

- Attach cover plate and side cover.

4.2 Automation PC 620 with add-on interface module

4.2.1 APC620, 1 PCI slot

- Remove side cover (see section 5 "Mounting the side cover", on page 756).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).

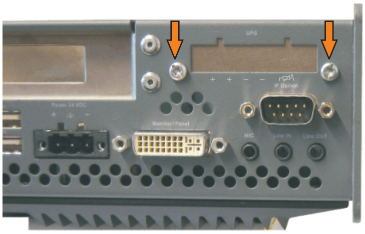


Figure 420: Remove UPS module cover

- Screw in spacing bolt (using M5 hex socket screwdriver).

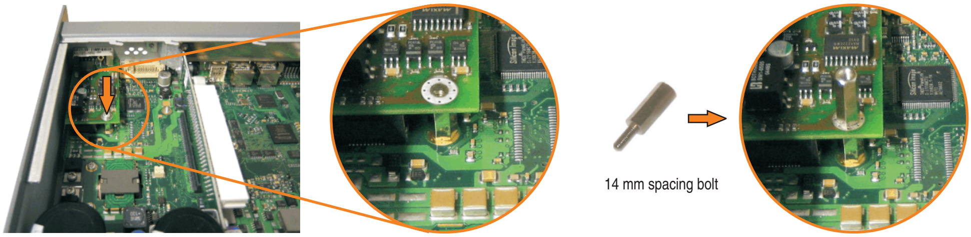


Figure 421: Screw in spacing bolt

- Install UPS module with 2 Torx screws (T10) and 1 Torx screw (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.

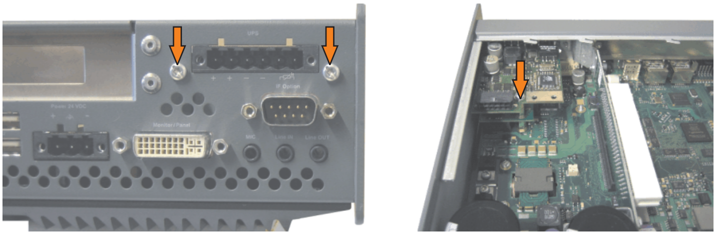


Figure 422: Install UPS module

- Plug in connection cable (see marked socket).

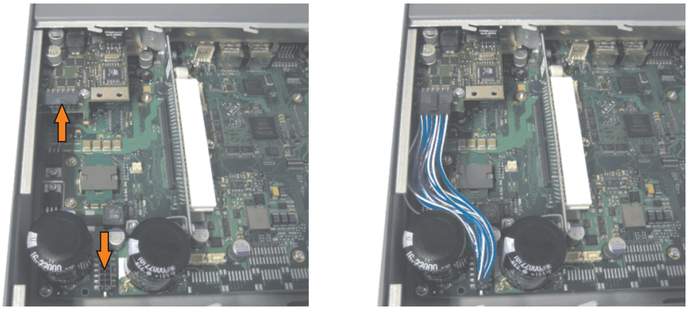


Figure 423: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.

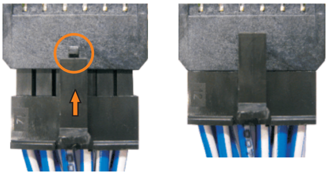


Figure 424: Connector locking mechanism

- Attach the side cover.

4.2.2 APC620, 2 PCI slot

- Remove side cover (see section 5 "Mounting the side cover", on page 756).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).

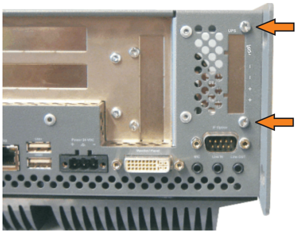


Figure 425: Remove UPS module cover

- Remove cover plate by removing the marked Torx screw (T10).

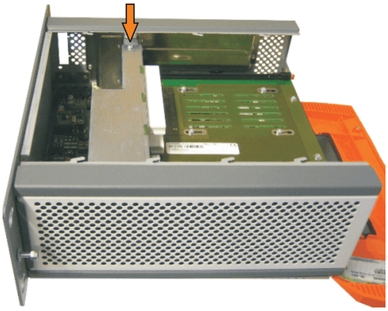


Figure 426: Remove cover plate

- Screw in spacing bolt (using M5 hex socket screwdriver).

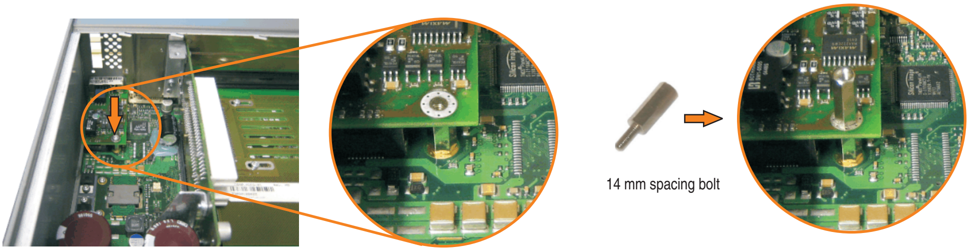


Figure 427: Screw in spacing bolt

- Install mounting bracket on UPS module using 2 Torx screws (T10).

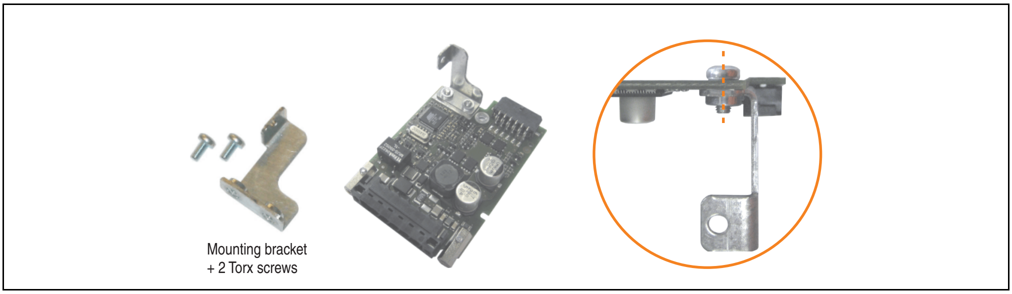


Figure 428: Install mounting bracket

- Install UPS module with 2 Torx screws (T10) and 1 Torx screw (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.

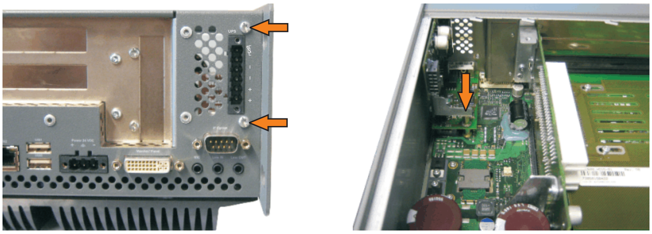


Figure 429: Install UPS module

- Plug in connection cable (see marked socket).

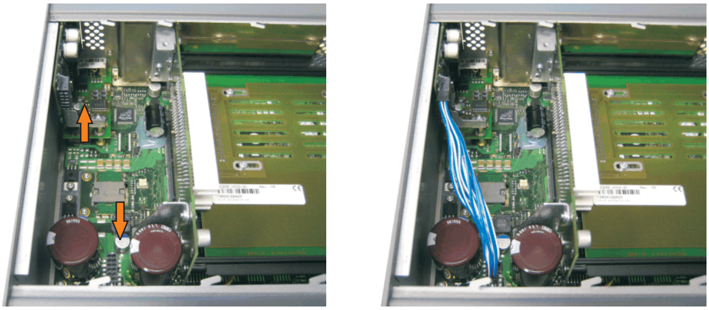


Figure 430: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.

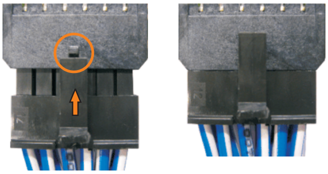


Figure 431: Connector locking mechanism

- Attach cover plate and side cover.

4.2.3 APC620, 5 PCI slot

- Remove side cover (see section 5 "Mounting the side cover", on page 756).
- Remove UPS module cover by removing the 2 marked Torx screws (using T10 screwdriver).

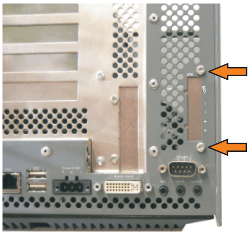


Figure 432: Remove UPS module cover

- Remove cover plate by removing the marked Torx screw (T10).

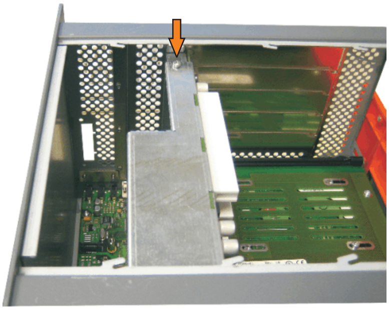


Figure 433: Remove cover plate

- Screw in spacing bolt (using M5 hex socket screwdriver).

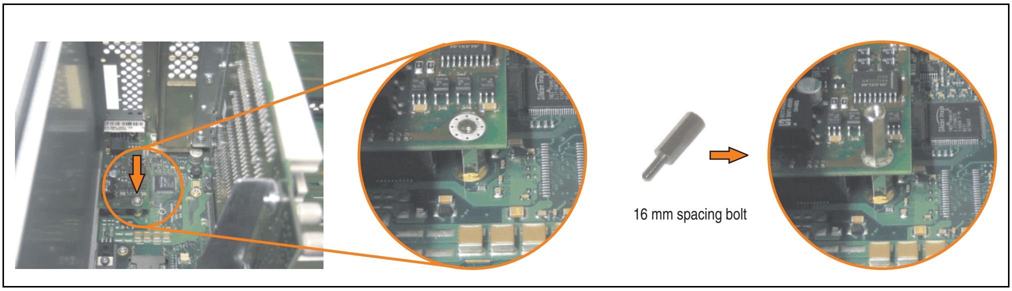


Figure 434: Screw in spacing bolt

- Install mounting bracket on UPS module using 2 Torx screws (T10).

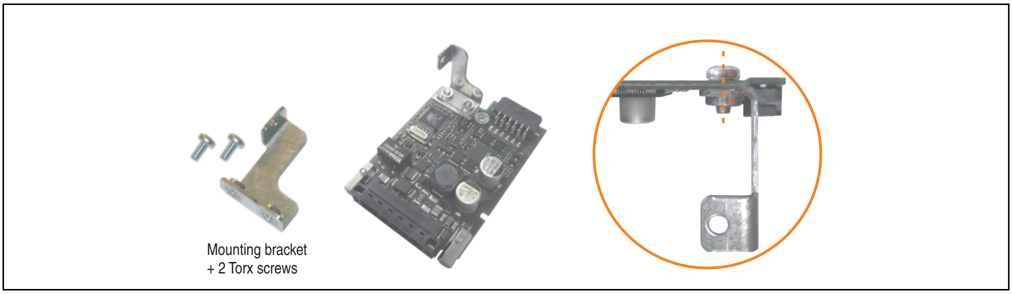


Figure 435: Install mounting bracket

- Install UPS module with 2 Torx screws (T10) and 1 Torx screw (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.

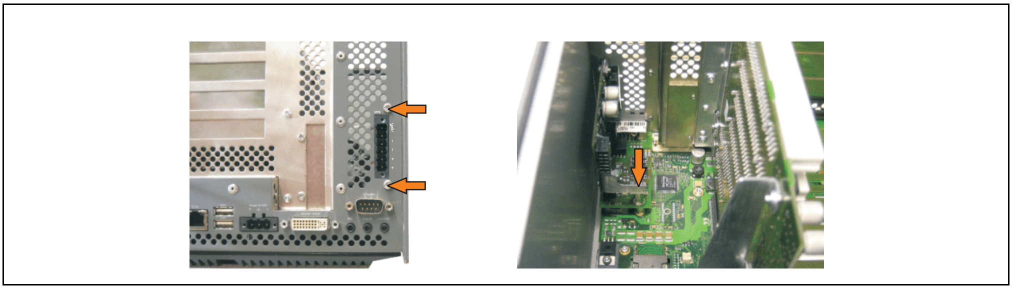


Figure 436: Install UPS module

- Plug in connection cable (see marked socket).

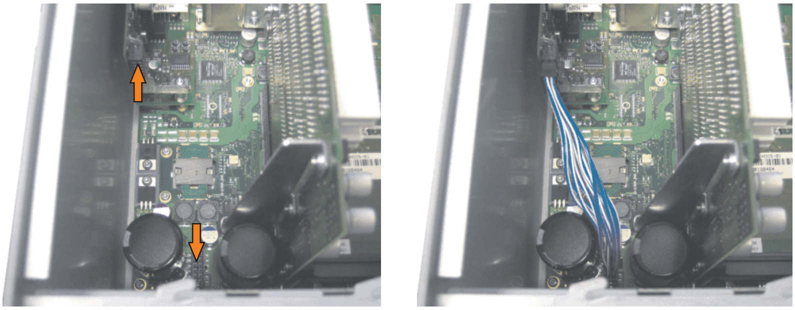


Figure 437: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.

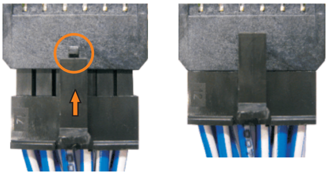


Figure 438: Connector locking mechanism

- Attach cover plate and side cover.

5. Mounting the side cover

The number of Torx (T10) screws varies depending on the system (1, 2, 3 or 5 PCI slots).

5.1 APC620 with 1 PCI slot

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 3 Torx screws (T10) that must be removed.

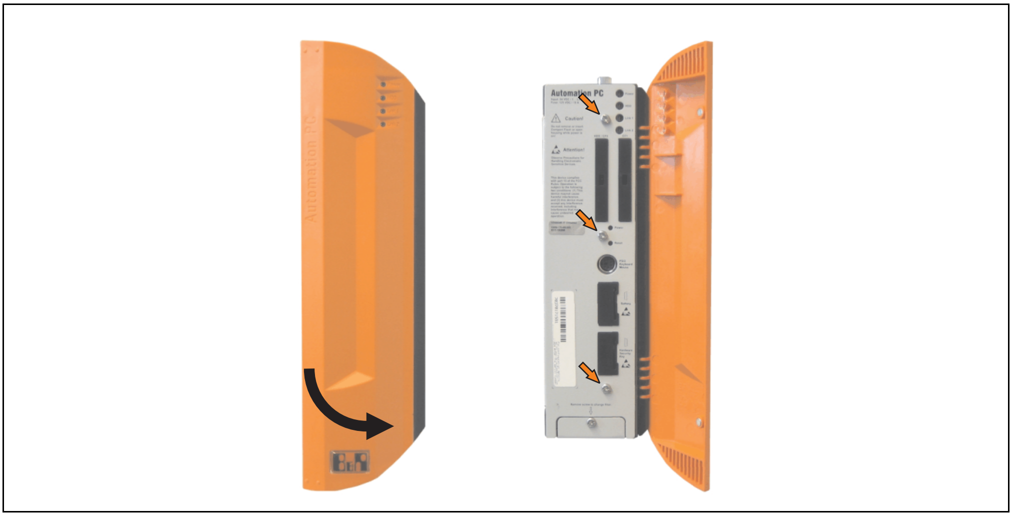


Figure 439: Mounting the side cover - APC620, 1 PCI slot

- After the screws have been removed, the side cover can be removed by sliding it toward the front.

5.2 APC620 with 2 PCI slot

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 5 Torx screws (T10) that must be removed.

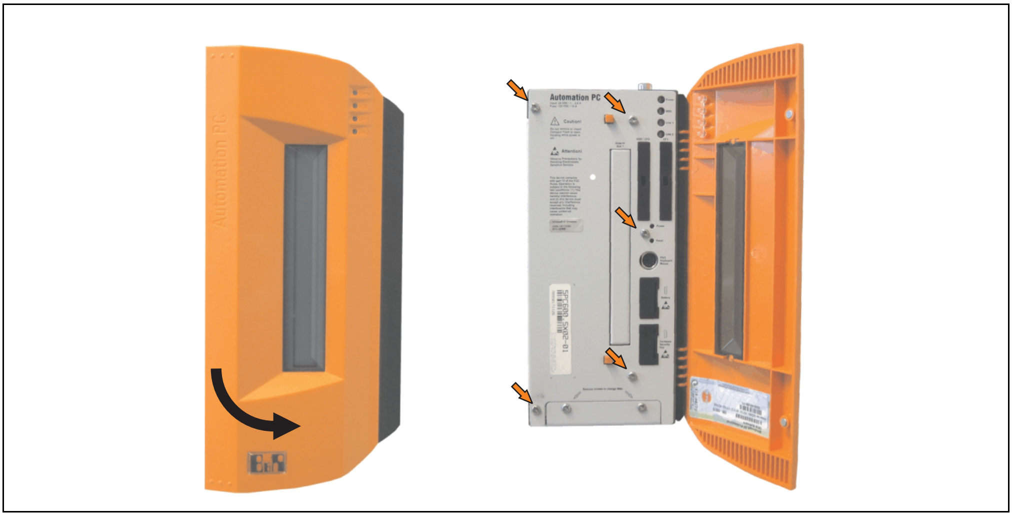


Figure 440: Mounting the side cover - APC620, 2 PCI slot

- After the screws have been removed, the side cover can be removed by sliding it toward the front.

5.3 APC620 with 3 PCI slot

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 7 Torx screws (T10) that must be removed.

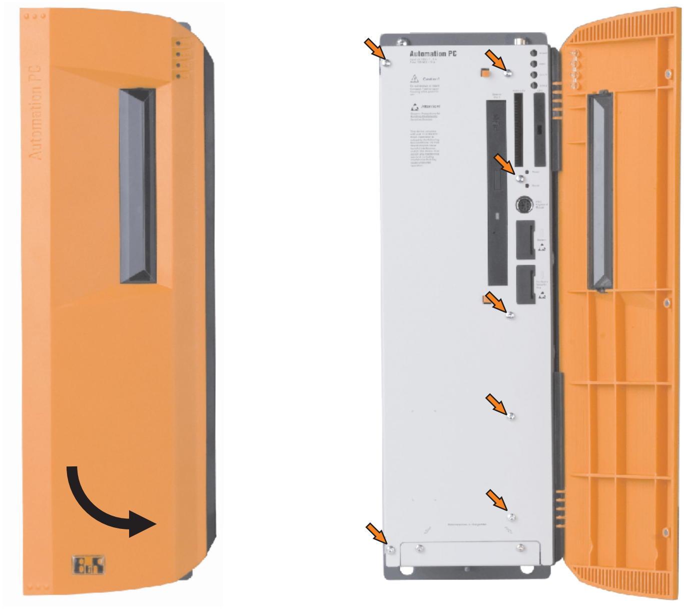


Figure 441: Mounting the side cover - APC620, 3 PCI slot

- After the screws have been removed, the side cover can be removed by sliding it toward the front.

5.4 APC620 with 5 PCI slot

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 7 Torx screws (T10) that must be removed.

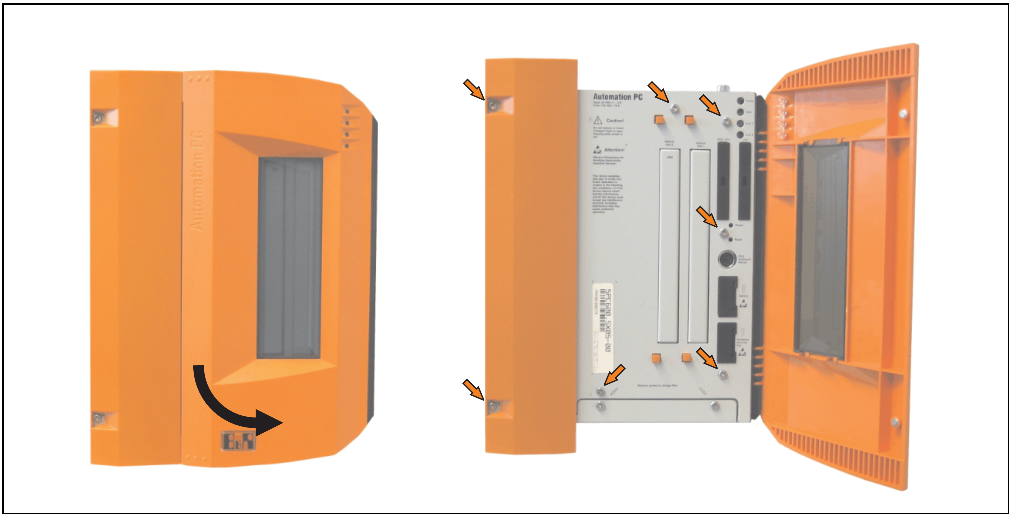


Figure 442: Mounting the side cover - APC620, 5 PCI slot

- After the screws have been removed, the side cover can be removed by sliding it toward the front.

6. Exchanging a PCI SATA RAID hard disk

In the example, the assumption is made that the secondary hard disk (HDD1) is defective. In such a case, the defective hard disk can be replaced by the replacement drive SATA hard disk.

A size 10 Torx screwdriver is needed for exchanging the hard disk.

Exchange procedure

- Remove the power supply to the device (Automation PC 620 / Panel PC 700).
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Remove the side cover.
- Remove the SATA RAID insert.
- Loosen the 4 appropriate mounting screws (M3x5) - see Figure 443 "Screw assignment on the back side of the SATA RAID controller", on page 760.

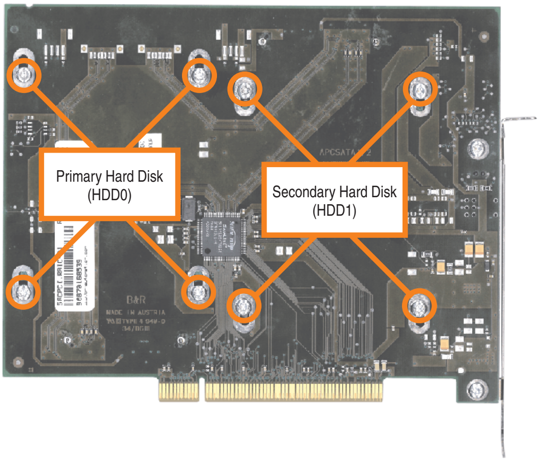


Figure 443: Screw assignment on the back side of the SATA RAID controller

- On the front side, slide the hard disk down and away (image 1).
- Carefully plug the new hard disk into the connector (image 2).

Information:

When doing this, make sure that the hard disk is only touched on the front side, and not on the top side.

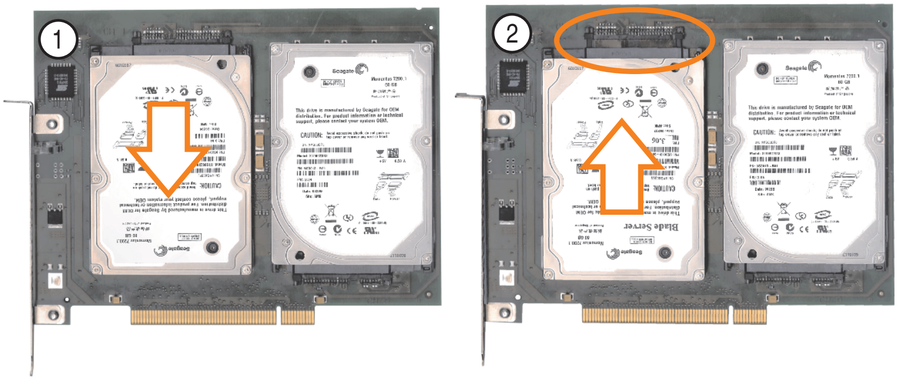


Figure 444: Hard disk exchange

- Re-secure the hard disk using the 4 fastening screws (M3x5) used earlier.
- Reassemble device in the reverse order.
- An error message is output by the RAID BIOS after starting the system "`RAID1 set is in Critical status - press any key to enter Configuration Utility`".

A rebuild must be executed in the SATA RAID BIOS - for more information on this, see the section "Rebuild mirrored set", on page 342.

7. Replacing the front cover

Depending on how the front cover is attached, the following points must be taken into consideration when replacing.

7.1 Variation A - Front cover screwed-in

- On the side of the APC620 there are Torx screws (T12) that must be removed (3, 4 or 6 screws, depending on the APC620 design).
  Pull the cover in the direction of the arrows, thereby pulling the hinge bar under the heat sink.

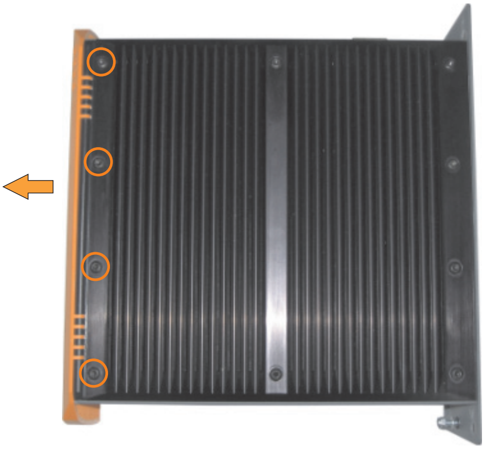


Figure 445: Removing the APC620 front cover

- Slide the new hinge bar under the heat sink and screw it back on using the screws removed earlier.

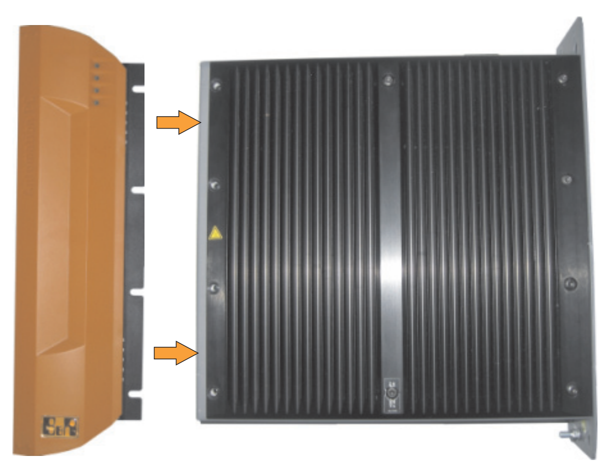


Figure 446: Mounting the APC620 front cover

7.2 Variation B - Front cover attached without screws

- A label on the side of the hinge bar "PULL TO REMOVE" indicates that the front cover is attached without screws.

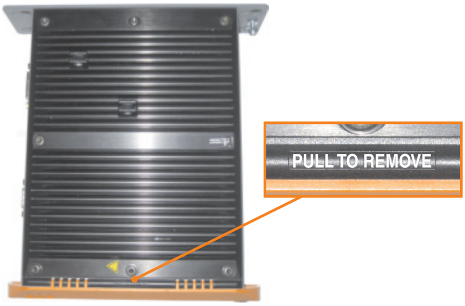


Figure 447: APC620 front cover label

- Open the front cover approximately 1-2 cm. Now remove the cover by pulling it in the direction of the red arrow.

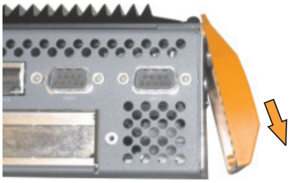


Figure 448: Removing the APC620 front cover

- Attach the new cover to the hinge bar from the side.

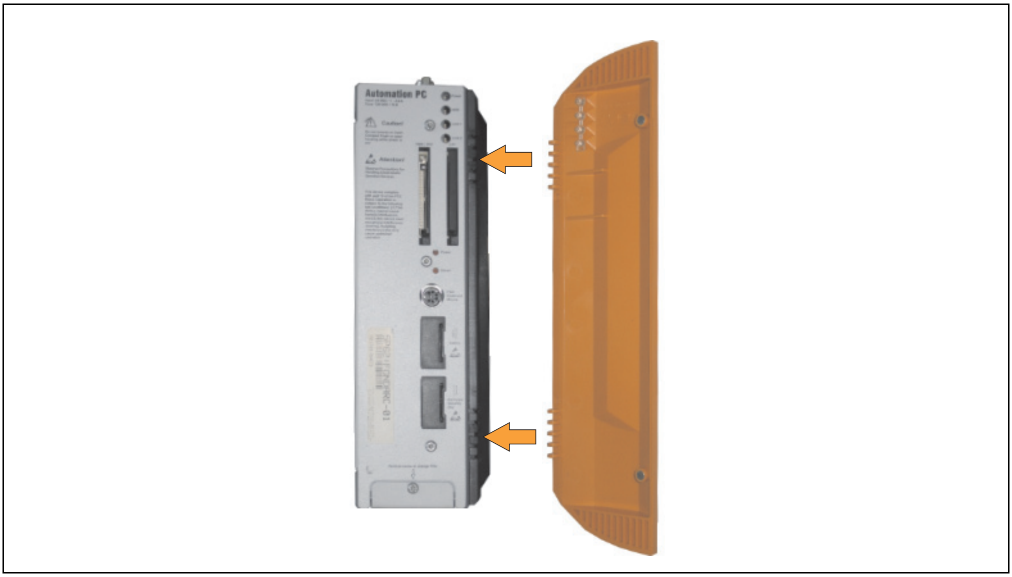


Figure 449: Attaching the front cover

Appendix A

1. Temperature sensor locations

The APC620 has temperature sensors in various places (CPU, power supply, slide-in drive 1, slide-in drive 2, I/O). The temperatures[1] can be read in BIOS (menu item "advanced" - baseboard/panel features - baseboard monitor) or in Microsoft Windows XP/Embedded, using B&R Control Center[2] .

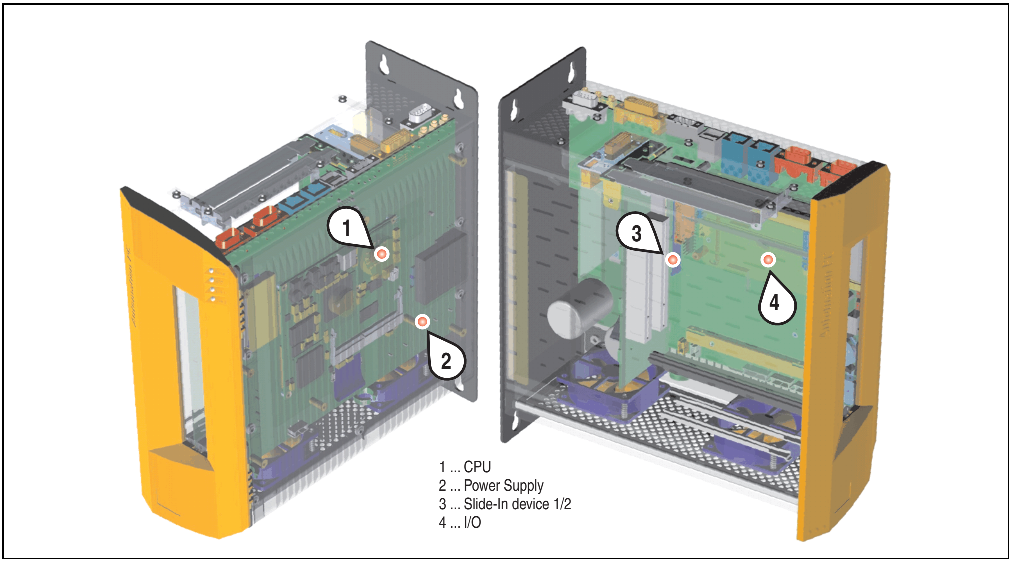


Figure 450: Temperature sensor locations

Position	Measurement point for	Measurement	Max. specified
1	CPU	Processor temperature (sensor integrated on the CPU board).	100°C
2	Power supply	Power supply temperature.	95°C
3	Slide-in drive 1/2	Temperature of a slide-in drive (the sensor is integrated on the slide-in drive)	Drive dependent
4	I/O	Temperature under an add-on drive.	80°C

Table 456: Temperature sensor locations

[1] The measured temperature is a guideline for the immediate ambient temperature, but can be influenced by neighboring components.

[2] The B&R Control Center - ADI driver - can be downloaded for free from the download area on the B&R homepage (**www.br-automation.com**).

2. Connection of an external device to the main board

A plug on the main board enables branching of +5 VDC and +12 VDC for the internal supply of e.g. special PCI cards.

The connector is only provided starting with the following system unit revisions:

Model number	Short description	Starting with revision
5PC600.SX01-00	System 1 PCI	B7
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	B0
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	B9
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	A0
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	A0

Table 457: Revision information for connecting an external device

The voltage can be accessed using the "APC620 internal supply cable 5CAMSC.0001-00", on page 667. Depending on the system unit revision, the connector is located close to the fan connector. The APC620 side cover and possibly also the slide-in drive and PCI cards must be removed to reach the connector.

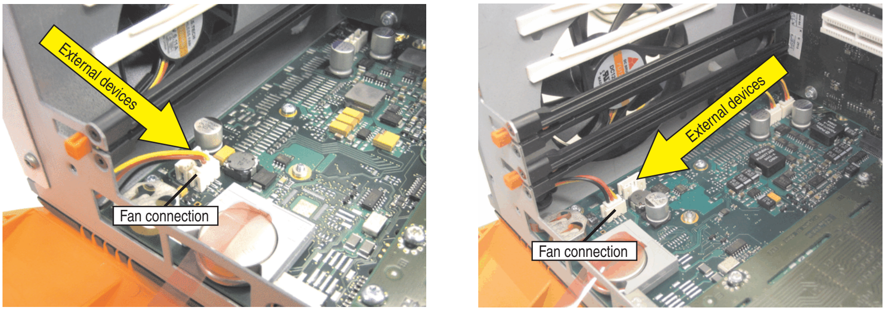


Figure 451: Connector location for external devices

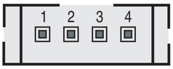
Connector for the external devices			
Pin	Assignment	Power	4-pin connector, male 
1	+12 VDC	Max. 10 W	
2	GND		
3	GND	Max. 5 W	
4	+5 VDC		

Table 458: Pin assignments - Connector on main board

Connections are protected by a 1 A multi-fuse.

3. Maintenance Controller Extended (MTCX)

The MTCX controller (FPGA processor) is located on the main board (part of every system unit) of the APC620 device.

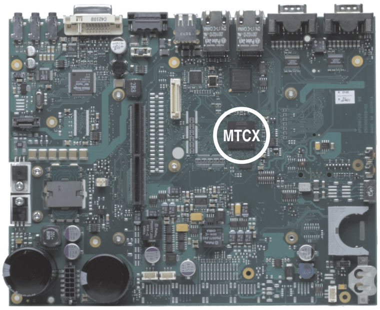


Figure 452: MTCX controller location

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

- Power on (power OK sequencing) and power fail logic
- Watchdog handling (NMI and reset handling)
- Temperature monitoring (I/O area, power supply, slide-in drive 1/2)
- Fan control (3 housing fans)
- Key handling / coordination (matrix keyboard on Automation Panel 900 devices configurable using B&R Key Editor, PS/2 keyboard)
- LED handling (matrix keyboard with LEDs on Automation Panel 900 devices configurable using B&R Key Editor)
- Advanced desktop operation (keys, USB forwarding)
- Daisy chain display operation (touch screen, USB forwarding)
- Panel locking mechanism (configurable using B&R Control Center - ADI driver)
- Backlight control for a connected B&R display
- Statistical data recording (power cycles - each power on, power on and fan hours are recorded - every full hour is counted e.g. 50 minutes no increase)
- SDL data transfer (display, matrix keyboard, touch screen, service data, USB)
- Status LEDs (HDD, panel lock, Link 1, Link 2)

The functions of the MTCX can be expanded via Firmware upgrade[1] . The version can be read in BIOS (menu item "advanced" - baseboard/panel features) or in Microsoft Windows XP/embedded, using B&R Control Center.

---

[1] Can be downloaded from the download area on the B&R homepage (**www.br-automation.com**).

3.1 SDL timing

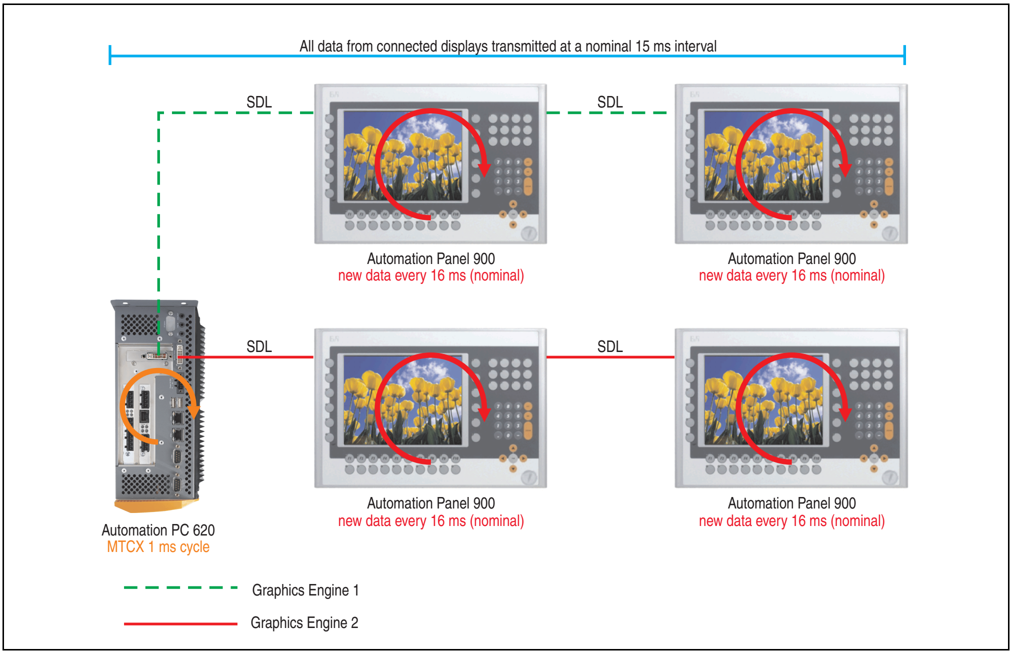

All data from connected displays transmitted at a nominal 15 ms interval
SDL
SDL
SDL
SDL
Automation Panel 900
new data every 16 ms (nominal)
Automation Panel 900
new data every 16 ms (nominal)
Automation Panel 900
new data every 16 ms (nominal)
Automation Panel 900
new data every 16 ms (nominal)
Automation PC 620
MTCX 1 ms cycle
Graphics Engine 1
Graphics Engine 2

Figure 453: Sample configuration for SDL timing

Basic procedure:

1) On every Automation Panel 900 display unit, the data (button and LED, touch screen, service data) is nominally determined asynchronously every 16 ms, saved and made available.

2) The MTCX in the APC620 samples one display unit after another asynchronously in 1 ms increments. The status is requested within the 15 ms nominal cycle (maximum 15 display units x 1 ms), regardless of the total number of display units connected in the system (Graphics Engine 1 + Graphics Engine 2), and the information is saved in the MTCX's Dual-Ported RAM.

3) An application can access the MTXC data using the programming interface (API) ADI (Automation Device Interface). Reading or writing data does not affect the asynchronous acquisition of data from the connected display units.
Further information about this can be found in the "ADI Development Kit" and the "Automation PC 620 / Panel PC 700 Implementation Guide" (both available on the B&R Homepage).

Caution!

Due to safety requirements regulated by international standards, implementing an E-stop element via SDL (using Matrix) is NOT allowed. Instead, such an element must be wired according to the safety requirements.

Information:

Display data will not be updated and cannot be read by the MTCX while a display unit is in upgrade mode (e.g. SDL firmware upgrade).

The nominal time specifications are not guaranteed maximum lengths of time, but may be increased due to e.g. transfer disturbances and external influences.

Schematic diagram

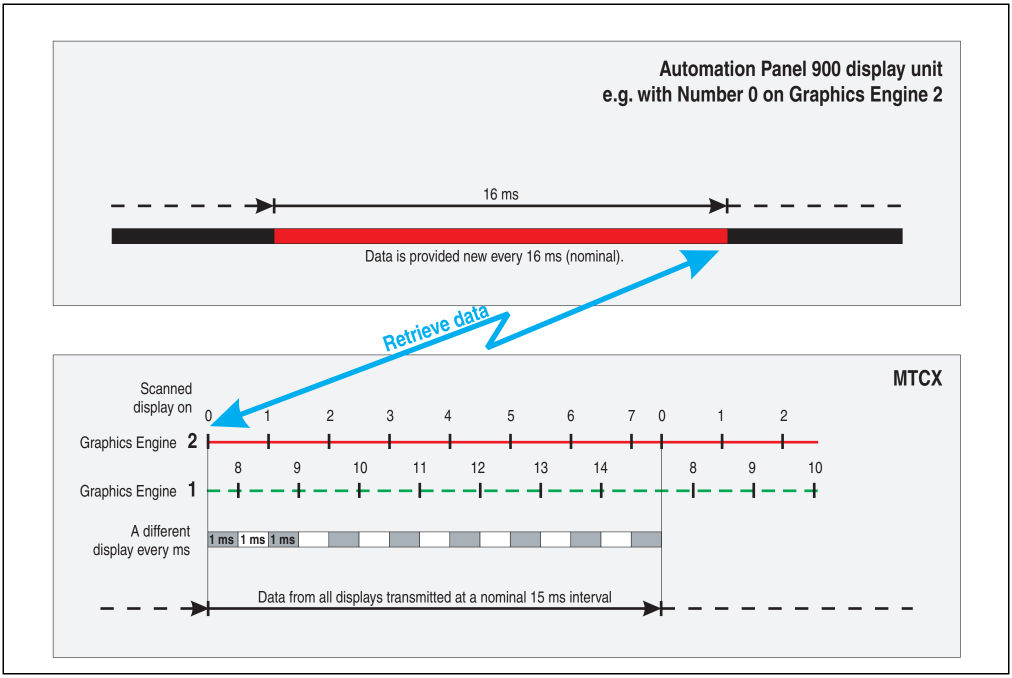

Automation Panel 900 display unit
e.g. with Number 0 on Graphics Engine 2
16 ms
Data is provided new every 16 ms (nominal).
Retrieve data
MTCX
Scanned display on
Graphics Engine 2
Graphics Engine 1
0 1 2 3 4 5 6 7 0 1 2
8 9 10 11 12 13 14 8 9 10
A different display every ms
1 ms
1 ms
1 ms
Data from all displays transmitted at a nominal 15 ms interval

Figure 454: SDL timing - Example for Automation Panel 900 with the number 0

3.2 Temperature monitoring - Fan control

The MTCX constantly monitors the temperature using temperature sensors (see section 1 "Temperature sensor locations", on page 767), which directly determine how the fan is controlled. The RPM depends on the temperature measured. The limit values depend on the MTCX firmware version being used.

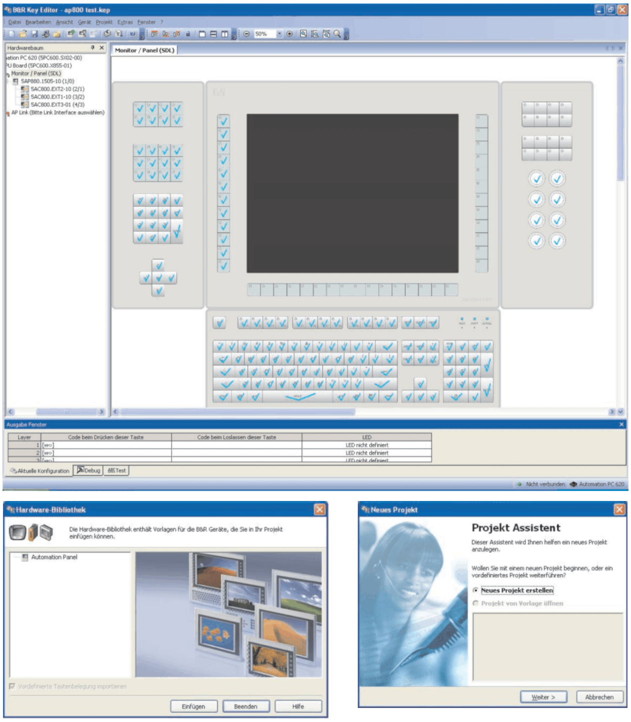
Sensor range	Start-up temperature	Max fan speed at:
CPU	+39°C	+55°C
Power supply	+39°C	+55°C
Slide-in drive 1/2	+39°C	+55°C
I/O	+39°C	+55°C

Table 459: Temperature limits for fan control

The fans stop again when the temperature drops below +37°C.

4. B&R Key Editor information

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



ation PC 620 (5PC600.SX02-00)
PU Board (5PC600.X855-01)
Monitor / Panel (SDL)
5AP880.1505-10 (1/0)
5AC800.EXT2-10 (2/1)
5AC800.EXT1-10 (3/2)
5AC800.EXT3-01 (4/3)
AP Link (Bitte Link Interface auswählen)

Layer	Code beim Drücken dieser Taste	Code beim Loslassen dieser Taste	LED
1	[wo]		LED nicht definiert
2	[wo]		LED nicht definiert
3	[wo]		LED nicht definiert

Die Hardware-Bibliothek enthält Vorlagen für die B&R Geräte, die Sie in Ihr Projekt einfügen können.

Automation Panel

☑ Vordefinierte Tastenbelegung importieren

Projekt Assistent

Dieser Assistent wird Ihnen helfen ein neues Projekt anzulegen.

Wollen Sie mit einem neuen Projekt beginnen, oder ein vordefiniertes Projekt weiterführen?

● Neues Projekt erstellen
○ Projekt von Vorlage öffnen

Figure 455: B&R Key Editor screenshots Version 3.10 (representation picture)

Features:

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

Supports following systems (Version 3.10):

- Automation PC 620
- Automation PC 810
- Automation PC 820
- Automation Panel 800
- Automation Panel 900
- IPC2000, IPC2001, IPC2002
- IPC5000, IPC5600
- IPC5000C, IPC5600C
- Mobile Panel 40/50
- Mobile Panel 100/200
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400
- Power Panel 500 (the Key Editor device file must be downloaded separately from the B&R homepage)

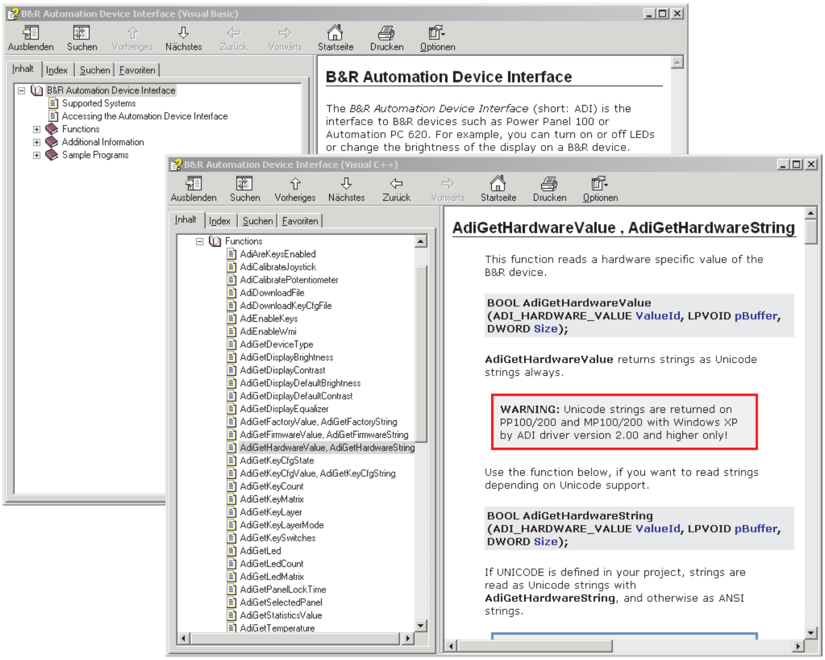
A detailed guide for configuring keys and LEDs can be found in the B&R Key Editor's online help.

The B&R Key Editor can be downloaded for free from the download area on the B&R homepage (**www.br-automation.com**). Additionally, it can also be found on the B&R HMI Drivers & Utilities DVD (model number 5SWHMI.0000-00).

5. B&R Automation Device Interface (ADI) development kit

This software can be used to activate functions of the B&R Automation Device Interface (ADI) from Windows applications, which, for example, were created using the following development tools:

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



B&R Automation Device Interface

The *B&R Automation Device Interface* (short: ADI) is the interface to B&R devices such as Power Panel 100 or Automation PC 620. For example, you can turn on or off LEDs or change the brightness of the display on a B&R device.

AdiGetHardwareValue , AdiGetHardwareString

This function reads a hardware specific value of the B&R device.

```
BOOL AdiGetHardwareValue
(ADI_HARDWARE_VALUE ValueId, LPVOID pBuffer,
DWORD Size);
```

AdiGetHardwareValue returns strings as Unicode strings always.

WARNING: Unicode strings are returned on PP100/200 and MP100/200 with Windows XP by ADI driver version 2.00 and higher only!

Use the function below, if you want to read strings depending on Unicode support.

```
BOOL AdiGetHardwareString
(ADI_HARDWARE_VALUE ValueId, LPVOID pBuffer,
DWORD Size);
```

If UNICODE is defined in your project, strings are read as Unicode strings with **AdiGetHardwareString**, and otherwise as ANSI strings.

Figure 456: ADI development kit screenshots (Version 3.10)

Features:

- One Microsoft Visual Basic module with declarations for the ADI functions.
- Header files and import libraries for Microsoft Visual C++ 6.0 and Microsoft eMbedded Visual C++ 4.0.
- Help files for Visual Basic and Visual C++.
- Sample projects for Visual Basic and Visual C++.
- ADI DLL (for testing the applications, if no ADI driver is installed).

Supports following systems (Version 3.10 and higher):

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

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

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

The B&R Automation Device Interface (ADI) development kit can be downloaded for free from the download area on the B&R homepage (**www.br-automation.com**).

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

This software can be used to activate functions of the B&R Automation Device Interface (ADI) from .NET applications, which were created using Microsoft Visual Studio 2005 (or newer).

Supported programming languages:

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

System requirements:

- Developingsystem: PC with Windows XP/7 with
  - Microsoft Visual Studio 2005 or newer
  - Microsoft .NET Framework 2.0 and / or Microsoft .NET Compact Framework 2.0 or newer
  - Optional for Windows CE Systems: B&R Windows CE SDK

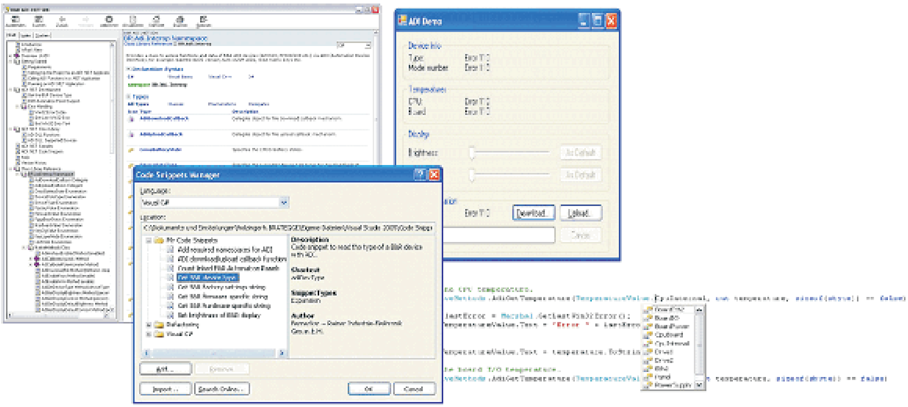


Figure 457: ADI .NET SDK Screenshots (Version 1.30)

Features:

- ADI .NET Class Library.
- Help files in HTML Help 1.0 format (.chm file) and MS Help 2.0 format (.HxS file).
- Sample projects and code snippets for Visual Basic, Visual C++, Visual C# and Visual J#.

- ADI DLL (for testing the applications, if no ADI driver is installed).

Supports following systems (Version 1.30 and higher):

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

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

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

The ADI .NET SDK can be downloaded for free from the download area on the B&R homepage (**www.br-automation.com**).

7. Glossary

A

ACPI

Abbreviation for "**A**dvanced **C**onfiguration and **P**ower **I**nterface". Configuration interface that enables the operating system to control the power supply for each device connected to the PC. With ACPI, the computer's BIOS is only responsible for the details of communication with the hardware.

APC

An abbreviation for "**A**utomation **PC**".

API

Abbreviation for "**A**pplication **P**rogram **I**nterface" The interface, which allows applications to communicate with other applications or with the operating system.

Automation Runtime

A uniform runtime system for all B&R automation components.

B

Baud rate

Measurement unit for data transfer speed. It indicates the number of states for a transferred signal per second and is measured using the baud unit of measurement. 1 baud = 1 bit/sec or 1 bps.

BIOS

An abbreviation for "**B**asic **I**nput/**O**utput **S**ystem". Core software for computer systems with essential routines for controlling input and output processes on hardware components, for performing tests after system start and for loading the operating system. Although BIOS is used to configure a system's performance, the user does not usually come into contact with it.

Bit

Binary digit > binary position, binary character, smallest discrete unit of information. A bit can have the value 0 or 1.

Bit rate

The number of bits that can be transferred within a specified time unit. 1 bit/sec = 1 baud.

Bootstrap loader

A program that automatically runs when the computer is switched on or restarted. After some basic hardware tests have been carried out, the bootstrap loader starts a larger loader and hands over control to it, which in turn boots the operating system. The bootstrap loader is typically found in ROM on the computer.

Byte

Data format [1 byte = 8 bits] and a unit for characterizing information amounts and memory capacity. The following units are the commonly used units of progression: KB, MB, GB.

B&R Automation Runtime

Windows-based program for creating installation disks to install B&R Automation Runtime™ on the target system.

C

Cache

Background memory, also known as non-addressable memory or fast buffer memory. It is used to relieve the fast main memory of a computer. For example, data that should be output to slower components by the working memory (e.g. disk storage, printers) is stored temporarily in cache memory and output from there at an appropriate speed for the target devices.

CAN

An abbreviation for "**C**ontroller **A**rea **N**etwork" (serial bus system). Structure according to ISO 11898; Bus medium: twisted pair. Good transfer properties in short distances less than 40 m with a 1 MBit/sec data transfer rate. Maximum number of stations: Theoretically unlimited, but practically limited up to 64. Real-time capable (i.e. defined maximum latency times for messages with high priority). High reliability using error detection, error handling, troubleshooting. Hamming distance.

CD-ROM

Abbreviation for "**C**ompact **D**isc **R**ead-**O**nly **M**emory". A removable data medium with a capacity of ~700 MB. CD-ROMs are optically scanned.

CE mark

A CE mark for a product. It consists of the letters "CE" and indicates conformity to all EU guidelines for the labeled product. It indicates that the individual or corporate body who has performed or attached the label assures that the product conforms to all EU guidelines for complete harmonization. It also indicates that all mandatory conformity evaluation procedures have taken place.

CMOS

"CMOS" is a battery powered memory area where fundamental parameters of an IBM (or compatible) personal computer are stored. Information such as the type of hard drive, size of the working memory and the current date and time are required when booting the computer. As the name suggests, the memory is based on CMOS technology standards.

COM

A device name used to access serial ports in MS-DOS. The first serial port can be accessed under COM1, the second under COM2, etc. A modem, mouse, or serial printer is typically connected to a serial port.

COM1

Device name for the first serial port in a PC system. The input/output area for COM1 is usually found at address 03F8H. Generally, the COM1 port is assigned to IRQ 4. In many systems, an RS232 serial mouse is connected to COM1.

COM2

Device name for the second serial port in a PC system. The input/output area for COM2 is usually found at address 02F8H. Generally, the COM2 port is assigned to IRQ 3. In many systems, a modem is connected to COM2.

COM3

Device name for a serial port in a PC system. The input/output area for COM3 is usually found at address 03E8H. Generally, the COM3 port is assigned to IRQ 4. In many systems, COM3 is used as an alternative for COM1 or COM2 if peripheral devices are already connected to COM1 and COM2.

CompactFlash®

CompactFlash memory cards [CF cards] are exchangeable nonvolatile mass memory systems with very small dimensions [43 x 36 x 3.3 mm, approximately half the size of a credit card]. In addition to the flash memory chips, the controller is also present on the cards. CF cards provide complete PC card / ATA functionality and compatibility. A 50-pin CF card can be simply inserted in a passive 68-pin type II adapter card. It conforms to all electrical and mechanical PC card interface specifications. CF cards were launched by SanDisk back in 1994. Currently, memory capacities reach up to 8 GB per unit. Since 1995, CompactFlash Association [CFA] has been looking after standardization and the worldwide distribution of CF technology

CPU

An abbreviation for "**C**entral **P**rocessing **U**nit". Interprets and executes commands. It is also known as a "microprocessor" or "processor" for short. A processor is able to receive, decode and execute commands, as well as transfer information to and from other resources via the computer bus.

CTS

An abbreviation for "**C**lear **T**o **S**end". A signal used when transferring serial data from modem to computer, indicating its readiness to send the data. CTS is a hardware signal which is transferred via line number 5 in compliance with the RS-232-C standard.

D

DCD

An abbreviation for "**D**ata **C**arrier **D**etected". A signal used in serial communication that is sent by the modem to the computer it is connected to, indicating that it is ready for transfer.

Dial-up

Data is transferred over the telephone network using a modem or an ISDN adapter.

DIMM

"Double In-line Memory Module" consisting of one or more RAM chips on a small circuit board that is connected with the motherboard of a computer.

DMA

Direct **M**emory **A**ccess > Accelerated direct access to a computer’s RAM by bypassing the CPU.

DRAM

An abbreviation for "**D**ynamic **R**andom **A**ccess **M**emory". Dynamic RAM consists of an integrated semiconductor circuit that stores information based on the capacitor principle. Capacitors lose their charge in a relatively short time. Therefore, dynamic RAM circuit boards must contain a logic that allows continual recharging of RAM chips. Since the processor cannot access dynamic RAM while it is being recharged, one or more waiting states can occur when reading or writing data. Although it is slower, dynamic RAM is used more often than static RAM since the simple design of the circuits means that it can store four times more data than static RAM.

DSR

An abbreviation for "**D**ata **S**et **R**eady". A signal used in serial data transfer, which is sent by the modem to the computer it is connected to, indicating its readiness for processing. DSR is a hardware signal which is sent via line number 6 in compliance with the RS-232-C standard.

DTR

An abbreviation for "**D**ata **T**erminal **R**eady". A signal used in serial data transfer that is sent by the computer to the modem it is connected to, indicating the computer's readiness to accept incoming signals.

DVD

An abbreviation for "**D**igital **V**ersatile **D**isc". The next generation of optical data carrier technology is able to store a higher volume of data than conventional CDs. Standard DVDs, which have a single layer, can hold 4.7 GB. Dual-layer DVDs can hold 8.5 GB. Double-sided DVDs can therefore hold up to 17 GB. A special drive is needed for DVDs. Conventional CDs can also be played on DVD drives.

DVI

Abbreviation for "**D**igital **V**isual **I**nterface" An interface for the digital transfer of video data.

DVI-A

Analog only

DVI-D

Digital only

DVI-I

Integrated, i.e. analog and digital

E

EDID data

Abbreviation for "**E**xtended **D**isplay **I**dentification **D**ata". EDID data contains the characteristics of monitors / TFT displays transferred as 128 KB data blocks to the graphics card via the Display Data Channel (DDC). This EDID data can be used to set the graphics card to the monitor properties.

EIDE

An abbreviation for "**E**nhanced **I**ntegrated **D**rive **E**lectronics". An expansion of the IDE standard. Enhanced IDE is considered the standard for hardware interfaces. This interface is designed for drives with an integrated drive controller.

EMC

"**E**lectro**m**agnetic **C**ompatibility" The ability of a device or a system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment [IEV 161-01-07].

EPROM

Erasable **PROM** > (completely with ultraviolet light).

Ethernet

An IEEE 802.3 standard for networks. Ethernet uses bus or star topology and controls the traffic on communication lines using the access procedure CSMA/CD (Carrier Sense Multiple Access with Collision Detection). Network nodes are connected using coaxial cables, fiber optic cables or twisted pair cabling. Data transfer on an Ethernet network takes place in frames of variable lengths that consist of supply and controller information as well as 1500 bytes of data. The Ethernet standard provides base band transfers at 10 megabit and 100 megabit per second.

ETX

Abbreviation for "**E**mbedded **T**echnology e**X**tended" This established standard offers complete PC functionality on a very compact form factor of just 114 mm x 100 mm (´4.5" x 4"). The flexibility offered by ETX® in the development of system specific main boards allows easy requirement fulfillment in a number of different applications.

F

FDD

Abbreviation for "**F**loppy **D**isk **D**rive". Reading device for removable magnetic memory from the early days of PC technology. Due to their sensitivity and moving components, FDDs have been almost completely replaced by CompactFlash memory in modern automation solutions.

Fiber optics

Fiber optic cable

FIFO

An abbreviation for "**F**irst **I**n **F**irst **O**ut". A queuing organization method whereby elements are removed in the same order as they were inserted. The first element inserted is the first one removed. Such an organization method is typical for a list of documents that are waiting to be printed.

Firmware

Programs stored permanently in read-only memory. Firmware is software used to operate computer-controlled devices that generally stays in the device throughout its lifespan or over a long period of time. Such software includes operating systems for CPUs and application programs for industrial PCs as well as programmable logic controllers (e.g. the software in a washing machine controller). This software is written in read-only memory (ROM, PROM, EPROM) and cannot be easily replaced.

Floppy

Also known as a diskette. A round plastic disk with an iron oxide coating that can store a magnetic field. When the floppy disk is inserted in a disk drive, it rotates so that the different areas (or sectors) of the disk's surface are moved under the read/write head. This allows the magnetic orientation of the particle to be modified and recorded. Orientation in one direction represents binary 1, while the reverse orientation represents binary 0.

FPC

An abbreviation for "**F**lat **P**anel **C**ontroller".

FPD

An abbreviation for "**F**lat **P**anel **D**isplay".

FTP

"**F**ile **T**ransfer **P**rotocol" Rules for transferring data over a network from one computer to another computer. This protocol is based on TCP/IP, which has established itself as the standard for transferring data over Ethernet networks. FTP is one of the most used protocols on the Internet. It is defined in RFC 959 in the official regulations for Internet communication.

G

GB

Gigabyte (1 GB = 230 or 1,073,741,824 Bytes)

H

Handshake

Method of synchronization for data transfer when data is sent at irregular intervals. The sender signals that data can be sent, and the receiver signals when new data can be received.

HDD

An abbreviation for "**H**ard **D**isk **D**rive". Fixed magnetic mass memory with high capacities, e.g. 120 GB.

I

IDE

An abbreviation for "**I**ntegrated **D**rive **E**lectronics". A drive interface where the controller electronics are integrated in the drive.

ISA

An abbreviation for "**I**ndustry **S**tandard **A**rchitecture". A term given for the bus design which allows expansion of the system with plug-in cards that can be inserted in PC expansion slots.

ISO

International Organization for Standardization > Worldwide federation of national standardization institutions from over 130 countries. ISO is not an acronym for the name of the organization; it is derived from the Greek word "isos", meaning "equal" (**www.iso.ch**).

J

Jitter

Jitter is a term that describes time deviations of cyclic events. If, for example, an event should take place every 200ìs and it actually occurs every 198 to 203ìs, then the jitter is 5ìs. Jitter has many causes. It originates in the components and transfer media of networks because of noise, crosstalk, electromagnetic interference and many other random occurrences. In automation technology, jitter is a measure of the quality of synchronization and timing.

Jumper

A small plug or wire link for adapting the hardware configuration used to connect the different points of an electronic circuit.

L

LCD

An abbreviation for "**L**iquid **C**rystal **D**isplay". A display type, based on liquid crystals that have a polarized molecular structure and are enclosed between two transparent electrodes as a thin layer. If an electrical field is applied to the electrodes, the molecules align themselves with the field and form crystalline arrangements that polarize the light passing through. A polarization filter, which is arranged using lamellar electrodes, blocks the polarized light. In this way, a cell (pixel) containing liquid crystals can be switched on using electrode gates, thus coloring this pixel black. Some LCD displays have an electroluminescent plate behind the LCD screen for lighting. Other types of LCD displays can use color.

LED

An abbreviation for "**L**ight **E**mitting **D**iode". A semiconductor diode which converts electrical energy into light. LEDs work on the principle of electroluminescence. They are highly efficient because they do not produce much heat in spite of the amount of light they emit. For example, "operational status indicators" on floppy disk drives are LEDs.

LPT

Logical device name for line printers. In MS-DOS, names are reserved for up to three parallel printer ports with the names LPT1, LPT2 and LPT3. The first parallel port (LPT1) is usually identical to the primary parallel output device PRN (in MS-DOS the logical device name for the printer). The abbreviation LPT stands for "Line Printer Terminal".

M

MB

Megabyte (1 MB = 220 or 1,048,576 bytes).

Microprocessor

Highly integrated circuit with the functionality of a CPU, normally housed on a single chip. It comprises a control unit, arithmetic and logic unit, several registers and a link system for connecting memory and peripheral components. The main performance features are the internal and external data bus and address bus widths, the command set and the clock frequency. Additionally, a choice can be made between CISC and RISC processors. The first commercially available worldwide microprocessor was the Intel 4004. It came on the market in 1971.

MIPS

Million instructions per second > Measurement for the computing speed of computers.

Motherboard

A circuit board that houses the main components of a computer such as the CPU switching circuit, co-processors, RAM, ROM for firmware, interface circuits, and expansion slots for hardware expansions.

MTBF

An abbreviation for "**M**ean **t**ime **b**etween **f**ailure". The average time which passes before a hardware component fails and repair is needed. This time is usually expressed in thousands or ten thousands of hours, sometimes known as power-on hours (POH).

MTCX

An abbreviation for »**M**ain**t**enance **C**ontroller E**X**tended«. The MTCX is an independent processor system that provides additional functions for a B&R industrial PC that are not available with a normal PC. The MTC communicates with the B&R industrial PC via the ISA bus (using a couple register).

Multitasking

Multitasking is an operating mode in an operating system that allows several computer tasks to be executed virtually simultaneously.

O

OEM

"**O**riginal **E**quipment **M**anufacturer"; A company that integrates third-party and in-house manufactured components into their own product range and then distributes these products under its own name.

OPC

OLE for Process Control > A communication standard for components in the area of automation. The goal of OPC development is to provide an open interface that builds on Windows-based technologies such as OLE, COM and DCOM. It allows problem-free standardized data transfer between controllers, operating and monitoring systems, field devices and office applications from different manufacturers. This development is promoted by the OPC Foundation, which is made up of over 200 companies from around the world, including Microsoft and other leading companies. Nowadays, OPC is also interpreted as a synonym for Openness, Productivity and Connectivity, symbolizing the new possibilities that this standard opens up.

OPC server

The missing link between connection modules for the Interbus and the visualization application. It communicates serially with the connection modules via the ISA or PCI bus or Ethernet.

P

Panel

A common term for B&R display units (with or without keys).

PCI Bus

Abbreviation for "**P**eripheral **C**omponent **I**nterconnect bus". Developed by Intel as an intermediary/local bus for the latest PC generations. It is basically a synchronous bus. The main clock of the CPU is used for synchronization. The PCI bus is microprocessor-independent, 32-bit and 64-bit compatible, and supports both 3.3 V and 5 V cards and devices.

PCMCIA

An abbreviation for "**P**ersonal **C**omputer **M**emory **C**ard **I**nternational **A**ssociation". An association of manufacturers and dealers who are dedicated to the cultivation and further development of common standards for peripheral devices based on PC cards with a slot for such cards. PC cards are mainly used for laptops, palmtops (and other portable computers), and intelligent electronic devices. Version 1 of the PCMCIA standard was introduced in 1990.

PLC

Programmable Logic Controller; Computer-based control device that functions using an application program. The application program is relatively easy to create using standardized programming languages [IL, FBD, LAD, AS, ST]. Because of its serial functionality, reaction times are slower compared to connection-oriented control. Today, PLCs are available in device families with matched modular components for all levels of an automation hierarchy.

PnP

An abbreviation for "**P**lug and **P**lay". Specifications developed by Intel. Using Plug and Play allows a PC to automatically configure itself so that it can communicate with peripheral devices (e.g. monitors, modems, and printers). Users can connect a peripheral device (plug) and it immediately runs (play) without having to manually configure the system. A Plug and Play PC requires a BIOS that supports Plug and Play and a respective expansion card.

POH

An abbreviation for "**P**ower **O**n **H**ours". See MTBF.

POST

An abbreviation for "**P**ower-**O**n **S**elf **T**est". A set of routines that are stored in ROM on the computer and that test different system components, e.g. RAM, disk drive and the keyboard in order to determine that the connection is operating correctly and ready for operation. POST routines notify the user of problems that occur. This is done using several signal tones or by displaying a message that frequently accompanies a diagnosis value on the standard output or standard error devices (generally the monitor). If the POST runs successfully, control is transferred over to the system's bootstrap loader.

POWERLINK

An enhancement of standard Ethernet. It enables data exchange under strict real-time conditions with cycle times down to 200 µs and jitter under 1 µs. This makes Ethernet power available on all communication levels of automation technology – from control levels to I/O. POWERLINK was initiated by the company B&R Industrie-Elektronik and is now managed by the open end user and vendor association, EPSG - Ethernet POWERLINK Standardization Group (**www.ethernet-powerlink.org**).

Q

QVGA

Abbreviation for "**Q**uarter **V**ideo **G**raphics **A**rray". Usually a screen resolution of 320 × 240 pixels.

QUXGA

Abbreviation for "**Q**uad **U**ltra E**x**tended **G**raphics **A**rray". Generally a screen resolution of 3200 × 2400 pixels (4:3). Quad implies the 4x greater pixel resolution compared to the UXGA.

QWUXGA

Abbreviation for "**Q**uad **WUXGA**"; Generally a screen resolution of 3840 × 2400 pixels (8:5, 16:10).

R

RAM

An abbreviation for "**R**andom **A**ccess **M**emory". Semiconductor memory which can be read or written to by the microprocessor or other hardware components. Memory locations can be accessed in any order. The various ROM memory types do allow random access, but they cannot be written to. The term RAM refers to a more temporary memory that can be written to as well as read.

Real time

A system is operating in real time or has real-time capability if the input sizes (e.g. signals, data) are received and processed in a defined time period, and the results are made available in real time for a partner system or the system environment. See also "real-time demands" and "real-time system".

ROM

An abbreviation for "**R**ead-**O**nly **M**emory". Semiconductor memory where programs or data were permanently stored during the production process.

RS232

Recommended **S**tandard **N**umber **232**. Oldest and most widespread interface standard, also called a V.24 interface. All signals are referenced to ground making this an unbalanced interface. High level: -3 to -30 V, low level: +3 to +30 V; cable lengths up to 15 m, transfer rates up to 20 kbit/s; for point-to-point connections between 2 stations.

RS422

Recommended **S**tandard **N**umber **422**. Interface standard, balanced operation, increased immunity to disturbances. High level: 2 to -6 V, low level: +2 to +6 V; 4-wire connection [inverted/not inverted], cable lengths up to 1200 m, transfer rates up to 10 Mbit/s, 1 sender can carry out simplex communication with up to 10 receivers.

RS485

Recommended **S**tandard **N**umber **485**. Interface standard upgraded from RS422. High level: 1.5 to -6 V, low level: +1.5 to +6 V; two-line connection [half-duplex mode] or four-line connection [full-duplex mode]; permissible cable length up to 1200 m, transfer rates up to 10 Mbit/s. Up to 32 stations (sender/receiver) can be connected to an RS485 bus.

RTS

An abbreviation for "**R**equest **T**o **S**end". A signal used in serial data transfer for requesting send permission. For example, it is sent from a computer to the modem connected to it. The RTS signal is assigned to pin 4 according to the hardware specifications of the RS-232-C standard.

RXD

An abbreviation for "Receive (**RX**) **D**ata". A line for transferring serial data received from one device to another, e.g. from a modem to a computer. For connections complying with the RS-232-C standard, the RXD is connected to pin 3 of the plug.

S

SDRAM

An abbreviation for "**S**ynchronous **D**ynamic **R**andom **A**ccess **M**emory". A construction of dynamic semiconductor components (DRAM) that can operate with higher clock rates than conventional DRAM switching circuits. This is made possible using block access. For each access, the DRAM determines the next memory addresses to be accessed.

SFC

Sequential function chart > Graphic input language for PLCs used to represent sequential control.

Slot PLC

PC insert card that has full PLC functionality. On the PC, it is coupled via a DPR with the process using a fieldbus connection. It is programmed externally or using the host PC.

SoftPLC

Synonym for SoftPLC.

SRAM

An abbreviation for "**S**tatic **R**andom **A**ccess **M**emory". A semiconductor memory (RAM) made up of certain logic circuits (flip-flop) that only keeps stored information while powered. In computers, static RAM is generally only used for cache memory.

SUXGA

Abbreviation for **S**uper **U**ltra **E**xtended **G**raphics **A**rray; Generally a screen resolution of 2048×1536 pixels (4:3). An alternative name is QXGA (**Q**uad **E**xtended **G**raphics **A**rray), which is 4x the pixel resolution of XGA.

SVGA

Abbreviation for "**S**uper **V**ideo **G**raphics **A**rray"; Graphics standard with a resolution of at least 800×600 pixels and at least 256 colors.

Switch

Device similar to a hub that takes data packets received in a network and, unlike a hub, passes them only to the respective addressee, not to all network nodes. Unlike a hub, a switch provides targeted communication within a network that only takes place between sender and receiver. Other network nodes are not involved.

SXGA

Abbreviation for Super Extended Graphics Array. Graphics standard with a screen resolution of 1280 × 1024 pixels (aspect ratio 5:4).

SXGA+

Abbreviation for SXGA Plus; Generally 1400 × 1050 pixels.

System units

Provit system units consist of a mainboard (without processor), slots for RAM modules, VGA controller, serial and parallel interfaces, and connections for the FPD, monitor, PS/2 AT keyboard, PS/2 mouse, USB, Ethernet (for system units with Intel Celeron and Pentium III processors), Panelware keypad modules and external FDD.

T

Task

Program unit that is assigned a specific priority by the real-time operating system. It contains a complete process and can consist of several modules.

TCP/IP

Transmission Control Protocol/Internet Suit of Protocols. Network protocol that has become the generally accepted standard for data exchange in heterogeneous networks. TCP/IP is used both in local networks for communication between various computer and also for LAN to WAN access.

TFT display

LCD (Liquid Crystal Display) technology where the display consists of a large grid of LCD cells. Each pixel is represented by a cell, whereby electrical fields produced in the cells are supported by thin film transistors (TFT) that result in an active matrix. In its simplest form, there is exactly one thin film transistor per cell. Displays with an active matrix are generally used in laptops and notebooks because they are thin, offer high-quality color displays and can be viewed from all angles.

Touch screen

Screen with touch sensors for selecting options in a displayed menu using the tip of the finger.

TXD

An abbreviation for "Transmit (**TX**) **D**ata". A line for the transfer of serial data sent from one device to another, e.g. from a computer to a modem. For connections complying with the RS-232-C standard, the TXD is connected to pin 2 of the plug.

U

UART

An abbreviation for "**U**niversal **A**synchronous **R**eceiver-**T**ransmitter". A module generally consisting of a single integrated circuit that combines the circuits required for asynchronous serial communication for both sending and receiving. UART represents the most common type of circuit in modems for connecting to a personal computer.

UDMA

An abbreviation for "**U**ltra **D**irect **M**emory **A**ccess". A special IDE data transfer mode that allows high data transfer rates for drives. There have been many variations in recent times.
UDMA33 mode transfers 33 megabytes per second.
UDMA66 mode transfers 66 megabytes per second.
UDMA100 mode transfers 100 megabytes per second.
Both the mainboard and the hard drive must support the specification to implement modifications.

UPS

Abbreviation for "**U**ninterruptible **P**ower **S**upply". See "UPS".

USB

An abbreviation for "**U**niversal **S**erial **B**us" A serial bus with a bandwidth of up to 12 megabits per second (Mbit/s) for connecting a peripheral device to a microcomputer. Up to 127 devices can be connected to the system using a single multipurpose connection, the USB bus (e.g. external CD drives, printers, modems as well as the mouse and keyboard). This is done by connecting the devices in a row. USB allows devices to be changed when the power supply is switched on (hot plugging) and multi-layered data flow.

UPS

An abbreviation for "**U**ninterruptible **P**ower **S**upply". The UPS supplies power to systems that cannot be connected directly to the power mains for safety reasons because a power failure could lead to loss of data. The UPS allows the PC to be shut down securely without losing data if a power failure occurs.

UXGA

Abbreviation for "**U**ltra **E**xtended **G**raphics **A**rray" Generally a screen resolution of 1600 × 1200 pixels (aspect ratio 4:3, 12:9).

V

VGA

An abbreviation for "**V**ideo **G**raphics **A**dapter". A video adapter which can handle all EGA (Enhanced Graphics Adapter) video modes and adds several new modes.

W

Windows CE

Compact 32-bit operating system with multitasking and multithreading that Microsoft developed especially for the OEM market. It can be ported for various processor types and has a high degree of real-time capability. The development environment uses proven, well-established development tools. It is an open and scalable Windows operating system platform for many different devices. Examples of such devices are handheld PCs, digital wireless receivers, intelligent mobile phones, multimedia consoles, etc. In embedded systems, Windows CE is also an excellent choice for automation technology.

WSXGA

Wide SXGA, generally 1600 × 900 pixels (16:9).

WUXGA

Wide UXGA, generally 1920 × 1200 pixels (16:10).

WXGA

Wide XGA, generally 1280 × 768 pixels.

X

XGA

An abbreviation for "E**X**tended **G**raphics **A**rray". An expanded standard for graphics controllers and monitors that was introduced by IBM in 1990. This standard supports 640x480 resolution with 65,536 colors or 1024x768 resolution with 256 colors. This standard is generally used in workstation systems.

XTX

Abbreviation for "e**X**press **T**echnologoy for ET**X**" A further development consistent with the proven ETX® standard. The newest I/O technology is implemented on a reliable form factor in XTX. The ETX® interface X2 is equipped with new serial buses like PCI Express™ und Serial ATA®, instead of the unpopular ISA bus. All other signals on the X1, X3 and X4 interfaces remain completely compatible with the ETX® Standard (Rev. 2.7). However, if ISA signals are needed, a PCI-ISA can be implemented on the base board. The use of an LPC bus already in XTX™ is considerably cheaper than a bridge solution.