Automation PC 620

User's Manual

Version: **2.41 (August 2008)**

Model number: **MAAPC620-GER**

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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	21.07.2004	- First version
1.1 Preliminary	12.11.2004	- 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	23.11.2004	- 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	27.12.2004	- 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.

Table 1: Manual history

Version	Date	Change
1.4 Preliminary	07.03.2005	- 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. - 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	16.03.2005	- Temperature and performance table design changed. - Mounting orientation more precisely specified.
1.6 Preliminary	04.07.2005	- 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 expanded. - Real-time clock (RTC) specifications about the system unit added. - Index modifications.
1.70	08.03.2006	- 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 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").

Table 1: Manual history (cont.)

Version	Date	Change
1.70	08.03.2006	- 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) cancelled. - 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 - 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). - Extended 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	21.04.2006	- 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.

Table 1: Manual history (cont.)

Version	Date	Change
1.90	29.08.2006	- 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.
2.00	13.12.2006	- 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	23.01.2007	- 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.

Table 1: Manual history (cont.)

Version	Date	Change
2.10	22.01.2007	- 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	12.02.2007	- Figure "ADI Control Center UPS settings", on page 488 updated.
2.30	10.09.2007	- USB Memory Sticks 256 MB (5MMUSB.0256-00) and 1 GB (5MMUSB.1024-00) cancelled. - UPS module + accessories short descriptions changed (page 40). Description of UPS configuration revised beginning on page 554. - Section "SDL flex cable - test description" on page 583 expanded (cable drag chain and torsion test). - Section "USB Flash Drive 5MMUSB.0xxx-00" on page 631 updated. - General in section "Automation PC 620 with Automation Runtime" on page 525 expanded. - Section "Automation Panel 900 connection examples" changed to "Connection examples" and expanded to include Automation Panel 800 connection examples - Section "Grounding concept" on page 279 added - Section "Configuration of a SATA RAID array" on page 324 added - Section "Automation Device Interface (ADI) driver - Control Center" on page 551 updated (screenshots, UL compliant operation) - Section "APC620 UPS" on page 667 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 544 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 filter" on page 681) expanded. - Maintenance interval information for the UPS battery (5AC600.UPSB-00) expanded. - 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 135). - The optional UPS module added to all block diagrams for the entire device (see Section "Block diagram" on page 152). - Drilling template for 5PC600.SF03-00 expanded (see section "Drilling templates" on page 266). - 815E CPU boards BIOS description updated to version 1.23 (see "Software" chapter, section "815E (ETX)BIOS Description" on page 337). - 855GME CPU boards BIOS description updated to version 1.26 (see "Software" chapter, section "855GME (ETX) BIOS description" on page 391). - 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 34). - Safety guidelines updated to include "Environmental conditions - dust, humidity, aggressive gases" on page 29. - 855GME (XTX) CPU boards (BIOS Version 1.14) BIOS description updated (see "Software" chapter, section 1.3 "855GME (XTX) BIOS description" on page 446). - Add-On UPS module pin assignments and UPS battery unit expanded (see Section "APC620 UPS" on page 667). - UPS battery unit deep discharge cycle diagram updated (see image 354 "Deep discharge cycles" on page 673). - SRAM module 5AC600.SRAM-00 added (see section "SRAM module - 5AC600.SRAM-00" on page 682). - 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 (cont.)

Version	Date	Change
2.40	25.02.2008	- 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 234) + 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 520). - 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 option (5AC600.CANI-00) - Section "Power management for APC620 system units" revised. - "SRAM module - 5AC600.SRAM-00" on page 682 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 171 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 335 added - Add-on hard disk 5AC600.HDDI-06 added (see section "Add-on hard disk 80 GB 24x7 ET - 5AC600.HDDI-06" on page 191). - 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 237) added. - Replacement SATA HDD 160 GB 5ACPCI.RAIC-04 added (see the section "Replacement SATA HDD 160 GB - 5ACPCI.RAIC-04" on page 242). - The section "Configuration of a SATA RAID array" in the "Commissioning" chapter updated. - The section "Exchanging a PCI SATA RAID hard disk" in the "Maintenance / Servicing" chapter updated.
2.41	11.08.2008	- 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 732. - User serial ID description expanded. - Graphic "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 685). - PCI Ethernet cards 5ACPCI.ETH1-01 and 5ACPCI.ETH3-01 added (see Section 677). - 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 332 added - Section "Visual Components graphic engine support" on page 526 added - Graphic "Environmental temperatures for systems with an 855GME CPU board (EXT / XTX)" on page 82 updated to include the APC620e system units 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02.

Table 1: Manual history (cont.)

2. Safety guidelines

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 contacts of connectors 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 who are familiar with the transport, mounting, installation, commissioning, and operation of the product and who have the appropriate qualifications (e.g. IEC 60364). National accident prevention guidelines must be followed.
The safety guidelines, connection descriptions (rating plate and documentation) and limit values listed in the technical data must be read carefully and must be observed before installation and commissioning.

2.4 Transport and storage

During transport and storage, devices must be protected from excessive stress (mechanical load, temperature, humidity, aggressive atmosphere, 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, and 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 voltage-carrying parts 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 such as 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.

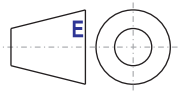
3. Organization of safety notices

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 2: Organization of safety notices

4. Guidelines



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

5. Model numbers

5.1 System units

Model number	Short description	Comment
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 (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	
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 (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	
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).	
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).	
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).	
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).	
5PC600.SE00-00	**APC620e System SDL EPL X2X CAN 512kB** APC620 embedded system unit, connections for 2 x RS232, 4 x USB 2.0, Smart Display Link, 1 x ETH 10/100, 1 x Ethernet POWERLINK, 1 x CAN, 1 x X2X, UPS module, 512kB SRAM; (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	
5PC600.SE00-01	**APC620e System CRT EPL X2X CAN 512KB** APC620 embedded system unit, connections for 2 x RS232, 4 x USB 2.0, CRT, 1 x ETH 10/100, 1 x Ethernet POWERLINK, 1 x CAN, 1 x X2X, UPS module, 512kB SRAM; (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	
5PC600.SE00-02	**APC620e System SDL EPL X2X CAN 1MB** APC620 embedded system unit, connections for 2 x RS232, 4 x USB 2.0, Smart Display Link, 1 x ETH 10/100, 1 x Ethernet POWERLINK, 1 x CAN, 1 x X2X, UPS module, 1MB SRAM; (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	

Table 3: 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	Comment
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
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 4: Model numbers - 815E (ETX) CPU boards

5.3 CPU boards 855GME (ETX)

Model number	Short description	Comment
5PC600.E855-00	**CPU board 855GME PM-1100** CPU Board Intel Pentium M, 1100 MHz, 400 MHz FSB, 1 MB L2 Cache; Chipset 855GME; 1 socket for SO-DIMM DDR RAM module.	
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.	
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.	
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.	
5PC600.E855-04	**CPU board 855GME CM-600** CPU board Intel Celeron M, 600 MHz, 400 MHz FSB, 512 kB L2 cache; 855GME chipset; 1 socket for SO-DIMM DDR RAM module.	
5PC600.E855-05	**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.	

Table 5: Model numbers - 855GME (ETX) CPU boards

5.4 CPU boards 855GME (XTX)

Model number	Short description	Comment
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.	
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.	
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.	
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.	
5PC600.X855-04	**CPU board 855GME CM-600** CPU board Intel Celeron M, 600 MHz, 400 MHz FSB, 512 kB L2 cache; 855GME chipset; 1 socket for SO-DIMM DDR RAM module.	
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.	

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

5.5 Heat sink

Model number	Short description	Comment
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)
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.	
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.	
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.	
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.	
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).	

Table 7: Model numbers - Heat sinks

5.6 Main memory

Model number	Short description	Comment
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)
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).	
5MMDDR.0512-00	**SO-DIMM DDR-SDRAM 512 MB PC2700** SO-DIMM DDR-SDRAM 512 MB PC2700 for 855GME CPU boards (ETX / XTX).	
5MMDDR.1024-00	**SO-DIMM DDR-SDRAM 1024 MB PC2700** SO-DIMM DDR-SDRAM 1024 MB PC2700 for 855GME CPU boards (ETX / XTX).	

Table 8: Model numbers - Main memory

5.7 Drives

Model number	Short description	Comment
5AC600.CFSI-00	**Add-on CompactFlash slot** CompactFlash slot (add-on); for installation in an APC620 or PPC700.	
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.
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.
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.
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.
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.
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.	
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.	
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.	
5AC600.CFSS-00	**Slide-in CF 2-slot** Slide-in CompactFlash adapter for 2 CompactFlash cards (via IDE and USB 2.0)	

Table 9: Model numbers - Drives

Model number	Short description	Comment
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.	
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.	
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.	
5AC600.HDDS-00	**30 GB 24x7 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.
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.
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.	
5ACPCI.RAIC-00	**PCI RAID controller ATA/100** PCI Raid controller	
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
5ACPCI.RAIC-02	**Replacement SATA-HDD 60 GB** 1 piece Hard disk 60 GB SATA, replacement part for 5ACPCI.RAIC-01	
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.	
5ACPCI.RAIC-04	**Replacement SATA-HDD 160 GB** 1 piece Hard disk 160 GB SATA, replacement part for 5ACPCI.RAIC-03	
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
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

Table 9: Model numbers - Drives (cont.)

5.8 Interface options

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

Table 10: Model numbers - Interfaces

5.9 Fan kits

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

Table 11: Model numbers - Fan kits

5.10 AP Link cards

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

Table 12: Model numbers - AP Link graphics adapter

5.11 Accessories

5.11.1 Batteries

Model number	Short description	Comment
0AC201.9	**Lithium batteries (5x)** Lithium batteries, 5 pcs., 3 V / 950 mAh, button cell	
4A0006.00-000	**Lithium battery (1x)** Lithium batteries, 1 pcs., 3 V / 950 mAh, button cell	

Table 13: Model numbers - Batteries

5.11.2 Supply voltage connectors

Model number	Short description	Comment
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.	
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.	

Table 14: Model numbers - Supply voltage connectors

5.11.3 CompactFlash cards

Model number	Short description	Comment
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
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
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
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
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
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
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
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 15: Model numbers - CompactFlash cards

5.11.4 USB flash drives

Model number	Short description	Comment
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

Table 16: Model numbers - USB flash drives

Model number	Short description	Comment
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	

Table 16: Model numbers - USB flash drives (cont.)

5.11.5 Cables

Model number	Description	Comment
5CADVI.0018-00	**DVI-D cable 1.8 m / single** Single cable, DVI-D/m:DVI-D/m; length: 1.8m	
5CADVI.0050-00	**DVI-D cable 5 m / single** Single cable, DVI-D/m:DVI-D/m; length: 5 m	
5CADVI.0100-00	**DVI-D cable 10 m / single** Single cable, DVI-D/m:DVI-D/m; length: 10 m	
5CAMSC.0001-00	**APC620 internal supply cable**	
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	**1.8 m flex SDL cable** 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	**5 m flex SDL cable** 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	**10 m flex SDL cable** 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	**15 m flex SDL cable** 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	**20 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 20 m	

Table 17: Model numbers - Cables

Model number	Description	Comment
5CASDL.0250-00	**SDL cable 25 m** SDL cable for a fixed type of layout; length: 25 m	
5CASDL.0250-03	**25 m flex SDL cable** 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	**30 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 30 m	
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.0300-13	**30 m SDL flex cable with extender** SDL cable with extender for fixed and flexible type of layout; length: 30 m	
5CASDL.0400-10	**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
5CASDL.0400-13	**40 m SDL flex cable with extender** SDL cable with extender for fixed and flexible type of layout; length: 40 m	
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.	

Table 17: Model numbers - Cables (cont.)

5.11.6 UPS module + accessories

Model number	Short description	Comment
5AC600.UPSI-00	**Add-on UPS module** UPS module for APC620 / APC810 system units 5PC600.SX01-00 (Rev. H0 and up), 5PC600.SX02-00 (Rev. G0 and up), 5PC600.SX02-01 (Rev. H0 and up), 5PC600.SX05-00 (Rev. F0), 5PC600.SX05-01 (starting with Rev. F0), 5PC600.SF03-00 (starting with Rev. A0), 5PC600.SE00-00 (starting with Rev. A0), 5PC600.SE00-01 (starting with Rev. A0), 5PC600.SE00-02 (starting with Rev. A0), 5PC810.SX*. Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately.	
5AC600.UPSB-00	**Battery unit 5 Ah** UPS battery unit for the add-on UPS module	
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	

Table 18: Model numbers - UPS module + accessories

5.11.7 PCI Ethernet cards

Model number	Short description	Comment
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	

Table 19: Model numbers - PCI Ethernet cards

5.11.8 Miscellaneous

Model number	Short description	Comment
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	
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.	
5AC600.SRAM-00	**APC620/PPC700 SRAM module 512kB** SRAM module for APC620 and PPC700 512 kB.	
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
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.	
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 kit for system units with 3 PCI slots	
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).	
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 installation	
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	

Table 20: Model numbers - Other items

Model number	Short description	Comment
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 20: Model numbers - Other items (cont.)

5.12 Software

Model number	Short description	Comment
5SWHMI.0000-00	**HMI Drivers & Utilities DVD** Contains drivers, utilities, software upgrades and user's manuals for B&R panel system products (see B&R homepage – Industrial PCs, Visualization and Operation).	
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.	
9S0000.08-010	**OEM Microsoft Windows XP Professional** CD, German; Only delivered with a new PC.	
9S0000.08-020	**OEM Microsoft Windows XP Professional** CD, English; Only delivered with a new PC.	
9S0000.09-090	**OEM Microsoft Windows XP Professional Multilanguage** CDs; Only delivered with a new PC.	
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
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

Table 21: Model numbers - Software

Model number	Short description	Comment
9S0001.28-020	**OEM Microsoft Windows XP embedded (incl. SP2) AC620 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[1)]	**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.	
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
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
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).	
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
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
5SWWXP.0600-DEU	**WinXP Professional with SP3, CD German** OEM Windows XP Professional including Service Pack 3, CD, German, only supplied together with a new PC.	
5SWWXP.0600-ENG	**WinXP Professional with SP3, CD English** OEM Windows XP Professional including Service Pack 3, CD, English, only supplied together with a new PC.	
5SWWXP.0600-MUL	**WinXP Professional with SP3, CD English** OEM Windows XP Professional including Service Pack 3, CD, Multi-language, only supplied together with a new PC.	
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).	

Table 21: Model numbers - Software (cont.)

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

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 Ethernet POWERLINK, CAN and X2X in a compact housing.

Figure 1: 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 interface option
- Fieldbus interfaces[1] (Ethernet POWERLINK, CAN and X2X)
- RS232/422/485 interface option
- 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

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 starting with revision H0, 5PC600.SX02-00 starting with revision G0,
5PC600.SX02-01 starting with revision H0, 5PC600.SX05-00 starting with revision F0, 5PC600.SX05-01 starting with revision F0.

4) Installation depends on the revision of the system unit: 5PC600.SX01-00 starting with revision I0, 5PC600.SX02-00 starting with revision H0,
5PC600.SX02-01 starting with revision K0, 5PC600.SX05-00 starting with revision H0, 5PC600.SX05-01 starting with revision 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

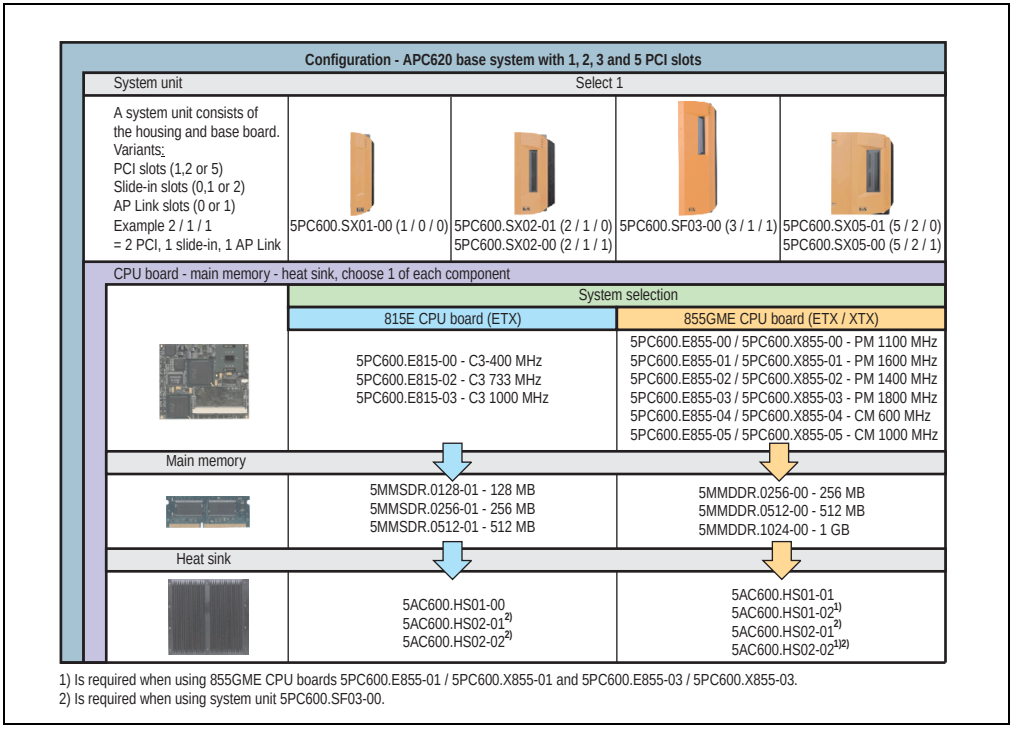


Figure 2: Selection guide - APC620 basic system with 1, 2, 3, and 5 PCI slots

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 49).

1.2.2 Selection guide - Optional components

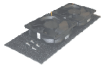
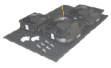
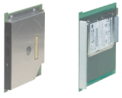
Configuration - Optional				
System unit				
The system unit consists of the housing and base board. Variants: PCI slots (1,2, 3 or 5) Slide-in slots (0,1 or 2) AP Link slots (0 or 1) Example: 2 / 1 / 1 = 2 PCI, 1 slide-in, 1 AP Link	 5PC600.SX01-00 (1 / 0 / 0)	 5PC600.SX02-01 (2 / 1 / 0) 5PC600.SX02-00 (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 operation and extended temp 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				
	5ACPCI.RAIC-01 5ACPCI.RAIC-03 (occupies 1 PCI slot)	5ACPCI.RAIC-01 (occupies 1 PCI slot) or 5ACPCI.RAIC-00 with 5ACPCI.RAIS-00 or 5ACPCI.RAIS-01 (combination, occupies 2 PCI slots)		
Optional interface	Select 1			
	5AC600.CANI-00 (CAN) 5AC600.485I-00 (combined RS232/RS422/RS485)			
UPS module				
	5AC600.UPSI-00 (Add-on UPS module) 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 3: 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 "Environmental temperatures for systems with an 815E CPU board (ETX)" on page 78 and 2.7 "Environmental temperatures for systems with an 855GME CPU board (EXT / XTX)" on page 82)
- 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 optional interface adds an additional 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.

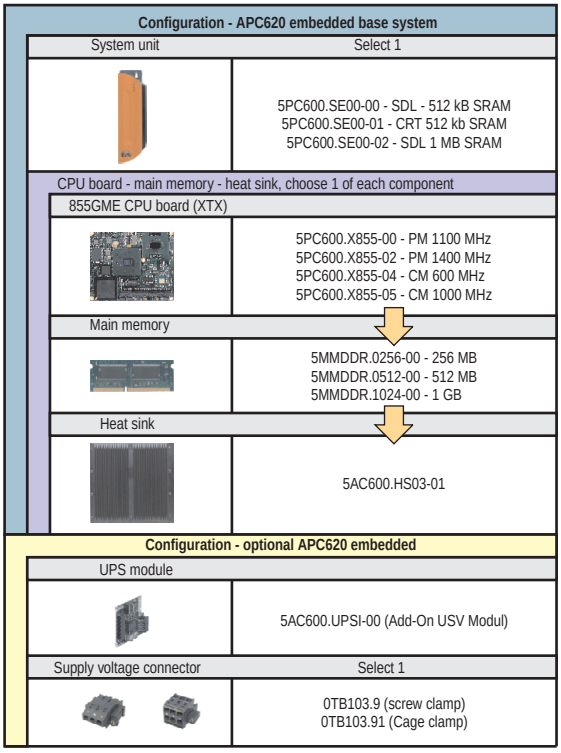


Figure 4: Selection guide - Basic system and optional components APC620 embedded

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

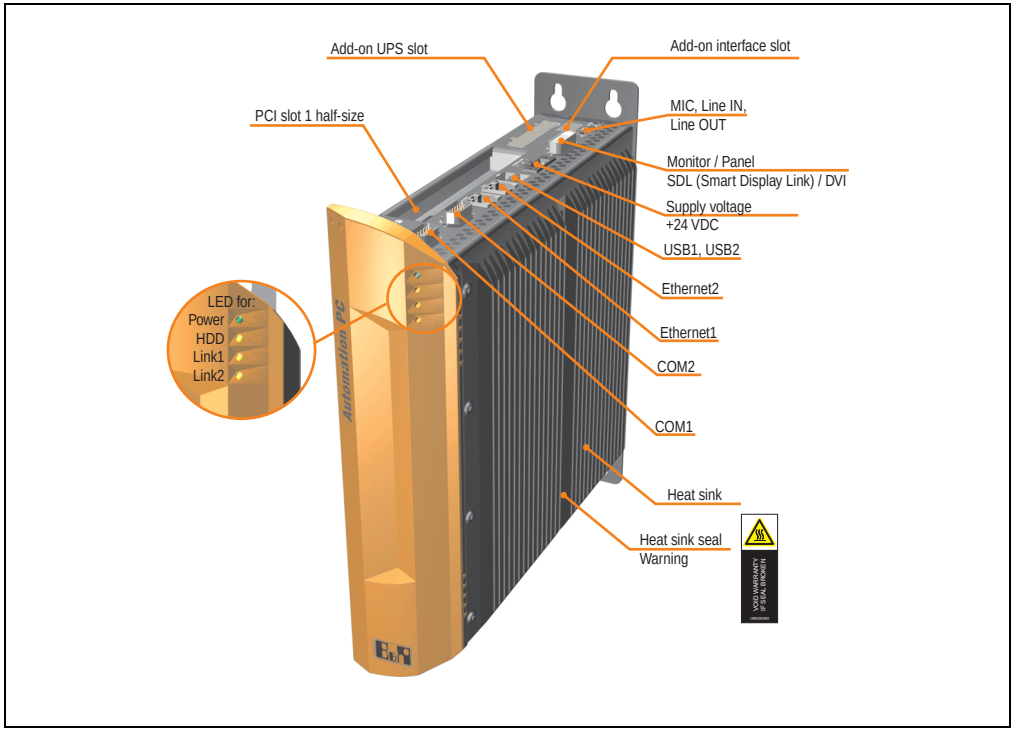


Figure 5: Interface overview - APC620, 1 PCI slot variant (top)

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").

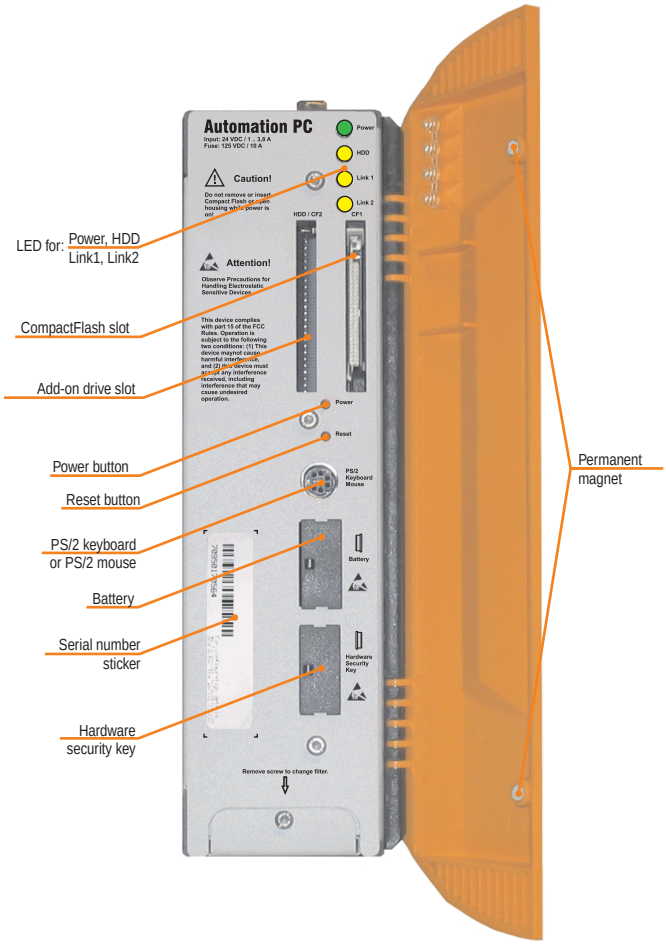


Figure 6: Interface overview - APC620, 1 PCI slot variant (front)

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
Boot loader / Operating system	BIOS / see the chapter 4 "Software" on page 337
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 739) 10 ms, dependent on the system unit revision (see page 525)
Real-time clock Battery-buffered Accuracy	 Yes Component-dependent, see technical data for the CPU board
Battery Type Removable Lifespan	See also page 145 Renata 950 mAh Yes, accessible behind the orange cover 4 years [2] [3]
Ethernet Controller Amount	 See also page 118 or page 120 2
CAN bus	optional with add-on interface option (5AC600.CANI-00)
CompactFlash Type Amount	See also page 140 or page 141 Type I 1 (max. 4 using optional components)
Serial interface Amount Type UART Transfer rate Connection	See also page 111 or page 112 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 121 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, see also section "Status LEDs" on page 138
PCI slots half-size full-size	See also section "PCI slots" on page 135 1 -
Add-on UPS internal slot	Yes 5PC600.SX01-00 starting with revision H0 See also section "Add-on UPS module slot" on page 134
SRAM internal slot options	Yes 5PC600.SX01-00 starting with revision I0

Table 22: Technical data - APC620, 1 PCI slot variant

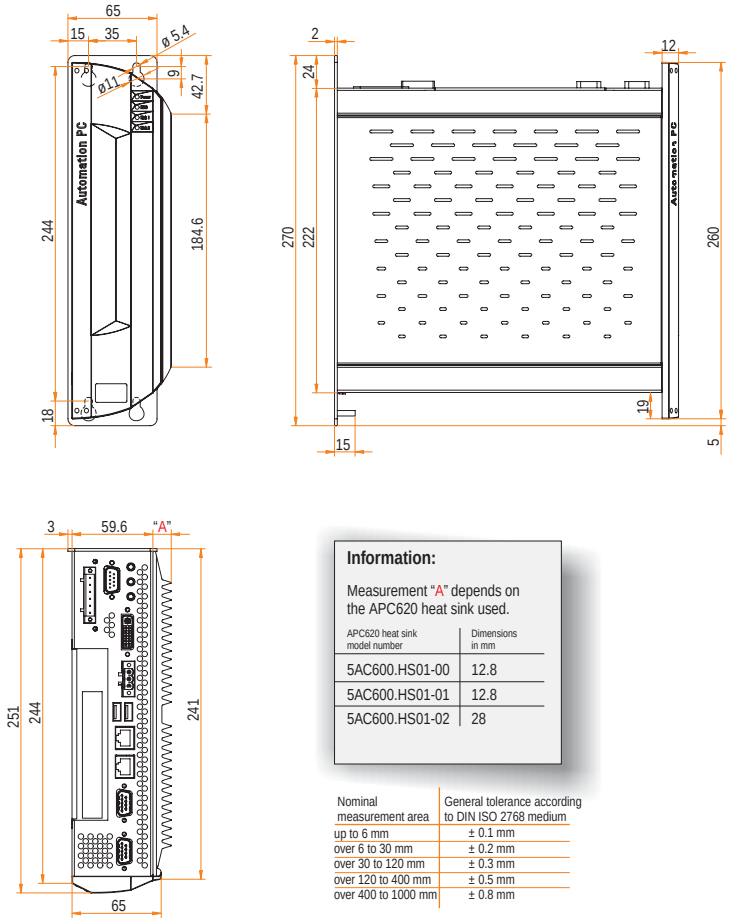
Electrical characteristics	APC620, 1 PCI slot variant
Power supply Rated voltage Rated current Starting current Power consumption	 24 VDC ±25% 3.8 A Typ. 7 A, max. 40 A for < 300 µs Component-dependent, see section 2.8 "Power management APC620 system unit with 1 PCI slot"
Mechanical characteristics	
Housing[4)] Material 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 section "Dimensions" on page 56.
Weight	Approx. 3.4 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Storage Transport	 Component-dependent, see the section about ambient temperature on page 78 and page 82 -20°C .. +60°C -20°C .. +60°C
Relative humidity Operation Storage Transport	 Component-dependent, see section "Humidity specifications" on page 108 Component-dependent, see section "Humidity specifications" on page 108 Component-dependent, see section "Humidity specifications" on page 108
Vibration[5)] Operation (continuous) Operation (occasional) Storage 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 Storage 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 22: Technical data - APC620, 1 PCI slot variant (cont.)

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.Nr. 5AC600.SRAM-00) is installed, the buffer duration is 2 1/2 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 specify 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.

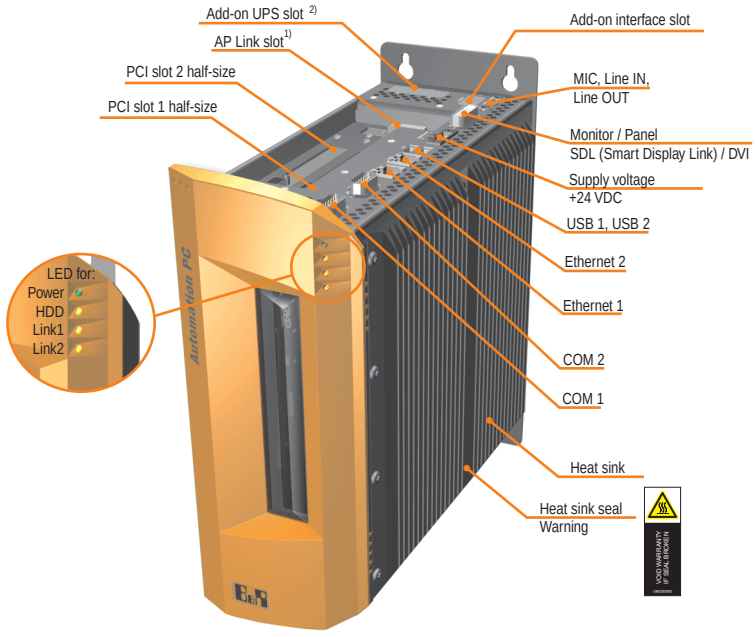
APC620 heat sink model number	Dimensions in mm
5AC600.HS01-00	12.8
5AC600.HS01-01	12.8
5AC600.HS01-02	28

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 7: Dimensions - APC620, 1 PCI slot variant

2.2 APC620, 2 PCI slot variant

2.2.1 Interfaces



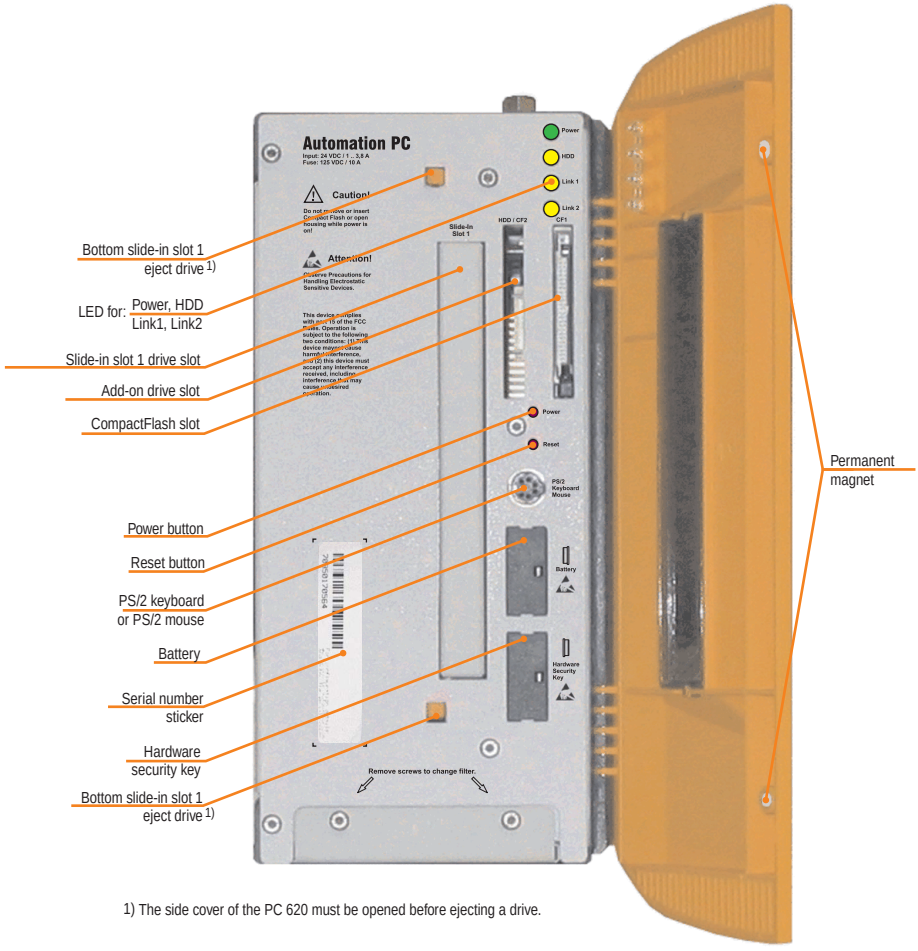
1) Can only be used with system unit 5PC600.SX02-00
2) Slot is standard starting with 5PC600.SX02-00, Rev. G0 and 5PC600.SX02-01 Rev. H0

Figure 8: 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 9: 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
Boot loader / Operating system	BIOS / see the chapter 4 "Software" on page 337
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 739) 10 ms, dependent on the system unit revision (see page 525)
Real-time clock Battery-buffered Accuracy	 Yes Component-dependent, see technical data for the CPU board
Battery Type Removable Lifespan	See also page 145 Renata 950 mAh Yes, accessible behind the orange cover 4 years [2] [3]
Ethernet Controller Amount	 See also page 118 or page 120 2
CAN bus	Optional with add-on interface (5AC600.CANI-00)
CompactFlash Type Amount	See also page 140 or page 141 Type I 2 (max. 4 using optional components)
Serial interface Amount Type UART Transfer rate Connection	See also page 111 or page 112 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 121 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, see also section "Status LEDs" on page 138
PCI slots half-size full-size	See also section "PCI slots" on page 135 2 -
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 134
SRAM internal slot options	Yes 5PC600.SX02-00 starting with revision H0, 5PC600.SX02-01 starting with revision K0 present

Table 23: Technical data - APC620, 2 PCI slot variant

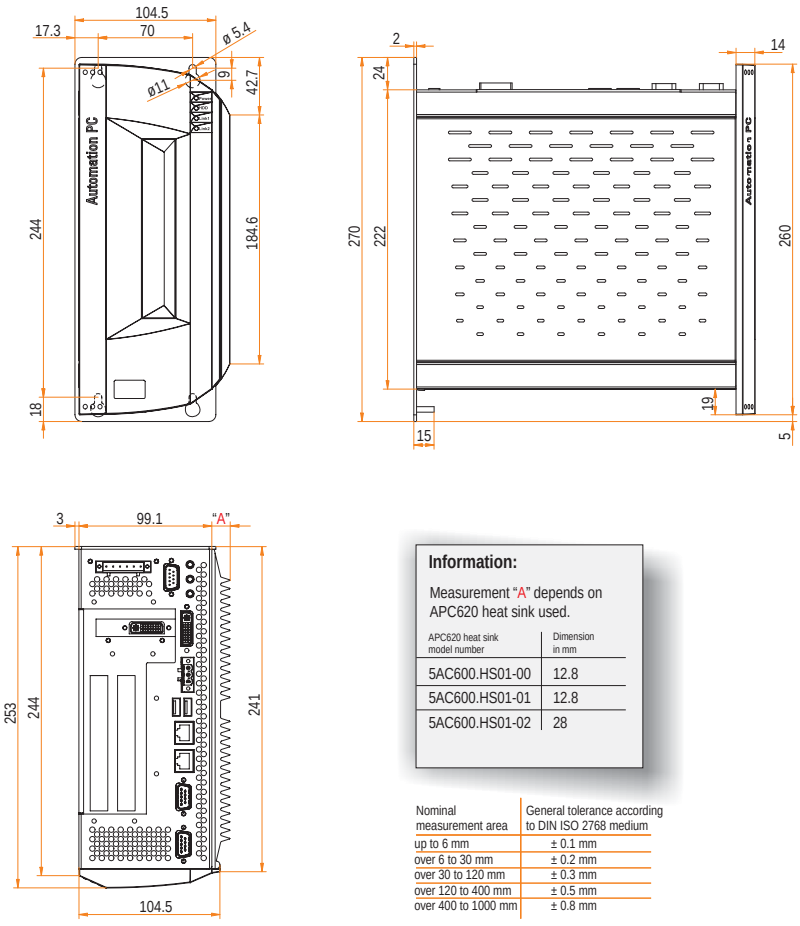
Electrical characteristics	APC620, 2 PCI slot variant
Power supply	
Rated voltage	24 VDC ±25%
Rated current	3.8 A
Starting current	Typ. 7 A, max. 40 A for < 300 µs
Power consumption	Component-dependent, see section 2.8 "Power management APC620 system unit with 1 PCI slot"
Mechanical characteristics	
Housing[4)]	
Material	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 section "Dimensions" on page 61.
Weight	Approx. 4.5 kg (component-dependent)
Environmental characteristics	
Ambient temperature	
Operation	Component-dependent, see the section about ambient temperature on page 78 and page 82
Storage	-20°C .. +60°C
Transport	-20°C .. +60°C
Relative humidity	
Operation	Component-dependent, see section "Humidity specifications" on page 108
Storage	Component-dependent, see section "Humidity specifications" on page 108
Transport	Component-dependent, see section "Humidity specifications" on page 108
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
Storage	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
Storage	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
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 23: Technical data - APC620, 2 PCI slot variant (cont.)

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.Nr. 5AC600.SRAM-00) is installed, the buffer duration is 2 1/2 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 specify 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 10: Dimensions - APC620, 2 PCI slot variant

2.3 APC620, 3 PCI slot variant

2.3.1 Interfaces

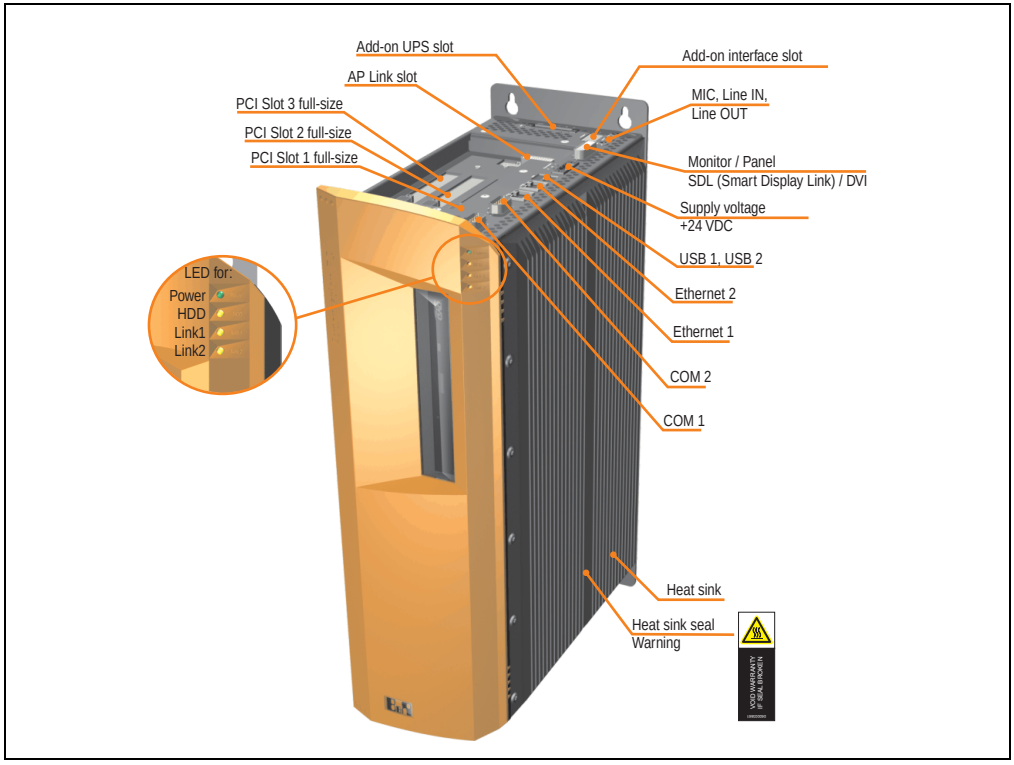
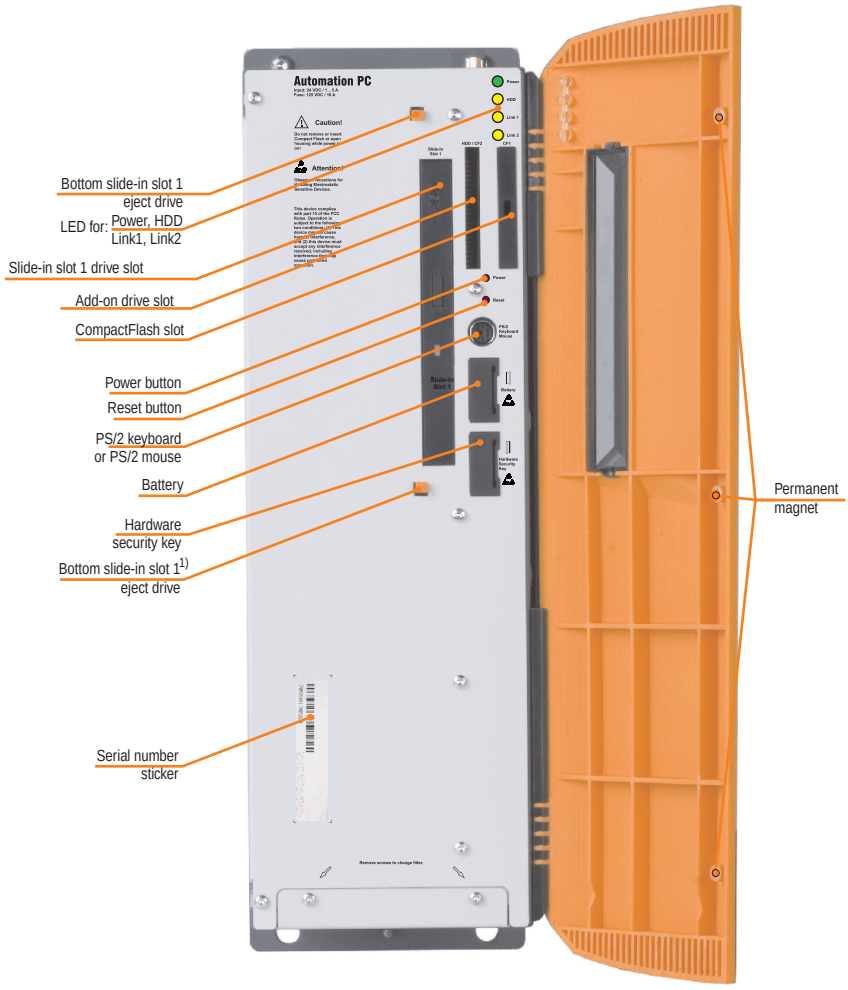


Figure 11: Interface overview - APC620, 3 PCI slot variant (top)

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 12: 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
Boot loader / Operating system	BIOS / see the chapter 4 "Software" on page 337
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. 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 739) 10 ms, dependent on the system unit revision (see page 525)
Real-time clock Battery-buffered Accuracy	 Yes Component-dependent, see technical data for the CPU board
Battery Type Removable Lifespan	See also page 145 Renata 950 mAh Yes, accessible behind the orange cover 4 years [2] [3]
Ethernet Controller Amount	 See also page 118 or page 120 2
CAN bus	Optional with add-on interface (5AC600.CANI-00)
CompactFlash Type Amount	See also page 140 or page 141 Type I 2 (max. 4 using optional components)
Serial interface Amount Type UART Transfer rate Connection	See also page 111 or page 112 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 121 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, see also section "Status LEDs" on page 138
PCI slots half-size full-size	See also section "PCI slots" on page 135 - 3
Add-on UPS internal slot	Yes See also section "Add-on UPS module slot" on page 134
SRAM internal slot options	Yes

Table 24: Technical data - APC620, 3 PCI slot variant

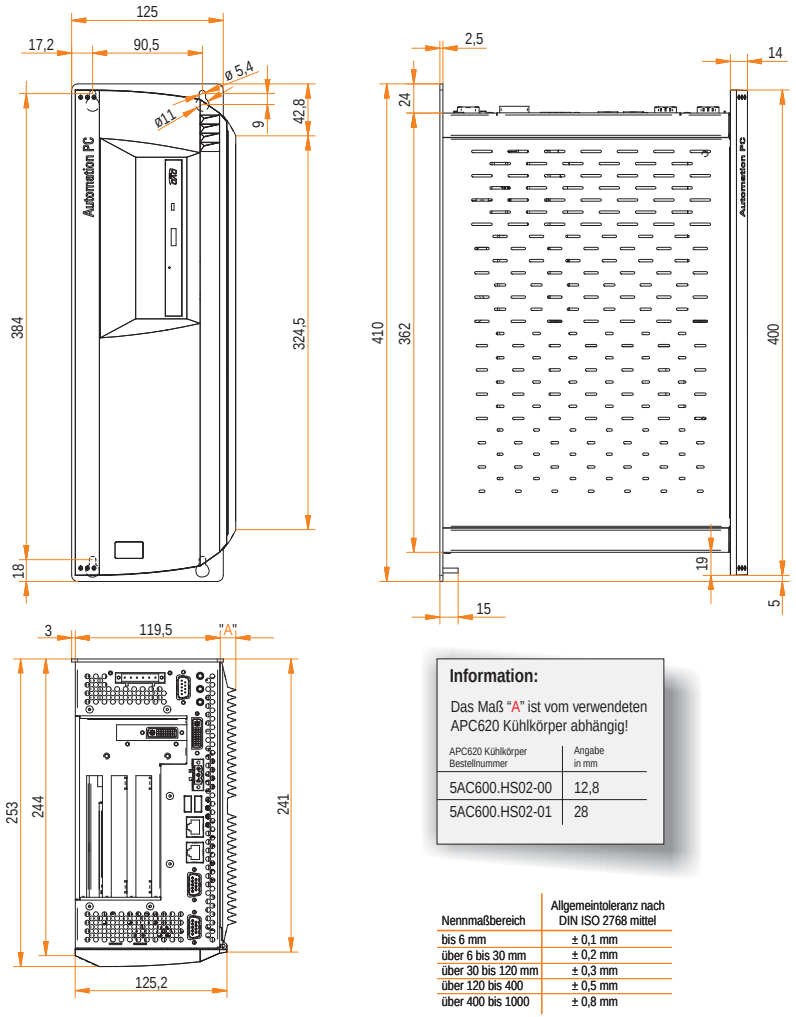
Electrical characteristics	APC620, 3 PCI slot variant
Power supply Rated voltage Rated current Starting current Power consumption	 24 VDC ±25% 5 A Typ. 10 A, max. 40 A for < 300 µs Component-dependent, see section 2.10 "Power management APC620 system unit with 3 PCI slots"
Mechanical characteristics	
Housing[4)] Material 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 section "Dimensions" on page 66.
Weight	Approx. 4.5 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Storage Transport	 Component-dependent, see the section about ambient temperature on page 82 -20°C .. +60°C -20°C .. +60°C
Relative humidity Operation Storage Transport	 Component-dependent, see section "Humidity specifications" on page 108 Component-dependent, see section "Humidity specifications" on page 108 Component-dependent, see section "Humidity specifications" on page 108
Vibration[5)] Operation (continuous) Operation (occasional) Storage 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 Storage 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 24: Technical data - APC620, 3 PCI slot variant (cont.)

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.Nr. 5AC600.SRAM-00) is installed, the buffer duration is 2 1/2 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:

Das Maß "A" ist vom verwendeten APC620 Kühlkörper abhängig!

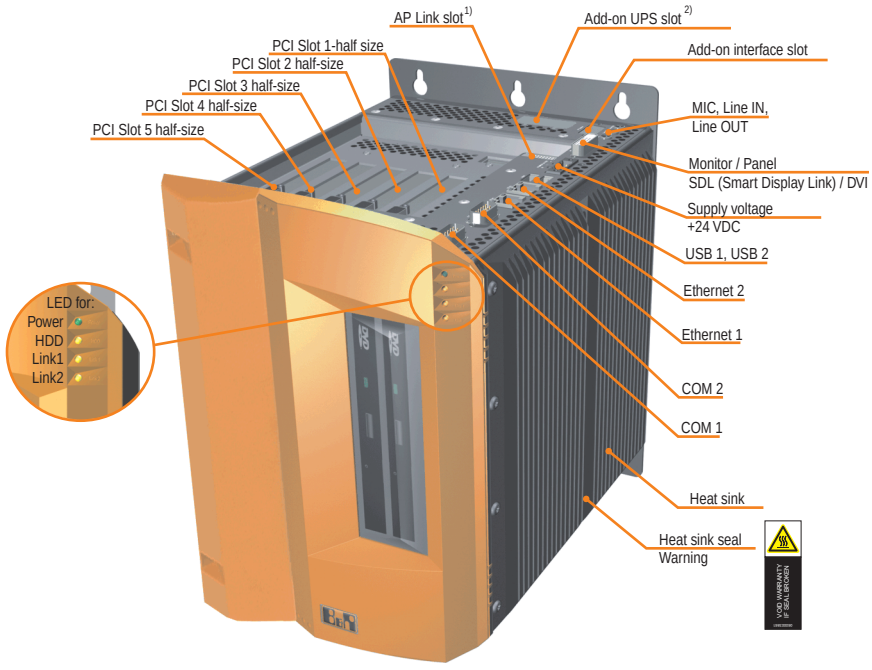
APC620 Kühlkörper Bestellnummer	Angabe in mm
5AC600.HS02-00	12,8
5AC600.HS02-01	28

Nennmaßbereich	Allgemeintoleranz nach DIN ISO 2768 mittel
bis 6 mm	± 0,1 mm
über 6 bis 30 mm	± 0,2 mm
über 30 bis 120 mm	± 0,3 mm
über 120 bis 400	± 0,5 mm
über 400 bis 1000	± 0,8 mm

Figure 13: 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 14: 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").

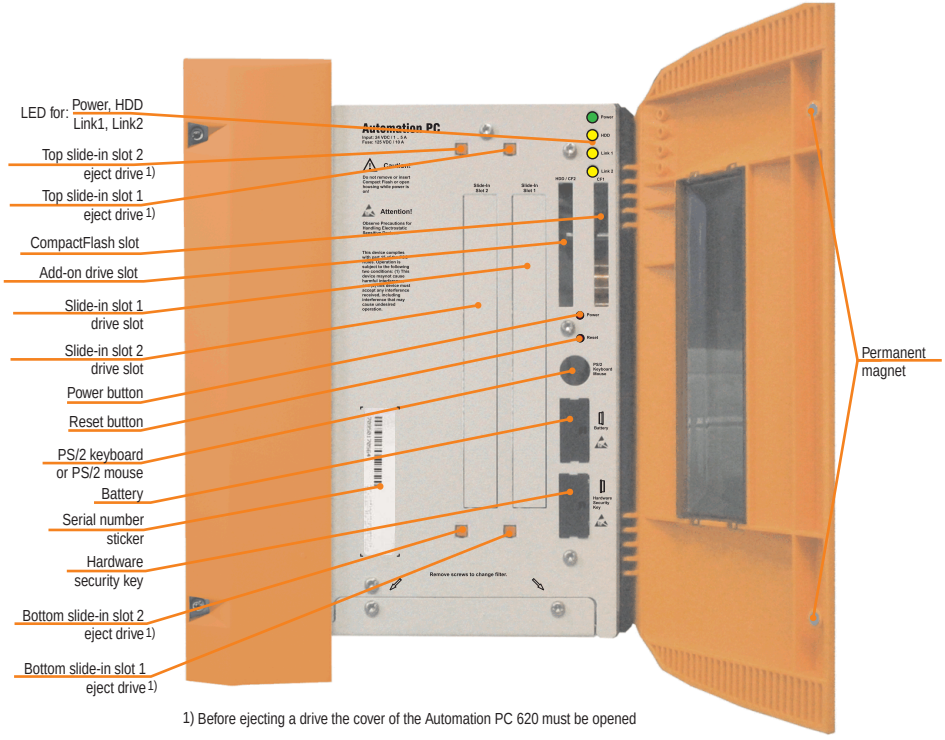


Figure 15: Interface overview - APC620, 5 PCI slot variant (front)

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
Boot loader / Operating system	BIOS / see the chapter 4 "Software" on page 337
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 739) 10 ms, dependent on the system unit revision (see page 525)
Real-time clock Battery-buffered Accuracy	 Yes Component-dependent, see technical data for the CPU board
Battery Type Removable Lifespan	See also page 145 Renata 950 mAh Yes, accessible behind the orange cover 4 years [2] [3]
Ethernet Controller Amount	 See also page 118 or page 120 2
CAN bus	Optional with add-on interface (5AC600.CANI-00)
CompactFlash Type Amount	See also page 140 or page 141 Type I 2 (max. 4 using optional components)
Serial interface Amount Type UART Transfer rate Connection	See also page 111 or page 112 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 121 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, see also section "Status LEDs" on page 138
PCI slots half-size full-size	See also section "PCI slots" on page 135 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 134
SRAM internal slot options	Yes 5PC600.SX05-00 starting with revision H0, 5PC600.SX05-01 starting with revision H0 present

Table 25: Technical data - APC620, 5 PCI slot variant

Electrical characteristics	APC620, 5 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 2.11 "Power management APC620 system units with 5 PCI slots"
Mechanical characteristics	
Housing[4)] Material 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 section "Dimensions" on page 71.
Weight	Approx. 5.7 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Storage Transport	 Component-dependent, see the section about ambient temperature on page 78 and page 82 -20°C .. +60°C -20°C .. +60°C
Relative humidity Operation Storage Transport	 Component-dependent, see section "Humidity specifications" on page 108 Component-dependent, see section "Humidity specifications" on page 108 Component-dependent, see section "Humidity specifications" on page 108
Vibration[5)] Operation (continuous) Operation (occasional) Storage 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 Storage 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 25: Technical data - APC620, 5 PCI slot variant (cont.)

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.Nr. 5AC600.SRAM-00) is installed, the buffer duration is 2 1/2 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 specify any other.
6) Derating the maximum ambient temperature - typically 1°C per 1000 meters (from 500 meters above sea level).

2.4.3 Dimensions

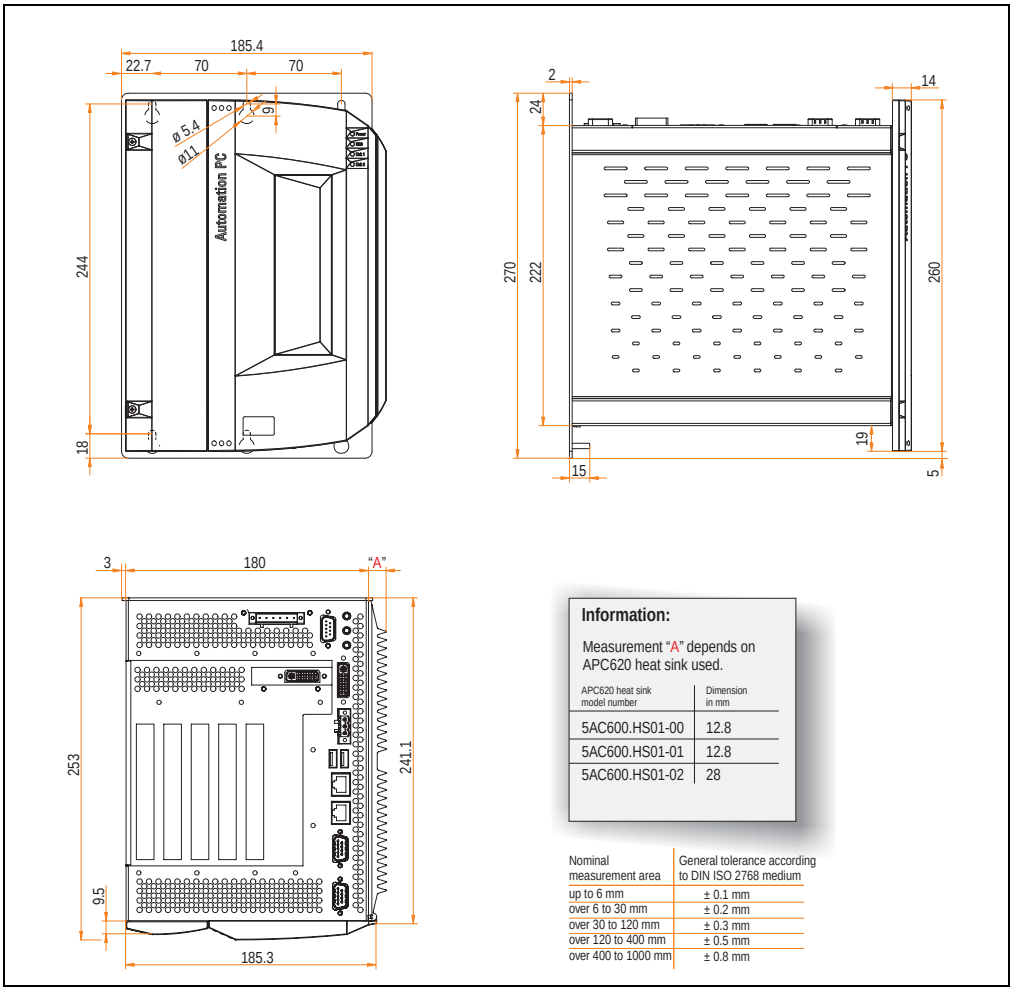


Figure 16: Dimensions - APC620, 5 PCI slot variant

2.5 APC620 embedded variant

2.5.1 Interfaces

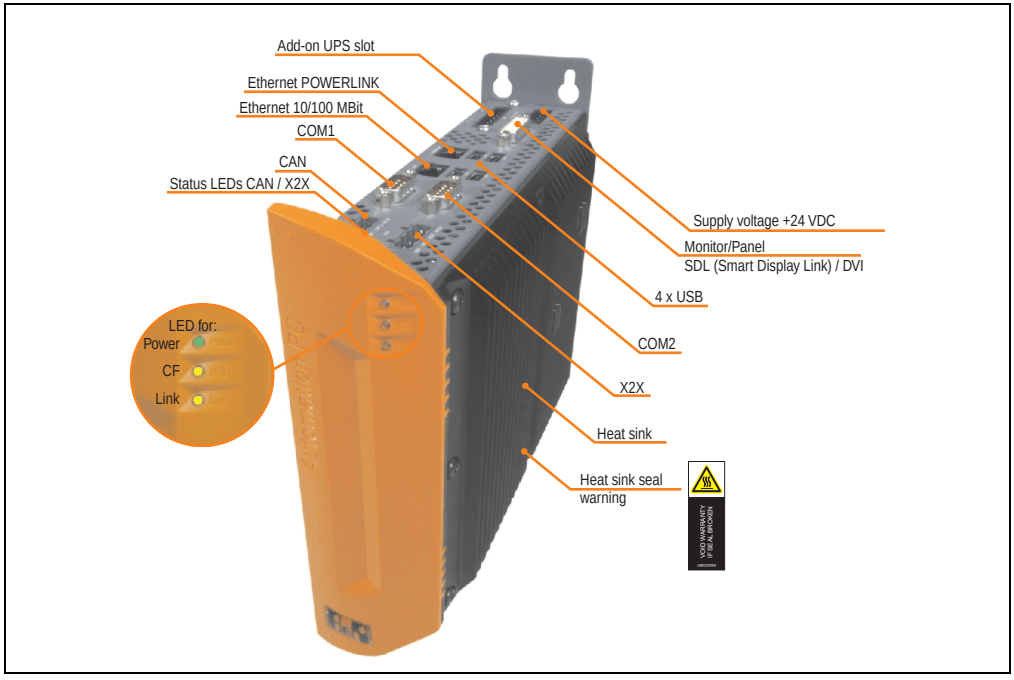


Figure 17: APC620 embedded variant interface overview - top side

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").

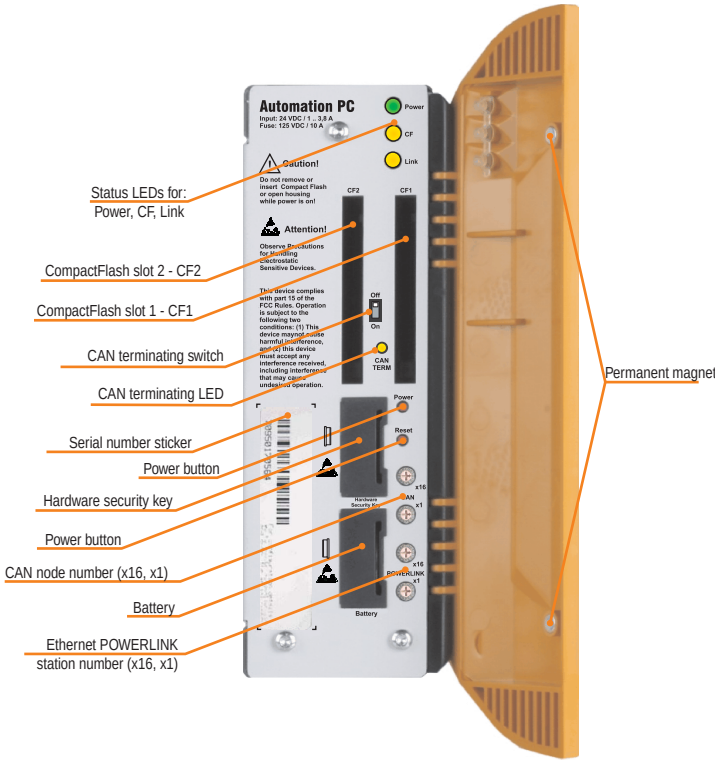


Figure 18: APC620 embedded variant interface overview - front side

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
Boot loader / Operating system	BIOS / see the chapter 4 "Software" on page 337
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 169
Power failure logic Controller Buffer time	 MTCX[1] (see also page 739) 10 ms, dependent on the system unit revision (see page 525)
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 145 Renata 950 mAh Yes, accessible behind the orange cover 2 1/2 years[2]
Ethernet Controller Amount	Yes See also page 117 1
Ethernet POWERLINK Amount Station number switches	Yes, also see page 115 1 2 pcs.
X2X Link Amount Status LED	Yes, also see page 113 1 Yes, see page 115
CAN bus Amount Transfer rate Node switch Terminating resistor Status LED	See also page 113 1 Max. 500 kBit/s Yes Yes, can be activated using a switch Yes, see page 115
CompactFlash Type Amount	See also page 142 Type I 2
Serial interface Amount Type UART Transfer rate Connection	See also page 111 or page 112 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 122 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
Reset button	Yes, accessible behind the orange cover

Table 26: Technical data - APC620 embedded variant

Features	APC620 embedded variant
LEDs	3 directed outwards via fiber optic lines, see also section "Status LEDs Power, CF, Link (only APC620 embedded)" on page 139
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)] Material 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 section "Dimensions" on page 77.
Weight	approx. 1.4 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Storage Transport	 Component-dependent, see the section about ambient temperature on page 82 -20°C .. +60°C -20°C .. +60°C
Relative humidity Operation Storage Transport	 Component-dependent, see section "Humidity specifications" on page 108 Component-dependent, see section "Humidity specifications" on page 108 Component-dependent, see section "Humidity specifications" on page 108
Vibration[4)] Operation (continuous) Operation (occasional) Storage 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 Storage 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 26: Technical data - APC620 embedded variant (cont.)

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 26: Technical data - APC620 embedded variant (cont.)

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

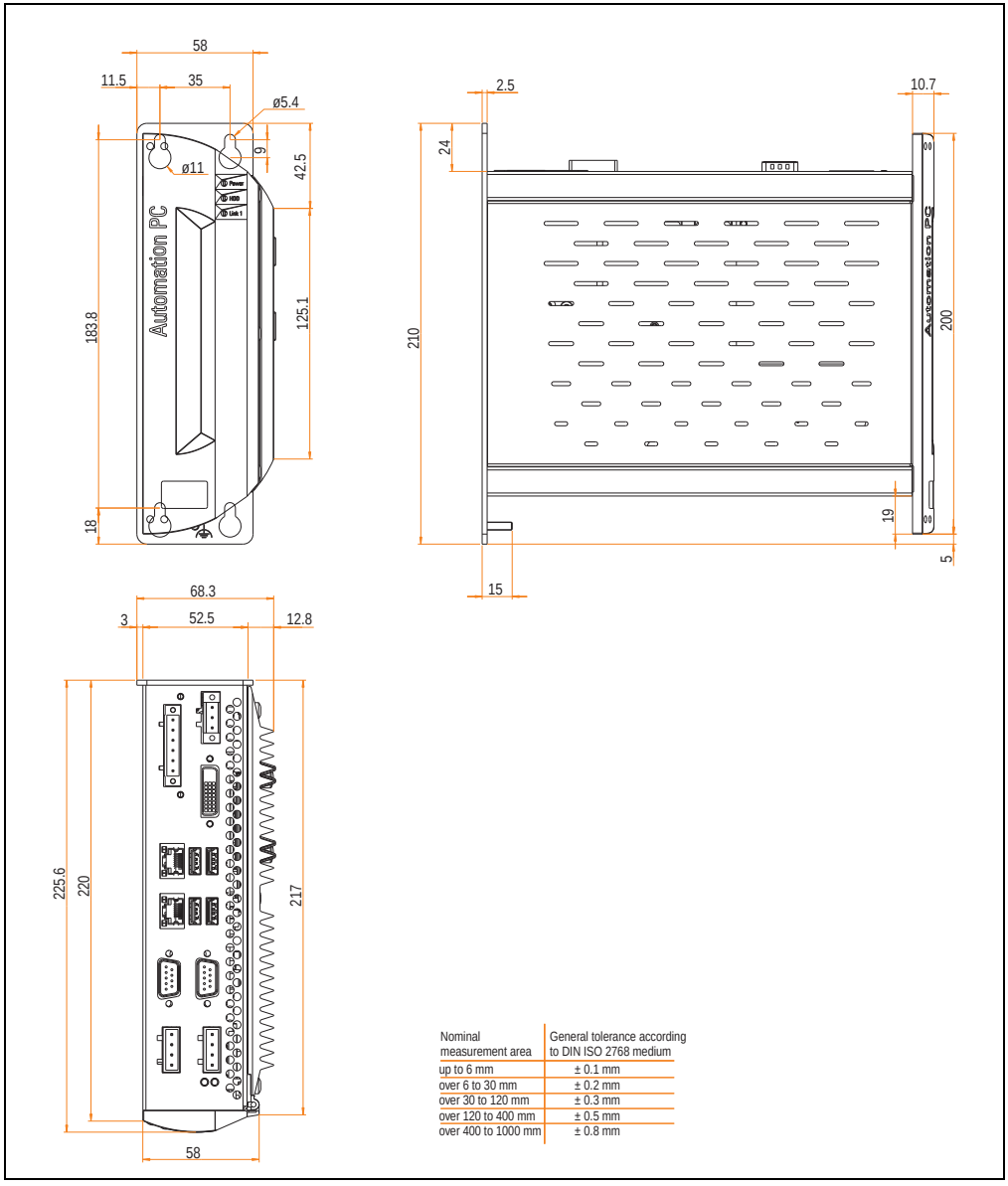


Figure 19: APC620 embedded variant - dimensions

2.6 Environmental 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 the figure, 21 "Environmental temperatures for systems with an 815E CPU board (ETX)" on page 79).

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 337).

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.

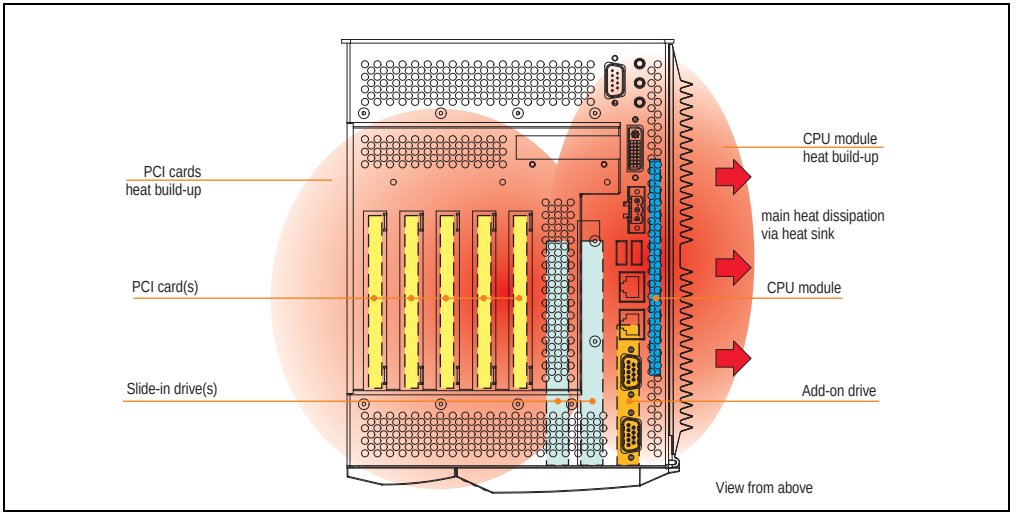


Figure 20: Example of worst-case conditions for temperature measurement

2.6.1 Maximum ambient temperature

	All temperatures in degrees celsius (°C) at 500 meters NN. Derating the maximum ambient temperature typically 1°C per 1000 meters above 500 NN	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 limits	Location of sensor(s)
		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. ambient temperature	50	45	30						55	55	55							
③	What can still be operated at max. amb. temp., and are there limits?																		
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-02 or 5CFCRD.xxxx-03) from B&R.

Figure 21: Environmental 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 figure "Temperature sensor locations" on page 737. The value listed in the table represents the defined maximum temperature for this measurement point[1)]. An alarm is not triggered when this temperature is exceeded. The temperatures[1)] 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) The measured temperature is a guideline for the immediate ambient temperature, but can be influenced by neighboring components.

2.7 Environmental temperatures for systems with an 855GME CPU board (EXT / 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 the figure, 23 "Environmental temperatures for systems with an 855GME CPU board (EXT / XTX)" on page 83).

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 337).

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.

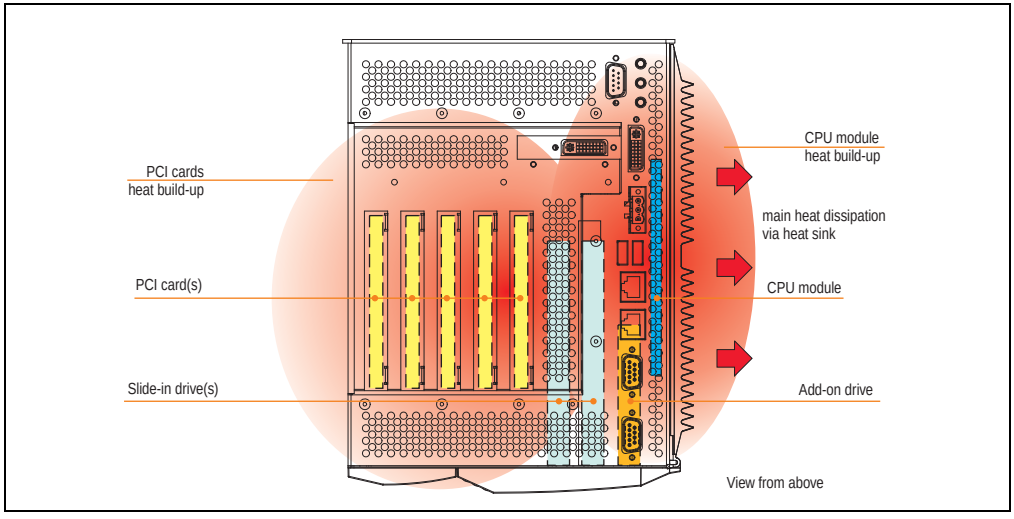


Figure 22: Example of worst-case conditions for temperature measurement

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	855GME CPU board (ETX / XTX) without fan kit (1) and heat sink 5AC600.HS01-01				and heat sink 5AC600.HS01-02				855GME CPU Board (ETX / XTX) with fan kit (1) and heat sink 5AC600.HS01-01				and heat sink 5AC600.HS01-02					
	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	PM 1600 5PC600.E855-01 5PC600.X855-01	PM 1800 5PC600.E855-03 5PC600.X855-03			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				
(2) Maximum ambient temperature	50	45	45	45	/	/			55	55	55	55	45	45				
(3) What can still be operated at max. ambient temp.? What are the limitations?																	Temp. Monitored by sensors located in	
Add-on drive																		
Onboard CompactFlash [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.CFSI-00 [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.HDDI-01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.HDDI-00 (24-hour/Standard)	-/30	-/25	-/25	-/25					30/40	30/40	30/40	30/40	-/35	-/35			45/55	I/O
5AC600.HDDI-05	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.HDDI-06	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓				I/O
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	Slide-in drive 1 and 2
5AC600.DVDS-00	30	30	30	30					40	40	40	40	30	30			45	Slide-in drive 1 and 2
5AC600.DVRS-00	30	30	30	30					40	40	40	40	30	30			45	Slide-in drive 1 and 2
5AC600.FDDS-00	40	35	35	35					45	45	45	45	35	35			50	Slide-in drive 1 and 2
5AC600.HDDS-01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	Slide-in drive 1 and 2
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	Slide-in drive 1 and 2
5AC600.HDDS-02	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	Slide-in drive 1 and 2
Main memory																		
5MMDDR.0256-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5MMDDR.0512-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5MMDDR.1024-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
System units																		
5PC600.SX01-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			95	Power supply
5PC600.SX02-00 / -01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			95	Power supply
5PC600.SF03-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			95	Power supply
5PC600.SX05-00 / -01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			95	Power supply
5PC600.SE00-00 / -01 / -02																	95	Power supply
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 with a CompactFlash card (5CFCRD.xxxx-02 or 5CFCRD.xxxx-03) from B&R.

Figure 23: Environmental temperatures for systems with an 855GME CPU board (EXT / 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.

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

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 figure "Temperature sensor locations" on page 737. The value listed in the table represents the defined maximum temperature for this measurement point[1)]. An alarm is not triggered when this temperature is exceeded. The temperatures[1)] 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) 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.

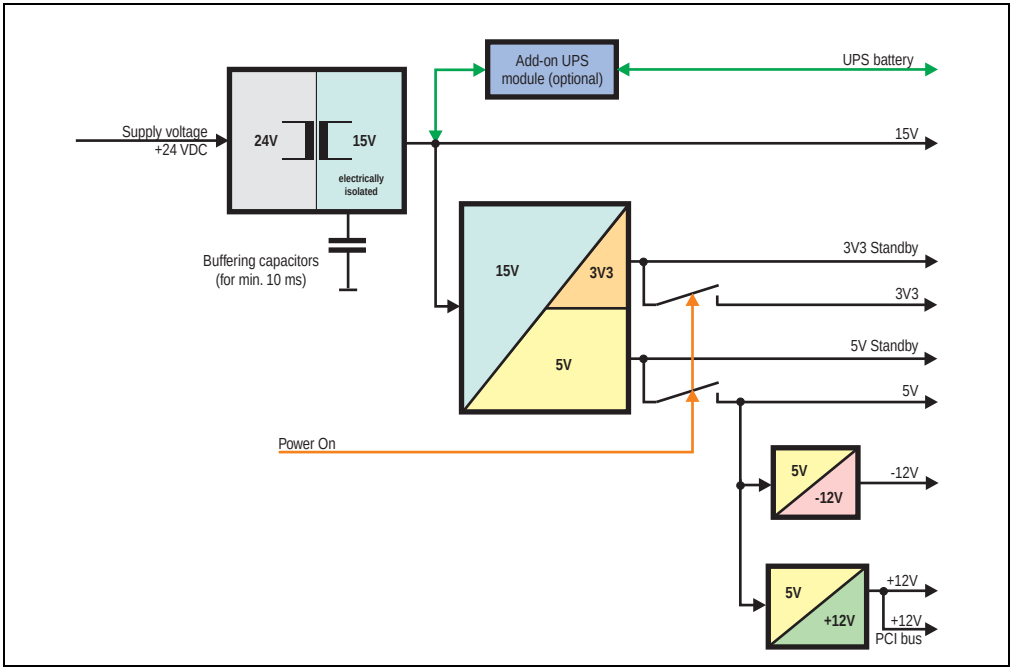


Figure 24: Supply voltage for the 5PC600.SX01-00 revision >= I0

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. On the 5 V output, two additional DC/DC inverters generate
+12 V and -12 V, which is 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:

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	
	Pro 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 pero 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 withou 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 (über 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 ∑										
-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 ∑										
	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 ki

See section "Starting current" on page 124 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.

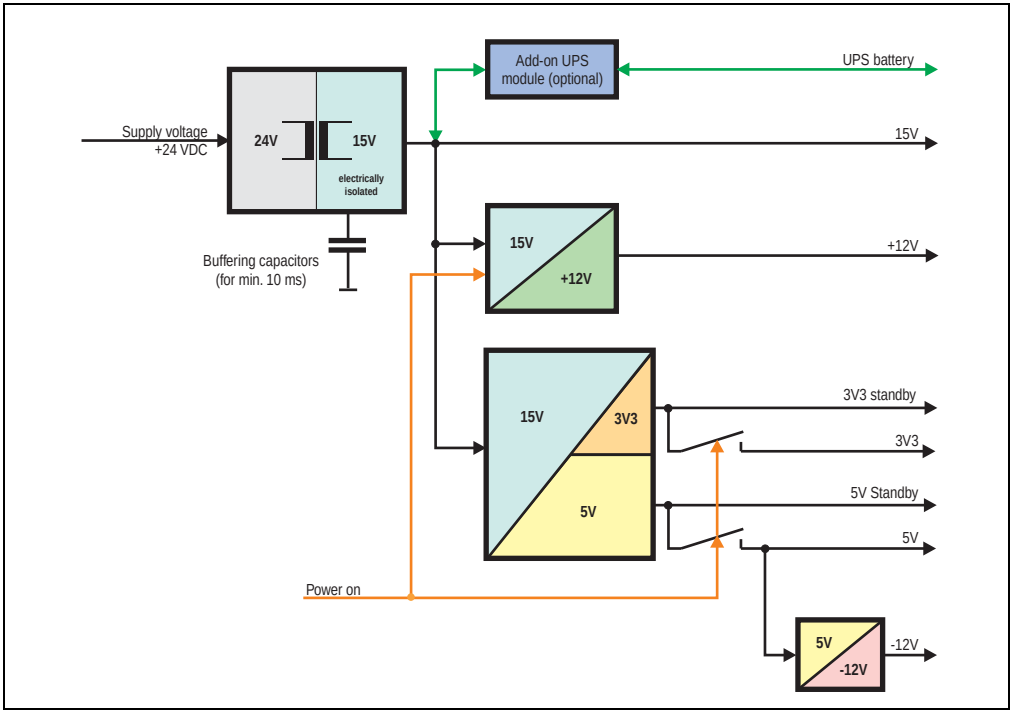


Figure 25: Supply voltage for the 5PC600.SX01-00 revision < I0

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:	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 column
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	
Pro 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 Σ										
-12V – max. possible at -12V										**1.2**
PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit) [1]										
Devices -12V Σ										
Devices total 5V Σ										
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 Σ										
+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 Σ										
Devices total Σ										

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 ki

See section "Starting current" on page 124 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).

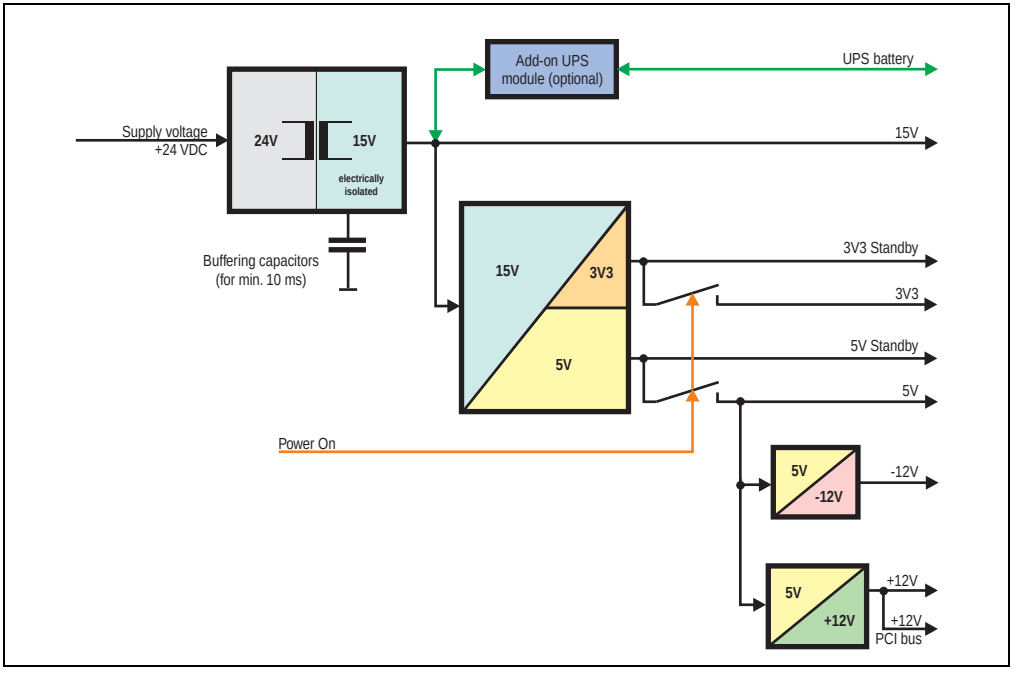


Figure 26: Supply voltage for the 2 PCI slots (dependent on system unit version)

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. On the 5 V output, two additional DC/DC inverters generate
+12 V and -12 V, which is 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 column
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	
	Pro 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	
	Pro 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 drive, 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 ∑										
-12V	max. possible at -12V										1.2
	PIC 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 ∑										
	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 ki

See section "Starting current" on page 124 for starting current values.

2.9.3 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 column
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	
	Pro 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	
	Pro 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	
	Schnittstellenoption (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 3V§ ∑
+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 ki

See section "Starting current" on page 124 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).

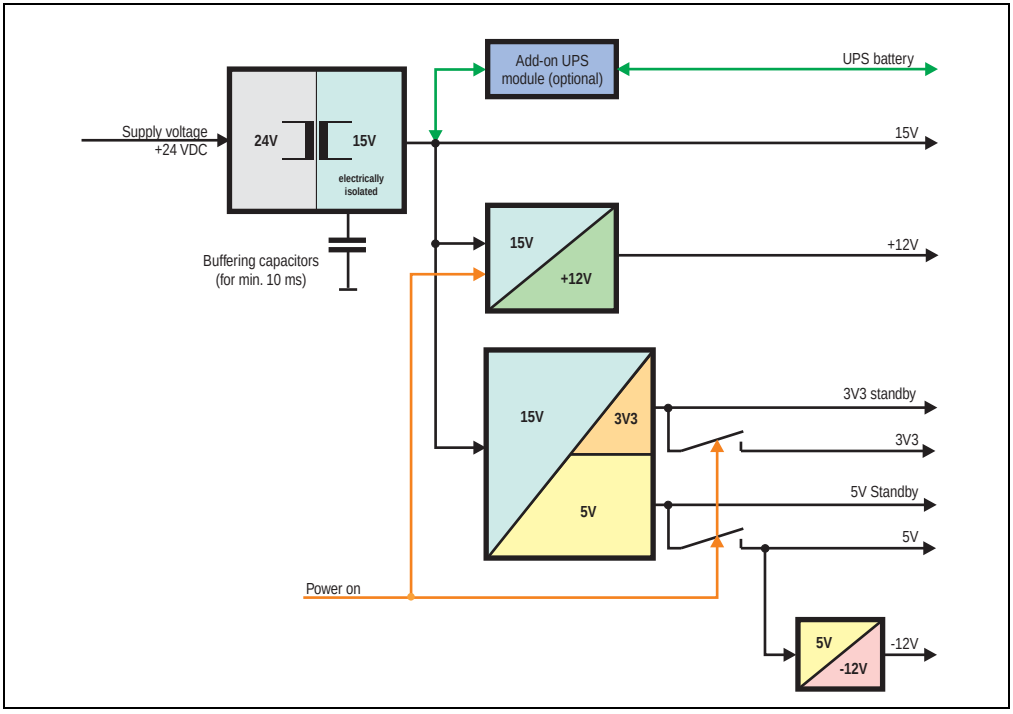


Figure 27: Supply voltage for the 2 PCI slots (dependent on system unit version)

Explanation:

The supply voltage is converted to 15 V with a DC/DC converter. These electrically isolated 15 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 column
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
5V	CPU Board, fixed device	14	18	25	17	21	23	23	37	37	
5V	Pro 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	Pro 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	Graphics adapter (AP link), optional	5	5	5	5	5	5	5	5	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 Σ
-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 Σ
											Devices total 5V Σ
3V3											max. possible at 3V3	23
3V3	System unit, fixed device	4	4	4	4	4	4	4	4	4	
3V3	Graphics adapter (AP link), optional	5	5	5	5	5	5	5	5	5	
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 Σ
+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 wattst without fan kit, max. 12 watts with fan kit) 1)										
+12V											Devices +12V Σ
											Devices total Σ

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 ki

See section "Starting current" on page 124 for starting current values.

2.9.6 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.X855-04 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 (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	
Pro 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	
Pro 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 – maximal möglich bei 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 Watt ohne Lüfter Kit, max. 17 Watt mit Lüfter 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 ki

See section "Starting current" on page 124 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.

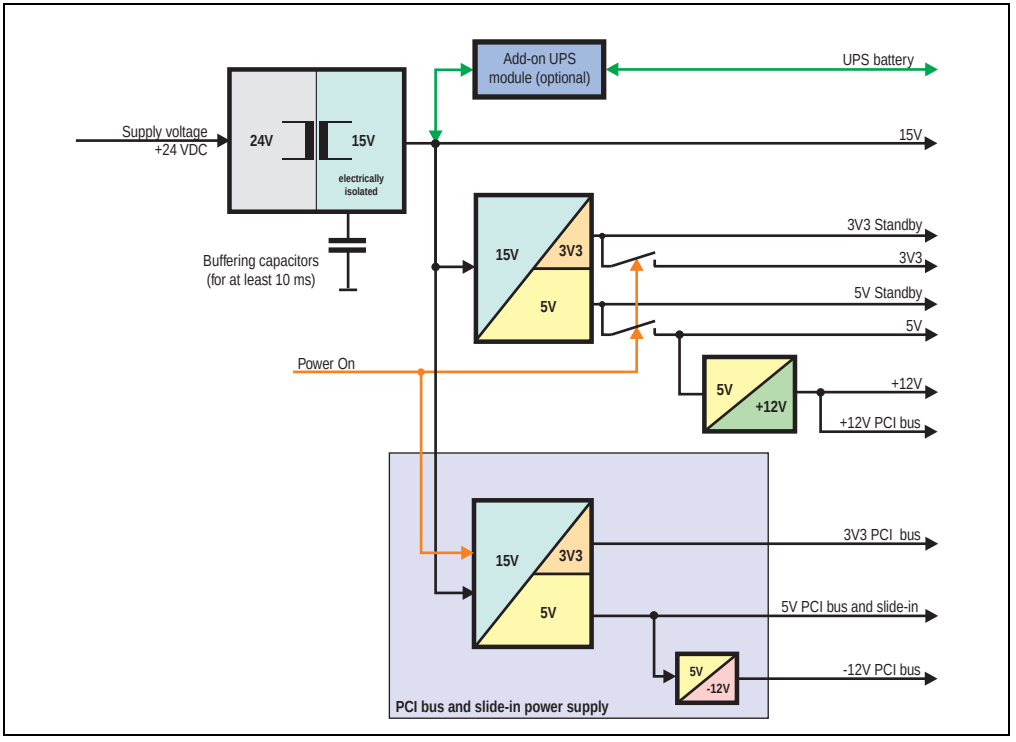


Figure 28: Supply voltage block diagram 3 PCI slots

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
Total power supply	Add-On UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5				
Total power supply / 5V											max. possible at 5V 70
Total power supply / 5V	CPU Board, fixed device	17	21	23	23	37	37				
Total power supply / 5V	Pro CompactFlash, optional (Add-On)	1	1	1	1	1	1				
Total power supply / 5V	Hard Disk, optional (Add-On)	4	4	4	4	4	4				
Total power supply / 5V	External keyboard PS/2, optional	1	1	1	1	1	1				
Total power supply / 5V	USB Peripheral, optional (max. 2.5 watts per USB1 and USB2 connection)	5	5	5	5	5	5				
Total power supply / 5V	Interface option (Add-On Interface), optional	0.5	0.5	0.5	0.5	0.5	0.5				
Total power supply / 5V	Graphics adapter (AP Link), optional	5	5	5	5	5	5				
Total power supply / 5V	External device, optional (via BaseBoard)	5	5	5	5	5	5				
Total power supply / 5V / +-12V											max. possible at +12V 24
Total power supply / 5V / +-12V	Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5				
Total power supply / 5V / +-12V	External device, optional (via BaseBoard)	10	10	10	10	10	10				
Total power supply / 5V / +-12V	PCI card manufacturer limits, optional [1] (max. 3 watts without fan kit, max. 12 watts with fan kit)										
Total power supply / 5V											Devices total 5V Σ
Total power supply / 3V3											max. possible at 3V3 23
Total power supply / 3V3	System unit, fixed device	4	4	4	4	4	4				
Total power supply / 3V3	Graphics adapter (AP Link), optional	5	5	5	5	5	5				
Total power supply / 3V3	Interface option (Add-On Interface), optional	0.25	0.25	0.25	0.25	0.25	0.25				
Total power supply / 3V3											Devices Σ
PCI bus and slide-in power supply											PCI bus and slide-in power supply (max.) 50
PCI bus and slide-in power supply / 5V											max. possible at 5V PCI bus und slide-in 50
PCI bus and slide-in power supply / 5V	Pro CompactFlash, optional (slide-sn)	1	1	1	1	1	1				
PCI bus and slide-in power supply / 5V	Pro hard disk, optional (slide-in)	4	4	4	4	4	4				
PCI bus and slide-in power supply / 5V	Pro drive, optional (slide-in - CD/DVD)	4	4	4	4	4	4				
PCI bus and slide-in power supply / 5V	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) [1]										
PCI bus and slide-in power supply / 5V / -12V											max. possible at -12V PCI bus and slide-in 1.2
PCI bus and slide-in power supply / 5V / -12V	PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit) [1]										
PCI bus and slide-in power supply / 5V											Devices -12V Σ
PCI bus and slide-in power supply / 5V											Devices total 5V Σ
PCI bus and slide-in power supply / 3V3											max. possible at 3V3 PCI bus and slide-in 23
PCI bus and slide-in power supply / 3V3	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) [1]										
PCI bus and slide-in power supply / 3V3											Devices 3V3 Σ
PCI bus and slide-in power supply											Total PCI bus and slide-in Σ
											Devices total Σ

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 124 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).

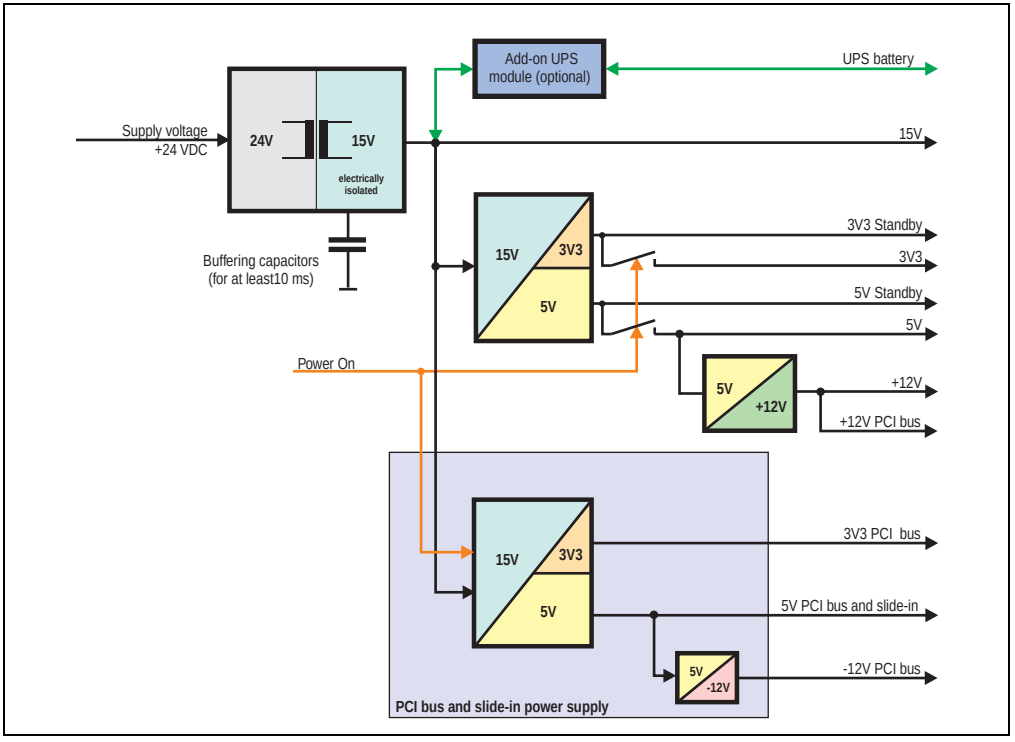


Figure 29: Supply voltage for the 5 PCI slots (dependent on system unit version)

Explanation:

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 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	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	
	Pro CompactFlash, optional (Add-On)	1	1	1	1	1	1	1	1	1	
	Hard disk, optional (Add-On)	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
	Pro CompactFlash, optional (slide-in)	1	1	1	1	1	1	1	1	1	
	Pro hard disk, optional (slide-in)	4	4	4	4	4	4	4	4	4	
	Pro 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 ki

See section "Starting current" on page 124 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 column
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	
Pro CompactFlash, optional (Add-On)	1	1	1	1	1	1	1	1	1	
Hard disk, optional (Add-On)	4	4	4	4	4	4	4	4	4	
External keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
USB peripheal, 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 Σ										
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 Σ										
PCI bus and slide-in power supply (max.)										50
5V – max. possible at 5V PCI bus and slide-in										50
Pro CompactFlash, optional (slide-in)	1	1	1	1	1	1	1	1	1	
Pro hard disk, optional (slide-in)	4	4	4	4	4	4	4	4	4	
Pro 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 -12V Σ										
Devices total 5V Σ										
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 Σ										
Total PCI bus and slide-in Σ										
Devices total Σ										

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 ki

See section "Starting current" on page 124 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).

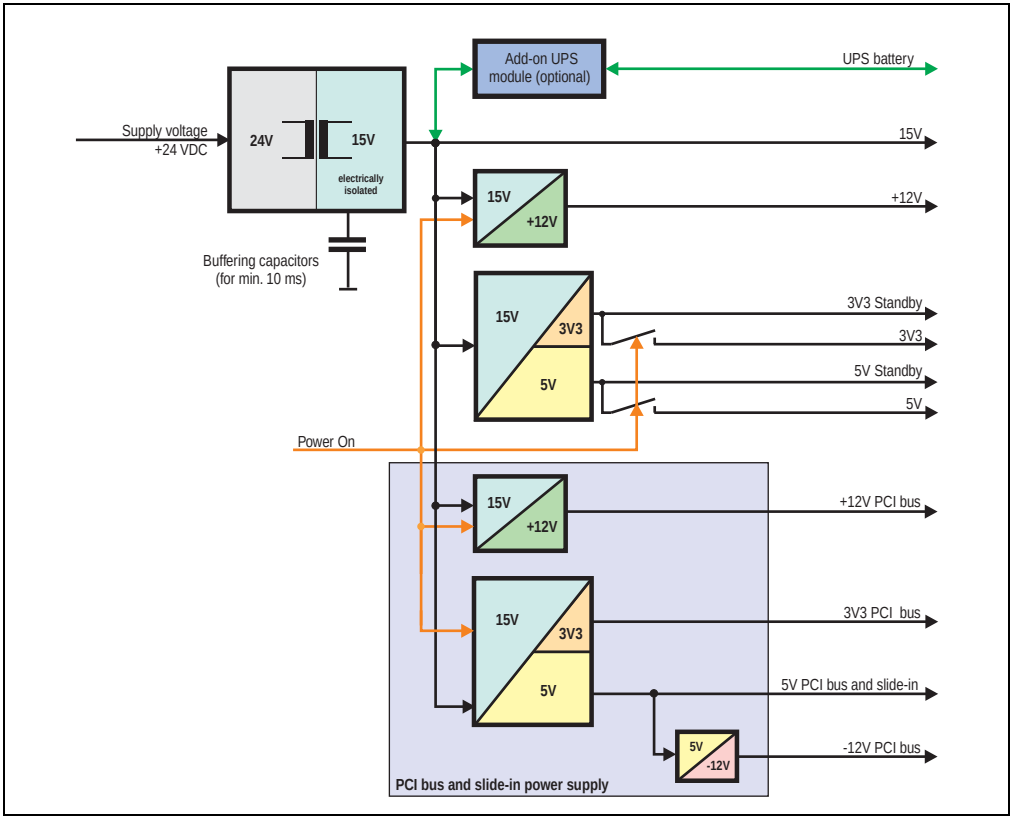


Figure 30: Supply voltage block diagram 5 PCI slots (dependent on system unit version)

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:	APC620 system unit 5PC600.SX05-00									This system
	C3 400	C3 733	C3 1000	CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800	
All entries in watts The entries for the **Generator** are maximum values. Entries for the **Device** are determined maximum values, but not peak values.	5PC600.E815-00	5PC600.E815-02	5PC600.E815-03	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	⇩
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)	1	1	1	1	1	1	1	1	1	
Hard disk, optional (add-on)	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 or USB2 connection)	5	5	5	5	5	5	5	5	5	
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 Σ										
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	
Add-on interface, optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
Devices Σ										
+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 Σ										
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 limits, optional (max. 3 watts w/o fan kit, max. 17 watts w/ fan kit) 1)										
3V3 — Max. possible at 3V3 PCI bus and slide-in										
PCI card manufacturer, optional (max. 3 watts w/o fan kit, max. 17 watts w/ fan kit) 1)										23
Devices Σ										
+12V — Max. possible at +12V PCI bus and slide-in										
PCI card manufacturer limits, optional (max. 3 watts w/o fan kit, max. 12 watts w/ fan kit) 1)										12
Devices Σ										
-12V — Max. possible at -12V PCI bus and slide-in Σ										
PCI card manufacturer limits, optional (max. 1.2 watts with or without fan kit) 1)										1.2
Devices Σ										
Total PCI bus and slide-in Σ										
Total devices Σ										

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 l

See section "Starting current" on page 124 for starting current values.

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

Information:	APC620 System unit 5PC600.SX05-01									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 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	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	
Pro CompactFlash, optional (Add-On)	1	1	1	1	1	1	1	1	1	
Hard disk, optional (Add-On)	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 Σ										
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 Σ										
+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 Σ										
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
Pro CompactFlash, optional (slide-in)	1	1	1	1	1	1	1	1	1	
Pro hard disk, optional (slide-in)	4	4	4	4	4	4	4	4	4	
Pro drive, optional (slide-in - CD/DVD)	4	4	4	4	4	4	4	4	4	
DCI 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 Σ										
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 Σ										
+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 Σ										
Total PCI bus and slide-in Σ										
Devices total Σ										

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 124 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.

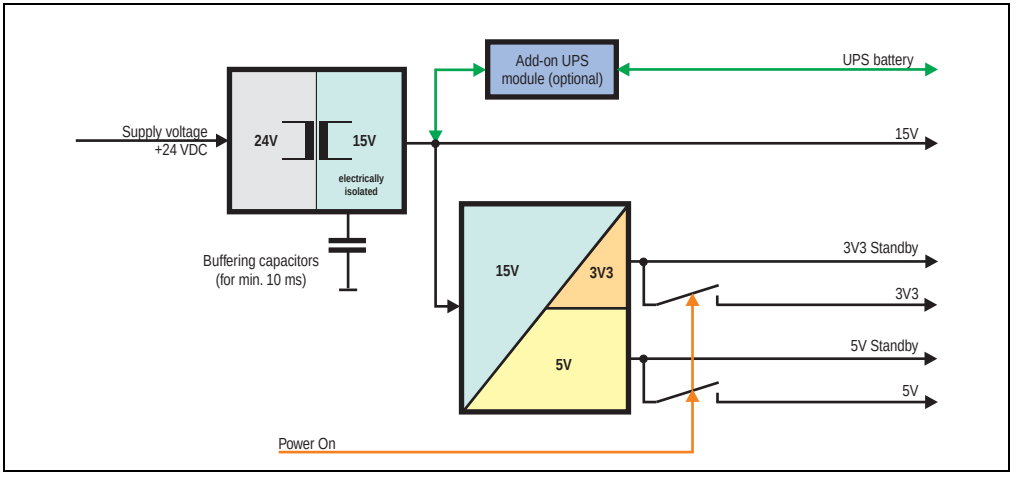


Figure 31: Supply voltage for the 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02

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

TBD

See section TBD 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.

Relative humidity in %RH (non-condensing) at 30°C ambient temp.

Components		Operation	Storage / Transport
815E CPU boards (ETX)		10 - 90	5 - 95
855GME CPU boards (ETX / XTX)		10 - 90	5 - 95
System units - 1, 2, 3 and 5 PCI slot		5 - 90	5 - 95
Main memory for CPU boards		10 - 90	5 - 95
Add-on drives	5AC600.HDDI-01 (ET)	8 - 90	5 - 95
	5AC600.HDDI-00 (24-hour/Standard)	8 - 90	5 - 95
	5AC600.HDDI-05 (ET, 24x7)	8 - 90	5 - 95
	5AC600.CDXS-00	8 - 80	5 - 95
Slide-in drives	5AC600.DVDS-00	8 - 80	5 - 95
	5AC600.DVRS-00	8 - 80	5 - 95
	5AC600.FDDS-00	20 - 80	10 - 95
	5AC600.HDDS-01 (ET)	8 - 90	5 - 95
	5AC600.HDDS-00 (24-hour/Standard)	8 - 90	5 - 95
	5AC600.HDDS-02 (ET, 24x7)	8 - 90	5 - 95
	5AC600.CANI-00	5 - 90	5 - 95
Additional insert cards interfaces AP Link	5AC600.485I-00	5 - 90	5 - 95
	5AC600.SDL0-00	5 - 90	5 - 95
	5ACPCI.RAIS-00 (24-hour/Standard)	8 - 90	5 - 95
	5ACPCI.RAIS-00 (24-hour/Standard)	8 - 90	5 - 95
	5ACPCI.RAIC-01 (24-hour/Standard)	8 - 90	5 - 95
	CompactFlash cards 5CFCRD.xxxx-03	8 - 95	8 - 95
Accessories	Flash drive 5MMUSB.xxxx-00	10 - 90	5 - 90
	USB Media Drive 5MD900.USB2-00	20 - 80	5 - 90

Figure 32: Overview of humidity specifications for individual components

The listed tasks correspond to the 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 of 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.

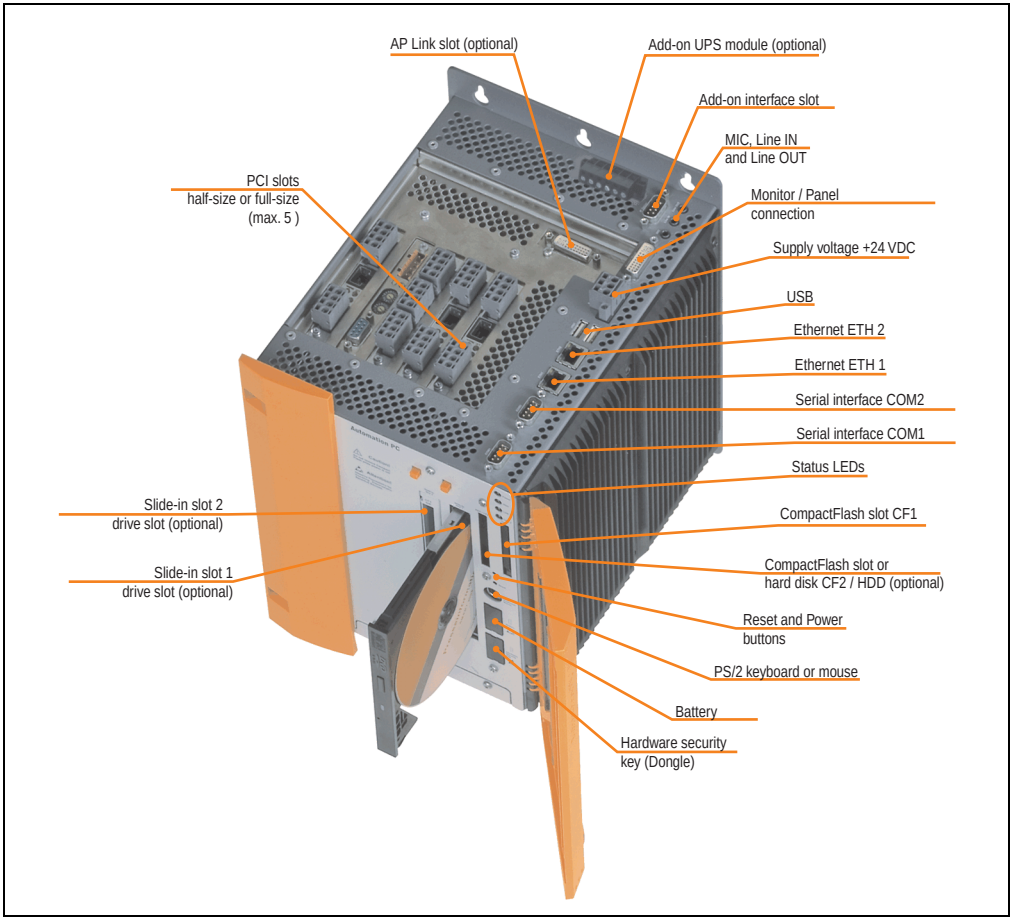


Figure 33: General device interfaces example - APC620 with 5 PCI slots

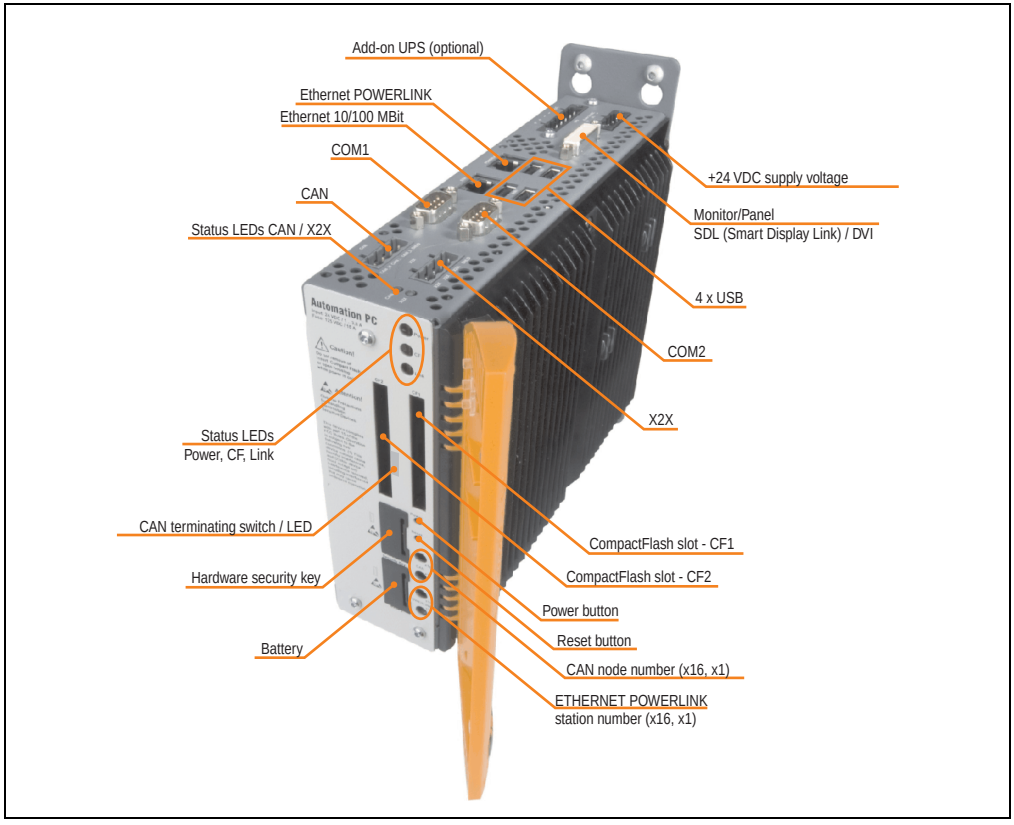


Figure 34: General device interfaces example - APC620 embedded

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

2.14.1 Serial interfaces 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 27: 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 28: 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 interfaces 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 29: 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 30: 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)

X2X Link interface (only APC620 embedded)	
The electrically isolated X2X Link is a 4-pin multipoint connector.	
Pin	**X2X Link**
1	X2X
2	X2X⊥
3	X2X\
4	SHLD (shield)

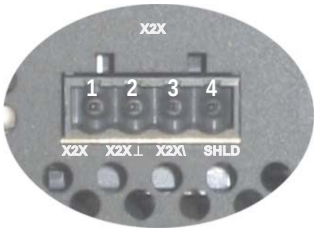


Table 31: X2X pin assignments (only APC620 embedded)

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 525).

2.14.4 CAN (only APC620 embedded)

CAN	
The electrically isolated CAN bus interface is a 4-pin multipoint connector.	
Transfer rate	Max. 500 kBit/s
Bus length	Max. 1000 meters
Pin	**CAN bus**
1	CAN_H (CAN High)
2	CAN⊥ (CAN Ground)
3	CAN_L (CAN Low)
4	SHLD (shield)

Table 32: 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 525).

2.14.5 CAN node number (only APC620 embedded)

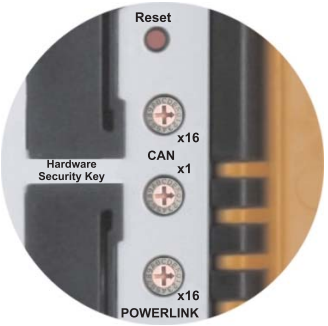
CAN node number switch (x1, x16) - only APC620 embedded			
Both of these hex switches (x16, x1) are used to configure the node number for the CAN interface.			
Switch position			
x16	x1	Description	
0 ... F	0 ... F	Any	

Table 33: CAN node number switch (x1, x16) - only APC620 embedded

2.14.6 CAN terminating switch / LED (only APC620 embedded)

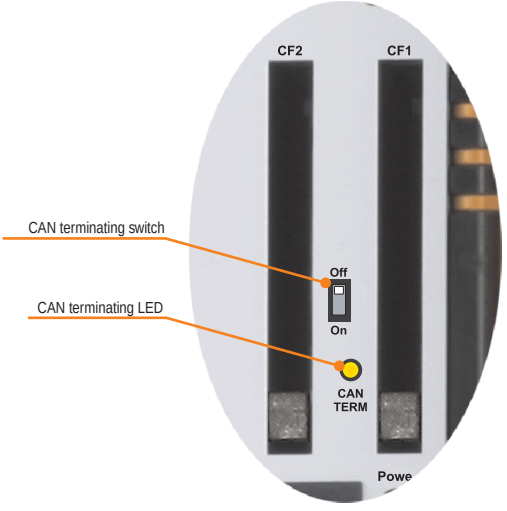
CAN terminating switch / LED (only APC620 embedded)			
CAN networks are cabled using a bus structure where both ends of the bus are equipped with terminating resistors. The APC620 embedded has an integrated terminating resistor (delivery state: disabled with the setting "Off").			
LED	On	Off	
Yellow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

Table 34: CAN terminating switch / LED (only APC620 embedded)

2.14.7 Status LEDs CAN / X2X (only APC620 embedded)

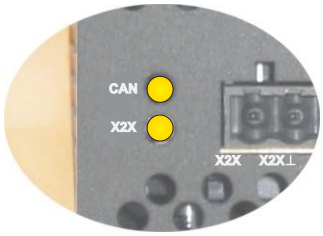
Status LEDs CAN / X2X (only APC620 embedded)			
			
Yellow LED for	**On**	**Off**	
CAN	Sends data	Receives data	
X2X	Sends data	Receives data	

Table 35: Status LEDs CAN / X2X (only APC620 embedded)

2.14.8 Ethernet POWERLINK (only APC620 embedded)

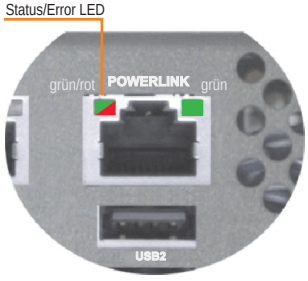
Ethernet POWERLINK (only APC620 embedded)			
Controller			
Cabling	S/STP (Cat5e)		
Transfer rate			
Cable length	max. 100 m (min. Cat5e)		
LED color	**On**	**Off**	
Green/red	see Status / Error LED		
Green	Link (Ethernet POWERLINK network connection available)	Activity (blinking) (Data transfer in progress)	

Table 36: Ethernet POWERLINK (only APC620 embedded)

Driver support

The fieldbus interface Ethernet POWERLINK is only supported together with Automation Runtime (for more information, see section "Automation PC 620 with Automation Runtime" on page 525).

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

Table 37: Status / Error LED as error LED - Ethernet 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 38: Status / Error LED as status LED - Ethernet POWERLINK V2 operating mode

2.14.9 Ethernet POWERLINK station number (only APC620 embedded)

Ethernet POWERLINK station number (x1, x16)			
Both of these hex switches (x16, x1) are used to configure the station number for the Ethernet POWERLINK. Station numbers are permitted between #00 and #FD.			
Switch position			
x16	x1	Description	
0	0	Operation as managing node	
0 ... F	1 ... D	station number Operation as controlled node	
F	E	Reserved	
F	F	Reserved	

Table 39: Ethernet 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.

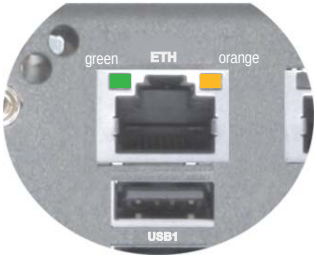
Ethernet connection ETH (only APC620 embedded)			
Controller	Intel 82562		RJ45 twisted pair (10BaseT/100BaseT), female 
Cabling	S/STP (Cat5e)		
Transfer rate	10/100 MBit/s 1)		
Cable length	max. 100 m (min. Cat5e)		
LED	On	Off	
Green	100 MBit/s	10 MBit/s	
Orange	Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)	

Table 40: 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.

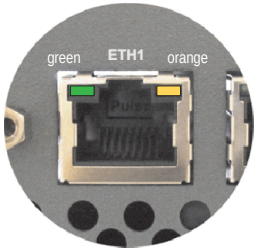
Ethernet connection (ETH1[1])			
Controller	Intel 82562		RJ45 twisted pair (10BaseT/100BaseT), female 
Cabling	S/STP (Cat5e)		
Transfer rate	10/100 MBit/s [2]		
Cable length	See table42 "Ethernet cable length in conjunction with 5PC600.E855-xx CPU boards (ETX)" on page 119 and table 43 "Ethernet cable length in conjunction with 5PC600.E855-xx CPU boards" on page 119.		
LED	**On**	**Off**	
Green	100 MBit/s	10 MBit/s	
Orange	Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)	

Table 41: 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, and DOS are available for download on the B&R Homepage in the download area (**www.br-automation.com**).

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 42: 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 43: 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.

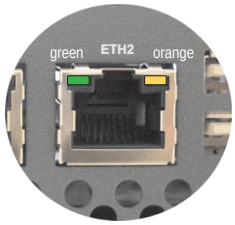
Ethernet connection (ETH2[1])			
Controller	Intel 82551ER		RJ45 twisted pair (10BaseT/100BaseT), female 
Cabling	S/STP (Cat5e)		
Transfer rate	10/100 MBit/s [2]		
Cable length	max. 100 m (min. Cat5e)		
LED	**On**	**Off**	
Green	100 MBit/s	10 MBit/s	
Orange	Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)	

Table 44: Ethernet connection (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, and DOS are available for download on the B&R Homepage in the download area (**www.br-automation.com**).

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 122 for a description of the USB connections on APC620 embedded devices.

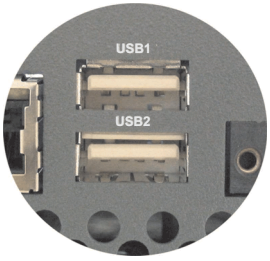
Universal Serial Bus (USB1 und USB2)[1]		
Transfer rate	Low speed (1.5 MBit/s), Full speed (12 MBit/s) up to High speed (480 Mbit/s)	2x USB Type A, female 
Power supply	max. 500 mA per port[2]	
Maximum cable length	5 m (without hub)	

Table 45: 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 assure the performance of all USB devices that they provide.

Important!

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) to High speed (480 Mbit/s)	4 x USB type A, female 
Power Supplies[2] USB1, USB3 USB2, USB4	 Max. 500 mA Max. 1 A	
Maximum cable length	5 m (without hub)	

Table 46: 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 assure the performance of all USB devices that they provide.

Important!

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 47: 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).

Supply voltage		
Protected against reverse polarity		3-pin, male
Pin	**Description**	
1	+	
2	Functional grounding	
3	-	
Accessories		
0TB103.9	Plug 24 V 5.08 3p screw clamps	
0TB103.91	Plug 24 V 5.08 3p cage clamps	

Figure 35: Supply voltage connection

Ground

Important!

The pin's connection to the functional ground (pin 2, e.g. switching cabinet) should be as short as possible. 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).

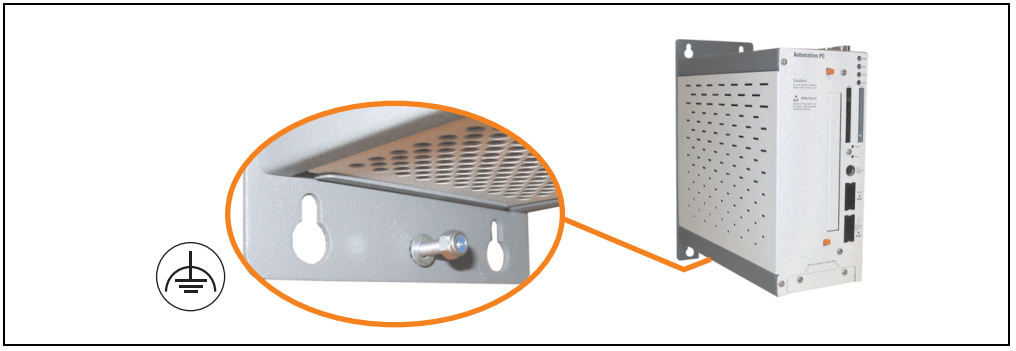


Figure 36: Ground connection

Also see the section "Grounding concept" on page 279.

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)

Table 48: 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

49 "System unit revisions for at least 10 seconds standby 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 standby 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 49: System unit revisions for at least 10 seconds standby time

Thanks to a workaround, the standby 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 revision 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 revision 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

Table 50: System unit revisions for any standby 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.

Monitor / Panel			
The following will provide an overview of the video signals available with different system units and CPU boards.			24-pin DVI-I with special functions, female 
System unit	815E board (ETX)	855GME board (XTX)	
5PC600.SX01-00	RGB, DVI, SDL	RGB, DVI, SDL	
5PC600.SX02-00	RGB	RGB, DVI, SDL	
5PC600.SX02-01	RGB, DVI, SDL	RGB, DVI, SDL	
5PC600.SF03-00	RGB, DVI, SDL	RGB, DVI, SDL	
5PC600.SX05-00	RGB	RGB, DVI, SDL	
5PC600.SX05-01	RGB, DVI, SDL	RGB, DVI, SDL	
5PC600.SE00-00	-	RGB, DVI, SDL	
5PC600.SE00-01	-	RGB	
5PC600.SE00-02	-	RGB, DVI, SDL	

Figure 37: Monitor / Panel connection

Hotplug for a display device is not supported in any combination. The connection cycle value for the plug is specified at 100x.

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 130 for descriptions of RGB, DVI and SDL.

Pin assignments

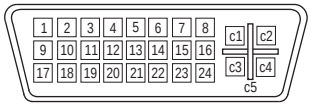
Pin	Assignment	Pin	Assignment	
1	T.M.D.S. data 2-	16	Hot Plug detect	DVI-I 24 pin, female 
2	T.M.D.S. data 2+	17	T.M.D.S. data 0-	
3	T.M.D.S. data 2/SDL shield	18	T.M.D.S. data 0+	
4	SDL-	19	T.M.D.S. DATA 0/XUSB1 shield	
5	SDL+	20	XUSB1-	
6	DDC clock	21	XUSB1+	
7	DDC data	22	T.M.D.S. clock shield	
8	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 51: 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 52: 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
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 52: Segment lengths, resolutions and SDL cables (cont.)

1) See table 53 "Requirements for SDL cable with automatic cable adjustment (equalizer)" on page 128

2) See table 54 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)" on page 129

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	Comment
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**	**Comment**
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 53: 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	Comment
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**	**Comment**
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 54: 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.

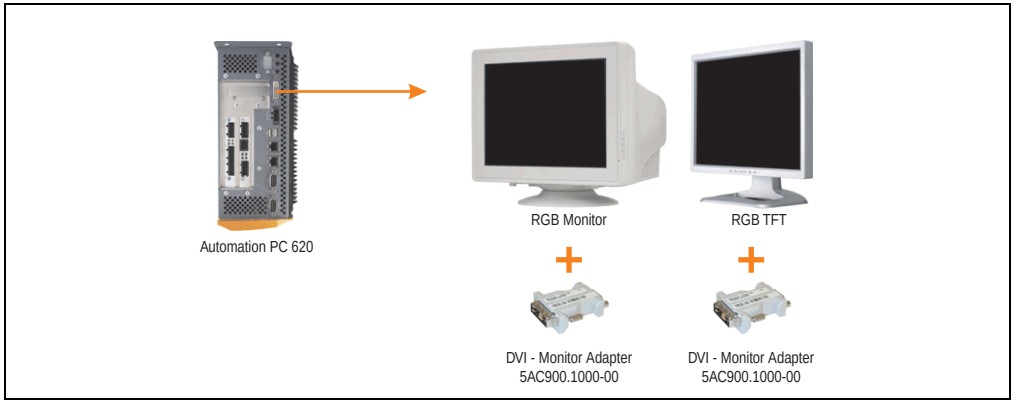


Figure 38: Monitor / Panel connection with RGB video signal

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.

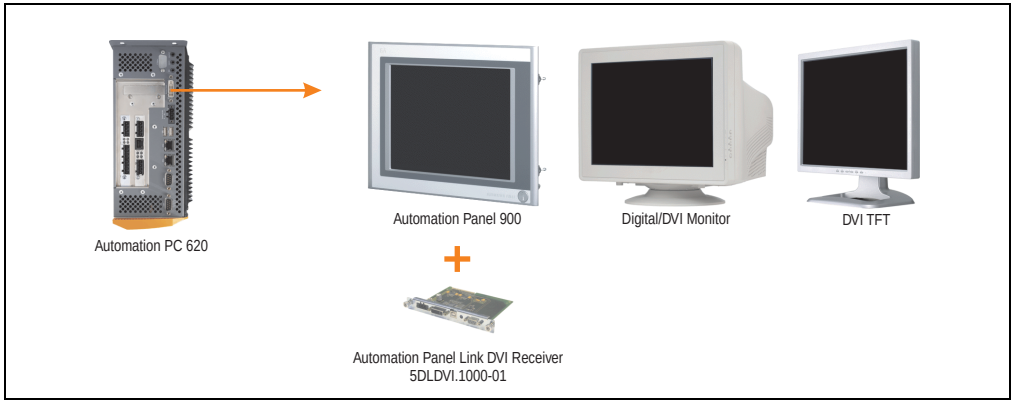


Figure 39: Monitor / Panel connection with DVI video signal

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 280.

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).

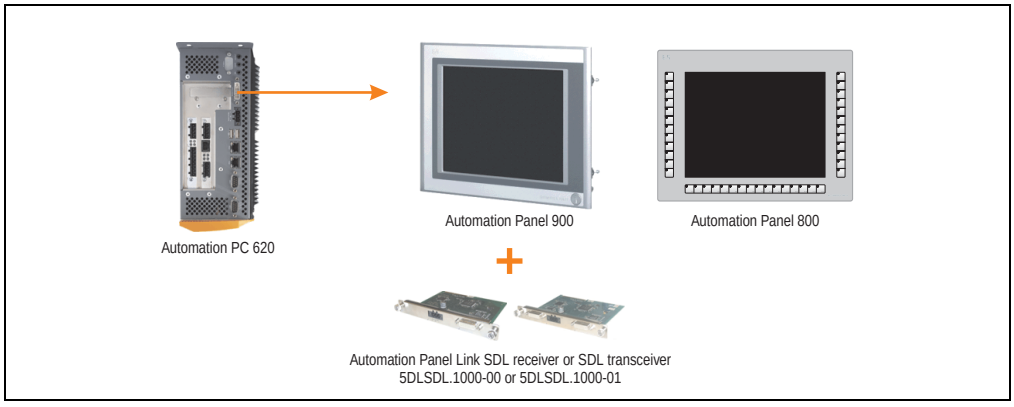


Figure 40: Monitor / Panel connection with SDL video signal

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 280.

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.

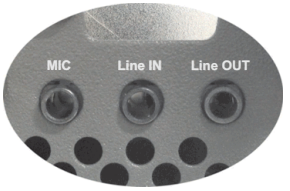
MIC, Line IN and Line OUT		
Controller	Realtek AC97	3.5 mm socket, female 
MIC	Connection of a mono microphone with a 3.5 mm stereo (headphone) jack.	
Line IN	Stereo Line IN signal supplied via 3.5 mm plug.	
Line OUT	Connection of a stereo sound reader (e.g. amplifier) via a 3.5 mm plug.	

Table 55: 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 and Windows XP Embedded are available for download on the B&R Homepage in the download area (**www.br-automation.com**).

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 245.

Information:

APC620 embedded devices do not have this option.

Add-on interface slot		
		
Available add-on interfaces		
5AC600.CANI-00	Add-on CAN interface	
5AC600.485I-00	Add-on RS232/422/485 interface	

Table 56: 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 57: 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 13 "APC620 UPS" on page 667.

For info on configuring the UPS module, see chapter 4 "Software", section 7.3 "UPS configuration" on page 554.

For info on installing the UPS module, see chapter 7 "Maintenance / Servicing", section 4 "Installation of the UPS module" on page 709.

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 259.

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.

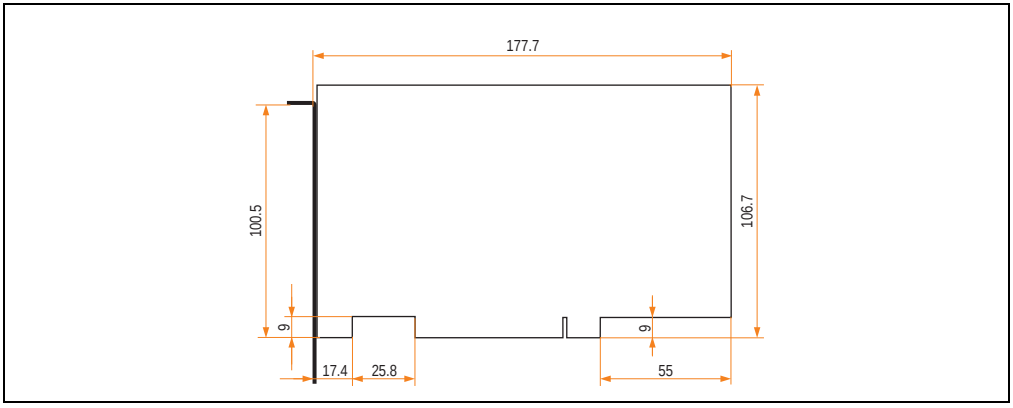


Figure 41: Dimensions - Standard half-size PCI cards

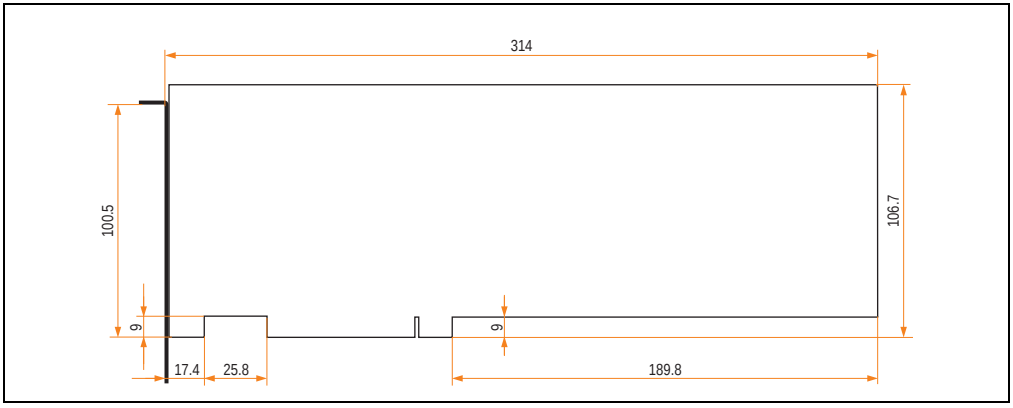


Figure 42: Dimensions - Standard full-size PCI cards

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 86 or section "Power management APC620 system unit with 3 PCI slots" on page 96 and "Power management APC620 system units with 5 PCI slots" on page 98).

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 58: 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.

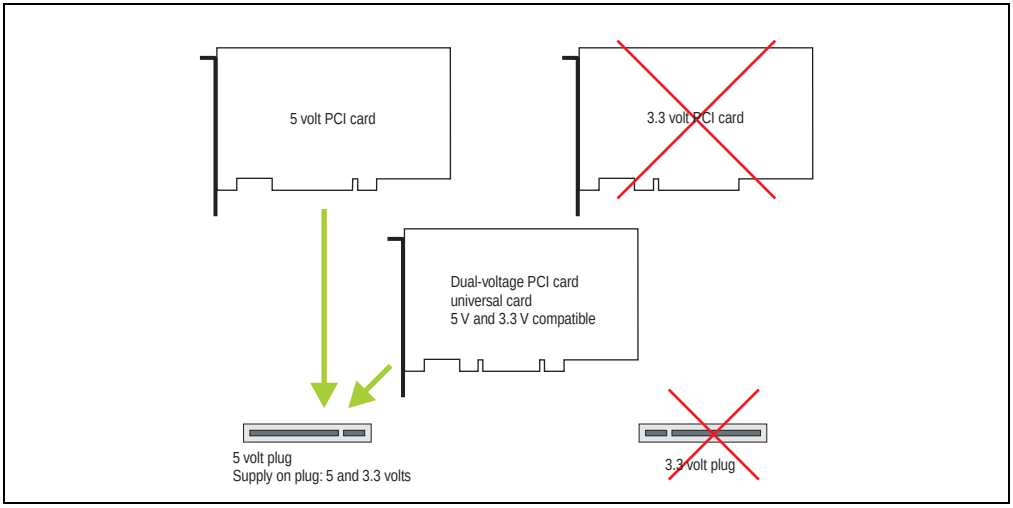


Figure 43: PCI connector type: 5 volt

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 139 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.	
Link 2	Yellow	-	In preparation	

Table 59: 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 44: 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

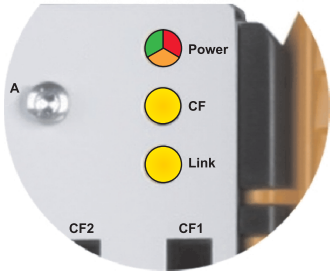


Table 60: Status LEDs Power, CF, Link (only APC620 embedded)

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 15 "Model numbers - CompactFlash cards" on page 38.

See the section "CompactFlash slots (only APC620 embedded)" on page 142 for a description of the CompactFlash slots on APC620 embedded devices.

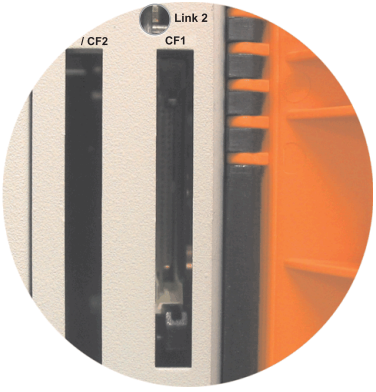
CompactFlash slot (CF1)		
Connection	Primary master IDE device	
CompactFlash Type	Type I	
Accessories	**Short description**	
5CFCRD.0064-03	CompactFlash 64 MB SSI	
5CFCRD.0128-03	CompactFlash 128 MB SSI	
5CFCRD.0256-03	CompactFlash 256 MB SSI	
5CFCRD.0512-03	CompactFlash 512 MB SSI	
5CFCRD.1024-03	CompactFlash 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 61: 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 142 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.

Hard disk / CompactFlash slot (HDD/CF2)		
Connection	Primary slave IDE device	
Add-on hard disks 2.5" drive (internal)		
5AC600.HDDI-05	Add-on hard disk 40 GB ET, 24/7	
5AC600.HDDI-06	Add-on hard disk 80 GB ET, 24/7	
Add-on CompactFlash slot		
5AC600.CFSI-00	Add-on CompactFlash slot	
CompactFlash Type	Type I	
Accessories	**Short description**	
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 62: 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.

CompactFlash slot (CF1 / CF2)		
Connection CF1 CF2	 Primary master IDE device Primary slave IDE device	
CompactFlash Type	 Type I	
Accessories	**Short description**	
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 63: 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 375 for 815E CPU boards (ETX), or section "Power" on page 431 for 855GME CPU boards (ETX) or section "Power" on page 488 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 64: 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 65: 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!).

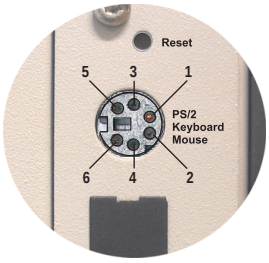
Connection for keyboard/mouse (PS/2)		
Pin	Assignment	PS/2 socket, female
1	DATA 0	
2	DATA 1	
3	GND	
4	+5 V[1)]	
5	CLK 0	
6	CLK 1	

Table 66: 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 (2 1/2 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).

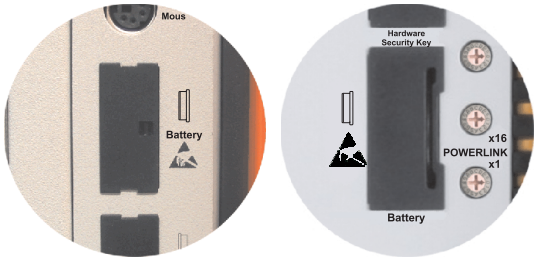
Battery		
Battery Type Removable Lifespan	 Renata 950 mAh Yes, accessible from the outside 4 years [1) 2)]	 APC620 with 1, 2, 3 and 5 PCI slots APC620 embedded
Accessories	**Short description**	
0AC201.9	**Lithium batteries (5x)** Lithium batteries (5 pcs.), 3 V / 950 mAh, button cell	
4A0006.00-000	**Lithium battery (1x)** Lithium battery (1 pcs.), 3 V / 950 mAh, button cell	

Table 67: 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 2 1/2 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 687.

For technical information on the lithium battery, see chapter 6 "Accessories", section 3 "Replacement CMOS batteries" on page 594.

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 68: 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 68: Meaning of battery status

Hardware requirements (system unit)

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

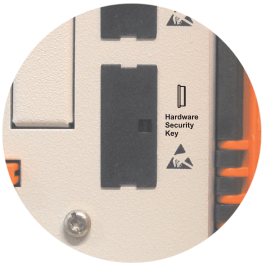
Hardware security key	
A hardware security key (dongle) can be inserted behind the black cover.	

Table 69: 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 70: 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 9 "Model numbers - Drives" on page 35.

For instructions about installing and replacing a slide-in, see chapter 7 "Maintenance / Servicing", section 3 "Slide-in drive - installation and exchange" on page 706.

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.

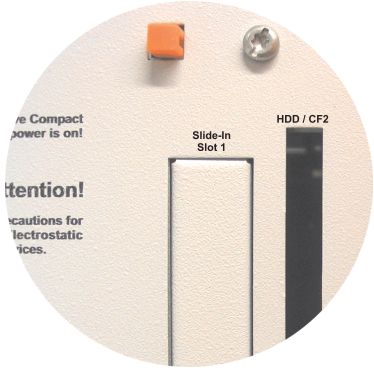
Slide-in slot 1		
Connection	Secondary slave IDE device	
Accessories	**Short description**	
5AC600.CDXS-00	Slide-in CD-ROM	
5AC600.CFSS-00	Slide-in CF 2-slot	
5AC600.DVDS-00	Slide-in DVD-ROM/CD-RW	
5AC600.DVRS-00	Slide-in DVD-R/RW, DVD+R/RW	
5AC600.FDDS-00	Slide-in USB FDD	
5AC600.HDDS-02	40 GB 24x7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

Table 71: 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 9 "Model numbers - Drives" on page 35.

For instructions about installing and replacing a slide-in, see chapter 7 "Maintenance / Servicing", section 3 "Slide-in drive - installation and exchange" on page 706.

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 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.

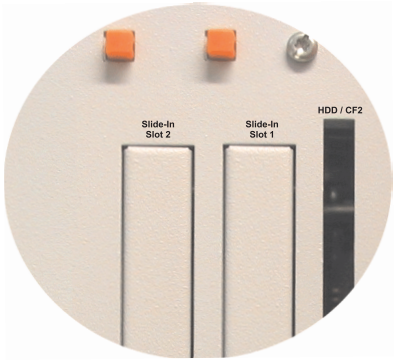
Slide-in slot 2		
Connection	Secondary master IDE device	
Accessories	**Short description**	
5AC600.CDXS-00	Slide-in CD-ROM	
5AC600.CFSS-00	Slide-in CF 2-slot	
5AC600.DVDS-00	Slide-in DVD-ROM/CD-RW	
5AC600.DVRS-00	Slide-in DVD-R/RW, DVD+R/RW	
5AC600.FDDS-00	Slide-in USB FDD	
5AC600.HDDS-02	Slide-in hard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

Table 72: 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).

Figure 45: 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.

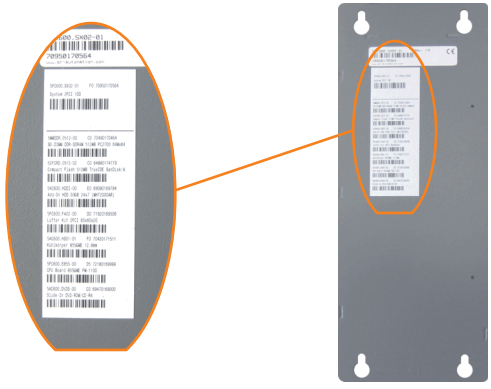
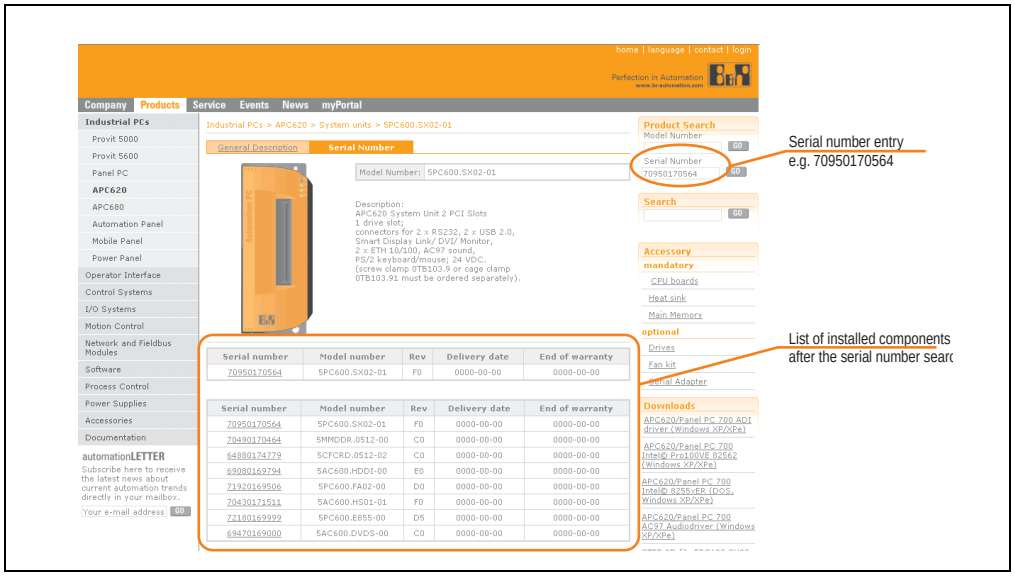


Figure 46: APC620 serial number sticker on back-side

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	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.HDD1-00	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

Figure 47: 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

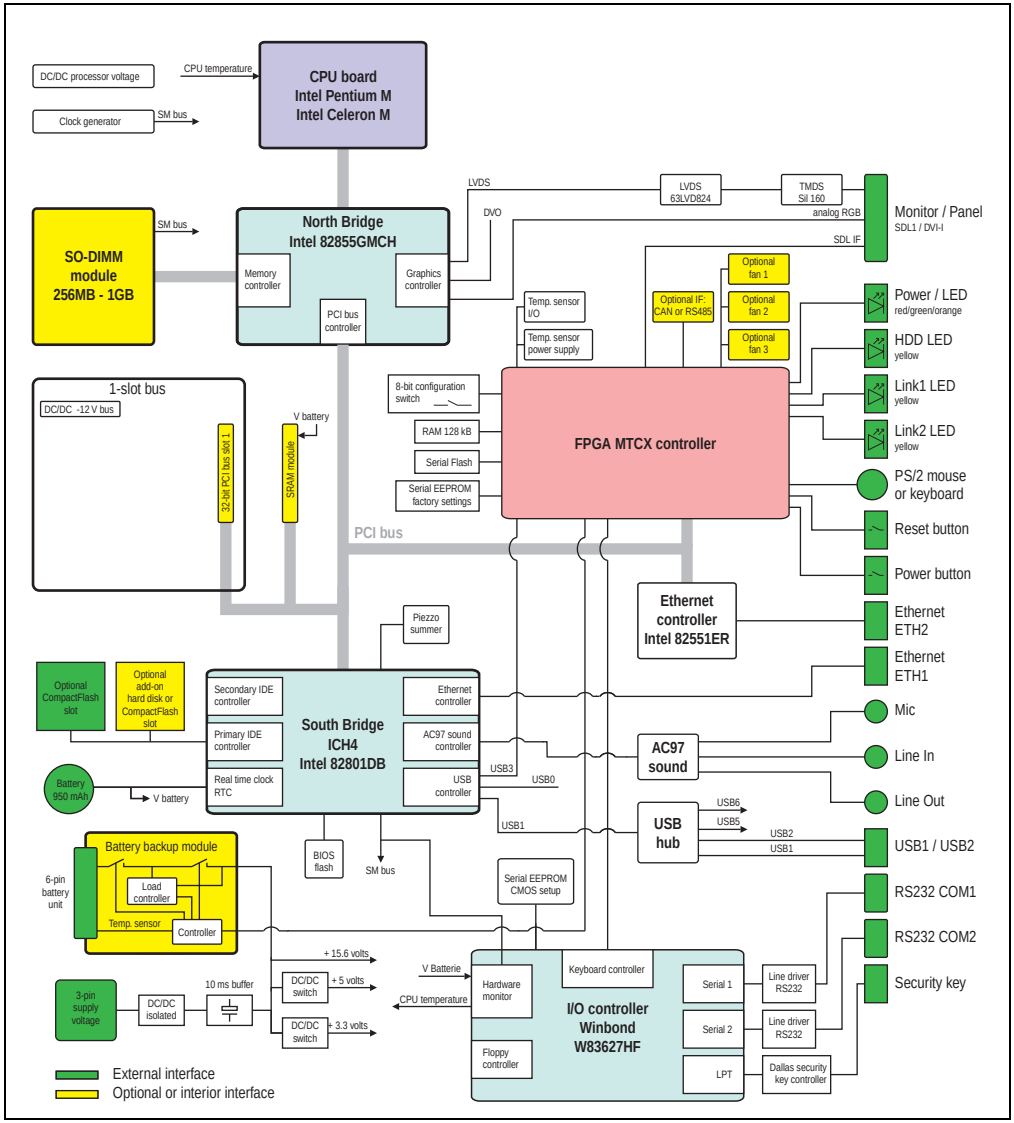


Figure 48: Block diagram of entire device with system unit 5PC600.SX01-00 and 855GME CPU board

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

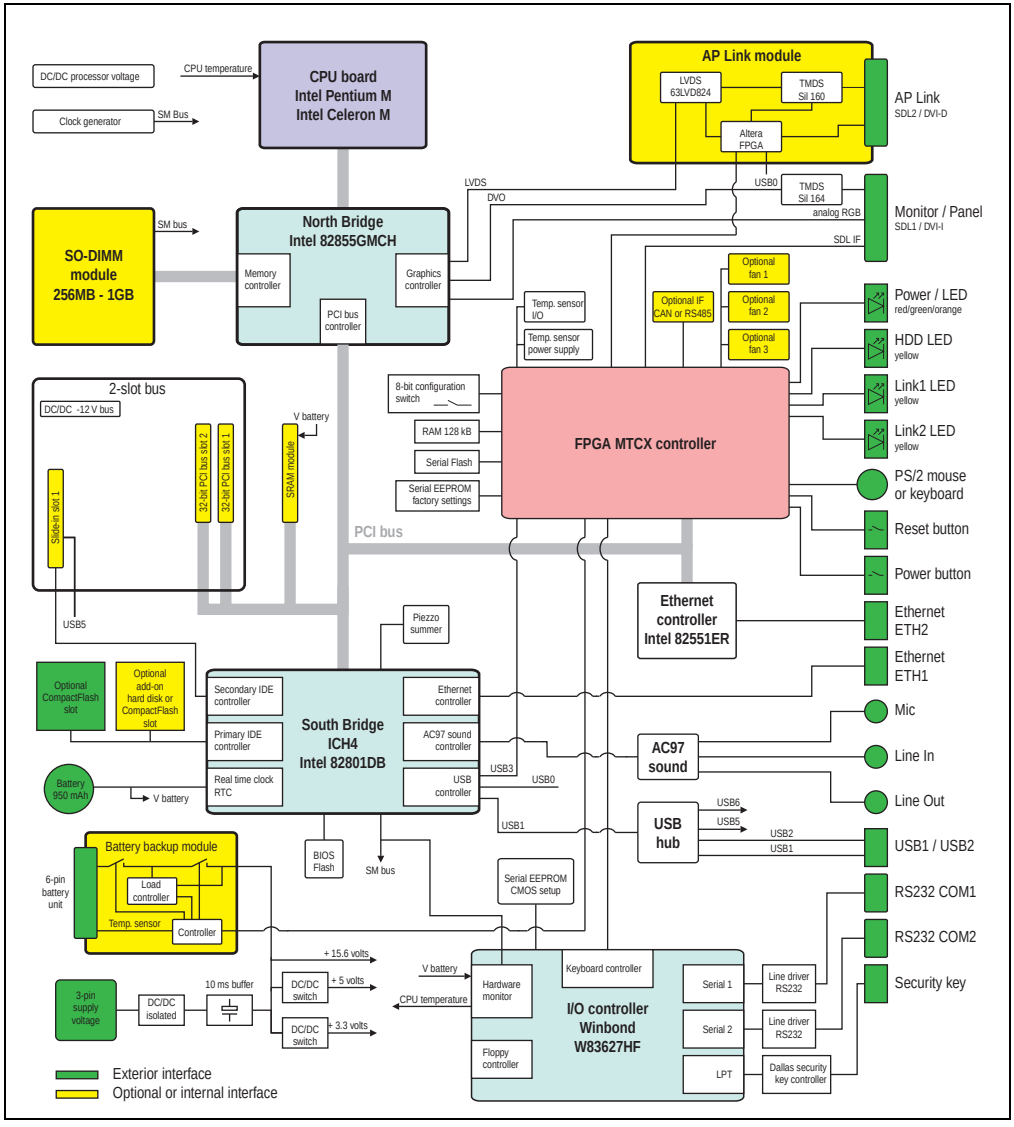


Figure 49: Block diagram of entire device with system unit 5PC600.SX02-00 and 855GME CPU board

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

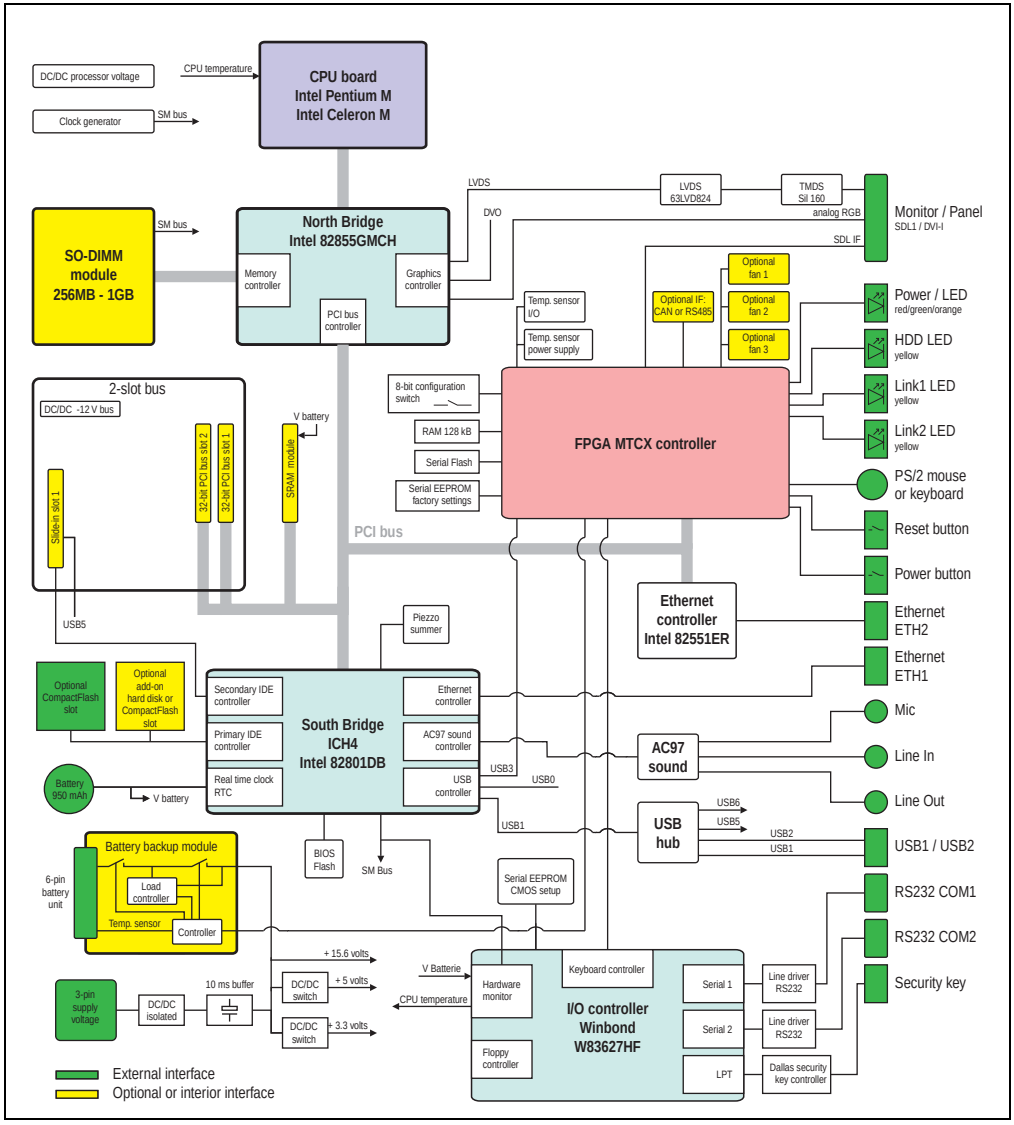


Figure 50: Block diagram of entire device with system unit 5PC600.SX02-01 and 855GME CPU board

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

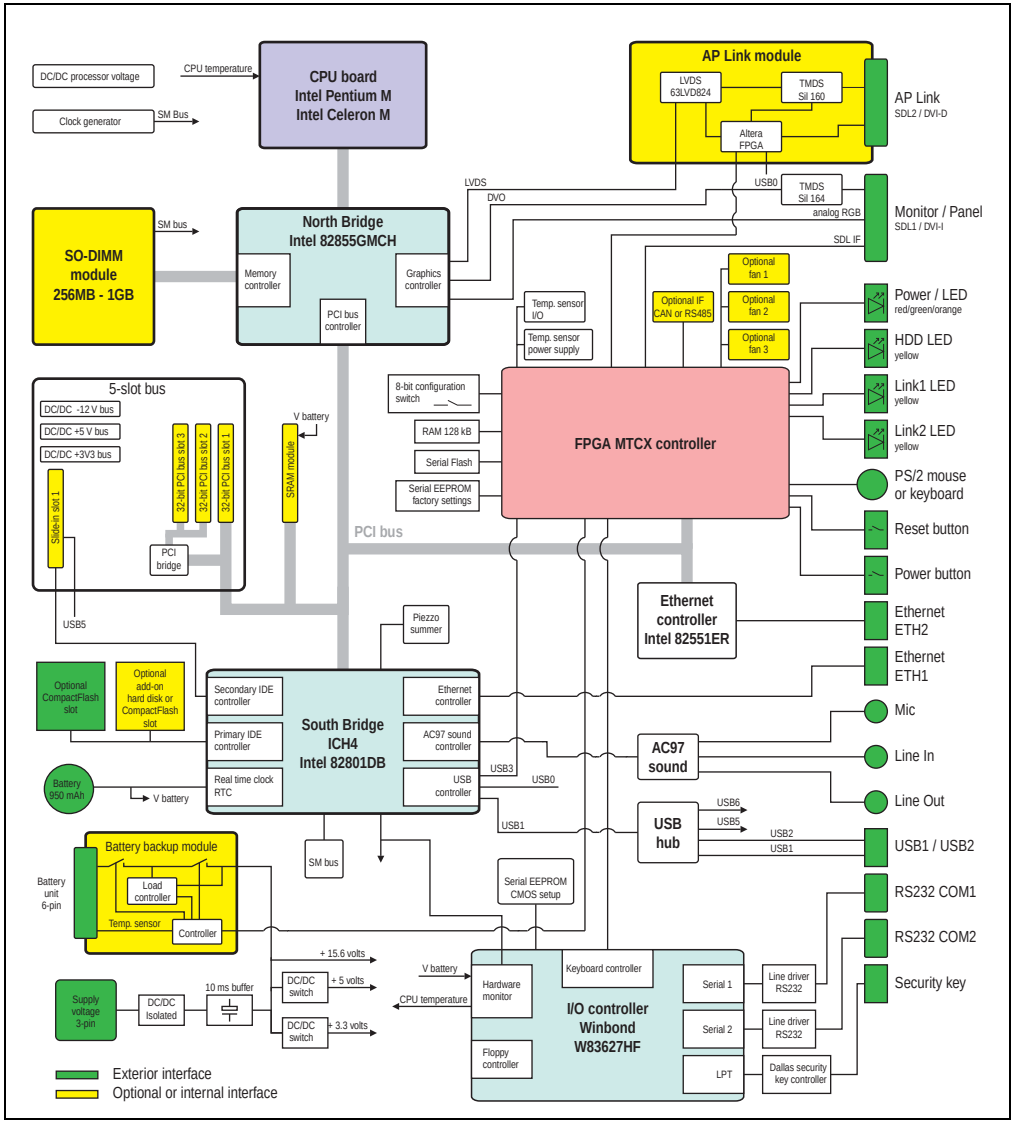


Figure 51: Block diagram of entire device with system unit 5PC600.SF03-00 and 855GME CPU board

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

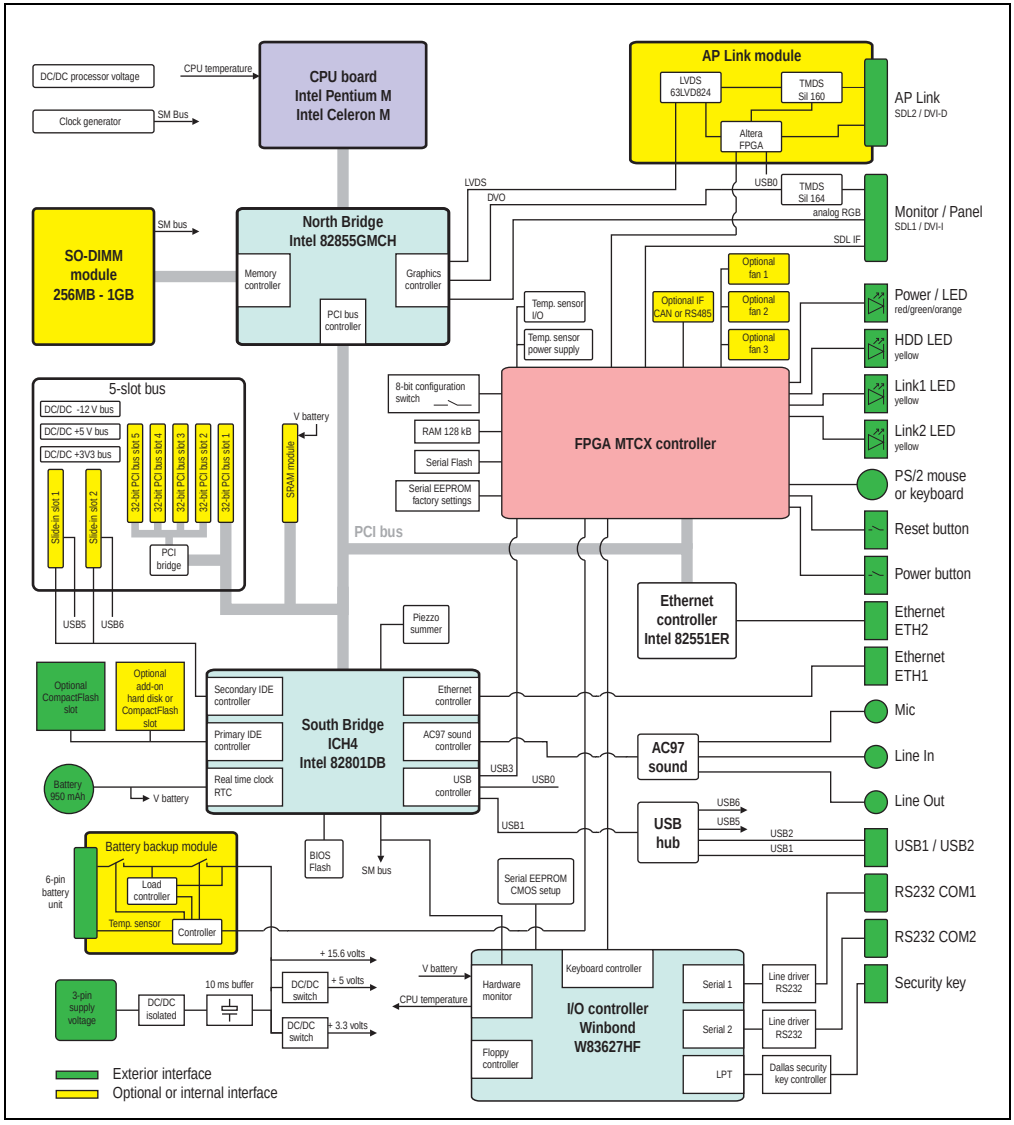


Figure 52: Block diagram of entire device with system unit 5PC600.SX05-00 and 855GME CPU board

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

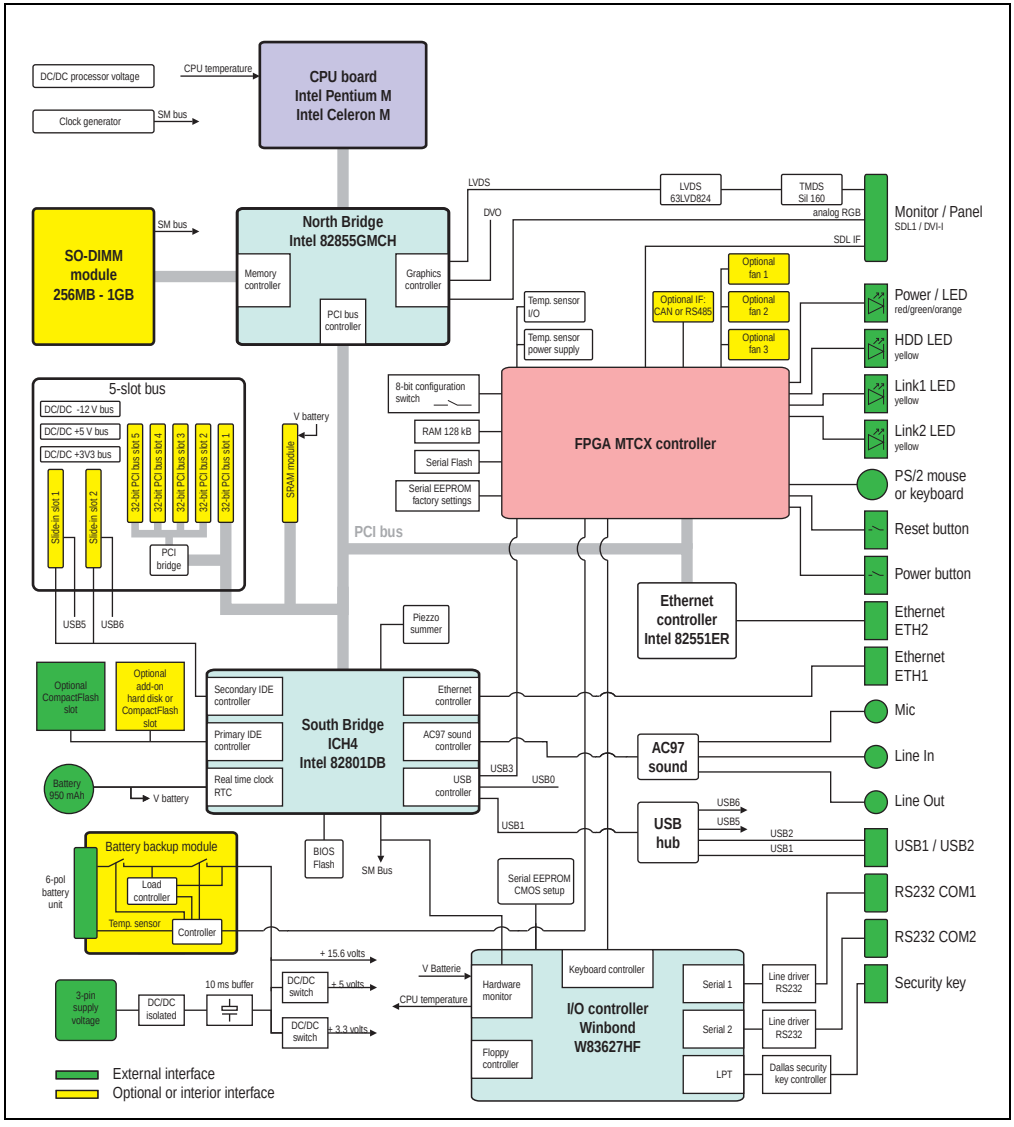


Figure 53: Block diagram of entire device with system unit 5PC600.SX05-01 and 855GME CPU board

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

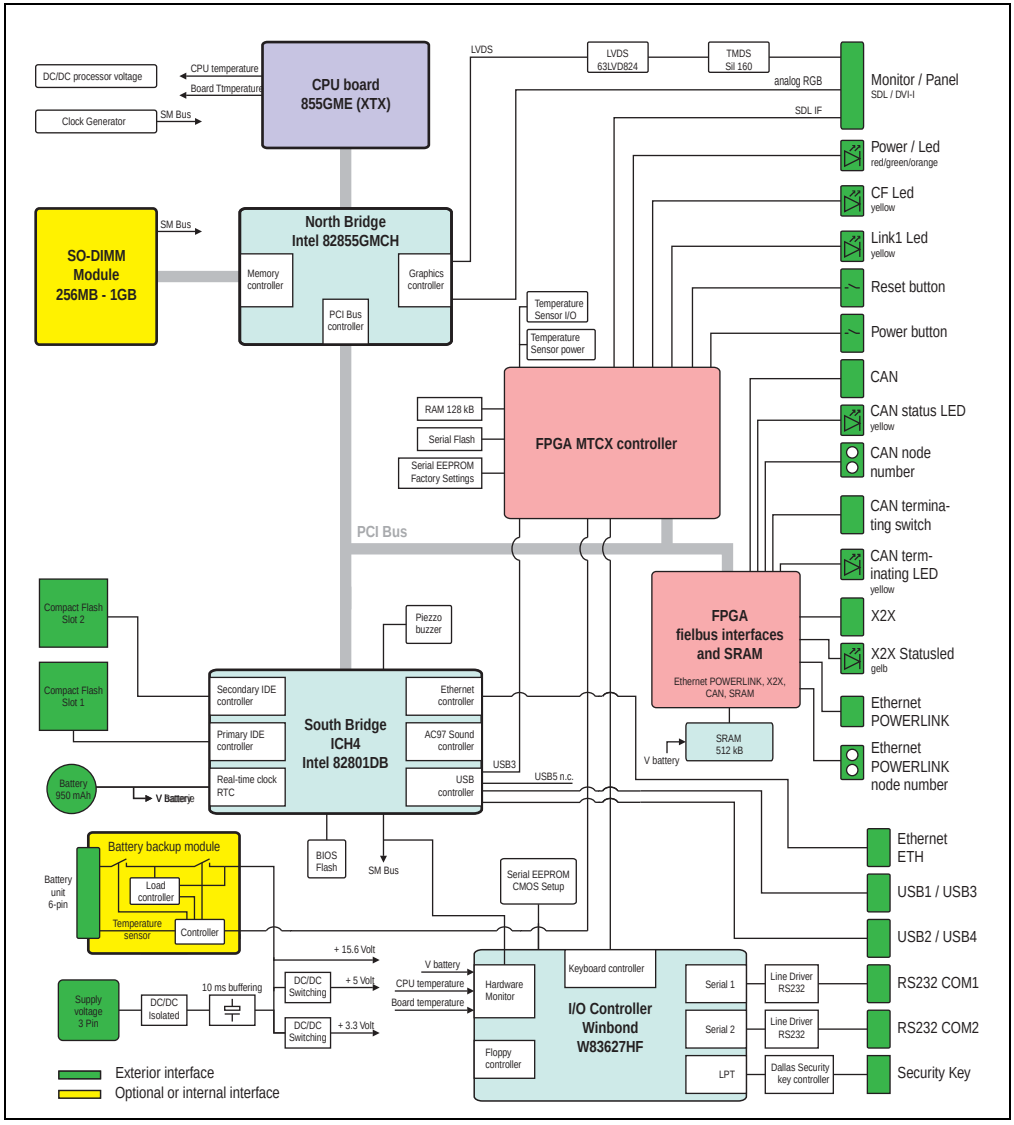


Figure 54: Block diagram of entire device with system unit 5PC600.SE00-00 and 855GME CPU board

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

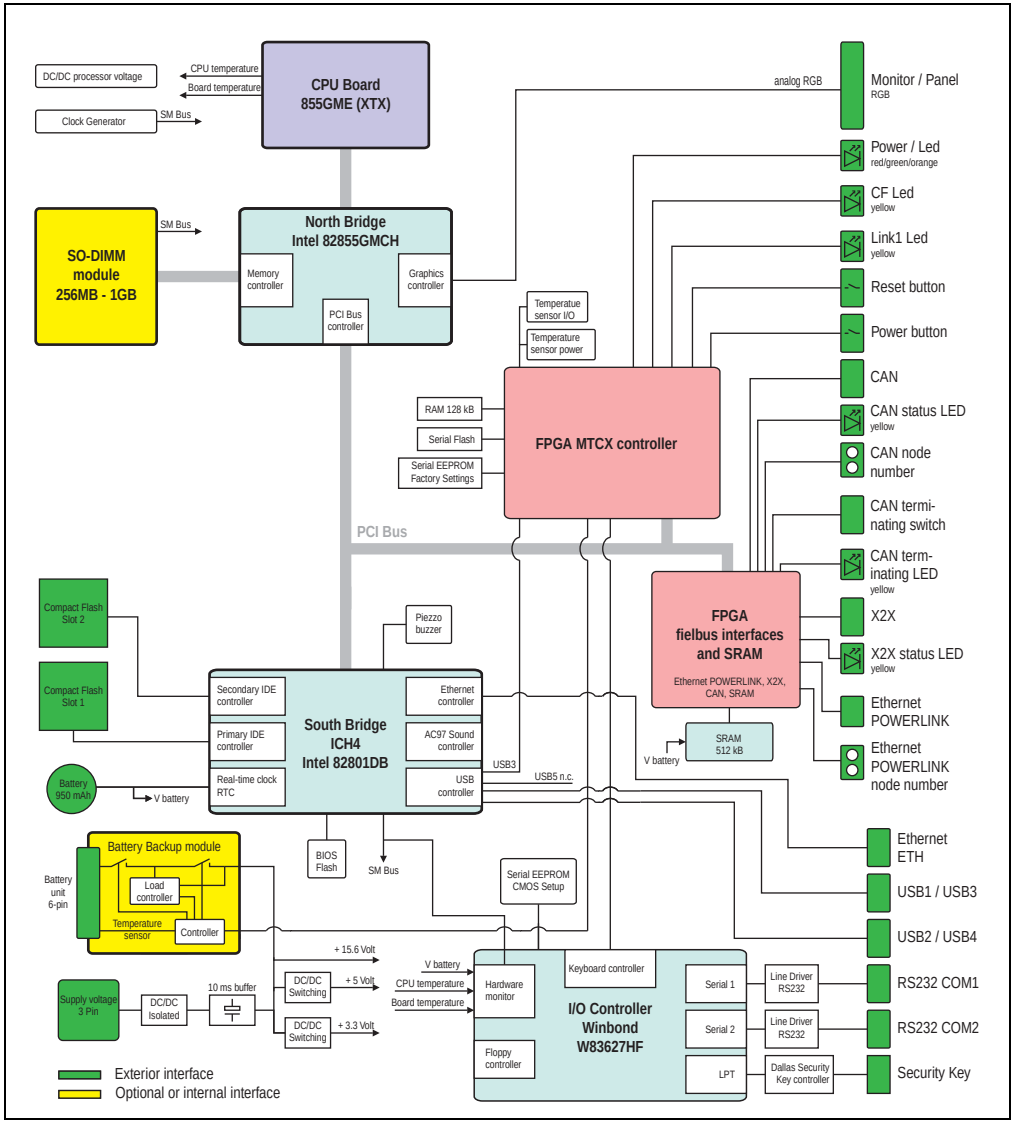


Figure 55: Block diagram of entire device with system unit 5PC600.SE00-01 and 855GME CPU board

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

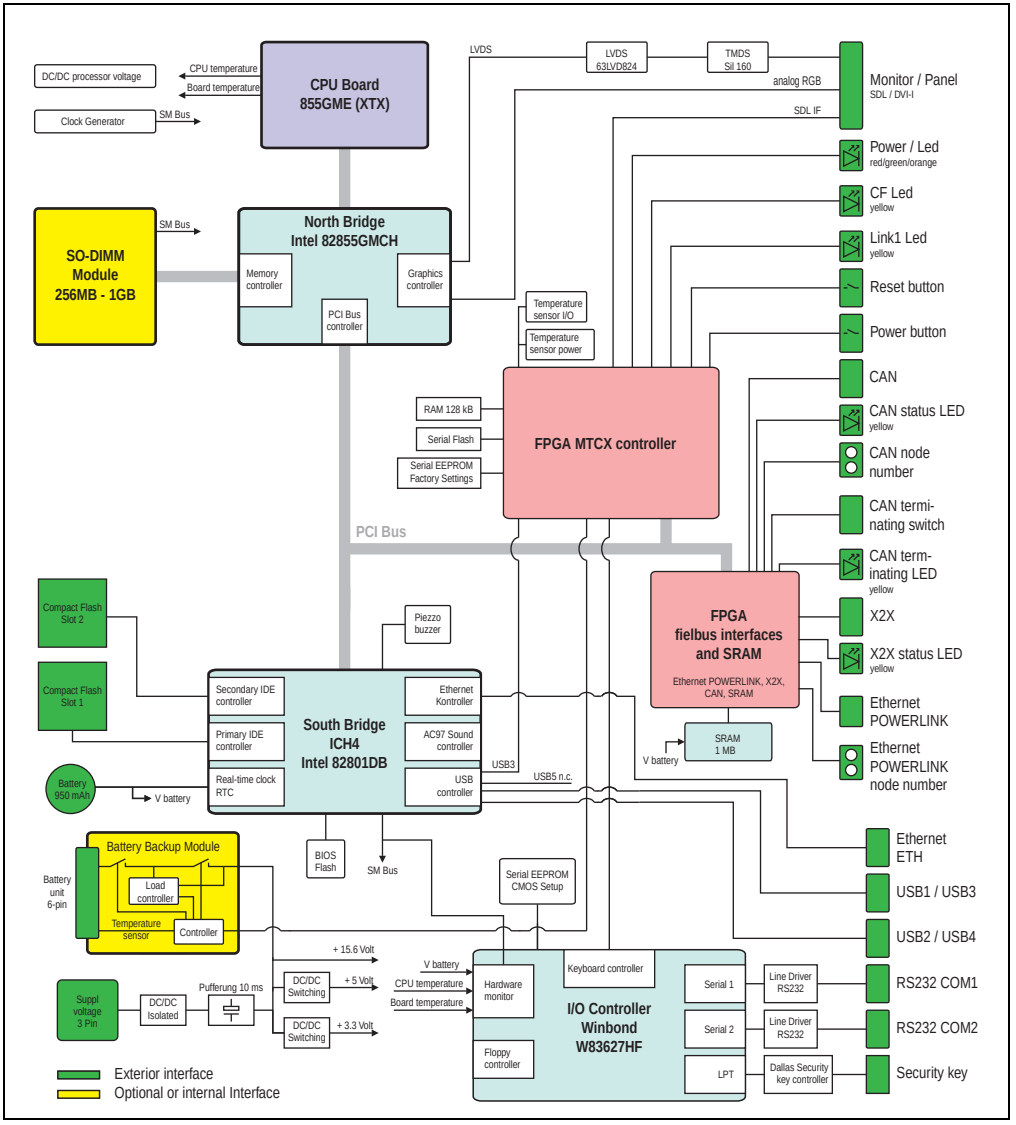


Figure 56: Block diagram of entire device with system unit 5PC600.SE00-02 and 855GME CPU board

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						
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 118 and "Ethernet connection ETH2" on page 120 10/100 Mbit/s RJ45 twisted pair (10 BaseT / 100 BaseT)					
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 73: 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 section 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)] Material 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 73: Technical data - 1, 2, 3 and 5 PCI slot types (cont.)

1) **M**ain**t**enance **C**ontroller E**x**tended, for more information, see the section "Maintenance Controller Extended (MTCX)" on page 739.

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			
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 117 10/100 Mbit/s RJ45 twisted pair (10 BaseT / 100 BaseT)		
Ethernet POWERLINK Amount Station number switches	 1 2 pcs.		
X2X Link Amount Status LED	 1 Yes, see page 115		
CAN bus Amount Transfer rate Node switch Terminating resistor Status LED	See also page 113 1 Max. 500 kBit/s Yes Yes, can be activated using a switch Yes, see page 115		
USB interface Type Amount Transfer rate Connection	 USB 2.0 4 Up to 480 Mbit (high speed) Type A		
Monitor / Panel	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		
CompactFlash slot 2 (CF2) Internal organization	integrated Primary slave		

Table 74: Technical data - APC620 embedded variations

Features	5PC600.SE00-00	5PC600.SE00-01	5PC600.SE00-02
Insert for slide-in drive 1 Internal organization	-		
Insert for slide-in drive 2 Internal organization	-		
APC620 UPS module optional	Yes		
SRAM Quantity	Yes 512 kB	Yes 512 kB	Yes 1 MB
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 7A maximum 40 A for < 300 µs See section 2.12 "Power management for the APC620 embedded system unit".		
Mechanical characteristics			
Housing[2)] Material 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 74: Technical data - APC620 embedded variations (cont.)

1) **M**ain**t**enance **C**ontroller E**x**tended, for more information, see the section "Maintenance Controller Extended (MTCX)" on page 739.

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

3.2 CPU boards 815E (ETX)

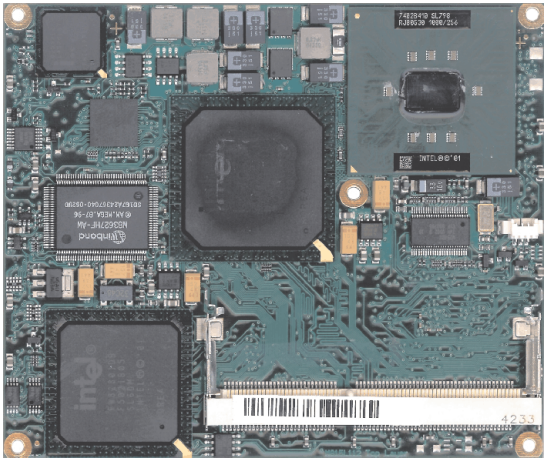


Figure 57: CPU boards 815E (ETX)

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those 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 337)		
Processor Architectures Type 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
IDE ports	2 IDE ports, UDMA 100		

Table 75: Technical data - 815E CPU boards (ETX)

Features	5PC600.E815-00	5PC600.E815-02	5PC600.E815-03
Memory Type Quantity Socket	 SDRAM Max. 512 MB SO-DIMM 144-pin		
Graphics Controller Memory Color depth	Support up to SXGA display units Intel 82815 (integrated in the Chipset) 32 MB shared memory (reserved in the main memory) Max. 24 bit		

Table 75: Technical data - 815E CPU boards (ETX) (cont.)

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

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**).

3.3 CPU boards 855GME (ETX)

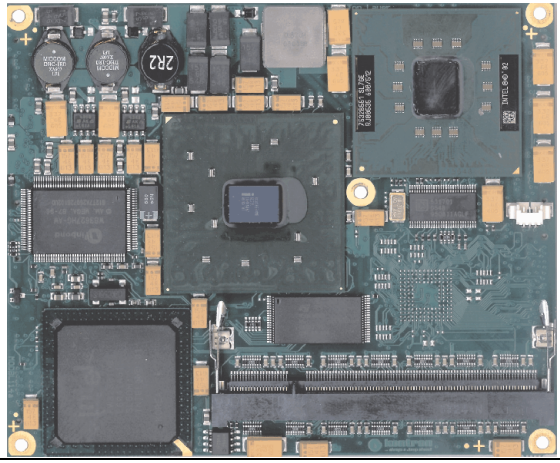


Figure 58: CPU boards 855GME (ETX)

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those 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 391)					
Processor						
Architectures	0.13 µm	0.13 µm	0.90 nm	0.90 nm	0.13 µm	0.13 µm
Type	Intel Pentium M 1.1 GHz	Intel Pentium M 1.6 GHz	Intel Pentium M 1.4 GHz	Intel Pentium M 1.8 GHz	Intel Celeron M 600 MHz	Intel Celeron M 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)					
Real-time clock (RTC)						
Battery-buffered	Yes					
Accuracy	At 25°C typ. 12 ppm (1 second)[1)] per day					

Table 76: 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
Front side bus	400 MHz					
IDE ports	2 IDE ports, UDMA 100					
Memory Type Quantity Socket	 DDRAM Max. 1 GB SO-DIMM 200-pin					
Graphics Controller Memory Color depth	 Intel Extreme Graphics 2 (integrated in the chipset) 64 MB shared memory (reserved in the main memory) Max. 32 bit					

Table 76: Technical data - CPU boards 855GME (ETX) (cont.)

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

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. They can be downloaded from the download area on the B&R homepage (**www.br-automation.com**).

3.4 CPU boards 855GME (XTX)

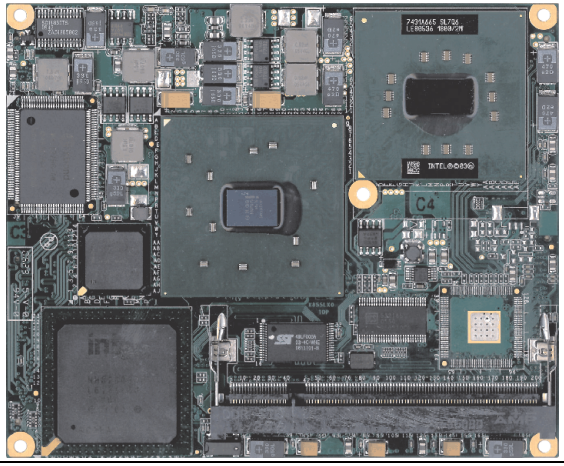


Figure 59: CPU boards 855GME (XTX)

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those 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 446)					
Processor						
Architectures	0.13 µm	0.13 µm	0.90 nm	0.90 nm	0.13 µm	0.13 µm
Type	Intel Pentium M 1.1 GHz	Intel Pentium M 1.6 GHz	Intel Pentium M 1.4 GHz	Intel Pentium M 1.8 GHz	Intel Celeron M 600 MHz	Intel Celeron M 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)					
Real-time clock (RTC)						
Battery-buffered	Yes					
Accuracy	At 25°C typ. 12 ppm (1 second)[1)] per day					

Table 77: 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
Front side bus	400 Mhz					
IDE ports	2 IDE ports, UDMA 100					
Memory Type Quantity Socket	 DDRAM Max. 1 GB SO-DIMM 200-pin					
Graphics Controller Memory Color depth	 Intel Extreme Graphics 2 (integrated in the chipset) Up to 64 MB shared memory (reserved in the main memory) Max. 32 bit					

Table 77: Technical data - CPU boards 855GME (XTX) (cont.)

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

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. They can be downloaded from the download area on the B&R homepage (**www.br-automation.com**).

3.5 Heat sink

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

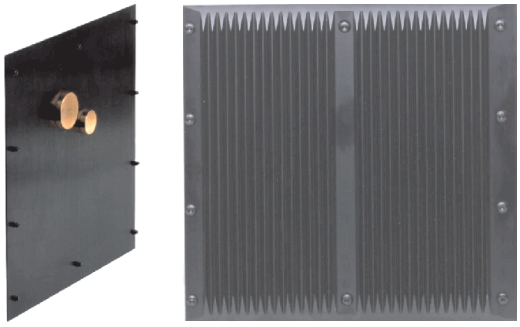


Figure 60: Heat sink

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
Material	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 138 mm 12.8 mm
Weight	Approx. 1340 g		Approx. 1640 g	Approx. 2000 g	Approx. 3200 g	Approx. 900 g

Table 78: 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.

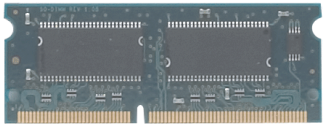


Figure 61: Main memory module

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 79: 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.

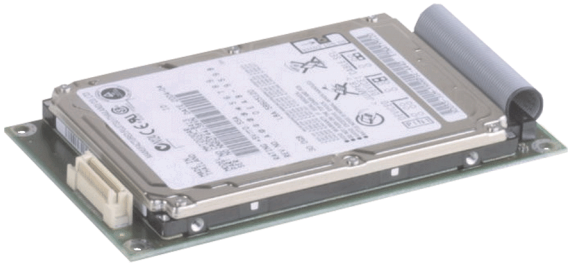


Figure 62: Add-on hard disk 30 GB 24x7 - 5AC600.HDDI-00

Technical data

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those 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 80: 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 To 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 temperature[1)] Operation - Standard [2)] Operation - 24-hour [3)] Storage Transport	 +5°C .. +55°C +5°C .. +44°C -40°C .. +65°C -40°C .. +65°C
Relative humidity Operation Storage Transport	 8 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage	 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 Storage	 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 Storage	 - 300 to 3000 meters - 300 to 12000 meters

Table 80: Technical data - Add-on hard disk 5AC600.HDDI-00 (cont.)

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 - Operation and storage

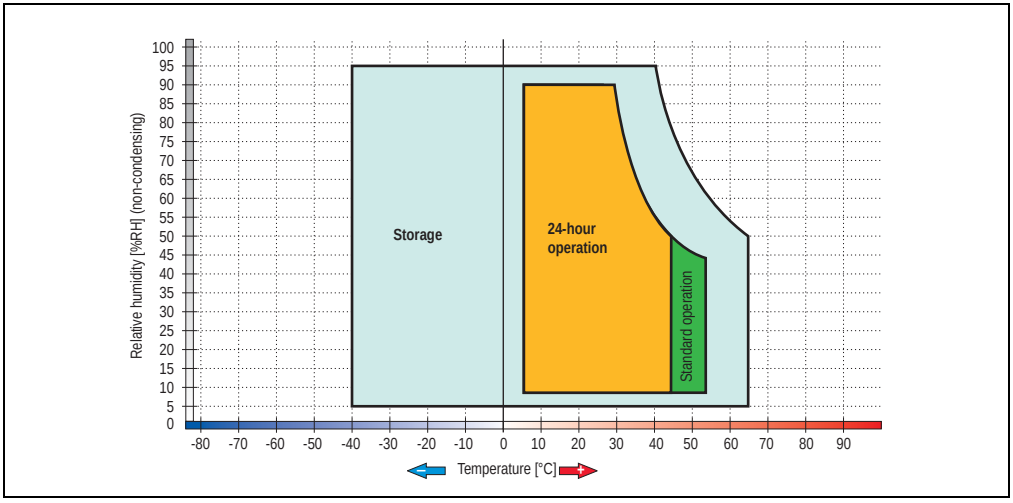


Figure 63: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-00

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).

3.7.2 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.

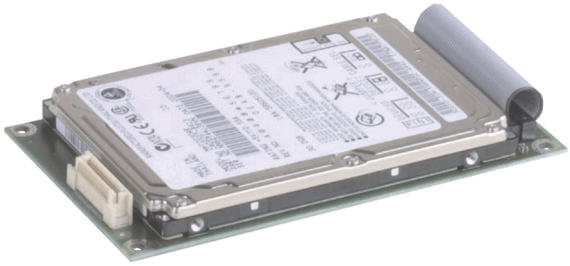


Figure 64: Add-on hard disk 20 GB - 5AC600.HDDI-01

Technical data

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those 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 81: 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 To 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)] Storage Transport	 -20°C .. +80°C -40°C .. +85°C -40°C .. +85°C
Relative humidity Operation Storage Transport	 8 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage	 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 Storage	 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 Storage	 - 300 to 3000 meters - 300 to 12000 meters

Table 81: Technical data - Add-on hard disk 5AC600.HDDI-01 (cont.)

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 - Operation and storage

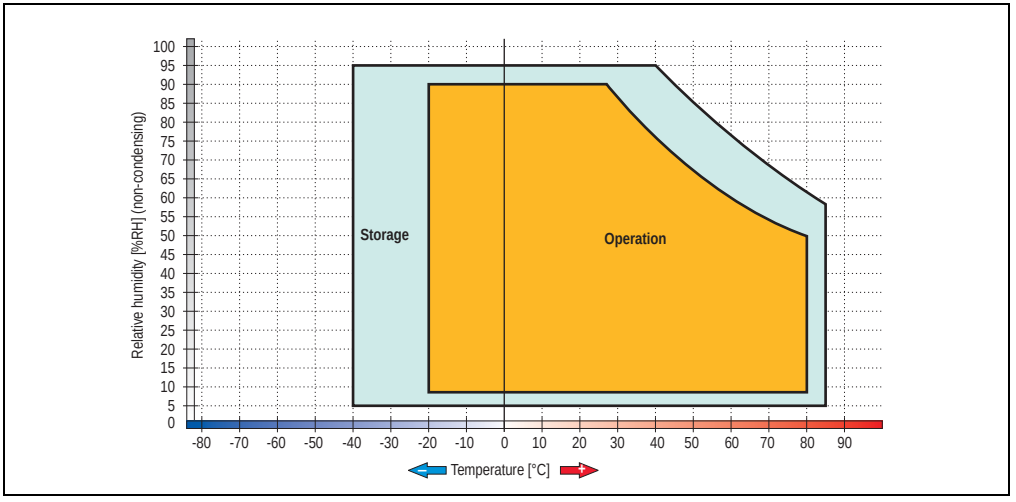


Figure 65: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-01

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).

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.

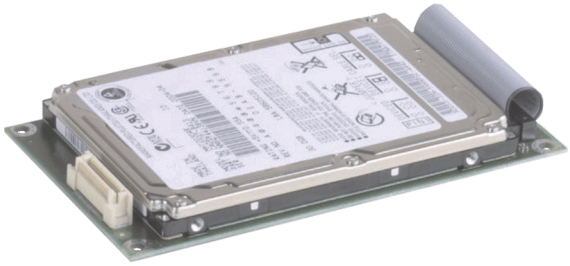


Figure 66: Add-on hard disk 40 GB - 5AC600.HDDI-02

Technical data

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those 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 82: 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 To the medium To / from host	 236 to 507 MBits/sec 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 hours[1)]
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[2)] Operation - Standard [3)] Operation - 24-hour [4)] Storage Transport	 +5°C .. +55°C +5°C .. +40°C -40°C .. +65°C -40°C .. +65°C
Relative humidity Operation Storage Transport	 8 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage	 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 Storage	 Max. 200 g (1960 m/s^2 0-peak) and 2 ms duration, no non-recovered errors Max. 15 g (147 m/s^2 0-peak) and 11 ms duration, no non-recovered errors Max. 980 g (9800 m/s^2 0-peak) and 1 ms duration, no damage Max. 120 g (1176 m/s^2 0-peak) and 11 ms duration, no damage
Altitude Operation Storage	 - 300 to 3048 meters - 300 to 12,192 meters

Table 82: Technical data - add-on hard disk - 5AC600.HDDI-02 (cont.)

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 - Operation and storage

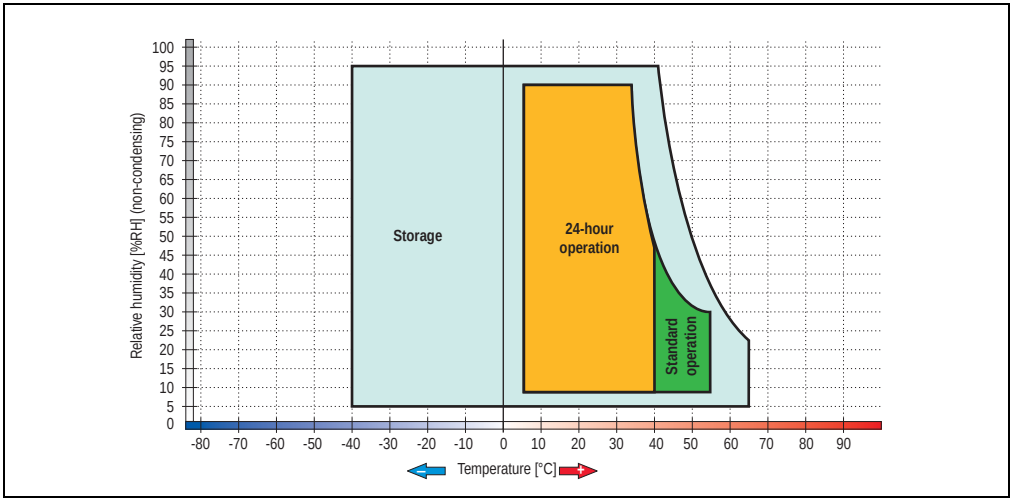


Figure 67: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-02

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).

3.7.4 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.

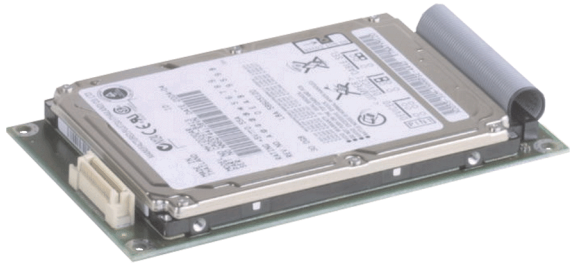


Figure 68: Add-on hard disk 60 GB - 5AC600.HDDI-03

Technical data

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those 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 83: 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 To the medium To / from host	 267 to 629 MBits/sec 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	
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[2)] Operation - Standard [3)] Operation - 24-hour [4)] Storage Transport	 +5°C .. +55°C +5°C .. +40°C -40°C .. +65°C -40°C .. +65°C
Relative humidity Operation Storage Transport	 8 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage	 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 Storage	 Max. 160 g (1568 m/s^2 0-peak) and 1 ms duration, no non-recovered errors Max. 300 g (2900 m/s^2 0-peak) and 2 ms duration, no non-recovered errors Max. 15 g (147 m/s^2 0-peak) and 11 ms duration, no non-recovered errors Max. 1000 g (9800 m/s^2 0-peak) and 1 ms duration, no damage Max. 120 g (1176 m/s^2 0-peak) and 11 ms duration, no damage
Altitude Operation Storage	 - 300 to 3048 meters - 300 to 12,192 meters

Table 83: Technical data - add-on hard disk - 5AC600.HDDI-03 (cont.)

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 - Operation and storage

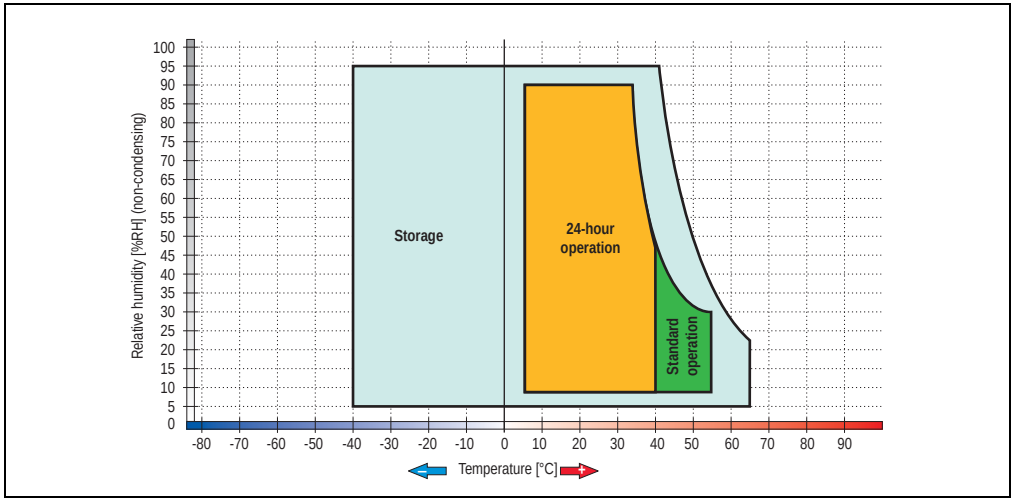


Figure 69: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-03

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).

3.7.5 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.

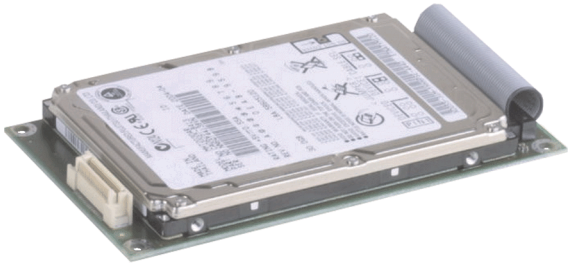


Figure 70: Add-on hard disk 80 GB - 5AC600.HDDI-04

Technical data

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those 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 84: 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 To the medium To / from host	 267 to 629 MBits/sec 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	
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[2)] Operation - Standard [3)] Operation - 24-hour [4)] Storage Transport	 +5°C .. +55°C +5°C .. +40°C -40°C .. +65°C -40°C .. +65°C
Relative humidity Operation Storage Transport	 8 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage	 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 Storage	 Max. 160 g (1568 m/s^2 0-peak) and 1 ms duration, no non-recovered errors Max. 300 g (2900 m/s^2 0-peak) and 2 ms duration, no non-recovered errors Max. 15 g (147 m/s^2 0-peak) and 11 ms duration, no non-recovered errors Max. 1000 g (9800 m/s^2 0-peak) and 1 ms duration, no damage Max. 120 g (1176 m/s^2 0-peak) and 11 ms duration, no damage
Altitude Operation Storage	 - 300 to 3048 meters - 300 to 12,192 meters

Table 84: Technical data - add-on hard disk - 5AC600.HDDI-04 (cont.)

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 - Operation and storage

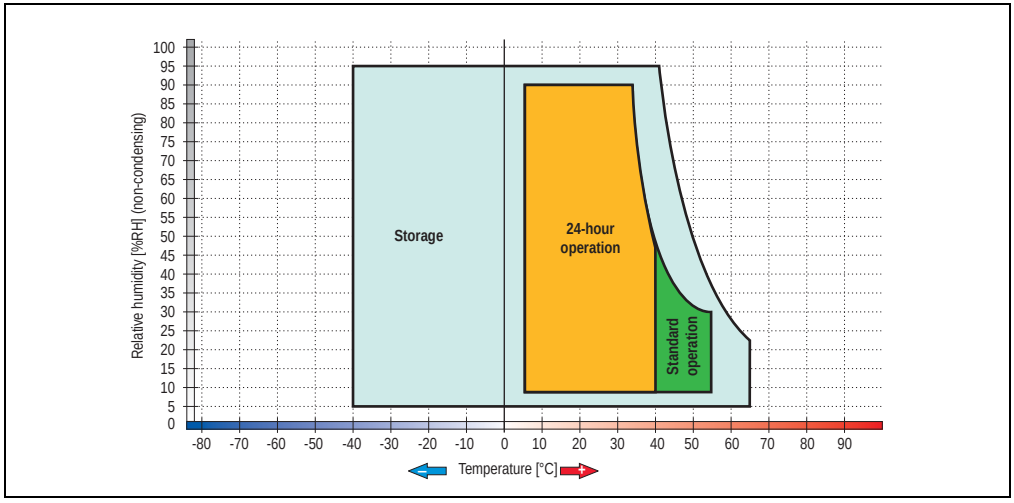


Figure 71: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-04

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).

3.7.6 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 72: 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 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 ³ 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 85: Technical data - Add-on hard disk 5AC600.HDDI-05

Features	5AC600.HDDI-05 < Revision D0	5AC600.HDDI-05 ³ 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 To the medium To / from host	Max. 321 MBits/sec Max. 100 MB/s (Ultra-DMA Mode 5)	Max. 450 MBits/sec 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 Storage Transport	-30°C .. +85°C -40°C .. +95°C -40°C .. +95°C	
Relative humidity Operation Storage Transport	5 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing	
Vibration Operation Storage	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 Storage	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 Storage	- 300 to 4419 meters - 300 to 12,192 meters	- 300 to 5000 meters - 300 to 12,192 meters

Table 85: Technical data - Add-on hard disk 5AC600.HDDI-05 (cont.)

1) With 8760 POH (Power On Hours) per year and 70°C surface temperature.

2) Temperature values for 305 meter elevation. 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 - Operation and storage

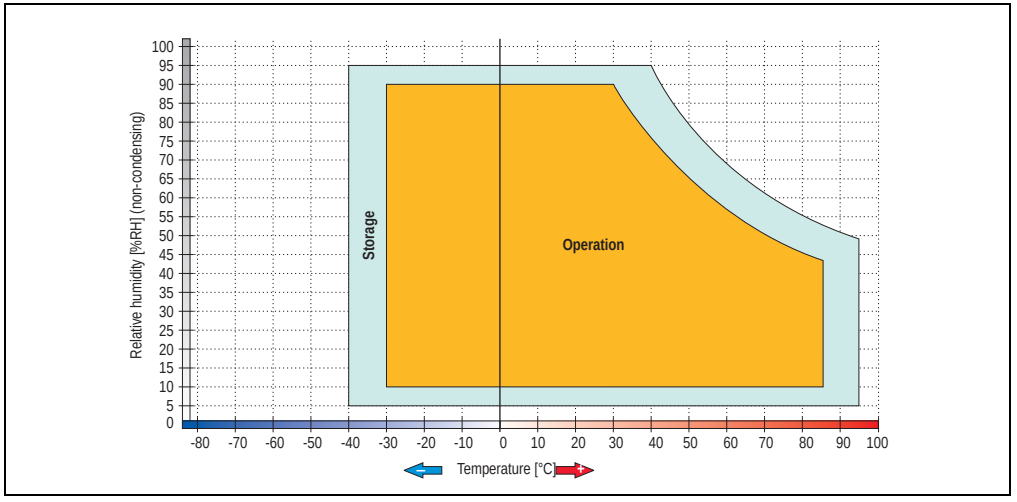


Figure 73: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-05

Temperature values for 305 meter elevation. 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.

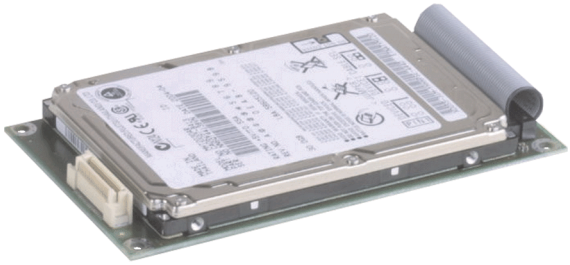


Figure 74: Add-on hard disk 80 GB - 5AC600.HDDI-06

Technical data

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those 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 86: 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 To the medium To / from host	 Max. 450 MBits/sec Max. 100 MB/s (Ultra-DMA Mode 5)
S.M.A.R.T. support	Yes
Cache	8 MB
MTBF	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	120 g
Environmental characteristics	
Ambient temperature[2)] Operation - Standard / 24-hour Storage Transport	 -30°C .. +85°C -40°C .. +95°C -40°C .. +95°C
Relative humidity Operation Storage Transport	 5 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage	 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 Storage	 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 Storage	 - 300 to 5000 meters - 300 to 12,192 meters

Table 86: Technical data - add-on hard disk - 5AC600.HDDI-06 (cont.)

1) With 8760 POH (Power On Hours) per year and 70°C surface temperature.

2) Temperature values for 305 meter elevation. 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 - Operation and storage

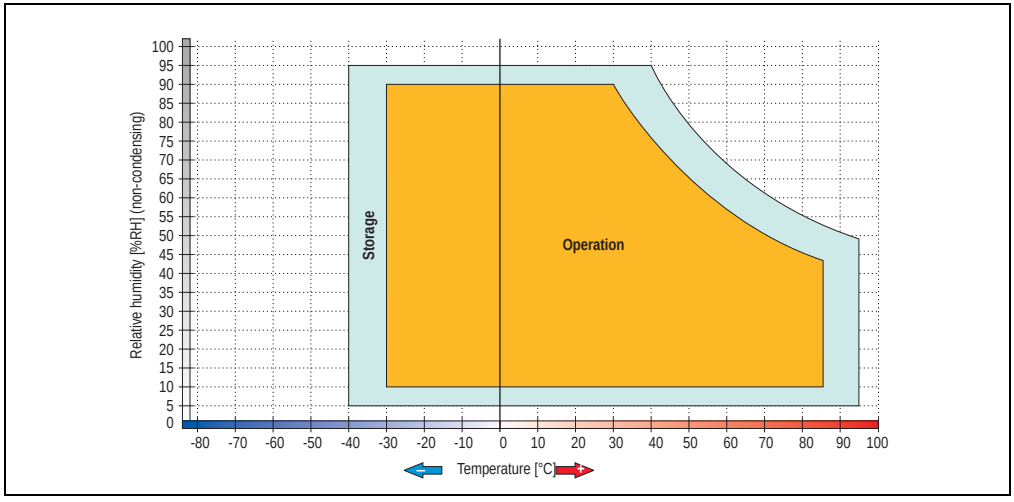


Figure 75: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-06

Temperature values for 305 meter elevation. 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.

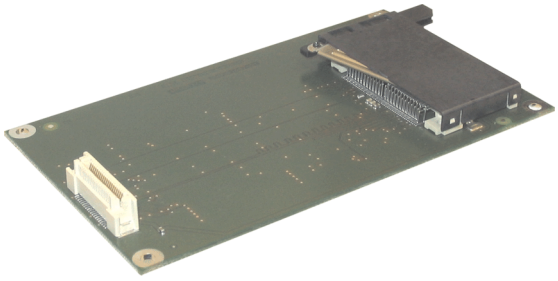


Figure 76: Add-on CompactFlash slot - 5AC600.CFSI-00

Technical data

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

Table 87: 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 77: 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 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/sec.
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 Storage Transport	 -5°C .. +60°C [2)] -20°C .. +60°C -40°C .. +65°C
Relative humidity Operation Storage Transport	 8 - 80%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage 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 Storage 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 88: 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 - Operation and storage

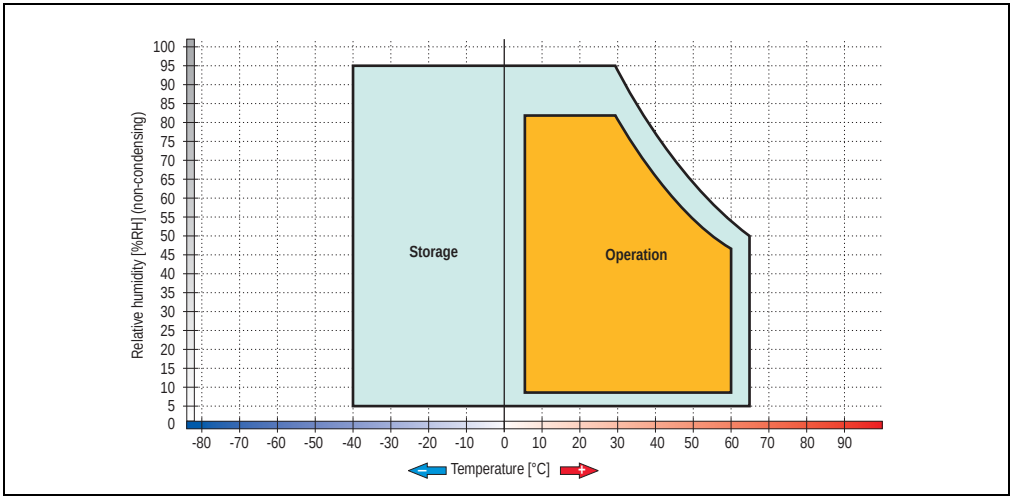


Figure 78: Temperature humidity diagram - Slide-in CD-ROM 5AC600.CDXS-00

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).

3.7.10 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 79: 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 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/sec.
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 Storage Transport	 +5°C .. +50°C [2)] -20°C .. +60°C -40°C .. +65°C
Relative humidity Operation Storage Transport	 8 - 80%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage 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 89: 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
Storage	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 89: Technical data - Slide-in DVD-ROM/CD-RW 5AC600.DVDS-00 (cont.)

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 - Operation and storage

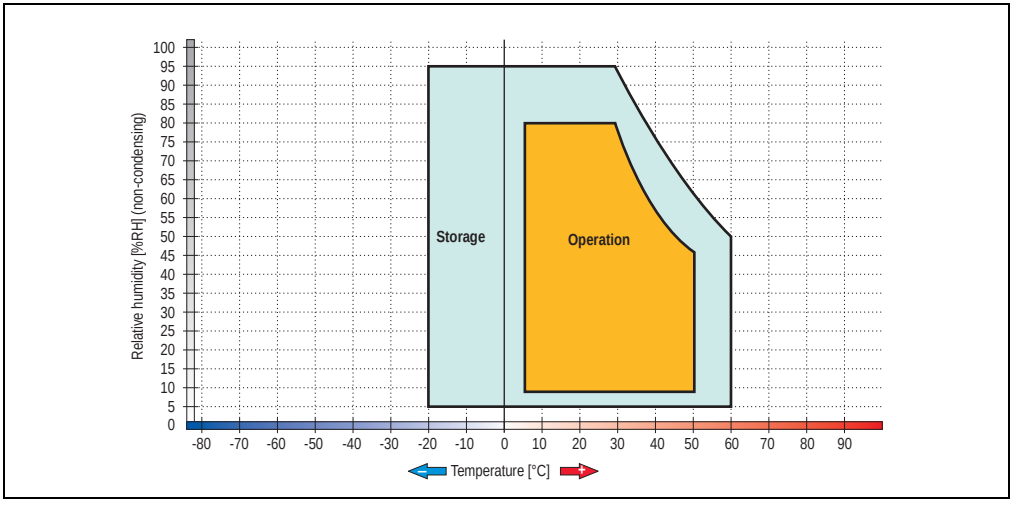


Figure 80: Temperature humidity diagram - Slide-in DVD-ROM/CD-RW 5AC600.DVDS-00

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).

3.7.11 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 81: 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 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 starting with revision D0
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/sec.
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 Storage Transport	 +5°C .. +55°C [3)] -20°C .. +60°C -40°C .. +65°C

Table 90: Technical data - Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 Rev. D0

Features	5AC600.DVRS-00 starting with revision D0
Relative humidity Operation Storage Transport	 8 - 80%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage 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 Storage 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 90: Technical data - Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 Rev. D0 (cont.)

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") D0

Features	5AC600.DVRS-00 Rev. D0
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/sec.
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 91: Technical data - Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 Rev. D0

Features	5AC600.DVRS-00 Rev. D0
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 Storage Transport	 +5°C .. +55°C [2)] -20°C .. +60°C -40°C .. +65°C
Relative humidity Operation Storage Transport	 8 - 80%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage 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 Storage 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 91: Technical data - Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 Rev. D0 (cont.)

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 - Operation and storage

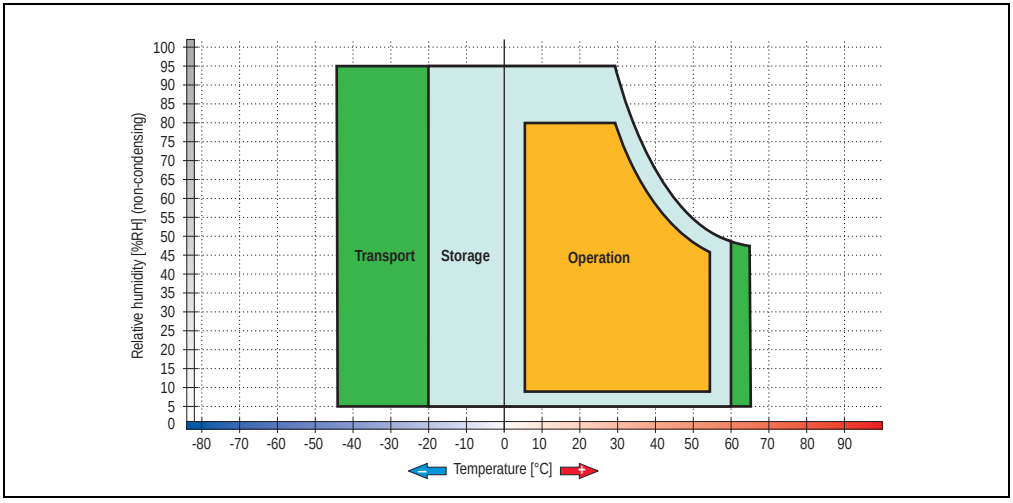


Figure 82: Temperature humidity diagram - Slide-in DVD-R/RW, DVD+R/RW 5AC600.DVRS-00

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).

3.7.12 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!

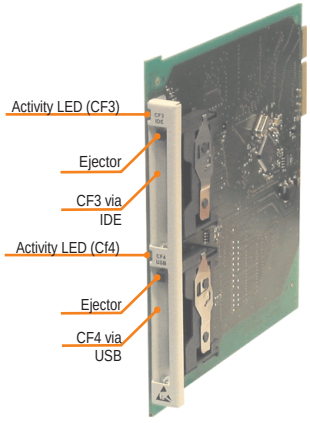


Figure 83: Slide-in CF 2-slot - 5AC600.CFSS-00

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 92: 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 84: 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 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 Storage Transport	 +4°C .. +50°C -20°C .. +60°C -20°C .. +60°C
Relative humidity Operation Storage Transport	 20 - 80%, non-condensing 5 - 90%, non-condensing 5 - 90%, non-condensing
Vibration Operation Storage 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 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 93: 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 - Operation and storage

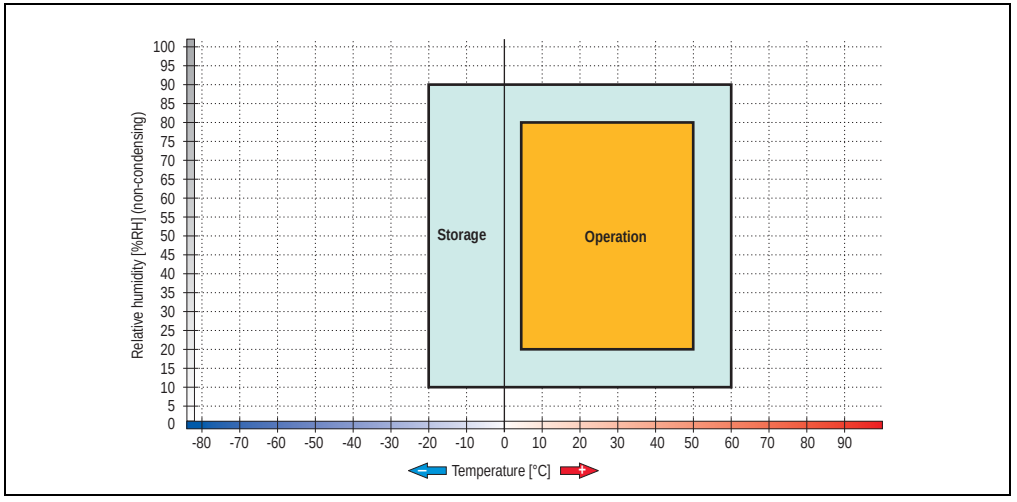


Figure 85: Temperature humidity diagram - Slide-in USB diskette drive 5AC600.FDDS-00

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).

3.7.14 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 86: 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 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) 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 To 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	
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 temperature[1)] Operation - Standard [2)] Operation - 24-hour [3)] Storage Transport	 +5°C .. +55°C +5°C .. +44°C -40°C .. +60°C -40°C .. +60°C
Relative humidity Operation Storage Transport	 8 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage	 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)

Table 94: Technical data - Slide-in hard disk - 5AC600.HDDS-00

Environmental characteristics	5AC600.HDDS-00
Shock (pulse with a sine half-wave) Operation Storage	 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 Storage	 - 300 to 3000 meters - 300 to 12,000 meters

Table 94: Technical data - Slide-in hard disk - 5AC600.HDDS-00 (cont.)

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 - Operation and storage

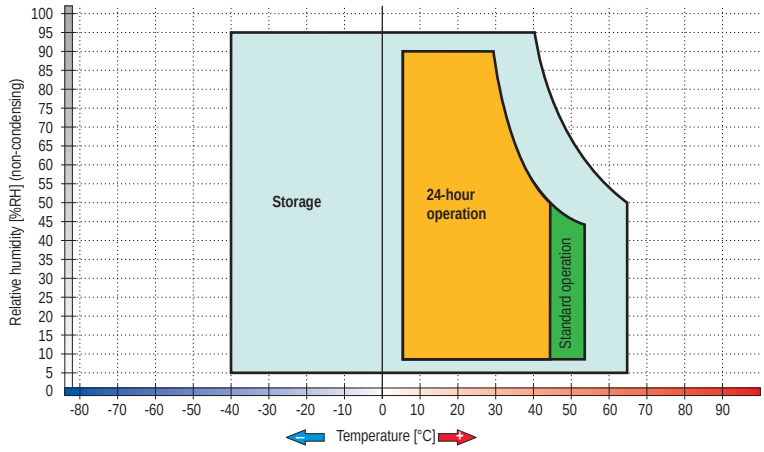


Figure 87: Temperature humidity diagram - Slide-in hard disk 5AC600.HDDS-00

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).

3.7.15 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 88: 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 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 To 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 temperature[1)] Operation [2)] Storage Transport	 -20°C .. +80°C -40°C .. +85°C -40°C .. +85°C
Relative humidity Operation Storage Transport	 8 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage	 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 Storage	 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 95: Technical data - Slide-in hard disk - 5AC600.HDDS-01

Features	5AC600.HDDS-01
Altitude	
Operation	- 300 to 3000 meters
Storage	- 300 to 12,000 meters

Table 95: Technical data - Slide-in hard disk - 5AC600.HDDS-01 (cont.)

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 - Operation and storage

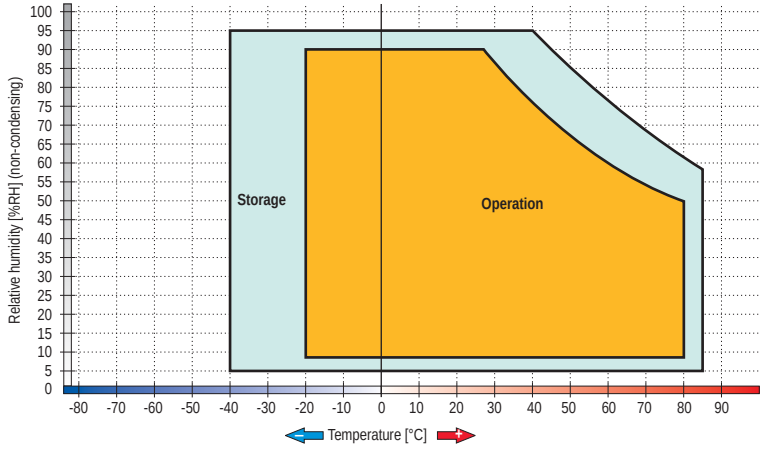


Figure 89: Temperature humidity diagram - Slide-in hard disk 5AC600.HDDS-01

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).

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 90: 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 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 ³ 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 To the medium To / from host	 Max. 321 MBits/sec Max. 100 MB/s (Ultra-DMA Mode 5)	 Max. 450 MBits/sec 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 Storage Transport	 -30°C .. +85°C -40°C .. +95°C -40°C .. +95°C	

Table 96: Technical data - Slide-in hard disk - 5AC600.HDDS-02

Environmental characteristics	5AC600.HDDS-02 < Revision D0	5AC600.HDDS-02 [3] Revision D0
Relative humidity Operation Storage Transport	 5 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing	
Vibration Operation Storage	 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 Storage	 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 Storage	 - 300 to 4419 meters - 300 to 12,192 meters	 - 300 to 5000 meters - 300 to 12,192 meters

Table 96: Technical data - Slide-in hard disk - 5AC600.HDDS-02 (cont.)

1) With 8760 POH (Power On Hours) per year and 70°C surface temperature.

2) Temperature values for 305 meter elevation. 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 - Operation and storage

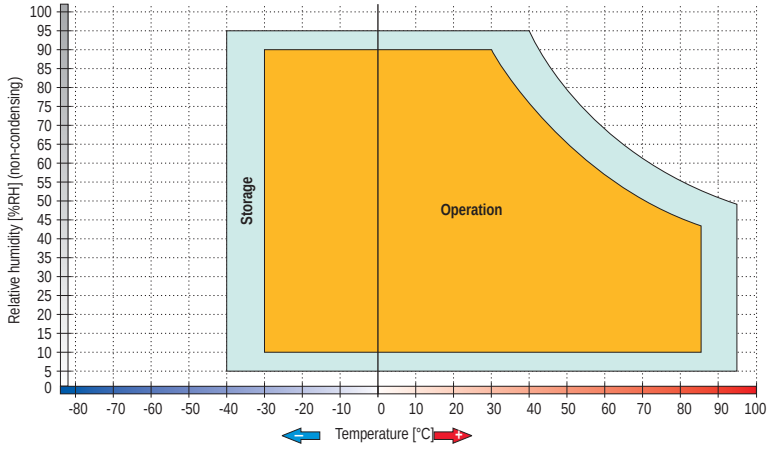


Figure 91: Temperature humidity diagram - Slide-in hard disk 5AC600.HDDS-02

Temperature values for 305 meter elevation. 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.

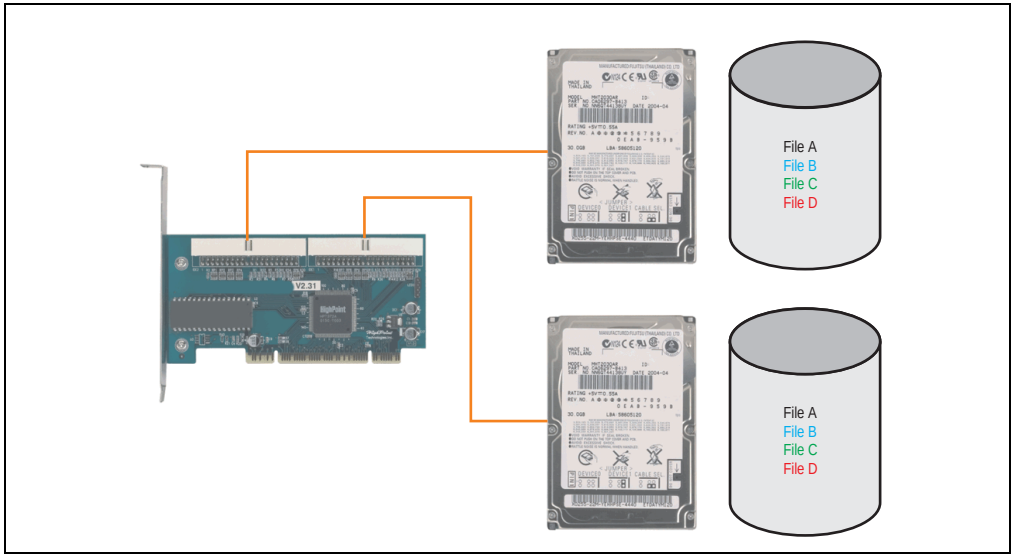


Figure 92: RAID 1 system schematic

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.

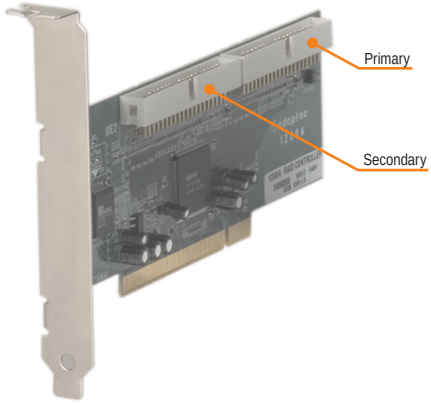


Figure 93: RAID controller - 5ACPCI.RAIC-00

Technical data

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those 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 97: 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 Storage Transport	 0°C .. +55°C -20°C .. +60°C -20°C .. +60°C

Table 97: Technical data - RAID controller - 5ACPCI.RAIC-00 (cont.)

Driver support

Drivers for the approved operating systems can be downloaded from the download area on the B&R homepage (**www.br-automation.com**).

Contents of delivery

Amount	Component
1	Adaptec ATA RAID 1200A controller
2	ATA RAID connection cable (length 130 mm)

Table 98: 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.

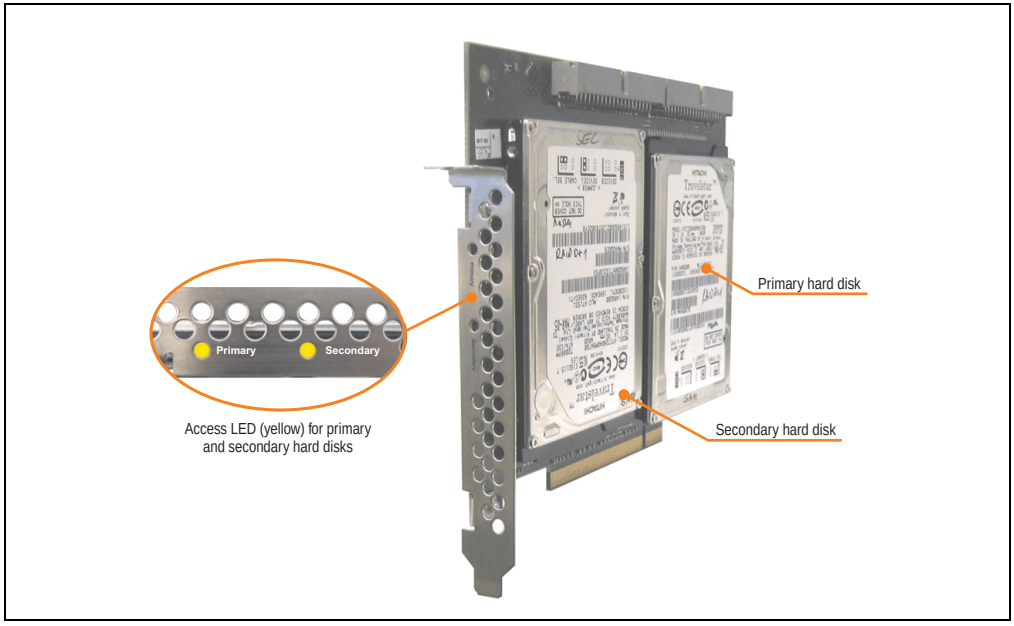


Figure 94: PCI RAID storage - 5ACPCI.RAIS-00

Technical data

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those 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 To the medium To / from host	 236 to 507 MBits/sec 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 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	350 g
Environmental characteristics	
Ambient temperature[2)] Operation - Standard [3)] Operation - 24-hour [4)] Storage Transport	 +5°C .. +55°C +5°C .. +40°C -40°C .. +65°C -40°C .. +65°C

Table 99: Technical data - RAID hard disk - 5ACPCI.RAIS-00

Environmental characteristics	5ACPCI.RAIS-00
Relative humidity Operation Storage Transport	 8 - 90 %, non-condensing 5 - 95 %, non-condensing 5 - 95 %, non-condensing
Vibration Operation (continuous) Operation (occasional) Storage 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 Max. 10 - 500 Hz and 5 g (49 m/s^2 0-peak) 0.5 oct/min duration, no damage Max. 10 - 500 Hz and 5 g (49 m/s^2 0-peak) 0.5 oct/min duration, no damage
Shock (pulse with a sine half-wave) Operation Storage	 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 Storage	 - 300 to 3048 meters - 300 to 12,192 meters

Table 99: Technical data - RAID hard disk - 5ACPCI.RAIS-00 (cont.)

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 - Operation and storage

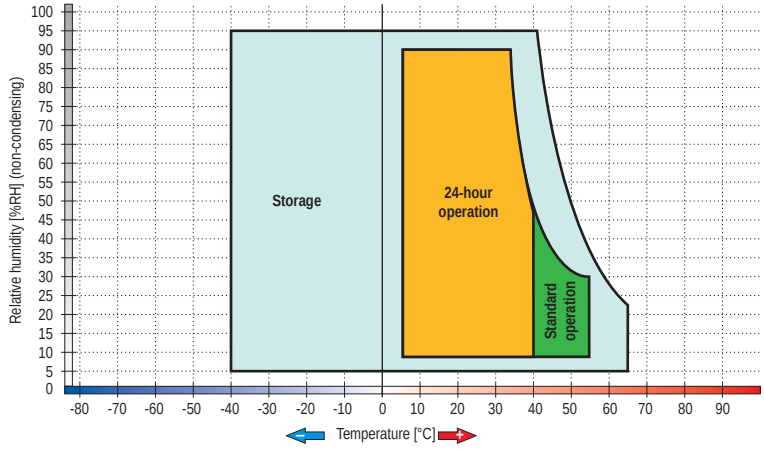


Figure 95: Temperature humidity diagram - RAID hard disk 5ACPCI.RAIS-00

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).

3.8.3 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.

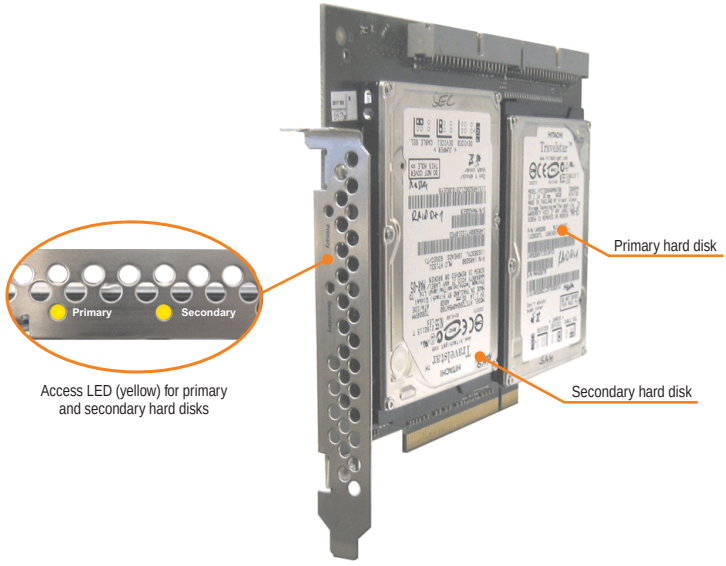


Figure 96: PCI RAID storage - 5ACPCI.RAIS-01

Technical data

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those 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 To the medium To / from host	 267 to 629 MBits/sec 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)] Storage Transport	 +5°C .. +55°C +5°C .. +40°C -40°C .. +65°C -40°C .. +65°C

Table 100: Technical data - RAID hard disk - 5ACPCI.RAIS-01

Environmental characteristics	5ACPCI.RAIS-01
Relative humidity Operation Storage Transport	 8 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation (continuous) Operation (occasional) Storage 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 Max. 10 - 500 Hz and 5 g (49 m/s^2 0-peak) 0.5 oct/min duration, no damage Max. 10 - 500 Hz and 5 g (49 m/s^2 0-peak) 0.5 oct/min duration, no damage
Shock (pulse with a sine half-wave) Operation Storage	 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 Storage	 - 300 to 3048 meters - 300 to 12,192 meters

Table 100: Technical data - RAID hard disk - 5ACPCI.RAIS-01 (cont.)

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 - Operation and storage

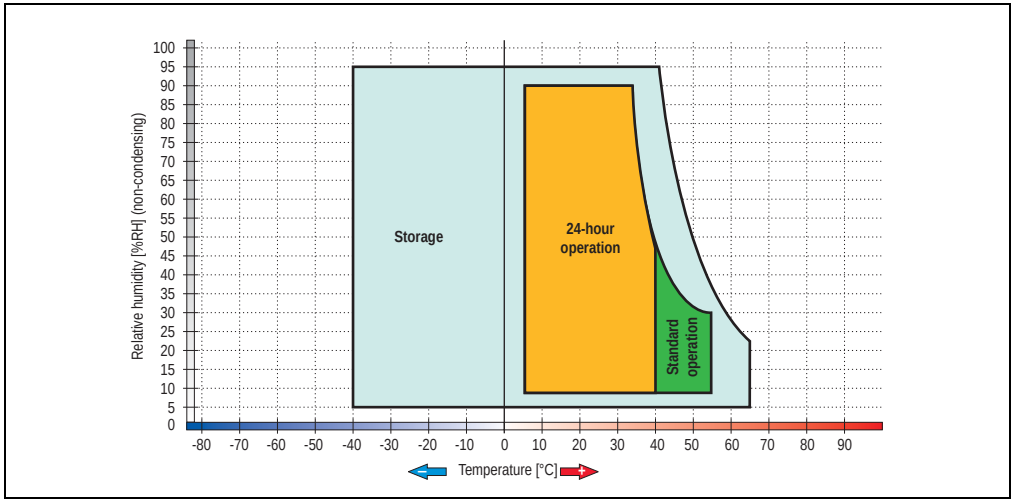


Figure 97: Temperature humidity diagram - RAID hard disk 5ACPCI.RAIS-01

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).

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

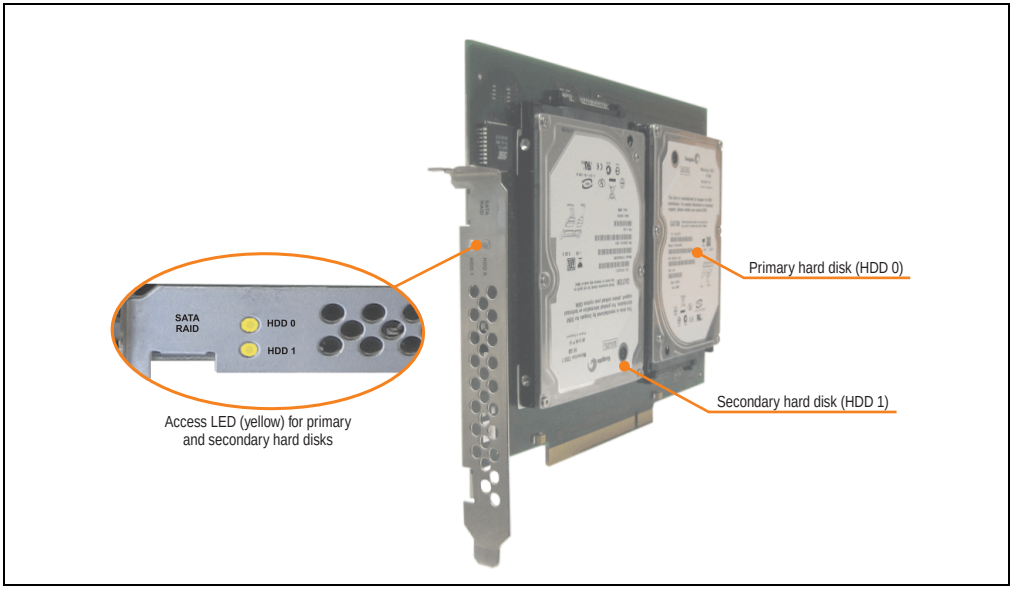


Figure 98: PCI SATA RAID controller - 5ACPCI.RAIC-01

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 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 To the medium To / from host	 Max. 539 MBits/sec 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 101: Technical data - RAID hard disk - 5ACPCI.RAIC-01

Environmental characteristics	5ACPCI.RAIC-01
Ambient temperature[1)] Operation - Standard [2)] Operation - 24-hour [3)] Storage Transport	 +5°C .. +55°C +5°C .. +40°C -40°C .. +70°C -40°C .. +70°C
Relative humidity Operation Storage Transport	 5 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration[4)] Operation (continuous) Operation (occasional) Storage 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 Max. 5 - 500 Hz and 5 g (49 m/s^2 0-peak) 0.5 oct/min duration, no damage Max. 5 - 500 Hz and 5 g (49 m/s^2 0-peak) 0.5 oct/min duration, no damage
Shock [4)] (pulse with a sine half-wave) Operation Storage	 No non-recovered errors at max. 125 g (1226 m/s^2 0-peak) and 2 ms duration 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 Storage	 - 300 to 3048 meters - 300 to 12,192 meters

Table 101: Technical data - RAID hard disk - 5ACPCI.RAIC-01 (cont.)

1) Temperature values for 305 meter elevation. 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 - Operation and storage

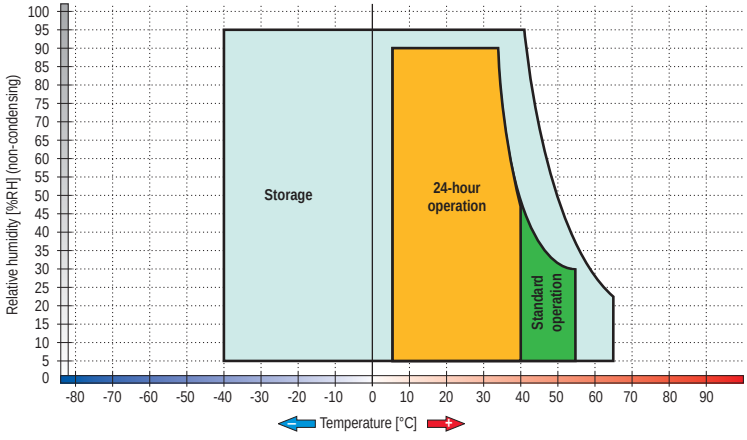


Figure 99: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-01

Temperature values for 305 meter elevation. 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 and Windows XP Embedded 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.

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 SATA 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 100 "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.

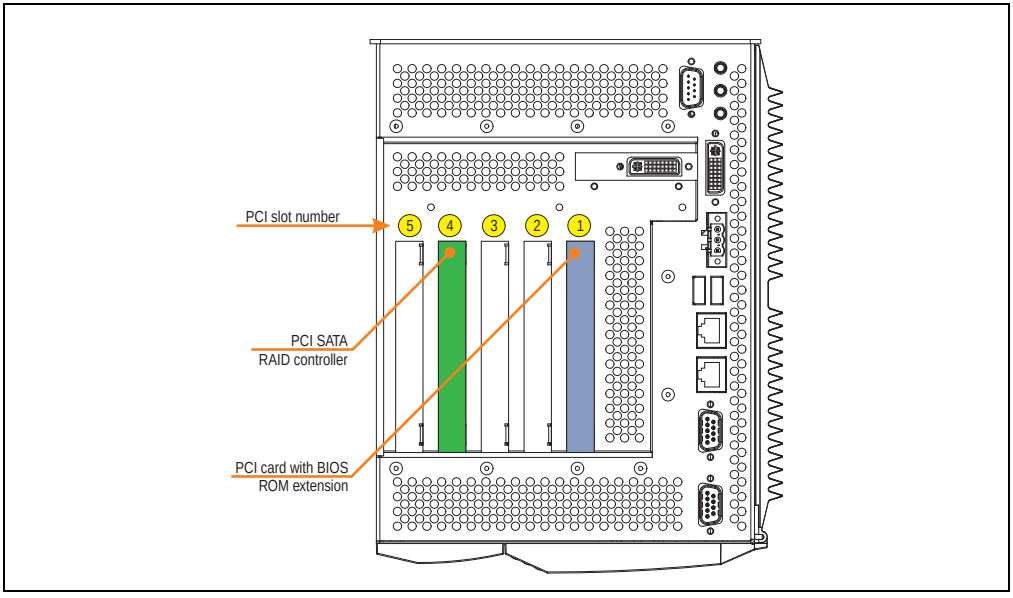


Figure 100: PCI slot numbering on APC620 systems with 5 PCI slots

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 324.

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.

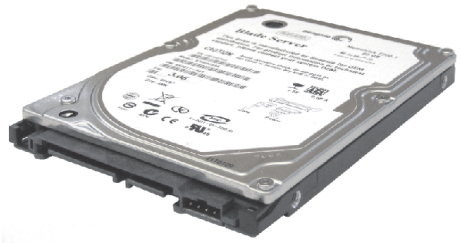


Figure 101: Replacement SATA HDD 60 GB - 5ACPCI.RAIC-02

Technical data

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those 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 To the medium To / from host	 Max. 539 MBits/sec Max. 150 MB/s

Table 102: 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)] Operation - 24-hour [3)] Storage Transport	 +5°C .. +55°C +5°C .. +40°C -40°C .. +70°C -40°C .. +70°C
Relative humidity Operation Storage Transport	 5 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration[4)] Operation (continuous) Operation (occasional) Storage 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 Max. 5 - 500 Hz and 5 g (49 m/s^2 0-peak) 0.5 oct/min duration, no damage Max. 5 - 500 Hz and 5 g (49 m/s^2 0-peak) 0.5 oct/min duration, no damage
Shock [4)] (pulse with a sine half-wave) Operation Storage	 No non-recovered errors at max. 125 g (1226 m/s^2 0-peak) and 2 ms duration 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 Storage	 - 300 to 3048 meters - 300 to 12,192 meters

Table 102: Technical data - RAID hard disk - 5ACPCI.RAIC-02 (cont.)

1) Temperature values for 305 meter elevation. 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 - Operation and storage

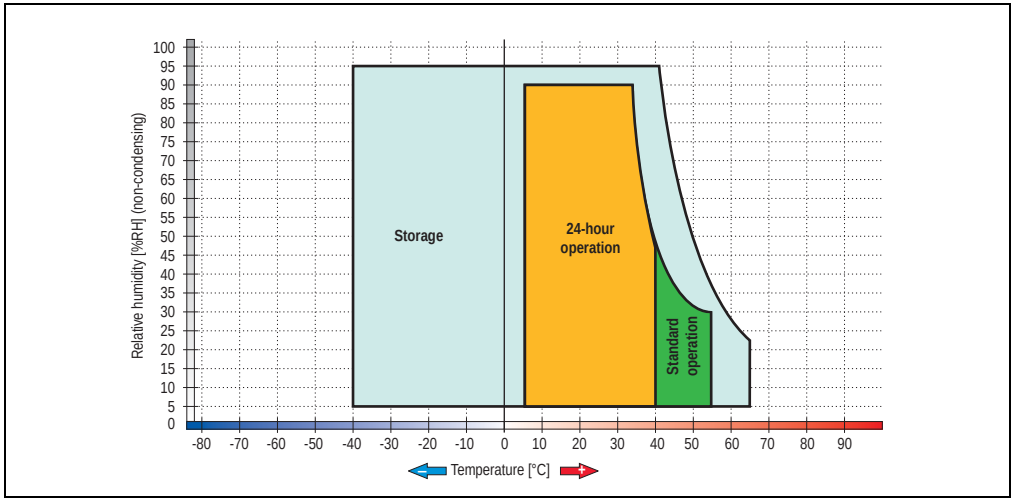


Figure 102: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-02

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 730.

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

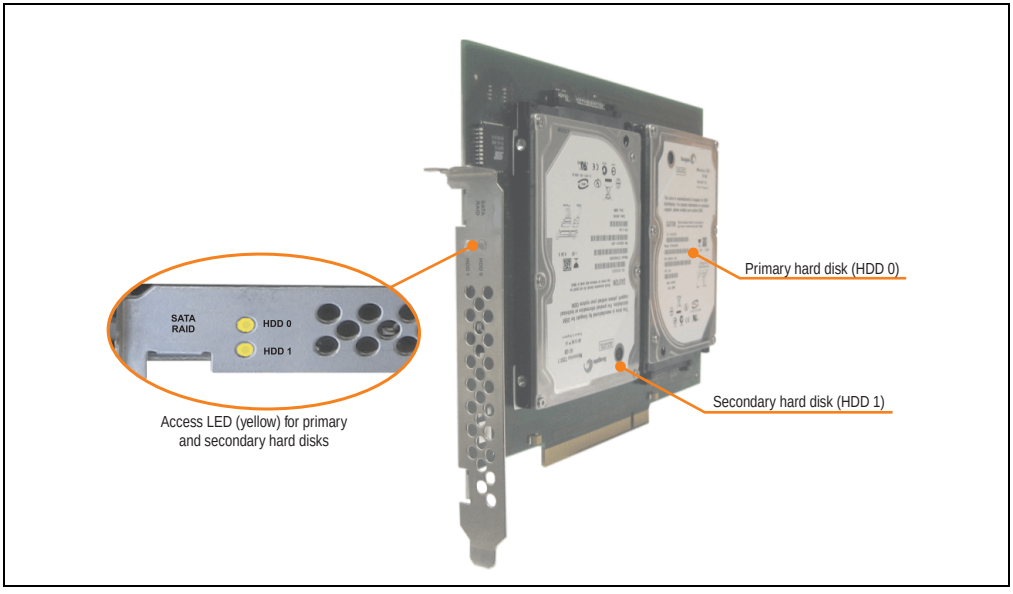


Figure 103: PCI SATA RAID controller - 5ACPCI.RAIC-03

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 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 ca. 32 kByte
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 To the medium To / from host	 Max. 84.6 MBits/sec 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 103: Technical data - RAID hard disk - 5ACPCI.RAIC-03

Environmental characteristics	5ACPCI.RAIC-03
Ambient temperature[1)] Operation - Standard / 24-hour[2)] Storage Transport	 -15°C .. +80°C -40°C .. +95°C -40°C .. +95°C
Relative humidity Operation Storage Transport	 8 - 90% non-condensing (maximum humidity at +29°C) 5 - 95% non-condensing (maximum humidity at +40°C) 5 - 95% non-condensing (maximum humidity at +40°C)
Vibration[3)] Operation (continuous) Operation (occasional) Storage 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 Storage	 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 Storage	 - 300 to 3048 meters - 300 to 12,192 meters

Table 103: Technical data - RAID hard disk - 5ACPCI.RAIC-03 (cont.)

1) Temperature values for 305 meter elevation. 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 - Operation and storage

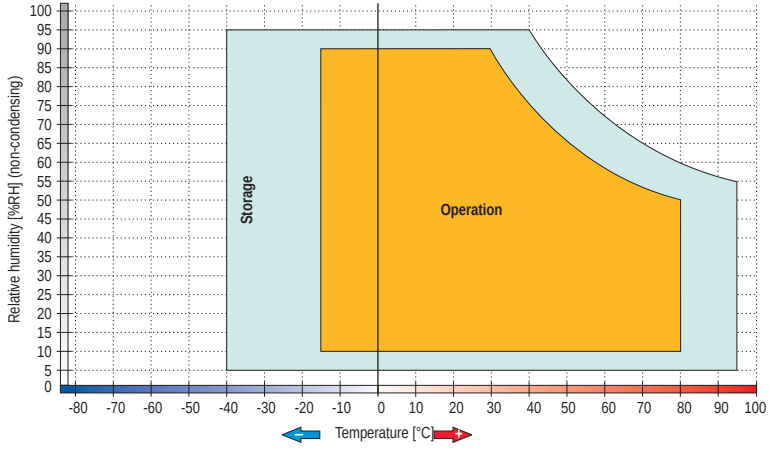


Figure 104: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-03

Temperature values for 305 meter elevation. 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 and Windows XP Embedded 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.

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 SATA 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 100 "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.

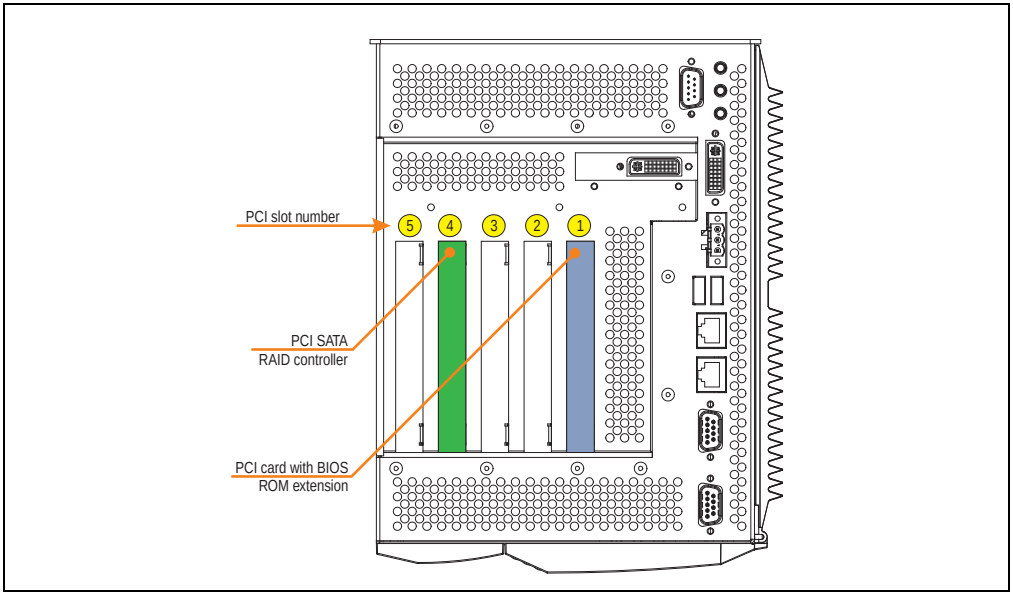


Figure 105: PCI slot numbering on APC620 systems with 5 PCI slots

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 324.

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.

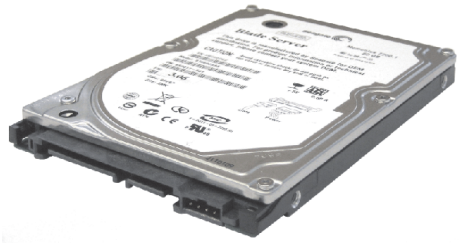


Figure 106: Replacement SATA HDD 160 GB - 5ACPCI.RAIC-04

Technical data

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those 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 To the medium To / from host	 Max. 84.6 MBits/sec Max. 150 MB/s

Table 104: 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)] Storage Transport	 -15°C .. +80°C -40°C .. +95°C -40°C .. +95°C
Relative humidity Operation Storage Transport	 8 - 90% non-condensing (maximum humidity at +29°C) 5 - 95% non-condensing (maximum humidity at +40°C) 5 - 95% non-condensing (maximum humidity at +40°C)
Vibration[3)] Operation (continuous) Operation (occasional) Storage 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 Storage	 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 Storage	 - 300 to 3048 meters - 300 to 12,192 meters

Table 104: Technical data - RAID hard disk - 5ACPCI.RAIC-04 (cont.)

1) Temperature values for 305 meter elevation. 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 - Operation and storage

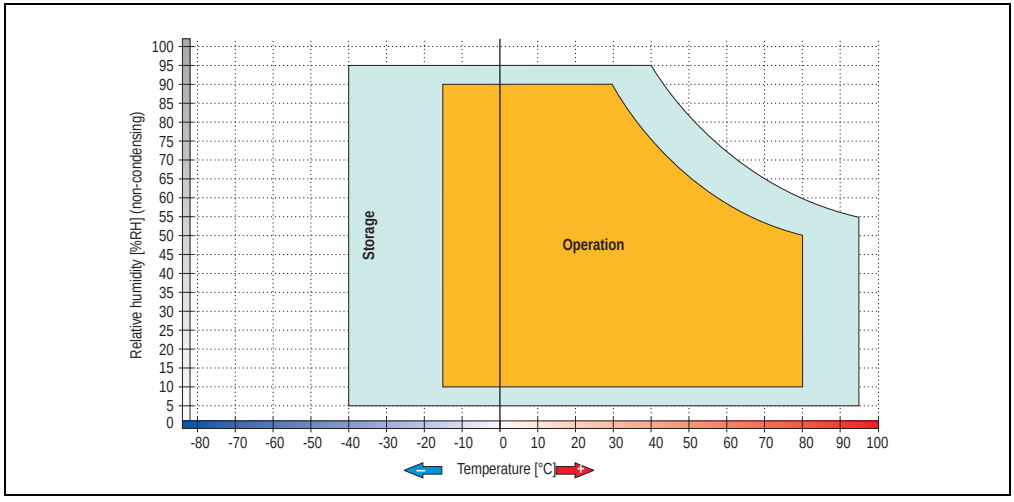


Figure 107: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-04

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 730.

3.9 Interface options

An optional interface (CAN or combined RS232/422/485) can be inserted.

Information:

It is possible to add or remove an optional interface at any time.

Caution!

Turn off power before adding or removing an optional 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).

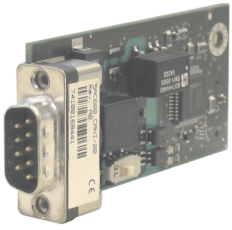


Figure 108: Add-on CAN interface - 5AC600.CANI-00

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 105: Technical data - Add-on CAN interface - 5AC600.CANI-00

Pin assignments

Add-on CAN		
Type	Electrically isolated	9-pin DSUB plug 
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 106: Pin assignments - CAN

I/O address and IRQ

Resource	Default setting	Additional setting options
I/O address	384 / 385	-
IRQ	IRQ10	NMI [1)]

Table 107: Add-on CAN - I/O address and 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 108: 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 109: 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	2 x 0.25 mm² (24AWG/19), tinned Cu wire
Wire insulation	PU
Conductor resistance	£ 82 Ohm / 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	PU
Conductor resistance	£ 59 Ohm / km
Outer sheathing	
Material	PUR mixture
Properties	Halogen free
Entire shielding	From tinned cu wires

Table 110: CAN cable requirements

Terminating resistors

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").

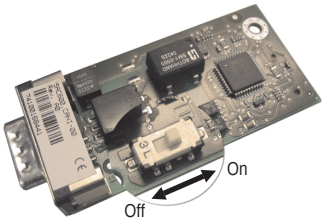


Figure 109: Terminating resistor - Add-on CAN interface 5AC600.CANI-00

Contents of delivery

The screws included in the mounting kit are to be used for installation.

Figure 110: 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.

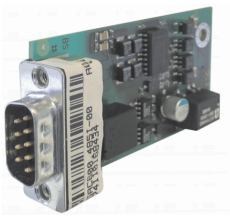


Figure 111: Add-on RS232/422/485 interface - 5AC600.485I-00

Pin assignments

Add-on RS232/422/485			
Features	**RS232**	**RS422/485**	
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)**	9-pin DSUB plug 
1	n.c.	$\overline{\text{TXD}}$	
2	RXD	n.c.	
3	TXD	n.c.	
4	n.c.	TXD	
5	GND	GND	
6	n.c.	$\overline{\text{RXD}}$	
7	RTS	n.c.	
8	CTS	n.c.	
9	n.c.	RXD	

Table 111: 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 112: 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 "Baseboard/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 113: Bus length and transfer rate - RS232

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 PU £ 82 Ohm / 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 PU £ 59 Ohm / km
Outer sheathing Material Properties Entire shielding	 PUR mixture Halogen free From tinned cu wires

Table 114: RS232 cable requirements

Bus length and cable type RS422

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 115: Bus length and transfer rate - RS422

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 PU £ 82 Ohm / 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 PU £ 59 Ohm / km
Outer sheathing Material Properties Entire shielding	 PUR mixture Halogen free From tinned cu wires

Table 116: 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.

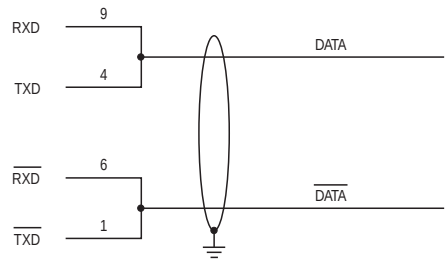


Figure 112: Add-on RS232/422/485 interface - operated in RS485 mode

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 W resistance.

Bus length and cable type RS485

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 117: Bus length and transfer rate - RS485

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 Wire insulation Conductor resistance Stranding Shield	 4 x 0.25 mm² (24AWG/19), tinned Cu wire PU £ 82 Ohm / 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 PU £ 59 Ohm / km
Outer sheathing Material Properties Entire shielding	 PUR mixture Halogen free From tinned cu wires

Table 118: RS485 cable requirements

Contents of delivery

The screws included in the mounting kit are to be used for installation.

Figure 113: Contents of the delivery / mounting material - 5AC600.485I-00

3.10 Fan kit

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 filter" on page 681.

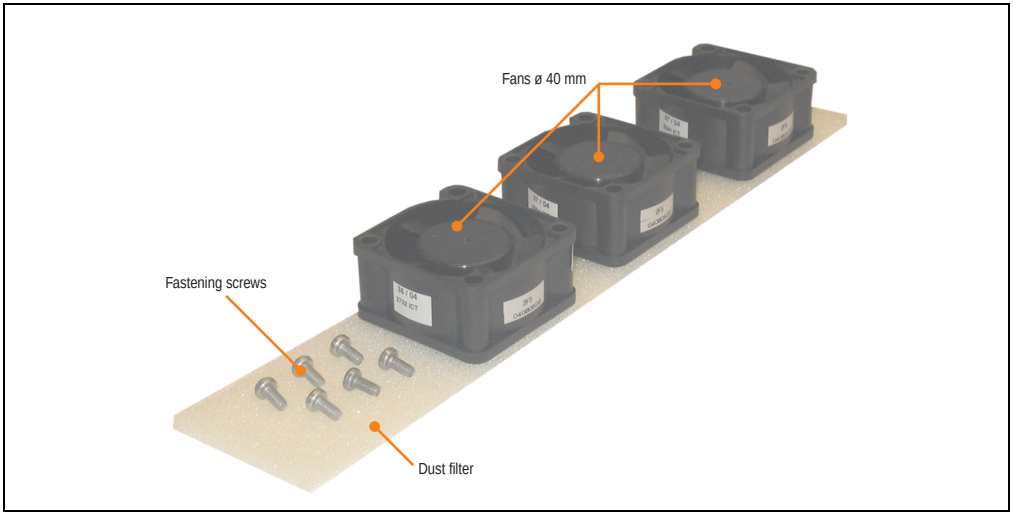


Figure 114: Fan kit - 5PC600.FA01-00

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 119: 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 119: Technical data - 5PC600.FA01-00 (cont.)

Contents of delivery

Amount	Component
3	Fans with 40 mm diameter
1	Dust filter
6	Mounting screws

Table 120: 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 691.

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 filter" on page 681.

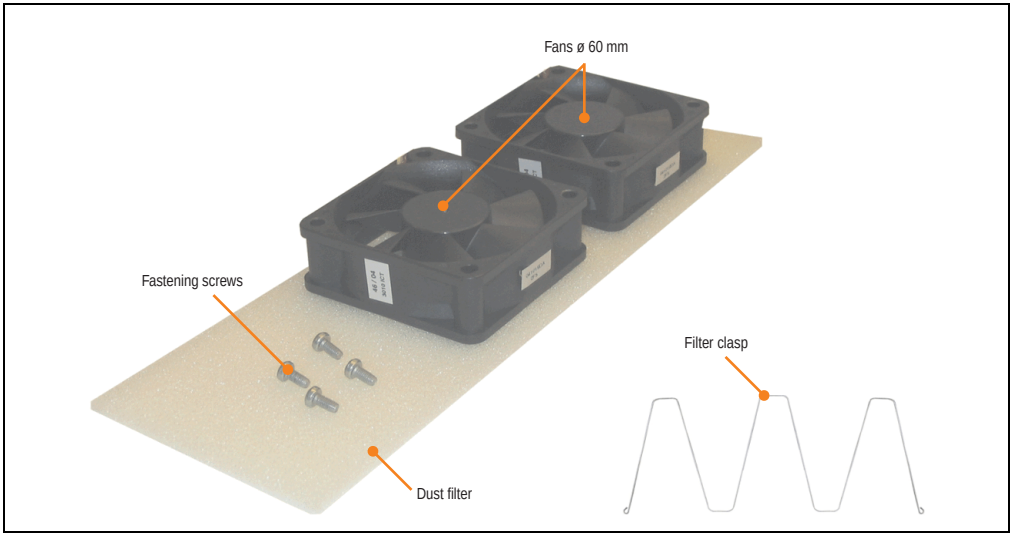


Figure 115: Fan kit - 5PC600.FA02-00

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 121: 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 122: 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 694.

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 filter" on page 681.

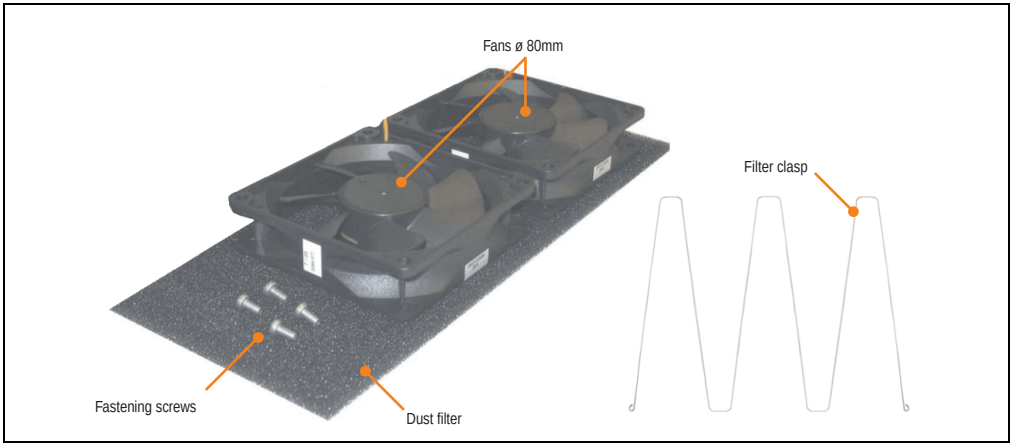


Figure 116: Fan kit - 5PC600.FA03-00

Technical data

Features	5PC600.FA05-00
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 123: 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 124: Contents of delivery - 5PC600.FA03-00

Amount	Component
2	Cable fastener

Table 124: 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 697.

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 filter" on page 681.

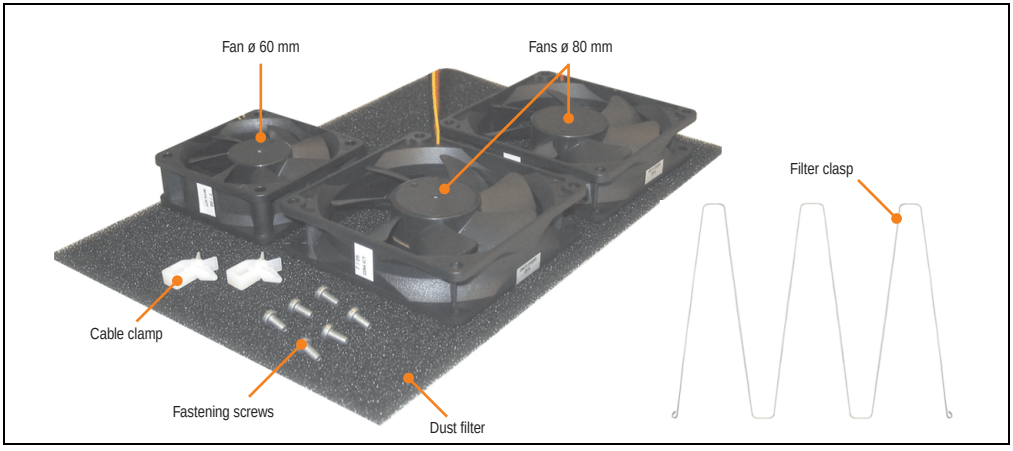


Figure 117: Fan kit - 5PC600.FA05-00

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 125: 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 126: 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 701.

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 2 graphics line can be created using the AP Link graphics adapter cards.

3.11.1 AP Link SDL transmitter 5AC600.SDL0-00

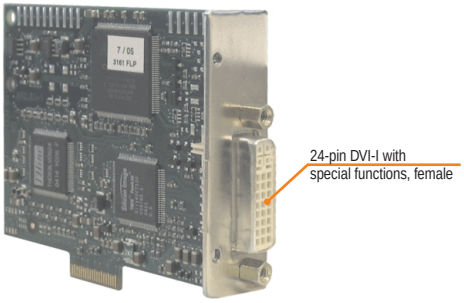


Figure 118: AP Link card

Model number	Short description	Comment
5AC600.SDL0-00	AP Link SDL transmitter	

Table 127: Model numbers - AP Link graphics adapter

The following video signals are available via AP Link and monitor/panel output. The connection cycle value for the plug is specified at 100x.

AP Link slot (AP Link card inserted)		
AP Link card	Signal with 855GME board on	
	AP Link	Monitor / Panel
5AC600.SDL0-00	DVI, SDL	RGB, DVI, SDL

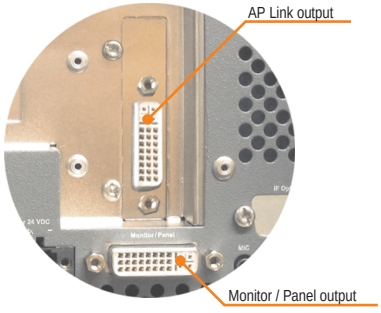


Table 128: AP Link slot (AP Link card inserted)

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

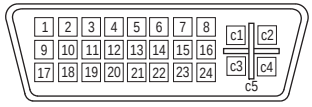
Pin	Assignment	Pin	Assignment	
1	T.M.D.S. data 2-	16	Hot Plug detect	DVI-I 24 pin, female 
2	T.M.D.S. data 2+	17	T.M.D.S. data 0-	
3	T.M.D.S. data 2/SDL shield	18	T.M.D.S. data 0+	
4	SDL-	19	T.M.D.S. DATA 0/XUSB1 shield	
5	SDL+	20	XUSB1-	
6	DDC clock	21	XUSB1+	
7	DDC data	22	T.M.D.S. clock shield	
8	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 129: 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 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.0200-30[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 130: Segment lengths, resolutions and SDL cables

1) See table 131 "Requirements for SDL cable with automatic cable adjustment (equalizer)" on page 261

2) See table 132 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)" on page 262

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	Comment
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**	**Comment**
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 131: 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	Comment
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**	**Comment**
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 132: 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.

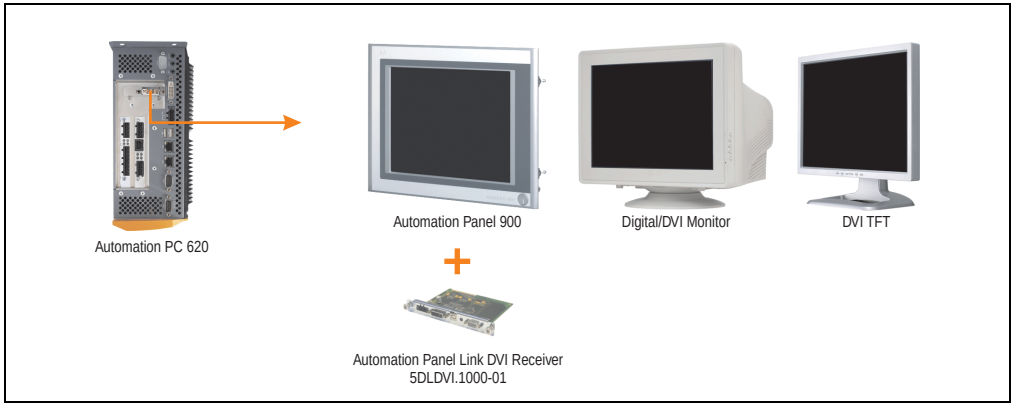


Figure 119: AP Link device connection with DVI video signal

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 280.

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).

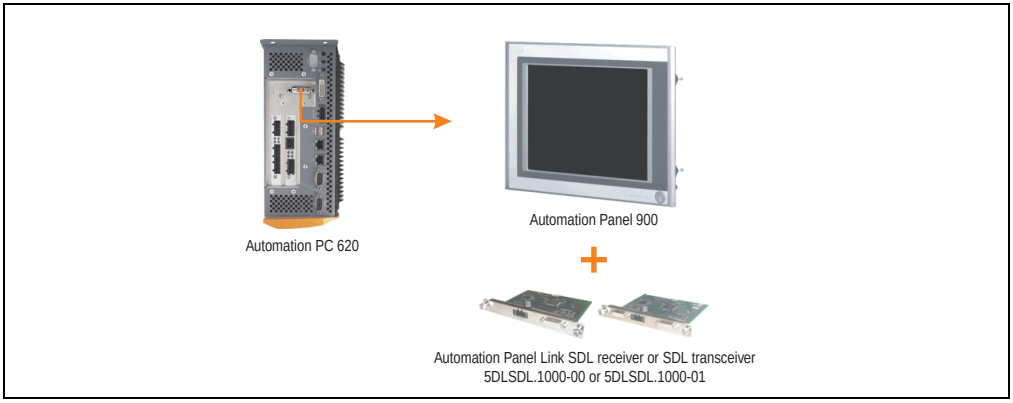


Figure 120: AP Link device connection with SDL video signal

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 280.

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.

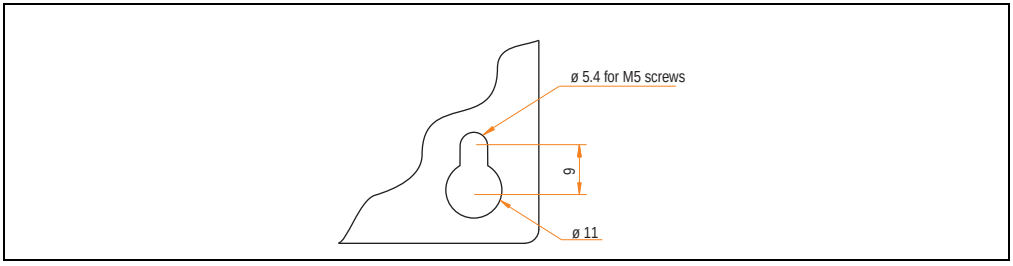


Figure 121: Mounting plates for the APC620

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 "Environmental temperatures for systems with an 815E CPU board (ETX)" on page 78, and section 2.7 "Environmental temperatures for systems with an 855GME CPU board (EXT / XTX)" on page 82).
- 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 use the allowed mounting orientations (see section 1.3 "Mounting orientation" on page 269).
- 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 278).

1.2 Drilling templates

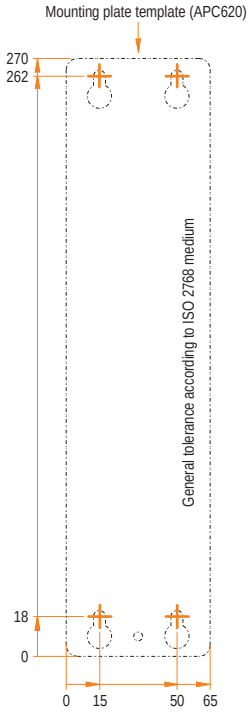
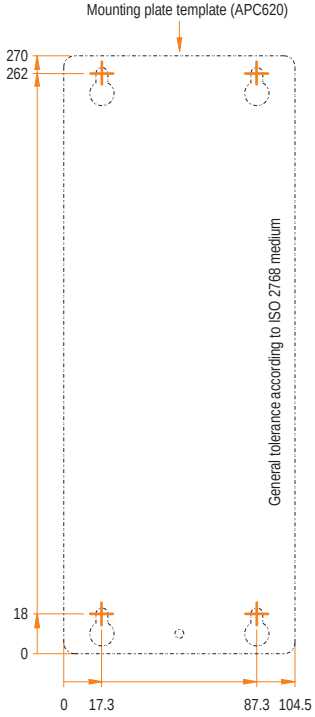
APC620 with 1 PCI slot	APC620 with 2 PCI slots
	

Table 133: Drilling templates - 1 and 2 PCI slots

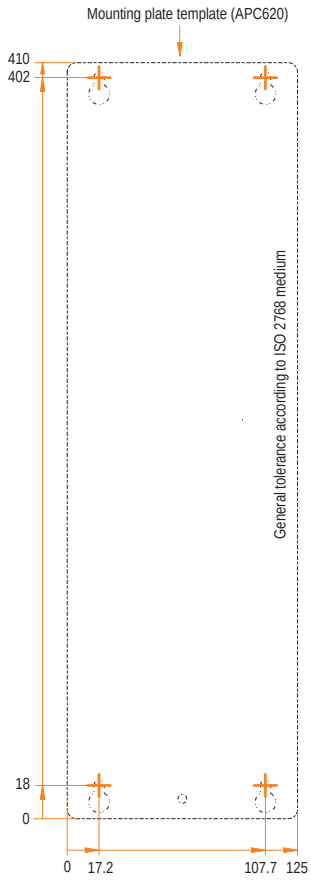
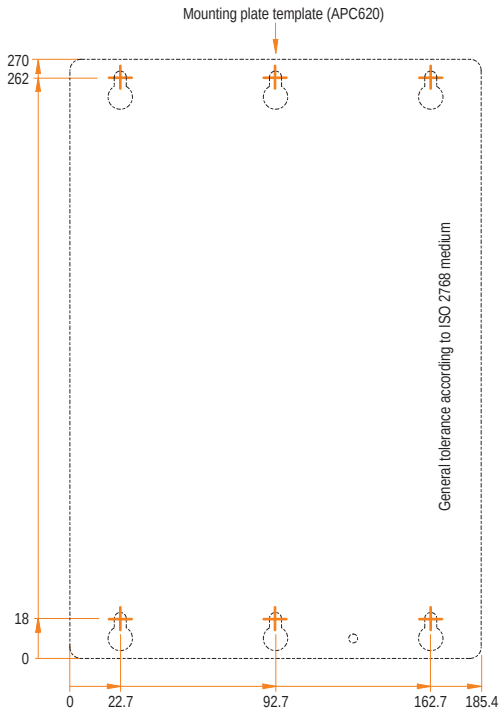
APC620 with 3 PCI slots	APC620 with 5 PCI slots
	

Table 134: Drilling templates - 3 and 5 PCI slots

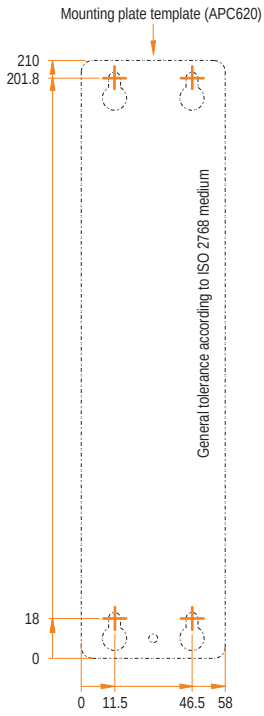
APC620 embedded


Table 135: 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.

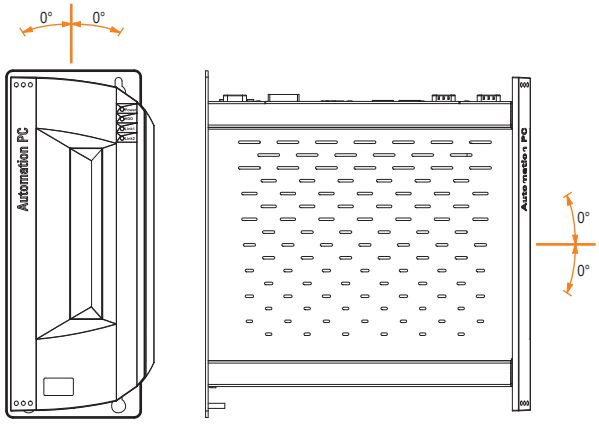


Figure 122: Mounting orientation - Standard

In order to guarantee natural air circulation, mount the system so that the spacing on the top, bottom, and sides is as follows.

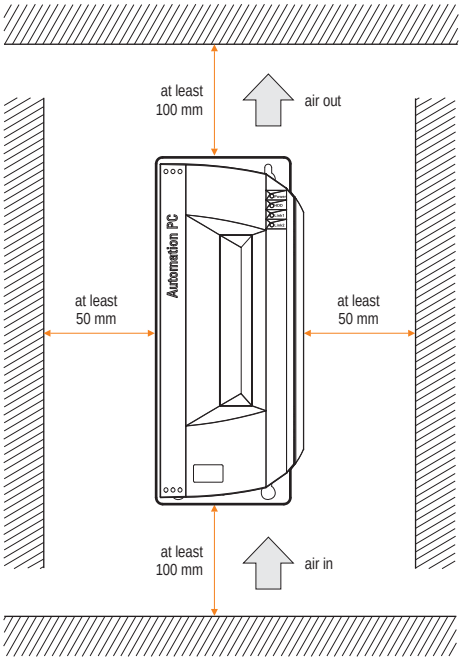


Figure 123: Air circulation spacing - Standard

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.

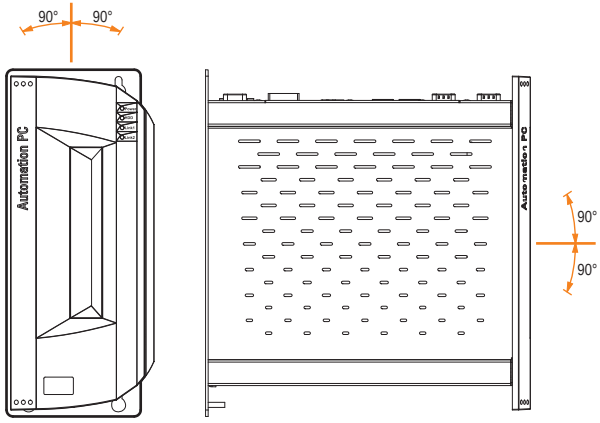


Figure 124: Mounting orientation - Optional

In order to guarantee natural air circulation, mount the system so that the spacing on the top, bottom, and sides is as follows.

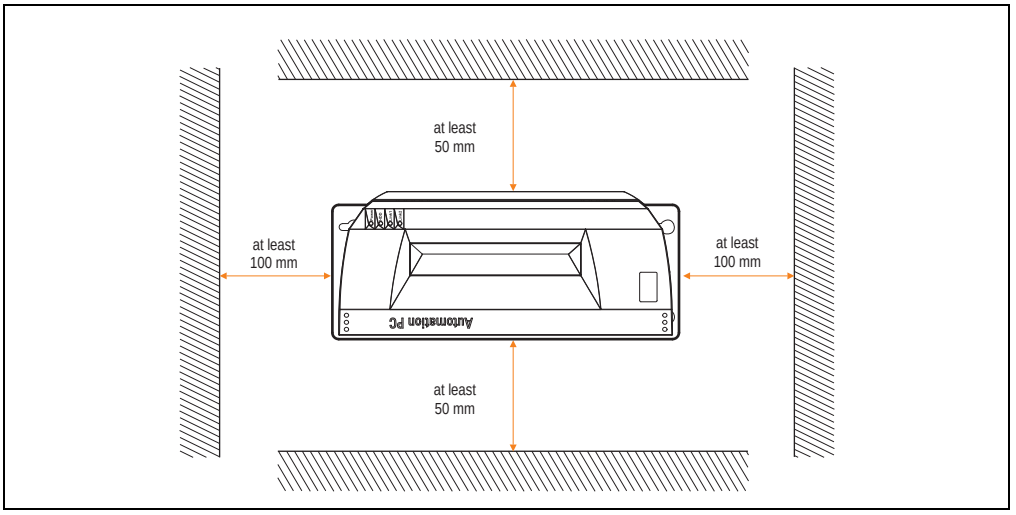


Figure 125: Optional circulation spacing

CompactFlash slot, add-on or slide-in

No limitation on mounting orientation. Permissible mounting orientations are shown in figure 124 "Mounting orientation - Optional" on page 271.

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).

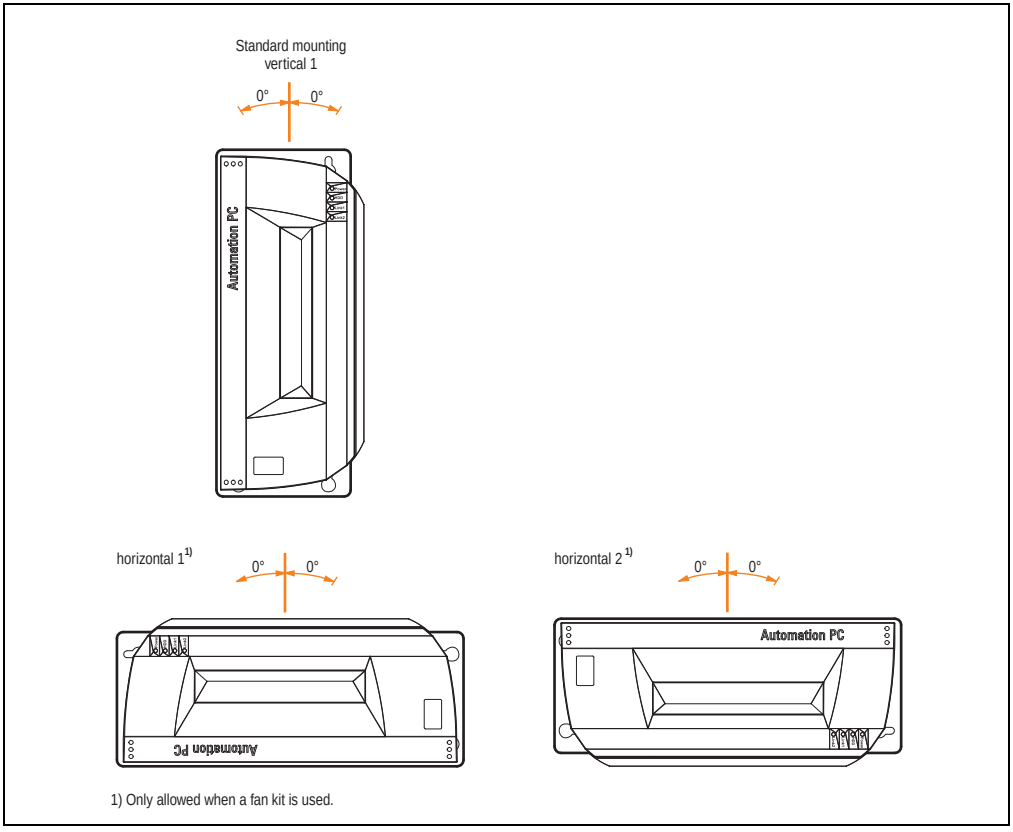
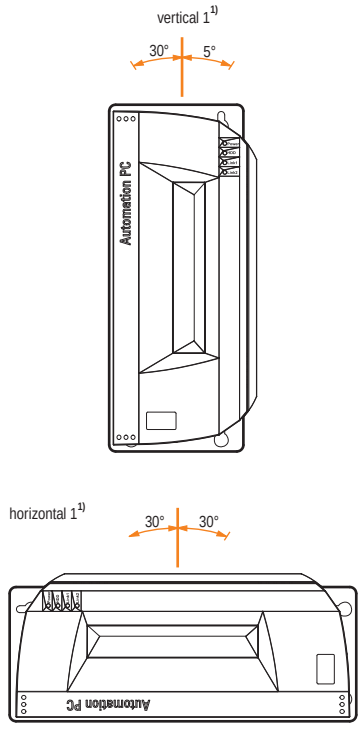


Figure 126: Mounting orientations for an APC620 with hard disk drive

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).



1) Only allowed when fan kit is used.

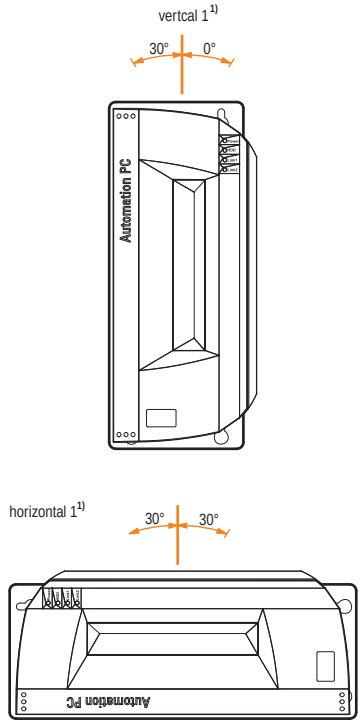
Figure 127: Mounting orientations for an APC 620 with a slide-in CD-ROM drive

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.

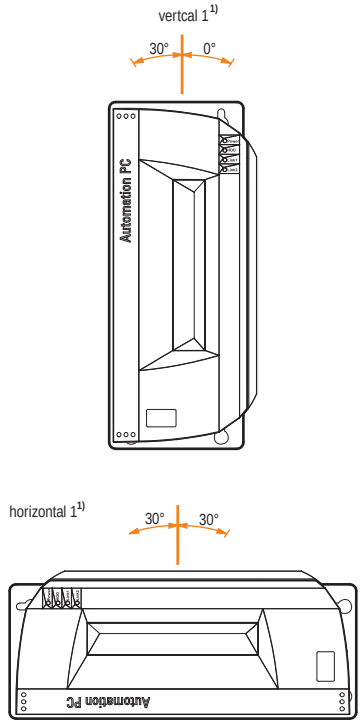
Figure 128: Mounting orientations for an APC620 with a slide-in DVD-ROM/CD-RW drive

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.

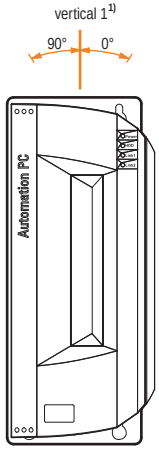
Figure 129: Mounting orientations for an APC620 with a slide-in DVD-R/RW / DVD+R/RW drive

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 130: 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.

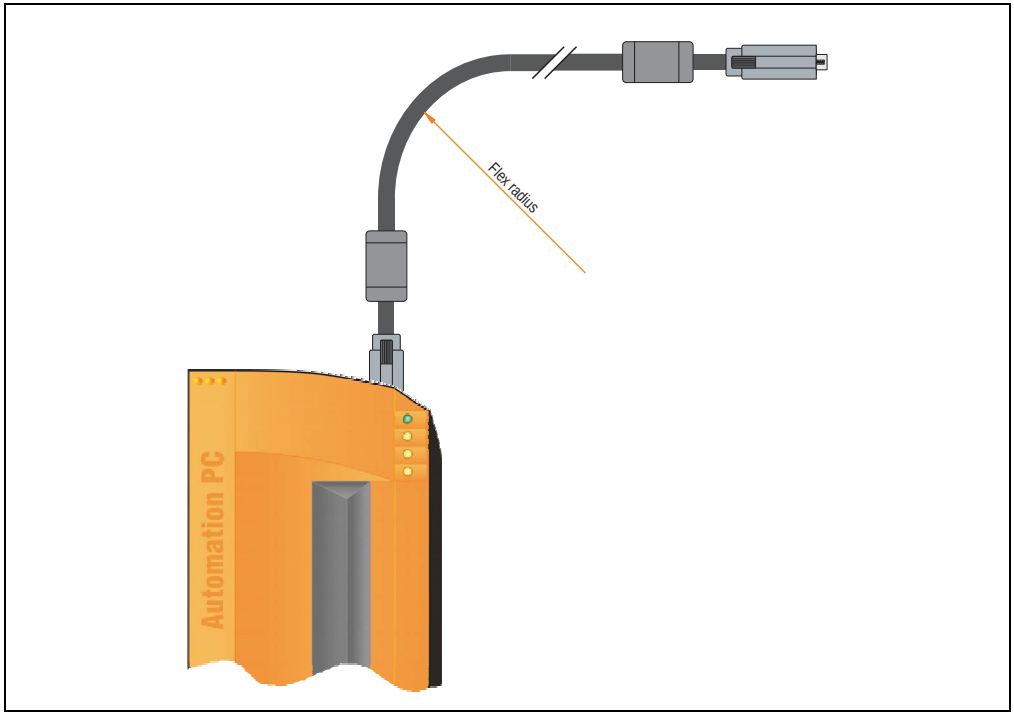


Figure 131: Flex radius - Cable connection

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 118.

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.

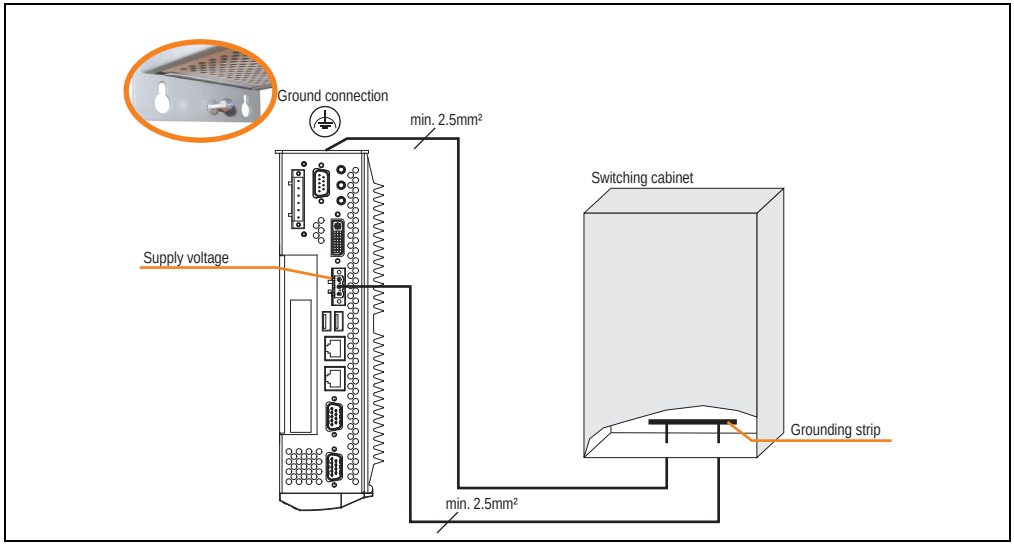


Figure 132: Grounding concept

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 136: 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).

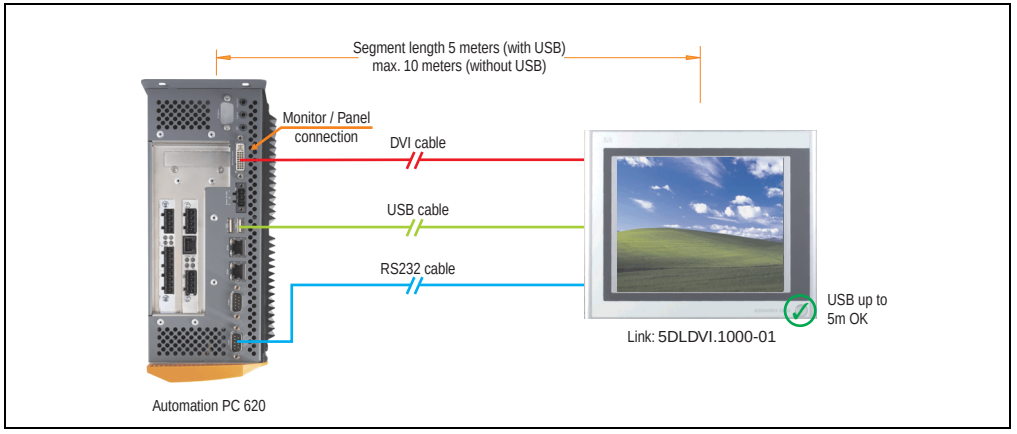


Figure 133: Configuration - One Automation Panel 900 via DVI (onboard)

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						Limitation 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 137: Possible combinations of system unit and CPU board

4.2.2 Link modules

Model number	Description	Comment
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 138: 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 139: Cable 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 140: 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 4 "Automation PC 620 with Windows XP Professional" on page 529.

4.2.7 Windows touch screen driver settings

See chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 529.

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).

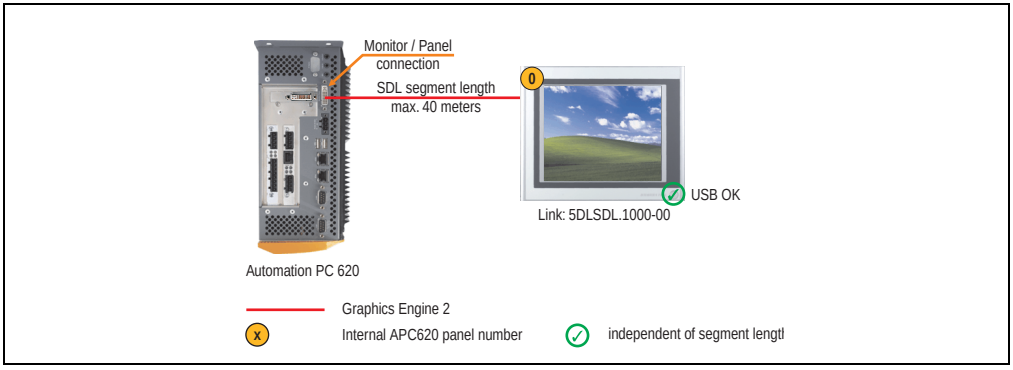


Figure 134: Configuration - An Automation Panel 900 via SDL (onboard)

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						Limitation 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 141: Possible combinations of system unit and CPU board

4.3.2 Link modules

Model number	Description	Comment
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 142: Link module for the configuration - One Automation Panel 900 via DVI

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 143: 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 5CASDL.0100-01 5CASDL.0100-03
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	- - -
20	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	- -
25	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	- -	- -
30	5CASDL.0300-00 5CASDL.0300-03	5CASDL.0300-00 5CASDL.0300-03	5CASDL.0300-10 5CASDL.0300-13	5CASDL.0300-10 5CASDL.0300-13	- -
40	5CASDL.0400-10 5CASDL.0400-13	5CASDL.0400-10 5CASDL.0400-13	5CASDL.0400-10 5CASDL.0400-13	5CASDL.0400-10 5CASDL.0400-13	- -

Table 144: Segment lengths, resolutions and SDL cables

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	Comment
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**	**Comment**
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 145: 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	Comment
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**	**Comment**
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 146: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

4.3.4 BIOS settings

No special BIOS settings are necessary for operation.

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 4 "Automation PC 620 with Windows XP Professional" on page 529.

4.3.6 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 529.

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).

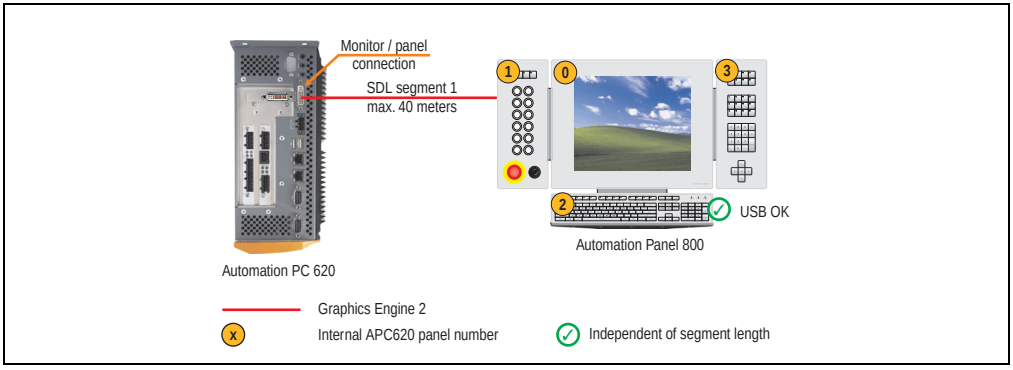


Figure 135: Configuration - An Automation Panel 800 via SDL (onboard)

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						Limitation 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 147: 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 148: 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 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 149: Segment lengths, resolutions and SDL cables

1) See table 150 "Requirements for SDL cable with automatic cable adjustment (equalizer)"
2) See table 151 "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	Comment
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 150: 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	Comment
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**	**Comment**
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 151: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

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 4 "Automation PC 620 with Windows XP Professional" on page 529.

4.4.5 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 529.

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).

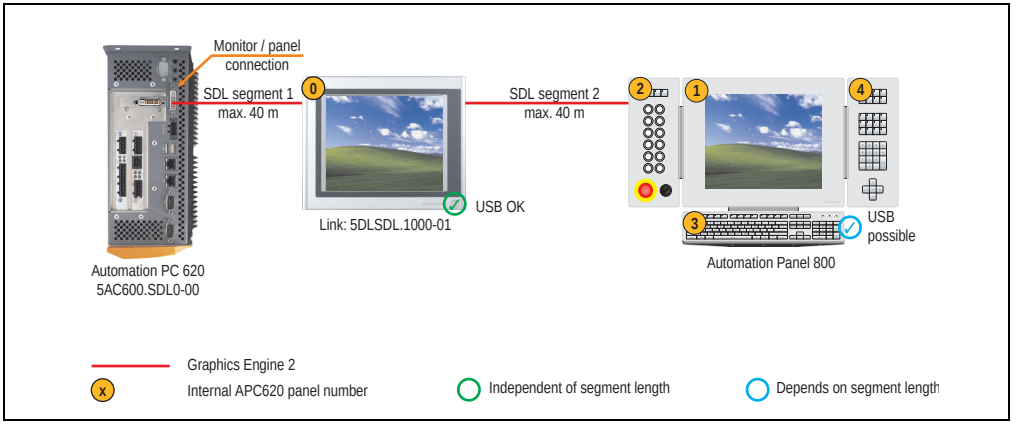


Figure 136: Configuration - An AP900 and an AP800 via SDL (onboard)

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						Limitation 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 152: 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 Segment length [m]	Resolution 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 153: Segment lengths, resolutions and SDL cables

1) See table 154 "Requirements for SDL cable with automatic cable adjustment (equalizer)"
2) See table 155 "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	Comment
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 154: 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	Comment
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**	**Comment**
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 155: 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 4 "Automation PC 620 with Windows XP Professional" on page 529.

4.5.5 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 529.

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).

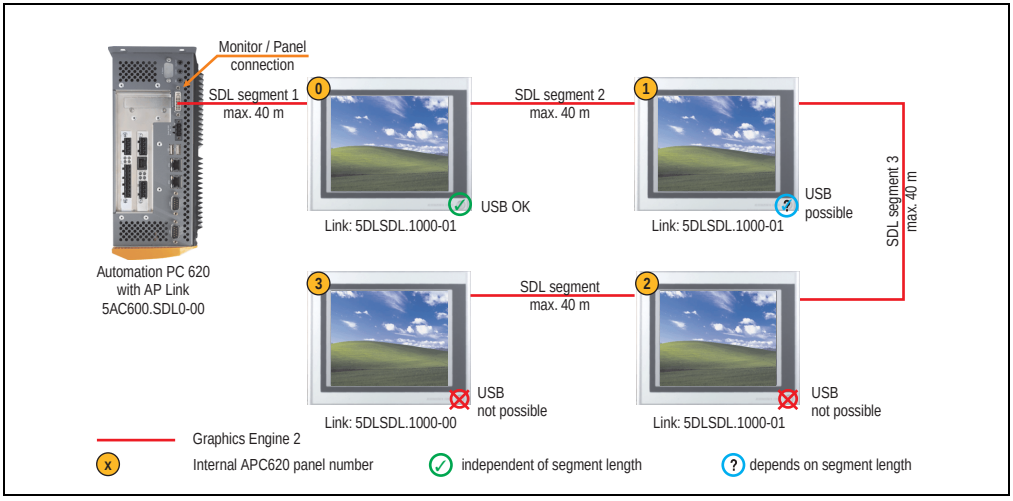


Figure 137: Configuration - Four Automation Panel 900 units via SDL (onboard)

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						Limitation 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 156: Possible combinations of system unit and CPU board

CPU board	with system unit						Limitation 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 156: Possible combinations of system unit and CPU board (cont.)

4.6.2 Link modules

Model number	Description	Comment
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 157: 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 158: 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 158: 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 159: Segment lengths, resolutions and SDL cables

1) See table 160 "Requirements for SDL cable with automatic cable adjustment (equalizer)" on page 298

2) See table 161 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)" on page 298

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	Comment
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**	**Comment**
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 160: 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	Comment
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**	**Comment**
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 161: 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 4 "Automation PC 620 with Windows XP Professional" on page 529.

4.6.6 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 529.

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).

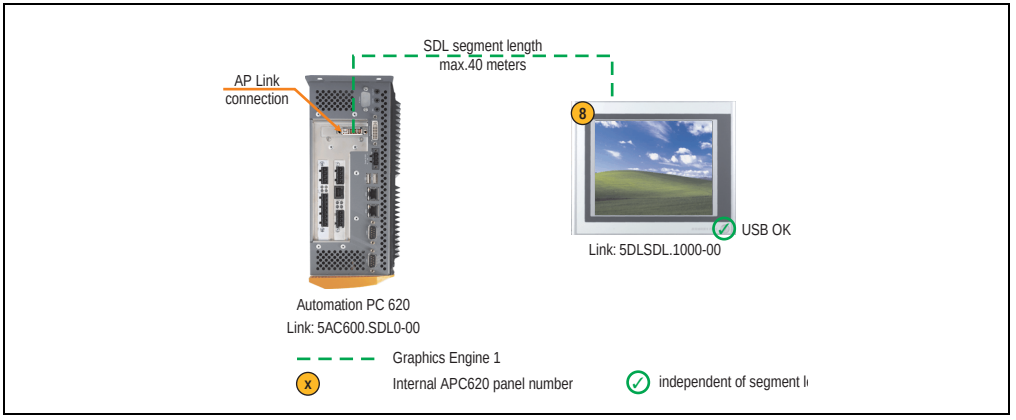


Figure 138: Configuration - One Automation Panel 900 via SDL (AP Link)

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						Limitation 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 162: Possible combinations of system unit and CPU board

4.7.2 Link modules

Model number	Description	Comment
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 163: 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 164: 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 165: Segment lengths, resolutions and SDL cables

1) See table 166 "Requirements for SDL cable with automatic cable adjustment (equalizer)" on page 302

2) See table 167 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)" on page 303

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	Comment
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**	**Comment**
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 166: 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	Comment
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**	**Comment**
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 167: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

4.7.4 BIOS settings

No special BIOS settings are necessary for operation.

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 4 "Automation PC 620 with Windows XP Professional" on page 529.

4.7.6 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 529.

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).

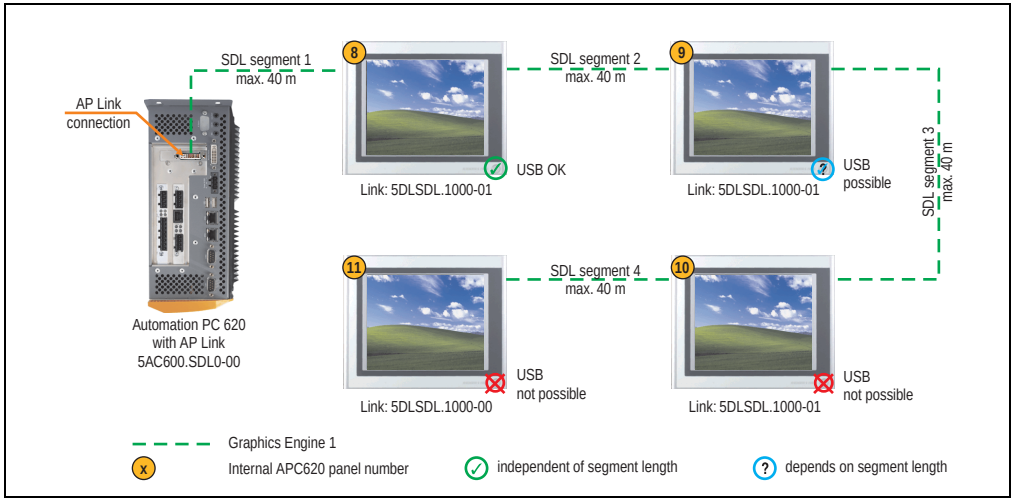


Figure 139: Configuration - 4 Automation Panel 900 units via SDL (AP Link)

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						Limitation 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 168: Possible combinations of system unit and CPU board

CPU board	with system unit						Limitation 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 168: Possible combinations of system unit and CPU board (cont.)

4.8.2 Link modules

Model number	Description	Comment
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 169: Link modules for the 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 170: 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 170: 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 171: Segment lengths, resolutions and SDL cables

1) See table 172 "Requirements for SDL cable with automatic cable adjustment (equalizer)" on page 307

2) See table 173 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)" on page 307

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	Comment
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**	**Comment**
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 172: 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	Comment
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**	**Comment**
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 173: 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 4 "Automation PC 620 with Windows XP Professional" on page 529.

4.8.6 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 529.

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.

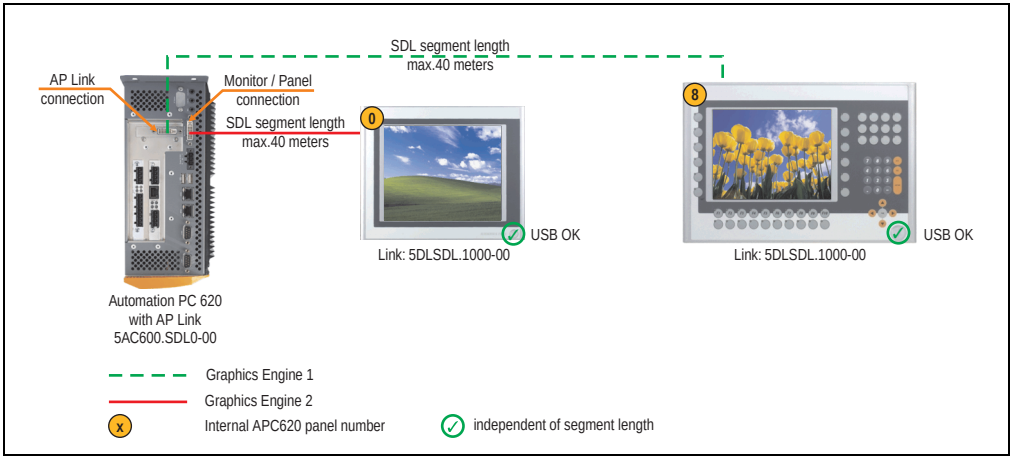


Figure 140: Configuration - Two Automation Panel 900 units via SDL (onboard) and SDL (AP Link)

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						Limitation 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 174: Possible combinations of system unit and CPU board

4.9.2 Link modules

Model number	Description	Comment
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 175: 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 176: 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 177: Segment lengths, resolutions and SDL cables

1) See table 178 "Requirements for SDL cable with automatic cable adjustment (equalizer)" on page 311

2) See table 179 "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	Comment
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**	**Comment**
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 178: 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	Comment
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**	**Comment**
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 179: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

4.9.4 BIOS settings

No special BIOS settings are necessary for operation.

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 4 "Automation PC 620 with Windows XP Professional" on page 529.

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 4.2.4 "Graphics settings for Dual Display Clone" on page 535).

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 4.2.3 "Graphics settings for Extended Desktop" on page 533).

4.9.6 Windows touch screen driver settings

See chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 529.

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).

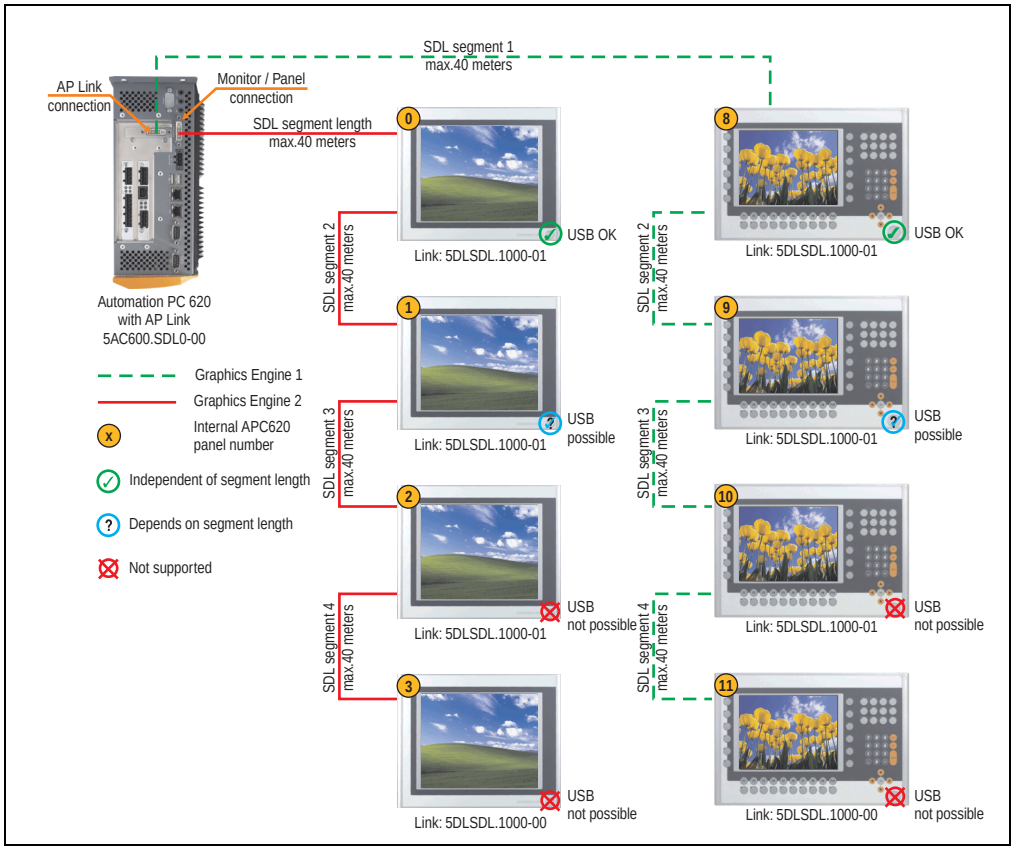


Figure 141: Configuration - Eight Automation Panel 900 units via SDL (onboard) and SDL (AP Link)

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						Limitation 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 180: Possible combinations of system unit and CPU board

4.10.2 Link modules

Model number	Description	Comment
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 181: Link modules for the 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 182: 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

Table 183: 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 183: Segment lengths, resolutions and SDL cables (cont.)

1) See table 184 "Requirements for SDL cable with automatic cable adjustment (equalizer)" on page 316

2) See table 185 "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	Comment
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**	**Comment**
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 184: 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	Comment
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**	**Comment**
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 185: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

4.10.4 BIOS settings

No special BIOS settings are necessary for operation.

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 4 "Automation PC 620 with Windows XP Professional" on page 529.

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 the Chapter 4 "Software", Section 4.2.4 "Graphics settings for Dual Display Clone" on page 535).

4.10.6 Windows touch screen driver settings

See chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 529.

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).

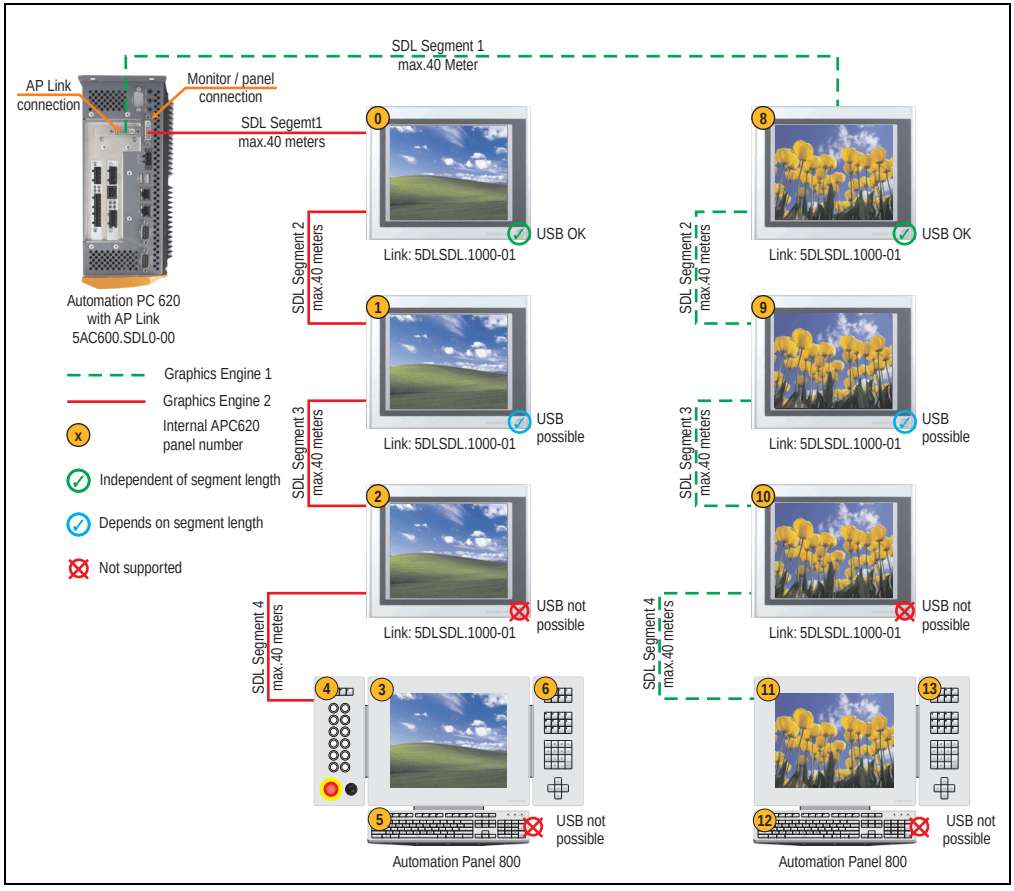


Figure 142: Configuration - Six AP900 and two AP800 devices via SDL (onboard) and SDL (AP Link)

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						Limitation 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 186: Possible combinations of system unit and CPU board

4.11.2 Link modules

Model number	Description	Comment
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 187: Link modules for the 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 188: Segment lengths, resolutions and SDL cables

1) See table 190 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)" on page 322

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	Comment
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 189: 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	Comment
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**	**Comment**
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 190: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

4.11.4 BIOS settings

No special BIOS settings are necessary for operation.

To operate Automation Panel 900 panels and Automation Panel 800 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 4 "Automation PC 620 with Windows XP Professional" on page 529.

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 4.2.4 "Graphics settings for Dual Display Clone" on page 535).

4.11.6 Windows touch screen driver settings

See chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 529.

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.

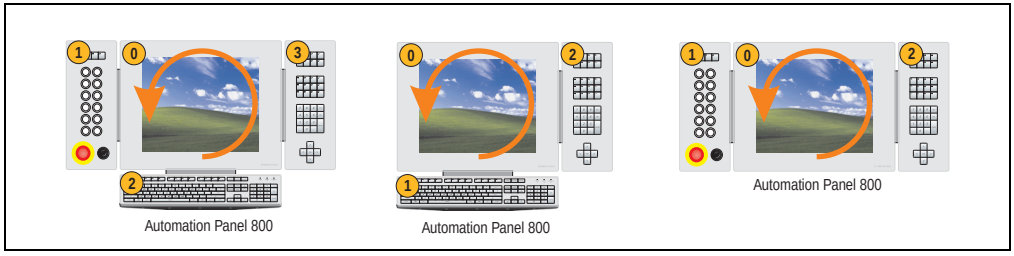


Figure 143: Examples - internal numbering of the extension units

5. Configuration of a SATA RAID array

For the configuration, it's necessary to use the "RAID Configuration Utility" in BIOS. After the POST, enter <Ctrl+S> or <F4> to open RAID BIOS.

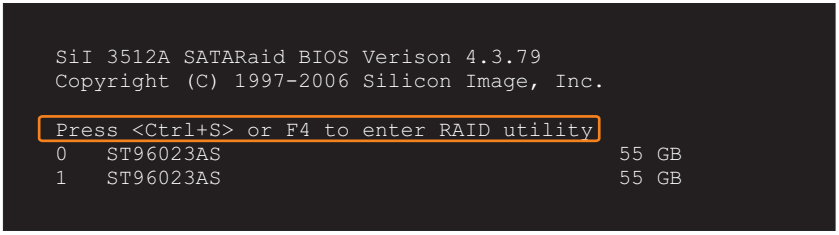


Figure 144: Open the RAID Configuration Utility

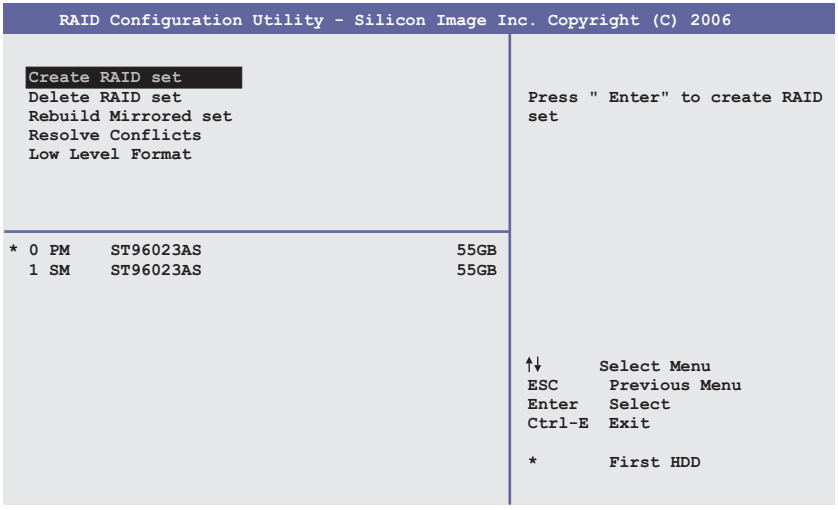


Figure 145: RAID Configuration Utility - Menu

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 191: 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 191: BIOS-relevant keys in the RAID Configuration Utility

5.1 Create RAID Set

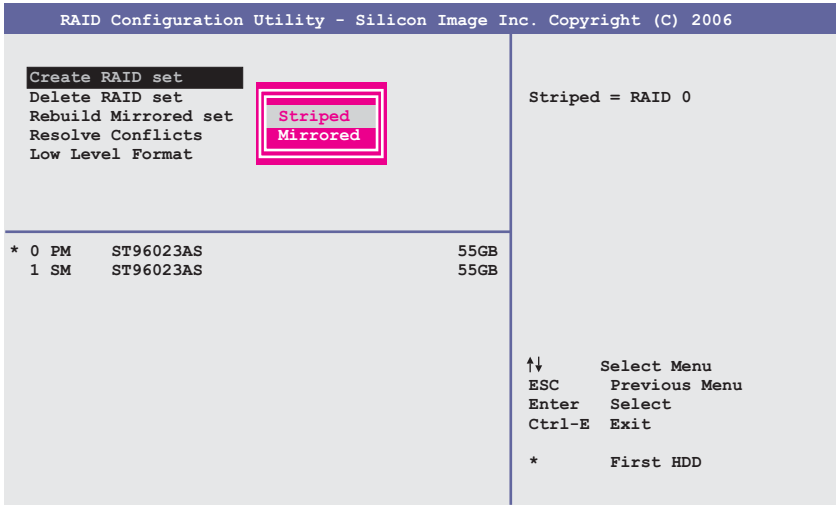


Figure 146: RAID Configuration Utility - Menu

Using the menu "Create RAID set", it's possible to recreate the RAID system as "Striped" = RAID0 or "Mirrored" = RAID1.

5.1.1 Create RAID Set - striped

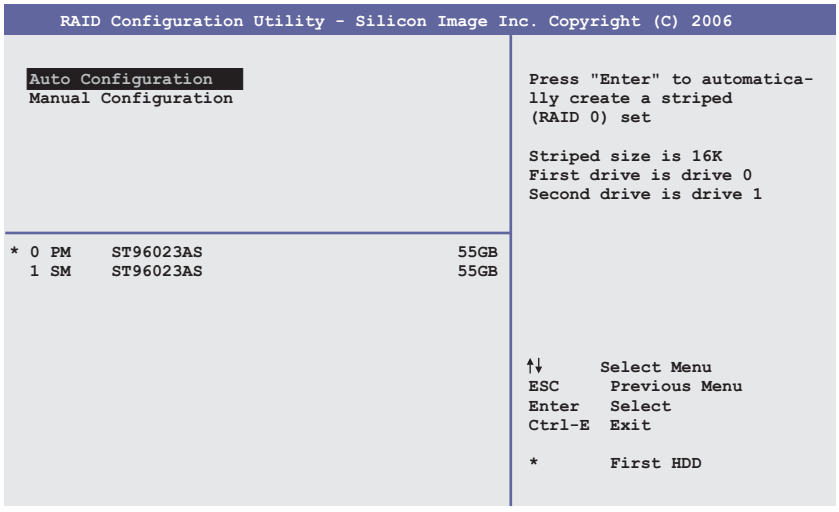


Figure 147: RAID Configuration Utility - Create RAID set - striped

Auto Configuration

Auto Configuration optimizes all settings.

Manual Configuration

It's 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

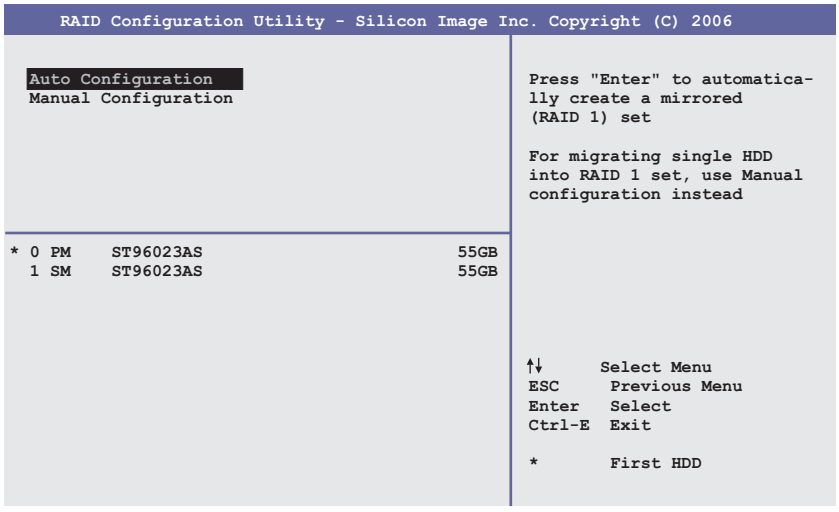


Figure 148: RAID Configuration Utility - Create RAID set - Mirrored

Auto Configuration

Auto Configuration optimizes all settings.

Manual Configuration

It's possible to specify the "Source" and "Target" HDD, and also to specify if a rebuild (mirror) should be done immediately (approx. 50 minutes).

5.2 Delete RAID set

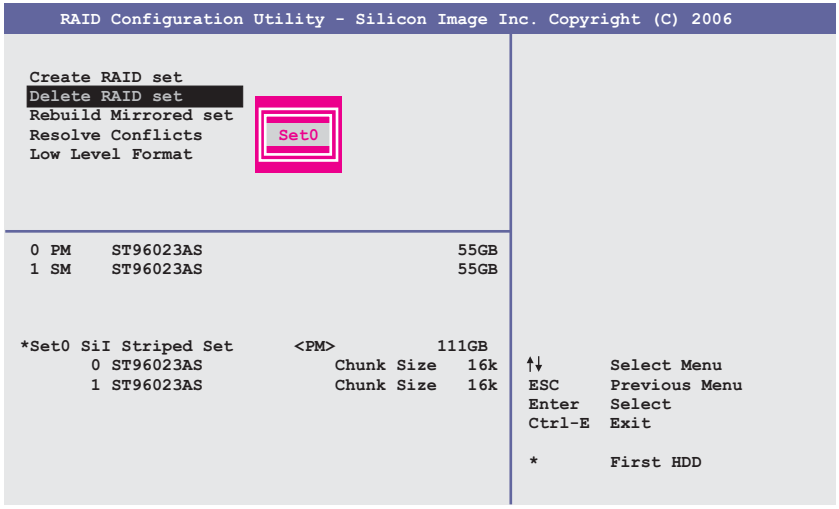


Figure 149: RAID Configuration Utility - Delete RAID set

Using the menu "Delete RAID set", it's possible to delete an existing RAID set.

5.3 Rebuild Mirrored Set

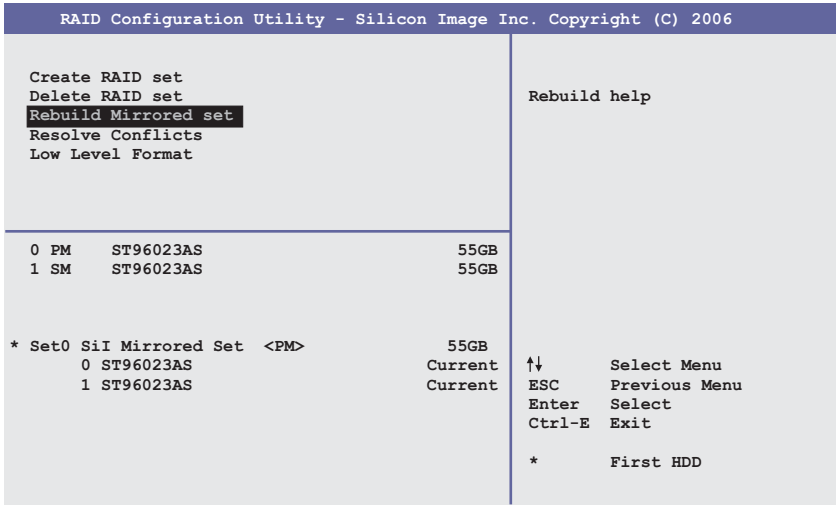


Figure 150: RAID Configuration Utility - Rebuild Mirrored set

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

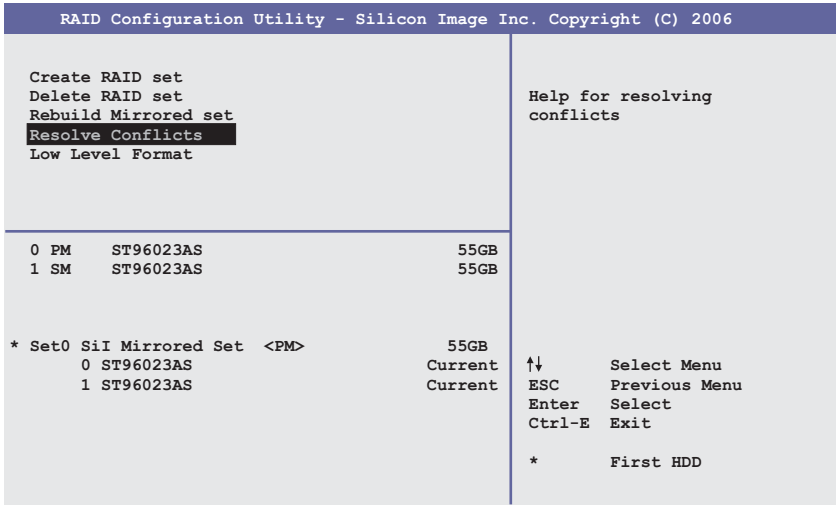


Figure 151: RAID Configuration Utility - Resolve Conflicts

Using the menu "Resolve Conflicts", it's possible to resolve RAID set conflicts. This function is only available if the status of the hard disk is "conflict".

5.5 Low Level Format

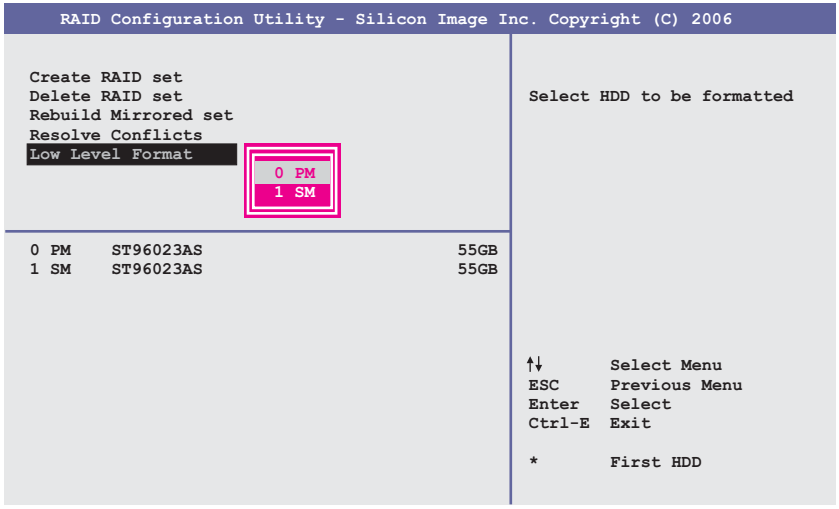


Figure 152: RAID Configuration Utility - Low Level Format

Using the menu "Low Level Format", it's possible to format individual hard disks. 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 assure 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 121 and "USB connection (only APC620 embedded)" on page 122.

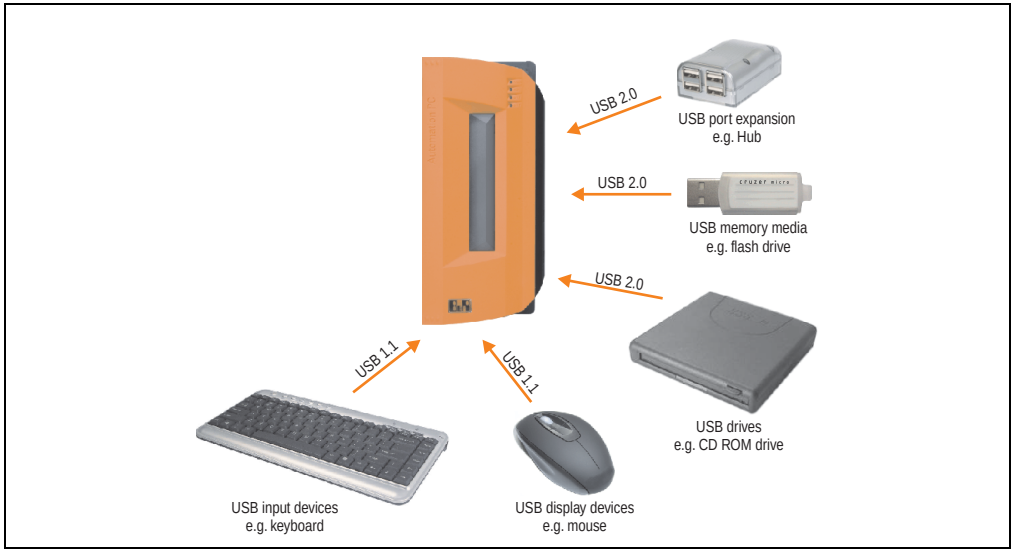


Figure 153: Local connection of USB peripheral devices on the APC620

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 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.

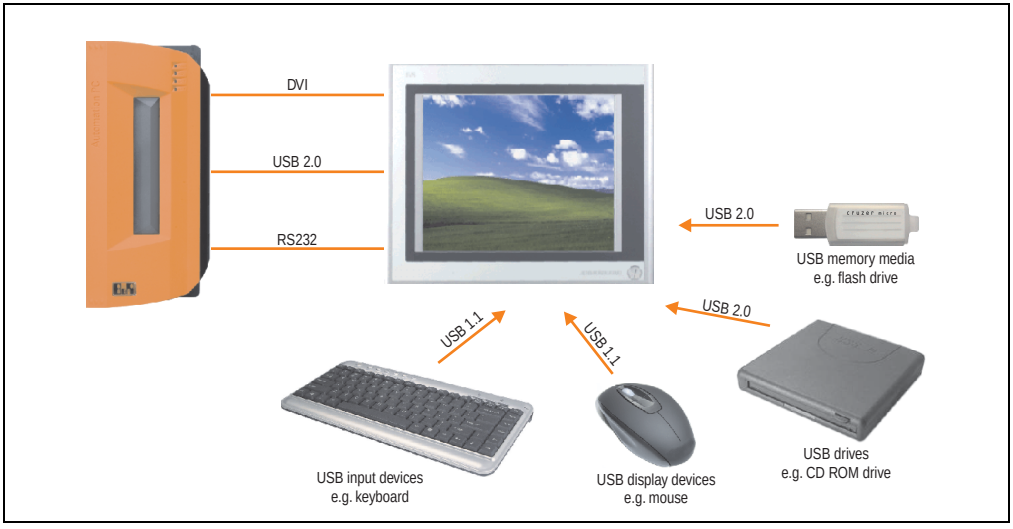


Figure 154: Remote connection of USB peripheral devices to the APC900 via DVI

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.

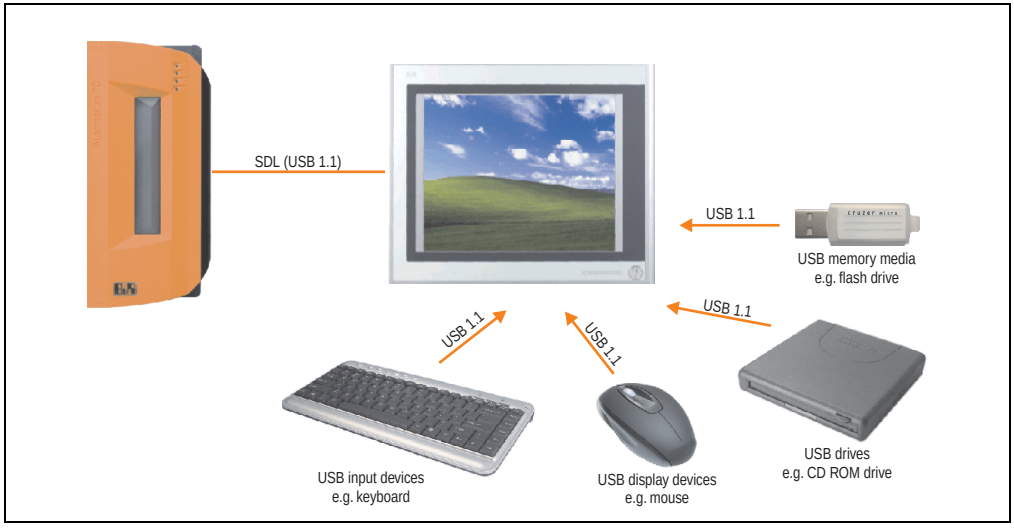


Figure 155: Remote connection of USB peripheral devices to the APC800/900 via SDL

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 Power	Yes Equal to
Software compatibility Hardware driver BIOS Windows XP embedded Windows XP Professional Automation Runtime	 Yes No - AMI BIOS No - New image required (see model number overview) No - Reinstall required 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 192: Compatibility / improvements from 855GME (XTX) to 855GME (ETX)

Chapter 4 • Software

1. Automation PC 620 with BIOS

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 382).**

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"

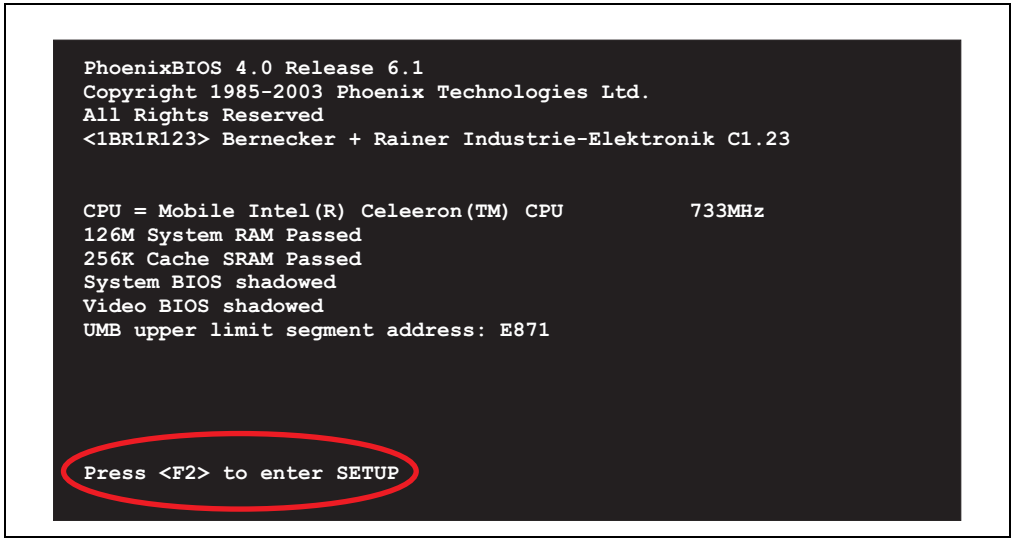


Figure 156: 815E (ETX) BIOS diagnostic screen

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 157: 815E (ETX) BIOS diagnostic 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 193: 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.
PgUp↑	Moves the cursor to the top of the current BIOS setup page.
PgDn ↓	Moves the cursor to the bottom of the current BIOS setup page.

Table 194: Keys relevant to 815E (ETX) BIOS during POST

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 194: Keys relevant to 815E (ETX) BIOS during POST (cont.)

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.	341
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.	350
Security	For setting up the system's security functions.	373
Power	Setup of various APM (Advanced Power Management) options.	375
Boot	The boot order can be set here.	379
Exit	To end the BIOS setup.	380

Table 195: Overview of 815E (ETX) BIOS menu items

1.1.4 Main

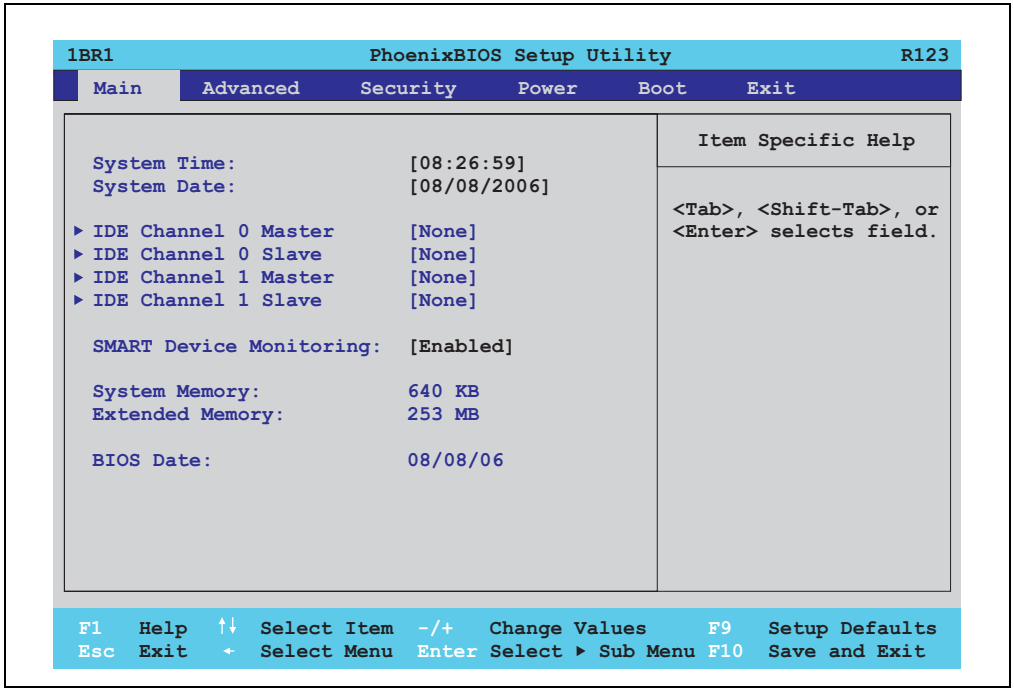


Figure 158: 815E (ETX)- main menu

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.	Adjustment of 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 to 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 submenu see "IDE channel 0 master" on page 342.
IDE channel 0 slave	The drive in the system that is connected to the IDE primary slave port is configured here.	Enter	Opens submenu see "IDE channel 0 slave" on page 344.
IDE channel 1 master	The drive in the system that is connected to the IDE secondary master port is configured here.	Enter	Opens submenu see "IDE channel 1 master" on page 346.
IDE channel 1 slave	The drive in the system that is connected to the IDE secondary slave port is configured here.	Enter	Opens submenu see "IDE channel 1 slave" on page 348.

Table 196: 815E (ETX)- main menu - 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 196: 815E (ETX)- main menu - setting options (cont.)

IDE channel 0 master

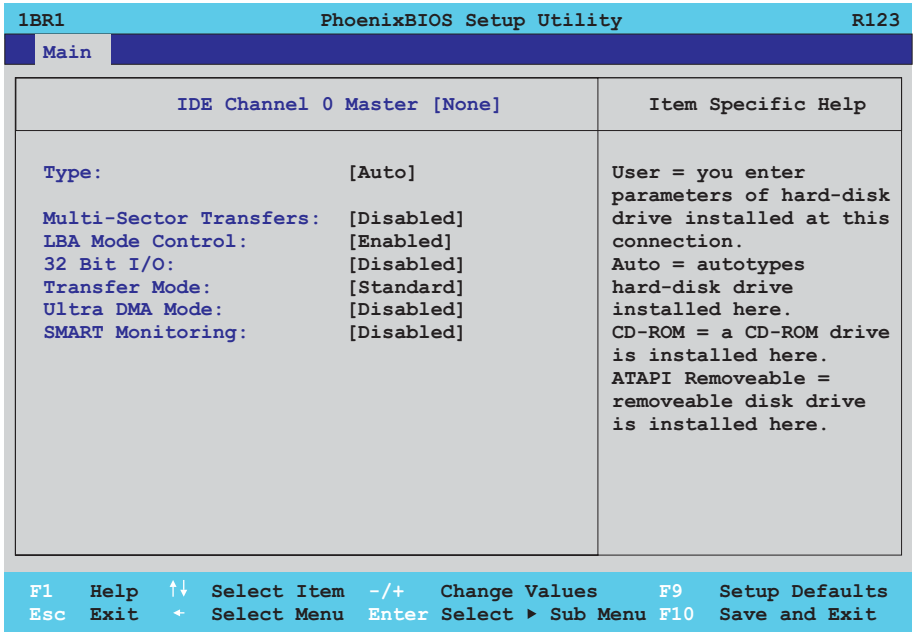


Figure 159: 815E (ETX) IDE Channel 0 Master

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 197: 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 160: 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 198: 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 198: 815E (ETX) IDE Channel 0 Slave - setting options (cont.)

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 161: 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 199: 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 199: 815E (ETX) IDE Channel 1 Master - setting options (cont.)

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 162: 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 200: 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 200: 815E (ETX) IDE Channel 1 Slave - setting options (cont.)

1.1.5 Advanced

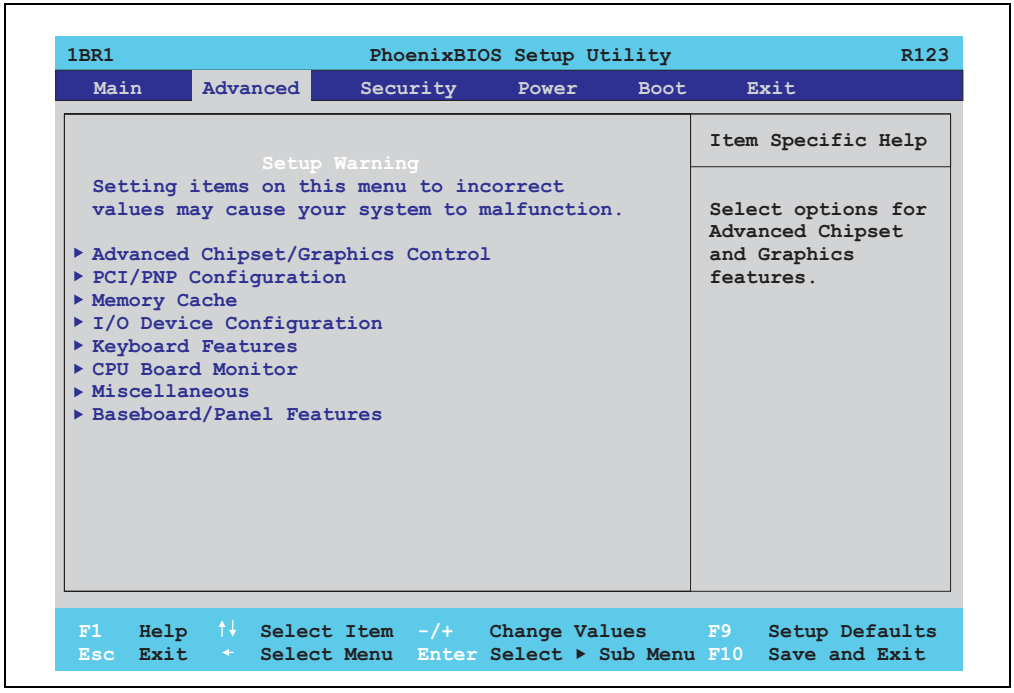


Figure 163: 815E (ETX)- main menu

BIOS setup menu	Meaning	Setting options	Effect
Advanced chipset/graphics control	Setup of advanced chipset and graphics functions.	Enter	Opens submenu see "Advanced chipset/graphics control" on page 351.
PCI/PNP configuration	Configures PCI devices.	Enter	Opens submenu see "PCI/PNP configuration" on page 353.
Memory cache	Configuration of the memory cache resources.	Enter	Opens submenu see "Memory cache" on page 359.
I/O device configuration	Configuration of the I/O devices.	Enter	Opens submenu see "I/O device configuration" on page 361.
Keyboard features	Configuration of the keyboard options.	Enter	Opens submenu see "Keyboard features" on page 364.
CPU board monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens submenu see "CPU board monitor" on page 365.
Miscellaneous	Configuration of various BIOS settings (summary screen, halt on errors, etc.).	Enter	Opens submenu see "Miscellaneous" on page 366.
Baseboard/panel features	Displays device specific information and setup of device specific values.	Enter	Opens submenu see "Baseboard/panel features" on page 367.

Table 201: 815E (ETX)- main 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 164: 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	**Important!** **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.

Table 202: 815E (ETX) - advanced chipset/graphics control - setting options

BIOS setting	Meaning	Setting options	Effect
Internal graphics API Rev	Displays the internal graphics API (Application Programmer Interface) version number.	None	-

Table 202: 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 165: 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 203: 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 submenu See "PCI device, slot #1" on page 355
PCI device, slot #2	Advanced configuration of the PCI slot number 2.	Enter	Opens submenu See "PCI device, slot #2" on page 356
PCI device, slot #3	Advanced configuration of the PCI slot number 3.	Enter	Opens submenu See "PCI device, slot #3" on page 357
PCI device, slot #4	Advanced configuration of the PCI slot number 4.	Enter	Opens submenu See "PCI device, slot #4" on page 358
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 203: 815E (ETX) - PCI/PNP configuration - setting options (cont.)

PCI device, slot #1

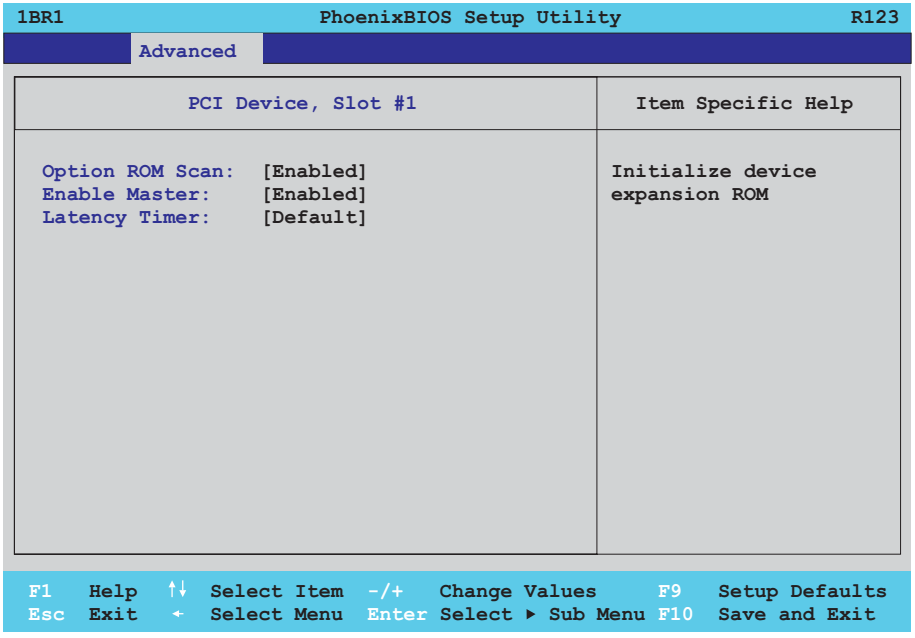


Figure 166: 815E (ETX) - PCI device, slot #1

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. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manually setting the value.

Table 204: 815E (ETX) - PCI device, slot #1 - setting options

PCI device, slot #2

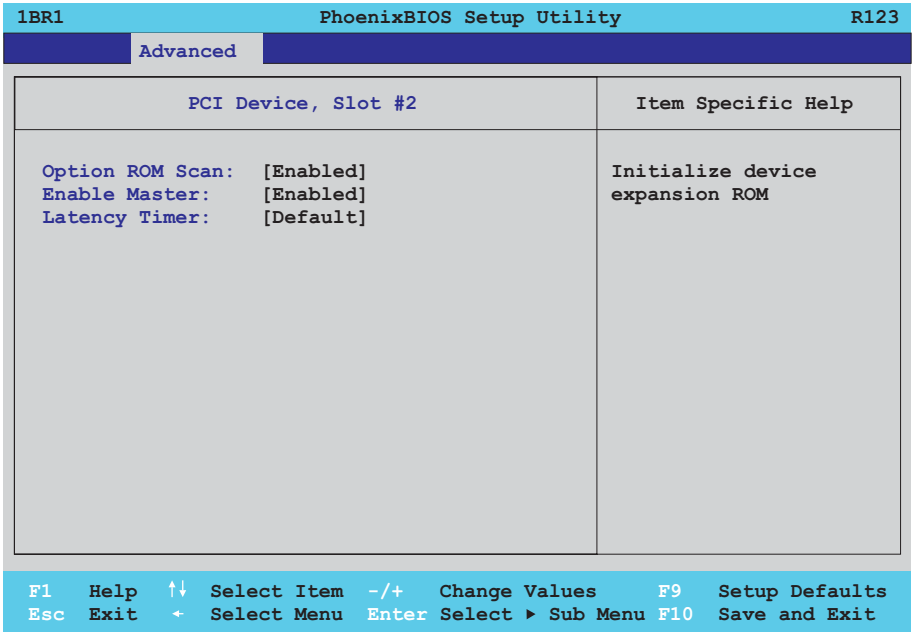


Figure 167: 815E (ETX) - PCI device, slot #2

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. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manually setting the value.

Table 205: 815E (ETX) - PCI device, slot #2 - setting options

PCI device, slot #3

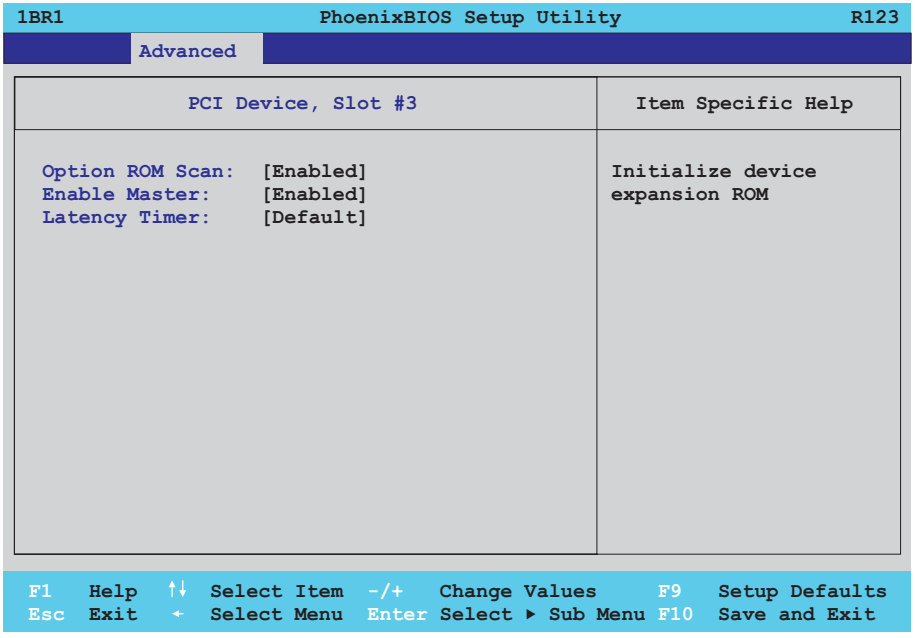


Figure 168: 815E (ETX) - PCI device, slot #3

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. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manually setting the value.

Table 206: 815E (ETX) - PCI device, slot #3 - setting options

PCI device, slot #4

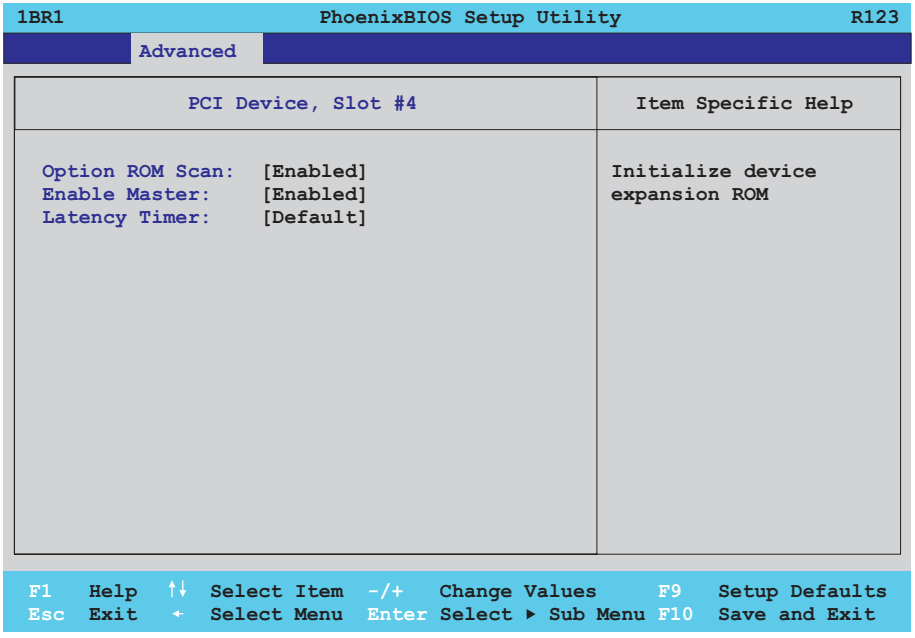


Figure 169: 815E (ETX) - PCI device, slot #4

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. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manually setting the value.

Table 207: 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 170: 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 208: 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 208: 815E (ETX) - memory cache - setting options (cont.)

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]
  Parallet 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 171: 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 209: 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 209: 815E (ETX) - I/O device configuration - setting options (cont.)

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 209: 815E (ETX) - I/O device configuration - setting options (cont.)

Keyboard features

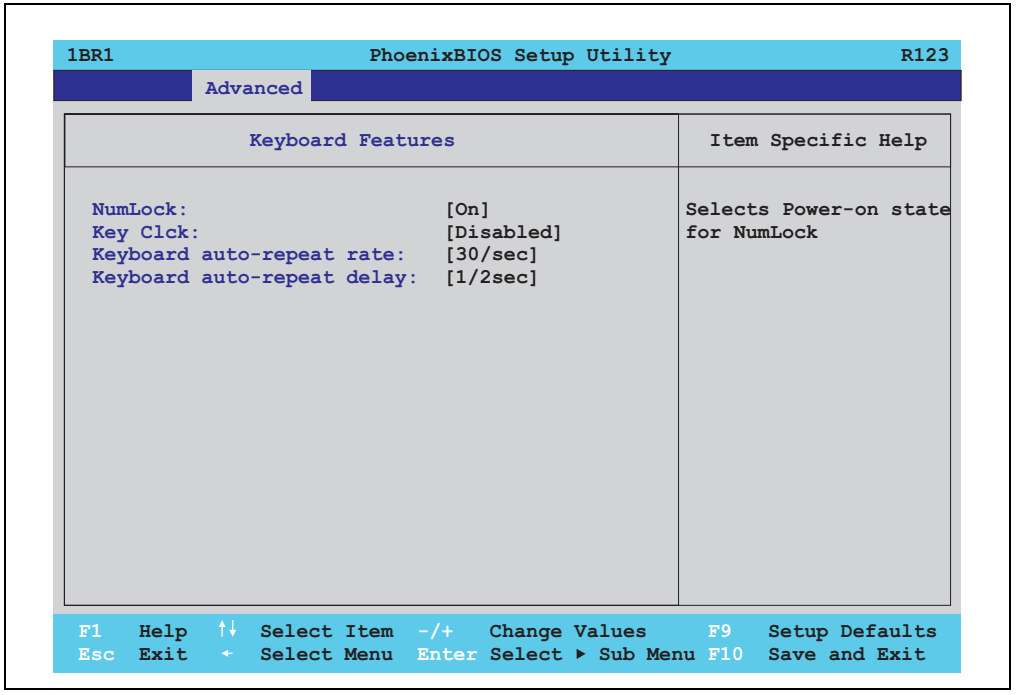


Figure 172: 815E (ETX) - keyboard features

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 210: 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.

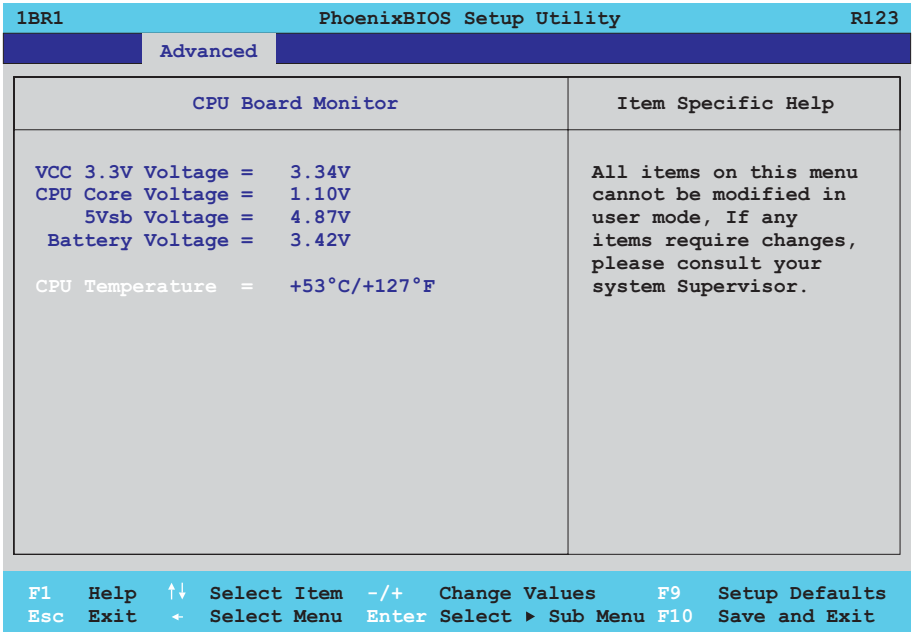


Figure 173: 815E (ETX) - CPU board monitor

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 211: 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 174: 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 157 "815E (ETX) BIOS diagnostic screen" on page 339).	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 156 "815E (ETX) BIOS diagnostic screen" on page 338) should be displayed when the system is started.	Enabled	Enables this function. The diagnostics screen is displayed.
		Disabled	Disables this function. The diagnostics screen is not displayed.

Table 212: 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 212: 815E (ETX)- miscellaneous - setting options (cont.)

Baseboard/panel features

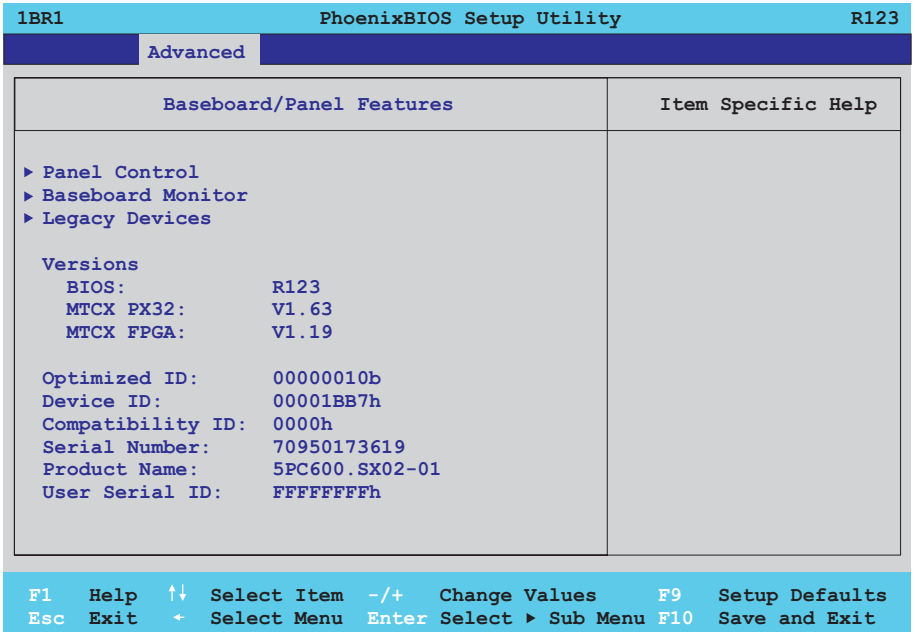


Figure 175: 815E (ETX) - baseboard / panel features

BIOS setting	Meaning	Setting options	Effect
Panel control	For special setup of connected panels (display units).	Enter	Opens submenu See "Panel control" on page 369
Baseboard monitor	Display of various temperatures and fan speeds.	Enter	Opens submenu See "Baseboard monitor" on page 370

Table 213: 815E (ETX) - baseboard / panel features - setting options

BIOS setting	Meaning	Setting options	Effect
Legacy devices		Enter	Opens submenu See "Legacy devices" on page 371
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 213: 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 176: 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 214: 815E (ETX) panel control - setting options

Baseboard monitor

```
1BR1                    PhoenixBIOS Setup Utility                    R123
                Advanced

        Baseboard Monitor                          Item Specific Help

 Temperatures
   I/O:                  42°C/108°F
   Power Supply:         34°C/93°F
   Slide-In Drive 1:     00°C/32°F
   Slide-In Drive 2:     00°C/32°F

 Fan Speeds                                        All items on this menu
   Case 1:               00 RPM                    cannot be modified in
   Case 2:               00 RPM                    user mode. If any
   Case 3:               00 RPM                    items require changes,
   Case 4:               00 RPM                    please consult your
   CPU:                  00 RPM                    system Supervisor.

 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 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 25.40 mm 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 215: 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 178: 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 216: 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 of a B&R add-on interface option (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 216: 815E (ETX) - Legacy devices - setting options (cont.)

1.1.6 Security

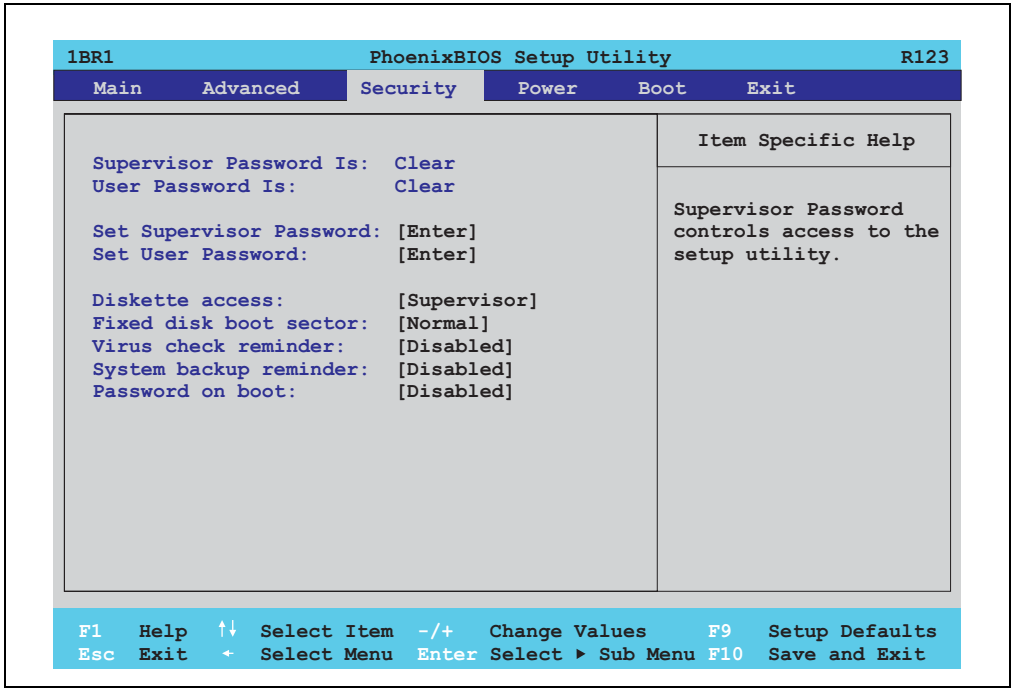


Figure 179: 815E (ETX)- security menu

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 217: 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 217: 815E (ETX)- security - setting options (cont.)

1.1.7 Power

```
1BR1                    PhoenixBIOS Setup Utility                    R123
  Main     Advanced     Security     Power     Boot     Exit

                                                   Item Specific Help
  Enable ACPI                [Yes]

▶ 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 180: 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 submenu See "ACPI control" on page 377
Thermal management	Configuration of specific CPU limits.	Enter	Opens submenu See "Thermal management" on page 378
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 218: 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. **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 218: 815E (ETX)- power - setting options (cont.)

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 181: 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°C... 100°C	Temperature setting for the active trip point. Can be set in 5 degree increments.
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°C... 100°C	Temperature setting for the passive cooling trip point. Can be set in 5 degree increments.
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°C... 110°C	Temperature setting for the critical trip point. Can be set in 5 degree increments.

Table 219: 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 219: 815E (ETX) ACPI control - setting options (cont.)

Thermal management

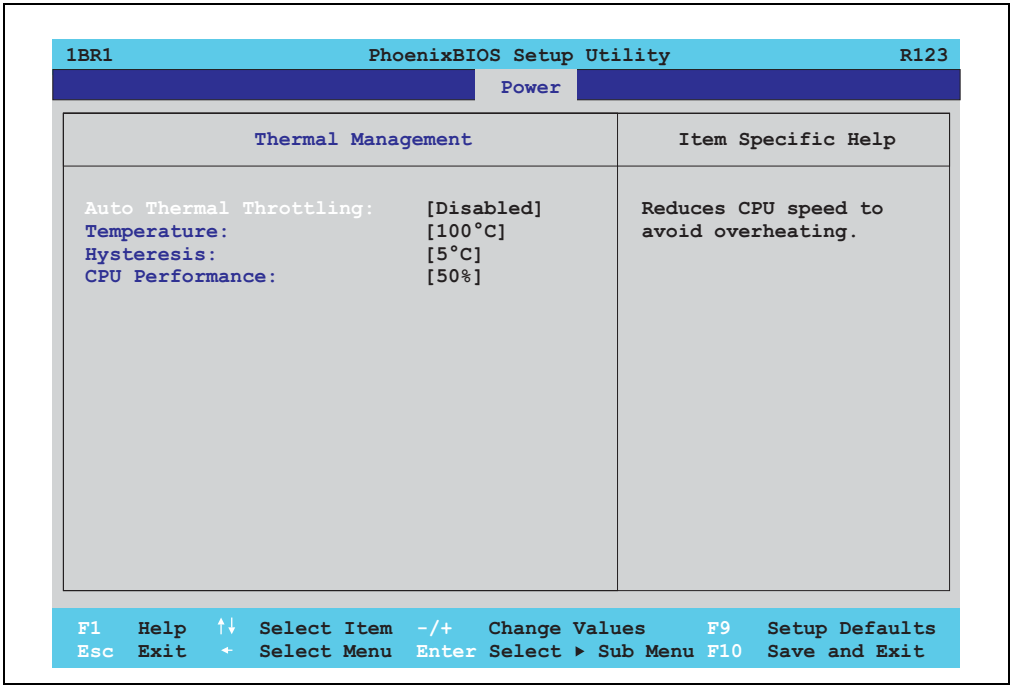


Figure 182: 815E (ETX) - thermal management

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 220: 815E (ETX) - thermal management

BIOS setting	Meaning	Setting options	Effect
Temperature	Temperature limit for the setting "auto thermal throttling."	75°C ... 110°C	Can be set in increments of 5°C.
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°C ... 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 (%) set in this option.	13%, 25%, 50%, 75%	CPU performance throttled by amount selected, in percent.

Table 220: 815E (ETX) - thermal management (cont.)

1.1.8 Boot

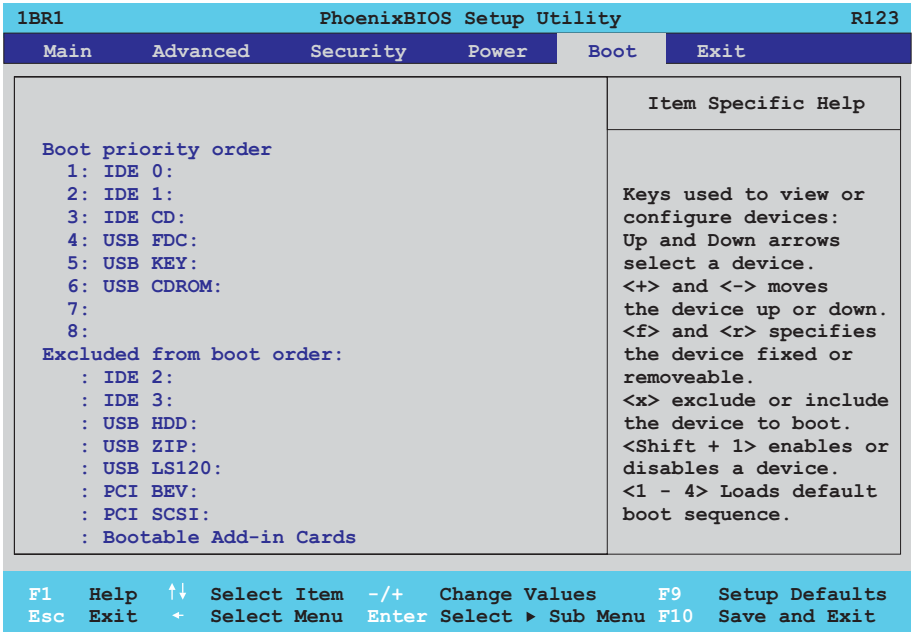


Figure 183: 815E (ETX)- boot menu

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 221: 815E (ETX)- boot menu - setting options

1.1.9 Exit

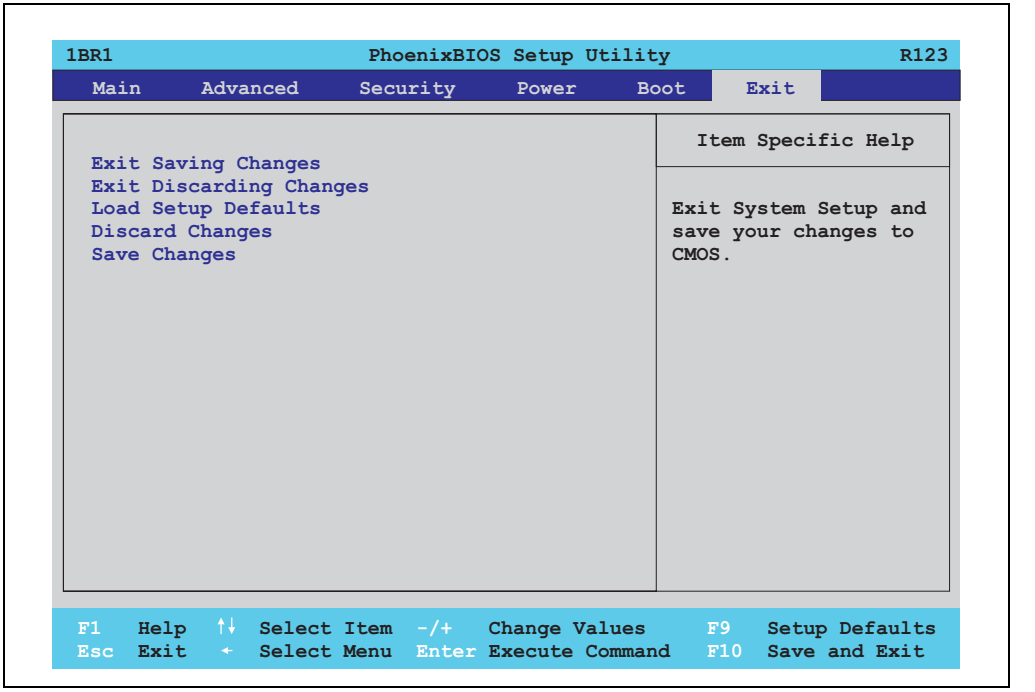


Figure 184: 815E (ETX)- exit menu

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	

Table 222: 815E (ETX)- exit menu - setting options

BIOS setting	Meaning	Setting options	Effect
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 222: 815E (ETX)- exit menu - setting options (cont.)

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 1.9 "Location of the DIP switch in APC620 system units" on page 523).

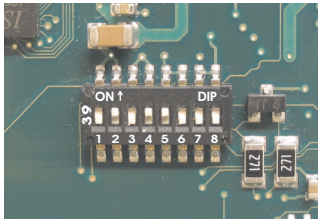


Figure 185: DIP switch on system unit

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 223: 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 224: 815E (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	
Graphics memory size	1MB	1MB	1MB	1MB	1MB	
Enable memory gap	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 225: 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 226: 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 226: 815E (ETX) - PCI/PNP configuration - profile settings overview (cont.)

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 227: 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 228: 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 228: 815E (ETX) - I/O device configuration - profile settings overview (cont.)

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 229: 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 230: 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 231: 815E (ETX)- miscellaneous - profile settings overview

Baseboard/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	-	-	-	-	-	
Baseboard 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 232: 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 232: 815E (ETX) - baseboard / panel features - profile settings overview (cont.)

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 233: 815E (ETX)- security menu - 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	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	
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 234: 815E (ETX)- power menu - 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 235: 815E (ETX)- boot menu - profile settings overview

1.2 855GME (ETX) BIOS description

Information:

- **The following diagrams and BIOS menu items including descriptions refer to BIOS version 1.26. 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 437).**

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
<0BR1R126> Bernecker + Rainer Industrie-Elektronik B1.26


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 186: 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 187: 855GME (ETX) - BIOS diagnostics 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 236: 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.
PgUp↑	Moves the cursor to the top of the current BIOS setup page.
PgDn ↓	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.
<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 237: 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.	394
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.	404
Security	For setting up the system's security functions.	429
Power	Setup of various APM (Advanced Power Management) options.	431
Boot	The boot order can be set here.	435
Exit	To end the BIOS setup.	436

Table 238: Overview of 855GME (ETX) BIOS menu items

1.2.4 Main

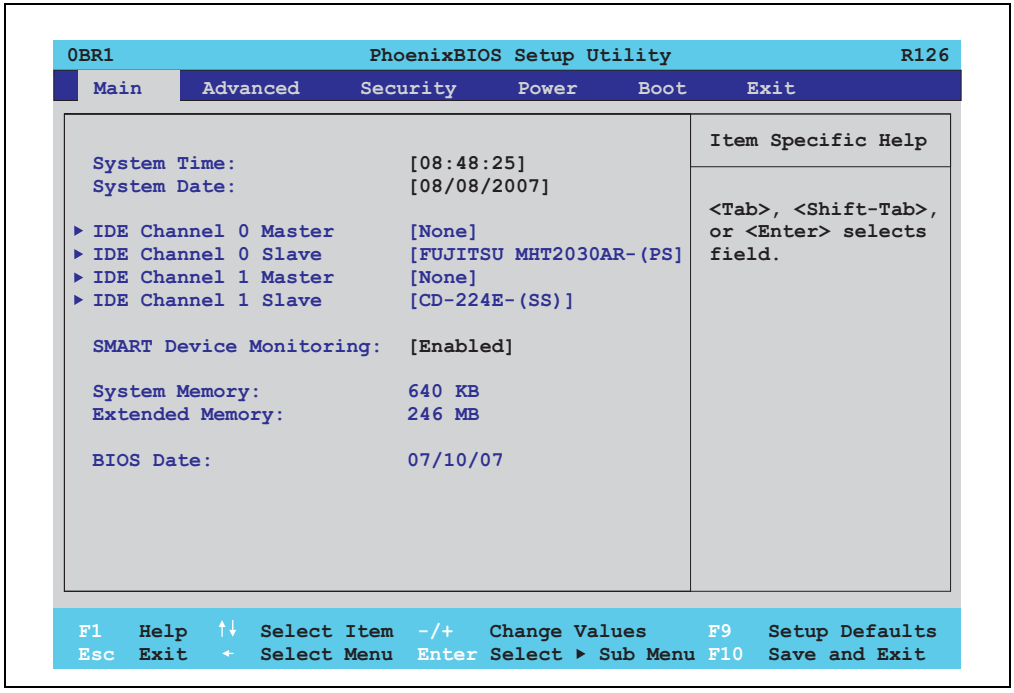


Figure 188: 855GME (ETX) main menu

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.	Adjustment of 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 to 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 submenu see "IDE channel 0 master" on page 396.
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 submenu see "IDE channel 0 slave" on page 398.
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 submenu see "IDE channel 1 master" on page 400.

Table 239: 855GME (ETX) main menu - setting options

BIOS setting	Meaning	Setting options	Effect
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 submenu see "IDE channel 1 slave" on page 402.
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 239: 855GME (ETX) main menu - setting options (cont.)

IDE channel 0 master

```
0BR1                    PhoenixBIOS Setup Utility                    R126
 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 189: 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 240: 815E (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 240: 815E (ETX) IDE Channel 0 Master - setting options (cont.)

IDE channel 0 slave

```
0BR1                    PhoenixBIOS Setup Utility                    R126
 Main

 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 190: 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 241: 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 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 241: 815E (ETX) IDE Channel 0 slave - setting options (cont.)

IDE channel 1 master

```
0BR1                    PhoenixBIOS Setup Utility                    R126
 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 191: 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 242: 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 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 242: 815E (ETX) IDE Channel 1 Master - setting options (cont.)

IDE channel 1 slave

```
0BR1                    PhoenixBIOS Setup Utility                    R126
 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 192: 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 243: 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 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 243: 815E (ETX) IDE Channel 1 slave - setting options (cont.)

1.2.5 Advanced

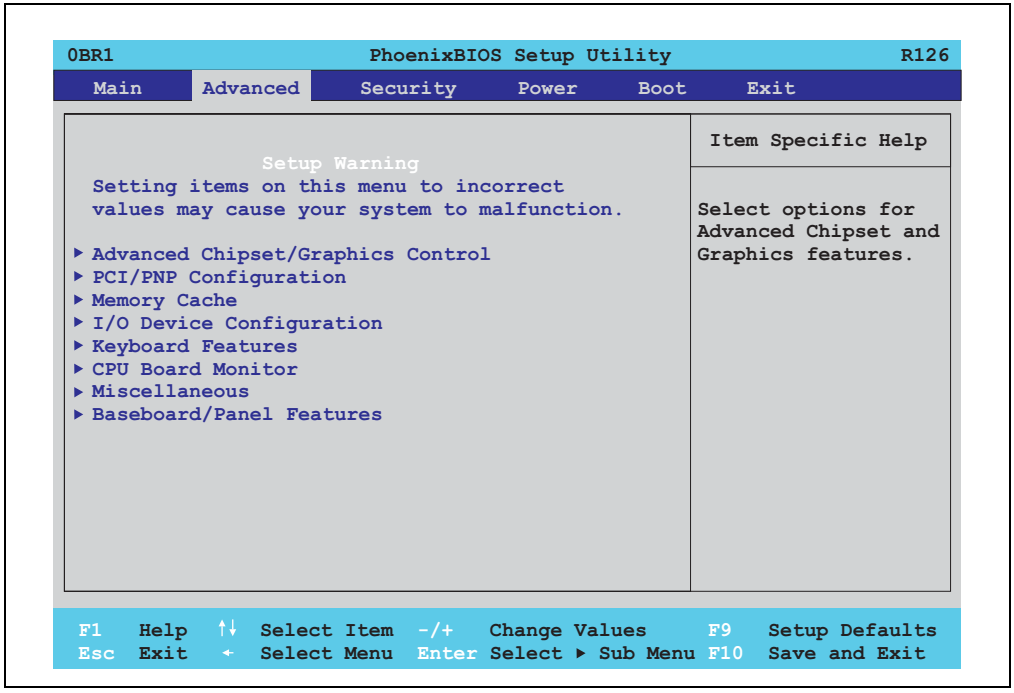


Figure 193: 855GME - advanced setup menu - overview

BIOS setup menu	Meaning	Setting options	Effect
Advanced chipset/graphics control	Setup of advanced chipset and graphics functions.	Enter	Opens submenu see "Advanced chipset/graphics control" on page 405.
PCI/PNP configuration	Configures PCI devices.	Enter	Opens submenu see "PCI/PNP configuration" on page 407.
Memory cache	Configuration of the memory cache resources.	Enter	Opens submenu see "Memory cache" on page 414.
I/O device configuration	Configuration of the I/O devices.	Enter	Opens submenu see "I/O device configuration" on page 416.
Keyboard features	Configuration of the keyboard options.	Enter	Opens submenu see "Keyboard features" on page 419.
CPU board monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens submenu see "CPU board monitor" on page 420.
Miscellaneous	Configuration of various BIOS settings (summary screen, halt on errors, etc.).	Enter	Opens submenu see "Miscellaneous" on page 421.
Baseboard/panel features	Displays device specific information and setup of device specific values.	Enter	Opens submenu see "Baseboard/panel features" on page 422.

Table 244: 855GME (ETX) - advanced menu - setting options

Advanced chipset/graphics control

```
0BR1                    PhoenixBIOS Setup Utility                    R126
                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 194: 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 the graphics engine 1. The resolution is set using a read-out of the panel's EDID data. **Information:** **EDID data older than V1.1 is not passed on to the VGA-BIOS.**
		Disabled	Disable graphics controller. **Important!** **The onboard video controller must be activated to make video output possible. Deactivate only for use of an external PCI graphics card.**

Table 245: 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 the graphics engine 2. The resolution is set using a read-out of the 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 : No support 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 245: 855GME (ETX) - advanced chipset control - setting options (cont.)

PCI/PNP configuration

```
0BR1                    PhoenixBIOS Setup Utility                    R126
                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 195: 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.

Table 246: 815GME (ETX) - PCI/PNP configuration - setting options

BIOS setting	Meaning	Setting options	Effect
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 submenu See "PCI device, slot #1" on page 410
PCI device, slot #2	Advanced configuration of the PCI slot number 2.	Enter	Opens submenu See "PCI device, slot #2" on page 411
PCI device, slot #3	Advanced configuration of the PCI slot number 3.	Enter	Opens submenu See "PCI device, slot #3" on page 412
PCI device, slot #4	Advanced configuration of the PCI slot number 4.	Enter	Opens submenu See "PCI device, slot #4" on page 413
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.
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.

Table 246: 815GME (ETX) - PCI/PNP configuration - setting options (cont.)

BIOS setting	Meaning	Setting options	Effect
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 246: 815GME (ETX) - PCI/PNP configuration - setting options (cont.)

PCI device, slot #1

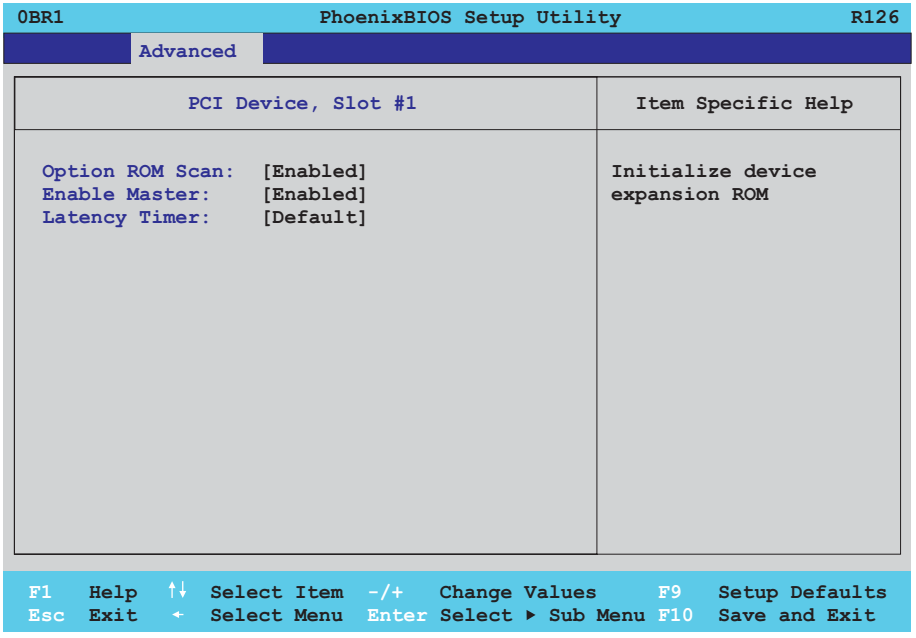


Figure 196: 855GME (ETX) - PCI device, slot #1

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 tr eated 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. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manually setting the value.

Table 247: 855GME (ETX) - PCI device, slot #1 - setting options

PCI device, slot #2

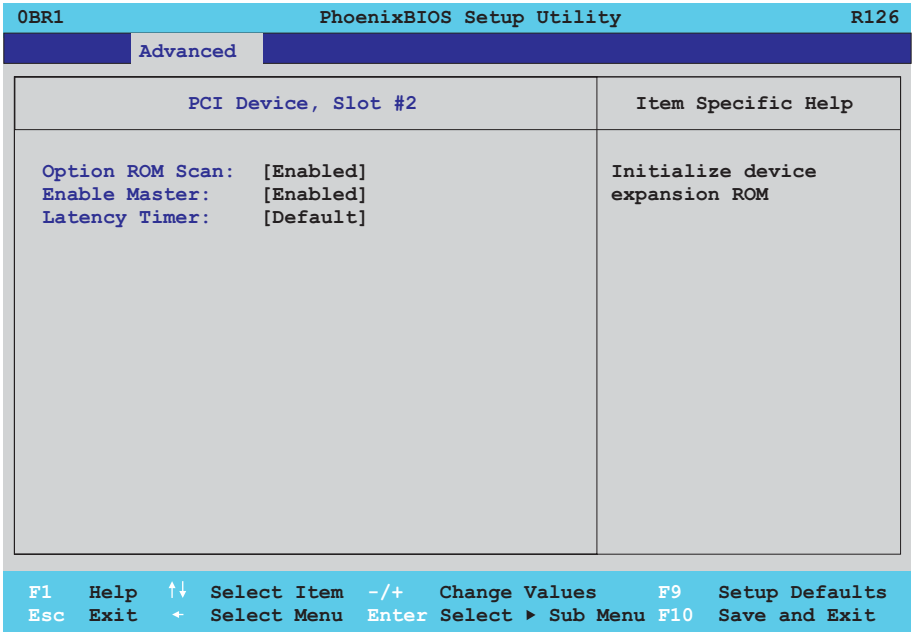


Figure 197: 855GME (ETX) - PCI device, slot #2

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. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manually setting the value.

Table 248: 855GME (ETX) - PCI device, slot #2 - setting options

PCI device, slot #3

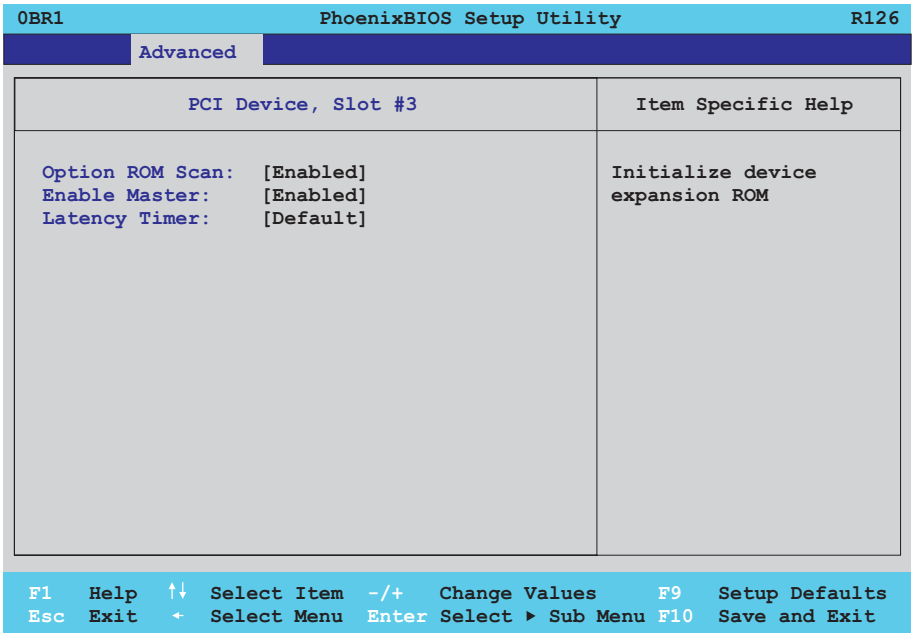


Figure 198: 855GME (ETX) - PCI device, slot #3

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. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manually setting the value.

Table 249: 855GME (ETX) - PCI device, slot #3 - setting options

PCI device, slot #4

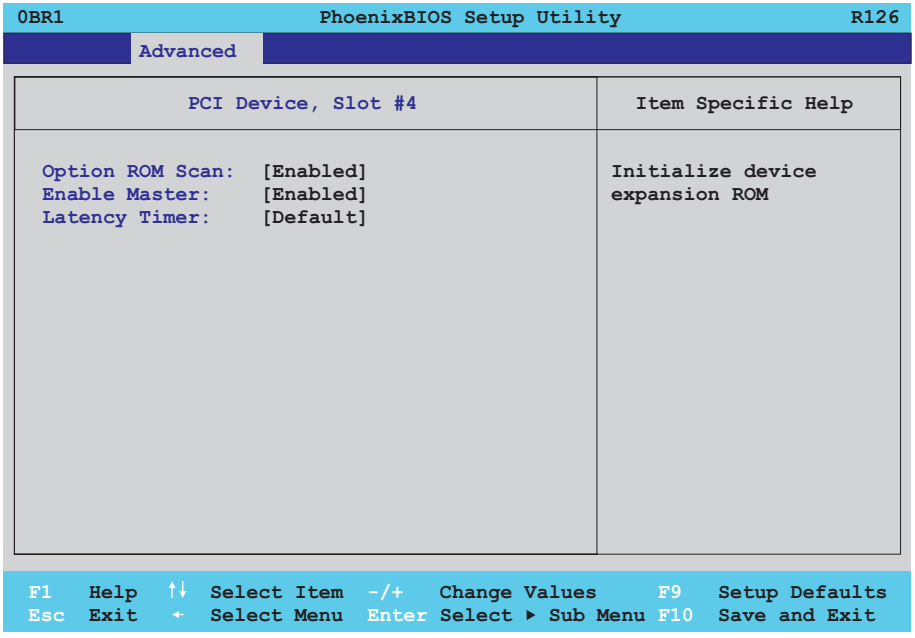


Figure 199: 855GME (ETX) - PCI device, slot #4

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. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manually setting the value.

Table 250: 855GME (ETX) - PCI device, slot #4 - setting options

Memory cache

```
0BR1                    PhoenixBIOS Setup Utility                    R126
                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 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]

 F1   Help  ↑↓  Select Item  -/+   Change Values     F9   Setup Defaults
 Esc  Exit  ←   Select Menu  Enter Select ▶ Sub Menu F10  Save and Exit
```

Figure 200: 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 251: 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 251: 855GME (ETX) - memory cache - setting options (cont.)

I/O device configuration

```
0BR1                    PhoenixBIOS Setup Utility                    R126
                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]
  Parallet 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 201: 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 252: 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 252: 855GME (ETX) - I/O device configuration - setting options (cont.)

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 252: 855GME (ETX) - I/O device configuration - setting options (cont.)

Keyboard features

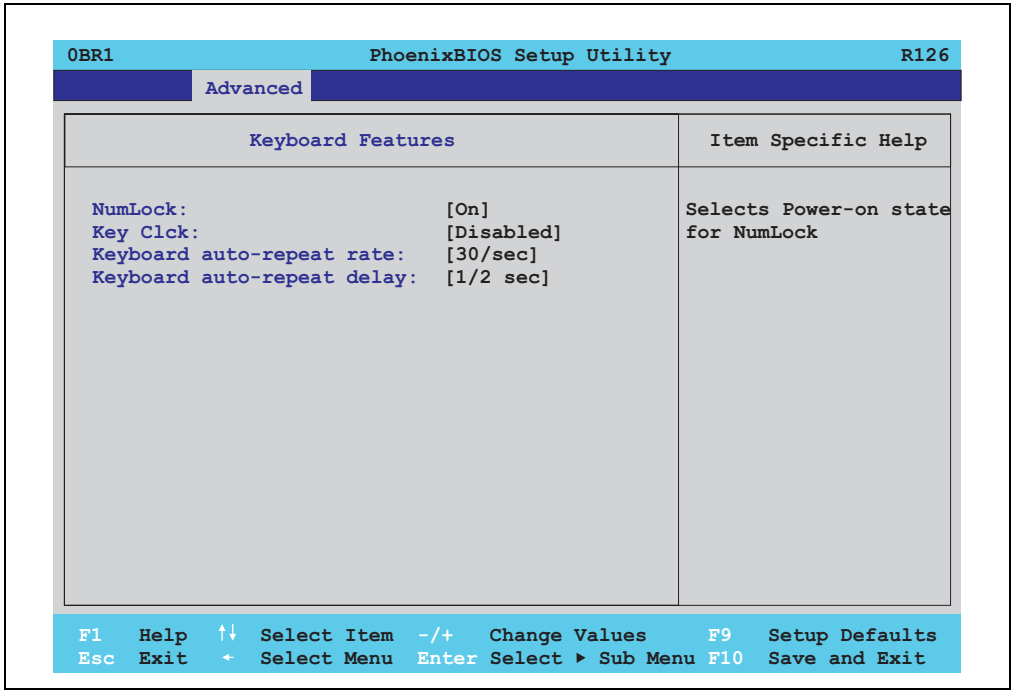


Figure 202: 855GME (ETX) - keyboard features

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 253: 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.

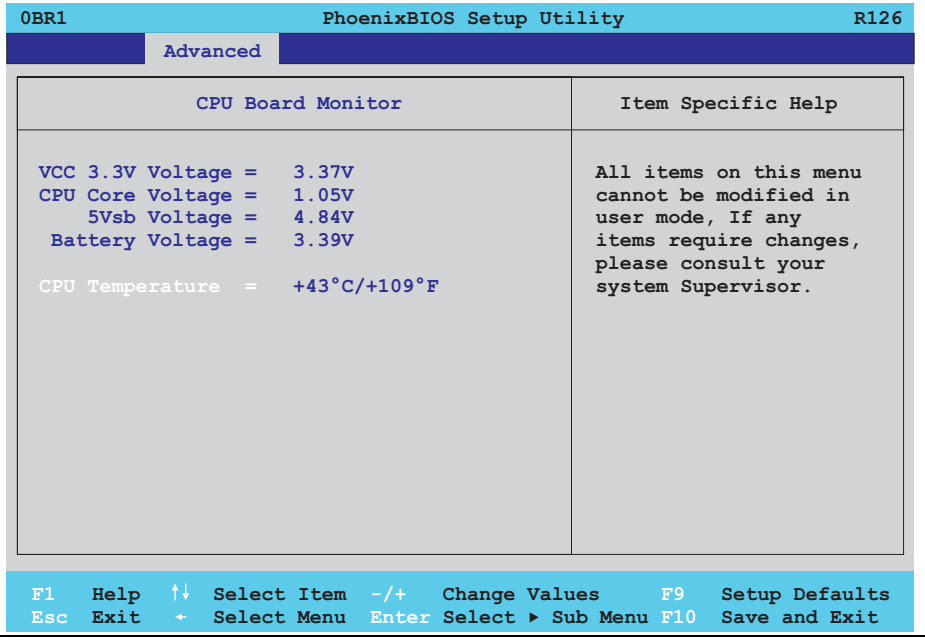


Figure 203: 855GME (ETX) - CPU board monitor

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 254: 855GME (ETX) - CPU board monitor - setting options

Miscellaneous

```
0BR1                    PhoenixBIOS Setup Utility                    R126
            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 204: 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 187 "855GME (ETX) - BIOS diagnostics screen" on page 392).	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 186 "855GME (ETX) - BIOS diagnostics screen" on page 392) should be displayed when the system is started.	Enabled	Enables this function. The diagnostics screen is displayed.
		Disabled	Disables this function. The diagnostics screen is not displayed.

Table 255: 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 255: 855GME (ETX) miscellaneous - setting options

Baseboard/panel features

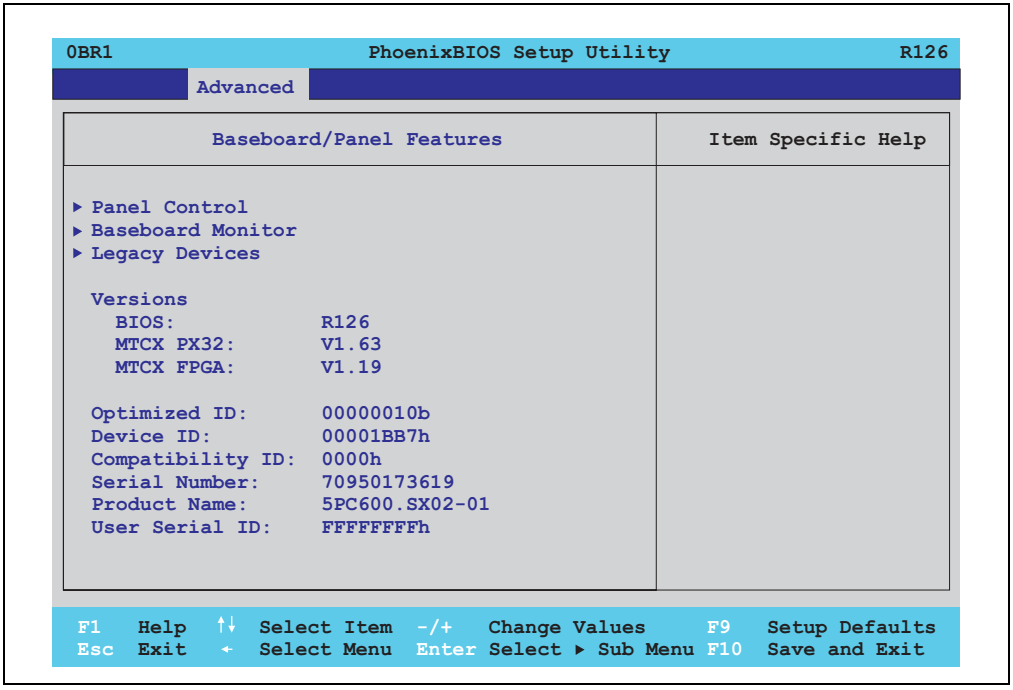


Figure 205: 855GME (ETX) - baseboard/panel features

BIOS setting	Meaning	Setting options	Effect
Panel control	For special setup of connected panels.	Enter	Opens submenu see "Panel control" on page 424.
Baseboard monitor	Display of various temperatures and fan speeds.	Enter	Opens submenu see "Baseboard monitor" on page 425.

Table 256: 855GME (ETX) - baseboard/panel features - setting options

BIOS setting	Meaning	Setting options	Effect
Legacy devices		Enter	Opens submenu see "Legacy devices" on page 427.
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 256: 855GME (ETX) - baseboard/panel features - setting options (cont.)

Panel control

```
0BR1                    PhoenixBIOS Setup Utility                    R126
                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 206: 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 257: 855GME (ETX) - panel control - setting options

Baseboard monitor

```
0BR1                    PhoenixBIOS Setup Utility                    R126
                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 207: 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 145	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 25.40 mm 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	

Table 258: 855GME (ETX) - baseboard monitor - setting options

BIOS setting	Meaning	Setting options	Effect
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 258: 855GME (ETX) - baseboard monitor - setting options (cont.)

Legacy devices

```
0BR1                    PhoenixBIOS Setup Utility                    R126
                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 208: 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 259: 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 of a B&R add-on interface option (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.	-	-
LAN2 MAC address	Displays the MAC addresses for the ETH2 network controller.	-	-

Table 259: 855GME (ETX) - Legacy devices - setting options (cont.)

1.2.6 Security

```
0BR1                    PhoenixBIOS Setup Utility                    R126
  Main     Advanced    Security    Power    Boot    Exit

                                                   Item Specific Help
  Supervisor Password Is:   Clear
  User Password Is:         Clear

  Set Supervisor Password:  [Enter]              Supervisor Password
  Set User Password:        [Enter]              controls access to the
                                                 setup utility.
  Diskette access:          [Supervisor]
  Fixed disk boot sector:   [Normal]
  Virus check reminder:     [Disabled]
  System backup reminder:   [Disabled]
  Password on boot:         [Disabled]

 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) - 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 260: 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 260: 855GME (ETX) security - setting options (cont.)

1.2.7 Power

```
0BR1                    PhoenixBIOS Setup Utility                    R126
  Main     Advanced     Security     Power     Boot     Exit

                                                   Item Specific Help
  Enable ACPI                          [Yes]

▶ ACPI Control                                     En/Disable ACPI BIOS
                                                   (Advance Configuration
  Max CPU frequency:                   [1800MHz]    and Power Interface)
  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 210: 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 submenu See "ACPI control" on page 433
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 261: 855GME (ETX) - power - 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 261: 855GME (ETX) - power - setting options (cont.)

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 261: 855GME (ETX) - power - setting options (cont.)

ACPI control

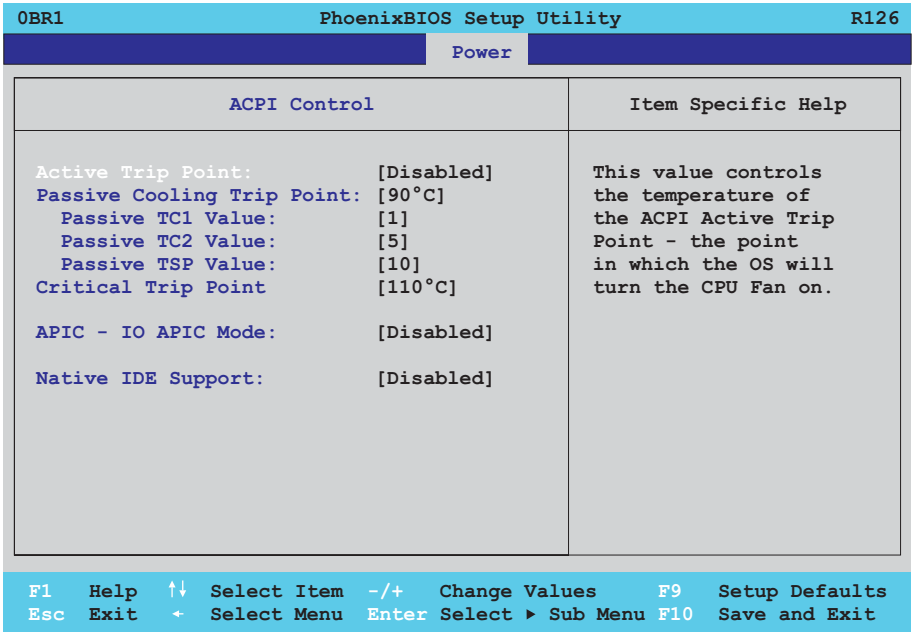


Figure 211: 855GME (ETX) - ACPI control

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 °C .. 100 °C	Temperature setting for the active trip point. Can be set in 5 degree increments.

Table 262: 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°C .. 100°C	Temperature setting for the passive cooling trip point. Can be set in increments of 5 degrees Celsius.
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°C ... 110°C	Temperature setting for the critical trip point. Can be set in increments of 5 degrees Celsius.
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 262: 855GME (ETX) - ACPI control - setting options (cont.)

1.2.8 Boot

```
0BR1                    PhoenixBIOS Setup Utility                    R126
  Main     Advanced     Security     Power     Boot     Exit

                                                   Item Specific Help

 Boot priority order
   1: IDE 0:
   2: IDE 1:     FUJITSU MHT2030AR-(PS)            Keys used to view or
   3: IDE CDROM:CD-224E-(SS)                       configure devices:
   4: USB FDD:                                     Up and Down arrows
   5: USB KEY:                                     select a device.
   6: USB CDROM:                                   <+> and <-> moves
   7: IDE 2:                                       the device up or down.
   8: IDE 3:                                       <f> and <r> specifies
 Excluded from boot order:                         the device fixed or
     : USB HDD:                                    removeable.
     : USB ZIP:                                    <x> exclude or include
     : USB LS120:                                  the device to boot.
     : PCI BEV:                                    <Shift + 1> enables or
     : PCI SCSI:                                   disables a device.
     : Bootable Add-In Cards:                      <1 - 4> Loads default
                                                   boot sequence.

 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) - 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 263: 855GME (ETX) - boot menu - setting options

1.2.9 Exit

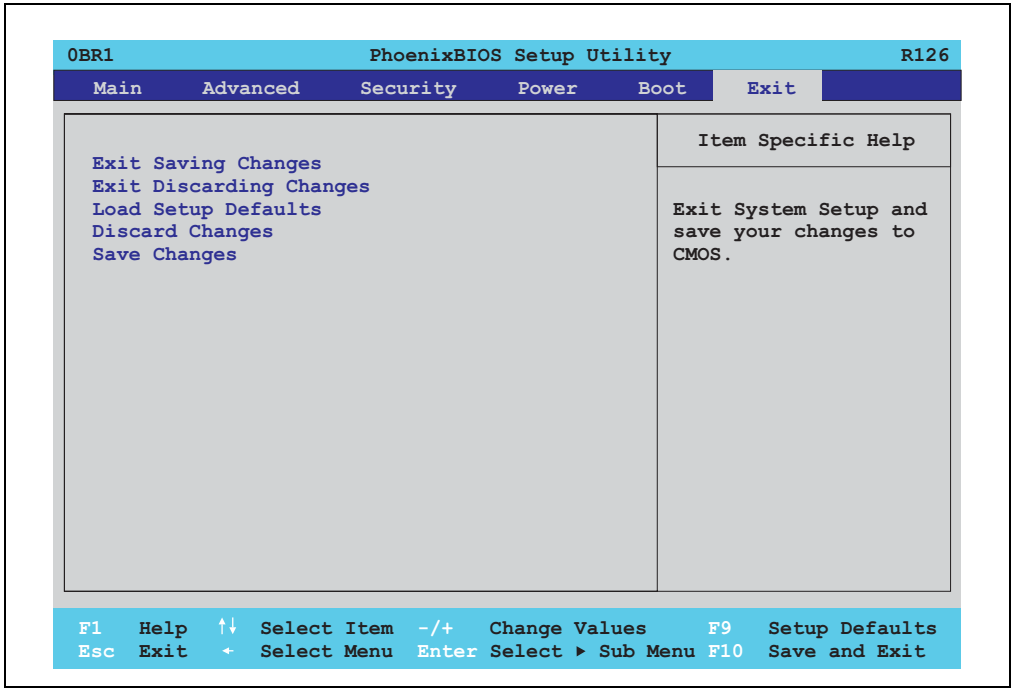


Figure 213: 855GME (ETX) - exit menu

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	
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 264: 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 1.9 "Location of the DIP switch in APC620 system units" on page 523).

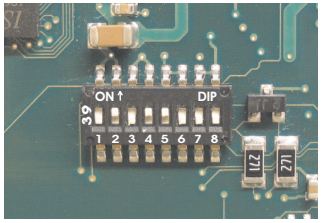


Figure 214: DIP switch on system unit

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 265: 855GME (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	
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 266: 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 267: 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 268: 815GME (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 268: 815GME (ETX) - PCI/PNP configuration - profile settings overview (cont.)

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 269: 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	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 270: 855GME (ETX) - I/O device configuration - profile setting 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 271: 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 272: 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 273: 855GME (ETX) - miscellaneous - profile setting overview

Baseboard/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	-	-	-	-	-	

Table 274: 855GME (ETX) - baseboard/panel features -profile setting overview

Panel control	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Select panel number	0	0	0	0	0	
Version	-	-	-	-	-	
Brightness	100%	100%	100%	100%	100%	
Temperature	-	-	-	-	-	
Fan speed	-	-	-	-	-	
Keys/LEDs	-	-	-	-	-	
Baseboard 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 274: 855GME (ETX) - baseboard/panel features -profile setting overview (cont.)

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 275: 855GME (ETX) security - profile setting 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	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	
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 276: 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 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 277: 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 492).**

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"

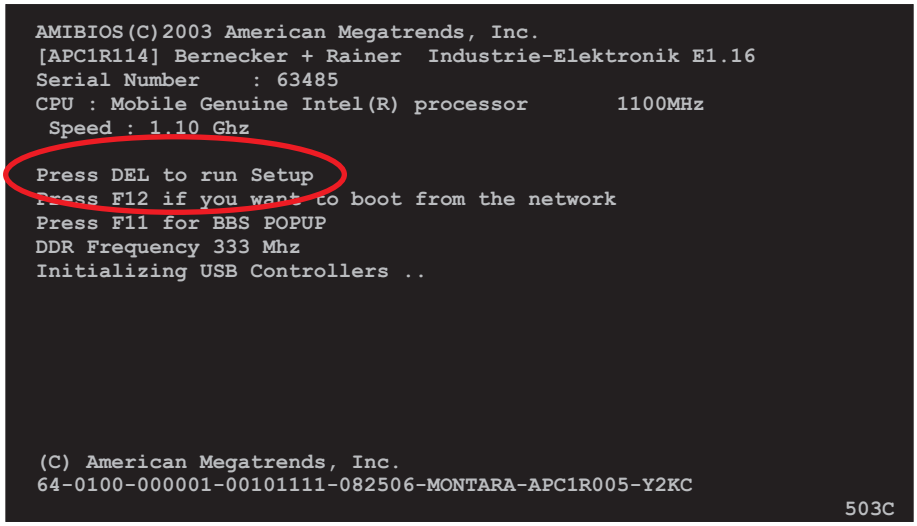


Figure 215: 855GME (XTX) - BIOS diagnostics screen

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 278: 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 279: 855GME (XTX) - keys relevant to BIOS in the BIOS menu

Key	Function
Enter	Changes to the selected menu.
PgUp↑	Change to the previous page.
PgDn ↓	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 279: 855GME (XTX) - keys relevant to BIOS in the BIOS menu (cont.)

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.	449
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.	450
Boot	The boot order can be set here.	483
Security	For setting up the system's security functions.	485
Power	Setup of various APM (Advanced Power Management) options.	488
Exit	To end the BIOS setup.	490

Table 280: Overview of 855GME (XTX) BIOS menu items

1.3.4 Main

The BIOS setup main menu appears immediately after pressing the DEL button while the system is booting:

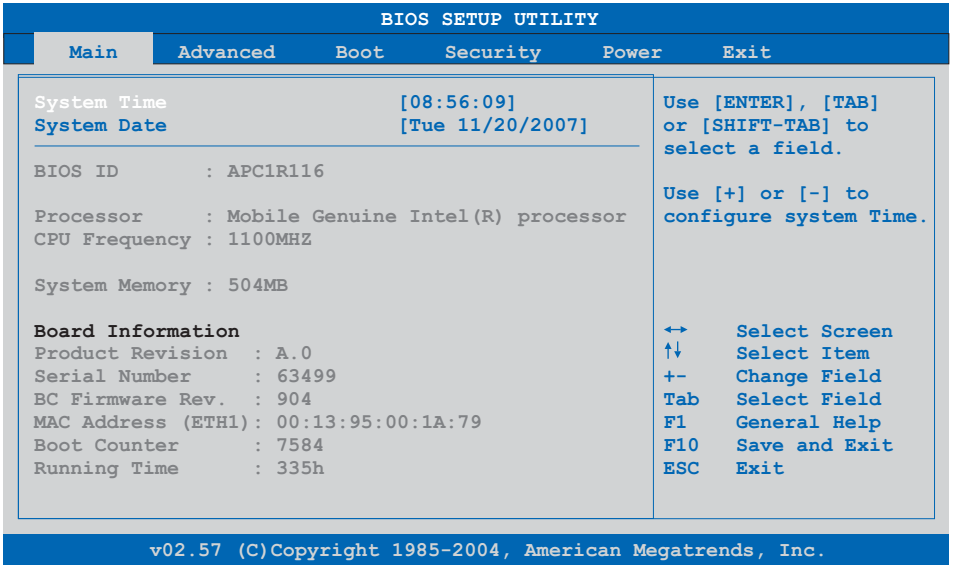


Figure 216: 855GME (XTX) BIOS main menu

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.	Adjustment of 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 to 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	-

Table 281: 855GME (XTX) main menu - setting options

BIOS setting	Meaning	Setting options	Effect
MAC Address (ETH1)	Displays the assigned MAC address.	None	-
Boot counter	Boot counter display.	None	-
Running time	Runtime display.	None	-

Table 281: 855GME (XTX) main menu - setting options (cont.)

1.3.5 Advanced

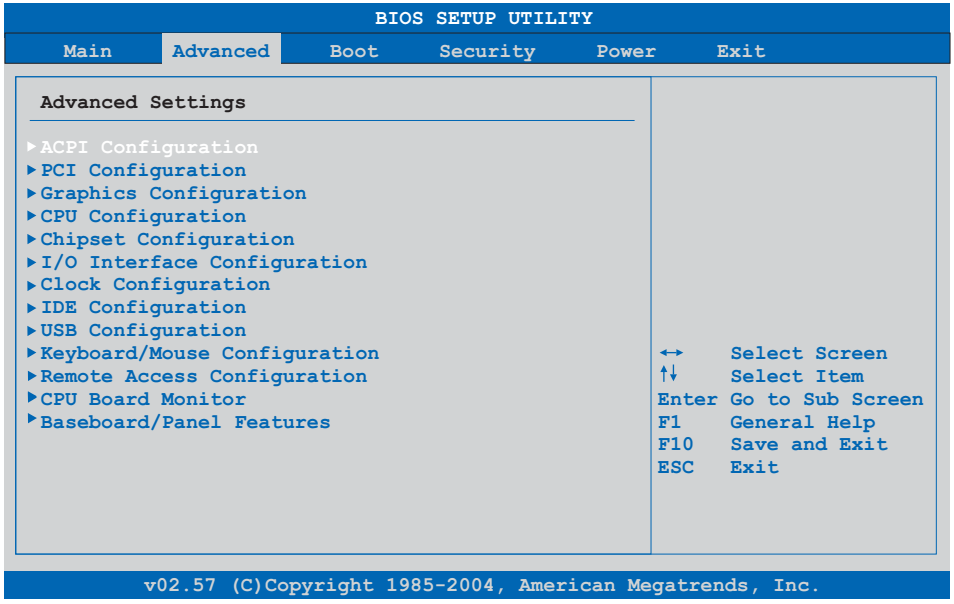


Figure 217: 855GME (XTX) - advanced menu

BIOS setting	Meaning	Setting options	Effect
ACPI configuration	Configures APCI devices.	Enter	Opens submenu See "ACPI configuration" on page 451
PCI configuration	Configures PCI devices.	Enter	Opens submenu See "PCI configuration" on page 453
Graphics configuration	Configures the graphic settings.	Enter	Opens submenu See "Graphics configuration" on page 455
CPU configuration	Configures CPU settings.	Enter	Opens submenu See "CPU configuration" on page 457
Chipset configuration	Configures the chipset functions.	Enter	Opens submenu See "Chipset configuration" on page 458

Table 282: 855GME (XTX) - advanced menu - setting options

BIOS setting	Meaning	Setting options	Effect
I/O interface configuration	Configuration of the I/O devices.	Enter	Opens submenu See "I/O interface configuration" on page 459
Clock configuration	Configures clock settings.	Enter	Opens submenu See "Clock configuration" on page 461
IDE Configuration	Configures the IDE functions.	Enter	Opens submenu See "IDE Configuration" on page 462
USB configuration	Configures USB settings	Enter	Opens submenu See "USB configuration" on page 469
Keyboard/mouse configuration	Configuration of the keyboard/mouse options.	Enter	Opens submenu See "Keyboard/mouse configuration" on page 472
Remote access configuration	Configures the remote access settings	Enter	Opens submenu See "Remote access configuration" on page 474
CPU board monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens submenu See "CPU board monitor" on page 476
Baseboard/panel features	Displays device specific information and setup of device specific values.	Enter	Opens submenu See "Baseboard/panel features" on page 477

Table 282: 855GME (XTX) - advanced menu - setting options (cont.)

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 218: 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 is activated by the operating system when the CPU reaches the set temperature. Temperatur erreicht ist.	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 10 degree increments.
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 10 degree increments.
Critical trip point	With this function, a temperature can be set at which the operating 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 5 degree increments.
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 283: 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]
3nd Exclusive PCI IRQ          [None]

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```

Figure 219: 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	The operating system 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	Manually setting the value.
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. oder nicht.	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.

Table 284: 855GME (XTX) - advanced PCI configuration - setting options

BIOS setting	Meaning	Setting options	Effect
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.
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 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 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). **Note:** **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). **Note:** **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). **Note:** **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 284: 855GME (XTX) - advanced PCI configuration - setting options (cont.)

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 220: 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 285: 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. **Note: The size with the best performance is the same size as the application memory.**	64MB, 128MB, 256MB	Manually setting the value.
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 285: 855GME (XTX) - advanced graphics configuration - setting options (cont.)

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 221: 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	Display of first level cache memory area.	None	-
L2 cache	Display of 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. **Note:** **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;	Manually setting the value.

Table 286: 855GME (XTX) - advanced CPU configuration - setting options

Chipset configuration

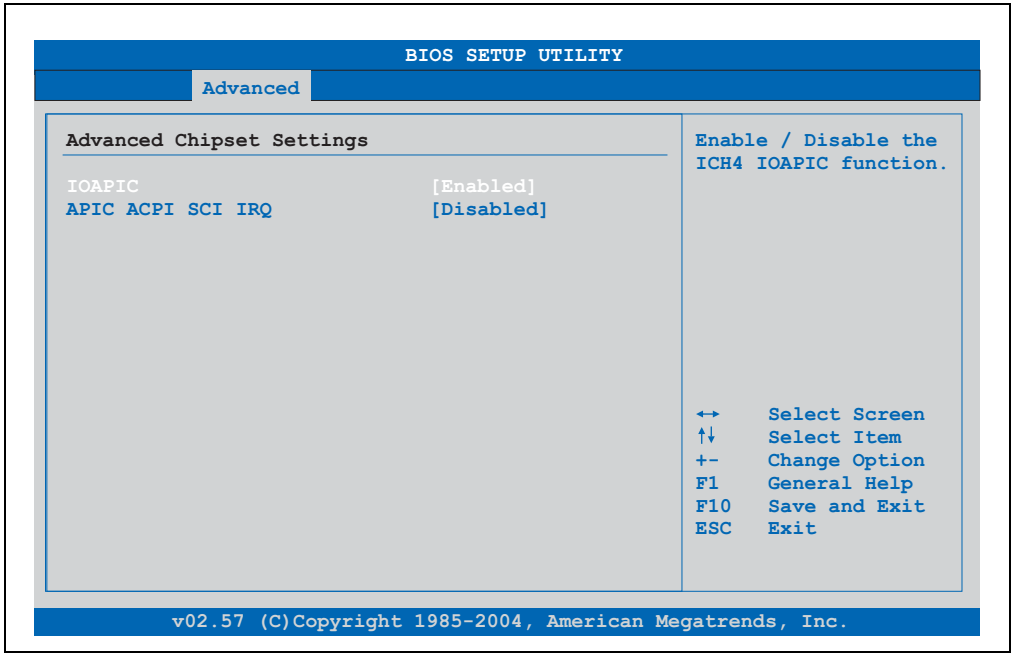

Figure 222: 855GME (XTX) - advanced chipset configuration

BIOS setting	Meaning	Setting options	Effect
IOAPIC	This option is used to activate or deactivate the APIC (Advanced Programmable Interrupt Controller). **Note:** **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). **Note:** **The IRQ resources available to the system are expanded when the APIC mode is enabled.**	Disabled	Deactivates this function.
		Enabled	Activates this function.

Table 287: 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 223: 855GME (XTX) - I/O interface configuration

BIOS setting	Meaning	Setting options	Effect
Onboard AC'97 Audio	For turning the Onboard AC97 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 288: 855GME (XTX) - 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. **Note:** **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. **Note:** **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. **Note:** **Address is automatically set, even if the function is disabled.**	Disabled	Deactivates the port.
		378, 278, 3BC	Manual assignment of the port address.

Table 288: 855GME (XTX) - I/O interface configuration - setting options (cont.)

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 224: 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 289: 855GME (XTX) - advanced clock configuration - setting options

IDE Configuration

```
BIOS SETUP UTILITY
Advanced

IDE Configuration

OnBoard PCI IDE Controller     [Both]
OnBoard PCI IDE Operate Mode   [Legacy Mode]

▶Primary IDE Master              : [Not Detected]
▶Primary IDE Slave               : [Not Detected]
▶Secondary IDE Master            : [Not Detected]
▶Secondary IDE Slave             : [Not Detected]

Hard Disk Write Protect        [Disabled]
IDE Detect Time Out (Sec)      [35]
ATA(PI) 80Pin Cable Detection  [Host & Device]

DISABLED: disables the
integrated IDE
Controller.
PRIMARY:enables only
the Primary IDE
Controller.
SECONDARY: enables
only the Secondary IDE
Contoller.
BOTH: enables both IDE
Controllers.

←→     Select Screen
↑↓     Select Item
+-     Change Option
F1     General Help
F10    Save and Exit
ESC    Exit

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```

Figure 225: 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 is configured here.	Enter	Opens submenu See "Primary IDE master" on page 463
Primary IDE slave	The drive in the system that is connected to the IDE primary slave port is configured here.	Enter	Opens submenu See "Primary IDE slave" on page 465
Secondary IDE master	The drive in the system that is connected to the IDE secondary master port is configured here.	Enter	Opens submenu See "Secondary IDE master" on page 466

Table 290: 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 submenu See "Secondary IDE slave" on page 468
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	Manually setting the value.
ATA (PI) 80 pin cable detection	Detects whether an 80 pin cable is connected to the drive, the controller or to both. **Note:** **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 290: 855GME (XTX) - advanced IDE configuration - setting options (cont.)

Primary IDE master

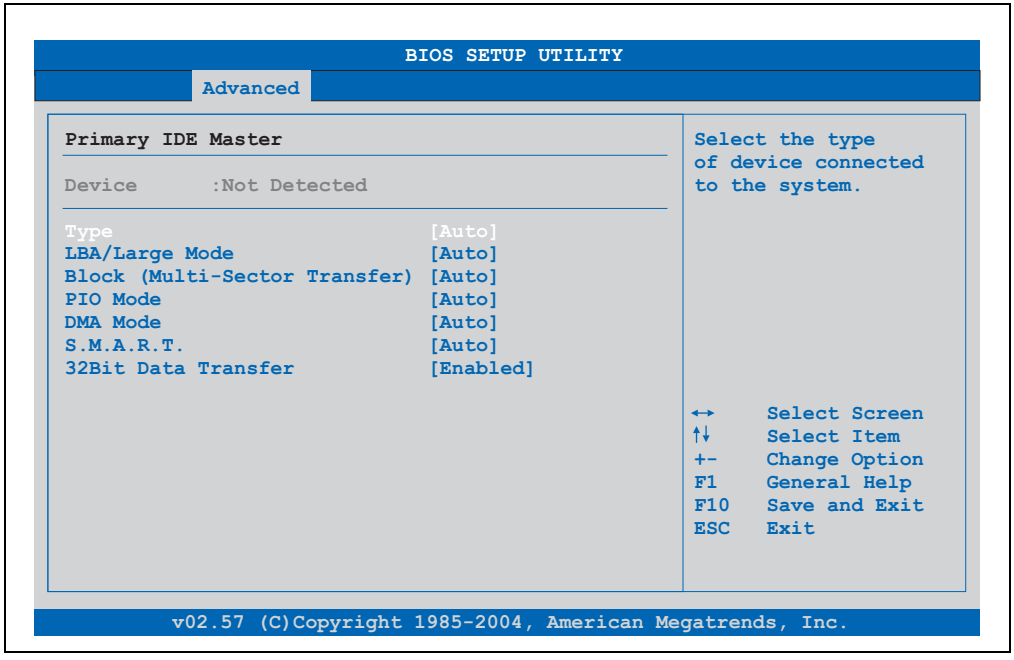

Figure 226: 855GME (XTX) - primary IDE master

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 enables 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. Note: 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 enabled 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. Data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 291: 855GME (XTX) - primary IDE master - setting options

Primary IDE slave

```
BIOS SETUP UTILITY
Advanced

Primary 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 227: 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 enables 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. Note: 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 292: 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 enabled 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. Data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 292: 855GME (XTX) - primary IDE slave - setting options

Secondary IDE master

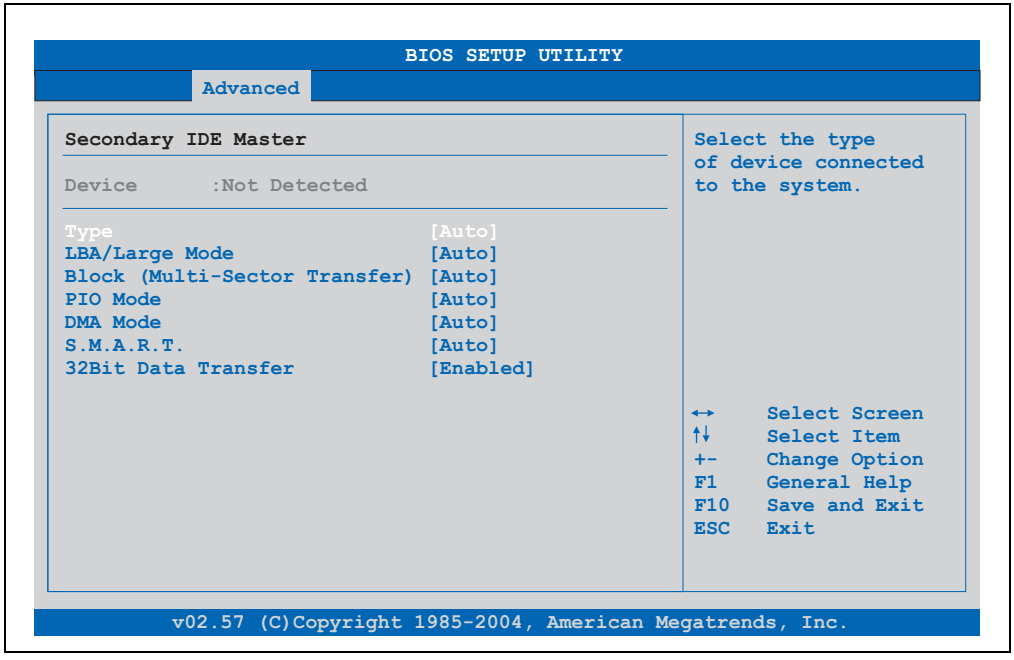

Figure 228: 855GME (XTX) - secondary IDE master

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 enables 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. Note: 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 enabled 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. Data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 293: 855GME (XTX) - secondary IDE master - setting options

Secondary IDE slave

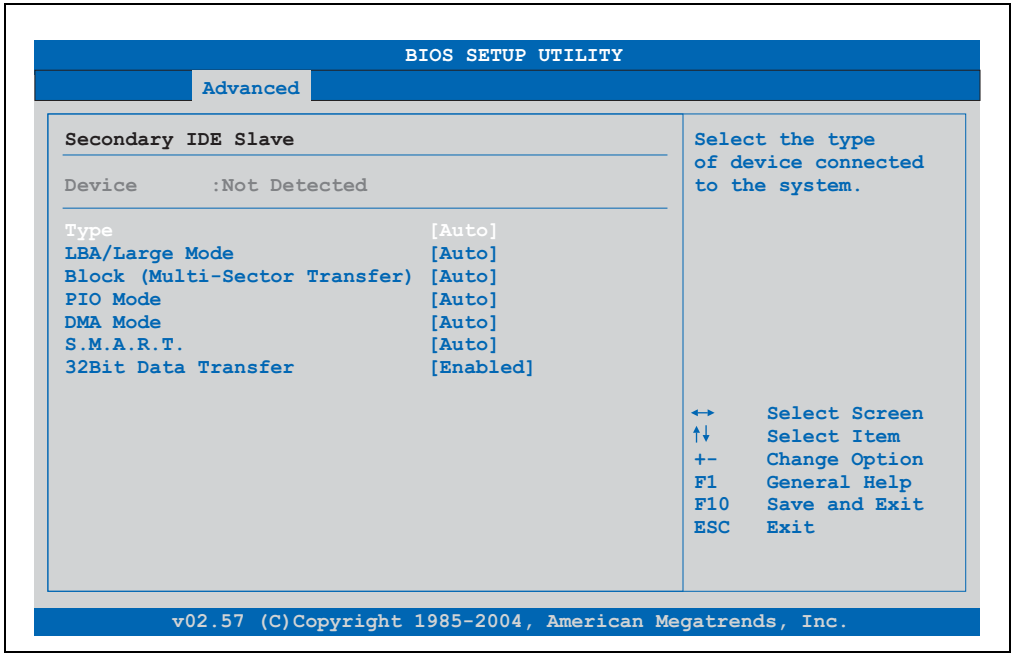

Figure 229: 855GME (XTX) - secondary IDE slave

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 enables 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. Note: 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 294: 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 drive is defined here. The DMA mode must be enabled 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. Data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 294: 855GME (XTX) - secondary IDE slave - setting options (cont.)

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 230: 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. **Note:** **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 other 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.
USB mass storage reset delay	The waiting time that the USB device POST requires after the device start command can be set. **Note:** **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	Manually setting the value.

Table 295: 855GME (XTX) - advanced USB configuration - setting options

BIOS setting	Meaning	Setting options	Effect
USB mass storage device configuration	This is where the USB mass memory device is configured. **Note:** **Is only visible when the "USB stick default emulation" function is set to AUTO.**	Enter	Opens submenu See "USB mass storage device configuration" on page 471

Table 295: 855GME (XTX) - advanced USB configuration - setting options (cont.)

USB mass storage device configuration

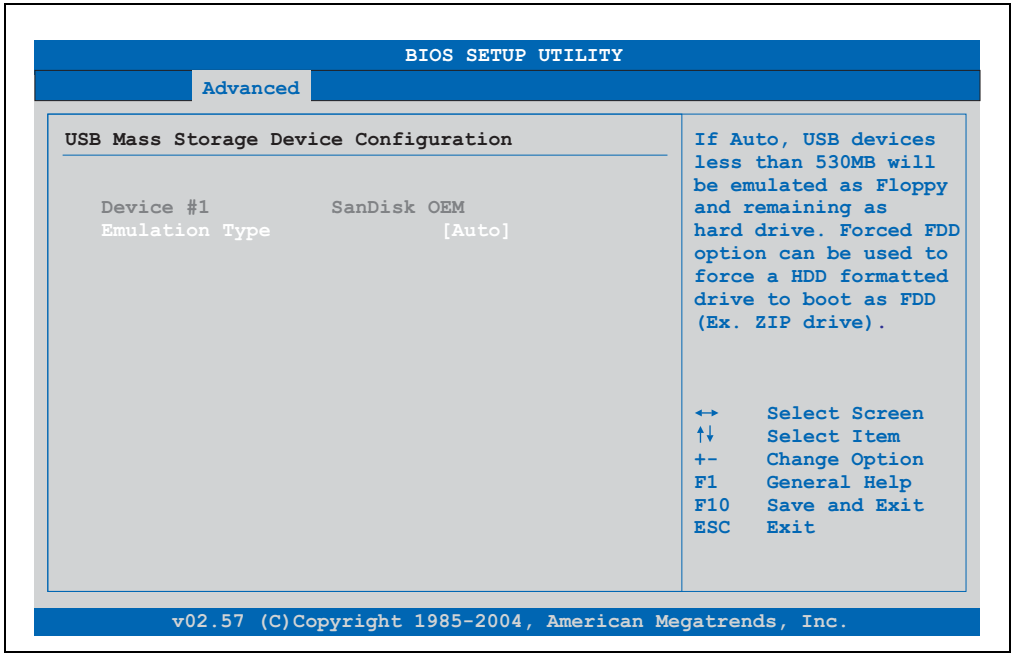

Figure 231: 855GME (XTX) USB mass storage device configuration

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 296: 855GME (XTX) USB mass storage device configuration

Keyboard/mouse configuration

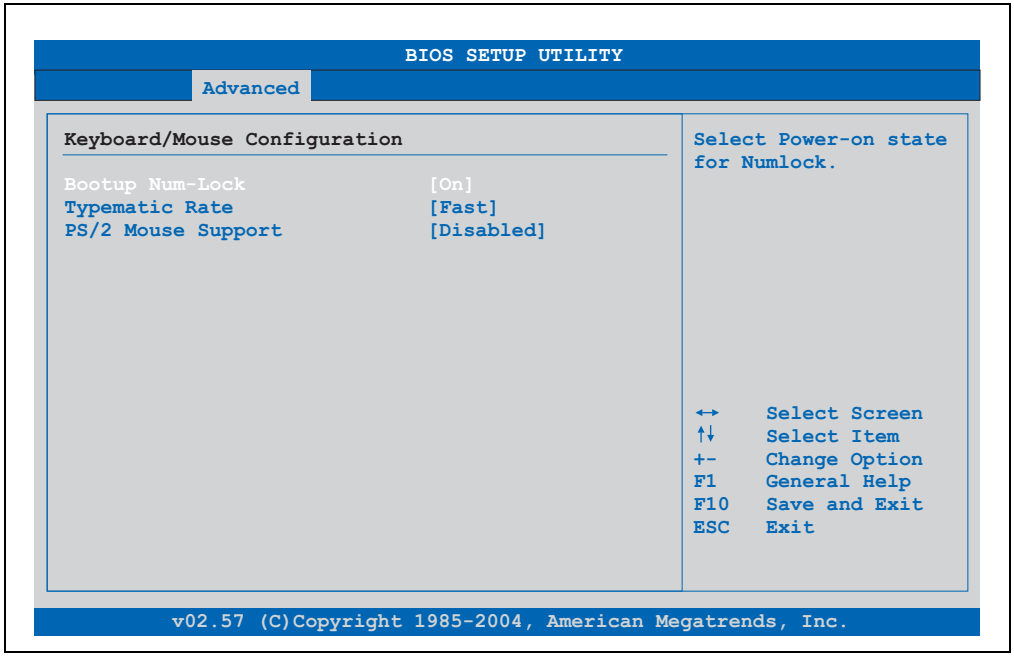

Figure 232: 855GME (XTX) - advanced keyboard/mouse configuration

BIOS setting	Meaning	Setting options	Effect
Bootup Num-lock	This option sets the status of the numeric keypad when the the system is booted.	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.

Table 297: 855GME (XTX) - advanced keyboard/mouse configuration - setting options

BIOS setting	Meaning	Setting options	Effect
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 297: 855GME (XTX) - advanced keyboard/mouse configuration - setting options

Remote access configuration

```
BIOS SETUP UTILITY
Advanced

Configure Remote Access type and parameters

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]

Serial Port BIOS Update          [Disabled]

Select Remote Access
type.

←→    Select Screen
↑↓    Select Item
+-    Change Option
F1    General Help
F10   Save and Exit
ESC   Exit

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```

Figure 233: 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	Manually setting the value.
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. **Note:** **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.

Table 298: 855GME (XTX) - advanced remote access configuration - setting options

BIOS setting	Meaning	Setting options	Effect
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	Manually setting the value.
Serial port BIOS update	During system start up, the update is loaded via the serial interface in the processor. **Note:** **If this option is disabled, the boot time is reduced.**	Disabled	Disables this function.
		Enabled	Enables this function.

Table 298: 855GME (XTX) - advanced remote access configuration - setting options (cont.)

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.

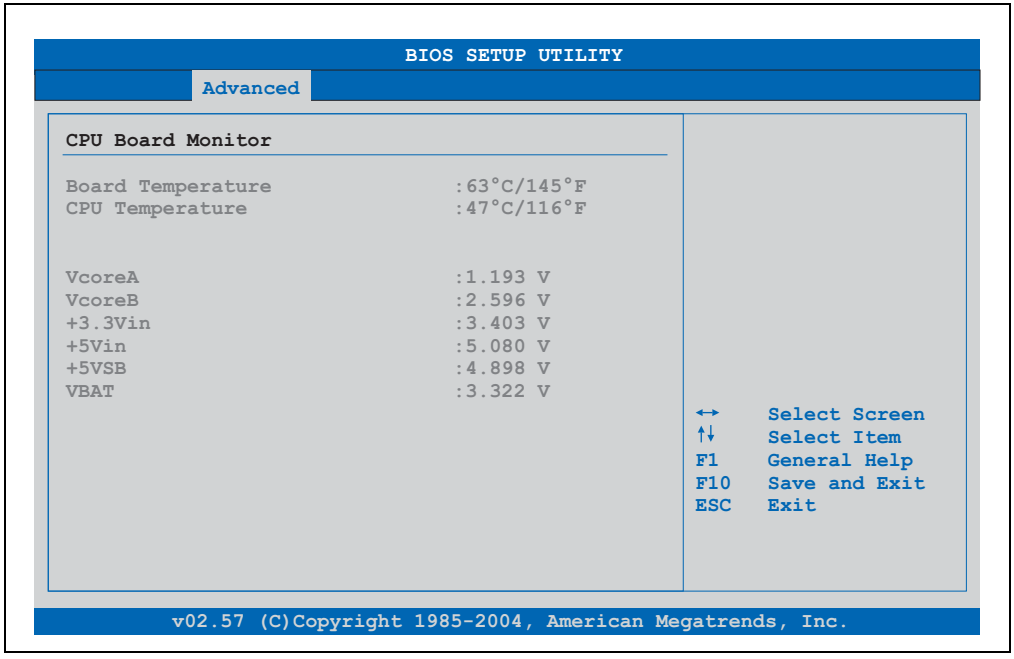

Figure 234: 855GME (XTX) - advanced CPU board monitor

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 (in volts).	None	-
VcoreB	Displays the DDR's core voltage (in volts).	None	-

Table 299: 855GME (XTX) - advanced remote access configuration - setting options

BIOS setting	Meaning	Setting options	Effect
+3.3Vin	Displays the current voltage of the 3.3 volt supply.	None	-
+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 299: 855GME (XTX) - advanced remote access configuration - setting options

Baseboard/panel features

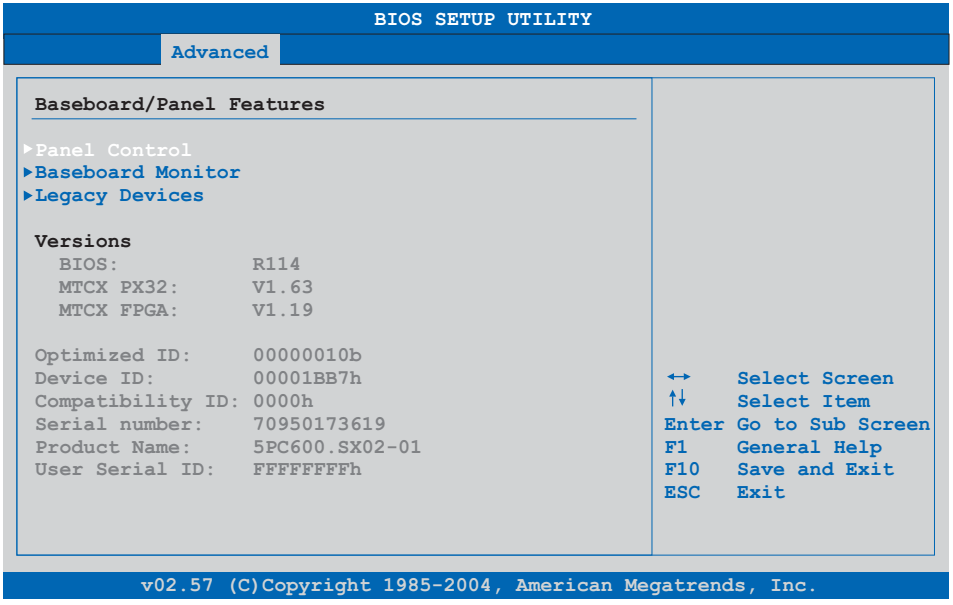

Figure 235: 855GME (XTX) - advanced baseboard/panel features

BIOS setting	Meaning	Setting options	Effect
Panel control	For special setup of connected panels (display units).	Enter	Opens submenu See "Panel control" on page 478
Baseboard monitor	Displays different temperature values and fan speeds.	Enter	Opens submenu See "Baseboard monitor" on page 479
Legacy devices	Special settings for the interface can be changed here.	Enter	Opens submenu See "Legacy devices" on page 481
BIOS	Displays the BIOS version.	None	-

Table 300: 855GME (XTX) - advanced baseboard/panel features - setting options

BIOS setting	Meaning	Setting options	Effect
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 300: 855GME (XTX) - advanced baseboard/panel features - setting options (cont.)

Panel control

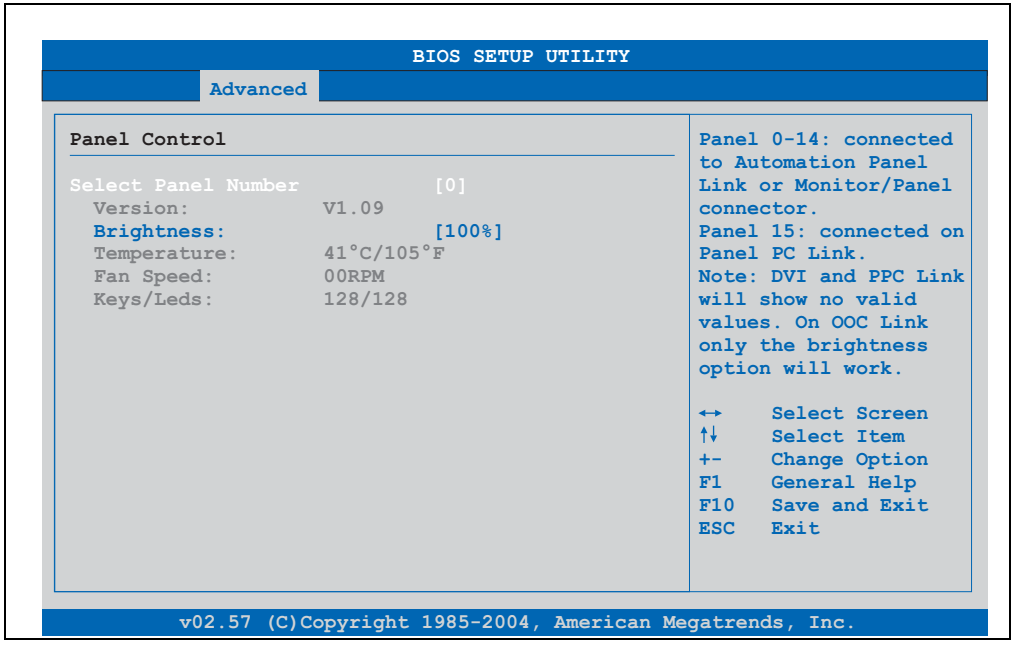

Figure 236: 855GME (XTX) - panel control

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 301: 855GME (XTX) - panel control - setting options

Baseboard monitor

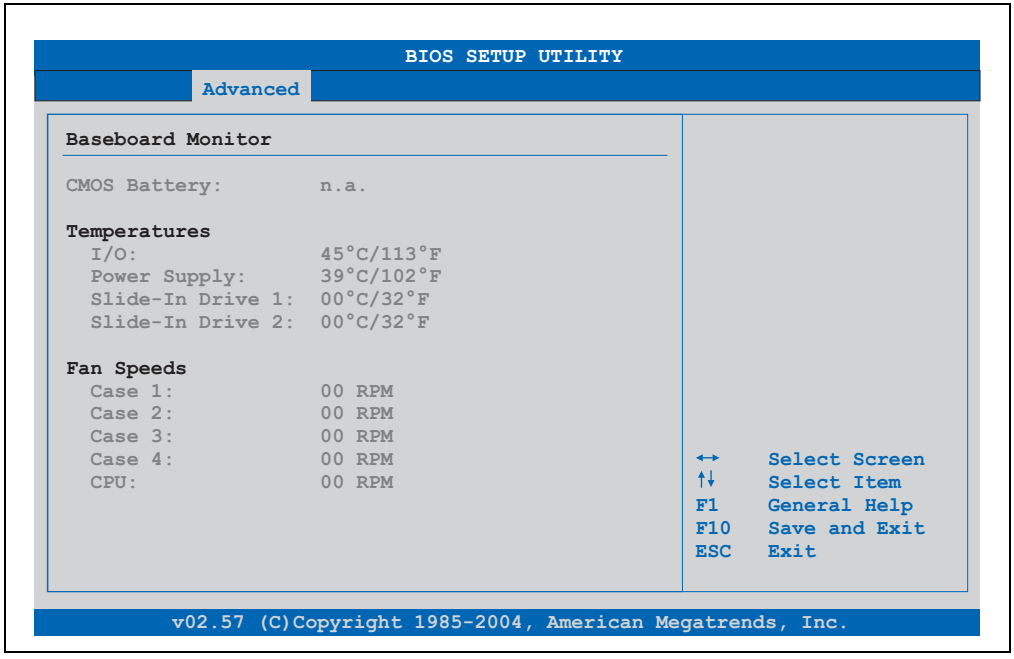

Figure 237: 855GME (XTX) - baseboard monitor

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 "Baseboard/panel features" on page 477) or the hardware is too old. **Good** - battery ok. **Bad** - battery is damaged.	None	-
I/O	Displays the temperature of 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 5.08 cm 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 302: 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 238: 855GME (XTX) - Legacy devices

BIOS setting	Meaning	Setting options	Effect
COM C	Settings for the internal serial interfaces in the system. Using this setting, the touch screen on Panel PC 700 systems as well display units in Automation Panel 900 data transfer are activated.	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 conflict with another device is marked with a yellow "star".	328, 338, 3E8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM C port. port. A conflict with another device is marked with a yellow "star".	IRQ 5, IRQ 6, IRQ 11, IRQ 12	Selected interrupt is assigned.
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.

Table 303: 855GME (XTX) - Legacy devices - setting options

BIOS setting	Meaning	Setting options	Effect
Base I/O address	Selection of the base I/O address for the COM D port. A conflict with another device is marked with a yellow "star".	238, 328, 338	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM D port. A conflict with another device is marked with a yellow "star".	IRQ 5, IRQ 6, IRQ 7, IRQ 12	Selected interrupt is assigned.
COM E	Configuration of the optional COM E port of a B&R add-on interface option (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 conflict with another device is marked with a yellow "star".	2E8, 328, 338	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM E port. A conflict with another device is marked with a yellow "star".	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 conflict with another device is marked with a yellow "star".	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 303: 855GME (XTX) - Legacy devices - setting options (cont.)

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 239: 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 drive 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			

Table 304: 855GME (XTX) Boot menu - setting options

BIOS setting	Meaning	Setting options	Effect
Quick boot	This function reduces the boot time by skipping lines.	Disabled	Disables this function.
		Enabled	Enables this function.
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.
AddOn 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.
Hold on errors	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. **Note: 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 304: 855GME (XTX) Boot menu - setting options (cont.)

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 240: 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. **Note:** **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 submenu See "Hard disk security user password" on page 486

Table 305: 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 submenu See "Hard disk security master password" on page 487
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 305: 855GME (XTX) - security menu - setting options (cont.)

Hard disk security user password

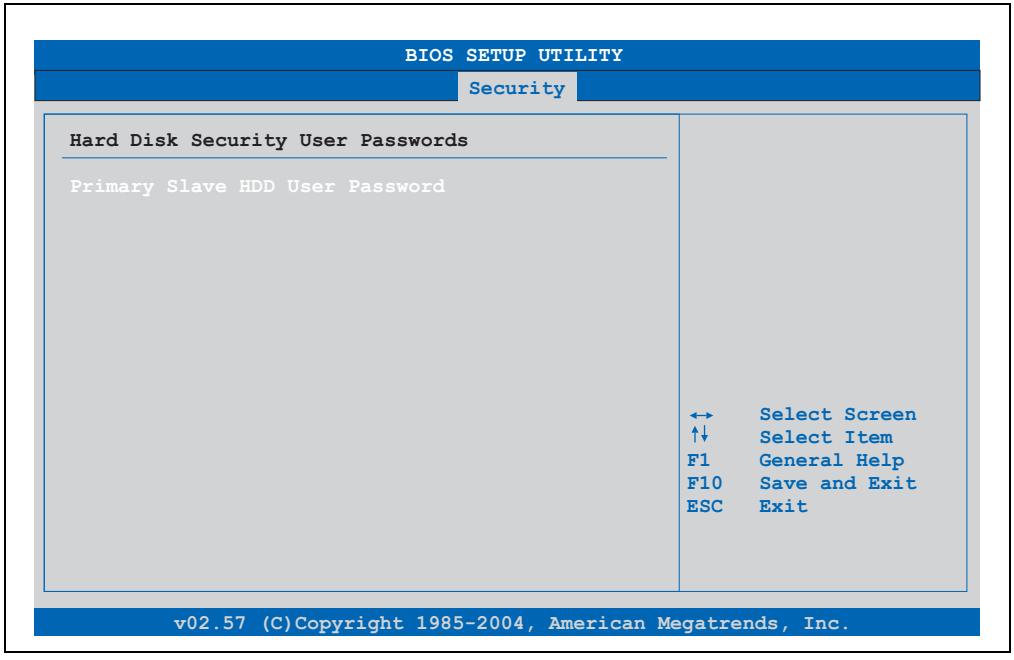


Figure 241: 855GME (XTX) Hard disk security user password

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 306: 855GME (XTX) Hard disk security user password

Hard disk security master password

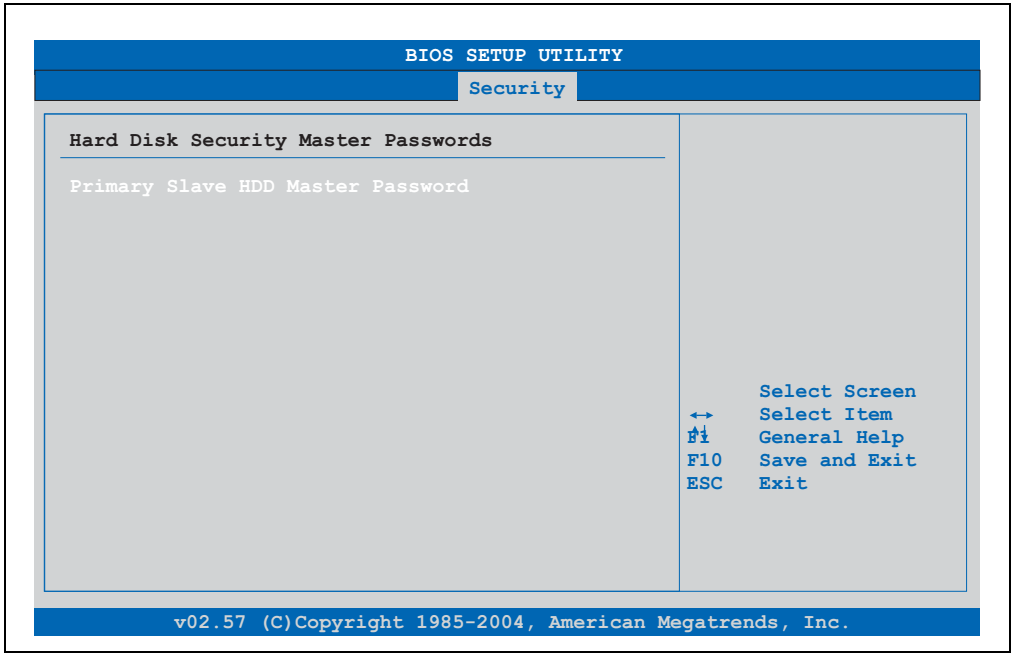


Figure 242: 855GME (XTX) Hard disk security master password

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 307: 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]

        v02.57 (C)Copyright 1985-2004, American Megatrends, Inc.
```

Figure 243: 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;	Manually setting the value.

Table 308: 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;	Manually setting the value.
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. **Note:** **Setting with "+"/"-".**	Every day	System starts daily.
		01-31	System start takes place on the manually set date.
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 308: 855GME (XTX) power menu - setting options (cont.)

1.3.9 Exit

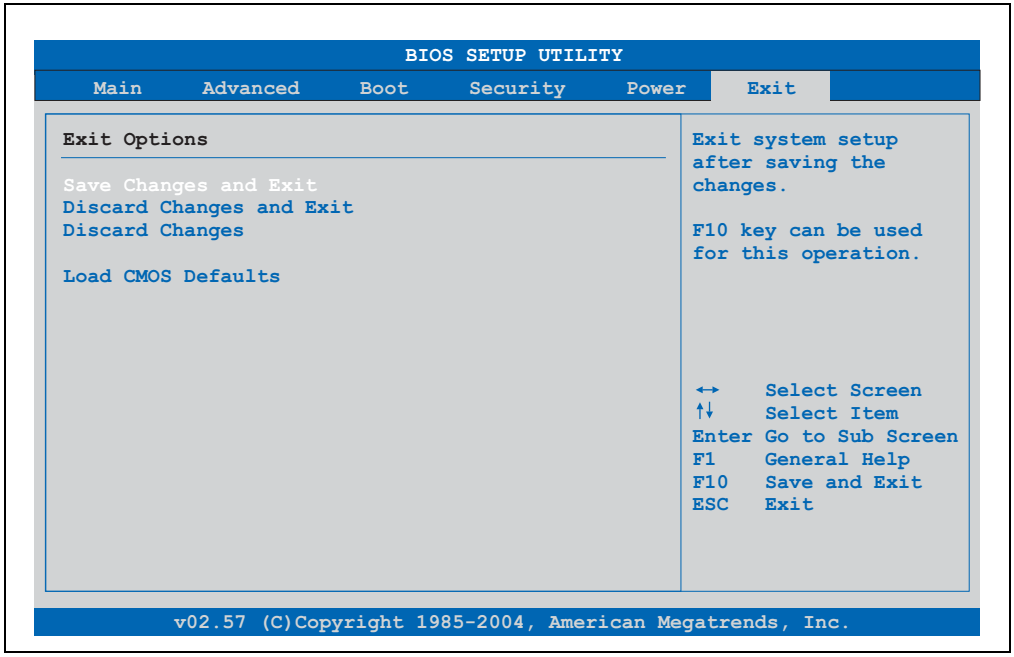


Figure 244: 855GME (XTX) - Exit menu

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	This item closes BIOS setup. without saving the changes made. The system is then rebooted.	OK / cancel	
Discard changes	If it is not known which changes have been made, these can be restored as long as they have not been saved.	OK / cancel	

Table 309: 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 309: 855GME (XTX) Exit menu - setting options (cont.)

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 1.9 "Location of the DIP switch in APC620 system units" on page 523).

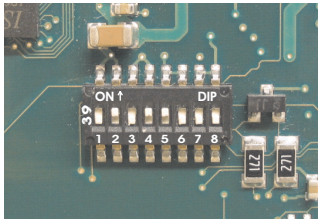


Figure 245: DIP switch on system unit

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 310: 855GME (XTX) - profile overview

1) Reserved

The following pages provide an overview of the BIOS default settings for the different DIP switch configurations. Yellow highlighted settings are variations in 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 311: 855GME (XTX) - main - profile setting 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 312: 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	

Table 313: 855GME - (XTX) PCI configuration - profile setting overview

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 313: 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 314: 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 315: 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 316: 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 317: 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 318: 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	
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	

Table 319: 855GME - (XTX) IDE configuration - profile setting overview

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 319: 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 320: 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
Bootup 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 321: 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 322: 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 323: 855GME (XTX) - CPU board monitor - profile setting overview

Baseboard/panel features

Baseboard/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	-	-	-	-	-	-	
Baseboard monitor							
CMOS battery	-	-	-	-	-	-	
I/O	-	-	-	-	-	-	
Power supply	-	-	-	-	-	-	
Slide-in drive 1	-	-	-	-	-	-	
Slide-in drive 2	-	-	-	-	-	-	
Case 1	-	-	-	-	-	-	
Case 2	-	-	-	-	-	-	
Baseboard 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**	-	

Table 324: 855GME (XTX) - baseboard/panel features -profile setting overview

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 324: 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	
AddOn ROM display mode	Keep current	Keep current	Keep current	Keep current	Keep current	Keep current	
Hold on errors	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 325: 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 326: 855GME (XTX) - security - profile setting options

END-key loads CMOS default	Yes	Yes	Yes	Yes	Yes	Yes	

Table 326: 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 327: 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 328: 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 329: 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 329: BIOS post code messages BIOS 855GME (XTX) (cont.)

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 - 0CFFFFh	VGA BIOS freely available.
0E0000h - 0EBFFFh	USB
0E4000h - 0FFFFFh	System BIOS (Phoenix)
100000h -	SDRAM

Table 330: 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 331: 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 332: 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 333: 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					❍	❍	❍	❍	❍		❍	❍	❍	❍		❍											●
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																								●			
PIRQ H [7)]																									●		

Table 334: IRQ interrupt assignments in APIC mode

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.

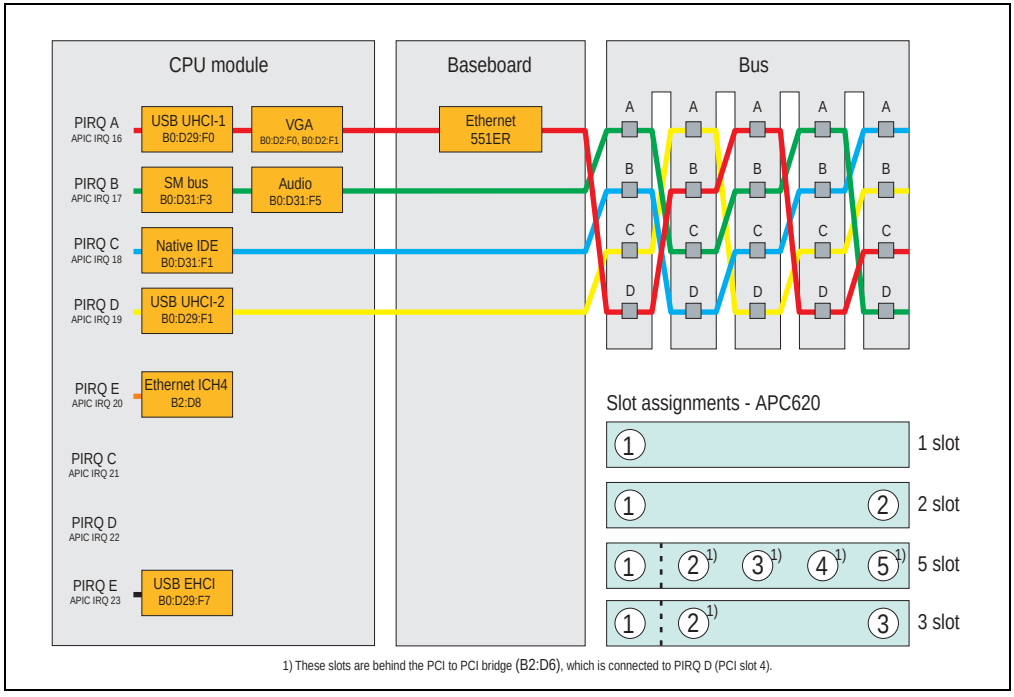


Figure 246: PCI routing with activated APIC CPU boards 815E (ETX), 855GME (ETX)

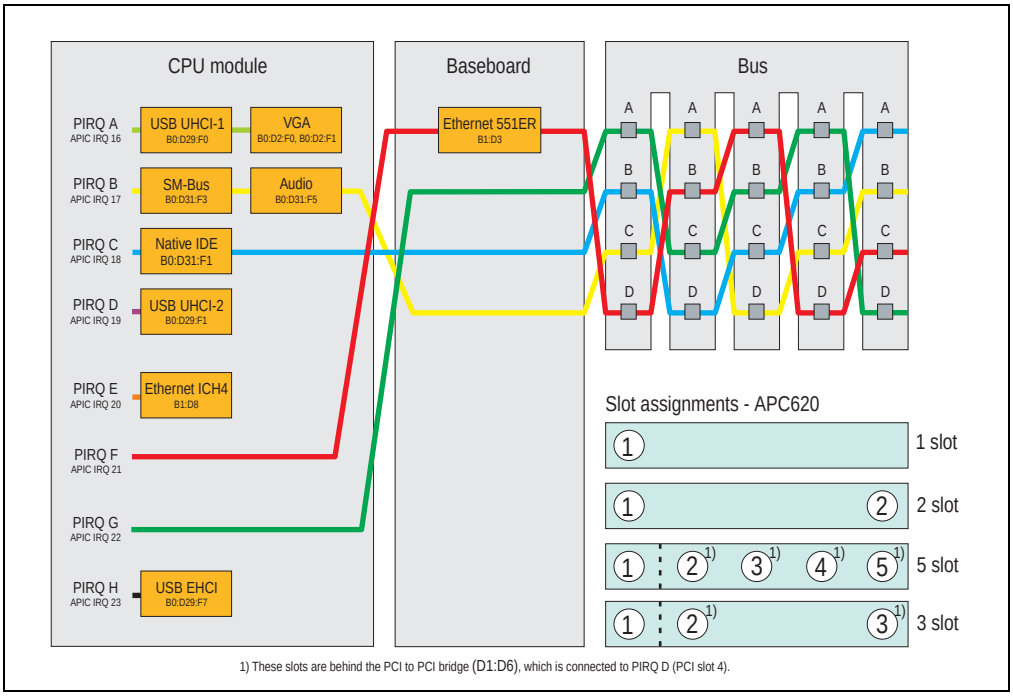


Figure 247: PCI routing with activated APIC CPU boards 855GME (XTX)

1.5.6 Inter-IC (I²C) bus

I²C address	Resource	Comment
A0h	EEPROM	EEPROM for CMOS data - cannot be used
B0h	Reserved	Cannot be used
58h	Reserved	Cannot be used

Table 335: Inter-IC (I²C) bus resources

1.5.7 System Management (SM) bus

SM Bus address	SM device	Comment
12h	SMART_CHARGER	
14h	SMART_SELECTOR	
16h	SMART_BATTERY	
D2h	Clock Generator	

Table 336: Inter-IC (I²C) bus resources

1.6 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 337: CPU board software versions

Automation Panel Link	Transceiver (5DLSDL.1000-01)	Receiver (5DLSDL.1000-00)
SDLR version	< V0.03	< V0.03

Table 338: Automation panel link software versions

1.6.1 Requirements

The following peripheral devices are needed for a software upgrade:

- USB floppy drive or USB flash drive
- 1.44 MB HDD diskette(s) (max. 3 diskettes)
- PS/2 or USB keyboard
- B&R upgrade software (**www.br-automation.com**)

1.6.2 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" and "C".

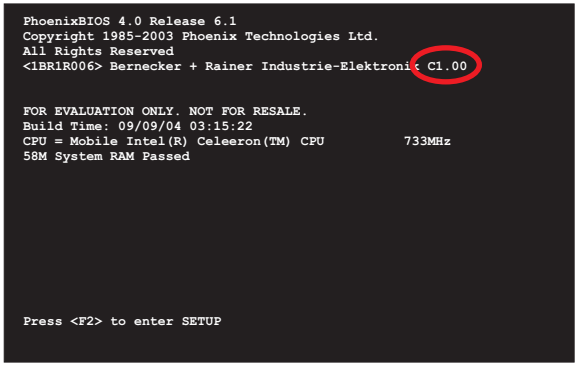


Figure 248: Differentiating between 815E and 855GME CPU boards

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 339: 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):

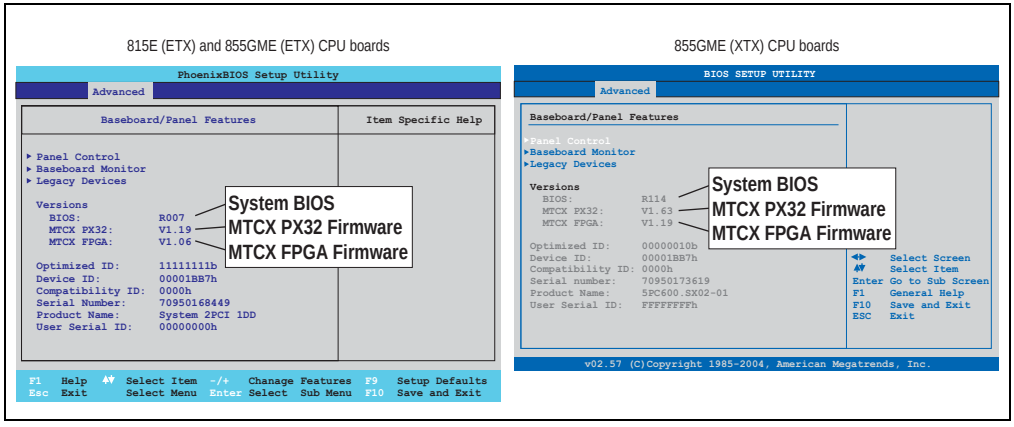


Figure 249: Software versions

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.

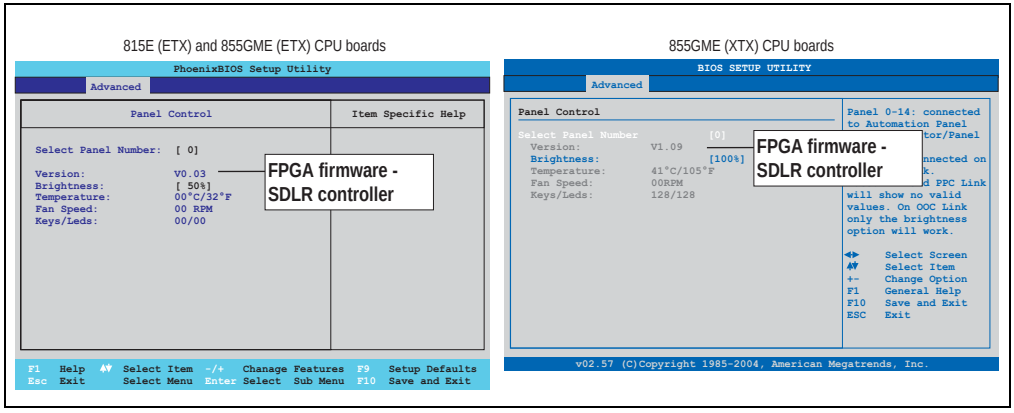


Figure 250: Firmware version of Automation Panel Link SDL transceiver/receiver

1.6.3 Upgrade BIOS for 815E (ETX)

- Download and unzip the zip file from the B&R homepage.
- Copy the files to an MS-DOS startup disk (information about creating a bootable disk can be found in section 1.8 "Creating a DOS boot diskette in Windows XP" on page 522).
- Place the diskette in the USB floppy drive and reboot the PPC700.
- 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:
Return 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.

1.6.4 Upgrade BIOS for 855GME (ETX)

- Download and unzip the zip file from the B&R homepage.
- Copy the files to a MS-DOS startup disk or USB stick (see the section 1.8 "Creating a DOS boot diskette in Windows XP" on page 522 for information about creating a bootable disk or section "Creating a bootable USB flash drive" on page 635 about creating a bootable USB Memory stick).
- Insert the diskette in the USB floppy drive or the USB stick in the USB port and reboot the PPC700.
- 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:
Return 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).

1.6.5 Upgrade BIOS for 855GME (XTX)

- Download and unzip the zip file from the B&R homepage.
- Copy the files to a MS-DOS startup disk or USB stick (see the section 1.8 "Creating a DOS boot diskette in Windows XP" on page 522 for information about creating a bootable disk or section "Creating a bootable USB flash drive" on page 635 about creating a bootable USB Memory stick).
- Insert the diskette in the USB floppy drive or the USB stick in the USB port and reboot the PPC700.
- 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:
Return 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 using either the "F9" key or the menu item "Exit" - "Load CMOS defaults".

1.6.6 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 4.2.1 "Installing the graphics driver for 815E (ETX) CPU boards").

1.7 Upgrading 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.

1.7.1 Procedure

- Download and unzip the zip file from the B&R homepage.
- Copy the files to a MS-DOS startup disk (see the section 1.8 "Creating a DOS boot diskette in Windows XP" on page 522 for information about creating a bootable disk or Appendix A, section "Creating a bootable USB flash drive" on page 635 about creating a bootable USB Memory stick).
- Insert the diskette in the USB floppy drive or the USB flash drive in the USB port and reboot the APC620.
- The boot menu is shown after startup

Information:

- **The following boot menu options including descriptions are based on version 1.16 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 SDR (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.
(by default, after 5 seconds).

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 (by default, after 5 seconds).

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.

5.1. Upgrade add-on UPS firmware (5AC600.UPSI-00)
The firmware for the add-on UPS 5AC600.UPSI-00 is automatically updated.

5.2. Upgrade battery settings (5AC600.UPSB-00)
The battery settings for 5AC600.UPSB-00 are automatically updated.

5.3 Return to main menu
Returns to the main menu.

Concerning point 6:
Return to the shell (MS-DOS).

Information:

The system must be powered off and on again after a successful controller upgrade.

1.7.2 Possible upgrade problems and version dependencies

1. The SDLR firmware can only be updated if an Automation Panel with Automation Panel Link Transceiver (5DLSDL.1000-01) and Automation Panel Link Receiver (5DLSDL.1000-00) is connected. This update is only permitted in an office environment (clean environment - no disturbances) because a software error in versions older than V0.03 can cause errors. This error can cause the Automation Panel to remain off after an update. If this error occurs, the Automation Panel Link Transceiver (5DLSDL.1000-01) or Automation Panel Link Receiver (5DLSDL.1000-00) must be exchanged or sent in for repair.

2. Daisy Chain operation of 2 Automation Panel 900 units is supported starting with SDLR version V00.08 or V01.01 and MTCX PX32 V01.33 and MTCX FPGA V01.11 (contents of the MTCX upgrade disk V01.04).

3. Operation of an SDLT adapter in the AP Link slot is supported starting with MTCX PX32 V01.50 and MTCX FPGA V01.12 (contents of the MTCX upgrade disk V01.07).

4. When using a functional SDL connection with an installed SDLR version V00.03 or lower, the SDLR must first be updated to version V00.05 or higher. Only then can the MTCX PX32 and FPGA be updated. If the MTCX PX32 and FPGA is updated first, then the SDLR firmware can no longer be updated.

5. Starting with SDLR version V00.05 or V01.01, the MTCX PX32 must be higher than or equal to V01.23 and the MTCX FPGA must higher than or equal to V01.09. Otherwise, full SDL functionality is not possible.

6. SDL with equalizer is first supported starting with SDLR version V01.04 and MTCX PX32 version V01.55 and MTCX FPGA version V01.15. An SDLT with version V00.02 is required on the AP Link slot (contents of the MTCX upgrade disk V01.10). SDL with equalizer allows longer distances (max. 40m) depending on the AP being used.

7. Automation Panel Link transceivers (5DLSDL.1000-01) or Automation Panel Link receivers (5DLSDL.1000-00) with a Firmware version lower than or equal to V00.10 can no longer be combined with Automation Panel Link transceivers (5DLSDL.1000-01) or Automation Panel Link receivers (5DLSDL.1000-00) with a Firmware higher than or equal to V01.04. Daisy Chain mode is not possible with such a combination.

8. If an APC620 add-on UPS (e.g. 5AC600.UPSI-00) + battery unit (e.g. 5AC600.UPSB-00) is connected to the system and operable, then after an upgrade of the MTCX or SDLT you must either disconnect the battery or push the Power button (to put the system in Standby mode), before executing the required power off/on. If not, the firmware upgrade will not work because the UPS buffers the system.

9. The menu items "3. Upgrade SDLR on Monitor/Panel" and "4. Upgrade SDLR on AP Link Slot" (starting with MTCX upgrade disk V01.13) for upgrading the Automation Panel 800 series have been expanded.

10. The ID AP8H was changed to SDL8 (AP800 series).

11. The menu item "5. Upgrade add-on UPS (firmware and battery settings)", starting with MTCX upgrade disk V01.16, has been inserted.

12. Starting with MTCX upgrade disk V01.16, all firmware files are equipped with an XML header; as a result, the name assignment has changed (compatible with Automation Studio and Automation Runtime).

13. If a UPS (e.g. 5AC600.UPSI-00) + battery unit (e.g. 5AC600.UPSB-00) is connected to the system and operable, then after an upgrade of the MTCX or SDLT you must either disconnect the battery or push the Power button (to put the system in Standby mode), before executing the required power off/on. If not, the firmware upgrade will not work because the UPS buffers the system.

14. Starting with UPS firmware V01.10, the APC620/PPC700 ADI driver + Control Center V01.80 should be used in order to configure the new options "configurable LowBatteryShutdownTime" and UL compliant "OverCurrentEnable".

1.8 Creating a DOS boot diskette in Windows XP

- Place an empty 1.44MB HDD diskette in the disk drive.
- Open Windows Explorer.
- Right-click on the 3 1/2" Floppy icon and select **"Format..."**.

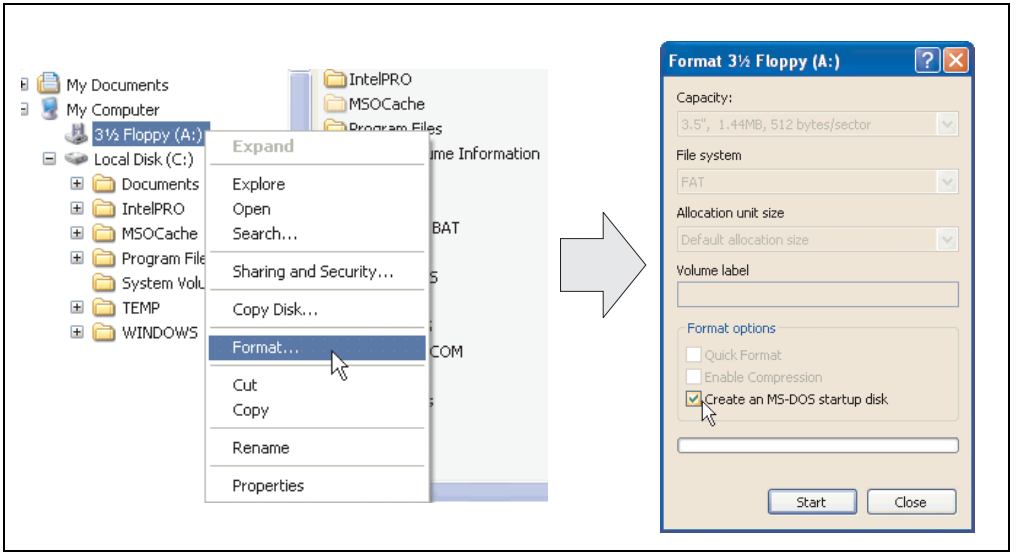


Figure 251: Creating a bootable diskette in Windows XP - step 1

- Then select the checkbox **"Create an MS-DOS startup disk"**, press **"Start"** and acknowledge the warning message with "OK".

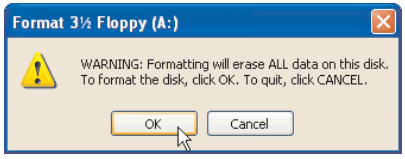


Figure 252: Creating a bootable diskette in Windows XP - step 2

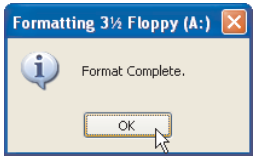


Figure 253: Creating a bootable diskette in Windows XP - step 3

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 as default) and deactivate the option "show hidden files and folders".

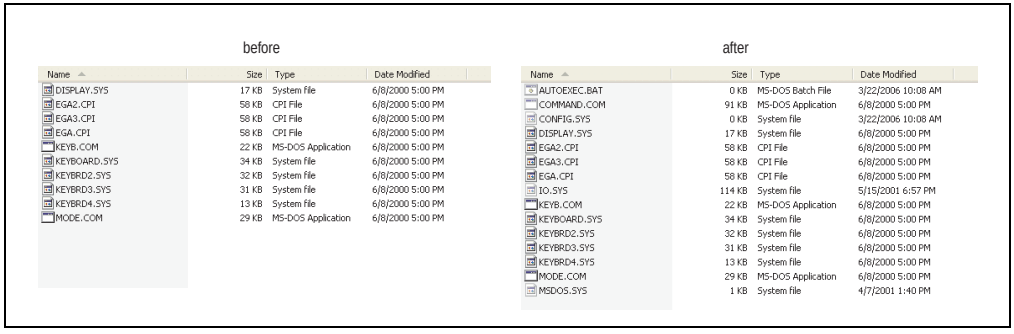


Figure 254: Creating a bootable diskette in Windows XP - step 4

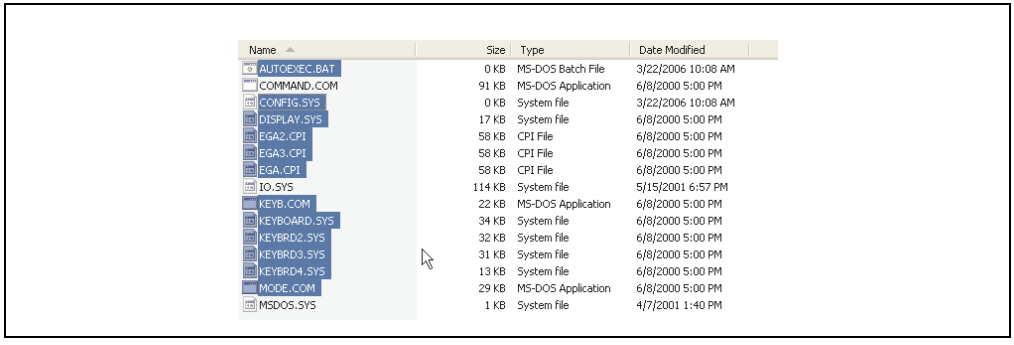


Figure 255: Creating a bootable diskette in Windows XP - step 5

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

1.9 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.

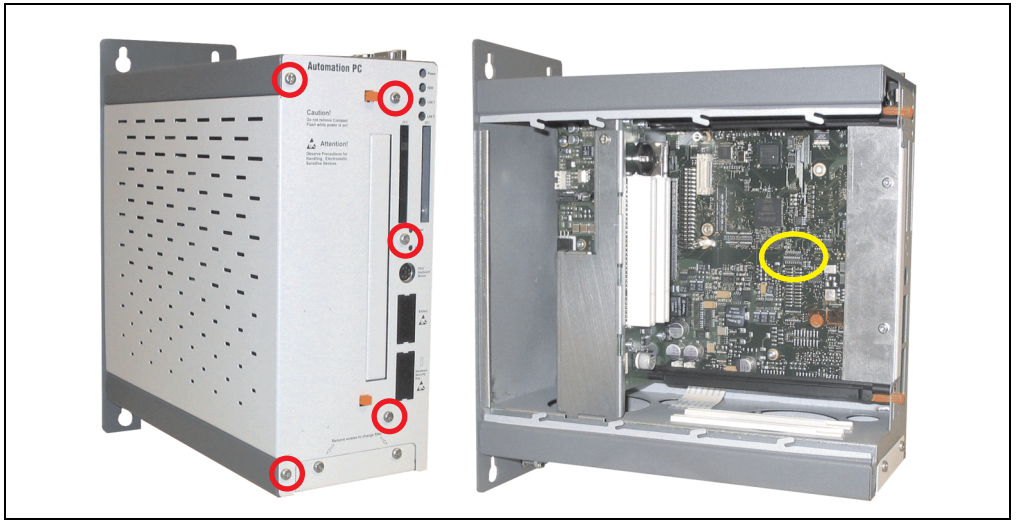


Figure 256: Location of DIP switch

2. Automation PC 620 with Automation Runtime

2.1 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

2.2 Support for Automation PC 620 embedded

2.2.1 AR010

The fieldbus interfaces CAN, X2X, and Ethernet POWERLINK are supported by AR010 with an AS 2.6 upgrade.

2.2.2 AR106

The fieldbus interfaces CAN, X2X, and Ethernet POWERLINK are supported by AR 2.94 together with an AS 2.7.

2.3 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 340: 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 340: System unit support for buffering with Automation Runtime (cont.)

2.4 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 341: 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.

3. Automation PC 620 with MS-DOS

Figure 257: Automation PC 620 with MS-DOS

Model number	Short description	Comment
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 342: Model numbers - MS-DOS

3.1 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 343: Tested resolutions and color depths for DVI and RGB signals

4. Automation PC 620 with Windows XP Professional

Figure 258: Windows XP Professional Logo

Model number	Short description	Comment
9S0000.08-010	**OEM Microsoft Windows XP Professional** CD, German; Only delivered with a new PC.	
9S0000.08-020	**OEM Microsoft Windows XP Professional** CD, English; Only delivered with a new PC.	
9S0000.09-090	**OEM Microsoft Windows XP Professional Multilanguage** CDs; Only delivered with a new PC.	
5SWWXP.0600-DEU	**WinXP Professional with SP3, CD German** OEM Windows XP Professional including Service Pack 3, CD, German, only supplied together with a new PC.	
5SWWXP.0600-ENG	**WinXP Professional with SP3, CD English** OEM Windows XP Professional including Service Pack 3, CD, English, only supplied together with a new PC.	
5SWWXP.0600-MUL	**WinXP Professional with SP3, CD English** OEM Windows XP Professional including Service Pack 3, CD, Multi-language, only supplied together with a new PC.	

Table 344: Model numbers - Windows XP Professional

4.1 Installation

Generally, Windows XP Professional is already pre-installed by B&R 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.

4.1.1 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.

4.2 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 - Product Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (**www.br-automation.com**).

4.2.1 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).

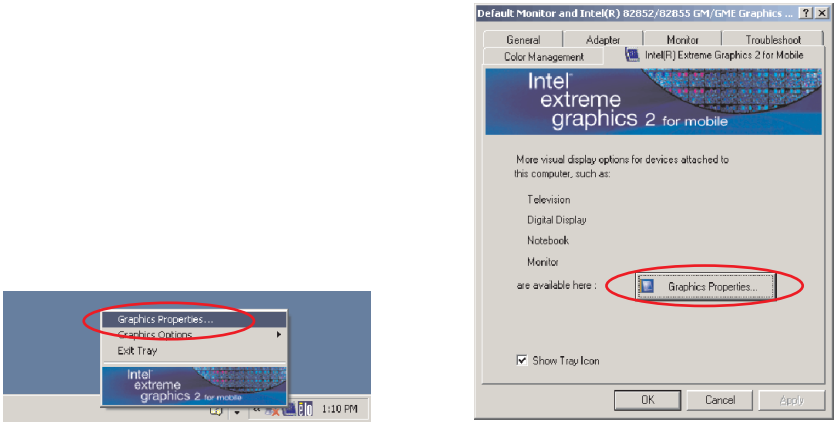


Figure 259: Graphics driver for 815E Control Panel access

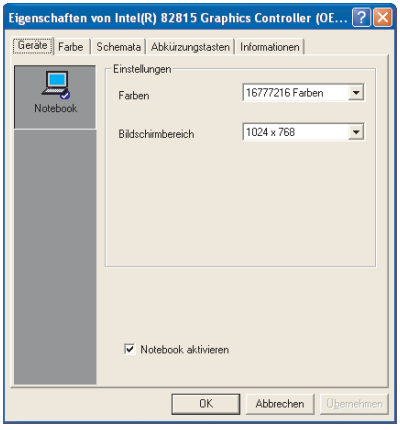


Figure 260: Graphics driver for 815E settings

4.2.2 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).

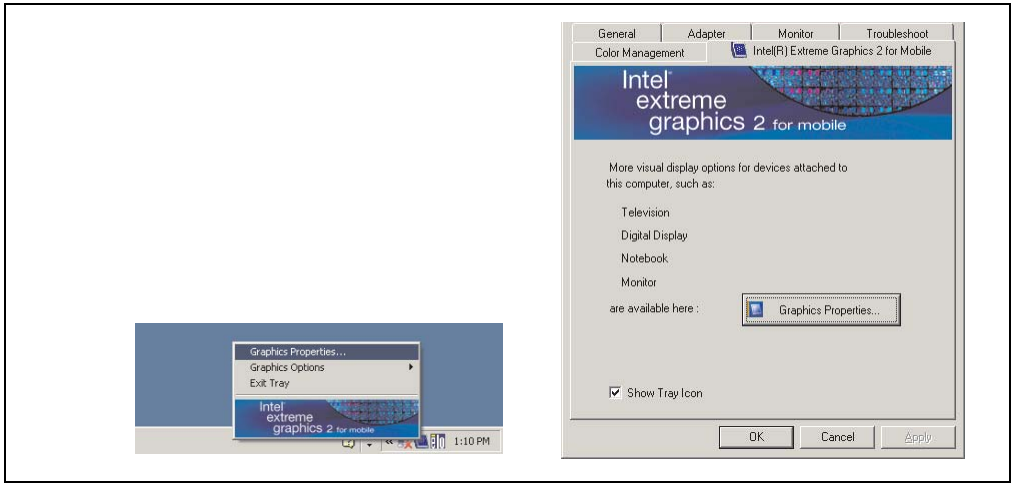


Figure 261: Accessing the graphics driver via Control Panel

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 536.

4.2.3 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 345: 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.

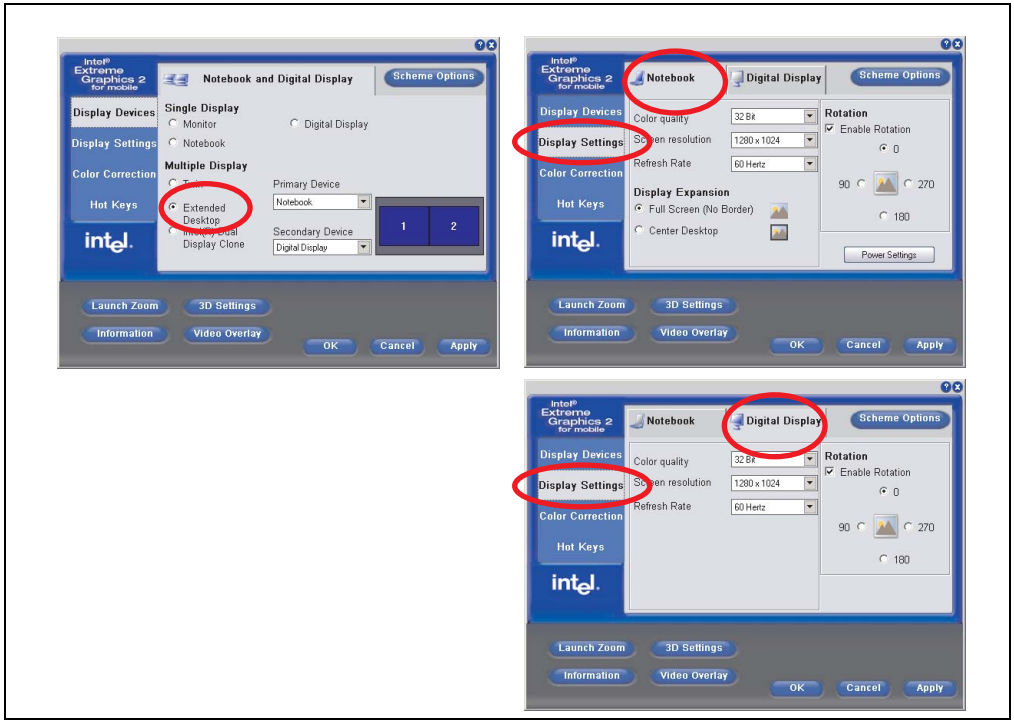


Figure 262: Extended desktop settings - primary and secondary device

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 4.3.1 "Installation for Extended Desktop" on page 538 for information about installing the touch screen driver.

4.2.4 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 346: Relationship between driver settings and graphics engine

Resolution and color depth can only be set on the line designated as the primary device.

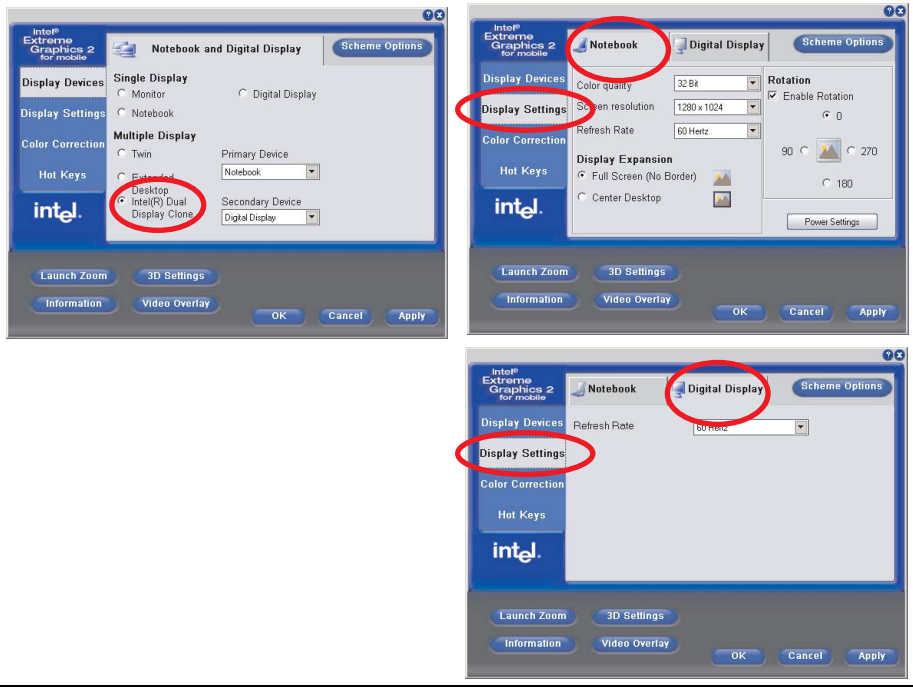


Figure 263: Dual display clone settings - primary and secondary device

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 4.3.2 "Installation for Dual Display Clone" on page 540 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.**

4.2.5 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.

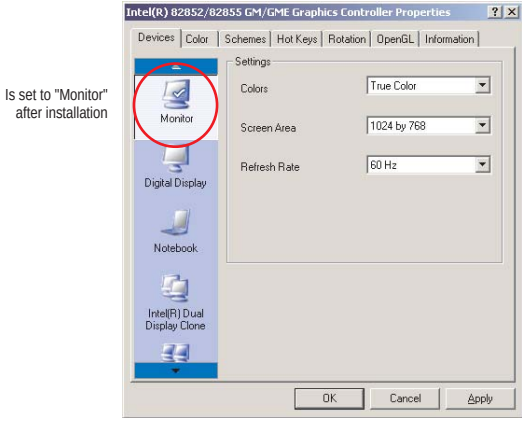
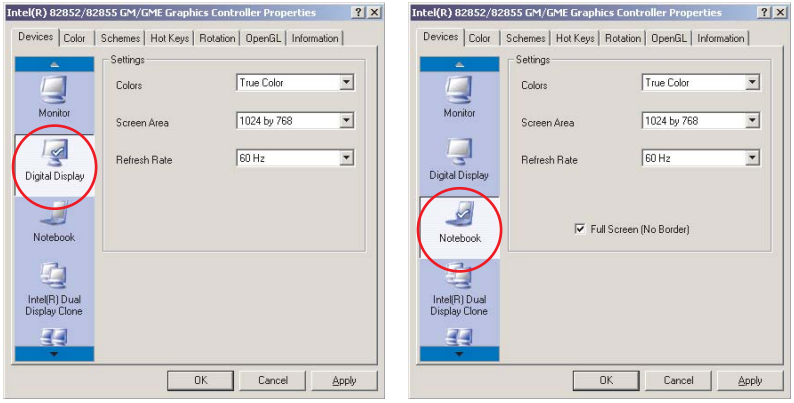


Figure 264: Settings after installing the graphics driver

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).



Digital display for Monitor / Panel output

Notebook for AP Link output

Figure 265: Settings for adjustment

4.3 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 - Product 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").

4.3.1 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.

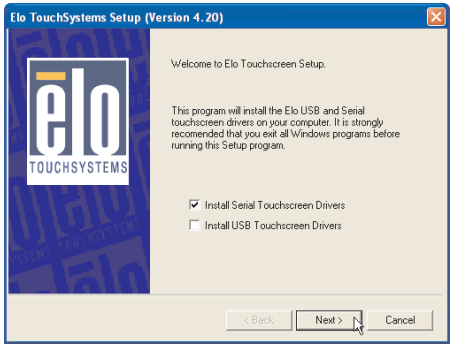


Figure 266: Touch screen driver - serial touch screen

- 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)

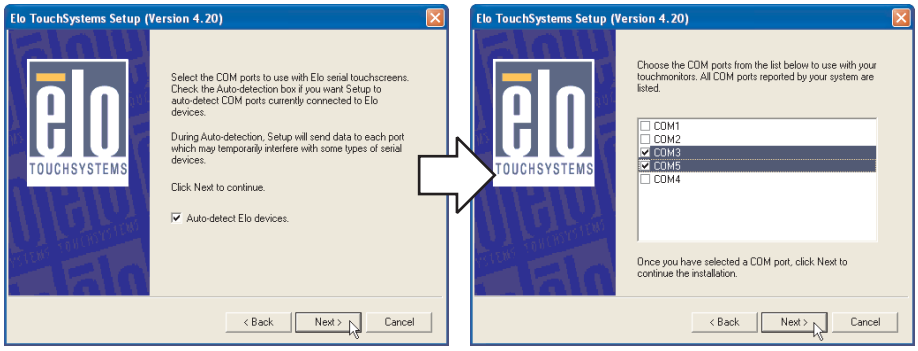


Figure 267: Touch screen driver - auto-detect

- 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.

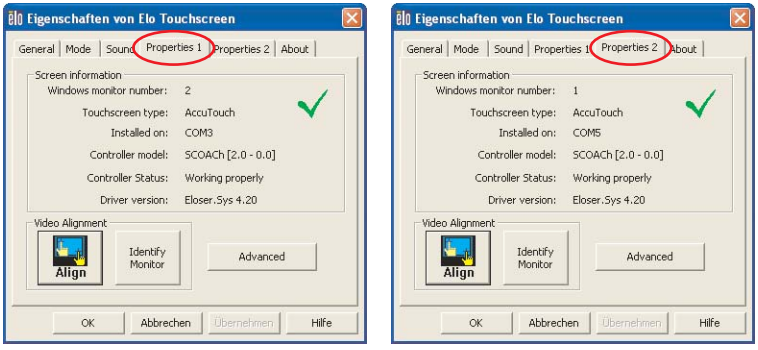


Figure 268: Touch screen calibration

4.3.2 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.

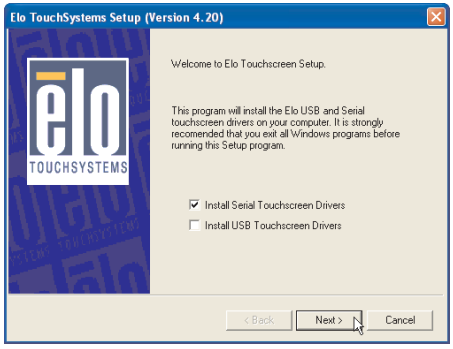


Figure 269: Touch screen driver - serial touch screen

- 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)

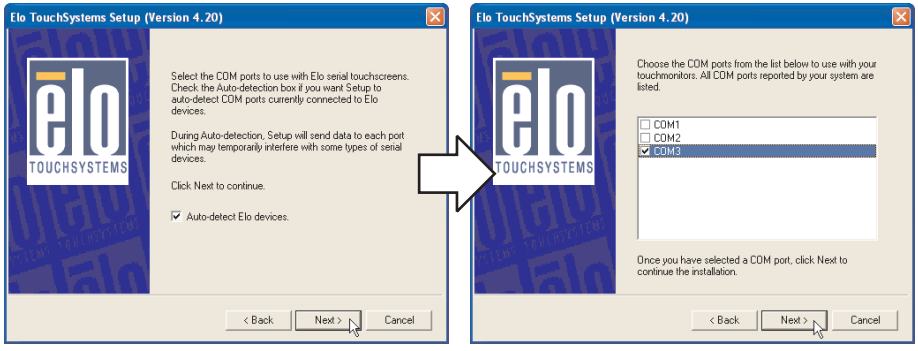


Figure 270: Touch screen driver - auto-detect

- 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.

Figure 271: Touch screen calibration

4.3.3 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.

4.4 Audio driver

An audio driver can be found in the download area (Service - Product 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 132 for information about the audio driver type.

4.4.1 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.

4.5 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 - Product Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (**www.br-automation.com**).

See the sections "Ethernet connection ETH1" on page 118 and "Ethernet connection ETH2" on page 120 for information about network controller types.

4.5.1 Installation ETH1

Execute the downloaded setup.

4.5.2 Installation ETH2

Installation is performed via the Windows device manager using the Net559ER.inf file.

4.6 Automation PC 620 embedded

The fieldbus interfaces CAN, X2X and Ethernet POWERLINK are not supported by Microsoft Windows XP (no drivers present).

5. Automation PC 620 with Windows XP Embedded

Figure 272: Windows XP Embedded Logo

Model number	Short description	Comment
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) AC620 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 347: Model numbers - Windows XP Embedded

5.1 General information

Windows XP Embedded is the most modular version of the Windows XP Professional desktop operating system and makes it possible to quickly develop reliable and advanced embedded devices. 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.

5.2 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 348: Device functions in Windows XP embedded with FP2007

5.3 Installation

Windows XP Embedded is usually preinstalled at B&R Austria on a suitable CompactFlash card (at least 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).

5.4 Graphics drivers

Already included in the B&R Windows XP embedded image for 815E and 855GME CPU boards.

5.5 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 4.3 "Touch screen driver" on page 538

The driver can be downloaded from the download area on the B&R homepage (www.br-automation.com).

5.6 Audio driver

Already integrated in the B&R Windows XP embedded image for 815E and 855GME CPU boards.

5.6.1 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 4.2.1 "Installing the graphics driver for 815E (ETX) CPU boards").

5.7 Network driver

Already integrated in the B&R Windows XP embedded image for 815E and 855GME CPU boards.

5.8 FAQ

If USB devices are connected with the APC620 and XP Embedded executes a restart during a shutdown, then the 3 "USB Root Hubs" under Properties ->Power Management-> Allow the computer to turn off this device to save power -> must be selected in the "Device manager" under "Universal Serial Bus controllers".

6. Automation PC 620 with Windows CE

Model number	Short description	Comment
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).	

Table 349: Model numbers - Windows CE

6.1 General information

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.

6.1.1 Advantages

- Internet Explorer 6.0 for Windows® CE - standard components
- Fonts for attractive text display
- TCP/IP for network and Internet communication
- Remote Desktop Protocol (RDP) for thin clients
- ActiveSync for synchronization with the PC
- Windows® Media Player application

- Compact Framework V1.0 Service Pack 2
- Network utilities
- VBScript 6.0
- JScript 6.0
- Viewers for Excel, Word, images, PDFs, PowerPoint (only in Windows CE 5.0 ProPlus)
- Windows CE is also less expensive than other Windows licenses.

6.2 Properties in connection with APC620 devices

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 for APC620
Supported screen resolutions	VGA, SVGA, XGA
Color depth	16 bit or 65536 colors
Graphics card driver	Intel(R) embedded graphics driver
Main memory	Automatic detection and use of up to 512 MB
Boot time / Startup time	Approx. 39 seconds [1)]
Included web browser	Internet Explorer 6 for Windows CE
.NET	Compact Framework V2.0
Image size	Approx. 29 MByte[2)] (not compressed)
Custom keys	Supported
PVI	Supported

Table 350: Properties for Windows CE 5.0 and APC620

1) Measured with a 32 MByte SanDisk 5CFCRD.0032-02, 2 partitions, no USB mass memory inserted, all servers disabled, BIOS options Summary Screen=Disabled, Extended Memory Testing=None and Dark Boot=Enabled, both network cards connected with one network and enabled, USB keyboard and USB mouse plugged-in.

2) Use the function "Compress Windows CE Image" in the B&R eMbedded OS Installer to reduce the image size.

6.3 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)

6.4 Installation

Windows CE is usually preinstalled at B&R Austria.

6.4.1 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 for free 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.

6.5 Known problems

- USB 2.0 (EHCI) fails sporadically.
- The SNTP service isn't working.
- USB mouse not detected on USB port 2.
- RDP device change notification only works during the first RDP connection.
- If the display is rotated 90°, the TAB control navigation buttons disappear.
- The image viewer can't display CMYK JPEG files.

7. 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.

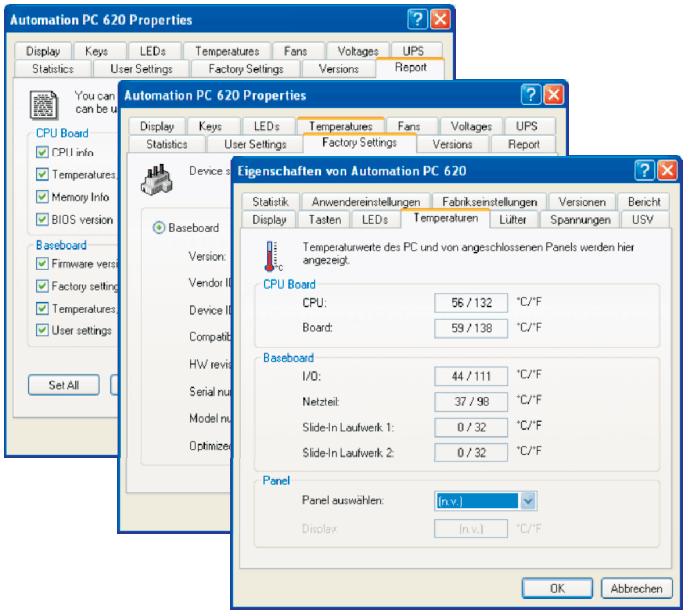


Figure 273: ADI Control Center screenshots (Version 1.61) - example

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.

Features (device dependent)

- Adjusting the display brightness of connected Panels
- Reading device specific keys (in order for this to be possible, a key configuration must be installed that was created with the B&R Key Editor)
- Change the user serial ID
- Activation of device specific LEDs on a foil keypad

- Reading temperatures, fan speeds, and statistical data
- 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

Supports following systems:

System	Operating system	Comment
Automation PC 620	Windows XP Professional Windows 2000	Installation using its own setup
	Windows XP embedded	Content of B&R Windows XP embedded image
	Windows CE	Content of B&R Windows CE image
Automation PC 810	Windows XP Professional	Installation using its own setup
	Windows XP embedded	Content of B&R Windows XP embedded image
Panel PC 700	Windows XP Professional Windows 2000	Installation using its own setup
	Windows XP embedded	Content of B&R Windows XP embedded image
	Windows CE	Content of B&R Windows CE image
Power Panel 100 BIOS devices	Windows XP embedded	Content of B&R Windows XP embedded image
	Windows CE 4.x, 5.0	Content of B&R Windows CE image
Power Panel 300 BIOS devices	Windows XP embedded	Content of B&R Windows XP embedded image
	Windows CE 4.x, 5.0	Content of B&R Windows CE image
	Windows CE 6.0	Content of B&R Windows CE image
Mobile Panel BIOS devices	Windows XP embedded	Content of B&R Windows XP embedded image
	Windows CE 4.x	Content of B&R Windows CE image
Automation Panel 900	-	Together with Automation PC 620 / Panel PC 700 and Automation PC810

Table 351: System support - ADI driver

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**).

7.1 Installation

The latest version of the ADI driver for the existing target system can be found in the download area (Service - Product Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (**www.br-automation.com**).

1) Download and unpack the ZIP archive

2) Close all applications.

3) Start BrSetup.exe (e.g. by double clicking in Explorer) or right click on BrSetup.inf in explorer and select "Install".

Information:

The ADI driver and B&R control center are already included in the Windows XP Embedded operating system. 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.

7.2 SDL equalizer setting

The equalizer makes it possible to adjust the strength of the video signal to the SDL cable length. This allows you to improve the visual representation on the display.

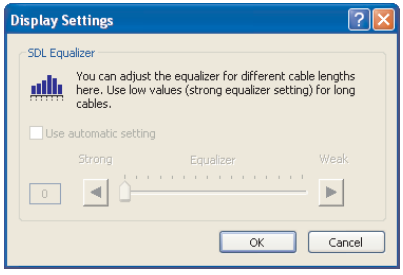


Figure 274: ADI Control Center - SDL equalizer settings

The value is optimally defined for the cable length when using the "Automatic setting".

The equalizer value can only be changed if the function is supported by Automation Panel 900 (starting with Panel Firmware version 1.04 or higher) and if MTCX PX32 version 1.54 or higher is installed. Otherwise, the dialog fields are disabled.

7.3 UPS configuration

Here, the status values for an installed B&R APC620 UPS can be displayed and the battery settings for the UPS can be changed, updated, and saved. The system settings for the UPS can also be configured.

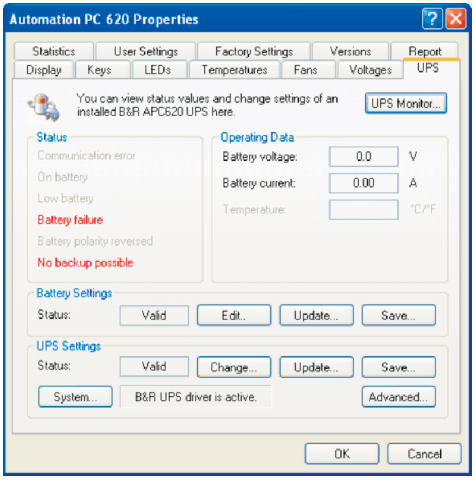


Figure 275: ADI Control Center - UPS settings

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.

7.3.1 Configuration of UPS operation for the B&R APC620 UPS

1) Open the energy options dialog box in the Control Panel.
2) Go to the UPS tab and click on "Select".
3) Set the manufacturer to "Bernecker + Rainer" and the model to "APC620 UPS" and click on "Finish". The value for the COM connection is only required for a serially connected UPS and is ignored by the APC620 UPS driver.
4) Click on "Apply" to begin UPS operation. After a few seconds the UPS status and details are displayed.

Information:

- **Administrator rights are required in order to change the energy options or display the UPS status.**
- **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.**

7.3.2 Display status values for UPS

1) Open the Control Center in the Control Panel.
2) Select UPS tab.

The displayed values are updated automatically.

Information:

Notes:

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.

Select UPS monitor to display UPS status changes since the last time the system or UPS driver was started.

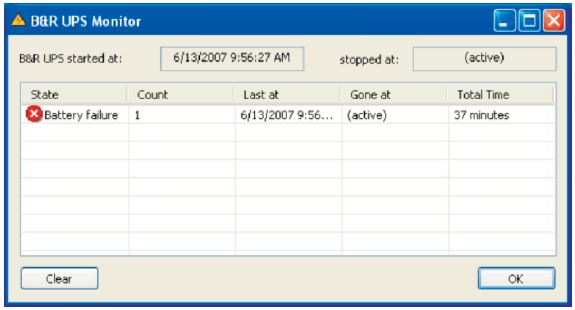


Figure 276: ADI Control Center - UPS monitor

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.

7.3.3 Change 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.

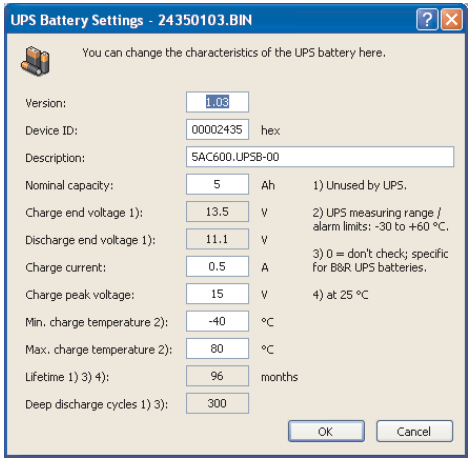


Figure 277: ADI Control Center - UPS battery settings

In this dialog box you can change the settings for the UPS battery.

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:

If you would like to change the current battery settings on the UPS, they must first be saved in a file.

7.3.4 Update 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!

- **Battery operation is not possible during the update.**
- **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.

7.3.5 Save 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".

The transfer can be aborted by clicking on "Cancel" in the Download dialog box.

7.3.6 Configure UPS system settings

1) Open the Control Center in the Control Panel.
2) Select UPS tab.
3) Under UPS settings, click on "System". The energy options dialog box in the Control Panel is opened.

Further information regarding the UPD system settings can be found in the Windows help.

Information:

Administrator rights are required in order to change the energy options or display the UPS status.

7.3.7 Configuring the "UL compliant operation"

1) Open the Control Center in the Control Panel.
2) Select UPS tab.
3) Under UPS settings, click on "Change". This opens the following dialog box:

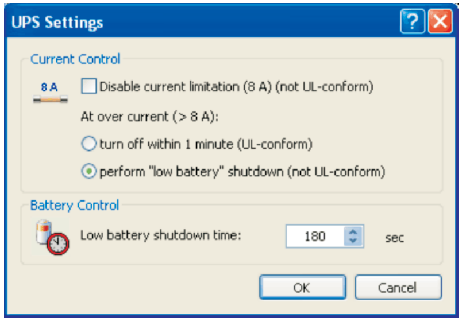


Figure 278: ADI Control Center - UPS settings

Information:

- **For UL compliant operation, ADI driver version 1.80 and UPS firmware version 1.10 are minimum requirements.**
- **The UL compliant operation is switched on by default.**

If the "Low Battery" shutdown option is activated, the LowBatteryFlag is set at over-current, and a low battery shutdown is executed (for more information on low battery shutdown, see "Procedure following power failure" on page 562). If the UL compliant operation is reactivated, the following warning is displayed.

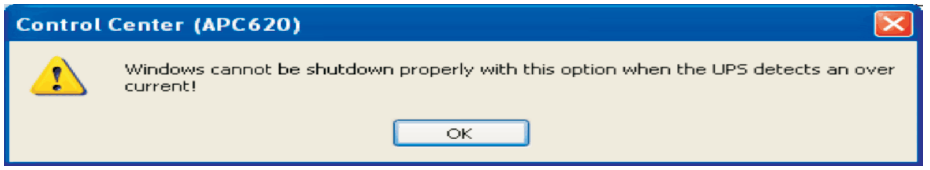


Figure 279: ADI control center warning

7.3.8 Change additional UPS settings

1) Open the Control Center in the Control Panel.

2) Select UPS tab.

3) Under UPS settings, click on "Advanced". This opens the following dialog box:

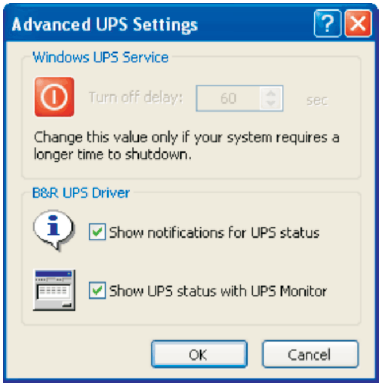


Figure 280: ADI Control Center - Advanced UPS settings

Information:

Administer rights are required in order to display this dialog box.

Change turn-off time for UPS

Under "Windows UPS Service", you can enter the turn-off time in seconds. This is the length of time that the UPS waits before switching off the power supply.

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").

7.3.9 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 dying. Once the shutdown 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 shutdown time is 3 minutes, by default.

If the power supply returns during the shutdown process, the shutdown timer runs until the APC620 enters standby mode. Then the shutdown time is reduced to 4 seconds.

Chapter 5 • Standards and certifications

1. Applicable European guidelines

- EMC guidelines 2004/108/EG
- Low-voltage guidelines 2006/95/EG
- Machine guidelines 98/37/EG beginning 12/29/2009: 2006/42/EG

2. Overview of standards

The Automation PC 620 as an entire device meets the following 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 55024 Class A	Electromagnetic compatibility (EMC), immunity 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 68068-2-2	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

Table 352: Overview of standards

Standard	Description
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
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 (EN 50082-2)	Electromagnetic compatibility (EMC), generic immunity standard - part 2: industrial environments (EN 50082-2 has been replaced by EN 61000-6-2)
EN 61000-6-4 (EN 50081-2)	Electromagnetic compatibility (EMC), generic emission standard - part 2: industrial environments (EN 50081-2 has been replaced by EN 61000-6-4)
EN 61131-2 IEC 61131-2	Product standard, programmable logic controllers - part 2: equipment requirements and tests
UL 508	Industrial control equipment (UL = Underwriters Laboratories)
VDE 0701-1	Service, modification, and testing of electrical devices - part 1: General requirements
47 CFR	Federal Communications Commission (FCC), 47 CFR Part 15 Subpart B Class A

Table 352: Overview of standards (cont.)

3. Requirements for emissions

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 353: 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) and 53 - 43 dB (µA) Quasi-peak value 84 - 74 dB (µV) and 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 354: 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 354: Test requirements - Network-related emissions for industrial areas (cont.)

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 355: : Test requirements - Electromagnetic emissions for industrial areas

4. Requirements for immunity to disturbances

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
		EN 55024: Information technology equipment (ITE devices)
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
		EN 55024: Information technology equipment (ITE devices)
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
		EN 55024: Information technology equipment (ITE devices)
Immunity to surge voltages	EN 61000-4-5	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
		EN 55024: Information technology equipment (ITE devices)
Immunity to conducted disturbances	EN 61000-4-6	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
		EN 55024: Information technology equipment (ITE devices)
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
		EN 55024: Information technology equipment (ITE devices)
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
		EN 55024: Information technology equipment (ITE devices)
Immunity to damped vibration	EN 61000-4-12	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
		EN 55024: Information technology equipment (ITE devices)

Table 356: 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 intended **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 when 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	Limits according to EN 55024
Contact discharge to powder-coated and bare metal housing parts	± 4 kV, 10 discharges, criteria B	± 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	± 8 kV, 10 discharges, criteria B

Table 357: 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	Limits according to EN 55024
Housing, completely wired	80 MHz - 1 GHz, 10 V/m, 80 % amplitude modulation with 1 kHz, length 3 seconds, criteria A	80 MHz - 1 GHz, 1.4 - 2 GHz, 10 V/m, 80 % amplitude modulation with 1 kHz, length 3 seconds, criteria A 800-960 MHz (GSM), 10 V/m, pulse modulation with 50 % duty cycle, criteria A	80 MHz - 1 GHz, 1.4 - 2 GHz, 3 V/m, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A

Table 358: 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	Limits according to EN 55024
AC power I/O	± 2 kV, criteria B	-	± 1 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	-	± 0.5 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	± 0.5 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 359: Test requirements - High-speed transient electrical disturbances (burst)

1) For EN 55024 without length limitation.

4.4 Surge voltages (Surge)

Test carried out according to EN 61000-4-5	Limits according to EN 61000-6-2	Limits according to EN 61131-2	Limits according to EN 55024
AC power I/O, L to L	± 1 kV, criteria B	± 1 kV, criteria B	± 1 kV, criteria B
AC power I/O, L to PE	± 2 kV, criteria B	± 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	-	± 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	± 1 kV, criteria B
All shielded cables	-	± 1 kV, criteria B	-

Table 360: 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	Limits according to EN 55024
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	150 kHz - 80 MHz, 3 V, 80 % amplitude modulation with 1 kHz, criteria A
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	150 kHz - 80 MHz, 3 V, 80 % amplitude modulation with 1 kHz, 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	150 kHz - 80 MHz, 3 V, 80 % amplitude modulation with 1 kHz, criteria A

Table 361: Test requirements - Conducted disturbances

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	Limits according to EN 55024
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	50 Hz, 1 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	50 Hz, 1 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	50 Hz, 1 A/m, criteria A

Table 362: 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	Limits according to EN 55024
AC power inputs	Voltage dip 70% (30% reduction), 0.5 periods, criteria B	-	Voltage dip < 5% (> 95% reduction), 0.5 half-oscillations, criteria B
AC power inputs	Voltage dip 40% (60% reduction), 5 periods, criteria C	-	Voltage dip 70% (30% reduction), 25 half-oscillations, 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	-	Voltage interruptions < 5% (> 95% reduction), 250 half-oscillations, 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 363: Test requirements - Voltage dips, fluctuations, and short-term interruptions

4.8 Damped oscillations

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 364: 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 365: Overview of limits and testing guidelines for vibration

5.1 Vibration during 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 366: 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 367: 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, length 11 ms, 18 shocks	Acceleration 15 g, length 11 ms	

Table 368: Test requirements - Shock during operation

5.4 Shock 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 369: 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	
Toppling and knocking over	Devices: Toppling/knocking over on each edge		Devices: Toppling/knocking over on each edge		Devices: Toppling/knocking over 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 370: 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 371: 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 372: Overview of limits and testing guidelines for temperature and humidity

6.1 Worst case during 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 373: 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 374: 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 375: 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 376: 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 377: Test requirements - Temperature fluctuations in operation

6.6 Humid heat, cyclical

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 378: 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 379: 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 380: 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 Ohm
	1.0 mm²	3.3 V	
	1.5 mm²	2.6 V	
	2.5 mm²	1.9 V	
	4.0 mm²	1.4 V	
	> 6.0 mm²	1.0 V	

Table 381: 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 MOhm at 500 VDC voltage		

Table 382: 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 383: 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 384: 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 385: 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 386: 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 387: 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 388: 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 389: Overview of limits and testing guidelines for other tests

8.1 Protection

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 390: 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 391: Test requirements - Degree of pollution

9. SDL flex cable - test description

9.1 Torsion

9.1.1 Structure of the test

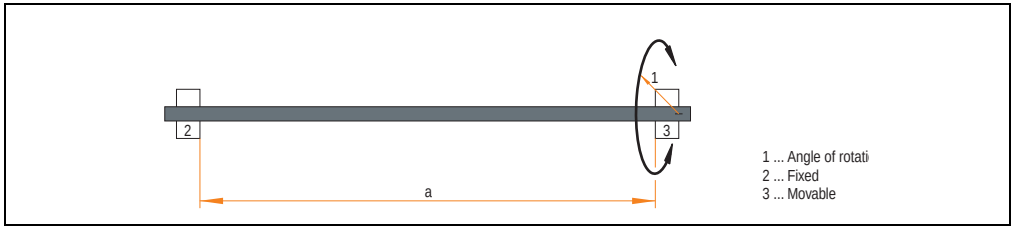


Figure 281: Test structure - torsion

9.1.2 Test conditions

- Distance a: 450 mm
- Rotation angle: ± 85°
- Speed: 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 Structure of the test

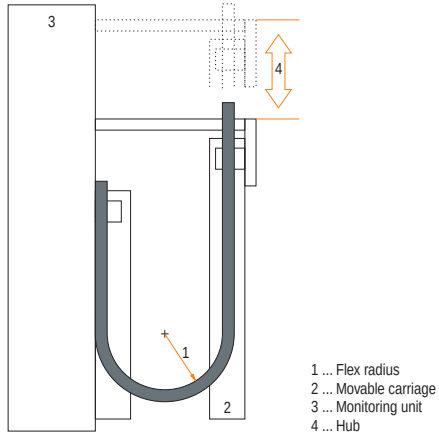


Figure 282: Test structure - Cable drag chain

9.2.2 Test conditions

- Flex radius: 180 mm (= 15 x cable diameter)
- Hub: 460 mm
- Speed: 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 guidelines are met.

Table 392: International certifications

Chapter 6 • Accessories

1. Overview

Model number	Short description	Comment
0AC201.9	**Lithium batteries (5x)** Lithium batteries, 5 pcs., 3 V / 950 mAh, button cell	See page 594
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	See page 592
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	See page 592
4A0006.00-000	**Lithium battery (1x)** Lithium battery, 1 pc., 3 V / 950 mAh, button cell	See page 594
5A5003.03	**Front cover** Front cover for the USB 2.0 Media Drive 5MD900.USB2-00.	See page 622 and page 629
5AC600.ICOV-00	**Interface covers** Interface covers for APC620 and PPC700 devices; 5 pieces	See page 595
5AC600.UPSI-00	**Add-on UPS module** UPS module for APC620 / APC810 system units 5PC600.SX01-00 (Rev. H0 and up), 5PC600.SX02-00 (Rev. G0 and up), 5PC600.SX02-01 (Rev. H0 and up), 5PC600.SX05-00 (Rev. F0 and up), 5PC600.SX05-01 (Rev. F0), 5PC600.SF03-00 (Rev. A0 and up), 5PC600.SE00-00 (Rev. A0), 5PC600.SE00-01 (Rev. A0 and up), 5PC600.SE00-02 (Rev. A0 and up), 5PC810.SX*. Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately.	See page 670
5AC600.UPSB-00	**Battery unit 5 Ah** Battery unit	See page 672
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 DB15HD/f** Adapter DVI (plug) to CRT (socket), for connecting a standard monitor to a DVI-I interface.	See page 596
5CADVI.0018-00	**DVI-D cable 1.8 m / single** Single cable, DVI-D/m:DVI-D/m; length: 1.8m	See page 639
5AC600.SRAM-00	**APC620/PPC700 SRAM module 512kB** SRAM module for APC620 and PPC700 512 kB.	See page 682
5CADVI.0050-00	**DVI-D cable 5 m / single** Single cable, DVI-D/m:DVI-D/m; length: 5 m	See page 639

Table 393: Model numbers - Accessories

Model number	Short description	Comment
5CADVI.0100-00	**DVI-D cable 10 m / single** Single cable, DVI-D/m:DVI-D/m; length: 10 m	See page 639
5CAMSC.0001-00	**APC620 internal supply cable**	See page 642
5CASDL.0018-00	**SDL cable 1.8 m** SDL cable for a fixed type of layout; length: 1.8 m	See page 643
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 646
5CASDL.0018-03	**SDL flex cable 1.8 m** SDL cable for fixed and flexible type of layout; length: 1.8 m	See page 653
5CASDL.0050-00	**SDL cable 5 m** SDL cable for a fixed type of layout; length: 5 m	See page 643
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 646
5CASDL.0050-03	**5 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 5 m	See page 653
5CASDL.0100-00	**SDL cable 10 m** SDL cable for a fixed type of layout; length: 10 m	See page 643
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 646
5CASDL.0100-03	**10 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 10 m	See page 653
5CASDL.0150-00	**SDL cable 15 m** SDL cable for a fixed type of layout; length: 15 m	See page 643
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 646
5CASDL.0150-03	**15 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 15 m	See page 653
5CASDL.0200-00	**SDL cable 20 m** SDL cable for a fixed type of layout; length: 20 m	See page 643
5CASDL.0200-03	**20 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 20 m	See page 653
5CASDL.0250-00	**SDL cable 25 m** SDL cable for a fixed type of layout; length: 25 m	See page 643
5CASDL.0250-03	**25 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 25 m	See page 653
5CASDL.0300-00	**SDL cable 30 m** SDL cable for a fixed type of layout; length: 30 m	See page 643
5CASDL.0300-03	**30 m flex SDL cable** SDL cable for fixed and flexible type of layout; length: 30 m	See page 653
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 649
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 658

Table 393: Model numbers - Accessories (cont.)

Model number	Short description	Comment
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 649
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 658
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 665
5CAUPS.0030-00	**APC620 UPS cable 3 m** Connection cable between add-on UPS module and UPS battery unit, length 3 meters	See page 665
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 665
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 665
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 See page 597
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 See page 597
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 See page 597
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 See page 597
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 See page 597
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 See page 597
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 See page 597
5CFCRD.0064-03	**CompactFlash 64 MB SSI** CompactFlash card with 64 MB SLC NAND flash and IDE/ATA interface	See page 605
5CFCRD.0128-03	**CompactFlash 128 MB SSI** CompactFlash card with 128 MB SLC NAND flash and IDE/ATA interface	See page 605
5CFCRD.0256-03	**CompactFlash 256 MB SSI** CompactFlash card with 256 MB SLC NAND flash and IDE/ATA interface	See page 605
5CFCRD.0512-03	**CompactFlash 512 MB SSI** CompactFlash card with 512 MB SLC NAND flash and IDE/ATA interface	See page 605
5CFCRD.1024-03	**CompactFlash 1024 MB SSI** CompactFlash card with 1024 MB SLC NAND flash and IDE/ATA interface	See page 605
5CFCRD.2048-03	**CompactFlash 2048 MB SSI** CompactFlash card with 2048 MB SLC NAND flash and IDE/ATA interface	See page 605

Table 393: Model numbers - Accessories (cont.)

Model number	Short description	Comment
5CFCRD.4096-03	**CompactFlash 4096 MB SSI** CompactFlash card with 4096 MB SLC NAND flash and IDE/ATA interface	See page 605
5CFCRD.8192-03	**CompactFlash 8192 MB SSI** CompactFlash card with 8192 MB SLC NAND flash and IDE/ATA interface	See page 605
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 See page 617
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 624
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 631
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 631
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 631
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 631
5MMUSB.2048-00	**USB flash drive 2 GB SanDisk** USB 2.0 flash drive 2 GB	See page 631
5SWHMI.0000-00	**HMI Drivers & Utilities DVD**	See page 636
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 663
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 663
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 663
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 681
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 681
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 681
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 681
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 installation	See page 685
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 685

Table 393: Model numbers - Accessories (cont.)

Model number	Short description	Comment
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 685
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 685
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 685
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 685
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 685
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 685
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 685
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 685
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 685

Table 393: Model numbers - Accessories (cont.)

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	Plug for the 24 V supply voltage (cage clamps)	 0TB103.91

Table 394: 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 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
Distance between contacts	5.08 mm	

Table 395: Technical data - TB103 supply plug

Name	0TB103.9	0TB103.91
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 395: Technical data - TB103 supply plug (cont.)

3. 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).

3.1 Order data

Model number	Description	Figure
0AC201.9	Lithium batteries, 5 pcs., 3 V / 950 mAh button cell	
4A0006.00-000	Lithium battery, 1 piece, 3 V / 950 mAh button cell	

Table 396: Order data - Lithium batteries

3.2 Technical data

Information:

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

Features	0AC201.9	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	
Environmental characteristics		
Storage temperature	-20°C to +60°C	
Relative humidity	0 to 95%, non-condensing	

Table 397: Technical data - Lithium batteries

4. Interface covers 5AC600.ICOV-00

The interface covers protect interfaces from dirt and dust when not in use.

4.1 Order data

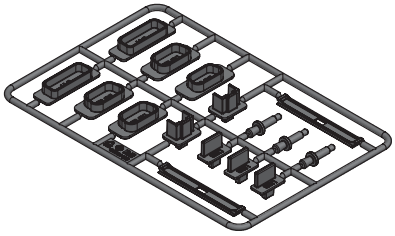
Model number	Description	Figure
5AC600.ICOV-00	**Interface covers** Interface covers for APC620 and PPC700 devices; 5 pieces	

Table 398: Order data - APC620 interface cover

4.2 Contents of delivery

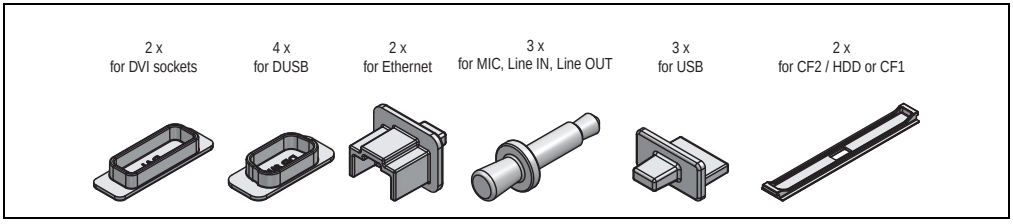


Figure 283: Contents of delivery - interface cover

5. DVI - monitor adapter 5AC900.1000-00

This adapter enables a standard monitor to be connected to the DVI-I interface.

5.1 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 399: Order data - DVI - CRT adapter

6. CompactFlash cards 5CFCRD.xxxx-02

6.1 General information

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

6.2 Order data

Model number	Description	Figure
5CFCRD.0032-02	CompactFlash 32 MB SanDisk/A	
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 400: Order data - CompactFlash cards 5CFCRD.xxxx-02

6.3 Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those 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
Features	**5CFCRD.xxxx-02**
Write/erase procedures	> 2,000,000 times
Mechanical characteristics	

Table 401: Technical data - CompactFlash cards 5CFCRD.xxxx-02

Dimensions Length Width Thickness	 36.4 ± 0.15 mm 42.8 ± 0.10 mm 3.3 mm ± 0.10 mm
Weight	11.4 g
Environmental characteristics	
Ambient temperature Operation Storage Transport	 0°C to +70°C -25°C to +85°C -25°C 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	24000 meters

Table 401: Technical data - CompactFlash cards 5CFCRD.xxxx-02 (cont.)

6.4 Dimensions

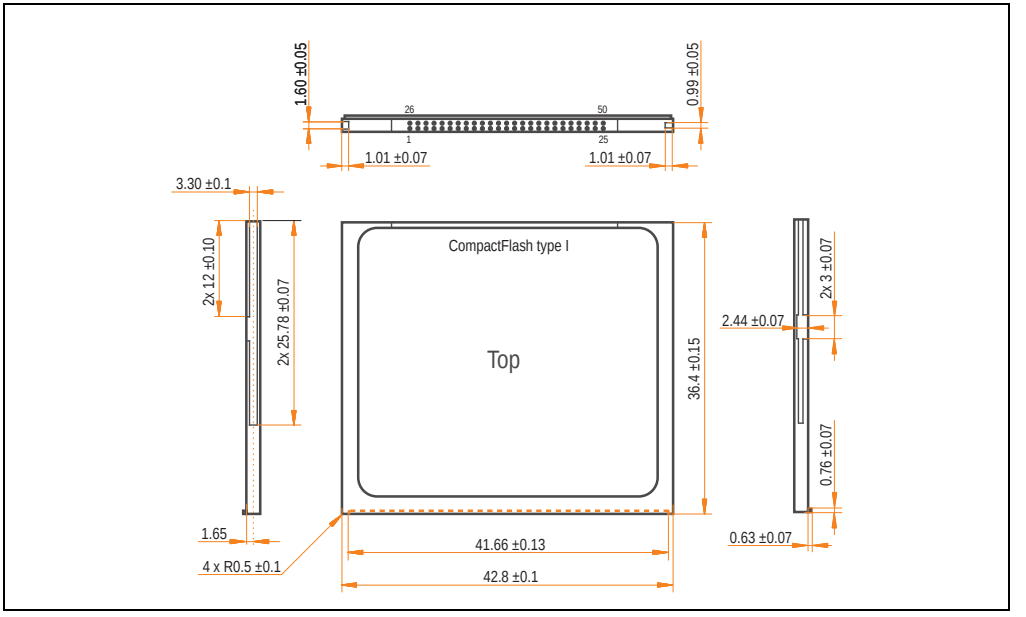


Figure 284: Dimensions - CompactFlash card Type I

6.5 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 285: SanDisk white paper - page 1 of 6

SanDisk® Corporation general policy does not recommend the use of its products in life support applications where in a failure or malfunction of the product may directly threaten life or injury. Per SanDisk Terms and Conditions of Sale, the user of SanDisk products in life support applications assumes all risk of such use and indemnifies SanDisk against all damages.

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Lit. No. 80-36-00278 10/03 Printed in U.S.A.

Figure 286: 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 287: 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 288: SanDisk white paper - page 4 of 6

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.

$$lifetime = 2{,}000{,}000 \times \frac{4000}{4} \times \frac{1}{1/5\,\mathrm{sec}}$$

$$lifetime = 317\, years$$

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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.

$$lifetime = 2{,}000{,}000 \times \frac{4 \times \left(1 - 1 \times \frac{32-8}{32}\right)}{.004} \times \frac{1}{1/5\,\text{sec}}$$

$$lifetime = 79.3\,years$$

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

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7. CompactFlash cards 5CFCRD.xxxx-03

7.1 General information

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

7.2 Order data

Model number	Description	Figure
5CFCRD.0064-03	CompactFlash 64 MB SSI	 Example: 8 GB CompactFlash cards
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 402: CompactFlash cards - Order data

7.3 Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from 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-03
MTBF (at 25 °C)	> 4,000,000 hours
Maintenance	None
Data reliability	< 1 unrecoverable error in 10^{14} bit read accesses
Write/erase procedures	> 2,000,000 times
Data retention	10 years
Mechanical characteristics	
Dimensions Length Width Thickness	 36.4 ± 0.15 mm 42.8 ± 0.10 mm 3.3 ± 0.10 mm

Table 403: Technical data - CompactFlash cards 5CFCRD.xxxx-03

Mechanical characteristics	5CFCRD.xxxx-03
Weight	11.4 grams
Environmental characteristics	
Ambient temperature Operation Storage Transport	 0°C to +70°C -50°C to +100°C -50 C to +100°C
Relative humidity Operation / Storage	 8% to 95%, non-condensing
Vibration Operation Storage / Transport	 Maximum 16.3 g (point to point) Maximum 30 g (point to point)
Shock Operation Storage / Transport	 Maximum 1000 g Maximum 3,000 g
Altitude	Maximum 80,000 feet (24,383 meters)

Table 403: Technical data - CompactFlash cards 5CFCRD.xxxx-03 (cont.)

7.3.1 Temperature humidity diagram - Operation and storage

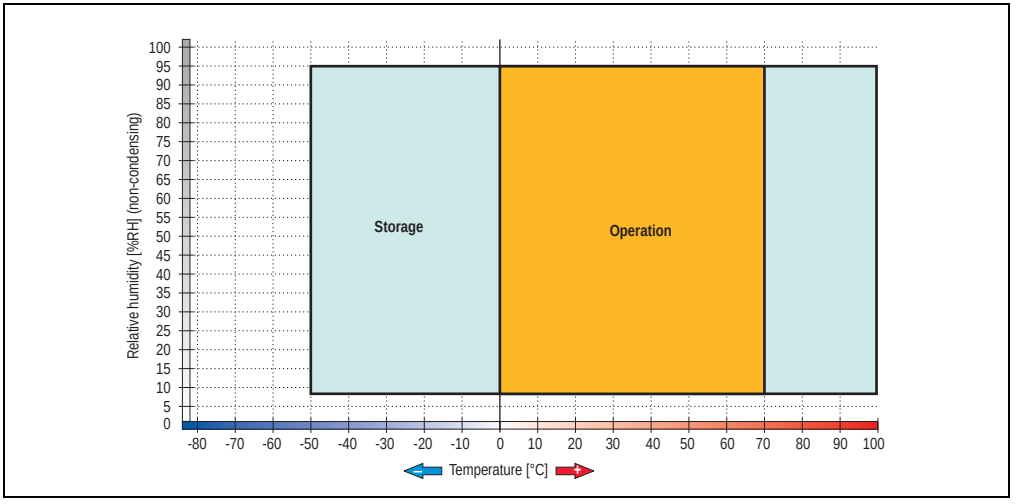

Figure 291: Temperature humidity diagram - CompactFlash cards 5CFCRD.xxxx-03

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).

7.4 Dimensions

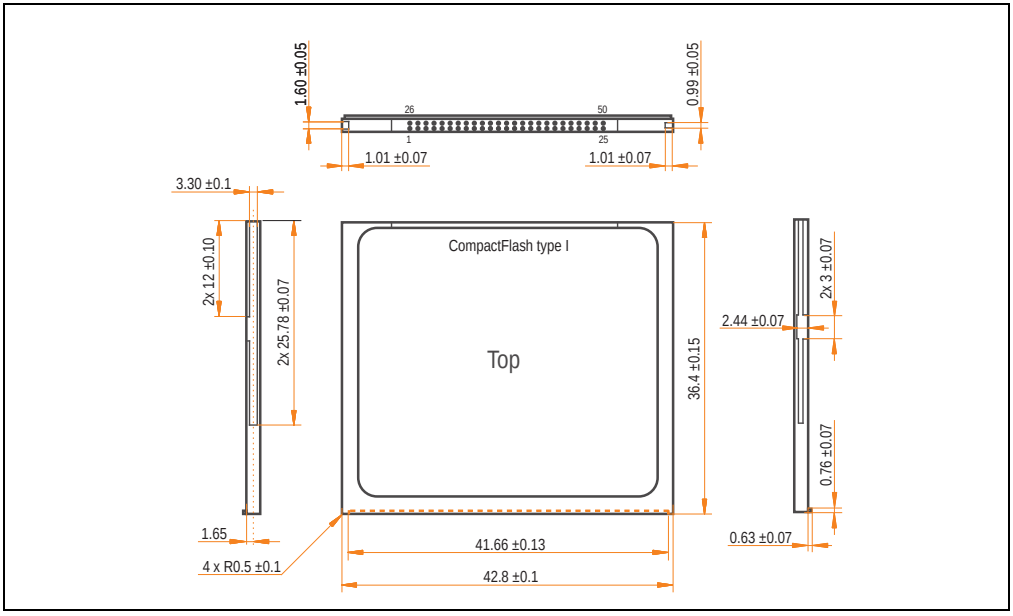

Figure 292: Dimensions - CompactFlash card Type I

7.5 Calculating the lifespan

Silicon Systems provides a 9-page "white paper" for the lifespan calculation for CompactFlash cards (see following pages). This document can also be found on the Silicon Systems homepage (**www.siliconsystems.com**).

Information:

A software tool for calculating the statistical lifespan of the Silicon Systems CompactFlash cards in various settings can be downloaded from the B&R Homepage (www.br-automation.com).

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ENDURANCE CONSIDERATIONS

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Revision D
January 2006

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INTRODUCTION

SiliconSystems' SiliconDrive™ technology is specifically designed to meet the high performance and high reliability requirements of Enterprise System OEMs in the netcom, military, industrial, interactive kiosk and medical markets. One of the measures of storage reliability in Enterprise System OEM applications is endurance – the number of write/erase cycles that can be performed before the storage product "wears out."

BACKGROUND

It is important to note that endurance is not just a function of the storage media. Rather, it is the combination of the storage media and the controller technology that determines the endurance. For example, magnetic media is an order of magnitude less reliable than NAND flash, yet the controller technology employed by rotating hard drives can compensate for this deficiency to yield reliability results that meet those of solid-state storage.

{NOTE: This is a completely different discussion from the mechanical reliability involving rotating hard drives versus solid-state storage that has no moving parts. This is just an example of how a controller, if it is good enough, can compensate for the deficiencies of the media}.

Write/erase cycle endurance for solid-state storage is specified in many ways by many different vendors. Some specify the endurance at the physical block level, while others specify at the logical block level. Still others specify it at the card or drive level. Since endurance is also related to data retention, endurance can be specified at a higher level if the data retention specification is lower. For these reasons, it is often difficult to make an "apples to apples" comparison of write/erase endurance by solely relying on these numbers in a datasheet.

A better way to judge endurance is to break the specification down into the main components that affect the endurance calculation:

1. Storage Media
2. Wear Leveling Algorithm
3. Error Correction Capabilities

Other factors that affect endurance include the amount of spare sectors available and whether or not the write is done using a file system or direct logical block addressing. While these issues can contribute to the overall endurance calculation, their effects on the resulting number is much lower than the three parameters above. Each of those factors will be examined individually, assuming ten-year data retention.

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STORAGE MEDIA

The scope of this white paper is confined to non-volatile storage – systems that do not lose their data when the power is turned off. The dominant technology for non-volatile solid-state storage is NAND flash. While NOR flash is also a possible solution, implementation of NOR technology is generally confined to applications like cell phones that require the functionality of DRAM, boot PROM and storage component in a single chip. The economies of scale and component densities of NAND relative to NOR make it the ideal solution for non-volatile, solid-state storage subsystems.

The two dominant NAND technologies available today are SLC (single-level cell, sometimes called binary) and MLC (multi-level cell). SLC technology stores one bit per cell and MLC stores two bits. A comparison of SLC and MLC is shown in figure 1.

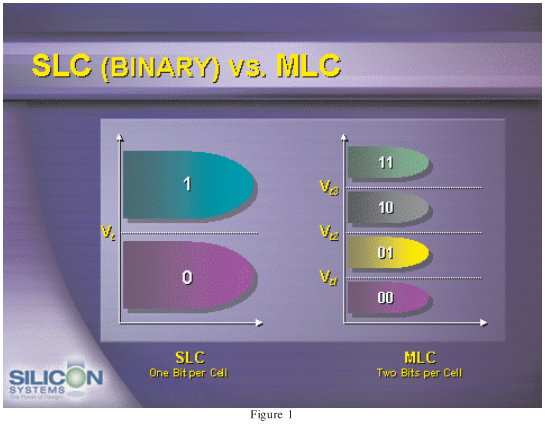

Figure 1

SLC NAND is generally specified at 100,000 write/erase cycles per block with 1-bit ECC (this is explained below). MLC NAND is specified at 10,000 write/erase cycles per block with ECC. The MLC datasheet does not specify a number of bits of ECC required. Therefore, when using the same controller, a storage device using SLC will have an endurance value roughly 10x that of a similar MLC-based product. In order to achieve maximum endurance, capacity and speed, SiliconSystems currently uses SLC NAND in our SiliconDrive technology.

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A more thorough discussion of SLC vs. MLC can be found from the component manufacturers:
Samsung: http://www.samsung.com
Toshiba: http://www.toshiba.com

WEAR LEVELING

Wear leveling is defined as the allowing data writes to be evenly distributed over the entire storage device. More precisely, wear leveling is an algorithm by which the controller in the storage device re-maps logical block addresses to different physical block addresses in the solid-state storage array. The frequency of this re-map, the algorithm to find the "least worn" area to which to write and any data swapping capabilities are generally considered proprietary intellectual property of the controller vendor.

It is important to note that the wear leveling is done in the solid-state memory controller and is independent of the host system. The host system performs its reads and writes to logical block addresses only, so as far as the host is concerned, the data stays in the same place.

To illustrate the effects of wear leveling on overall endurance, assume three different storage devices with the following characteristics:

1. Flash Card with No Wear Leveling
2. Flash Card with Dynamic Wear Leveling
3. SiliconDrive with Static Wear Leveling

In addition, assume that all three storage devices use the same solid-state storage technologies (SLC or MLC – for purposes of this discussion, it doesn't matter). All three devices will have 75% of the capacity as static data, which is defined below:

Static Data: Any data on a solid-state storage device that does not change. Examples include: operating system files, look-up tables and executable files.

Finally, the same type of write is performed to all three systems. The host system is writing a single block of data to the same logical block address over and over again.

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No Wear Leveling

Figure 2 shows a normalized distribution of writes to a flash card that does not use wear leveling. In this instance, the data gets written to the same physical block. Once that physical block wears out and all spare blocks are exhausted (see discussion below), the device ceases to operate, even though only a small percentage of the card was used.

In this instance, the endurance of the card is only dependent on the type of flash used and any error correction capabilities in excess of one byte per sector. Early flash cards did not use wear leveling and thus failed in write-intensive applications. For this reason, flash cards with no wear leveling are only useful in consumer electronic applications.

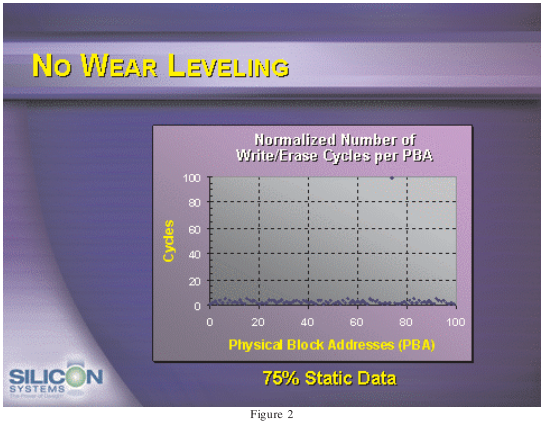

Figure 2

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Dynamic Wear Leveling

Figure 3 shows a normalized distribution of writes to a flash card that employs dynamic wear leveling. This algorithm only wear levels over "free" or "dynamic" data areas. That is to say, if there is static data as defined above, this area is never involved in the wear leveling process. In the current example, since 75% of the flash card is used for static data, only 25% of the card is available for wear leveling. The endurance of the card is calculated to be 25 times better than for the card with no wear leveling, but only one-fourth that of static wear leveling.

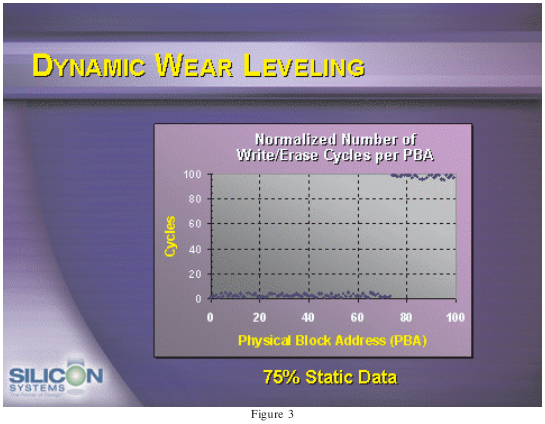

Figure 3

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Static Wear Leveling

Figure 4 shows a normalized distribution of writes to a SiliconDrive that employs static wear leveling. This algorithm evenly distributes the data over the entire SiliconDrive. The algorithm searches for the least-used physical blocks and writes the data to that location. If that location is empty, the write occurs normally. If that location contains static data, the static data is moved to a more heavily-used location prior to the new data being written. The endurance of the SiliconDrive is calculated to be 100 times better than for the card with no wear leveling and four times the endurance of the card that uses dynamic wear leveling.

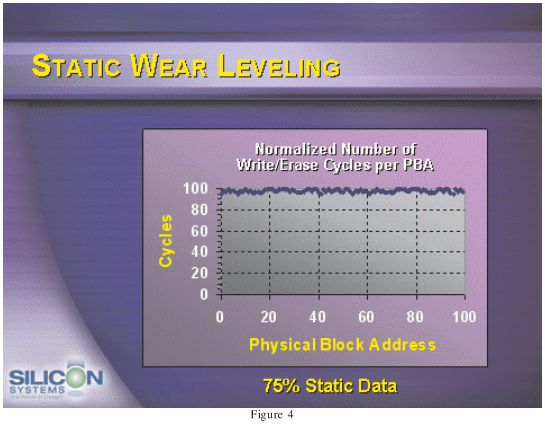

Figure 4

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ERROR CORRECTION

Part of the solid-state memory components specification is related to error correction. For example, SLC NAND components are specified at 100,000 write/erase cycles with one-bit ECC. It goes to reason that the specification increases with a better error correction algorithm. Most flash cards employ error correction algorithms ranging from two-bit to four-bit correction. SiliconSystems' SiliconDrive technology uses six-bit correction.

The term six-bit correction may be slightly confusing. Six-bit correction really defines the capability of correcting up to six bytes in a 512-byte sector. Since a byte is eight bits, this really means the SiliconDrive can correct 48 bits as long as those bits are confined to six bytes in the sector. The same definition holds for two-bit and four-bit correction.

The relationship between the number of bytes per sector the controller can correct does not appear to be directly proportional to the overall endurance, since the bit error rate of the NAND flash is not linear. To state it another way, six-bit error correction is not necessarily three times better than two-bit ECC. In most cases, it is significantly better than that.

SUMMARY OF MEDIA, WEAR LEVELING AND ECC

The matrix below summarizes the effects of the different items discussed above. In the table, a "1" indicates the best possible scenario, and a "10" indicates the least desirable in terms of endurance.

N = No Wear Leveling; D = Dynamic Wear Leveling; S = Static Wear Leveling

ECC	SLC NAND			MLC NAND		
	N	D	S	N	D	S
2-bit	6	5	4	10	9	8
4-bit	5	4	2	9	8	7
6-bit	4	3	1*	8	7	6

= SiliconSystems' SiliconDrive Configuration

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ENDURANCE CALCULATIONS

To get an idea of how long a solid-state storage device will last in an application, the following calculations can be used. Note: These calculations are valid only for products that use either dynamic or static wear leveling. Use the solid-state memory component specifications for products that do not use wear leveling.

To calculate the expected life in years a product will last:

$$\text{Years} = \frac{(\alpha - \beta) \times \lambda \times (1 - \varphi)}{(\omega \times \xi) \times k}$$

Where:

- α = Capacity in MB (when converting from MB to GB, MB = GB x 1,024)
- β = Amount of Static Data in MB (this value should be 0 for static wear leveling)
- λ = Endurance Specification
- φ = Safety Margin
- ω = File Size in MB (when converting from KB to MB, KB = MB x 1,024)
- ξ = Number of Writes of file size ω per minute
- k = Number of minutes per year = 525,600

To calculate the number of data transactions:

$$\text{Transactions} = \frac{(\alpha - \beta) \times \lambda \times (1 - \varphi)}{\omega}$$

Where:

- α = Capacity in MB (when converting from MB to GB, MB = GB x 1,024)
- β = Amount of Static Data in MB (this value should be 0 for static wear leveling)
- λ = Endurance Specification
- φ = Safety Margin Percentage (usually 25%)
- ω = File Size in MB (when converting from KB to MB, KB = MB x 1,024)

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8. USB Media Drive 5MD900.USB2-00

Figure 302: USB Media Drive 5MD900.USB2-00

8.1 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 8.8 "Front cover 5A5003.03 for the USB Media Drive" on page 622)

8.2 Technical data

Information:

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

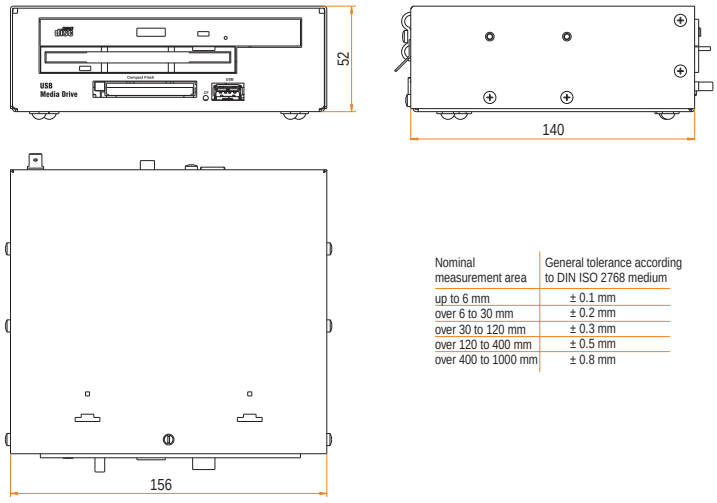
Features - entire device	5MD900.USB2-00
Transfer rate	Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)
Maximum cable length	5 m (not including hub)
Power supply Rated voltage	 24 VDC ± 25%
Features - diskette drive	
Data capacity	720 KB / 1.25 MB / 1.44 MB (formatted)
Data transfer rate	250 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)
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/sec.
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 404: 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 Storage Transport	 +5°C .. +45°C -20°C .. +60°C -40°C .. +60°C
Environmental characteristics	
Relative humidity Operation Storage Transport	 20 - 80%, non-condensing 5 - 90%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage 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 404: Technical data - USB Media Drive 5MD900.USB2-00 (cont.)

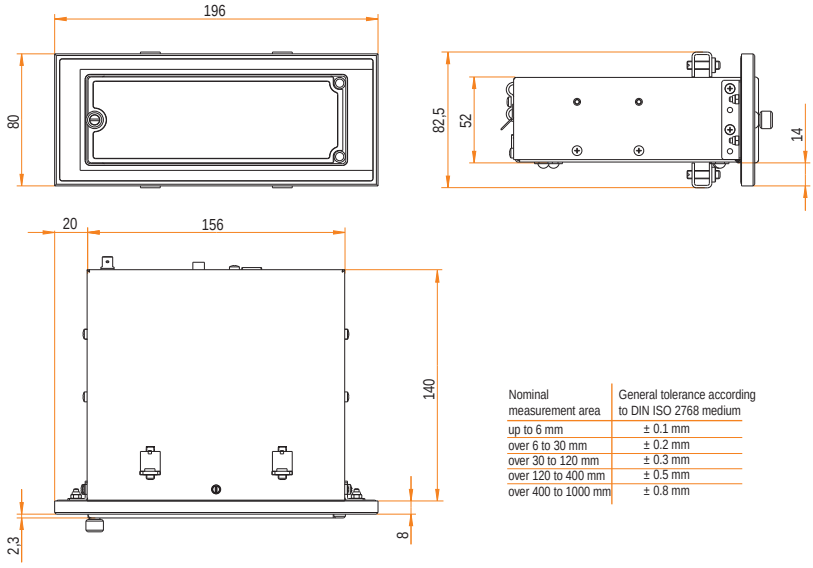
8.3 Dimensions



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

8.4 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

8.5 Contents of delivery

Amount	Component
1	USB Media Drive complete unit
2	Mounting rail brackets

Table 405: Contents of delivery - USB Media Drive 5MD900.USB2-00

8.6 Interfaces

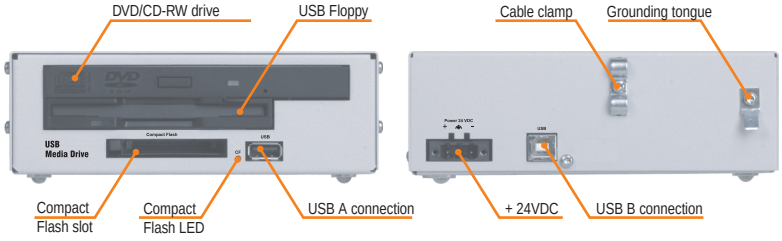


Figure 305: Interfaces for USB Media Drive 5MD900.USB2-00

8.7 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).

8.7.1 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.

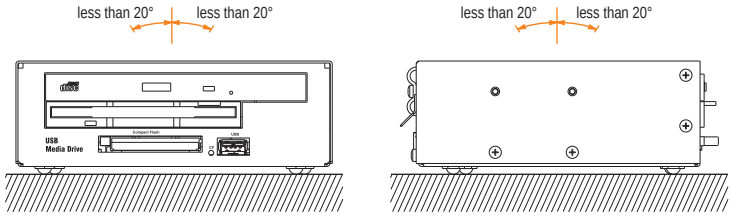


Figure 306: Mounting orientation of USB Media Drive 5MD900.USB2-00

8.8 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.

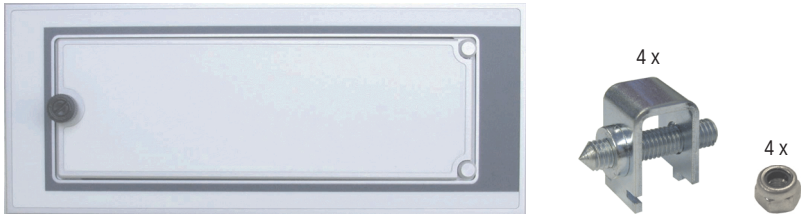


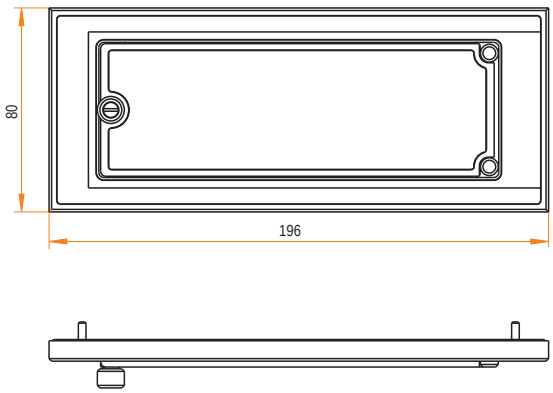
Figure 307: Front cover 5A5003.03

8.8.1 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 406: Technical data - 5A5003.03

8.8.2 Dimensions



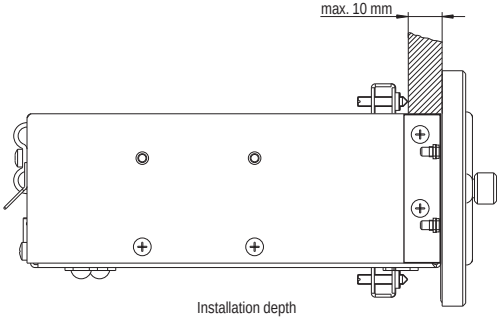
Nominal measurement area	General tolerance according to DIN ISO 2768 medium
up to 6 mm	± 0.1 mm
over 6 to 30 mm	± 0.2 mm
over 30 to 120 mm	± 0.3 mm
over 120 to 400 mm	± 0.5 mm
over 400 to 1000 mm	± 0.8 mm

Figure 308: Dimensions - 5A5003.03

8.8.3 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

9. USB Media Drive - 5MD900.USB2-01

Figure 310: USB Media Drive - 5MD900.USB2-01

9.1 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 9.8 "Front cover 5A5003.03 for the USB Media Drive" on page 629)

9.2 Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from those 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 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)
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/sec.
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 407: 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 Storage Transport	 +5°C .. +45°C -20°C .. +60°C -40°C .. +60°C

Table 407: Technical data - USB Media Drive 5MD900.USB2-01 (cont.)

Environmental characteristics	5MD900.USB2-01
Relative humidity Operation Storage Transport	 20 - 80 %, non-condensing 5 - 90 %, non-condensing 5 - 95 %, non-condensing
Vibration Operation Storage 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 407: Technical data - USB Media Drive 5MD900.USB2-01 (cont.)

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.

9.3 Dimensions

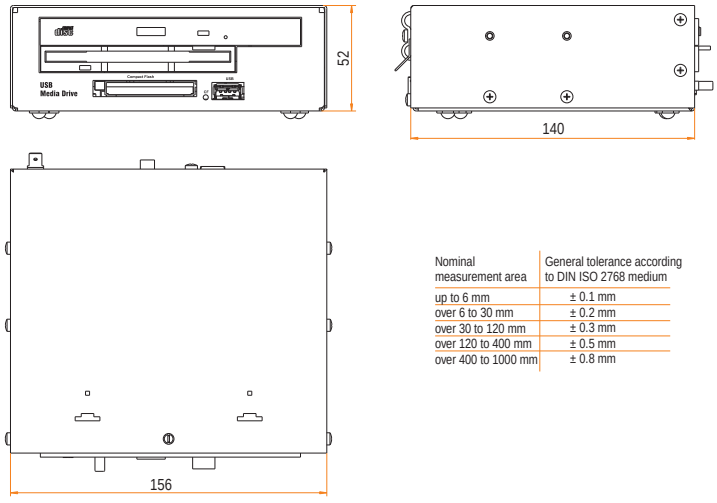
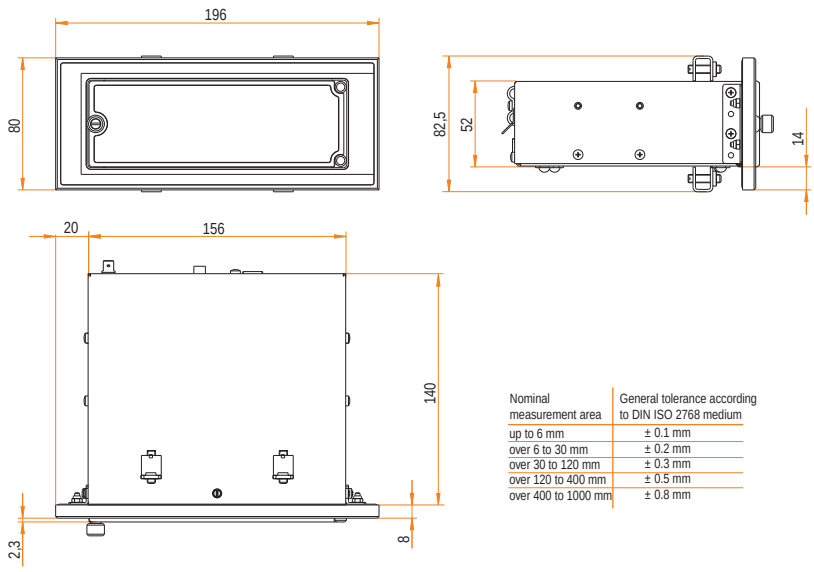


Figure 311: Dimensions - 5MD900.USB2-01

9.4 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

9.5 Contents of delivery

Amount	Component
1	USB Media Drive complete unit
2	Mounting rail brackets

Table 408: Contents of delivery - USB Media Drive - 5MD900.USB2-01

9.6 Interfaces

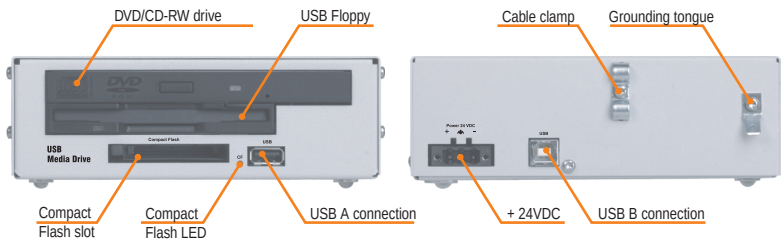


Figure 313: Interfaces - 5MD900.USB2-01

9.7 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).

9.7.1 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.

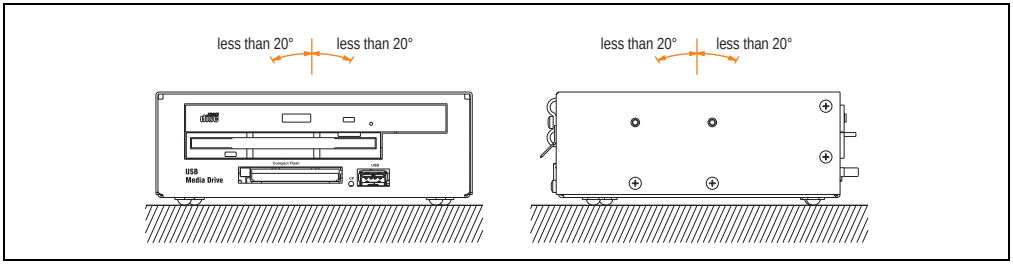


Figure 314: Mounting orientation - 5MD900.USB2-01

9.8 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.

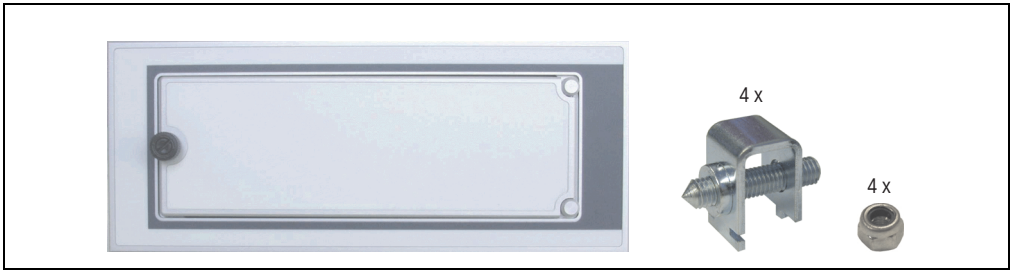


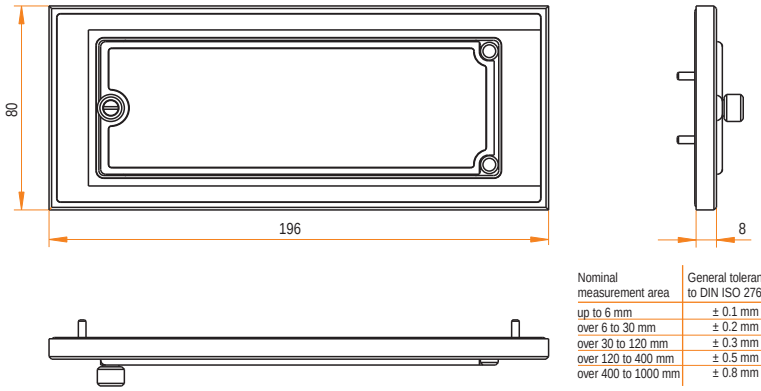
Figure 315: Front cover 5A5003.03

9.8.1 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 409: Technical data - 5A5003.03

9.8.2 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

9.8.3 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.

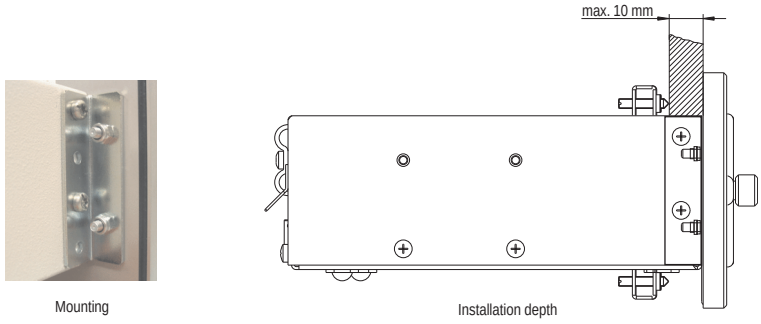


Figure 317: Front cover mounting and installation depth

10. USB Flash Drive 5MMUSB.0xxx-00

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. As a result, the following measures may be necessary (e.g. using the SanDisk Cruzer Micro flash drive with 512 MB) to take the following measures in order to boot from these flash drives:

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

10.1 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. Only USB flash drives from the memory specialists SanDisk are used.

10.2 Order data

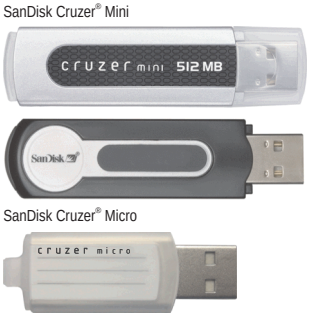
Model number	Description	Figure
5MMUSB.0128-00	USB flash drive 128 MB SanDisk Cruzer Mini	
5MMUSB.0256-00	USB flash drive 256 MB SanDisk Cruzer Mini	
5MMUSB.0512-00	USB flash drive 512 MB SanDisk Cruzer Mini up to Rev. E0 or Cruzer Micro starting with Rev. E0	
5MMUSB.1024-00	USB flash drive 1 GB SanDisk Cruzer Mini up to Rev. C0 or Cruzer Micro starting with Rev. C0	
5MMUSB.2048-00	USB flash drive 2 GB SanDisk Cruzer Micro	

Table 410: Order data - USB flash drives

10.3 Technical data

Information:

The following characteristics, features and limit values only apply to this accessory and can deviate from 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 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, 98SE[1)] , 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 Micro Operation Storage Transport	0°C .. +45°C -20°C .. +60°C -20°C .. +60°C				
Humidity Cruzer Mini / Cruzer Micro Operation Storage Transport	10% .. 90%, non-condensing 5% .. 90%, non-condensing 5% .. 90%, non-condensing				
Vibration Cruzer Mini / Cruzer Micro Operation Storage Transport	At 10 - 500 Hz: 2 g (19.6 m/s^2 0 peak), oscillation rate 1/minute At 10 - 500 Hz: 4 g (39.2 m/s^2 0 peak), oscillation rate 1/minute At 10 - 500 Hz: 4 g (39.2 m/s^2 0 peak), oscillation rate 1/minute				

Table 411: Technical data - USB flash drive 5MMUSB.xxxx-00

Features	5MMUSB.0128-00	5MMUSB.0256-00	5MMUSB.0512-00	5MMUSB.1024-00	5MMUSB.2048-00
Shock Cruzer Mini / Cruzer Micro Operation Storage Transport	 Max. 40 g (392 m/s^2 0-peak) and 11 ms length Max. 80 g (784 m/s^2 0-peak) and 11 ms length Max. 80 g (784 m/s^2 0-peak) and 11 ms length				
Altitude Cruzer Mini / Cruzer Micro Operation Storage Transport	 3048 meters 12,192 meters 12,192 meters				

Table 411: Technical data - USB flash drive 5MMUSB.xxxx-00 (cont.)

1) For Win 98SE, a driver can be downloaded from the SanDisk homepage.

10.3.1 Temperature humidity diagram - Operation and storage

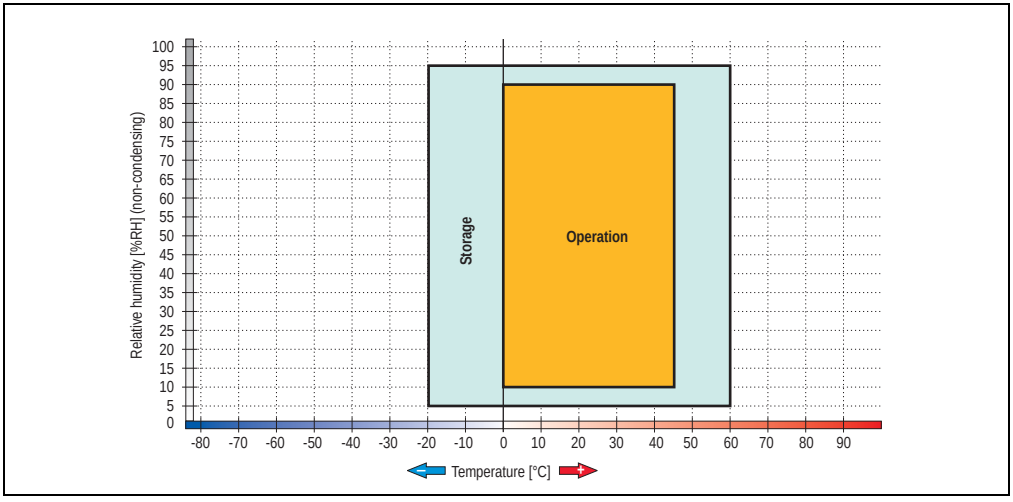


Figure 318: Temperature humidity diagram for flash drives 5MMUSB.xxxx-00

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).

10.4 Contents of delivery

SanDisk Cruzer Mini
1 USB flash drive in desired size + 1 strap 
SanDisk Cruzer Micro
1 USB flash drive in desired size + 2 replacement covers (blue and pink) + 1 strap[1)] 

Table 412: Contents of delivery - USB flash drives 5MMUSB.xxxx-00

1) Due to a change in the contents of delivery from the manufacturer, it is possible that the USB flash drive (with white cap) is delivered without the replacement covers or strap.

10.5 Creating a bootable USB flash drive

When used in connection with an Automation PC 620 / Panel PC 700, it is possible to boot the system from one of the flash drives available from B&R (5MMUSB.0128-00, 5MMUSB.0256-00, 5MMUSB.0512-00, 5MMUSB.1024-00, 5MMUSB.2048-00). The flash drive must be specially prepared for this.

10.5.1 Requirements

The following peripherals are required for creating a bootable flash drive:

- B&R USB flash drive (see model number "USB flash drives" on page 38)
- Automation PC 620 or Panel PC 700
- USB floppy drive (external or slide-in USB floppy 5AC600.FDDS-00)
- PS/2 or USB keyboard
- A start disk created using MS-DOS 6.22 or Windows 98 - 1.44MB HDD (Windows Millennium, NT4.0, 2000, XP start disks cannot be used).
  The tools "`format.com`" and "`fdisk.exe`" must be located on the diskette!

10.5.2 Procedure

- Plug in the flash drive and boot from the start disk.
- Set active partition on the flash drive using "`fdisk`" and follow the further instructions.
- Reboot the system from the start disk.
- Format and simultaneously transfer the system files to the flash drive with the command "`format c: /s`".

11. HMI Drivers & Utilities DVD 5SWHMI.0000-00

Figure 319: HMI Drivers & Utilities DVD 5SWHMI.0000-00

Model number	Short description	Comment
5SWHMI.0000-00	**HMI Drivers & Utilities DVD**	

Table 413: 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 – Industrial PCs, Visualization and Operation).
Information in detail:

BIOS upgrades for the products

- Automation PC 620
- Panel PC 700
- Automation PC 680
- Provit 2000 product family - IPC2000/2001/2002
- Provit 5000 product family - IPC5000/5600/5000C/5600C
- Power Panel 100 BIOS devices
- Mobile Panel 100 BIOS devices
- Power Panel 100 / Mobile Panel 100 user boot logo
- Power Panel 100 / Mobile Panel 100 REMHOST utility

Drivers for the devices

- Automation Device Interface (ADI)
- Audio
- Chipset
- CD-ROM
- LS120
- Graphics
- Network
- PCI RAID controller
- Touch screen
- Touchpad
- Interface board

Updates

- Firmware upgrades (e.g. MTCX, SMXC)

Utilities/Tools

- Automation Device Interface (ADI)
- Miscellaneous
- MTC utilities
- Key editor
- MTC & Mkey utilities
- Mkey utilities
- UPS configuration software
- ICU ISA configuration
- Intel PCI NIC boot ROM
- Diagnostics
- CompactFlash lifespan calculation for Silicon Systems CompactFlash cards 5CFCRD.xxxx-03

Windows and embedded operating systems

- Thin client
- Windows CE
- Windows NT Embedded
- Windows XP Embedded

MCAD templates for

- Industrial PCs
- Visualization and operating devices
- Legend strip templates

Documentation for

- B&R Windows CE
- Automation PC 620
- Automation PC 680
- Automation Panel 900
- Panel PC 700
- Power Panel 15/21/35/41
- Power Panel 100/200
- Provit 2000
- Provit 3030
- Provit 4000
- Provit 5000
- Provit Benchmark
- Provit Mkey
- Windows NT Embedded application guide
- Windows XP Embedded application guide
- Uninterruptible power supply

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)

12. Cables

12.1 DVI cable 5CADVI.0xxx-00

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

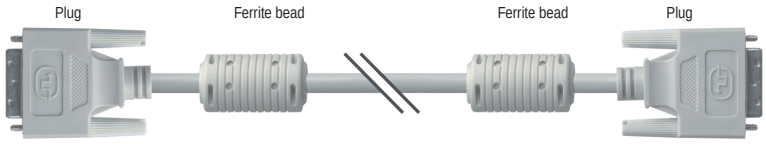


Figure 320: DVI extension cable (similar)

Caution!

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

12.1.1 Order data

Model number	Description	Comment
5CADVI.0018-00	**DVI-D cable 1.8 m / single** Single cable, DVI-D/m:DVI-D/m; length: 1.8m	
5CADVI.0050-00	**DVI-D cable 5 m / single** Single cable, DVI-D/m:DVI-D/m; length: 5 m	
5CADVI.0100-00	**DVI-D cable 10 m / single** Single cable, DVI-D/m:DVI-D/m; length: 10 m	

Table 414: Model numbers - DVI cables

12.1.2 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. 237Ω/km		
Insulation resistance	Min. 100 MΩ/km		

Table 415: Technical data - DVI cable 5CADVI.0xxx-00

Features	5CADVI.0018-00	5CADVI.0050-00	5CADVI.0100-00
Flexibility	limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5 x cable diameter, 20 cycles / minute)		
Flex radius Fixed layout	See figure "Flex radius specification" on page 640 ≥ 5 x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)		
Weight	Approx. 300 g	Approx. 590 g	Approx. 2100 g

Table 415: Technical data - DVI cable 5CADVI.0xxx-00 (cont.)

12.1.3 Flex radius specification

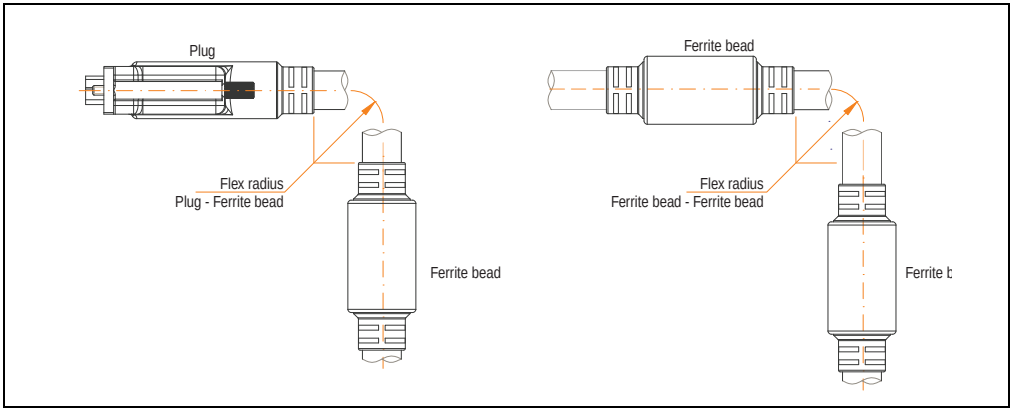


Figure 321: Flex radius specification

12.1.4 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.

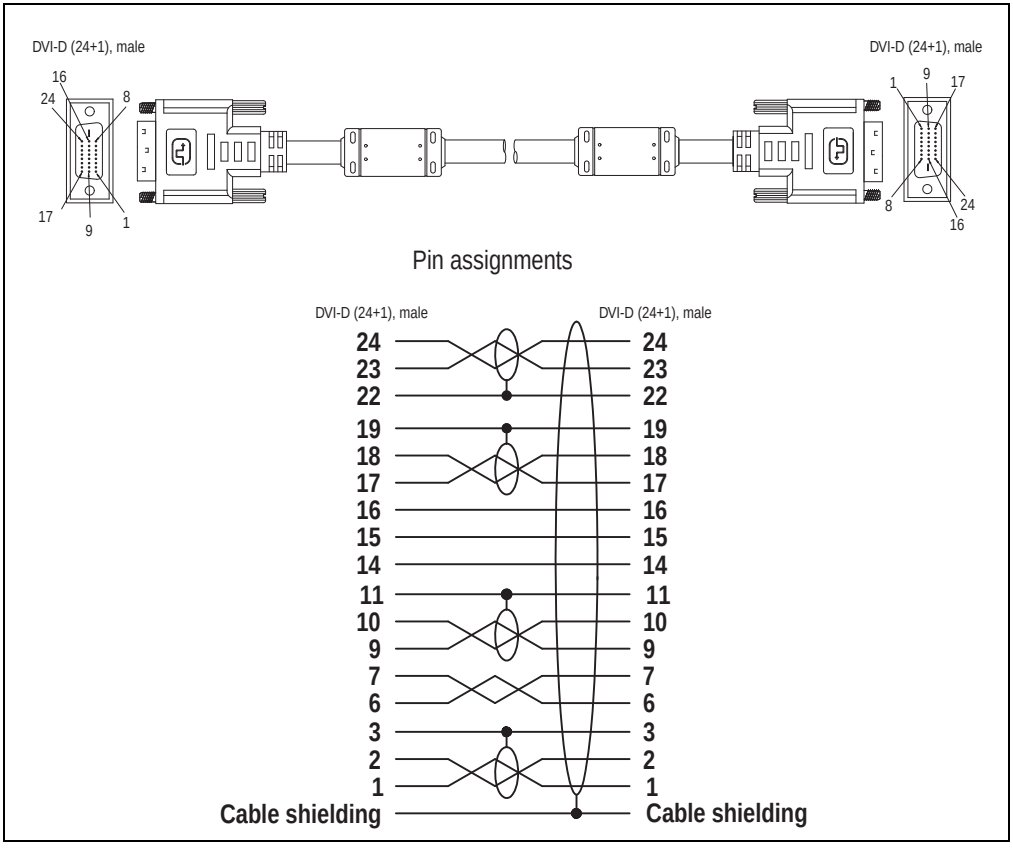


Figure 322: Pin assignments - DVI cable

12.2 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 738.

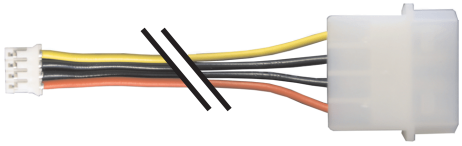


Figure 323: APC620 internal supply cable 5CAMSC.0001-00

12.2.1 Order data

Model number	Description	Comment
5CAMSC.0001-00	**APC620 internal supply cable**	

Table 416: Model number - APC620 internal supply cable

12.2.2 Technical data

Features	5CAMSC.0001-00
Length	100 mm ± 5 mm
Connector type	1x disk drive power plug 4-pin male, 1x plug housing 4-pin female
Wire cross section	AWG 22
Flexibility	Flexible

Table 417: Technical data - 5CAMSC.0001-00

12.3 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).

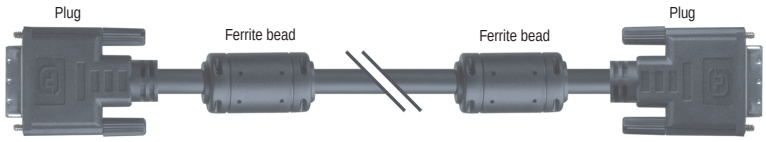


Figure 324: SDL extension cable (similar)

Caution!

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

12.3.1 Order data

Model number	Description	Comment
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 418: Model numbers - SDL cables

12.3.2 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. 237Ω/km		Max. 93Ω/km				
Insulation resistance	Min. 10 MΩ/km						
Flexibility	limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5 x cable diameter, 20 cycles / minute)						
Flex radius Fixed layout	See figure "Flex radius specification" on page 644 ≥ 5 x 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 419: Technical data - SDL cables 5CASDL.0xxx-00

12.3.3 Flex radius specification

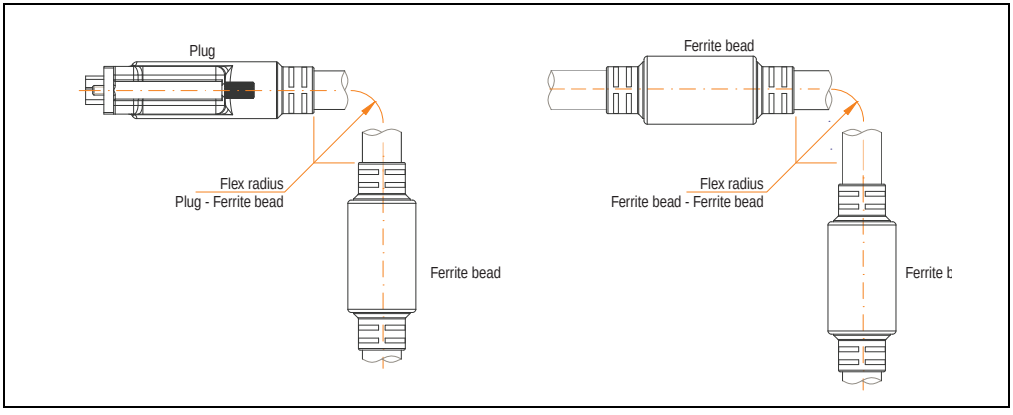


Figure 325: Flex radius specification

12.3.4 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.

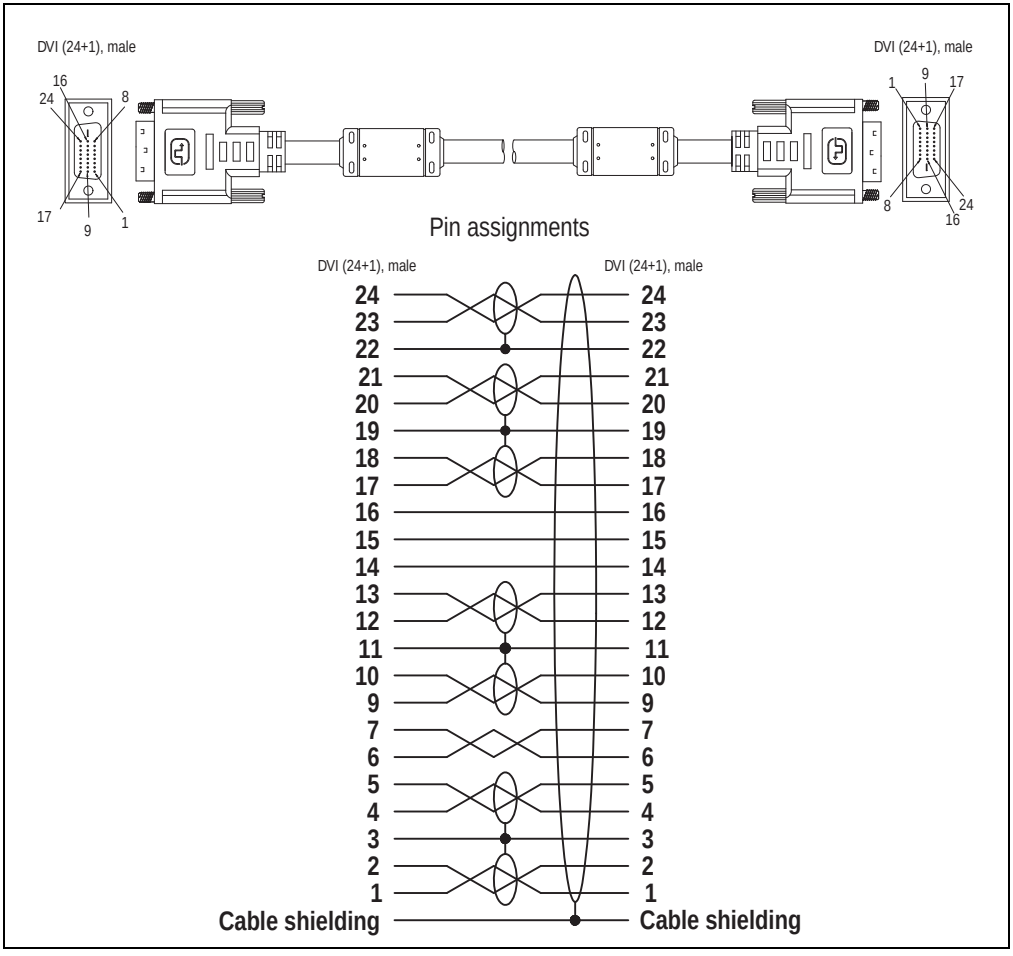


Figure 326: Pin assignments - SDL cable 5CASDL.0xxx-00

12.4 SDL cable with 45° plug 5CASDL.0xxx-01

The SDL cables 5CASDL.0xxx-01 are designed for fixed layout.

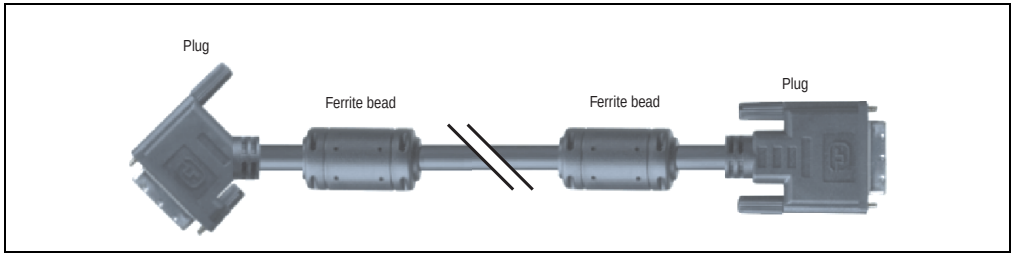


Figure 327: SDL cable with 45° plug (similar)

Caution!

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

12.4.1 Order data

Model number	Description	Comment
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 420: Model numbers - SDL cables with 45° plug

12.4.2 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. 237Ω/km		Max. 93Ω/km	
Insulation resistance	Min. 10 MΩ/km			
Flexibility	limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5 x cable diameter, 20 cycles / minute)			
Flex radius Fixed layout	See figure "Flex radius specification" on page 647 ≥ 5 x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)			
Weight	Approx. 300 g	Approx. 590 g	Approx. 2100 g	Approx. 3000 g

Table 421: Technical data - SDL cable with 45° plug 5CASDL.0xxx-01

12.4.3 Flex radius specification

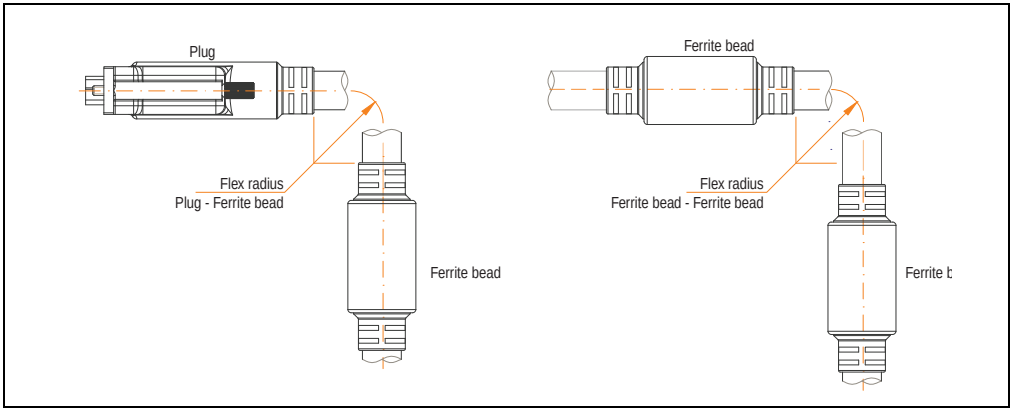


Figure 328: Flex radius specification

12.4.4 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.

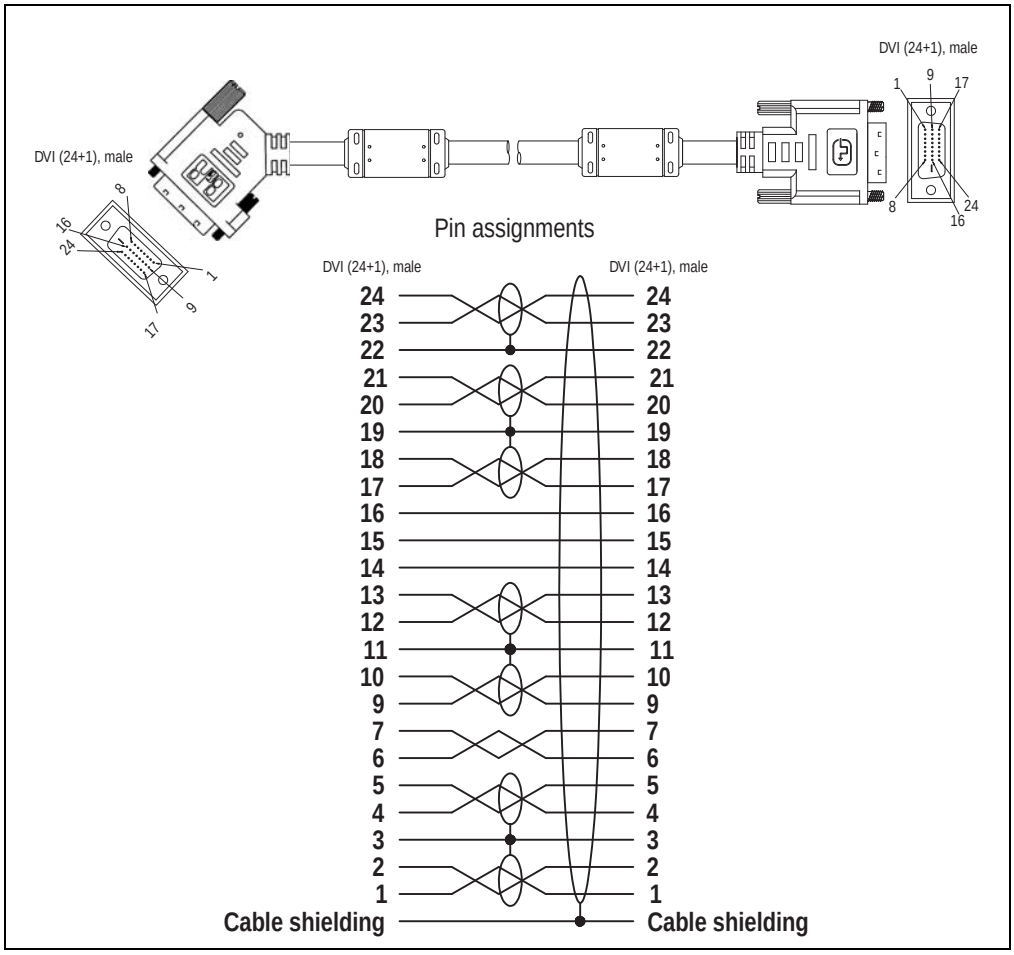


Figure 329: Pin assignments - SDL cable with 45° plug 5CASDL.0xxx-01

12.5 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).

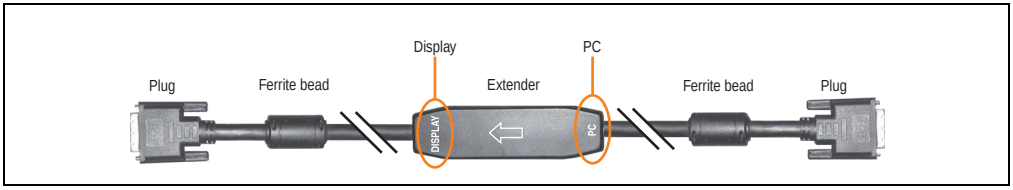


Figure 330: SDL cable with extender (similar)

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.

12.5.1 Order data

Model number	Description	Comment
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 422: Model numbers - SDL cable with extender

12.5.2 Technical data

Features	5CASDL.0300-10	5CASDL.0400-10
Length Tolerance	30 m ±200 mm	40 m ±200 mm
Dimensions of 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. 93Ω/km	
Insulation resistance	Min. 10 MΩ/km	
Flexibility	limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5 x cable diameter, 20 cycles / minute)	
Flex radius Fixed layout	See figure "Flex radius specification" on page 650 ≥ 5 x cable diameter (from plug - ferrite magnet and ferrite magnet - extender)	
Weight	Approx. 6100 g	Approx. 8100 g

Table 423: Technical data - SDL cable with extender 5CASDL.0x00-10

12.5.3 Flex radius specification

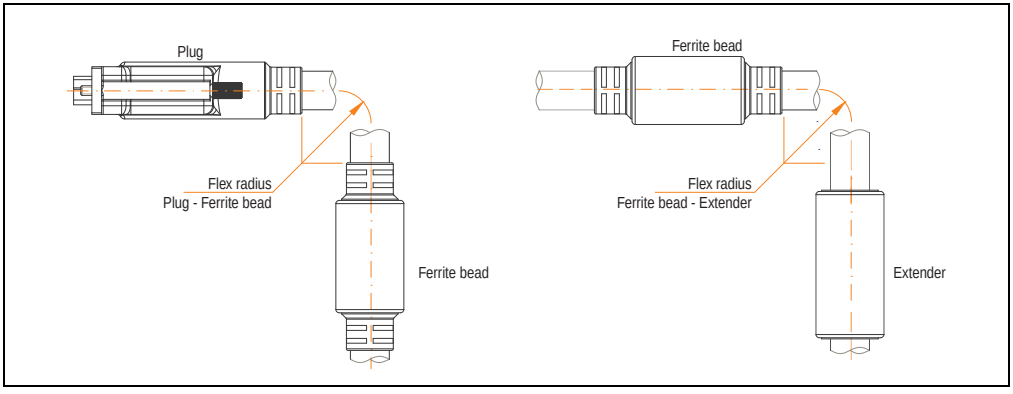


Figure 331: Flex radius specification

12.5.4 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.

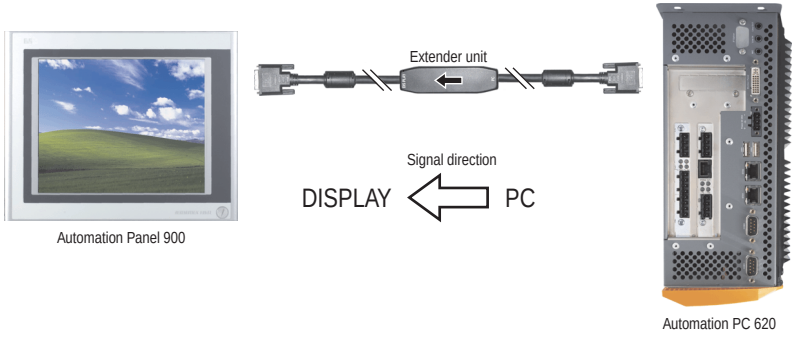


Figure 332: Example of the signal direction for the SDL cable with extender

12.5.5 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.

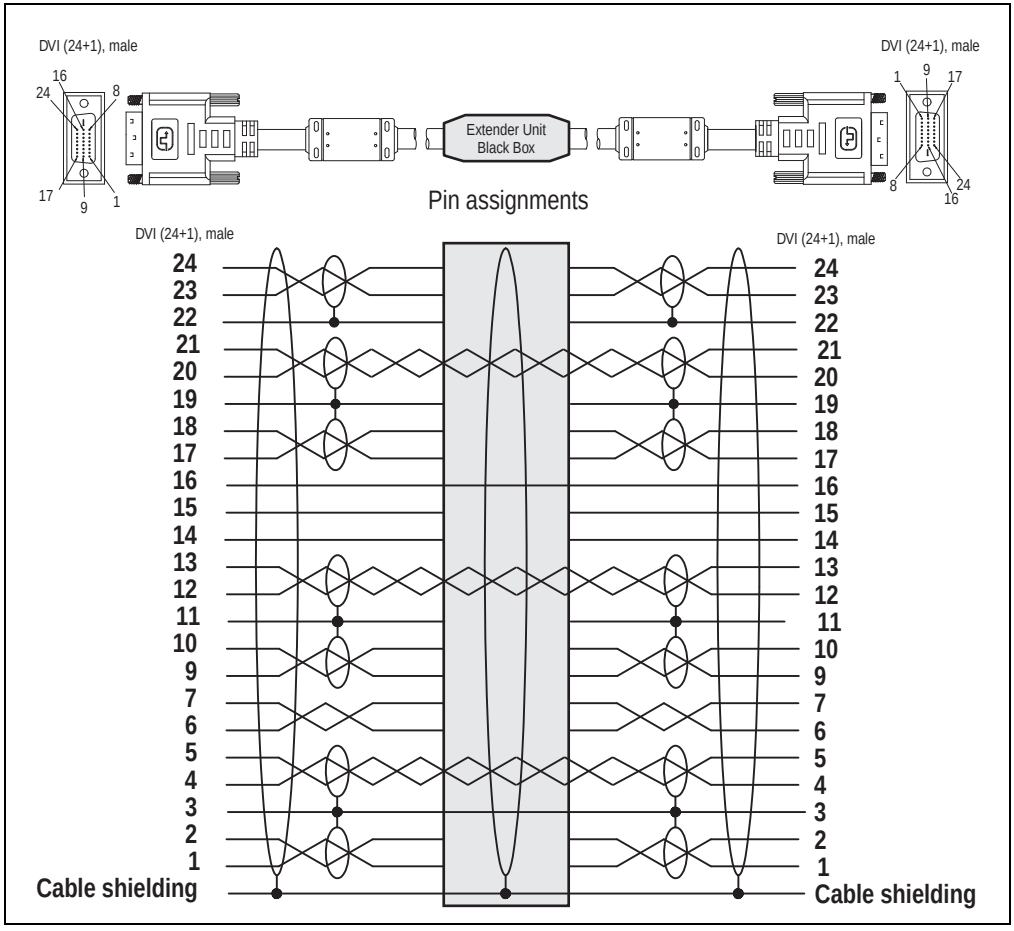


Figure 333: Pin assignments - SDL cable with extender 5CASDL.0x00-10

12.6 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).

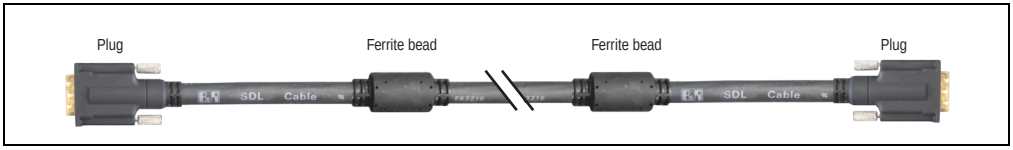


Figure 334: SDL cable 5CASDL.0xxx-03 (similar)

Caution!

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

12.6.1 Order data

Model number	Description	Comment
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 424: Model numbers - SDL cable 5CASDL.0xxx-03

12.6.2 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 ±230 mm	30 m ±280 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 shielding 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 15 x cable diameter, 4800 cycles / hour)						
Flex radius Fixed layout flexible installation	See figure "Flex radius specification" on page 655 ≥ 6 x cable diameter (from plug - ferrite magnet) ≥ 10 x cable diameter (from ferrite magnet - ferrite magnet) ≥ 15 x cable diameter (from 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 Storage	-20°C .. +80°C -5°C .. +60°C -20°C .. +80°C						
Standards and certifications							
Torsion load	100,000 cycles (tested angle of rotation: ± 85°; speed: 50 cycles / minute)						

Table 425: Technical data - SDL cable 5CASDL.0xxx-03

Cable drag chain	300,000 cycles Tested flex radius: 180 mm;15 x cable diameter; hub: 460 mm; speed: 4800 cycles / hour						
Standards and certifications	**5CASDL.0018-03**	**5CASDL.0050-03**	**5CASDL.0100-03**	**5CASDL.0150-03**	**5CASDL.0200-03**	**5CASDL.0250-03**	**5CASDL.0300-03**
Approbation	UL AWM 20236 80°C 30 V						
Oil and hydrolysis resistance	According to VDE 0282-10						

Table 425: Technical data - SDL cable 5CASDL.0xxx-03 (cont.)

12.6.3 Flex radius specification

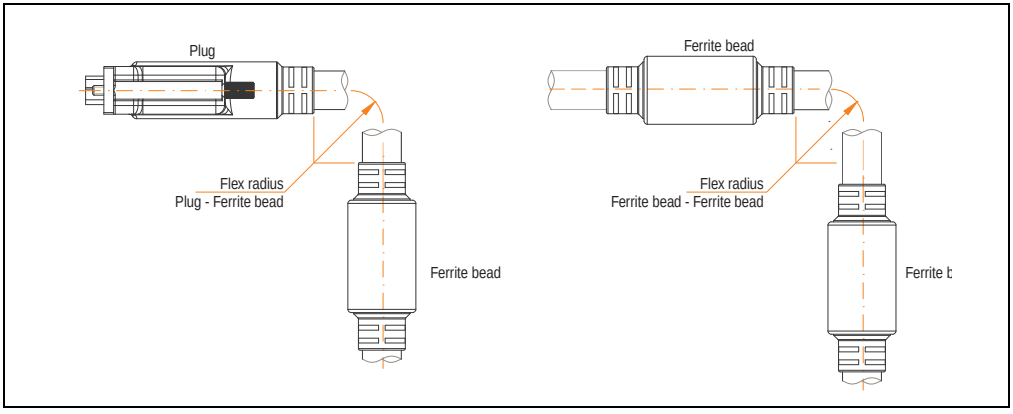


Figure 335: Flex radius specification

12.6.4 Dimensions

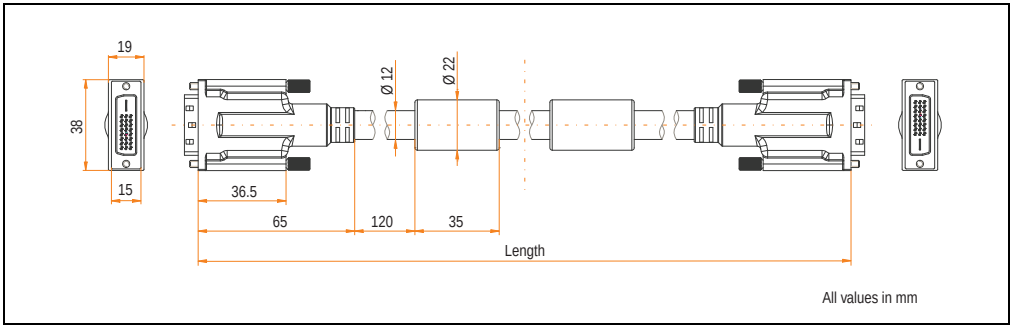


Figure 336: Dimensions - SDL cable 5CASDL.0xxx-03

12.6.5 Construction

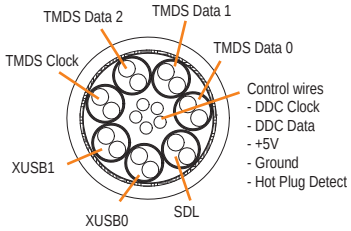
Element	Assignment	Cross section	
DVI	TMDS data 0	26 AWG	 Schematic display
	TMDS data 1	26 AWG	
	TMDS data 2	26 AWG	
	TMDS cycle	26 AWG	
USB	XUSB0	26 AWG	
	XUSB1	26 AWG	
Data	SDL	26 AWG	
Control wires	DDC cycle	24 AWG	
	DDC data	24 AWG	
	+ 5 V	24 AWG	
	mass	24 AWG	
	Hot Plug detect	24 AWG	

Table 426: Structure - SDL cable 5CASDL.0xxx-03

12.6.6 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.

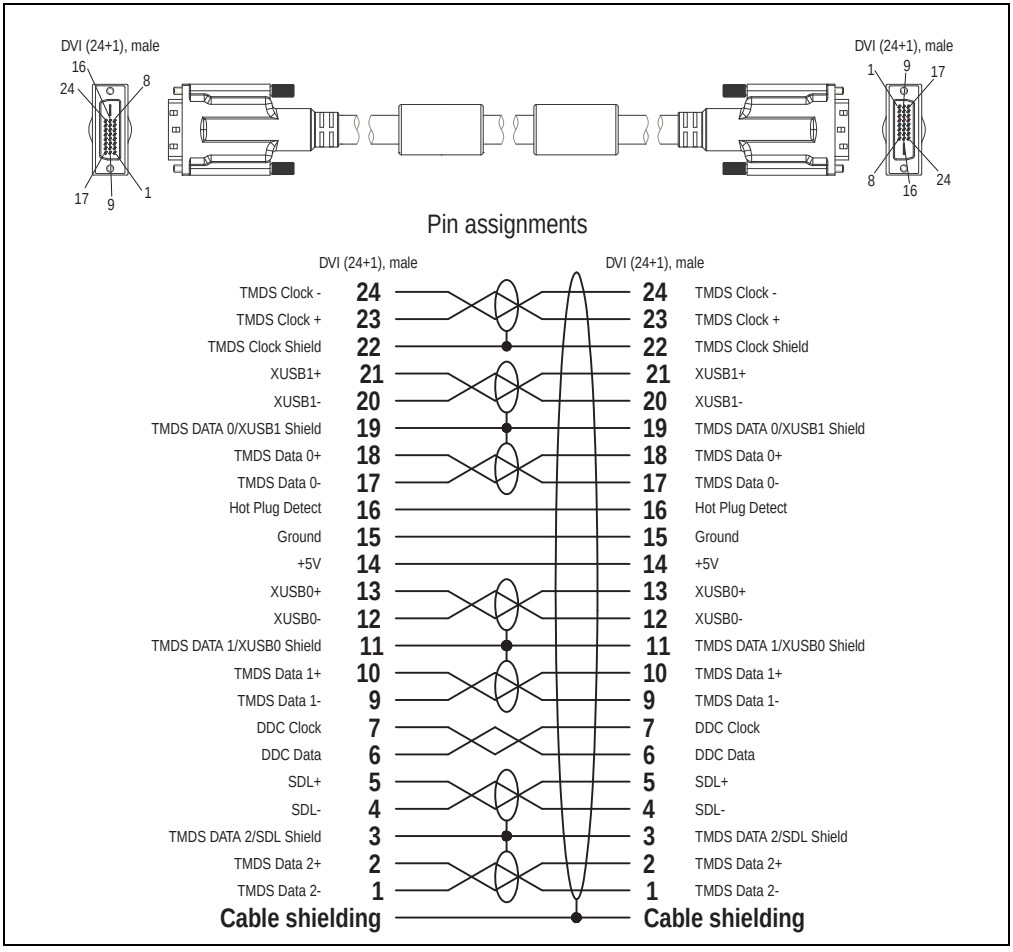


Figure 337: Pin assignments - SDL cable 5CASDL.0xxx-03

12.7 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).

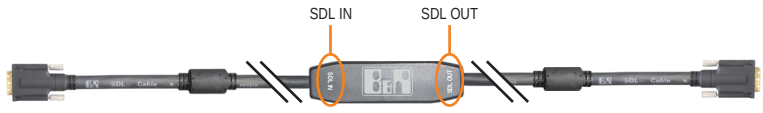


Figure 338: SDL flex cable with extender - 5CASDL.0x00-13 (similar)

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).

12.7.1 Order data

Model number	Description	Comment
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 427: Model numbers - SDL flex cable with extender

12.7.2 Technical data

Features	5CASDL.0300-13	5CASDL.0400-13
Length Tolerance	30 m ±200 mm	40 m ±200 mm
Dimensions of 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	

Table 428: Technical data - SDL flex cable with extender 5CASDL.0x00-13

Features	5CASDL.0300-13	5CASDL.0400-13
Materials Cable shielding 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 15 x cable diameter, 4800 cycles / hour)	
Flex radius Fixed layout flexible installation	See figure "Flex radius specification" on page 660 ≥ 6 x cable diameter (from plug - ferrite magnet) ≥ 10 x cable diameter (from ferrite magnet - extender) ≥ 15 x cable diameter (from 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 Storage	 -20°C .. +60°C -5°C .. +60°C -20°C .. +60°C	
Standards and certifications		
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;15 x 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 428: Technical data - SDL flex cable with extender 5CASDL.0x00-13 (cont.)

12.7.3 Flex radius specification

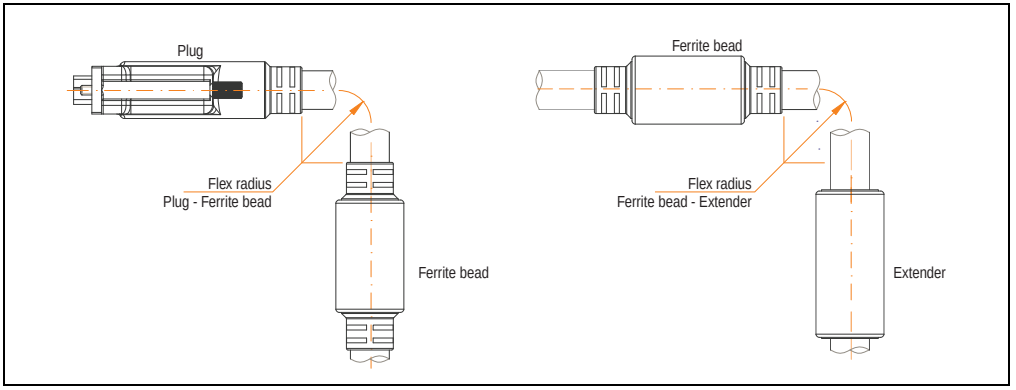


Figure 339: Flex radius specification

12.7.4 Dimensions

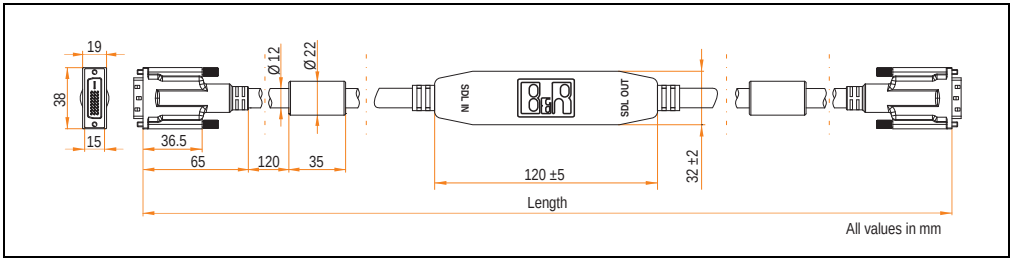


Figure 340: Dimensions - SDL flex cable with extender 5CASDL.0x00-13

12.7.5 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).

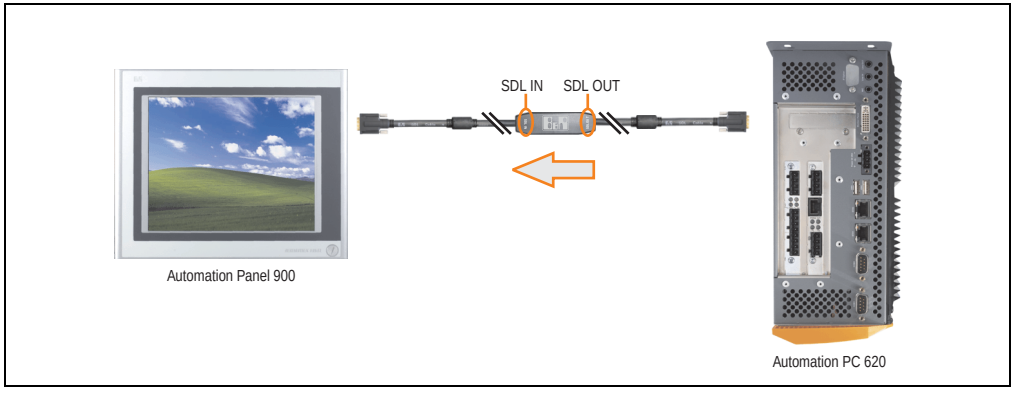


Figure 341: Example of the signal direction for the SDL flex cable with extender - APC620

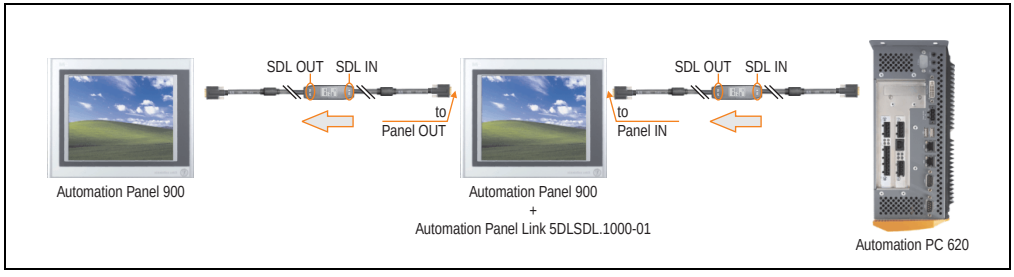


Figure 342: Example of the signal direction display - SDL flex cable with extender

12.7.6 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.

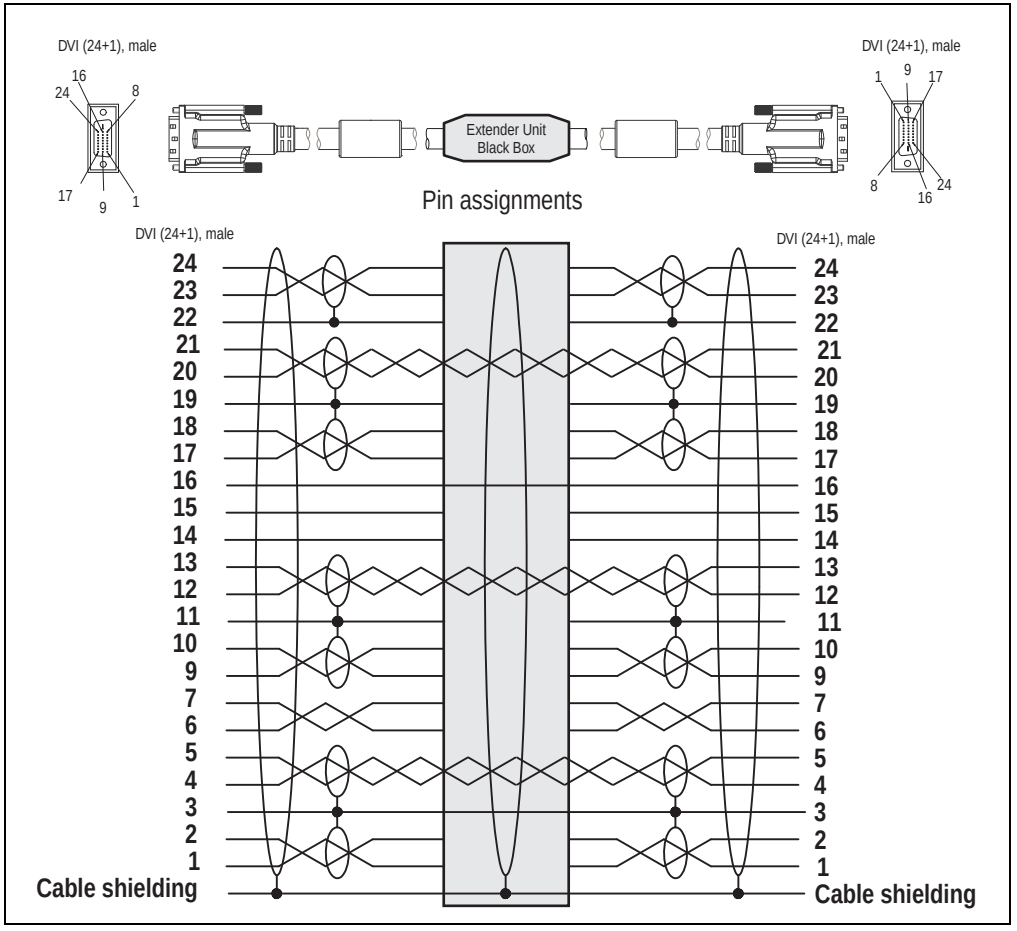


Figure 343: Pin assignments - SDL flex cable with extender 5CASDL.0x00-13

12.8 RS232 cable 9A0014-xx

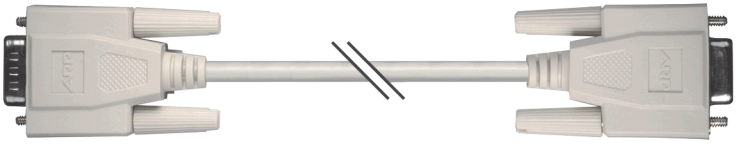


Figure 344: RS232 extension cable (similar)

12.8.1 Order data

Model number	Description	Comment
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 429: Model numbers - RS232 cables

12.8.2 Technical data

Features	9A0014.02	9A0014.05	9A0014.10
Length	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 430: Technical data - RS232 cables

12.8.3 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.

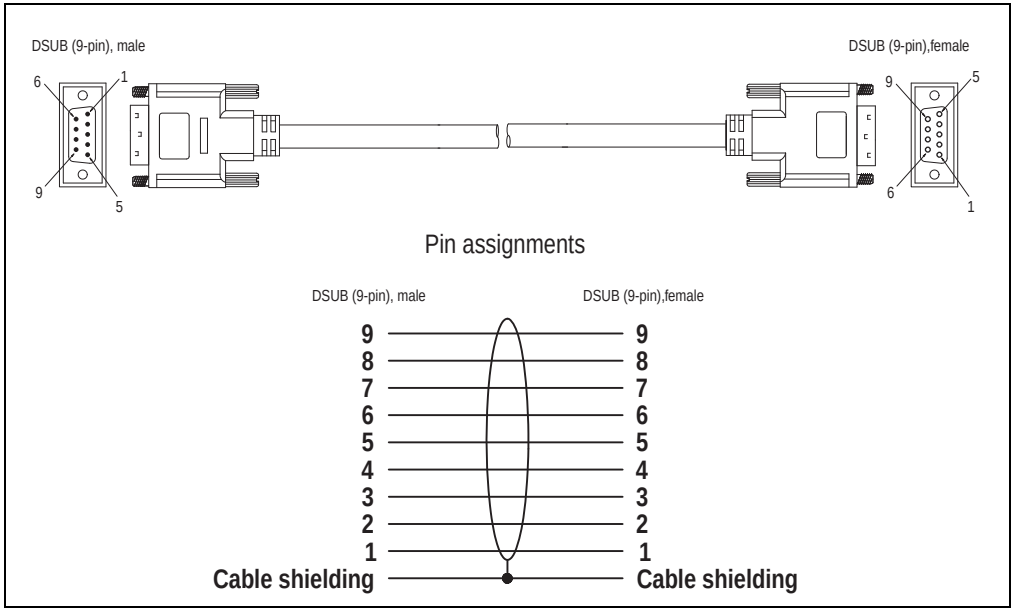


Figure 345: Pin assignments - RS232 cable

12.9 USB cable 5CAUSB.00xx-00

Figure 346: USB extension cable (similar)

12.9.1 Order data

Model number	Description	Comment
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 431: Model numbers - USB cables

12.9.2 Technical data

Features	5CAUSB.0018-00	5CAUSB.0050-00
Length	1.8 m ± 30 mm	5 m ± 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 432: Technical data - USB cables

12.9.3 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.

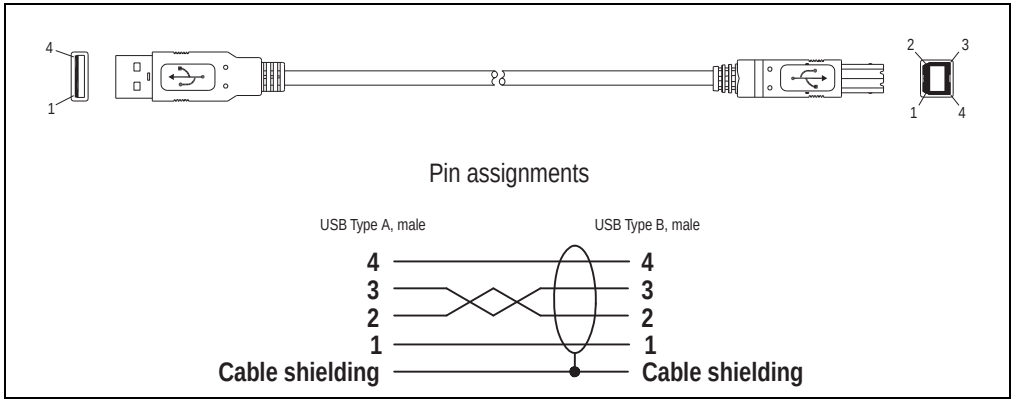


Figure 347: Pin assignments - USB cable

13. APC620 UPS

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:

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.

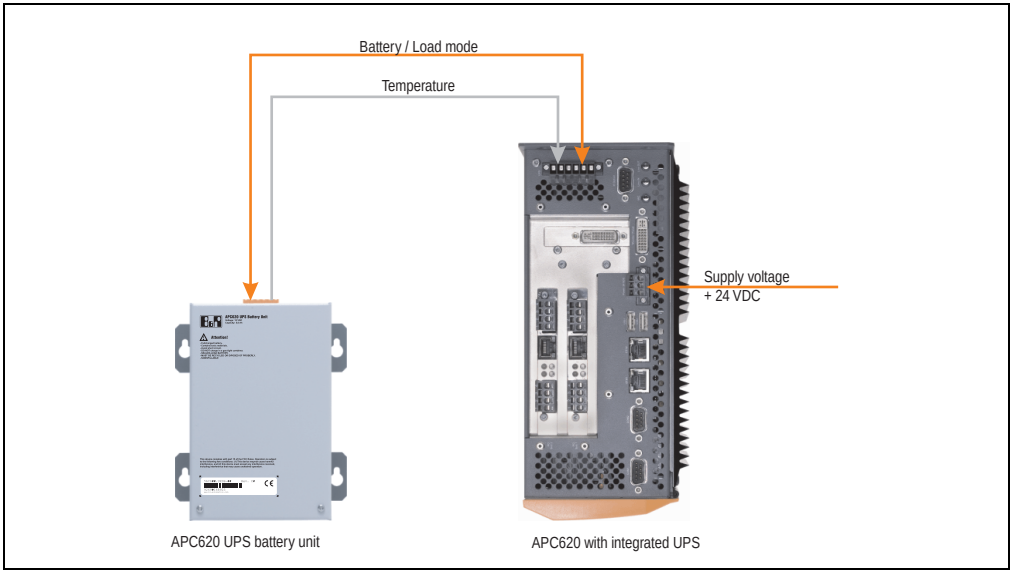


Figure 348: UPS principle

13.1 Features

- Long-lasting, maintenance-free rechargeable batteries
- Communication via integrated interfaces
- Temperature sensor
- Driver software
- Deep discharge protection

13.2 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 revision F0
5PC600.SX05-01	Starting with revision 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 433: 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 "Installation of the UPS module" on page 709.

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

Table 434: Firmware and software required for the UPS

Software name	Type	Version
MTCX FPGA[1)]	Firmware	1.18 or higher
ADI Control Center[1)]	Driver / Control Center	1.60 or later

Table 434: 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 1.7 "Upgrading the firmware" on page 518.

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.

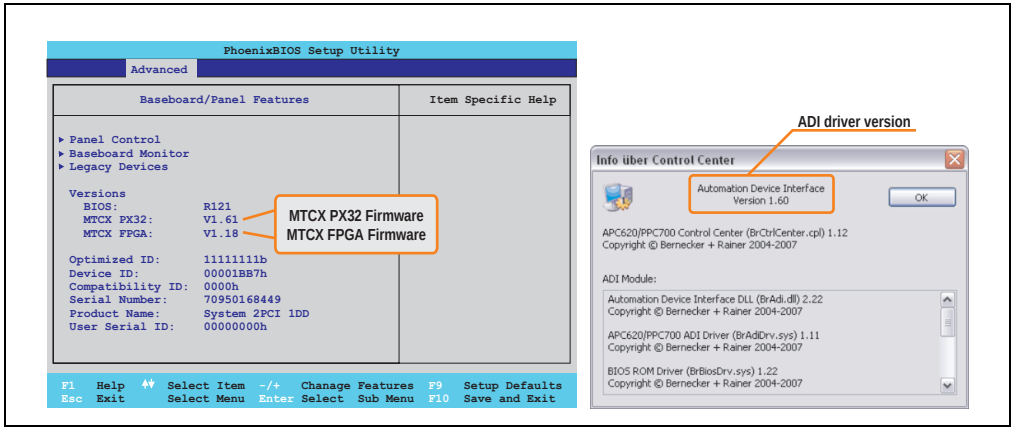


Figure 349: Firmware and software required for the UPS

The required firmware versions can be found in the APC620 / Panel PC firmware upgrade (MTCX, SDLR, SDLT) V1.16[1)] .

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 7.3 "UPS configuration" on page 554.

1) The software can be downloaded from the B&R homepage (www.br-automation.com).

13.3 Individual components

13.3.1 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 668).

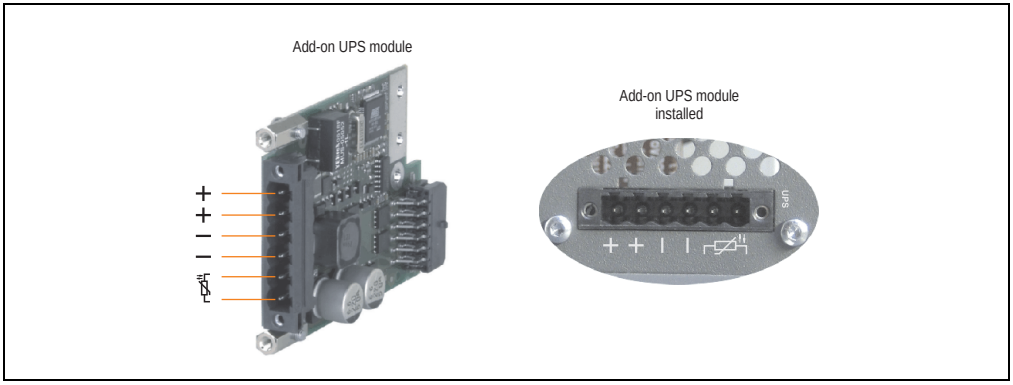


Figure 350: Add-on UPS module 5AC600.UPSI-00

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 of the battery unit
Short circuit protection	No
Power requirements	Max. 7.5 watts
Status indicators	Via the ADI Control Center (see section "UPS configuration" on page 554)
Parameter settings	Via the ADI Control Center (see section "UPS configuration" on page 554)

Table 435: Technical data - 5AC600.UPSI-00

Installation

The module is installed using the materials included in the delivery. For installation instructions, see section "Installation of the UPS module" on page 709.

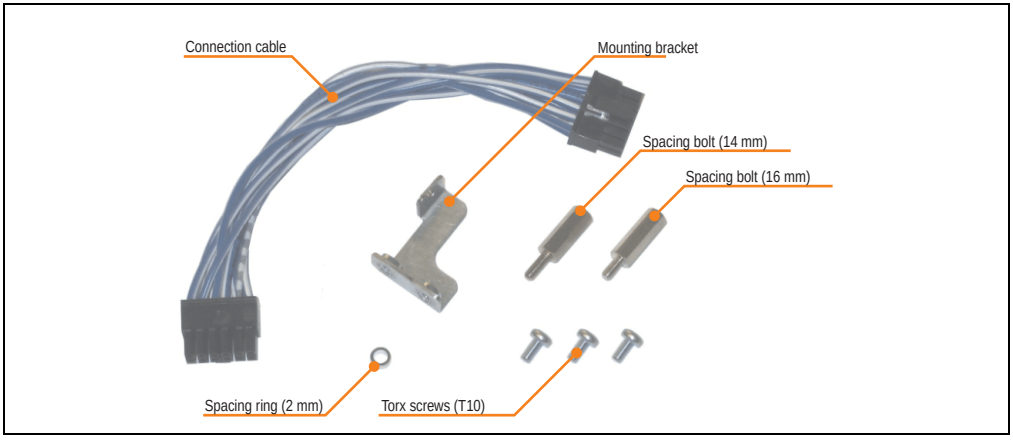


Figure 351: Add-on UPS module 5AC600.UPSI-00 - Installation materials

13.3.2 Battery unit 5AC600.UPSB-00

The battery unit is subject to wear and should be replaced regularly (at least following the specified lifespan).

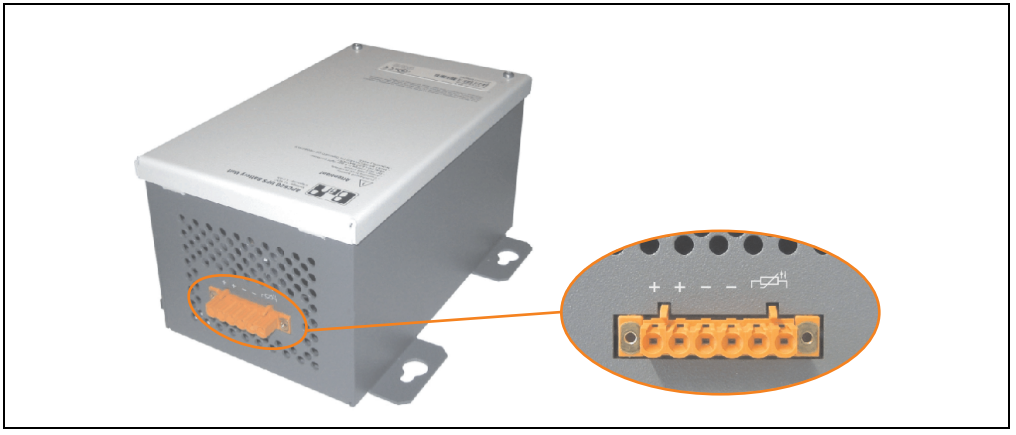


Figure 352: Battery unit 5AC600.UPSB-00

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 355 "Dimensions - 5AC600.UPSB-00" on page 674
Temperature sensor	NTC resistance
Weight	Approx. 3.2 kg
Ambient temperature Operation Storage Transport	 -40°C .. +80°C -65°C .. +80°C -65°C .. +80°C
Relative humidity Operation Storage Transport	 5 - 95% (non-condensing) 5 - 95% (non-condensing) 5 - 95% (non-condensing)
Altitude	Max. 3000 meters
Mounting instructions	See section "Mounting instructions" on page 675.
Lifespan	10 years at 25°C (up to 80% battery capacity)
Maintenance interval during storage	Load once every 6 months

Table 436: 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

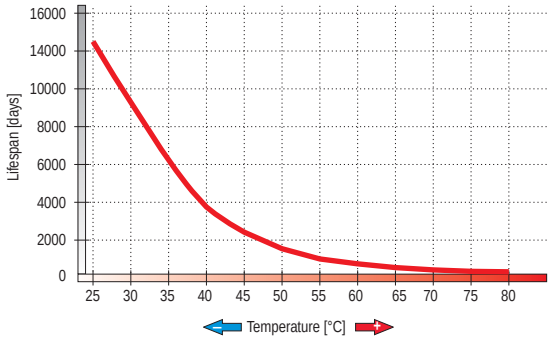


Figure 353: Temperature life span diagram

Deep discharge cycles

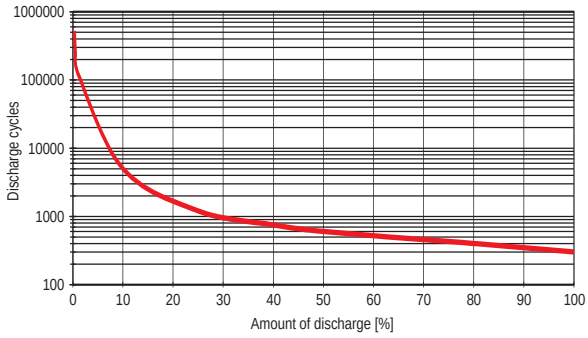


Figure 354: Deep discharge cycles

Dimensions

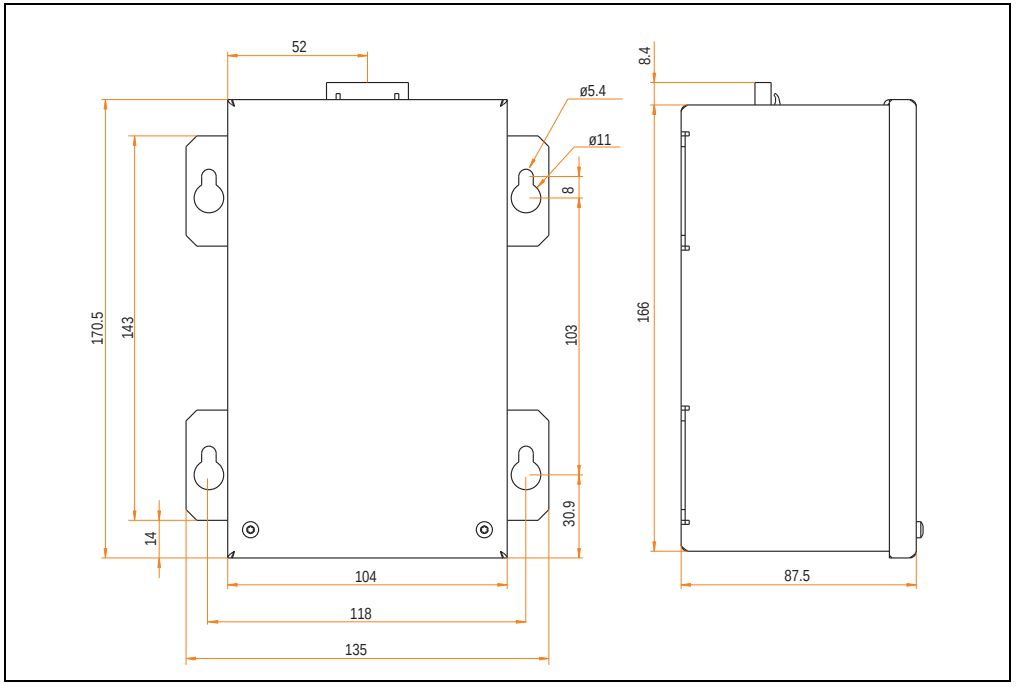


Figure 355: Dimensions - 5AC600.UPSB-00

Drilling template

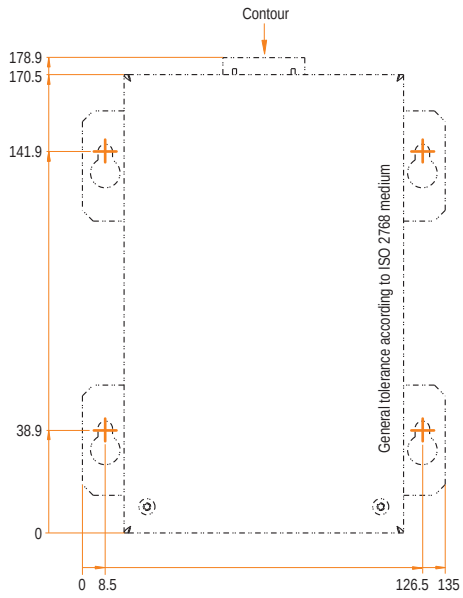


Figure 356: Drilling template for the battery unit

Mounting instructions

Due to the unique construction of these batteries, they can be stored and operated in any position.

13.3.3 UPS connection cable

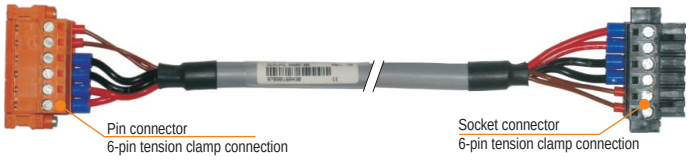


Figure 357: UPS connection cable

Technical data

Features	5CAUPS.0005-00	5CAUPS.0030-00
Length	0.5 m	3 m
Outer diameter	8.5 mm ± 0.2mm	
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°C ... +80°C -30°C ... +80°C	
Weight	Approx. 143 kg/km	
Materials Cable shielding 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 437: Technical data - UPS connection cable

14. PCI Ethernet cards

14.1 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.

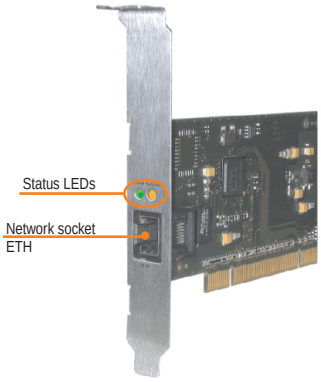


Figure 358: PCI Ethernet card 10/100 - 5ACPCI.ETH1-01

14.1.1 Technical data

Ethernet connection			
Controller	Intel 82551ER		RJ45 twisted pair (10BaseT/100BaseT), female 
Power supply	Universal card (2 notches) for 3.3 V or 5 V		
Cabling	S/STP (Cat5e)		
Transfer rate	10/100 MBit/s [1]		
Cable length	max. 100 m (min. Cat5e)		
LED	**On**	**Off**	
Green	100 MBit/s	10 MBit/s	
Orange	Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)	

Table 438: Ethernet connection ETH

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

14.1.2 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**).

14.1.3 Dimensions

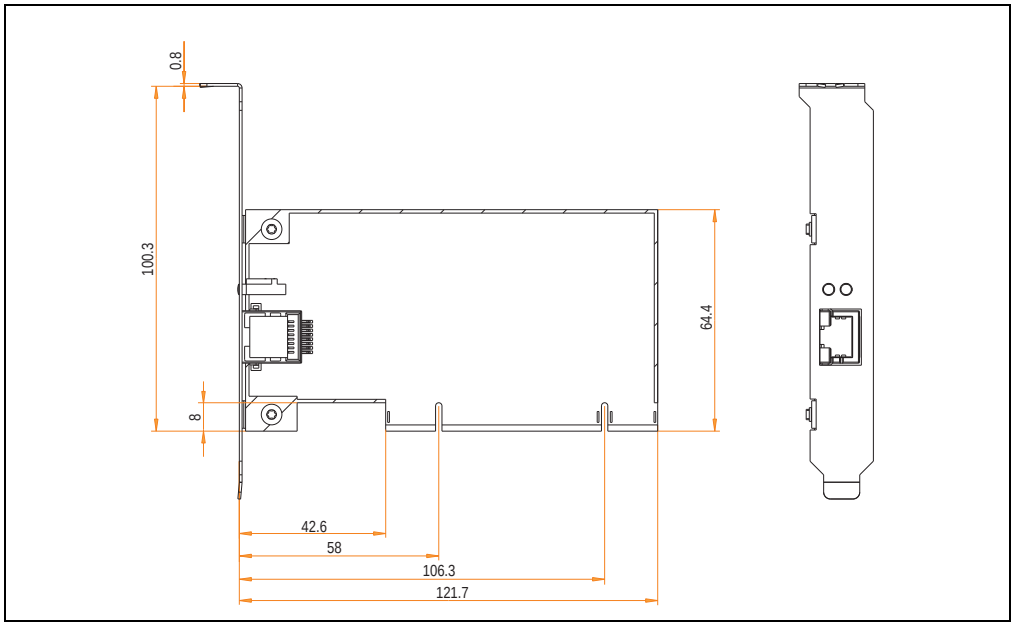


Figure 359: Dimensions - 5ACPCI.ETH1-01

14.2 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.

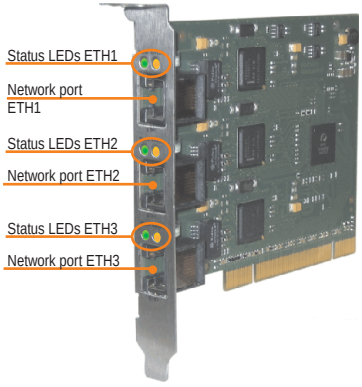


Figure 360: PCI Ethernet card 10/100 - 5ACPCI.ETH3-01

14.2.1 Technical data

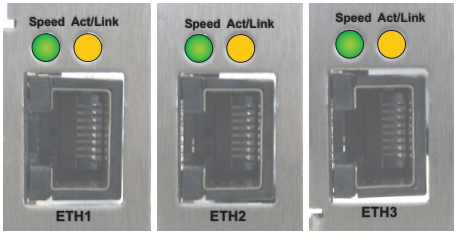
Ethernet connections			
Controller	each with Intel 82551ER		3 x RJ45 twisted pair (10BaseT/100BaseT), female 
Power supply	Universal card (2 notches) for 3.3 V or 5 V		
Cabling	each S/STP (Cat5e)		
Transfer rate	each 10/100 MBit/s [1]		
Cable length	each max. 100 m (min. Cat5e)		
LED	**On**	**Off**	
Green	100 MBit/s	10 MBit/s	
Orange	Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)	

Table 439: Ethernet connections ETH1, ETH2, ETH3

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

14.2.2 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**).

14.2.3 Dimensions

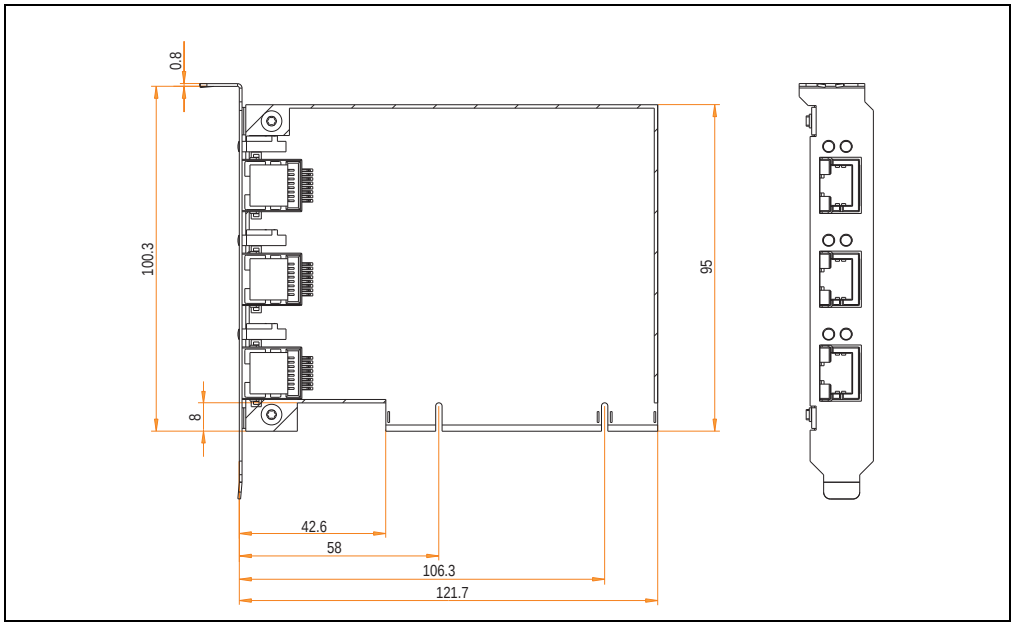


Figure 361: Dimensions - 5ACPCI.ETH3-01

15. Replacement fan filter

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.

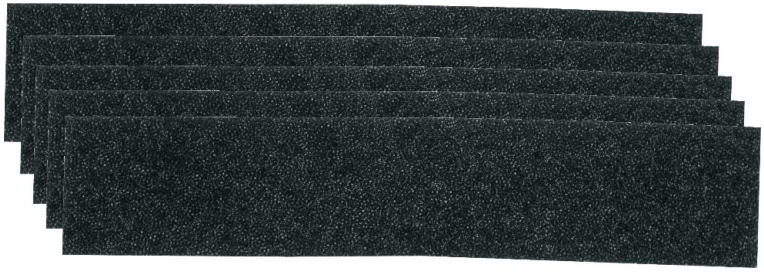


Figure 362: Replacement fan

Model number	Short description	Comment
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 440: Model numbers - Replacement fan filters

16. 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.

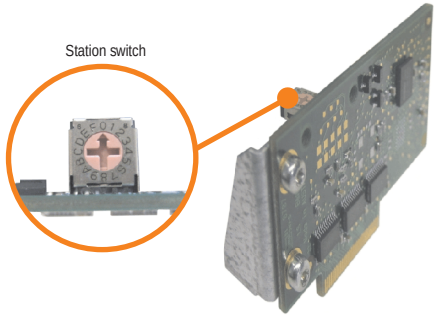


Figure 363: 5AC600.SRAM-00

The following system unit hardware revisions are required before mounting the SRAM module:

- 5PC600.SX01-00 starting with revision I0
- 5PC600.SX01-00 starting with revision H0
- 5PC600.SX02-01 starting with revision K0
- 5PC600.SF03-00 all revisions
- 5PC600.SX05-00 starting with revision H0
- 5PC600.SX05-01 starting with revision H0

16.1 Technical data

Features	5AC600.SRAM-00	
Connection to system	via the PCI bus (PCI PnP)	
Memory Quantity Battery-buffered	SRAM 512 KB Yes	
Station switch	16 digits (0-F)	
Data rate	up to 31 MB/sec for write access up to 25 MB/sec for read access	
PCI configuration space	**Value**	**Meaning**

Table 441: Technical data - 5AC600.SRAM-00

Features	5AC600.SRAM-00	
Vendor ID	1677h	B & R
Device ID	A085h	5AC600.SRAM-00
Status	0200h	DEVSEL timing medium
HeaderType	00h	Single function device
The card is registered in the PCI Configuration Space as Single Function Device	**Value**	**Meaning**
Device 0		
Base class	05h	Memory controller
Sub class	00h	RAM
Command	0000h	Bus master (not used)
IRQ	-	Not used
BAR0	512	kByte memory area
BAR1	4	Byte I/O area

Table 441: Technical data - 5AC600.SRAM-00

16.2 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.

16.3 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 726).
- Screw on the M3x5 Torx included in the delivery to the baseboard of the module.

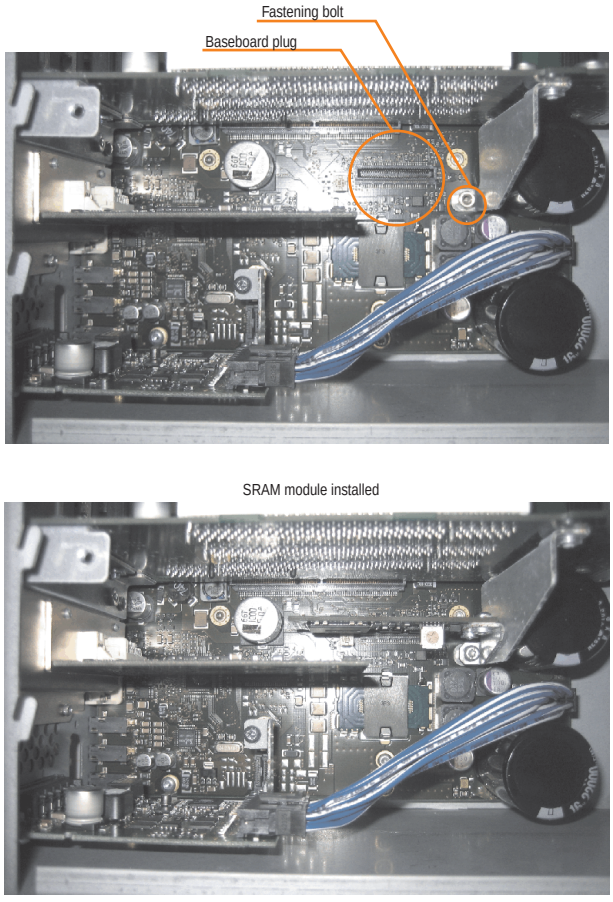


Figure 364: SRAM module installation

17. Power supplies

In order to meet demands for complete, comprehensive system solutions, power supplies are available for mounting rail installation in the B&R product line. 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 365: 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 demounting. Wiring is essentially performed in seconds thanks to the the cage clamp terminals 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.

17.1 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).

17.1.1 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 442: Single-phase power supplies

17.1.2 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 443: 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 (2 1/2 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.**

The following replacement lithium batteries are available: 4A0006.00-000 (single) and 0AC201.9 (5 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

Table 444: 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 444: 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 687).
- 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 366: 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.

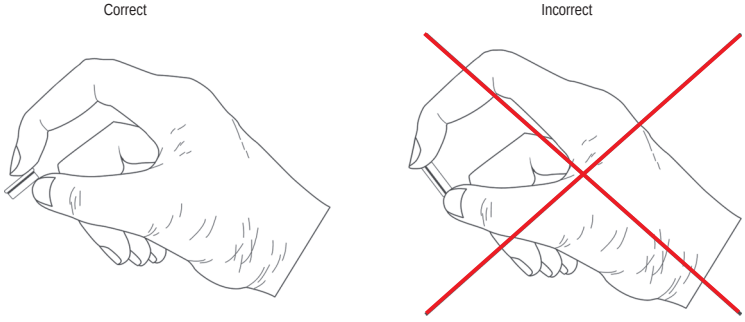


Figure 367: Battery handling

Figure 368: 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 687).
- Reset the data and time in BIOS (see information on page 687).

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 slots

- 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 369: 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 370: 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.

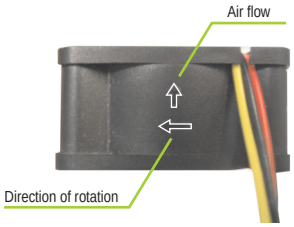


Figure 371: Markings for direction of airflow / fan rotation

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.

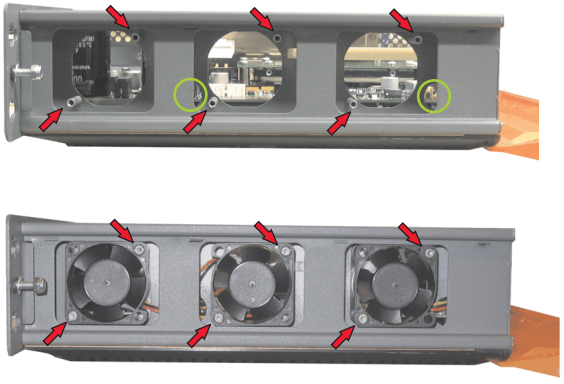


Figure 372: APC620 1PCI slot - Fan installation

- 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).

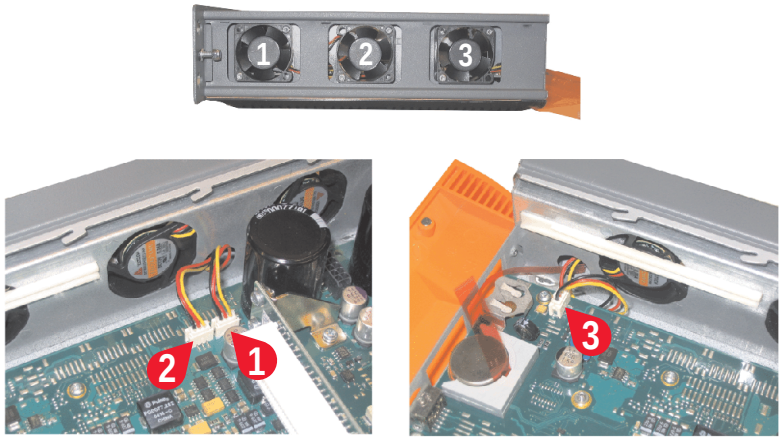


Figure 373: APC620 1PCI slot - Fan cable connection to the main board

- 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 slots

- 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 374: 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 375: 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.

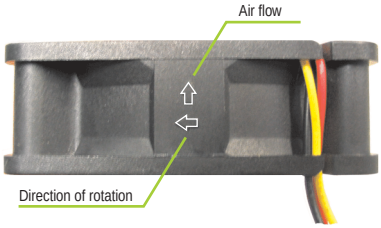


Figure 376: Markings for direction of airflow / fan rotation

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.

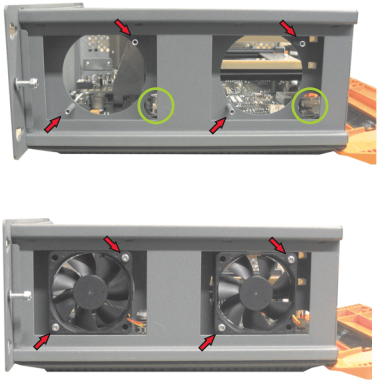


Figure 377: APC620 2PCI slots - Fan installation

- 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).

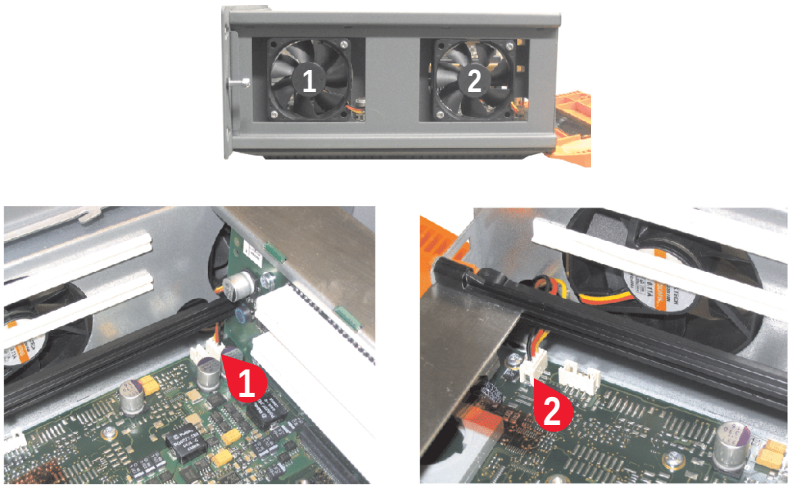


Figure 378: APC620 2PCI slots - Fan cable connection to the main board

- 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.

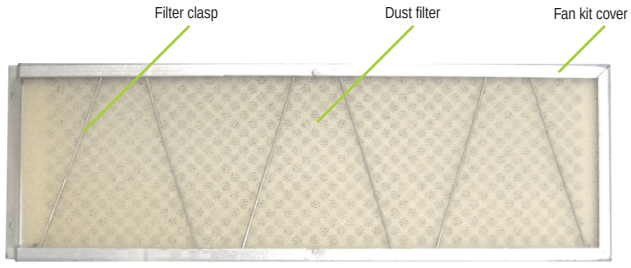


Figure 379: Dust filter in the fan kit cover and filter clasp

- Replace any removed components (filter kit cover, side cover) in the reverse order.

2.3 Procedure for APC620 with 3 PCI slots

- 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 380: 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 381: 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.

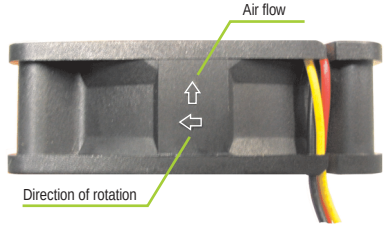


Figure 382: Markings for direction of airflow / fan rotation

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.

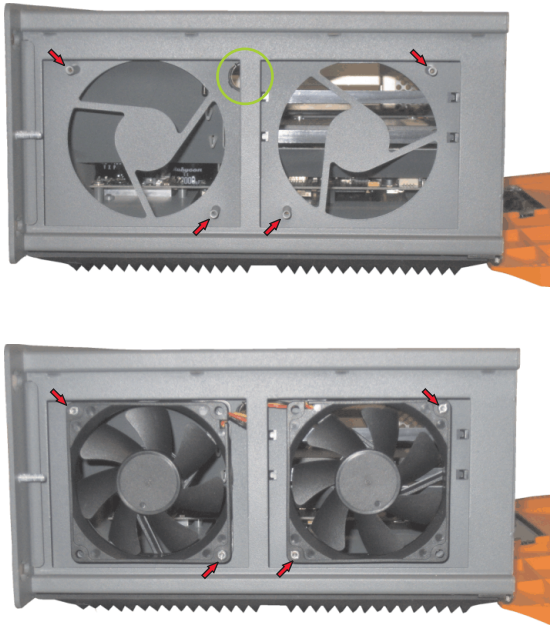


Figure 383: APC620 3PCI slot - Fan installation

- 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).

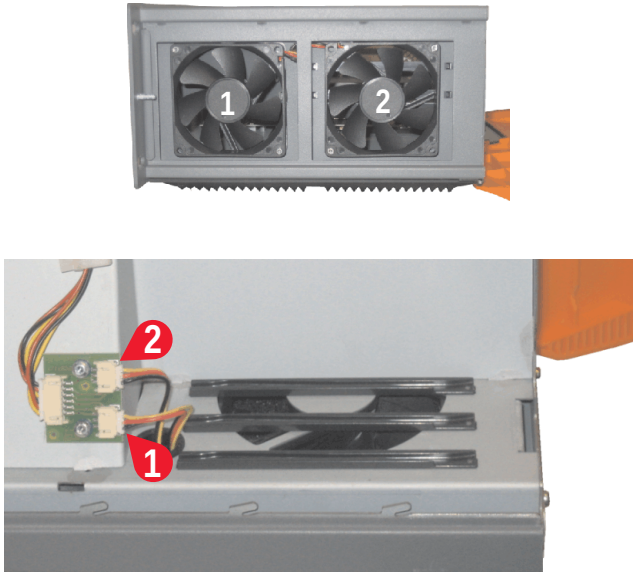


Figure 384: APC620 3PCI slot - Fan cable connection to the main board

- Place the dust filter in the fan kit cover and secure with the filter clasp.

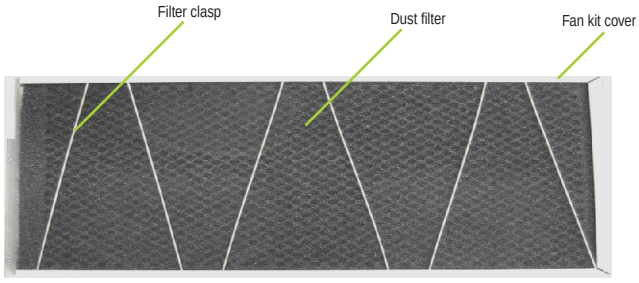


Figure 385: Dust filter in the fan kit cover and filter clasp

- Replace any removed components (filter kit cover, side cover) in the reverse order.

2.4 Procedure for APC620 with 5 PCI slots

- 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.

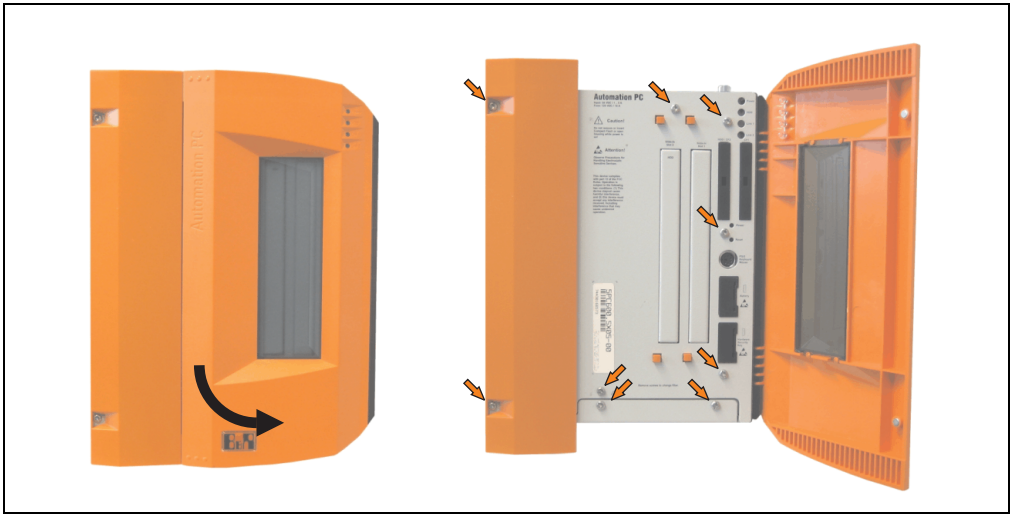


Figure 386: APC620 5PCI slot - Remove screws to install/ remove filter kit

- After the screws have been removed, the side cover and the fan kit cover can be removed toward the front.

Figure 387: 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.

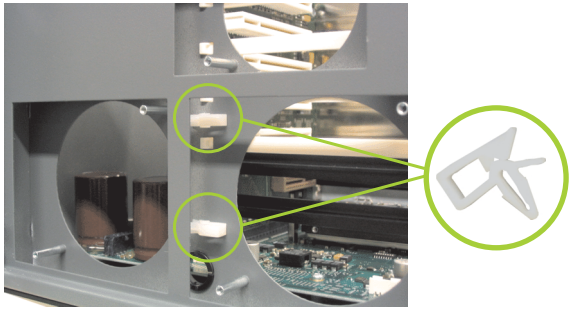


Figure 388: APC620 5PCI attach cable fasteners

- There are two arrows on the fans that indicate the direction of air flow and the direction of fan rotation.

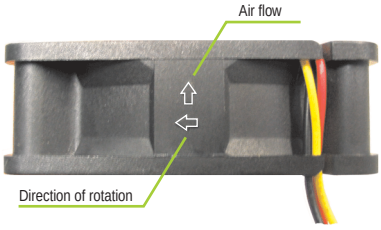


Figure 389: Markings for direction of airflow / fan rotation

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.

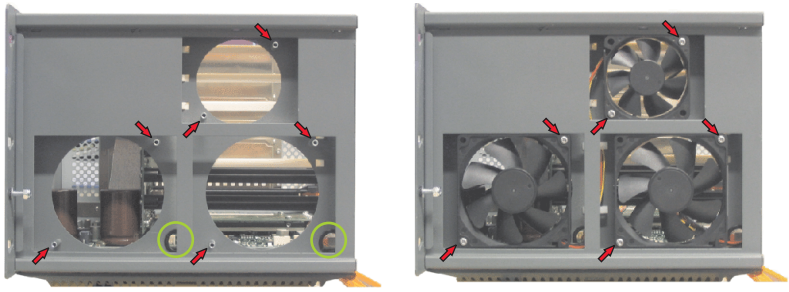


Figure 390: APC620 5PCI slot - Fan installation

- 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).

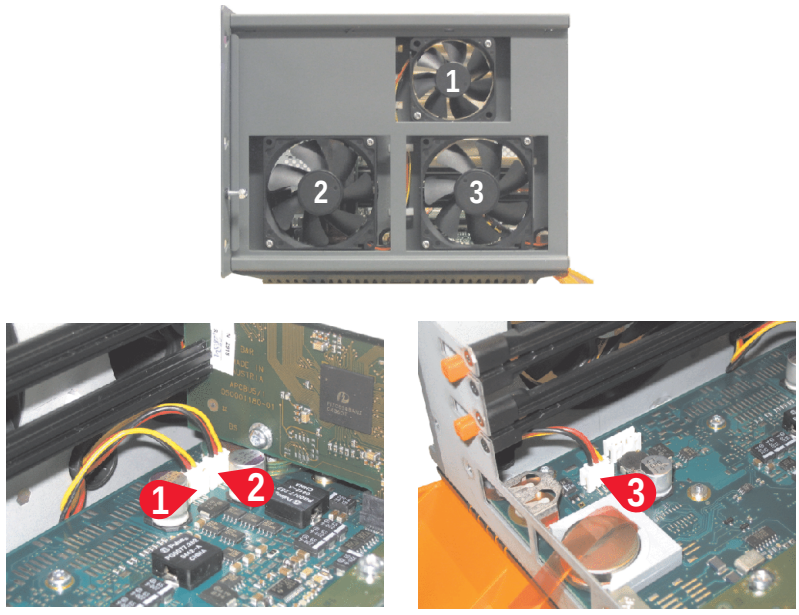


Figure 391: APC620 5PCI slot - Fan cable connection to the main board

- 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.

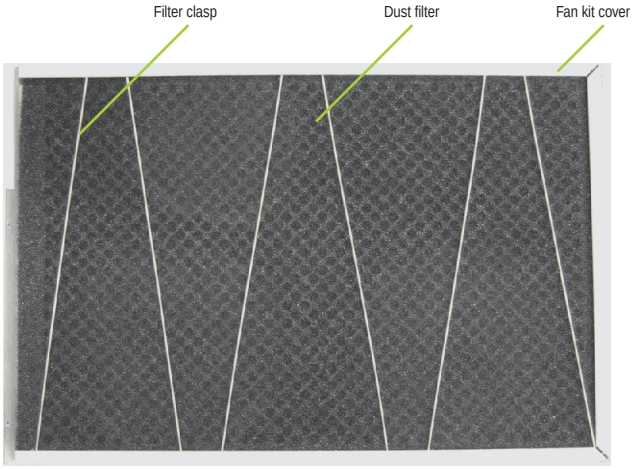


Figure 392: Dust filter in the fan kit cover and filter clasp

- 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 726.
- Remove the slide-in dummy module.

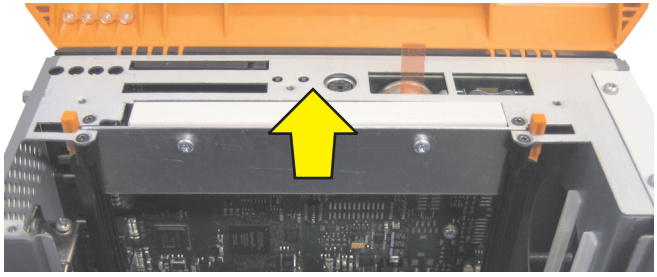


Figure 393: Removing the slide-in dummy module

- Insert the slide-in drive.

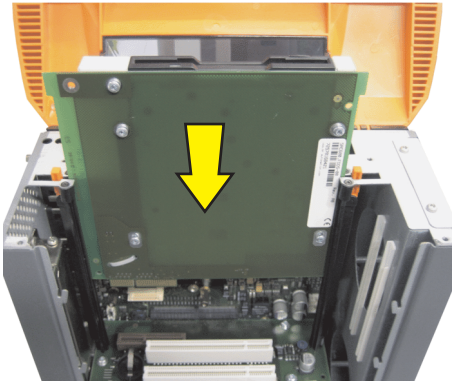


Figure 394: Installing the slide-in drive

- 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 726.
- Simultaneously remove both slide-in slot releasing mechanisms outwards The slide-in drive is pushed a few mm upwards for easy removal.

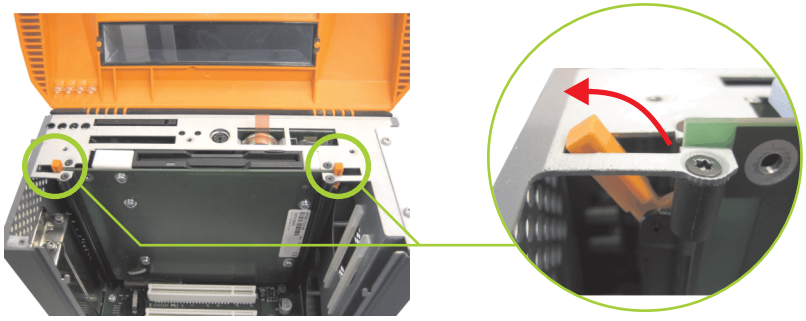


Figure 395: Release the slide-in slot releasing mechanisms

- Removing the slide-in drive.

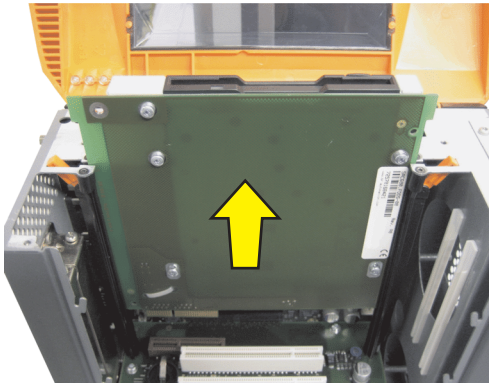


Figure 396: Removing the slide-in drive

- Move the slide-in slot releasing mechanisms to the start position.

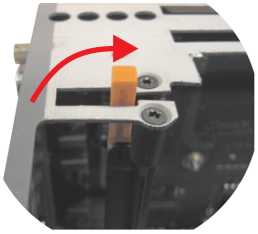


Figure 397: Slide-in slot releasing mechanism start position

- Insert the new slide-in drive or re-attach the side cover.

4. Installation of the UPS module

The module is installed using the materials included in the delivery. Different parts are used depending on the system unit and **installed** (description starting on page 718) or **not installed** (description follows) add-on interface module.

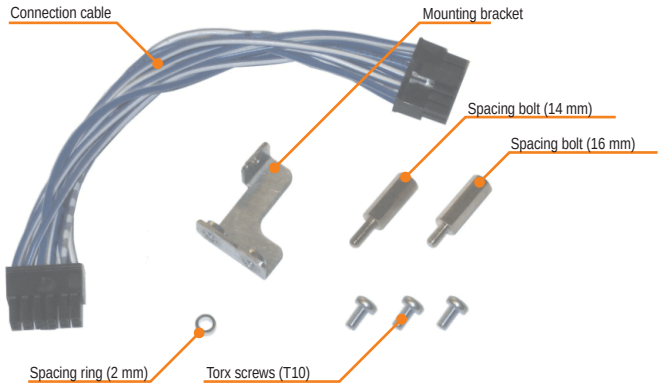


Figure 398: Add-on UPS module 5AC600.UPSI-00 - Installation materials

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 726).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).

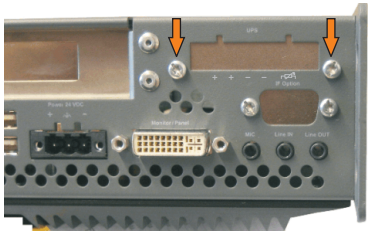


Figure 399: Remove UPS module cover

- Screw in spacing bolt and spacing ring (using M5 hex socket screwdriver).

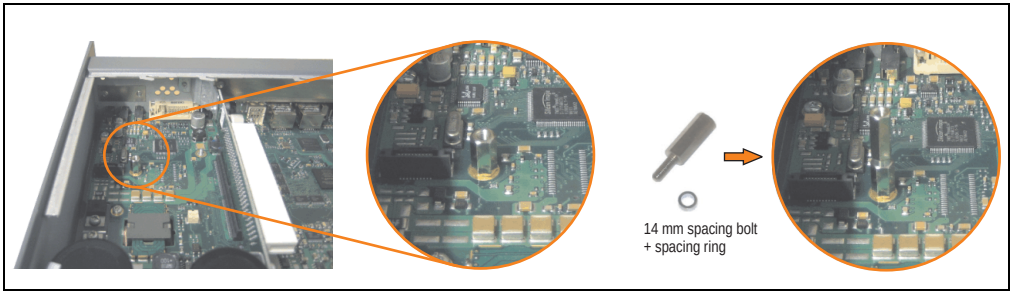


Figure 400: Screw in spacing bolt and spacing ring

- 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 401: Install UPS module

- Plug in connection cable (see marked socket).

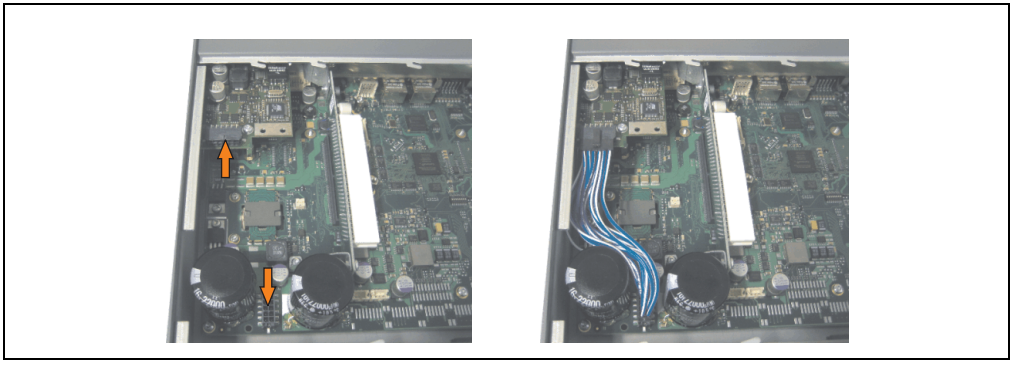


Figure 402: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.

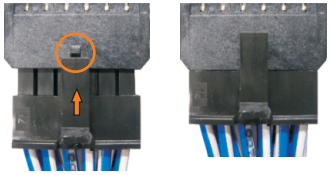


Figure 403: Connector locking mechanism

- Attach the side cover.

4.1.2 APC620, 2 PCI slot

- Remove side cover (see section 5 "Mounting the side cover" on page 726).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).

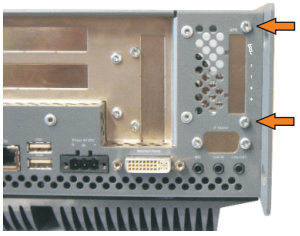


Figure 404: Remove UPS module cover

- Remove cover plate by removing the marked Torx screw (T10).

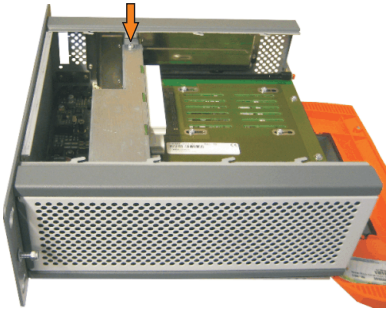


Figure 405: Remove cover plate

- Screw in spacing bolt and spacing ring (using M5 hex socket screwdriver).

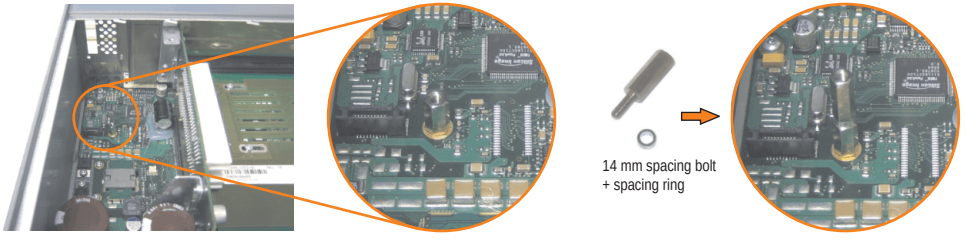


Figure 406: Screw in spacing bolt and spacing ring

- Install mounting bracket on UPS module using 2 Torx screws (T10).

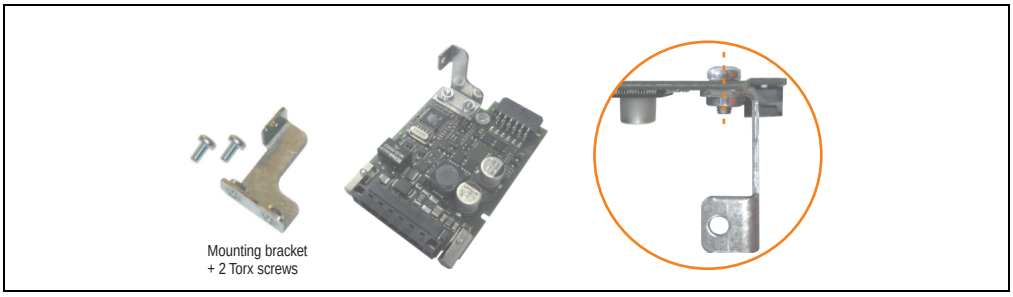


Figure 407: Install mounting bracket

- 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.

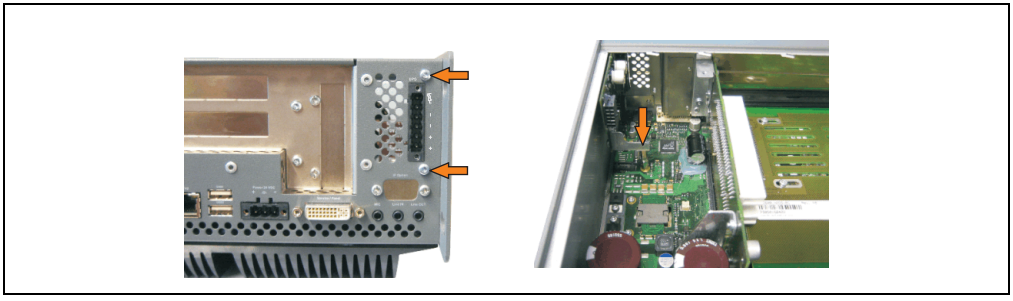


Figure 408: Install UPS module

- Plug in connection cable (see marked socket).

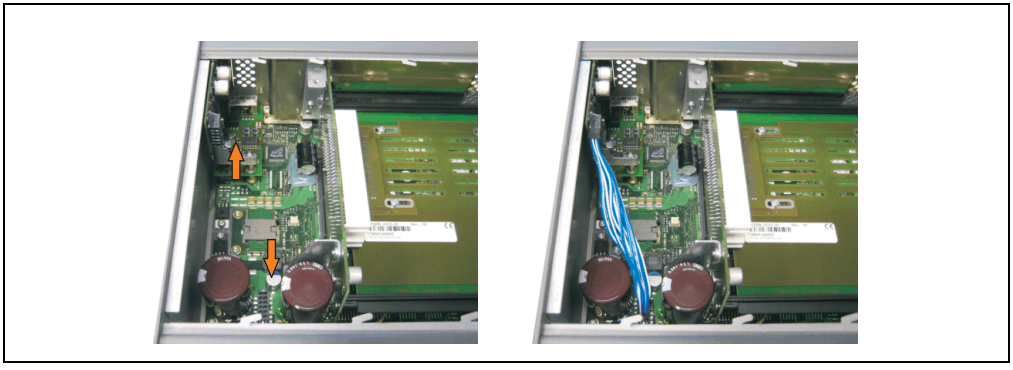


Figure 409: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.

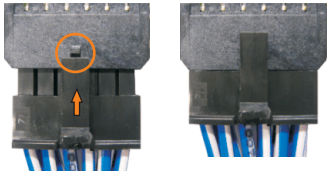


Figure 410: Connector locking mechanism

- 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 726).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).

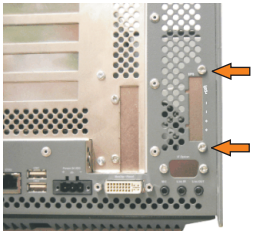


Figure 411: Remove UPS module cover

- Remove cover plate by removing the marked Torx screw (T10).

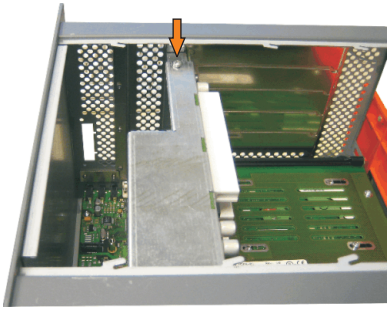


Figure 412: Remove cover plate

- Screw in spacing bolt and spacing ring (using M5 hex socket screwdriver).

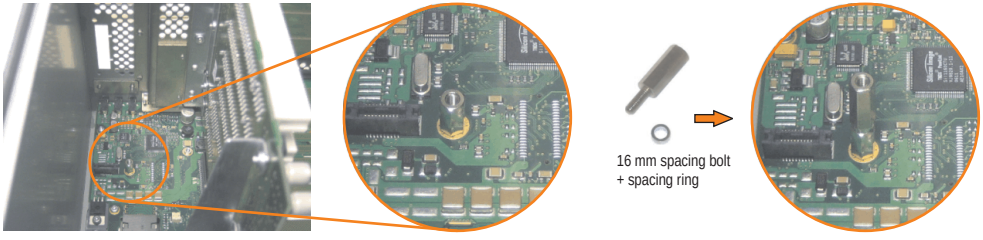


Figure 413: Screw in spacing bolt and spacing ring

- Install mounting bracket on UPS module using 2 Torx screws (T10).

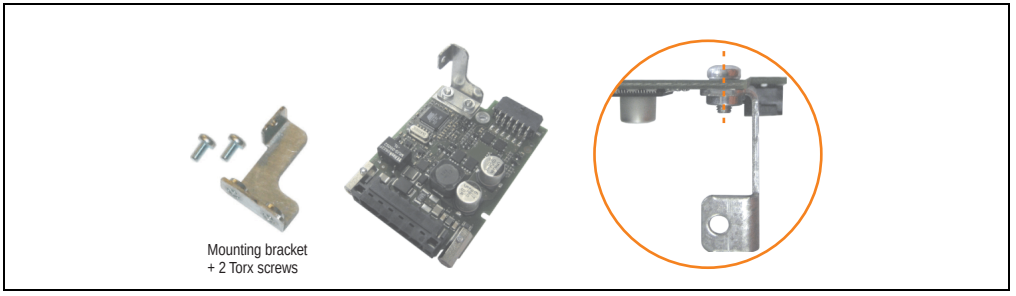


Figure 414: Install mounting bracket

- 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.

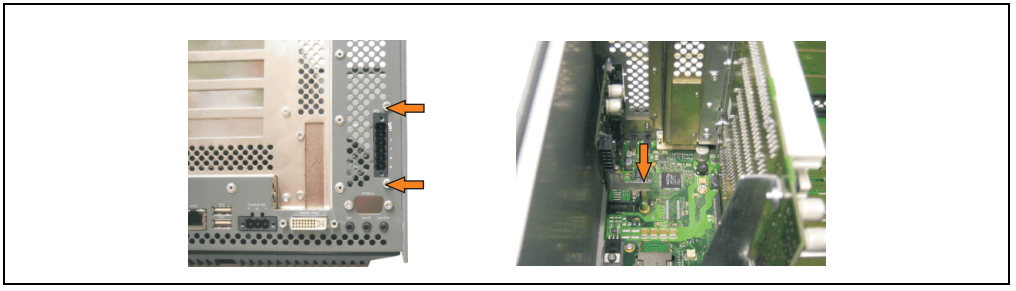


Figure 415: Install UPS module

- Attach connection cable (see marked socket).

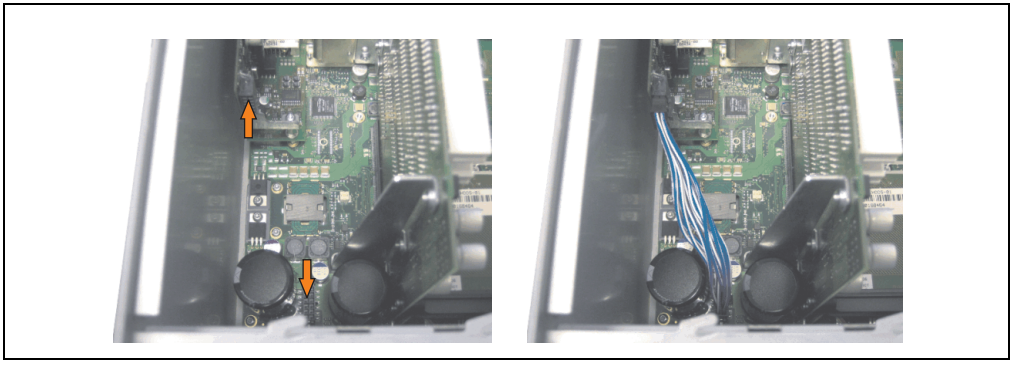


Figure 416: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.

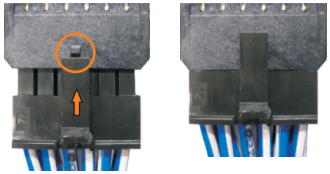


Figure 417: Connector locking mechanism

- 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 726).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).

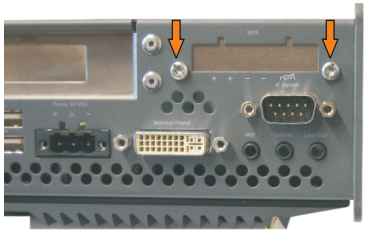


Figure 418: Remove UPS module cover

- Screw in spacing bolt (using M5 hex socket screwdriver).

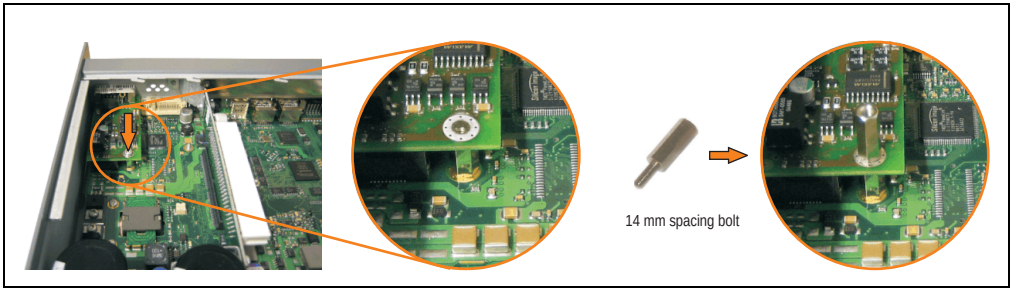


Figure 419: Screw in spacing bolt

- 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.

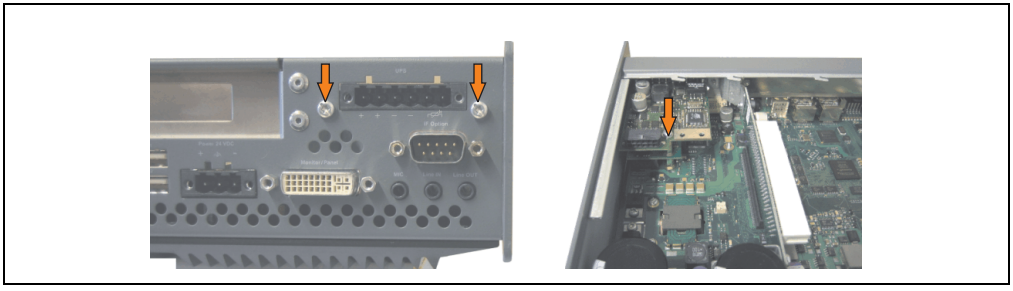


Figure 420: Install UPS module

- Plug in connection cable (see marked socket).

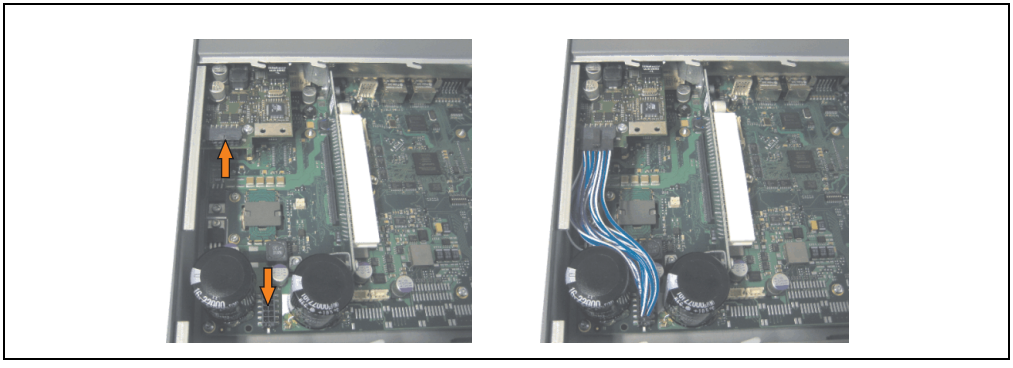


Figure 421: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.

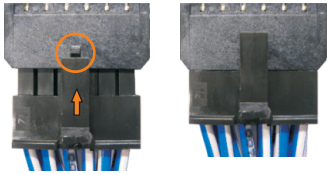


Figure 422: Connector locking mechanism

- Attach the side cover.

4.2.2 APC620, 2 PCI slot

- Remove side cover (see section 5 "Mounting the side cover" on page 726).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).

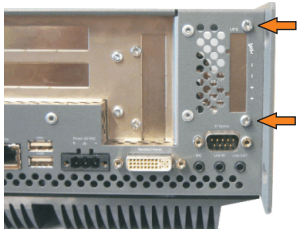


Figure 423: Remove UPS module cover

- Remove cover plate by removing the marked Torx screw (T10).

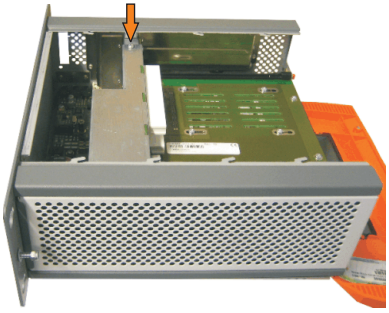


Figure 424: Remove cover plate

- Screw in spacing bolt (using M5 hex socket screwdriver).

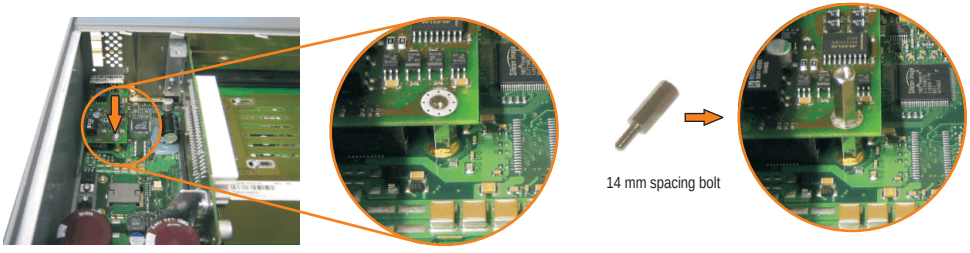


Figure 425: Screw in spacing bolt

- Install mounting bracket on UPS module using 2 Torx screws (T10).

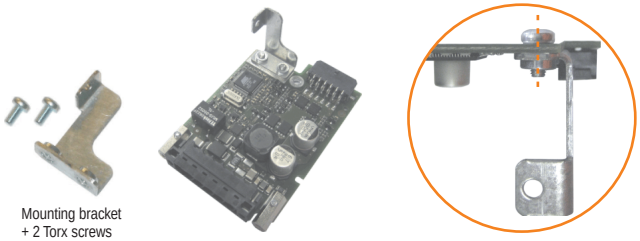


Figure 426: Install mounting bracket

- 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.

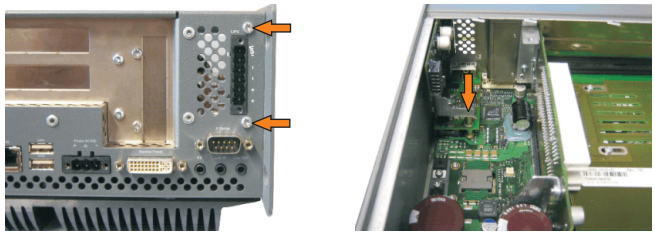


Figure 427: Install UPS module

- Plug in connection cable (see marked socket).

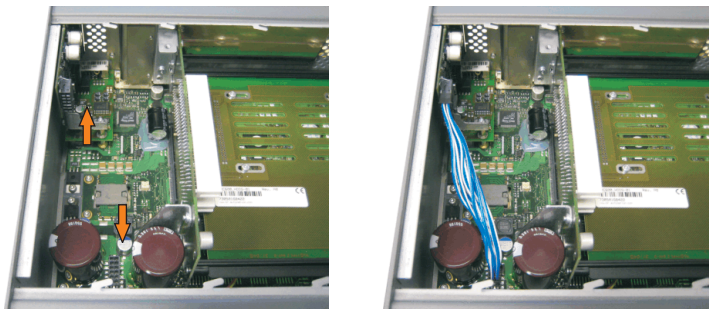


Figure 428: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.

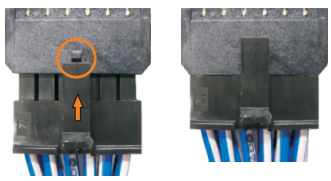


Figure 429: Connector locking mechanism

- 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 726).
- Remove UPS module cover by removing the 2 marked Torx screws (using T10 screwdriver).

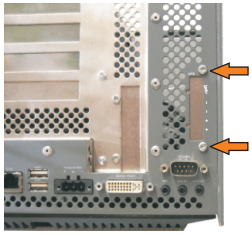


Figure 430: Remove UPS module cover

- Remove cover plate by removing the marked Torx screw (T10).

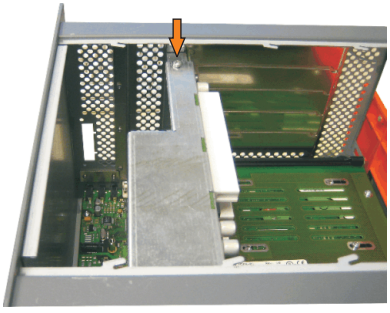


Figure 431: Remove cover plate

- Screw in spacing bolt (using M5 hex socket screwdriver).

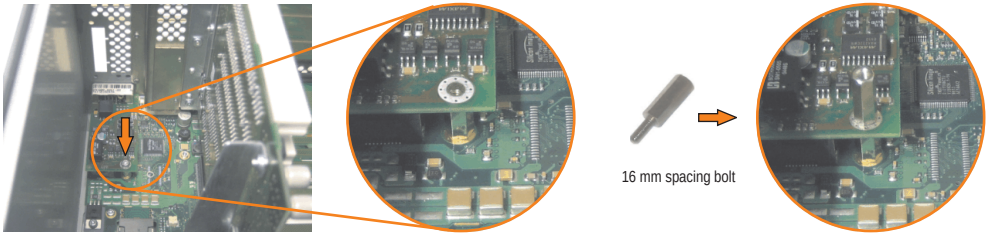


Figure 432: Screw in spacing bolt

- Install mounting bracket on UPS module using 2 Torx screws (T10).

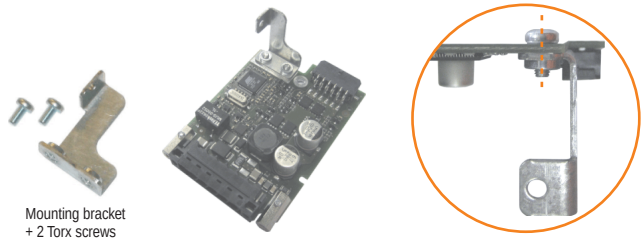


Figure 433: Install mounting bracket

- 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.

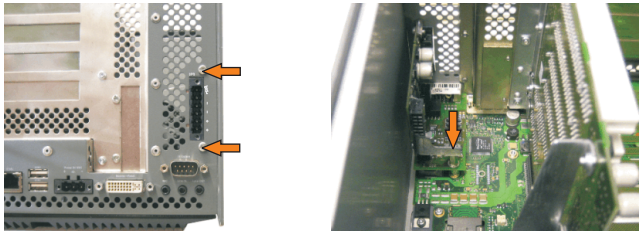


Figure 434: Install UPS module

- Plug in connection cable (see marked socket).

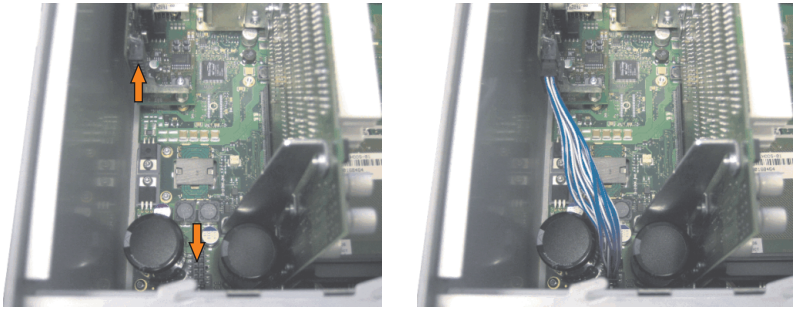


Figure 435: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.

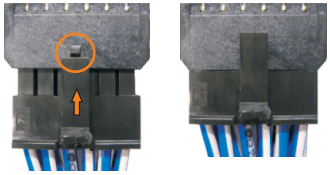


Figure 436: Connector locking mechanism

- 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 437: 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.

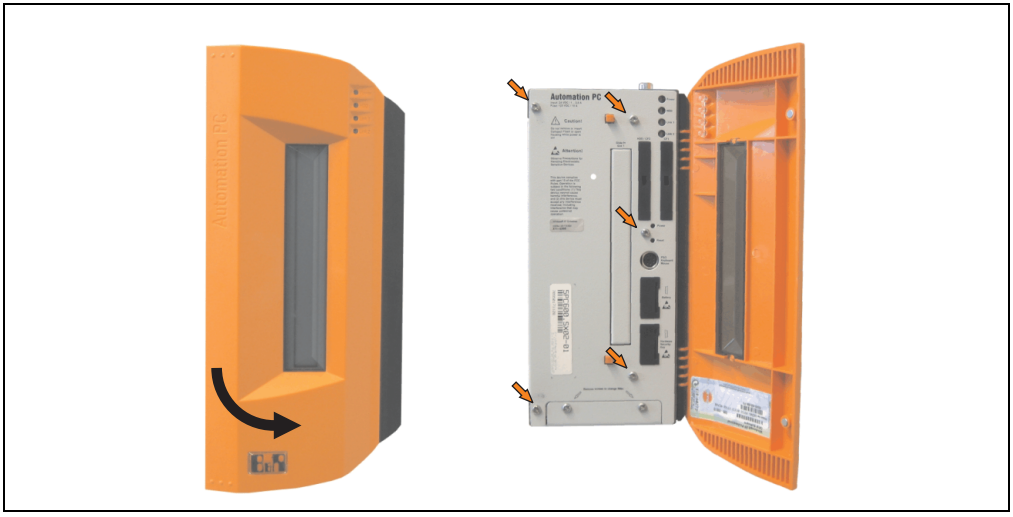


Figure 438: Mounting the side cover - APC620, 2 PCI slot

- 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 439: 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.

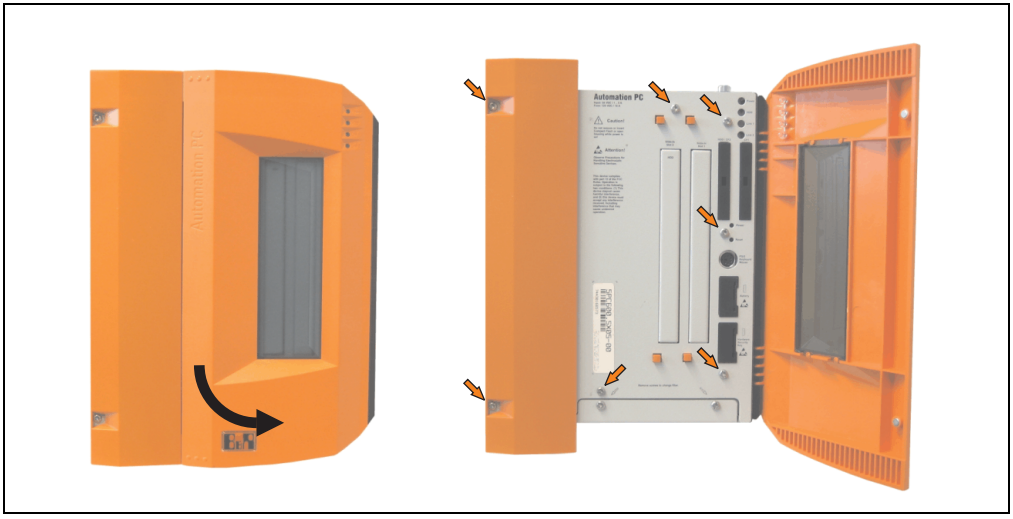


Figure 440: Mounting the side cover - APC620, 5 PCI slot

- 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. 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 441 "Screw assignment on the back side of the SATA RAID controller" on page 730.

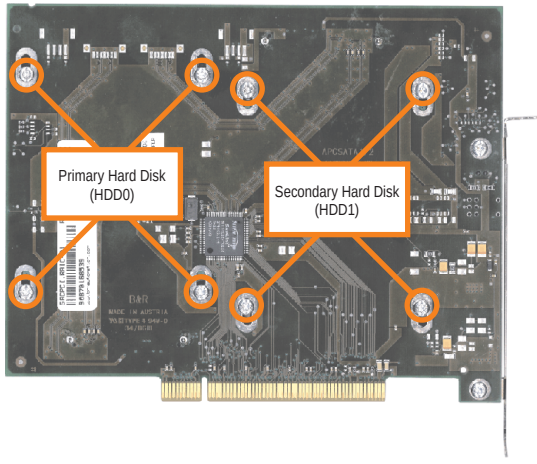


Figure 441: Screw assignment on the back side of the SATA RAID controller

- On the front side, slide the hard disk down and away (image 1).
- Carefully plug the new hard disk into the connector (image 2).

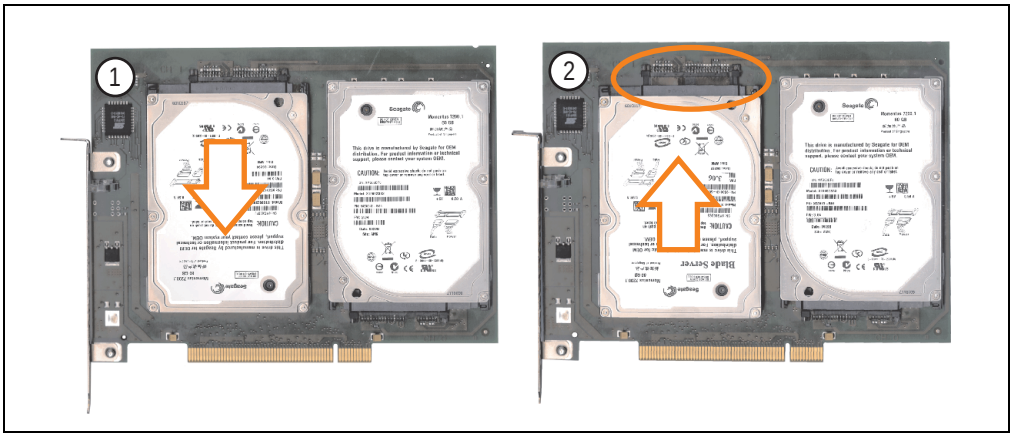


Figure 442: Hard disk exchange

- 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 329.

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.

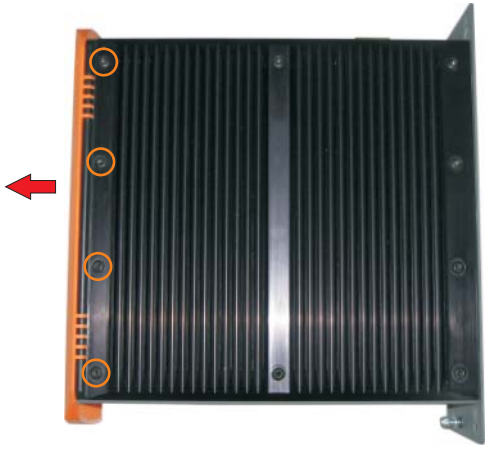


Figure 443: Removing the APC620 front cover

- Slide the new hinge bar under the heat sink and screw it back on using the screws removed earlier.

Figure 444: 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.

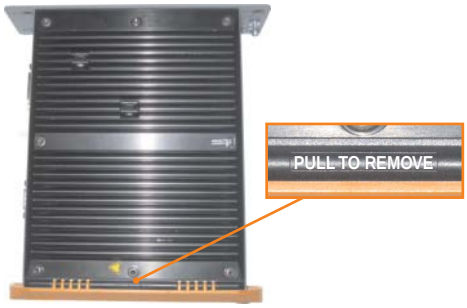


Figure 445: APC620 front cover label

- Open the front cover approximately 1-2 cm. Now remove the cover by pulling it in the direction of the red arrow.

Figure 446: Removing the APC620 front cover

- Attach the new cover to the hinge bar from the side.

Figure 447: 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] .

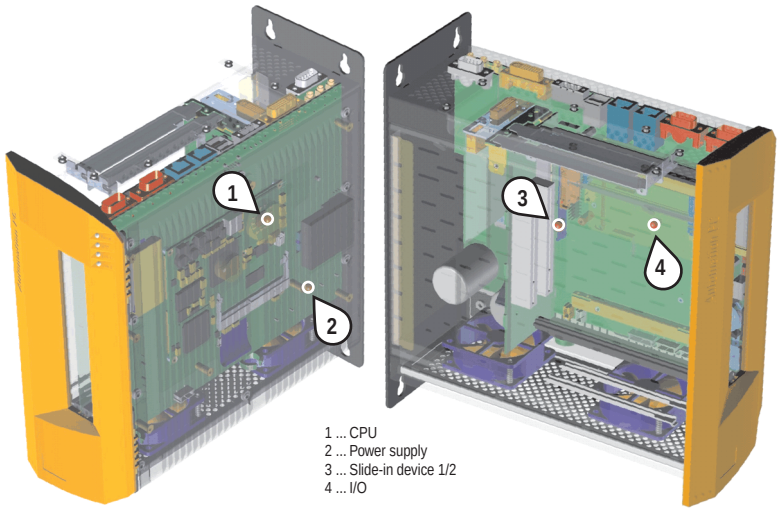


Figure 448: Temperature sensor locations

Section		Position
1	CPU	Processor temperature (sensor integrated on the CPU board)
2	Power supply	Power supply temperature (maximum 95°C)
3	Slide-in drive 1/2	Temperature of a slide-in drive (the sensor is integrated on the slide-in drive)
4	I/O	Temperature under an add-on drive

Table 445: 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 446: Revision information for connecting an external device

The voltage can be accessed using the "APC620 internal supply cable 5CAMSC.0001-00" on page 642. 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.

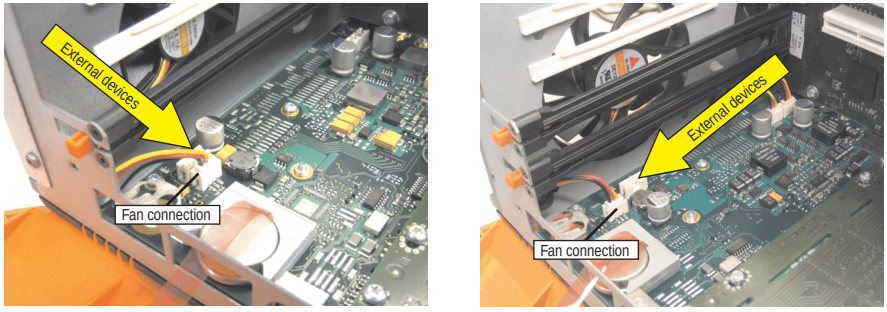


Figure 449: Connector location for external devices

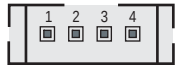
Connector for the external devices			
Pin	Assignment	Power	4-pin connector, male
1	+12 VDC	Max. 10 watts	
2	GND		
3	GND	Max. 5 watts	
4	+5 VDC		

Table 447: 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.

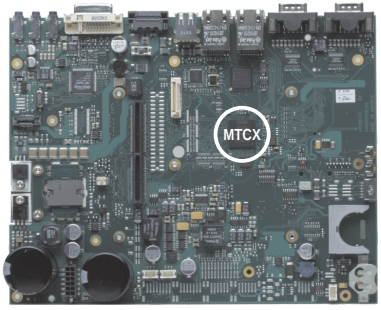


Figure 450: MTCX controller location

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

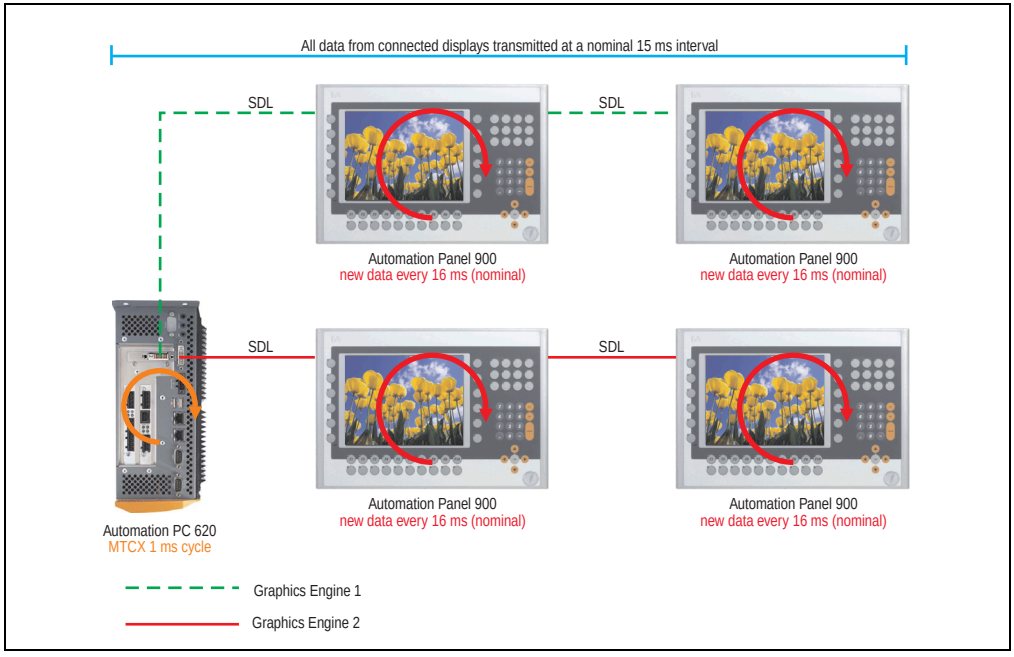


Figure 451: Sample configuration for SDL timing

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 display

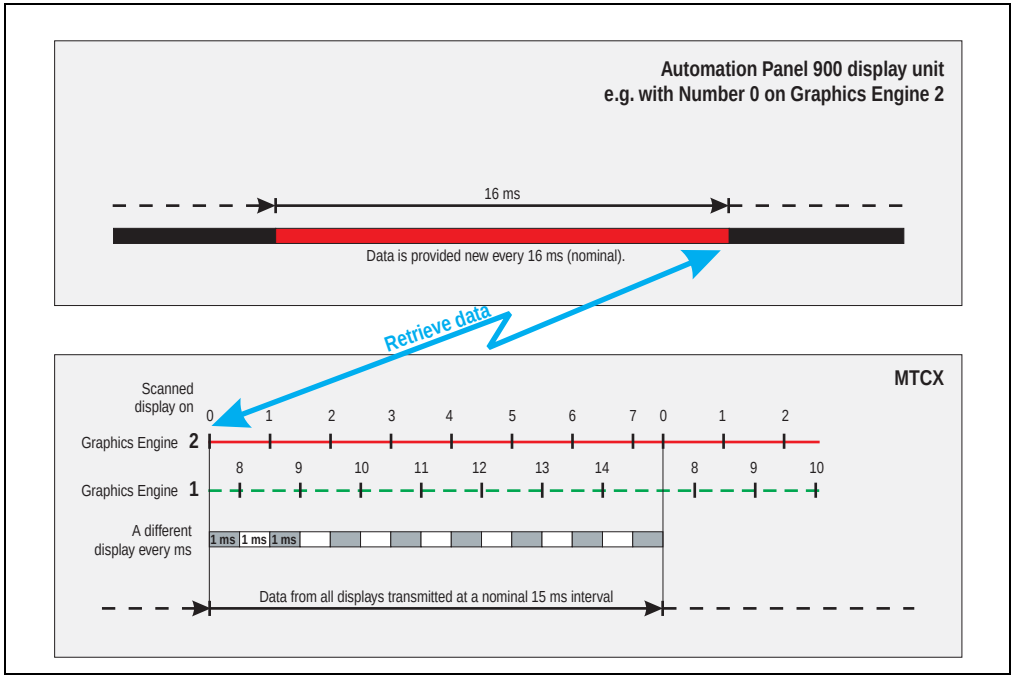


Figure 452: SDL timing - Example for Automation Panel 900 with the number 0

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. With the B&R Key Editor, it is possible to quickly and easily set up the application individually.

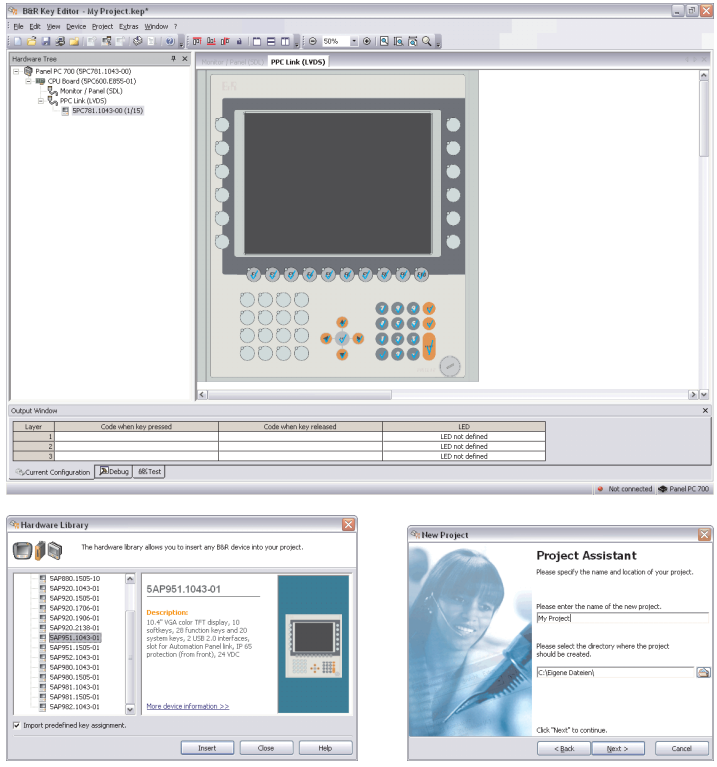


Figure 453: B&R Key Editor screenshots (Version 2.10)

Features:

- Configuration of normal keys like on a keyboard (A, B, C, etc.)
- Key combinations/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 PC 620 and Panel PC 700 devices

Supports following systems:

- Automation PC 620
- Panel PC 700
- Provit 2000
- Provit 5000
- Power Panel BIOS devices
- Mobile Panel BIOS devices

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**).

5. B&R Automation Device Interface (ADI) development kit

The ADI development kit is used to access the functions of the ADI driver. The programming languages C (with import libraries for Microsoft Visual C++ 6.0 and Microsoft eMbedded Visual C++ 4.0) and Visual Basic (for Microsoft Visual Basic 6.0) are supported.

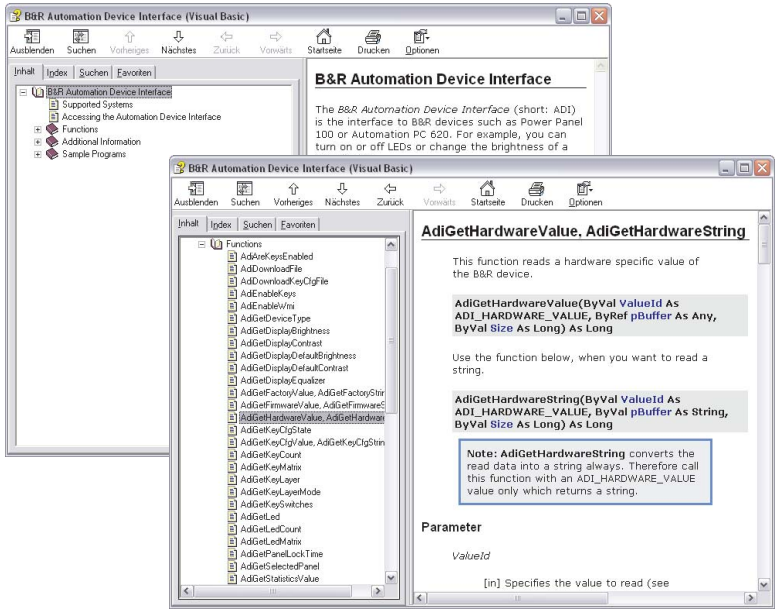


Figure 454: ADI development kit screenshots (Version 1.50)

Features:

- Extensive library of API functions
- Supported programming languages: Visual Basic, Visual C++
- Online documentation (German, English)
- Installation using its own setup

Supports following systems:

- Automation PC 620
- Panel PC 700
- Power Panel BIOS devices
- Mobile Panel BIOS devices
- Automation Panel 900

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. 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

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: unlimited in theory, up to 64 with real-time capability in practice, i.e. defined maximum delay 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 that 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. Using this technology it is possible to encode video, audio and computer data on CD. DVDs can 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.

Ethernet 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. Ethernet 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).

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 200µs and it actually occurs every 198 to 203µs, then the jitter is 5µs. 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

Original **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 generation. 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

See "Ethernet POWERLINK".

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 ... -30 V, low level: +3 ... +30 V. Cable lengths up to 15 m, transfer rates up to 20 kBit/s. For point-to-point connections between 2 participants.

RS422

Recommended **S**tandard **N**umber **422**. Interface standard, balanced operation, increased immunity to disturbances. High level: 2 ... -6 V, low level: +2 ... +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 ... -6 V, low level: +1.5 ... +6 V; 2-wire connection [half duplex operation] or 4-wire connection [full duplex operation. Cable lengths up to 1200 m, transfer rates up to 10 Mbit/s. Up to 32 participants can be connected to an RS485 bus [sender/receiver].

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**x**tended **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 activating an item with 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.

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