Automation PC 620 with 945GME N270 CPU board

User's Manual

Model number:

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Chapter 1 • General information

Information:

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

1. Manual history

Version	Date	Change
1.00	2009-10-07	- First version
1.05	2009-12-10	 Information in section 7 "Known problems / issues", on page 264 expanded. Section 12 "Cables", on page 446 corrected. 16 GB B&R CompactFlash 5CFCRD.016G-04 added. Section 1 "Temperature sensor locations", on page 541 corrected.
1.10	2010-08-25	Chapter 5 "Standards and certifications", on page 387 updated. Section 8 "Automation PC 620 with Windows Embedded Standard 2009", on page 368 added Section 10 "B&R Automation Device Interface (ADI) driver - Control Center", on page 373 updated. B&R ID codes for system units added. Technical data "Remanent variables for AR (Automation Runtime) in Power Fail Mode" added for the APC620 embedded system units and for the SRAM module 5AC600.SRAM-00. The section "Creating a bootable USB flash drive" removed. B&R USB flash drive added to the chapter 6 "Accessories" on page 441. Section 2 "Upgrade information", on page 330 updated. BIOS updated to V1.13.
1.11	2011-01-27	- The appellation "AR010" was changed to "ARwin". - The appellation "AR106" was changed to "ARemb".

Table 1: Manual history

2. Safety notices

2.1 Intended use

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

2.2 Protection against electrostatic discharges

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

2.2.1 Packaging

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

2.2.2 Guidelines for proper ESD handling

Electrical components with housing

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

Electrical components without housing

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

- Any persons handling electrical components or devices that will be installed in the electrical components must be grounded.
- Components can only be touched on the small sides or on the front plate.
- Components should always be stored in a suitable medium (ESD packaging, conductive foam, etc.).

Metallic surfaces are not suitable storage surfaces!

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

Individual components

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

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

2.3 Policy and procedures

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

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

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

2.4 Transport and storage

During transport and storage, devices must be protected from excessive stress (mechanical load, temperature, humidity, aggressive atmospheres, etc.).

2.5 Installation

must be observed.

General information • Safety notices

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

2.6 Operation

2.6.1 Protection against touching electrical parts

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

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

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

2.6.2 Environmental conditions - dust, humidity, aggressive gases

Use of operating and monitoring devices (e.g. industrial PCs, power panels, mobile panels, etc.) and uninterruptible power supplies in very dusty environments should be avoided. Dust collection on the devices influences their function and, especially in systems with active cooling (fans), sufficient cooling cannot be guaranteed.

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

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

2.6.3 Programs, viruses, and dangerous programs

The system is subject to potential danger each time data is exchanged or software is installed from a data medium (e.g. diskette, CD-ROM, USB flash drive, etc.), a network connection, or the Internet. The user is responsible for assessing these dangers, implementing preventative measures such as virus protection programs, firewalls, etc. and obtaining software from reliable sources.

2.7 Environmentally-friendly disposal

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

2.7.1 Separation of materials

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

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

Table 2: Environmentally-friendly separation of materials

Disposal must comply with the respective legal regulations.

General information • Organization of safety notices

3. Organization of safety notices

The safety notices in this manual are organized as follows:

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

Table 3: Organization of safety notices

4. Directives



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

5. Model numbers

5.1 System units

Model number	Short description	Note
5PC600.SX01-00	System 1 PCI APC620 system unit 1 half size PCI slot, connection for 2 x RS232, 2 x USB 2.0, Short Display Link, 2 x ETH 10/100, AC97 sound, PS/2 keyboard/mouse; UPS module ¹⁾ ; 24 VDC (order 0TB103.9 screw clamp or 0TB103.91 cage clamp terminals separately).	See page 46
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot APC620 system unit 2 half size PCI slots, 1 drive slot, 1 slot for Automation Panel link transmitter; connections for 2 x RS232, 2 x USB 2.0, Short Display Link, 2 x ETH 10/100, AC97 sound, PS/2 keyboard/mouse, UPS module ²⁾ ; 24 VDC (order 0TB103.9 screw clamp or 0TB103.91 cage clamp terminals separately).	See page 52
5PC600.SX02-01	System 2 PCI, 1 disk drive slot APC620 system unit 2 half size PCI slots, 1 drive slot; connections for 2 x RS232, 2 x USB 2.0, Short Display Link, 2 x ETH 10/100, AC97 sound, PS/2 keyboard/mouse, UPS module ¹⁾ ; 24 VDC (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	See page 52
5PC600.SF03-00	System 3 PCI, 1 disk drive, 1 AP Link slot APC620 system unit, 3 full-size PCI slots; 1 slot for Automation Panel link transmitter; 1 drive slot; Smart Display Link / DVI / monitor, connections for 2 x RS232, 2 x USB 2.0, 2 x ETH 10/100, AC97 sound, PS/2 keyboard/mouse; 24 VDC (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	See page 58
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot APC620 system unit 5 half size PCI slots, 2 drive slot; 1 slot for Automation Panel Link Transmitter; connections for 2 x RS232, 2 x USB 2.0, Short Display Link, 2 x ETH 10/100, AC97 sound, PS/2 keyboard/mouse, UPS module ³⁾ ; 24 VDC (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	See page 63
5PC600.SX05-01	System 5 PCI, 2 disk drive slots APC620 system unit 5 half size PCI slots, 2 drive slots; connections for 2 x RS232, 2 x USB 2.0, Short Display Link, 2 x ETH 10/100, AC97 sound, PS/2 keyboard/mouse, UPS module ³⁾ ; 24 VDC (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	See page 63
5PC600.SE00-00	APC620e System SDL EPL X2X CAN 512kB APC620 embedded system unit, connections for 2x RS232, 4x USB 2.0, Smart Display Link, 1x ETH 10/100, 1x POWERLINK, 1x CAN, 1x X2X, UPS module, 512kB SRAM; (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	See page 69
5PC600.SE00-01	APC620e System CRT EPL X2X CAN 512KB APC620 embedded system unit, connections for 2x RS232, 4x USB 2.0, CRT, 1x ETH 10/100, 1x POWERLINK, 1x CAN, 1x X2X, UPS module, 512kB SRAM; (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	See page 69
5PC600.SE00-02	APC620e System SDL EPL X2X CAN 1MB APC620 embedded system unit, connections for 2x RS232, 4x USB 2.0, Smart Display Link, 1x ETH 10/100, 1x POWERLINK, 1x CAN, 1x X2X, UPS module, 1MB SRAM; (0TB103.9 screw clamp or 0TB103.91 cage clamp sold separately).	See page 69

Table 4: Model numbers - system units

- 1) Slot only available on system units with revision H0 or later.
- 2) Slot only available on system units with revision G0 or later.
- 3) Slot only available on system units with revision F0 or later.

5.2 X945 CPU boards

Model number	Short description	Note
5PC600.X945-00	X945 CPU board CPU board Intel Atom, 1600 MHz, 533 MHz FSB, 512 KB L2 cache; chipset 945GME; 1 socket for an SO-DIMM DDR2 RAM module.	See page 160

Table 5: Model numbers - X945 CPU boards

5.3 Heat sink

Model number	Short description	Note
5AC600.HS01-03	APC620 heat sink X945 12.8 mm For APC620 system units with X945 CPU boards.	See page 162
5AC600.HS02-03	APC620f heat sink X945 12.8 mm For APC620 full-size system units with X945 CPU boards.	See page 162
5AC600.HS03-02	APC620e heat sink X945 12.8 mm For APC620 embedded system units with X945 CPU boards.	See page 162

Table 6: Model numbers - Heat sinks

5.4 Main memory

Model number	Short description	Note
5MMDDR.0512-01	SO-DIMM DDR2 512MB PC2-5300	See page 163
5MMDDR.1024-01	SO-DIMM DDR2 1024MB PC2-5300	See page 163
5MMDDR.2048-01	SO-DIMM DDR2 2048MB PC2-5300	See page 163

Table 7: Model numbers - Main memory

5.5 Drives

Model number	Short description	Note
5AC600.HDDI-05	Add-on hard disk 40 GB, 24x7, ET 40 GB hard disk (add-on); Suitable for 24 hour operation (24x7) as well as for operation in the extended temperature range (ET). For installation in an APC620 or PPC700.	See page 164
5AC600.HDDI-06	Add-on hard disk 80 GB, 24x7, ET 80 GB hard disk (add-on); Suitable for 24 hour operation (24x7) as well as for operation in the extended temperature range (ET). For installation in an APC620 or PPC700.	See page 167
5AC600.CFSI-00	Add-on CompactFlash slot CompactFlash slot (add-on); for installation in an APC620 or PPC700.	See page 170
5AC600.FDDS-00	Slide-in USB floppy disk drive FDD drive (slide-in); for operation in a slide-in drive slot in an APC620 or PPC700 system.	See page 171
5ACPCI.RAIC-03	PCI SATA RAID system 2 x 160 GB 24x7, ET PCI Raid controller + 2 x 160 GB SATA hard disk; Suitable for 24 hour operation (24x7) as well as for operation in the extended temperature range (ET). Requires a free PCI slot.	See page 175

Table 8: Model numbers - Drives

Model number	Short description	Note
5ACPCI.RAIC-04	Replacement SATA-HDD 160 GB 1 piece Hard disk 160 GB SATA, replacement part for 5ACPCI.RAIC-03	See page 180

Table 8: Model numbers - Drives (Forts.)

5.6 Interface options

Model number	Short description	Note
5AC600.CANI-00	Add-on CAN interface CAN interface for installation in an APC620 or PPC700.	See page 183
5AC600.485I-00	Add-on RS232/422/485 interface Add-on RS232/422/485 interface for installation in an APC620 and PPC700.	See page 187

Table 9: Model numbers - Interfaces

5.7 Fan kits

Model number	Short description	Note
5PC600.FA01-00	Fan kit 1PCI APC620 fan kit, for system units with 1 PCI slot.	See page 191
5PC600.FA02-00	Fan kit 2PCI APC620 fan kit + filter clasp for system units with 2 PCI slots.	See page 192
5PC600.FA03-00	Fan kit 3PCI APC620 fan kit + filter clasp for system units with 3 PCI slots.	See page 194
5PC600.FA05-00	Fan kit 5PCI APC620 fan kit + filter clasp for system units with 5 PCI slots.	See page 195

Table 10: Model numbers - Fan kits

5.8 AP Link cards

Model number	Short description	Note
5AC600.SDL0-00	AP Link SDL transmitter APC620 Smart Display Link Transmitter, to connect an Automation Panel via SDL to an APC620.	See page 197

Table 11: Model numbers - AP Link graphics adapter

5.9 Accessories

5.9.1 Supply voltage connectors

Model number	Short description	Note
0TB103.9	Plug 24V 5.08 3-pin screw clamps 24 VDC 3-pin connector, female. Screw clamp, 3.31mm ² ; protected against vibration by the screw flange.	See page 415
0TB103.91	Plug 24V 5.08 3-pin cage clamps 24 VDC 3-pin connector, female. cage clamps, 3.31mm ² ; protected against vibration by the screw flange.	See page 415

Table 12: Model numbers - Supply voltage connectors

5.9.2 X2X and CAN plugs

Model number	Short description	Note
0TB704.9	Terminal block, 4-pin, Screw clamp, 1.5 mm ²	See page 417
0TB704.91	Terminal block, 4-pin, cage clamps, 2.5 mm ²	See page 417

Table 13: Model numbers - X2X and CAN plug

5.9.3 Batteries

Model number	Short description	Note
0AC201.91	Lithium batteries, 4 pcs. Lithium batteries, 4 pcs., 3 V / 950 mAh, button cell	See page 418
4A0006.00-000	Lithium battery, 1 pc. Lithium batteries, 1 pcs., 3 V / 950 mAh, button cell	See page 418

Table 14: Model numbers - Batteries

5.9.4 CompactFlash cards

Model number	Short description	Note
5CFCRD.0512-04	CompactFlash 512 MB B&R CompactFlash card with 512 MB SLC NAND flash and IDE/ATA interface	See page 422

Table 15: Model numbers - CompactFlash cards

Model number	Short description	Note
5CFCRD.1024-04	CompactFlash 1024 MB B&R CompactFlash card with 1024 MB SLC NAND flash and IDE/ATA interface	See page 422
5CFCRD.2048-04	CompactFlash 2048 MB B&R CompactFlash card with 2048 MB SLC NAND flash and IDE/ATA interface	See page 422
5CFCRD.4096-04	CompactFlash 4096 MB B&R CompactFlash card with 4096 MB SLC NAND flash and IDE/ATA interface	See page 422
5CFCRD.8192-04	CompactFlash 8192 MB B&R CompactFlash card with 8192 MB SLC NAND flash and IDE/ATA interface	See page 422
5CFCRD.016G-04	CompactFlash 16 GB B&R CompactFlash card with 16 GB SLC NAND flash, and IDE/ATA interface	See page 422
5CFCRD.0064-03	CompactFlash 64 MB SSI CompactFlash card with 64 MB SLC NAND flash and IDE/ATA interface	See page 427
5CFCRD.0128-03	CompactFlash 128 MB SSI CompactFlash card with 128 MB SLC NAND flash and IDE/ATA interface	See page 427
5CFCRD.0256-03	CompactFlash 256 MB SSI CompactFlash card with 256 MB SLC NAND flash and IDE/ATA interface	See page 427
5CFCRD.0512-03	CompactFlash 512 MB SSI CompactFlash card with 512 MB SLC NAND flash and IDE/ATA interface	See page 427
5CFCRD.1024-03	CompactFlash 1024 MB SSI CompactFlash card with 1024 MB SLC NAND flash and IDE/ATA interface	See page 427
5CFCRD.2048-03	CompactFlash 2048 MB SSI CompactFlash card with 2048 MB SLC NAND flash and IDE/ATA interface	See page 427
5CFCRD.4096-03	CompactFlash 4096 MB SSI CompactFlash card with 4096 MB SLC NAND flash and IDE/ATA interface	See page 427
5CFCRD.8192-03	CompactFlash 8192 MB SSI CompactFlash card with 8192 MB SLC NAND flash and IDE/ATA interface	See page 427

Table 15: Model numbers - CompactFlash cards (Forts.)

5.9.5 USB flash drives

Model number	Short description	Note
5MMUSB.2048-00	USB flash drive 2 GB SanDisk USB 2.0 flash drive 2 GB	See page 439
5MMUSB.2048-01	USB flash drive 2 GB B&R USB 2.0 flash drive 2 GB	See page 441

Table 16: Model numbers - USB flash drives

5.9.6 Cables

Model number	Description	Note
5CADVI.0018-00	DVI-D cable 1.8 m Single cable, DVI-D/m:DVI-D/m; length: 1.8 m	See page 447
5CADVI.0050-00	DVI-D cable 5 m Single cable, DVI-D/m:DVI-D/m; length: 5 m	See page 447

Table 17: Model numbers - Cables

Model number	Description	Note
5CADVI.0100-00	DVI-D cable 10 m Single cable, DVI-D/m:DVI-D/m; length: 10 m	See page 447
5CAMSC.0001-00	APC620 internal supply cable	See page 446
5CASDL.0018-00	SDL cable 1.8 m SDL cable for a fixed type of layout; length: 1.8 m	See page 450
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 452
5CASDL.0018-03	SDL flex cable 1.8 m SDL cable for fixed and flexible type of layout; length: 1.8 m	See page 456
5CASDL.0050-00	SDL cable 5 m SDL cable for a fixed type of layout; length: 5 m	See page 450
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 452
5CASDL.0050-03	SDL flex cable 5 m SDL cable for fixed and flexible type of layout; length: 5 m	See page 456
5CASDL.0100-00	SDL cable 10 m SDL cable for a fixed type of layout; length: 10 m	See page 450
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 452
5CASDL.0100-03	SDL flex cable 10 m SDL cable for fixed and flexible type of layout; length: 10 m	See page 456
5CASDL.0150-00	SDL cable 15 m SDL cable for a fixed type of layout; length: 15 m	See page 450
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 452
5CASDL.0150-03	SDL flex cable 15 m SDL cable for fixed and flexible type of layout; length: 15 m	See page 456
5CASDL.0200-00	SDL cable 20 m SDL cable for a fixed type of layout; length: 20 m	See page 450
5CASDL.0200-03	SDL flex cable 20 m SDL cable for fixed and flexible type of layout; length: 20 m	See page 456
5CASDL.0250-00	SDL cable 25 m SDL cable for a fixed type of layout; length: 25 m	See page 450
5CASDL.0250-03	SDL flex cable 25 m SDL cable for fixed and flexible type of layout; length: 25 m	See page 456
5CASDL.0300-00	SDL cable 30 m SDL cable for a fixed type of layout; length: 30 m	See page 450
5CASDL.0300-03	SDL flex cable 30 m SDL cable for fixed and flexible type of layout; length: 30 m	See page 456
5CASDL.0300-13	SDL flex cable with extender 30 m SDL cable with extender for fixed and flexible type of layout; length: 30 m	See page 461
5CASDL.0400-13	SDL flex cable with extender 40 m SDL cable with extender for fixed and flexible type of layout; length: 40 m	See page 461
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 468

Table 17: Model numbers - Cables (Forts.)

Model number	Description	Note
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 468
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 466
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 466
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 466

Table 17: Model numbers - Cables (Forts.)

5.9.7 UPS module + accessories

Model number	Short description	Note
5AC600.UPSI-00	Add-on UPS module UPS module for APC620 / APC810 system units 5PC600.SX01-00 (starting with Rev. H0), 5PC600.SX02-00 (starting with Rev. G0), 5PC600.SX02-01 (starting with Rev. H0), 5PC600.SX05-00 (starting with Rev. F0), 5PC600.SX05-01 (starting with Rev. F0), 5PC600.SE00-01 (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.	See page 474
5AC600.UPSB-00	Battery unit 5 Ah UPS battery unit for the add-on UPS module	See page 476
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 480
5CAUPS.0030-00	APC620 UPS cable 3 m Connection cable between add-on UPS module and UPS battery unit, length 3 meters	See page 480

Table 18: Model numbers - UPS module + accessories

5.9.8 PCI Ethernet cards

Model number	Short description	Note
5ACPCI.ETH1-01	PCI Ethernet card 10/100 half size PCI Ethernet card, 1 Ethernet connection	See page 483
5ACPCI.ETH3-01	PCI Ethernet card 10/100 3port half size PCI Ethernet card, 3 Ethernet connections	See page 485

Table 19: Model numbers - PCI Ethernet cards

5.9.9 Miscellaneous

Model number	Short description	Note
5A5003.03	Front cover Front cover for the USB 2.0 Media Drive 5MD900.USB2-00.	See page 435
5AC600.ICOV-00	Interface covers Interface covers for APC620 and PPC700 devices; 5 pieces	See page 420

Table 20: Model numbers - Other items

Model number	Short description	Note
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 421
5AC600.SRAM-00	APC620/PPC700 SRAM module 512kB SRAM module for APC620 and PPC700 512 KB.	See page 488
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 431
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 487
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 487
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 487
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 487
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 491
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 491
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 491
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 491
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 491
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 491
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 491
0PS305.1	Power supply, 3-phase, 5 A 24 VDC power supply, 3-phase, 5 A, input 400500 VAC (3 phases), wide range, DIN rail mounting	See page 491
0PS310.1	Power supply, 3-phase, 10 A 24 VDC power supply, 3-phase, 10 A, input 400500 VAC (3 phases), wide range, DIN rail mounting	See page 491
0PS320.1	Power supply, 3-phase, 20 A 24 VDC power supply, 3-phase, 20 A, input 400500 VAC (3 phases), wide range, DIN rail mounting	See page 491
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 491

Table 20: Model numbers - Other items (Forts.)

5.10 Software

Model number	Short description	Note
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).	See page 443
9S0000.01-010	OEM MS-DOS 6.22 German (disk) OEM MS-DOS 6.22 German disks Only delivered with a new PC.	See page 349
9S0000.01-020	OEM MS-DOS 6.22 English (disk) OEM MS-DOS 6.22 English disks Only delivered with a new PC.	See page 349
5SWWXP.0600-GER	WinXP Professional with SP3, CD German Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a new device.	See page 351
5SWWXP.0600-ENG	WinXP Professional with SP3, CD English Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a new device.	See page 351
5SWWXP.0600-MUL	WinXP Professional with SP3, CD, Multi-language Microsoft OEM Windows XP Professional Service Pack 3, CD, multi-language. Only available with a new device.	See page 351
5SWWXP.0500-GER	WinXP Professional with SP2c, CD German Microsoft OEM Windows XP Professional Service Pack 2c, CD, German. Only available with a new device.	See page 351
5SWWXP.0500-ENG	WinXP Professional with SP2c, CD English Microsoft OEM Windows XP Professional Service Pack 2c, CD, English. Only available with a new device.	See page 351
5SWWXP.0500-MUL	WinXP Professional with SP2c, CD English Microsoft OEM Windows XP Professional Service Pack 2c, CD, multi-language. Only available with a new device.	See page 351
5SWWXP.0430-ENG	WinXPe FP2007 APC620 945GME XTX Microsoft OEM Windows XP Embedded Feature Pack 2007, English; for APC620 with CPU board 5PC600.X945-00; order CompactFlash separately (at least 512 MB).	See page 365
5SWWXP.0730-ENG	Windows Embedded Standard 2009 APC620 945GME Microsoft OEM Windows Embedded, Standard 2009, English; for APC620 with CPU board, 5PC600.X945-00; order CompactFlash separately (at least 1 GB).	See page 368
5SWWCE.0830-ENG	WinCE6.0 Pro APC620 945GME XTX Microsoft OEM Windows CE 6.0 Professional, English; for APC620 with CPU board 5PC600.X945-00; order CompactFlash separately (at least 128 MB).	See page 371

Table 21: Model numbers - Software

6. Typical topologies

6.1 APC620 embedded for central control and visualization

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



Figure 1: APC620 embedded for central control and visualization
6.2 APC620 as visualization device

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



Figure 2: APC620 as visualization device

Chapter 2 • Technical data

1. Introduction

With its structure, its many slots and well thought-out placement of interfaces and drives, the APC620 provides optimal adaptability and ergonomics. The APC620 saves space in the switching cabinet. Drive inserts (HDD, USB floppy) and up to two CompactFlash slots are hidden behind a cover on the front of the device.

The APC620 embedded additionally unites the fieldbus interfaces POWERLINK, CAN and X2X in a compact housing.



Figure 3: Automation PC 620 system overview

The APC620 with an Intel® Atom[™] processor and Intel® 945GME chipset is available for applications with low processing demands. 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.

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1.1 Features

- Intel® Atom™ N270 1.6 GHz processor
- CompactFlash slot (type I)
- Half-size / full-size PCI slots (PCI standard 2.2, 32-bit, PCI bus speed 33 MHz)
- AC97 sound
- USB 2.0
- 24 VDC supply voltage
- 2x Ethernet 10/100 MBit interfaces
- 2x RS232 Interface, modem compatible
- PS/2 keyboard/mouse (combined)
- CAN add-on interface
- Fieldbus interfaces¹⁾ (POWERLINK, CAN and X2X)
- RS232/422/485 add-on interface
- Fan-free operation²⁾
- BIOS
- Real-time clock, (RTC) battery-buffered
- Up to 2 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 module³⁾
- Optional SRAM module⁴⁾ battery backed

¹⁾ Only on APC620 embedded system units.

²⁾ Dependent on the device configuration and the ambient temperature.

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

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

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

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

The following components are absolutely essential for operation:

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

1.2.1 Selection guide - basic system



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

1.2.2 Selection guide - Optional components

	0011			
System unit	1	1		
The system unit consists of the housing and base board. Variants: PCI slots (1,2, 3 or 5) Slidé-in slots (0,1 or 2) AP Link slots (0 or 1) Example: 2 / 1 / 1	EDC600 EVOI 00 (1/0/0)		EPC600 5502 00 /2/1/1/	
= 2 PCI, 1 slide-in, 1 AP Link	5PC600.5X01-00 (1/0/0)	5PC600.SX02-01 (2/1/0) 5PC600.SX02-00 (2/1/1)	5PC600.5F03-00 (3/1/1)	5PC600.SX05-01 (5/2 5PC600.SX05-00 (5/2
Fan kit (select 1)				
A fan kit may be required for some system configurations	and all the	IN STR	and the second s	
	5PC600.FA01-00	5PC600.FA02-00	5PC600.FA03-00	5PC600.FA05-00
Add-on drive		Selec	ct 1	
	5AC60 5AC60 5AC60	0.HDDI-05 (40 GB HDD - 24x7 0.HDDI-06 (80 GB HDD - 24x7 0.CFSI-00 (CompactFlash slot)	operation and extended temp. rang operation and extended temperatu	ge) ire range)
Slide-in drives	not possible	Select	max. 1	Select max. 2
			5AC600.FDDS-00 (USB Flo	ppy)
AP Link insert cards	not possible		Select 1	
for a second graphics line		Only possible when u	5AC600.SDL0-00 Ising a 5PC600.SX02-00, 5P	C600.SX05-00 board.
RAID system		•		
D		5ACPCI.RAIC-03 (takes up 1 5ACPCI.RAIC-04 - replacem	1 PCI slot) ient hard diskl for 5ACPCI.R/	ACI-03
Optional interface		Sel	ect 1	
A second		5AC600.CA 5AC600.485I-00 (combin	NI-00 (CAN) ed RS232/RS422/RS485)	
UPS module		Sel	ect 1	
B	Can only be installe 5PC600.SX02 Rev. G0,	5AC600.UPSI-00 (ed starting with the following , 5PC600.SX02-01 Rev. H0,	Add-on UPS modul) system unit revisions: 5PC60 5PC600.SX05-00 Rev. F0, 5	00.SX01-00 Rev. H0, PC600.SX05-01 Rev. F0
SRAM module		Sel	ect 1	
1	Can only be install 5PC600.SX02 Rev. H0,	5AC600.SRAM-00 (Add ed starting with the following 5PC600.SX02-01 Rev. K0, 5	-On SRAM Modul 512kB) system unit revisions: 5PC6 5PC600.SX05-00 Rev. H0, 5	00.SX01-00 Rev. I0, PC600.SX05-01 Rev. H0
		Sel	ect 1	
Supply voltage plugs		001		

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

Technical data • Introduction

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 section 2.6 "Ambient temperatures for systems with X945 CPU board", on page 75)
- 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 X945 CPU board.
- An add-on interface adds an optional connection possibility.
- Depending on the revision of the system unit (see graphic), an optional integrated UPS add-on module can be installed.
- Depending on the revision of the system unit (see graphic), an optional integrated SRAM module (battery backed) can be installed.
- The appropriate power supply plugs ensure simple connection to the power supply.

1.3 Structure / configuration APC620 embedded

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



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

Explanation:

- 1) Select a system unit.
- 2) Select a CPU board.
- 3) Select main memory and heat sink (selection 1 each).
- 4) Select optional components.

Technical data

Section 2

2. Entire device

2.1 APC620, 1 PCI slot variant

2.1.1 Interfaces



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

Warning!

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

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



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

Information:

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

Section 2 Technical data

2.1.2 Technical data

Features	APC620, 1 PCI slot variant
B&R ID code	Component-dependent, see 3.1 "System units", on page 155
Boot loader / Operating system	BIOS / see the chapter 4 "Software", on page 265
Processor Cooling	Component-dependent, see technical data for the CPU board
Main memory	
Graphics	
Controller	Component-dependent, see technical data for the CPU board
Power failure logic Controller Buffer time	MTCX ¹⁾ (see also page 544) 10 ms, dependent on the system unit revision, TBD
Real-time clock Battery-buffered Accuracy	Yes Component-dependent, see technical data for the CPU board
Battery Type Removable Lifespan	See also page 139 Renata 950 mAh Yes, accessible behind the orange cover 4 years ^{2) 3)}
Ethernet Controller Amount	See also page 111 or page 113 2
CAN bus	Optional using add-on interface (5AC600.CANI-00)
CompactFlash Type Amount	See also page 133 or page 134 Type I 1 (max. 4 using optional components)
Serial interface Amount Type UART Transfer rate Connection	See also page 104 or page 105 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 114 USB 2.0 2 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s) Type A Max. 500 mA per connection
Reset button	Yes, accessible behind the orange cover
LEDs	4 directed outwards via fiber optic lines, also see section "Status LEDs", on page 131
PCI slots half-size full-size	See also section "PCI slots", on page 128 1 -
Add-on UPS internal slot	Yes 5PC600.SX01-00 starting with revision H0 See also section "Add-on UPS module slot", on page 127

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

Features	APC620, 1 PCI slot variant
SRAM internal slot options	Yes 5PC600.SX01-00 starting with revision I0
Electrical characteristics	
Power supply Rated voltage 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 2.7 "Power management APC620 system unit with 1 PCI slot"
Mechanical characteristics	
Housing ⁴⁾ Item Paint Front cover	Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See "Dimensions", on page 51
Weight	Approx. 3.4 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Bearings Transport	Component-dependent, see the section about ambient temperature on page 75 -20 to +60°C -20 to +60°C
Relative humidity Operation Bearings Transport	Component-dependent, see section "Humidity specifications", on page 101 Component-dependent, see section "Humidity specifications", on page 101 Component-dependent, see section "Humidity specifications", on page 101
Vibration ⁵⁾ Operation (continuous) Operation (occasional) Bearings Transport	2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock ⁵⁾ Operation Bearings Transport	15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Protection type	IP20
Altitude Operation	max. 3000 m ⁶⁾ (component-dependent)
Electromagnetic compatibility	
Emissions Network-related emissions Emissions	EN 61000-6-4, EN 55022 A EN 61000-6-4, EN 55011 class A, EN 55022 class A, EN 61131-2, 47 CFR Part 15

Table 22: Technical data - APC620, 1 PCI slot variant (Forts.)

Section 2 Technical data

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

Table 22: Technical data - APC620, 1 PCI slot variant (Forts.)

1) Maintenance controller extended.

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

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

2.1.3 Dimensions



Figure 9: Dimensions - APC620, 1 PCI slot variant

2.2 APC620, 2 PCI slot variant

2.2.1 Interfaces



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

Warning!

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

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



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

Information:

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

Technical data

2.2.2 Technical data

Features	APC620, 2 PCI slot variant
B&R ID code	Component-dependent, see 3.1 "System units", on page 155
Boot loader / Operating system	BIOS / see the chapter 4 "Software", on page 265
Processor Cooling	Component-dependent, see technical data for the CPU board
Main memory	Fassive via near sink and optionally supported with an active fair kit
Graphics Controller	Component-dependent, see technical data for the CPU board
Power failure logic Controller Buffer time	MTCX ¹⁾ (see also page 544) 10 ms, dependent on the system unit revision, TBD
Real-time clock Battery-buffered Accuracy	Yes Component-dependent, see technical data for the CPU board
Battery Type Removable Lifespan	See also page 139 Renata 950 mAh Yes, accessible behind the orange cover 4 years ^{2) 3)}
Ethernet Controller Amount	See also page 111 or page 113 2
CAN bus	Optional using add-on interface (5AC600.CANI-00)
CompactFlash Type Amount	See also page 133 or page 134 Type I 2 (max. 4 using optional components)
Serial interface Amount Type UART Transfer rate Connection	See also page 104 or page 105 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 114 USB 2.0 2 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s) Type A Max. 500 mA per connection
Reset button	Yes, accessible behind the orange cover
LEDs	4 directed outwards via fiber optic lines, also see section "Status LEDs", on page 131
PCI slots half-size full-size	See also section "PCI slots", on page 128 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 127

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

Features	APC620, 2 PCI slot variant
SRAM internal slot options	Yes 5PC600.SX02-00 starting with revision H0, 5PC600.SX02-01 starting with revision K0 present
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption	24 VDC ±25% 3.8 A Typ. 7 A, max. 40 A for < 300 μs Component-dependent, see section 2.7 "Power management APC620 system unit with 1 PCI slot"
Mechanical characteristics	
Housing ⁴⁾ Item Paint Front cover	Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See "Dimensions", on page 57
Weight	Approx. 4.5 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Bearings Transport	Component-dependent, see the section about ambient temperature on page 75 -20 to +60°C -20 to +60°C
Relative humidity Operation Bearings Transport	Component-dependent, see section "Humidity specifications", on page 101 Component-dependent, see section "Humidity specifications", on page 101 Component-dependent, see section "Humidity specifications", on page 101
Vibration ⁵⁾ Operation (continuous) Operation (occasional) Bearings Transport	2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock ⁵⁾ Operation Bearings Transport	15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Protection type	IP20
Altitude Operation	max. 3000 m ⁶⁾ (component-dependent)
Electromagnetic compatibility	
Emissions Network-related emissions Emissions	EN 61000-6-4, EN 55022 A EN 61000-6-4, EN 55011 class A, EN 55022 class A, EN 61131-2, 47 CFR Part 15

Table 23: Technical data - APC620, 2 PCI slot variant (Forts.)

Section 2 Technical data

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

1) Maintenance controller extended.

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

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

2.2.3 Dimensions



Figure 12: Dimensions - APC620, 2 PCI slot variant

2.3 APC620, 3 PCI slot variant

2.3.1 Interfaces



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

Warning!

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

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



Technical data • Entire device

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

Information:

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

2.3.2 Technical data

Features	APC620, 3 PCI slot variant
B&R ID code	Component-dependent, see 3.1 "System units", on page 155
Boot loader / Operating system	BIOS / see the chapter 4 "Software", on page 265
Processor Cooling Method	Component-dependent, see technical data for the CPU board
Main memory	Max. 2 GB
Graphics Controller	Component-dependent, see technical data for the CPU board
Power failure logic Controller Buffer time	MTCX ¹⁾ (see also page 544) 10 ms, dependent on the system unit revision, TBD
Real-time clock Battery-buffered Accuracy	Yes Component-dependent, see technical data for the CPU board
Battery Type Removable Lifespan	See also page 139 Renata 950 mAh Yes, accessible behind the orange cover 4 years ^{2) 3)}
Ethernet Controller Amount	See also page 111 or page 113 2
CAN bus	Optional using add-on interface (5AC600.CANI-00)
CompactFlash Type Amount	See also page 133 or page 134 Type I 2 (max. 4 using optional components)
Serial interface Amount Type UART Transfer rate Connection	See also page 104 or page 105 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 114 USB 2.0 2 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s) Type A Max. 500 mA per connection
Reset button	Yes, accessible behind the orange cover
LEDs	4 directed outwards via fiber optic lines, also see section "Status LEDs", on page 131
PCI slots half-size full-size	See also section "PCI slots", on page 128 - 3
Add-on UPS internal slot	Yes See also section "Add-on UPS module slot", on page 127
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 2.9 "Power management APC620 system unit with 3 PCI slots"
Mechanical characteristics	
Housing ⁴⁾ Item Paint Front cover	Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See "Dimensions", on page 62
Weight	Approx. 4.5 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Bearings Transport	Component-dependent, see the section about ambient temperature on page 75 -20 to +60°C -20 to +60°C
Relative humidity Operation Bearings Transport	Component-dependent, see section "Humidity specifications", on page 101 Component-dependent, see section "Humidity specifications", on page 101 Component-dependent, see section "Humidity specifications", on page 101
Vibration ⁵⁾ Operation (continuous) Operation (occasional) Bearings Transport	2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock ⁵⁾ Operation Bearings Transport	15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Protection type	IP20
Altitude Operation	max. 3000 m ⁶⁾ (component-dependent)
Electromagnetic compatibility	
Emissions Network-related emissions Emissions	EN 61000-6-4, EN 55022 A EN 61000-6-4, EN 55011 class A, EN 55022 class A, EN 61131-2, 47 CFR Part 15
Immunity Electrostatic discharge (ESD) High-frequency electromagnetic fields High-speed transient disturbances (Burst) Surges Conducted values Magnetic fields with electrical frequencies Voltage dips, interruptions	EN 61000-6-2, EN 61131-2, EN 55024 EN 61000-6-2, EN 61131-2, EN 55024
Damped vibration	EN 61000-6-2, EN 61131-2, EN 55024

Table 24: Technical data - APC620, 3 PCI slot variant (Forts.)

1) Maintenance controller extended.

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

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



Figure 15: Dimensions - APC620, 3 PCI slot variant

2.4 APC620, 5 PCI slot variant

2.4.1 Interfaces



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

Warning!

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

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





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

Information:

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

2.4.2 Technical data

Features	APC620, 5 PCI slot variant
B&R ID code	Component-dependent, see 3.1 "System units", on page 155
Boot loader / Operating system	BIOS / see the chapter 4 "Software", on page 265
Processor Cooling	Component-dependent, see technical data for the CPU board
Method	Passive via heat sink and optionally supported with an active fan kit
Main memory	Max. 2 GB
Graphics Controller	Component-dependent, see technical data for the CPU board
Power failure logic Controller Buffer time	MTCX ¹⁾ (see also page 544) 10 ms, dependent on the system unit revision, TBD
Real-time clock Battery-buffered Accuracy	Yes Component-dependent, see technical data for the CPU board
Battery Type Removable Lifespan	See also page 139 Renata 950 mAh Yes, accessible behind the orange cover 4 years ^{2) 3)}
Ethernet Controller Amount	See also page 111 or page 113 2
CAN bus	Optional using add-on interface (5AC600.CANI-00)
CompactFlash Type Amount	See also page 133 or page 134 Type I 2 (max. 4 using optional components)
Serial interface Amount Type UART Transfer rate Connection	See also page 104 or page 105 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 114 USB 2.0 2 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s) Type A Max. 500 mA per connection
Reset button	Yes, accessible behind the orange cover
LEDs	4 directed outwards via fiber optic lines, also see section "Status LEDs", on page 131
PCI slots half-size full-size	See also section "PCI slots", on page 128 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 127

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

Features	APC620, 5 PCI slot variant
SRAM internal slot options	Yes 5PC600.SX05-00 starting with revision H0, 5PC600.SX05-01 starting with revision H0 present
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption	24 VDC ±25% 5 A Typ. 10 A, max. 40 A for < 300 μs Component-dependent, see section 2.10 "Power management APC620 system units with 5 PCI slots"
Mechanical characteristics	
Housing ⁴⁾ Item Paint Front cover	Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See "Dimensions", on page 68
Weight	Approx. 5.7 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Bearings Transport	Component-dependent, see the section about ambient temperature on page 75 -20 to +60°C -20 to +60°C
Relative humidity Operation Bearings Transport	Component-dependent, see section "Humidity specifications", on page 101 Component-dependent, see section "Humidity specifications", on page 101 Component-dependent, see section "Humidity specifications", on page 101
Vibration ⁵⁾ Operation (continuous) Operation (occasional) Bearings Transport	2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock ⁵⁾ Operation Bearings Transport	15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Protection type	IP20
Altitude Operation	max. 3000 m ⁶⁾ (component-dependent)
Electromagnetic compatibility	
Emissions Network-related emissions Emissions	EN 61000-6-4, EN 55022 A EN 61000-6-4, EN 55011 class A, EN 55022 class A, EN 61131-2, 47 CFR Part 15

Table 25: Technical data - APC620, 5 PCI slot variant (Forts.)

Electromagnetic compatibility	APC620, 5 PCI slot variant
Immunity Electrostatic discharge (ESD) High-frequency electromagnetic fields High-speed transient disturbances (Burst) Surges Conducted values Magnetic fields with electrical frequencies Voltage dips, interruptions Damoed 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

Table 25: Technical data - APC620, 5 PCI slot variant (Forts.)

1) Maintenance controller extended.

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

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

Section 2 Technical data

2.4.3 Dimensions



Figure 18: Dimensions - APC620, 5 PCI slot variant

2.5 APC620 embedded variant

2.5.1 Interfaces



Figure 19: APC620 embedded variant interface overview - top side

Warning!

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

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

Technical data



Figure 20: APC620 embedded variant interface overview - front side

Information:

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

2.5.2 Technical data

Features	APC620 embedded variant
B&R ID code	Component-dependent, see 3.1 "System units", on page 155
Boot loader / Operating system	BIOS / see the chapter 4 "Software", on page 265
Processor Cooling Method	Component-dependent, see technical data for the CPU board Passive via heat sink
Main memory	Max. 2 GB
Graphics Controller	Component-dependent, see technical data for the CPU board
Power failure logic Controller Buffer time	MTCX ¹⁾ (see also page 544) 10 ms, dependent on the system unit revision, TBD
Real-time clock Battery-buffered Accuracy	Yes Component-dependent, see technical data for the CPU board
Battery	See also page 139
Type	Renata 950 mAh
Removable	Yes, accessible behind the orange cover
Lifespan	2 1/2 years ²⁾
Ethernet	Yes
Controller	See also page 110
Amount	1
POWERLINK	Yes, also see page 108
Amount	1
Station Number Dial	2 pcs.
X2X Link	Yes, also see page 106
Amount	1
Status LED	Yes, see page 108
CAN bus	See also page 106
Amount	1
Transfer rate	Max. 500 kBit/s
Node switch	Yes
Terminating resistor	Yes, can be activated using a switch
Status LED	Yes, see page 108
CompactFlash	See also page 136
Type	Type I
Amount	2
Serial interface	See also page 104 or page 105
Amount	2
Type	RS232, modem-capable, not electrically isolated
UART	16550-compatible, 16-byte FIFO
Transfer rate	Max. 115 kBaud
Connection	9-pin DSUB
USB interface	See also page 115
Type	USB 2.0
Amount	4
Transfer rate	Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)
Connection	Type A
Current load	Max. 500 mA or 1 A per connection

Table 26: Technical data - APC620 embedded variant

Features	APC620 embedded variant
Reset button	Yes, accessible behind the orange cover
LEDs	3 directed outwards via fiber optic lines, also see section "Status LEDs Power, CF, Link (only APC620 embedded)", on page 132
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 2.11 "Power management for the APC620 embedded system unit"
Mechanical characteristics	
Housing ³⁾ Item Paint Front cover	Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See "Dimensions", on page 74
Weight	Approx. 1.4 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Bearings Transport	Component-dependent, see the section about ambient temperature on page 75 -20 to +60°C -20 to +60°C
Relative humidity Operation Bearings Transport	Component-dependent, see section "Humidity specifications", on page 101 Component-dependent, see section "Humidity specifications", on page 101 Component-dependent, see section "Humidity specifications", on page 101
Vibration ⁴⁾ Operation (continuous) Operation (occasional) Bearings Transport	2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock ⁵⁾ Operation Bearings Transport	15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Protection type	IP20
Altitude Operation	max. 3000 m ⁵⁾ (component-dependent)
Electromagnetic compatibility	
Emissions Network-related emissions Emissions	EN 61000-6-4, EN 55022 A EN 61000-6-4, EN 55011 class A, EN 55022 class A, EN 61131-2, 47 CFR Part 15

Table 26: Technical data - APC620 embedded variant (Forts.)
Electromagnetic compatibility	APC620 embedded variant		
Immunity Electrostatic discharge (ESD) High-frequency electromagnetic fields High-speed transient disturbances (Burst) Surges Conducted values Magnetic fields with electrical frequencies	EN 61000-6-2, EN 61131-2, EN 55024 EN 61000-6-2, EN 61131-2, EN 55024		
Voltage dips, interruptions Damped vibration	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 (Forts.)

1) Maintenance controller extended.

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

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

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

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

Section 2 Technical data

2.5.3 Dimensions



Figure 21: APC620 embedded variant - dimensions

2.6 Ambient temperatures for systems with X945 CPU board

It is possible to combine CPU boards with various other components, such as drives, main memory, additional insert cards, etc. dependent on system unit and fan kit. The various configurations result in varying maximum possible ambient temperatures, which can be seen in the following graphic (see figure 2.6 "Ambient temperatures for systems with X945 CPU board", on page 75).

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 265).

Worst-case conditions for systems with an X945 CPU board

- 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

2.6.1 Maximum ambient temperature



Figure 23: Ambient temperatures for systems with an X945 CPU board



Figure 24: Ambient temperatures for embedded systems with an X945 CPU board

2.6.2 Minimum ambient temperature

For systems containing one of the following components, the minimum ambient temperature is +5°C: 5AC600.FDDS-00.

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

Technical data • Entire device

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 - RAID hard disks

For these hard disks, the limits will depend on whether the system is intended for 24-hour¹⁾ or standard¹⁾ 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 RAID hard disks (5ACPCI.RAIC-03).

2.6.4 Temperature monitoring

The APC620 has temperature sensors in various places (I/O, power supply, slide-in drive 1, slide-in drive 2). The locations of the temperature sensors can be found in the figure "Temperature sensor locations", on page 541. The value listed in the table represents the defined maximum temperature for this measurement point²⁾. An alarm is not triggered when this temperature is exceeded. The temperatures²⁾ can be read in BIOS (menu item "Advanced" - Baseboard/panel features - Baseboard monitor) or in Microsoft Windows XP/Embedded, using the B&R Control Center.

Additionally, the hard disks for APC620 systems available from B&R are equipped with S.M.A.R.T, or Self Monitoring, Analysis, and Reporting Technology. This makes it possible to read various parameters, for example the temperature, using software (e.g. HDD thermometer - freeware) in Microsoft Windows XP/Embedded.

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

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

2.7 Power management APC620 system unit with 1 PCI slot

2.7.1 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 10.



Figure 25: Supply voltage for the 5PC600.SX01-00 revision >= 10

Explanation:

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

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

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

Inf	orm	atio	n:	5PC600.SX01-00	This system
All o The The valu	entrie value value es, b	es in es for es for ut not	watts the suppliers are maximum values. the devices are average maximum peak values.	5PC600.X945-00 🖉	Enter values in this column
			Total power supply	(maximum)	70
		Ad	d-on UPS module, optional	7,5	
			Maximun	n possible at 5V	70
		CF	PU board, fixed device	16	
		Pe	r CompactFlash, optional (add-on, slide-in)	1	
		Ha	rd Disk, optional (add-on, slide-in)	4	
		Ex	ternal keyboard PS/2, optional	1	
		US (ma	B peripheral, optional ax. 2.5 watts per USB1 and USB2 connection)	5	
		Int	erface option (add-on interface), optional	0.5	
		PC (ma	Cl card manufacturer limit, optional ax. 3 watts without fan kit, max. 17 watts with fan kit) ¹⁾		
_		Ex	ternal device, optional (via BaseBoard)		
ppl	N		I	Devices 5V Σ	
lns .	5	2	Maximum p	ossible at +12V	12
ver			Fan kit, optional	2.5	
bo			External device, optional (via BaseBoard)	10	
otal		+	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit) 1)		
				Devices +12V \sum	
			Maximum p	oossible at -12V	1.2
		-12V	PCI card manufacturer limit, optional (max. 1.2 watts with and without fan kit) ¹⁾		
				Devices -12V \sum	
			[Devices total 5V Σ	
			Maximum	possible at 3V3	23
		Sy	stem unit, fixed device	4	
	V3	Int	erface option (add-on interface), optional	0.25	
	3	PC (ma	Cl card manufacturer limit, optional ax. 3 watts without fan kit, max. 17 watts with fan kit) ¹⁾		
				Devices 3V3 Σ	
				Devices total Σ	

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

2.7.3 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 < 10.



Figure 26: Supply voltage for the 5PC600.SX01-00 revision < 10

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, 5V, +12V are placed on the bus. At the 5V output, yet another DC/DC converter generates -12V, and places these on the bus.

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

Inf	orm	atio	n:	5PC600.SX01-00	This system
All o The The valu	entrie value value ies, b	es in es for es for ut not	watts the suppliers are maximum values. the devices are average maximum peak values.	5PC600.X945-00 2	Enter values in this column
			Total power sup	ply (maximum)	70
		Ad	d-on UPS module, optional	7.5	
			Maximum	possible at 5V	55
		CF	PU board, fixed device	16	
		Pe	r CompactFlash, optional (add-on, slide-in)	1	
		Ha	rd disk, optional (add-on, slide-in)	4	
		Ex	ternal keyboard PS/2, optional	1	
		US (ma	B peripheral, optional ax. 2.5 watts per USB1 and USB2 connection)	5	
		Int	erface option (add-on interface), optional	0.5	
	5V	PC (ma	Cl card manufacturer limit, optional ax. 3 watts without fan kit, max. 17 watts with fan kit) ¹⁾		
_		Ex	ternal device, optional (via BaseBoard)	5	
٥ld				Devices 5V Σ	
ns ,		Maximum possible a			1.2
ower		-12V	PCI card manufacturer limit, optional (max. 1.2 watts with and without fan kit) ¹⁾		
talp				Devices -12V Σ	
P		Devices total 5V Σ			
			Maximum p	23	
		Sy	stem unit, fixed device	4	
	V3	Int	erface option (add-on interface), optional	0.25	
	3	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) ¹⁾			
				Devices 3V3 Σ	
			Maximum po	ossible at +12V	12
		Fa	n kit, optional	2.5	
	2	Ex	ternal device, optional (via BaseBoard)	10	
	+	PC (ma	Cl card manufacturer limit, optional ax. 3 watts without fan kit, max. 12 watts with fan kit)		
				Devices +12V Σ	
				Devices total Σ	

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

2.8 Power management APC620 system units with 2 PCI slots

2.8.1 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 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 V feed four further DC/DC converters, which generate the remaining voltages.

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

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

Inf	orm	atic	on:	5PC600.SX02-00	This system
All o The The value	entrie value value ies, b	es in es for es for ut no	watts the suppliers are maximum values. the devices are average maximum t peak values.	5PC600.X945-00 §	Enter values in this column
			Total power sup	ply (maximum)	70
		Ac	ld-on UPS module, optional	7.5	
			Maximum	possible at 5V	70
		CF	PU board, fixed device	16	
		Pe	r CompactFlash, optional (add-on, slide-in)	1	
		Ha	ard disk, optional (add-on, slide-in)	4	
		Pe	r drive, optional (slide-in CD,DVD CD-RW)	4	
		Ex	ternal keyboard PS/2, optional	1	
		(m	SB peripheral, optional ax. 2.5 watts per USB1 and USB2 connection)	5	
		Int	erface option (add-on interface), optional	0.5	
		Gr	aphics adapter (AP Link), optional	5	
		PC (m	CI card manufacturer limit, optional ax. 3 watts without fan kit, max. 17 watts with fan kit) ¹⁾		
Ň	_	Ex	ternal device, optional (via BaseBoard)	5	
dh	5			Devices 5V Σ	
er s			Maximum po	ossible at +12V	12
Ň		_	Fan kit, optional	2.5	
l p		2	External device, optional (via BaseBoard)	10	
Tota		Ŧ	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit) ¹⁾		
				Devices +12V Σ	
			Maximum p	ossible at -12V	1.2
		12V	PCI card manufacturer limit, optional (max. 1.2 watts with and without fan kit) ¹⁾		
		ľ.		Devices -12V Σ	
			D	evices total 5V Σ	
			Maximum p	oossible at 3V3	23
		Sy	stem unit, fixed device	4	
	3	Gr	aphics adapter (AP Link), optional	5	
	3V	Int	erface option (add-on interface), optional	0.25	
		(m	A card manufacturer limit, optional ax. 3 watts without fan kit, max. 17 watts with fan kit) ¹⁾		
				Devices 3V3 Σ	
				Devices total Σ	

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

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

Inf	orm	ation:	5PC600.SX02-01	This system
All The The valu	entrie value value ies, b	is in watts es for the suppliers are maximum values. es for the devices are average maximum ut not peak values.	5PC600.X945-00 🖉	Enter values in this column
		Total power sup	ply (maximum)	70
		Add-on UPS module, optional	7.5	
		Maximum	possible at 5V	70
		CPU board, fixed device	16	
		Per CompactFlash, optional (add-on, slide-in)	1	
		Hard disk, optional (add-on, slide-in)	4	
		Per drive, optional (slide-in CD, DVD, CD-RW)	4	
		External keyboard PS/2, optional	1	
		USB peripheral, optional (max. 2.5 watts per USB1 and USB2 connection)	5	
		Interface option (add-on interface), optional	0.5	
	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	
ddn			Devices 5V Σ	
er s		Maximum p	ossible at -12V	1.2
Nod		PCI card manufacturer limit, optional (max. 1.2 watts with and without fan kit) ¹⁾		
otal			Devices -12V Σ	
Ĕ		D	evices total 5V Σ	
		Maximum	23	
		System unit, fixed device	4	
	33	Interface option (add-on interface), optional	0.25	
	é	PCI card manufacturer limit, optional		
		(max. 3 watts without fan kit, max. 17 watts with fan kit)	_	
			Devices 3V§ Σ	
		Maximum po	ossible at +12V	12
	5	Fan kit, optional	2.5	
	12	External device, optional (via BaseBoard)	10	
	+	(max. 3 watts without fan kit, max. 12 watts with fan kit)		
			Devices +12V Σ	
			Devices total Σ	

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

Technical data • Entire device

2.8.4 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 28: 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, 5V, +12V are placed on the bus. At the 5V output, yet another DC/DC converter generates -12V, and places these on the bus.

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

Inf	orm	atio	n:	5PC600.SX02-00	This system
All o The The valu	entrie value values, b	es in es for es for ut not	watts the suppliers are maximum values. the devices are average maximum peak values.	5PC600.X845-00 ន្ទី	Enter values in this column
			Total power sup	ply (maximum)	70
		Ad	d-on UPS module, optional	7.5	
			Maximum	possible at 5V	55
		CF	PU board, fixed device	16	
		Pe	r CompactFlash, optional (add-on, slide-in)	1	
		На	rd disk, optional (add-on, slide-in)	4	
		Pe	r drive, optional (slide-in CD, DVD, CD-RW)	4	
		Ex	ternal keyboard PS/2, optional	1	
		US (ma	B peripheral, optional ax. 2.5 watts per USB1 and USB2 connection)	5	
		Int	erface option (add-on interface), optional	0.5	
	2	Gr	aphics adapter (AP Link), optional	5	
	ß	PC (ma	CI card manufacturer limit, optional ax. 3 watts without fan kit, max. 17 watts with fan kit) ¹⁾		
Ň		Ex	ternal device, optional (via BaseBoard)	5	
ldns				Devices 5V Σ	
er s			Maximum p	1.2	
bow		-12V	PCI card manufacturer limit, optional (max. 1.2 watts with and without fan kit) ¹⁾		
otal				Devices -12V Σ	
			D	evices total 5V Σ	
			Maximum p	23	
		Sy	stem unit, fixed device	4	
	3	Gr	aphics adapter (AP Link), optional	5	
	3	Int	erface option (add-on interface), optional	0.25	
		PC (ma	Cl card manufacturer limit, optional ax. 3 watts without fan kit, max. 17 watts with fan kit) ¹⁾		
				Devices 3V3 Σ	
			Maximum po	ossible at +12V	12
		Fa	n kit, optional	2.5	
	2	Ex	ternal device, optional (via BaseBoard)	10	
	Ŧ	PC (ma	CI card manufacturer limit, optional ax. 3 watts without fan kit, max. 12 watts with fan kit) ¹⁾		
				Devices +12V Σ	
				Devices total Σ	

Section 2 Technical data

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

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

Inf	orm	atic	on:	5PC600.SX02-01	This system
All o The The valu	entrie value value ies, b	es in es for es for ut no	watts the suppliers are maximum values. the devices are average maximum t peak values.	5PC600.X945-00 §	Enter values in this column
			Total power sup	ply (maximum)	70
		Ac	ld-on UPS module, optional	7.5	
			Maximum	possible at 5V	55
		CF	PU board, fixed device	16	
		Pe	er CompactFlash, optional (add-on, slide-in)	1	
		Ha	ard disk, optional (add-on, slide-in)	4	
		Pe	er drive, optional (slide-in CD, DVD, CD-RW)	4	
		Ex	ternal keyboard PS/2, optional	1	
		US (m	SB peripheral, optional ax. 2.5 watts per USB1 and USB2 connection)	5	
		Interface option (add-on interface), optional		0.5	
	5V	PC (m	CI card manufacturer limit, optional ax. 3 watts without fan kit, max. 17 watts with fan kit) ¹⁾		
Ŋ		Ex	ternal device, optional (via BaseBoard)	5	
ddn				Devices 5V Σ	
er s			Maximum p	ossible at -12V	1.2
pow		-12V	PCI card manufacturer limit, optional (max. 1.2 watts with and without fan kit) ¹⁾		
otal				Devices -12V Σ	
F			D	evices total 5V Σ	
		Maximum possible at 3V3			23
		Sy	stem unit, fixed device	4	
	V3	Int	terface option (add-on interface), optional	0.25	
	3	PC (m	CI card manufacturer limit, optional ax. 3 watts without fan kit, max. 17 watts with fan kit) ¹⁾		
				Devices 3V3 Σ	
			Maximum po	ossible at +12V	12
		Fa	in kit, optional	2.5	
	12	Ex	ternal device, optional (via BaseBoard)	10	
	Ŧ	PC (m	CI card manufacturer limit, optional ax. 3 watts without fan kit, max. 12 watts with fan kit) ¹⁾		
				Devices +12V Σ	
				Devices total Σ	

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

2.9 Power management APC620 system unit with 3 PCI slots

2.9.1 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 29: 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, 5V, +12V are placed on the bus. At the 5V output, yet another DC/DC converter generates -12V, and places these on the bus.

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

Inf	information:				5PC600.SF03-00	This system
All e The The valu	entrie value value ies, bi	es in es for es for ut not	watts the s the d	uppliers are maximum values. evices are average maximum values.	5PC600.X945-00 §	Enter values in this column
				Total power supp	ly (maximum)	110
		Ad	d-on	UPS module, optional	7.5	
				Maximum p	ossible at 5V	70
		CF	PU bo	ard, fixed device	16	
		Pe	r Con	npactFlash, optional (add-on)	1	
		Ha	rd dis	sk, optional (add-on)	4	
			B	rinheral ontional	1	
		(ma	ax. 2.5	watts per USB1 and USB2 connection)	5	
	~	Int	erface	e option (add-on interface), optional	0.5	
	5	Gr	aphic	s adapter (AP Link), optional	5	
		Ex	ternal	l device, optional (via BaseBoard)	5	
				Maximum pos	sible at +12V	24
		S	Fan	kit, optional	2.5	
		+12	Exte	ernal device, optional (via BaseBoard)	10	
			PCI (max.	card manufacturer limit, optional 1) 3 watts without fan kit, max. 12 watts with fan kit)		
N	De				vices total 5V Σ	
d		Maximum possible at 3V3				23
r s		Sy	stem	unit, fixed device	4	
No.	33	Gr	aphic	s adapter (AP Link), optional	5	
<u>a</u>		Interface option (add-on interface), optional 0.25				
ota						
F			PCI bus and slide-in power supply rating (maximum)			50
	≥			Maximum possible at 5V PCI bu	s and slide-in	50
	d		Pro	o CompactFlash, optional (slide-in)	1	
	r sı		Pro	b Hard Disk, optional (slide-in)	4	
	Ne		Pro	b Lautwerk, optional (slide-in - CD/DVD)	4	
	g	>	PC (ma	ax. 3 watts without fan kit, max. 17 watts with fan kit)		
	e-in	വ		Maximum possible at -12V PCI bu	s and slide-in	1.2
	slid		12	PCI card manufacturer limit,		
	pug		•	optional (max r.z watto with and wattout fail fail)	Devices -12V Σ	
	us â			De	vices total 5V Σ	
	СIР			Maximum possible at 3V3 PCI bu	s and slide-in	23
	₽	3V3	PC (ma	cl card manufacturer limit, optional		
			(116	and the second of the second	Devices 3V3 Σ	
				PCI bus and	I slide-in total Σ	
					Devices total Σ	

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

2.10 Power management APC620 system units with 5 PCI slots

2.10.1 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 30: 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, 5V, +12V are placed on the bus. At the 5V output, yet another DC/DC converter generates -12V, and places these on the bus.

Technical data • Entire device

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

Inf	orm	atic	n:		5PC600.SX05-00	This system
All o The The valu	All entries in watts The values for the suppliers are maximum values. The values for the devices are average maximum values, but to pack values.				5PC600.X945-00 §	Enter values in this column
				Total power sup	nly (maximum)	110
	_	Ac	ld-on			110
		Au	u-on	Maximum	7.5	70
		C	PIIbo	maximum and fixed device	16	70
		Pe	r Con	npactElash, optional (add-on)	1	
		Ha	ard dis	sk, optional (add-on)	4	
		Ex	terna	I keyboard PS/2, optional	1	
		US (m	SB pe ax. 2.5	ripheral, optional watts per USB1 and USB2 connection)	5	
	~	Sc	hnitts	tellenoption (Add-On Interface), optional	0.5	
	5	Gr	afikad	dapter (AP Link), optional	5	
		Ex	terna	I device, optional (via BaseBoard)	5	
				Maximum po	ossible at +12V	24
		≳	Fa	n kit, optional	2.5	
		ΙŦ.	Ex	ternal device, optional (via BaseBoard)	10	
			PC (ma	Cl card manufacturer limit, optional 1) ax. 3 watts without fan kit, max. 17 watts with fan kit)		
				D	evices total 5V Σ	
l d				Maximum p	oossible at 3V3	23
sup		System unit, fixed device 4				
ēr	3V:	Gr	afikad	dapter (AP Link), optional	5	
No C		Int	erface	e option (add-on interface), optional		
al					Devices 3V3 Σ	
ם				PCI bus and slide-in power supply rati	50	
				Maximum possible at 5V PCI b	us and slide-in	50
	Ŋ		Pe	r CompactFlash, optional (slide-in)	1	
	ldn		Pe	r hard disk, optional (slide-in)	4	
	er s		Pe	r drive, optional (slide-in - CD/DVD)	4	
	Mo		PC (ma	ax. 3 watts without fan kit, max. 17 watts with fan kit)		
	n p	5		, , ,	Devices 5V S	
	Je-i			Maximum possible	at -12V PCI bus	1.2
	d slid		2	PCI card manufacturer limit,optional	121101003	1.2
	an		7	(max. 1.2 watts with and without fan kit)		
	pus			Da		
	S					
	-		DC	Maximum possible	at 3V3 PCI bus	23
		3V	(ma	ax. 3 watts without fan kit, max. 17 watts with fan kit) ¹⁾		
					Devices 3V3 Σ	
				PCI bus an	id slide-in total Σ	
					Devices total Σ	

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

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

Inf	orm	atio	n:		5PC600.SX05-01	This system
All o The The valu	All entries in watts The values for the suppliers are maximum values. The values for the devices are average maximum values but not neak values				5PC600.X945-00 🖉	Enter values in this column
				Total power sup	ply (maximum)	110
		Ad	ld-on	UPS module, optional	7.5	
				Maximum	possible at 5V	70
		CF	PU bo	ard, fixed device	16	
		Pe	r Cor	npactFlash, optional (add-on)	1	
		Ha	ard dis	sk, optional (add-on)	4	
		Ex	terne	Tastatur PS/2, optional	1	
		US (ma	SB pe ax. 2.5	ripheral, optional watts per USB1 and USB2 connection)	5	
	2	Int	erfac	e option (add-on interface), optional	0.5	
		Ex	terna	I device, optional (via BaseBoard)	5	
				Maximum po	ossible at +12V	24
		N	Fa	n kit, optional	2.5	
		÷	Ex	ternal device, optional (via BaseBoard)	10	
			PC (ma	Cl card manufacturer limit, optional 1) ax. 3 watts without fan kit, max. 12 watts with fan kit)		
N		Devices total 5V Σ				
ddn				Maximum	oossible at 3V3	23
r sı	3	Sy	stem	unit, fixed device	4	
Ňe	3/	Int	erfac	e option (add-on interface), optional	0.25	
l po		Devices 3V3 Σ				
Tota				PCI bus and slide-in power supply rat	50	
	~			Maximum possible at 5V PCI b	us and slide-in	50
	bp		Pe	r CompactFlash, optional (slide-in)	1	
	su		Pe	r hard disk, optional (slide-in)	4	
	ver		Pe	er drive, optional (slide-in - CD/DVD)	4	
	pov	>	PC (ma	Cl card manufacturer limit, optional ax. 3 watts without fan kit, max. 17 watts with fan kit)		
	e-i	5		Maximum possible at -12V PCI b	us and slide-in	1.2
	slid		12V	PCI card manufacturer limit, optional (max. 1.2 watts with and without fan kit) ¹⁾		
	and		'		Devices -12V Σ	
	sno			D	evices total 5V Σ	
	CIR			Maximum possible at 3V3 PCI b	us and slide-in	23
		3V3	PC (ma	CI card manufacturer limit, optional ax. 3 watts without fan kit, max. 17 watts with fan kit) 1)		
					Devices 3V3 Σ	
				PCI bus ar	nd slide-in total Σ	
	Devices t				Devices total $ \Sigma $	

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

2.10.4 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 31: 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.

Technical data • Entire device

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

Inf	orm	atio	n:	5PC600.SX05-00	This system
	•	ano		N270	
All	entrie	es in	watts	45-00	Enter values in this
The	e value	es for	the suppliers are maximum values.	0.X9	column
l ne vali	e value	es for ut not	the devices are average maximum	2060	
Faire	100, 0	armo	Tatal	- 10 - 10	440
	<u> </u>	Ad	Iotal power sup	piy (maximum)	110
		Au	Maximum	neosible at EV	EE
		CF	PU board fixed device	16	55
		Pe	r CompactFlash, optional (add-on)	1	
		На	urd disk, optional (add-on)	4	
		Ex	ternal keyboard PS/2, optional	1	
	5V	US (ma	B peripheral, optional ax. 2.5 watts per USB1 and USB2 connection)	5	
		Int	erface option (add-on interface), optional	0.5	
		Gr	aphics adapter (AP Link), optional	5	
		Ex	ternal device, optional (via BaseBoard)	5	
				Devices 5V Σ	
			Maximum p	possible at 3V3	23
	_	Sy	stem unit, fixed device	4	
	3	Gr	aphics adapter (AP Link), optional	5	
		Int	erface option (add-on interface), optional		
				Devices 3V3 Σ	
١d			Maximum po	ossible at +12V	12
su	2	Fa	n kit, optional	2.5	
ě	Ŧ	Ex	ternal device, optional (via BaseBoard)	10	
lğ				Devices +12V Σ	
tal	Ι.	_	PCI bus and slide-in power supply rat	50	
l⊢			Maximum possible at 5V PCI b	us and slide-in	50
			Per CompactFlash, optional (slide-in)	1	
	N		Per hard disk, optional (slide-in)	4	
	dd		Per drive, optional (slide-in - CD/DVD)	4	
	er su	5V	(max. 3 watts without fan kit, max. 17 watts with fan kit)		
	OWe		Maximum possible at -12V PCI be	us and slide-in	1.2
	-in p		PCI card manufacturer limit, optional (max. 1.2 watts with and without fan kit) 1)		
	ide		De	evices total 5V Σ	
	d sl		Maximum possible at 3V3 PCI b	us and slide-in	23
	s an	3V3	PCI card manufacturer limit, optional		
	l bu		(הומגי ט שמוט שמוטערומר און הומגי דר שמוט שמרומר און	Devices 3V3 Σ	
	РС		Maximum possible at +12V PCI b	us and slide-in	12
		+12V	PCI card manufacturer limit, optional		
			(ITIAA. 5 WALLS WILLIOUL IAIT KIL, ITIAA. 12 WALLS WILLI IAIT KILL	-	
		Ŧ	(חמא. 5 שמנוס שונווסטרומוז און, חומא. 21 שמנוס שונו זמוז און)	Devices +12V \sum	
		+1	PCI bus ar	Devices +12V Σ nd slide-in total Σ	

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

Technical data • Entire device

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

Inf	orm	atic	n:	5PC600.SX05-01	This system
All The The valu	entrie value value value ies, b	es in es for es for ut no	watts the suppliers are maximum values. the devices are average maximum t peak values.	5PC600.X945-00 8	Enter values in this column
			Total power sup	ply (maximum)	110
		Ac	ld-on UPS module, optional	7.5	
			Maximum	possible at 5V	55
		CF	PU board, fixed device	16	
		Pe	er Compact-lash, optional (add-on)	1	
	_	Fx	ternal keyboard PS/2 ontional	4	
	5	- 12	SB peripheral, optional	-	
		(m	ax. 2.5 watts per USB1 and USB2 connection)	5	
		Int	erface option (add-on interface), optional	0.5	
		Ex	ternal device, optional (via BaseBoard)	5	
				Devices 5V Σ	
			Maximum p	oossible at 3V3	23
	V3	Sy	stem unit, fixed device	4	
	3	Int	erface option (add-on interface), optional	0.25	
				Devices 3V3 Σ	
<u> </u>			Maximum po	ossible at +12V	12
l d	2V	Fa	n kit, optional	2.5	
su	Ŧ	External device, optional (via BaseBoard) 10			
Ver		Devices +12V Σ			
l Q			PCI bus and slide-in power supply rati	ing (maximum)	50
tal			Maximum possible at 5V PCI b	50	
l₽.			Per CompactFlash, optional (slide-in)	1	
	ply		Per hard disk, optional (slide-in)	4	
	dns		Per drive, optional (slide-in - CD/DVD)	4	
	er :	5	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) ¹⁾		
	NOC		Maximum possible at -12V PCI b	us and slide-in	1.2
	in		PCI card manufacturer limit, optional		
	de-		(max. 1.2 watts with and without fan kit) 1)		
	l sli		D	evices total 5V Σ	
	anc		Maximum possible at 3V3 PCI b	us and slide-in	23
	SU	33	PCI card manufacturer limit, optional		
	CIP		(max. 5 watts without lankit, max. 17 watts with lankit)	Deviees 2V2 S	
	P	_	L		
		>	Maximum possible at +12V PCI b	us and slide-in	12
		5	(max. 3 watts without fan kit, max. 12 watts with fan kit) ¹⁾		
				Devices +12V \sum	
			PCI bus an	d slide-in total Σ	

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

2.11 Power management for the APC620 embedded system unit

2.11.1 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 32: 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.

2.12 Humidity specifications

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

Component		Operation	Storage / Transport
X945 CPU board		10 - 90%	5 - 95%
System units (all models)		5- 90%	5 - 95%
Main memory for CPU board		10 - 90%	5 - 95%
Add-on drives	5AC600.HDDI-05 (ET, 24x7)	5 - 90%	5 - 95%
	5AC600.HDDI-06 (ET, 24x7)	5 - 90%	5 - 95%
Slide-in drive	5AC600.FDDS-00	20 - 80%	5 - 90%
	5AC600.CANI-00	5 - 90%	5 - 95%
	5AC600.485I-00	5 - 90%	5 - 95%
Additional insert cards Interfaces AP Link	5AC600.SDL0-00	5 - 90%	5 - 95%
	5ACPCI.RAIC-02 (24 hours/default)	5 - 90%	5 - 95%
	5ACPCI.RAIC-03 (24 hours/default)	8 - 90%	5 - 95%
	5ACPCI.RAIC-04 (24 hours/default)	8 - 90%	5 - 95%
	CompactFlash cards 5CFCRD.xxxx-04	85%	85%
	CompactFlash cards - 5CFCRD.xxxx-03	8 - 95%	8 - 95%
Accessories	Flash drive 5MMUSB.2048-00	10 - 90%	5 - 90%
	Flash drive 5MMUSB.2048-01	10 - 90%	5 - 90%
	USB Media Drive 5MD900.USB2-01	20 - 80%	5 - 90%

Table 27: Overview of humidity specifications for individual components

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

Technical data • Entire device

2.13 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.

2.13.1 Serial interface COM1

Serial interfaces COM1 ¹⁾				
Туре	RS232, modem-capable, not electrically isolated			
UART	16550-compatible, 16-byte FIFO			
Transfer rate	Max. 115 kBaud	9-pin DSUB, male		
Cable length	Max. 15 meters			
Pin	Assignment			
1	DCD	СОМ1		
2	RXD			
3	TXD			
4	DTR			
5	GND			
6	DSR			
7	RTS			
8	CTS			
9	RI			

Table 28: 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 29: 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.

2.13.2 Serial interface COM2

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

Table 30: 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 31: 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.

2.13.3 X2X (only APC620 embedded)

	X2X Link interface (only APC620 embedded)				
The electrically isolate	ed X2X Link is a 4-pin multipoint connector.				
Pin	X2X Link				
1	X2X	222			
2	X2X⊥	1 2 3 4			
3	X2X\				
4	SHLD (shield)	X2X X2X⊥ X2X\ SHLD			

Table 32: X2X pin assignments (only APC620 embedded)

Driver support

The fieldbus interface X2X is only supported together with Automation Runtime.

2.13.4 CAN (only APC620 embedded)

		CAN
The electrically isolate connector.	ed CAN bus interface is a 4-pin multipoint	
Transfer rate	Max. 500 kBit/s	CAN
Bus length	Max. 1000 meters	CAN P S
Pin	CAN bus	
1	CAN_H (CAN High)	BBBB
2	CAN⊥ (CAN ground)	CAN_H CAN_L CAN_L SHLD
3	CAN_L (CAN Low)	X2X
4	SHLD (shield)	

Table 33: CAN pin assignments (only APC620 embedded)

Driver support

The fieldbus interface CAN is only supported together with Automation Runtime.

2.13.5 CAN node number (only APC620 embedded)

	CA	AN node number swit	ch (x1, x16) - only APC620 embedded
Both of these hex sw node number for the	vitches (x16, x1) are us CAN interface.	ed to configure the	
	Switch position		Reset
x16	x1	Description	
0 F	0 F	Any	Hardware Security Key V16 CAN X16 CAN X17 CO X16 CAN X17 CO X16 CAN X17 CO X16 CAN X17 CO X16 CAN X17 CO X16 CAN X17 CO X16 CAN X17 CO X16 CAN X17 CO X16 CAN X17 CO X16 CAN X17 CO X16 CAN X16 CAN X16 CAN X16 CAN X17 CO X16 CAN X17 CO X16 CAN X17 CO X16 CAN X17 CO X16 CAN X17 CO X16 CAN X17 CO X16 CO X17 CO X16 CO X17 CO X16 CO X17 CO CO X17 CO CO X17 CO X CO X CO X CO X CO X CO X CO X CO

Table 34: CAN node number switch (x1, x16) - only APC620 embedded

2.13.6 CAN terminating switch / LED (only APC620 embedded)



Table 35: CAN terminating switch / LED (only APC620 embedded)

Section 2 Technical data

2.13.7 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	
			xxx O O
			x2x x2x⊥
			207

Table 36: Status LEDs CAN / X2X (only APC620 embedded)

2.13.8 POWERLINK (only APC620 embedded)

		POWERLINK	C (only APC620 embedded)
Controller			
Cabling	S/STP	(Cat5e)	Status/Error LED
Transfer rate			
Cable length	max. 100 m	(min. Cat5e)	green/red POWERLINK green
LED color	On	Off	
Green/red	see Status	/ Error LED	e de la companya de
Green	Link (POWERLINK network connection available)	Activity (blinking) (Data transfer in progress)	USB2

Table 37: POWERLINK (only APC620 embedded)

Driver support

The fieldbus interface POWERLINK is only supported together with Automation Runtime.

Status / Error LED

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

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

Table 38: Status / Error LED as error LED - POWERLINK V2 operating mode
Green - status	Description
Off NOT_ACTIVE	Managing Node (MN) The bus is monitored for POWERLINK frames. If a frame is not received within the configured time window (timeout), the interface goes directly into PRE_OPERATIONAL_1 status (single flash). If, however, POWERLINK communication is detected before this time passes, the interface goes directly into the BASIC_ETHERNET status (flickering). Controlled Node (CN) The bus is monitored for POWERLINK frames. If a frame is not received within the configured time window (timeout), the interface goes directly into BASIC_ETHERNET status (flickering). If, however, POWERLINK communication is detected during this time, the interface goes directly into the PRE_OPERATIONAL_1 status (single flash).
Green flickering (approx. 10 Hz) BASIC_ETHERNET	The interface is in BASIC_ETHERNET status, and is operated purely as an Ethernet TCP/IP interface. <u>Managing Node (MN)</u> This status can only be changed by resetting the interface. <u>Controlled Node (CN)</u> 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. <u>Managing Node (MN)</u> The MN begins with the cyclic communication (cyclic input data is not yet evaluated). The CNs are configured in this status. <u>Controlled Node (CN)</u> 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. <u>Managing Node (MN)</u> Normal cyclic and asynchronous communication. Received PDO data is ignored. <u>Controlled Node (CN)</u> The configuration of the interface is complete. Normal cyclic and asynchronous communication. The PDO data sent corresponds to the PDO mapping used. However, cyclic data is not yet evaluated.
On OPERATIONAL	The interface status is OPERATIONAL.
Blinking (approx. 2.5 Hz) STOPPED	The interface status is STOPPED. Managing Node (MN) This status is not possible for the MN. Controlled Node (CN) No output data is produced and no input data is received. Only the appropriate command from the manager can enter or leave this state.

Table 39: Status/Error LED as status LED - POWERLINK V2 operating mode

Section 2 Technical data

2.13.9 POWERLINK station number (only APC620 embedded)

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

Table 40: POWERLINK station number (x1, x16) - only APC620 embedded

2.13.10 Ethernet connection ETH (only APC620 embedded)

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)		green ETH orange	
LED	On	Off		
Green	100 Mbit/s	10 Mbit/s		
Orange	Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)	Uset	

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

Table 41: Ethernet connection ETH (only APC620 embedded)

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

2.13.11 Ethernet connection ETH1

Ethernet connection (ETH1¹⁾) Controller Intel 82562 RJ45 twisted pair (10BaseT/100BaseT), female Cabling S/STP (Cat5e) 10/100 MBit/s 2) Transfer rate See table 43 "Ethernet cable lengths Cable length when using 5PC600.X945-00 CPU boards", on page 112. LED On Off Green 100 Mbit/s 10 Mbit/s Link Activity (blinking) Orange (Ethernet network (Data transfer in progress) connection available)

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

Table 42: 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 (<u>www.br-automation.com</u>).

Information:

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

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Ethernet cable lengths when X945 CPU boards are used

When using Intel X945 CPU boards (5PC600.X945-00), the supported cable length depends on the system unit revision.

	Cable length with CAT5e cable		
System unit	Up to 50 meters	Up to 100 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 43: Ethernet cable lengths when using 5PC600.X945-00 CPU boards

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

2.13.12 Ethernet connection ETH2

Ethernet connection (ETH21)) Controller Intel 82551ER RJ45 twisted pair (10BaseT/100BaseT), female Cabling S/STP (Cat5e) 10/100 MBit/s 2) Transfer rate Cable length max. 100 m (min. Cat5e) LED On Off Green 100 Mbit/s 10 Mbit/s Link Activity (blinking) Orange (Ethernet network (Data transfer in connection progress) available)

This Ethernet connection is integrated in the system unit.

Table 44: Ethernet connection (ETH2)

 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 (<u>www.br-automation.com</u>).

Information:

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

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Section 2

2.13.13 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 115 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

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

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

Warning!

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

Warning!

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

Driver support

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

USB 2.0 comes already integrated in B&R's XP embedded operating systems.

2.13.14 USB connection (only APC620 embedded)

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

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

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 ensure the performance of all USB devices that they provide.

Warning!

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

Section 2 echnical data

2.13.15 +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				
Prot	ected against reverse polarity	3-pin, male			
Pin	Description				
1	+	Power 24 VDC			
2	Functional ground				
3	-				
Accessories					
0TB103.9	Plug 24 V 5.08 3p screw clamps	10.001			
0TB103.91	Plug 24 V 5.08 3p cage clamps				

Figure 35: Supply voltage connection

Ground

Caution!

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

The grounding connection can be found on the bottom of the APC620 systems. The M4 selflocking 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 214.

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 turn-off time" might not restart because a Power Off/On was not detected. To make sure that these system units will restart after a Power Off/On, the turn-off time should be set to at least 10 seconds.

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

Table 49: System unit revisions for at least 10 seconds turn-off time

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

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

Table 50: System unit revisions for any turn-off times

2.13.16 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.				
System unit	X945 board	24-pin DVI-I with special functions, female		
5PC600.SX01-00	RGB, DVI, SDL	000		
5PC600.SX02-00	RGB			
5PC600.SX02-01	RGB, DVI, SDL	Monitor / Panel		
5PC600.SF03-00	RGB			
5PC600.SX05-00	RGB			
5PC600.SX05-01	RGB, DVI, SDL	0.0.0.0		
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 plugs are specified for 100 connection cycles.

Caution!

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

See "Definitions for RGB, DVI, SDL", on page 123 for descriptions of RGB, DVI and SDL.

Pin assignments

Pin	Assignment	Pin	Assignment	
1	T.M.D.S. Data 2-	16	Hot Plug detect	
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	DVI-I 24 pin, female
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	SVGA	XGA	SXGA	UXGA		
	640 x 480	800 x 600	1024 x 768	1280 x 1024	1600 x 1200		
1.8	5CASDL.0018-00	5CASDL.0018-00	5CASDL.0018-00	5CASDL.0018-00	5CASDL.0018-00		
	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01		
	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03		
5	5CASDL.0050-00	5CASDL.0050-00	5CASDL.0050-00	5CASDL.0050-00	5CASDL.0050-00		
	5CASDL.0050-01	5CASDL.0050-01	5CASDL.0050-01	5CASDL.0050-01	5CASDL.0050-01		
	5CASDL.0050-03	5CASDL.0050-03	5CASDL.0050-03	5CASDL.0050-03	5CASDL.0050-03		
10	5CASDL.0100-00	5CASDL.0100-00	5CASDL.0100-00	5CASDL.0100-00	5CASDL.0100-00 ¹⁾		
	5CASDL.0100-01	5CASDL.0100-01	5CASDL.0100-01	5CASDL.0100-01	5CASDL.0100-01 ¹⁾		
	5CASDL.0100-03	5CASDL.0100-03	5CASDL.0100-03	5CASDL.0100-03	5CASDL.0100-03 ¹⁾		

Table 52: Segment lengths, resolutions and SDL cables

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

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Table 52: Segment lengths, resolutions and SDL cables (Forts.)

1) See table 53 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 121

2) See table 54 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 122

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

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

Table 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 no. 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 215.

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 215.

2.13.17 MIC, Line IN and Line OUT ports

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

Information:

APC620 embedded devices do not have these connections.

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

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 (<u>www.br-automation.com</u>).

Information:

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

2.13.18 Add-on interface slot

An optional add-on interface (e.g. CAN, RS485) can be installed here. See also section 3.7 "Interface options", on page 183.

Information:

APC620 embedded devices do not have this option.

		Add-on interface slot
Available add-on in	nterfaces	
5AC600.CANI-00	Add-on CAN interface	IF Option
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.

2.13.19 Add-on UPS module slot

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

	Add-on UPS module slot					
APC620 add-on UP	S module + accessories					
5AC600.UPSI-00	Add-on UPS module					
5AC600.UPSB-00	Battery unit 5 Ah	Pricing Contraction of the second sec				
5CAUPS.0005-00	APC620 UPS cable 0.5 m	2 and a second sec				
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 "Uninterruptible power supply", on page 470.

For info on configuring the UPS module, see chapter 4 "Software", section 10.4 "UPS configuration", on page 376.

For info on installing the UPS module, see chapter 7 "Maintenance / Servicing", section 4 "Installing the UPS module", on page 514.

Section 2 Technical data

2.13.20 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 3.9 "AP Link cards", on page 197.

Information:

APC620 embedded devices do not have this option.

2.13.21 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 79 or section "Power management APC620 system unit with 3 PCI slots", on page 89 and "Power management APC620 system units with 5 PCI slots", on page 91).

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

2.13.22 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 132 for a description of the status LEDs on APC620 embedded devices.

				Status LEDs	
LED	Color		Meaning		
	Green	On	Supply voltage OK		
Power	Red	On	The system is in standby mode (S5: soft-off mode or S4: Hibernate mode -Suspend-to- Disk)		Section 2
	Orange	On	Supply voltage not OK; the system is operating on battery power.		
HDD	Yellow	On	Signals IDE drive access (CF, HDD, CD, etc.)	Power	
Link 1	Yellow	On	Active SDL connection.		
		blink ing	An active SDL connection has been interrupted by a loss of power in the display unit.		
		Off	No active SDL connection available.	HDD / CF2 CF1	
		On	Active SDL connection on the AP Link slot.		
Link 2	Yellow	blink ing	An active SDL connection on the AP Link slot has been interrupted by a loss of power in the display unit.		
		Off	No active SDL connection on the AP Link slot available.		

Table 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.

Technical data



Figure 44: Front-side status LEDs

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

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

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

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

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

2.13.24 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 30.

See the section "CompactFlash slots (only APC620 embedded)", on page 136 for a description of the CompactFlash slots on APC620 embedded devices.

		CompactFlash slot (CF1)	
Connection	Primary master IDE device		2 data
CompactFlash Type	Туре І		bnical
Accessories	Short description		S De L
5CFCRD.0512-04	512 MB B&R CompactFlash card	Link 2	
5CFCRD.1024-04	1024 MB B&R CompactFlash card	CF2 CF1	
5CFCRD.2048-04	2048 MB B&R CompactFlash card		
5CFCRD.4096-04	4096 MB B&R CompactFlash card		
5CFCRD.8192-04	8192 MB B&R CompactFlash card		
5CFCRD.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!

2.13.25 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 5.5 "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 136 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 CompactFl	ash slot	
5AC600.CFSI-00	Add-on CompactFlash slot	
CompactFlash Type	Туре І	HOD/CF2
Accessories	Short description	
5CFCRD.0512-04	512 MB B&R CompactFlash card	
5CFCRD.1024-04	1024 MB B&R CompactFlash card	
5CFCRD.2048-04	2048 MB B&R CompactFlash card	
5CFCRD.4096-04	4096 MB B&R CompactFlash card	
5CFCRD.8192-04	8192 MB B&R CompactFlash card	
5CFCRD.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!

2.13.26 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	Туре І	CF2 CF1		
Accessories	Short description			
5CFCRD.0512-04	512 MB B&R CompactFlash card			
5CFCRD.1024-04	1024 MB B&R CompactFlash card			
5CFCRD.2048-04	2048 MB B&R CompactFlash card			
5CFCRD.4096-04	4096 MB B&R CompactFlash card			
5CFCRD.8192-04	8192 MB B&R CompactFlash card			
5CFCRD.0064-03	CompactFlash 64 MB SSI			
5CFCRD.0128-03	CompactFlash 128 MB SSI	On		
5CFCRD.0256-03	CompactFlash 256 MB SSI			
5CFCRD.0512-03	CompactFlash 512 MB SSI	CAN TERM		
5CFCRD.1024-03	CompactFlash 1024 MB SSI			
5CFCRD.2048-03	CompactFlash 2048 MB SSI			
5CFCRD.4096-03	CompactFlash 4096 MB SSI	Ejector		
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!

2.13.27 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 309 for X945 CPU boards) or, for example, in the operating system Windows XP.



Table 64: Technical data - Power button

2.13.28 Reset button



Table 65: Technical data - Reset button

Warning!

A system reset can cause data to be lost!

2.13.29 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!).



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").

2.13.30 Battery

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



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 493.

For technical information on the lithium battery, see chapter 6 "Accessories", section 4 "Replacement CMOS batteries", on page 418.

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

Technical data

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

Firmware / BIOS requirements

APC620 / Panel PC 700 Firmware Upgrade V1.19 (MTCX PX32: V1.63, MTCX FPGA V1.19)

2.13.31 Hardware Security Key

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



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").

Section 2 Technical data

2.13.32 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 8 "Model numbers - Drives", on page 28.

For instructions about installing and replacing a slide-in, see chapter 7 "Maintenance / Servicing", section 3 "Slide-in drive - installation and exchange", on page 511.

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.

Caution!

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



Table 71: Technical data - Slide-in slot 1

2.13.33 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 8 "Model numbers - Drives", on page 28.

For instructions about installing and replacing a slide-in, see chapter 7 "Maintenance / Servicing", section 3 "Slide-in drive - installation and exchange", on page 511.

The slide-in USB FDD drive (5AC600.FDDS-00) is referred to as USB.

Information:

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

Caution!

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

Slide-in slot 2				
Connection	USB			
Accessories	Short description			
5AC600.FDDS-00	Slide-in USB FDD	Slide-In Slot 2 Slot 1		

Table 72: Technical data - Slide-in slot 2

2.14 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 <u>www.br-automation.com</u>. The search provides you with a detailed list of the individual components.
					Per	fection in Autometion	
Company Products Se	urvice Events New	rs myPortal				www.br-subenation.com	
Industrial PCs	Industrial PCs > APC62	n > System units > 5P		2-01		Product Search	
Provit 5000						Model Number	Serial number entry
Provit 5600	General Description	Serial Number				Sovial Alumbar	o.g. 70050170564
Panel PC		Model Nu	mber: 5	PC600.SX02-01		70950170564 60	e.g. 70950170504
APC620						\sim	
APC680	5	Descriptio	n:			Search	
Automation Panel	mat	APC620 S 1 drive slo	ystem Un it;	it 2 PCI Slots		GU	
Mobile Panel	Auto	connector Smart Dis	s for 2 x I play Link,	RS232, 2 × USB 2.0, / DVI/ Monitor,			
Power Panel		2 x ETH 11 PS/2 keyb)/100, AC oard/mo	197 sound, use: 24 VDC.		Accessory	
Operator Interface		(screw cla	mp 0TB1	03.9 or cage clamp		mandatory	
Control Systems		01010010	. must be	or dered separatery yr		CPU boards	
I/O Systems						Heat sink	
Motion Control	ElS					Main Memory	
Network and Fieldbus						Drives	List of installed component
Modules	Serial number	Model number	Rev	Delivery date	End of warranty	Fan kit	after the serial number sea
Software	70950170564	5PC600.SX02-01	FO	0000-00-00	0000-00-00	Luit Kis	
Process Control						perial Adapter	
Power Supplies	Serial number	Model number	Rev	Delivery date	End of warranty	Downloads	
Accessories	70950170564	5PC600.SX02-01	FO	0000-00-00	0000-00-00	APC620/Panel PC 700 ADI driver (Windows XP/XPe)	
Documentation	70490170464	5MMDDR.0512-00	CO	0000-00-00	0000-00-00	APC620/Panel PC 700	
automationLETTER	64880174779	5CFCRD.0512-02	CO	0000-00-00	0000-00-00	Intel© Pro100VE 82562	
Subscribe here to receive the latest news about	69080169794	5AC600.HDDI-00	EO	0000-00-00	0000-00-00	(Windows XP/XPe)	
current automation trends	71920169506	5PC600.FA02-00	DO	0000-00-00	0000-00-00	APC620/Panel PC 700 Intel® 8255xER (DOS,	
Grectly in your mailbox.	70430171511	5AC600.HS01-01	FO	0000-00-00	0000-00-00	Windows XP/XPe)	
rour official address	72180169999	5PC600.E855-00	DS	0000-00-00	0000-00-00	APC620/Panel PC 700 AC97 Audiodriver (Windows	
	69470169000	5AC600.DVDS-00	CO	0000-00-00	0000-00-00	XP/XPe)	

Г

Figure 47: Example of serial number search: 70950170564

Section 2 Technical data

2.15 Block diagram

The following block diagrams show the simplified structure according to the system unit being used with a X945 CPU board.





Figure 48: Block diagram of entire device with system unit 5PC600.SX01-00 and X945 CPU board



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

Figure 49: Block diagram of entire device with system unit 5PC600.SX02-00 and X945 CPU board

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



Figure 50: Block diagram of entire device with system unit 5PC600.SX02-01 and X945 CPU board



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

Figure 51: Block diagram of entire device with system unit 5PC600.SX03-00 and X945 CPU board

Section 2 Technical data

Technical data • Entire device

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



Figure 52: Block diagram of entire device with system unit 5PC600.SX05-00 and X945 CPU board

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



Figure 53: Block diagram of entire device with system unit 5PC600.SX05-01 and X945 CPU board

Section 2 Technical data

Technical data • Entire device

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



Figure 54: Block diagram of entire device with system unit 5PC600.SX00-00 and X945 CPU board



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

Figure 55: Block diagram of entire device with system unit 5PC600.SX00-01 and X945 CPU board

Technical data

Section 2

Technical data • Entire device

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



Figure 56: Block diagram of entire device with system unit 5PC600.SX00-02 and X945 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	E.	10			R K	
B&R ID code	\$1B7D	\$1BB6	\$1BB7	\$A0B7	\$1D13	\$1D14
Serial interfaces Type Amount UART Transfer rate Connection	RS232, modem capable 2 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB male					
Ethernet Controller Transfer rate Connection	See "Ethernet connection ETH1", on page 111 and "Ethernet connection ETH2", on page 113 10/100 Mbit/s RJ45 twisted pair (10 Base T / 100 Base T)				page 113	
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 33 I	2 - .2 MHz	- 3 2.2 33 MHz	2 33 I	5 - - MHz
CompactFlash slot 1 (CF1) Internal organization	integrated Primary master					

Table 73: Technical data - 1, 2, 3 and 5 PCI slot types

Technical data • Individual components

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)		Yes, optional add-on CompactFlash slot or add-on hard disk Primary slave				
Insert for slide-in drive 1	-	- Yes				
Insert for slide-in drive 2 Internal organization	-	Yes			es SB	
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			Y	es	•	
Power button			Y	es		
PS/2 keyboard / mouse		Yes	, combined, will be	automatically dete	ected	
Battery slot			Y	es		
Hardware security key slot			Yes (DS1425 fro	m MAXIM/Dallas)		
Fan slot	Yes					
Automation Panel link slot	-	1	-	1	1	-
Status LEDs		Power, HDD, Link1, Link2				
Real-time clock (RTC) Battery-buffered Accuracy		Yes See the technical data for CPU boards				
MTCX ¹⁾		Yes				
Electrical characteristics						
Power supply Rated voltage Starting current Power consumption	24 VDC ±25% Typically 7A Maximum 40 A for < 300 µs See 2.7 "Power management APC620 system unit with 1 PCI slot" 24 VDC ±25% Typically 10 A Maximum 40 A for < 300 µs See section 2.9 "Power management APC620 system unit with 3 PCI slots" or 2.10 "Power management APC620 system units with 5 PCI sk			00 µs ment APC620 ∵2.10 "Power s with 5 PCI slots"		
Mechanical characteristics						
Housing ²⁾ Item Paint Front cover	Galvanized steel plate Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored plastic (similar to Pantone 144CV)				/)	
Outer dimensions Width Length Height	65 mm 104.5 mm 125 mm 185.4 mm 251 mm 253 mm 253 mm 253 mm 270 mm 270 mm 410 mm 270 mm			4 mm mm 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 (Forts.)

1) Maintenance Controller Extended, for more information, see the section "Maintenance Controller Extended (MTCX)", on page 544.

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		Ex	
B&R ID code	\$A3BA	\$A3BB	\$A52B
Serial interfaces Type Amount UART Transfer rate Connection	RS232, modem capable 2 16550-compatible, 16-byte FIFO Max. 115 kBaud 9-pin DSUB, male		
Ethernet Controller Transfer rate Connection	See "Ethernet connection ETH (only APC620 embedded)", on page 110 10/100 Mbit/s RJ45 twisted pair (10 Base T / 100 Base T)		
POWERLINK Amount Station Number Dial	1 2 pcs.		
X2X Link Amount Status LED	1 Yes, see page 108		
CAN bus Amount Transfer rate Node switch Terminating resistor Status LED	See also page 106 1 Max. 500 kBit/s Yes Yes, can be activated using a switch Yes, see page 108		
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		

Table 74: Technical data - APC620 embedded variations

Section 2 Technical data

Technical data • Individual components

Features	5PC600.SE00-00	5PC600.SE00-01	5PC600.SE00-02		
CompactFlash slot 2 (CF2) Internal organization	integrated Primary slave				
Insert for slide-in drive 1 Internal organization	-				
Insert for slide-in drive 2 Internal organization	-				
APC620 UPS module optional	Yes				
SRAM Quantity Remanent variables for AR (Automation Runtime) in power fail mode	Y 512 256 kB with CPU bo 192 kB with CPU bo	Yes 1 MB 256 kB with CPU board 5PC600.X855-xx 192 kB with CPU board 5PC600.X945-00			
Reset button		Yes			
Power button		Yes			
PS/2 keyboard / mouse		-			
Battery slot		Yes			
Hardware security key slot	Yes (DS1425 from MAXIM/Dallas)				
Fan slot	· ·				
Automation Panel link slot	· ·				
Status LEDs	Power, HDD, Link1				
Real-time clock (RTC) Battery-buffered Accuracy	Yes See the technical data for the CPU board				
MTCX ¹⁾	Yes				
Electrical characteristics					
Power supply Rated voltage Starting current	0044 #D	24 VDC ±25% Typically 7 Α maximum 40 A for < 300 μs			
Power consumption	See 2.11 "Powe	r management for the APC620 ember	daea system unit"		
Item Paint Front cover	Galvanized steel plate Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored plastic (similar to Pantone 144CV)				
Outer dimensions Width Length Height	68.3 mm 225.6 mm 210 mm				
Weight		Approx. 1.3 kg			
Mounting plates (for M4 screws)		4			
Drilling templates for mounting	(see chapter 3 "Commissioning", section 1.2 "Drilling templates")				

Table 74: Technical data - APC620 embedded variations (Forts.)

1) Maintenance Controller Extended, for more information, see the section "Maintenance Controller Extended (MTCX)", on page 544.

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

3.2 X945 CPU board



Figure 57: X945 CPU board

Information:

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

3.2.1 Technical data

Features	5PC600.X945-00
Boot loader / Operating system	BIOS AMI (see BIOS section 1 "BIOS options", on page 265)
Processor Architectures Type Name Clock frequency Expanded command set L1 cache L2 cache Floating point unit (FPU)	45 nm Intel® Atom™ N270 1.6 GHz Hyper-threading technology, enhanced speed step SSE, SSE2, SSE3 (Streaming SIMD extensions) 24 KB 512 KB 512 KB Yes
Chipset	Intel® 945GME / Intel 82801DBM (ICH7M-DH)

Table 75: Technical data - CPU board X945

Features	5PC600.X945-00
Real-time clock (RTC) Battery-buffered Accuracy	Yes At 25°C, typically 12 ppm (1sec) ¹⁾ per day
Front side bus	533 MHz
Mass memory management	1x EIDE
Memory Type Quantity Socket	DDR2 Max. 2 GB SO-DIMM 200-pin
Graphics Controller Memory Color depth Resolution RGB GE1 ²¹ = LVDS	Intel® Graphics Media Accelerator 950 Up to 224 MB (reserved from main memory) Max 32 Bit 400 MHz RAMDAC, up to 2048 x 1536 @75 Hz (QXGA) including 1920 x 1080 @ >85 Hz (HDTV) From 640 x 480 up to 1920 x 1200 (Embedded Panel Interface based on VESA EDID™ 1.3)

Table 75: Technical data - CPU board X945 (Forts.)

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

2) GE = Graphics Engine

Driver support

In order for the CPU board with the Intel 945GME 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 (<u>www.br-automation.com</u>).

Information:

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

Section 2 Technical data

3.3 Heat sink



Figure 58: Heat sink

Information:

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

3.3.1 Technical data

Mechanical characteristics	5AC600.HS01-03	5AC600.HS02-03	5AC600.HS03-02
Ideal for CPU boards		5PC800.X945-00	
Suitable for the following system units	5PC600.SX01-00 5PC600.SX02-00 5PC600.SX02-01 5PC600.SX05-00 5PC600.SX05-01	5PC600.SF03-00	5PC600.SE00-00 5PC600.SE00-01 5PC600.SE00-02
Item		Black-coated aluminum	
Outer dimensions Width Height Depth	228.7 mm 218 mm 12.8 mm	228.7 mm 358 mm 12.8 mm	203.9 mm 158 mm 12.8 mm
Weight	Approx. TBD g	Approx. TBD g	Approx. TBD g

Table 76: Technical data - Heat sink

3.4 Main memory

When choosing a main memory, it is important to consider the 2 GB maximum memory capacity of the CPU boards.



Section 2 Technical data

Figure 59: Main memory module

3.4.1 Technical data

Features	5MMDDR.0512-01	5MMDDR.1024-01	5MMDDR.2048-01	
Quantity	512 MB	1 GB	2 GB	
Туре	DDR2 SDRAM / PC2-5300			
Construction	200 Pin SO-DIMM			
Organization	64M x 64-bit	128M x 64-bit	256M x 64-bit	

Table 77: Technical data - Main memory

Information:

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

3.5 Drives

3.5.1 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 60: Add-on hard disk 40 GB - 5AC600.HDDI-05

Technical data

Information:

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

Features	5AC600.HDDI-05 < Revision D0 5AC600.HDDI-05 Revision I	
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	

Table 78: Technical data - Add-on hard disk 5AC600.HDDI-05

Features	5AC600.HDDI-05 < Revision D0	5AC600.HDDI-05 Revision D0		
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	AT	A-6		
Data transfer rate On the medium To/from host	Max. 321 MBit/s Max. 100 MB/s (Ultra-DMA Mode 5) Max. 100 MB/s (Ultra-DMA M			
Cache	81	MB		
S.M.A.R.T. Support	Y	es		
MTBF	550,000 hours ¹⁾	750,000 hours ¹⁾		
Mechanical characteristics				
Add-on mounting	Fi	red		
Outer dimensions (without slide-in) Width Length Height	70 mm 100 mm 9.5 mm			
Weight	100 g			
Environmental characteristics				
Ambient temperature ²⁾ Operation - Standard / 24-hour Bearings Transport	-30 to +85°C -40 to +95°C -40 to +95°C			
Relative humidity Operation Bearings Transport	5 to 90%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing			
Vibration Operation Bearings	10 - 500 Hz: 1 g; no non-recovered errors 5 - 500 Hz: 2 g; no non-recovered errors 5 - 500 Hz: 5 g; no non-recovered errors 5 - 500 Hz: 5 g; no non-recovered errors			
Shock (pulse with a sine half-wave) Operation Bearings	Max. 200 g, 2 ms; no non-recovered errors Max. 110 g, 11 ms; no non-recovered errors Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage	Max. 300 g, 2 ms; no non-recovered errors Max. 150 g, 11 ms; no non-recovered errors Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage		
Altitude Operation Bearings	- 300 to 4,419 meters - 300 to 12,192 meters	- 300 to 5,000 meters - 300 to 12,192 meters		

Table 78: Technical data - Add-on hard disk 5AC600.HDDI-05 (Forts.)

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

 Temperature values for 305 meter altitude. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 3°C per minute.

Technical data • Individual components

Temperature humidity diagram



Figure 61: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-05

Temperature values for 305 meter altitude. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 3°C per minute.

3.5.2 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 62: Add-on hard disk 80 GB - 5AC600.HDDI-06

Technical data

Information:

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

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

Table 79: Technical data - add-on hard disk - 5AC600.HDDI-06

Technical data • Individual components

Features	5AC600.HDDI-06
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1 ms 12.5 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Interface	ATA-6
Data transfer rate On the medium To/from host	Max. 450 MBit/s Max. 100 MB/s (Ultra-DMA Mode 5)
S.M.A.R.T. Support	Yes
Cache	8 MB
MTBF	750,000 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 Bearings Transport	-30 to +85°C -40 to +95°C -40 to +95°C
Relative humidity Operation Bearings Transport	5 to 90%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings	5 - 500 Hz: 2 g; no non-recovered errors 5 - 500 Hz: 5 g; no non-recovered errors
Shock (pulse with a sine half-wave) Operation Bearings	Max. 300 g, 2 ms; no non-recovered errors Max. 150 g, 11 ms; no non-recovered errors Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage
Altitude Operation Bearings	- 300 to 5,000 meters - 300 to 12,192 meters

Table 79: Technical data - add-on hard disk - 5AC600.HDDI-06 (Forts.)

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

 Temperature values for 305 meter altitude. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 3°C per minute.

Temperature humidity diagram



Figure 63: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-06

Temperature values for 305 meter altitude. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 3°C per minute.

Technical data

3.5.3 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 64: 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 80: Technical data - Add-on CompactFlash slot 5AC600.CFSI-00

Warning!

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

3.5.4 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 65: Slide-in USB FDD - 5AC600.FDDS-00

Technical data

Information:

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

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

Table 81: Technical data - Slide-in USB diskette drive - 5AC600.FDDS-00

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

Temperature humidity diagram



Figure 66: 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).

Technical data • Individual components

3.6 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-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 67: RAID 1 system schematic

3.6.1 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 68: 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.

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Information:

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

Features	5ACPCI.RAIC-03
SATA RAID controller Type Specifications Data transfer rate RAID level BIOS Extension ROM - requirements	Sil 3512 SATA link Serial ATA 1.0 Max. 1.5 GB/s (150 MB/s) Supports RAID 0, 1 Approx. 32 KB
Hard disks Amount	Fujitsu M120-ESW MHY2160BH-ESW 2
Formatted capacity (512 bytes/sector)	160 GB
Number of heads	3
Number of sectors (user)	312,581,808
Bytes per sector	512
Revolution speed	5400 rpm ±1%
Access time (average)	5.56 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1.5 ms 12 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Supported transfer mode	SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5
Data transfer rate On the medium To/from host	Max. 84.6 MBit/s Max. 150 MB/s
Cache	8 MB
S.M.A.R.T. Support	Yes
Lifespan	5 years
Electrical characteristics	
Power consumption	0.3 A at 3.3 V (PCI bus) 1 A at 5 V (PCI bus)
Mechanical characteristics	
Mounted on PCI insert	Fixed
Weight	350 g

Table 82: Technical data - RAID hard disk - 5ACPCI.RAIC-03

Environmental characteristics	5ACPCI.RAIC-03
Ambient temperature ¹⁾ Operation - Standard / 24-hour ²⁾ Bearings Transport	-15 to +80°C -40 to +95°C -40 to +95°C
Relative humidity Operation Bearings Transport	8 to 90% non-condensing (maximum humidity at +29°C) 5 to 95% non-condensing (maximum humidity at +40°C) 5 to 95% non-condensing (maximum humidity at +40°C)
Vibration ³⁾ Operation (continuous) Operation (occasional) Bearings Transport	 5 - 500 Hz: max. 0.125 g; duration 1 octave per minute; no unrecoverable errors 5 - 500 Hz: max. 0.25 g; duration 1 octave per minute; no unrecoverable errors 5 - 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage 5 - 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage
Shock (pulse with a sine half-wave) Operation Bearings	Max. 125 g, 2 ms; no unrecoverable errors Max. 400 g, 2 ms; no damage Max. 450 g, 1 ms; no damage Max. 200 g, 0.5 ms; no damage
Altitude Operation Bearings	- 300 to 3,048 meters - 300 to 12,192 meters

Table 82: Technical data - RAID hard disk - 5ACPCI.RAIC-03 (Forts.)

1) Temperature values for 305 meter altitude. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 3°C per minute.

2) 24-hour operation means 732 POH (power-on hours) per month.

3) Operation in areas prone to vibration and shock can affect performance negatively (reduction of transfer rate).



Temperature humidity diagram

Figure 69: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-03

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Technical data • Individual components

Temperature values for 305 meter altitude. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 3°C per minute.

Driver support

Special drivers are necessary for operating the PCI SATA RAID controller. Drivers for Windows XP Professional and Windows XP Embedded are available for download on the B&R Homepage in the download area (<u>www.br-automation.com</u>).

The .NET-based SATARaid[™] serial ATA RAID management software can also be found on the B&R homepage.

Information:

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

Known limitations in a RAID 1 configuration

If one of the two hard disks is physically damaged, when the system is booted the SATA RAID BIOS displays the following error message for approx. 5 seconds: "RAID1 set is in critical status". After this time the operating system is automatically started on the functioning hard disk. The installed SATA Raid[™] serial ATA RAID management software does not detect this error status. After repairing the cause of the error (e.g. replacing the hard disk) the SATARaid[™] Serial ATA RAID management software at 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 70 "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 70: 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 253.

3.6.2 Replacement SATA HDD 160 GB - 5ACPCI.RAIC-04

The hard disk can be used as a replacement part for 5ACPCI.RAIC-03.



Figure 71: Replacement SATA HDD 160 GB - 5ACPCI.RAIC-04

Technical data

Information:

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

Features	5ACPCI.RAIC-04
Hard disks Amount	Fujitsu M120-ESW MHY2160BH-ESW 1
Formatted capacity (512 bytes/sector)	160 GB
Number of heads	3
Number of sectors (user)	312,581,808
Bytes per sector	512
Revolution speed	5400 rpm ±1%
Access time (average)	5.56 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1.5 ms 12 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Supported transfer mode	SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5
Data transfer rate On the medium To/from host	Max. 84.6 MBit/s Max. 150 MB/s

Table 83: Technical data - RAID hard disk - 5ACPCI.RAIC-04
Features	5ACPCI.RAIC-04
Cache	8 MB
S.M.A.R.T. Support	Yes
Lifespan	5 years
Environmental characteristics	
Ambient temperature ¹⁾ Operation - Standard / 24-hour ²⁾ Bearings Transport	-15 to +80°C -40 to +95°C -40 to +95°C
Relative humidity Operation Bearings Transport	8 to 90% non-condensing (maximum humidity at +29°C) 5 to 95% non-condensing (maximum humidity at +40°C) 5 to 95% non-condensing (maximum humidity at +40°C)
Vibration ³⁾ Operation (continuous) Operation (occasional) Bearings Transport	 5 - 500 Hz: max. 0.125 g; duration 1 octave per minute; no unrecoverable errors 5 - 500 Hz: max. 0.25 g; duration 1 octave per minute; no unrecoverable errors 5 - 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage 5 - 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage
Shock (pulse with a sine half-wave) Operation Bearings	Max. 125 g, 2 ms; no unrecoverable errors Max. 400 g, 2 ms; no damage Max. 450 g, 1 ms; no damage Max. 200 g, 0.5 ms; no damage
Altitude Operation Bearings	- 300 to 3,048 meters - 300 to 12,192 meters

Table 83: Technical data - RAID hard disk - 5ACPCI.RAIC-04 (Forts.)

1) Temperature values for 305 meter altitude. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 3°C per minute.

2) 24-hour operation means 732 POH (power-on hours) per month.

3) Operation in areas prone to vibration and shock can affect performance negatively (reduction of transfer rate).

Temperature humidity diagram



Figure 72: 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 535.

3.7 Interface options

An add-on interface (CAN or combined RS232/422/485) can be inserted.

Information:

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

Caution!

Turn off power before adding or removing an add-on interface.

3.7.1 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 73: 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 84: Technical data - Add-on CAN interface - 5AC600.CANI-00

Pin assignments

		Add-on CAN
Туре	Electrically isolated	
Transfer rate	Max. 500 kBit/s	
Bus length	Max. 1000 Meter	
Pin	Assignment	
1	n.c.	9-pin DSUB connector
2	CAN low	1 5
3	GND	6
4	n.c.	····
5	n.c.	6 9
6	Reserved	
7	CAN high	
8	n.c.	
9	n.c.	

Table 85: Pin assignments - CAN

I/O address and IRQ

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

Table 86: Add-on CAN - I/O Adresse und IRQ

1) NMI = Non Maskable Interrupt.

The setting for the IRQ can be changed in the BIOS setup (under "Advanced" - submenu "Baseboard/Panel Features" - submenu "Legacy Devices", setting "CAN"). Please note any potential conflicts with other resources when changing this setting.

I/O address	Register	Function
384h	Address register	Defines the register number to access.
385h	Data register	Access to the register defined in the address register.

Table 87: 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	Тур. 50
≤ 200	Тур. 250
≤ 60	Тур. 500

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Table 88: Bus length and transfer rate - CAN

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

CAN cable	Property
Signal lines Cable cross section Wire insulation Conductor resistance Stranding Shield	$2 \times 0.25 \text{ mm}^2$ (24AWG/19), tinned Cu wire PE $\leq 82 \Omega / \text{km}$ Wires stranded in pairs Paired shield with aluminum foil
Grounding line Cable cross section Wire insulation Conductor resistance	1 x 0.34 mm² (22AWG/19), tinned Cu wire PE \leq 59 Ω / km
Outer sheathing Item Characteristics Entire shielding	PUR mixture Halogen free From tinned cu wires

Table 89: CAN cable requirements

Terminating resistor

CAN networks are cabled using a bus structure where both ends of the bus are equipped with terminating resistors. The add-on CAN interface has an integrated terminating resistor (delivery state: disabled with the setting "Off").



Figure 74: 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 75: Contents of the delivery / mounting material - 5AC600.CANI-00

3.7.2 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 76: Add-on RS232/422/485 interface - 5AC600.485I-00

Pin assignments

Add-on RS232/422/485			
Features	RS232	RS422/485	
Туре	RS232 not modem compatible; Electrically isolated		
UART	16550 compatib	le, 16 byte FIFO	
Transfer rate	Max. 11	5 kBit/s	
Bus length	Max. 15 meters	Max. 1200 meters	
Pin	Assignments (RS232)	Assignments (RS422)	9-pin DSUB connector
1	n.c.	TXD\	
2	RXD	n.c.	
3	TXD	n.c.	6 9
4	n.c.	TXD	
5	GND	GND	
6	n.c.	RXD\	
7	RTS	n.c.	
8	CTS	n.c.	
9	n.c.	RXD	

Table 90: 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 91: Add-on RS232/422/485 - I/O address and IRQ



The setting for the I/O address and the IRQ can be changed in the BIOS setup (under "Advanced" - submenu "Main board/Panel Features" - submenu "Legacy Devices", setting "COM E"). Please note any potential conflicts with other resources when changing this setting.

Bus length and cable type RS232

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

Distance [m]	Transfer rate [kBit/s]
≤ 15	Тур. 64
≤ 10	Тур. 115
≤ 5	Тур. 115

Table 92: RS232 - Bus length and transfer rate

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

RS232 cable	Property
Signal lines Cable cross section Wire insulation Conductor resistance Stranding Shield	4 x 0.16 mm ² (26AWG), tinned Cu wire PE \leq 82 Ω / km Wires stranded in pairs Paired shield with aluminum foil
Grounding line Cable cross section Wire insulation Conductor resistance	1 x 0.34 mm² (22AWG/19), tinned Cu wire PE \leq 59 Ω / km
Outer sheathing Item Characteristics Entire shielding	PUR mixture Halogen free From tinned cu wires

Table 93: RS232 - Cable requirements

RS422 - Bus length and cable type

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

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

Distance [m]	Transfer rate [kBit/s]
1200	Тур. 115

Table 94: RS422 - Bus length and transfer rate

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

RS422 cable	Property	
Signal lines Cable cross section Wire insulation Conductor resistance Stranding Shield	4 x 0.25 mm ² (24AWG/19), tinned Cu wire PE \leq 82 Ω / km Wires stranded in pairs Paired shield with aluminum foil	
Grounding line Cable cross section Wire insulation Conductor resistance	1 x 0.34 mm² (22AWG/19), tinned Cu wire PE \leq 59 Ω / km	
Outer sheathing Item Characteristics Entire shielding	PUR mixture Halogen free From tinned cu wires	

Table 95: 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 77: Add-on RS232/422/485 interface - operated in RS485 mode

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

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

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

RS485 - Bus length and cable type

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

Section 2 Technical data

Distance [m]	Transfer rate [kBit/s]	
1200	Тур. 115	

Table 96: RS485 - Bus length and transfer rate

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

RS485 cable	Property	
Signal lines Cable cross section Wire insulation Conductor resistance Stranding Shield	4 x 0.25 mm ² (24AWG/19), tinned Cu wire PE \leq 82 Ω / km Wires stranded in pairs Paired shield with aluminum foil	
Grounding line Cable cross section Wire insulation Conductor resistance	1 x 0.34 mm ² (22AWG/19), tinned Cu wire PE \leq 59 Ω / km	
Outer sheathing Item Characteristics Entire shielding	PUR mixture Halogen free From tinned cu wires	

Table 97: RS485 - Cable requirements

Contents of delivery

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



Figure 78: Contents of the delivery / mounting material - 5AC600.485I-00

3.8 Fan kits

Information:

Fans are necessary when using components which must work within certain temperature limits, e.g. hard disks, DVD combos, PCI cards, etc.

The fan and dust filter are subject to wear and must be checked with appropriate frequency and cleaned or replaced when not functioning properly (e.g. due to dirt and grime).

3.8.1 Fan kit 1 PCI - 5PC600.FA01-00

This fan kit is an optional addition for system units with 1 PCI slots. For available replacement dust filters for this fan kit, see section "Replacement fan", on page 487.

Fans ø 40 mm



Figure 79: 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 98: 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 98: Technical data - 5PC600.FA01-00 (Forts.)

Contents of delivery

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

Table 99: 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 496.

3.8.2 Fan kit 2 PCI - 5PC600.FA02-00

This fan kit is an optional addition for system units with 2 PCI slots. For available replacement dust filters for this fan kit, see section "Replacement fan", on page 487.



Figure 80: 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 100: 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 101: 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 499.

3.8.3 Fan kit 3PCI - 5PC600.FA03-00

This fan kit is an optional addition for system units with 3 PCI slots. For available replacement dust filters for this fan kit, see section "Replacement fan", on page 487.



Figure 81: Fan kit - 5PC600.FA03-00

Technical data

Features	5PC600.FA03-00		
Fan type Amount Width Length Height	Double ball bearings 2 80 mm 80 mm 20 mm		
Revolution speed	2600 rpm ±10%		
Noise level	27 dB		
Lifespan	80,000 hours at 30°C		
Maintenance interval	The fans are subject to wear. Depending on the work environment, the dust filter should be checked with appropriate frequency to determine whether the air flow provides sufficient cooling. An exchange or cleaning of the filter kit is appropriate at that time.		

Table 102: 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 103: Contents of delivery - 5PC600.FA03-00

Amount	Component
2	Cable fastener

Table 103: 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 502.

3.8.4 Fan kit 5 PCI - 5PC600.FA05-00

This fan kit is an optional addition for system units with 5 PCI slots. For available replacement dust filters for this fan kit, see section "Replacement fan", on page 487.



Figure 82: 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 104: 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 105: 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 506.

3.9 AP Link cards

For the APC620 system units 5PC600.SX02-00, 5PC600.SF03-00 and 5PC600.SX05-00 and an X945 CPU board, a second graphics line can be created using the AP Link graphics adapter cards.

3.9.1 AP Link SDL transmitter - 5AC600.SDL0-00



Figure 83: AP Link card

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

Table 106: Model numbers - AP Link graphics adapter

The following video signals are available via AP Link and monitor/panel output. The plugs are specified for 100 connection cycles.

		AP Link slo	ot (AP Link card inserted)
AD Link card	Signal with 2	X945 board on	AP Link output
AP Link Monitor/Panel			
5AC600.SDL0-00	DVI, SDL	RGB	
			NICE WARTER OF MONITOR / Panel output

Table 107: 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	
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+	DVI-I 24 nin female
7	DDC data	22	T.M.D.S. Clock Shield	By 124 pill, iciliaic
8	n.c.	23	T.M.D.S. Clock +	
9	T.M.D.S. DATA 1-	24	T.M.D.S. Clock -	9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 3 c4
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 108: Pin assignment for AP Link connection

1) Protected internally by a multifuse

Cable lengths and resolutions for SDL transfer

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

Cables	Resolution				
Segment length [m]	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 ¹⁾ 5CASDL.0100-01 ¹⁾ 5CASDL.0100-03 ¹⁾
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 ¹⁾ 5CASDL.0150-01 ¹⁾ 5CASDL.0150-03 ¹⁾	
20	5CASDL.0200-00 ¹⁾ 5CASDL.0200-30 ¹⁾	5CASDL.0200-00 ¹⁾ 5CASDL.0200-30 ¹⁾	5CASDL.0200-00 ¹⁾ 5CASDL.0200-30 ¹⁾	5CASDL.0200-00 ¹⁾ 5CASDL.0200-30 ¹⁾	-
25	5CASDL.0250-00 ¹⁾ 5CASDL.0250-30 ¹⁾	5CASDL.0250-00 ¹⁾ 5CASDL.0250-30 ¹⁾	5CASDL.0250-00 ¹⁾ 5CASDL.0250-30 ¹⁾	-	-
30	5CASDL.0300-00 ¹⁾ 5CASDL.0300-03 ¹⁾	5CASDL.0300-00 ¹⁾ 5CASDL.0300-03 ¹⁾	5CASDL.0300-10 ²⁾ 5CASDL.0300-13 ²⁾	5CASDL.0300-10 ²⁾ 5CASDL.0300-13 ²⁾	-
40	5CASDL.0400-10 ²⁾ 5CASDL.0400-13 ²⁾	5CASDL.0400-10 ²⁾ 5CASDL.0400-13 ²⁾	5CASDL.0400-10 ²⁾ 5CASDL.0400-13 ²⁾	5CASDL.0400-10 ²⁾ 5CASDL.0400-13 ²⁾	-

Table 109: Segment lengths, resolutions and SDL cables

1) See table 110 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 199

2) See table 111 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 200

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

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

Table 110: Requirements for SDL cable with automatic cable adjustment (equalizer)

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

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

Table 111: 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 84: 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 215.

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 85: 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 215.

Technical data

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1. Installation

The APC620 systems are mounted with the mounting plates found on the housing. The plates are designed for M5 screws.



Figure 86: Mounting plates for the APC620

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

1.1 Important mounting information

- The environmental conditions must be taken into consideration (see chapter 2 "Technical data", section 2.6 "Ambient temperatures for systems with X945 CPU board", on page 75).
- The APC620 is only for operation in closed rooms.
- The APC620 cannot be situated in direct sunlight.
- The ventilation holes cannot be covered.
- When mounting the device, be sure to adhere to the allowable mounting orientations (see section 1.3 "Mounting orientation", on page 207).
- 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 213).

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1.2 Drilling templates



Table 112: Drilling templates - 1 and 2 PCI slots

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Table 113: Drilling templates - 3 and 5 PCI slots



Table 114: 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 87: 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.

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Figure 88: 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 (hard disk, etc.). See the following pages for information regarding the specifications for mounting orientation.



Figure 89: Mounting orientation - Optional

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



Figure 90: Optional circulation spacing

CompactFlash slot add-on

No limitation on mounting orientation. Permissible mounting orientations are shown in figure 89 "Mounting orientation - Optional", on page 209.

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).





The mounting orientations "horizontal 1" and "horizontal 2" require the use of a fan kit.

Slide-in USB FDD

The following figure shows the possible mounting orientations for an APC620 device with a slidein USB FDD drive (5AC600.FDDS-00).





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 93: 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 111.

Section 3 Commissioning

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 mm² per connection.
- Note the line shielding concept, all connected data cables are used as shielded lines.



Figure 94: 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).

Commissioning • Connection examples

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 115: 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 95: Configuration - One Automation Panel 900 via DVI (onboard)

4.2.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table (e.g. for connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit							Restriction
	5PC600.SX01 -00	5PC600.SX02 -00	5PC600.SX02 -01	5PC600.SF03 -00	5PC600.SX05 -00	5PC600.SX05 -01	5PC600.SE00 -00 / -02	Resolution
5PC600.X945-00	~	-	1	-	-	1	1	Max. SXGA

Table 116: Possible combinations of system unit and CPU board

4.2.2 Link modules

Model number	Description	Note
5DLDVI.1000-01	Automation Panel Link DVI receiver connections for DVI-D, RS232 and USB 2.0 (Type B); 24VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900

Table 117: Link module for the configuration - One Automation Panel 900 via DVI

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Section 3

4.2.3 Cables

Select one cable each from the 3 required types.

Model number	Туре	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 118: Cables for DVI configurations

1) USB support is not possible on the Automation Panel 900 because USB is limited to 5 m.

4.2.4 Possible Automation Panel units, resolutions und segment lengths

The following Automation Panel 900 units can be used. In rare cases, the segment length is limited according to the resolution.

Model number	Diagonal	Resolution	Touch screen	Keys	Max. segment length
5AP920.1043-01	10.4"	VGA	1	-	5 m / 10 m ¹⁾
5AP920.1214-01	12.1"	SVGA	~	-	5 m / 10 m ¹⁾
5AP920.1505-01	15.0"	XGA	1	-	5 m / 10 m ¹⁾
5AP920.1706-01	17.0"	SXGA	1	-	5 m / 10 m ¹⁾
5AP920.1906-01	19.0"	SXGA	1	-	5 m / 10 m ¹⁾

Table 119: 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 6 "Automation PC 620 with Windows XP Professional", on page 351.

4.2.7 Windows touch screen driver settings

See chapter 4 "Software", section 6 "Automation PC 620 with Windows XP Professional", on page 351.

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

4.3.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table (e.g. for connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit							Restriction
	5PC600.SX01 -00	5PC600.SX02 -00	5PC600.SX02 -01	5PC600.SF03 -00	5PC600.SX05 -00	5PC600.SX05 -01	5PC600.SE00 -00 / -02	Resolution
5PC600.X945-00	1	-	1	-	-	1	1	Max. UXGA

Table 120: Possible combinations of system unit and CPU board

4.3.2 Link modules

Model number	Description	Note
5DLSDL.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900

Table 121: Link module for the configuration - One Automation Panel 900 via SDL

4.3.3 Cables

Select a cable from the following table.

Model number	Туре	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 122: 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	SVGA	XGA	SXGA	UXGA		
	640 x 480	800 x 600	1024 x 768	1280 x 1024	1600 x 1200		
1.8	5CASDL.0018-00	5CASDL.0018-00	5CASDL.0018-00	5CASDL.0018-00	5CASDL.0018-00		
	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01		
	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03		

Table 123: Segment lengths, resolutions and SDL cables

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

1) See table 124 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 222

2) See table 125 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 223

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

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

Table 124: Requirements for SDL cable with automatic cable adjustment (equalizer)

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

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

Table 125: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

4.3.4 BIOS settings

No special BIOS settings are necessary for operation without touch.

To operate Automation Panel 900 panels with a touch screen (Extended Desktop or Dual Display Clone), the serial interfaces COM C and COM D must be activated in BIOS (BIOS default setting = disabled).

4.3.5 Windows graphics driver settings

"Digital display" must be defined as output device in the graphics driver.

For more information on this, see chapter 4 "Software", section 6 "Automation PC 620 with Windows XP Professional", on page 351.

4.3.6 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 6 "Automation PC 620 with Windows XP Professional", on page 351.

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

4.4.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table.

CPU board	with system unit							Restriction
	5PC600.SX01 -00	5PC600.SX02 -00	5PC600.SX02 -01	5PC600.SF03 -00	5PC600.SX05 -00	5PC600.SX05 -01	5PC600.SE00 -00 / -02	Resolution
5PC600.X945-00	1	-	1	-	-	1	1	max. XGA

Table 126: Possible combinations of system unit and CPU board

4.4.2 Cables

Select an SDL cable from the following table.

Model number	Туре	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 127: Cables for SDL configurations

Cable lengths and resolutions for SDL transfer

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

Cables	Resolution		
Segment length [m]	XGA 1024 x 768		
1.8	5CASDL.0018-20		
5	5CASDL.0050-20		
10	5CASDL.0100-20		
15	5CASDL.0150-20		
20	5CASDL.0200-20 ¹⁾		
25	5CASDL.0250-20 ¹⁾		
30	5CASDL.0300-30 ²⁾		
40	5CASDL.0400-30 ²⁾		

Table 128: Segment lengths, resolutions and SDL cables

1) See table 129 "Requirements for SDL cable with automatic cable adjustment (equalizer)"

2) See table 130 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)"

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

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description.
MTCX PX32	Firmware on the APC620	v 01.55	Firmware upgrade (MTCX, SDLR, SDLT) V01.10, available in the download area of the B&R homepage.

Table 129: Requirements for SDL cable with automatic cable adjustment (equalizer)

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

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description.
MTCX PX32	Firmware on the APC620	v 01.55	Supported starting with the APC620 / PPC /00 Firmware upgrade (MTCX, SDLR, SDLT) V01.10, available in the download area of the B&R homepage.
Hardware	Name	Revision	Note
5PC600.SX01-00	System 1 PCI	Rev. E0	-
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	-

Table 130: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

Firmware	Name	Version	Note
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 130: Requirements for SDL cable with extender and automatic cable adjustment (equalizer) (Forts.)

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 6 "Automation PC 620 with Windows XP Professional", on page 351.

4.4.5 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 6 "Automation PC 620 with Windows XP Professional", on page 351.

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 98: Configuration - One AP900 and an AP800 via SDL (onboard)

4.5.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table.

CPU board	with system unit					Restriction		
	5PC600.SX01 -00	5PC600.SX02 -00	5PC600.SX02 -01	5PC600.SF03 -00	5PC600.SX05 -00	5PC600.SX05 -01	5PC600.SE00 -00 / -02	Resolution
5PC600.X945-00	1	-	1	-	-	1	1	Max. UXGA

Table 131: Possible combinations of system unit and CPU board

4.5.2 Cables

How to select an SDL cable for connecting the AP900 display to the AP900 display 4.3 "An Automation Panel 900 via SDL (onboard)".

How to select an SDL cable for connecting the AP800 display to the AP900 display4.4 "An Automation Panel 800 via SDL (onboard)".

Cable lengths and resolutions for SDL transfer

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

Cables	Resolution		
Segment length [m]	XGA 1024 x 768		
1.8	5CASDL.0018-20		
5	5CASDL.0050-20		
10	5CASDL.0100-20		
15	5CASDL.0150-20		
20	5CASDL.0200-20 ¹⁾		
25	5CASDL.0250-20 ¹⁾		
30	5CASDL.0300-30 ²⁾		
40	5CASDL.0400-30 ²⁾		

Table 132: Segment lengths, resolutions and SDL cables

1) See table 133 "Requirements for SDL cable with automatic cable adjustment (equalizer)"

2) See table 134 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)"

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

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description.
MTCX PX32	Firmware on the APC620	v 01.55	Firmware upgrade (MTCX, SDLR, SDLT) V01.10, available in the download area of the B&R homepage.

Table 133: Requirements for SDL cable with automatic cable adjustment (equalizer)

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

Firmware	Name	Version	Note
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description.
MTCX PX32	Firmware on the APC620	v 01.55	Supported starting with the APC5207 PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) V01.10, available in the download area of the B&R homepage.
Hardware	Name	Revision	Note
5PC600.SX01-00	System 1 PCI	Rev. E0	-
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	-
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0	-
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0	
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Rev. C0	-
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0	-

Table 134: 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 6 "Automation PC 620 with Windows XP Professional", on page 351.

4.5.5 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 6 "Automation PC 620 with Windows XP Professional", on page 351.

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

4.6.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table (e.g. for connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit					Restriction		
	5PC600.SX01 -00	5PC600.SX02 -00	5PC600.SX02 -01	5PC600.SF03 -00	5PC600.SX05 -00	5PC600.SX05 -01	5PC600.SE00 -00 / -02	Resolution
5PC600.X945-00	~	-	1	-	-	1	1	Max. UXGA

Table 135: Possible combinations of system unit and CPU board

4.6.2 Link modules

Model number	Description	Note
5DLSDL.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
5DLSDL.1000-01	Automation Panel Link SDL transceiver Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 3 pieces required

Table 136: 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	Туре	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 137: 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 138: Segment lengths, resolutions and SDL cables

1) See table 139 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 232

2) See table 140 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 233

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

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

Table 139: Requirements for SDL cable with automatic cable adjustment (equalizer)

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

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

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Table 140: 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 6 "Automation PC 620 with Windows XP Professional", on page 351.

4.6.6 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 6 "Automation PC 620 with Windows XP Professional", on page 351.

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

4.7.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table (e.g. for connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit					Restriction		
	5PC600.SX01 -00	5PC600.SX02 -00	5PC600.SX02 -01	5PC600.SF03 -00	5PC600.SX05 -00	5PC600.SX05 -01	5PC600.SE00 -00 / -02	Resolution
5PC600.X945-00	-	1	-	1	1	-	-	Max. UXGA

Table 141: Possible combinations of system unit and CPU board

4.7.2 Link modules

Model number	Description	Note
5DLSDL.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
5AC600.SDL0-00	APC620 Smart Display Link transmitter For connecting Automation Panels to an APC620 via SDL.	For Automation PC 620

Table 142: 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	Туре	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	Resolution					
Segment length [m]	VGA	SVGA	XGA	SXGA	UXGA	
	640 x 480	800 x 600	1024 x 768	1280 x 1024	1600 x 1200	
1.8	5CASDL.0018-00	5CASDL.0018-00	5CASDL.0018-00	5CASDL.0018-00	5CASDL.0018-00	
	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01	
	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03	

Table 144: Segment lengths, resolutions and SDL cables

Cables		Resolution						
Segment length [m]	VGA 640 x 480	VGA SVGA 640 x 480 800 x 600		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.0150-0 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⁾	-			

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Table 144: Segment lengths, resolutions and SDL cables (Forts.)

1) See table 145 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 237

2) See table 146 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 238

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

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

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

4.7.4 BIOS settings

No special BIOS settings are necessary for operation without touch.

To operate Automation Panel 900 panels with a touch screen (Extended Desktop or Dual Display Clone), the serial interfaces COM C and COM D must be activated in BIOS (BIOS default setting = disabled).

4.7.5 Windows graphics driver settings

"Notebook" must be defined as output device in the graphics driver.

For more information on this, see chapter 4 "Software", section 6 "Automation PC 620 with Windows XP Professional", on page 351.

4.7.6 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 6 "Automation PC 620 with Windows XP Professional", on page 351.

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

4.8.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table (e.g. for connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit					Restriction		
	5PC600.SX01 -00	5PC600.SX02 -00	5PC600.SX02 -01	5PC600.SF03 -00	5PC600.SX05 -00	5PC600.SX05 -01	5PC600.SE00 -00 / -02	Resolution
5PC600.X945-00	-	1	-	1	1	-	-	Max. UXGA

Table 147: Possible combinations of system unit and CPU board

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4.8.2 Link modules

Model number	Description	Note
5DLSDL.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
5DLSDL.1000-01	Automation Panel Link SDL transceiver Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 3 pieces required
5AC600.SDL0-00	APC620 Smart Display Link transmitter For connecting Automation Panels to an APC620 via SDL.	For Automation PC 620

Table 148: Link modules for configuration: 4 Automation Panel 900 units via SDL (optional) on 1 line

4.8.3 Cables

Selection of 4 cables from the following tables.

Model number	Туре	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 149: 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.0050-00 5 5CASDL.0050-01 5CASDL.0050-01 5CASDL.0050-03 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 150: Segment lengths, resolutions and SDL cables

1) See table 151 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 241

2) See table 152 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 242

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

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

Table 151: Requirements for SDL cable with automatic cable adjustment (equalizer)

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

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

Table 152: 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 6 "Automation PC 620 with Windows XP Professional", on page 351.

4.8.6 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 6 "Automation PC 620 with Windows XP Professional", on page 351.

4.9 Four Automation Panel 900 units via SDL (AP Link) and RGB (onboard)

A CRT monitor (max. UXGA) is connected to the integrated monitor/panel interface (onboard) via RGB. Four additional Automation Panel 900 units (max. UXGA) are connected to the optional SDL transmitter (AP Link). The Automation Panels must be the same type. The two lines display different content (Extended Desktop), but 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. USB devices can only be connected directly to the Automation Panel (without hub).



Figure 102: Configuration - Four Automation Panel 900 units via SDL (AP Link) and CRT (onboard)

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4.9.1 Basic system requirements

The following table shows the possible combinations for the APC620 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table (e.g. for connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit						Restriction	
	5PC600.SX01 -00	5PC600.SX02 -00	5PC600.SX02 -01	5PC600.SF03 -00	5PC600.SX05 -00	5PC600.SX05 -01	5PC600.SE00 -00 / -02	Resolution
5PC600.X945-00	-	1	-	1	1	-	-	Max. UXGA

Table 153: Possible combinations of system unit and CPU board

4.9.2 Link modules

Model number	Description	Note
5DLSDL.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
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 1 pieces required

Table 154: Link modules for configuration: 4 Automation Panel 900 units via SDL (AP Link) and RGB (onboard)

4.9.3 Cables

Selection of 8 cables from the following tables.

Model number	Туре	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

Table 155: Cables for SDL configurations

Model number	Туре	Length
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 155: 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 156: Segment lengths, resolutions and SDL cables

1) See table 157 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 246

2) See table 158 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 246

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

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

Table 157: Requirements for SDL cable with automatic cable adjustment (equalizer)

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

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

Table 158: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

4.9.4 BIOS settings

No special BIOS settings are necessary for operation without touch.

To operate Automation Panel 900 panels with a touch screen (Extended Desktop or Dual Display Clone), the serial interfaces COM C and COM D must be activated in BIOS (BIOS default setting = disabled).

4.9.5 Windows graphics driver settings

See chapter 4 "Software", section 6 "Automation PC 620 with Windows XP Professional", on page 351.

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 6.2.3 "Graphics settings for Dual Display Clone", on page 357).

4.9.6 Windows touch screen driver settings

See chapter 4 "Software", section 6 "Automation PC 620 with Windows XP Professional", on page 351.

4.10 Three AP900 units and one AP800 via SDL (AP Link) and RGB (onboard)

A CRT monitor (max. UXGA) is connected to the integrated monitor/panel interface (onboard). Three additional Automation Panel 900 units (max. UXGA) are connected to the optional SDL transmitter. The Automation Panels must be the same type. The two lines display different content (Extended Desktop), but panels 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 103: Configuration - Three AP900 units and one AP800 via SDL (AP Link) and RGB (onboard)

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.

If an Automation Panel 800 and an Automation Panel 900 should be connected on the same line, the devices must have the same display type.

CPU board		with system unit						Restriction
	5PC600.SX01 -00	5PC600.SX02 -00	5PC600.SX02 -01	5PC600.SF03 -00	5PC600.SX05 -00	5PC600.SX05 -01	5PC600.SE00 -00 / -02	Resolution
5PC600.X945-00	-	1	-	~	~	-	-	max. XGA

Table 159: Possible combinations of system unit and CPU board

4.10.2 Link modules

Model number	Description	Note
5DLSDL.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
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 2 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 160: Link modules for configuration: 3 AP900 units and one AP800 via SDL (AP Link) and RGB (onboard)

4.10.3 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)".

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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.0018-20 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 161: Segment lengths, resolutions and SDL cables

1) See table 162 "Requirements for SDL cable with automatic cable adjustment (equalizer)", on page 250

2) See table 163 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)", on page 251

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

Firmware	Name	Version	Note	
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the BIOS description.	
MTCX PX32	Firmware on the APC620	v 01.55	Supported starting with the APC620 / PPC /00 Firmware upgrade (MTCX, SDLR, SDLT) V01.10, available in the download area of the B&R homepage.	

Table 162: Requirements for SDL cable with automatic cable adjustment (equalizer)

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

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

Table 163: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

4.10.4 BIOS settings

No special BIOS settings are necessary for operation without touch.

To operate Automation Panel 900 panels with a touch screen (Extended Desktop or Dual Display Clone), the serial interfaces COM C and COM D must be activated in BIOS (BIOS default setting = disabled).

4.10.5 Windows graphics driver settings

See chapter 4 "Software", section 6 "Automation PC 620 with Windows XP Professional", on page 351.

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 6.2.3 "Graphics settings for Dual Display Clone", on page 357).

4.10.6 Windows touch screen driver settings

See chapter 4 "Software", section 6 "Automation PC 620 with Windows XP Professional", on page 351.

4.11 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 104: Examples - internal numbering of the extension units
5. Configuration of a SATA RAID array

You must enter the BIOS "RAID Configuration Utility" in order to make the necessary settings. After the POST, enter <Ctrl+S> or <F4> to open RAID BIOS.

SiI 3512A SATARaid BIOS Verison 4.3.79	
Copyright (C) 1997-2006 Silicon Image, Inc.	
Dress (Ctrl/C) or E4 to optor DATD utility)
Press Collins of F4 to enter RAID utility	
0 ST96023AS	55 GB
1 ST96023AS	55 GB

Figure 105: Open the RAID Configuration Utility

RAID Configuration T	Utility - Silicon Image In	nc. Copyright (C) 2006	ection 3
Create RAID set Delete RAID set Rebuild Mirrored set Resolve Conflicts Low Level Format		Press " Enter" to create RAID set	
* 0 PM ST96023AS 1 SM ST96023AS	55GB 55GB		
		†↓ Select Menu ESC Previous Menu Enter Select Ctrl-E Exit	
		* First HDD	

Figure 106: RAID Configuration Utility - Menu

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

Кеу	Function
Cursor ↑	Go to previous item.
Cursor ↓	Go to the next item.
Enter	Select an item or open a submenu.

Table 164: BIOS-relevant keys in the RAID Configuration Utility

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Кеу	Function
ESC	Go back to previous menu.
Ctrl+E	Exit setup and save the changed settings.

Table 164: BIOS-relevant keys in the RAID Configuration Utility

5.1 Create RAID set



Figure 107: RAID Configuration Utility - Menu

The RAID system can be recreated as "Striped" = RAID0 or "Mirrored" = RAID1 using the menu "Create RAID set".

5.1.1 Create RAID set - Striped

RAID Configuration Utility - Silicon Image	Inc. Copyright (C) 2006
Auto Configuration Manual Configuration	Press "Enter" to automatica- lly create a striped (RAID 0) set Striped size is 16K First drive is drive 0 Second drive is drive 1
* 0 PM ST96023AS 55GE 1 SM ST96023AS 55GE	-
	<pre>↑↓ Select Menu ESC Previous Menu Enter Select Ctrl-E Exit * First HDD</pre>

Figure 108: RAID Configuration Utility - Create RAID set - Striped

Auto Configuration

Auto Configuration optimizes all settings.

Manual Configuration

It is possible to specify the first and second HDD as well as the "Chunk Size" (= block size, application-dependent).

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5.1.2 Create RAID set - Mirrored

RAID Configuration	Utility - Silicon	Image In	c. Copyright (C) 2006
Auto Configuration Manual Configuration			Press "Enter" to automatica- lly create a mirrored (RAID 1) set For migrating single HDD into RAID 1 set, use Manual configuration instead
* 0 PM ST96023AS 1 SM ST96023AS		55GB 55GB	
			↑↓ Select Menu ESC Previous Menu Enter Select Ctrl-E Exit* First HDD

Figure 109: RAID Configuration Utility - Create RAID set - Mirrored

Auto Configuration

Auto Configuration optimizes all settings.

Manual Configuration

It is possible to specify the "Source" and "Target" HDD, and also to specify whether a rebuild (mirror) should be performed immediately (approx. 50 minutes).

5.2 Delete RAID set

RAID Configuration	Utility - Silicon Image I	nc. Copyright (C) 2006
Create RAID set Delete RAID set Rebuild Mirrored set Resolve Conflicts Low Level Format	Set0	
0 PM ST96023AS 1 SM ST96023AS	55GB 55GB	
Set0 SiI Striped Set 0 ST96023AS 1 ST96023AS	<pm> 111GB Chunk Size 16k Chunk Size 16k</pm>	↑↓ Select Menu ESC Previous Menu Enter Select Ctrl-E Exit First HDD

Figure 110: RAID Configuration Utility - Delete RAID set

An existing RAID set can be deleted using the menu "Delete RAID set".

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5.3 Rebuild mirrored set

RAID Configuration	Utility - Silicon	Image Inc.	. Copyri	ight (C)	2006
Create RAID set Delete RAID set Rebuild Mirrored set Resolve Conflicts Low Level Format		F	Rebuild	help	
0 PM ST96023AS 1 SM ST96023AS		55GB 55GB			
* Set0 SiI Mirrored Set 0 ST96023AS 1 ST96023AS	<pm> 0</pm>	55GB Current † Eurrent E	↓ ESC Enter Ctrl-E	Select M Previous Select Exit First H	Menu s Menu DD

Figure 111: RAID Configuration Utility - Rebuild mirrored set

The "Rebuild mirrored set" menu can be used to restart a rebuild procedure in a RAID 1 network if an error occurs, after first interrupting the rebuild procedure or when exchanging a hard disk.

If "onlinerebuild" is selected, then the rebuild is executed during operation after the system is booted. E.g. an event pop-up is displayed by the installed SATA RAID configuration program: SATARaid detected a new event and the rebuild is started. The entire rebuild lasts approximately 50 minutes.

If "offlinerebuild" is selected, then a rebuild is performed immediately before starting the operating system (lasts approximately 30 minutes).

5.4 Resolve conflicts

RAID Configuration	Utility - Silicon Image In	nc. Copyright (C) 2006
Create RAID set Delete RAID set Rebuild Mirrored set Resolve Conflicts Low Level Format		Help for resolving conflicts
0 PM ST96023AS 1 SM ST96023AS	55GB 55GB	
* Set0 SiI Mirrored Set 0 ST96023AS 1 ST96023AS	<pm> 55GB Current Current</pm>	↑↓ Select Menu ESC Previous Menu Enter Select Ctrl-E Exit * First HDD

Figure 112: RAID Configuration Utility - Resolve conflicts

Conflicts in a RAID set can be resolved using the "Resolve conflicts" menu. This function is only available if the status of the hard disk is "conflict".

5.5 Low level format

RAID Configuration Utility - S	Silicon Image Inc. Copyright (C) 2006
Create RAID set Delete RAID set Rebuild Mirrored set Resolve Conflicts Low Level Format	Select HDD to be formatted
0 PM ST96023AS 1 SM ST96023AS	55GB 55GB
	↑↓ Select Menu ESC Previous Menu Enter Select Ctrl-E Exit

Figure 113: RAID Configuration Utility - Low level format

Individual hard disks can be configured using the "Low Level Format" menu. This can only be done if a RAID set is not configured. A low level format of a hard disk takes approx. 40 minutes.

6. Connection of USB peripheral devices

Warning!

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

6.1 Local on the APC620

Many different peripheral USB devices can be connected to the 2 or 4 (APC embedded) USB interfaces. The maximum current load values and transfer speeds can be found in Sections "USB port", on page 114 and "USB connection (only APC620 embedded)", on page 115.



Figure 114: Local connection of USB peripheral devices on the APC620

6.2 Remote connection to Automation Panel 900 via DVI

Many different peripheral USB devices can be connected to the 2 or 3 USB interfaces on the Automation Panel 900. These can each handle a load of 500 mA. The maximum transfer rate is USB 2.0.

Information:

Only end devices (no hubs) can be connected to the Automation Panel 900.



Figure 115: 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 116: Remote connection of USB peripheral devices to the APC800/900 via SDL

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7. Known problems / issues

The following issues for the APC620/PPC700 devices are known:

- No support for IDE-based slide-in drives. Only USB slide-in drives are supported.
- Graphics Engine 2 (GE2) interface not supported. Only GE1 and analog RGB are supported.
- In Windows XP, the Windows Standby mode is not supported in combination with the add-on hard disk (5AC600.HDDI-05 and 5AC600.HDDI-06) in IDE Slave Only mode. A blue screen or Windows crash can occur sporadically when returning from Windows Standby mode. Windows Standby mode will function if a CompactFlash card is connected to the IDE Master in addition the HDD on the slave slot. The same problem also occurs if the "Turn off hard disks" function is activated in the Power Options in the Control Panel (must be set to "Never").
- If the Intel GMA driver (Graphics Media Accelerator) is installed in the system (e.g. in Windows XP), then an analog RGB monitor will always be detected, regardless of whether one is connected or not.
- Using two different types of CompactFlash cards can cause problems in Automation PCs and Panel PCs. This can result in one of the two cards not being detected during system startup. This is caused by varying startup speeds. CompactFlash cards with older technology require significantly more time during system startup than CompactFlash cards with newer technology. This behavior occurs near the limits of the time frame provided for startup. The problem described above can occur because the startup time for the CompactFlash cards fluctuates due to the variance of the components being used. Depending on the CompactFlash cards being used, this error might never, sometimes or always occur.
- During daisy chain operation of multiple AP800/AP900 devices via SDL, it's possible that the touch controller status shows a red "X" in the Control Center applet for the touch screen driver when the touch controller is detected. The functionality of the touch system is not affected by this. This can be avoided by setting a panel locking time of 50 ms. The panel locking time can be configured with the B&R Key Editor.

Chapter 4 • Software

1. BIOS options

The BIOS settings available for the X945 CPU boards are described in the following sections.

Information:

- The following diagrams and BIOS menu items including descriptions refer to BIOS version 1.13. 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 1.9 "BIOS default settings", on page 312).

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 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).

1.2 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 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 117: X945 - BIOS diagnostics screen

1.2.1 BIOS setup keys

The following keys are enabled during the POST:

Кеу	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 \uparrow and cursor \downarrow and by pressing <enter>, select the device from which will be booted.</enter>
<pause></pause>	Pressing the <pause> key stops the POST. Press any other key to resume the POST.</pause>

Table 165: X945 bios-relevant keys at POST

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

Кеу	Function
F1	General help
Cursor ↑	Moves to the previous item.
Cursor ↓	Go to the next item.
Cursor \leftarrow	Moves to the previous item.
$Cursor \to$	Go to the next item.
+-	Changes the setting of the selected function.
Enter	Changes to the selected menu.
PageUp↑	Change to the previous page.
PageDown↓	Change to the previous page.
Pos 1	Jumps to the first BIOS menu item or object.
End	Jumps to the last BIOS menu item or object.
F2 / F3	The colors of the BIOS Setup are switched.
F7	Changes are reset.
F9	These settings are loaded for all BIOS configurations.
F10	Save and close.
Esc	Exits the submenu.

Table 166: X945 bios-relevant keys in the BIOS menu

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.	268
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.	269
Boot	The boot order can be set here.	303
Security	For setting up the system's security functions.	305
Power	Setup of various APM (Advanced Power Management) options.	309
Exit	To end the BIOS setup.	311

Table 167: X945 - Overview of BIOS menu items

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1.3 Main

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Immediately after the DEL button is pressed during startup, the main BIOS setup menu appears.

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Main	Advanced	Boot	Security	Power	Exit
System Tin System Da	me te	[['	12:24:36] Thu 07/15/201	0] Us	se [ENTER], [TAB] r [SHIFT-TAB] to
BIOS ID	: APC7R1	13		Se	siect a field.
Processor CPU Frequ	: Intel(ency : 1600MH	R) Atom(T) Z	M) CPU N270	CC	se [+] or [-] to onfigure system Time
System Me	mory : 1016MB				
Board Inf Product R Serial Nu BC Firmwa MAC Addre	ormation evision : Y. mber : 31 re Rev. : 90 ss (ETH1): 00	0 6862 4 :13:95:05	:75:C0	<++ ↑↓ Ta F1	 Select Screen Select Item Change Field Select Field General Help
Boot Coun Running T	ter : 21 ime : 38	874 1h		FI	10 Save and Exit SC Exit

Figure 118: X945 BIOS Main Menu

BIOS setting	Meaning	Setting options	Effect
System Time	This is the current system time setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Changes the System time	Set the system time in the format Hour:Minute:Second (hh:mm:ss).
System Date	This is the current system date setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Changes the system date	Sets the system date in the format Month:Day:Year (mm:dd:yyyy).
BIOS ID	Displays the BIOS recognition.	None	-
Processor	Displays the processor type.	None	-
CPU Frequency	Displays the processor frequency.	None	-
System Memory	Displays the system memory size.	None	-
Product Revision	Displays the CPU board HW revision.	None	-
Serial Number	Displays the CPU board serial number.	None	-
BC Firmware Rev.	Displays the CPU board controller firmware revision.	None	-
MAC Address (ETH1)	Displays the MAC addresses assigned for the ETH1 interface.	None	-

Table 168: X945 Main Menu setting options

BIOS setting	Meaning	Setting options	Effect
Boot Counter	Displays the boot counter - each restart increments the counter by one (max. 16777215).	None	-
Running Time	Displays the runtime in whole hours. (max. 65535).	None	-

Table 168: X945 Main Menu setting options (Forts.)

1.4 Advanced

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Main	Advanced	Boot	Security	Power	1	Exit
Advanced	Settings					
PCI Conf	iguration					
Graphics	Configuration	n				
CPU Conf	iguration					
Chipset	Configuration					
I/O Inte	rface Configu	ration				
DE Conf	nfiguration					
USB Conf	iguration					
Keyboard	/Mouse Config	uration			↔	Select Screen
Remote A	ccess Configu	ration			t↓	Select Item
CPU Boar	d Monitor			:	Enter	Go to Sub Screen
Baseboar	d/Panel Featu	res			F1	General Help
					F10	Save and Exit
					ESC	Exit

Figure 119: X945 Advanced Menu

BIOS setting	Meaning	Setting options	Effect
ACPI configuration	Configures the APCI devices.	Enter	Opens the submenu See "ACPI configuration", on page 271.
PCI Configuration	Configures PCI devices.	Enter	Opens the submenu See "PCI Configuration", on page 273.
Graphics configuration	Configures the graphics settings.	Enter	Opens the submenu See "Graphics configuration", on page 277.
CPU configuration	Configures the CPU settings.	Enter	Opens the submenu See "CPU configuration", on page 279.
Chipset configuration	Configures the chipset functions.	Enter	Opens the submenu See "Chipset configuration", on page 281.

Table 169: X945 Advanced Menu setting options

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BIOS setting	Meaning	Setting options	Effect
I/O interface configuration	Configures the I/O devices.	Enter	Opens the submenu See "I/O interface configuration", on page 282.
Clock Configuration	Configures the clock settings.	Enter	Opens the submenu See "Clock Configuration", on page 284.
IDE Configuration	Configures the IDE functions.	Enter	Opens the submenu See "IDE Configuration", on page 285.
USB configuration	Configures the USB settings.	Enter	Opens the submenu See "USB configuration", on page 291.
Keyboard/mouse configuration	Configures the keyboard/mouse options.	Enter	Opens the submenu See "Keyboard/mouse configuration", on page 293.
Remote access configuration	Configures the remote access settings.	Enter	Opens the submenu See "Remote access configuration", on page 294.
CPU board monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens the submenu See "CPU board monitor", on page 296.
Main Board/Panel Features	Displays device specific information and setup of device specific values.	Enter	Opens the submenu See "Main Board/Panel Features", on page 297.

Table 169: X945 Advanced Menu setting options (Forts.)

1.4.1 ACPI configuration

ACPI Settings		Enable / Disable
ACPI Aware O/S	[Yes]	ACPI support for Operating System.
ACPI Version Features	[ACPI v2.0]	ENABLE: If OS
ACPI APIC support Suspend mode	[Enabled] [S1 (POS)]	supports ACPI.
USB Device Wakeup from S3/S4	[Disabled]	DISABLE: If OS does not support
Active Cooling Trip Point Passive Cooling Trip Point Critical Trip Point	[Disabled] [Disabled] [105°C]	ACPI.
		↔ Select Screen ↓ Select Item +- Change Option
		F1 General Help F10 Save and Exit

Figure 120: X945 Advanced ACPI configuration

BIOS setting	Meaning	Setting options	Effect
ACPI Aware O/S	This function determines if the operating	Yes	The operating system supports ACPI.
	Advanced Configuration and Power Interface).	No	The operating system does not support ACPI.
ACPI Version	Option for setting the power option	ACPI v1.0	ACPI functions in accordance with v1.0
Features	specifications to be supported. The ACPI functions must be supported by	ACPI v2.0	ACPI functions in accordance with v2.0
	the drivers and operating systems being used.	ACPI v3.0	ACPI functions in accordance with v3.0
ACPI APIC support	This option controls the support of the advanced programmable interrupt controller in the processor.	Enabled	Enables this function.
		Disabled	Disables the function
Suspend mode	Selects the ACPI status to be used when Suspend Mode is enabled.	S1 (POS)	Sets S1 as Suspend mode. Only a few functions are disabled and are available again at the touch of a button
		S3 (STR)	Sets S3 as Suspend Mode. The current state of the operating system is written to the RAM, which is then supplied solely with power.
USB Device Wakeup	This options makes it possible for activity	Enabled	Enables this function.
trom 53/54	on a connected USB device to wake the system up from the S3/S4 standby mode.	Disabled	Disables the function

Table 170: X945 Advanced ACPI configuration setting options

Section 4 Software

BIOS setting	Meaning	Setting options	Effect
Active Cooling Trip	ctive Cooling Trip With this function, an optional CPU fan		Disables this function.
Point above the operating system can be set to turn on when the CPU reaches the set temperature.		50°C, 60°C, 70°C, 80°C, 90°C	Temperature setting for the active cooling 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 passive cooling 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.

Table 170: X945 Advanced ACPI configuration setting options (Forts.)

1.4.2 PCI Configuration

	BIOS SETUP UTIL	ITY
Advanced		
Advanced PCI/PnP Settings		NO: lets the BIOS
Plug & Play O/S		devices in the system.
PCI Latency Timer	[64]	YES: lets the
Allocate IRO to PCI VGA	[Yes]	operating system
Allocate IRQ to SMBUS HC	[Yes]	configure Plug and
		Play (PnP) devices not
▶ PCI IRQ Resource Exclusio	n	required for boot if
		your system has a Plug
PCI Interrupt Routing		and Play operating
		system.
		↔ Select Screen
		T+ Select Item
		+- Change Option
		FI General Help
		FIU Save and EXIC
		ESC EXIC
	+ 1995-2009 Amor	ican Megatrends Inc

Figure 121: X945 Advanced PCI Configuration

BIOS setting	Meaning	Setting options	Effect
Plug & Play O/S	BIOS is informed if Plug & Play is capable on the operating system.	Yes	The operating system handles the distribution of resources.
		No	BIOS handles the distribution of resources.
PCI Latency Timer	This option controls how long (in PCI ticks) one PCI bus card can continue to use the master after another PCI card has requested access.	32, 64, 96, 128, 160, 192, 224, 248	Manually sets the value in PCI ticks.
Allocate IRQ to PCI This function is used to determine if an	This function is used to determine if an	Yes	Automatic assignment of an interrupt.
VGA interrupt is assigned to the PCI VGA.		No	No assignment of an interrupt.
Allocate IRQ	Use this function to set whether or not the	Yes	Automatic assignment of a PCI interrupt.
to SMBUS HC	SMBUS HC SM (System Management) bus controller is assigned a PCI interrupt.	No	No assignment of an interrupt.
PCI IRQ Resource Exclusion	Configures the PCI IRQ resource settings for ISA Legacy devices.	Enter	Opens the submenu See "PCI IRQ Resource Exclusion", on page 274
PCI Interrupt Routing	Configures PCI interrupt routing	Enter	Opens the submenu See "PCI Interrupt Routing", on page 275

Table 171: X945 Advanced PCI configuration setting options

PCI IRQ Resource Exclusion

PCI IRQ Resource Exclusion		Available: Specified
TROS	[Allocated]	IRQ is available to be
TRO4	[Allocated]	devices
TRO5	[Available]	Reserved: Specified
IRO6	[Available]	IRO is reserved for
IRO7	[Available]	use by Legacy ISA
IRQ9	[Allocated]	devices.
IRQ10	[Available]	
IRQ11	[Available]	
IRQ12	[Available]	
IRQ14	[Allocated]	
IRQ15	[Available]	↔ Select Screen
		↑↓ Select Item
		+- Change Option
		F1 General Help
		F10 Save and Exit
		ESC EXIT

Figure 122: X945 Advanced PCI IRQ Resource Exclusion

BIOS setting	Meaning	Setting options	Effect
IRQx	IRQ interrupt routing for Legacy ISA	Allocated	Allocated by the system - cannot be used.
	devices.	Available	Available - can be used.
		Reserved	Reserved - cannot be used.

Table 172: X945 Advanced PCI IRQ Resource Exclusion setting options

PCI Interrupt Routing

Advanced		
PCI Interrupt Routing		Select fixed IRQ or
PIRO A (VGA)	[Auto]	BIOS and OS route an
PIRO B (AC97, INTD)	[Auto]	IRQ to this line.
PIRQ C (PATA, INTC)	[Auto]	-
PIRQ D (SATA, UHCI1, SMB)	[Auto]	Make sure that the
PIRQ E (ETH1)	[Auto]	selected IRQ is not
PIRQ F (INTA,ETH2)	[Auto]	assigned to legacy IO
PIRQ G (INTB)	[5]	
PIRQ H (UHCI0, EHCI)	[6]	
1 st Exclusive PCI	[None]	
2 nd Exclusive PCI	[None]	
<pre>INTn : External PCI Bus INTn Line PATA : Parallel ATA in Enhanced/Native Mode SATA : Serial ATA in Enhanced/Native Mode SMB : System Management Bus Controller</pre>		↔ Select Screen ↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit

Figure 123: X945 Advanced PCI Interrupt Routing

BIOS setting	Meaning	Setting options	Effect
PIRQ A (VGA)	Option for setting the PIRQ A.	Auto	Automatic assignment by the BIOS and operating system.
		5,6,7,9,10,11,12	Manual assignment
PIRQ B (AC97, INTD)	Option for setting the PIRQ B.	Auto	Automatic assignment by the BIOS and operating system.
		5,6,7,9,10,11,12	Manual assignment.
PIRQ C (PATA,INTC)	Option for setting the PIRQ C.	Auto	Automatic assignment by the BIOS and operating system.
		5,6,7,9,10,11,12	Manual assignment.
PIRQ D (SATA,UHCI1,SMB)	Option for setting the PIRQ D.	Auto	Automatic assignment by the BIOS and operating system.
		5,6,7,9,10,11,12	Manual assignment.
PIRQ E (ETH1)	Option for setting the PIRQ E.	Auto	Automatic assignment by the BIOS and operating system.
		5,6,7,9,10,11,12	Manual assignment.

Table 173: X945 Advanced PCI Interrupt Routing setting options

BIOS setting	Meaning	Setting options	Effect
PIRQ F (INTA, ETH2)	Option for setting the PIRQ F.	Auto	Automatic assignment by the BIOS and operating system.
		5,6,7,9,10,11,12	Manual assignment.
PIRQ G (INTB)	Option for setting the PIRQ G.	Auto	Automatic assignment by the BIOS and operating system.
		5,6,7,9,10,11,12	Manual assignment.
PIRQ H (UHCI0, EHCI)	Option for setting the PIRQ H.	Auto	Automatic assignment by the BIOS and operating system.
		5,6,7,9,10,11,12	Manual assignment.
1st Exclusive PCI	With this option you can determine if the	None	No interrupt is assigned.
	IRQ assigned to the PIRQ x is handled exclusively (no IRQ sharing).	x	Assigns the PIRQ as 1st exclusive PCI IRQ.
	Information:		
	Is only displayed if a PIRQ is manually set (e.g. 5).		
2nd Exclusive PCI	With this option you can determine if the	None	No interrupt is assigned.
	IRQ assigned to the PIRQ x is handled exclusively (no IRQ sharing).	x	Assigns the PIRQ as 2nd exclusive PCI IRQ.
	Information:		
	Only displayed when two PIRQs are set manually.		
3rd Exclusive PCI	With this option you can determine if the	None	No interrupt is assigned.
	IRQ assigned to the PIRQ x is handled exclusively (no IRQ sharing).	x	Assigns the PIRQ as 3rd exclusive PCI IRQ.
	Information:		
	Only displayed in connection with an APC620e and if three PIRQs are set manually.		

Table 173: X945 Advanced PCI Interrupt Routing setting options (Forts.)

1.4.3 Graphics configuration

Advanced			
Graphics Configuration		Select primary video	
		adapter to be used during boot up.	
Internal Graphics Mode Select DVMT Mode Select DVMT/FIXED Memory	[Enabled, 8MB] [DVMT Mode] [128MB]		
Boot Display Device Always Try Auto Panel Detect Local Flat Panel Type	[Auto] [No] [Auto]		
Local Flat Panel Scaling	[Expand Text & Grap]	 ↔ Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit 	

Figure 124: X945 Advanced Graphics configuration

BIOS setting	Meaning	Setting options	Effect
Primary Video Device	Option for selecting the primary video device.	Internal VGA	The internal graphics chip on the CPU board is used as video device (monitor / panel connection).
		PCI / Int. VGA	The graphics chip of a connected graphics card is used as video device.
Internal Graphics	Option for setting the memory size that	Disabled	No reservation - Disables the graphics controller.
Mode Select	can be used for the internal graphics controller.	Enabled, 1MB	1MB main memory provided.
		Enabled, 8MB	8MB main memory provided.
DVMT Mode Select	Option for determining the DVMT mode (Dynamic Video Memory Technology) of the DVMT graphics driver.	Fixed Mode	A fixed amount of memory is allocated to the graphics chip, which is no longer available to the PC.
		DVMT Mode	Memory consumption is controlled dynamically by the DVMT graphics driver. Only the amount of memory that is required is used.
		Combo Mode	The DVMT graphics driver reserves at least 64MB, but can use up to 224MB if necessary.

Table 174: X945 Advanced Graphics configuration setting options

BIOS setting	Meaning	Setting options	Effect
DVMT/FIXED	Option for setting the amount of memory	64MB	64MB of main memory can be used.
Memory	used for the DVMT mode.	128MB	128MB of main memory can be used.
		Maximum DVMT	The remaining available main memory can be used.
Boot Display Device	Determines which video channel should	Auto	Automatic selection.
	be enabled for a video device during the boot procedure.	CRT only	Only use the CRT (Cathode Ray Tube) channel.
		LFP only	Only use the LFP (Local Flat Panel) channel.
		CRT + LFP	Use CRT + LFP channel.
Always Try Auto	This option first searches for EDID data in	No	Disables this function.
Panel Detect	an external EEPHOM to contigure the LFP. If no EDID data is found, then the data selected under "Local Flat Panel Type" is used.	Yes	Enables this function.
Local Flat Panel Type	This option can be used to set a pre- defined profile for the LVDS channel.	Auto	Automatic detection and setting using the EDID data.
		VGA 1x18 (002h)	640 x 480
		VGA 1x18 (013h)	640 x 480
		SVGA 1x18 (01Ah)	800 x 600
		XGA 1x18 (006h)	1024 x 768
		XGA 2x18 (007h)	1024 x 768
		XGA 1x24 (008h)	1024 x 768
		XGA 2x24 (012h)	1024 x 768
		SXGA 2x24 (00Ah)	1280 x 1024
		SXGA 2x24 (018h)	1280 x 1024
		UXGA 2x24 (00Ch)	1600 x 1200
		Customized EDID 1	User-defined profile
		Customized EDID 2	User-defined profile
		Customized EDID 3	User-defined profile
Local flat panel scaling	Determines the screen content should be output according to the defined Local Flat	Centering	The screen content is output centered on the display.
	Panel Type.	Expand Text	The text is stretched across the entire surface of the display.
		Expand Graphics	The graphics are stretched across the entire surface of the display.
		Expand Text & Graphics	Text and graphics are stretched across the entire surface of the display.
Display Mode	When enabled, the operating system	Enabled	Enables this function.
Persistence	graphics driver attempts to restore the most recent configuration.	Disabled	Disables this function.

Table 174: X945 Advanced Graphics configuration setting options (Forts.)

1.4.4 CPU configuration

Advanced				
Configure advanced CPU settings Module Version:3F.12 Manufacturer:Intel Intel(R) Atom(TM) CPU N270 @ 1.60 GHz Frequency :1.60GHz FSB Speed :532MHz Cache L1 :24 KB Cache L2 :512 KB Ratio Actual Value:12		Seled of th	Select the revsion of the multi processor support interface that should be offered by the BIOS.	
		support shou: the l		
			Colort Concer	
Max CPUID Value Limit	[Disabled]		Select Screen	
Execute-Disable Bit Capabilit	v[Enabled]	+-	Change Option	
Hyper Threading Technology	[Enabled]	F1	General Help	
Intel(R) SpeedStep(tm) tech	[Enabled]	F10	Save and Exit	
Boot CPU Speed On AC	[Maximum]	ESC	Exit	
Intel(R) C-STATE tech	[Enabled]			
	[Enchled]			

Figure 125: X945 Advanced CPU Configuration

BIOS setting	Meaning	Setting options	Effect
Module Version	BIOS Module Version	None	-
Manufacturer	Manufacturer's display.	None	-
Frequency	Processor speed display	None	-
FSB speed	Cycle display of all addressed components. (Front side bus)	None	-
L1 cache	Displays first level cache memory area.	None	-
L2 cache	Displays first level cache memory area.	None	-
Ratio Actual Value	Displays the Ratio Actual Value.	None	-
MPS Revision	This option supports the use of multiple	1.1	Sets MPS support Revision 1.1
	CPUs (MPS=multi-processor system).	1.4	Sets MPS support Revision 1.4
Max CPUID value limit	Option for limiting the CPUID input value. This could be necessary for older operating systems.	Enabled	The processor limits the maximum CPUID input value to 03h if necessary when the the processor supports a higher value.
		Disabled	The processor returns the current maximum value upon request of the CPUID input value.

Table 175: X945 Advanced CPU Configuration setting options

Section 4 Software

BIOS setting	Meaning	Setting options	Effect
Execute-Disable Bit	Option for enabling or disabling hardware	Enabled	Enables this function.
Capability	support for prevention of data execution.	Disabled	Disables this function.
Hyper Threading	Hyper threading technology enables a	Enabled	Enables this function.
Technology	single physical processor to appear as a multitude of logical processors. This technology allows the operating system to get more out of the internal processor resources, which in turns leads to increased performance.	Disabled	Disables this function.
	Information:		
	This setting should only be disabled when using an operating system older than Windows XP.		
Intel (R) SpeedStep	Option for controlling the Intel(R)	Enabled	SpeedStep technology enabled.
(tm) tech	SpeedStep(1M) technology. The processor clock speed is increased or decreased according to the amount of calculations that must be made. As a result, the power consumption depends largely on the processor load.	Disabled	Disables SpeedStep technology.
Boot CPU Speed On AC	This setting is used to define the maximum or minimum CPU speed during	Minimum	CPU starts with minimum speed during the boot procedure.
	the boot procedure. However, the operating system can change the speed during operation.	Maximum	CPU starts with maximum speed during the boot procedure.
Intel(R) C-STATE tech	This setting allows the operating system to set processor clock rates on its own, thereby saving energy.	Enabled	Enables this function. The processors are run at different frequencies, thereby saving energy.
		Disabled	Disables this function. Both processors are run at the same frequency.
Enhanced C-	This setting allows the operating system	Enabled	Enables this function.
States '	to set processor clock rates on its own, thereby saving energy.	Disabled	Disables this function.

Table 175: X945 Advanced CPU Configuration setting options

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

1.4.5 Chipset configuration

Advanced			
Advanced Chipset Settings			Options
		Auto	
Memory Hole	[Disabled]	400 1	MHz
DIMM Thermal Control	[Disabled]	533 1	MHz
DT in SPD	[Disabled]		
TS on DIMM	[Disabled]		
High Precision Event Timer	[Disabled]		
IOAPIC	[Enabled]		
APIC ACPI SCI IRQ	[Disabled]		
C4 On C3	[Disabled]		
		↔	
		†↓	Select Screen Select Item
		+-	Change Option
		F1	General Help
		F10	Save and Exit
		ESC	Exit

Figure 126: X945 Advanced Chipset Configuration

BIOS setting	Meaning	Setting options	Effect
DRAM Frequency	Option for setting the RAM frequency.	Auto	Frequency set automatically by the BIOS.
		400, 533 MHz	Desired clock frequency set manually.
Memory Hole	Option for ISA cards with frame buffer. Not	Disabled	Disables this function.
	relevant for an APC620.	15MB-16MB	This address area is reserved.
DIMM Thermal	Option for setting the maximum surface	Disabled	Surface temperature not limited.
Control	temperature of the DIMM module. The module is cooled by limiting the memory bandwidth if the defined surface temperature is reached.	40°C, 50°C, 60°C, 70°C, 80°C, 85°C, 90°C	Temperature limit value for the limitation.
DT in SPD	Option to determine whether the GMCH	Disabled	Disables this function.
	(Graphics and Memory Controller Hub) supports DT (Delta Temperature) in the SPD (Serial Presence Detect) Management Algorithm of the DIMM module.	Enabled	Enables this function.
TS on DIMM	Option to determine whether the GMCH	Disabled	Disables this function.
	(Graphics and Memory Controller Hub) supports TS (Thermal Sensor) in the Thermal Management Algorithm of the DIMM module.	Enabled	Enables this function.

Table 176: X945 Advanced Chipset setting options

Section 4 Software

BIOS setting	Meaning	Setting options	Effect
High Precision Event	The HPET is a timer inside the PC. It is	Disabled	Disables this function.
Timer	able to trigger an interrupt with a high degree of accuracy, which allows other programs to better synchronize a variety of applications.	Enabled	Enables this function. This function is recommended for multimedia applications.
IOAPIC	This option is used to activate or	Disabled	Disables this function.
	deactivate the APIC (Advanced Programmable Interrupt Controller).	Enabled	The IRQ resources available to the system are expanded when the APIC mode is enabled.
	Information:		
	The IRQ resources available to the system are expanded when the APIC mode is enabled.		
APIC ACPI SCI IRQ	This option is used to modify the SCI IRQ	Disabled	IRQ9 is used for SCI.
	when in APIC (Advanced Programmable Interrupt Controller) mode.	Enabled	IRQ20 is used for SCI.
C4 On C3	Fine-tunes the power saving function on	Disabled	Disables this function.
	an ACPI operating system.	Enabled	Processor is needed in C4 if the operating system is initiated in a C3 state.

Table 1	76: X	(945 A	dvanced	Chipset	settina	options
				0	00111.9	000.00

1.4.6 I/O interface configuration



Figure 127: X945 Advanced I/O Interface Configuration

BIOS setting	Meaning	Setting options	Effect
Onboard AC'97	For turning the AC97 Sound on and off.	Enabled	Enables AC'97 sound.
Audio		Disabled	Disables AC'97 sound.
Onboard LAN (ETH1)	For turning the on-board LAN controller (for ETH1) on and off.	Enabled	Activates the LAN controller or the ETH1 interface.
		Disabled	Deactivates the LAN controller or the ETH1 interface.
Serial port 1	For the configuration of serial port 1	Disabled	Port 1 deactivated.
configuration	(COM1).	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.
Serial port 2 mode	This option is for setting the serial port B	Normal	Standard interface.
	as either a standard interface or as an infrared interface (not currently supported).	IrDA	IrDA interface (compliant serial infrared port).
		ASK IR	Interface for IR devices (amplitude shift keyed infrared port).
Parallel port address	The address of the parallel interface can	Disabled	Deactivates the port.
	be defined with this option.	378, 278, 3BC	Manual assignment of the port address.
	Information:		
	Address is automatically set, even if the function is disabled.		

Table 177: X945 Advanced I/O Interface Configuration setting options

Section 4 Software

1.4.7 Clock Configuration

Clock Configuration	Enable clock	
		EMI.
		 ↔ Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit

Figure 128: X945 Advanced Clock Configuration

BIOS setting	Meaning	Setting options	Effect
Spread spectrum	With this option, the cycle frequency can	Enabled	Enables this function.
	be modulated by reducing electromagnetic disturbances.	Disabled	Disables this function.

Table 178: X945 Advanced Clock Configuration setting options

1.4.8 IDE Configuration

IDE Configuration			Options
TA/IDE Configuration IDE Channel Control	[Compatible] [PATA only]	Disah Compa Enhar	oled atible aced
 Primary IDE Master Primary IDE Slave 	: [Not Detected] : [Hard Disk]		
lard Disk Write Protect ATA Detect Time Out (Sec) ATA Detect Time Out (Sec) ATA(PI) 80Pin Cable Detection	[Disabled] [35] [3] [Host & Device]	↓ ↓↓ +- F1 F10 ESC	Select Screen Select Item Change Option General Help Save and Exit Exit

Figure 129: X945 Advanced IDE Configuration

BIOS setting	Meaning	Setting options	Effect
ATA/IDE	Option for configuring the integrated PATA and SATA controller.	Disabled	Both controllers disabled.
Configuration		Compatible	Both controllers run in Legacy or Compatible Mode.
		Enhanced	Both controllers run in Enhanced or Native Mode.
IDE Channel	Option for configuring the IDE channels in	SATA only	Only use SATA drives.
Control	"Compatible" mode.	SATA Pri, PATA Sec	SATA drives are address primarily and PATA drive secondarily.
		PATA only ²⁾	Only use PATA drives.
Primary IDE Master	The drive in the system that is connected to the IDE primary master port is configured here.	Enter	Opens the submenu See "Primary IDE Master", on page 287
Primary IDE slave	The drive in the system that is connected to the IDE primary slave port is configured here.	Enter	Opens the submenu See "Primary IDE slave", on page 289
Secondary IDE Master	The drive in the system that is connected to the IDE secondary master port is configured here.	Enter	Opens the submenu

Table 179: X945 Advanced IDE Configuration setting options

BIOS setting	Meaning	Setting options	Effect
Secondary IDE Slave	The drive in the system that is connected to the IDE secondary slave port is configured here.	Enter	Opens the submenu
Third IDE Master ³⁾	The drive in the system that is connected to the IDE third master port is configured here.	Enter	Opens the submenu
Third IDE Slave ⁴⁾	The drive in the system that is connected to the IDE third slave port is configured here.	Enter	Opens the submenu
Hard disk write	Write protection for the hard drive can be enabled/disabled here.	Disabled	Disables this function.
protect		Enabled	Enables this function.
PATA Detect Time Out (Sec)	Configuring the time overrun limit value for the PATA device identification.	0, 5, 10, 15, 20, 25, 30, 35	Value set manually.
SATA Detect Time Out (Sec)	Configuring the time overrun limit value for the SATA device identification.	0, 1, 2, 3, 5, 10, 15, 30	Value set manually.
ATA(PI) 80Pin Cable Detection	Detects whether an 80 pin cable is connected to the drive, the controller or to	Host & device	Using both IDE controllers (motherboard, disk drive).
	both.	Host	IDE controller motherboard used.
	Information:	Device	IDE disk drive controller used.
	This option is not available on the APC620 CPU board. Therefore this setting is not relevant.		

Table 179: X945 Advanced IDE Configuration setting options

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

Primary IDE Master

Primary IDF Master		Sele	at the type
FILMALY IDE MASCEL		of de	evice connected
Device :Not Detected		to th	ne system.
Tupe	[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

Figure 130: X945 Primary IDE Master

BIOS setting	Meaning	Setting options	Effect
Туре	The type of drive connected to the primary	Not installed	No drive installed.
	master is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive.
		ARMD	ARMD - drive (zip drive)
LBA/Large Mode	This option activates the logical block	Disabled	Disables this function.
	addressing / large mode for IDE.	Auto	Automatic enabling of this function when supported by the system.
Block (Multi-Sector	This option enables the block mode for	Disabled	Disables this function.
I ranster)	IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Auto	Automatic enabling of this function when supported by the system.

Table 180: X945 Primary IDE Master setting options

Section 4 Software

BIOS setting	Meaning	Setting options	Effect
PIO Mode	The PIO mode determines the data rate of	Auto	Automatic configuration of PIO mode.
	the hard drive.	0, 1, 2, 3, 4	Manual configuration of PIO mode.
	Information:		
	This option is not available on the APC620. Therefore this setting is not relevant.		
DMA Mode	The data transfer rate to and from the	Auto	Automatic definition of the transfer rate.
	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	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives	Auto	Automatic detection and enabling.
	(self-monitoring, analysis and reporting technology).	Disabled	Disables this function.
		Enabled	Enables this function.
32 Bit Data Transfer	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 180: X945 Primary IDE Master setting options (Forts.)
Primary IDE slave

Primary IDE Slave		Selea	ct the type
Device :Not Detected		of de to th	evice connected he system.
Туре	[Auto]		
LBA/Large Mode	[Auto]		
Block (Multi-Sector Transfer)	[Auto]		
MA Mode	[Auto]		
S.M.A.R.T.	[Auto]		
32Bit Data Transfer	[Enabled]		
		↔	Select Screen
		↑↓	Select Item
		+-	Change Option
		F10	Save and Exit
		ESC	Exit

Figure 131: X945 Primary IDE Slave

BIOS setting	Meaning	Setting options	Effect
Туре	The type of drive connected to the	Not installed	No drive installed.
	secondary slave is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive.
		ARMD	ARMD - drive (zip drive)
LBA/Large Mode This option activates the logical block addressing / large mode for IDE.	This option activates the logical block	Disabled	Disables this function.
	Auto	Automatic enabling of this function when supported by the system.	
Block (Multi-Sector	This option enables the block mode for	Disabled	Disables this function.
I ransfer)	IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Auto	Automatic enabling of this function when supported by the system.

Table 181: X945 Primary IDE Slave setting options

BIOS setting	Meaning	Setting options	Effect
PIO Mode	The PIO mode determines the data rate of	Auto	Automatic configuration of PIO mode.
	the hard drive.	0, 1, 2, 3, 4	Manual configuration of PIO mode.
	Information:		
	This option is not available on the APC620. Therefore this setting is not relevant.		
DMA Mode	The data transfer rate to and from	Auto	Automatic definition of the transfer rate.
	the secondary 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	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives	Auto	Automatic detection and enabling.
	(seir-monitoring, analysis and reporting technology).	Disabled	Disables this function.
		Enabled	Enables this function.
32 Bit Data Transfer	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 181: X945 Primary IDE Slave setting options (Forts.)

1.4.9 USB configuration

Advanced			
JSB Configuration			Options
USB Devices Enabled :		Disab	led
1 Keyboard, 1 Hub		2 USB	Ports
		4 USB	Ports
		6 USB	Ports
JSB 2.0 Controller	[Enabled]		
Legacy USB Support	[Enabled]		
USB Legacy POST-Always	[Enabled]		
USB Keyboard Legacy Support	[Enabled]		
USB Mouse Legacy Support	[Disabled]		
JSB Storage Device Support	[Enabled]	↔	Select Screen
Port 64/60 Emulation	[Disabled]	<u>↑</u> ↓	Select Item
USB 2.0 Controller Mode	[HiSpeed]	+-	Change Option
BIOS EHCI Hand-Off	[Disabled]	F1	General Help
USB Beep Message	[Enabled]	F10	Save and Exit
USB Stick Default Emulation	[Hard Disk]	ESC	Exit
USB Mass Storage Reset Delay	[20 Sec]		

Figure 132: X945 Advanced USB Configuration

BIOS setting	Meaning	Setting options	Effect
USB Function	USB ports can be enabled/disabled here.	Disabled	Disables the USB port.
	The USB numbers (e.g. USB1, USB3,	2 USB Ports	USB1, USB3 are enabled.
	etc.) are printed on the APC620 housing).	4 USB Ports	USB1, USB2, USB3, USB4 are enabled.
		6 USB Ports	USB1, USB2, USB3, USB4, USB5 are enabled.
		8 USB Ports	USB1, USB2, USB3, USB4, USB5, USB are enabled on an AP via SDL.
USB 2.0 Controller	Option for enabling or disabling USB 2.0	Enabled	All USB interfaces run in USB 2.0 mode.
mode.	mode.	Disabled	All USB interfaces run in USB 1.1 mode.
Legacy USB Support Legacy USB support c	Legacy USB support can be	Disabled	Disables this function.
	enabled/disabled here. USB interfaces do not function during	Enabled	Enables this function.
startup. USB is supported again after the operating system has started. A USB keyboard is still recognized during the POST.	Auto	Automatic enabling.	
USB Legacy POST- Always	Option to enable Legacy USB Support during the POST (Power On Self Test) the	Enabled	The BIOS Setup can be called up during the POST using a USB keyboard.
	same as the Legacy USB Support setting.	Disabled	Disables this function.

Table 182: X945 Advanced USB Configuration setting options

BIOS setting	Meaning	Setting options	Effect	
USB Keyboard	USB keyboard support can be	Disabled	Disables this function.	
Legacy Support	enabled/disabled here.	Enabled	Enables this function.	
USB Mouse Legacy	USB mouse support can be	Disabled	Disables this function.	
oupport		Enabled	Enables this function.	
USB Storage Device	USB storage device support can be	Disabled	Disables this function.	
Support	enabled/disabled here.	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 Mode	Settings can be made for the USB controller.	Full Speed	12 MBps	
		Hi Speed	480 MBps	
BIOS EHCI Hand-	The support for the operating system can	Disabled	Disables the function	
Off	be set up without the fully automatic EHCI function.	Enabled	Enables this function.	
USB Beep Message	Option for outputting a tone each time a	Disabled	Disables this function.	
	during the POST.	Enabled	Enables this function.	
USB Stick Default Emulation	You can set how the USB device is to be used.	Auto	USB devices with fewer than 530MB of memory are simulated as floppy disk drives and devices with larger capacities are simulated as hard drives.	
		Hard Disk	An HDD-formatted drive can be used as an FDD (e.g. zip drive) for starting the system.	
USB Mass Storage Reset Delay	The waiting time that the USB device POST requires after the device start command can be set.	10 Sec, 20 Sec, 30 Sec, 40 Sec	Value set manually.	
	Information:			
	The message "No USB mass storage device detected" is displayed if no USB memory device has been installed.			

Table 182: X945 Advanced USB Configuration setting options (Forts.)

1.4.10 Keyboard/mouse configuration

Keyboard/Mouse Configuration		Select Power-on sta
Bootup Num-Lock Typematic Rate PS/2 Mouse Support	[On] [Fast] [Enabled]	FOF NUMLOCK.
		 ↔ Select Screent ↑↓ Select Item +- Change Option F1 General Help F10 Save and Eximate

Figure 133: X945 Advanced Keyboard/Mouse Configuration

BIOS setting	Meaning	Setting options	Effect
Boot-up Num-lock This option sets the si of the numeric keypac system is booted.	This option sets the status of the numeric keypad when the the	Off	Only the cursor functions of the numerical keypad are enabled.
	system is booted.	On	Numeric keypad is enabled.
Typematic rate	The key repeat function is set here.	Slow	Slow key repeat.
		Fast	Fast key repeat.
PS/2 mouse support	PS/2 mouse support Sets whether the PS/2 mouse port should be activated. Disabled Disables Enabled Enabled Enabled Enables	Disables this function.	
		Enabled	Enables this function.
		Auto	Automatic activation of the function if PS/2 mouse port is supported.

Table 183: X945 Advanced Keyboard/Mouse Configuration setting options

1.4.11 Remote access configuration

Configure Remote Access type and parameters		Sele	ct Remote Access
		type	
Serial Port number	[COM1]		
Base Address, IRQ	[3F8h, 4]		
Serial Port Mode	[115200 8,n,1]		
Flow Control	[None]		
Redirection After BIOS POST	[Always]		
Terminal Type	[ANSI]		
VT-UTF8 Combo Key Support	[Enabled]		
Sredir Memory Display Delay	[No Delay]		
		↔	Select Screen
Serial Port BIOS Update	[Disabled]	†+	Select Item
		+-	Change Option
		F1	General Help
		F10	Save and Exit
		ESC	Exit

Figure 134: X945 Advanced Remote Access Configuration

BIOS setting	Meaning	Setting options	Effect
Remote access	The remote access function can be	Disabled	Disables this function.
	enabled/disabled here.	Enabled	Enables this function.
Serial port number	The serial interface can be set using this option, as long as disabled is not entered	COM1	Enables the COM1 interface as remote access interface.
	In the remote access field.	COM2	Enables the COM2 interface as remote access interface.
Base address, IRQ	Serial connection display for the logical address and interrupt, as long as disabled is not entered in the <i>remote access</i> field.	None	-
Serial port mode	The serial interface transfer rate is defined here, as long as disabled is not entered in the <i>remote access</i> field.	115200 8,n,1 57600 8,n,1 38400 8,n,1 19200 8,n,1 09600 8,n,1	Value set manually.
Flow control	This setting determines how the transfer is	None	The interface is operated without transfer control.
	Information:	Hardware	The interface transfer control is carried out through hardware. This mode must be supported by a cable.
	The setting must be the same on the terminal and the server.	Software	The interface transfer control is carried out through software.

Table 184: X945 Advanced Remote Access Configuration setting options

BIOS setting	Meaning	Setting options	Effect
Redirection after	The redirection after start up can be set	Disabled	The redirection is switched off after start up.
BIOSPOSI	the <i>remote access</i> field.	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 <i>remote access</i> field.	ANSI, VT100, VT-UTF8	Manual configuration of the connection type.
VT-UTF8 Combo	With this option, the VT-UTF8 Combo Key	Disabled	Disables this function.
Key Support Support for the ANSI and V1100 connections can be enabled, as long as disabled is not entered in the <i>remote</i> access field.	Enabled	Enables this function.	
Sredir Memory	Memory / Delay The memory output delay can be set using this option, as long as disabled is not entered in the <i>remote access</i> field (Sredir -> serial redirection).	No delay	No delay.
Display Delay		Delay 1 sec, Delay 2 sec, Delay 4 sec	Value set manually.
Serial port BIOS	During system start up, the update is	Disabled	Disables this function.
update	processor.	Enabled	Enables this function.
	Information:		
	If this option is disabled, the boot time is reduced.		

Table 184: X945 Advanced Remote Access Configuration setting options (Forts.)

1.4.12 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.

Hardware Health Configurati	on		
Board Temperature CPU Temperature DIMM Environment Temp. Fan1 Speed VcoreA VcoreB +3.3Vin +5Vin +5VSB VRTC	:40°C/104°F :43°C/109°F :42°C/107°F :0 RPM :1.209 V :1.048 V :3.370 V :5.053 V :4.970 V :3.338 V	↑↓ +- F1 F10 ESC	Select Screen Select Item Change Option General Help Save and Exit Exit

Figure 135: X945 Advanced CPU Board Monitor

BIOS setting	Meaning	Setting options	Effect
Board temperature	Displays the board temperature in degrees Celsius and Fahrenheit.	None	-
CPU temperature	Displays the processor's temperature (in degrees Celsius and Fahrenheit).	None	-
DIMM Environment Temp.	Displays the temperature of the DRAM module.	None	-
Fan1 Speed	Displays the rotating speed of the processor fan.	None	-
VcoreA	Displays the processor's core voltage A in volts.	None	-

Table 185: X945 Advanced Remote Access Configuration setting options

BIOS setting	Meaning	Setting options	Effect
VcoreB	Displays the DDR's core voltage B in volts.	None	-
+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	-
VRTC	Displays the battery voltage (in volts).	None	-

Table 185: X945 Advanced Remote Access Configuration setting options (Forts.)

1.4.13 Main Board/Panel Features



Figure 136: X945 Advanced Baseboard/Panel Features

BIOS setting	Meaning	Setting options	Effect
Panel control	For special setup of connected panels (display units).	Enter	Opens the submenu See "Panel control", on page 299
Main board monitor	Display of various temperatures and fan speeds.	Enter	Opens the submenu See "Main board monitor", on page 300
Legacy devices	Special settings for the interface can be changed here.	Enter	Opens the submenu See "Legacy devices", on page 301
BIOS	Displays the BIOS version.	None	-

Table 186: X945 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 186: X945 Advanced Baseboard/Panel Features setting options (Forts.)

Panel control

Advanced		
Panel Control		Panel 0-14: connected
Select Panel Number Version: Brightness: Temperature: Fan Speed: Keys/Leds:	[8] V1.16 [100%] 39°C/102°F 00 RPM 128/128	Link or Monitor/Panel connector. Panel 15: connected or Panel PC Link. Note: DVI and PPC Link will show no valid values. On PPC Link only the brightness option will work.
		 ↔ Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit

Figure 137: X945 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.	015	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%, 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>).</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 187: X945 Panel Control setting options

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Main board monitor

aseboard Monitor			
MOS Battery:	Good		
emperatures			
I/O:	37°C/98°F		
Power Supply:	31°C/87°F		
Slide-In Drive 1	: 00°C/32°F		
Slide-In Drive 2	: 26°C/78°F		
an Speeds			
Case 1:	1524 RPM		
Case 2:	2376 RPM		Select Screen
Case 3:	1512 RPM	T+	Select Item
Case 4:	00 RPM	F1	General Help
CPU:	00 RPM	F10	Save and Exit
		ESC	Exit

Figure 138: X945 Baseboard Monitor

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

Table 188: X945 Baseboard Monitor setting options

Legacy devices

Legacy Devices		Enable/Disable the
COM C.	[Disabled]	for touch
COM D:	[Disabled]	
COM E:	[Disabled]	Fot detailed
CAN:	[Disabled]	descrpition see use: manual
ETH2 LAN controller:	[Enabled]	inditidul .
ETH2 MAC Address:	00:60:65:04:D0:F8	
		↔ Select Item
		↑↓ Select Screen
		+- Change Option
		F1 General Help
		F10 Save and Exit
		ESC Exit

Figure 139: X945 Legacy Devices

BIOS setting	Meaning	Setting options	Effect
COM C	Setting of the COM port for the touch	Disabled	Disables the interface.
	screen on the monitor/panel connector.	Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the COM port.	238, 2E8, 328, 338, 3E8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM port.	IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11	Selected interrupt is assigned.
COM D	Setting of the COM port for the touch	Disabled	Disables the interface.
	screen on the AP Link connector.	Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the COM port.	238, 2E8, 328, 338, 3E8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM port.	IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11	Selected interrupt is assigned.
COM E	Configuration of the COM port on the B&R	Disabled	Disables the interface.
	add-on interface 5AC600.4851-00 (IF option).	Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the COM port.	238, 2E8, 328, 338, 3E8	Selected base I/O address is assigned.

Table 189: X945 Legacy Devices setting options

BIOS setting	Meaning	Setting options	Effect
Interrupt	Selection of the interrupt for the COM port.	IRQ 5, IRQ 6, IRQ 7, IRQ 10, IRQ 11	Selected interrupt is assigned.
CAN	Configuration of the CAN port of the B&R	Disabled	Disables the interface.
	add-on CAN interface card 5AC600.CANI-00 (IF option).	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.	IRQ 10, NMI	Selected interrupt is assigned.
ETH2 LAN controller	For turning the onboard LAN controller	Disabled	Disables the controller.
	(ETH2) on and off.	Enabled	Enables the controller.
ETH2 MAC Address	Displays the Ethernet 2 controller MAC address.	None	-

Table 189: X945 Legacy Devices setting options (Forts.)

1.5 Boot

Advanced Settings > ACPI Configuration > PCI Configuration > Graphics Configuration > CPU Configuration > Chipset Configuration > I/O Interface Configuration > Clock Configuration > IDE Configuration	
 ACPI Configuration PCI Configuration Graphics Configuration CPU Configuration Chipset Configuration I/O Interface Configuration Clock Configuration IDE Configuration 	
 ▶USB Configuration ▶Keyboard/Mouse Configuration ▶Remote Access Configuration ▶ CPU Board Monitor ▶ Baseboard/Panel Features 	 ↔ Select Screen ↑↓ Select Item Enter Go to Sub Scre F1 General Help F10 Save and Exit ESC Exit
v02.66 (C)Copyright 1985-2009, Ame	erican Megatrends, Inc.

Figure 140: X945 Boot Menu

BIOS setting	Meaning	Setting options	Effect
Boot Priority Selection	The method for when the drives should be booted can be set here.	Device Based	Only the devices that are recognized by the system are listed. The sequence of this list can be changed.
		Type Based	The boot sequence of a device type list can be changed. Device types that are not connected can also be entered to this list.

Table 190: X945 Boot Menu setting options

BIOS setting	Meaning	Setting options	Effect
1st Boot Device	The boot drives can be set using this	Disabled, Primary	Select the desired sequence.
2nd Boot Device	opiion.	Secondary Master,	
3rd Boot Device		Secondary Slave,	
4th Boot Device		Floppy, USB Hard disk,	
5th Boot Device		Removable Device,	
6th Boot Device		Onboard LAN, External	
7th Boot Device		PCI SCSI Card, Any PCI	
8th Boot Device		BEV Device, Third Master, Third Slave, PCI RAID, Local BEV ROM	
Quick Boot	This function reduces the boot time by	Disabled	Disables this function.
	skipping some POST procedures.	Enabled	Enables this function.
Quiet Boot	Determines if POST message or OEM	Disabled	POST message display.
	logo (default = black background) is displayed.	Enabled	OEM logo display instead of POST message.
Automatic Boot List	With this option, the operating system	Disabled	Disables this function.
Retry	attempts to automatically restart following startup failure.	Enabled	Enables this function.
Add-On ROM	Sets the display mode for the ROM	Force BIOS	An additional BIOS part can be displayed.
Display Mode	(during the booting procedure).	Keep Current	BIOS information is displayed.
Halt On Error	This option sets whether the system should pause the Power On Self Test	Disabled	The system does not pause. All errors are ignored.
	(POST) when it encounters an error.	Enabled	The system pauses. The system pauses every time an error is encountered.
Hit 'DEL' Message	Settings can be made here for the "Hit	Disabled	The message is not displayed.
Display	DEL Message display.	Enabled	The message is displayed.
	Information:		
	When quiet boot is activated the message is not displayed.		
Interrupt 19 Capture	This function can be used to incorporate	Disabled	Disables this function.
	the BIOS Interrupt.	Enabled	Enables this function.
PXE boot to LAN	Enables/disables the function to boot from	Disabled	Disables this function.
(ETH1)	LAN (ETH1).	Enabled	Enables this function.
Power Loss Control	Determines if the system is on/off	Remain Off	Remains off.
	tollowing power loss.	Turn On	Powers on.
		Last State	Enables the previous state.

Table 190: X945 Boot Menu setting options (Forts.)

1.6 Security

	Advanced	Boot	Security	Power	E	kit	
Security	Settings				Insta	ll or Change	the
Supervis	or Password	:Not Insta	alled		passwo	ord.	
User Pas	sword	:Not Insta	alled				
Change U	ser Password						
HDD Secu	tor Virus Pro ritv Freeze Lo	tection ock	[Disabled]				
HDD Secu	tor Virus Prot rity Freeze Lo	tection ock	[Disabled]				
HDD Secu: Hard Dis	tor Virus Prot rity Freeze Lo k Security	tection ock	[Disabled]			Select Sare	0.7
HDD Secu: Hard Disl	tor Virus Prot rity Freeze Lo k Security Password on Ev	tection ock very Boot	[Disabled]		+→ †↓	Select Scre Select Item	en
Hard Disl Ask HDD I Hard Disl	tor Virus Prod rity Freeze La k Security Password on En sk Security Us	tection ock very Boot ser Passwo	[Disabled] [No] ords		↑↓ Enter	Select Scre Select Item Change	en
Hard Disl Ask HDD I > Hard Disl > Hard Disl > Hard Disl > Hard Disl	tor Virus Pro rity Freeze Lo k Security Password on En sk Security Us sk Security Ma	tection ock very Boot ser Passwo aster Pass	[Disabled] [No] ords swords		↓ ↓↓ Enter F1 Enter	Select Scre Select Item Change General Hel	en P
Hard Dis Hard Dis Ask HDD I Hard Dis Hard Dis END-Key	tor Virus Pro rity Freeze Lo k Security Password on Ev sk Security U sk Security Ma Loads CMOS De:	tection ock very Boot ser Passwo aster Pass faults	[Disabled] [No] ords swords [No]		<pre> +→ t↓ Enter F1 F10 ESC</pre>	Select Scre Select Item Change General Hel Save and Ex Exit	en P it
HDD Secu HDD Secu Hard Disl Ask HDD 1 > Hard Dia END-Key 1	tor Virus Pro rity Freeze Lo k Security Password on Ev sk Security U sk Security Ma Loads CMOS De:	tection ock very Boot ser Passwo aster Pass faults	[Disabled] [No] ords swords [No]		↑↓ Enter F1 F10 ESC	Select Scre Select Item Change General Hel Save and Ex Exit	en P it

Figure 141: X945 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	With this option, a warning is issued when	Disabled	Disables this function.
Protection	the boot sector is accessed through a program or virus.	Enabled	Enables this function.
	Information:		
	With this option, only the boot sector is protected, not the entire hard drive.		

Table 191: X945 Security Menu setting options

BIOS setting	Meaning	Setting options	Effect
HDD Security	This option can be used to define whether	Disabled	Deactivates this function.
Freeze Lock	the BIOS sends the HDD Security Freeze Lock command to every connected hard disk that supports the Security command. This prevents the setting or changing of a hard disk password after the POST.	Enabled	Activates this function.
Ask HDD Password	This function can be used to select	Yes	Deactivates this function.
on Every Boot	whether the hard disk password must be entered each time the system boots.	No	Activates this function.
	Information:		
	Can only be used if a hard disk user password has been created.		
Hard Disk Security User Passwords	The hard disk security user password can be created here.	Enter	Opens the submenu See "Hard disk security user password", on page 307
Hard Disk Security Master Passwords	The hard disk security master password can be created here.	Enter	Opens the submenu See "Hard disk security master password", on page 308
End-Key Load	Using this function, CMOS can be loaded	No	Disables this function.
CMOS Defaults	by pressing the END key during POST.	Yes	Enables this function.

Table 191: X945 Security Menu setting options (Forts.)

1.6.1 Hard disk security user password

Hard Disk Security	llser Passwords		
Primary Slave HDD U	ser Password	_	
		↑↓ F1 F10 ESC	Select Screen Select Item General Help Save and Exit Exit

Figure 142: X945 Hard Disk Security User Password

BIOS setting	Meaning	Setting options	Effect	on 4 are
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.	Section

Table 192: X945 Hard Disk Security User Password

1.6.2 Hard disk security master password

Hard Disk Security	Master Passwords		
		t↓ f1 F10 ESC	Select Screen Select Item General Help Save and Exit Exit

Figure 143: X945 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 193: X945 Hard Disk	Security Master Password
---------------------------	--------------------------

1.7 Power

Main	Advanced	Boot	Security	Power		Exit
Congigure	power manage	ment and	l control		Enab	le or disable
			Fm 1 1 11		APM.	
Power Mana	agement/APM		[Enabled]			
Suspend T:	ime Out		[Disabled]			
Video Powe	er Down Mode		[Suspend]			
Hard Disk	Power Down M	ode	[Suspend]			
Keyboard 8	§ PS/2 Mouse		[MONITOR]			
FDC/LPT/CO	OM Ports		[MONITOR]			
Primary Ma	aster IDE		[MONITOR]			
Primary Si	lave IDE		[MONITOR]			
Secondary	Master IDE		[MONITOR]			
Secondary	Slave IDE		[MONITOR]			
					\leftrightarrow	Select Screen
Resume On	Ring		[Disabled]			Select Item
Resume On	PME#		[Disabled]		+-	Change Option
Resume On	RTC Alarm		[Disabled]		F1	General Help
					F10	Save and Exit
Power But	ton Mode		[On/Off]		ESC	Exit
Duc						

Figure 144: X945 Power Menu

BIOS setting	Meaning	Setting options	Effect
Power	This option switches the APM function on	Disabled	Disables this function.
Management/APM	or off. This is an advanced plug & play and power management functionality.	Enabled	Enables this function.
Suspend Time Out	Using this option, you can configure how	Disabled	Disables this function.
	long the system stays inactive (all components but the CPU are shut off, if possible) before entering suspend mode.	1 Min, 2 Min, 4 Min, 8 Min, 10 Min, 20 Min, 30 Min, 40 Min, 50 Min, 60 Min;	Value set manually.
Video Power Down	This option allows you to set the energy	Disabled	Do not switch off the monitor.
Mode	saving mode for the monitor.	Standby	Monitor goes to standby mode.
		Suspend	Monitor goes to suspend mode.
Hard Disk Power	This option allows you to set the energy	Disabled	Do not switch off the hard drive.
Down Mode	saving mode for the hard drive.	Standby	Monitor goes to standby mode.
		Suspend	Hard drive goes to suspend mode.
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.

Table 194: X945 Power Menu setting options

BIOS setting	Meaning	Setting options	Effect
FDC/LPT/COM ports	The monitoring of activities during power saving mode is determined here.	MONITOR	Activity on the parallel port, the serial 1&2 port, or the floppy port returns the system to its normal state from an energy saving mode.
		IGNORE	Activities are ignored.
Primary Master IDE	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 Slave IDE	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.
Secondary Master IDE	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.
Secondary Slave IDE	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.
Resume On Ring	When the modem receives an incoming	Disabled	Disables this function.
	call, the PC is brought out of power saving mode.	Enabled	Enables this function.
Resume on PME#	With this option, you can switch the PME	Disabled	Disables this function.
	wakeup function on or off.	Enabled	Enables this function.
Resume On RTC	With this option, you can activate the	Disabled	Disables this function.
Alarm	alarm and enter the date and time for the system start.	Enabled	Enables this function.
Power Button Mode	This function determines the function of	On/Off	Power button switches on/off.
	the power button.	Suspend	Suppresses the function.

Table 194: X945 Power Menu setting options (Forts.)

1.8 Exit

Main	Advanced	Boot	Security	Power	Exit	
Exit Opti	ons			E	kit system	setup
				a:	fter savin	g the
Save Chan Discard C	ges and Exit	·i+		CI	nanges.	
Discard C	hanges and ha			F	10 key can	be used
	-			f	or this op	eration.
Load CMOS	Defaults					
				→	→ Selec	t Screen
				E	f Selec	Sub Scree
				F	1 Gener	al Help
				F	10 Save	and Exit
				E	SC Exit	

Figure 145: X945 Exit Menu

BIOS setting	Meaning	Setting options	Effect
Save Changes and Exit	BIOS setup is closed with this item. Changes made are saved in CMOS after confirmation, and the system is rebooted.	OK / Cancel	
Discard Changes and Exit	With this item you can close BIOS setup without saving the changes made. The system is then rebooted.	OK / Cancel	
Discard Changes	In the event that settings were made which the user can no longer remember, changes can be reset as long as they haven't been saved.	OK / Cancel	
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 195: X945 Exit Menu setting options

1.9 BIOS default settings

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

DIP switch position see Section 3 "Location of the DIP switch in APC620 system units", on page 346).



Figure 146: CMOS profile hex switch

Information:

The switch position that is set upon delivery represents the optimum BIOS default values for this system and should therefore not be changed.

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

				D	IP swite	ch setti	ng		
Profile number	Optimized for	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	-	-
Profile 6	Panel PC 700 system unit 5PC725.1505-00	Off	On	On	Off	Off	Off	-	-

Table 196: Profile overview

1) Reserved.

The following pages provide an overview of the BIOS default settings for the different DIP switch position. Settings highlighted in yellow are variations from the BIOS default profile (=profile 1).

1.9.1 Main

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
System Time	-	-	-	-	-	-	-	
System Date	-	-	-	-	-	-	-	
BIOS ID	-	-	-	-	-	-	-	
Processor	-	-	-	-	-	-	-	
CPU Frequency	-	-	-	-	-	-	-	
System Memory	-	-	-	-	-	-	-	
Product Revision	-	-	-	-	-	-	-	
Serial Number	-	-	-	-	-	-	-	
BC Firmware Rev.	-	-	-	-	-	-	-	
MAC Address (ETH1)	-	-	-	-	-	-	-	
Boot Counter	-	-	-	-	-	-	-	
Running Time	-	-	-	-	-	-	-	

Table 197: X945 - Main profile setting overview

1.9.2 Advanced

ACPI configuration

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
ACPI Aware O/S	Yes							
ACPI Version Features	ACPI v2.0							
ACPI APIC support	Enabled							
Suspend mode	S1 (POS)							
USB Device Wakeup from S3/S4	Disabled							
Active Cooling Trip Point	Disabled							
Passive Cooling Trip Point	Disabled							
Critical Trip Point	105°C							

Table 198: X945 Advanced - ACPI Configuration Profile setting overview

PCI Configuration

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

Table 199: X945 Advanced - PCI Configuration Profile setting overview

Graphics configuration

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
Primary Video Device	Internal VGA							
Internal Graphics Mode Select	Enabled, 8MB							
DVMT Mode Select	DVMT Mode							
DVMT/FIXED Memory	128MB							
Boot Display Device	Auto							
Always Try Auto Panel Detect	No							
Local Flat Panel Type	Auto							
Local flat panel scaling	Expand Text & Graphics							
Display Mode Persistence	Enabled							

Table 200: X945 Advanced - Graphics Configuration Profile setting overview

CPU configuration

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
Module Version	-	-	-	-	-	-	-	
Manufacturer	-	-	-	-	-	-	-	
Frequency	-	-	-	-	-	-	-	
FSB speed	-	-	-	-	-	-	-	
L1 cache	-	-	-	-	-	-	-	
L2 cache	-	-	-	-	-	-	-	
Ratio Actual Value	-	-	-	-	-	-	-	
MPS Revision	1.4	1.4	1.4	1.4	1.4	1.4	1.4	
Max CPUID value limit	Disabled							
Execute-Disable Bit Capability	Enabled							
Hyper Threading Technology	Enabled							
Intel(R) SpeedStep (tm) tech	Enabled							
Boot CPU Speed On AC	Maximum							
Intel(R) C-STATE tech	Disabled							
Enhanced C-States	Disabled							

Table 201: X945 Advanced - CPU Configuration Profile setting overview

Chipset configuration

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
DRAM Frequency	Auto							
Memory Hole	Disabled							
DIMM Thermal Control	Disabled							
DT in SPD	Disabled							
TS on DIMM	Disabled							
High Precision Event Timer	Disabled							
IOAPIC	Enabled							
APIC ACPI SCI IRQ	Disabled							
C4 On C3	Disabled							

Table 202: X945 Advanced - Chipset Configuration Profile setting overview

I/O interface configuration

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

Table 203: X945 Advanced - I/O Interface Configuration profile setting overview

Clock Configuration

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
Spread spectrum	Disabled							

Table 204: X945 Advanced - Clock Configuration Profile setting overview

IDE Configuration

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
ATA/IDE Configuration	Compatible							
Legacy IDE Channels	PATA Only							
Hard disk write protect	Disabled							
PATA Detect Time Out (Sec)	35	35	35	35	35	35	35	

Table 205: X945 Advanced - IDE Configuration Profile setting overview

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
SATA Detect Time Out (Sec)	3	3	3	3	3	3	3	
ATA(PI) 80Pin Cable Detection	Host & device							
Primary IDE Master								
Туре	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							
Primary IDE slave								
Туре	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							

Table 205: X945 Advanced - IDE Configuration Profile setting overview (Forts.)

USB configuration

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
USB Function	4 USB Ports	6 USB Ports	4 USB Ports					
USB 2.0 Controller	Enabled							
Legacy USB Support	Enabled							
USB Legacy POST- Always	Enabled							
USB Keyboard Legacy Support	Enabled							
USB Mouse Legacy Support	Disabled							
USB Storage Device Support	Enabled							
Port 64/60 Emulation	Disabled							
USB 2.0 Controller Mode	HiSpeed							

Table 206: X945 Advanced - USB Configuration Profile setting overview

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
BIOS EHCI Hand-Off	Disabled							
USB Beep Message	Enabled							
USB Stick Default Emulation	Hard Disk							
USB Mass Storage Reset Delay	20 Sec							

Table 206: X945 Advanced - USB Configuration Profile setting overview (Forts.)

Keyboard/mouse configuration

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

Table 207: X945 Advanced Keyboard/Mouse Configuration profile setting overview

Remote access configuration

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

Table 208: X945 Advanced Remote Access Configuration profile setting overview

CPU board monitor

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
Board temperature	-	-	-	-	-	-	-	
CPU temperature	-	-	-	-	-	-	-	
DIMM Environment Temp.	-	-	-	-	-	-	-	
Fan1 Speed	-	-	-	-	-	-	-	
VcoreA	-	-	-	-	-	-	-	
VcoreB	-	-	-	-	-	-	-	
+3.3Vin	-	-	-	-	-	-	-	
+5Vin	-	-	-	-	-	-	-	
+5VSB	-	-	-	-	-	-	-	
VRTC	-	-	-	-	-	-	-	

Table 209: X945 Advanced CPU Board Monitor profile setting overview

Main Board/Panel Features

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
BIOS	-	-	-	-	-	-	-	
MTCX PX32	-	-	-	-	-	-	-	
MTCX FPGA	-	-	-	-	-	-	-	
Optimized ID	-	-	-	-	-	-	-	
Device ID	-	-	-	-	-	-	-	
Compatibility ID	-	-	-	-	-	-	-	
Serial Number	-	-	-	-	-	-	-	
Product name	-	-	-	-	-	-	-	
User serial ID	-	-	-	-	-	-	-	
Panel control								
Select panel number	-	-	-	-	-	-	-	
Version	-	-	-	-	-	-	-	
Brightness	100%	100%	100%	100%	100%	100%	100%	
Temperature	-	-	-	-	-	-	-	
Fan speed	-	-	-	-	-	-	-	
Keys/LEDs	-	-	-	-	-	-	-	
Main board monitor								
CMOS battery	-	-	-	-	-	-	-	
I/O	-	-	-	-	-	-	-	
Power supply								
Slide-in drive 1	-	-	-	-	-	-	-	
Slide-in drive 2	-	-	-	-	-	-	-	
Case 1	-	-	-	-	-	-	-	
Case 2	-	-	-	-	-	-	-	
Case 3	-	-	-	-	-	-	-	
Case 4	-	-	-	-	-	-	-	
CPU	-	-	-	-	-	-	-	
Legacy devices								
COM C	Disabled	Enabled	Disabled	Enabled	Enabled	Disabled	Enabled	
Base I/O address	-	3E8	-	3E8	3E8	-	3E8	
Interrupt	-	11	-	11	11	-	11	
COM D	Disabled							
Base I/O address	-	-	-	-	-	-	-	
Interrupt	-	-	-	-	-	-	-	
COM E	Disabled							
Base I/O address	-	-	-	-	-	-	-	

Table 210: X945 Advanced - Baseboard/Panel Features profile setting overview

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
BIOS	-	-	-	-	-	-	-	
MTCX PX32	-	-	-	-	-	-	-	
MTCX FPGA	-	-	-	-	-	-	-	
Optimized ID	-	-	-	-	-	-	-	
Device ID	-	-	-	-	-	-	-	
Compatibility ID	-	-	-	-	-	-	-	
Serial Number	-	-	-	-	-	-	-	
Product name	-	-	-	-	-	-	-	
User serial ID	-	-	-	-	-	-	-	
Interrupt	-	-	-	-	-	-	-	
CAN	Disabled							
Base I/O address	-	-	-	-	-	-	-	
Interrupt	-	-	-	-	-	-	-	
ETH2 LAN Controller	Enabled							
ETH2 MAC Address	-	-	-	-	-	-	-	

Table 210: X945 Advanced - Baseboard/Panel Features profile setting overview (Forts.)

1.9.3 Boot

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
Boot Priority Selection	Type Based							
1st Boot Device	Primary master	Onboard LAN	Primary master	Primary master	Primary master	Primary master	Primary master	
2nd Boot Device	Primary slave	Primary master	Primary slave	Primary slave	Primary slave	Primary slave	Primary slave	
3rd Boot Device	USB floppy	Primary slave	USB floppy					
4th Boot Device	USB removable device	USB floppy	USB removable device	USB removable device	USB removable device	USB removable device	USB removable device	
5th Boot Device	USB hard disk	USB removable device	USB hard disk					
6th Boot Device	USB CDROM	USB HDD	USB CDROM	USB CDROM	USB CDROM	USB CDROM	USB CDROM	
7th Boot Device	Disabled							
8th Boot Device	Disabled							
Quick Boot	Enabled							
Quiet Boot	Disabled							
Automatic Boot List Retry	Disabled							

Table 211: X945 Boot profile setting overview

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
Add-On ROM Display Mode	Keep Current							
Halt On Error	Disabled							
Hit "DEL" Message Display	Enabled							
Interrupt 19 Capture	Disabled							
PXE Boot to LAN	Disabled	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Power Loss Control	Turn On							

Table 211: X945 Boot profile setting overview

1.9.4 Security

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

Table 212: X945 Security profile setting overview

1.9.5 Power

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
Power Management/APM	Enabled							
Suspend Time Out	Disabled							
Video Power Down Mode	Suspend							
Hard Disk Power Down Mode	Suspend							
Keyboard & PS/2 Mouse	MONITOR							
FDC/LPT/COM ports	MONITOR							
Primary Master IDE	MONITOR							
Primary Slave IDE	MONITOR							
Secondary Master IDE	MONITOR							

Table 213: X945 Power profile setting overview

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
Secondary Slave IDE	MONITOR							
Resume On Ring	Disabled							
Resume on PME#	Disabled							
Resume On RTC Alarm	Disabled							
Power Button Mode	On/Off							

Table 213: X945 Power profile setting overview

1.10 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.

1.10.1 BIOS X945

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)	Load BIOS defaults. 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.	Check the placement of the inserted card. In the event that the error persists, send industrial PC to B&R for testing.
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.

Table 214: BIOS post code messages BIOS X945

1.11 Distribution of resources

1.11.1 RAM address assignment

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

Table 215: RAM address assignment

1) T.O.M. = Top of memory = Max. installed DRAM.

2) The VGA frame buffer can be reduced to 1 MB in the setup.

3) Only if ACPI Aware OS is set to YES in the setup.

1.11.2 DMA channel assignment

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

Table 216: DMA channel assignment

1) Not available if the parallel port is not used in ECP mode.
1.11.3 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 217: I/O address assignment

Section 4 Software

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1.11.4 Interrupt assignments in PCI mode

IRQ		0	-	2	3	4	5	9	7	8	6	10	11	12	13	14	15	IMI	NONE
System	n timer	٠																	
Keyboa	ard		•																
IRQ ca	scade			•															
COM1	(Serial port A)				0	•													
COM2	(Serial port B)				•	0													
LPT1					0	0	0	0	0		0	0	0	0		0			٠
LPT2					0	0	0	0	О		0	0	0	О		0			•
LPT3					0	О	0	0	0		О	0	0	0		0			•
PS/2 m	nouse													٠					
ACPI ¹⁾											٠								
FDD								٠											0
Real-tir	me clock									٠									
Coproc	essor (FPU)														٠				
Primary	y IDE channel															٠			
Second channe	dary IDE el																0		
	COM3 (COM C)				0	0	0		0			0	0	0					•
B&R	COM4 (COM D)				0	0	0		0			0	0	0					•
	COM5 (COM E)				0	0	0		0			0	0	0					•
	CAN											0						0	•

Table 218: IRQ interrupt assignments in PCI mode

1) Advanced Configuration and Power Interface.

• ... Default setting

O ... Optional setting

Software • BIOS options

1.11.5 Interrupt assignments in APIC mode

A total of 23 IRQs are available in the APIC mode (Advanced Programmable Interrupt Controller). 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	-	2	3	4	5	9	7	8	6	10	11	12	13	14	15	16	17	18	19	20	21	22	23	IMI	NONE
System	timer	٠																									
Keyboa	ırd		•																								
IRQ cas	scade			٠																							
COM1 A)	(Serial port				0	•																					
COM2 B)	(Serial port				•	0																					
LPT1					0	0	0	0	0		0	0	0	0		0											•
LPT2					0	0	0	0	0		0	0	0	0		0											•
PS/2 m	ouse													•													
ACPI ¹⁾											•						-										
FDD								•																			0
Real-tin	ne clock									•																	
Coproc (FPU)	essor														•												
Primary channe	/ IDE I															•											
Second channe	lary IDE I																0										
	COM3 (COM C)				0	0	0		0			0	0	0													•
B&R	COM4 (COM D)				0	0	0		0			0	0	0													•
-	COM5 (COM E)				0	0	0		0			0	0	0													•
	CAN											0														0	•
PIRQ A	2)																-	•									
PIRQ B	3)																-		٠								
PIRQ C	; 4)																-			٠							
PIRQ D) 5)																				٠						
PIRQ E	6)																					٠					
PIRQ F	:7)																						٠				
PIRQ G	à ⁸⁾																							٠			
PIRQ H	9)																								•		

Table 219: IRQ interrupt assignments in APIC mode

Software • BIOS options

- 1) Advanced Configuration and Power Interface.
- 2) PIRQ A: Graphics controller.
- 3) PIRQ B: INTD + AC97 audio controller.
- 4) PIRQ C: INTC + Native IDE.
- 5) PIRQ D: USB UHCI controller #1 + SM bus.
- 6) PIRQ E: LAN controller (ETH1).
- 7) PIRQ F: INTA + ETH2
- 8) PIRQ G: INTB
- 9) PIRQ H: USB EHCI controller + UHCI0.
- ... Default setting
- O ... 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 147: PCI Routing with activated APIC CPU board X945



Figure 148: PCI Routing with activated APIC CPU board X945 on the APC620e

1.11.6 Inter-IC (I²C) bus

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

Table 220: Inter-IC (I²C) bus resources

1.11.7 System Management (SM) bus

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

Table 221: Inter-IC (I²C) bus resources

2. Upgrade information

Warning!

The BIOS and firmware on APC620 systems must be kept up to date. New versions can be downloaded from the B&R homepage (<u>www.br-automation.com</u>).

2.1 BIOS upgrade

An upgrade might be necessary for the following reason:

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

2.1.1 What information do I need?

Information:

Individually saved BIOS settings are deleted when upgrading the BIOS.

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

Which BIOS version and firmware are already installed on the APC620?

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

Baseboard/Panel Fe	atures		
Panel Control			
Baseboard Monitor			
Legacy Devices			
Versions	D110 Custom DIOC		
BIOS: MTCX PX32.	V1 74 MTCX PX32 firmware		
MTCX FPGA:	V1.25 MTCX FPGA firmware		
Optimized ID:	0000010b		
Device ID:	00001BB7h	↔	Select Screen
Compatibility ID:	0000h	T+	Select Item
Product Name:	5PC600.SX02-01	F1	General Help
User Serial ID:	FFFFFFFFh	F10	Save and Exit
		ESC	Exit
Compatibility ID: Serial number: Product Name: User Serial ID:	0000h 70950173619 5PC600.SX02-01 FFFFFFFh	↑↓ Enter F1 F10 ESC	Select Item Go to Sub Scr General Help Save and Exit Exit

Figure 149: Software versions

Which firmware is installed on the Automation Panel Link transceiver/receiver?

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

- 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.

Advanced						
Panel Control Select Panel Number Version: Brightness: Temperature: Fan Speed: Keys/Leds:	[0] V1.09 41°C/105°F 00RPM 128/128	FPGA firmware of the SDLR controller	Panel 0-14: connected to Automation Panel Link or Monitor/Panel connector. Panel 15: connected or Panel PC Link. Note: DVI and PPC Link will show no valid values. On OOC Link only the brightness option will work. ↔ Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit			

Figure 150: Firmware version of Automation Panel Link SDL transceiver/receiver

2.1.2 Upgrade BIOS for X945

- Download and unzip the zip file from the B&R homepage.
- Create bootable media.

Information:

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

Information concerning creating a bootable diskette in Windows XP cab be found on page 340.

Information concerning creating a USB flash drive for a B&R upgrade can be found on page 341.

Information concerning creating a CompactFlash card for a B&R upgrade can be found on page 344.

- Copy the contents of the *.zip file to the bootable media. If the B&R upgrade was already
 added when the bootable media was created using the B&R Embedded OS Installer, then
 this step is not necessary.
- Connect the bootable media to the APC620 and reboot the device.
- The following boot menu will be shown after startup:
- 1. Upgrade AMI BIOS for X945/N270 (5PC600.X945-xx)
- 2. Exit to MS-DOS

Concerning point 1: BIOS is automatically upgraded (default after 5 seconds).

Concerning point 2: Returns to the shell (MS-DOS).

• The system must be rebooted after a successful upgrade.

Information:

After the system restart, the warning "CMOS checksum BAD" is displayed, but BIOS boots through it. The setup can be opened using the "Del" key and the setup defaults must be loaded again and saved using either the "F9" key or the menu item "Exit" - "Load CMOS defaults".

2.1.3 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 (<u>www.br-automation.com</u>).

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

2.2 Upgrade the firmware

With the APC620 / Panel PC firmware upgrade (MTCX, SDLR, SDLT), the firmware of a number of controllers (MTCX, SDLR, SDLT, UPS) can be updated, depending on the construction of the APC620 system.

2.2.1 Procedure

- Download and unzip the zip file from the B&R homepage.
- Create bootable media.

Information:

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

Information concerning creating a bootable diskette in Windows XP cab be found on page 340.

Information concerning creating a USB flash drive for a B&R upgrade can be found on page 341.

Information concerning creating a CompactFlash card for a B&R upgrade can be found on page 344.

- Copy the contents of the *.zip file to the bootable media. If the B&R upgrade was already
 added when the bootable media was created using the B&R Embedded OS Installer, then
 this step is not necessary.
- Connect the bootable media to the APC620 and reboot the device.
- The following boot menu will be shown after startup:

Information:

The following boot menu options including descriptions are based on version 1.27 of the APC620 / Panel PC Firmware upgrade (MTCX, SDLR, SDLT) disk. In some cases, these descriptions might not match the version you are currently using.

Boot menu options:

- 1. Upgrade MTCX (APC620/PPC700) PX32 and FPGA
- 2. Upgrade SDLT (APC620) only
- 3. Upgrade SDLR (AP800/AP900) on monitor/panel
 - 3.1 Upgrade SDLR on AP 0 (AP800/AP900)
 - 3.2 Upgrade SDLR on AP 1 (AP800/AP900)

Software • Upgrade information

- 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 - this is irrelevant for PPC700 systems.

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

Information:

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

Software • Upgrade information

2.2.2 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 FW 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. Detailed information for this can be found in the APC620 or PPC700 user's manual.

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. The menu items "2. Upgrade MTCX PX32 only" and "3. Upgrade MTCX FPGA only" have been removed from the boat menu starting with MTCX Upgrade Disk V01.13.

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".

15. The IF option Add-On Module CAN with SJA1000 (5AC600.CANI-01) is only supported starting with MTCX FPGA V01.23 (MTCX Upgrade DISK V01.24).

2.3 Creating an MS-DOS boot diskette in Windows XP

- Place an empty 1.44 MB HD diskette in the disk drive
- Open Windows Explorer
- Right-click on the 31/2" floppy icon and select "Format...".

			Format 3½ Floppy (A:)
🛚 🚞 My Documents			
🗉 👮 My Computer	📄 MSOCach	e	Capacity:
316 Elonov (A-)	C Program P	≕ilęs	3.5", 1.44MB, 512 bytes/sector 😪
E Scal Disk (C:)	Expand	ime Information	File system
🗄 🚞 Documents	Explore		FAT
🗉 🚞 IntelPRO	Open		Allocation unit size
🗄 🚞 MSOCache	Search	BAT	Default allocation size
🖻 🧰 Program File	Sharing and Security	5	Volume label
E D TEMP	Copy Disk		
🗉 🚞 WINDOWS	Format	COM	Format options
	Cot I	-	Enable Compression
	Cut		Create an MS-DOS startup disk
	Сору		
	Rename		
-	Properties		
			Start Close

Figure 151: 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 152: Creating a bootable diskette in Windows XP - step 2

Figure 153: Creating a bootable diskette in Windows XP - step 3

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

When doing this, all files (hidden, system files, etc.) must be shown on the diskette.

In Explorer, go to the Tools menu, select Folder Options... and open the View tab. Now deactivate the option Hide protected operating system files (Recommended) (activated by default) and activate the option Show hidden files and folders.

	befo	re			after		
Name 🔺	Size	Туре	Date Modified	Name 🔺	Size	Туре	Date Modified
DISPLAY.SYS	17 KB	System file	6/8/2000 5:00 PM	AUTOEXEC.BAT	0 KB	MS-DOS Batch File	3/22/2006 10:08 AM
EGA2.CPI	58 KB	CPI File	6/8/2000 5:00 PM	COMMAND.COM	91 KB	MS-DOS Application	6/8/2000 5:00 PM
🖬 EGA3.CPI	58 KB	CPI File	6/8/2000 5:00 PM	CONFIG.SYS	0 KB	System file	3/22/2006 10:08 AM
🖬 EGA.CPI	58 KB	CPI File	6/8/2000 5:00 PM	display.sys	17 KB	System file	6/8/2000 5:00 PM
KEYB.COM	22 KB	MS-DOS Application	6/8/2000 5:00 PM	EGA2.CPI	58 KB	CPI File	6/8/2000 5:00 PM
KEYBOARD.SYS	34 KB	System file	6/8/2000 5:00 PM	EGA3.CPI	58 KB	CPI File	6/8/2000 5:00 PM
KEYBRD2.SYS	32 KB	System file	6/8/2000 5:00 PM	EGA.CPI	58 KB	CPI File	6/8/2000 5:00 PM
KEYBRD3.SYS	31 KB	System file	6/8/2000 5:00 PM	IO.SYS	114 KB	System file	5/15/2001 6:57 PM
KEYBRD4.SYS	13 KB	System file	6/8/2000 5:00 PM	KEYB.COM	22 KB	MS-DOS Application	6/8/2000 5:00 PM
MODE.COM	29 KB	MS-DOS Application	6/8/2000 5:00 PM	KEYBOARD.SYS	34 KB	System file	6/8/2000 5:00 PM
				KEYBRD2.5Y5	32 KB	System file	6/8/2000 5:00 PM
				KEYBRD3.5Y5	31 KB	System file	6/8/2000 5:00 PM
				KEYBRD4.5Y5	13 KB	System file	6/8/2000 5:00 PM
				MODE.COM	29 KB	MS-DOS Application	6/8/2000 5:00 PM
				MSDOS, SYS	1 KB	System file	4/7/2001 1:40 PM

Figure 154: Creating a bootable diskette in Windows XP - step 4

Name 🔺	Size	Туре	Date Modified
T AUTOEXEC.BAT	0 KB	MS-DOS Batch File	3/22/2006 10:08 AM
COMMAND.COM	91 KB	MS-DOS Application	6/8/2000 5:00 PM
CONFIG.SYS	0 KB	System file	3/22/2006 10:08 AM
DISPLAY.SYS	17 KB	System file	6/8/2000 5:00 PM
EGA2.CPI	58 KB	CPI File	6/8/2000 5:00 PM
EGA3.CPI	58 KB	CPI File	6/8/2000 5:00 PM
EGA.CPI	58 KB	CPI File	6/8/2000 5:00 PM
IO.SYS	114 KB	System file	5/15/2001 6:57 PM
KEYB.COM	22 KB	MS-DOS Application	6/8/2000 5:00 PM
KEYBOARD.SYS	34 KB	System file	6/8/2000 5:00 PM
KEYBRD2.SYS	32 KB	System file	6/8/2000 5:00 PM
EKEYBRD3.SYS	31 KB	System file	6/8/2000 5:00 PM
KEYBRD4.SYS	13 KB	System file	6/8/2000 5:00 PM
MODE.COM	29 KB	MS-DOS Application	6/8/2000 5:00 PM
MSDOS.SYS	1 KB	System file	4/7/2001 1:40 PM

Figure 155: Creating a bootable diskette in Windows XP - step 5

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

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

When used in connection with a B&R industrial PC, it is possible to upgrade BIOS from one of the USB flash drives available from B&R. To do this, the USB flash drive must be prepared accordingly. This is done with the B&R Embedded OS Installer, which can be downloaded for free from the B&R homepage (www.br-automation.com).

Software • Upgrade information

2.4.1 Requirements

The following peripherals are required for creating a bootable USB flash drive:

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

2.4.2 Procedure

- Connect the USB flash drive to the PC.
- If the drive list is not refreshed automatically, the list must be updated using the command **Drives > Refresh**.
- Mark the desired USB flash drive in the drive list.
- Change to the Action tab and select Install a B&R Update to a USB flash drive as type of action.
- Enter the path to the MS-DOS operating system files. If the files are part of a ZIP archive, then click on the button By ZIP file.... If the files are stored in a directory on the hard drive, then click on the button By folder....
- In the **B&R Upgrade** text box, it's also possible to enter the path to the ZIP file for the B&R Upgrade Disk and select the file.
- Click on the **Start action** button in the toolbar.

	B&R Embedded OS Installer	
	Datei Laufwerke Extras ?	
	Atualsieren Betrahten Aktion starten Image öffnen Image erzeugen Image wiederherstellen Erwetkerte Enstellungen	
	an ∰ Conouter Logi Wechandaterizioger (G), Generic STORAGE LEVICE, 250 MBytes	
-	ktion Identifikations-Datei	
	Aktionstyp	
	Wählen Sie den Typ der Aktion: Ein BBR Upgrade auf einen USB-Memorystick Installeren	x
	Beschreibung: Erstellt einen bootbaren USB-Memorystäck, mit welchem ein Upgrade durchgeführt werden i Sie benötigen ein Windows 95, Windows 98 oder Windows ME MS-DOS.	kann.
	U Verwenden Sie die Funktion "Erweiterte Einstellungen" um die Konfiguration des Betriebssystems anzupassen.	
	Betriebssystem-Dateien	
	Wahlen Sie die WinnSjing/Me MS-DOS Datelein aus: Aus einem Verzeichnis Aus einer ZIP-Date [:[445-DOS]	
	Box Upgrade	
	wanen sie das zur-Archvinic dem Bak upgrade aus:	
	The state of the second st	
_		

Figure 156: Creating a USB flash drive for B&R upgrade files

2.4.3 Where do I get MS-DOS?

Information concerning creating an MS-DOS boot diskette can be found in section 2.3 "Creating an MS-DOS boot diskette in Windows XP", on page 340. Then the files from the diskette are to be copied to your hard drive.

Software • Upgrade information

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

When used in connection with a B&R industrial PC, it is possible to upgrade BIOS from one of the CompactFlash cards available from B&R. To do this, the CompactFlash card must be prepared accordingly. This is done with the B&R Embedded OS Installer, which can be downloaded for free from the B&R homepage (<u>www.br-automation.com</u>).

2.5.1 Requirements

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

- CompactFlash card
- B&R Industrial PC
- B&R Embedded OS Installer (V3.10 or higher)

2.5.2 Procedure

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

BRR Embedded OS Installer	
Datei Laufwerke Extras ?	
C Second	an
□ M Computer	
Aktion Identifikations-Datei	
Altionstyp	
Wählen Sie den Typ der Aktion: Ein BSR Upgrade auf eine CompactFlash Karte installeren	
Beschreibung: Einstell eine bootsver Compactifisch Karte, mit weichen ein logisad auchgeführt vern Sie benöftigen ein Windows 95. Windows 99. Oder Windows HEVE-DOG. Verwenden Sie de Funktion "Ernebente Einstellungen" un die Konforg alten des Betriebonsterer angezessen.	den kann.
Betriebssystem-Dateien	
Wahan Sie die Wints(Ne(Me MS-DOS Dateien aus:Aus einem VerzeichnisAus einer ZD- 	Datei
BBR Upgrade	
C:(UPG_APC800_PPC800_BIOS8945GME_V0114	

Figure 157: Creating a CompactFlash card for B&R upgrade files

2.5.3 Where do I get MS-DOS?

Information concerning creating an MS-DOS boot diskette can be found in section 2.3 "Creating an MS-DOS boot diskette in Windows XP", on page 340. Then the files from the diskette are to be copied to your hard drive.

2.6 Upgrade problems

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

3. 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 158: Location of DIP switch

4. Automation PC 620 with Automation Runtime

4.1 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

4.2 Support for Automation PC 620 embedded

4.2.1 ARwin

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

4.2.2 ARemb

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

4.3 Support for the Automation PC 620 with 5PC600.X945-00 CPU board

4.3.1 ARwin

The system is supported by ARwin with an AS 3.0.80 upgrade.

4.3.2 ARemb

In preparation.

4.4 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	В0
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	В0
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	В0
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	A0
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 222: System unit support for buffering with Automation Runtime

4.5 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.

	Graphic	Graphic engi	Stretch support	
System unit	engine (GE) Number	Monitor / Panel	AP Link slot (5AC600.SDL0-00)	on graphic connection
5PC600.SX01-00	1	GE1	-	Monitor / Panel
5PC600.SX02-00	2	analog RGB	GE1	AP Link slot (5AC600.SDL0-00)
5PC600.SX02-01	1	GE1	-	Monitor / Panel
5PC600.SF03-00	2	analog RGB	GE1	AP Link slot (5AC600.SDL0-00)
5PC600.SX05-00	2	analog RGB	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 223: 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.

5. Automation PC 620 with MS-DOS

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Figure 159: Automation PC 620 with MS-DOS

Model number	Short description	Note
9S0000.01-010	OEM MS-DOS 6.22 German (disk) OEM MS-DOS 6.22 German disks Only delivered with a new PC.	
9S0000.01-020	OEM MS-DOS 6.22 English (disk) OEM MS-DOS 6.22 English disks Only delivered with a new PC.	

Table 224: Model numbers - MS-DOS

5.1 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.
 USB Support only BIOS output USB is supported.
- Graphics Support No special drivers available.
- 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 X945 CPU boards.

Software • Automation PC 620 with MS-DOS

	Color depth				
Resolutions for DVI	8-bit	16-bit	24-bit		
640 x 480	✓	✓	✓		
800 x 600	✓	1	✓		
1024 x 768	✓	✓	✓		
1280 x 1024	✓	✓	✓		
		Color depth			
Resolutions for RGB	8-bit	16-bit	24-bit		
640 x 480	<i>√</i>	<i>√</i>	√		
800 x 600	✓	1	✓		
1024 x 768	✓	✓	✓		
1280 x 1024	✓	1	✓		
1600 x 1200	✓	1	✓		
1920 x 1440	✓	1			

Table 225: Tested resolutions and color depths for DVI and RGB signals

6. Automation PC 620 with Windows XP Professional



Figure 160: Windows XP Professional Logo

Model number	Short description	Note
5SWWXP.0600-GER	WinXP Professional with SP3, CD German Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a new device.	
5SWWXP.0600-ENG	WinXP Professional with SP3, CD English Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a new device.	
5SWWXP.0600-MUL	WinXP Professional with SP3, CD, Multi-language Microsoft OEM Windows XP Professional Service Pack 3, CD, multi-language. Only available with a new device.	
5SWWXP.0500-GER	WinXP Professional with SP2c, CD German Microsoft OEM Windows XP Professional Service Pack 2c, CD, German. Only available with a new device.	
5SWWXP.0500-ENG	WinXP Professional with SP2c, CD English Microsoft OEM Windows XP Professional Service Pack 2c, CD, English. Only available with a new device.	
5SWWXP.0500-MUL	WinXP Professional with SP2c, CD English Microsoft OEM Windows XP Professional Service Pack 2c, CD, multi-language. Only available with a new device.	

Table 226: Model numbers - Windows XP Professional

6.1 Installation

Upon request, B&R will pre-install Windows XP Professional on the desired mass memory (addon hard disk, slide-in hard disk). All of the drivers required for operation (graphics, network, etc.) are also installed when doing so.

6.1.1 FAQ

Installation on PCI SATA RAID controller - 5ACPCI.RAIC-03

The following steps are necessary for installing Windows XP Professional on the PCI SATA RAID controller:

- 1) Download the RAID driver from the B&R homepage (<u>www.br-automation.com</u>) and copy the files to a diskette.
- 2) Connect the Media Drive (5MD900.USB2-01 or 5MD900.USB2-00) to the USB port.
- 3) Insert the diskette and Windows XP Professional CD in the the Media Drive and boot from the CD.
- 4) Press the F6 key during setup to install a third-party SCSI or a driver.
- 5) Press the "s" key when asked about installing an additional drive. Insert the disk in the floppy drive. Press "Enter" and select the driver.
- 6) Follow the setup instructions.
- 7) The setup copies the files to the Windows XP Professional folder and restarts the APC620.

6.2 Graphics drivers

For operation modes "extended desktop" and "dual display clone", the Intel Extreme graphics chip driver must be installed. Graphics drivers for X945 CPU boards are available for approved operating systems in the download area (Service - Material Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (www.br-automation.com).

6.2.1 Installing the graphics driver for X945 CPU boards

Information:

Ē

The following screenshots and descriptions refer to the graphics driver version 14.32.4 for X945 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).

	Allgemein Grafikkate Monitor Problembehandlung Farbverwaltung Intel(R) Graphics Media Accelerator Driver for Mobile
	Intel® Graphics Media Accelerator Driver for mobile
	Weitere visuelle Displayoptionen für Geräte, die mit diesem Computer verbunden sind, wie zum Beispiel:
	Fernsehgerät
	Digitalanzeige
	Norebook
	sind hier verfügbar: Grafikeigenschaften
Grafikaigenschaften Grafikoptionen Taskietse beenden Intel ¹² Graphics Media	Symbol in Taskleiste anzeigen
Accelerator Driver (intel)	

Figure 161: Accessing the graphics driver via Control Panel

6.2.2 Graphics settings for Extended Desktop

Under the "Extended desktop" settings, "Notebook" can be set as the primary device (Graphics Engine 1) and "Monitor" as secondary device. The two lines display different content (Extended Desktop).

The following table is valid for 5PC600.SX02-00, 5PC600.SX05-00 and 5PC600.SF03-00:

Driver	settings	Effect or	APC620
Primary device	Notebook	AP Link output	Graphics engine 1
Secondary device	Monitor	Monitor / Panel	Monitor
Primary device	Monitor	Monitor / Panel	Monitor
Secondary device	Notebook	AP Link output	Graphics engine 1

Table 227: Relationship between driver settings and graphics engine for 5PC600.SX02-00, 5PC600.SX05-00 und 5PC600.SF03-00

The following table is valid for 5PC600.SX01-00, 5PC600.SX02-01, 5PC600.SX05-01, 5PC600.SE00-00 and 5PC600.SE00-02:

Driver	settings	Effect or	APC620
Primary device	Notebook	Monitor / Panel	Graphics engine 1
Secondary device	Monitor	Monitor / Panel	Monitor
Primary device	Monitor	Monitor / Panel	Monitor
Secondary device	Notebook	Monitor / Panel	Graphics engine 1

Table 228: Relationship between driver settings and graphics engine for 5PC600.SX01-00, 5PC600.SX02-01, 5PC600.SX05-01, 5PC600.SE00-00 and 5PC600.SE00-02

Resolution and color depth can be configured separately for each line via the device settings for notebook and monitor.

Graphics Media Accelerator Driver for mobile	I Notebook und	Monitor	Schemaopti	onen	Graphics Media Accelerator Driver for mobile	J Notebook	Monitor	Schemaoptionen
Displaygeräte	Einzelnes Display	C Monitor			Displaygerate	Farbquaintat	32 Bit 💌	Drehung
Displayeinstellungen					Displayeinstellungen	Belschirmauflösung	1024 × 768 💌	(* D
Farbkorrektur	Mehrere Displays	Primärgerät			Farbkorrektur	Displayerweiterun	IZ 60 Hertz 💌	90 C 🚺 C 270
Abkürzungstästen	Enweiterter	Notebook			Abkurzungstasten	Seiterwerhält	nisoptionen	C 180
(intel)	Desktop Iniciti, oual Display Clone	Sekundärgerät Monitor	1	2	(intel)			Energieeinstellungen
Zoom starten] 3D-Einstellungen				Zoom starten] 3D-Einstellungen		
Informationen	Videoüberlagerung	ОК	Abbrechen	andan	Informationen	Videoüberlagerun	g OK	Abbrechen
				cinden				
				ī	Intel [®] Graphics Media Accelerator Driver for mobile		Monitor	Schemaopfionen
				j	Intel® Graphics Media Accelerator Driver for mobile Displaygeräte	Notebook Farbqualität	Monitor 32 BR	Schemaoptionen Drehung Z Britation aktivieren
					Intel [®] Graphics Media Accelerator Driver for mobile Displaygerate Displayeinstellungen	Notebook	Monitor 32 Bk ▼ 1024 × 768 ▼	C Schemaoptionen Drehung I⊄ Rotation aktivieren I € 0
					Intel® Graphics Media Accelerator Driver for mobile Displaygerate Displaygenstellungen Farbkorrektur	Notebook Farbqualität Bittschirmauflösung Bildwiederholfrequer Displayerweiterun	32 B# • 1024 x 768 • 12 60 Hettz •	C Schemaoptionen Drehung IF Rotation aktivieren G 0 90 C ↓ C 270
					Intel ^a Graphics Media Accessito Driver for mobile Displayegrate Displayeinstellungen Farbkorrektur Abkurzungstasten	Farbqualität Bilschirmauflösung Bildwiederholfrequer Displayerweiterun Cederverhölt	Monitor 2 BA • 1024 x 788 • IZ 6D Hetz • g riccoloren	C Schemaoptionen Drehung ☞ Rotation aktivieren ☞ 0 90 ← ▲ ← 270 ← 160
					Intel [®] Graphics Media Graphics Mer Ofiver for mobile Displayerate Displayerate Displayerate Abkurzungstasten	Notebook Farbqualitäl Bilschirmauflösung Bildwiederholfrequer Displayerweiterun Satemenhab	S BA V 1024 x 758 V 22 B0 Hetz V g pricedionem	C Cchemaoptionen Drehung P Rotation aktivieren ° 0 90 ○ ○ ○ 270 ° 180
					Interior Media Granitestar Driver for mobile Displayeinstellungen Farbkorrektur Abkurzungstasten Litter	Notebook Farbqualität Dischirmauflosung Bittiviedentolfrequer Displayerweiterun Cetenstellungen 3D-Einstellungen	Monitor 2 8 8 ▼ 1024 + 788 ▼ 2 80 Hetet ▼ 9 nicoclinants	Chemaoptionen Drehung P Rotation aktivieren P O C C 270 C 180

Figure 162: Extended desktop settings - primary device and monitor

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 6.3.1 "Installation for Extended Desktop", on page 359 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.

6.2.3 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 Monitor). This enables operation of the application from every display.

The following table is valid for 5PC600.SX02-00, 5PC600.SX05-00 and 5PC600.SF03-00:

Driver settings		Effect or	APC620
Primary device	Notebook	AP Link output	Graphics engine 1
Secondary device	Monitor	Monitor / Panel	Monitor
Primary device	Monitor	Monitor / Panel	Monitor
Secondary device	Notebook	AP Link output	Graphics engine 1

 Table 229: Relationship between driver settings and graphics engine (DDC) for 5PC600.SX02-00,

 5PC600.SX05-00 und 5PC600.SF03-00

The following table is valid for 5PC600.SX01-00, 5PC600.SX02-01, 5PC600.SX05-01, 5PC600.SE00-00 and 5PC600.SE00-02:

Driver settings		Effect on APC620		
Primary device	Notebook	Monitor / Panel	Graphics engine 1	
Secondary device	Monitor	Monitor / Panel	Monitor	
Primary device	Monitor	Monitor / Panel	Monitor	
Secondary device	Notebook	Monitor / Panel	Graphics engine 1	

Table 230: Relationship between driver settings and graphics engine (DDC) for 5PC600.SX01-00, 5PC600.SX02-01, 5PC600.SX05-01, 5PC600.SE00-02 and 5PC600.SE00-02

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

Accelerator Driver	Motebook und	Monitor	Schemaoptione		ntel° raphics Media ccelerator Driver or mobile	J Notebook	🗐 Monitor	Schemaoptionen
Displaygeräte	Einzelnes Display	Monitor			Displaygeräte	Farbquaiitat	32 Bit 💌	Drehung
Displayeinstellunger	n			Di	splayeinstellungen	Bilschirmauflösun	g 1024 x 768 💌	Rotation aktivieren
Farbkorrektur	Mehrere Displays				Farbkorrektur	Bildwiederholfreque	nz 60 Heitz 💌	
	C Twin	Primärgerät Netekeek	-		h kiiraun setaeten	Displayerweiteru	1g	90 🗘 🕍 🗘 270
Abkurzungstasten	Erweiterter	NOCEDODIC	<u></u>		tokurzungstasten	Seiterwerhä	Inisoptionen	C 180
(intel)	Intel(R) Dual Display Clone	Sekundärgerät Monitor	•		(intel)			Energiaeinstellungen
		Monitor			0			Energiacinationaligen
Zoom starten	3D-Einstellungen				Zoom starten	3D-Einstellunge	n	
Informationen	Videoüberlagerung			_	Informationen	Videoüberlageru	1g	
		OK	Abbrechen	len			ОК	Abbrechen
				_				0
					ntel ¹ raphics Media colerator Driver or mobile Displaygerate splayeinstellungen Farbkorrektur Abkurzungsfasten	Notebook Bildwiederholfreque Displayerweiteruu Seiterweite	Monitor nz 60 Hate V	Schemaoptionen Drehung ○

Figure 163: Dual display clone settings - primary and monitor

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 6.3.2 "Installation for Dual Display Clone", on page 361 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.

6.3 Touch screen driver

For operation modes "extended desktop" and "dual display clone", the Elo touch screen driver must be installed. This can be found in the download area (Service - Material Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (<u>www.br-automation.com</u>).

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").

6.3.1 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 164: 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)

BOO TOUCHSYSTEMS	Select the CDM poits to use with Elo senial touchscreens. Check the Auto-detection box if you want Setup to auto-detect CDM poits currently connected to Elo devices. During Mato-detection, Setup will send data to each poit which may the end data to each poit which may the end data to each poit which may the end data to each poit devices. Elick Next to continue. Auto-detect Elo devices.	GOO TOUCHSYSTEMS	Choose the CDM ports from the list below to use with your touchmonitors. All CDM ports reported by your system are listed.	
	< Back Next > Cancel		< Back Next > Cancel	

Figure 165: 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.

General Mode Sound Properties 1 Properties 2 About Screen information Windows monitor number: 2 Windows monitor number: 1 Touchscreen type: AccuTouch Windows monitor number: 1 Touchscreen type: AccuTouch Vindows monitor number: 1 Controller status: Working property Controller status: Working property Driver version: Elser.Sys 4.20 Driver version: Elser.Sys 4.20 Video Alignment Identify Advanced Monitor	🕼 Eigenschaften von Elo Touchscreen 🛛 🛛 👂	🗓 Eigenschaften von Elo Touchscreen		
Screen information Windows monitor number: 2 Touchscreen type: AccuTouch Installed on: COM3 Controller model: SCOACh [2.0 - 0.0] Controller status: Working properly Driver version: Eloser.Sys 4.20 Video Alignment Identify Align Identify Advanced Monitor	General Mode Sound Properties 1 Properties 2 About	General Mode Sound Properties 1 Properties 2 About		
Touchscreen type: AccuTouch Installed on: CON5 Controller model: SCOACh [2:0 - 0:0] Controller status: Working properly Driver version: Eloser.Sys 4:20 Video Alignment Video Alignment Align Identify	Screen information Windows monitor number: 2	Screen information Windows monitor number: 1		
Installed on: COM3 Controller model: SCOACh [2:0 - 0:0] Controller status: Working properly Driver version: Eloser.5ys 4.20 Video Alignment Identify Advanced Advanced	Touchscreen type: AccuTouch 💙	Touchscreen type: AccuTouch 💙		
Controller model: SCOACh [2.0 - 0.0] Controller Status: Working properly Driver version: Eloser,Sys 4.20 Video Alignment Video Alignment Align Identify Advanced	Installed on: COM3	Installed on: COM5		
Controller Status: Working properly Driver version: Eloser.Sys 4.20 Video Alignment Align Identify Advanced Identify Advanced	Controller model: SCOACh [2.0 - 0.0]	Controller model: SCOACh [2.0 - 0.0]		
Driver version: Eloser.Sys 4.20 Video Alignment Video Alignment Identify Advanced Align Identify	Controller Status: Working properly	Controller Status: Working properly		
Video Alignment Uideo Alignment Uideo Alignment Advanced Align Identify Advanced Advanced Advanced	Driver version: Eloser.Sys 4.20	Driver version: Eloser.Sys 4.20		
	Video Alignment Identify Advanced Align	Video Alignment Identify Align Monitor Advanced		

Figure 166: Touch screen calibration
6.3.2 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.

Elo TouchSystems Setup (V	lersion 4.20)
	Welcome to Elo Touchscreen Setup.
	This program will install the Elo USB and Setial touchscreen drivers on your computer. It is strongly recomended that you exit all Windows programs before running this Setup program.
	Install Secial Touchscreen Drivers ☐ Install USB Touchscreen Drivers
	< Back Next > Cancel

Figure 167: Touch screen driver - serial touch screen

• The driver's auto-detect function sends data packets to every existing serial interface. It then returns a list of all the ports on which an Elo touch screen is connected. The panel locking time must be set to 0 ms (auto-detect only found 1 touch screen)

Select the Dreak the david detect davides davides During Auto devices. During Auto devices. Click Newt I	COM ports to use with Elo serial touchscreens. Auto-detection how if you ward Setup to COM ports currently connected to Elo >-detection, Setup will send data to each port temporarily interfere with some types of serial o continue. tect Elo devices.	COUCHSYSTEMS	Discuss the CDM posts from the list below to use with your touchronitors. All CDM posts reported by your system are listed.
	<back next=""> Cancel</back>		< Back Next > Cancel

Figure 168: Touch screen driver - auto-detect

Section 4 Software

Software • Automation PC 620 with Windows XP Professional

- 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 169: Touch screen calibration

6.3.3 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.

6.4 Audio driver

An audio driver can be found in the download area (Service - Material Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (<u>www.br-automation.com</u>).

See the section "MIC, Line IN and Line OUT ports", on page 125 for information about the audio driver type.

6.4.1 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.

Section 4 Software

Software • Automation PC 620 with Windows XP Professional

6.5 Network driver

The APC620 has 2 different networks controllers. Drivers for both network connections (ETH1 and ETH2) are available for approved operating systems in the download area (Service - Material Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (<u>www.br-automation.com</u>).

See the sections "Ethernet connection ETH1", on page 111 and "Ethernet connection ETH2", on page 113 for information about network controller types.

6.5.1 Installation ETH1

Execute the downloaded setup.

6.5.2 Installation ETH2

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

6.6 Automation PC 620 embedded

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

7. Automation PC 620 with Windows XP embedded



Figure 170: Windows XP Embedded Logo

Model number	Short description	Note
5SWWXP.0430-ENG	WinXPe FP2007 APC620 945GME XTX Microsoft OEM Windows XP Embedded Feature Pack 2007, English; for APC620 with CPU board 5PC600.X945-00; order CompactFlash separately (at least 512 MB).	

Table 231: Model numbers - Windows XP Embedded

7.1 General information

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

7.2 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)	1
File Based Write Filter	1
Page file	Configurable
Administrator account	1
User account	Configurable
Explorer shell	1
Registry filter	1
Internet Explorer 6.0 + SP2	1
Internet information service (IIS)	-
Terminal service	1

Table 232: Device functions in Windows XP Embedded with FP2007

Software •	Automation	PC 620 with	Windows XP	embedded
------------	------------	-------------	------------	----------

Function	Present
Windows Firewall	<i>√</i>
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	1
Media Player	-
DirectX	-
Accessories	1
Number of fonts	89

Table 232: Device functions in Windows XP Embedded with FP2007

7.3 Installation

Upon request, Windows XP Embedded can be preinstalled at B&R Austria on a suitable CompactFlash card (min. 512 MB). The APC620 system is then automatically configured after it has been switched on for the first time. This procedure takes approximately 30 minutes, and the device will be rebooted a number of times.

Brief instructions for creating your own Windows XP Embedded images or a suitable Target Designer export file for X945 CPU boards can be downloaded from the download area on the B&R homepage (<u>www.br-automation.com</u>).

7.4 Graphics drivers

Already included in the B&R Windows XP Embedded image for X945 CPU boards.

7.5 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 6.3 "Touch screen driver", on page 359

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

7.6 Audio driver

Already integrated in the B&R Windows XP Embedded image for X945 CPU boards.

7.6.1 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

7.7 Network driver

Already integrated in the B&R Windows XP Embedded image for X945 CPU boards.

7.8 FAQ

7.8.1 Why does the B&R device restart when shutdown?

If the APC620 is connected with a B&R device, then the option "USB root hubs" must be disabled in the Windows XP Embedded device manager under "Universal Serial Bus controllers" using the following dialog box: **Properities > Power Management > Allow the computer to turn off this device to save power**.

Section 4 Software

8. Automation PC 620 with Windows Embedded Standard 2009



Figure 171: Windows Embedded Standard 2009 Logo

Model number	Short description	Note
5SWWXP.0730-ENG	Windows Embedded Standard 2009 APC620 945GME Microsoft OEM Windows Embedded, Standard 2009, English; for APC620 with CPU board, 5PC600.X945-00; order CompactFlash separately (at least 1 GB).	

Table 233: Model numbers - Windows Embedded Standard 2009

8.1 General information

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

8.2 Features with WES2009 (Windows Embedded Standard 2009)

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

Function	Present
Enhanced write filter (EWF)	<i>✓</i>
File Based Write Filter	<i>✓</i>
Page file	Configurable
Administrator account	<i>✓</i>
User account	Configurable
Explorer shell	✓
Registry filter	<i>✓</i>
Internet Explorer 7.0	✓ ✓
Internet information service (IIS)	-
Terminal service	✓ ✓
Windows Firewall	✓
MSN-Explorer	-
Outlook Express	-
Administrative Tools	✓
Remote Desktop	✓
Remote Assistance	-
.NET Framework	-
ASP.NET	-
Local Network Bridge	✓ ✓
Codepages/User Locale/Keyboard	<i>✓</i>
Disk Management Service	✓ ✓
Windows Installer Service	✓
Class Installer	✓
CoDevice Installer	✓
Media Player 6.4	✓
DirectX 9.0c	1
Accessories	✓
Number of fonts	89

Table 234: Device functions in Windows Embedded Standard 2009

Software • Automation PC 620 with Windows Embedded Standard 2009

8.3 Installation

Upon request, Windows Embedded Standard 2009 can be preinstalled at B&R Austria on a suitable CompactFlash card (min. 1GB). The APC620 system is then automatically configured after it has been switched on for the first time. This procedure takes approximately 30 minutes, and the device will be rebooted a number of times.

8.4 Drivers

All drivers required for operation are preinstalled on the operating system. If an older driver version is installed, the latest version can be downloaded from the B&R homepage (<u>www.br-automation.com</u>) and installed. A potentially activated "Enhanced Write Filter (EWF)" must be taken into consideration.

8.4.1 Touch screen driver

The touch screen driver must be manually installed in order to operate Automation Panel 800 or Automation Panel 900 touch screen devices. The driver can be downloaded from the download area on the B&R homepage (<u>www.br-automation.com</u>). A potentially activated "Enhanced Write Filter (EWF)" must be taken into consideration.

Information:

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

9. Automation PC 620 with Windows CE



Model number	Short description	Note
5SWWCE.0830-ENG	WinCE6.0 Pro APC620 945GME XTX Microsoft OEM Windows CE 6.0 Professional, English; for APC620 with CPU board 5PC600.X945-00; order CompactFlash separately (at least 128 MB).	

Table 235: Model numbers - Windows CE

9.1 General information

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

9.2 Windows CE 6.0 features

Detailed information about Windows CE for B&R devices can be downloaded in the download area on the B&R homepage (<u>www.br-automation.com</u>).

Features	Windows CE 6.0	
Supported screen resolutions	VGA (TFT), SVGA (TFT), XGA (TFT)	
Chipset	Intel 945GME	
Color depth	16-bit or 65,536 colors ¹⁾	
Graphics card driver	Intel(R) embedded graphics driver TBD	
Main memory	Automatic detection and use of up to 512 MB RAM	
Boot time / Startup time	Approx. 20 seconds	
Screen rotation	not supported	
Web browser	Internet Explorer	
.NET	Compact Framework	
Image size	TBD ²⁾	

Table 236: Windows CE 6.0 features

Software • Automation PC 620 with Windows CE

Features	Windows CE 6.0	
Custom keys	Supported	
PVI	Supported	
Automation Device Interface	Supported	
Remote Desktop Protocol for thin clients	Supported	
B&R VNC Viewer	Supported	
B&R Task Manager	Supported	
B&R Picture Viewer	Supported	
Compatible with zenOn	Yes	
Compatible with Wonderware	No	
Serial interfaces for any use	3	
DirectX	No	
Audio ports	"Line OUT" and "MIC" are supported. "Line IN" is not supported.	

Table 236: Windows CE 6.0 features

1) The color depth depends on the display used.

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

9.3 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)

9.4 Installation

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

9.4.1 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 from the download area on the B&R homepage (<u>www.br-automation.com</u>). Further information is available in the online help for the B&R Embedded OS Installer.

10. B&R Automation Device Interface (ADI) driver - Control Center

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

Automation PC 810 Display Keys Statistics You can CPU Board ICPU Board ICPU Board ICPU Board ICPU Board ICPU Board ICPU Memory Ir	Properties ? × LEDs Temperatures Fans Switches UPS ser Settings Factory Settings Versions Report create a report with selected device information here. This report Temperatures Factory Settings tomation PE 810 Properties ? × Display Keys LEDs Temperatures Statistics User Settings Factory Settings Versions Firmware installed on the PC and connected devices Temperatures Factory Settings
Set All	Automation PC 810 Properties ? CPU Board Statistics User Settings Factory Settings Versions Report Bios Statistics User Settings Temperatures values of the PC and connected panels are displayed here. UPS MTD Image: CPU Board CPU Board CPU Panel SDL: Board I/O: 38 / 100 'C/'F Panel UPS Board I/O: 38 / 100 'C/'F Side-In 1: 0 / 32 'C/'F UPS Firmw Board I/O: 36 / 96 'C/'F Side-In 1: 0 / 32 'C/'F ETH2: 48 / 118 'C/'F Side-In 2: 0 / 32 'C/'F Power supply: 34 / 33 'C/'F Firster Temperature values of 'C/'F
	OK Abbrechen

Figure 172: ADI Control Center screenshots - Examples (symbol photo)

Information:

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

Section 4 Software

10.1 Features

Information:

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

- Adjusting the display-specific parameters of connected Panels
- Reading of device-specific keys
- · Activation of device specific LEDs on a foil keypad
- · Reading temperatures, fan speeds, statistical data, and switch settings
- · Reading user settings and factory settings
- Reading software versions
- Updating and securing firmware
- Creating reports about the current system (support assistance)
- Setting the SDL equalizer value for the SDL cable adjustment
- Configuring an optional mounted UPS
- Change the user serial ID.

Supports following systems:

System	Operating system	Note		
	Windows XP Professional	Installation using its own setup		
Automation PC 820	Windows XP Embedded	Content of B&R Windows XP Embedded image		
	Windows Embedded Standard 2009	Content of B&R Windows Embedded Standard 2009 image		
	Windows XP Professional	Installation using its own setup		
Automation PC 810	Windows XP Embedded	Content of B&R Windows XP Embedded image		
	Windows Embedded Standard 2009	Content of B&R Windows Embedded Standard 2009 image		
Automation PC 620	Windows XP Professional	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		
	Windows Embedded Standard 2009	Content of B&R Windows Embedded Standard 2009 image		
D	Windows XP Professional	Installation using its own setup		
	Windows XP Embedded	Content of B&R Windows XP Embedded image		
Faller FC 700	Windows Embedded Standard 2009	Content of B&R Windows Embedded Standard 2009 image		
	Windows CE	Content of B&R Windows CE image		

Table 237: System support - ADI driver

Software • B&R Automation Device Interface (ADI) driver - Control Center

System	Operating system	Note
	Windows XP Professional	Installation using its own setup
Panel PC 725	Windows Embedded Standard 2009	Content of B&R Windows Embedded Standard 2009 image
	Windows CE	Content of B&R Windows CE image
	Windows XP Professional	Installation using its own setup
Panel PC 800	Windows XP Embedded	Content of B&R Windows XP Embedded image
	Windows Embedded Standard 2009	Content of B&R Windows Embedded Standard 2009 image
Power Panel BIOS devices	Windows XP Embedded	Content of B&R Windows XP Embedded image
	Windows CE Content of B&R Windows CE image	
	Windows Embedded Standard 2009	Content of B&R Windows Embedded Standard 2009 image
Mahila Panal RIOS daviasa	Windows XP Embedded	Content of B&R Windows XP Embedded image
Mobile Panel BIOS devices	Windows CE	Content of B&R Windows CE image
Automation Panel 800	-	Together with APC620/ APC810/ APC820/ PPC700/ PPC800
Automation Panel 900	-	Together with APC620/ APC810/ APC820/ PPC700/ PPC800

Table 237: 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 (<u>www.br-automation.com</u>).

10.2 Installation

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

- 1) Download and unzip the ZIP archive
- 2) Close all applications.
- 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 and Windows Embedded Standard 2009 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.

10.3 SDL equalizer setting

- 1) Start the Control Center in the Control Panel.
- 2) Then select the **Display** tab.
- 3) Click on **Settings**. This opens the following dialog box:

Display S	ettings	? X
SDLE	qualizer	
<u>uth</u>	You can adjust the equalizer for different cable lengths here. Use low values (strong equalizer setting) for long cables.	
🗖 Us	e <u>a</u> utomatic setting	
	Strong Equalizer Weak	
0		
	OK Canc	el

Figure 173: ADI Control Center - SDL equalizer settings

You can change the display's SDL equalizer settings in this dialog box. The equalizer is integrated in the Automation Panel and adapts the DVI signal to various cable lengths. The equalizer value is automatically calculated based on the cable length: You may set a different equalizer value in order to obtain the best possible display quality (e.g. with low-quality cables or poor DVI signal quality).

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

Information:

The equalizer value can only be changed if the function is supported by the panel (panel firmware version 1.04 or higher) and if MTCX PX32 version 1.54 or higher is installed. Otherwise, the dialog fields are disabled.

10.4 UPS configuration

Here you can view the status values for an optionally installed B&R APC add-on UPS as well as change, update or save the battery settings for the UPS. You can also configure the system settings for the UPS.

Automation PE 620 Properties Statistics User Settings Display Keys LEDs	Factory Settings Versions Temperatures Fans Voltages	Report UPS	
Status Communication error On battery Low bettery Battery failure Battery polarity reversed No backup possible	Operating Data Operating Data Depending Data Date Voltage: 13.7 Battery voltage: 0.00 Temperature: 30 / 86	V A °C/'F	
Battery Settings Status: Valid UPS Settings Status: Valid System B&R UPS of	Edit. Update Sav	re	

Figure 174: 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.

10.4.1 Installing the UPS service for the B&R APC add-on UPS

- 1) Open the Control Center in the Control Panel.
- 2) Select UPS tab.
- 3) Click on System under UPS settings. This opens the Power Options in the Control Panel. (The Power Options can also be opened directly from the Control Panel.)
- 4) Select the UPS tab and click Select....
- 5) Choose 'Bernecker + Rainer' as manufacturer and 'APC Add-On UPS' as model and then click Finish. The value for the COM connection is only required for a serially connected UPS and is ignored by the APC add-on UPS driver.
- Click on Apply to begin UPS operation. After a few seconds the UPS status and details are displayed.

Software • B&R Automation Device Interface (ADI) driver - Control Center

- 7) Click **OK**.
- 8) The text field beside **System** (on the **UPS** tab in the **Control Center**) also indicates whether the B&R UPS driver is active.

Information:

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

10.4.2 Displaying UPS status values

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

The displayed values are updated automatically.

Information:

The "reversed battery polarity" status is only displayed in UPS firmware version 1.08 or higher.

In UPS firmware Version 1.07 or smaller, a change between battery operation and normal operation can lead to communication errors.

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

B&R UPS started at:	10/14	/2005 3:42:39 AM	stopped at:	(active)
State	Count	Last at	Gone at	Total Time
🔥 Battery defe	1	10/14/2005 3:4	. (active)	92 seconds

Figure 175: ADI Control Center - UPS monitor

The dialog box is updated automatically when the status changes.

To remove a status from the list, click on **delete**.

Information:

The current status of the UPS is also displayed when the UPS service is started in the Windows Control Panel on the UPS page in the energy options.

Information:

In a German version of Windows XP Professional the battery status is displayed as "low" in the energy options, even if the battery is OK (Windows error). In an English version, three battery status levels are displayed: unknown, OK, replace A low battery status is never displayed.

10.4.3 Changing UPS battery settings

- 1) Open the Control Center in the Control Panel.
- 2) Select UPS tab.
- 3) Under "Battery settings," click on Edit. Clicking on "Open" opens a dialog box.
- 4) Select and **open** the file containing the battery settings.

You can change th
Version: Device ID: Description: Nominal gapacity: Charge end voltage 1): Digcharge end voltage 1): Digcharge end voltage 1): Charge current: Charge peak voltage: Min. charge temperature 2): Max. charge temperature 2): Lifetime 1) 3) 4): Deep discharge cycles 1) 3):

Figure 176: ADI Control Center - UPS battery settings

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

The changed settings are written to the file by clicking on the **OK** button. The battery settings for the UPS can then be updated with this file.

Software

Information:

To make settings for batteries not from B&R, it is best to make a copy of a file with battery settings from B&R under a new name and make adjust the settings in this file for the battery being used.

Current files with settings for batteries from B&R can be found on the B&R APC620 / PPC700 firmware upgrade disk (starting with V1.16) and can also be updated using these.

Information:

- The current UPS firmware version 1.10 does not use charge end voltage, deep discharge voltage, lifespan and deep discharge cycles.
- Lifespan is only included in version 2 (and higher) of the UPS battery settings and only valid for B&R UPS batteries at 25°C ambient temperature.
- Deep discharge cycles are only included in version 3 (and higher) of the UPS battery settings and only valid for B&R UPS batteries.

Information:

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

10.4.4 Updating UPS battery settings

- 1) Open the **Control Center** in the **Control Panel**.
- 2) Select UPS tab.
- 3) Under Battery settings, click on Update. Clicking on "Open" opens a dialog box.
- 4) Select and **open** the file containing the battery settings. The "Download" dialog box is opened.

The transfer can be aborted by clicking on **Cancel** in the Download dialog box. **Cancel** is disabled when the flash memory is being written to.

Caution!

- The UPS cannot be operated while updating the battery settings.
- If the transfer is interrupted, then the procedure must be repeated until the battery settings have been updated successfully. Otherwise battery operation will no longer be possible.

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

Information:

The UPS is automatically restarted after a successful download. This can cause a brief failure in the UPS communication.

Software • B&R Automation Device Interface (ADI) driver - Control Center

10.4.5 Saving UPS battery settings

- 1) Open the Control Center in the Control Panel.
- 2) Select UPS tab.
- 3) Under "Battery settings", click on Save. Clicking on "Save under" opens a dialog box.
- 4) Enter a file name or select an existing file and click on Save.

Information:

UPS settings can only be saved using UPS firmware version 1.10 and higher.

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

10.4.6 Configuring UPS system settings

- 1) Open the Control Center in the Control Panel.
- 2) Select UPS tab.
- 3) Click on **System** under **UPS settings**. The energy options dialog box in the Control Panel is opened.

UPS Settings	<u>? ×</u>
Current Control Current Imitation (8 A) (not UL-conform) At over current (> 8 A): Curring fi within 1 minute (UL-conform) perform "low battery" shutdown (not UL-conform Battery Control Low battery shutdown time: 180 OK OK	n) sec Cancel

Figure 177: ADI Control Center - UPS settings

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

Information:

- UPS settings can only be changed using UPS firmware version 1.10 and higher. If there are no changed settings on the UPS, then the factory or default settings are used.
- The UPS is automatically restarted after UPS settings have been changed. This can cause a brief disruption in communication with the UPS.
- Administrator rights are required in order to change the energy options or display the UPS status.

Disabling 8 A current limitation

Information:

It is not UL compliant to switch off the 8 A current limitation on devices during battery operation!

"Low Battery" shutdown caused by an over-current of > 8 A on devices during battery operation is not UL compliant!

Select the checkbox Disable current limitation (8 A).

If current limitation is enabled (checkbox deselected), then the UPS uses battery operation to check whether the UPS battery is discharged with 8 A for longer than 16 seconds. If so, then an overcurrent alarm is sent to the PC.

Information:

Current limitation is only supported with UPS firmware version 1.10 and higher.

Enabling one of the two following options determines how the UPS should perform when an overcurrent alarm occurs:

If **Turn-off within 1 minute** is selected, then the UPS will turn-off within one when an overcurrent alarm occurs.

Warning!

The operating system will not be properly shut down if an overcurrent alarm occurs!

If **Perform "low battery" shutdown** is selected, then the UPS will also signal a "Low battery alarm" in addition to the overcurrent alarm and will turn off after the defined **Low battery shutdown time**. This will allow the operating system to shut down properly when UPS service is enabled.

Software • B&R Automation Device Interface (ADI) driver - Control Center

Changing the UPS shutdown time when battery is low

Enter the **"Low Battery" shutdown time** in seconds. This is the amount of time that the UPS will wait before shutting off the power supply when the battery level is low.

This prevents the UPS battery from becoming too discharged if the Windows UPS service is not enabled and the UPS is therefore not turned off by the operating system.

If the UPS service is enabled, then the UPS will be turned off by the operating system when the battery level is low, based on the Windows UPS service **Turn-off delay** (see 10.4.7 "Changing additional UPS settings"). The **low battery shutdown time** will then be ignored.

Information:

- The low battery shutdown time must be set to at least 60 seconds, so that the operating system has enough time to send the shutdown command to the UPS when the battery level is low (normally occurs after approximately 30 seconds).
- The low battery shutdown time can only be set in UPS firmware version 1.10 and later. UPS firmware version 1.08 always uses a turn off delay time of 180 seconds. UPS firmware versions earlier than 1.08 do not shut down automatically when the battery level is low.

10.4.7 Changing additional UPS settings

- 1) Open the Control Center in the Control Panel.
- 2) Select UPS tab.
- 3) Click on Advanced under UPS settings. This opens the following dialog box:

Advanced UPS Settings	? ×	
Windows UPS Service	res a	
longer time to shutdown. B&R UPS Driver ↓ ♥ Show notifications for UPS state	JS	
Show UPS status with UPS Mon	itor	
OK Car	ncel	

Figure 178: ADI Control Center - Advanced UPS settings

Information:

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

Change turn-off time for UPS

The **Shutdown time** can be specified in seconds under **Windows UPS service**. This is the length of time that the UPS waits before switching off the power supply. When a critical alarm occurs (e.g. at low battery level), the Windows UPS service will send a shutdown command with the turn off delay time to the UPS and will shut down the system.

Information:

This time is evaluated by the Windows UPS Service, but can not be set in the UPS system settings of the energy options. This value should only be changed if the system requires longer than the default setting of 180 seconds to shut down.

Caution!

The time entered must be longer than the time required to shut down the operating system.

Activate UPS messages

Under "B&R UPS driver", activate the checkbox "UPS status messages". Any changes to the UPS status will then trigger a message from the B&R UPS driver.

Information:

Shutting down the system is only reported by the Windows UPS Service. The UPS Service also sends other messages if they are activated in the UPS system settings energy options. These messages are only displayed when the Windows Alerter and Windows Messenger¹⁾ 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").

10.4.8 Procedure following power failure

Over-current shutdown

If an over-current >8 A is present during battery operation for a duration of 16 seconds, the overcurrent shutdown is executed. A turn-off time of one minute is available to the system.

If the supply is regenerated during this time, then the shut down process is aborted.

Information:

The over-current shutdown has the highest priority.

Low battery shutdown

If the LowBatteryFlag is set during power failure, then the "low battery" shutdown is executed, preventing the battery from fully discharging. Once the turn-off time expires (3 minutes by default), the UPS shuts down.

If an "over-current" shutdown or "standard" shutdown is detected during the shutdown process, the "low battery" shutdown is replaced by the respective process.

Standard shutdown

The standard shutdown is effective when the UPS service is active, the turn-off time is 3 minutes by default.

If the supply voltage returns during the turn-off time, then the shutdown procedure will be stopped.

If the supply voltage returns during the shutdown process, then the shutdown timer will run until the APC620 enters standby mode and will then reboot the system.

Chapter 5 • Standards and certifications

1. Applicable European directives

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

2. Overview of standards

Standard	Description
EN 55011 Class A	Electromagnetic compatibility (EMC), radio disturbance product standard, industrial, scientific, and medical high-frequency devices (ISM devices), limit values and measurement procedure; group 1 (devices that do not create HF during material processing) and group 2 (devices that create HF during material processing)
EN 55022 Class A	Electromagnetic compatibility (EMC), radio disturbance characteristics, information technology equipment (ITE devices), limits and methods of measurement
EN 60060-1	High-voltage test techniques - part 1: General specifications and testing conditions
EN 60068-2-1	Environmental testing - part 2: Tests; test A: Dry cold
EN 60068-2-2	Environmental testing - part 2: Tests; test B: Dry heat
EN 60068-2-3	Environmental testing - part 2: Tests; test and guidance: Damp heat, constant
EN 60068-2-6	Environmental testing - part 2: Tests; test: Vibration (sinusoidal)
EN 60068-2-14	Environmental testing - part 2: Tests; test N: Change of temperature
EN 60068-2-27	Environmental testing - part 2: Tests; test and guidance: Shock
EN 60068-2-30	Environmental testing - part 2: Tests; test and guidance: Damp heat, cyclic
EN 60068-2-31	Environmental testing - part 2: Tests; test: Drop and topple, primarily for equipment-type specimens
EN 60068-2-32	Environmental testing - part 2: Tests; test: Free fall
EN 60204-1	Safety of machinery, electrical equipment on machines - part 1: General requirements
EN 60529	Degrees of protection provided by enclosures (IP code)
EN 60664-1	Insulation coordination for equipment within low-voltage systems - part 1: Principles, requirements and tests
EN 60721-3-2	Classification of environmental conditions - part 3: Classification of groups of environmental parameters and their severities, section 2: Transport
EN 60721-3-3	Classification of environmental conditions - part 3: Classification of groups of environmental parameters and their severities, section 3: Stationary use at weather-protected locations

Table 238: Overview of standards

Standards and certifications • Overview of standards

Standard	Description
EN 61000-4-2	Electromagnetic compatibility (EMC) - part 4-2: Testing and measuring techniques; electrostatic discharge immunity test
EN 61000-4-3	Electromagnetic compatibility (EMC) - part 4-3: Testing and measuring techniques; radiated radio- frequency electromagnetic field immunity test
EN 61000-4-4	Electromagnetic compatibility (EMC) - part 4-4: Testing and measuring techniques; electrical fast transient/burst immunity test
EN 61000-4-5	Electromagnetic compatibility (EMC) - part 4-5: Testing and measuring techniques; surge immunity test
EN 61000-4-6	Electromagnetic compatibility (EMC) - part 4-6: Testing and measuring techniques; immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-8	Electromagnetic compatibility (EMC) - part 4-8: Testing and measuring techniques; power frequency magnetic field immunity test
EN 61000-4-11	Electromagnetic compatibility (EMC) - part 4-11: Testing and measuring techniques; voltage dips, short interruptions and voltage variations immunity tests
EN 61000-4-12	Electromagnetic compatibility (EMC) - part 4-12: Testing and measuring techniques; oscillatory waves immunity test
EN 61000-4-17	Electromagnetic compatibility (EMC) - part 4-12: Testing and measuring techniques; ripple on DC input power port immunity test
EN 61000-4-29	Electromagnetic compatibility (EMC) - part 4-29: Testing and measuring techniques; voltage dips, short interruptions and voltage variations on DC input power port immunity tests
EN 61000-6-2	Electromagnetic compatibility (EMC), generic immunity standard - part 2: industrial environment
EN 61000-6-4	Electromagnetic compatibility (EMC), generic emission standard - part 2: industrial environment
EN 61131-2	Product standard, programmable logic controllers - part 2: Equipment requirements and tests
UL 508	Industrial control equipment (UL = Underwriters Laboratories)
47 CFR	Federal Communications Commission (FCC), 47 CFR Part 15 Subpart B Class A

Table 238: Overview of standards (Forts.)

3. Emission requirements (emission)

Emissions	Test carried out according to	Limits according to	
Network-related emissions	EN 55011 / EN 55022	EN 61000-6-4: Generic standard (industrial areas)	
		EN 55011: Industrial, scientific, and medical (ISM) radio-frequency equipment, class A (industrial areas)	
		EN 55022: Information technology equipment (ITE devices), class A (industrial areas)	
		EN 61131-2: Programmable logic controllers	
		47 CFR Part 15 Subpart B Class A (FCC)	
Emissions,	EN 55011 / EN 55022	EN 61000-6-4: Generic standard (industrial areas)	
Electromagnetic emissions		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 239: Overview of limits and testing guidelines for emissions

Section 5 Standards and certifications

3.1 Network-related emissions

Test carried out according to EN 55011 / EN 55022	Limits according to EN 61000-6-4	Limits according to EN 55011 Class A	Limits according to EN 55022 Class A
Power mains connections 150 kHz - 500 kHz	-	79 dB (µV) Quasi-peak value 66 dB (µV) Average	79 dB (µV) Quasi-peak value 66 dB (µV) Average
Power mains connections 500 kHz - 30 MHz	-	73 dB (μV) Quasi-peak value 60 dB (μV) Average	73 dB (μV) Quasi-peak value 60 dB (μV) Average
AC mains connections 150 kHz - 500 kHz	79 dB (μV) Quasi-peak value 66 dB (μV) Average	-	-
AC mains connections 500 kHz - 30 MHz	73 dB (μV) Quasi-peak value 60 dB (μV) Average	-	-
Other connections 150 kHz - 500 kHz	-		97 - 87 dB (μV) und 53 - 43 dB (μA) Quasi-peak value 84 - 74 dB (μV) und 40 - 30 dB (μA) Average
Other connections 500 kHz - 30 MHz	-	-	87 dB (μV) and 43 dB (μA) Quasi-peak value 74 dB (μV) and 30 dB (μA) Average
Test carried out according to EN 55011 / EN 55022	Limits according to EN 61131-2	Limits according to 47 CFR Part 15 Subpart B class A	
Power mains connections ¹⁾ 150 kHz - 500 kHz	79 dB (μV) Quasi-peak value 66 dB (μV) Average	-	
Power mains connections 500 kHz - 30 MHz	73 dB (μV) Quasi-peak value 60 dB (μV) Average	-	
AC mains connections 150 kHz - 500 kHz	-	79 dB (μV) Quasi-peak value 66 dB (μV) Average	
AC mains connections 500 kHz - 30 MHz	-	73 dB (μV) Quasi-peak value 60 dB (μV) Average	

Table 240: Test requirements - Network-related emissions for industrial areas

Standards and certifications • Emission requirements (emission)

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 240: Test requirements - Network-related emissions for industrial areas (Forts.)

1) AC network connections only with EN 61131-2

3.2 Emissions, electromagnetic emissions

Test carried out according to EN 55011 / EN 55022	Limits according to EN 61000-6-4	Limits according to EN 55011 Class A	Limits according to EN 55022 Class A
30 MHz - 230 MHz measured at a distance of 10 m	< 40 dB (µV/m) Quasi-peak value	< 40 dB (µV/m) Quasi-peak value	< 40 dB (µV/m) Quasi-peak value
230 MHz - 1 GHz measured at a distance of 10 m	< 47 dB (µV/m) Quasi-peak value	< 47 dB (µV/m) Quasi-peak value	< 47 dB (μV/m) Quasi-peak value
Test carried out according to EN 55011 / EN 55022	Limits according to EN 61131-2		
30 MHz - 230 MHz measured at a distance of 10 m	< 40 dB (µV/m) Quasi-peak value		
230 MHz - 1 GHz measured at a distance of 10 m	< 47 dB (μV/m) Quasi-peak value		
Test carried out	Limits according to 47 CFR Part 15 Subpart B class A		
30 MHz - 88 MHz measured at a distance of 10 m	< 90 dB (µV/m) Quasi-peak value		
88 MHz - 216 MHz measured at a distance of 10 m	< 150 dB (µV/m) Quasi-peak value		
216 MHz - 960 MHz measured at a distance of 10 m	< 210 dB (µV/m) Quasi-peak value		
> 960 MHz measured at a distance of 10 m	< 300 dB (µV/m) Quasi-peak value		

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Table 241: : Test requirements - Electromagnetic emissions for industrial areas

4. Requirements for immunity to disturbances (immunity)

Immunity	Test carried out according to	Limits according to
Electrostatic discharge (ESD)	EN 61000-4-2	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
Immunity against high-frequency	EN 61000-4-3	EN 61000-6-2: Generic standard (industrial areas)
electromagnetic fields (HF field)		EN 61131-2: Programmable logic controllers
Immunity to high-speed transient	EN 61000-4-4	EN 61000-6-2: Generic standard (industrial areas)
electrical disturbances (burst)		EN 61131-2: Programmable logic controllers
Immunity to surge voltages	EN 61000-4-5	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
Immunity to conducted	EN 61000-4-6	EN 61000-6-2: Generic standard (industrial areas)
disturbances		EN 61131-2: Programmable logic controllers
Immunity against magnetic fields	EN 61000-4-8	EN 61000-6-2: Generic standard (industrial areas)
with electrical frequencies		EN 61131-2: Programmable logic controllers
Immunity to voltage dips, short-	EN 61000-4-11	EN 61000-6-2: Generic standard (industrial areas)
fluctuations		EN 61131-2: Programmable logic controllers
Immunity to damped vibration	Immunity to damped vibration EN 61000-4-12 EN 61000-6-2: Generic standard (industrial area	
		EN 61131-2: Programmable logic controllers

Table 242: 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 **<u>during</u>** the test. There should be no interference in the operating behavior and no system failures below a minimum operating quality as defined by the manufacturer.

Criteria B:

The operating equipment must continue to work as directed <u>after</u> the test. There should be no interference in the operating behavior and no system failures below a minimum operating quality as defined by the manufacturer.

Criteria C:

A temporary function failure is permitted if the function restores itself, or the function can be restored by activating configuration and control elements.

Criteria D:

Impairment or failure of the function, which can no longer be established (operating equipment destroyed).

4.1 Electrostatic discharge (ESD)

Test carried out according to EN 61000-4-2	Limits according to EN 61000-6-2	Limits according to EN 61131-2	
Contact discharge to powder- coated and bare metal housing parts	±4 kV, 10 discharges, criteria B	±4 kV, 10 discharges, criteria B	
Discharge through the air to plastic housing parts	±8 kV, 10 discharges, criteria B	±8 kV, 10 discharges, criteria B	

Table 243: Test requirements - Electrostatic discharge (ESD)

4.2 High-frequency electromagnetic fields (HF field)

Test carried out according to EN 61000-4-3	Limits according to EN 61000-6-2	Limits according to EN 61131-2	
Housing, completely wired	80 MHz - 1 GHz, 10 V/m, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	2 GHz - 2.7 GHz, 1 V/m, 1.4 GHz - 2 GHz, 3 V/m, 80 MHz - 1 GHz, 10 V/m, 80% amplitude modulation at 1 kHz, duration 3 seconds, criteria A	

Table 244: Test requirements - High-frequency electromagnetic fields (HF field)

4.3 High-speed transient electrical disturbances (burst)

Test carried out according to EN 61000-4-4	Limits according to EN 61000-6-2	Limits according to EN 61131-2	
AC power I/O	±2 kV, criteria B	-	
AC power inputs	-	±2 kV, criteria B	
AC power outputs	-	±1 kV, criteria B	
DC power I/O >10 m ¹⁾	±2 kV, criteria B	-	
DC power inputs >10 m	-	±2 kV, criteria B	
DC power outputs >10 m	-	±1 kV, criteria B	
Functional ground connections, signal lines and I/Os >3 m	±1 kV, criteria B	±1 kV, criteria B	
Unshielded AC I/O >3 m	-	±2 kV, criteria B	
Analog I/O	±1 kV, criteria B	±1 kV, criteria B	

Table 245: Test requirements - High-speed transient electrical disturbances (burst)

1) For EN 55024 without length limitation.

4.4 Surges (surge)

Test carried out according to EN 61000-4-5	Limits according to EN 61000-6-2	Limits according to EN 61131-2	
AC power I/O, L to L	±1 kV, criteria B	±1 kV, criteria B	
AC power I/O, L to PE	±2 kV, criteria B	±2 kV, criteria B	
DC power I/O, L+ to L-, >10 m	±0.5 kV, criteria B	-	
DC power I/O, L to PE, >10 m	±0.5 kV, criteria B	-	
DC power inputs, L+ to L-	-	±0.5 kV, criteria B	
DC power inputs, L to PE	-	±1 kV, criteria B	
DC power outputs, L+ to L-	-	±0.5 kV, criteria B	
DC power outputs, L to PE	-	±0.5 kV, criteria B	
Signal connections >30 m	±1 kV, criteria B	±1 kV, criteria B	
All shielded cables	-	±1 kV, criteria B	

Table 246: Test requirements - Surge voltages

4.5 Conducted disturbances

Test carried out according to EN 61000-4-6	Limits according to EN 61000-6-2	Limits according to EN 61131-2	
AC power I/O	150 kHz - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	

Table 247: Test requirements - Conducted disturbances

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Test carried out according to EN 61000-4-6	Limits according to EN 61000-6-2	Limits according to EN 61131-2	
DC power I/O	150 kHz - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	
Functional ground connections	0.15 - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, Length 3 seconds, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	
Signal connections >3 m	0.15 - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, Length 3 seconds, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	

Table 247: Test requirements - Conducted disturbances (Forts.)

4.6 Magnetic fields with electrical frequencies

Test carried out according to EN 61000-4-8	Limits according to EN 61000-6-2	Limits according to EN 61131-2	
Test direction x, test in the field of an induction coil 1 m x 1 m $$	30 A/m, criteria A	30 A/m, criteria A	
Test direction y, test in the field of an induction coil 1 m x 1 m $$	30 A/m, criteria A	30 A/m, criteria A	
Test direction z, test in the field of an induction coil 1 m x 1 m	30 A/m, criteria A	30 A/m, criteria A	

Table 248: Test requirements - Magnetic fields with electrical frequencies

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4.7	Voltage	dips.	fluctuations	and	short-term	interruption	s
	Tonuge	upo,	naotautono	unu	Short term	meriuption	•

Test carried out according to EN 61000-4-11	Limits according to EN 61000-6-2	Limits according to EN 61131-2	
AC power inputs	Voltage dip 70% (30% reduction), 0.5 periods, criteria B	-	
AC power inputs	Voltage dip 40% (60% reduction), 5 periods, criteria C	-	
AC power inputs	Voltage dip 40% (60% reduction), 50 periods, criteria C	-	
AC power inputs	Voltage interruptions < 5% (> 95% reduction), 250 periods, criteria C	-	
AC power inputs	-	20 interruptions, 0.5 periods, criteria A	
DC power inputs	-	20 interruptions for 10 ms < UN - 15%, criteria A	

Table 249: Test requirements - Voltage dips, fluctuations, and short-term interruptions

4.8 Damped vibration

Test carried out according to EN 61000-4-12	Limits according to EN 61131-2	
Power I/O, L to L	±1 kV, 1 MHz, repeat rate 400/seconds, length 2 seconds, connection lengths 2 m, criteria B	
Power I/O, L to PE	±2.5 kV, 1 MHz, repeat rate 400/seconds, length 2 seconds, connection lengths 2 m, criteria B	

Table 250: 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	EN 60068-2-6	EN 60721-3-2 class 2M1
(packaged)		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 251: Overview of limits and testing guidelines for vibration

5.1 Vibration operation

Test carried out according to EN 60068-2-6	Limits according to EN 61131-2		arried out according to Limits according to EN 61131-2 EN 60721-3-3 class 3M4		
Vibration during operation:	10 sweeps for each axis		10 sweeps for each axis		
frequency in all 3 axes (x, y, z), 1	Frequency	Limit value	Frequency	Limit value	
octave per minute	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 252: Test requirements - Vibration during operation

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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	10 sweeps for each axis, packaged		10 sweeps for each axis, packaged		10 sweeps for each axis, packaged	
frequency in all 3 axes (x, y, z)	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 253: Test requirements - Vibration during transport (packaged)

5.3 Shock during operation

Test carried out according to EN 60068-2-27	Limits according to EN 61131-2	Limits according to EN 60721-3-3 class 3M4	
Shock during operation: Pulse (half-sine) stress in all 3 axes (x, y, z)	Acceleration 15 g, duration 11 ms, 18 shocks	Acceleration 15 g, duration 11 ms	

Table 254: Test requirements - Shock during operation

5.4 Shock during transport (packaged)

Test carried out according to	Limits according to	Limits according to	Limits according to
EN 60068-2-27	EN 60721-3-2 class 2M1	EN 60721-3-2 class 2M2	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 255: Test requirements - Shock during transport

5.5 Toppling

Test carried out according to EN 60068-2-31	Limits according to EN 60721-3-2 class 2M1		Limits according to EN 60721-3-2 class 2M2		Limits according to EN 60721-3-2 class 2M3	
Drop and topple	Devices: Drop/topple on each edge		brop/topple Devices: Drop/topple on each edge		Devices: Drop/topple on each edge	
	Weight	Weight Required Weight <20 kg Yes <2		Required	Weight	Required
	<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 256: Test requirements - Toppling

5.6 Free fall (packaged)

Test carried out according to EN 60068-2-32	Limits acc EN 61	cording to 131-2	to Limits according to EN 60721-3-2 class 2M1		Limits according to EN 60721-3-2 class 2M1		Limits according to EN 60721-3-2 class 2M1 2M2		cording to -3-2 class M2	Limits acc EN 60721 21	cording to -3-2 class //3
Free fall	Devices with delivery packaging each with 5 fall tests		Devices with delivery Devices packaged Devices packaged packaging each with 5 fall tests		packaged	Devices	backaged				
	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 w packaging fall t	ith product each with 5 ests									
	Weight	Height									
	<10 kg	0.3 m									
	10 - 40 kg	0.3 m									
	> 40 kg	0.25 m									

Table 257: Test requirements - Toppling

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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 258: Overview of limits and testing guidelines for temperature and humidity

6.1 Worst case operation

Test carried out	Limits according to	Limits according to	
according to UL 508	UL 508	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 259: 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 260: 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 261: 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 262: 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 263: Test requirements - Temperature fluctuations during operation

6.6 Humid heat, cyclic

Test carried out according to EN 60068-2-30	Limits according to EN 61131-2	
Alternating climate	24 hours at +25°C / +55°C and 97% / 83% RH, 2 cycles, then 2 hours acclimatization, function testing and insulation, duration approximately 50 hours	

Table 264: 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 265: 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 266: Overview of limits and testing guidelines for safety

7.1 Ground resistance

Test carried out according to EN 61131-2	Limits act EN 60	Limits according to EN 61131-2	
Ground resistance: housing (from any metal part to the ground terminal)	Smallest effective cross section of the protective ground conductor for the branch being tested	Maximum measured voltage drop at a test current of 10 A	Test current 30 A for 2 min, $<$ 0.1 Ω
	1.0 mm ²	3.3 V	
	1.5 mm ²	2.6 V	
	2.5 mm ²	1.9 V	
	4.0 mm ²	1.4 V	
	> 6.0 mm ²	1.0 V	

Table 267: 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 $M\Omega$ at 500 V DC voltage	

Table 268: Test requirements - Insulation resistance

1) See EN 60204-1:1997 page 62, table 9.

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7.3 High voltage

Test carried out according to EN 60060-1	Limits according to EN 61131-2 ¹⁾			Lin	nits according UL 508	l to	
High voltage: Primary circuit to	Input voltage		Test voltage		Input	Test v	oltage
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)		1.2/50 µs voltage surge peak	AC, 1 min	DC, 1 min	voltage	AC, 1 min	DC, 1 min
	0 - 50 VAC 0 - 60 VDC	850 V	510 V	720 V	\leq 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 269: 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 270: 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 271: 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 272: 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 273: Test requirements - Defective component

7.8 Voltage range

Test carried out according to	Limits acc EN 61	cording to 131-2	
Supply voltage	Measurement value	Tolerance min/max	
	24 VDC 48 VDC 125 VDC	-15% +20%	
	24 VAC 48 VAC 100 VAC 110 VAC 200 VAC 200 VAC 230 VAC 240 VAC 400 VAC	-15% +10%	

Table 274: Test requirements - Voltage range

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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 275: Overview of limits and testing guidelines for other tests

8.1 Protection type

Test carried out according to	Limits according to EN 60529	Limits according to EN 60529	
Protection of the operating equipment	IP2. Protection against large solid foreign bodies =12.5 mm diameter	IP.6 Protection against large solid foreign bodies: Dust-proof	
Protection of personnel	IP2. Protection against touching dangerous parts with finger	IP.6 Protection against touching dangerous parts with conductor	
Protection against water permeation with damaging consequences	IP.0 Not protected	IP.5 Protected against sprayed water	

Table 276: 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 277: Test requirements - Degree of pollution

9. SDL flex cable - test description

9.1 Torsion

9.1.1 Test structure



Figure 179: Test structure - torsion

9.1.2 Test conditions

- Distance a: 450 mm
- Rotation angle: ±85°
- Velocity: 50 cycles / minute
- Special feature: The cable was clamped down twice in the machine.

9.1.3 Individual tests

- Visible pixel errors: At the beginning of the test, the minimum equalizer setting was determined. This is the value between 0-15 at which no more pixel errors are visible. If the equalizer setting is changed due to the mechanical load, this is noted.
- Touch screen for function (with a 21.3" Automation Panel 5AP920.2138-01)
- USB mouse function
- Hot plug function tested by unplugging the USB plug
- After a test duration of 15000 cycles, the test was ended with a result of "OK".

Section 5 Standards and certifications

9.2 Cable drag chain

9.2.1 Test structure



Figure 180: Test structure - Cable drag chain

9.2.2 Test conditions

- Flex radius: 180 mm (= 15 x cable diameter)
- Hub: 460 mm
- Velocity: 4800 cycles / hour
- Special feature: The cable was clamped down twice in the machine.

9.2.3 Individual tests:

- Visible pixel errors: At the beginning of the test, the minimum equalizer setting is determined. This is the value between 0-15 at which no more pixel errors are visible. If the equalizer setting is changed due to the mechanical load, this is noted.
- Touch screen for function (with a 21.3" Automation Panel 5AP920.2138-01)
- USB mouse function
- Hot plug function tested by unplugging the USB plug
- After a test duration of 30,000 cycles, the test was ended with a result of "OK".

10. International certifications

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

Certifications		
USA and Canada	All important B&R products are tested and listed by Underwriters Laboratories and checked quarterly by a UL inspector. This mark is valid for the USA and Canada and simplifies certification of your machines and systems in these areas.	
Europe	All harmonized EN standards for the applicable directives are met.	
CE		

Table 278: International Certifications

Chapter 6 • Accessories

1. Overview

Model number	Short description	Note
0AC201.91	Lithium batteries, 4 pcs. Lithium batteries, 4 pcs., 3 V / 950 mAh, button cell	
4A0006.00-000	Lithium battery, 1 pc. Lithium battery, 1 pc., 3 V / 950 mAh, button cell	
0TB103.9	Plug 24V 5.08 3-pin screw clamps 24 VDC 3-pin connector, female. Screw clamps, 3.31 mm ² , protected against vibration by the screw flange	
0TB103.91	Plug 24V 5.08 3-pin cage clamps 24 VDC 3-pin connector, female. Cage clamps, 3.31 mm ² , protected against vibration by the screw flange	
0TB704.9	Terminal block, 4-pin, Screw clamp, 1.5 mm ²	
0TB704.91	Terminal block, 4-pin, cage clamps, 2.5 mm ²	
5A5003.03	Front cover Front cover for the USB 2.0 Media Drive 5MD900.USB2-00.	
5AC600.ICOV-00	Interface covers Interface covers for APC620 and PPC700 devices; 5 pieces	
5AC600.UPSI-00	Add-on UPS module UPS module for APC620, APC810, PPC800; for system units 5PC600.SX01-00 (starting with Rev. H0), 5PC600.SX02-00 (starting with Rev. G0), 5PC600.SX02-01 (starting with Rev. H0), 5PC600.SX05-00 (starting with Rev. F0), 5PC600.SX05-01 (starting with Rev. F0), 5PC600.SF03-00 (starting with Rev. A0), 5PC810.SX*. 5PC820.1505-00, 5PC820.1906-00 Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately.	
5AC600.UPSB-00	Battery unit 5 Ah Battery unit 5Ah; for APC620, APC810 or PPC800 UPS.	
5ACPCI.ETH1-01	PCI Ethernet card 10/100 half size PCI Ethernet card, 1 Ethernet connection	
5ACPCI.ETH3-01	PCI Ethernet card 10/100 3port half size PCI Ethernet card, 3 Ethernet connections	
5AC900.1000-00	Adapter DVI-A/m to CRT Adapter DVI (plug) to CRT (socket), for connecting a standard monitor to a DVI-I interface.	
5AC600.SRAM-00	APC620/PPC700 SRAM module 512kB SRAM module for APC620 and PPC700 512 KB.	
5CAMSC.0001-00	APC620 internal supply cable	

Section 6 Accessories

Table 279: Model numbers - Accessories

Accessories • Overview

Model number	Short description	Note
5CADVI.0018-00	DVI-D cable 1.8 m Single cable, DVI-D/m:DVI-D/m; length: 1.8 m	
5CADVI.0050-00	DVI-D cable 5 m Single cable, DVI-D/m:DVI-D/m; length: 5 m	
5CADVI.0100-00	DVI-D cable 10 m Single cable, DVI-D/m:DVI-D/m; length: 10 m	
5CASDL.0018-00	SDL cable 1.8 m SDL cable for a fixed type of layout; length: 1.8 m	
5CASDL.0018-01	SDL cable 1.8 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 1.8 m	
5CASDL.0018-03	SDL flex cable 1.8 m SDL cable for fixed and flexible type of layout; length: 1.8 m	
5CASDL.0050-00	SDL cable 5 m SDL cable for a fixed type of layout; length: 5 m	
5CASDL.0050-01	SDL cable 5 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 5 m	
5CASDL.0050-03	SDL flex cable 5 m SDL cable for fixed and flexible type of layout; length: 5 m	
5CASDL.0100-00	SDL cable 10 m SDL cable for a fixed type of layout; length: 10 m	
5CASDL.0100-01	SDL cable 10 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 10 m	
5CASDL.0100-03	SDL flex cable 10 m SDL cable for fixed and flexible type of layout; length: 10 m	
5CASDL.0150-00	SDL cable 15 m SDL cable for a fixed type of layout; length: 15 m	
5CASDL.0150-01	SDL cable 15 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 15 m	
5CASDL.0150-03	SDL flex cable 15 m SDL cable for fixed and flexible type of layout; length: 15 m	
5CASDL.0200-00	SDL cable 20 m SDL cable for a fixed type of layout; length: 20 m	
5CASDL.0200-03	SDL flex cable 20 m SDL cable for fixed and flexible type of layout; length: 20 m	
5CASDL.0250-00	SDL cable 25 m SDL cable for a fixed type of layout; length: 25 m	
5CASDL.0250-03	SDL flex cable 25 m SDL cable for fixed and flexible type of layout; length: 25 m	
5CASDL.0300-00	SDL cable 30 m SDL cable for a fixed type of layout; length: 30 m	
5CASDL.0300-03	SDL flex cable 30 m SDL cable for fixed and flexible type of layout; length: 30 m	
5CASDL.0300-13	SDL flex cable with extender 30 m SDL cable with extender for fixed and flexible type of layout; length: 30 m	
5CASDL.0400-13	SDL flex cable with extender 40 m SDL cable with extender for fixed and flexible type of layout; length: 40 m	

Table 279: Model numbers - Accessories (Forts.)

Model number	Short description	Note
5CAUPS.0005-00	APC620 UPS cable 0.5 m Connection cable between add-on UPS module and UPS battery unit, length 0.5 meters	
5CAUPS.0030-00	APC620 UPS cable 3 m Connection cable between add-on UPS module and UPS battery unit, length 3 meters	
5CAUSB.0018-00	USB 2.0 cable, A/m:B/m 1.8 m USB 2.0 connection cable; plug type A - type B; length 1.8 m	
5CAUSB.0050-00	USB 2.0 cable, A/m:B/m 5 m USB 2.0 connection cable; plug type A - type B; length 5 m	
9A0014.02	RS232 cable DB9/f:DB9/m 1.8 m RS232 extension cable for remote operation of a display unit with touch screen, length 1.8 m.	
9A0014.05	RS232 cable DB9/f:DB9/m 5 m RS232 extension cable for remote operation of a display unit with touch screen, length 5 m.	
9A0014.10	RS232 cable DB9/f:DB9/m 10 m RS232 extension cable for remote operation of a display unit with touch screen, length 10 m.	
5CFCRD.0512-04	CompactFlash 512 MB B&R CompactFlash card with 512 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.1024-04	CompactFlash 1024 MB B&R CompactFlash card with 1024 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.2048-04	CompactFlash 2048 MB B&R CompactFlash card with 2048 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.4096-04	CompactFlash 4096 MB B&R CompactFlash card with 4096 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.8192-04	CompactFlash 8192 MB B&R CompactFlash card with 8192 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.016G-04	CompactFlash 16 GB B&R CompactFlash card with 16 GB SLC NAND flash and IDE/ATA interface	
5CFCRD.0064-03	CompactFlash 64 MB SSI CompactFlash card with 64 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.0128-03	CompactFlash 128 MB SSI CompactFlash card with 128 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.0256-03	CompactFlash 256 MB SSI CompactFlash card with 256 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.0512-03	CompactFlash 512 MB SSI CompactFlash card with 512 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.1024-03	CompactFlash 1024 MB SSI CompactFlash card with 1024 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.2048-03	CompactFlash 2048 MB SSI CompactFlash card with 2048 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.4096-03	CompactFlash 4096 MB SSI CompactFlash card with 4096 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.8192-03	CompactFlash 8192 MB SSI CompactFlash card with 8192 MB SLC NAND flash and IDE/ATA interface	
5MD900.USB2-01	USB 2.0 drive DVD-RW/CD-RW FDD CF USB USB 2.0 drive combination, consists of DVD-R/RW/DVD+R/RW/CD-RW, FDD, CompactFlash slot (type II), USB connection (type A front, type B back); 24 V DC.	
5MMUSB.2048-00	USB flash drive 2 GB SanDisk USB 2.0 flash drive 2 GB	

Table 279: Model numbers - Accessories (Forts.)

Accessories • Overview

Model number	Short description	Note
5MMUSB.2048-01	USB flash drive 2 GB B&R USB 2.0 flash drive 2 GB	
5SWHMI.0000-00	HMI Drivers & Utilities DVD	
5AC600.FA01-00	APC620 replacement fan filter 1PCI 5 piece APC620 replacement fan filter for system unit with 1 PCI Slot (5PC600.SX01-00).	
5AC600.FA02-00	APC620 replacement fan filter 1PCI 5 piece APC620 replacement fan filter for system unit with 2 PCI slot (5PC600.SX02-00, 5PC600.SX02-01).	
5AC600.FA03-00	APC620f replacement fan filter 1PCI 5 piece APC620 replacement fan filter for system unit with 3 PCI Slots (5PC600.SF03-00).	
5AC600.FA05-00	APC620 replacement fan filter 1PCI 5 piece APC620 replacement fan filter for system units with 5 PCI slot (5PC600.SX02-00, 5PC600.SX02-01).	
0PS102.0	Power supply, 1-phase, 2.1 A 24 VDC power supply, 1-phase, 2.1 A, input 100-240 VAC, wide range, DIN rail mounting	
0PS104.0	Power supply, 1-phase, 4.2 A 24 VDC power supply, 1 phase, 4.2 A, input 115/230 VAC, auto select, DIN rail mounting	
0PS105.1	Power supply, 1-phase, 5 A 24 VDC power supply, 1 phase, 5 A, input 115/230 VAC, manual select, DIN rail mounting	
0PS105.2	Power supply, 1-phase, 5 A, redundant 24 VDC power supply, 1 phase, 5 A, redundant through parallel operation, input 115/230 VAC, manual select, DIN rail mounting	
0PS110.1	Power supply, 1-phase, 10 A 24 VDC power supply, 1 phase, 10 A, input 115/230 VAC, manual select, DIN rail mounting	
0PS110.2	Power supply, 1-phase, 10 A, redundant 24 VDC power supply, 1 phase, 10 A, redundant through parallel operation, input 115/230 VAC, manual select, DIN rail mounting	
0PS120.1	Power supply, 1-phase, 20 A 24 VDC power supply, 1 phase, 20 A, input 115/230 VAC, auto select, DIN rail mounting	
0PS305.1	Power supply, 3-phase, 5 A 24 VDC power supply, 3-phase, 5 A, input 400500 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 400500 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 400500 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 279: Model numbers - Accessories (Forts.)

2. Supply voltage connector (TB103 3-pin)

2.1 General information

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

2.2 Order data

Model number	Description	Figure
0TB103.9	Plug for the 24 V supply voltage (screw clamps)	
0TB103.91	Plug for the 24 V supply voltage (cage clamps)	***
		OTB103.9 OTB103.91

Table 280: Order data - TB103

2.3 Technical data

Information:

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

Name	0TB103.9	0TB103.91	9 L
Number of pins		3	ctior
Type of terminal	Screw clamps	Cage clamps	Sec

Table 281: Technical data - TB103 supply plug

Accessories • Supply voltage connector (TB103 3-pin)

Name	0TB103.9	0TB103.91
Distance between contacts	5.08 mm	
Resistance between contacts	\leq 5 m Ω	
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 mm ² - 3.31 mm ²	
Cable type	Copper wires only (no aluminum wires!)	

Table 281: Technical data - TB103 supply plug (Forts.)

3. X2X and CAN plugs (4-pin)

3.1 General information

This 4-pin plug is needed for connecting to the X2X and CAN interface.

3.2 Order data

Model number	Description	Figure
0TB704.9	4-pin screw clamp	
0TB704.91	4-pin cage clamps	
		1200 C
		0TB704.9
		1234
		0TB704.91

Table 282: Order data - 0TB704.9 and 0TB704.91

3.3 Technical data

Information:

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

Name	0TB704.9 0TB704.91					
Number of pins		4				
Type of terminal	Screw clamps	Cage clamps				

Table 283: Technical data - TB103 supply plug

Section 6 Accessories

4. Replacement CMOS batteries

The lithium battery is needed for buffering the BIOS CMOS data, the real-time clock, and SRAM data. The battery is subject to wear and should be replaced regularly (at least following the specified buffer duration).

4.1 Order data

Model number	Description	Figure
0AC201.91	Lithium batteries, 5 pcs., 3 V / 950 mAh button cell	
4A0006.00-000	Lithium battery, 1 piece, 3 V / 950 mAh button cell	24
		State Production

Table 284: Order data - Lithium batteries

4.2 Technical data

Warning!

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

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

Information:

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

Features	0AC201.91 4A0006.00-000					
Capacity	950	mAh				
Voltage	3 V					
Self discharge at 23°C	< 1% per year					
Storage time	Max. 3 years at 30° C					

Table 285: Technical data - Lithium batteries

Accessories • Replacement CMOS batteries

Features	0AC201.91	4A0006.00-000			
Environmental characteristics					
Storage temperature	-20 to +60°C				
Relative humidity	0 to 95% (non-condensing)				

Table 285: Technical data - Lithium batteries (Forts.)

5. Interface covers 5AC600.ICOV-00

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

5.1 Order data

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

Table 286: Order data - APC620 interface cover

5.2 Contents of delivery



Figure 181: Contents of delivery - interface cover

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

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

6.1 Order data

Model number	Description	Figure
5AC900.1000-00	Adapter DVI-A/m to CRT DB15HD/f Adapter DVI (plug) to CRT (socket), for connecting a standard monitor to a DVI-I interface.	
		and a series of the series of

Table 287: Order data - DVI - CRT adapter

7. CompactFlash cards 5CFCRD.xxxx-04

7.1 General information

Information:

B&R CompactFlash cards 5CFCRD.xxxx-04 and CompactFlash cards from a different manufacturer cannot be used in the same system at the same time. Due to differences in technology (older vs. newer technologies), problems can occur during system startup that are caused by the different boot times.

See chapter 3 "Commissioning", section 7 "Known problems / issues", on page 264.

Information:

The 5CFCRD.xxxx-04 CompactFlash cards are supported on B&R devices with WinCE Version 6.0 or higher.

7.2 Order data

Model number	Description	Figure
5CFCRD.0512-04	512 MB B&R CompactFlash card	
5CFCRD.1024-04	1024 MB B&R CompactFlash card	
5CFCRD.2048-04	2048 MB B&R CompactFlash card	
5CFCRD.4096-04	4096 MB B&R CompactFlash card	A Can
5CFCRD.8192-04	8192 MB B&R CompactFlash card	ALL RA
5CFCRD.016G-04	16 GB B&R CompactFlash card	032
		CompactFlack card
		Compactriash caru

Table 288: Order data - CompactFlash cards

7.3 Technical data

Caution!

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

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

Information:

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

Features	5CFCRD.0512- 04	5CFCRD.1024- 04	5CFCRD.2048- 04	5CFCRD.4096- 04	5CFCRD.8192- 04	5CFCRD.016G -04		
MTBF (at 25°C)		> 3,000,000 hours						
Maintenance			No	one				
Data reliability		< 1 ur	nrecoverable error i	in 10 ¹⁴ bit read acc	esses			
Data retention			10 y	ears				
Lifetime monitoring			Ye	es				
Supported operating modes		PIO Mode 0-	6, Multiword DMA	Mode 0-4, Ultra DN	IA Mode 0-4			
Continuous reading	Typically 35 MB/s(240X) ¹⁾²⁾ Max 37 MB/s	Typically 35 MB/s (240X) ¹⁾ 2)	Typically 35 MB/s (240X) ¹⁾ 2)	Typically 33 MB/s (220X) ¹⁾ 2)	Typically 27 MB/s (180X) ¹⁾ 2)	Typically 36 MB/s (240X) ¹⁾ 2)		
	(260X) ^{1) 2)}	Max. 37 MB/s (260X) ^{1) 2)}	Max. 37 MB/s (260X) ^{1) 2)}	Max. 34 MB/s (226X) ^{1) 2)}	Max. 28 MB/s (186X) ^{1) 2)}	Max. 37 MB/s (247X) ^{1) 2)}		
Continuous writing	Typically 17 MB/s (110X) Max. 20 MB/s (133X)	Typically 17 Typically 17 MB/s (110X) MB/s (110X) Max. 20 MB/s (133X) Max. 20 MB/s (133X)		Typically 16 MB/s (106X) Max. 18 MB/s (120X)	Typically 15 MB/s (100X) Max. 17 MB/s (110X)	Typically 18 MB/s (120X) Max. 19 MB/s (126X)		
Endurance								
Guaranteed amount of data ³⁾ Results in 5 years ³⁾	50 TB 27.40 GB/day	100 TB 54.79 GB/day	200 TB 109.59 GB/day	400 TB 219.18 GB/day	800 TB 438.36 GB/day	1600 TB 876.72 GB/day		
Clear/write cycles Guaranteed Typical ⁴⁾	100,000 2,000,000							
SLC flash			Ye	es				
Wear leveling			Sta	atic				
Endurance	5CFCRD.0512- 04	5CFCRD.1024- 04	5CFCRD.2048- 04	5CFCRD.4096- 04	5CFCRD.8192- 04	5CFCRD.016G -04		
Error Correction Coding (ECC)	Yes							

Table 289: Technical data - CompactFlash cards 5CFCRD.xxxx-04

Section 6 Accessories

Accessories • CompactFlash cards 5CFCRD.xxxx-04

Support							
Hardware	PP300/400, PPC300, PPC700, PPC725, PPC800, APC620, APC810, APC820						
Windows XP Professional	-	-	-	Yes	Yes	Yes	
Windows XP Embedded	Yes	Yes	Yes	Yes	Yes	Yes	
Windows Embedded Standard 2009	-	Yes	Yes	Yes	Yes	Yes	
Windows CE 6.0	Yes	Yes	Yes	Yes	Yes	Yes ⁵⁾	
Windows CE 5.0	-	-	-	-	-	-	
PVI Transfer Tool		V3.2.3.8 (part of P	VI Development Se	etup V2.06.00.301	1)	-	
B&R Embedded OS Installer		V3.10 -					
Mechanical characteristics							
Dimensions Length Width Thickness	36.4 ±0.15 mm 42.8 ±0.10 mm 3.3 ±0.10 mm						
Weight			10	Dg			
Environmental characteristics							
Ambient temperature Operation Bearings Transport		0 to +70°C -65 to +150°C -65 to +150°C					
Relative humidity Operation/Storage/Transport			Max. 85	% at 85°C			
Vibration Operation/Storage/Transport	20 G peak, 20- 2000 Hz, 4 in each direction (JEDEC JESD22, method B103) 5.35 G RMS, 15 min per level (IEC 68-2-6)						
Shock Operation/Storage/Transport	1.5k G peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 G, 11 ms 1 time (IEC 68-2-27)						
Altitude			Max. 15,000	feet (4,572 m)			

Table 289: Technical data - CompactFlash cards 5CFCRD.xxxx-04 (Forts.)

1) Speed specification with 1X = 150 KB/s. All specifications refer to the Samsung Flash chips, CompactFlash cards in UDMA mode 4, 30 ns cycle time in True-IDE mode with sequential write/read test.

2) The file is written/read sequentially in True IDE mode with the DOS program Thruput.exe.

3) Endurance of B&R CF cards (linear written block size with 128 KB)

4) Depending on the average file size.

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



7.3.1 Temperature humidity diagram



7.4 Dimensions



Figure 183: Dimensions - CompactFlash card Type I

Section 6 Accessories

7.5 Benchmark



Figure 184: ATTO disk benchmark v2.34 comparison (reading)



Figure 185: ATTO disk benchmark v2.34 comparison (writing)

8. CompactFlash cards - 5CFCRD.xxxx-03

8.1 General information

Information:

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

See chapter 3 "Commissioning", section 7 "Known problems / issues", on page 264.

Information:

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

8.2 Order data

Model number	Description	Figure
5CFCRD.0064-03	CompactFlash 64 MB SSI	
5CFCRD.0128-03	CompactFlash 128 MB SSI	
5CFCRD.0256-03	CompactFlash 256 MB SSI	
5CFCRD.0512-03	CompactFlash 512 MB SSI	SSD-CVXX.35
5CFCRD.1024-03	CompactFlash 1024 MB SSI	Mr (5) Come Object
5CFCRD.2048-03	CompactFlash 2048 MB SSI	SYSTEMS ON
5CFCRD.4096-03	CompactFlash 4096 MB SSI	
5CFCRD.8192-03	CompactFlash 8192 MB SSI	CompactFlash card

Table 290: Order data - CompactFlash cards

Section 6 Accessories

8.3 Technical data

Caution!

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

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

Information:

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

Features	5CFCRD. 0064-03	5CFCRD. 0128-03	5CFCRD. 0256-03	5CFCRD. 0512-03	5CFCRD. 1024-03	5CFCRD. 2048-03	5CFCRD. 4096-03	5CFCRD. 8192-03
MTBF (at 25°C)		> 4,000,000 hours						
Maintenance				No	one			
Data reliability			< 1 unrecov	verable error	in 10 ¹⁴ bit rea	ad accesses		
Data retention				10 y	ears			
Lifetime monitoring				Y	es			
Supported operating modes			PIO Mo	ode 0-4, Multi	word DMA M	ode 0-2		
Continuous reading		Typically 8 MB/s						
Continuous writing	Typically 6 MB/s							
Endurance								
Clear/write cycles Typical				> 2,00	00,000			
SLC flash				Y	es			
Wear leveling				Sta	atic			
Error Correction Coding (ECC)			-	Y	es			
Support								
Hardware		MP100/200 Provi	, PP100/200, it 2000, Provi	PP300/400, t 5000, APC6	PPC300, PP 20, APC680,	C700, PPC72 APC810, AP	25, PPC800, 9C820	
Windows XP Professional	-	-	-	-	-	-	Yes	Yes
Windows XP Embedded	-	-	-	Yes	Yes	Yes	Yes	Yes
Windows Embedded Standard 2009	-	-	-	-	Yes	Yes	Yes	Yes
Windows CE 6.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes ¹⁾

Table 291: Technical data - CompactFlash cards 5CFCRD.xxxx-03

Accessories • CompactFlash cards - 5CFCRD.xxxx-03

Support	5CFCRD.	5CFCRD. 0128-03	5CFCRD. 0256-03	5CFCRD. 0512-03	5CFCRD.	5CFCRD. 2048-03	5CFCRD. 4096-03	5CFCRD. 8192-03
Windows CE 5.0	Yes	Yes	Yes	Yes	Yes	-	-	-
PVI Transfer Tool	V2.57 (part of PVI Development Setup V2.5.3.3005)							
B&R Embedded OS Installer				V2	2.21			
Mechanical characteristics								
Dimensions Length Width Thickness	36.4 ±0.15 mm 42.8 ±0.10 mm 3.3 ±0.10 mm							
Weight	11.4 g							
Environmental characteristics								
Ambient temperature Operation Bearings Transport	0 to +70°C -50 to +100°C -50 to +100°C							
Relative humidity Operation/Storage/Transport				8 to 95%, no	n-condensing	J		
Vibration Operation Storage/Transport	max. 16,3 g (159 m/s ² 0-peak) max. 30 g (294 m/s ² 0-peak)							
Shock Operation Storage/Transport	Max. 1000 g (9810 m/s ² 0-peak) Max. 3000 g (29430 m/s ² 0-peak)							
Altitude			Maxin	num 80,000 f	eet (24,383 n	neters)		

Table 291: Technical data - CompactFlash cards 5CFCRD.xxxx-03 (Forts.)

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

8.3.1 Temperature humidity diagram



Figure 186: Temperature humidity diagram - CompactFlash cards 5CFCRD.xxxx-03

8.4 Dimensions



Figure 187: Dimensions - CompactFlash card Type I

9. USB Media Drive - 5MD900.USB2-01



Figure 188: 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 436)

9.2 Technical data

Information:

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

Features - entire device	5MD900.USB2-01
Transfer rate	Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)
Maximum cable length	5 m (not including hub)
Power supply Rated voltage	24 VDC ±25%
Features - diskette drive	
Data capacity	720 KB / 1.25 MB / 1.44 MB (formatted)
Data transfer rate	250 kbit/s (720 KB) or 500 kbit/s (1.25 MB and 1.44 MB)
Rotation speed	Up to 360 rpm
Diskette media	High density (2HD) or normal density (2DD) 3.5" diskettes
MTBF	30,000 POH (Power-On Hours)
Features - DVD-RW/CD-RW drive	
Write speed CD-R CD-RW DVD-R DVD-RW DVD-RM ¹⁾ DVD+R DVD+R DVD+R (double layer) DVD+RW	24x, 16x, 10x and 4x 10x and 4x 8x, 4x and 2x 4x and 2x 3x and 2x 8x, 4x and 2x 2x,4x 4x and 2x
Reading rate CD DVD	24x 8x
Data transfer rate	Max. 33.3 MB/s
Access time (average) CD DVD	130 ms (24x) 130 ms (8x)
Revolution speed	Max. 5090 rpm ±1%
Starting time (0 rpm to read access) CD DVD	14 seconds (maximum) 15 seconds (maximum)
Host interface	IDE (ATAPI)
Laser class	Class 1 laser
Features - DVD-ROM/CD-RW drive	5MD900.USB2-01

Table 292: Technical data - USB Media Drive 5MD900.USB2-01
Readable media CD DVD	CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW DVD-ROM, DVD-R, DVD-RW. DVD-RAM, DVD+R, DVD+R (double layer), DVD+RW
Non-write protected media CD DVD	CD-R, CD-RW DVD-R/RW, DVD-RAM (4.7 GB), DVD+R/RW, DVD+R (double layer)
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session), Enhanced CD, CD text DVD-ROM, DVD-R, DVD-RW, DVD-Video DVD-RAM (4.7 GB, 2.6 GB) DVD+R, DVD+R (double layer), DVD+RW
Write-methods CD DVD	Disk at once, session at once, packet write, track at once Disk at once, incremental, over-write, sequential, multi-session
Data buffer capacity	8 MB
Noise level (complete read access)	Approx. 48 dBA at 50 cm
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10,000 times
CompactFlash slot layout	
CompactFlash Type Amount Connection	Type I 1 slot IDE/ATAPI
CompactFlash LED	Signals read or write access to an inserted CompactFlash card
Hot Plug capable	Yes
Features - USB connections	
USB A on the front side Power supply Type Transfer rate	Connection of further peripheral devices Max. 500 mA 2.0 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)
USB B back side	Connection to the system
Mechanical characteristics	
Outer dimensions (without slide-in) Width Length Height	70 mm 100 mm 9.5 mm
Weight	Approx. 1.1 kg (without front cover)
Environmental characteristics	
Ambient temperature Operation Bearings Transport	+5 to +45°C -20 to +60°C -40 to +60°C

Table 292: Technical data - USB Media Drive 5MD900.USB2-01 (Forts.)

Accessories • USB Media Drive - 5MD900.USB2-01

Environmental characteristics	5MD900.USB2-01
Relative humidity Operation Bearings Transport	20 to 80%, non-condensing 5 to 90%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings Transport	At max. 5 - 500 Hz and 0.3 g At max. 10 - 100 Hz and 2 g At max. 10 - 100 Hz and 2 g
Shock (pulse with a sine half-wave) Operation Storage (packaged) Transport (packaged)	At max. 5 g for 11 ms At max. 60 g for 11 ms At max. 60 g for 11 ms
Altitude	Max. 3000 meters

Table 292: Technical data - USB Media Drive 5MD900.USB2-01 (Forts.)

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

9.3 Dimensions



Figure 189: Dimensions - 5MD900.USB2-01





Figure 190: 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 293: Contents of delivery - USB Media Drive - 5MD900.USB2-01

9.6 Interfaces



Figure 191: 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 192: 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 193: 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



9.8.2 Dimensions



Figure 194: 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 195: Front cover mounting and installation depth

10. USB flash drive

Information:

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

- 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 (USB 2.0), the 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.

10.2 Order data

Model number	Description	Figure
5MMUSB.2048-00	USB flash drive 2 GB SanDisk Cruzer Micro	Cruzer micro
5MMUSB.2048-01	USB flash drive 2 GB B&R USB 2.0 flash drive 2 GB	Perfection in Automation

Table 295: Order data - USB flash drives

10.3 Technical data - 5MMUSB.2048-00

Information:

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

Features	5MMUSB.2048-00
LED	1 LED (green), signals data transfer (send and receive)
Power supply Current requirements	Via the USB port 650 μA in sleep mode, 150 mA read/write
Interface Type Transfer rate Sequential reading Sequential writing Connection	USB specification 2.0 high speed device, mass storage class, USB-IF and WHQL certified USB 1.1 and 2.0 compatible Up to 480 MBit (high speed) Max. 8.7 MB/second Max. 1.7 MB/second To each USB type A interface
MTBF (at 25°C)	100,000 hours
Data retention	10 years
Maintenance	None
Operating system support	Windows CE 4.2, CE 5.0, ME, 2000, XP and Mac OS 9.1.x+, OS X v10.1.2+
Mechanical characteristics	
Dimensions Length Width Thickness	52.2 mm 19 mm 7.9 mm
Environmental characteristics	
Ambient temperature Operation Bearings Transport	0 to +45°C -20 to +60°C -20 to +60°C
Relative humidity Operation Bearings Transport	10 to 90%, non-condensing 5 to 90%, non-condensing 5 to 90%, non-condensing
Vibration Operation Bearings 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
Shock Operation Bearings 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

Table 296: Technical data - USB flash drive 5MMUSB.2048-00

Accessories • USB flash drive

Environmental characteristics	5MMUSB.2048-00
Altitude	3 0/48 matars
Bearings	12,192 meters
Transport	12,192 meters

Table 296: Technical data - USB flash drive 5MMUSB.2048-00 (Forts.)

10.3.1 Temperature humidity diagram



Figure 196: Temperature humidity diagram - USB flash drive - 5MMUSB.2048-00

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 Technical data - 5MMUSB.2048-01

Information:

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

Features	5MMUSB.2048-01
LED	1 LED (green), signals data transfer (send and receive)
Power supply Current requirements	Via the USB port max. 500 µA sleep mode, max. 120 mA read/write
Interface Type Transfer rate Sequential reading Sequential writing Connection	USB specification 2.0 high speed device, mass storage class, USB-IF and WHQL certified USB 1.1 and 2.0 compatible Up to 480 MBit (high speed) Max. 31 MB/second Max. 30 MB/second To each USB type A interface
MTBF	> 3,000,000 hours
Data retention	> 10 years
Maintenance	None
Operating system support	Windows CE, ME, 2000, XP, Vista und Mac OS 9 or newer, Linux 2.4 or newer
Mechanical characteristics	
Dimensions Length Width Thickness	67.85 mm 17.97 mm 8.35 mm
Environmental characteristics	
Ambient temperature Operation Bearings Transport	0 to +70°C -50 to +100°C -50 to +100°C
Relative humidity Operation Bearings Transport	85%, non-condensing 85%, non-condensing 85%, non-condensing
Vibration Operation Bearings Transport	At 20 - 2000 Hz: 20 g (peak) At 20 - 2000 Hz: 20 g (peak) At 20 - 2000 Hz: 20 g (peak)
Shock Operation Bearings Transport	max. 1500 g (peak) max. 1500 g (peak) max. 1500 g (peak)

Table 297: Technical data - USB flash drive 5MMUSB.2048-01

Accessories • USB flash drive

Environmental characteristics	5MMUSB.2048-01
Altitude	2 040 matan
Operation	3,048 meters
Transport	12,192 IIIeleis 12,102 maters
mansport	12,132 meters

Table 297: Technical data - USB flash drive 5MMUSB.2048-01 (Forts.)

10.4.1 Temperature humidity diagram



Figure 197: Temperature humidity diagram - USB flash drive - 5MMUSB.2048-01

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

11. HMI Drivers & Utilities DVD 5SWHMI.0000-00



Figure 198: HMI Drivers & Utilities DVD 5SWHMI.0000-00

Model number	Short description	Note
5SWHMI.0000-00	HMI Drivers & Utilities DVD	

Table 298: 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 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 542.



Figure 199: APC620 internal supply cable 5CAMSC.0001-00

12.1.1 Order data

Model number	Description	Note
5CAMSC.0001-00	APC620 internal supply cable	

Table 299: Model number - APC620 internal supply cable

12.1.2 Technical data

Features	5CAMSC.0001-00
Length	100 mm ±5 mm
Connector type	1x 4-pin male disk drive power plug, 1x 4-pin female plug housing
Wire cross section	AWG 22
Flexibility	Flexible

Table 300: Technical data - 5CAMSC.0001-00

12.2 DVI cable 5CADVI.0xxx-00

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

Plug Ferrite Ferrite Plug

Figure 200: 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.

12.2.1 Order data

Model number	Description	Note
5CADVI.0018-00	DVI-D cable 1.8 m Single cable, DVI-D/m:DVI-D/m; length: 1.8 m	
5CADVI.0050-00	DVI-D cable 5 m Single cable, DVI-D/m:DVI-D/m; length: 5 m	
5CADVI.0100-00	DVI-D cable 10 m Single cable, DVI-D/m:DVI-D/m; length: 10 m	

Table 301: Model numbers - DVI cables

Accessories • Cables

12.2.2 Technical data

Features	5CADVI.0018-00	5CADVI.0050-00	5CADVI.0100-00	
Length Tolerance	1.8 m ±30 mm	5 m ±50 mm	10 m ±100 mm	
Cable diameter Maximum	8.5 mm			
Shielding		Individual cable pairs and entire cable		
Connector type Connection cycles	2x DVI-D (18+1), male 100			
Wire cross section	AWG 28			
Line resistance	Max. 237 Ω/km			
Insulation resistance	Min. 100 MΩ/km			
Flexibility	Limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5x cable diameter, 20 cycles / minute)			
Flex radius Fixed layout	See figure "Flex radius specification", on page 448 5x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)			
Weight	Approx. 300 g	Approx. 590 g	Approx. 2100 g	

Table 302: Technical data - DVI cable 5CADVI.0xxx-00

12.2.3 Flex radius specification



Figure 201: Flex radius specification

12.2.4 Cable specifications

The following figure shows the pin assignments for the DVI cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly.



Figure 202: Pin assignments - DVI cable

Accessories • Cables

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 203: SDL extension cable (similar)

Caution!

The SDI cable can only be plugged in and unplugged when the device is turned off.

12.3.1 Order data

Model number	Description	Note
5CASDL.0018-00	SDL cable 1.8 m SDL cable for a fixed type of layout; length: 1.8 m	
5CASDL.0050-00	SDL cable 5 m SDL cable for a fixed type of layout; length: 5 m	
5CASDL.0100-00	SDL cable 10 m SDL cable for a fixed type of layout; length: 10 m	
5CASDL.0150-00	SDL cable 15 m SDL cable for a fixed type of layout; length: 15 m	
5CASDL.0200-00	SDL cable 20 m SDL cable for a fixed type of layout; length: 20 m	
5CASDL.0250-00	SDL cable 25 m SDL cable for a fixed type of layout; length: 25 m	
5CASDL.0300-00	SDL cable 30 m SDL cable for a fixed type of layout; length: 30 m	

Table 303: 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 e	ntire cable		
Connector type Connection cycles	2x DVI-D (24+1), male 100						
Wire cross section	AWO	G 28			AWG 24		
Line resistance	Max. 23	37 Ω/km			Max. 93 Ω/km		
Insulation resistance				Min. 10 $M\Omega/km$			
Flexibility	Limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5x cable diameter, 20 cycles / minute)						
Halogen-free	No						
Flex radius Fixed layout	See figure "Flex radius specification", on page 451 5x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)						
Weight	Approx. 300 g	Approx. 590 g	Approx. 2100 g	Approx. 3000 g	Approx. 4100 g	Approx. 5100 g	Approx. 6100 g

Table 304: Technical data - SDL cables 5CASDL.0xxx-00

12.3.3 Flex radius specification



Figure 204: Flex radius specification

Accessories • Cables

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 205: 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 206: SDL cable with 45° plug (similar)

Caution!

The SDI cable can only be plugged in and unplugged when the device is turned off.

12.4.1 Order data

Model number	Description	Note
5CASDL.0018-01	SDL cable 1.8 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 1.8 m	
5CASDL.0050-01	SDL cable 5 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 5 m	
5CASDL.0100-01	SDL cable 10 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 10 m	
5CASDL.0150-01	SDL cable 15 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 15 m	

Table 305: Model numbers - SDL cables with 45° plug

Accessories • Cables

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 r	nm	11.5 mm		
Shielding		Individual cable pa	irs and entire cable		
Connector type Connection cycles	2x DVI-D (24+1), male 100				
Wire cross section	AWG 28 AWG 24				
Line resistance	Max. 237 Ω/km Max. 93 Ω/km				
Insulation resistance	Min. 10 MΩ/km				
Flexibility	Limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5x cable diameter, 20 cycles / minute)				
Halogen-free	No				
Flex radius Fixed layout	See figure "Flex radius specification", on page 454 5x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)				
Weight	Approx. 300 g	Approx. 590 g	Approx. 2100 g	Approx. 3000 g	

Table 306: Technical data - SDL cable with 45° plug 5CASDL.0xxx-01

12.4.3 Flex radius specification



Figure 207: 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 208: Pin assignments - SDL cable with 45° plug 5CASDL.0xxx-01

12.5 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 209: SDL cable 5CASDL.0xxx-03 (similar)

Caution!

The SDI cable can only be plugged in and unplugged when the device is turned off.

12.5.1 Order data

Model number	Description	Note
5CASDL.0018-03	SDL flex cable 1.8 m SDL cable for fixed and flexible type of layout; length: 1.8 m	
5CASDL.0050-03	SDL flex cable 5 m SDL cable for fixed and flexible type of layout; length: 5 m	
5CASDL.0100-03	SDL flex cable 10 m SDL cable for fixed and flexible type of layout; length: 10 m	
5CASDL.0150-03	SDL flex cable 15 m SDL cable for fixed and flexible type of layout; length: 15 m	
5CASDL.0200-03	SDL flex cable 20 m SDL cable for fixed and flexible type of layout; length: 20 m	
5CASDL.0250-03	SDL flex cable 25 m SDL cable for fixed and flexible type of layout; length: 25 m	
5CASDL.0300-03	SDL flex cable 30 m SDL cable for fixed and flexible type of layout; length: 30 m	

Table 307: Model numbers - SDL cable 5CASDL.0xxx-03

12.5.2 Technical data

Mechanical characteristics	5CASDL.0018- 03	5CASDL.0050- 03	5CASDL.0100- 03	5CASDL.0150- 03	5CASDL.0200- 03	5CASDL.0250- 03	5CASDL.0300- 03
Length Tolerance	1.8 m ±20 mm	5 m ±45 mm	10 m ±90 mm	15 m ±135 mm	20 m ±180 mm	25 m ±225 mm	30 m ±270 mm
Cable diameter Maximum				12 mm			
Shielding			Individual	cable pairs and e	entire cable		
Connector type Connection cycles Contacts Mechanical protection			2x Metal cov	DVI-D (24+1), m Min. 200 Gold plated er with crimped s	ale tress relief		
Max. tension During installation During operation				\leq 400 N \leq 50 N			
Materials Cable shield Color		RoHS compliant Aluminum foil clad + tinned copper mesh Black (similar to RAL 9005)					
Flexibility	Flexible; valid f	or ferrite magnet	- ferrite magnet (tested 300,000 c	ycles with 15x cal	ble diameter, 480	0 cycles / hour)
Halogen-free		Yes					
Flex radius Fixed layout	See figure "Flex radius specification", on page 458 6x cable diameter (of plug - ferrite magnet) 10x cable diameter (of ferrite magnet - ferrite magnet)						
flexible installation		1	5x cable diamete	er (of ferrite magr	iet - ferrite magne	et)	1
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				$> 200 \text{ M}\Omega/\text{km}$			
Wave impedance				100 $\pm 10~\Omega$			
Test voltage Wire / wire Wire / shield	1 kV _{eff} 0.5 kV _{eff}						
Operating voltage		≤ 30 V					
Environmental characteristics							
Temperature resistance Fixed installation Moving Bearings		-20 to +80°C -5 to +60°C -20 to +80°C					
Fire resistance	Fire resistant according to UL758 (cable vertical flame test)						

Table 308: Technical data - SDL cable 5CASDL.0xxx-03

Section 6 Accessories

Accessories • Cables

Standards and certifications	5CASDL.0018- 03	5CASDL.0050- 03	5CASDL.0100- 03	5CASDL.0150- 03	5CASDL.0200- 03	5CASDL.0250- 03	5CASDL.0300- 03
Torsion load	100,000 cycles (tested angle of rotation: ±85° speed: 50 cycles / minute)						
Cable drag chain	300,000 cycles Tested flex radius: 180 mm;15x cable diameter; hub: 460 mm; speed: 4800 cycles / hour						
Approbation	UL AWM 20236 80°C 30 V						
Oil and hydrolysis resistance		According to VDE 0282-10					

Table 308: Technical data - SDL cable 5CASDL.0xxx-03 (Forts.)

12.5.3 Flex radius specification



Figure 210: Flex radius specification

12.5.4 Dimensions



Figure 211: Dimensions - SDL cable 5CASDL.0xxx-03

12.5.5 Structure

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

Table 309: Structure - SDL cable 5CASDL.0xxx-03

Accessories • Cables

12.5.6 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 212: Pin assignments - SDL cable 5CASDL.0xxx-03

12.6 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 213: 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).

12.6.1 Order data

Model number	Description	Note
5CASDL.0300-13	SDL flex cable with extender 30 m SDL cable with extender for fixed and flexible type of layout; length: 30 m	
5CASDL.0400-13	SDL flex cable with extender 40 m SDL cable with extender for fixed and flexible type of layout; length: 40 m	

Table 310: Model numbers - SDL flex cable with extender

12.6.2 Technical data

Features	5CASDL.0300-13	5CASDL.0400-13			
Length Tolerance	30 m ±200 mm	40 m ±200 mm			
Dimensions - Extender box	Height 18.5 mm, width 35 mm, length 125 mm				
Cable diameter Maximum	12 1	mm			
Shielding	Individual cable pa	irs 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	≤ 40 ≤ 5	00 N 0 N			
Materials Cable shield Color	RoHS compliant Aluminum foil clad + tinned copper mesh Black (similar to RAL 9005)				
Flexibility	Flexible; valid for ferrite magnet - ferrite magnet (tested 300,000 cycles with 15x cable diameter, 4800 cycles / hour)				
Halogen-free	Yes				
Flex radius Fixed layout flexible installation	See figure "Flex radius specification", on page 463 6x cable diameter (of plug - ferrite magnet) 10x cable diameter (of ferrite magnet - extender) 15x cable diameter (of ferrite magnet - ferrite magnet)				
Weight	Approx, 6200 g	Approx. 8000 g			
Electrical properties (at +20°C)					
Wire cross section	24 AWG (cc 26 AWG (DV	ontrol wires) I, USB, data)			
Line resistance 24 AWG 26 AWG	≤ 95 Ω/km ≤ 145 Ω/km				
Insulation resistance	> 200 M	MΩ/km			
Wave impedance	100 ±	-10 Ω			
Test voltage Wire / wire Wire / shield	1 kV _{eff} 0.5 kV _{eff}				
Operating voltage	≤ 30 V				
Environmental characteristics					
Temperature resistance Fixed installation Moving Bearings	-20 to +60°C -5 to +60°C -20 to +60°C				
Fire resistance	Fire resistant according to UL758 (cable vertical flame test)				

Table 311: Technical data - SDL flex cable with extender 5CASDL.0x00-13

Standards and certifications	5CASDL.0300-13	5CASDL.0400-13
Torsion load	100,000 cycles (tested angle of rotation: $\pm 85^{\circ}$ speed: 50 cycles / minute)	
Cable drag chain	300,000 cycles Tested flex radius: 180 mm;15x cable diameter; hub: 460 mm; speed: 4800 cycles / hour	
Approbation	UL AWM 20236 80°C 30 V	
Oil and hydrolysis resistance	According to VDE 0282-10	

Table 311: Technical data - SDL flex cable with extender 5CASDL.0x00-13 (Forts.)

12.6.3 Flex radius specification



Figure 214: Flex radius specification

12.6.4 Dimensions



Figure 215: Dimensions - SDL flex cable with extender 5CASDL.0x00-13

Accessories • Cables

12.6.5 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 216: Example of the signal direction for the SDL flex cable with extender - APC620



Figure 217: Example of signal direction display - SDL flex cable with extender

12.6.6 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 218: Pin assignments - SDL flex cable with extender 5CASDL.0x00-13

12.7 RS232 cable 9A0014-xx



Figure 219: RS232 extension cable (similar)

12.7.1 Order data

Model number	Description	Note
9A0014.02	RS232 cable DB9/ft: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/ftDB9/m 5 m RS232 extension cable for remote operation of a display unit with touch screen, length 5 m.	
9A0014.10	RS232 cable DB9/ftDB9/m 10 m RS232 extension cable for remote operation of a display unit with touch screen, length 10 m.	

Table 312: Model numbers - RS232 cables

12.7.2 Technical data

Features	9A0014.02	9A0014.05	9A0014.10
Length Tolerance	1.8 m ±50 mm	5 m ±80 mm	10 m ±100 mm
Outer diameter	Max. 5 mm		
Shielding	Entire cable		
Connector type	DSUB (9-pin), male / female		
Wire cross section	AWG 26		
Flexibility	Flexible		
Flex radius	Min. 70 mm		

Table 313: Technical data - RS232 cables

12.7.3 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 220: Pin assignments - RS232 cable

12.8 USB cable 5CAUSB.00xx-00



Figure 221: USB extension cable (similar)

12.8.1 Order data

Model number	Description	Note
5CAUSB.0018-00	USB 2.0 cable, A/m:B/m 1.8 m USB 2.0 connection cable; plug type A - type B; length 1.8 m	
5CAUSB.0050-00	USB 2.0 cable, A/m:B/m 5 m USB 2.0 connection cable; plug type A - type B; length 5 m	

Table 314: Model numbers - USB cables

12.8.2 Technical data

Features	5CAUSB.0018-00	5CAUSB.0050-00	
Length Tolerance	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 315: Technical data - USB cables
12.8.3 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 222: Pin assignments - USB cable

13. Uninterruptible power supply

With the optionally integrated UPS, the Automation PC 620 makes sure that the PC system completes write operations even after a power failure occurs. When the UPS detects a power failure, it switches to battery operation immediately without interruption. This means that all running programs will be ended properly by the UPS software. This prevents the possibility of inconsistent data (only functions if the UPC is already configured and the driver is activated).

Information:

More detailed information about uninterruptible power supplies can be found in the UPS manual. This can be downloaded from the B&R homepage.

Information:

The monitor is not buffered by the UPS and will shut off when the power fails.

By integrating the charging circuit in the Automation PC 620 housing, the installation has been reduced to merely attaching the connection cable to the battery unit mounted next to the PC.

Special emphasis was placed on ease of maintenance when the battery unit was designed. The batteries are easily accessible from the front and can be switched in just a few moments when servicing.



Figure 223: UPS principle

13.1 Order data

Model number	Description	Note
5AC600.UPSI-00	Add-on UPS module Order UPS module for Automation PC, cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately.	
5AC600.UPSB-00	5Ah battery unit UPS battery unit for the add-on UPS module	
5CAUPS.0005-00	0.5 meter UPS cable Connection cable between add-on UPS module and UPS battery unit, length 0.5 meters	
5CAUPS.0030-00	3 meter UPS cable Connection cable between add-on UPS module and UPS battery unit, length 3 meters	

Table 316: Order data - Uninterruptible power supply

13.2 Features

- Long-lasting, maintenance-free rechargeable batteries
- Communication via integrated interfaces
- Temperature sensor
- Driver software
- Deep discharge protection

13.3 Requirements

 An appropriate system unit. The add-on UPS module (5AC600.UPSI-00) can only be installed with the following APC620 system unit revisions:

System unit	Revision
5PC600.SX01-00	Starting with revision H0
5PC600.SX02-00	Starting with revision G0
5PC600.SX02-01	Starting with revision H0
5PC600.SX05-00	Starting with F0
5PC600.SX05-01	Starting with F0
5PC600.SF03-00	Starting with revision A0
5PC600.SE00-00	Starting with revision A0
5PC600.SE00-01	Starting with revision A0
5PC600.SE00-02	Starting with revision A0
5PC810.SX*.	Starting with revision A0

Table 317: System unit revisions - Add-on UPS module

Section 6 Accessories

Accessories • Uninterruptible power supply

- Add-on UPS module 5AC600.UPSI-00 For more on installing the add-on modules, see chapter 7 "Maintenance / Servicing", section 4 "Installing the UPS module", on page 514.
- 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	Туре	Version
MTCX PX32 ¹⁾	Firmware	1.61 or higher
MTCX FPGA ¹⁾	Firmware	1.18 or higher
ADI Control Center ¹⁾	Driver / Control Center	1.60 or higher

Table 318: Firmware and software required for the UPS

1) The software can be downloaded from the B&R homepage (www.br-automation.com).

For info regarding upgrading the firmware, see chapter 4 "Software", section 2.2 "Upgrade the firmware", on page 335.

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.

Advanced	BIOS SETUP UTILITY					
Baseboard/Panel Features					ADI driver	version
▶Panel Control				Info über Contr	ol Center	
<pre>>Legacy Devices Versions BIOS: R110 MTCX PX32: V1.74 MTCX FPGA: V1.25 Optimized ID: 0000001 000001</pre>	MTCX PX32 firmware MTCX FPGA firmware			APC620/PPC700 C Copyright © Berne ADI Module:	Automation Device Interface Version 1.60 iontrol Center (BrCtrlCenter.cpl) 1.12 scker + Rainer 2004-2007	ОК
Device ID: 00001D1 Compatibility ID: 0000h Serial Number: 7443016 Product Name: 5PC600.3 User Serial ID: 111111	3h 9136 5X05-00 Lh	↑↓ Enter F1 F10 F20 F20 F20 F20 F20 F20 F20 F20 F20 F2	Select Screen Select Item Go to Sub Screen General Help Save and Exit	Automation Devic Copyright © Berr APC620/PPC700	te Interface DLL (BrAdi. dll) 2.22 necker + Rainer 2004-2007 ADI Driver (BrAdiDrv.sys) 1.11 secker + Bainer 2004-2007	

Figure 224: Firmware and software required for the UPS

The required firmware versions can be found in the APC620 / Panel PC firmware upgrade (MTCX, SDLR, SDLT) V1.16¹⁾.

¹⁾ The software can be downloaded from the B&R homepage (www.br-automation.com).

6) To configure: Automation Device Interface driver version 1.60 or higher (for the ADI Control Center)

For info regarding configuration of the B&R UPS using the ADI Control Center, see chapter 4 "Software", section 10.4 "UPS configuration", on page 376.

13.4 Individual components

13.4.1 Add-on UPS module 5AC600.UPSI-00

The add-on UPS module can easily be installed in an appropriate APC620 system unit (List of required revisions: see section "Requirements", on page 471).



Figure 225: Add-on UPS module 5AC600.UPSI-00

Technical data

Features	5AC600.UPSI-00		
Switching threshold mains / battery operation	15 / 13 V		
Mains failure bridging	Max. 20 min at 150 W load		
Charging current	Max. 0.5 A		
Deep discharge protection	Yes, at 10 V on the battery unit		
Short circuit protection	No		
Power requirements	Max. 7.5 W		
Status indicators	Via the ADI Control Center (see section "UPS configuration", on page 376)		
Configuration	Via the ADI Control Center (see section "UPS configuration", on page 376)		

Table 319: Technical data - 5AC600.UPSI-00

Installation

The module is installed using the materials included in the delivery. For installation instructions, see chapter 7 "Maintenance / Servicing", section 4 "Installing the UPS module", on page 514.



Figure 226: Add-on UPS module 5AC600.UPSI-00 - Installation materials

13.4.2 Battery unit 5AC600.UPSB-00

The battery unit is subject to wear and should be replaced regularly (at least following the specified lifespan).



Figure 227: 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 230 "Dimensions - 5AC600.UPSB-00", on page 478		
Temperature sensor	NTC resistance		
Weight	Approx. 3.2 kg		
Ambient temperature Operation Bearings Transport	-40 to +80°C -65 to +80°C -65 to +80°C		
Relative humidity Operation Bearings Transport	5 to 95% (non-condensing) 5 to 95% (non-condensing) 5 to 95% (non-condensing)		
Altitude	Max. 3000 meters		
Mounting instructions	See "Mounting instructions", on page 479		
Lifespan	10 years at 25°C (up to 80% battery capacity)		
Maintenance interval during storage	6 month interval between charges		

Table 320: Technical data - 5AC600.UPSB-00

Temperature life span diagram up to 20% battery capacity.



Figure 228: Temperature life span diagram



Deep discharge cycles

Figure 229: Deep discharge cycles

Section 6 Accessories

Accessories • Uninterruptible power supply

Dimensions



Figure 230: Dimensions - 5AC600.UPSB-00

Drilling template



Figure 231: 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.

Section 6 Accessories

13.4.3 UPS connection cable



Figure 232: UPS connection cable

Technical data

Features	5CAUPS.0005-00 5CAUPS.0030-0				
Length	0.5 m 3 m				
Outer diameter	8.5 mm ±0.2 mm				
Connector type	6-pin plug connectors, tension clamp connection / 6-pin socket connectors, tension clamp connection				
Wire cross section Temperature sensor wire Voltage wire	2 x 0.5 mm ² (AWG 20) 4 x 2.5 mm ² (AWG 13)				
Line resistance 0.5 mm ² 2.5 mm ²	Max. 39 Ω/km Max. 7.98 Ω/km				
Flex radius Fixed installation Free-moving	5 x wire cross-section 10 x wire cross-section				
Temperature range Moving Non-moving	-5 to +80°C -30 to +80°C				
Weight	Approx. 143 kg/km				
Materials Cable shield Color	Thermoplastic PVC-based material Window gray (similar to RAL 7040)				
Peak operating voltage	12 V DC				
Testing AC voltage Wire / wire	1500 V				
Operating voltage	Max	300 V			
Current load	10 A at +20 °C				

Table 321: Technical data - UPS connection cable

14. External UPS



Figure 233: Block diagram of the UPS

14.1 General information

For supply with an external UPS, a UPS charging unit, a battery unit and a null modem cable are required.

In normal operation, the 24 VDC supply voltage is put straight through to the load system. If the supply voltage fails, the rechargeable UPS batteries power the PC to allow controlled shutdown without loss of data.

Data and commands are exchanged between the UPS and the load system via the handshake signals for an RS232 interface.

More information concerning an external UPS is available in the "UPS manual", which can be downloaded from the B&R homepage (<u>www.br-automation.com</u>).

14.2 Order data

Model number	Description	Note
9A0100.11	UPS 24 VDC 24 VDC input, 24 VDC output, serial interface	
9A0100.14	UPS battery unit type B 24 V; 2.2 Ah; including battery cage	
9A0100.15	UPS battery unit type B (replacement part) 2 x 12 V; 2.2 Ah; for battery unit 9A0100.14	
9A0017.01	RS232 Null Modem Cable, 0.6 m To connect UPS and load system (9-pin DSUB socket - 9-pin DSUB socket)	
9A0017.02	RS232 Null Modem Cable, 1.8 m To connect UPS and load system (9-pin DSUB socket - 9-pin DSUB socket)	

Table 322: UPS - Order data

15. PCI Ethernet cards

15.1 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 234: PCI Ethernet card 10/100 - 5ACPCI.ETH1-01

15.1.1 Technical data

		Eth	nernet 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)		Speed Act/Link
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)	ETH

Table 323: Ethernet connection ETH

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

Section 6 Accessories

Accessories • PCI Ethernet cards

15.1.2 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 (<u>www.br-automation.com</u>).

Information:

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

15.1.3 Dimensions



Figure 235: Dimensions - 5ACPCI.ETH1-01

15.2 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 236: PCI Ethernet card 10/100 - 5ACPCI.ETH3-01

15.2.1 Technical data

		Eth	ernet connections		
Controller	each with Intel 82551ER				
Power supply	Universal card (2 notches) for 3.3 V or 5 V		3 x RJ45 twist	ted pair (10BaseT/100I	BaseT), temale
Cabling	each S/STP (Cat5e)		Speed Act/Link	Speed Act/Link	Speed Act/Link
Transfer rate	each 10/100 MBit/s 1)				$\bigcirc \bigcirc$
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)	ETH1	ETH2	ETH3

Table 324: Ethernet connections ETH1, ETH2, ETH3

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

Accessories • PCI Ethernet cards

15.2.2 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 (<u>www.br-automation.com</u>).

Information:

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

15.2.3 Dimensions



Figure 237: Dimensions - 5ACPCI.ETH3-01

16. Replacement fan

Information:

The fan filters are subject to wear , and should be checked with appropriate frequency to determine whether the air flow provides sufficient cooling. An exchange or cleaning of the filter kit is appropriate at that time.



Figure 238: Replacement fan

Model number	Short description	Note
5AC600.FA01-00	APC620 replacement fan filter 1PCI 5 piece This fan filter is an optional addition for system units with 1 PCL slot (5PC600.SX01-00).	
5AC600.FA02-00	APC620 replacement fan filter 1PCI 5 piece This fan filter is an optional addition for system units with 2 PCL slots (5PC600.SX02-00, 5PC600.SX02-01).	
5AC600.FA03-00	APC620 replacement fan filter 3PCI 5 piece This fan filter is an optional addition for system units with 3 PCL slots (5PC600.SF03-00).	
5AC600.FA05-00	APC620 replacement fan filter 1PCI 5 piece This fan filter is an optional addition for system units with 5 PCL slots (5PC600.SX05-00, 5PC600.SX05-01).	

Table 325: Model numbers - Replacement fan filters

Accessories • SRAM module - 5AC600.SRAM-00

17. 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 239: 5AC600.SRAM-00

The following system unit hardware revisions are required before mounting the SRAM module:

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

17.1 Technical data

Features	5AC600.SRAM-00
Connection to system	via the PCI bus (PCI PnP)
Memory Quantity Battery-buffered Remanent variables for AR (Automation Runtime) in power fail mode	SRAM 512 kB Yes 256 kB with CPU board 5PC600.E855-xx and 5PC600.X855-xx 192 kB with CPU board 5PC600.X945-00
Station switch	16 digits (0-F)
Data rate	Up to 31 MB/s for write access Up to 25 MB/s for read access

Table 326: Technical data - 5AC600.SRAM-00

Features	5AC600.SRAM-00		
PCI configuration space	Value	Meaning	
Vendor ID Device ID Status HeaderType	1677h A085h 0200h 00h	B & R 5AC600.SRAM-00 DEVSEL timing medium Single function device	
The card is registered in the PCI Configuration Space as Single Function Device	Value	Meaning	
Device 0 Base class Sub class Command IRQ BAR0 BAR1	05h 00h 0000h - 512 4	Memory controller RAM Bus master (not used) Not used kByte memory area Byte I/O area	

Table 326: Technical data - 5AC600.SRAM-00

17.2 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.

17.3 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 531).
- Screw on the M3x5 Torx included in the delivery to the baseboard of the module.



Figure 240: SRAM module installation

18. Power supplies

In order to meet demands for complete, comprehensive system solutions, power supplies are available in the B&R product line for mounting rail installation. This extensive spectrum ranges from single-phase power supplies that supply 2.1 A up to three-phase power supplies that supply 40 A. All switching power supplies can manage a wide range of AC and DC input voltages. This input ranges from 100 to 240 VAC or 400 to 500 VAC and from 85 to 375 VDC. Devices are protected against short circuit, overload, and open circuit, which allows them to be operated without functional limitations or derating even when overloads between 15% and 25% occur.



Figure 241: B&R power supplies (examples)

Two mini power supplies (PS102 and PS104) in robust plastic housing are available in the lower performance range. A well-designed cooling concept allows several different mounting orientations. The functional DIN rail allows fast mounting and removal. Wiring is essentially performed in seconds thanks to the spring clamps being used. The compact design, easy mounting and several different mounting orientations make the two smallest power supplies in this product line components that can be used practically anywhere.

Accessories • Power supplies

18.1 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 (<u>www.br-automation.com</u>).

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				
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

18.1.1 Single-phase power supplies

Table 327: Single-phase power supplies

18.1.2 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 328: 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 0AC201.91 (4 pcs.).

1.1 Battery status evaluation

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

Battery status	Meaning
N/A	Hardware, i.e. firmware used is too old and does not support read.
GOOD	Data buffering is guaranteed
BAD	Data buffering is guaranteed for approx. another 500 hours from the point in time that the battery capacity is determined to be BAD (insufficient).

Table 329: 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 493).
- 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 242: 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.

Maintenance / Servicing • Changing the battery



Figure 243: Battery handling



Figure 244: 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 493).
- Reset the data and time in BIOS (see information on page 493).

Warning!

Lithium batteries are considered hazardous waste. Used batteries should be disposed of according to local requirements.

Maintenance / Servicing

Section 7

2. Fan kit installation and replacement

2.1 Procedure for APC620 with 1 PCI slot

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 4 Torx screws (T10) that must be removed.



Figure 245: 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 246: 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 247: 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 248: APC620 1PCI slot - Fan installation

• Secure fans with the 6 included Torx (T10) screws.

Maintenance / Servicing • Fan kit installation and replacement

• 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 249: APC620 1PCI slot - Fan cable connection to the main board

- If a PCI card was previously in place, it can now be re-inserted.
- Place dust filter in the fan kit cover and replace removed components (filter kit cover, side cover) in reverse order.

2.2 Procedure for APC620 with 2 PCI slot

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 4 Torx screws (T10) that must be removed.



Figure 250: 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 251: APC620 2PCI slots - Remove side cover and fan kit cover

Maintenance / Servicing • Fan kit installation and replacement

- 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 252: 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 253: 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 254: 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 255: Dust filter in the fan kit cover and filter clasp

• Replace any removed components (filter kit cover, side cover) in the reverse order.

2.3 Procedure for APC620 with 3 PCI slot

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 4 Torx screws (T10) that must be removed.



Figure 256: 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 257: 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 258: 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 259: 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 260: 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 261: Dust filter in the fan kit cover and filter clasp

• Replace any removed components (filter kit cover, side cover) in the reverse order.

Maintenance / Servicing

Section 7

2.4 Procedure for APC620 with 5 PCI slot

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 4 Torx screws (T10) that must be removed.



Figure 262: 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 263: 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 264: 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 265: 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 266: 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 267: 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 268: 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 531.
- Remove the slide-in dummy module.



Figure 269: Removing the slide-in dummy module

• Insert the slide-in drive.



Figure 270: 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 531.
- Simultaneously remove both slide-in slot releasing mechanisms outwards The slide-in drive is pushed a few mm upwards for easy removal.



Figure 271: Release the slide-in slot releasing mechanisms

• Removing the slide-in drive.



Figure 272: Removing the slide-in drive

Maintenance / Servicing • Slide-in drive - installation and exchange

• Move the slide-in slot releasing mechanisms to the start position.



Figure 273: Slide-in slot releasing mechanism start position

• Insert the new slide-in drive or re-attach the side cover.

4. Installing the UPS module

The module is installed using the materials included in the delivery. Different parts are used depending on the system unit and whether the add-on interface module is **installed** (description starting on page 523) or **not installed** (description follows).



Figure 274: 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 531).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).



Figure 275: Remove UPS module cover

• Screw in spacing bolt and spacing ring (using M5 hex socket screwdriver).



Figure 276: 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 277: Install UPS module

• Plug in connection cable (see marked socket).



Figure 278: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.



Figure 279: 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 531).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).

Figure 280: Remove UPS module cover

• Remove cover plate by removing the marked Torx screw (T10).

Figure 281: Remove cover plate

• Screw in spacing bolt and spacing ring (using M5 hex socket screwdriver).

Figure 282: Screw in spacing bolt and spacing ring

14 mm spacing bolt + spacing ring

Install mounting bracket on UPS module using 2 Torx screws (T10).









Figure 283: 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 284: Install UPS module

• Plug in connection cable (see marked socket).



Figure 285: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.



Figure 286: 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 531).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).



Figure 287: Remove UPS module cover

• Remove cover plate by removing the marked Torx screw (T10).



Figure 288: Remove cover plate

• Screw in spacing bolt and spacing ring (using M5 hex socket screwdriver).



Figure 289: Screw in spacing bolt and spacing ring

Install mounting bracket on UPS module using 2 Torx screws (T10).



Figure 290: 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 291: Install UPS module

• Attach connection cable (see marked socket).



Figure 292: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.



Figure 293: Connector locking mechanism

• Attach cover plate and side cover.

• Remove UPS module cover by removing the 2 marked Torx screws (T10).

4.2 Automation PC 620 with add-on interface module

4.2.1 APC620, 1 PCI slot

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Figure 294: Remove UPS module cover

• Screw in spacing bolt (using M5 hex socket screwdriver).



Figure 295: 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 296: Install UPS module

• Plug in connection cable (see marked socket).



Figure 297: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.



Figure 298: 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 531).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).



Figure 299: Remove UPS module cover

• Remove cover plate by removing the marked Torx screw (T10).



Figure 300: Remove cover plate

• Screw in spacing bolt (using M5 hex socket screwdriver).



Figure 301: Screw in spacing bolt

Install mounting bracket on UPS module using 2 Torx screws (T10).



Figure 302: 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 303: Install UPS module

• Plug in connection cable (see marked socket).



Figure 304: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.



Figure 305: 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 531).
- Remove UPS module cover by removing the 2 marked Torx screws (using T10 screwdriver).



Figure 306: Remove UPS module cover

• Remove cover plate by removing the marked Torx screw (T10).



Figure 307: Remove cover plate

• Screw in spacing bolt (using M5 hex socket screwdriver).



Figure 308: Screw in spacing bolt

• Install mounting bracket on UPS module using 2 Torx screws (T10).



Figure 309: 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 310: Install UPS module

• Plug in connection cable (see marked socket).



Figure 311: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.



Figure 312: 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 313: Mounting the side cover - APC620, 1 PCI slot

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 314: Mounting the side cover - APC620, 2 PCI slot

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 315: Mounting the side cover - APC620, 3 PCI slot

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 316: Mounting the side cover - APC620, 5 PCI slot

6. Exchanging a PCI SATA RAID hard disk

In the example, the assumption is made that the secondary hard disk (HDD1) is defective. In such a case, the defective hard disk can be replaced by the replacement drive SATA hard disk.

A size 10 Torx screwdriver is needed for exchanging the hard disk.

Exchange procedure

- Remove the power supply to the device (Automation PC 620 / Panel PC 700).
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Remove the side cover.
- Remove the SATA RAID insert.
- Loosen the 4 appropriate mounting screws (M3x5) see Figure 317 "Screw assignment on the back side of the SATA RAID controller", on page 535.



Figure 317: Screw assignment on the back side of the SATA RAID controller

- On the front side, slide the hard disk down and away (image 1).
- Carefully plug the new hard disk into the connector (image 2).

Information:

When doing this, make sure that the hard disk is only touched on the front side, and not on the top side.

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Section 7

Maintenance / Servicing • Exchanging a PCI SATA RAID hard disk



Figure 318: 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 258.

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 319: Removing the APC620 front cover

Maintenance / Servicing • Replacing the front cover

• Slide the new hinge bar under the heat sink and screw it back on using the screws removed earlier.



Figure 320: 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 321: 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 322: Removing the APC620 front cover

Maintenance / Servicing • Replacing the front cover

• Attach the new cover to the hinge bar from the side.



Figure 323: Attaching the front cover
Appendix A

1. Temperature sensor locations

Sensors monitor temperature values at different locations in the APC620 (inside CPU, CPU board, power supply, slide-in drive 1, slide-in drive 2, I/O). The temperatures¹⁾ can be read out in the BIOS (menu item Advanced - Baseboard/Panel Features - Baseboard Monitor) or via the B&R Control Center²⁾ using Microsoft Windows XP/Embedded and Embedded Standard 2009.



Figure 324: Temperature sensor locations

Position	Measurement point for	Measurement	Max. specified
1	CPU internal	Processor temperature (sensor integrated on the processor).	90°C
2	CPU board	CPU board temperature (sensor integrated on the CPU board).	95°C
3	Power supply	Power supply temperature (sensor on the power supply).	95°C
4	Slide-in drive 1/2	Temperature of a slide-in drive (the sensor is integrated on the slide-in drive)	Drive dependent
5	I/O	Temperature under an add-on drive (sensor on the baseboard).	Max. 80°C Drive dependent

Table 330: Temperature sensor locations

- 1) The measured temperature is a guideline for the immediate ambient temperature, but can be influenced by neighboring components.
- The B&R Control Center ADI driver can be downloaded for free from the download area on the B&R homepage (www.brautomation.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	В0
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	В9
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 331: Revision information for connecting an external device

The voltage can be accessed using the "APC620 internal supply cable 5CAMSC.0001-00", on page 446. 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 325: Connector location for external devices

Appendix A • Connection of an external device to the main board

Connector for the external devices				
Pin	Assignment	Power	4-pin connector. male	
1	+12 VDC	14 40 W	P	
2	GND	Max. 10 W		
3	GND			
4	+5 VDC	Max. 5 W		

Table 332: 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 326: 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 upgrade¹⁾. 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 327: Sample configuration for SDL timing

Basic procedure:

- 1) On every Automation Panel 900 display unit, the data (button and LED, touch screen, service data) is nominally determined asynchronously every 16 ms, saved and made available.
- 2) The MTCX in the APC620 samples one display unit after another asynchronously in 1 ms increments. The status is requested within the 15 ms nominal cycle (maximum 15 display units x 1 ms), regardless of the total number of display units connected in the system (Graphics Engine 1 + Graphics Engine 2), and the information is saved in the MTCX's Dual-Ported RAM.
- 3) An application can access the MTXC data using the programming interface (API) ADI (Automation Device Interface). Reading or writing data does not affect the asynchronous acquisition of data from the connected display units. Further information about this can be found in the "ADI Development Kit" and the "Automation PC 620 / Panel PC 700 Implementation Guide" (both available on the B&R Homepage).

Caution!

Due to safety requirements regulated by international standards, implementing an E-stop element via SDL (using Matrix) is NOT allowed. Instead, such an element must be wired according to the safety requirements.

Information:

Display data will not be updated and cannot be read by the MTCX while a display unit is in upgrade mode (e.g. SDL firmware upgrade).

The nominal time specifications are not guaranteed maximum lengths of time, but may be increased due to e.g. transfer disturbances and external influences.

Schematic diagram



Figure 328: SDL timing - Example for Automation Panel 900 with the number 0

3.2 Temperature monitoring - Fan control

The MTCX constantly monitors the temperature using temperature sensors (see section 1 "Temperature sensor locations", on page 541), which directly determine how the fan is controlled. The RPM depends on the temperature measured. The limit values depend on the MTCX firmware version being used.

Sensor range	Start-up temperature	Max fan speed at:
CPU	+39°C	+55°C
Power supply	+39°C	+55°C
Slide-in drive 1/2	+39°C	+55°C
I/O	+39°C	+55°C

Table 333: Temperature limits for fan control

The fans stop again when the temperature drops below +37°C.

Appendix A

Appendix A • B&R Key Editor information

4. B&R Key Editor information

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



Figure 329: B&R Key Editor screenshots (Version 2.70)

Features:

- Configuration of normal keys like on a keyboard (A, B, C, etc.)
- Keyboard shortcuts (CTRL+C, SHIFT+DEL, etc.) on one key
- Special key functions (change brightness, etc.)
- Assign functions to LEDs (HDD access, power, etc.)
- 4 assignments per key possible (using layer function)
- Configuration of panel locking time when multiple Automation Panel 900 devices are connected to Automation PC 620, Automation PC 810 and Panel PC 700 devices.

Supports following systems (Version 2.70):

- Automation PC 800
- Automation PC 620 (ETX, XTX, Embedded)
- Panel PC 300
- Panel PC 700 (ETX, XTX)
- Power Panel 100, 200
- Power Panel 300/400
- Mobile Panel 40/50
- Mobile Panel 100, 200
- Provit 2000
- Provit 5000

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 (<u>www.br-automation.com</u>). Additionally, it can also be found on the B&R HMI Drivers & Utilities DVD (model number 5SWHMI.0000-00).

5. B&R Automation Device Interface (ADI) development kit

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 330: ADI development kit screenshots (Version 2.40)

Features:

- One Microsoft Visual Basic module with declarations for the ADI functions.
- Header files and import libraries for Microsoft Visual C++ 6.0 and Microsoft eMbedded Visual C++ 4.0.
- Help files for Visual Basic and Visual C++.
- Sample projects for Visual Basic and Visual C++.
- ADI DLL (for testing the applications, if no ADI drive is installed).

Supports following systems (Version 2.40 and higher):

- Automation PC 620
- Automation PC 810
- Automation PC 820

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

The ADI driver suitable for the device must be installed to the stated product series (for Windows XP, Windows XP+SP2). The ADI driver is already included in the Windows XP embedded and Windows CE operating systems offered by B&R and does not have to be additionally installed.

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. 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 (<u>www.br-automation.com</u>).

6. Glossary

A

ACPI

Abbreviation for "Advanced Configuration and Power Interface". Configuration interface that enables the operating system to control the power supply for each device connected to the PC. With ACPI, the computer's BIOS is only responsible for the details of communication with the hardware.

APC

An abbreviation for "Automation PC".

API

Abbreviation for "Application Program Interface" 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.

В

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 "Basic Input/Output System". 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.

С		

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 "Controller Area Network" (serial bus system). Structure according to ISO 11898; Bus medium: twisted pair. Good transfer properties in short distances less than 40 m with a 1 MBit/sec data transfer rate. Maximum number of stations: Theoretically unlimited, but practically limited up to 64. Real-time capable (i.e. defined maximum latency times for messages with high priority). High reliability using error detection, error handling, troubleshooting. Hamming distance.

CD-ROM

Abbreviation for "Compact Disc Read-Only Memory". A removable data medium with a capacity of \sim 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.

Appendix A • Glossary

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 "Central Processing Unit". 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.

Appendix A

CTS

An abbreviation for "Clear To Send". 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 "Data Carrier Detected". 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 Memory Access > Accelerated direct access to a computer's RAM by bypassing the CPU.

DRAM

An abbreviation for "Dynamic Random Access Memory". 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 "Data Set Ready". A signal used in serial data transfer, which is sent by the modem to the computer it is connected to, indicating its readiness for processing. DSR is a hardware signal which is sent via line number 6 in compliance with the RS-232-C standard.

DTR

An abbreviation for "Data Terminal Ready". 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.

Appendix A • Glossary

DVD

An abbreviation for "Digital Versatile Disc". The next generation of optical data carrier technology is able to store a higher volume of data than conventional CDs. Standard DVDs, which have a single layer, can hold 4.7 GB. Dual-layer DVDs can hold 8.5 GB. Double-sided DVDs can therefore hold up to 17 GB. A special drive is needed for DVDs. Conventional CDs can also be played on DVD drives.

DVI

Abbreviation for "Digital Visual Interface" 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

Е

EDID data

Abbreviation for "Extended Display Identification Data". 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 "Enhanced Integrated Drive Electronics". 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

"Electromagnetic Compatibility" The ability of a device or a system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment [IEV 161-01-07].

EPROM

Erasable **PROM** > (completely with ultraviolet light).

Ethernet

An IEEE 802.3 standard for networks. Ethernet uses bus or star topology and controls the traffic on communication lines using the access procedure CSMA/CD (Carrier Sense Multiple Access with Collision Detection). Network nodes are connected using coaxial cables, fiber optic cables or twisted pair cabling. Data transfer on an Ethernet network takes place in frames of variable lengths that consist of supply and controller information as well as 1500 bytes of data. The Ethernet standard provides base band transfers at 10 megabit and 100 megabit per second.

ETX

Abbreviation for "Embedded Technology eXtended" 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.

FDD

F

Abbreviation for "Floppy Disk Drive". 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 "First In First Out". 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.

Appendix A • Glossary

FPC

An abbreviation for "Flat Panel Controller".

FPD

An abbreviation for "Flat Panel Display".

FTP

"File Transfer Protocol" 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)

Н

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 "Hard Disk Drive". Fixed magnetic mass memory with high capacities, e.g. 120 GB.

I

IDE

An abbreviation for "Integrated Drive Electronics". A drive interface where the controller electronics are integrated in the drive.

ISA

An abbreviation for "Industry Standard Architecture". 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" (<u>www.iso.ch</u>).

J

Jitter

Jitter is a term that describes time deviations of cyclic events. If, for example, an event should take place every 200is and it actually occurs every 198 to 203is, then the jitter is 5is. 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.

LCD

L

An abbreviation for "Liquid Crystal Display". 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 "Light Emitting Diode". 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".

М

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 "Mean time between failure". 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 »Maintenance Controller EXtended«. 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.

0

OEM

"Original Equipment Manufacturer"; 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.

Panel

Ρ

A common term for B&R display units (with or without keys).

PCI Bus

Abbreviation for "Peripheral Component Interconnect bus". Developed by Intel as an intermediary/local bus for the latest PC generations. It is basically a synchronous bus. The main clock of the CPU is used for synchronization. The PCI bus is microprocessor-independent, 32-bit and 64-bit compatible, and supports both 3.3 V and 5 V cards and devices.

PCMCIA

An abbreviation for "Personal Computer Memory Card International Association". 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.

Appendix A • Glossary

PnP

An abbreviation for "Plug and Play". 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 "Power On Hours". See MTBF.

POST

An abbreviation for "Power-On Self Test". A set of routines that are stored in ROM on the computer and that test different system components, e.g. RAM, disk drive and the keyboard in order to determine that the connection is operating correctly and ready for operation. POST routines notify the user of problems that occur. This is done using several signal tones or by displaying a message that frequently accompanies a diagnosis value on the standard output or standard error devices (generally the monitor). If the POST runs successfully, control is transferred over to the system's bootstrap loader.

POWERLINK

An enhancement of standard Ethernet. It enables data exchange under strict real-time conditions with cycle times down to 200 μ s and jitter under 1 μ s. This makes Ethernet power available on all communication levels of automation technology – from control levels to I/O. POWERLINK was initiated by the company B&R Industrie-Elektronik and is now managed by the open end user and vendor association, EPSG - Ethernet POWERLINK Standardization Group (<u>www.ethernet-powerlink.org</u>).

QVGA

Abbreviation for "Quarter Video Graphics Array". Usually a screen resolution of 320 × 240 pixels.

QUXGA

Abbreviation for "Quad Ultra Extended Graphics Array". Generally a screen resolution of 3200 \times 2400 pixels (4:3). Quad implies the 4x greater pixel resolution compared to the UXGA.

QWUXGA

Abbreviation for "Quad WUXGA"; Generally a screen resolution of 3840×2400 pixels (8:5, 16:10).

R

RAM

An abbreviation for "Random Access Memory". 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 "Read-Only Memory". Semiconductor memory where programs or data were permanently stored during the production process.

RS232

Recommended **S**tandard **N**umber **232**. Oldest and most widespread interface standard, also called a V.24 interface. All signals are referenced to ground making this an unbalanced interface. High level: -3 to -30 V, low level: +3 to +30 V; cable lengths up to 15 m, transfer rates up to 20 kbit/s; for point-to-point connections between 2 stations.

RS422

Recommended **S**tandard **N**umber **422**. Interface standard, balanced operation, increased immunity to disturbances. High level: 2 to -6 V, low level: +2 to +6 V; 4-wire connection [inverted/not inverted], cable lengths up to 1200 m, transfer rates up to 10 Mbit/s, 1 sender can carry out simplex communication with up to 10 receivers.

RS485

Recommended **S**tandard **N**umber **485**. Interface standard upgraded from RS422. High level: 1.5 to -6 V, low level: +1.5 to +6 V; two-line connection [half-duplex mode] or four-line connection [full-duplex mode]; permissible cable length up to 1200 m, transfer rates up to 10 Mbit/s. Up to 32 stations (sender/receiver) can be connected to an RS485 bus.

RTS

An abbreviation for "Request To Send". 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.

Appendix A • Glossary

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 "Synchronous Dynamic Random Access Memory". 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 "Static Random Access Memory". 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 Super Ultra Extended Graphics Array; Generally a screen resolution of 2048×1536 pixels (4:3). An alternative name is QXGA (Quad Extended Graphics Array), which is 4x the pixel resolution of XGA.

SVGA

Abbreviation for "Super Video Graphics Array"; 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.

Appendix A

Task

Т

Program unit that is assigned a specific priority by the real-time operating system. It contains a complete process and can consist of several modules.

TCP/IP

Transmission Control Protocol/Internet Suit of Protocols. Network protocol that has become the generally accepted standard for data exchange in heterogeneous networks. TCP/IP is used both in local networks for communication between various computer and also for LAN to WAN access.

TFT display

LCD (Liquid Crystal Display) technology where the display consists of a large grid of LCD cells. Each pixel is represented by a cell, whereby electrical fields produced in the cells are supported by thin film transistors (TFT) that result in an active matrix. In its simplest form, there is exactly one thin film transistor per cell. Displays with an active matrix are generally used in laptops and notebooks because they are thin, offer high-quality color displays and can be viewed from all angles.

Touch screen

Screen with touch sensors for selecting options in a displayed menu using the tip of the finger.

TXD

An abbreviation for "Transmit (**TX**) **D**ata". A line for the transfer of serial data sent from one device to another, e.g. from a computer to a modem. For connections complying with the RS-232-C standard, the TXD is connected to pin 2 of the plug.

U

UART

An abbreviation for "Universal Asynchronous Receiver-Transmitter". 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 "Ultra Direct Memory Access". 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 "Uninterruptible Power Supply". See "UPS".

USB

An abbreviation for "Universal Serial Bus" 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 "Uninterruptible Power Supply". 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 "Ultra Extended Graphics Array" Generally a screen resolution of 1600×1200 pixels (aspect ratio 4:3, 12:9).

۷

VGA

An abbreviation for "Video Graphics Adapter". A video adapter which can handle all EGA (Enhanced Graphics Adapter) video modes and adds several new modes.

Appendix A • Glossary

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.

Х

XGA

An abbreviation for "EXtended Graphics Array". 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.

хтх

Abbreviation for "eXpress Technologoy for ETX" 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.

W

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