# Automation PC 810

## **User's Manual**

Version: 0.42 Preliminary (May 2008) MAAPC800-ENG

Model number:

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## **Chapter 1 • General information**

## 1. Manual history

Version	Date	Change
0.10 Preliminary	20.11.2007	- First version
0.20 Preliminary	11.01.2008	Text changed in the brief system unit text     Text change made to 945GME (instead of 945GM)     256 MB main memory removed.     5AC801.ADAS-00 and 5AC801.HDDS-00 added.     Accessories added.     Ready relay 5AC801.RDYR-00, SATA RAID controller, fan kit, IF options, replacement fan filter     added.     BIOS description added.
0.30 Preliminary	31.01.2008	<ul> <li>Mistake regarding the configuration corrected.</li> <li>BIOS default profile added.</li> <li>Name change from APC810 to APC800 and model number change</li> <li>Technical data for the entire device updated.</li> <li>Connection examples added.</li> <li>Problems and properties of the first production lot added.</li> </ul>
0.40 Preliminary	11.04.2008	Problems and properties of the first production lot revised.     Section "Temperature sensor locations" on page 303 in chapter appendix A expanded.     "Ambient temperatures" on page 48 added.     System unit with 1 card slot added.     Content changes (especially in "Maintenance / Servicing" chapter).     BIOS description for Version 1.10 revised.
0.41 Preliminary	09.05.2008	Graphic corrections to "Ambient temperatures with and without a fan kit".     Measurement values of the 1 and 2 card slot devices around the heat sink 5AC801.HS00-01 updated.     "Power management" section added.     Serial number sticker information updated     Section "Automation PC 810 with Windows XP Professional and Windows XP embedded" added.     "Automation Device Interface (ADI)" expanded.     Scard slot variants added.     Drilling templates added for 5-card slot variants.     Abschnitt "Connection of USB peripheral devices" on page 164Connection of USB peripheral devices added.     Index expanded

Table 1: Manual history

## General information • Manual history

Version	Date	Change
0.42 Preliminary	29.05.2008	<ul> <li>Information for mounting orientation (vertical, horizontal) added in Chapter 3 "Commissioning".</li> <li>Ambient temperature values with and without a fan kit regarding mounting orientation (vertical, horizontal) updated.</li> <li>Error correction (Fan kit model numbers) in Figure 2 "Configuration - Drives, software, accessories" on page 32.</li> <li>Error correction (pin assignments) in Table 18 "Supply voltage connection + 24VDC" on page 56.</li> <li>Slide-in Slot 2 description revised.</li> <li>Slide-in DVD burner 5AC801.DVDS-00 added.</li> <li>Fan kit for the 5-card slot variant (5PC810.FA05-00) added.</li> <li>Real-time clock (RTC) specifications added.</li> </ul>

Table 1: Manual history (cont.)

Chapter 1 General information

## 2. Safety guidelines

## 2.1 Intended use

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

## 2.2 Protection against electrostatic discharges

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

### 2.2.1 Packaging

- <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 contacts of connectors on connected cables.
- Do not touch the contact tips on the circuit boards.

### **Electrical components without housing**

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

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

Metallic surfaces are not suitable storage surfaces!

#### General information • Safety guidelines

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

#### Individual components

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

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

## 2.3 Policy and procedures

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

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

All tasks such as installation, commissioning, and maintenance are only permitted to be carried out by qualified personnel. Qualified personnel are persons who are familiar with the transport, mounting, installation, commissioning, and operation of the product and who have the appropriate qualifications (e.g. IEC 60364). National accident prevention guidelines must be followed.

The safety guidelines, connection descriptions (rating plate and documentation) and limit values listed in the technical data must be read carefully and must be observed before installation and commissioning.

## 2.4 Transport and storage

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

#### 2.5 Installation

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

### 2.6 Operation

#### 2.6.1 Protection against touching electrical parts

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

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

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

#### 2.6.2 Environmental conditions - dust, humidity, aggressive gases

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

The presence of aggressive gases in the environment can also lead to malfunctions. When combined with high temperature and humidity, aggressive gases - e.g. with sulfuric, nitric and chloric components- spur chemical chemical process that can damage electronic components very quickly. Signs of the presence of aggressive gases are blackened copper surfaces and cables on existing installations.

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

#### **General information • Safety guidelines**

#### 2.6.3 Programs, viruses and dangerous programs

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

## 3. Organization of safety notices

The safety notices in this manual are organized as follows:

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

Table 2: Organization of safety notices

## 4. Guidelines



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

## 5. Model numbers

## 5.1 System units

Model number	Short description	Comment
5PC810.SX01-00	APC810 System 1CS <sup>1)</sup> APC810 system unit 1 card slot (PCI, PCI Express, depending on bus), 1 slide-in compact slot for drive, 2 CompactFlash slots; Smart Display Link/DVI/Monitor, connections for 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, AC97 sound, 24 VDC	
5PC810.SX02-00	APC810 system 2CS <sup>1)</sup> 1DD <sup>2)</sup> 1LS <sup>3)</sup> APC810 system unit 2 card slots (PCI, PCI Express, depending on bus), 1 slot for Automation Panel Link Transmitter; 1 slide-in compact slot and 1 slide-in slot for drives, 2 CompactFlash slots; Smart Display Link/DVI/Monitor, connections for 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, AC97 sound, 24 VDC	
5PC810.SX05-00	APC810 system 5CS <sup>1)</sup> 2DD <sup>2)</sup> 1LS <sup>3)</sup> APC810 system unit 5 card slots (PCI, PCI Express, depending on bus), 1 slot for Automation Panel Link Transmitter; 1 slide-in compact slot and 2 slide-in slot for drives, 2 CompactFlash slots; Smart Display Link/DVI/Monitor, connections for 2x RS232, 5x USB 2.0, 2x ETH 10/100/1000, AC97 sound, 24 VDC	In preparation

Table 3: Model numbers - System units

- 1) Card Slot = PCI slot: PCI or PCI Express
- 2) Disk drive = Slide-in drive slot
- 3) Link slot = Slot for one AP Link card

## 5.2 Bus units

Model number	Short description	Comment
5PC810.BX01-00	APC810 bus 1PCI APC810 bus unit with a PCI slot.	
5PC810.BX01-01	APC810 bus 1PCIe.x4 APC810 bus unit with a PCIe slot.	
5PC810.BX02-00	APC810 bus 2PCI APC810 bus unit with 2 PCI slots.	
5PC810.BX02-01	APC810 bus 1PCI 1PCIe.x4 APC810 bus unit with one PCI and one PCIe slot.	
5PC810.BX05-00	APC810 bus 4PCI 1PCIe.x1 APC810 bus unit with 4 PCI slots and one PCIe slot.	In preparation
5PC810.BX05-01	APC810 bus 2PCI 3PCIe.x1 APC810 bus unit with 2 PCI slots and 3 PCIe slots.	In preparation

Table 4: Model numbers - bus units

## 5.3 CPU boards 945GME COM Express

Model number	Short description	Comment
5PC800.B945-00	CPU board Intel <sup>®</sup> Core <sup>™</sup> Duo L2400, 1.66 GHz 667 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 socket for SO-DIMM DDR2 module	
5PC800.B945-01	CPU board Intel® Core™2 Duo L7400, 1.5 GHz 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 socket for SO-DIMM DDR2 module	
5PC800.B945-02	CPU board Intel® Core™2 Duo U7500, 1.06 GHz 533 MHz FSB, 2 MB L2 cache; 945GME chipset; 2 socket for SO-DIMM DDR2 module	
5PC800.B945-03	CPU board Intel® Celeron® M 423, 1.06 GHz 533 MHz FSB, 1 MB L2 cache; 945GME chipset; 2 socket for SO-DIMM DDR2 module	
5PC800.B945-04	CPU board Intel® Core™2 Duo T7400, 2.16 GHz 667 MHz FSB, 4 MB L2 cache; 945GME chipset; 2 socket for SO-DIMM DDR2 module	

Table 5: Model numbers - CPU boards 945GME

## 5.4 Heat sink

Model number	Short description	Comment
5AC801.HS00-00	APC810 heat sink Heat sink APC810 for CPU boards with Dual Core processors L2400, L7400, U7500 and Celeron® M 423	
5AC801.HS00-01	APC810 heat sink T7400 Heat sink APC810 for CPU board with Dual Core processor T7400	

Table 6: Model numbers - Heat sinks

## 5.5 Main memory

Model number	Short description	Comment
5MMDDR.0512-01	SO-DIMM DDR2 512MB PC2-5300	
5MMDDR.1024-01	SO-DIMM DDR2 1024MB PC2-5300	
5MMDDR.2048-01	SO-DIMM DDR2 2,048MB PC2-5300	

Table 7: Model numbers - main memory

### 5.6 Drives

Model number	Short description	Comment
5AC801.ADAS-00	APC810 slide-in compact adapter Adapter for operating compact slide-in drives in a slide-in slot drive slot (can only be used in slide-in slot 1).	
5AC801.HDDI-00	APC810 slide-in compact HDD 40GB 40 GB SATA Hard Disk (slide-in compact)	

Table 8: Model numbers - Drives

Model number	Short description	Comment
5AC801.HDDI-01	APC810 slide-in compact HDD 80GB 80 GB SATA Hard Disk (slide-in compact)	Cancelled since 02/2008, replacement type 5AC801.HDDI-02
5AC801.HDDI-02	APC810 slide-in compact HDD 160GB 24x7 ET 160 GB SATA Hard Disk (slide-in compact)	
5AC801.HDDS-00	APC810 slide-in HDD 40GB 40 GB SATA hard disk drive (slide-in )	
5AC801.DVDS-00	APC810 slide-in DVD-ROM DVD-ROM drive (slide-in)	
5AC801.DVRS-00	APC810 slide-in DVD-R/RW DVD-R/RW, DVD+R/RW drive (slide-in)	
5ACPCI.RAIC-01	PCI SATA RAID System 2x60 GB PCI RAID controller + 2 x 60 GB SATA hard disks; requires a free PCI slot.	
5ACPCI.RAIC-02	Replacement SATA-HDD 60GB Hard disk 60 GB SATA, replacement part for 5ACPCI.RAIC-01	
5ACPCI.RAIC-03	PCI SATA RAID System 2x160 GB PCI RAID controller + 2 x 160 GB SATA hard disks; requires a free PCI slot.	
5ACPCI.RAIC-04	Replacement SATA-HDD 160GB Hard disk 160 GB SATA, replacement part for 5ACPCI.RAIC-03	

#### Table 8: Model numbers - Drives (cont.)

## 5.7 Fan kits

Model number	Short description	Comment
5PC810.FA01-00	APC810 fan kit for system unit 5PC800.SX01-00 APC810 fan kit for system unit with CS, made up of 3 fans (40x40x10)	
5PC810.FA02-00	APC810 fan kit for system unit 5PC800.SX02-00 APC810 fan kit for system unit with CS, made up of 2 fans (70x70x15)	
5PC810.FA05-00	APC810 fan kit for system unit 5PC800.SX05-00 APC810 fan kit for system unit with 5CS, made up of 3 fans (70x70x15)	

Table 9: Model numbers - Fan kits

## 5.8 AP Link cards

Model number	Short description	Comment
5AC801.SDL0-00	APC810 AP Link SDL transmitter Automation Panel SDL link transmitter	
5AC801.RDYR-00	APC810 Ready relay APC810 Ready relay	

Table 10: Model numbers - AP Link

## 5.9 Uninterruptible power supply

Model number	Short description	Comment
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	Battery unit 5 Ah UPS battery unit for the add-on UPS module	
5CAUPS.0005-00	UPS cable 0.5 m Connection cable between add-on UPS module and UPS battery unit, length 0.5 meters	
5CAUPS.0030-00	UPS cable 3 m Connection cable between add-on UPS module and UPS battery unit, length 3 meters	

Table 11: Model numbers - Uninterruptible power supply

## 5.10 Interface options (IF option)

Model number	Short description	Comment
5AC600.CANI-00	Add-on CAN interface CAN interface for installation in an APC620, APC800 or PPC700.	
5AC600.485I-00	Add-on RS232/422/485 interface Add-on RS232/422/485 interface for installation in an APC620, AP800 and PPC700.	

Table 12: Model numbers - Interface options (IF option)

## 5.11 Accessories

Model number	Short description	Comment
0TB103.9	Plug 24V 5.08 3-pin screw clamps 24 VDC 3-pin connector, female. Screw clamps, 3.31 mm <sup>2</sup> , 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 <sup>2</sup> , protected against vibration by the screw flange	
0AC201.9	Lithium batteries (5x) Lithium batteries, 5 pcs., 3 V / 950 mAh, button cell	
4A0006.00-000	Lithium battery (1x) Lithium battery, 1 pc., 3 V / 950 mAh, button cell	
5AC801.FA01-00	APC810 replacement fan filter for system units with 1CS 5 pcs	
5AC801.FA02-00	APC810 replacement fan filter for system units with 2CS 5 pcs	
5AC801.FA05-00	APC810 replacement fan filter for system units with 5CS 5 pcs	
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.	
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	

Table 13: Model numbers - Accessories

Model number	Short description	Comment
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 8,192 MB SSI CompactFlash card with 8,192 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 side, type B back side); 24 VDC.	
5A5003.03	Front cover for the USB Media Drive 5MD900.USB2-01 Front cover for the remote USB 2.0 drive combination 5MD900.USB2-01.	
5MMUSB.2048-00	USB flash drive 2 GB SanDisk USB 2.0 flash drive 2 GB	
0PS102.0	Power supply, 1-phase, 2.1 A 24 VDC power supply, 1 phase, 2.1 A, input 100-240 VAC, wide range, DIN rail installation	
0PS104.0	Power supply, 1-phase, 4.2 A 24 VDC power supply, 1 phase, 4.2 A, input 115/230 VAC, auto select, DIN rail mounting	
0PS105.1	Power supply, 1-phase, 5 A 24 VDC power supply, 1 phase, 5 A, input 115/230 VAC, manual select, DIN rail mounting	
0PS105.2	Power supply, 1-phase, 5 A, redundant 24 VDC power supply, 1 phase, 5 A, redundant through parallel operation, input 115/230 VAC, manual select, DIN rail mounting	
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 13: Model numbers - Accessories (cont.)

## 5.12 Software

Model number	Short description	Comment
5SWWXP.0426-ENG	WinXPe FP2007 APC810 C945GM Order Microsoft Windows XP embedded English, Feature Pack 2007, for PPC700 with CPU boards 5PC600.X855-00, 5PC600.X855-01, 5PC600.X855-02, 5PC600.X855-03, 5PC600.X855-04, 5PC600.X855-05; CompactFlash separately (at least 512 MB). Only delivered with a new PC.	
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.	
9\$0000.08-010	OEM Microsoft Windows XP Professional German CD, German; Only delivered with a new PC.	
9\$0000.08-020	OEM Microsoft Windows XP Professional English CD, English; Only delivered with a new PC.	
9\$0000.09-090	OEM Microsoft Windows XP Professional Multilanguage CDs; Only delivered with a new PC.	

Table 14: Software Model Numbers

## **Chapter 2 • Technical data**

## **1. Introduction**

The APC810 is the sophisticated upgrade to the APC620 product series. Based on the latest Intel® Core<sup>™</sup>2 Duo technology, the APC810 offers the highest level of performance for all applications that require maximum computing power.

The APC810 saves space in the switching cabinet. Drive inserts (DVD, HDD) and two CompactFlash slots are protected behind a cover on the front of the device. The modular plugin technology makes it easy for the user to switch drives. All connections and interfaces are located on the top side of the housing. The installation depth is not increased by protruding connectors. The different APC810 sizes with one, two or five card slots (for PCI/PCI Express cards) provide the optimum design for every installation situation - a perfect fit without wasting valuable space in the switching cabinet.



## 1.1 Features

- Latest processor technologies Core Duo, Core 2 Duo and Celeron M
- Up to 3 GB main memory (Dual Channel Memory Support)
- 2 CompactFlash slots (type I)
- 1, 2 or 5 card slots (for PCI / PCI Express (PCIe) cards)
- SATA drives (slide-in and slide-in compact slots)
- 5x USB 2.0
- 2x Ethernet 10/100/1000 MBit interfaces
- 2x RS232 Interface, modem compatible
- 24 VDC supply voltage
- Fan-free operation<sup>1)</sup>
- BIOS (AMI)
- Real-time clock, RTC (battery-buffered)
- 512 KB SRAM (with battery back-up)
- Connection of various display devices to the "Monitor/Panel" video output (supports RGB, DVI, and SDL - Smart Display Link - signals)
- 2nd graphics line with installation of the optional AP Link card
- Easy slide-in drive exchange (SATA hot plug capable)
- Optional installation of add-on UPS module
- Optional CAN interface
- Optional RS232/422/485 interface
- Optional RAID controller (requires an open PCI slot)

## 1.2 System components / Configuration

The AP810 system can be assembled to meet individual requirements and operational conditions.

The following components are absolutely essential for operation:

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

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

Software

## 1.3 Configuration - Basic system

## Information:

Components shown in light gray are in preparation.



Figure 1: Configuration - Basic system

#### 1.4 Configuration - Drives, software, accessories



Figure 2: Configuration - Drives, software, accessories

## 2. Entire device

## 2.1 Overview of APC810 1 PCI slot variations

## 2.1.1 Interfaces



Figure 3: Interface overview - APC810, 1 card 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. If this connection is broken, the APC810 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 4: Interface overview - APC810, 1 card slot variant (bottom)

## Information:

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

## 2.1.2 Technical data

Features	APC810 1 card slot variant
Boot loader / Operating system	BIOS
Processor	Component-dependent, see technical data for the CPU board
Cooling Method	Passive via heat sink and optionally supported with an active fan kit
Main memory	Max. 3 GB
Graphics Controller	Component-dependent, see technical data for the CPU board
Power failure logic Controller Buffer time	MTCX <sup>1)</sup> (see also page 304) 10 ms
Real-time clock (RTC) Battery-buffered Accuracy	Yes See the technical data for CPU boards
SRAM Battery-buffered Quantity	Yes 512 kB
Battery Type Removable Lifespan	See also page 68 Renata 950 mAh Yes, accessible behind the orange front doors 2 1/2 years <sup>2)</sup>
Ethernet Amount Speed Controller	2 10/100/1000 MBit/s See also page 58 or page 60
CAN bus	Optional with add-on interface (5AC600.CANI-00)
CompactFlash Type Amount	See also page 70 or page 71 Type I 2
Serial interface Amount Type UART Transfer rate Connection	See also page 57 or page 58 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	Also see page 61 USB 2.0 5 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s) Type A Max. 500 mA or 1 A per connection
Reset button	Yes, accessible behind the orange front doors
LEDs	4 directed outwards via fiber optic lines, see also section "status LEDs" on page 65
Card slots Amount half-size	See also section "Card slot (PCI / PCIe)" on page 64 1 Dimensions of the PCI / PCIe cards vary
Add-on UPS slot	Yes

Table 15: Technical data - APC810, 1 card slot variant

#### Technical data • Entire device

Features	APC810 1 card slot variant
AP Link slot	-
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption	24 VDC ± 25% 5 A Typ. 7 A, max. 50 A < 300µs Component-dependent, see section "Power calculation with 5PC810.SX01-00." on page 52
Mechanical characteristics	
Housing <sup>3)</sup> Material Paint Front cover	Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See section "Dimensions - APC810 1 card slot variant" on page 37.
Weight	approx. 3 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Storage Transport	Component-dependent - see section 2.4 "Ambient temperatures" on page 48 -20°C +60°C -20°C +60°C
Relative humidity Operation Storage Transport	Component-dependent, see section "Humidity specifications" on page 51 Component-dependent, see section "Humidity specifications" on page 51 Component-dependent, see section "Humidity specifications" on page 51
Vibration <sup>4)</sup> Operation (continuous) Operation (occasional) Storage Transport	2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock <sup>4)</sup> Operation Storage Transport	15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Protection type	IP20
Altitude Operation	max. 3000 m <sup>5)</sup> (component-dependent)

Table 15: Technical data - APC810, 1 card slot variant (cont.)

1) Maintenance Controller Extended.

2) at 50°C, 8.5  $\mu A$  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).




Figure 5: Dimensions - APC810 1 card slot variant

Chapter 2 Technical data

## 2.2 Overview of APC810 2 PCI slot variations

#### 2.2.1 Interfaces



Figure 6: Interface overview - APC810, 2 card 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. If this connection is broken, the APC810 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 7: Interface overview - APC810, 2 card slot variant (bottom)

# Information:

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

## 2.2.2 Technical data

Features	APC810 2 card slot variant
Boot loader / Operating system	BIOS
Processor	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. 3 GB
Graphics Controller	Component-dependent, see technical data for the CPU board
Power failure logic Controller Buffer time	MTCX <sup>1)</sup> (see also page 304) 10 ms
Real-time clock (RTC) Battery-buffered Accuracy	Yes See the technical data for CPU boards
SRAM Battery-buffered Quantity	Yes 512 kB
Battery Type Removable Lifespan	See also page 68 Renata 950 mAh Yes, accessible behind the orange front doors 2 1/2 years <sup>2)</sup>
Ethernet Amount Speed Controller	2 10/100/1000 MBit/s See also page 58 or page 60
CAN bus	Optional with add-on interface (5AC600.CANI-00)
CompactFlash Type Amount	See also page 70 or page 71 Type I 2
Serial interface Amount Type UART Transfer rate Connection	See also page 57 or page 58 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	Also see page 61 USB 2.0 5 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s) Type A Max. 500 mA or 1 A per connection
Reset button	Yes, accessible behind the orange front doors
LEDs	4 directed outwards via fiber optic lines, see also section "status LEDs" on page 65
Card slots Amount half-size	See also section "Card slot (PCI / PCIe)" on page 64 2 Dimensions of the PCI / PCIe cards vary
Add-on UPS slot	Yes

Table 16: Technical data - APC810, 2 card slot variant

Features	APC810 2 card slot variant
AP Link slot	Yes
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption	24 VDC ± 25% 5 A Typ. 7 A, max. 50 A < 300μs Component-dependent, see section "Power calculation with 5PC810.SX02-00" on page 53
Mechanical characteristics	
Housing <sup>3)</sup> Material Paint Front cover	Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See section "Dimensions - APC810 2 card slot variant" on page 42.
Weight	approx. 5 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Storage Transport	Component-dependent - see section 2.4 "Ambient temperatures" on page 48 -20°C +60°C -20°C +60°C
Relative humidity Operation Storage Transport	Component-dependent, see section "Humidity specifications" on page 51 Component-dependent, see section "Humidity specifications" on page 51 Component-dependent, see section "Humidity specifications" on page 51
Vibration <sup>4)</sup> Operation (continuous) Operation (occasional) Storage Transport	2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock <sup>4)</sup> Operation Storage Transport	15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Protection type	IP20
Altitude Operation	max. 3000 m <sup>5)</sup> (component-dependent)

Table 16: Technical data - APC810, 2 card slot variant (cont.)

1) Maintenance Controller Extended.

2) at 50°C, 8.5  $\mu A$  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 specify any other.

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

Chapter 2 Technical data

#### 2.2.3 Dimensions



Figure 8: Dimensions - APC810 2 card slot variant

## 2.3 Overview of APC810 5 PCI slot variations

## 2.3.1 Interfaces



Figure 9: Interface overview - APC810, 5 card 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. If this connection is broken, the APC810 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 10: Interface overview - APC810, 5 card slot variant (bottom)

# Information:

The 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.

## 2.3.2 Technical data

Features	APC810 5 card slot variant
Boot loader / Operating system	BIOS
Processor	Component-dependent, see technical data for the CPU board
Cooling Method	Passive via heat sink and optionally supported with an active fan kit
Main memory	Max. 3 GB
Graphics Controller	Component-dependent, see technical data for the CPU board
Power failure logic Controller Buffer time	MTCX <sup>1)</sup> (see also page 304) 10 ms
Real-time clock (RTC) Battery-buffered Accuracy	Yes See the technical data for CPU boards
SRAM Battery-buffered Quantity	Yes 512 kB
Battery Type Removable Lifespan	See also page 68 Renata 950 mAh Yes, accessible behind the orange front doors 2 1/2 years <sup>2)</sup>
Ethernet Amount Speed Controller	2 10/100/1000 MBit/s See also page 58 or page 60
CAN bus	Optional with add-on interface (5AC600.CANI-00)
CompactFlash Type Amount	See also page 70 or page 71 Type I 2
Serial interface Amount Type UART Transfer rate Connection	See also page 57 or page 58 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	Also see page 61 USB 2.0 5 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s) Type A Max. 500 mA or 1 A per connection
Reset button	Yes, accessible behind the orange front doors
LEDs	4 directed outwards via fiber optic lines, see also section "status LEDs" on page 65
Card slots Amount half-size	See also section "Card slot (PCI / PCIe)" on page 64 5 Dimensions of the PCI / PCIe cards vary
Add-on UPS slot	Yes

Table 17: Technical data - APC810, 5 card slot variant

Features	APC810 5 card slot variant
AP Link slot	Yes
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption	24 VDC ± 25% 5 A TBD Component-dependent, see section TBD
Mechanical characteristics	
Housing <sup>3)</sup> Material Paint Front cover	Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See section "Dimensions - APC810 5 card slot variant" on page 47.
Weight	Approx. TBD kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Storage Transport	Component-dependent - see section 2.4 "Ambient temperatures" on page 48 -20°C +60°C -20°C +60°C
Relative humidity Operation Storage Transport	Component-dependent, see section "Humidity specifications" on page 51 Component-dependent, see section "Humidity specifications" on page 51 Component-dependent, see section "Humidity specifications" on page 51
Vibration <sup>4)</sup> Operation (continuous) Operation (occasional) Storage Transport	2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock <sup>4)</sup> Operation Storage Transport	15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Protection type	IP20
Altitude Operation	max. 3000 m <sup>5)</sup> (component-dependent)

Table 17: Technical data - APC810, 5 card slot variant (cont.)

1) Maintenance Controller Extended.

2) at 50°C, 8.5  $\mu A$  of the supplied components and a self discharge of 40%.

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

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

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

## 2.3.3 Dimensions



Figure 11: Dimensions - APC810 5 card slot variant

### 2.4 Ambient temperatures

It is possible to combine CPU boards with various other components, such as drives, main memory, additional insert cards, etc. dependant on system unit and fan kit. The various configurations result in varying maximum possible ambient temperatures, which can be seen in the following graphics.

# Information:

The maximum specified ambient temperatures for operation with and without a fan kit 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).

#### Information on the worst-case conditions

- Thermal Analysis Tool (TAT V2.02) 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.

#### What must be considered when determining the maximum ambient temperature?

- Operation of the Ethernet interfaces (ETH1/ETH2) in 10/100MBit or 1 GBit mode
- Operating the entire device with or without fan kit

## 2.4.1 Without fan kit

## Information:

- Differentiating the ETH2 interface in up to 100 MBit or 1 GBit operation
- ETH1 in 1GBit operation is not permitted without a fan kit.
- Operation without the fan kit is only permitted with a vertical mounting orientation (see also Chapter 3 "Commissioning", Section "Mounting orientation" on page 130).

			ETH1: u ETH2: u	p to 10 p to 10	0 MBit o 0 MBit o	operatio operatio	n n		ETH1: u ETH2:	p to 10 up to 1	0 MBit o GBit op	peration peration		
	All temperature values in degrees Celsius (°C) at 500 meters NN. Derating the maximum ambient temperature (typically 1°C per 1000 meters above 500 NM		5PC800.B945-01 8	5PC800.B945-02	5PC800.B945-03 8	5PC800.B945-04 ≣		5PC800.B945-00 §	5PC800.B945-01	5PC800.B945-02	5PC800.B945-03 858	5PC800.B945-04 5		
	Maximum ambient temperature	35	35	35	45	/		30	30	30	40	/	Its	(orle)
	What can also be operated at the max. ambient temperature, or are there limits?												Temperature lim	anadian of source
act	On-Board CompactFlash <sup>1)</sup>	1	1	1	1			1	1	1	1		80	Γ
Compa	5AC801.HDDI-00	1	$\checkmark$	1	1			1	1	1	1		80	],
de-in (	5AC801.HDDI-01	1	$\checkmark$	$\checkmark$	$\checkmark$			1	1	$\checkmark$	$\checkmark$		80	
Sli	5AC801.HDDI-02	$\checkmark$	$\checkmark$	$\checkmark$	1			1	1	1	$\checkmark$		80	
_	5AC801.HDDS-00	1	1	1	1			1	1	1	1		80	Т
Optio	5AC801.DVDS-00	1	1	1	40			1	1	1	1		50	1 :
Slide-in	5AC801.DVRS-00	1	1	1	40			1	1	1	1		50	
Jory	5MMDDR.0512-01	1	1	1	1			~	1	1	1		-	Ν
nem r	5MMDDR.1024-01	1	1	1	1			1	1	1	1		-	1
Maiı	5MMDDR.2048-01	1	1	1	1			$\checkmark$	$\checkmark$	1	1		-	
	5PC810.SX01-00	1	1	1	1			1	1	1	1		80	Т
nuits	5PC810.SX02-00	1	1	1	1			1	1	1	1		80	1
Systen	5PC810.SX05-00	1	1	1	1			1	1	1	1		80	
	5AC600.CANI-00	1	1	1	1			1	1	1	1		-	
Link	5AC600.485I-00	1	1	1	1			1	1	1	1		-	
insert s / AP	5AC801.SDL0-00	1	1	1	1			1	1	1	1		-	
tional	5AC801.RDYR-00	1	1	1	1			1	1	1	1		-	
Addit	5ACPCI.RAIC-01(24 hours/standard)	30/	30/	30/	30/40			1	1	1	30/		-	
	5ACPCI.RAIC-03	1	1	1	1			1	1	1	1		-	

Figure 12: Ambient temperatures without a fan kit

## 2.4.2 With fan kit

## Information:

- Differentiating between up to 100 MBit or 1 GBit operation of ETH1 and ETH2.
- Vertical and horizontal (minus 5°C) mounting orientations are permitted (see also Chapter 3 "Commissioning", Section "Mounting orientation" on page 130).

		E	TH1: u	p to 100 p to 100	0 MBit o 0 MBit o	peratio peratio	n n		ETH1: ETH2:	up to 1 up to 1	GBit op GBit op	eration eration			
	All temperature values in degrees Celsius (°C) at 500 meters NN. Derating the maximum ambient temperature (typically 1°C per 1000 meters above 500 NN	5PC800.B945-00	5PC800.B945-01	5PC800.B945-02	5PC800.B945-03 🐕	5PC800.B945-04		5PC800.B945-00	5PC800.B945-01	5PC800.B945-02	5PC800.B945-03 8	5PC800.B945-04 🗟			
[	Maximum ambient temperature 1)	55	55	55	55	55		50	50	50	50	45		s	or(s)
	What can also be operated at the max. ambient temperature, or are there limits?													Temperature limit	Location of senso
act	On-Board CompactFlash <sup>2)</sup>	1	1	1	1	1		1	1	1	1	1		80	
Compa	5AC801.HDDI-00	1	1	1	1	1		✓	1	1	1	$\checkmark$		80	
de-in (	5AC801.HDDI-01	1	1	1	1	1		1	1	1	1	1		80	×.
Sli	5AC801.HDDI-02	1	1	$\checkmark$	$\checkmark$	1		1	$\checkmark$	1	1	$\checkmark$		80	
_	5AC801.HDDS-00	1	1	1	1	1		1	~	1	1	$\checkmark$		80	
Optio	5AC801.DVDS-00	50	50	50	50	50		1	1	1	1	1		50	Drive
Slide-in	5AC801.DVRS-00	50	50	50	50	50		1	1	1	1	✓		50	Slide-ir
nory	5MMDDR.0512-01	1	1	1	1	1		1	<ul> <li>Image: A start of the start of</li></ul>	1	1	1		-	
n men	5MMDDR.1024-01	1	1	1	1	1		$\checkmark$	$\checkmark$	1	1	$\checkmark$		-	$  \rangle$
Mai	5MMDDR.2048-01	1	1	1	1	1		1	1	1	1	1		-	
	5PC810.SX01-00	1	1	1	1	1		1	1	1	1	$\checkmark$		80	~
m uni	5PC810.SX02-00	1	1	1	1	1		1	1	1	1	1		80	ddns
Syster	5PC810.SX05-00	1	1	1	1	1		1	1	1	1	✓		80	Power
	5AC600.CANI-00	1	1	~	1	1		1	1	1	1	✓		-	
Link	5AC600.485I-00	1	1	1	1	1		1	1	1	1	1		-	$\setminus$
AP AP	5AC801.SDL0-00	1	1	1	1	1		1	1	1	1	1		-	
ional	5AC801.RDYR-00	1	1	1	1	1		1	1	1	1	1		-	
Addit. Intel	5ACPCI.RAIC-01(24 hours/standard)	30/40	30/40	30/40	30/40	30/40		30/40	30/40	30/40	30/40	30/40	ĺ	-	
	5ACPCI.RAIC-03	1	1	1	1	1		1	1	1	1	1		-	

Figure 13: Ambient temperatures with a fan kit

## 2.5 Humidity specifications

TBD

## 2.6 Power management

The following block diagram presents the simplified structure of the APC810 supply voltage for system units 5PC810.SX01-00 and 5PC810.SX02-00.



Figure 14: Supply voltage 1 and 2 card slot system units

## Explanation:

The supply voltage is converted to 15 V with a DC/DC converter. These electrically isolated 15 V feed 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. An additional DC/DC converter at the 5 V output generates -12 V and places it on the bus. An additional DC/DC converter generates +12 V.

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

#### 2.6.1 Power calculation with 5PC810.SX01-00.

Inf	orm	nation:		CPL	J Boa	rds		This system
<b>All</b> The Ent	entri e entri ries fo ues, b	es in watts ies for the Generator are maximum values. or the Device are determined maximum sut not peak values.	5PC800.B945-00 §	5PC800.B945-01	5PC800.B945-02	5PC800.B945-03 💈	5PC800.B945-04 💈	Enter values in this column
		Total	oowe	r sup	ply (i	max.)		85
		Add-on UPS module, optional	7.5	7.5	7.5	7.5	7.5	
		m	ax. po	ossib	le at	+12V		75
		CPU Board, fixed device	26	30	18	14	43	
		512MB RAM, max. 2 pcs. each 1.5 watts						
		1024MB RAM, max. 2 pcs. each 2.5 watts						
		2048MB RAM, max. 2 pcs. each 3 watts						
	12	Fan kit, optional	1.8	1.8	1.8	1.8	1.8	
	+	External keyboard, optional (via Baseboard)	10	10	10	10	10	
		PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 6 watts with fan kit) <sup>1)</sup>						
		PCIe x4 card manufacturer limit, optional (max. 3 watts without fan kit, max. 20 watts with fan kit) <sup>1)</sup>						
				Dev	ices	+12V	Σ	
≥	Ι.	r	nax. p	ossi	ble a	t +5V		65
dd		System unit, fixed device	4	4	4	4	4	
su		Hard Disk (slide-in compact)	4	4	4	4	4	
ē		USB Peripheral USB2 and USB4, each 2.5 watts						
ğ		USB Peripheral USB1, USB3 and USB5, each 5 watts						
Ē	_	Interface option (Add-on interface), optional	0.5	0.5	0.5	0.5	0.5	
ö	ι Σ	External device, optional (via BaseBoard)	5	5	5	5	5	
		PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 20 watts with fan kit) <sup>1)</sup>						
		n	nax. p	ossi	ble at	-12\		1,2
		PCI card manufacturer limit, optional (max. 1.2 watts with and without fan kit) <sup>(1)</sup>						
				De	vices	-12V	Σ	
				D	evice	es 5V	Σ	
		r	nax. j	possi	ble a	t 3V3		40
		System unit, fixed device	4	4	4	4	4	
		CompactFlash, each 1 watt						
	3	Interface option (Add-on interface), optional	0.25	0.25	0.25	0.25	0.25	
	3V	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 15 watts with fan kit) <sup>1)</sup>						
		PCIe x4 card manufacturer limit, optional (max. 3 watts without fan kit, max. 10 watts with fan kit) <sup>1)</sup>						
				De	vices	s 3V3	Σ	
	L				De	vices	Σ	

Figure 15: Power calculation with 5PC810.SX01-00

## 2.6.2 Power calculation with 5PC810.SX02-00

Inf	orn	nati	ion:		CPL	J Boa	rds		This system
				L2400	L7400	U7500	CM423	T7400	Esteradore in thi
All	entri	es i	n watts	45-0	45-0	45-0	45-0	45-0	Enter values in this
The	entr	ies f	or the Generator are maximum values.	0.B9	0.B9	0.Bg	0.Bg	0.B9	column
Entr	ries t	or th	e Device are determined maximum	80	80	80	080	80	
valu	103, L	Jui II	or peak values.	15	19	5	5	5F	~
1	_			powe	r sup	<b>piy (</b>	nax.	7.5	80
			maxim	17.5 um n	7.5	In at	1.5 +12\	7.5	75
			DL Darad fired derive		000	40	1121	40	15
			JPU Board, fixed device	26	30	18	14	43	
		- 3	12MB RAW Hax. 2 pcs. each 1.5 watts						
			1024IVIB RAWI Max. 2 pcs. each 2.5 walls	-					
	2	L	2046/vib RAWI max. 2 pcs. each 3 walls	2.0	2.0	2.0	2.0	2.0	
	13	Ľ	an kit, optional	2.8	2.8	2.8	2.8	2.8	
		Ľ	External device, optional (via Baseboard)	10	10	10	10	10	
			max. 3 watts without fan kit, max, 6 watts with fan kit)						
		F	PCI card manufacturer PCIe x4 Karte, optional						
		(1	max. 3 watts without fan kit, max. 20 watts with fan kit) 1)						
					Dev	ices	+12V	Σ	
		_		max. I	ossi	ble a	t +5V		65
-		5	System unit, fixed device	4	4	4	4	4	
١d		L F	Hard disk (slide-in compact)	4	4	4	4	4	
dn		5	Slide-in drive (hard disk, DVD-ROM,)	4	4	4	4	4	
er s		Ľ	JSB peripheral USB2 and USB4 each 2.5 watts						
We		ι	JSB peripheral USB1, USB3 and USB5 each 5 watts						
рс			nterface option (Add-on interface), optional	0.5	0.5	0.5	0.5	0.5	
tal	5	0	Graphics adapter (AP Link), optional	5	5	5	5	5	
2	<b>T</b>	E	External device, optional (via BaseBoard)	5	5	5	5	5	
		F	PCI card manufacturer PCI card, optional						
		(	max. 5 watts without fair kit, max. 20 watts with fair kit)	nav n	ossi	hlo ai	-12\	,	12
		>	PCI card manufacturer PCI card optional	Παλ. μ	0331		121		1.2
		-12	(max. 1.2 watts with and without fan kit) <sup>(1)</sup>						
					D	evice	-12V	Σ	
						Devi	ce 5V	Σ	
		_		max. J	oossi	ble a	t 3V3		40
			System unit, fixed device	4	4	4	4	4	
			CompactFlash, each 1 watt						
	~		nterface option (Add-on Interface), optional	0.25	0.25	0.25	0.25	0.25	
	3		Graphics adapter (AP Link), optional	1.5	1.5	1.5	1.5	1.5	
		F	PCI card manufacturer PCI card, optional						
		F	PCI card manufacturer PCIe x4 card, optional						<u> </u>
		(1	max. 3 watst without fan kit, max. 10 watts with fan kiit) <sup>1)</sup>						
					D	evic	e 3V3	Σ	
						D	evice	Σ	

Figure 16: Power calculation with 5PC810.SX02-00

#### 2.7 Serialnumber 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 17: Serial number sticker (front)

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



Figure 18: Serial number sticker (back)

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.

						ontact   language 💌   lugin	
					Per	fection in Automation	
Commente Desduste C	andas Fuente Nev	un mußertel				www.beautonaton.com	
Industrial PCs	BIVIDE EVENUS NEV	vs myPortai					
Brouit E000	Industrial PCs > Autor	hation PC 8JU > System	1 units >	SPC810.5X02-00		Search	
Provid 5500	General Description	Serial Number				Model Number 60	Sorial number optru
Provit 5500	1000	Nodel Nu	mbor: 5	5PC810.5X02 00			
Automation PC 620						A3C70168444	e.g. A3C70168444
Automation PC 800		Descriptio	n:			Search 60	
Automation Panel 800	M	APCR10 s PCI, depe for Autom	nding on ation Par	ut 2 slots (PCI Express, bus) 1 side-in slot nel Link transmitter;		Downloada	
Automation Panel 900		1 clide-in alot, Sma 2× R3232	t Display 5x U3D	clot and 1 clide-in y Link/DVI/monitor, 12.0, AC97 sound,		Automation PC 800 User's	
Panel PC 300		2× ETH 10 0TB103.9	(100/10) or cage	00, 24 VDC (screw clam clamp 0TB103.91 must	be	Nanual	
Panel PC 700		ordered s	eparately	y)			
Mobile Panel 40/50							
Mobile Panel 100							
Power Panel							
Operator Toterface							
Control Systems	No. NI						
I/O Systems	Let I						
Making Cantral	CREATE ORDER						
Moden Control	Castal sumbar	Madel assessment	David	Delivery dete	Field of succession		
Modules	A3C70168444	5PC810.SX02-00	40	C000-00-00	0000-00-00		
Software						-	List of installed components
Process Control	i his material is part or	a configured material w	nich was	s assembeld as follows.			after the serial number sea
Power Supplies	Serial number	Nodel number	Rev	Delivery date-0	End of warranty		
A	A3C70168444	5PC810.SX02-00	A0	000-00-00	00-00-00	_	
Accessories	A3E60168445	5MMDDR.1024-01	A0	0000-00-00	00-00-00	-	
Subscribe here to receive	A3E0U168447	5HMDDK.1024-01	AU	0000-00-00	0000-00-00	-	
the letest news about	A3140100425	5AC001.0001-01	AU	0000-00-00	00-00-00	-	
directly in your mailbox.	A2EA0168442	EPC910 BV02-01	A0	0000-00-00	0000-00-00	-	
Your e-mail address 60	A2CA0168420	5-C010.0A02-01	A0	0000-00-00	0000-00-00	-	
	A3CA0168430	5PC000.8945-00	AU	0000-00-00	0000-00-00		

Figure 19: Example of serial number search - A3C70168444

Chapter 2 Technical data

## 2.8 Device interfaces

## 2.8.1 +24 VDC supply voltage

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 APC810 housing. The supply voltage is protected internally by a soldered fuse (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). The device must be returned to B&R for repairs if the fuse is blown because of an error.

	Supply voltage								
Pr	rotected against reverse polarity	3-pin, male							
Pin	Description	Line IN							
1	-								
2	Functional grounding	Power 24 VDC							
3	+	- 🛧 +							
Accessories		9:::9							
0TB103.9	Plug 24 V 5.08 3p screw clamps	1_2_3_							
0TB103.91	Plug 24 V 5.08 3p cage clamps								

Table 18: Supply voltage connection + 24VDC

## Ground

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

The grounding connection can be found on the bottom of the APC810 systems.



Figure 20: Ground connection

The M4 self-locking nut can be used, for example, to fasten a copper strip that is built into the APC810 at a central grounding point in the switching cabinet or system. The largest possible conductor cross section should be used (at least 2.5 mm<sup>2</sup>).

### 2.8.2 Serial interface COM1

	Seria	l interfaces COM1 <sup>1</sup>	
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 19: 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.

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#### 2.8.3 Serial interface COM2

	Seria	l interfaces COM2 <sup>1)</sup>
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	COM2
2	RXD	
3	TXD	6
4	DTR	
5	GND	
6	DSR	
7	RTS	
8 CTS		
9	RI	

Table 20: 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.

## 2.8.4 Monitor / Panel connection - SDL (Smart Display Link / DVI)

Monitor / Panel connection - SDL (Smart Display Link / DVI)		
The following will provide an overview of the video signals available on the monitor/panel output.		
CPU board	Video signals with all system unit variations	
5PC800.B945-00	RGB, DVI, SDL	Monitor / Panel
5PC800.B945-01	RGB, DVI, SDL	
5PC800.B945-02	RGB, DVI, SDL	
5PC800.B945-03	RGB, DVI, SDL	
5PC800.B945-04	RGB, DVI, SDL	

Table 21: Monitor / Panel connection - RGB, DVI, SDL

#### 2.8.5 Ethernet 1 (ETH1)

This Ethernet controller is integrated in the CPU board and is fed outwards via the system unit.



Table 22: 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) Change-over takes place automatically.
- 3) The 10 MBit/s transfer speed / connection is only present if the Link LED is simultaneously active.

#### Important information on transfer speed

Because of thermal factors, operation of the ETH1 in 1000 MBit/s mode is only permitted with use of a fan kit (see also Section 2.4 "Ambient temperatures" on page 48).

#### **Driver support**

A special driver is necessary for operating the Realtek Ethernet controllers RTL8111B. The necessary software can be downloaded from the download area on the B&R homepage (<u>www.br-automation.com</u>).

## 2.8.6 Ethernet 2 (ETH2)

This Ethernet controller is integrated in the main board and is fed outwards via the system unit.



Table 23: Ethernet connection (ETH2)

- 1) The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.
- 2) Change-over takes place automatically.
- 3) The 10 MBit/s transfer speed / connection is only present if the Link LED is simultaneously active.

#### **Driver support**

A special driver is necessary for operating the Intel Ethernet controller 82573L. The necessary software can be downloaded from the download area on the B&R homepage (<u>www.br-automation.com</u>).

#### 2.8.7 USB interfaces (USB1,2,3,4,5)

The APC810 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.

# Warning!

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

See Chapter3 "Commissioning", Section "Connection of USB peripheral devices" on page 164 for additional information.

## Important!

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

#### USB1,2,3,4



Table 24: USB1, USB2, USB3, USB4 connection

 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).

#### USB5

	Universal Serial Bus (USB5) <sup>1)</sup>		
Transfer rate	Low speed (1.5 MBit/s), Full speed (12 MBit/s) to High speed (480 Mbit/s)	4 x USB type A, female	
Power Supplies <sup>2)</sup> USB5	Max. 1 A		
Maximum cable length	5 m (without hub)		

Table 25: USB5 connection

- 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. 1 A).

#### 2.8.8 MIC, Line IN, Line OUT

All APC810 systems include an AC97 (Rev 2.2) compatible sound chip with access to the channels MIC, Line IN and Line OUT from the outside.

MIC, Line IN, Line OUT		
Controller	Realtek AC97 Rev. 2.2	3.5 mm socket, female
MIC	Connection for a mono microphone via 3.5 mm stereo (headphone) jack.	
Line IN	Stereo Line IN signal supplied via 3.5 mm plug.	2
Line OUT	Connection for a stereo sound reader (e.g. amplifier) via a 3.5 mm plug.	MIC Line IN Line OUT
Power 24 VDC - A +	Power 24 VDC +	

Table 26: MIC, Line IN, Line OUT

## **Driver support**

A special driver is necessary for operating the audio controller. The necessary software can be downloaded from the download area on the B&R homepage (<u>www.br-automation.com</u>).

## 2.8.9 Add-on UPS slot

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

ç	Add-on UPS slot		
apter 2		Add-on UPS + accessories	
CP CP		Add-on UPS module	5AC600.UPSI-00
F		Battery unit 5 Ah	5AC600.UPSB-00
	-	UPS cable 0.5 m	5CAUPS.0005-00
		UPS cable 3 m	5CAUPS.0030-00
	+ + 1 1	with mounted add-on UPS module	Pin assignments
		+	1
		+	2
		-	3
		-	4
		NTC (for battery temperature measurement	5
		NTC (for battery temperature measurement	6
		with mounted add-on UPS module  + +	Pin assignments           1           2           3           4           5           6

Table 27: Add-on UPS slot (with and without mounted UPS)

## 2.8.10 AP Link slot

When connected with the AP Link card 5AC801.SDL0-00, it is possible to implement a second graphic line with DVI and SDL, but without RGB signals. Furthermore, the APC810 ready relay 5AC801.RDYR-00 can also be mounted.

The AP Link cards can only be mounted to the system units 5PC810.SX02-00 and 5PC810.SX05-00.

## 2.8.11 Card slot (PCI / PCIe)

Standard PCI 2.2 half-size cards or PCI Express (PCIe) half-size cards can be plugged in depending on the type of bus unit. They cannot exceed the following dimensions.



Figure 21: Dimensions - Standard half-size PCI card



Figure 22: Dimensions - Standard half-size PCIe card

#### 2.8.12 status LEDs

The status LEDs are in the system unit.

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)	
	Orange 1)	On	Supply voltage not OK; the system is operating on battery power.	Power
HDD	Yellow	On	Signals IDE drive access (CF, HDD, CD, etc.)	CMOS Profile
Link 1 Yellow	On	On	Indicates an active SDL connection on the monitor / panel plug.	Hardware Link 2 Reset Security Key Battery
	blink ing	An active SDL connection has been interrupted by a loss of power in the display unit.		
Link 2 Yellow		On	Indicates an active SDL connection on the AP Link.	
	blink ing	An active SDL connection on the AP link has been interrupted by a loss of power in the display unit.		

Table 28: Data - status LEDs

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

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



Figure 23: Front-side status LEDs

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#### 2.8.13 CMOS profile switch

CMOS profile switch		
Different BIOS default value profiles can be defined using the 16-position CMOS profile switch.		0. E Hav
Switch position Description		
0	Profile 0: Default profile reserved.	Power
1	Profile 1: Optimized for the system unit 5PC810.SX02-00	CMOS Profile Mardware Security Key Battery

Table 29: CMOS profile 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 position of the CMOS profile switch is is displayed in the BIOS setup pages and in the B&R ADI Control Center, among other places.

#### 2.8.14 Power button

The power button has a variety of functions due to full ATX power supply support.



Table 30: Power button

## 2.8.15 Reset button

# Information:

From MTCX PX32 firmware  $\geq$  V00.11 and higher, the reset button is only triggered by edges. This means that the device boots even when the reset button is pressed. In MTCX PX32 firmware < V00.11, the system does not start after pressing (ca. 10 seconds) and releasing the reset button.



Table 31: Reset button

# Warning!

#### A system reset can cause data to be lost!

#### 2.8.16 Battery

The lithium battery (3 V, 950 mAh) buffers the internal real-time clock (RTC) as well as the individually saved BIOS settings and data in the SRAM and is located behind the black cover. The buffer duration of the battery is at least 2 1/2 years (at 50°C, 8.5 mA current requirements of the supplied components and a self discharge of 40%). The battery is subject to wear and should be replaced regularly (at least following the specified buffer duration).

	Battery			
Battery Type Removable Lifespan	Renata 950 mAh Yes, accessible from the outside 2 1/2 years <sup>1)</sup>	CMOS HDD Profile Link 1		
Accessories	Short description			
0AC201.9	Lithium batteries (5x) Lithium batteries, 5 pcs., 3 V / 950 mAh, button cell	Hardware Security Key Battery		
4A0006.00-000	Lithium battery (1x) Lithium batteries, 1 pcs., 3 V / 950 mAh, button cell			

Table 32: Battery

1) At 50 ?, 8.5  $\mu\text{A}$  of the supplied components and a self discharge of 40%.

#### **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 33: Meaning of battery status

## 2.8.17 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 34: Hardware security key

# Warning!

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

Chapter 2 Technical data

## 2.8.18 CompactFlash slot 1

This CompactFlash slot is a fixed part of an APC810 system, is internally connected with the chipset via IDE PATA. Type I CompactFlash cards are supported.

CompactFlash slot (CF1)				
Connection	PATA Master			
CompactFlash Type	Туре І	CF2		
Accessories	Short description			
5CFCRD.0064-03	CompactFlash 64 MB SSI			
5CFCRD.0128-03	CompactFlash 128 MB SSI			
5CFCRD.0256-03	CompactFlash 256 MB SSI			
5CFCRD.0512-03	CompactFlash 512 MB SSI			
5CFCRD.1024-03	CompactFlash 1024 MB SSI			
5CFCRD.2048-03	CompactFlash 2048 MB SSI			
5CFCRD.4096-03	CompactFlash 4096 MB SSI			
5CFCRD.8192-03	CompactFlash 8,192 MB SSI	CF1		

Table 35: CompactFlash slot (CF1)

# Warning!

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

## 2.8.19 CompactFlash slot 2

This CompactFlash slot is a fixed part of an APC810 system, is internally connected with the chipset via IDE PATA. Type I CompactFlash cards are supported.

CompactFlash slot (CF2)			
Connection	PATA Slave		
CompactFlash Type	Туре І		
Accessories	Short description		
5CFCRD.0064-03	CompactFlash 64 MB SSI		
5CFCRD.0128-03	CompactFlash 128 MB SSI	USB5	
5CFCRD.0256-03	CompactFlash 256 MB SSI	HUD	
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 8,192 MB SSI	CF2	

Table 36: CompactFlash slot (CF2)

# Warning!

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

#### 2.8.20 Slide-In slot 1

The slide-in slot 1 is internally connected with the chipset via SATA I.

Slide-in slot 1		
Connection	SATAI	
Accessories	Short description	
5AC801.ADAS-00	APC810 slide-in compact adapter	
5AC801.HDDS-00	APC810 slide-in HDD EE25	Slide-In Slot 1 Hardware Security Key
5AC801.DVRS-00	APC810 slide-in DVD-R/RW	
5AC801.DVDS-00	APC810 slide-in DVD-ROM	

Table 37: Slide-in slot 1

## Information:

The SATA I interface allows data carriers to be exchanged during operation (hotplug). To utilize this capability, it must be supported by the operating system.
## 2.8.21 Slide-In slot 2

The slide-in slot 2 is internally connected with the chipset via SATA I.

		Slide-in slot 2		
Connection	SATAI			
Accessories	Short description			
5AC801.HDDS-00	APC810 slide-in HDD EE25		(3)	
5AC801.DVRS-00	APC810 slide-in DVD-R/RW		Slide-In Slot 2	Slide-In Slot 1
5AC801.DVDS-00	APC810 slide-in DVD-ROM			

Table 38: Slide-in slot 2

## Information:

The APC810 slide-in compact adapter 5AC801.ADAS-00 can only be inserted into slide-in slot 1 for mechanical reasons (closing the front door).

# Information:

The SATA I interface allows data carriers to be exchanged during operation (hotplug). To utilize this capability, it must be supported by the operating system. Chapter 2 Technical data

## 2.8.22 Slide-in compact slot

The slide-in compact slot is internally connected with the chipset via SATA I.

	Slide-in compact slot		
Connection	SATAI		
Accessories	Short description		
5AC801.HDDI-00	APC810 slide-in compact HDD 40GB EE25		
5AC801.HDDI-01	APC810 slide-in compact HDD 80GB EE25	USB5 HDD	
5AC801.HDDI-02	APC810 slide-in compact HDD 160GB EE25		

Table 39: Slide-in compact slot

## Information:

## The SATA I interface allows data carriers to be exchanged during operation (hotplug). To utilize this capability, it must be supported by the operating system.

For information about installing / exchanging a slide-in compact drive, see the section "Installing / exchanging a slide-in compact drive" on page 286.

## 3. Individual components

## 3.1 Systemunits

The system unit unites all of the individual components in one compact device. It consists of a housing with an integrated main board. The interfaces easily accessible on the front side, just behind the orange front doors or on the top. The system units are available in sizes with 1, 2 or 5 card slots.

## 3.1.1 Technical data

Features	5PC810.SX01-00	5PC810.SX02-00	5PC810.SX05-00
Photo	1000 100	E.S.	- KS
Serial interface Amount		2	
Ethernet Interface Amount		2	
USB interface Amount		5	
Monitor / Panel output	Yes		
AC97 sound		Yes	
IF optional slot		Yes	
Card slots (PCI / PCIe slots <sup>1)</sup> )	1	2	5
CompactFlash slot Amount		2	
Slot for slide-in drive	-	1	2
Slot for slide-in compact drive		1	
Slot for add-on UPS module		Yes	
Reset button		Yes	
Power button	Yes		
CMOS profile switch	Yes		
Battery compartment		Yes	
Hardware security compartment		Yes	
Fan kit insert	Yes		
AP Link slot	-	Y	es

Table 40: Technical data - System units

Features	5PC810.SX01-00	5PC810.SX02-00	5PC810.SX05-00		
Status LEDs	Yes				
MTCX <sup>2)</sup>		Yes			
Electrical characteristics					
Supply voltage Rated voltage Starting current Power consumption	24 VDC Typ. 7 A, max See section 2.6 "Po	: ± 25% .50 A < 300µs wer management".	24 VDC ± 25% TBD TBD		
Mechanical characteristics					
Housing <sup>3)</sup> Material Paint Front cover	Light gray (similar t Orange	Galvanized steel plate o Pantone 427C), dark gray (simila e colored plastic (similar to Pantone	r to Pantone 432C) e 144C)		
Outer dimensions (without heat sink) Width Length Height	74 mm 252.7 mm 270 mm	113.5 mm 254.6 mm 270 mm	194.4 mm 254.5 mm 270 mm		
Weight (without heat sink)	Approx. 2.2 kg	Approx. 2.8 kg	TBD		
Mounting plates (for M4 screws)	4	4	6		
Drilling templates for mounting	See chapter 3 "Commissioning", section "Drilling templates" on page 128				

Table 40: Technical data - System units (cont.)

1) Depends on the bus unit.

2) For more information about Maintenance Controller Extended, see the section "Maintenance Controller Extended (MTCX)" on page 304.

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

## 3.2 Busunits

The bus units are compatible with the system units in 1, 2 or 5 card slot sizes, available with PCI and/or PCI Express support.



Figure 24: 1 slot bus units



Figure 25: 2 slot bus units

## 3.2.1 Technical data

Features	5PC810.BX01-00	5PC810.BX01-01	5PC810.BX02-00	5PC810.BX02-01	5PC810.BX05-00	5PC810.BX05-01
PCI slot Amount Default Bus speed	1 2.2 33 MHz	-	2 2.2 33 MHz	1 2.2 33 MHz	4 2.2 33 MHz	2 2.2 33 MHz
PCI Express Amount Default Bus speed	-	1 1.0a x4 (10 GB/s)	-	1 1.0a x4 (10 GB/s)	1 1.0a x1 (2.5 GB/s)	3 1.0a x1 (2.5 GB/s)

Table 41: Technical data - Bus units

Chapter 2 Technical data

## 3.3 CPU boards 945GME



Figure 26: CPU board

## 3.3.1 Technical data

Features	5PC800.B945-00	5PC800.B945-01	5PC800.B945-02	5PC800.B945-03	5PC800.B945-04
Boot loader / Operating system	embedded AMI B	IOS (for a description,	see Chapter 4 "Softwar	e", section "BIOS optic	ons" on page 169)
Processor Type Name Speed Architectures L1 cache L2 cache Front side bus - FSB	Intel® Core™ Duo L2400 1.66 GHz 65 nm 32 kByte 1 MB 667 MHz	Intel <sup>®</sup> Core™2 Duo L7400 1.5 GHz 65 nm 32 kByte 4 MB 667 MHz	Intel <sup>®</sup> Core™2 Duo U7500 1.06 GHz 65 nm 32 kByte 2 MB 533 MHz	Intel® Celeron® M 423, 1.06 GHz 65 nm 32 kByte 1 MB 533 MHz	Intel <sup>®</sup> Core™2 Duo T7400 2.16 GHz 65 nm 32 kByte 4 MB 667 MHz
Chipset		Intel® 9450	GME / Intel 8201 GMH (	ICH7M-DH)	
DRAM		SO-DIMM	DDR2 667/PC5300, ma	ax. 3 GByte	
Graphics Controller Memory Color depth Max. resolution		Intel® C up to 224 M	Graphics Media Acceler Byte (reserved from ma max 32 Bit 1920 x 1200	ator 950 ain memory)	
Real-time clock (RTC) Battery-buffered Accuracy		At 25°C t	Yes yp. 12 ppm (1 second)	<sup>1)</sup> per day	
Mass memory management			2 x SATA, 1 x IDE		
Power management		ACPI 2.0	), S3 Support (suspend	to RAM)	

#### Table 42: Technical data - CPU boards

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

## 3.4 Heat sink



Figure 27: Heat sink

## 3.4.1 Technical data

Mechanical characteristics	5AC801.HS00-00	5AC801.HS00-01
Ideal for CPU boards	5PC800.B945-00 5PC800.B945-01 5PC800.B945-02 5PC800.B945-03	5PC800.B945-04
Material	Aluminum, black-coate	d with copper heat pipes
Outer dimensions Width Height Depth	228.7 mm 218 mm 12.8 mm	228.7 mm 218 mm 28 mm
Weight	Approx. 1.7 kg	Approx. 2 kg

Table 43: Technical data - Heat sink

## 3.5 Mainmemory

The CPU boards offer room for two main memory modules. Dual-Channel memory technology is supported when two modules of the same size (e.g. 1 GB) are plugged in. This technology is not supported when two modules of different sizes (e.g. 1 GB and 2 GB) are plugged in.

When two 2 GB modules are plugged in, only 3 GB of main memory can be used.



Figure 28: Main memory

## 3.5.1 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 44: Technical data - Main memory

# Information:

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

## 3.6 Drives

## 3.6.1 Slide-in compact HDD 40GB EE25 - 5AC801.HDDI-00

This hard disk is specified for 24-hour operation and also provides an extended temperature specification.



Figure 29: Slide-in compact HDD 40GB EE25 - 5AC801.HDDI-00

## **Technical data**

## Information:

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

Features	5AC801.HDDI-00
Manufacturer's product ID	Seagate ST940817SM
Formatted capacity	40 GB
Number of heads	1
Number of sectors (user)	78.140.160
Bytes per sector	512
Revolution speed	5400 rpm
Access time (average)	12.5 ms

Table 45: Technical data - add-on hard disk - 5AC801.HDDI-00

Features	5AC801.HDDI-00
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1 ms 12.5 ms 23 ms
Starting time (0 rpm to read access)	3 seconds (typically)
Interface	SATA
Data transfer rate Internal To / from host	Max. 450 MBits/sec Max. 150 MB/s (Ultra-DMA Mode 5)
Cache	8 MB
S.M.A.R.T. support	Yes
MTBF	750000 Power On Hours <sup>1)</sup>
Mechanical characteristics	
Slide-in compact mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	70 mm 100 mm 9.5 mm
Weight	100 g
Environmental characteristics	
Ambient temperature <sup>2)</sup> Operation - Standard / 24-hour Storage Transport	-30°C +85°C -40°C +95°C -40°C +95°C
Relative Humidity <sup>3)</sup> Operation Storage Transport	5 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage	2 g at 5 - 500 Hz, no non-recovered errors 5 g at 5 - 500 Hz, no non-recovered errors
Shock (pulse with a sine half-wave) Operation Storage	300 g and 2 ms duration, no non-recovered errors 150 g and 11 ms duration, no non-recovered errors 800 g and 2 ms duration, no non-recovered errors 400 g and 0.5 ms duration, no non-recovered errors
Altitude Operation Storage	- 300 to 5000 meters - 300 to 12192 meters

Table 45: Technical data - add-on hard disk - 5AC801.HDDI-00 (cont.)

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

2) Temperature values for 305 meter elevation. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 20°C per hour.

3) Humidity gradient: Maximum 15% per hour.



## Temperature humidity diagram - Operation and storage



Temperature values for 305 meter elevation. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 20°C per hour.

Technical data

Chapter 2

## 3.6.2 Slide-in compact HDD 80GB EE25 - 5AC801.HDDI-01

This hard disk is specified for 24-hour operation and also provides an extended temperature specification.



Figure 31: Slide-in compact HDD 80GB EE25 - 5AC801.HDDI-01

## **Technical data**

## Information:

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

Features	5AC801.HDDI-01
Manufacturer's product ID	Seagate ST980817SM
Formatted capacity	80 GB
Number of heads	2
Number of sectors (user)	156.301.488
Bytes per sector	512
Revolution speed	5400 rpm
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 23 ms

Table 46: Technical data - Slide-in compact HDD - 5AC801.HDDI-01

Features	5AC801.HDDI-01
Starting time (0 rpm to read access)	3 seconds (typically)
Interface	SATA
Data transfer rate Internal To / from host	Max. 450 MBits/sec Max. 150 MB/s (Ultra-DMA Mode 5)
Cache	8 MB
S.M.A.R.T. support	Yes
MTBF	750000 Power On Hours <sup>1)</sup>
Mechanical characteristics	
Slide-in compact mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	70 mm 100 mm 9.5 mm
Weight	100 g
Environmental characteristics	
Ambient temperature <sup>2)</sup> Operation - Standard / 24-hour Storage Transport	-30°C +85°C -40°C +95°C -40°C +95°C
Relative Humidity <sup>3)</sup> Operation Storage Transport	5 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage	2 g at 5 - 500 Hz, no non-recovered errors 5 g at 5 - 500 Hz, no non-recovered errors
Shock (pulse with a sine half-wave) Operation Storage	300 g and 2 ms duration, no non-recovered errors 150 g and 11 ms duration, no non-recovered errors 800 g and 2 ms duration, no non-recovered errors 400 g and 0.5 ms duration, no non-recovered errors
Altitude Operation Storage	- 300 to 5000 meters - 300 to 12192 meters

Table 46: Technical data - Slide-in compact HDD - 5AC801.HDDI-01 (cont.)

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

2) Temperature values for 305 meter elevation. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 20°C per hour.

3) Humidity gradient: Maximum 15% per hour.





Figure 32: Temperature humidity diagram - 5AC801.HDDI-01

Temperature values for 305 meter elevation. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 20°C per hour.

## 3.6.3 Slide-in hard disk 160 GB GB 24x7 ET - 5AC801.HDDI-02

This hard disk is specified for 24-hour operation (24x7) and also provides an extended temperature specification (ET).



Figure 33: Slide-in compact HDD 160 GB - 5AC801.HDDI-02

## **Technical data**

## Information:

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

Features	5AC801.HDDI-02
Manufacturer's product ID	Fujitsu MHY2160BH-ESW
Formatted capacity	160 GB
Number of heads	3
Number of sectors (user)	312.581.808
Bytes per sector	512
Revolution speed	5400 rpm
Access time (average)	12 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1.5 ms 12 ms 22 ms

Table 47: Technical data - Slide-in compact HDD - 5AC801.HDDI-02

Features	5AC801.HDDI-02
Starting time (0 rpm to read access)	4 seconds (typically)
Interface	SATA
Data transfer rate Internal To / from host	Max. 84.6 MBits/sec Max. 150 MB/s (Ultra-DMA Mode 5)
Cache	8 MB
S.M.A.R.T. support	Yes
MTBF	300000 Power On Hours <sup>1)</sup>
Mechanical characteristics	
Slide-in compact mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	70 mm 100 mm 9.5 mm
Weight	100 g
Environmental characteristics	
Ambient temperature <sup>2)</sup> Operation - Standard / 24-hour Storage Transport	-15°C +80°C -40°C +95°C -40°C +95°C
Relative Humidity <sup>3)</sup> Operation Storage Transport	8 - 90% non-condensing (maximum humidity at +29°C) 5 - 95% non-condensing (maximum humidity at +40°C) 5 - 95% non-condensing (maximum humidity at +40°C)
Vibration Operation Storage	5 - 500 Hz: 1 g, no unrecoverable errors 5 - 500 Hz: 5 g, no damage
Shock (pulse with a sine half-wave) Operation Storage	325 g, 2 ms, no unrecoverable errors 900 g, 1 ms, no damage 120 g, 11 ms, no damage
Altitude Operation Storage	- 300 to 3000 meters - 300 to 12192 meters

#### Table 47: Technical data - Slide-in compact HDD - 5AC801.HDDI-02 (cont.)

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

2) Temperature values for 305 meter elevation. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 20°C per hour.

3) Humidity gradient: Maximum 15% per hour.



## Temperature humidity diagram - Operation and storage



Temperature values for 305 meter elevation. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 20°C per hour.

Technical data

Chapter 2

## 3.6.4 Slide-in HDD EE25 - 5AC801.HDDS-00



Figure 35: Slide-in HDD EE25 5AC801.HDDS-00

## **Technical data**

## Information:

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

Features	5AC801.HDDS-00
Manufacturer's product ID	Seagate ST940817SM
Formatted capacity	40 GB
Number of heads	1
Number of sectors (user)	78.140.160
Bytes per sector	512
Revolution speed	5400 rpm
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 23 ms
Starting time (0 rpm to read access)	3 seconds (typically)

Table 48: Technical data - Slide-in HDD EE25 - 5AC801.HDDS-00

Features	5AC801.HDDS-00
Interface	SATA
Data transfer rate Internal To / from host	Max. 450 MBits/sec Max. 150 MB/s (Ultra-DMA Mode 5)
Cache	8 MB
S.M.A.R.T. support	Yes
MTBF	750000 Power On Hours <sup>1)</sup>
Mechanical characteristics	
Slide-in compact mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	70 mm 100 mm 9.5 mm
Weight	100 g
Environmental characteristics	
Ambient temperature <sup>2)</sup> Operation - Standard / 24-hour Storage Transport	-30°C +85°C -40°C +95°C -40°C +95°C
Relative Humidity <sup>3)</sup> Operation Storage Transport	5 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage	2 g at 5 - 500 Hz, no non-recovered errors 5 g at 5 - 500 Hz, no non-recovered errors
Shock (pulse with a sine half-wave) Operation Storage	300 g and 2 ms duration, no non-recovered errors 150 g and 11 ms duration, no non-recovered errors 800 g and 2 ms duration, no non-recovered errors 400 g and 0.5 ms duration, no non-recovered errors
Altitude Operation Storage	- 300 to 5000 meters - 300 to 12192 meters

#### Table 48: Technical data - Slide-in HDD EE25 - 5AC801.HDDS-00 (cont.)

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

2) Temperature values for 305 meter elevation. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 20°C per hour.

3) Humidity gradient: Maximum 15% per hour.

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Figure 36: Temperature humidity diagram - 5AC801.HDDS-00

Temperature values for 305 meter elevation. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 20°C per hour.

## 3.6.5 Slide-in DVD-ROM - 5AC801.DVDS-00



Figure 37: Slide-in DVD-ROM 5AC801.DVDS-00

## **Technical data**

# Information:

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

Features	5AC801.DVDS-00
Reading rate CD DVD	24x 8x
Data transfer rate	max. 1.5 Gbps
Access time (average) CD DVD	130 ms 140 ms
Revolution speed	Max. 5090 rpm ± 1%
Starting time (0 rpm to read access)	19 seconds (maximum)
Host interface	SATA

Table 49: Technical data - 5AC801.DVDS-00

Features	5AC801.DVDS-00
Readable media CD DVD	CD-ROM (12 cm, 8 cm), CD-A CD-R, CD-RW DVD-ROM, DVD-R, DVD-R DL, DVD-RW, DVD+R DL, DVD+RW, DVD-RAM
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-Video (Double Layer), DVD-R (Single/Multi-border), DVD-R DL (Single/Multi- border), DVD-RW (Single/Multi-border), DVD+R (Single/Multi session), DVD+RW (Single/Multi session), DVD+R DL (Single/Multi session), DVD+RW (Single/Multi session), DVD-RAM (4.7 GB, 2.6 GB)
Laser class	Class 1 laser
Noise level (complete read access)	Approx. 45 dBA in a distance of 50 cm
Lifespan Opening/closing the drawer	60000 POH (Power-On Hours) > 10000 times
Environmental characteristics	
Ambient temperature <sup>1)</sup> Operation Storage Transport	+5°C +55°C <sup>2)</sup> -20°C +60°C -40°C +65°C
Relative humidity Operation Storage Transport	8 - 80%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage Transport	0.2 g at 5 - 500 Hz 2 g at 5 - 500 Hz 2 g at 5 - 500 Hz 2 g at 5 - 500 Hz
Shock Operation Storage Transport	5 g and 11 ms duration 60 g and 11 ms duration 200 g and 2 ms duration 60 g and 11 ms duration 200 g and 2 ms duration

Table 49: Technical data - 5AC801.DVDS-00 (cont.)

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

2) Drive surface temperature



## Temperature humidity diagram - Operation and storage



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).

### Hot plug capable

Hardware revision B0 of the slide-in DVD-ROM - 5AC801.DVDS-00 does not offer SATA hot plug capability. Other hardware revisions are hot plug capable.

Technical data

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## 3.6.6 Slide-in DVD-R/RW - 5AC801.DVRS-00



Figure 39: Slide-in DVD-R/RW - 5AC801.DVRS-00

## **Technical data**

## Information:

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

Features	5AC801.DVRS-00
Write speed CD-R CD-RW DVD-R (Double Layer) DVD-RW DVD-RW DVD-RM <sup>1)</sup> DVD+R DVD+R (double layer) DVD+RW	24x, 16x, 10x and 4x 24x, 16x, 10x and 4x 8x, 4x and 2x 6x, 4x and 2x 6x, 4x and 2x 5x, 3x and 2x 8x, 4x and 2x 8x, 4x and 2,4x 6x, 4x and 2,4x 4x and 2x
Reading rate CD DVD	max. 24x max. 8x
Data transfer rate	Max. 33.3 MB/sec.

Table 50: Technical data for slide-in DVD-R/RW, DVD+R/RW - 5AC801.DVRS-00

Features	5AC801.DVRS-00
Access time (average) CD DVD	140 ms (24x) 150 ms (8x)
Revolution speed	Max. 5160 rpm ± 1%
Starting time (0 rpm to read access) CD DVD	14 seconds (maximum) 15 seconds (maximum)
Host interface	SATA
Readable media CD DVD	CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW DVD-ROM, DVD-R, DVD-R (double layer), DVD-RW. DVD-RAM, DVD+R, DVD+R (double layer), DVD+RW, DVD-RAM
Non-write protected media CD DVD	CD-R, CD-RW DVD-R/RW, DVD-R (double layer), 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-R (double layer), DVD-RW, DVD-Video DVD-RAM (4.7 GB, 2.6 GB) DVD+R, DVD+R (double layer), DVD+RW
Write-methods CD DVD	Disk at once, session at once, packet write, track at once Disk at once, incremental, over-write, sequential, multi-session
Laser class	Class 1 laser
Data buffer capacity	2 MB
Noise level (complete read access)	Approx. 45 dBA at 50 cm
Lifespan Opening/closing the drawer	60000 POH (Power-On Hours) > 10000 times
Environmental characteristics	
Ambient temperature <sup>2)</sup> Operation Storage Transport	+5°C +55°C <sup>3)</sup> -20°C +60°C -40°C +65°C
Relative humidity Operation Storage Transport	8 - 80%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage Transport	At max. 5 - 500 Hz and 0.2 g At max. 5 - 500 Hz and 2 g At max. 5 - 500 Hz and 2 g
Shock (pulse with a sine half-wave) Operation Storage Transport	At max. 5 g for 11 ms At max. 60 g for 11 ms At max. 200 g for 2 ms At max. 60 g for 11 ms At max. 200 q for 2 ms

Table 50: Technical data for slide-in DVD-R/RW, DVD+R/RW - 5AC801.DVRS-00

- RAM drivers are not provided by the manufacturer. Support of RAM function by the burning software "Nero" (model number 5SWUTI.0000-00) or other burning software packages and drivers from third party providers.
- 2) Temperature data is for operation at 500 meters. Derating the max. ambient temperature typically 1°C per 1000 meters (from 500 meters above sea level).
- 3) Drive surface temperature



## Temperature humidity diagram - Operation and storage



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

## 3.6.7 PCI SATA RAID controller - 5ACPCI.RAIC-01

## **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 41: PCI SATA RAID controller - 5ACPCI.RAIC-01

## Information:

The PCI SATA RAID controller can not be used in place of a Universal Power Supply (UPS). If the operating system is shut down improperly, the next time it is started it is detected as an error by the RAID 1, and a complete rebuild is executed. This generally takes at least 50 minutes (configurable) to complete.

**Technical data** 

## **Technical data**

## Information:

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

Features	5ACPCI.RAIC-01
SATA RAID controller Type Specifications Data transfer rate RAID level BIOS Extension ROM - requirements	Sil 3512 SATA link Serial ATA 1.0 Max. 1.5 GB/s (150 MB/s) Supports RAID 0, 1 ca. 32 kByte
Hard disks Amount	Seagate Momentus 7200.1 ST96023AS 2
Formatted capacity (512 bytes/sector)	60 GB
Number of heads	3
Number of sectors (user)	117.210.240
Bytes per sector	512
Revolution speed	7200 rpm ± 1%
Access time (average)	4.2 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1.5 ms 10.5 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Supported transfer mode	SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5
Data transfer rate To the medium To / from host	Max. 539 MBits/sec Max. 150 MB/s
Cache	8 MB
S.M.A.R.T. support	Yes
Lifespan	5 years
Electrical characteristics	
Power consumption	0.3 A at 3.3 V (PCI bus) 1 A at 5 V (PCI bus)
Mechanical characteristics	
Mounted on PCI insert	Fixed
Weight	350 g

Table 51: Technical data - RAID hard disk - 5ACPCI.RAIC-01

Environmental characteristics	5ACPCI.RAIC-01
Ambient temperature <sup>1)</sup> Operation - Standard <sup>2)</sup> Operation - 24-hour <sup>3)</sup> Storage Transport	+5°C +55°C +5°C +40°C -40°C +70°C -40°C +70°C
Relative humidity Operation Storage Transport	5 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration <sup>4)</sup> Operation (continuous) Operation (occasional) Storage Transport	At max. 5 - 500 Hz and 0.125 g (1.225 m/s <sup>2</sup> 0-peak) duration 1 octave per minute no damage At max. 5 - 500 Hz and 0.25 g (2.45 m/s <sup>2</sup> 0-peak) duration 1 octave per minute no damage At max. 5 - 500 Hz and 5 g (49 m/s <sup>2</sup> 0-peak) duration 0.5 octave/minute no damage At max. 5 - 500 Hz and 5 g (49 m/s <sup>2</sup> 0-peak) duration 0.5 octave/minute no damage
Shock <sup>4)</sup> (pulse with a sine half-wave) Operation Storage	At max. 125 g (1226 m/s <sup>2</sup> 0-peak) and 2 ms duration no non-recovered errors At max. 400 g (3924 m/s <sup>2</sup> 0-peak) and 2 ms duration no damage At max. 450 g (4424 m/s <sup>2</sup> 0-peak) and 1 ms duration no damage At max. 200 g (1.962 m/s <sup>2</sup> 0-peak) and 0.5 ms duration no damage
Altitude Operation Storage	- 300 to 3048 meters - 300 to 12192 meters

Table 51: Technical data - RAID hard disk - 5ACPCI.RAIC-01 (cont.)

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

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

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

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

## Temperature humidity diagram - Operation and storage



Figure 42: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-01

Chapter 2 Technical data

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

### **Driver support**

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

The .NET-based SATARaid<sup>™</sup> serial ATA RAID management software can also be found on the B&R homepage.

## Configuration

For configuration of a SATA RAID network, see Chapter 4 "Software", section "Configuration of a SATA RAID array" on page 234.

## Exchanging a HDD

A hard drive can be easily exchanged in the event of an error when using the RAID1 (mirroring) configuration without having to re-install the system. The replacement SATA HDD 60GB 5ACPCI.RAIC-02 is available as a replacement part for a HDD.

For instructions on exchanging the drive, see Chapter 6 "Maintenance / Servicing", section "Exchanging a PCI SATA RAID hard disk in a RAID 1 system" on page 299.

### 3.6.8 Replacement PCI SATA RAID HDD 60GB - 5ACPCI.RAIC-02

The hard disk can be used as replacement for a HDD in a PCI SATA RAID Controller 5ACPCI.RAIC-01. For instructions on exchanging the drive, see Chapter 6 "Maintenance / Servicing", section "Exchanging a PCI SATA RAID hard disk in a RAID 1 system" on page 299.



Figure 43: Replacement SATA HDD 60 GB - 5ACPCI.RAIC-02

## **Technical data**

## Information:

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

Features	5ACPCI.RAIC-02
Hard disks Amount	Seagate Momentus 7200.1 ST96023AS 1
Formatted capacity (512 bytes/sector)	60 GB
Number of heads	3
Number of sectors (user)	117.210.240
Bytes per sector	512
Revolution speed	7200 rpm ± 1%
Access time (average)	4.2 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1.5 ms 10.5 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Supported transfer mode	SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5

Table 52: Technical data - RAID hard disk - 5ACPCI.RAIC-02

Features	5ACPCI.RAIC-02
Data transfer rate To the medium To / from host	Max. 539 MBits/sec Max. 150 MB/s
Cache	8 MB
S.M.A.R.T. support	Yes
Lifespan	5 years
Environmental characteristics	
Ambient temperature <sup>1)</sup> Operation - Standard <sup>2)</sup> Operation - 24-hour <sup>3)</sup> Storage Transport	+5°C +55°C +5°C +40°C -40°C +70°C -40°C +70°C
Relative humidity Operation Storage Transport	5 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration <sup>4)</sup> Operation (continuous) Operation (occasional) Storage Transport	No damage at max. 5 - 500 Hz and 0.125 g (1.225 m/s <sup>2</sup> 0-peak) duration 1 oct/min No damage at max. 5 - 500 Hz and 0.25 g (2.45 m/s <sup>2</sup> 0-peak) duration 1 oct/min Max. 5 - 500 Hz and 5 g (49 m/s <sup>2</sup> 0-peak) 0.5 oct/min duration, no damage Max. 5 - 500 Hz and 5 g (49 m/s <sup>2</sup> 0-peak) 0.5 oct/min duration, no damage
Shock <sup>4)</sup> (pulse with a sine half-wave) Operation Storage	No non-recovered errors at max. 125 g (1226 m/s <sup>2</sup> 0-peak) and 2 ms duration No damage at max. 400 g (3924 m/s <sup>2</sup> 0-peak) and 2 ms duration No damage at max. 450 g (4424 m/s <sup>2</sup> 0-peak) and 1 ms duration No damage at max. 200 g (1962 m/s <sup>2</sup> 0-peak) and 0.5 ms duration
Altitude Operation Storage	- 300 to 3048 meters - 300 to 12192 meters

#### Table 52: Technical data - RAID hard disk - 5ACPCI.RAIC-02 (cont.)

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

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

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

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



Temperature humidity diagram - Operation and storage



Technical data

Chapter 2

## 3.6.9 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 45: 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 120 minutes (configurable) to complete.

## **Technical data**

## Information:

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

Features	5ACPCI.RAIC-03
SATA RAID controller Type Specifications Data transfer rate RAID level BIOS Extension ROM - requirements	Sil 3512 SATA link Serial ATA 1.0 Max. 1.5 GB/s (150 MB/s) Supports RAID 0, 1 ca. 32 kByte
Hard disks Amount	Fujitsu M120-ESW MHY2160BH-ESW 2
Formatted capacity (512 bytes/sector)	160 GB
Number of heads	3
Number of sectors (user)	312.581.808
Bytes per sector	512
Revolution speed	5400 rpm ±1%
Access time (average)	5.56 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1.5 ms 12 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Supported transfer mode	SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5
Data transfer rate To the medium To / from host	Max. 84.6 MBits/sec Max. 150 MB/s
Cache	8 MB
S.M.A.R.T. support	Yes
Lifespan	5 years
Electrical characteristics	
Power consumption	0.3 A at 3.3 V (PCI bus) 1 A at 5 V (PCI bus)
Mechanical characteristics	
Mounted on PCI insert	Fixed
Weight	350 g

Table 53: Technical data - RAID hard disk - 5ACPCI.RAIC-03

Environmental characteristics	5ACPCI.RAIC-03
Ambient temperature <sup>1)</sup> Operation - Standard / 24-hour <sup>2)</sup> Storage Transport	-15°C +80°C -40°C +95°C -40°C +95°C
Relative humidity Operation Storage Transport	8 - 90% non-condensing (maximum humidity at +29°C) 5 - 95% non-condensing (maximum humidity at +40°C) 5 - 95% non-condensing (maximum humidity at +40°C)
Vibration <sup>3)</sup> Operation (continuous) Operation (occasional) Storage Transport	<ul> <li>5 - 500 Hz: max. 0.125 g; duration 1 octave per minute; no unrecoverable errors</li> <li>5 - 500 Hz: max. 0.25 g; duration 1 octave per minute; no unrecoverable errors</li> <li>5 - 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage</li> <li>5 - 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage</li> </ul>
Shock <sup>4)</sup> (pulse with a sine half-wave) Operation Storage	Max. 125 g, 2 ms; no unrecoverable errors Max. 400 g, 2 ms; no damage Max. 450 g, 1 ms; no damage Max. 200 g, 0.5 ms; no damage
Altitude Operation Storage	- 300 to 3048 meters - 300 to 12192 meters

Table 53: Technical data - RAID hard disk - 5ACPCI.RAIC-03 (cont.)

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

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

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

#### Relative humidity [%RH] (non-condensing) Storage Operation 0 -80 -70 -60 -50 -40 -30 -20 -10 Temperature [°C]

## Temperature humidity diagram - Operation and storage

Figure 46: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-03
Temperature values for 305 meter elevation. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 3°C per minute.

### **Driver support**

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

The .NET-based SATARaid<sup>™</sup> serial ATA RAID management software can also be found on the B&R homepage.

### Configuration

For configuration of a SATA RAID network, see Chapter 4 "Software", section "Configuration of a SATA RAID array" on page 234.

### Exchanging a HDD

A hard drive can be easily exchanged in the event of an error when using the RAID1 (mirroring) configuration without having to re-install the system. The replacement SATA HDD 60GB 5ACPCI.RAIC-02 is available as a replacement part for a HDD.

For instructions on exchanging the drive, see Chapter 6 "Maintenance / Servicing", section "Exchanging a PCI SATA RAID hard disk in a RAID 1 system" on page 299.

#### 3.6.10 Replacement PCI SATA RAID HDD 160 GB - 5ACPCI.RAIC-04

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



Figure 47: Replacement SATA HDD 160 GB - 5ACPCI.RAIC-04

#### **Technical data**

# Information:

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

Features	5ACPCI.RAIC-04
Hard disks Amount	Fujitsu M120-ESW MHY2160BH-ESW 1
Formatted capacity (512 bytes/sector)	160 GB
Number of heads	3
Number of sectors (user)	312.581.808
Bytes per sector	512
Revolution speed	5400 rpm ±1%
Access time (average)	5.56 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1.5 ms 12 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Supported transfer mode	SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5
Data transfer rate To the medium To / from host	Max. 84.6 MBits/sec Max. 150 MB/s

Table 54: 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 <sup>1)</sup> Operation - Standard / 24-hour <sup>2)</sup> Storage Transport	-15°C +80°C -40°C +95°C -40°C +95°C
Relative humidity Operation Storage Transport	8 - 90% non-condensing (maximum humidity at +29°C) 5 - 95% non-condensing (maximum humidity at +40°C) 5 - 95% non-condensing (maximum humidity at +40°C)
Vibration <sup>3)</sup> Operation (continuous) Operation (occasional) Storage Transport	5 - 500 Hz: max. 0.125 g; duration 1 octave per minute; no unrecoverable errors 5 - 500 Hz: max. 0.25 g; duration 1 octave per minute; no unrecoverable errors 5 - 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage 5 - 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage
Shock <sup>4)</sup> (pulse with a sine half-wave) Operation Storage	Max. 125 g, 2 ms; no unrecoverable errors Max. 400 g, 2 ms; no damage Max. 450 g, 1 ms; no damage Max. 200 g, 0.5 ms; no damage
Altitude Operation Storage	- 300 to 3048 meters - 300 to 12192 meters

#### Table 54: Technical data - RAID hard disk - 5ACPCI.RAIC-04 (cont.)

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

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

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

#### Technical data • Individual components





Figure 48: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-04

### 3.7 Fan kit

# Information:

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

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).

#### 3.7.1 Fan kit 1 card slot - 5PC810.FA01-00

This fan kit is an optional addition for system units with one card slot. For available replacement





Figure 49: Fan kit - 5PC810.FA01-00

#### **Technical data**

Features	5PC810.FA01-00
Fan type Width Length Height	40 mm 40 mm 10 mm
Revolution speed	max. 6100 rpm
Noise level	21 dB
Lifespan	80000 hours at 70°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 55: Technical data - 5PC810.FA01-00

#### Technical data • Individual components

For information about installing or exchanging the fan kits, see the section "Installing / exchanging the fan kit" on page 290.

#### 3.7.2 Fan kit 2 card slot - 5PC810.FA02-00

This fan kit is an optional addition for system units with 2 card slots. For available replacement dust filters for this fan kit, see section "Replacement fan filter" on page 247.



Figure 50: Fan kit - 5PC810.FA02-00

#### **Technical data**

Features	5PC810.FA02-00
Fan type Width Length Height	70 mm 70 mm 15 mm
Revolution speed	Max. 4300 rpm ± 12.5%
Noise level	32 dB
Lifespan	60000 hours at 40°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 56: Technical data - 5PC810.FA02-00

For information about installing or exchanging the fan kits, see the section "Installing / exchanging the fan kit" on page 290.

#### 3.7.3 Fan kit 5 card slot - 5PC810.FA05-00

This fan kit is an optional addition for system units with 2 card slots. For available replacement dust filters for this fan kit, see section "Replacement fan filter" on page 247.



Figure 51: Fan kit - 5PC810.FA05-00

#### **Technical data**

Features	5PC810.FA05-00
Fan type Width Length Height	70 mm 70 mm 15 mm
Revolution speed	Max. 4300 rpm ± 10%
Noise level	32 dB
Lifespan	60000 hours at 40°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 57: Technical data - 5PC810.FA05-00

For information about installing or exchanging the fan kits, see the section "Installing / exchanging the fan kit" on page 290.

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#### 3.8 AP Link cards

AP Link cards can be installed in the APC810 system units 5PC810.SX02-00 and 5PC810.SX05-00 (also see the section "Configuration - Drives, software, accessories" on page 32).

#### 3.8.1 AP Link SDL transmitter 5AC801.SDL0-00

A second graphics line can be created using an AP Link graphics adapter card. DVI and SDL signals are available with this. RGB signals are not supported.



Figure 52: AP Link SDL transmitter 5AC801.SDL0-00

The AP Link SDL transmitter can only be installed in the AP Link slot in the system units 5PC810.SX02-00 and 5PC810.SX05-00.



Figure 53: Mounting example with the system unit 5PC810.SX02-00

#### 3.8.2 Ready relay 5AC801.RDYR-00



Figure 54: Ready relay 5AC801.RDYR-00

The ready relay can only be installed in the AP Link slot in the system units 5PC810.SX02-00 and 5PC810.SX05-00.



Figure 55: Mounting example with the system unit 5PC810.SX02-00

The relay contacts are closed when the APC810 is powered on.

	Ready relay pin assignments		
Pin assignments - 4-pin multipoint connector N.O. and N.C., max. 30 VDC, max. 10 A			
Pin	Assignment		
1	Normally open		
2	Root		
3	Normally closed		
4	n.c.		
Accessories			
0TB704.90	Terminal block, 4-pin, Screw clamp, 1.5 mm <sup>2</sup>		
TB704.91	Terminal block, 4-pin, Cage clamps, 2.5 mm <sup>2</sup>		

Table 58: Pin assignments - Ready relay 5AC801.RDYR-00

### 3.9 Interface options (IF option)

An additional interface (CAN or combined RS232/422/485) can be installed in the APC810's IF optional slot.



Figure 56: Interface options (IF option)

# Information:

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

# **Caution!**

Turn off power before adding or removing an optional interface.

#### 3.9.1 Add-on CAN interface - 5AC600.CANI-00

The add-on CAN interface is equipped with 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).

#### Order data

Model number	Description	Figure	
5AC600.CANI-00	Add-on CAN interface CAN interface for installation in an APC620, APC800 or PPC700.		Ipter 2
			Cha

Table 59: Add-on CAN interface - 5AC600.CANI-00

#### **Technical data**

Features	5AC600.CANI-00
CAN interface Controller Amount Connection	Intel 82527 1 9-pin DSUB, male
Terminating resistor Default setting	Can be activated and deactivated using a sliding switch Disabled

Table 60: Technical data - Add-on CAN interface - 5AC600.CANI-00

#### Technical data • Individual components

#### **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 plug
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 61: Pin assignments - CAN

#### I/O address and IRQ

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

Table 62: Add-on CAN - I/O address and IRQ

1) NMI = Non Maskable Interrupt.

The IRQ setting can be changed in the BIOS setup. 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 63: 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

Chapter 2 Technical data

Table 64: Bus length and transfer rate - CAN

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

CAN cable	Property
Signal lines Cable cross section Wire insulation Conductor resistance Stranding Shield	2 x 0.25 mm² (24AWG/19), tinned Cu wire PU ≤ 82 Ohm / km Wires stranded in pairs Paired shield with aluminum foil
Grounding line Cable cross section Wire insulation Conductor resistance	1 x 0.34 mm <sup>2</sup> (22AWG/19), tinned Cu wire PU $\leq$ 59 Ohm / km
Outer sheathing Material Properties Entire shielding	PUR mixture Halogen free From tinned cu wires

Table 65: CAN cable requirements

#### Technical data • Individual components

#### **Terminating resistors**

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



Figure 57: 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 58: Contents of the delivery / mounting material - 5AC600.CANI-00

#### **Driver support**

Because of the Dual Core processors, the INACAN.SYS driver version 2.36, contained in the PVI setup 2.6.0.3105, is required for the operation.

#### 3.9.2 Add-on RS232/422/485 interface - 5AC600.485I-00

The serial interface is a combined RS232/RS422/RS485 interface. The operating mode (RS232/RS422/RS485) is selected automatically, depending on the electrical connection.

#### Order data

Model number	Description	Figure	
5AC600.485I-00	Add-on RS232/422/485 interface Add-on RS232/422/485 interface for installation in an APC620, AP800 and PPC700.		r )
			Chanto

Table 66: Add-on RS232/422/485 interface - 5AC600.485I-00

#### **Pin assignments**

Add-on RS232/422/485			
	RS232	RS422/485	
Туре	RS232 not moc electrical	lem compatible; y isolated	
UART	16550 compatib	le, 16 byte FIFO	
Transfer rate	Max. 11	15 kBit/s	
Bus length	Max. 15 meters	Max. 1200 meters	
Pin	Assignments (RS232)	Assignments (RS422)	9-pin DSUB plug
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 67: Pin assignments - RS232/RS422

Technical data

#### Technical data • Individual components

#### I/O address and IRQ

Resource	Default setting	Additional setting options
I/O address	2E8h	238, 2F8, 338, 3E8, 3F8
IRQ	IRQ10	IRQ 3, 4, 5, 7, 11, 12

Table 68: Add-on RS232/422/485 - I/O address and IRQ

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

#### Bus length and cable type RS232

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

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

Table 69: Bus length and transfer rate - RS232

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

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

Table 70: RS232 cable requirements

#### Bus length and cable type RS422

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

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

Table 71: Bus length and transfer rate - RS422

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

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

Table 72: RS422 cable requirements

#### **RS485** interface operation

In RS422 mode, the interface can also be operated as an RS485 interface. This is possible using TriState switching, which is achieved using RTS (Request To Send).



Figure 59: Add-on RS232/422/485 interface - operated in RS485 mode

#### Bus length and cable type RS485

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

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

Table 73: Bus length and transfer rate - RS485

Chapter 2 Technical data

#### Technical data • Individual components

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

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

Table 74: RS485 cable requirements

#### **Contents of delivery**

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



Figure 60: Contents of the delivery / mounting material - 5AC600.485I-00

# **Chapter 3 • Commissioning**

# 1. Installation

The APC810 systems are mounted with the mounting plates found on the housing. The plates are designed for M5 screws.



Figure 61: Mounting plates

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 2.4 "Ambient temperatures" on page 48).
- The APC810 is only permitted for operation in closed rooms.
- The APC810 cannot be situated in direct sunlight.
- The vent holes may not be covered.
- When mounting the device, be sure to adhere to the allowable mounting orientations (see Section "Mounting orientation" on page 130).
- Be sure the wall or switching cabinet can withstand four times the total weight of the the APC810.
- When connecting certain cable types (DVI, SDL, USB, etc.), keep the flex radius of the cable in mind (see section 2 "Cable connections" on page 132).

### **1.2 Drilling templates**



Table 75: Drilling templates - 1 and 2 card slot system units



Table 76: Drilling template - 5 card slot system unit

**Commissioning • Installation** 

#### **1.3 Mounting orientation**

The APC810 system must be mounted as described in the following sections.

#### 1.3.1 Standard Mounting - vertical

Standard mounting refers to vertical mounting orientation. APC810 systems with and without fan kit can be mounted this way.



Figure 62: Standard mounting - vertical

#### 1.3.2 Optional mounting - horizontal

Operation in the optional horizontal mounting position (heat sink on top) requires the use of a fan kit. The maximum specific ambient temperature specification must be lowered to 5°C.



Figure 63: Optional mounting - horizontal

#### 1.3.3 Spacing for air circulation

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



Figure 64: Standard mounting - Mounting distances

These defined distances are valid for both vertical and horizontal mounting of the APC810.

Chapter 3 Commissioning

## 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 65: Flex radius - Cable connection

# Information:

The specified flex radius can be found in the Automation Panel 800 or Automation Panel 900 user's manual, which can be downloaded as a .pdf file from the B&R homepage <u>www.br-automation.com</u>.

# 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 APC810 functional ground has 2 connections:

- Supply voltage
- Ground connection

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

- The device should be connected to the ground using the shortest route possible.
- Use cable with a minimum cross section of 2.5 mm<sup>2</sup> per connection.
- Note the line shielding concept, all connected data cables are used as shielded lines.



Figure 66: Grounding concept

Commissioning

### 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 APC810. The following questions will be answered:

- How are Automation Panel 900 devices connected to the monitor / panel output of the APC810, and what needs to be considered?
- How are Automation Panel 800 devices connected to the monitor / panel output of the APC810, 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 APC810 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?

### 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

### 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 hub).



Figure 67: Configuration - One Automation Panel 900 via DVI (onboard)

#### 4.2.1 Basic system requirements

The following table displays the possible combinations for the APC810 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table (e.g. for connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit			Limitation
	5PC810.SX01-00	5PC810.SX02-00	5PC810.SX05-00	Resolution
5PC800.B945-00	1	✓	✓	Max. SXGA
5PC800.B945-01	1	1	1	Max. SXGA
5PC800.B945-02	1	✓	1	Max. SXGA
5PC800.B945-03	1	✓	✓	Max. SXGA
5PC800.B945-04	1	✓	✓	Max. SXGA

Table 78: Possible combinations of system unit and CPU board

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Chapter 3

#### **Commissioning • Connection examples**

#### 4.2.2 Link modules

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

Table 79: Link module for the configuration - One Automation Panel 900 via DVI

#### 4.2.3 Cables

Select one Automation Panel 900 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 <sup>1)</sup>
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 <sup>1)</sup>
5CAUSB.0018-00	USB cable	1.8 m
5CAUSB.0050-00	USB cable	5 m

Table 80: Cable for DVI configurations

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

# Information:

Detailed technical data about the cables can be found in the Automation Panel 900 User's Manual. This can be downloaded as a .pdf file from the B&R homepage <u>www.br-automation.com</u>.

#### 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 <sup>1)</sup>
5AP920.1214-01	12.1"	SVGA	~	-	5 m / 10 m <sup>1)</sup>
5AP920.1505-01	15.0"	XGA	1	-	5 m / 10 m <sup>1)</sup>
5AP920.1706-01	17.0"	SXGA	1	-	5 m / 10 m <sup>1)</sup>
5AP920.1906-01	19.0"	SXGA	~	-	5 m / 10 m <sup>1)</sup>

Table 81: 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.

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### 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 hub).



Figure 68: Configuration - An Automation Panel 900 via SDL (onboard)

#### 4.3.1 Basic system requirements

The following table displays the possible combinations for the APC810 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		Limitation		
	5PC810.SX01-00	5PC810.SX02-00	5PC810.SX05-00	Resolution
5PC800.B945-00	1	1	1	Max. UXGA
5PC800.B945-01	1	1	1	Max. UXGA
5PC800.B945-02	1	1	1	Max. UXGA
5PC800.B945-03	1	1	1	Max. UXGA
5PC800.B945-04	1	1	1	Max. UXGA

Table 82: Possible combinations of system unit and CPU board

#### 4.3.2 Link modules

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

Table 83: Link module for the configuration - One Automation Panel 900 via DVI

#### 4.3.3 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 84: Cables for SDL configurations

# Information:

Detailed technical data about the cables can be found in the Automation Panel 900 User's Manual. This can be downloaded as a .pdf file from the B&R homepage <u>www.br-automation.com</u>.

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#### **Commissioning • Connection examples**

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

Table 85: Segment lengths, resolutions and SDL cables

#### 4.3.4 BIOS settings

No special BIOS settings are necessary for operation.

#### **Touch screen functionality**

The COM C must be enabled in BIOS in order to operate the connected panel touch screen on the monitor / panel connection (found in the BIOS menu under "Advanced - Baseboard / Panel Features - Legacy Devices").

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

#### 4.4.1 Basic system requirements

The following table displays the possible combinations for the APC810 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		Limitation		
	5PC810.SX01-00	5PC810.SX02-00	5PC810.SX05-00	Resolution
5PC800.B945-00	1	1	1	Max. UXGA
5PC800.B945-01	1	1	✓	Max. UXGA
5PC800.B945-02	1	1	1	Max. UXGA
5PC800.B945-03	1	1	1	Max. UXGA
5PC800.B945-04	1	1	1	Max. UXGA

Table 86: Possible combinations of system unit and CPU board

#### 4.4.2 Cables

Select an Automation Panel 800 SDL cable from the following table.

Model number	Туре	Length
5CASDL.0018-20	SDL cable for fixed and flexible type of layout	1.8 m
5CASDL.0050-20	SDL cable for fixed and flexible type of layout	5 m
5CASDL.0100-20	SDL cable for fixed and flexible type of layout	10 m
5CASDL.0150-20	SDL cable for fixed and flexible type of layout	15 m

Table 87: Cables for SDL configurations

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Model number	Туре	Length
5CASDL.0200-20	SDL cable for fixed and flexible type of layout	20 m
5CASDL.0250-20	SDL cable for fixed and flexible type of layout	25 m
5CASDL.0300-30	SDL cable with extender for fixed and flexible type of layout	30 m
5CASDL.0400-30	SDL cable with extender for fixed and flexible type of layout	40 m

Table 87: Cables for SDL configurations (cont.)

# Information:

Detailed technical data about the cables can be found in the Automation Panel 800 User's Manual. This can be downloaded as a .pdf file from the B&R homepage <u>www.br-automation.com</u>.

#### 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
25	5CASDL.0250-20
30	5CASDL.0300-30
40	5CASDL.0400-30

Table 88: Segment lengths, resolutions and SDL cables

#### 4.4.3 BIOS settings

No special BIOS settings are necessary for operation.

#### **Touch screen functionality**

The COM C must be enabled in BIOS in order to operate the connected panel touch screen on the monitor / panel connection (found in the BIOS menu under "Advanced - Baseboard / Panel Features - Legacy Devices").

### 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 70: Configuration - An AP900 and an AP800 via SDL (onboard)

#### 4.5.1 Basic system requirements

The following table displays the possible combinations for the APC810 system unit with CPU board to implement the configuration shown in the figure above. If the maximum resolution is limited when making the combination then it is also shown in this table (e.g. for connecting a non-B&R Automation Panel 900 device).

CPU board	with system unit			Limitation
	5PC810.SX01-00	5PC810.SX02-00	5PC810.SX05-00	Resolution
5PC800.B945-00	1	1	✓	Max. UXGA
5PC800.B945-01	1	1	1	Max. UXGA
5PC800.B945-02	1	1	1	Max. UXGA
5PC800.B945-03	1	1	✓	Max. UXGA
5PC800.B945-04	1	1	1	Max. UXGA

Table 89: Possible combinations of system unit and CPU board

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#### **Commissioning • Connection examples**

#### 4.5.2 Link modules

Model number	Description	Comment
5DLSDL.1000-0	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 1 pieces required

Table 90: Link modules for configuration - One AP900 and one AP800 via SDL (onboard)

#### 4.5.3 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 display 4.4 "An Automation Panel 800 via SDL (onboard)".

# Information:

Detailed technical data about the cables can be found in the Automation Panel 800 or Automation Panel 900 User's Manual. These can be downloaded as .pdf files from the B&R homepage <u>www.br-automation.com</u>.

#### 4.5.4 BIOS settings

No special BIOS settings are necessary for operation.

#### **Touch screen functionality**

The COM C must be enabled in BIOS in order to operate the connected panel touch screen on the monitor / panel connection (found in the BIOS menu under "Advanced - Baseboard / Panel Features - Legacy Devices").
# 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 hub).



Figure 71: Configuration - Four Automation Panel 900 units via SDL (onboard)

## 4.6.1 Basic system requirements

The following table displays the possible combinations for the APC810 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		Limitation		
	5PC810.SX01-00	5PC810.SX02-00	5PC810.SX05-00	Resolution
5PC800.B945-00	1	✓	✓	Max. UXGA
5PC800.B945-01	✓	✓	✓	Max. UXGA
5PC800.B945-02	1	✓	✓	Max. UXGA
5PC800.B945-03	✓	✓	✓	Max. UXGA
5PC800.B945-04	✓	✓	✓	Max. UXGA

Table 91: Possible combinations of system unit and CPU board

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#### **Commissioning • Connection examples**

## 4.6.2 Link modules

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

Table 92: 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 93: Cables for SDL configurations

# Information:

Detailed technical data about the cables can be found in the Automation Panel 900 User's Manual. This can be downloaded as a .pdf file from the B&R homepage <u>www.br-automation.com</u>.

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

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Table 94: Segment lengths, resolutions and SDL cables

#### 4.6.4 BIOS settings

No special BIOS settings are necessary for operation.

#### **Touch screen functionality**

The COM C must be enabled in BIOS in order to operate the connected panel touch screen on the monitor / panel connection (found in the BIOS menu under "Advanced - Baseboard / Panel Features - Legacy Devices").

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# 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 hub).



Figure 72: Configuration - One Automation Panel 900 via SDL (AP Link)

#### 4.7.1 Basic system requirements

The following table displays the possible combinations for the APC810 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		Limitation		
	5PC810.SX01-00 <sup>1)</sup>	5PC810.SX01-00 <sup>1)</sup> 5PC810.SX02-00 5PC810.SX05-00		Resolution
5PC800.B945-00	-	1	✓	Max. UXGA
5PC800.B945-01	-	1	✓	Max. UXGA
5PC800.B945-02	-	1	✓	Max. UXGA
5PC800.B945-03	-	✓	✓	Max. UXGA
5PC800.B945-04	-	1	✓	Max. UXGA

Table 95: Possible combinations of system unit and CPU board

1) AP Link cannot be installed.

# 4.7.2 Link modules

Model number	Description	Comment
5DLSDL.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
5AC801.SDL0-00	APC810 AP Link SDL transmitter	For Automation PC 810

Table 96: Link modules for the configuration: 4 Automation Panel 900 via SDL on 1 line

## 4.7.3 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 97: Cables for SDL configurations

# Information:

Detailed technical data about the cables can be found in the Automation Panel 900 User's Manual. This can be downloaded as a .pdf file from the B&R homepage <u>www.br-automation.com</u>.

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

# 4.7.4 BIOS settings

No special BIOS settings are necessary for operation.

# **Touch screen functionality**

The COM D must be enabled in BIOS in order to operate the connected panel touch screen on the AP Link connection (found in the BIOS menu under "Advanced - Baseboard / Panel Features - Legacy Devices").

# 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 hub).



Figure 73: Configuration - Four Automation Panel 900 units via SDL (AP Link)

#### 4.8.1 Basic system requirements

The following table displays the possible combinations for the APC810 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		Limitation		
	5PC810.SX01-00 <sup>1)</sup>	5PC810.SX02-00	5PC810.SX05-00	Resolution
5PC800.B945-00	-	1	✓	Max. UXGA
5PC800.B945-01	-	1	✓	Max. UXGA
5PC800.B945-02	-	1	✓	Max. UXGA
5PC800.B945-03	-	1	✓	Max. UXGA
5PC800.B945-04	-	J.	1	Max. UXGA

Table 99: Possible combinations of system unit and CPU board

1) AP Link cannot be installed.

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## 4.8.2 Link modules

Model number	Description	Comment
5DLSDL.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900
5DLSDL.1000-01	Automation Panel Link SDL transceiver Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 3 pieces required
5AC801.SDL0-00	APC810 AP Link SDL transmitter	For Automation PC 810

Table 100: Link modules for configuration - Four Automation Panel 900 units via SDL (AP Link)

## 4.8.3 Cables

Select four Automation Panel 900 cables 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 101: Cables for SDL configurations

# Information:

Detailed technical data about the cables can be found in the Automation Panel 900 User's Manual. This can be downloaded as a .pdf file from the B&R homepage <u>www.br-automation.com</u>.

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

Table 102: Segment lengths, resolutions and SDL cables

## 4.8.4 BIOS settings

No special BIOS settings are necessary for operation.

#### **Touch screen functionality**

The COM D must be enabled in BIOS in order to operate the connected panel touch screen on the monitor / panel connection (found in the BIOS menu under "Advanced - Baseboard / Panel Features - Legacy Devices").

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#### **Commissioning • Connection examples**

# 4.9 Two Automation Panel 900 units via SDL (onboard) and SDL (AP Link)

An Automation Panel 900 (max. UXGA) is connected to the integrated SDL interface (onboard) via an SDL cable. A second Automation Panel 900 (max. UXGA) is connected to the optional SDL transmitter (AP Link) via an SDL cable. The Automation Panels show different content (Extended Desktop) and can be different types.



Figure 74: Configuration - Two Automation Panel 900 units via SDL (onboard) and SDL (AP Link)

#### 4.9.1 Basic system requirements

The following table displays the possible combinations for the APC810 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		Limitation		
	5PC810.SX01-00 <sup>1)</sup> 5PC810.SX02-00 5PC810.SX05-00			Resolution
5PC800.B945-00	-	1	1	Max. UXGA
5PC800.B945-01	-	1	1	Max. UXGA
5PC800.B945-02	-	✓	✓	Max. UXGA
5PC800.B945-03	-	1	1	Max. UXGA
5PC800.B945-04	-	✓	✓	Max. UXGA

Table 103: Possible combinations of system unit and CPU board

1) AP Link cannot be installed.

# 4.9.2 Link modules

Model number	Description	Comment
5DLSDL.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	2 pieces for Automation Panel 900
5AC801.SDL0-00	APC810 AP Link SDL transmitter	For Automation PC 810

Table 104: Link modules for configuration - Two Automation Panel 900 units via SDL (onboard) and SDL (AP Link)

#### 4.9.3 Cables

Select four Automation Panel 900 cables 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 105: Cables for SDL configurations

# Information:

Detailed technical data about the cables can be found in the Automation Panel 900 User's Manual. This can be downloaded as a .pdf file from the B&R homepage <u>www.br-automation.com</u>.

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

Table 106: Segment lengths,	resolutions and SDL cables
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# 4.9.4 BIOS settings

No special BIOS settings are necessary for operation.

## **Touch screen functionality**

The COM C or COM D must be enabled in BIOS in order to operate the connected panel touch screen on the monitor / panel or AP Link connection (found in the BIOS menu under "Advanced - Baseboard / Panel Features - Legacy Devices").

# 4.10 Eight Automation Panel 900 units via SDL (onboard) and SDL (AP Link)

Four Automation Panel 900 units (max. UXGA) are connected to the integrated SDL interface (onboard) via SDL. Four additional Automation Panel 900 units (max. UXGA) are connected to the optional SDL transmitter (AP Link). The Automation Panels in each line must be the same type. The display content of the two lines is different (Extended Desktop), but the panels in the same line show the same content (Display Clone).

USB is supported up to a maximum distance (SDL segment 1 + SDL segment 2) of 30 m on the first two panels (front and back side) of the two lines. From a distance of 30 m and longer, USB is only available for the first panel on each line. USB devices can only be connected directly to the Automation Panel (without hub).



Figure 75: Configuration - Eight Automation Panel 900 units via SDL (onboard) and SDL (AP Link)

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#### 4.10.1 Basic system requirements

The following table displays the possible combinations for the APC810 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		Limitation		
	5PC810.SX01-00 <sup>1)</sup>	5PC810.SX02-00	5PC810.SX05-00	Resolution
5PC800.B945-00	-	1	1	Max. UXGA
5PC800.B945-01	-	1	1	Max. UXGA
5PC800.B945-02	-	1	1	Max. UXGA
5PC800.B945-03	-	1	1	Max. UXGA
5PC800.B945-04	-	1	1	Max. UXGA

Table 107: Possible combinations of system unit and CPU board

1) AP Link cannot be installed.

#### 4.10.2 Link modules

Model number	Description	Comment
5DLSDL.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 2 pieces required
5DLSDL.1000-01	Automation Panel Link SDL transceiver Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 6 pieces required
5AC801.SDL0-00	APC810 AP Link SDL transmitter	For Automation PC 810

Table 108: Link modules for the configuration: 8 Automation Panel 900 units via SDL and SDL (optional)

#### 4.10.3 Cables

Select four Automation Panel 900 cables 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

Table 109: Cables for SDL configurations

Model number	Туре	Length
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 109: Cables for SDL configurations (cont.)

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

Table 110: Segment lengths, resolutions and SDL cables

# Information:

Detailed technical data about the cables can be found in the Automation Panel 900 User's Manual. This can be downloaded as a .pdf file from the B&R homepage <u>www.br-automation.com</u>.

# 4.10.4 BIOS settings

No special BIOS settings are necessary for operation.

# **Touch screen functionality**

The COM C or COM D must be enabled in BIOS in order to operate the connected panel touch screen on the monitor / panel or AP Link connection (found in the BIOS menu under "Advanced - Baseboard / Panel Features - Legacy Devices").

# 4.11 Six AP900 and two AP800 devices via SDL (onboard) and SDL (AP Link)

Three Automation Panel 900 (max. UXGA) units and one Automation Panel 800 are connected to the integrated SDL interface (onboard) via SDL. Additionally, three Automation Panel 900 (max. UXGA) units and one Automation Panel 800 are operated on the optional SDL transmitters. The Automation Panels in each line must be the same type. The display content of the two lines is different (Extended Desktop), but the displays in the same line show the same content (Display Clone).

USB is supported up to a maximum distance (segment 1 + segment 2) of 30 m on the first two displays. Starting at a distance of 30 m, USB is only available on the first display (front and back) up to a maximum of 40 m. USB devices can only be connected directly to Automation Panel 900 devices (without a hub).



Figure 76: Configuration - Six AP900 and two AP800 devices via SDL (onboard) and SDL (AP Link)

#### **Commissioning • Connection examples**

#### 4.11.1 Basic system requirements

The following table displays the possible combinations for the APC810 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		Limitation		
	5PC810.SX01-00 <sup>1)</sup>	5PC810.SX02-00	5PC810.SX05-00	Resolution
5PC800.B945-00	-	1	1	Max. UXGA
5PC800.B945-01	-	1	1	Max. UXGA
5PC800.B945-02	-	1	1	Max. UXGA
5PC800.B945-03	-	1	1	Max. UXGA
5PC800.B945-04	-	1	1	Max. UXGA

Table 111: Possible combinations of system unit and CPU board

1) AP Link cannot be installed.

#### 4.11.2 Link modules

Model number	Description	Comment
5DLSDL.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 2 pieces required
5DLSDL.1000-01	Automation Panel Link SDL transceiver Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 6 pieces required
5AC801.SDL0-00	APC810 AP Link SDL transmitter	For Automation PC 810

Table 112: Link modules for the configuration: 8 Automation Panel 900 units via SDL and SDL (optional)

#### 4.11.3 Cables

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

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

# Information:

Detailed technical data about the cables can be found in the Automation Panel 800 or Automation Panel 900 User's Manual. These can be downloaded as .pdf files from the B&R homepage <u>www.br-automation.com</u>.

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

Cables	bles 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 5CASDL.0200-02 5CASDL.0200-03	- - -	- - -
25	-	-	5CASDL.0250-00 5CASDL.0250-02 5CASDL.0250-03	-	-
30	-	-	5CASDL.0300-10 5CASDL.0300-13 5CASDL.0300-30	-	-
40	-	-	5CASDL.0400-10 5CASDL.0400-13 5CASDL.0400-30	-	-

Table 113: Segment lengths, resolutions and SDL cables

# **Touch screen functionality**

The COM C or COM D must be enabled in BIOS in order to operate the connected panel touch screen on the monitor / panel or AP Link connection (found in the BIOS menu under "Advanced - Baseboard / Panel Features - Legacy Devices").

Chapter 3 Commissioning

# 5. Connection of USB peripheral devices

# Warning!

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

# 5.1 Local on the APC810

Many different peripheral USB devices can be connected to the 5 USB interfaces. This means that the USB interfaces USB1, USB3, USB5 can each handle a load of 1A and USB interfaces USB2 and USB4 can each handle a load of 500mA. The maximum transfer rate is a maximum of USB 2.0.



Figure 77: Local connection of USB peripheral devices on the APC810

# 5.2 Remote connection to Automation Panel 900 via DVI

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

# Information:

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



Figure 78: Remote connection of USB peripheral devices to the APC900 via DVI

Commissioning

#### **Commissioning • Connection of USB peripheral devices**

## 5.3 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 2.0.

# Information:

Only end devices (no hubs) can be connected to the Automation Panel 800/900.



Figure 79: Remote connection of USB peripheral devices to the APC800/900 via SDL

# 6. Known problems / issues

The following points listed are known as of 07.05.08 in the first production lot of APC800 devices:

- The hardware security key interface is supported beginning with MTXC FPGA version 00.06 and higher.
- The status indicator of the Link or Activity LED for the ETH1 interface did not function correctly. However, this did not affect the network connection. The status indicator functions correctly beginning with hardware revisions 5PC810.SX92-00 (revision B0) and 5PC800.B945-0x (revision B0).
- Sporadically, it was possible that the ETH2 interface was not initialized during a poweron and therefore it would not function. The problem could be corrected by a reset or warm restart (Ctrl+Alt+Del). This problem is corrected in MTXC FPGA version 00.03.
- First Boot Agent Windows XP embedded and built-in SATA HDD drive The BIOS setting "Legacy IDE Channels" under "Advanced - IDE Configuration" must be set to "PATA only" before inserting a CompactFlash card with a Windows XP embedded image and executing the First Boot Agent or the SATA drive can first be removed.
- When using two graphic lines, the Windows XP graphics driver assigns the labels "digital indicator" to the monitor / panel plug and "digital indicator 2" to the AP Link plug. In the "extended desktop" mode, the following behavior is observed: If the digital display device on the monitor / panel is removed (e.g. cable disconnected), digital display 2 is activated automatically, and the graphics driver settings also switch over accordingly. The next time the system is rebooted, the image content is diverted from the monitor / panel plug to the AP Link plug.

If the BIOS option "SDVO/DVI Hotplug support" is set to "enabled" (found under the BIOS menu point "Advanced - Graphics - Configuration"), then the image content is automatically diverted from the separate monitor / panel plug to the second graphics line on the AP Link plug.

- Special features of "Quick Switching" if the APC810 is in Standby mode Power LED is red (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 the system might not restart because a Power Off/On was not detected. To make sure that these system units will restart after a Power Off/On, the standby time should be set to at least 10 seconds.
- From MTCX PX32 firmware ≥ V00.11 and higher, the reset button is only triggered by edges. This means that the device boots even when the reset button is pressed. In MTCX PX32 firmware < V00.11, the system does not start after pressing (ca. 10 seconds) and releasing the reset button.</li>
- Hardware revision B0 of the slide-in DVD-ROM 5AC801.DVDS-00 does not offer SATA hot plug capability. Other hardware revisions are hot plug capable.

# **Chapter 4 • Software**

# 1. BIOS options

# Information:

The following diagrams and BIOS menu items including descriptions refer to BIOS version 1.10. It is therefore possible that these diagrams and BIOS descriptions do not correspond with the installed BIOS version.

# **1.1 General information**

BIOS stands for "Basic Input Output System." It is the most basic standardized communication between the user and the system (hardware). The BIOS system used in the Automation PC 810 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 (if present), and remains in the APC810 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 810 system or pressing the power button. The system checks if the setup data from the EEPROM is "OK". If the data is "OK", then it is transferred to the CMOS. If the data is "not OK", then the CMOS data is checked for validity. An error message is output if the CMOS data contains errors and the boot procedure can be continued by pressing the <F1> key. To prevent the error message from appearing at each restart, open the BIOS setup by pressing the <Del> key and re-save the settings.

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

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

To enter BIOS Setup, the DEL key must be pressed after the USB controller has been initialized as soon as the following message appears on the monitor (during POST):

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#### Software • BIOS options

"Press DEL to run SETUP"



Figure 80: Boot screen

## 1.2.1 BIOS setup keys

The following keys are enabled during the POST:

# Information:

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

Кеу	Function
Del	Enters the BIOS setup menu.
F12	Using the F12 key, you can boot from the network.

Table 114: 945GME bios-relevant keys at POST

Кеу	Function
F11	Cues the boot menu. Lists all bootable devices that are connected to the system. With cursor ↑ and cursor ↓ and by pressing <enter>, select the device from which will be booted.  Please select boot device:  SATA: PM-ST940817SM HDD: SM-SILCONSYSTEMS INC 512MB</enter>
	<pre>↑ and ↓ to move selection ENTER to select boot device ESC to boot using defaults</pre>
<pause></pause>	Pressing the <pause> key stops the POST. Press any other key to resume the POST.</pause>



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

Table 115: 945GME bios-relevant keys in the BIOS menu

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# 1.3 Main

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

Main	Advanced	Boot	Security	Power	:	Exit
System Tin System Dat	ie :e	[12 [We	2:50:16] ed 12/12/2007]		Use   or [S	[ENTER], [TAB] SHIFT-TAB] to ct a field.
BIOS ID Processor CPU Freque System Mem	: APC2R0 !!! Fo: : Intel(1 ency : 1500MH	01 <b>r Evaluatic</b> R) Core(TM) Z	on Only !!! 2 CPU L7400		Use   confi	[+] or [-] to igure system Time
Board Info Product Re Serial Num BC Firmwar MAC Addres Boot Count Running Ti	Demation           vvision         : B.           uber         : 13:           :e Rev.         : 90:           :s         (ETH1):         00:           :er         : 37:           .me         : 16:	0 3448 7 :13:95:00:F h	r2:90		<pre> ++ Tab F1 F10 ESC </pre>	Select Screen Select Item Change Field Select Field General Help Save and Exit Exit

Figure 8	1: 945GM	F BIOS Ma	in Menu
i igui o o	1.04000		in monoria

BIOS setting	Meaning	Setting options	Effect
System time	This is the current system time setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Adjustment of the system time	Set the system time in the format 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 to the system date	Set 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	-

Table 116: 945GME Main Menu setting options

BIOS setting	Meaning	Setting options	Effect
MAC Address (ETH1)	Displays the MAC addresses assigned for the ETH1 interface.	None	-
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 116: 945GME Main Menu setting options (cont.)

# 1.4 Advanced

Main	Advanced	Boot	Security	Power		Exit
Advanced	Settings					
PCI Conf	iguration					
PCI Expr	ess Configura	tion				
Graphics	Configuration	n				
CPU Conf	iguration					
Chipset	Configuration					
Clock Co	riace Configu:	ration				
TDE Conf	iguration					
USB Conf	iguration					
Keyboard	/Mouse Config	uration			↦	Select Screen
Remote A	ccess Configu	ration		1	÷‡	Select Item
CPU Boar	d Monitor			E	Inter	Go to Sub Screen
Baseboar	d/Panel Featu	res		E	71	General Help
				E	10	Save and Exit
				E	ISC	Exit

Figure 82: 945GME Advanced Menu

BIOS setting	Meaning	Setting options	Effect
ACPI configuration	Configures APCI devices.	Enter	Opens submenu see "ACPI configuration" on page 175.
PCI configuration	Configures PCI devices.	Enter	Opens submenu see "PCI configuration" on page 177.
PCI Express Configuration	Configures the PCI Express	Enter	Opens submenu see "PCI Express Configuration" on page 181.
Graphics configuration	Configures the graphic settings.	Enter	Opens submenu see "Graphics configuration" on page 183.

Table 117: 945GME - Advanced Menu - Setting options

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# Software • BIOS options

BIOS setting	Meaning	Setting options	Effect
CPU configuration	Configures CPU settings.	Enter	Opens submenu see "CPU configuration" on page 186.
Chipset configuration	Configures the chipset functions.	Enter	Opens submenu see "Chipset configuration" on page 187.
I/O interface configuration	Configuration of the I/O devices.	Enter	Opens submenu see "I/O interface configuration" on page 189.
Clock configuration	Configures clock settings.	Enter	Opens submenu see "Clock configuration" on page 190.
IDE Configuration	Configures the IDE functions.	Enter	Opens submenu see "IDE Configuration" on page 191.
USB configuration	Configures USB settings	Enter	Opens submenu see "USB configuration" on page 198.
Keyboard/mouse configuration	Configuration of the keyboard/mouse options.	Enter	Opens submenu see "Keyboard/mouse configuration" on page 200.
Remote access configuration	Configures the remote access settings	Enter	Opens submenu see "Remote access configuration" on page 201.
CPU board monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens submenu see "CPU board monitor" on page 203.
Baseboard/panel features	Displays device specific information and setup of device specific values.	Enter	Opens submenu see "Baseboard/panel features" on page 204.

Table 117: 945GME - Advanced Menu - Setting options (cont.)

# 1.4.1 ACPI configuration

ACPI Aware O/S[Yes]ACPI support for Operating SystemACPI Version Features[ACPI v2.0]ENABLE: If OS supports ACPI.ACPI APIC support[Enabled]Supports ACPI.Suspend mode[S1 (POS)]DISABLE: If OS does not supportDSB Device Wakeup from S3/S4[Disabled]DISABLE: If OS does not supportActive Cooling Trip Point[Disabled]ACPI.Critical Trip Point[I05°C]++	CPI Aware O/S CPI Version Features	[Yes]	ACPI support for Operating System.
ACPI Version Features[ACPI v2.0]ENABLE: If OSACPI APIC support[Enabled]supports ACPI.Suspend mode[S1 (POS)]DISABLE: If OSJSB Device Wakeup from S3/S4[Disabled]DISABLE: If OSActive Cooling Trip Point[Disabled]ACPI.Critical Trip Point[105°C]++	CPI Version Features	[ACDT2 0]	
ACPI APIC support[Enabled]supports ACPI.Suspend mode[S1 (POS)]DISABLE: If OSJSB Device Wakeup from S3/S4[Disabled]DISABLE: If OSActive Cooling Trip Point[Disabled]ACPI.Passive Cooling Trip Point[Disabled]ACPI.Critical Trip Point[105°C]++		[ACPI VZ.0]	ENABLE: If OS
Suspend mode       [S1 (POS)]         JSB Device Wakeup from S3/S4       [Disabled]         DISABLE: If OS does not support         Active Cooling Trip Point       [Disabled]         Passive Cooling Trip Point       [Disabled]         Critical Trip Point       [105°C]	CPI APIC support	[Enabled]	supports ACPI.
JSB Device Wakeup from S3/S4 [Disabled] DISABLE: If OS does not support Active Cooling Trip Point [Disabled] Passive Cooling Trip Point [Disabled] Critical Trip Point [105°C]	uspend mode	[S1 (POS)]	
Active Cooling Trip Point [Disabled] ACPI. Passive Cooling Trip Point [Disabled] Critical Trip Point [105°C] + Select Scr	SB Device Wakeup from S3/S4	[Disabled]	DISABLE: If OS
Active Cooling Trip Point [Disabled] ACPI. Passive Cooling Trip Point [Disabled] Critical Trip Point [105°C] ++ Select Scr			does not support
Passive Cooling Trip Point [Disabled] Critical Trip Point [105°C] ↔ Select Scr	ctive Cooling Trip Point	[Disabled]	ACPI.
Critical Trip Point [105°C] ↔ Select Scr	assive Cooling Trip Point	[Disabled]	
→ Select Scr	ritical Trip Point	[105°C]	
			Select Screen
↑↓ Select Ite			↑↓ Select Item
+- Change Opt			+- Change Option
F1 General He			F1 General Help
F10 Save and F			

#### Figure 83: 945GME 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.
	system supports the ACPI function (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	Enabled	Enables this function.
	of the advanced programmable interrupt controller in the processor.	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 118: 945GME Advanced ACPI configuration setting options

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BIOS setting	Meaning	Setting options	Effect
Active cooling trip	With this function, an optional	Disabled	Disables this function.
system when the CPU reaches the set temperature. Temperatur erreicht ist.	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	assive cooling trip With this function, a temperature can be	Disabled	Disables this function.
at which the CPU automatically reduce its speed.	set at which the CPU automatically reduces its speed.	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 the system 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 118: 945GME Advanced ACPI configuration setting options (cont.)

# 1.4.2 PCI configuration

	BIOS SETUP UTIL	ITY
Advanced		
Advanced PCI/PnP Settings		NO: lets the BIOS
		device 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
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Play (PnP) devices no
▶ PCI IRQ Resource Exclusion	1	required for boot if
-		your system has a Plue
PCI Interrupt Routing		and Play operating
		system.
		←→ Select Screen
		↑↓ Select Item
		+- Change Option
		F1 General Help
		F10 Save and Exit
		ESC Exit

#### Figure 84: 945GME Advanced PCI Configuration

BIOS setting	Meaning	Setting options	Effect
Plug & Play O/S	BIOS is informed if Plug & Play is capable on the operating system.	Yes	The operating system handles the distribution of resources.
		No	The operating system handles the distribution of resources.
PCI latency timer	This option controls how long (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	Yes	Automatic assignment of an interrupt.
VGA	Interrupt is assigned to the PCI VGA.	No	No assignment of an interrupt.
Allocate IRQ to	Use this function to set	Yes	Automatic assignment of a PCI interrupt.
SMBUS HC	whether or not the 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 submenu See "PCI IRQ Resource Exclusion" on page 178
PCI Interrupt Routing	Configures the PCI Interrupt Routing	Enter	Opens submenu See "PCI Interrupt Routing" on page 180

Table 119: 945GME Advanced PCI configuration setting options

Chapter 4 Software

## Software • BIOS options

#### **PCI IRQ Resource Exclusion**

PCI IRQ Resource Exc	lusion	Available: Specified
IRQ3 IRQ4 IRQ5 IRQ6 IRQ7 IRQ9	[Allocated] [Allocated] [Available] [Available] [Available] [Allocated]	IRQ is available to be used by PCI/PnP devices. Reserved: Specified IRQ is reserved for use by Legacy ISA devices.
IRQ10 IRQ11 IRQ12 IRQ14 IRQ15	[Available] [Allocated] [Available] [Allocated] [Allocated]	↔ Select Screen
		↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit

#### Figure 85: 945GME Advanced PCI IRQ Resource Exclusion

BIOS setting	Meaning	Setting options	Effect
IRQ3	IRQ interrupt assignment for Legacy ISA devices.	Allocated	Allocated by the system - cannot be used.
IRQ4	IRQ interrupt assignment for Legacy ISA devices.	Allocated	Allocated by the system - cannot be used.
IRQ5	IRQ interrupt assignment for Legacy ISA devices. Note: No ISA bus present in the APC810 system. Therefore this setting is not relevant.	Available	Available - can be used.
		Reserved	Reserved - cannot be used.
IRQ6	IRQ interrupt assignment for Legacy ISA	Available	Available - can be used.
devices. Note: No ISA bus present in the APC system. Therefore this setting is relevant.		Reserved	Reserved - cannot be used.

Table 120: 945GME Advanced PCI IRQ Resource Exclusion setting options

## Software • BIOS options

BIOS setting	Meaning	Setting options	Effect
IRQ7	IRQ interrupt assignment for Legacy ISA	Available	Available - can be used.
	devices. Note: No ISA bus present in the APC810 system. Therefore this setting is not relevant.	Reserved	Reserved - cannot be used.
IRQ9	IRQ interrupt assignment for Legacy ISA devices.	Allocated	Allocated by the system - cannot be used.
IRQ10	IRQ interrupt assignment for Legacy ISA	Available	Available - can be used.
	Note: No ISA bus present in the APC810 system. Therefore this setting is not relevant.	Reserved	Reserved - cannot be used.
IRQ11	IRQ interrupt assignment for Legacy ISA	Available	Available - can be used.
	Note: No ISA bus present in the APC810 system. Therefore this setting is not relevant.	Reserved	Reserved - cannot be used.
IRQ12	12 IRQ interrupt assignment for Legacy ISA		Available - can be used.
	No ISA bus present in the APC810 system. Therefore this setting is not relevant.	Reserved	Reserved - cannot be used.
IRQ14	IRQ interrupt assignment for Legacy ISA devices.	Allocated	Allocated by the system - cannot be used.
IRQ15	IRQ interrupt assignment for Legacy ISA devices.	Allocated	Allocated by the system - cannot be used.

Table 120: 945GME Advanced PCI IRQ Resource Exclusion setting options (cont.)

Chapter 4 Software

## **PCI Interrupt Routing**

BIC	S SETUP UTILITY		
Advanced			
PCI Interrupt Routing		Sele	ct fixed IRQ for
PTRO A (VGA, PCTEX0, ETH2, UHCT3)	[Auto]	BTOS	and OS route an
PTRO B (AC97.PCTEX1.ETH1)	[Auto]	TRO	to this line.
PIRO C (PATA, UHCI2, PCIEX2)	[Auto]		
PIRQ D (SATA, UHCI1, SMB, PCIEX3)	[5]	Make	sure that the
PIRQ E (INTD)	[Auto]	sele	cted IRQ is not
PIRQ F (INTA)	[7]	assi	gned to legacy IO
PIRQ G (INTB)	[Auto]		
PIRQ H (INTC, UHCI0, EHCI)	[Auto]		
1st Exclusive PCI IRQ	[5]		
2nd Exclusive PCI IRQ	[7]		
PCIEXn : PCI Express Root Port n		_ →	Select Screen
INTn : External PCI Bus INTn	Line	↑↓	Select Item
PATA : Parallel ATA in Enhanc	ed/Native Mode	+-	Change Option
SATA : Serial ATA in Enhanced	/Native Mode	F1	General Help
SMB : System Management Bus	Controllerde	F10	Save and Exit
		ESC	Exit

#### Figure 86: 945GME Advanced PCI Interrupt Routing

BIOS setting	Meaning	Setting options	Effect
PIRQ A (VGA,PCIEX0,ETH2	Option for setting the PIRQ A.	Auto	Automatic assignment by the BIOS and operating system.
,UHCI3)		3,4,5,6,7,9,10,11,12	Manual assignment
PIRQ B (AC97,PCIEX1,ETH	Option for setting the PIRQ B.	Auto	Automatic assignment by the BIOS and operating system.
1)		3,4,5,6,7,9,10,11,12	Manual assignment
PIRQ C (PATA,UHCI2,PCIE X2)	Option for setting the PIRQ C.	Auto	Automatic assignment by the BIOS and operating system.
		3,4,5,6,7,9,10,11,12	Manual assignment
PIRQ D (SATA,UHCI1,SMB,	Option for setting the PIRQ D.	Auto	Automatic assignment by the BIOS and operating system.
PCIEX3)		3,4,5,6,7,9,10,11,12	Manual assignment
PIRQ E (INTD)	Option for setting the PIRQ E.	Auto	Automatic assignment by the BIOS and operating system.
		3,4,5,6,7,9,10,11,12	Manual assignment

Table 121: 945GME Advanced PCI Interrupt Routing setting options
BIOS setting	Meaning	Setting options	Effect
PIRQ F (INTA)	Option for setting the PIRQ F.	Auto	Automatic assignment by the BIOS and operating system.
		3,4,5,6,7,9,10,11,12	Manual assignment
PIRQ G (INTB)	Option for setting the PIRQ G.	Auto	Automatic assignment by the BIOS and operating system.
		3,4,5,6,7,9,10,11,12	Manual assignment
PIRQ H (INTC,UHCI0,EHCI)	Option for setting the PIRQ H.	Auto	Automatic assignment by the BIOS and operating system.
		3,4,5,6,7,9,10,11,12	Manual assignment
1st Exclusive PCI IRQ	Option for setting the first exclusive IRQ. Can only be set if an earlier IRQ PIRQ (A- H) has been set manually.	IRQ number of a manually set IRQ PIRQ (A-H) IRQ	Preferred first IRQ line.
2nd Exclusive PCI IRQ	Option for setting the second exclusive IRQ. Can only be set if two earlier IRQ PIRQ (A-H) have been set manually.	IRQ number of a manually set IRQ PIRQ (A-H) IRQ	Preferred second IRQ line.

Table 121: 945GME Advanced PCI Interrupt Routing setting options (cont.)

### 1.4.3 PCI Express Configuration

PCI Express Configuration Active State Power-Management [Disabled]		Enable/Disable
		PCI Express LOs and L1 link power
PCIE Port 0	[Auto]	states.
PCIE Port 1	[Auto]	
PCIE Port 2	[Auto]	
PCIE Port 3	[Auto]	
PCIE High Priority Port	[Disabled]	
Res. PCIE Hotplug Resources	[No]	
PCIE Port 0 IOxAPCI Enable	[Disabled]	
PCIE Port 1 IOxAPCI Enable	[Disabled]	↔ Select Screen
PCIE Port 2 IOxAPCI Enable	[Disabled]	↑↓ Select Item
PCIE Port 3 IOxAPCI Enable	[Disabled]	+- Change Option
		F1 General Help
		F10 Save and Exit
		ESC Exit

Figure 87: 945GME Advanced PCI Express Configuration

BIOS setting	Meaning	Setting options	Effect
Active State Power-	Option for setting a power saving function	Disabled	Disables this function.
Management	(LOS/L1) for PCIE slots if they do not require full power.	Enabled	Enables this function.
PCIE Port 0	TBD	Auto	
		Enabled	
		Disabled	
PCIE Port 1	TBD	Auto	
		Enabled	
		Disabled	
PCIE Port 2	TBD	Auto	
		Enabled	
		Disabled	
PCIE Port 3	TBD	Auto	
		Enabled	
		Disabled	
PCIE High Priority	TBD	Disabled	
Port		Port 0	
		Port 1	
		Port 2	
		Port 3	
		ETH2	
		ETH1	
Res. PCIE Hotplug	TBD	No	
Resource		Yes	
PCIE Port 0	TBD	Disabled	
IOXAPIC Enable		Enabled	
PCIE Port 1	TBD	Disabled	
IOXAPIC Enable		Enabled	
PCIE Port 2	TBD	Disabled	
IUXAPIC Enable		Enabled	
PCIE Port 3	TBD	Disabled	
IOXAPIC Enable		Enabled	

Table 122: 945GME Advanced PCI Express Configuration setting options

# 1.4.4 Graphics configuration

Advanced			
Graphics Configuration		Select primary video	
		duri	ter to be used ng boot.
Internat Graphics Mode Select	[Enabled, 8MB]		
DVMT Mode Select	[DVMT Mode]		
DVMT/FIXED Memory	[128MB]		
Boot Display Device	[Auto]		
Boot Display Preference	[LFP SDVO-B SDVO-C]		
Local Flat Panel Type	[Auto]		
Local Flat Panel Scalling	[Centering]		
		↔	Select Screen
SDVO Port B Device	[DVI]	↑↓	Select Item
SDVO Port C Device	[DVI]	+-	Change Option
		F1	General Help
SDVO/DVI Hotplug Support	[Enabled]	F10	Save and Exit
Display Mode Persistence	[Enabled]	ESC	Exit

#### Figure 88: 945GME 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	cs Option for setting the memory size that can be used for the internal graphics controller. Enable	Disabled	No reservation - Disables the graphics controller.
Mode Select		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 123: 945GME 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 DVM1 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.
		SDVO only	Only use the SDVO (Serial Digital Video Out) channel.
		CRT + SDVO	Use CRT and SDVO channel.
		LFP only	Only use the LFP (Local Flat Panel) channel.
		CRT + LFP	Use CRT + LFP channel.
Boot Display	This option determines the order in which	LFP SDVO-B SDVO-C	TBD
Preference	LFP and SDVO should be checked.	LFP SDVO-C SDVO-B	TBD
	The setting is only needed when the	SDVO-B SDVO-C LFP	TBD
	"Auto".	SDVO-C SDVO-B LFP	TBD
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 (004h)	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
	UXGA 2x24 Customized	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.
	Рапеттуре.	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.

Table 123: 945GME Advanced Graphics Configuration setting options (cont.)

BIOS setting	Meaning	Setting options	Effect
SDVO Port B Device	Option for selecting the video device that	None	No video device connected.
	is connected to the SDVO Port B.	DVI	Video signal output is optimized for a DVI- compatible video device.
		TV	Video signal output is optimized for a TV- compatible video device.
		CRT	Video signal output is optimized for a CRT- compatible video device.
		LVDS	Video signal output is optimized for a LVDS- compatible video device.
		DVI-Analog	Video signal output is optimized for an analog DVI-compatible video device.
SDVO Port C Device	Option for selecting the video device that	at None	No video device connected.
	is connected to the SDVO Port A.	DVI	Video signal output is optimized for a DVI- compatible video device.
		TV CRT	Video signal output is optimized for a TV- compatible video device.
			Video signal output is optimized for a CRT- compatible video device.
		LVDS	Video signal output is optimized for a LVDS- compatible video device.
		DVI-Analog	Video signal output is optimized for an analog DVI-compatible video device.
SDVO/DVI Hotplug	TBD	Enabled	
Support		Disabled	
Display Mode	TBD	Enabled	
Persistence		Disabled	

Table 123: 945GME Advanced Graphics Configuration setting options (cont.)

## 1.4.5 CPU configuration

Advanced	SIOS SETUP UTILITY		
Configure advanced CPU settings Module Version -13.04		Select the revsion of the multi processo	
Manufacturer:Intel Brand String:Intel(R) Core(TM Frequency :1.50GHz FSB Speed :667MHz	4)2 CPU L7400	support interface tha should be offered by the BIOS.	
Cache L1 :64 KB Cache L2 :4096 KB			
MPS Revision Max CPUID Value Limit Execute Disable Bit Core Multi-Processing Intel(R) SpeedStep(tm) tech. Max. CPU Frequency C1 Config. C2 Config. C3 Config. C3 Config. C4 Config.	<pre>[1.4] [Disabled] [Enabled] [Automatic] [1500 MHz] [Standard] [Disabled] [Disabled]</pre>	<ul> <li>↔ Select Screen</li> <li>↑↓ Select Item</li> <li>+- Change Option</li> <li>F1 General Help</li> <li>F10 Save and Exit</li> <li>ESC Exit</li> </ul>	

Figure 89:	945GME	Advanced	CPU	Configuration
i igui e oo.	0-10 OME	/ lavanoca	0.0	Configuration

BIOS setting	Meaning	Setting options	Effect
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.
Execute Disable Bit	Option for enabling or disabling hardware	Enabled	Enables this function.
	support for prevention of data execution.	Disabled	Disables this function.
Core Multi-	When using a Dual Core processor, this	Enabled	Both cores are used in a Dual Core processor.
Processing	option can be used to disable a core.	Disabled	Only one core is used in a Dual Core processor.
Intel (R) SpeedStep (tm) tech.	Option for controlling the Intel(R) SpeedStep(tm) technology. The	Automatic	The processor speed is regulated by the operating system.
	processor clock speed is increased or decreased according to the amount of	Maximum speed	The processor speed is set to a maximum.
	calculations that must be made. As a result, the power consumption depends	Minimum speed	The processor speed is set to a minimum.
	largely on the processor load.	Disabled	SpeedStep technology disabled.

Table 124: 945GME Advanced CPU Configuration setting options

BIOS setting	Meaning	Setting options	Effect
Max. CPU frequency	Option for setting the maximum processor speed if the value "Automatic" or "Maximum Speed" is set for the option "Intel(R) SpeedStep(tm) tech.".	xxxx MHz	
C1 Config.	TBD	Default	
		Enhanced	
C2 Config.	TBD	Default	
		Enhanced	
		Disabled	
C3 Config.	TBD	Default	
		Enhanced	
		Disabled	
C4 Config.	TBD	Default	
		Enhanced	
		Disabled	

Table 124: 945GME Advanced CPU Configuration setting options (cont.)

## 1.4.6 Chipset configuration

Г

Advanced Chipset Settings		Options
		Auto
femory Hole	[Disabled]	400 MHz
IMM Thermal Control	[Disabled]	533 MHz
DT in SPD	[Disabled]	667 MHz
rs on DIMM	[Disabled]	
IOAPIC	[Enabled]	
APIC ACPI SCI IRQ	[Enabled]	
C4 On C3	[Enabled]	
		↔ Select Screen
		↑↓ Select Item
		+- Change Option
		F1 General Help
		F10 Save and Exit
		ESC Exit

Figure 90: 945GME 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, 667 MHz	Desired clock frequency set manually.
Memory Hole	Option for ISA cards with frame buffer. Not	Disabled	Disables this function.
	relevant for an APC810.	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, 50, 60, 70 80, 85, 90?	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.
IOAPIC	This option is used to enable or disable	Disabled	Disables this function.
	APIC (Advanced Programmable Interrupt Controller). Note: The IRQ resources available to the system are expanded when the APIC mode is enabled.	Enabled	The IRQ resources available to the system are expanded when the APIC mode is enabled.
APIC ACPI SCI IRQ	This option is used to enable or disable	Disabled	IRQ9 is used for SCI.
	Programmable Interrupt Controller) mode.	Enabled	IRQ20 is used for SCI.
C4 On C3	Fine-tunes the power saving function on an ACPI operating system.	Disabled	Processor is needed in C4 if the operating system is initiated in a C3 state.
		Enabled	

Table 125: 945GME Advanced Chipset setting options

# 1.4.7 I/O interface configuration

I/O Interface Configuration		Options
OnBoard Audio Controller	[AC97]	AC97 Disabled
		<ul> <li>↔ Select Screen</li> <li>↑↓ Select Item</li> <li>+- Change Option</li> <li>F1 General Help</li> <li>F10 Save and Exit</li> </ul>

#### Figure 91: 945GME Advanced I/O Interface Configuration

BIOS setting	Meaning	Setting options	Effect	
OnBoard Audio Controller	For turning the Onboard AC97 audio	AC97	Enables AC'97 sound.	
	controller on and off.	Disabled	Disables AC'97 sound.	

Table 126: 945GME Advanced I/O Interface Configuration setting options

#### 1.4.8 Clock configuration

Clock Configuration	Enable clock modulation to reduce	
		EMI.
		<ul> <li>↔ Select Screen</li> <li>↑↓ Select Item</li> <li>+- Change Option</li> <li>F1 General Help</li> </ul>
		F10 Save and Exit ESC Exit

#### Figure 92: 945GME 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 127: 945GME Advanced Clock Configuration setting options

## 1.4.9 IDE Configuration

IDE Configuration		
ATA/IDE Configuration Legacy IDE Channels > Primary IDE Master > Primary IDE Slave > Secondary IDE Master > Secondary IDE Slave Hard Disk Write Protect	[Compatible] [SATA Pri, PATA Sec] : [Not Detected] : [Hard Disk] : [Hard Disk] [Disabled]	
IDE Detect Time Out (Sec) ATA(PI) 80Pin Cable Detection	[35] [Host & Device]	Select Screen Select Item Change Option General Help Save and Exit Exit

#### Figure 93: 945GME Advanced IDE Configuration

BIOS setting	Meaning	Setting options	Effect
ATA/IDE Configuration	Option for configuring the integrated PATA and SATA controller.	Compatible	Both controllers run in Legacy or Compatible Mode.
		Disabled	Both controllers disabled.
		Enhanced	Both controllers run in Enhanced or Native Mode.
Legacy IDE Channels	Option for configuring the Legacy IDE channels in Compatible Mode.	SATA Pri, PATA Sec	SATA drives are address primarily and PATA drive secondarily.
		SATA only	Only use SATA drives.
		PATA only	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 submenu See "Primary IDE master" on page 192
Primary IDE slave	The drive in the system that is connected to the IDE primary slave port is configured here.	Enter	Opens submenu See "Primary IDE slave" on page 194
Secondary IDE master	The drive in the system that is connected to the IDE secondary master port is configured here.	Enter	Opens submenu See "Secondary IDE master" on page 195

Table 128: 945GME Advanced IDE Configuration setting options

BIOS setting	Meaning	Setting options	Effect
Secondary IDE slave	The drive in the system that is connected to the IDE secondary slave port is configured here.	Enter	Opens submenu See "Secondary IDE slave" on page 197
Hard disk write	Write protection for the hard drive can be	Disabled	Disables this function.
protect	enabled/disabled here.	Enabled	Enables this function.
IDE Detect Time Out (Sec)	Configuring the time overrun limit value for the ATA/ATAPI device identification.	0, 5, 10, 15, 20, 25, 30, 35	Time setting in seconds.
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. Note:	Host	Using the IDE controller motherboard.
	This cable should be used whenever possible, otherwise error messages will appear.	Device	Using the IDE disk drive controller.

Table 128: 945GME Advanced IDE Configuration setting options

## Primary IDE master

Drimary T	DE Master		Sele	at the type
FIIMALY I	DE Master		of de	evice connected
Device	:Not Detected		to th	he system.
Tune		[Auto]		
LBA/Large	Mode	[Auto]		
Block (Mu	lti-Sector Transfer	c) [Auto]		
PIO Mode		[Auto]		
DMA Mode		[Auto]		
S.M.A.R.T		[Auto]		
32Bit Dat	a Transfer	[Enabled]		
			_ ↔	Select Screen
			↑↓	Select Item
			+-	Change Option
			F1	General Help
			F10	Save and Exit
			ESC	Exit

Figure 94: 945GME Primary IDE Master

BIOS setting	Meaning	Setting options	Effect
Туре	The type of drive connected to the primary	Not installed	No drive installed.
	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 enables the logical block addressing/ large mode for IDF	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.
transfer)	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.
PIO mode	The PIO mode determines the data rate of the hard drive. Note: The higher the PIO mode, the shorter the data cable must be.	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.
DMA mode	The data transfer rate to and from	Auto	Automatic definition of the transfer rate.
	the primary master drive is defined here. The DMA mode must be enabled in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	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.
	Data transfer.	Enabled	Enables this function.

Table 129: 945GME Primary IDE Master setting options

#### **Primary IDE slave**

Primary IDE Slave		Sele	ct the type	
Device :Not Detected			to the system.	
Туре	[Auto]			
LBA/Large Mode	[Auto]			
Block (Multi-Sector Transfe	er) [Auto]			
PIO Mode	[Auto]			
DMA Mode	[Auto]			
S.M.A.R.T.	[Auto]			
SZBIL DALA ITANSIER	[Enabled]			
		<b>↔</b>	Select Screen	
		<u>↑</u> ↓	Select Item	
		+-	Change Option	
		F1	General Help	
		F10	Save and Exit	
		ESC	Exit	

#### Figure 95: 945GME Primary IDE Slave

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 enables the logical block addressing/ large mode for IDE.	Disabled	Disables this function.
		Auto	Automatic enabling of this function when supported by the system.
Block (multi-sector	This option enables the block mode for	Disabled	Disables this function.
transfer)	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.
PIO mode	The PIO mode determines the data rate of	Auto	Automatic configuration of PIO mode.
	the hard drive. Note: The higher the PIO mode, the shorter the data cable must be.	0, 1, 2, 3, 4	Manual configuration of PIO mode.

Table 130: 945GME Primary IDE Slave setting options

BIOS setting	Meaning	Setting options	Effect
DMA mode	A mode The data transfer rate to and from	Auto	Automatic definition of the transfer rate.
	the primary master drive is defined here. The DMA mode must be enabled in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives	Auto	Automatic detection and enabling.
	(seif-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.
	Data transfer.	Enabled	Enables this function.

Table 130: 945GME Primary IDE Slave setting options (cont.)

#### Secondary IDE master



Figure 96: 945GME Secondary 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 enables the logical block addressing/ large mode for IDF	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.
transfer)	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.
PIO mode	The PIO mode determines the data rate of the hard drive. Note: The higher the PIO mode, the shorter the data cable must be.	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.
DMA mode	MA mode The data transfer rate to and from		Automatic definition of the transfer rate.
	the primary master drive is defined here. The DMA mode must be enabled in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	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.
	Data transfer.	Enabled	Enables this function.

Table 131: 945GME Secondary IDE Master setting options

## Secondary IDE slave

Secondary IDE Slave		Selec	at the type
Secondary IDE Stave		of de	evice connected
Device :Not Detected		to th	ne system.
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]		
		<b>~</b>	Select Screen
		<u>↑</u> ↓	Select Item
		+-	Change Option
		F1	General Help
		F10	Save and Exit
		ESC	Exit

#### Figure 97: 945GME Secondary IDE Slave

BIOS setting	Meaning	Setting options	Effect
Туре	The type of drive connected to the primary master is configured here.	Not installed	No drive installed.
		Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive.
		ARMD	ARMD - drive (zip drive)
LBA/Large mode	A/Large mode This option enables the logical block		Disables this function.
		Auto	Automatic enabling of this function when supported by the system.
Block (multi-sector	k: (multi-sector     This option enables the block mode for IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.     Dis		Disables this function.
transfer)			Automatic enabling of this function when supported by the system.
PIO mode	The PIO mode determines the data rate of	Auto	Automatic configuration of PIO mode.
	the hard drive. Note: The higher the PIO mode, the shorter the data cable must be.	0, 1, 2, 3, 4	Manual configuration of PIO mode.

Table 132: 945GME Secondary IDE Slave setting options

BIOS setting	Meaning	Setting options	Effect
DMA mode	The data transfer rate to and from the primary master drive is defined here. The DMA mode must be enabled in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Auto	Automatic definition of the transfer rate.
		Disabled	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives (self-monitoring, analysis and reporting technology).	Auto	Automatic detection and enabling.
		Disabled	Disables this function.
		Enabled	Enables this function.
32 bit data transfer	This function enables 32-bit data transfer.	Disabled	Disables this function.
	Data transfer.	Enabled	Enables this function.

Table 132: 945GME Secondary IDE Slave setting options (cont.)

## 1.4.10 USB configuration

Advanced			
USB Configuration			Options
USB Devices Enabled :		Disab	led
1 Keyboard, 1 Hub		2 USB	Ports
		4 USB	Ports
		6 USB	Ports
USB 2.0 Controller	[Enabled]	8 USB	Ports
Legacy USB Support	[Enabled]		
USB Legacy POST-Always	[Enabled]		
USB Keyboard Legacy Support	[Enabled]		
USB Mouse Legacy Support	[Enabled]		
USB Storage Device Support	[Enabled]	↔	Select Screen
Port 64/60 Emulation	[Disabled]	↑↓	Select Item
USB 2.0 Controller Mode	[HiSpeed]	+-	Change Option
BIOS EHCI Hand-Off	[Enabled]	F1	General Help
USB Beep Message	[Enabled]	F10	Save and Exit
USB Stick Default Emulation	[Auto]	ESC	Exit
USB Mass Storage Reset Delay	[20 Sec]		

Figure 98: 945GME 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 APC810 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.	Disabled	All USB interfaces run in USB 1.1 mode.
Legacy USB support	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 same as the Legacy USB Support setting.	Enabled	The BIOS Setup can be called up during the POST using a USB keyboard.
		Disabled	Disables this function.
USB keyboard	USB keyboard support can be enabled/disabled here.	Disabled	Disables this function.
legacy support		Enabled	Enables this function.
USB mouse legacy support	USB mouse support can be enabled/disabled here.	Disabled	Disables this function.
		Enabled	Enables this function.
USB storage device	USB storage device support can be	Disabled	Disables this function.
support	enableu/ulsableu liefe.	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	Settings can be made for the USB	Full speed	12 MBps
mode	controller.	Hi speed	480 MBps
BIOS EHCI hand-off	The support for the operating system can	Disabled	Disables the function
	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.
	USB device is detected by the BIOS 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 other devices with larger capacities are simulated as hard drives.
		Hard disk	An HDD-formatted drive can be used as an FDD (e.g. zip drive) for starting the system.

Table 133: 945GME Advanced USB Configuration setting options

BIOS setting	Meaning	Setting options	Effect
USB mass storage reset delay	The waiting time that the USB device POST requires after the device start command can be set. Note: The message "No USB mass storage device detected" is displayed if no USB memory device has been installed.	10 Sec, 20 Sec, 30 Sec, 40 Sec	Manually setting the value.

Table 133: 945GME Advanced USB Configuration setting options (cont.)

### 1.4.11 Keyboard/mouse configuration

Advanced			
Keyboard/Mouse Configuration		Select Power-on state	
Bootup Num-Lock Typematic Rate	[On] [Fast]	IOI MUNICER.	
		↔ Select Screen	
		↑↓ Select Item	
		F1 General Help	
		F10 Save and Exit ESC Exit	

#### Figure 99: 945GME Advanced Keyboard/Mouse Configuration

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

Table 134: 945GME Advanced Keyboard/Mouse Configuration setting options

## 1.4.12 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]		
	151		Select Screen
Serial Port BIOS Update	[Disabled]		Select Item
		+- E1	Conoral Holp
		F10	Save and Exit
		FIC	Save and Exit

#### Figure 100: 945GME 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 remote access field.	None	-
Serial port mode	The serial interface transfer rate is defined here, as long as disabled is not entered in the remote access field.	115200 8,n,1. 57600 8,n,1. 38400 8,n,1. 19200 8,n,1. 09600 8,n,1	Manually setting the value.
Flow control	This setting determines how the transfer is	None	The interface is operated without transfer control.
	controlled via the interface. Note: The setting must be the same on the terminal and the server	Hardware	The interface transfer control is carried out through hardware. This mode must be supported by a cable.
		Software	The interface transfer control is carried out through software.

Table 135: 945GME Advanced Remote Access Configuration setting options

BIOS setting	Meaning	Setting options	Effect
Redirection after	The redirection after start up can be set here, as long as disabled is not entered in the remote access field.	Disabled	The redirection is switched off after start up.
BIOS POST		Boot loader	Redirection is enabled during system start up and charging.
		Always	Redirection is always enabled.
Terminal type	The type of connection can be chosen here, as long as disabled is not entered in the remote access field.	ANSI, VT100, VT-UTF8	Manual configuration of the connection type.
VT-UTF8 Combo	With this option, the VT-UTF8 Combo Key Support for the ANSI and VT100 connections can be enabled, as long as disabled is not entered in the remote access field.	Disabled	Disables this function.
Key Support		Enabled	Enables this function.
Sredir Memory	The memory output delay can be set	No delay	No delay.
Display Delay	y Delay using this option, as long as disabled is not entered in the remote access field (Sredir -> serial redirection).	Delay 1 sec, Delay 2 sec, Delay 4 sec	Manually setting the value.
Serial port BIOS	During system start up, the update is	Disabled	Disables this function.
ираате	roaded via the serial interface in the processor. Note: If this option is disabled, the boot time is reduced.	Enabled	Enables this function.

Table 135: 945GME Advanced Remote Access Configuration setting options (cont.)

### 1.4.13 CPU board monitor

Hardware Health Configuration			Options
		Disal Enab	oled Led
Hardware Health Event Monitori:	ng		
Board Temperature	:63°C/145°F		
CPU Temperature	:47°C/116°F		
Top DIMM Environment Temp.	:53°C/161°F		
Bottom DIMM Environment Temp.	:54°C/161°F		
CPU Fan Speed	:0 RPM		
		↔	Select Screen
VcoreA	:0.960 V	†+	Select Item
+3.3VSB	:3.351 V	+-	Change Option
+5VSB	:5.080 V	F1	General Help
+12Vin	:12.187 V	<b>F10</b>	Save and Exit
VRTC	:3.322 V	ESC	Exit

#### Figure 101: 945GME Advanced CPU Board Monitor

BIOS setting	Meaning	Setting options	Effect
H/W Health Function	Option for displaying all values on this	Enabled	Displays all values.
	page.	Disabled	No values are shown on this page.
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	-
Top DIMM Environment Temp.	Displays the temperature of the first DRAM module.	None	-
Bottom DIMM Environment Temp.	Displays the temperature of the second DRAM module.	None	-
CPU Fan Speed	Displays the rotating speed of the processor fan.	None	-
VcoreA	Displays the processor's core voltage (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	-

Table 136: 945GME Advanced Remote Access Configuration setting options

BIOS setting	Meaning	Setting options	Effect
+5VSB	Displays the current level of the jumper.	None	-
+12Vin	Displays the current voltage of the 12 volt supply.	None	
VRTC	Displays the battery voltage (in volts).	None	-

Table 136: 945GME Advanced Remote Access Configuration setting options (cont.)

## 1.4.14 Baseboard/panel features

Advanc	ed	
Baseboard/Panel F	eatures	
▶Panel Control		
Baseboard Monitor Legacy Devices		
Versions		
BIOS:	R110	
MTCX PX32:	V0.06	
MTCX FPGA:	V0.03	
CMOS Profil:	Oh	
Device ID:	0000AC7h	Select Screen
Compatibility ID:	0000h	î↓ Select Item
Serial Number:	A3C70168427	Enter Go to Sub Screer
Product Name:	5PC810.SX02-00	F1 General Help
User Serial ID:	0000000h	FIU Save and Exit
		ESC EXIL

Figure 102: 945GME Advanced Baseboard/Panel Features

BIOS setting	Meaning	Setting options	Effect
Panel control	For special setup of connected panels (display units).	Enter	Opens submenu See "Panel control" on page 205
Baseboard monitor	Displays different temperature values and fan speeds.	Enter	Opens submenu See "Baseboard monitor" on page 206
Legacy devices	Special settings for the interface can be changed here.	Enter	Opens submenu See "Legacy devices" on page 208
BIOS	Displays the BIOS version.	None	-
MTCX PX32	Displays the MTCX PX32 firmware version.	None	-
MTCX FPGA	Displays the MTCX FPGA firmware version.	None	-

Table 137: 945GME Advanced Baseboard/Panel Features setting options

BIOS setting	Meaning	Setting options	Effect
CMOS profile	Shows the CMOS profile number.	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 hexadecimal value of the user serial ID number. This number can only be changed with "control center", available from B&R. werden!	None	

Table 137: 945GME Advanced Baseboard/Panel Features setting options (cont.)

#### **Panel control**



Figure 103: 945GME 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. vorgesehen.
Version	Display of the firmware version of the SDLR controller. Controllers.	None	-
Brightness	For setting the brightness of the selected panel.	00%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%	For setting the brightness (in %) of the selected panel. Changes take effect after saving and restarting the system (e.g. by pressing <f10>).</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 138: 945GME Panel Control setting options

## **Baseboard monitor**

aseboard Monitor			
MOS Battery:	Good		
emperatures			
Board I/O:	45°C/113°F		
Board ETH2:	39°C/102°F		
Board Power:	43°C/109°F		
Power Supply:	39°C/102°F		
Slide-In Drive 1	: 00°C/32°F		
Slide-In Drive 2:	: 00°C/32°F		
		$\leftrightarrow$	Select Screen
'an Speeds		↑↓	Select Item
Case 1:	00 RPM	F1	General Help
Case 2:	00 RPM	F10	Save and Exit
Case 3:	00 RPM	ESC	Exit
Case 4:	00 RPM		

Figure 104: 945GME Baseboard Monitor

BIOS setting	Meaning	Setting options	Effect
CMOS battery	Displays the battery status. N/A - not available Good - battery ok. Bad - battery is damaged.	None	-
Board I/O	Displays the temperature of the I/O area in degrees Celsius and Fahrenheit.	None	-
Board ETH2	Displays the temperature in the ETH2 controller chip area in degrees Celsius and Fahrenheit.	None	-
Board Power	Displays the temperature in the power supply area in degrees Celsius and Fahrenheit.	None	-
Slide-in drive 1	Displays the temperature of the slide-in drive 1 in degrees Celsius and Fahrenheit.	None	-
Slide-in drive 2	Displays the temperature of the slide-in drive 5.08 cm degrees Celsius and Fahrenheit.	None	-
ETH2 Controller	Displays the temperature of the ETH2 controller in degrees Celsius and Fahrenheit.	None	-
Case 1	Displays the fan speed of housing fan 1.	None	-
Case 2	Displays the fan speed of housing fan 2.	None	-
Case 3	Displays the fan speed of housing fan 3.	None	-
Case 4	Displays the fan speed of housing fan 4.	None	-

Table 139: 945GME Baseboard Monitor setting options

#### Legacy devices

Advanced			
Legacy Devices		Enab	le/Disable the
COM A:		COM	i porc.
Base I/O address:	[3E8]		
Interrupt:	[IRQ 11]		
COM B:	[Enabled]		
Base I/O address:	[238]		
Interrupt:	[IRQ 7]		
COM C:	[Enabled]		
Base I/O address:	[2E8]		
Interrupt:	[IRQ 11]		
COM D:	[Disabled]		
COM E:	[Disabled]	↔	Select Screen
CAN:	[Disabled]	†+	Select Item
Hardware Security Key:	[Enabled]	+-	Change Option
Base I/O address	[378]	F1	General Help
		F10	Save and Exit
ETH2 LAN controller:	[Enabled]	ESC	Exit
ETH2 MAC Address:	Unknown		

#### Figure 105: 945GME Legacy Devices

BIOS setting	Meaning	Setting options	Effect
COM A	Settings for the COM1 serial interface in	Disabled	Disables the interface.
	the system.	Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the COM port.	328, 338, 3E8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM port.	IRQ 5, IRQ 6, IRQ 11, IRQ 12	Selected interrupt is assigned.
COM B	Settings for the <b>COM2</b> serial interface in the system.	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the COM port.	238, 328, 338	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM 2 port.	IRQ 5, IRQ 6, IRQ 7, IRQ 12	Selected interrupt is assigned.
COM C	Setting of the COM port for the touch screen on the monitor/panel connector.	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the COM port.	2E8, 328, 338	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM port.	IRQ 5, IRQ 6, IRQ 10, IRQ 12	Selected interrupt is assigned.

Table 140: 945GME Legacy Devices setting options

BIOS setting	Meaning	Setting options	Effect
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.	2E8, 328, 338	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM port.	IRQ 5, IRQ 6, IRQ 10, IRQ 12	Selected interrupt is assigned.
COM E	Configuration of the COM port of the B&R	Disabled	Disables the interface.
	add-on interface option 5AC600.4851-00 (IF option).	Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the COM port.	2E8, 328, 338	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM port.	IRQ 5, IRQ 6, IRQ 10, IRQ 12	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 and NMI	Selected interrupt is assigned.
Hardware security	Settings for the hardware security key	Disabled	Disables the interface.
кеу	(Dongle) are made here.	Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the hardware security interface.	None	-
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 140: 945GME Legacy Devices setting options (cont.)

## 1.5 Boot

Main	Advanced	Boot	Security	Power		Exit
Boot Pri Boot Dev	ority Selectio ice Priority	n [	Type Based]		The d prior to se	evice based boot ity list allows lect from a list
1st Boot 2nd Boot	Device Device	] ]	Primary Maste Primary Slave	r] ]	devic The t	es. ype based boot
3rd Boot	Device	[	USB Floppy]		prior	ity list allows
4th Boot	Device	]	USB Removable	Devi]	to se	lect device types
5th Boot	Device		USB Harddisk]		even	if a respective
6th Boot	Device	L	USB CDROMJ		devic	e is not (yet)
/th Boot	Device	Ļ	Secondary Mas	terj	prese	nt.
Boot Set	tings Configur	ation			↔ †↓ +-	Select Screen Select Item Change Option
Quick Bo	ot	t I	Enabled]		F1	General Help
Quiet Bo	ot	1	Disabled]		F10	Save and Exit
Automati	c Boot List Re	try [	Disabled]		ESC	Exit
AddOn RO	M Display Mode	1	Keep Current]			
Halt On	Error	1	Disabled]			
Hit 'DEL	Message Disp	lay [	Enabled]			
Interrup	t 19 Capture	1	Enabled]			
PXE Boot	to LAN (ETH1)	[	Disabled]			
Power Lo	ss Control	[	Turn On]			

Figure	106:	945GME	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 141: 945GME Boot Menu setting options

BIOS setting	Meaning	Setting options	Effect
1st boot device	The boot drive can be set using this	Disabled, primary	Selecting the desired sequence.
2nd boot device	option.	secondary master,	
3rd boot device		secondary slave, Legacy	
4th boot device		hard disk, USB CDROM,	
5th boot device	-	USB removable device, onboard LAN, external	
6th boot device		LAN, PCI mass storage	
7th boot device		BEV device, onboard	
8th boot device		PCI SATA, third master third slave	
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.
AddOn ROM display	Sets the display mode for the ROM	Force BIOS	An additional BIOS part can be displayed.
mode	(during the booting procedure).	Keep current	BIOS information is displayed.
Hold on errors	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. Note:	Enabled	The message is displayed.
	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.
	LAN (ETHT).	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 141: 945GME Boot Menu setting options (cont.)

Chapter 4 Software

## 1.6 Security

Main	Advanced	Boot	Security	Power	Ex	(it	
Security Supervise User Pass	Settings or Password sword	Not Inst: Not Inst:	alled		Instal passwo	ll or Change	th
Change Us	ser Password						
Boot Sect	tor Virus Prot	tection	[Disabled]				
Boot Sec Hard Disl	tor Virus Prot k Security	tection	[Disabled]				
Boot Sec Hard Disl Hard Dis	tor Virus Prot k Security sk Security Us	tection	[Disabled]		<b>*</b>	Select Scree	en
Boot Sec Hard Disl > Hard Dis > Hard Dis	tor Virus Prot k Security sk Security Us sk Security Ma	ser Passwa ster Pass	[Disabled] ords swords		↑↓ ↑↓ Enter	Select Scree Select Item Change	en
Boot Sec Hard Dis >Hard Dis >Hard Dis	tor Virus Prot k Security sk Security U: sk Security Ma	tection ser Passwo aster Pass	[Disabled] ords swords		↓ ↓↓ Enter F1 F10	Select Scree Select Item Change General Help	en
Boot Sec Hard Dis Hard Dis Hard Dis	tor Virus Prot k Security sk Security U sk Security Ma	ser Passwo	[Disabled] ords swords		<pre> +→ t↓ Enter F1 F10 ESC </pre>	Select Scre Select Item Change General Help Save and Exi Exit	en t

#### Figure 107: 945GME 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. Note: With this option, only the boot sector is protected, not the entire hard drive.	Enabled	Enables this function.
Hard disk security user password	The hard disk security user password can be created here.	Enter	Opens submenu See "Hard disk security user password" on page 213

Table 142: 945GME Security Menu setting options

BIOS setting	Meaning	Setting options	Effect
Hard disk security master password	The hard disk security master password can be created here.	Enter	Opens submenu See "Hard disk security master password" on page 214

Table 142: 945GME Security Menu setting options (cont.)

## 1.6.1 Hard disk security user password

Security		
Hard Disk Security User Passwords Primary Slave HDD User Password	++ †↓ F1 F10 ESC	Select Screen Select Item General Help Save and Exit Exit

#### Figure 108: 945GME Hard disk security user password

BIOS setting	Meaning	Setting options	Effect
Primary slave HDD user password	This function makes it possible to use the user password to change or configure each hard drive without having to reboot the device. A user password allows the user to edit only certain BIOS settings.	Enter	Enter password.

Table 143: 945GME Hard disk securi	ity user password
------------------------------------	-------------------

#### 1.6.2 Hard disk security master password

Hard Disk Security	Master Passwords		
		++ ↑↓ 11	Select Screen Select Item General Help
		F10 ESC	Save and Exit Exit

#### Figure 109: 945GME 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 144: 945GME Hard Disk Security Master Password

### 1.7 Power

Main	Advanced	Boot	Security	Power		Exit
Congigure	power manage	ment and	control		Enab	le or disable
					APM.	
Suspond T	imo Out		[Diabled]			
Video Dev	an Down Mode		[Disabled]			
Video Pow Ward Dick	Power Down M	ode	[Suspend]			
Keyboard	s DS/2 Mouse	oue				
Reyboard	OM Porte					
Drimary M	ester IDF					
Primary M	lave TDE		[MONITOR]			
Secondary 5	Master IDE		[MONITOR]			
Secondary	Slave TDE		[MONITOR]			
becondury	biare ibi		[montron]		<b>↔</b>	Select Screen
Resume On	Ring		[Disabled]		ή.	Select Item
Resume On	PME#		[Disabled]		+-	Change Option
Resume On	BTC Alarm		[Enabled]		F1	General Help
			[]		F10	Save and Exit
Power But	ton Mode		[On/Off]		ESC	Exit
Loner Dut	con node		[0.17, 0.17]		200	Linto

#### Figure 110: 945GME 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;	Manually setting the value.
Video power down mode	This option allows you to set the energy saving mode for the monitor.	Disabled	Do not switch off the monitor.
		Standby	Monitor goes to standby mode.
		Suspend	Monitor goes to suspend mode.
Hard disk power	This option allows you to set the energy saving mode for the hard drive.	Disabled	Do not switch off the hard drive.
down mode		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 145: 945GME Power Menu setting options

BIOS setting	Meaning	Setting options	Effect
Primary Master IDE	This option is used to determine whether or not BIOS monitors the activities of these components.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Primary Slave IDE	This option is used to determine whether or not BIOS monitors the activities of these components.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Secondary Master IDE	This option is used to determine whether or not BIOS monitors the activities of these components.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Secondary Slave IDE	This option is used to determine whether or not BIOS monitors the activities of these components.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Resume on ring	When the modem receives an incoming call, the PC is brought out of power saving mode.	Disabled	Disables this function.
		Enabled	Enables this function.
Resume on PME#	With this option, you can switch the PME	Disabled	Disables this function.
	wakeup function on or off.	Enabled	Enables this function.
Resume on RTC alarm	With this option, you can activate the	Disabled	Disables this function.
	alarm and enter the date and time for the system start.	Enabled	Enables this function.
Power button mode	This function determines the function of the power button.	On/Off	Power button switches on/off.
		Suspend	

Table 145: 945GME Power Menu setting options (cont.)
#### 1.8 Exit

Main	Advanced	Boot	Security	Power	Exit	
Exit Opti	ons			E	Lxit system	setup
				a	after savin	g the
Save Chan	ges and Exit			c	changes.	
Discard C	hanges and Ex	it			10 here een	he wood
Discard C	manges				for this on	eration
Load CMOS	Defaults				of the second	
					↔ Selec	t Screen
				1	V Selec	t Item
				E	Inter Go to	Sub Scree
				E	71 Gener	al Help
				E	10 Save	and Exit
				E	ISC Exit	

#### Figure 111: 945GME 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 146: 855GME (XTX) Exit menu - setting options

## **1.9 BIOS default settings**

The CMOS Profile Hex switch (for position, see the figure "Interface overview - APC810, 2 card slot variant (bottom)" on page 39) can be used to load pre-defined BIOS profile settings based on the position.



Figure 112: 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.

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

Profile number	Optimized for	Switch position
Profile 0	Reserved	0
Profile 1	System unit 5PC810.SX02-00	1

Table 147: Profile overview

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

#### 1.9.1 Main

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	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 148: 945GME Main profile setting overview

#### 1.9.2 Advanced

#### **ACPI configuration**

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

Table 149: 945GME Advanced - ACPI configuration profile setting overview

#### Software • BIOS options

### **PCI** configuration

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	My setting
Plug & Play O/S	No	Yes			
PCI latency timer	64	64			
Allocate IRQ to PCI VGA	Yes	Yes			
Allocate IRQ to SMBUS HC	Yes	Yes			
PCI IRQ Resource Exclusion					
IRQ3	Allocated	Allocated			
IRQ4	Allocated	Allocated			
IRQ5	Available	Available			
IRQ6	Available	Available			
IRQ7	Available	Available			
IRQ9	Allocated	Allocated			
IRQ10	Available	Available			
IRQ11	Allocated	Allocated			
IRQ12	Available	Available			
IRQ14	Allocated	Allocated			
IRQ15	Allocated	Allocated			
PCI Interrupt Routing					
PIRQ A (VGA,PCIEX0,ETH2,UHCI3)	Auto	Auto			
PIRQ B (AC97, PCIEX1, ETH1)	Auto	Auto			
PIRQ C (PATA,UHCI2,PCIEX2)	Auto	Auto			
PIRQ D (SATA,UHCI1,SMB,PCIEX3)	Auto	Auto			
PIRQ E (INTD)	Auto	Auto			
PIRQ F (INTA)	Auto	Auto			
PIRQ G (INTB)	Auto	Auto			
PIRQ H (INTC,UHCI0,EHCI)	Auto	Auto			

Table 150: 945GME Advanced - PCI configuration profile setting overview

## **PCI Express Configuration**

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	My setting
Active State Power-Management	Disabled	Disabled			
PCIE Port 0	Auto	Auto			
PCIE Port 1	Auto	Auto			
PCIE Port 2	Auto	Auto			
PCIE Port 3	Auto	Auto			
PCIE High Priority Port	Disabled	Disabled			
Res. PCIE Hotplug Resource	No	No			
PCIE Port 0 IOxAPIC Enable	Disabled	Disabled			
PCIE Port 1 IOxAPIC Enable	Disabled	Disabled			
PCIE Port 2 IOxAPIC Enable	Disabled	Disabled			
PCIE Port 3 IOxAPIC Enable	Disabled	Disabled			

Table 151: 945GME Advanced - PCI Express configuration profile setting overview

#### **Graphics configuration**

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	My setting
Primary Video Device	Internal VGA	Internal VGA			
Internal Graphics Mode Select	Enabled, 8MB	Enabled, 8MB			
DVMT Mode Select	DVMT Mode	DVMT Mode			
DVMT/FIXED Memory	128MB	128MB			
Boot Display Device	Auto	Auto			
Boot Display Preference	SDVO-B SDVO-C LFP	SDVO-B SDVO-C LFP			
Local Flat Panel Type	Auto	Auto			
Local Flat Panel Scaling	Centering	Centering			
SDVO Port B Device	DVI	DVI			
SDVO Port C Device	DVI	DVI			
SDVO/DVI Hotplug Support	Enabled	Enabled			
Display Mode Persistence	Enabled	Enabled			

Chapter 4 Software

Table 152: 945GME Advanced - Graphics configuration profile setting overview

## **CPU** configuration

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	My setting
MPS Revision	1.4	1.4			
Max CPUID Value Limit	Disabled	Disabled			
Execute Disable Bit	Enabled	Enabled			

Table 153: 945GME Advanced - CPU configuration profile setting overview

#### Software • BIOS options

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	My setting
Core Multi-Processing	Enabled	Enabled			
Intel (R) SpeedStep (tm) tech.	Automatic	Automatic			
Max. CPU frequency	xxxx MHz	xxxx MHz			
C1 Config.	Default	Default			
C2 Config.	Disabled	Disabled			
C3 Config.	Disabled	Disabled			
C4 Config.	Disabled	Disabled			

Table 153: 945GME Advanced - CPU configuration profile setting overview (cont.)

#### **Chipset configuration**

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

Table 154: 945GME Advanced - Chipset configuration profile setting overview

#### I/O interface configuration

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	My setting
Onboard Audio Controller	AC97	AC97			

Table 155: 945GME Advanced - I/O Interface Configuration profile setting overview

#### **Clock configuration**

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

Table 156: 945GME Advanced - Clock configuration profile setting overview

## **IDE Configuration**

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	My setting
ATA/IDE Configuration	Compatible	Compatible			
Legacy IDE Channels	SATA Pri, PATA Sec	SATA Pri, PATA Sec			
Hard disk write protect	Disabled	Disabled			
IDE Detect Time Out (Sec)	35	35			
ATA(PI) 80 Pin Cable Detection	Host & device	Host & device			
Primary IDE master					
Туре	Auto	Auto			
LBA/Large mode	Auto	Auto			
Block (multi-sector transfer)	Auto	Auto			
PIO mode	Auto	Auto			
DMA mode	Auto	Auto			
S.M.A.R.T.	Auto	Auto			
32Bit data transfer	Enabled	Enabled			
Primary IDE slave					
Туре	Auto	Auto			
LBA/Large mode	Auto	Auto			
Block (multi-sector transfer)	Auto	Auto			
PIO mode	Auto	Auto			
DMA mode	Auto	Auto			
S.M.A.R.T.	Auto	Auto			
32Bit data transfer	Enabled	Enabled			
Secondary IDE master					
Туре	Auto	Auto			
LBA/Large mode	Auto	Auto			
Block (multi-sector transfer)	Auto	Auto			
PIO mode	Auto	Auto			
DMA mode	Auto	Auto			
S.M.A.R.T.	Auto	Auto			
32Bit data transfer	Enabled	Enabled			
Secondary IDE slave					
Туре	Auto	Auto			
LBA/Large mode	Auto	Auto			
Block (multi-sector transfer)	Auto	Auto			
PIO mode	Auto	Auto			
DMA mode	Auto	Auto			

Chapter 4 Software

Table 157: 945GME Advanced - IDE configuration profile setting overview

#### Software • BIOS options

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	My setting
S.M.A.R.T.	Auto	Auto			
32Bit data transfer	Enabled	Enabled			

Table 157: 945GME Advanced - IDE configuration profile setting overview (cont.)

#### **USB** configuration

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	My setting
USB function	8 USB ports	8 USB ports			
USB 2.0 controller	Enabled	Enabled			
Legacy USB support	Enabled	Enabled			
USB Legacy POST-Always	Enabled	Enabled			
USB keyboard legacy support	Enabled	Enabled			
USB mouse legacy support	Enabled	Enabled			
USB storage device support	Enabled	Enabled			
Port 64/60 emulation	Enabled	Enabled			
USB 2.0 controller mode	HiSpeed	HiSpeed			
BIOS EHCI hand-off	Disabled	Disabled			
USB beep message	Enabled	Enabled			
USB stick default emulation	Hard disk	Hard disk			
USB mass storage reset delay	20 Sec	20 Sec			

Table 158: 945GME Advanced - USB configuration profile setting overview

#### Keyboard/mouse configuration

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	My setting
Bootup Num-lock	On	On			
Typematic rate	Fast	Fast			

Table 159: 945GME Advanced - Keyboard/Mouse Configuration profile setting overview

#### **Remote access configuration**

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

Table 160: 945GME Advanced - Remote Access Configuration profile setting overview

#### **CPU board monitor**

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	My setting
H/W Health Function	Enabled	Enabled			

Table 161: 945GME Advanced - CPU Board Monitor profile setting overview

### **Baseboard/panel features**

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	My setting
Panel control					
Select panel number	-	-			
Version	-	-			
Brightness	100%	100%			
Temperature	-	-			
Fan speed	-	-			
Keys/LEDs	-	-			
Panel control					
CMOS battery	-	-			
Board I/O	-	-			
Board ETH2	-	-			
Board Power	-	-			
Slide-in drive 1	-	-			
Slide-in drive 2	-	-			
ETH2 Controller	-	-			
Case 1	-	-			
Case 2	-	-			
Case 3	-	-			
Case 4	-	-			
Legacy devices					
COM A	Enabled	Enabled			
Base I/O address	3F8	3F8			
Interrupt	IRQ4	IRQ4			
COM B	Enabled	Enabled			
Base I/O address	2F8	2F8			
Interrupt	IRQ3	IRQ3			
COM C	Enabled	Disabled			
Base I/O address	3E8	-			
Interrupt	IRQ11	-			
COM D	Disabled	Disabled			

Table 162: 945GME Advanced - Baseboard/Panel Features profile setting overview

#### Software • BIOS options

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	My setting
COM E	Disabled	Disabled			
CAN	Disabled	Disabled			
Hardware security key	Enabled	Enabled			
Base I/O address	378	378			
ETH2 LAN Controller	Enabled	Enabled			
ETH2 MAC Address	-	-			

Table 162: 945GME Advanced - Baseboard/Panel Features profile setting overview (cont.)

### 1.9.3 Boot

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	My setting
Boot priority selection	Type based	Type based			
1st boot device	Onboard LAN	Primary master			
2nd boot device	Primary master	Primary slave			
3rd boot device	Primary slave	USB floppy			
4th boot device	USB floppy	USB Removable Devi			
5th boot device	USB Removable Devi	USB hard disk			
6th boot device	USB CDROM	USB CDROM			
7th boot device	Secondary master	Secondary master			
8th boot device	Secondary slave	Secondary slave			
Quick boot	Enabled	Enabled			
Quiet boot	Disabled	Disabled			
Automatic boot list retry	Disabled	Disabled			
AddOn ROM display mode	Keep current	Keep current			
Hold on errors	Disabled	Disabled			
Hit "DEL" Message Display	Enabled	Enabled			
Interrupt 19 capture	Disabled	Disabled			
PXE boot to LAN (ETH1)	Enabled	Disabled			
Power loss control	Turn on	Turn on			

Table 163: 945GME Boot profile setting overview

#### 1.9.4 Security

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	My setting
Supervisor password	-	-			
User password	-	-			
Boot sector virus protection	Disabled	Disabled			
Hard disk security user password	-	-			
Hard disk security master password	-	-			

Table 164: 945GME Security profile setting overview

#### 1.9.5 Power

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	My setting
Power management/APM	Enabled	Enabled			
Suspend time out	Disabled	Disabled			
Video power down mode	Suspend	Suspend			
Hard disk power down mode	Suspend	Suspend			
Keyboard & PS/2 mouse	MONITOR	MONITOR			
Primary Master IDE	MONITOR	MONITOR			
Primary Slave IDE	MONITOR	MONITOR			
Secondary Master IDE	MONITOR	MONITOR			
Secondary Slave IDE	MONITOR	MONITOR			
Resume on ring	Disabled	Disabled			
Resume on PME#	Disabled	Disabled			
Resume on RTC alarm	Disabled	Disabled			
Power button mode	On/Off	On/Off			

Table 165: 945GME Power profile setting overview

## 2. Automation PC 810 with Windows XP Professional



Figure 113: Windows XP Professional Logo

Model number	Short description	Comment
9S0000.08-010	OEM Microsoft Windows XP Professional German CD, German; Only delivered with a new PC.	
9S0000.08-020	OEM Microsoft Windows XP Professional English CD, English; Only delivered with a new PC.	
9S0000.09-090	OEM Microsoft Windows XP Professional Multilanguage CDs; Only delivered with a new PC.	

Table 166: Model numbers - Windows XP Professional

## 2.1 Installation

Generally, the required Windows XP Professional version is already pre-installed by B&R on the desired mass memory (add-on hard disk, slide-in hard disk). All of the drivers required for operation (graphics, network, etc.) are also installed when doing so.

## 2.2 Drivers

The latest drivers for all released operating systems can be found in the download area (Service - Product Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (<u>www.br-automation.com</u>).

## 3. Automation PC 810 with Windows XP embedded



Figure 114: Windows XP Embedded Logo

Model number	Short description	Comment
5SWWXP.0426-ENG	WinXPe FP2007 APC810 C945GM Order Microsoft Windows XP embedded English, Feature Pack 2007, for PPC700 with CPU boards 5PC600.X855-00, 5PC600.X855-01, 5PC600.X855-02, 5PC600.X855-03, 5PC600.X855-04, 5PC600.X855-05; CompactFlash separately (at least 512 MB). Only delivered with a new PC.	

Table 167: Model numbers - Windows XP Embedded

## 3.1 General information

Windows XP Embedded is the most modular version of the Windows XP Professional desktop operating system and makes it possible to quickly develop reliable and advanced embedded devices. Windows XP Embedded is based on the same binary files as Windows XP Professional and is optimally tailored to the hardware being used. In other words, only the functions and modules required by the respective device are included. Windows XP Embedded is also based on the same reliable code as Windows XP Professional. It provides industry with leading reliability, improvements in security and performance, and the latest technology for Web browsing and extensive device support.

#### 3.2 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	✓
User account	configurable
Explorer shell	1
Registry Filter	✓
Internet Explorer 6.0 + SP2	✓
Internet information service (IIS)	-
Terminal service	1
Windows Firewall	✓
MSN-Explorer	-
Outlook Express	-
Administrative Tools	✓
Remote Desktop	1
Remote Assistance	-
.NET Framework	-
ASP.NET	-
Codepages/User Locale/Keyboard	1
Disk Management Service	✓
Windows Installer Service	1
Class Installer	1
CoDevice Installer	1
Media Player	-
DirectX	-
Accessories	<i>✓</i>
Number of fonts	89

Table 168: Device functions in Windows XP Embedded with FP2007

#### 3.3 Installation

Windows XP Embedded is usually preinstalled at B&R Austria on a suitable CompactFlash card (at least 512 MB). The APC810 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.

#### 3.4 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.

#### 3.4.1 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.

## 4. Automation Device Interface (ADI) - Control Center

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

Display Tasten LEDs Te Statistik Anwendereinstellungen	mperaturen Lüfter Schalter Fabrikseinstellungen Versionen	USV Bericht
Sie körnen his einen Beuch erstelle Eigenschaften vor CPU Board – V CEU Ind V EEU Ind V Temperatu V Speicher II BIORO KIE Die Fin Geräf	I mit ausgewählten Gestleinformationen n Automation PC 800 n [LEDs] Temperaturen [Lüff ndereinstellungen Fabrikseinstellunge ware des PC und von angeschlossenen Sigenschaften von Automation P	ter Schalter USV m Versionen Bericht C 900
Baseboard     Baseboard     Baseboard     Baseboard     Baseboard     Baseboard     Baseboard     Baseboard     MTC     Anwenden     MTC     SDL:     Panel	Statistik Anwendereinstellungen Display Tasten LEDs T Engesaturveste des PC un angezeigt. CPU Board CPU: 43 / 109 °C/°F Board 44 / 111 °C/°F	Fabrikseinstellungen     Versionen     B       emperaturen     Lüfter     Schalter     L       d von angeschlossenen Panels     werden hier       Panel
USV Firmw	Baseboard Board I/O: Board ETH2: Board Netzteit ETH2 Controller: Netzteit Stide-In Laufwerk 1: Stide-In Laufwerk 2:	46 / 114 C/F 47 / 116 C/F 44 / 111 C/F 80 / 140 C/F 45 / 113 C/F 32 / 89 C/F 0 / 32 C/F

Figure 115: ADI Control Center Screenshots - Examples

## 4.1 Functions

- Adjusting the display brightness of connected Panels
- Reading of device-specific keys
- · Activation of device specific LEDs on a Mylar keypad
- Reading temperatures, fan speeds, and statistical data
- · Reading user settings and factory settings
- Reading software versions
- Updating and securing firmware
- Creating reports about the current system (support assistance)

- Setting the SDL equalizer value for the SDL cable adjustment
- Configuring an optional mounted UPS

#### 4.2 Installation

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

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

- or -

Right click on BrSetup.inf in explorer and select "Install".

# Information:

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

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

# 5. Configuration of a SATA RAID array

# Information:

The following software description is valid for PCI SATA controllers 5ACPCI.RAIC-01 and 5ACPCI.RAIC-03.

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



Figure 116: Open the RAID Configuration Utility

RAID Configuration	Utility - Silicon Image 1	nc. Copyright (C) 2006
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 117: RAID Configuration Utility - Menu

#### Software • Configuration of a SATA RAID array

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

Table 169: BIOS-relevant keys in the RAID Configuration Utility

### 5.1 Create RAID Set

Create RAID set Delete RAID set Rebuild Mirrored set Resolve Conflicts Low Level Format	Striped = RAID 0
* 0 PM ST96023AS 1 SM ST96023AS	55GB 55GB
	†↓ Select Menu ESC Previous Menu Enter Select Ctrl-E Exit

Figure 118: RAID Configuration Utility - Menu

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

#### 5.1.1 Create RAID Set - striped

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 1 SM ST96023AS	55G 55G	3
		†↓ Select Menu ESC Previous Menu Enter Select Ctrl-E Exit

Figure 119: RAID Configuration Utility - Create RAID set - striped

Auto Configuration

Auto Configuration optimizes all settings.

Manual Configuration

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

#### 5.1.2 Create RAID Set - Mirrored

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

Figure 120: RAID Configuration Utility - Create RAID set - Mirrored

Auto Configuration

Auto Configuration optimizes all settings.

Manual Configuration

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

### 5.2 Delete RAID set

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

Figure 121: RAID Configuration Utility - Delete RAID set

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

#### 5.3 Rebuild Mirrored Set

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

Figure 122: 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 I	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 123: RAID Configuration Utility - Resolve Conflicts

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

#### 5.5 Low Level Format

RAID Configuration	Utility - Silicon Image	Inc.	Copyr:	ight (C) 2006
Create RAID set Delete RAID set Rebuild Mirrored set Resolve Conflicts Low Level Format	0 PM 1 SM	Se	lect I	HDD to be formatted
0 PM ST96023AS 1 SM ST96023AS	55G 55G			
		†↓ ES En Ct	SC iter :rl-E	Select Menu Previous Menu Select Exit
		*		First HDD

Figure 124: RAID Configuration Utility - Low Level Format

Using the menu "Low Level Format", it's possible to format individual hard disks. This can only be done if a RAID set is not configured. A low level format of a hard disk takes approx. 40 minutes.

# **Chapter 5 • Accessories**

## 1. Overview

Model number	Short description	Comment
0TB103.9	Plug 24V 5.08 3-pin screw clamps 24 VDC 3-pin connector, female. Screw clamps, 3.31 mm <sup>2</sup> , 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 <sup>2</sup> , protected against vibration by the screw flange	
0AC201.9	Lithium batteries (5x) Lithium batteries, 5 pcs., 3 V / 950 mAh, button cell	
4A0006.00-000	Lithium battery (1x) Lithium battery, 1 pc., 3 V / 950 mAh, button cell	
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	Battery unit 5 Ah UPS battery unit for the add-on UPS module	
5CAUPS.0005-00	UPS cable 0.5 m Connection cable between add-on UPS module and UPS battery unit, length 0.5 meters	
5CAUPS.0030-00	UPS cable 3 m Connection cable between add-on UPS module and UPS battery unit, length 3 meters	
5AC801.FA01-00	APC810 replacement fan filter 1CS 5 pcs.	
5AC801.FA02-00	APC810 replacement fan filter 2CS 5 pcs.	
5AC801.FA05-00	APC810 replacement fan filter 5CS 5 pcs.	
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.	
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	

Chapter 5 Accessories

Table 170: Model numbers - Accessories

#### Accessories • Overview

Model number	Short description	Comment
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 side, type B back side); 24 VDC.	
5MMUSB.2048-00	USB flash drive 2 GB SanDisk USB 2.0 flash drive 2 GB	
0PS102.0	Power supply, 1-phase, 2.1 A 24 VDC power supply, 1 phase, 2.1 A, input 100-240 VAC, wide range, DIN rail installation	
0PS104.0	Power supply, 1-phase, 4.2 A 24 VDC power supply, 1 phase, 4.2 A, input 115/230 VAC, auto select, DIN rail mounting	
0PS105.1	Power supply, 1-phase, 5 A 24 VDC power supply, 1 phase, 5 A, input 115/230 VAC, manual select, DIN rail mounting	
0PS105.2	Power supply, 1-phase, 5 A, redundant 24 VDC power supply, 1 phase, 5 A, redundant through parallel operation, input 115/230 VAC, manual select, DIN rail mounting	
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 170: Model numbers - Accessories (cont.)

## 2. TB103 3-pin supply voltage connector

## 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)	
OTB103.91	Plug for the 24 V supply voltage (cage clamps)	
		0TB103.9
		0TB103.91

Table 171: Order data - TB103 supply plug

## 2.3 Technical data

Name	0TB103.9	0TB103.91
Number of pins	3	
Type of terminal	Screw clamps	Cage clamps
Distance between contacts	5.08 mm	
Resistance between contacts	$\leq$ 5 m $\Omega$	
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 <sup>2</sup> - 3.31 mm <sup>2</sup>	
Cable type	Copper wires only (no aluminum wires!)	

Table 172: Technical data - TB103 supply plug

Chapter 5 Accessories

## 3. Replacement CMOS batteries

The lithium battery is needed for buffering the BIOS CMOS data, the real-time clock, and SRAM data.

#### 3.1 Order data

Model number	Description	Figure
0AC201.9	Lithium batteries, 5 pcs., 3 V / 950 mAh button cell	
4A0006.00-000	Lithium battery, 1 piece, 3 V / 950 mAh button cell	.24
		STATE AND

Table 173: Order data - Lithium batteries

### 3.2 Technical data

# Information:

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

Features	0AC201.9	4A0006.00-000
Capacity	950 mAh	
Voltage	3 V	
Self discharge at 23°C	< 1% per year	
Storage time	Max. 3 years at 30°C	
Environmental characteristics		
Storage temperature	-20°C to +60°C	
Relative humidity	0 to 95%, non-condensing	

Table 174: Technical data - Lithium batteries

## 4. Replacement fan filter

# Information:

The fan filters are subject to wear, and should be checked with appropriate frequency to determine whether the air flow provides sufficient cooling. An exchange or cleaning of the filter kit is appropriate at that time.



#### Figure 125: Replacement fan

Model number	Short description	Comment
5AC801.FA01-00	APC810 replacement fan filter 1CS 5 pcs.	In preparation
5AC801.FA02-00	APC810 replacement fan filter 2CS 5 pcs.	
5AC801.FA05-00	APC810 replacement fan filter 5CS 5 pcs.	In preparation

Table 175: Model numbers - Replacement fan filters

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

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

## 5.1 Order data

Model number	Description	Figure
5AC900.1000-00	Adapter DVI-A/m to CRT DB15HD/f Adapter DVI (plug) to CRT (socket), for connecting a standard monitor to a DVI-I interface.	
		and a state of the

Table 176: Order data - DVI - CRT adapter

# 6. CompactFlash cards 5CFCRD.xxxx-03

## 6.1 General information

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

## 6.2 Order data

Model number	Description	Figure
5CFCRD.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	8GB
5CFCRD.1024-03	CompactFlash 1024 MB SSI	SSD-C08GI-3076
5CFCRD.2048-03	CompactFlash 2048 MB SSI	SILICON
5CFCRD.4096-03	CompactFlash 4096 MB SSI	STATEMS
5CFCRD.8192-03	CompactFlash 8192 MB SSI	Example: 8 GB CompactFlash cards

Table 177: CompactFlash cards - Order data

## 6.3 Technical data

# Information:

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

Features	5CFCRD.xxxx-03
MTBF (at 25°C)	> 4000000 hours
Maintenance	None
Data reliability	< 1 unrecoverable error in 10 <sup>14</sup> bit read accesses
Write/erase procedures	> 2,000,000 times
Data retention	10 years
Mechanical characteristics	
Dimensions Length Width Thickness	36.4 ± 0.15 mm 42.8 ± 0.10 mm 3.3 ± 0.10 mm
Weight	11.4 grams
Environmental characteristics	
Ambient temperature Operation Storage Transport	0°C to +70°C -50°C to +100°C -50°C to +100°C
Relative humidity Operation / Storage	8% to 95%, non-condensing
Vibration Operation Storage / Transport	max. 16.3 g (159 m/s <sup>2</sup> 0-peak) max. 30 g (294 m/s <sup>2</sup> 0-peak)
Shock Operation Storage / Transport	max. 1000 g (9810 m/s <sup>2</sup> 0-peak) max. 3000 g (29430 m/s <sup>2</sup> 0-peak)
Altitude	Maximum 80,000 feet (24.383 meters)

Table 178: Technical data - CompactFlash cards 5CFCRD.xxxx-03

#### Accessories • CompactFlash cards 5CFCRD.xxxx-03



#### 6.3.1 Temperature humidity diagram - Operation and storage



#### 6.4 Dimensions



Figure 127: Dimensions - CompactFlash card Type I

#### 6.5 Calculating the lifespan

Silicon Systems provides a 9-page "white paper" for the lifespan calculation for CompactFlash cards (see following pages). This document can also be found on the Silicon Systems homepage (<u>www.siliconsystems.com</u>).

## Information:

A software tool for calculating the statistical lifespan of the Silicon Systems CompactFlash cards in various settings can be downloaded from the B&R Homepage (<u>www.br-automation.com</u>).



Figure 128: Silicon Systems white paper - page 1 of 9

Chapter 5 Accessories



#### SILICONDRIVE<sup>™</sup> WHITE PAPER WP401D

#### INTRODUCTION

SiliconSystems' SiliconDrive™ technology is specifically designed to meet the high performance and high reliability requirements of Enterprise System OEMs in the netcom, military, industrial, interactive kiosk and medical markets. One of the measures of storage reliability in Enterprise System OEM applications is endurance – the number of write/erase cycles that can be performed before the storage product "wears out."

#### BACKGROUND

It is important to note that endurance is not just a function of the storage media. Rather, it is the combination of the storage media and the controller technology that determines the endurance. For example, magnetic media is an order of magnitude less reliable than NAND flash, yet the controller technology employed by rotating hard drives can compensate for this deficiency to yield reliability results that meet those of solid-state storage.

[NOTE: This is a completely different discussion from the mechanical reliability involving rotating hard drives versus solid-state storage that has no moving parts. This is just an example of how a controller, if it is good enough, can compensate for the deficiencies of the media).

Write/erase cycle endurance for solid-state storage is specified in many ways by many different vendors. Some specify the endurance at the physical block level, while others specify at the logical block level. Still others specify it at the card or drive level. Since endurance is also related to data retention, endurance can be specified at a higher level if the data retention specification is lower. For these reasons, it is often difficult to make an "apples to apples" comparison of write/erase endurance by solely relying on these numbers in a datasheet.

A better way to judge endurance is to break the specification down into the main components that affect the endurance calculation:

- 1. Storage Media
- 2. Wear Leveling Algorithm
- 3. Error Correction Capabilities

Other factors that affect endurance include the amount of spare sectors available and whether or not the write is done using a file system or direct logical block addressing. While these issues can contribute to the overall endurance calculation, their effects on the resulting number is much lower than the three parameters above. Each of those factors will be examined individually, assuming ten-year data retention.

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Figure 129: Silicon Systems white paper - page 2 of 9


#### STORAGE MEDIA

The scope of this white paper is confined to non-volatile storage – systems that do not lose their data when the power is turned off. The dominant technology for non-volatile solid-state storage is NAND flash. While NOR flash is also a possible solution, implementation of NOR technology is generally confined to applications like cell phones that require the functionality of DRAM, boot PROM and storage component in a single chip. The economies of scale and component densities of NAND relative to NOR make it the ideal solution for non-volatile, solid-state storage subsystems.

The two dominant NAND technologies available today are SLC (single-level cell, sometimes called binary) and MLC (multi-level cell). SLC technology stores one bit per cell and MLC stores two bits. A comparison of SLC and MLC is shown in figure 1.



SLC NAND is generally specified at 100,000 write/erase cycles per block with 1-bit ECC (this is explained below). MLC NAND is specified at 10,000 write/erase cycles per block with ECC. The MLC datasheet does not specify a number of bits of ECC required. Therefore, when using the same controller, a storage device using SLC will have an endurance value roughly 10x that of a similar MLC-based product. In order to achieve maximum endurance, capacity and speed, SiliconSystems currently uses SLC NAND in our SiliconDrive technology.

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Figure 130: Silicon Systems white paper - page 3 of 9





#### No Wear Leveling

Figure 2 shows a normalized distribution of writes to a flash card that does not use wear leveling. In this instance, the data gets written to the same physical block. Once that physical block wears out and all spare blocks are exhausted (see discussion below), the device ceases to operate, even though only a small percentage of the card was used.

In this instance, the endurance of the card is only dependent on the type of flash used and any error correction capabilities in excess of one byte per sector. Early flash cards did not use wear leveling and thus failed in write-intensive applications. For this reason, flash cards with no wear leveling are only useful in consumer electronic applications.



Figure 132: Silicon Systems white paper - page 5 of 9



Figure 133: Silicon Systems white paper - page 6 of 9



#### Static Wear Leveling

Figure 4 shows a normalized distribution of writes to a SiliconDrive that employs static wear leveling. This algorithm evenly distributes the data over the entire SiliconDrive. The algorithm searches for the least-used physical blocks and writes the data to that location. If that location is empty, the write occurs normally. If that location contains static data, the static data is moved to a more heavily-used location prior to the new data being written. The endurance of the SiliconDrive is calculated to be 100 times better than for the card with no wear leveling and four times the endurance of the card that uses dynamic wear leveling.



Figure 134: Silicon Systems white paper - page 7 of 9



#### ERROR CORRECTION

Part of the solid-state memory components specification is related to error correction. For example, SLC NAND components are specified at 100,000 write/erase cycles with one-bit ECC. It goes to reason that the specification increases with a better error correction algorithm. Most flash cards employ error correction algorithms ranging from two-bit to four-bit correction. SiliconSystems' SiliconDrive technology uses six-bit correction.

The term six-bit correction may be slightly confusing. Six-bit correction really defines the capability of correcting up to six bytes in a 512-byte sector. Since a byte is eight bits, this really means the SiliconDrive can correct 48 bits as long as those bits are confined to six bytes in the sector. The same definition holds for two-bit and four-bit correction.

The relationship between the number of bytes per sector the controller can correct does not appear to be directly proportional to the overall endurance, since the bit error rate of the NAND flash is not linear. To state it another way, six-bit error correction is not necessarily three times better than two-bit ECC. In most cases, it is significantly better than that.

#### SUMMARY OF MEDIA, WEAR LEVELING AND ECC

The matrix below summarizes the effects of the different items discussed above. In the table, a "1" indicates the best possible scenario, and a "10" indicates the least desirable in terms of endurance.

N = No Wear Leveling; D = Dynamic Wear Leveling; S = Static Wear Leveling

ECC	SLC NAND			MLC NAND		
	Ν	D	S	Ν	D	S
2-bit	6	5	4	10	9	8
4-bit	5	4	2	9	8	7
6-bit	4	3	1*	8	7	6
- SiliconSystems' SiliconDrive Configuration						

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Figure 135: Silicon Systems white paper - page 8 of 9





#### ENDURANCE CALCULATIONS

To get an idea of how long a solid-state storage device will last in an application, the following calculations can be used. Note: These calculations are valid only for products that use either dynamic or static wear leveling. Use the solid-state memory component specifications for products that do not use wear leveling.

To calculate the expected life in years a product will last:

Years = 
$$\frac{(\alpha - \beta) \times \lambda \times (1 - \varphi)}{(\omega \times \xi) \times k}$$

Where:

- $\alpha$  = Capacity in MB (when converting from MB to GB, MB = GB x 1,024)
- $\beta$  = Amount of Static Data in MB (this value should be 0 for static wear leveling)
- $\lambda$  = Endurance Specification
- $\varphi$  = Safety Margin
- $\omega$  = File Size in MB (when converting from KB to MB, KB = MB x 1,024)
- $\xi$  = Number of Writes of file size  $\omega$  per minute
- k = Number of minutes per year = 525,600

To calculate the number of data transactions:

Transactions = 
$$\frac{(\alpha - \beta) \times \lambda \times (1 - \phi)}{\omega}$$

Where:

- $\alpha$  = Capacity in MB (when converting from MB to GB, MB = GB x 1,024)
- $\beta$  = Amount of Static Data in MB (this value should be 0 for static wear leveling)
- $\lambda$  = Endurance Specification
- $\varphi$  = Safety Margin Percentage (usually 25%)
- $\omega$  = File Size in MB (when converting from KB to MB, KB = MB x 1,024)

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Figure 136: Silicon Systems white paper - page 9 of 9

## 7. USB Media Drive - 5MD900.USB2-01



Figure 137: USB Media Drive - 5MD900.USB2-01

### 7.1 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 (see also section 7.8 "Front cover 5A5003.03 for the USB Media Drive" on page 266)

### 7.2 Technical data

# Information:

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

Features - entire device	5MD900.USB2-01 Rev. D0 and higher D0		
Transfer rate	Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)		
Maximum cable length	5 m (without hub)		
Power supply Rated voltage	24 VDC ± 25%		
Features - diskette drive			
Data capacity	720 KB / 1.25 MB / 1.44 MB (formatted)		
Data transfer rate	250 kbits (720 KB) or 500 kbits (1.25 MB and 1.44 MB)		
Rotation speed	Up to 360 rpm		
Diskette media	High density (2HD) or normal density (2DD) 3.5" diskettes		
MTBF	30000 POH (Power-On Hours)		
Features - DVD-RW/CD-RW drive			
Write speed CD-R CD-RW DVD-R DVD-RW DVD+R DVD+R(double layer) DVD-R (double layer) DVD-R(Double Layer) DVD-RAM <sup>1)</sup> Reading rate CD	10-24x 10-24x 2-6x 3.3-8x 3.3-8x 2.4-4x 2-4x 3-5x 24x		
DVD	8x		
Data transfer rate	Max. 33.3 MB/sec.		
Access time (average) CD/DVD	130 ms (24x) / 130 ms (8x)		
Revolution speed	Max. 5090 rpm ± 1%		
Starting time (0 rpm to read access) CD DVD	14 seconds (maximum) 15 seconds (maximum)		
Host interface	IDE (ATAPI)		
Features - DVD-RW/CD-RW drive	5MD900.USB2-01		

Table 179: Technical data - USB Media Drive 5MD900.USB2-01 Rev D0 and higherD0

### Accessories • 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		
Laser class	Class 1 laser		
Data buffer capacity	8 MB		
Noise level (complete read access)	Approx. 48 dBA in a distance of 50 cm		
Lifespan Opening/closing the drawer	60000 POH (Power-On Hours) > 10000 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 <sup>2)</sup> Operation Storage Transport	+5°C +45°C -20°C +60°C -40°C +60°C		
Environmental characteristics	5MD900.USB2-01		

Table 179: Technical data - USB Media Drive 5MD900.USB2-01 Rev D0 and higherD0 (cont.)

Relative humidity Operation Storage Transport	20 - 80%, non-condensing 5 - 90%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage Transport	5 - 500 Hz: 0.3 g (2.9 m/s <sup>2</sup> 0-peak) 10 - 100 Hz: 2 g (19.6 m/s <sup>2</sup> 0-peak) 10 - 100 Hz: 2 g (19.6 m/s <sup>2</sup> 0-peak)
Shock Operation Storage Transport	Max. 5 g (49 m/s <sup>2</sup> 0-peak) and 11 ms length Max. 60 g (588 m/s <sup>2</sup> 0-peak) and 11 ms length Max. 60 g (588 m/s <sup>2</sup> 0-peak) and 11 ms length
Altitude	Max. 3000 meters

Table 179: Technical data - USB Media Drive 5MD900.USB2-01 Rev D0 and higherD0 (cont.)

- 1) DVD RAM drivers are not provided by the manufacturer. Support of DVD RAM function by the burning software "Nero" (model number 5SWUTI.0000-00) or other burning software packages and drivers from third party providers.
- 2) Temperature data is for operation at 500 meters. Derating the max. ambient temperature typically 1°C per 1000 meters (from 500 meters above sea level).

### 7.3 Dimensions



Figure 138: Dimensions - 5MD900.USB2-01

### 7.4 Dimensions with front cover



Figure 139: Dimensions - USB Media Drive with front cover

### 7.4.1 Cutout installation



Figure 140: Installation cutout - USB Media Drive with front cover

### 7.5 Contents of delivery

Amount	Component
1	USB Media Drive complete unit
2	Mounting rail brackets

Table 180: Contents of delivery - USB Media Drive - 5MD900.USB2-01

### 7.6 Interfaces



Figure 141: Interfaces - 5MD900.USB2-01

### 7.7 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).

### 7.7.1 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 142: Mounting orientation - 5MD900.USB2-01

### 7.8 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 143: Front cover 5A5003.03

### 7.8.1 Technical data

Features	5A5003.03
Front cover design / colors Dark gray border around the cover Light gray background	Pantone 432CV Pantone 427CV

Table 181: Technical data - 5A5003.03

### 7.8.2 Dimensions



Figure 144: Dimensions - 5A5003.03

### 7.8.3 Installation

The front cover is attached with 2 mounting rail brackets (included with USB Media Drive) and 4 M3 locknuts. The USB media drive and front cover can be mounted as a whole in (for example) a switching cabinet door.



Figure 145: Front cover mounting and installation depth

### 7.8.4 Cutout installation

See the figure 140 "Installation cutout - USB Media Drive with front cover" on page 264.

## 8. 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.

### 8.1 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. Only USB flash drives from the memory specialists <u>SanDisk</u> are used.

### 8.2 Order data

Model number	Description	Figure
5MMUSB.2048-00	USB flash drive 2 GB SanDisk Cruzer Micro	

Table 182: Order data - USB flash drives

### 8.3 Technical data

# Information:

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

Features	5MMUSB.2048-00
LED	1 LED (green), signals data transfer (send and receive)
Power supply Current requirements	Via the USB port 650 μA 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)	100000 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 Storage Transport	0°C +45°C -20°C +60°C -20°C +60°C
Relative humidity Operation Storage Transport	10% 90%, non-condensing 5% 90%, non-condensing 5% 90%, non-condensing
Vibration Operation Storage Transport	At 10 - 500 Hz: 2 g (19.6 m/s <sup>2</sup> 0 peak), oscillation rate 1/minute At 10 - 500 Hz: 4 g (39.2 m/s <sup>2</sup> 0 peak), oscillation rate 1/minute At 10 - 500 Hz: 4 g (39.2 m/s <sup>2</sup> 0 peak), oscillation rate 1/minute
Shock Operation Storage Transport	Max. 40 g (392 m/s <sup>2</sup> 0-peak) and 11 ms length Max. 80 g (784 m/s <sup>2</sup> 0-peak) and 11 ms length Max. 80 g (784 m/s <sup>2</sup> 0-peak) and 11 ms length
Altitude Operation Storage Transport	3048 meters 12192 meters 12192 meters

Table 183: Technical data - USB flash drive 5MMUSB.2048-00

#### Accessories • USB flash drive

#### 8.3.1 Temperature humidity diagram - Operation and storage



Figure 146: 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).

### 8.4 Contents of delivery



Table 184: Contents of delivery - USB flash drive 5MMUSB.2048-00

1) Due to a change in the contents of delivery from the manufacturer, it is possible that the USB flash drive (with white cap) is delivered without the replacement covers or strap.

### 8.5 Creating a bootable USB flash drive

When used in connection with an Automation PC 620 / Panel PC 700, it is possible to boot the system from one of the flash drives available from B&R. The flash drive must be specially prepared for this.

### 8.5.1 Requirements

The following peripherals are required for creating a bootable flash drive:

- B&R USB flash drive
- Automation PC 620 or Panel PC 700
- USB floppy drive (external or slide-in USB floppy 5AC600.FDDS-00)
- PS/2 or USB keyboard
- A start disk created using MS-DOS 6.22 or Windows 98 1.44MB HDD (Windows Millennium, NT4.0, 2000, XP start disks cannot be used). The tools "format.com" and "fdisk.exe" must be located on the diskette!

### 8.5.2 Procedure

- Plug in the flash drive and boot from the start disk.
- Set active partition on the flash drive using "fdisk" and follow the further instructions.
- Reboot the system from the start disk.

Format and simultaneously transfer the system files to the flash drive with the command "format c: /s".

## 9. Uninterruptible power supply UPS

With the optionally integrated UPS, the Automation PC 810 makes sure that the PC system completes write operations even after a power failure occurs. When the UPS detects a power failure, it switches to battery operation immediately without interruption. This means that all running programs will be ended properly by the UPS software. This prevents the possibility of inconsistent data (only functions if the UPC is already configured and the driver is activated).

# Information:

### The monitor is not buffered by the UPS and will shut off when the power fails.

By integrating the charging circuit in the Automation PC 810 housing, the installation has been reduced to merely attaching the connection cable to the battery unit mounted next to the PC.



Figure 147: UPS principle

### 9.1 Features

- Long-lasting, maintenance-free rechargeable batteries
- Communication via integrated interfaces
- Temperature sensor
- Driver software
- Deep discharge protection

### 9.2 Requirements

- Add-on UPS module 5AC600.UPSI-00 For more on installing the add-on modules, see chapter TBD, section TBD.
- 2) Battery unit 5AC600.UPSB-00
- 3) UPS connection cable 0.5 m (5CAUPS.0005-00) or 3 m (5CAUPS.0030-00)
- 4) 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 TBD, section TBD.

### 9.3 Individual components

### 9.3.1 Add-on UPS module 5AC600.UPSI-00



Figure 148: Add-on UPS module 5AC600.UPSI-00

### **Technical data**

Features	5AC600.UPSI-00
Switching threshold mains / battery operation	15 / 13 V
Mains failure bridging	Max. 20 min at 150 W load
Charging current	Max. 0.5 A
Deep discharge protection	Yes, at 10 V of the battery unit
Short circuit protection	No
Power requirements	Max. 7.5 watts
Status indicators	Via the ADI Control Center (see section TBD)
Parameter settings	Via the ADI Control Center (see section TBD)

Table 185: Technical data - 5AC600.UPSI-00

### Installation

The module is installed using the materials included in the delivery. For installation instructions, see section TBD.



Figure 149: Add-on UPS module 5AC600.UPSI-00 - Installation materials

### 9.3.2 Battery unit 5AC600.UPSB-00

The battery unit is subject to wear and should be replaced regularly (at least following the specified lifespan).



Figure 150: 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 153 "Dimensions - 5AC600.UPSB-00" on page 278		
Temperature sensor	NTC resistance		
Weight	Approx. 3.2 kg		
Ambient temperature Operation Storage Transport	-40°C +80°C -65°C +80°C -65°C +80°C		
Relative humidity Operation Storage Transport	5 - 95% (non-condensing) 5 - 95% (non-condensing) 5 - 95% (non-condensing)		
Altitude	Max. 3000 meters		
Mounting instructions	See section "Mounting instructions" on page 279.		
Lifespan	10 years at 25°C (up to 80% battery capacity)		
Maintenance interval during storage	Load once every 6 months		

Table 186: Technical data - 5AC600.UPSB-00

Temperature life span diagram up to 20% battery capacity.



Figure 151: Temperature life span diagram



**Deep discharge cycles** 

Figure 152: Deep discharge cycles

### Accessories • Uninterruptible power supply UPS

### Dimensions



Figure 153: Dimensions - 5AC600.UPSB-00

### **Drilling template**



Figure 154: 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.

### 9.3.3 UPS connection cable



Figure 155: UPS connection cable

### **Technical data**

Features	5CAUPS.0005-00	5CAUPS.0030-00			
Length	0.5 m 3 m				
Outer diameter	8.5 mm :	± 0.2mm			
Connector type	6-pin plug connectors, tension clamp connection / 6-pin socket connectors, tension clamp connection				
Wire cross section Temperature sensor wire Voltage wire	2 x 0.5 mm <sup>2</sup> (AWG 20) 4 x 2.5 mm <sup>2</sup> (AWG 13)				
Line resistance 0.5 mm <sup>2</sup> 2.5 mm <sup>2</sup>	Max. 39 Ω/km Max. 7.98 Ω/km				
Flex radius Fixed installation Free-moving	5 x wire cross-section 10 x wire cross-section				
Temperature range Moving Non-moving	-5°C +80°C -30°C +80°C				
Weight	Approx. 143 kg/km				
Materials Cable shielding Color	Thermoplastic PV Window gray (sin	/C-based material illar to RAL 7040)			
Peak operating voltage	12 V DC				
Testing AC voltage Wire/wire	150	0 V			
Operating voltage	Max. 300 V				
Current load	10 A at	+20°C			

Table 187: Technical data - UPS connection cable

### **10. Power Supplies**

In order to meet demands for complete, comprehensive system solutions, power supplies are available for mounting rail installation in the B&R product line. This extensive spectrum ranges from single-phase power supplies that supply 2.1 A up to three-phase power supplies that supply 40 A. All switching power supplies can manage a wide range of AC and DC input voltages. This input ranges from 100 to 240 VAC or 400 to 500 VAC and from 85 to 375 VDC. Devices are protected against short circuit, overload, and open circuit, which allows them to be operated without functional limitations or derating even when overloads between 15% and 25% occur.



Figure 156: B&R power supplies (examples)

Two mini power supplies (PS102 and PS104) in robust plastic housing are available in the lower performance range. A well designed cooling concept allows several different mounting orientations. The functional DIN rail allows fast mounting and demounting. Wiring is essentially performed in seconds thanks to the the cage clamp terminals used. The compact design, easy mounting and several different mounting orientations make the two smallest power supplies in this product line components that can be used practically anywhere.

### **Accessories • Power Supplies**

### 10.1 Model numbers and brief technical overview

The technical data listed in the following tables should act as a brief selection guide. For more detailed technical data, data sheets are available for download from production description section of the B&R homepage (www.br-automation.com).

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

### 10.1.1 Single-phase power supplies

Table 188: Single-phase power supplies

### 10.1.2 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 189: Three-phase power supplies

# **Chapter 6 • Maintenance / Servicing**

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

## **1. Changing the battery**

## Information:

- The product design allows the battery to be changed with the APC810 switched either on or off. In some countries, safety regulations do not allow batteries to be changed while the module is switched on.
- Any BIOS settings that have been made will remain when the battery is changed with the power turned off (stored in non-volatile EEPROM). The date and time must be reset later because this data is lost when the battery is changed.
- The battery should only be changed by qualified personnel.

The following replacement lithium batteries are available: 4A0006.00-000 (single) and 0AC201.9 (5 pcs.).

### 1.1 Procedure

- Disconnect the power supply to the Automation PC 810.
- 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 removal strips.



Figure 157: Remove battery

• The battery should not be held by its edges. Insulated tweezers may also be used for inserting the battery.



Figure 158: Battery handling

### Maintenance / Servicing • Changing the battery

• Insert the new battery with correct polarity.



Figure 159: Battery polarity

- To make the next battery change easier, be sure the removal strip is in place when inserting battery.
- Reconnect power supply to the PC 620 (plug in power cable and press power button).
- Date and time might need to be reset in BIOS.

# Warning!

Lithium batteries are considered hazardous waste. Used batteries should be disposed of according to local requirements.

## 2. Installing / exchanging a slide-in compact drive

# Information:

The SATA I interface allows data carriers to be exchanged during operation (hotplug). To utilize this capability, it must be supported by the operating system.

 Loosen and remove the two ¼ turn screws on the protective cover / slide-in compact drive.



Figure 160: Loosening the 1/4 turn screws

• Insert the compact SATA drive and fasten using the ¼ turn screws.



Figure 161: Inserting the compact SATA drive

## 3. Slide-in slot drive installation / Exchange

Slide-in drives can be installed and exchanged in system units with 2 or 5 card slots.

### 3.1 Procedure

- Disconnect the power supply to the Automation PC 810.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Remove the slide-in dummy module or slide-in drive by unscrewing the 2 ¼ turn screws.



Figure 162: Loosening the ¼ turn screws

• Insert the slide-in drive and tighten with both 1/4 turn screws.



Figure 163: Installing the slide-in drive

### 4. Mounting the slide-in compact adapter

A slide-in compact drive (e.g. slide-in compact HDD) can be mounted in a slide-in slot using the slide-in compact adapter.

### 4.1 Procedure

- Disconnect the power supply to the Automation PC 810.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.





Figure 164: Loosening the 1/4 turn screws

• Insert the slide-in compact adapters and tighten with both ¼ turn screws.



Figure 165: Installing the slide-in compact adapter
• Once it is mounted, the slide-in compact drive can be installed.



Figure 166: Mounting the slide-in compact drive

Maintenance / Servicing

Chapter 6

# 5. Installing / exchanging the fan kit

- Disconnect the power supply to the Automation PC 810.
- 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 167: APC810 2 card slots - Remove screws to install/ remove filter kit

• After the screws have been removed, the fan kit cover can be removed toward the front.

#### Maintenance / Servicing • Installing / exchanging the fan kit



Figure 168: Remove fan kit insert

• Insert the frame - Mount the contact board side to the sliding contacts on the system unit and fasten using the three 1/4 turn screws.



Figure 169: Inserting and fastening the fan kit

• Place the dust filter in the fan kit cover and secure with the filter clasp.

Chapter 6 Maintenance / Servicing

#### Maintenance / Servicing • Installing / exchanging the fan kit



Figure 170: Securing the dust filter with the filter clasp

• Place the fan kit cover in the housing and fasten using the Torx screws removed earlier.

# Information:

Regular control of the dust filter depending on area of use and degree of dirtiness.

# 6. Installing the UPS module



The module is installed using the materials included in the delivery.

Figure 171: Add-on UPS module 5AC600.UPSI-00 - Installation materials

Installation may vary depending the system unit type (1, 2 or 5 card slots) or whether an add-on interface module (IF option) is installed in the APC810.

#### 6.1 Installation without installed add-on interface module

Different parts are used depending on the system unit and **installed** (description starting on page 296) or **not installed** (description follows) add-on interface module.

#### 6.1.1 APC810 2 card slot

- Remove side cover (see section "Mounting the side cover" on page 301).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).



Figure 172: Remove UPS module cover

Chapter 6 Maintenance / Servicing

#### Maintenance / Servicing • Installing the UPS module

• Screw in spacing bolt and spacing ring on the main board (using M5 hex socket screwdriver).



Figure 173: Screw in spacing bolt and spacing ring

• Install mounting bracket on UPS module using 2 Torx screws (T10).



Figure 174: Install mounting bracket

• Install the UPS module using 3 Torx screws (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.



Figure 175: Install UPS module

#### Maintenance / Servicing • Installing the UPS module

• Plug in connection cable (see marked socket).



Figure 176: Plug in connection cable

# Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.



Figure 177: Connector locking mechanism

Attach the side cover.

#### 6.2 Installation with installed add-on interface module

#### 6.2.1 APC810 2 card slot

- Remove side cover (see section "Mounting the side cover" on page 301).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).



Figure 178: Remove UPS module cover

• Screw in spacing bolt (using M5 hex socket screwdriver).



Figure 179: Screw in spacing bolt

• Install mounting bracket on UPS module using 2 Torx screws (T10).



Figure 180: Install mounting bracket

• Install the UPS module using 3 Torx screws (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.



Figure 181: Install UPS module

• Plug in connection cable (see marked socket).



Figure 182: Plug in connection cable

# Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.



Figure 183: Connector locking mechanism

Maintenance / Servicing

Chapter 6

#### Maintenance / Servicing • Installing the UPS module

• Attach cover plate and side cover.

#### Maintenance / Servicing • Exchanging a PCI SATA RAID hard disk in a RAID 1 system

# 7. Exchanging a PCI SATA RAID hard disk in a RAID 1 system

In the example, the assumption is made that the secondary hard disk (HDD1) is defective in a RAID 1 configuration. In such a case, the defective hard disk can be replaced by the replacement drive SATA hard disk.

Model number - PCI SATA RAID controller	Model number of required replacement SATA HDD	Comment
5ACPCI.RAIC-01	5ACPCI.RAIC-02	60 GB hard disk
5ACPCI.RAIC-03	5ACPCI.RAIC-04	160 GB hard disk

Table 190: Overview of required replacement SATA HDD for PCI SATA HDD RAID controller

A size 10 Torx screwdriver is needed for exchanging the hard disk.

#### 7.1 Exchange procedure

- Remove the power supply to the device (Automation PC 620 / Panel PC 700 / Automation PC 810).
- 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).



Figure 184: Screw layout on the back side of the SATA RAID controller 5ACPCI.RAIC-01

#### Maintenance / Servicing • Exchanging a PCI SATA RAID hard disk in a RAID 1 system

- On the front side, slide the hard disk down and away (image 1).
- Carefully plug the new hard disk into the connector (image 2).



Figure 185: 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 239.

#### 8. Mounting the side cover

The side cover can be easily removed by loosening the Torx (T10) screws. The number of Torx screws can vary depending on the system.

#### 8.1 APC810 with 2 card slot

- Disconnect the power supply to the Automation PC 810.
- 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 Kombitorx screws (T10) that must be removed.



Figure 186: Mounting the side cover - APC810 2 card slot

• After the screws have been removed, the side cover can be removed by sliding it toward the front.

# **Appendix A**

#### 1. Temperature sensor locations

Sensors display temperature values in various places (CPU, board I/O, slide-in drive, etc.) on the APC810. Die Temperaturen<sup>1)</sup> können im BIOS (Menüpunkt Advanced - CPU Monitor) oder unter Microsoft Windows XP/Embedded mittels B&R Control Center<sup>2)</sup> ausgelesen werden.



Figure 187: Temperature sensor locations

Position	Messpunkt für	Measurement
1	CPU	Temperatur des Prozessors (Sensor integriert im Prozessor)
2	Board	Temperatur des CPU Boards (Sensor integriert im CPU Board)
3	Board I/O	Temperatur des Board I/O Bereichs (Sensor auf dem Basebaord)
4	Board ETH2	Temperatur des Baseboards im Bereich des ETH2 Controllers (Sensor am Baseboard)
5	Board Netzteil	Temperatur des Board Netzteils (Sensor am Baseboard)
6	ETH2 Controller	Temperatur des ETH2 Controllers (Sensor im ETH2 Controller)
7	Power supply	Temperatur des Netzteils (Sensor am Netzteil)
8	Slide-in drive 1/2	Temperature of a slide-in drive (the sensor is integrated on the slide-in drive)

Table 191: Temperature sensor locations

- 1) The measured temperature is a guideline for the immediate ambient temperature, but can be influenced by neighboring components.
- 2) The B&R Control Center ADI driver can be downloaded for free from the download area on the B&R homepage (www.brautomation.com).

# 2. Maintenance Controller Extended (MTCX)

The MTCX controller (FPGA processor) is located on the main board (part of every system unit) of the APC810 device.



Figure 188: 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)
- Ventilation
- Key and LED handling/coordination (matrix keyboard on B&R display units)
- 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)

#### Appendix A • Maintenance Controller Extended (MTCX)

The functions of the MTCX can be expanded via Firmware upgrade<sup>1)</sup>. Die Version kann im BIOS (Menüpunkt Advanced - Baseboard/Panel Features) oder unter Microsoft Windows XP/Embedded mittels B&R Control Center ausgelesen werden.

For more information about this, see the Firmware upgrade section on page TBD of the Software chapter.

1) Can be downloaded from the download area on the B&R homepage (www.br-automation.com).

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