

Automation PC 800

User's Manual

Version: **0.30 Preliminary (January 2008)**

Model number: **MAAPC800-ENG**

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Chapter 1 • General

Information:

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

www.br-automation.com.

1. Manual history

Version	Date	Change
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	25.01.2008	- Mistake regarding the configuration corrected. - BIOS default profile added. - Name change from APC810 to APC800 and model number change - Technical data for the entire device updated. - Connection examples added. - Problems and properties of the first production lot added.

Table 1: Manual history

2. Safety guidelines

2.1 Intended use

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

2.2 Protection against electrostatic discharges

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

2.2.1 Packaging

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

2.2.2 Guidelines for proper ESD handling

Electrical components with housing

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

Electrical components without housing

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

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

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

Individual components

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

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

2.3 Policy and procedures

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

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

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

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

2.4 Transport and storage

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

2.5 Installation

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

2.6 Operation

2.6.1 Protection against touching electrical parts

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

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

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

2.6.2 Environmental conditions - dust, humidity, aggressive gases

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

The presence of aggressive gases in the environment can also lead to malfunctions. When combined with high temperature and humidity, aggressive gases - e.g. with 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 like Automation Panel or Power Panel are protected on the front side. The rear side of all devices must be protected from dust and humidity and must be cleaned at suitable intervals.

2.6.3 Programs, viruses and dangerous programs

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

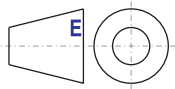
3. Organization of safety notices

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	Note
5PC810.SX01-00	APC810 System 1CS¹⁾ APC810 System unit 1 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	In preparation
5PC810.SX02-00	APC810 system 2CS¹⁾ 1DD²⁾ 1LS³⁾ APC810 System unit 2 slots (PCI, PCI Express, depending on bus) 1 slide-in 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 5CS¹⁾ 2DD²⁾ 1LS³⁾ APC810 System unit 5 slots (PCI, PCI Express, depending on bus) 1 slide-in 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	Note
5PC810.BX01-00	APC810 bus 1 PCI	In preparation
5PC810.BX01-01	APC810 bus 1PCle.x4	In preparation
5PC810.BX02-00	APC810 bus 2PCI	
5PC810.BX02-01	APC810 bus 1PCI 1PCle.x4	
5PC810.BX05-00	APC810 bus 4PCI 1PCle.x1	In preparation
5PC810.BX05-01	APC810 bus 2PCI 3PCle.x1	In preparation

Table 4: Model numbers - bus units

5.3 CPU boards 945GME COM Express Basic

Model number	Short description	Note
5PC800.B945-00	CPU board Intel® Core™ 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	Note
5AC801.HS00-00	APC810 heat sink Heat sink APC810 for CPU boards with Dual Core Processors L2400, L7400, U7500 und 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	Note
5MMDDR.0512-01	SO-DIMM DDR2 512MB PC2-5300	
5MMDDR.1024-01	SO-DIMM DDR2 1,024MB 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	Note
5AC801.ADAS-00	APC810 slide-in compact adapter	In preparation
5AC801.HDDI-00	APC810 slide-in compact HDD 40GB EE25 40 GB SATA Hard Disk (slide-in compact)	
5AC801.HDDI-01	APC810 slide-in compact HDD 80GB EE25 80 GB SATA Hard Disk (slide-in compact)	

Table 8: Model numbers - Drives

Model number	Short description	Note
5AC801.HDDS-00	APC810 slide-in HDD EE25 40 GB SATA hard disk drive (slide-in)	
5AC801.DVRS-00	APC810 slide-in DVD-R/RW DVD-R/RW, DVD+R/RW drive (slide-in)	In preparation
5AC801.DVDS-00	APC810 slide-in DVD-ROM DVD-ROM 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 (ST96023AS) Hard disk 60 GB SATA, replacement part for 5ACPCI.RAIC-01	

Table 8: Model numbers - Drives (cont.)

5.7 Fan kits

Model number	Short description	Note
5PC810.FA01-00	APC810 fan kit for System unit 5PC800.SX01-00 APC810 fan kit 1CS ?x?x?	In preparation
5PC810.FA02-00	APC810 fan kit for System unit 5PC800.SX02-00 APC810 fan kit 2CS 70x70x15	
5PC810.FA05-00	APC810 fan kit for System unit 5PC800.SX05-00 APC810 fan kit 5CS ?x?x?	In preparation

Table 9: Model numbers - fan kit

5.8 AP Link cards

Model number	Short description	Note
5AC801.SDL0-00	APC810 AP Link SDL transmitter	
5AC801.RDYR-00	APC810 Ready relay	

Table 10: Model numbers - AP Link

5.9 Uninterruptible power supply

Model number	Short description	Note
5AC600.UPSI-00	Add-on UPS module Order UPS module for Automation PC, cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately.	
5AC600.UPSB-00	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	Note
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	Note
0TB103.9	Plug 24V 5.08 3-pin screw clamps 24 VDC 3-pin connector, female. Screw clamps, 3.31 mm ² , protected against vibration by the screw flange	
0TB103.91	Plug 24V 5.08 3-pin cage clamps 24 VDC 3-pin connector, female. Cage clamps, 3.31 mm ² , protected against vibration by the screw flange	
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 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
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	
5CFCRD.1024-03	CompactFlash 1,024 MB SSI CompactFlash card with 1,024 MB SLC NAND flash, and IDE/ATA interface	
5CFCRD.2048-03	CompactFlash 2,048 MB SSI CompactFlash card with 2,048 MB SLC NAND flash, and IDE/ATA interface	
5CFCRD.4096-03	CompactFlash 4,096 MB SSI CompactFlash card with 4,096 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.	

Table 13: Model numbers - Accessories

Model number	Short description	Note
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 400..500 VAC (3 phases), wide range, DIN rail mounting	
0PS310.1	Power supply, 3-phase, 10 A 24 VDC power supply, 3-phase, 10 A, input 400..500 VAC (3 phases), wide range, DIN rail mounting	
0PS320.1	Power supply, 3-phase, 20 A 24 VDC power supply, 3-phase, 20 A, input 400..500 VAC (3 phases), wide range, DIN rail mounting	
0PS340.1	Power supply, 1-phase, 40 A 24 VDC power supply, 3 phase, 40 A, input 115/230 VAC, auto select, DIN rail mounting	

Table 13: Model numbers - Accessories (cont.)

5.12 Software

Model number	Short description	Note
5SWWXP.0426-ENG	WinXPc FP2007 APC810 C945GM	

Table 14: Software Model Numbers

Chapter 2 • Technical data

1. Introduction

The APC810 is the sophisticated advancement of the proven APC620 product series. Based on the latest Intel® Core™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 plug-in 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 and five PCI/PCI Express slots provide the optimum design for every installation situation - a perfect fit and 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)
- PCI / PCI Express (PCIe) slots
- 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 operation¹⁾
- BIOS (AMI)
- Real-time clock, RTC (battery-buffered)
- SRAM 512 kByte
- 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

1.2 Structure / configuration

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

The following components are absolutely essential for operation:

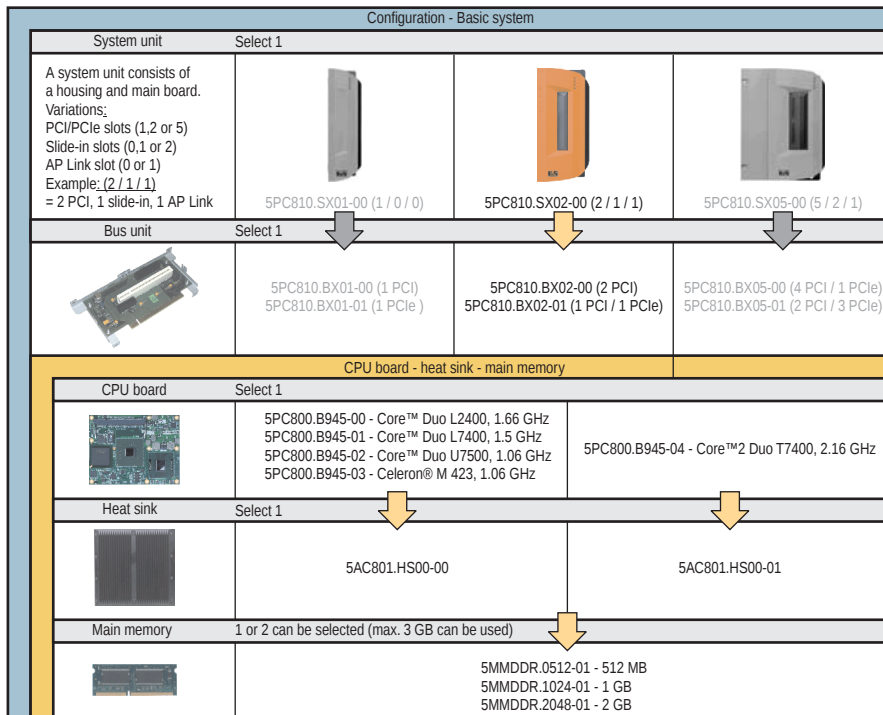
- System unit
- Bus unit
- CPU board
- Heat sink
- Main memory
- Drive (mass memory such as CF card or hard disk) for the operating system software

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

1.3 Configuration - Basic system

Information:

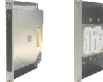
Components shown in light gray are in preparation.



Information: Components displayed in lighty gray are in preparation.

Figure 1: Configuration - Basic system

1.4 Configuration - Drives, software, accessories

Configuration - drives, software, accessories			
System unit			
A system unit consists of a housing and main board. Variations: PCI/PCle slots (1,2 or 5) Slide-in slots (0,1 or 2) AP Link slot (0 or 1) Example: (2 / 1 / 1) = 2 PCI, 1 slide-in, 1 AP Link			
	5PC810.SX01-00 (1 / 0 / 0)	5PC810.SX02-00 (2 / 1 / 1)	5PC810.SX05-00 (5 / 2 / 1)
Fan kit (select 1)			
	5PC810.FA01-00	5PC810.FA02-00	5PC810.FA05-00
Slide-in compact			
	Select 1 5AC801.HDDI-00 (40 GB) 5AC801.HDDI-01 (80 GB)		
CompactFlash			
	Select 1 or 2 5CFCRD.0064-03, 5CFCRD.0128-03, 5CFCRD.0256-03, 5CFCRD.0512-03 5CFCRD.1024-03, 5CFCRD.2048-03, 5CFCRD.4096-03, 5CFCRD.8192-03		
Slide-in drive			
	Not possible	1 possible	2 possible
		5AC801.HDDS-00 (40 GB) 5AC801.DVDS-00 (DVD drive) 5AC801.DVDR-00 (DVD burner) 5AC801.ADAS-00 (adapter)	
AP Link card			
		Select 1 5AC801.SDL0-00 (= 2nd graphics line) 5AC801.RDYR-00 (= ready relay)	
RAID system			
	Select 1 5ACPCI.RAIC-01 (occupies 1 PCI slot)		
Interface option			
	Select 1 5AC600.CANI-00 (CAN) 5AC600.485I-00 (combined RS232/RS422/RS485)		
UPS module			
	Select 1		
Supply voltage connectors			
	Select 1 0TB103.9 (screw clamp) 0TB103.91 (cage clamp)		
Software			
	Select 1 9S0000.08-010 (XP Pro German) 5SWWXP.0426-ENG (XP embedded English) 9S0000.08-020 (XP Pro English) 9S0000.09-090 (XP Multi-language)		

Information: Components displayed in light gray are in preparation.

Figure 2: Configuration - Drives, software, accessories

2. Entire device

2.1 Overview of APC810 2 PCI slot variations

2.1.1 Interfaces

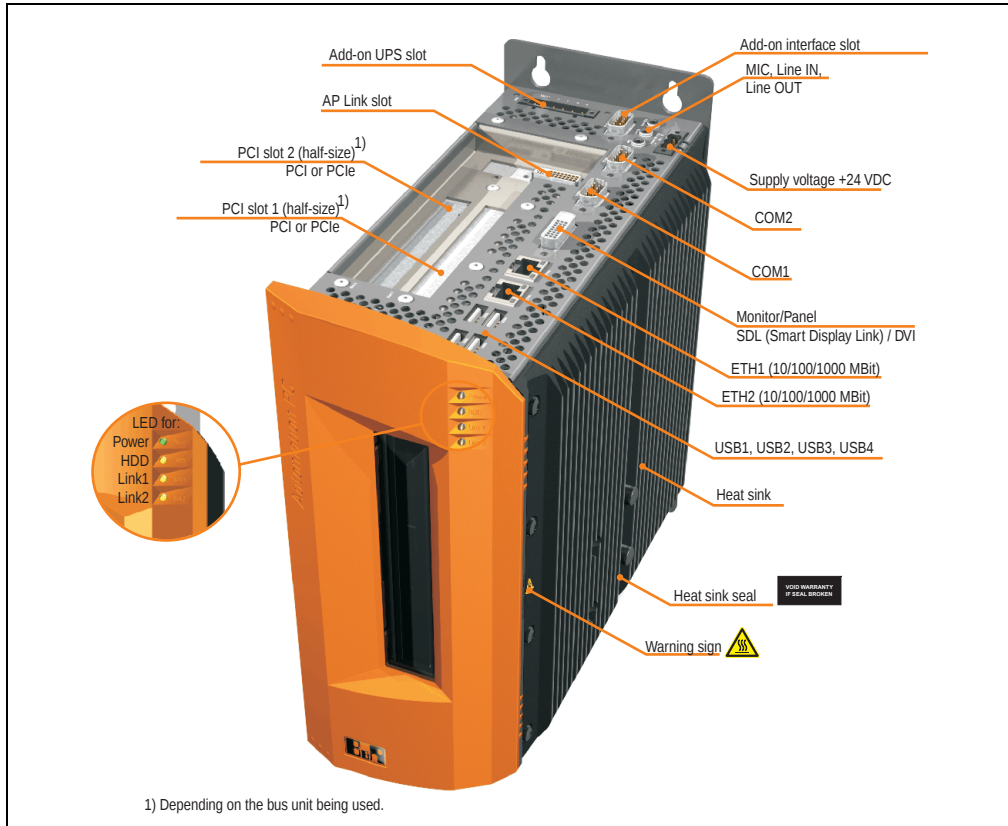


Figure 3: Interface overview - APC810, 2 PCI slot variant (top)

Warning!

Do not remove the mounting screws from the heat sink, as it is connected to the processor and chipset by a thermal coupling. 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").

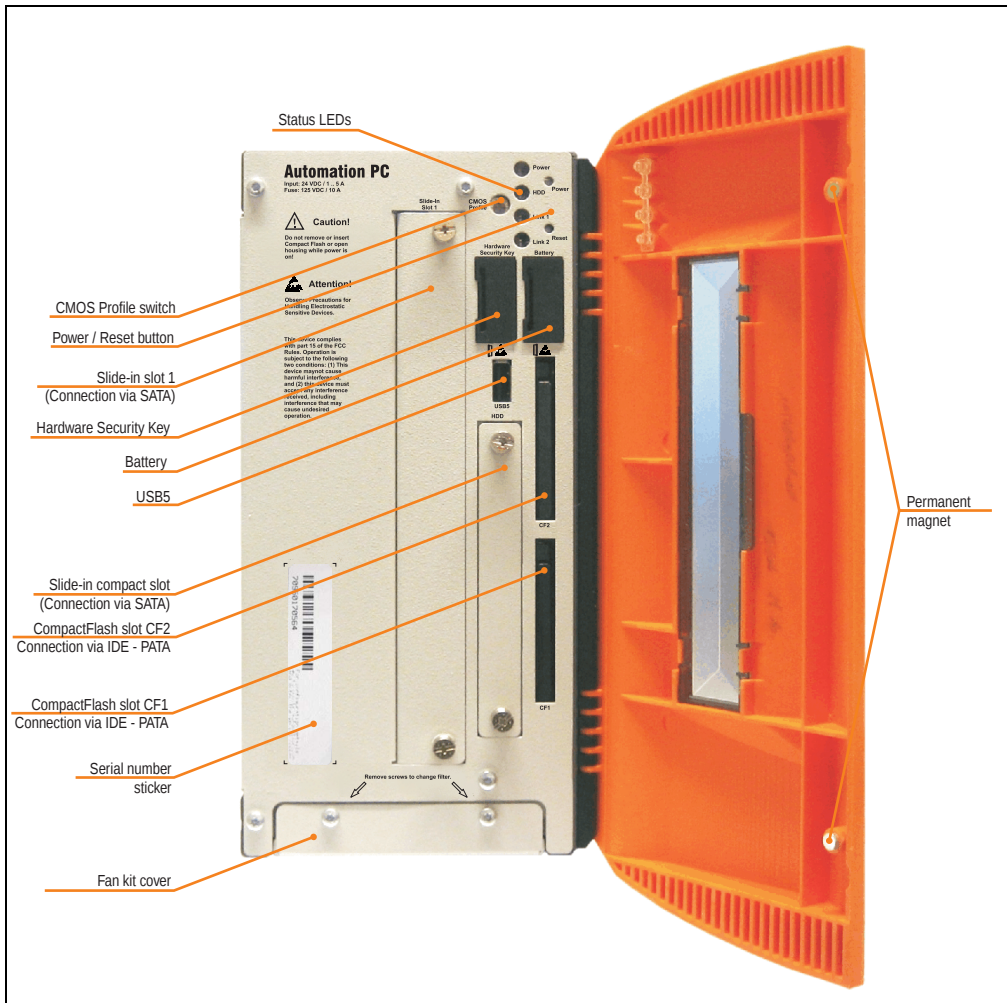


Figure 4: Interface overview - APC810, 2 PCI slot variant (front)

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 2 PCI slot variations
Boot loader / Operating system	BIOS
Processor	Component-dependent, see technical data for the CPU board
Cooling Type	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 ¹⁾ (see also page 253) 10 ms
Real-time clock Battery-buffered Accuracy	Yes TBD
SRAM Size	Yes 512 kB
Battery Type Removable Lifespan	See also page 47 Renata 950 mAh Yes, accessible behind the orange front doors 2 1/2 years ²⁾
Ethernet Amount Speed Controller	2 10/100/1000 MBit/s See also page 38 or page 39
CAN bus	Optional with add-on interface (5AC600.CANI-00)
CompactFlash Type Amount	See also page 49 or page 50 Type I 2 (max. 4 using optional components)
Serial interface Amount Type UART Transfer rate Connection	See also page 36 or page 37 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 40 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 44
PCI slots half-size	See also section "PCI slot (PCI / PCIe)" on page 43 2 (dimensions of PCI / PCIe interfacecards are different)
Add-on UPS slot	Yes
AP Link slot	Yes

Table 15: Technical data - APC810, 2 PCI slot variant

Electrical characteristics	APC810 2 PCI slot variations
Power supply Rated voltage Rated current Starting current Power consumption	24 VDC $\pm$ 25% 5 A TBD Component-dependent, TBD
Mechanical characteristics	
Housing ³⁾ Material Paint Front cover	Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See section "Dimensions - APC810 2 PCI slot variations" on page 33.
Weight	approx. 5 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Storage Transport	TBD -20°C .. +60°C -20°C .. +60°C
Relative humidity Operation Storage Transport	TBD
Vibration Operation (continuous) Operation (occasional) Storage Transport	TBD
Shock Operation Storage Transport	TBD
Protection type	IP20
Altitude Operation	max. 3000 m (component-dependent)

Table 15: Technical data - APC810, 2 PCI slot variant (cont.)

- 1) Maintenance Controller Extended.
- 2) at 50°C, 8.5 μ 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.

2.1.3 Dimensions

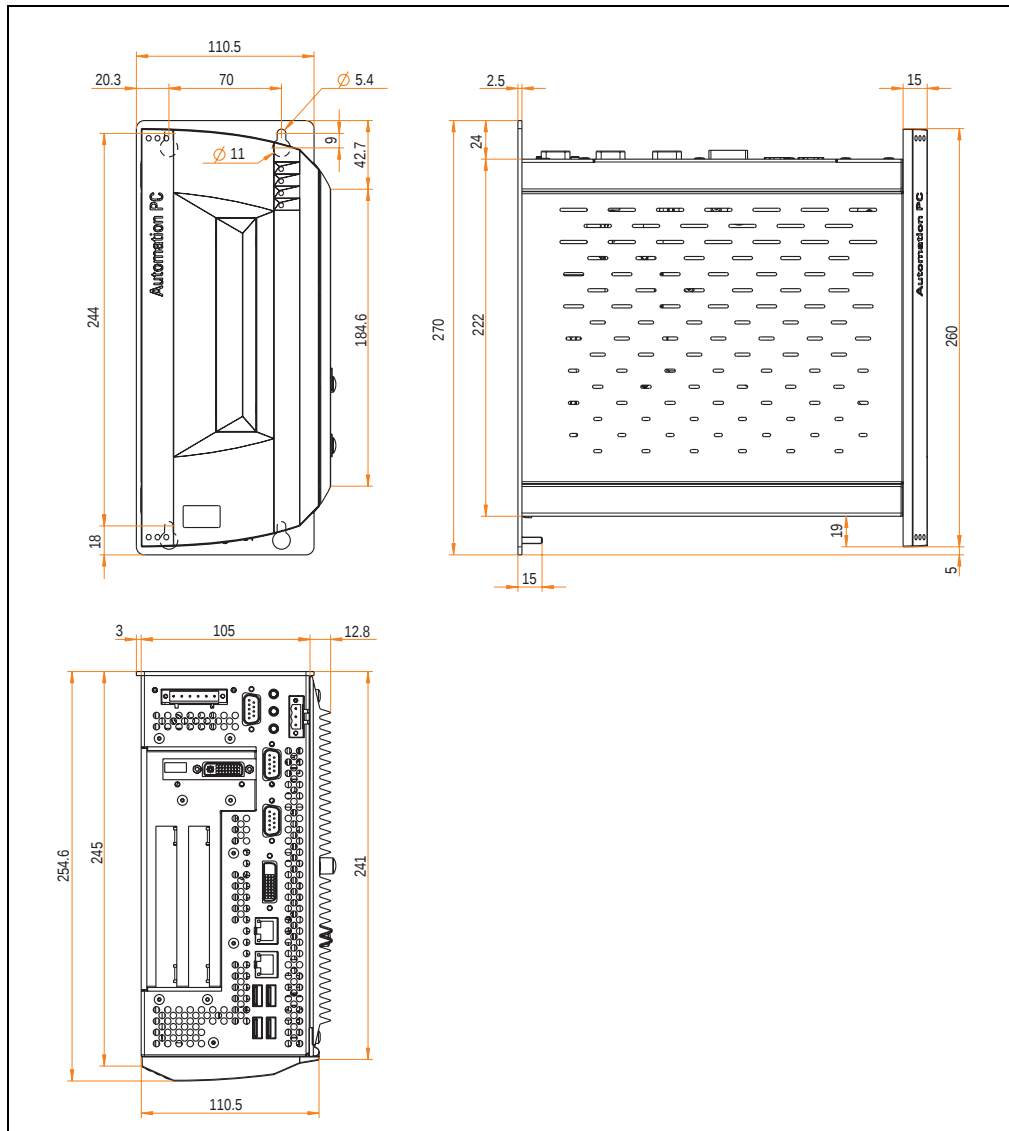


Figure 5: Dimensions - APC810 2 PCI slot variations

2.2 Ambient temperatures

TBD

2.3 Humidity specifications

TBD

2.4 Power management

TBD

2.5 Serial number sticker

TBD

2.6 Device interfaces

2.6.1 +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.

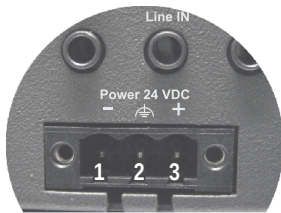
Supply voltage		
Protected against reverse polarity		3-pin, male 
Pin	Description	
1	+	
2	Functional grounding	
3	-	
Accessories		
0TB103.9	Plug 24 V 5.08 3p screw clamps	
0TB103.91	Plug 24 V 5.08 3p cage clamps	

Table 16: 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.

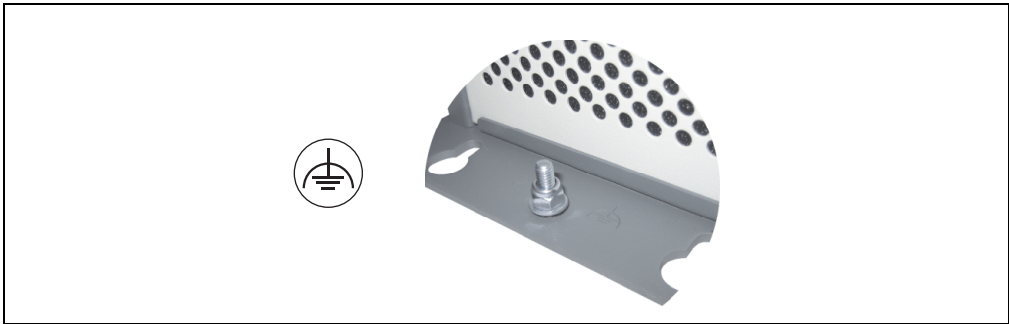


Figure 6: Ground connection

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

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 mm²).

2.6.2 Serial interface COM1

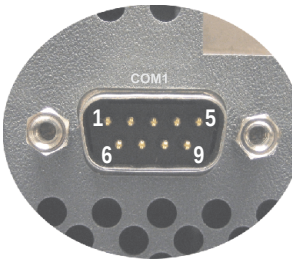
Serial interfaces COM1 ¹⁾		
Type	RS232, modem-capable, not electrically isolated	9-pin DSUB male 
UART	16550-compatible, 16-byte FIFO	
Transfer rate	Max. 115 kBaud	
Cable length	Max. 15 meters	
Pin	Assignment	
1	DCD	
2	RXD	
3	TXD	
4	DTR	
5	GND	
6	DSR	
7	RTS	
8	CTS	
9	RI	

Table 17: 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.

2.6.3 Serial interface COM2

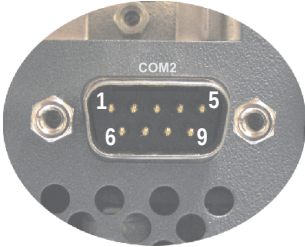
Serial interfaces COM2 ¹⁾		
Type	RS232, modem-capable, not electrically isolated	9-pin DSUB male 
UART	16550-compatible, 16-byte FIFO	
Transfer rate	Max. 115 kBaud	
Cable length	Max. 15 meters	
Pin	Assignment	
1	DCD	
2	RXD	
3	TXD	
4	DTR	
5	GND	
6	DSR	
7	RTS	
8	CTS	
9	RI	

Table 18: 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.

2.6.4 Monitor / Panel SDL (Smart Display Link / DVI)

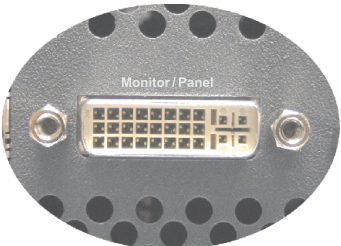
Supply voltage		
The following will provide an overview of the video signals available with different system units and CPU boards.		Monitor / Panel 
CPU board	Video signals with all system unit variations	
5PC800.B945-00	RGB, DVI, SDL	
5PC800.B945-01	RGB, DVI, SDL	
5PC800.B945-02	RGB, DVI, SDL	
5PC800.B945-03	RGB, DVI, SDL	
5PC800.B945-04	RGB, DVI, SDL	
5PC800.B945-00	RGB, DVI, SDL	

Table 19: Monitor / Panel connection - RGB, DVI, SDL

2.6.5 Ethernet 1 (ETH1)

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

Ethernet connection (ETH1 ¹⁾)		
Controller	Realtek RTL8111B	
Cabling	S/STP (Cat5e)	
Transfer rate	10/100/1000 MBit/s ²⁾	
Cable length	max. 100 m (min. Cat5e)	
LED	On	Off
Green	100 MBit/s	10 MBit/s
Red	1000 MBit/s	-
Orange	Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)

RJ45 twisted pair (10BaseT/100BaseT), female

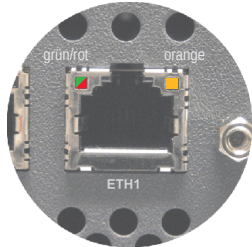


Table 20: Ethernet connection (ETH1)

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.

Driver support

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

2.6.6 Ethernet 2 (ETH2)

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

Ethernet connection (ETH2 ¹⁾)		
Controller	Intel 82573L	
Cabling	S/STP (Cat5e)	
Transfer rate	10/100/1000 MBit/s ²⁾	
Cable length	max. 100 m (min. Cat5e)	
LED	On	Off
Green	100 MBit/s	10 MBit/s
Red	1000 MBit/s	-
Orange	Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)

RJ45 twisted pair (10BaseT/100BaseT), female

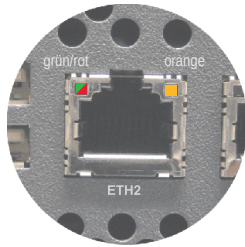


Table 21: Ethernet connection (ETH2)

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.

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 (www.br-automation.com).

2.6.7 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.

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

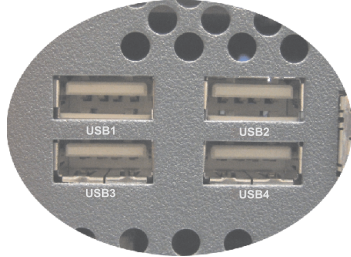
Universal Serial Bus (USB1, USB2, USB3, USB4) ¹⁾		
Transfer rate	Low speed (1.5 MBit/s), Full speed (12 MBit/s) to High speed (480 Mbit/s)	4 x USB type A, female 
Power Supplies ²⁾ USB1, USB3 USB2, USB4	Max. 1 A Max. 500 mA	
Maximum cable length	5 m (without hub)	

Table 22: USB1, USB2, USB3, USB4 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. 500 mA or 1 A).

USB5

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

Table 23: 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).

2.6.8 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 Digital High Definition Audio (HDA)	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.	
Line OUT	Connection for a stereo sound reader (e.g. amplifier) via a 3.5 mm plug.	

Table 24: 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 (www.br-automation.com).

2.6.9 Add-on UPS slot

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

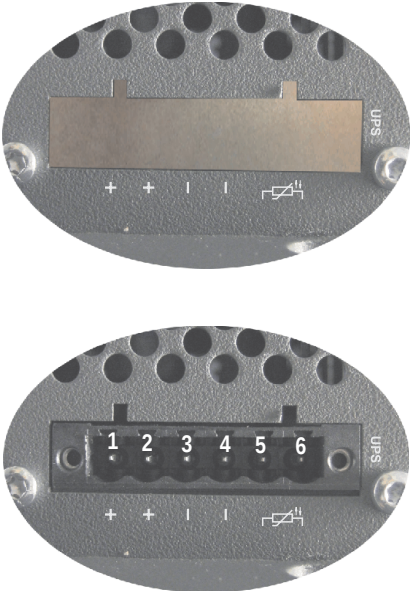
Add-on UPS slot																	
<table border="1"> <thead> <tr> <th colspan="2">Add-on UPS + accessories</th></tr> </thead> <tbody> <tr> <td>5AC600.UPI-00</td><td>Add-on UPS module</td></tr> <tr> <td>5AC600.UPSB-00</td><td>Battery unit 5 Ah</td></tr> <tr> <td>5CAUPS.0005-00</td><td>UPS cable 0.5 m</td></tr> <tr> <td>5CAUPS.0030-00</td><td>UPS cable 3 m</td></tr> </tbody> </table>		Add-on UPS + accessories		5AC600.UPI-00	Add-on UPS module	5AC600.UPSB-00	Battery unit 5 Ah	5CAUPS.0005-00	UPS cable 0.5 m	5CAUPS.0030-00	UPS cable 3 m						
Add-on UPS + accessories																	
5AC600.UPI-00	Add-on UPS module																
5AC600.UPSB-00	Battery unit 5 Ah																
5CAUPS.0005-00	UPS cable 0.5 m																
5CAUPS.0030-00	UPS cable 3 m																
<table border="1"> <thead> <tr> <th colspan="2">Pin assignments with mounted add-on UPS module</th></tr> </thead> <tbody> <tr> <td>1</td><td>+</td></tr> <tr> <td>2</td><td>+</td></tr> <tr> <td>3</td><td>-</td></tr> <tr> <td>4</td><td>-</td></tr> <tr> <td>5</td><td>NTC (for battery temperature measurement)</td></tr> <tr> <td>6</td><td>NTC (for battery temperature measurement)</td></tr> <tr> <td></td><td></td></tr> </tbody> </table>		Pin assignments with mounted add-on UPS module		1	+	2	+	3	-	4	-	5	NTC (for battery temperature measurement)	6	NTC (for battery temperature measurement)		
Pin assignments with mounted add-on UPS module																	
1	+																
2	+																
3	-																
4	-																
5	NTC (for battery temperature measurement)																
6	NTC (for battery temperature measurement)																
																	

Table 25: Add-on UPS slot (with and without mounted UPS)

2.6.10 AP Link slot

When connected with the AP Link card 5AC801.SDL0-00, it is possible to implement a second graphic line with the same functions as the monitor/panel connection. 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.

2.6.11 PCI 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.

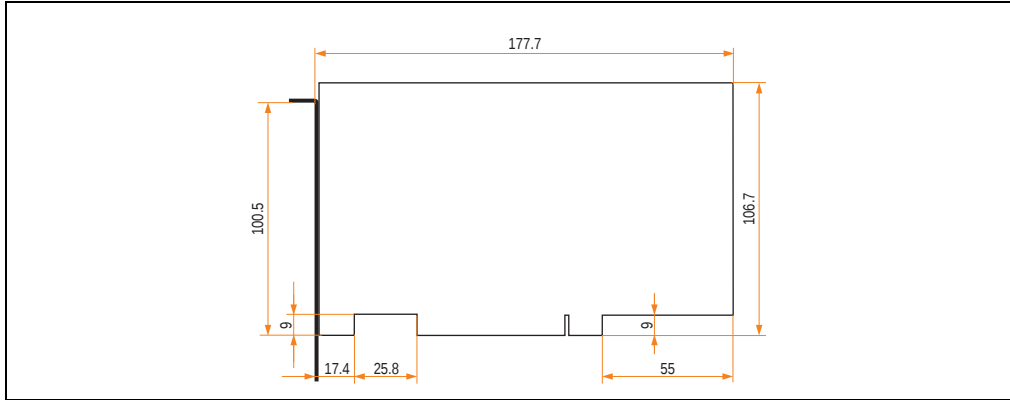


Figure 7: Dimensions - Standard half-size PCI cards

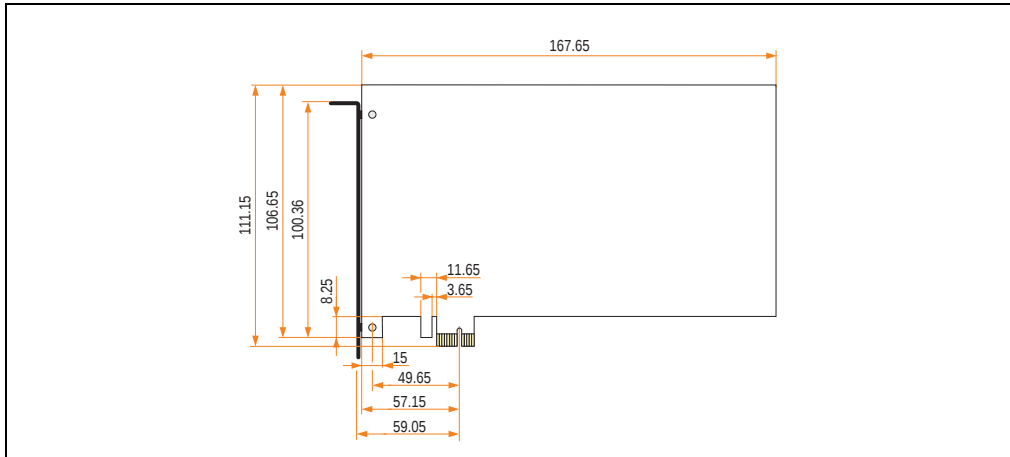


Figure 8: Dimensions - Standard half-size PCIe cards

2.6.12 status LEDs

The status LEDs are in the system unit.

Status LEDs			
LED	Color		Meaning
Power	Green	On	Supply voltage OK
	Red	On	The system is in standby mode (S5: soft-off mode or S4: hibernate mode -Suspend-to-Disk)
	Orange ¹⁾	On	Supply voltage not OK; the system is operating on battery power.
HDD	Yellow	On	Signals IDE drive access (CF, HDD, CD, etc.)
Link 1	Yellow	On	Indicates an active SDL connection on the monitor / panel plug.
		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.

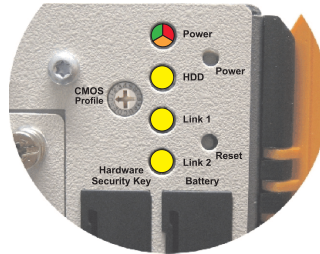


Table 26: Data - status LEDs

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.

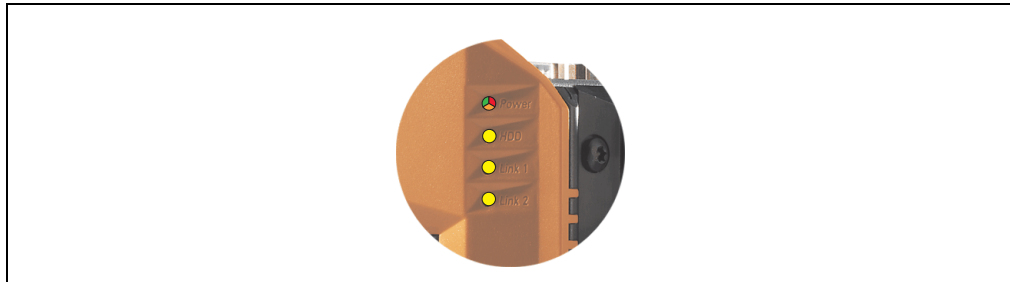


Figure 9: Front-side status LEDs

2.6.13 CMOS profile switch

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



Table 27: 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 displayed in the BIOS setup pages and in the B&R ADI Control Center, among other places.

2.6.14 Power button

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

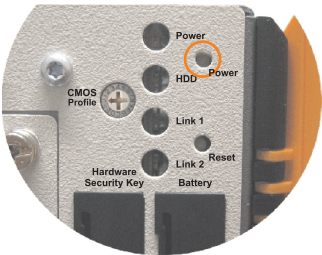
Power button	
The power button can be pressed with a pointed object (i.e. paper clip or tip of a pen). The power button acts like the on/off switch on a normal desktop PC with ATX power supply: press and release ... Switches on APC810 or shuts down operating system and switches off the APC810. press and hold ... ATX power supply switches off without shutting down the APC810 (data could be lost!). Pressing the power button does not reset the MTCX processor.	

Table 28: Power button

2.6.15 Reset button

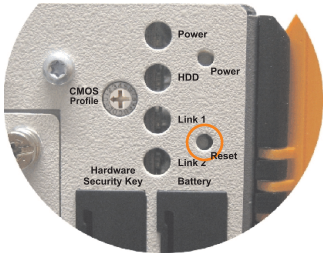
Reset button	
The reset button can be pressed with a pointed object (i.e. paper clip or tip of a pen). Pushing the reset button results in a hardware-reset, PCI-reset. The APC810 is restarted (cold restart). The MTCX processor is not reset when the reset button is pressed.	

Table 29: Reset button

Warning!

A system reset can cause data to be lost!

2.6.16 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).

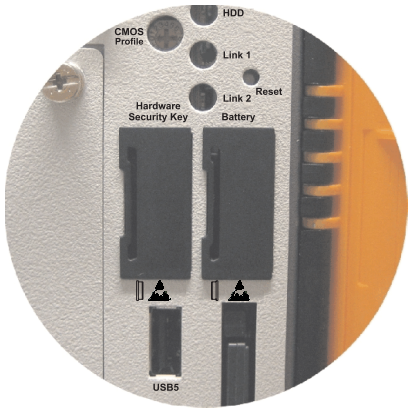
Battery		
Battery Type	Renata 950 mAh	
Removable	Yes, accessible from the outside	
Lifespan	2 1/2 years ¹⁾	
Accessories	Short description	
0AC201.9	Lithium batteries (5x) Lithium batteries, 5 pcs., 3 V / 950 mAh, button cell	
4A0006.00-000	Lithium battery (1x) Lithium batteries, 1 pcs., 3 V / 950 mAh,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

Table 30: Battery

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

Battery status - TBD

2.6.17 Hardware security key

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

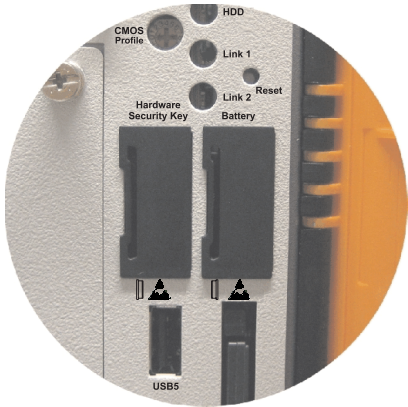
Hardware security key	
A hardware security key (dongle) can be inserted behind the black cover.	

Table 31: Hardware security key

Warning!

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

2.6.18 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	
CompactFlash type	Type I	
Accessories	Short description	
5CFCRD.0064-03	CompactFlash 64 MB SSI	
5CFCRD.0128-03	CompactFlash 128 MB SSI	
5CFCRD.0256-03	CompactFlash 256 MB SSI	
5CFCRD.0512-03	CompactFlash 512 MB SSI	
5CFCRD.1024-03	CompactFlash 1024 MB SSI	
5CFCRD.2048-03	CompactFlash 2048 MB SSI	
5CFCRD.4096-03	CompactFlash 4096 MB SSI	
5CFCRD.8192-03	CompactFlash 8192 MB SSI	

Table 32: CompactFlash slot (CF1)

Warning!

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

2.6.19 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	
CompactFlash Type	Type I	
Accessories	Short description	
5CFCRD.0064-03	CompactFlash 64 MB SSI	
5CFCRD.0128-03	CompactFlash 128 MB SSI	
5CFCRD.0256-03	CompactFlash 256 MB SSI	
5CFCRD.0512-03	CompactFlash 512 MB SSI	
5CFCRD.1024-03	CompactFlash 1024 MB SSI	
5CFCRD.2048-03	CompactFlash 2048 MB SSI	
5CFCRD.4096-03	CompactFlash 4096 MB SSI	
5CFCRD.8192-03	CompactFlash 8192 MB SSI	

Table 33: CompactFlash slot (CF2)

Warning!

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

2.6.20 Slide-in slot 1

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

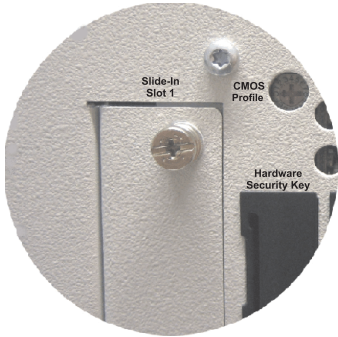
Slide-in slot 1		
Connection	SATA I	
Accessories	Short description	
5AC801.ADAS-00	APC810 slide-in compact adapter	
5AC801.HDDS-00	APC810 slide-in HDD EE25	
5AC801.DVRS-00	APC810 slide-in DVD-R/RW	
5AC801.DVDS-00	APC810 slide-in DVD-ROM	

Table 34: Slide-in slot 1

Information:

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

2.6.21 Slide-in compact slot

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

Slide-in compact slot		
Connection	SATA I	
Accessories	Short description	
5AC801.HDDI-00	APC810 slide-in compact HDD 40GB EE25	
5AC801.HDDI-01	APC810 slide-in compact HDD 80GB EE25	

Table 35: Slide-in compact slot

Information:

The SATA I interface allows data carriers to be exchanged during operation (hot-plug). 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 240.

3. Individual components

3.1 System units

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 PCI slots.

3.1.1 Technical data

Features	5PC810.SX01-00	5PC810.SX02-00	5PC810.SX05-00
Photo			
Serial interface Amount	2		
Ethernet Interface Amount	2		
USB interface Amount	5		
Monitor / Panel output	Yes		
AC97 sound	Yes		
IF optional slot	Yes		
PCI / PCIe slots ¹⁾ (half size)	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 slot	Yes		
AP Link slot	-	Yes	

Table 36: Technical data - System units

Technical data • Individual components

Features	5PC810.SX01-00	5PC810.SX02-00	5PC810.SX05-00
Status LEDs	Yes		
MTCX ²⁾	Yes		
Electrical characteristics			
Supply voltage	24 VDC ± 25% TBD TBD	24 VDC ± 25% TBD TBD	24 VDC ± 25% TBD TBD
Rated voltage			
Starting current			
Power consumption			
Mechanical characteristics			
Housing ³⁾	Galvanized steel plate Light gray (similar to Pantone 427C), dark gray (similar to Pantone 432C) Orange colored plastic (similar to Pantone 144C)		
Material			
Paint			
Front cover			
Outer dimensions	TBD	120.8 mm 254.6 mm 270 mm	TBD
Width			
Length			
Height			
Weight (without heat sink)	TBD	2.8 kg	TBD
Mounting plates (for M4 screws)	TBD	4	TBD
Drilling template	See chapter 3 "Start-up", section "Drilling template" on page 94		

Table 36: 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 253.

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

3.2 Bus units

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

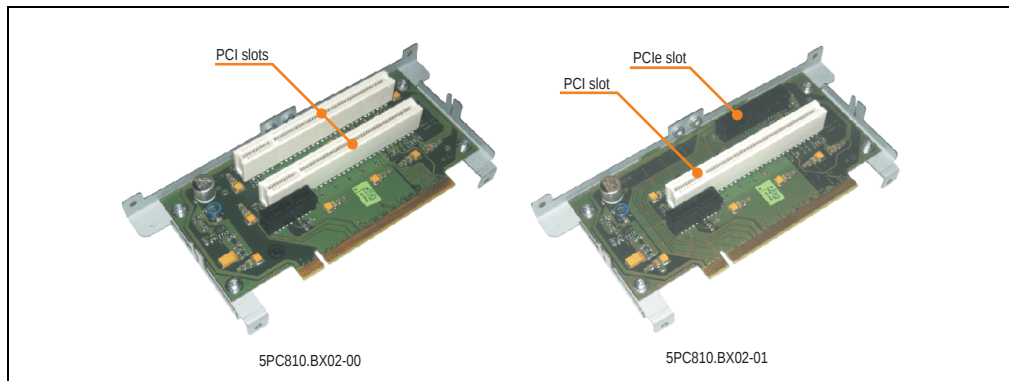


Figure 10: Bus units

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	1	-	2	1	4	2
Default	2.2	2.2	2.2	2.2	2.2	2.2
Bus speed	33 MHz	33 MHz	33 MHz	33 MHz	33 MHz	33 MHz
PCI Express						
Amount	-	1	-	1	1	3
Default		1.0a		1.0a	1.0a	1.0a
Bus speed		x4 (10 GB/s)		x4 (10 GB/s)	x1 (2.5 GB/s)	x1 (2.5 GB/s)

Table 37: Technical data - Bus units

3.3 CPU boards 945GME

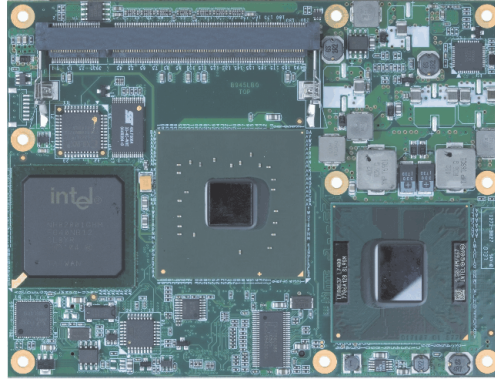


Figure 11: CPU board

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 BIOS (for a description, see Chapter 4 "Software", section "BIOS options" on page 129)				
Processor					
Type	Intel® Core™ Duo	Intel® Core™2 Duo	Intel® Core™2 Duo	Intel® Celeron® M	Intel® Core™2 Duo
Name	L2400	L7400	U7500	423	T7400
Speed	1.66 GHz	1.5 GHz	1.06 GHz	1.06 GHz	2.16 GHz
Architectures	65 nm	65 nm	65 nm	65 nm	65 nm
L1 cache	32 kByte	32 kByte	32 kByte	32 kByte	32 kByte
L2 cache	1 MB	4 MB	2 MB	1 MB	4 MB
Front side bus - FSB	667 MHz	667 MHz	533 MHz	533 MHz	667 MHz
Chipset	Intel® 945GME / Intel 8201 GMH (ICH7M-DH)				
DRAM	SO-DIMM DDR2 667/PC5300, max. 3 GByte				
Graphics					
Controller	Intel® Graphics Media Accelerator 950				
Memory	up to 224 MByte (reserved from main memory)				
Color depth	max 32 Bit				
Max. resolution	1920 x 1200				
Real-time clock (RTC)	TBD				
Battery-buffered					
Accuracy					
Mass memory management	2 x SATA, 1 x IDE				
Power management	ACPI 2.0, S3 Support (suspend to RAM)				

Table 38: Technical data - CPU boards

3.4 Heat sink

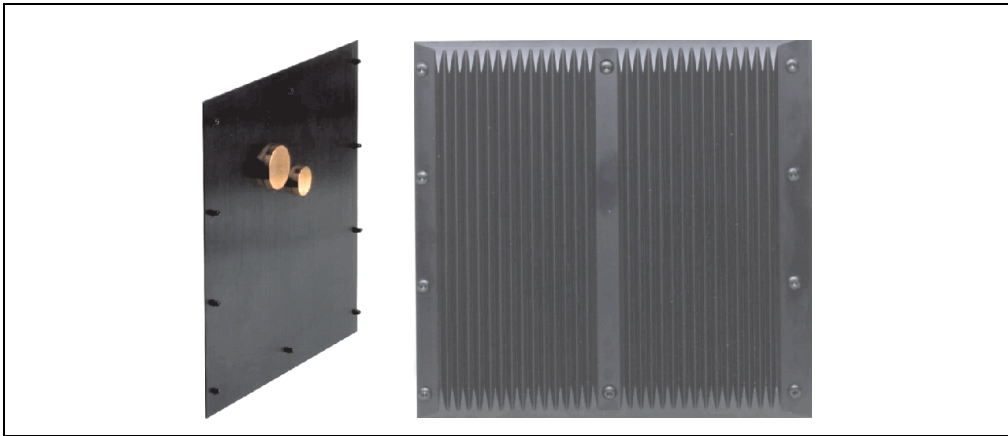


Figure 12: Heat sink

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.B945-03
Material	Aluminum, black-coated with copper heat pipes	
Outer dimensions		
Width	228.7 mm	TBD
Height	218 mm	
Depth	12.8 mm	
Weight	Approx. 1.7 kg	TBD

Table 39: Technical data - Heat sink

3.5 Main memory

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.

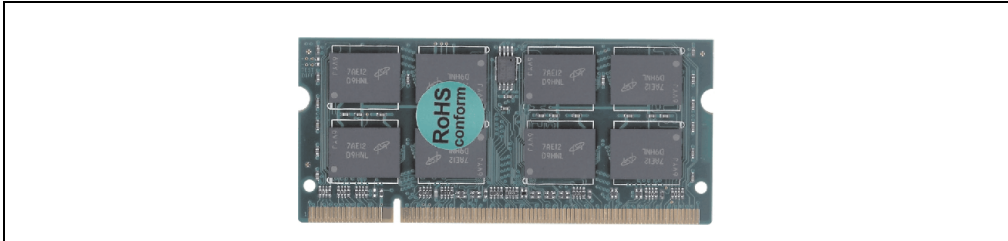


Figure 13: Main memory

3.5.1 Technical data

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

Table 40: 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 14: 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 41: Technical data - add-on hard disk - 5AC801.HDDI-00

Technical data • Individual components

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 ¹⁾
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 ²⁾ Operation - Standard / 24-hour Storage Transport	-30°C .. +85°C -40°C .. +95°C -40°C .. +95°C
Relative humidity ³⁾ 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 41: 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

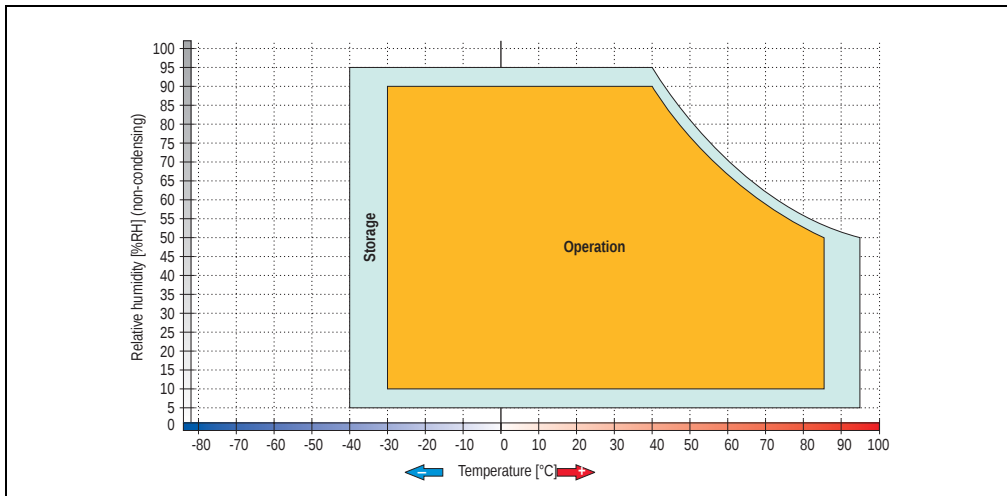


Figure 15: Temperature humidity diagram - 5AC801.HDDI-00

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.

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



Figure 16: 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)	1 ms
Average (read access)	12.5 ms
Maximum (read access)	23 ms
Starting time (0 rpm to read access)	3 seconds (typically)
Interface	SATA

Table 42: Technical data - Add-on hard disk 5AC801.HDDI-01

Features	5AC801.HDDI-01
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 ¹⁾
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 ²⁾ Operation - Standard / 24-hour Storage Transport	-30°C .. +85°C -40°C .. +95°C -40°C .. +95°C
Relative humidity ³⁾ 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 42: Technical data - Add-on hard disk 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.

Temperature humidity diagram - Operation and storage

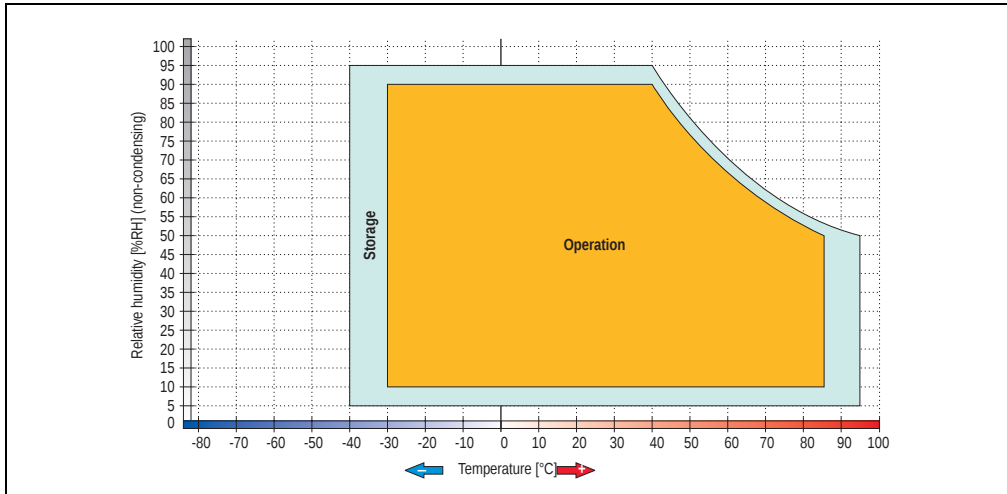


Figure 17: Temperature humidity diagram - 5AC801.HDDI-01

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 HDD EE25 - 5AC801.HDDS-00



Figure 18: Slide-in HDD EE25 5AC801.HDDS-00

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)	1 ms
Average (read access)	12.5 ms
Maximum (read access)	23 ms
Starting time (0 rpm to read access)	3 seconds (typically)
Interface	SATA

Table 43: Technical data - Slide-in HDD EE25 - 5AC801.HDDS-00

Technical data • Individual components

Features	5AC801.HDDS-00
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 ¹⁾
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 ²⁾ Operation - Standard / 24-hour Storage Transport	-30°C .. +85°C -40°C .. +95°C -40°C .. +95°C
Relative humidity ³⁾ 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 43: 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.

Temperature humidity diagram - Operation and storage

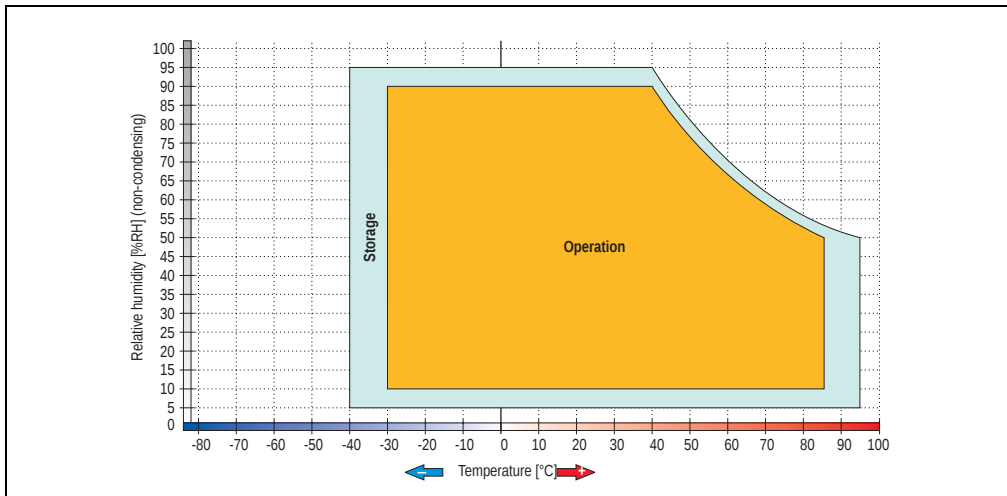


Figure 19: Temperature humidity diagram - 5AC801.HDDS-00

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.

3.6.4 Slide-in DVD-R/RW, - 5AC801.DVRS-00

TBD

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



Figure 20: 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 $\pm$ 1%
Starting time (0 rpm to read access)	19 seconds (maximum)
Host interface	SATA

Table 44: Technical data - 5AC801.DVDS-00

Technical data • Individual components

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 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+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 ¹⁾ Operation Storage Transport	+5°C .. +55°C ²⁾ -20°C .. +60°C -40°C .. +65°C
Relative humidity Operation Storage Transport	8 - 80%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage Transport	0.2 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 44: 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

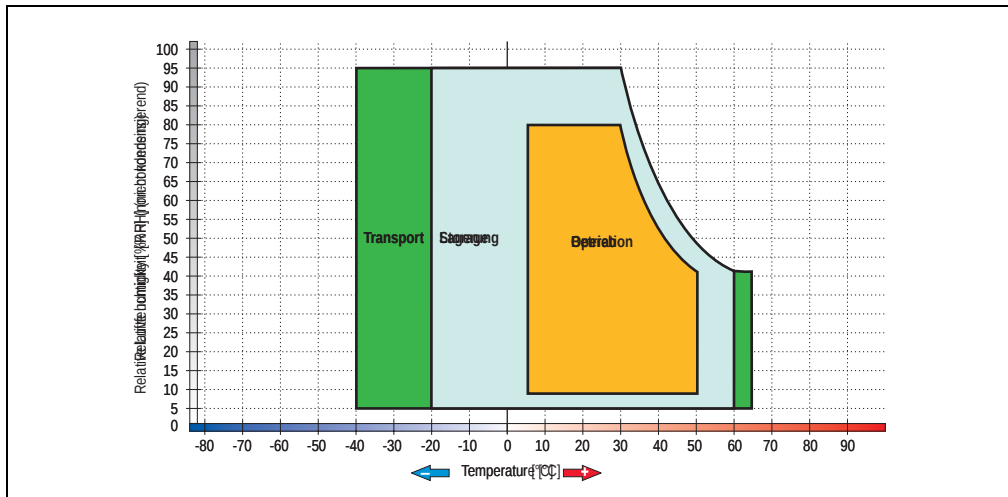


Figure 21: Temperature humidity diagram - Slide-in DVD-ROM/CD-RW 5AC600.DVDS-00

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

3.6.6 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

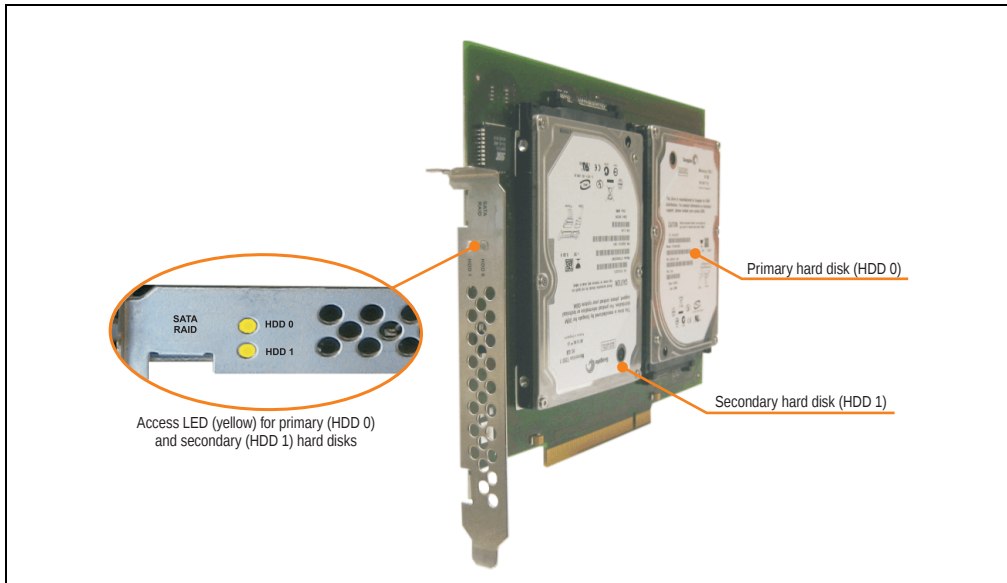


Figure 22: PCI SATA RAID controller - 5ACPCI.RAIC-01

Information:

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

Technical data

Information:

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

Features	5ACPCI.RAIC-01
SATA RAID controller Type Specifications Data transfer rate RAID level BIOS Extension ROM - requirements	Sil 3512 SATA link Serial ATA 1.0 Max. 1.5 GB/s (150 MB/s) Supports RAID 0, 1 ca. 32 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 $\pm$ 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 45: Technical data - RAID hard disk - 5ACPCI.RAIC-01

Technical data • Individual components

Environmental characteristics	5ACPCI.RAIC-01
Ambient temperature ¹⁾ Operation - Standard ²⁾ Operation - 24-hour ³⁾ Storage Transport	+5°C .. +55°C +5°C .. +40°C -40°C .. +70°C -40°C .. +70°C
Relative humidity Operation Storage Transport	5 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration ⁴⁾ Operation (continuous) Operation (occasional) Storage Transport	At max. 5 - 500 Hz and 0.125 g (1.225 m/s ² 0-peak) duration 1 octave per minute no damage At max. 5 - 500 Hz and 0.25 g (2.45 m/s ² 0-peak) duration 1 octave per minute no damage At max. 5 - 500 Hz and 5 g (49 m/s ² 0-peak) duration 0.5 octave/minute no damage At max. 5 - 500 Hz and 5 g (49 m/s ² 0-peak) duration 0.5 octave/minute no damage
Shock ⁴⁾ (pulse with a sine half-wave) Operation Storage	At max. 125 g (1226 m/s ² 0-peak) and 2 ms duration no non-recovered errors At max. 400 g (3924 m/s ² 0-peak) and 2 ms duration no damage At max. 450 g (4424 m/s ² 0-peak) and 1 ms duration no damage At max. 200 g (1962 m/s ² 0-peak) and 0.5 ms duration no damage
Altitude Operation Storage	- 300 to 3048 meters - 300 to 12192 meters

Table 45: 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

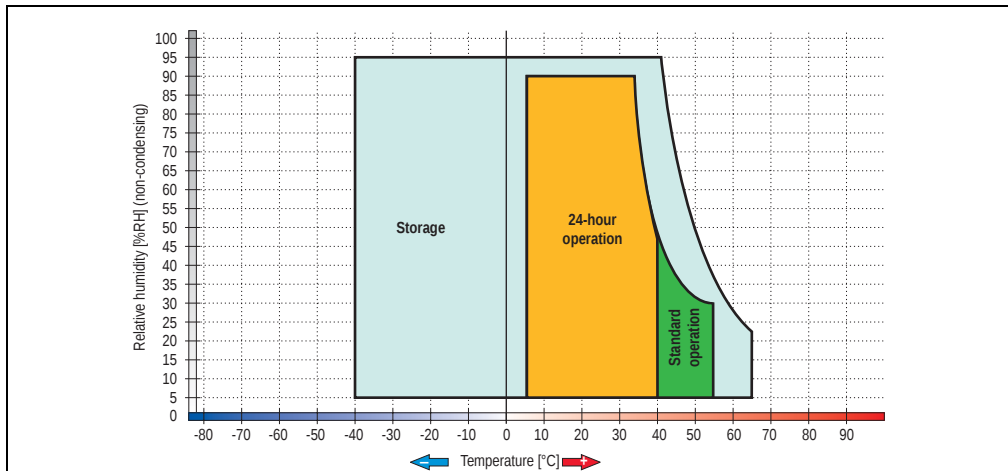


Figure 23: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-01

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

Driver support

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

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

Configuration

For configuration of a SATA RAID network, see Chapter 4 "Software", section "Configuration of a SATA RAID array" on page 190.

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 250.

3.6.7 Replacement SATA 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 250.



Figure 24: 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	Seagate Momentus 7200.1 ST96023AS
Amount	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 $\pm$ 1%
Access time (average)	4.2 ms
Positioning time (seek, typical values)	
Minimum (track to track)	1.5 ms
Average (read access)	10.5 ms
Maximum (read access)	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 46: 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 ¹⁾ Operation - Standard ²⁾ Operation - 24-hour ³⁾ Storage Transport	+5°C .. +55°C +5°C .. +40°C -40°C .. +70°C -40°C .. +70°C
Relative humidity Operation Storage Transport	5 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration ⁴⁾ Operation (continuous) Operation (occasional) Storage Transport	No damage at max. 5 - 500 Hz and 0.125 g (1.225 m/s ² 0-peak) duration 1 oct/min No damage at max. 5 - 500 Hz and 0.25 g (2.45 m/s ² 0-peak) duration 1 oct/min Max. 5 - 500 Hz and 5 g (49 m/s ² 0-peak) 0.5 oct/min duration, no damage Max. 5 - 500 Hz and 5 g (49 m/s ² 0-peak) 0.5 oct/min duration, no damage
Shock ⁴⁾ (pulse with a sine half-wave) Operation Storage	No non-recovered errors at max. 125 g (1226 m/s ² 0-peak) and 2 ms duration No damage at max. 400 g (3924 m/s ² 0-peak) and 2 ms duration No damage at max. 450 g (4424 m/s ² 0-peak) and 1 ms duration No damage at max. 200 g (1962 m/s ² 0-peak) and 0.5 ms duration
Altitude Operation Storage	- 300 to 3048 meters - 300 to 12192 meters

Table 46: Technical data - RAID hard disk - 5ACPCI.RAIC-02 (cont.)

- 1) Temperature values for 305 meter elevation. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 3 °C per minute.
- 2) Standard operation means 333 POH (power-on hours) per month.
- 3) 24-hour operation means 732 POH (power-on hours) per month.
- 4) Operation in areas prone to vibration and shock can affect performance negatively (reduction of transfer rate).

Temperature humidity diagram - Operation and storage

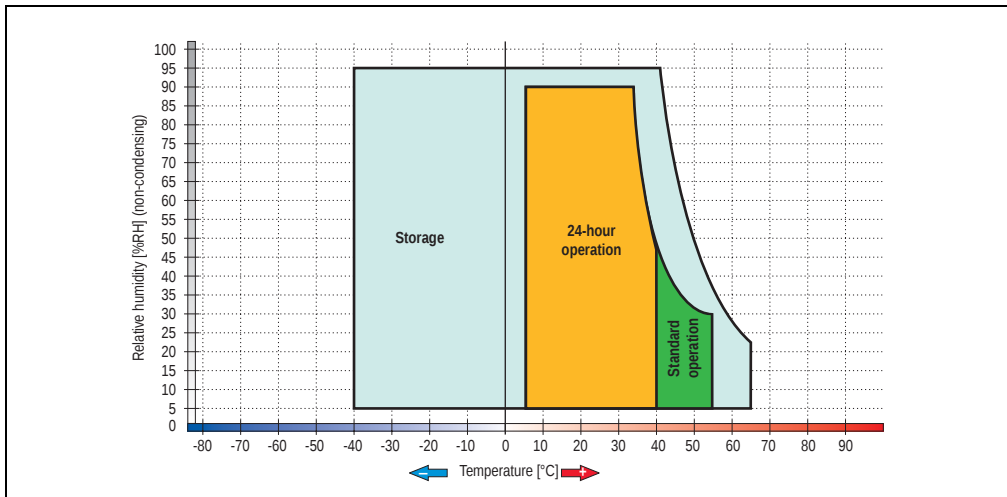


Figure 25: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-02

3.7 Fan kits

Information:

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

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

3.7.1 Fan kit 1 PCI slot - 5PC810.FA01-00

TBD

3.7.2 Fan kit 2 PCI slot - 5PC810.FA02-00

This fan kit is an optional addition for system units with 2 PCI slots. For available replacement dust filters for this fan kit, see section "Replacement fan" on page 203.

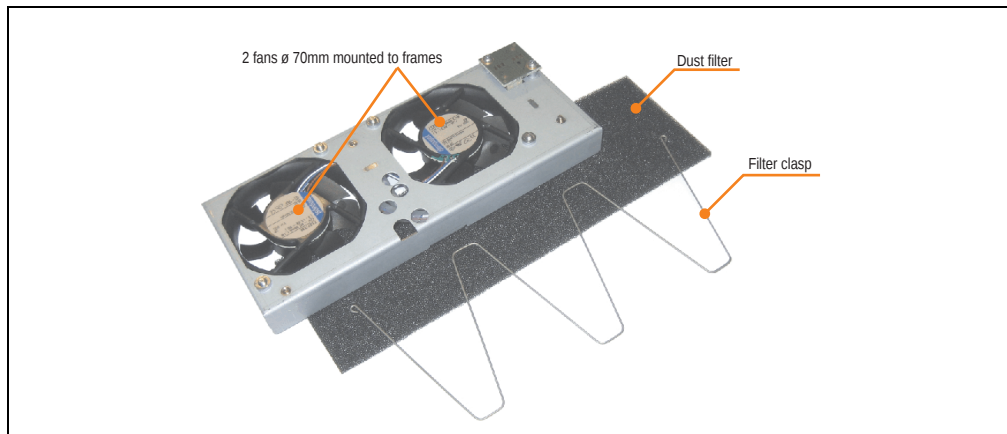


Figure 26: Fan kit - 5PC810.FA02-00

Technical data

Features	5PC810.FA02-00
Fan type	
Width	70 mm
Length	70 mm
Height	15 mm
Revolution speed	Max. 4300 rpm $\pm$ 12.5%

Table 47: Technical data - 5PC810.FA02-00

Features	5PC810.FA02-00
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 47: Technical data - 5PC810.FA02-00 (cont.)

For information about installing or exchanging the fan kit, see the section "Installing / exchanging the fan kit" on page 242.

3.7.3 Fan kit 5 PCI slot - 5PC810.FA05-00

TBD

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 28).

3.8.1 AP Link SDL transmitter 5AC801.SDL0-00

A second graphics line can be created using an AP Link graphics adapter card.

TBD

Figure 27: 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.

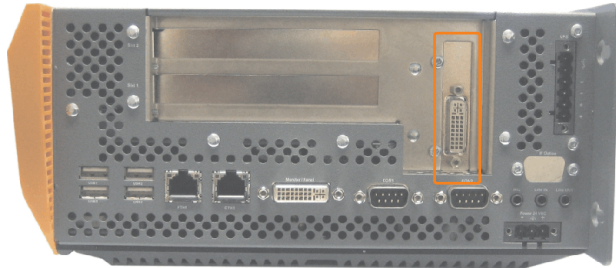


Figure 28: Mounting example with the system unit 5PC810.SX02-00

3.8.2 Ready relay 5AC801.RDYR-00

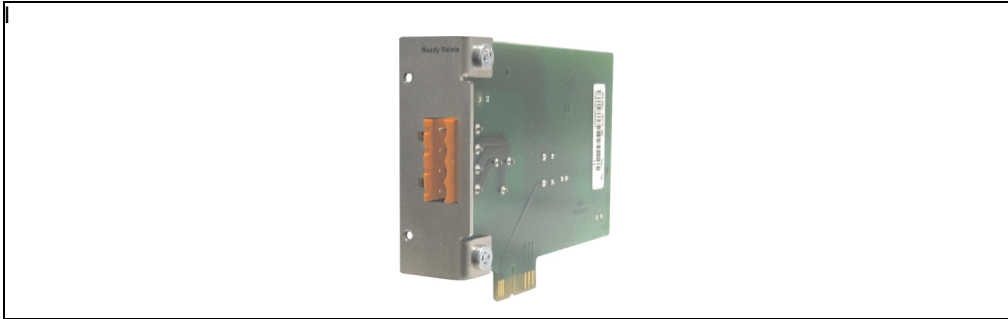


Figure 29: Ready relay 5AC801.RDYR-00

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

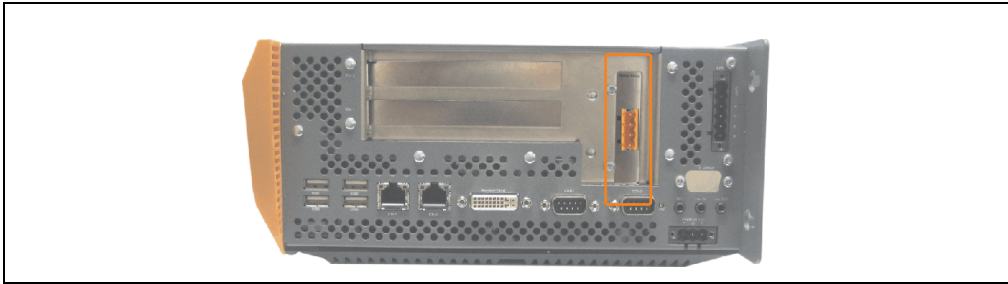


Figure 30: Mounting example with the system unit 5PC810.SX02-00

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

Ready relay pin assignments	
Pin assignments - 4-pin multipoint connector	
Pin	Assignment
1	Normally open
2	Root
3	Normally closed
4	n.c.
Accessories	
0TB704.90	Terminal block, 4-pin, Screw clamp, 1.5 mm²
TB704.91	Terminal block, 4-pin, Cage clamps, 2.5 mm²

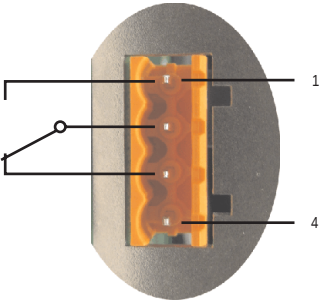


Table 48: Pin assignments - Ready relay 5AC801.RDYR-00

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.

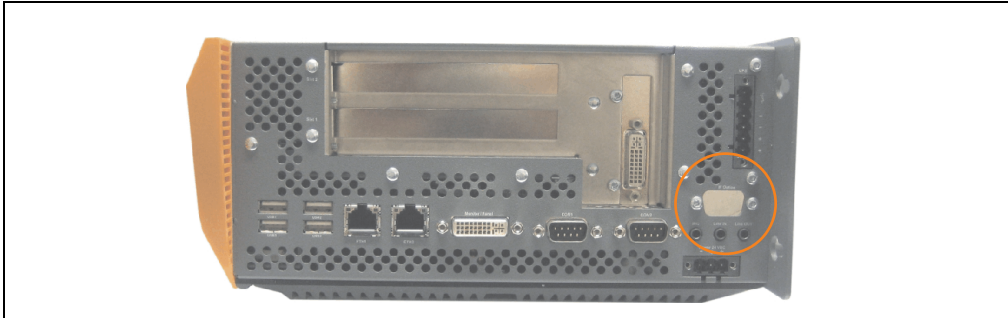


Figure 31: Interface options (IF option)

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

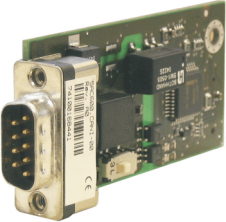
Model number	Description	Figure
5AC600.CANI-00	Add-on CAN interface CAN interface for installation in an APC620, APC800 or PPC700.	

Table 49: Add-on CAN interface - 5AC600.CANI-00

Technical data

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

Table 50: Technical data - Add-on CAN interface - 5AC600.CANI-00

Pin assignments

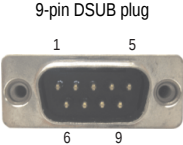
Add-on CAN		
Type	Electrically isolated	
Transfer rate	Max. 500 kBit/s	
Bus length	Max. 1000 Meter	
Pin	Assignment	
1	n.c.	
2	CAN low	
3	GND	
4	n.c.	
5	n.c.	
6	Reserved	
7	CAN high	
8	n.c.	
9	n.c.	

Table 51: Pin assignments - CAN

I/O address and IRQ

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

Table 52: 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 53: CAN address register

Bus length and cable type

The type of cable used depends largely on the required bus length and the number of nodes. The bus length is mainly determined by the bit rate. In accordance with CiA (CAN in Automation) the maximum bus length is 1000 meters.

The following bus lengths are permitted with a maximum oscillator tolerance of 0.121%:

Distance [m]	Transfer rate [kBit/s]
≤ 1000	Typ. 50
≤ 200	Typ. 250
≤ 60	Typ. 500

Table 54: 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 mm ² (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 ² (22AWG/19), tinned Cu wire PU ≤ 59 Ohm / km
Outer sheathing Material Properties Entire shielding	PUR mixture Halogen free From tinned cu wires

Table 55: CAN cable requirements

Terminating resistors

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

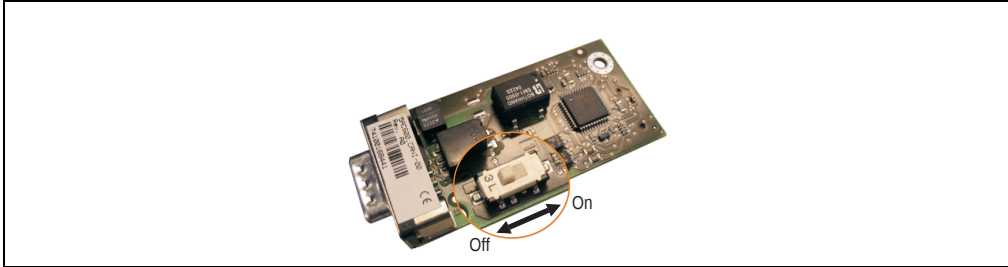


Figure 32: Terminating resistor - Add-on CAN interface 5AC600.CANI-00

Contents of delivery

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

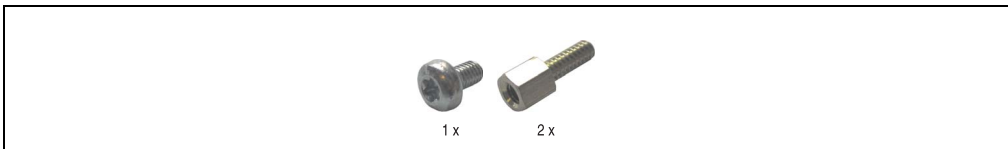


Figure 33: Contents of the delivery / mounting material - 5AC600.CANI-00

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

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

Order data

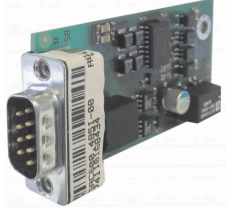
Model number	Description	Figure
5AC600.485I-00	Add-on RS232/422/485 interface Add-on RS232/422/485 interface for installation in an APC620, AP800 and PPC700.	

Table 56: Add-on RS232/422/485 interface - 5AC600.485I-00

Pin assignments

Add-on RS232/422/485		
	RS232	RS422/485
Type	RS232 not modem compatible; electrically isolated	
UART	16550 compatible, 16 byte FIFO	
Transfer rate	Max. 115 kBit/s	
Bus length	Max. 15 meters	Max. 1200 meters
Pin	Assignments (RS232)	Assignments (RS422)
1	n.c.	TXD
2	RXD	n.c.
3	TXD	n.c.
4	n.c.	TXD
5	GND	GND
6	n.c.	RXD
7	RTS	n.c.
8	CTS	n.c.
9	n.c.	RXD

9-pin DSUB plug



Table 57: Pin assignments - RS232/RS422

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

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

Bus length and cable type RS232

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

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

Table 59: 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 mm ² (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 mm ² (22AWG/19), tinned Cu wire PU ≤ 59 Ohm / km
Outer sheathing Material Properties Entire shielding	PUR mixture Halogen free From tinned cu wires

Table 60: RS232 cable requirements

Bus length and cable type RS422

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

Technical data • Individual components

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

Table 61: 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 mm ² (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 ² (22AWG/19), tinned Cu wire PU ≤ 59 Ohm / km
Outer sheathing Material Properties Entire shielding	PUR mixture Halogen free From tinned cu wires

Table 62: 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).

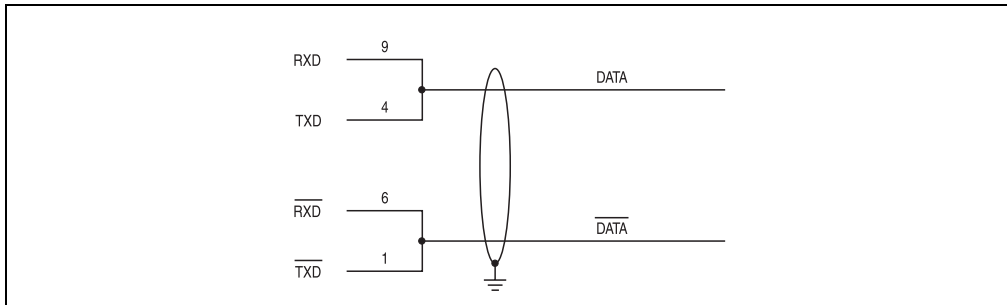


Figure 34: Add-on RS232/422/485 interface - operated in RS485 mode

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	Typ. 115

Table 63: Bus length and transfer rate - RS485

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

RS485 cable	Property
Signal lines Cable cross section Wire insulation Conductor resistance Stranding Shield	4 x 0.25 mm ² (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 ² (22AWG/19), tinned Cu wire PU ≤ 59 Ohm / km
Outer sheathing Material Properties Entire shielding	PUR mixture Halogen free From tinned cu wires

Table 64: RS485 cable requirements

Contents of delivery

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

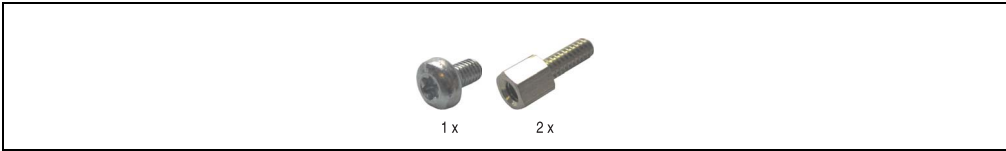


Figure 35: Contents of the delivery / mounting material - 5AC600.485I-00

Chapter 3 • Start-up

1. Installation

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

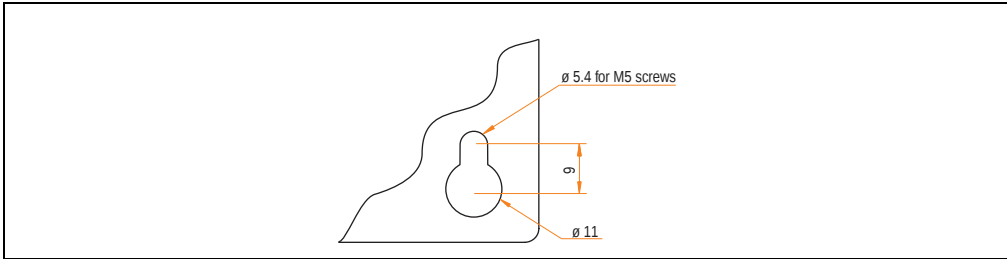


Figure 36: Mounting plates

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

1.1 Drilling template

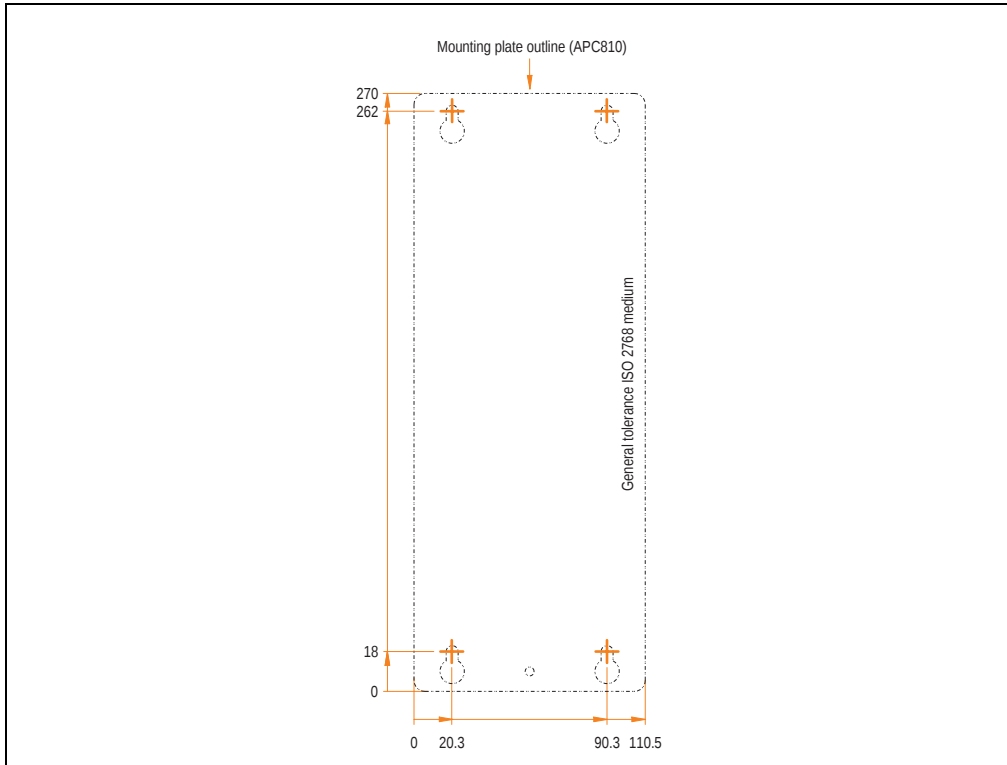


Figure 37: Drilling template - APC810 2 PCI slot variations

2. Cable connections

When making cable connections and installing cables, it is not permitted to have a bending radius smaller than the minimum value specified.

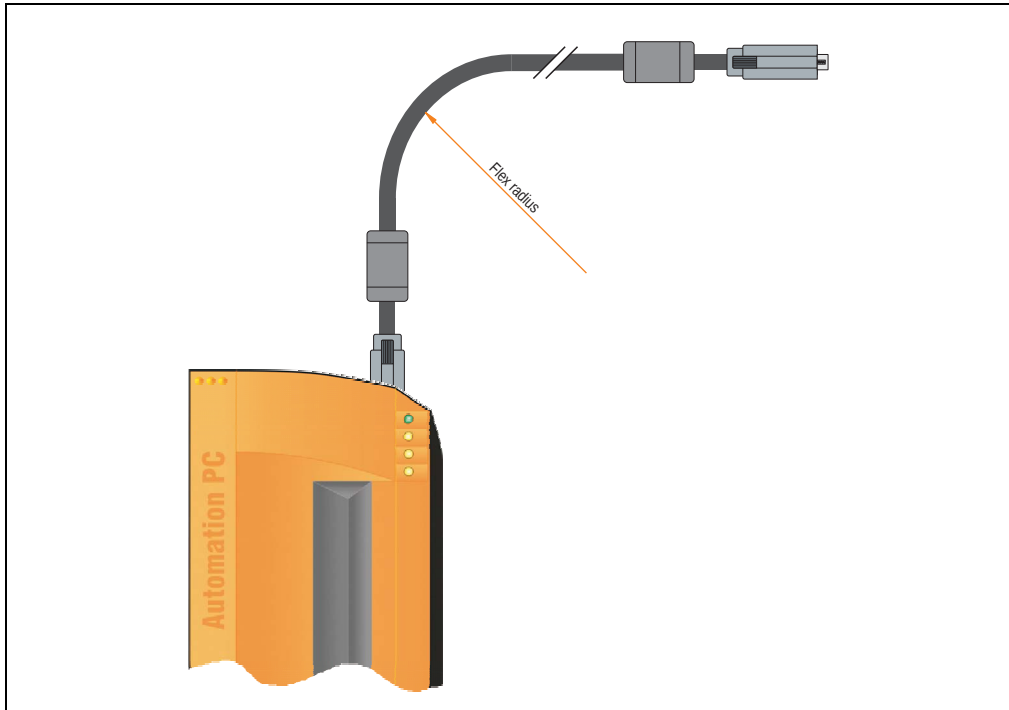


Figure 38: Flex radius - Cable connection

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 www.br-automation.com.

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

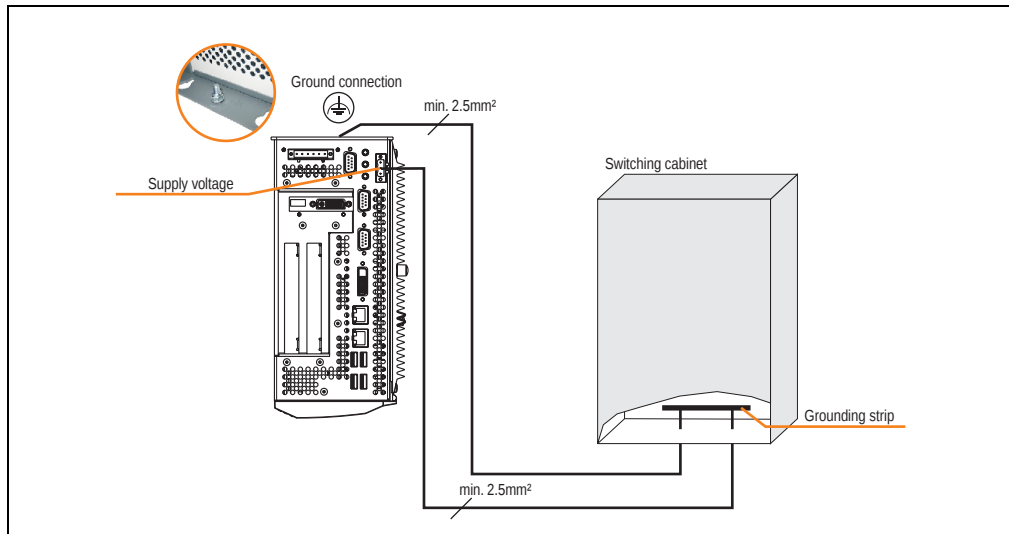


Figure 39: Grounding concept

4. Connection examples

The following examples provide an overview of the configuration options for connecting Automation Panel 800 and Automation Panel 900 and/or Automation Panel 800 devices with the 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

Table 65: Selecting the display units

4.2 One Automation Panel 900 via DVI (onboard)

An Automation Panel 900 with max. SXGA resolution is connected to the integrated DVI interface (onboard). As an alternative, an office TFT with DVI interface or an analog monitor (using adapter with model no. 5AC900.1000-00) can also be operated. A separate cable is used for touch screen and USB. If USB devices are to be operated on the Automation Panel 900, the maximum distance is 5 meters. USB devices can only be connected directly to the Automation Panel (without hub).

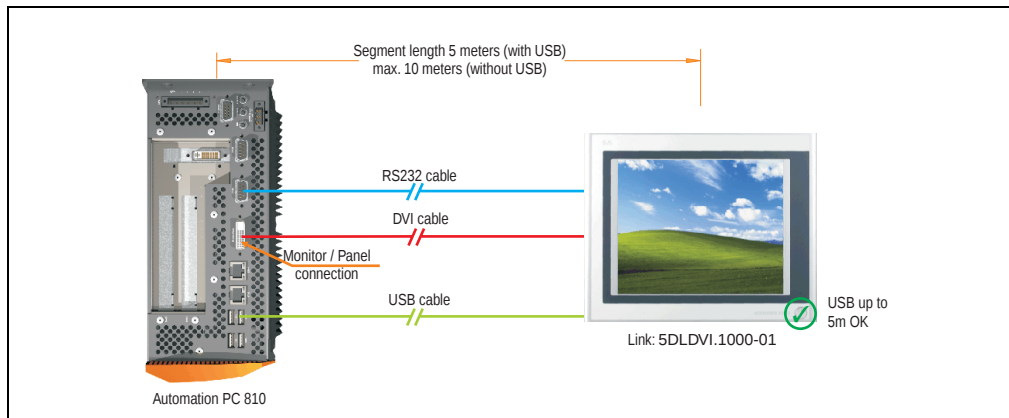


Figure 40: Configuration - One Automation Panel 900 via DVI (onboard)

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 Resolution
	5PC810.SX01-00	5PC810.SX02-00	5PC810.SX05-00	
5PC800.B945-00	✓	✓	✓	Max. SXGA
5PC800.B945-01	✓	✓	✓	Max. SXGA
5PC800.B945-02	✓	✓	✓	Max. SXGA
5PC800.B945-03	✓	✓	✓	Max. SXGA
5PC800.B945-04	✓	✓	✓	Max. SXGA

Table 66: Possible combinations of system unit and CPU board

4.2.2 Link modules

Model number	Description	Note
5DL DVI.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 67: 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	Type	Length
5CADVI.0018-00	DVI cable	1.8 m
5CADVI.0050-00	DVI cable	5 m
5CADVI.0100-00	DVI cable	10 m ¹⁾
9A0014.02	Touch screen cable - serial	1.8 m
9A0014.05	Touch screen cable - serial	5 m
9A0014.10	Touch screen cable - serial	10 m ¹⁾
5CAUSB.0018-00	USB cable	1.8 m
5CAUSB.0050-00	USB cable	5 m

Table 68: 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 www.br-automation.com.

4.2.4 Possible Automation Panel units, resolutions und segment lengths

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

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

Table 69: Possible Automation Panel units, resolutions und segment lengths

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

Information:

The DVI transfer mode does not allow reading statistical values on Automation Panel 900 units.

4.2.5 BIOS settings

No special BIOS settings are necessary for operation.

4.3 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).

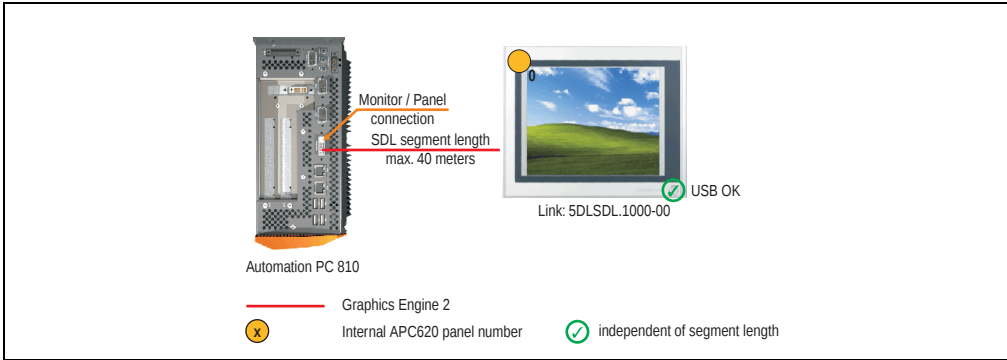


Figure 41: Configuration - An Automation Panel 900 via SDL (onboard)

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

Table 70: Possible combinations of system unit and CPU board

4.3.2 Link modules

Model number	Description	Note
5DLSDL.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp OTB103.9 or cage clamp OTB103.91 sold separately).	For Automation Panel 900

Table 71: 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	Type	Length
5CASDL.0018-00	SDL cable for a fixed type of layout	1.8 m
5CASDL.0018-01	SDL cable with 45° plug for fixed type of layout	1.8 m
5CASDL.0018-03	SDL cable for fixed and flexible type of layout	1.8 m
5CASDL.0050-00	SDL cable for a fixed type of layout	5 m
5CASDL.0050-01	SDL cable with 45° plug for fixed type of layout	5 m
5CASDL.0050-03	SDL cable for fixed and flexible type of layout	5 m
5CASDL.0100-00	SDL cable for a fixed type of layout	10 m
5CASDL.0100-01	SDL cable with 45° plug for fixed type of layout	10 m
5CASDL.0100-03	SDL cable for fixed and flexible type of layout	10 m
5CASDL.0150-00	SDL cable for a fixed type of layout	15 m
5CASDL.0150-01	SDL cable with 45° plug for fixed type of layout	15 m
5CASDL.0150-03	SDL cable for fixed and flexible type of layout	15 m
5CASDL.0200-00	SDL cable for a fixed type of layout	20 m
5CASDL.0200-03	SDL cable for fixed and flexible type of layout	20 m
5CASDL.0250-00	SDL cable for a fixed type of layout	25 m
5CASDL.0250-30	SDL cable for fixed and flexible type of layout	25 m
5CASDL.0300-00	SDL cable for a fixed type of layout	30 m
5CASDL.0300-03	SDL cable for fixed and flexible type of layout	30 m
5CASDL.0300-10	SDL cable with extender for a fixed type of layout	30 m
5CASDL.0300-13	SDL cable with extender for fixed and flexible type of layout	30 m
5CASDL.0400-10	SDL cable with extender for a fixed type of layout	40 m
5CASDL.0400-13	SDL cable with extender for fixed and flexible type of layout	40 m

Table 72: 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 www.br-automation.com.

Cable lengths and resolutions for SDL transfer

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

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

Table 73: 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 Automation Panel 900 panels with 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).

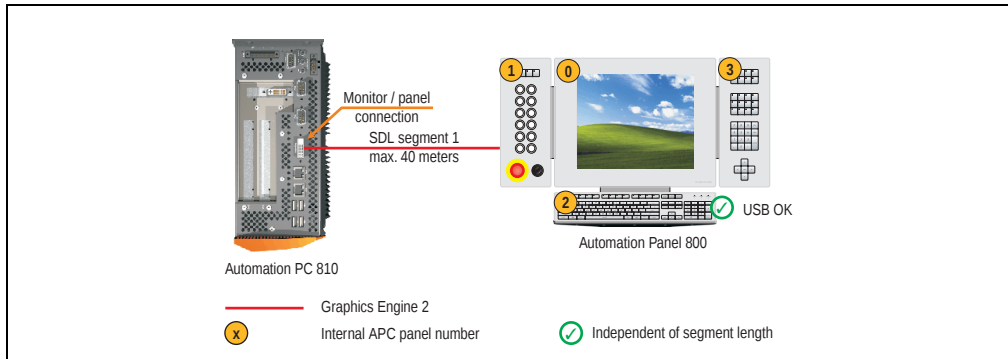


Figure 42: Configuration - An Automation Panel 800 via SDL (onboard)

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

Table 74: 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	Type	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 75: Cables for SDL configurations

Model number	Type	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 75: 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 www.br-automation.com.

Cable lengths and resolutions for SDL transfer

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

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

Table 76: 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 Automation Panel 900 panels with 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).

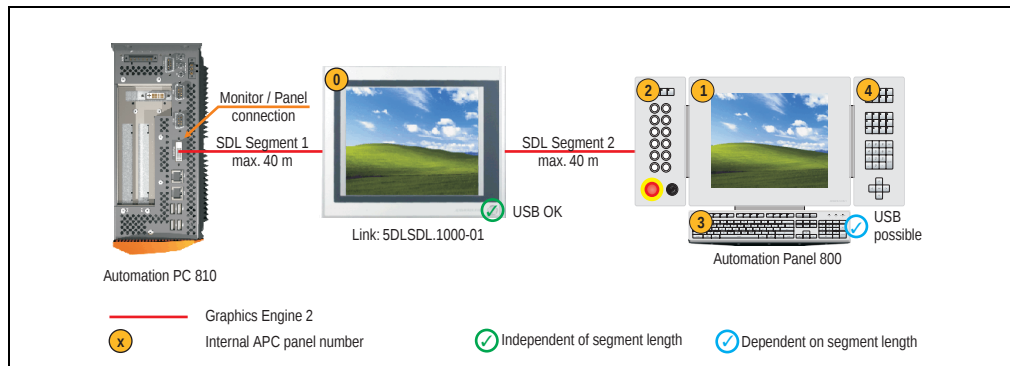


Figure 43: Configuration - An AP900 and an AP800 via SDL (onboard)

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 Resolution
	5PC810.SX01-00	5PC810.SX02-00	5PC810.SX05-00	
5PC800.B945-00	✓	✓	✓	Max. UXGA
5PC800.B945-01	✓	✓	✓	Max. UXGA
5PC800.B945-02	✓	✓	✓	Max. UXGA
5PC800.B945-03	✓	✓	✓	Max. UXGA
5PC800.B945-04	✓	✓	✓	Max. UXGA

Table 77: Possible combinations of system unit and CPU board

4.5.2 Link modules

Model number	Description	Note
5DLSDL.1000-01	Automation Panel Link SDL transceiver Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 1 pieces required

Table 78: 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 www.br-automation.com.

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 Automation Panel 900 panels with 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).

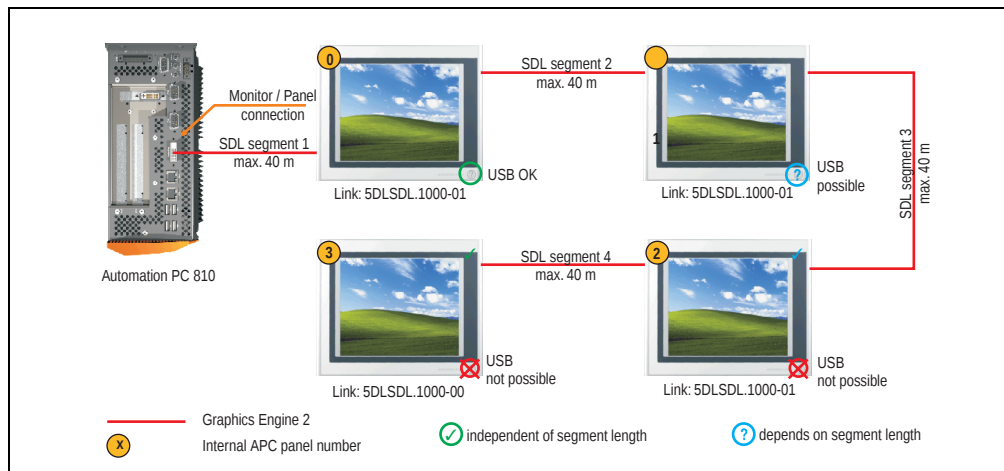


Figure 44: Configuration - Four Automation Panel 900 units via SDL (onboard)

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

Table 79: Possible combinations of system unit and CPU board

4.6.2 Link modules

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

Table 80: Link modules for the configuration: 4 Automation Panel 900 via SDL on 1 line

4.6.3 Cables

Select an Automation Panel 900 cable from the following table.

Model number	Type	Length
5CASDL.0018-00	SDL cable for a fixed type of layout	1.8 m
5CASDL.0018-01	SDL cable with 45° plug for fixed type of layout	1.8 m
5CASDL.0018-03	SDL cable for fixed and flexible type of layout	1.8 m
5CASDL.0050-00	SDL cable for a fixed type of layout	5 m
5CASDL.0050-01	SDL cable with 45° plug for fixed type of layout	5 m
5CASDL.0050-03	SDL cable for fixed and flexible type of layout	5 m
5CASDL.0100-00	SDL cable for a fixed type of layout	10 m
5CASDL.0100-01	SDL cable with 45° plug for fixed type of layout	10 m
5CASDL.0100-03	SDL cable for fixed and flexible type of layout	10 m
5CASDL.0150-00	SDL cable for a fixed type of layout	15 m
5CASDL.0150-01	SDL cable with 45° plug for fixed type of layout	15 m
5CASDL.0150-03	SDL cable for fixed and flexible type of layout	15 m
5CASDL.0200-00	SDL cable for a fixed type of layout	20 m
5CASDL.0200-03	SDL cable for fixed and flexible type of layout	20 m
5CASDL.0250-00	SDL cable for a fixed type of layout	25 m
5CASDL.0250-30	SDL cable for fixed and flexible type of layout	25 m
5CASDL.0300-00	SDL cable for a fixed type of layout	30 m
5CASDL.0300-03	SDL cable for fixed and flexible type of layout	30 m
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 81: 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 www.br-automation.com.

Cable lengths and resolutions for SDL transfer

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

Cables Segment length [m]	Resolution				
	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200
1,8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	- - -
20	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	- -
25	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	- -	- -
30	5CASDL.0300-00 5CASDL.0300-03	5CASDL.0300-00 5CASDL.0300-03	5CASDL.0300-10 5CASDL.0300-13	5CASDL.0300-10 5CASDL.0300-13	- -
40	5CASDL.0400-10 5CASDL.0400-13	5CASDL.0400-10 5CASDL.0400-13	5CASDL.0400-10 5CASDL.0400-13	5CASDL.0400-10 5CASDL.0400-13	- -

Table 82: 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 Automation Panel 900 panels with touch screen on the monitor / panel connection (found in the BIOS menu under "Advanced - Baseboard / Panel Features - Legacy Devices").

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).

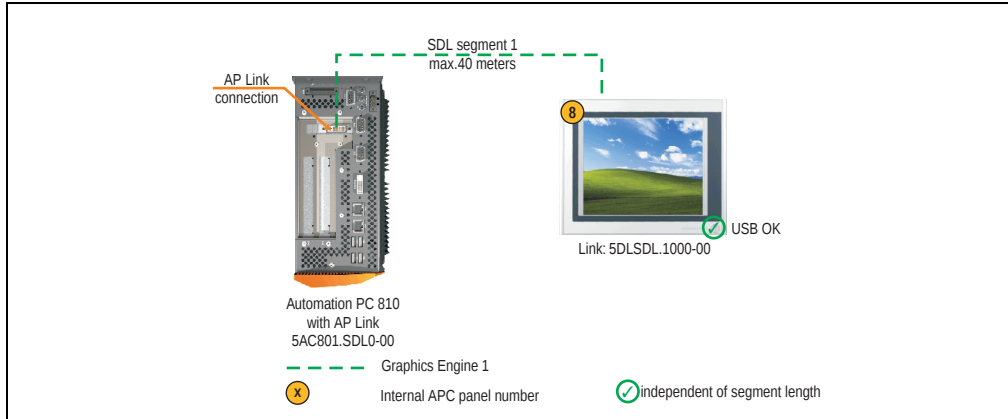


Figure 45: Configuration - One Automation Panel 900 via SDL (AP Link)

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

Table 83: Possible combinations of system unit and CPU board

1) AP Link cannot be installed.

4.7.2 Link modules

Model number	Description	Note
5DLSL.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 OTB103.9 or cage clamp OTB103.91 sold separately).	For Automation Panel 900
5AC801.SDL0-00	APC810 AP Link SDL transmitter	For Automation PC 810

Table 84: 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	Type	Length
5CASDL.0018-00	SDL cable for a fixed type of layout	1.8 m
5CASDL.0018-01	SDL cable with 45° plug for fixed type of layout	1.8 m
5CASDL.0018-03	SDL cable for fixed and flexible type of layout	1.8 m
5CASDL.0050-00	SDL cable for a fixed type of layout	5 m
5CASDL.0050-01	SDL cable with 45° plug for fixed type of layout	5 m
5CASDL.0050-03	SDL cable for fixed and flexible type of layout	5 m
5CASDL.0100-00	SDL cable for a fixed type of layout	10 m
5CASDL.0100-01	SDL cable with 45° plug for fixed type of layout	10 m
5CASDL.0100-03	SDL cable for fixed and flexible type of layout	10 m
5CASDL.0150-00	SDL cable for a fixed type of layout	15 m
5CASDL.0150-01	SDL cable with 45° plug for fixed type of layout	15 m
5CASDL.0150-03	SDL cable for fixed and flexible type of layout	15 m
5CASDL.0200-00	SDL cable for a fixed type of layout	20 m
5CASDL.0200-03	SDL cable for fixed and flexible type of layout	20 m
5CASDL.0250-00	SDL cable for a fixed type of layout	25 m
5CASDL.0250-30	SDL cable for fixed and flexible type of layout	25 m
5CASDL.0300-00	SDL cable for a fixed type of layout	30 m
5CASDL.0300-03	SDL cable for fixed and flexible type of layout	30 m
5CASDL.0300-10	SDL cable with extender for a fixed type of layout	30 m
5CASDL.0300-13	SDL cable with extender for fixed and flexible type of layout	30 m
5CASDL.0400-10	SDL cable with extender for a fixed type of layout	40 m
5CASDL.0400-13	SDL cable with extender for fixed and flexible type of layout	40 m

Table 85: 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 www.br-automation.com.

Cable lengths and resolutions for SDL transfer

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

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

Table 86: Segment lengths, resolutions and SDL cables

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 Automation Panel 900 panels with 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).

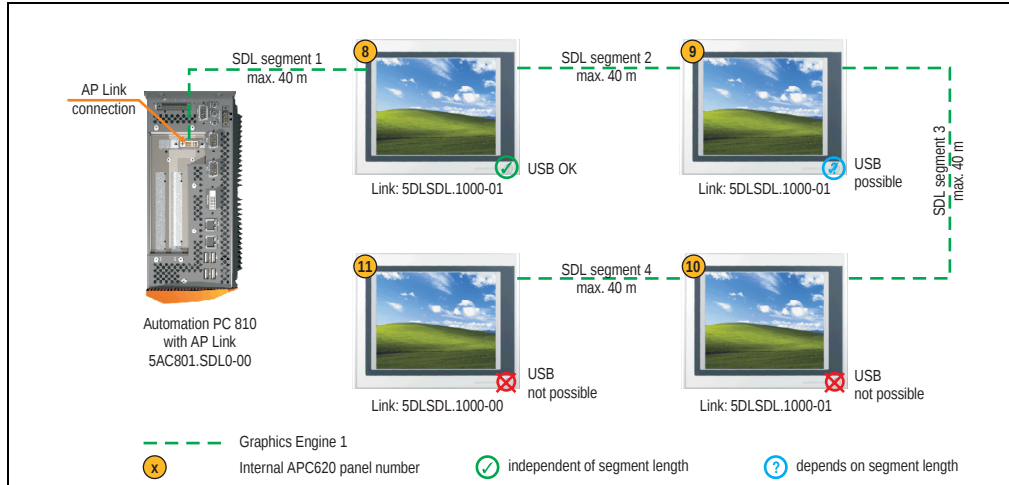


Figure 46: Configuration - Four Automation Panel 900 units via SDL (AP Link)

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

Table 87: Possible combinations of system unit and CPU board

1) AP Link cannot be installed.

4.8.2 Link modules

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

Table 88: 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	Type	Length
5CASDL.0018-00	SDL cable for a fixed type of layout	1.8 m
5CASDL.0018-01	SDL cable with 45° plug for fixed type of layout	1.8 m
5CASDL.0018-03	SDL cable for fixed and flexible type of layout	1.8 m
5CASDL.0050-00	SDL cable for a fixed type of layout	5 m
5CASDL.0050-01	SDL cable with 45° plug for fixed type of layout	5 m
5CASDL.0050-03	SDL cable for fixed and flexible type of layout	5 m
5CASDL.0100-00	SDL cable for a fixed type of layout	10 m
5CASDL.0100-01	SDL cable with 45° plug for fixed type of layout	10 m
5CASDL.0100-03	SDL cable for fixed and flexible type of layout	10 m
5CASDL.0150-00	SDL cable for a fixed type of layout	15 m
5CASDL.0150-01	SDL cable with 45° plug for fixed type of layout	15 m
5CASDL.0150-03	SDL cable for fixed and flexible type of layout	15 m
5CASDL.0200-00	SDL cable for a fixed type of layout	20 m
5CASDL.0200-03	SDL cable for fixed and flexible type of layout	20 m
5CASDL.0250-00	SDL cable for a fixed type of layout	25 m
5CASDL.0250-30	SDL cable for fixed and flexible type of layout	25 m
5CASDL.0300-00	SDL cable for a fixed type of layout	30 m
5CASDL.0300-03	SDL cable for fixed and flexible type of layout	30 m
5CASDL.0300-10	SDL cable with extender for a fixed type of layout	30 m
5CASDL.0300-13	SDL cable with extender for fixed and flexible type of layout	30 m
5CASDL.0400-10	SDL cable with extender for a fixed type of layout	40 m
5CASDL.0400-13	SDL cable with extender for fixed and flexible type of layout	40 m

Table 89: 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 www.br-automation.com.

Cable lengths and resolutions for SDL transfer

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

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

Table 90: 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 Automation Panel 900 panels with touch screen on the AP Link connection (found in the BIOS menu under "Advanced - Baseboard / Panel Features - Legacy Devices").

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.

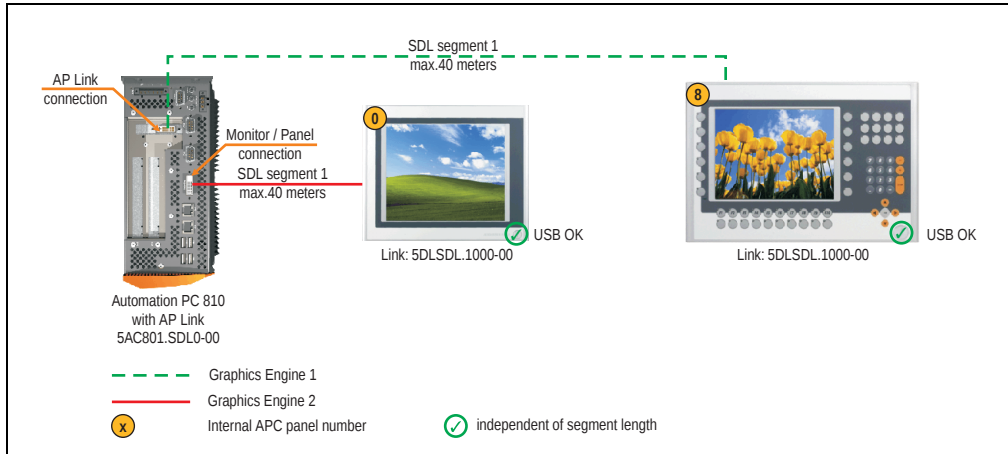


Figure 47: Configuration - Two Automation Panel 900 units via SDL (onboard) and SDL (AP Link)

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

Table 91: Possible combinations of system unit and CPU board

1) AP Link cannot be installed.

4.9.2 Link modules

Model number	Description	Note
5DLSDL.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp OTB103.9 or cage clamp OTB103.91 sold separately).	2 pieces for Automation Panel 900
5AC801.SDL0-00	APC810 AP Link SDL transmitter	For Automation PC 810

Table 92: 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	Type	Length
5CASDL.0018-00	SDL cable for a fixed type of layout	1.8 m
5CASDL.0018-01	SDL cable with 45° plug for fixed type of layout	1.8 m
5CASDL.0018-03	SDL cable for fixed and flexible type of layout	1.8 m
5CASDL.0050-00	SDL cable for a fixed type of layout	5 m
5CASDL.0050-01	SDL cable with 45° plug for fixed type of layout	5 m
5CASDL.0050-03	SDL cable for fixed and flexible type of layout	5 m
5CASDL.0100-00	SDL cable for a fixed type of layout	10 m
5CASDL.0100-01	SDL cable with 45° plug for fixed type of layout	10 m
5CASDL.0100-03	SDL cable for fixed and flexible type of layout	10 m
5CASDL.0150-00	SDL cable for a fixed type of layout	15 m
5CASDL.0150-01	SDL cable with 45° plug for fixed type of layout	15 m
5CASDL.0150-03	SDL cable for fixed and flexible type of layout	15 m
5CASDL.0200-00	SDL cable for a fixed type of layout	20 m
5CASDL.0200-03	SDL cable for fixed and flexible type of layout	20 m
5CASDL.0250-00	SDL cable for a fixed type of layout	25 m
5CASDL.0250-30	SDL cable for fixed and flexible type of layout	25 m
5CASDL.0300-00	SDL cable for a fixed type of layout	30 m
5CASDL.0300-03	SDL cable for fixed and flexible type of layout	30 m
5CASDL.0300-10	SDL cable with extender for a fixed type of layout	30 m
5CASDL.0300-13	SDL cable with extender for fixed and flexible type of layout	30 m
5CASDL.0400-10	SDL cable with extender for a fixed type of layout	40 m
5CASDL.0400-13	SDL cable with extender for fixed and flexible type of layout	40 m

Table 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 www.br-automation.com.

Cable lengths and resolutions for SDL transfer

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

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

Table 94: Segment lengths, resolutions and SDL cables

4.9.4 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 Automation Panel 900 panels with touch screen on the monitor / panel connection (found in the BIOS menu under "Advanced - Baseboard / Panel Features - Legacy Devices").

Start-up • Connection examples

The COM D must be enabled in BIOS in order to operate Automation Panel 900 panels with touch screen on the 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).

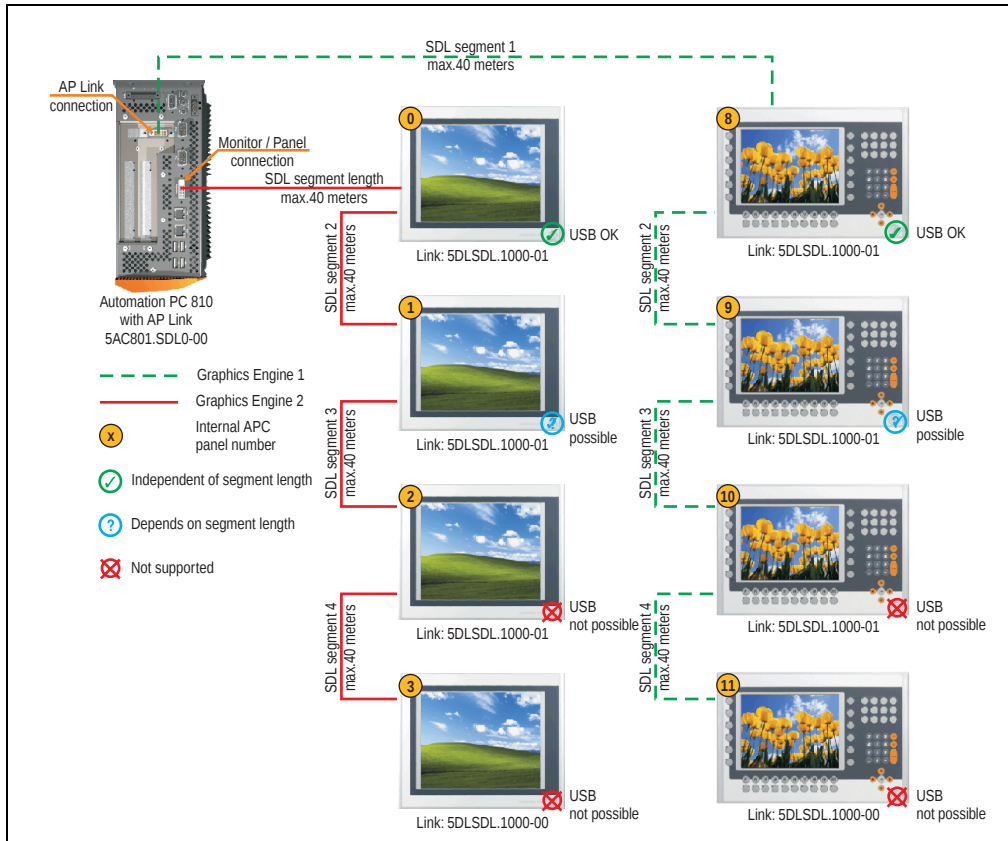


Figure 48: Configuration - Eight Automation Panel 900 units via SDL (onboard) and SDL (AP Link)

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

Table 95: Possible combinations of system unit and CPU board

1) AP Link cannot be installed.

4.10.2 Link modules

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

Table 96: 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	Type	Length
5CASDL.0018-00	SDL cable for a fixed type of layout	1.8 m
5CASDL.0018-01	SDL cable with 45° plug for fixed type of layout	1.8 m
5CASDL.0018-03	SDL cable for fixed and flexible type of layout	1.8 m
5CASDL.0050-00	SDL cable for a fixed type of layout	5 m
5CASDL.0050-01	SDL cable with 45° plug for fixed type of layout	5 m
5CASDL.0050-03	SDL cable for fixed and flexible type of layout	5 m
5CASDL.0100-00	SDL cable for a fixed type of layout	10 m
5CASDL.0100-01	SDL cable with 45° plug for fixed type of layout	10 m

Table 97: Cables for SDL configurations

Model number	Type	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 97: 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 Segment length [m]	Resolution				
	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-03
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	- - -
20	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	5CASDL.0200-00 5CASDL.0200-03	- -
25	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	5CASDL.0250-00 5CASDL.0250-03	- -	- -
30	5CASDL.0300-00 5CASDL.0300-03	5CASDL.0300-00 5CASDL.0300-03	5CASDL.0300-10 5CASDL.0300-13	5CASDL.0300-10 5CASDL.0300-13	- -
40	5CASDL.0400-10 5CASDL.0400-13	5CASDL.0400-10 5CASDL.0400-13	5CASDL.0400-10 5CASDL.0400-13	5CASDL.0400-10 5CASDL.0400-13	- -

Table 98: 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 www.br-automation.com.

4.10.4 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 Automation Panel 900 panels with touch screen on the monitor / panel connection (found in the BIOS menu under "Advanced - Baseboard / Panel Features - Legacy Devices").

The COM D must be enabled in BIOS in order to operate Automation Panel 900 panels with touch screen on the 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).

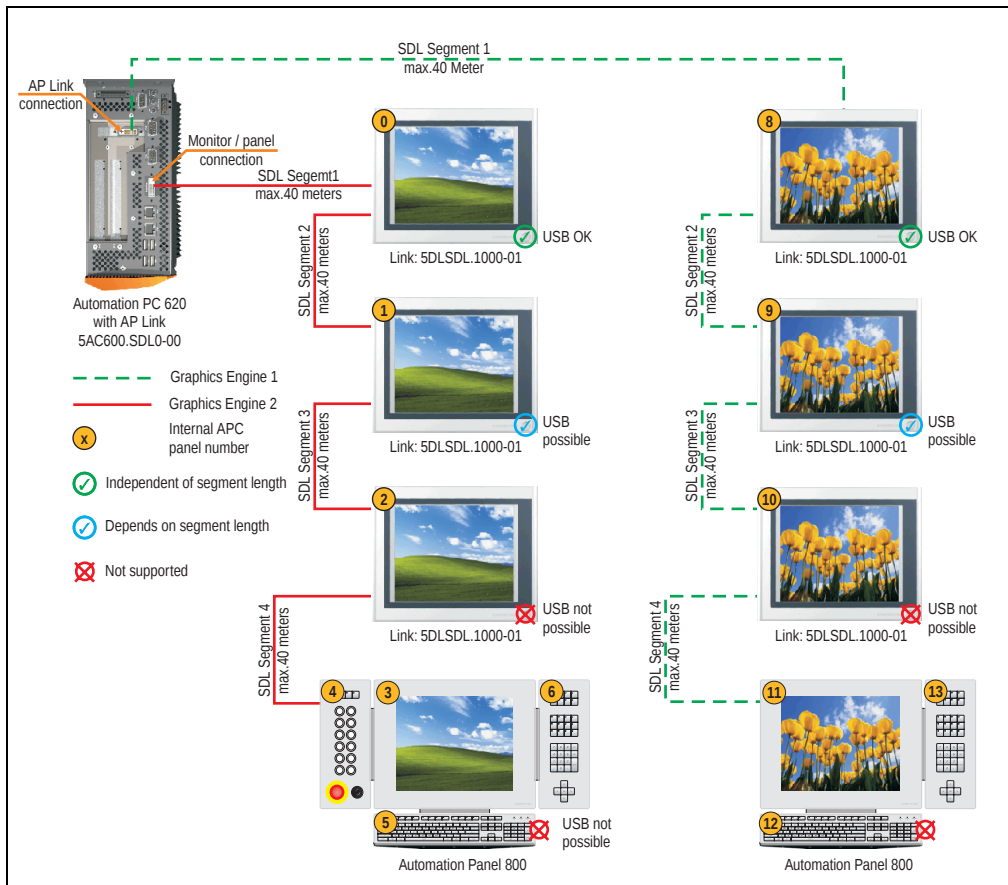


Figure 49: Configuration - Six AP900 and two AP800 devices via SDL (onboard) and SDL (AP Link)

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

Table 99: Possible combinations of system unit and CPU board

1) AP Link cannot be installed.

4.11.2 Link modules

Model number	Description	Note
5DLSL.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
5DLSL.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 100: 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 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 www.br-automation.com.

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

Cables Segment length [m]	Resolution				
	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200
1,8	-	-	5CASDL.0018-00	-	-
	-	-	5CASDL.0018-01	-	-
	-	-	5CASDL.0018-20	-	-
	-	-	5CASDL.0018-03	-	-
5	-	-	5CASDL.0050-00	-	-
	-	-	5CASDL.0050-01	-	-
	-	-	5CASDL.0050-02	-	-
	-	-	5CASDL.0050-03	-	-
10	-	-	5CASDL.0100-00	-	-
	-	-	5CASDL.0100-01	-	-
	-	-	5CASDL.0100-02	-	-
	-	-	5CASDL.0100-03	-	-
15	-	-	5CASDL.0150-00	-	-
	-	-	5CASDL.0150-01	-	-
	-	-	5CASDL.0150-02	-	-
	-	-	5CASDL.0150-03	-	-
20	-	-	5CASDL.0200-00	-	-
	-	-	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 101: Segment lengths, resolutions and SDL cables

Touch screen functionality

The COM C must be enabled in BIOS in order to operate Automation Panel 900 panels with touch screen on the monitor / panel connection (found in the BIOS menu under "Advanced - Baseboard / Panel Features - Legacy Devices").

The COM D must be enabled in BIOS in order to operate Automation Panel 900 panels with touch screen on the AP Link connection (found in the BIOS menu under "Advanced - Baseboard / Panel Features - Legacy Devices").

5. Known problems / issues

The following points listed are known as of January 25, 2008 in the first production lot of APC800 devices:

- The hardware security key interface is not yet implemented. Implementation is planned for the next MTCX version via a firmware upgrade.
- The status display of the Link or Activity LED for the ETH1 interface does not function correctly. However, this does not affect the network connection.
- Sporadically, it's possible that the ETH2 interface is not initialized during a power-on and therefore it doesn't function. The problem can be corrected by a reset or warm restart (Ctrl+Alt+Del).
- First Boot Agent Windows XP embedded and built-in SATA HDD
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.

Chapter 4 • Software

1. BIOS options

Information:

The following diagrams and BIOS menu items including descriptions refer to BIOS Version 0.02. It is therefore possible that these diagrams and BIOS descriptions do not correspond with the installed BIOS version.

1.1 General

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 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):

"Press DEL to run SETUP"



Figure 50: 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.

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

Table 102: 945GME bios-relevant keys at POST

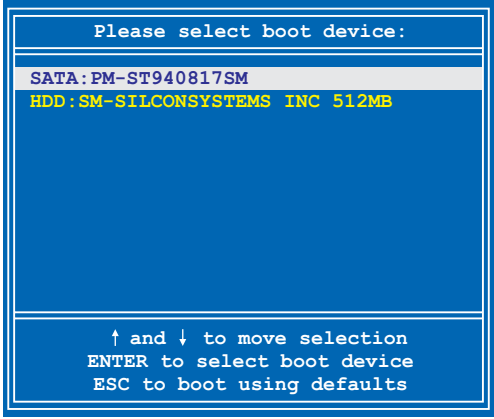
Key	Function
F11	Cues the boot menu. Lists all bootable devices that are connected to the system. With cursor ↑ and cursor ↓ and by pressing <ENTER>, select the device from which will be booted. 
<Pause>	Pressing the <pause> key stops the POST. Press any other key to resume the POST.

Table 102: 945GME bios-relevant keys at POST

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

Key	Function
F1	General help
Cursor ↑	Moves to the previous item.
Cursor ↓	Go to the next item.
Cursor ←	Moves to the previous item.
Cursor →	Go to the next item.
+ -	Changes the setting of the selected function.
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 103: 945GME bios-relevant keys in the BIOS menu

1.3 Main

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

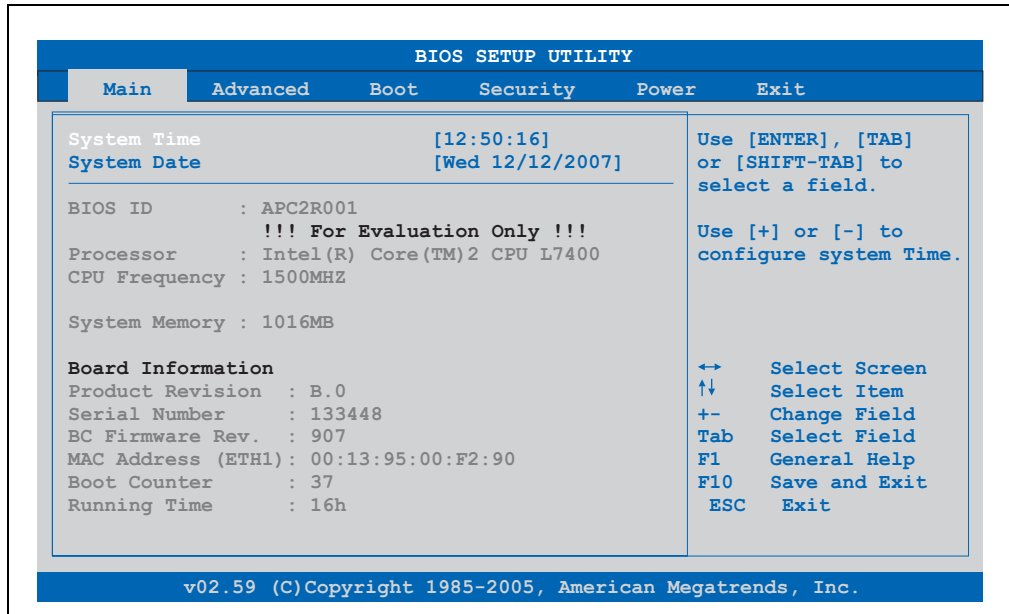


Figure 51: 945GME BIOS Main Menu

BIOS setting	Meaning	Setting options	Effect
System time	This is the current system time setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Adjustment of the system time	Set the system time in the format 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 104: 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 104: 945GME Main Menu setting options (cont.)

1.4 Advanced

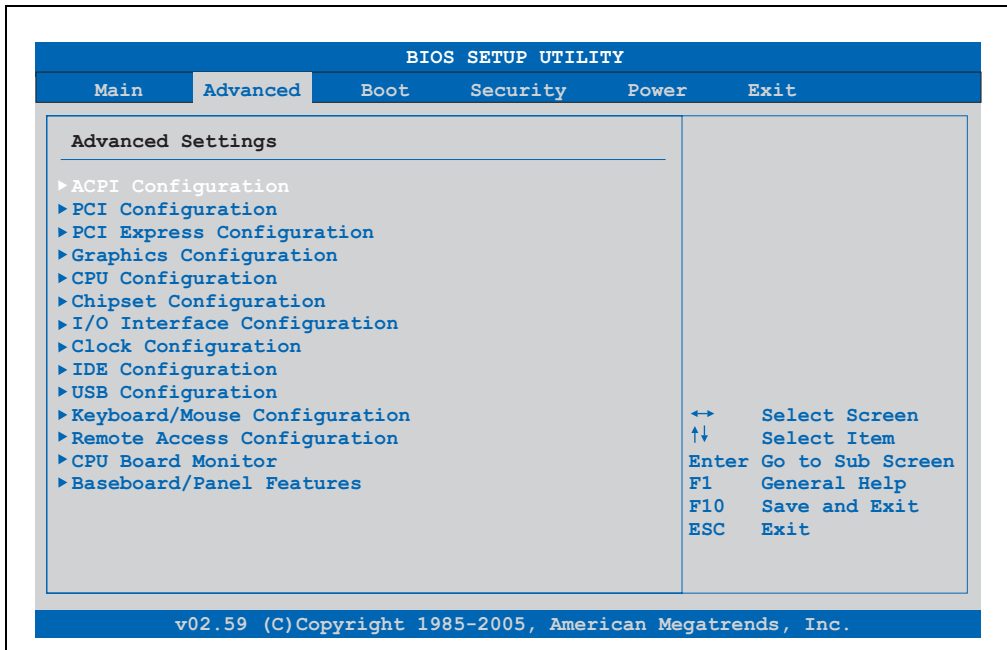


Figure 52: 945GME Advanced Menu

BIOS setting	Meaning	Setting options	Effect
ACPI configuration	Configures APCI devices.	Enter	Opens submenu see "ACPI configuration" on page 135.
PCI configuration	Configures PCI devices.	Enter	Opens submenu see "PCI configuration" on page 137.
PCI Express configuration	Configures the PCI Express	Enter	Opens submenu see "PCI Express Configuration" on page 141.
Graphics configuration	Configures the graphic settings.	Enter	Opens submenu see "Graphics configuration" on page 143.

Table 105: 945GME - Advanced Menu - Setting options

BIOS setting	Meaning	Setting options	Effect
CPU configuration	Configures CPU settings.	Enter	Opens submenu see "CPU configuration" on page 146.
Chipset configuration	Configures the chipset functions.	Enter	Opens submenu see "Chipset configuration" on page 147.
I/O interface configuration	Configuration of the I/O devices.	Enter	Opens submenu see "I/O interface configuration" on page 149.
Clock configuration	Configures clock settings.	Enter	Opens submenu see "Clock configuration" on page 150.
IDE configuration	Configures the IDE functions.	Enter	Opens submenu see "IDE Configuration" on page 151.
USB configuration	Configures USB settings	Enter	Opens submenu see "USB configuration" on page 158.
Keyboard/mouse configuration	Configuration of the keyboard/mouse options.	Enter	Opens submenu see "Keyboard/mouse configuration" on page 160.
Remote access configuration	Configures the remote access settings	Enter	Opens submenu see "Remote access configuration" on page 161.
CPU board monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens submenu see "CPU board monitor" on page 163.
Baseboard/panel features	Displays device specific information and setup of device specific values.	Enter	Opens submenu see "Baseboard/panel features" on page 164.

Table 105: 945GME - Advanced Menu - Setting options (cont.)

1.4.1 ACPI configuration

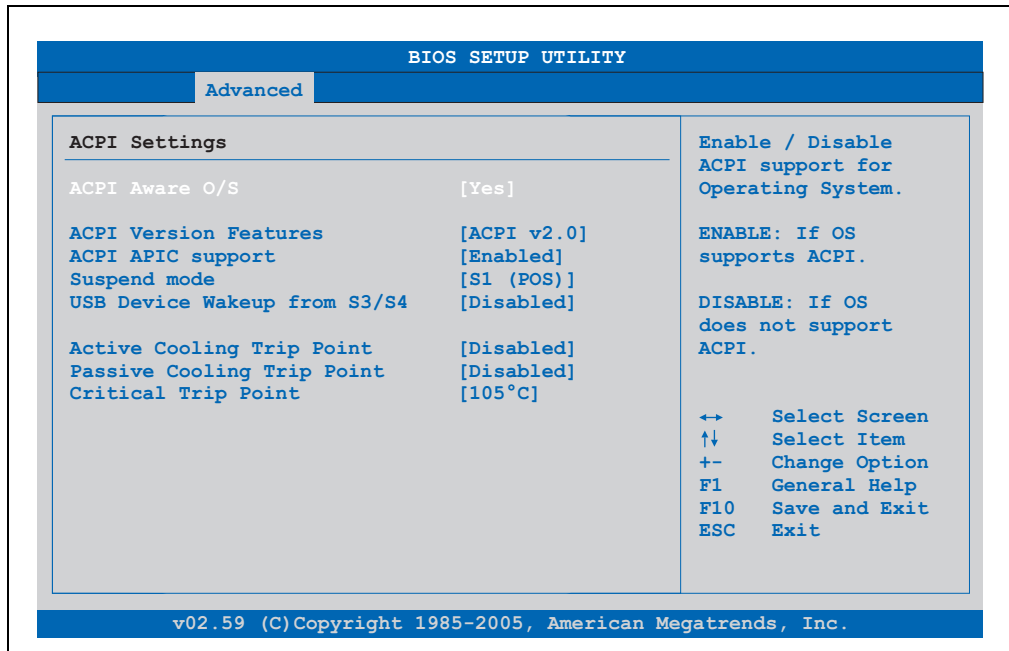


Figure 53: 945GME Advanced ACPI configuration

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

Table 106: 945GME Advanced ACPI configuration setting options

BIOS setting	Meaning	Setting options	Effect
Active cooling trip point	With this function, an optional CPU fan is activated by the operating system when the CPU reaches the set temperature.	Disabled	Disables this function.
		50°C, 60°C, 70°C, 80°C, 90°C	Temperature setting for the active cooling trip point. Can be set in 10 degree increments.
Passive cooling trip point	With this function, a temperature can be set at which the CPU automatically reduces its speed.	Disabled	Disables this function.
		50°C, 60°C, 70°C, 80°C, 90°C	Temperature setting for the passive cooling trip point. Can be set in 10 degree increments.
Critical trip point	With this function, a temperature can be set at which the operating system automatically shuts 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 106: 945GME Advanced ACPI configuration setting options (cont.)

1.4.2 PCI configuration

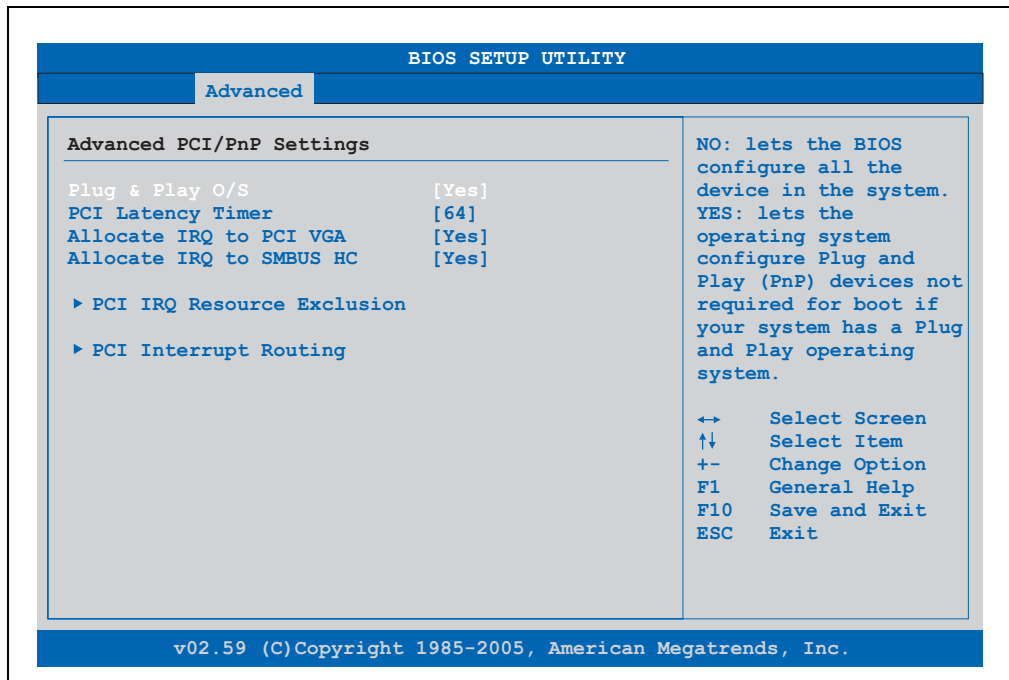


Figure 54: 945GME Advanced PCI Configuration

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 VGA	This function is used to determine if an interrupt is assigned to the PCI VGA.	Yes	Automatic assignment of an interrupt.
		No	No assignment of an interrupt.
Allocate IRQ to SMBUS HC	Use this function to set whether or not the SM (System Management) bus controller is assigned a PCI interrupt.	Yes	Automatic assignment of a PCI interrupt.
		No	No assignment of an interrupt.
PCI IRQ Resource Exclusion	Configures the PCI IRQ resource settings for ISA Legacy devices.	Enter	Opens submenu See "PCI IRQ Resource Exclusion" on page 138
PCI Interrupt Routing	Configures the PCI Interrupt Routing	Enter	Opens submenu See "PCI Interrupt Routing" on page 140

Table 107: 945GME Advanced PCI configuration setting options

PCI IRQ Resource Exclusion

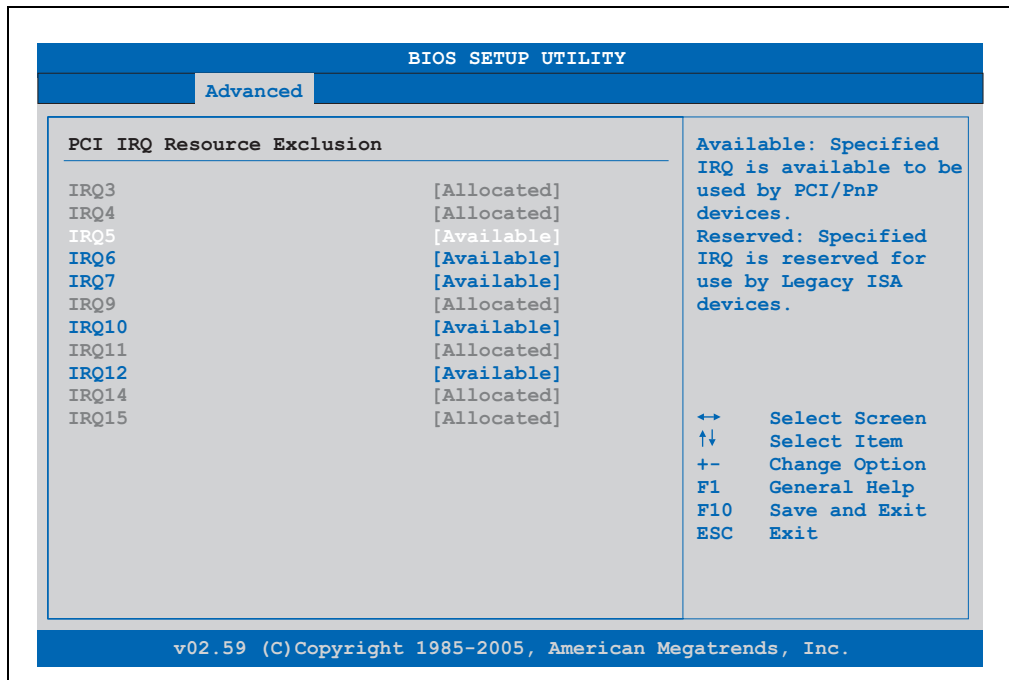


Figure 55: 945GME Advanced PCI IRQ Resource Exclusion

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 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.

Table 108: 945GME Advanced PCI IRQ Resource Exclusion setting options

BIOS setting	Meaning	Setting options	Effect
IRQ7	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.
IRQ9	IRQ interrupt assignment for Legacy ISA devices.	Allocated	Allocated by the system - cannot be used.
IRQ10	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.
IRQ11	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.
IRQ12	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.
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 108: 945GME Advanced PCI IRQ Resource Exclusion setting options (cont.)

PCI Interrupt Routing

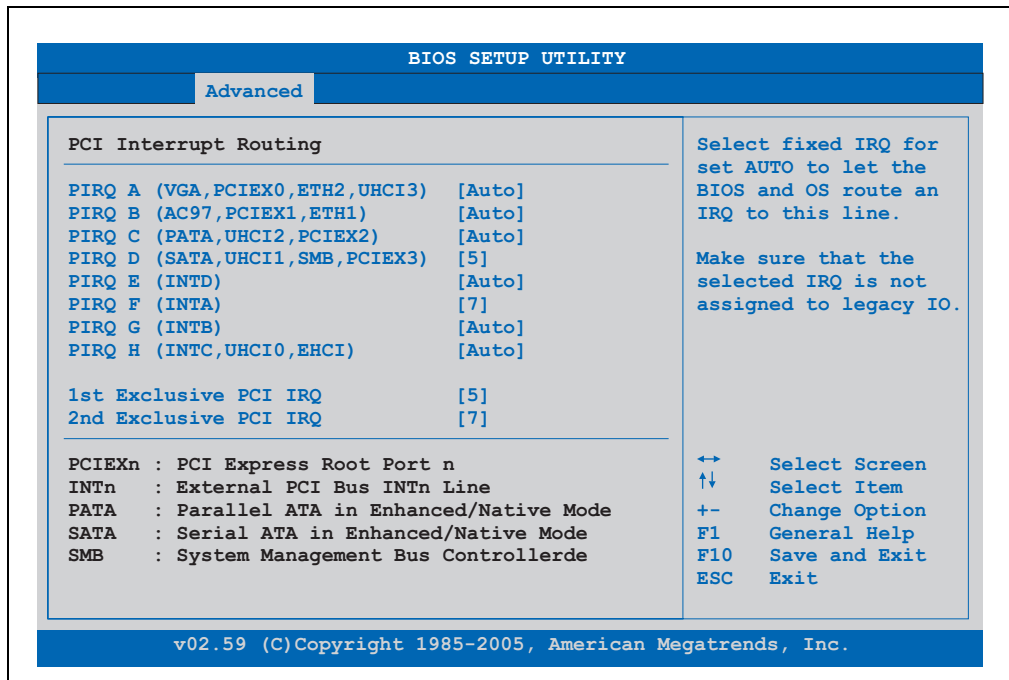


Figure 56: 945GME Advanced PCI Interrupt Routing

BIOS setting	Meaning	Setting options	Effect
PIRQ A (VGA,PCIEX0,ETH2,UHCI3)	Option for setting the PIRQ A.	Auto	Automatic assignment by the BIOS and operating system.
		3,4,5,6,7,9,10,11,12	Manual assignment
PIRQ B (AC97,PCIEX1,ETH1)	Option for setting the PIRQ B.	Auto	Automatic assignment by the BIOS and operating system.
		3,4,5,6,7,9,10,11,12	Manual assignment
PIRQ C (PATA,UHCI2,PCIEX2)	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,PCIEX3)	Option for setting the PIRQ D.	Auto	Automatic assignment by the BIOS and operating system.
		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 109: 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 109: 945GME Advanced PCI Interrupt Routing setting options (cont.)

1.4.3 PCI Express Configuration

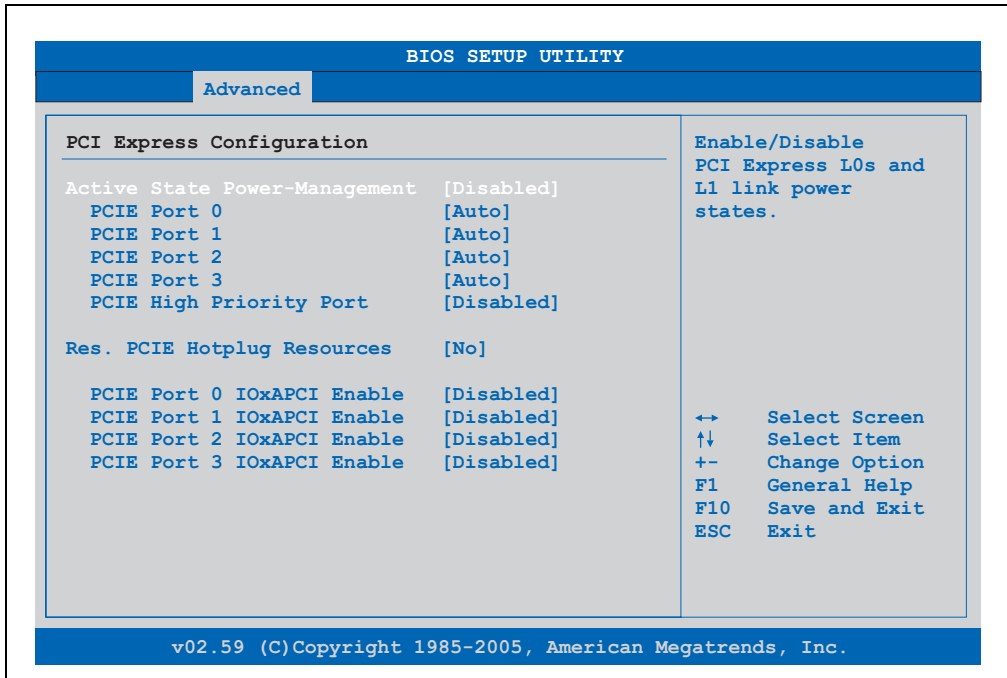


Figure 57: 945GME Advanced PCI Express Configuration

BIOS setting	Meaning	Setting options	Effect
Active State Power- Management	Option for setting a power saving function (L0s/L1) for PCIE slots if they do not require full power.	Disabled	Disables this function.
		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 Port	TBD	Disabled	
		Port 0	
		Port 1	
		Port 2	
		Port 3	
		ETH2	
Res. PCIE Hotplug Resource	TBD	ETH1	
		No	
PCIE Port 0 IOxAPIC Enable	TBD	Yes	
		Disabled	
PCIE Port 1 IOxAPIC Enable	TBD	Enabled	
		Disabled	
PCIE Port 2 IOxAPIC Enable	TBD	Enabled	
		Disabled	
PCIE Port 3 IOxAPIC Enable	TBD	Enabled	
		Disabled	

Table 110: 945GME Advanced PCI Express Configuration setting options

1.4.4 Graphics configuration

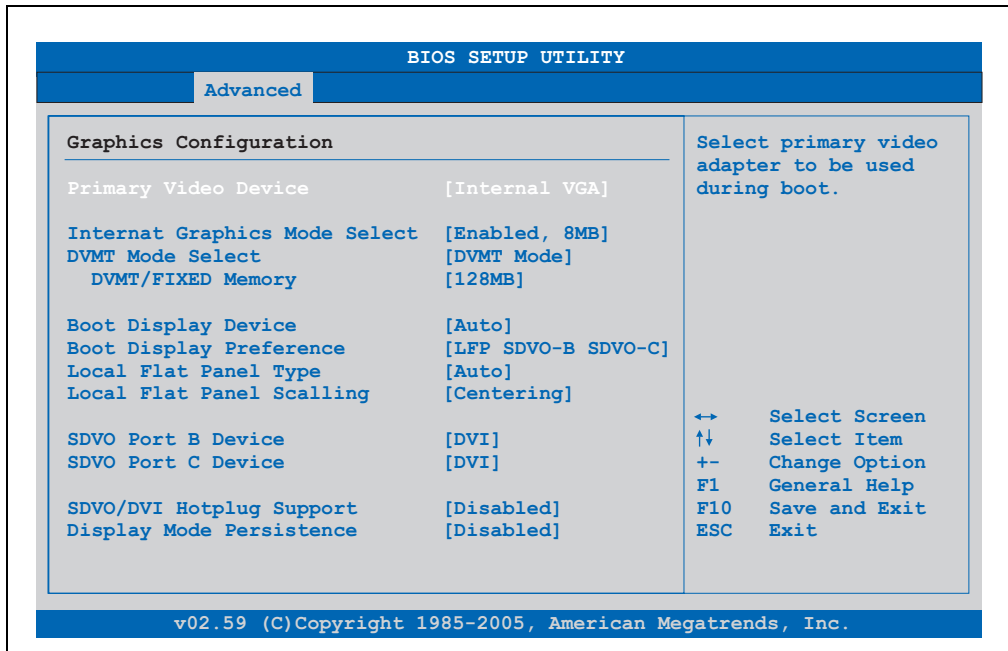


Figure 58: 945GME Advanced Graphics Configuration

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 Mode Select	Option for setting the memory size that can be used for the internal graphics controller.	Disabled	No reservation - Disables the graphics controller.
		Enabled, 1MB	1MB main memory provided.
		Enabled, 8MB	8MB main memory provided.
DMT Mode Select	Option for determining the DMT mode (Dynamic Video Memory Technology) of the DMT graphics driver.	Fixed Mode	A fixed amount of memory is allocated to the graphics chip, which is no longer available to the PC.
		DMT Mode	Memory consumption is controlled dynamically by the DMT graphics driver. Only the amount of memory that is required is used.
		Combo Mode	The DMT graphics driver reserves at least 64MB, but can use up to 224MB if necessary.

Table 111: 945GME Advanced Graphics Configuration setting options

BIOS setting	Meaning	Setting options	Effect
DVMT/FIXED Memory	Option for setting the amount of memory used for the DVMT mode.	64MB	64MB of main memory can be used.
		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 be enabled for a video device during the boot procedure.	Auto	Automatic selection.
		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 Preference	This option determines the order in which the devices on the connected channels LFP and SDVO should be checked. The setting is only needed when the Option Boot Display Device is set to "Auto".	LFP SDVO-B SDVO-C	TBD
		LFP SDVO-C SDVO-B	TBD
		SDVO-B SDVO-C LFP	TBD
		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 (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 Panel Type.	Centering	The screen content is output centered on the display.
		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 111: 945GME Advanced Graphics Configuration setting options (cont.)

BIOS setting	Meaning	Setting options	Effect
SDVO Port B Device	Option for selecting the video device that is connected to the SDVO Port B.	None	No video device connected.
		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 is connected to the SDVO Port A.	None	No video device connected.
		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/DVI Hotplug Support	TBD	Enabled	
		Disabled	
Display Mode Persistence	TBD	Enabled	
		Disabled	

Table 111: 945GME Advanced Graphics Configuration setting options (cont.)

1.4.5 CPU configuration

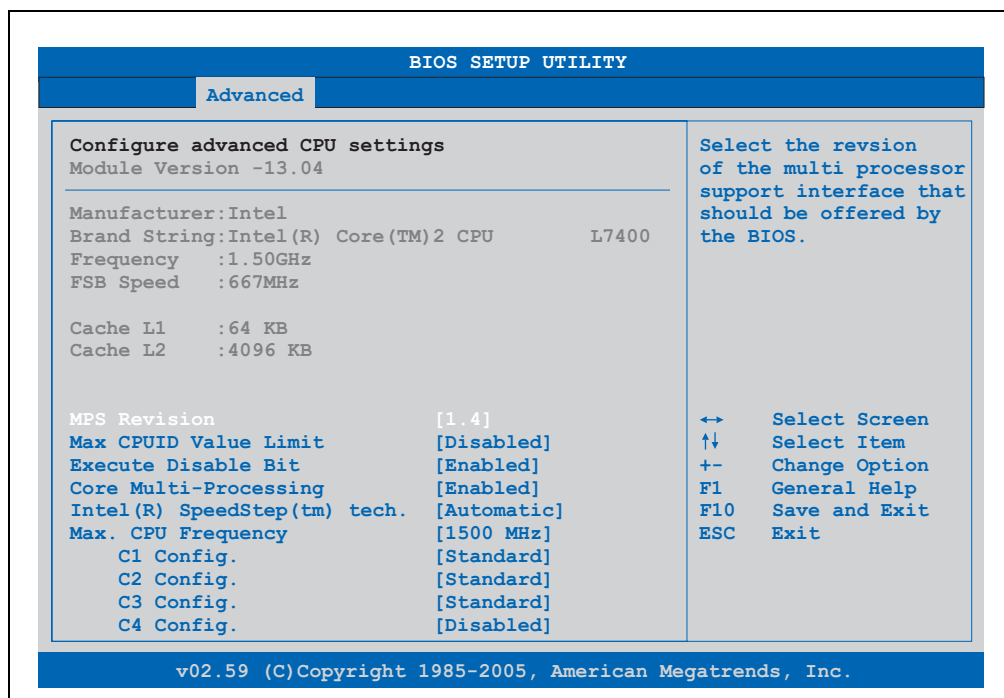


Figure 59: 945GME Advanced CPU Configuration

BIOS setting	Meaning	Setting options	Effect
MPS Revision	This option supports the use of multiple CPUs (MPS=multi-processor system).	1.1	Sets MPS support Revision 1.1
		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 support for prevention of data execution.	Enabled	Enables this function.
		Disabled	Disables this function.
Core Multi-Processing	When using a Dual Core processor, this option can be used to disable a core.	Enabled	Both cores are used in a Dual Core processor.
		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 processor clock speed is increased or decreased according to the amount of calculations that must be made. As a result, the power consumption depends largely on the processor load.	Automatic	The processor speed is regulated by the operating system.
		Maximum speed	The processor speed is set to a maximum.
		Minimum speed	The processor speed is set to a minimum.
		Disabled	SpeedStep technology disabled.

Table 112: 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 112: 945GME Advanced CPU Configuration setting options (cont.)

1.4.6 Chipset configuration

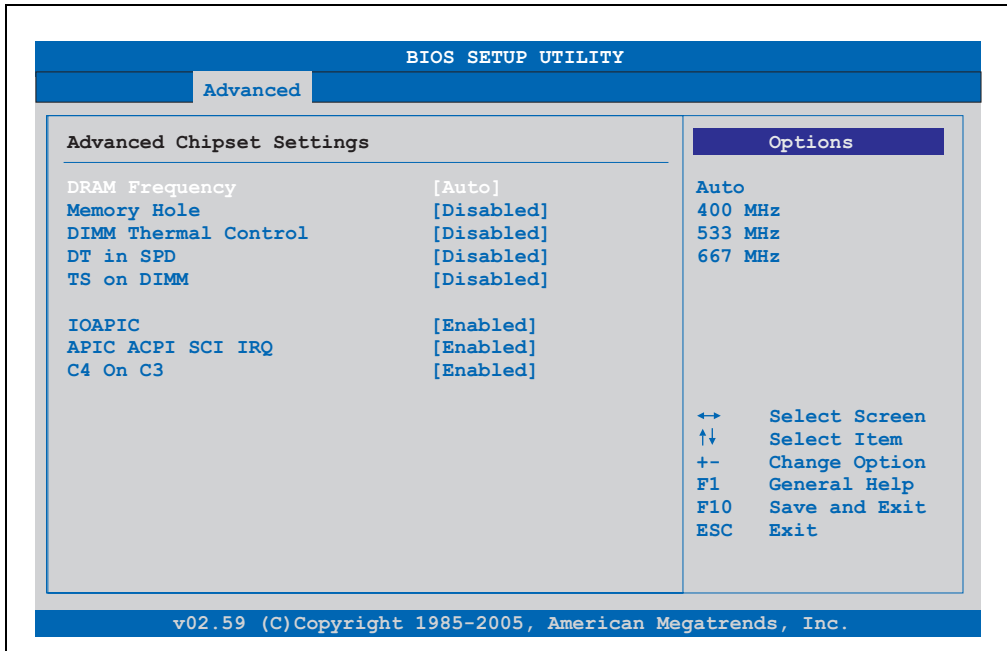


Figure 60: 945GME Advanced Chipset Configuration

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 relevant for an APC810.	Disabled	Disables this function.
		15MB -16MB	This address area is reserved.
DIMM Thermal Control	Option for setting the maximum surface temperature of the DIMM module. The module is cooled by limiting the memory bandwidth if the defined surface temperature is reached.	Disabled	Surface temperature not limited.
		40, 50, 60, 70 80, 85, 90°C	Temperature limit value for the limitation.
DT in SPD	Option to determine whether the GMCH (Graphics and Memory Controller Hub) supports DT (Delta Temperature) in the SPD (Serial Presence Detect) Management Algorithm of the DIMM module.	Disabled	Disables this function.
		Enabled	Enables this function.
TS on DIMM	Option to determine whether the GMCH (Graphics and Memory Controller Hub) supports TS (Thermal Sensor) in the Thermal Management Algorithm of the DIMM module.	Disabled	Disables this function.
		Enabled	Enables this function.
IOAPIC	This option is used to enable or disable APIC (Advanced Programmable Interrupt Controller). Note: The IRQ resources available to the system are expanded when the APIC mode is enabled.	Disabled	Disables this function.
		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 Modify SCI IRQ when in APIC (Advanced Programmable Interrupt Controller) mode.	Disabled	IRQ9 is used for SCI.
		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 113: 945GME Advanced Chipset setting options

1.4.7 I/O interface configuration

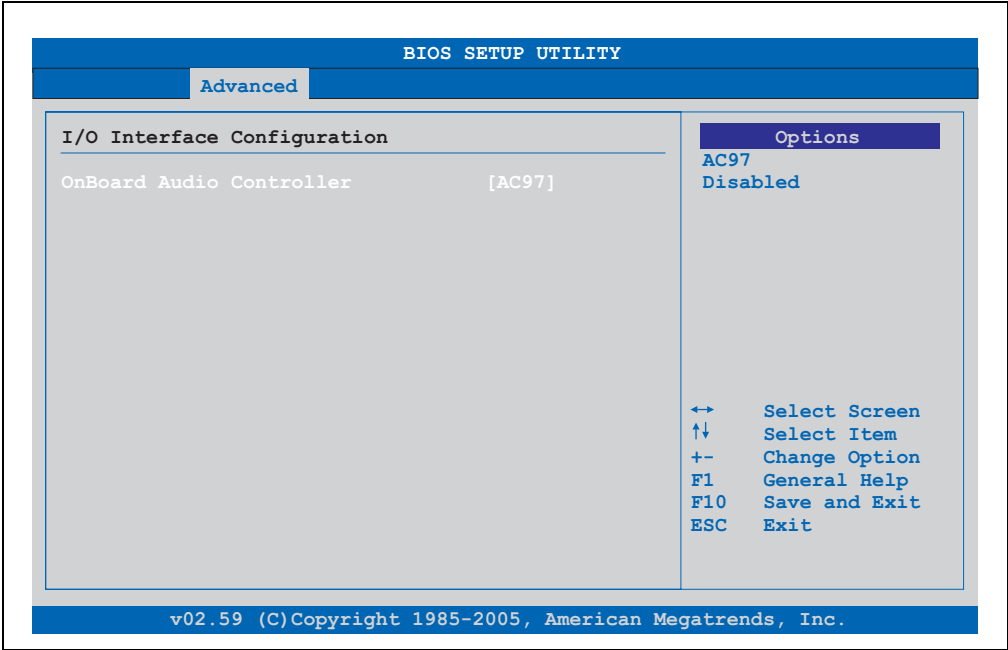


Figure 61: 945GME Advanced I/O Interface Configuration

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

Table 114: 945GME Advanced I/O Interface Configuration setting options

1.4.8 Clock configuration

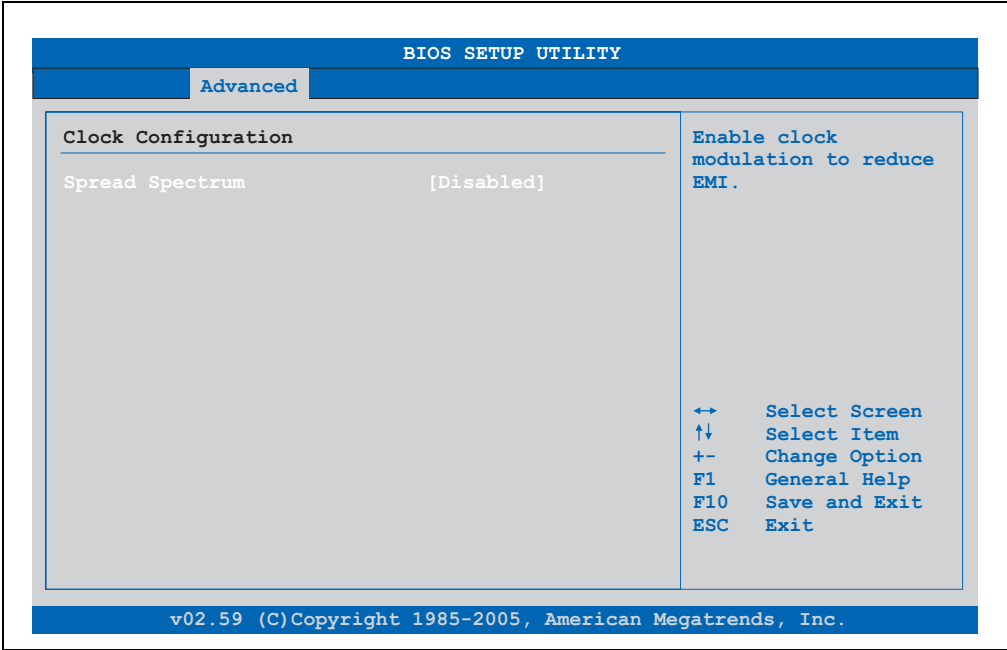


Figure 62: 945GME Advanced Clock Configuration

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

Table 115: 945GME Advanced Clock Configuration setting options

1.4.9 IDE Configuration

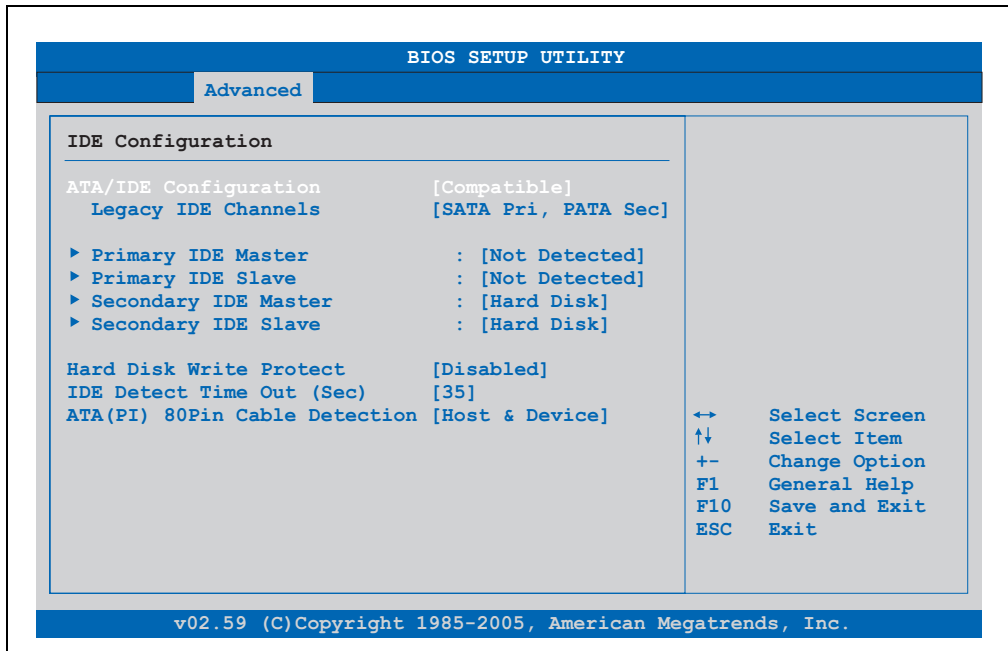


Figure 63: 945GME Advanced IDE Configuration

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 152
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 154
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 155

Table 116: 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 157
Hard disk write protect	Write protection for the hard drive can be enabled/disabled here.	Disabled	Disables this function.
		Enabled	Enables this function.
IDE Detect Time Out (Sec)	Configuring the time overrun limit value for the ATA/ATAPI device identification.	0, 5, 10, 15, 20, 25, 30, 35	Time setting in seconds.
ATA(P) 80Pin Cable Detection	Detects whether an 80 pin cable is connected to the drive, the controller or to both. Note: This cable should be used whenever possible, otherwise error messages will appear.	Host & device	Using both IDE controllers (motherboard, disk drive).
		Host	Using the IDE controller motherboard.
		Device	Using the IDE disk drive controller.

Table 116: 945GME Advanced IDE Configuration setting options

Primary IDE master

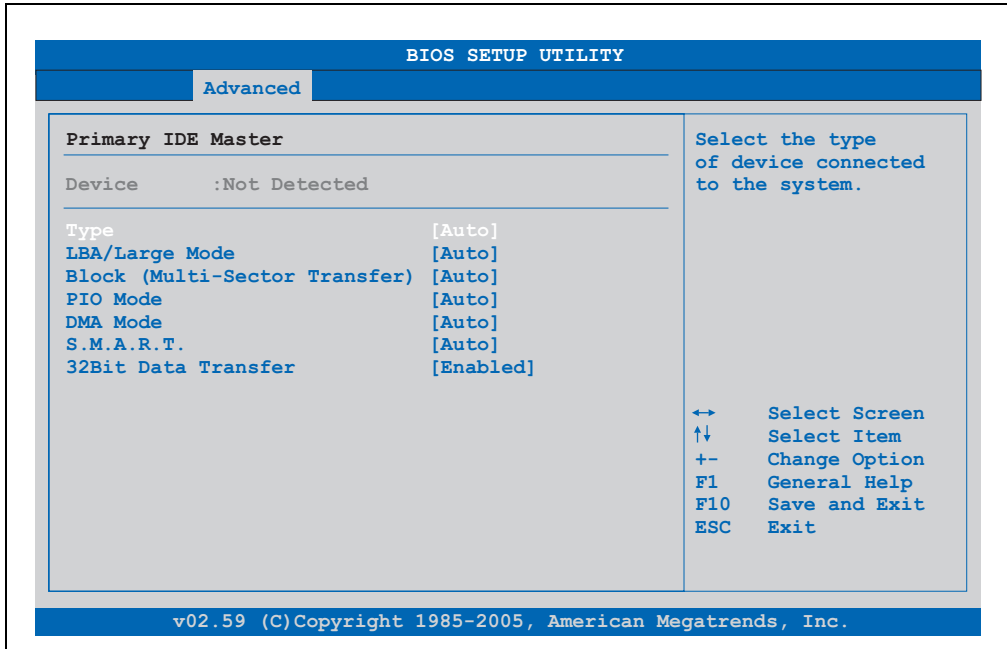


Figure 64: 945GME Primary IDE Master

BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the primary master is configured here.	Not installed	No drive installed.
		Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive.
		ARMD	ARMD - drive (zip drive)
LBA/Large mode	This option enables the logical block addressing/ large mode for IDE.	Disabled	Disables this function.
		Auto	Automatic activation of this function when supported by the system.
Block (multi-sector transfer)	This option enables the block mode for IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Disabled	Disables this function.
		Auto	Automatic enabling of this function when supported by the system.
PIO mode	The PIO mode determines the data rate of the hard drive. Note: The higher the PIO mode, the shorter the data cable must be.	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.
DMA mode	The data transfer rate to and from the primary master drive is defined here. The DMA mode must be enabled in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Auto	Automatic definition of the transfer rate.
		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. Data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 117: 945GME Primary IDE Master setting options

Primary IDE slave

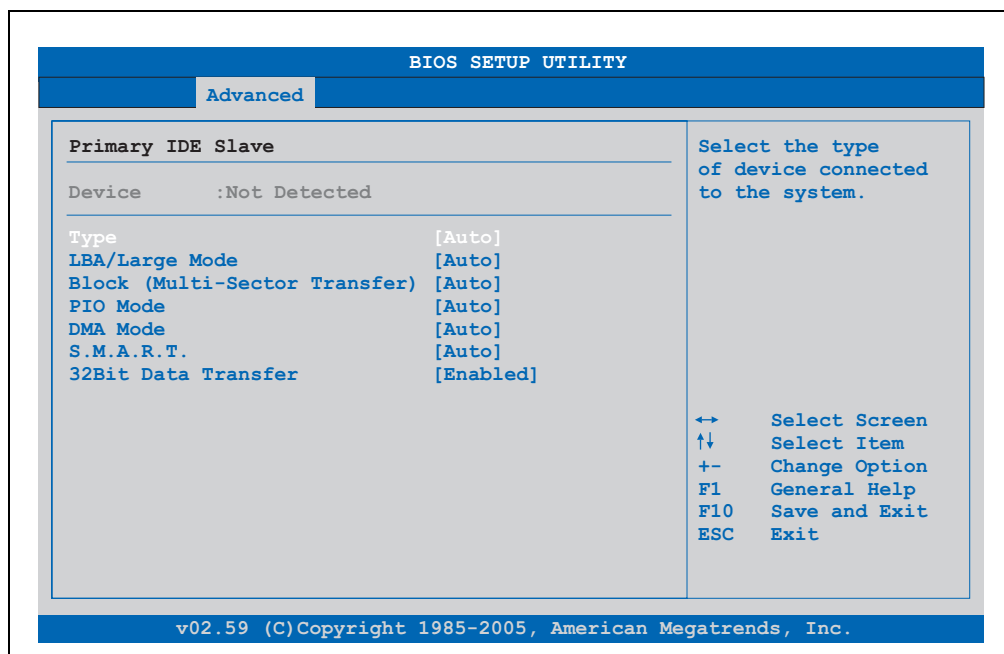


Figure 65: 945GME Primary IDE Slave

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

Table 118: 945GME Primary 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. Data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 118: 945GME Primary IDE Slave setting options (cont.)

Secondary IDE master

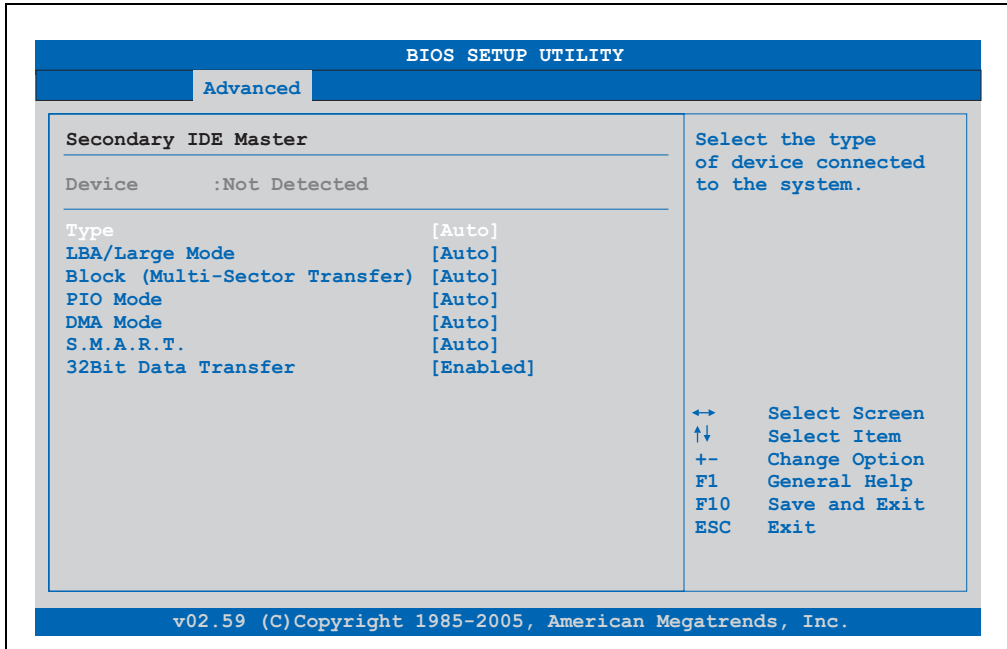


Figure 66: 945GME Secondary IDE Master

BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the primary master is configured here.	Not installed	No drive installed.
		Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive.
		ARMD	ARMD - drive (zip drive)
LBA/Large mode	This option enables the logical block addressing/ large mode for IDE.	Disabled	Disables this function.
		Auto	Automatic enabling of this function when supported by the system.
Block (multi-sector transfer)	This option enables the block mode for IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Disabled	Disables this function.
		Auto	Automatic enabling of this function when supported by the system.
PIO mode	The PIO mode determines the data rate of the hard drive. Note: The higher the PIO mode, the shorter the data cable must be.	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.
DMA mode	The data transfer rate to and from the primary master drive is defined here. The DMA mode must be enabled in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Auto	Automatic definition of the transfer rate.
		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. Data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 119: 945GME Secondary IDE Master setting options

Secondary IDE slave

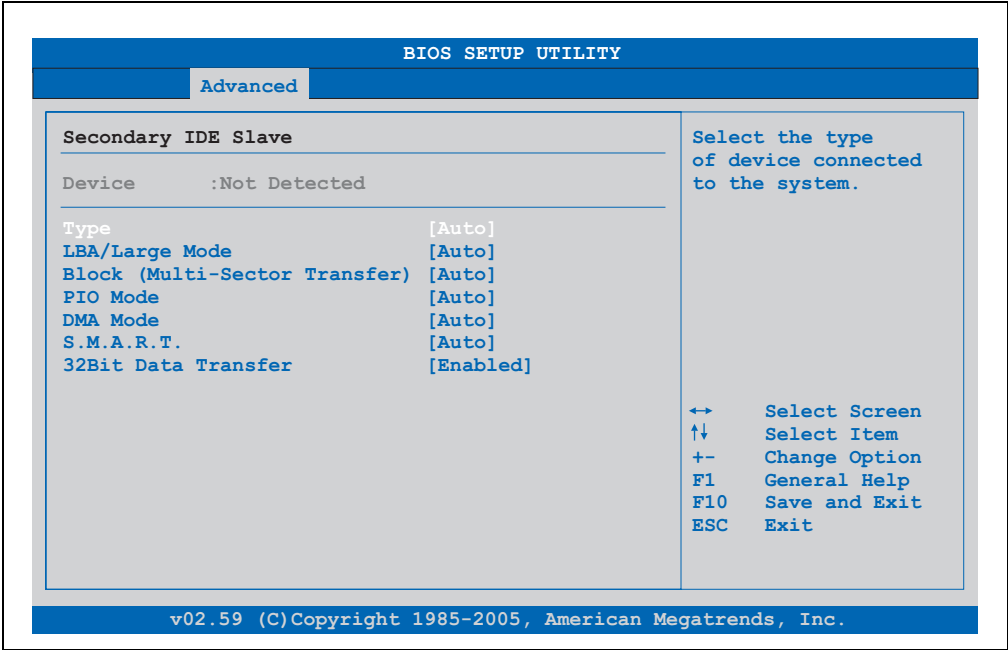


Figure 67: 945GME Secondary IDE Slave

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

Table 120: 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. Data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 120: 945GME Secondary IDE Slave setting options (cont.)

1.4.10 USB configuration

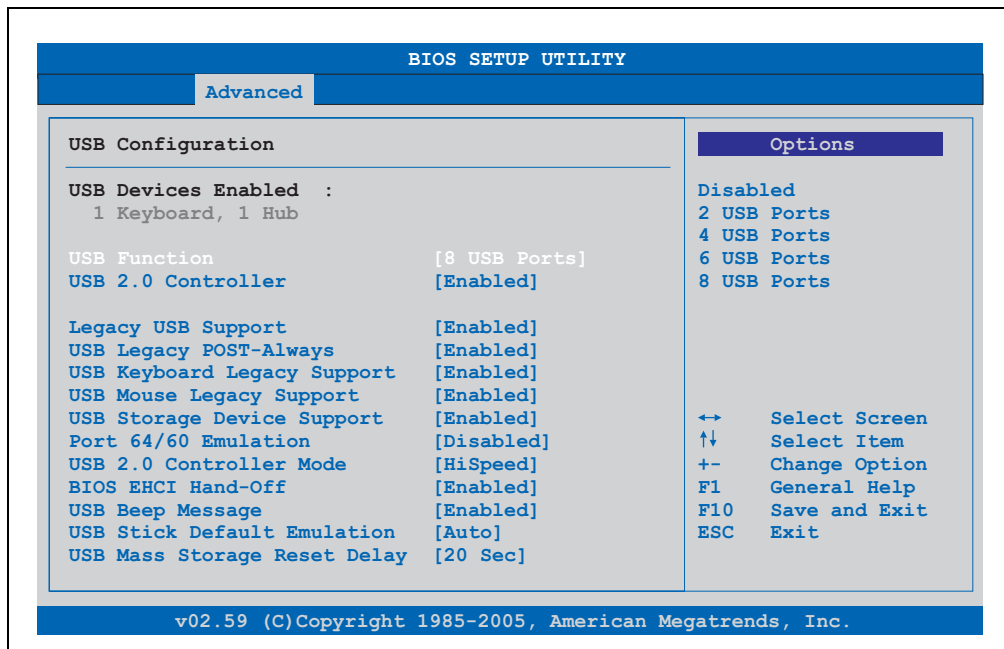


Figure 68: 945GME Advanced USB Configuration

BIOS setting	Meaning	Setting options	Effect
USB function	USB ports can be enabled/disabled here. The USB numbers (e.g. USB1, USB3, etc.) are printed on the APC810 housing).	Disabled	Disables the USB port.
		2 USB ports	USB1, USB3 are enabled.
		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 mode.	Enabled	All USB interfaces run in USB 2.0 mode.
		Disabled	All USB interfaces run in USB 1.1 mode.
Legacy USB support	Legacy USB support can be enabled/disabled here. USB interfaces do not function during startup. USB is supported again after the operating system has started. A USB keyboard is still recognized during the POST.	Disabled	Disables this function.
		Enabled	Enables this function.
		Auto	Automatic enabling.
USB 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 legacy support	USB keyboard support can be enabled/disabled here.	Disabled	Disables this function.
		Enabled	Enables this function.
USB mouse legacy support	USB mouse support can be enabled/disabled here.	Disabled	Disables this function.
		Enabled	Enables this function.
USB storage device support	USB storage device support can be enabled/disabled here.	Disabled	Disables this function.
		Enabled	Enables this function.
Port 64/60 emulation	Port 64/60 emulation can be enabled/disabled here.	Disabled	USB keyboard functions in all systems excluding Windows NT.
		Enabled	USB keyboard functions in Windows NT.
USB 2.0 controller mode	Settings can be made for the USB controller.	Full speed	12 MBps
		Hi speed	480 MBps
BIOS EHCI hand-off	The support for the operating system can be set up without the fully automatic EHCI function.	Disabled	Disables the function
		Enabled	Enables this function.
USB beep message	Option for outputting a tone each time a USB device is detected by the BIOS during the POST.	Disabled	Disables this function.
		Enabled	Enables this function.
USB stick default emulation	You can set how the USB device is to be used.	Auto	USB devices with fewer than 530MB of memory are simulated as floppy disk drives and other devices with larger capacities are simulated as hard drives.
		Hard disk	An HDD-formatted drive can be used as an FDD (e.g. zip drive) for starting the system.

Table 121: 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 121: 945GME Advanced USB Configuration setting options (cont.)

1.4.11 Keyboard/mouse configuration

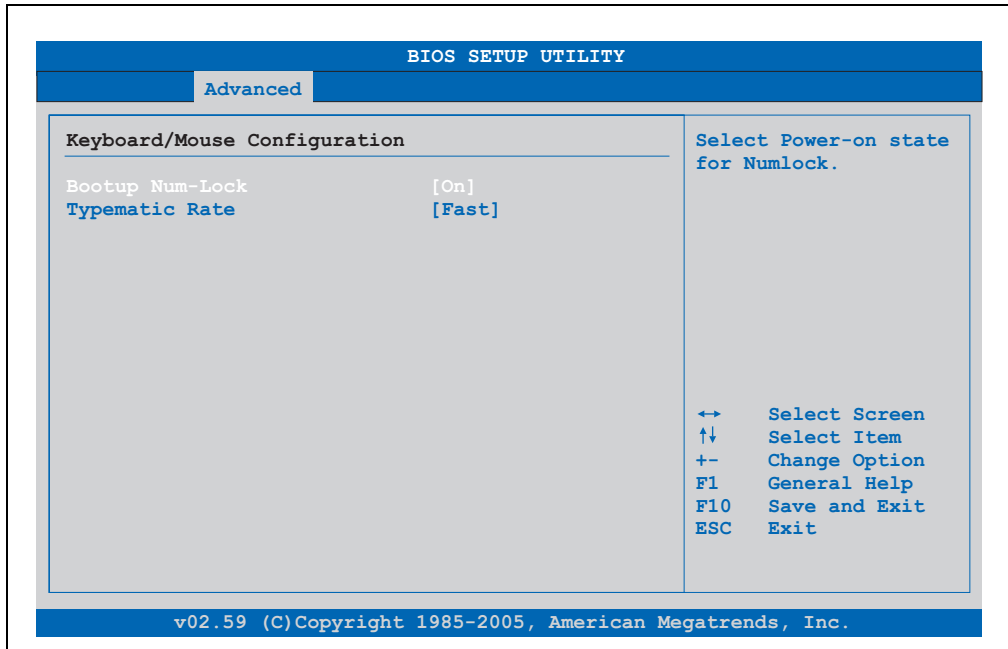


Figure 69: 945GME Advanced Keyboard/Mouse Configuration

BIOS setting	Meaning	Setting options	Effect
Bootup Num-lock	This option sets the status of the numeric keypad when the system is booted.	Off	Only the cursor functions of the numerical keypad are enabled.
		On	Numeric keypad is enabled.
Typematic rate	The key repeat function is set here.	Slow	Slow key repeat.
		Fast	Fast key repeat.

Table 122: 945GME Advanced Keyboard/Mouse Configuration setting options

1.4.12 Remote access configuration

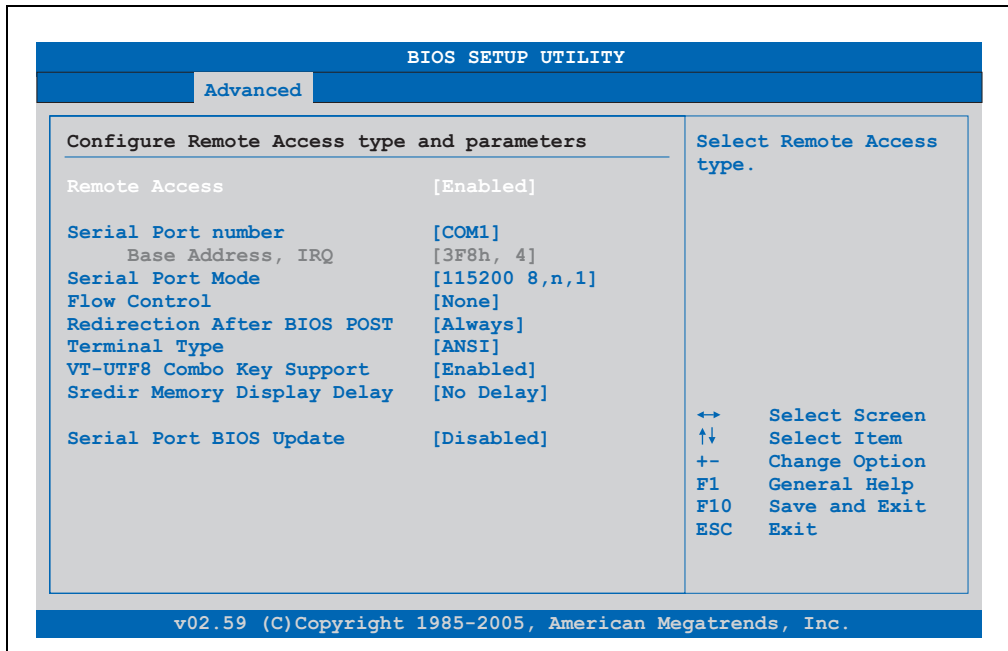


Figure 70: 945GME Advanced Remote Access Configuration

BIOS setting	Meaning	Setting options	Effect
Remote access	The remote access function can be enabled/disabled here.	Disabled	Disables this function.
		Enabled	Enables this function.
Serial port number	The serial interface can be set using this option, as long as disabled is not entered in the remote access field.	COM1	Enables the COM1 interface as remote access interface.
		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 controlled via the interface. Note: The setting must be the same on the terminal and the server.	None	The interface is operated without transfer control.
		Hardware	The interface transfer control is carried out through hardware. This mode must be supported by a cable.
		Software	The interface transfer control is carried out through software.

Table 123: 945GME Advanced Remote Access Configuration setting options

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

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

1.4.13 CPU board monitor

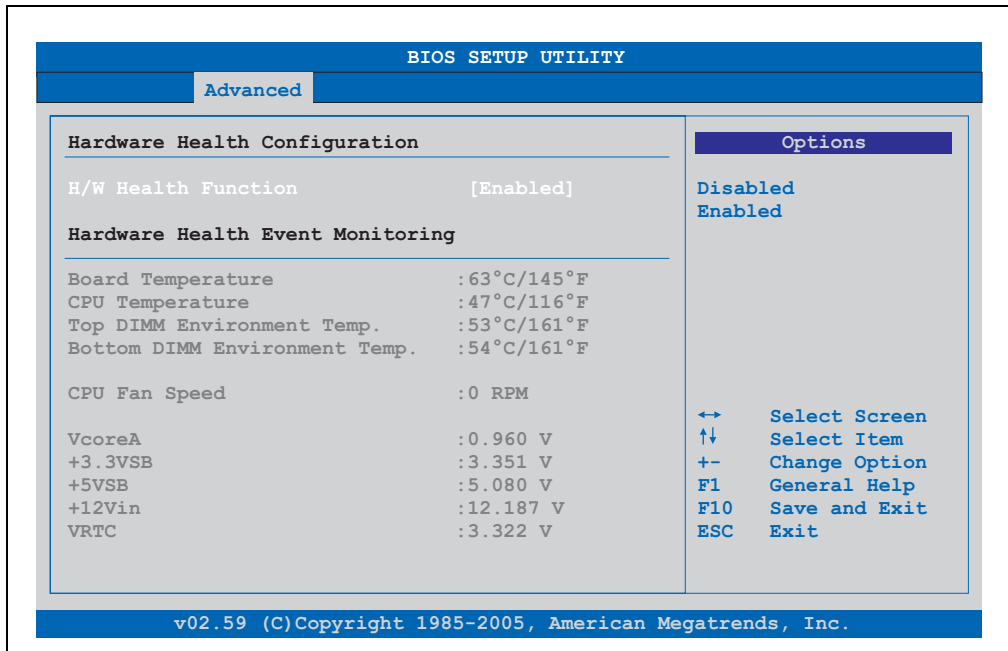


Figure 71: 945GME Advanced CPU Board Monitor

BIOS setting	Meaning	Setting options	Effect
H/W Health Function	Option for displaying all values on this page.	Enabled	Displays all values.
		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 124: 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 124: 945GME Advanced Remote Access Configuration setting options (cont.)

1.4.14 Baseboard/panel features

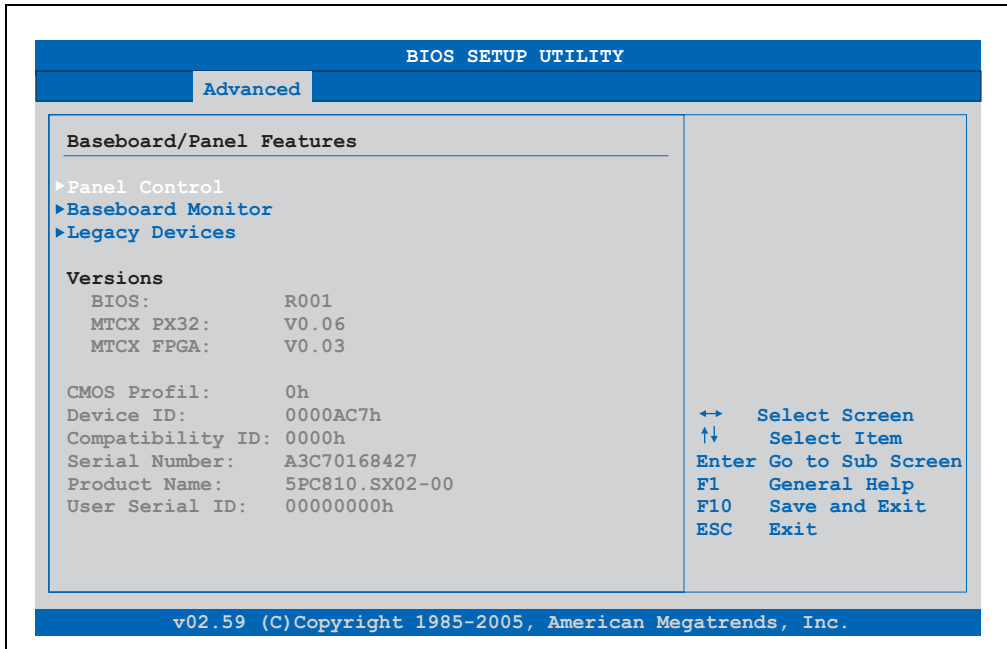


Figure 72: 945GME Advanced Baseboard/Panel Features

BIOS setting	Meaning	Setting options	Effect
Panel control	For special setup of connected panels (display units).	Enter	Opens submenu See "Panel control" on page 165
Baseboard monitor	Displays different temperature values and fan speeds.	Enter	Opens submenu See "Baseboard monitor" on page 166
Legacy devices	Special settings for the interface can be changed here.	Enter	Opens submenu See "Legacy devices" on page 168
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 125: 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.	None	-

Table 125: 945GME Advanced Baseboard/Panel Features setting options (cont.)

Panel control

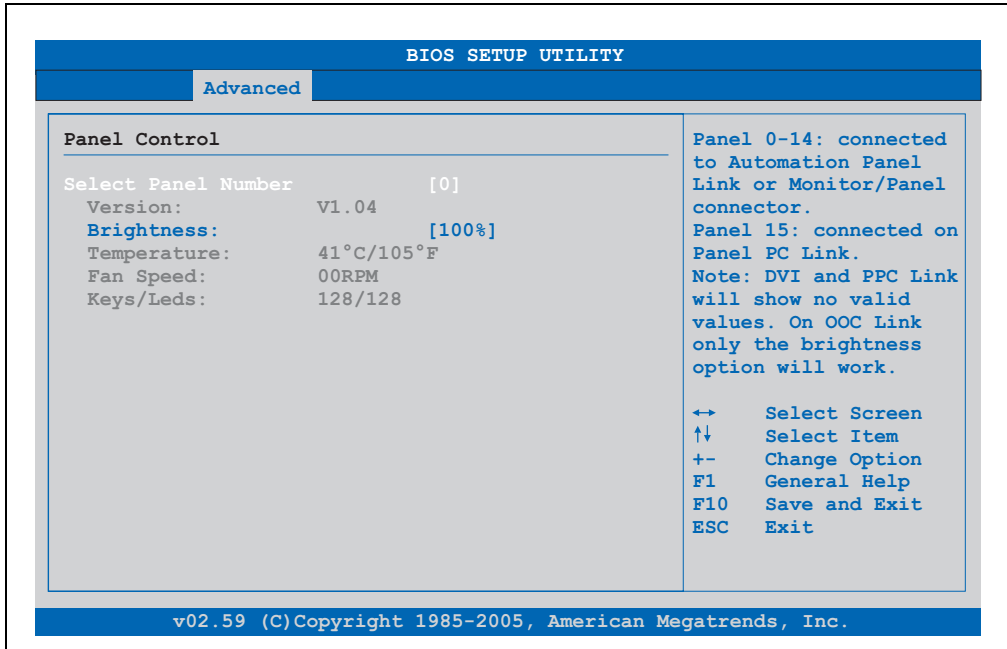


Figure 73: 945GME Panel Control

Software • BIOS options

BIOS setting	Meaning	Setting options	Effect
Select panel number	Selection of the panel number for which the values should be read out and/or changed.	0...15	Selection of panel 0 ... 15. Panel 15 is specifically intended for panel PC 700 systems.
Version	Display of the firmware version of the SDLR controller.	None	-
Brightness	For setting the brightness of the selected panel.	00%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%	For setting the brightness (in %) of the selected panel. Changes take effect after saving and restarting the system (e.g. by pressing <F10>).
Temperature	Displays the selected panel's temperature (in degrees Celsius and Fahrenheit).	None	-
Fan speed	Displays fan speed for the selected panel.	None	-
Keys/LEDs	Displays the available keys and LEDs on the selected panel.	None	-

Table 126: 945GME Panel Control setting options

Baseboard monitor

BIOS SETUP UTILITY	
Advanced	
Baseboard Monitor	
CMOS Battery:	Good
Temperatures	
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
Fan Speeds	
Case 1:	00 RPM
Case 2:	00 RPM
Case 3:	00 RPM
Case 4:	00 RPM
↔ Select Screen ↑↓ Select Item F1 General Help F10 Save and Exit ESC Exit	
v02.59 (C) Copyright 1985-2005, American Megatrends, Inc.	

Figure 74: 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 25.40 mm 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 127: 945GME Baseboard Monitor setting options

Legacy devices

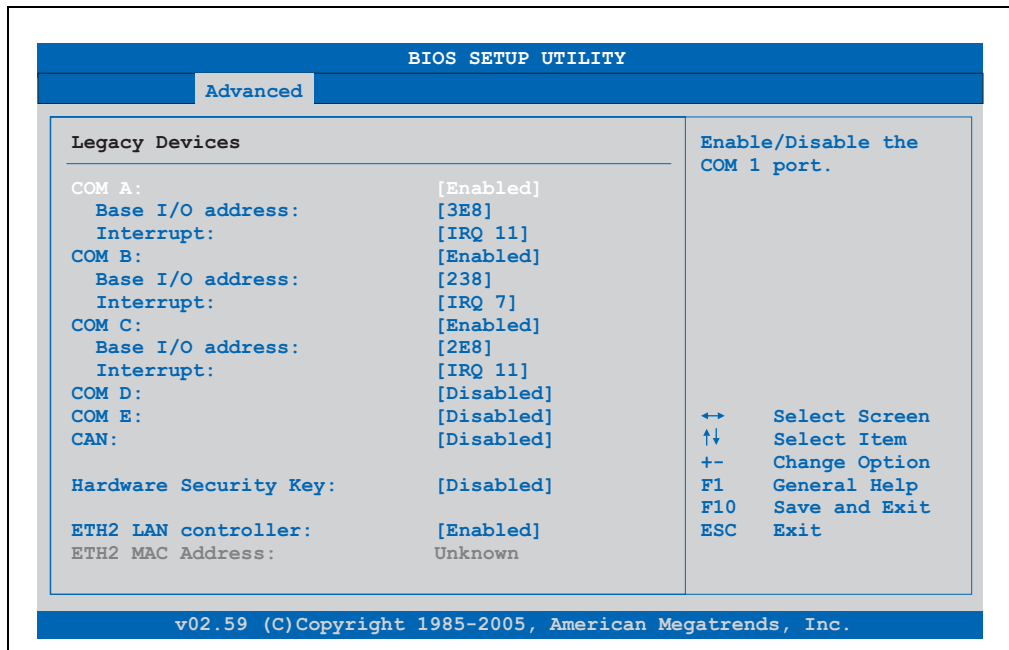


Figure 75: 945GME Legacy Devices

BIOS setting	Meaning	Setting options	Effect
COM A	Settings for the COM1 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.	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 COM2 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 128: 945GME Legacy Devices setting options

BIOS setting	Meaning	Setting options	Effect
COM D	Setting of the COM port for the touch screen on the AP Link 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.
COM E	Configuration of the COM port of the B&R add-on interface option 5AC600.485I-00 (IF option).	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.
CAN	Configuration of the CAN port of the B&R add-on CAN interface card 5AC600.CANI-00 (IF option).	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the CAN port.	None	-
Interrupt	Selection of the interrupt for the CAN port.	IRQ 10 and NMI	Selected interrupt is assigned.
Hardware security key	Settings for the hardware security key (Dongle) are made here.	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the hardware security key port.	278, 378, 3BC	Selected base I/O address is assigned.
ETH2 LAN controller	For turning the onboard LAN controller (ETH2) on and off.	Disabled	Disables the controller.
		Enabled	Enables the controller.
ETH2 MAC Address	Displays the Ethernet 2 controller MAC address.	None	-

Table 128: 945GME Legacy Devices setting options (cont.)

1.5 Boot

BIOS SETUP UTILITY					
Main	Advanced	Boot	Security	Power	Exit
Boot Priority Selection			[Type Based]		The device based boot priority list allows to select from a list of currently detected devices. The type based boot priority list allows to select device types even if a respective device is not (yet) present. ↔ Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit
Boot Device Priority					
1st Boot Device			[Primary Master]		
2nd Boot Device			[Primary Slave]		
3rd Boot Device			[USB Floppy]		
4th Boot Device			[USB Removable Devi]		
5th Boot Device			[USB Harddisk]		
6th Boot Device			[USB CDROM]		
7th Boot Device			[Secondary Master]		
8th Boot Device			[Secondary Slave]		
Boot Settings Configuration					
Quick Boot			[Enabled]		
Quiet Boot			[Disabled]		
Automatic Boot List Retry			[Disabled]		
AddOn ROM Display Mode			[Keep Current]		
Halt On Error			[Disabled]		
Hit 'DEL' Message Display			[Enabled]		
Interrupt 19 Capture			[Enabled]		
PXE Boot to LAN (ETH1)			[Disabled]		
Power Loss Control			[Turn On]		
v02.59 (C)Copyright 1985-2005, American Megatrends, Inc.					

Figure 76: 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 129: 945GME Boot Menu setting options

BIOS setting	Meaning	Setting options	Effect
1st boot device	The boot drive can be set using this option.	Disabled, primary master, primary slave, secondary master, secondary slave, Legacy floppy, USB floppy, USB hard disk, USB CDROM, USB removable device, onboard LAN, external LAN, PCI mass storage PCI SCSI card, any PCI BEV device, onboard PCI SATA, third master third slave	Selecting the desired sequence.
2nd boot device			
3rd boot device			
4th boot device			
5th boot device			
6th boot device			
7th boot device			
8th boot device			
Quick boot	This function reduces the boot time by skipping some POST procedures.	Disabled	Disables this function.
		Enabled	Enables this function.
Quiet boot	Determines if POST message or OEM logo (default = black background) is displayed.	Disabled	POST message display.
		Enabled	OEM logo display instead of POST message.
Automatic boot list retry	With this option, the operating system attempts to automatically restart following startup failure.	Disabled	Disables this function.
		Enabled	Enables this function.
AddOn ROM display mode	Sets the display mode for the ROM (during the booting procedure).	Force BIOS	An additional BIOS part can be displayed.
		Keep current	BIOS information is displayed.
Hold on errors	This option sets whether the system should pause the Power On Self Test (POST) when it encounters an error.	Disabled	The system does not pause. All errors are ignored.
		Enabled	The system pauses. The system pauses every time an error is encountered.
Hit 'DEL' Message Display	Settings can be made here for the "Hit 'DEL' Message" display. Note: When quiet boot is activated the message is not displayed.	Disabled	The message is not displayed.
		Enabled	The message is displayed.
Interrupt 19 capture	This function can be used to incorporate the BIOS interrupt.	Disabled	Disables this function.
		Enabled	Enables this function.
PXE Boot to LAN	Enables/disables the function to boot from LAN (ETH1).	Disabled	Disables this function.
		Enabled	Enables this function.
Power loss control	Determines if the system is on/off following power loss.	Remain off	Remains off.
		Turn on	Powers on.
		Last state	Enables the previous state.

Table 129: 945GME Boot Menu setting options (cont.)

1.6 Security

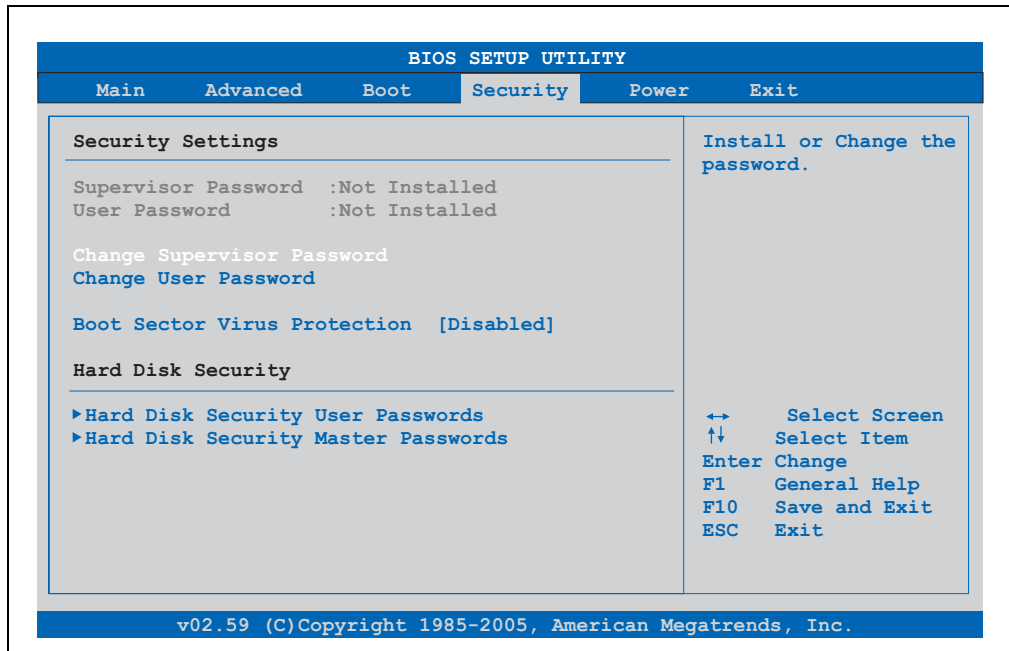


Figure 77: 945GME Security Menu

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 protection	With this option, a warning is issued when the boot sector is accessed through a program or virus. Note: With this option, only the boot sector is protected, not the entire hard drive.	Disabled	Disables this function.
		Enabled	Enables this function.
Hard disk security user password	The hard disk security user password can be created here.	Enter	Opens submenu See "Hard disk security user password" on page 173

Table 130: 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 174

Table 130: 945GME Security Menu setting options (cont.)

1.6.1 Hard disk security user password

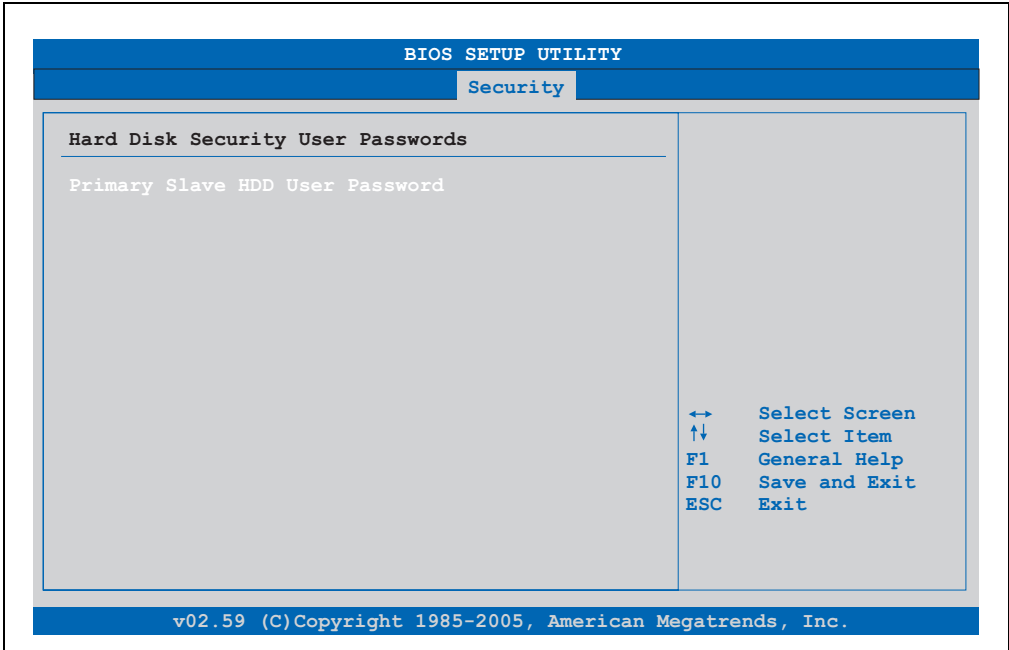


Figure 78: 945GME Hard disk security user password

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 131: 945GME Hard disk security user password

1.6.2 Hard disk security master password

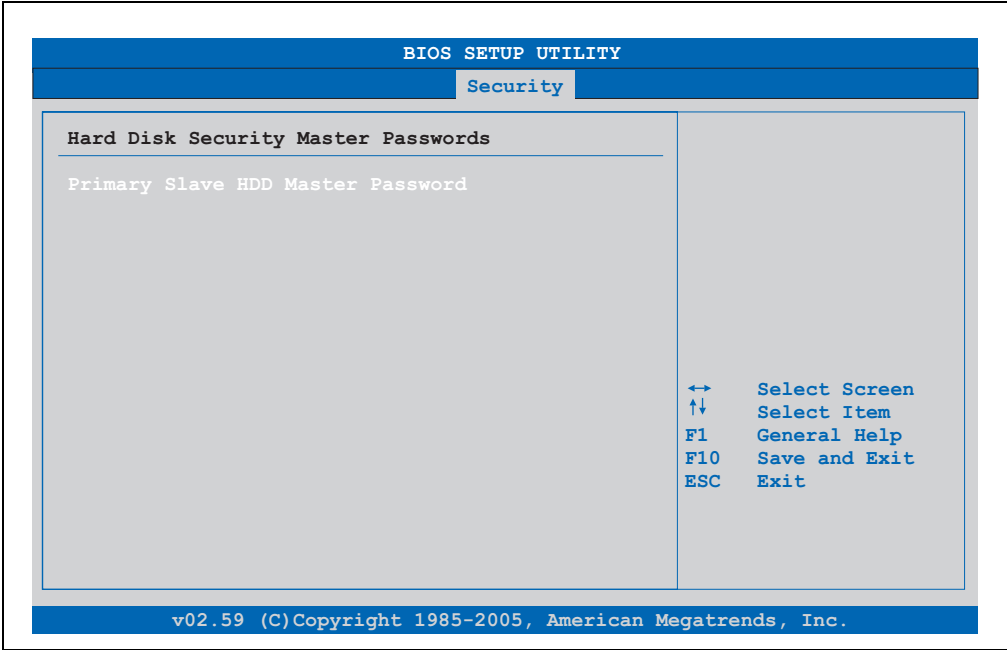


Figure 79: 945GME Hard Disk Security Master Password

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 132: 945GME Hard Disk Security Master Password

1.7 Power

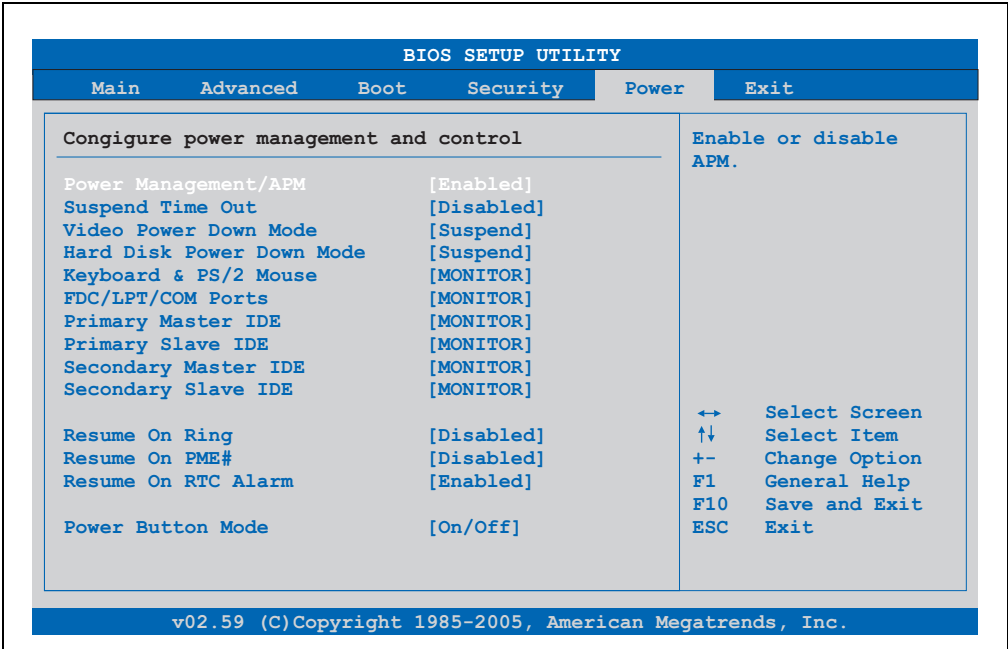


Figure 80: 945GME Power Menu

BIOS setting	Meaning	Setting options	Effect
Power management/APM	This option switches the APM function on or off. This is an advanced plug & play and power management functionality.	Disabled	Disables this function.
		Enabled	Enables this function.
Suspend time out	Using this option, you can configure how long the system stays inactive (all components but the CPU are shut off, if possible) before entering suspend mode.	Disabled	Disables this function.
		1 min, 2 min, 4 min, 8 min, 10 min, 20 min 30 min, 40 min, 50 min, 60 min;	Manually setting the value.
Video power down mode	This option allows you to set the energy saving mode for the monitor.	Disabled	Do not switch off the monitor.
		Standby	Monitor goes to standby mode.
		Suspend	Monitor goes to suspend mode.
Hard disk power down mode	This option allows you to set the energy saving mode for the hard drive.	Disabled	Do not switch off the hard drive.
		Standby	Monitor goes to standby mode.
		Suspend	Hard drive goes to suspend mode.
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 133: 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 wakeup function on or off.	Disabled	Disables this function.
		Enabled	Enables this function.
Resume on RTC alarm	With this option, you can activate the alarm and enter the date and time for the system start.	Disabled	Disables this function.
		Enabled	Enables this function.
Power button mode	This function determines the function of the power button.	On/Off	Power button switches on/off.
		Suspend	

Table 133: 945GME Power Menu setting options (cont.)

1.8 Exit

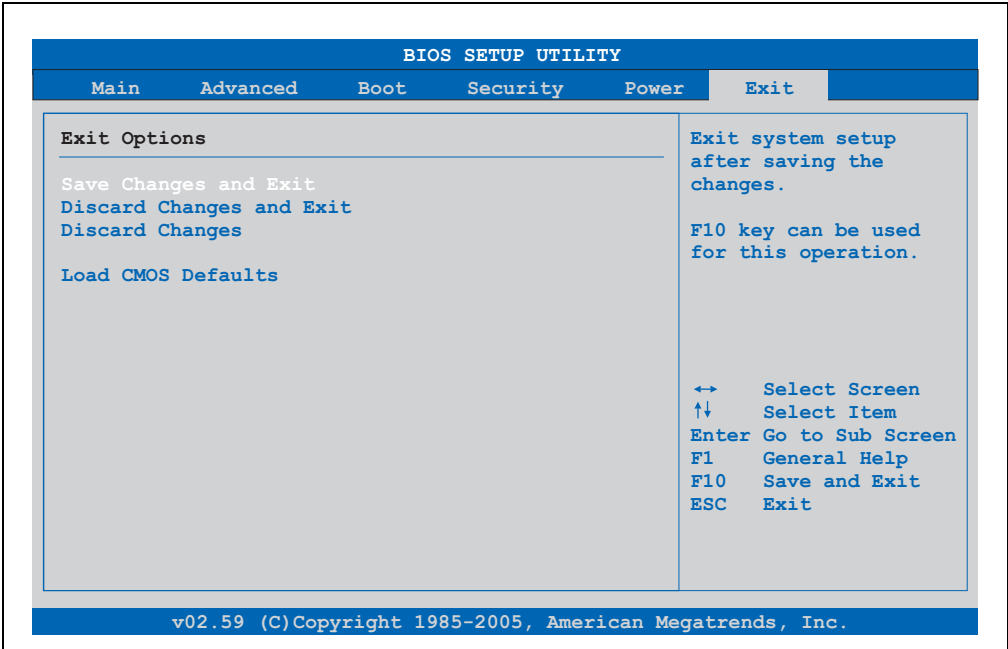


Figure 81: 945GME Exit Menu

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 134: 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 PCI slot variant (front)" on page 30) can be used to load pre-defined BIOS profile settings based on the position.



Figure 82: 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 135: 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 136: 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 137: 945GME Advanced - ACPI configuration profile setting overview

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 138: 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 139: 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	Disabled	Disabled			
Display Mode Persistence	Disabled	Disabled			

Table 140: 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 141: 945GME Advanced - CPU configuration profile setting overview

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.	Default	Default			
C3 Config.	Default	Default			
C4 Config.	Default	Default			

Table 141: 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 142: 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 143: 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 144: 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) 80Pin Cable Detection	Host & device	Host & device			
Primary IDE master					
Type	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					
Type	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					
Type	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					
Type	Auto	Auto			
LBA/Large mode	Auto	Auto			
Block (multi-sector transfer)	Auto	Auto			
PIO mode	Auto	Auto			
DMA mode	Auto	Auto			

Table 145: 945GME Advanced - IDE configuration profile setting overview

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 145: 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 146: 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 147: 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 148: 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 149: 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 150: 945GME Advanced - Baseboard/Panel Features profile setting overview

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

Table 150: 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 151: 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 152: 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 153: 945GME Power profile setting overview

2. 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.

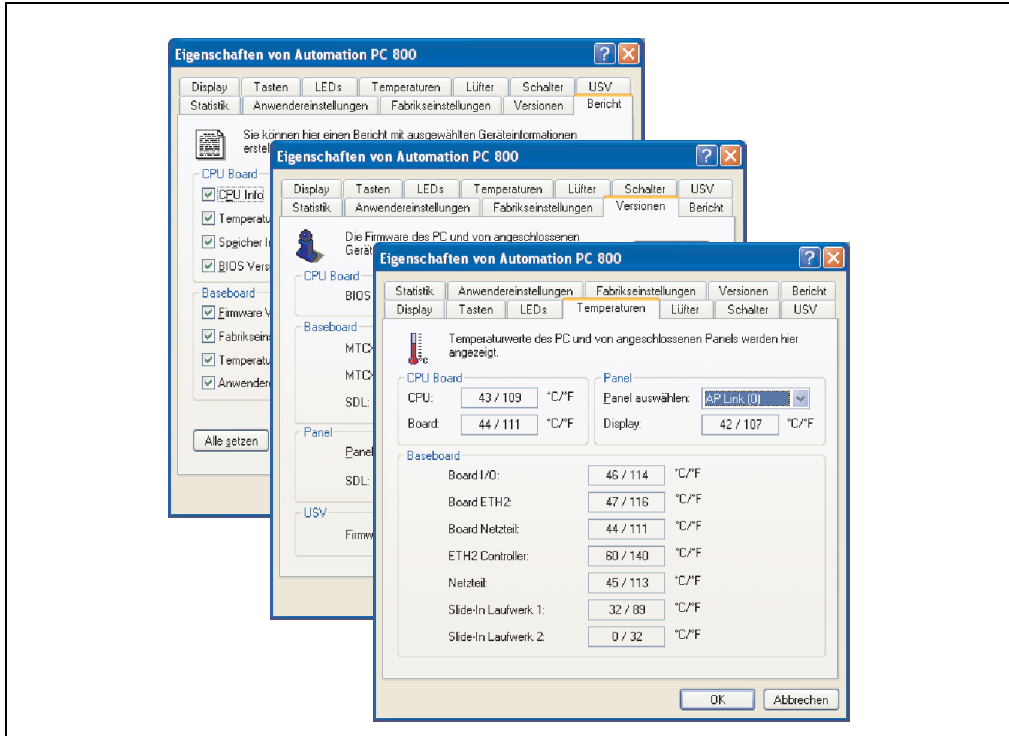


Figure 83: ADI Control Center Screenshots - Examples

2.1 Functions

- Adjusting the display brightness of connected Panels
- Reading device specific keys (in order for this to be possible, a key configuration must be installed that was created with the B&R Key Editor)
- 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 a mounted UPS

3. Configuration of a SATA RAID array

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

```
SiI 3512A SATARaid BIOS Verison 4.3.79
Copyright (C) 1997-2006 Silicon Image, Inc.

Press <Ctrl+S> or F4 to enter RAID utility
0   ST96023AS                      55 GB
1   ST96023AS                      55 GB
```

Figure 84: Open the RAID Configuration Utility

```
RAID Configuration Utility - Silicon Image Inc. 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                      55GB
  1 SM   ST96023AS                      55GB

↑↓   Select Menu
ESC   Previous Menu
Enter Select
Ctrl-E Exit
*     First HDD
```

Figure 85: RAID Configuration Utility - Menu

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

Key	Function
Cursor ↑	Go to previous item.
Cursor ↓	Go to the next item.
Enter	Select an item or open a submenu.
ESC	Go back to previous menu.

Table 154: BIOS-relevant keys in the RAID Configuration Utility

Key	Function
Ctrl+E	Exit setup and save the changed settings.

Table 154: BIOS-relevant keys in the RAID Configuration Utility

3.1 Create RAID Set

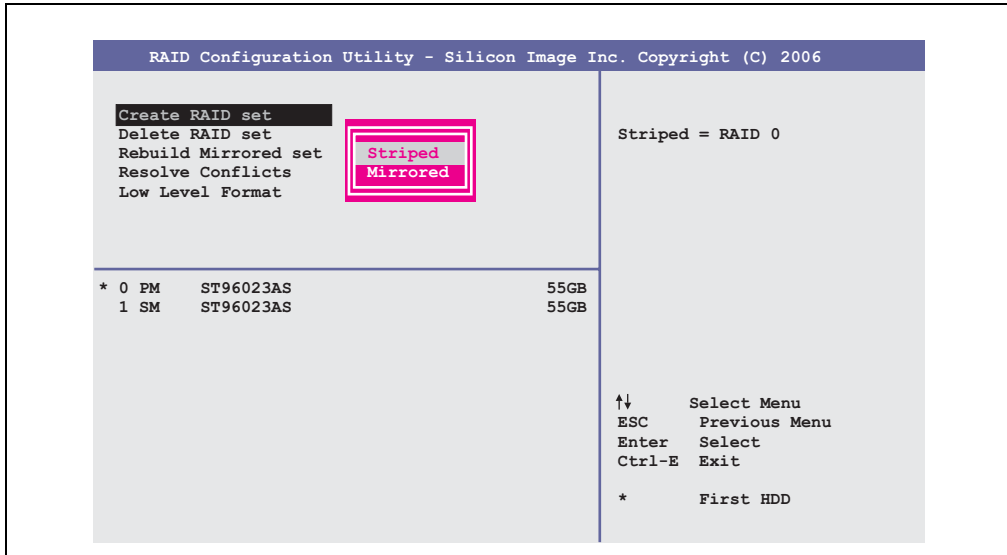


Figure 86: RAID Configuration Utility - Menu

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

3.1.1 Create RAID Set - striped

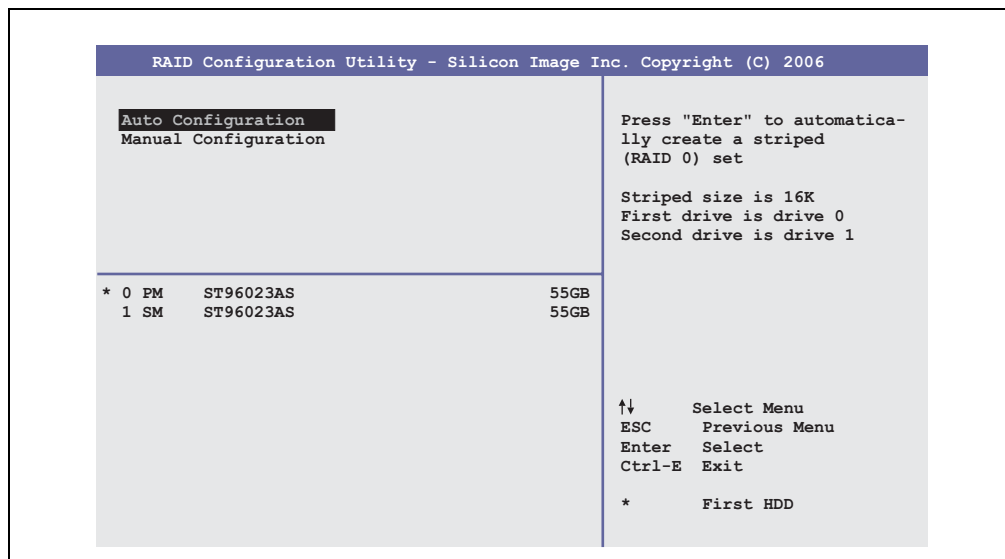


Figure 87: RAID Configuration Utility - Create RAID set - striped

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).

3.1.2 Create RAID Set - Mirrored

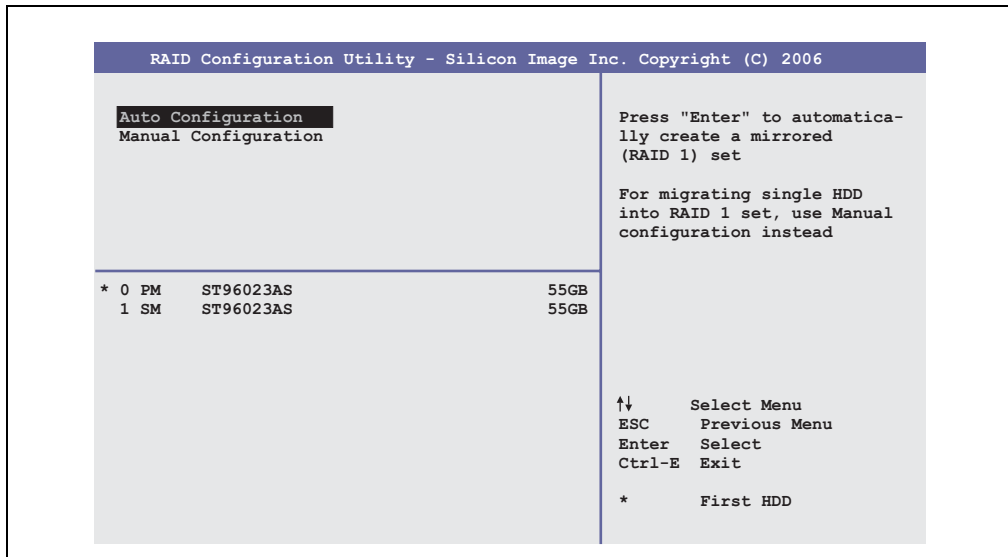


Figure 88: RAID Configuration Utility - Create RAID set - Mirrored

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).

3.2 Delete RAID set

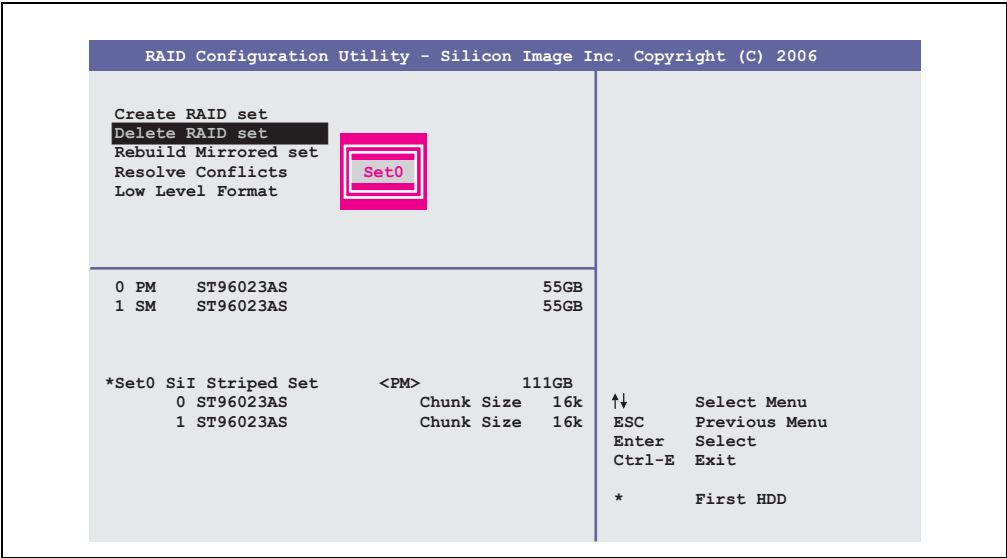


Figure 89: RAID Configuration Utility - Delete RAID set

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

3.3 Rebuild Mirrored Set

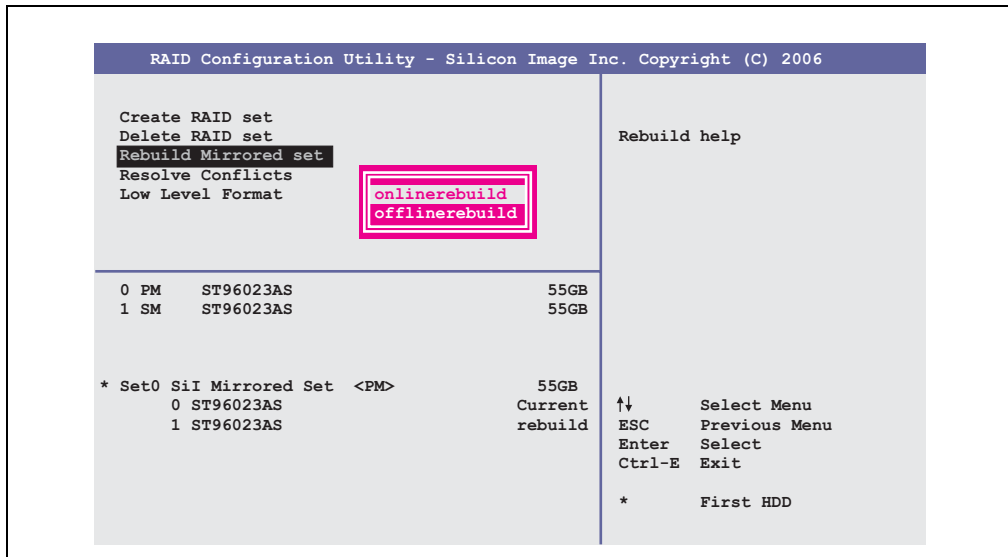


Figure 90: RAID Configuration Utility - Rebuild Mirrored set

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).

3.4 Resolve Conflicts



Figure 91: 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".

3.5 Low Level Format

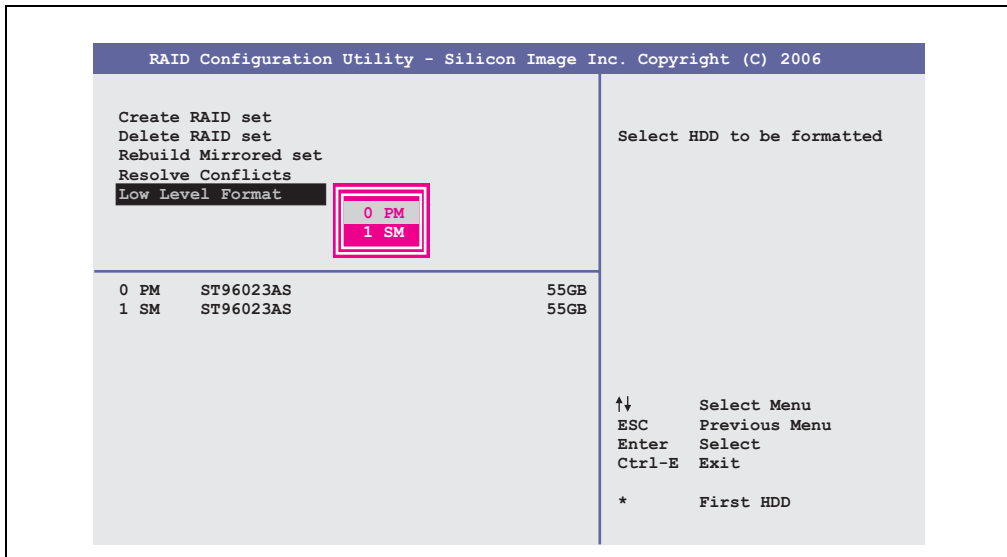


Figure 92: RAID Configuration Utility - Low Level Format

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	Note
0TB103.9	Plug 24V 5.08 3-pin screw clamps 24 VDC 3-pin connector, female. Screw clamps, 3.31 mm ² , protected against vibration by the screw flange	
0TB103.91	Plug 24V 5.08 3-pin cage clamps 24 VDC 3-pin connector, female. Cage clamps, 3.31 mm ² , protected against vibration by the screw flange	
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	

Table 155: Model numbers - Accessories

Accessories • Overview

Model number	Short description	Note
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 400..500 VAC (3 phases), wide range, DIN rail mounting	
0PS310.1	Power supply, 3-phase, 10 A 24 VDC power supply, 3-phase, 10 A, input 400..500 VAC (3 phases), wide range, DIN rail mounting	
0PS320.1	Power supply, 3-phase, 20 A 24 VDC power supply, 3-phase, 20 A, input 400..500 VAC (3 phases), wide range, DIN rail mounting	
0PS340.1	Power supply, 1-phase, 40 A 24 VDC power supply, 3 phase, 40 A, input 115/230 VAC, auto select, DIN rail mounting	

Table 155: Model numbers - Accessories (cont.)

2. TB103 3-pin supply voltage connector

2.1 General

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

2.2 Order data

Model number	Description	Figure
0TB103.9	Plug for the 24 V supply voltage (screw clamps)	 0TB103.9  0TB103.91
0TB103.91	Plug for the 24 V supply voltage (cage clamps)	

Table 156: 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	$\leq 5 \text{ m}\Omega$	
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 ² - 3.31 mm ²	
Cable type	Copper wires only (no aluminum wires!)	

Table 157: Technical data - TB103 supply plug

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	

Table 158: 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 159: Technical data - Lithium batteries

4. Replacement fan

Information:

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

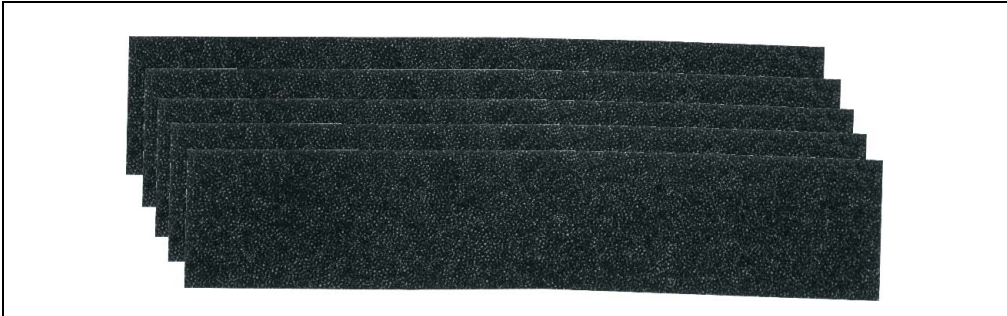


Figure 93: Replacement fan

Model number	Short description	Note
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 160: 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.	

Table 161: 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	
5CFCRD.1024-03	CompactFlash 1024 MB SSI	
5CFCRD.2048-03	CompactFlash 2048 MB SSI	
5CFCRD.4096-03	CompactFlash 4096 MB SSI	
5CFCRD.8192-03	CompactFlash 8192 MB SSI	

Example: 8 GB CompactFlash cards

Table 162: 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^{14} bit read accesses
Write/erase procedures	> 2000000 times
Data retention	10 years
Mechanical characteristics	
Dimensions	
Length	36.4 ± 0.15 mm
Width	42.8 ± 0.10 mm
Thickness	3.3 ± 0.10 mm
Weight	11.4 grams
Environmental characteristics	
Ambient temperature	
Operation	0°C to +70°C
Storage	-50°C to +100°C
Transport	-50°C to +100°C
Relative humidity	
Operation / Storage	8% to 95%, non-condensing
Vibration	
Operation	max. 16.3 g (159 m/s ² 0-peak)
Storage / Transport	max. 30 g (294 m/s ² 0-peak)
Shock	
Operation	max. 1000 g (9810 m/s ² 0-peak)
Storage / Transport	max. 3000 g (29430 m/s ² 0-peak)
Altitude	Maximum 80,000 feet (24,383 meters)

Table 163: Technical data - CompactFlash cards 5CFCRD.xxxx-03

6.3.1 Temperature humidity diagram - Operation and storage

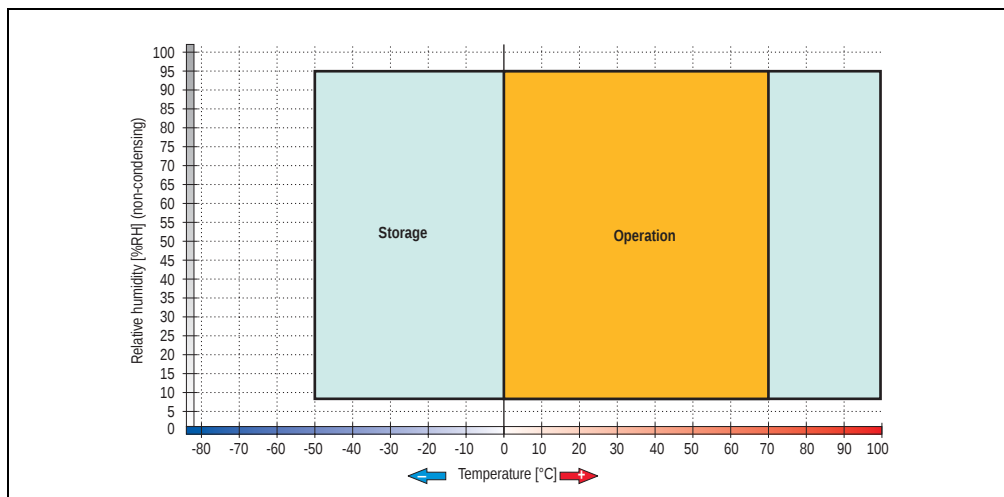


Figure 94: Temperature humidity diagram - CompactFlash cards 5CFCRD.xxxx-03

6.4 Dimensions

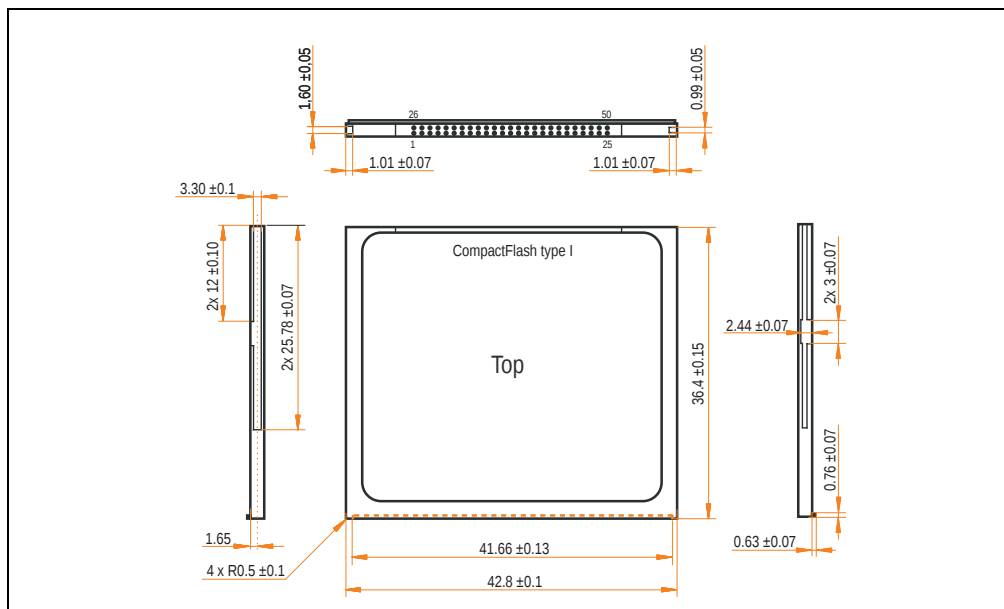


Figure 95: Dimensions - CompactFlash card Type I

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 (www.siliconsystems.com).

Information:

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

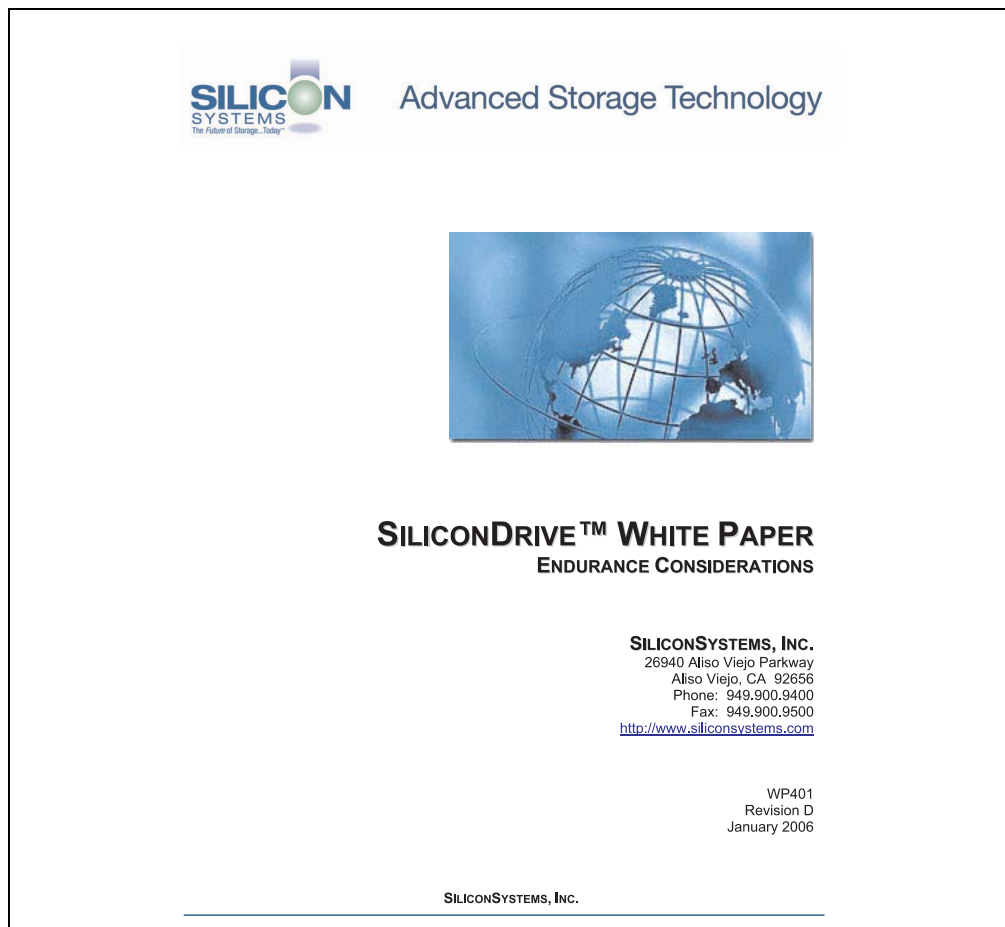


Figure 96: Silicon Systems white paper - page 1 of 9



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INTRODUCTION

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

BACKGROUND

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

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

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

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

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

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

Figure 97: Silicon Systems white paper - page 2 of 9



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STORAGE MEDIA

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

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

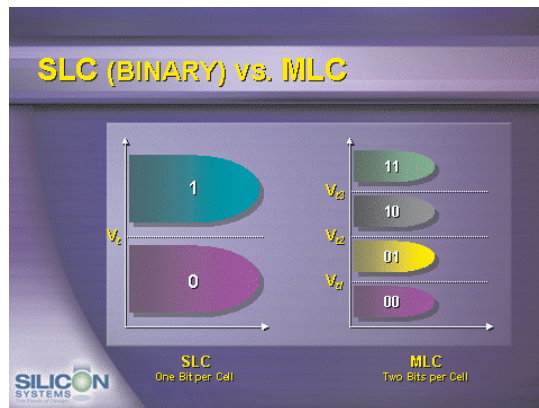


Figure 1

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

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A more thorough discussion of SLC vs. MLC can be found from the component manufacturers:

Samsung: <http://www.samsung.com>

Toshiba: <http://www.toshiba.com>

WEAR LEVELING

Wear leveling is defined as the allowing data writes to be evenly distributed over the entire storage device. More precisely, wear leveling is an algorithm by which the controller in the storage device re-maps logical block addresses to different physical block addresses in the solid-state storage array. The frequency of this re-map, the algorithm to find the "least worn" area to which to write and any data swapping capabilities are generally considered proprietary intellectual property of the controller vendor.

It is important to note that the wear leveling is done in the solid-state memory controller and is independent of the host system. The host system performs its reads and writes to logical block addresses only, so as far as the host is concerned, the data stays in the same place.

To illustrate the effects of wear leveling on overall endurance, assume three different storage devices with the following characteristics:

1. Flash Card with No Wear Leveling
2. Flash Card with Dynamic Wear Leveling
3. SiliconDrive with Static Wear Leveling

In addition, assume that all three storage devices use the same solid-state storage technologies (SLC or MLC – for purposes of this discussion, it doesn't matter). All three devices will have 75% of the capacity as static data, which is defined below:

Static Data: Any data on a solid-state storage device that does not change. Examples include: operating system files, look-up tables and executable files.

Finally, the same type of write is performed to all three systems. The host system is writing a single block of data to the same logical block address over and over again.

Figure 99: Silicon Systems white paper - page 4 of 9



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No Wear Leveling

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

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

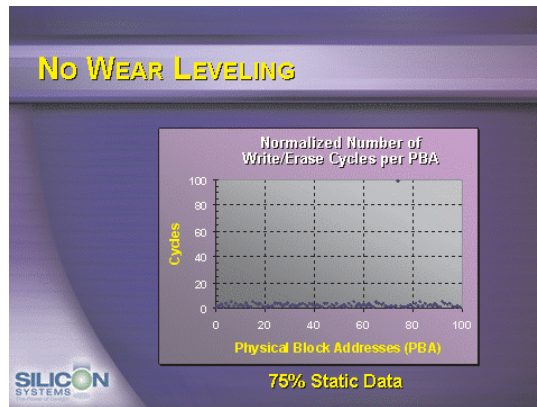


Figure 2



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Dynamic Wear Leveling

Figure 3 shows a normalized distribution of writes to a flash card that employs dynamic wear leveling. This algorithm only wear levels over "free" or "dynamic" data areas. That is to say, if there is static data as defined above, this area is never involved in the wear leveling process. In the current example, since 75% of the flash card is used for static data, only 25% of the card is available for wear leveling. The endurance of the card is calculated to be 25 times better than for the card with no wear leveling, but only one-fourth that of static wear leveling.

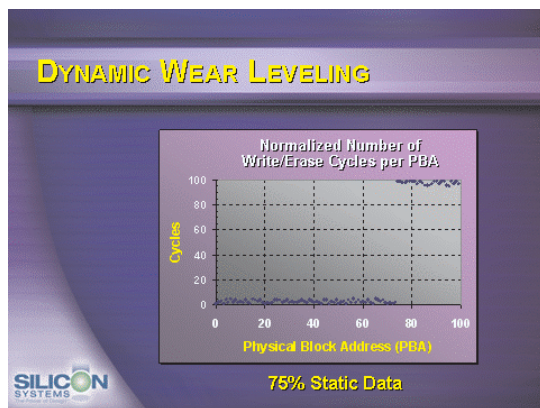


Figure 3



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Static Wear Leveling

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

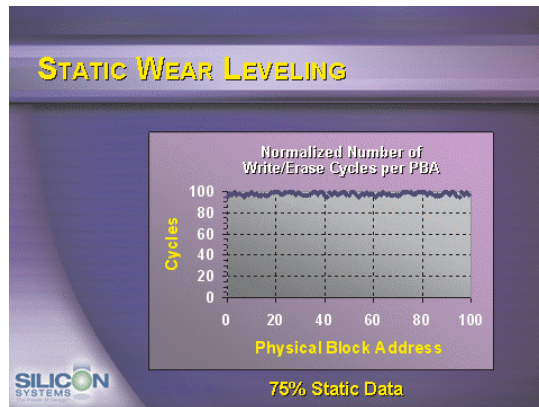


Figure 4

Figure 102: Silicon Systems white paper - page 7 of 9



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ERROR CORRECTION

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

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

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

SUMMARY OF MEDIA, WEAR LEVELING AND ECC

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

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

ECC	SLC NAND			MLC NAND		
	N	D	S	N	D	S
2-bit	6	5	4	10	9	8
4-bit	5	4	2	9	8	7
6-bit	4	3	1*	8	7	6

* SiliconSystems' SiliconDrive Configuration

Figure 103: Silicon Systems white paper - page 8 of 9



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ENDURANCE CALCULATIONS

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

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

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

Where:

- α = Capacity in MB (when converting from MB to GB, MB = GB x 1,024)
- β = Amount of Static Data in MB (this value should be 0 for static wear leveling)
- λ = Endurance Specification
- φ = Safety Margin
- ω = File Size in MB (when converting from KB to MB, KB = MB x 1,024)
- ξ = Number of Writes of file size ω per minute
- k = Number of minutes per year = 525,600

To calculate the number of data transactions:

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

Where:

- α = Capacity in MB (when converting from MB to GB, MB = GB x 1,024)
- β = Amount of Static Data in MB (this value should be 0 for static wear leveling)
- λ = Endurance Specification
- φ = Safety Margin Percentage (usually 25%)
- ω = File Size in MB (when converting from KB to MB, KB = MB x 1,024)

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Figure 104: Silicon Systems white paper - page 9 of 9

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



Figure 105: 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 222)

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
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 $\pm$ 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	10-24x
CD-RW	10-24x
DVD-R	2-6x
DVD-RW	2-6x
DVD+R	3.3-8x
DVD+RW	3.3-8x
DVD+R (double layer)	2.4-4x
DVD-R (Double Layer)	2-4x
DVD-RAM ¹⁾	3-5x
Reading rate	
CD	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 $\pm$ 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 164: Technical data - USB Media Drive 5MD900.USB2-01 Rev D0 and higher

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 ²⁾ Operation Storage Transport	+5°C .. +45°C -20°C .. +60°C -40°C .. +60°C

Table 164: Technical data - USB Media Drive 5MD900.USB2-01 Rev D0 and higher (cont.)

Environmental characteristics	5MD900.USB2-01
Relative humidity Operation Storage Transport	20 - 80%, non-condensing 5 - 90%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage Transport	5 - 500 Hz: 0.3 g (2.9 m/s ² 0-peak) 10 - 100 Hz: 2 g (19.6 m/s ² 0-peak) 10 - 100 Hz: 2 g (19.6 m/s ² 0-peak)
Shock Operation Storage Transport	Max. 5 g (49 m/s ² 0-peak) and 11 ms length Max. 60 g (588 m/s ² 0-peak) and 11 ms length Max. 60 g (588 m/s ² 0-peak) and 11 ms length
Altitude	Max. 3000 meters

Table 164: Technical data - USB Media Drive 5MD900.USB2-01 Rev D0 and higher (cont.)

- 1) DVD RAM drivers are not provided by the manufacturer. Support of DVD RAM function by the burning software "Nero" (model number 5SWUT1.0000-00) 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

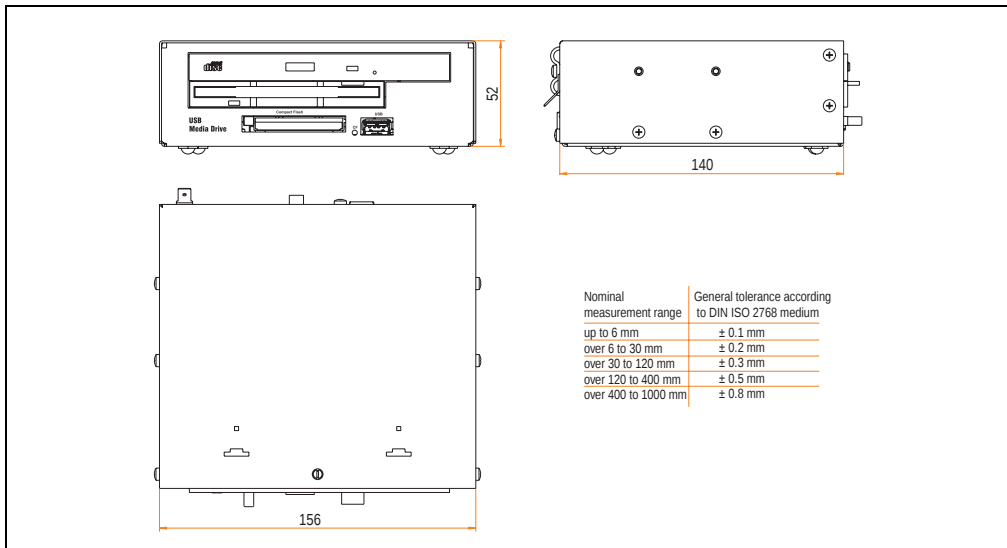


Figure 106: Dimensions - 5MD900.USB2-01

7.4 Dimensions with front cover

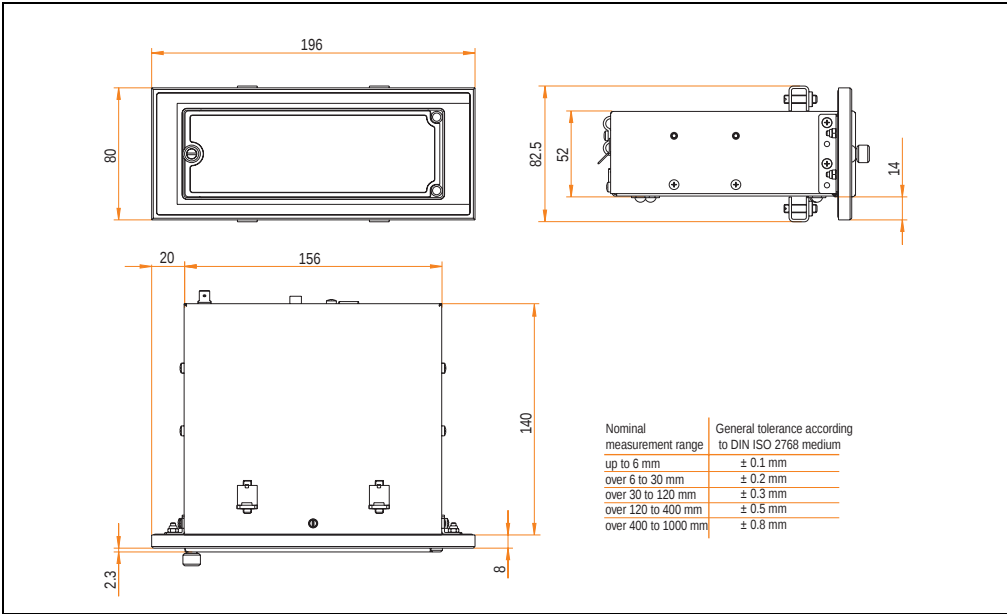


Figure 107: Dimensions - USB Media Drive with front cover

7.4.1 Cutout installation

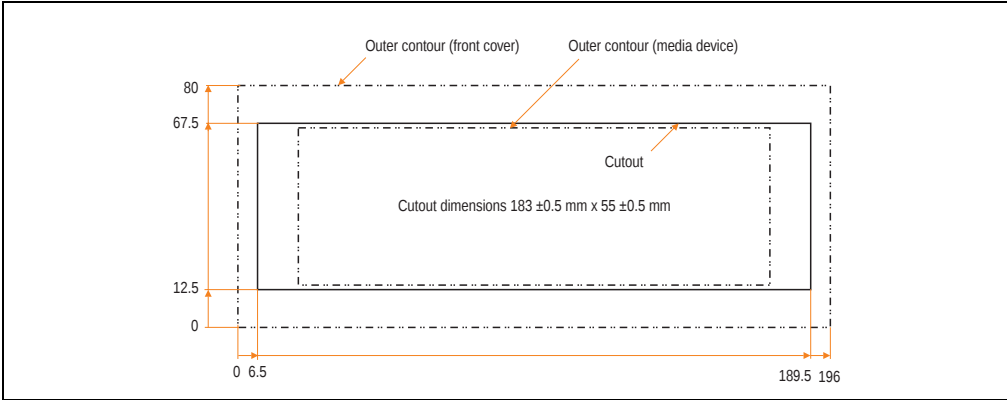


Figure 108: Installation cutout - USB Media Drive with front cover

7.5 Contents of delivery

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

Table 165: Contents of delivery - USB Media Drive - 5MD900.USB2-01

7.6 Interfaces

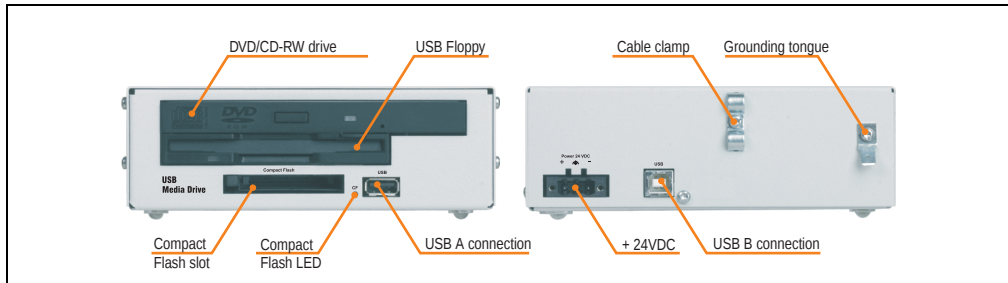


Figure 109: Interfaces - 5MD900.USB2-01

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.

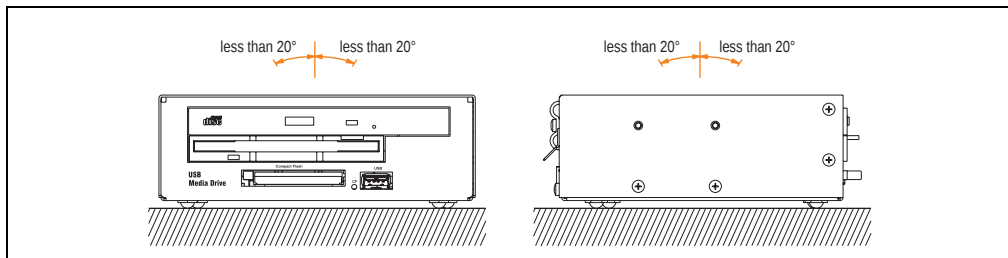


Figure 110: Mounting orientation - 5MD900.USB2-01

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.

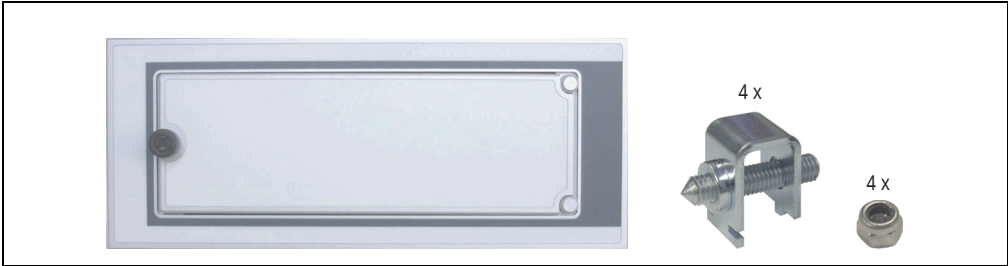


Figure 111: Front cover 5A5003.03

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 166: Technical data - 5A5003.03

7.8.2 Dimensions

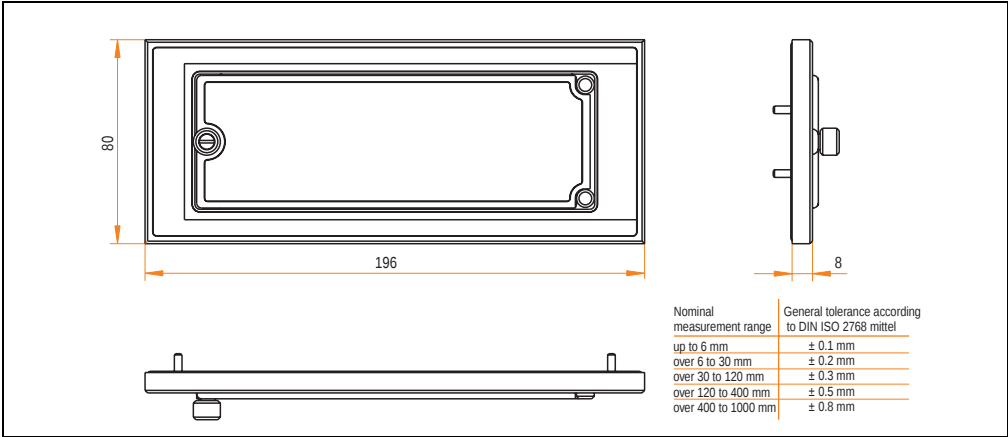


Figure 112: Dimensions - 5A5003.03

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.

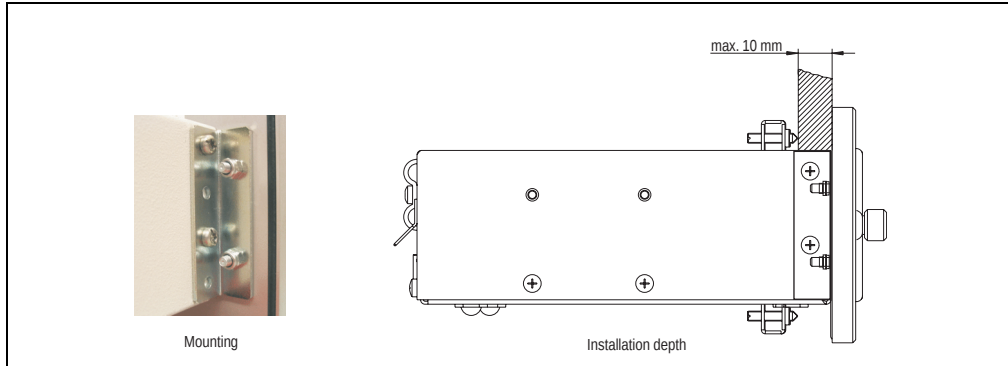


Figure 113: Front cover mounting and installation depth

7.8.4 Cutout installation

See the figure 108 "Installation cutout - USB Media Drive with front cover" on page 220.

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 [SanDisk](#) are used.

8.2 Order data

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

Table 167: 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 μ A 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 ² 0 peak), oscillation rate 1/minute At 10 - 500 Hz: 4 g (39.2 m/s ² 0 peak), oscillation rate 1/minute At 10 - 500 Hz: 4 g (39.2 m/s ² 0 peak), oscillation rate 1/minute
Shock Operation Storage Transport	max. 40 g (392 m/s ² 0-peak) and 11 ms length max. 80 g (784 m/s ² 0-peak) and 11 ms length max. 80 g (784 m/s ² 0-peak) and 11 ms length
Altitude Operation Storage Transport	3048 meters 12192 meters 12192 meters

Table 168: Technical data - USB flash drive 5MMUSB.2048-00

8.3.1 Temperature humidity diagram - Operation and storage

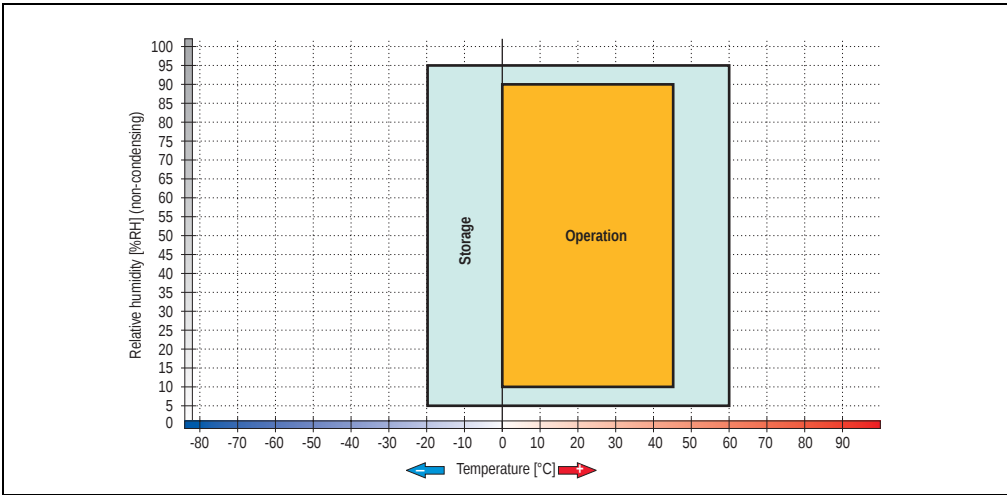


Figure 114: Temperature humidity diagram - USB flash drive - 5MMUSB.2048-00

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

SanDisk Cruzer Micro	
1 USB flash drive in desired size + 2 replacement covers (blue and pink) + 1 strap ¹⁾	
	

Table 169: 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.

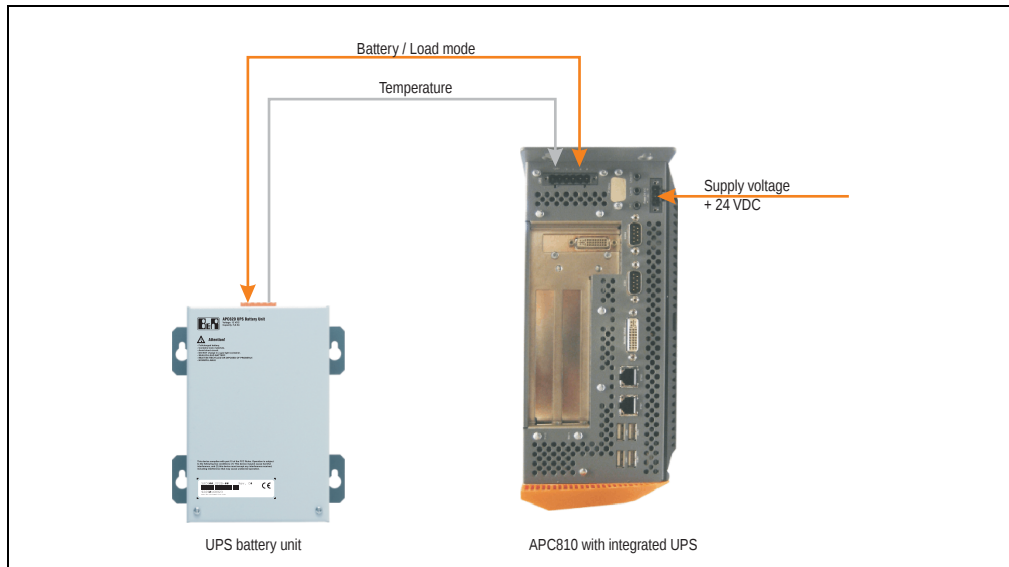


Figure 115: UPS principle

9.1 Features

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

9.2 Requirements

- 1) 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

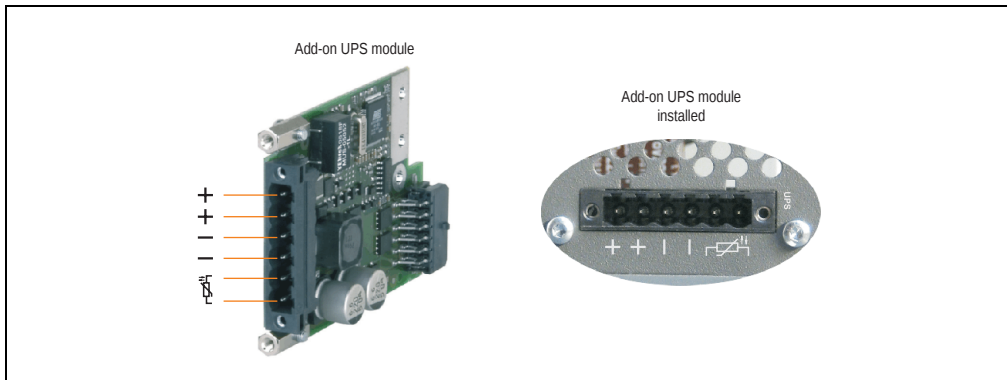


Figure 116: Add-on UPS module 5AC600.UPSI-00

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 170: Technical data - 5AC600.UPSI-00

Installation

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

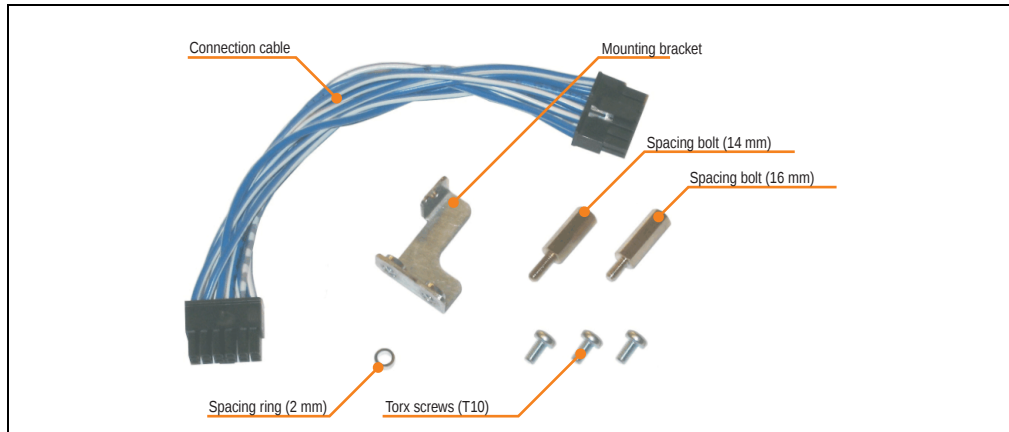


Figure 117: Add-on UPS module 5AC600.UPSI-00 - Installation materials

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).

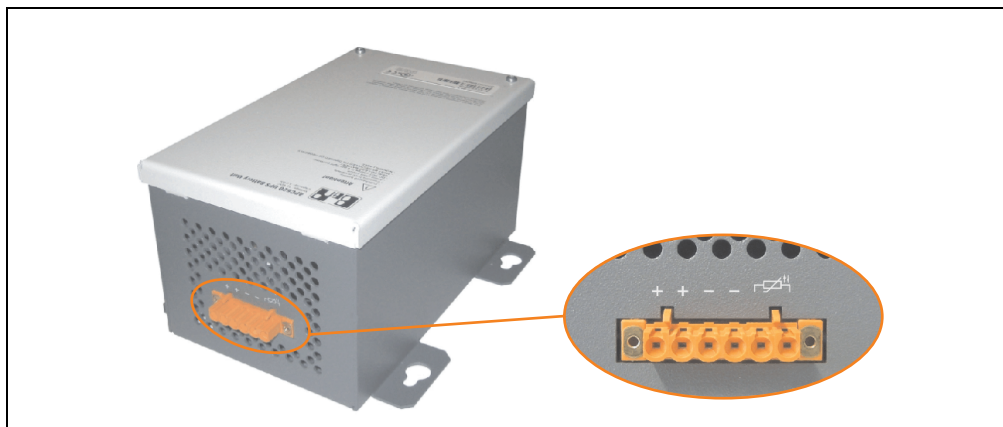


Figure 118: Battery unit 5AC600.UPSB-00

Technical data

Features	5AC600.UPSB-00
Battery Type Type	Energys 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 121 "Dimensions - 5AC600.UPSB-00" on page 234
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 235.
Lifespan	10 years at 25°C (up to 80% battery capacity)
Maintenance interval during storage	Load once every 6 months

Table 171: Technical data - 5AC600.UPSB-00

Temperature life span diagram up to 20% battery capacity.

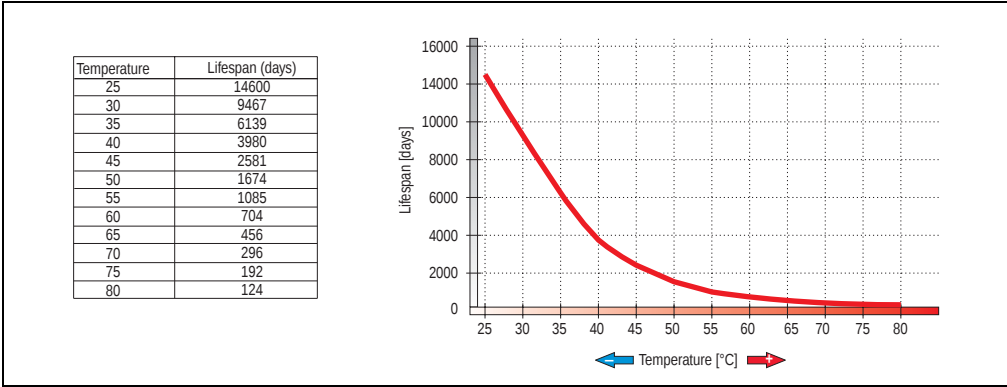


Figure 119: Temperature life span diagram

Deep discharge cycles

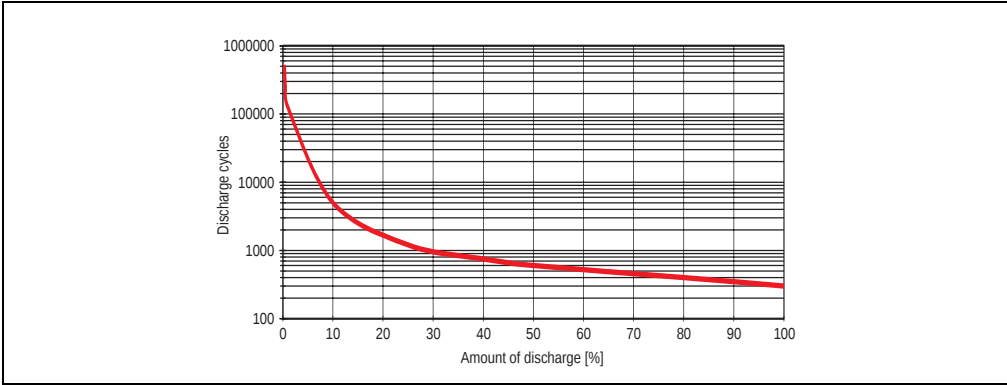


Figure 120: Deep discharge cycles

Dimensions

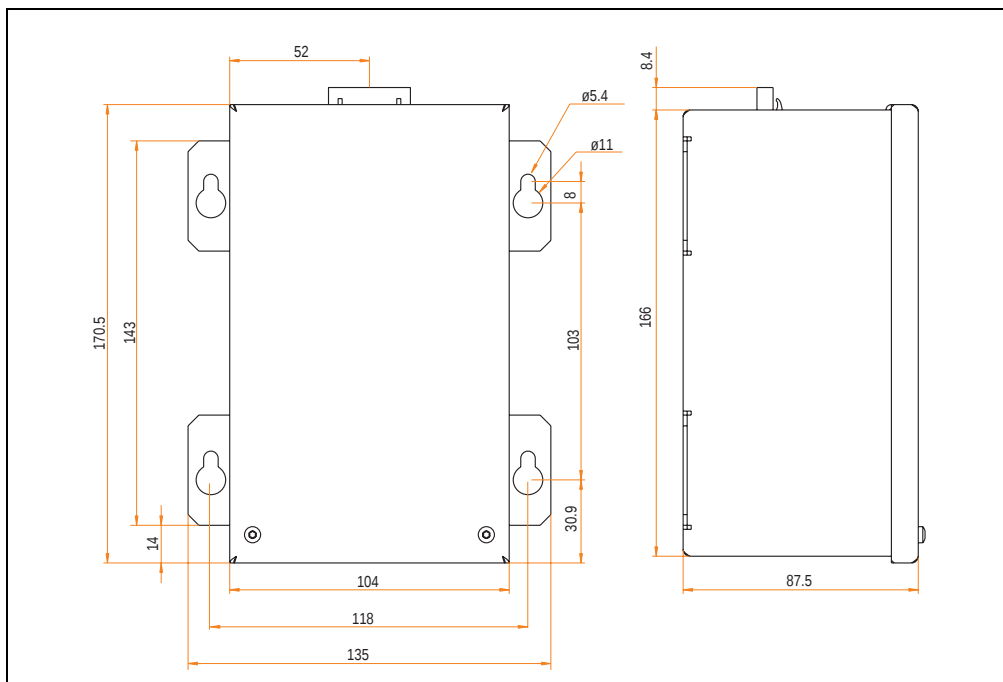


Figure 121: Dimensions - 5AC600.UPSB-00

Drilling template

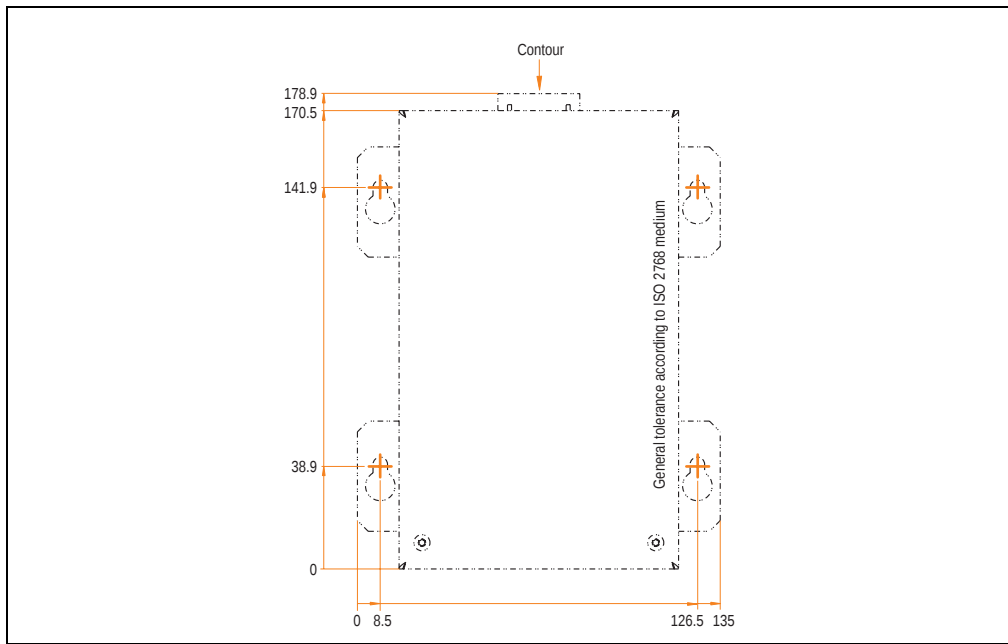


Figure 122: Drilling template for the battery unit

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

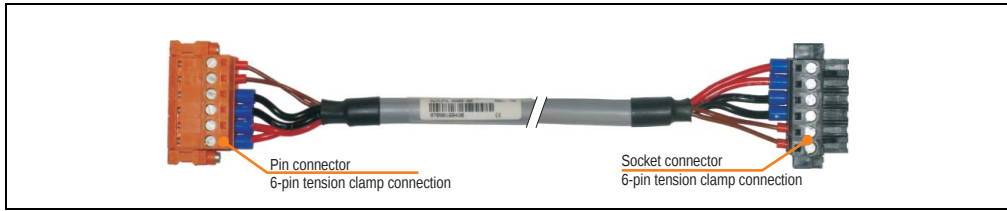


Figure 123: UPS connection cable

Technical data

Features	5CAUPS.0005-00	5CAUPS.0030-00
Length	0.5 m	3 m
Outer diameter	8.5 mm ± 0.2mm	
Connector type	6-pin plug connectors, tension clamp connection / 6-pin socket connectors, tension clamp connection	
Wire cross section Temperature sensor wire Voltage wire	2 x 0.5 mm ² (AWG 20) 4 x 2.5 mm ² (AWG 13)	
Line resistance 0.5 mm ² 2.5 mm ²	Max. 39 Ω/km Max. 7.98 Ω/km	
Flex radius Fixed installation Free-moving	5 x wire cross-section 10 x wire cross-section	
Temperature range Moving Non-moving	-5°C ... +80°C -30°C ... +80°C	
Weight	Approx. 143 kg/km	
Materials Cable shielding Color	Thermoplastic PVC-based material Window gray (similar to RAL 7040)	
Peak operating voltage	12 V DC	
Testing AC voltage Wire/wire	1500 V	
Operating voltage	Max. 300 V	
Current load	10 A at +20°C	

Table 172: 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 124: 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.

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).

10.1.1 Single-phase power supplies

Features	0PS102.0	0PS104.0	0PS105.1	0PS105.2	0PS110.1	0PS110.2	0PS120.1
Output power	50 W	100 W	120 W	120 W	240 W	240 W	480 W
AC input voltage	85-264 V	85-132 V 184-264 V	85-132 V 176-264 V	85-132 V 176-264 V	85-132 V 176-264 V	85-132 V 176-264 V	85-132 V 176-264 V
DC input voltage	85-375 V	220-375 V	210-375 V	210-375 V	210-375 V	210-375 V	-
Output voltage	24-28 V	24-28 V	24 V	24 V	24-28 V	24-28 V	24-28 V
Output current at 24 V	2.1 A	4.2 A	5 A	5 A	10 A	10 A	20 A
Parallel operation	No	Yes	Yes	Yes	Yes	Yes	Yes
Current balancing	No	Yes	No	Yes	No	Yes	Yes

Table 173: 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 174: Three-phase power supplies

Chapter 6 • Maintenance / Servicing

1. Changing the battery

TBD

2. Installing / exchanging a slide-in compact drive

Information:

The SATA I interface allows data carriers to be exchanged during operation (hot-plug). 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 125: Loosening the ¼ turn screws

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



Figure 126: Inserting the compact SATA drive

3. Slide-in slot drive installation

TBD

4. 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.

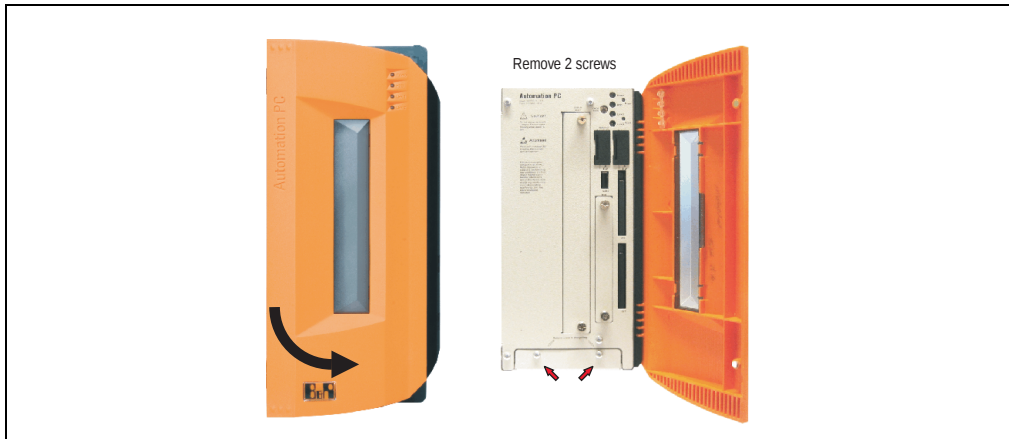


Figure 127: APC810 2PCI slots - Remove screws to install/ remove filter kit

- After the screws have been removed, the fan kit cover can be removed toward the front.

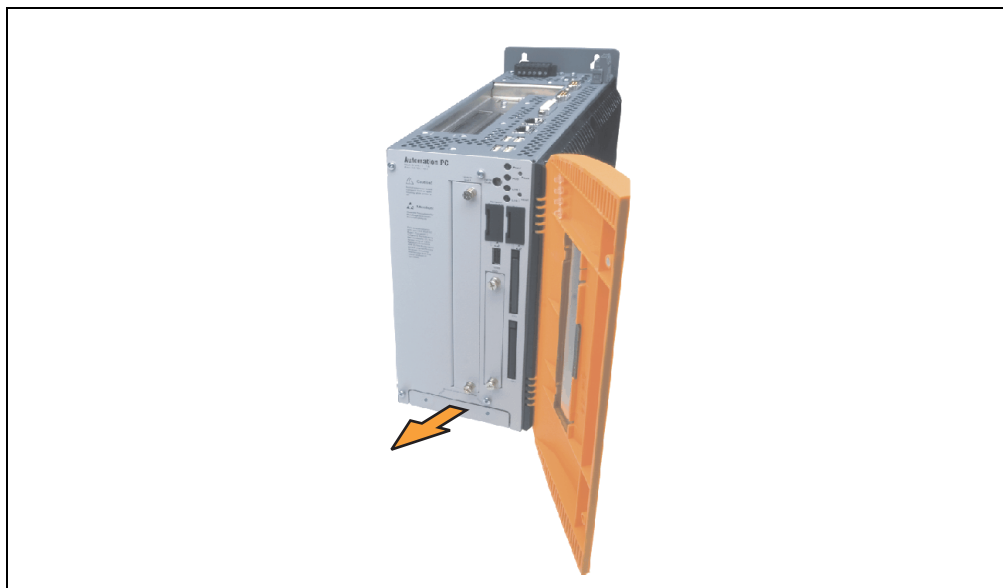


Figure 128: Removing the fan kit insert

- Insert the frame - Mount the contact board side to the sliding contacts on the system unit and fasten using the three $\frac{1}{4}$ turn screws.

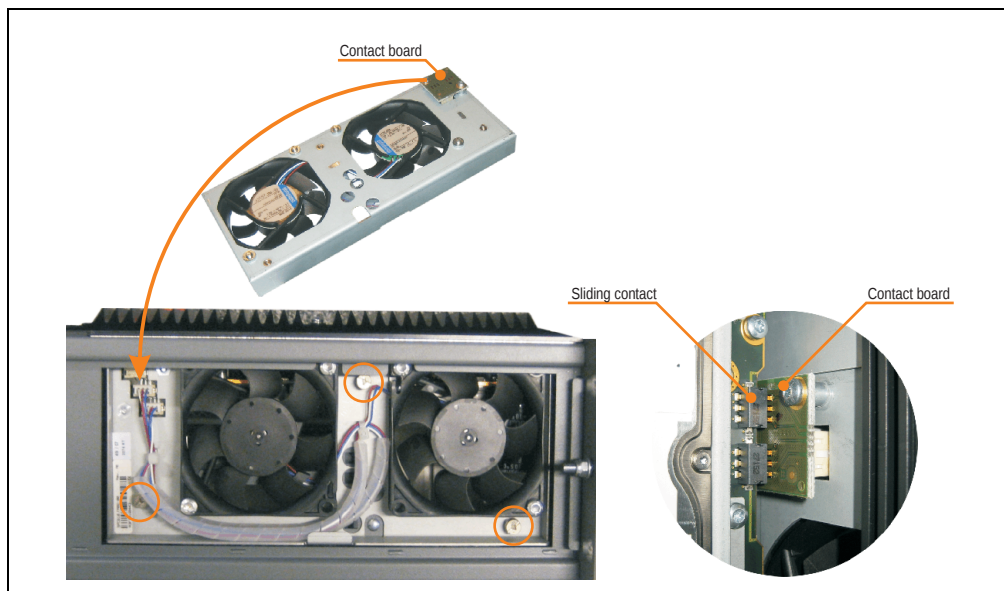


Figure 129: Inserting and fastening the fan kit

- Place the dust filter in the fan kit cover and secure with the filter clasp.

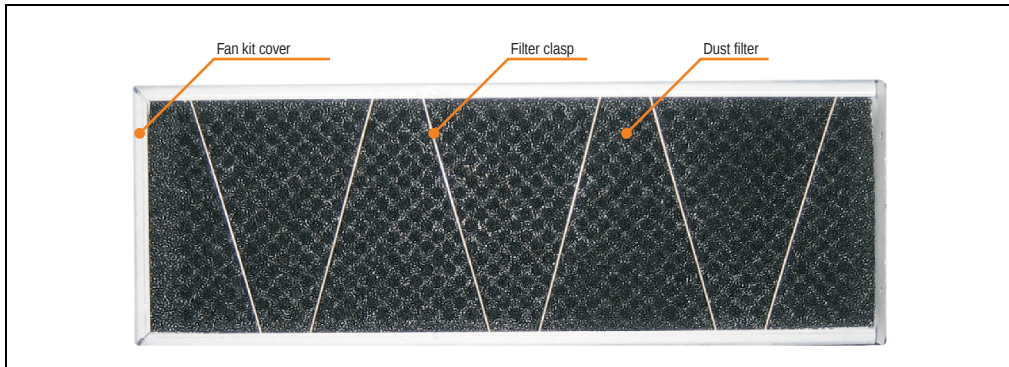


Figure 130: Securing the dust filter with the filter clasp

- Place the fan kit cover in the housing and fasten using the Torx screws removed earlier.

5. Installing the UPS module

The module is installed using the materials included in the delivery.

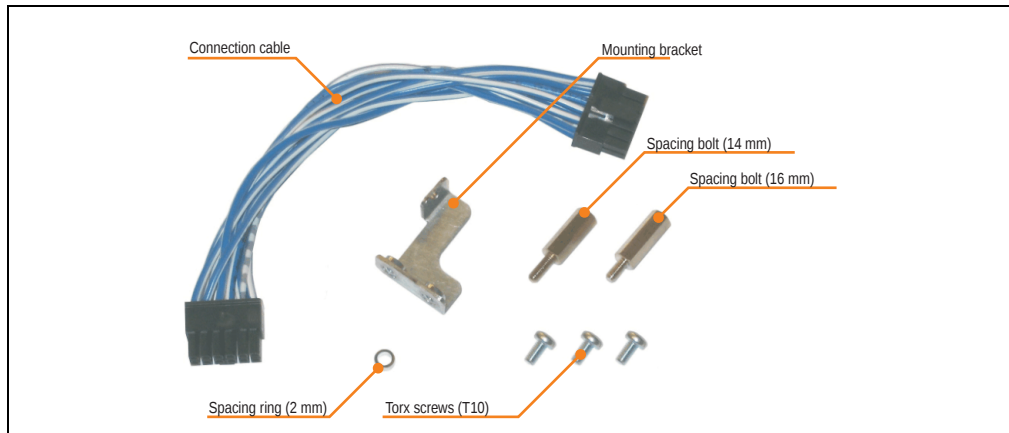


Figure 131: Add-on UPS module 5AC600.UPSI-00 - Installation materials

Installation may vary depending the system unit type (1, 2 or 5 PCI) or whether an add-on interface module (IF option) is installed in the APC810.

5.1 Installation without installed add-on interface module

Different parts are used depending on the system unit and **installed** (description starting on page 248) or **not installed** (description follows) add-on interface module.

5.1.1 APC810 2 PCI slot

- Remove side cover (see section "Mounting the side cover" on page 252).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).

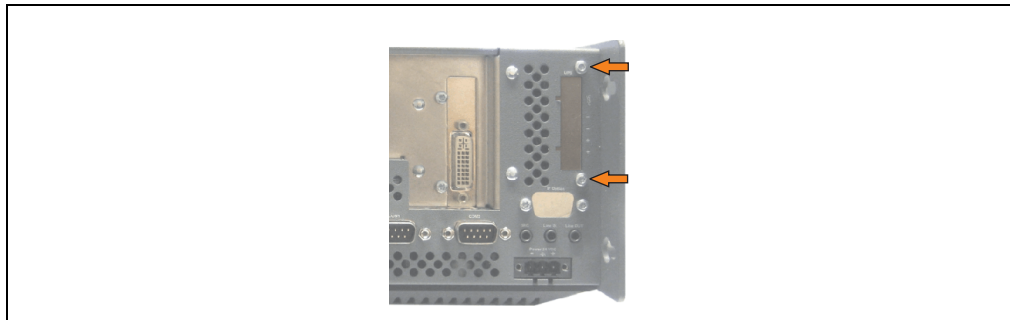


Figure 132: Remove the UPS module cover

Maintenance / Servicing • Installing the UPS module

- Screw in spacing bolt and spacing ring on the main board (using M5 hex socket screwdriver).

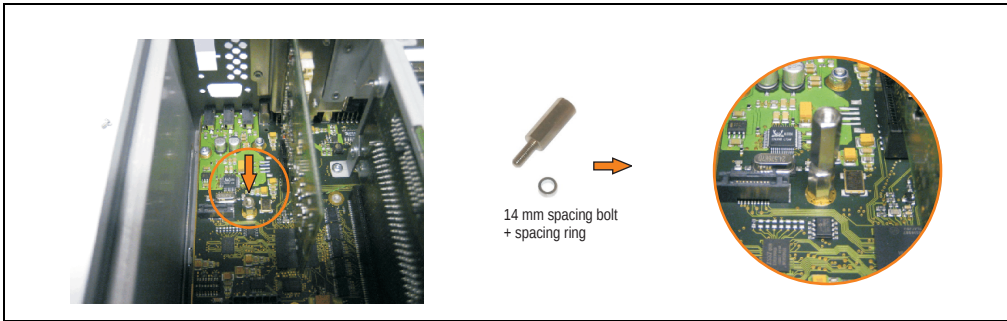


Figure 133: Screw in spacing bolt and spacing ring

- Install mounting bracket on UPS module using 2 Torx screws (T10).

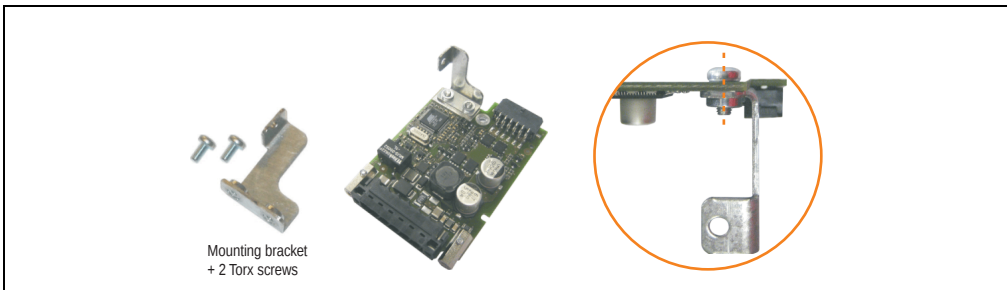


Figure 134: Install mounting bracket

- Install the UPS module using 3 Torx screws (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.

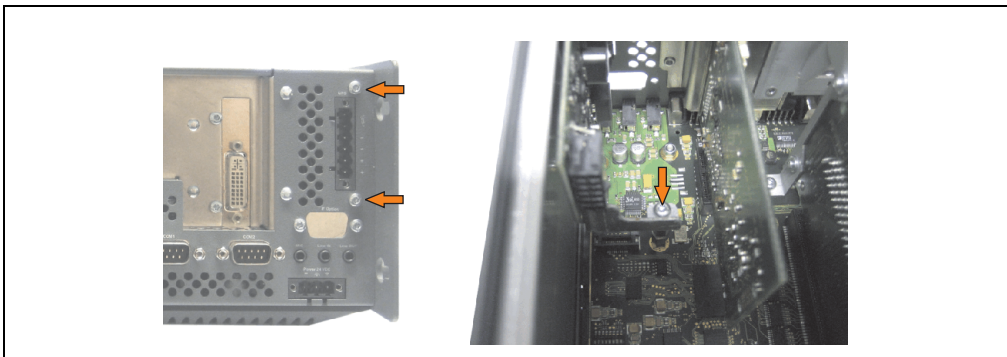


Figure 135: Install UPS module

- Plug in connection cable (see marked socket).

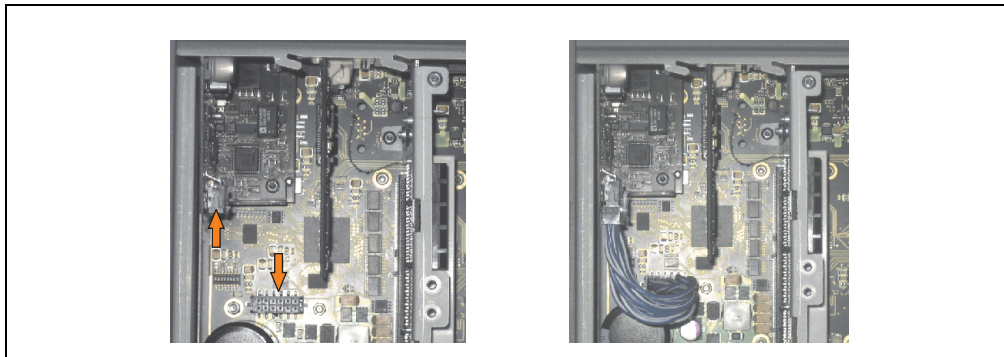


Figure 136: Plug in connection cable

Information:

When connecting the cable, make sure that the connector locking mechanism is engaged.

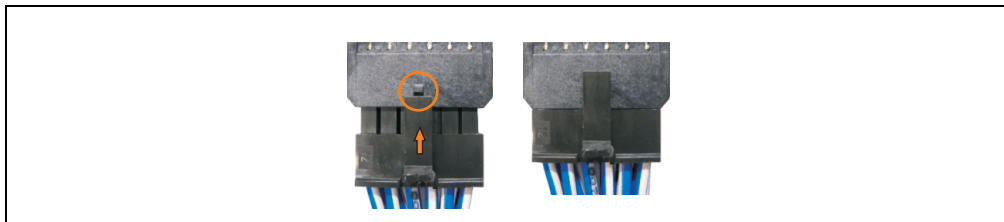


Figure 137: Connector locking mechanism

- Attach the side cover.

5.2 Installation with installed add-on interface module

5.2.1 APC810 2 PCI slot

- Remove side cover (see section "Mounting the side cover" on page 252).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).

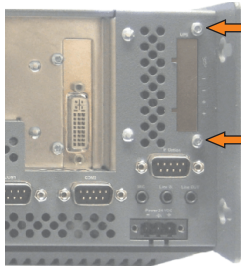


Figure 138: Remove UPS module cover

- Screw in spacing bolt (using M5 hex socket screwdriver).

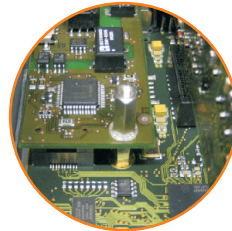
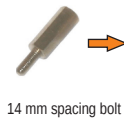
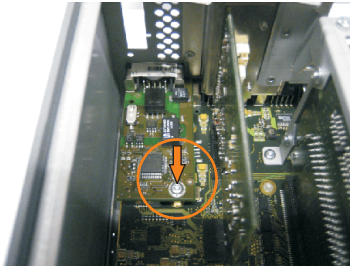


Figure 139: Screw in spacing bolt

- Install mounting bracket on UPS module using 2 Torx screws (T10).



Figure 140: 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.

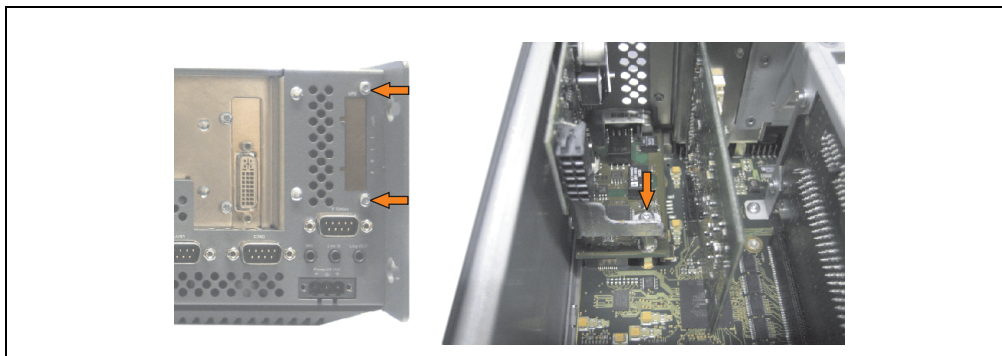


Figure 141: Install UPS module

- Plug in connection cable (see marked socket).

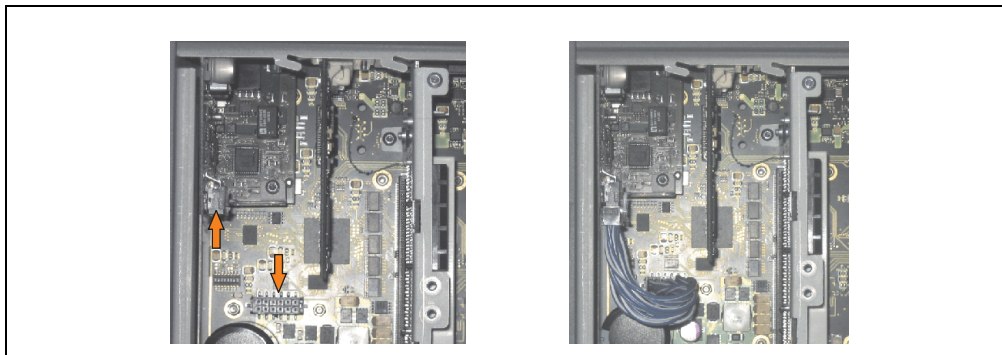


Figure 142: Plug in connection cable

Information:

When connecting the cable, make sure connector locking mechanism is engaged.

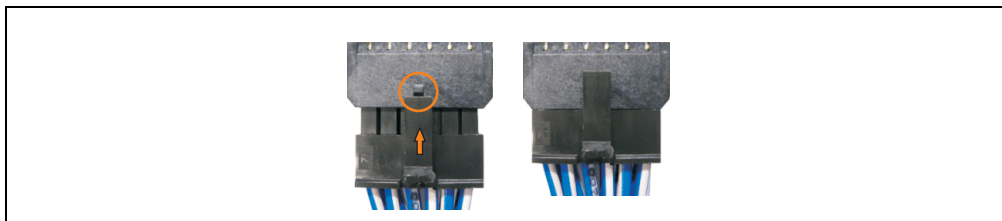


Figure 143: Connector locking mechanism

- Attach cover plate and side cover.

6. 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 HDD 60GB 5ACPCI.RAIC-02.

A size 10 Torx screwdriver is needed for exchanging the hard disk.

Exchange procedure

- Remove the power supply to the device (Automation PC 620 / Panel PC 700 / 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).

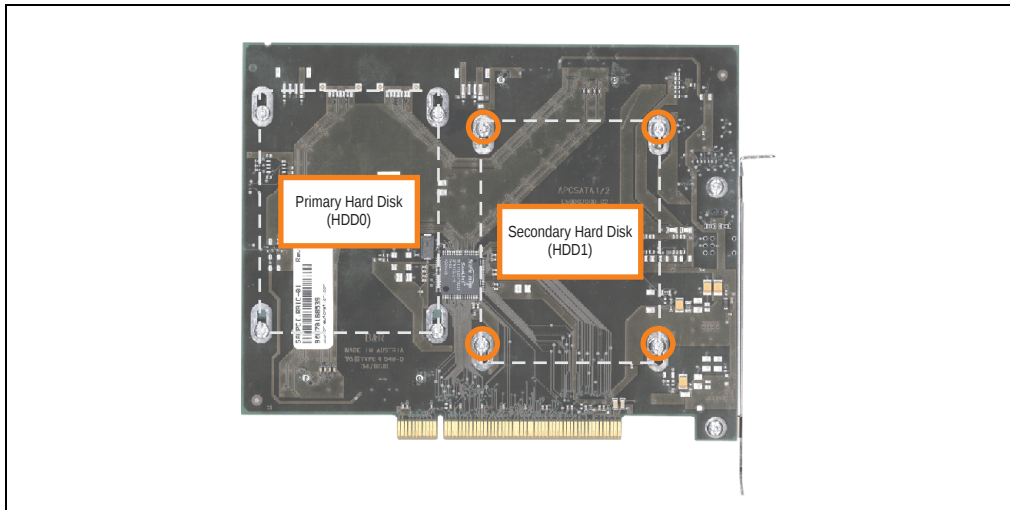


Figure 144: Screw layout on the back side of the SATA RAID controller 5ACPCI.RAIC-01

- On the front side, slide the hard disk down and away (image 1).
- Carefully plug the new hard disk into the connector (image 2).

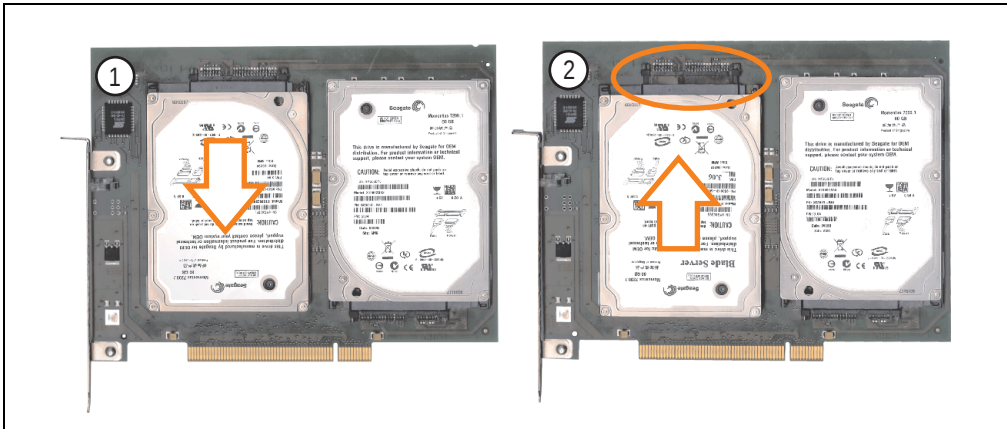


Figure 145: Hard disk exchange

- 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 195.

7. 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.

7.1 APC810 with 2 PCI 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 146: Mounting the side cover - APC810 2 PCI slot

- After the screws have been removed, the side cover can be removed by sliding it toward the front.

Appendix A • Appendix A

1. Maintenance Controller Extended (MTCX)

The MTCX controller (FPGA processor) is located on the main board (part of every system unit) of the APC810 device.

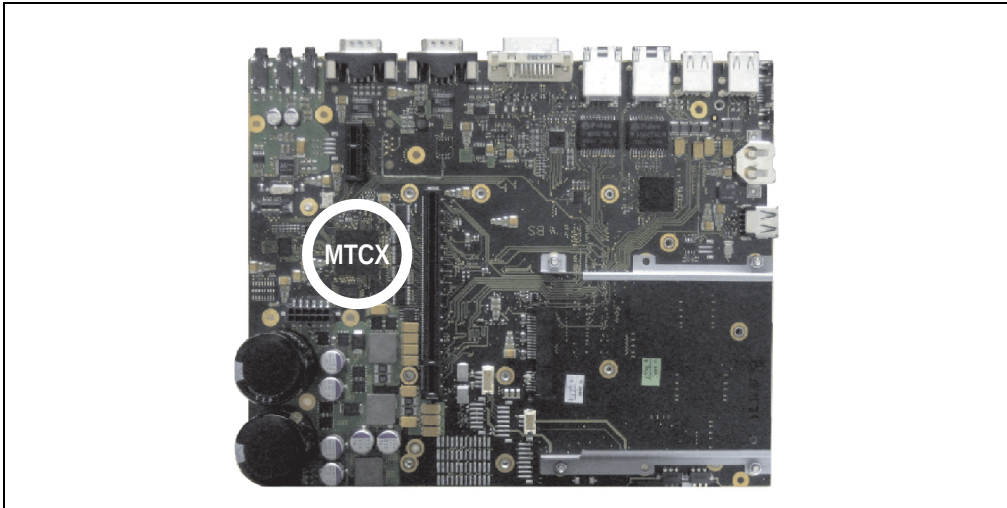


Figure 147: MTCX controller location

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

Appendix A • Maintenance Controller Extended (MTCX)

- recorded - every full hour is counted e.g. 50 minutes no increase)
- SDL data transfer (display, matrix keyboard, touch screen, service data, USB)
- Status LEDs (HDD, panel lock, Link 1, Link 2)

The functions of the MTCX can be expanded via Firmware upgrade¹⁾. The version can be read in BIOS (menu item "advanced" - baseboard/panel features) or in Microsoft Windows XP/embedded, using B&R Control Center.

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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