Panel PC 700

User's Manual

Version: **1.40 (January 2007)**

Model No.: **MAPPC700-ENG**

All information contained in this manual is current as of its creation/publication. We reserve the right to change the contents of this manual without warning. The information contained herein is believed to be accurate as of the date of publication; however, Bernecker + Rainer Industrie-Elektronik Ges.m.b.H. makes no warranty, expressed or implied, with regards to the products or the documentation contained within this book. In addition, Bernecker + Rainer Industrie-Elektronik Ges.m.b.H. shall not be liable in the event of incidental or consequential damages in connection with or resulting from the furnishing, performance, or use of these products. The software names, hardware names, and trademarks used in this manual are registered by the respective companies.

Chapter 1: General information

Chapter 2: Technical data

Chapter 3: Commissioning

Chapter 4: Software

Chapter 5: Standards and certifications

Chapter 6: Accessories

Chapter 7: Maintenance / servicing

Appendix A

Figure index

Table index

Model number index

Index

Chapter 1: General information 15

1. Manual history 15
2. Safety guidelines 17
   2.1 Intended use 17
   2.2 Protection against electrostatic discharges 17
      2.2.1 Packaging 17
      2.2.2 Guidelines for proper ESD handling 17
   2.3 Policy and procedures 18
   2.4 Transport and storage 18
   2.5 Mounting 19
   2.6 Operation 19
      2.6.1 Protection against touching electrical parts 19
      2.6.2 Programs, viruses and dangerous programs 19
3. Organization of safety notices 20
4. Guidelines 20
5. Model numbers 21
   5.1 System units 21
   5.2 CPU boards 815E 22
   5.3 CPU boards 855GME 22
   5.4 Heat sink 23
   5.5 Main memory 23
   5.6 Drives 23
   5.7 Interface options 24
   5.8 Fan kits 25
   5.9 Accessories 25
      5.9.1 Batteries 25
      5.9.2 Supply voltage connectors 25
      5.9.3 CompactFlash cards 26
      5.9.4 USB flash drives 27
      5.9.5 Cable 27
      5.9.6 Miscellaneous 28
   5.10 Software 29
6. Typical topologies 31
   6.1 Panel PC 700 for central control and visualization 31

Chapter 2: Technical data 33

1. Introduction 33
   1.1 Features 34
   1.2 System components / Configuration 35
      1.2.1 Selection guide - basic system 36
      1.2.2 Selection guide - optional components 37
2. Device 39
   2.1 Ambient temperature for systems with an 855GME CPU board 39
      2.1.1 Ambient temperatures with system unit 5PC720.1043-00 41
      2.1.2 Ambient temperatures with system unit 5PC720.1043-01 42
      2.1.3 Ambient temperatures with system unit 5PC720.1214-00 43

2.1.4 Ambient temperatures with system unit 5PC720.1214-01 44
2.1.5 Ambient temperatures with system unit 5PC720.1505-00 45
2.1.6 Ambient temperatures with system unit 5PC720.1505-01 46
2.1.7 Ambient temperatures with system unit 5PC720.1505-02 47
2.1.8 Ambient temperatures with system unit 5PC720.1706-00 48
2.1.9 Ambient temperatures with system unit 5PC720.1906-00 49
2.1.10 Ambient temperatures with system unit 5PC781.1043-00 50
2.1.11 Ambient temperatures with system unit 5PC781.1505-00 51
2.1.12 Ambient temperatures with system unit 5PC782.1043-00 52
2.1.13 How is the maximum ambient temperature determined? 53
2.1.14 Temperature monitoring 53
2.2 Power management 54
2.2.1 10.4" Panel PC 700 55
2.2.2 12.1" Panel PC 700 56
2.2.3 15" Panel PC 700 57
2.2.4 17" Panel PC 700 58
2.2.5 19" Panel PC 700 59
2.3 Device interfaces 60
2.3.1 Serial interfaces COM1 61
2.3.2 Serial interfaces COM2 62
2.3.3 Ethernet connection ETH1 63
2.3.4 Ethernet connection ETH2 64
2.3.5 USB port 65
2.3.6 Supply voltage 66
2.3.7 Monitor / Panel connection 67
2.3.8 MIC, Line IN and Line OUT Port 68
2.3.9 Add-on interface slot 68
2.3.10 PCI slots 69
2.3.11 Status LEDs 70
2.3.12 CompactFlash slot (CF1) 71
2.3.13 Hard disk / CompactFlash slot (HDD/CF2) 72
2.3.14 Power button 73
2.3.15 Reset button 73
2.3.16 PS/2 keyboard/mouse 74
2.3.17 Battery 75
2.3.18 Hardware security key 76
2.3.19 Slide-in slot 1 drive slot 77
2.4 Serial number sticker 78
3. Individual components 80
3.1 System units 80
3.1.1 Panel PC 5PC720.1043-00 80
3.1.2 Panel PC 5PC720.1043-01 85
3.1.3 Panel PC 5PC720.1214-00 90
3.1.4 Panel PC 5PC720.1214-01 95
3.1.5 Panel PC 5PC720.1505-00 100
3.1.6 Panel PC 5PC720.1505-01 105
3.1.7 Panel PC 5PC720.1505-02 111

3.1.8 Panel PC 5PC720.1706-00 116
3.1.9 Panel PC 5PC720.1906-00 121
3.1.10 Panel PC 5PC781.1043-00 126
3.1.11 Panel PC 5PC781.1505-00 132
3.1.12 Panel PC 5PC782.1043-00 138
3.2 CPU boards 815E 144
3.2.1 Technical data 144
3.3 CPU boards 855GME 146
3.3.1 Technical data 146
3.4 Heat sink 148
3.5 Main memory 149
3.5.1 Technical data 149
3.6 Drives 150
3.6.1 Add-on hard disk 30 GB 24x7 - 5AC600.HDDI-00 150
3.6.2 Add-on hard disk 20 GB ET - 5AC600.HDDI-01 153
3.6.3 Add-on hard disk 40 GB - 5AC600.HDDI-05 156
3.6.4 Add-on CompactFlash slot - 5AC600.CFSI-00 159
3.6.5 Slide-in CD-ROM - 5AC600.CDXS-00 160
3.6.6 Slide-in DVD-ROM/CD-RW - 5AC600.DVDS-00 163
3.6.7 Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 166
3.6.8 Slide-in CF 2 slot - 5AC600.CFSS-00 171
3.6.9 Slide-in USB FDD - 5AC600.FDDS-00 173
3.6.10 Slide-in hard disk 30 GB 24x7 - 5AC600.HDDS-00 176
3.6.11 Slide-in hard disk ET 20 GB - 5AC600.HDDS-01 179
3.6.12 Slide-in hard disk 40 GB - 5AC600.HDDS-02 182
3.6.13 RAID system 185
3.7 Interface options 197
3.7.1 Add-on CAN interface - 5AC600.CANI-00 197
3.7.2 Add-on RS232/422/485 interface - 5AC600.485I-00 200
3.8 Fan kit 205
3.8.1 Fan kit 5PC700.FA00-01 205
3.8.2 Fan kit 5PC700.FA02-00 206
3.8.3 Fan kit 5PC700.FA02-01 208

Chapter 3: Commissioning 211

1. Installation 211
1.1 Important mounting information 212
1.2 Air circulation 213
1.3 Mounting orientation 214
2. Cable connections 215
3. Connection examples 216
3.1 One Automation Panel via DVI (onboard) 217
3.1.1 Basic system requirements 217
3.1.2 Link modules 218
3.1.3 Cables 218
3.1.4 Possible Automation Panel units, resolutions und segment lengths 219

3.1.5 BIOS settings 219
3.2 An Automation Panel 900 via SDL (onboard) 220
3.2.1 Basic system requirements 220
3.2.2 Link modules 221
3.2.3 Cables 221
3.2.4 BIOS settings 223

Chapter 4: Software 225

1. Panel PC 700 with BIOS 225
1.1 815E BIOS description 225
1.1.1 General information 225
1.1.2 BIOS setup 225
1.1.3 BIOS setup keys 227
1.1.4 Main 228
1.1.5 Advanced 237
1.1.6 Security 261
1.1.7 Power 263
1.1.8 Boot 268
1.1.9 Exit 269
1.1.10 Profile overview 270
1.2 855GME BIOS description 279
1.2.1 General information 279
1.2.2 BIOS setup and boot procedure 279
1.2.3 BIOS setup keys 281
1.2.4 Main 282
1.2.5 Security 316
1.2.6 Power 318
1.2.7 Boot 322
1.2.8 Exit 323
1.2.9 Profile overview 324
1.3 BIOS upgrade 333
1.3.1 Requirements 333
1.3.2 What information do I need? 334
1.3.3 Upgrade BIOS for 815E 337
1.3.4 Upgrade BIOS for 855GME 338
1.3.5 Upgrade the firmware 339
1.3.6 Installing the graphics chip driver for 815E CPU boards 340
1.3.7 Windows XP Embedded and BIOS upgrade 341
1.3.8 Creating a DOS boot diskette in Windows XP 342
2. Panel PC 700 with Windows CE 344
2.1 General information 344
2.2 Properties in connection with PPC700 devices 345
2.3 Requirements 345
2.4 Installation 345
2.4.1 B&R eMbedded OS Installer 345
2.5 Known problems 346

Chapter 5: Standards and certifications 347

1. Applicable European guidelines 347
2. Overview of standards 347
3. Requirements for emissions 349
   3.1 Network related emissions 350
   3.2 Emissions / Electromagnetic emissions 351
4. Requirements for immunity to disturbances 352
   4.1 Electrostatic discharge (ESD) 353
   4.2 High-frequency electromagnetic fields (HF field) 353
   4.3 High-speed transient electrical disturbances (Burst) 354
   4.4 Surge voltages (Surge) 354
   4.5 Conducted disturbances 354
   4.6 Magnetic fields with electrical frequencies 355
   4.7 Voltage dips, fluctuations and short-term interruptions 356
   4.8 Damped oscillations 356
5. Mechanical conditions 357
   5.1 Vibration operation 357
   5.2 Vibration during transport (packaged) 358
   5.3 Shock during operation 358
   5.4 Shock transport (packaged) 358
   5.5 Toppling 358
   5.6 Free fall (packaged) 359
6. Climate conditions 360
   6.1 Worst case operation 360
   6.2 Dry heat 360
   6.3 Dry cold 360
   6.4 Large temperature fluctuations 361
   6.5 Temperature fluctuations in operation 361
   6.6 Humid heat, cyclical 361
   6.7 Humid heat, constant (storage) 361
7. Safety 362
   7.1 Ground resistance 363
   7.2 Insulation resistance 363
   7.3 High voltage 364
   7.4 Residual voltage 364
   7.5 Overload 364
   7.6 Defective component 365
   7.7 Voltage range 365
8. Other tests 365
   8.1 Protection 366
9. International certifications 367

Chapter 6: Accessories 369

1. Overview 369
2. Replacement CMOS batteries 373
   2.1 Order data 373

2.2 Technical data 373
3. Supply voltage connector (TB103 3-pin) 374
3.1 General information 374
3.2 Order data 374
3.3 Technical data 374
4. Interface covers 5AC600.ICOV-00 375
4.1 Order data 375
4.2 Contents of delivery 375
5. DVI - monitor adapter 5AC900.1000-00 376
5.1 Order data 376
6. USB interface cover (cannot be lost) 377
6.1 Order data 377
6.2 Installation 377
7. CompactFlash cards 5CFCRD.xxxx-02 378
7.1 General information 378
7.2 Order data 378
7.3 Technical data 378
7.4 Dimensions 379
7.5 Calculating the lifespan 380
8. CompactFlash cards 5CFCRD.xxxx-03 386
8.1 General information 386
8.2 Order data 386
8.3 Technical data 387
8.3.1 Temperature humidity diagram for operation and storage 388
8.4 Dimensions 388
8.5 Calculating the lifespan 389
9. USB Media Drive - 5MD900.USB2-00 398
9.1 Features 398
9.2 Technical data 399
9.3 Dimensions 401
9.4 Dimensions with front cover 402
9.5 Contents of delivery 402
9.6 Interfaces 402
9.7 Mounting 403
9.7.1 Mounting orientation 403
9.8 Front cover 5A5003.03 for the USB Media Drive 404
9.8.1 Technical data 404
9.8.2 Dimensions 404
9.8.3 Installation 405
10. USB Media Drive - 5MD900.USB2-01 406
10.1 Features 406
10.2 Technical data 407
10.3 Dimensions 409
10.4 Dimensions with front cover 410
10.5 Contents of delivery 410
10.6 Interfaces 410
10.7 Mounting 411

10.7.1 Mounting orientation 411
10.8 Front cover 5A5003.03 for the USB Media Drive 412
10.8.1 Technical data 412
10.8.2 Dimensions 412
10.8.3 Installation 413
11. USB flash drive 414
11.1 General information 414
11.2 Order data 414
11.3 Technical data 415
11.3.1 Temperature humidity diagram for operation and storage 416
11.4 Contents of delivery 417
12. HMI Drivers & Utilities DVD 5SWHMI.0000-00 418
13. Cables 421
13.1 DVI cable 5CADVI.0xxx-00 421
13.1.1 Order data 421
13.1.2 Technical data 421
13.1.3 Cable specifications 422
13.2 SDL cable 5CASDL.0xxx-00 423
13.2.1 Order data 423
13.2.2 Technical data 424
13.2.3 Cable specifications 425
13.3 SDL cable with 45° plug 5CASDL.0xxx-01 426
13.3.1 Order data 426
13.3.2 Technical data 426
13.3.3 Cable specifications 427
13.4 SDL cable with extender 5CASDL.0x00-10 428
13.4.1 Order data 428
13.4.2 Technical data 428
13.4.3 Cable connection 429
13.4.4 Cable specifications 430
13.5 SDL cable flex 5CASDL.0xxx-03 431
13.5.1 Order data 431
13.5.2 Technical data 432
13.5.3 Dimensions 433
13.5.4 Layering 433
13.5.5 Cable specifications 434
13.6 SDL cable flex with extender 5CASDL.0x00-13 435
13.6.1 Order data 435
13.6.2 Technical data 435
13.6.3 Cable connection 437
13.6.4 Cable specifications 438
13.7 RS232 cable 439
13.7.1 Order data 439
13.7.2 Technical data 439
13.7.3 Cable specifications 440
13.8 USB cable 441
13.8.1 Order data 441

13.8.2 Technical data 441
13.8.3 Cable specifications 442
14. Legend strip templates 443
14.1 Order data 444

Chapter 7: Maintenance / servicing 445
1. Changing the battery 445
1.1 Procedure 446
2. Fan kit installation and replacement 448
2.1 Procedure - PPC700 with 0 PCI slots 448
2.2 Procedure - PPC700 with 1 and 2 PCI slots 451
3. Slide-in drive - installation and exchange 454
3.1 Installation procedure 454
3.2 Exchange procedure 456

Appendix A 459
1. Temperature sensor locations 459
2. Maintenance Controller Extended (MTCX) 460
3. B&R Key Editor 461
4. B&R Automation Device Interface (ADI) driver - Control Center 463
4.1 SDL equalizer setting 464
5. B&R Automation Device Interface (ADI) development kit 466
6. Creating a bootable USB flash drive 467
6.1 Requirements 467
6.2 Procedure 467
7. Touch Screen - Elo Accu Touch 467
7.1 Temperature humidity diagram for operation and storage 469
7.2 Cleaning 469
8. Glossary 470

Chapter 1 • General information

Information:

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

1. Manual history

Version	Date	Change
1.0 Preliminary	07.05.2005	- First version
1.1 Preliminary	31.05.2005	- Technical data updated - New dimension diagrams (fan) - Cutout diagrams updated - Mounting chapter updated - Photos updated
1.2 Preliminary	31.01.2006	- Conductor cross section and AWG changes for the supply plug - More detailed definition of standard and 24-hour operation of hard disks 5AC600.HDDI-00 and 5AC600.HDDS-00. - Technical data for SDL cable updated due to new specifications from manufacturer. - Information about general tolerances according to DIN ISO 2768 added to dimension diagrams. - Safety guidelines revised - IP65 protection specified in more detail. - Intel 815E CPU boards discontinued. - Additional PCI bus information added. - Voltage information on the PCI slot plug and the compatible PCI cards added. - Display contrast and viewing angle properties added. - Rear view photos of system units 5PC781.1505-00 and 5PC782.1043-00 added. - Installation diagrams and tolerance information revised for the dimensions sections - The slide-in drives can be used in system units with **1 or** 2 PCI slots. - Dimensions corrected in the "Technical data" table for system unit 5PC720.1505-02.

Table 1: Manual history

Version	Date	Change
1.30	09.10.2006	- Dimensions (depth) corrected. - Information regarding the new 512 MB and 1 GB SanDisk Cruzer Micro flash drives added. - Silicon Systems CompactFlash cards 5CFCRD.xxxx-03 added. - Power management section for 10.4", 12.1" and 15" Panel PC 700 types added. - SDL cable with 45° plug 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 added (see section "SDL cable with 45° plug 5CASDL.0xxx-01" on page 426). - SDL cable with extender 5CASDL.0300-10 and 5CASDL.0400-10 added (see section "SDL cable with extender 5CASDL.0x00-10" on page 428). - Technical data for the 855GME CPU boards 5PC600.E855-04 and 5PC600.E855-05 corrected. - Typical topologies added. - Selection guide for the basic system and optional components added. - HMI Drivers & Utilities DVD 5SWHMI.0000-00 added. - Legend strip templates 5AC900.104X-00, 5AC900.104X-01 and 5AC900.150X-01 added. - Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 added. - Adjustment of the 855GME BIOS description for BIOS Version 1.21. - Windows CE order numbers added. - Standards and certifications chapter added. - Service and maintenance chapter added. - Name change for CompactFlash short text. - Power management values added. - Technical data for the touch screen added (see appendix A) - New model number for the PPC700 documentation MAPPC700-ENG. - Ambient temperature specifications depending on the system unit added. - Chapter 3 "Installation" renamed to "Commissioning".
1.40	15.11.2006	- Error in the SDL cable model number overview corrected. - Texts for all SDL cables changed. - Error in the image in table 271 "Order data - legend strip templates" corrected. - Note concerning publication of the technical data for the components placed on the title page. - USB connection description changed (back and front side) - Description of the voltage supply connection and ground (functional ground) changed. - Information about the serial number sticker added (see section "Serial number sticker" on page 78). - Font symbol assigned to the character format symbol. - 2 GB USB flash drive 5MMUSB.2048-00 added (see section "USB flash drive" on page 414.) - Document now includes the chm tag "Filename". - SDL cable flex 5CASDL.0xxx-03 added (see section "SDL cable flex 5CASDL.0xxx-03" on page 431). - SDL cable flex with extender 5CASDL.0xxx-13 added (see section "SDL cable flex with extender 5CASDL.0x00-13" on page 435). - Fan kit installation and exchange added (see chapter 7 "Maintenance / servicing", section "Fan kit installation and replacement" on page 448.) - Add-on hard disk 40 GB - 5AC600.HDDI-05 added (see section "Add-on hard disk 40 GB - 5AC600.HDDI-05" on page 156). - Slide-in hard disk 40 GB - 5AC600.HDDS-02 added (see section "Slide-in hard disk 40 GB - 5AC600.HDDS-02" on page 182). - PCI SATA RAID controller 5ACPCI.RAIC-01 added (see section "PCI SATA RAID controller 5ACPCI.RAIC-01" on page 193). - Chapter 3 'Commissioning' updated (important information for installation, cable connection, connection examples with Automation Panel 800 and Automation Panel 900 devices) - USB Media Drive 5MD900.USB2-00 added. - 5A5003.03 front cover description added to the 5MD900.USB2-00 and 5M900.USB2-01 product descriptions. - Description of the BIOS function "Legacy USB Support" updated.

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

In addition to "Electrical components with housing", the following also applies:

- 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 Mounting

- Installation must take place according to the documentation, using suitable equipment and tools.
- Devices may only 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 operational 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 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.

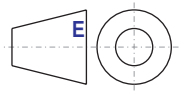
3. Organization of safety notices

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
5PC720.1043-00	**Panel PC 720 10.4" VGA T, 0 PCI slots** 10.4" VGA color TFT display with touch screen (resistive); connections for 2 x RS232, 3 x USB 2.0, monitor, 2 x Ethernet 10/100, AC97 sound, PS/2 keyboard/mouse; IP65 protection (front side); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	See page 80
5PC720.1043-01	**Panel PC 720 10.4" VGA T, 2 PCI slots, 1 disk drive slot** 10.4" VGA color TFT display with touch screen (resistive); 1 drive slot; connections for 2 x RS232, 3 x USB 2.0, monitor, 2 x Ethernet 10/100, AC97 sound, PS/2 keyboard/mouse; IP65 protection (front side); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	See page 85
5PC720.1214-00	**Panel PC 720 12.1" SVGA T, 0 PCI slots** 12.1" SVGA color TFT display with touch screen (resistive); connections for 2 x RS232, 3 x USB 2.0, monitor, 2 x Ethernet 10/100, AC97 sound, PS/2 keyboard/mouse; IP65 protection (front side); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	See page 90
5PC720.1214-01	**Panel PC 720 12.1" SVGA T, 2 PCI slots, 1 disk drive slot** 12.1" SVGA color TFT display with touch screen (resistive); 1 drive slot; connections for 2 x RS232, 3 x USB 2.0, monitor, 2 x Ethernet 10/100, AC97 sound, PS/2 keyboard/mouse; IP65 protection (front side); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	See page 95 In preparation
5PC720.1505-00	**Panel PC 720 15" XGA T, 0 PCI slots** 15" XGA color TFT display with touch screen (resistive); connections for 2 x RS232, 3 x USB 2.0, monitor, 2 x Ethernet 10/100, AC97 sound, PS/2 keyboard/mouse; IP65 protection (front side); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	See page 100
5PC720.1505-01	**Panel PC 720 15" XGA T, 2 PCI slots, 1 disk drive slot** 15" XGA color TFT display with touch screen (resistive); 1 drive slot; connections for 2 x RS232, 3 x USB 2.0, monitor, 2 x Ethernet 10/100, AC97 sound, PS/2 keyboard/mouse; IP65 protection (front side); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	See page 105
5PC720.1505-02	**Panel PC 720 15" XGA T, 1 PCI slot, 1 disk drive slot** 15" XGA color TFT display with touch screen (resistive); 1 drive slot; connections for 2 x RS232, 3 x USB 2.0, monitor, 2 x Ethernet 10/100, AC97 sound, PS/2 keyboard/mouse; IP65 protection (front side); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	See page 111
5PC720.1706-00	**Panel PC 720 17" SXGA T, 0 PCI slots** 17" SXGA color TFT display with touch screen (resistive); connections for 2 x RS232, 3 x USB 2.0, monitor, 2 x Ethernet 10/100, AC97 sound, PS/2 keyboard/mouse; IP65 protection (front side); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	See page 116
5PC720.1906-00	**Panel PC 720 19" SXGA T, 0 PCI slots** 19" SXGA color TFT display with touch screen (resistive); connections for 2 x RS232, 3 x USB 2.0, monitor, 2 x Ethernet 10/100, AC97 sound, PS/2 keyboard/mouse; IP65 protection (front side); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	See page 121 In preparation

Table 3: Model numbers - system units

Model number	Short description	Note
5PC781.1043-00	**Panel PC 781 10.4" VGA FT, 0 PCI slots** 10.4" VGA color TFT display with touch screen (resistive); 10 softkeys; 28 function keys and 20 system keys; connections for 2 x RS232, 3 x USB 2.0, monitor, 2 x Ethernet 10/100, AC97 sound, PS/2 keyboard/mouse; IP65 protection (front side); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	See page 126
5PC781.1505-00	**Panel PC 781 15" XGA FT, 0 PCI slots** 15" XGA color TFT display with touch screen (resistive); 12 softkeys; 20 function keys and 92 system keys; connections for 2 x RS232, 3 x USB 2.0, monitor, 2 x Ethernet 10/100, AC97 sound, PS/2 keyboard/mouse; IP65 protection (front side); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	See page 132
5PC782.1043-00	**Panel PC 782 10.4" VGA FT, 0 PCI slots** 10.4" VGA color TFT display with touch screen (resistive); 10 softkeys; 44 function keys and 20 system keys; connections for 2 x RS232, 3 x USB 2.0, monitor, 2 x Ethernet 10/100, AC97 sound, PS/2 keyboard/mouse; IP65 protection (front side); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	See page 138

Table 3: Model numbers - system units (cont.)

5.2 CPU boards 815E

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

Table 4: Model numbers - CPU boards 815E

5.3 CPU boards 855GME

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

Table 5: Model numbers - CPU boards 855GME

Model number	Short description	Note
5PC600.E855-05	**CPU board 855GME CM-1000** Intel Pentium M CPU board, 1000 MHz, 400 MHz FSB, 1 MB L2 cache; chipset 855GME; 1 socket for SO-DIMM DDR RAM module.	

Table 5: Model numbers - CPU boards 855GME

5.4 Heat sink

Model number	Short description	Note
5AC700.HS01-00	**Panel PC 700 fan** For PPC700 systems with an Intel 815E CPU board (5PC600.E815-00, 5PC600.E815-02 and 5PC600.E815-03).	Cancelled since 10/2005 Heat sinks for 855GME boards are replacement types
5AC700.HS01-01	**Panel PC 700 fan** For PPC700 systems with an Intel 855GME CPU board (5PC600.E855-00, 5PC600.E855-02, 5PC600.E855-04 and 5PC600.E855-05)	
5AC700.HS01-02	**Panel PC 700 fan** for CPU boards with an Intel 855GME CPU board (5PC600.E855-01 and 5PC600.E855-03).	

Table 6: Model numbers - heat sinks

5.5 Main memory

Model number	Short description	Note
5MMSDR.0128-01	**SO-DIMM SDRAM 128 MB PC133** SO-DIMM SDRAM 128 MB PC133 for 815E CPU boards.	Cancelled since 10/2005 Main memory for 855GME CPU boards are replacement types
5MMSDR.0256-01	**SO-DIMM SDRAM 256 MB PC133** SO-DIMM SDRAM 256 MB PC133 for 815E CPU boards.	
5MMSDR.0512-01	**SO-DIMM SDRAM 512 MB PC133** SO-DIMM SDRAM 512 MB PC133 for 815E CPU boards.	
5MMDDR.0256-00	**SO-DIMM DDR-SDRAM 256 MB PC2700** SO-DIMM DDR-SDRAM 256 MB PC2700 for 855GME CPU boards.	
5MMDDR.0512-00	**SO-DIMM DDR-SDRAM 512 MB PC2700** SO-DIMM DDR-SDRAM 512 MB PC2700 for 855GME CPU boards.	
5MMDDR.1024-00	**SO-DIMM DDR-SDRAM 1024 MB PC2700** SO-DIMM DDR-SDRAM 1024 MB PC2700 for 855GME CPU boards.	

Table 7: Model numbers - main memory

5.6 Drives

Model number	Short description	Note
5AC600.CFSI-00	**Add-on CompactFlash slot** CompactFlash slot (add-on); for installation in an APC620 or PPC700.	
5AC600.HDDI-00	**Add-on hard disk 30 GB 24/7** 30 GB hard disk (add-on); ideal for 24-hour operation. For installation in an APC620 or PPC700.	

Table 8: Model numbers - drives

Model number	Short description	Note
5AC600.HDDI-01	**Add-on hard disk 20 GB ET** 20 GB hard disk (add-on); with expanded temperature range. For installation in an APC620 or PPC700.	
5AC600.HDDI-05	**Add-on hard disk 40 GB ET, 24x7** 40 GB hard disk (add-on); With extended temperature range and also ideal for 24-hour operation. For installation in an APC620 or PPC700.	
5AC600.CDXS-00	**Slide-in CD-ROM** CD-ROM drive (slide-in); for operation in a slide-in drive slot in an APC620 or PPC700 system.	
5AC600.CFSS-00	**Slide-in CF 2-slot** Slide-in CompactFlash adapter for 2 CompactFlash cards (via IDE and USB 2.0)	
5AC600.DVDS-00	**Slide-in DVD-ROM/CD-RW** DVD-ROM/CD-RW drive (slide-in); for operation in a slide-in drive slot in an APC620 or PPC700 system.	
5AC600.DVRS-00	**Slide-in DVD-R/RW, DVD+R/RW** DVD-RW drive (slide-in); for operation in a drive slot in an APC620 or PPC700 system.	
5AC600.FDDS-00	**Slide-in USB FDD** FDD drive (slide-in); for operation in a slide-in drive slot in an APC620 or PPC700 system.	
5AC600.HDDS-00	**Slide-in hard disk 30 GB 24x7** 30 GB Hard disk (slide-in); ideal for 24-hour operation. For use in a slide-in drive slot in an APC620 or PPC700 system.	
5AC600.HDDS-01	**Slide-in hard disk 20 GB ET** 20 GB hard disk (slide-in); with expanded temperature range. For use in a slide-in drive slot in an APC620 or PPC700 system.	
5AC600.HDDS-02	**Slide-in hard disk 40 GB ET, 24x7** 40 GB hard disk (slide-in); With extended temperature range and also ideal for 24-hour operation. For use in a slide-in drive slot in an APC620 or PPC700 system.	
5ACPCI.RAIC-00	**PCI RAID controller ATA/100** PCI Raid controller	
5ACPCI.RAIC-01	**PCI SATA RAID system 2 x 60 GB** PCI SATA RAID system with 2 x 60 GB SATA hard disks; requires a free PCI slot.	
5ACPCI.RAIS-00	**PCI RAID storage 2 x 40 GB** PCI Raid hard disk 2 x 40 GB for the PCI RAID controller ATA/100 5ACPCI.RAIC-00.	Cancelled since 06/2006 Replacement type 5ACPCI.RAIS-00
5ACPCI.RAIS-01	**PCI RAID storage 2 x 60 GB** PCI Raid hard disk 2 x 60 GB for the PCI RAID controller ATA/100 5ACPCI.RAIC-00.	Replacement for 5ACPCI.RAIS-00

Table 8: Model numbers - drives (cont.)

5.7 Interface options

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

Table 9: Model numbers - interface

5.8 Fan kits

Model number	Short description	Note
5PC700.FA00-01	**Panel PC 700 fan kit** For Panel PC 700 10.4", 12.1", 15", 17" and 19" with 0 PCI slots (5PC720.1043-00, 5PC720.1214-00, 5PC720.1505-00, 5PC720.1706-00, 5PC720.1906-00, 5PC781.1043-00, 5PC781.1505-00 and 5PC782.1043-00).	40 x 40 x 20
5PC700.FA02-00	**Panel PC 700 fan kit** For Panel PC 700 10.4" with 2 PCI slots (5PC720.1043-01).	60 x 60 x 10
5PC700.FA02-01	**Panel PC 700 fan kit** For Panel PC 12.1" and 15" with 1 and 2 PCI slots (5PC720.1214-01, 5PC720.1505-01 and 5PC720.1505-02).	60 x 60 x 20

Table 10: Model numbers - fan kits

5.9 Accessories

5.9.1 Batteries

Model number	Short description	Note
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	

Table 11: Model numbers - batteries

5.9.2 Supply voltage connectors

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

Table 12: Model numbers - supply voltage connectors

5.9.3 CompactFlash cards

Model number	Short description	Note
5CFCRD.0032-02	**CompactFlash 32 MB SanDisk/A** CompactFlash card with 32 MB NAND Flash, and IDE/ATA interface.	Cancelled since 12/2005 Replacement type 5CFCRD.0064-03
5CFCRD.0064-02	**CompactFlash 64 MB SanDisk/A** CompactFlash card with 64 MB NAND Flash, and IDE/ATA interface.	Cancelled since 12/2005 Replacement type 5CFCRD.0064-03
5CFCRD.0064-03	**CompactFlash 64 MB SSI** CompactFlash card with 64 MB SLC NAND Flash, and IDE/ATA interface.	
5CFCRD.0128-02	**CompactFlash 128 MB SanDisk/A** CompactFlash card with 128 MB NAND Flash, and IDE/ATA interface.	Cancelled since 12/2005 Replacement type 5CFCRD.0128-03
5CFCRD.0128-03	**CompactFlash 128 MB SSI** CompactFlash card with 128 MB SLC NAND Flash, and IDE/ATA interface.	
5CFCRD.0256-02	**CompactFlash 256 MB SanDisk/A** CompactFlash card with 256 MB NAND Flash, and IDE/ATA interface.	Cancelled since 12/2005 Replacement type 5CFCRD.0256-03
5CFCRD.0256-03	**CompactFlash 256 MB SSI** CompactFlash card with 256 MB SLC NAND Flash, and IDE/ATA interface.	
5CFCRD.0512-02	**CompactFlash 512 MB SanDisk/A** CompactFlash card with 512 MB NAND Flash, and IDE/ATA interface.	Cancelled since 12/2005 Replacement type 5CFCRD.0512-03
5CFCRD.0512-03	**CompactFlash 512 MB SSI** CompactFlash card with 512 MB SLC NAND Flash, and IDE/ATA interface.	
5CFCRD.1024-02	**CompactFlash 1024 MB SanDisk/A** CompactFlash card with 1024 MB NAND Flash, and IDE/ATA interface.	Cancelled since 12/2005 Replacement type 5CFCRD.1024-03
5CFCRD.1024-03	**CompactFlash 1024 MB SSI** CompactFlash card with 1024 MB SLC NAND Flash, and IDE/ATA interface.	
5CFCRD.2048-02	**CompactFlash 2048 MB SanDisk/A** CompactFlash card with 2048 MB NAND Flash, and IDE/ATA interface.	Cancelled since 12/2005 Replacement type 5CFCRD.2048-03
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.	

Table 13: Model numbers - CompactFlash cards

5.9.4 USB flash drives

Model number	Short description	Note
5MMUSB.0128-00	**USB flash drive 128 MB SanDisk** USB 2.0 flash drive 128 MB	*Cancelled since 12/2005*
5MMUSB.0256-00	**USB flash drive 256 MB SanDisk** USB 2.0 flash drive 256 MB	
5MMUSB.0512-00	**USB flash drive 512 MB SanDisk** USB 2.0 flash drive 512 MB	
5MMUSB.1024-00	**USB flash drive 1 GB SanDisk** USB 2.0 flash drive 1 GB	
5MMUSB.2048-00	**USB flash drive 2 GB SanDisk** USB 2.0 flash drive 2 GB	

Table 14: Model numbers - USB flash drives

5.9.5 Cable

Model number	Description	Note
5CADVI.0018-00	**DVI-D cable 1.8 m / single** Cable single DVI-D/m:DVI-D/m 1.8 m	
5CADVI.0050-00	**DVI-D cable 5 m / single** Cable single DVI-D/m:DVI-D/m 5 m	
5CADVI.0100-00	**DVI-D cable 10 m / single** Cable single DVI-D/m:DVI-D/m 10 m	
5CASDL.0018-00	**SDL cable 1.8 m** SDL cable length: 1.8 m	
5CASDL.0018-01	**SDL cable 1.8 m 45°** SDL cable length: 1.8 m; single sided 45° plug	
5CASDL.0018-03	**SDL cable flex 1.8 m** SDL cable, semi flexible, length: 1.8 m	
5CASDL.0050-00	**SDL cable 5 m** SDL cable length: 5 m	
5CASDL.0050-01	**SDL cable 5 m 45°** SDL cable length: 5 m; single sided 45° plug	
5CASDL.0050-03	**SDL cable flex 5 m** SDL cable, semi flexible, length: 5 m	
5CASDL.0100-00	**SDL cable 10 m** SDL cable length: 10 m	
5CASDL.0100-01	**SDL cable 10 m 45°** SDL cable length: 10 m; single sided 45° plug	
5CASDL.0100-03	**SDL cable flex 10 m** SDL cable, semi flexible, length: 10 m	
5CASDL.0150-00	**SDL cable 15 m** SDL cable length: 15 m	
5CASDL.0150-01	**SDL cable 15 m 45°** SDL cable length: 15 m; single sided 45° plug	

Table 15: Model numbers - cables

Model number	Description	Note
5CASDL.0150-03	**SDL cable flex 15 m** SDL cable, semi flexible, length: 15 m	
5CASDL.0200-00	**SDL cable 20 m** SDL cable length: 20 m	
5CASDL.0200-03	**SDL cable flex 20 m** SDL cable, semi flexible, length: 20 m	
5CASDL.0250-00	**SDL cable 25 m** SDL cable length: 25 m	
5CASDL.0250-03	**SDL cable flex 25 m** SDL cable, semi flexible, length: 25 m	
5CASDL.0300-00	**SDL cable 30 m** SDL cable length: 30 m	
5CASDL.0300-03	**SDL cable flex 30 m** SDL cable, semi flexible, length: 30 m	
5CASDL.0300-10	**SDL cable with extender 30 m** SDL cable length: 30 m with extender	
5CASDL.0300-13	**SDL cable flex with extender 30 m** SDL cable, semi flexible, length: 30 m with extender	
5CASDL.0400-10	**SDL cable with extender 40 m** SDL cable length: 40 m with extender	
5CASDL.0400-13	**SDL cable flex with extender 40 m** SDL cable, semi flexible, length: 40 m with extender	
5CAUSB.0018-00	**USB 2.0 cable A/m:B/m 1.8 m** USB 2.0 connection cable; Type A - Type B; 1.8 m	
5CAUSB.0050-00	**USB 2.0 cable A/m:B/m 5 m** USB 2.0 connection cable; Type A - Type B; 5 m	
9A0014.02	**RS232 cable DB9/f:DB9/m 1.8 m** RS232 extension cable for remote operation of a display unit with touch screen, length 1.8 m.	
9A0014.05	**RS232 cable DB9/f:DB9/m 5 m** RS232 extension cable for remote operation of a display unit with touch screen, length 5 m.	
9A0014.10	**RS232 cable DB9/f:DB9/m 10 m** RS232 extension cable for remote operation of a display unit with touch screen, length 10 m.	

Table 15: Model numbers - cables (cont.)

5.9.6 Miscellaneous

Model number	Short description	Note
5A5003.03	**Front cover** Front cover for the USB 2.0 Media Drive 5MD900.USB2-00.	
5AC600.ICOV-00	**Interface covers,** Interface covers for APC620 and PPC700 devices; 5 pieces	
5AC900.1000-00	**Adapter DVI-A/m to CRT DB15HD/f** Adapter DVI (plug) to CRT (socket), for connecting a standard monitor to a DVI-I interface.	
5AC900.104X-00	**Legend strip template 10.4" portrait format** For Panel PC 5PC781.1043-00. For 1 device.	

Table 16: Model numbers - other items

Model number	Short description	Note
5AC900.104X-01	**Legend strip template 10.4" landscape format** For Panel PC 5PC782.1043-00. For 1 device	
5AC900.150X-01	**Slide-in legend strip template 15".** For Panel PC 5PC781.1505-00. For 4 devices.	
5AC900.1200-00	**USB interface cover (cannot be lost)** Front side USB interface cover (cannot be lost) for Automation Panel 900 and Panel PC 700 devices.	
5MD900.USB2-00	**USB 2.0 drive DVD-ROM/CD-RW FDD CF USB** USB 2.0 drive combination, consists of DVD-ROM/CD-RW, FDD, CompactFlash slot (type II), USB connection (type A front, type B back); 24 V DC. (0TB103.9 screw clamps or 0TB103.91 cage clamps sold separately).	
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, FDD, CompactFlash slot (type II), USB connection (type A front, type B back); 24V DC; (0TB103.9 screw clamps or 0TB103.91 cage clamps sold separately).	

Table 16: Model numbers - other items (cont.)

5.10 Software

Model number	Short description	Note
5SWHMI.0000-00	**HMI Drivers & Utilities DVD** Contains drivers, utilities, software upgrades and user manuals for B&R Panel system products (see B&R homepage – Industrial PCs, Visualization and Operation).	
9S0000.01-010	**OEM MS-DOS 6.22 German (disks)** Only delivered with a new industrial PC.	
9S0000.01-020	**OEM MS-DOS 6.22 English (disks)** Only delivered with a new industrial PC.	
9S0000.08-010	**OEM Microsoft Windows XP Professional** CD, German; Only delivered with a new industrial PC.	
9S0000.08-020	**OEM Microsoft Windows XP Professional** CD, English; Only delivered with a new industrial PC.	
9S0000.09-090	**OEM Microsoft Windows XP Professional Multilanguage** CDs; Only delivered with a new industrial PC.	
9S0001.19-020	**OEM Microsoft Windows XP embedded APC620 815E w/CF, English** 512 MB CompactFlash with Windows XP embedded image for APC620 systems with a 815E CPU board. Only delivered with a new industrial PC.	Cancelled since 10/2005
9S0001.20-020	**OEM Microsoft Windows XP embedded APC620 855GME w/CF, English** 512 MB CompactFlash with Windows XP embedded image for APC620 systems with a 855GME CPU board. Only delivered with a new industrial PC.	
9S0001.27-020	**OEM Microsoft Windows XP embedded (incl. SP2) APC620 815E w/CF, English** 512 MB CompactFlash with Windows XP embedded image including SP2 for APC620 systems with a 815E CPU board. Only delivered with a new industrial PC.	Cancelled since 10/2005
9S0001.28-020	**OEM Microsoft Windows XP embedded (incl. SP2) APC620 855GME w/CF, English** 512 MB CompactFlash with Windows XP embedded image including SP2 for APC620 systems with a 855GME CPU board. Only delivered with a new industrial PC.	
9S0001.29-020	**WinCE5.0 Pro** Windows CE 5.0 Image, the size of the CompactFlash card must be specified in the order. Only delivered with a new industrial PC.	

Table 17: Model numbers - software

Model number	Short description	Note
9S0001.32-020	**WinCE5.0 Pro APC620,PPC700** 128 MB CompactFlash with Windows CE 5.0. Only delivered with a new industrial PC.	
9S0001.34-020	**WinCE5.0 ProPlus APC620,PPC700** 128 MB CompactFlash with Windows CE 5.0 including the following licensed Viewers (PDF, Power Point, Word, Excel and CE Image Viewer). Only delivered with a new industrial PC.	
9S0001.36-020	**WinCE5.0 ProPlus** Windows CE 5.0 Image, including the following licensed Viewers (PDF, Power Point, Word, Excel und CE Image Viewer), the size of the CompactFlash card must be specified in the order. Only delivered with a new industrial PC.	

Table 17: Model numbers - software (cont.)

6. Typical topologies

6.1 Panel PC 700 for central control and visualization

The control program runs on the Panel PC 700. The visualization project is integrated with Visual Components. The Panel PC 700 is networked over Ethernet TCP/IP; additional Power Panel-based operator terminals can also be connected via Ethernet. Fieldbus systems (CAN bus, ETHERNET Powerlink™) are used to handle the communication to I/O systems with axis control.

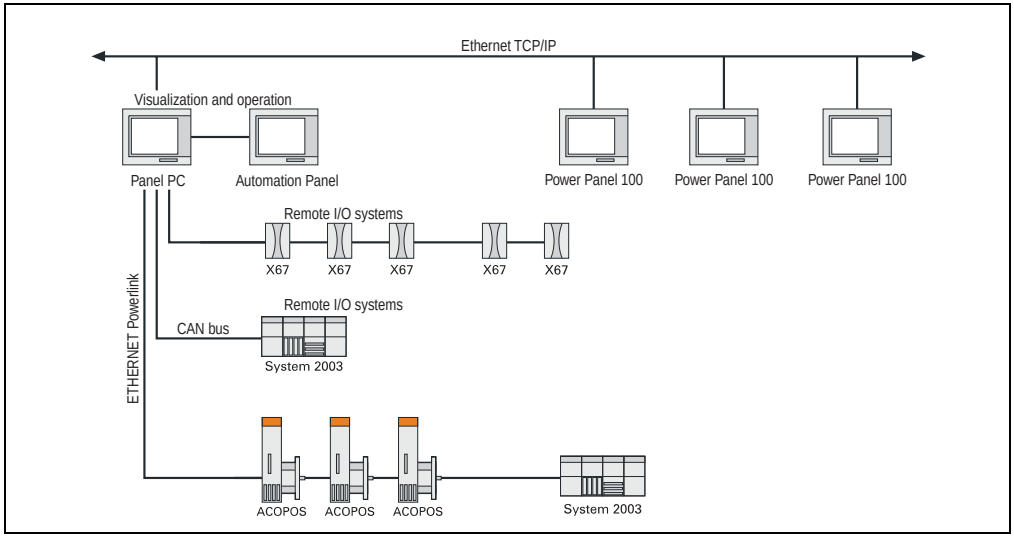


Figure 1: Typical topologies

Chapter 2 • Technical data

1. Introduction

The Panel PC 700 (PPC700) combines an industrial PC and display in one housing. This variant is the first choice anywhere a PC and display must be installed in a limited space.

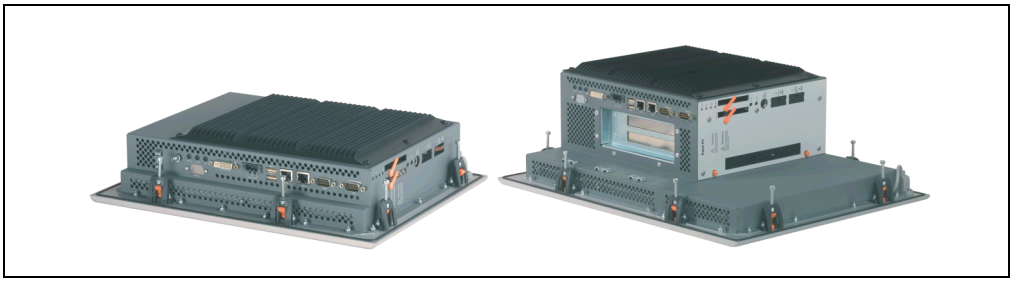
The Panel PC 700 and Automation PC 620 are based on the same platform, which means that the Panel PC also offers the full bandwidth of processors ranging from Celeron® 600 MHz to Pentium® M 1.8 GHz. Panel PCs are available as touch devices with 10.4" VGA, 12.1" SVGA, 15" XGA, 17" SXGA and 19" SXGA TFT displays. The housing is also a defining factor: From very flat devices without PCI slots to expandable devices with two PCI slots, the Panel PC can be optimized to meet the requirements of the application. Four additional Automation Panel 900s can be connected to the Panel PC 700 (dual independent display).

1.1 Features

- Diagonals up to 19"
- Processors up to Pentium M 1.8 GHz
- CompactFlash slot (type I)
- Half-size PCI slots (PCI standard 2.2, PCI bus speed 33 MHz)
- AC97 sound
- USB 2.0
- 24 VDC supply voltage
- 2x Ethernet 10/100 MBit interfaces
- 2x RS232 Interface, modem compatible
- PS/2 keyboard/mouse (combined)
- CAN interface option
- RS232/422/485 interface option
- Fan-free operation[1)]
- BIOS (Phoenix)
- Real-time clock, RTC (battery-buffered)
- Up to 1 GB central memory
- Connection of various display devices to the "Monitor/Panel" video output (supports RGB, DVI, and SDL - Smart Display Link - signals)

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

1.2 System components / Configuration



The PPC700 system can be assembled to meet individual requirements and operational conditions.

The following components are absolutely essential for operation:

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

1.2.1 Selection guide - basic system

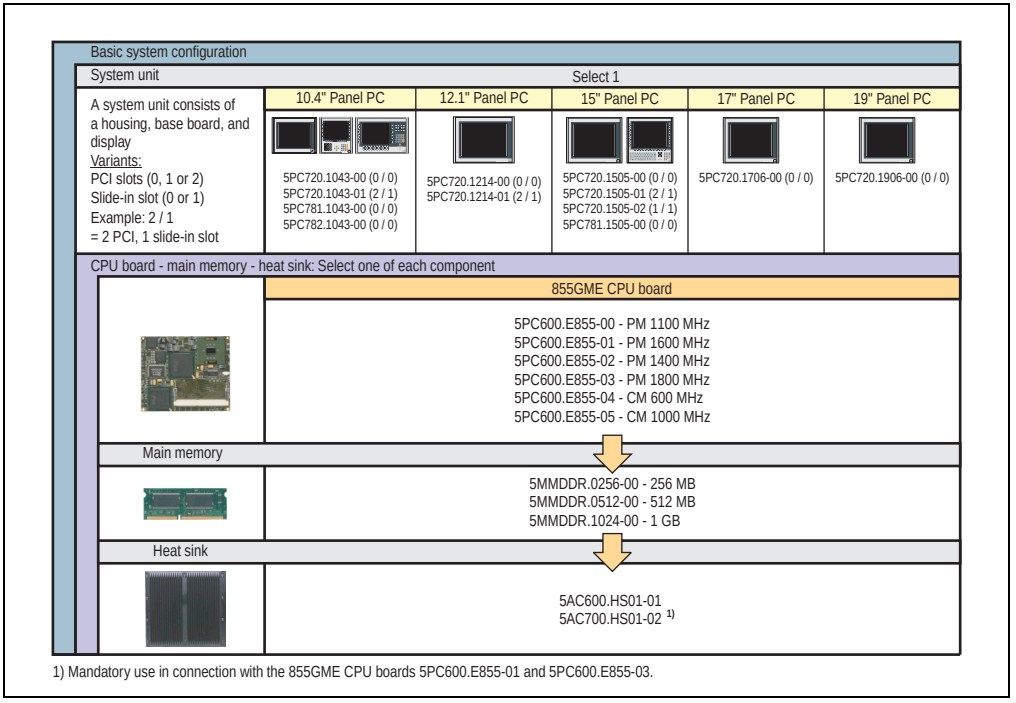


Figure 2: Configuration - basic system

Explanation:

1) Select a system unit.

2) Select CPU board (select 1).

3) Select the main memory (select 1).

4) Select the heat sink for the respective CPU board (select 1).

5) Select optional components, based on selected system unit (see section 1.2.2 "Selection guide - optional components" on page 37).

1.2.2 Selection guide - optional components

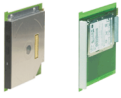
Optional configuration			
System unit	Select 1		
A system unit consists of a housing, base board, and display Variants: PCI slots (0, 1 or 2) Slide-in slot (0 or 1) Example: 2 / 1 = 2 PCI, 1 slide-in slot	0 PCI slots	1 PCI slot	2 PCI slots
	5PC720.1043-00 (0 / 0) 5PC720.1214-00 (0 / 0) 5PC720.1505-00 (0 / 0) 5PC720.1706-00 (0 / 0) 5PC720.1906-00 (0 / 0) 5PC781.1043-00 (0 / 0) 5PC781.1505-00 (0 / 0) 5PC782.1043-00 (0 / 0)	5PC720.1505-02 (1 / 1)	5PC720.1043-01 (2 / 1) 5PC720.1214-01 (2 / 1) 5PC720.1505-01 (2 / 1)
Fan kit (select 1)			
A fan kit may be necessary for certain configurations.	 5PC700.FA00-01	 5PC700.FA02-01 (also for 5PC720.1505-01 and 5PC720.1214-01)	 5PC700.FA02-00 (only for 5PC720.1043-01)
Add-on drive	Select 1		
	5AC600.HDDI-00 (24-hour hard disk) 5AC600.HDDI-01 (Hard disk - expanded temperature range) 5AC600.CFSI-00 (CompactFlash slot)		
Slide-in drives	Not possible	Select max. 1	
		5AC600.CFSS-00 (2 CompactFlash slots) 5AC600.CDXS-00 (CD-ROM) 5AC600.DVDS-00 (DVD-ROM/CD-RW) 5AC600.DVRS-00 (DVD-R/RW DVD+R/RW) 5AC600.FDDS-00 (USB floppy) 5AC600.HDDS-00 (24-hour hard disk) 5AC600.HDDS-01 (Hard disk - expanded temperature range)	
RAID system	Not possible	Not possible	
			5ACPCI.RAIC-00 with 5ACPCI.RAIS-00 or 5ACPCI.RAIS-01 (combination, occupies 2 PCI slots)
Interface option	Select 1		
	5AC600.CANI-00 (CAN) 5AC600.485I-00 (combined RS232/RS422/RS485)		
Voltage supply connectors	Select 1		
	0TB103.9 (screw clamps) 0TB103.91 (cage clamps)		

Figure 3: Configuration of optional components

- Depending on the system unit, a compatible fan kit can be installed in the PPC700. Required for certain system configurations and ambient temperatures (see also section 2.4 "Ambient temperature for systems with an 815E CPU board", on page 53 or section 2.5 "Ambient temperature for systems with an 855GME CPU board", on page 56).
- Select optional drive(s) (add-on / slide-in), based on the system unit. One add-on drive can be installed in each system unit. A slide-in drive is only available in certain system units.

- An additional interface can be added using an interface option.
- The appropriate power supply plugs ensure simple connection to the power supply.

2. Device

2.1 Ambient temperature for systems with an 855GME CPU board

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

Information:

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

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

Worst-case conditions for systems with an 855GME CPU board

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

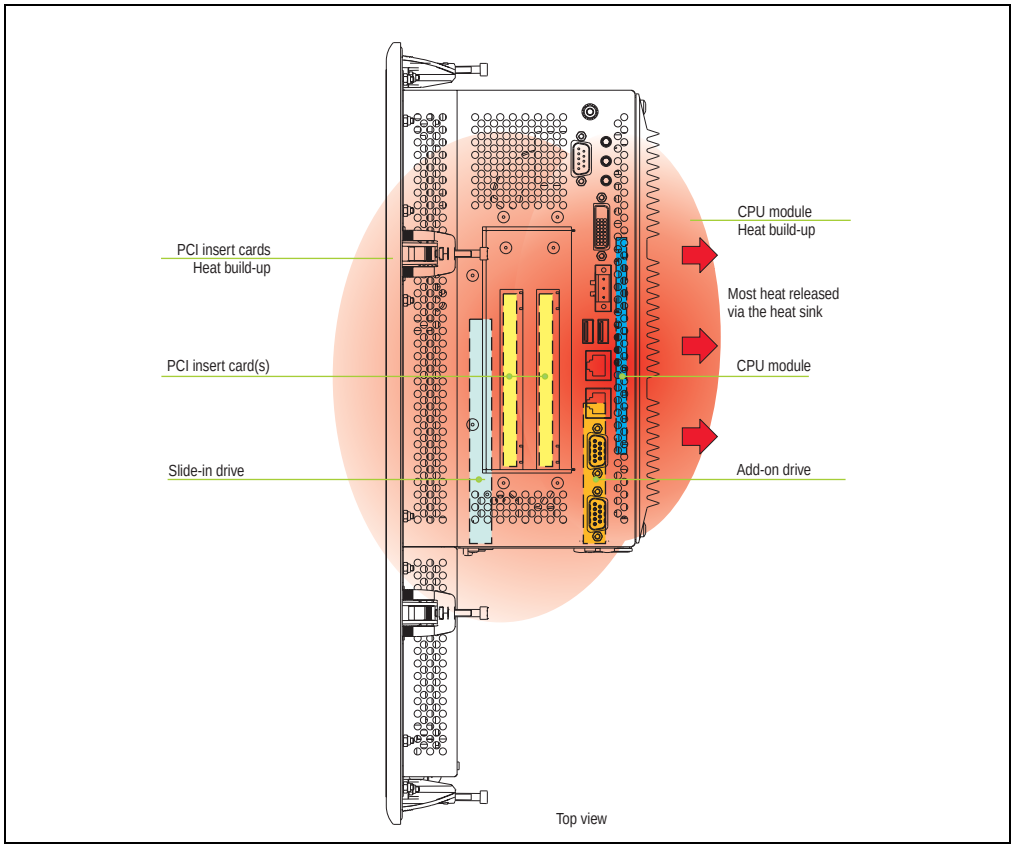


Figure 4: Example of worst-case conditions for temperature measurement

2.1.1 Ambient temperatures with system unit 5PC720.1043-00

All temperatures in Celsius (°C)	855GME CPU board without fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02				855GME CPU board with fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02					
	CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800			CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800				
	5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03			5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03			Temperature monitoring using sensor(s) in the range	
(2) Maximum ambient temperature	45	40	40	40	/	/			55	50	50	50	45	45				
(3) What can still be operated at the max. ambient temperature, or are there limits?																		
Add-on drive																		
Onboard CompactFlash [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.CFSI-00 [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.HDDI-01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.HDDI-00 (24 hours/standard)	-/25	-/25	-/25	-/25					25/35	25/35	25/35	25/35	-/30	-/30			45/55	I/O
Main memory																		
5MMDDR.0256-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5MMDDR.0512-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5MMDDR.1024-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Other insert cards Interfaces																		
5AC600.CANI-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5AC600.485I-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	

1) Only possible in connection with CompactFlash cards 5CFCRD.xxxx-02 and 5CFCRD.xxxx-03 available from B&R.

Figure 5: Ambient temperatures with 855GME CPU board and 5PC720.1043-00

For a description of this image - see section 2.1.13 "How is the maximum ambient temperature determined?".

2.1.2 Ambient temperatures with system unit 5PC720.1043-01

	All temperatures in Celsius (°C)	855GME CPU board without fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02				855GME CPU board with fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02					
		CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800			CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800				
		5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03			5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03				
	(2) Maximum ambient temperature	45	40	40	40	/	/			55	50	50	50	45	45				
(3)	What can still be operated at the max. ambient temperature, or are there limits?																	Temperature monitoring using sensor(s) in the range	
Add-on drive	Onboard CompactFlash [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
Add-on drive	5AC600.CFSI-00 [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
Add-on drive	5AC600.HDDI-01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
Add-on drive	5AC600.HDDI-00 (24 hours/standard)	-/25	-/25	-/25	-/25					25/35	25/35	25/35	25/35	-/30	-/30			45/55	I/O
Slide-in drive	5AC600.CFSS-00 [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	Slide-In crive 1
Slide-in drive	5AC600.CDXS-00	35	35	35	35					40	40	40	40	35	35			55	Slide-In crive 1
Slide-in drive	5AC600.DVDS-00	25	25	25	25					30	30	30	30	25	25			45	Slide-In crive 1
Slide-in drive	5AC600.DVRS-00	25	25	25	25					30	30	30	30	25	25			45	Slide-In crive 1
Slide-in drive	5AC600.FDDS-00	30	30	30	30					35	35	35	35	30	30			50	Slide-In crive 1
Slide-in drive	5AC600.HDDS-01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	Slide-In crive 1
Slide-in drive	5AC600.HDDS-00 (24 hours/standard)	25/35	25/35	25/35	25/35					30/40	30/40	30/40	30/40	25/35	25/35			45/55	Slide-In crive 1
Main memory	5MMDDR.0256-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Main memory	5MMDDR.0512-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Main memory	5MMDDR.1024-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Other insert cards interfaces	5AC600.CANI-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Other insert cards interfaces	5AC600.485I-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Other insert cards interfaces	5ACPCI.RAIS-00 (24 hours/standard)	25/35	25/35	25/35	25/35					30/40	30/40	30/40	30/40	25/35	25/35			-	
Other insert cards interfaces	5ACPCI.RAIS-01 (24 hours/standard)	25/35	25/35	25/35	25/35					30/40	30/40	30/40	30/40	25/35	25/35			-	

1) Only possible in connection with CompactFlash cards 5CFCRD.xxxx-02 and 5CFCRD.xxxx-03 available from B&R.

Figure 6: Ambient temperatures with 855GME CPU board and 5PC720.1043-01

For a description of this image - see section 2.1.13 "How is the maximum ambient temperature determined?".

2.1.3 Ambient temperatures with system unit 5PC720.1214-00

All temperatures in Celsius (°C)	855GME CPU board without fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02				855GME CPU board with fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02					
	CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800			CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800				
	5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03			5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03			Temperature monitoring using sensor(s) in the range	
(2) Maximum ambient temperature	45	40	40	40	/	/			55	50	50	50	45	45				
(3) What can still be operated at the max. ambient temperature, or are there limits?																		
Add-on drive																		
Onboard CompactFlash [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.CFSI-00 [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.HDDI-01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.HDDI-00 (24 hours/standard)	-/25	-/25	-/25	-/25					25/35	25/35	25/35	25/35	-/30	-/30			45/55	I/O
Main memory																		
5MMDDR.0256-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5MMDDR.0512-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5MMDDR.1024-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Other insert cards Interfaces																		
5AC600.CANI-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5AC600.485I-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	

1) Only possible in connection with CompactFlash cards 5CFCRD.xxxx-02 and 5CFCRD.xxxx-03 available from B&R.

Figure 7: Ambient temperatures with 855GME CPU board and 5PC720.1214-00

For a description of this image - see section 2.1.13 "How is the maximum ambient temperature determined?".

2.1.4 Ambient temperatures with system unit 5PC720.1214-01

TBD

Figure 8: Ambient temperatures with 855GME CPU board and 5PC720.1214-01

2.1.5 Ambient temperatures with system unit 5PC720.1505-00

All temperatures in Celsius (°C)	855GME CPU board without fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02				855GME CPU board with fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02					
	CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800			CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800				
	5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03			5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03				
(2) Maximum ambient temperature	45	40	40	40	/	/			50	50	50	50	45	45				
(3) What can still be operated at the max. ambient temperature, or are there limits?																	Temperature monitoring using sensor(s) in the range	
Add-on drive																		
Onboard CompactFlash [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.CFSI-00 [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.HDDI-01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.HDDI-00 (24 hours/standard)	-/30	-/25	-/25	-/25					30/40	25/35	25/35	25/35	-/30	-/30			45/55	I/O
5AC600.HDDI-05	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
Main memory																		
5MMDDR.0256-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5MMDDR.0512-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5MMDDR.1024-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Other insert cards interfaces																		
5AC600.CANI-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5AC600.485I-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
																	-	
																	-	

1) Only possible in connection with CompactFlash cards 5CFCRD.xxxx-02 and 5CFCRD.xxxx-03 available from B&R.

Figure 9: Ambient temperatures with 855GME CPU board and 5PC720.1505-00

For a description of this image - see section 2.1.13 "How is the maximum ambient temperature determined?".

2.1.6 Ambient temperatures with system unit 5PC720.1505-01

	All temperatures in Celsius (°C)	855GME CPU board without fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02				855GME CPU board with fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02					
		CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800			CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800				
		5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03			5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03				
	(2) Maximum ambient temperature	40	40	40	40	/	/			50	45	45	45	45	45			Temperature monitoring using sensor(s) in the range	
(3)	What can still be operated at the max. ambient temperature, or are there limits?																		
Add-on drive	Onboard CompactFlash [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
Add-on drive	5AC600.CFSI-00 [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
Add-on drive	5AC600.HDDI-01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
Add-on drive	5AC600.HDDI-00 (24 hours/standard)	-/25	-/25	-/25	-/25					30/40	25/35	-/30	-/30	-/30	-/30			45/55	I/O
Slide-in drive	5AC600.CFSS-00 [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	Slide-in drive 1
Slide-in drive	5AC600.CDXS-00	35	35	35	35					40	40	40	40	35	35			55	Slide-in drive 1
Slide-in drive	5AC600.DVDS-00	25	25	25	25					30	30	30	30	25	25			45	Slide-in drive 1
Slide-in drive	5AC600.DVRS-00	25	25	25	25					30	30	30	30	25	25			45	Slide-in drive 1
Slide-in drive	5AC600.FDDS-00	30	30	30	30					35	35	35	35	30	30			50	Slide-in drive 1
Slide-in drive	5AC600.HDDS-01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	Slide-in drive 1
Slide-in drive	5AC600.HDDS-00 (24 hours/standard)	25/35	25/35	25/35	25/35					30/40	30/40	30/40	30/40	25/35	25/35			45/55	Slide-in drive 1
Main memory	5MMDDR.0256-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Main memory	5MMDDR.0512-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Main memory	5MMDDR.1024-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Other insert cards Interfaces	5AC600.CANI-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Other insert cards Interfaces	5AC600.485I-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Other insert cards Interfaces	5ACPCI.RAIS-00 (24 hours/standard)	30/✓	30/✓	30/✓	30/✓					35/45	30/40	30/40	30/40	25/35	25/35			-	
Other insert cards Interfaces	5ACPCI.RAIS-01 (24 hours/standard)	30/✓	30/✓	30/✓	30/✓					35/45	30/40	30/40	30/40	25/35	25/35			-	

1) Only possible in connection with CompactFlash cards 5CFCRD.xxxx-02 and 5CFCRD.xxxx-03 available from B&R.

Figure 10: Ambient temperatures with 855GME CPU board and 5PC720.1505-01

For a description of this image - see section 2.1.13 "How is the maximum ambient temperature determined?".

2.1.7 Ambient temperatures with system unit 5PC720.1505-02

	All temperatures in Celsius (°C)	855GME CPU board without fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02				855GME CPU board with fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02					
		CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800			CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800				
		5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03			5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03				
	(2) Maximum ambient temperature	45	40	40	40	/	/			55	50	50	50	45	45			Temperature monitoring using sensor(s) in the range	
(3)	What can still be operated at the max. ambient temperature, or are there limits?																		
Add-on drive	Onboard CompactFlash [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
Add-on drive	5AC600.CFSI-00 [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
Add-on drive	5AC600.HDDI-01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
Add-on drive	5AC600.HDDI-00 (24 hours/standard)	-/25	-/25	-/25	-/25					25/35	25/35	25/35	25/35	-/30	-/30			45/55	I/O
Slide-in drive	5AC600.CFSS-00 [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	Slide-in drive 1
Slide-in drive	5AC600.CDXS-00	35	35	35	35					40	40	40	40	35	35			55	Slide-in drive 1
Slide-in drive	5AC600.DVDS-00	25	25	25	25					30	30	30	30	25	25			45	Slide-in drive 1
Slide-in drive	5AC600.DVRS-00	25	25	25	25					30	30	30	30	25	25			45	Slide-in drive 1
Slide-in drive	5AC600.FDDS-00	30	30	30	30					35	35	35	35	30	30			50	Slide-in drive 1
Slide-in drive	5AC600.HDDS-01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	Slide-in drive 1
Slide-in drive	5AC600.HDDS-00 (24 hours/standard)	25/35	25/35	25/35	25/35					30/40	30/40	30/40	30/40	25/35	25/35			45/55	Slide-in drive 1
Main memory	5MMDDR.0256-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Main memory	5MMDDR.0512-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Main memory	5MMDDR.1024-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Other insert cards interfaces	5AC600.CANI-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Other insert cards interfaces	5AC600.485I-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Other insert cards interfaces																		-	
Other insert cards interfaces																		-	

1) Only possible in connection with CompactFlash cards 5CFCRD.xxxx-02 and 5CFCRD.xxxx-03 available from B&R.

Figure 11: Ambient temperatures with 855GME CPU board and 5PC720.1505-02

For a description of this image - see section 2.1.13 "How is the maximum ambient temperature determined?".

2.1.8 Ambient temperatures with system unit 5PC720.1706-00

TBD

Figure 12: Ambient temperatures with 855GME CPU board and 5PC720.1706-00

2.1.9 Ambient temperatures with system unit 5PC720.1906-00

TBD

Figure 13: Ambient temperatures with 855GME CPU board and 5PC720.1906-00

2.1.10 Ambient temperatures with system unit 5PC781.1043-00

All temperatures in Celsius (°C)	855GME CPU board without fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02				855GME CPU board with fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02					
	CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800			CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800				
	5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03			5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03				
(2) Maximum ambient temperature	45	40	40	40	/	/			55	50	50	50	45	45				
(3) What can still be operated at the max. ambient temperature, or are there limits?																	Temperature monitoring using sensor(s) in the range	
Add-on drive: Onboard CompactFlash [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
Add-on drive: 5AC600.CFSI-00 [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
Add-on drive: 5AC600.HDDI-01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
Add-on drive: 5AC600.HDDI-00 (24 hours/standard)	-/25	-/25	-/25	-/25					25/35	25/35	25/35	25/35	-/30	-/30			45/55	I/O
Main memory: 5MMDDR.0256-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Main memory: 5MMDDR.0512-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Main memory: 5MMDDR.1024-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Other insert cards Interfaces: 5AC600.CANI-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Other insert cards Interfaces: 5AC600.485I-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	

1) Only possible in connection with CompactFlash cards 5CFCRD.xxxx-02 and 5CFCRD.xxxx-03 available from B&R.

Figure 14: Ambient temperatures with 855GME CPU board and 5PC781.1043-00

For a description of this image - see section 2.1.13 "How is the maximum ambient temperature determined?".

2.1.11 Ambient temperatures with system unit 5PC781.1505-00

All temperatures in Celsius (°C)	855GME CPU board without fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02				855GME CPU board with fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02					
	CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800			CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800				
	5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03			5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03			Temperature monitoring using sensor(s) in the range	
(2) Maximum ambient temperature	45	40	40	40	/	/			50	50	50	50	45	45				
(3) What can still be operated at the max. ambient temperature, or are there limits?																		
Add-on drive																		
Onboard CompactFlash [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.CFSI-00 [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.HDDI-01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.HDDI-00 (24 hours/standard)	-/30	-/25	-/25	-/25					30/40	25/35	25/35	25/35	-/30	-/30			45/55	I/O
Main memory																		
5MMDDR.0256-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5MMDDR.0512-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5MMDDR.1024-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Other insert cards Interfaces																		
5AC600.CANI-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5AC600.485I-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
																	-	
																	-	

1) Only in connection with CompactFlash cards 5CFCRD.xxxx-02 and 5CFCRD.xxxx-03 available from B&R.

Figure 15: Ambient temperatures with 855GME CPU board and 5PC781.1505-00

For a description of this image - see section 2.1.13 "How is the maximum ambient temperature determined?".

2.1.12 Ambient temperatures with system unit 5PC782.1043-00

All temperatures in Celsius (°C)	855GME CPU board without fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02				855GME CPU board with fan kit (1) and heat sink 5AC700.HS01-01				and heat sink 5AC700.HS01-02					
	CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800			CM 600	CM 1000	PM 1100	PM 1400	PM 1600	PM 1800				
	5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03			5PC600.E855-04	5PC600.E855-05	5PC600.E855-00	5PC600.E855-02	5PC600.E855-01	5PC600.E855-03				
(2) Maximum ambient temperature	45	40	40	40	/	/			55	50	50	50	45	45				
(3) What can still be operated at the max. ambient temperature, or are there limits?																	Temperature monitoring using sensor(s) in the range	
Add-on drive																		
Onboard CompactFlash [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.CFSI-00 [1]	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.HDDI-01	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			80	I/O
5AC600.HDDI-00 (24 hours/standard)	-/25	-/25	-/25	-/25					25/35	25/35	25/35	25/35	-/30	-/30			45/55	I/O
Main memory																		
5MMDDR.0256-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5MMDDR.0512-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5MMDDR.1024-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
Other insert cards Interfaces																		
5AC600.CANI-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	
5AC600.485I-00	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			-	

1) Only possible in connection with CompactFlash cards 5CFCRD.xxxx-02 and 5CFCRD.xxxx-03 available from B&R.

Figure 16: Ambient temperatures with 855GME CPU board and 5PC782.1043-00

For a description of this image - see section 2.1.13 "How is the maximum ambient temperature determined?".

2.1.13 How is the maximum ambient temperature determined?

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

2) The "maximum ambient temperature" line shows the maximum ambient temperature for the entire system (= system unit + CPU board).

3) Incorporating additional drives (add-on, slide-in), main memory, additional insert cards, etc. can change the temperature limits of a Panel PC 700 system.

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

If there is a specific temperature, for example "35", next to the component, then the ambient temperature of the whole Panel PC 700 system cannot exceed this temperature.

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

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

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

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

Information:

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

2.1.14 Temperature monitoring

The PPC700 has temperature sensors in various places (I/O, power supply, slide-in drive 1). The locations of the temperature sensors can be found in figure "Temperature sensor locations" on page 459. The value listed in the table represents the defined maximum temperature for this measurement point[2] . When this temperature is exceeded, an alarm is triggered. The temperatures[2] can be read in BIOS (menu item "Advanced" - Baseboard/panel features - Baseboard monitor) or in Microsoft Windows XP/embedded, using the B&R Control Center.
Additionally, the hard disks for PPC700 systems available from B&R are equipped with S.M.A.R.T, or Self Monitoring, Analysis, and Reporting Technology. This makes it possible to read various parameters, for example the temperature, using software (e.g. HDD thermometer - freeware) in Microsoft Windows XP/embedded.

1) 24-hour operation = 732 POH (Power On Hours) per month, standard operation = 250 POH or 333 POH (Power On Hours) per month.
2) The measured temperature is a guideline for the immediate ambient temperature, but can be influenced by neighboring components.

2.2 Power management

The following block diagram presents the simplified structure of the PPC700 supply voltage for all types.

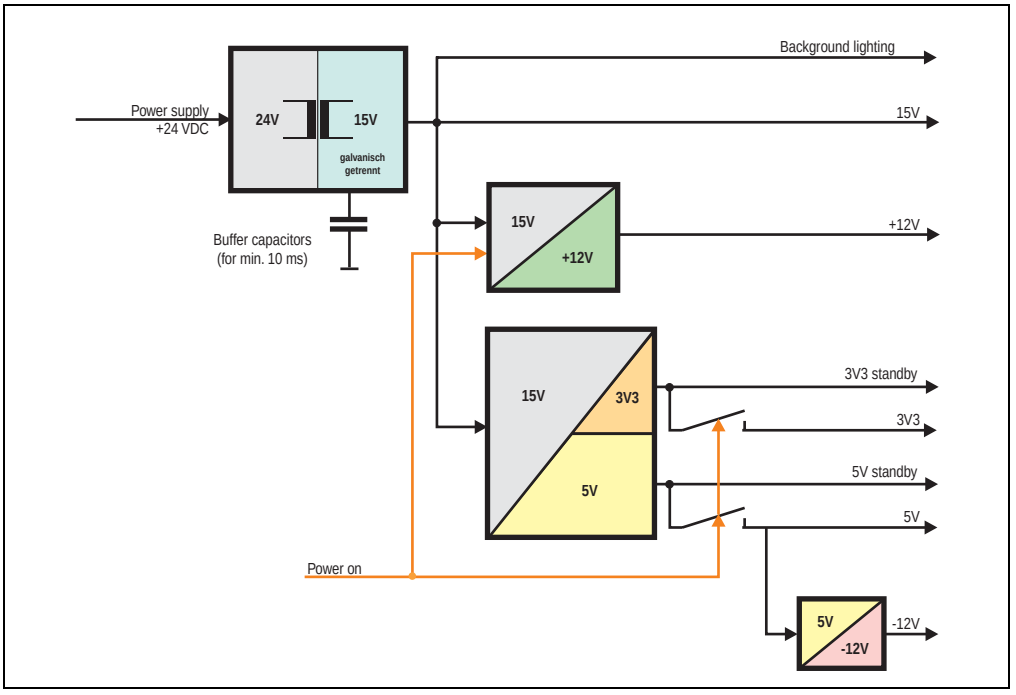


Figure 17: Block diagram - supply voltage

Explanation:

The supply voltage (+24 VDC) is converted to 15 V with a DC/DC converter. The electrically isolated 15 V is used to feed two further DC/DC converters (generation of +12 V, 3V3 and 5V standby) as well as the background lighting.

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

2.2.1 10.4" Panel PC 700

All values in watts		10.4" Panel PC 700									Current system
		C3 400 5PC600.E815-00	C3 733 5PC600.E815-02	C3 1000 5PC600.E815-03	CM 600 5PC600.E855-04	CM 1000 5PC600.E855-05	PM 1100 5PC600.E855-00	PM 1400 5PC600.E855-02	PM 1600 5PC600.E855-01	PM 1800 5PC600.E855-03	
Total power supply		Total power supply power (maximum)									110
	Total power supply, permanent consumers	9	9	9	9	9	9	9	9	9	
5V		Maximum possible at 5V									55
	CPU board, permanent consumers	14	18	25	17	21	23	23	37	37	
	Per CompactFlash, optional (add-on, slide-in)	1	1	1	1	1	1	1	1	1	
	Hard disk, optional (add-on, slide-in)	4	4	4	4	4	4	4	4	4	
	Per drive, optional (slide-in CD, DVD CD-RW)	4	4	4	4	4	4	4	4	4	
	External PS/2 keyboard, optional	1	1	1	1	1	1	1	1	1	
	USB peripheral, optional (max. 2.5 W per USB1 or USB2 connection)	5	5	5	5	5	5	5	5	5	
	Interface option (add-on interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
	PCI card manufacturer power specification, optional (max. 3 W without fan kit, max. 17 W with fan kit) 1)										
	External consumers, optional (via base board)	5	5	5	5	5	5	5	5	5	
	Keys/LEDs, permanent consumers (dep. on system unit)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
		5V consumers Σ									
3V3		Maximum possible at 3V3									23
	System unit, permanent consumers	5	5	5	5	5	5	5	5	5	
	Interface option (add-on interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
	PCI card manufacturer power specification, optional (max. 3 W without fan kit, max. 17 W with fan kit) 1)										
		3V3 consumers Σ									
+12V		Maximum possible at +12V									12
	Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
	External consumers, optional (via base board)	10	10	10	10	10	10	10	10	10	
	PCI card manufacturer power specification, optional (max. 3 W without fan kit, max. 12 W with fan kit) 1)										
		+12V consumers Σ									
-12V		Maximum possible at -12V									1,2
	PCI card manufacturer power specification, optional (max. 1.2 W with and without fan kit) 1)										
		-12V consumers Σ									
		All consumers Σ									

1) The total power of a PCI card per PCI slot (=sum of the power consumption per voltage range) may not exceed the max. power specifications with and without fan kit.

Figure 18: Power management - 10.4" Panel PC 700

2.2.2 12.1" Panel PC 700

All values in watts		12.1" Panel PC 700									Current system
		C3 400 5PC600.E815-00	C3 733 5PC600.E815-02	C3 1000 5PC600.E815-03	CM 600 5PC600.E855-04	CM 1000 5PC600.E855-05	PM 1100 5PC600.E855-00	PM 1400 5PC600.E855-02	PM 1600 5PC600.E855-01	PM 1800 5PC600.E855-03	
Total power supply		Total power supply power (maximum)									110
Total power supply	Total power supply, permanent consumers	10	10	10	10	10	10	10	10	10	
Total power supply	5V	Maximum possible at 5V									55
Total power supply	5V	CPU board, permanent consumers	14	18	25	17	21	23	23	37	37
Total power supply	5V	Per CompactFlash, optional (add-on, slide-in)	1	1	1	1	1	1	1	1	1
Total power supply	5V	Hard disk, optional (add-on, slide-in)	4	4	4	4	4	4	4	4	4
Total power supply	5V	Per drive, optional (slide-in CD, DVD CD-RW)	4	4	4	4	4	4	4	4	4
Total power supply	5V	External PS/2 keyboard, optional	1	1	1	1	1	1	1	1	1
Total power supply	5V	USB peripheral, optional (max. 2.5 W per USB1 or USB2 connection)	5	5	5	5	5	5	5	5	5
Total power supply	5V	Interface option (add-on interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Total power supply	5V	PCI card manufacturer power specification, optional (max. 3 W without fan kit, max. 17 W with fan kit)[1]									
Total power supply	5V	External consumers, optional (via base board)	5	5	5	5	5	5	5	5	5
Total power supply		5V consumers Σ									
Total power supply	3V3	Maximum possible at 3V3									23
Total power supply	3V3	System unit, permanent consumers	5	5	5	5	5	5	5	5	5
Total power supply	3V3	Interface option (add-on interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Total power supply	3V3	PCI card manufacturer power specification, optional (max. 3 W without fan kit, max. 17 W with fan kit)[1]									
Total power supply		3V3 consumers Σ									
Total power supply	+12V	Maximum possible at +12V									12
Total power supply	+12V	Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Total power supply	+12V	External consumers, optional (via base board)	10	10	10	10	10	10	10	10	10
Total power supply	+12V	PCI card manufacturer power specification, optional (max. 3 W without fan kit, max. 12 W with fan kit)[1]									
Total power supply		+12V consumers Σ									
Total power supply	-12V	Maximum possible at -12V									1,2
Total power supply	-12V	PCI card manufacturer power specification, optional (max. 1.2 W with and without fan kit)[1]									
Total power supply		-12V consumers Σ									
Total power supply		All consumers Σ									

1) The total power of a PCI card per PCI slot (=sum of the power consumption per voltage range) may not exceed the max. power specifications with and without fan kit.

Figure 19: Power management - 12.1" Panel PC 700

2.2.3 15" Panel PC 700

All values in watts		15" Panel PC 700									Current system
		C3 400 5PC600.E815-00	C3 733 5PC600.E815-02	C3 1000 5PC600.E815-03	CM 600 5PC600.E855-04	CM 1000 5PC600.E855-05	PM 1100 5PC600.E855-00	PM 1400 5PC600.E855-02	PM 1600 5PC600.E855-01	PM 1800 5PC600.E855-03	
Total power supply		Total power supply power (maximum)									110
	Total power supply, permanent consumers	22	22	22	22	22	22	22	22	22	
5V		Maximum possible at 5V									55
	CPU board, permanent consumers	14	18	25	17	21	23	23	37	37	
	Per CompactFlash, optional (add-on, slide-in)	1	1	1	1	1	1	1	1	1	
	Hard disk, optional (add-on, slide-in)	4	4	4	4	4	4	4	4	4	
	Per drive, optional (slide-in CD, DVD CD-RW)	4	4	4	4	4	4	4	4	4	
	External PS/2 keyboard, optional	1	1	1	1	1	1	1	1	1	
	USB peripheral, optional (max. 2.5 W per USB1 or USB2 connection)	5	5	5	5	5	5	5	5	5	
	Interface option (add-on interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
	PCI card manufacturer power specification, optional (max. 3 W without fan kit, max. 17 W with fan kit)[1]										
	External consumers, optional (via base board)	5	5	5	5	5	5	5	5	5	
	Keys/LEDs, perm. consumers (dep. on system unit)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
		5V consumers Σ									
3V3		Maximum possible at 3V3									23
	System unit, permanent consumers	7	7	7	7	7	7	7	7	7	
	Interface option (add-on interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
	PCI card manufacturer power specification, optional (max. 3 W without fan kit, max. 17 W with fan kit)[1]										
		3V3 consumers Σ									
+12V		Maximum possible at +12V									12
	Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
	External consumers, optional (via base board)	10	10	10	10	10	10	10	10	10	
	PCI card manufacturer power specification, optional (max. 3 W without fan kit, max. 12 W with fan kit)[1]										
		+12V consumers Σ									
-12V		Maximum possible at -12V									1,2
	PCI card manufacturer power specification, optional (max. 1.2 W with and without fan kit)[1]										
		-12V consumers Σ									
		All consumers Σ									

1) The total power of a PCI card per PCI slot (=sum of the power consumption per voltage range) may not exceed the max. power specifications with and without fan kit.

Figure 20: Power management - 15" Panel PC 700

2.2.4 17" Panel PC 700

All values in watts

		17" Panel PC 700						Current system
		CM 600 5PC600.E855-04	CM 1000 5PC600.E855-05	PM 1100 5PC600.E855-00	PM 1400 5PC600.E855-02	PM 1600 5PC600.E855-01	PM 1800 5PC600.E855-03	
Total power supply	Total power supply power (maximum)							110
	Total power supply, permanent consumers	25	25	25	25	25	25	
5V	Maximum possible at 5V							55
	CPU board, permanent consumers	17	21	23	23	37	37	
	Per CompactFlash, optional (add-on, slide-in)	1	1	1	1	1	1	
	Hard disk, optional (add-on, slide-in)	4	4	4	4	4	4	
	External PS/2 keyboard, optional	1	1	1	1	1	1	
	USB peripheral, optional (max. 2.5 W per USB1 or USB2 connection)	5	5	5	5	5	5	
	Interface option (add-on interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	
	External consumers, optional (via base board)	5	5	5	5	5	5	
	5V consumers Σ							
3V3	Maximum possible at 3V3							23
	System unit, permanent consumers	6	6	6	6	6	6	
	Interface option (add-on interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	
	3V3 consumers Σ							
+12V	Maximum possible at +12V							12
	Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	
	External consumers, optional (via base board)	10	10	10	10	10	10	
	+12V consumers Σ							
	All consumers Σ							

Figure 21: Power management - 17" Panel PC 700

2.2.5 19" Panel PC 700

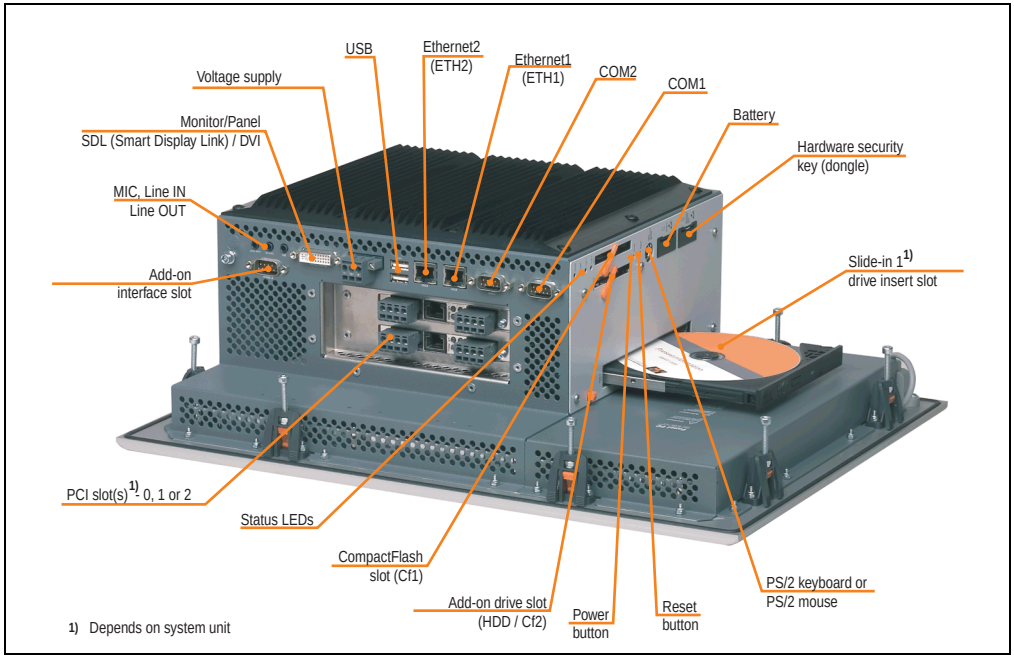
All values in watts

		19" Panel PC 700						Current system
		CM 600 5PC600.E855-04	CM 1000 5PC600.E855-05	PM 1100 5PC600.E855-00	PM 1400 5PC600.E855-02	PM 1600 5PC600.E855-01	PM 1800 5PC600.E855-03	
Total power supply	Total power supply power (maximum)							110
	Total power supply, permanent consumers	25	25	25	25	25	25	
5V	Maximum possible at 5V							55
	CPU board, permanent consumers	17	21	23	23	37	37	
	Per CompactFlash, optional (add-on, slide-in)	1	1	1	1	1	1	
	Hard disk, optional (add-on, slide-in)	4	4	4	4	4	4	
	External PS/2 keyboard, optional	1	1	1	1	1	1	
	USB peripheral, optional (max. 2.5 W per USB1 or USB2 connection)	5	5	5	5	5	5	
	Interface option (add-on interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	
	External consumers, optional (via base board)	5	5	5	5	5	5	
	5V consumers Σ							
3V3	Maximum possible at 3V3							23
	System unit, permanent consumers	6	6	6	6	6	6	
	Interface option (add-on interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	
	3V3 consumers Σ							
+12V	Maximum possible at +12V							12
	Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	
	External consumers, optional (via base board)	10	10	10	10	10	10	
	+12V consumers Σ							
	All consumers Σ							

Figure 22: Power management - 19" Panel PC 700

2.3 Device interfaces

The following image shows the general and optional device interfaces for an entire Panel PC 700 device.



Depending on system unit, the device interfaces will vary only in the number of PCI slots and the presence of a slide-in drive slot.

2.3.1 Serial interfaces COM1

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

Table 18: Pin assignments - COM1

I/O address and IRQ

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

Table 19: COM1 - I/O address and IRQ

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

2.3.2 Serial interfaces COM2

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

Table 20: Pin assignments - COM2

I/O address and IRQ

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

Table 21: COM2 - I/O address and IRQ

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

2.3.3 Ethernet connection ETH1

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

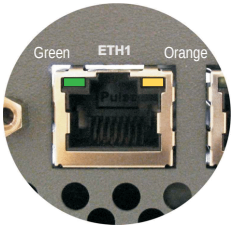
Ethernet connection (ETH1)			
Controller	Intel 82562		RJ45 twisted pair (10BaseT/100BaseT), female 
Cabling	S/STP (category 5)		
Transfer rate	10/100 MBit/s [1]		
LED	**On**	**Off**	
Green	100 MBit/s	10 MBit/s	
Orange	Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)	

Table 22: Ethernet connection (ETH1)

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

Driver support

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

2.3.4 Ethernet connection ETH2

This Ethernet connection is integrated in the system unit.

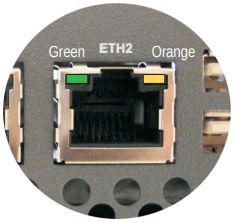
Ethernet connection (ETH2)			
Controller	Intel 82551ER		RJ45 twisted pair (10BaseT/100BaseT), female 
Cabling	S/STP (category 5)		
Transfer rate	10/100 MBit/s 1)		
LED	**On**	**Off**	
Green	100 MBit/s	10 MBit/s	
Orange	Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)	

Table 23: Ethernet connection (ETH2)

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

Driver support

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

2.3.5 USB port

All PPC700 devices have a USB 2.0 (Universal Serial Bus) Host Controller with multiple USB ports, 3 of which (2x back, 1x front) are on the outside for easy user access.

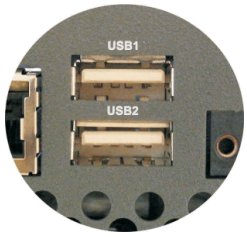
Universal serial bus		
Transfer rate	Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)	USB type A, female  Back side Front side
Power supply	Max. 500 mA per Port[1)]	
Maximum cable length	5 m (not including hub)	

Table 24: USB port - back

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

Warning!

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

Important!

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

Driver support

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

2.3.6 Supply voltage

The PPC700 system units have a 24 VDC ATX compatible power supply.

System unit	Max. performance at + 5 V	Max. performance at + 3V3	Max. power at + 12 V	Max. power at - 12 V	Max. total power
All types	55	23	12	1.2	110

Table 25: Power supply

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 Panel PC 700 housing. The supply voltage is internally protected (10A, fast-acting), so that the device cannot be damaged if there is an overload (fuse replacement necessary) or if the voltage supply is connected incorrectly (reverse polarity protection - fuse replacement not necessary).

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

Figure 23: Supply voltage connection

Ground

Important!

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

PPC700 systems are equipped with a ground connection. The M4 self-locking nut can be used, for example, to fasten a copper strip that is built into the PPC700 at a central grounding point in the switching cabinet or system. The largest possible conductor cross section should be used (at least 2.5 mm²).

Figure 24: Ground connection

2.3.7 Monitor / Panel connection

When using this video output, understand that the video signals that are available (RGB, DVI, and SDL - Smart Display Link) will vary depending on the system unit and CPU board. DVI hotplug is not supported

Monitor / Panel		
The following will provide an overview of the video signals available with different system units and CPU boards.		24-pin DVI-I with special functions, female
System unit	**815E board**	**855GME board**
5PC720.1043-00	RGB	RGB, DVI, SDL
5PC720.1043-01	RGB	RGB, DVI, SDL
5PC720.1214-00	RGB	RGB, DVI, SDL
5PC720.1214-01	RGB	RGB, DVI, SDL
5PC720.1505-00	RGB	RGB, DVI, SDL
5PC720.1505-01	RGB	RGB, DVI, SDL
5PC720.1505-02	RGB	RGB, DVI, SDL
5PC720.1706-00	RGB	RGB, DVI, SDL
5PC720.1906-00	RGB	RGB, DVI, SDL
5PC781.1043-00	RGB	RGB, DVI, SDL
5PC781.1505-00	RGB	RGB, DVI, SDL
5PC782.1043-00	RGB	RGB, DVI, SDL

Figure 25: Monitor / Panel connection

2.3.8 MIC, Line IN and Line OUT Port

All PPC700 systems include an AC97 (specification 2.2) compatible sound chip with access to the channels MIC, Line IN and Line OUT from the outside.

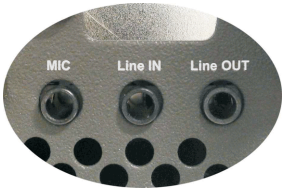
MIC, Line IN and Line OUT		
Controller	Realtek AC97	3.5 mm socket, female 
MIC	Connection of a mono microphone with a 3.5 mm stereo (headphone) jack.	
Line IN	Stereo Line IN signal supplied via 3.5 mm plug.	
Line OUT	Connection of a stereo sound reader (e.g. amplifier) via a 3.5 mm plug.	

Table 26: MIC, Line IN and Line OUT port

Driver support

Special drivers are necessary for operating the AC97 sound chip (Realtek). Drivers for Windows XP Professional and Windows XP Embedded are available for download on the B&R Homepage in the download area (**www.br-automation.com**).

2.3.9 Add-on interface slot

An optional add-on interface (e.g. CAN, RS485) can be installed here. See also section 3.7 "Interface options" on page 197.

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

Table 27: Add-on interface slot

Information:

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

2.3.10 PCI slots

Up to 2 PCI slots are available, depending on the system unit. 5 volt cards and universal cards that comply with the PCI half-size standard 2.2 and do not exceed the following dimensions can be inserted.

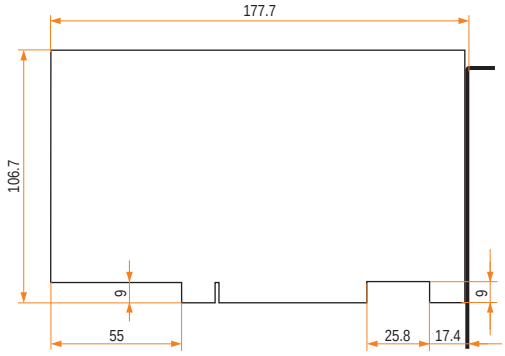


Figure 26: Dimensions - standard half-size PCI cards.

Information:

The total performance of one PCI card per PCI slot should not exceed the limit with or without a fan kit (see section 2.2 "Power management").

Technical data

Features	PCI bus properties
Default	PCI 2.2
Design	Half-size PCI
PCI bus type	32 bit
PCI bus speed	33 MHz

Table 28: Technical data - PCI bus

Voltages on the PCI slot plug

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

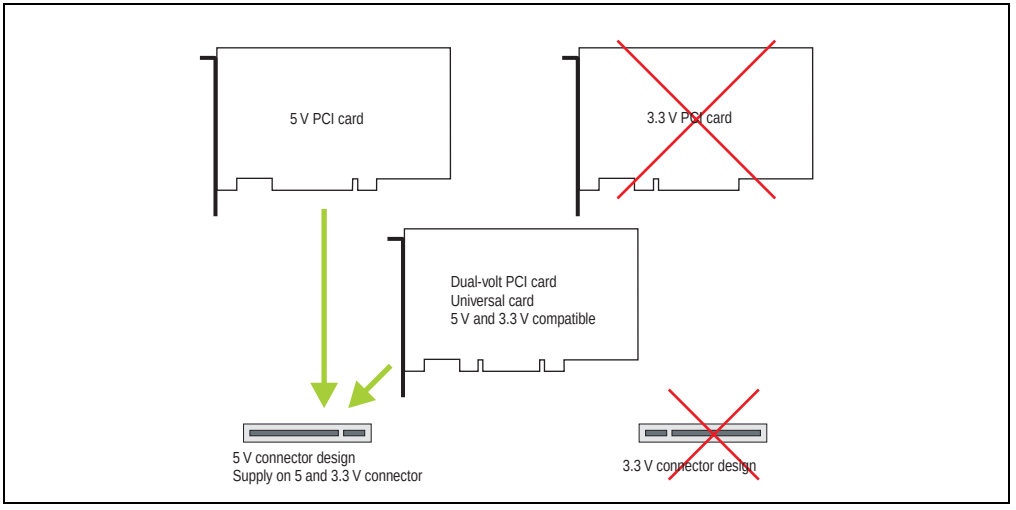


Figure 27: PCI connector type: 5 volt

2.3.11 Status LEDs

The status LEDs are integrated 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).
HDD	Yellow	On	Signals IDE drive access (CF, HDD, CD, etc.)
Link 1	Yellow	On	Active SDL connection.
		blinking	An active SDL connection has been interrupted by a loss of power in the display unit.
Link 2	Yellow	-	In preparation

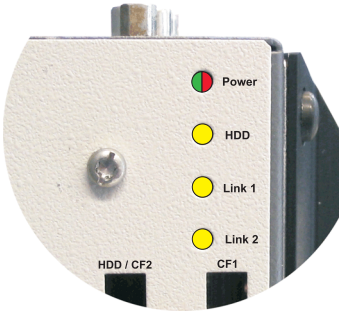


Table 29: Status LEDs

2.3.12 CompactFlash slot (CF1)

This CompactFlash slot is a fixed component of an PPC700 system, and is defined in BIOS as the primary master drive. Available CompactFlash cards - see table 13 "Model numbers - CompactFlash cards" on page 26.

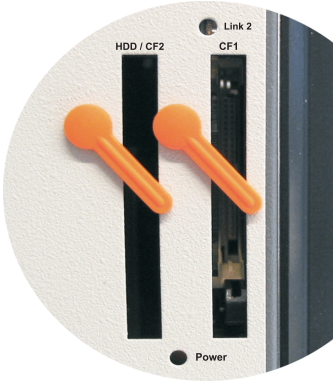
CompactFlash slot (CF1)		
Connection	Primary master IDE device	
CompactFlash Type	Type I	
Accessories	**Short description**	
5CFCRD.0064-03	CompactFlash 64 MB SSI	
5CFCRD.0128-03	CompactFlash 128 MB SSI	
5CFCRD.0256-03	CompactFlash 256 MB SSI	
5CFCRD.0512-03	CompactFlash 512 MB SSI	
5CFCRD.1024-03	CompactFlash 1024 MB SSI	
5CFCRD.2048-03	CompactFlash 2048 MB SSI	
5CFCRD.4096-03	CompactFlash 4096 MB SSI	

Table 30: CompactFlash slot (CF1)

Warning!

The power must be shut off before inserting or removing the CompactFlash card.

2.3.13 Hard disk / CompactFlash slot (HDD/CF2)

This slot allows for installation of a hard disk or a second CompactFlash slot as so-called add-on drives (see table 8 "Model numbers - drives" for available add-on drives). The add-on drive is referred to in BIOS as the primary slave drive.

Information:

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

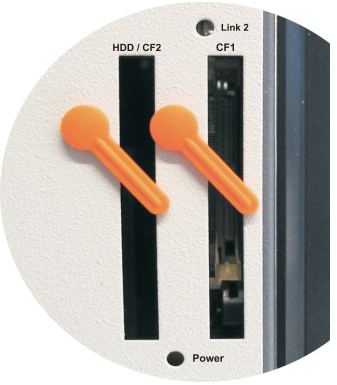
Hard disk / CompactFlash slot (HDD/CF2)		
Connection	Primary slave IDE device	
Add-on hard disks - 2.5" drive (internal)		
5AC600.HDDI-00	Add-on hard disk 30 GB 24/7	
5AC600.HDDI-01	Add-on hard disk 20 GB ET	
5AC600.HDDI-05	Add-on hard disk 40 GB ET, 24/7	
Add-on CompactFlash slot		
5AC600.CFSI-00	Add-on CompactFlash slot	
CompactFlash Type	Type I	
Accessories	**Short description**	
5CFCRD.0064-03	CompactFlash 64 MB SSI	
5CFCRD.0128-03	CompactFlash 128 MB SSI	
5CFCRD.0256-03	CompactFlash 256 MB SSI	
5CFCRD.0512-03	CompactFlash 512 MB SSI	
5CFCRD.1024-03	CompactFlash 1024 MB SSI	
5CFCRD.2048-03	CompactFlash 2048 MB SSI	
5CFCRD.4096-03	CompactFlash 4096 MB SSI	

Table 31: Hard disk / CompactFlash slot (HDD/CF2)

Warning!

The power must be shut off before inserting or removing the CompactFlash card.

2.3.14 Power button

Due to the complete ATX power supply support, the power button serves various functions. These functions can be configured either in the BIOS setup (see BIOS function "Power button function" in section "Power" on page 263 for 815E CPU boards, or section "Power" on page 318 for 855GME CPU boards) or, for example, in the operating system Windows XP.

Power button	
The power button can be pressed with a pointed object (i.e. paper clip or tip of a pen). The power button acts like the on/off switch on a normal desktop PC with ATX power supply: **press and release** ... Switches on PPC700 or shuts down operating system and switches off the PPC700. **press and hold** ... ATX power supply switches off without shutting down the APC620 (**data could be lost!**). Pressing the power button does not reset the MTCX processor.	

Table 32: Power button

2.3.15 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 PPC700 is restarted (cold restart). The MTCX processor is not reset when the reset button is pressed.	

Table 33: Reset button

Warning!

A reset triggered by actuating the reset button can cause data to be lost!

2.3.16 PS/2 keyboard/mouse

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

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

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

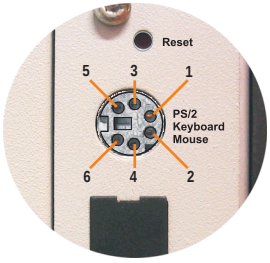
Connection for keyboard/mouse (PS/2)		
Pin	Assignment	PS/2 socket, female
1	DATA 0	
2	DATA 1	
3	GND	
4	+5 V [1)]	
5	CLK 0	
6	CLK 1	

Table 34: Connection for external keyboard/mouse (PS/2)

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

Warning!

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

Information:

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

2.3.17 Battery

The lithium battery (3 V, 950 mAh) buffers the internal real-time clock (RTC) as well as the individually saved BIOS settings and is located behind the black cover. The buffer duration of the battery is at least 4 years (at 50°C, 8.5 mA current requirements of the supplied components and a self discharge of 40%).

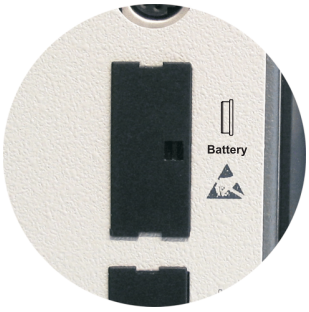
Battery		
Battery Type Removable Lifespan	 Renata 950 mAh Yes, accessible from the outside 4 years at 50°C	
Accessories	**Short description**	
0AC201.9	**Lithium batteries (5x)** Lithium batteries, 5 pcs., 3 V / 950 mAh, button cell	
4A0006.00-000	**Lithium battery (1x)** Lithium battery, 1 pc., 3 V / 950 mAh, button cell	

Table 35: Battery

For more on changing the lithium battery, see chapter 7 "Maintenance / servicing", section 1 "Changing the battery" on page 445.

2.3.18 Hardware security key

B&R recommends a dongle (security key) 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 36: Hardware security key

Warning!

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

2.3.19 Slide-in slot 1 drive slot

This slide-in slot 1 drive slot exists only in PPC700 system units with 2 PCI slots. It is possible to insert a number of slide-in drives into it. See table for available slide-in drives 8 "Model numbers - drives" on page 23.

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

Information:

- **It is possible to add, remove, or modify the slide-in drive at any time.**

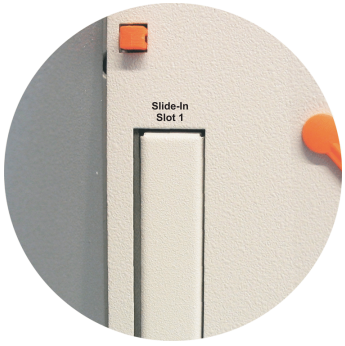
Slide-in slot 1		
Connection	Secondary slave IDE device	
Accessories	**Short description**	
5AC600.CDXS-00	Slide-in CD-ROM	
5AC600.CFSS-00	Slide-in CF 2-slot	
5AC600.DVDS-00	Slide-in DVD-ROM/CD-RW	
5AC600.FDDS-00	Slide-in USB FDD	
5AC600.HDDS-00	Slide-in hard disk 30 GB 24x7	
5AC600.HDDS-01	Slide-in hard disk 20 GB ET	
5AC600.HDDS-02	Slide-in hard disk 40 GB ET, 24x7	

Table 37: Slide-in slot 1

Caution!

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

2.4 Serial number sticker

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

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

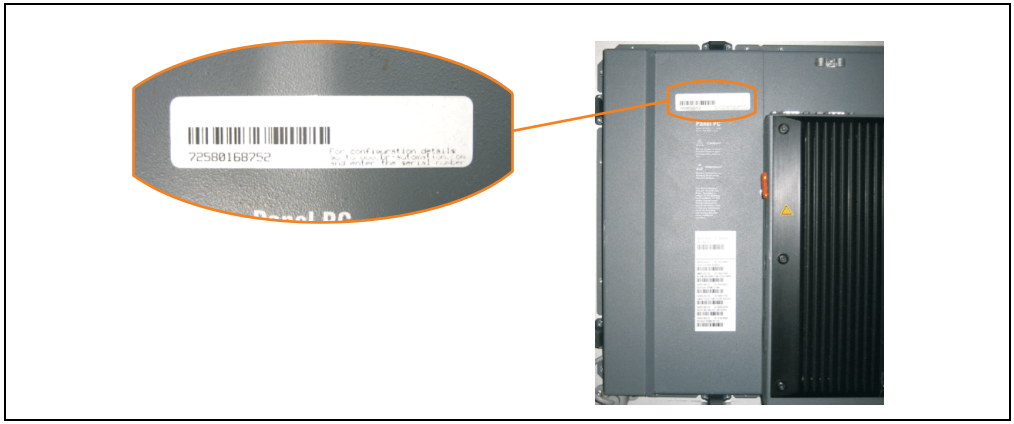


Figure 28: Serial number sticker for PPC700 assembly (back)

A sticker with detailed information about the individual components can also be found at a suitable location.

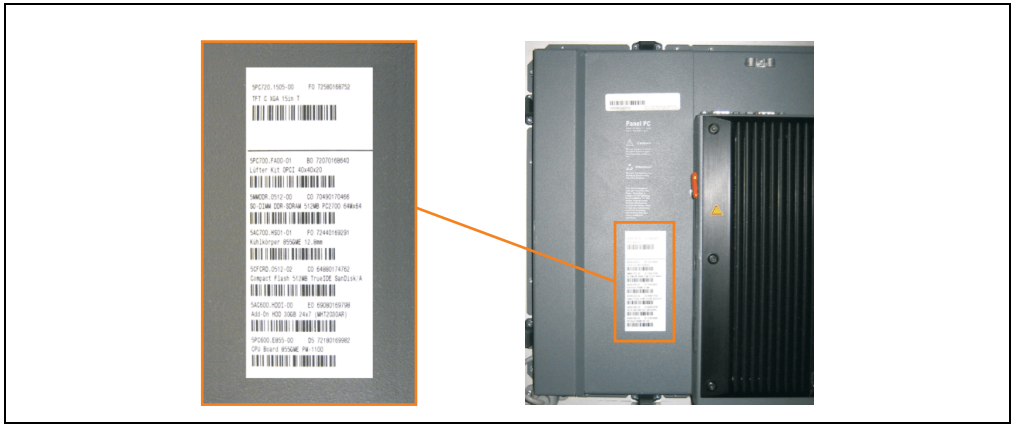


Figure 29: Serial number stickers for individual PPC700 components

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

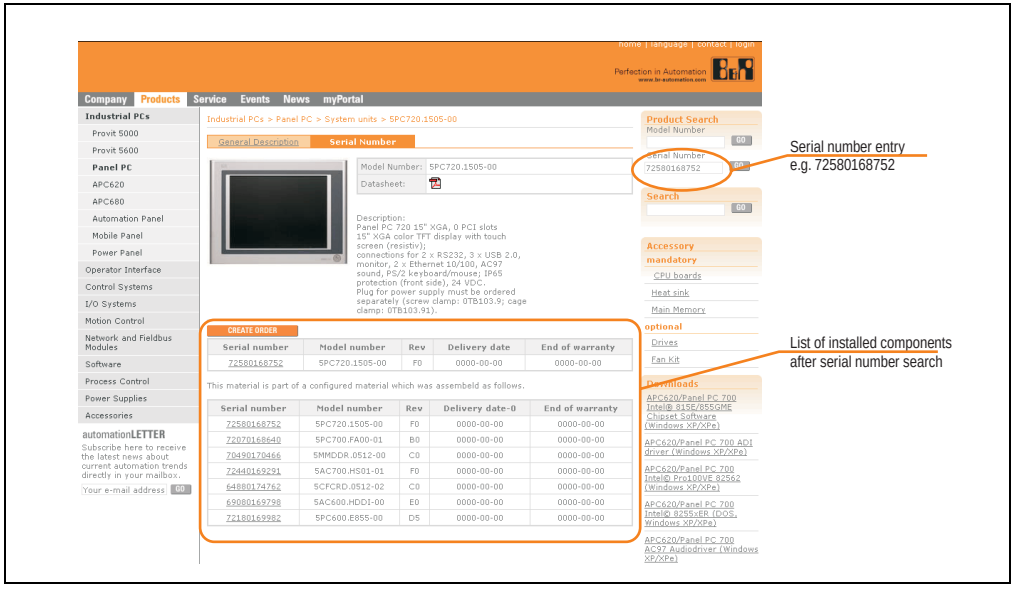


Figure 30: Example of serial number search: 72580168752

3. Individual components

3.1 System units

All components (CPU board, fan, main memory, drives) are connected together to form the system unit.

3.1.1 Panel PC 5PC720.1043-00

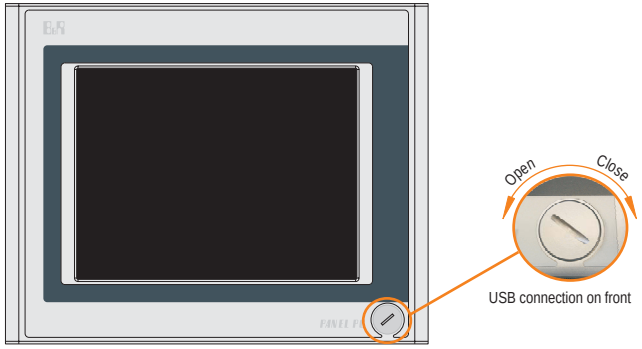


Figure 31: Front view 5PC720.1043-00

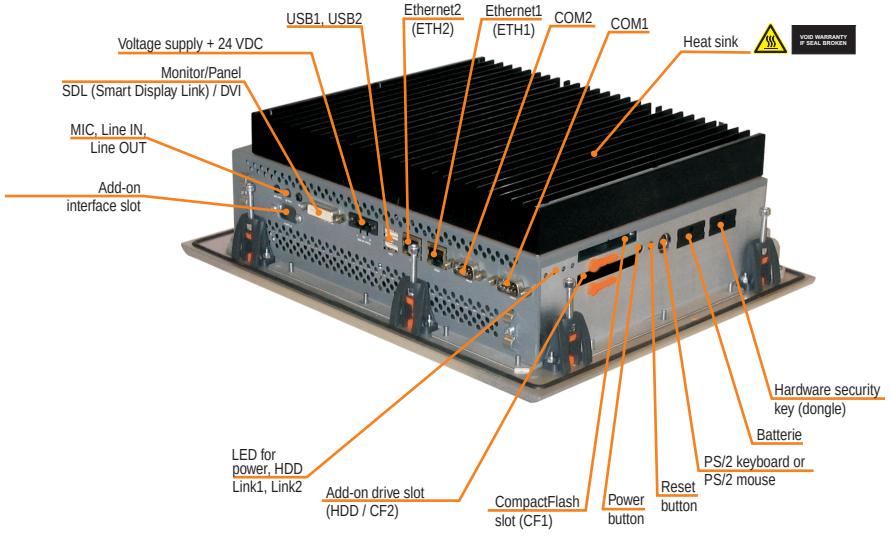


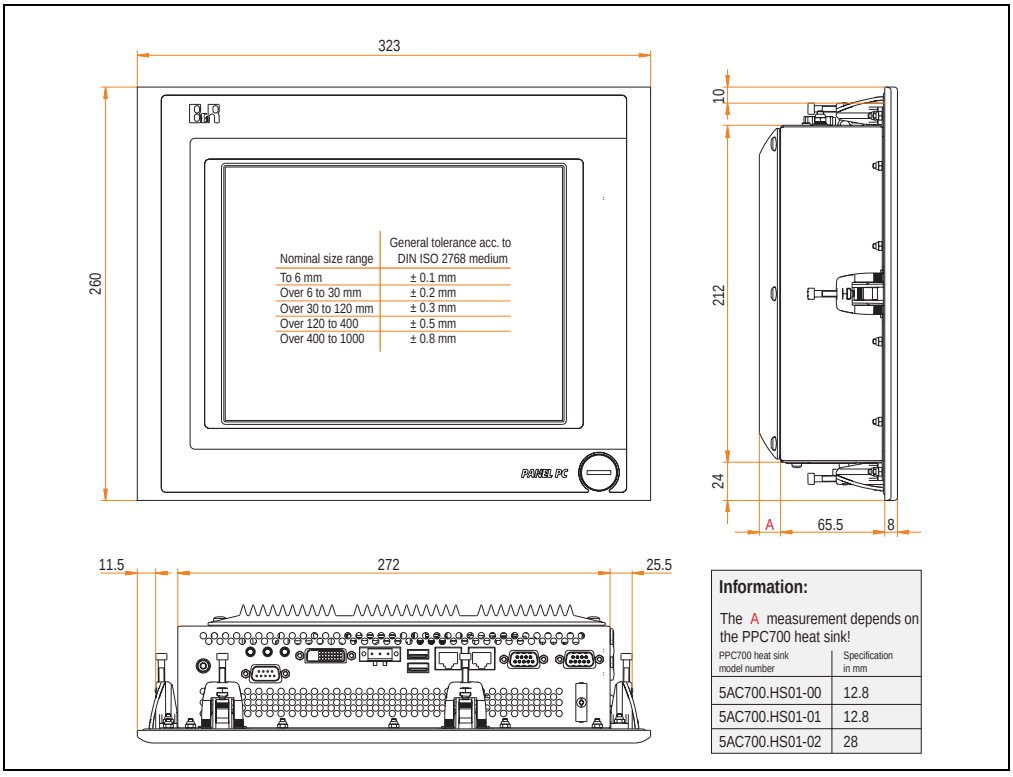
Figure 32: Rear view 5PC720.1043-00

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 PPC700 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").

Dimensions



Nominal size range	General tolerance acc. to DIN ISO 2768 medium
To 6 mm	± 0.1 mm
Over 6 to 30 mm	± 0.2 mm
Over 30 to 120 mm	± 0.3 mm
Over 120 to 400	± 0.5 mm
Over 400 to 1000	± 0.8 mm

PPC700 heat sink model number	Specification in mm
5AC700.HS01-00	12.8
5AC700.HS01-01	12.8
5AC700.HS01-02	28

Figure 33: Dimensions - 5PC720.1043-00

Technical data

Features	5PC720.1043-00
Serial interfaces Type Number UART Transfer rate Connection	See "Serial interfaces COM1" on page 61 and "Serial interfaces COM2" on page 62 RS232, modem capable 2 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB, male
Ethernet Controller Transfer rate Connection	See "Ethernet connection ETH1" on page 63 and "Ethernet connection ETH2" on page 64 10/100 Mbit/s RJ45 twisted pair (10 BaseT / 100 BaseT)
USB interfaces Type Number Transfer rate Connection	See also "USB port" on page 65 USB 2.0 3 (2x back side, 1x front side) up to 480 MBit 1) (high speed) Type A
Monitor / Panel Type	See also "Monitor / Panel connection" on page 67 DVI-I, female
AC97 sound Inputs Outputs	See also "MIC, Line IN and Line OUT Port" on page 68 Microphone, Line in Line out
Add-on interface slot Number	See also "Add-on interface slot" on page 68 1
PCI slots Number Type Default	-
CompactFlash slot 1 (CF1) Internal organization	Yes, see also "CompactFlash slot (CF1)" on page 71 Primary master
CompactFlash slot 2 / hard disk (HDD/CF2) Type Internal organization	Yes, see also "Hard disk / CompactFlash slot (HDD/CF2)" on page 72 Combined Primary slave
Insert for slide-in drive 1 Internal organization	Yes, see also "Slide-in slot 1 drive slot" on page 77 Secondary slave
Reset button	Yes, see also "Power button" on page 73
Power button	Yes, see also "Reset button" on page 73
PS/2 keyboard/mouse Type	Yes, see also "PS/2 keyboard/mouse" on page 74 Combined, will be automatically detected
Battery Type Removable Lifespan	Yes, see also "Battery" on page 75 Renata 950 mAh Yes, accessible from the outside 4 years 2)
Hardware security key compartment Optimized for	Yes, see also "Hardware security key" on page 76 DS1425 from MAXIM/Dallas
Fan insert for fan kit	Yes, compatible fan kit - see section 3.8.2 "Fan kit 5PC700.FA02-00" on page 206
LED Number	See also "Status LEDs" on page 70 4 (Power, HDD, Link 1, Link 2)

Table 38: Technical data - 5PC720.1043-00

Features	5PC720.1043-00
Touch screen [3)] Technology Controller Degree of transmission	 Analog, resistive Elo, serial, 12-bit Up to 78%
Display Type Diagonal Colors Resolution Contrast Viewing angle horizontal / vertical Background lighting Brightness Half-brightness time	 Color TFT 10.4 inch (264 mm) 262144 colors VGA, 640 x 480 pixels 300:1 70° / 70° 350 cd/m² 50000 hours
Keys Function keys Soft keys Cursor keys Number block Other keys Key lifespan LED brightness	-
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption Electrical isolation	See also "Supply voltage" on page 66 24 VDC ±25% 3.8 A Typ. 10 A, max. 40 A for < 300 µs See power management section "10.4" Panel PC 700" on page 55 Yes
Mechanical characteristics	
Front Frame Design Membrane Dark gray border around display Light background Gasket	 Aluminum, naturally anodized[4)] Gray[4)] Polyester Similar to Pantone 432CV[4)] Similar to Pantone 427CV[4)] Flat gasket around display front
Housing	Metal
Outer dimensions Width Height Depth	Also see drawing "Dimensions - 5PC720.1043-00" on page 81 323 mm 260 mm 151.3 or 166.5 mm (depending on the heat sink)
Weight	Approx. 3.6 kg
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 See 2.1.1 "Ambient temperatures with system unit 5PC720.1043-00" on page 41. -30°C .. +70°C -30°C .. +70°C
Relative humidity Operation / Storage / Transport	 T <= 40°C: 5% to 90%, non-condensing T > 40°C: < 90% non-condensing

Table 38: Technical data - 5PC720.1043-00 (cont.)

Environmental characteristics	5PC720.1043-00
Vibration Operation (continuous) Operation (occasional) Storage / Transport	 5 - 9 Hz: 1.75 mm amplitude / 9 - 150 Hz: 0.5 g (4.9 m/s² 0-peak) 5 - 9 Hz: 3 mm amplitude / 9 - 150 Hz: 1 g (9.8 m/s² 0-peak) Max. 10 - 57 Hz and 0.075 mm amplitude Max. 58 - 500 Hz and 1 g (9.8 m/s² 0-peak)
Shock Operation Storage / Transport	 TBD Max. 50 g (490 m/s² 0-peak) and 11 ms length
Protection type	IP20 back side (only with installed CompactFlash card) IP65 / NEMA 250 type 4X, dust and sprayed water protection (front side)
Altitude	Max. 3,000 m

Table 38: Technical data - 5PC720.1043-00 (cont.)

1) Software must support USB 2.0 (e.g. Windows XP with at least Service Pack 1).
2) At 50°C, 8.5 µA of the supplied components and a self discharge of 40%.
3) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
4) Depending on the process or batch, there may be visual deviations in the color and surface structure.

Cutout installation

The Panel PC 700 with preassembled mounting blocks is installed e.g. in a housing cutout. A cutout that corresponds to the following drawing must be made.

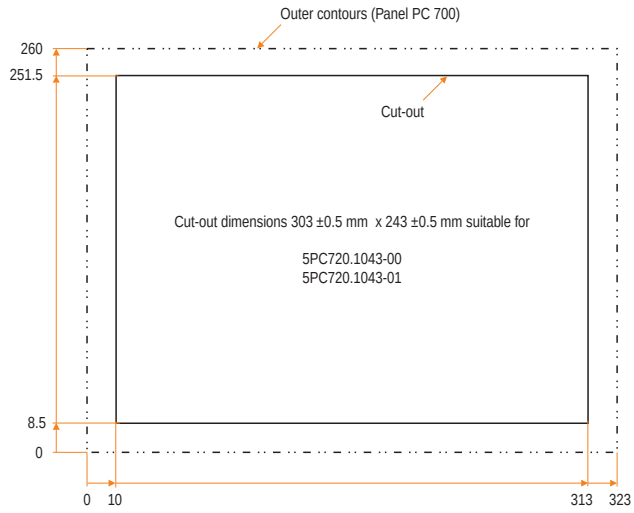


Figure 34: Cutout installation - 5PC720.1043-00

For further information regarding mounting and installation position, see chapter 3 "Commissioning" on page 211.

3.1.2 Panel PC 5PC720.1043-01

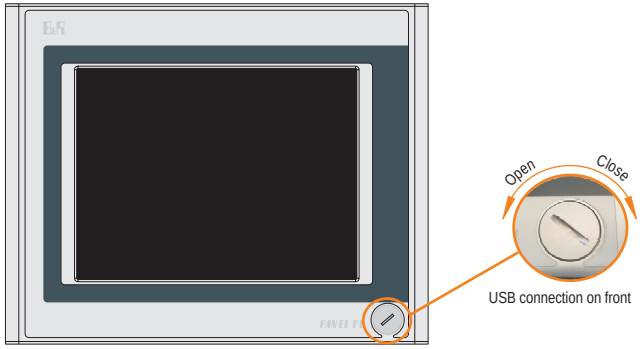


Figure 35: Front view 5PC720.1043-01

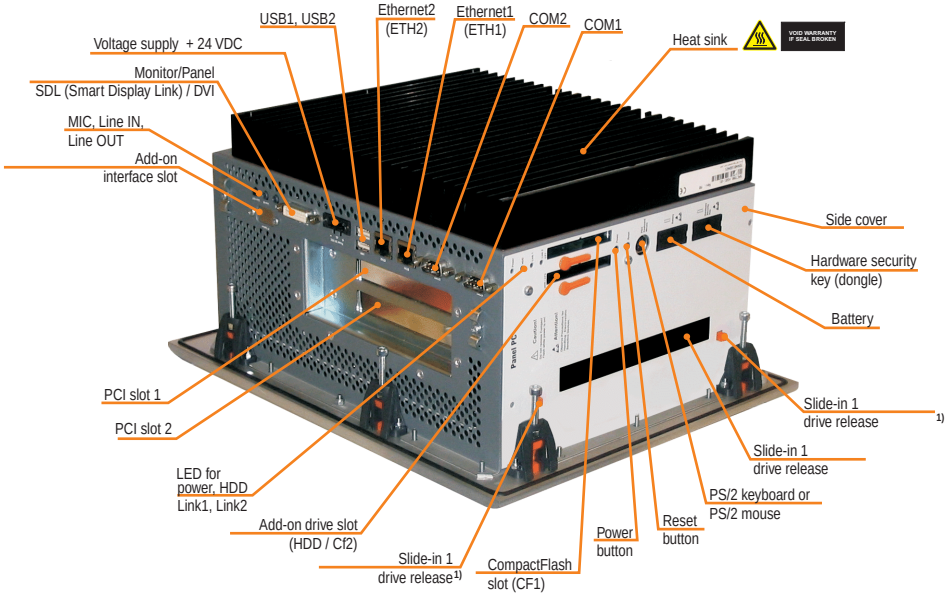


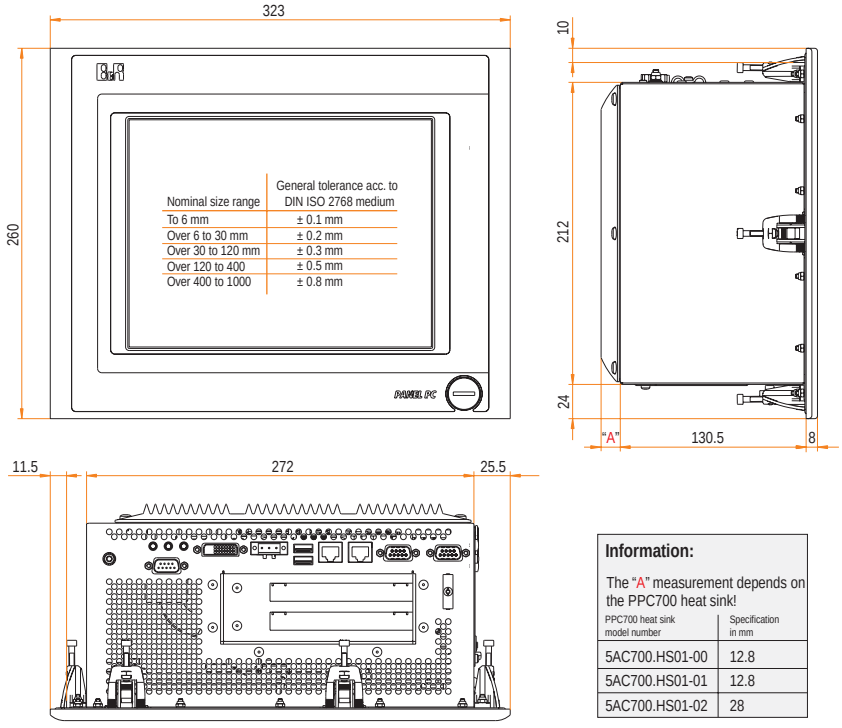
Figure 36: Rear view 5PC720.1043-01

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 PPC700 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").

Dimensions



Nominal size range	General tolerance acc. to DIN ISO 2768 medium
To 6 mm	± 0.1 mm
Over 6 to 30 mm	± 0.2 mm
Over 30 to 120 mm	± 0.3 mm
Over 120 to 400	± 0.5 mm
Over 400 to 1000	± 0.8 mm

Information:

The "A" measurement depends on the PPC700 heat sink!

PPC700 heat sink model number	Specification in mm
5AC700.HS01-00	12.8
5AC700.HS01-01	12.8
5AC700.HS01-02	28

Figure 37: Dimensions - 5PC720.1043-01

Technical data

Features	5PC720.1043-01
Serial interfaces Type Number UART Transfer rate Connection	See "Serial interfaces COM1" on page 61 and "Serial interfaces COM2" on page 62 RS232, modem capable 2 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB, male
Ethernet Controller Transfer rate Connection	See "Ethernet connection ETH1" on page 63 and "Ethernet connection ETH2" on page 64 10/100 Mbit/s RJ45 twisted pair (10 BaseT / 100 BaseT)
USB interfaces Type Number Transfer rate Connection	See also "USB port" on page 65 USB 2.0 3 (2x back side, 1x front side) up to 480 MBit 1) (high speed) Type A
Monitor / Panel Type	See also "Monitor / Panel connection" on page 67 DVI-I, female
AC97 sound Inputs Outputs	See also "MIC, Line IN and Line OUT Port" on page 68 Microphone, Line in Line out
Add-on interface slot Number	See also "Add-on interface slot" on page 68 1
PCI slots Number Type Default	See also "PCI slots" on page 69 2 Half-size According to PCI half-size standard 2.2
CompactFlash slot 1 (CF1) Internal organization	Yes, see also "CompactFlash slot (CF1)" on page 71 Primary master
CompactFlash slot 2 / hard disk (HDD/CF2) Type Internal organization	Yes, see also "Hard disk / CompactFlash slot (HDD/CF2)" on page 72 Combined Primary slave
Insert for slide-in drive 1 Internal organization	Yes, see also "Slide-in slot 1 drive slot" on page 77 Secondary slave
Reset button	Yes, see also "Power button" on page 73
Power button	Yes, see also "Reset button" on page 73
PS/2 keyboard/mouse Type	Yes, see also "PS/2 keyboard/mouse" on page 74 Combined, will be automatically detected
Battery Type Removable Lifespan	Yes, see also "Battery" on page 75 Renata 950 mAh Yes, accessible from the outside 4 years 2)
Hardware security key compartment Optimized for	Yes, see also "Hardware security key" on page 76 DS1425 from MAXIM/Dallas
Fan insert for fan kit	Yes, compatible fan kit - see section 3.8.2 "Fan kit 5PC700.FA02-00" on page 206
LED Number	See also "Status LEDs" on page 70 4 (Power, HDD, Link 1, Link 2)

Table 39: Technical data - 5PC720.1043-01

Features	5PC720.1043-01
Touch screen [3)] Technology Controller Degree of transmission	 Analog, resistive Elo, serial, 12-bit Up to 78%
Display Type Diagonal Colors Resolution Contrast Viewing angle horizontal / vertical Background lighting Brightness Half-brightness time	 Color TFT 10.4 inch (264 mm) 262144 colors VGA, 640 x 480 pixels 300:1 70° / 70° 350 cd/m² 50000 hours
Keys Function keys Soft keys Cursor keys Number block Other keys Key lifespan LED brightness	-
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption Electrical isolation	See also "Supply voltage" on page 66 24 VDC ±25% 3.8 A Typ. 10 A, max. 40 A for < 300 µs See power management section "10.4" Panel PC 700" on page 55 Yes
Mechanical characteristics	
Front Frame Design Membrane Dark gray border around display Light background Gasket	 Aluminum, naturally anodized[4)] Gray[4)] Polyester Similar to Pantone 432CV[4)] Similar to Pantone 427CV[4)] Flat gasket around display front
Housing	Metal
Outer dimensions Width Height Depth	Also see drawing "Dimensions - 5PC720.1043-01" on page 86 323 mm 260 mm 151.3 or 166.5 mm (depending on the heat sink)
Weight	Approx. 4.5 kg
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 See 2.1.2 "Ambient temperatures with system unit 5PC720.1043-01" on page 42. -30°C .. +70°C -30°C .. +70°C
Relative humidity Operation / Storage / Transport	 T <= 40°C: 5% to 90%, non-condensing T > 40°C: < 90% non-condensing

Table 39: Technical data - 5PC720.1043-01 (cont.)

Environmental characteristics	5PC720.1043-01
Vibration Operation (continuous) Operation (occasional) Storage / Transport	 5 - 9 Hz: 1.75 mm amplitude / 9 - 150 Hz: 0.5 g (4.9 m/s² 0-peak) 5 - 9 Hz: 3 mm amplitude / 9 - 150 Hz: 1 g (9.8 m/s² 0-peak) Max. 10 - 57 Hz and 0.075 mm amplitude Max. 58 - 500 Hz and 1 g (9.8 m/s² 0-peak)
Shock Operation Storage / Transport	 TBD Max. 50 g (490 m/s² 0-peak) and 11 ms length
Protection type	IP20 back side (only with installed CompactFlash card) IP65 / NEMA 250 type 4X, dust and sprayed water protection (front side)
Altitude	Max. 3,000 m

Table 39: Technical data - 5PC720.1043-01 (cont.)

1) Software must support USB 2.0 (e.g. Windows XP with at least Service Pack 1).
2) At 50°C, 8.5 µA of the supplied components and a self discharge of 40%.
3) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
4) Depending on the process or batch, there may be visual deviations in the color and surface structure.

Cutout installation

The Panel PC 700 with preassembled mounting blocks is installed e.g. in a housing cutout. A cutout that corresponds to the following drawing must be made.

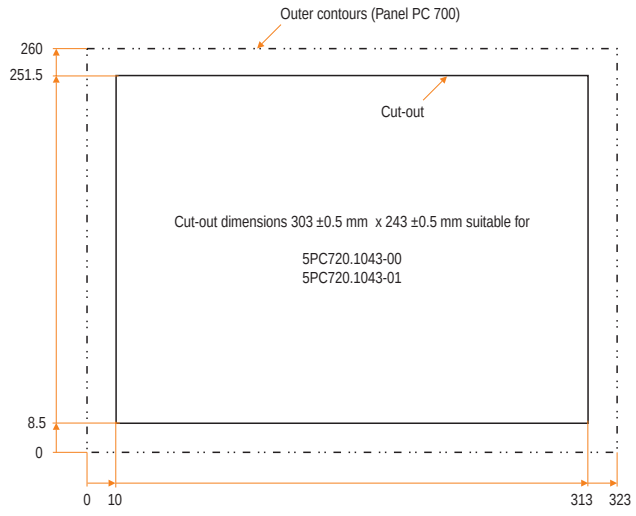


Figure 38: Cutout installation - 5PC720.1043-01

For further information regarding mounting and installation position, see chapter 3 "Commissioning" on page 211.

3.1.3 Panel PC 5PC720.1214-00

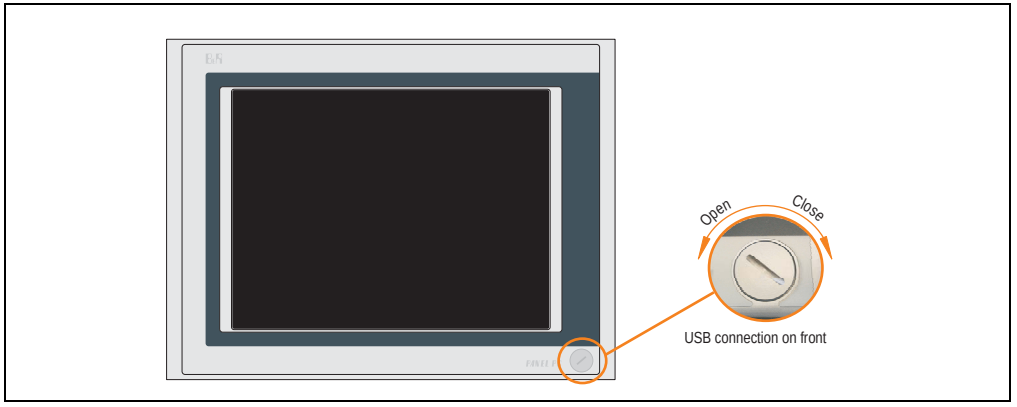


Figure 39: Front view 5PC720.1214-00

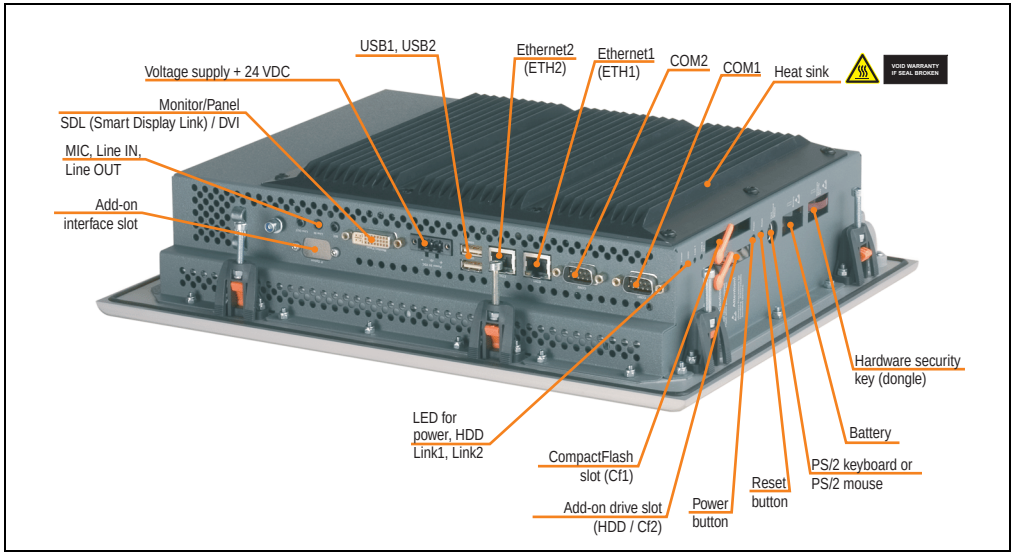


Figure 40: Rear view 5PC720.1214-00

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 PPC700 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").

Dimensions

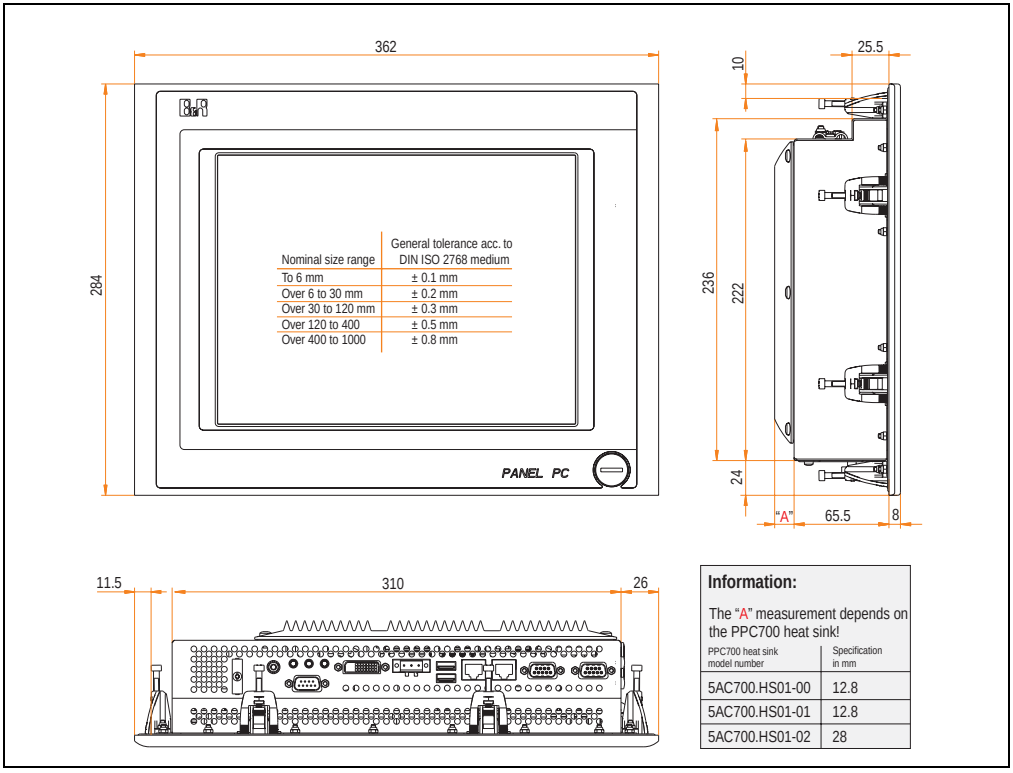


Figure 41: Dimensions - 5PC720.1214-00

Technical data

Features	5PC720.1214-00
Serial interfaces Type Number UART Transfer rate Connection	See "Serial interfaces COM1" on page 61 and "Serial interfaces COM2" on page 62 RS232, modem capable 2 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB, male
Ethernet Controller Transfer rate Connection	See "Ethernet connection ETH1" on page 63 and "Ethernet connection ETH2" on page 64 10/100 Mbit/s RJ45 twisted pair (10 BaseT / 100 BaseT)

Table 40: Technical data - 5PC720.1214-00

USB interfaces Type Number Transfer rate Connection	See also "USB port" on page 65 USB 2.0 3 (2x back side, 1x front side) up to 480 MBit [1] (high speed) Type A
Monitor / Panel Type	See also "Monitor / Panel connection" on page 67 DVI-I, female
AC97 sound Inputs Outputs	See also "MIC, Line IN and Line OUT Port" on page 68 Microphone, Line in Line out
Add-on interface slot Number	See also "Add-on interface slot" on page 68 1
PCI slots Number Type Default	-
CompactFlash slot 1 (CF1) Internal organization	Yes, see also "CompactFlash slot (CF1)" on page 71 Primary master
CompactFlash slot 2 / hard disk (HDD/CF2) Type Internal organization	Yes, see also "Hard disk / CompactFlash slot (HDD/CF2)" on page 72 Combined Primary slave
Insert for slide-in drive 1 Internal organization	-
Reset button	Yes, see also "Power button" on page 73
Power button	Yes, see also "Reset button" on page 73
PS/2 keyboard/mouse Type	Yes, see also "PS/2 keyboard/mouse" on page 74 Combined, will be automatically detected
Battery Type Removable Lifespan	Yes, see also "Battery" on page 75 Renata 950 mAh Yes, accessible from the outside 4 years [2]
Hardware security key compartment Optimized for	Yes, see also "Hardware security key" on page 76 DS1425 from MAXIM/Dallas)
Fan insert for fan kit	Yes, compatible fan kit - see section 3.8.1 "Fan kit 5PC700.FA00-01" on page 205
LED Number	See also "Status LEDs" on page 70 4 (Power, HDD, Link 1, Link 2)
Features	**5PC720.1214-00**
Touch screen [3] Technology Controller Degree of transmission	 Analog, resistive Elo, serial, 12-bit Up to 78%

Table 40: Technical data - 5PC720.1214-00 (cont.)

Display Type Diagonal Colors Resolution Contrast Viewing angle horizontal / vertical Background lighting Brightness Half-brightness time	 Color TFT 12.1 inch (307 mm) 262144 colors SVGA, 800 x 600 pixels 300:1 70° / 70° 350 cd/m² 50000 hours
Keys Function keys Soft keys Cursor keys Number block Other keys Key lifespan LED brightness	-
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption Electrical isolation	See also "Supply voltage" on page 66 24 VDC ±25% 3.8 A Typ. 10 A, max. 40 A for < 300 µs See power management section "12.1" Panel PC 700" on page 56 Yes
Mechanical characteristics	
Front Frame Design Membrane Dark gray border around display Light background Gasket	 Aluminum, naturally anodized[4)] Gray[4)] Polyester Similar to Pantone 432CV[4)] Similar to Pantone 427CV[4)] Flat gasket around display front
Housing	Metal
Outer dimensions Width Height Depth	Also see drawing "Dimensions - 5PC720.1214-00" on page 91 362 mm 284 mm 86.3 or 101.5 mm (depending on the heat sink)
Weight	Approx. 4.2 kg
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 See 2.1.3 "Ambient temperatures with system unit 5PC720.1214-00" on page 43. -30°C .. +70°C -30°C .. +70°C
Relative humidity Operation / Storage / Transport	 T <= 40°C: 5% to 90%, non-condensing T > 40°C: < 90% non-condensing
Environmental characteristics	**5PC720.1214-00**
Vibration Operation (continuous) Operation (occasional) Storage / Transport	 5 - 9 Hz: 1.75 mm amplitude / 9 - 150 Hz: 0.5 g (4.9 m/s² 0-peak) 5 - 9 Hz: 3 mm amplitude / 9 - 150 Hz: 1 g (9.8 m/s² 0-peak) Max. 10 - 57 Hz and 0.075 mm amplitude Max. 58 - 500 Hz and 1 g (9.8 m/s² 0-peak)

Table 40: Technical data - 5PC720.1214-00 (cont.)

Shock Operation Storage / Transport	 TBD Max. 50 g (490 m/s² 0-peak) and 11 ms length
Protection type	IP20 back side (only with installed CompactFlash card) IP65 / NEMA 250 type 4X, dust and sprayed water protection (front side)
Altitude	Max. 3,000 m

Table 40: Technical data - 5PC720.1214-00 (cont.)

1) Software must support USB 2.0 (e.g. Windows XP with at least Service Pack 1).
2) At 50°C, 8.5 µA of the supplied components and a self discharge of 40%.
3) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
4) Depending on the process or batch, there may be visual deviations in the color and surface structure.

Cutout installation

The Panel PC 700 with preassembled mounting blocks is installed e.g. in a housing cutout. A cutout that corresponds to the following drawing must be made.

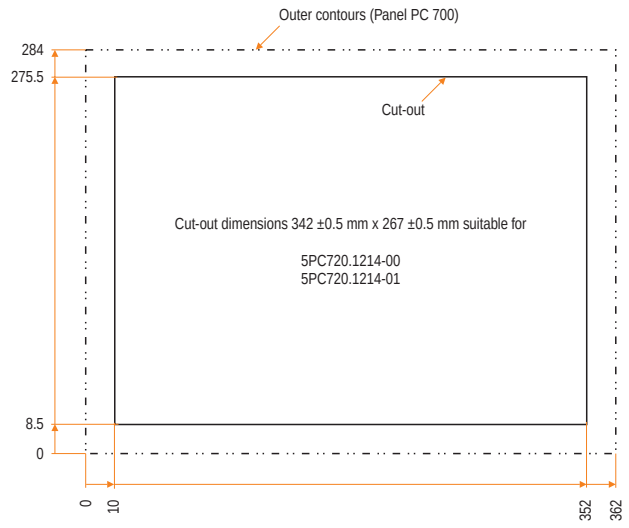


Figure 42: Cutout installation - 5PC720.1214-00

For further information regarding mounting and installation position, see chapter 3 "Commissioning" on page 211.

3.1.4 Panel PC 5PC720.1214-01

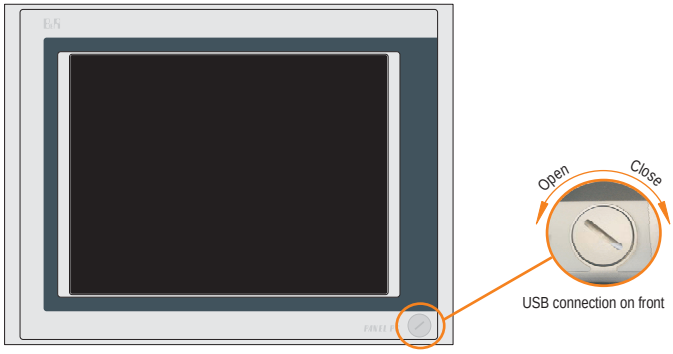


Figure 43: Front view 5PC720.1214-01

Figure 44: Rear view 5PC720.1214-01

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 PPC700 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").

Dimensions

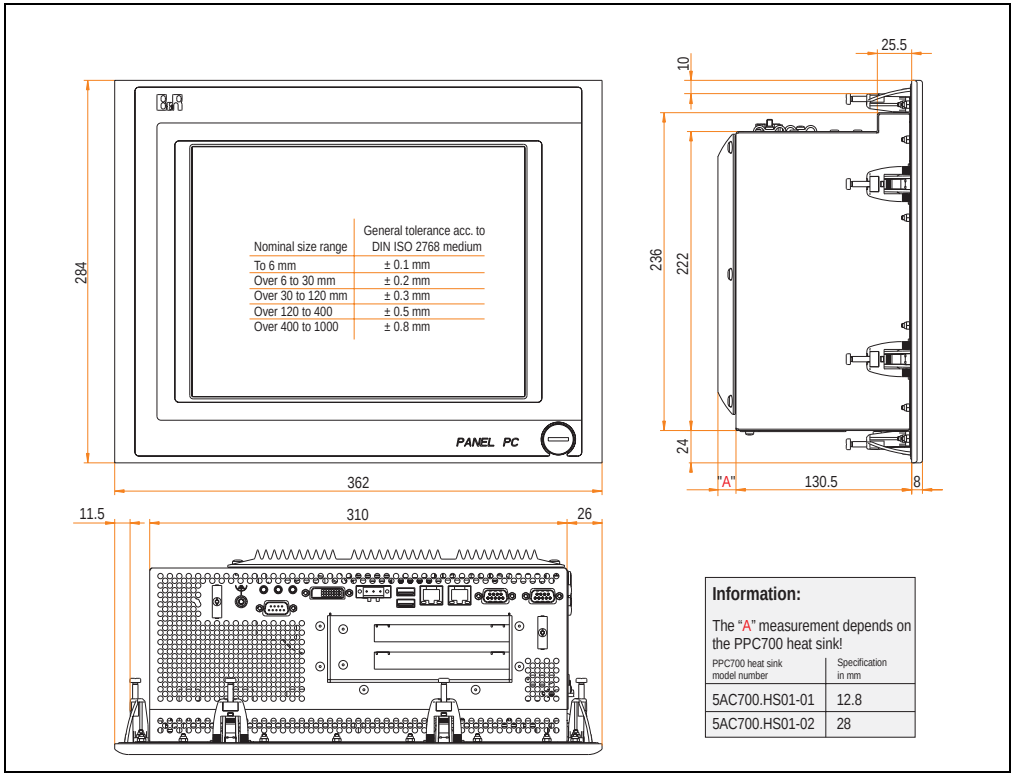


Figure 45: Dimensions 5PC720.1214-01

Technical data

Features	5PC720.1214-01
Serial interfaces	See "Serial interfaces COM1" on page 61 and "Serial interfaces COM2" on page 62
Type	RS232, modem capable
Number	2
UART	16550 compatible, 16 byte FIFO
Transfer rate	Max. 115 kBaud
Connection	9-pin DSUB, male
Ethernet	
Controller	See "Ethernet connection ETH1" on page 63 and "Ethernet connection ETH2" on page 64
Transfer rate	10/100 Mbit/s
Connection	RJ45 twisted pair (10 BaseT / 100 BaseT)

Table 41: Technical data - 5PC720.1214-01

USB interfaces Type Number Transfer rate Connection	See also "USB port" on page 65 USB 2.0 3 (2x back side, 1x front side) up to 480 MBit [1] (high speed) Type A
Monitor / Panel Type	See also "Monitor / Panel connection" on page 67 DVI-I, female
AC97 sound Inputs Outputs	See also "MIC, Line IN and Line OUT Port" on page 68 Microphone, Line in Line out
Add-on interface slot Number	See also "Add-on interface slot" on page 68 1
PCI slots Number Type Default	2
CompactFlash slot 1 (CF1) Internal organization	Yes, see also "CompactFlash slot (CF1)" on page 71 Primary master
CompactFlash slot 2 / hard disk (HDD/CF2) Type Internal organization	Yes, see also "Hard disk / CompactFlash slot (HDD/CF2)" on page 72 Combined Primary slave
Insert for slide-in drive 1 Internal organization	-
Reset button	Yes, see also "Power button" on page 73
Power button	Yes, see also "Reset button" on page 73
PS/2 keyboard/mouse Type	Yes, see also "PS/2 keyboard/mouse" on page 74 Combined, will be automatically detected
Battery Type Removable Lifespan	Yes, see also "Battery" on page 75 Renata 950 mAh Yes, accessible from the outside 4 years [2]
Hardware security key compartment Optimized for	Yes, see also "Hardware security key" on page 76 DS1425 from MAXIM/Dallas)
Fan insert for fan kit	Yes, compatible fan kit - see section 3.8.1 "Fan kit 5PC700.FA00-01" on page 205
LED Number	See also "Status LEDs" on page 70 4 (Power, HDD, Link 1, Link 2)
Features	**5PC720.1214-01**
Touch screen [3] Technology Controller Degree of transmission	 Analog, resistive Elo, serial, 12-bit Up to 78%

Table 41: Technical data - 5PC720.1214-01 (cont.)

Display Type Diagonal Colors Resolution Contrast Viewing angle horizontal / vertical Background lighting Brightness Half-brightness time	 Color TFT 12.1 inch (307 mm) 262144 colors SVGA, 800 x 600 pixels 300:1 70° / 70° 350 cd/m² 50000 hours
Keys Function keys Soft keys Cursor keys Number block Other keys Key lifespan LED brightness	-
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption Electrical isolation	See also "Supply voltage" on page 66 24 VDC ±25% 3.8 A Typ. 10 A, max. 40 A for < 300 µs See power management section "12.1" Panel PC 700" on page 56 Yes
Mechanical characteristics	
Front Frame Design Membrane Dark gray border around display Light background Gasket	 Aluminum, naturally anodized[4)] Gray[4)] Polyester Similar to Pantone 432CV[4)] Similar to Pantone 427CV[4)] Flat gasket around display front
Housing	Metal
Outer dimensions Width Height Depth	Also see drawing "Dimensions 5PC720.1214-01" on page 96 362 mm 284 mm 151.3 or 166.5 mm (depending on the heat sink)
Weight	Approx. TBD kg
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 See 2.1.4 "Ambient temperatures with system unit 5PC720.1214-01" on page 44. -30°C .. +70°C -30°C .. +70°C
Relative humidity Operation / Storage / Transport	 T <= 40°C: 5% to 90%, non-condensing T > 40°C: < 90% non-condensing
Environmental characteristics	**5PC720.1214-01**
Vibration Operation (continuous) Operation (occasional) Storage / Transport	 5 - 9 Hz: 1.75 mm amplitude / 9 - 150 Hz: 0.5 g (4.9 m/s² 0-peak) 5 - 9 Hz: 3 mm amplitude / 9 - 150 Hz: 1 g (9.8 m/s² 0-peak) Max. 10 - 57 Hz and 0.075 mm amplitude Max. 58 - 500 Hz and 1 g (9.8 m/s² 0-peak)

Table 41: Technical data - 5PC720.1214-01 (cont.)

Shock Operation Storage / Transport	 TBD Max. 50 g (490 m/s² 0-peak) and 11 ms length
Protection type	IP20 back side (only with installed CompactFlash card) IP65 / NEMA 250 type 4X, dust and sprayed water protection (front side)
Altitude	Max. 3,000 m

Table 41: Technical data - 5PC720.1214-01 (cont.)

1) Software must support USB 2.0 (e.g. Windows XP with at least Service Pack 1).
2) At 50°C, 8.5 µA of the supplied components and a self discharge of 40%.
3) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
4) Depending on the process or batch, there may be visual deviations in the color and surface structure.

Cutout installation

The Panel PC 700 with preassembled mounting blocks is installed e.g. in a housing cutout. A cutout that corresponds to the following drawing must be made.

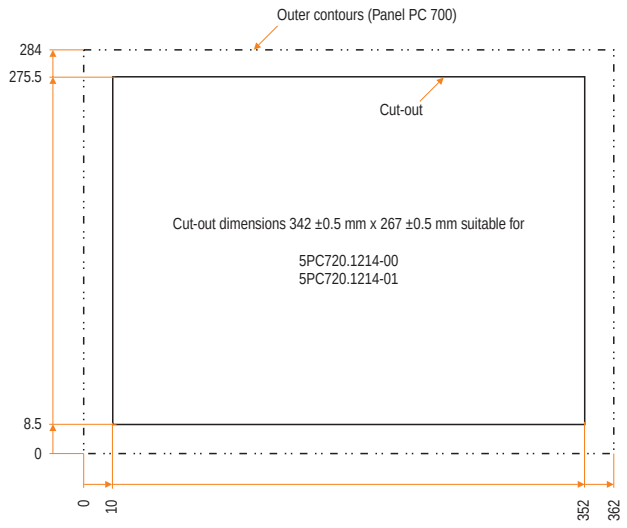


Figure 46: Cutout installation - 5PC720.1214-01

For further information regarding mounting and installation position, see chapter 3 "Commissioning" on page 211.

3.1.5 Panel PC 5PC720.1505-00

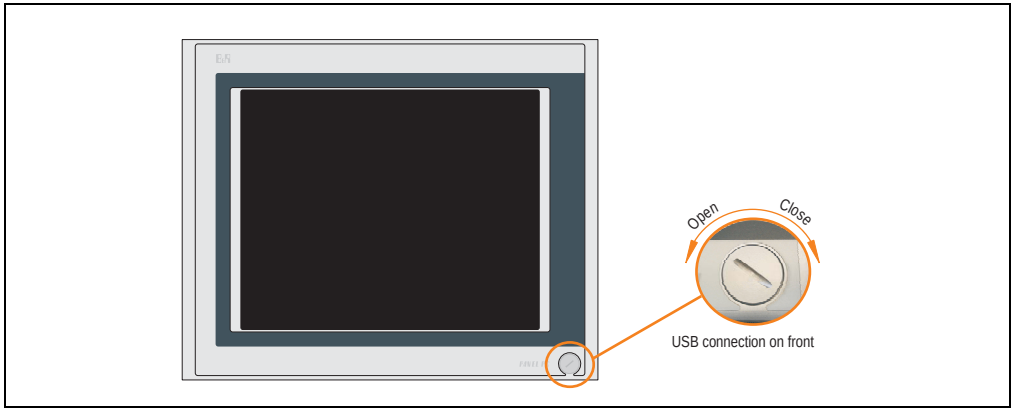


Figure 47: Front view 5PC720.1505-00

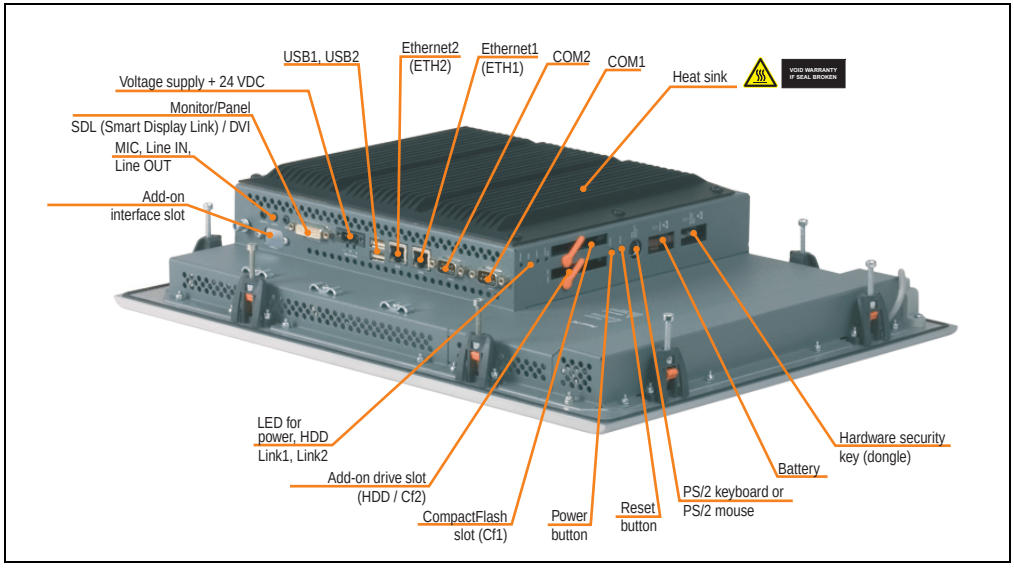


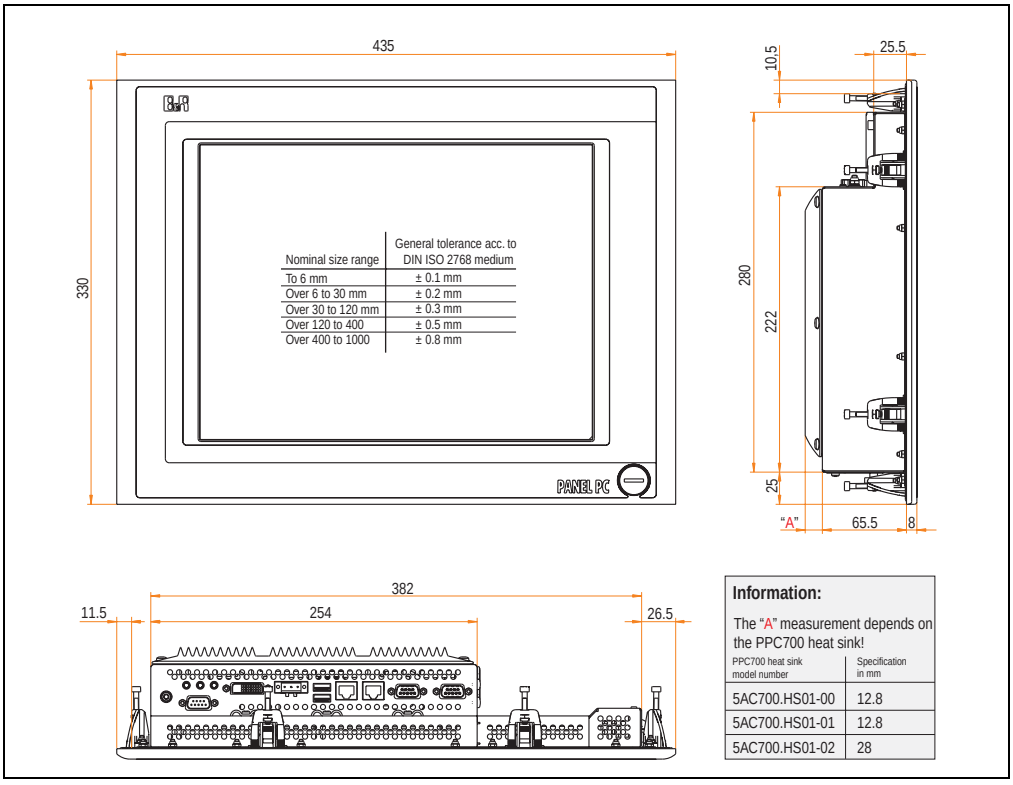
Figure 48: Rear view 5PC720.1505-00

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 PPC700 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").

Dimensions



Nominal size range	General tolerance acc. to DIN ISO 2768 medium
To 6 mm	± 0.1 mm
Over 6 to 30 mm	± 0.2 mm
Over 30 to 120 mm	± 0.3 mm
Over 120 to 400	± 0.5 mm
Over 400 to 1000	± 0.8 mm

PPC700 heat sink model number	Specification in mm
5AC700.HS01-00	12.8
5AC700.HS01-01	12.8
5AC700.HS01-02	28

Figure 49: Dimensions - 5PC720.1505-00

Technical data

Features	5PC720.1505-00
Serial interfaces Type Number UART Transfer rate Connection	See "Serial interfaces COM1" on page 61 and "Serial interfaces COM2" on page 62 RS232, modem capable 2 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB, male
Ethernet Controller Transfer rate Connection	See "Ethernet connection ETH1" on page 63 and "Ethernet connection ETH2" on page 64 10/100 Mbit/s RJ45 twisted pair (10 BaseT / 100 BaseT)
USB interfaces Type Number Transfer rate Connection	See also "USB port" on page 65 USB 2.0 3 (2x back side, 1x front side) up to 480 MBit [1] (high speed) Type A
Monitor / Panel Type	See also "Monitor / Panel connection" on page 67 DVI-I, female
AC97 sound Inputs Outputs	See also "MIC, Line IN and Line OUT Port" on page 68 Microphone, Line in Line out
Add-on interface slot Number	See also "Add-on interface slot" on page 68 1
PCI slots Number Type Default	-
CompactFlash slot 1 (CF1) Internal organization	Yes, see also "CompactFlash slot (CF1)" on page 71 Primary master
CompactFlash slot 2 / hard disk (HDD/CF2) Type Internal organization	Yes, see also "Hard disk / CompactFlash slot (HDD/CF2)" on page 72 Combined Primary slave
Insert for slide-in drive 1 Internal organization	-
Reset button	Yes, see also "Power button" on page 73
Power button	Yes, see also "Reset button" on page 73
PS/2 keyboard/mouse Type	Yes, see also "PS/2 keyboard/mouse" on page 74 Combined, will be automatically detected
Battery Type Removable Lifespan	Yes, see also "Battery" on page 75 Renata 950 mAh Yes, accessible from the outside 4 years [2]
Hardware security key compartment Optimized for	Yes, see also "Hardware security key" on page 76 DS1425 from MAXIM/Dallas)
Fan insert for fan kit	Yes, compatible fan kit - see section 3.8.1 "Fan kit 5PC700.FA00-01" on page 205
LED Number	See also "Status LEDs" on page 70 4 (Power, HDD, Link 1, Link 2)

Table 42: Technical data - 5PC720.1505-00

Features	5PC720.1505-00
Touch screen [3)] Technology Controller Degree of transmission	 Analog, resistive Elo, serial, 12-bit Up to 78%
Display Type Diagonal Colors Resolution Contrast Viewing angle horizontal / vertical Background lighting Brightness Half-brightness time	 Color TFT 15 inch (381 mm) 16 million XGA, 1024 x 768 pixels 400:1 85° / 85° 250 cd/m² 50000 hours
Keys Function keys Soft keys Cursor keys Number block Other keys Key lifespan LED brightness	-
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption Electrical isolation	See also "Supply voltage" on page 66 24 VDC ±25% 3.8 A Typ. 10 A, max. 40 A for < 300 µs See power management section "15" Panel PC 700" on page 57 Yes
Mechanical characteristics	
Front Frame Design Membrane Dark gray border around display Light background Gasket	 Aluminum, naturally anodized[4)] Gray[4)] Polyester Similar to Pantone 432CV[4)] Similar to Pantone 427CV[4)] Flat gasket around display front
Housing	Metal
Outer dimensions Width Height Depth	Also see drawing "Dimensions - 5PC720.1505-00" on page 101 435 mm 330 mm 86.3 or 101.5 mm (depending on the heat sink)
Weight	Approx. 6 kg
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 See 2.1.5 "Ambient temperatures with system unit 5PC720.1505-00" on page 45. -20°C .. +60°C -20°C .. +60°C
Relative humidity Operation / Storage / Transport	T <= 40°C: 5% to 90%, non-condensing T > 40°C: < 90% non-condensing

Table 42: Technical data - 5PC720.1505-00 (cont.)

Environmental characteristics	5PC720.1505-00
Vibration Operation (continuous) Operation (occasional) Storage / Transport	 5 - 9 Hz: 1.75 mm amplitude / 9 - 150 Hz: 0.5 g (4.9 m/s² 0-peak) 5 - 9 Hz: 3 mm amplitude / 9 - 150 Hz: 1 g (9.8 m/s² 0-peak) Max. 10 - 57 Hz and 0.075 mm amplitude Max. 58 - 500 Hz and 1 g (9.8 m/s² 0-peak)
Shock Operation Storage Transportation	TBD
Protection type	IP20 back side (only with installed CompactFlash card) IP65 / NEMA 250 type 4X, dust and sprayed water protection (front side)
Altitude	Max. 3,000 m

Table 42: Technical data - 5PC720.1505-00 (cont.)

1) Software must support USB 2.0 (e.g. Windows XP with at least Service Pack 1).
2) At 50°C, 8.5 µA of the supplied components and a self discharge of 40%.
3) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
4) Depending on the process or batch, there may be visual deviations in the color and surface structure.

Cutout installation

The Panel PC 700 with preassembled mounting blocks is installed e.g. in a housing cutout. A cutout that corresponds to the following drawing must be made.

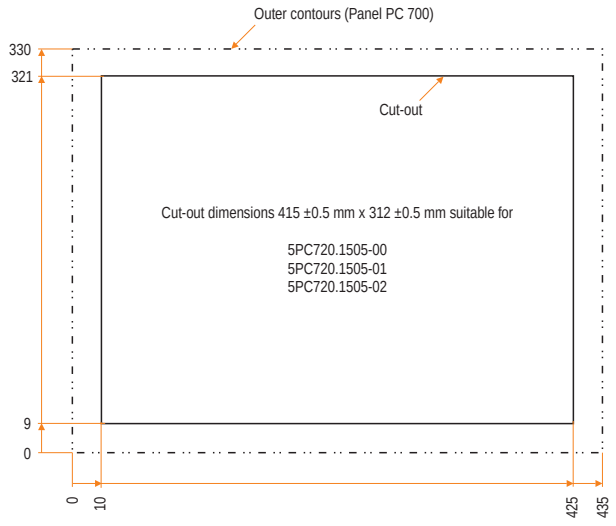


Figure 50: Cutout installation - 5PC720.1505-00

For further information regarding mounting and installation position, see chapter 3 "Commissioning" on page 211.

3.1.6 Panel PC 5PC720.1505-01

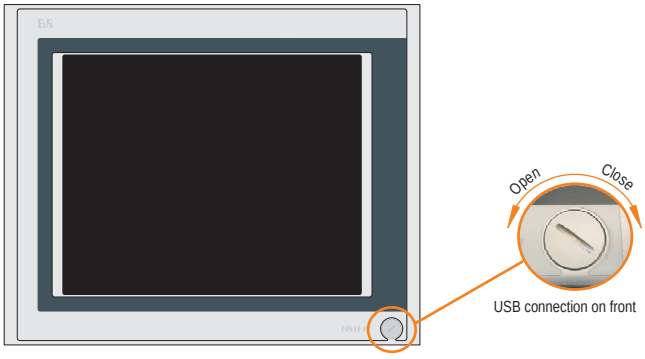
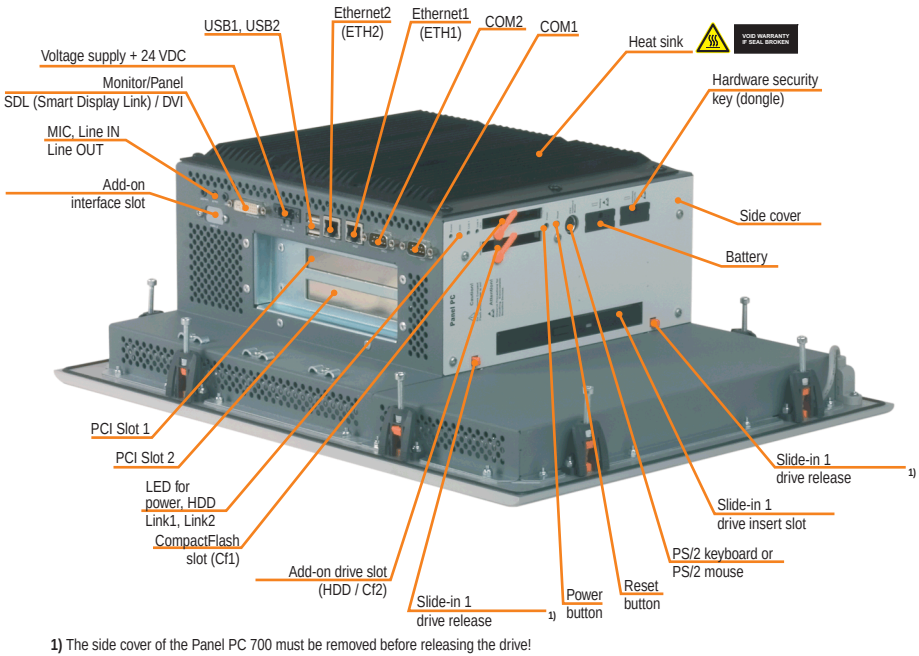


Figure 51: Front view 5PC720.1505-01



1) The side cover of the Panel PC 700 must be removed before releasing the drive!

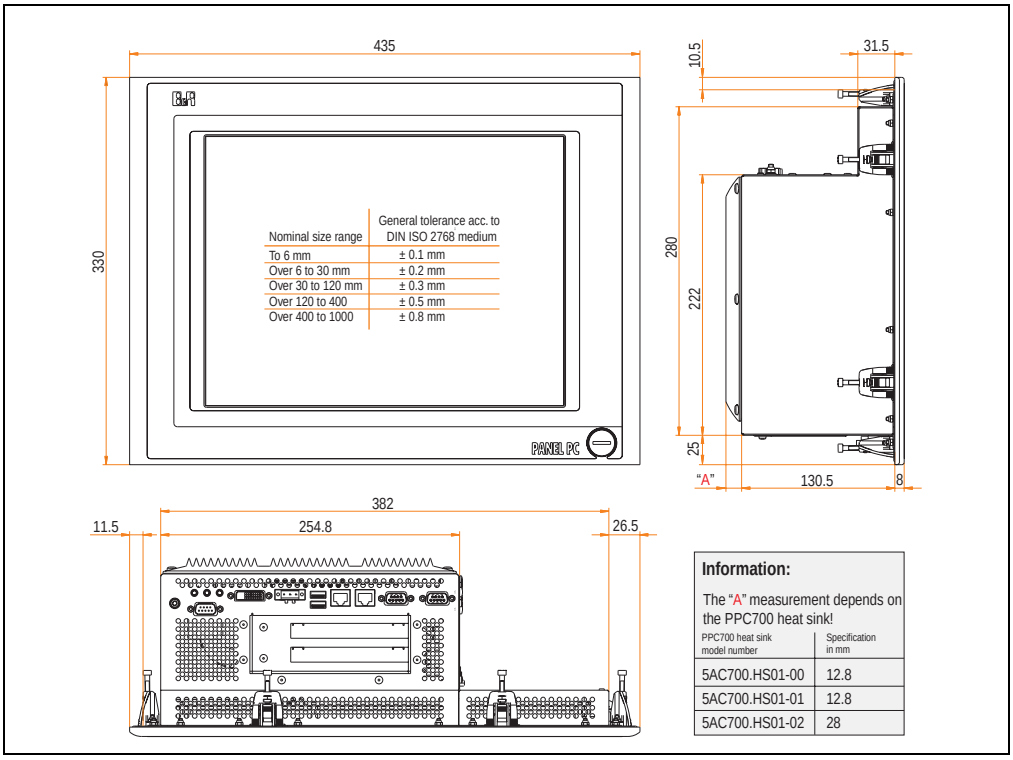
Figure 52: Rear view 5PC720.1505-01

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 PPC700 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").

Dimensions



Nominal size range	General tolerance acc. to DIN ISO 2768 medium
To 6 mm	± 0.1 mm
Over 6 to 30 mm	± 0.2 mm
Over 30 to 120 mm	± 0.3 mm
Over 120 to 400	± 0.5 mm
Over 400 to 1000	± 0.8 mm

PPC700 heat sink model number	Specification in mm
5AC700.HS01-00	12.8
5AC700.HS01-01	12.8
5AC700.HS01-02	28

Figure 53: Dimensions - 5PC720.1505-01

Technical data

Features	5PC720.1505-01
Serial interfaces Type Number UART Transfer rate Connection	See "Serial interfaces COM1" on page 61 and "Serial interfaces COM2" on page 62 RS232, modem capable 2 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB, male
Ethernet Controller Transfer rate Connection	See "Ethernet connection ETH1" on page 63 and "Ethernet connection ETH2" on page 64 10/100 Mbit/s RJ45 twisted pair (10 BaseT / 100 BaseT)
USB interfaces Type Number Transfer rate Connection	See also "USB port" on page 65 USB 2.0 3 (2x back side, 1x front side) up to 480 MBit [1] (high speed) Type A
Monitor / Panel Type	See also "Monitor / Panel connection" on page 67 DVI-I, female
AC97 sound Inputs Outputs	See also "MIC, Line IN and Line OUT Port" on page 68 Microphone, Line in Line out
Add-on interface slot Number	See also "Add-on interface slot" on page 68 1
PCI slots Number Type Default	See also "PCI slots" on page 69 2 Half-size According to PCI half-size standard 2.2
CompactFlash slot 1 (CF1) Internal organization	Yes, see also "CompactFlash slot (CF1)" on page 71 Primary master
CompactFlash slot 2 / hard disk (HDD/CF2) Type Internal organization	Yes, see also "Hard disk / CompactFlash slot (HDD/CF2)" on page 72 Combined Primary slave
Insert for slide-in drive 1 Internal organization	Yes, see also "Slide-in slot 1 drive slot" on page 77 Secondary slave
Reset button	Yes, see also "Power button" on page 73
Power button	Yes, see also "Reset button" on page 73
PS/2 keyboard/mouse Type	Yes, see also "PS/2 keyboard/mouse" on page 74 Combined, will be automatically detected
Battery Type Removable Lifespan	Yes, see also "Battery" on page 75 Renata 950 mAh Yes, accessible from the outside 4 years [2]
Hardware security key compartment Optimized for	Yes, see also "Hardware security key" on page 76 DS1425 from MAXIM/Dallas
Fan insert for fan kit	Yes, compatible fan kit - see section 3.8.3 "Fan kit 5PC700.FA02-01" on page 208

Table 43: Technical data - 5PC720.1505-01

Features	5PC720.1505-01
LED Number	See also "Status LEDs" on page 70 4 (Power, HDD, Link 1, Link 2)
Touch screen [3)] Technology Controller Degree of transmission	 Analog, resistive Elo, serial, 12-bit Up to 78%
Display Type Diagonal Colors Resolution Contrast Viewing angle horizontal / vertical Background lighting Brightness Half-brightness time	 Color TFT 15 inch (381 mm) 16 million XGA, 1024 x 768 pixels 400:1 85° / 85° 250 cd/m² 50000 hours
Keys/LED Function keys Soft keys Cursor keys Number block Other keys Key lifespan LED brightness	-
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption Electrical isolation	See also "Supply voltage" on page 66 24 VDC ±25% 3.8 A Typ. 10 A, max. 40 A for < 300 µs See power management section "15" Panel PC 700" on page 57 Yes
Mechanical characteristics	
Front Frame Design Membrane Dark gray border around display Light background Gasket	 Aluminum, naturally anodized[4)] Gray[4)] Polyester Similar to Pantone 432CV[4)] Similar to Pantone 427CV[4)] Flat gasket around display front
Housing	Metal
Outer dimensions Width Height Depth	Also see drawing "Dimensions - 5PC720.1505-01" on page 106 435 mm 330 mm 151.3 or 166.5 mm (depending on the heat sink)
Weight	Approx. 6.7 kg
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 See 2.1.6 "Ambient temperatures with system unit 5PC720.1505-01" on page 46. -20°C .. +60°C -20°C .. +60°C

Table 43: Technical data - 5PC720.1505-01 (cont.)

Environmental characteristics	5PC720.1505-01
Relative humidity Operation / Storage / Transport	T <= 40°C: 5% to 90%, non-condensing T > 40°C: < 90% non-condensing
Vibration Operation (continuous) Operation (occasional) Storage / Transport	 5 - 9 Hz: 1.75 mm amplitude / 9 - 150 Hz: 0.5 g (4.9 m/s² 0-peak) 5 - 9 Hz: 3 mm amplitude / 9 - 150 Hz: 1 g (9.8 m/s² 0-peak) Max. 10 - 57 Hz and 0.075 mm amplitude Max. 58 - 500 Hz and 1 g (9.8 m/s² 0-peak)
Shock Operation Storage Transportation	TBD
Protection type	IP20 back side (only with installed CompactFlash card) IP65 / NEMA 250 type 4X, dust and sprayed water protection (front side)
Altitude	Max. 3,000 m

Table 43: Technical data - 5PC720.1505-01 (cont.)

1) Software must support USB 2.0 (e.g. Windows XP with at least Service Pack 1).

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

3) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).

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

Cutout installation

The Panel PC 700 with preassembled mounting blocks is installed e.g. in a housing cutout. A cutout that corresponds to the following drawing must be made.

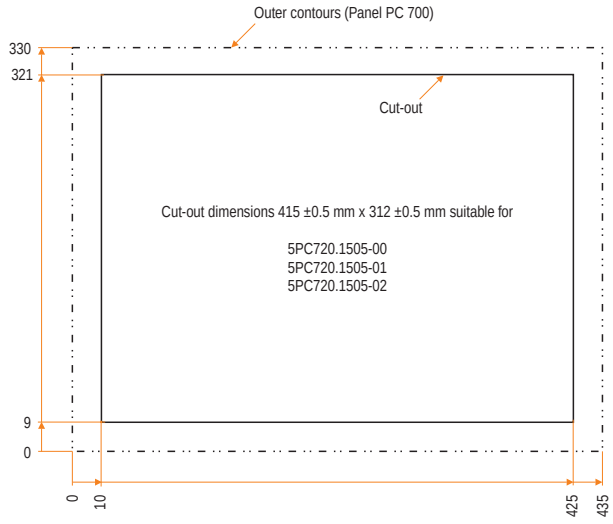


Figure 54: Cutout installation - 5PC720.1505-01

For further information regarding mounting and installation position, see chapter 3 "Commissioning" on page 211.

3.1.7 Panel PC 5PC720.1505-02

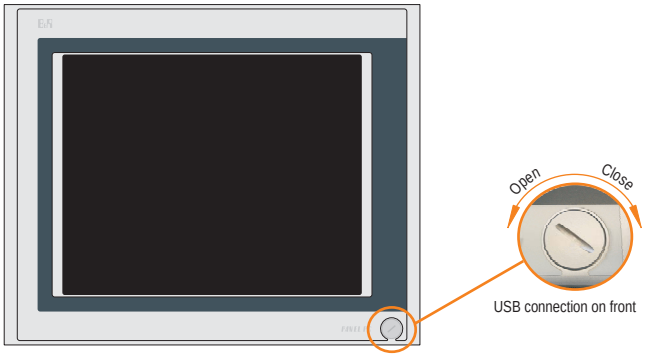
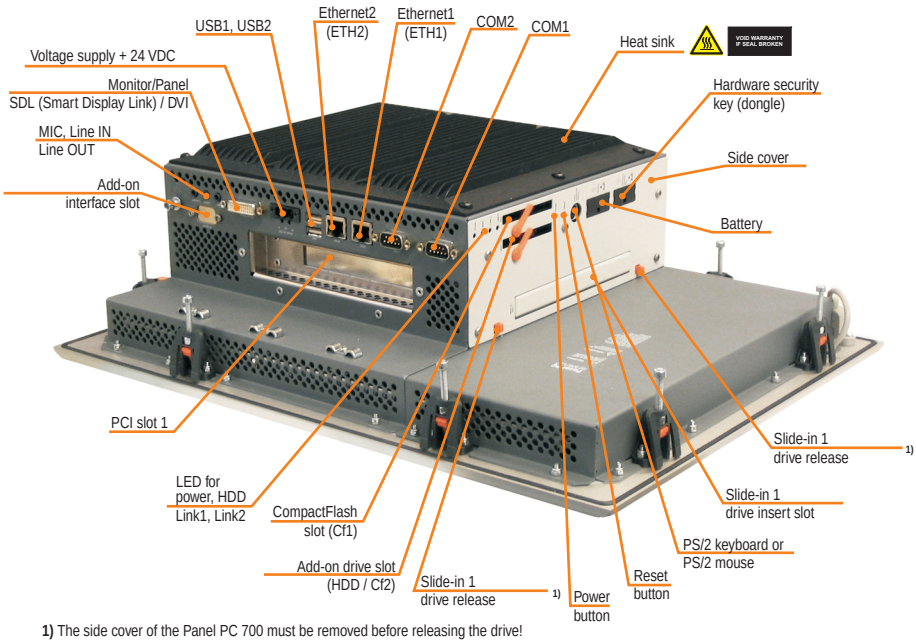


Figure 55: Front view 5PC720.1505-02



1) The side cover of the Panel PC 700 must be removed before releasing the drive!

Figure 56: Rear view 5PC720.1505-02

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 PPC700 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").

Dimensions

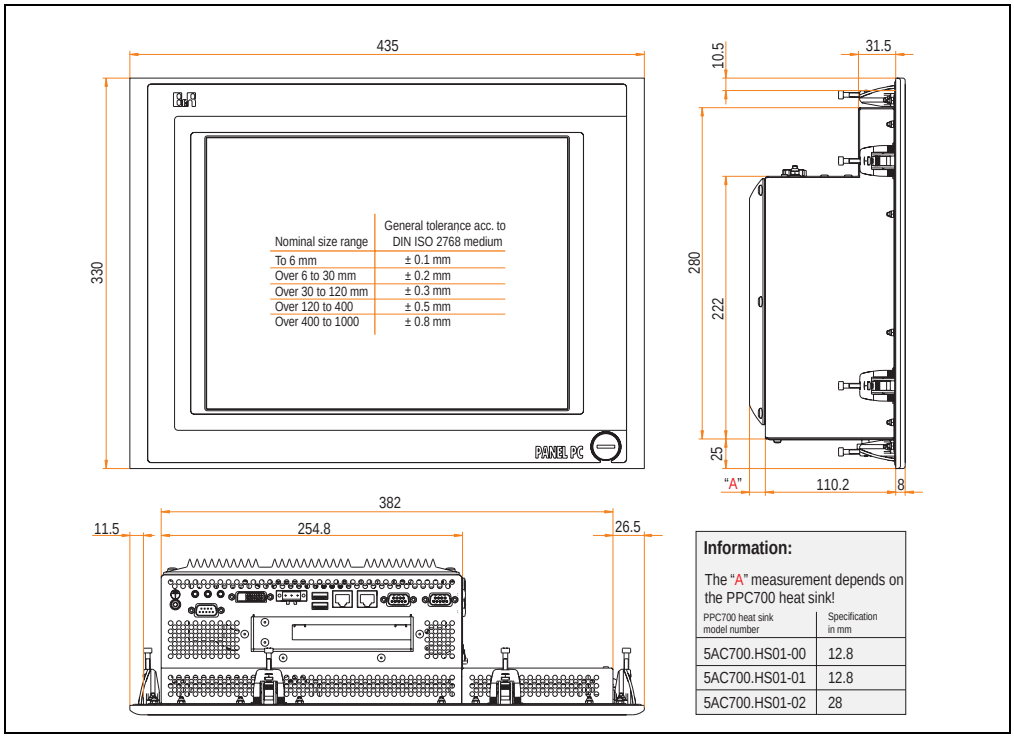


Figure 57: Dimensions - 5PC720.1505-02

Technical data

Features	5PC720.1505-02
Serial interfaces Type Number UART Transfer rate Connection	See "Serial interfaces COM1" on page 61 and "Serial interfaces COM2" on page 62 RS232, modem capable 2 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB, male
Ethernet Controller Transfer rate Connection	See "Ethernet connection ETH1" on page 63 and "Ethernet connection ETH2" on page 64 10/100 Mbit/s RJ45 twisted pair (10 BaseT / 100 BaseT)
USB interfaces Type Number Transfer rate Connection	See also "USB port" on page 65 USB 2.0 3 (2x back side, 1x front side) up to 480 MBit 1) (high speed) Type A
Monitor / Panel Type	See also "Monitor / Panel connection" on page 67 DVI-I, female
AC97 sound Inputs Outputs	See also "MIC, Line IN and Line OUT Port" on page 68 Microphone, Line in Line out
Add-on interface slot Number	See also "Add-on interface slot" on page 68 1
PCI slots Number Type Default	See also "PCI slots" on page 69 1 Half-size According to PCI half-size standard 2.2
CompactFlash slot 1 (CF1) Internal organization	Yes, see also "CompactFlash slot (CF1)" on page 71 Primary master
CompactFlash slot 2 / hard disk (HDD/CF2) Type Internal organization	Yes, see also "Hard disk / CompactFlash slot (HDD/CF2)" on page 72 Combined Primary slave
Insert for slide-in drive 1 Internal organization	Yes, see also "Slide-in slot 1 drive slot" on page 77 Secondary slave
Reset button	Yes, see also "Power button" on page 73
Power button	Yes, see also "Reset button" on page 73
PS/2 keyboard/mouse Type	Yes, see also "PS/2 keyboard/mouse" on page 74 Combined, will be automatically detected
Battery Type Removable Lifespan	Yes, see also "Battery" on page 75 Renata 950 mAh Yes, accessible from the outside 4 years 2)
Hardware security key compartment Optimized for	Yes, see also "Hardware security key" on page 76 DS1425 from MAXIM/Dallas)
Fan insert for fan kit	Yes, compatible fan kit - see section 3.8.3 "Fan kit 5PC700.FA02-01" on page 208
LED Number	See also "Status LEDs" on page 70 4 (Power, HDD, Link 1, Link 2)

Table 44: Technical data - 5PC720.1505-02

Features	5PC720.1505-02
Touch screen [3)] Technology Controller Degree of transmission	 Analog, resistive Elo, serial, 12-bit Up to 78%
Display Type Diagonal Colors Resolution Contrast Viewing angle horizontal / vertical Background lighting Brightness Half-brightness time	 Color TFT 15 inch (381 mm) 16 million XGA, 1024 x 768 pixels 400:1 85° / 85° 250 cd/m² 50000 hours
Keys/LED Function keys Soft keys Cursor keys Number block Other keys Key lifespan LED brightness	-
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption Electrical isolation	See also "Supply voltage" on page 66 24 VDC ±25% 3.8 A Typ. 10 A, max. 40 A for < 300 µs See power management section "15" Panel PC 700" on page 57 Yes
Mechanical characteristics	
Front Frame Design Membrane Dark gray border around display Light background Gasket	 Aluminum, naturally anodized[4)] Gray[4)] Polyester Similar to Pantone 432CV[4)] Similar to Pantone 427CV[4)] Flat gasket around display front
Housing	Metal
Outer dimensions Width Height Depth	Also see drawing "Dimensions - 5PC720.1505-02" on page 112 435 mm 330 mm 131 or 146.2 mm (depending on the heat sink)
Weight	Approx. 6.5 kg
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 See section 2.1.7 "Ambient temperatures with system unit 5PC720.1505-02" on page 47-20°C .. +60°C -20°C .. +60°C
Relative humidity Operation / Storage / Transport	T <= 40°C: 5% to 90%, non-condensing T > 40°C: < 90% non-condensing

Table 44: Technical data - 5PC720.1505-02 (cont.)

Environmental characteristics	5PC720.1505-02
Vibration Operation (continuous) Operation (occasional) Storage / Transport	 5 - 9 Hz: 1.75 mm amplitude / 9 - 150 Hz: 0.5 g (4.9 m/s² 0-peak) 5 - 9 Hz: 3 mm amplitude / 9 - 150 Hz: 1 g (9.8 m/s² 0-peak) Max. 10 - 57 Hz and 0.075 mm amplitude Max. 58 - 500 Hz and 1 g (9.8 m/s² 0-peak)
Shock Operation Storage Transportation	TBD
Protection type	IP20 back side (only with installed CompactFlash card) IP65 / NEMA 250 type 4X, dust and sprayed water protection (front side)
Altitude	Max. 3,000 m

Table 44: Technical data - 5PC720.1505-02 (cont.)

1) Software must support USB 2.0 (e.g. Windows XP with at least Service Pack 1).
2) At 50°C, 8.5 µA of the supplied components and a self discharge of 40%.
3) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
4) Depending on the process or batch, there may be visual deviations in the color and surface structure.

Cutout installation

The Panel PC 700 with preassembled mounting blocks is installed e.g. in a housing cutout. A cutout that corresponds to the following drawing must be made.

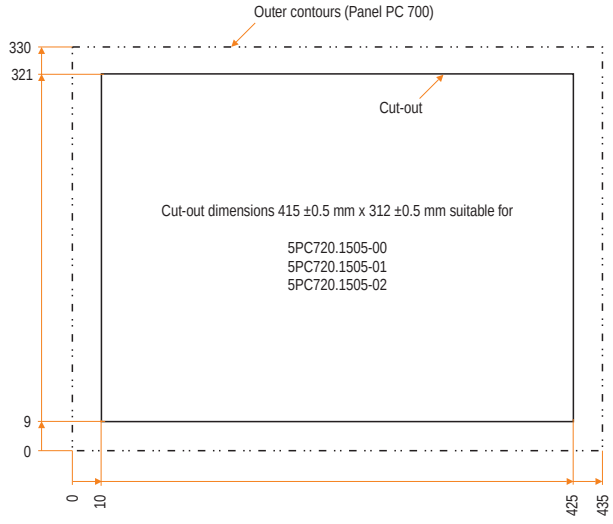


Figure 58: Cutout installation - 5PC720.1505-02

For further information regarding mounting and installation position, see chapter 3 "Commissioning" on page 211.

3.1.8 Panel PC 5PC720.1706-00

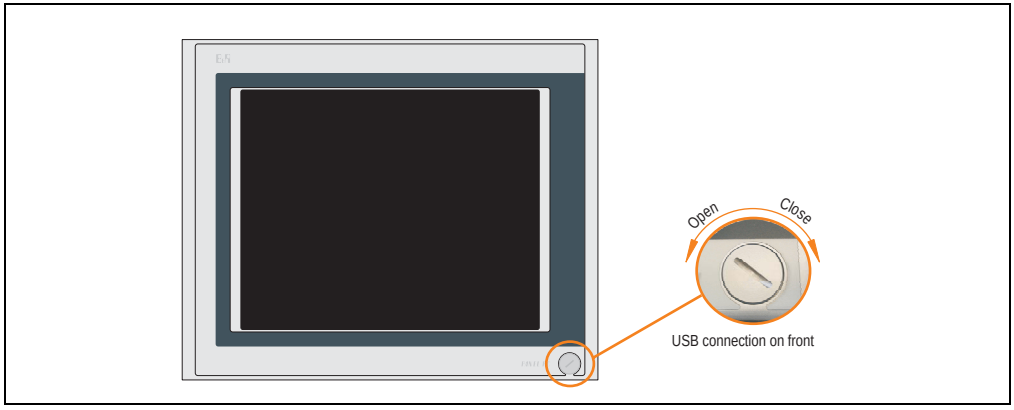


Figure 59: Front view 5PC720.1706-00

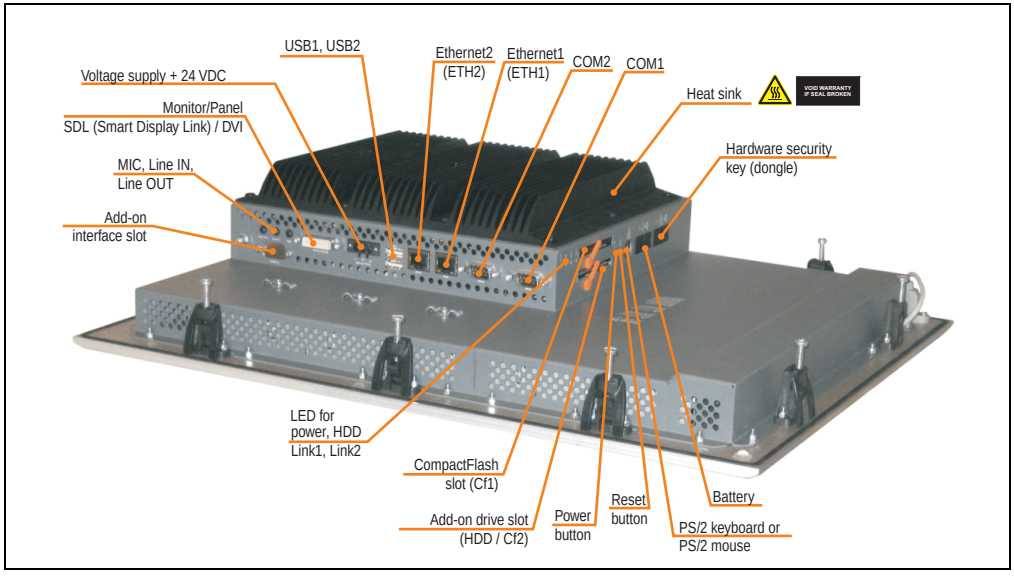


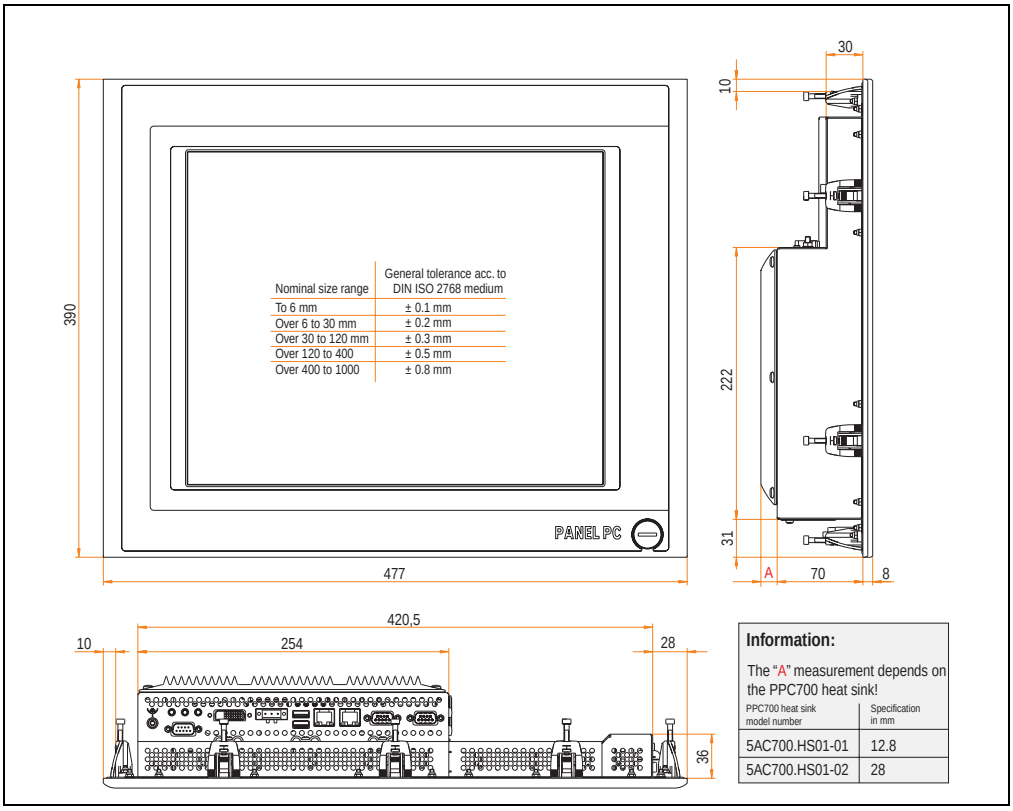
Figure 60: Rear view 5PC720.1706-00

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 PPC700 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").

Dimensions



Nominal size range	General tolerance acc. to DIN ISO 2768 medium
To 6 mm	± 0.1 mm
Over 6 to 30 mm	± 0.2 mm
Over 30 to 120 mm	± 0.3 mm
Over 120 to 400	± 0.5 mm
Over 400 to 1000	± 0.8 mm

PPC700 heat sink model number	Specification in mm
5AC700.HS01-01	12.8
5AC700.HS01-02	28

Figure 61: Dimensions - 5PC720.1706-00

Technical data

Features	5PC720.1706-00
Serial interfaces Type Number UART Transfer rate Connection	See "Serial interfaces COM1" on page 61 and "Serial interfaces COM2" on page 62 RS232, modem capable 2 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB, male
Ethernet Controller Transfer rate Connection	See "Ethernet connection ETH1" on page 63 and "Ethernet connection ETH2" on page 64 10/100 Mbit/s RJ45 twisted pair (10 BaseT / 100 BaseT)
USB interfaces Type Number Transfer rate Connection	See also "USB port" on page 65 USB 2.0 3 (2x back side, 1x front side) up to 480 MBit 1) (high speed) Type A
Monitor / Panel Type	See also "Monitor / Panel connection" on page 67 DVI-I, female
AC97 sound Inputs Outputs	See also "MIC, Line IN and Line OUT Port" on page 68 Microphone, Line in Line out
Add-on interface slot Number	See also "Add-on interface slot" on page 68 1
PCI slots Number Type Default	-
CompactFlash slot 1 (CF1) Internal organization	Yes, see also "CompactFlash slot (CF1)" on page 71 Primary master
CompactFlash slot 2 / hard disk (HDD/CF2) Type Internal organization	Yes, see also "Hard disk / CompactFlash slot (HDD/CF2)" on page 72 Combined Primary slave
Insert for slide-in drive 1 Internal organization	-
Reset button	Yes, see also "Power button" on page 73
Power button	Yes, see also "Reset button" on page 73
PS/2 keyboard/mouse Type	Yes, see also "PS/2 keyboard/mouse" on page 74 Combined, will be automatically detected
Battery Type Removable Lifespan	Yes, see also "Battery" on page 75 Renata 950 mAh Yes, accessible from the outside 4 years 2)
Hardware security key compartment Optimized for	Yes, see also "Hardware security key" on page 76 DS1425 from MAXIM/Dallas)
Fan insert for fan kit	Yes, compatible fan kit - see section 3.8.1 "Fan kit 5PC700.FA00-01" on page 205
LED Number	See also "Status LEDs" on page 70 4 (Power, HDD, Link 1, Link 2)

Table 45: Technical data - 5PC720.1706-00

Features	5PC720.1706-00
Touch screen [3)] Technology Controller Degree of transmission	 Analog, resistive Elo, serial, 12-bit Up to 78%
Display Type Diagonal Colors Resolution Contrast Viewing angle horizontal / vertical Background lighting Brightness Half-brightness time	 Color TFT 15 inch (381 mm) 16 million XGA, 1024 x 768 pixels 400:1 85° / 85° 250 cd/m² 50000 hours
Keys Function keys Soft keys Cursor keys Number block Other keys Key lifespan LED brightness	-
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption Electrical isolation	See also "Supply voltage" on page 66 24 VDC ±25% 3.8 A Typ. 10 A, max. 40 A for < 300 µs See power management section "17" Panel PC 700" on page 58 Yes
Mechanical characteristics	
Front Frame Design Membrane Dark gray border around display Light background Gasket	 Aluminum, naturally anodized[4)] Gray[4)] Polyester Similar to Pantone 432CV[4)] Similar to Pantone 427CV[4)] Flat gasket around display front
Housing	Metal
Outer dimensions Width Height Depth	Also see drawing "Dimensions - 5PC720.1706-00" on page 117 477 mm 390 mm 90.8 or 106 mm (depending on the heat sink)
Weight	Approx. 7.7 kg
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 See 2.1.8 "Ambient temperatures with system unit 5PC720.1706-00" on page 48. -20°C .. +60°C -20°C .. +60°C
Relative humidity Operation / Storage / Transport	T <= 40°C: 5% to 90%, non-condensing T > 40°C: < 90% non-condensing

Table 45: Technical data - 5PC720.1706-00 (cont.)

Environmental characteristics	5PC720.1706-00
Vibration Operation (continuous) Operation (occasional) Storage / Transport	 5 - 9 Hz: 1.75 mm amplitude / 9 - 150 Hz: 0.5 g (4.9 m/s² 0-peak) 5 - 9 Hz: 3 mm amplitude / 9 - 150 Hz: 1 g (9.8 m/s² 0-peak) Max. 10 - 57 Hz and 0.075 mm amplitude Max. 58 - 500 Hz and 1 g (9.8 m/s² 0-peak)
Shock Operation Storage Transportation	TBD
Protection type	IP20 back side (only with installed CompactFlash card) IP65 / NEMA 250 type 4X, dust and sprayed water protection (front side)
Altitude	Max. 3,000 m

Table 45: Technical data - 5PC720.1706-00 (cont.)

1) Software must support USB 2.0 (e.g. Windows XP with at least Service Pack 1).
2) At 50°C, 8.5 µA of the supplied components and a self discharge of 40%.
3) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
4) Depending on the process or batch, there may be visual deviations in the color and surface structure.

Cutout installation

The Panel PC 700 with preassembled mounting blocks is installed e.g. in a housing cutout. A cutout that corresponds to the following drawing must be made.

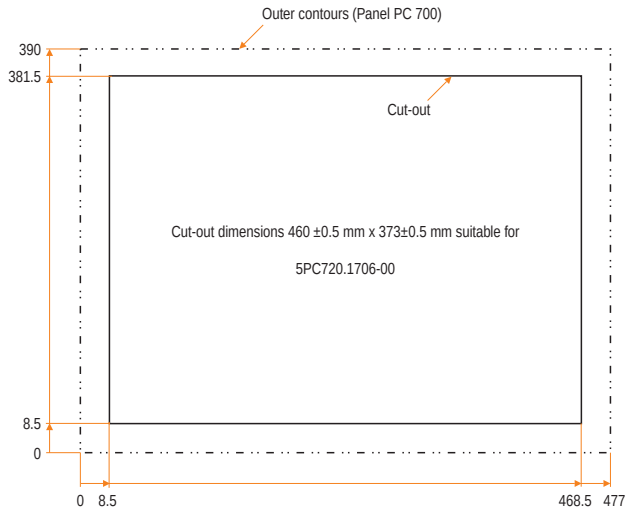


Figure 62: Cutout installation - 5PC720.1706-00

For further information regarding mounting and installation position, see chapter 3 "Commissioning" on page 211.

3.1.9 Panel PC 5PC720.1906-00

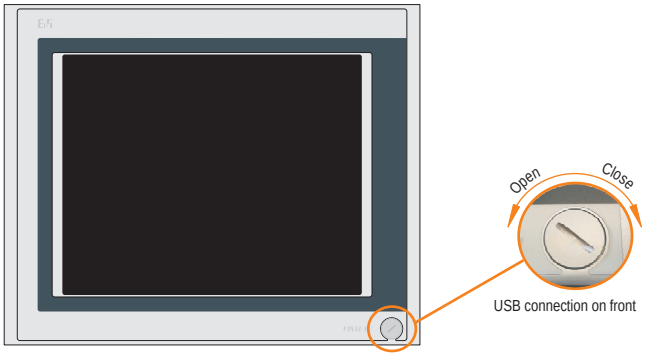


Figure 63: Front view 5PC720.1906-00

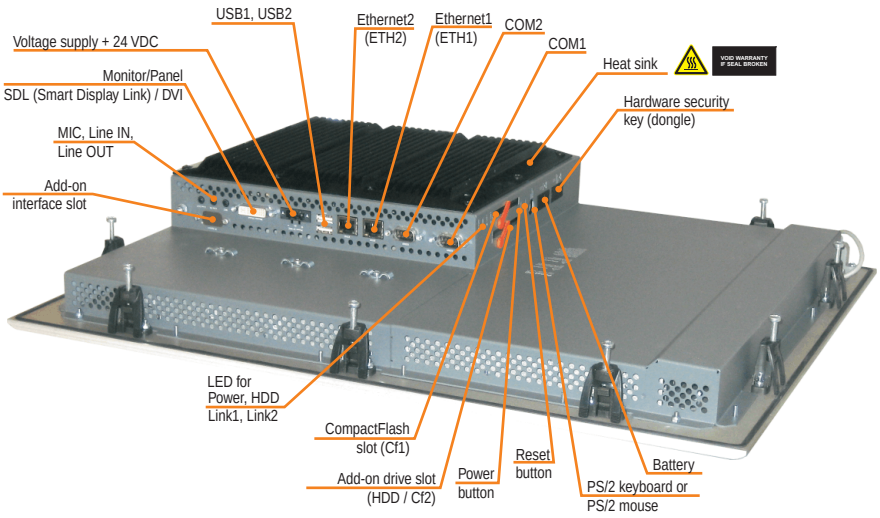


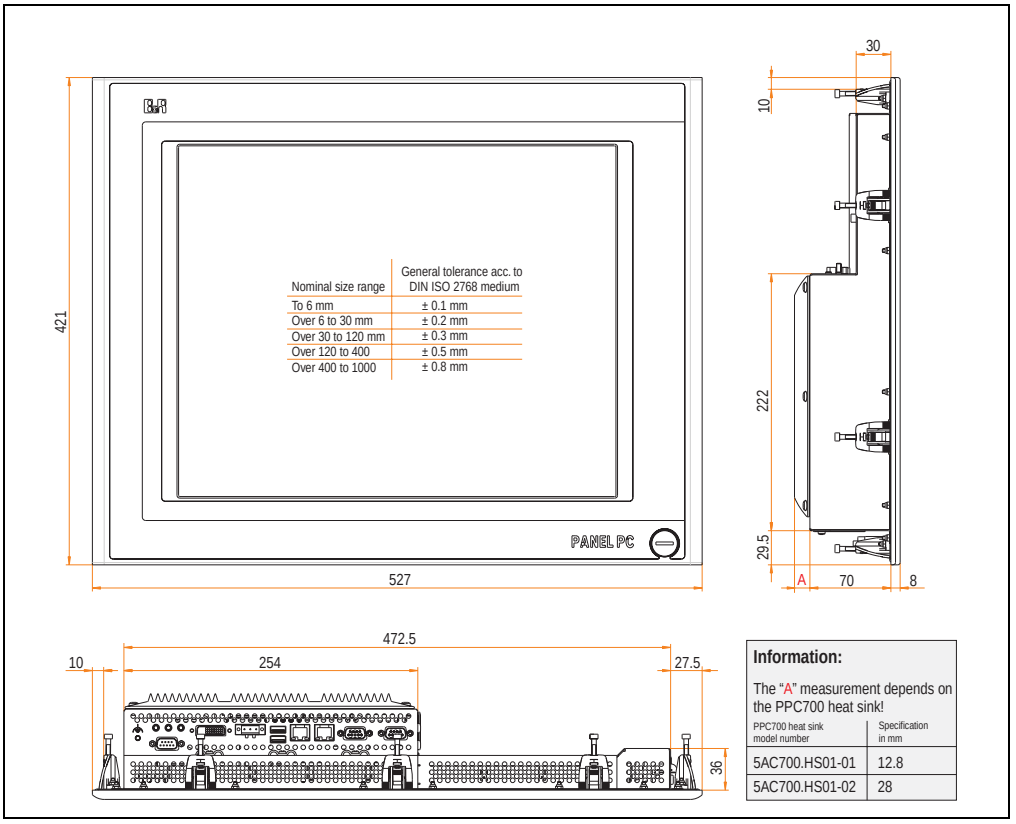
Figure 64: Rear view 5PC720.1906-00

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 PPC700 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").

Dimensions



Nominal size range	General tolerance acc. to DIN ISO 2768 medium
To 6 mm	± 0.1 mm
Over 6 to 30 mm	± 0.2 mm
Over 30 to 120 mm	± 0.3 mm
Over 120 to 400	± 0.5 mm
Over 400 to 1000	± 0.8 mm

PPC700 heat sink model number	Specification in mm
5AC700.HS01-01	12.8
5AC700.HS01-02	28

Figure 65: Dimensions - 5PC720.1906-00

Technical data

Features	5PC720.1906-00
Serial interfaces Type Number UART Transfer rate Connection	See "Serial interfaces COM1" on page 61 and "Serial interfaces COM2" on page 62 RS232, modem capable 2 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB, male
Ethernet Controller Transfer rate Connection	See "Ethernet connection ETH1" on page 63 and "Ethernet connection ETH2" on page 64 10/100 Mbit/s RJ45 twisted pair (10 BaseT / 100 BaseT)
USB interfaces Type Number Transfer rate Connection	See also "USB port" on page 65 USB 2.0 3 (2x back side, 1x front side) up to 480 MBit 1) (high speed) Type A
Monitor / Panel Type	See also "Monitor / Panel connection" on page 67 DVI-I, female
AC97 sound Inputs Outputs	See also "MIC, Line IN and Line OUT Port" on page 68 Microphone, Line in Line out
Add-on interface slot Number	See also "Add-on interface slot" on page 68 1
PCI slots Number Type Default	-
CompactFlash slot 1 (CF1) Internal organization	Yes, see also "CompactFlash slot (CF1)" on page 71 Primary master
CompactFlash slot 2 / hard disk (HDD/CF2) Type Internal organization	Yes, see also "Hard disk / CompactFlash slot (HDD/CF2)" on page 72 Combined Primary slave
Insert for slide-in drive 1 Internal organization	-
Reset button	Yes, see also "Power button" on page 73
Power button	Yes, see also "Reset button" on page 73
PS/2 keyboard/mouse Type	Yes, see also "PS/2 keyboard/mouse" on page 74 Combined, will be automatically detected
Battery Type Removable Lifespan	Yes, see also "Battery" on page 75 Renata 950 mAh Yes, accessible from the outside 4 years 2)
Hardware security key compartment Optimized for	Yes, see also "Hardware security key" on page 76 DS1425 from MAXIM/Dallas)
Fan insert for fan kit	Yes, compatible fan kit - see section 3.8.1 "Fan kit 5PC700.FA00-01" on page 205
LED Number	See also "Status LEDs" on page 70 4 (Power, HDD, Link 1, Link 2)

Table 46: Technical data - 5PC720.1906-00

Features	5PC720.1906-00
Touch screen [3)] Technology Controller Degree of transmission	 Analog, resistive Elo, serial, 12-bit Up to 78%
Display Type Diagonal Colors Resolution Contrast Viewing angle horizontal / vertical Background lighting Brightness Half-brightness time	 Color TFT 15 inch (381 mm) 16 million XGA, 1024 x 768 pixels 400:1 85° / 85° 250 cd/m² 50000 hours
Keys Function keys Soft keys Cursor keys Number block Other keys Key lifespan LED brightness	-
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption Electrical isolation	See also "Supply voltage" on page 66 24 VDC ±25% 3.8 A Typ. 10 A, max. 40 A for < 300 µs See power management section "19" Panel PC 700" on page 59 Yes
Mechanical characteristics	
Front Frame Design Membrane Dark gray border around display Light background Gasket	 Aluminum, naturally anodized[4)] Gray[4)] Polyester Similar to Pantone 432CV[4)] Similar to Pantone 427CV[4)] Flat gasket around display front
Housing	Metal
Outer dimensions Width Height Depth	Also see drawing "Dimensions - 5PC720.1906-00" on page 122 527 mm 421 mm 90.8 or 106 mm (depending on the heat sink)
Weight	Approx. TBD kg
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 See 2.1.9 "Ambient temperatures with system unit 5PC720.1906-00" on page 49. -20°C .. +60°C -20°C .. +60°C
Relative humidity Operation / Storage / Transport	T <= 40°C: 5% to 90%, non-condensing T > 40°C: < 90% non-condensing

Table 46: Technical data - 5PC720.1906-00 (cont.)

Environmental characteristics	5PC720.1906-00
Vibration Operation (continuous) Operation (occasional) Storage / Transport	 5 - 9 Hz: 1.75 mm amplitude / 9 - 150 Hz: 0.5 g (4.9 m/s² 0-peak) 5 - 9 Hz: 3 mm amplitude / 9 - 150 Hz: 1 g (9.8 m/s² 0-peak) Max. 10 - 57 Hz and 0.075 mm amplitude Max. 58 - 500 Hz and 1 g (9.8 m/s² 0-peak)
Shock Operation Storage Transportation	TBD
Protection type	IP20 back side (only with installed CompactFlash card) IP65 / NEMA 250 type 4X, dust and sprayed water protection (front side)
Altitude	Max. 3,000 m

Table 46: Technical data - 5PC720.1906-00 (cont.)

1) Software must support USB 2.0 (e.g. Windows XP with at least Service Pack 1).
2) At 50°C, 8.5 µA of the supplied components and a self discharge of 40%.
3) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
4) Depending on the process or batch, there may be visual deviations in the color and surface structure.

Cutout installation

The Panel PC 700 with preassembled mounting blocks is installed e.g. in a housing cutout. A cutout that corresponds to the following drawing must be made.

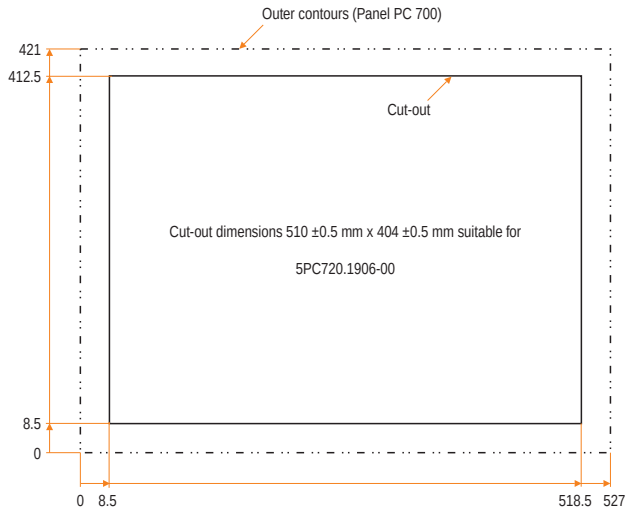


Figure 66: Cutout installation - 5PC720.1906-00

For further information regarding mounting and installation position, see chapter 3 "Commissioning" on page 211.

3.1.10 Panel PC 5PC781.1043-00

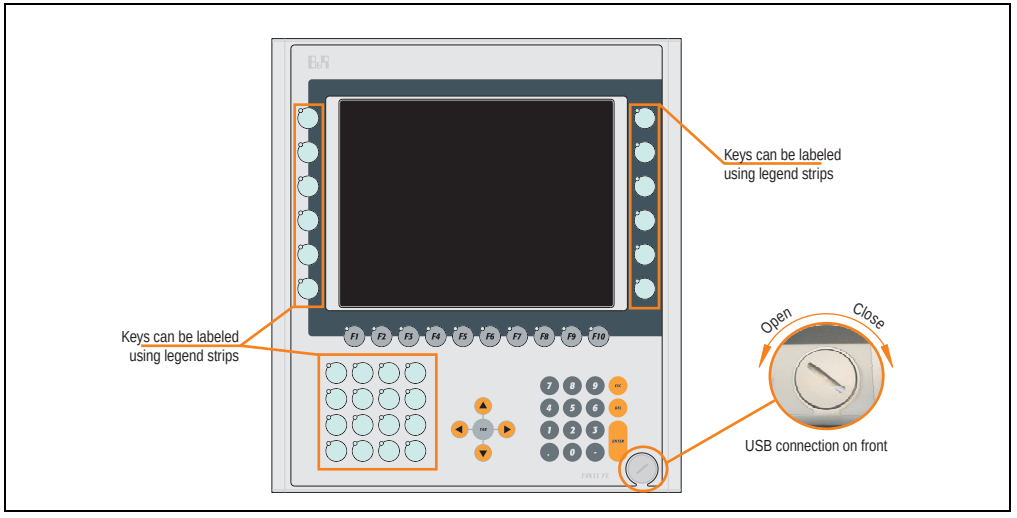


Figure 67: Front view 5PC781.1043-00

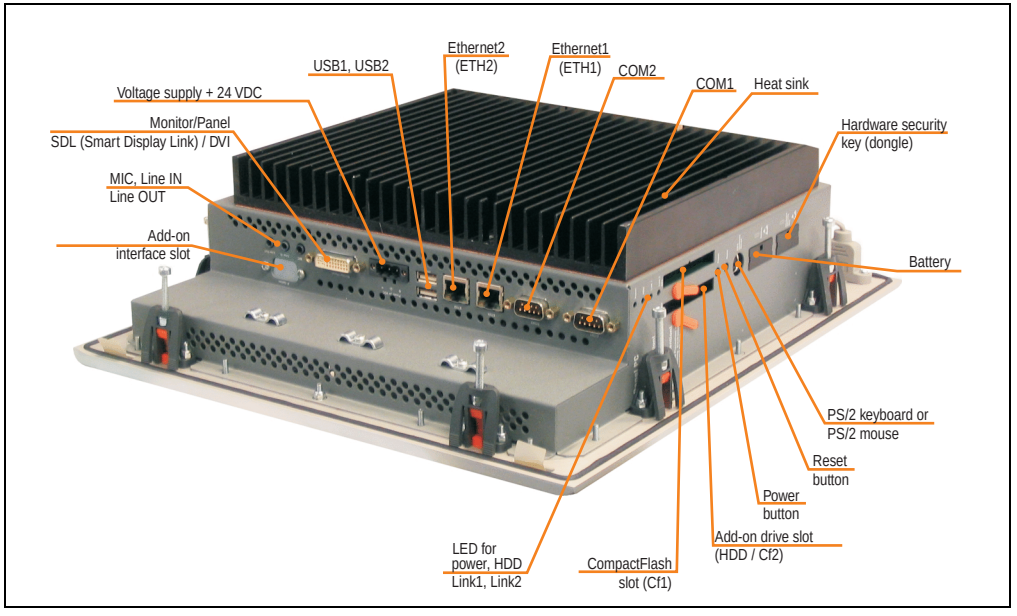


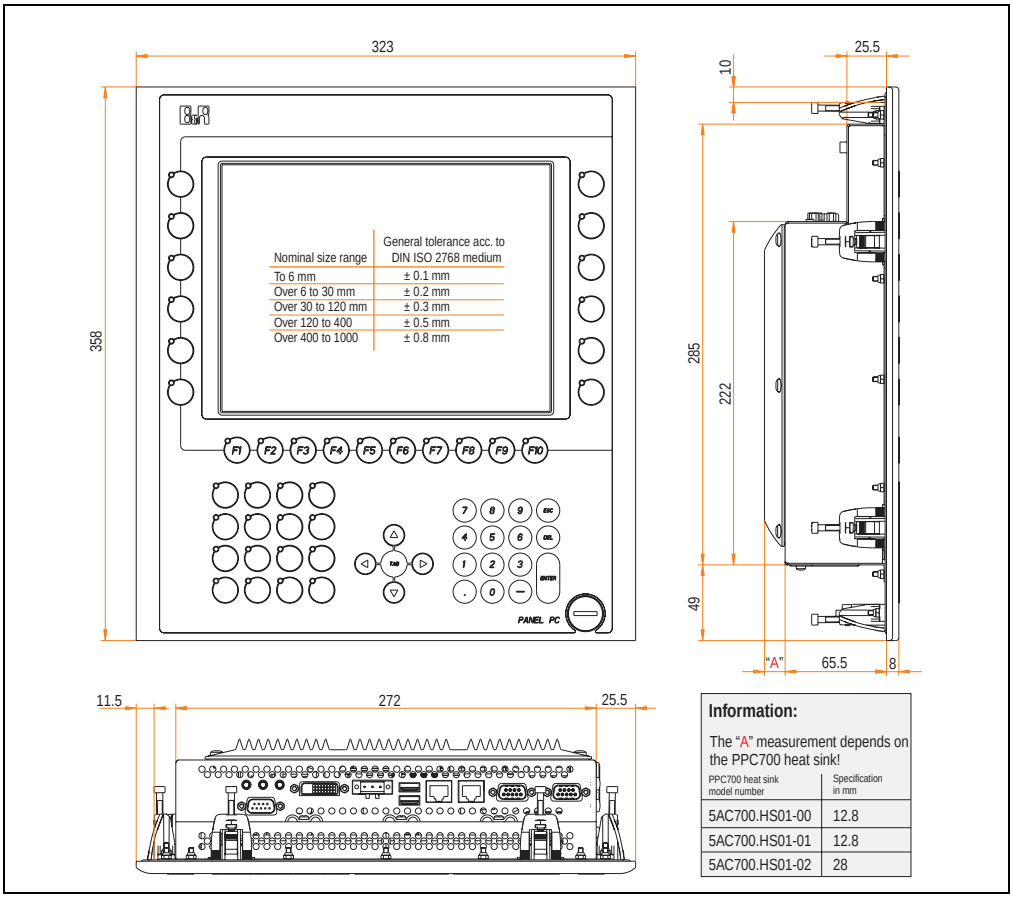
Figure 68: Rear view 5PC781.1043-00

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 PPC700 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").

Dimensions



Nominal size range	General tolerance acc. to DIN ISO 2768 medium
To 6 mm	± 0.1 mm
Over 6 to 30 mm	± 0.2 mm
Over 30 to 120 mm	± 0.3 mm
Over 120 to 400	± 0.5 mm
Over 400 to 1000	± 0.8 mm

PPC700 heat sink model number	Specification in mm
5AC700.HS01-00	12.8
5AC700.HS01-01	12.8
5AC700.HS01-02	28

Figure 69: Dimensions - 5PC781.1043-00

Technical data

Features	5PC781.1043-00
Serial interfaces Type Number UART Transfer rate Connection	See "Serial interfaces COM1" on page 61 and "Serial interfaces COM2" on page 62 RS232, modem capable 2 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB, male
Ethernet Controller Transfer rate Connection	See "Ethernet connection ETH1" on page 63 and "Ethernet connection ETH2" on page 64 10/100 Mbit/s RJ45 twisted pair (10 BaseT / 100 BaseT)
USB interfaces Type Number Transfer rate Connection	See also "USB port" on page 65 USB 2.0 3 (2x back side, 1x front side) up to 480 MBit [1] (high speed) Type A
Monitor / Panel Type	See also "Monitor / Panel connection" on page 67 DVI-I, female
AC97 sound Inputs Outputs	See also "MIC, Line IN and Line OUT Port" on page 68 Microphone, Line in Line out
Add-on interface slot Number	See also "Add-on interface slot" on page 68 1
PCI slots Number Type Default	-
CompactFlash slot 1 (CF1) Internal organization	Yes, see also "CompactFlash slot (CF1)" on page 71 Primary master
CompactFlash slot 2 / hard disk (HDD/CF2) Type Internal organization	Yes, see also "Hard disk / CompactFlash slot (HDD/CF2)" on page 72 Combined Primary slave
Insert for slide-in drive 1 Internal organization	-
Reset button	Yes, see also "Power button" on page 73
Power button	Yes, see also "Reset button" on page 73
PS/2 keyboard/mouse Type	Yes, see also "PS/2 keyboard/mouse" on page 74 Combined, will be automatically detected
Battery Type Removable Lifespan	Yes, see also "Battery" on page 75 Renata 950 mAh Yes, accessible from the outside 4 years [2]
Hardware security key compartment Optimized for	Yes, see also "Hardware security key" on page 76 DS1425 from MAXIM/Dallas)
Fan insert for fan kit	Yes, compatible fan kit - see section 3.8.1 "Fan kit 5PC700.FA00-01" on page 205
LED Number	See also "Status LEDs" on page 70 4 (Power, HDD, Link 1, Link 2)

Table 47: Technical data - 5PC781.1043-00

Features	5PC781.1043-00
Touch screen [3]	
Technology	Analog, resistive
Controller	Elo, serial, 12-bit
Degree of transmission	Up to 78%
Display	
Type	Color TFT
Diagonal	10.4 inch (264 mm)
Colors	262144 colors
Resolution	VGA, 640 x 480 pixels
Contrast	300:1
Viewing angle horizontal / vertical	70° / 70°
Background lighting	
Brightness	350 cd/m²
Half-brightness time	50000 hours
Keys/LED[4]	
Function keys	28 with LED (yellow)
Soft keys	10 with LED (yellow)
Cursor keys	-
Number block	15 without LED
Other keys	5 without LED
Key lifespan	> 1,000,000 actuations with 1 ±0.3 to 3 ±0.3 N operating force
LED brightness	Typically 12 mcd (yellow)
Caution! **Pressing several keys at the same time may trigger unintended actions.**	
Electrical characteristics	
Power supply	See also "Supply voltage" on page 66
Rated voltage	24 VDC ±25%
Rated current	3.8 A
Starting current	Typ. 10 A, max. 40 A for < 300 µs
Power consumption	See power management section "10.4" Panel PC 700" on page 55
Electrical isolation	Yes
Mechanical characteristics	
Front	
Frame	Aluminum, naturally anodized[5]
Design	Gray[5]
Membrane	Polyester
Dark gray border around display	Similar to Pantone 432CV[5]
Light background	Similar to Pantone 427CV[5]
Orange keys	Similar to Pantone 151CV[5]
Dark gray keys	Similar to Pantone 431CV[5]
Color legend strips	Similar to Pantone 429CV[5]
Gasket	Flat gasket around display front
Outer dimensions	Also see drawing "Dimensions - 5PC781.1043-00" on page 127
Width	323 mm
Height	358 mm
Depth	86.3 or 101.5 mm (depending on the heat sink)
Weight	Approx. 4.5 kg

Table 47: Technical data - 5PC781.1043-00 (cont.)

Environmental characteristics	5PC781.1043-00
Ambient temperature Operation Storage Transportation	 See section 2.1.10 "Ambient temperatures with system unit 5PC781.1043-00" on page 50--30°C .. +70°C -30°C .. +70°C
Relative humidity Operation / Storage / Transport	 T <= 40°C: 5% to 90%, non-condensing T > 40°C: < 90% non-condensing
Vibration Operation (continuous) Operation (occasional) Storage / Transport	 5 - 9 Hz: 1.75 mm amplitude / 9 - 150 Hz: 0.5 g (4.9 m/s² 0-peak) 5 - 9 Hz: 3 mm amplitude / 9 - 150 Hz: 1 g (9.8 m/s² 0-peak) Max. 10 - 57 Hz and 0.075 mm amplitude Max. 58 - 500 Hz and 1 g (9.8 m/s² 0-peak)
Shock Operation Storage Transportation	 TBD
Protection type	IP20 back side (only with installed CompactFlash card) IP65 / NEMA 250 type 4X, dust and sprayed water protection (front side)
Altitude	Max. 3,000 m

Table 47: Technical data - 5PC781.1043-00 (cont.)

1) Software must support USB 2.0 (e.g. Windows XP with at least Service Pack 1).
2) At 50°C, 8.5 µA of the supplied components and a self discharge of 40%.
3) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
4) The key and LED functions can be freely configured with the B&R Key Editor, which can be found in the download area of the B&R homepage (www.br-automation.com) or on the B&R HMI Driver & Utilities DVD (Mod. No. 5SWHMI.0000-00).
5) Depending on the process or batch, there may be visual deviations in the color and surface structure.

Cutout installation

The Panel PC 700 with preassembled mounting blocks is installed e.g. in a housing cutout. A cutout that corresponds to the following drawing must be made.

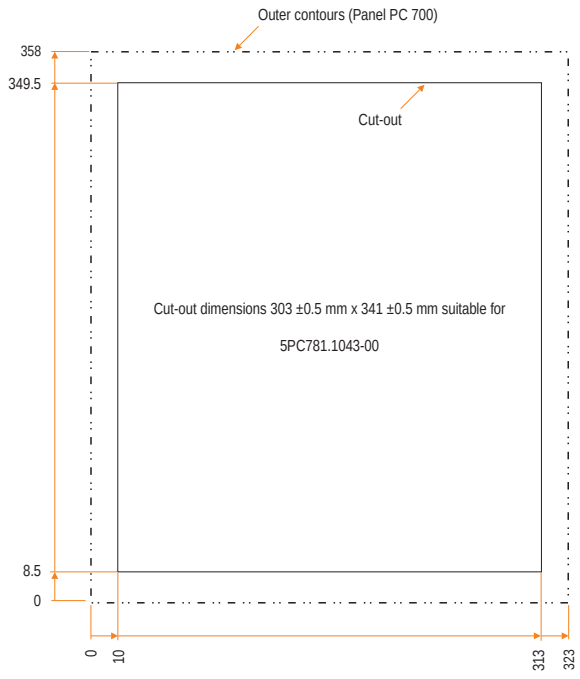


Figure 70: Cutout installation - 5PC781.1043-00

For further information regarding mounting and installation position, see chapter 3 "Commissioning" on page 211.

3.1.11 Panel PC 5PC781.1505-00

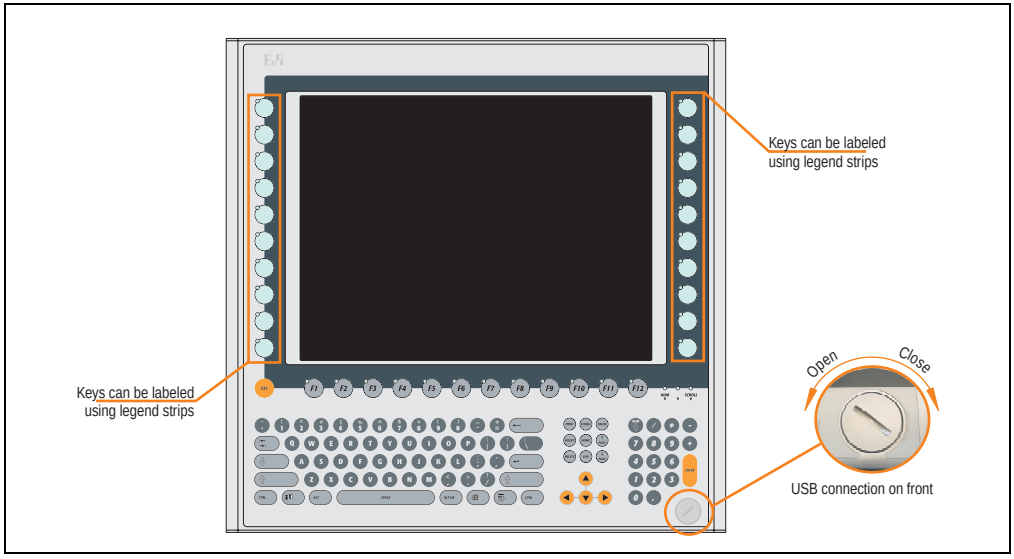


Figure 71: Front view 5PC781.1505-00

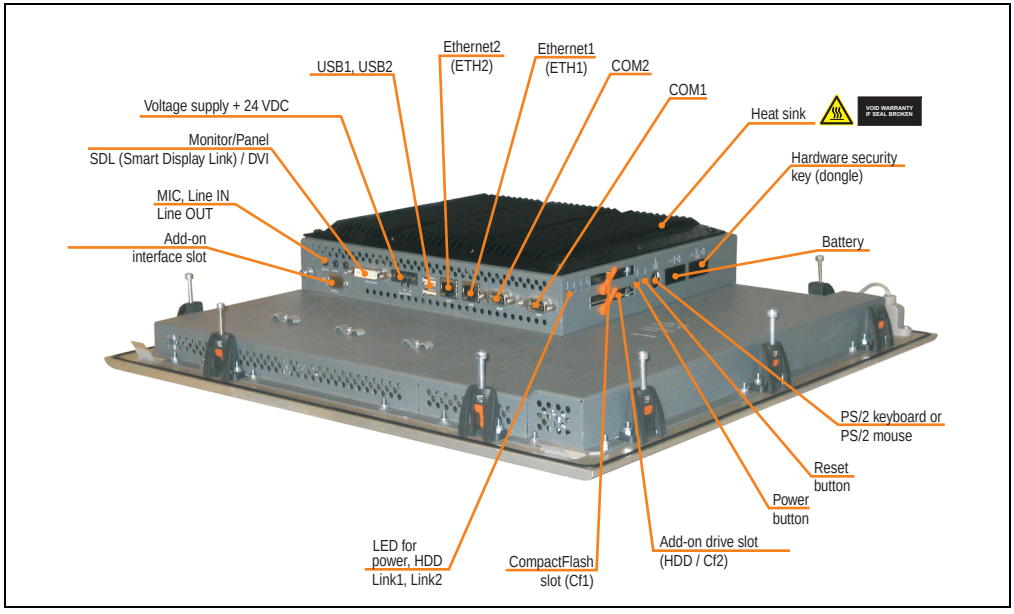


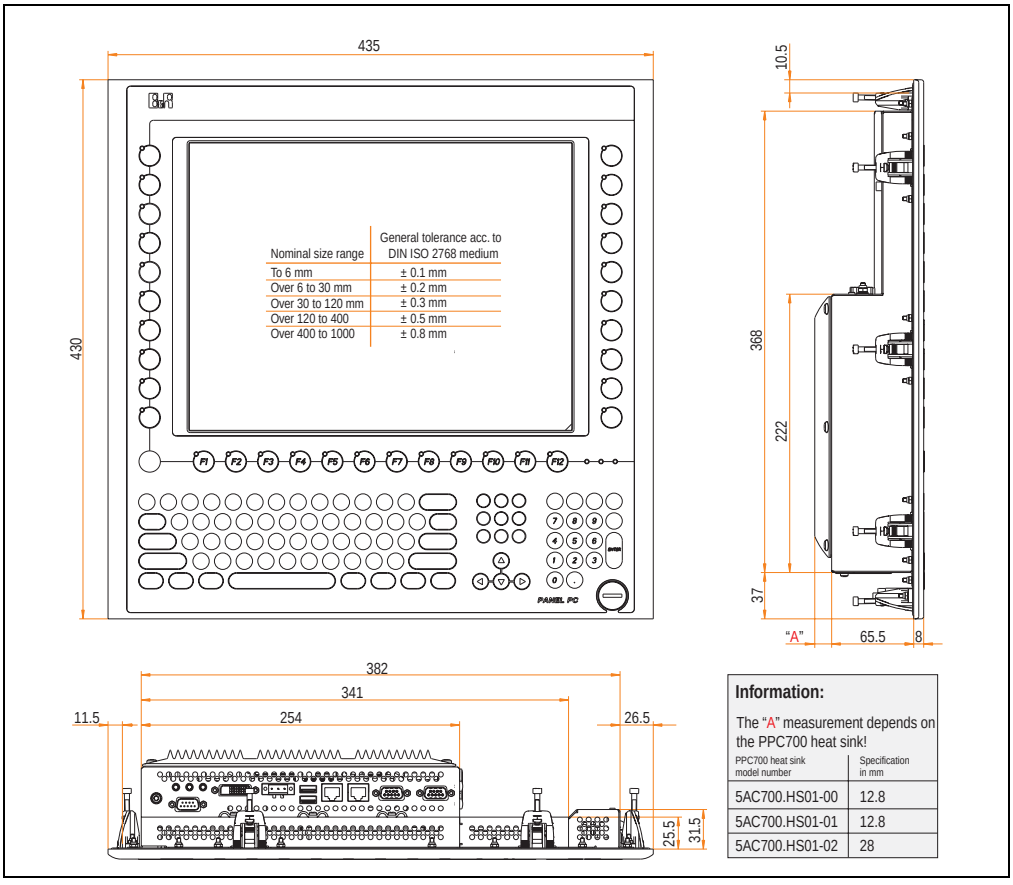
Figure 72: Rear view 5PC781.1505-00

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 PPC700 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").

Dimensions



Nominal size range	General tolerance acc. to DIN ISO 2768 medium
To 6 mm	± 0.1 mm
Over 6 to 30 mm	± 0.2 mm
Over 30 to 120 mm	± 0.3 mm
Over 120 to 400	± 0.5 mm
Over 400 to 1000	± 0.8 mm

PPC700 heat sink model number	Specification in mm
5AC700.HS01-00	12.8
5AC700.HS01-01	12.8
5AC700.HS01-02	28

Figure 73: Dimensions - 5PC781.1505-00

Technical data

Features	5PC781.1505-00
Serial interfaces Type Number UART Transfer rate Connection	See "Serial interfaces COM1" on page 61 and "Serial interfaces COM2" on page 62 RS232, modem capable 2 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB, male
Ethernet Controller Transfer rate Connection	See "Ethernet connection ETH1" on page 63 and "Ethernet connection ETH2" on page 64 10/100 Mbit/s RJ45 twisted pair (10 BaseT / 100 BaseT)
USB interfaces Type Number Transfer rate Connection	See also "USB port" on page 65 USB 2.0 3 (2x back side, 1x front side) up to 480 MBit [1] (high speed) Type A
Monitor / Panel Type	See also "Monitor / Panel connection" on page 67 DVI-I, female
AC97 sound Inputs Outputs	See also "MIC, Line IN and Line OUT Port" on page 68 Microphone, Line in Line out
Add-on interface slot Number	See also "Add-on interface slot" on page 68 1
PCI slots Number Type Default	-
CompactFlash slot 1 (CF1) Internal organization	Yes, see also "CompactFlash slot (CF1)" on page 71 Primary master
CompactFlash slot 2 / hard disk (HDD/CF2) Type Internal organization	Yes, see also "Hard disk / CompactFlash slot (HDD/CF2)" on page 72 Combined Primary slave
Insert for slide-in drive 1 Internal organization	-
Reset button	Yes, see also "Power button" on page 73
Power button	Yes, see also "Reset button" on page 73
PS/2 keyboard/mouse Type	Yes, see also "PS/2 keyboard/mouse" on page 74 Combined, will be automatically detected
Battery Type Removable Lifespan	Yes, see also "Battery" on page 75 Renata 950 mAh Yes, accessible from the outside 4 years [2]
Hardware security key compartment Optimized for	Yes, see also "Hardware security key" on page 76 DS1425 from MAXIM/Dallas)
Fan insert for fan kit	Yes, compatible fan kit - see section 3.8.1 "Fan kit 5PC700.FA00-01" on page 205
LED Number	See also "Status LEDs" on page 70 4 (Power, HDD, Link 1, Link 2)

Table 48: Technical data - 5PC781.1505-00

Features	5PC781.1505-00
Touch screen [3]	
Technology	Analog, resistive
Controller	Elo, serial, 12-bit
Degree of transmission	Up to 78%
Display	
Type	Color TFT
Diagonal	15 inch (381 mm)
Colors	16 million
Resolution	XGA, 1024 x 768 pixels
Contrast	400:1
Viewing angle horizontal / vertical	85° / 85°
Background lighting	
Brightness	250 cd/m²
Half-brightness time	50000 hours
Keys/LED[4]	
Function keys	20 with LED (yellow)
Soft keys	12 with LED (yellow)
Cursor keys	-
Number block	15 without LED
Other keys	77 without LED
Key lifespan	> 1,000,000 actuations with 1 ±0.3 to 3 ±0.3 N operating force
LED brightness	Typically 12 mcd (yellow)
Caution! **Pressing several keys at the same time may trigger unintended actions.**	
Electrical characteristics	
Power supply	See also "Supply voltage" on page 66
Rated voltage	24 VDC ±25%
Rated current	3.8 A
Starting current	Typ. 10 A, max. 40 A for < 300 µs
Power consumption	See power management section "15" Panel PC 700" on page 57
Electrical isolation	Yes
Mechanical characteristics	
Front	
Frame	Aluminum, naturally anodized[5]
Design	Gray[5]
Membrane	Polyester
Dark gray border around display	Similar to Pantone 432CV[5]
Light background	Similar to Pantone 427CV[5]
Orange keys	Similar to Pantone 151CV[5]
Dark gray keys	Similar to Pantone 431CV[5]
Color legend strips	Similar to Pantone 429CV[5]
Gasket	Flat gasket around display front
Housing	Metal
Outer dimensions	Also see drawing "Dimensions - 5PC781.1505-00" on page 133
Width	435 mm
Height	430 mm
Depth	86.3 or 101.5 mm (depending on the heat sink)
Weight	Approx. 7.5 kg

Table 48: Technical data - 5PC781.1505-00 (cont.)

Environmental characteristics	5PC781.1505-00
Ambient temperature Operation Storage Transportation	 See 2.1.11 "Ambient temperatures with system unit 5PC781.1505-00" on page 51. -30°C .. +70°C -30°C .. +70°C
Relative humidity Operation / Storage / Transport	 T <= 40°C: 5% to 90%, non-condensing T > 40°C: < 90% non-condensing
Vibration Operation (continuous) Operation (occasional) Storage / Transport	 5 - 9 Hz: 1.75 mm amplitude / 9 - 150 Hz: 0.5 g (4.9 m/s² 0-peak) 5 - 9 Hz: 3 mm amplitude / 9 - 150 Hz: 1 g (9.8 m/s² 0-peak) Max. 10 - 57 Hz and 0.075 mm amplitude Max. 58 - 500 Hz and 1 g (9.8 m/s² 0-peak)
Shock Operation Storage Transportation	TBD
Protection type	IP20 back side (only with installed CompactFlash card) IP65 / NEMA 250 type 4X, dust and sprayed water protection (front side)
Altitude	Max. 3,000 m

Table 48: Technical data - 5PC781.1505-00 (cont.)

1) Software must support USB 2.0 (e.g. Windows XP with at least Service Pack 1).
2) At 50°C, 8.5 µA of the supplied components and a self discharge of 40%.
3) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).
4) The key and LED functions can be freely configured with the B&R Key Editor, which can be found in the download area of the B&R homepage (www.br-automation.com) or on the B&R HMI Driver & Utilities DVD (Mod. No. 5SWHMI.0000-00).
5) Depending on the process or batch, there may be visual deviations in the color and surface structure.

Cutout installation

The Panel PC 700 with preassembled mounting blocks is installed e.g. in a housing cutout. A cutout that corresponds to the following drawing must be made.

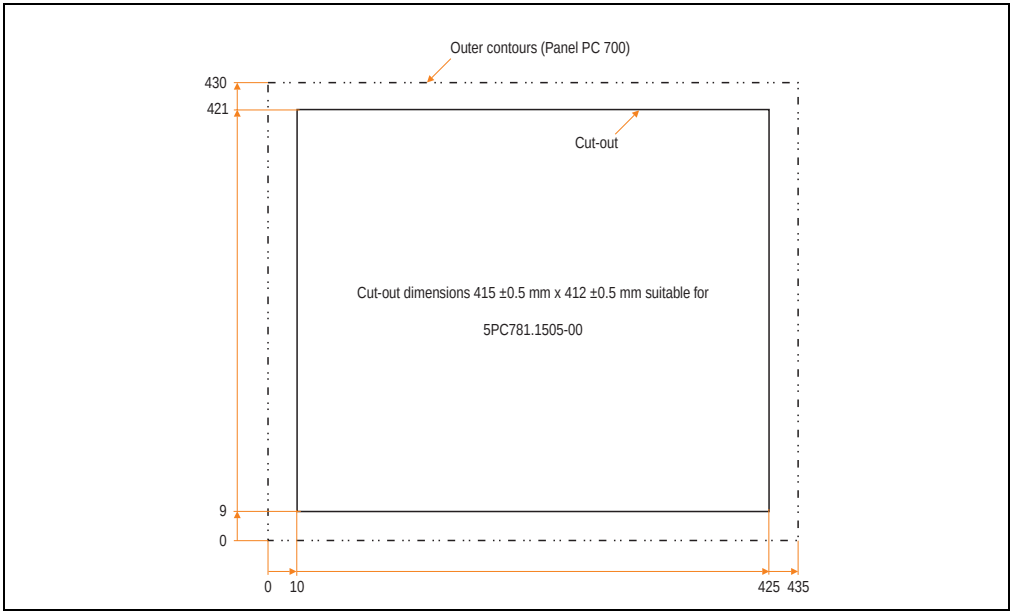


Figure 74: Cutout installation - 5PC781.1505-00

For further information regarding mounting and installation position, see chapter 3 "Commissioning" on page 211.

3.1.12 Panel PC 5PC782.1043-00

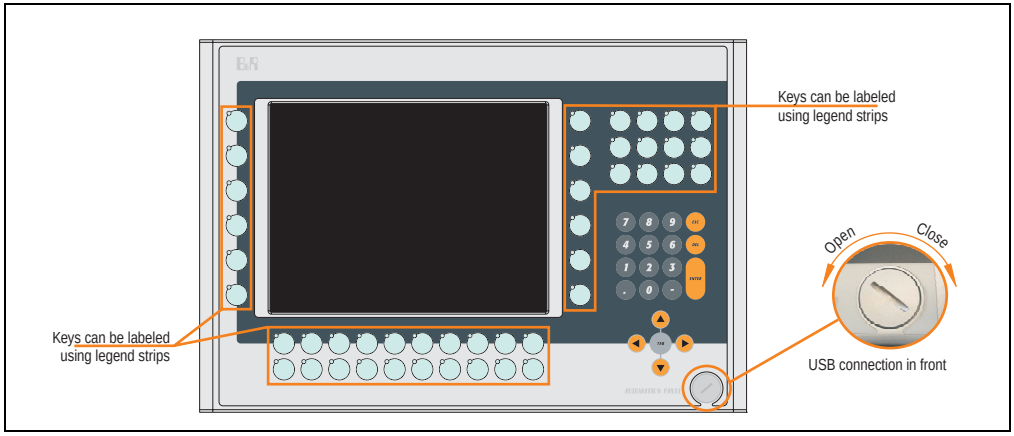


Figure 75: Front view 5PC782.1043-00

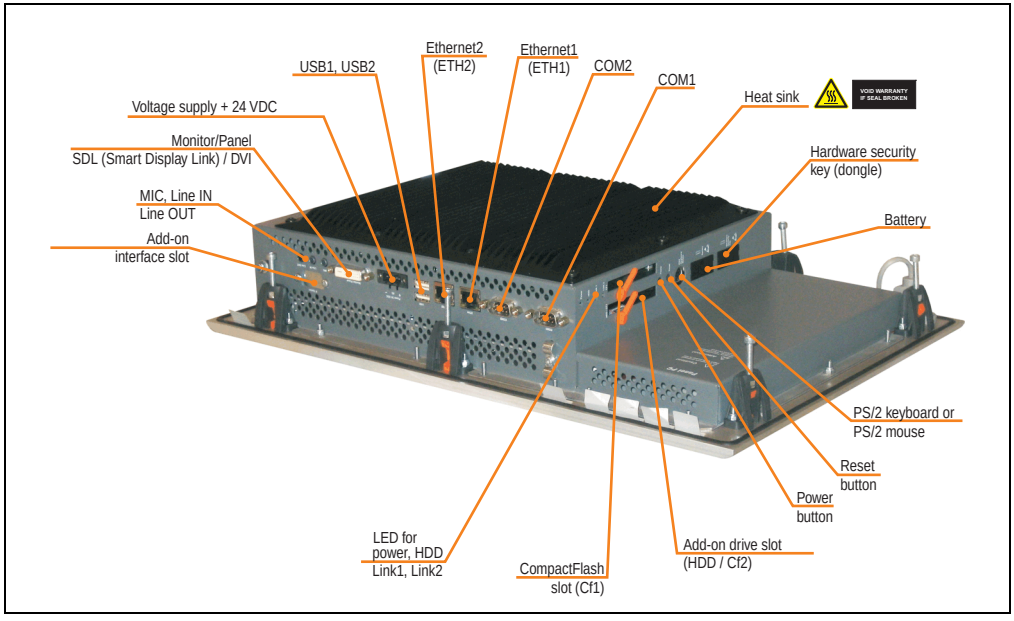


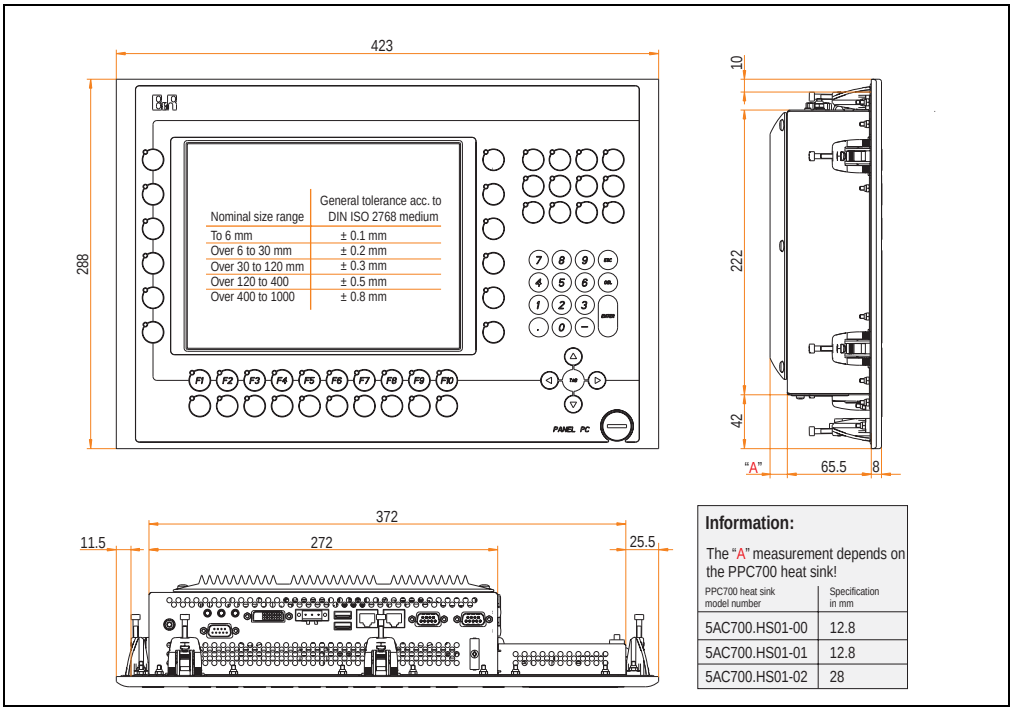
Figure 76: Rear view 5PC782.1043-00

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 PPC700 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").

Dimensions



Nominal size range	General tolerance acc. to DIN ISO 2768 medium
To 6 mm	± 0.1 mm
Over 6 to 30 mm	± 0.2 mm
Over 30 to 120 mm	± 0.3 mm
Over 120 to 400	± 0.5 mm
Over 400 to 1000	± 0.8 mm

PPC700 heat sink model number	Specification in mm
5AC700.HS01-00	12.8
5AC700.HS01-01	12.8
5AC700.HS01-02	28

Figure 77: Dimensions - 5PC782.1043-00

Technical data

Features	5PC782.1043-00
Serial interfaces Type Number UART Transfer rate Connection	See "Serial interfaces COM1" on page 61 and "Serial interfaces COM2" on page 62 RS232, modem capable 2 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB, male
Ethernet Controller Transfer rate Connection	See "Ethernet connection ETH1" on page 63 and "Ethernet connection ETH2" on page 64 10/100 Mbit/s RJ45 twisted pair (10 BaseT / 100 BaseT)
USB interfaces Type Number Transfer rate Connection	See also "USB port" on page 65 USB 2.0 3 (2x back side, 1x front side) up to 480 MBit [1] (high speed) Type A
Monitor / Panel Type	See also "Monitor / Panel connection" on page 67 DVI-I, female
AC97 sound Inputs Outputs	See also "MIC, Line IN and Line OUT Port" on page 68 Microphone, Line in Line out
Add-on interface slot Number	See also "Add-on interface slot" on page 68 1
PCI slots Number Type Default	-
CompactFlash slot 1 (CF1) Internal organization	Yes, see also "CompactFlash slot (CF1)" on page 71 Primary master
CompactFlash slot 2 / hard disk (HDD/CF2) Type Internal organization	Yes, see also "Hard disk / CompactFlash slot (HDD/CF2)" on page 72 Combined Primary slave
Insert for slide-in drive 1 Internal organization	-
Reset button	Yes, see also "Power button" on page 73
Power button	Yes, see also "Reset button" on page 73
PS/2 keyboard/mouse Type	Yes, see also "PS/2 keyboard/mouse" on page 74 Combined, will be automatically detected
Battery Type Removable Lifespan	Yes, see also "Battery" on page 75 Renata 950 mAh Yes, accessible from the outside 4 years [2]
Hardware security key compartment Optimized for	Yes, see also "Hardware security key" on page 76 DS1425 from MAXIM/Dallas)
Fan insert for fan kit	Yes, compatible fan kit - see section 3.8.1 "Fan kit 5PC700.FA00-01" on page 205
LED Number	See also "Status LEDs" on page 70 4 (Power, HDD, Link 1, Link 2)

Table 49: Technical data - 5PC782.1043-00

Features	5PC782.1043-00
Touch screen [3]	
Technology	Analog, resistive
Controller	Elo, serial, 12-bit
Degree of transmission	Up to 78%
Display	
Type	Color TFT
Diagonal	10.4 inch (264 mm)
Colors	262144 colors
Resolution	VGA, 640 x 480 pixels
Contrast	300:1
Viewing angle horizontal / vertical	70° / 70°
Background lighting	
Brightness	350 cd/m²
Half-brightness time	50000 hours
Keys/LED[4]	
Function keys	44 with LED (yellow)
Soft keys	-
Cursor keys	-
Number block	15 without LED
Other keys	5 without LED
Key lifespan	> 1,000,000 actuations with 1 ±0.3 to 3 ±0.3 N operating force
LED brightness	Typically 12 mcd (yellow)
Caution! **Pressing several keys at the same time may trigger unintended actions.**	
Electrical characteristics	
Power supply	See also "Supply voltage" on page 66
Rated voltage	24 VDC ±25%
Rated current	3.8 A
Starting current	Typ. 10 A, max. 40 A for < 300 µs
Power consumption	See power management section "10.4" Panel PC 700" on page 55
Electrical isolation	Yes
Mechanical characteristics	
Front	
Frame	Aluminum, naturally anodized[5]
Design	Gray[5]
Membrane	Polyester
Dark gray border around display	Similar to Pantone 432CV[5]
Light background	Similar to Pantone 427CV[5]
Orange keys	Similar to Pantone 151CV[5]
Dark gray keys	Similar to Pantone 431CV[5]
Color legend strips	Similar to Pantone 429CV[5]
Gasket	Flat gasket around display front
Housing	Metal
Outer dimensions	Also see drawing "Dimensions - 5PC782.1043-00" on page 139
Width	423 mm
Height	288 mm
Depth	86.3 or 101.5 mm (depending on the heat sink)
Weight	Approx. 7.5 kg

Table 49: Technical data - 5PC782.1043-00 (cont.)

Environmental characteristics	5PC782.1043-00
Ambient temperature Operation Storage Transportation	 See 2.1.12 "Ambient temperatures with system unit 5PC782.1043-00" on page 52. -30°C .. +70°C -30°C .. +70°C
Relative humidity Operation / Storage / Transport	 T <= 40°C: 5% to 90%, non-condensing T > 40°C: < 90% non-condensing
Vibration Operation (continuous) Operation (occasional) Storage / Transport	 5 - 9 Hz: 1.75 mm amplitude / 9 - 150 Hz: 0.5 g (4.9 m/s² 0-peak) 5 - 9 Hz: 3 mm amplitude / 9 - 150 Hz: 1 g (9.8 m/s² 0-peak) Max. 10 - 57 Hz and 0.075 mm amplitude Max. 58 - 500 Hz and 1 g (9.8 m/s² 0-peak)
Shock Operation Storage / Transport	 TBD Max. 50 g (490 m/s² 0-peak) and 11 ms length
Protection type	IP20 back side (only with installed CompactFlash card) IP65 / NEMA 250 type 4X, dust and sprayed water protection (front side)
Altitude	Max. 3,000 m

Table 49: Technical data - 5PC782.1043-00 (cont.)

1) Software must support USB 2.0 (e.g. Windows XP with at least Service Pack 1).

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

3) Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com).

4) The key and LED functions can be freely configured with the B&R Key Editor, which can be found in the download area of the B&R homepage (www.br-automation.com) or on the B&R HMI Driver & Utilities DVD (Mod. No. 5SWHMI.0000-00).

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

Cutout installation

The Panel PC 700 with preassembled mounting blocks is installed e.g. in a housing cutout. A cutout that corresponds to the following drawing must be made.

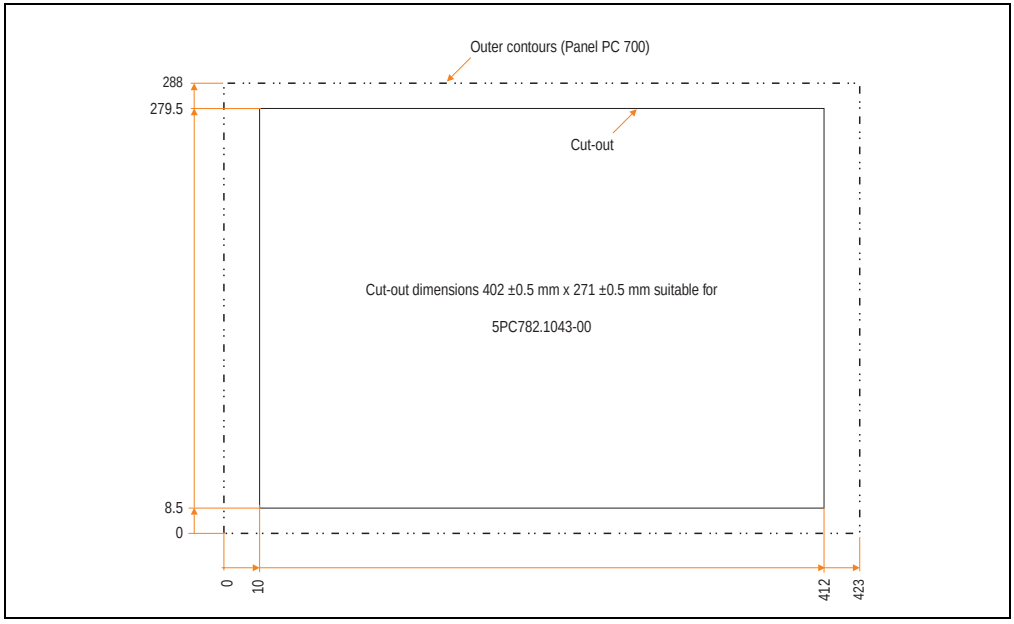


Figure 78: Cutout installation - 5PC782.1043-00

For further information regarding mounting and installation position, see chapter 3 "Commissioning" on page 211.

3.2 CPU boards 815E

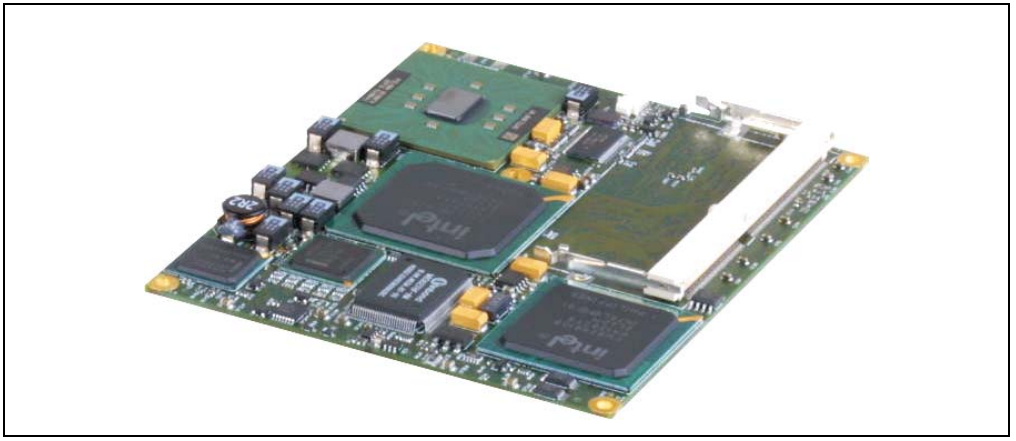


Figure 79: CPU boards 815E

3.2.1 Technical data

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

Features	5PC600.E815-00	5PC600.E815-02	5PC600.E815-03
Boot loader / Operating system	BIOS Phoenix		
Processor Architectures Type Expanded command set L1 cache L2 cache Floating point unit (FPU)	 0.13 µm Intel Celeron 3 400 MHz MMX technology, streaming SIMD extension 16 KB 256 KB Yes	 0.13 µm Intel Celeron 3 733 MHz MMX technology, streaming SIMD extension 16 KB 256 KB Yes	 0.13 µm Intel Celeron 1 GHz MMX technology, streaming SIMD extension 16 KB 256 KB Yes
Chipset	Intel 82815E (GMCH) Intel 82801DB (ICH4)		
Front side bus	100 MHz	133 MHz	133 MHz
IDE ports	2 IDE ports, UDMA 100		

Table 50: Technical data - 815E CPU boards

Features	5PC600.E815-00	5PC600.E815-02	5PC600.E815-03
Memory Type Size Socket	SDRAM Max. 512 MB SO-DIMM 144-pin		
Graphics Controller Memory Color depth	Support up to SXGA display units Intel 82815 (integrated in the Chipset) 64 MB shared memory (reserved in the main memory) Max. 24 bit		

Table 50: Technical data - 815E CPU boards (cont.)

Driver support

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

3.3 CPU boards 855GME

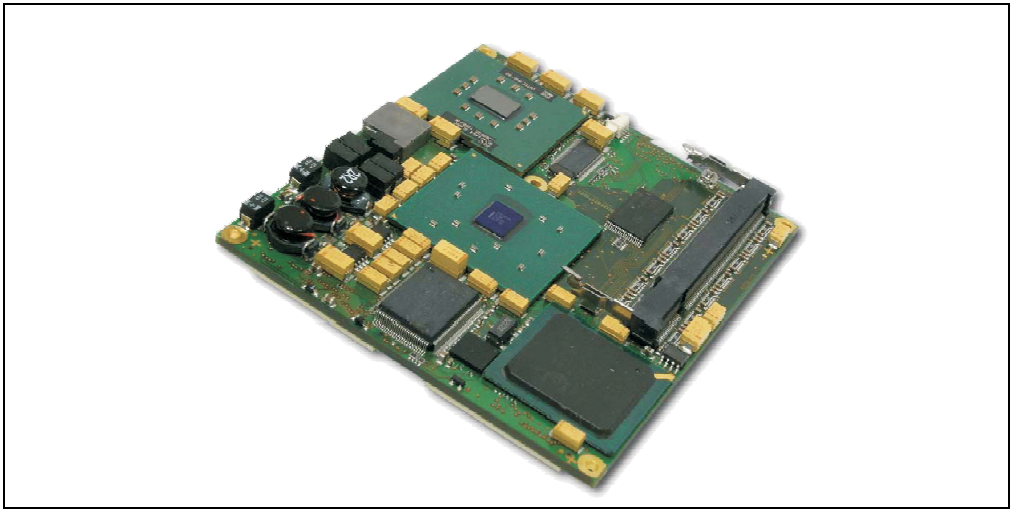


Figure 80: CPU boards 855GME

3.3.1 Technical data

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

Features	5PC600.E855-00	5PC600.E855-01	5PC600.E855-02	5PC600.E855-03	5PC600.E855-04	5PC600.E855-05
Boot loader / Operating system	BIOS Phoenix					
Processor						
Architectures	0.13 µm	0.13 µm	0.90 nm	0.90 nm	0.90 nm	0.13 µm
Type	Intel Pentium M 1,1 GHz	Intel Pentium M 1.6 GHz	Intel Pentium M 1.4 GHz	Intel Pentium M 1.8 GHz	Intel Celeron M 1000 MHz	Intel Celeron M 600 MHz
Expanded command set	MMX technology, streaming SIMD extension 2	MMX technology, streaming SIMD extension 2	MMX technology, streaming SIMD extension 2	MMX technology, streaming SIMD extension 2	MMX technology, streaming SIMD extension 2	MMX technology, streaming SIMD extension 2
L1 cache	32 KB	32 KB	32 KB	32 KB	32 KB	32 KB
L2 cache	1 MB	1 MB	2 MB	2 MB	1 MB	512 kB
Floating point unit (FPU)	Yes	Yes	Yes	Yes	Yes	Yes
Chipset	Intel 82855GME (GMHC) Intel 82801DB (ICH4)					

Table 51: Technical data - 855GME CPU boards

Features	5PC600.E855-00	5PC600.E855-01	5PC600.E855-02	5PC600.E855-03	5PC600.E855-04	5PC600.E855-05
Front side bus	400 MHz					
IDE ports	2 IDE ports, UDMA 100					
Memory Type Size Socket	 DDRAM Max. 1 GB SO-DIMM 200-pin					
Graphics Controller Memory Color depth	 Intel Extreme Graphics 2 (integrated in the chipset) 64 MB shared memory (reserved in the main memory) Max. 32 bit					

Table 51: Technical data - 855GME CPU boards (cont.)

Driver support

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

3.4 Heat sink

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

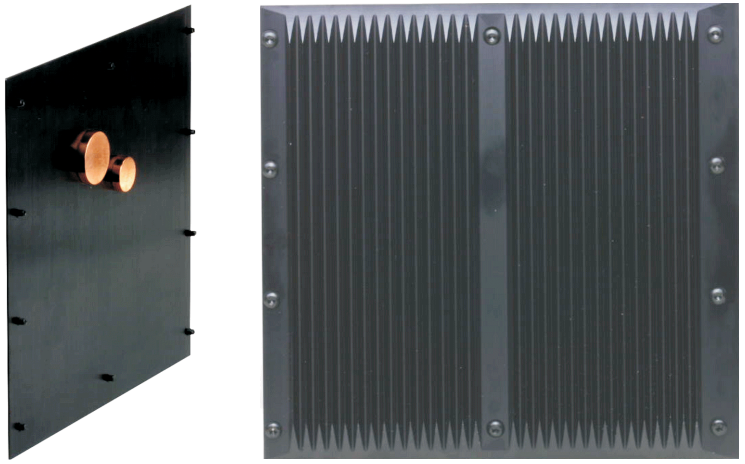


Figure 81: Heat sink

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

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

Mechanical characteristics	5AC700.HS01-00	5AC700.HS01-01	5AC700.HS01-02
Ideal for CPU boards	5PC600.E815-00 5PC600.E815-02 5PC600.E815-03	5PC600.E855-00 5PC600.E855-02 5PC600.E855-04 5PC600.E855-05	5PC600.E855-01 5PC600.E855-03
Material	Black-coated aluminum		
Outer dimensions Width Height Depth	250 mm 208 mm 12.8 mm		250 mm 208 mm 30 mm
Weight	1450 g		1900 g

Table 52: Technical data - heat sink

3.5 Main memory

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

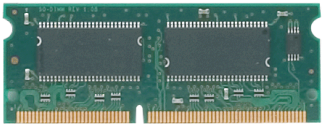


Figure 82: Main memory module

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

3.5.1 Technical data

Features	5MMSDR.0128-01	5MMSDR.0256-01	5MMSDR.0512-01	5MMDDR.0256-00	5MMDDR.0512-00	5MMDDR.1024-00
Ideal for CPU boards	815E			855GME		
Size Construction type	128 MB 144-pin SO-DIMM SDRAM	256 MB 144-pin SO-DIMM SDRAM	512 MB 144-pin SO-DIMM SDRAM	256 MB 200-pin SO-DIMM DDR-SDRAM	512 MB 200-pin SO-DIMM DDR-SDRAM	1 GB 200-pin SO-DIMM DDR-SDRAM
Organization	16Mx64	32Mx64	64Mx64	32Mx64	64Mx64	128Mx64

Table 53: Technical data - main memory

Information:

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

3.6 Drives

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

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

Information:

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

Figure 83: Add-on hard disk 30 GB 24/7 - 5AC600.HDDI-00

Technical data

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

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

Table 54: Technical data - add-on hard disk 5AC600.HDDI-00

Features	5AC600.HDDI-00
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum	 1.5 ms 12 ms 22 ms
Starting time (0 rpm to read access)	5 seconds (typically)
Interface	ATA-6
Data transfer rate To the medium To / from host	 26.1 to 36.2 MB/s Max. 100 MB/s (ultra-DMA mode 5)
Cache	2 MB
Noise level (idle mode)	Approx. 24 dBA at 30 cm
Electrical characteristics	
Lifespan	5 years or 20,000 POH (Power-On Hours)
MTBF	300000 hours
Mechanical characteristics	
Add-on mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature Operation - standard 1) Operation - 24-hour 2) Storage Transportation	 +5°C .. +55°C +5°C .. +44°C -40°C .. +65°C -40°C .. +65°C
Relative humidity Operation Storage Transportation	 8 - 90% non-condensing 5 - 95% non-condensing 5 - 95% non-condensing
Vibration Operation Storage	 No non-recovered errors at max. 5 - 500 Hz and 1 g (9.8 m/s^2 0-peak) No damage at max. 5 - 500 Hz and 5 g (49 m/s^2 0-peak)
Shock (pulse with a sinus half-wave) Operation Storage	 No non-recovered errors at max. 225 g (2,207 m/s^2 0-peak) and 2 ms duration No damage at max. 900 g (8,820 m/s^2 0-peak) and 1 ms duration No damage at max. 120 g (1,176 m/s^2 0-peak) and 11 ms duration
Altitude Operation Storage	 - 300 to 3,000 meters - 300 to 12,000 meters

Table 54: Technical data - add-on hard disk 5AC600.HDDI-00 (cont.)

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

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

Temperature humidity diagram for operation and storage

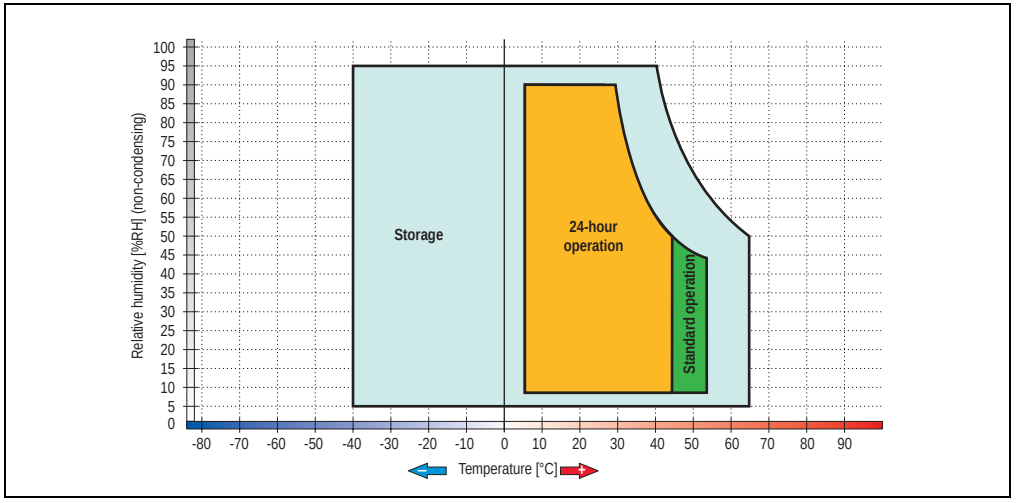


Figure 84: Temperature humidity diagram - add-on hard disk 5AC600.HDDI-00

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

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

Information:

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

Figure 85: Add-on hard disk 20 GB ET - 5AC600.HDDI-01

Technical data

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

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

Table 55: Technical data - add-on hard disk 5AC600.HDDI-01

Features	5AC600.HDDI-01
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum	 1.5 ms 12 ms 22 ms
Starting time (0 rpm to read access)	5 seconds (typically)
Interface	ATA-6
Data transfer rate To the medium To / from host	 up to 28.9 MB/s Max. 100 MB/s (ultra-DMA mode 5)
Cache	2 MB
Noise level (idle mode)	Approx. 22 dBA at 30 cm
Electrical characteristics	
Lifespan	5 years or 20,000 POH (Power-On Hours)
MTBF	300000 hours
Mechanical characteristics	
Add-on mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature Operation [1)] Storage Transportation	 -20°C .. +80°C -40°C .. +85°C -40°C .. +85°C
Relative humidity Operation Storage Transportation	 8 - 90% non-condensing 5 - 95% non-condensing 5 - 95% non-condensing
Vibration Operation Storage	 No non-recovered errors at max. 5 - 500 Hz and 1 g (9.8 m/s^2 0-peak) No damage at max. 5 - 500 Hz and 5 g (49 m/s^2 0-peak)
Shock (pulse with a sinus half-wave) Operation Storage	 No non-recovered errors at max. 225 g (2,207 m/s^2 0-peak) and 2 ms duration No damage at max. 900 g (8,820 m/s^2 0-peak) and 1 ms duration No damage at max. 120 g (1,176 m/s^2 0-peak) and 11 ms duration
Altitude Operation Storage	 - 300 to 3,000 meters - 300 to 12,000 meters

Table 55: Technical data - add-on hard disk 5AC600.HDDI-01 (cont.)

1) Operation means 250 POH (power-on hours) per month.

Temperature humidity diagram for operation and storage

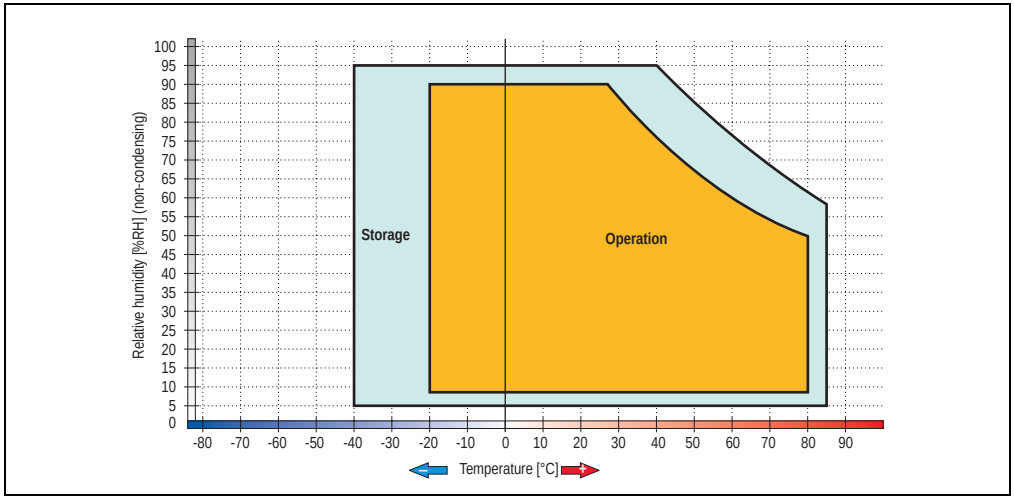


Figure 86: Temperature humidity diagram - add-on hard disk 5AC600.HDDI-01

3.6.3 Add-on hard disk 40 GB - 5AC600.HDDI-05

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

Information:

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

Figure 87: Add-on hard disk 40 GB - 5AC600.HDDI-05

Technical data

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

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

Table 56: Technical data - add-on hard disk - 5AC600.HDDI-05

Features	5AC600.HDDI-05
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	 1 ms 12.5 ms 22 ms
Starting time (0 rpm to read access)	3 seconds (typically)
Interface	ATA-6
Data transfer rate To the medium To / from host	 Max. 321 MBits/sec Max. 100 MB/s (ultra-DMA mode 5)
Cache	8 MB
S.M.A.R.T. support	Yes
MTBF	550,000 hours[1)]
Mechanical characteristics	
Add-on mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	100 g
Environmental characteristics	
Ambient temperature[2)] Operation - standard / 24-hour Storage Transportation	 -30°C .. +85°C -40°C .. +95°C -40°C .. +95°C
Relative humidity Operation Storage Transportation	 5 - 90% non-condensing 5 - 95% non-condensing 5 - 95% non-condensing
Vibration Operation Storage	 10 - 500 Hz: 1 g (9.8 m/s^2 0-peak), no non-recovered errors 5 - 500 Hz: 5 g (49 m/s^2 0-peak), no non-recovered errors
Shock (pulse with a sinus half-wave) Operation Storage	 Max. 200 g (1,962 m/s^2 0-peak) and 2 ms duration, no non-recovered errors Max. 110 g (1,079 m/s^2 0-peak) and 11 ms duration, no non-recovered errors Max. 800 g (7,848 m/s^2 0-peak) and 2 ms duration, no damage Max. 400 g (3,924 m/s^2 0-peak) and 0.5 ms duration, no damage
Altitude Operation Storage	 - 300 to 4,419 meters - 300 to 12,192 meters

Table 56: Technical data - add-on hard disk - 5AC600.HDDI-05 (cont.)

1) With 8760 POH (power on hours) per year and 70°C surface temperature.

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

Temperature humidity diagram for operation and storage

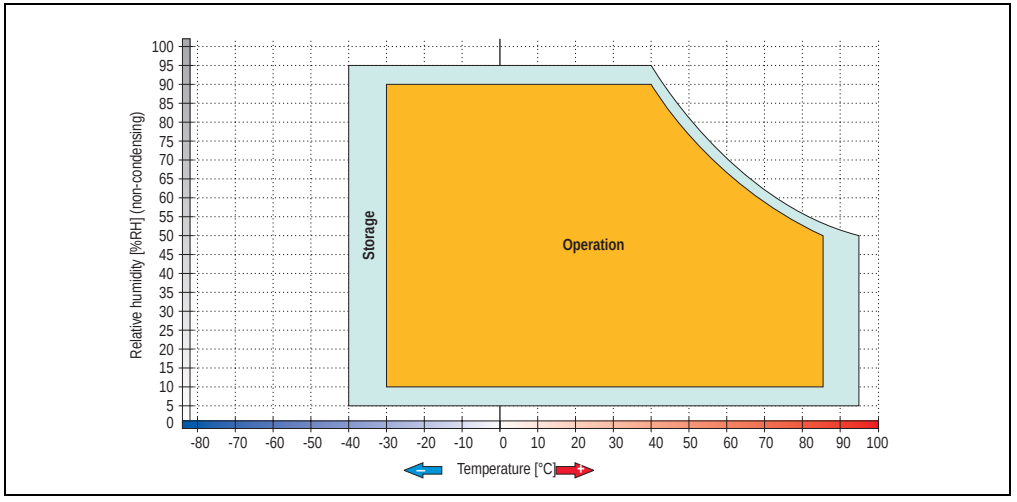


Figure 88: Temperature humidity diagram - add-on hard disk 5AC600.HDDI-05

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

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

Information:

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

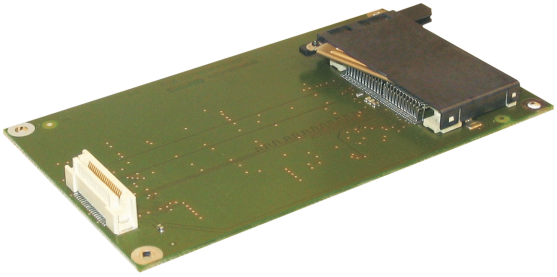


Figure 89: Add-on CompactFlash slot - 5AC600.CFSI-00

Technical data

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

Table 57: Technical data - add-on CompactFlash slot 5AC600.CFSI-00

Warning!

The power must be shut off before inserting or removing the CompactFlash card.

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

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

Information:

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

Caution!

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

Figure 90: Slide-in CD-ROM - 5AC600.CDXS-00

Technical data

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

Features	5AC600.CDXS-00
Reading rate	24x
Data transfer rate	Max. 33.3 MB/sec.
Access time (average)	115 ms
Revolution speed	Max. 5,136 rpm ± 1%
Starting time (0 rpm to read access)	10 seconds (maximum)
Host interface	IDE (ATAPI)
Readable CD media	CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session) Enhanced CD
Cache	128 kB
Noise level (complete read access)	Approx. 45 dBA at 50 cm
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10000 times
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 -5°C .. +60°C[1)] -20°C .. +60°C -40°C .. +65°C
Relative humidity Operation Storage Transportation	 8 - 80% non-condensing 5 - 95% non-condensing 5 - 95% non-condensing
Vibration Operation Storage Transportation	 At max. 5 - 500 Hz and 0.3 g At max. 5 - 500 Hz and 2 g At max. 5 - 500 Hz and 5 g
Shock (pulse with a sinus half-wave) Operation Storage Transportation	 At max. 7 g for 11 ms At max. 60 g for 11 ms At max. 200 g for 2 ms At max. 60 g for 11 ms At max. 200 g for 2 ms

Table 58: Technical data - slide-in CD-ROM 5AC600.CDXS-00

1) Drive surface temperature

Temperature humidity diagram for operation and storage

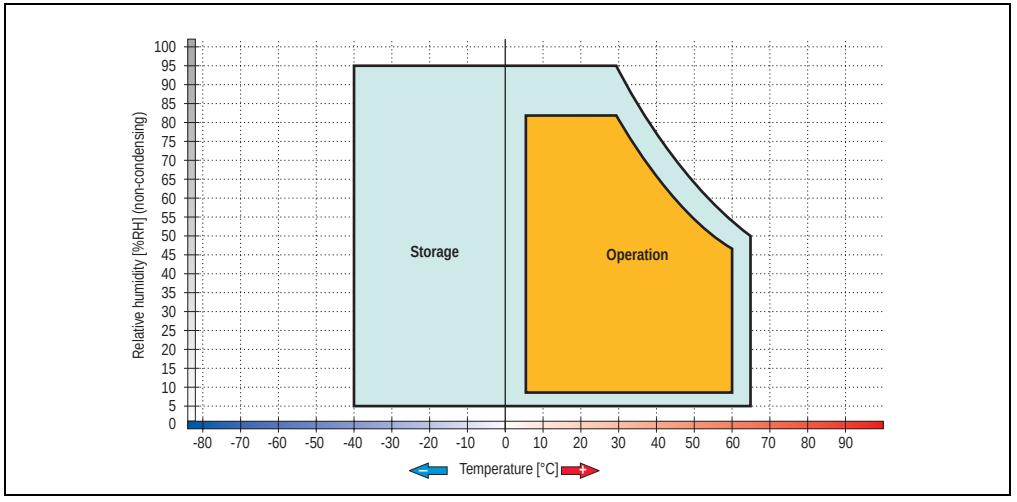


Figure 91: Temperature humidity diagram - slide-in CD-ROM - 5AC600.CDXS-00

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

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

Information:

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

Caution!

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

Figure 92: Slide-in DVD-ROM/CD-RW - 5AC600.DVDS-00

Technical data

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

Features	5AC600.DVDS-00
Write speed CD-R CD-RW	 24x, 16x, 10x and 4x 10x and 4x
Reading rate CD DVD	 24x 8x
Data transfer rate	Max. 33.3 MB/sec.
Access time (average) CD DVD	 85 ms 110 ms
Revolution speed	Max. 5,136 rpm ± 1%
Starting time (0 rpm to read access)	19 seconds (maximum)
Host interface	IDE (ATAPI)
Readable media CD DVD	 CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW DVD-ROM, DVD-R, DVD-RW, DVD-RAM
Non-write protected media CD	 CD-R, CD-RW
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session) Enhanced CD, CD-text DVD-ROM, DVD-R, DVD-Video (double layer) DVD-RAM (4.7 GB, 2.6 GB)
Write-methods	Disc at once, session at once, packet write, track at once
Laser class	Class 1 laser
Data buffer capacity	2 MB
Noise level (complete read access)	Approx. 45 dBA at 50 cm
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10000 times
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 +5°C .. +50°C[1)] -20°C .. +60°C -40°C .. +65°C

Table 59: Technical data - slide-in DVD-ROM/CD-RW 5AC600.DVDS-00

Features	5AC600.DVDS-00
Relative humidity Operation Storage Transportation	 8 - 80% non-condensing 5 - 95% non-condensing 5 - 95% non-condensing
Vibration Operation Storage Transportation	 At max. 5 - 500 Hz and 0.2 g At max. 5 - 500 Hz and 2 g At max. 5 - 500 Hz and 2 g
Shock (pulse with a sinus half-wave) Operation Storage Transportation	 At max. 5 g for 11 ms At max. 60 g for 11 ms At max. 200 g for 2 ms At max. 60 g for 11 ms At max. 200 g for 2 ms

Table 59: Technical data - slide-in DVD-ROM/CD-RW 5AC600.DVDS-00 (cont.)

1) Drive surface temperature

Temperature humidity diagram for operation and storage

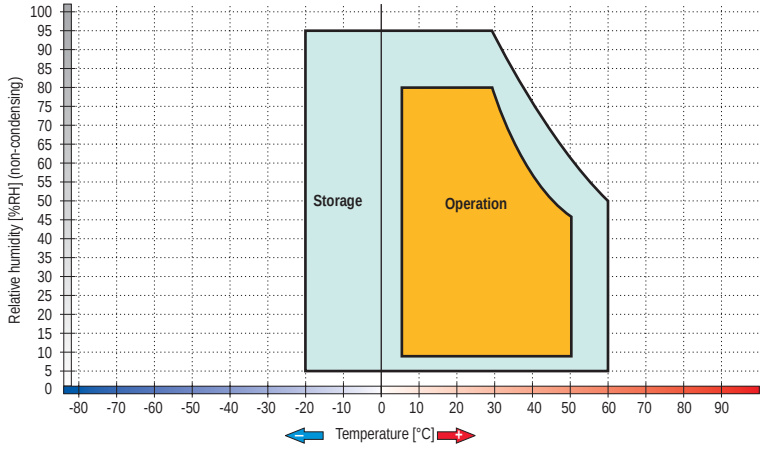


Figure 93: Temperature humidity diagram - slide-in DVD-ROM/CD-RW - 5AC600.DVDS-00

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

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

Information:

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

Caution!

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

Figure 94: Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00

Technical data - revision D0 and higher

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

Features	5AC600.DVRS-00 starting with revision D0
Write speed CD-R CD-RW DVD-R DVD-RW DVD-RAM DVD+R DVD+R (double layer) DVD+RW	 24x, 16x, 10x and 4x 10x and 4x 8x, 4x and 2x 4x and 2x 3x and 2x 8x, 4x and 2x 2x,4x 4x and 2x
Reading rate CD DVD	 24x 8x
Data transfer rate	Max. 33.3 MB/sec.
Access time (average) CD DVD	 130 ms (24x) 130 ms (8x)
Revolution speed	Max. 5090 rpm ± 1%
Starting time (0 rpm to read access) CD DVD	 14 seconds (maximum) 15 seconds (maximum)
Host interface	IDE (ATAPI)
Readable media CD DVD	 CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW DVD-ROM, DVD-R, DVD-RW. DVD-RAM, DVD+R, DVD+R (double layer), DVD+RW
Non-write protected media CD DVD	 CD-R, CD-RW DVD-R/RW, DVD-RAM (4.7 GB), DVD+R/RW, DVD+R (double layer)
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session), Enhanced CD, CD text DVD-ROM, DVD-R, DVD-RW, DVD video DVD-RAM (4.7 GB, 2.6 GB) DVD+R, DVD+R (double layer), DVD+RW
Write-methods CD DVD	 Disc at once, session at once, packet write, track at once Disc at once, Incremental, Over-write, sequential, multi-session
Laser class	Class 1 laser
Data buffer capacity	8 MB

Table 60: Technical data - slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 revision D0 and higher

Features	5AC600.DVRS-00 starting with revision D0
Noise level (complete read access)	Approx. 48 dBA at 50 cm
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10000 times
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 +5°C .. +55°C[1)] -20°C .. +60°C -40°C .. +65°C
Relative humidity Operation Storage Transportation	 8 - 80% non-condensing 5 - 95% non-condensing 5 - 95% non-condensing
Vibration Operation Storage Transportation	 At max. 5 - 500 Hz and 0.2 g At max. 5 - 500 Hz and 2 g At max. 5 - 500 Hz and 2 g
Shock (pulse with a sinus half-wave) Operation Storage Transportation	 At max. 5 g for 11 ms At max. 60 g for 11 ms At max. 200 g for 2 ms At max. 60 g for 11 ms At max. 200 g for 2 ms

Table 60: Technical data - slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 revision D0 and higher (cont.)

1) Drive surface temperature

"Technical data") D0

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

Table 61: Technical data - slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 revision D0 and lower

Features	5AC600.DVRS-00 revision D0 and lower
Readable media CD DVD	 CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW DVD-ROM, DVD-R, DVD-RW
Non-write protected media CD DVD	 CD-R, CD-RW DVD-R/RW, DVD+R/RW
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session) Enhanced CD, CD-text DVD-ROM, DVD-R, DVD-Video (double layer), DVD-RW DVD+R, DVD+R (double layer), DVD+RW
Write-methods CD DVD	 Disc at once, session at once, packet write, track at once Disc at once, Incremental, Over-write, sequential, multi-session
Laser class	Class 1 laser
Data buffer capacity	8 MB
Noise level (complete read access)	Approx. 48 dBA at 50 cm
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10000 times
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 +5°C .. +55°C[1)] -20°C .. +60°C -40°C .. +65°C
Relative humidity Operation Storage Transportation	 8 - 80% non-condensing 5 - 95% non-condensing 5 - 95% non-condensing
Vibration Operation Storage Transportation	 At max. 5 - 500 Hz and 0.2 g At max. 5 - 500 Hz and 2 g At max. 5 - 500 Hz and 2 g
Shock (pulse with a sinus half-wave) Operation Storage Transportation	 At max. 5 g for 11 ms At max. 60 g for 11 ms At max. 200 g for 2 ms At max. 60 g for 11 ms At max. 200 g for 2 ms

Table 61: Technical data - slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 revision D0 and lower (cont.)

1) Drive surface temperature

Temperature humidity diagram for operation and storage

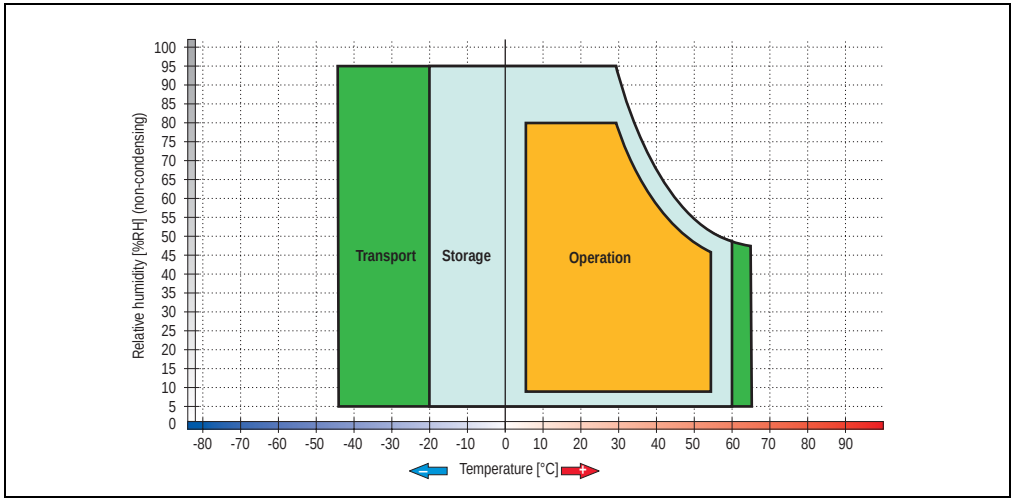


Figure 95: Temperature humidity diagram - slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00

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

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

Information:

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

Caution!

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

Warning!

The CompactFlash card can only be inserted in and removed from the CF3 IDE CompactFlash slot without power applied to the PPC700!

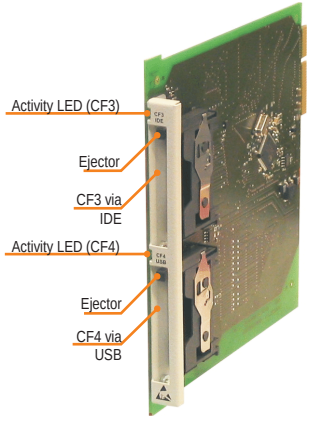


Figure 96: Slide-in CF 2-slot - 5AC600.CFSS-00

Technical data

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

Table 62: Technical data - slide-in CF 2 slot - 5AC600.CFSS-00

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

The slide-in drive can be used in system units with 1 or 2 PCI slots. In these units it is connected to the system via USB.

Information:

It is possible to add, remove, or modify the slide-in drive at any time.

Caution!

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

Figure 97: Slide-in USB FDD - 5AC600.FDDS-00

Technical data

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

Features	5AC600.FDDS-00
Data capacity	720 KB / 1.25 MB / 1.44 MB (formatted)
USB transfer rate	Full speed (12 Mbps)
Data transfer rate	250 kbits (720 KB) or 500 kbits (1.25 MB and 1.44 MB)
Rotation speed	Up to 360 rpm
Diskette media	High density (2HD) or normal density (2DD) 3.5" diskettes
MTBF	30,000 POH (Power-On Hours)
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 +4°C .. +50°C -20°C .. +60°C -20°C .. +60°C
Relative humidity Operation Storage Transportation	 20 - 80% non-condensing 5 - 90% non-condensing 5 - 90% non-condensing
Vibration Operation Storage Transportation	 At max. 5 - 500 Hz and 0.3 g At max. 10 - 100 Hz and 2 g At max. 10 - 100 Hz and 2 g
Shock (pulse with a sinus half-wave) Operation Storage Transportation	 At max. 5 g for 11 ms At max. 60 g for 11 ms At max. 60 g for 11 ms
Altitude	Max. 3,000 meters

Table 63: Technical data - slide-in USB diskette drive - 5AC600.FDDS-00

Temperature humidity diagram for operation and storage

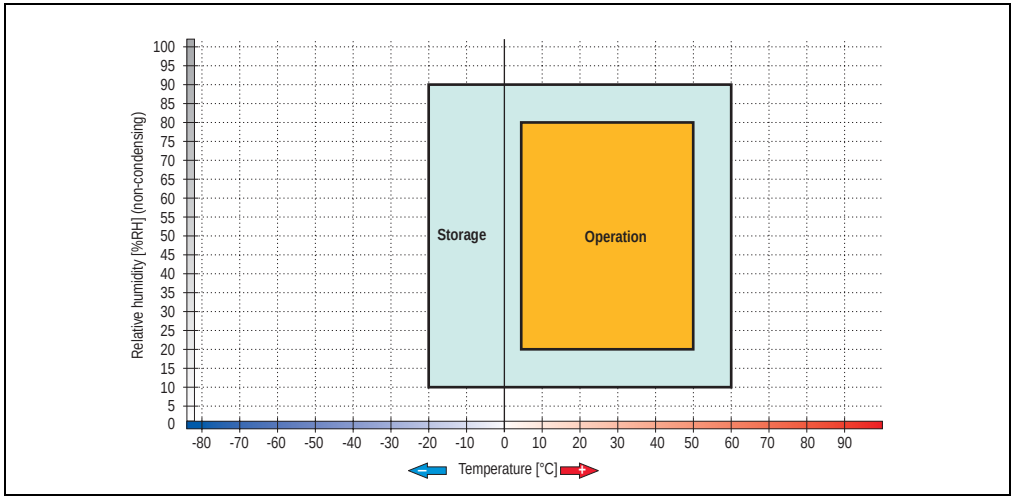


Figure 98: Temperature humidity diagram - slide-in USB diskette drive - 5AC600.FDDS-00

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

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

Information:

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

Caution!

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

Figure 99: Slide-in hard disk 30 GB - 5AC600.HDDS-00

Technical data

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

Features	5AC600.HDDS-00
Manufacturer's product ID	Fujitsu MHT2030AR
Formatted capacity	30 GB
Number of heads	2
Number of sectors (user)	58.605.120
Bytes per sector	512
Revolution speed	4200 rpm ± 1%
Access time (average)	7.14 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum	 1.5 ms 12 ms 22 ms
Starting time (0 rpm to read access)	5 seconds (typically)
Interface	ATA-6
Data transfer rate To the medium To / from host	 26.1 to 36.2 MB/s Max. 100 MB/s (ultra-DMA mode 5)
Cache	2 MB
Noise level (idle mode)	Approx. 24 dBA at 30 cm
Electrical characteristics	
Lifespan	5 years or 20,000 POH (Power-On Hours)
MTBF	300000 hours
Mechanical characteristics	
Slide-in mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	120 g

Table 64: Technical data - slide-in hard disk - 5AC600.HDDS-00

Environmental characteristics	5AC600.HDDS-00
Ambient temperature Operation - standard [1)] Operation - 24-hour [2)] Storage Transportation	 +5°C .. +55°C +5°C .. +44°C -40°C .. +60°C -40°C .. +60°C
Relative humidity Operation Storage Transportation	 8 - 90% non-condensing 5 - 95% non-condensing 5 - 95% non-condensing
Vibration Operation Storage	 No non-recovered errors at max. 5 - 500 Hz and 1 g (9.8 m/s^2 0-peak) No damage at max. 5 - 500 Hz and 5 g (49 m/s^2 0-peak)
Shock (pulse with a sinus half-wave) Operation Storage	 No non-recovered errors at max. 225 g (2,207 m/s^2 0-peak) and 2 ms duration No damage at max. 900 g (8,820 m/s^2 0-peak) and 1 ms duration No damage at max. 120 g (1,176 m/s^2 0-peak) and 11 ms duration
Altitude Operation Storage	 - 300 to 3,000 meters - 300 to 12,000 meters

Table 64: Technical data - slide-in hard disk - 5AC600.HDDS-00 (cont.)

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

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

Temperature humidity diagram for operation and storage

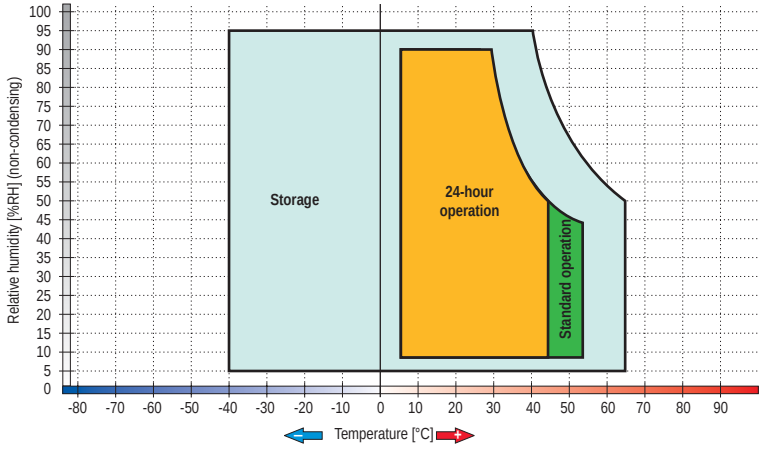


Figure 100: Temperature humidity diagram - slide-in hard disk - 5AC600.HDDS-00

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

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

Information:

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

Caution!

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

Figure 101: Slide-in hard disk 20 GB - 5AC600.HDDS-01

Technical data

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

Features	5AC600.HDDS-01
Manufacturer's product ID	Fujitsu MHT2020AC
Formatted capacity	20 GB
Number of heads	2
Number of sectors (user)	39,070,080
Bytes per sector	512
Revolution speed	4200 rpm ± 1%
Access time (average)	7.14 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum	 1.5 ms 12 ms 22 ms
Starting time (0 rpm to read access)	5 seconds (typically)
Interface	ATA-6
Data transfer rate To the medium To / from host	 Up to 28.9 MB/s Max. 100 MB/s (ultra-DMA mode 5)
Cache	2 MB
Noise level (idle mode)	Approx. 22 dBA at 30 cm
Electrical characteristics	
Lifespan	5 years or 20,000 POH (Power-On Hours)
MTBF	300000 hours
Mechanical characteristics	
Slide-in mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature Operation [1)] Storage Transportation	 -20°C .. +80°C -40°C .. +85°C -40°C .. +85°C

Table 65: Technical data - slide-in hard disk - 5AC600.HDDS-01

Features	5AC600.HDDS-01
Relative humidity Operation Storage Transportation	 8 - 90% non-condensing 5 - 95% non-condensing 5 - 95% non-condensing
Vibration Operation Storage	 No non-recovered errors at max. 5 - 500 Hz and 1 g (9.8 m/s^2 0-peak) No damage at max. 5 - 500 Hz and 5 g (49 m/s^2 0-peak)
Shock (pulse with a sinus half-wave) Operation Storage	 No non-recovered errors at max. 225 g (2,207 m/s^2 0-peak) and 2 ms duration No damage at max. 900 g (8,820 m/s^2 0-peak) and 1 ms duration No damage at max. 120 g (1,176 m/s^2 0-peak) and 11 ms duration
Altitude Operation Storage	 - 300 to 3,000 meters - 300 to 12,000 meters

Table 65: Technical data - slide-in hard disk - 5AC600.HDDS-01 (cont.)

1) Operation means 250 POH (power-on hours) per month.

Temperature humidity diagram for operation and storage

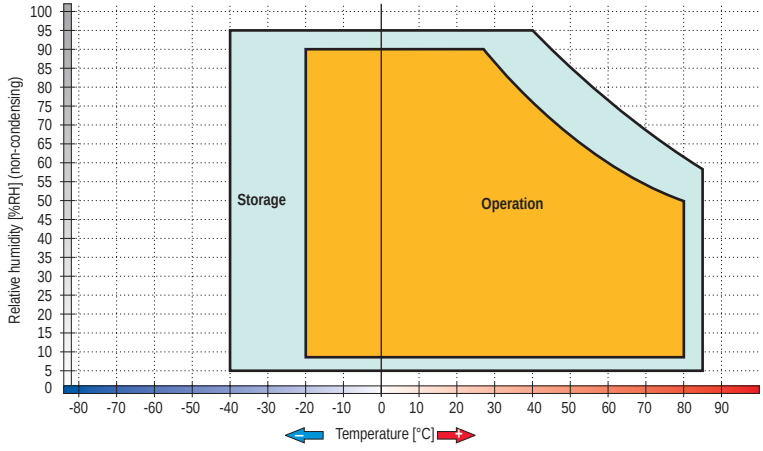


Figure 102: Temperature humidity diagram - slide-in hard disk - 5AC600.HDDS-01

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

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

Information:

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

Caution!

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

Figure 103: Slide-in hard disk 40 GB - 5AC600.HDDS-02

Technical data

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

Features	5AC600.HDDS-02
Manufacturer's product ID	Seagate ST940813AM
Formatted capacity	40 GB
Number of heads	2
Number of sectors (user)	78,140,160
Bytes per sector	512
Revolution speed	5400 rpm ± 1%
Access time (average)	12.5 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	 1 ms 12.5 ms 22 ms
Starting time (0 rpm to read access)	3 seconds (typically)
Interface	ATA-6
Data transfer rate To the medium To / from host	 Max. 321 MBits/sec Max. 100 MB/s (ultra-DMA mode 5)
Cache	8 MB
S.M.A.R.T. support	Yes
MTBF	550000 hours[1)]
Mechanical characteristics	
Add-on mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	100 g
Environmental characteristics	
Ambient temperature[2)] Operation - standard / 24-hour Storage Transportation	 -30°C .. +85°C -40°C .. +95°C -40°C .. +95°C

Table 66: Technical data for slide-in hard disk - 5AC600.HDDS-02

Environmental characteristics	5AC600.HDDS-02
Relative humidity Operation Storage Transportation	 5 - 90% non-condensing 5 - 95% non-condensing 5 - 95% non-condensing
Vibration Operation Storage	 10 - 500 Hz: 1 g (9.8 m/s^2 0-peak), no non-recovered errors 5 - 500 Hz: 5 g (49 m/s^2 0-peak), no non-recovered errors
Shock (pulse with a sinus half-wave) Operation Storage	 Max. 200 g (1962 m/s^2 0-peak) and 2 ms duration, no non-recovered errors Max. 110 g (1079 m/s^2 0-peak) and 11 ms duration, no non-recovered errors Max. 800 g (7848 m/s^2 0-peak) and 2 ms duration, no damage Max. 400 g (3924 m/s^2 0-peak) and 0.5 ms duration, no damage
Altitude Operation Storage	 - 300 to 4419 meters - 300 to 12192 meters

Table 66: Technical data for slide-in hard disk - 5AC600.HDDS-02 (cont.)

1) With 8760 POH (power on hours) per year and 70°C surface temperature.

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

Temperature humidity diagram for operation and storage

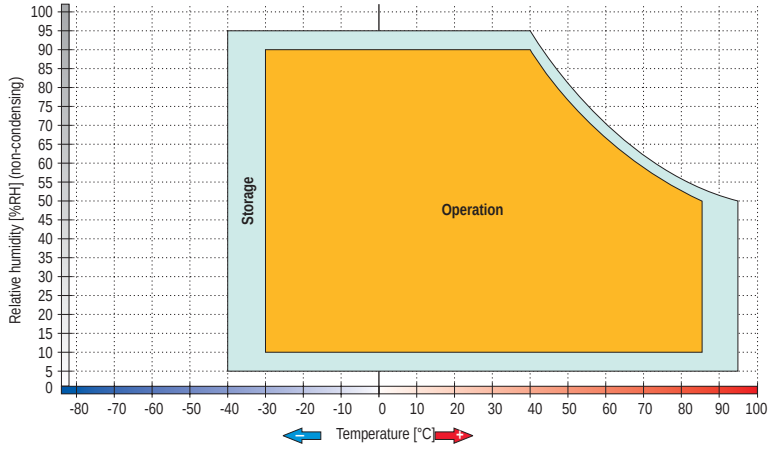


Figure 104: Temperature humidity diagram - slide-in hard disk - 5AC600.HDDS-02

3.6.13 RAID system

Sometimes it is simply not possible to avoid using hard disks due to the amount of data that needs to be saved. In this case, a RAID provides high system availability. All data is simultaneously and automatically stored on two hard drives. This double data storage means that when one hard disk fails, the system will continue to run on the second hard disk.

Advantages for the user:

- No data loss when hard drive fails.
- The system continues to run with a hard disk.
- Data redundancy is automatically restored by the system when the faulty hard disk has been replaced.

Depending on the type, the RAID 1 system is designed in the form of 1 or 2 PCI cards.

1 PCI slot: PCI SATA RAID controller 5ACPCI.RAIC-01 (controller + 2 SATA HDD hard drives)

2 PCI slots: PCI RAID controller (5ACPCI.RAIC-00) and PCI card with two hard disks (5ACPCI.RAIS-00 or 5ACPCI.RAIS-01)

The system can be flexibly implemented in all APC620 und PPC700s with 1 free PCI slot (depending on the RAID system design). There are no further hardware requirements. The RAID card has its own controller. This means that the industrial PC's main processor is not overloaded by redundant data storage. The system also supports RAID 0 applications. As a result, parallel access to two hard drives with a relatively high data throughput is the main focus, in addition to the high availability.

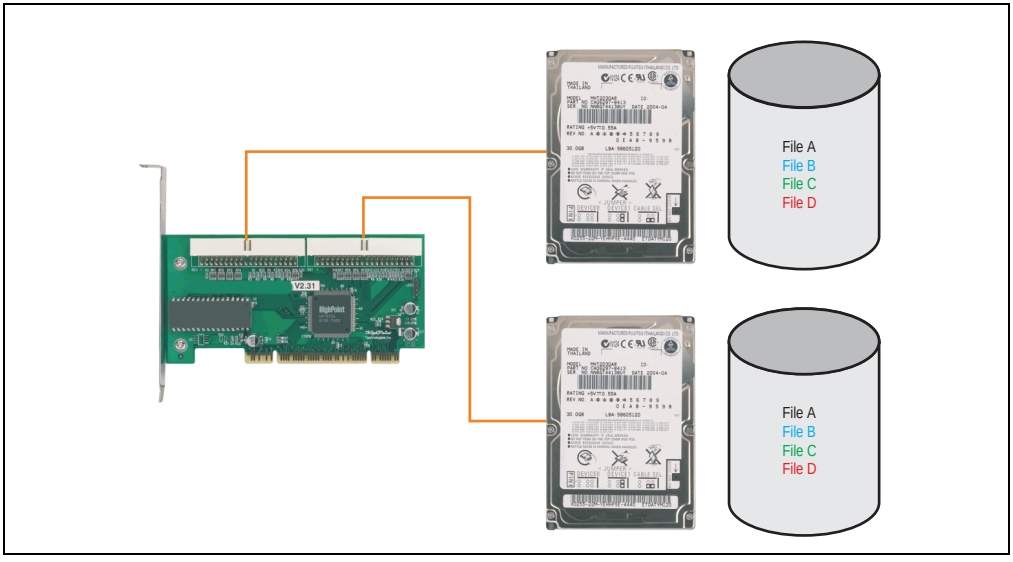


Figure 105: RAID 1 system schematic

PCI RAID Controller ATA/100 5ACPCI.RAIC-00

Information:

PCI RAID controllers are only available factory-installed. Therefore, this needs to be requested when placing the order.

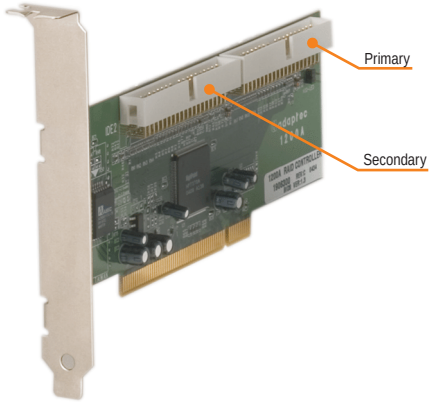


Figure 106: RAID controller 5ACPCI.RAIC-00

Technical data

Features	5ACPCI.RAIC-00
Manufacturer's product ID	Adaptec ATA RAID 1200A
Data transfer rate	Up to 100 MB/s per channel
RAID Level	Supports RAID 0, 1, 0/1 and JBOD
Internal connections	Two 40-pin connections
Electrical characteristics	
Power consumption	0.15 A at 5 V (PCI bus)
Mechanical characteristics	
Outer dimensions Length Height	 168 mm 64 mm
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 0°C .. +55°C -20°C .. +60°C -20°C .. +60°C

Table 67: Technical data - RAID controller - 5ACPCI.RAIC-00

Contents of delivery

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

Table 68: Contents of delivery - 5ACPCI.RAIC-00

PCI RAID storage 2 x 40 GB 5ACPCI.RAIS-00

Information:

PCI RAID storage drives are only available factory-installed. Therefore, this needs to be requested when placing the order.

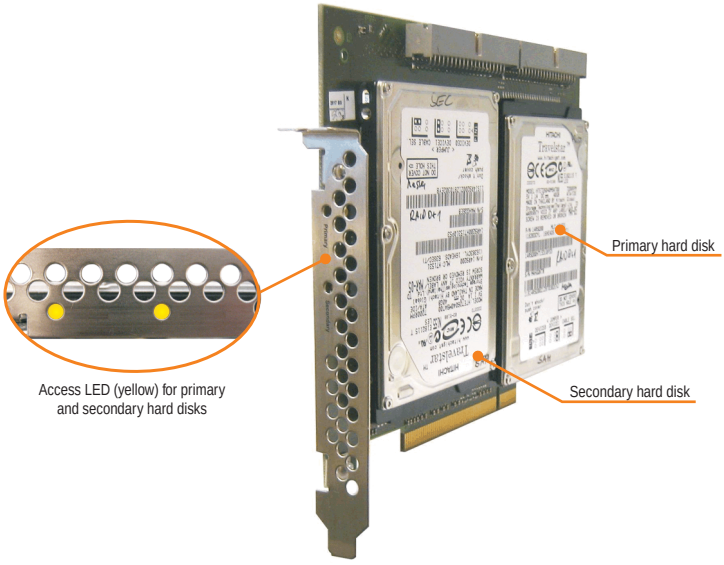


Figure 107: PCI RAID storage 5ACPCI.RAIS-00

Technical data

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

Features	5ACPCI.RAIS-00
Manufacturer's product ID	Hitachi Travelstar HTE726040M9AT00
Formatted capacity	40 GB
Number of heads	4
Number of sectors (user)	78,140,160
Bytes per sector	512
Revolution speed	7200 rpm ± 1%
Access time (average)	4.2 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	 1 ms 10 ms 16 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Interface	ATA-6
Data transfer rate To the medium To / from host	 236 to 507 MBits/sec Max. 100 MB/s (ultra-DMA mode 5)
Cache	8 MB
Electrical characteristics	
Lifespan	5 years or 30000 POH (Power-On Hours)
MTBF	477000 hours[1)]
Mechanical characteristics	
Mounted on PCI insert	Fixed
Outer dimensions (without PCI card) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	350 g
Environmental characteristics	
Ambient temperature Operation - standard [2)] Operation - 24-hour [3)] Storage Transportation	 +5°C .. +55°C +5°C .. +40°C -40°C .. +65°C -40°C .. +65°C

Table 69: Technical data - RAID hard disk - 5ACPCI.RAIS-00

Environmental characteristics	5ACPCI.RAIS-00
Relative humidity Operation Storage Transportation	 8 - 90% non-condensing 5 - 95% non-condensing 5 - 95% non-condensing
Vibration Operation Storage	 No non-recovered errors at max. 5 - 500 Hz and 1 g (9,8 m/s^2 0-peak) No damage at max. 5 - 500 Hz and 5 g (49 m/s^2 0-peak)
Shock (pulse with a sinus half-wave) Operation Storage	 No non-recovered errors at max. 200 g (1,960 m/s^2 0-peak) and 2 ms duration No damage at max. 980 g (9,800 m/s^2 0-peak) and 1 ms duration No damage at max. 120 g (1,176 m/s^2 0-peak) and 11 ms duration
Altitude Operation Storage	 - 300 to 3,048 meters - 300 to 12,192 meters

Table 69: Technical data - RAID hard disk - 5ACPCI.RAIS-00 (cont.)

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

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

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

Temperature humidity diagram for operation and storage

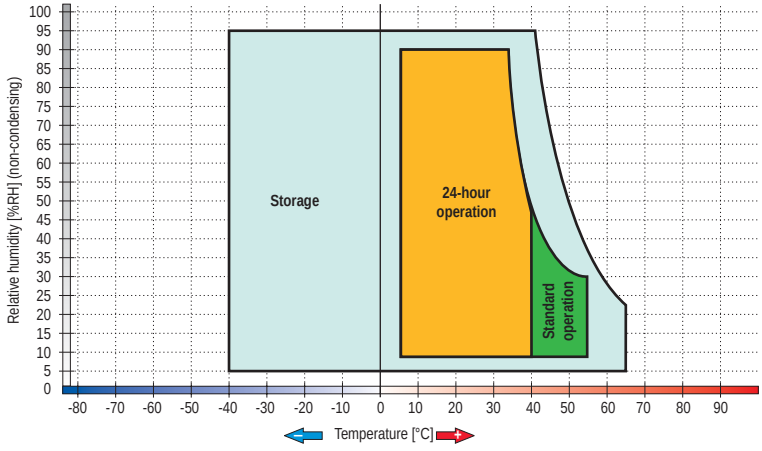


Figure 108: Temperature humidity diagram - RAID hard disk - 5ACPCI.RAIS-00

PCI RAID storage 2 x 60 GB - 5ACPCI.RAIS-01

Information:

PCI RAID storage drives are only available factory-installed. Therefore, this needs to be requested when placing the order.

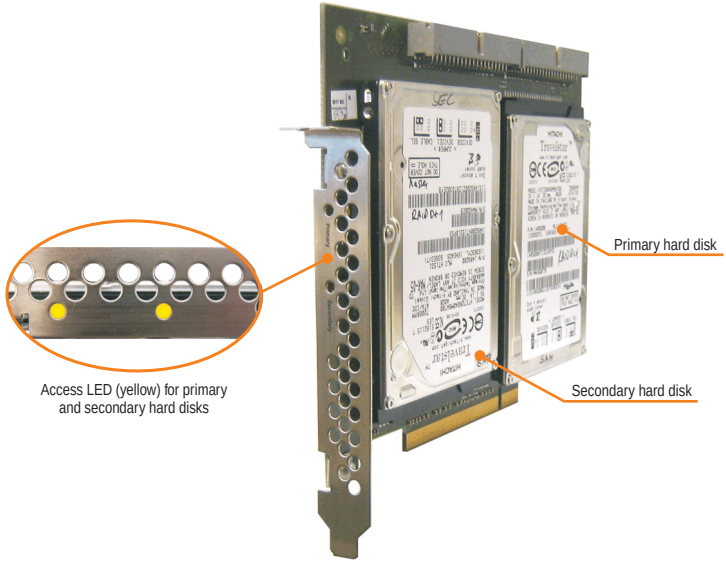


Figure 109: PCI RAID storage - 5ACPCI.RAIS-01

Technical data

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

Features	5ACPCI.RAIS-01
Manufacturer's product ID	Hitachi HTE721060G9AT00
Formatted capacity	60 GB
Number of heads	3
Number of sectors (user)	117,210,240
Bytes per sector	512
Revolution speed	7200 rpm ± 1%
Access time (average)	10 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	 1 ms 10 ms 16 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Interface	ATA-6
Data transfer rate To the medium To / from host	 267 to 629 MBits/sec Max. 100 MB/s (ultra-DMA mode 5)
Cache	8 MB
Electrical characteristics	
Lifespan	5 years or 30000 POH (Power-On Hours)
MTBF	550000 hours[1)]
Mechanical characteristics	
Mounted on PCI insert	Fixed
Outer dimensions (without PCI card) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature Operation - standard [2)] Operation - 24-hour [3)] Storage Transportation	 +5°C .. +55°C +5°C .. +40°C -40°C .. +65°C -40°C .. +65°C

Table 70: Technical data - RAID hard disk - 5ACPCI.RAIS-01

Features	5ACPCI.RAIS-01
Relative humidity Operation Storage Transportation	 8 - 90% non-condensing 5 - 95% non-condensing 5 - 95% non-condensing
Vibration Operation Storage	 Max. 5 - 500 Hz and 1 g (9.8 m/s^2 0-peak) 1 oct/min duration, no non-recovered errors Max. 10 - 500 Hz and 5 g (49 m/s^2 0-peak) 0.5 oct/min duration, no damage
Shock (pulse with a sinus half-wave) Operation Storage	 No non-recovered errors at max. 160 g (1,568 m/s^2 0-peak) and 1 ms duration No non-recovered errors at max. 300 g (2,900 m/s^2 0-peak) and 2 ms duration No non-recovered errors at max. 15 g (147 m/s^2 0-peak) and 11 ms duration No damage at max. 1000 g (9,800 m/s^2 0-peak) and 1 ms duration No damage at max. 120 g (1,176 m/s^2 0-peak) and 11 ms duration
Altitude Operation Storage	 - 300 to 3,048 meters - 300 to 12,192 meters

Table 70: Technical data - RAID hard disk - 5ACPCI.RAIS-01 (cont.)

1) Manufacturer specification at + 40°C ambient temperature.
2) Standard operation means 333 POH (power-on hours) per month.
3) 24-hour operation means 732 POH (power-on hours) per month.

Temperature humidity diagram for operation and storage

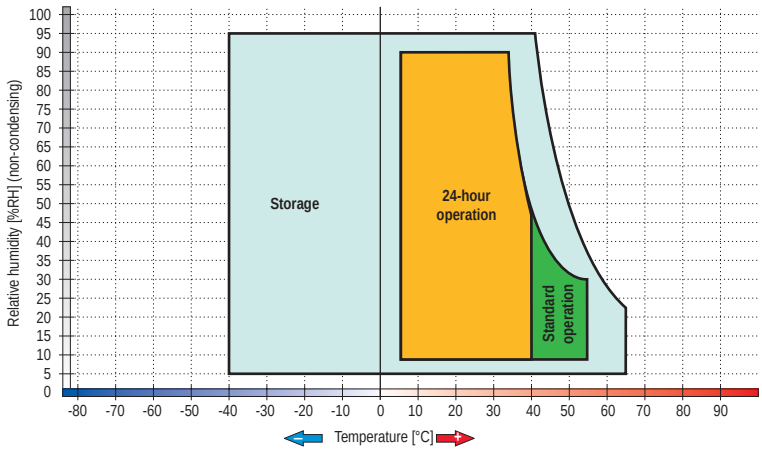


Figure 110: Temperature humidity diagram - RAID hard disk - 5ACPCI.RAIS-01

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

Information:

PCI SATA RAID controllers are only available factory-installed. Therefore, this needs to be requested when placing the order.

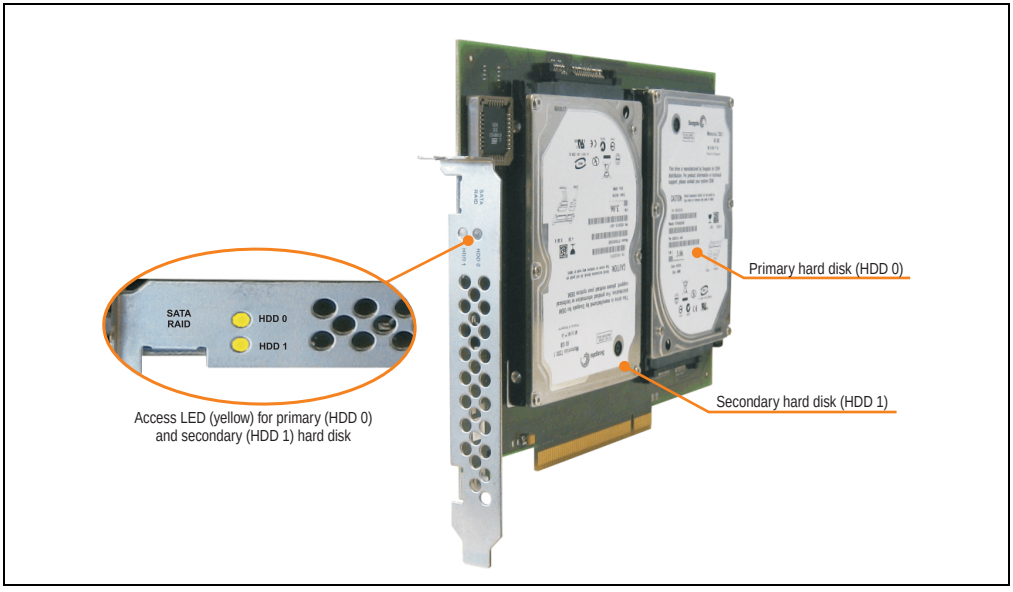


Figure 111: PCI SATA RAID controller - 5ACPCI.RAIC-01

Technical data

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are 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	 Sil 3512 SATA link Serial ATA 1.0 Max. 1.5 Gbps (150 MB/s) Supports RAID 0, 1
Hard disks Number	Seagate Momentus 7200.1 ST96023AS 2
Formatted capacity (512 bytes/sector)	60 GB
Number of heads	3
Number of sectors (user)	117,210,240
Bytes per sector	512
Revolution speed	7200 rpm ± 1%
Access time (average)	4.2 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	 1.5 ms 10.5 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Supported transfer mode	SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5
Data transfer rate To the medium To / from host	 Max. 539 MBits/sec Max. 150 MB/s
Cache	8 MB
S.M.A.R.T. support	Yes
Lifespan	5 years
Mechanical characteristics	
Mounted on PCI insert	Fixed
Outer dimensions (without PCI card) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	350 g

Table 71: Technical data - RAID hard disk - 5ACPCI.RAIC-01

Environmental characteristics	5ACPCI.RAIC-01
Ambient temperature[1)] Operation - standard [2)] Operation - 24-hour [3)] Storage Transportation	 +5°C .. +55°C +5°C .. +40°C -40°C .. +70°C -40°C .. +70°C
Relative humidity Operation Storage Transportation	 5 - 90% non-condensing 5 - 95% non-condensing 5 - 95% non-condensing
Vibration Operation (continuous) Operation (occasional) Storage Transportation	 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 (pulse with a sinus half-wave) Operation Storage	 No non-recovered errors at max. 125 g (1,226 m/s^2 0-peak) and 2 ms duration No damage at max. 400 g (3,924 m/s^2 0-peak) and 2 ms duration No damage at max. 450 g (4,424 m/s^2 0-peak) and 1 ms duration No damage at max. 200 g (1,962 m/s^2 0-peak) and 0.5 ms duration
Altitude Operation Storage	 - 300 to 3,048 meters - 300 to 12,192 meters

Table 71: 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.

Temperature humidity diagram for operation and storage

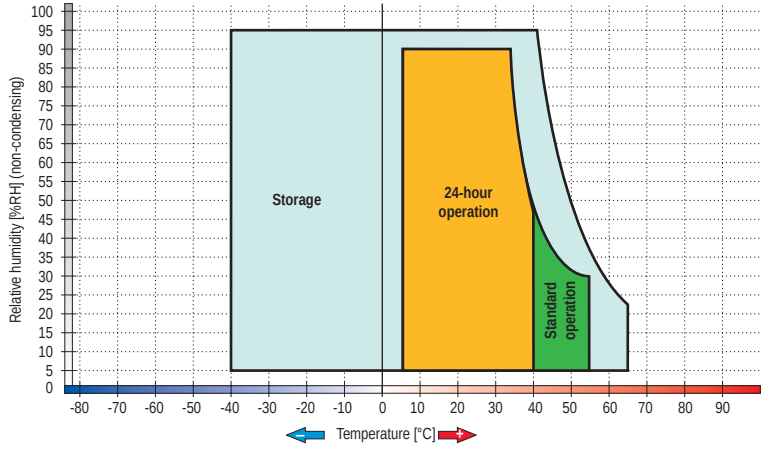


Figure 112: Temperature humidity diagram - SATA RAID hard disk - 5ACPCI.RAIC-01

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 JAVA-based SATA Raid™ Serial ATA RAID management software can also be found on the B&R homepage.

Important notes / BIOS Extension ROM

For PCI cards with BIOS Extension ROM, there is a limited area of 64 KB available in the Phoenix BIOS. A B&R PCI SATA RAID controller requires a free area of approx. 32 KB. The remaining area can be used as desired.

3.7 Interface options

Another interface (CAN or combined RS232/422/485) can be inserted using an interface option.

Information:

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

Caution!

Turn off power before adding or removing an interface option.

3.7.1 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

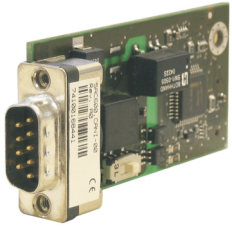
Model number	Description	Image
5AC600.CANI-00	**Add-on CAN interface** CAN interface for installation in an APC620 or PPC700.	

Table 72: Add-on CAN interface - 5AC600.CANI-00

Technical data

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

Table 73: 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.	9-pin DSUB plug
2	CAN low	
3	GND	
4	n.c.	
5	n.c.	
6	Reserved	
7	CAN high	
8	n.c.	
9	n.c.	

Table 74: Pin assignments - CAN

I/O address and IRQ

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

Table 75: Add-on CAN - I/O address and IRQ

1) NMI = Non Maskable Interrupt.

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

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	Type 50
≤ 200	Type 250
≤ 60	Type 500

Table 76: CAN bus length and transfer rate

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

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

Table 77: 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").

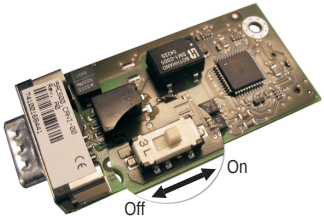


Figure 113: Terminating resistor for add-on CAN interface 5AC600.CANI-00

Contents of the delivery / mounting material

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

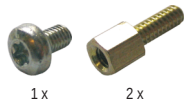


Figure 114: Contents of the delivery / mounting material - 5AC600.CANI-00

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

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

Order data

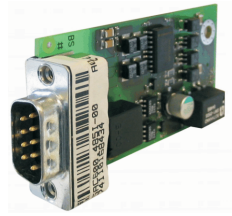
Model number	Description	Image
5AC600.485I-00	**Add-on RS232/422/485 interface** Add-on RS232/422/485 interface for installation in an APC620 and PPC700.	

Table 78: Add-on RS232/422/485 interface - 5AC600.485I-00

Pin assignments

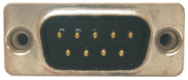
Add-on RS232/422/485			
	RS232	RS422/485	9-pin DSUB plug 1 5  6 9
Type	Electrically isolated		
Transfer rate	Max. 115 kBit/s		
Bus length	Max. 15 meters	Max. 1200 meters	
Pin	**Assignments RS232**	**Assignments RS422**	
1	n.c.	$\overline{\text{TXD}}$	
2	RXD	n.c.	
3	TXD	n.c.	
4	n.c.	TXD	
5	GND	GND	
6	n.c.	$\overline{\text{RXD}}$	
7	RTS	n.c.	
8	CTS	n.c.	
9	n.c.	RXD	

Table 79: Pin assignments RS232/RS422

I/O address and IRQ

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

Table 80: 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	Type 64
≤ 10	Type 115
≤ 5	Type 115

Table 81: RS232 bus length and transfer rate

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

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

Table 82: RS232 cable requirements

Bus length and cable type RS422

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

Distance [m]	Transfer rate [kBit/s]
1200	Type 115

Table 83: RS422 bus length and transfer rate

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

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

Table 84: 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).

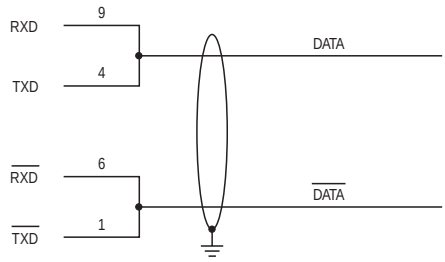


Figure 115: Add-on RS232/422/485 interface - operated in RS485 mode

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	Type 115

Table 85: RS485 bus length and transfer rate

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

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

Table 86: RS485 cable requirements

Contents of the delivery / mounting material

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

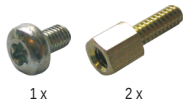


Figure 116: Contents of the delivery / mounting material 5AC600.485I-00

3.8 Fan kit

Information:

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

3.8.1 Fan kit 5PC700.FA00-01

This fan kit can be used as an option for 10.4", 12.1", 15", 17" and 19" Panel PC 700 system units with 0 PCI slots (5PC720.1043-00, 5PC720.1214-00, 5PC720.1505-00, 5PC720.1706-00, 5PC720.1906-00, 5PC781.1043-00, 5PC781.1505-00 and 5PC782.1043-00).

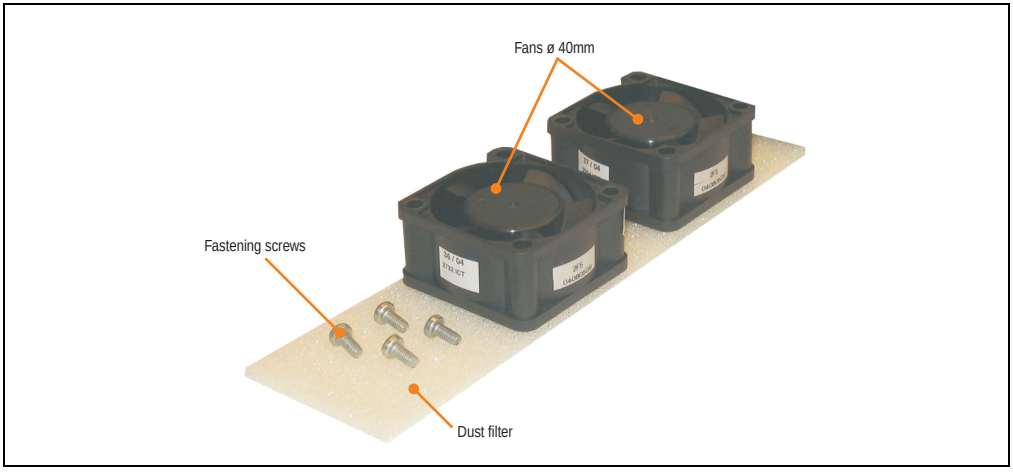


Figure 117: Fan kit 5PC700.FA00-01

Technical data

Features	5PC700.FA00-01
Fan type Width Length Height	Double ball bearings 40 mm 40 mm 20 mm
Revolution speed	5600 rpm ± 10%
Noise level	24 dB
Lifespan	80,000 hours at 30°C
Maintenance interval	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 87: Technical data - 5PC700.FA00-01

Contents of delivery

- 2 fans with 40 mm diameter
- 1 dust filter
- Installation material - Mounting screws

Installation

For a description of how to install the fan kit, see chapter 7 "Maintenance / servicing", section 2 "Fan kit installation and replacement", starting on page 448.

3.8.2 Fan kit 5PC700.FA02-00

This fan kit can be used as an option for 10.4" Panel PC 700 system units with 2 PCI slots (5PC720.1043-01).

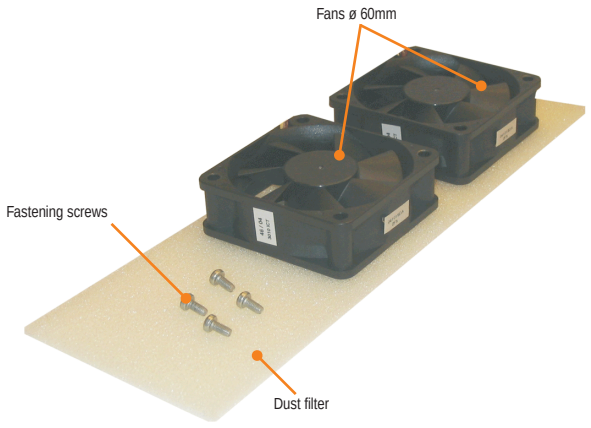


Figure 118: Fan kit 5PC700.FA02-00

Technical data

Features	5PC700.FA02-00
Fan type Width Length Height	Double ball bearings 60 mm 60 mm 10 mm
Revolution speed	3600 rpm ± 10%
Noise level	30.5 dB
Lifespan	80,000 hours at 30°C

Table 88: Technical data - 5PC700.FA02-00

Features	5PC700.FA02-00
Maintenance interval	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.
Installation	See

Table 88: Technical data - 5PC700.FA02-00 (cont.)

Contents of delivery

- 2 fans with 60 mm diameter
- 1 dust filter
- Installation material - Mounting screws

Installation

For a description of how to install the fan kit, see chapter 7 "Maintenance / servicing", section 2 "Fan kit installation and replacement", starting on page 451.

3.8.3 Fan kit 5PC700.FA02-01

This fan kit can be used as an option for 12.1" and 15" Panel PC 700 system units with 1 and 2 PCI slots (5PC720.1214-01, 5PC720.1505-01 and 5PC720.1505-02).

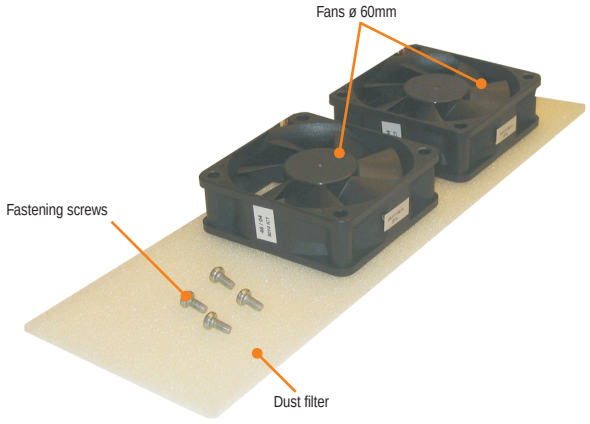


Figure 119: Fan kit 5PC700.FA02-01

Technical data

Features	5PC700.FA02-01
Fan type Width Length Height	Double ball bearings 60 mm 60 mm 20 mm
Revolution speed	3600 rpm ± 10%
Noise level	30.5 dB
Lifespan	80,000 hours at 30°C
Maintenance interval	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 89: Technical data - 5PC700.FA02-01

Contents of delivery

- 2 fans with 60 mm diameter
- 1 dust filter
- Installation material - Mounting screws

Installation

For a description of how to install the fan kit, see chapter 7 "Maintenance / servicing", section 2 "Fan kit installation and replacement", starting on page 451.

Chapter 3 • Commissioning

1. Installation

Panel PC 700 devices are best mounted in a housing cutout using the clamps found on the housing (different designs possible). The cutout dimensions for the respective Panel PC 700 device can be found in the technical data for the system units (see chapter 2 "Technical data" starting on page 33).

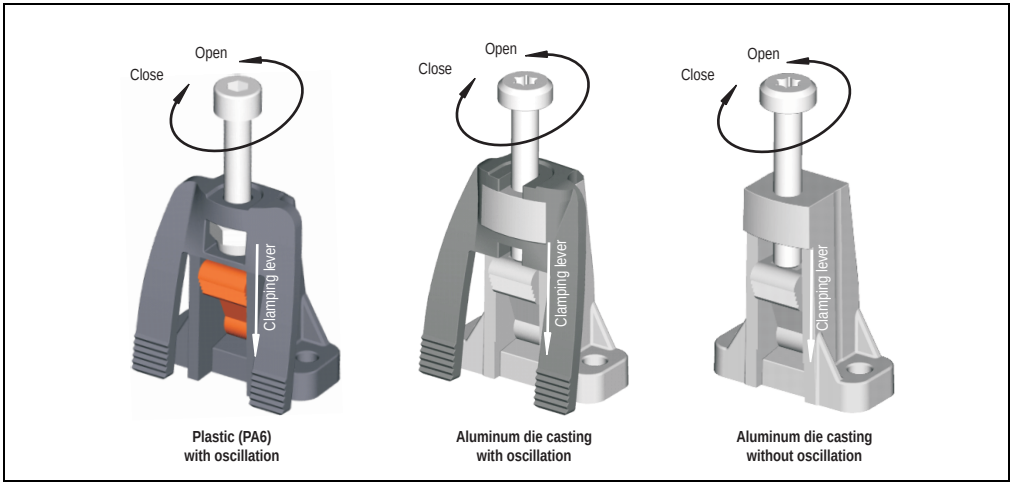


Figure 120: Clamp

The mounting clamps are designed for a max. thickness of 10 mm for the material where the device is being clamped. The minimum thickness is 2 mm.

In order to tighten or loosen the screws, a hex key (size 3) is required for the plastic clamps and a Torx screwdriver (size 20) or a large flat-head screwdriver for the aluminum die casting.

The maximum torque when tightening the clamp is 0.5 Nm. A Panel PC 700 unit must be mounted to a flat surface. Uneven areas can cause damage to the display when tightening the screws.

1.1 Important mounting information

- The environmental conditions must be taken into consideration (see chapter 2 "Technical data", section "Ambient temperature for systems with an 855GME CPU board" on page 39).
- The PPC700 must be mounted to a planar surface.
- The PPC700 is only for operation in closed rooms.
- The PPC700 cannot be situated in direct sunlight.
- The vent holes may not be covered.
- When mounting the device, be sure to adhere to the allowable mounting orientations (see Section "Mounting orientation" on page 214).
- Be sure the wall or switching cabinet can withstand four times the total weight of the the PPC700.
- When connecting certain cable types (DVI, SDL, USB, etc.), keep the flex radius in mind.

1.2 Air circulation

In order to guarantee proper air circulation, allow the specified amount of space above, below, to the side and behind the Panel PC 700. The minimum specified free space can be found in the diagram below.

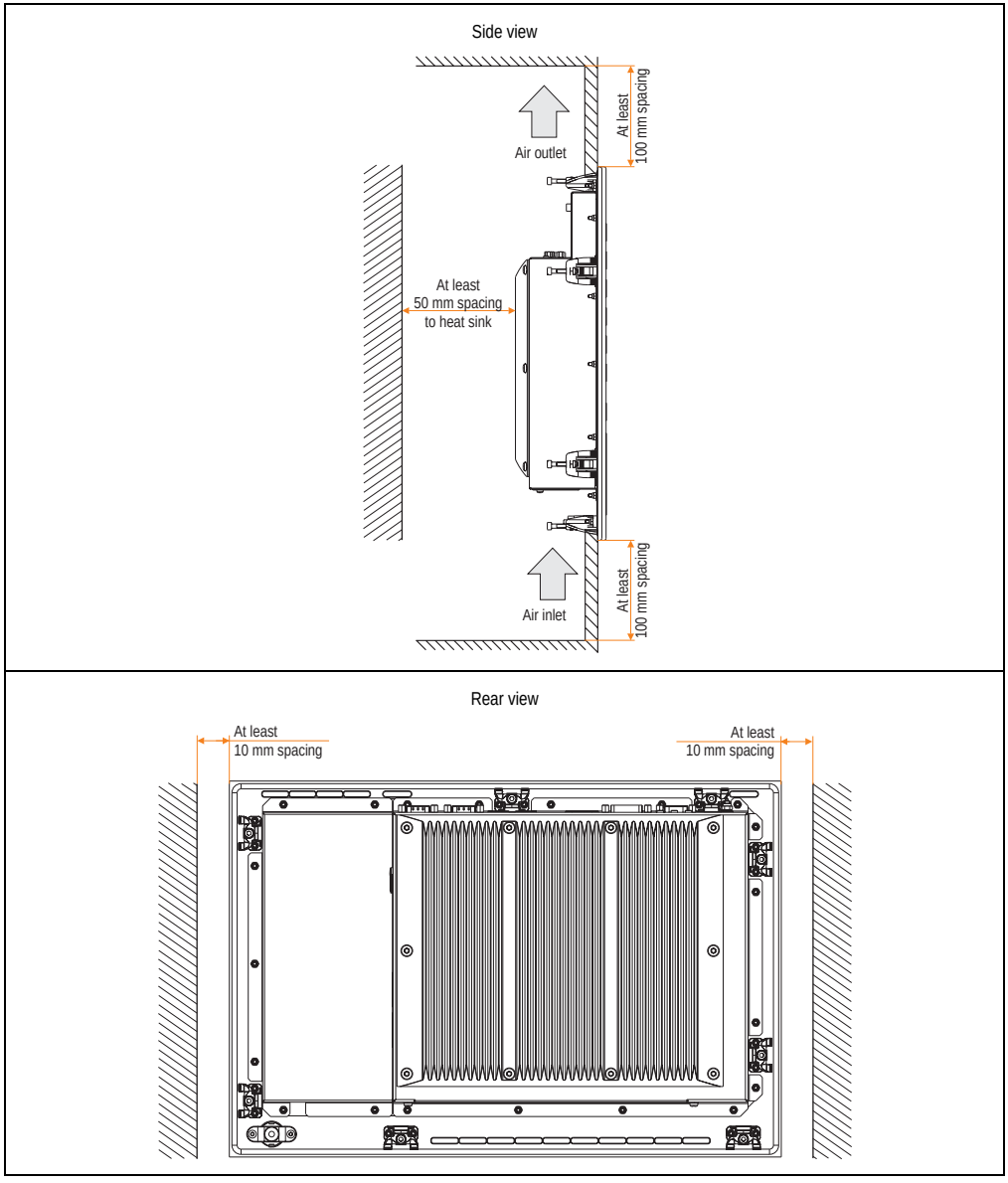


Figure 121: Spaces for air circulation

1.3 Mounting orientation

The following diagram displays the specified mounting orientation for the Panel PC 700 device.

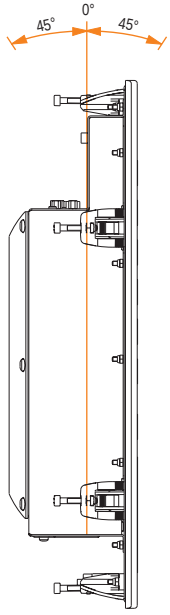


Figure 122: Mounting orientation

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.

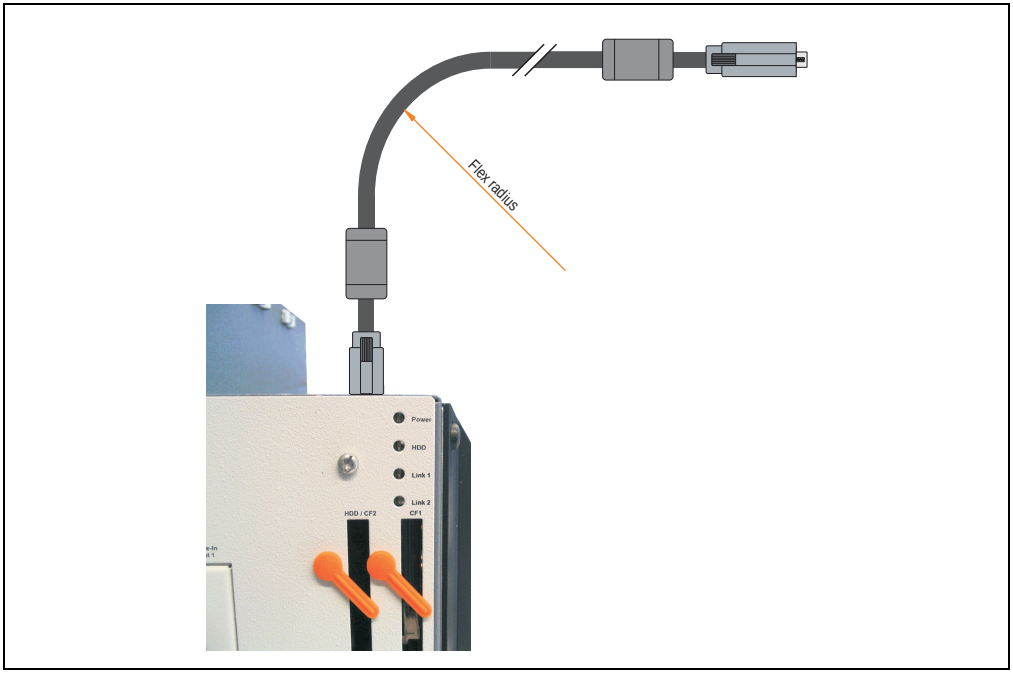


Figure 123: Flex radius - cable connection

Information:

The value specified for the minimum flex radius can be found in the technical data for the cable that is being used.

3. Connection examples

The following examples provide an overview of the configuration options for connecting Automation Panel 800 and Automation Panel 900 devices with the PPC700. The following questions will be answered:

- How are Automation Panel 800 devices connected to the monitor / panel output of the PPC700, and what needs to be considered?
- How are Automation Panel 900 devices connected to the monitor / panel output of the PPC700, and what needs to be considered?
- How are Automation Panel 800 and Automation Panel 900 devices connected in a line to the monitor / panel output of the PPC700, and what needs to be considered?
- What are "Display Clone" and "Extended Desktop" modes?
- How many Automation Panel 900 and Automation Panel 800 devices can be connected in one line?
- How are the connected Automation Panel 800 and Automation Panel 900 devices numbered internally?
- Are there limitations to the segment length and if so, what are they?
- Up to what segment length or for which Automation Panel is USB supported?
- Which cables are required?
- Do BIOS settings have to be changed for a specific configuration?

3.1 One Automation Panel 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).

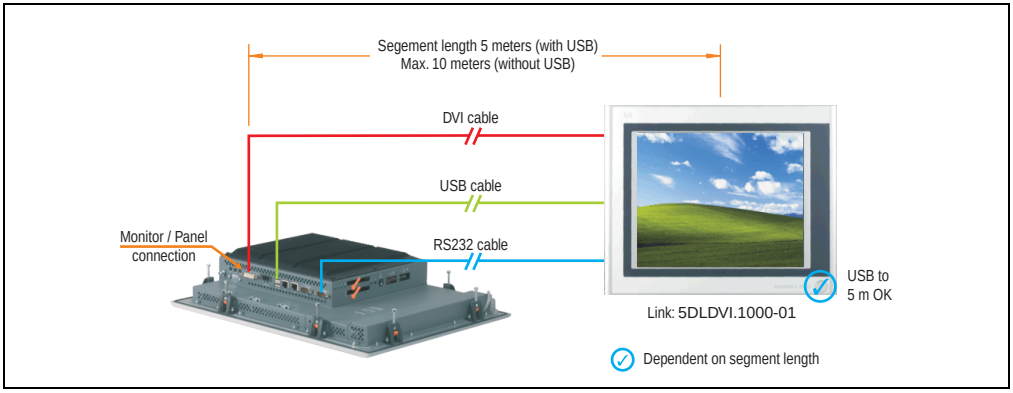


Figure 124: Configuration - One Automation Panel via DVI (onboard)

3.1.1 Basic system requirements

The following table displays the possible combinations for the PPC700 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).

System unit	CPU board						Resolution limitations
	5PC600.E855-00	5PC600.E855-01	5PC600.E855-02	5PC600.E855-03	5PC600.E855-04	5PC600.E855-05	
5PC720.1043-00	✓	✓	✓	✓	✓	✓	Max. SXGA
5PC720.1043-01	✓	✓	✓	✓	✓	✓	Max. SXGA
5PC720.1214-00	✓	✓	✓	✓	✓	✓	Max. SXGA
5PC720.1214-01	✓	✓	✓	✓	✓	✓	Max. SXGA
5PC720.1505-00	✓	✓	✓	✓	✓	✓	Max. SXGA
5PC720.1505-01	✓	✓	✓	✓	✓	✓	Max. SXGA
5PC720.1505-02	✓	✓	✓	✓	✓	✓	Max. SXGA
5PC720.1706-00	✓	✓	✓	✓	✓	✓	Max. SXGA
5PC720.1906-00	✓	✓	✓	✓	✓	✓	Max. SXGA
5PC781.1043-00	✓	✓	✓	✓	✓	✓	Max. SXGA

Table 90: Possible combinations of system unit and CPU board

System unit	CPU board						Resolution limitations
	5PC600.E855-00	5PC600.E855-01	5PC600.E855-02	5PC600.E855-03	5PC600.E855-04	5PC600.E855-05	
5PC781.1505-00	✓	✓	✓	✓	✓	✓	Max. SXGA
5PC782.1043-00	✓	✓	✓	✓	✓	✓	Max. SXGA

Table 90: Possible combinations of system unit and CPU board

3.1.2 Link modules

Model number	Description	Note
5DLDVI.1000-01	**Automation Panel Link DVI receiver**	for Automation Panel 900

Table 91: Link module for the configuration - One Automation Panel via DVI

3.1.3 Cables

Select one cable each from the 3 required types.

Model number	Type	Length
5CADVI.0018-00	DVI	1.8 m
5CADVI.0050-00	DVI	5 m
5CADVI.0100-00	DVI	10 m[1)]
9A0014.02	Touch screen	1.8 m
9A0014.05	Touch screen	5 m
9A0014.10	Touch screen	10 m[1)]
5CAUSB.0018-00	USB	1.8 m
5CAUSB.0050-00	USB	5 m

Table 92: Cable for DVI configurations

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

3.1.4 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 93: 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.

3.1.5 BIOS settings

No special BIOS settings are necessary for operation.

3.2 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 extension keyboard (without a hub).

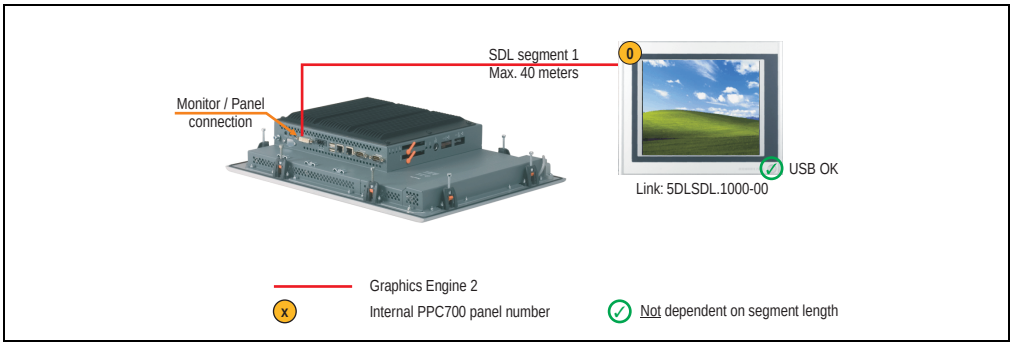


Figure 125: Configuration - An Automation Panel 800 via SDL (onboard)

3.2.1 Basic system requirements

The following table displays the possible combinations for the PPC700 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.

System unit	CPU board						Resolution limitations
	5PC600.E855-00	5PC600.E855-01	5PC600.E855-02	5PC600.E855-03	5PC600.E855-04	5PC600.E855-05	
5PC720.1043-00	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC720.1043-01	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC720.1214-00	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC720.1214-01	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC720.1505-00	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC720.1505-01	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC720.1505-02	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC720.1706-00	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC720.1906-00	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC781.1043-00	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC781.1505-00	✓	✓	✓	✓	✓	✓	Max. UXGA
5PC782.1043-00	✓	✓	✓	✓	✓	✓	Max. UXGA

Table 94: Possible combinations of system unit and CPU board

3.2.2 Link modules

Model number	Description	Note
5DLSDL.1000-00	**Automation Panel Link SDL Receiver**	For Automation Panel 900

Table 95: Link module for the configuration - One Automation Panel via DVI

3.2.3 Cables

Selection of an SDL cable from the subsequent table for connecting an AP900 display.

Model number	Type	Length
5CASDL.0018-01	SDL with single-sided 45° plug	1.8 m
5CASDL.0018-03	SDL flex without extender	1.8 m
5CASDL.0050-01	SDL with single-sided 45° plug	5 m
5CASDL.0050-03	SDL flex without extender	5 m
5CASDL.0100-01	SDL with single-sided 45° plug	10 m
5CASDL.0100-03	SDL flex without extender	10 m
5CASDL.0150-01	SDL with single-sided 45° plug	15 m
5CASDL.0150-03	SDL flex without extender	15 m
5CASDL.0200-03	SDL flex without extender	20 m
5CASDL.0250-03	SDL flex without extender	25 m
5CASDL.0300-03	SDL flex without extender	30 m
5CASDL.0300-13	SDL flex with extender	30 m
5CASDL.0400-13	SDL flex with extender	40 m

Table 96: Cables for SDL configurations

Cable lengths and resolutions for SDL transfer

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

Cable 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.0018-01 5CASDL.0018-03	5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-01 5CASDL.0018-03
5	5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-01 5CASDL.0050-03	5CASDL.0050-01 5CASDL.0050-03
10	5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-01 5CASDL.0100-03	5CASDL.0100-01[1)] 5CASDL.0100-03[1)]
15	5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-01[1)] 5CASDL.0150-03[1)]	- -
20	5CASDL.0200-03[1)]	5CASDL.0200-03[1)]	5CASDL.0200-03[1)]	5CASDL.0200-03[1)]	-
25	5CASDL.0250-03[1)]	5CASDL.0250-03[1)]	5CASDL.0250-03[1)]	-	-
30	5CASDL.0300-03[1)] 5CASDL.0300-13[2)]	5CASDL.0300-03[1)] 5CASDL.0300-13[2)]	5CASDL.0300-13[2)] -	5CASDL.0300-13[2)] -	- -
40	5CASDL.0400-13[2)]	5CASDL.0400-13[2)]	5CASDL.0400-13[2)]	5CASDL.0400-13[2)]	-

Table 97: Segment lengths, resolutions and SDL cable

1) See table 98 "Requirements for SDL cable with automatic cable adjustment (equalizer)"
2) See table 99 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)"

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

Firmware	Designation	Version	Note
MTCX FPGA	Firmware on PPC700	v 01.19	The version is read from BIOS - see the BIOS description. Supported starting with APC620 / PPC 700 firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on PPC700	v 01.06	
SDLR FPGA	Firmware on the AP Link SDL receiver	v 00.03	
SDLT FPGA	Firmware on the AP Link SDL transceiver	v 00.03	
Hardware	**Designation**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. E0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. E0	

Table 98: Requirements for SDL cable with automatic cable adjustment (equalizer)

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

Firmware	Designation	Version	Note
MTCX FPGA	Firmware on PPC700	v 01.19	The version is read from BIOS - see the BIOS description. Supported starting with APC620 / PPC 700 firmware upgrade (MTCX, SDLR, SDLT) **V01.10**, available in the download area of the B&R homepage.
MTCX PX32	Firmware on PPC700	v 01.06	
SDLR FPGA	Firmware on the AP Link SDL receiver	v 00.03	
SDLT FPGA	Firmware on the AP Link SDL transceiver	v 00.03	
Hardware	**Designation**	**Revision**	**Note**
5DLSDL.1000-00	AP Link SDL receiver	Rev. E0	-
5DLSDL.1000-01	AP Link SDL transceiver	Rev. E0	-
5PC720.1043-00	Panel PC 720 10.4" VGA T, 0 PCI slots	Rev. J0	-
5PC720.1043-01	Panel PC 720 10.4" VGA T, 2 PCI slots, 1 disk drive slot	Rev. H0	-
5PC720.1214-00	Panel PC 720 12.1" SVGA T, 0 PCI slots	Rev. J0	-
5PC720.1214-01	Panel PC 720 12.1" SVGA T, 2 PCI slots, 1 disk drive slot	Rev. A0	-
5PC720.1505-00	Panel PC 720 15" XGA T, 0 PCI slots	Rev. J0	-
5PC720.1505-01	Panel PC 720 15" XGA T, 2 PCI slots, 1 disk drive slot	Rev. I0	-
5PC720.1505-02	Panel PC 720 15" XGA T, 1 PCI slot, 1 disk drive slot	Rev. H0	-
5PC720.1706-00	Panel PC 720 17" SXGA T, 0 PCI slots	Rev. A0	-
5PC720.1906-00	Panel PC 720 19" SXGA T, 0 PCI slots	Rev. A0	-
5PC781.1043-00	Panel PC 781 10.4" VGA FT, 0 PCI slots	Rev. G0	-
5PC781.1505-00	Panel PC 781 15" XGA FT, 0 PCI slots	Rev. G0	-
5PC782.1043-00	Panel PC 782 10.4" VGA FT, 0 PCI slots	Rev. G0	-

Table 99: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

3.2.4 BIOS settings

No special BIOS settings are necessary for operation.

Chapter 4 • Software

1. Panel PC 700 with BIOS

1.1 815E BIOS description

Information:

- **The following diagrams, BIOS menu items, and descriptions refer to BIOS Version R115. It is therefore possible that these diagrams and BIOS descriptions do not correspond with the installed BIOS version.**
- **The setup defaults are the settings recommended by B&R. The setup defaults are dependant on the DIP switch configuration on the baseboard (see section 1.1.10 "Profile overview" on page 270).**

1.1.1 General information

BIOS stands for "Basic Input Output System." It is the most basic standardized communication between the user and the system (hardware). The BIOS system used on the Panel PC 700 systems is produced by Phoenix.

The BIOS setup utility lets you modify basic system configuration settings. These settings are stored in CMOS and in EEPROM (as a backup).

The CMOS is buffered by a battery, and remains in the PPC700 even when the power is turned off.

1.1.2 BIOS setup

BIOS is immediately activated when the Panel PC 700 system power supply is switching. BIOS reads the system configuration information in CMOS RAM, checks the system, and configures it using the Power On Self Test (POST).

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

To enter BIOS setup, the F2 key must be pressed as soon as the following message appears on the lower margin of the display (during POST):

"Press <F2> to enter SETUP"

```
PhoenixBIOS 4.0 Release 6.1
Copyright 1985-2003 Phoenix Technologies Ltd.
All Rights Reserved
<1BR1R115> Bernecker + Rainer Industrie-Elektronik C1.15


CPU = Mobile Intel(R) Celeeron(TM) CPU          733MHz
126M System RAM Passed
256K Cache SRAM Passed
System BIOS shadowed
Video BIOS shadowed
UMB upper limit segment address: E542




Press <F2> to enter SETUP
```

Figure 126: 815E - BIOS diagnostic screen

Summary screen

After the POST, the summary screen displays the most important system characteristics.

```
                        PhoenixBIOS Setup Utilitiy

CPU Type          : Mobile Intel(R) Celeron(TM) CPU          733MHz
CPU Speed         : 733 MHz
                                        System ROM     : E542 - FFFF
System Memory     : 640 KB              BIOS Date      : 12/17/04
Extended Memory   : 259584 KB
Shadow Ram        : 384 KB              COM Ports      : 0378 02F8
Cache Ram         : 256 KB              LPT Ports      : 0378
                                        Display Type   : EGA \ VGA
                                        PS/2 Mouse     : Not Installed
Hard Disk 0       : None
Hard Disk 1       : None
Hard Disk 2       : None
Hard Disk 3       : None
```

Figure 127: 815E - BIOS summary screen

1.1.3 BIOS setup keys

The following keys are active during the POST:

Key	Function
F2	Enters the BIOS setup menu.
ESC	Cues the boot menu. Lists all bootable devices that are connected to the system. With cursor ↑ and cursor ↓ and by pressing <ENTER>, select the device from which will be booted.
<Spacebar>	Pressing the spacebar skips the system RAM check.
<Pause>	Pressing the <pause> key stops the POST. Press any other key to resume the POST.

Table 100: Keys relevant to BIOS during POST

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

Key	Function
Cursor ↑	Moves to previous item.
Cursor ↓	Moves to next item.
Cursor ←	Move to the item on the left.
Cursor →	Move to the item on the right.
<ESC>	Exits the submenu.
PgUp↑	Moves the cursor to the top of the current BIOS setup page.
PgDn ↓	Moves the cursor to the bottom of the current BIOS setup page.
<F1> or <Alt+H>	Opens a help window showing the key assignments.
<F5> or <->	Scrolls to the previous option for the selected BIOS setting.
<F6> or <+> or <spacebar>	Scrolls to the next option for the selected BIOS setting.
<F9>	Loads setup defaults for the current BIOS setup screen.
<F10>	Saves settings and closes BIOS setup.
<Enter>	Opens submenu for a BIOS setup menu item, or displays the configurable values of a BIOS setup item.

Table 101: Keys relevant to BIOS

The following sections explain the individual BIOS setup menu items in detail.

BIOS setup menu Item	Function	From page
Main	The basic system configurations (e.g. time, date, hard disk parameters) can be set in this menu.	228
Advanced	Advanced BIOS options such as cache areas, PnP, keyboard repeat rate, as well as settings specific to B&R integrated hardware, can be configured here.	237
Security	For setting up the system's security functions.	261
Power	Setup of various APM (Advanced Power Management) options.	263
Boot	The boot order can be set here.	268
Exit	To end the BIOS setup.	269

Table 102: Overview of BIOS menu items

1.1.4 Main

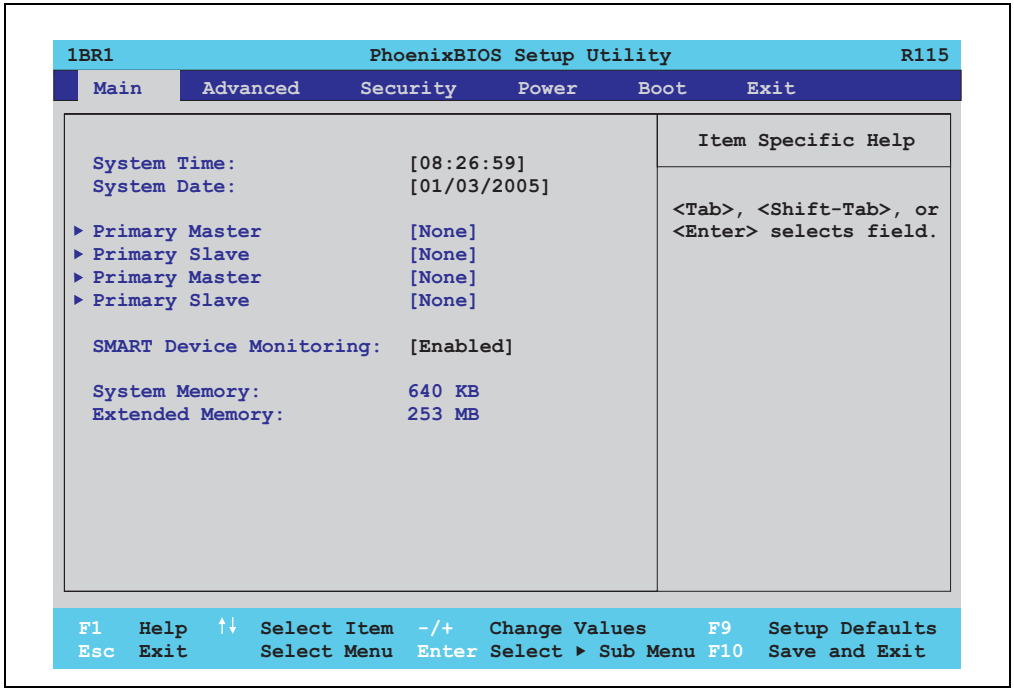


Figure 128: 815E - main menu

BIOS setting	Meaning	Setting options	Effect
System time	This is the current system time setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Adjustment of the system time	Set the system time in the format (hh:mm:ss).
System date	This is the current system date setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Changes to the system date	Set the system date in the format (mm:dd:yyyy).
Primary master	The drive in the system that is connected to the IDE primary master port is configured here.	Enter	Opens submenu see "Primary master" on page 229.
Primary slave	The drive in the system that is connected to the IDE primary slave port is configured here.	Enter	Opens submenu see "Primary slave" on page 231.
Secondary master	The drive in the system that is connected to the IDE secondary master port is configured here.	Enter	Opens submenu see "Secondary master" on page 233.
Secondary slave	The drive in the system that is connected to the IDE secondary slave port is configured here.	Enter	Opens submenu see "Secondary slave" on page 235.

Table 103: 815E - main setting options

BIOS setting	Meaning	Setting options	Effect
Smart device monitoring	S.M.A.R.T. (Self Monitoring Analysis and Reporting Technology) is implemented in the today's hard drives. This technology allows you to detect reading or rotational problems with the hard drive, and much more.	Enabled	Activates this function. In the future, a message regarding impending errors is produced.
		Disabled	Deactivates this function.
System memory	Displays the amount of main memory installed. Between 0 and 640 KB.	None	-
Extended memory	Displays the available main memory from the first MB to the maximum memory capacity.	None	-

Table 103: 815E - main setting options (cont.)

Primary master

```
1BR1                    PhoenixBIOS Setup Utility                    R115
 Main

        Primary Master [None]                      Item Specific Help

  Type:                        [Auto]              User = you enter
                                                   parameters of hard-disk
  Multi-Sector Transfers:      [Disabled]          drive installed at this
  LBA Mode Control:            [Enabled]           connection.
  32 Bit I/O:                  [Disabled]Monitor   Auto = autotypes
  Transfer Mode:               [Fast PIO 2]        hard-disk drive
  Ultra DMA Mode:              [Disabled]          installed here.
  SMART Monitoring:            [Disabled]          1-39 = you select
                                                   pre-determined type of
                                                   hard-disk drive
                                                   installed here.
                                                   CD-ROM = a CD-ROM drive
                                                   is installed here.
                                                   ATAPI Removeable =
                                                   removeable disk drive
                                                   is installed here.

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

Figure 129: 815E - primary master setup

BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the primary master is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		User	Manual setup of the drive (number of cylinders, heads, and sectors).
		Other ATAPI	Use this option for IDE disk drives that are not mentioned here.
		CD-ROM	CD-ROM = CD-ROM drive
		ATAPI removable	The removable media drive is treated as a hard drive or floppy drive.
		IDE removable	The IDE removable drive is treated as a hard drive.
Multi-sector transfer	This option determines the number of sectors per block. Only possible when manually setting up the drive.	Disabled	Disables this function.
		2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Disabled	Disables this function.
		Enabled	Enables this function.
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the primary master drive and the system memory is defined here. Only possible when manually setting up the drive.	Default	Default setting
		Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the primary master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Disables this function. Do not use UDMA mode.
		Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the primary master drive supports SMART technology.	Disabled	No drive support, and function is deactivated.
		Enabled	Drive support present, and function is activated.

Table 104: 815E - primary master setting options

Primary slave

```
1BR1                    PhoenixBIOS Setup Utility                    R115
 Main

          Primary Slave [None]                      Item Specific Help

 Type:                        [Auto]                User = you enter
                                                    parameters of hard-disk
 Multi-Sector Transfers:      [Disabled]            drive installed at this
 LBA Mode Control:            [Enabled]             connection.
 32 Bit I/O:                  [Disabled]Monitor     Auto = autotypes
 Transfer Mode:               [Fast PIO 2]          hard-disk drive
 Ultra DMA Mode:              [Disabled]            installed here.
 SMART Monitoring:            [Disabled]            1-39 = you select
                                                    pre-determined type of
                                                    hard-disk drive
                                                    installed here.
                                                    CD-ROM = a CD-ROM drive
                                                    is installed here.
                                                    ATAPI Removeable =
                                                    removeable disk drive
                                                    is installed here.

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

Figure 130: 815E - primary slave setup

BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the primary slave is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		User	Manual setup of the drive (number of cylinders, heads, and sectors).
		Other ATAPI	Use this option for IDE disk drives that are not mentioned here.
		CD-ROM	CD-ROM = CD-ROM drive
		ATAPI removable	The removable media drive is treated as a hard drive or floppy drive.
		IDE removable	The IDE removable drive is treated as a hard drive.
Multi-sector transfer	This option determines the number of sectors per block. Only possible when manually setting up the drive.	Disabled	Disables this function.
		2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 105: 815E - primary slave setting options

BIOS setting	Meaning	Setting options	Effect
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the primary slave drive and the system memory is defined here. Only possible when manually setting up the drive.	Default	Default setting
		Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the primary slave drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Disables this function. Do not use UDMA mode.
		Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the primary slave drive supports SMART technology.	Disabled	No drive support, and function is deactivated.
		Enabled	Drive support present, and function is activated.

Table 105: 815E - primary slave setting options (cont.)

Secondary master

```
1BR1                    PhoenixBIOS Setup Utility                    R115
 Main

        Secondary Master [None]                    Item Specific Help

 Type:                          [Auto]             User = you enter
                                                   parameters of hard-disk
 Multi-Sector Transfers:        [Disabled]         drive installed at this
 LBA Mode Control:              [Enabled]          connection.
 32 Bit I/O:                    [Disabled]Monitor  Auto = autotypes
 Transfer Mode:                 [Fast PIO 2]       hard-disk drive
 Ultra DMA Mode:                [Disabled]         installed here.
 SMART Monitoring:              [Disabled]         1-39 = you select
                                                   pre-determined type of
                                                   hard-disk drive
                                                   installed here.
                                                   CD-ROM = a CD-ROM drive
                                                   is installed here.
                                                   ATAPI Removeable =
                                                   removeable disk drive
                                                   is installed here.

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

Figure 131: 815E - secondary master setup

BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the secondary master is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		User	Manual setup of the drive (number of cylinders, heads, and sectors).
		Other ATAPI	Use this option for IDE disk drives that are not mentioned here.
		CD-ROM	CD-ROM = CD-ROM drive
		ATAPI removable	The removable media drive is treated as a hard drive or floppy drive.
		IDE removable	The IDE removable drive is treated as a hard drive.
Multi-sector transfer	This option determines the number of sectors per block. Only possible when manually setting up the drive.	Disabled	Disables this function.
		2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 106: 815E - secondary master setting options

BIOS setting	Meaning	Setting options	Effect
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the secondary master drive and the system memory is defined here. Only possible when manually setting up the drive.	Default	Default setting
		Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the secondary master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Disables this function. Do not use UDMA mode.
		Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the secondary master drive supports SMART technology.	Disabled	No drive support, and function is deactivated.
		Enabled	Drive support present, and function is activated.

Table 106: 815E - secondary master setting options (cont.)

Secondary slave

```
1BR1                    PhoenixBIOS Setup Utility                    R115
 Main

        Secondary Slave [None]                      Item Specific Help

  Type:                          [Auto]             User = you enter
                                                    parameters of hard-disk
  Multi-Sector Transfers:        [Disabled]         drive installed at this
  LBA Mode Control:              [Enabled]          connection.
  32 Bit I/O:                    [Disabled]Monitor  Auto = autotypes
  Transfer Mode:                 [Fast PIO 2]       hard-disk drive
  Ultra DMA Mode:                [Disabled]         installed here.
  SMART Monitoring:              [Disabled]         1-39 = you select
                                                    pre-determined type of
                                                    hard-disk drive
                                                    installed here.
                                                    CD-ROM = a CD-ROM drive
                                                    is installed here.
                                                    ATAPI Removeable =
                                                    removeable disk drive
                                                    is installed here.

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

Figure 132: 815E - secondary slave setup

BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the secondary slave is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		User	Manual setup of the drive (number of cylinders, heads, and sectors).
		Other ATAPI	Use this option for IDE disk drives that are not mentioned here.
		CD-ROM	CD-ROM = CD-ROM drive
		ATAPI removable	The removable media drive is treated as a hard drive or floppy drive.
		IDE removable	The IDE removable drive is treated as a hard drive.
Multi-sector transfer	This option determines the number of sectors per block. Only possible when manually setting up the drive.	Disabled	Disables this function.
		2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 107: 815E - secondary slave setting options

BIOS setting	Meaning	Setting options	Effect
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the secondary slave drive and the system memory is defined here. Only possible when manually setting up the drive.	Default	Default setting
		Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the secondary slave is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Disables this function. Do not use UDMA mode.
		Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the secondary slave drive supports SMART technology.	Disabled	No drive support, and function is deactivated.
		Enabled	Drive support present, and function is activated.

Table 107: 815E - secondary slave setting options (cont.)

1.1.5 Advanced

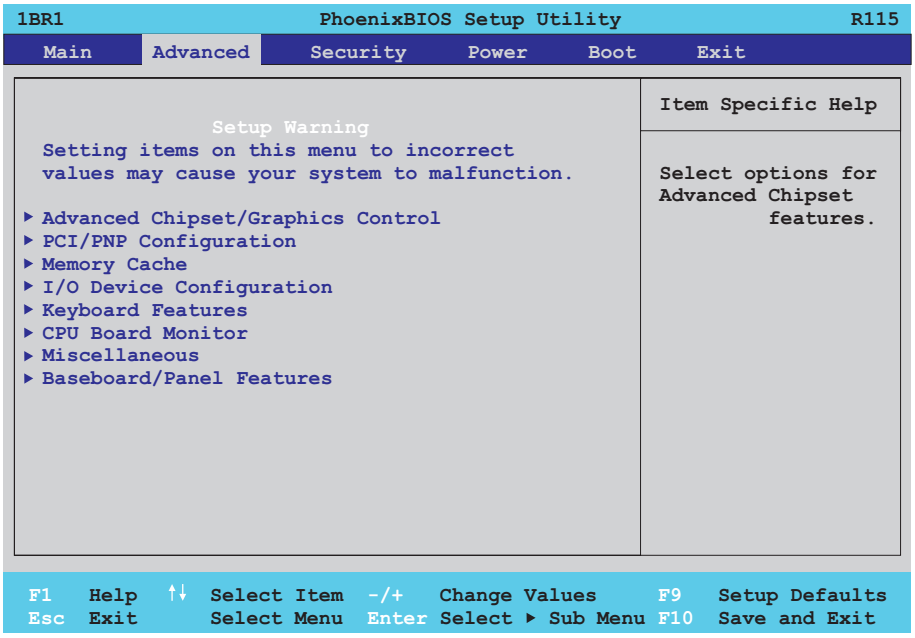


Figure 133: 815E - advanced menu

BIOS setup menu	Meaning	Setting options	Effect
Advanced chipset/graphics control	Setup of advanced chipset and graphics functions.	Enter	Opens submenu see "Advanced chipset/graphics control" on page 238.
PCI/PNP configuration	Configures PCI devices.	Enter	Opens submenu see "PCI/PNP configuration" on page 240.
Memory cache	Configuration of the memory cache resources.	Enter	Opens submenu see "Memory cache" on page 247.
I/O device configuration	Configuration of the I/O devices.	Enter	Opens submenu see "I/O device configuration" on page 249.
Keyboard features	Configuration of the keyboard options.	Enter	Opens submenu see "Keyboard features" on page 252.
CPU board monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens submenu see "CPU board monitor" on page 253.
Miscellaneous	Configuration of various BIOS settings (summary screen, halt on errors, etc.).	Enter	Opens submenu see "Miscellaneous" on page 254.

Table 108: 815E - advanced menu setting options

BIOS setup menu	Meaning	Setting options	Effect
Baseboard/panel features	Display of device specific information and setup of device specific values.	Enter	Opens submenu see "Baseboard/panel features" on page 255.

Table 108: 815E - advanced menu setting options (cont.)

Advanced chipset/graphics control

```
1BR1                    PhoenixBIOS Setup Utility                    R115
                Advanced

      Advanced Chipset/Graphics Control          Item Specific Help

  Graphics Engine:        [Auto]                 Select 'Auto' or
  Graphics Memory Size:   [  1MB]                one of the
                                                 predefined LCDs:
  Enable memory gap:   [Disabled]
                                                 VGA = 640 x 480 1x18
                                                 SVGA= 800 x 600 1x18
                                                 XGA = 1024x 768 1x18
                                                 XGA2= 1024x 768 2x18
                                                 SXGA= 1280x1024 2x18

                                                 or [Disabled] to
                                                 disable the onboard
                                                 video controller.

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

Figure 134: 815E - advanced chipset/graphics control

BIOS setting	Meaning	Setting options	Effect
Graphics engine	Settings can be made for the onboard video controller.	Auto	Automatic setting of the resolution (using a read-out of the connected panel's EDID data).
		VGA, SVGA, XGA, XGA2, SXGA	VGA = 640 x 480 resolution SVGA = 800 x 600 resolution XGA = 1024 x 768 resolution XGA2 = 1024 x 768 resolution SXGA = 1280 x 1024 resolution
		Disabled	**Important!** **The onboard video must be activated to make video output possible. Deactivate only for use of an external PCI graphics card.**

Table 109: 815E - advanced chipset/graphics control setting options

BIOS setting	Meaning	Setting options	Effect
Graphics memory size	Reserves a memory location in the RAM for the onboard graphics controller, into which the memory access will be directed.	1 MB	1 MB main memory is reserved for the onboard video controller.
		512kB	512 k main memory is reserved for the onboard video controller.
Enable memory gap	Specific settings for an inserted PCI graphics card can be activated here.	Disabled	Disables this function.
		Extended	A memory location is reserved in the main memory: 128 kB (for cards with 512 kB or more) or 1 MB (for cards with 15 MB or more) .

Table 109: 815E - advanced chipset/graphics control setting options

PCI/PNP configuration

```
1BR1                    PhoenixBIOS Setup Utility                    R115
                Advanced

        PCI/PNP Configuration                      Item Specific Help

  PNP OS installed:                  [Yes]         Select the operating
  Reset Configuration Data:          [No]          system installed
  Secured Setup Configurations       [Yes]         on your system which
                                                   you will use most
▶ PCI Device, Slot #1                              commonly.
▶ PCI Device, Slot #2
▶ PCI Device, Slot #3                              Note: An incorrect
▶ PCI Device, Slot #4                              setting can cause
                                                   some operating
  PCI IRQ line 1:                    [Auto Select] systems to display
  PCI IRQ line 2:                    [Auto Select] unexpected behavior
  PCI IRQ line 3:                    [Auto Select]
  PCI IRQ line 4:                    [Auto Select]
  Onboard LAN IRQ line:              [Auto Select]
  Onboard USB EHCI IRQ line:         [Auto Select]

▶ PCI/PNP ISA IRQ Resource Exclusion
  Default Primary Video Adapter:     [PCI]
  Assign IRQ to SMB:                 [Enabled]

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

Figure 135: 815E - PCI/PNP configuration

BIOS setting	Meaning	Setting options	Effect
PNP OS installed	If the operating system is plug & play capable, then this option informs BIOS that the operating system will handle the distribution of resources in the future.	Yes	The ISA PnP resources are not assigned. The resource assignment sequence is as follows: 1. Motherboard devices 2. PCI devices
		No	The resource assignment sequence is as follows: 1. Motherboard devices 2. ISA PnP devices 3. PCI devices
Reset configuration data	During booting, the assigned resources are stored in Flash (ESCD).	Yes	When the system is reset after leaving the BIOS setup, all ESCD entries (extended system configuration data) are deleted.
		No	Disables this function. Resources are not reset.
Secured setup configuration	This option protects the setup configuration from interference from a PnP operating system.	Yes	Prevents a PnP operating system from changing system settings.
		No	Disables this function. Changes are allowed.
PCI device, slot #1	Advanced configuration of the PCI slot number 1.	Enter	Opens submenu See "PCI device, slot #1" on page 242

Table 110: 815E - PCI/PNP configuration options

BIOS setting	Meaning	Setting options	Effect
PCI device, slot #2	Advanced configuration of the PCI slot number 2.	Enter	Opens submenu See "PCI device, slot #2" on page 243
PCI device, slot #3	Advanced configuration of the PCI slot number 3.	Enter	Opens submenu See "PCI device, slot #3" on page 244
PCI device, slot #4	Advanced configuration of the PCI slot number 4.	Enter	Opens submenu See "PCI device, slot #4" on page 245
PCI IRQ line 1	Under this option, the external PCI interrupt 1 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 2	Under this option, the external PCI interrupt 2 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 3	Under this option, the external PCI interrupt 3 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 4	Under this option, the external PCI interrupt 4 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
Onboard LAN IRQ line	Under this option, the onboard LAN interrupt is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
Onboard USB EHCI IRQ line	Under this option, the USB EHCI interrupt is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI/PNP ISA IRQ resource exclusion	This option reserves IRQs that are not being used by plug & play capable ISA devices.	Enter	Opens submenu See "PCI/PNP ISA IRQ resource exclusion" on page 246
Default primary video adapter	This option sets the default graphics card (either an existing AGP or the PCI graphic card).	PCI	A PCI graphics card is set as the default display device.
		AGP	An AGP graphics card is set as the default display device.

Table 110: 815E - PCI/PNP configuration options (cont.)

BIOS setting	Meaning	Setting options	Effect
Assign IRQ to SMB	Use this function to set whether or not the SM (System Management) bus controller is assigned a PCI interrupt.	Enabled	Automatic assignment of a PCI interrupt.
		Disabled	No assignment of an interrupt.

Table 110: 815E - PCI/PNP configuration options (cont.)

PCI device, slot #1

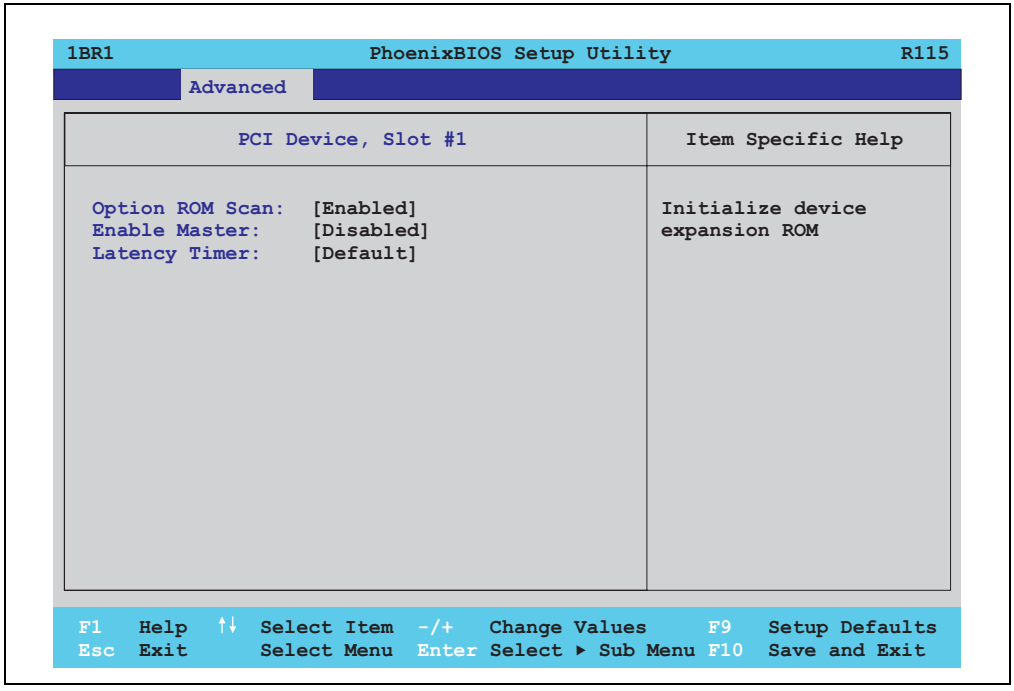


Figure 136: 815E - PCI device, slot #1

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be treated as the PCI bus master. Not all PCI devices can function as PCI bus master! Check device description.	Enabled	Enables this function.
		Disabled	Disables this function.
Latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manual configuration of the setting.

Table 111: 815E - PCI device, slot #1 - setting options

PCI device, slot #2

```
1BR1                    PhoenixBIOS Setup Utility                    R115
            Advanced

        PCI Device, Slot #2                      Item Specific Help

  Option ROM Scan:   [Enabled]                   Initialize device
  Enable Master:     [Disabled]                  expansion ROM
  Latency Timer:     [Default]

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

Figure 137: 815E - PCI device, slot #2

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be treated as the PCI bus master. Not all PCI devices can function as PCI bus master! Check device description.	Enabled	Enables this function.
		Disabled	Disables this function.
Latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manual configuration of the setting.

Table 112: 815E - PCI device, slot #2 - setting options

PCI device, slot #3

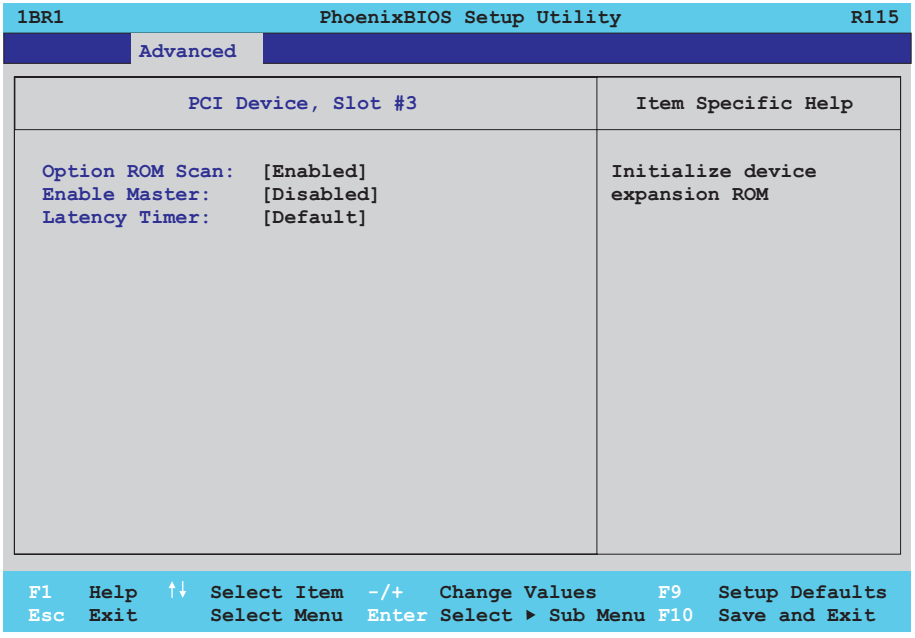


Figure 138: 815E - PCI device, slot #3

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be treated as the PCI bus master. Not all PCI devices can function as PCI bus master! Check device description.	Enabled	Enables this function.
		Disabled	Disables this function.
Latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manual configuration of the setting.

Table 113: 815E - PCI device, slot #3 - setting options

PCI device, slot #4

```
1BR1                    PhoenixBIOS Setup Utility                    R115
          Advanced

        PCI Device, Slot #4                      Item Specific Help

  Option ROM Scan:   [Enabled]                   Initialize device
  Enable Master:     [Disabled]                  expansion ROM
  Latency Timer:     [Default]

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

Figure 139: 815E - PCI device, slot #4

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be treated as the PCI bus master. Not all PCI devices can function as PCI bus master! Check device description.	Enabled	Enables this function.
		Disabled	Disables this function.
Latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manual configuration of the setting.

Table 114: 815E - PCI device, slot #4 - setting options

PCI/PNP ISA IRQ resource exclusion

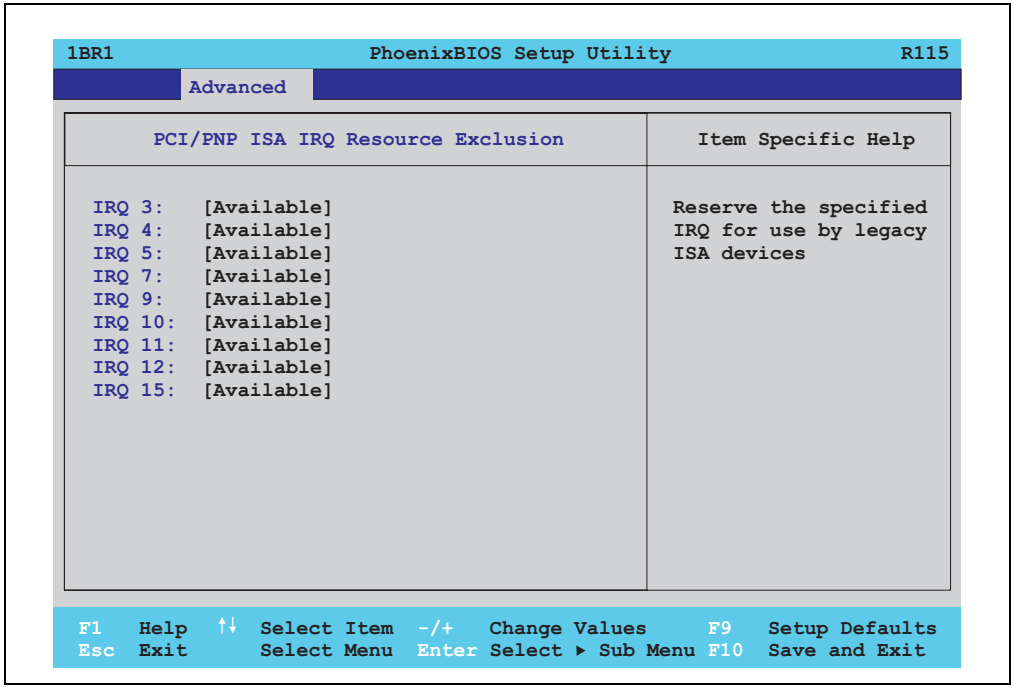


Figure 140: 815E - PCI/PNP ISA IRQ resource exclusion

BIOS setting	Meaning	Setting options	Effect
IRQ 3	This setting determines whether the IRQ 3 is reserved for legacy ISA devices.	Available	It is available for PCI devices.
		Reserved	It is reserved for ISA devices.
IRQ 4	This setting determines whether the IRQ 4 is reserved for legacy ISA devices.	Available	It is available for PCI devices.
		Reserved	It is reserved for ISA devices.
IRQ 5	This setting determines whether the IRQ 5 is reserved for legacy ISA devices.	Available	It is available for PCI devices.
		Reserved	It is reserved for ISA devices.
IRQ 7	This setting determines whether the IRQ 7 is reserved for legacy ISA devices.	Available	It is available for PCI devices.
		Reserved	It is reserved for ISA devices.
IRQ 9	This setting determines whether the IRQ 9 is reserved for legacy ISA devices.	Available	It is available for PCI devices.
		Reserved	It is reserved for ISA devices.
IRQ 10	This setting determines whether the IRQ 10 is reserved for legacy ISA devices.	Available	It is available for PCI devices.
		Reserved	It is reserved for ISA devices.
IRQ 11	This setting determines whether the IRQ 11 is reserved for legacy ISA devices.	Available	It is available for PCI devices.
		Reserved	It is reserved for ISA devices.

Table 115: 815E - PCI/PNP ISA IRQ resource exclusion - setting options

BIOS setting	Meaning	Setting options	Effect
IRQ 12	This setting determines whether the IRQ 12 is reserved for legacy ISA devices.	Available	It is available for PCI devices.
		Reserved	It is reserved for ISA devices.
IRQ 15	This setting determines whether the IRQ 15 is reserved for legacy ISA devices.	Available	It is available for PCI devices.
		Reserved	It is reserved for ISA devices.

Table 115: 815E - PCI/PNP ISA IRQ resource exclusion - setting options (cont.)

Memory cache

```
1BR1                    PhoenixBIOS Setup Utility                    R115
                Advanced

                Memory Cache                        Item Specific Help

  Memory Cache:                  [Enabled]
  Cache System BIOS area:        [Write Protect]     Sets the state of the
  Cache Video BIOS area          [Write Protect]     memory cache.
  Cache Extended Memory Area:    [Write Back]
  Cache D000 - D3FF:             [Disabled]
  Cache D40D - D7FF:             [Disabled]
  Cache DB00 - DBFF:             [Disabled]
  Cache DC00 - DFFF:             [Disabled]

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

Figure 141: 815E - memory cache

BIOS setting	Meaning	Setting options	Effect
Memory cache	Enable/ disable utilization of the L2 cache.	Enabled	Enables this function.
		Disabled	Disables this function.
Cache system BIOS area	Set whether or not the system BIOS should be buffered.	Write protect	System BIOS is mapped in the cache.
		Uncached	System BIOS is not mapped in the cache.
Cache video BIOS area	Set whether or not the video BIOS should be buffered.	Write protect	Video BIOS is mapped in the cache.
		Uncached	Video BIOS is not mapped in the cache.

Table 116: 815E - memory cache - setting options

BIOS setting	Meaning	Setting options	Effect
Cache extended memory area	Configure how the memory content of the system memory above 1MB should be mapped.	Uncached	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache D000 - D3FF	Configure how the memory content of D000-D3FF should be mapped.	Uncached	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache D400 - D7FF	Configure how the memory content of D400-D7FF should be mapped.	Uncached	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache D800 - DBFF	Configure how the memory content of D800-DBFF should be mapped.	Uncached	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache DC00 - DFFF	Configure how the memory content of DC00-DFFF should be mapped.	Uncached	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.

Table 116: 815E - memory cache - setting options (cont.)

I/O device configuration

```
1BR1                    PhoenixBIOS Setup Utility                    R115
            Advanced

        I/O Device Configuration                    Item Specific Help

  Local Bus IDE adapter:          [Both]            Enable the integrated
  Primary IDE UDMA66/100:         [Enabled]         local bus IDE adapter
  Secondary IDE UDMA66/100:       [Enabled]
  USB UHCI Host Controller 1:     [Enabled]
  USB UHCI Host Controller 2:     [Enabled]
  USB EHCI Host Controller:       [Enabled]
  Legacy USB Support:             [Enabled]
  AC97 Audio controller:          [Enabled]
  Onboard LAN controller:         [Enabled]
  Onboard LAN PXE ROM:            [Disabled]

  Serial port A:                  [Enabled]
    Base I/O address:             [3F8]
    Interrupt:                    [IRQ 4]
  Serial port B:                  [Enabled]
    Mode:                         [Normal]
    Base I/O address:             [2F8]
    Interrupt:                    [IRQ 3]
  Parallet port:                  [Enabled]
    Base I/O address:             [378]

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

Figure 142: 815E - I/O device configuration

BIOS setting	Meaning	Setting options	Effect
Local bus IDE adapter	Enable or disable one or both of the PCI IDE controllers (primary and secondary).	Disabled	Deactivates both PCI IDE controllers (primary and secondary).
		Primary	Activates the primary IDE controller only.
		Secondary	Activates the secondary IDE controller only.
		Both	Activates both PCI IDE controllers (primary and secondary).
Primary IDE UDMA66/100	Setup the data transfer rate for a device connected to the primary IDE channel. This option is only available when a primary IDE drive is connected.	Disabled	The maximum data transfer rate is UDMA33.
		Enabled	The maximum data transfer rate is UDMA66 or higher.
Secondary IDE UDMA66/100	Setup the data transfer rate for a device connected to the secondary IDE channel. This option is only available when a secondary IDE drive is connected.	Disabled	The maximum data transfer rate is UDMA33.
		Enabled	The maximum data transfer rate is UDMA66.

Table 117: 815E - I/O device configuration - setting options

BIOS setting	Meaning	Setting options	Effect
USB UHCI host controller 1	Configuration of USB UHCI controller 1 for USB port 0 und 1.	Disabled	Deactivates the USB support.
		Enabled	Activates the USB support.
USB UHCI host controller 2	Configuration of the USB UHCI controller 1 for USB port 2 and 3. Can only be configured if the USB UHCI controller 1 is activated.	Disabled	Deactivates the USB support.
		Enabled	Activates the USB support.
USB UHCI host controller	Configuration of the USB EHCI controller. Can only be configured if the USB UHCI controller 1 is activated.	Disabled	Deactivates the USB support.
		Enabled	When enabled, the USB 2.0 support is activated as soon as a USB 2.0 device is connected to the interface.
Legacy USB support	Here IRQs are assigned to the USB connections.	Disabled	No IRQ assigned. It is not possible to boot from a USB device (USB stick, USB floppy, USB CD ROM, etc.)! However, a connected USB keyboard can be used to access and configure the BIOS setup, boot menu or optional RAID boot menu. USB devices will not function after completing the BIOS POST routine. USB devices only work after starting the operating system with USB support (e.g. Windows XP). MS-DOS does not support the use of USB devices.
		Enabled	IRQ assigned. Booting from USB devices is now possible. Supported USB devices work with MS-DOS (e.g. USB keyboard, etc).
AC97 audio controller	For turning the AC97 audio controller on and off.	Disabled	AC97 sound is deactivated.
		Enabled	AC97 sound is activated.
Onboard LAN controller	For turning the ICH4 on-board LAN controller (for ETH1) on and off.	Disabled	Deactivates the LAN controller or the ETH1 interface.
		Enabled	Activates the LAN controller or the ETH1 interface.
Onboard LAN PXE ROM	For turning the remote boot BIOS extension for the on-board LAN controller (ETH1) on and off.	Disabled	Disables this function.
		Enabled	Enables this function.
Serial port A	For the configuration of serial port A (COM1).	Disabled	Port A deactivated.
		Enabled	Port A activated. The base I/O addresses and the interrupt must then be configured manually.
		Auto	Either BIOS or the operating system configures the port automatically.
Base I/O address	Selection of the base I/O address for port A. A yellow star indicates a conflict with another device.	3F8, 2F8, 3E8, 2E8	Base I/O address is manually assigned.
Interrupt	Selection of the interrupt for port A. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4	Manual assignment of the interrupt.

Table 117: 815E - I/O device configuration - setting options (cont.)

BIOS setting	Meaning	Setting options	Effect
Serial port B	For the configuration of serial port B (COM2).	Disabled	Port B deactivated.
		Enabled	Port A activated. The base I/O addresses and the interrupt must then be configured manually.
		Auto	Either BIOS or the operating system configures the port automatically.
Mode	This option is for setting the serial port B as either a standard interface or as an infrared interface.	Normal	Serial port B is used as a standard interface.
		IR	The serial interface is used as an infrared interface, and allows data transfers up to 115 kBit/s.
Base I/O address	Selection of the base I/O address for port B. A yellow star indicates a conflict with another device.	3F8, 2F8, 3E8, 2E8	Selected base I/O address is manually assigned.
Interrupt	Selection of the interrupt for port B. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4	Selected interrupt is manually assigned.
Parallel port	For configuring the hardware security key (dongle), which accessed internally through the parallel interface.	Disabled	Deactivates the port.
		Enabled	Activates the port. The base I/O address must then be set.
		Auto	First BIOS and then the operating system configure the port automatically.
Base I/O address	Selection of the base I/O address for the parallel port.	378, 278, 3BC	Base I/O address is manually assigned.

Table 117: 815E - I/O device configuration - setting options (cont.)

Keyboard features

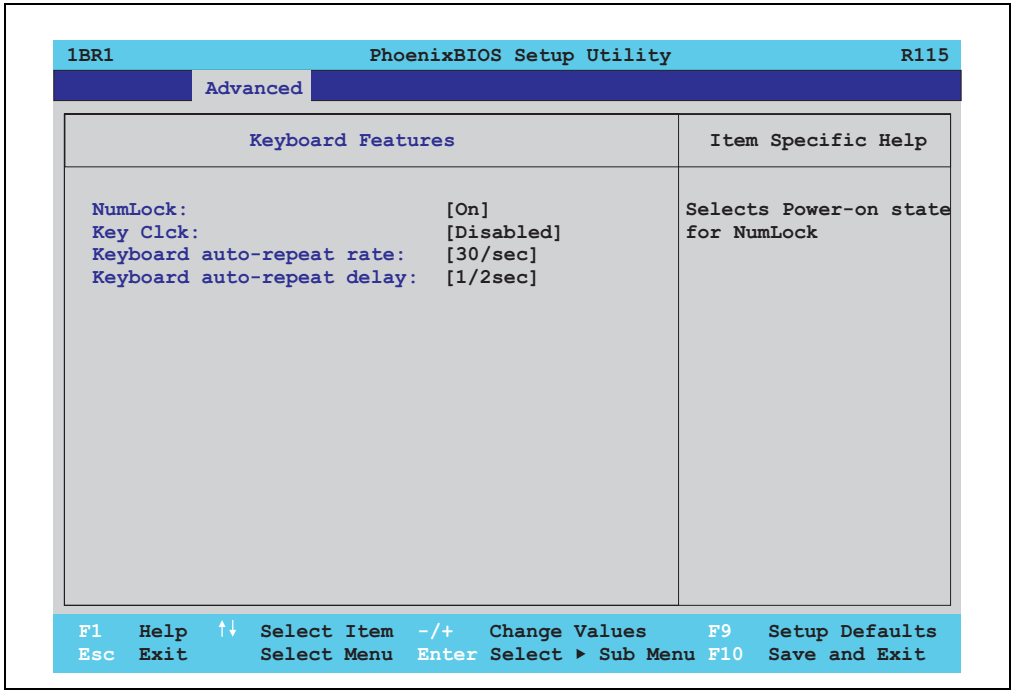


Figure 143: 815E - keyboard features

BIOS setting	Meaning	Setting options	Effect
NumLock	This option sets the status of the numeric keypad when the the system is booted.	On	Numeric keypad is activated.
		Off	Only the cursor functions of the numerical keypad are activated.
		Auto	Numeric keypad is activated, if present.
Key click	Using this option, the clicking of the keys can be turned on or off.	Disabled	Disables this function.
		Enabled	Enables this function.
Keyboard auto-repeat rate	For setting the speed of repetition when a key is held down.	30/sec, 26.7/sec, 21.8/sec, 18.5/sec, 13.3/sec, 10/sec, 6/sec, 2/sec	Settings from 2 to 30 characters per second.
Keyboard auto-repeat delay	For setting the amount of delay after the key is pressed before the auto-repeat begins.	1/4 sec, 1/2 sec, 3/4 sec, 1 sec	Setting of the desired delay.

Table 118: 815E - keyboard features - setting options

CPU board monitor

```
1BR1                    PhoenixBIOS Setup Utility                    R115
            Advanced

        CPU Board Monitor                          Item Specific Help

VCC 3.3V Voltage =    3.34V                  All items on this menu
CPU Core Voltage =    1.10V                  cannot be modified in
    5Vsb Voltage =    4.87V                  user mode, If any
 Battery Voltage =    3.42V                  items require changes,
                                             please consult your
CPU Temperature  =    +53°C/+127°F           system Supervisor.

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

Figure 144: 815E - CPU board monitor

BIOS setting	Meaning	Setting options	Effect
VCC 3.3V voltage	Displays the current voltage of the 3.3 volt supply (in volts).	None	
CPU core voltage	Displays the processor's core voltage (in volts).	None	
5Vsb voltage	Displays the 5 V standby voltage (in volts).	None	
Battery voltage	Displays the battery voltage (in volts).	None	
CPU temperature	Displays the processor's temperature (in degrees Celsius and Fahrenheit).	None	

Table 119: 815E - CPU board monitor - setting options

Miscellaneous

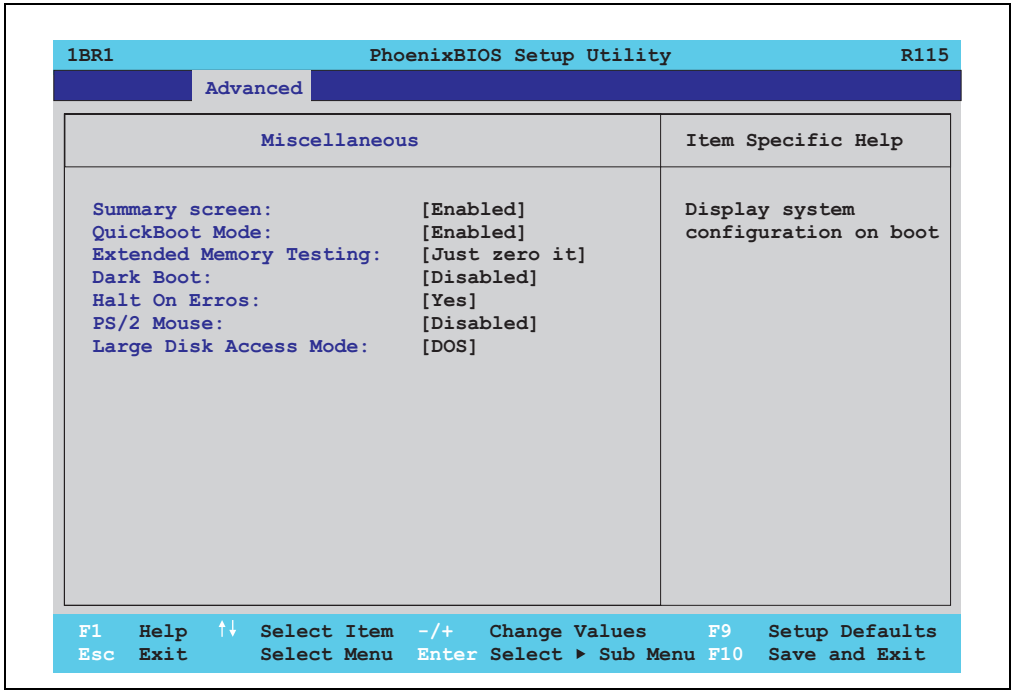


Figure 145: 815E - miscellaneous

BIOS setting	Meaning	Setting options	Effect
Summary screen	Set whether or not the system summary screen should open when the system is started (see figure 127 "815E - BIOS summary screen" on page 226).	Enabled	Enables this function.
		Disabled	Disables this function.
QuickBoot mode	Speeds up the booting process by skipping several tests.	Enabled	Enables this function.
		Disabled	Disables this function.
Extended memory testing	This function determines the method by which the main memory over 1 MB is tested.	Just zero it	The main memory is quickly tested.
		None	The main memory is not tested at all.
		Normal	This option is only available when the function "QuickBoot mode" has been set to "disabled." The main memory is tested more slowly than with "Just zero It."
Dark boot	Sets whether the diagnostics screen (see figure 126 "815E - BIOS diagnostic screen" on page 226) should be displayed when the system is started.	Enabled	Enables this function. The diagnostics screen is displayed.
		Disabled	Disables this function. The diagnostics screen is not displayed.

Table 120: 815E - miscellaneous setting options

BIOS setting	Meaning	Setting options	Effect
Halt on errors	This option sets whether the system should pause the Power On Self Test (POST) when it encounters an error.	Yes	The system pauses. The system pauses every time an error is encountered.
		No	The system does not pause. All errors are ignored.
PS/2 mouse	Sets whether the PS/2 mouse port should be activated.	Disabled	Deactivates the port.
		Enabled	Activates the port. The IRQ12 is reserved, and is not available for other components.
Large disk access mode	This option is intended for hard discs with more than 1024 cylinders, 16 heads, and more than 63 sectors per track. Setting options: DOS	Other	For non-compatible access (e.g. Novell, SCO Unix.)
		DOS	For MS DOS compatible access.

Table 120: 815E - miscellaneous setting options (cont.)

Baseboard/panel features

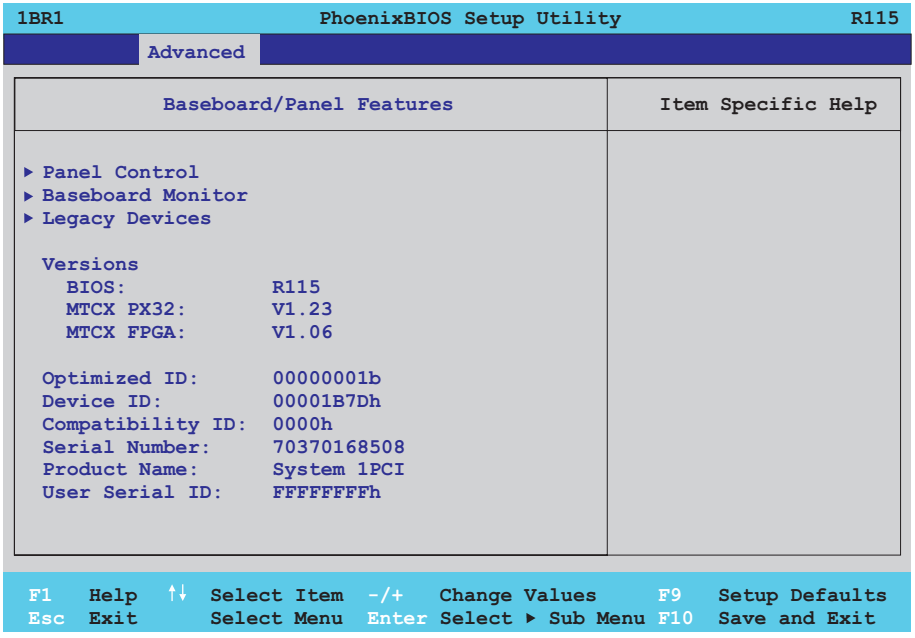


Figure 146: 815E - baseboard / panel features

BIOS setting	Meaning	Setting options	Effect
Panel control	For special setup of connected panels (display units).	Enter	Opens submenu See "Panel control" on page 257
Baseboard monitor	Display of various temperatures and fan speeds.	Enter	Opens submenu See "Baseboard monitor" on page 258

Table 121: 815E - baseboard / panel features - setting options

BIOS setting	Meaning	Setting options	Effect
Legacy devices		Enter	Opens submenu See "Legacy devices" on page 259
BIOS	Displays the BIOS version.	None	
MTCX PX32	Displays the MTCX PX32 firmware version.	None	
MTCX FPGA	Displays the MTCX FPGA firmware version.	None	
Optimized ID	Displays the DIP switch setting of the configuration switch.	None	
Device ID	Displays the hexadecimal value of the hardware device ID.	None	
Compatibility ID	Displays the version of the device within the same B&R device code. This ID is needed for Automation Runtime.	None	
Serial number	Displays the B&R serial number.	None	
Product name	Displays the B&R model number.	None	
User serial ID	Displays the hexadecimal value of the user serial ID number. This number can only be changed with "control center," available from B&R.	None	

Table 121: 815E - baseboard / panel features - setting options

Panel control

```
1BR1                    PhoenixBIOS Setup Utility                    R115
                Advanced

        Panel Control                          Item Specific Help

  Select Panel Number:   [ 0]                  Panel 0-14 = Panels
    Version:             V0.00                 connected to Automation
    Brightness:          [ 50%]                Panel Link or Monitor/
    Temperature:         00°C/32°F             Panel connector.
    Fan Speed:           00 RPM
    Keys/Leds:           00/00                 Panel 15 = Panel
                                               connected on Panel PC
                                               Link.

                                               Note: DVI and PPC Link
                                               will show no valid
                                               values.
                                               On PPC Link only the
                                               brightness option will
                                               work.

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

Figure 147: 815E - panel control

BIOS setting	Meaning	Setting options	Effect
Select panel number	Selection of the panel number for which the values should be read out and/or changed.	0 ... 15	Selection of panel 0 ... 15. Panel 15 is specifically intended for panel PC 700 systems.
Version	Displays the firmware version of the SDLR controller.	None	
Brightness	For setting the brightness of the selected panel.	0%, 25%, 50%, 75%, 100%	For setting the brightness in% of the selected panel. Changes take effect after saving and restarting the system (e.g. by pressing <F10>).
Temperature	Displays the selected panel's temperature (in degrees Celsius and Fahrenheit).	None	
Fan speed	Displays fan speed for the selected panel.	None	
Keys/LEDs	Displays the available keys and LEDs on the selected panel.	None	

Table 122: 815E - panel control - setting options

Baseboard monitor

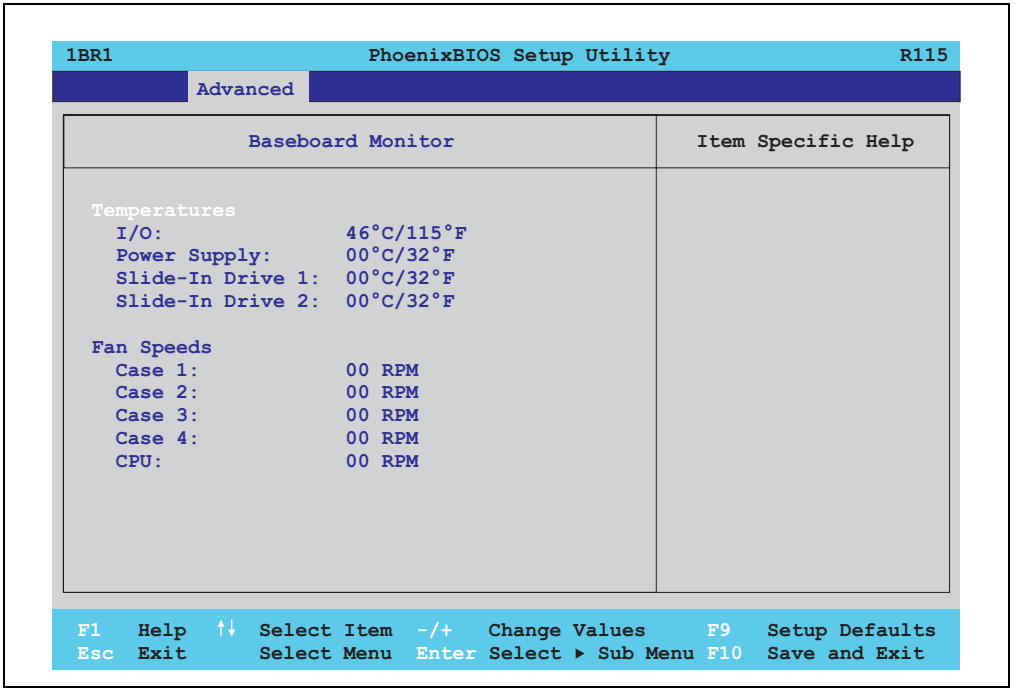


Figure 148: 815E - baseboard monitor

BIOS setting	Meaning	Setting options	Effect
I/O	Displays the temperature in the I/O area in degrees Celsius and Fahrenheit.	None	
Power supply	Displays the temperature in the power supply area in degrees Celsius and Fahrenheit.	None	
Slide-in drive 1	Displays the temperature of the slide-in drive 1 in degrees Celsius and Fahrenheit.	None	
Slide-in drive 2	Displays the temperature of the slide-in drive 2 in degrees Celsius and Fahrenheit.	None	
Case 1	Displays the fan speed of housing fan 1.	None	
Case 2	Displays the fan speed of housing fan 2.	None	
Case 3	Displays the fan speed of housing fan 3.	None	
Case 4	Displays the fan speed of housing fan 4.	None	
CPU	Displays the fan speed of the processor fan.	None	

Table 123: 815E - baseboard monitor - setting options

Legacy devices

```
1BR1                    PhoenixBIOS Setup Utility                    R115
                Advanced

              Legacy Devices                          Item Specific Help

  COM C:                    [Enabled]                 Enable/Disable the
    Base I/O address:       [3E8]                     internal COM port
    Interrupt:              [IRQ 11]                  for touch.
  COM D:                    [Enabled]
    Base I/O address:       [238]                     For detailed
    Interrupt:              [IRQ 7]                   description see user
  COM E:                    [Enabled]                 manual.
    Base I/O address:       [2E8]
    Interrupt:              [IRQ 10]
  LPT:                      [Enabeld]
    Base I/O address:       [278]
  CAN:                      [Enabled]
    Base I/O address:       384/385h
    Interrupt:              [IRQ 10]

  2nd LAN controller:       [Enabled]

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

Figure 149: 815E - Legacy devices

BIOS setting	Meaning	Setting options	Effect
COM C	Settings for the internal serial interfaces in the system. This setting activates the touch screen in panel PC 700 systems, and, using SDL and LDL transfer technology, also in Automation Panel 900 display units.	Disabled	Deactivates the interface.
		Enabled	Activates the interface.
Base I/O address	Selection of the base I/O address for the COM C port. A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM C port. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 10, IRQ 11, IRQ 12, IRQ 15	Selected interrupt is assigned.
COM D	Configuration of the COM D port for the serial interface of an automation panel link slot.	Disabled	Deactivates the interface.
		Enabled	Activates the interface.
Base I/O address	Configuration of the base I/O address for the serial COM D port. A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.

Table 124: 815E - Legacy devices - setting options

BIOS setting	Meaning	Setting options	Effect
Interrupt	Selection of the interrupt for the COM D port. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 10, IRQ 11, IRQ 12, IRQ 15	Selected interrupt is assigned.
COM E	Configuration of the optional COM E port of a B&R add-on interface option (IF option).	Disabled	Deactivates the interface.
		Enabled	Activates the interface.
Base I/O address	Configuration of the base I/O address for the serial COM E port. A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM E port. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 10, IRQ 11, IRQ 12, IRQ 15	Selected interrupt is assigned.
LPT	This setting is specific to B&R and should not be changed.	Disabled	Deactivates the interface.
		Enabled	Activates the interface.
Base I/O address	Configuration of the base I/O address for the optional LPT. A yellow star indicates a conflict with another device.	278, 378, 3BC	Selected base I/O address is assigned.
CAN	Configuration of the CAN port of a B&R add-on interface card.	Disabled	Deactivates the interface.
		Enabled	Activates the interface.
Base I/O address	384/385h	None	-
Interrupt	Selection of the interrupt for the CAN port.	IRQ 10	Selected interrupt is assigned.
		NMI	NMI interrupt is assigned.
2nd LAN controller	For turning the onboard LAN controller (ETH2) on and off.	Disabled	Deactivates the controller.
		Enabled	Activates the controller.

Table 124: 815E - Legacy devices - setting options (cont.)

1.1.6 Security

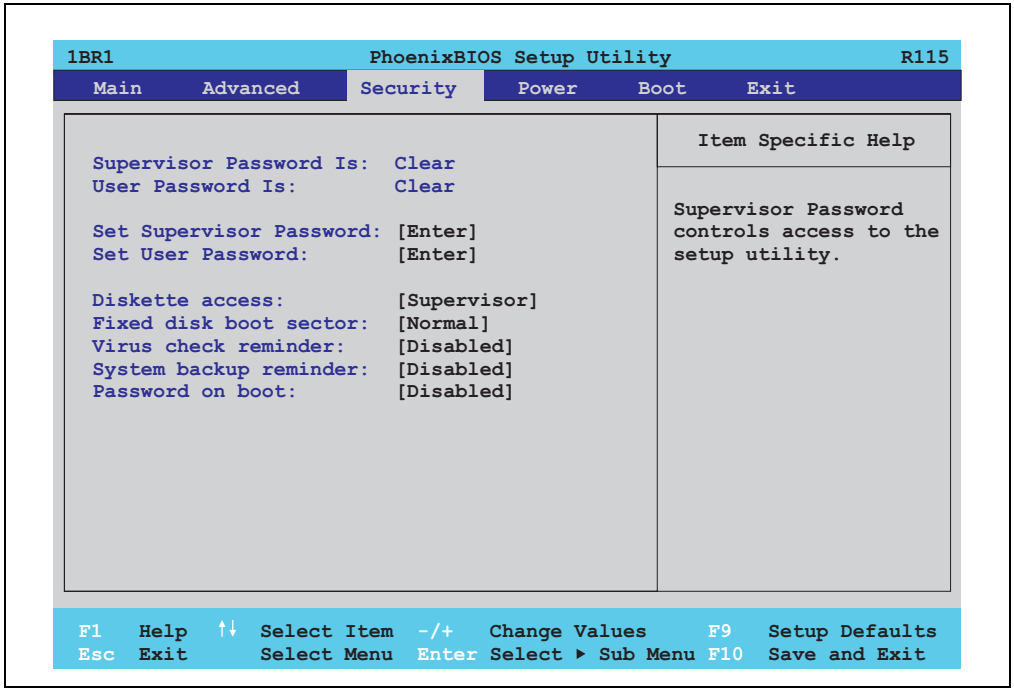


Figure 150: 815E - security menu

BIOS setting	Meaning	Setting options	Effect
Supervisor password is	Displays whether or not a supervisor password has been set.	None	Display **set**: A supervisor password has been set. Display **clear**: No supervisor password has been set.
User password is	Displays whether or not a user password has been set.	None	Display **set**: A user password has been set. Display **clear**: No user password has been set.
Set supervisor password	To enter/change a supervisor password. A supervisor password is necessary to edit all BIOS settings.	Enter maximum 7 alphanumeric characters - not case sensitive.	Press Enter and enter password two times. The password must be 7 alphanumeric characters or less. Needed to enter BIOS setup. To change the password, enter the old password once and then the new password twice.
Set user password	To enter/change a user password. A user password allows the user to edit only certain BIOS settings.	Enter maximum 7 alphanumeric characters - not case sensitive.	Press Enter and enter password two times. The password must be 7 alphanumeric characters or less. Needed to enter BIOS setup. To change the password, enter the old password once and then the new password twice.

Table 125: 815E - security - setting options

BIOS setting	Meaning	Setting options	Effect
Diskette access	Access to the diskette drive is controlled here. Either or the supervisor or the user has access to it. Does not work with USB diskette drives.	Supervisor	Supervisor password is needed to access a diskette drive.
		User	User password is needed to access a diskette drive.
Fixed disk boot sector	The boot sector of the primary hard drive can be write protected against viruses with this option.	Normal	Write access allowed.
		Write protect	Boot sector is write protected.
Virus check reminder	This function opens a reminder when the system is started to scan for viruses.	Disabled	Disables this function.
		Daily	A reminder appears every day when the system is started.
		Weekly	A reminder appears the first time the system is started after every Sunday.
		Monthly	A reminder appears the first time the system is started each month.
System backup reminder	This function opens a reminder when the system is started to create a system backup.	Disabled	Disables this function.
		Daily	A reminder appears every day when the system is started.
		Weekly	A reminder appears the first time the system is started after every Sunday.
		Monthly	A reminder appears the first time the system is started each month.
Password at boot	This function requires a supervisor or user password when the system is started. Only possible when a supervisor or user password is enabled.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 125: 815E - security - setting options (cont.)

1.1.7 Power

```
1BR1                    PhoenixBIOS Setup Utility                    R115
  Main     Advanced     Security     Power     Boot     Exit

                                                   Item Specific Help
  Enable ACPI                [Yes]

▶ ACPI Control                                     En/Disable ACPI BIOS
                                                   (Advance Configuration
▶ Thermal Management                               and Power Interface)

  Power Savings:             [Customized]
  Standby Timeout:           [Off]
    Auto Suspend Timeout:    [Off]
  Hard Disk Timeout:         [Disabled]
  Video Timeout:             [Disabled]

  Resume On Modem Ring:      [Off]
  Resume On Time:            [Off]
  Resume Time:               [00:00:00]

  Power supply:              [ATX]
  Power Button Function:     [Power Off]
  Power Loss Control         [Power On]

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

Figure 151: 815E - power menu

BIOS setting	Meaning	Setting options	Effect
Enable ACPI	This option turns the ACPI function (Advanced Configuration and Power Interface) on or off. This is an advanced plug & play and power management functionality.	Yes	Enables this function.
		No	Disables this function.
ACPI control	Configuration of specific limits.	Enter	Opens submenu See "ACPI control" on page 265
Thermal management	Configuration of specific CPU limits.	Enter	Opens submenu See "Thermal management" on page 267
Power savings	This function determines if and how the power save function is used.	Disabled	Deactivates the power savings function.
		Customized	Power management is configured by adjusting the individual settings.
		Maximum power savings	Maximum power savings function.
		Maximum performance	Power savings function to maximize performance.

Table 126: 815E - power - setting options

BIOS setting	Meaning	Setting options	Effect
Standby timeout	Set here when the system should enter standby mode. During standby, various devices and the display will be deactivated. This option only available when "power savings" is set to customized.	Off	No standby.
		1, 2, 4, 8 minutes	Time in minutes until standby.
Auto suspend timeout	Set here when the system should enter suspend mode to save electricity. This option only available when "power savings" is set to customized.	Off	No standby.
		5, 10, 15, 20, 30, 40, 60 minutes	Time in minutes until standby.
Hard disk timeout	Set here how long after the last access the hard disk should enter standby mode. This option only available when "power savings" is set to customized.	Disabled	Disables this function.
		10, 15, 30, 45 seconds	Time in seconds until standby.
		1, 2, 4, 6, 8, 10, 15 minutes	Time in minutes until standby.
Video timeout		Disabled	
Resume on modem ring	If an external modem is connected to a serial port and the telephone rings, the system starts up.	Off	Disables this function.
		On	Enables this function.
Resume on time	This function enables the system to start at the time set under "resume time."	Off	Disables this function.
		On	Enables this function.
Resume time	Time setting for the option "resume on time" (when the system should start up).	[00:00:00]	Personal setting of the time in the format (hh:mm:ss).
Power supply	The type of power supply being used can be entered here.	ATX	An ATX compatible power supply is being used. **Since the PPC700 contains an ATX power supply, ATX should be selected.**
		AT	An AT compatible power supply is being used.
Power button function	This option determines the function of the power button.	Power off	Shuts down the system.
		Sleep	The system enters sleep mode.
Power loss control	This option determines how the system reacts to a power outage.	Stay off	The system does not turn back on. The system remains off until the power button is pressed.
		Power-on	The system turns back on.
		Last state	The system resumes the last state it was in before the power outage.

Table 126: 815E - power - setting options (cont.)

ACPI control

```
1BR1                    PhoenixBIOS Setup Utility                    R115
                                  Power

        ACPI Control                          Item Specific Help

 Active Trip Point:            [Disabled]     This value controls
 Passive Cooling Trip Point:   [Disabled]     the temperature of
 Critical Trip Point           [110°C]        the ACPI Active Trip
                                              Point - the point
 APIC - IO APIC Mode:          [Disabled]     in which the OS will
                                              turn the CPU Fan on.
 Native IDE Support:           [Disabled]

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

Figure 152: 815E - ACPI control

BIOS setting	Meaning	Setting options	Effect
Active trip point	With this function, an optional CPU fan above the operating system can be set to turn on when the CPU reaches the set temperature.	Disabled	Disables this function.
		40°... 100°C	Temperature setting for the active trip point. Can be set in 5 degree increments.
Passive cooling trip point	With this function, a temperature can be set at which the CPU automatically reduces its speed.	Disabled	Disables this function.
		40°... 100°C	Temperature setting for the passive cooling trip point. Can be set in 5 degree increments.
Critical trip point	With this function, a temperature can be set at which the operating system automatically shuts itself down. **Warning!** **This function should never be deactivated, as this would allow the CPU to rise above the temperature specifications.**	Disabled	Disables this function.
		40°... 110°C	Temperature setting for the critical trip point. Can be set in 5 degree increments.

Table 127: 815E - ACPI control - setting options

BIOS setting	Meaning	Setting options	Effect
APIC - I/O APIC mode	This option controls the functionality of the advanced interrupt controller in the processor.	Disabled	Deactivates the function
		Enabled	Enables this function. The activation of this option is only effective if it takes place before the operating system (Windows XP) is activated. There are then 23 IRQs available.
Native IDE support	The native IDE support offers the possibility to make 4 hard disk controllers (2 x primary ATA for a total of 4 devices, and 2 x secondary ATA for another 2 devices) accessible through Windows XP.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 127: 815E - ACPI control - setting options (cont.)

Thermal management

```
1BR1                    PhoenixBIOS Setup Utility                    R115
                                  Power

        Thermal Management                          Item Specific Help

 Auto Thermanl Throttling:    [Disabled]        Reduces CPU speed to
 Temperature:                 [100°C]           avoid overheating.
 Hysteresis:                  [5°C]
 CPU Performance:             [50%]

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

Figure 153: 815E - thermal management

BIOS setting	Meaning	Setting options	Effect
Auto thermal throttling	Reduces the CPU speed when it exceeds the limit set in the "temperature" option by the amount set in the "CPU performance" option.	Enabled	Enables this function.
		Disabled	Disables this function.
Temperature	Temperature limit for the setting "auto thermal throttling."	75°C ... 110°C	Can be set in increments of 5°C.
Hysteresis	When auto thermal throttling has been activated and the temperature sinks by the number of degrees in this setting, the processor resumes 100% performance.	3°C ... 6°C	Can be set in increments of 1°C.
CPU performance	When the CPU reaches the temperature set in the "temperature" option, the CPU is throttled by the amount (%) set in this option.	13%, 25%, 50%, 75%	CPU performance throttled by amount selected, in percent.

Table 128: 815E - thermal management

1.1.8 Boot

```
1BR1                    PhoenixBIOS Setup Utility                    R115
  Main     Advanced     Security     Power     Boot     Exit

                                                   Item Specific Help

 Boot priority order
   1: IDE 0:
   2: IDE 1:
   3: IDE CD:
   4: USB FDC:
   5: USB KEY:
   6: USB CDROM:
   7:
   8:
 Excluded from boot order:
     : IDE 2:
     : IDE 3:
     : USB HDD:
     : USB ZIP:
     : USB LS120:
     : PCI BEV:
     : PCI SCSI:
     : Bootable Add-in Cards

                                                   Keys used to view or
                                                   configure devices:
                                                   Up and Down arrows
                                                   select a device.
                                                   <+> and <-> moves
                                                   the device up or down.
                                                   <f> and <r> specifies
                                                   the device fixed or
                                                   removeable.
                                                   <x> exclude or include
                                                   the device to boot.
                                                   <Shift + 1> enables or
                                                   disables a device.
                                                   <1 - 4> Loads default
                                                   boot sequence.

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

Figure 154: 815E - boot menu

BIOS setting	Meaning	Setting options	Effect
1:		IDE 0, IDE 1, IDE 2, IDE 3, IDE CD USB FDC, USB KEY USB CDROM USB HDD, USB ZIP USB LS120, PCI BEV, PCI SCSI, bootable add-in cards	Use the up arrow ↑ and down arrow ↓ , to select a device. Then, use the <+> und <-> keys to change the boot priority of the drive. To add a device to the "boot priority order" list from the "excluded from boot order" list, use the <x> key. In the same way, the <x> key can move boot devices down out of the boot priority order. The keys 1 - 4 can load preset boot sequences.
2:			
3:			
4:			
5:			
6:			
7:			
8:			

Table 129: 815E - boot menu - setting options

1.1.9 Exit

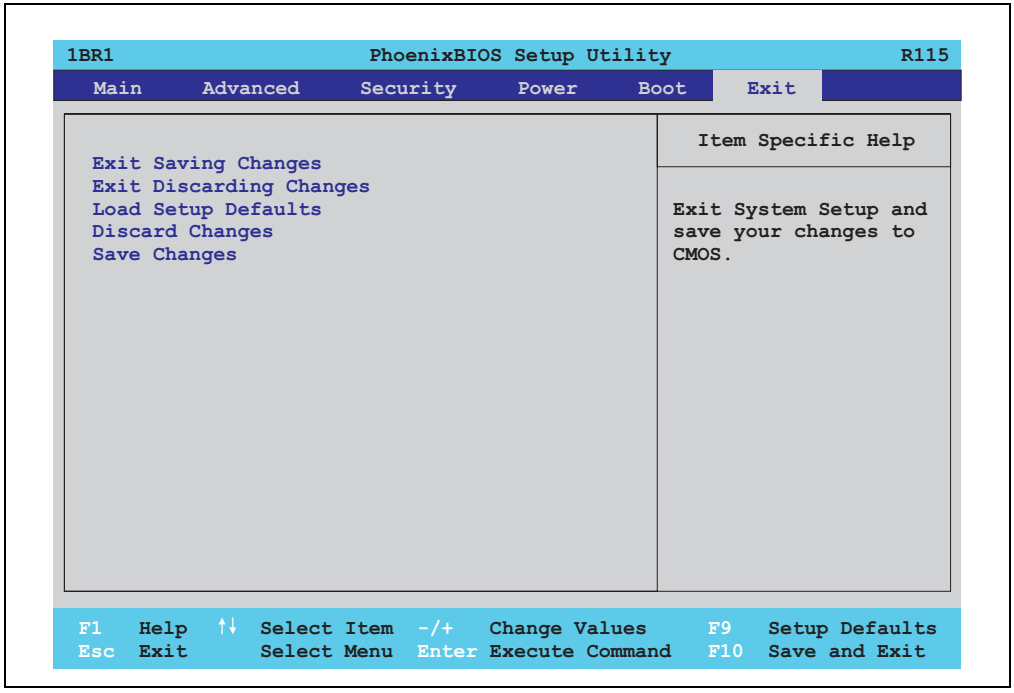


Figure 155: 815E - exit menu

BIOS setting	Meaning	Setting options	Effect
Exit saving changes	BIOS setup is closed with this item. Changes made are saved in CMOS after confirmation, and the system is rebooted.	Yes / No	
Exit discarding changes	With this item you can close BIOS setup without saving the changes made. The system is then rebooted.	Yes / No	
Load setup defaults	This item loads the BIOS setup defaults, which are defined by the DIP switch settings. These settings are loaded for all BIOS configurations.	Yes / No	
Discard changes	Should unknown changes have been made and not yet saved, they can be discarded.	Yes / No	
Save changes	Settings are saved, and the system is not restarted.	Yes / No	

Table 130: 815E - exit menu - setting options

1.1.10 Profile overview

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.

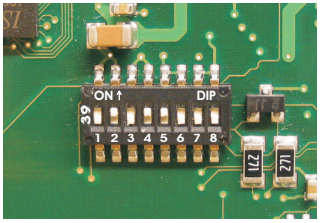


Figure 156: DIP switch on system unit

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

Number	Optimized for	DIP switch setting							
		1	2	3	4	5	6	7[1]	8[1]
Profile 0	Automation PC 620 system units 5PC600.SX01-00.	Off	Off	Off	Off	Off	Off	-	-
Profile 1	Reserved	On	Off	Off	Off	Off	Off	-	-
Profile 2	Automation PC 620 system units 5PC600.SX02-00, 5PC600.SX02-01, 5PC600.SX05-00 and 5PC600.SX05-01.	Off	On	Off	Off	Off	Off	-	-
Profile 3	Panel PC 700 system unit 5PC720.1043-00, 5PC720.1214-00, 5PC720.1505-00, 5PC720.1706-00, 5PC720.1906-00, 5PC781.1043-00, 5PC781.1505-00 and 5PC782.1043-00.	On	On	Off	Off	Off	Off	-	-
Profile 4	Panel PC 700 system unit 5PC720.1043-01, 5PC720.1214-01, 5PC720.1505-01 and 5PC720.1505-02.	Off	Off	On	Off	Off	Off	-	-

Table 131: 815E - profile overview

1) Reserved.

The following pages provide an overview of the BIOS default settings for the different DIP switch configurations.

Personal settings

If changes have been made to the BIOS defaults, they can be entered in the personal settings column of the following tables for backup.

Main

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
System time	-	-	-	-	-	
System date	-	-	-	-	-	
SMART device monitoring	Enabled	Enabled	Enabled	Enabled	Enabled	
Primary master						
Type	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	
Primary slave						
Type	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	
Secondary master						
Type	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Secondary master						
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	
Secondary slave						
Type	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 132: 815E - main profile setting overview

Advanced

Advanced chipset/graphics control

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Graphics engine 1	Auto	Auto	Auto	Auto	Auto	
Graphics memory size	1MB	1MB	1MB	1MB	1MB	
Enable memory gap	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 133: 815E - advanced chipset/graphics control - profile settings overview

PCI/PNP configuration

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
PNP OS installed	Yes	Yes	Yes	Yes	Yes	
Reset configuration data	No	No	No	No	No	
Secured setup configuration	Yes	Yes	Yes	Yes	Yes	
PCI IRQ line 1	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
PCI IRQ line 2	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
PCI IRQ line 3	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
PCI IRQ line 4	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
Onboard LAN IRQ line	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
Onboard USB EHCI IRQ line	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
Default primary video adapter	PCI	PCI	PCI	PCI	PCI	
Assign IRQ to SMB	Enabled	Enabled	Enabled	Enabled	Enabled	
PCI device, slot #1						
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Disabled	Disabled	Disabled	Disabled	Disabled	
Latency timer	Default	Default	Default	Default	Default	
PCI device, slot #2						
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Disabled	Disabled	Disabled	Disabled	Disabled	
Latency timer	Default	Default	Default	Default	Default	
PCI device, slot #3						
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Disabled	Disabled	Disabled	Disabled	Disabled	
Latency timer	Default	Default	Default	Default	Default	

Table 134: 815E - PCI/PNP configuration - profile setting options

PCI device, slot #4	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Disabled	Disabled	Disabled	Disabled	Disabled	
Latency timer	Default	Default	Default	Default	Default	
PCI/PNP ISA IRQ resource exclusion						
IRQ 3	Available	Available	Available	Available	Available	
IRQ 4	Available	Available	Available	Available	Available	
IRQ 5	Available	Available	Available	Available	Available	
IRQ 7	Available	Available	Available	Available	Available	
IRQ 9	Available	Available	Available	Available	Available	
IRQ 10	Available	Available	Available	Available	Available	
IRQ 11	Available	Available	Available	Available	Available	
IRQ 12	Available	Available	Available	Available	Available	
IRQ 15	Available	Available	Available	Available	Available	

Table 134: 815E - PCI/PNP configuration - profile setting options (cont.)

Memory cache

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Memory cache	Enabled	Enabled	Enabled	Enabled	Enabled	
Cache system BIOS area	Write protect	Write protect	Write protect	Write protect	Write protect	
Cache video BIOS area	Write protect	Write protect	Write protect	Write protect	Write protect	
Cache extended memory area	Write back	Write back	Write back	Write back	Write back	
Cache D000 - D3FF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache D400 - D7FF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache D800 - DBFF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache DC00 - DFFF	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 135: 815E - memory cache - profile setting overview

I/O device configuration

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Local bus IDE adapter	Primary	**Both**	**Both**	Primary	**Both**	
Primary IDE UDMA66/100	Enabled	Enabled	Enabled	Enabled	Enabled	
USB UHCI host controller 1	Enabled	Enabled	Enabled	Enabled	Enabled	
USB UHCI host controller 2	Enabled	Enabled	Enabled	Enabled	Enabled	
USB UHCI host controller	Enabled	Enabled	Enabled	Enabled	Enabled	
Legacy USB support	Enabled	Enabled	Enabled	Enabled	Enabled	
AC97 audio controller	Enabled	Enabled	Enabled	Enabled	Enabled	
Onboard LAN controller	Enabled	Enabled	Enabled	Enabled	Enabled	
Onboard LAN PXE ROM	Disabled	**Enabled**	Disabled	Disabled	Disabled	
Serial port A	Enabled	Enabled	Enabled	Enabled	Enabled	
Base I/O address	3F8	3F8	3F8	3F8	3F8	
Interrupt	IRQ 4	IRQ 4	IRQ 4	IRQ 4	IRQ 4	
Serial port B	Enabled	Enabled	Enabled	Enabled	Enabled	
Mode	Normal	Normal	Normal	Normal	Normal	
Base I/O address	3F8	3F8	3F8	3F8	3F8	
Interrupt	IRQ 3	IRQ 3	IRQ 3	IRQ 3	IRQ 3	
Parallel port	Enabled	Enabled	Enabled	Enabled	Enabled	
Base I/O address	378	378	378	378	378	

Table 136: 815E - I/O device configuration - profile setting overview

Keyboard features

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
NumLock	On	On	On	On	On	
Key click	Disabled	Disabled	Disabled	Disabled	Disabled	
Keyboard auto-repeat rate	30/sec	30/sec	30/sec	30/sec	30/sec	
Keyboard auto-repeat delay	1/2 sec	1/2 sec	1/2 sec	1/2 sec	1/2 sec	

Table 137: 815E - keyboard features - profile setting overview

CPU board monitor

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
VCC 3.3V voltage	-	-	-	-	-	
CPU core voltage	-	-	-	-	-	
5Vsb voltage	-	-	-	-	-	
Battery voltage	-	-	-	-	-	
CPU temperature	-	-	-	-	-	

Table 138: 815E - CPU board monitor - profile setting overview

Miscellaneous

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Summary screen	Enabled	Enabled	Enabled	Enabled	Enabled	
QuickBoot mode	Enabled	Enabled	Enabled	Enabled	Enabled	
Extended memory testing	Just zero it	Just zero it	Just zero it	Just zero it	Just zero it	
Dark boot	Disabled	Disabled	Disabled	Disabled	Disabled	
Halt on errors	Yes	Yes	Yes	Yes	Yes	
PS/2 mouse	Disabled	**Enabled**	Disabled	Disabled	Disabled	
Large disk access mode	DOS	DOS	DOS	DOS	DOS	

Table 139: 815E - miscellaneous - profile setting overview

Baseboard/panel features

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Versions	-	-	-	-	-	
BIOS	-	-	-	-	-	
MTCX	-	-	-	-	-	
FPGA	-	-	-	-	-	
Optimized ID	-	-	-	-	-	
Device ID	-	-	-	-	-	
Compatibility ID	-	-	-	-	-	
Serial number	-	-	-	-	-	
Product name	-	-	-	-	-	
User serial ID	-	-	-	-	-	
Panel control						
Select panel number	0	0	0	**15**	**15**	
Version	-	-	-	-	-	
Brightness	100%	100%	100%	100%	100%	

Table 140: 815E - baseboard/panel features - profile setting overview

Baseboard monitor	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Temperature	-	-	-	-	-	
Fan speed	-	-	-	-	-	
Keys/LEDs	-	-	-	-	-	
Temperatures	-	-	-	-	-	
I/O	-	-	-	-	-	
Power supply	-	-	-	-	-	
Slide-in drive 1	-	-	-	-	-	
Slide-in drive 2	-	-	-	-	-	
Fan speeds	-	-	-	-	-	
Case 1	-	-	-	-	-	
Case 2	-	-	-	-	-	
Case 3	-	-	-	-	-	
Case 4	-	-	-	-	-	
CPU	-	-	-	-	-	
Legacy devices						
COM C	Disabled	Disabled	Disabled	**Enabled**	**Enabled**	
Base I/O address	-	-	-	**3E8h**	**3E8h**	
Interrupt	-	-	-	**11**	**11**	
COM D	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-	-	-	
COM E	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-	-	-	
LPT	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
CAN	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-	-	-	
2nd LAN controller	Enabled	Enabled	Enabled	Enabled	Enabled	

Table 140: 815E - baseboard/panel features - profile setting overview (cont.)

Security

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Supervisor password is	Clear	Clear	Clear	Clear	Clear	
User password is	Clear	Clear	Clear	Clear	Clear	
Set supervisor password	-	-	-	-	-	
Set user password	-	-	-	-	-	
Diskette access	Supervisor	Supervisor	Supervisor	Supervisor	Supervisor	
Fixed disk boot sector	Normal	Normal	Normal	Normal	Normal	
Virus check reminder	Disabled	Disabled	Disabled	Disabled	Disabled	
System backup reminder	Disabled	Disabled	Disabled	Disabled	Disabled	
Password at boot	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 141: 815E - security - profile setting overview

Power

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Enable ACPI	Yes	Yes	Yes	Yes	Yes	
Power savings	Disabled	Disabled	Disabled	Disabled	Disabled	
Standby timeout	-	-	-	-	-	
Auto suspend timeout	-	-	-	-	-	
Hard disk timeout	Disabled	Disabled	Disabled	Disabled	Disabled	
Video timeout	Disabled	Disabled	Disabled	Disabled	Disabled	
Resume on modem ring	Off	Off	Off	Off	Off	
Resume on time	Off	Off	Off	Off	Off	
Resume time	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	
Power supply	ATX	ATX	ATX	ATX	ATX	
Power button function	Power off	Power off	Power off	Power off	Power off	
Power loss control	Power-on	Power-on	Power-on	Power-on	Power-on	
ACPI control						
Active trip point	Disabled	Disabled	Disabled	Disabled	Disabled	
Passive cooling trip point	Disabled	Disabled	Disabled	Disabled	Disabled	
Critical trip point	110°C	110°C	110°C	110°C	110°C	
APIC - I/O APIC mode	Disabled	**Enabled**	Disabled	Disabled	Disabled	
Native IDE support	Disabled	Disabled	Disabled	Disabled	Disabled	
Thermal management						
Auto thermal throttling	Enabled	Enabled	Enabled	Enabled	Enabled	
Temperature	100°C	100°C	100°C	100°C	100°C	
Hysteresis	5°C	5°C	5°C	5°C	5°C	

Table 142: 815E - power - profile setting overview

CPU performance	50%	50%	50%	50%	50%	

Table 142: 815E - power - profile setting overview

Boot

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Boot priority order						
1:	IDE 0	**PCI BEV**	IDE 0	IDE 0	IDE 0	
2:	IDE 1	**IDE 0**	IDE 1	IDE 1	IDE 1	
3:	IDE CD	**IDE 1**	IDE CD	IDE CD	IDE CD	
4:	USB FDC	**IDE CD**	USB FDC	USB FDC	USB FDC	
5:	USB KEY	**USB FDC**	USB KEY	USB KEY	USB KEY	
6:	USB CDROM	**USB KEY**	USB CDROM	USB CDROM	USB CDROM	
7:	-	**USB CDROM**	**IDE 2**	-	**IDE 2**	
8:	-	-	**IDE 3**	-	**IDE 3**	
Excluded from boot order						
:	IDE 2	IDE 2	**USB HDD**	IDE 2	**USB HDD**	
:	IDE 3	IDE 3	**USB ZIP**	IDE 3	**USB ZIP**	
:	USB HDD	USB HDD	**USB LS120**	USB HDD	**USB LS120**	
:	USB ZIP	USB ZIP	**PCI BEV**	USB ZIP	**PCI BEV**	
:	USB LS120	USB LS120	**PCI SCSI**	USB LS120	**PCI SCSI**	
:	PCI BEV	**PCI SCSI**	**Bootable add-in cards**	PCI BEV	**Bootable add-in cards**	
:	PCI SCSI	**Bootable add-in cards**		PCI SCSI		
:	Bootable add-in cards			Bootable add-in cards		

Table 143: 815E - boot - profile setting overview

1.2 855GME BIOS description

Information:

- **The following diagrams and BIOS menu items including descriptions refer to BIOS Version 1.21. It is therefore possible that these diagrams and BIOS descriptions do not correspond with the installed BIOS version.**
- **The setup defaults are the settings recommended by B&R. The setup defaults are dependant on the DIP switch configuration on the baseboard (see section 1.2.9 "Profile overview" on page 324).**

1.2.1 General information

BIOS stands for "Basic Input Output System." It is the most basic standardized communication between the user and the system (hardware). The BIOS system used on the Panel PC 700 systems is produced by Phoenix.

The BIOS Setup Utility lets you modify basic system configuration settings. These settings are stored in CMOS and in EEPROM (as a backup).

The CMOS is buffered by a battery, and remains in the PPC700 even when the power is turned off (no 24 V supply).

1.2.2 BIOS setup and boot procedure

BIOS is immediately activated when switching on the power supply of the Panel PC 700 system or pressing the power button. The system checks if the setup data from the EEPROM is "OK". If the data is "OK", then it is transferred to the CMOS. If the data is "not OK", then the CMOS data is checked for validity. An error message is output if the CMOS data contains errors and the boot procedure can be continued by pressing the <F1> key. To prevent the error message from appearing at each restart, open the BIOS setup by pressing the <F2> key and re-save the settings.

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

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

To enter BIOS setup, the F2 key must be pressed as soon as the following message appears on the lower margin of the display (during POST):

"Press <F2> to enter SETUP"

```
PhoenixBIOS 4.0 Release 6.1
Copyright 1985-2003 Phoenix Technologies Ltd.
All Rights Reserved
<0BR1R121> Bernecker + Rainer Industrie-Elektronik B1.21


CPU = Intel(R) Pentium(R) M processor 1.80GHz
247M System RAM Passed
2048K Cache SRAM Passed
System BIOS shadowed
Video BIOS shadowed



Press <F2> to enter SETUP
```

Figure 157: 855GME - BIOS diagnostics screen

Summary screen

After the POST, the summary screen displays the most important system characteristics.

```
                    PhoenixBIOS Setup Utilitiy

CPU Type          : Intel(R) Pentium(R) M processor  1.80GHz
CPU Speed         : 1800 MHz
                                        System ROM    : E88F - FFFF
System Memory     : 640 KB              BIOS Date     : 02/02/06
Extended Memory   : 251904 KB
Shadow Ram        : 384 KB              COM Ports     : 0378 02F8
Cache Ram         : 2048 KB             LPT Ports     : 0378
                                        Display Type  : EGA \ VGA
                                        PS/2 Mouse    : Not Installed
Hard Disk 0       : None
Hard Disk 1       : FUJITSU MHT2030AR-(PS)
Hard Disk 2       : None
Hard Disk 3       : CD-224E-(SS)
```

Figure 158: 855GME - BIOS summary screen

1.2.3 BIOS setup keys

The following keys are active during the POST:

Key	Function
F2	Enters the BIOS setup menu.
ESC	Cues the boot menu. Lists all bootable devices that are connected to the system. With cursor ↑ and cursor ↓ and by pressing <ENTER>, select the device from which will be booted.
<Spacebar>	Pressing the spacebar skips the system RAM check.
<Pause>	Pressing the <pause> key stops the POST. Press any other key to resume the POST.

Table 144: Keys relevant to BIOS during POST

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

Key	Function
Cursor ↑	Moves to previous item.
Cursor ↓	Moves to next item.
Cursor ←	Move to the item on the left.
Cursor →	Move to the item on the right.
<ESC>	Exits the submenu.
PgUp↑	Moves the cursor to the top of the current BIOS setup page.
PgDn ↓	Moves the cursor to the bottom of the current BIOS setup page.
<F1> or <Alt+H>	Opens a help window showing the key assignments.
<F5> or <->	Scrolls to the previous option for the selected BIOS setting.
<F6> or <+> or <spacebar>	Scrolls to the next option for the selected BIOS setting.
<F9>	Loads setup defaults for the current BIOS setup screen.
<F10>	Saves settings and closes BIOS setup.
<Enter>	Opens submenu for a BIOS setup menu item, or displays the configurable values of a BIOS setup item.

Table 145: Keys relevant to BIOS

The following sections explain the individual BIOS setup menu items in detail.

BIOS setup menu Item	Function	From page
Main	The basic system configurations (e.g. time, date, hard disk parameters) can be set in this menu.	282
Advanced	Advanced BIOS options such as cache areas, PnP, keyboard repeat rate, as well as settings specific to B&R integrated hardware, can be configured here.	292
Security	For setting up the system's security functions.	316
Power	Setup of various APM (Advanced Power Management) options.	318
Boot	The boot order can be set here.	322
Exit	To end the BIOS setup.	323

Table 146: Overview of BIOS menu items

1.2.4 Main

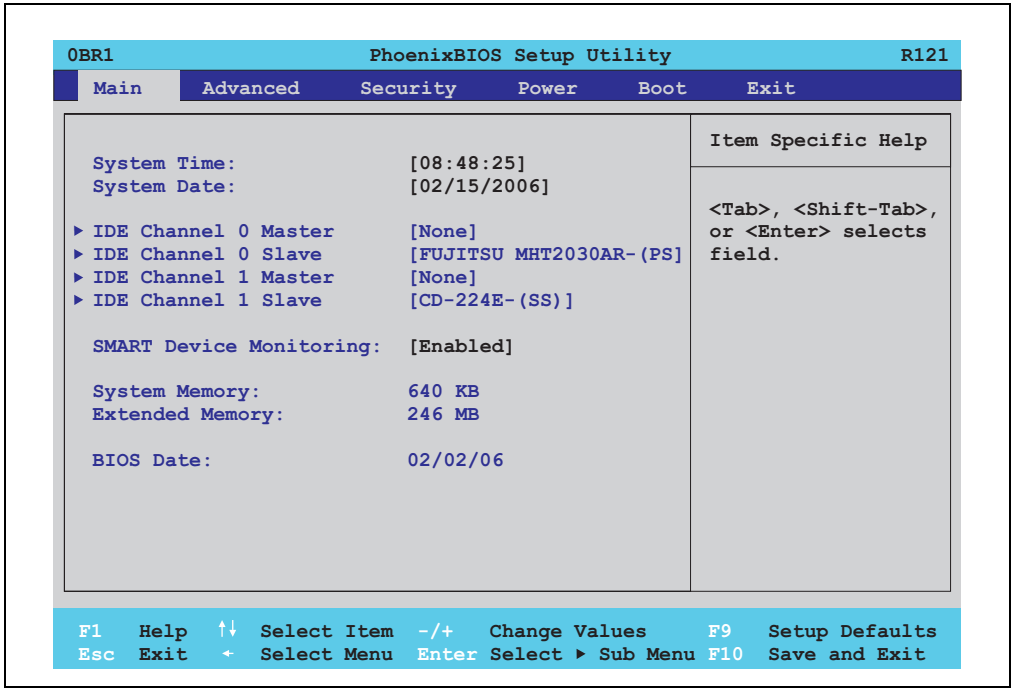


Figure 159: 855GME - main

BIOS setting	Meaning	Setting options	Effect
System time	This is the current system time setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Adjustment of the system time	Set the system time in the format (hh:mm:ss).
System date	This is the current system date setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Changes to the system date	Set the system date in the format (mm:dd:yyyy).
IDE channel 0 master	The drive in the system that is connected to the IDE channel 0 master (previously "primary master") port is configured here.	Enter	Opens submenu see "IDE channel 0 master" on page 284.
IDE channel 0 slave	The drive in the system that is connected to the IDE channel 0 slave (previously "primary slave") port is configured here.	Enter	Opens submenu see "IDE channel 0 slave" on page 286.
IDE channel 1 master	The drive in the system that is connected to the IDE channel 1 master (previously "secondary master") port is configured here.	Enter	Opens submenu see "IDE channel 1 master" on page 288.

Table 147: 855GME - main - setting options

BIOS setting	Meaning	Setting options	Effect
IDE channel 1 slave	The drive in the system that is connected to the IDE channel 1 slave (previously "secondary slave") port is configured here.	Enter	Opens submenu see "IDE channel 1 slave" on page 290.
Smart device monitoring	S.M.A.R.T. (Self Monitoring Analysis and Reporting Technology) is implemented in the today's hard drives. This technology allows you to detect reading or rotational problems with the hard drive, and much more.	Enabled	Activates this function. In the future, a message regarding impending errors is produced.
		Disabled	Deactivates this function.
System memory	Displays the amount of main memory installed. Between 0 and 640 KB.	None	-
Extended memory	Displays the available main memory from the first MB to the maximum memory capacity.	None	-

Table 147: 855GME - main - setting options (cont.)

IDE channel 0 master

```
0BR1                    PhoenixBIOS Setup Utility                    R121
 Main

        IDE Channel 0 Master [None]                  Item Specific Help

 Type:                        [Auto]                 User = you enter
                                                     parameters of hard-disk
 Multi-Sector Transfers:      [Disabled]             drive installed at this
 LBA Mode Control:            [Enabled]              connection.
 32 Bit I/O:                  [Disabled]             Auto = autotypes
 Transfer Mode:               [Fast PIO 2]           hard-disk drive
 Ultra DMA Mode:              [Disabled]             installed here.
 SMART Monitoring:            [Disabled]             1-39 = you select
                                                     pre-determined type of
                                                     hard-disk drive
                                                     installed here.
                                                     CD-ROM = a CD-ROM drive
                                                     is installed here.
                                                     ATAPI Removeable =
                                                     removeable disk drive
                                                     is installed here.

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

Figure 160: 855GME IDE channel 0 master setup

BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the IDE channel 0 master (previously "primary master") is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		User	Manual setup of the drive (number of cylinders, heads, and sectors).
		Other ATAPI	Use this option for IDE disk drives that are not mentioned here.
		CD-ROM	CD-ROM = CD-ROM drive
		ATAPI removable	The removable media drive is treated as a hard drive or floppy drive.
		IDE removable	The IDE removable drive is treated as a hard drive.
Multi-sector transfer	This option determines the number of sectors per block. Only possible when manually setting up the drive.	Disabled	Disables this function.
		2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 148: 855GME IDE channel 0 master setting options

BIOS setting	Meaning	Setting options	Effect
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the IDE channel 0 master drive and the system memory is defined here. Only possible when manually setting up the drive.	Default	Default setting
		Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the IDE channel 0 master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Disables this function. Do not use UDMA mode.
		Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the IDE channel 0 master drive supports SMART technology.	Disabled	No drive support, and function is deactivated.
		Enabled	Drive support present, and function is activated.

Table 148: 855GME IDE channel 0 master setting options (cont.)

IDE channel 0 slave

```
0BR1                    PhoenixBIOS Setup Utility                    R121
 Main

 IDE Channel 0 Slave [FUJITSU MHT2030AR-(PS)]      Item Specific Help

 Type:                        [Auto]              User = you enter
                        LBA Format                parameters of hard-disk
 Total Sectors:               58605120            drive installed at this
 Maximum Capacity:            30006MB             connection.
                                                  Auto = autotypes
 Multi-Sector Transfers:      [Disabled]          hard-disk drive
 LBA Mode Control:            [Enabled]           installed here.
 32 Bit I/O:                  [Disabled]          1-39 = you select
 Transfer Mode:               [Fast PIO 2]        pre-determined type of
 Ultra DMA Mode:              [Disabled]          hard-disk drive
 SMART Monitoring:            [Disabled]          installed here.
                                                  CD-ROM = a CD-ROM drive
                                                  is installed here.
                                                  ATAPI Removeable =
                                                  removeable disk drive
                                                  is installed here.

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

Figure 161: 855GME IDE channel 0 slave setup

BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the IDE channel 0 slave (previously "primary slave") is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		User	Manual setup of the drive (number of cylinders, heads, and sectors).
		Other ATAPI	Use this option for IDE disk drives that are not mentioned here.
		CD-ROM	CD-ROM = CD-ROM drive
		ATAPI removable	The removable media drive is treated as a hard drive or floppy drive.
		IDE removable	The IDE removable drive is treated as a hard drive.
Multi-sector transfer	This option determines the number of sectors per block. Only possible when manually setting up the drive.	Disabled	Disables this function.
		2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 149: 855GME IDE channel 0 slave setting options

BIOS setting	Meaning	Setting options	Effect
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the IDE channel 0 slave and the system memory is defined here. Only possible when manually setting up the drive.	Default	Default setting
		Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the IDE channel 0 slave drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Disables this function. Do not use UDMA mode.
		Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the IDE channel 0 slave drive supports SMART technology.	Disabled	No drive support, and function is deactivated.
		Enabled	Drive support present, and function is activated.

Table 149: 855GME IDE channel 0 slave setting options (cont.)

IDE channel 1 master

```
0BR1                    PhoenixBIOS Setup Utility                    R121
 Main

        IDE Channel 1 Master   [None]                 Item Specific Help

  Type:                        [Auto]                 User = you enter
                                                      parameters of hard-disk
  Multi-Sector Transfers:      [Disabled]             drive installed at this
  LBA Mode Control:            [Enabled]              connection.
  32 Bit I/O:                  [Disabled]             Auto = autotypes
  Transfer Mode:               [Fast PIO 2]           hard-disk drive
  Ultra DMA Mode:              [Disabled]             installed here.
  SMART Monitoring:            [Disabled]             1-39 = you select
                                                      pre-determined type of
                                                      hard-disk drive
                                                      installed here.
                                                      CD-ROM = a CD-ROM drive
                                                      is installed here.
                                                      ATAPI Removeable =
                                                      removeable disk drive
                                                      is installed here.

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

Figure 162: 855GME IDE channel 1 master setup

BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the IDE channel 1 master (previously "secondary master") is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		User	Manual setup of the drive (number of cylinders, heads, and sectors).
		Other ATAPI	Use this option for IDE disk drives that are not mentioned here.
		CD-ROM	CD-ROM = CD-ROM drive
		ATAPI removable	The removable media drive is treated as a hard drive or floppy drive.
		IDE removable	The IDE removable drive is treated as a hard drive.
Multi-sector transfer	This option determines the number of sectors per block. Only possible when manually setting up the drive.	Disabled	Disables this function.
		2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 150: 855GME IDE channel 1 master setting options

BIOS setting	Meaning	Setting options	Effect
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the IDE channel 1 master and the system memory is defined here. Only possible when manually setting up the drive.	Default	Default setting
		Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the IDE channel 1 master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Disables this function. Do not use UDMA mode.
		Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the IDE channel 1 master drive supports SMART technology.	Disabled	No drive support, and function is deactivated.
		Enabled	Drive support present, and function is activated.

Table 150: 855GME IDE channel 1 master setting options (cont.)

IDE channel 1 slave

```
0BR1                    PhoenixBIOS Setup Utility                    R121
 Main

        IDE Channel 1 Slave [None]                  Item Specific Help

  Type:                        [Auto]               User = you enter
                                                    parameters of hard-disk
  Multi-Sector Transfers:      [Disabled]           drive installed at this
  LBA Mode Control:            [Enabled]            connection.
  32 Bit I/O:                  [Disabled]           Auto = autotypes
  Transfer Mode:               [Fast PIO 2]         hard-disk drive
  Ultra DMA Mode:              [Disabled]           installed here.
  SMART Monitoring:            [Disabled]           1-39 = you select
                                                    pre-determined type of
                                                    hard-disk drive
                                                    installed here.
                                                    CD-ROM = a CD-ROM drive
                                                    is installed here.
                                                    ATAPI Removeable =
                                                    removeable disk drive
                                                    is installed here.

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

Figure 163: 855GME IDE channel 1 slave setup

BIOS setting	Meaning	Setting options	Effect
Type	The type of drive connected to the IDE channel 1 slave (previously "secondary slave") is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		User	Manual setup of the drive (number of cylinders, heads, and sectors).
		Other ATAPI	Use this option for IDE disk drives that are not mentioned here.
		CD-ROM	CD-ROM = CD-ROM drive
		ATAPI removable	The removable media drive is treated as a hard drive or floppy drive.
		IDE removable	The IDE removable drive is treated as a hard drive.
Multi-sector transfer	This option determines the number of sectors per block. Only possible when manually setting up the drive.	Disabled	Disables this function.
		2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 151: 855GME IDE channel 1 slave setting options

BIOS setting	Meaning	Setting options	Effect
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the IDE channel 1 slave drive and the system memory is defined here. Only possible when manually setting up the drive.	Default	Default setting
		Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the IDE channel 1 slave drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Disables this function. Do not use UDMA mode.
		Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the IDE channel 1 slave drive supports SMART technology.	Disabled	No drive support, and function is deactivated.
		Enabled	Drive support present, and function is activated.

Table 151: 855GME IDE channel 1 slave setting options (cont.)

Advanced

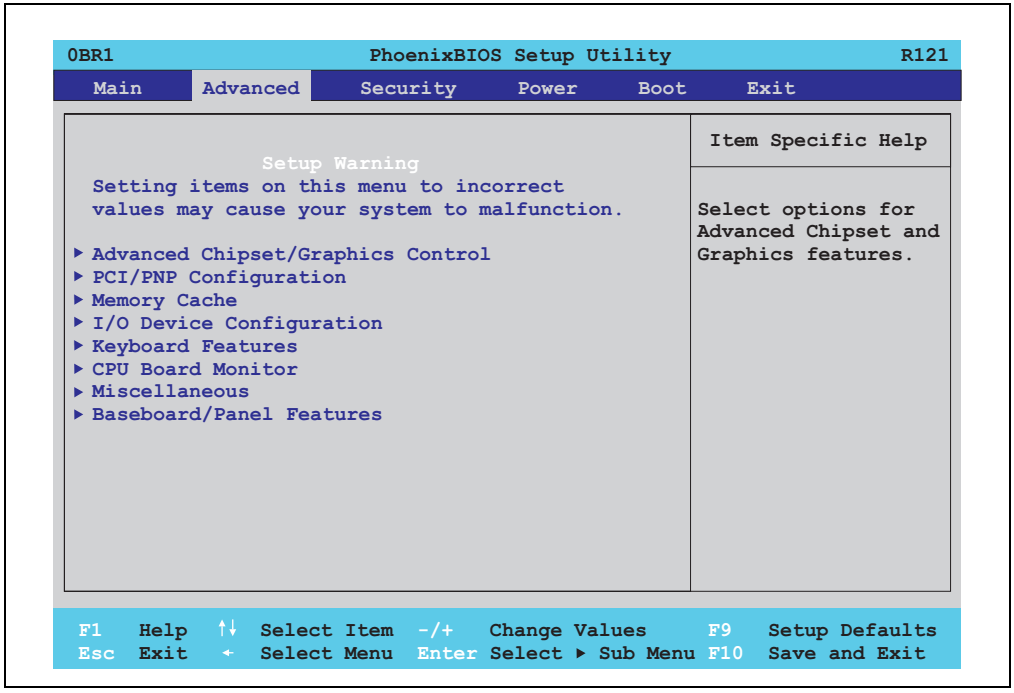


Figure 164: 855GME - advanced setup menu - overview

BIOS setup menu	Meaning	Setting options	Effect
Advanced chipset/graphics control	Setup of advanced chipset and graphics functions.	Enter	Opens submenu see "Advanced chipset/graphics control" on page 293.
PCI/PNP configuration	Configures PCI devices.	Enter	Opens submenu see "PCI/PNP configuration" on page 295.
Memory cache	Configuration of the memory cache resources.	Enter	Opens submenu see "Memory cache" on page 302.
I/O device configuration	Configuration of the I/O devices.	Enter	Opens submenu see "I/O device configuration" on page 304.
Keyboard features	Configuration of the keyboard options.	Enter	Opens submenu see "Keyboard features" on page 307.
CPU board monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens submenu see "CPU board monitor" on page 308.
Miscellaneous	Configuration of various BIOS settings (summary screen, halt on errors, etc.).	Enter	Opens submenu see "Miscellaneous" on page 309.
Baseboard/panel features	Display of device specific information and setup of device specific values.	Enter	Opens submenu see "Baseboard/panel features" on page 310.

Table 152: 855GME - advanced menu - setting options

Advanced chipset/graphics control

```
0BR1                    PhoenixBIOS Setup Utility                    R121
                Advanced

      Advanced Chipset/Graphics Control          Item Specific Help

  Graphics Engine 1:          [Auto]              Enable or Disable
    Default Flat Panel:       [None]              the Internal Graphics
    Flat Panel Scaling:       [Streched]          Device by setting item
                                                  to the desired value.
  Graphics Engine 2:          [Auto]

  Primary Graphics Engine:    [Graphics Engine 1]
  Graphics Memory Size:       [UMA = 8MB]
  Assign IRQ to VGA:          [Enabled]

  Internal Graphics API Rev: 1.2

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

Figure 165: 855GME - advanced chipset control

BIOS setting	Meaning	Setting options	Effect
Graphics engine 1	Settings can be made for the onboard video controller (internal graphics device).	Auto	Automatic setting of the graphics engine 1. The resolution is set using a read-out of the panel's EDID data. **Information:** **EDID data older than V1.1 is not passed on to the VGA-BIOS.**
		Disabled	Disable graphics controller. **Important!** **The onboard video controller must be activated to make video output possible. Deactivate only for use of an external PCI graphics card.**

Table 153: 855GME - advanced chipset control - setting options

BIOS setting	Meaning	Setting options	Effect
Default flat panel	Should the connected panel fail to be automatically recognized, a predefined resolution can be set manually here.	None	A predefined resolution has not been set.
		VGA, SVGA, XGA, XGA2, SXGA, UXGA	VGA = 640 x 480 resolution SVGA = 800 x 600 resolution XGA = 1024 x 768 resolution XGA2 = 1024 x 768 resolution SXGA = 1280 x 1024 resolution UXGA = 1600 x 1200 resolution
Flat panel scaling	For setting whether the video signal should be centered on the panel (stamp format), or fill the entire display (stretched).	Centered	Display is centered.
		Stretched	Display is stretched to fit screen.
Graphics engine 2	Settings can be made for the second onboard video controller (only with an AP Link card).	Auto	Automatic setting of the graphics engine 2. The resolution is set using a read-out of the panel's EDID data.
		Disabled	Deactivates the graphics interface.
Graphics engine	Selection of the primary video output line. **Information:** **The "Primary graphics engine" setting is only relevant from the booting of the system until a graphics driver is started (e.g. in Windows).**	Graphics engine 1	The display devices on the monitor / panel plug are the primary video output.
		Graphics engine 2	The Panel PC 700 display is the primary video output.
Graphics memory size	For setting how much of the main memory (in MB) the graphics controller can use.	1 MB	1 MB main memory to be used by the graphics controller.
		UMA = 8 MB	8 MB main memory to be used by the graphics controller.
		UMA = 16 MB	16 MB main memory to be used by the graphics controller.
		UMA = 32 MB	32 MB main memory to be used by the graphics controller.
Assign IRQ to VGA	This is where an IRQ is reserved and automatically assigned for the CPU board's onboard graphics.	Enabled	Enables this function.
		Disabled	Disables this function.
Internal graphics API Rev	Displays the internal graphics API version number.	-	

Table 153: 855GME - advanced chipset control - setting options (cont.)

PCI/PNP configuration

```
0BR1                    PhoenixBIOS Setup Utility                    R121
                Advanced

        PCI/PNP Configuration                      Item Specific Help

  PNP OS installed:                  [Yes]         Select the operating
  Reset Configuration Data:          [No]          system installed
  Secured Setup Configurations       [Yes]         on your system which
                                                   you will use most
▶ PCI Device, Slot #1                              commonly.
▶ PCI Device, Slot #2
▶ PCI Device, Slot #3                              Note: An incorrect
▶ PCI Device, Slot #4                              setting can cause
                                                   some operating
  PCI IRQ line 1:                    [Auto Select] systems to display
  PCI IRQ line 2:                    [Auto Select] unexpected behavior.
  PCI IRQ line 3:                    [Auto Select]
  PCI IRQ line 4:                    [Auto Select]
  Onboard LAN IRQ line:              [Auto Select]
  Onboard USB EHCI IRQ line:         [Auto Select]

  Default Primary Video Adapter:     [PCI]
  Assing IRQ for SMB:                [Enabled]

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

Figure 166: 855GME - PCI/PNP configuration

BIOS setting	Meaning	Setting options	Effect
PNP OS installed	If the operating system is plug & play capable, then this option informs BIOS that the operating system will handle the distribution of resources in the future.	Yes	The ISA PnP resources are not assigned. The resource assignment sequence is as follows: 1. Motherboard devices 2. PCI devices
		No	The resource assignment sequence is as follows: 1. Motherboard devices 2. ISA PnP devices 3. PCI devices
Reset configuration data	During booting, the assigned resources are stored in Flash (ESCD).	Yes	When the system is reset after leaving the BIOS setup, all ECSD entries (extended system configuration data) are deleted.
		No	Disables this function. Resources are not reset.

Table 154: 855GME - PCI/PNP configuration - setting options

BIOS setting	Meaning	Setting options	Effect
Secured setup configuration	This option protects the setup configuration from interference from a PnP operating system.	Yes	Prevents a PnP operating system from changing system settings.
		No	Disables this function. Changes are allowed.
PCI device, slot #1	Advanced configuration of the PCI slot number 1.	Enter	Opens submenu See "PCI device, slot #1" on page 298
PCI device, slot #2	Advanced configuration of the PCI slot number 2.	Enter	Opens submenu See "PCI device, slot #2" on page 299
PCI device, slot #3	Advanced configuration of the PCI slot number 3.	Enter	Opens submenu See "PCI device, slot #3" on page 300
PCI device, slot #4	Advanced configuration of the PCI slot number 4.	Enter	Opens submenu See "PCI device, slot #4" on page 301
PCI IRQ line 1	Under this option, the external PCI interrupt 1 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 2	Under this option, the external PCI interrupt 2 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 3	Under this option, the external PCI interrupt 3 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 4	Under this option, the external PCI interrupt 4 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
Onboard LAN IRQ line	Under this option, the onboard LAN interrupt is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
Onboard USB EHCI IRQ line	Under this option, the USB EHCI interrupt is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
Default primary video adapter	This option sets the first activated graphics card (either an existing AGP or the PCI graphics card).	PCI	A PCI graphics card is set as the default display device.
		AGP	An AGP graphics card is set as the default display device.

Table 154: 855GME - PCI/PNP configuration - setting options (cont.)

BIOS setting	Meaning	Setting options	Effect
Assign IRQ to SMB	Use this function to set whether or not the SM (System Management) bus controller is assigned a PCI interrupt.	Enabled	Automatic assignment of a PCI interrupt.
		Disabled	No assignment of an interrupt.

Table 154: 855GME - PCI/PNP configuration - setting options (cont.)

PCI device, slot #1

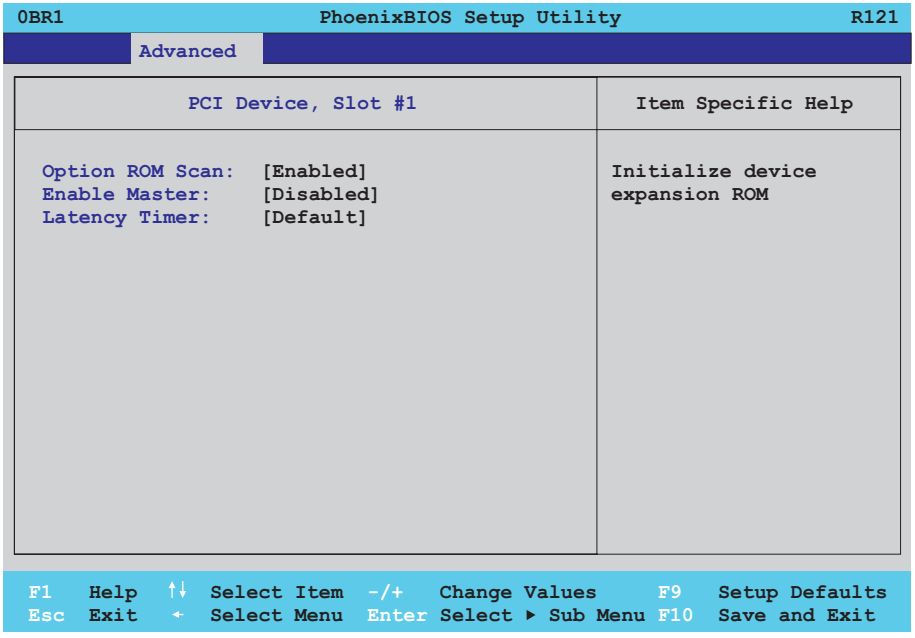


Figure 167: 855GME - PCI device, slot #1

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be treated as the PCI bus master. Not all PCI devices can function as PCI bus master! Check device description.	Enabled	Enables this function.
		Disabled	Disables this function.
Latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manual configuration of the setting.

Table 155: 855GME - PCI device, slot #1 - setting options

PCI device, slot #2

```
0BR1                    PhoenixBIOS Setup Utility                    R121
          Advanced

        PCI Device, Slot #2                      Item Specific Help

  Option ROM Scan:   [Enabled]                   Initialize device
  Enable Master:     [Disabled]                  expansion ROM
  Latency Timer:     [Default]

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

Figure 168: 855GME - PCI device, slot #2

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be treated as the PCI bus master. Not all PCI devices can function as PCI bus master! Check device description.	Enabled	Enables this function.
		Disabled	Disables this function.
Latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manual configuration of the setting.

Table 156: 855GME - PCI device, slot #2 - setting options

PCI device, slot #3

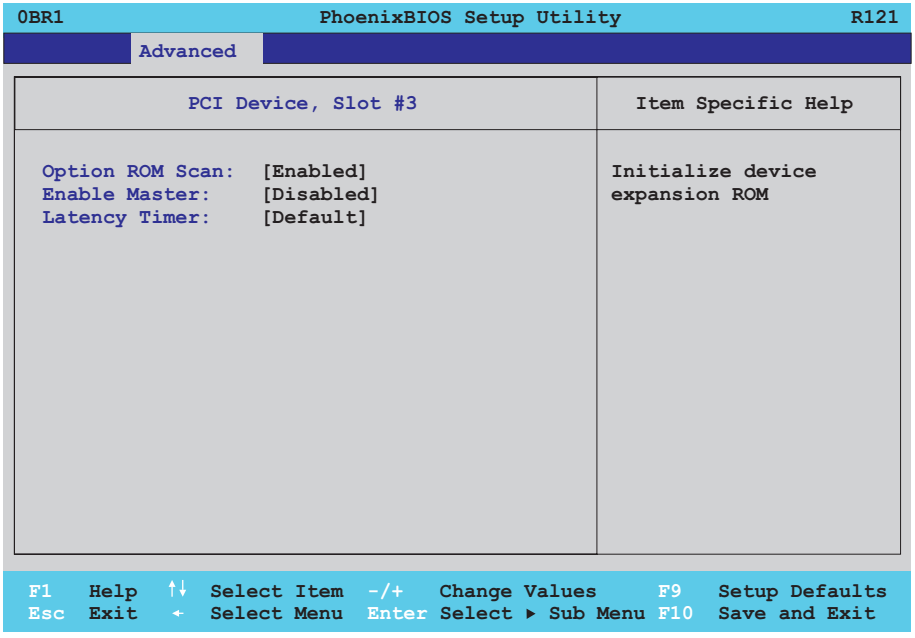


Figure 169: 855GME - PCI device, slot #3

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be treated as the PCI bus master. Not all PCI devices can function as PCI bus master! Check device description.	Enabled	Enables this function.
		Disabled	Disables this function.
Latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Standard
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manual configuration of the setting.

Table 157: 855GME - PCI device, slot #3 - setting options

PCI device, slot #4

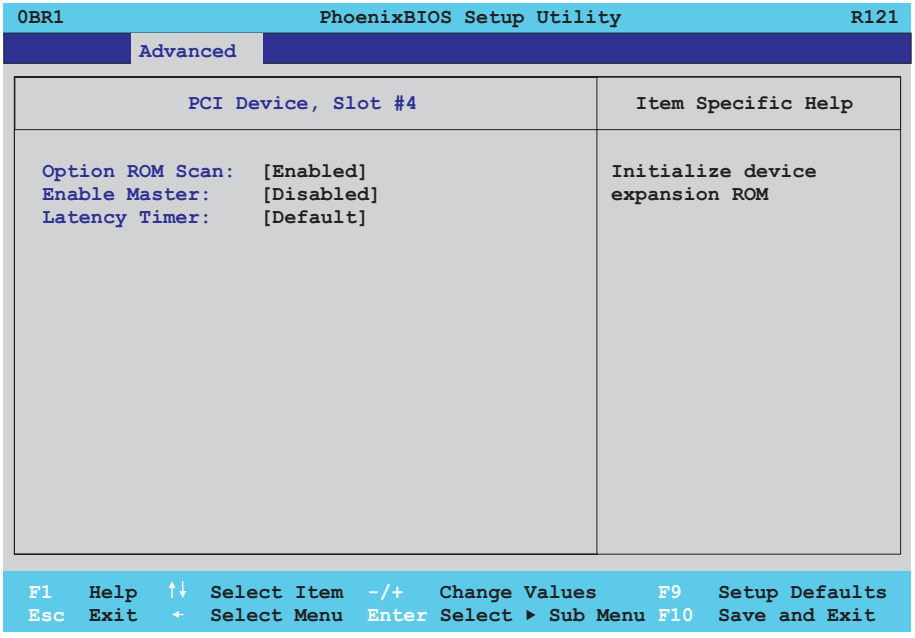


Figure 170: 855GME - PCI device, slot #4

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be treated as the PCI bus master. Not all PCI devices can function as PCI bus master! Check device description.	Enabled	Enables this function.
		Disabled	Disables this function.
Latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manual configuration of the setting.

Table 158: 855GME - PCI device, slot #4 - setting options

Memory cache

```
0BR1                    PhoenixBIOS Setup Utility                    R121
                Advanced

        Memory Cache                          Item Specific Help

  Memory Cache:                  [Enabled]     Sets the state of the
  Cache System BIOS area:        [Write Protect]memory cache.
  Cache Video BIOS area          [Write Protect]
  Cache Base 0-512k:             [Write Back]
  Cache Base 512k-640k:          [Write Back]
  Cache Extended Memory Area:    [Write Back]
  Cache D000 - D3FF:             [Disabled]
  Cache D40D - D7FF:             [Disabled]
  Cache DB00 - DBFF:             [Disabled]
  Cache DC00 - DFFF:             [Disabled]

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

Figure 171: 855GME - memory cache

BIOS setting	Meaning	Setting options	Effect
Memory cache	Enable/ disable utilization of the L2 cache.	Enabled	Enables this function.
		Disabled	Disables this function.
Cache system BIOS area	Set whether or not the system BIOS should be buffered.	Write protect	System BIOS is mapped in the cache.
		Uncached	System BIOS is not mapped in the cache.
Cache video BIOS area	Set whether or not the video BIOS should be buffered.	Write protect	Video BIOS is mapped in the cache.
		Uncached	Video BIOS is not mapped in the cache.
Cache base 0-512k	Set whether the memory content should be mapped in the cache (0-512k), and when necessary, written in the main memory.	Uncached	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.

Table 159: 855GME - memory cache - setting options

BIOS setting	Meaning	Setting options	Effect
Cache base 512-640k	Set whether the memory content should be mapped in the cache (512-640k), and when necessary, written in the main memory.	Uncached	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache extended memory area	Configure how the memory content of the system memory above 1MB should be mapped.	Uncached	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache D000 - D3FF	Configure how the memory content of D000-D3FF should be mapped.	Uncached	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache D400 - D7FF	Configure how the memory content of D400-D7FF should be mapped.	Uncached	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache D800 - DBFF	Configure how the memory content of D800-DBFF should be mapped.	Uncached	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache DC00 - DFFF	Configure how the memory content of DC00-DFFF should be mapped.	Uncached	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.

Table 159: 855GME - memory cache - setting options (cont.)

I/O device configuration

```
0BR1                    PhoenixBIOS Setup Utility                    R121
                Advanced

        I/O Device Configuration                    Item Specific Help

  Local Bus IDE adapter:        [Both]              Enable the integrated
  Primary IDE UDMA66/100        [Enabled]           local bus IDE adapter
  Secondary IDE UDMA66/100      [Enabled]
  USB UHCI Host Controller 1:   [Enabled]
  USB UHCI Host Controller 2:   [Enabled]
  USB EHCI Host Controller:     [Enabled]
  Legacy USB Support:           [Enabled]
  AC97 Audio controller:        [Enabled]
  Onboard LAN controller:       [Enabled]
  Onboard LAN PXE ROM:          [Disabled]

  Serial port A:                [Enabled]
    Base I/O address:           [3F8]
    Interrupt:                  [IRQ 4]
  Serial port B:                [Enabled]
    Mode:                       [Normal]
    Base I/O address:           [2F8]
    Interrupt:                  [IRQ 3]
  Parallet port:                [Enabled]
    Base I/O address:           [378]

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

Figure 172: 855GME - I/O device configuration

BIOS setting	Meaning	Setting options	Effect
Local bus IDE adapter	Enable or disable one or both of the PCI IDE controllers (primary and secondary).	Disabled	Deactivates both PCI IDE controllers (primary and secondary).
		Primary	Activates the primary IDE controller only.
		Secondary	Activates the secondary IDE controller only.
		Both	Activates both PCI IDE controllers (primary and secondary).
Primary IDE UDMA66/100	Setup the data transfer rate for a device connected to the primary IDE channel. This option is only available when a primary IDE drive is connected.	Disabled	The maximum data transfer rate is UDMA33.
		Enabled	The maximum data transfer rate is UDMA66 or higher.
Secondary IDE UDMA66/100	Setup the data transfer rate for a device connected to the secondary IDE channel. This option is only available when a secondary IDE drive is connected.	Disabled	The maximum data transfer rate is UDMA33.
		Enabled	The maximum data transfer rate is UDMA66.

Table 160: 855GME - I/O device configuration - setting options

BIOS setting	Meaning	Setting options	Effect
USB UHCI host controller 1	Configuration of USB UHCI controller 1 for USB port 0 und 1.	Disabled	Deactivates the USB support.
		Enabled	Activates the USB support.
USB UHCI host controller 2	Configuration of the USB UHCI controller 1 for USB port 2 and 3. Can only be configured if the USB UHCI controller 1 is activated.	Disabled	Deactivates the USB support.
		Enabled	Activates the USB support.
USB UHCI host controller	Configuration of the USB EHCI controller. Can only be configured if the USB UHCI controller 1 is activated.	Disabled	Deactivates the USB support.
		Enabled	When enabled, the USB 2.0 support is activated as soon as a USB 2.0 device is connected to the interface.
Legacy USB support	Here IRQs are assigned to the USB connections.	Disabled	No IRQ assigned. It is not possible to boot from a USB device (USB stick, USB floppy, USB CD ROM, etc.)! However, a connected USB keyboard can be used to access and configure the BIOS setup, boot menu or optional RAID boot menu. USB devices will not function after completing the BIOS POST routine. USB devices only work after starting the operating system with USB support (e.g. Windows XP). MS-DOS does not support the use of USB devices.
		Enabled	IRQ assigned. Booting from USB devices is now possible. Supported USB devices work with MS-DOS (e.g. USB keyboard, etc).
AC97 audio controller	For turning the AC97 audio controller on and off.	Disabled	AC97 sound is deactivated.
		Enabled	AC97 sound is activated.
Onboard LAN controller	For turning the ICH4 on-board LAN controller (for ETH1) on and off.	Disabled	Deactivates the LAN controller or the ETH1 interface.
		Enabled	Activates the LAN controller or the ETH1 interface.
Onboard LAN PXE ROM	For turning the remote boot BIOS extension for the on-board LAN controller (ETH1) on and off.	Disabled	Disables this function.
		Enabled	Enables this function.
Serial port A	For the configuration of serial port A (COM1).	Disabled	Port A deactivated.
		Enabled	Port A activated. The base I/O addresses and the interrupt must then be configured manually.
		Auto	Either BIOS or the operating system configures the port automatically.
Base I/O address	Selection of the base I/O address for port A. A yellow star indicates a conflict with another device.	3F8, 2F8, 3E8, 2E8	Base I/O address is manually assigned.
Interrupt	Selection of the interrupt for port A. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4	Manual assignment of the interrupt.

Table 160: 855GME - I/O device configuration - setting options (cont.)

BIOS setting	Meaning	Setting options	Effect
Serial port B	For the configuration of serial port B (COM2).	Disabled	Port B deactivated.
		Enabled	Port A activated. The base I/O addresses and the interrupt must then be configured manually.
		Auto	Either BIOS or the operating system configures the port automatically.
Mode	This option is for setting the serial port B as either a standard interface or as an infrared interface.	Normal	Serial port B is used as a standard interface.
		IR	The serial interface is used as an infrared interface, and allows data transfers up to 115 kBit/s.
Base I/O address	Selection of the base I/O address for port B. A yellow star indicates a conflict with another device.	3F8, 2F8, 3E8, 2E8	Selected base I/O address is manually assigned.
Interrupt	Selection of the interrupt for port B. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4	Selected interrupt is assigned.
Parallel port	For configuring the hardware security key (dongle), which accessed internally through the parallel interface.	Disabled	Deactivates the port.
		Enabled	Activates the port. The base I/O address must then be set.
		Auto	First BIOS and then the operating system configure the port automatically.
Base I/O address	Selection of the base I/O address for the parallel port.	378, 278, 3BC	Base I/O address is manually assigned.

Table 160: 855GME - I/O device configuration - setting options (cont.)

Keyboard features

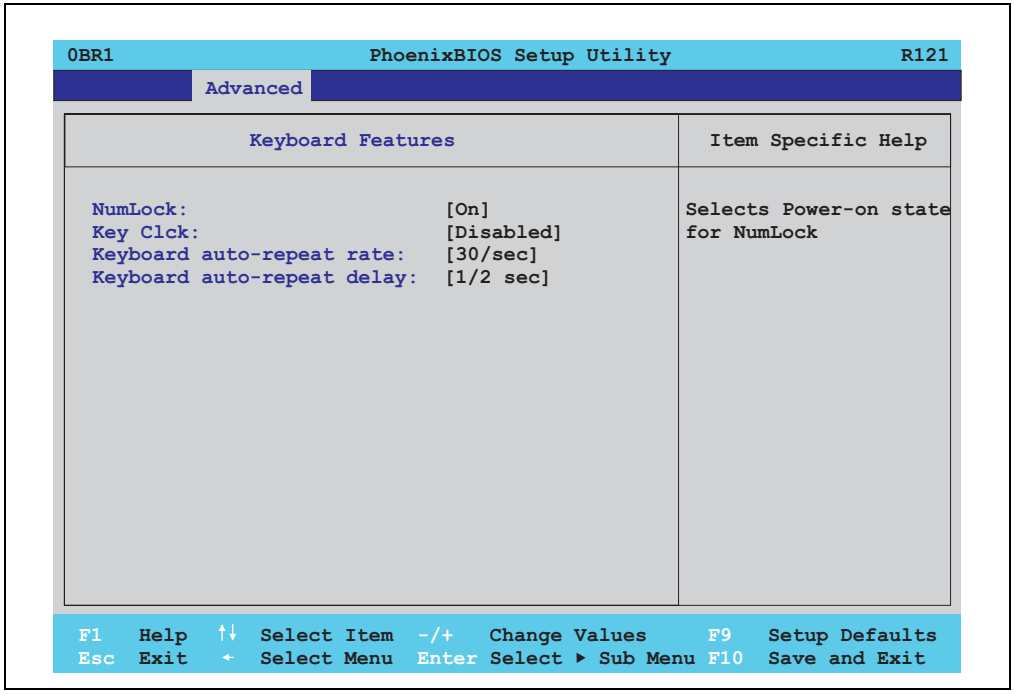


Figure 173: 855GME - keyboard features

BIOS setting	Meaning	Setting options	Effect
NumLock	This option sets the status of the numeric keypad when the the system is booted.	On	Numeric keypad is activated.
		Off	Only the cursor functions of the numerical keypad are activated.
		Auto	Numeric keypad is activated, if present.
Key click	Using this option, the clicking of the keys can be turned on or off.	Disabled	Disables this function.
		Enabled	Enables this function.
Keyboard auto-repeat rate	For setting the speed of repetition when a key is held down.	30/sec, 26.7/sec, 21.8/sec, 18.5/sec, 13.3/sec, 10/sec, 6/sec, 2/sec	Settings from 2 to 30 characters per second.
Keyboard auto-repeat delay	For setting the amount of delay after the key is pressed before the auto-repeat begins.	1/4 sec, 1/2 sec, 3/4 sec, 1 sec	Setting of the desired delay.

Table 161: 855GME - keyboard features - setting options

CPU board monitor

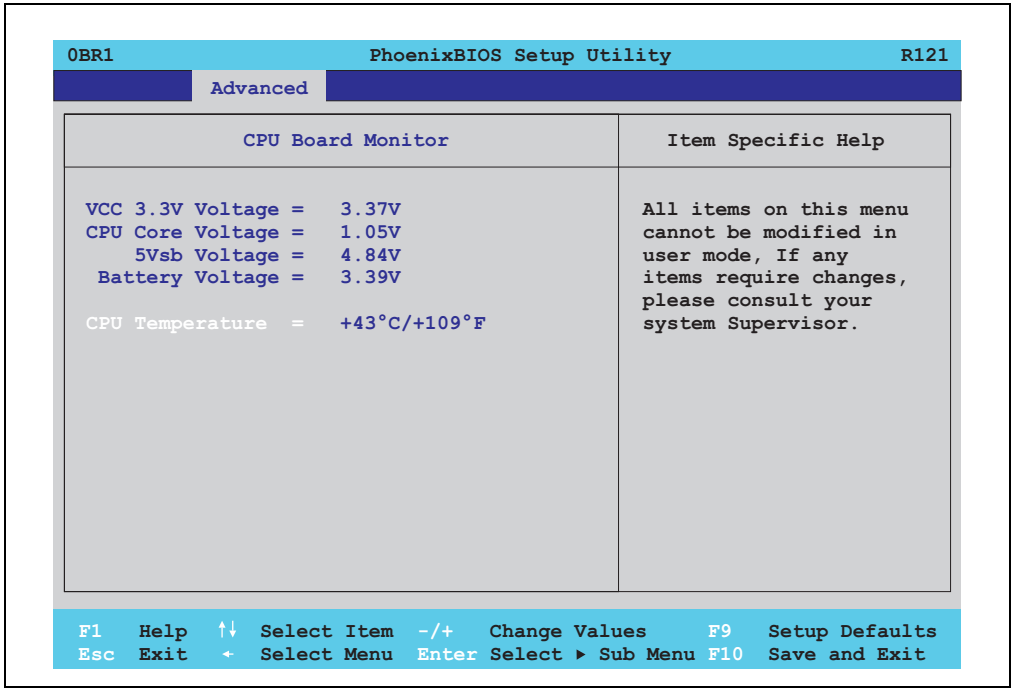


Figure 174: 855GME - CPU board monitor

BIOS setting	Meaning	Setting options	Effect
VCC 3.3V voltage	Displays the current voltage of the 3.3 volt supply (in volts).	None	
CPU core voltage	Displays the processor's core voltage (in volts).	None	
5Vsb voltage	Displays the 5 V standby voltage (in volts).	None	
Battery voltage	Displays the battery voltage (in volts).	None	
CPU temperature	Displays the processor's temperature (in degrees Celsius and Fahrenheit).	None	

Table 162: 855GME - CPU board monitor - setting options

Miscellaneous

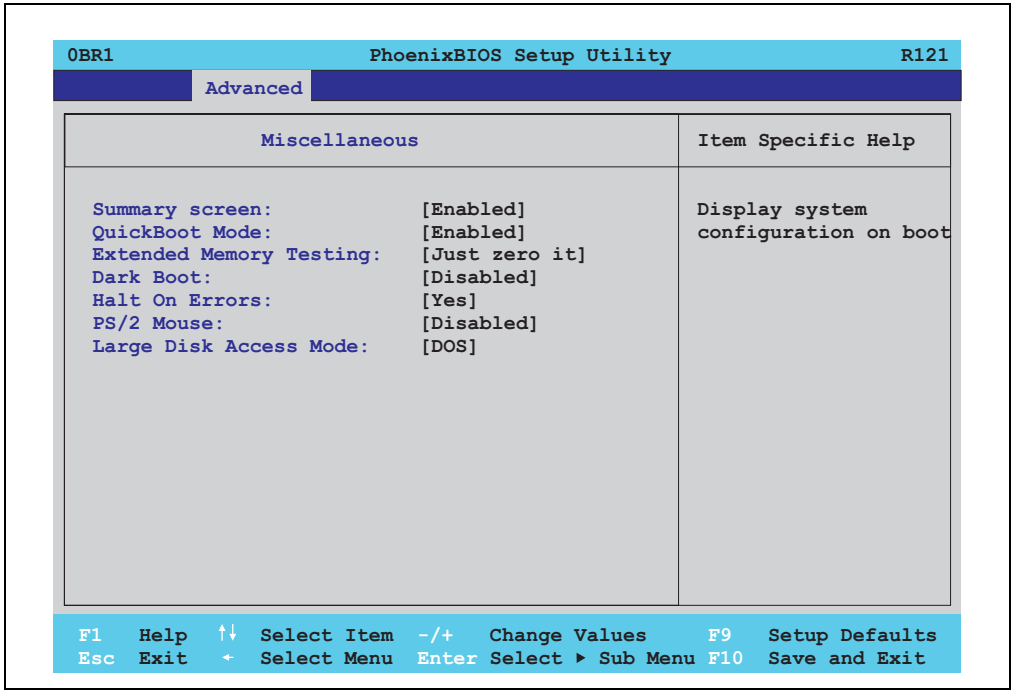


Figure 175: 855GME - miscellaneous

BIOS setting	Meaning	Setting options	Effect
Summary screen	Set whether or not the system summary screen should open when the system is started (see figure 158 "855GME - BIOS summary screen" on page 280).	Enabled	Enables this function.
		Disabled	Disables this function.
QuickBoot mode	Speeds up the booting process by skipping several tests.	Enabled	Enables this function.
		Disabled	Disables this function.
Extended memory testing	This function determines the method by which the main memory over 1 MB is tested.	Just zero it	The main memory is quickly tested.
		None	The main memory is not tested at all.
		Normal	This option is only available when the function "QuickBoot mode" has been set to "disabled." The main memory is tested more slowly than with "Just zero It."
Dark boot	Sets whether the diagnostics screen (see figure 157 "855GME - BIOS diagnostics screen" on page 280) should be displayed when the system is started.	Enabled	Enables this function. The diagnostics screen is displayed.
		Disabled	Disables this function. The diagnostics screen is not displayed.

Table 163: 855GME - miscellaneous - setting options

BIOS setting	Meaning	Setting options	Effect
Halt on errors	This option sets whether the system should pause the Power On Self Test (POST) when it encounters an error.	Yes	The system pauses. The system pauses every time an error is encountered.
		No	The system does not pause. All errors are ignored.
PS/2 mouse	Sets whether the PS/2 mouse port should be activated.	Disabled	Deactivates the port.
		Enabled	Activates the port. The IRQ12 is reserved, and is not available for other components.
Large disk access mode	This option is intended for hard discs with more than 1024 cylinders, 16 heads, and more than 63 sectors per track. Setting options: DOS	Other	For non-compatible access (e.g. Novell, SCO Unix.)
		DOS	For MS DOS compatible access.

Table 163: 855GME - miscellaneous - setting options

Baseboard/panel features

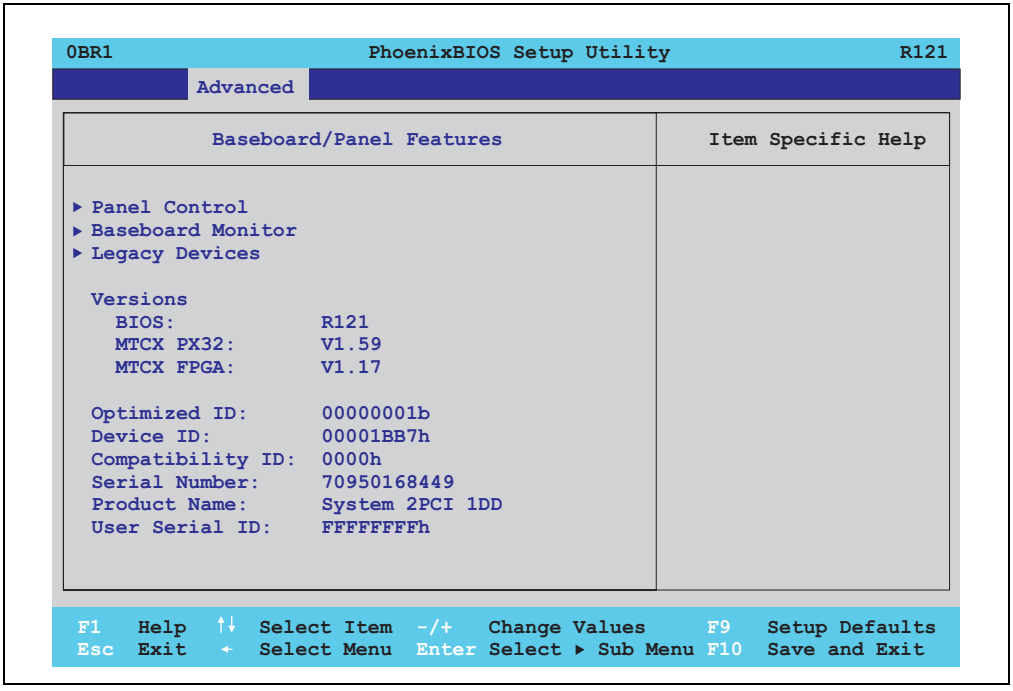


Figure 176: 855GME - baseboard/panel features

BIOS setting	Meaning	Setting options	Effect
Panel control	For special setup of connected panels.	Enter	Opens submenu see "Panel control" on page 312.
Baseboard monitor	Display of various temperatures and fan speeds.	Enter	Opens submenu see "Baseboard monitor" on page 313.

Table 164: 855GME - baseboard/panel features - setting options

BIOS setting	Meaning	Setting options	Effect
Legacy devices		Enter	Opens submenu see "Legacy devices" on page 314.
BIOS	Displays the BIOS version.	None	
MTCX PX32	Displays the MTCX PX32 firmware version.	None	
MTCX FPGA	Displays the MTCX FPGA firmware version.	None	
Optimized ID	Displays the DIP switch setting of the configuration switch.	None	
Device ID	Displays the hexadecimal value of the hardware device ID.	None	
Compatibility ID	Displays the version of the device within the same B&R device code. This ID is needed for Automation Runtime.	None	
Serial number	Displays the B&R serial number.	None	
Product name	Displays the B&R model number.	None	
User serial ID	Displays the hexadecimal value of the user serial ID number. This number can only be changed with "control center," available from B&R.	None	

Table 164: 855GME - baseboard/panel features - setting options (cont.)

Panel control

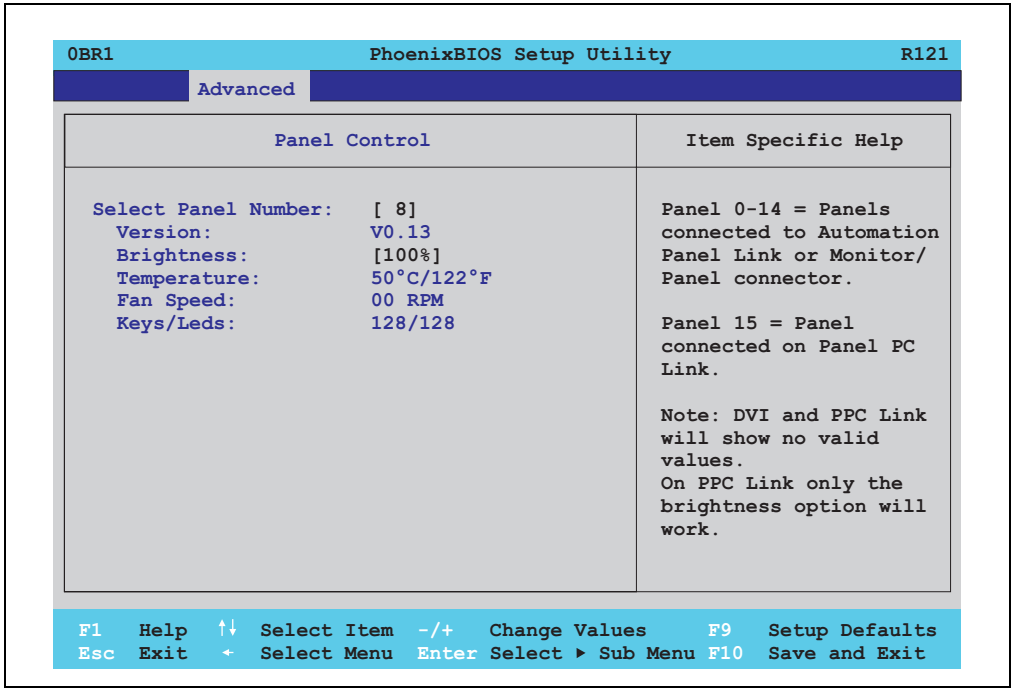


Figure 177: 855GME - panel control

BIOS setting	Meaning	Setting options	Effect
Select panel number	Selection of the panel number for which the values should be read out and/or changed.	0 ... 15	Selection of panel 0 ... 15. Panel 15 is specifically intended for panel PC 700 systems.
Version	Displays the firmware version of the SDLR controller.	None	
Brightness	For setting the brightness of the selected panel.	0%, 25%, 50%, 75%, 100%	For setting the brightness (in%) of the selected panel. Changes take effect after saving and restarting the system (e.g. by pressing <F10>).
Temperature	Displays the selected panel's temperature (in degrees Celsius and Fahrenheit).	None	
Fan speed	Displays fan speed for the selected panel.	None	
Keys/LEDs	Displays the available keys and LEDs on the selected panel.	None	

Table 165: 855GME - panel control - setting options

Baseboard monitor

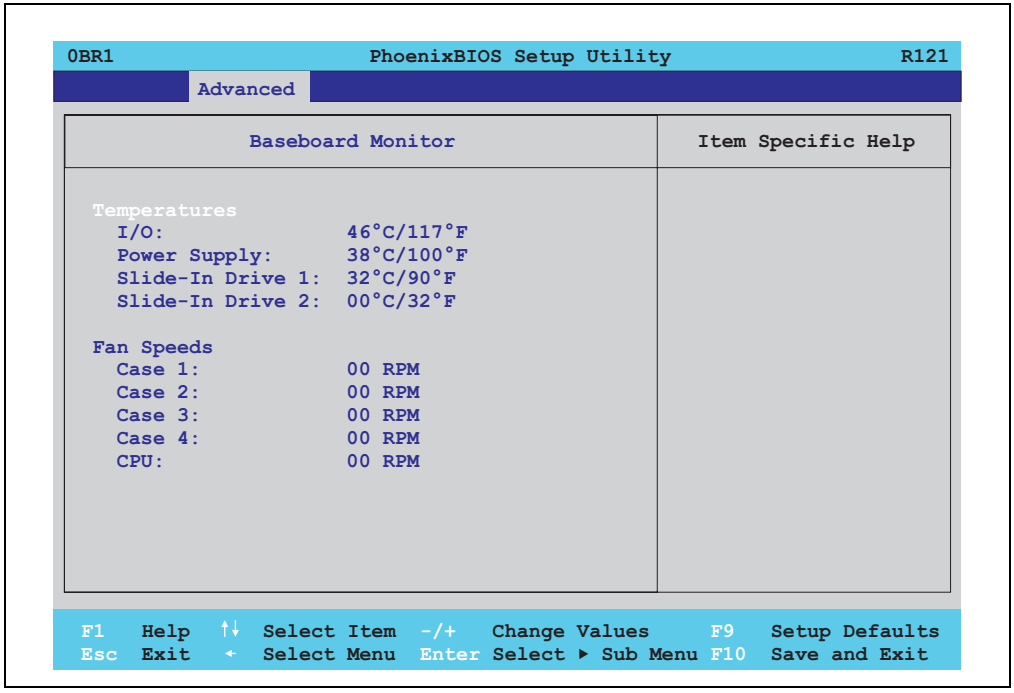


Figure 178: 855GME - baseboard monitor

BIOS setting	Meaning	Setting options	Effect
I/O	Displays the temperature in the I/O area in degrees Celsius and Fahrenheit.	None	
Power supply	Displays the temperature in the power supply area in degrees Celsius and Fahrenheit.	None	
Slide-in drive 1	Displays the temperature of the slide-in drive 1 in degrees Celsius and Fahrenheit.	None	
Slide-in drive 2	Displays the temperature of the slide-in drive 2 in degrees Celsius and Fahrenheit.	None	
Case 1	Displays the fan speed of housing fan 1.	None	
Case 2	Displays the fan speed of housing fan 2.	None	
Case 3	Displays the fan speed of housing fan 3.	None	
Case 4	Displays the fan speed of housing fan 4.	None	
CPU	Displays the fan speed of the processor fan.	None	

Table 166: 855GME - baseboard monitor - setting options

Legacy devices

```
0BR1                    PhoenixBIOS Setup Utility                    R121
                Advanced

        Legacy Devices                          Item Specific Help

COM C:                      [Enabled]           Enable/Disable the
  Base I/O address:         [2E8]               internal COM port
  Interrupt:                [IRQ 11]            for touch.
COM D:                      [Enabled]
  Base I/O address:         [238]               For detailed
  Interrupt:                [IRQ 7]             description see user
COM E:                      [Enabled]           manual.
  Base I/O address:         [2E8]
  Interrupt:                [IRQ 10]
CAN:                        [Enabled]
  Base I/O address:        384/385h
  Interrupt:                [IRQ 10]

2nd LAN controller:         [Enabled]

LAN1 MAC address:           FF:FF:FF:FF:FF:FF
LAN2 MAC address:           FF:FF:FF:FF:FF:FF

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

Figure 179: 855GME - Legacy devices

BIOS setting	Meaning	Setting options	Effect
COM C	Settings for the internal serial interfaces in the system. This setting activates the touch screen in panel PC 700 systems, and, using SDL transfer technology, also in Automation Panel 900 display units.	Disabled	Deactivates the interface.
		Enabled	Activates the interface.
Base I/O address	Selection of the base I/O address for the COM C port. A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM C port. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
COM D	Configuration of the COM D port for the serial interface of an automation panel link slot. The interface is used to operate the touch screen on connected Automation Panel 900 units.	Disabled	Deactivates the interface.
		Enabled	Activates the interface.

Table 167: 855GME - Legacy devices - setting options

BIOS setting	Meaning	Setting options	Effect
Base I/O address	Configuration of the base I/O address for the serial COM D port. A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM D port. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
COM E	Configuration of the optional COM E port of a B&R add-on interface option (IF option).	Disabled	Deactivates the interface.
		Enabled	Activates the interface.
Base I/O address	Configuration of the base I/O address for the serial COM E port. A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM E port. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
LPT	This setting is specific to B&R and should not be changed.	Disabled	Deactivates the interface.
		Enabled	Activates the interface.
Base I/O address	Configuration of the base I/O address for the optional LPT. A yellow star indicates a conflict with another device.	278, 378, 3BC	Selected base I/O address is assigned.
CAN	Configuration of the CAN port of a B&R add-on interface card.	Disabled	Deactivates the interface.
		Enabled	Activates the interface.
Base I/O address	384/385h	None	-
Interrupt	Selection of the interrupt for the CAN port.	IRQ 10	Selected interrupt is assigned.
		NMI	NMI interrupt is assigned.
2nd LAN controller	For turning the on-board LAN controller (ETH2) on and off.	Disabled	Deactivates the controller.
		Enabled	Activates the controller.
LAN1 MAC address	Displays the MAC addresses for the ETH1 network controller.	-	-
LAN2 MAC address	Displays the MAC addresses for the ETH2 network controller.	-	-

Table 167: 855GME - Legacy devices - setting options (cont.)

1.2.5 Security

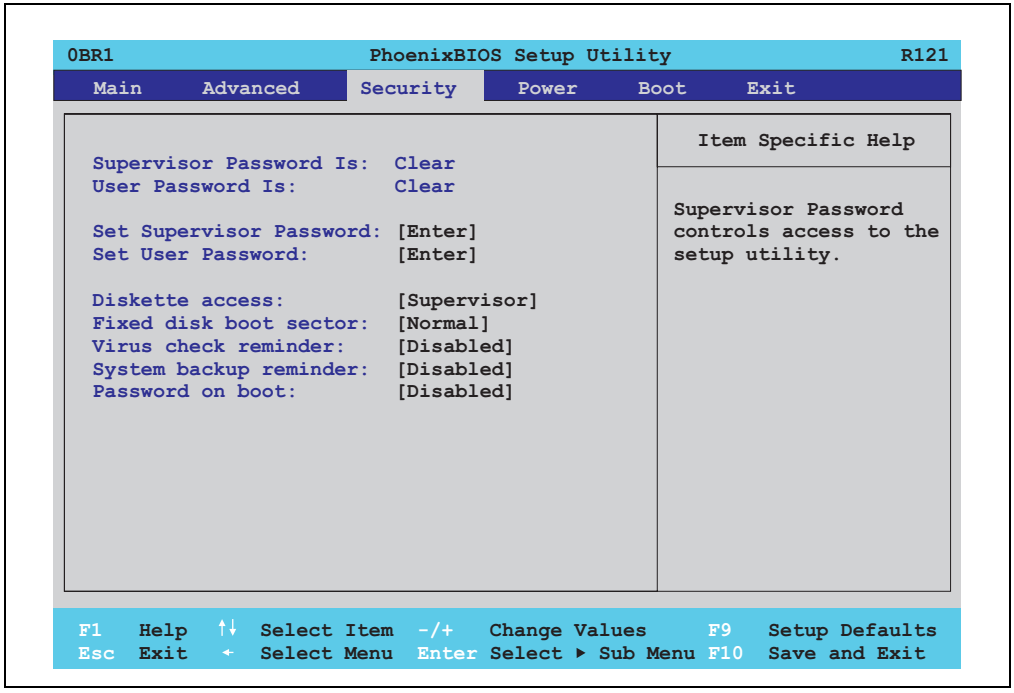


Figure 180: 855GME - security menu

BIOS setting	Meaning	Setting options	Effect
Supervisor password is	Displays whether or not a supervisor password has been set.	None	Display **set**: A supervisor password has been set. Display **clear**: No supervisor password has been set.
User password is	Displays whether or not a user password has been set.	None	Display **set**: A user password has been set. Display **clear**: No user password has been set.
Set supervisor password	To enter/change a supervisor password. A supervisor password is necessary to edit all BIOS settings.	Enter maximum 7 alphanumeric characters - not case sensitive.	Press Enter and enter password two times. The password must be 7 alphanumeric characters or less. Needed to enter BIOS setup. To change the password, enter the old password once and then the new password twice.
Set user password	To enter/change a user password. A user password allows the user to edit only certain BIOS settings.	Enter maximum 7 alphanumeric characters - not case sensitive.	Press Enter and enter password two times. The password must be 7 alphanumeric characters or less. Needed to enter BIOS setup. To change the password, enter the old password once and then the new password twice.

Table 168: 855GME - security - setting options

BIOS setting	Meaning	Setting options	Effect
Diskette access	Access to the diskette drive is controlled here. Either or the supervisor or the user has access to it. Does not work with USB diskette drives.	Supervisor	Supervisor password is needed to access a diskette drive.
		User	User password is needed to access a diskette drive.
Fixed disk boot sector	The boot sector of the primary hard drive can be write protected against viruses with this option.	Normal	Write access allowed.
		Write protect	Boot sector is write protected.
Virus check reminder	This function opens a reminder when the system is started to scan for viruses.	Disabled	Disables this function.
		Daily	A reminder appears every day when the system is started.
		Weekly	A reminder appears the first time the system is started after every Sunday.
		Monthly	A reminder appears the first time the system is started each month.
System backup reminder	This function opens a reminder when the system is started to create a system backup.	Disabled	Disables this function.
		Daily	A reminder appears every day when the system is started.
		Weekly	A reminder appears the first time the system is started after every Sunday.
		Monthly	A reminder appears the first time the system is started each month.
Password at boot	This function requires a supervisor or user password when the system is started. Only possible when a supervisor or user password is enabled.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 168: 855GME - security - setting options (cont.)

1.2.6 Power

```
0BR1                    PhoenixBIOS Setup Utility                    R121
  Main     Advanced     Security     Power     Boot     Exit

                                                   Item Specific Help
  Enable ACPI                          [Yes]

▶ ACPI Control                                     En/Disable ACPI BIOS
                                                   (Advance Configuration
  Max CPU frequency:                   [1100MHz]    and Power Interface)
  Automatic Thermal Control Circuit:   [TM2]

  Power Savings:                       [Disabled]
  Hard Disk Timeout:                   [Disabled]
  Video Timeout:                       [Disabled]

  Resume On Modem Ring:                [Off]
  Resume On Time:                      [Off]
  Resume Time:                         [00:00:00]

  Power supply:                        [ATX]
  Power Button Function:               [Power Off]
  Power Loss Control                   [Power On]

  Enable PME for WOL:                  [OS control]

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

Figure 181: 855GME - power menu

BIOS setting	Meaning	Setting options	Effect
Enable ACPI	This option turns the ACPI function (Advanced Configuration and Power Interface) on or off. This is an advanced plug & play and power management functionality.	Yes	Enables this function.
		No	Disables this function.
ACPI control	Configuration of specific limits.	Enter	Opens submenu See "ACPI control" on page 320
Max CPU frequency	This option makes it possible to determine the maximum CPU frequency for Pentium M processors. This option is not shown for Celeron M processors.	MHz processor frequency steps - depending on the processor being used	Determining the frequency. Low heat build-up, therefore low processing power.
Automatic thermal control circuit	This function monitors the CPUs temperature. If the maximum operating temperature of the CPU is exceeded, the performance of the processor is throttled.	Disabled	Disables this function.
		TM1	Operation with 50% load.
		TM2	Operation in accordance with Intel's Geyserville specifications.

Table 169: 855GME - power - setting options

BIOS setting	Meaning	Setting options	Effect
Power savings	This function determines if and how the power save function is used.	Disabled	Deactivates the power save function.
		Customized	Power management is configured by adjusting the individual settings.
		Maximum power Savings	Maximum power savings function.
		Maximum performance	Energy savings function to maximize performance.
Standby timeout	Set here when the system should enter standby mode. During standby, various devices and the display will be deactivated. This option only available when "power savings" is set to customized.	Off	No standby.
		1, 2, 4, 8 minutes	Time in minutes until standby.
Auto suspend timeout	Set here when the system should enter suspend mode to save electricity. This option only available when "power savings" is set to customized.	Off	No standby.
		5, 10, 15, 20, 30, 40, 60 minutes	Time in minutes until standby.
Hard disk timeout	Set here how long after the last access the hard disk should enter standby mode. This option only available when "power savings" is set to customized.	Disabled	Disables this function.
		10, 15, 30, 45 seconds	Time in seconds until standby.
		1, 2, 4, 6, 8, 10, 15 minutes	Time in minutes until standby.
Video timeout		Disabled	
Resume on modem ring	If an external modem is connected to a serial port and the telephone rings, the system starts up.	Off	Disables this function.
		On	Enables this function.
Resume on time	This function enables the system to start at the time set under "resume time."	Off	Disables this function.
		On	Enables this function.
Resume time	Time setting for the option "resume on time" (when the system should start up).	[00:00:00]	Personal setting of the time in the format (hh:mm:ss).
Power supply	The type of power supply being used can be entered here.	ATX	An ATX compatible power supply is being used.
		AT	An AT compatible power supply is being used.
Power button function	This option determines the function of the power button.	Power off	Shuts down the system.
		Sleep	The system enters sleep mode.
Power loss control	This option determines how the system reacts to a power outage.	Stay off	The system does not turn back on. The system remains off until the power button is pressed.
		Power-on	The system turns back on.
		Last state	The system resumes the last state it was in before the power outage.

Table 169: 855GME - power - setting options (cont.)

BIOS setting	Meaning	Setting options	Effect
Enable PME for WOL	This option enables the PME (Power Management Event) signal for controlling the WOL (Wake On LAN) function for the operating system. This setting affects both Ethernet interfaces (ETH1 and ETH2).	OS control	Evaluation of the PME signal is only active if it has been accordingly activated in the operating system driver. The system can only be woken up from the S4: hibernate mode - Suspend-to-Disk status.
		Enabled	The function, WOL and the evaluation of the PME signal is always enabled.
		Disabled	Disables the function - no WOL possible.

Table 169: 855GME - power - setting options (cont.)

ACPI control

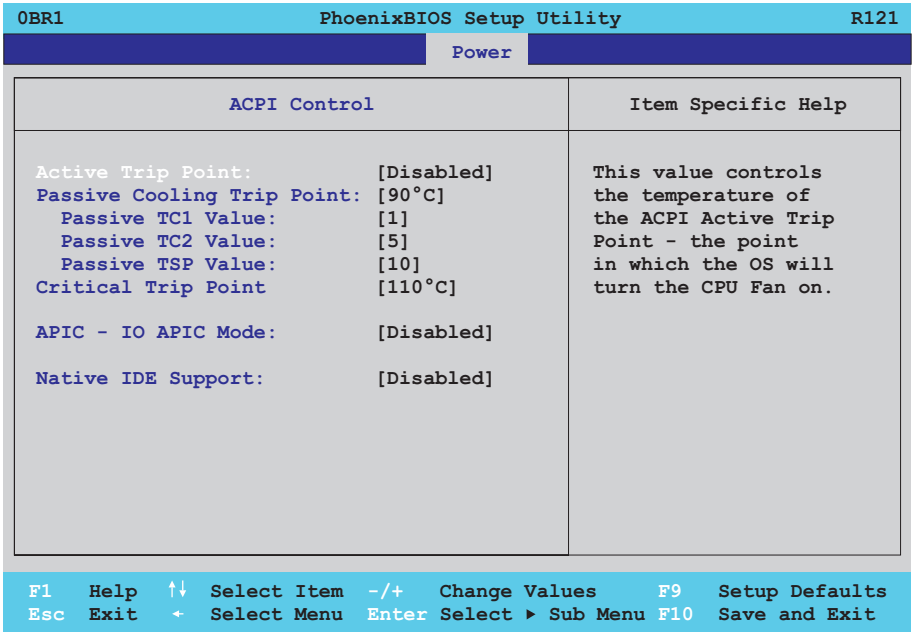


Figure 182: 855GME - ACPI control

BIOS setting	Meaning	Setting options	Effect
Active trip point	With this function, an optional CPU fan above the operating system can be set to turn on when the CPU reaches the set temperature. **Information:** **This function is not supported by MS-DOS.**	Disabled	Disables this function.
		40°C .. 100°C	Temperature setting for the active trip point. Can be set in 5 degree increments.

Table 170: 855GME - ACPI control - setting options

BIOS setting	Meaning	Setting options	Effect
Passive cooling trip point	With this function, a temperature can be set at which the CPU automatically reduces its speed. **Information:** **This function is not supported by MS-DOS.**	Disabled	Disables this function.
		40°C .. 100°C	Temperature setting for the passive cooling trip point. Can be set in increments of 5 degrees Celsius.
Passive TC1 value	Can only be set if a value was defined manually under the item "Passive cooling trip point".	1 .. 16	Can be defined in single steps.
Passive TC2 value	Can only be set if a value was defined manually under the item "Passive cooling trip point".	1 .. 16	Can be defined in single steps.
Passive TSP value	Can only be set if a value was defined manually under the item "Passive cooling trip point".	2 .. 30	Can be defined in double steps.
Critical trip point	With this function, a temperature can be set at which the operating system automatically shuts itself down. **Information:** **This function is not supported by MS-DOS.**	40°C ... 110°C	Temperature setting for the critical trip point. Can be set in increments of 5 degrees Celsius.
APIC - I/O APIC mode	This option controls the functionality of the advanced interrupt controller in the processor.	Disabled	Disables this function.
		Enabled	Enables this function. The activation of this option is only effective if it takes place before the operating system (Windows XP) is activated. There are then 23 IRQs available.
Native IDE support	The native IDE support offers the possibility to make 4 hard disk controllers (2 x primary ATA for a total of 4 devices, and 2 x secondary ATA for another 2 devices) accessible through Windows XP. **Information:** **This function is not supported by MS-DOS.**	Disabled	Disables this function.
		Enabled	Enables this function.

Table 170: 855GME - ACPI control - setting options (cont.)

1.2.7 Boot

```
0BR1                    PhoenixBIOS Setup Utility                    R121
  Main     Advanced     Security     Power     Boot     Exit

                                                   Item Specific Help

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

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

Figure 183: 855GME - boot menu

BIOS setting	Meaning	Setting options	Effect
1:		IDE 0, IDE 1, IDE 2, IDE 3, IDE CD USB FDC, USB KEY USB CDROM USB HDD, USB ZIP USB LS120, PCI BEV, PCI SCSI, bootable add-in cards	Use the up arrow ↑ and down arrow ↓ , to select a device. Then, use the <+> und <-> keys to change the boot priority of the drive. To add a device to the "boot priority order" list from the "excluded from boot order" list, use the <x> key. In the same way, the <x> key can move boot devices down out of the boot priority order. The keys 1 - 4 can load preset boot sequences.
2:			
3:			
4:			
5:			
6:			
7:			
8:			

Table 171: 855GME - boot - setting options

1.2.8 Exit

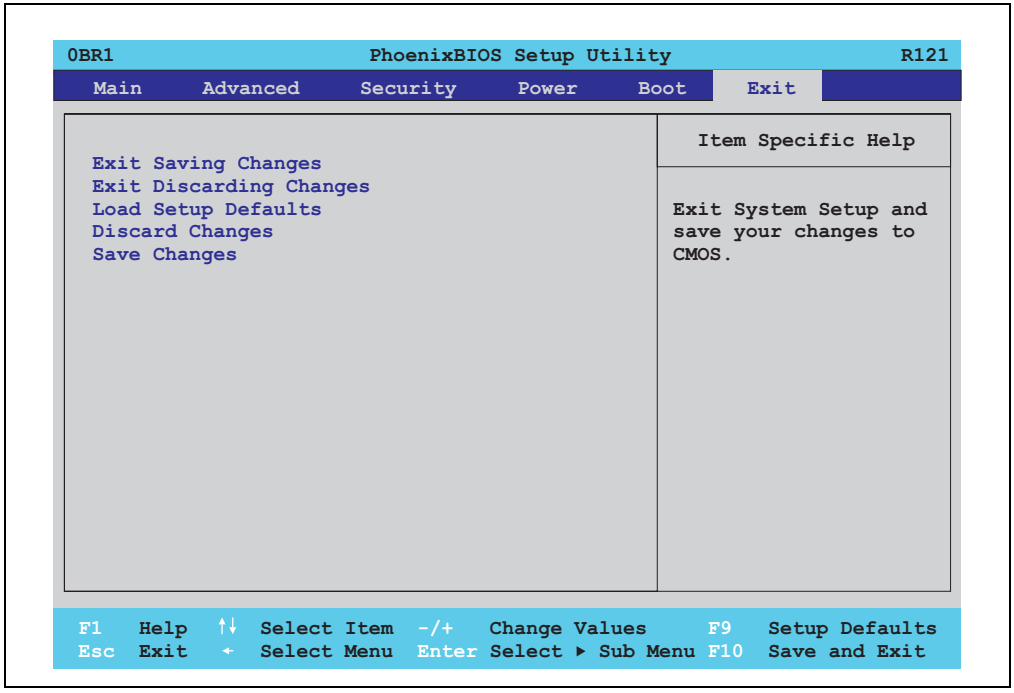


Figure 184: 855GME - exit menu

BIOS setting	Meaning	Setting options	Effect
Exit saving changes	BIOS setup is closed with this item. Changes made are saved in CMOS after confirmation, and the system is rebooted.	Yes / No	
Exit discarding changes	With this item you can close BIOS setup without saving the changes made. The system is then rebooted.	Yes / No	
Load setup defaults	This item loads the BIOS setup defaults, which are defined by the DIP switch settings. These settings are loaded for all BIOS configurations.	Yes / No	
Discard changes	Should unknown changes have been made and not yet saved, they can be discarded.	Yes / No	
Save changes	Settings are saved, and the system is not restarted.	Yes / No	

Table 172: 855GME - exit menu - setting options

1.2.9 Profile overview

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.

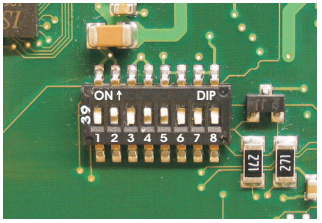


Figure 185: DIP switch on system unit

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

Number	Optimized for	DIP switch setting							
		1	2	3	4	5	6	7[1]	8[1]
Profile 0	Automation PC 620 system units 5PC600.SX01-00.	Off	Off	Off	Off	Off	Off	-	-
Profile 1	Reserved	On	Off	Off	Off	Off	Off	-	-
Profile 2	Automation PC 620 system units 5PC600.SX02-00, 5PC600.SX02-01, 5PC600.SX05-00 and 5PC600.SX05-01.	Off	On	Off	Off	Off	Off	-	-
Profile 3	Panel PC 700 system unit 5PC720.1043-00, 5PC720.1214-00, 5PC720.1505-00, 5PC720.1706-00, 5PC720.1906-00, 5PC781.1043-00, 5PC781.1505-00 and 5PC782.1043-00.	On	On	Off	Off	Off	Off	-	-
Profile 4	Panel PC 700 system unit 5PC720.1043-01, 5PC720.1214-01, 5PC720.1505-01 and 5PC720.1505-02.	Off	Off	On	Off	Off	Off	-	-

Table 173: 855GME - profile overview

1) Reserved.

The following pages provide an overview of the BIOS default settings for the different DIP switch configurations.

Personal settings

If changes have been made to the BIOS defaults, they can be entered in the personal settings column of the following tables for backup.

Main

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
System time	-	-	-	-	-	
System date	-	-	-	-	-	
SMART device monitoring	Enabled	Enabled	Enabled	Enabled	Enabled	
Primary master						
Type	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	
Primary slave						
Type	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	
Secondary master						
Type	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	
Secondary slave						
Type	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 174: 855GME - main - profile setting overview

Advanced

Advanced chipset/graphics control

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Graphics engine 1	Auto	Auto	Auto	Auto	Auto	
Default flat panel	XGA	XGA	XGA	None	None	
Flat panel scaling	Stretched	Stretched	Stretched	Stretched	Stretched	
Graphics engine 2	Auto	Auto	Auto	Auto	Auto	
Graphics engine	Graphics engine 1	Graphics engine 1	Graphics engine 1	Graphics engine 1	Graphics engine 1	
Graphics memory size	UMA = 8 MB	UMA = 8 MB	UMA = 8 MB	UMA = 8 MB	UMA = 8 MB	
Enable memory gap	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 175: 855GME - advanced chipset/graphics control - profile settings overview

PCI/PNP configuration

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
PNP OS installed	Yes	Yes	Yes	Yes	Yes	
Reset configuration data	No	No	No	No	No	
Secured setup configuration	Yes	Yes	Yes	Yes	Yes	
PCI IRQ line 1	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
PCI IRQ line 2	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
PCI IRQ line 3	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
PCI IRQ line 4	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
Onboard LAN IRQ line	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
Onboard USB EHCI IRQ line	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
Default primary video adapter	PCI	PCI	PCI	PCI	PCI	
Assign IRQ to SMB	Enabled	Enabled	Enabled	Enabled	Enabled	
PCI device, slot #1						
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Disabled	Disabled	Disabled	Disabled	Disabled	
Latency timer	Default	Default	Default	Default	Default	
PCI device, slot #2						
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Disabled	Disabled	Disabled	Disabled	Disabled	
Latency timer	Default	Default	Default	Default	Default	

Table 176: 855GME - PCI/PNP configuration - profile setting overview

PCI device, slot #3	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Disabled	Disabled	Disabled	Disabled	Disabled	
Latency timer	Default	Default	Default	Default	Default	
PCI device, slot #4						
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Disabled	Disabled	Disabled	Disabled	Disabled	
Latency timer	Default	Default	Default	Default	Default	
PCI/PNP ISA IRQ resource exclusion						
IRQ 3	Available	Available	Available	Available	Available	
IRQ 4	Available	Available	Available	Available	Available	
IRQ 5	Available	Available	Available	Available	Available	
IRQ 7	Available	Available	Available	Available	Available	
IRQ 9	Available	Available	Available	Available	Available	
IRQ 10	Available	Available	Available	Available	Available	
IRQ 11	Available	Available	Available	Available	Available	
IRQ 12	Available	Available	Available	Available	Available	
IRQ 15	Available	Available	Available	Available	Available	

Table 176: 855GME - PCI/PNP configuration - profile setting overview (cont.)

Memory cache

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Memory cache	Enabled	Enabled	Enabled	Enabled	Enabled	
Cache system BIOS area	Write protect	Write protect	Write protect	Write protect	Write protect	
Cache video BIOS area	Write protect	Write protect	Write protect	Write protect	Write protect	
Cache base 0-512k	Write back	Write back	Write back	Write back	Write back	
Cache base 512-640k	Write back	Write back	Write back	Write back	Write back	
Cache extended memory area	Write back	Write back	Write back	Write back	Write back	
Cache D000 - D3FF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache D400 - D7FF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache D800 - DBFF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache DC00 - DFFF	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 177: 855GME - memory cache - profile setting overview

I/O device configuration

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Local bus IDE adapter	Primary	**Both**	**Both**	Primary	**Both**	
Primary IDE UDMA66/100	Enabled	Enabled	Enabled	Enabled	Enabled	
Secondary IDE UDMA66/100	Enabled	Enabled	Enabled	Enabled	Enabled	
USB UHCI host controller 1	Enabled	Enabled	Enabled	Enabled	Enabled	
USB UHCI host controller 2	Enabled	Enabled	Enabled	Enabled	Enabled	
USB UHCI host controller	Enabled	Enabled	Enabled	Enabled	Enabled	
Legacy USB support	Enabled	Enabled	Enabled	Enabled	Enabled	
AC97 audio controller	Enabled	Enabled	Enabled	Enabled	Enabled	
Onboard LAN controller	Enabled	Enabled	Enabled	Enabled	Enabled	
Onboard LAN PXE ROM	Disabled	**Enabled**	Disabled	Disabled	Disabled	
Serial port A	Enabled	Enabled	Enabled	Enabled	Enabled	
Base I/O address	3F8	3F8	3F8	3F8	3F8	
Interrupt	IRQ 4	IRQ 4	IRQ 4	IRQ 4	IRQ 4	
Serial port B	Enabled	Enabled	Enabled	Enabled	Enabled	
Mode	Normal	Normal	Normal	Normal	Normal	
Base I/O address	3F8	3F8	3F8	3F8	3F8	
Interrupt	IRQ 3	IRQ 3	IRQ 3	IRQ 3	IRQ 3	
Parallel port	Enabled	Enabled	Enabled	Enabled	Enabled	
Base I/O address	378	378	378	378	378	

Table 178: 855GME - I/O device configuration - profile setting overview

Keyboard features

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
NumLock	On	On	On	On	On	
Key click	Disabled	Disabled	Disabled	Disabled	Disabled	
Keyboard auto-repeat rate	30/sec	30/sec	30/sec	30/sec	30/sec	
Keyboard auto-repeat delay	1/2 sec	1/2 sec	1/2 sec	1/2 sec	1/2 sec	

Table 179: 855GME - keyboard features - profile setting overview

CPU board monitor

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
VCC 3.3V voltage	-	-	-	-	-	
CPU core voltage	-	-	-	-	-	
5Vsb voltage	-	-	-	-	-	
Battery voltage	-	-	-	-	-	
CPU temperature	-	-	-	-	-	

Table 180: 855GME - CPU board monitor - profile setting overview

Miscellaneous

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Summary screen	Enabled	Enabled	Enabled	Enabled	Enabled	
QuickBoot mode	Enabled	Enabled	Enabled	Enabled	Enabled	
Extended memory testing	Just zero it	Just zero it	Just zero it	Just zero it	Just zero it	
Dark boot	Disabled	Disabled	Disabled	Disabled	Disabled	
Halt on errors	Yes	Yes	Yes	Yes	Yes	
PS/2 mouse	Disabled	**Enabled**	Disabled	Disabled	Disabled	
Large disk access mode	DOS	DOS	DOS	DOS	DOS	

Table 181: 855GME - miscellaneous - profile setting overview

Baseboard/panel features

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Versions	-	-	-	-	-	
BIOS	-	-	-	-	-	
MTCX	-	-	-	-	-	
FPGA	-	-	-	-	-	
Optimized ID	-	-	-	-	-	
Device ID	-	-	-	-	-	
Compatibility ID	-	-	-	-	-	
Serial number	-	-	-	-	-	
Product name	-	-	-	-	-	
User serial ID	-	-	-	-	-	
Panel control	**Profile 0**	**Profile 1**	**Profile 2**	**Profile 3**	**Profile 4**	**Personal settings**
Select panel number	0	0	0	0	0	
Version	-	-	-	-	-	
Brightness	100%	100%	100%	100%	100%	

Table 182: 855GME - baseboard/panel features - profile setting overview

Temperature	-	-	-	-	-	
Fan speed	-	-	-	-	-	
Keys/LEDs	-	-	-	-	-	
Baseboard monitor						
Temperatures	-	-	-	-	-	
I/O	-	-	-	-	-	
Power supply	-	-	-	-	-	
Slide-in drive 1	-	-	-	-	-	
Slide-in drive 2	-	-	-	-	-	
Fan speeds	-	-	-	-	-	
Case 1	-	-	-	-	-	
Case 2	-	-	-	-	-	
Case 3	-	-	-	-	-	
Case 4	-	-	-	-	-	
CPU	-	-	-	-	-	
Legacy devices						
COM C	Disabled	Disabled	Disabled	**Enabled**	**Enabled**	
Base I/O address	-	-	-	**3E8h**	**3E8h**	
Interrupt	-	-	-	**11**	**11**	
COM D	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-	-	-	
COM E	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-	-	-	
LPT	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
CAN	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-	-	-	
2nd LAN controller	Enabled	Enabled	Enabled	Enabled	Enabled	

Table 182: 855GME - baseboard/panel features - profile setting overview (cont.)

Security

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Supervisor password is	Clear	Clear	Clear	Clear	Clear	
User password is	Clear	Clear	Clear	Clear	Clear	
Set supervisor password	-	-	-	-	-	
Set user password	-	-	-	-	-	
Diskette access	Supervisor	Supervisor	Supervisor	Supervisor	Supervisor	
Fixed disk boot sector	Normal	Normal	Normal	Normal	Normal	
Virus check reminder	Disabled	Disabled	Disabled	Disabled	Disabled	
System backup reminder	Disabled	Disabled	Disabled	Disabled	Disabled	
Password at boot	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 183: 855GME - security - profile setting overview

Power

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Enable ACPI	Yes	Yes	Yes	Yes	Yes	
Max CPU frequency	Dependant on processor	Dependant on processor	Dependant on processor	Dependant on processor	Dependant on processor	
Automatic thermal control circuit	TM2	TM2	TM2	TM2	TM2	
Power savings	Disabled	Disabled	Disabled	Disabled	Disabled	
Standby timeout	-	-	-	-	-	
Auto suspend timeout	-	-	-	-	-	
Hard disk timeout	Disabled	Disabled	Disabled	Disabled	Disabled	
Video timeout	Disabled	Disabled	Disabled	Disabled	Disabled	
Resume on modem ring	Off	Off	Off	Off	Off	
Resume on time	Off	Off	Off	Off	Off	
Resume time	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	
Power supply	ATX	ATX	ATX	ATX	ATX	
Power button function	Power off	Power off	Power off	Power off	Power off	
Power loss control	Power-on	Power-on	Power-on	Power-on	Power-on	
ACPI control						
Active trip point	Disabled	Disabled	Disabled	Disabled	Disabled	
Passive cooling trip point	Disabled	Disabled	Disabled	Disabled	Disabled	
Critical trip point	110°C	110°C	110°C	110°C	110°C	
APIC - I/O APIC mode	Disabled	**Enabled**	Disabled	Disabled	Disabled	
Native IDE support	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 184: 855GME - power - profile setting overview

Boot

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Boot priority order						
1:	IDE 0	**PCI BEV**	IDE 0	IDE 0	IDE 0	
2:	IDE 1	**IDE 0**	IDE 1	IDE 1	IDE 1	
3:	IDE CD	**IDE 1**	IDE CD	IDE CD	IDE CD	
4:	USB FDC	**IDE CD**	USB FDC	USB FDC	USB FDC	
5:	USB KEY	**USB FDC**	USB KEY	USB KEY	USB KEY	
6:	USB CDROM	**USB KEY**	USB CDROM	USB CDROM	USB CDROM	
7:	-	**USB CDROM**	-	**IDE 2**	**IDE 2**	
8:	-	-	-	**IDE 3**	**IDE 3**	
Excluded from boot order						
:	IDE 2	IDE 2	IDE 2	**USB HDD**	**USB HDD**	
:	IDE 3	IDE 3	IDE 3	**USB ZIP**	**USB ZIP**	
:	USB HDD	USB HDD	USB HDD	**USB LS120**	**USB LS120**	
:	USB ZIP	USB ZIP	USB ZIP	**PCI BEV**	**PCI BEV**	
:	USB LS120	USB LS120	USB LS120	**PCI SCSI**	**PCI SCSI**	
:	PCI BEV	**PCI SCSI**	PCI BEV	**Bootable add-in cards**	**Bootable add-in cards**	
:	PCI SCSI	**Bootable add-in cards**	PCI SCSI			
:	Bootable add-in cards		Bootable add-in cards			

Table 185: 855GME - boot - profile setting overview

1.3 BIOS upgrade

Warning!

The upgrade procedures described in the following pages must be carried out for all PPC700 systems with software versions lower than those listed in the following table.

CPU board software	815E	855GME
BIOS	< R017	< R007
MTCX PX32 firmware	< V1.19	< V1.19
MTCX FPGA firmware	< V1.06	< V1.06

Table 186: CPU board software versions

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

Table 187: Automation panel link software versions

1.3.1 Requirements

The following peripheral devices are needed for a software upgrade:

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

1.3.2 What information do I need?

Before starting the upgrade, you should know the CPU board type (815E or 855GME) and the various software versions.

Which CPU board do I have?

After switching on the PPC700, the installed CPU board can be identified by the letter "B" or "C".

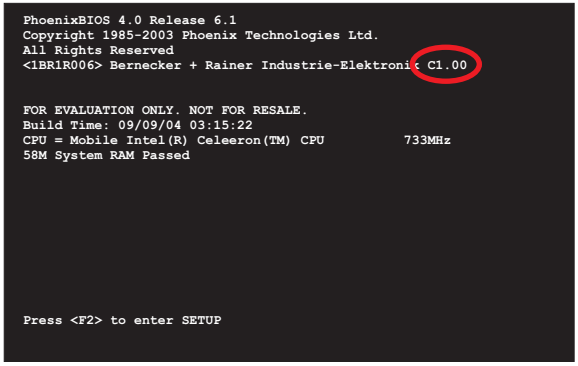


Figure 186: Differentiating between 815E and 855GME CPU boards

Letter	CPU board	Model number
B	855GME	5PC600.E855-00
C	815E	5PC600.E815-00, 5PC600.E815-02, 5PC600.E815-03

Table 188: Differentiating between 815E and 855GME CPU boards

Which BIOS version and firmware are already installed on the PPC700?

This information can be found on the same BIOS setup page for both the 815E and the 855GME CPU boards:

- After switching on the PPC700, you can get to the BIOS setup by pressing "F2".
- From the BIOS main menu "advanced" (top), select "baseboard/panel features" (bottom):

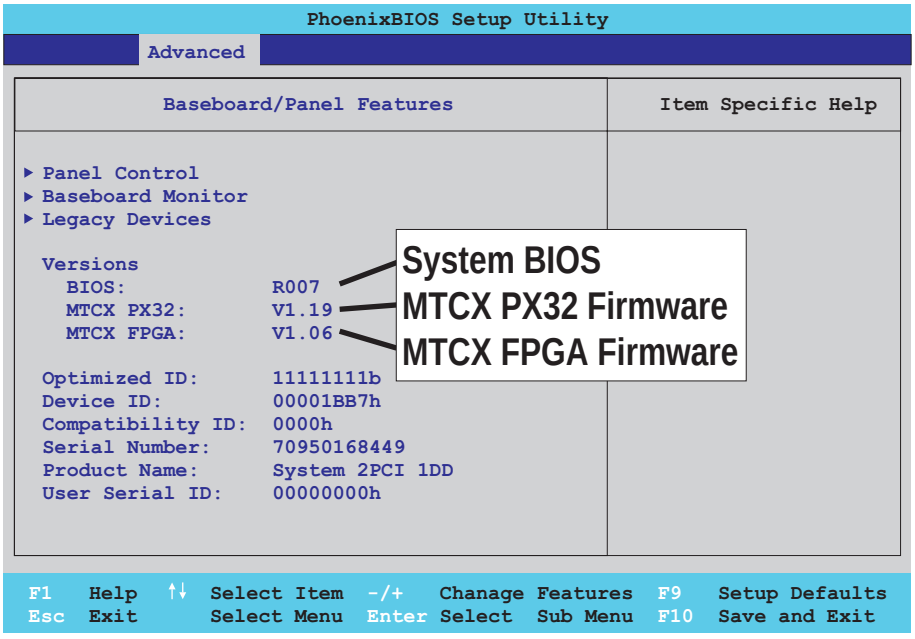


Figure 187: Software versions

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

This information can be found on the same BIOS setup page for both the 815E and the 855GME CPU boards:

- After switching on the PPC700, you can get to the BIOS setup by pressing "F2".
- From the BIOS main menu "advanced" (top), select "baseboard/panel features" (bottom) and then "panel control":

Information:

The version can only be shown if an Automation Panel with Automation Panel Link SDL transceiver (5DLSDL.1000-01) and Automation Panel Link SDL receiver (5DLSDL.1000-00) is connected.

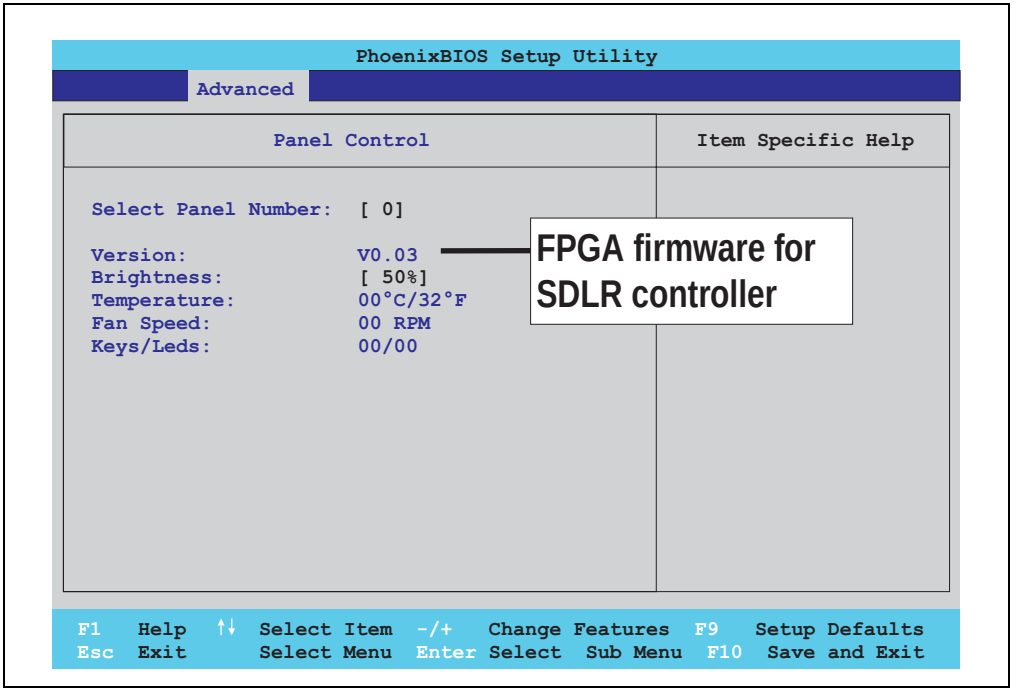


Figure 188: Firmware version of Automation Panel Link SDL transceiver/receiver

1.3.3 Upgrade BIOS for 815E

- Download and unzip the zip file from the B&R homepage.
- Copy the files to an MS-DOS startup disk (information about creating a bootable disk can be found in section 1.3.8 "Creating a DOS boot diskette in Windows XP" on page 342).
- Place the diskette in the USB floppy drive and reboot the PPC700.
- The following boot menu will be shown after startup

```
1. Upgrade PHOENIX BIOS for 815E

2. Exit
```

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

Concerning option 2:
Return to the shell (MS-DOS).

- The system must be rebooted after a successful upgrade.

Information:

When the system has rebooted, setup default values must be reloaded after the Checksum error message (press F1 or select "load setup defaults" in the BIOS setup "exit" menu). Afterwards, the time and date must be set again.

When using a system unit with 2 PCI slots, the DIP switches on the system unit must be set to profile position 2. When using a system unit with 1 PCI slot, the DIP switches do not have to be changed.

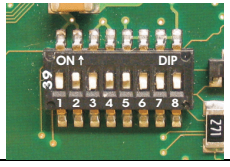


Figure 189: DIP switch on system unit (example)

Number	Optimized for device	DIP switch setting							
		1	2	3	4	5	6	7[1)]	8[1)]
Profile 0	Automation PC 620 system units 5PC600.SX01-00.	Off	Off	Off	Off	Off	Off	-	-
Profile 1	Reserved	On	Off	Off	Off	Off	Off	-	-
Profile 2	Automation PC 620 system units 5PC600.SX02-00, 5PC600.SX02-01, 5PC600.SX05-00 and 5PC600.SX05-01.	Off	On	Off	Off	Off	Off	-	-

Table 189: Profile overview

Number	Optimized for device	DIP switch setting							
		1	2	3	4	5	6	7[1)]	8[1)]
Profile 3	Panel PC 700 system unit 5PC720.1043-00, 5PC720.1214-00, 5PC720.1505-00, 5PC720.1706-00, 5PC720.1906-00, 5PC781.1043-00, 5PC781.1505-00 and 5PC782.1043-00.	On	On	Off	Off	Off	Off	-	-
Profile 4	Panel PC 700 system unit 5PC720.1043-01, 5PC720.1214-01, 5PC720.1505-01 and 5PC720.1505-02.	Off	Off	On	Off	Off	Off	-	-

Table 189: Profile overview (cont.)

1) Not required. Free.

1.3.4 Upgrade BIOS for 855GME

- Download and unzip the zip file from the B&R homepage.
- Copy the files to an MS-DOS startup disk (information about creating a bootable disk can be found in section 1.3.8 "Creating a DOS boot diskette in Windows XP" on page 342).
- Place the diskette in the USB floppy drive and reboot the PPC700.
- The following boot menu will be shown after startup

```
1. Upgrade PHOENIX BIOS for 855GME

2. Exit
```

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

Concerning option 2:
Return to the shell (MS-DOS).

- The system must be rebooted after a successful upgrade.

Information:

When the system has rebooted, Load Setup Default values must be reloaded after the Checksum error message (press F1 or select "Load Setup Defaults" in the BIOS setup "Exit" menu). Afterwards, the time and date must be set again.

When using a system unit with 2 PCI slots, the DIP switches on the system unit must be set to profile position 2. When using a system unit with 1 PCI slot, the DIP switches do not have to be changed.

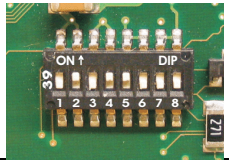


Figure 190: DIP switch on system unit (example)

Number	Optimized for device	DIP switch setting							
		1	2	3	4	5	6	7[1)]	8[1)]
Profile 0	Automation PC 620 system units 5PC600.SX01-00.	Off	Off	Off	Off	Off	Off	-	-
Profile 1	Reserved	On	Off	Off	Off	Off	Off	-	-
Profile 2	Automation PC 620 system units 5PC600.SX02-00, 5PC600.SX02-01, 5PC600.SX05-00 and 5PC600.SX05-01.	Off	On	Off	Off	Off	Off	-	-
Profile 3	Panel PC 700 system unit 5PC720.1043-00, 5PC720.1214-00, 5PC720.1505-00, 5PC720.1706-00, 5PC720.1906-00, 5PC781.1043-00, 5PC781.1505-00 and 5PC782.1043-00.	On	On	Off	Off	Off	Off	-	-
Profile 4	Panel PC 700 system unit 5PC720.1043-01, 5PC720.1214-01, 5PC720.1505-01 and 5PC720.1505-02.	Off	Off	On	Off	Off	Off	-	-

Table 190: Profile overview

1) Not required. Free.

1.3.5 Upgrade the firmware

Depending on the design, a PPC700 system is equipped with several controllers (MTCX, SDLR). The firmware can be upgraded individually.

- Download and unzip the zip file from the B&R homepage.
- Copy the files to an MS-DOS startup disk (information about creating a bootable disk can be found in section 1.3.8 "Creating a DOS boot diskette in Windows XP" on page 342).
- Place the diskette in the USB floppy drive and reboot the PPC700.
- The following boot menu will be shown after startup:

```
1. Upgrade MTCX PX32 and FPGA

2. Upgrade MTCX PX32 only

3. Upgrade MTCX FPGA only

4. Upgrade SDLR on Panel 0 only

5. Exit
```

Concerning option 1:
Automatically upgrade PX32 and FPGA for MTCX (default after 5 seconds).

Concerning option 2:
Automatically upgrade PX32 for MTCX.

Concerning option 3:
Automatically upgrade FPGA for MTCX.

Concerning option 4:
Automatically upgrade FPGA firmware for SDLR controller on Panel 0.

Warning!

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

Concerning option 5:
Return to the shell (MS-DOS).

1.3.6 Installing the graphics chip driver for 815E CPU boards

The following must be observed when installing the graphics chip driver for the graphics chip integrated in the 815E chip set:

- The driver available from Intel is NOT permitted to be used, only the driver available from B&R (www.br-automation.com).
- After unpacking the *.zip file, the driver must be updated using the Windows Device Manager "Start - Control Panel - System - Hardware - Device Manager - Update Driver". When doing this, use the file **i81xnt5.inf**.
- The initial installation of the driver can only be carried out with an external monitor connected. After successfully installing the B&R driver, an Automation Panel can be operated without problems.

Caution!

Presently, this driver is only approved for the Windows XP Professional and Windows XP embedded operating systems.

1.3.7 Windows XP Embedded and BIOS upgrade

If the following error message appears after upgrading BIOS:

`"Copy Error"`

`"Setup cannot copy the file Audio3d.dll"`

then the audio driver must be reinstalled.

To do this, use the audio driver from the B&R Homepage (www.br-automation.com).

During the installation of the audio driver, the following 2 files must be manually selected from the following directories.

`ksuser.dll` `in the directory ...\Windows\system32`

`ks.sys` `in the directory ...\Windows\system32\drivers`

This applies to 815E and 855ME CPU boards.

In order to be able to set up all possible resolutions when using an 815E CPU board, the graphics driver must be installed (see 1.3.6 "Installing the graphics chip driver for 815E CPU boards").

1.3.8 Creating a DOS boot diskette in Windows XP

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

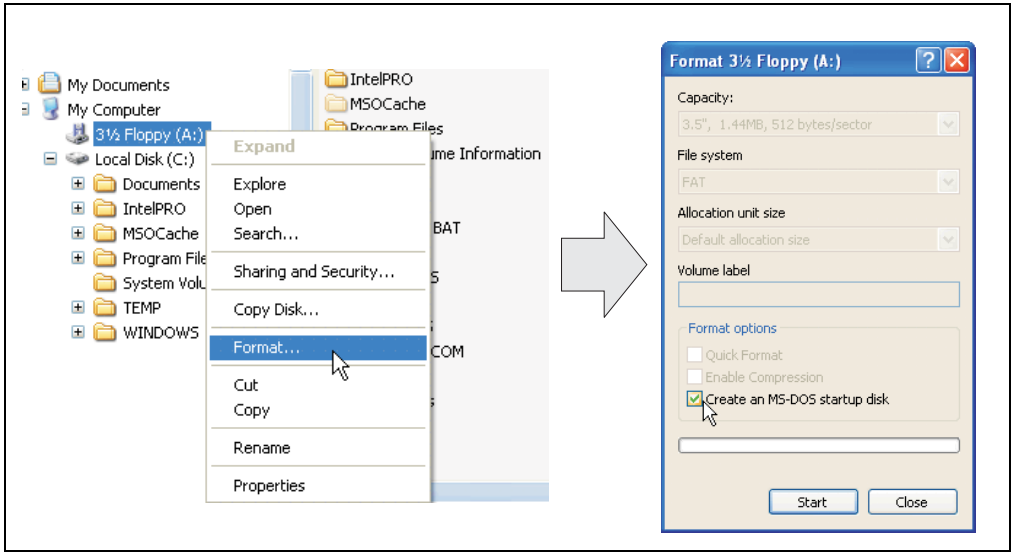


Figure 191: Creating a bootable diskette in Windows XP - step 1

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

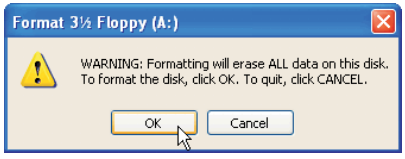


Figure 192: Creating a bootable diskette in Windows XP - step 2

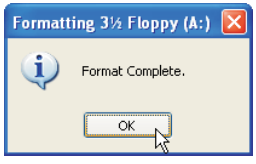
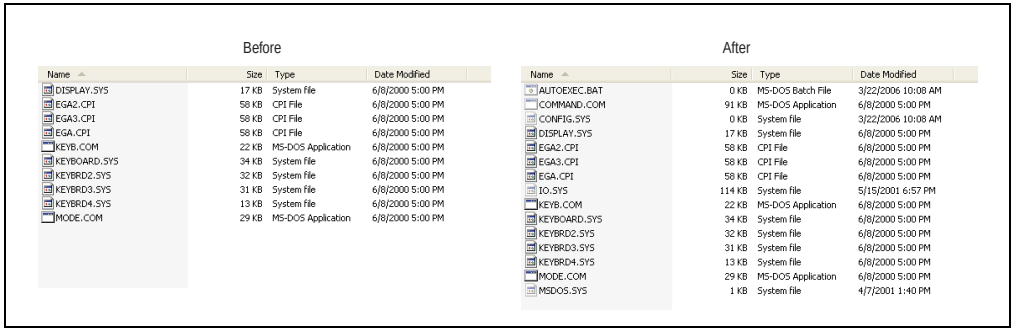


Figure 193: Creating a bootable diskette in Windows XP - step 3

After creating the startup disk, some of the files must be deleted because of the size of the update.

When doing this, all files (hidden, system files, etc.) must be shown on the diskette.

In Explorer, go to the "tools" menu, select "folder options..." and open the "view" tab - now uncheck the option "hide protected operating system files (recommended)" (checked as default) and check the option "show hidden files and folders".



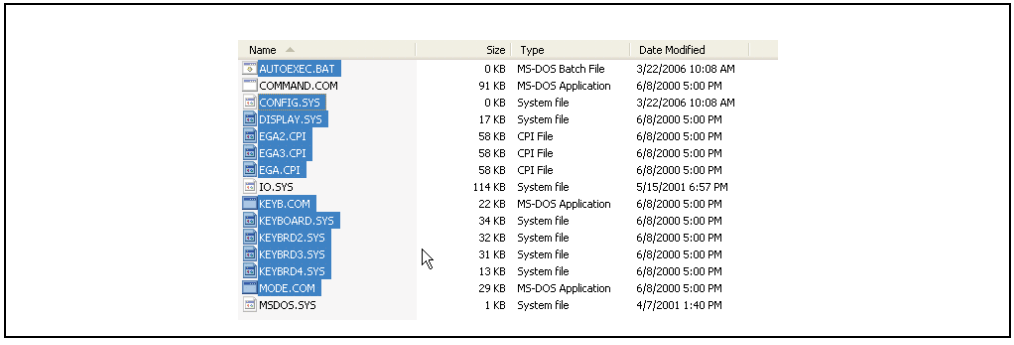
Before

Name	Size	Type	Date Modified
DISPLAY.SYS	17 KB	System file	6/8/2000 5:00 PM
EGA2.CPI	58 KB	CPI File	6/8/2000 5:00 PM
EGA3.CPI	58 KB	CPI File	6/8/2000 5:00 PM
EGA.CPI	58 KB	CPI File	6/8/2000 5:00 PM
KEYB.COM	22 KB	MS-DOS Application	6/8/2000 5:00 PM
KEYBOARD.SYS	34 KB	System file	6/8/2000 5:00 PM
KEYBRD2.SYS	32 KB	System file	6/8/2000 5:00 PM
KEYBRD3.SYS	31 KB	System file	6/8/2000 5:00 PM
KEYBRD4.SYS	13 KB	System file	6/8/2000 5:00 PM
MODE.COM	29 KB	MS-DOS Application	6/8/2000 5:00 PM

After

Name	Size	Type	Date Modified
AUTOEXEC.BAT	0 KB	MS-DOS Batch File	3/22/2006 10:08 AM
COMMAND.COM	91 KB	MS-DOS Application	6/8/2000 5:00 PM
CONFIG.SYS	0 KB	System file	3/22/2006 10:08 AM
DISPLAY.SYS	17 KB	System file	6/8/2000 5:00 PM
EGA2.CPI	58 KB	CPI File	6/8/2000 5:00 PM
EGA3.CPI	58 KB	CPI File	6/8/2000 5:00 PM
EGA.CPI	58 KB	CPI File	6/8/2000 5:00 PM
IO.SYS	114 KB	System file	5/15/2001 6:57 PM
KEYB.COM	22 KB	MS-DOS Application	6/8/2000 5:00 PM
KEYBOARD.SYS	34 KB	System file	6/8/2000 5:00 PM
KEYBRD2.SYS	32 KB	System file	6/8/2000 5:00 PM
KEYBRD3.SYS	31 KB	System file	6/8/2000 5:00 PM
KEYBRD4.SYS	13 KB	System file	6/8/2000 5:00 PM
MODE.COM	29 KB	MS-DOS Application	6/8/2000 5:00 PM
MSDOS.SYS	1 KB	System file	4/7/2001 1:40 PM

Figure 194: Creating a bootable diskette in Windows XP - step 4



Name	Size	Type	Date Modified
AUTOEXEC.BAT	0 KB	MS-DOS Batch File	3/22/2006 10:08 AM
COMMAND.COM	91 KB	MS-DOS Application	6/8/2000 5:00 PM
CONFIG.SYS	0 KB	System file	3/22/2006 10:08 AM
DISPLAY.SYS	17 KB	System file	6/8/2000 5:00 PM
EGA2.CPI	58 KB	CPI File	6/8/2000 5:00 PM
EGA3.CPI	58 KB	CPI File	6/8/2000 5:00 PM
EGA.CPI	58 KB	CPI File	6/8/2000 5:00 PM
IO.SYS	114 KB	System file	5/15/2001 6:57 PM
KEYB.COM	22 KB	MS-DOS Application	6/8/2000 5:00 PM
KEYBOARD.SYS	34 KB	System file	6/8/2000 5:00 PM
KEYBRD2.SYS	32 KB	System file	6/8/2000 5:00 PM
KEYBRD3.SYS	31 KB	System file	6/8/2000 5:00 PM
KEYBRD4.SYS	13 KB	System file	6/8/2000 5:00 PM
MODE.COM	29 KB	MS-DOS Application	6/8/2000 5:00 PM
MSDOS.SYS	1 KB	System file	4/7/2001 1:40 PM

Figure 195: Creating a bootable diskette in Windows XP - step 5

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

2. Panel PC 700 with Windows CE

Model number	Short description	Note
9S0001.29-020	**WinCE5.0 Pro** Windows CE 5.0 Image, the size of the CompactFlash card must be specified in the order. Only delivered with a new industrial PC.	
9S0001.32-020	**WinCE5.0 Pro APC620,PPC700** 128 MB CompactFlash with Windows CE 5.0. Only delivered with a new industrial PC.	
9S0001.34-020	**WinCE5.0 ProPlus APC620,PPC700** 128 MB CompactFlash with Windows CE 5.0 including the following licensed Viewers (PDF, Power Point, Word, Excel and CE Image Viewer). Only delivered with a new industrial PC.	
9S0001.36-020	**WinCE5.0 ProPlus** Windows CE 5.0 Image, including the following licensed Viewers (PDF, Power Point, Word, Excel und CE Image Viewer), the size of the CompactFlash card must be specified in the order. Only delivered with a new industrial PC.	

Table 191: Model numbers - Windows CE

2.1 General information

Windows CE is an operating system which is optimally tailored to B&R's devices. It includes only the functions and modules which are required by each device. This makes this operating system extremely robust and stable.

Advantages

- Windows CE is a 32-bit operating system with multitasking and multithreading capabilities.
- In addition to being compact, it even offers high performance for configurations with limited RAM.
- Windows CE is best suited for integrated automation used in industrial systems.
- Windows CE is also less expensive than other Windows licenses.

2.2 Properties in connection with PPC700 devices

Detailed information about Windows CE for B&R devices can be downloaded in the download area on the B&R homepage (www.br-automation.com).

Features	Windows CE 5.0 for PPC700
Supported screen resolutions	VGA, SVGA, XGA
Color depth	16-bit or 65536 colors
Graphics card driver	Intel® embedded graphics driver
Main memory	Automatic detection and use of up to 512 MB
Boot time / Startup time	Approx. 39 seconds [1)]
Included web browser	Internet Explorer 6 for Windows CE
.NET	Compact Framework V2.0
Image size	Approx. 29 MB[2)] (not compressed)
Custom keys	Supported
PVI	Supported

Table 192: Properties for Windows CE 5.0 and PPC700

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

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

2.3 Requirements

The device must fulfill the following criteria to be able run the Windows CE operating system.

- At least 128 MB main memory
- At least one 32 MB CompactFlash card (size should be specified when ordering von 9S0001.29-020 and 9S0001.36-020)

2.4 Installation

Windows CE is usually preinstalled at B&R Austria.

2.4.1 B&R eMbedded OS Installer

The B&R eMbedded OS Installer allows you to install existing B&R Windows CE images. The four files (NK.BIN, BLDR, LOGOXRES.BMP, and LOGOQVGA.BMP) must be provided from an already functioning B&R Windows CE installation.

The B&R eMbedded OS Installer can be downloaded for free from the download area on the B&R homepage (www.br-automation.com). Further information is available in the online help for the B&R eMbedded OS Installer.

2.5 Known problems

- The ATAPI driver being used doesn't support DMA transfers. All devices (CompactFlash cards, hard drives, etc.) are operated in PIO mode.
- USB 2.0 (EHCI) fails sporadically.
- The graphics driver "Clone mode" only functions if the setting "Graphics Engine 2" has been made under the BIOS setting "Primary Graphics Engine".

Chapter 5 • Standards and certifications

1. Applicable European guidelines

- EMC guidelines 89/336/EWG
- Low-voltage guidelines 73/23/EWG
- Machine guidelines 98/37/EG

2. Overview of standards

The Panel PC 700 as an entire device meets the following standards:

Standard	Description
EN 50081-2	Electromagnetic compatibility (EMC), generic emission standard - part 2: Industrial environments (EN 50081-2 has been replaced by EN 61000-6-4)
EN 50082-2	Electromagnetic compatibility (EMC), generic immunity standard - part 2: Industrial environments (EN 50082-2 has been replaced by EN 61000-6-2)
EN 55011 Class A	Electromagnetic compatibility (EMC), radio disturbance product standard, industrial, scientific, and medical high-frequency devices (ISM devices), limit values and measurement procedure; group 1 (devices that do not create HF during material processing) and group 2 (devices that create HF during material processing)
EN 55022 Class A	Electromagnetic compatibility (EMC), radio disturbance characteristics, information technology equipment (ITE devices), limits and methods of measurement
EN 55024 Class A	Electromagnetic compatibility (EMC), immunity characteristics, information technology equipment (ITE devices), limits and methods of measurement
EN 60060-1	High-voltage test techniques - part 1: General specifications and testing conditions
EN 60068-2-1	Environmental testing - part 2: Tests; test A: Dry cold
EN 68068-2-2	Environmental testing - part 2: Tests; test B: Dry heat
EN 60068-2-3	Environmental testing - part 2: Tests; test and guidance: Damp heat, constant
EN 60068-2-6	Environmental testing - part 2: Tests; test: Vibration (sinusoidal)
EN 60068-2-14	Environmental testing - part 2: Tests; test N: Change of temperature
EN 60068-2-27	Environmental testing - part 2: Tests; test and guidance: Shock
EN 60068-2-30	Environmental testing - part 2: Tests; test and guidance: Damp heat, cyclic
EN 60068-2-31	Environmental testing - part 2: Tests; test: Drop and topple, primarily for equipment-type specimens
EN 60068-2-32	Environmental testing - part 2: Tests; test: Free fall
EN 60204-1	Safety of machinery, electrical equipment on machines - part 1: General requirements

Table 193: Overview of standards

Standard	Description
EN 60529	Degrees of protection provided by enclosures (IP code)
EN 60721-3-2	Classification of environmental conditions - part 3: Classification of groups of environmental parameters and their severities, section 2: Transportation
EN 60721-3-3	Classification of environmental conditions - part 3: Classification of groups of environmental parameters and their severities, section 3: Stationary use at weather-protected locations
EN 61000-4-2	Electromagnetic compatibility (EMC) - part 4-2: Testing and measuring techniques; electrostatic discharge immunity test
EN 61000-4-3	Electromagnetic compatibility (EMC) - part 4-3: Testing and measuring techniques; radiated radio-frequency electromagnetic field immunity test
EN 61000-4-4	Electromagnetic compatibility (EMC) - part 4-4: Testing and measuring techniques; electrical fast transient/burst immunity test
EN 61000-4-5	Electromagnetic compatibility (EMC) - part 4-5: Testing and measuring techniques; surge immunity test
EN 61000-4-6	Electromagnetic compatibility (EMC) - part 4-6: Testing and measuring techniques; immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-8	Electromagnetic compatibility (EMC) - part 4-8: Testing and measuring techniques; power frequency magnetic field immunity test
EN 61000-4-11	Electromagnetic compatibility (EMC) - part 4-11: Testing and measuring techniques; voltage dips, short interruptions and voltage variations immunity tests
EN 61000-4-12	Electromagnetic compatibility (EMC) - part 4-12: Testing and measuring techniques; oscillatory waves immunity test
EN 61000-4-17	Electromagnetic compatibility (EMC) - part 4-12: Testing and measuring techniques; ripple on DC input power port immunity test
EN 61000-6-2 (EN 50082-2)	Electromagnetic compatibility (EMC), generic immunity standard - part 2: industrial environments (EN 50082-2 has been replaced by EN 61000-6-2)
EN 61000-6-4 (EN 50081-2)	Electromagnetic compatibility (EMC), generic emission standard - part 2: industrial environments (EN 50081-2 has been replaced by EN 61000-6-4)
EN 61131-2 IEC 61131-2	Product standard, programmable logic controllers - part 2: equipment requirements and tests
UL 508	Industrial control equipment (UL = Underwriters Laboratories)
47 CFR	Federal Communications Commission (FCC), 47 CFR Part 15 Subpart B Class A

Table 193: Overview of standards (cont.)

3. Requirements for emissions

Emission	Test carried out according to	Limits according to
Network-related emissions	EN 55011 / EN 55022	EN 61000-6-4: Generic standard (industrial areas)
		EN 55011: Industrial, scientific, and medical (ISM) radio-frequency equipment, class A (industrial areas)
		EN 55022: Information technology equipment (ITE devices), class A (industrial areas)
		EN 61131-2: Programmable logic controllers
		47 CFR Part 15 Subpart B Class A (FCC)
Emissions, electromagnetic emissions	EN 55011 / EN 55022	EN 61000-6-4: Generic standard (industrial areas)
		EN 55011: Industrial, scientific, and medical (ISM) radio-frequency equipment, class A (industrial areas)
		EN 55022: Information technology equipment (ITE devices), class A (industrial areas)
		EN 61131-2: Programmable logic controllers
		47 CFR Part 15 Subpart B Class A (FCC)

Table 194: Overview of limits and testing guidelines for emissions

3.1 Network related emissions

Test carried out according to EN 55011 / EN 55022	Limits according to EN 61000-6-4	Limits according to EN 55011 class A	Limits according to EN 55022 class A
Power mains connections 150 kHz - 500 kHz	-	79 dB (µV) quasi-peak value 66 dB (µV) average	79 dB (µV) quasi-peak value 66 dB (µV) average
Power mains connections 500 kHz - 30 MHz	-	73 dB (µV) quasi-peak value 60 dB (µV) average	73 dB (µV) quasi-peak value 60 dB (µV) average
AC mains connections 150 kHz - 500 kHz	79 dB (µV) quasi-peak value 66 dB (µV) average	-	-
AC mains connections 500 kHz - 30 MHz	73 dB (µV) quasi-peak value 60 dB (µV) average	-	-
Other connections 150 kHz - 500 kHz	-	-	97 - 87 dB (µV) and 53 - 43 dB (µA) quasi-peak value 84 - 74 dB (µV) and 40 - 30 dB (µA) average
Other connections 500 kHz - 30 MHz	-	-	87 dB (µV) and 43 dB (µA) quasi-peak value 74 dB (µV) and 30 dB (µA) average
Test carried out according to EN 55011 / EN 55022	**Limits according to EN 61131-2**	**Limits according to 47 CFR Part 15 Subpart B class A**	
Power mains connections [1)] 150 kHz - 500 kHz	79 dB (µV) quasi-peak value 66 dB (µV) average	-	
Power mains connections 500 kHz - 30 MHz	73 dB (µV) quasi-peak value 60 dB (µV) average	-	
AC mains connections 150 kHz - 500 kHz	-	79 dB (µV) quasi-peak value 66 dB (µV) average	
AC mains connections 500 kHz - 30 MHz	-	73 dB (µV) quasi-peak value 60 dB (µV) average	

Table 195: Test requirements - network-related emissions for industrial areas

Other connections 150 kHz - 500 kHz	Only informative for cable lengths > 10 m 40 - 30 dB (µA) quasi-peak value 30 - 20 dB (µA) average	-	-
Other connections 500 kHz - 30 MHz	Only informative for cable lengths > 10 m 30 dB (µA) quasi-peak value 20 dB (µA) average	-	-

Table 195: Test requirements - network-related emissions for industrial areas (cont.)

1) AC network connections only with EN 61131-2

3.2 Emissions / Electromagnetic emissions

Test carried out according to EN 55011 / EN 55022	Limits according to EN 61000-6-4	Limits according to EN 55011 class A	Limits according to EN 55022 class A
30 MHz - 230 MHz measured at a distance of 10 m	< 40 dB (µV/m) quasi-peak value	< 40 dB (µV/m) quasi-peak value	< 40 dB (µV/m) quasi-peak value
230 MHz - 1 GHz measured at a distance of 10 m	< 47 dB (µV/m) quasi-peak value	< 47 dB (µV/m) quasi-peak value	< 47 dB (µV/m) quasi-peak value
Test carried out according to EN 55011 / EN 55022	**Limits according to EN 61131-2**		
30 MHz - 230 MHz measured at a distance of 10 m	< 40 dB (µV/m) quasi-peak value		
230 MHz - 1 GHz measured at a distance of 10 m	< 47 dB (µV/m) quasi-peak value		
Test carried out	**Limits according to 47 CFR Part 15 Subpart B class A**		
30 MHz - 88 MHz measured at a distance of 10 m	< 90 dB (µV/m) quasi-peak value		
88 MHz - 216 MHz measured at a distance of 10 m	< 150 dB (µV/m) quasi-peak value		
216 MHz - 960 MHz measured at a distance of 10 m	< 210 dB (µV/m) quasi-peak value		
>960 MHz measured at a distance of 10 m	< 300 dB (µV/m) quasi-peak value		

Table 196: : Test requirements - electromagnetic emissions for industrial areas

4. Requirements for immunity to disturbances

Immunity	Test carried out according to	Limits according to
Electrostatic discharge (ESD)	EN 61000-4-2	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
		EN 55024: Information technology equipment (ITE devices)
Immunity against high-frequency electromagnetic fields (HF field)	EN 61000-4-3	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
		EN 55024: Information technology equipment (ITE devices)
Immunity to high-speed transient electrical disturbances (burst)	EN 61000-4-4	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
		EN 55024: Information technology equipment (ITE devices)
Immunity to surge voltages	EN 61000-4-5	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
		EN 55024: Information technology equipment (ITE devices)
Immunity to conducted disturbances	EN 61000-4-6	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
		EN 55024: Information technology equipment (ITE devices)
Immunity against magnetic fields with electrical frequencies	EN 61000-4-8	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
		EN 55024: Information technology equipment (ITE devices)
Immunity to voltage dips, short-term interruptions and voltage fluctuations	EN 61000-4-11	EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
		EN 55024: Information technology equipment (ITE devices)
Immunity to damped vibration	EN 61000-4-12	EN 61000-6-2: Generic standard (industrial areas)
		EN 61000-6-2: Generic standard (industrial areas)
		EN 61131-2: Programmable logic controllers
		EN 55024: Information technology equipment (ITE devices)

Table 197: Overview of limits and testing guidelines for immunity

Evaluation criteria according to EN 61000-6-2

Criteria A:
The operating equipment must continue to work as intended **during** the test. There should be no interference in the operating behavior and no system failures below a minimum operating quality as defined by the manufacturer.

Criteria B:
The operating equipment must continue to work as intended **after** the test. There should be no interference in the operating behavior and no system failures below a minimum operating quality as defined by the manufacturer.

Criteria C:
A temporary function failure is permitted when the function restores itself, or the function can be restored by activating configuration and control elements.

Criteria D:
Impairment or failure of the function, which can no longer be established (operating equipment destroyed).

4.1 Electrostatic discharge (ESD)

Test carried out according to EN 61000-4-2	Limits according to EN 61000-6-2	Limits according to EN 61131-2	Limits according to EN 55024
Contact discharge to powder-coated and bare metal housing parts	± 4 kV, 10 discharges, criteria B	± 4 kV, 10 discharges, criteria B	± 4 kV, 10 discharges, criteria B
Discharge through the air to plastic housing parts	± 8 kV, 10 discharges, criteria B	± 8 kV, 10 discharges, criteria B	± 8 kV, 10 discharges, criteria B

Table 198: Test requirements - electrostatic discharge (ESD)

4.2 High-frequency electromagnetic fields (HF field)

Test carried out according to EN 61000-4-3	Limits according to EN 61000-6-2	Limits according to EN 61131-2	Limits according to EN 55024
Housing, completely wired	80 MHz - 1 GHz, 10 V/m, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	80 MHz - 1 GHz, 1.4 - 2 GHz, 10 V/m, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A 800-960 MHz (GSM), 10 V/m, pulse modulation with 50% duty cycle, criteria A	80 MHz - 1 GHz, 1.4 - 2 GHz, 3 V/m, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A

Table 199: Test requirements - high-frequency electromagnetic fields (HF field)

4.3 High-speed transient electrical disturbances (Burst)

Test carried out according to EN 61000-4-4	Limits according to EN 61000-6-2	Limits according to EN 61131-2	Limits according to EN 55024
AC power I/O	± 2 kV, criteria B	-	± 1 kV, criteria B
AC power inputs	-	± 2 kV, criteria B	-
AC power outputs	-	± 1 kV, criteria B	-
DC power I/O >10 m [1)]	± 2 kV, criteria B	-	± 0.5 kV, criteria B
DC power inputs >10 m	-	± 2 kV, criteria B	-
DC power outputs >10 m	-	± 1 kV, criteria B	-
Functional ground connections, signal lines and I/Os >3 m	± 1 kV, criteria B	± 1 kV, criteria B	± 0.5 kV, criteria B
Unshielded AC I/O >3 m	-	± 2 kV, criteria B	-
Analog I/O	± 1 kV, criteria B	± 1 kV, criteria B	-

Table 200: Test requirements - high-speed transient electrical disturbances (burst)

1) For EN 55024 without length limitation.

4.4 Surge voltages (Surge)

Test carried out according to EN 61000-4-5	Limits according to EN 61000-6-2	Limits according to EN 61131-2	Limits according to EN 55024
AC power I/O, L to L	± 1 kV, criteria B	± 1 kV, criteria B	± 1 kV, criteria B
AC power I/O, L to PE	± 2 kV, criteria B	± 2 kV, criteria B	± 2 kV, criteria B
DC power I/O, L+ to L-, >10 m	± 0.5 kV, criteria B	-	-
DC power I/O, L to PE, >10 m	± 0.5 kV, criteria B	-	± 0.5 kV, criteria B
DC power inputs, L+ to L-	-	± 0.5 kV, criteria B	-
DC power inputs, L to PE	-	± 1 kV, criteria B	-
DC power outputs, L+ to L-	-	± 0.5 kV, criteria B	-
DC power outputs, L to PE	-	± 0.5 kV, criteria B	-
Signal connections >30 m	± 1 kV, criteria B	± 1 kV, criteria B	± 1 kV, criteria B
All shielded cables	-	± 1 kV, criteria B	-

Table 201: Test requirements - surge voltages

4.5 Conducted disturbances

Test carried out according to EN 61000-4-6	Limits according to EN 61000-6-2	Limits according to EN 61131-2	Limits according to EN 55024
AC power I/O	150 kHz - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, criteria A

Table 202: Test requirements - conducted disturbances

Test carried out according to EN 61000-4-6	Limits according to EN 61000-6-2	Limits according to EN 61131-2	Limits according to EN 55024
DC power I/O	150 kHz - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, criteria A
Functional ground connections	0.15 - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, Length 3 seconds, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	-
Signal connections >3 m	0.15 - 80 MHz, 10 V, 80% amplitude modulation with 1 kHz, Length 3 seconds, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, length 3 seconds, criteria A	150 kHz - 80 MHz, 3 V, 80% amplitude modulation with 1 kHz, criteria A

Table 202: Test requirements - conducted disturbances (cont.)

4.6 Magnetic fields with electrical frequencies

Test carried out according to EN 61000-4-8	Limits according to EN 61000-6-2	Limits according to EN 61131-2	Limits according to EN 55024
Test direction x, test in the field of an induction coil 1 m x 1 m	30 A/m, criteria A	30 A/m, criteria A	50 Hz, 1 A/m, criteria A
Test direction y, test in the field of an induction coil 1 m x 1 m	30 A/m, criteria A	30 A/m, criteria A	50 Hz, 1 A/m, criteria A
Test direction z, test in the field of an induction coil 1 m x 1 m	30 A/m, criteria A	30 A/m, criteria A	50 Hz, 1 A/m, criteria A

Table 203: Test requirements - magnetic fields with electrical frequencies

4.7 Voltage dips, fluctuations and short-term interruptions

Test carried out according to EN 61000-4-11	Limits according to EN 61000-6-2	Limits according to EN 61131-2	Limits according to EN 55024
AC power inputs	Voltage dip 70% (30% reduction), 0.5 periods, criteria B	-	Voltage dip < 5% (> 95% reduction), 0.5 half-oscillations, criteria B
AC power inputs	Voltage dip 40% (60% reduction), 5 periods, criteria C	-	Voltage dip 70% (30% reduction), 25 half-oscillations, criteria C
AC power inputs	Voltage dip 40% (60% reduction), 50 periods, criteria C	-	-
AC power inputs	Voltage interruptions < 5% (> 95% reduction), 250 periods, criteria C	-	Voltage interruptions < 5% (> 95% reduction), 250 half-oscillations, criteria C
AC power inputs	-	20 interruptions, 0.5 periods, criteria A	-
DC power inputs	-	20 interruptions for 10 ms < UN - 15%, criteria A	-

Table 204: Test requirements - voltage dips, fluctuations, and short-term interruptions

4.8 Damped oscillations

Test carried out according to EN 61000-4-12	Limits according to EN 61131-2		
Power I/O, L to L	± 1 kV, 1 MHz, repeat rate 400/seconds, length 2 seconds, connection lengths 2 m, criteria B		
Power I/O, L to PE	± 2.5 kV, 1 MHz, repeat rate 400/seconds, length 2 seconds, connection lengths 2 m, criteria B		

Table 205: Test requirements - damped vibration

5. Mechanical conditions

Vibration	Test carried out according to	Limits according to
Vibration operation	EN 60068-2-6	EN 61131-2: Programmable logic controllers
		EN 60721-3-3 class 3M4
Vibration transport (packaged)	EN 60068-2-6	EN 60721-3-2 class 2M1
		EN 60721-3-2 class 2M2
		EN 60721-3-2 class 2M3
Shock during operation	EN 60068-2-27	EN 61131-2: Programmable logic controllers
		EN 60721-3-3 class 3M4
Shock transport (packaged)	EN 60068-2-27	EN 60721-3-2 class 2M1
		EN 60721-3-2 class 2M2
		EN 60721-3-2 class 2M3
Toppling (packaged)	EN 60068-2-31	EN 60721-3-2 class 2M1
		EN 60721-3-2 class 2M2
		EN 60721-3-2 class 2M3
Free fall (packaged)	EN 60068-2-32	EN 61131-2: Programmable logic controllers

Table 206: Overview of limits and testing guidelines for vibration

5.1 Vibration operation

Test carried out according to EN 60068-2-6	Limits according to EN 61131-2		Limits according to EN 60721-3-3 class 3M4		
Vibration operation: Uninterrupted duty with moveable frequency in all 3 axes (x, y, z), 1 octave per minute	10 sweeps for each axis		10 sweeps for each axis		
	Frequency	Limit value	Frequency	Limit value	
	5 - 9 Hz	Amplitude 3.5 mm	2 - 9 Hz	Amplitude 3 mm	
	9 - 150 Hz	Acceleration 1 g	9 - 200 Hz	Acceleration 1 g	

Table 207: Test requirements - vibration operation

5.2 Vibration during transport (packaged)

Test carried out according to EN 60068-2-6	Limits according to EN 60721-3-2 class 2M1		Limits according to EN 60721-3-2 class 2M2		Limits according to EN 60721-3-2 class 2M3	
Vibration during transport: Uninterrupted duty with moveable frequency in all 3 axes (x, y, z)	10 sweeps for each axis, packed		10 sweeps for each axis, packed		10 sweeps for each axis, packed	
	Frequency	**Limit value**	**Frequency**	**Limit value**	**Frequency**	**Limit value**
	2 - 9 Hz	Amplitude 3.5 mm	2 - 9 Hz	Amplitude 3.5 mm	2 - 8 Hz	Amplitude 7.5 mm
	9 - 200 Hz	Acceleration 1 g	9 - 200 Hz	Acceleration 1 g	8 - 200 Hz	Acceleration 2 g
	200 - 500 Hz	Acceleration 1.5 g	200 - 500 Hz	Acceleration 1.5 g	200 - 500 Hz	Acceleration 4 g

Table 208: Testing requirements for vibration during transport (packaged)

5.3 Shock during operation

Test carried out according to EN 60068-2-27	Limits according to EN 61131-2	Limits according to EN 60721-3-3 class 3M4	
Shock operation: Pulse shaped (half-sine) stress in all 3 axes (x, y, z)	Acceleration 15 g, length 11 ms, 18 shocks	Acceleration 15 g, length 11 ms	

Table 209: Test requirements - shock operation

5.4 Shock transport (packaged)

Test carried out according to EN 60068-2-27	Limits according to EN 60721-3-2 class 2M1	Limits according to EN 60721-3-2 class 2M2	Limits according to EN 60721-3-2 class 2M3
Pulse shaped (half-sine) stress in all 3 axes (x, y, z)	Acceleration 10 g, Length 11 ms, each 3 shocks, packed	Acceleration 30 g, Length 6 ms, each 3 shocks, packed	Acceleration 100 g, Length 6 ms, each 3 shocks, packed

Table 210: Test requirements - shock transport

5.5 Toppling

Test carried out according to EN 60068-2-31	Limits according to EN 60721-3-2 class 2M1		Limits according to EN 60721-3-2 class 2M2		Limits according to EN 60721-3-2 class 2M3	
Toppling and knocking over	Devices: Toppling/knocking over on each edge		Devices: Toppling/knocking over on each edge		Devices: Toppling/knocking over on each edge	
	Weight	**Required**	**Weight**	**Required**	**Weight**	**Required**
	<20 kg	Yes	<20 kg	Yes	<20 kg	Yes
	20 - 100 kg	-	20 - 100 kg	Yes	20 - 100 kg	Yes
	>100 kg	-	>100 kg	-	>100 kg	Yes

Table 211: Test requirements - toppling

5.6 Free fall (packaged)

Test carried out according to EN 60068-2-32	Limits according to EN 61131-2		Limits according to EN 60721-3-2 class 2M1		Limits according to EN 60721-3-2 class 2M2		Limits according to EN 60721-3-2 class 2M3	
Free fall	Devices with delivery packaging each with 5 fall tests		Devices packaged		Devices packaged		Devices packaged	
	Weight	**Height**	**Weight**	**Height**	**Weight**	**Height**	**Weight**	**Height**
	<10 kg	1.0 m	<20 kg	0.25 m	<20 kg	1.2 m	<20 kg	1.5 m
	10 - 40 kg	0.5 m	20 - 100 kg	0.25 m	20 - 100 kg	1.0 m	20 - 100 kg	1.2 m
	>40 kg	0.25 m	>100 kg	0.1 m	>100 kg	0.25 m	>100 kg	0.5 m
	Devices with product packaging each with 5 fall tests							
	Weight	**Height**						
	<10 kg	0.3 m						
	10 - 40 kg	0.3 m						
	>40 kg	0.25 m						

Table 212: Test requirements - toppling

6. Climate conditions

Temperature / humidity	Test carried out according to	Limits according to
Worst case operation	UL 508	UL 508: Industrial control equipment EN 61131-2: Programmable logic controllers
Dry heat	EN 60068-2-2	EN 61131-2: Programmable logic controllers
Dry cold	EN 60068-2-1	EN 61131-2: Programmable logic controllers
Large temperature fluctuations	EN 60068-2-14	EN 61131-2: Programmable logic controllers
Temperature fluctuations in operation	EN 60068-2-14	EN 61131-2: Programmable logic controllers
Humid heat, cyclic	EN 60068-2-30	EN 61131-2: Programmable logic controllers
Humid heat, constant (storage)	EN 60068-2-3	EN 61131-2: Programmable logic controllers

Table 213: Overview of limits and testing guidelines for temperature and humidity

6.1 Worst case operation

Test carried out according to UL 508	Limits according to UL 508	Limits according to EN 61131-2	
Worst case operation. Operation of the device with the max. ambient temperature specified in the data sheet at the max. specified load	3 hours at max. ambient temperature (min. +40°C) duration approx. 5 hours	3 hours at max. ambient temperature (min. +40°C) duration approx. 5 hours	

Table 214: Test requirements - worst case operation

6.2 Dry heat

Test carried out according to EN 60068-2-2	Limits according to EN 61131-2		
Dry heat	16 hours at +70°C for 1 cycle, then 1 hour acclimatization and function testing, duration approximately 17 hours		

Table 215: Test requirements - dry heat

6.3 Dry cold

Test carried out according to EN 60068-2-1	Limits according to EN 61131-2		
Dry cold	16 hours at -40°C for 1 cycle, then 1 hour acclimatization and function testing, duration approximately 17 hours		

Table 216: Test requirements - dry cold

6.4 Large temperature fluctuations

Test carried out according to EN 60068-2-14	Limits according to EN 61131-2		
Large temperature fluctuations	3 hours at -40°C and 3 hours at +70°C, 2 cycles, then 2 hours acclimatization and function testing, duration approximately 14 hours		

Table 217: Test requirements - large temperature fluctuations

6.5 Temperature fluctuations in operation

Test carried out according to EN 60068-2-14	Limits according to EN 61131-2		
Open devices: These can also have a housing and are installed in switching cabinets	3 hours at +5°C and 3 hours at 55°C, 5 cycles, temperature gradient 3°C / min, the unit is occasionally supplied with voltage during testing, duration approximately 30 hours		
Closed devices: These are devices whose data sheet specifies a surrounding housing (enclosure) with the corresponding safety precautions	3 hours at +5°C and 3 hours at +55°C, 5 cycles, temperature gradient 3°C / min, the unit is occasionally supplied with voltage during testing, duration approximately 30 hours		

Table 218: Test requirements - temperature fluctuations in operation

6.6 Humid heat, cyclical

Test carried out according to EN 60068-2-30	Limits according to EN 61131-2		
Alternating climate	24 hours at +25°C / +55°C and 97% / 83% RH, 2 cycles, then 2 hours acclimatization, function testing and insulation, duration approximately 50 hours		

Table 219: Test requirements - humid heat, cyclic

6.7 Humid heat, constant (storage)

Test carried out according to EN 60068-2-3	Limits according to EN 61131-2		
Humid heat, constant (storage)	48 hours at +40°C and 92.5% RH, then insulation test within 3 hours, duration approximately 49 hours		

Table 220: Test requirements - humid heat, constant (storage)

7. Safety

Safety	Test carried out according to	Limits according to
Ground resistance	EN 61131-2	EN 60204-1: Electrical equipment of machines
		EN 61131-2: Programmable logic controllers
Insulation resistance		EN 60204-1: Electrical equipment of machines
High voltage	EN 60060-1	EN 61131-2: Programmable logic controllers
		UL 508: Industrial control equipment
Residual voltage	EN 61131-2	EN 60204-1: Electrical equipment of machines
		EN 61131-2: Programmable logic controllers
Overload	UL 508	EN 61131-2: Programmable logic controllers
		UL 508: Industrial control equipment
Simulation component defect	UL 508	EN 61131-2: Programmable logic controllers
		UL 508: Industrial control equipment
Voltage range		EN 61131-2: Programmable logic controllers

Table 221: Overview of limits and testing guidelines for safety

7.1 Ground resistance

Test carried out according to EN 61131-2	Limits according to EN 60204-1[1)]		Limits according to EN 61131-2
Ground resistance: housing (from any metal part to the ground terminal)	Smallest effective cross section of the protective ground conductor for the branch being tested	Maximum measured voltage drop at a test current of 10 A	Test current 30 A for 2 min, < 0.1 Ohm
	1.0 mm²	3.3 V	
	1.5 mm²	2.6 V	
	2.5 mm²	1.9 V	
	4.0 mm²	1.4 V	
	> 6.0 mm²	1.0 V	

Table 222: Test requirements - ground resistance

1) See EN 60204-1:1997 page 62, table 9.

7.2 Insulation resistance

Test carried out	Limits according to EN 60204-1[1)]		
Insulation resistance: main circuits to protective ground conductor	> 1 MOhm at 500 VDC voltage		

Table 223: Test requirements - insulation resistance

1) See EN 60204-1:1997 page 62, table 9.

7.3 High voltage

Test carried out according to EN 60060-1	Limits according to EN 61131-2[1)]				Limits according to UL 508		
High voltage: Primary circuit to secondary circuit and to protective ground circuit (transformers, coils, varistors, capacitors and components used to protect against over-voltage can be removed before the test)	Input voltage	Test voltage			Input voltage	Test voltage	
		1.2/50 µs voltage surge peak	AC, 1 min	DC, 1 min		AC, 1 min	DC, 1 min
	0 - 50 VAC 0 - 60 VDC	850 V	510 V	720 V	≤ 50 V	500 V	707 V
	50 - 100 VAC 60 - 100 VDC	1360 V	740 V	1050 V	> 50 V	1000 V + 2 x U_N	(1000 V + 2 x U_N) x 1.414
	100 - 150 VAC 100 - 150 VDC	2550 V	1400 V	1950 V			
	150 - 300 VAC 150 - 300 VDC	4250 V	2300 V	3250 V			
	300 - 600 VAC 300 - 600 VDC	6800 V	3700 V	5250 V			
	600 - 1000 VAC 600 - 1000 VDC	10200 V	5550 V	7850 V			

Table 224: Test requirements - high voltage

1) See EN 61131-2:2003 page 104, table 59.

7.4 Residual voltage

Test carried out according to EN 61131-2	Limits according to EN 60204-1	Limits according to EN 61131-2	
Residual voltage after switching off	< 60 V after 5 sec (active parts) < 60 V after 1 sec (plug pins)	< 60 V after 5 sec (active parts) < 60 V after 1 sec (plug pins)	

Table 225: Test requirements - residual voltage

7.5 Overload

Test carried out according to UL 508	Limits according to EN 61131-2	Limits according to UL 508	
Overload of transistor outputs	50 switches, 1.5 I_N, 1 sec on / 9 sec off	50 switches, 1.5 I_N, 1 sec on / 9 sec off	

Table 226: Test requirements - overload

7.6 Defective component

Test carried out according to UL 508	Limits according to EN 61131-2	Limits according to UL 508	
Simulation of how components in power supply became defective	Non-flammable surrounding cloth No contact with conductive parts	Non-flammable surrounding cloth No contact with conductive parts	

Table 227: Test requirements - defective component

7.7 Voltage range

Test carried out according to	Limits according to EN 61131-2			
Supply voltage	Measurement value	Tolerance min/max		
	24 VDC 48 VDC 125 VDC	-15% +20%		
	24 VAC 48 VAC 100 VAC 110 VAC 120 VAC 200 VAC 230 VAC 240 VAC 400 VAC	15% +10%		

Table 228: Test requirements - voltage range

8. Other tests

Other tests	Test carried out according to	Limits according to
Protection type	-	EN 60529: Degrees of protection provided by enclosures (IP code)

Table 229: Overview of limits and testing guidelines for other tests

8.1 Protection

Test carried out according to	Limits according to EN 60529	Limits according to EN 60529	
Protection of the operating equipment	IP2. Protection against large solid foreign bodies =12.5 mm diameter	IP6. Protection against large solid foreign bodies: dust-proof	
Protection of personnel	IP2. Protection against touching dangerous parts with finger	IP6. Protection against touching dangerous parts with conductor	
Protection against water permeation with damaging consequences	IP.0 Not protected	IP.5 Protected against sprayed water	

Table 230: Test requirements - protection

9. International certifications

B&R products and services comply with applicable standards. They are international standards from organizations such as ISO, IEC and CENELEC, as well as national standards from organizations such as UL, CSA, FCC, VDE, ÖVE, etc. We give special consideration to the reliability of our products in an industrial environment.

Certifications	
USA and Canada	All important B&R products are tested and listed by Underwriters Laboratories and checked quarterly by a UL inspector. This mark is valid for the USA and Canada and simplifies certification of your machines and systems in these areas.
Europe	All harmonized EN standards for the valid guidelines are met.

Table 231: International certifications

Chapter 6 • Accessories

1. Overview

Model number	Short description	Note
0AC201.9	**Lithium batteries (5x)** Lithium batteries, 5 pcs., 3 V / 950 mAh, button cell	See page 373
0TB103.9	**Plug 24V 5.08 3-pin screw clamps** 24 VDC 3-pin connector, female. Screw clamps, 2.5 mm², protected against vibration by the screw flange	See page 374
0TB103.91	**Plug 24V 5.08 3-pin cage clamps** 24 VDC 3-pin connector, female. Cage clamps, 2.5 mm², protected against vibration by the screw flange	See page 374
4A0006.00-000	**Lithium battery (1x)** Lithium battery, 1 pc., 3 V / 950 mAh, button cell	See page 373
5A5003.03	**Front cover** Front cover for the USB 2.0 Media Drive 5MD900.USB2-00.	See page 404 and Page 412
5AC600.ICOV-00	**Interface covers** Interface covers for APC620 and PPC700 devices; 5 pieces	See page 375
5AC900.1000-00	**Adapter DVI-A/m to CRT DB15HD/f** Adapter DVI (connector) to CRT (socket), for connecting a standard monitor to a DVI-I interface.	See page 376
5AC900.104X-00	**Slide-in legend strip template 10.4".** For Panel PC 5PC781.1043-00. For 1 device.	See page 443
5AC900.104X-01	**Slide-in legend strip template 10.4".** For Panel PC 5PC782.1043-00. For 1 device	See page 443
5AC900.150X-01	**Slide-in legend strip template 15".** For Panel PC 5PC781.1505-00. For 4 devices.	See page 443
5AC900.1200-00	**USB interface cover (cannot be lost)** Front side USB interface cover (cannot be lost) for Automation Panel 900 and Panel PC 700 devices.	See page 377
5CADVI.0018-00	**DVI-D cable 1.8 m / single** Cable single DVI-D/m:DVI-D/m 1.8 m	See page 421
5CADVI.0050-00	**DVI-D cable 5 m / single** Cable single DVI-D/m:DVI-D/m 5 m	See page 421
5CADVI.0100-00	**DVI-D cable 10 m / single** Cable single DVI-D/m:DVI-D/m 10 m	See page 421
5CASDL.0018-00	**SDL cable 1.8 m** SDL cable length: 1.8 m	See page 423
5CASDL.0018-01	**SDL cable 1.8 m 45°** SDL cable length: 1.8 m; single sided 45° plug	See page 426

Table 232: Model numbers - accessories

Model number	Short description	Note
5CASDL.0018-03	**SDL cable flex 1.8 m** SDL cable, semi flexible, length: 1.8 m	See page 431
5CASDL.0050-00	**SDL cable 5 m** SDL cable length: 5 m	See page 423
5CASDL.0050-01	**SDL cable 5 m 45°** SDL cable length: 5 m; single sided 45° plug	See page 426
5CASDL.0050-03	**SDL cable flex 5 m** SDL cable, semi flexible, length: 5 m	See page 431
5CASDL.0100-00	**SDL cable 10 m** SDL cable length: 10 m	See page 423
5CASDL.0100-01	**SDL cable 10 m 45°** SDL cable length: 10 m; single sided 45° plug	See page 426
5CASDL.0100-03	**SDL cable flex 10 m** SDL cable, semi flexible, length: 10 m	See page 431
5CASDL.0150-00	**SDL cable 15 m** SDL cable length: 15 m	See page 423
5CASDL.0150-01	**SDL cable 15 m 45°** SDL cable length: 15 m; single sided 45° plug	See page 426
5CASDL.0150-03	**SDL cable flex 15 m** SDL cable, semi flexible, length: 15 m	See page 431
5CASDL.0200-00	**SDL cable 20 m** SDL cable length: 20 m	See page 423
5CASDL.0200-03	**SDL cable flex 20 m** SDL cable, semi flexible, length: 20 m	See page 431
5CASDL.0250-00	**SDL cable 25 m** SDL cable length: 25 m	See page 423
5CASDL.0250-03	**SDL cable flex 25 m** SDL cable, semi flexible, length: 25 m	See page 431
5CASDL.0300-00	**SDL cable 30 m** SDL cable length: 30 m	See page 423
5CASDL.0300-03	**SDL cable flex 30 m** SDL cable, semi flexible, length: 30 m	See page 431
5CASDL.0300-10	**SDL cable with extender 30 m** SDL cable length: 30 m with extender	See page 428
5CASDL.0300-13	**SDL cable flex with extender 30 m** SDL cable, semi flexible, length: 30 m with extender	See page 435
5CASDL.0400-10	**SDL cable with extender 40 m** SDL cable length: 40 m with extender	See page 428
5CASDL.0400-13	**SDL cable flex with extender 40 m** SDL cable, semi flexible, length: 40 m with extender	See page 435
5CAUSB.0018-00	**USB 2.0 Cable A/m:B/m 1.8 m** USB 2.0 connection cable; Type A - Type B; 1.8 m	See page 441
5CAUSB.0050-00	**USB 2.0 Cable A/m:B/m 5 m** USB 2.0 connection cable; Type A - Type B; 5 m	See page 441
5CFCRD.0032-02	**CompactFlash 32 MB SanDisk/A** CompactFlash card with 32 MB Flash PROM, and IDE/ATA interface	*Cancelled since 12/2005* See page 378

Table 232: Model numbers - accessories

Model number	Short description	Note
5CFCRD.0064-02	**CompactFlash 64 MB SanDisk/A** CompactFlash card with 64 MB Flash PROM, and IDE/ATA interface	*Cancelled since 12/2005* See page 378
5CFCRD.0128-02	**CompactFlash 128 MB SanDisk/A** CompactFlash card with 128 MB Flash PROM, and IDE/ATA interface	*Cancelled since 12/2005* See page 378
5CFCRD.0256-02	**CompactFlash 256 MB SanDisk/A** CompactFlash card with 256 MB Flash PROM, and IDE/ATA interface	*Cancelled since 12/2005* See page 378
5CFCRD.0512-02	**CompactFlash 512 MB SanDisk/A** CompactFlash card with 512 MB Flash PROM, and IDE/ATA interface	*Cancelled since 12/2005* See page 378
5CFCRD.1024-02	**CompactFlash 1024 MB SanDisk/A** CompactFlash card with 1024 MB Flash PROM, and IDE/ATA interface	*Cancelled since 12/2005* See page 378
5CFCRD.2048-02	**CompactFlash 2048 MB SanDisk/A** CompactFlash card with 2048 MB Flash PROM, and IDE/ATA interface	*Cancelled since 12/2005* See page 378
5CFCRD.0064-03	**CompactFlash 64 MB SSI** CompactFlash card with 64 MB SLC NAND Flash, and IDE/ATA interface	See page 386
5CFCRD.0128-03	**CompactFlash 128 MB SSI** CompactFlash card with 128 MB SLC NAND Flash, and IDE/ATA interface	See page 386
5CFCRD.0256-03	**CompactFlash 256 MB SSI** CompactFlash card with 256 MB SLC NAND Flash, and IDE/ATA interface	See page 386
5CFCRD.0512-03	**CompactFlash 512 MB SSI** CompactFlash card with 512 MB SLC NAND Flash, and IDE/ATA interface	See page 386
5CFCRD.1024-03	**CompactFlash 1024 MB SSI** CompactFlash card with 1024 MB SLC NAND Flash, and IDE/ATA interface	See page 386
5CFCRD.2048-03	**CompactFlash 2048 MB SSI** CompactFlash card with 2048 MB SLC NAND Flash, and IDE/ATA interface	See page 386
5CFCRD.4096-03	**CompactFlash 4096 MB SSI** CompactFlash card with 4096 MB SLC NAND Flash, and IDE/ATA interface	See page 386
5MD900.USB2-00	**USB 2.0 drive DVD-ROM/CD-RW FDD CF USB** USB 2.0 drive combination, consists of DVD-ROM/CD-RW, FDD, CompactFlash slot (type II), USB connection (type A front, type B back); 24 V DC. (0TB103.9 screw clamps or 0TB103.91 cage clamps sold separately).	See page 398
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, FDD, CompactFlash slot (type II), USB connection (type A front, type B back); 24V DC; (0TB103.9 screw clamps or 0TB103.91 cage clamps sold separately).	See page 406
5MMUSB.0128-00	**USB flash drive 128 MB SanDisk** USB 2.0 flash drive 128 MB	*Cancelled* since 12/2005 See page 414
5MMUSB.0256-00	**USB flash drive 256 MB SanDisk** USB 2.0 flash drive 256 MB	See page 414
5MMUSB.0512-00	**USB flash drive 512 MB SanDisk** USB 2.0 flash drive 512 MB	See page 414
5MMUSB.1024-00	**USB flash drive 1 GB SanDisk** USB 2.0 flash drive 1 GB	See page 414

Table 232: Model numbers - accessories

Model number	Short description	Note
5MMUSB.2048-00	**USB flash drive 2 GB SanDisk** USB 2.0 flash drive 2 GB	See page 414
5SWHMI.0000-00	**HMI Drivers & Utilities DVD**	See page 418
9A0014.02	**RS232 cable DB9/f:DB9/m 1.8 m** RS232 extension cable for remote operation of a display unit with touch screen, length 1.8 m.	See page 439
9A0014.05	**RS232 cable DB9/f:DB9/m 5 m** RS232 extension cable for remote operation of a display unit with touch screen, length 5 m.	See page 439
9A0014.10	**RS232 cable DB9/f:DB9/m 10 m** RS232 extension cable for remote operation of a display unit with touch screen, length 10 m.	See page 439

Table 232: Model numbers - accessories

2. Replacement CMOS batteries

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

Model number and accessory table

2.1 Order data

Model number	Description	Image
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 233: Order data - lithium batteries

2.2 Technical data

Information:

The following defined characteristics, features and limit values are only valid for 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	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	
Environment		
Storage temperature	-20°C to +60°C	
Relative humidity	0 to 95% (non-condensing)	

Table 234: Technical data - lithium batteries

3. Supply voltage connector (TB103 3-pin)

3.1 General information

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

3.2 Order data

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

Table 235: Order data - TB103

3.3 Technical data

Information:

The following defined characteristics, features and limit values are only valid for 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.

Designation	0TB103.9	0TB103.91
Number of pins	3	
Type of terminal	Screw clamps	Cage clamps
Distance between contacts	5.08 mm	

Table 236: Technical data - TB103

Designation	0TB103.9	0TB103.91
Resistance between contacts	≤ 5 mΩ	
Nominal voltage according to VDE / UL,CSA	250 V / 300 V	
Current load according to VDE / UL,CSA	14.5 A / 10 A per contact	
Terminal size	0.08 mm² - 3.31 mm²	
Cable type	Copper wires only (no aluminum wires!)	

Table 236: Technical data - TB103

4. Interface covers 5AC600.ICOV-00

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

4.1 Order data

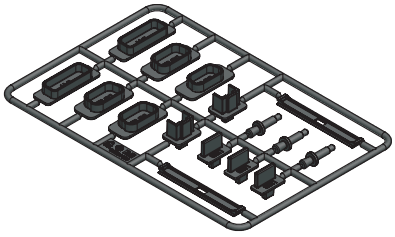
Model number	Description	Image
5AC600.ICOV-00	**Interface covers** Interface covers for APC620 and PPC700 devices; 5 pieces	

Table 237: Order data - PPC700 interface cover

4.2 Contents of delivery

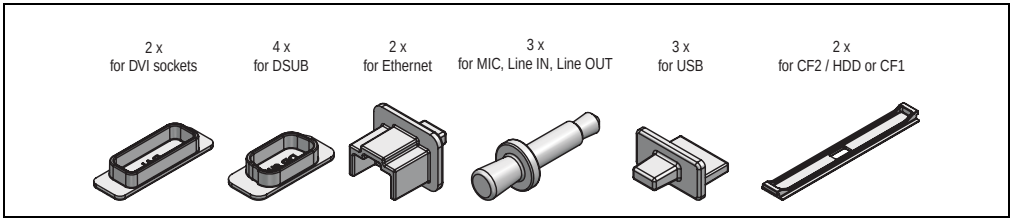


Figure 196: Interface cover - contents of delivery

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	Image
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 238: Order data - DVI - CRT adapter

6. USB interface cover (cannot be lost)

Front side USB interface cover (cannot be lost) for Automation Panel 900 and Panel PC 700 devices.

6.1 Order data

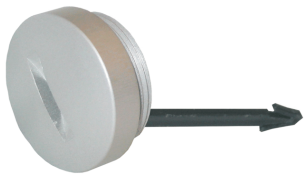
Model number	Description	Image
5AC900.1200-00	**USB interface cover (cannot be lost)** Front side USB interface cover (cannot be lost) for Automation Panel 900 and Panel PC 700 devices.	

Table 239: Order data - USB interface cover (cannot be lost)

6.2 Installation

- Remove old cover.
- Feed the USB interface cover through the small opening (see red markings).

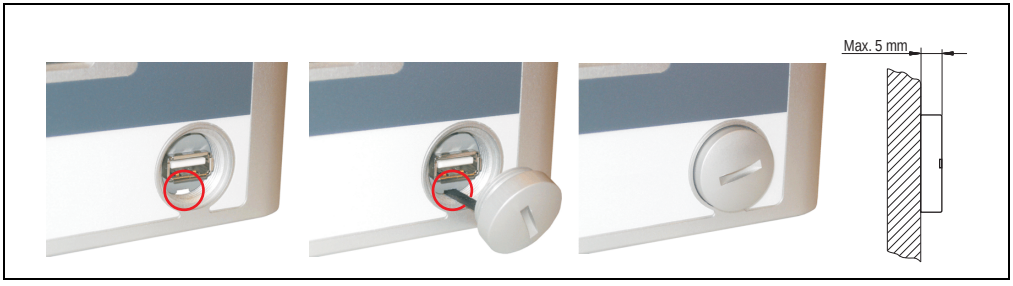


Figure 197: Front side USB interface cover - installation

- With the cover screwed on, the front side of the display is raised a maximum of 5 mm.

7. CompactFlash cards 5CFCRD.xxxx-02

7.1 General information

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

7.2 Order data

Model number	Description	Image
5CFCRD.0032-02	CompactFlash 32 MB SanDisk/A	
5CFCRD.0064-02	CompactFlash 64 MB SanDisk/A	
5CFCRD.0128-02	CompactFlash 128 MB SanDisk/A	
5CFCRD.0256-02	CompactFlash 256 MB SanDisk/A	
5CFCRD.0512-02	CompactFlash 512 MB SanDisk/A	
5CFCRD.1024-02	CompactFlash 1024 MB SanDisk/A	
5CFCRD.2048-02	CompactFlash 2048 MB SanDisk/A	

Table 240: Order data - CompactFlash cards

7.3 Technical data

Information:

The following defined characteristics, features and limit values are only valid for 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-02
MTBF (@ 25°C)	> 3000000 hours
Maintenance	None
Data reliability	< 1 unrecoverable error in 10^{14} bit read accesses < 1 faulty correction in 10^{20} bit read accesses
Write/erase procedures	> 2,000,000 times

Table 241: Technical data - 5CFCRD.xxxx-02 CompactFlash cards

Mechanical characteristics	5CFCRD.xxxx-02
Dimensions Length Width Thickness	 36.4 ± 0.15 mm 42.8 ± 0.10 mm 3.3 mm ± 0.10 mm
Weight	11.4 g
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 0°C to +70°C -25°C to +85°C -25°C to +85°C
Relative humidity Operation / Storage	 8% to 95%, non-condensing
Vibration Operation / Storage	 Maximum 30 g (point to point)
Shock Operation / Storage	 Maximum 3,000 g
Altitude	24000 meters

Table 241: Technical data - 5CFCRD.xxxx-02 CompactFlash cards (cont.)

7.4 Dimensions

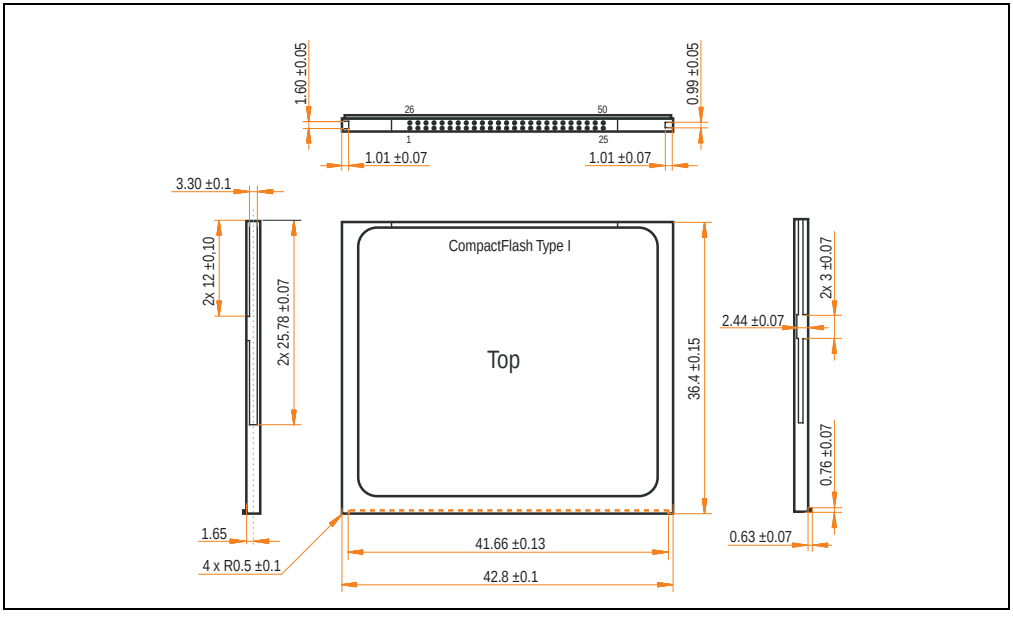


Figure 198: Dimensions for CompactFlash card type I

7.5 Calculating the lifespan

SanDisk provides a 6-page "white paper" for the lifespan calculation for CompactFlash cards (see following pages). This document can also be found on the SanDisk homepage.

SanDisk

WHITE PAPER

SANDISK FLASH MEMORY CARDS

WEAR LEVELING

October 2003

140 Caspian Court • Sunnyvale, California 94089 • Phone: 408-542-0500 • Fax: 408-542-0503

Figure 199: SanDisk white paper - page 1

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

The information in this manual is subject to change without notice.

SanDisk Corporation shall not be liable for technical or editorial errors or omissions contained herein; nor for incidental or consequential damages resulting from the furnishing, performance, or use of this material.

All parts of the SanDisk documentation are protected by copyright law and all rights are reserved. This documentation may not, in whole or in part, be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form without prior consent, in writing, from SanDisk Corporation.

SanDisk and the SanDisk logo are registered trademarks of SanDisk Corporation.

Product names mentioned herein are for identification purposes only and may be trademarks and/or registered trademarks of their respective companies.

© 2003 SanDisk Corporation. All rights reserved.

SanDisk products are covered or licensed under one or more of the following U.S. Patent Nos. 5,070,032; 5,095,344; 5,168,465; 5,172,338; 5,198,380; 5,200,959; 5,268,318; 5,268,870; 5,272,669; 5,418,752; 5,602,987. Other U.S. and foreign patents awarded and pending.

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

Figure 200: SanDisk white paper - page 2

OVERVIEW

This purpose of this white paper is to help SanDisk customers understand the benefits of wear leveling and to assist customers in calculating life expectancy of SanDisk cards in specific applications.

Flash memory is susceptible to wear as a result of the repeated program and erase cycles that are inherent in typical data storage applications. Applications in which this is a major concern include hard disk replacement applications where write operations occur frequently. How a storage system manages the wear of the memory is key to understanding the extended reliability of the host that relies on these storage systems.

WEAR LEVELING METHODOLOGY

Current products available in the industrial channel use NAND flash memory. It is important to understand the NAND memory architecture to gain insight into the wear leveling mechanism.

Each memory chip is divided into blocks. A block is an array of memory cells organized as sectors. The number of blocks and sectors vary from product to product. The minimum unit for a write or read operation is a page (or sector). The minimum unit for an erase operation is a block. Physical blocks are logically grouped into zones. For the current technology, a typical zone size is 4 MB. However, this may change from product to product. Wear leveling is done within a zone. The current firmware does not spread the wear across the capacity of the card. Each zone has about 3% additional “spare blocks” beyond what is assigned to meet the logical capacity of the flash card. This group of blocks is commonly referred to as the “Erase Pool”.

With the introduction of SanDisk’s Write-before-Erase architecture, each time a host writes data to the same logical address (CHS or LBA), data is written into a newly assigned, empty physical block from the “Erase Pool”. The intrinsic nature of writing to a new physical location each time a logical address is written to is the basis for wear leveling found in SanDisk cards. This action spreads the writes over the zone, thus greatly extending the overall life of the card. The methodology of using a large number of physical addresses to manage a smaller logical address table allows for rotation of the physical addresses among the entire group of physical blocks within a zone. The resulting wear leveling optimizes the effective life of the media and avoids prematurely reaching the end of life on frequently written to host addresses.

When a card detects that a block has reached the end of its useful life, it removes that block from the blocks that are available for write operations. The result is a reduction of the size of the erase pool. This does not affect the capacity of the card as seen by the host. When the pool of blocks available for write operations has been exhausted due to wear, the card will reach the end of its useful life for write operations.

Figure 201: SanDisk white paper - page 3

Current SanDisk products do not preempt wear leveling events during normal operation of the card. Applications typically don't require such management beyond the natural wear leveling that occurs during normal host operations. As a result, the effectiveness of wear leveling in current SanDisk products is dependent upon host usage. It is important for customers whose applications do not fall into this typical usage pattern to understand how their applications will affect the lifetime of the card.

LIFE EXPECTANCY SCENARIOS

►best case analysis

In a typical application, large data files are written to the card occupying contiguous sequential logical address space. This results in optimal wear leveling and provides card life exceeding the specification for card endurance. This increased endurance is achieved as follows: The 2,000,000 endurance cycles specification (I-Grade only) is a result of large amounts of test data collected from a very large sample set that accounts for the extreme limits of the test population. With the 3% additional erase pool being used in an ideal fashion, the distribution is narrowed and the card will survive beyond its specified lifetime.

►worst case analysis

In the worst-case application, data will be written as single sectors to random addresses across the card. These single sector writes will exercise the erase pool more rapidly, requiring the system to perform a "garbage collection" operation to free up new blocks for subsequent write operations. At the extreme, each single sector write would cause one block to be programmed and erased. As a typical block size is 16kB or 32 sectors, the amount of wear is increased by a factor of 31 since 32 physical sectors are written and erased for each sector the host writes. Spreading this wear across the erase pool results in an effective 1/30 usable lifetime. This case is an extreme example and is only included to show the range of application dependence. This result is comparable to other vendor's cards based on memory with a 16kB erase block.

►analysis of host dependence

In assessing the life expectancy of a card in a given system several factors need to be understood. These factors include the types of files and their corresponding sizes, frequency of card write operations and file system behavior (including data structures). The types of files must be considered since some files, such as operating systems or executable files, typically remain in fixed locations once they are stored in the card. This limits the number of physical blocks available for circulation into the erase pool. The remaining capacity after these files have been accounted for can then be divided by the typical size of files that will be updated over the lifetime of the card. Related to this calculation is how the file system overwrites existing files. Typical operating system behavior, such as DOS, will allocate new blocks from the file allocation table, or FAT, and so repeated file writes will occupy a new set of addresses on the card. This is very beneficial in spreading wear across the card since it forces the card to cycle the entire physical

Figure 202: SanDisk white paper - page 4

area being used for such files. Special cases to consider include those where the files being updated are very small. Typically an operating system uses a minimum number of sectors to store a file, referred to as a cluster. Typical cluster sizes range from 8 to 64 sectors in size. The cluster size is important for files that are the same or smaller than the 32-sector block since these may trigger garbage collection operations. If these updates happen in a random fashion (sequential updates would not be affected by cluster size) lifetime may be reduced as a result. Finally, the frequency of such updates is then used to determine how long it will take before the card reaches its statistical limit for endurance. These factors can be combined in an equation that can be used to calculate the minimum time a card will function in that application:

$$lifetime = 2{,}000{,}000 \times \frac{\left(C_{tzone} - C_{fixed}\right) \times \left(1 - k_r \times \frac{32 - N_{cluster}}{32}\right)}{FS_{typ}} \times \frac{1}{f_w}$$

where Czone is the total capacity of the zone, Cfixed is the capacity used by fixed files, Ncluster is the cluster size, FStyp is the average file size and fw is the average frequency at which files are updated. kr is a factor that is 0 for file sizes that are typically over 16kB or for applications that are not random in the order in which such files are updated.

Example 1

In this example 128 KB of data is updated once a day. The zone has 500 KB worth of fixed files. A 4 MB zone size is assumed.

$$lifetime = 2{,}000{,}000 \times \frac{(4000 - 500) \times (1 - 0)}{128} \times \frac{1}{1/day}$$

$$lifetime = 149828\, years$$

Example 2

This example is a data logging operation using a 1GB card where a 4kB file is updated every five seconds. This would result in sequential address being written.

$$lifetime = 2{,}000{,}000 \times \frac{4000}{4} \times \frac{1}{1/5\,\text{sec}}$$

$$lifetime = 317\, years$$

Figure 203: SanDisk white paper - page 5

Example 3

This example is a data logging operation using the same 1GB card where a new 4kB file is written every five seconds. But in this case the cluster size is 4kB and it is expected that, due to file system fragmentation, the logical addresses will be written randomly.

$$lifetime = 2{,}000{,}000 \times \frac{4 \times \left(1 - 1 \times \frac{32-8}{32}\right)}{.004} \times \frac{1}{1/5\,\text{sec}}$$

$$lifetime = 79.3\,years$$

CONCLUSION

These examples are general in nature but show how the equation can be used as a guideline for calculating card lifetime in different applications. They also demonstrate that SanDisk card architecture exceeds reasonable life expectancy in typical applications. If a particular applications behaves in such a way that this equation cannot be applied, the SanDisk Applications Engineering group can assist in performing card lifetime analysis.

For more information, please visit the SanDisk Web site at: www.sandisk.com

SanDisk Corporation

Corporate Headquarters
140 Caspian Court
Sunnyvale, CA 94089
408-542-0500
FAX: 408-542-0503
URL: http://www.sandisk.com

Figure 204: SanDisk white paper - page 6

8. CompactFlash cards 5CFCRD.xxxx-03

8.1 General information

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

8.2 Order data

Model number	Description	Image
5CFCRD.0064-03	CompactFlash 64 MB SSI	Example: 256 MB CompactFlash card
5CFCRD.0128-03	CompactFlash 128 MB SSI	
5CFCRD.0256-03	CompactFlash 256 MB SSI	
5CFCRD.0512-03	CompactFlash 512 MB SSI	
5CFCRD.1024-03	CompactFlash 1024 MB SSI	
5CFCRD.2048-03	CompactFlash 2048 MB SSI	
5CFCRD.4096-03	CompactFlash 4096 MB SSI	

Table 242: Order data - CompactFlash cards

8.3 Technical data

Information:

The following defined characteristics, features and limit values are only valid for 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	> 2,000,000 times
Data retention	10 years
Mechanical characteristics	
Dimensions Length Width Thickness	 36.4 ± 0.15 mm 42.8 ± 0.10 mm 3.3 ± 0.10 mm
Weight	11.4 grams
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 0°C to +70°C -50°C to +100°C -50°C to +100°C
Relative humidity Operation / Storage	 8% to 95%, non-condensing
Vibration Operation Storage / Transport	 Maximum 16.3 g (point to point) Maximum 30 g (point to point)
Shock Operation Storage / Transport	 Maximum 1000 g Maximum 3,000 g
Altitude	Maximum 80,000 feet (24,383 meters)

Table 243: Technical data - 5CFCRD.xxxx-03 CompactFlash cards

8.3.1 Temperature humidity diagram for operation and storage

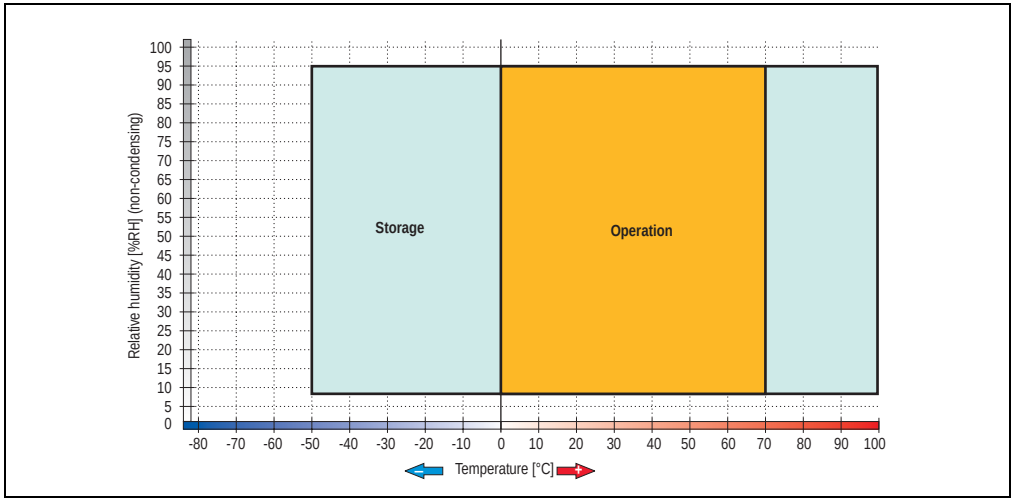


Figure 205: Temperature humidity diagram - CompactFlash cards 5CFCRD.xxxx-03

8.4 Dimensions

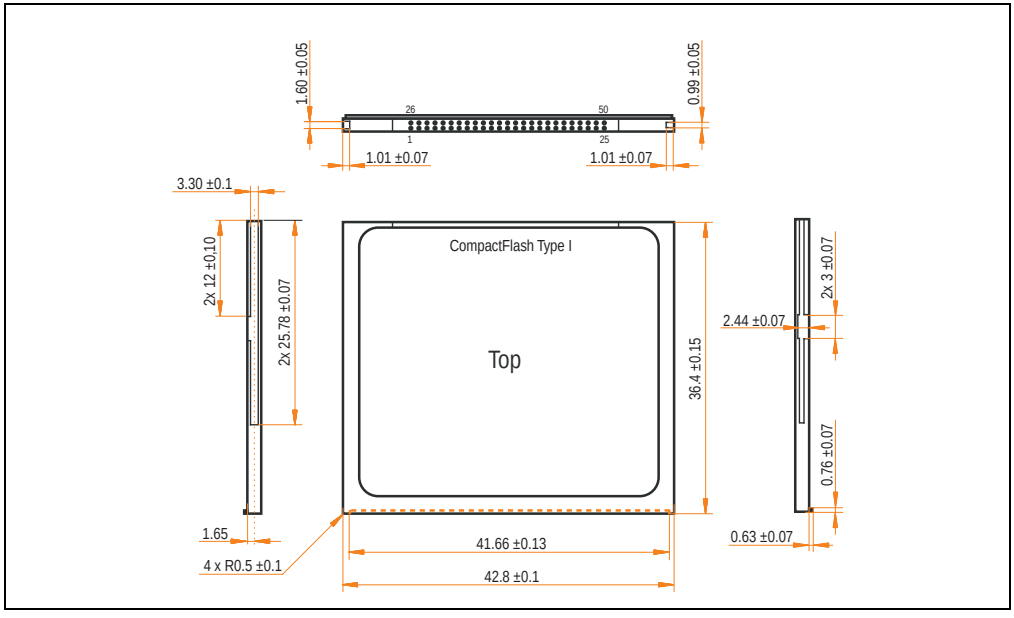


Figure 206: Dimensions - CompactFlash card type I

8.5 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).

SILICON SYSTEMS The Future of Storage...Today™ Advanced Storage Technology

SILICONDRIVE™ WHITE PAPER
ENDURANCE CONSIDERATIONS

SILICONSYSTEMS, INC.
26940 Aliso Viejo Parkway
Aliso Viejo, CA 92656
Phone: 949.900.9400
Fax: 949.900.9500
http://www.siliconsystems.com

WP401
Revision D
January 2006

SILICONSYSTEMS, INC.

Figure 207: Silicon Systems white paper - page 1 of 9

SILICON SYSTEMS
The Future of Storage...Today™

SILICONDRIVE™ WHITE PAPER
WP401D

INTRODUCTION

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

BACKGROUND

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

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

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

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

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

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

PAGE 2 OF 9 SILICONSYSTEMS PROPRIETARY SILICONSYSTEMS The Future of Storage...Today™

Figure 208: Silicon Systems white paper - page 2 of 9

SILICON SYSTEMS
The Future of Storage...Today™

SILICONDRIVE™ WHITE PAPER
WP401D

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.

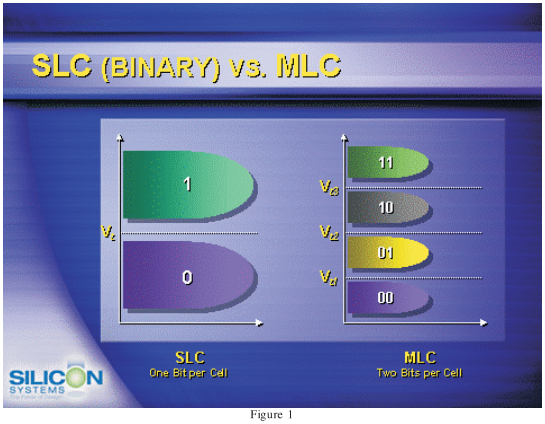


Figure 1

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.

PAGE 3 OF 9 SILICONSYSTEMS PROPRIETARY SILICONSYSTEMS The Future of Storage...Today™

Figure 209: Silicon Systems white paper - page 3 of 9

SILICON SYSTEMS
The Future of Storage...Today™

SILICONDRIVE™ WHITE PAPER
WP401D

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.

PAGE 4 OF 9 SILICONSYSTEMS PROPRIETARY SILICONSYSTEMS The Future of Storage...Today™

Figure 210: Silicon Systems white paper - page 4 of 9

SILICON SYSTEMS
The Future of Storage...Today™

SILICONDRIVE™ WHITE PAPER
WP401D

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.

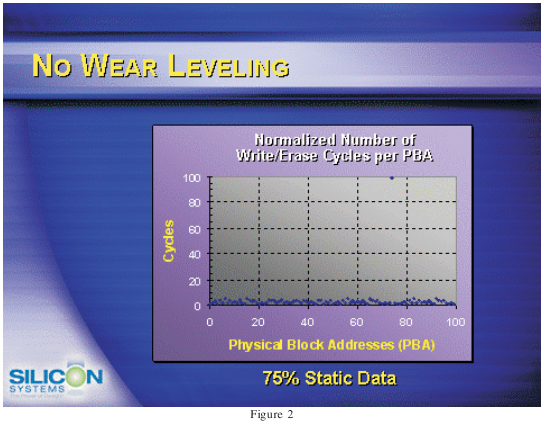


Figure 2

PAGE 5 OF 9 SILICONSYSTEMS PROPRIETARY SILICONSYSTEMS The Future of Storage...Today™

Figure 211: Silicon Systems white paper - page 5 of 9

SILICON SYSTEMS
The Future of Storage...Today™

SILICONDRIVE™ WHITE PAPER
WP401D

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.

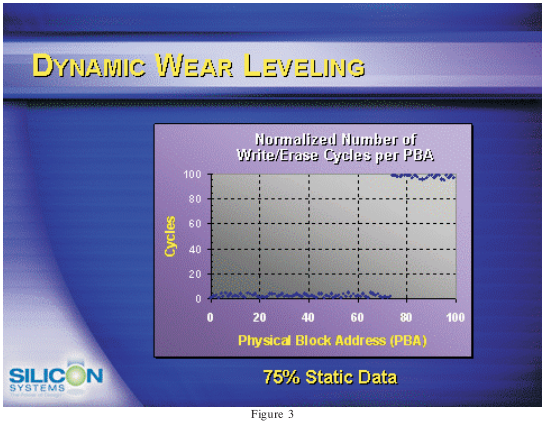


Figure 3

PAGE 6 OF 9 SILICONSYSTEMS PROPRIETARY SILICONSYSTEMS The Future of Storage...Today™

Figure 212: Silicon Systems white paper - page 6 of 9

SILICON SYSTEMS
The Future of Storage...Today™

SILICONDRIVE™ WHITE PAPER
WP401D

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.

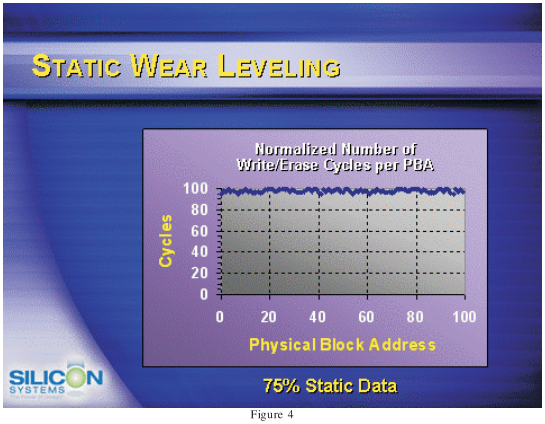


Figure 4

PAGE 7 OF 9 SILICONSYSTEMS PROPRIETARY SILICONSYSTEMS The Future of Storage...Today™

Figure 213: Silicon Systems white paper - page 7 of 9

SILICON SYSTEMS
The Future of Storage...Today™

SILICONDRIVE™ WHITE PAPER
WP401D

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

PAGE 8 OF 9 SILICONSYSTEMS PROPRIETARY SILICONSYSTEMS The Future of Storage...Today™

Figure 214: Silicon Systems white paper - page 8 of 9

SILICON SYSTEMS
The *Future* of Storage...Today™

SILICONDRIVE™ WHITE PAPER
WP401D

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)

The information contained in this bulletin ("Information") is for general guidance on matters of interest relating to the products referred to herein. While SiliconSystems and the author of this bulletin have made every attempt to ensure the accuracy of the Information, SiliconSystems, its officers, and employees shall not be responsible for any errors or omissions, or for the results obtained from the use of this Information. All Information is provided "as is," with no guarantee of completeness, accuracy, timeliness or of the results obtained from the use of this Information, and without warranty of any kind, express or implied. In no event shall SiliconSystems or its employees be liable for any decision made or action taken in reliance on the Information or for any consequential, special or similar damages, even if advised of the possibility of such damages.

Figure 215: Silicon Systems white paper - page 9 of 9

9. USB Media Drive - 5MD900.USB2-00

Figure 216: USB Media Drive - 5MD900.USB2-00

9.1 Features

- Desk-top or rack-mount operation (mounting rail brackets)
- Integrated USB diskette drive
- Integrated DVD-ROM/CD-RW drive
- Integrated CompactFlash slot IDE/ATAPI (Hot Plug capable)
- Integrated USB 2.0 connection (up to 480 MBit high speed)
- +24 VDC supply (back side)
- USB/B 2.0 connection (back side)
- Optional front cover (see also section 9.8 "Front cover 5A5003.03 for the USB Media Drive" on page 404)

9.2 Technical data

Information:

The following defined characteristics, features and limit values are only valid for 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.

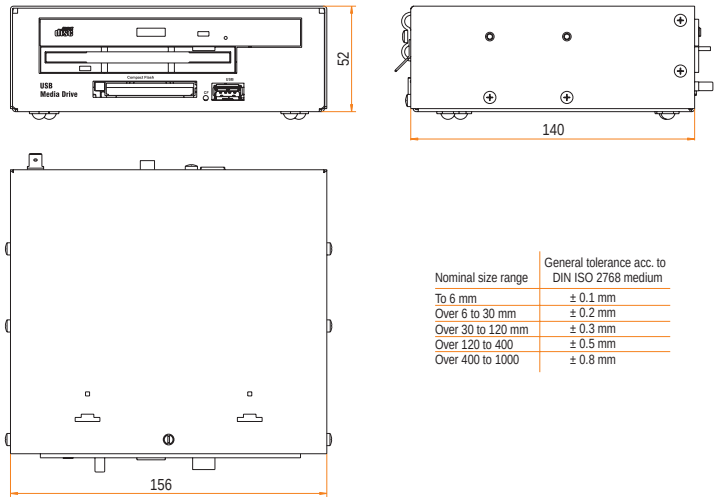
Features - entire device	5MD900.USB2-00
Transfer rate	Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)
Maximum cable length	5 m (not including hub)
Power supply Rated voltage	 24 VDC ±25%
Features - diskette drive	
Data capacity	720 KB / 1.25 MB / 1.44 MB (formatted)
Data transfer rate	250 kbits (720 KB) or 500 kbits (1.25 MB and 1.44 MB)
Rotation speed	Up to 360 rpm
Diskette media	High density (2HD) or normal density (2DD) 3.5" diskettes
MTBF	30,000 POH (Power-On Hours)
Features - DVD-ROM/CD-RW drive	
Write speed CD-R CD-RW	 24x, 16x, 10x and 4x 10x and 4x
Reading rate CD DVD	 24x 8x
Data transfer rate	Max. 33.3 MB/sec.
Access time (average) CD DVD	 85 ms 110 ms
Revolution speed	Max. 5136 rpm ± 1%
Starting time (0 rpm to read access)	19 seconds (maximum)
Host interface	IDE (ATAPI)
Readable media CD DVD	 CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW DVD-ROM, DVD-R, DVD-RW, DVD-RAM
Non-write protected media CD	 CD-R, CD-RW
Compatible formats	CD-DA, CD-ROM Mode 1/ Mode 2, CD-ROM XA Mode 2 (Form 1, Form 2), Photo CD (single/multi-session), Enhanced CD, CD-Text, DVD-ROM, DVD-R, DVD-Video (Double Layer) DVD-RAM (4.7 GB, 2.6 GB)
Write-methods	Disc at once, session at once, packet write, track at once

Table 244: Technical data - USB Media Drive 5MD900.USB2-00

Features - DVD-ROM/CD-RW drive	5MD900.USB2-00
Laser class	Class 1 laser
Data buffer capacity	2 MB
Noise level (complete read access)	Approx. 45 dBA at 50 cm
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10000 times
Features - CompactFlash slot	
CompactFlash Type Number Connection	 Type I 1 slot IDE / ATAPI
CompactFlash LED	Signals read or write access to an inserted CompactFlash card
Hot Plug capable	Yes
Features - USB connections	
USB A on the front side Power supply	Connection of further peripheral devices Max. 500 mA
USB B back side	Connection to the system
Mechanical characteristics	
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	Approx. 1.1 kg (without front cover)
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 +5°C .. +45°C -20°C .. +60°C -40°C .. +60°C
Relative humidity Operation Storage Transportation	 20 - 80% non-condensing 5 - 90% non-condensing 5 - 95% non-condensing
Vibration Operation Storage Transportation	 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 Transportation	 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. 3,000 meters

Table 244: Technical data - USB Media Drive 5MD900.USB2-00 (cont.)

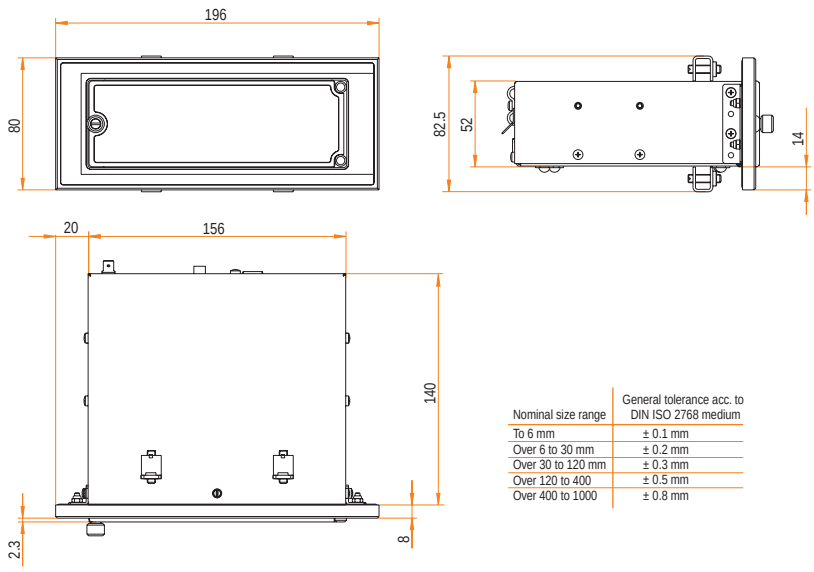
9.3 Dimensions



Nominal size range	General tolerance acc. to DIN ISO 2768 medium
To 6 mm	± 0.1 mm
Over 6 to 30 mm	± 0.2 mm
Over 30 to 120 mm	± 0.3 mm
Over 120 to 400	± 0.5 mm
Over 400 to 1000	± 0.8 mm

Figure 217: Dimensions - 5MD900.USB2-00

9.4 Dimensions with front cover



Nominal size range	General tolerance acc. to DIN ISO 2768 medium
To 6 mm	± 0.1 mm
Over 6 to 30 mm	± 0.2 mm
Over 30 to 120 mm	± 0.3 mm
Over 120 to 400	± 0.5 mm
Over 400 to 1000	± 0.8 mm

Figure 218: Dimensions - USB Media Drive with front cover

9.5 Contents of delivery

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

Table 245: Contents of delivery - USB Media Drive 5MD900.USB2-00

9.6 Interfaces

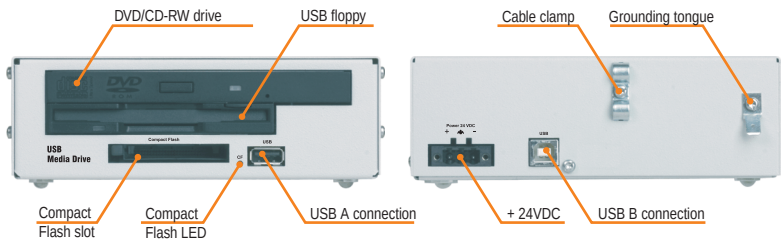


Figure 219: Interfaces - 5MD900.USB2-00

9.7 Mounting

The USB Media Drive can be operated as a desk-top device (rubber feet) or as a rack-mount device (2 mounting rail brackets included).

9.7.1 Mounting orientation

Because of limits to the mounting orientation with the components used (floppy, DVD-CDRW drive), the USB media drive is only permitted to be mounted and operated as shown in the following figure.

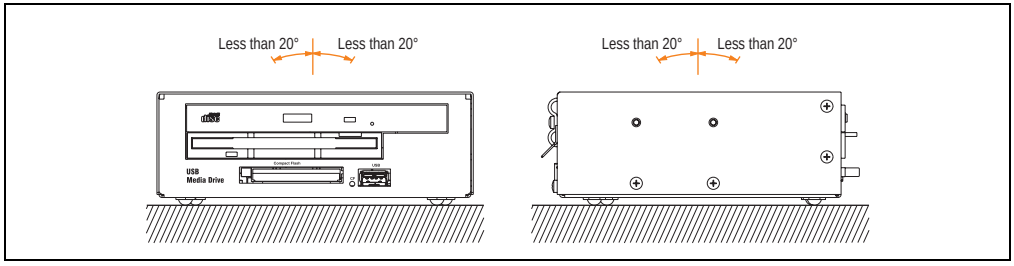


Figure 220: Mounting orientation - 5MD900.USB2-00

9.8 Front cover 5A5003.03 for the USB Media Drive

This front cover can also be mounted on the front of the USB media drive (model number 5MD900.USB2-00 or 5MD900.USB2-01) to protect the interface.

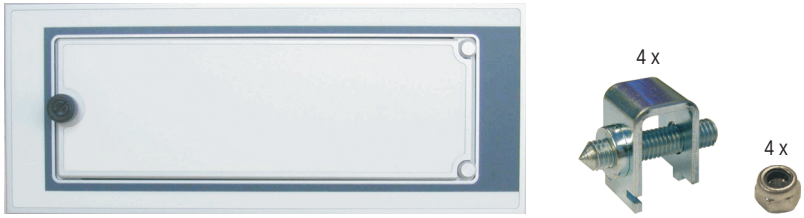


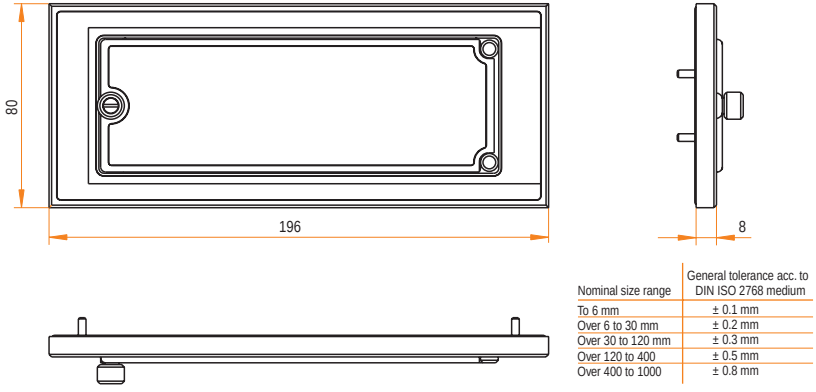
Figure 221: Front cover 5A5003.03

9.8.1 Technical data

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

Table 246: Technical data - 5A5003.03

9.8.2 Dimensions



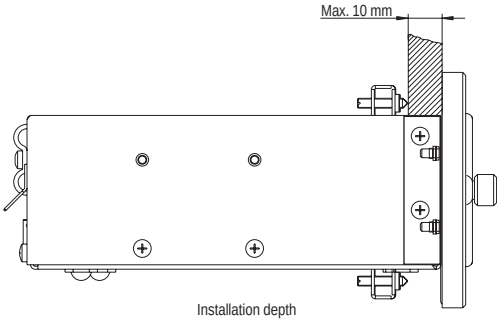
Nominal size range	General tolerance acc. to DIN ISO 2768 medium
To 6 mm	± 0.1 mm
Over 6 to 30 mm	± 0.2 mm
Over 30 to 120 mm	± 0.3 mm
Over 120 to 400	± 0.5 mm
Over 400 to 1000	± 0.8 mm

Figure 222: Dimensions - 5A5003.03

9.8.3 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.

Mounting



Installation depth

Figure 223: Front cover mounting and installation depth

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

Figure 224: USB Media Drive - 5MD900.USB2-01

10.1 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 10.8 "Front cover 5A5003.03 for the USB Media Drive" on page 412)

10.2 Technical data

Information:

The following defined characteristics, features and limit values are only valid for 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 - entire device	5MD900.USB2-01
Transfer rate	Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)
Maximum cable length	5 m (not including hub)
Power supply Rated voltage	 24 VDC ±25%
Features - diskette drive	
Data capacity	720 KB / 1.25 MB / 1.44 MB (formatted)
Data transfer rate	250 kbits (720 KB) or 500 kbits (1.25 MB and 1.44 MB)
Rotation speed	Up to 360 rpm
Diskette media	High density (2HD) or normal density (2DD) 3.5" diskettes
MTBF	30,000 POH (Power-On Hours)
Features - DVD-RW/CD-RW drive	
Write speed CD-R CD-RW DVD-R DVD-RW DVD-RAM[1)] DVD+R DVD+R (double layer) DVD+RW	 24x, 16x, 10x and 4x 10x and 4x 8x, 4x and 2x 4x and 2x 3x and 2x 8x, 4x and 2x 2x,4x 4x and 2x
Reading rate CD DVD	 24x 8x
Data transfer rate	Max. 33.3 MB/sec.
Access time (average) CD/DVD	 130 ms (24x) / 130 ms (8x)
Revolution speed	Max. 5090 rpm ± 1%
Starting time (0 rpm to read access) CD DVD	 14 seconds (maximum) 15 seconds (maximum)
Host interface	IDE (ATAPI)
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

Table 247: Technical data - USB Media Drive 5MD900.USB2-01

Features - DVD-RW/CD-RW drive	5MD900.USB2-01
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	 Disc at once, session at once, packet write, track at once Disc at once, incremental, over-write, sequential, multi-session
Laser class	Class 1 laser
Data buffer capacity	8 MB
Noise level (complete read access)	Approx. 48 dBA at 50 cm
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10000 times
Features - CompactFlash slot	
CompactFlash Type Number Connection	 Type I 1 slot IDE / ATAPI
CompactFlash LED	Signals read or write access to an inserted CompactFlash card
Hot Plug capable	Yes
Features - USB connections	
USB A on the front side Power supply Type Transfer rate	Connection of further peripheral devices Max. 500 mA 2.0 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)
USB B back side	Connection to the system
Mechanical characteristics	
Outer dimensions (without slide-in) Width Length Height	 70 mm 100 mm 9.5 mm
Weight	Approx. 1.1 kg (without front cover)
Environmental characteristics	
Ambient temperature Operation Storage Transportation	 +5°C .. +45°C -20°C .. +60°C -40°C .. +60°C
Relative humidity Operation Storage Transportation	 20 - 80% non-condensing 5 - 90% non-condensing 5 - 95% non-condensing

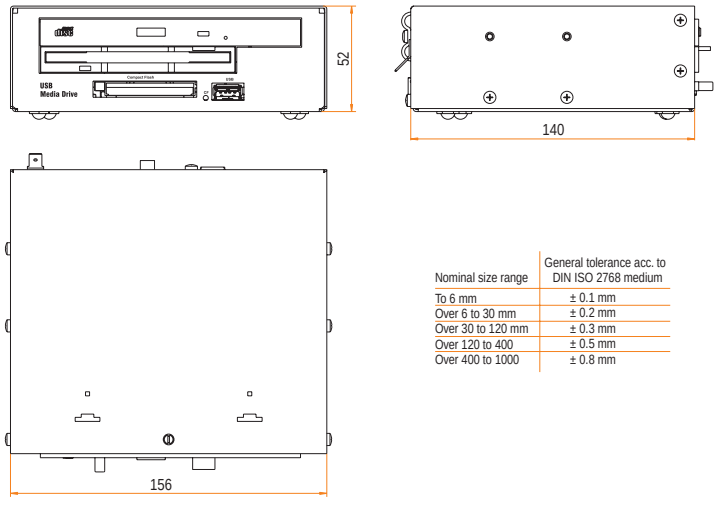
Table 247: Technical data - USB Media Drive 5MD900.USB2-01 (cont.)

Environmental characteristics	5MD900.USB2-01
Vibration Operation Storage Transportation	 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 Transportation	 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. 3,000 meters

Table 247: Technical data - USB Media Drive 5MD900.USB2-01 (cont.)

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

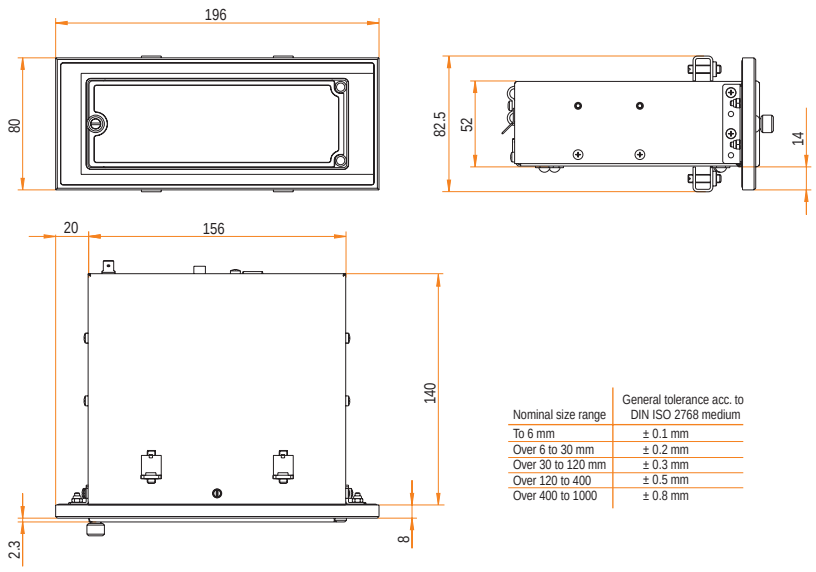
10.3 Dimensions



Nominal size range	General tolerance acc. to DIN ISO 2768 medium
To 6 mm	± 0.1 mm
Over 6 to 30 mm	± 0.2 mm
Over 30 to 120 mm	± 0.3 mm
Over 120 to 400	± 0.5 mm
Over 400 to 1000	± 0.8 mm

Figure 225: Dimensions - 5MD900.USB2-01

10.4 Dimensions with front cover



Nominal size range	General tolerance acc. to DIN ISO 2768 medium
To 6 mm	± 0.1 mm
Over 6 to 30 mm	± 0.2 mm
Over 30 to 120 mm	± 0.3 mm
Over 120 to 400	± 0.5 mm
Over 400 to 1000	± 0.8 mm

Figure 226: Dimensions - USB Media Drive with front cover

10.5 Contents of delivery

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

Table 248: Contents of delivery - USB Media Drive - 5MD900.USB2-01

10.6 Interfaces

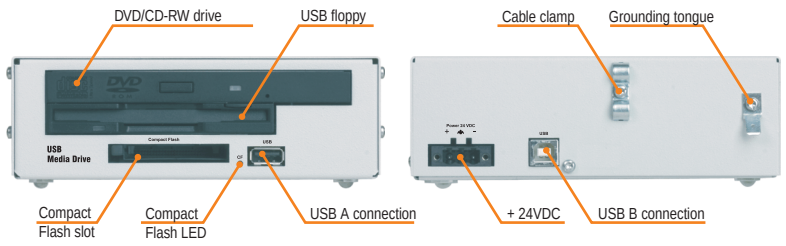


Figure 227: Interfaces - 5MD900.USB2-01

10.7 Mounting

The USB Media Drive can be operated as a desk-top device (rubber feet) or as a rack-mount device (2 mounting rail brackets included).

10.7.1 Mounting orientation

Because of limits to the mounting orientation with the components used (floppy, DVD-CDRW drive), the USB media drive is only permitted to be mounted and operated as shown in the following figure.

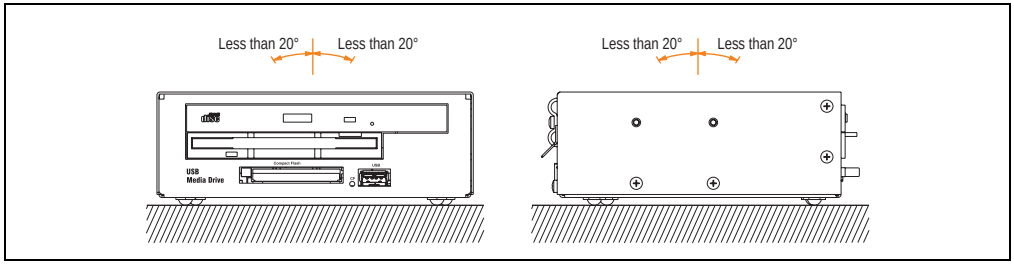


Figure 228: Mounting orientation - 5MD900.USB2-01

10.8 Front cover 5A5003.03 for the USB Media Drive

This front cover can also be mounted on the front of the USB media drive (model number 5MD900.USB2-00 or 5MD900.USB2-01) to protect the interface.

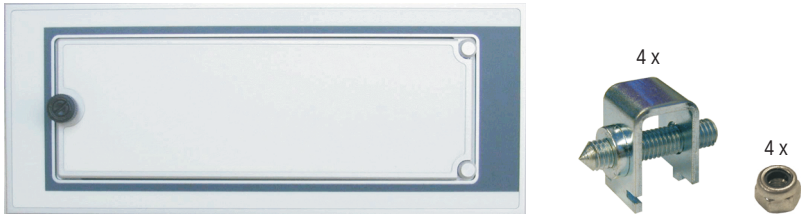


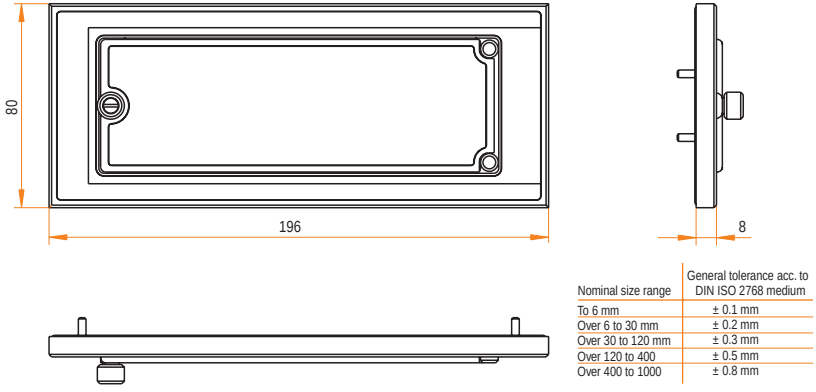
Figure 229: Front cover 5A5003.03

10.8.1 Technical data

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

Table 249: Technical data - 5A5003.03

10.8.2 Dimensions



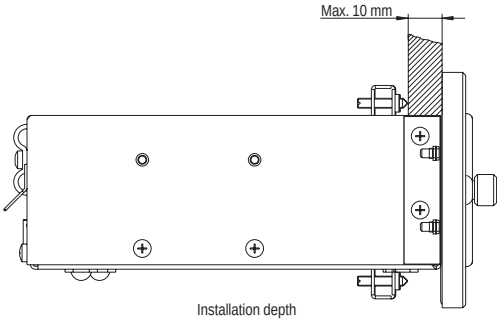
Nominal size range	General tolerance acc. to DIN ISO 2768 medium
To 6 mm	± 0.1 mm
Over 6 to 30 mm	± 0.2 mm
Over 30 to 120 mm	± 0.3 mm
Over 120 to 400	± 0.5 mm
Over 400 to 1000	± 0.8 mm

Figure 230: Dimensions - 5A5003.03

10.8.3 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.

Mounting



Installation depth

Figure 231: Front cover mounting and installation depth

11. USB flash drive

Information:

We reserve the right to supply alternative products, due to the vast quantity of flash drives available on the market and their corresponding short product lifecycle. Therefore, the following measures might be necessary in order to boot from these flash drives (e.g. the SanDisk Cruzer Micro Flash Drive with 512 MB):

- **The flash drive must be reformatted or in some cases even re-partitioned (set active partition).**
- **The flash drive must be at the top of the BIOS boot order, or alternatively the IDE controllers can also be deactivated in the BIOS. This can be avoided in most cases if a "`fdisk /mbr`" is also executed on the USB flash drive.**

11.1 General information

USB flash drives are easy-to-exchange memory 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.

11.2 Order data

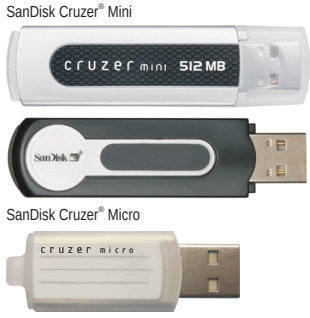
Model number	Description	Image
5MMUSB.0128-00	USB flash drive 128 MB SanDisk Cruzer Mini	
5MMUSB.0256-00	USB flash drive 256 MB SanDisk Cruzer Mini	
5MMUSB.0512-00	USB flash drive 512 MB SanDisk Cruzer Mini up to Rev. E0 or Cruzer Micro starting with Rev. E0	
5MMUSB.1024-00	USB flash drive 1 GB SanDisk Cruzer Mini up to Rev. C0 or Cruzer Micro starting with Rev. C0	
5MMUSB.2048-00	USB flash drive 1 GB SanDisk Cruzer Micro	

Table 250: Order data - USB flash drives

11.3 Technical data

Information:

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

Features	5MMUSB.0128-00	5MMUSB.0256-00	5MMUSB.0512-00	5MMUSB.1024-00	5MMUSB.2048-00
LED Cruzer Mini / Cruzer Micro	1 LED (green), signals data transfer (send and receive)				
Power supply Current requirements Cruzer Mini / Cruzer Micro	via the USB port 650 µA sleep mode, 150 mA read/write				
Interface Cruzer Mini / Cruzer Micro Type Transfer rate Sequential reading Sequential writing Connection	USB specification 2.0 high speed device, mass storage class, USB-IF and WHQL certified USB 1.1 and 2.0-compatible Up to 480 MBit (high speed) Max. 8.7 MB/second Max. 1.7 MB/second To each USB type A interface				
MTBF (at 25°C) Cruzer Mini / Cruzer Micro	100,000 hours				
Data retention Cruzer Mini / Cruzer Micro	10 years				
Maintenance Cruzer Mini / Cruzer Micro	None				
Operating system support Cruzer Mini Cruzer Micro	Windows CE 4.1, CE 4.2, 98SE[1)] , ME, 2000, XP, Mac OS 9.1.x and Mac OS X 10.1.2 Windows CE 4.2, CE 5.0, ME, 2000, XP and Mac OS 9.1.x+, OS X v10.1.2+				
Mechanical characteristics					
Dimensions Height - Cruzer Mini / Cruzer Micro Width - Cruzer Mini / Cruzer Micro Depth - Cruzer Mini / Cruzer Micro	62 mm / 52.2 mm 19 mm / 19 mm 11 mm / 7.9 mm				
Environmental characteristics					
Environmental temperature Cruzer Mini / Cruzer Micro Operation Storage Transportation	0°C .. +45°C -20°C .. +60°C -20°C .. +60°C				
Humidity Cruzer Mini / Cruzer Micro Operation Storage Transportation	10% .. 90%, non-condensing 5% .. 90%, non-condensing 5% .. 90%, non-condensing				
Vibration Cruzer Mini / Cruzer Micro Operation Storage Transportation	At 10 - 500 Hz: 2 g (19.6 m/s^2 0 peak), oscillation rate 1/minute At 10 - 500 Hz: 4 g (39.2 m/s^2 0 peak), oscillation rate 1/minute At 10 - 500 Hz: 4 g (39.2 m/s^2 0 peak), oscillation rate 1/minute				

Table 251: Technical data - USB flash drive 5MMUSB.xxxx-00

Features	5MMUSB.0128-00	5MMUSB.0256-00	5MMUSB.0512-00	5MMUSB.1024-00	5MMUSB.2048-00
Shock Cruzer Mini / Cruzer Micro Operation Storage Transportation	 Max. 40 g (392 m/s^2 0-peak) and 11 ms length Max. 80 g (784 m/s^2 0-peak) and 11 ms length Max. 80 g (784 m/s^2 0-peak) and 11 ms length				
Altitude Cruzer Mini / Cruzer Micro Operation Storage Transportation	 3048 meters 12192 meters 12192 meters				

Table 251: Technical data - USB flash drive 5MMUSB.xxxx-00 (cont.)

1) For Win 98SE, a driver can be downloaded from the SanDisk homepage.

11.3.1 Temperature humidity diagram for operation and storage

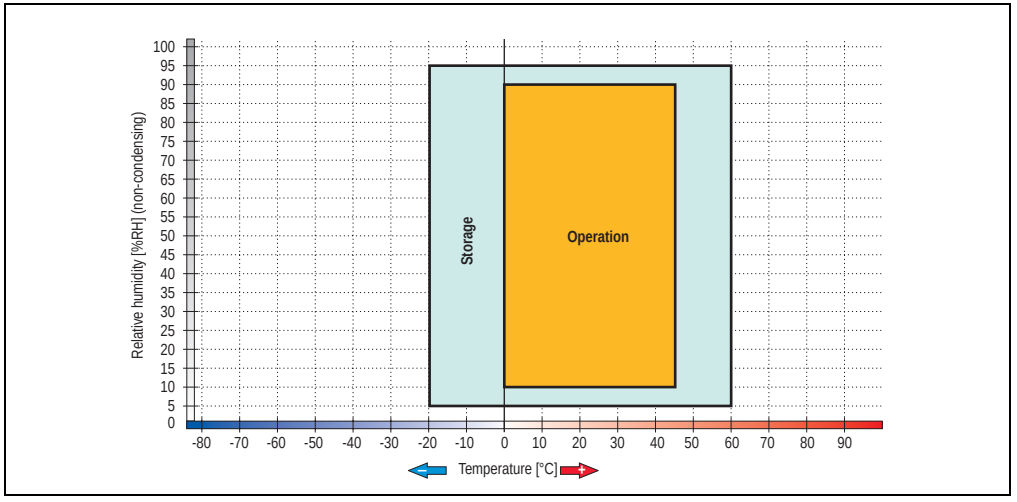


Figure 232: Temperature humidity diagram for USB flash drive - 5MMUSB.xxxx-00

11.4 Contents of delivery

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

Table 252: Contents of delivery - USB flash drives 5MMUSB.xxxx-00

12. HMI Drivers & Utilities DVD 5SWHMI.0000-00

Figure 233: HMI Drivers & Utilities DVD 5SWHMI.0000-00

Model number	Short description	Note
5SWHMI.0000-00	**HMI Drivers & Utilities DVD**	

Table 253: Model number - HMI Drivers & Utilities DVD

This DVD contains drivers, utilities, software upgrades and user manuals for B&R Panel system products (see B&R homepage – Industrial PCs, Visualization and Operation).
Information in detail:

BIOS upgrades for the products

- Automation PC 620
- Panel PC 700
- Automation PC 680
- Provit 2000 product family - IPC2000/2001/2002
- Provit 5000 product family - IPC5000/5600/5000C/5600C
- Power Panel 100 BIOS devices
- Mobile Panel 100 BIOS devices
- Power Panel 100 / Mobile Panel 100 User Boot Logo
- Power Panel 100 / Mobile Panel 100 REMHOST Utility

Drivers for the devices

- Automation Device Interface (ADI)
- Audio
- Chipset
- CD-ROM
- LS120
- Graphics
- Network
- PCI RAID Controller
- Touch screen
- Touchpad
- Interface board

Updates

- Firmware Upgrades (e.g. MTCX, SMXC)

Utilities/Tools

- Automation Device Interface (ADI)
- Miscellaneous
- MTC Utilities
- Key Editor
- MTC & Mkey Utilities
- Mkey Utilities
- UPS Configuration Software
- ICU ISA Configuration
- Intel PCI NIC Boot ROM
- Diagnostics
- CompactFlash lifespan calculation for Silicon Systems CompactFlash cards 5CFCRD.xxxx-03

Windows and embedded operating systems

- Thin client
- Windows CE
- Windows NT Embedded
- Windows XP Embedded

MCAD templates for

- Industrial PCs
- Visualization and operating devices
- Legend strip templates

Documentation for

- B&R Windows CE
- Automation PC 620
- Automation PC 680
- Automation Panel 900
- Panel PC 700
- Power Panel 15/21/35/41
- Power Panel 100/200
- Provit 2000
- Provit 3030
- Provit 4000
- Provit 5000
- Provit Benchmark
- Provit Mkey
- Windows NT Embedded Application Guide
- Windows XP Embedded Application Guide
- Uninterruptible power supply

Service tools

- Acrobat Reader 5.0.5 (Freeware in German, English and French)
- Power Archiver 6.0 (Freeware in German, English and French)
- Internet Explorer 5.0 (German and English)
- Internet Explorer 6.0 (German and English)

13. Cables

13.1 DVI cable 5CADVI.0xxx-00

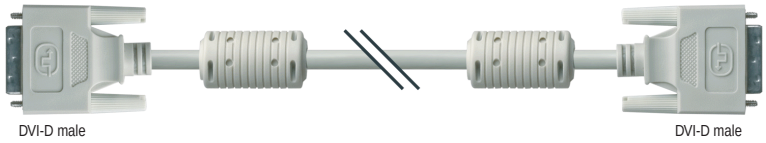


Figure 234: DVI extension cable - 5CADVI.0xxx-00 (similar)

Caution!

DVI cables can only be plugged in and unplugged when the device is turned off.

13.1.1 Order data

Model number	Description	Note
5CADVI.0018-00	**DVI-D cable 1.8 m / single** Cable single DVI-D/m:DVI-D/m 1.8 m	
5CADVI.0050-00	**DVI-D cable 5 m / single** Cable single DVI-D/m:DVI-D/m 5 m	
5CADVI.0100-00	**DVI-D cable 10 m / single** Cable single DVI-D/m:DVI-D/m 10 m	

Table 254: Model numbers - DVI cables

13.1.2 Technical data

Features	5CADVI.0018-00	5CADVI.0050-00	5CADVI.0100-00
Length	1.8 m ± 30 mm	5 m ± 50 mm	10 m ± 100 mm
Outer diameter	Max. 8.5 mm		
Shielding	Individual cable pairs and entire cable		
Connector type	2x DVI-D (18+1), male		
Wire cross section	AWG 28		
Line resistance	Max. 237 Ω/km		
Insulation resistance	Min. 100 MΩ/km		
Flexibility	Flexible (not for use in drag chain installations)		
Flex radius	Min. 146 mm		
Plug connection cycles	100		
Weight	Approx. 300 g	Approx. 590 g	Approx. 2100 g

Table 255: Technical data - DVI cable 5CADVI.0xxx-00

13.1.3 Cable specifications

The following figure shows the pin assignments for the DVI cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly.

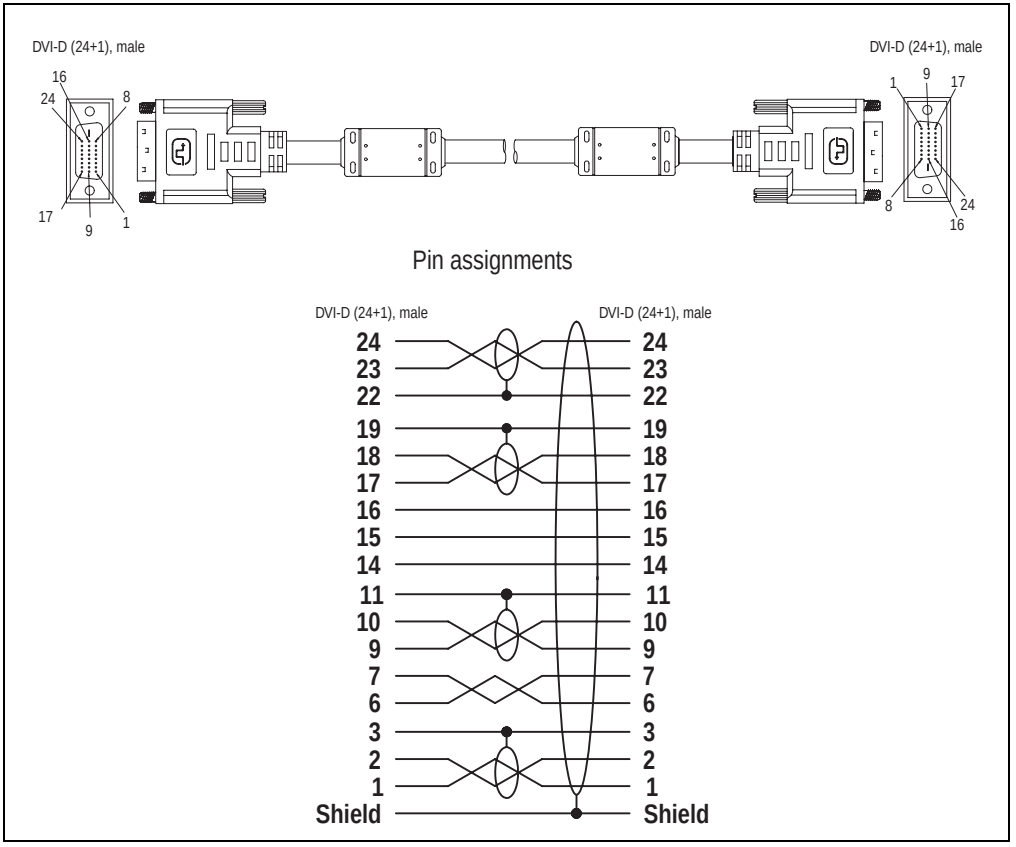


Figure 235: DVI cable pin assignments

13.2 SDL cable 5CASDL.0xxx-00

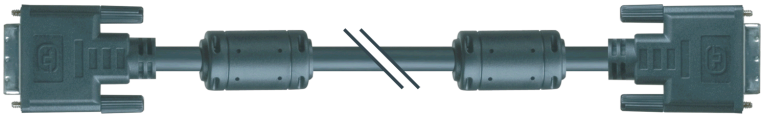


Figure 236: SDL extension cable (similar)

Caution!

SDL cables can only be plugged in and unplugged when the device is turned off.

13.2.1 Order data

Model number	Description	Note
5CASDL.0018-00	**SDL cable 1.8 m** SDL cable length: 1.8 m	
5CASDL.0050-00	**SDL cable 5 m** SDL cable length: 5 m	
5CASDL.0100-00	**SDL cable 10 m** SDL cable length: 10 m	
5CASDL.0150-00	**SDL cable 15 m** SDL cable length: 15 m	
5CASDL.0200-00	**SDL cable 20 m** SDL cable length: 20 m	
5CASDL.0250-00	**SDL cable 25 m** SDL cable length: 25 m	
5CASDL.0300-00	**SDL cable 30 m** SDL cable length: 30 m	

Table 256: Model numbers - SDL cables

13.2.2 Technical data

Features	5CASDL.0018-00	5CASDL.0050-00	5CASDL.0100-00	5CASDL.0150-00	5CASDL.0200-00	5CASDL.0250-00	5CASDL.0300-00
Length	1.8 m ± 50 mm	5 m ± 80 mm	10 m ± 100 mm	15 m ± 120 mm	20 m ± 150 mm	25 m ± 200 mm	30 m ± 200 mm
Outer diameter	Max. 9 mm		Max. 11.5 mm				
Shielding	Individual cable pairs and entire cable						
Connector type	2x DVI-D (24+1), male						
Wire cross section	AWG 28		AWG 24				
Line resistance	Max. 237 Ω/km		Max. 93 Ω/km				
Insulation resistance	Min. 10 MΩ/km						
Flexibility	Flexible (not for use in drag chain installations)						
Flex radius	Min. 172 mm		Min. 220 mm				
Plug connection cycles	100						
Weight	Approx. 300 g	Approx. 590 g	Approx. 2100 g	Approx. 3000 g	Approx. 4100 g	Approx. 5100 g	Approx. 6100 g

Table 257: Technical data - SDL cables 5CASDL.0xxx-00

13.2.3 Cable specifications

The following figure shows the pin assignments for the SDL cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly. The SDL cables provided by B&R are guaranteed to function properly.

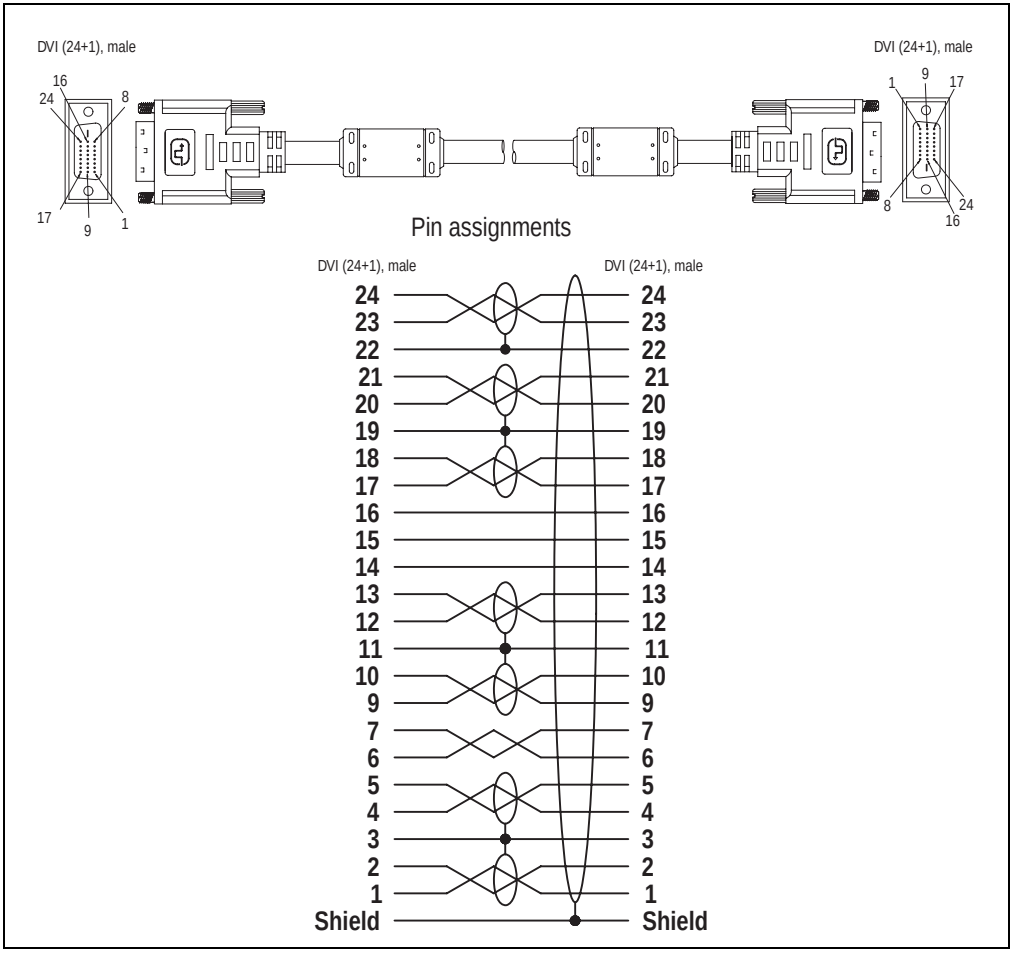


Figure 237: SDL pin assignments for 5CASDL.0xxx-00

13.3 SDL cable with 45° plug 5CASDL.0xxx-01

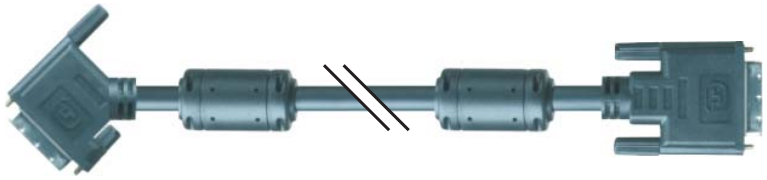


Figure 238: SDL cable with 45° plug (similar)

Caution!

SDL cables can only be plugged in and unplugged when the device is turned off.

13.3.1 Order data

Model number	Description	Note
5CASDL.0018-01	**SDL cable 1.8 m 45°** SDL cable length: 1,8 m; single sided 45° plug	
5CASDL.0050-01	**SDL cable 5 m 45°** SDL cable length: 5 m; single sided 45° plug	
5CASDL.0100-01	**SDL cable 10 m 45°** SDL cable length: 10 m; single sided 45° plug	
5CASDL.0150-01	**SDL cable 15 m 45°** SDL cable length: 15 m; single sided 45° plug	

Table 258: Model numbers - SDL cables with 45° plug

13.3.2 Technical data

Features	5CASDL.0018-01	5CASDL.0050-01	5CASDL.0100-01	5CASDL.0150-01
Length	1.8 m ± 50 mm	5 m ± 80 mm	10 m ± 100 mm	15 m ± 120 mm
Outer diameter	Max. 9 mm		Max. 11.5 mm	
Shielding	Individual cable pairs and entire cable			
Connector type	2x DVI-D (24+1), male			
Wire cross section	AWG 28		AWG 24	
Line resistance	Max. 237 Ω/km		Max. 93 Ω/km	
Insulation resistance	Min. 10 MΩ/km			
Flexibility	Flexible (not for use in drag chain installations)			
Flex radius	Min. 172 mm		Min. 220 mm	
Plug connection cycles	100			
Weight	Approx. 300 g	Approx. 590 g	Approx. 2100 g	Approx. 3000 g

Table 259: Technical data - SDL cable with 45° plug 5CASDL.0xxx-01

13.3.3 Cable specifications

The following figure shows the pin assignments for the SDL cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly. The SDL cables provided by B&R are guaranteed to function properly.

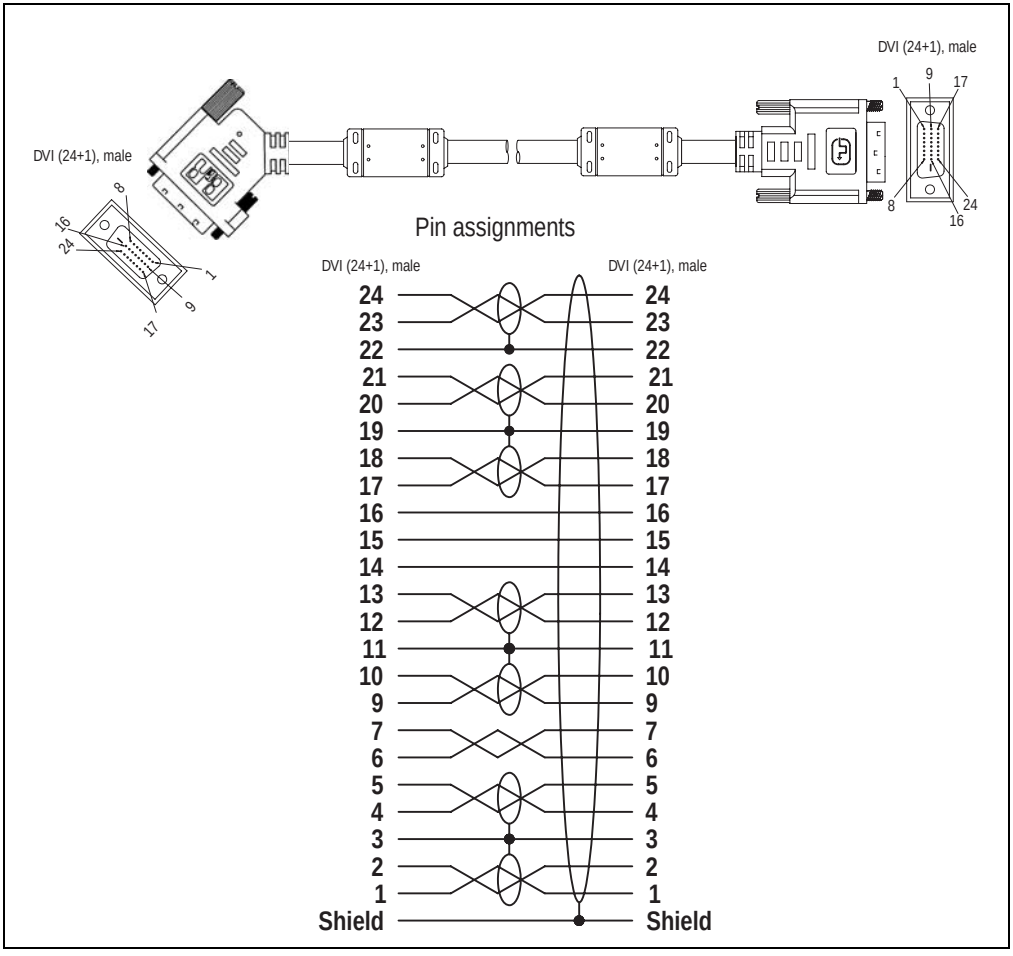


Figure 239: Pin assignments for SDL cable with 45° plug 5CASDL.0xxx-01

13.4 SDL cable with extender 5CASDL.0x00-10

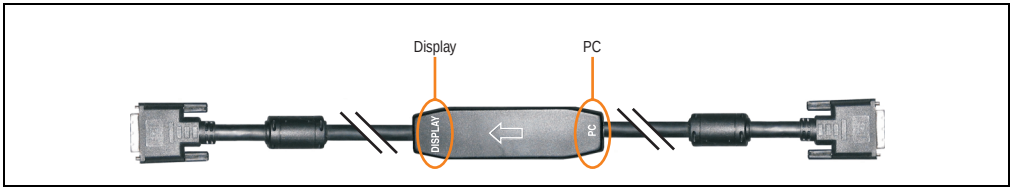


Figure 240: SDL cable with extender - 5CASDL.0x00-10 (similar)

Caution!

SDL cables with extender can only be plugged in and unplugged when the device is turned off. The correct direction of connection (Display, PC) for the wiring is illustrated on the middle of the extender.

13.4.1 Order data

Model number	Description	Note
5CASDL.0300-10	**SDL cable with extender 30 m** SDL cable length: 30 m with extender	
5CASDL.0400-10	**SDL cable with extender 40 m** SDL cable length: 40 m with extender	

Table 260: Model numbers - SDL cable with extender

13.4.2 Technical data

Features	5CASDL.0300-10	5CASDL.0400-10
Length	30 m ± 200 mm	40 m ± 200 mm
Dimensions of extender box	Height 18.5 mm, width 35 mm, length 125 mm	
Outer diameter	Max. 11.5 mm	
Shielding	Individual cable pairs and entire cable	
Connector type	2x DVI-D (24+1), male	
Wire cross section	AWG 24	
Line resistance	Max. 93 Ω/km	
Insulation resistance	Min. 10 MΩ/km	
Flexibility	Flexible (not for use in drag chain installations)	
Flex radius	Min. 220 mm	
Plug connection cycles	100	
Weight	Approx. 6100 g	Approx. 8100 g

Table 261: Technical data - SDL cable with extender 5CASDL.0x00-10

13.4.3 Cable connection

The SDL cable with extender must be connected between the Panel PC 700 and Automation Panel 900 display unit in the correct direction. The correct signal direction is indicated on the extender unit for this purpose:

- Connect the end labeled "PC" with the video output of the Panel PC 700 (monitor/panel).
- The "Display" end should be connected to the display unit Automation Panel 900 via Automation Panel Link insert card.

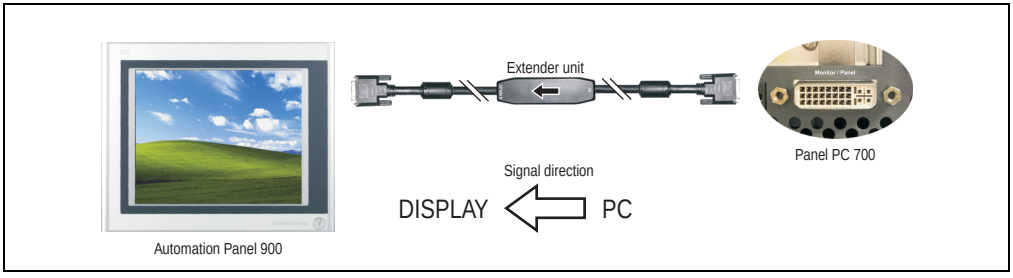


Figure 241: Example of the signal direction for the SDL cable with extender - PPC700

13.4.4 Cable specifications

The following figure shows the pin assignments for the SDL cable with extender available at B&R.

Information:

Only B&R SDL cables with extender can be used.

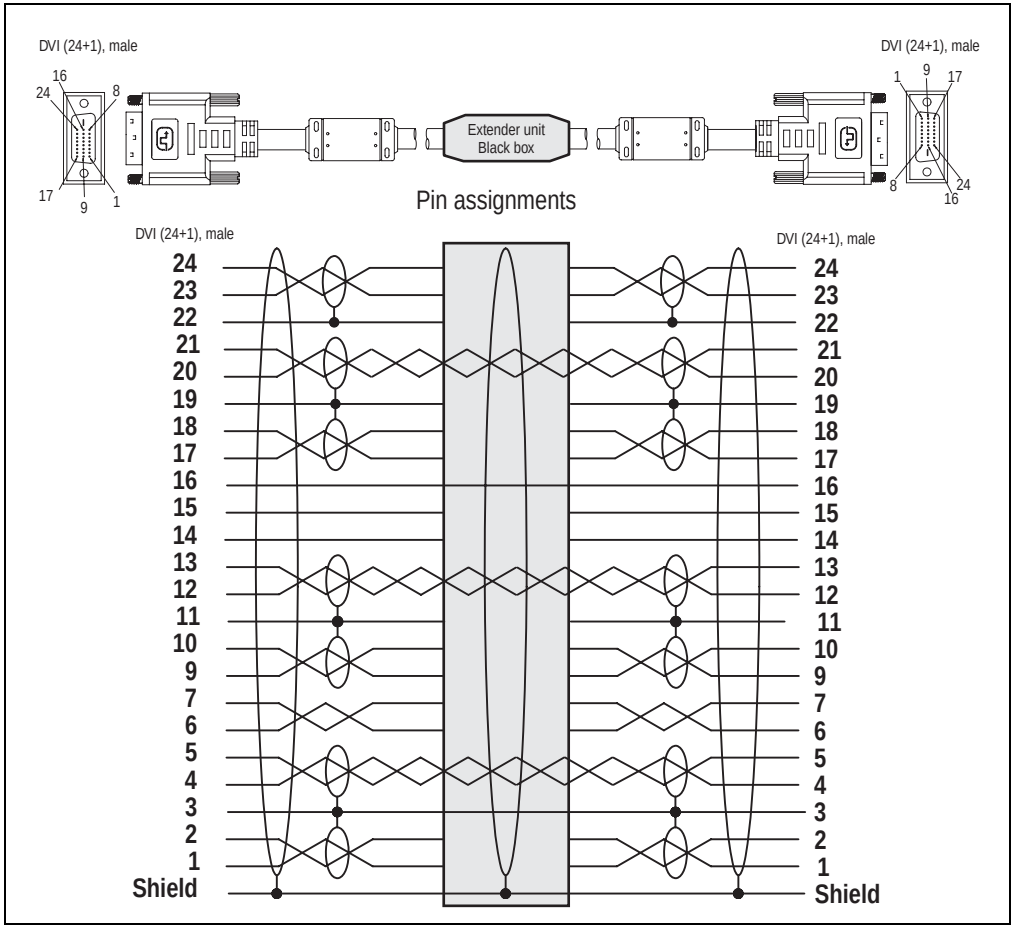


Figure 242: Pin assignments for SDL cable with extender 5CASDL.0x00-10

13.5 SDL cable flex 5CASDL.0xxx-03

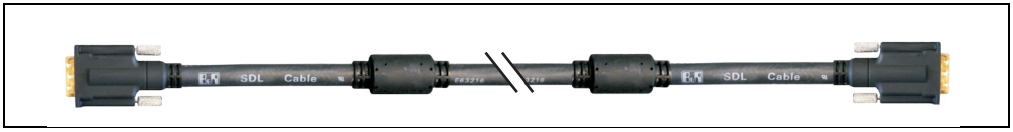


Figure 243: SDL cable 5CASDL.0xxx-03 (similar)

Caution!

SDL cables can only be plugged in and unplugged when the device is turned off.

13.5.1 Order data

Model number	Description	Note
5CASDL.0018-03	**SDL cable flex 1.8 m** SDL cable, semi flexible, length: 1.8 m	
5CASDL.0050-03	**SDL cable flex 5 m** SDL cable, semi flexible, length: 5 m	
5CASDL.0100-03	**SDL cable flex 10 m** SDL cable, semi flexible, length: 10 m	
5CASDL.0150-03	**SDL cable flex 15 m** SDL cable, semi flexible, length: 15 m	
5CASDL.0200-03	**SDL cable flex 20 m** SDL cable, semi flexible, length: 20 m	
5CASDL.0250-03	**SDL cable flex 25 m** SDL cable, semi flexible, length: 25 m	
5CASDL.0300-03	**SDL cable flex 30 m** SDL cable, semi flexible, length: 30 m	

Table 262: Model numbers - SDL cable 5CASDL.0xxx-03

13.5.2 Technical data

Mechanical characteristics	5CASDL.0018-03	5CASDL.0050-03	5CASDL.0100-03	5CASDL.0150-03	5CASDL.0200-03	5CASDL.0250-03	5CASDL.0300-03
Length	1.8 m ± 20 mm	5 m ± 45 mm	10 m ± 90 mm	15 m ± 135 mm	20 m ± 180 mm	25 m ± 230 mm	30 m ± 280 mm
Weight	Approx. 450 g	Approx. 1000 g	Approx. 2000 g	Approx. 3000 g	Approx. 4000 g	Approx. 5000 g	Approx. 6000 g
Cable diameter	12 mm ± 0.5 mm						
Connectors Connection cycles Contacts Mechanical protection	2x DVI-D (24+1), male Min. 200 Gold plated Metal cover with crimped stress relief						
Flexibility[1)]	Semi-flexible, occasional movement (limited use in cable drag chains)						
Flex radius Single Moving	≥ 10 x cable diameter ≥ 15 x cable diameter						
Max. tension During installation During operation	≤ 400 N ≤ 50 N						
Materials Cable shielding Color	RoHS compliant Aluminum foil clad + tinned copper mesh Black (similar to RAL 9005)						
Shielding	Individual cable pairs and entire cable						
Electrical properties (at +20°C)							
Wire cross section	24 AWG (control wires) 26 AWG (DVI, USB, data)						
Line resistance 24 AWG 26 AWG	≤ 95 Ω/km ≤ 145 Ω/km						
Insulation resistance	> 200 MΩ/km						
Wave impedance	100 ± 10 Ω						
Test voltage Wire/wire Wire/shield	1 kV_{eff} 0.5 kV_{eff}						
Operating voltage	≤ 30 V						
Environmental characteristics							
Temperature resistance Fixed installation Moving Storage	-20°C .. +80°C -5°C .. +60°C -20°C .. +80°C						
Standards and certifications							
Torsion load	TBD						
Bending resistance	TBD						

Table 263: Technical data - SDL cable 5CASDL.0xxx-03

Approbation	UL AWM 20236 80°C 30 V						
Standards and certifications	**5CASDL.0018-03**	**5CASDL.0050-03**	**5CASDL.0100-03**	**5CASDL.0150-03**	**5CASDL.0200-03**	**5CASDL.0250-03**	**5CASDL.0300-03**
Oil and hydrolysis resistance	According to VDE 0282-10						

Table 263: Technical data - SDL cable 5CASDL.0xxx-03 (cont.)

1) 300,000 cycles tested at: flex radius 180 mm; stroke 460 mm; speed 4800 cycles/hours.

13.5.3 Dimensions

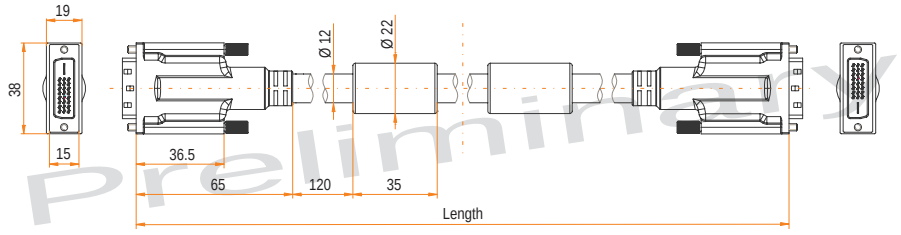


Figure 244: Dimensions - SDL cable 5CASDL.0xxx-03

13.5.4 Layering

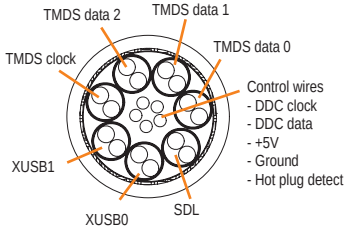
Element	Assignment	Cross section	
DVI	TMDS data 0	26 AWG	 Schematic display
	TMDS data 1	26 AWG	
	TMDS data 2	26 AWG	
	TMDS cycle	26 AWG	
USB	XUSB0	26 AWG	
	XUSB1	26 AWG	
Data	SDL	26 AWG	
Control wires	DDC cycle	24 AWG	
	DDC data	24 AWG	
	+ 5 V	24 AWG	
	Ground	24 AWG	
	Hot Plug detect	24 AWG	

Table 264: Design - SDL cable 5CASDL.0xxx-03

13.5.5 Cable specifications

The following figure shows the pin assignments for the SDL cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly.

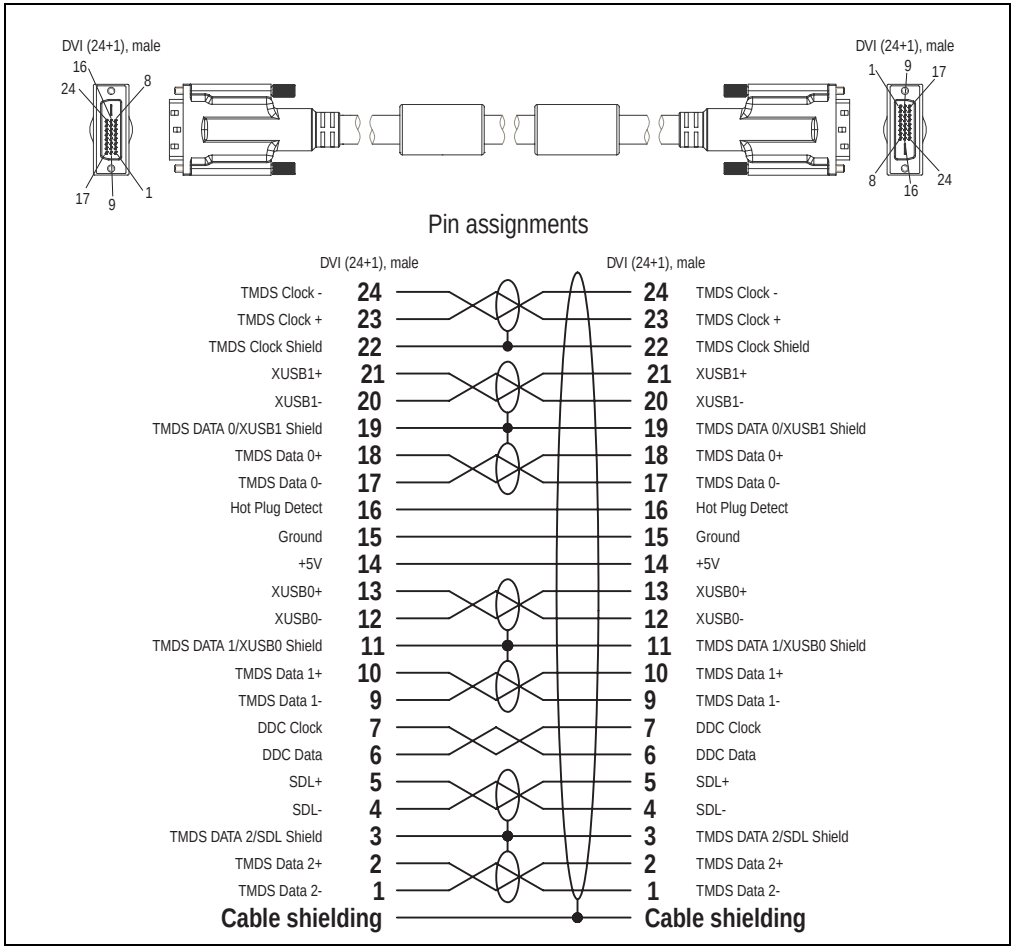


Figure 245: Pin assignments - SDL cable 5CASDL.0xxx-03

13.6 SDL cable flex with extender 5CASDL.0x00-13

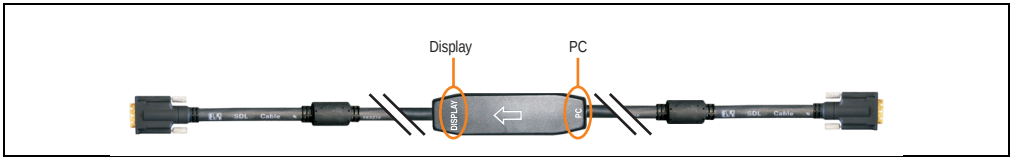


Figure 246: SDL cable flex with extender - 5CASDL.0x00-13 (similar)

Caution!

SDL cables with extender can only be plugged in and unplugged when the device is turned off. The correct direction of connection (Display, PC) for the wiring is illustrated on the middle of the extender.

13.6.1 Order data

Model number	Description	Note
5CASDL.0300-13	**SDL cable flex with extender 30 m** SDL cable, semi flexible, length: 30 m with extender	
5CASDL.0400-13	**SDL cable flex with extender 40 m** SDL cable, semi flexible, length: 40 m with extender	

Table 265: Model numbers for SDL cable flex with extender

13.6.2 Technical data

Features	5CASDL.0300-13	5CASDL.0400-13
Length	30 m ± 200 mm	40 m ± 200 mm
Dimensions of extender box	Height 18.5 mm, width 35 mm, length 125 mm	
Cable diameter	12 mm ± 0.5 mm	
Connectors Connection cycles Contacts Mechanical protection	2x DVI-D (24+1), male Min. 200 gold plated Metal cover with crimped stress relief	
Flexibility[1)]	Semi-flexible, occasional movement (limited use in cable drag chains)	
Flex radius Single Moving	 ≥ 10 x cable diameter ≥ 15 x cable diameter	
Max. tension During installation During operation	 ≤ 400 N ≤ 50 N	
Materials Cable shielding Color	RoHS compliant Aluminum foil clad + tinned copper mesh Black (similar to RAL 9005)	

Table 266: Technical data - SDL cable flex with extender 5CASDL.0x00-13

Features	5CASDL.0300-13	5CASDL.0400-13
Shielding	Individual cable pairs and entire cable	
Electrical properties (at +20°C)		
Wire cross section	24 AWG (control wires) 26 AWG (DVI, USB, data)	
Line resistance 24 AWG 26 AWG	 ≤ 95 Ω/km ≤ 145 Ω/km	
Insulation resistance	> 200 MΩ/km	
Wave impedance	100 ± 10 Ω	
Test voltage Wire/wire Wire/shield	 1 kV_{eff} 0.5 kV_{eff}	
Operating voltage	≤ 30 V	
Environmental characteristics		
Temperature resistance Fixed installation Moving Storage	 -20°C .. +60°C -5°C .. +60°C -20°C .. +60°C	
Standards and certifications		
Torsion load	TBD	
Bending resistance	TBD	
Approbation	UL AWM 20236 80°C 30 V	
Standards and certifications		
Oil and hydrolysis resistance	According to VDE 0282-10	

Table 266: Technical data - SDL cable flex with extender 5CASDL.0x00-13 (cont.)

1) 300,000 cycles tested at: flex radius 180 mm; stroke 460 mm; speed 4800 cycles/hours.

13.6.3 Cable connection

The SDL cable flex with extender must be connected between the Industrial PC and Automation Panel 900 display unit in the correct direction. The correct signal direction is indicated on the extender unit for this purpose:

- Connect the end labeled "PC" with the video output of the Panel PC 700 (monitor/panel).
- The "Display" end should be connected to the display unit Automation Panel 900 via Automation Panel Link insert card.

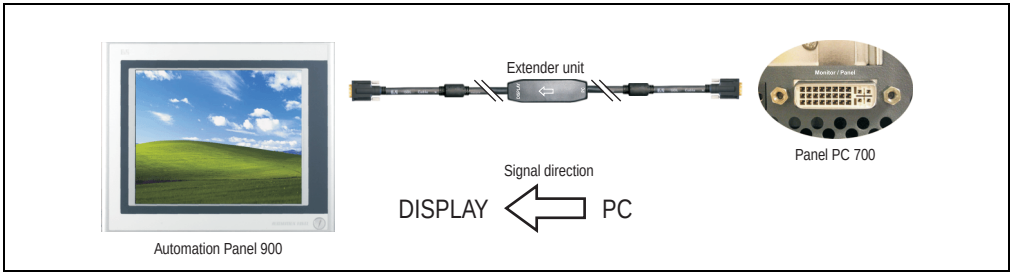


Figure 247: Example of the signal direction for the SDL cable flex with extender - PPC700

13.6.4 Cable specifications

The following figure shows the pin assignments for the SDL cable flex with extender available at B&R.

Information:

Only B&R SDL flex cables with extender can be used.

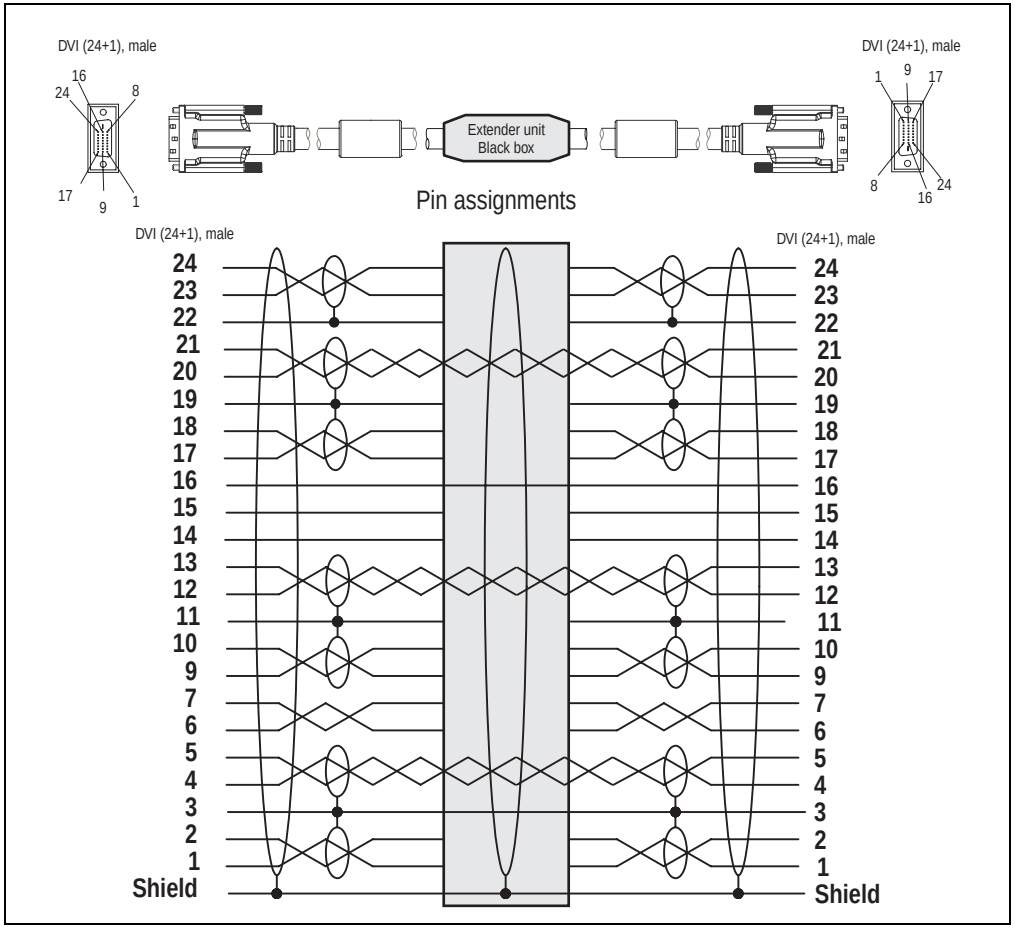


Figure 248: Pin assignments - SDL cable flex with extender 5CASDL.0x00-13

13.7 RS232 cable

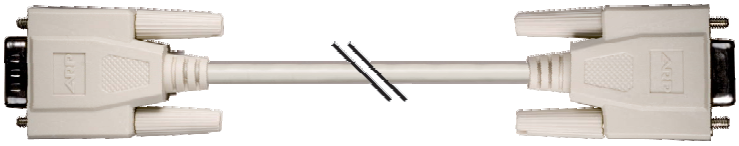


Figure 249: RS232 extension cable (similar)

13.7.1 Order data

Model number	Description	Note
9A0014.02	**RS232 cable DB9/f:DB9/m 1.8 m** RS232 extension cable for remote operation of a display unit with touch screen, length 1.8 m.	
9A0014.05	**RS232 cable DB9/f:DB9/m 5 m** RS232 extension cable for remote operation of a display unit with touch screen, length 5 m.	
9A0014.10	**RS232 cable DB9/f:DB9/m 10 m** RS232 extension cable for remote operation of a display unit with touch screen, length 10 m.	

Table 267: Model numbers - RS232 cables

13.7.2 Technical data

Features	9A0014.02	9A0014.05	9A0014.10
Length	1.8 m ± 50 mm	5 m ± 80 mm	10 m ± 100 mm
Outer diameter	Max. 5 mm		
Shielding	Entire cable		
Connector type	DSUB (9-pin), male / female		
Wire cross section	AWG 26		
Flexibility	Flexible		
Flex radius	Min. 70 mm		

Table 268: Technical data - RS232 cables

13.7.3 Cable specifications

The following figure shows the pin assignments for the RS232 cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly. The RS232 cables provided by B&R are guaranteed to function properly.

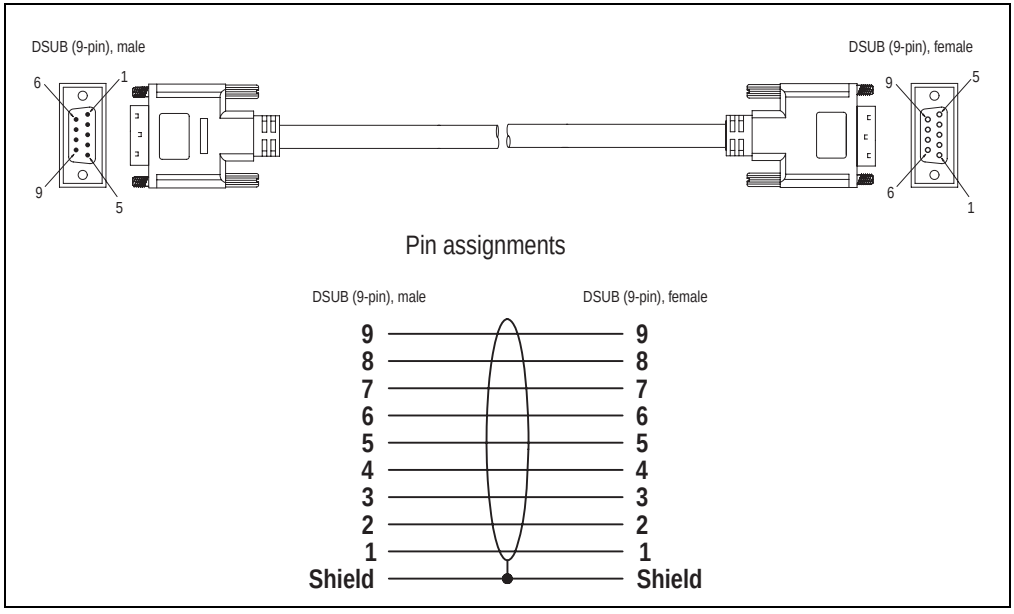


Figure 250: RS232 cable assignments

13.8 USB cable

Figure 251: USB extension cable (similar)

13.8.1 Order data

Model number	Description	Note
5CAUSB.0018-00	**USB 2.0 Cable A/m:B/m 1.8 m** USB 2.0 connection cable; Type A - Type B; 1.8 m	
5CAUSB.0050-00	**USB 2.0 Cable A/m:B/m 5 m** USB 2.0 connection cable; Type A - Type B; 5 m	

Table 269: Model numbers - USB cables

13.8.2 Technical data

Features	5CAUSB.0018-00	5CAUSB.0050-00
Length	1.8 m ± 30 mm	5 m ± 50 mm
Outer diameter	Max. 5 mm	
Shielding	Entire cable	
Connector type	USB type A male and USB type B male	
Wire cross section	AWG 24, 28	
Flexibility	Flexible	
Flex radius	Min. 100 mm	

Table 270: Technical data - USB cables

13.8.3 Cable specifications

The following figure shows the pin assignments for the USB cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly. The USB cables provided by B&R are guaranteed to function properly.

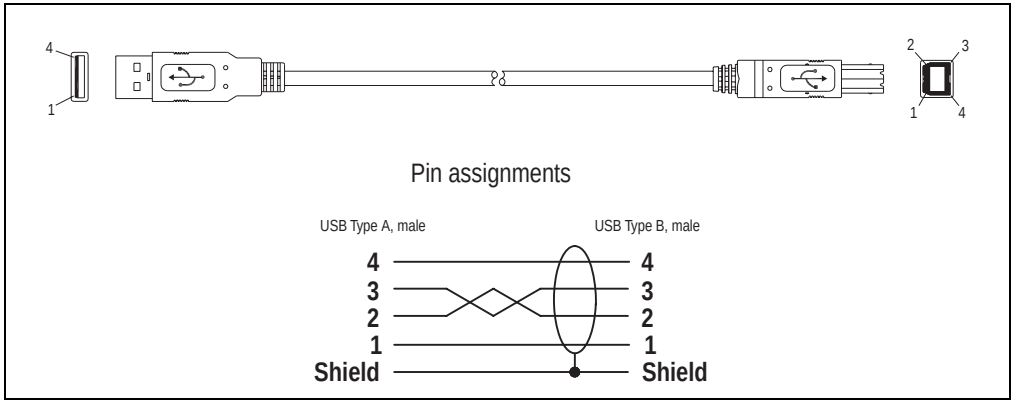


Figure 252: USB cable assignments

14. Legend strip templates

Panel PC 700 devices with keys are delivered with partially pre-labeled key legend strips (F1, F2, etc.). The key legend strip slots are accessible on the back of the Panel PC 700 device (above and below).

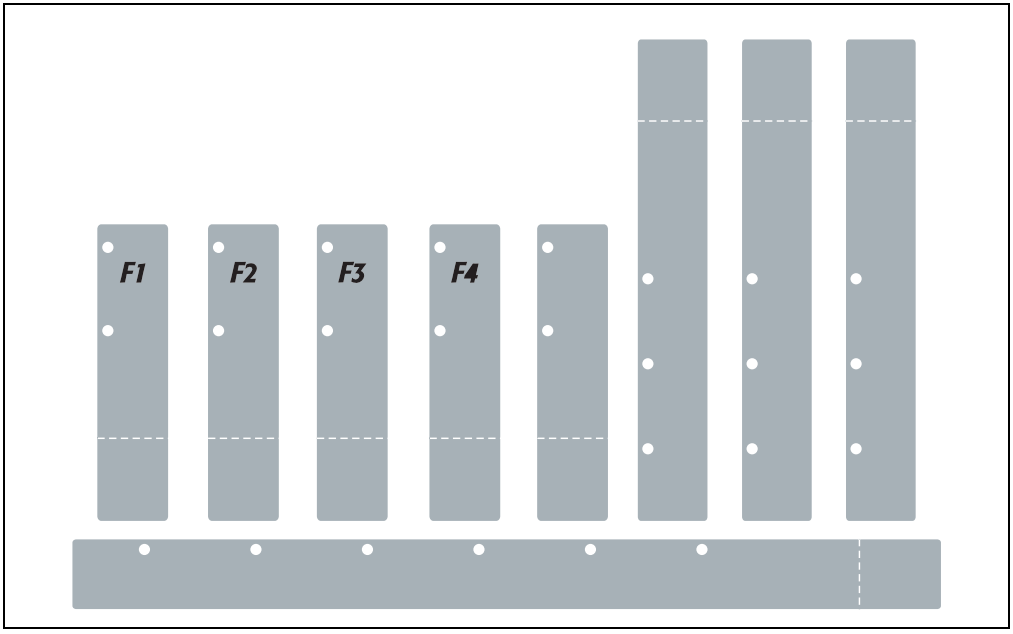


Figure 253: Legend strip templates

Printable legend strips (A4 format) can be ordered from B&R (see table 16 "Model numbers - other items" on page 28). They can be printed using a standard laser printer (b/w or color) in a temperature range from -40°C to +125°C. A print template (available for Corel Draw version 7, 9 and 10) for the respective legend strip template can be downloaded from the B&R homepage **www.br-automation.com**. The print templates can also be found on the HMI Drivers & Utilities DVD (Mod. No. 5SWHMI.0000-00).

14.1 Order data

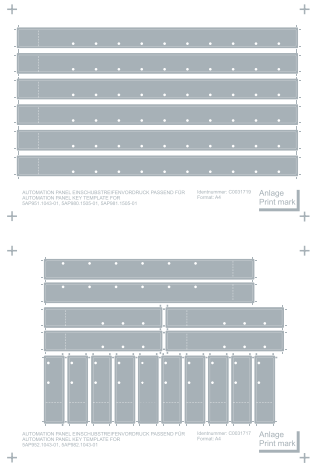
Model number	Description	Image
5AC900.104X-00	**Legend strip template 10.4" portrait format** Legend strip template for Panel PC 700 system unit 5PC781.1043-00. For 1 device.	Examples of legend strip templates 
5AC900.104X-01	**Legend strip template 10.4" landscape format** Legend strip template for Panel PC 700 system unit 5PC782.1043-00. For 1 device.	
5AC900.150X-01	**Slide-in legend strip template 15".** Legend strip template for Panel PC 700 system unit 5PC781.1505-00. For 4 devices.	

Table 271: Order data - legend strip templates

Chapter 7 • Maintenance / servicing

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

1. Changing the battery

The lithium battery bufferd the internal real-time clock (RTC) and the CMOS data. The buffer duration of the battery is at least 4 years (at 50°C, 8.5 µA of the supplied components and a self discharge of 40%).

Information:

- **The product design allows the battery to be changed with the PPC700 switched either on or off. In some countries, safety regulations do not allow batteries to be changed while the module is switched on.**
- **Any BIOS settings that have been made will remain when the battery is changed with the power turned off (stored in non-volatile EEPROM). The date and time must be reset later because this data is lost when the battery is changed.**
- **The battery should only be changed by qualified personnel.**

The following replacement lithium batteries are available:

- 4A0006.00-000 (1 piece)
- 0AC201.9 (5 pieces)

1.1 Procedure

- Disconnect the power supply to the Panel PC 700 (also see information on page 445).
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Remove the black plastic cover from the battery compartment and carefully pull out the battery using removal strips.

Figure 254: Battery removal

- Insert the new battery with correct polarity. The battery should not be held by its edges. Insulated tweezers may also be used for inserting the battery.

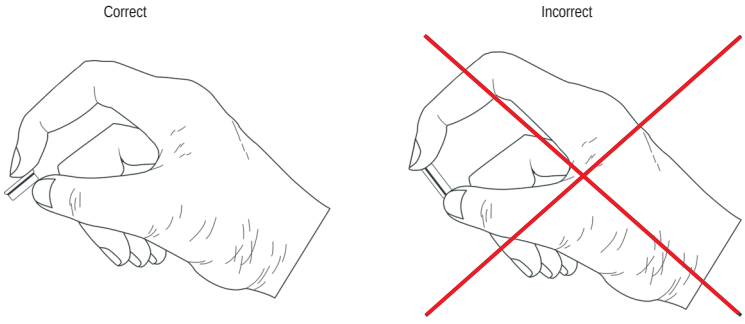


Figure 255: Battery handling

Figure 256: Battery polarity

- To make the next battery change easier, be sure the removal strip is in place when inserting battery.
- Reconnect the power supply to the Panel PC 700 by plugging the power cable back in and pressing the power button (also see information on page 445).
- Reset the data and time in BIOS (see information on page 445).

Warning!

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

2. Fan kit installation and replacement

2.1 Procedure - PPC700 with 0 PCI slots

The procedure for devices with 0 PCI slots (5PC720.1043-00, 5PC720.1214-00, 5PC720.1505-00, 5PC720.1706-00, 5PC720.1906-00, 5PC781.1043-00, 5PC781.1505-00, 5PC782.1043-00) is explained step-by-step in the following example (5PC720.1505-00).

- Disconnect the power supply to the Panel PC 700.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Loosen the nuts on the clamp (using hex key) and lift the clamp to remove. Loosen the screws on the fan kit cover (using Torx screw driver size 10) and remove the cover.

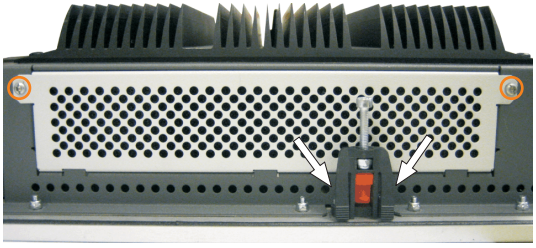


Figure 257: Removing the fan kit cover

- There are two arrows on the fans that indicate the direction of air flow and the direction of fan rotation.

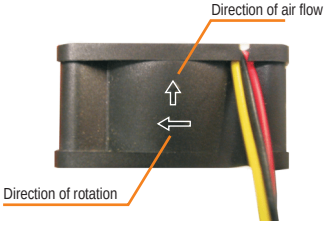


Figure 258: Marking for direction of airflow / fan rotation

Warning!

The fans must be inserted so that the air flows toward the inside of the housing.

- Align fans over the fastening bolts (see arrows). Feed cables through the opening in the housing (see square) into the main board of the PPC700.

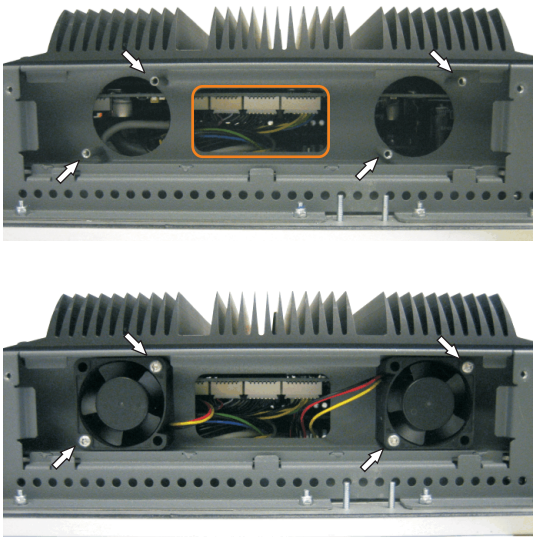


Figure 259: Fan Installation

- Secure fans with the 4 included Kombitorx (T10) screws.

- Loosen the marked nuts (using hex key) and open the cover (open carefully because of cable).

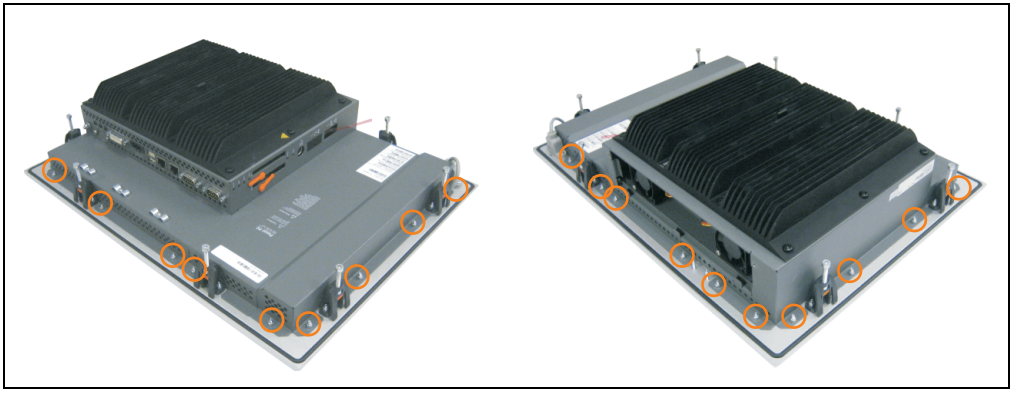


Figure 260: Removing the cover

- The fan connection cable must be connected to the main circuit board at the right position (fan 1 at position 1, fan 2 at position 2).

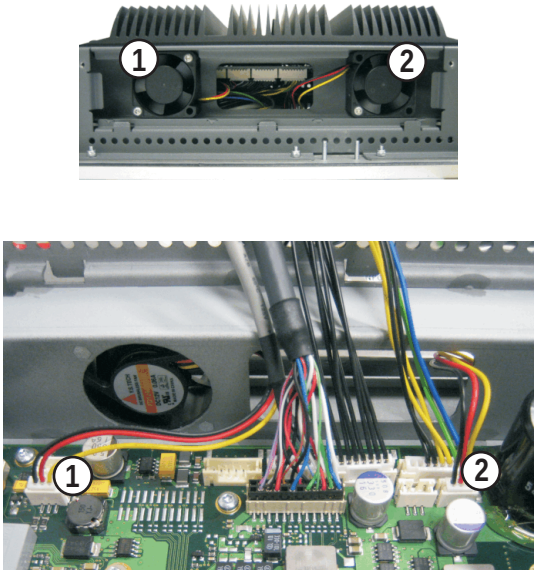


Figure 261: Fan cable connection on the main board

- Place dust filter in the fan kit cover and replace removed components (cover, filter kit cover) in reverse order.

2.2 Procedure - PPC700 with 1 and 2 PCI slots

The procedure for devices with 2 PCI slots (5PC720.1043-01, 5PC720.1214-01, 5PC720.1505-01, 5PC720.1505-02) is explained step-by-step in the following example (5PC720.1505-01).

- Disconnect the power supply to the Panel PC 700.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Loosen the screws on the fan kit cover (using Torx screw driver size 10) and remove the cover.

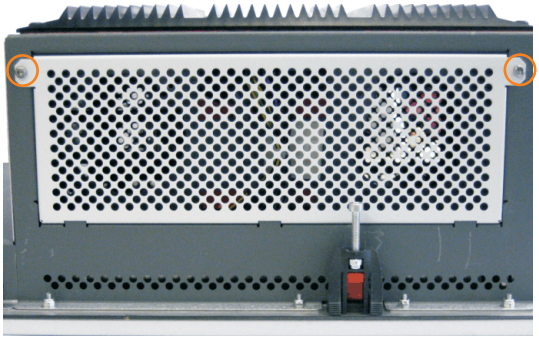


Figure 262: Removing the fan kit cover

- If a PCI card is in place, it must be removed before moving on to the next step.
- There are two arrows on the fans that indicate the direction of air flow and the direction of fan rotation.

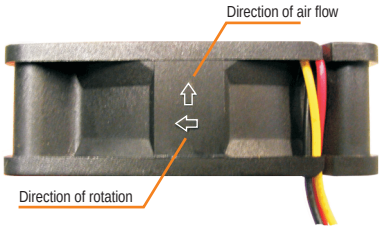


Figure 263: Marking for direction of airflow / fan rotation

Warning!

The fans must be inserted so that the air flows toward the inside of the housing.

- Remove the clamp screw (see circle). Align fans over the fastening bolts (see arrows). Feed cables through the opening in the housing (see square) into the main board of the PPC700.

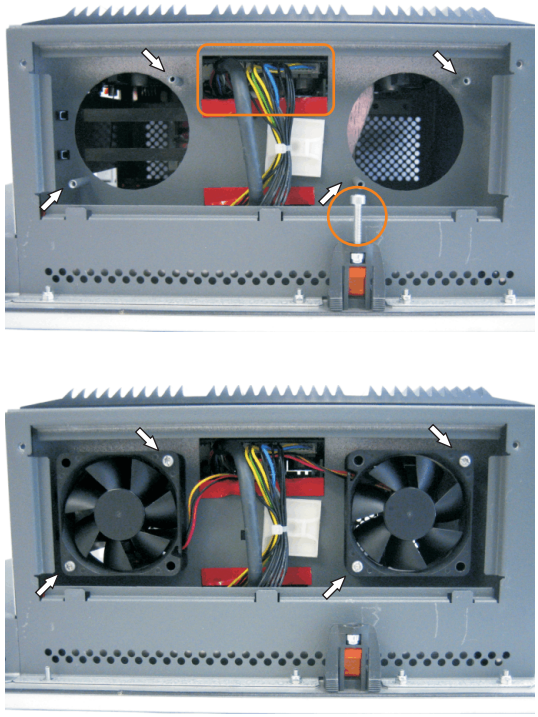


Figure 264: Fan Installation

- Secure fans with the 4 included Kombitorx (T10) screws.

- Loosen the screws on the side cover (using Torx screw driver size 10) and remove the cover.

Figure 265: Removing the side cover

- The fan connection cable must be connected to the main circuit board at the right position (fan 1 at position 1, fan 2 at position 2).

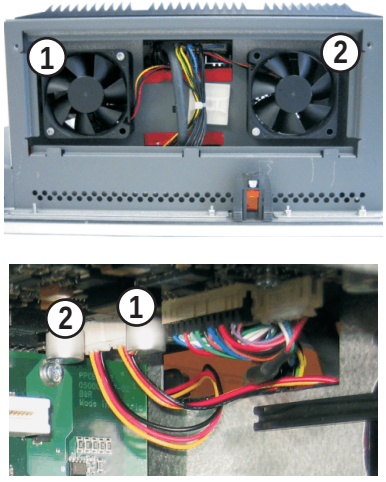


Figure 266: Fan cable connection on the main board

- If a PCI card was previously in place, it can now be re-inserted.
- Place dust filter in the fan kit cover and replace removed components (filter kit cover, side cover) in reverse order.

3. Slide-in drive - installation and exchange

A slide-in drive can be installed and exchanged in system units with 1 or 2 PCI slots.

3.1 Installation procedure

- Disconnect the power supply to the Panel PC 700.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Remove the light-gray side cover. This generally requires removing 5 Kombitorx screws (T10).

Figure 267: Example - Side cover removal on the system unit 5PC720.1505-02

- Remove the slide-in dummy module.

Figure 268: Removing the slide-in dummy module

- Insert the slide-in drive.

Figure 269: Installing the slide-in drive

- Attach the side cover.

3.2 Exchange procedure

- Disconnect the power supply to the Panel PC 700.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Remove the light-gray side cover. This generally requires removing 5 Kombitorx screws (T10).

Figure 270: Example - Side cover removal on the system unit 5PC720.1505-02

- Remove both slide-in slot releasing mechanisms outwards. The slide-in drive is pushed a few mm upwards for easy removal.

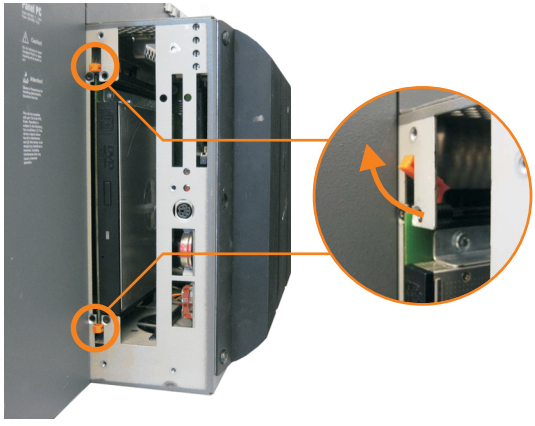


Figure 271: Release the slide-in slot releasing mechanisms

- Remove the slide-in drive.
- Move the slide-in slot releasing mechanism to the start position and insert the new slide-in drive.

Figure 272: Installing the slide-in drive

- Attach the side cover.

Appendix A

1. Temperature sensor locations

The PPC700 has temperature sensors in various places (CPU, power supply, slide-in drive 1, slide-in drive 2, I/O). The temperatures[1] can be read in BIOS (menu item "advanced" - baseboard/panel features - baseboard monitor) or in Microsoft Windows XP/embedded, using B&R Control Center[2] .

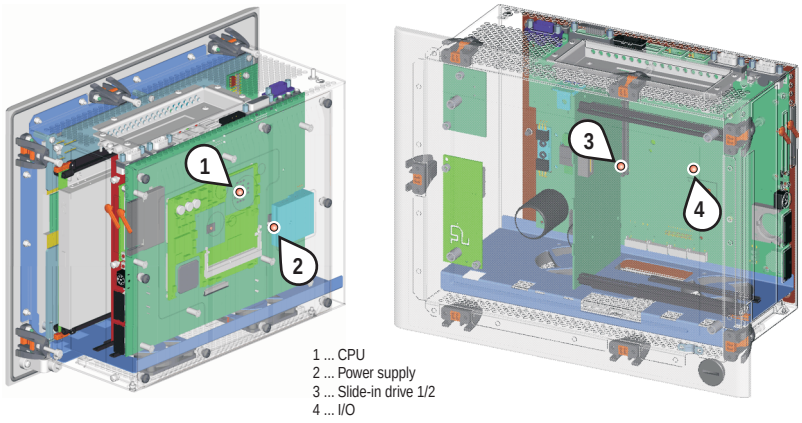


Figure 273: Temperature sensor locations

Range		Position
1	CPU	Processor temperature (sensor integrated on the CPU board)
2	Power supply	Power supply temperature (maximum 95°C)
3	Slide-in drive 1/2	Temperature of a slide-in drive (the sensor is integrated on the slide-in drive)
4	I/O	Temperature under an add-on drive

Table 272: Temperature sensor locations

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

2) The B&R Control Center - ADI driver - can be downloaded for free from the download area on the B&R homepage (www.br-automation.com).

2. Maintenance Controller Extended (MTCX)

The MTCX controller (FPGA processor) is located on the main board (part of every system unit) of Automation PC 620 and Panel PC 700 devices.

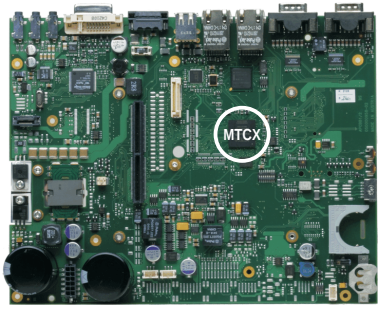


Figure 274: MTCX controller location

The MTCX is responsible for the following monitoring and control functions:

- Power on (power OK sequencing) and power fail logic
- Watchdog handling (NMI and reset handling)
- Temperature monitoring (I/O area, power supply, slide-in drive 1/2)
- Fan control (3 housing fans)
- Key handling / coordination (matrix keyboard on Automation Panel 900 devices configurable using B&R Key Editor, PS/2 keyboard)
- LED handling (matrix keyboard with LEDs on Automation Panel 900 devices configurable using B&R Key Editor)
- Advanced desktop operation (keys, USB forwarding)
- Daisy chain display operation (touch screen, USB forwarding)
- Panel locking mechanism (configurable using B&R Control Center - ADI driver)
- Backlight control for a connected B&R display
- Statistical data recording (power cycles - each power on, power on and fan hours are recorded - every full hour is counted e.g. 50 minutes no increase)
- SDL data transfer (display, matrix keyboard, touch screen, service data, USB)
- Status LEDs (HDD, panel lock, Link 1, Link 2)

The functions of the MTCX can be expanded via Firmware upgrade[1)] . The version can be read in BIOS (menu item "advanced" - baseboard/panel features) or in Microsoft Windows XP/embedded, using B&R Control Center.

1) Can be downloaded from the download area on the B&R homepage (www.br-automation.com).

3. B&R Key Editor

On display units, it is often necessary to adjust the function keys and LEDs for the application software being used. With the B&R Key Editor, it is possible to quickly and easily set up the application individually.

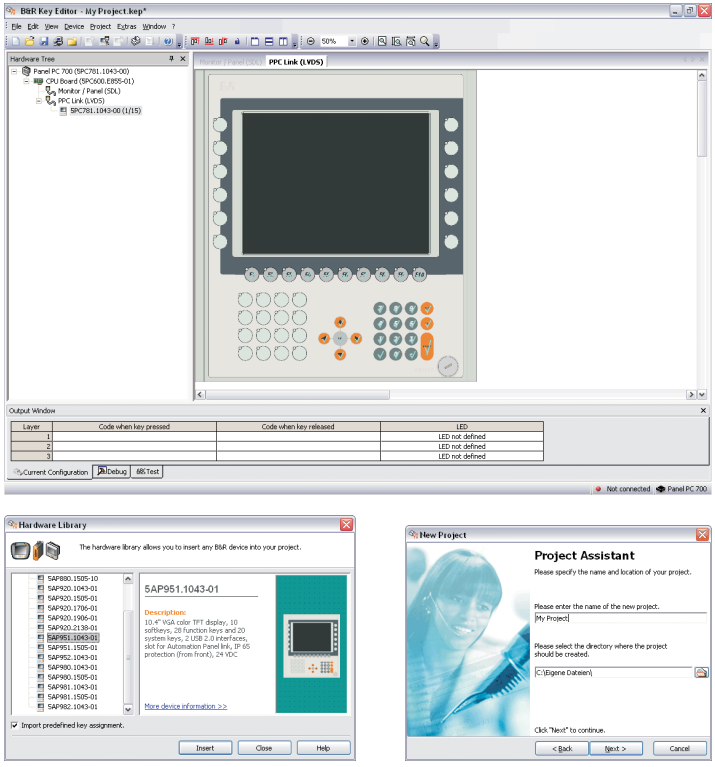


Figure 275: B&R Key Editor screenshots (Version 2.10)

Features:

- Configuration of normal keys like on a keyboard (A, B, C, etc.)
- Key combinations/shortcuts (CTRL+C, SHIFT+DEL, etc.) on one key
- Special key functions (change brightness, etc.)
- Assign functions to LEDs (HDD access, power, etc.)
- 4 assignments per key possible (using layer function)
- Configuration of panel locking time when multiple Automation Panel 900 devices are connected to Automation PC 620 and Panel PC 700 devices.

Supports following systems:

- Automation PC 620
- Automation Panel 800
- Automation Panel 900
- Panel PC 700
- Provit 2000
- Provit 5000
- Power Panel BIOS devices
- Mobile Panel BIOS devices

A detailed guide for configuring keys and LEDs can be found in the B&R Key Editor's online help.

The B&R Key Editor can be downloaded for free from the download area on the B&R homepage (**www.br-automation.com**). Additionally, it can also be found on the B&R HMI Driver and Utilities DVD (Mod. No. 5SWHMI.0000-00).

4. B&R Automation Device Interface (ADI) driver - Control Center

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

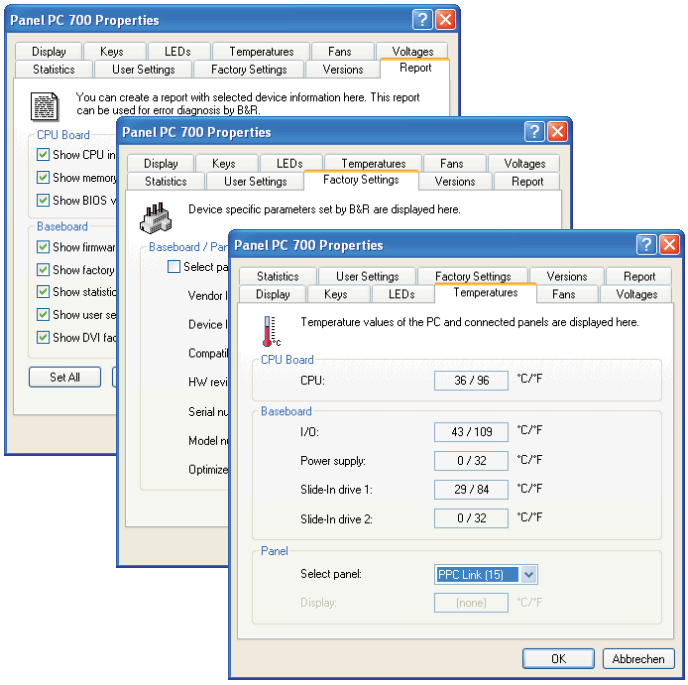


Figure 276: ADI Control Center screenshots (Version 1.50) - example

Features (device dependent)

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

Supports following systems:

System	Operating system	Note
Automation PC 620	Windows XP Professional Windows 2000	Installation using its own setup
	Windows XP Embedded	Content of B&R Windows XP Embedded image
Panel PC 700	Windows XP Professional Windows 2000	Installation using its own setup
	Windows XP Embedded	Content of B&R Windows XP Embedded image
Power Panel BIOS devices	Windows XP Embedded	Content of B&R Windows XP Embedded image
	Windows CE 4.x	Content of B&R Windows CE image
Mobile Panel BIOS devices	Windows XP Embedded	Content of B&R Windows XP Embedded image
	Windows CE 4.x	Content of B&R Windows CE image
Automation Panel 900	-	With Automation PC620 and Panel PC 700

Table 273: System support - ADI driver

A detailed description of the Control Center can be found in the integrated online help.

The B&R Automation Device Interface (ADI) driver (also contains Control Center) can be downloaded for free from the download area on the B&R homepage (**www.br-automation.com**).

4.1 SDL equalizer setting

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

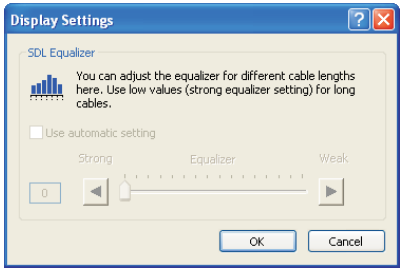


Figure 277: SDL equalizer setting in the B&R Control Center

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

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

5. B&R Automation Device Interface (ADI) development kit

The ADI development kit is used to access the functions of the ADI driver. The programming languages C (with import libraries for Microsoft Visual C++ 6.0 and Microsoft eMbedded Visual C++ 4.0) and Visual Basic (for Microsoft Visual Basic 6.0) are supported.

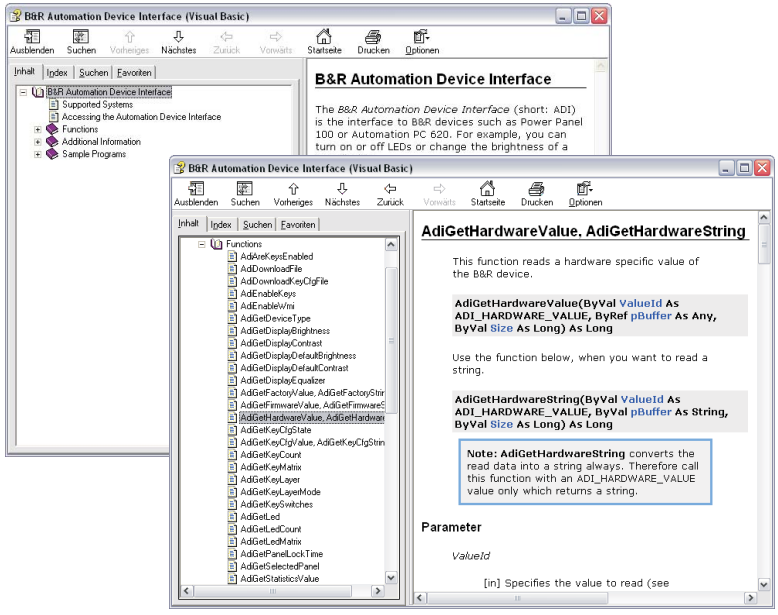


Figure 278: ADI development kit screenshots (Version 1.50)

Features:

- Extensive library of API functions
- Supported programming languages: Visual Basic, Visual C++
- Online documentation (German, English)
- Installation using its own setup

Supports following systems:

- Automation PC 620
- Panel PC 700
- Power Panel BIOS devices
- Mobile Panel BIOS devices
- Automation Panel 900

A detailed description of using the ADI functions can be found in the integrated online help.

The B&R Automation Device Interface (ADI) development kit can be downloaded for free from the download area on the B&R homepage (**www.br-automation.com**).

6. Creating a bootable USB flash drive

When used in connection with an Automation PC 620 / Panel PC 700, it is possible to boot the system from one of the flash drives available from B&R (5MMUSB.0128-00, 5MMUSB.0256-00, 5MMUSB.0512-00, 5MMUSB.1024-00). The flash drive must be specially prepared for this.

6.1 Requirements

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

- B&R USB flash drive (see model number "USB flash drive" on page 414)
- 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!

6.2 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`".

7. Touch Screen - Elo Accu Touch

Information:

The following characteristics, features and limit values are only valid for these individual components and can deviate from those for the entire device. For the entire device in which these individual components are used, refer to the data given specifically for the entire device.

Elo Accu touch screen	Specifications
Manufacturer	Elo
Accuracy For < 18" diagonals For > 18" diagonals	 Typically < than 0.080 inches (2.032 mm) Maximum error in all directions 0.180 inches (4.752 mm) Maximum 1% of the diagonal for the active area of the touch screens
Reaction time	< 10 ms
Release pressure	< 113 grams
Resolution	4096 x 4096 touch points
Light permeability	Up to 80% ± 5%
Temperature Operation Storage Transportation	 - 10°C to + 50°C - 40°C to + 71°C - 40°C to + 71°C
Relative humidity Operation Storage Transportation	 Max. 90% at max. 35°C Max. 90% at max. 35°C for 240 hours, non-condensing Max. 90% at max. 35°C for 240 hours, non-condensing
Waterproofing	IP65
Lifespan	35 million contacts on the same point
Chemical resistance [1)]	Acetone, ammonia-based glass cleaner, normal food and drinks, hexane, methylene chloride, methyl ethyl ketone, mineral spirits, turpentine, isopropyl alcohol
Activation	Finger, pointer, credit card, glove
Drivers	Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br-automation.com). Additionally, they can also be found on the B&R HMI Driver and Utilities DVD (Mod. No. 5SWHMI.0000-00).

Table 274: Technical data - Elo Accu Touch

1) The active area of the touch screen is resistant to these chemicals for a timeframe of one hour at 21°C.

7.1 Temperature humidity diagram for operation and storage

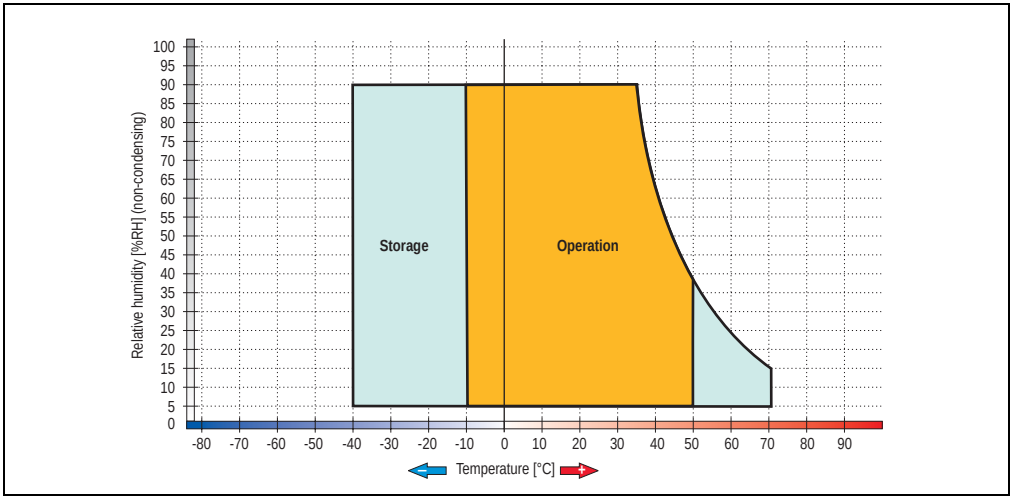


Figure 279: Temperature humidity diagram for Elo Accu touch screen 5-wire

7.2 Cleaning

The touch screen should be cleaned with a moist lint-free cloth. When moistening the cloth, use only water with detergent, screen cleaning agent, or alcohol (ethanol). The cleaning agent should be applied to the cloth beforehand and not sprayed directly onto the touch screen itself. Never use aggressive solvents, chemicals, or scouring agents.

8. Glossary

A

ACPI

Abbreviation for »**A**dvanced **C**onfiguration and **P**ower **I**nterface« Configuration interface that enables the operating system to control the power supply for each device connected to the PC. With ACPI, the computer's BIOS is only responsible for the details of communication with the hardware.

APC

Abbreviation for »**A**utomation **PC**«

API

Abbreviation for »**A**pplication **P**rogram **I**nterface« The interface, which allows applications to communicate with other applications or with the operating system.

Automation Runtime

A uniform runtime system for all B&R automation components.

B

Baud rate

Measurement unit for data transfer speed. It indicates the number of states for a transferred signal per second and is measured using the baud unit of measurement. 1 baud = 1 bit/sec or 1 bps.

BIOS

An abbreviation for »**B**asic **I**nput/**O**utput **S**ystem«. Core software for computer systems with essential routines for controlling input and output processes on hardware components, for performing tests after system start and for loading the operating system. Although BIOS is used to configure a system's performance, the user does not usually come into contact with it.

Bit

Binary digit > binary position, binary character, binary digit smallest discrete information unit. A bit can have the value 0 or 1.

Bit rate

The number of bits that can be transferred within a specified time unit. 1 bit/sec = 1 baud.

Byte

Data format [1 byte = 8 bit] and a unit for characterizing information amounts and memory capacity. The following units are the commonly used units of progression : KB, MB, GB.

B&R Automation Runtime

Windows-based program for creating installation disks to install B&R Automation Runtime™ on the target system.

C

Cache

Background memory, also known as non-addressable memory or fast buffer memory. It is used to relieve the fast main memory of a computer. Data, which e.g. should be output to slower components by the working memory (e.g. disk storage, printers), is stored temporarily in the cache and output from there with an appropriate speed for the target devices.

CAN

An abbreviation for »**C**ontroller **A**rea **N**etwork« (serial bus system) Structure according to ISO 11898; bus medium: twisted pair. Good transfer properties in short-ranges below 40 m with a 1 MBit/sec data transfer rate. Maximum number of stations: Unlimited in theory, practically up to 64 with real-time capability, i.e. defined maximum queuing time for messages with high priority. High reliability using error detection, error handling, troubleshooting. Hamming distance.

CD-ROM

Abbreviation for »**C**ompact **D**isc **R**ead-**O**nly **M**emory« A removable data medium with a high capacity of ~700 MB. CD-ROMs are optically scanned.

CE mark

A CE mark for a product. It consists of the letters 'CE' and indicates conformity to all EU guidelines for the labeled product. It indicates that the individual or corporate body, who has performed or attached the label, assures that the product conforms to all EU guidelines for the complete harmonization. It also indicates that all mandatory conformity evaluation procedures have taken place.

CMOS

»CMOS« is a battery powered memory area where fundamental parameters of an IBM (or compatible) personal computer are stored. Information such as the type of hard drive, size of the working memory and the current date and time are required when booting the computer. As the name suggests, the memory is based on CMOS technology standards.

COM

A device name used to access serial ports in MS-DOS. The first serial port can be accessed under COM1, the second under COM2 etc. Typically, a modem, mouse or serial printer is connected to a serial port.

COM1

Device name for the first serial port in a PC system. The input-output area for COM1 is usually found at address 03F8H. Generally, the COM1 port is assigned IRQ 4. In many systems, an RS232 serial mouse is connected to COM1.

COM2

Device name for the second serial port in a PC system. The input-output area for COM2 is usually found at address 02F8H. Generally, the COM2 port is assigned IRQ 3. In many systems, a modem is connected to COM2.

COM3

Device name for a serial port in a PC system. The input-output area for COM3 is usually found at address 03E8H. Generally, the COM3 port is assigned IRQ 4. In many systems, COM3 is used as an alternative for COM1 or COM2 if peripheral devices are already connected to COM1 and COM2.

CompactFlash®

CompactFlash memory cards [CF cards] are exchangeable nonvolatile mass memory systems with very small dimensions [43 x 36 x 3.3 mm, approximately half the size of a credit card]. In addition to the Flash memory chips, the controller is also accommodated on the cards. CF cards provide complete PC Card-ATA functionality and compatibility. A 50-pin CF card can be simply inserted in a passive 68-pin type II adapter card. It conforms to all electrical and mechanical PC Card interface specifications. CF cards were launched by SanDisk back in 1994. Currently, memory capacities reach up to 8 GB per unit. Since 1995, CompactFlash Association [CFA] has been looking after standardization and the worldwide distribution of CF technology

CPU

An abbreviation for »**C**entral **P**rocessing **U**nit« Interprets and executes commands. It is also known as a "microprocessor" or "processor" for short. A processor is able to receive, decode and execute commands, as well as transfer information to and from other resources via the computer bus.

CTS

An abbreviation for »**C**lear **T**o **S**end« A signal used when transferring serial data from modem to computer, indicating its readiness to send the data. CTS is a hardware signal which is transferred via line number 5 in compliance with the RS-232-C standard.

D

DCD

An abbreviation for » **D**ata **C**arrier **D**etected« A signal used in serial communication which is sent by the modem to the computer it is connected to, indicating that it is ready for transfer.

Dial-Up

Data is transferred over the telephone network using a modem or an ISDN adapter.

DIMM

Double In-line Memory Module, consisting of one or more RAM chips on a small circuit board, which is connected with the motherboard of a computer via a connector.

DMA

Direct **M**emory **A**ccess > Accelerated direct access to a computer's RAM through by-passing the CPU.

DRAM

An abbreviation for »**D**ynamic **R**andom **A**ccess **M**emory« Dynamic RAM consists of an integrated semiconductor circuit, which stores information based on the capacitor principle. Capacitors lose their charge in a relatively short time. Therefore, dynamic RAM circuit boards must contain a logic that allows continual recharging of RAM chips. Since the processor cannot access dynamic RAM while it is being recharged, one or more waiting states can occur when reading or writing data. Although it is slower, dynamic RAM is used more often than static RAM, because the simple design of the circuits means that it can store four times more data than static RAM.

DSR

An abbreviation for »**D**ata **S**et **R**eady« A signal used in serial data transfer, which is sent by the modem to the computer it is connected to, indicating its readiness for processing. DSR is a hardware signal which is sent via line number 6 in compliance with the RS-232-C standard.

DTR

An abbreviation for »**D**ata **T**erminal **R**eady« A signal used in serial data transfer, which is sent by the computer to the modem it is connected to, indicating the computer's readiness to accept incoming signals.

DVD

An abbreviation for »**D**igital **V**ersatile **D**isc« The next generation of optic data carrier technology. Using this technology it is possible to code video, audio and computer data on CD. DVDs can store a higher volume of data than conventional CDs. Standard DVDs , which have a single coating, can hold 4.7 GB. Double coated DVDs can hold 8.5 GB. Double sided DVDs can hold up to 17 GB. A special drive is needed for DVDs. Conventional CDs can also be played on DVD drives.

DVI

Abbreviation for »**D**igital **V**isual **I**nterface« An interface for the digital transfer of video data.

DVI-A

Analog only

DVI-D

Digital only

DVI-I

Integrated, i.e. analog and digital

E

EDID data

Abbreviation for »**E**xtended **D**isplay **I**dentification **D**ata« EDID data contains the characteristics of monitors / TFT displays transferred as 128 kB data block to the graphics card via the Display Data Channel (DDC). This EDID data can be used to set the graphics card to the monitor properties.

EIDE

An abbreviation for »**E**nhanced **I**ntegrated **D**rive **E**lectronics« An expansion of the IDE standard. Enhanced IDE is considered the standard for hardware interfaces. This interface is designed for drives, with an integrated drive controller.

EMC

»**E**lectro**m**agnetic **C**ompatibility« The ability of a device or a system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment [IEV 161-01-07])

EPROM

Erasable **PROM** > (complete with ultraviolet light)

Ethernet

An IEEE 802.3 standard for networks. Ethernet uses bus or star topology and controls the traffic on communication lines using the access procedure CSMA/CD (Carrier Sense Multiple Access with Collision Detection). Network nodes are connected using coaxial cables, optical fiber cables or twisted pair cabling. Data transfer on an Ethernet network takes place in frames of variable lengths, which consist of supply and controller information as well as 1500 bytes of data. The Ethernet standard provides base band transfers at 10 megabit and 100 megabit per second.

ETHERNET Powerlink

is an enhancement of standard Ethernet. It enables data exchange under strict real-time conditions with cycle times down to 200 µs and jitter under 1µs. This makes Ethernet power available on all communication levels of Automation technology – from control levels to I/O. Ethernet Powerlink was initialized by the company B&R Industrie-Elektronik and is now managed by the open end-user and vendor association, EPSG - ETHERNET Powerlink Standardization Group (www.ethernet-powerlink.org).

F

FDD

Abbreviation for »**F**loppy **D**isk **D**rive« Reading device for removable magnetic memory from the early days of PC technology. Due to their sensitivity and moving components, FDDs have been almost completely replaced by CompactFlash memory in modern automation solutions.

FIFO

An abbreviation for »**F**irst **I**n **F**irst **O**ut«. A queuing organization method whereby elements are removed in the same order as they were inserted. The first element inserted is the first one removed. Such an organization method is typical for a list of documents, which are waiting to be printed.

Firmware

Programs stored permanently in read-only memory. Firmware is software used to operate computer-controlled devices, which generally stays in the device throughout its lifespan or over a long period of time. Such software includes operating systems for CPUs and application programs for industrial-PCs as well as programmable logic controllers, (i.e. the software in a washing machine controller). This software is written in read-only memory (ROM, PROM, EPROM) and cannot be easily replaced.

Floppy

Also known as a diskette. A round plastic disk with an iron oxide coating, which can store a magnetic field. When the floppy disk is inserted in a disk drive, it rotates, so that the different areas (or sectors) of the disk's surface are moved under the read-write head, allowing the magnetic orientation of the particle to be modified and recorded. Orientation in one direction represents binary 1, while the reverse orientation represents binary 0.

FPC

An abbreviation for »**F**lat **P**anel **C**ontroller«

FPD

An abbreviation for »**F**lat **P**anel **D**isplay«

FTP

»**F**ile **T**ransfer **P**rotocol« Rules for transferring data over a network from one computer to another computer. This protocol is based on TCP/IP, which has established itself as quasi standard for the transfer of data via Ethernet networks. FTP is one of the most-used protocols on the Internet. It is defined in RFC 959 in the official regulations for Internet communication.

G

GB

Gigabyte (1 GB = 230 or 1,073,741,824 Bytes)

H

Handshake

Method of synchronization for data transfer when data is sent at irregular intervals. The sender signals that data can be sent and the receiver signals when new data can be received.

HDD

An abbreviation for »**H**ard **D**isk **D**rive« ; Fixed magnetic mass memory with high capacities e.g. 120 GB.

I

IDE

An abbreviation for »**I**ntegrated **D**rive **E**lectronics« A drive interface where the controller electronics are integrated in the drive.

Interface

From the hardware point of view, an interface is the connection point between two modules/devices/systems. The units on both sides of the interface are connected by the interface lines so that data, addresses and control signals can be exchanged. The term interface includes all functional, electrical and constructive conditions [coding, signal level, pin assignments], which characterize the connection point between the modules, devices or systems. Depending on the type of data transfer, a differentiation is made between parallel [e.g. Centronics, IEEE 488] and serial interfaces [e.g. V.24, TTY, RS232, RS422, RS485], which are

set up for different transfer speeds and transfer distances. From the point of view of software, the term interface describes the transfer point between program modules using specified rules for transferring the program data.

ISA

An abbreviation for »**I**ndustry **S**tandard **A**rchitecture« A term given for the bus design which allows expansion of the system with plug-in cards which can be inserted in the expansion slots provided in the PC.

ISO

International Organization for Standardization > Worldwide federation of national standardization institutions from over 130 countries. ISO is not an acronym for the name of the organization; it is derived from the Greek word isos, meaning "equal" (www.iso.ch).

J

Jitter

Jitter is a term that describes time deviations of cyclic events. If, for example, an event should take place every 200s and it actually occurs every 198 to 203s, then the jitter is 5s. Jitter has many causes. It originates in the components and transfer media of networks because of noise, crosstalk, electromagnetic interference and many other random occurrences. In automation technology, jitter is a measure of the quality of synchronization and timing.

Jumpers

A small plug or wire link for adapting the hardware configuration used to connect the different points of an electronic circuit.

L

LCD

An abbreviation for »**L**iquid **C**rystal **D**isplay« A display type, based on liquid crystals which have a polarized molecular structure and are enclosed between two transparent electrodes as a thin layer. If an electrical field is applied to the electrodes, the molecules align themselves with the field and form crystalline arrangements, which polarize the light passing through. A polarization filter, which is arranged using lamellar electrodes, blocks the polarized light. In this way, a cell (pixel) containing liquid crystals can be switched on using electrode gates, thus coloring this pixel black. Some LCD displays have an electroluminescent plate behind the LCD screen for lighting. Other types of LCD displays can use color.

LED

An abbreviation for »**L**ight **E**mitting **D**iode« A semiconductor diode which converts electrical energy into light. LEDs work on the principle of electroluminescence. They are highly efficient because they do not produce much heat in spite of the amount of light they emit. For example, "operational status indicators" on floppy disk drives are LEDs.

LPT

Logical device name for line printers. In MS DOS, names are reserved for up to three parallel printer ports with the names LPT1, LPT2 and LPT3. The first parallel port (LPT1) is usually identical to the primary parallel output device PRN (in MS-DOS the logical device name for the printer). The lettering LPT was originally stood for "Line Printer Terminal".

M

MB

Megabyte (1 MB = 220 or 1,048,576 bytes)

Microprocessor

Highly integrated circuit with the functionality of a CPU, normally housed on a single chip. It comprises a control unit, arithmetic and logic unit, several registers and a link system for connecting memory and peripheral components. The main performance features are the internal and external data bus and address bus widths, the command set and the clock frequency. Additionally, a choice can be made between CISC and RISC processors. The first commercially available worldwide microprocessor was the Intel 4004. It came on the market in 1971.

MIPS

Million Instructions Per Second > Measurement for the computing speed of computers.

Motherboard

A circuit board, which houses the main components of a computer such as the CPU switching circuit, co-processors, RAM, ROM for firmware, interface circuits and expansion slots for hardware expansions.

MTBF

An abbreviation for »**M**ean **T**ime **B**etween **F**ailure« The average time which passes before a hardware component fails and repair is needed. This time is usually expressed in thousands or ten thousands of hours, sometimes known as power-on hours (POH).

MTC

An abbreviation for »**M**ain**t**enance **C**ontroller« The MTC is an independent processor system, which provides additional functions for a B&R Industrial PC that are not available with a normal PC. The MTC communicates with the B&R Industrial PC via the ISA bus (using a couple register).

MTCX

Abbreviation for »**M**ain**T**enance **C**ontroller E**X**tended«

Multitasking

Multitasking is an operating mode in an operating system, which allows several computer tasks to be executed parallel and simultaneously.

O

OEM

Original **E**quipment **M**anufacturer; A company that integrates third-party and in-house manufactured components into their own product range and then distributes these products under its own name.

OPC

OLE for Process Control > A communication standard for components in the area of automation. The goal of OPC development is to provide an open interface that builds on Windows-based technologies such as OLE, COM and DCOM. It allows problem-free standardized data transfer between controllers, operating and monitoring systems, field devices and office applications of different manufacturers. This development is promoted by the OPC foundation, which is made up of over 200 companies from around the world, including Microsoft and other leading companies. Nowadays, OPC is also interpreted as a synonym for Openness, Productivity and Connectivity, symbolizing the new possibilities that this standard opens up.

OPC server

The missing link between connection modules for the InterBus and the visualization. It communicates serially with the connection modules via the ISA or PCI bus or Ethernet.

P

Panel

A common term for B&R display units (with or without keys).

PCI bus

Abbreviation for »**P**eripheral **C**omponent **I**nterconnect Bus«; Developed by INTEL as an intermediary/local bus for the latest PC generation. It is basically a synchronous bus. The main clock of the CPU is used for synchronization. The PCI bus is microprocessor independent, compatible with 32-bit and 64-bit and supports both 3.3 V and 5 V cards and devices.

PCMCIA

An abbreviation for »**P**ersonal **C**omputer **M**emory **C**ard **I**nternational **A**ssociation« An association of manufacturers and dealers, who are dedicated to the cultivation and further development of common standards for peripheral devices based on PC cards with a slot for such cards. PC Cards are mainly used for laptops, palmtops (and other portable computers) and intelligent electronic devices. Version 1 of the PCMCIA standard was introduced in 1990.

PnP

An abbreviation for »**P**lug and **P**lay« Specifications developed by Intel. Using Plug and Play allows a PC to automatically configure itself, so that it can communicate with peripheral devices (e.g. monitors, modems and printers). Users can connect a peripheral device (plug) and it is immediately runs (play), without having to manually configure the system. A Plug and Play PC requires a BIOS that supports Plug and Play and a respective expansion card.

POH

An abbreviation for »**P**ower **O**n **H**ours« see MTBF

POST

An abbreviation for »**P**ower-**O**n **S**elf **T**est« A set of routines which are stored in ROM on the computer and test different system components e.g. RAM, disk drive and the keyboard, in order to determine that the connection is operating correctly and ready for operation. POST routines notify the user of problems that occur. This is done using several signal tones or by displaying a message, which frequently accompanies a diagnosis value, on the standard output or standard error devices (generally the monitor). If POST runs successfully, control is transferred over to the system's bootstrap loader.

Powerlink

See "ETHERNET Powerlink".

PROFIBUS-DP

PROFIBUS for "decentralized peripherals". PROFIBUS-DP can be used to allow simply digital and analog I/O modules as well as intelligent signal and data processing units to be installed in the machine room, which among other things can significantly reduce cabling costs. Many used for time-critical factory automation applications.

Q

QVGA

Abbreviation for **Q**uarter **V**ideo **G**raphics **A**rray. Generally a screen resolution of 320 × 240 pixels.

QUXGA

Abbreviation for **Q**uad **U**ltra E**x**tended **G**raphics **A**rray. Generally a screen resolution of 3200 × 2400 pixels (4:3). Quad implies the 4x greater pixel resolution compared to the UXGA.

QWUXGA

Abbreviation for **Q**uad **WUXGA**; Generally a screen resolution of 3840 × 2400 pixels (8:5, 16:10).

R

RAM

An abbreviation for »**R**andom **A**ccess **M**emory« A semiconductor memory which can be read or written to by the microprocessor or other hardware components. Memory locations can be accessed in any order. The various ROM memory types do allow random access, however they cannot be written to. The term RAM refers to a more temporary memory that can be written to as well as read.

Real-time

A system is operating in real-time or has real-time capability, if the input sizes [e.g. signals, data) are received and processed in a defined time period, and the results are made available in real-time for a partner system or the system environment. See also 'Real-time Demands' and 'Real-time System'.

ROM

An abbreviation for »**R**ead-**O**nly **M**emory« A semiconductor in which programs or data have already been permanently stored during the production process.

RS232

Recommended **S**tandard **N**umber **232**. Oldest and most widespread interface standard, also called V.24 interface; all signals are referenced to ground making this an unbalanced interface. High level: -3 ... -30 V, Low level: +3 ... +30 V; cable lengths up to 15 m, transfer rates up to 20 kbit/s; for point-to-point connections between 2 participants.

RS422

Recommended **S**tandard **N**umber **422**; Interface standard, balanced operation resulting in increased immunity to disturbances. High level: 2 ... -6 V, Low level: +2 ... +6 V; 4-wire connection [inverted/not inverted], cable lengths up to 1200 m, transfer rates up to 10 Mbit/s, 1 sender can carry out simplex communication with up to 10 receivers.

RS485

Recommended **S**tandard **N**umber **485**; Interface standard upgraded from RS422; High level: 1.5 ...-6 V, Low level: +1,5 ... +6 V; 2-wire connection [half duplex operation] or 4-wire connection [full duplex operation]; cable lengths up to 1200 m, transfer rates up to 10 Mbit/s. Up to 32 participants can be connected to an RS485 bus [sender/receiver].

RTS

An abbreviation for »**R**equest **T**o **S**end« A signal used in serial data transfer for requesting send permission. For example, it is sent from a computer to the modem connected to it. The RTS signal is assigned to pin 4 according to hardware specifications of the RS-232-C standard.

RXD

An abbreviation for »Receive (**RX**) **D**ata« A line for the transfer of serial data received from one device to another - e.g. from a modem to a computer. For connections complying with the RS-232-C standard, the RXD is connected to pin 3 of the plug.

S

SDRAM

An abbreviation for »**S**ynchronous **D**ynamic **R**andom **A**ccess **M**emory« A construction of dynamic semiconductor components (DRAM), which can operate with higher clock rates than conventional DRAM switching circuits. This is made possible using block access. For each access, the DRAM determines the next memory addresses to be accessed.

SFC

Sequential function chart >; Used for graphic representation of sequential control, graphic input language for PLCs.

Slot PLC

PC insert card that has full PLC functionality. On the PC, it is coupled via a DPR with the process using a fieldbus connection. It is programmed externally or using the host PC.

SoftPLC

Synonym for SoftSPS.

PLC

Programmable Logic Controller; Computer-based control device that functions using an application program. The application program is relatively easy to create using standardized programming languages [IL, FBD, LAD, AS, ST]. Because of its serial functionality, reaction times are slower compared to connection-oriented control. Today, PLCs are available in device families with matched modular components for all levels of an automation hierarchy.

SRAM

An abbreviation for »**S**tatic **R**andom **A**ccess **M**emory« A semiconductor memory (RAM) made up of certain logic circuits (flip-flop), which only keeps stored information while the operating voltage is active. In computers, static RAM is generally only used for the cache memory.

SUXGA

Abbreviation for **S**uper **U**ltra **E**xtended **G**raphics **A**rray; Generally a screen resolution of 2048 × 1536 pixels (4:3). An alternative name is QXGA (**Q**uad E**x**tended **G**raphics **A**rray), which is 4x the pixel resolution of XGA.

SVGA

Abbreviation for »**S**uper **V**ideo **G**raphics **A**rray«; Graphics standard with a resolution of at least 800×600 pixels and at least 256 colors.

Switch

Device, similar to a hub, that takes data packets received in a network and, unlike a hub, does not pass them on to all network nodes, instead only to the respective addressee. Unlike a hub, a switch provides targeted communication within a network that only takes place between sender and receiver. Other network nodes are not involved.

SXGA

Abbreviation for Super Extended Graphics Array. Graphics standard with a screen resolution of 1280 × 1024 pixels (aspect ratio 5:4).

SXGA+

Abbreviation for SXGA Plus; Generally 1400 × 1050 pixels.

System units

Provit system units consist of a mainboard (without processor), slots for RAM modules, VGA controller, serial and parallel interfaces, and connections for the FPD, monitor, PS/2 AT keyboard, PS/2 mouse, USB, Ethernet (for system units with Intel Celeron and Pentium III processors), Panelware keypad modules and external FDD.

T

Task

Program unit, which is assigned a specific priority by the real-time operating system. It contains a complete process and can consist of several modules.

TCP/IP

Transmission Control Protocol/Internet Suit of Protocols; Network protocol, generally accepted standard for data exchange in heterogeneous networks. TCP/IP is used both in local networks for communication between various computer and also for LAN to WAN access.

TFT display

An LCD (Liquid Crystal Display) technology where the display consists of a large grid of LCD cells. Each pixel is represented by a cell, whereby electrical fields produced in the cells are supported by thin film transistors (TFT) resulting in an active matrix. In the simplest form, there is exactly one thin film transistor per cell. Displays with an active matrix are generally used in laptops and notebooks because they are thin, offer high quality color displays and can be viewed from all angles.

Touch screen

Screen with touch sensors for activating an item with the finger.

TXD

An abbreviation for »Transmit (**TX**) **D**ata« A line for the transfer of serial data sent from one device to another - e.g. from a computer to a modem. For connections complying with the RS-232-C standard, the TXD is connected to pin 2 of the plug.

U

UART

An abbreviation for »**U**niversal **A**synchronous **R**eceiver-**T**ransmitter« Generally, a module consisting of a single integrated circuit, which combines the circuits required for asynchronous serial communication for both sending and receiving. UART represents the most common type of circuit in modems for connection to a personal computer.

UDMA

An abbreviation for »**U**ltra **D**irect **M**emory **A**ccess« A special IDE data transfer mode that allows high data transfer rates for drives. There have been many variations in the recent times.
The UDMA33 mode transfers 33 megabytes per second.
The UDMA66 mode transfers 66 megabytes per second.
The UDMA100 mode transfers 100 megabytes per second.
A condition for modifications is that both the mainboard and the hard drive support the specification.

Bootstrap loader

A program that automatically runs when the computer is switched on or restarted. After some basic hardware tests have been carried out, the bootstrap loader starts a larger loader and hands over control to it, which in turn boots the operating system. The bootstrap loader is typically found in ROM on the computer.

USB

An abbreviation for "**U**niversal **S**erial **B**us". A serial bus with a bandwidth of up to 12 megabits per second (Mbit/s) for connecting a peripheral device to a microcomputer. Up to 127 devices can be connected to the system using a single multipurpose connection, the USB bus (e.g. external CD drives, printer, modems as well as the mouse and keyboard). This is done by connecting the devices in a row. USB allows devices to be changed when the power supply is switched on (hot plugging) and multi-layered data flow.

UPS

An abbreviation for »**U**ninterruptible **P**ower**S**upply« UPS supplies power to systems which cannot be connected directly to the power mains for safety reasons because a power failure could lead to loss of data. The UPS allows the PC to be shut down securely without losing data if a power failure occurs.

UXGA

Abbreviation for »**U**ltra **E**xtended **G**raphics **A**rray« Generally a screen resolution of 1600 × 1200 pixels (aspect ratio 4:3, 12:9).

V

VGA

An abbreviation for »**V**ideo **G**raphics **A**dapter« A video adapter which can handle all EGA (Enhanced Graphics Adapter) video modes and adds several new modes.

W

Windows CE

Compact 32-bit operating system with multitasking and multithreading, that Microsoft developed especially for the OEM market. It can be ported for various processor types and has a high degree of real-time capability. The development environment uses proven, well established development tools. It is an open and scalable Windows operating system platform for many different devices. Examples of such devices are handheld PCs, digital wireless receivers, intelligent mobile phones, multimedia consoles, etc. In embedded systems, Windows CE is also an excellent choice for automation technology.

WSXGA

Wide SXGA, generally 1600 × 900 pixels (16:9).

WUXGA

Wide UXGA, generally 1920 × 1200 pixels (16:10).

WXGA

Wide XGA, generally 1280 × 768 pixels.

X

XGA

An abbreviation for »E**X**tended **G**raphics **A**rray« An expanded standard for graphic controllers and monitors which was introduced by IBM in 1990. This standard supports a 640 * 480 resolution with 65,536 colors or a 1024 * 768 resolution with 256 colors. This standard is generally used in workstation systems.

Figure 1: Typical topologies ... 31
Figure 2: Configuration - basic system ... 36
Figure 3: Configuration of optional components ... 37
Figure 4: Example of worst-case conditions for temperature measurement ... 40
Figure 5: Ambient temperatures with 855GME CPU board and 5PC720.1043-00 ... 41
Figure 6: Ambient temperatures with 855GME CPU board and 5PC720.1043-01 ... 42
Figure 7: Ambient temperatures with 855GME CPU board and 5PC720.1214-00 ... 43
Figure 8: Ambient temperatures with 855GME CPU board and 5PC720.1214-01 ... 44
Figure 9: Ambient temperatures with 855GME CPU board and 5PC720.1505-00 ... 45
Figure 10: Ambient temperatures with 855GME CPU board and 5PC720.1505-01 ... 46
Figure 11: Ambient temperatures with 855GME CPU board and 5PC720.1505-02 ... 47
Figure 12: Ambient temperatures with 855GME CPU board and 5PC720.1706-00 ... 48
Figure 13: Ambient temperatures with 855GME CPU board and 5PC720.1906-00 ... 49
Figure 14: Ambient temperatures with 855GME CPU board and 5PC781.1043-00 ... 50
Figure 15: Ambient temperatures with 855GME CPU board and 5PC781.1505-00 ... 51
Figure 16: Ambient temperatures with 855GME CPU board and 5PC782.1043-00 ... 52
Figure 17: Block diagram - supply voltage ... 54
Figure 18: Power management - 10.4" Panel PC 700 ... 55
Figure 19: Power management - 12.1" Panel PC 700 ... 56
Figure 20: Power management - 15" Panel PC 700 ... 57
Figure 21: Power management - 17" Panel PC 700 ... 58
Figure 22: Power management - 19" Panel PC 700 ... 59
Figure 23: Supply voltage connection ... 66
Figure 24: Ground connection ... 67
Figure 25: Monitor / Panel connection ... 67
Figure 26: Dimensions - standard half-size PCI cards. ... 69
Figure 27: PCI connector type: 5 volt ... 70
Figure 28: Serial number sticker for PPC700 assembly (back) ... 78
Figure 29: Serial number stickers for individual PPC700 components ... 78
Figure 30: Example of serial number search: 72580168752 ... 79
Figure 31: Front view 5PC720.1043-00 ... 80
Figure 32: Rear view 5PC720.1043-00 ... 80
Figure 33: Dimensions - 5PC720.1043-00 ... 81
Figure 34: Cutout installation - 5PC720.1043-00 ... 84
Figure 35: Front view 5PC720.1043-01 ... 85
Figure 36: Rear view 5PC720.1043-01 ... 85
Figure 37: Dimensions - 5PC720.1043-01 ... 86
Figure 38: Cutout installation - 5PC720.1043-01 ... 89
Figure 39: Front view 5PC720.1214-00 ... 90
Figure 40: Rear view 5PC720.1214-00 ... 90
Figure 41: Dimensions - 5PC720.1214-00 ... 91
Figure 42: Cutout installation - 5PC720.1214-00 ... 94
Figure 43: Front view 5PC720.1214-01 ... 95
Figure 44: Rear view 5PC720.1214-01 ... 95
Figure 45: Dimensions 5PC720.1214-01 ... 96
Figure 46: Cutout installation - 5PC720.1214-01 ... 99
Figure 47: Front view 5PC720.1505-00 ... 100

Figure 48: Rear view 5PC720.1505-00 ... 100
Figure 49: Dimensions - 5PC720.1505-00 ... 101
Figure 50: Cutout installation - 5PC720.1505-00 ... 104
Figure 51: Front view 5PC720.1505-01 ... 105
Figure 52: Rear view 5PC720.1505-01 ... 105
Figure 53: Dimensions - 5PC720.1505-01 ... 106
Figure 54: Cutout installation - 5PC720.1505-01 ... 110
Figure 55: Front view 5PC720.1505-02 ... 111
Figure 56: Rear view 5PC720.1505-02 ... 111
Figure 57: Dimensions - 5PC720.1505-02 ... 112
Figure 58: Cutout installation - 5PC720.1505-02 ... 115
Figure 59: Front view 5PC720.1706-00 ... 116
Figure 60: Rear view 5PC720.1706-00 ... 116
Figure 61: Dimensions - 5PC720.1706-00 ... 117
Figure 62: Cutout installation - 5PC720.1706-00 ... 120
Figure 63: Front view 5PC720.1906-00 ... 121
Figure 64: Rear view 5PC720.1906-00 ... 121
Figure 65: Dimensions - 5PC720.1906-00 ... 122
Figure 66: Cutout installation - 5PC720.1906-00 ... 125
Figure 67: Front view 5PC781.1043-00 ... 126
Figure 68: Rear view 5PC781.1043-00 ... 126
Figure 69: Dimensions - 5PC781.1043-00 ... 127
Figure 70: Cutout installation - 5PC781.1043-00 ... 131
Figure 71: Front view 5PC781.1505-00 ... 132
Figure 72: Rear view 5PC781.1505-00 ... 132
Figure 73: Dimensions - 5PC781.1505-00 ... 133
Figure 74: Cutout installation - 5PC781.1505-00 ... 137
Figure 75: Front view 5PC782.1043-00 ... 138
Figure 76: Rear view 5PC782.1043-00 ... 138
Figure 77: Dimensions - 5PC782.1043-00 ... 139
Figure 78: Cutout installation - 5PC782.1043-00 ... 143
Figure 79: CPU boards 815E ... 144
Figure 80: CPU boards 855GME ... 146
Figure 81: Heat sink ... 148
Figure 82: Main memory module ... 149
Figure 83: Add-on hard disk 30 GB 24/7 - 5AC600.HDDI-00 ... 150
Figure 84: Temperature humidity diagram - add-on hard disk 5AC600.HDDI-00 ... 152
Figure 85: Add-on hard disk 20 GB ET - 5AC600.HDDI-01 ... 153
Figure 86: Temperature humidity diagram - add-on hard disk 5AC600.HDDI-01 ... 155
Figure 87: Add-on hard disk 40 GB - 5AC600.HDDI-05 ... 156
Figure 88: Temperature humidity diagram - add-on hard disk 5AC600.HDDI-05 ... 158
Figure 89: Add-on CompactFlash slot - 5AC600.CFSI-00 ... 159
Figure 90: Slide-in CD-ROM - 5AC600.CDXS-00 ... 160
Figure 91: Temperature humidity diagram - slide-in CD-ROM - 5AC600.CDXS-00 ... 162
Figure 92: Slide-in DVD-ROM/CD-RW - 5AC600.DVDS-00 ... 163
Figure 93: Temperature humidity diagram - slide-in DVD-ROM/CD-RW - 5AC600.DVDS-00 165

Figure 94: Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 166
Figure 95: Temperature humidity diagram - slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 170
Figure 96: Slide-in CF 2-slot - 5AC600.CFSS-00 171
Figure 97: Slide-in USB FDD - 5AC600.FDDS-00 173
Figure 98: Temperature humidity diagram - slide-in USB diskette drive - 5AC600.FDDS-00 175
Figure 99: Slide-in hard disk 30 GB - 5AC600.HDDS-00 176
Figure 100: Temperature humidity diagram - slide-in hard disk - 5AC600.HDDS-00..... 178
Figure 101: Slide-in hard disk 20 GB - 5AC600.HDDS-01 179
Figure 102: Temperature humidity diagram - slide-in hard disk - 5AC600.HDDS-01..... 181
Figure 103: Slide-in hard disk 40 GB - 5AC600.HDDS-02 182
Figure 104: Temperature humidity diagram - slide-in hard disk - 5AC600.HDDS-02..... 184
Figure 105: RAID 1 system schematic 185
Figure 106: RAID controller 5ACPCI.RAIC-00 186
Figure 107: PCI RAID storage 5ACPCI.RAIS-00 187
Figure 108: Temperature humidity diagram - RAID hard disk - 5ACPCI.RAIS-00 189
Figure 109: PCI RAID storage - 5ACPCI.RAIS-01 190
Figure 110: Temperature humidity diagram - RAID hard disk - 5ACPCI.RAIS-01 192
Figure 111: PCI SATA RAID controller - 5ACPCI.RAIC-01..... 193
Figure 112: Temperature humidity diagram - SATA RAID hard disk - 5ACPCI.RAIC-01 195
Figure 113: Terminating resistor for add-on CAN interface 5AC600.CANI-00 199
Figure 114: Contents of the delivery / mounting material - 5AC600.CANI-00 200
Figure 115: Add-on RS232/422/485 interface - operated in RS485 mode..... 203
Figure 116: Contents of the delivery / mounting material 5AC600.485I-00..... 204
Figure 117: Fan kit 5PC700.FA00-01..... 205
Figure 118: Fan kit 5PC700.FA02-00..... 206
Figure 119: Fan kit 5PC700.FA02-01..... 208
Figure 120: Clamp 211
Figure 121: Spaces for air circulation 213
Figure 122: Mounting orientation..... 214
Figure 123: Flex radius - cable connection..... 215
Figure 124: Configuration - One Automation Panel via DVI (onboard) 217
Figure 125: Configuration - An Automation Panel 800 via SDL (onboard)..... 220
Figure 126: 815E - BIOS diagnostic screen 226
Figure 127: 815E - BIOS summary screen..... 226
Figure 128: 815E - main menu 228
Figure 129: 815E - primary master setup 229
Figure 130: 815E - primary slave setup..... 231
Figure 131: 815E - secondary master setup 233
Figure 132: 815E - secondary slave setup 235
Figure 133: 815E - advanced menu 237
Figure 134: 815E - advanced chipset/graphics control 238
Figure 135: 815E - PCI/PNP configuration..... 240
Figure 136: 815E - PCI device, slot #1..... 242
Figure 137: 815E - PCI device, slot #2..... 243
Figure 138: 815E - PCI device, slot #3..... 244

Figure 139: 815E - PCI device, slot #4 ... 245
Figure 140: 815E - PCI/PNP ISA IRQ resource exclusion ... 246
Figure 141: 815E - memory cache ... 247
Figure 142: 815E - I/O device configuration ... 249
Figure 143: 815E - keyboard features ... 252
Figure 144: 815E - CPU board monitor ... 253
Figure 145: 815E - miscellaneous ... 254
Figure 146: 815E - baseboard / panel features ... 255
Figure 147: 815E - panel control ... 257
Figure 148: 815E - baseboard monitor ... 258
Figure 149: 815E - Legacy devices ... 259
Figure 150: 815E - security menu ... 261
Figure 151: 815E - power menu ... 263
Figure 152: 815E - ACPI control ... 265
Figure 153: 815E - thermal management ... 267
Figure 154: 815E - boot menu ... 268
Figure 155: 815E - exit menu ... 269
Figure 156: DIP switch on system unit ... 270
Figure 157: 855GME - BIOS diagnostics screen ... 280
Figure 158: 855GME - BIOS summary screen ... 280
Figure 159: 855GME - main ... 282
Figure 160: 855GME IDE channel 0 master setup ... 284
Figure 161: 855GME IDE channel 0 slave setup ... 286
Figure 162: 855GME IDE channel 1 master setup ... 288
Figure 163: 855GME IDE channel 1 slave setup ... 290
Figure 164: 855GME - advanced setup menu - overview ... 292
Figure 165: 855GME - advanced chipset control ... 293
Figure 166: 855GME - PCI/PNP configuration ... 295
Figure 167: 855GME - PCI device, slot #1 ... 298
Figure 168: 855GME - PCI device, slot #2 ... 299
Figure 169: 855GME - PCI device, slot #3 ... 300
Figure 170: 855GME - PCI device, slot #4 ... 301
Figure 171: 855GME - memory cache ... 302
Figure 172: 855GME - I/O device configuration ... 304
Figure 173: 855GME - keyboard features ... 307
Figure 174: 855GME - CPU board monitor ... 308
Figure 175: 855GME - miscellaneous ... 309
Figure 176: 855GME - baseboard/panel features ... 310
Figure 177: 855GME - panel control ... 312
Figure 178: 855GME - baseboard monitor ... 313
Figure 179: 855GME - Legacy devices ... 314
Figure 180: 855GME - security menu ... 316
Figure 181: 855GME - power menu ... 318
Figure 182: 855GME - ACPI control ... 320
Figure 183: 855GME - boot menu ... 322
Figure 184: 855GME - exit menu ... 323
Figure 185: DIP switch on system unit ... 324

Figure 186: Differentiating between 815E and 855GME CPU boards 334
Figure 187: Software versions..... 335
Figure 188: Firmware version of Automation Panel Link SDL transceiver/receiver 336
Figure 189: DIP switch on system unit (example) 337
Figure 190: DIP switch on system unit (example) 338
Figure 191: Creating a bootable diskette in Windows XP - step 1 342
Figure 192: Creating a bootable diskette in Windows XP - step 2 342
Figure 193: Creating a bootable diskette in Windows XP - step 3 342
Figure 194: Creating a bootable diskette in Windows XP - step 4 343
Figure 195: Creating a bootable diskette in Windows XP - step 5 343
Figure 196: Interface cover - contents of delivery 375
Figure 197: Front side USB interface cover - installation 377
Figure 198: Dimensions for CompactFlash card type I 379
Figure 199: SanDisk white paper - page 1 380
Figure 200: SanDisk white paper - page 2 381
Figure 201: SanDisk white paper - page 3 382
Figure 202: SanDisk white paper - page 4 383
Figure 203: SanDisk white paper - page 5 384
Figure 204: SanDisk white paper - page 6 385
Figure 205: Temperature humidity diagram - CompactFlash cards 5CFCRD.xxxx-03 ... 388
Figure 206: Dimensions - CompactFlash card type I 388
Figure 207: Silicon Systems white paper - page 1 of 9 389
Figure 208: Silicon Systems white paper - page 2 of 9 390
Figure 209: Silicon Systems white paper - page 3 of 9 391
Figure 210: Silicon Systems white paper - page 4 of 9 392
Figure 211: Silicon Systems white paper - page 5 of 9 393
Figure 212: Silicon Systems white paper - page 6 of 9 394
Figure 213: Silicon Systems white paper - page 7 of 9 395
Figure 214: Silicon Systems white paper - page 8 of 9 396
Figure 215: Silicon Systems white paper - page 9 of 9 397
Figure 216: USB Media Drive - 5MD900.USB2-00 398
Figure 217: Dimensions - 5MD900.USB2-00 401
Figure 218: Dimensions - USB Media Drive with front cover 402
Figure 219: Interfaces - 5MD900.USB2-00 402
Figure 220: Mounting orientation - 5MD900.USB2-00 403
Figure 221: Front cover 5A5003.03..... 404
Figure 222: Dimensions - 5A5003.03..... 404
Figure 223: Front cover mounting and installation depth 405
Figure 224: USB Media Drive - 5MD900.USB2-01 406
Figure 225: Dimensions - 5MD900.USB2-01 409
Figure 226: Dimensions - USB Media Drive with front cover 410
Figure 227: Interfaces - 5MD900.USB2-01 410
Figure 228: Mounting orientation - 5MD900.USB2-01 411
Figure 229: Front cover 5A5003.03..... 412
Figure 230: Dimensions - 5A5003.03..... 412
Figure 231: Front cover mounting and installation depth 413
Figure 232: Temperature humidity diagram for USB flash drive - 5MMUSB.xxxx-00 416

Figure 233: HMI Drivers & Utilities DVD 5SWHMI.0000-00 418
Figure 234: DVI extension cable - 5CADVI.0xxx-00 (similar)..... 421
Figure 235: DVI cable pin assignments..... 422
Figure 236: SDL extension cable (similar)..... 423
Figure 237: SDL pin assignments for 5CASDL.0xxx-00..... 425
Figure 238: SDL cable with 45° plug (similar) 426
Figure 239: Pin assignments for SDL cable with 45° plug 5CASDL.0xxx-01..... 427
Figure 240: SDL cable with extender - 5CASDL.0x00-10 (similar) 428
Figure 241: Example of the signal direction for the SDL cable with extender - PPC700. 429
Figure 242: Pin assignments for SDL cable with extender 5CASDL.0x00-10..... 430
Figure 243: SDL cable 5CASDL.0xxx-03 (similar) 431
Figure 244: Dimensions - SDL cable 5CASDL.0xxx-03 433
Figure 245: Pin assignments - SDL cable 5CASDL.0xxx-03..... 434
Figure 246: SDL cable flex with extender - 5CASDL.0x00-13 (similar)..... 435
Figure 247: Example of the signal direction for the SDL cable flex with extender - PPC700. 437
Figure 248: Pin assignments - SDL cable flex with extender 5CASDL.0x00-13 438
Figure 249: RS232 extension cable (similar)..... 439
Figure 250: RS232 cable assignments..... 440
Figure 251: USB extension cable (similar) 441
Figure 252: USB cable assignments 442
Figure 253: Legend strip templates..... 443
Figure 254: Battery removal 446
Figure 255: Battery handling 446
Figure 256: Battery polarity 447
Figure 257: Removing the fan kit cover..... 448
Figure 258: Marking for direction of airflow / fan rotation 448
Figure 259: Fan Installation..... 449
Figure 260: Removing the cover 450
Figure 261: Fan cable connection on the main board 450
Figure 262: Removing the fan kit cover..... 451
Figure 263: Marking for direction of airflow / fan rotation 451
Figure 264: Fan Installation..... 452
Figure 265: Removing the side cover..... 453
Figure 266: Fan cable connection on the main board 453
Figure 267: Example - Side cover removal on the system unit 5PC720.1505-02..... 454
Figure 268: Removing the slide-in dummy module 455
Figure 269: Installing the slide-in drive..... 455
Figure 270: Example - Side cover removal on the system unit 5PC720.1505-02..... 456
Figure 271: Release the slide-in slot releasing mechanisms 456
Figure 272: Installing the slide-in drive..... 457
Figure 273: Temperature sensor locations..... 459
Figure 274: MTCX controller location..... 460
Figure 275: B&R Key Editor screenshots (Version 2.10) 461
Figure 276: ADI Control Center screenshots (Version 1.50) - example 463
Figure 277: SDL equalizer setting in the B&R Control Center..... 464
Figure 278: ADI development kit screenshots (Version 1.50) 466

Figure 279: Temperature humidity diagram for Elo Accu touch screen 5-wire..... 469

Table 1: Manual history ... 15
Table 2: Organization of safety notices ... 20
Table 3: Model numbers - system units ... 21
Table 4: Model numbers - CPU boards 815E ... 22
Table 5: Model numbers - CPU boards 855GME ... 22
Table 6: Model numbers - heat sinks ... 23
Table 7: Model numbers - main memory ... 23
Table 8: Model numbers - drives ... 23
Table 9: Model numbers - interface ... 24
Table 10: Model numbers - fan kits ... 25
Table 11: Model numbers - batteries ... 25
Table 12: Model numbers - supply voltage connectors ... 25
Table 13: Model numbers - CompactFlash cards ... 26
Table 14: Model numbers - USB flash drives ... 27
Table 15: Model numbers - cables ... 27
Table 16: Model numbers - other items ... 28
Table 17: Model numbers - software ... 29
Table 18: Pin assignments - COM1 ... 61
Table 19: COM1 - I/O address and IRQ ... 61
Table 20: Pin assignments - COM2 ... 62
Table 21: COM2 - I/O address and IRQ ... 62
Table 22: Ethernet connection (ETH1) ... 63
Table 23: Ethernet connection (ETH2) ... 64
Table 24: USB port - back ... 65
Table 25: Power supply ... 66
Table 26: MIC, Line IN and Line OUT port ... 68
Table 27: Add-on interface slot ... 68
Table 28: Technical data - PCI bus ... 69
Table 29: Status LEDs ... 70
Table 30: CompactFlash slot (CF1) ... 71
Table 31: Hard disk / CompactFlash slot (HDD/CF2) ... 72
Table 32: Power button ... 73
Table 33: Reset button ... 73
Table 34: Connection for external keyboard/mouse (PS/2) ... 74
Table 35: Battery ... 75
Table 36: Hardware security key ... 76
Table 37: Slide-in slot 1 ... 77
Table 38: Technical data - 5PC720.1043-00 ... 82
Table 39: Technical data - 5PC720.1043-01 ... 87
Table 40: Technical data - 5PC720.1214-00 ... 91
Table 41: Technical data - 5PC720.1214-01 ... 96
Table 42: Technical data - 5PC720.1505-00 ... 102
Table 43: Technical data - 5PC720.1505-01 ... 107
Table 44: Technical data - 5PC720.1505-02 ... 113
Table 45: Technical data - 5PC720.1706-00 ... 118
Table 46: Technical data - 5PC720.1906-00 ... 123
Table 47: Technical data - 5PC781.1043-00 ... 128

Table 48: Technical data - 5PC781.1505-00 ... 134
Table 49: Technical data - 5PC782.1043-00 ... 140
Table 50: Technical data - 815E CPU boards ... 144
Table 51: Technical data - 855GME CPU boards ... 146
Table 52: Technical data - heat sink ... 148
Table 53: Technical data - main memory ... 149
Table 54: Technical data - add-on hard disk 5AC600.HDDI-00 ... 150
Table 55: Technical data - add-on hard disk 5AC600.HDDI-01 ... 153
Table 56: Technical data - add-on hard disk - 5AC600.HDDI-05 ... 156
Table 57: Technical data - add-on CompactFlash slot 5AC600.CFSI-00 ... 159
Table 58: Technical data - slide-in CD-ROM 5AC600.CDXS-00 ... 161
Table 59: Technical data - slide-in DVD-ROM/CD-RW 5AC600.DVDS-00 ... 164
Table 60: Technical data - slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 revision D0 and higher ... 167
Table 61: Technical data - slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 revision D0 and lower ... 168
Table 62: Technical data - slide-in CF 2 slot - 5AC600.CFSS-00 ... 172
Table 63: Technical data - slide-in USB diskette drive - 5AC600.FDDS-00 ... 174
Table 64: Technical data - slide-in hard disk - 5AC600.HDDS-00 ... 177
Table 65: Technical data - slide-in hard disk - 5AC600.HDDS-01 ... 180
Table 66: Technical data for slide-in hard disk - 5AC600.HDDS-02 ... 183
Table 67: Technical data - RAID controller - 5ACPCI.RAIC-00 ... 186
Table 68: Contents of delivery - 5ACPCI.RAIC-00 ... 187
Table 69: Technical data - RAID hard disk - 5ACPCI.RAIS-00 ... 188
Table 70: Technical data - RAID hard disk - 5ACPCI.RAIS-01 ... 191
Table 71: Technical data - RAID hard disk - 5ACPCI.RAIC-01 ... 194
Table 72: Add-on CAN interface - 5AC600.CANI-00 ... 197
Table 73: Technical data - add-on CAN interface - 5AC600.CANI-00 ... 197
Table 74: Pin assignments - CAN ... 198
Table 75: Add-on CAN - I/O address and IRQ ... 198
Table 76: CAN bus length and transfer rate ... 199
Table 77: CAN cable requirements ... 199
Table 78: Add-on RS232/422/485 interface - 5AC600.485I-00 ... 200
Table 79: Pin assignments RS232/RS422 ... 201
Table 80: Add-on RS232/422/485 - I/O address and IRQ ... 201
Table 81: RS232 bus length and transfer rate ... 201
Table 82: RS232 cable requirements ... 202
Table 83: RS422 bus length and transfer rate ... 202
Table 84: RS422 cable requirements ... 202
Table 85: RS485 bus length and transfer rate ... 203
Table 86: RS485 cable requirements ... 203
Table 87: Technical data - 5PC700.FA00-01 ... 205
Table 88: Technical data - 5PC700.FA02-00 ... 206
Table 89: Technical data - 5PC700.FA02-01 ... 208
Table 90: Possible combinations of system unit and CPU board ... 217
Table 91: Link module for the configuration - One Automation Panel via DVI ... 218
Table 92: Cable for DVI configurations ... 218

Table 93: Possible Automation Panel units, resolutions und segment lengths 219
Table 94: Possible combinations of system unit and CPU board 220
Table 95: Link module for the configuration - One Automation Panel via DVI 221
Table 96: Cables for SDL configurations 221
Table 97: Segment lengths, resolutions and SDL cable 222
Table 98: Requirements for SDL cable with automatic cable adjustment (equalizer) 222
Table 99: Requirements for SDL cable with extender and automatic cable adjustment (equalizer) 223
Table 100: Keys relevant to BIOS during POST 227
Table 101: Keys relevant to BIOS 227
Table 102: Overview of BIOS menu items 227
Table 103: 815E - main setting options 228
Table 104: 815E - primary master setting options 230
Table 105: 815E - primary slave setting options 231
Table 106: 815E - secondary master setting options 233
Table 107: 815E - secondary slave setting options 235
Table 108: 815E - advanced menu setting options 237
Table 109: 815E - advanced chipset/graphics control setting options 238
Table 110: 815E - PCI/PNP configuration options 240
Table 111: 815E - PCI device, slot #1 - setting options 242
Table 112: 815E - PCI device, slot #2 - setting options 243
Table 113: 815E - PCI device, slot #3 - setting options 244
Table 114: 815E - PCI device, slot #4 - setting options 245
Table 115: 815E - PCI/PNP ISA IRQ resource exclusion - setting options 246
Table 116: 815E - memory cache - setting options 247
Table 117: 815E - I/O device configuration - setting options 249
Table 118: 815E - keyboard features - setting options 252
Table 119: 815E - CPU board monitor - setting options 253
Table 120: 815E - miscellaneous setting options 254
Table 121: 815E - baseboard / panel features - setting options 255
Table 122: 815E - panel control - setting options 257
Table 123: 815E - baseboard monitor - setting options 258
Table 124: 815E - Legacy devices - setting options 259
Table 125: 815E - security - setting options 261
Table 126: 815E - power - setting options 263
Table 127: 815E - ACPI control - setting options 265
Table 128: 815E - thermal management 267
Table 129: 815E - boot menu - setting options 268
Table 130: 815E - exit menu - setting options 269
Table 131: 815E - profile overview 270
Table 132: 815E - main profile setting overview 271
Table 133: 815E - advanced chipset/graphics control - profile settings overview 272
Table 134: 815E - PCI/PNP configuration - profile setting options 272
Table 135: 815E - memory cache - profile setting overview 273
Table 136: 815E - I/O device configuration - profile setting overview 274
Table 137: 815E - keyboard features - profile setting overview 274
Table 138: 815E - CPU board monitor - profile setting overview 275

Table 139: 815E - miscellaneous - profile setting overview 275
Table 140: 815E - baseboard/panel features - profile setting overview 275
Table 141: 815E - security - profile setting overview 277
Table 142: 815E - power - profile setting overview 277
Table 143: 815E - boot - profile setting overview 278
Table 144: Keys relevant to BIOS during POST 281
Table 145: Keys relevant to BIOS 281
Table 146: Overview of BIOS menu items 281
Table 147: 855GME - main - setting options 282
Table 148: 855GME IDE channel 0 master setting options 284
Table 149: 855GME IDE channel 0 slave setting options 286
Table 150: 855GME IDE channel 1 master setting options 288
Table 151: 855GME IDE channel 1 slave setting options 290
Table 152: 855GME - advanced menu - setting options 292
Table 153: 855GME - advanced chipset control - setting options 293
Table 154: 855GME - PCI/PNP configuration - setting options 295
Table 155: 855GME - PCI device, slot #1 - setting options 298
Table 156: 855GME - PCI device, slot #2 - setting options 299
Table 157: 855GME - PCI device, slot #3 - setting options 300
Table 158: 855GME - PCI device, slot #4 - setting options 301
Table 159: 855GME - memory cache - setting options 302
Table 160: 855GME - I/O device configuration - setting options 304
Table 161: 855GME - keyboard features - setting options 307
Table 162: 855GME - CPU board monitor - setting options 308
Table 163: 855GME - miscellaneous - setting options 309
Table 164: 855GME - baseboard/panel features - setting options 310
Table 165: 855GME - panel control - setting options 312
Table 166: 855GME - baseboard monitor - setting options 313
Table 167: 855GME - Legacy devices - setting options 314
Table 168: 855GME - security - setting options 316
Table 169: 855GME - power - setting options 318
Table 170: 855GME - ACPI control - setting options 320
Table 171: 855GME - boot - setting options 322
Table 172: 855GME - exit menu - setting options 323
Table 173: 855GME - profile overview 324
Table 174: 855GME - main - profile setting overview 325
Table 175: 855GME - advanced chipset/graphics control - profile settings overview 326
Table 176: 855GME - PCI/PNP configuration - profile setting overview 326
Table 177: 855GME - memory cache - profile setting overview 327
Table 178: 855GME - I/O device configuration - profile setting overview 328
Table 179: 855GME - keyboard features - profile setting overview 328
Table 180: 855GME - CPU board monitor - profile setting overview 329
Table 181: 855GME - miscellaneous - profile setting overview 329
Table 182: 855GME - baseboard/panel features - profile setting overview 329
Table 183: 855GME - security - profile setting overview 331
Table 184: 855GME - power - profile setting overview 331
Table 185: 855GME - boot - profile setting overview 332

Table 186: CPU board software versions 333
Table 187: Automation panel link software versions 333
Table 188: Differentiating between 815E and 855GME CPU boards 334
Table 189: Profile overview 337
Table 190: Profile overview 339
Table 191: Model numbers - Windows CE 344
Table 192: Properties for Windows CE 5.0 and PPC700 345
Table 193: Overview of standards 347
Table 194: Overview of limits and testing guidelines for emissions 349
Table 195: Test requirements - network-related emissions for industrial areas 350
Table 196: : Test requirements - electromagnetic emissions for industrial areas 351
Table 197: Overview of limits and testing guidelines for immunity 352
Table 198: Test requirements - electrostatic discharge (ESD) 353
Table 199: Test requirements - high-frequency electromagnetic fields (HF field) 353
Table 200: Test requirements - high-speed transient electrical disturbances (burst) 354
Table 201: Test requirements - surge voltages 354
Table 202: Test requirements - conducted disturbances 354
Table 203: Test requirements - magnetic fields with electrical frequencies 355
Table 204: Test requirements - voltage dips, fluctuations, and short-term interruptions 356
Table 205: Test requirements - damped vibration 356
Table 206: Overview of limits and testing guidelines for vibration 357
Table 207: Test requirements - vibration operation 357
Table 208: Testing requirements for vibration during transport (packaged) 358
Table 209: Test requirements - shock operation 358
Table 210: Test requirements - shock transport 358
Table 211: Test requirements - toppling 358
Table 212: Test requirements - toppling 359
Table 213: Overview of limits and testing guidelines for temperature and humidity 360
Table 214: Test requirements - worst case operation 360
Table 215: Test requirements - dry heat 360
Table 216: Test requirements - dry cold 360
Table 217: Test requirements - large temperature fluctuations 361
Table 218: Test requirements - temperature fluctuations in operation 361
Table 219: Test requirements - humid heat, cyclic 361
Table 220: Test requirements - humid heat, constant (storage) 361
Table 221: Overview of limits and testing guidelines for safety 362
Table 222: Test requirements - ground resistance 363
Table 223: Test requirements - insulation resistance 363
Table 224: Test requirements - high voltage 364
Table 225: Test requirements - residual voltage 364
Table 226: Test requirements - overload 364
Table 227: Test requirements - defective component 365
Table 228: Test requirements - voltage range 365
Table 229: Overview of limits and testing guidelines for other tests 365
Table 230: Test requirements - protection 366
Table 231: International certifications 367
Table 232: Model numbers - accessories 369

Table 233: Order data - lithium batteries ... 373
Table 234: Technical data - lithium batteries ... 373
Table 235: Order data - TB103 ... 374
Table 236: Technical data - TB103 ... 374
Table 237: Order data - PPC700 interface cover ... 375
Table 238: Order data - DVI - CRT adapter ... 376
Table 239: Order data - USB interface cover (cannot be lost) ... 377
Table 240: Order data - CompactFlash cards ... 378
Table 241: Technical data - 5CFCRD.xxxx-02 CompactFlash cards ... 378
Table 242: Order data - CompactFlash cards ... 386
Table 243: Technical data - 5CFCRD.xxxx-03 CompactFlash cards ... 387
Table 244: Technical data - USB Media Drive 5MD900.USB2-00 ... 399
Table 245: Contents of delivery - USB Media Drive 5MD900.USB2-00 ... 402
Table 246: Technical data - 5A5003.03 ... 404
Table 247: Technical data - USB Media Drive 5MD900.USB2-01 ... 407
Table 248: Contents of delivery - USB Media Drive - 5MD900.USB2-01 ... 410
Table 249: Technical data - 5A5003.03 ... 412
Table 250: Order data - USB flash drives ... 414
Table 251: Technical data - USB flash drive 5MMUSB.xxxx-00 ... 415
Table 252: Contents of delivery - USB flash drives 5MMUSB.xxxx-00 ... 417
Table 253: Model number - HMI Drivers & Utilities DVD ... 418
Table 254: Model numbers - DVI cables ... 421
Table 255: Technical data - DVI cable 5CADVI.0xxx-00 ... 421
Table 256: Model numbers - SDL cables ... 423
Table 257: Technical data - SDL cables 5CASDL.0xxx-00 ... 424
Table 258: Model numbers - SDL cables with 45° plug ... 426
Table 259: Technical data - SDL cable with 45° plug 5CASDL.0xxx-01 ... 426
Table 260: Model numbers - SDL cable with extender ... 428
Table 261: Technical data - SDL cable with extender 5CASDL.0x00-10 ... 428
Table 262: Model numbers - SDL cable 5CASDL.0xxx-03 ... 431
Table 263: Technical data - SDL cable 5CASDL.0xxx-03 ... 432
Table 264: Design - SDL cable 5CASDL.0xxx-03 ... 433
Table 265: Model numbers for SDL cable flex with extender ... 435
Table 266: Technical data - SDL cable flex with extender 5CASDL.0x00-13 ... 435
Table 267: Model numbers - RS232 cables ... 439
Table 268: Technical data - RS232 cables ... 439
Table 269: Model numbers - USB cables ... 441
Table 270: Technical data - USB cables ... 441
Table 271: Order data - legend strip templates ... 444
Table 272: Temperature sensor locations ... 459
Table 273: System support - ADI driver ... 464
Table 274: Technical data - Elo Accu Touch ... 468

0

0AC201.9 ..... 25, 75, 373
0TB103.9 ..... 25, 374
0TB103.91 ..... 25, 374

4

4A0006.00-000 ..... 25, 75, 373

5

5A5003.03 ..... 28, 404, 412
5AC600.485I-00 ..... 24, 200
5AC600.CANI-00 ..... 24, 197
5AC600.CDXS-00 ..... 24, 161
5AC600.CFSI-00 ..... 23, 159
5AC600.CFSS-00 ..... 24, 171
5AC600.DVDS-00 ..... 24, 164
5AC600.DVRS-00 ..... 24, 167, 168
5AC600.FDDS-00 ..... 24, 174
5AC600.HDDI-00 ..... 23, 150
5AC600.HDDI-01 ..... 24, 153
5AC600.HDDI-05 ..... 24, 156
5AC600.HDDS-00 24
5AC600.HDDS-01 ..... 24, 180
5AC600.HDDS-02 ..... 24, 183
5AC600.ICOV-00 ..... 28, 375
5AC700.HS01-00 ..... 23, 148
5AC700.HS01-01 ..... 23, 148
5AC700.HS01-02 ..... 23, 148
5AC900.1000-00 ..... 28, 376
5AC900.104X-00 ..... 28, 444
5AC900.104X-01 ..... 29, 444
5AC900.1200-00 ..... 29, 377
5AC900.150X-01 ..... 29, 444
5ACPCI.RAIC-00 ..... 24, 186
5ACPCI.RAIC-01 ..... 24, 193, 194
5ACPCI.RAIS-00 ..... 24, 187
5ACPCI.RAIS-01 ..... 24, 190, 191
5CADVI.0018-00 ..... 27, 421
5CADVI.0050-00 ..... 27, 421
5CADVI.0100-00 ..... 27, 421
5CASDL.0018-00 ..... 27, 423
5CASDL.0018-01 ..... 27, 426
5CASDL.0018-03 ..... 27, 431
5CASDL.0050-00 ..... 27, 423
5CASDL.0050-01 ..... 27, 426
5CASDL.0050-03 ..... 27, 431
5CASDL.0100-00 ..... 27, 423
5CASDL.0100-01 ..... 27, 426
5CASDL.0100-03 ..... 27, 431
5CASDL.0150-00 ..... 27, 423
5CASDL.0150-01 ..... 27, 426
5CASDL.0150-03 ..... 28, 431
5CASDL.0200-00 ..... 28, 423
5CASDL.0200-03 ..... 28, 431
5CASDL.0250-00 ..... 28, 423
5CASDL.0250-03 ..... 28, 431
5CASDL.0300-00 ..... 28, 423
5CASDL.0300-03 ..... 28, 431
5CASDL.0300-10 ..... 28, 428
5CASDL.0300-13 ..... 28, 435
5CASDL.0400-10 ..... 28, 428
5CASDL.0400-13 ..... 28, 435
5CAUSB.0018-00 ..... 28, 441
5CAUSB.0050-00 ..... 28, 441
5CFCRD.0032-02 ..... 26, 378
5CFCRD.0064-02 ..... 26, 378
5CFCRD.0064-03 ..... 26, 71, 72, 386
5CFCRD.0128-02 ..... 26, 378
5CFCRD.0128-03 ..... 26, 71, 72, 386
5CFCRD.0256-02 ..... 26, 378
5CFCRD.0256-03 ..... 26, 71, 72, 386
5CFCRD.0512-02 ..... 26, 378
5CFCRD.0512-03 ..... 26, 71, 72, 386
5CFCRD.1024-02 ..... 26, 378
5CFCRD.1024-03 ..... 26, 71, 72, 386
5CFCRD.2048-02 ..... 26, 378
5CFCRD.2048-03 ..... 26, 71, 72, 386
5CFCRD.4096-03 ..... 26, 71, 72, 386
5MD900.USB2-00 ..... 29, 398
5MD900.USB2-01 ..... 29, 406
5MMDDR.0256-00 ..... 23, 149
5MMDDR.0512-00 ..... 23, 149
5MMDDR.1024-00 ..... 23, 149
5MMSDR.0128-01 ..... 23, 149
5MMSDR.0256-01 ..... 23, 149
5MMSDR.0512-01 ..... 23, 149
5MMUSB.0128-00 ..... 27, 414
5MMUSB.0256-00 ..... 27, 414
5MMUSB.0512-00 ..... 27, 414
5MMUSB.1024-00 ..... 27, 414
5MMUSB.2048-00 ..... 27, 414

5PC600.E815-00 ..... 22, 144
5PC600.E815-02 ..... 22, 144
5PC600.E815-03 ..... 22, 144
5PC600.E855-00 ..... 22, 146
5PC600.E855-01 ..... 22, 146
5PC600.E855-02 ..... 22, 146
5PC600.E855-03 ..... 22, 146
5PC600.E855-04 ..... 22, 146
5PC600.E855-05 ..... 23, 146
5PC700.FA00-01 ..... 25, 205
5PC700.FA02-00 ..... 25, 206
5PC700.FA02-01 ..... 25, 208
5PC720.1043-00 ..... 21, 80
5PC720.1043-01 ..... 21, 85
5PC720.1214-00 ..... 21, 90
5PC720.1214-01 ..... 21, 95
5PC720.1505-00 ..... 21, 100
5PC720.1505-01 ..... 21, 105
5PC720.1505-02 ..... 21, 111
5PC720.1706-00 ..... 21, 116
5PC720.1906-00 ..... 21, 121
5PC781.1043-00 ..... 22, 126
5PC781.1505-00 ..... 22, 132
5PC782.1043-00 ..... 22, 138
5SWHMI.0000-00 ..... 29, 418

9

9A0014.02 ..... 28, 439
9A0014.05 ..... 28, 439
9A0014.10 ..... 28, 439
9S0000.01-010 29
9S0000.01-020 29
9S0000.08-010 29
9S0000.08-020 29
9S0000.09-090 29
9S0001.19-020 29
9S0001.20-020 29
9S0001.27-020 29
9S0001.28-020 29
9S0001.29-020 ..... 29, 344
9S0001.32-020 ..... 30, 344
9S0001.34-020 ..... 30, 344
9S0001.36-020 ..... 30, 344

A

AC97 sound 34, 68, 305
ACPI 318, 470
Add-on 68
Add-on CAN interface 197
Add-on CompactFlash slot 159
Add-on hard disk 150, 153
Add-on RS232/422/485 interface 200
ADI 460, 463
  Development kit 466
  Drivers 463
APC 470
API 470
ATX power supply 73
Automation Device Interface 463
Automation Runtime 470

B

B&R Automation Device Interface 463
B&R Automation Runtime 471
B&R Control Center 463
B&R eMbedded OS Installer 345
B&R Key Editor 461
Backup battery 75
Barcodes 78
Battery 75
Baud rate 470
BIOS 225, 279, 470
BIOS 855GME
  IDE channel 0 master 284
  IDE channel 0 slave 286
  IDE channel 1 master 288
  IDE channel 1 slave 290
BIOS Extension ROM 196
BIOS upgrade 333
Bit 470
Bit rate 470
Bootstrap loader 484
Buffer duration 75
Burst 354
Bus length 198
Bus structure 199
Byte 471

C

Cable type 198, 201, 202, 203
Cache 471
Cage clamps 66
CAN 34, 471
  Bus length 198
  Cable type 198
CAN controller 197
CD-ROM 471
CE mark 471
Certifications 367
Clamp 211
Climate conditions 360
CMOS 471
CMOS battery 373
COM 472
COM1 .....61, 472
COM2 .....62, 472
COM3 472
CompactFlash 378, 386, 472
  Calculating the lifespan 380, 389
  Dimensions 379, 388
  General information 378, 386
  Order data 378, 386
  Technical data 378, 387
CompactFlash slot 71, 72
Conducted disturbances 354
Control Center 459, 463
CPU 472
CPU board 815E 144
CPU board 855GME 146
CTS 473

D

Damped vibration 356
Data loss 73, 484
DCD 473
Defective component 365
Development kit 466
Dial-Up 473
Dimension standards 20
DIMM 473
Display Clone 216
DMA 473
Dongle 76, 306

DOS boot diskette 342
DRAM 473
Drives 150
Dry cold 360
Dry heat 360
DSR 473
DTR 473
DVD 474
DVI 474
DVI - CRT adapter 376
DVI cable 421
DVI-A 474
DVI-D 474
DVI-I 474

E

EDID 474
Data 293, 294
EIDE 474
electromagnetic emissions 351
Electrostatic discharge 353
eMbedded OS Installer 345
EMC 474
Emission 349
Emissions 351
EPROM 474
Equalizer 464
ESD 17, 353
Electrical components with housing 17
Electrical components without housing ..17
Individual components 18
Packaging 17
Proper handling 17
ETH1 .....63, 305, 315, 320
ETH2 .....64, 315, 320
Ethernet 34, 475
ETHERNET Powerlink 475
European guidelines 347
Extended desktop 216, 460

F

Fan kit installation 448
Fan kit replacement 448
Fan kits 205
Fastening torque 211
FDD 475
Features 34
FIFO 475
Firmware 339, 475
Floppy 475
FPC 476
FPD 476
Free fall 359
Front cover 404, 412
FTP 476
Functional grounding 66

G

GB 476
Graphics engine 1 293
Graphics engine 2 .....294, 346
Ground resistance 363

H

Half-size 34
Handshake 476
Hard disk 72
Hardware security key 76
HDD 70, 476
Heat sink 148
HF field 353
Hibernate 70
High voltage 364
High-frequency electromagnetic fields 353
High-speed transient electrical disturbances variables 354
Hot Plug 74
Humid heat, constant 361
Humid heat, cyclic 361

I

IDE 476
Identification 78
Immunity 352
Insulation resistance 363
Interface 476
ISA 477

ISO 477

J

Jitter 477
Jumper 477

K

Key Editor 461
Keyboard 74

L

Layering 35
LCD 477
LED 70, 477
Lifespan
  CompactFlash 389
Line IN 68
Line OUT 68
Lithium battery 75
Locking time 461
LPT 478

M

Magnetic fields with electrical frequencies 355
Main memory 149
Maintenance Controller Extended 460
Manual history 15
MB 478
Mechanical conditions 357
MIC 68
Microprocessor 478
MIPS 478
Mkey 478
Model numbers 21
Monitor / Panel 67
Motherboard 478
Mounting orientation 214
Mounting rail brackets 398, 406
Mouse 74
MTBF 478
MTC 478
MTCX 73, 339, 460, 478
Multitasking 478

N

Network-related emissions 350
NMI 197

O

OEMs 479
OPC 479
OPC server 479
Overload 66, 364

P

Panel 479
PCI 479
PCI slot 69
PCMCIA 479
PLC 482
PnP 480
POH 480
POST 480
Power 70
Power button 73, 319
Powerlink 480
PROFIBUS 480
Profile overview 270, 324
Protection type 366
PS/2 74
  Keyboard 74
  Mouse 74
  Y-cable 74

Q

QUXGA 480
QVGA 480
QWUXGA 480
QXGA 482

R

RAID 193

RAM 481
Real-time 481
Real-time clock 34, 75
Requirements for emissions 349
Requirements for immunity to disturbances .. 352
Reset button 73
Residual voltage 364
Reverse polarity protection 66
ROM 481
RS232 ..... 201, 481
  Bus length 201
  Cable type 201
RS232 cable 439
RS422 ..... 202, 481
  Bus length 202
  Cable type 202
RS485 ..... 203, 481
  Bus length 203
  Cable type 203
RTC 34, 75
RTS 481
RXD 482

S

Safety 362
Safety guidelines 17
  Installation 19
  Intended use 17
  Operation 19
  Organization 20
  Policy and procedures 18
  Programs 19
  Protection against electrostatic discharges 17
  Touching electrical parts 19
  Transport and storage 18
  Viruses 19
Screw clamps 66
SDL cable 423, 431
SDL cable flex with extender 435
SDL cable with 45° plug 426
SDL cable with extender 428
SDL equalizer 464
SDRAM 482
Self discharging 75
Sequential function chart 482
Serial number 78
SFC 482
Shock during operation 358
Shock transport 358
Short-term interruptions 356
Slide-in CD-ROM 160
Slide-in CF 2-slot 171
Slide-in DVD-ROM/CD-RW 163
Slide-in hard disk 176, 179, 182
Slide-in slot 1 77
Slide-in USB FDD 173
Slot PLC 482
Smart Display Link 67
Soft-off 70
SoftPLC 482
SRAM 482
Standard keypad module 482
Standards 347
  Overview 347
Status LED 70
  HDD 70
  Link 1 70
  Link 2 70
  Power 70
Supply voltage 34, 66
Supply voltage connectors 374
Surge 354
Surge voltages 354
Suspend-to-disk 70
SUXGA 482
SVGA 482
Switch 483
SXGA 483
SXGA+ 483
System units 483

T

Task 483
TCP/IP 483
Temperature 459
Temperature fluctuations 361
  Operation 361
Temperature monitoring 53
Temperature sensor 459
Temperature sensor locations 459

TFT display 483
Toppling 358
Touch screen 483
TXD 484

U

UART 484
UDMA 484
UPS 484
USB 484
USB cable 441
USB flash drive 414, 467
General information 414
Order data 414
Technical data 415
USB Media Drive 398, 406
Dimensions 401, 409
Dimensions with front cover 410
Installation 403, 411
Interfaces 402, 410
Mounting orientation 403, 411
Technical data 399, 407
USB port 65
UXGA 485

V

VGA 485
Vibration during transport 358
Vibration operation 357
Voltage dips 356
Voltage fluctuations 356
Voltage range 365

W

Wake On LAN 320
Windows CE 344, 485
eMbedded OS Installer 345
General information 344
Installation 345
Known problems 346
Properties 345
Worst case 360
WSXGA 485
WUXGA 485
WXGA 485

X

XGA 485