# Automation PC 620 User's Manual



# **Automation PC 620**

# **User's Manual**

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# **Chapter 1: General information Chapter 2: Technical data Chapter 3: Start-up 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	21
1. Manual history	
2. Safety guidelines	27
2.1 Intended use	
2.2 Protection against electrostatic discharges	27
2.2.1 Packaging	27
2.2.2 Guidelines for proper ESD handling	27
2.3 Policy and procedures	
2.4 Transport and storage	
2.5 Installation	
2.6 Operation	
2.6.1 Protection against touching electrical parts	
2.6.2 Environmental conditions - dust, humidity, aggressive gases	
2.6.3 Programs, viruses and dangerous programs	
3. Organization of safety notices	
4. Guidelines	
5. Model numbers	_
5.1 System units	
5.2 CPU boards 815E (ETX)	
5.3 CPU boards 855GME (ETX)	
5.4 CPU boards 855GME (XTX)	
5.5 Heat sink	
5.6 Main memory	
5.7 Drives	
5.9 Fan kits	
5.9 Fan kils	
5.10 AP LINK Cards	_
5.11 Accessories	
5.11.2 Supply voltage connectors	
5.11.3 CompactFlash cards	
5.11.4 USB flash drives	
5.11.5 Cables	
5.11.6 UPS module + accessories	
5.11.7 Miscellaneous	
5.12 Software	
0.12 0004410	
Chapter 1. Technical data	42
Chapter 2: Technical data	43
1. Introduction	
1.1 Features	
1.2 Structure / configuration APC620 with 1, 2, 3 and 5 PCI slots	
1.2.1 Selection guide - Basic system	
1.2.2 Selection guide - Optional components	
2. Entire device	
2.1 APC620, 1 PCI slot variant	
2. I AFOUZU, I FOI SIUL VALIAIIL	ວບ

2.1.1 Interfaces	50
2.1.2 Technical data	52
2.1.3 Dimensions	54
2.2 APC620, 2 PCI slot variant	55
2.2.1 Interfaces	55
2.2.2 Technical data	57
2.2.3 Dimensions	59
2.3 APC620, 3 PCI slot variant	60
2.3.1 Interfaces	60
2.3.2 Technical data6	62
2.3.3 Dimensions	64
2.4 APC620, 5 PCI slot variant	65
2.4.1 Interfaces	65
2.4.2 Technical data6	67
2.4.3 Dimensions	69
2.5 APC620 embedded variant	70
2.5.1 Interfaces	70
2.5.2 Technical data	72
2.5.3 Dimensions	75
2.6 Environmental temperatures for systems with an 815E CPU board (ETX)	
2.6.1 Maximum ambient temperature	77
2.6.2 Minimum ambient temperature	78
2.6.3 How do you determine the maximum ambient temperature?	78
2.6.4 Temperature monitoring	79
2.7 Environmental temperatures for systems with an 855GME CPU board (EXT / XTX) 8	80
2.7.1 Maximum ambient temperature 8	81
2.7.2 Minimum ambient temperature 8	
2.7.3 How do you determine the maximum ambient temperature?	82
2.7.4 Temperature monitoring	
2.8 Power management APC620 system unit with 1 PCI slot	
2.8.1 Supply voltage for the 5PC600.SX01-00 revision >= I0	84
2.8.2 Power calculation with 5PC600.SX01-00 revision >= I0	
2.8.3 Supply voltage for the 5PC600.SX01-00 revision < I0	
2.8.4 Power calculation with 5PC600.SX01-00 revision < I0	
2.9 Power management APC620 system units with 2 PCI slots	88
2.9.1 Supply voltage for the 5PC600.SX02-00 revision >= H0 and 5PC600.SX02-01 revisio	n
>= K0)	
2.9.2 Power calculation with 5PC600.SX02-00 revision >= H0	
2.9.3 Power calculation with 5PC600.SX02-01 revision >= K0	
2.9.4 Supply voltage for the 5PC600.SX02-00 revision < H0 and 5PC600.SX02-01 revisio	
< K0)	
2.9.5 Power calculation with 5PC600.SX02-00 revision < H0	
2.9.6 Power calculation with 5PC600.SX02-01 revision < K0	
2.10 Power management APC620 system unit with 3 PCI slots	
2.10.1 5PC600.SF03-00 supply voltage	94
2.10.2 Power calculation with system unit 5PC600.SF03-00	95
2.11 Power management APC620 system units with 5 PCI slots	96

	0.SX05-00 (revision >= H0) and 5PC600.SX05	
	unit 5PC600.SX05-00 (revision >= H0)	
	unit 5PC600.SX05-01 (revision >= H0)	
	0.SX05-00 (revision < H0) and 5PC600.SX05-0	
	unit 5PC600.SX05-05 revision < H0	
	unit 5PC600.SX05-01 revision < H0	
	20 embedded system unit	
2.12.1 Supply voltage for the 5PC600	SE00-00, 5PC600.SE00-01 and 5PC600.SE	00-02 .
104		
2.12.2 Power calculation with 5PC600	0.SE00-00, 5PC600.SE00-01 and 5PC600.SE	00-02
105		
2.14.2 Serial interfaces COM2		110
	)	
	l)	
	620 embedded)	
2.14.6 CAN terminating switch / LED	(only APC620 embedded)	112
2.14.7 Status LEDs CAN / X2X (only	APC620 embedded)	113
	PC620 embedded)	
	number (only APC620 embedded)	
	ly APC620 embedded)	
	20 embedded)	
	orts	
2.14.19 Add-on UPS module slot		132
2.14.22 Status LEDs		136
	(only APC620 embedded)	
2.14.25 Hard disk / CompactFlash slo	ot (HDD/CF2)	139
	C620 embedded)	
2.14.32 Slide-in slot 1 drive slot		146

	2.14.33 Slide-in slot 2 drive slot	147
	2.15 Serial number sticker	148
	2.16 Block diagram	
	2.16.1 Entire device with system unit 5PC600.SX01-00	150
	2.16.2 Entire device with system unit 5PC600.SX02-00	
	2.16.3 Entire device with system unit 5PC600.SX02-01	
	2.16.4 Entire device with system unit 5PC600.SF03-00	
	2.16.5 Entire device with system unit 5PC600.SX05-00	
	2.16.6 Entire device with system unit 5PC600.SX05-01	
	2.16.7 Entire device with system unit 5PC600.SE00-00	
	2.16.8 Entire device with system unit 5PC600.SE00-01	
	2.16.9 Entire device with system unit 5PC600.SE00-02	
3	. Individual components	
	3.1 System units	
	3.1.1 APC620 with 1, 2, 3 and 5 PCI slots	
	3.1.2 APC620 embedded variations	
	3.2 CPU boards 815E (ETX)	
	3.3 CPU boards 855GME (ETX)	
	3.4 CPU boards 855GME (XTX)	
	3.5 Heat sink	
	3.6 Main memory	
	3.7 Drives	
	3.7.1 Add-on hard disk 30 GB 24x7 - 5AC600.HDDI-00	171
	3.7.2 Add-on hard disk 20 GB ET - 5AC600.HDDI-01	
	3.7.3 Add-on hard disk 40 GB 24x7 ET - 5AC600.HDDI-05	
	3.7.4 Add-on hard disk 80 GB 24x7 ET - 5AC600.HDDI-06	
	3.7.5 Add-on CompactFlash slot - 5AC600.CFSI-00	
	3.7.6 Slide-in CD-ROM - 5AC600.CDXS-00	
	3.7.7 Slide-in DVD-ROM/CD-RW - 5AC600.DVDS-00	
	3.7.8 Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00	
	3.7.9 Slide-in CF 2 slot - 5AC600.CFSS-00	
	3.7.10 Slide-in USB FDD - 5AC600.FDDS-00	
	3.7.11 Slide-in hard disk 30 GB 24x7 - 5AC600.HDDS-00	
	3.7.12 Slide-in hard disk 20 GB ET - 5AC600.HDDS-01	
	3.7.13 Slide-in hard disk 40 GB ET - 5AC600.HDDS-02	
	3.8 RAID system	209
	3.8.1 PCI RAID Controller ATA/100 - 5ACPCI.RAIC-00	
	3.8.2 PCI RAID storage 2 x 40 GB 24x7 - 5ACPCI.RAIS-00	212
	3.8.3 PCI RAID storage 2 x 60 GB 24x7 - 5ACPCI.RAIS-01	
	3.8.4 PCI SATA RAID 2 x 60 GB 24x7 - 5ACPCI.RAIC-01	
	3.8.5 Replacement SATA HDD 60 GB - 5ACPCI.RAIC-02	223
	3.8.6 PCI SATA RAID 2 x 160 GB 24x7 ET - 5ACPCI.RAIC-03	
	3.8.7 Replacement SATA HDD 160 GB - 5ACPCI.RAIC-04	
	3.9 Interface options	
	3.9.1 Add-on CAN interface - 5AC600.CANI-00	
	3.9.2 Add-on RS232/422/485 interface - 5AC600.485I-00	
	3.10 Fan kit	

3.10.1 Fan kit 1 PCI - 5PC600.FA01-00	242
3.10.2 Fan kit 2 PCI - 5PC600.FA02-00	243
3.10.3 Fan kit 3PCI - 5PC600.FA03-00	245
3.10.4 Fan kit 5 PCI - 5PC600.FA05-00	246
3.11 AP Link cards	248
Chapter 3: Start-up	253
1. Installation	
1.1 Important mounting information	253
1.2 Drilling templates	
1.3 Mounting orientation	
1.3.1 Standard mounting	
1.3.2 Optional mounting orientations	
2. Cable connections	
2.1 Ethernet cable lengths for ETH1	266
3. Grounding concept	
4. Connection examples	
4.1 Selecting the display units	
4.2 One Automation Panel 900 via DVI (onboard)	
4.2.1 Basic system requirements	270
4.2.2 Link modules	
4.2.3 Cables	271
4.2.4 Possible Automation Panel units, resolutions und segment lengths	271
4.2.5 BIOS settings	272
4.2.6 Windows graphics driver settings	272
4.2.7 Windows touch screen driver settings	
4.3 An Automation Panel 900 via SDL (onboard)	273
4.3.1 Basic system requirements	
4.3.2 Link modules	274
4.3.3 Cables	274
4.3.4 BIOS settings	
4.3.5 Windows graphics driver settings	276
4.3.6 Windows touch screen driver settings	276
4.4 An Automation Panel 800 via SDL (onboard)	277
4.4.1 Basic system requirements	277
4.4.2 Cables	278
4.4.3 BIOS settings	279
4.4.4 Windows graphics driver settings	279
4.4.5 Windows touch screen driver settings	
4.5 An AP900 and an AP800 via SDL (onboard)	
4.5.1 Basic system requirements	
4.5.2 Cables	
4.5.3 BIOS settings	
4.5.4 Windows graphics driver settings	
4.5.5 Windows touch screen driver settings	
4.6 Four Automation Panel 900 units via SDL (onboard)	283

	4.6.1 Basic system requirements	
	4.6.2 Link modules	284
	4.6.3 Cables	284
	4.6.4 BIOS settings	286
	4.6.5 Windows graphics driver settings	286
	4.6.6 Windows touch screen driver settings	287
	4.7 One Automation Panel 900 unit via SDL (AP Link)	
	4.7.1 Basic system requirements	
	4.7.2 Link modules	
	4.7.3 Cables	
	4.7.4 BIOS settings	
	4.7.5 Windows graphics driver settings	
	4.7.6 Windows touch screen driver settings	
	4.8 Four Automation Panel 900 units via SDL (AP Link)	
	4.8.1 Basic system requirements	
	4.8.2 Link modules	
	4.8.3 Cables	
	4.8.4 BIOS settings	
	4.8.5 Windows graphics driver settings	
	4.8.6 Windows touch screen driver settings	
	4.9 Two Automation Panel 900 units via SDL (onboard) and SDL (AP Link)	
	4.9.1 Basic system requirements	
	4.9.2 Link modules	
	4.9.3 Cables	
	4.9.4 BIOS settings	
	4.9.5 Windows graphics driver settings	
	4.9.6 Windows touch screen driver settings	
	4.10 Eight Automation Panel 900 units via SDL (onboard) and SDL (AP Link)	
	4.10.1 Basic system requirements	
	4.10.2 Link modules	
	4.10.3 Cables	304
	4.10.4 BIOS settings	
	4.10.5 Windows graphics driver settings	
	4.10.6 Windows touch screen driver settings	
	4.11 Six AP900 and two AP800 devices via SDL (onboard) and SDL (AP Link)	
	4.11.1 Basic system requirements	309
	4.11.2 Link modules	
	4.11.3 Cables	
	4.11.4 BIOS settings	
	4.11.5 Windows graphics driver settings	
	4.11.6 Windows touch screen driver settings	
	4.12 Internal numbering of extension units in AP800 devices	
5	Configuration of a SATA RAID array	
<u> </u>	5.1 Create RAID Set	
	5.1.1 Create RAID Set - striped	
	5.1.2 Create RAID Set - Mirrored	
	5.2 Delete RAID set	
	O.E DOIGO 14 11D 000	017

5.3 Rebuild Mirrored Set	318
5.4 Resolve Conflicts	319
5.5 Low Level Format	320
6. Compatibility / improvement from 855GME (XTX) to 855GME (ETX)	321
Chapter 4: Software	
1. Automation PC 620 with BIOS	
1.1 815E (ETX)BIOS Description	
1.1.1 General information	
1.1.2 BIOS setup and boot procedure	
1.1.3 BIOS setup keys	
1.1.4 Main	
1.1.5 Advanced	
1.1.6 Security	
1.1.7 Power	361
1.1.8 Boot	365
1.1.9 Exit	
1.1.10 Profile overview - BIOS default settings - 815E (ETX)	
1.2 855GME (ETX) BIOS description	
1.2.1 General information	
1.2.2 BIOS setup and boot procedure	
1.2.3 BIOS setup keys	
1.2.4 Main	
1.2.5 Advanced	
1.2.6 Security	
1.2.7 Power	
1.2.8 Boot	
1.2.9 Exit	
1.2.10 Profile overview - BIOS default settings - 855GME (ETX)	
1.3 855GME (XTX) BIOS description	
1.3.1 General information	
1.3.2 BIOS setup and boot procedure	
1.3.3 BIOS setup keys	
1.3.4 Main	
1.3.5 Advanced	436
1.3.6 Boot	
1.3.7 Security	
1.3.8 Power	
1.3.9 Exit	
1.3.10 Profile overview - BIOS default settings - 855GME (XTX)	
1.4 BIOS Error signals (beep codes)	488
1.4.1 BIOS 815E (ETX) and 855GME (ETX)	
1.4.2 BIOS 855GME (XTX)	488
1.5 Distribution of resources	
1.5.1 RAM address assignment	
1.5.2 DMA channel assignment	490

1.5.3 I/O address assignment	
1.5.4 Interrupt assignments in PCI mode	
1.5.5 Interrupt assignments in APIC mode	493
1.5.6 Inter-IC (I <sup>2</sup> C) bus	495
1.5.7 System Management (SM) bus	
1.6 BIOS upgrade	496
1.6.1 Requirements	
1.6.2 What information do I need?	496
1.6.3 Upgrade BIOS for 815E (ETX)	500
1.6.4 Upgrade BIOS for 855GME (ETX)	501
1.6.5 Upgrade BIOS for 855GME (XTX)	
1.6.6 Windows XP Embedded and BIOS upgrade	503
1.7 Upgrading the firmware	
1.7.1 Procedure	
1.7.2 Possible upgrade problems and version dependencies	506
1.8 Creating a DOS boot diskette in Windows XP	508
1.9 Location of the DIP switch in APC620 system units	509
2. Automation PC 620 with Automation Runtime	
2.1 General information	
2.2 Support for Automation PC 620 embedded	
2.2.1 AR010	
2.2.2 AR106	
2.3 Selection of devices	
3. Automation PC 620 with MS-DOS	
3.1 Known problems	513
4. Automation PC 620 with Windows XP Professional	
4.1 Installation	
4.1.1 FAQ	
4.2 Graphics drivers	
4.2.1 Installing the graphics driver for 815E (ETX) CPU boards	
4.2.2 Graphics driver installation - 855GME (ETX / XTX) CPU boards	
4.2.3 Graphics settings for Extended Desktop	
4.2.4 Graphics settings for Dual Display Clone	
4.2.5 FAQ	
4.3 Touch screen driver	
4.3.1 Installation for Extended Desktop	
4.3.2 Installation for Dual Display Clone	
4.3.3 FAQ	
4.4 Audio driver	
4.4.1 Installation	
4.5 Network driver	
4.5.1 Installation ETH1	
4.5.2 Installation ETH2	
4.6 Automation PC 620 embedded	
5. Automation PC 620 with Windows XP Embedded	
5.1 General information	
5.2 Features with FP2007 (Feature Pack 2007)	531

	5.3 Installation	532
	5.4 Graphics drivers	532
	5.5 Touch screen driver	
	5.6 Audio driver	532
	5.6.1 After a BIOS upgrade	
	5.7 Network driver	533
	5.8 FAQ	
6	. Automation PC 620 with Windows CE	
	6.1 General information	
	6.1.1 Advantages	534
	6.2 Properties in connection with APC620 devices	
	6.3 Requirements	535
	6.4 Installation	
	6.4.1 B&R eMbedded OS Installer	536
	6.5 Known problems	536
7	. Automation Device Interface (ADI) driver - Control Center	537
	7.1 SDL equalizer setting	539
	7.2 UPS configuration	. 540
	7.2.1 Configuration of UPS operation for the B&R APC620 UPS	541
	7.2.2 Display status values for UPS	. 541
	7.2.3 Change UPS battery settings	542
	7.2.4 Update UPS battery settings	543
	7.2.5 Save UPS battery settings	
	7.2.6 Configure UPS system settings	. 545
	7.2.7 Configuring the "UL compliant operation"	
	7.2.8 Change additional UPS settings	
	7.2.9 Procedure following power failure	. 548
_	Chapter F. Standards and cartifications	E 40
	Chapter 5: Standards and certifications	
	. Applicable European guidelines	
	. Overview of standards	
3	. Requirements for emissions	
	3.1 Network related emissions	
1	3.2 Emissions / Electromagnetic emissions	
4	4.1 Electrostatic discharge (ESD)	
	4.1 Electrostatic discriarge (ESD) 4.2 High-frequency electromagnetic fields (HF field)	
	4.3 High-speed transient electrical disturbances (Burst)	
	4.4 Surge voltages (Surge)	
	4.5 Conducted disturbances	
	4.6 Magnetic fields with electrical frequencies	
	4.7 Voltage dips, fluctuations and short-term interruptions	
	4.8 Damped oscillations	
5	. Mechanical conditions	
J	5.1 Vibration operation	
	5.2 Vibration during transport (packaged)	
	o.z. violation daining transport (packagoa)	

5.3 Shock during operation		
5.4 Shock transport (packaged)		560
5.5 Toppling		560
5.6 Free fall (packaged)		561
6. Climate conditions		562
6.1 Worst case operation		562
6.2 Dry heat		562
6.3 Dry cold		562
6.4 Large temperature fluctuations		563
6.5 Temperature fluctuations in operation		
6.6 Humid heat, cyclical		
6.7 Humid heat, constant (storage)		
7. Safety		
7.1 Ground resistance		
7.2 Insulation resistance		
7.3 High voltage		
7.4 Residual voltage		
7.5 Leakage current		
7.6 Overload		
7.7 Defective component		
7.8 Voltage range		
8. Other tests		
8.1 Protection		
8.2 Degree of pollution		
9. SDL flex cable - test description		
9.1 Torsion		
9.1.1 Structure of the test		
9.1.2 Test conditions		569
9.1.3 Individual tests		
9.2 Cable drag chain		570
9.2.1 Structure of the test		
9.2.2 Test conditions		570
9.2.3 Individual tests:		570
10. International certifications		571
Chapter 6: Accessories	F	73
1. Overview		579
2. Supply voltage connector (TB103 3-pin)		
2.1 General information		
2.2 Order data		
2.3 Technical data		
3. Replacement CMOS batteries		
3.1 Order data		
3.2 Technical data		
4. Interface covers 5AC600.ICOV-00		
4.1 Order data		วชป

	4.2 Contents of delivery	580
5.	DVI - monitor adapter 5AC900.1000-00	581
	5.1 Order data	
6.	CompactFlash cards 5CFCRD.xxxx-02	582
	6.1 General information	582
	6.2 Order data	
	6.3 Technical data	582
	6.4 Dimensions	
	6.5 Calculating the lifespan	
7.	CompactFlash cards 5CFCRD.xxxx-03	590
	7.1 General information	
	7.2 Order data	
	7.3 Technical data	
	7.3.1 Temperature humidity diagram - Operation and storage	
	7.4 Dimensions	
	7.5 Calculating the lifespan	
8.	USB Media Drive 5MD900.USB2-00	
	8.1 Features	
	8.2 Technical data	
	8.3 Dimensions	
	8.4 Dimensions with front cover	
	8.5 Contents of delivery	
	8.6 Interfaces	
	8.7 Installation	
	8.7.1 Mounting orientation	
	8.8 Front cover 5A5003.03 for the USB Media Drive	
	8.8.1 Technical data	
	8.8.2 Dimensions	
_	8.8.3 Installation	
9.	USB Media Drive - 5MD900.USB2-01	
	9.2 Technical data	
	9.3 Dimensions	
	9.5 Contents of delivery	
	9.6 Interfaces	
	9.7 Installation	
	9.7.1 Mounting orientation	-
	9.8 Front cover 5A5003.03 for the USB Media Drive	
	9.8.1 Technical data	
	9.8.2 Dimensions	
	9.8.3 Installation	
11	D. USB Flash Drive 5MMUSB.0xxx-00	
11	10.1 General information	
	10.2 Order data	
	10.3 Technical data	
	10.3.1 Temperature humidity diagram - Operation and storage	_
	10.0.1 Tomporatore normanly diagram Operation and storage	010

10.4 Contents of delivery	
10.5 Creating a bootable USB flash drive	
10.5.1 Requirements	
10.5.2 Procedure	620
11. HMI Drivers & Utilities DVD 5SWHMI.0000-00	621
12. Cables	
12.1 DVI cable 5CADVI.0xxx-00	624
12.1.1 Order data	624
12.1.2 Technical data	624
12.1.3 Flex radius specification	625
12.1.4 Cable specifications	626
12.2 APC620 internal supply cable 5CAMSC.0001-00	627
12.2.1 Order data	
12.2.2 Technical data	627
12.3 SDL cable 5CASDL.0xxx-00	628
12.3.1 Order data	628
12.3.2 Technical data	629
12.3.3 Flex radius specification	629
12.3.4 Cable specifications	630
12.4 SDL cable with 45° plug 5CASDL.0xxx-01	631
12.4.1 Order data	631
12.4.2 Technical data	632
12.4.3 Flex radius specification	632
12.4.4 Cable specifications	633
12.5 SDL cable with extender 5CASDL.0x00-10	
12.5.1 Order data	634
12.5.2 Technical data	635
12.5.3 Flex radius specification	635
12.5.4 Cable connection	636
12.5.5 Cable specifications	
12.6 SDL flex cable 5CASDL.0xxx-03	
12.6.1 Order data	638
12.6.2 Technical data	639
12.6.3 Flex radius specification	640
12.6.4 Dimensions	640
12.6.5 Construction	
12.6.6 Cable specifications	642
12.7 SDL flex cable with extender 5CASDL.0x00-13	
12.7.1 Order data	
12.7.2 Technical data	643
12.7.3 Flex radius specification	
12.7.4 Dimensions	
12.7.5 Cable connection	
12.7.6 Cable specifications	
12.8 RS232 cable 9A0014-xx	
12.8.1 Order data	
12.8.2 Technical data	648

12.8.3 Cable specifications	649
12.9 USB cable 5CAUSB.00xx-00	650
12.9.1 Order data	650
12.9.2 Technical data	650
12.9.3 Cable specifications	651
13. APC620 UPS	652
13.1 Features	653
13.2 Requirements	653
13.3 Individual components	
13.3.1 Add-on UPS module 5AC600.UPSI-00	655
13.3.2 Battery unit 5AC600.UPSB-00	
13.3.3 UPS connection cable	
14. Replacement fan filter	662
15. SRAM module - 5AC600.SRAM-00	663
15.1 Technical data	663
15.2 Driver support	664
15.3 Installation	665
Chapter 7: Maintenance / Servicing	667
1. Changing the battery	667
1.1 Battery status evaluation	
1.2 Procedure	
2. Fan kit installation and replacement	
2.1 Procedure for APC620 with 1 PCI slots	671
2.2 Procedure for APC620 with 1 PCI slots	
2.3 Procedure for APC620 with 3 PCI slots	
2.4 Procedure for APC620 with 5 PCI slots	
3. Slide-in drive - installation and exchange	
3.1 Installation procedure	
3.2 Exchange procedure	
4. Installation of the UPS module	
4.1 Automation PC 620 without add-on interface module	
4.1.1 APC620, 1 PCI slot	
4.1.2 APC620, 2 PCI slot	
4.1.3 APC620, 5 PCI slot	
4.2 Automation PC 620 with add-on interface module	
4.2.1 APC620, 1 PCI slot	608
4.2.2 APC620, 2 PCI slot	
4.2.3 APC620, 5 PCI slot	
5. Mounting the side cover	
5.1 APC620 with 1 PCI slot	
5.1 APC620 with 1 PCI slot	
5.2 APC620 with 3 PCI slot	
5.3 APC620 with 3 PCI slot	
6. Exchanging a PCI SATA RAID hard disk	
o. Exchanging a Poi SATA KAID hard disk	. /10

Appendix A	713
1. Temperature sensor locations	713
2. Connection of an external device to the main board	714
3. Maintenance Controller Extended (MTCX)	715
3.1 SDL timing	716
4. B&R Key Editor information	718
5. B&R Automation Device Interface (ADI) development kit	720
6. Glossary	722

# **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	21.07.2004	- First version
1.1 Preliminary	12.11.2004	Drilling templates for the APC620 1 and 2 PCI slot variations added.  New overview images added for the APC620 1 and 2 PCI slot variations.  New dimension diagrams added for the APC620 1 and 2 PCI slot variations.  Model number overview revised.  Interface descriptions added (behind the front cover).  "Software" chapter has been updated.  "Accessories" chapter has been updated.  System unit with 5 PCI slots added.  Technical data for all individual components was expanded.
1.2 Preliminary	23.11.2004	<ul> <li>Pictures of the interfaces from the front have been updated.</li> <li>General descriptions of device interfaces have been revised.</li> <li>New CPU boards and system units added.</li> <li>USB media device and fitting front cover added.</li> </ul>
1.3 Preliminary	27.12.2004	New column "My settings" (815E and 855GME BIOS) added to the BIOS profile settings table. Chapter 7 "Maintenance / Servicing", on page 609 updated. APC620 interface cover 5AC600.ICOV-00 updated (see section "Interface cover 5AC600.ICOV-00", on page 528). Information for the maximum color depth for the CPU board added. Error correction in the BIOS description for Legacy Devices Com D, COM E, LPT.

Table 1: Manual history

Version	Date	Change
1.4 Preliminary	07.03.2005	- Cover for the slide-in USB disk drive updated (see figure 65 "Slide-in USB FDD - 5AC600.FDDS-00", on page 160).  - Chapter 4 (Software) updated for new BIOS versions. (815E BIOS Version 1.15, 855GME BIOS Version V1.14).  - Fan kit (5PC600.HS05-00) for APC620 system with 5 PCI slots (see section "Fan kit 5 PCI - 5PC600.FA05-00", on page 203) and installation (see section 2.4 "Procedure for APC620 with 5 PCI slot", on page 623) updated.  - Mounting orientations more precisely specified, see the "Commissioning" chapter, section 1.3 "Mounting orientation", on page 214.  - Temperature specifications for the 815E CPU boards added.  - Temperature specifications for the 855GME CPU boards added.  - Power management for the APC620 systems updated (see the section "Power management for APC620 systems 1 and 2 PCI slots", on page 76).  - RAID System updated (see the section "RAID System", on page 172).
1.5 Preliminary	16.03.2005	- Temperature and performance table design changed Mounting orientation more precisely specified.
1.6 Preliminary	04.07.2005	- System unit weights added Add-on interface cards CAN (5AC600.CANI-00) and RS232/422/485 (5AC600.485I-00) added Model numbers for Microsoft Windows XP embedded with SP2 added Cables (DVI, SDL, USB, RS232) added to accessories chapter AP Link cards added Slide-in CF 2-slot 5AC600.CFSS-00 added Configuration and selection guide for APC620 systems added (see chapter "Technical data", section 1.2 "Structure / configuration", on page 44) Key Editor brief info section added (see Appendix A, "B&R Key Editor Information" section on page 658) Automation Device Interface (ADI), Control Center, and Development Kit: brief info section added (see "Software" chapter, from page 486) Information added: battery compartment, real-time clock (RTC) Temperature sensor locations for APC620 devices added (see Appendix A, "Temperature sensor positions" section, on page 653) Ambient temperatures for PM 1600 (5PC600.E855-01) and PM 1800 (5PC600.E855-03) added Appendix A expanded Real-time clock (RTC) specifications about the system unit added.
1.70	08.03.2006	- Conductor cross section and AWG change for the supply plug Meaning of standard and 24-hour hard disk operation specified more precisely Procedure for creating a bootable USB flash drive (see section "Creating a bootable USB flash drive", on page 568) Slide-in DVD-R/RW, DVD+R/RW drive 5AC600.DVRS-00 updated (see section "Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00", on page 153) Maintenance Controller Extended (MTCX) information added (see the section "Maintenance Controller Extended (MTCX)", on page 655) Technical data about the SDL cable (flex radius, AWG) modified due to new specifications Information about general tolerances according to DIN ISO 2768 added to dimension diagrams BIOS distribution of resources added (see section "Resource distribution", on page 437) Testing conditions added for the determined ambient temperature specifications Slide-in drive installation and exchange description updated (see the section "Slide-in drive installation and exchange", on page 628) 5CAMSC.0001-00 cable for connecting external devices updated (see the section "APC620 internal supply cable 5CAMSC.0001-00", on page 574) Information about connecting an external device updated (see the section "Connection of an external device to the main board", on page 654) Filter clasp information added for the fan kits for 2 and 5 PCI system units Safety guidelines revised (EBG information).

Table 1: Manual history (cont.)

Version	Date	Change
1.70	08.03.2006	- Environmental temperature adjustments for systems with 815E and 855GME CPU boards (temperature limits for slide-in DVD-R/RW and 24-hour hard disk).  - Firmware upgrade information updated (see the section "Firmware upgrade", on page 453).  - Intel 815E CPU boards (5PC600 E815-0x) cancelled.  - BIOS function "Max CPU frequency" described.  - Description of the SDL timing for communication between display unit and MTCX added (see the section "SDL timing", page 656).  - APC620 with 5 PCI slots with orange front cover (previously light gray) - photos modified Information about changing the battery revised (see the section "Changing the battery", on page 609).  - Pin assignments for the monitor / panel plug and the optional AP Link plug-in card added Important information added for installation of the touch screen driver (located under Software - Touch screen driver installation).  - 1 GB flash drive (SMMUSB.1024-00) added (128 MB - 5MMUSB.0128-00 cancelled).  - Silicon Systems CompactFlash cards 5CFCRD.xxxx-03 updated (see the section "USB flash drive SMMUSB.0xxx-00", on page 564).  - Serial number sticker information updated (see the section "Serial number sticker", on page 119) Extended technical data about the PCI bus added A general device interface photo (version with 5 PCI slots) added (see the section "Device interfaces", on page 90) Information about the minimum ambient temperature added (component-dependent) Block diagrams of entire device for all system units with 855GME CPU boards added SDL cable with 45° plug 5CASDL.0018-01, 5CASDL.0050-01, 5CASDL.0100-01, 5CASDL.0150-01 added (see the section "SDL cable with extender 5CASD.0x00-10", on page 581) System unit support for buffering (10 ms) with Automation Runtime added (see the section "SDL cable with extender 5CASDL.0x00-10", on page 461) Explanation of terminology added in the form of a glossary (see the "Glossary" section, on page 662) "## "## "SGSME (ETX) BIOS description" section on page 453 adapted to BIOS version 1.2
1.80	21.04.2006	<ul> <li>Corrections to chapter "Standards and Certifications".</li> <li>The footnote "Depending on the process or batch, there may be visual deviations in the color and surface structure." was added for housing and color specifications.</li> <li>PCI RAID hard disk 5ACPCI.RAIS-01 (60 GB) added.</li> <li>Information regarding the new 512 MB and 1 GB SanDisk Cruzer Micro flash drives added.</li> <li>Temperature specifications for the PCI RAID hard disk 5ACPCI.RAIS-00 added.</li> <li>HMI Drivers &amp; Utilities DVD 5SWHMI.0000-00 added.</li> </ul>

Table 1: Manual history (cont.)

Version	Date	Change
1.90	29.08.2006	- Corrections to chapter "Standards and Certifications" - section "Emission requirements" - standards were listed twice.  - The manual history has been corrected.  - Vibration values were switched for 'continuous' and 'occasional' operation.  - "Cable connections" section on page 223 (flex radius) updated.  - Name change for CompactFlash short text.  - Name change of chapter "Installation" to "Commissioning".  - Restructuring of section "Automation Panel 900 - connection examples" - it is now located in chapter "Commissioning".  - BIOS postcode messages added.  - USB Media Drive 5MD900.USB2-00 added.  - New technical data added for slide-in drive 5AC600.DVRS-00 revision D0 and later.  - New image for PCI routing.  - List of delivery contents removed for some components (e.g. cable).  - Vibration and shock values changed for the PCI RAID controller hard discs.
2.00	13.12.2006	<ul> <li>New configuration diagrams for Automation Panel 900 connection examples (USB information added).</li> <li>Panel locking time information modified.</li> <li>New model number for the APC620 documentation MAAPC620-ENG</li> <li>Nominal current specification for 1, 2 and 5 PCI systems added.</li> <li>Font symbol assigned to the character format symbol.</li> <li>Description of the BIOS function "Legacy USB Support" updated.</li> <li>Information about Ethernet cable length support for ETH1 added.</li> <li>Name modifications SDLT FPGA: from "Firmware on the AP Link SDL transceiver" to "SDLT FPGA Firmware on the AP Link SDL transmitter".</li> <li>SDLR FPGA: from "Firmware on the AP Link SDL receiver" to "Firmware on the AP Link SDL receiver and transceiver"</li> <li>USB Memory Stick 2 GB SanDisk 5MMUSB.2048-00 added.</li> <li>PCI SATA RAID controller 5ACPCI.RAIC-01 added (adjustment made to the ambient temperature determination with 855GME boards).</li> <li>Add-on hard disk 40 GB ET, 24x7 - 5AC600.HDDI-05 added (adjustment made to the ambient temperature determination with 855GME boards).</li> <li>Slide-in hard disk 40 GB ET, 24x7 - 5AC600.HDDS-02 added (adjustment made to the ambient temperature determination with 855GME boards).</li> </ul>
2.10	23.01.2007	<ul> <li>New dimension diagram for the APC620 1 PCI variant with add-on UPS module (see the section 6 "APC620 1 PCI slot variant dimensions", on page 52) updated.</li> <li>New dimension diagram for the APC620 2 PCI variant with add-on UPS module (see the section 9 "APC620 2 PCI slot variant dimensions", on page 57) updated.</li> <li>New dimension diagram for the APC620 5 PCI variant with add-on UPS module (see the section 15 "APC620 5 PCI slot variant dimensions", on page 67) updated.</li> <li>SDL cable flex 5CASDL.0xxx-03 added (see section "SDL cable flex 5CASDL.0xxx-03", on page 584).</li> <li>SDL cable flex with extender 5CASDL.0xxx-13 added (see the section "SDL cable with extender 5CASDL.0x00-13", on page 588).</li> <li>8 GB CompactFlash card 5CFCRD.8192-03 added.</li> <li>5A5003.03 front cover description added to the 5MD900.USB2-00 and 5M900.USB2-01 product descriptions.</li> <li>Document now includes the chm tag "Filename".</li> <li>New Windows CE 5.0 model numbers added.</li> <li>APC620 UPS model numbers added (UPS module, battery, cable).</li> <li>APC620 overview images updated (with slot for UPS add-on module).</li> <li>Descriptions of interfaces updated to include slot for add-on UPS module (see "Add-on UPS module slot", on page 106).</li> <li>SATA RAID description updated (new image + new footnote for vibration and shock data (performance problems) + known limitations).</li> <li>Figure "Selection guide - Optional components", on page 46 updated.</li> </ul>

Table 1: Manual history (cont.)

Version	Date	Change
2.10	22.01.2007	- Graphics in the section "Power management for APC620 systems 1 and 2 PCI slots", on page 76 and "Power management for APC620 systems 5 PCI slots", on page 83 updated (add-on UPS module).  - Status LED description on page 109 updated (battery operation).  - Section "Firmware upgrade", on page 453 updated (new APC620 / Panel PC Firmware upgrade V1.16).  - Section "B&R Automation Device Interface (ADI) driver - Control Center" moved from "Appendix A" to chapter 4 "Software" (see page 486).  - Configuration of UPS with B&R Control Center added (see the "UPS configuration" section on page 488).
2.20	12.02.2007	- Figure "ADI Control Center UPS settings", on page 488 updated.
2.30	10.09.2007	USB Memory Sticks 256 MB (5MMUSB.0256-00) and 1 GB (5MMUSB.1024-00) cancelled.  UPS module + accessories short descriptions changed (page 40).  Description of UPS configuration revised beginning on page 540.  Section "SDL flex cable - test description" on page 569 expanded (cable drag chain and torsion test).  Section "USB Flash Drive 5MMUSB.0xxx-00" on page 616 updated.  General in section "Automation PC 620 with Automation Runtlime" on page 511 expanded.  Section "Automation Panel 900 connection examples" changed to "Connection examples" and expanded to include Automation Panel 800 connection examples section "Grounding concept" on page 267 added  Section "Configuration of a SATA RAID array" on page 313 added  Section "Configuration of a SATA RAID array" on page 313 added  Section "Automation Device Interface (ADI) driver - Control Center" on page 537 updated (screenshots, UL compliant operation)  Section "Automation Device Interface (ADI) driver - Control Center" on page 537 updated (screenshots, UL compliant operation)  Section "Automation Device Interface (ADI) driver - Control Center" on page 537 updated (screenshots, UL compliant operation)  Section "Automation Device Interface (ADI) driver - Control Center" on page 537 updated (screenshots, UL compliant operation)  Section "Automation Pose 300 expanded (secription, technical data, temperature lifespan diagram up in 20% battery capacity, deep discharge cycles added)  New model numbers for Windows CE and Windows XPE expanded.  Section "Automation Pc 620 with Windows XPE expanded.  Section "Automation Pc 620 with Windows XPE expanded.  Fan kit 5PC600.FA03-00 expanded.  Fan kit 5PC600.FA03-00 expanded.  Replacement fan fillers 5AC600.FA01-00, 5AC600.FA02-00, 5AC600.FA03-00, 5AC600.FA05-00 (see section "Replacement fan filler" on page 662) expanded.  Maintenance interval information for the UPS battery (5AC600.UPSB-00) expanded.  Satomatic Pub Board SPC600.E85-05 (1 GHz Celeron) L2 cache entry changed from 1MB to 512 kB.  Standard Full-size PCI card size exp

Table 1: Manual history (cont.)

Version	Date	Change
2.40	25.02.2008	- CAN interface description added Ethernet interface description added Description of the "Advanced USB Configuration USB" for 855GME (XTX) changed Replacement SATA RAID HDD 5PCPCI.RAIC-02 (see section "Replacement SATA HDD 60 GB-5ACPCI.RAIC-02" on page 223) + instructions for exchanging added 855GME (XTX) BIOS description adjusted to the BIOS version 1.16 Vibration and shock data for the complete devices revised Possible upgrade problems and version dependencies updated (see page 506) DVI / SDL cable descriptions revised Color specifications of the orange front doors changed from Pantone 151CV to Pantone 144CV Additions to the address and data register for the CAN add-on interface option (5AC600.CANI-00) - Section "Power management for APC620 system units" revised "SRAM module - 5AC600.SRAM-00" on page 663 description updated Information about voltage and temperature indicators in BIOS Setup and ADI Control Center pages added Text change from "Compact Flash" to "CompactFlash" Automation PC 620 embedded devices 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02 added - Section "Heat sink" on page 169 revised Block diagram with system unit 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02 added Section "Compatibility improvement from 855GME (XTX) to 855GME (ETX)" on page 321 added - Add-on hard disk 5AC600.HDDI-06 added (see section "Add-on hard disk 80 GB 24x7 ET - 5AC600.HDDI-06" on page 180) Technical data for the hard disk 5AC600.HDDI-05 updated due to Revision D0 Technical data for the hard disk 5AC600.HDDI-05 updated due to Revision D0 Technical data for the hard disk 5AC600.HDDI-05 updated due to Revision D0 Technical data for the hard disk 5AC600.HDDI-05 updated due to Revision D0 Technical data for the hard disk 5AC600.HDDI-05 updated due to Revision D0 Technical data for the hard disk 5AC600.HDDI-05 updated due to Revision D0 Technical data for the hard disk 5AC600.HDDI-05 updated due to Revision D0 Technical data for the hard disk 5AC

Table 1: Manual history (cont.)

# 2. Safety guidelines

#### 2.1 Intended use

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

#### 2.2 Protection against electrostatic discharges

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

#### 2.2.1 Packaging

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

#### 2.2.2 Guidelines for proper ESD handling

#### **Electrical components with housing**

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

#### **Electrical components without housing**

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

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

#### General information • Safety guidelines

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

#### **Individual components**

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

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

#### 2.3 Policy and procedures

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

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

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

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

#### 2.4 Transport and storage

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

#### 2.5 Installation

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

#### 2.6 Operation

#### 2.6.1 Protection against touching electrical parts

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

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

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

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

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

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

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

#### General information • Safety guidelines

#### 2.6.3 Programs, viruses and dangerous programs

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

# 3. Organization of safety notices

The safety notices in this manual are organized as follows:

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

Table 2: Organization of safety notices

# 4. Guidelines



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

# 5. Model numbers

## 5.1 System units

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

Table 3: Model numbers - System units

- 1) Slot only available on system units with revision H0 or later.
- 2) Slot only available on system units with revision G0 or later.
- 3) Slot only available on system units with revision  ${\sf F0}$  or later.

# **5.2 CPU boards 815E (ETX)**

Model number	Short description	Comment
5PC600.E815-00	CPU board 815E C3-400 CPU Board Intel Celeron 3, 400 MHz, 100 MHz FSB, 256 kB L2 Cache, Chipset 815E; 1 socket for SO-DIMM SDRAM module.	
5PC600.E815-02	CPU board 815E C3-733 CPU Board Intel Celeron 3, 733 MHz, 133 MHz FSB, 256 kB L2 Cache, Chipset 815E; 1 socket for SO-DIMM SDRAM module.	Cancelled since 10/2005 Replaced by 855GME (ETX / XTX) CPU boards
5PC600.E815-03	CPU board 815E C3-1000 CPU Board Intel Celeron 3, 1,000 MHz, 133 MHz FSB, 256 kB L2 Cache, Chipset 815E; 1 socket for SO-DIMM SDRAM module.	

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

# 5.3 CPU boards 855GME (ETX)

Model number	Short description	Comment
5PC600.E855-00	CPU board 855GME PM-1100 CPU Board Intel Pentium M, 1100 MHz, 400 MHz FSB, 1 MB L2 Cache; Chipset 855GME; 1 socket for SO-DIMM DDR RAM module.	
5PC600.E855-01	CPU board 855GME PM-1600 CPU Board Intel Pentium M, 1600 MHz, 400 MHz FSB, 1 MB L2 Cache; Chipset 855GME; 1 socket for SO-DIMM DDR RAM module.	
5PC600.E855-02	CPU board 855GME PM-1400 CPU Board Intel Pentium M, 1,400 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 CPU Board Intel Pentium M, 1,800 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 CPU Board Intel Celeron M, 600 MHz, 400 MHz FSB, 512 kB L2 Cache; Chipset 855GME; 1 socket for SO-DIMM DDR RAM module.	
5PC600.E855-05	CPU board 855GME CM-1000 CPU Board Intel Pentium M, 1,000 MHz, 400 MHz FSB, 512 kB L2 Cache; Chipset 855GME; 1 socket for SO-DIMM DDR RAM module.	

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

# 5.4 CPU boards 855GME (XTX)

Model number	Short description	Comment
5PC600.X855-00	CPU board 855GME PM-1100 CPU Board Intel Pentium M, 1,100 MHz, 400 MHz FSB, 1 MB L2 Cache; Chipset 855GME; 1 socket for SO-DIMM DDR RAM module.	
5PC600.X855-01	CPU board 855GME PM-1600 CPU Board Intel Pentium M, 1600 MHz, 400 MHz FSB, 1 MB L2 Cache; Chipset 855GME; 1 socket for SO-DIMM DDR RAM module.	
5PC600.X855-02	CPU board 855GME PM-1400 CPU Board Intel Pentium M, 1,400 MHz, 400 MHz FSB, 2 MB L2 Cache; Chipset 855GME; 1 socket for SO-DIMM DDR RAM module.	
5PC600.X855-03	CPU board 855GME PM-1800 CPU Board Intel Pentium M, 1,800 MHz, 400 MHz FSB, 2 MB L2 Cache; Chipset 855GME; 1 socket for SO-DIMM DDR RAM module.	
5PC600.X855-04	CPU board 855GME CM-600 CPU Board Intel Celeron M, 600 MHz, 400 MHz FSB, 512 kB L2 Cache; Chipset 855GME; 1 socket for SO-DIMM DDR RAM module.	
5PC600.X855-05	CPU board 855GME CM-1000 CPU Board Intel Pentium M, 1,000 MHz, 400 MHz FSB, 512 kB L2 Cache; Chipset 855GME; 1 socket for SO-DIMM DDR RAM module.	

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

#### 5.5 Heat sink

Model number	Short description	Comment
5AC600.HS01-00	APC620 heat sink 815E (ETX) 12.8mm For APC620 system units with Intel 815E CPU Boards (ETX) with Celeron 3 400 MHz, Celeron 3 733 MHz, Celeron 3 1000 MHz.	Cancelled since 10/2005 Replaced by heat sinks for 855GME boards (ETX / XTX)
5AC600.HS01-01	APC620 heat sink 855GME (ETX / XTX) 12.8mm For APC620 system units with Intel 855GME CPU Boards (ETX / XTX) with Celeron M 600 MHz, Celeron M 1000, Pentium M 1100 MHz, Pentium M 1400 MHz.	
5AC600.HS01-02	APC620 heat sink 855GME (ETX / XTX) 28mm for APC620 system units with Intel 855GME CPU Boards (ETX / XTX) with Pentium M 1600 MHz, Pentium M 1800 MHz.	
5AC600.HS02-01	APC620f heat sink 855GME (ETX / XTX) 12.8mm For APC620 full-size system units with Intel 855GME CPU Boards (ETX / XTX) with Celeron M 600 MHz, Celeron M 1000, Pentium M 1100 MHz, Pentium M 1400 MHz.	
5AC600.HS02-02	APC620f heat sink 855GME (ETX / XTX) 28mm for APC620 full-size system units with Intel 855GME CPU Boards (ETX / XTX) with Pentium M 1600 MHz, Pentium M 1800 MHz.	
5AC600.HS03-01	APC620 embedded heat sink (855GME XTX) 12.8 mm  Heat sink for APC620 embedded system units with Celeron® M 600 MHz (5PC600.X855-04), Celeron® M 1000 MHz (5PC600.X855-05), Pentium® M 1100 MHz (5PC600.X855-00) and Pentium® M 1400 MHz (5PC600.X855-02).	

Table 7: Model numbers - Heat sinks

# 5.6 Main memory

Model number	Short description	Comment
5MMSDR.0128-01	SO-DIMM SDRAM, 128 MB PC133 SO-DIMM SDRAM 128 MB PC133 for 815E CPU boards (ETX).	
5MMSDR.0256-01	SO-DIMM SDRAM, 256 MB PC133 SO-DIMM SDRAM 256 MB PC133 for 815E CPU boards (ETX).	Cancelled since 10/2005 Replaced by main memory for 855GME boards (ETX / XTX)
5MMSDR.0512-01	SO-DIMM SDRAM, 512 MB PC133 SO-DIMM SDRAM 512 MB PC133 for 815E CPU boards (ETX).	
5MMDDR.0256-00	SO-DIMM DDR-SDRAM 256 MB PC2700 SO-DIMM DDR-SDRAM 256 MB PC2700 for 855GME CPU boards (ETX / XTX).	
5MMDDR.0512-00	SO-DIMM DDR-SDRAM 512 MB PC2700 SO-DIMM DDR-SDRAM 512 MB PC2700 for 855GME CPU boards (ETX / XTX).	
5MMDDR.1024-00	SO-DIMM DDR-SDRAM 1,024 MB PC2700 SO-DIMM DDR-SDRAM 1,024 MB PC2700 for 855GME CPU boards (ETX / XTX).	

Table 8: Model numbers - Main memory

#### 5.7 Drives

Model number	Short description	Comment
5AC600.CFSI-00	Add-on CompactFlash slot CompactFlash slot (add-on); for installation in an APC620 or PPC700.	
5AC600.HDDI-00	Add-on hard disk 30 GB 24x7 30 GB hard disk (add-on); ideal for 24 hour operation (24x7). For installation in an APC620 or PPC700.	
5AC600.HDDI-01	Add-on hard disk 20 GB ET 20 GB hard disk (add-on), with expanded temperature range (ET). For installation in an APC620 or PPC700.	
5AC600.HDDI-05	Add-on hard disk 40 GB, 24x7, ET 40 GB hard disk (add-on); Suitable for 24 hour operation (24x7) as well as for operation in the extended temperature range (ET). For installation in an APC620 or PPC700.	
5AC600.HDDI-06	Add-on hard disk 80 GB, 24x7, ET 80 GB hard disk (add-on); Suitable for 24 hour operation (24x7) as well as for operation in the extended temperature range (ET). For installation in an APC620 or PPC700.	
5AC600.CDXS-00	Slide-in CD-ROM CD-ROM drive (slide-in); for operation in a slide-in drive slot in an APC620 or PPC700 system.	
5AC600.CFSS-00	Slide-in CF 2-slot Slide-in CompactFlash adapter for 2 CompactFlash cards (via IDE and USB 2.0)	
5AC600.DVDS-00	Slide-in DVD-ROM/CD-RW DVD-ROM/CD-RW drive (slide-in); for operation in a slide-in drive slot in an APC620 or PPC700 system.	
5AC600.DVRS-00	Slide-in DVD-R/RW, DVD+R/RW DVD-RW drive (slide-in); for operation in a drive slot in an APC620 or PPC700 system.	
5AC600.FDDS-00	Slide-in USB floppy disk drive FDD drive (slide-in); for operation in a slide-in drive slot in an APC620 or PPC700 system.	

Table 9: Model numbers - Drives

Model number	Short description	Comment
5AC600.HDDS-00	30 GB 24x7 slide-in hard disk 30 GB hard disk (slide-in); ideal for 24 hour operation (24x7). For use in a slide-in drive slot in an APC620 or PPC700 system.	
5AC600.HDDS-01	20 GB ET slide-in hard disk 20 GB hard disk (slide-in); with expanded temperature range (ET). For use in a slide-in drive slot in an APC620 or PPC700 system.	
5AC600.HDDS-02	40 GB 24x7 ET slide-in hard disk 40 GB hard disk (add-on): Suitable for 24 hour operation (24x7) as well as for operation in the extended temperature range (ET). For use in a slide-in drive slot in an APC620 or PPC700 system.	
5ACPCI.RAIC-00	PCI RAID controller ATA/100 PCI Raid controller	
5ACPCI.RAIC-01	PCI SATA RAID system 2 x 60 GB 24x7 PCI Raid controller + 2 x 60 GB SATA hard disk; ideal for 24 hour operation (24x7). Requires a free PCI slot.	
5ACPCI.RAIC-02	Replacement SATA-HDD 60 GB 1 piece Hard disk 60 GB SATA, replacement part for 5ACPCI.RAIC-01	
5ACPCI.RAIC-03	PCI SATA RAID system 2 x 160 GB 24x7, ET PCI Raid controller + 2 x 160 GB SATA hard disk; Suitable for 24 hour operation (24x7) as well as for operation in the extended temperature range (ET). Requires a free PCI slot.	
5ACPCI.RAIC-04	Replacement SATA-HDD 160 GB 1 piece Hard disk 160 GB SATA, replacement part for 5ACPCI.RAIC-03	
5ACPCI.RAIS-00	PCI RAID storage 2 x 40 GB PCI Raid hard disk 2 x 40 GB	Cancelled since 06/2006 Replaced by 5ACPCI.RAIS- 01
5ACPCI.RAIS-01	PCI RAID storage 2 x 60 GB PCI Raid hard disk 2 x 60 GB	Replacement type for 5ACPCI.RAIS-00

Table 9: Model numbers - Drives (cont.)

# 5.8 Interface options

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

Table 10: Model numbers - Interfaces

## 5.9 Fan kits

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

Table 11: Model numbers - Fan kits

Model number	Short description	Comment
5PC600.FA05-00	Fan kit 5PCI APC620 fan kit + filter clasp for system units with 5 PCI slots.	

Table 11: Model numbers - Fan kits

## 5.10 AP Link cards

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

Table 12: Model numbers - AP Link graphics adapter

### 5.11 Accessories

### 5.11.1 Batteries

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

Table 13: Model numbers - Batteries

## 5.11.2 Supply voltage connectors

Model number	Short description	Comment
0TB103.9	Plug 24V 5.08 3-pin screw clamps 24 VDC 3-pin connector, female. Screw clamp, 3.31mm²; protected against vibration by the screw flange.	
OTB103.91	Plug 24V 5.08 3-pin cage clamps 24 VDC 3-pin connector, female. cage clamps, 3.31mm²; protected against vibration by the screw flange.	

Table 14: Model numbers - Supply voltage connectors

# 5.11.3 CompactFlash cards

Model number	Short description	Comment
5CFCRD.0032-02	CompactFlash 32 MB SanDisk/A CompactFlash card with 32 MB NAND flash and IDE/ATA interface.	Cancelled since 12/2005 Replaced by 5CFCRD.0064- 03
5CFCRD.0064-02	CompactFlash 64 MB SanDisk/A CompactFlash card with 64 MB NAND flash and IDE/ATA interface.	Cancelled since 12/2005 Replaced by 5CFCRD.0064- 03
5CFCRD.0128-02	CompactFlash 128 MB SanDisk/A CompactFlash card with 128 MB NAND flash and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.0128- 03

Table 15: Model numbers - CompactFlash cards

Model number	Short description	Comment
5CFCRD.0256-02	CompactFlash 256 MB SanDisk/A CompactFlash card with 256 MB NAND flash and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.0256- 03
5CFCRD.0512-02	CompactFlash 512 MB SanDisk/A CompactFlash card with 512 MB NAND flash and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.0512- 03
5CFCRD.1024-02	CompactFlash 1024 MB SanDisk/A CompactFlash card with 1024 MB NAND flash and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.1024- 03
5CFCRD.2048-02	CompactFlash 2048 MB SanDisk/A CompactFlash card with 2048 MB NAND flash and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.2048- 03
5CFCRD.0064-03	CompactFlash 64 MB SSI CompactFlash card with 64 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.0128-03	CompactFlash 128 MB SSI CompactFlash card with 128 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.0256-03	CompactFlash 256 MB SSI CompactFlash card with 256 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.0512-03	CompactFlash 512 MB SSI CompactFlash card with 512 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.1024-03	CompactFlash 1024 MB SSI CompactFlash card with 1024 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.2048-03	CompactFlash 2048 MB SSI CompactFlash card with 2048 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.4096-03	CompactFlash 4096 MB SSI CompactFlash card with 4096 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.8192-03	CompactFlash 8192 MB SSI CompactFlash card with 8192 MB SLC NAND flash and IDE/ATA interface	

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

## 5.11.4 USB flash drives

Model number	Short description	Comment
5MMUSB.0128-00	USB flash drive 128 MB SanDisk USB 2.0 flash drive 128 MB	Cancelled since 12/2005 Replaced by 5MMUSB.2048- 00
5MMUSB.0256-00	USB flash drive 256 MB SanDisk USB 2.0 flash drive 256 MB	Cancelled since 03/2007 Replaced by 5MMUSB.2048- 00
5MMUSB.0512-00	USB flash drive 512 MB SanDisk USB 2.0 flash drive 512 MB	Cancelled since 07/2007 Replaced by 5MMUSB.2048- 00
5MMUSB.1024-00	USB flash drive 1 GB SanDisk USB 2.0 flash drive 1 GB	Cancelled since 03/2007 Replaced by 5MMUSB.2048- 00
5MMUSB.2048-00	USB flash drive 2 GB SanDisk USB 2.0 flash drive 2 GB	

Table 16: Model numbers - USB flash drives

# 5.11.5 Cables

Model number	Description	Comment
5CADVI.0018-00	DVI-D cable 1.8 m / single Single cable, DVI-D/m:DVI-D/m; length: 1.8m	
5CADVI.0050-00	DVI-D cable 5 m / single Single cable, DVI-D/m:DVI-D/m; length: 5 m	
5CADVI.0100-00	DVI-D cable 10 m / single Single cable, DVI-D/m:DVI-D/m; length: 10 m	
5CAMSC.0001-00	APC620 internal supply cable	
5CASDL.0018-00	SDL cable 1.8 m SDL cable for a fixed type of layout; length: 1.8 m	
5CASDL.0018-01	SDL cable 1.8 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 1.8 m	
5CASDL.0018-03	SDL flex cable 1.8 m SDL cable for fixed and flexible type of layout; length: 1.8 m	
5CASDL.0050-00	SDL cable 5 m SDL cable for a fixed type of layout; length: 5 m	
5CASDL.0050-01	SDL cable 5 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 5 m	
5CASDL.0050-03	5 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 5 m	
5CASDL.0100-00	SDL cable 10 m SDL cable for a fixed type of layout; length: 10 m	
5CASDL.0100-01	SDL cable 10 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 10 m	
5CASDL.0100-03	10 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 10 m	
5CASDL.0150-00	SDL cable 15 m SDL cable for a fixed type of layout; length: 15 m	
5CASDL.0150-01	SDL cable 15 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 15 m	
5CASDL.0150-03	15 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 15 m	
5CASDL.0200-00	SDL cable 20 m SDL cable for a fixed type of layout; length: 20 m	
5CASDL.0200-03	20 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 20 m	
5CASDL.0250-00	SDL cable 25 m SDL cable for a fixed type of layout; length: 25 m	
5CASDL.0250-03	25 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 25 m	
5CASDL.0300-00	SDL cable 30 m SDL cable for a fixed type of layout; length: 30 m	
5CASDL.0300-03	30 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 30 m	

Table 17: Model numbers - Cables

Model number	Description	Comment
5CASDL.0300-10	30 m SDL cable with extender SDL cable with extender for a fixed type of layout; length 30 m	Cancelled since 12/2006 Replaced by 5CASDL.0300- 13
5CASDL.0300-13	30 m SDL flex cable with extender SDL cable with extender for fixed and flexible type of layout; length: 30 m	
5CASDL.0400-10	40 m SDL cable with extender SDL cable with extender for a fixed type of layout; length 40 m	Cancelled since 12/2006 Replaced by 5CASDL.0400- 13
5CASDL.0400-13	40 m SDL flex cable with extender SDL cable with extender for fixed and flexible type of layout; length: 40 m	
5CAUSB.0018-00	USB 2.0 cable, A/m:B/m 1.8 m USB 2.0 connection cable; plug type A - type B; length 1.8 m	
5CAUSB.0050-00	USB 2.0 cable, A/m:B/m 5 m USB 2.0 connection cable; plug type A - type B; length 5 m	
9A0014.02	RS232 cable DB9/f:DB9/m 1.8 m RS232 extension cable for remote operation of a display unit with touch screen, length 1.8 m.	
9A0014.05	RS232 cable DB9/f:DB9/m 5 m RS232 extension cable for remote operation of a display unit with touch screen, length 5 m.	
9A0014.10	RS232 cable DB9/f:DB9/m 10 m RS232 extension cable for remote operation of a display unit with touch screen, length 10 m.	

Table 17: Model numbers - Cables (cont.)

### 5.11.6 UPS module + accessories

Model number	Short description	Comment
5AC600.UPSI-00	Add-on UPS module UPS module for APC620 system units 5PC600.SX01-00 (Rev. H0 and up), 5PC600.SX02-00 (Rev. G0 and up), 5PC600.SX02-01 (Rev. H0 and up), 5PC600.SX05-00 (Rev. F0 and up), 5PC600.SX05-01 (Rev. F0 and up). Order cable (5CAUPS.0005-00 or 5CAUPS.0030-00) and battery unit (5AC600.UPSB-00) separately.	
5AC600.UPSB-00	Battery unit 5 Ah UPS battery unit for the add-on UPS module	
5CAUPS.0005-00	APC620 UPS cable 0.5 m Connection cable between add-on UPS module and UPS battery unit, length 0.5 meters	
5CAUPS.0030-00	APC620 UPS cable 3 m Connection cable between add-on UPS module and UPS battery unit, length 3 meters	

Table 18: Model numbers - UPS module + accessories

### 5.11.7 Miscellaneous

Model number	Short description	Comment
5A5003.03	Front cover Front cover for the USB 2.0 Media Drive 5MD900.USB2-00.	
5AC600.ICOV-00	Interface covers Interface covers for APC620 and PPC700 devices; 5 pieces	
5AC900.1000-00	Adapter DVI-A/m to CRT DB15HD/f Adapter DVI (plug) to CRT (socket), for connecting a standard monitor to a DVI-I interface.	

Table 19: Model numbers - Other items

Model number	Short description	Comment
5AC600.SRAM-00	APC620/PPC700 SRAM module 512kB SRAM module for APC620 and PPC700 512 kB.	
5MD900.USB2-00	USB 2.0 drive DVD-ROM/CD-RW FDD CF USB USB 2.0 drive combination, consists of DVD-ROM/CD-RW, FDD, CompactFlash slot (type II), USB connection (type A front, type B back); 24 V DC.	Cancelled since 10/2006 Replacement type 5MD900.USB2-01
5MD900.USB2-01	USB 2.0 drive DVD-RW/CD-RW FDD CF USB USB 2.0 drive combination, consists of DVD-R/RW/DVD+R/RW/CD-RW, FDD, CompactFlash slot (type II), USB connection (type A front, type B back); 24 V DC.	
5AC600.FA01-00	APC620 replacement fan filter 1PCI 5 piece APC620 replacement fan filter for system unit with 1 PCI Slot (5PC600.SX01-00).	
5AC600.FA02-00	APC620 replacement fan filter 1PCI 5 piece APC620 replacement fan filter for system unit with 2 PCI slot (5PC600.SX02-00, 5PC600.SX02-01).	
5AC600.FA03-00	APC620f replacement fan filter 1PCI 5 piece APC620 replacement fan kit for system units with 3 PCI slots	
5AC600.FA05-00	APC620 replacement fan filter 1PCI 5 piece APC620 replacement fan filter for system units with 5 PCI slot (5PC600.SX02-00, 5PC600.SX02-01).	

Table 19: Model numbers - Other items (cont.)

## 5.12 Software

Model number	Short description	Comment
5SWHMI.0000-00	HMI Drivers & Utilities DVD  Contains drivers, utilities, software upgrades and user's manuals for B&R panel system products (see B&R homepage – Industrial PCs, Visualization and Operation).	
9S0000.01-010	OEM MS-DOS 6.22 German (disk) OEM MS-DOS 6.22 German disks Only delivered with a new PC.	
9S0000.01-020	OEM MS-DOS 6.22 English (disk) OEM MS-DOS 6.22 English disks Only delivered with a new PC.	
9S0000.08-010	OEM Microsoft Windows XP Professional CD, German; Only delivered with a new PC.	
9S0000.08-020	OEM Microsoft Windows XP Professional CD, English; Only delivered with a new PC.	
9S0000.09-090	OEM Microsoft Windows XP Professional Multilanguage CDs; Only delivered with a new PC.	
9S0001.19-020	OEM Microsoft Windows XP Embedded APC620 815E w/CF, English 512 MB CompactFlash card with Windows XP Embedded image for APC620 systems with a 815E CPU board. Only delivered with a new PC.	Cancelled since 10/2005
9S0001.20-020	OEM Microsoft Windows XP Embedded APC620 855GME w/CF, English 512 MB CompactFlash card with Windows XP Embedded image for APC620 systems with a 855GME CPU board. Only delivered with a new PC.	Cancelled since 10/2007 Replacement type 5SWWXP.0412-ENG
9S0001.27-020	OEM Microsoft Windows XP embedded (incl. SP2) APC620 815E w/CF, English 512 MB CompactFlash card with Windows XP Embedded image including SP2 for APC620 systems with a 815E CPU board. Only delivered with a new PC.	Cancelled since 10/2005

Table 20: Model numbers - Software

Model number	Short description	Comment
9S0001.28-020	OEM Microsoft Windows XP embedded (incl. SP2) AC620 855GME w/CF, English 512 MB CompactFlash card with Windows XP Embedded image including SP2 for APC620 systems with a 855GME CPU board. Only delivered with a new PC.	Cancelled since 10/2007 Replacement type 5SWWXP.0412-ENG
5SWWXP.0412-ENG	WinXPe FP2007 APC620 E855GME Order Microsoft Windows XP embedded English, Feature Pack 2007, for APC620 with CPU boards 5PC600.E855-00, 5PC600.E855-01, 5PC600.E855-02, 5PC600.E855-03, 5PC600.E855-04, 5PC600.E855-05; CompactFlash separately (at least 512 MB). Only delivered with a new PC.	
5SWWXP.0413-ENG <sup>1)</sup>	WinXPe FP2007 APC620 X855GME Order Microsoft Windows XP embedded English, Feature Pack 2007, for APC620 with CPU boards 5PC600.X855-00, 5PC600.X855-01, 5PC600.X855-02, 5PC600.X855-03, 5PC600.X855-04, 5PC600.X855-05; CompactFlash separately (at least 512 MB). Only delivered with a new PC.	
9S0001.29-020	WinCE5.0 Pro license OEM Microsoft Windows CE 5.0 Professional, English, license, only supplied together with a device.	Cancelled since 07/2007
9S0001.32-020	WinCE5.0 Pro APC620,PPC700 OEM Microsoft Windows CE 5.0 Professional; for APC620 and PPC700 with Intel 855GME chipset, English; preinstalled on 128 MB CompactFlash card.	Cancelled since 07/2007 Replacement type: 5SWWCE.0512-ENG
5SWWCE.0512-ENG	WinCE5.0 Pro APC620 E855GME Order Microsoft Windows CE 5.0 Professional, English, including license, for APC620 with CPU boards 5PC600.E855-00, 5PC600.E855-01, 5PC600.E855-02, 5PC600.E855-03, 5PC600.E855-04, 5PC600.E855-05; CompactFlash separately (at least 128 MB).	
5SWWCE.0513-ENG	WinCE5.0 Pro APC620 X855GME Order Microsoft Windows CE 5.0 Professional, English, including license, for APC620 with CPU boards 5PC600.X855-00, 5PC600.X855-01, 5PC600.X855-02, 5PC600.X855-03, 5PC600.X855-04, 5PC600.X855-05; CompactFlash separately (at least 128 MB).	
9S0001.34-020	WinCE5.0 ProPlus APC620,PPC700 OEM Microsoft Windows CE 5.0 Professional plus; for APC620 and PPC700 with Intel 855GME chipset, English; preinstalled on 128 MB CompactFlash card.	Cancelled since 07/2007 Replacement type: 5SWWCE.0612-ENG
9S0001.36-020	WinCE5.0 ProPlus license OEM Microsoft Windows CE 5.0 Professional plus, English, license, only supplied together with a device.	Cancelled since 07/2007
5SWWCE.0612-ENG	WinCE5.0 ProPlus APC620 E855GME Order Microsoft Windows CE 5.0 Professional Plus, English, including license, for APC620 with CPU boards 5PC600.E855-00, 5PC600.E855-01, 5PC600.E855-02, 5PC600.E855-03, 5PC600.E855-04, 5PC600.E855-05; CompactFlash separately (at least 128 MB).	
5SWWCE.0613-ENG	WinCE5.0 ProPlus APC620 X855GME Order Microsoft Windows CE 5.0 Professional Plus, English, including license, for APC620 with CPU boards 5PC600.X855-00, 5PC600.X855-01, 5PC600.X855-02, 5PC600.X855-03, 5PC600.X855-04, 5PC600.X855-05; CompactFlash separately (at least 128 MB).	

Table 20: Model numbers - Software (cont.)

<sup>1)</sup> Support for Automation PC 620 embedded system units starting with Revision D0.

# Chapter 2 • Technical data

### 1. Introduction

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

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



Figure 1: Automation PC 620 system overview

The APC620 with an Intel® Pentium® M processor and Intel® 855GME chipset is available for high-performance applications that require a powerful processor. These processors, developed specially for mobile computing, offer many advantages for industrial applications as well. They combine a high computing capacity with low power consumption. The chipset contains an integrated graphic solution which provides optimal use of memory for the system and graphics.

#### Technical data • Introduction

#### 1.1 Features

- Processors up to Pentium M 1.8 GHz (APC620 embedded only possible up to 1.4 GHz)
- CompactFlash slot (type I)
- Half-size / full-size PCI slots (PCI standard 2.2, 32-bit, PCI bus speed 33 MHz)
- AC97 sound
- USB 2.0
- 24 VDC supply voltage
- 2x Ethernet 10/100 MBit interfaces
- 2x RS232 Interface, modem compatible
- PS/2 keyboard/mouse (combined)
- · CAN interface option
- Fieldbus interfaces<sup>1)</sup> (Ethernet POWERLINK, CAN and X2X)
- RS232/422/485 interface option
- Fan-free operation<sup>2)</sup>
- BIOS
- Real-time clock, (RTC) battery-buffered
- Up to 1 GB main memory
- Connection of various display devices to the "Monitor/Panel" video output (supports RGB, DVI, and SDL - Smart Display Link - signals)
- Optional installation of add-on UPS APC620 module<sup>3)</sup>
- Optional SRAM module<sup>4)</sup> battery backed

<sup>1)</sup> Only on APC620 embedded system units.

<sup>2)</sup> Dependent on the device configuration and the ambient temperature.

Installation depends on the revision of the system unit: 5PC600.SX01-00 starting with revision H0, 5PC600.SX02-00 starting with revision G0,

<sup>5</sup>PC600.SX02-01 starting with revision H0, 5PC600.SX05-00 starting with revision F0, 5PC600.SX05-01 starting with revision F0.

<sup>4)</sup> Installation depends on the revision of the system unit: 5PC600.SX01-00 starting with revision I0, 5PC600.SX02-00 starting with revision H0,

<sup>5</sup>PC600.SX02-01 starting with revision K0, 5PC600.SX05-00 starting with revision H0, 5PC600.SX05-01 starting with revision H0.

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

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

The following components are absolutely essential for operation:

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

### 1.2.1 Selection guide - Basic system

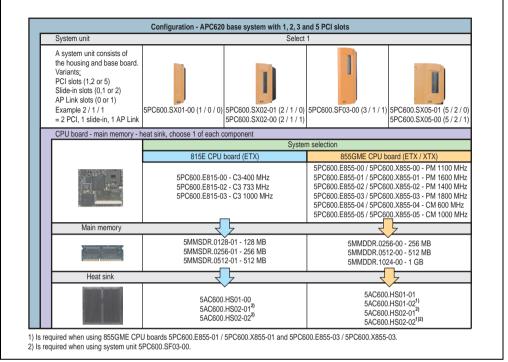


Figure 2: Selection guide - APC620 basic system with 1, 2, 3, and 5 PCI slots

### Explanation:

- 1) Select a system unit.
- 2) System selection Choose a CPU board variant (815E ETX or 855GME ETX / XTX).
- 3) Select one each of main memory and heat sink, based on selected CPU board.
- 4) Select optional components, based on selected system unit (see section 1.2.2 "Selection quide Optional components" on page 47).

## 1.2.2 Selection guide - Optional components



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

#### Technical data • Introduction

#### Information:

- Depending on the system unit, a compatible fan kit can be installed in the APC620.
  Required for certain system configurations and ambient temperatures (see also sections
  2.6 "Environmental temperatures for systems with an 815E CPU board (ETX)" on
  page 76 and 2.7 "Environmental temperatures for systems with an 855GME CPU board
  (EXT / XTX)" on page 80)
- Select optional drive(s) (add-on / slide-in), based on the system unit. One add-on drive
  can be installed in each system unit. Slide-in drives (1 or 2) are only available in certain
  system units.
- AP Link cards create a second graphics line (possibility of extended desktop or display clone operation) on the APC620. Only possible with system units 5PC600.SX02-00, 5PC600.SX05-00, 5PC600.SF03-00 and with an 855GME CPU board.
- · An optional interface adds an additional connection possibility.
- Depending on the revision of the system unit (see graphic), an optional integrated UPS add-on module can be installed.
- Depending on the revision of the system unit (see graphic), an optional integrated SRAM module (battery backed) can be installed.
- The appropriate power supply plugs ensure simple connection to the power supply.

# 1.3 Structure / configuration APC620 embedded

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

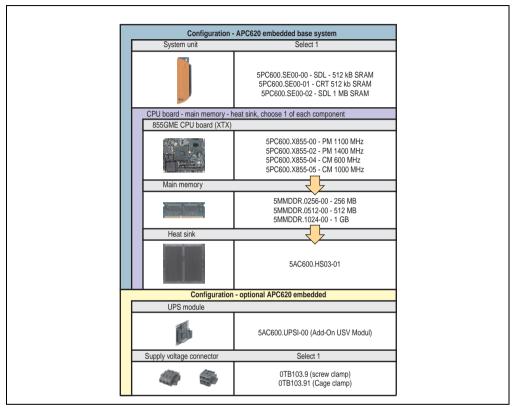


Figure 4: Selection guide - Basic system and optional components APC620 embedded

#### Explanation:

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

## 2. Entire device

## 2.1 APC620, 1 PCI slot variant

#### 2.1.1 Interfaces

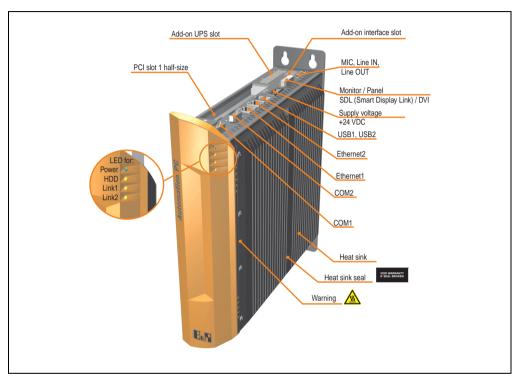


Figure 5: Interface overview - APC620, 1 PCI slot variant (top)

# Warning!

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

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

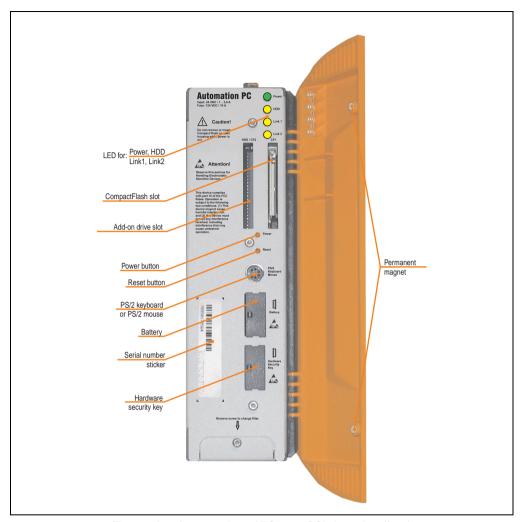


Figure 6: Interface overview - APC620, 1 PCI slot variant (front)

# Information:

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

## 2.1.2 Technical data

Features	APC620, 1 PCI slot variant
Boot loader / Operating system	BIOS / see the chapter 4 "Software" on page 323
Processor	Component-dependent, see technical data for the CPU board
Cooling Method	Passive via heat sink and optionally supported with an active fan kit
Main memory	max. 512 MB with 815E CPU board, max. 1 GB with 855GME CPU board
Graphics Controller	Component-dependent, see technical data for the CPU board
Power failure logic Controller Buffer time	MTCX <sup>1)</sup> (see also page 715) 10 ms, dependent on the system unit revision (see page 511)
Real-time clock Battery-buffered Accuracy	Yes Component-dependent, see technical data for the CPU board
Battery Type Removable Lifespan	See also page 143 Renata 950 mAh Yes, accessible behind the orange cover 4 years <sup>2) 3)</sup>
Ethernet Controller Amount	See also page 116 or page 118 2
CAN bus	optional with add-on interface option (5AC600.CANI-00)
CompactFlash Type Amount	See also page 138 or page 139 Type I 1 (max. 4 using optional components)
Serial interface Amount Type UART Transfer rate Connection	See also page 109 or page 110 2 RS232, modem-capable, not electrically isolated 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB
USB interface Type Amount Transfer rate Connection Current load	See also section "USB port" on page 119 USB 2.0 2 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s) Type A Max. 500 mA per connection
Reset button	Yes, accessible behind the orange cover
LEDs	4 directed outwards via fiber optic lines, see also section "Status LEDs" on page 136
PCI slots half-size full-size	See also section "PCI slots" on page 133 1 -
Add-on UPS internal slot	Yes 5PC600.SX01-00 starting with revision H0 See also section "Add-on UPS module slot" on page 132
SRAM internal slot options	Yes 5PC600.SX01-00 starting with revision I0

Table 21: Technical data - APC620, 1 PCI slot variant

Electrical characteristics	APC620, 1 PCI slot variant
Power supply Rated voltage Rated current Starting current Power consumption	24 VDC ±25% 3.8 A Typ. 7 A, max. 40 A for < 300 μs Component-dependent, see section 2.8 "Power management APC620 system unit with 1 PCI slot"
Mechanical characteristics	
Housing <sup>4)</sup> Material Paint Front cover	Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See section "Dimensions" on page 54.
Weight	Approx. 3.4 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Storage Transport	Component-dependent, see the section about ambient temperature on page 76 and page 80 -20°C +60°C -20°C +60°C
Relative humidity Operation Storage Transport	Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specifications" on page 106
Vibration <sup>5)</sup> Operation (continuous) Operation (occasional) Storage Transport	2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock <sup>5)</sup> Operation Storage Transport	15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Protection type	IP20
Altitude Operation	max. 3000 m <sup>6)</sup> (component-dependent)
Electromagnetic compatibility	
Emissions Network-related emissions Emissions	EN 61000-6-4, EN 55022 A EN 61000-6-4, EN 55011 class A, EN 55022 class A, EN 61131-2, 47 CFR Part 15
Immunity Electrostatic discharge (ESD) High-frequency electromagnetic fields High-speed transient disturbances (Burst) Surges Conducted values Magnetic fields with electrical frequencies	EN 61000-6-2, EN 61131-2, EN 55024 EN 61000-6-2, EN 61131-2, EN 55024
Voltage dips, interruptions  Damped vibration	

Table 21: Technical data - APC620, 1 PCI slot variant (cont.)

<sup>1)</sup> Maintenance Controller Extended.

- 2) at 50°C, 8.5 µA of the supplied components and a self discharge of 40%.
- 3) If an SRAM module (Mod.Nr. 5AC600.SRAM-00) is installed, the buffer duration is 2 1/2 years.
- 4) Depending on the process or batch, there may be visible deviations in the color and surface structure.
- 5) Maximum values, as long as no other individual component specify any other.
- 6) Derating the maximum ambient temperature typically 1°C per 1000 meters (from 500 meters above sea level).

### 2.1.3 Dimensions

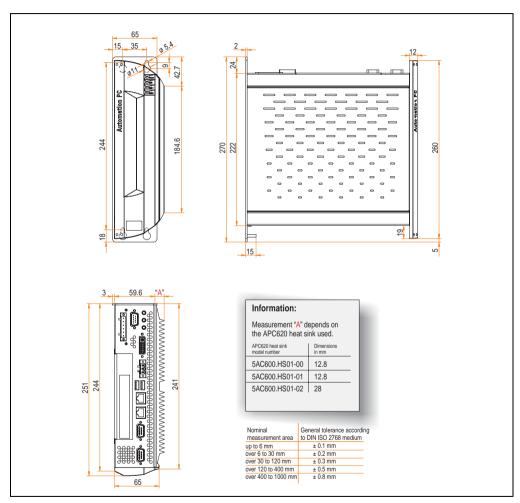


Figure 7: Dimensions - APC620, 1 PCI slot variant

## 2.2 APC620, 2 PCI slot variant

#### 2.2.1 Interfaces

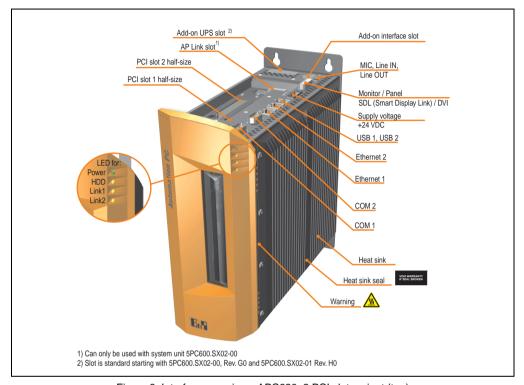


Figure 8: Interface overview - APC620, 2 PCI slot variant (top)

# Warning!

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

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

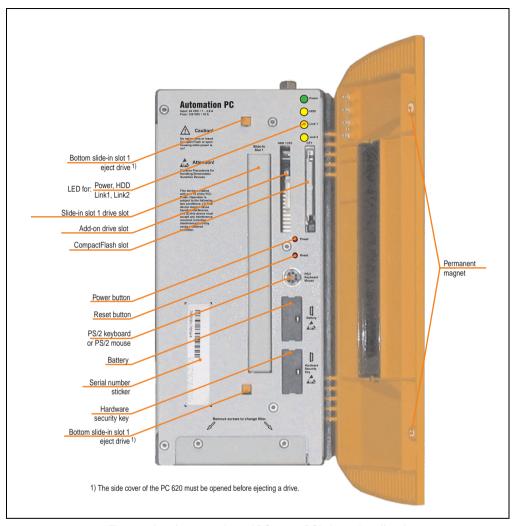


Figure 9: Interface overview - APC620, 2 PCI slot variant (front)

# Information:

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

# 2.2.2 Technical data

Features	APC620, 2 PCI slot variant
Boot loader / Operating system	BIOS / see the chapter 4 "Software" on page 323
Processor	Component-dependent, see technical data for the CPU board
Cooling Method	Passive via heat sink and optionally supported with an active fan kit
Main memory	Max. 512 MB with 815E CPU board, max. 1 GB with 855GME CPU board
Graphics Controller	Component-dependent, see technical data for the CPU board
Power failure logic Controller Buffer time	MTCX <sup>1)</sup> (see also page 715) 10 ms, dependent on the system unit revision (see page 511)
Real-time clock Battery-buffered Accuracy	Yes Component-dependent, see technical data for the CPU board
Battery Type Removable Lifespan	See also page 143 Renata 950 mAh Yes, accessible behind the orange cover 4 years <sup>2) 3)</sup>
Ethernet Controller Amount	See also page 116 or page 118
CAN bus	Optional with add-on interface (5AC600.CANI-00)
CompactFlash Type Amount	See also page 138 or page 139 Type I 2 (max. 4 using optional components)
Serial interface Amount Type UART Transfer rate Connection	See also page 109 or page 110 2 RS232, modem-capable, not electrically isolated 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB
USB interface Type Amount Transfer rate Connection Current load	See also section "USB port" on page 119 USB 2.0 2 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s) Type A Max. 500 mA per connection
Reset button	Yes, accessible behind the orange cover
LEDs	4 directed outwards via fiber optic lines, see also section "Status LEDs" on page 136
PCI slots half-size full-size	See also section "PCI slots" on page 133 2 -
Add-on UPS internal slot	Yes 5PC600.SX02-00 starting with revision G0, 5PC600.SX02-01 starting with revision H0 present See also section "Add-on UPS module slot" on page 132
SRAM internal slot options	Yes 5PC600.SX02-00 starting with revision H0, 5PC600.SX02-01 starting with revision K0 present

Table 22: Technical data - APC620, 2 PCI slot variant

Electrical characteristics	APC620, 2 PCI slot variant
Power supply Rated voltage Rated current Starting current Power consumption	24 VDC ±25% 3.8 A Typ. 7 A, max. 40 A for < 300 μs Component-dependent, see section 2.8 "Power management APC620 system unit with 1 PCI slot"
Mechanical characteristics	
Housing <sup>4)</sup> Material Paint Front cover	Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See section "Dimensions" on page 59.
Weight	Approx. 4.5 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Storage Transport	Component-dependent, see the section about ambient temperature on page 76 and page 80 -20°C +60°C -20°C +60°C
Relative humidity Operation Storage Transport	Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specifications" on page 106
Vibration <sup>5)</sup> Operation (continuous) Operation (occasional) Storage Transport	2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock <sup>5)</sup> Operation Storage Transport	15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Protection type	IP20
Altitude Operation	max. 3000 m <sup>6)</sup> (component-dependent)
Electromagnetic compatibility	
Emissions Network-related emissions Emissions	EN 61000-6-4, EN 55022 A EN 61000-6-4, EN 55011 class A, EN 55022 class A, EN 61131-2, 47 CFR Part 15
Immunity Electrostatic discharge (ESD) High-frequency electromagnetic fields High-speed transient disturbances (Burst) Surges Conducted values Magnetic fields with electrical frequencies Voltage dips, interruptions	EN 61000-6-2, EN 61131-2, EN 55024 EN 61000-6-2, EN 61131-2, EN 55024
Damped vibration	EN 61000-6-2, EN 61131-2, EN 55024

Table 22: Technical data - APC620, 2 PCI slot variant (cont.)

<sup>1)</sup> Maintenance Controller Extended.

- 2) at 50°C, 8.5 µA of the supplied components and a self discharge of 40%.
- 3) If an SRAM module (Mod.Nr. 5AC600.SRAM-00) is installed, the buffer duration is 2 1/2 years.
- 4) Depending on the process or batch, there may be visible deviations in the color and surface structure.
- 5) Maximum values, as long as no other individual component specify any other.
- 6) Derating the maximum ambient temperature typically 1°C per 1000 meters (from 500 meters above sea level).

### 2.2.3 Dimensions

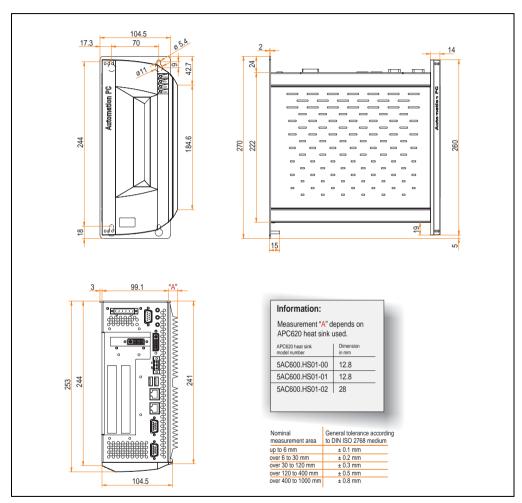


Figure 10: Dimensions - APC620, 2 PCI slot variant

### 2.3 APC620, 3 PCI slot variant

#### 2.3.1 Interfaces

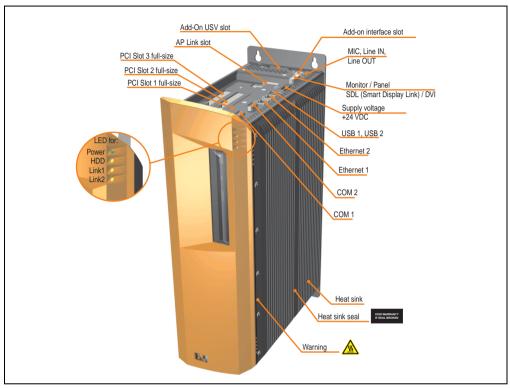


Figure 11: Interface overview - APC620, 3 PCI slot variant (top)

# Warning!

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

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



Figure 12: Interface overview - APC620, 3 PCI slot variant (front)

# Information:

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

## 2.3.2 Technical data

Features	APC620, 3 PCI slot variant
Boot loader / Operating system	BIOS / see the chapter 4 "Software" on page 323
Processor Cooling	Component-dependent, see technical data for the CPU board
Method	Passive via heat sink and optionally supported with an active fan kit
Main memory	Max. 1 GB with 855GME CPU board
Graphics Controller	Component-dependent, see technical data for the CPU board
Power failure logic Controller Buffer time	MTCX <sup>1)</sup> (see also page 715) 10 ms, dependent on the system unit revision (see page 511)
Real-time clock Battery-buffered Accuracy	Yes Component-dependent, see technical data for the CPU board
Battery Type Removable Lifespan	See also page 143 Renata 950 mAh Yes, accessible behind the orange cover 4 years <sup>2) 3)</sup>
Ethernet Controller Amount	See also page 116 or page 118
CAN bus	Optional with add-on interface (5AC600.CANI-00)
CompactFlash Type Amount	See also page 139 Type I 2 (max. 4 using optional components)
Serial interface Amount Type UART Transfer rate Connection	See also page 109 or page 110 2 RS232, modem-capable, not electrically isolated 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB
USB interface Type Amount Transfer rate Connection Current load	See also section "USB port" on page 119 USB 2.0 2 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s) Type A Max. 500 mA per connection
Reset button	Yes, accessible behind the orange cover
LEDs	4 directed outwards via fiber optic lines, see also section "Status LEDs" on page 136
PCI slots half-size full-size	See also section "PCI slots" on page 133 - 3
Add-on UPS internal slot	Yes See also section "Add-on UPS module slot" on page 132
SRAM internal slot options	Yes

Table 23: Technical data - APC620, 3 PCI slot variant

Power supply Rated voltage Rated current Starting current Power consumption  Mechanical characteristics  Housing <sup>0</sup> Material Paint Front cover  Outer dimensions  See section "Dimensions" on page 64.  Weight  Approx. 4.5 kg (component-dependent)  Environmental characteristics  Component-dependent, see section "Dimensions" on page 64.  Weight  Approx. 4.5 kg (component-dependent)  Environmental characteristics  Component-dependent, see the section about ambient temperature on page 80  Storage Transport  Component-dependent, see section "Humidity specifications" on page 106  Storage Transport  Operation Operation (continuous) Operation (coxasional) Storage 1 Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section	Electrical characteristics	APC620, 3 PCI slot variant
Housing <sup>6)</sup> Material Paint Point Cover  Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)  Meight  Approx. 4.5 kg (component-dependent)  Environmental characteristics  Ambient temperature Operation Storage Transport  Component-dependent, see the section about ambient temperature on page 80 Storage Transport  Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specifications" on page 106 Storage Component-dependent, see section "Humidity specifications" on page 106 Transport  Vibration (Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specifications" on page 106 Vibration (Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specifications" on page 106 Component-dependent (9 - 200 Hz. 2 g) 200 Hz. 2 g Component (9 - 200 Hz. 2 g) 200 Hz. 2 g Component (9 - 200 Hz. 2 g) 200 Hz. 2 g Component (9 - 200 Hz. 2 g) 200 Hz. 2 g Component (9 - 200 Hz. 2 g) 200 Hz. 2 g Component (9 - 200 Hz. 2 g) 200 Hz. 2 g Component (9 - 200 Hz. 2 g) 200 Hz. 2 g Component (9 - 200 Hz. 2 g) 200 Hz. 2 g Component (9 - 200 Hz. 2 g) 200 Hz. 2 g Component (9 - 200 Hz. 2 g) 200 Hz. 2 g Component (9 - 200 Hz. 2 g) 200 Hz. 2 g Component (9 - 200 Hz. 2 g) 200 Hz. 2 g Component (9 - 200 Hz. 2 g) 200 Hz. 2 g Component (9 - 200 Hz. 2 g) 200 Hz. 2 g Component (9 - 200 Hz. 2 g)	Rated voltage Rated current Starting current	5 A Typ. 10 A, max. 40 A for < 300 μs
Maidrial Paint Pai	Mechanical characteristics	
Weight Approx. 4.5 kg (component-dependent)  Environmental characteristics  Ambient temperature Operation Storage Transport  Relative humidity Operation Storage Transport  Component-dependent, see the section about ambient temperature on page 80 Storage Transport  Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specifications" on page 106  Vibration" Operation (continuous) Operation (cocasional) Storage Transport  2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 7.5 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 7.5 mm amplitude / 9 - 200 Hz: 0.5 g 3 - 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g  Shocks Operation Storage Transport  15 g, 11 ms Storage Transport  16 ms. 300 g, 15 ms Transport  Electromagnetic compatibility  Emissions Network-related emissions Environamental discharge (ESD) High-frequency electromagnetic fields High-speed transient disturbances (Burst) Surges En 61000-6-2, EN 61131-2, EN 55024 EN 61000-6-2, EN 61131-2	Material Paint	Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV)
Environmental characteristics  Ambient temperature Operation Storage Transport  Relative humidity Operation Storage Transport  Component-dependent, see the section about ambient temperature on page 80 Storage Transport  Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specific	Outer dimensions	See section "Dimensions" on page 64.
Ambient temperature Operation Storage Transport  Relative humidity Operation Storage Transport  Component-dependent, see the section about ambient temperature on page 80 Storage Transport  Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specifications" on page 106 Transport  Vibration* Operation (continuous) Operation (occasional) Storage Transport  2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g Operation (occasional) Storage Transport  2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g Transport  Shock* Operation Storage Transport  Transport  Transport  Protection type  IP20  Altitude Operation Storage Transport  Electromagnetic compatibility  Emissions Network-related emissions Emissions Network-related emissions Emissions Network-related emissions Emissions  End 61000-6-4, EN 55012 class A, EN 55022 class A, EN 61131-2, EN 55024 High-frequency electromagnetic fields High-speed transient disturbances (Burst) Surges Conducted values Magnetic fields with electrical frequencies Voltage dips, interruptions Damped vibration	Weight	Approx. 4.5 kg (component-dependent)
Operation Storage Transport Component-dependent, see the section about ambient temperature on page 80 Storage Transport -20°C+60°C Transport -20°C+60°C Transport -20°C+60°C Transport Component-dependent, see section "Humidity specifications" on page 106 Storage Component-dependent, see section "Humidity specifications" on page 106 Transport Transport Transport Component-dependent, see section "Humidity specifications" on page 106 Transport	Environmental characteristics	
Operation Storage Component-dependent, see section "Humidity specifications" on page 106 Component-dependent specifications" on page 106 Component-dependent specifications on page 106 Co	Operation Storage	-20°C +60°C
Operation (continuous)	Operation Storage	Component-dependent, see section "Humidity specifications" on page 106
Operation Storage Transport         15 g, 11 ms 30 g, 15 ms           Protection type         IP20           Altitude Operation         max. 3000 m <sup>6)</sup> (component-dependent)           Electromagnetic compatibility         Emissions Network-related emissions Emissions           Emissions Network-related emissions Emissions         EN 61000-6-4, EN 55022 A EN 61000-6-4, EN 55022 class A, EN 61131-2, 47 CFR Part 15           Immunity Electrostatic discharge (ESD) High-frequency electromagnetic fields High-speed transient disturbances (Burst) Surges Conducted values Magnetic fields with electrical frequencies Voltage dips, interruptions Damped vibration         EN 61000-6-2, EN 61131-2, EN 55024 EN 61000-6-2, EN 61131-2, EN 55024 EN 61000-6-2, EN 61131-2, EN 55024	Operation (continuous) Operation (occasional) Storage	2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Altitude Operation  max. 3000 m <sup>6)</sup> (component-dependent)  Electromagnetic compatibility  Emissions Network-related emissions Emissions En 61000-6-4, EN 55022 A Emissions En 61000-6-4, EN 55022 class A, EN 61131-2, 47 CFR Part 15  Immunity Electrostatic discharge (ESD) High-frequency electromagnetic fields High-speed transient disturbances (Burst) Surges Conducted values Magnetic fields with electrical frequencies Voltage dips, interruptions Damped vibration  max. 3000 m <sup>6)</sup> (component-dependent)  EN 61000-6-4, EN 55022 A  EN 61000-6-4, EN 55022 class A, EN 61131-2, 47 CFR Part 15  EN 61000-6-2, EN 61131-2, EN 55024	Operation Storage	30 g, 15 ms
Operation         max. 3000 m <sup>6)</sup> (component-dependent)           Electromagnetic compatibility         Emissions           Emissions Network-related emissions Emissions         EN 61000-6-4, EN 55022 A EN 61100-6-4, EN 55022 class A, EN 61131-2, 47 CFR Part 15           Immunity Electrostatic discharge (ESD) High-frequency electromagnetic fields High-speed transient disturbances (Burst)         EN 61000-6-2, EN 61131-2, EN 55024 EN 61	Protection type	IP20
Emissions Network-related emissions Emissions Network-related emissions Emissions EN 61000-6-4, EN 55012 A EN 61000-6-4, EN 55022 class A, EN 61131-2, 47 CFR Part 15  Immunity Electrostatic discharge (ESD) High-frequency electromagnetic fields High-speed transient disturbances (Burst) Surges EN 61000-6-2, EN 61131-2, EN 55024		max. 3000 m <sup>6)</sup> (component-dependent)
Network-related emissions   EN 61000-6-4, EN 55022 A	Electromagnetic compatibility	
Electrostatic discharge (ESD) High-frequency electromagnetic fields High-speed transient disturbances (Burst) Surges Conducted values Magnetic fields with electrical frequencies Voltage dips, interruptions Damped vibration  EN 61000-6-2, EN 61131-2, EN 55024	Network-related emissions	
	Electrostatic discharge (ESD) High-frequency electromagnetic fields High-speed transient disturbances (Burst) Surges Conducted values Magnetic fields with electrical frequencies Voltage dips, interruptions	EN 61000-6-2, EN 61131-2, EN 55024  EN 61000-6-2, EN 61131-2, EN 55024
EN 61000-6-2, EN 61131-2, EN 55024	Damped vibration	EN 61000-6-2, EN 61131-2, EN 55024

Table 23: Technical data - APC620, 3 PCI slot variant (cont.)

<sup>1)</sup> Maintenance Controller Extended.

- 2) at 50°C, 8.5 µA of the supplied components and a self discharge of 40%.
- 3) If an SRAM module (Mod.Nr. 5AC600.SRAM-00) is installed, the buffer duration is 2 1/2 years.
- 4) Depending on the process or batch, there may be visible deviations in the color and surface structure.
- 5) Maximum values, as long as no other individual component specifies any other.
- 6) Derating the maximum ambient temperature typically 1°C per 1000 meters (from 500 meters above sea level).

### 2.3.3 Dimensions

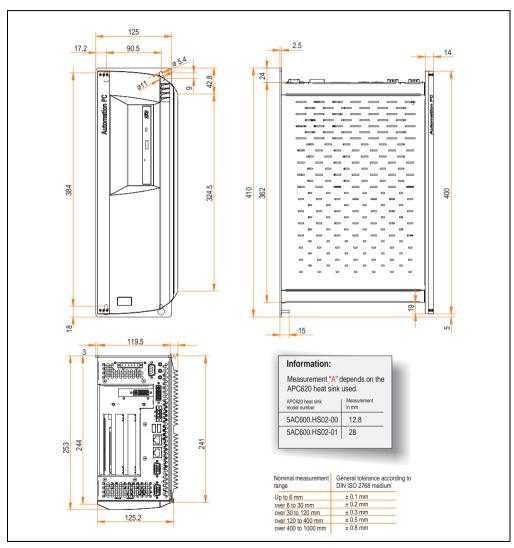


Figure 13: Dimensions - APC620, 3 PCI slot variant

## 2.4 APC620, 5 PCI slot variant

#### 2.4.1 Interfaces

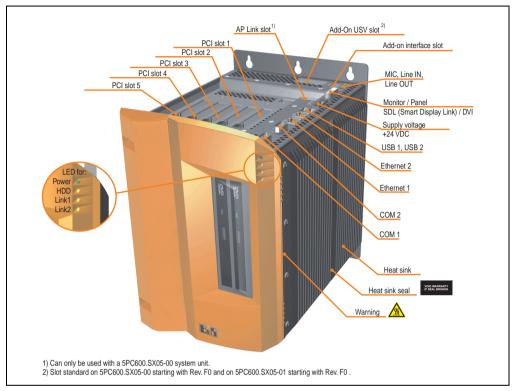


Figure 14: Interface overview - APC620, 5 PCI slot variant (top)

# Warning!

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

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

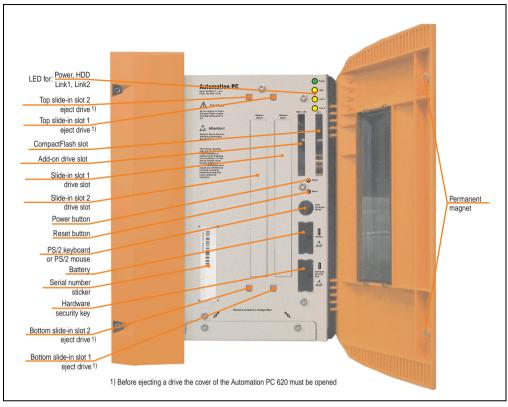


Figure 15: Interface overview - APC620, 5 PCI slot variant (front)

# Information:

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

# 2.4.2 Technical data

Features	APC620, 5 PCI slot variant
Boot loader / Operating system	BIOS / see the chapter 4 "Software" on page 323
Processor	Component-dependent, see technical data for the CPU board
Cooling Method	Passive via heat sink and optionally supported with an active fan kit
Main memory	Max. 512 MB with 815E CPU board, max. 1 GB with 855GME CPU board
Graphics Controller	Component-dependent, see technical data for the CPU board
Power failure logic Controller Buffer time	MTCX <sup>1)</sup> (see also page 715) 10 ms, dependent on the system unit revision (see page 511)
Real-time clock Battery-buffered Accuracy	Yes Component-dependent, see technical data for the CPU board
Battery Type Removable Lifespan	See also page 143 Renata 950 mAh Yes, accessible behind the orange cover 4 years <sup>2) 3)</sup>
Ethernet Controller Amount	See also page 116 or page 118
CAN bus	Optional with add-on interface (5AC600.CANI-00)
CompactFlash Type Amount	See also page 139 Type I 2 (max. 4 using optional components)
Serial interface Amount Type UART Transfer rate Connection	See also page 109 or page 110 2 RS232, modem-capable, not electrically isolated 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB
USB interface Type Amount Transfer rate Connection Current load	See also section "USB port" on page 119  USB 2.0 2  Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)  Type A  Max. 500 mA per connection
Reset button	Yes, accessible behind the orange cover
LEDs	4 directed outwards via fiber optic lines, see also section "Status LEDs" on page 136
PCI slots half-size full-size	See also section "PCI slots" on page 133 5 -
Add-on UPS internal slot	Yes 5PC600.SX05-00 starting with revision F0, 5PC600.SX05-01 starting with revision F0 present See also section "Add-on UPS module slot" on page 132
SRAM internal slot options	Yes 5PC600.SX05-00 starting with revision H0, 5PC600.SX05-01 starting with revision H0 present

Table 24: Technical data - APC620, 5 PCI slot variant

Electrical characteristics	APC620, 5 PCI slot variant
Power supply Rated voltage Rated current Starting current Power consumption	24 VDC ±25% 5 A Typ. 10 A, max. 40 A for < 300 μs Component-dependent, see section 2.11 "Power management APC620 system units with 5 PCI slots"
Mechanical characteristics	
Housing <sup>4)</sup> Material Paint Front cover	Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See section "Dimensions" on page 69.
Weight	Approx. 5.7 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Storage Transport	Component-dependent, see the section about ambient temperature on page 76 and page 80 -20°C +60°C -20°C +60°C
Relative humidity Operation Storage Transport	Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specifications" on page 106
Vibration <sup>5)</sup> Operation (continuous) Operation (occasional) Storage Transport	2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock <sup>5)</sup> Operation Storage Transport	15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Protection type	IP20
Altitude Operation	max. 3000 m <sup>6)</sup> (component-dependent)
Electromagnetic compatibility	
Emissions Network-related emissions Emissions	EN 61000-6-4, EN 55022 A EN 61000-6-4, EN 55011 class A, EN 55022 class A, EN 61131-2, 47 CFR Part 15
Immunity Electrostatic discharge (ESD) High-frequency electromagnetic fields High-speed transient disturbances (Burst) Surges Conducted values Magnetic fields with electrical frequencies Voltage dips, interruptions	EN 61000-6-2, EN 61131-2, EN 55024 EN 61000-6-2, EN 61131-2, EN 55024
Damped vibration	EN 61000-6-2, EN 61131-2, EN 55024

Table 24: Technical data - APC620, 5 PCI slot variant (cont.)

<sup>1)</sup> Maintenance Controller Extended.

- 2) at 50°C, 8.5 µA of the supplied components and a self discharge of 40%.
- 3) If an SRAM module (Mod.Nr. 5AC600.SRAM-00) is installed, the buffer duration is 2 1/2 years.
- 4) Depending on the process or batch, there may be visible deviations in the color and surface structure.
- 5) Maximum values, as long as no other individual component specify any other.
- 6) Derating the maximum ambient temperature typically 1°C per 1000 meters (from 500 meters above sea level).

### 2.4.3 Dimensions

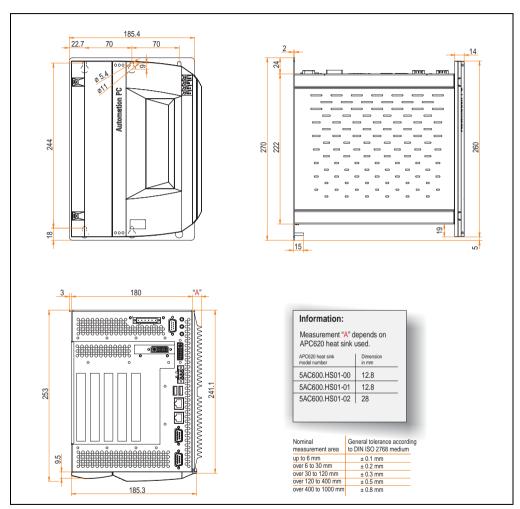


Figure 16: Dimensions - APC620, 5 PCI slot variant

### 2.5 APC620 embedded variant

#### 2.5.1 Interfaces

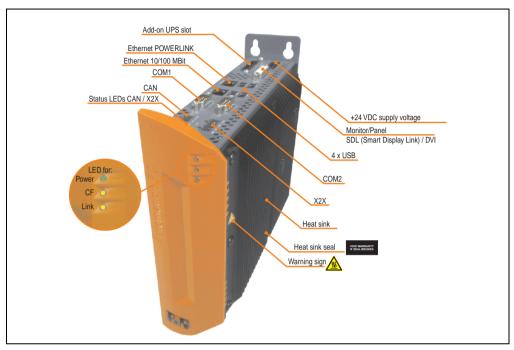


Figure 17: APC620 embedded variant interface overview - top side

# Warning!

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

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

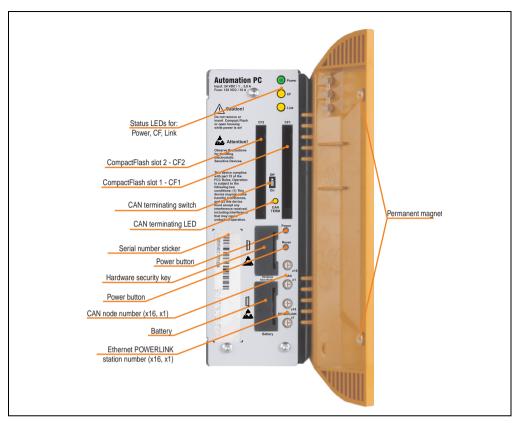


Figure 18: APC620 embedded variant interface overview - front side

# Information:

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

## 2.5.2 Technical data

Features	APC620 embedded variant
Boot loader / Operating system	BIOS / see the chapter 4 "Software" on page 323
Processor	Component-dependent, see technical data for the CPU board
Cooling Method	Passive via heat sink
Main memory	Max. 1 GB with 855GME CPU board
Graphics Controller	Component-dependent, see technical data for the CPU board on page 167
Power failure logic Controller Buffer time	MTCX <sup>1)</sup> (see also page 715) 10 ms, dependent on the system unit revision (see page 511)
Real-time clock Battery-buffered Accuracy	Yes Component-dependent, see technical data for the 855GME (XTX) CPU board
Battery Type Removable Lifespan	See also page 143 Renata 950 mAh Yes, accessible behind the orange cover 2 1/2 years <sup>2)</sup>
Ethernet Controller Amount	Yes See also page 115 1
Ethernet POWERLINK Amount Station number switches	Yes, also see page 113 1 2 pcs.
X2X Link Amount	Yes, also see page 111
Status LED	Yes, see page 113
CAN bus Amount Transfer rate Node switch Terminating resistor Status LED	See also page 111 1 Max. 500 kBit/s Yes Yes, can be activated using a switch Yes, see page 113
CompactFlash Type Amount	See also page 140 Type I 2
Serial interface Amount Type UART Transfer rate Connection	See also page 109 or page 110 2 RS232, modem-capable, not electrically isolated 16550-compatible, 16-byte FIFO Max. 115 kBaud 9-pin DSUB
USB interface Type Amount Transfer rate Connection Current load	See also page 120 USB 2.0 4 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s) Type A Max. 500 mA or 1 A per connection
Reset button	Yes, accessible behind the orange cover

Table 25: Technical data - APC620 embedded variant

Features	APC620 embedded variant
LEDs	3 directed outwards via fiber optic lines, see also section "Status LEDs Power, CF, Link (only APC620 embedded)" on page 137
Add-on UPS slot	Yes
Electrical characteristics	
Power supply Rated voltage Rated current Starting current Power consumption	$$24\ VDC\pm25\%$$ $$3.8\ A$$ Typ. 7 A, max. 40 A for < 300 $\mu s$ Component-dependent, see section 2.12 "Power management for the APC620 embedded system unit"
Mechanical characteristics	
Housing <sup>3)</sup> Material Paint Front cover	Galvanized plate, plastic Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored orange plastic (similar to Pantone 144CV)
Outer dimensions	See section "Dimensions" on page 75.
Weight	approx. 1.4 kg (component-dependent)
Environmental characteristics	
Ambient temperature Operation Storage Transport	Component-dependent, see the section about ambient temperature on page 80 -20°C +60°C -20°C +60°C
Relative humidity Operation Storage Transport	Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specifications" on page 106 Component-dependent, see section "Humidity specifications" on page 106
Vibration <sup>4)</sup> Operation (continuous) Operation (occasional) Storage Transport	2 - 9 Hz: 1.75 mm amplitude / 9 - 200 Hz: 0.5 g 2 - 9 Hz: 3.5 mm amplitude / 9 - 200 Hz: 1 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g 2 - 8 Hz: 7.5 mm amplitude / 8 - 200 Hz: 2 g / 200 - 500 Hz: 4 g
Shock <sup>5)</sup> Operation Storage Transport	15 g, 11 ms 30 g, 15 ms 30 g, 15 ms
Protection type	IP20
Altitude Operation	max. 3000 m <sup>5)</sup> (component-dependent)
Electromagnetic compatibility	
Emissions Network-related emissions Emissions	EN 61000-6-4, EN 55022 A EN 61000-6-4, EN 55011 class A, EN 55022 class A, EN 61131-2, 47 CFR Part 15

Table 25: Technical data - APC620 embedded variant (cont.)

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

Table 25: Technical data - APC620 embedded variant (cont.)

- 1) Maintenance Controller Extended.
- 2) at 50°C, 8.5 µA of the supplied components and a self discharge of 40%.
- 3) Depending on the process or batch, there may be visible deviations in the color and surface structure.
- 4) Maximum values, as long as no other individual component specifies any other.
- 5) Derating the maximum ambient temperature typically 1°C per 1000 meters (from 500 meters above sea level).

## 2.5.3 Dimensions

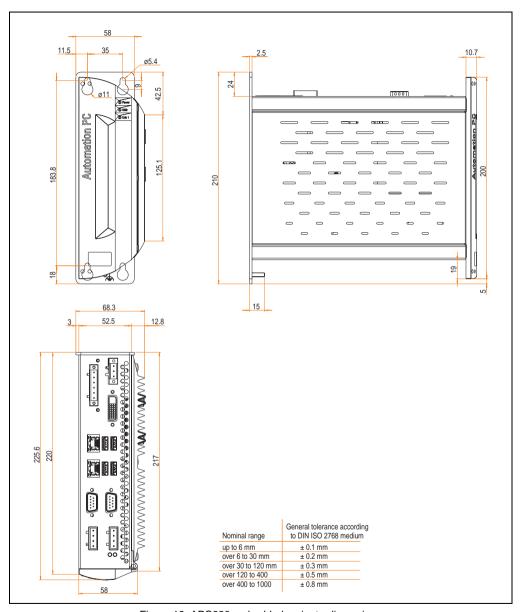


Figure 19: APC620 embedded variant - dimensions

## 2.6 Environmental temperatures for systems with an 815E CPU board (ETX)

It is possible to combine CPU boards with various other components, such as drives, main memory, additional insert cards, etc. dependent on system unit and fan kit. The various configurations result in varying maximum possible ambient temperatures, which can be seen in the following graphic (see the figure, 21 "Environmental temperatures for systems with an 815E CPU board (ETX)" on page 77).

# Information:

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

Experience has shown that higher ambient temperatures can be reached under typical conditions, e.g. using Microsoft Windows. The testing and evaluation is to be done on-site by the user (temperatures can be read in BIOS or using the B&R Control Center, see the chapter 4 "Software" on page 323).

## Worst-case conditions for systems with an 815E CPU board (ETX)

- HiPower V3.0 from Intel for simulating 100% processor load.
- BurnIn testing tool (BurnIn V4.0 Pro from Passmark Software) to simulate a 100% load on the interface via loop-back adapters (serial interfaces, add-on and slide-in drives, USB interfaces, audio outputs).
- Maximum system extension and power consumption.

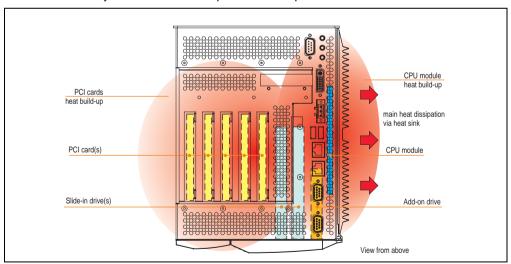


Figure 20: Example of worst-case conditions for temperature measurement

# 2.6.1 Maximum ambient temperature

		1				ut fan ki HS01-00		1		815E C nd heat		fan kit HS01-00	0)	
	All temperatures in degrees celsius (°C) at 500 meters NN.	ಚ ಚ 00-9	E815-02 🖁	ස 1000 2-03				g 480 C-C	5-02	C3 1000 C3-C3				
	Derating the maximum ambient temperature typically 1°C per 1000 meters above 500 NN	5PC600.E815-00	5PC600.E81	5PC600.E815-03				5PC600.E815-00	5PC600.E815-02	5PC600.E815-03				
	2 Max. ambient temperature	50	45	30				55	55	55				its
3 T	What can still be operated at max. amb. temp., and are there limits?													Temperature limits
	On-board CompactFlash 1)	1	1	1				1	1	1				80
rive	5AC600.CFSI-00 <sup>1)</sup>	1	1	1				1	1	1				80
Add-on drive	5AC600.HDDI-01	1	1	1				1	1	1				80
Ad	5AC600.HDDI-00 (24-hour / standard)	<b>-</b> /30	<b>-</b> /25	<b>-</b> /25				35/45	35/45	35/45				45/55
	5AC600.CFSS-00 <sup>1)</sup>	1	1	1				1	1	1				80
	5AC600.CDXS-00	45	1	1				50	50	50				55
Ф	5AC600.DVDS-00	35	35	1				40	40	40				45
Slide-in drive	5AC600.DVRS-00	35	35	1				40	40	40				45
3lide-i	5AC600.FDDS-00	35	35	1				40	40	40				50
,	5AC600.HDDS-01	1	1	1				1	1	1				80
	5AC600.HDDS-00 (24-hour / standard)	30/35	30/35	30/35				40/50	40/50	40/50				45/55
'n	5MMSDR.0128-01	1	1	1				1	1	1				-
Main memory	5MMSDR.0256-01	1	1	1				1	1	1				-
Main	5MMSDR.0512-01	1	1	1				1	1	1				-
	5PC600.SX01-00	1	1	1				1	1	1				95
S	5PC600.SX02-01	1	1	1				1	1	1				95
System units	5PC600.SX02-00	1	1	1				1	1	1				95
Syste	5PC600.SX05-01	1	1	1				1	1	1				95
	5PC600.SX05-00	1	1	1				1	1	1				95
	5AC600.CANI-00	1	1	1				1	1	1				-
nal ⊩ s	5AC600.485I-00	1	1	1				1	1	1				-
Additional III slots	5ACPCI.RAIS-00 (24-hour / standard)	30/35	30/35	30/35				40/50	40/50	40/50				-
Ŕ	5ACPCI.RAIS-01 (24-hour / standard)	30/35	30/35	30/35				40/50	40/50	40/50				-

Figure 21: Environmental temperatures for systems with an 815E CPU board (ETX)

See the following page for a description of the graphic.

#### 2.6.2 Minimum ambient temperature

For systems containing one of the following components, the minimum ambient temperature is +5°C: 5AC600.HDDI-00, 5AC600.CDXS-00, 5AC600.DVDS-00, 5AC600.DVDS-00, 5AC600.HDDS-00, 5ACPCI.RAIS-01, 5ACPCI.RAIS-01.

If none of these components are used, then the minimum ambient temperature is 0°C.

#### 2.6.3 How do you determine the maximum ambient temperature?

- 1) Selection of the CPU board (use with or without fan kit).
- 2) The "maximum ambient temperature" line shows the maximum ambient temperature for the entire system when using this CPU board.

# Information:

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

3) Incorporating additional drives (add-on, slide-in), main memory, additional insert cards, etc. can change the temperature limits of an APC620 system.

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

If there is a specific temperature, for example "35", next to the component, then the ambient temperature of the whole APC620 system cannot exceed this temperature.

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

For these hard disks, the limits will depend on whether the system is intended for 24-hour<sup>1)</sup> or standard<sup>1)</sup> 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.

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

### 2.6.4 Temperature monitoring

The APC620 has temperature sensors in various places (I/O, power supply, slide-in drive 1, slide-in drive 2). The locations of the temperature sensors can be found in figure "Temperature sensor locations" on page 713. The value listed in the table represents the defined maximum temperature for this measurement point<sup>1)</sup>. When this temperature is exceeded, an alarm is triggered. The temperatures<sup>1)</sup> can be read in BIOS (menu item "Advanced" - Baseboard/panel features - Baseboard monitor) or in Microsoft Windows XP/embedded, using the B&R Control Center.

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

<sup>1)</sup> The measured temperature is a guideline for the immediate ambient temperature, but can be influenced by neighboring components.

# 2.7 Environmental temperatures for systems with an 855GME CPU board (EXT / XTX)

It is possible to combine CPU boards with various other components, such as drives, main memory, additional insert cards, etc. dependent on system unit and fan kit. The various configurations result in varying maximum possible ambient temperatures, which can be seen in the following graphic (see the figure, 23 "Environmental temperatures for systems with an 855GME CPU board (EXT / XTX)" on page 81).

## Information:

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

Experience has shown that higher ambient temperatures can be reached under typical conditions, e.g. using Microsoft Windows. The testing and evaluation is to be done on-site by the user (temperatures can be read in BIOS or using the B&R Control Center, see the chapter 4 "Software" on page 323).

#### Worst-case conditions for systems with an 855GME CPU board (ETX / XTX)

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

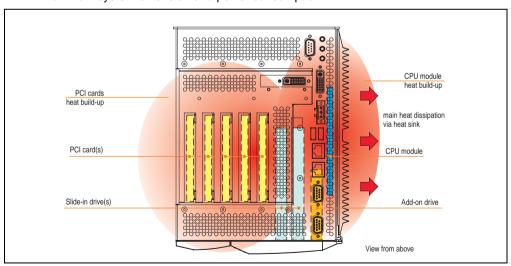


Figure 22: Example of worst-case conditions for temperature measurement

# 2.7.1 Maximum ambient temperature

		1)8	and	heat sink		(X / XT)	and he	ut fan ki	t	1)8	and h	eat sink	oard (E		X) with fan and heat sink			
	All temperatures in degrees celsius (°C) at 500 meters NN.  Derating the maximum ambient temperature typically 1°C per 1000 meters above 500 NN.	5PC600.E855-04 😩	5PC600.E855-05 W 5PC600.X855-05 W 5PC6000.X855-05 W 5PC600.X855-05 W 5PC600.X855-05 W 5PC600.X855-05 W 5PC6000.X855-05 W 5PC60000.X855-05 W 5PC600000.X855-05 W 5PC600000.X855-05 W 5PC600000.X855-05 W 5PC6000000.X855-05 W 5PC6000000000.X855-05 W 5PC6000000000000000000000000000000000000	5PC600.E855-00 611 Md 5PC600.X855-00 611 Md	5PC600.E855-02 Md 5PC600.X855-02 Md	5PC600.E855-01 Wd 5PC600.X855-01 89	5PC600:E855-03 088 Md 5PC600.X855-03 088 DM	HS01-02		5PC600.E855-04 ♀ 5PC600.X855-04	CM 1000	5PC600.E855-00 Md 5PC600.X855-00 Md 5PC6000.X855-00 Md 5PC60000.X855-00 Md 5PC600000.X855-00 Md 5PC600000.X855-00 Md 5PC6000000.X855-00 Md 5PC600000000.X855-00 Md 5PC6000000000000000000000000000000000000	5PC600.E855-02 № 5PC600.X855-02 №	5PC600.E855-01 Wd 5PC600.X855-01	2PC600.E855-03 5PC600.X855-03 5PC600.X855-03	02		
	2 Maximum ambient temperature	50	45	45	45	/	/			55	55	55	55	45	45		ış.	r(s)
3 \tau	What can still be operated at max. amb. temperature and are there limits?																Temperature limits	Location of sensor(s)
П	On-Board CompactFlash 1)	1	✓	1	1					1	1	1	1	1	1		80	
	5AC600.CFSI-00 <sup>1)</sup>	1	\	1	1					1	1	1	1	1	1		80	
rive	5AC600.HDDI-01	>	\	1	1					1	1	1	1	1	1		80	일
Add-on drive	5AC600.HDDI-00 (24 hour / standard)	<b>-</b> /30	<b>-</b> /25	<b>-</b> /25	<b>-</b> /25					30/40	30/40	30/40	30/40	<b>-</b> /35	<b>-</b> /35		45/55	
Ag	5AC600.HDDI-05	1	1	1	1					1	1	1	1	1	1		80	1
	5AC600.HDDI-06	1	1	1	1					1	1	1	1	1	1		80	1
П	5AC600.CFSS-00 <sup>1)</sup>	1	1	1	1					1	1	1	1	1	1		80	
	5AC600.CDXS-00	45	40	40	40					50	50	50	50	40	40		55	1
ᆂ	5AC600.DVDS-00	30	30	30	30					40	40	40	40	30	30		45	<sup>1</sup> <sup>2</sup> <sup>2</sup>
aufwe	5AC600.DVRS-00	30	30	30	30					40	40	40	40	30	30		45	ve 1 a
Slide-In Laufwerk	5AC600.FDDS-00	40	35	35	35					45	45	45	45	35	35		50	Slide-In drive 1 and 2
Slid	5AC600.HDDS-01	1	1	1	1					1	1	1	1	1	1		80	Slide
Ιİ	5AC600.HDDS-00 (24 hours / standard)	35/45	30/40	30/40	30/40					40/50	40/50	40/50	40/50	30/40	30/40		45/55	1
Ιİ	5AC600.HDDS-02	1	1	1	1					1	1	1	1	1	1		80	1
ž	5MMDDR.0256-00	1	1	1	1					1	1	1	1	1	1		-	
Main memory	5MMDDR.0512-00	1	1	1	1					1	1	1	1	1	1		1-	$  \cdot  $
Main	5MMDDR.1024-00	1	1	1	1					1	1	1	1	1	1		١.	\
П	5PC600.SX01-00	1	1	1	1					1	1	1	1	1	1		95	
	5PC600.SX02-01	1	1	1	1					1	1	1	1	1	1		95	÷
mits	5PC600.SX02-00	1	1	1	1					1	1	1	1	1	1		95	Power Supply
System units	5PC600.SF03-00	1	1	1	1					1	1	1	1	1	1		95	Powe
š	5PC600.SX05-01	1	1	1	1					1	1	1	1	1	1		95	
	5PC600.SX05-00	1	1	1	1					1	1	1	1	1	1		95	
П	5AC600.CANI-00	1	1	1	1					1	1	1	1	1	1		-	
	5AC600.485I-00	1	1	1	1					1	1	1	1	1	1		-	
rds P Link	5AC600.SDL0-00	1	1	1	1					1	1	1	1	1	1		-	
Add-on cards interfaces / AP Link	5ACPCI.RAIS-00 (24 hour / standard)	35/45	30/40	30/40	30/40					40/50	40/50	40/50	40/50	30/40	30/40		١.	
Add	5ACPCI.RAIS-01 (24 hour / standard)	35/45	30/40	30/40	30/40					40/50	40/50	40/50	40/50	30/40	30/40		-	
. <u>=</u> -	5ACPCI.RAIC-01 (24 hour / standard)	35/45	30/40	30/40	30/40					40/50	40/50	40/50	40/50	30/40	30/40		-	\
	5ACPCI.RAIC-03 (24 hour / standard)	1	1	1	1					1	1	1	1	1	1		-	\
-	ly possible with a CompactFlash card available from																	_

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

#### 2.7.2 Minimum ambient temperature

For systems containing one of the following components, the minimum ambient temperature is +5°C: 5AC600.HDDI-00, 5AC600.CDXS-00, 5AC600.DVDS-00, 5AC600.DVDS-00, 5AC600.DVDS-00, 5AC600.HDDS-00, 5ACPCI.RAIS-01, 5ACPCI.RAIC-01. If none of these components are used, then the minimum ambient temperature is 0°C.

#### 2.7.3 How do you determine the maximum ambient temperature?

- 1) Selection of the CPU board (use with or without fan kit).
- 2) The "maximum ambient temperature" line shows the maximum ambient temperature for the entire system when using this CPU board.

# Information:

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

3) Incorporating additional drives (add-on, slide-in), main memory, additional insert cards, etc. can change the temperature limits of an APC620 system.

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

If there is a specific temperature, for example "35", next to the component, then the ambient temperature of the whole APC620 system cannot exceed this temperature.

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

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

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

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

# Information:

It is generally recommended to use a fan kit when using hard disks 5AC600.HDDI-00, 5AC600.HDDS-00 and the RAID hard disks 5ACPCI.RAIS-00, 5ACPCI.RAIS-01, 5ACPCI.RAIC-01 and 5ACPCI.RAIC-03.

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

### 2.7.4 Temperature monitoring

The APC620 has temperature sensors in various places (I/O, power supply, slide-in drive 1, slide-in drive 2). The locations of the temperature sensors can be found in figure "Temperature sensor locations" on page 713. The value listed in the table represents the defined maximum temperature for this measurement point<sup>1)</sup>. When this temperature is exceeded, an alarm is triggered. The temperatures<sup>1)</sup> can be read in BIOS (menu item "Advanced" - Baseboard/panel features - Baseboard monitor) or in Microsoft Windows XP/embedded, using the B&R Control Center.

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

<sup>1)</sup> The measured temperature is a guideline for the immediate ambient temperature, but can be influenced by neighboring components.

## 2.8 Power management APC620 system unit with 1 PCI slot

### 2.8.1 Supply voltage for the 5PC600.SX01-00 revision >= 10

The following block diagram presents the simplified structure of the APC620 supply voltage for 5PC600.SX01-00 system units starting with revision ≥ I0.

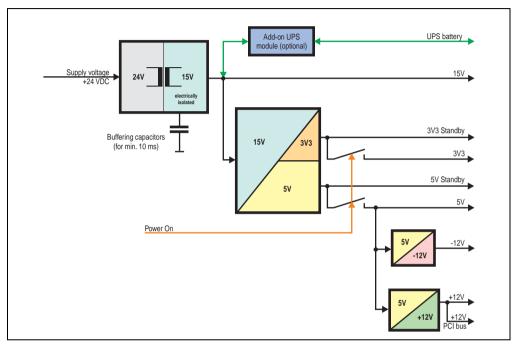


Figure 24: Supply voltage for the 5PC600.SX01-00 revision >= I0

#### **Explanation:**

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

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

The optional APC620 add-on UPS and battery unit is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

## 2.8.2 Power calculation with 5PC600.SX01-00 revision >= 10

Inf	orm	atio	n:				stem						This system
The Entr	entri	es for or the	watts the Generator are maximum values. Device are determined maximum peak values.	5PC600.E815-00 🖁	5PC600.E815-02 🖁	5PC600.E815-03 🖁	5PC600.E855-04 ⊋ 5PC600.X855-04 ≅	5PC600.E855-05 ≅ 5PC600.X855-05 ≅	5PC600.E855-00 ≧ 5PC600.X855-00 ≧	5PC600.E855-02   5PC600.X855-02   5PC6000.X855-02   5PC600.X855-02   5PC6	5PC600.E855-01   5PC600.X855-01   §	5PC600.E855-03 ≅ 5PC600.X855-03 ≅	Enter values in this columns
					Total		er sup						70
		Ad	d-On UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
							max.	pos	sible	at 5\	/		70
H		-	U Board, fixed device	14	18	25	17	21	23	23	37	37	
			CompactFlash, optional (Add-On, slide-in)	1	1	1	1	1	1	1	1	1	
H			rd Disk, optional (Add-On, slide-in)	4	4	4	4	4	4	4	4	4	
H			ternal keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
		(ma	B Peripheral, optional ax. 2.5 watts pero USB1 and USB2 connection)	5 5 5 5 5 5 5 5 5									
			erface option (Add-On interface), optional	0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5									
		(ma	Cl card manufacturer limit, optional ax. 3 watts withou fan kit, max. 17 watts with fan kit)										
		Ex	ternal device, optional via BaseBoard)	5	5	5	5	5	5				
흥	>								Devic	es 5\	/	Σ	
r su	5V					m	ax. p	ossik	ole at	+12\	/		12
&			Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
임		+12V	External device, optional (über BaseBoard)	10	10	10	10	10	10	10	10	10	
Total power supply		+	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)										
								Dev	/ices	+12\	/	Σ	
						n	nax. p	ossi	ble a	t -12\	/		1,2
		-12V	PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit) <sup>1)</sup>										
				Devices -12V									
								Dev	ices	total	5V	Σ	
							max.	poss	ible a	at 3V	3		23
H		,	stem unit, fixed device	4	4	4	4	4	4	4	4	4	
	3V3		erface option (Add-On interface), optional	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	
	က	PC (ma	Cl card manufacturer limit, optional ax. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
								De	evice	s 3V	3	Σ	
								De	vices	tota	ıl	Σ	

<sup>1)</sup> The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan ki

## 2.8.3 Supply voltage for the 5PC600.SX01-00 revision < 10

The following block diagram presents the simplified structure of the APC620 supply voltage for 5PC600.SX01-00 system units starting with revision < I0.

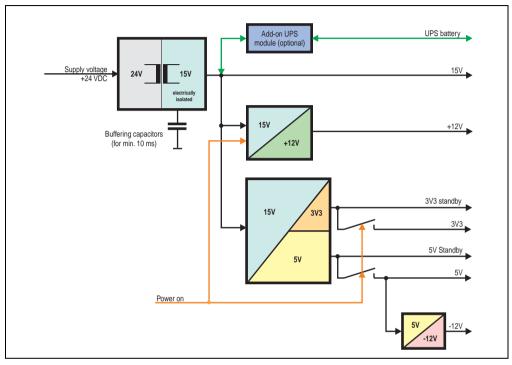


Figure 25: Supply voltage for the 5PC600.SX01-00 revision < 10

## **Explanation:**

The supply voltage is converted to 15 V with a DC/DC converter. These electrically isolated 15 volts feed two further DC/DC converters. One generates +12 V, and the other 3V3 and 5V standby.

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

The optional APC620 add-on UPS and battery unit is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

## 2.8.4 Power calculation with 5PC600.SX01-00 revision < 10

Inf	orm	ation:	_			stem						This system
The Entr	entri	es in watts es for the Generator are maximum values. or the Device are determined maximum ut not peak values.	5PC600.E815-00 🕏	5PC600.E815-02 g	5PC600.E815-03 🖁	5PC600.E855-04 ⊋ 5PC600.X855-04 ≅	5PC600.E855-05   § 5PC600.X855-05   §	5PC600.E855-00 ₩ 5PC600.X855-00	5PC600.E855-02 ≅ 5PC600.X855-02 ≦	5PC600.E855-01 ₩ 5PC600.X855-01	5PC600.E855-03 ≅ 5PC600.X855-03 ≊	Enter values in this column
						otal p						70
		Add-On UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
							max.	poss	sible	at 5V		55
		CPU Board, fixed device	14	18	25	17	21	23	23	37	37	
		Pro CompactFlash, optional (Add-On, slide-in)	1	1	1	1	1	1	1	1	1	
		Hard disk, optional (Add-On, slide-in)	4	4	4	4	4	4	4	4	4	
		External keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
		USB Peripheral, optional (max. 2.5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
		Interface option (Add-On interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
	20	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
_		External device, optional (via BaseBoard)	5	5	5	5	5	5				
dc			l					D	evic	es 5V	Σ	
r su						m	1.2					
Total power supply		PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit) <sup>1)</sup>										
a								De	/ices	-12V	Σ	
힏							D	evice	s tot	al 5V	Σ	
						n	nax. p	ossi	ble a	t 3V3		23
		System unit, fixed device	4	4	4	4	4	4	4	4	4	
	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	
	3	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
	Devices 31										Σ	
						ma	ax. po	ossib	le at	+12V		12
		Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
	+12V	External device, optional (via BaseBoard)	10	10	10	10	10	10	10	10	10	
	Ŧ	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)										
	Devices +12										Σ	
								De	/ices	tota	Σ	

<sup>1)</sup> The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan ki

## 2.9 Power management APC620 system units with 2 PCI slots

# 2.9.1 Supply voltage for the 5PC600.SX02-00 revision >= H0 and 5PC600.SX02-01 revision >= K0)

The following block diagram presents the simplified structure of the APC620 supply voltage for system units 5PC600.SX02-00 (revision  $\geq$  H0 and higher), 5PC600.SX02-01 (revision  $\geq$  K0 and higher).

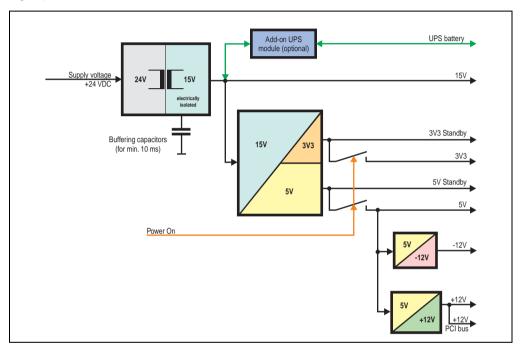


Figure 26: Supply voltage for 2 PCI slots (dependent on system unit version)

#### **Explanation:**

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

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

The optional APC620 add-on UPS and battery unit is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

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

rm	atio	n:										This system
entrie es fo	es for r the	the <b>Generator</b> are maximum values. <b>Device</b> are determined maximum	5PC600.E815-00 🕏	5PC600.E815-02 g	5PC600.E815-03 🖁	5PC600.E855-04 ⊋ 5PC600.X855-04 ≅	5PC600.E855-05 ≅ 5PC600.X855-05 ≅	5PC600.E855-00 ₩ 5PC600.X855-00 ₩	5PC600.E855-02 ₹ 5PC600.X855-02 ₹	5PC600.E855-01 ₹ 5PC600.X855-01 ₹	5PC600.E855-03 ≅ 5PC600.X855-03 ≅	Enter values in this column
			_									70
	Ad	d-On UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
							max.	pos	sible	at 5V		70
	CF	U Board, fixed device	14	18	25	17	21	23	23	37	37	
		, , , , , , , , , , , , , , , , , , , ,	1	1	1	1	1	1	1	1	1	
			4	4	4	4	4	4	4	4	4	
			4	4	4	4	4	4	4	4	4	
			1	1	1	1	1	1	1	1	1	
	(ma	x. 2.5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
			5	5	5	5	5	5	5	5	5	
	(ma	x. 3 watts without fan kit, max. 17 watts with fan kit) 1)	L									
_	Ex	ernal device, optional (via BaseBoard)	5	5	5	5	5	5	5	5	5	
5								0	evice	es 5V	Σ	
						ma			le at	+12V	'	12
			2.5	2.5	2.5	2.5			2.5	2.5	2.5	
	12		10	10	10	10	10	10	10	10	10	
	+	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)	L									
								Dev	ices	+12V	Σ	
						m	ах. р	ossil	ole at	-12V	'	1.2
	-12V	PIC card manufacturer limit, optional (max. 1.2 watts without and with fan kit) <sup>1)</sup>										
								De	vices	-12V	Σ	
Devices total 5V												
						n	nax. p	ossi	ble a	t 3V3	;	23
	Sy	stem unit, fixed device	4	4	4	4	4	4	4	4	4	
_	Gr	aphics adapter (AP link), optional	5	5	5	5	5	5	5	5	5	
3			0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
	PC (ma	I card manufacturer limit, optional x. 3 watts without fan kit, max. 17 watts with fan kit)  1)										
								De	vices	s 3V3	Σ	
			İ					De	vices	total	Σ	
	ntrie ntrie	Add Add Add Add Add Add Add Add Add Add	Fan kit, optional  External drive, optional via BaseBoard)  PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)  PIC card manufacturer limit, optional (max. 1.2 watts without and with fan kit) <sup>1)</sup> System unit, fixed device  Graphics advancer (AB link), optional	Add-On UPS module, optional  CPU Board, fixed device Pro CompactFlash, optional (Add-On, slide-in) Hard disk, optional (Side-in CD, DVD, CD-RW) External keyboard PS/2, optional USB Peripheral, optional (slide-in CD, DVD, CD-RW) Interface option (Add-On interface), optional (max. 3 watts without fan kit, max. 17 watts with fan kit)  External device, optional (via BaseBoard)  Fan kit, optional External drive, optional (via BaseBoard) PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)  PCI card manufacturer limit, optional (max. 3 watts without and with fan kit)  Fan kit, optional External drive, optional via BaseBoard)  PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)  PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)  PCI card manufacturer limit, optional (max. 12 watts without and with fan kit)  System unit, fixed device Graphics adapter (AP link), optional (max. 12 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 12 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 12 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 12 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 12 watts without and with fan kit)	Add-On UPS module, optional  CPU Board, fixed device Pro CompactFlash, optional (Add-On, slide-in) Hard disk, optional (Side-in CD, DVD, CD-RW) External keyboard PS/2, optional (max. 2.5 watts per USB1 and USB2 connection) Interface option (Add-On interface), optional (max. 3 watts without fan kit, max. 17 watts with fan kit)  External device, optional (via BaseBoard) PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)  PCI card manufacturer limit, optional (max. 3 watts without and with fan kit)  System unit, fixed device Graphics adapter (AP link), optional External device, optional (via BaseBoard)  PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)  System unit, fixed device Graphics adapter (AP link), optional (max. 3 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)  PCI card manufacturer limit, optional (max. 12 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 12 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 12 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 12 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 12 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 12 watts without and with fan kit)	tries in watts  Intries for the Generator are maximum values. s for the Device are determined maximum s, but not peak values.  Add-On UPS module, optional  CPU Board, fixed device Pro CompactFlash, optional (Add-On, slide-in) Hard disk, optional (Add-On, slide-in) Hard disk, optional (Side-in CD, DVD, CD-RW) External keyboard PS/2, optional (max. 2.5 wats per USB1 and USB2 connection) Interface option (Add-On interface), optional (max. 3 watts without fan kit, max. 17 watts with fan kit)  External device, optional (via BaseBoard)  PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)  PCI card manufacturer limit, optional (max. 3 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 3 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 3 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 3 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 1 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 1 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 1 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 1 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 1 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 1 watts without and with fan kit)  PCI card manufacturer limit, optional (max. 2 watts without and with fan kit)	CPU Board, fixed device	Case   Case	Interface option (Add-On interface), optional   Card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit)   Device of Card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)   Device of Card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit)   Device of Card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit)   Device of Card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit)   Device   Device of Card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit)   Device   Device of Card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit)   Device   De	Interest in watts   Care   C	tries in watts  Intries for the Generator are maximum values. s for the Device are determined maximum s, but not peak values.    Total power supply (max.)	tries in watts  Intries for the Generator are maximum values. s for the Device are determined maximum s, but not peak values.    Total power supply (max)

<sup>1)</sup> The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan ki

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

Inf	orm	ation:							600.S		_	This system
The Entr	entrie	es in watts as for the <b>Generator</b> are maximum values. If the <b>Device</b> are determined maximum ut not peak values.	5PC600.E815-00 🖁	5PC600.E815-02 g	5PC600.E815-03 🖁	5PC600.E855-04 g 5PC600.X855-04 8	5PC600,E855-05 8 5PC600,X855-05 8	5PC600.E855-00 ₩ 5PC600.X855-00	5PC600.E855-02 ≅ 5PC600.X855-02 ≅	5PC600.E855-01 ₩ 5PC600.X855-01 ®	5PC600.E855-03   5PC600.X855-03    8	Enter values in this column
									ply (ı			70
		Add-On UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
							max.	poss	sible	at 5V		70
		CPU Board, fixed device	14	18	25	17	21	23	23	37	37	
		Pro CompactFlash, optional (Add-On, slide-in)	1	1	1	1	1	1	1	1	1	
		Hard disk, optional (Add-On, slide-in)	4	4	4	4	4	4	4	4	4	
		Pro drive, optional (slide-in CD, DVD, CD-RW)	4	4	4	4	4	4	4	4	4	
		External keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
		USB Peripheral, optional (max. 2.5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
	L	Interface option (Add-On interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
	20	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
~		External device, optional (via BaseBoard)	5 5 5 5 5 5 5 5									
ddns								D	evice	es 5V	Σ	
le s						m	ах. р	ossil	ole at	-12V		1.2
Total power supply		PCI card manunfacturer limit, optional (max. 1.2 watts without and with fan kit) <sup>1)</sup>										
otal								De	vices	-12V	Σ	
-							D	evice	s tot	al 5V	Σ	
						n	nax. p	ossi	ble a	t 3V3		23
		System unit, fixed device	4	4	4	4	4	4	4	4	4	
	3V3	Schnittstellenoption (Add-On Interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
	3	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
			Σ									
						ma	ax. po	ossib	le at	+12V		12
		Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
	+12V	External device, optional via BaseBoard)	10	10	10	10	10	10	10	10	10	
	+	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit) 1)										
			+12V	Σ								
		Devices tot									-	

<sup>1)</sup> The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan ki

# 2.9.4 Supply voltage for the 5PC600.SX02-00 revision < H0 and 5PC600.SX02-01 revision < K0)

The following block diagram presents the simplified structure of the APC620 supply voltage for system units 5PC600.SX02-00 (revision < H0 and higher), 5PC600.SX02-01 (revision < K0 and higher).

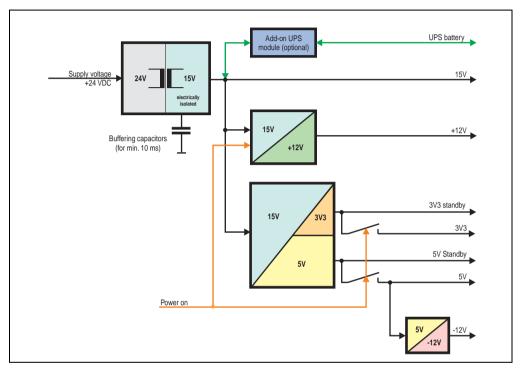


Figure 27: Supply voltage for 2 PCI slots (dependent on system unit version)

#### **Explanation:**

The supply voltage is converted to 15 V with a DC/DC converter. These electrically isolated 15 volts feed two further DC/DC converters. One generates +12 V, and the other 3V3 and 5V standby.

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

The optional APC620 add-on UPS and battery unit is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

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

Inf	orm	ation:	_		0 Sy	stem	unit	5PC6	00.S	X02-(	00	This system
The	entri	es in watts es for the Generator are maximum values. or the Device are determined maximum ut not peak values.	5PC600.E815-00 🖁	5PC600.E815-02 g	5PC600.E815-03 🖁	5PC600.E855-04 g 5PC600.X855-04 ®	5PC600,E855-05 ≅ 5PC600,X855-05 ≅	5PC600.E855-00   5PC600.X855-00    §	5PC600.E855-02   5PC600.X855-02   §	5PC600.E855-01 ₹ 5PC600.X855-01 ₹	5PC600.E855-03 ≅ 5PC600.X855-03 ≅	Enter values in this column
							owe					70
		Add-On UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
							max.	poss	sible	at 5V	'	55
		CPU Board, fixed device	14	18	25	17	21	23	23	37	37	
		Pro CompactFlash, optional (Add-On, slide-in)	1	1	1	1	1	1	1	1	1	
		Hard disk, optional (Add-On, slide-in)	4	4	4	4	4	4	4	4	4	
		Pro drive, optional (slide-in CD, DVD, CD-RW)	4	4	4	4	4	4	4	4	4	
		External keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
		USB peripheral, optional (max. 2.5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
		Interface option (Add-On interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
	20	Graphics adapter (AP link), optional	5	5	5	5	5	5				
	5	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
چا		External device, optional (via BaseBoard)	5	5	5	5	5	5	5	5	5	
d			Г					D	evice	es 5V	Σ	
er s						m	ах. р	ossil	ole at	-12V	,	1.2
Total power supply		PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit) <sup>1)</sup>										
동								De	/ices	-12V	Σ	
-							D	evice	s tot	al 5V	Σ	
						n	nax. p	ossi	ble a	t 3V3	3	23
		System unit, fixed device	4	4	4	4	4	4	4	4	4	
	8	Graphics adapter (AP link), optional	5	5	5	5	5	5	5	5	5	
	3V3	Interface option (Add-On interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
		PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit)										
			L					Σ				
						m	ax. po	ossib	le at	+12V		12
		Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
	+12V	External device, optional (via BaseBoard)	10	10	10	10	10	10	10	10	10	
	+	PCI card manufacturer limit, optional (max. 3 wattst without fan kit, max. 12 watts with fan kit) 1)	L									
								Dev	ices	+12V	Σ	
										total	_	
_	_		_									

<sup>1)</sup> The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan ki

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

rma	ation:			0 Sy	stem	unit	5PC6	00.S	X02-(	)1	This system
entrie	es for the <b>Generator</b> are maximum values.  r the <b>Device</b> are determined maximum	5PC600.E815-00 🙎	5PC600.E815-02 g	5PC600.E815-03 🖁	5PC600.E855-04 g 5PC600.X855-04 8	5PC600,E855-05 ≅ 5PC600,X855-05 ≅	5PC600.E855-00   5PC600.X855-00    §	5PC600.E855-02   5PC600.X855-02   €	5PC600.E855-01   5PC600.X855-01   §	5PC600.E855-03 ≅ 5PC600.X855-03 ≅	Enter values in this column
											70
	Add-On UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
						max.	poss	sible	at 5V		55
	CPU Board, fixed device	14	18	25	17	21	23	23	37	37	
		1	1	1	1	1	1	1	1	1	
	7 1 7	_	<u> </u>	<u> </u>			<u> </u>			L-i	
		_		<u> </u>			<u> </u>				
	2 1	1	1	1	1	1	1	1	1	1	
		5	5	5	5	5	5	5	5	5	
ŀ	Interface option (Add-On interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
2	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
ı	External device, optional via BaseBoard)	5 5 5 5 5 5 5 5									
							D	evice	es 5V	Σ	
					m	ах. р	ossil	ole at	-12V		1.2
	PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit) <sup>1)</sup>										
-							De	vices	-12V	Σ	
						D	evice	s tot	al 5V	Σ	
					maxir	nal n	nöglid	ch be	i 3V3		23
Γ	System unit, fixed device	4	4	4	4	4	4	4	4	4	
2	Interface option (Add-On interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
3	PCI card manufacturer limit, optional (max. 3 Watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit) <sup>1)</sup>										
		L					De	vices	s 3V3	Σ	
					ma	ax. po	ossib	le at	+12V		12
	Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
≲	External device, optional (via BaseBoard)	10	10	10	10	10	10	10	10	10	
Ŧ	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit) 1)										
							Dev	ices	+12V	Σ	
Devices to										_	
	entries fo	CPU Board, fixed device Pro CompactFlash, optional (Add-On, slide-in) Hard disk, optional (Add-On, slide-in) Pro drive, optional (slide-in CD, DVD, CD-RW) External keyboard PS/2, optional USB Peripheral, optional (max. 2.5 watts per USB1 and USB2 connection) Interface option (Add-On interface), optional (max. 3 watts without fan kit, max. 17 watts with fan kit) External device, optional via BaseBoard)  PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit)  System unit, fixed device Interface option (Add-On interface), optional PCI card manufacturer limit, optional (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  Fan kit, optional External device, optional (via BaseBoard) PCI card manufacturer limit, optional	tries in watts  Intries for the Generator are maximum values. So for the Device are determined maximum so, but not peak values.  Add-On UPS module, optional  CPU Board, fixed device Pro CompactFlash, optional (Add-On, slide-in) Hard disk, optional (Add-On, slide-in) Hard disk, optional (Add-On, slide-in) Hor drive, optional (slide-in CD, DVD, CD-RW) External keyboard PS/2, optional (max. 2.5 wats per USB1 and USB2 connection) Interface option (Add-On interface), optional (max. 3 wats without fan kit, max. 17 wats with fan kit)  External device, optional via BaseBoard)  PCI card manufacturer limit, optional (max. 12 wats without and with fan kit)  System unit, fixed device Interface option (Add-On interface), optional (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  Fan kit, optional External device, optional (via BaseBoard) PCI card manufacturer limit, optional (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit) PCI card manufacturer limit, optional (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit) PCI card manufacturer limit, optional	tries in watts  ntries for the Generator are maximum values. so for the Device are determined maximum s, but not peak values.  Add-On UPS module, optional  CPU Board, fixed device Pro CompactFlash, optional (Add-On, slide-in) Hard disk, optional (Add-On, slide-in) Hard disk, optional (slide-in CD, DVD, CD-RW) External keyboard PS/2, optional (max. 2.5 watts per US81 and US82 connection) Interface option (Add-On interface), optional (max. 3 watts without fan kit, max. 17 watts with fan kit)  External device, optional via BaseBoard)  PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit)  System unit, fixed device Interface option (Add-On interface), optional (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  PCI card manufacturer limit, optional (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  PCI card manufacturer limit, optional (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  PCI card manufacturer limit, optional (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  PCI card manufacturer limit, optional (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  PCI card manufacturer limit, optional (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  PCI card manufacturer limit, optional (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  PCI card manufacturer limit, optional	tries in watts  ntries for the Generator are maximum values. ss for the Device are determined maximum s, but not peak values.  Add-On UPS module, optional  CPU Board, fixed device  Pro CompactFlash, optional (Add-On, slide-in)  Hard disk, optional (Add-On, slide-in)  Hard disk, optional (slide-in CD, DVD, CD-RW)  External keyboard PS/2, optional  (max. 2.5 watts per USB1 and USB2 connection)  Interface option (Add-On interface), optional  (max. 3 watts without fan kit, max. 17 watts with fan kit)  External device, optional via BaseBoard)  PCI card manufacturer limit, optional  (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  PCI card manufacturer limit, optional  (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  PCI card manufacturer limit, optional  (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  PCI card manufacturer limit, optional  (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  PCI card manufacturer limit, optional  (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  PCI card manufacturer limit, optional  (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  PCI card manufacturer limit, optional  (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  PCI card manufacturer limit, optional  (max. 3 watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)  PCI card manufacturer limit, optional  External device, optional (via BaseBoard)  PCI card manufacturer limit, optional	CPU Board, fixed device	Cease   Carp   Color   Colo	tries in watts  ntries for the Generator are maximum values. stor the Device are determined maximum s, but not peak values.  Total power supply (in the peak value)  T	tries in watts  ntries for the Generator are maximum values. stor the Device are determined maximum s, but not peak values.  Total power supply (max.)  Add-On UPS module, optional  7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5 7.5	tries in watts    Case   Carp	
<sup>1)</sup> The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan ki

### 2.10 Power management APC620 system unit with 3 PCI slots

#### 2.10.1 5PC600.SF03-00 supply voltage

The following block diagram presents the simplified structure of the APC620 supply voltage for system units 5PC600.SF03-00.

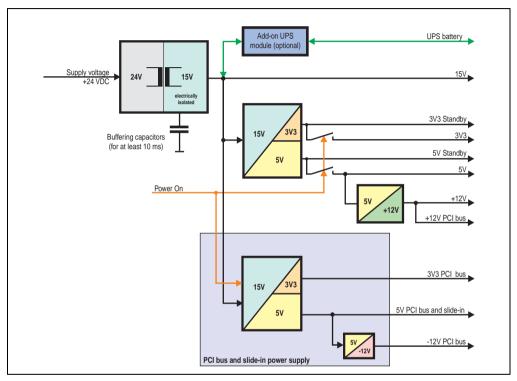


Figure 28: Supply voltage block diagram 3 PCI slots

#### **Explanation:**

Systems with 3 PCI slots have an additional power supply for the PCI buses and the slide-in drive. The supply voltage is converted to 15 V with a DC/DC converter. These electrically isolated 15 volts feed two further DC/DC converters. One generates 5 V for an additional DC/DC converter, which produces +12 V and +12V PCI bus voltage. The other DC/DC converter produces 3V3 and 5V standby.

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

The optional APC620 add-on UPS and battery unit is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

# 2.10.2 Power calculation with system unit 5PC600.SF03-00

Inf	orm	atic	n:			PC62					600.S	F03-0	00	This system
The Entr	entries fo	es for	Devic	nenerator are maximum values. Le are determined maximum values.	5PC600.E855-04 g 5PC600.X855-04 ®	5PC600.E855-05 ₩ 5PC600.X855-05 ₩	5PC600.E855-00 ₩ 5PC600.X855-00 €	5PC600.E855-02 ₩ 5PC600.X855-02 ₺	E855-01 X855-01	5PC600.E855-03 ₩ 5PC600.X855-03 ₩				Enter values in this column
Ι.									oowe	<u> </u>	ply (	max.)		110
		Ac	dd-On	UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5				
	١.									•	sible	at 5V		70
				ard, fixed device	17	21	23	23	37	37				
				pactFlash, optional (Add-On)	1	1	1	1	1	1				
				k, optional (Add-On) keyboard PS/2, optional	1	1	1	1	1	4				
				ipheral, optional	+				_					
				watts per USB1 and USB2 connection)	5	5	5	5	5	5				
	_			option (Add-On Interface), optional	0.5	0.5	0.5	0.5	0.5	0.5				
	5V			adapter (AP Link), optional	5	5	5	5	5	5				
		Ex	ternal	device, optional (via BaseBoard)	5	5	5	5	5	5				
									ax. po		le at	+12V		24
		Fan kit, optional 2.5 2.5 2.5 2.5 2.5 2.5 2.5 External device, optional (via BaseBoard) 10 10 10 10 10 10 10												
		Ŧ	-	rnal device, optional (via BaseBoard)	10	10	10	10	10	10				
				card manufacturer limits, optional 1) 3 watts without fan kit, max. 12 watts with fan kit)										
چ									D	evice	es tot	al 5V	Σ	
Total power supply								r	nax. Į	oossi	ble a	t 3V3		23
r s	ایرا			unit, fixed device	4	4	4	4	4	4				
) We	3V3			adapter (AP Link), optional	5	5	5	5	5	5				
l pd		Int	tertace	option (Add-On Interface), optional	0.25	0.25	0.25	0.25	0.25	0.25				
ota					L						De	vices	Σ	
-	١.			F	CI bu	s and	slid	e-in į	oowe	r sup	ply (	max.)		50
	>			1	max. į	oossi	ble a	t 5V	PCI b	us uı	nd sli	de-in	ı	50
	bus and slide-in power supply			CompactFlash, optional (slide-sn)	1	1	1	1	1	1				
	เรา			hard disk, optional (slide-in)	4	4	4	4	4	4				
	We			drive, optional (slide-in - CD/DVD)	4	4	4	4	4	4				
	8	20	(ma	card manufacturer limit, optional x. 3 watts without fan kit, max. 17 watts with fan kit)										
	딒	2		m	ax. po	ssibl	e at -	12V	PCI b	us aı	nd sli	ide-in		1,2
	ig		ا≲ا	PCI card manufacturer limit, optional	T			Г						
	g p		-12V	(max. 1.2 watts without and with fan kit) <sup>1)</sup>	╄									
	au				L					De	vices	-12V	Σ	
	snc								D	evice	s tot	al 5V	Σ	
	S			n	nax. p	ossib	le at	3V3	PCI b	us aı	nd sli	de-in	1	23
		3V3		card manufacturer limit, optional x. 3 watts without fan kit, max. 17 watts with fan kit)										
				,						De	vice	s 3V3	Σ	
							ī	otal	PCI b	us aı	nd sli	ide-in	Σ	
										De	vices	total	Σ	
_	_				_								_	

<sup>1)</sup> The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan kil

## 2.11 Power management APC620 system units with 5 PCI slots

# 2.11.1 Supply voltage for the 5PC600.SX05-00 (revision >= H0) and 5PC600.SX05-01 (revision >= H0)

The following block diagram presents the simplified structure of the APC620 supply voltage for system units 5PC600.SX05-00 (Revision  $\geq$  H0), 5PC600.SX05-01 (Revision  $\geq$  H0).

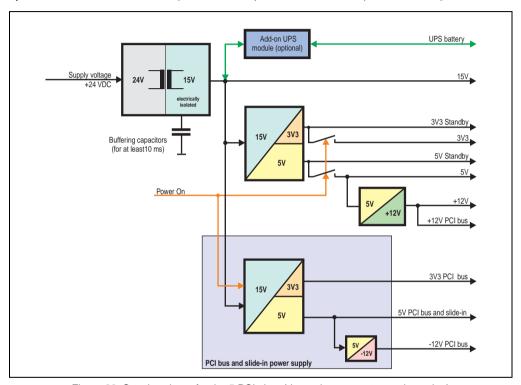


Figure 29: Supply voltage for the 5 PCI slots (dependent on system unit version)

## **Explanation:**

Systems with 5 PCI slots have an additional power supply for the PCI buses and the slide-in drive. The supply voltage is converted to 15 V with a DC/DC converter. These electrically isolated 15 volts feed two further DC/DC converters. One generates 5 V for an additional DC/DC converter, which produces +12 V and +12V PCI bus voltage. The other DC/DC converter produces 3V3 and 5V standby.

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

The optional APC620 add-on UPS and battery unit is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

Chapter 2 Technical data

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

Info	rma	atio	n:	Α	PC62		stem						This system
Entrie	entrie es fo	es for r the	vatts the Generator are maximum values. Device are determined maximum peak values.	5PC600.E815-00 🕏	5PC600.E815-02 g	5PC600.E815-03 🖁	5PC600.E855-04 ⊋ 5PC600.X855-04 ≅	5PC600.E855-05 ₩ 5PC600.X855-05 ₩	5PC600.E855-00 ₹ 5PC600.X855-00 ₹	5PC600.E855-02 ≅ 5PC600.X855-02 ≅	5PC600.E855-01 ₩ 5PC600.X855-01 ®	5PC600.E855-03   5PC600.X855-03   §	Enter values in this column
						T	otal p						110
		Ad	d-On UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
							max	imal	mögl	ich b	ei 5V	,	70
	[		U Board, fixed device	14	18	25	17	21	23	23	37	37	
			CompactFlash, optional (Add-On)	1	1	1	1	1	1	1	1	1	
			rd disk, optional (Add-On)	4	4	4	4	4	4	4	4	4	
	H		ernal keyboard PS/2, optional  B Peripheral, optional	1	1	1	1	1	1	1	1	1	
			x. 2.5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
١.		Inte	erface option (Add-On interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
-   1	2	Gra	aphics adapter (AP link), optional	5	5	5	5	5	5	5	5	5	
		Ex	ernal device, optional (via BaseBoard)	5	5	5	5	5	5	5	5	5	
	- 1						ma	ax. po	ossib	le at	+12V		24
		2	Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
		뒤	External device, optional via BaseBoard)	10	10	10	10	10	10	10	10	10	
			PCI card manufacturer limit, optional 1) (max. 3 watts without fan kit, max. 12 watts with fan kit)										
								D	evice	s tot	al 5V	Σ	
Total power supply							n	nax. ¡	ossi	ble a	t 3V3		23
ns l	ຼ[		stem unit, fixed device	4	4	4	4	4	4	4	4	4	
<u>ज</u>	33		aphics adapter (AP link), optional	5	5	5	5	5	5	5	5	5	
Š	ŀ	Inte	erface option (Add-On interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
<u></u>									De	vices	s 3V3	Σ	
[학			Р	CI bu	s and	l slid	e-in p	owe	r sup	ply (ı	max.)	1	50
			ı	nax. p	possi	ble a	t 5V I	PCI b	us aı	nd sli	de-in		50
-  -	싌		Pro CompactFlash, optional (slide-in)	1	1	1	1	1	1	1	1	1	
	ddns		Pro hard disk, optional (slide-in)	4	4	4	4	4	4	4	4	4	
	္က		Pro drive, optional (slide-in - CD/DVD)	4	4	4	4	4	4	4	4	4	
	ٳڲٚ		PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
	희	25		Т						evice	es 5V	Σ.	
	bus and slide-in power			_		may	poss	ihla :					1,2
-  -	≝		PCI card manufacturer limit,	г		iliax.	poss	ibic (	11-12		, Du	,	1.2
-	미		PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit)	╙									
	SI								De	vices	-12V	Σ	
								De	vices	tota	I +5V	Σ	
2	낊					max	. pos	sible	at 3\	/3 PC	l bus		23
		373	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
									De	vices	s 3V3	Σ	
						1	otal l	PCI b	us aı	nd sli	de-in	Σ	

<sup>1)</sup> The total performance of one PCI card per PCI slot (= sum of power consumptions for each voltage area) may not exceed the limits stated for operation with or without a fan ki

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

Info	rm	atio	n:	Α	PC62	20 Sy	stem	unit	5PC6	00.S	X05-	)1	This system
The e	entrie es fo	es for r the	watts the Generator are maximum values. Device are determined maximum peak values.	5PC600.E815-00 🕏	5PC600.E815-02 ਛੋ	5PC600.E815-03 ଛ	5PC600.E855-04 g 5PC600.X855-04 ®	5PC600.E855-05 P	5PC600.E855-00 ₩ 5PC600.X855-00 ₩	5PC600.E855-02 ₩ 5PC600.X855-02 ₺	5PC600.E855-01 ₹ 5PC600.X855-01	5PC600.E855-03   5PC600.X855-03   8	Enter values in this column
							otal p						110
		Ad	d-On UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
								max.	poss	sible	at 5V		70
	[	CF	U Board, fixed device	14	18	25	17	21	23	23	37	37	
-			CompactFlash, optional (Add-On)	1	1	1	1	1	1	1	1	1	
			rd disk, optional (Add-On)	4	4	4	4	4	4	4	4	4	
-			ternal keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
		(ma	B peripheal, optional ix. 2.5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
	25		erface option (Add-On interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
-	- 1	Ex	ternal device, optional (via BaseBoard)	5	5	5	5	5	5	5	5	5	
								_	ossib	_			24
		≳	Fan kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
		+12	External device, optional (via BaseBoard)	10	10	10	10	10	10	10	10	10	
			PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)									Ц	
≥L								D	evice	s tot	al 5V	Σ	
흑							n	nax. p	ossi	ble a	t 3V3		23
<u>ت</u> ا	က္	Sy	stem unit, fixed device	4	4	4	4	4	4	4	4	4	
\$	3\3	Int	erface option (Add-On interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
의									De	vice	3V3	Σ	
lotal power supply			Pí	CI bu	s and	d slid	e-in p	owe	r sup	ply (ı	nax.)		50
- 1	$\geq$		n	nax. p	oossi	ible a	t 5V I	PCI b	us aı	nd sli	de-in		50
- [	핆		Pro CompactFlash, optional (slide-in)	1	1	1	1	1	1	1	1	1	
-1	ns		Pro hard disk, optional (slide-in)	4	4	4	4	4	4	4	4	4	
-1	ē		Pro drive, optional (slide-in - CD/DVD)	4	4	4	4	4	4	4	4	4	
	slide-in power supply	20	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
- [	┇		ma	x. po	ssibl	e at -	12V I	PCI b	us aı	nd sli	de-in		1,2
	slid		PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit)										
-	au au								De	vices	-12V	Σ	
-	S							D	evice	s tot	al 5V	Σ	
	PCI bus and		m	ax. po	ossib	le at	3V3 I	PCI b	us aı	nd sli	de-ir		23
	۱-	3/3	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)	Ĺ									
		.,	man o mano munous tan ing man. 17 mano mun ian ing	Н	_	_			De	vices	3V3	Σ	
				Г		Т	otal l	PCI b				_	
- 1									De	vices	total	Σ	

# 2.11.4 Supply voltage for the 5PC600.SX05-00 (revision < H0) and 5PC600.SX05-01 (revision <= H0)

The following block diagram presents the simplified structure of the APC620 supply voltage for system units 5PC600.SX05-00 (Revision < H0), 5PC600.SX05-01 (Revision < H0).

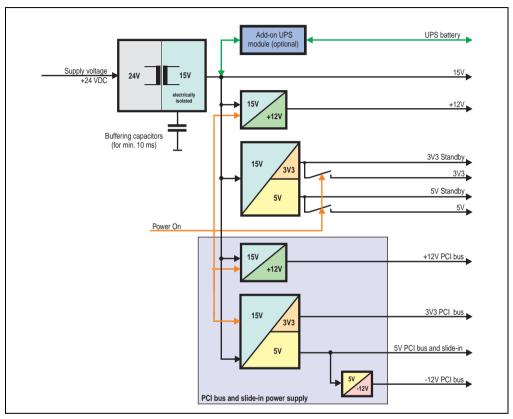


Figure 30: Supply voltage block diagram 5 PCI slots (dependent on system unit version)

#### **Explanation:**

Systems with 5 PCI slots have two additional power supplies for the PCI bus and the slide-in drives. The supply voltage is converted to 15 V with a DC/DC converter. These electrically isolated 15 V feed four further DC/DC converters. Two generate +12 V, and the others generate 3V3 and 5V standby. After the system is turned on (e.g. using the power button), the voltages 3V3, 5 V, +12 V are placed on the bus. At the 5 V output, yet another DC/DC converter generates -12 V, and places these on the bus.

The optional APC620 add-on UPS and battery unit is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

Chapter 2 Technical data

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

Info	orm	atic	n:	AP	C620	Sys	teme		Vorliegendes System				
Bei d	den A den A	Angal Angal	in Watt een der Erzeuger handelt sich um Maximalwerte, een der Verbraucher handelt es sich um gemittelte te, jedoch keine Peak-Werte.	5PC600.E815-00 🖁	5PC600.E815-02 g	5PC600.E815-03 🚊	5PC600.E855-04 g 5PC600.X855-04 8	5PC600.E855-05 ≅ 5PC600.X855-05 ≅	5PC600.E855-00 ₩ 5PC600.X855-00 ≅	5PC600.E855-02 ₹ 5PC600.X855-02 ₹	5PC600.E855-01 ₩ 5PC600.X855-01	5PC600.E855-03   5PC600.X855-03   €	Werte in dieser Spalte eintragen
				L	_eistı	ıng (	Sesar	ntne	zteil	(max	imal	)	110
		Ac	d-On USV Modul, optional	7,5	7,5	7,5	7,5	7,5	7,5	7,5	7,5	7,5	
							max	imal	mögl	ich b	ei 5V		55
		CF	PU Board, Fixverbraucher	14	18	25	17	21	23	23	37	37	
			Compact Flash, optional (Add-On)	1	1	1	1	1	1	1	1	1	
			rd Disk, optional (Add-On)	4	4	4	4	4	4	4	4	4	
			terne Tastatur PS/2, optional	1	1	1	1	1	1	1	1	1	
	2		SB Peripherie, optional ax. 2,5 Watt pro Anschluss USB1 und USB2)	5	5	5	5	5	5	5	5	5	
		Sc	hnittstellenoption (Add-On Interface), optional	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	
		Ğ	afikadapter (AP Link), optional	5	5	5	5	5	5	5	5	5	
		Ex	terner Verbraucher, optional (über BaseBoard)	5	5	5	5	5	5	5	5	5	
								١	/erbr	auch	er 5V	Σ	
							naxir	nal n	nöglid	ch be	i 3V3	,	23
	_	Sy	stemeinheit, Fixverbraucher	4	4	4	4	4	4	4	4	4	
- 1	33		afikadapter (AP Link), optional	5	5	5	5	5	5	5	5	5	
- 1	`	Sc	hnittstellenoption (Add-On Interface), optional	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	0,25	
-								Ve	erbra	uche	r 3V3	Σ	
Ī						m	axim	al m	iglich	n bei	+12\		12
ਡ∣	+12V	Lü	fter Kit, optional	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	
	Ŧ	Ex	terner Verbraucher, optional (über BaseBoard)	10	10	10	10	10	10	10	10	10	
<u> </u>								Ver	brau	cher	+12\	Σ	
Gesamtnetztei			Leistung F	PCI E	Bus u	nd S	lide-l	n Ne	zteil	(max	imal	)	50
<u>ة</u> ا			maxim	al m	öglic	h bei	5V F	CIB	us ur	nd Sli	de-Ir	1	50
			Pro Compact Flash, optional (Slide-In)	1	1	1	1	1	1	1	1	1	
- 1			Pro Hard Disk, optional (Slide-In)	4	4	4	4	4	4	4	4	4	
- 1			Pro Laufwerk, optional (Slide-In - CD/DVD)	4	4	4	4	4	4	4	4	4	
	ē	20	Leistungsangabe PCI Kartenhersteller, optional (max. 3 Watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit)										
-	E E		> maximal	mög	lich I	oei -1	2V P	CI Bu	ıs un	d Slic	de-In		1,2
1	Slide-In Netztei		Leistungsangabe PCI Kartenhersteller, optional (max. 1,2 Watt ohne und mit Lüfter Kit) <sup>1)</sup>										
-							Verb	raucl	her G	easn	nt 5V	Σ	
	اع		maxima	ıl mö	glich	bei :	3V3 F	CIB	us ur	nd Sli	de-Ir	1	23
	Bus und	3V3	Leistungsangabe PCI Kartenhersteller, optional (max. 3 Watt ohne Lüfter Kit, max. 17 Watt mit Lüfter Kit) 1)										
-	핅	•	(					Ve	erbra	uche	r 3V3	Σ	
	집		maximal	mög	lich l	oei +	12V F	CI B	us ur	nd Sli	de-Ir		12
		+12\	Leistungsangabe PCI Kartenhersteller, optional (max. 3 Watt ohne Lüfter Kit, max. 12 Watt mit Lüfter Kit) 1)										
								Ver	brau	cher	+12V	Σ	
ļ						Ges	amt F	CIB	us ur	nd Sli	de-Ir	Σ	
							١	erbra	auche	er Ge	sam	$\Sigma$	

<sup>1)</sup> Die Gesamtleistung einer PCI Karte pro PCI Steckplatz (= Summe der Leistungsaufnahmen pro Spannungsbereich) darf die max. Leistungsangabe mit und ohne Lüfter Kit nicht überschreiten.

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

Info	orm	atio	n:	_			stem	unit	5PC6	00.S	X05-(	01	This system
The Entr	entrie	r the	watts the Generator are maximum values. Device are determined maximum peak values.	5PC600.E815-00 ଛ	5PC600.E815-02 ⅔	5PC600.E815-03 🖁	5PC600.E855-04 g 5PC600.X855-04 8	5PC600.E855-05 ₩ 5PC600.X855-05 ®	5PC600.E855-00 ₩ 5PC600.X855-00 ଛ	5PC600.E855-02 ₩ 5PC600.X855-02 \$	5PC600.E855-01 W	5PC600.E855-03 ₩ 5PC600.X855-03 ≅	Enter values in this column
١.						T	otal p	owe	r sup	ply (	max.)	)	110
		Ad	d-On UPS module, optional	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	
								max.	pos	sible	at 5V	'	55
			U Board, fixed device	14	18	25	17	21	23	23	37	37	
			CompactFlash, optional (Add-On)	1	1	1	1	1	1	1	1	1	
			rd disk, optional (Add-On)	4	4	4	4	4	4	4	4	4	
	2		ernal keyboard PS/2, optional	1	1	1	1	1	1	1	1	1	
	-	(ma	B peripheral, optional x. 2.5 watts per USB1 and USB2 connection)	5	5	5	5	5	5	5	5	5	
			erface option (Add-On interface), optional	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
		Ex	ernal device, optional (via BaseBoard)	5	5	5	5	5	5	5	5	5	
									D	evic	es 5V	Σ	
							n	nax. p	ossi	ble a	t 3V3	3	23
	3V3		stem unit, fixed device	4	4	4	4	4	4	4	4	4	
	3	Inte	erface option (Add-On interface), optional	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
									De	vices	3V3	Σ	
							ma	ax. po	ossib	le at	+12V	,	12
ğ	2	Fai	n kit, optional	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
lns	+12V	Ex	ernal device, optional (via BaseBoard)	10	10	10	10	10	10	10	10	10	
er									Dev	ices	+12V	Σ	
Total power supply			P	CI bu	s and	d slid	le-in p	owe	r sup	ply (	max.)	)	50
tal			r	nax. į	ossi	ible a	t 5V I	PCI b	us aı	nd sli	ide-in	1	50
₽			Pro CompactFlash, optional (slide-in)	1	1	1	1	1	1	1	1	1	
	싕		Pro hard disk, optional (slide-in)	4	4	4	4	4	4	4	4	4	
	g		Pro drive, optional (slide-in - CD/DVD)	4	4	4	4	4	4	4	4	4	
	er s	20	DCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
	and slide-in power supply		<u> </u>	ax. po	ossib	le at	-12V I	PCI b	us aı	nd sli	ide-in	1	1.2
	e-in		PCI card manufacturer limit, optional (max. 1.2 watts without and with fan kit)										
	slic			Г				D	evice	es tot	al 5V	Σ	
	and	max. possible at 3V3 PCI bus and slide-in									1	23	
	snq	3V3	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 17 watts with fan kit) 1)										
	PCI			Г					De	vice	s 3V3	Σ	
			ma	x. po:	ssible	e at +	-12V I	PCI b	us aı	nd sli	ide-in	1	12
		12V	PCI card manufacturer limit, optional (max. 3 watts without fan kit, max. 12 watts with fan kit)  1)										
		+	· · · · · · · · · · · · · · · · · · ·	Г					Dev	ices	+12V	Σ	
						1	Total I	PCI b	us aı	nd sli	ide-in	Σ	
									De	vices	total	Σ	

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

## 2.12 Power management for the APC620 embedded system unit

### 2.12.1 Supply voltage for the 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02

The following block diagram presents the simplified structure of the APC620 embedded supply voltage for system units 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02.

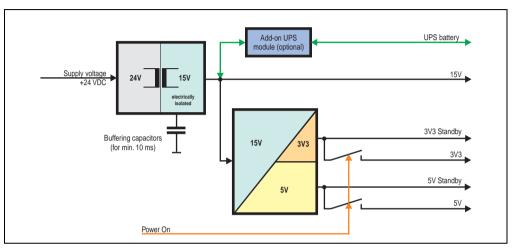


Figure 31: Supply voltage for the 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02

### **Explanation:**

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

After the system is turned on (e.g. using the power button), the voltages 3V3 and 5 V are placed on the bus.

The optional APC620 add-on UPS and battery unit is supplied with 15 V and provides an uninterrupted power supply from the 15 V bus during power failures.

2.12.2 Power calculation with 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-02

TBD

See section TBD for starting current values.

## 2.13 Humidity specifications

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

Components		Operation	Storage / Transport
815E CPU boards	(ETX)	10 - 90	5 - 95
855GME CPU box	ards (ETX / XTX)	10 - 90	5 - 95
System units - 1, 2	2, 3 and 5 PCI slot	5 - 90	5 - 95
Main memory for 0	CPU boards	10 - 90	5 - 95
	5AC600.HDDI-01 (ET)	8 - 90	5 - 95
Add-on drives	5AC600.HDDI-00 (24-hour/Standard)	8 - 90	5 - 95
	5AC600.HDDI-05 (ET, 24x7)	8 - 90	5 - 95
	5AC600.CDXS-00	8 - 80	5 - 95
	5AC600.DVDS-00	8 - 80	5 - 95
	5AC600.DVRS-00	8 - 80	5 - 95
Slide-in drives	5AC600.FDDS-00	20 - 80	10 - 95
	5AC600.HDDS-01 (ET)	8 - 90	5 - 95
	5AC600.HDDS-00 (24-hour/Standard)	8 - 90	5 - 95
	5AC600.HDDS-02 (ET, 24x7)	8 - 90	5 - 95
	5AC600.CANI-00	5 - 90	5 - 95
	5AC600.485I-00	5 - 90	5 - 95
Additional	5AC600.SDL0-00	5 - 90	5 - 95
insert cards interfaces	5ACPCI.RAIS-00 (24-hour/Standard)	8 - 90	5 - 95
AP Link	5ACPCI.RAIS-00 (24-hour/Standard)	8 - 90	5 - 95
	5ACPCI.RAIC-01 (24-hour/Standard)	8 - 90	5 - 95
	CompactFlash cards 5CFCRD.xxxx-03	8 - 95	8 - 95
Accessories	Flash drive 5MMUSB.xxxx-00	10 - 90	5 - 90
	USB Media Drive 5MD900.USB2-00	20 - 80	5 - 90

Figure 32: Overview of humidity specifications for individual components

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

## 2.14 Device interfaces

The following two graphics show the general and optional device interfaces on an APC620 complete device with 5 PCI slots or an APC620 embedded device.

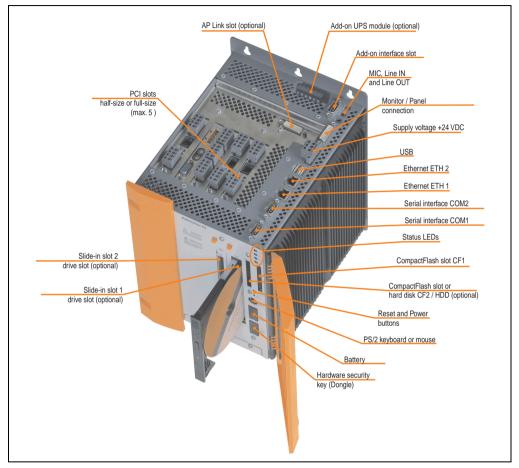


Figure 33: General device interfaces example - APC620 with 5 PCI slots

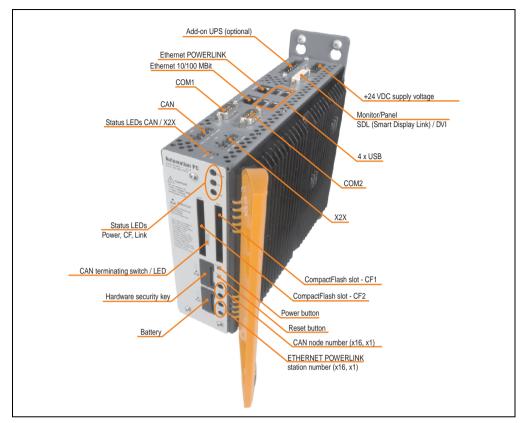


Figure 34: General device interfaces example - APC620 embedded

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

#### 2.14.1 Serial interfaces COM1

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

Table 26: 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 27: 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.

<sup>1)</sup> The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.

#### Technical data • Entire device

#### 2.14.2 Serial interfaces COM2

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

Table 28: 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 29: 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.

<sup>1)</sup> The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.

## 2.14.3 X2X (only APC620 embedded)

	X2X Link interfa	ce (only APC620 embedded)
The electrically isolate	ed X2X Link is a 4-pin multipoint connector.	
Pin	X2X Link	
1	X2X	X2X
2	X2X⊥	1-2-3-4-
3	X2X\	9 9 9 9 9 9
4	SHLD (shield)	X2X X2X⊥ X2X\ SHLD
		0000

Table 30: X2X pin assignments (only APC620 embedded)

## **Driver support**

The fieldbus interface X2X is only supported together with Automation Runtime (for more information, see section "Automation PC 620 with Automation Runtime" on page 511).

### 2.14.4 CAN (only APC620 embedded)

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

Table 31: CAN pin assignments (only APC620 embedded)

## **Driver support**

The fieldbus interface CAN is only supported together with Automation Runtime (for more information, see section "Automation PC 620 with Automation Runtime" on page 511).

### 2.14.5 CAN node number (only APC620 embedded)

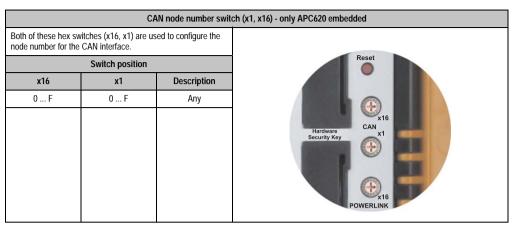


Table 32: CAN node number switch (x1, x16) - only APC620 embedded

## 2.14.6 CAN terminating switch / LED (only APC620 embedded)

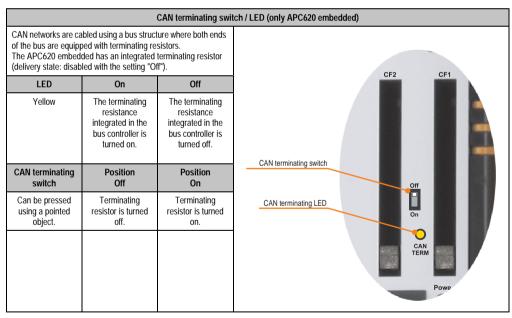


Table 33: CAN terminating switch / LED (only APC620 embedded)

## 2.14.7 Status LEDs CAN / X2X (only APC620 embedded)

		Status LEDs CAN
		_
Yellow LED for	On	Off
CAN	Sends data	Receives data
X2X	Sends data	Receives data

Table 34: Status LEDs CAN / X2X (only APC620 embedded)

#### 2.14.8 Ethernet POWERLINK (only APC620 embedded)

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

Table 35: Ethernet POWERLINK (only APC620 embedded)

#### **Driver support**

The fieldbus interface Ethernet POWERLINK is only supported together with Automation Runtime (for more information, see section "Automation PC 620 with Automation Runtime" on page 511).

#### Status / Error LED

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

## Technical data • Entire device

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

Table 36: Status / Error LED as error LED - Ethernet POWERLINK V2 operating mode

Green - status	Description
Off NOT_ACTIVE	Managing Node (MN) The bus is monitored for POWERLINK frames. If a frame is not received within the configured time window (timeout), the interface goes directly into PRE_OPERATIONAL_1 status (single flash). If, however, POWERLINK communication is detected before this time passes, the interface goes directly into the BASIC_ETHERNET status (flickering).  Controlled Node (CN) The bus is monitored for POWERLINK frames. If a frame is not received within the configured time window (timeout), the interface goes directly into BASIC_ETHERNET status (flickering). If, however, POWERLINK communication is detected during this time, the interface goes directly into the PRE_OPERATIONAL_1 status (single flash).
Green flickering (approx. 10 Hz) BASIC_ETHERNET	The interface is in BASIC_ETHERNET status, and is operated purely as an Ethernet TCP/IP interface.  Managing Node (MN) This status can only be changed by resetting the interface. Controlled Node (CN) If POWERLINK communication is detected while in this status, the interface goes into the PRE_OPERATIONAL_1 state (single flash).
Single flash (approx. 1 Hz) PRE_OPERATIONAL_1	The interface status is PRE_OPERATIONAL_1.  Managing Node (MN)  The MN starts the operation of the "reduced cycle". Collisions are allowed on the bus. There is not yet any cyclic communication.  Controlled Node (CN)  The CN waits until it receives an SoC frame and then switches to PRE_OPERATIONAL_2 status (double flash).
Double flash (approx. 1 Hz) PRE_OPERATIONAL_2	The interface status is PRE_OPERATIONAL_2.  Managing Node (MN)  The MN begins with the cyclic communication (cyclic input data is not yet evaluated). The CNs are configured in this status.  Controlled Node (CN)  In this status the interface is normally configured by the manager. After this, a command changes the status to READY_TO_OPERATE (triple flash).
Triple flash (approx. 1 Hz) READY_TO_OPERATE	The interface status is READY_TO_OPERATE.  Managing Node (NN)  Normal cyclic and asynchronous communication. Received PDO data is ignored.  Controlled Node (CN)  The configuration of the interface is complete. Normal cyclic and asynchronous communication. The PDO data sent corresponds to the PDO mapping used. However, cyclic data is not yet evaluated.
On OPERATIONAL	The interface status is OPERATIONAL.
Blinking (approx. 2.5 Hz) STOPPED	The interface status is STOPPED.  Managing Node (MN) This status is not possible for the MN. Controlled Node (CN) No output data is produced and no input data is received. Only the appropriate command from the manager can enter or leave this state.

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

## 2.14.9 Ethernet POWERLINK station number (only APC620 embedded)

		Ethernet POWER
station nu	umber for th	vitches (x16, x1) are used to configure the e Ethernet POWERLINK. Station numbers en #00 and #FD.
		Switch position
x16	х1	Description
0	0	Operation as managing node
0 F	1 D	station number Operation as controlled node
F	E	Reserved
F	F	Reserved

Table 38: Ethernet POWERLINK station number (x1, x16) - only APC620 embedded

## 2.14.10 Ethernet connection ETH (only APC620 embedded)

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

		Ethernet connection
Controller	ller Intel	82562
Cabling	ng S/STP	(Cat5e)
Transfer rate	rate 10/100	MBit/s 1)
Cable length	ngth max. 100 m	(min. Cat5e)
LED	On On	Off
Green	n 100 MBit/s	10 MBit/s
Orange	ge Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)

Table 39: Ethernet connection ETH (only APC620 embedded)

<sup>1)</sup> Both operating modes possible. Change-over takes place automatically.

#### 2.14.11 Ethernet connection ETH1

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

Controller
Cabling
Transfer rate
Cable length
LED
Green
Orange

Table 40: Ethernet connection (ETH1)

### **Driver support**

A special driver is necessary for operating the Intel Ethernet controller 82562. Drivers for Windows XP Professional, Windows XP Embedded, and DOS are available for download on the B&R Homepage in the download area (<a href="https://www.br-automation.com">www.br-automation.com</a>).

<sup>1)</sup> The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.

<sup>2)</sup> Both operating modes possible. Change-over takes place automatically.

#### Ethernet cable length when 855GME (ETX) CPU boards are used.

The supported cable length depends on the system unit revision when using Intel 855GME CPU boards (5PC600.E855-xx (ETX)).

	Cable length with CAT5e cable			
System unit	Up to 50 meters	Up to 80 meters <sup>1)</sup>		
5PC600.SX01-00	Revision < H0	Starting with Revision H0		
5PC600.SX02-00	Revision < F5	Starting with Revision F5		
5PC600.SX02-01	Revision < G5 Starting with Revision G			
5PC600.SF03-00	-	Starting with Revision A0		
5PC600.SX05-00	Revision < G0 Starting with Revision G0			
5PC600.SX05-01	Revision < G0	Starting with Revision G0		

Table 41: Ethernet cable length in conjunction with 5PC600.E855-xx CPU boards (ETX)

## Ethernet cable length when 855GME (XTX) CPU boards are used.

The supported cable length depends on the system unit revision when using Intel 855GME CPU boards (5PC600.E855-xx (XTX)).

	Cable length with CAT5e cable			
System unit	Up to 50 meters	Up to 100 meters		
5PC600.SX01-00	Revision < H0	Starting with Revision H0		
5PC600.SX02-00	Revision < F5 Starting with Revision F9			
5PC600.SX02-01	Revision < G5	Starting with Revision G5		
5PC600.SF03-00	- Starting with Revision A0			
5PC600.SX05-00	Revision < G0	Starting with Revision G0		
5PC600.SX05-01	Revision < G0	Starting with Revision G0		

Table 42: Ethernet cable length in conjunction with 5PC600.E855-xx CPU boards

### Special features when 855GME (XTX) CPU boards are used.

The hardware supports Auto MDX, which means an integrated switch automatically determines if the connected cable is crossed or not and adjusts itself accordingly. However, Auto MDX must be supported by the Ethernet driver used by the operating system.

B&R recommends not using the Auto MDX function during cabling, and instead using it only as a diagnostics or testing feature.

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

#### 2.14.12 Ethernet connection ETH2

This Ethernet connection is integrated in the system unit.

		Ethernet	t connection (ETH2 <sup>1)</sup> )	
Controller	Intel 82	2551ER		
Cabling	S/STP (Cat5e)		RJ45 twisted pair (10BaseT/100BaseT), female	
Transfer rate	10/100	MBit/s <sup>2)</sup>		
Cable length	max. 100 m	nax. 100 m (min. Cat5e)		
LED	On	Off		
Green	100 MBit/s	10 MBit/s	NAME OF THE PARTY	
Orange	Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)	0,0,0	

Table 43: Ethernet connection (ETH2)

### **Driver support**

A special driver is necessary for operating the Intel Ethernet controller 82551ER. Drivers for Windows XP Professional, Windows XP Embedded, and DOS are available for download on the B&R Homepage in the download area (<a href="https://www.br-automation.com">www.br-automation.com</a>).

<sup>1)</sup> The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.

<sup>2)</sup> Both operating modes possible. Change-over takes place automatically.

### 2.14.13 USB port

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

See the section "USB connection (only APC620 embedded)" on page 120 for a description of the USB connections on APC620 embedded devices.

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

Table 44: USB port

- The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.
- 2) For safety, every USB port is equipped with a maintenance free "USB current-limiting circuit breaker" (max. 500 mA)

# Warning!

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

# Important!

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

#### **Driver support**

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

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

#### 2.14.14 USB connection (only APC620 embedded)

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

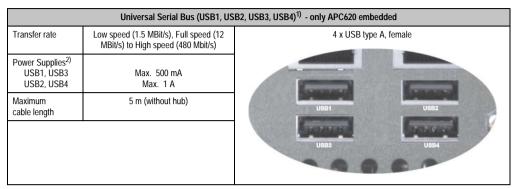


Table 45: USB connections 4 x - only APC620 embedded

- 1) The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.
- 2) For safety, every USB port is equipped with a maintenance free "USB current-limiting circuit breaker" (max. 500 mA or 1 A). The sum of all 4 USB ports must not exceed the limit of 2 A.

# Warning!

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

## Important!

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

### 2.14.15 +24 VDC supply voltage

The Automation PC 620 has a 24 VDC ATX compatible power supply. Depending on the system unit, the power supply provides the following maximum performances (in watts).

System unit	Max. power at + 5 V	Max. power at + 3V3	Max. power at + 12 V	Max. power at - 12 V	Max. total power
5PC600.SX01-00	55	23	12	1.2	70
5PC600.SX02-00	55	23	12	1.2	70
5PC600.SX02-01	55	23	12	1.2	70
5PC600.SF03-00	105	46	24	1.2	110
5PC600.SX05-00	105	46	24	1.2	110
5PC600.SX05-01	105	46	24	1.2	110
5PC600.SE00-00	55	23	12	1.2	55
5PC600.SE00-01	55	23	12	1.2	55
5PC600.SE00-02	55	23	12	1.2	55

Table 46: Power supply depending on the system unit

The 3-pin socket required for the supply voltage connection is not included in delivery. This can be ordered from B&R using the model number 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp).

The pin assignments can be found either in the following table or printed on the APC620 housing. The supply voltage is internally protected (10A, fast-acting), so that the device cannot be damaged if there is an overload (fuse replacement necessary) or if the voltage supply is connected incorrectly (reverse polarity protection - fuse replacement not necessary).

	Supply voltage					
Prote	cted against reverse polarity	3-pin, male				
Pin	Description					
1	+	Power 24 VDC + -				
2	Functional grounding					
3	-	1 2 3				
Accessories		666				
0TB103.9	Plug 24 V 5.08 3p screw clamps	20.0.0				
0TB103.91	Plug 24 V 5.08 3p cage clamps					

Figure 35: Supply voltage connection

### **Ground**

## Important!

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

The grounding connection can be found on the bottom of the APC620 systems. The M4 self-locking nut can be used, for example, to fasten a copper strip that is built into the APC620 at a central grounding point in the switching cabinet or system. The largest possible conductor cross section should be used (at least 2.5 mm²).



Figure 36: Ground connection

Also see the section "Grounding concept" on page 267.

## **Starting current**

System unit	Typical	Maximum
5PC600.SX01-00	7 A	40 A (time < 300 μs)
5PC600.SX02-00	7 A	40 A (time < 300 μs)
5PC600.SX02-01	7 A	40 A (time < 300 μs)
5PC600.SF03-00	10 A	40 A (time < 300 μs)
5PC600.SX05-00	10 A	40 A (time < 300 μs)
5PC600.SX05-01	10 A	40 A (time < 300 μs)

Table 47: Starting currents in the voltage supply to the system units

## Quick switching on/off of the power supply

If the APC620 is in Standby mode (e.g. Windows XP shutdown), then buffering takes a little more time due to capacitors and low power consumption. If the "Power Loss Control" option is set to "Power On" or "Last State" in BIOS, then a system with one of the system unit revisions in table

48 "System unit revisions for at least 10 seconds standby time" might not restart because a Power Off/On was not detected. To make sure that these system units will restart after a Power Off/On, the standby time should be set to at least 10 seconds.

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

Table 48: System unit revisions for at least 10 seconds standby time

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

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

Table 49: System unit revisions for any standby times

#### 2.14.16 Monitor / Panel connection

When using this video output, understand that the video signals that are available (RGB, DVI, and SDL - Smart Display Link) will vary depending on the system unit and CPU board.

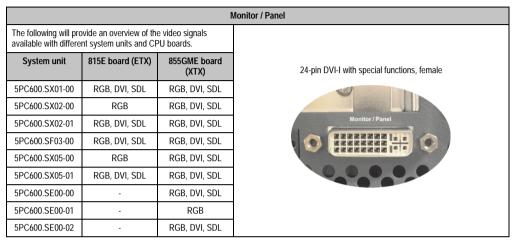


Figure 37: Monitor / Panel connection

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

## Caution!

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

See "Definitions for RGB, DVI, SDL" on page 128 for descriptions of RGB, DVI and SDL.

## Pin assignments

Pin	Assignment	Pin	Assignment	
1	T.M.D.S. data 2-	16	Hot Plug detect	
2	T.M.D.S. data 2+	17	T.M.D.S. data 0-	
3	T.M.D.S. data 2/SDL shield	18	T.M.D.S. data 0+	
4	SDL-	19	T.M.D.S. DATA 0/XUSB1 shield	
5	SDL+	20	XUSB1-	
6	DDC clock	21	XUSB1+	
7	DDC data	22	T.M.D.S. clock shield	DVI-I 24 pin, female
8	Analog vertical sync	23	T.M.D.S. clock +	12345678
9	T.M.D.S. DATA 1-	24	T.M.D.S. clock -	1 2 3 4 5 6 7 8 c1 c2 9 10 11 12 13 14 15 16 c1 c2 7 17 18 19 20 21 22 23 24 c3 c4
10	T.M.D.S. DATA 1+	c1	Analog red video out	17 18 19 20 21 22 23 24 c3 64 c5
11	T.M.D.S. DATA 1/XUBS0 shield	c2	Analog green video out	
12	XUSB0-	c3	Analog blue video out	
13	XUSB0+	c4	Analog horizontal sync	
14	+ 5 V Power <sup>1)</sup>	c5	Analog ground (analog R, G and B return)	
15	Ground (return for + 5V, HSync and VSync)			

Table 50: Pin assignments - Monitor / panel connection

## Cable lengths and resolutions for SDL transfer

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

Cables	Resolution					
Segment length [m]	VGA SVGA		XGA	SXGA	UXGA	
	640 x 480 800 x 600		1024 x 768	1280 x 1024	1600 x 1200	
1.8	5CASDL.0018-00	5CASDL.0018-00	5CASDL.0018-00	5CASDL.0018-00	5CASDL.0018-00	
	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01	
	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03	
5	5CASDL.0050-00	5CASDL.0050-00	5CASDL.0050-00	5CASDL.0050-00	5CASDL.0050-00	
	5CASDL.0050-01	5CASDL.0050-01	5CASDL.0050-01	5CASDL.0050-01	5CASDL.0050-01	
	5CASDL.0050-03	5CASDL.0050-03	5CASDL.0050-03	5CASDL.0050-03	5CASDL.0050-03	
10	5CASDL.0100-00	5CASDL.0100-00	5CASDL.0100-00	5CASDL.0100-00	5CASDL.0100-00 <sup>1)</sup>	
	5CASDL.0100-01	5CASDL.0100-01	5CASDL.0100-01	5CASDL.0100-01	5CASDL.0100-01 <sup>1)</sup>	
	5CASDL.0100-03	5CASDL.0100-03	5CASDL.0100-03	5CASDL.0100-03	5CASDL.0100-03 <sup>1)</sup>	

Table 51: Segment lengths, resolutions and SDL cables

<sup>1)</sup> Protected internally by a multifuse

#### Technical data • Entire device

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

Table 51: Segment lengths, resolutions and SDL cables (cont.)

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

Table 52: Requirements for SDL cable with automatic cable adjustment (equalizer)

<sup>1)</sup> See table 52 "Requirements for SDL cable with automatic cable adjustment (equalizer)" on page 126

<sup>2)</sup> See table 53 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)" on page 127

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

Table 53: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

#### **Definitions for RGB, DVI, SDL**

#### RGB means:

 It is possible to connect RGB monitors (with adapter, model nr. 5AC900.1000-00) and office RGB TFT displays.

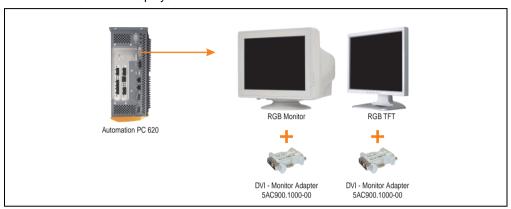


Figure 38: Monitor / Panel connection with RGB video signal

#### DVI means:

 Connection of B&R Automation Panel 900 display units with Automation Panel Link DVI Receiver (Model nr. 5DLDVI.1000-01), Office Digital/DVI Monitors and Office DVI TFT Displays is possible.

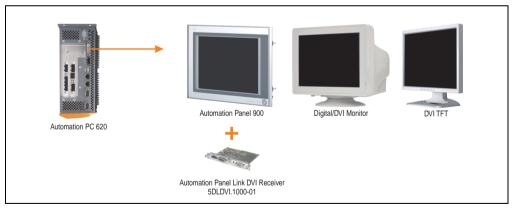


Figure 39: Monitor / Panel connection with DVI video signal

For examples and possibilities for connecting Automation Panel 900 display units via DVI, see Appendix A, chapter 3 "Start-up", section 4 "Connection examples", starting on page 268.

### SDL (Smart Display Link) means:

 Connection of B&R Automation Panel 800 and Automation Panel 900 display units with Automation Panel Link SDL receiver (Model nr. 5DLSDL.1000-01) or SDL transceiver (Model nr. 5DLSDL.1000-01).

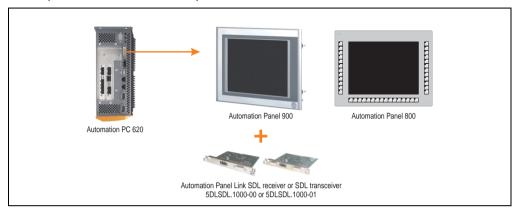


Figure 40: Monitor / Panel connection with SDL video signal

For examples and possibilities for connecting Automation Panel 900 and Automation Panel 800 display units via SDL, see Appendix A, chapter 3 "Start-up", section 4 "Connection examples", starting on page 268.

### 2.14.17 MIC, Line IN and Line OUT ports

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

## Information:

APC620 embedded devices do not have these connections.

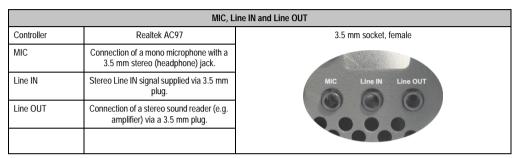


Table 54: Technical data - MIC, Line IN and Line OUT port

### **Driver support**

A special driver is necessary for operating the AC97 sound chip (Realtek). Drivers for Windows XP Professional and Windows XP Embedded are available for download on the B&R Homepage in the download area (<a href="https://www.br-automation.com">www.br-automation.com</a>).

#### 2.14.18 Add-on interface slot

An optional add-on interface (e.g. CAN, RS485) can be installed here. See also section 3.9 "Interface options" on page 234.

## Information:

APC620 embedded devices do not have this connection.

		Add-on interface slot
Available add-on in	nterfaces	
5AC600.CANI-00	Add-on CAN interface	IF Option
5AC600.485I-00	Add-on RS232/422/485 interface	
		Ic Line IN Line OUT
İ		

Table 55: Add-on interface slot

# Information:

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

#### 2.14.19 Add-on UPS module slot

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

	Add-	on UPS module slot
APC620 add-on UP	S module + accessories	
5AC600.UPSI-00	Add-on UPS module	
5AC600.UPSB-00	Battery unit 5 Ah	UPS
5CAUPS.0005-00	APC620 UPS cable 0.5 m	
5CAUPS.0030-00	APC620 UPS cable 3 m	

Table 56: Add-on UPS module slot

## Information:

An add-on UPS module can be installed with the following system unit revisions or later:

- 5PC600.SX01-00 starting with H0
- 5PC600.SX02-00 starting with G0
- 5PC600.SX02-01 starting with H0
- 5PC600.SF03-00 starting with A0
- 5PC600.SX05-00 starting with F0
- 5PC600.SX05-01 starting with F0
- 5PC600.SE00-00 starting with A0
- 5PC600.SE00-01 starting with A0
- 5PC600.SE00-02 starting with A0

For more on the UPS module, see chapter 6 "Accessories", section 13 "APC620 UPS" on page 652.

For info on configuring the UPS module, see chapter 4 "Software", section 7.2 "UPS configuration" on page 540.

For info on installing the UPS module, see chapter 7 "Maintenance / Servicing", section 4 "Installation of the UPS module" on page 689.

#### 2.14.20 AP Link slot

The option of inserting and using an AP Link card is only possible with system units 5PC600.SX02-00, 5PC600.SF03-00 and 5PC600.SX05-00.

For more information see section 3.11 "AP Link cards" on page 248.

## Information:

APC620 embedded devices do not have this option.

#### 2.14.21 PCI slots

## Information:

APC620 embedded devices do not have a PCI slot.

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

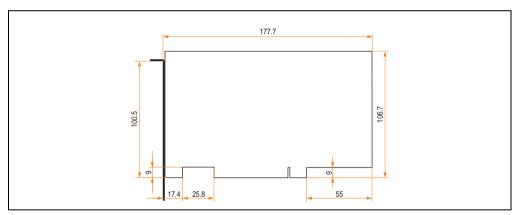


Figure 41: Dimensions - Standard half-size PCI cards

#### Technical data • Entire device

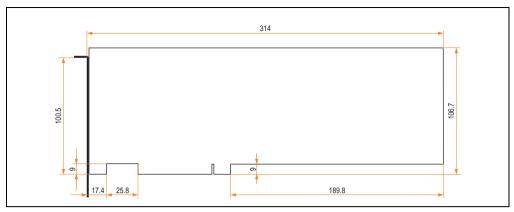


Figure 42: Dimensions - Standard full-size PCI cards

## Information:

The total performance of one PCI card per PCI slot should not exceed the limit with or without a fan kit (see section "Power management APC620 system unit with 1 PCI slot" on page 84 or section "Power management APC620 system unit with 3 PCI slots" on page 94 and "Power management APC620 system units with 5 PCI slots" on page 96).

#### **Technical data**

Features	PCI bus properties
Default	PCI 2.2
Design	Half-size PCI or full-size PCI <sup>1)</sup> 5 Volt connector
PCI bus type	32-bit
PCI bus speed	33 MHz

Table 57: Technical data - PCI bus

<sup>1)</sup> Only in conjunction with system unit 5PC600.SF03-00.

## Voltages on the PCI slot plug (plug-in PCI cards)

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

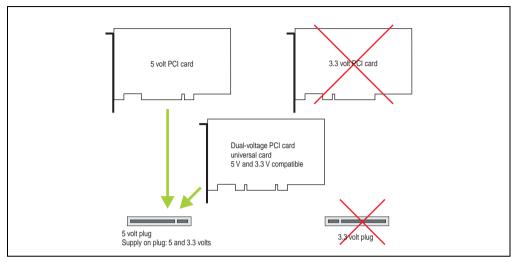


Figure 43: PCI connector type: 5 volt

#### 2.14.22 Status LEDs

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

See the section "Status LEDs Power, CF, Link (only APC620 embedded)" on page 137 for a description of the status LEDs on APC620 embedded devices.

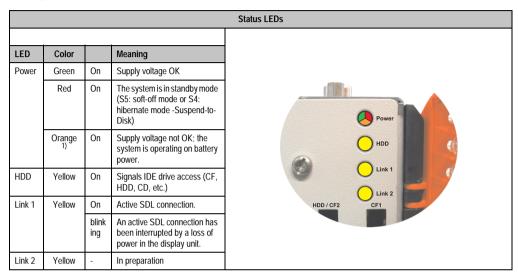


Table 58: Technical data - Status LEDs

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



Figure 44: Front-side status LEDs

<sup>1)</sup> Only lit when add-on UPS module is installed.

## 2.14.23 Status LEDs Power, CF, Link (only APC620 embedded)

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

	Status LEDs Power, CF, Link (only APC620 embedded)				
LED	Color		Meaning		
	Green	On	Supply voltage OK		
Power	Red	On	The system is in standby mode (S5: soft-off mode or S4: hibernate mode -Suspend-to- Disk)		
	Orange 1)	On	Supply voltage not OK; the system is operating on battery power.		
CF	Yellow	On	Indicates access to CompactFlash (read or write)		
		On	Active SDL connection on the monitor/panel connection		
Link	Yellow	blink ing	An active SDL connection has been interrupted by a loss of power in the display unit.		
		Off	No active SDL connection		

Table 59: Status LEDs Power, CF, Link (only APC620 embedded)

<sup>1)</sup> Only lit when add-on UPS module is installed.

#### 2.14.24 CompactFlash slot (CF1)

This CompactFlash slot is a fixed component of an APC620 system, and is defined in BIOS as the primary master drive. Type I CompactFlash cards are supported. Available CompactFlash cards - see table 15 "Model numbers - CompactFlash cards" on page 37.

See the section "CompactFlash slots (only APC620 embedded)" on page 140 for a description of the CompactFlash slots on APC620 embedded devices.

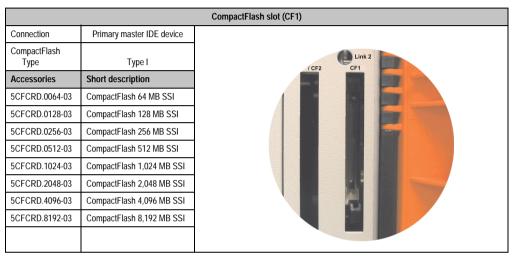


Table 60: Technical data - CompactFlash slot (CF1)

# Warning!

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

### 2.14.25 Hard disk / CompactFlash slot (HDD/CF2)

This slot allows for the installation of a hard disk or a second CompactFlash slot (type I CompactFlash card) as add-on drives (see table 5.7 "Drives" for available add-on drives). The add-on drive is referred to in BIOS as the primary slave drive.

See the section "CompactFlash slots (only APC620 embedded)" on page 140 for a description of the CompactFlash slots on APC620 embedded devices.

## Information:

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

	Hard disl
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
5AC600.HDDI-06	Add-on hard disk 80 GB ET, 24/7
Add-on CompactF	lash slot
5AC600.CFSI-00	Add-on CompactFlash slot
CompactFlash Type	Туре І
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 1,024 MB SSI
5CFCRD.2048-03	CompactFlash 2,048 MB SSI
5CFCRD.4096-03	CompactFlash 4,096 MB SSI
5CFCRD.8192-03	CompactFlash 8,192 MB SSI

Table 61: Technical data - Hard disk / CompactFlash slot (HDD/CF2)

# Warning!

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

## 2.14.26 CompactFlash slots (only APC620 embedded)

These CompactFlash slots are a fixed part of an APC620 embedded system and are defined in the BIOS as Primary Master (CF1) and Primary Slave (CF2) drive. Type I CompactFlash cards are supported.

	Comp	actFlash slot (CF1 / CF2)
Connection CF1 CF2	Primary master IDE device Primary slave IDE device	
CompactFlash Type	Туре І	CF2 CF1
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 1,024 MB SSI	Off □
5CFCRD.2048-03	CompactFlash 2,048 MB SSI	
5CFCRD.4096-03	CompactFlash 4,096 MB SSI	On On
5CFCRD.8192-03	CompactFlash 8,192 MB SSI	CAN
		Ejector Powe

Table 62: CompactFlash slots (CF1 / CF2) - APC620 embedded

# Warning!

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

#### 2.14.27 Power button

Due to the complete ATX power supply support, the power button serves various functions. These functions can be configured either in the BIOS setup (see BIOS function "Power button function" in section "Power" on page 361 for 815E CPU boards (ETX), or section "Power" on page 417 for 855GME CPU boards (ETX) or section "Power" on page 474 for 855GME CPU boards (XTX)) or, for example, in the operating system Windows XP.

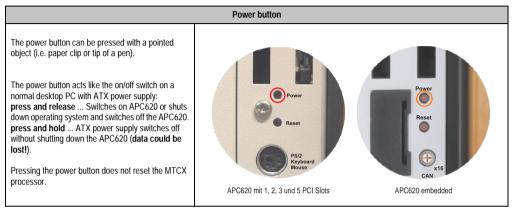


Table 63: Technical data - Power button

#### 2.14.28 Reset button

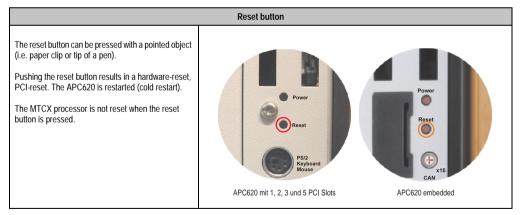


Table 64: Technical data - Reset button

# Warning!

A system reset can cause data to be lost!

#### 2.14.29 PS/2 keyboard/mouse

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

## Information:

APC620 embedded devices do not have a PCI slot.

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	Reset		
3	GND	5 3 1		
4	+5 V <sup>1)</sup>	PS/2 Keyboard		
5	CLK 0	Keyboard Mouse		
6	CLK 1	6 4 2		

Table 65: Technical data - PS/2 keyboard/mouse (external PS/2)

# 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").

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

#### 2.14.30 Battery

The lithium battery (3 V, 950 mAh) buffers the internal real-time clock (RTC) as well as the individually saved BIOS settings and is located behind the black cover. The buffer duration of the battery is at least 4 years (2 1/2 years with the SRAM module model number 5AC600.SRAM-00 or with an APC620 embedded system unit and at 50°C, 8.5 mA current requirements of the supplied components and a self discharge of 40%). The battery is subject to wear and should be replaced regularly (at least following the specified buffer duration).

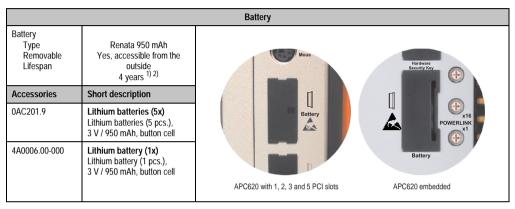


Table 66: Technical data - battery

- 1) at 50°C, 8.5 µA of the supplied components and a self discharge of 40%.
- 2) The buffer duration is 2 1/2 years if a SRAM module (Mod.Nr. 5AC600.SRAM-00) is installed or in conjunction with an APC620 embedded system unit.

For more on changing the lithium battery, see chapter 7 "Maintenance / Servicing", section "Changing the battery" on page 667.

For technical information on the lithium battery, see chapter 6 "Accessories", section 3 "Replacement CMOS batteries" on page 579.

#### **Battery status evaluation**

The battery status is evaluated immediately following start-up of the device and is subsequently checked by the system every 24 hours. The battery is subjected to a brief load (1 second) during the measurement and then evaluated. The evaluated battery status is displayed in the BIOS Setup pages (under Advanced - Baseboard monitor) and in the B&R Control Center (ADI driver), but can also be read in a customer application via the ADI Library.

Battery status	Meaning
N/A	Hardware, i.e. firmware used is too old and does not support read.
GOOD	Data buffering is guaranteed

Table 67: Meaning of battery status

#### Technical data • Entire device

Battery status	Meaning
BAD	Data buffering is guaranteed for approx. another 500 hours from the point in time that the battery capacity is determined to be BAD (insufficient).

Table 67: Meaning of battery status

#### Hardware requirements (system unit)

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

### Firmware / BIOS requirements

- APC620 / Panel PC 700 Firmware Upgrade V1.19 (MTCX PX32: V1.63, MTCX FPGA V1.19)
- BIOS 855GME (ETX) V1.26, BIOS 855GME (XTX) V1.14

#### 2.14.31 Hardware security key

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

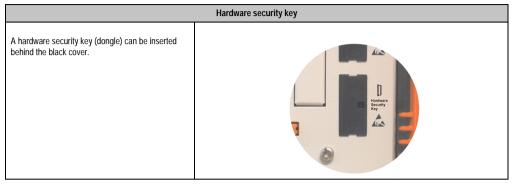


Table 68: Technical data - Hardware security key

# Warning!

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

#### I/O address and IRQ

Resource	Default setting	Additional setting options
I/O address	378	278, 3BC
IRQ	-	-

Table 69: Hardware security key - I/O address and IRQ

The setting for the I/O address and the IRQ can be changed in the BIOS setup (under "Advanced" - submenu "I/O device configuration" setting "Parallel port").

#### 2.14.32 Slide-in slot 1 drive slot

The "slide-in slot 1" drive slot exists only in APC620 system units with 2, 3 or 5 PCI slots. It is possible to insert a number of slide-in drives into it. See table for available slide-in drives 9 "Model numbers - Drives" on page 35.

For instructions about installing and replacing a slide-in, see chapter 7 "Maintenance / Servicing", section 3 "Slide-in drive - installation and exchange" on page 686.

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

### Information:

- It is possible to add, remove, or modify the slide-in drive at any time.
- In system units with 5 PCI slots, the slide-in USB FDD (5AC600.FDDS-00) drive must be inserted in slide-in slot 1 for mechanical reasons. The slide-in drive 5AC600.CFSS-00 (slide-in CF 2-slot) should only be operated in slide-in slot 2.

## Caution!

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

	Slide-in slot 1						
Connection	Secondary slave IDE device						
Accessories	Short description						
5AC600.CDXS-00	Slide-in CD-ROM						
5AC600.CFSS-00	Slide-in CF 2-slot						
5AC600.DVDS-00	Slide-in DVD-ROM/CD-RW	/e Compact HDD / CF2					
5AC600.DVRS-00	Slide-in DVD-R/RW, DVD+R/RW	power is on! Slide-In Slot 1					
5AC600.FDDS-00	Slide-in USB FDD	tention!					
5AC600.HDDS-00	30 GB 24x7 slide-in hard disk	scautions for					
5AC600.HDDS-01	20 GB ET slide-in hard disk	lectrostatic rices.					
5AC600.HDDS-02	40 GB 24x7 ET slide-in hard disk						

Table 70: Technical data - Slide-in slot 1

#### 2.14.33 Slide-in slot 2 drive slot

The "slide-in slot 2" drive slot exists only in APC620 system units with 5 PCI slots. It is possible to insert a number of slide-in drives into it. See table for available slide-in drives 9 "Model numbers - Drives" on page 35.

For instructions about installing and replacing a slide-in, see chapter 7 "Maintenance / Servicing", section 3 "Slide-in drive - installation and exchange" on page 686.

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

### Information:

- It is possible to add or remove a slide-in drive at any time.
- In system units with 5 PCI slots, the slide-in USB FDD drive (5AC600.FDDS-00) must be inserted in slide-in slot 1.
   The double CompactFlash slide-in drive (5AC600.CFSS-00) should only be used in slide-in slot 2.

### Caution!

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

		Slide-in slot 2
Connection	Secondary master IDE device	
Accessories	Short description	
5AC600.CDXS-00	Slide-in CD-ROM	
5AC600.CFSS-00	Slide-in CF 2-slot	
5AC600.DVDS-00	Slide-in DVD-ROM/CD-RW	HDD / CF2 Slide-In Slide-In
5AC600.DVRS-00	Slide-in DVD-R/RW, DVD+R/RW	Slot 2 Slot 1
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 24x7, ET	

Table 71: Technical data - Slide-in slot 2

#### 2.15 Serial number sticker

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

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

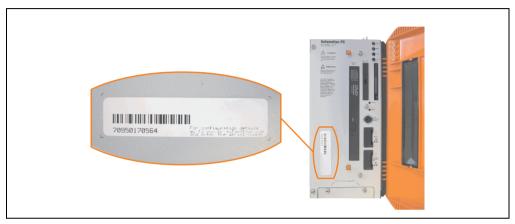


Figure 45: APC620 serial number sticker on front-side

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

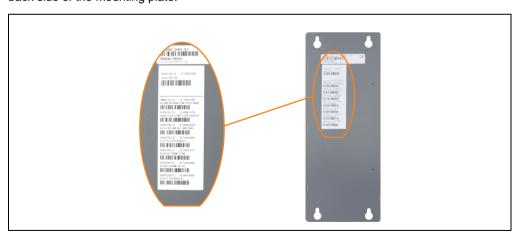


Figure 46: APC620 serial number sticker on back-side

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

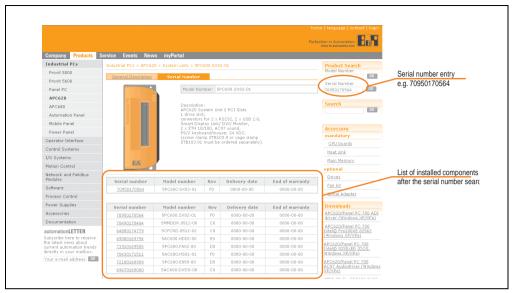


Figure 47: Example of serial number search: 70950170564

#### 2.16 Block diagram

The following block diagrams show the simplified structure according to the system unit being used with a 855GME CPU board (ETX / XTX).

#### 2.16.1 Entire device with system unit 5PC600.SX01-00

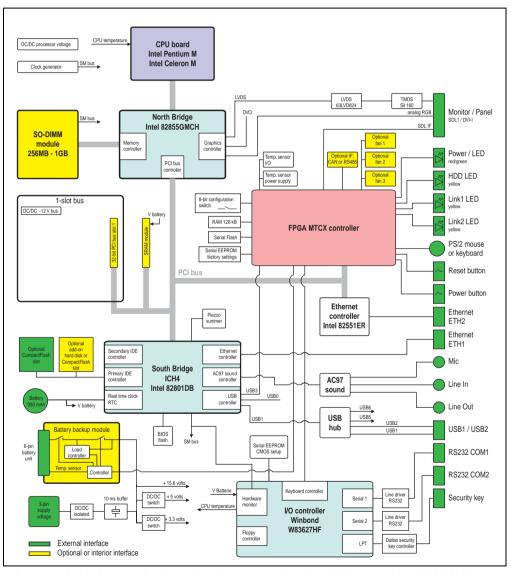


Figure 48: Block diagram of entire device with system unit 5PC600.SX01-00 and 855GME CPU board

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

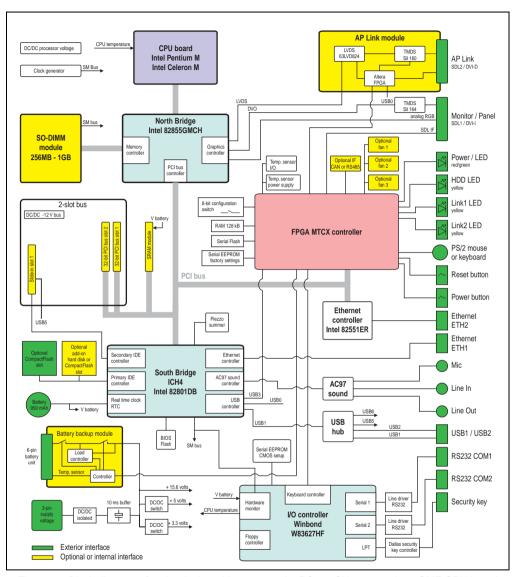


Figure 49: Block diagram of entire device with system unit 5PC600.SX02-00 and 855GME CPU board

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

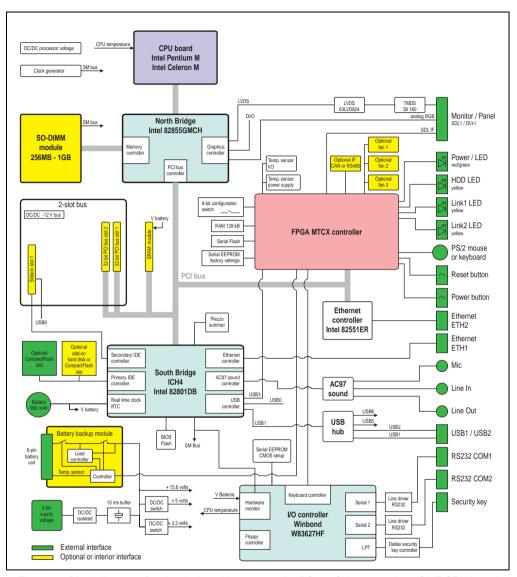


Figure 50: Block diagram of entire device with system unit 5PC600.SX02-01 and 855GME CPU board

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

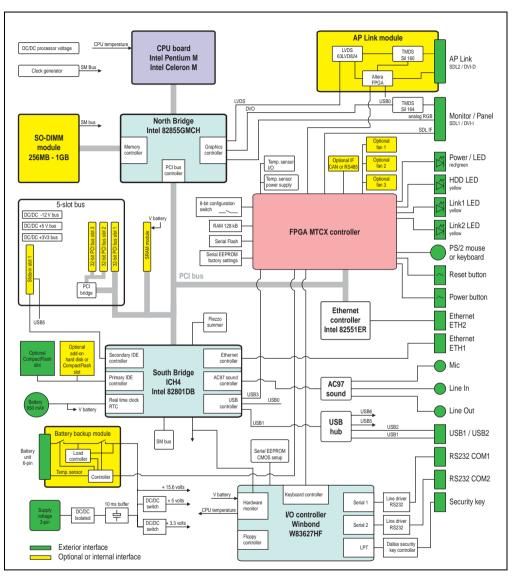


Figure 51: Block diagram of entire device with system unit 5PC600.SF03-00 and 855GME CPU board

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

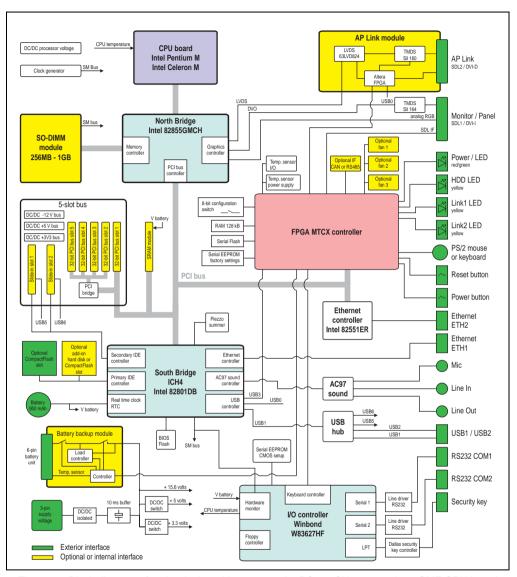


Figure 52: Block diagram of entire device with system unit 5PC600.SX05-00 and 855GME CPU board

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

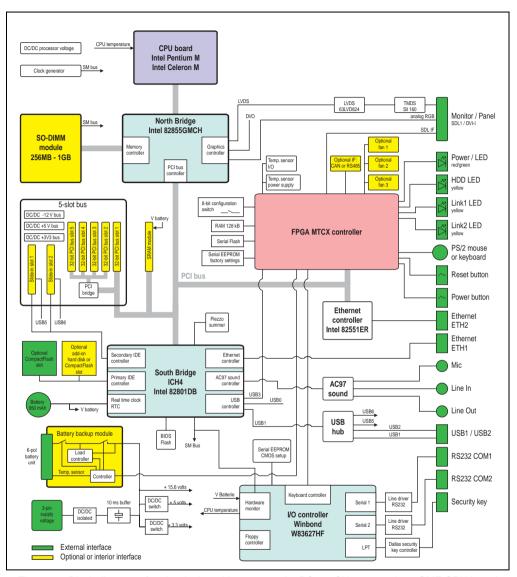


Figure 53: Block diagram of entire device with system unit 5PC600.SX05-01 and 855GME CPU board

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

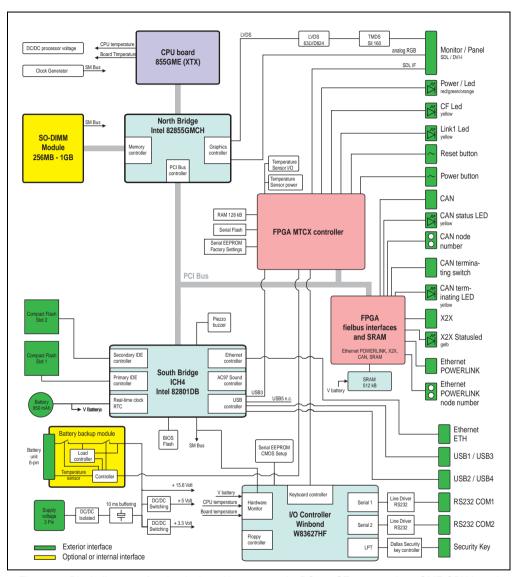


Figure 54: Block diagram of entire device with system unit 5PC600.SE00-00 and 855GME CPU board

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

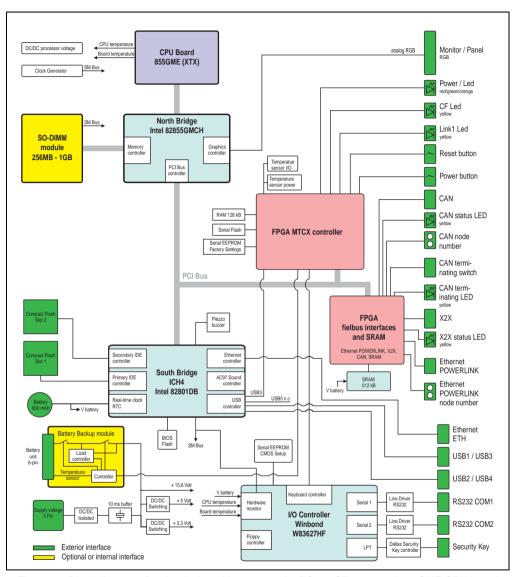


Figure 55: Block diagram of entire device with system unit 5PC600.SE00-01 and 855GME CPU board

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

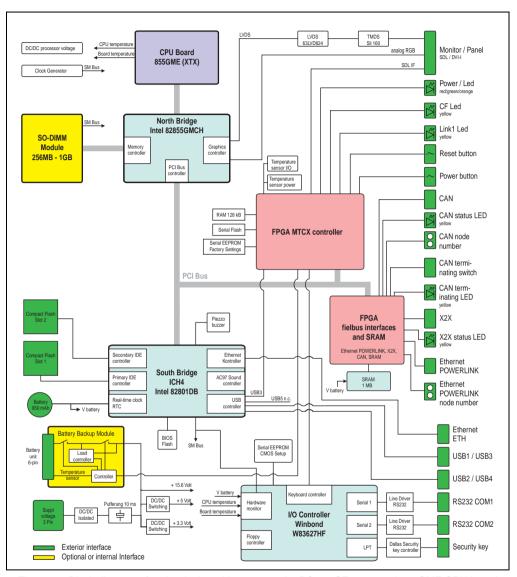


Figure 56: Block diagram of entire device with system unit 5PC600.SE00-02 and 855GME CPU board

# 3. Individual components

### 3.1 System units

All of the individual components of the Automation PC620 system come together inside the system unit. The system unit consists of an APC620 housing with an integrated main board. The housing units are available in variations with 1, 2, 3 and 5 PCI slots and in APC620 embedded. Units with 2, 3 or 5 PCI slots have an additional 1 or 2 slide-in drives, respectively.

#### 3.1.1 APC620 with 1, 2, 3 and 5 PCI slots

Features	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	
Photo	hot.	EN .			7		
Serial interfaces Type Amount UART Transfer rate Connection		RS232, modem capable 2 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-pin DSUB, male					
Ethernet Controller Transfer rate Connection	See "Ethernet connection ETH1" on page 116 and "Ethernet connection ETH2" on page 118 10/100 Mbit/s RJ45 twisted pair (10 BaseT / 100 BaseT)					page 118	
USB interface Type Amount Transfer rate Connection			Up to 480 Mb	2			
Monitor / Panel			DVI-I,	female			
AC97 sound			Mic., line	in, line out			
IF optional slot				1			
PCI slots half-size full-size PCI standard Bus speed	1 - 2.2 33 MHz	- 2.2 3 - 2.2 2.2 2.2				.2	
CompactFlash slot 1 (CF1) Internal organization	integrated Primary master						

Table 72: Technical data - 1, 2, 3 and 5 PCI slot types

Features	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	
Combined CompactFlash slot 2 / hard disk (HDD/CF2)		Yes, optional add-on CompactFlash slot or add-on hard disk					
Internal organization		Primary slave					
Insert for slide-in drive 1 Internal organization	-			Yes Secondary slave			
Insert for slide-in drive 2 Internal organization	-	-	-	-		es ry master	
APC620 UPS module optional	Yes, starting with Rev. H0	Yes, starting with Rev. G0	Yes, starting with Rev. H0	Yes	Yes, starting with Rev. F0	Yes, starting with Rev. H0	
SRAM module optional	Yes, starting with Rev. I0	Yes, starting with Rev. H0	Yes, starting with Rev. K0	Yes	Yes, starting with Rev. H0	Yes, starting with Rev. H0	
Reset button		•	Υ	es	•	•	
Power button			Υ	es			
PS/2 keyboard/mouse		Yes	, combined, will be	automatically dete	ected		
Battery slot			Υ	es			
Hardware security key slot			Yes (DS1425 fro	m MAXIM/Dallas)			
Fan slot			Υ	es			
Automation Panel link slot	-	1	-	1	1	-	
Status LEDs		•	Power, HDD	, Link1, Link2	•	•	
Real-time clock (RTC) Battery-buffered Accuracy		,		es lata for CPU board	ls		
MTCX <sup>1)</sup>			Υ	es			
Electrical characteristics							
Power supply Rated voltage Starting current Power consumption	See section 2	24 VDC ± 25% Typically 7A imum 40 A for < 30 .8 "Power manage em unit with 1 PCI	ment APC620	see section 2. system unit v	24 VDC ± 25% Typically 10 A imum 40 A for < 30 10 "Power manage with 3 PCI slots" or PC620 system units	ement APC620 2.11 "Power	
Mechanical characteristics							
Housing <sup>2)</sup> Material Paint Front cover	L	Galvanized steel plate Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored plastic (similar to Pantone 144CV)					
Outer dimensions Width Length Height	65 mm 104.5 mm 125 mm 185.4 mm 251 mm 253 mm 253 mm 253 mm 270 mm 270 mm 410 mm 270 mm			mm			
Weight	Approx. 1.5 kg	Approx	2.6 kg	Approx. 4.5 kg	Approx	. 3.8 kg	
Mounting plates (for M4 screws)		4 4 6					
Drilling templates for mounting		(see chapter 3 "Start-up", section 1.2 "Drilling templates")					

Table 72: Technical data - 1, 2, 3 and 5 PCI slot types (cont.)

- 1) Maintenance Controller Extended, for more information, see the section "Maintenance Controller Extended (MTCX)" on page 715.
- 2) Depending on the process or batch, there may be visible deviations in the color and surface structure.

### 3.1.2 APC620 embedded variations

Features	5PC600.SE00-00	5PC600.SE00-01	5PC600.SE00-02				
Photo							
Serial interfaces Type Amount UART Transfer rate Connection		RS232, modem capable 2 16550-compatible, 16-byte FIFO Max. 115 kBaud 9-pin DSUB, male					
Ethernet Controller Transfer rate Connection		See "Ethernet connection ETH (only APC620 embedded)" on page 115 10/100 Mbit/s RJ45 twisted pair (10 BaseT / 100 BaseT)					
Ethernet POWERLINK Amount Station number switches	1 2 pcs.						
X2X Link Amount Status LED		1 Yes, see page 113					
CAN bus Amount Transfer rate Node switch Terminating resistor Status LED	See also page 111  1  Max. 500 kBit/s  Yes  Yes  Yes, can be activated using a switch  Yes, see page 113						
USB interface Type Amount Transfer rate Connection	USB 2.0 4 Up to 480 Mbit (high speed) Type A						
Monitor / Panel		DVI-I, female					
AC97 sound		-					
IF optional slot		-					
PCI slots half-size full-size PCI standard Bus speed							
CompactFlash slot 1 (CF1) Internal organization		integrated Primary master					
CompactFlash slot 2 (CF2) Internal organization		integrated Primary slave					

Table 73: Technical data - APC620 embedded variations

Features	5PC600.SE00-00	5PC600.SE00-01	5PC600.SE00-02				
Insert for slide-in drive 1 Internal organization	-						
Insert for slide-in drive 2 Internal organization	-						
APC620 UPS module optional	Yes						
SRAM Quantity	Yes Yes Yes 512 kB 512 kB 1 MB						
Reset button		Yes					
Power button		Yes					
PS/2 keyboard/mouse		-					
Battery slot		Yes					
Hardware security key slot		Yes (DS1425 from MAXIM/Dallas)					
Fan slot		-					
Automation Panel link slot							
Status LEDs	Power, HDD, Link1						
Real-time clock (RTC) Battery-buffered Accuracy	Yes See the technical data for the CPU board						
MTCX <sup>1)</sup>		Yes					
Electrical characteristics							
Power supply Rated voltage Starting current Power consumption	See section 2.12 "Pc	24 VDC ± 25% Typically 7A maximum 40 A for < 300 µs wer management for the APC620 em	nbedded system unit".				
Mechanical characteristics							
Housing <sup>2)</sup> Material Paint Front cover	Galvanized steel plate Light gray (similar to Pantone 427CV), dark gray (similar to Pantone 432CV) Colored plastic (similar to Pantone 144CV)						
Outer dimensions Width Length Height	68.3 mm 225.6 mm 210 mm						
Weight	Approx. 1.3 kg						
Mounting plates (for M4 screws)		4					
Drilling templates for mounting	(see chap	oter 3 "Start-up", section 1.2 "Drilling to	emplates")				

Table 73: Technical data - APC620 embedded variations (cont.)

- 1) Maintenance Controller Extended, for more information, see the section "Maintenance Controller Extended (MTCX)" on page 715.
- 2) Depending on the process or batch, there may be visible deviations in the color and surface structure.

### 3.2 CPU boards 815E (ETX)

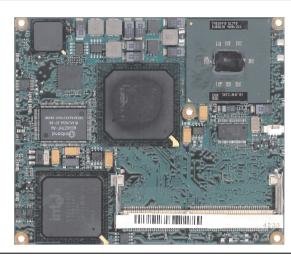


Figure 57: CPU boards 815E (ETX)

# Information:

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

Features	5PC600.E815-00	5PC600.E815-02	5PC600.E815-03		
Boot loader / Operating system	BIOS Phoenix (see section "815E (ETX)BIOS Description" on page 323)				
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 1 GHz MMX technology, streaming SIMD extension 16 KB 256 KB Yes		
Chipset		Intel 82815E (GMCH) Intel 82801DB (ICH4)			
Real-time clock (RTC) Battery-buffered Accuracy	Yes at 25°C typ. 24 ppm (2 seconds) <sup>1)</sup> per day				
Front side bus	100 MHz 133 MHz 133 MHz				
IDE ports	2 IDE ports, UDMA 100				

Table 74: Technical data - 815E CPU boards (ETX)

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

Table 74: Technical data - 815E CPU boards (ETX) (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 graphics chip. The necessary software can be downloaded from the download area on the B&R homepage (<a href="https://www.br-automation.com">www.br-automation.com</a>).

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

### 3.3 CPU boards 855GME (ETX)

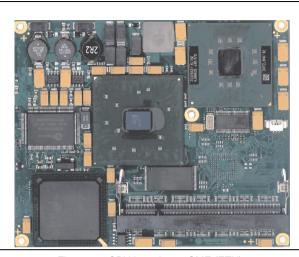


Figure 58: CPU boards 855GME (ETX)

# Information:

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

Features	5PC600.E855-00	5PC600.E855-01	5PC600.E855-02	5PC600.E855-03	5PC600.E855-04	5PC600.E855-05
Boot loader / Operating system	BIOS	S Phoenix (see BIO	OS section "855GN	ME (ETX) BIOS de	scription" on page	377)
Processor Architectures Type	0.13 µm Intel Pentium M 1.1 GHz	0.13 µm Intel Pentium M 1.6 GHz	0.90 nm Intel Pentium M 1.4 GHz	0.90 nm Intel Pentium M 1.8 GHz	0.13 µm Intel Celeron M 600 MHz	0.13 µm Intel Celeron M 1000 MHz
Expanded command set	MMX technology, streaming SIMD	MMX technology, streaming SIMD	MMX technology, streaming SIMD	MMX technology, streaming SIMD	MMX technology, streaming SIMD	MMX technology, streaming SIMD
L1 cache L2 cache Floating Point Unit (FPU)	extension 2 32 KB 1 MB Yes	extension 2 32 KB 1 MB Yes	extension 2 32 KB 2 MB Yes	extension 2 32 KB 2 MB Yes	extension 2 32 KB 512 KB Yes	extension 2 32 KB 512 KB Yes
Chipset	Intel 82855GME (GMHC) Intel 82801DB (ICH4)					
Real-time clock (RTC) Battery-buffered Accuracy	Yes At 25°C typ. 12 ppm (1 second) <sup>1)</sup> per day					

Table 75: Technical data - CPU boards 855GME (ETX)

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

Table 75: Technical data - CPU boards 855GME (ETX) (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 (<a href="www.br-automation.com">www.br-automation.com</a>).

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

### 3.4 CPU boards 855GME (XTX)

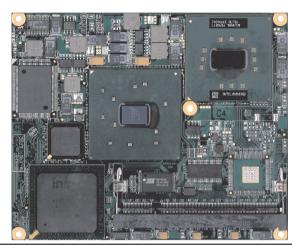


Figure 59: CPU boards 855GME (XTX)

# Information:

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

Features	5PC600.X855-00	5PC600.X855-01	5PC600.X855-02	5PC600.X855-03	5PC600.X855-04	5PC600.X855-05
Boot loader / Operating system	Ble	BIOS AMI (see BIOS section "855GME (XTX) BIOS description" on page 432)				
Processor Architectures	0.13 µm Intel Pentium	0.13 µm Intel Pentium	0.90 nm Intel Pentium	0.90 nm Intel Pentium	0.13 µm Intel Celeron	0.13 µm Intel Celeron
Type Expanded command set	M 1.1 GHz MMX technology, streaming SIMD	M 1.6 GHz MMX technology, streaming SIMD	M 1.4 GHz MMX technology, streaming SIMD	M 1.8 GHz MMX technology, streaming SIMD	M 600 MHz MMX technology, streaming SIMD	M 1000 MHz MMX technology, streaming SIMD
L1 cache L2 cache Floating Point Unit (FPU)	extension 2 32 KB 1 MB Yes	extension 2 32 KB 1 MB Yes	extension 2 32 KB 2 MB Yes	extension 2 32 KB 2 MB Yes	extension 2 32 KB 512 KB Yes	extension 2 32 KB 512 KB Yes
Chipset	Intel 82855GME (GMHC) Intel 82801DB (ICH4)					
Real-time clock (RTC) Battery-buffered Accuracy	Yes At 25°C typ. 12 ppm (1 second) <sup>1)</sup> per day					

Table 76: Technical data - CPU boards 855GME (XTX)

Features	5PC600.X855-00	5PC600.X855-01	5PC600.X855-02	5PC600.X855-03	5PC600.X855-04	5PC600.X855-05
Front side bus		400 Mhz				
IDE ports		2 IDE ports, UDMA 100				
Memory Type Quantity Socket	DDRAM Max. 1 GB SO-DIMM 200-pin					
Graphics Controller Memory Color depth	Intel Extreme Graphics 2 (integrated in the chipset) Up to 64 MB shared memory (reserved in the main memory) Max. 32 bit					

Table 76: Technical data - CPU boards 855GME (XTX) (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 (<a href="www.br-automation.com">www.br-automation.com</a>).

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

### 3.5 Heat sink

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

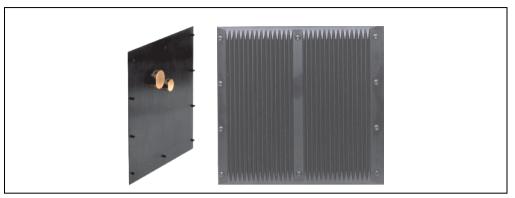


Figure 60: Heat sink

# Information:

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

Mechanical characteristics	5AC600.HS01-00	5AC600.HS01-01	5AC600.HS01-02	5AC600.HS02-01	5AC600.HS02-02	5AC600.HS03-01
Ideal for CPU boards	5PC600.E815-00 5PC600.E815-02 5PC600.E815-03	5PC600.E855-00 5PC600.E855-02 5PC600.E855-04 5PC600.E855-05 5PC600.X855-00 5PC600.X855-02 5PC600.X855-04 5PC600.X855-05	5PC600.E855-01 5PC600.E855-03 5PC600.X855-01 5PC600.X855-03	5PC600.E855-00 5PC600.E855-02 5PC600.E855-04 5PC600.E855-05 5PC600.X855-05 5PC600.X855-02 5PC600.X855-04 5PC600.X855-05	5PC600.E855-01 5PC600.E855-03 5PC600.X855-01 5PC600.X855-03	5PC600.X855-04 5PC600.X855-05 5PC600.X855-00 5PC600.X855-02
Suitable for the following system units	5PC600.SX01-00 5PC600.SX02-00 5PC600.SX02-01 5PC600.SX05-00 5PC600.SX05-01	5PC600.SX01-00 5PC600.SX02-00 5PC600.SX02-01 5PC600.SX05-00 5PC600.SX05-01	5PC600.SX01-00 5PC600.SX02-00 5PC600.SX02-01 5PC600.SX05-00 5PC600.SX05-01	5PC600.SF03-00	5PC600.SF03-00	5PC600.SE00-00 5PC600.SE00-01 5PC600.SE00-02
Material	Black-coated aluminum					
Outer dimensions Width Height Depth	218	7 mm mm mm	228.7 mm 218 mm 28 mm	228.7 mm 358 mm 12.8 mm	228.7 mm 358 mm 28 mm	203.9 mm 138 mm 12.8 mm
Weight	Approx.	1,340 g	Approx. 1,640 g	Approx. 2,000 g	Approx. 3,200 g	Approx. 900 g

Table 77: Technical data - Heat sink

### 3.6 Main memory

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

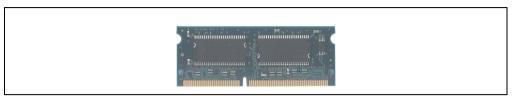


Figure 61: Main memory module

# Information:

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

Features	5MMSDR.0128-01	5MMSDR.0256-01	5MMSDR.0512-01	5MMDDR.0256-00	5MMDDR.0512-00	5MMDDR.1024-00
Idealfor CPU 815E (ETX)			855GME (ETX / XTX)			
Quantity Construct ion Type	128 MB 144-pin SO-DIMM SDRAM	256 MB 144-pin SO-DIMM SDRAM	512 MB 144-pin SO-DIMM SDRAM	256 MB 200-pin SO-DIMM DDR-SDRAM	512 MB 200-pin SO-DIMM DDR-SDRAM	1 GB 200-pin SO-DIMM DDR-SDRAM
Organization	16Mx64	32x64	64Mx64	32Mx64	64Mx64	128Mx64

Table 78: Technical data - Main memory

#### 3.7 Drives

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

This hard disk is specified for 24-hour operation (24x7). The add-on drive is referred to internally as the primary slave drive.

# Information:

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



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

#### **Technical data**

# Information:

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

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

Table 79: 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 20000 POH (Power-On Hours)	
MTBF	300,000 hours	
Mechanical characteristics		
Add-on mounting	Fixed	
Outer dimensions (without slide-in) Width Length Height	70 mm 100 mm 9.5 mm	
Weight	120 g	
Environmental characteristics		
Ambient temperature <sup>1)</sup> Operation - Standard <sup>2)</sup> Operation - 24-hour <sup>3)</sup> Storage Transport	+5°C +55°C +5°C +44°C -40°C +65°C -40°C +65°C	
Relative humidity Operation Storage Transport	8 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing	
Vibration Operation Storage	No non-recovered errors at max. 5 - 500 Hz and 1 g (9.8 m/s <sup>2</sup> 0-peak) No damage at max. 5 - 500 Hz and 5 g (49 m/s <sup>2</sup> 0-peak)	
Shock (pulse with a sine half-wave) Operation Storage	No non-recovered errors at max. 225 g (2207 m/s <sup>2</sup> 0-peak) and 2 ms duration No damage at max. 900 g (8820 m/s <sup>2</sup> 0-peak) and 1 ms duration No damage at max. 120 g (1176 m/s <sup>2</sup> 0-peak) and 11 ms duration	
Altitude Operation Storage	- 300 to 3000 meters - 300 to 12000 meters	

Table 79: Technical data - Add-on hard disk 5AC600.HDDI-00 (cont.)

- 1) Temperature data is for operation at 500 meters. Derating the max. ambient temperature typically 1°C per 1000 meters (from 500 meters above sea level).
- 2) Standard operation means 250 POH (power-on hours) per month.
- 3) 24-hour operation means 732 POH (power-on hours) per month.

### Temperature humidity diagram - Operation and storage

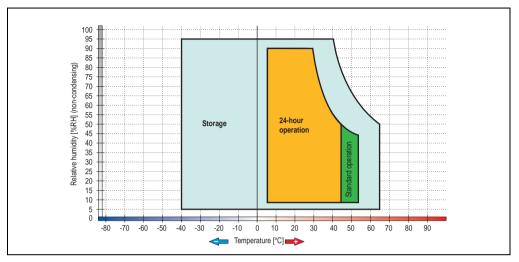


Figure 63: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-00

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

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

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

### Information:

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



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

#### **Technical data**

# Information:

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

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

Table 80: 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 20000 POH (Power-On Hours)
MTBF	300,000 hours
Mechanical characteristics	
Add-on mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	70 mm 100 mm 9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature <sup>1)</sup> Operation <sup>2)</sup> Storage Transport	-20°C +80°C -40°C +85°C -40°C +85°C
Relative humidity Operation Storage Transport	8 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage	No non-recovered errors at max. 5 - 500 Hz and 1 g (9.8 m/s <sup>2</sup> 0-peak) No damage at max. 5 - 500 Hz and 5 g (49 m/s <sup>2</sup> 0-peak)
Shock (pulse with a sine half-wave) Operation Storage	No non-recovered errors at max. 225 g (2207 m/s <sup>2</sup> 0-peak) and 2 ms duration No damage at max. 900 g (8820 m/s <sup>2</sup> 0-peak) and 1 ms duration No damage at max. 120 g (1176 m/s <sup>2</sup> 0-peak) and 11 ms duration
Altitude Operation Storage	- 300 to 3000 meters - 300 to 12000 meters

Table 80: Technical data - Add-on hard disk 5AC600.HDDI-01 (cont.)

- 1) Temperature data is for operation at 500 meters. Derating the max. ambient temperature typically 1°C per 1000 meters (from 500 meters above sea level).
- 2) Standard operation means 250 POH (power-on hours) per month.

#### Temperature humidity diagram - Operation and storage

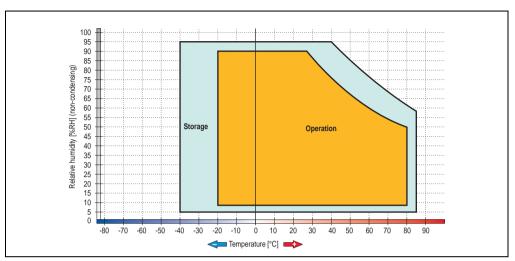


Figure 65: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-01

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

#### 3.7.3 Add-on hard disk 40 GB 24x7 ET - 5AC600.HDDI-05

This hard disk is specified for 24-hour operation (24x7) and also provides an extended temperature specification (ET). The add-on drive is referred to internally as the primary slave drive.

## Information:

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



Figure 66: Add-on hard disk 40 GB - 5AC600.HDDI-05

#### **Technical data**

# Information:

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

Features	5AC600.HDDI-05 < Revision D0	5AC600.HDDI-05 ≥ Revision D0	
Manufacturer's product ID	Seagate ST940813AM Seagate ST940817AM		
Formatted capacity	40	GB	
Number of heads	2		
Number of sectors (user)	78,140,160		
Bytes per sector	512		
Revolution speed	5400 rpm ±1%		
Access time (average)	12.5 ms		

Table 81: Technical data - Add-on hard disk 5AC600.HDDI-05

Features	5AC600.HDDI-05 < Revision D0	5AC600.HDDI-05 ≥ Revision D0	
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1 ms 12.5 ms 22 ms		
Starting time (0 rpm to read access)	3 seconds	(typically)	
Interface	AT	A-6	
Data transfer rate To the medium To / from host	Max. 321 MBits/sec Max. 100 MB/s (Ultra-DMA Mode 5)	Max. 450 MBits/sec Max. 100 MB/s (Ultra-DMA Mode 5)	
Cache	18	MB	
S.M.A.R.T. support	Y	es	
MTBF	550,000 hours <sup>1)</sup>	750,000 hours <sup>1)</sup>	
Mechanical characteristics			
Add-on mounting	Fix	red	
Outer dimensions (without slide-in) Width Length Height	70 mm 100 mm 9.5 mm		
Weight	10	0 g	
Environmental characteristics			
Ambient temperature <sup>2)</sup> Operation - Standard / 24-hour Storage Transport	-30°C +85°C -40°C +95°C -40°C +95°C		
Relative humidity Operation Storage Transport	5 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing		
Vibration Operation Storage	10 - 500 Hz: 1 g; no non-recovered errors 5 - 500 Hz: 2 g; no non-recovere 5 - 500 Hz: 5 g; no non-recovered errors 5 - 500 Hz: 5 g; no non-recovere		
Shock (pulse with a sine half-wave) Operation Storage	Max. 200 g, 2 ms; no non-recovered errors Max. 110 g, 11 ms; no non-recovered errors Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage	Max. 300 g, 2 ms; no non-recovered errors Max. 150 g, 11 ms; no non-recovered errors Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage	
Altitude Operation Storage	- 300 to 4419 meters - 300 to 12192 meters	- 300 to 5000 meters - 300 to 12192 meters	

Table 81: Technical data - Add-on hard disk 5AC600.HDDI-05 (cont.)

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

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

### Temperature humidity diagram - Operation and storage

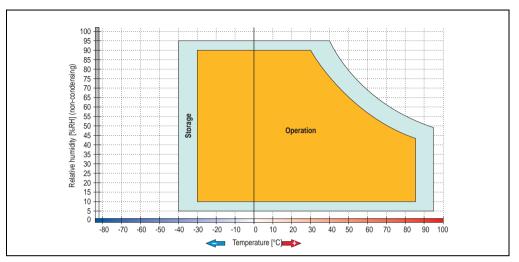


Figure 67: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-05

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

#### 3.7.4 Add-on hard disk 80 GB 24x7 ET - 5AC600.HDDI-06

This hard disk is specified for 24-hour operation (24x7) and also provides an extended temperature specification (ET). The add-on drive is referred to internally as the primary slave drive.

## Information:

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



Figure 68: Add-on hard disk 80 GB - 5AC600.HDDI-06

#### **Technical data**

## Information:

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

Table 82: Technical data - add-on hard disk - 5AC600.HDDI-06

Features	5AC600.HDDI-06
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1 ms 12.5 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Interface	ATA-6
Data transfer rate To the medium To / from host	Max. 450 MBits/sec Max. 100 MB/s (Ultra-DMA Mode 5)
S.M.A.R.T. support	Yes
Cache	8 MB
MTBF	750,000 hours <sup>1)</sup>
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 <sup>2)</sup> Operation - Standard / 24-hour Storage Transport	-30°C +85°C -40°C +95°C -40°C +95°C
Relative humidity Operation Storage Transport	5 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage	5 - 500 Hz: 2 g; no non-recovered errors 5 - 500 Hz: 5 g; no non-recovered errors
Shock (pulse with a sine half-wave) Operation Storage	Max. 300 g, 2 ms; no non-recovered errors Max. 150 g, 11 ms; no non-recovered errors Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage
Altitude Operation Storage	- 300 to 5000 meters - 300 to 12192 meters

Table 82: Technical data - add-on hard disk - 5AC600.HDDI-06 (cont.)

- 1) With 8760 POH (Power On Hours) per year and 70°C surface temperature.
- 2) Temperature values for 305 meter elevation. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 3°C per minute.

### Temperature humidity diagram - Operation and storage

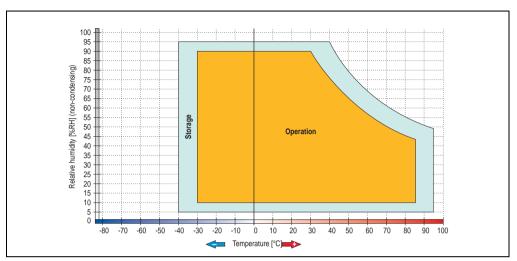


Figure 69: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-06

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

## 3.7.5 Add-on CompactFlash slot - 5AC600.CFSI-00

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

# Information:

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

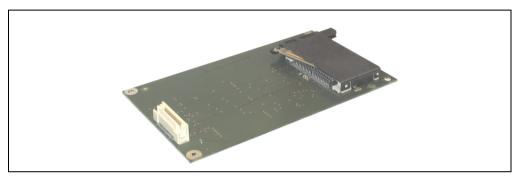


Figure 70: Add-on CompactFlash slot - 5AC600.CFSI-00

#### **Technical data**

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

Table 83: Technical data - Add-on CompactFlash slot 5AC600.CFSI-00

# Warning!

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

#### 3.7.6 Slide-in CD-ROM - 5AC600.CDXS-00

The slide-in drive can be used in system units with 2, 3 or 5 PCI slots. When inserted in slide-in slot 1 it is referred to internally as "secondary slave" and when in slide-in slot 2 as "secondary master."

## Information:

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

# Caution!

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



Figure 71: Slide-in CD-ROM - 5AC600.CDXS-00

### **Technical data**

## Information:

Features	5AC600.CDXS-00	
Reading rate	24x	
Data transfer rate	Max. 33.3 MB/sec.	
Access time (average)	115 ms	
Revolution speed	Max. 5136 rpm ± 1%	
Starting time (0 rpm to read access)	10 seconds (maximum)	
Host interface	IDE (ATAPI)	
Readable CD media	CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW	
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session) Enhanced CD	
Cache	128 KB	
Noise level (complete read access)	Approx. 45 dBA at 50 cm	
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10,000 times	
Environmental characteristics		
Ambient temperature <sup>1)</sup> Operation Storage Transport	-5°C +60°C <sup>2)</sup> -20°C +60°C -40°C +65°C	
Relative humidity Operation Storage Transport	8 - 80%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing	
Vibration Operation Storage Transport	At max. 5 - 500 Hz and 0.3 g At max. 5 - 500 Hz and 2 g At max. 5 - 500 Hz and 5 g	
Shock (pulse with a sine half-wave) Operation Storage Transport	At max. 7 g for 11 ms At max. 60 g for 11 ms At max. 200 g for 2 ms At max. 60 g for 11 ms At max. 200 g for 2 ms	

Table 84: Technical data - Slide-in CD-ROM 5AC600.CDXS-00

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

<sup>2)</sup> Drive surface temperature

### Temperature humidity diagram - Operation and storage

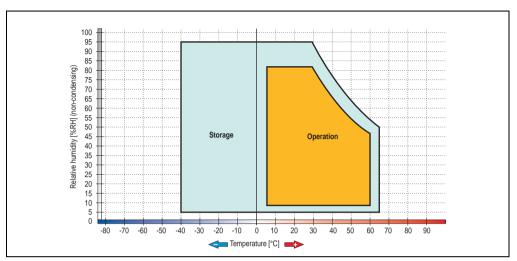


Figure 72: Temperature humidity diagram - Slide-in CD-ROM 5AC600.CDXS-00

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

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

The slide-in drive can be used in system units with 2, 3 or 5 PCI slots. When inserted in slide-in slot 1 it is referred to internally as "secondary slave" and when in slide-in slot 2 as "secondary master."

## Information:

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

# Caution!

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



Figure 73: Slide-in DVD-ROM/CD-RW - 5AC600.DVDS-00

### **Technical data**

# Information:

Features	5AC600.DVDS-00
Write speed CD-R CD-RW	24x, 16x, 10x and 4x 10x and 4x
Reading rate CD DVD	24x 8x
Data transfer rate	Max. 33.3 MB/sec.
Access time (average) CD DVD	85 ms 110 ms
Revolution speed	Max. 5136 rpm $\pm$ 1%
Starting time (0 rpm to read access)	19 seconds (maximum)
Host interface	IDE (ATAPI)
Readable media CD DVD	CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW DVD-ROM, DVD-R, DVD-RW, DVD-RAM
Non-write protected media CD	CD-R, CD-RW
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session) Enhanced CD, CD-text DVD-ROM, DVD-R, DVD-Video (double layer) DVD-RAM (4.7 GB, 2.6 GB)
Write-methods	Disk at once, session at once, packet write, track at once
Laser class	Class 1 laser
Data buffer capacity	2 MB
Noise level (complete read access)	Approx. 45 dBA at 50 cm
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10,000 times
Environmental characteristics	
Ambient temperature <sup>1)</sup> Operation Storage Transport	+5°C +50°C <sup>2)</sup> -20°C +60°C -40°C +65°C
Relative humidity Operation Storage Transport	8 - 80%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage Transport	At max. 5 - 500 Hz and 0.2 g At max. 5 - 500 Hz and 2 g At max. 5 - 500 Hz and 2 g

Table 85: Technical data - Slide-in DVD-ROM/CD-RW 5AC600.DVDS-00

Features	5AC600.DVDS-00
Shock (pulse with a sine half-wave)	
Operation	At max. 5 g for 11 ms
Storage	At max. 60 g for 11 ms
	At max. 200 g for 2 ms
Transport	At max. 60 g for 11 ms
	At max. 200 g for 2 ms

Table 85: Technical data - Slide-in DVD-ROM/CD-RW 5AC600.DVDS-00 (cont.)

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

### Temperature humidity diagram - Operation and storage

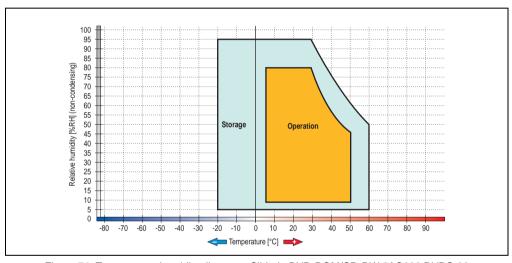


Figure 74: Temperature humidity diagram - Slide-in DVD-ROM/CD-RW 5AC600.DVDS-00

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

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

The slide-in drive can be used in system units with 2, 3 or 5 PCI slots. When inserted in slide-in slot 1 it is referred to internally as "secondary slave" and when in slide-in slot 2 as "secondary master."

## Information:

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

# Caution!

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



Figure 75: Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00

### Technical data - Revision D0 and higher

# Information:

Features	5AC600.DVRS-00 starting with revision D0
Write speed CD-R CD-RW DVD-R DVD-RW DVD-RW DVD-RAM <sup>1</sup> ) DVD+R DVD+R (double layer) DVD+RW	24x, 16x, 10x and 4x 10x and 4x 8x, 4x and 2x 4x and 2x 3x and 2x 8x, 4x and 2x 2x, 4x 4x and 2x
Reading rate CD DVD	24x 8x
Data transfer rate	Max. 33.3 MB/sec.
Access time (average) CD DVD	130 ms (24x) 130 ms (8x)
Revolution speed	Max. 5090 rpm ± 1%
Starting time (0 rpm to read access) CD DVD	14 seconds (maximum) 15 seconds (maximum)
Host interface	IDE (ATAPI)
Readable media CD DVD	CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW DVD-ROM, DVD-R, DVD-RW. DVD-RAM, DVD+R, DVD+R (double layer), DVD+RW
Non-write protected media CD DVD	CD-R, CD-RW DVD-R/RW, DVD-RAM (4.7 GB), DVD+R/RW, DVD+R (double layer)
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session), Enhanced CD, CD text DVD-ROM, DVD-R, DVD-RW, DVD video DVD-RAM (4.7 GB, 2.6 GB) DVD+R, DVD+R (double layer), DVD+RW
Write-methods CD DVD	Disk at once, session at once, packet write, track at once Disk at once, incremental, over-write, sequential, multi-session
Laser class	Class 1 laser
Data buffer capacity	8 MB
Noise level (complete read access)	Approx. 48 dBA at 50 cm
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10,000 times
Environmental characteristics	
Ambient temperature <sup>2)</sup> Operation Storage Transport	+5°C +55°C <sup>3)</sup> -20°C +60°C -40°C +65°C

Table 86: Technical data - Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 Rev. D0 and lower

Features	5AC600.DVRS-00 starting with revision D0
Relative humidity Operation Storage Transport	8 - 80%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage Transport	At max. 5 - 500 Hz and 0.2 g At max. 5 - 500 Hz and 2 g At max. 5 - 500 Hz and 2 g
Shock (pulse with a sine half-wave) Operation Storage Transport	At max. 5 g for 11 ms At max. 60 g for 11 ms At max. 200 g for 2 ms At max. 60 g for 11 ms At max. 200 g for 2 ms

Table 86: Technical data - Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 Rev. D0 and lower (cont.)

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

### "Technical data") D0

Features	5AC600.DVRS-00 Rev. D0
Write speed CD-R CD-RW DVD-R DVD-RW DVD+RW DVD+R DVD+RW	24x, 16x, 10x and 4x 10x and 4x 8x, 4x and 2x 4x and 2x 8x, 4x and 2x 4x and 2x
Reading rate CD DVD	24x 8x
Data transfer rate	Max. 33.3 MB/sec.
Access time (average) CD DVD	130 ms (24x) 130 ms (8x)
Revolution speed	Max. 5090 rpm ± 1%
Starting time (0 rpm to read access) CD DVD	14 seconds (maximum) 15 seconds (maximum)
Host interface	IDE (ATAPI)
Readable media CD DVD	CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW DVD-ROM, DVD-R, DVD-RW

Table 87: Technical data - Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 Rev. D0 and lower

Features	5AC600.DVRS-00 Rev. D0
Non-write protected media CD DVD	CD-R, CD-RW DVD-R/RW, DVD+R/RW
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session) Enhanced CD, CD-text DVD-ROM, DVD-R, DVD-Video (double layer), DVD-RW DVD+R, DVD+R (double layer), DVD+RW
Write-methods CD DVD	Disk at once, session at once, packet write, track at once Disk at once, incremental, over-write, sequential, multi-session
Laser class	Class 1 laser
Data buffer capacity	8 MB
Noise level (complete read access)	Approx. 48 dBA at 50 cm
Lifespan Opening/closing the drawer	60,000 POH (Power-On Hours) > 10,000 times
Environmental characteristics	
Ambient temperature <sup>1)</sup> Operation Storage Transport	+5°C +55°C <sup>2)</sup> -20°C +60°C -40°C +65°C
Relative humidity Operation Storage Transport	8 - 80%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage Transport	At max. 5 - 500 Hz and 0.2 g At max. 5 - 500 Hz and 2 g At max. 5 - 500 Hz and 2 g
Shock (pulse with a sine half-wave) Operation Storage Transport	At max. 5 g for 11 ms At max. 60 g for 11 ms At max. 200 g for 2 ms At max. 60 g for 11 ms At max. 200 q for 2 ms

Table 87: Technical data - Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 Rev. D0 and lower (cont.)

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

<sup>2)</sup> Drive surface temperature

### Temperature humidity diagram - Operation and storage

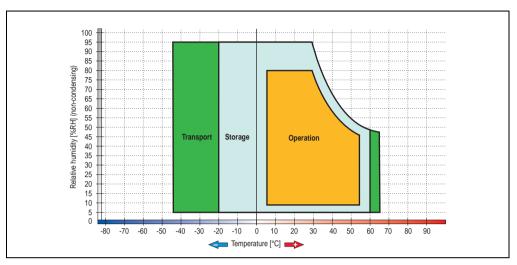


Figure 76: Temperature humidity diagram - Slide-in DVD-R/RW, DVD+R/RW 5AC600.DVRS-00

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

#### 3.7.9 Slide-in CF 2 slot - 5AC600.CFSS-00

The slide-in drive can be used in system units with 2, 3 or 5 PCI slots. When inserted in slide-in slot 1, the CompactFlash slot CF3 is referred to internally as "secondary slave" and when in slide-in slot 2 as "secondary master." CompactFlash slot CF4 is always accessed via USB.

## Information:

- It is possible to add or remove a slide-in drive at any time.
- In system units with 5 PCI slots, the slide-in USB FDD drive (5AC600.FDDS-00) must be inserted in slide-in slot 1.
   The double CompactFlash slide-in drive (5AC600.CFSS-00) should only be used in slide-in slot 2.

# Caution!

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

# Warning!

The CompactFlash card can only be inserted in and removed from the CF3 IDE CompactFlash slot can only take place without power applied to the APC620!

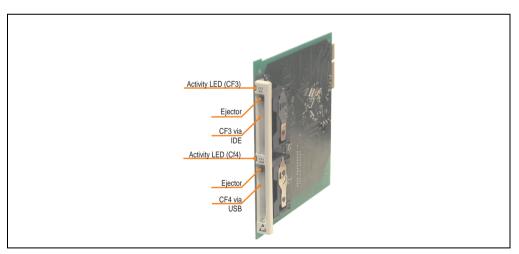


Figure 77: Slide-in CF 2-slot - 5AC600.CFSS-00

# **Technical data**

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

Table 88: Technical data - Slide-in CF slot 2 - 5AC600.CFSS-00

### 3.7.10 Slide-in USB FDD - 5AC600.FDDS-00

The slide-in drive can be used in system units with 2, 3 or 5 PCI slots. In these units it is connected to the system via USB.

# Information:

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

# Caution!

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



Figure 78: Slide-in USB FDD - 5AC600.FDDS-00

#### **Technical data**

# Information:

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	30000 POH (Power-On Hours)
Environmental characteristics	
Ambient temperature <sup>1)</sup> Operation Storage Transport	+4°C +50°C -20°C +60°C -20°C +60°C
Relative humidity Operation Storage Transport	20 - 80%, non-condensing 5 - 90%, non-condensing 5 - 90%, non-condensing
Vibration Operation Storage Transport	At max. 5 - 500 Hz and 0.3 g At max. 10 - 100 Hz and 2 g At max. 10 - 100 Hz and 2 g
Shock (pulse with a sine half-wave) Operation Storage Transport	At max. 5 g for 11 ms At max. 60 g for 11 ms At max. 60 g for 11 ms
Altitude	Max. 3000 meters

Table 89: Technical data - Slide-in USB diskette drive - 5AC600.FDDS-00

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

### Temperature humidity diagram - Operation and storage

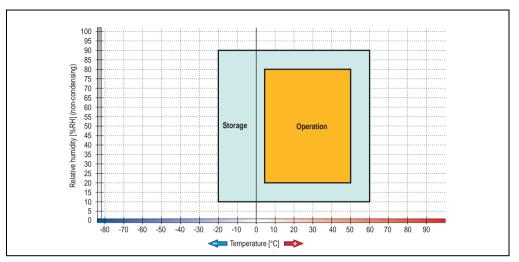


Figure 79: Temperature humidity diagram - Slide-in USB diskette drive 5AC600.FDDS-00

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

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

This hard disk is specified for 24-hour operation (24x7). The slide-in drive can be used in system units with 2, 3 or 5 PCI slots. When inserted in slide-in slot 1 it is referred to internally as "secondary slave" and when in slide-in slot 2 as "secondary master."

### Information:

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

# Caution!

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



Figure 80: Slide-in hard disk 30 GB - 5AC600.HDDS-00

#### **Technical data**

# Information:

Features	5AC600.HDDS-00
Manufacturer's product ID	Fujitsu MHT2030AR
Formatted capacity	30 GB
Number of heads	2
Number of sectors (user)	58,605,120
Bytes per sector	512
Revolution speed	4200 rpm ± 1%
Access time (average)	7.14 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum	1.5 ms 12 ms 22 ms
Starting time (0 rpm to read access)	5 seconds (typically)
Interface	ATA-6
Data transfer rate To the medium To / from host	26.1 to 36.2 MB/s Max. 100 MB/s (ultra-DMA mode 5)
Cache	2 MB
Noise level (idle mode)	Approx. 24 dBA at 30 cm
Electrical characteristics	
Lifespan	5 years or 20,000 POH (Power-On Hours)
MTBF	300,000 hours
Mechanical characteristics	
Slide-in mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	70 mm 100 mm 9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature <sup>1)</sup> Operation - Standard <sup>2)</sup> Operation - 24-hour <sup>3)</sup> Storage Transport	+5°C +55°C +5°C +44°C -40°C +60°C -40°C +60°C
Relative humidity Operation Storage Transport	8 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage	No non-recovered errors at max. 5 - 500 Hz and 1 g (9.8 m/s <sup>2</sup> 0-peak) No damage at max. 5 - 500 Hz and 5 g (49 m/s <sup>2</sup> 0-peak)

Table 90: Technical data - Slide-in hard disk - 5AC600.HDDS-00

Environmental characteristics	5AC600.HDDS-00
Shock (pulse with a sine half-wave) Operation Storage	No non-recovered errors at max. 225 g (2207 m/s <sup>2</sup> 0-peak) and 2 ms duration No damage at max. 900 g (8820 m/s <sup>2</sup> 0-peak) and 1 ms duration No damage at max. 120 g (1176 m/s <sup>2</sup> 0-peak) and 11 ms duration
Altitude Operation Storage	- 300 to 3000 meters - 300 to 12000 meters

Table 90: Technical data - Slide-in hard disk - 5AC600.HDDS-00 (cont.)

- 1) Temperature data is for operation at 500 meters. Derating the max. ambient temperature typically 1°C per 1000 meters (from 500 meters above sea level).
- 2) Standard operation means 250 POH (power-on hours) per month.
- 3) 24-hour operation means 732 POH (power-on hours) per month.

### Temperature humidity diagram - Operation and storage

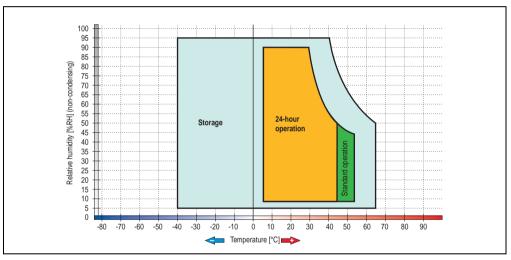


Figure 81: Temperature humidity diagram - Slide-in hard disk 5AC600.HDDS-00

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

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

This hard disk has an extended temperature specification (ET), but is not permitted for 24 hour operation. The slide-in drive can be used in system units with 2, 3 or 5 PCI slots. When inserted in slide-in slot 1 it is referred to internally as "secondary slave" and when in slide-in slot 2 as "secondary master."

## Information:

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

# Caution!

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



Figure 82: Slide-in hard disk 20 GB - 5AC600.HDDS-01

### **Technical data**

# Information:

Features	5AC600.HDDS-01
Manufacturer's product ID	Fujitsu MHT2020AC
Formatted capacity	20 GB
Number of heads	2
Number of sectors (user)	39,070,080
Bytes per sector	512
Revolution speed	4200 rpm ± 1%
Access time (average)	7.14 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum	1.5 ms 12 ms 22 ms
Starting time (0 rpm to read access)	5 seconds (typically)
Interface	ATA-6
Data transfer rate To the medium To / from host	Up to 28.9 MB/s Max. 100 MB/s (ultra-DMA mode 5)
Cache	2 MB
Noise level (idle mode)	Approx. 22 dBA at 30 cm
Electrical characteristics	
Lifespan	5 years or 20,000 POH (Power-On Hours)
MTBF	300,000 hours
Mechanical characteristics	
Slide-in mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	70 mm 100 mm 9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature <sup>1)</sup> Operation <sup>2)</sup> Storage Transport	-20°C +80°C -40°C +85°C -40°C +85°C
Relative humidity Operation Storage Transport	8 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage	No non-recovered errors at max. 5 - 500 Hz and 1 g (9.8 m/s <sup>2</sup> 0-peak) No damage at max. 5 - 500 Hz and 5 g (49 m/s <sup>2</sup> 0-peak)
Shock (pulse with a sine half-wave) Operation Storage	No non-recovered errors at max. 225 g (2207 m/s <sup>2</sup> 0-peak) and 2 ms duration No damage at max. 900 g (8820 m/s <sup>2</sup> 0-peak) and 1 ms duration No damage at max. 120 g (1176 m/s <sup>2</sup> 0-peak) and 11 ms duration

Table 91: Technical data - Slide-in hard disk - 5AC600.HDDS-01

Features	5AC600.HDDS-01	
Altitude Operation Storage	- 300 to 3000 meters - 300 to 12000 meters	

Table 91: Technical data - Slide-in hard disk - 5AC600.HDDS-01 (cont.)

- 1) Temperature data is for operation at 500 meters. Derating the max. ambient temperature typically 1°C per 1000 meters (from 500 meters above sea level).
- 2) Standard operation means 250 POH (power-on hours) per month.

### Temperature humidity diagram - Operation and storage

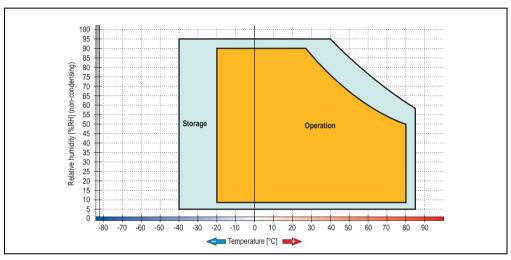


Figure 83: Temperature humidity diagram - Slide-in hard disk 5AC600.HDDS-01

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

#### 3.7.13 Slide-in hard disk 40 GB ET - 5AC600.HDDS-02

This hard disk is specified for 24-hour operation (24x7) and also provides an extended temperature specification (ET). The slide-in drive can be used in system units with 2, 3 or 5 PCI slots. When inserted in slide-in slot 1 it is referred to internally as "secondary slave" and when in slide-in slot 2 as "secondary master."

# Information:

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

# Caution!

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



Figure 84: Slide-in hard disk 40 GB - 5AC600.HDDS-02

### **Technical data**

# Information:

Features	5AC600.HDDS-02 < Revision D0	5AC600.HDDS-02 ≥ Revision D0
Manufacturer's product ID	Seagate ST940813AM	Seagate ST940817AM
Formatted capacity	40 GB	
Number of heads	:	2
Number of sectors (user)	78,14	0,160
Bytes per sector	5	12
Revolution speed	5400 rp	om ±1%
Access time (average)	12.5	5 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1 ms 12.5 ms 22 ms	
Starting time (0 rpm to read access)	3 seconds (typically)	
Interface	ATA-6	
Data transfer rate To the medium To / from host	Max. 321 MBits/sec Max. 100 MB/s (Ultra-DMA Mode 5)	Max. 450 MBits/sec Max. 100 MB/s (Ultra-DMA Mode 5)
Cache	8 MB	
S.M.A.R.T. support	Yes	
MTBF	550,000 hours <sup>1)</sup>	750,000 hours <sup>1)</sup>
Mechanical characteristics		
Slide-in mounting	Fixed	
Outer dimensions (without slide-in) Width Length Height	70 mm 100 mm 9.5 mm	
Weight	100 g	
Environmental characteristics		
Ambient temperature <sup>2)</sup> Operation - Standard / 24-hour Storage Transport	-30°C +85°C -40°C +95°C -40°C +95°C	

Table 92: Technical data - Slide-in hard disk - 5AC600.HDDS-02

Environmental characteristics	5AC600.HDDS-02 < Revision D0	5AC600.HDDS-02 ≥ Revision D0
Relative humidity Operation Storage Transport	5 - 90%, nor 5 - 95%, nor 5 - 95%, nor	-condensing
Vibration Operation Storage	10 - 500 Hz: 1 g; no non-recovered errors 5 - 500 Hz: 5 g; no non-recovered errors	5 - 500 Hz: 2 g; no non-recovered errors 5 - 500 Hz: 5 g; no non-recovered errors
Shock (pulse with a sine half-wave) Operation Storage	Max. 200 g, 2 ms; no non-recovered errors Max. 110 g, 11 ms; no non-recovered errors Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage	Max. 300 g, 2 ms; no non-recovered errors Max. 150 g, 11 ms; no non-recovered errors Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage
Altitude Operation Storage	- 300 to 4419 meters - 300 to 12192 meters	- 300 to 5000 meters - 300 to 12192 meters

Table 92: Technical data - Slide-in hard disk - 5AC600.HDDS-02 (cont.)

- 1) With 8760 POH (Power On Hours) per year and 70°C surface temperature.
- 2) Temperature values for 305 meter elevation. The temperature specification must be reduced linearly by 1°C every 305 meters. The temperature increase and decrease can be a maximum of 3°C per minute.

### Temperature humidity diagram - Operation and storage

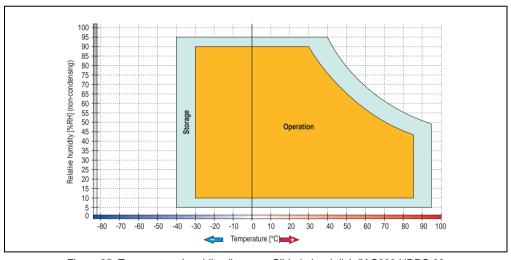


Figure 85: Temperature humidity diagram - Slide-in hard disk 5AC600.HDDS-02

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

### 3.8 RAID system

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

Advantages for the user:

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

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

- 1 PCI slot: PCI SATA RAID controller 5ACPCI.RAIC-01 (2x60GB) or 5ACPCI.RAIC-03 (2x160GB)
- **2 PCI slot:** PCI RAID controller (5ACPCI.RAIC-00) and PCI card with two hard disks (5ACPCI.RAIS-00 or 5ACPCI.RAIS-01).

The system can be flexibly implemented in all APC620 und PPC700s with 1 free PCI slot (depending on the RAID system design). The system also supports RAID 0 applications. As a result, parallel access to two hard drives with a relatively high data throughput is the main focus, in addition to the high availability.

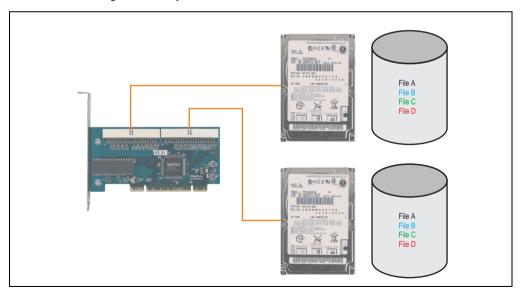


Figure 86: RAID 1 system schematic

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

# Information:

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

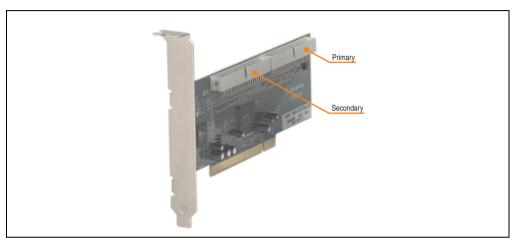


Figure 87: RAID controller - 5ACPCI.RAIC-00

### **Technical data**

# Information:

Features	5ACPCI.RAIC-00
Manufacturer's product ID	Adaptec ATA RAID 1200A
Data transfer rate	up to 100 MB/s per channel
RAID level	Supports RAID 0, 1, 0/1 and JBOD
Internal connections	Two 40-pin connections
Electrical characteristics	
Power consumption	0.15 A at 5 V (PCI bus)

Table 93: Technical data - RAID controller - 5ACPCI.RAIC-00

Mechanical characteristics	5ACPCI.RAIC-00
Outer dimensions Length Height	168 mm 64 mm
Environmental characteristics	
Ambient temperature Operation Storage Transport	0°C +55°C -20°C +60°C -20°C +60°C

Table 93: Technical data - RAID controller - 5ACPCI.RAIC-00 (cont.)

### **Driver support**

Drivers for the approved operating systems can be downloaded from the download area on the B&R homepage (<a href="https://www.br-automation.com">www.br-automation.com</a>).

### **Contents of delivery**

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

Table 94: Contents of delivery - 5ACPCI.RAIC-00

### 3.8.2 PCI RAID storage 2 x 40 GB 24x7 - 5ACPCI.RAIS-00

The hard disks that are used are specified for 24-hour operation (24x7).

# Information:

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

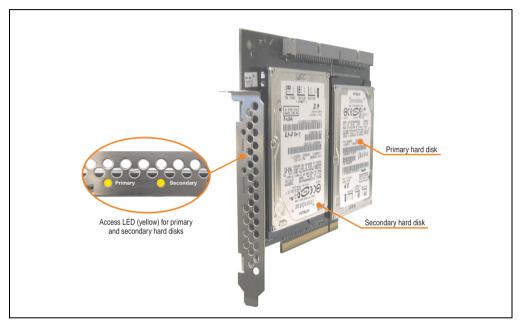


Figure 88: PCI RAID storage - 5ACPCI.RAIS-00

### **Technical data**

# Information:

Features	5ACPCI.RAIS-00	
Manufacturer's product ID	Hitachi Travelstar HTE726040M9AT00	
Formatted capacity	40 GB	
Number of heads	4	
Number of sectors (user)	78,140,160	
Bytes per sector	512	
Revolution speed	7200 rpm ± 1%	
Access time (average)	4.2 ms	
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1 ms 10 ms 16 ms	
Starting time (0 rpm to read access)	4 seconds (typically)	
Interface	ATA-6	
Data transfer rate To the medium To / from host	236 to 507 MBits/sec Max. 100 MB/s (ultra-DMA mode 5)	
Cache	8 MB	
Electrical characteristics		
Lifespan	5 years or 30,000 POH (Power-On Hours)	
MTBF	477,000 hours <sup>1)</sup>	
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 <sup>2)</sup> Operation - Standard <sup>3)</sup> Operation - 24-hour <sup>4)</sup> Storage Transport	+5°C +55°C +5°C +40°C -40°C +65°C -40°C +65°C	

Table 95: Technical data - RAID hard disk - 5ACPCI.RAIS-00

Environmental characteristics	5ACPCI.RAIS-00
Relative humidity Operation Storage Transport	8 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing
Vibration Operation (continuous) Operation (occasional) Storage Transport	No damage at max. $5$ - $500$ Hz and $0.125$ g ( $1.225$ m/s $^2$ 0-peak) duration 1 oct/min No damage at max. $5$ - $500$ Hz and $0.25$ g ( $2.45$ m/s $^2$ 0-peak) duration 1 oct/min Max. $10$ - $500$ Hz and $5$ g ( $49$ m/s $^2$ 0-peak) $0.5$ oct/min duration, no damage Max. $10$ - $500$ Hz and $5$ g ( $49$ m/s $^2$ 0-peak) $0.5$ oct/min duration, no damage
Shock (pulse with a sine half-wave) Operation Storage	No non-recovered errors at max. 80 g (784 m/s <sup>2</sup> 0-peak) and 1 ms duration No non-recovered errors at max. 150 g (1450 m/s <sup>2</sup> 0-peak) and 2 ms duration No non-recovered errors at max. 7 g (68 m/s <sup>2</sup> 0-peak) and 11 ms duration No damage at max. 500 g (4900 m/s <sup>2</sup> 0-peak) and 1 ms duration No damage at max. 60 g (588 m/s <sup>2</sup> 0-peak) and 11 ms duration
Altitude Operation Storage	- 300 to 3048 meters - 300 to 12192 meters

Table 95: Technical data - RAID hard disk - 5ACPCI.RAIS-00 (cont.)

- 1) Manufacturer specification at + 40°C ambient temperature.
- Temperature data is for operation at 500 meters. Derating the max. ambient temperature typically 1°C per 1000 meters (from 500 meters above sea level).
- 3) Standard operation means 333 POH (power-on hours) per month.
- 4) 24-hour operation means 732 POH (power-on hours) per month.

### Temperature humidity diagram - Operation and storage

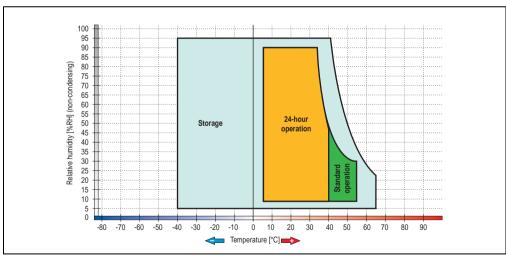


Figure 89: Temperature humidity diagram - RAID hard disk 5ACPCI.RAIS-00

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

### 3.8.3 PCI RAID storage 2 x 60 GB 24x7 - 5ACPCI.RAIS-01

The hard disks that are used are specified for 24-hour operation (24x7).

# Information:

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

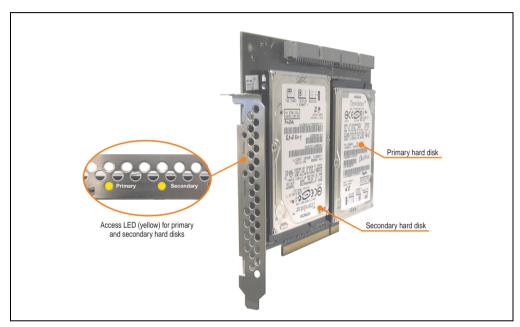


Figure 90: PCI RAID storage - 5ACPCI.RAIS-01

#### **Technical data**

# Information:

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

Features	5ACPCI.RAIS-01
Manufacturer's product ID	Hitachi HTE721060G9AT00
Formatted capacity	60 GB
Number of heads	3
Number of sectors (user)	117,210,240
Bytes per sector	512
Revolution speed	7200 rpm ± 1%
Access time (average)	10 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1 ms 10 ms 16 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Interface	ATA-6
Data transfer rate To the medium To / from host	267 to 629 MBits/sec Max. 100 MB/s (ultra-DMA mode 5)
Cache	8 MB
Electrical characteristics	
Lifespan	5 years or 30,000 POH (Power-On Hours)
MTBF	550,000 hours <sup>1)</sup>
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 <sup>2)</sup> Operation - Standard <sup>3)</sup> Operation - 24-hour <sup>4)</sup> Storage Transport	+5°C +55°C +5°C +40°C -40°C +65°C -40°C +65°C

Table 96: Technical data - RAID hard disk - 5ACPCI.RAIS-01

Environmental characteristics	5ACPCI.RAIS-01		
Relative humidity Operation Storage Transport	8 - 90%, non-condensing 5 - 95%, non-condensing 5 - 95%, non-condensing		
Vibration Operation (continuous) Operation (occasional) Storage Transport	No damage at max. 5 - 500 Hz and 0.125 g (1.225 m/s <sup>2</sup> 0-peak) duration 1 oct/min No damage at max. 5 - 500 Hz and 0.25 g (2.45 m/s <sup>2</sup> 0-peak) duration 1 oct/min Max. 10 - 500 Hz and 5 g (49 m/s <sup>2</sup> 0-peak) 0.5 oct/min duration, no damage Max. 10 - 500 Hz and 5 g (49 m/s <sup>2</sup> 0-peak) 0.5 oct/min duration, no damage		
Shock (pulse with a sine half-wave) Operation Storage	No non-recovered errors at max. 80 g (784 m/s <sup>2</sup> 0-peak) and 1 ms duration No non-recovered errors at max. 150 g (1450 m/s <sup>2</sup> 0-peak) and 2 ms duration No non-recovered errors at max. 7 g (68 m/s <sup>2</sup> 0-peak) and 11 ms duration No damage at max. 500 g (4900 m/s <sup>2</sup> 0-peak) and 1 ms duration No damage at max. 60 g (588 m/s <sup>2</sup> 0-peak) and 11 ms duration		
Altitude Operation Storage	- 300 to 3048 meters - 300 to 12192 meters		

Table 96: Technical data - RAID hard disk - 5ACPCI.RAIS-01 (cont.)

- 1) Manufacturer specification at + 40°C ambient temperature.
- Temperature data is for operation at 500 meters. Derating the max. ambient temperature typically 1°C per 1000 meters (from 500 meters above sea level).
- 3) Standard operation means 333 POH (power-on hours) per month.
- 4) 24-hour operation means 732 POH (power-on hours) per month.

## Temperature humidity diagram - Operation and storage

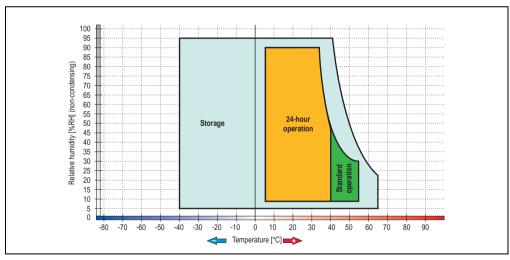


Figure 91: Temperature humidity diagram - RAID hard disk 5ACPCI.RAIS-01

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

#### 3.8.4 PCI SATA RAID 2 x 60 GB 24x7 - 5ACPCI.RAIC-01

The hard disks that are used are specified for 24-hour operation (24x7).

#### **Features**

- SATA RAID controller
- RAID Level 0 (striped) and 1 (mirrored)
- 2 SATA hard disk drives (suitable for 24 hour operation)
- Only requires 1 PCI slot
- Transfer rates up to 150 MB/s

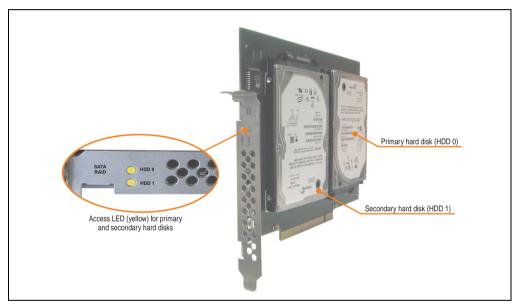


Figure 92: PCI SATA RAID controller - 5ACPCI.RAIC-01

# Information:

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

## **Technical data**

# Information:

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

Features	5ACPCI.RAIC-01
SATA RAID controller Type Specifications Data transfer rate RAID level BIOS Extension ROM - requirements	Sil 3512 SATA link Serial ATA 1.0 Max. 1.5 GB/s (150 MB/s) Supports RAID 0, 1 ca. 32 KB
Hard disks Amount	Seagate Momentus 7200.1 ST96023AS 2
Formatted capacity (512 bytes/sector)	60 GB
Number of heads	3
Number of sectors (user)	117,210,240
Bytes per sector	512
Revolution speed	7200 rpm ± 1%
Access time (average)	4.2 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1.5 ms 10.5 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Supported transfer mode	SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5
Data transfer rate To the medium To / from host	Max. 539 MBits/sec Max. 150 MB/s
Cache	8 MB
S.M.A.R.T. support	Yes
Lifespan	5 years
Electrical characteristics	
Power consumption	0.3 A at 3.3 V (PCI bus) 1 A at 5 V (PCI bus)
Mechanical characteristics	
Mounted on PCI insert	Fixed
Weight	350 g

Table 97: Technical data - RAID hard disk - 5ACPCI.RAIC-01

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

Table 97: Technical data - RAID hard disk - 5ACPCI.RAIC-01 (cont.)

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

## Temperature humidity diagram - Operation and storage

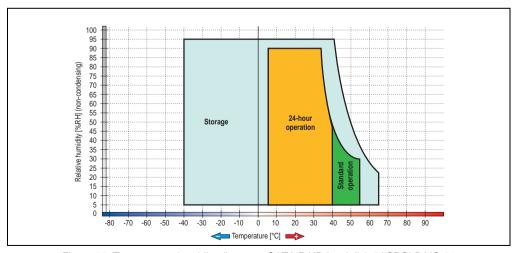


Figure 93: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-01

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

#### **Driver support**

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

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

#### **Known limitations in a RAID 1 configuration**

If one of the two hard disks is physically damaged, when the system is booted the SATA RAID BIOS displays the following error message for approx. 5 seconds: "RAID1 set is in critical status". After this time the operating system is automatically started on the functioning hard disk. The installed SATA Raid™ serial ATA RAID management software does not detect this error status. After repairing the cause of the error (e.g. replacing the hard disk) the SATA Raid™ management software automatically executes a rebuild (mirroring of the hard disk). This process takes approximately 50 minutes to complete, regardless of the amount of data and with the highest possible setting for "Rebuild rate".

A hard disk that becomes faulty during operation is detected by the SATA Raid™ Serial ATA RAID management software and indicated with an error message.

#### Important notes / BIOS Extension ROM

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

If a PCI card requiring BIOS extension ROM is plugged into PCI slot 1 on an AP620 with 5 PCI slots (see figure 94 "PCI slot numbering on APC620 systems with 5 PCI slots") and the B&R PCI SATA RAID controller is plugged-in at a different position (e.g. PCI slot 4), then the BIOS menu item Advanced - PCI/PnP Configuration - PCI Device, Slot #2 must be set from "Option ROM Scan" to "Disabled" so that this device can be used for booting. The BIOS default setting is to always attempt to load the BIOS Extension ROM from the PCI slot 1. Alternatively, the two PCI cards can be switched.

This setting does not have to be changed if a PCI card without BIOS extension ROM is plugged-in.

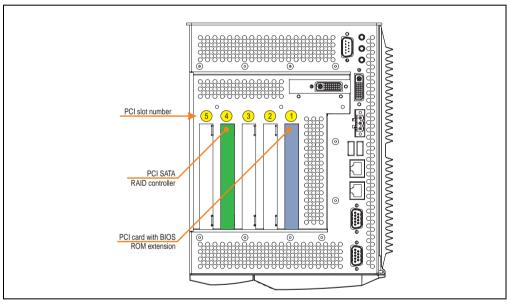


Figure 94: PCI slot numbering on APC620 systems with 5 PCI slots

## **Configuration of a PCI SATA RAID array**

Instructions for configuration of a PCI SATA RAID array using RAID BIOS can be found in chapter 3 "Start-up", section "Configuration of a SATA RAID array" on page 313.

# Chapter 2 Fechnical data

## 3.8.5 Replacement SATA HDD 60 GB - 5ACPCI.RAIC-02

The hard disk can be used as a replacement part for 5ACPCI.RAIC-01.



Figure 95: Replacement SATA HDD 60 GB - 5ACPCI.RAIC-02

#### **Technical data**

# Information:

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

Features	5ACPCI.RAIC-02
Hard disks Amount	Seagate Momentus 7200.1 ST96023AS 1
Formatted capacity (512 bytes/sector)	60 GB
Number of heads	3
Number of sectors (user)	117,210,240
Bytes per sector	512
Revolution speed	7200 rpm ± 1%
Access time (average)	4.2 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1.5 ms 10.5 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Supported transfer mode	SATA 1.0, PIO mode 0-4, multiword DMA mode 0-2, UDMA 0-5
Data transfer rate To the medium To / from host	Max. 539 MBits/sec Max. 150 MB/s

Table 98: Technical data - RAID hard disk - 5ACPCI.RAIC-02

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

Table 98: Technical data - RAID hard disk - 5ACPCI.RAIC-02 (cont.)

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

## Temperature humidity diagram - Operation and storage

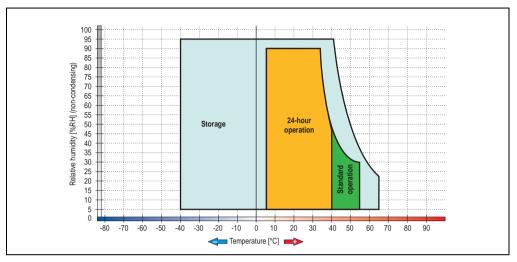


Figure 96: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-02

#### **Exchanging a PCI SATA RAID hard disk**

Instructions for exchanging a SATA hard disk can be found in chapter 7 "Maintenance / Servicing", section "Exchanging a PCI SATA RAID hard disk" on page 710.

#### 3.8.6 PCI SATA RAID 2 x 160 GB 24x7 ET - 5ACPCI.RAIC-03

The hard disks being used are specified for 24-hour operation (24x7) and also provides an extended temperature specification (ET).

#### **Features**

- SATA RAID controller
- RAID Level 0 (striped) and 1 (mirrored)
- 2 SATA hard disk drives (suitable for 24 hour operation)
- Only requires 1 PCI slot
- Transfer rates up to 150 MB/s

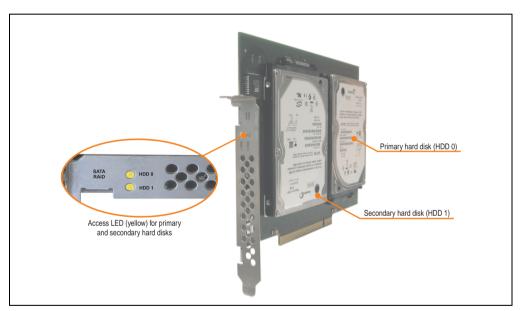


Figure 97: PCI SATA RAID controller - 5ACPCI.RAIC-03

# Information:

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

## **Technical data**

# Information:

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

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

Table 99: Technical data - RAID hard disk - 5ACPCI.RAIC-03

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

Table 99: Technical data - RAID hard disk - 5ACPCI.RAIC-03 (cont.)

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

## Temperature humidity diagram - Operation and storage

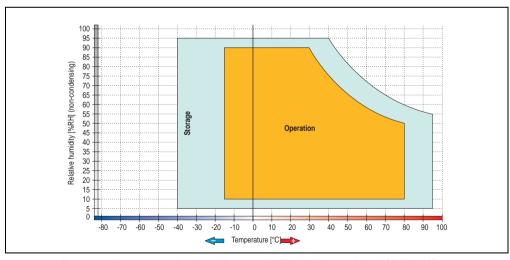


Figure 98: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-03

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

#### **Driver support**

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

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

#### Known limitations in a RAID 1 configuration

If one of the two hard disks is physically damaged, when the system is booted the SATA RAID BIOS displays the following error message for approx. 5 seconds: "RAID1 set is in critical status". After this time the operating system is automatically started on the functioning hard disk. The installed SATA Raid™ serial ATA RAID management software does not detect this error status. After repairing the cause of the error (e.g. replacing the hard disk) the SATA Raid™ management software automatically executes a rebuild (mirroring of the hard disk). This process takes approximately 50 minutes to complete, regardless of the amount of data and with the highest possible setting for "Rebuild rate".

A hard disk that becomes faulty during operation is detected by the SATA Raid™ Serial ATA RAID management software and indicated with an error message.

#### Important notes / BIOS Extension ROM

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

If a PCI card requiring BIOS extension ROM is plugged into PCI slot 1 on an AP620 with 5 PCI slots (see figure 94 "PCI slot numbering on APC620 systems with 5 PCI slots") and the B&R PCI SATA RAID controller is plugged-in at a different position (e.g. PCI slot 4), then the BIOS menu item Advanced - PCI/PnP Configuration - PCI Device, Slot #2 must be set from "Option ROM Scan" to "Disabled" so that this device can be used for booting. The BIOS default setting is to always attempt to load the BIOS Extension ROM from the PCI slot 1. Alternatively, the two PCI cards can be switched.

This setting does not have to be changed if a PCI card without BIOS extension ROM is plugged-in.

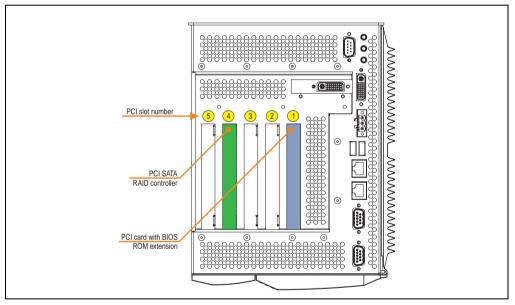


Figure 99: PCI slot numbering on APC620 systems with 5 PCI slots

## **Configuration of a PCI SATA RAID array**

Instructions for configuration of a PCI SATA RAID array using RAID BIOS can be found in chapter 3 "Start-up", section "Configuration of a SATA RAID array" on page 313.

# Chapter 2 Fechnical data

## 3.8.7 Replacement SATA HDD 160 GB - 5ACPCI.RAIC-04

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



Figure 100: Replacement SATA HDD 160 GB - 5ACPCI.RAIC-04

#### **Technical data**

# Information:

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

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

Table 100: Technical data - RAID hard disk - 5ACPCI.RAIC-04

Features	5ACPCI.RAIC-04
Cache	8 MB
S.M.A.R.T. support	Yes
Lifespan	5 years
Environmental characteristics	
Ambient temperature <sup>1)</sup> Operation - Standard / 24-hour <sup>2)</sup> Storage Transport	-15°C +80°C -40°C +95°C -40°C +95°C
Relative humidity Operation Storage Transport	8 - 90% non-condensing (maximum humidity at +29°C) 5 - 95% non-condensing (maximum humidity at +40°C) 5 - 95% non-condensing (maximum humidity at +40°C)
Vibration <sup>3)</sup> Operation (continuous) Operation (occasional) Storage Transport	5 - 500 Hz: max. 0.125 g; duration 1 octave per minute; no unrecoverable errors 5 - 500 Hz: max. 0.25 g; duration 1 octave per minute; no unrecoverable errors 5 - 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage 5 - 500 Hz: max. 5 g; duration 0.5 octaves per minute; no damage
Shock <sup>4)</sup> (pulse with a sine half-wave) Operation Storage	Max. 125 g, 2 ms; no unrecoverable errors Max. 400 g, 2 ms; no damage Max. 450 g, 1 ms; no damage Max. 200 g, 0.5 ms; no damage
Altitude Operation Storage	- 300 to 3048 meters - 300 to 12192 meters

Table 100: Technical data - RAID hard disk - 5ACPCI.RAIC-04 (cont.)

<sup>1)</sup> 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.

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

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

## Temperature humidity diagram - Operation and storage

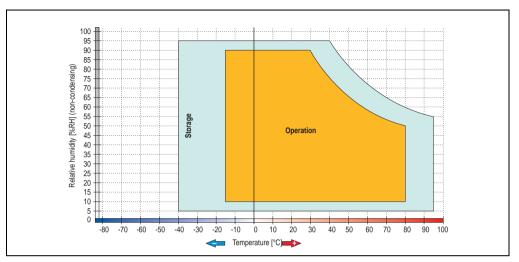


Figure 101: Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-04

## **Exchanging a PCI SATA RAID hard disk**

Instructions for exchanging a SATA hard disk can be found in chapter 7 "Maintenance / Servicing", section "Exchanging a PCI SATA RAID hard disk" on page 710.

## 3.9 Interface options

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

## Information:

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

## Caution!

Turn off power before adding or removing an optional interface.

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

The add-on CAN interface is equipped with an Intel 82527 CAN controller, which conforms to CAN specifications 2.0 part A/B. The CAN controller can trigger an NMI (non-maskable interrupt).

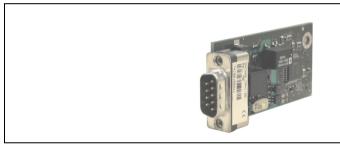


Figure 102: Add-on CAN interface - 5AC600.CANI-00

#### **Technical data**

Features	5AC600.CANI-00
CAN interface Controller Amount Connection	Bosch CC770 1 9-pin DSUB, male
Terminating resistors Default setting	Can be activated and deactivated using a sliding switch Disabled

Table 101: Technical data - Add-on CAN interface - 5AC600.CANI-00

## Pin assignments

		Add-on CAN
Туре	Electrically isolated	
Transfer rate	Max. 500 kBit/s	
Bus length	Max. 1000 Meter	
Pin	Assignment	
1	n.c.	9-pin DSUB plug
2	CAN low	1 5
3	GND	6(1111)6
4	n.c.	
5	n.c.	6 9
6	Reserved	1
7	CAN high	
8	n.c.	
9	n.c.	

Table 102: Pin assignments - CAN

#### I/O address and IRQ

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

Table 103: Add-on CAN - I/O address and IRQ

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

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

Table 104: CAN address register

<sup>1)</sup> NMI = Non Maskable Interrupt.

## Bus length and cable type

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

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

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

Table 105: Bus length and transfer rate - CAN

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

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

Table 106: CAN cable requirements

# Chapter 2 schnical data

## **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").

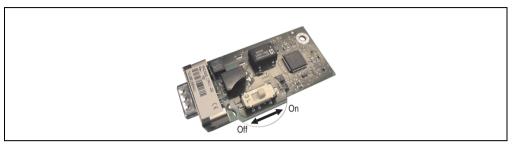


Figure 103: Terminating resistor - Add-on CAN interface 5AC600.CANI-00

#### **Contents of delivery**

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



Figure 104: Contents of the delivery / mounting material - 5AC600.CANI-00

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

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

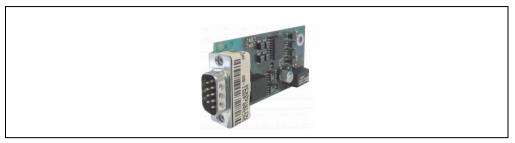


Figure 105: Add-on RS232/422/485 interface - 5AC600.485I-00

#### Pin assignments

	Add-on RS232/422/485		
Features	RS232	RS422/485	
Туре	RS232 not modem compatible; electrically isolated		
UART	16550 compatib	le, 16 byte FIFO	
Transfer rate	Max. 11	15 kBit/s	
Bus length	Max. 15 meters	Max. 1200 meters	
Pin	Assignments (RS232)	Assignments (RS422)	9-pin DSUB plug 1 5
1	n.c.	TXD	
2	RXD	n.c.	0
3	TXD	n.c.	6 9
4	n.c.	TXD	
5	GND	GND	
6	n.c.	RXD	
7	RTS	n.c.	
8	CTS	n.c.	
9	n.c.	RXD	

Table 107: 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 108: Add-on RS232/422/485 - I/O address and IRQ

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

## Bus length and cable type RS232

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

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

Table 109: Bus length and transfer rate - RS232

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

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

Table 110: RS232 cable requirements

## Bus length and cable type RS422

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

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

Table 111: Bus length and transfer rate - RS422

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

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

Table 112: 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).

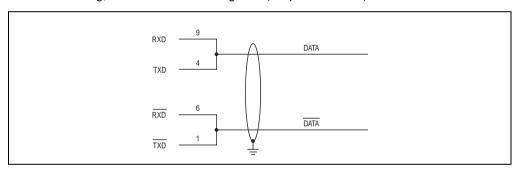


Figure 106: Add-on RS232/422/485 interface - operated in RS485 mode

## Bus length and cable type RS485

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

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

Table 113: Bus length and transfer rate - RS485

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

RS485 cable	Property	
Signal lines Cable cross section Wire insulation Conductor resistance Stranding Shield	$4 \times 0.25 \text{ mm}^2$ (24AWG/19), tinned Cu wire PU $\leq$ 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 $\leq$ 59 Ohm / km	
Outer sheathing Material Properties Entire shielding	PUR mixture Halogen free From tinned cu wires	

Table 114: RS485 cable requirements

## **Contents of delivery**

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



Figure 107: Contents of the delivery / mounting material - 5AC600.485I-00

#### 3.10 Fan kit

# Information:

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

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

#### 3.10.1 Fan kit 1 PCI - 5PC600.FA01-00

This fan kit is an optional addition for system units with 1 PCI slots. For available replacement dust filters for this fan kit, see section "Replacement fan filter" on page 662.

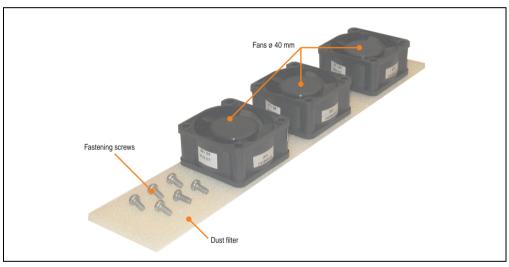


Figure 108: Fan kit - 5PC600.FA01-00

#### **Technical data**

Features	5PC600.FA01-00	
Fan type Width Length Height	Double ball bearings 40 mm 40 mm 20 mm	
Revolution speed	5600 rpm ± 10%	
Noise level	24 dB	
Lifespan	80,000 hours at 30°C	

Table 115: Technical data - 5PC600.FA01-00

Features	5PC600.FA01-00	
Maintenance interval	The fans are subject to wear. Depending on the work environment, the dust filter should be checked with appropriate frequency to determine whether the air flow provides sufficient cooling. An exchange or cleaning of the filter kit is appropriate at that time.	

Table 115: Technical data - 5PC600.FA01-00 (cont.)

#### **Contents of delivery**

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

Table 116: Contents of delivery - 5PC600.FA01-00

#### Installation

For a description of how to install the fan kit, see chapter 7 "Maintenance / Servicing", section 2 "Fan kit installation and replacement", starting on page 671.

#### 3.10.2 Fan kit 2 PCI - 5PC600.FA02-00

This fan kit is an optional addition for system units with 2 PCI slots. For available replacement dust filters for this fan kit, see section "Replacement fan filter" on page 662.

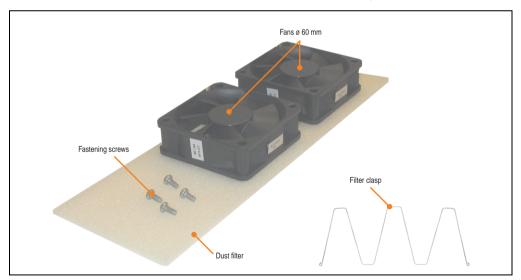


Figure 109: Fan kit - 5PC600.FA02-00

## **Technical data**

Features	5PC600.FA02-00	
Fan type Width Length Height	Double ball bearings 60 mm 60 mm 20 mm	
Revolution speed	3600 rpm ± 10%	
Noise level	30.5 dB	
Lifespan	80,000 hours at 30°C	
Maintenance interval	The fans are subject to wear. Depending on the work environment, the dust filter should be checked with appropriate frequency to determine whether the air flow provides sufficient cooling. An exchange or cleaning of the filter kit is appropriate at that time.	

Table 117: Technical data - 5PC600.FA02-00

## **Contents of delivery**

Amount	Component		
2	Fans with 60 mm diameter		
1	Dust filter		
1	Filter clasp		
4	Mounting screws		

Table 118: Contents of delivery - 5PC600.FA02-00

#### Installation

For a description of how to install the fan kit, see chapter 7 "Maintenance / Servicing", section 2 "Fan kit installation and replacement", starting on page 674.

## 3.10.3 Fan kit 3PCI - 5PC600.FA03-00

This fan kit is an optional addition for system units with 3 PCI slots. For available replacement dust filters for this fan kit, see section "Replacement fan filter" on page 662.

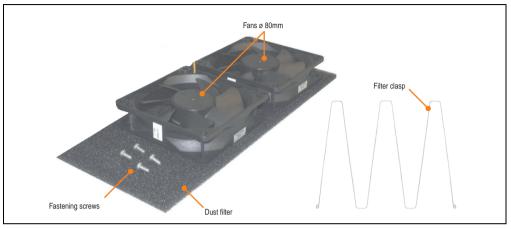


Figure 110: Fan kit - 5PC600.FA03-00

#### **Technical data**

Features	5PC600.FA05-00	
Fan type Amount Width Length Height	Double ball bearings 2 80 mm 80 mm 20 mm	
Revolution speed	2600 rpm ± 10%	
Noise level	27 dB	
Lifespan	80,000 hours at 30°C	
Maintenance interval	The fans are subject to wear. Depending on the work environment, the dust filter should be checked with appropriate frequency to determine whether the air flow provides sufficient cooling. An exchange or cleaning of the filter kit is appropriate at that time.	

Table 119: Technical data - 5PC600.FA03-00

## **Contents of delivery**

Amount	Component		
2	Fans with 80 mm diameter		
1	Dust filter		
1	Filter clasp		
4	Mounting screws		

Table 120: Contents of delivery - 5PC600.FA03-00

Amount	Component
2	Cable fastener

Table 120: Contents of delivery - 5PC600.FA03-00

#### Installation

For a description of how to install the fan kit, see chapter 7 "Maintenance / Servicing", section 2 "Fan kit installation and replacement", starting on page 677.

#### 3.10.4 Fan kit 5 PCI - 5PC600.FA05-00

This fan kit is an optional addition for system units with 5 PCI slots. For available replacement dust filters for this fan kit, see section "Replacement fan filter" on page 662.

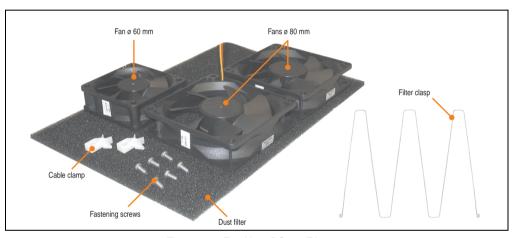


Figure 111: Fan kit - 5PC600.FA05-00

#### **Technical data**

Features	5PC600	5PC600.FA05-00			
Fan type Amount Width Length Height	Double ball bearings 1 60 mm 60 mm 20 mm	Double ball bearings 2 80 mm 80 mm 20 mm			
Revolution speed	3600 rpm ± 10%	2600 rpm ± 10%			
Noise level	30.5 dB	27 dB			
Lifespan	80,000 ho	80,000 hours at 30°C			
Maintenance interval	with appropriate frequency to determine whether the	The fans are subject to wear. Depending on the work environment, the dust filter should be checked with appropriate frequency to determine whether the air flow provides sufficient cooling. An exchange or cleaning of the filter kit is appropriate at that time.			

Table 121: Technical data - 5PC600.FA05-00

## **Contents of delivery**

Amount	Component		
1	Fans with 60 mm diameter		
2	Fans with 80 mm diameter		
1	Dust filter		
1	Filter clasp		
4	Mounting screws		
2	Cable fastener		

Table 122: Contents of delivery - 5PC600.FA05-00

## Installation

For a description of how to install the fan kit, see chapter 7 "Maintenance / Servicing", section 2 "Fan kit installation and replacement", starting on page 681.

#### 3.11 AP Link cards

For the APC620 system units 5PC600.SX02-00, 5PC600.SF03-00 and 5PC600.SX05-00 and an 855GME CPU board, a 2 graphics line can be created using the AP Link graphics adapter cards.

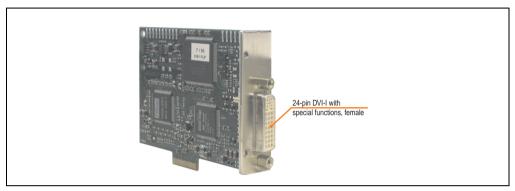


Figure 112: AP Link card

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

Table 123: Model numbers - AP Link graphics adapter

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

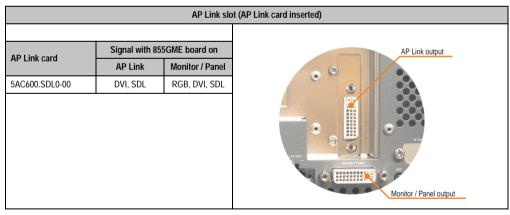


Table 124: AP Link slot (AP Link card inserted)

Hotplug for a display device is not supported in any combination.

# Caution!

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

## Pin assignments

Pin	Assignment	Pin	Assignment	
1	T.M.D.S. data 2-	16	Hot Plug detect	
2	T.M.D.S. data 2+	17	T.M.D.S. data 0-	
3	T.M.D.S. data 2/SDL shield	18	T.M.D.S. data 0+	
4	SDL-	19	T.M.D.S. DATA 0/XUSB1 shield	
5	SDL+	20	XUSB1-	
6	DDC clock	21	XUSB1+	DVI-I 24 pin, female
7	DDC data	22	T.M.D.S. clock shield	BVV 2 V pin, remain
8	n.c.	23	T.M.D.S. clock +	\\\ 12345678 c1 c2 )
9	T.M.D.S. DATA 1-	24	T.M.D.S. clock -	1 2 3 4 5 6 7 8 c1 2 9 10 11 12 13 14 15 16 c2 17 18 19 20 21 22 23 24 c3
10	T.M.D.S. DATA 1+	c1	n.c.	
11	T.M.D.S. DATA 1/XUBS0 shield	c2	n.c.	
12	XUSB0-	с3	n.c.	
13	XUSB0+	c4	n.c.	
14	+ 5 V Power <sup>1)</sup>	с5	n.c.	]
15	Ground (return for + 5V, HSync and VSync)			

Table 125: Pin assignment for AP Link connection

<sup>1)</sup> Protected internally by a multifuse

## Cable lengths and resolutions for SDL transfer

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

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

Table 126: Segment lengths, resolutions and SDL cables

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

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

Table 127: Requirements for SDL cable with automatic cable adjustment (equalizer)

<sup>1)</sup> See table 127 "Requirements for SDL cable with automatic cable adjustment (equalizer)" on page 250

<sup>2)</sup> See table 128 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)" on page 251

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

Table 128: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

## **DVI, SDL description**

#### DVI means:

 Connection of B&R Automation Panel 900 display units with Automation Panel Link DVI Receiver (Model nr. 5DLDVI.1000-01), Office Digital/DVI Monitors and Office DVI TFT Displays is possible.

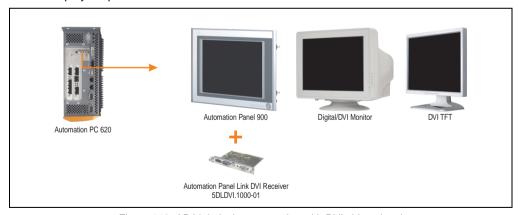


Figure 113: AP Link device connection with DVI video signal

For examples and possibilities for connecting Automation Panel 900 display units via DVI, see Appendix A, chapter 3 "Start-up", section 4 "Connection examples", starting on page 268.

## Technical data • Individual components

SDL (Smart Display Link) means:

 Connection of B&R Automation Panel 900 display units with Automation Panel Link SDL receiver (Model nr. 5DLSDL.1000-01) or SDL transceiver (Model nr. 5DLSDL.1000-01).

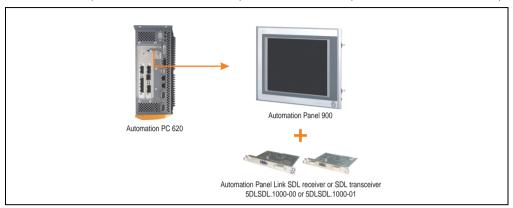


Figure 114: AP Link device connection with SDL video signal

For examples and possibilities for connecting Automation Panel 900 and Automation Panel 800 display units via SDL, see Appendix A, chapter 3 "Start-up", section 4 "Connection examples", starting on page 268.

# Chapter 3 • Start-up

## 1. Installation

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

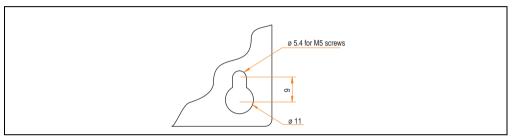


Figure 115: Mounting plates for the APC620

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

## 1.1 Important mounting information

- The environmental conditions must be taken into consideration (see chapter 2 "Technical data", section 2.6 "Environmental temperatures for systems with an 815E CPU board (ETX)" on page 76, and section 2.7 "Environmental temperatures for systems with an 855GME CPU board (EXT / XTX)" on page 80).
- The APC620 is only for operation in closed rooms.
- The APC620 cannot be situated in direct sunlight.
- The ventilation holes cannot be covered.
- When mounting the device, be sure to use the allowed mounting orientations (see section 1.3 "Mounting orientation" on page 257).
- Be sure the wall or switching cabinet can withstand four times the total weight of the the PC620.
- When connecting certain cable types (DVI, SDL, USB, etc.), keep the flex radius in mind. (see section 2 "Cable connections" on page 266).

## 1.2 Drilling templates

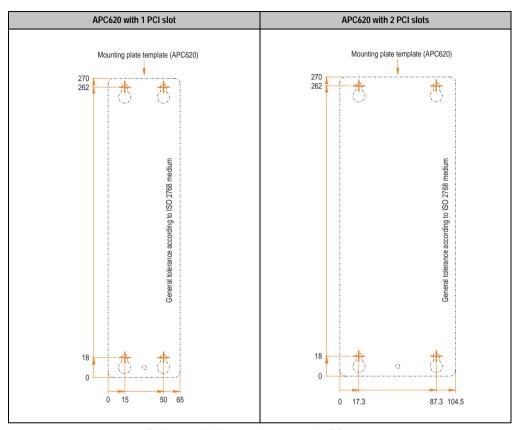


Table 129: Drilling templates - 1 and 2 PCI slots

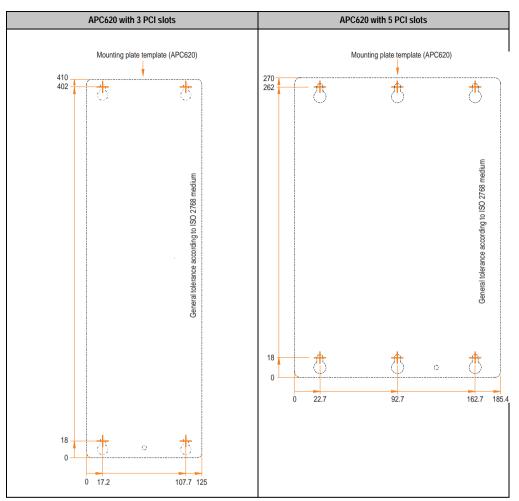


Table 130: Drilling templates - 3 and 5 PCI slots

## Start-up • Installation

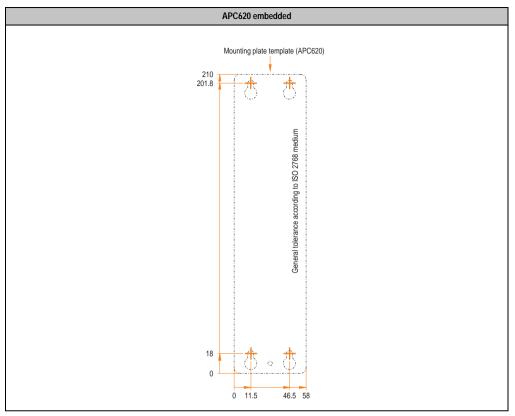


Table 131: Drilling templates - APC620 embedded

## 1.3 Mounting orientation

The Automation PC620 system must be mounted as described in the following sections.

## 1.3.1 Standard mounting

Standard mounting refers to vertical mounting orientation.

APC620 systems with and without fan kit can be mounted this way.

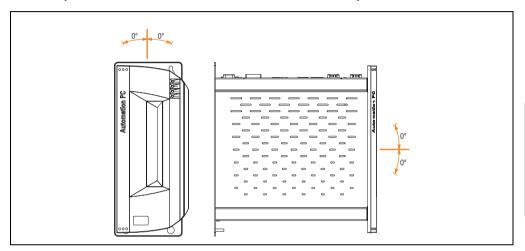


Figure 116: Mounting orientation - Standard

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

## Start-up • Installation

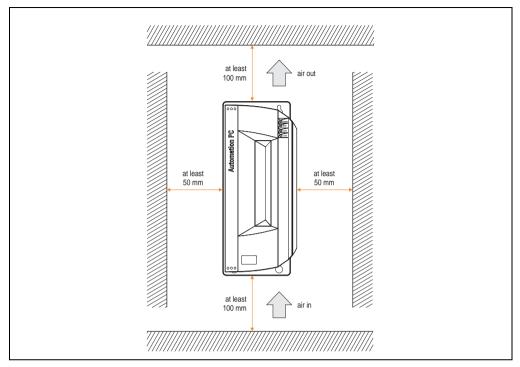


Figure 117: Air circulation spacing - Standard

## 1.3.2 Optional mounting orientations

## Caution!

A fan kit must be used if the system is mounted in the following orientations. In addition, it is important to be sure that the components used are installed in a way that complies with the specifications of the drives being used (CD-ROM, DVD/CD-RW, hard disk, etc.). See the following pages for information regarding the specifications for mounting orientation.

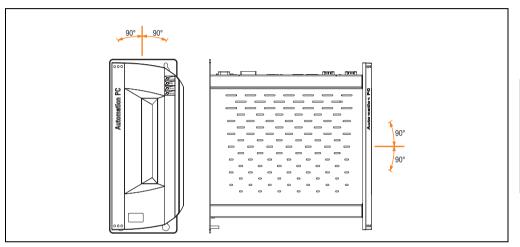


Figure 118: Mounting orientation - Optional

## Start-up • Installation

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

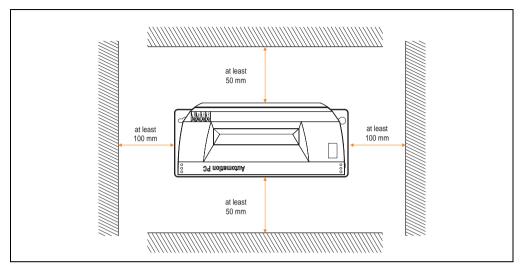


Figure 119: Optional circulation spacing

## CompactFlash slot, add-on or slide-in

No limitation on mounting orientation. Permissible mounting orientations are shown in figure 118 "Mounting orientation - Optional" on page 259.

## Add-on or slide-in hard disks 20, 30 and 40 GB.

The following figure shows the possible mounting orientations for an APC620 device with an add-on (5AC600.HDDI-00 or 5AC600.HDDI-01) or slide-in hard disk (5AC600.HDDS-00 or 5AC600.HDDS-02).

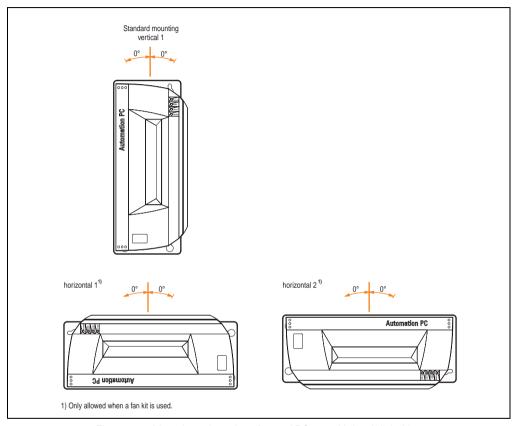


Figure 120: Mounting orientations for an APC620 with hard disk drive

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

## Start-up • Installation

#### Slide-in CD-ROM drive

The following figure shows the possible mounting orientations for an APC620 device with a slide-in CD-ROM drive (5AC600.CDXS-00).

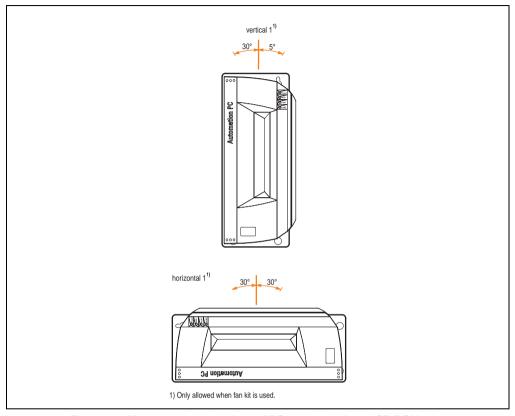


Figure 121: Mounting orientations for an APC 620 with a slide-in CD-ROM drive

The mounting orientation "horizontal 1" requires the use of a fan kit.

#### Slide-in DVD-ROM/CD-RW drive

The following figure shows the possible mounting orientations for an APC620 device with a slide-in DVD-ROM/CD-RW drive 5AC600.DVDS-00).

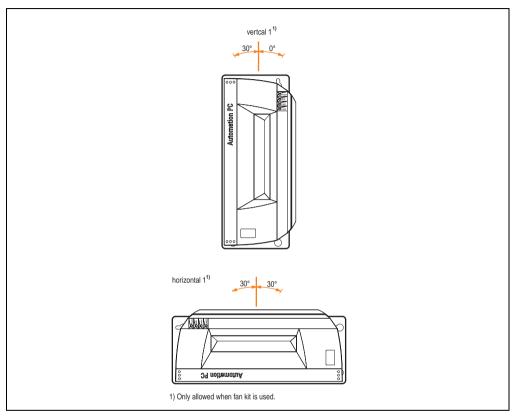


Figure 122: Mounting orientations for an APC620 with a slide-in DVD-ROM/CD-RW drive

The mounting orientation "horizontal 1" requires the use of a fan kit.

#### Slide-in DVD-R/RW/DVD+R/RW

The following figure shows the possible mounting orientations for an APC620 device with a slide-in DVD-R/RW / DVD+R/RW drive (5AC600.DVRS-00).

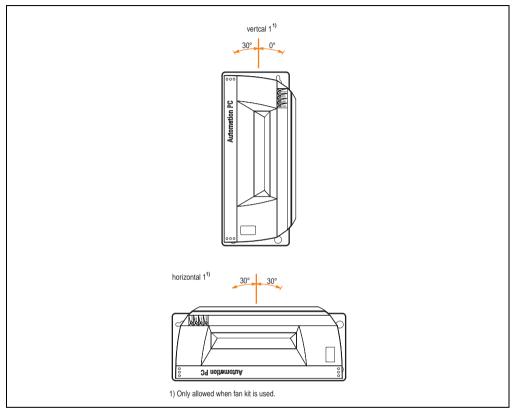


Figure 123: Mounting orientations for an APC620 with a slide-in DVD-R/RW / DVD+R/RW drive

The mounting orientation "horizontal 1" requires the use of a fan kit.

## Slide-in USB FDD

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

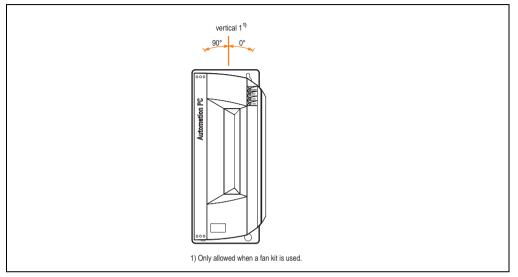


Figure 124: Mounting orientations for an APC620 with a slide-in USB FDD drive

## 2. Cable connections

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

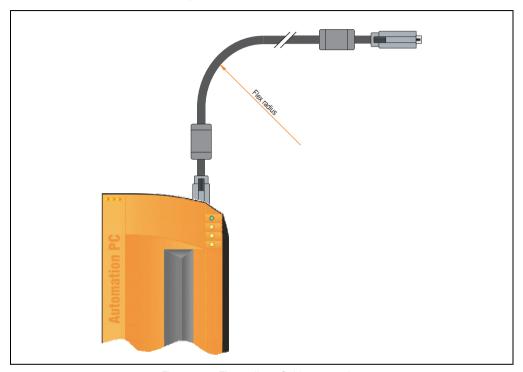


Figure 125: Flex radius - Cable connection

## Information:

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

## 2.1 Ethernet cable lengths for ETH1

For error free data transfer, take note of the cable length information in section "Ethernet connection ETH1" on page 116.

## 3. Grounding concept

The functional ground is a current path with low impedance between isolated circuits and ground, which is not a protective measure, but rather provides e.g. increased immunity to disturbances. It serves only as disturbance dissipation and not as contact protection for persons.

The APC620 functional ground has 2 connections:

- · Supply voltage
- Ground connection

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

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

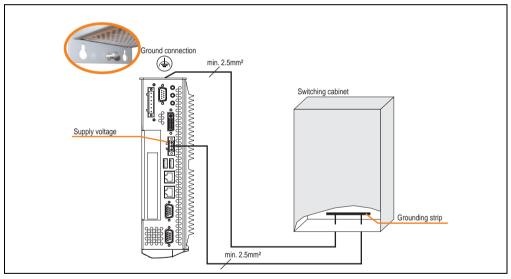


Figure 126: Grounding concept

## 4. Connection examples

The following examples provide an overview of the configuration options for connecting Automation Panel 800 and Automation Panel 900 and/or Automation Panel 800 devices with the APC620. The following questions will be answered:

- How are Automation Panel 900 devices connected to the monitor / panel output of the APC620, and what needs to be considered?
- How are Automation Panel 800 devices connected to the monitor / panel output of the APC620, and what needs to be considered?
- How are Automation Panel 900 devices connected simultaneously to the Monitor / Panel output on the optional SDL AP Link of the APC620 and what needs to be considered?
- What are "Display Clone" and "Extended Desktop" modes?
- How many Automation Panel 900 devices can be connected per line?
- How many Automation Panel 900 devices can be connected to an Automation Panel 800 device per line?
- How are the connected devices internally numbered?
- Are there limitations to the segment length and if so, what are they?
- What cables and link modules are needed?
- Do BIOS settings have to be changed for a specific configuration?

## Information:

An RGB monitor / flat-screen can always be connected to the monitor / panel output of the APC620 (necessary DVI to CRT adapter can be ordered under the model number 5AC900.1000-00).

## 4.1 Selecting the display units

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

The following table lists the AP900 devices that can be connected on the same line with an AP800 device.

Automation Panel 800	Automation Panel 900
5AP820.1505-00	5AP920.1505-01 5AP951.1505-01 5AP980.1505-01 5AP981.1505-01
5AP880.1505-00	5AP920.1505-01 5AP951.1505-01 5AP980.1505-01 5AP981.1505-01

Table 132: Selecting the display units

### 4.2 One Automation Panel 900 via DVI (onboard)

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

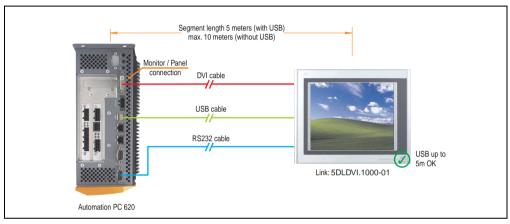


Figure 127: Configuration - One Automation Panel 900 via DVI (onboard)

#### 4.2.1 Basic system requirements

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

CPU board	with system unit					Limitation	
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	Resolution
5PC600.E855-00 5PC600.X855-00	1	1	1	1	1	1	Max. SXGA
5PC600.E855-01 5PC600.X855-01	1	1	1	1	1	1	Max. SXGA
5PC600.E855-02 5PC600.X855-02	1	1	✓	<b>✓</b>	<b>√</b>	✓	Max. SXGA
5PC600.E855-03 5PC600.X855-03	1	1	✓	<b>✓</b>	<b>√</b>	✓	Max. SXGA
5PC600.E855-04 5PC600.X855-04	1	1	✓	<b>✓</b>	<b>√</b>	✓	Max. SXGA
5PC600.E855-05 5PC600.X855-05	1	1	<b>√</b>	1	1	<b>√</b>	Max. SXGA

Table 133: Possible combinations of system unit and CPU board

#### 4.2.2 Link modules

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

Table 134: Link module for the configuration - One Automation Panel 900 via DVI

#### 4.2.3 Cables

Select one cable each from the 3 required types.

Model number	Туре	Length
5CADVI.0018-00	DVI cable	1.8 m
5CADVI.0050-00	DVI cable	5 m
5CADVI.0100-00	DVI cable	10 m <sup>1)</sup>
9A0014.02	Touch screen cable - serial	1.8 m
9A0014.05	Touch screen cable - serial	5 m
9A0014.10	Touch screen cable - serial	10 m <sup>1)</sup>
5CAUSB.0018-00	USB cable	1.8 m
5CAUSB.0050-00	USB cable	5 m

Table 135: Cable for DVI configurations

## 4.2.4 Possible Automation Panel units, resolutions und segment lengths

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

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

Table 136: Possible Automation Panel units, resolutions und segment lengths

## Information:

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

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

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

## 4.2.5 BIOS settings

No special BIOS settings are necessary for operation.

## 4.2.6 Windows graphics driver settings

See chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

## 4.2.7 Windows touch screen driver settings

See chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

## 4.3 An Automation Panel 900 via SDL (onboard)

An Automation Panel 900 is connected to the integrated SDL interface (onboard) via an SDL cable. USB devices can only be connected directly to the Automation Panel (without hub).

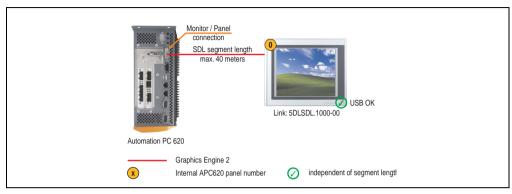


Figure 128: Configuration - An Automation Panel 900 via SDL (onboard)

### 4.3.1 Basic system requirements

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

CPU board	with system unit					Limitation	
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	Resolution
5PC600.E855-00 5PC600.X855-00	1	1	1	1	1	/	Max. UXGA
5PC600.E855-01 5PC600.X855-01	1	✓	✓	<b>✓</b>	<b>√</b>	<b>✓</b>	Max. UXGA
5PC600.E855-02 5PC600.X855-02	1	1	1	1	1	1	Max. UXGA
5PC600.E855-03 5PC600.X855-03	1	✓	✓	<b>✓</b>	✓	<b>✓</b>	Max. UXGA
5PC600.E855-04 5PC600.X855-04	1	1	1	1	1	/	Max. UXGA
5PC600.E855-05 5PC600.X855-05	1	1	1	1	1	1	Max. UXGA

Table 137: Possible combinations of system unit and CPU board

#### 4.3.2 Link modules

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

Table 138: Link module for the configuration - One Automation Panel 900 via DVI

## **4.3.3 Cables**

Select a cable from the following table.

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

Table 139: Cables for SDL configurations

## Cable lengths and resolutions for SDL transfer

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

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

Table 140: Segment lengths, resolutions and SDL cables

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

Firmware	Label	Version	Comment
MTCX FPGA	Firmware on the APC620	V 01.15	The version is read from BIOS - see the
MTCX PX32	Firmware on the APC620	v 01.55	BIOS description. Supported starting with the APC620 /
SDLR FPGA	PLR FPGA Firmware on the AP Link SDL receiver and transceiver		PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) <b>V01.10</b> , available in the download area of the B&R homepage.
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	download area of the bark nothepage.
Hardware	Label	Revision	Comment
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

Table 141: 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	Label	Version	Comment
MTCX FPGA	Firmware on the APC620	v 01.15	The version is read from BIOS - see the
MTCX PX32	Firmware on the APC620	v 01.55	BIOS description. Supported starting with the APC620 /
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) <b>V01.10</b> , available in the download area of the B&R homepage.
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	download area of the bark homepage.
Hardware	Label	Revision	Comment
5DLSDL.1000-00	AP Link SDL receiver	Rev. D0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. D0	
5AC600.SDL0-00	AP Link SDL transmitter	Rev. B3	
5PC600.SX01-00	System 1 PCI	Rev. E0	
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0	
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0	
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Rev. C0	
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0	

Table 142: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

## 4.3.4 BIOS settings

No special BIOS settings are necessary for operation.

## 4.3.5 Windows graphics driver settings

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

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

#### 4.3.6 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

## 4.4 An Automation Panel 800 via SDL (onboard)

An Automation Panel 800 is connected to the integrated SDL interface (onboard) via an SDL cable. USB devices can only be connected directly to the extension keyboard (without a hub).

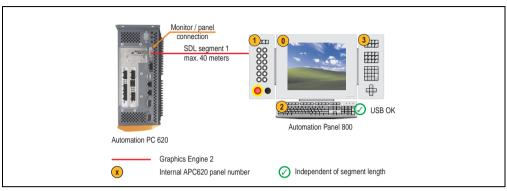


Figure 129: Configuration - An Automation Panel 800 via SDL (onboard)

## 4.4.1 Basic system requirements

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

CPU board			with sys	tem unit			Limitation
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	Resolution
5PC600.E855-00 5PC600.X855-00	1	1	1	1	1	1	max. XGA
5PC600.E855-01 5PC600.X855-01	1	1	1	1	1	1	max. XGA
5PC600.E855-02 5PC600.X855-02	1	1	1	1	1	1	max. XGA
5PC600.E855-03 5PC600.X855-03	1	1	1	1	1	1	max. XGA
5PC600.E855-04 5PC600.X855-04	1	1	1	1	1	1	max. XGA
5PC600.E855-05 5PC600.X855-05	1	1	1	1	1	1	max. XGA

Table 143: Possible combinations of system unit and CPU board

#### **4.4.2 Cables**

Select an SDL cable from the following table.

Model number	Туре	Length
5CASDL.0018-20	SDL w/o extender	1.8 m
5CASDL.0050-20	SDL w/o extender	5 m
5CASDL.0100-20	SDL w/o extender	10 m
5CASDL.0150-20	SDL w/o extender	15 m
5CASDL.0200-20	SDL w/o extender	20 m
5CASDL.0250-20	SDL w/o extender	25 m
5CASDL.0300-30	SDL w/ extender	30 m
5CASDL.0400-30	SDL w/ extender	40 m

Table 144: Cables for SDL configurations

## Cable lengths and resolutions for SDL transfer

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

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

Table 145: Segment lengths, resolutions and SDL cables

<sup>1)</sup> See table 146 "Requirements for SDL cable with automatic cable adjustment (equalizer)"

<sup>2)</sup> See table 147 "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	Label	Version	Comment
MTCX FPGA	Firmware on the APC620	V 01.15	The version is read from BIOS - see the BIOS description
MTCX PX32	Firmware on the APC620	v 01.55	Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) <b>V01.10</b> , available in the download area of the B&R homepage.

Table 146: 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	Label	Version	Comment
MTCX FPGA	Firmware on the APC620	V 01.15	The version is read from BIOS - see the BIOS description.
MTCX PX32	Firmware on the APC620	v 01.55  Supported starting with the APC Firmware upgrade (MTCX, SDLF available in the download are homepage.	
Hardware	Label	Revision	Comment
5PC600.SX01-00	System 1 PCI	Rev. E0	-
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	-
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0	-
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0	
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Rev. C0	-
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0	-

Table 147: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

#### 4.4.3 BIOS settings

No special BIOS settings are necessary for operation.

#### 4.4.4 Windows graphics driver settings

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

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

#### 4.4.5 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

### 4.5 An AP900 and an AP800 via SDL (onboard)

An Automation Panel 900 and an Automation Panel 800 are connected to the integrated SDL interface (onboard) via SDL.

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

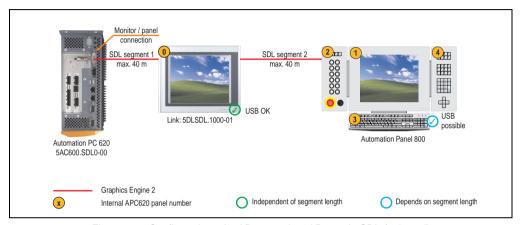


Figure 130: Configuration - An AP900 and an AP800 via SDL (onboard)

#### 4.5.1 Basic system requirements

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

CPU board	with system unit					Limitation	
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	Resolution
5PC600.E855-00 5PC600.X855-00	1	✓	✓	1	<b>√</b>	✓	Max. UXGA
5PC600.E855-01 5PC600.X855-01	1	✓	✓	1	<b>√</b>	✓	Max. UXGA
5PC600.E855-02 5PC600.X855-02	1	✓	✓	1	<b>√</b>	✓	Max. UXGA
5PC600.E855-03 5PC600.X855-03	1	✓	✓	1	✓	✓	Max. UXGA
5PC600.E855-04 5PC600.X855-04	1	<b>√</b>	<b>/</b>	1	<b>√</b>	<b>/</b>	Max. UXGA
5PC600.E855-05 5PC600.X855-05	✓	✓	✓	1	✓	✓	Max. UXGA

Table 148: Possible combinations of system unit and CPU board

#### **4.5.2 Cables**

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

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

#### Cable lengths and resolutions for SDL transfer

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

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

Table 149: Segment lengths, resolutions and SDL cables

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

Firmware	Label	Version	Comment
MTCX FPGA	Firmware on the APC620	V 01.15	The version is read from BIOS - see the BIOS description.
MTCX PX32	Firmware on the APC620	v 01.55	Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) <b>V01.10</b> , available in the download area of the B&R homepage.

Table 150: Requirements for SDL cable with automatic cable adjustment (equalizer)

<sup>1)</sup> See table 150 "Requirements for SDL cable with automatic cable adjustment (equalizer)"

<sup>2)</sup> See table 151 "Requirements for SDL cable with extender and 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	Label	Version	Comment
MTCX FPGA	Firmware on the APC620	V 01.15	The version is read from BIOS - see the BIOS description
MTCX PX32	Firmware on the APC620	v 01.55	Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) <b>V01.10</b> , available in the download area of the B&R homepage.
Hardware	Label	Revision	Comment
5PC600.SX01-00	System 1 PCI	Rev. E0	-
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	-
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0	-
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0	
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Rev. C0	-
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0	-

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

### 4.5.3 BIOS settings

No special BIOS settings are necessary for operation.

### 4.5.4 Windows graphics driver settings

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

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

#### 4.5.5 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

## 4.6 Four Automation Panel 900 units via SDL (onboard)

An Automation Panel 900 is connected to the integrated SDL interface (onboard) via an SDL cable. Up to three other Automation Panels of the same type are connected to this Automation Panel and operated via SDL. All four panels show the same content (Display Clone).

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

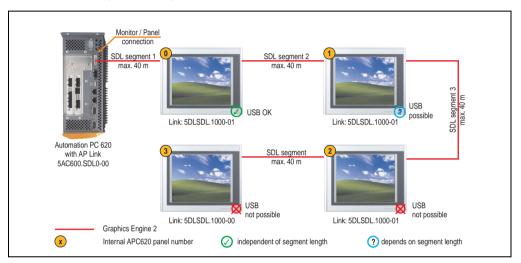


Figure 131: Configuration - Four Automation Panel 900 units via SDL (onboard)

#### 4.6.1 Basic system requirements

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

CPU board	with system unit						Limitation
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	Resolution
5PC600.E855-00 5PC600.X855-00	1	✓	<b>✓</b>	1	✓	<b>✓</b>	Max. UXGA
5PC600.E855-01 5PC600.X855-01	1	✓	<b>✓</b>	1	✓	<b>✓</b>	Max. UXGA
5PC600.E855-02 5PC600.X855-02	1	✓	<b>✓</b>	1	✓	<b>✓</b>	Max. UXGA
5PC600.E855-03 5PC600.X855-03	1	<b>√</b>	/	<b>√</b>	<b>√</b>	/	Max. UXGA

Table 152: Possible combinations of system unit and CPU board

CPU board	with system unit						Limitation
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	Resolution
5PC600.E855-04 5PC600.X855-04	1	1	1	1	1	1	Max. UXGA
5PC600.E855-05 5PC600.X855-05	1	1	1	1	1	1	Max. UXGA

Table 152: Possible combinations of system unit and CPU board (cont.)

#### 4.6.2 Link modules

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

Table 153: Link modules for the configuration: 4 Automation Panel 900 via SDL on 1 line

## **4.6.3 Cables**

Select an Automation Panel 900 cable from the following table.

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

Table 154: Cables for SDL configurations

Model number	Туре	Length
5CASDL.0300-10	SDL cable with extender for a fixed type of layout	30 m
5CASDL.0300-13	SDL cable with extender for fixed and flexible type of layout	30 m
5CASDL.0400-10	SDL cable with extender for a fixed type of layout	40 m
5CASDL.0400-13	SDL cable with extender for fixed and flexible type of layout	40 m

Table 154: Cables for SDL configurations (cont.)

#### Cable lengths and resolutions for SDL transfer

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

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

Table 155: Segment lengths, resolutions and SDL cables

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

<sup>1)</sup> See table 156 "Requirements for SDL cable with automatic cable adjustment (equalizer)" on page 286

<sup>2)</sup> See table 157 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)" on page 286

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

Table 156: 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	Label	Version	Comment	
MTCX FPGA	Firmware on the APC620	V 01.15	The version is read from BIOS - see the	
MTCX PX32	Firmware on the APC620	v 01.55	BIOS description. Supported starting with the APC620 /	
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) <b>V01.10</b> , available in the download area of the B&R homepage.	
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02		
Hardware	Label	Revision	Comment	
5DLSDL.1000-00	AP Link SDL receiver	Rev. D0		
5DLSDL.1000-01	AP Link SDL transceiver	Rev. D0		
5AC600.SDL0-00	AP Link SDL transmitter	Rev. B3		
5PC600.SX01-00	System 1 PCI	Rev. E0		
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0		
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0		
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0		
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	Rev. C0		
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0		

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

#### 4.6.4 BIOS settings

No special BIOS settings are necessary for operation.

## 4.6.5 Windows graphics driver settings

"Display Clone" must be defined as output device in the graphics driver, with "Digital Display" as primary device.

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

## 4.6.6 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

#### 4.7 One Automation Panel 900 unit via SDL (AP Link)

An Automation Panel 900 unit is connected to the optional SDL transmitter (AP Link) via an SDL cable. USB devices can only be connected directly to the Automation Panel (without hub).

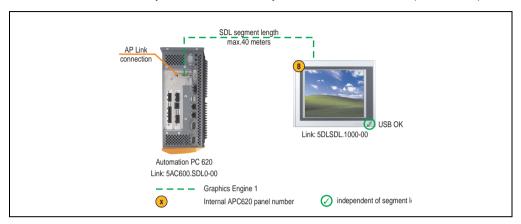


Figure 132: Configuration - One Automation Panel 900 via SDL (AP Link)

#### 4.7.1 Basic system requirements

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

CPU board	with system unit					Limitation	
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	Resolution
5PC600.E855-00 5PC600.X855-00	-	1	-	1	✓	-	Max. UXGA
5PC600.E855-01 5PC600.X855-01	-	1	-	1	✓	-	Max. UXGA
5PC600.E855-02 5PC600.X855-02	-	1	-	1	✓	-	Max. UXGA
5PC600.E855-03 5PC600.X855-03	-	1	-	1	✓	-	Max. UXGA
5PC600.E855-04 5PC600.X855-04	-	1	-	1	<b>√</b>	-	Max. UXGA
5PC600.E855-05 5PC600.X855-05	-	1	-	1	1	-	Max. UXGA

Table 158: Possible combinations of system unit and CPU board

#### 4.7.2 Link modules

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

Table 159: Link modules for the configuration: 1 Automation Panel 900 via SDL (optional)

#### **4.7.3 Cables**

Select a cable from the following table.

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

Table 160: Cables for SDL configurations

## Cable lengths and resolutions for SDL transfer

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

Cables			Resolution		
Segment length [m]	VGA	SVGA	XGA	SXGA	UXGA
	640 x 480	800 x 600	1024 x 768	1280 x 1024	1600 x 1200
1.8	5CASDL.0018-00	5CASDL.0018-00	5CASDL.0018-00	5CASDL.0018-00	5CASDL.0018-00
	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01	5CASDL.0018-01
	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03	5CASDL.0018-03
5	5CASDL.0050-00	5CASDL.0050-00	5CASDL.0050-00	5CASDL.0050-00	5CASDL.0050-00
	5CASDL.0050-01	5CASDL.0050-01	5CASDL.0050-01	5CASDL.0050-01	5CASDL.0050-01
	5CASDL.0050-03	5CASDL.0050-03	5CASDL.0050-03	5CASDL.0050-03	5CASDL.0050-03
10	5CASDL.0100-00	5CASDL.0100-00	5CASDL.0100-00	5CASDL.0100-00	5CASDL.0100-00 <sup>1)</sup>
	5CASDL.0100-01	5CASDL.0100-01	5CASDL.0100-01	5CASDL.0100-01	5CASDL.0100-01 <sup>1)</sup>
	5CASDL.0100-03	5CASDL.0100-03	5CASDL.0100-03	5CASDL.0100-03	5CASDL.0100-03 <sup>1)</sup>
15	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-03	5CASDL.0150-0 <sup>1)</sup> 5CASDL.0150-01 <sup>1)</sup> 5CASDL.0150-03 <sup>1)</sup>	
20	5CASDL.0200-00 <sup>1)</sup> 5CASDL.0200-03 <sup>1)</sup>	5CASDL.0200-00 <sup>1)</sup> 5CASDL.0200-03 <sup>1)</sup>	5CASDL.0200-00 <sup>1)</sup> 5CASDL.0200-03 <sup>1)</sup>	5CASDL.0200-00 <sup>1)</sup> 5CASDL.0200-03 <sup>1)</sup>	-
25	5CASDL.0250-00 <sup>1)</sup> 5CASDL.0250-03 <sup>1)</sup>	5CASDL.0250-00 <sup>1)</sup> 5CASDL.0250-03 <sup>1)</sup>	5CASDL.0250-00 <sup>1)</sup> 5CASDL.0250-03 <sup>1)</sup>	-	-
30	5CASDL.0300-00 <sup>1)</sup> 5CASDL.0300-03 <sup>1)</sup>	5CASDL.0300-00 <sup>1)</sup> 5CASDL.0300-03 <sup>1)</sup>	5CASDL.0300-10 <sup>2)</sup> 5CASDL.0300-13 <sup>2)</sup>	5CASDL.0300-10 <sup>2)</sup> 5CASDL.0300-13 <sup>2)</sup>	-
40	5CASDL.0400-10 <sup>2)</sup>	5CASDL.0400-10 <sup>2)</sup>	5CASDL.0400-10 <sup>2)</sup>	5CASDL.0400-10 <sup>2)</sup>	-
	5CASDL.0400-13 <sup>2)</sup>	5CASDL.0400-13 <sup>2)</sup>	5CASDL.0400-13 <sup>2)</sup>	5CASDL.0400-13 <sup>2)</sup>	-

Table 161: Segment lengths, resolutions and SDL cables

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

Firmware	Label	Version	Comment
MTCX FPGA	Firmware on the APC620	V 01.15	The version is read from BIOS - see the
MTCX PX32	Firmware on the APC620	v 01.55	BIOS description. Supported starting with the APC620 /
SDLR FPGA	LR FPGA Firmware on the AP Link SDL receiver and transceiver		PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) <b>V01.10</b> , available in the download area of the B&R homepage.
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	download area of the bark nomepage.
Hardware	Label	Revision	Comment
5DLSDL.1000-00	AP Link SDL receiver	Rev. B0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. B0	

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

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

<sup>1)</sup> See table 162 "Requirements for SDL cable with automatic cable adjustment (equalizer)" on page 290

<sup>2)</sup> See table 163 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)" on page 291

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

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

#### 4.7.4 BIOS settings

No special BIOS settings are necessary for operation.

#### 4.7.5 Windows graphics driver settings

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

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

#### 4.7.6 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

#### 4.8 Four Automation Panel 900 units via SDL (AP Link)

An Automation Panel 900 unit is connected to the optional SDL transmitter (AP Link) via an SDL cable. Three other Automation Panels of the same type are connected to this Automation Panel and operated via SDL. All four panels show the same content (Display Clone).

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

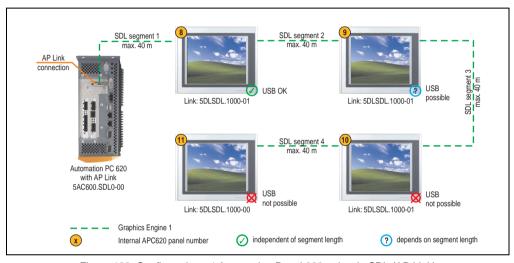


Figure 133: Configuration - 4 Automation Panel 900 units via SDL (AP Link)

#### 4.8.1 Basic system requirements

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

CPU board	with system unit					Limitation	
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	Resolution
5PC600.E855-00 5PC600.X855-00	-	1	-	<b>✓</b>	✓	-	Max. UXGA
5PC600.E855-01 5PC600.X855-01	-	1	-	<b>√</b>	<b>√</b>	•	Max. UXGA
5PC600.E855-02 5PC600.X855-02	-	1	-	1	1	-	Max. UXGA

Table 164: Possible combinations of system unit and CPU board

CPU board	with system unit						Limitation
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	Resolution
5PC600.E855-03 5PC600.X855-03	-	✓	-	<b>✓</b>	✓	-	Max. UXGA
5PC600.E855-04 5PC600.X855-04	-	✓	-	<b>✓</b>	<b>√</b>	-	Max. UXGA
5PC600.E855-05 5PC600.X855-05	-	1	-	1	1	-	Max. UXGA

Table 164: Possible combinations of system unit and CPU board (cont.)

#### 4.8.2 Link modules

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

Table 165: Link modules for the configuration: 4 Automation Panel 900 units via SDL (optional) on 1 line

#### **4.8.3 Cables**

Selection of 4 cables from the following tables.

Model number	Туре	Length
5CASDL.0018-00	SDL w/o extender	1.8 m
5CASDL.0018-01	SDL without extender with 45° plug	1.8 m
5CASDL.0018-03	SDL flex without extender	1.8 m
5CASDL.0050-00	SDL w/o extender	5 m
5CASDL.0050-01	SDL without extender with 45° plug	5 m
5CASDL.0050-03	SDL flex without extender	5 m
5CASDL.0100-00	SDL w/o extender	10 m
5CASDL.0100-01	SDL without extender with 45° plug	10 m
5CASDL.0100-03	SDL flex without extender	10 m
5CASDL.0150-00	SDL w/o extender	15 m
5CASDL.0150-01	SDL without extender with 45° plug	15 m
5CASDL.0150-03	SDL flex without extender	15 m
5CASDL.0200-00	SDL w/o extender	20 m
5CASDL.0200-03	SDL flex without extender	20 m
5CASDL.0250-00	SDL w/o extender	25 m

Table 166: Cables for SDL configurations

Model number	Туре	Length
5CASDL.0250-30	SDL flex without extender	25 m
5CASDL.0300-00	SDL w/o extender	30 m
5CASDL.0300-03	SDL flex without extender	30 m
5CASDL.0300-10	SDL w/ extender	30 m
5CASDL.0300-13	SDL flex with extender	30 m
5CASDL.0400-10	SDL w/ extender	40 m
5CASDL.0400-13	SDL flex with extender	40 m

Table 166: Cables for SDL configurations (cont.)

#### Cable lengths and resolutions for SDL transfer

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

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

Table 167: Segment lengths, resolutions and SDL cables

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

<sup>1)</sup> See table 168 "Requirements for SDL cable with automatic cable adjustment (equalizer)" on page 295

<sup>2)</sup> See table 169 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)" on page 295

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

Table 168: 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	Label	Version	Comment
MTCX FPGA	Firmware on the APC620	V 01.15	The version is read from BIOS - see the
MTCX PX32	Firmware on the APC620	v 01.55	BIOS description. Supported starting with the APC620 /
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) <b>V01.10</b> , available in the download area of the B&R homepage.
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	download area of the bark homepage.
Hardware	Label	Revision	Comment
5DLSDL.1000-00	AP Link SDL receiver	Rev. D0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. D0	
5AC600.SDL0-00	AP Link SDL transmitter	Rev. B3	
5PC600.SX01-00	System 1 PCI	Rev. E0	
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0	
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	Rev. A0	
5PC600.SX05-00 System 5 PCI, 2 disk drive slots, 1 AP Link slot		Rev. C0	
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0	

Table 169: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

#### 4.8.4 BIOS settings

No special BIOS settings are necessary for operation.

#### 4.8.5 Windows graphics driver settings

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

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

## 4.8.6 Windows touch screen driver settings

For more information on this, see chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

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

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

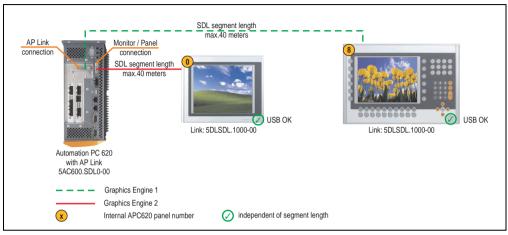


Figure 134: Configuration - Two Automation Panel 900 units via SDL (onboard) and SDL (AP Link)

#### 4.9.1 Basic system requirements

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

CPU board	with system unit					Limitation	
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	Resolution
5PC600.E855-00 5PC600.X855-00	-	1	-	1	/	-	Max. UXGA
5PC600.E855-01 5PC600.X855-01	-	1	-	1	/	-	Max. UXGA
5PC600.E855-02 5PC600.X855-02	-	✓	-	<b>✓</b>	<b>✓</b>	-	Max. UXGA
5PC600.E855-03 5PC600.X855-03	-	✓	-	<b>✓</b>	<b>✓</b>	-	Max. UXGA
5PC600.E855-04 5PC600.X855-04	-	<b>√</b>	-	<b>/</b>	/	-	Max. UXGA
5PC600.E855-05 5PC600.X855-05	-	1	-	1	√	-	Max. UXGA

Table 170: Possible combinations of system unit and CPU board

#### 4.9.2 Link modules

Model number	Description	Comment
5DLSDL.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 2 pieces required
5AC600.SDL0-00	APC620 Smart Display Link transmitter For connecting Automation Panels to an APC620 via SDL.	For Automation PC 620

Table 171: Link modules for the configuration: 2 Automation Panel 900 units via SDL and SDL (optional)

#### **4.9.3 Cables**

Selection of 2 cables from the following tables.

Model number	Туре	Length
5CASDL.0018-00	SDL w/o extender	1.8 m
5CASDL.0018-01	SDL without extender with 45° plug	1.8 m
5CASDL.0018-03	SDL flex without extender	1.8 m
5CASDL.0050-00	SDL w/o extender	5 m
5CASDL.0050-01	SDL without extender with 45° plug	5 m
5CASDL.0050-03	SDL flex without extender	5 m
5CASDL.0100-00	SDL w/o extender	10 m
5CASDL.0100-01	SDL without extender with 45° plug	10 m
5CASDL.0100-03	SDL flex without extender	10 m
5CASDL.0150-00	SDL w/o extender	15 m
5CASDL.0150-01	SDL without extender with 45° plug	15 m
5CASDL.0150-03	SDL flex without extender	15 m
5CASDL.0200-00	SDL w/o extender	20 m
5CASDL.0200-03	SDL flex without extender	20 m
5CASDL.0250-00	SDL w/o extender	25 m
5CASDL.0250-30	SDL flex without extender	25 m
5CASDL.0300-00	SDL w/o extender	30 m
5CASDL.0300-03	SDL flex without extender	30 m
5CASDL.0300-10	SDL w/ extender	30 m
5CASDL.0300-13	SDL flex with extender	30 m
5CASDL.0400-10	SDL w/ extender	40 m
5CASDL.0400-13	SDL flex with extender	40 m

Table 172: Cables for SDL configurations

#### Cable lengths and resolutions for SDL transfer

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

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

Table 173: Segment lengths, resolutions and SDL cables

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

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

Table 174: Requirements for SDL cable with automatic cable adjustment (equalizer)

<sup>1)</sup> See table 174 "Requirements for SDL cable with automatic cable adjustment (equalizer)" on page 299

<sup>2)</sup> See table 175 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)" on page 300

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	Label	Version	Comment
MTCX FPGA	Firmware on the APC620	V 01.15	The version is read from BIOS - see the
MTCX PX32	Firmware on the APC620	v 01.55	BIOS description. Supported starting with the APC620 /
SDLR FPGA	Firmware on the AP Link SDL receiver and transceiver	v 01.04	PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) <b>V01.10</b> , available in the download area of the B&R homepage.
SDLT FPGA	Firmware on the AP Link SDL transmitter	v 00.02	download area of the bark nomepage.
Hardware	Label	Revision	Comment
5DLSDL.1000-00	AP Link SDL receiver	Rev. D0	
5DLSDL.1000-01	AP Link SDL transceiver	Rev. D0	
5AC600.SDL0-00	AP Link SDL transmitter	Rev. B3	
5PC600.SX01-00	System 1 PCI	Rev. E0	
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	Rev. D0	
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	Rev. E0	
5PC600.SF03-00	600.SF03-00 System 3 PCI, 1 disk drive slot, 1 AP Link slot		
5PC600.SX05-00	5PC600.SX05-00 System 5 PCI, 2 disk drive slots, 1 AP Link slot		
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	Rev. C0	

Table 175: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

#### 4.9.4 BIOS settings

No special BIOS settings are necessary for operation.

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

#### 4.9.5 Windows graphics driver settings

See chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

If all connected Automation Panel 900 panels (line 1 + line 2) should display the same content, then "Dual Display Clone" mode must be set in the graphics driver (see chapter 4 "Software", section 4.2.4 "Graphics settings for Dual Display Clone" on page 521).

If all connected Automation Panel 900 panels (line 1 + line 2) should display the same content, then "Dual Display Clone" mode must be set in the graphics driver (see chapter 4 "Software", section 4.2.3 "Graphics settings for Extended Desktop" on page 519).

## 4.9.6 Windows touch screen driver settings

See chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

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

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

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

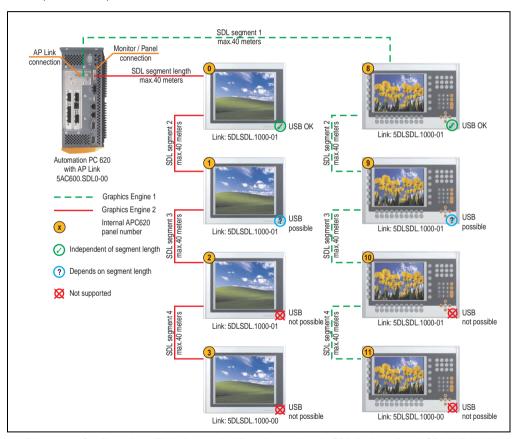


Figure 135: Configuration - Eight Automation Panel 900 units via SDL (onboard) and SDL (AP Link)

#### 4.10.1 Basic system requirements

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

CPU board	with system unit					Limitation	
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	Resolution
5PC600.E855-00 5PC600.X855-00	-	1	-	1	✓	-	Max. UXGA
5PC600.E855-01 5PC600.X855-01	-	1	-	1	✓	-	Max. UXGA
5PC600.E855-02 5PC600.X855-02	-	1	-	1	✓	-	Max. UXGA
5PC600.E855-03 5PC600.X855-03	-	1	-	1	1	-	Max. UXGA
5PC600.E855-04 5PC600.X855-04	-	1	-	1	<b>&gt;</b>	-	Max. UXGA
5PC600.E855-05 5PC600.X855-05	-	1	-	1	✓	-	Max. UXGA

Table 176: Possible combinations of system unit and CPU board

#### 4.10.2 Link modules

Model number	Description	Comment
5DLSDL.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 2 pieces required
5DLSDL.1000-01	Automation Panel Link SDL transceiver Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 6 pieces required
5AC600.SDL0-00	APC620 Smart Display Link transmitter For connecting Automation Panels to an APC620 via SDL.	For Automation PC 620 1 pieces required

Table 177: Link modules for the configuration: 8 Automation Panel 900 units via SDL and SDL (optional)

#### 4.10.3 Cables

Selection of 8 cables from the following tables.

Model number	Туре	Length
5CASDL.0018-00	SDL w/o extender	1.8 m
5CASDL.0018-01	SDL without extender with 45° plug	1.8 m
5CASDL.0018-03	SDL flex without extender	1.8 m
5CASDL.0050-00	SDL w/o extender	5 m
5CASDL.0050-01	SDL without extender with 45° plug	5 m
5CASDL.0050-03	SDL flex without extender	5 m
5CASDL.0100-00	SDL w/o extender	10 m
5CASDL.0100-01	SDL without extender with 45° plug	10 m
5CASDL.0100-03	SDL flex without extender	10 m
5CASDL.0150-00	SDL w/o extender	15 m
5CASDL.0150-01	SDL without extender with 45° plug	15 m
5CASDL.0150-03	SDL flex without extender	15 m
5CASDL.0200-00	SDL w/o extender	20 m
5CASDL.0200-03	SDL flex without extender	20 m
5CASDL.0250-00	SDL w/o extender	25 m
5CASDL.0250-30	SDL flex without extender	25 m
5CASDL.0300-00	SDL w/o extender	30 m
5CASDL.0300-03	SDL flex without extender	30 m
5CASDL.0300-10	SDL w/ extender	30 m
5CASDL.0300-13	SDL flex with extender	30 m
5CASDL.0400-10	SDL w/ extender	40 m
5CASDL.0400-13	SDL w/ extender	40 m

Table 178: Cables for SDL configurations

## Cable lengths and resolutions for SDL transfer

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

Cables	Resolution					
Segment length [m]	VGA         SVGA         XGA         SXGA         UXGA           640 x 480         800 x 600         1024 x 768         1280 x 1024         1600 x 12					
1.8	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-03	

Table 179: Segment lengths, resolutions and SDL cables

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

Table 179: Segment lengths, resolutions and SDL cables (cont.)

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

Table 180: 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:

<sup>1)</sup> See table 180 "Requirements for SDL cable with automatic cable adjustment (equalizer)" on page 305

<sup>2)</sup> See table 181 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)" on page 306

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

Table 181: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

#### 4.10.4 BIOS settings

No special BIOS settings are necessary for operation.

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

#### 4.10.5 Windows graphics driver settings

See chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

If all connected Automation Panel 900 panels (line 1 + line 2) should display the same content, then "Dual Display Clone" mode must be set in the graphics driver (see the Chapter 4 "Software", Section 4.2.4 "Graphics settings for Dual Display Clone" on page 521).

#### 4.10.6 Windows touch screen driver settings

See chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

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

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

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

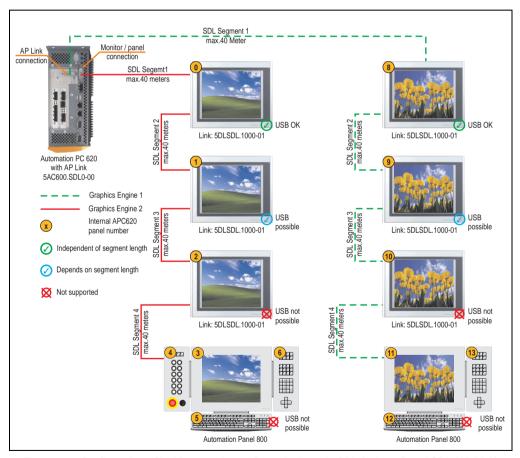


Figure 136: Configuration - Six AP900 and two AP800 devices via SDL (onboard) and SDL (AP Link)

#### 4.11.1 Basic system requirements

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

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

CPU board	with system unit			Limitation			
	5PC600.SX01-00	5PC600.SX02-00	5PC600.SX02-01	5PC600.SF03-00	5PC600.SX05-00	5PC600.SX05-01	Resolution
5PC600.E855-00 5PC600.X855-00	-	1	-	1	1	-	max. XGA
5PC600.E855-01 5PC600.X855-01	-	1	-	1	<b>√</b>	-	max. XGA
5PC600.E855-02 5PC600.X855-02	-	1	-	1	✓	-	max. XGA
5PC600.E855-03 5PC600.X855-03	-	1	-	1	<b>√</b>	-	max. XGA
5PC600.E855-04 5PC600.X855-04	-	1	-	1	1	-	max. XGA
5PC600.E855-05 5PC600.X855-05	-	1	-	1	1	-	max. XGA

Table 182: Possible combinations of system unit and CPU board

#### 4.11.2 Link modules

Model number	Description	Comment
5DLSDL.1000-00	Automation Panel Link SDL receiver Connection for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 2 pieces required
5DLSDL.1000-01	Automation Panel Link SDL transceiver Connections for SDL in, transfer of display data, touch screen, USB 1.1, matrix keys, and service data, 24 VDC (screw clamp 0TB103.9 or cage clamp 0TB103.91 sold separately).	For Automation Panel 900 6 pieces required
5AC600.SDL0-00	APC620 Smart Display Link transmitter For connecting Automation Panels to an APC620 via SDL.	For Automation PC 620 1 pieces required

Table 183: Link modules for the configuration: 6 Automation Panel 900 units via SDL and SDL (optional)

#### 4.11.3 Cables

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

How to select an SDL cable for connecting the AP800 display to the AP900 display 4.4 "An Automation Panel 800 via SDL (onboard)".

#### Cable lengths and resolutions for SDL transfer

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

Cables	Resolution				
Segment length [m]	VGA 640 x 480	SVGA 800 x 600	XGA 1024 x 768	SXGA 1280 x 1024	UXGA 1600 x 1200
1.8	- - -	- - - -	5CASDL.0018-00 5CASDL.0018-01 5CASDL.0018-20 5CASDL.0018-03	- - -	- - -
5	- - -	- - -	5CASDL.0050-00 5CASDL.0050-01 5CASDL.0050-02 5CASDL.0050-03	- - -	
10	- - -	- - - -	5CASDL.0100-00 5CASDL.0100-01 5CASDL.0100-02 5CASDL.0100-03		-
15	- - - -	- - - -	5CASDL.0150-00 5CASDL.0150-01 5CASDL.0150-02 5CASDL.0150-03	- - -	- - - -
20	- - -	- - -	5CASDL.0200-00 <sup>1)</sup> 5CASDL.0200-02 <sup>1)</sup> 5CASDL.0200-03 <sup>1)</sup>	- - -	- - -
25	- - -	- - -	5CASDL.0250-00 <sup>1)</sup> 5CASDL.0250-02 <sup>1)</sup> 5CASDL.0250-03 <sup>1)</sup>	- - -	- - -
30	- - -	- - -	5CASDL.0300-10 <sup>1)</sup> 5CASDL.0300-13 <sup>2)</sup> 5CASDL.0300-30 <sup>2)</sup>		-
40	-	-	5CASDL.0400-10 <sup>2)</sup> 5CASDL.0400-13 <sup>2)</sup> 5CASDL.0400-30 <sup>2)</sup>	-	-

Table 184: Segment lengths, resolutions and SDL cables

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

Firmware	Label	Version	Comment
MTCX FPGA	Firmware on the APC620	V 01.15	The version is read from BIOS - see the BIOS description.
MTCX PX32	Firmware on the APC620	v 01.55	Supported starting with the APC620 / PPC 700 Firmware upgrade (MTCX, SDLR, SDLT) <b>V01.10</b> , available in the download area of the B&R homepage.

Table 185: Requirements for SDL cable with automatic cable adjustment (equalizer)

<sup>1)</sup> See table 186 "Requirements for SDL cable with extender and automatic cable adjustment (equalizer)" on page 311

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

Table 186: Requirements for SDL cable with extender and automatic cable adjustment (equalizer)

#### 4.11.4 BIOS settings

No special BIOS settings are necessary for operation.

To operate Automation Panel 900 panels and Automation Panel 800 panels with a touch screen (Extended Desktop or Dual Display Clone), the serial interfaces COM C and COM D must be activated in BIOS (BIOS default setting = disabled).

#### 4.11.5 Windows graphics driver settings

See chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

If all connected Automation Panel 900 panels and Automation Panel 800 panels (line 1 + line 2) should display the same content, then "Dual Display Clone" mode must be set in the graphics driver (see chapter 4 "Software", section 4.2.4 "Graphics settings for Dual Display Clone" on page 521).

#### 4.11.6 Windows touch screen driver settings

See chapter 4 "Software", section 4 "Automation PC 620 with Windows XP Professional" on page 515.

## 4.12 Internal numbering of extension units in AP800 devices

An extension unit for an AP800 device is numbered like another device. The numbering of the extension units starts from the display unit and goes in the counter-clockwise direction; all extension unit slots that are not used are left out.

The following graphic shows numbering examples.

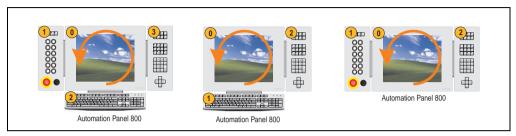


Figure 137: Examples - internal numbering of the extension units

## 5. Configuration of a SATA RAID array

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

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

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

Figure 138: Open the RAID Configuration Utility

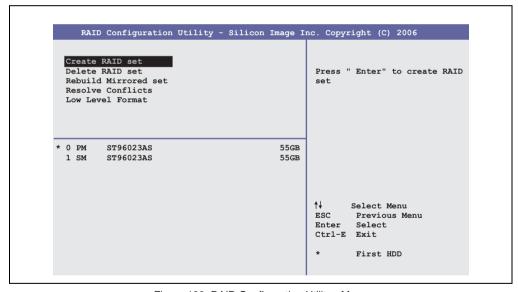


Figure 139: RAID Configuration Utility - Menu

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

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

Table 187: BIOS-relevant keys in the RAID Configuration Utility

#### Start-up • Configuration of a SATA RAID array

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

Table 187: BIOS-relevant keys in the RAID Configuration Utility

#### 5.1 Create RAID Set



Figure 140: RAID Configuration Utility - Menu

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

#### 5.1.1 Create RAID Set - striped

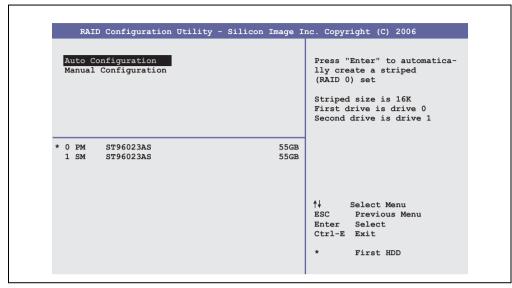


Figure 141: RAID Configuration Utility - Create RAID set - striped

#### **Auto Configuration**

Auto Configuration optimizes all settings.

#### Manual Configuration

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

#### Start-up • Configuration of a SATA RAID array

#### 5.1.2 Create RAID Set - Mirrored

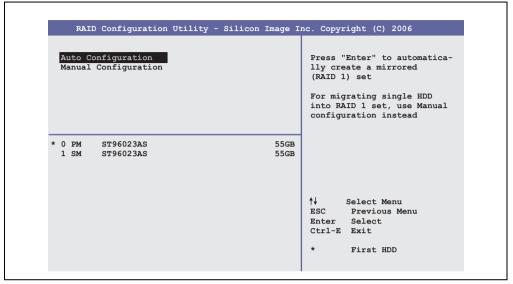


Figure 142: RAID Configuration Utility - Create RAID set - Mirrored

#### **Auto Configuration**

Auto Configuration optimizes all settings.

#### Manual Configuration

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

#### 5.2 Delete RAID set

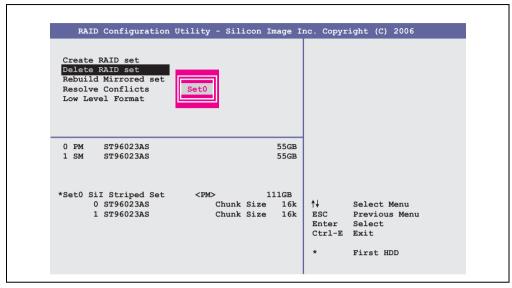


Figure 143: RAID Configuration Utility - Delete RAID set

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

#### 5.3 Rebuild Mirrored Set

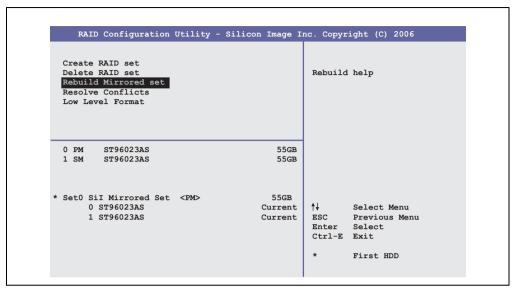


Figure 144: RAID Configuration Utility - Rebuild Mirrored set

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

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

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

#### 5.4 Resolve Conflicts



Figure 145: RAID Configuration Utility - Resolve Conflicts

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

#### 5.5 Low Level Format

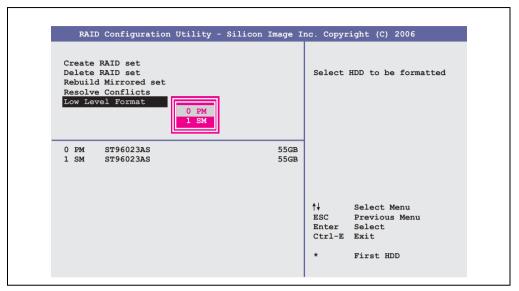


Figure 146: RAID Configuration Utility - Low Level Format

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

# 6. Compatibility / improvement from 855GME (XTX) to 855GME (ETX)

The following table shows the compatibilities and improvements from 855GME (XTX) 5PC600.X855-0x to 855GME (ETX) 5PC600.E855-0x CPU boards.

Property	Compatibility / improvement
Hardware compatibility Power	Yes Equal to
Software compatibility Hardware driver BIOS Windows XP embedded Windows XP Professional Automation Runtime	Yes No - AMI BIOS No - New image required (see model number overview) No - Reinstall required No - New version of Automation Runtime required
Improvements	No limitation of ETH1 cable length Better and more even distribution of IRQ load and distribution on the PCI bus USB 2.0 is already supported when booting Easier configuration of an "Exclusive PCI IRQ" Support for creating custom boot logos Better detection of connected display devices (e.g. Automation Panel 800, Automation Panel 900, standard TFT monitor, etc.)

Table 188: Compatibility / improvements from 855GME (XTX) to 855GME (ETX)



## Chapter 4 • Software

#### 1. Automation PC 620 with BIOS

The available BIOS settings in various CPU boards 815E (ETX), 855GME (ETX) and 855GME (XTX) are described in the following sections.

#### 1.1 815E (ETX)BIOS Description

## Information:

- The following diagrams and BIOS menu items including descriptions refer to BIOS Version 1.23. It is therefore possible that these diagrams and BIOS descriptions do not correspond with the installed BIOS version.
- The setup defaults are the settings recommended by B&R. The setup defaults are dependant on the DIP switch configuration on the baseboard (see section 1.1.10 "Profile overview - BIOS default settings - 815E (ETX)" on page 368).

#### 1.1.1 General information

BIOS stands for "Basic Input Output System." It is the most basic standardized communication between the user and the system (hardware). The BIOS system used in the Automation PC 620 systems is produced by Phoenix.

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

The CMOS data is buffered by a battery, and remains in the APC620 even when the power is turned off (no 24 VDC supply).

#### 1.1.2 BIOS setup and boot procedure

BIOS is immediately activated when switching on the power supply of the Automation PC 620 system or pressing the power button. The system checks if the setup data from the EEPROM is "OK". If the data is "OK", then it is transferred to the CMOS. If the data is "not OK", then the CMOS data is checked for validity. An error message is output if the CMOS data contains errors and the boot procedure can be continued by pressing the <F1> key. To prevent the error message from appearing at each restart, open the BIOS setup by pressing the <F2> key and resave the settings.

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

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

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

"Press <F2> to enter SETUP"

```
PhoenixBIOS 4.0 Release 6.1
Copyright 1985-2003 Phoenix Technologies Ltd.
All Rights Reserved
<1BRIR123> Bernecker + Rainer Industrie-Elektronik C1.23

CPU = Mobile Intel(R) Celeeron(TM) CPU 733MHz
126M System RAM Passed
256K Cache SRAM Passed
System BIOS shadowed
Video BIOS shadowed
Video BIOS shadowed
UMB upper limit segment address: E871

Press <F2> to enter SETUP
```

Figure 147: 815E (ETX) BIOS diagnostic screen

## **Summary screen**

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

```
PhoenixBIOS Setup Utility

CPU Type : Mobile Intel(R) Celeron(TM) CPU 733MHz

CPU Speed : 733 MHz

System ROM : E871 - FFFF

System Memory : 640 KB BIOS Date : 08/08/06

Extended Memory : 259584 KB

Shadow Ram : 384 KB COM Ports : 0378 02F8

Cache Ram : 256 KB LPT Ports : 0378

Display Type : EGA \ VGA

PS/2 Mouse : Not Installed

Hard Disk 0 : None

Hard Disk 1 : None

Hard Disk 2 : None

Hard Disk 3 : None
```

Figure 148: 815E (ETX) BIOS diagnostic screen

### 1.1.3 BIOS setup keys

The following keys are active during the POST:

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

Table 189: Keys relevant to 815E (ETX) BIOS during POST

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

Key	Function
Cursor ↑	Moves to the previous item.
Cursor ↓	Go to the next item.
Cursor ←	Move to the item on the left.
Cursor →	Move to the item on the right.
<esc></esc>	Exits the submenu.
PgUp↑	Moves the cursor to the top of the current BIOS setup page.
PgDn ↓	Moves the cursor to the bottom of the current BIOS setup page.

Table 190: Keys relevant to 815E (ETX) BIOS during POST

Key	Function	
<f1> or <alt+h></alt+h></f1>	Opens a help window showing the key assignments.	
<f5> or &lt;-&gt;</f5>	Scrolls to the previous option for the selected BIOS setting.	
<f6> or &lt;+&gt; or <spacebar></spacebar></f6>	Scrolls to the next option for the selected BIOS setting.	
<f9></f9>	Loads setup defaults for the current BIOS setup screen.	
<f10></f10>	Saves settings and closes BIOS setup.	
<enter></enter>	Opens submenu for a BIOS setup menu item, or displays the configurable values of a BIOS setup item.	

Table 190: Keys relevant to 815E (ETX) BIOS during POST (cont.)

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

BIOS setup menu item	Function	From page
Main	The basic system configurations (e.g. time, date, hard disk parameters) can be set in this menu.	327
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.	336
Security	For setting up the system's security functions.	359
Power	Setup of various APM (Advanced Power Management) options.	361
Boot	The boot order can be set here.	365
Exit	To end the BIOS setup.	366

Table 191: Overview of 815E (ETX) BIOS menu items

#### 1.1.4 Main

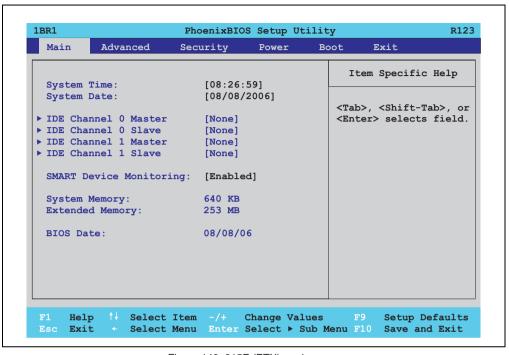


Figure 149: 815E (ETX)- main menu

BIOS setting	Meaning	Setting options	Effect
System time	This is the current system time setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Adjustment of the system time	Set the system time in the format (hh:mm:ss).
System date	This is the current system date setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Changes to the system date	Set the system date in the format (mm:dd:yyyy).
IDE channel 0 master	The drive in the system that is connected to the IDE primary master port is configured here.	Enter	Opens submenu see "IDE channel 0 master" on page 328.
IDE channel 0 slave	The drive in the system that is connected to the IDE primary slave port is configured here.	Enter	Opens submenu see "IDE channel 0 slave" on page 330.
IDE channel 1 master	The drive in the system that is connected to the IDE secondary master port is configured here.	Enter	Opens submenu see "IDE channel 1 master" on page 332.
IDE channel 1 slave	The drive in the system that is connected to the IDE secondary slave port is configured here.	Enter	Opens submenu see "IDE channel 1 slave" on page 334.

Table 192: 815E (ETX)- main menu - setting options

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

Table 192: 815E (ETX)- main menu - setting options (cont.)

#### **IDE** channel 0 master

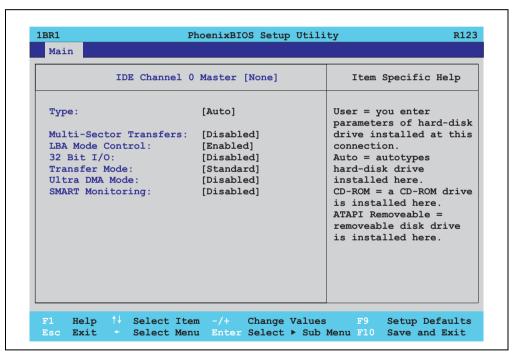


Figure 150: 815E (ETX) IDE Channel 0 Master

BIOS setting	Meaning	Setting options	Effect
Туре	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	Disabled	Disables this function.
	sectors per block. Only possible when manually setting up the drive.	2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block	Disabled	Disables this function.
	addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	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	Default	Default setting.
	primary master drive and the system memory is defined here. Only possible when manually setting up the drive.	Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the	Disabled	Disables this function. Do not use UDMA mode.
	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.	Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	Indicates whether the primary master	Disabled	No drive support, and function is deactivated.
	drive supports SMART technology.	Enabled	Drive support present, and function is activated.

Table 193: 815E (ETX) IDE Channel 0 Master - setting options

#### IDE channel 0 slave

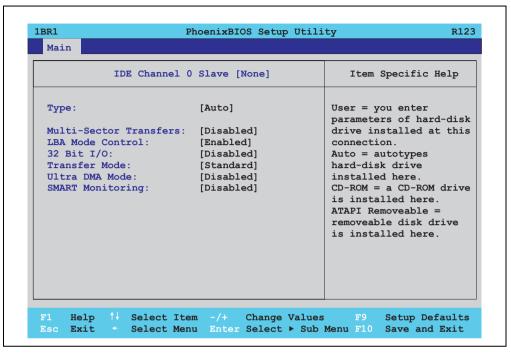


Figure 151: 815E (ETX) IDE Channel 0

BIOS setting	Meaning	Setting options	Effect
Туре	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	Disabled	Disables this function.
	sectors per block. Only possible when manually setting up the drive.	2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	This option activates the logical block	Disabled	Disables this function.
	addressing for IDE. This function enables support of drives larger than 540 MB. Only possible when manually setting up the drive.	Enabled	Enables this function.

Table 194: 815E (ETX) IDE Channel 0 Slave - setting options

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

Table 194: 815E (ETX) IDE Channel 0 Slave - setting options (cont.)

#### **IDE** channel 1 master

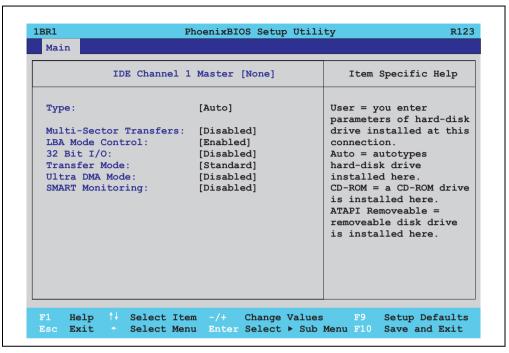


Figure 152: 815E (ETX) IDE Channel 1 Master

BIOS setting	Meaning	Setting options	Effect
Туре	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	Disabled	Disables this function.
	sectors per block. Only possible when manually setting up the drive.	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 195: 815E (ETX) IDE Channel 1 Master - setting options

BIOS setting	Meaning	Setting options	Effect
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the	Default	Default setting.
	secondary master drive and the system memory is defined here. Only possible when manually setting up the drive.	Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the	Disabled	Disables this function. Do not use UDMA mode.
	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.	Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	nonitoring 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 195: 815E (ETX) IDE Channel 1 Master - setting options (cont.)

#### **IDE** channel 1 slave

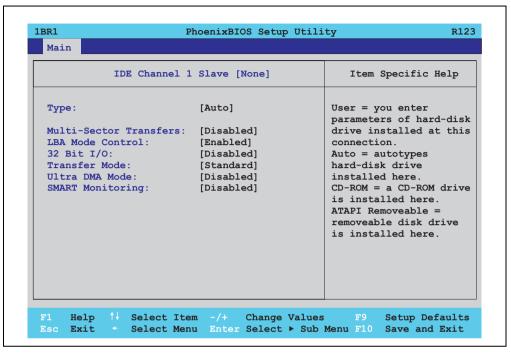


Figure 153: 815E (ETX) IDE Channel 1 Slave

BIOS setting	Meaning	Setting options	Effect
Туре	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	Disabled	Disables this function.
	sectors per block. Only possible when manually setting up the drive.	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 196: 815E (ETX) IDE Channel 1 Slave - setting options

# Chapter 4 Software

# **Software • Automation PC 620 with BIOS**

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	Default	Default setting.
	secondary slave drive and the system memory is defined here. Only possible when manually setting up the drive.	Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the	Disabled	Disables this function. Do not use UDMA mode.
	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.	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 196: 815E (ETX) IDE Channel 1 Slave - setting options (cont.)

#### 1.1.5 Advanced

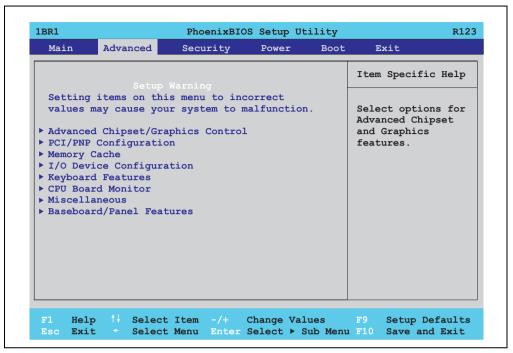


Figure 154: 815E (ETX)- main menu

BIOS setup menu	Meaning	Setting options	Effect
Advanced chipset/graphics control	Setup of advanced chipset and graphics functions.	Enter	Opens submenu see "Advanced chipset/graphics control" on page 337.
PCI/PNP configuration	Configures PCI devices.	Enter	Opens submenu see "PCI/PNP configuration" on page 339.
Memory cache	Configuration of the memory cache resources.	Enter	Opens submenu see "Memory cache" on page 345.
I/O device configuration	Configuration of the I/O devices.	Enter	Opens submenu see "I/O device configuration" on page 347.
Keyboard features	Configuration of the keyboard options.	Enter	Opens submenu see "Keyboard features" on page 350.
CPU board monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens submenu see "CPU board monitor" on page 351.
Miscellaneous	Configuration of various BIOS settings (summary screen, halt on errors, etc.).	Enter	Opens submenu see "Miscellaneous" on page 352.
Baseboard/panel features	Displays device specific information and setup of device specific values.	Enter	Opens submenu see "Baseboard/panel features" on page 353.

Table 197: 815E (ETX)- main menu - setting options

## Advanced chipset/graphics control

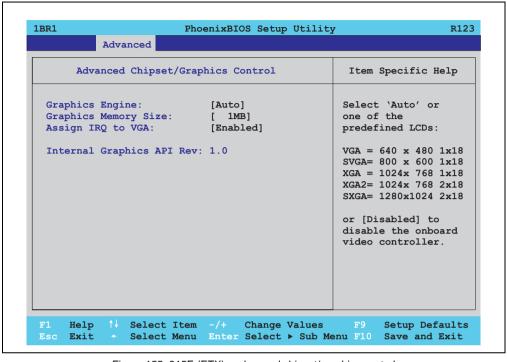


Figure 155: 815E (ETX) - advanced chipset/graphics control

BIOS setting	Meaning	Setting options	Effect
Graphics engine	Settings can be made for the onboard video controller.	Auto	Automatic setting of the resolution (using a read- out of the connected panel's EDID data).
		VGA, SVGA, XGA, XGA2, SXGA	VGA = 640 x 480 resolution SVGA = 800 x 600 resolution XGA = 1024 x 768 resolution XGA2 = 1024 x 768 resolution SXGA = 1280 x 1024 resolution
		Disabled	Important!
			The onboard video must be activated to make video output possible. Deactivate only for use of an external PCI graphics card.
Graphics memory size	Reserves a memory location in the RAM for the onboard graphics controller, into which the memory access will be directed.	1 MB	1 MB main memory is reserved for the onboard video controller.
		512kB	512 k main memory is reserved for the onboard video controller.
Assign IRQ to VGA	ign IRQ to VGA  This is where an IRQ is reserved and automatically assigned for the CPU board's onboard graphics.	Enabled	Enables this function.
		Disabled	Disables this function.

Table 198: 815E (ETX) - advanced chipset/graphics control - setting options

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

Table 198: 815E (ETX) - advanced chipset/graphics control - setting options

## **PCI/PNP** configuration

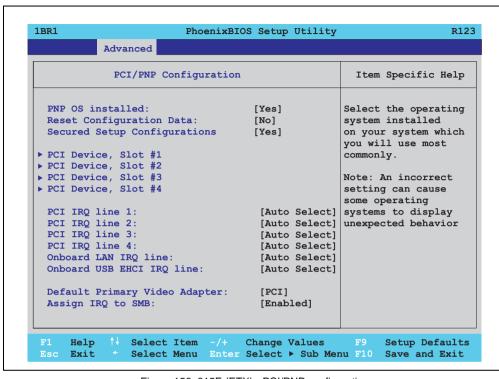


Figure 156: 815E (ETX) - PCI/PNP configuration

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

Table 199: 815E (ETX) - PCI/PNP configuration - setting options

BIOS setting	Meaning	Setting options	Effect
PCI device, slot #1	Advanced configuration of the PCI slot number 1.	Enter	Opens submenu See "PCI device, slot #1" on page 341
PCI device, slot #2	Advanced configuration of the PCI slot number 2.	Enter	Opens submenu See "PCI device, slot #2" on page 342
PCI device, slot #3	Advanced configuration of the PCI slot number 3.	Enter	Opens submenu See "PCI device, slot #3" on page 343
PCI device, slot #4	Advanced configuration of the PCI slot number 4.	Enter	Opens submenu See "PCI device, slot #4" on page 344
PCI IRQ line 1	Under this option, the external PCI interrupt 1 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 2	Under this option, the external PCI interrupt 2 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 3	Under this option, the external PCI interrupt 3 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 4	Under this option, the external PCI interrupt 4 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
Onboard LAN IRQ line	Under this option, the onboard LAN interrupt is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
Onboard USB EHCI IRQ line	Under this option, the USB EHCI interrupt is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the Plug & Play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
Default primary video adapter	This option sets the default graphics card (either an existing AGP or the PCI	PCI	A PCI graphics card is set as the default display device.
	graphics card).	AGP	An AGP graphics card is set as the default display device.
Assign IRQ to SMB	Use this function to set whether or not the	Enabled	Automatic assignment of a PCI interrupt.
	SM (System Management) bus controller is assigned a PCI interrupt.	Disabled	No assignment of an interrupt.

Table 199: 815E (ETX) - PCI/PNP configuration - setting options (cont.)

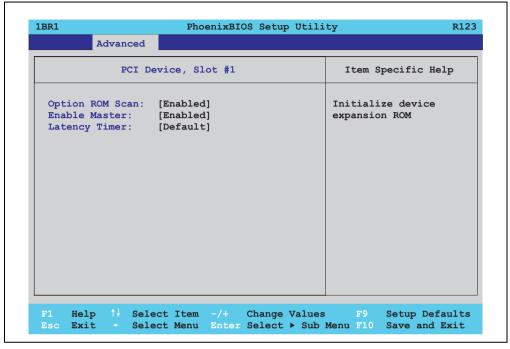


Figure 157: 815E (ETX) - PCI device, slot #1

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's	Enabled	Enables this function.
	ROM.	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	Latency timer  This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manually setting the value.

Table 200: 815E (ETX) - PCI device, slot #1 - setting options

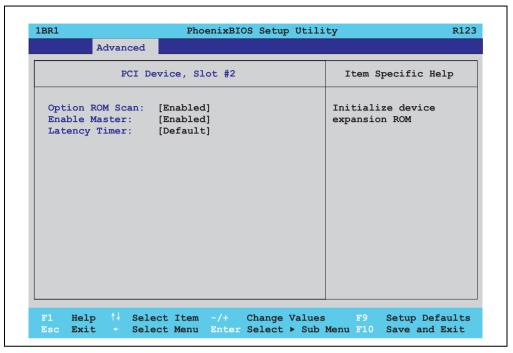


Figure 158: 815E (ETX) - PCI device, slot #2

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's	Enabled	Enables this function.
	ROM.	Disabled	Disables this function.
Enable master	ster 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	Latency timer  This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manually setting the value.

Table 201: 815E (ETX) - PCI device, slot #2 - setting options

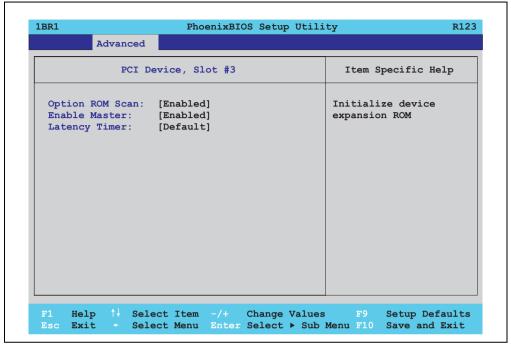


Figure 159: 815E (ETX) - PCI device, slot #3

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's	Enabled	Enables this function.
	ROM.	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	Latency timer  This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manually setting the value.

Table 202: 815E (ETX) - PCI device, slot #3 - setting options

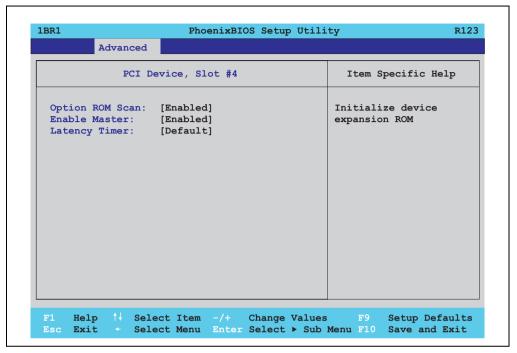


Figure 160: 815E (ETX) - PCI device, slot #4

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's	Enabled	Enables this function.
	ROM.	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	Enabled	Enables this function.
	description.	Disabled	Disables this function.
Latency timer	atency timer  This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manually setting the value.

Table 203: 815E (ETX) - PCI device, slot #4 - setting options

## **Memory cache**

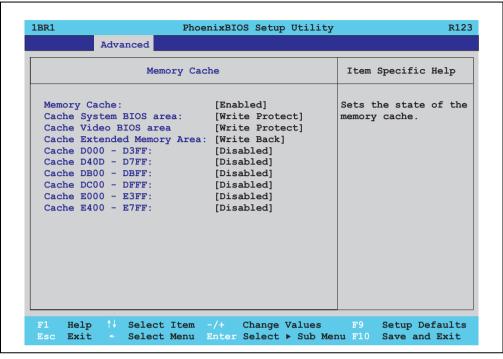


Figure 161: 815E (ETX) - memory cache

BIOS setting	Meaning	Setting options	Effect
Memory cache	Enable/ disable utilization of the L2 cache.	Enabled	Enables this function.
		Disabled	Disables this function.
Cache system BIOS	Set whether or not the system BIOS	Write protect	System BIOS is mapped in the cache.
area	should be buffered.	Uncached	System BIOS is not mapped in the cache.
Cache video BIOS	Set whether or not the video BIOS should be buffered.	Write protect	Video BIOS is mapped in the cache.
area		Uncached	Video BIOS is not mapped in the cache.
Cache extended	Configure how the memory content of the	Uncached	No mapping.
memory area	system memory above 1MB should be mapped.	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 204: 815E (ETX) - memory cache - setting options

BIOS setting	Meaning	Setting options	Effect
Cache D000 - D3FF	Configure how the memory content of D000-D3FF should be mapped.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache D400 - D7FF	Configure how the memory content of	Disabled	No mapping.
	D400-D7FF should be mapped.	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	Disabled	No mapping.
	D800-DBFF should be mapped.	Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache DC00 - DFFF	Configure how the memory content of DC00-DFFF should be mapped.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache E000 - E3FF	Configure how the memory content of	Disabled	No mapping.
	E000-E3FF should be mapped.	Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache E400 - E7FF	Configure how the memory content of	Disabled	No mapping.
	E400-E7FF should be mapped.	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 204: 815E (ETX) - memory cache - setting options (cont.)

# I/O device configuration

1BR1	Phoe	nixBIOS Setup Utili	ty R1:
Advanc	ed		
I/O De	vice Config	uration	Item Specific Help
Local Bus IDE ac Primary IDE UDM Secondary IDE UI USB UHCI Host Co USB EHCI Host Co USB EHCI Host Co Legacy USB Suppo AC97 Audio conti Onboard LAN cont Onboard LAN PXE  Serial port A: Base I/O addre Interrupt: Serial port B: Mode:	A66/100: MA66/100: ontroller 1: ontroller 2: ontroller: ort: coller: croller: ROM:	[Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled] [Enabled]	Enable the integrate local bus IDE adapte
Base I/O addre Interrupt: Parallet port:		[2F8] [IRQ 3] [Enabled]	
Base I/O addre	ess:	[378]	
		-/+ Change Values	

Figure 162: 815E (ETX) - I/O device configuration

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

Table 205: 815E (ETX) - I/O device configuration - setting options

BIOS setting	Meaning	Setting options	Effect
USB UHCI host	Configuration of USB UHCl controller 1 for USB port 0 und 1.	Disabled	Deactivates the USB support.
controller 1		Enabled	Activates the USB support.
USB UHCI host	Configuration of the USB UHCI controller	Disabled	Deactivates the USB support.
controller 2	1 for USB port 2 and 3. Can only be configured if the USB UHCI controller 1 is activated.	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.
	Connections.		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	For turning the AC97 audio controller on	Disabled	AC97 sound is deactivated.
controller	and off.	Enabled	AC97 sound is activated.
Onboard LAN controller	For turning the ICH4 on-board LAN controller (for ETH1) on and off.	Disabled	Deactivates the LAN controller or the ETH1 interface.
		Enabled	Activates the LAN controller or the ETH1 interface.
Onboard LAN PXE ROM	For turning the remote boot BIOS extension for the onboard LAN controller	Disabled	Disables this function.
KOW	(ETH1) on and off.	Enabled	Enables this function.
Serial port A	For the configuration of serial port A	Disabled	Port A deactivated.
	(COM1).	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 205: 815E (ETX) - I/O device configuration - setting options (cont.)

BIOS setting	Meaning	Setting options	Effect
Serial port B	For the configuration of serial port B	Disabled	Port B deactivated.
	(COM2).	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	Normal	Serial port B is used as a standard interface.
	as either a standard interface or as an infrared 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	Disabled	Deactivates the port.
	(dongle), which accessed internally through the parallel interface.	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 205: 815E (ETX) - I/O device configuration - setting options (cont.)

## **Keyboard features**

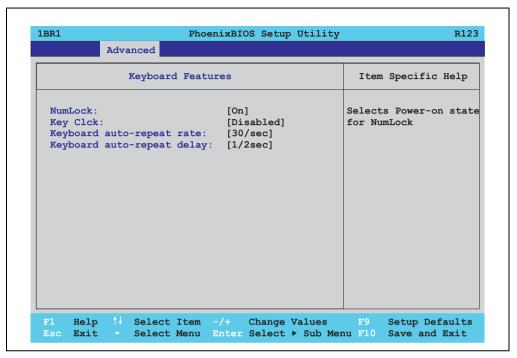


Figure 163: 815E (ETX) - keyboard features

BIOS setting	Meaning	Setting options	Effect
NumLock	This option sets the status	On	Numeric keypad is enabled.
	of the numeric keypad when the the system is booted.	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	Disabled	Disables this function.
	can be turned on or off.	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 206: 815E (ETX) - keyboard features - setting options

#### **CPU** board monitor

# Information:

The displayed voltage values (e.g. core voltage, battery voltage) on this BIOS Setup page represent uncalibrated information values. These cannot be used to draw any conclusions about any hardware alarms or error conditions. The hardware components used have automatic diagnostics functions that can be applied in the event of error.

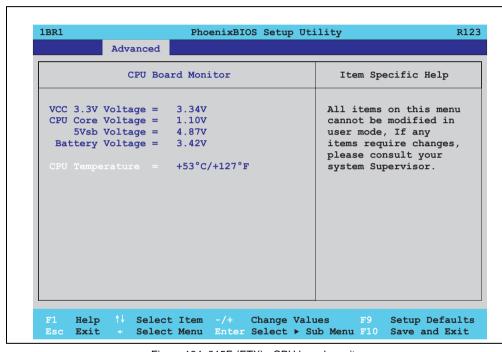


Figure 164: 815E (ETX) - CPU board monitor

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

Table 207: 815E (ETX) - CPU board monitor - setting options

#### Miscellaneous

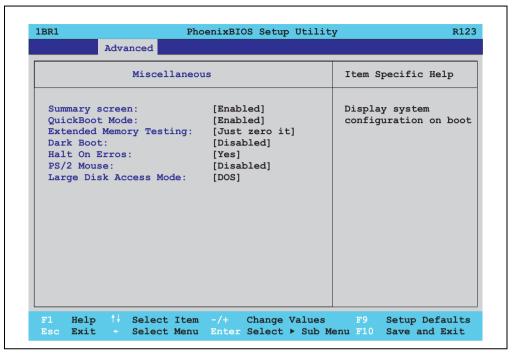


Figure 165: 815E (ETX) miscellaneous

BIOS setting	Meaning	Setting options	Effect
Summary screen	Set whether or not the system summary	Enabled	Enables this function.
	screen should open when the system is started (see figure 148 "815E (ETX) BIOS diagnostic screen" on page 325).	Disabled	Disables this function.
QuickBoot mode	Speeds up the booting process by	Enabled	Enables this function.
	skipping several tests.	Disabled	Disables this function.
Extended memory	This function determines the method by which the main memory over 1 MB is tested.	Just zero it	The main memory is quickly tested.
testing		None	The main memory is not tested at all.
		Normal	This option is only available when the function "OuickBoot Mode" has been set to "disabled." The main memory is tested more slowly than with "Just zero It."
fiç	k boot Sets whether the diagnostics screen (see figure 147 "815E (ETX) BIOS diagnostic screen" on page 324) 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 208: 815E (ETX)- miscellaneous - setting options

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

Table 208: 815E (ETX)- miscellaneous - setting options (cont.)

## **Baseboard/panel features**

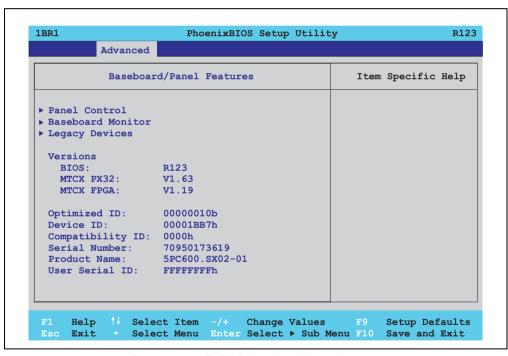


Figure 166: 815E (ETX) - baseboard / panel features

BIOS setting	Meaning	Setting options	Effect
Panel control	For special setup of connected panels (display units).	Enter	Opens submenu See "Panel control" on page 355
Baseboard monitor	Display of various temperatures and fan speeds.	Enter	Opens submenu See "Baseboard monitor" on page 356

Table 209: 815E (ETX) - baseboard / panel features - setting options

BIOS setting	Meaning	Setting options	Effect
Legacy devices		Enter	Opens submenu See "Legacy devices" on page 357
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 209: 815E (ETX) - baseboard / panel features - setting options

### Panel control

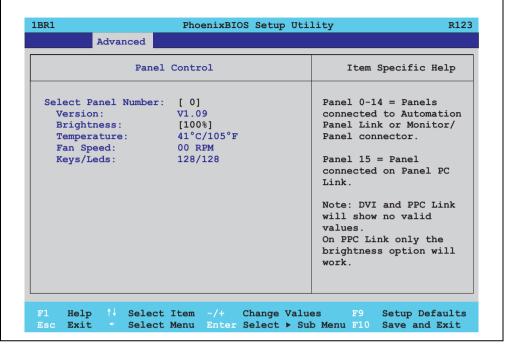


Figure 167: 815E (ETX) panel control

BIOS setting	Meaning	Setting options	Effect
Select panel number	Selection of the panel number for which the values should be read out and/or changed.	0 15	Selection of panel 0 15. Panel 15 is specifically intended for panel PC 700 systems.
Version	Displays the firmware version of the SDLR controller.	None	
Brightness	For setting the brightness of the selected panel.	0%, 25%, 50%, 75%, 100%	For setting the brightness (in %) of the selected panel. Changes take effect after saving and restarting the system (e.g. by pressing <f10>).</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 210: 815E (ETX) panel control - setting options

### **Baseboard monitor**

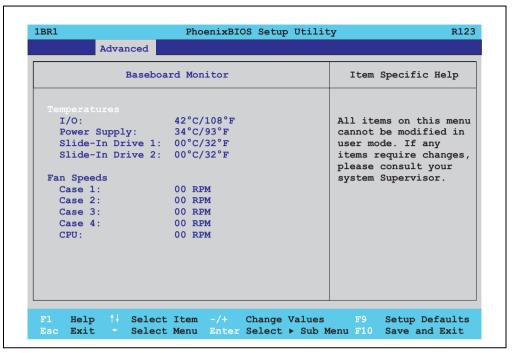


Figure 168: 815E (ETX) - baseboard monitor

BIOS setting	Meaning	Setting options	Effect
I/O	Displays the temperature in the I/O area in degrees Celsius and Fahrenheit.	None	
Power supply	Displays the temperature in the power supply area in degrees Celsius and Fahrenheit.	None	
Slide-in drive 1	Displays the temperature of the slide-in drive 25.40 mm degrees Celsius and Fahrenheit.	None	
Slide-in drive 2	Displays the temperature of the slide-in drive 5.08 cm degrees Celsius and Fahrenheit.	None	
Case 1	Displays the fan speed of housing fan 1.	None	
Case 2	Displays the fan speed of housing fan 2.	None	
Case 3	Displays the fan speed of housing fan 3.	None	
Case 4	Displays the fan speed of housing fan 4.	None	
CPU	Displays the fan speed of the processor fan.	None	

Table 211: 815E (ETX) - baseboard monitor - setting options

## Legacy devices

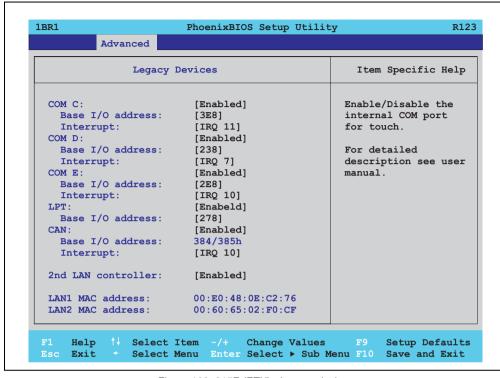


Figure 169: 815E (ETX) - Legacy devices

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

Table 212: 815E (ETX) - Legacy devices - setting options

BIOS setting	Meaning	Setting options	Effect
Base I/O address	Configuration of the base I/O address for the serial COM D port.  A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM D port.  A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 10, IRQ 11, IRQ 12, IRQ 15	Selected interrupt is assigned.
COM E	Configuration of the optional COM E port of a B&R add-on interface option (IF option).	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Configuration of the base I/O address for the serial COM E port.  A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM E port.  A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 10, IRQ 11, IRQ 12, IRQ 15	Selected interrupt is assigned.
LPT	This setting is specific to B&R and should not be changed.	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Configuration of the base I/O address for the optional LPT.  A yellow star indicates a conflict with another device.	278, 378, 3BC	Selected base I/O address is assigned.
CAN	Configuration of the CAN port of a B&R add-on CAN interface card (IF option).	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	384/385h	None	-
Interrupt	Selection of the interrupt for the CAN port.	IRQ 10	Selected interrupt is assigned.
		NMI	NMI interrupt is assigned.
2nd LAN controller	For turning the onboard LAN controller (ETH2) on and off.	Disabled	Disables the controller.
		Enabled	Enables the controller.
LAN1 MAC address	Displays the MAC addresses for the ETH1 network controller.	-	
LAN2 MAC address	Displays the MAC addresses for the ETH2 network controller.	-	

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

## 1.1.6 Security

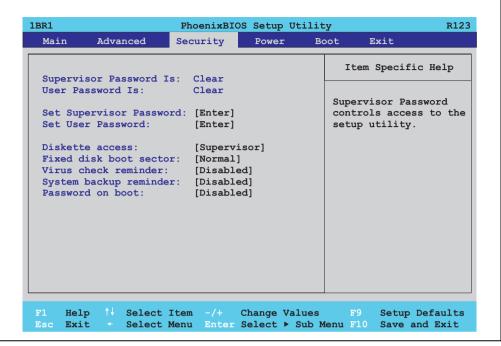


Figure 170: 815E (ETX)- security menu

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

Table 213: 815E (ETX)- security - setting options

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

Table 213: 815E (ETX)- security - setting options (cont.)

#### 1.1.7 **Power**

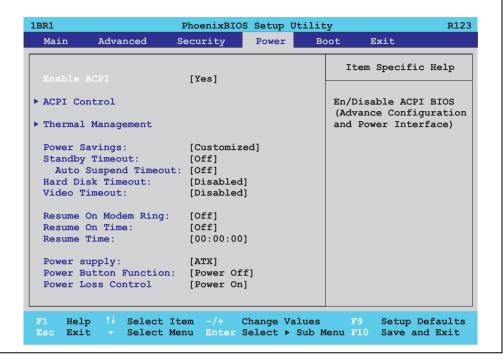


Figure 171: 815E (ETX)- power menu

BIOS setting	Meaning	Setting options	Effect				
Enable ACPI	This option turns the ACPI function (Advanced Configuration and Power Interface) on or off. This is an advanced	Yes	Enables this function.				
	plug & play and power management functionality.	No	Disables this function.				
ACPI control	Configuration of specific limits.	Enter	Opens submenu See "ACPI control" on page 363				
Thermal management	Configuration of specific CPU limits.	Enter	Opens submenu See "Thermal management" on page 364				
Power savings	This function determines if and how the	Disabled	Deactivates the power savings function.				
	power save function is used.	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 214: 815E (ETX)- power - setting options

BIOS setting	Meaning	Setting options	Effect
Standby timeout	Set here when the system should enter standby mode. During standby, various devices and the display will be	Off	No standby.
	deactivated. This option only available when "power savings" is set to customized.	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	Off	No standby.
	savings" is set to customized.	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	Disabled	Disables this function.
	hard disk should enter standby mode. This option only available when "power	10, 15, 30, 45 seconds	Time in seconds until standby.
	savings" is set to customized.	1, 2, 4, 6, 8, 10, 15 Minutes	Time in minutes until standby.
Video timeout		Disabled	
Resume on modem	If an external modem is connected to a	Off	Disables this function.
ring	serial port and the telephone rings, the system starts up.	On	Enables this function.
Resume on time	This function enables the system to start	Off	Disables this function.
	at the time set under "resume time."	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	ATX	An ATX compatible power supply is being used.
	be entered here.		Since the APC620 contains an ATX power supply, ATX should be selected.
		AT	An AT compatible power supply is being used.
Power button	This option determines the function of the	Power off	Shuts down the system.
Function	power button.	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 214: 815E (ETX)- power - setting options (cont.)

#### **ACPI** control

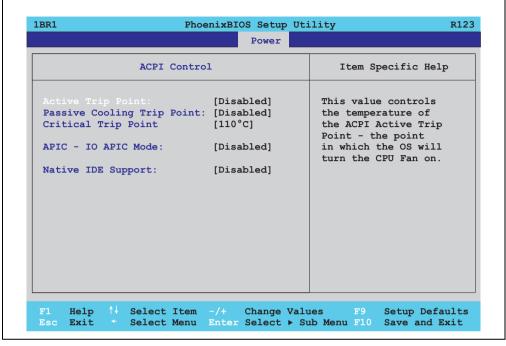


Figure 172: 815E (ETX) ACPI control

BIOS setting	Meaning	Setting options	Effect
Active trip point	With this function, an optional CPU fan	Disabled	Disables this function.
	above the operating system can be set to turn on when the CPU reaches the set temperature.	40°C 100°C	Temperature setting for the active trip point. Can be set in 5 degree increments.
Passive cooling trip	With this function, a temperature can be	Disabled	Disables this function.
point	set at which the CPU automatically reduces its speed.	40°C 100°C	Temperature setting for the passive cooling trip point. Can be set in 5 degree increments.
Critical trip point	With this function, a temperature can be set at which the operating system automatically shuts itself down.	Disabled	Disables this function.
	Warning!	40°C 110°C	Temperature setting for the critical trip point. Can
	This function should never be deactivated, as this would allow the CPU to rise above the temperature specifications.	10 0 110 0	be set in 5 degree increments.

Table 215: 815E (ETX) ACPI control - setting options

BIOS setting	Meaning	Setting options	Effect
APIC - I/O APIC	This option controls the functionality of the	Disabled	Disables the function
mode	advanced interrupt controller in the processor.	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,	Disabled	Disables this function.
	and 2 x secondary ATA for another 2 devices) accessible through Windows XP.	Enabled	Enables this function.

Table 215: 815E (ETX) ACPI control - setting options (cont.)

#### Thermal management

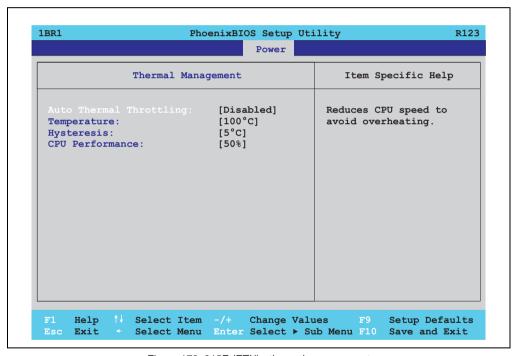


Figure 173: 815E (ETX) - thermal management

BIOS setting	Meaning	Setting options	Effect
Auto thermal	Reduces the CPU speed when it exceeds	Enabled	Enables this function.
throttling	the limit set in the "temperature" option by the amount set in the "CPU performance" option.	Disabled	Disables this function.

Table 216: 815E (ETX) - thermal management

BIOS setting	Meaning	Setting options	Effect
Temperature	Temperature limit for the setting "auto thermal throttling."	75°C 110°C	Can be set in increments of 5°C.
Hysteresis	When auto thermal throttling has been activated and the temperature sinks by the number of degrees in this setting, the processor resumes 100% performance.	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 216: 815E (ETX) - thermal management (cont.)

#### 1.1.8 Boot

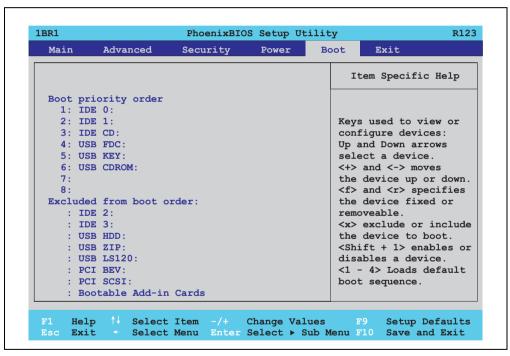


Figure 174: 815E (ETX)- boot menu

BIOS setting	Meaning	Setting options	Effect
1: 2: 3:		IDE 0, IDE 1, IDE 2, IDE 3, IDE CD USB FDC, USB KEY	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
4: 5:		USB CDROM USB HDD, USB ZIP USB LS120, PCI BEV, PCI SCSI,	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.</x></x>
6:		bootable add-in cards	The keys 1 - 4 can load preset boot sequences.
7:			
8:			

Table 217: 815E (ETX)- boot menu - setting options

#### 1.1.9 Exit

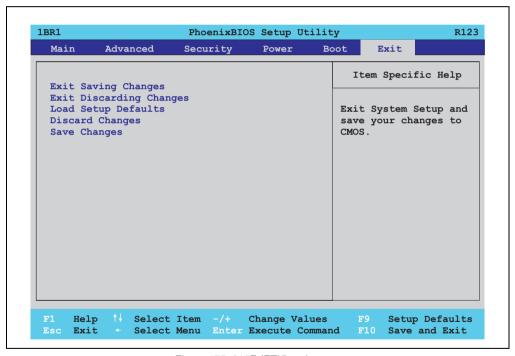


Figure 175: 815E (ETX)- exit menu

BIOS setting	Meaning	Setting options	Effect
Exit saving changes	BIOS setup is closed with this item. Changes made are saved in CMOS after confirmation, and the system is rebooted.	Yes / No	

Table 218: 815E (ETX)- exit menu - setting options

# Chapter 4

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

Table 218: 815E (ETX)- exit menu - setting options (cont.)

#### 1.1.10 Profile overview - BIOS default settings - 815E (ETX)

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

DIP switch position see Section 1.9 "Location of the DIP switch in APC620 system units" on page 509).

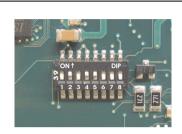


Figure 176: DIP switch on system unit

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

		DIP switch setting							
Number	Optimized for	1	2	3	4	5	6	7 <sup>1)</sup>	8 <sup>1)</sup>
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 219: 815E (ETX) profile overview

1) Reserved

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

#### Personal settings

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

#### Main

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
System time	-	-	-	-	-	
System date	-	-	-	-	-	
SMART device monitoring	Enabled	Enabled	Enabled	Enabled	Enabled	
BIOS Date	-	-	-	-	-	
IDE channel 0 master			•			
Туре	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	
IDE channel 0 slave			•			
Туре	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	
IDE channel 1 master						
Туре	Auto	Auto	Auto	Auto	Auto	
Multi-sector transfer	-	-	-	-	-	
LBA mode control	-	-	-	-	-	
32-bit I/O	Disabled	Disabled	Disabled	Disabled	Disabled	
Transfer mode	-	-	-	-	-	
Ultra DMA mode	-	-	-	-	-	
SMART monitoring	Disabled	Disabled	Disabled	Disabled	Disabled	
IDE channel 1 slave						
Туре	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 220: 815E (ETX)- main - profile setting overview

#### **Advanced**

# Advanced chipset/graphics control

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

Table 221: 815E (ETX) - advanced chipset/graphics control - profile settings overview

# PCI/PNP configuration

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

Table 222: 815E (ETX) - PCI/PNP configuration - profile settings overview

PCI device, slot #4	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Enabled	Enabled	Enabled	Enabled	Enabled	
Latency timer	Default	Default	Default	Default	Default	

Table 222: 815E (ETX) - PCI/PNP configuration - profile settings overview (cont.)

# Memory cache

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Memory cache	Enabled	Enabled	Enabled	Enabled	Enabled	
Cache system BIOS area	Write protect	Write protect	Write protect	Write protect	Write protect	
Cache video BIOS area	Write protect	Write protect	Write protect	Write protect	Write protect	
Cache extended memory area	Write back	Write back	Write back	Write back	Write back	
Cache D000 - D3FF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache D400 - D7FF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache D800 - DBFF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache DC00 - DFFF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache E000 - E3FF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache E400 - E7FF	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 223: 815E (ETX) - memory cache - profile settings overview

# I/O device configuration

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

Table 224: 815E (ETX) - I/O device configuration - profile settings overview

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Base I/O address	3F8	3F8	3F8	3F8	2F8	
Interrupt	IRQ 3					
Parallel port	Enabled	Enabled	Enabled	Enabled	Enabled	
Base I/O address	378	378	378	378	378	

Table 224: 815E (ETX) - I/O device configuration - profile settings overview (cont.)

## Keyboard features

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

Table 225: 815E (ETX) - keyboard features - profile settings overview

## **CPU** board monitor

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

Table 226: 815E (ETX) - CPU board monitor - profile settings overview

## Miscellaneous

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

Table 227: 815E (ETX)- miscellaneous - profile settings overview

# Baseboard/panel features

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Versions	-	-	-	-	-	
BIOS	-	-	-	-	-	
MTCX	-	-	-	-	-	
FPGA	-		-	-	-	
Optimized ID	-	-	-	-	-	
Device ID	-		-	-	-	
Compatibility ID	-		-	-	-	
Serial number	-	-	-	-	-	
Product name	-		-	-	-	
User serial ID	-		-	-	-	
Panel control						
Select panel number	0	0	0	15	15	
Version	-	-	-	-	-	
Brightness	100%	100%	100%	100%	100%	
Temperature	-	-	-	-	-	
Fan speed	-		-	-	-	
Keys/LEDs	-	-	-	-	-	
Baseboard monitor						
Temperatures	-		-	-	-	
1/0	-	-	-	-	-	
Power supply	-	-	-	-	-	
Slide-in drive 1	-	-	-	-	-	
Slide-in drive 2	-	-	-	-	-	
Fan speeds	-	-	-	-	-	
Case 1	-	-	-	-	-	
Case 2	-		-	-	-	
Case 3	-	-	-	-	-	
Case 4	-	-	-	-	-	
CPU	-	-	-	-	-	
Legacy devices						
COM C	Disabled	Disabled	Disabled	Enabled	Enabled	
Base I/O address	-	-	-	3E8h	3E8h	
Interrupt	-	-	-	11	11	
COM D	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-	-	-	

Table 228: 815E (ETX) - baseboard / panel features - profile settings overview

Legacy devices	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
COM E	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-		-	
LPT	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-		-	
CAN	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	•	•	•	-	
Interrupt	-	-	-		-	
2nd LAN controller	Enabled	Enabled	Enabled	Enabled	Enabled	
LAN1 MAC address	-	•	•	•	-	
LAN2 MAC address	-	-	-		-	

Table 228: 815E (ETX) - baseboard / panel features - profile settings overview (cont.)

# **Security**

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

Table 229: 815E (ETX)- security menu - profile settings overview

#### **Power**

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Enable ACPI	Yes	Yes	Yes	Yes	Yes	
Power savings	Disabled	Disabled	Disabled	Disabled	Disabled	
Standby timeout	-	-	-	-	-	
Auto suspend timeout	-	-	-	-	-	
Hard disk timeout	Disabled	Disabled	Disabled	Disabled	Disabled	
Video timeout	Disabled	Disabled	Disabled	Disabled	Disabled	
Resume on modem ring	Off	Off	Off	Off	Off	
Resume on time	Off	Off	Off	Off	Off	
Resume time	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	
Power supply	ATX	ATX	ATX	ATX	ATX	
Power button function	Power off	Power off	Power off	Power off	Power off	
Power loss control	Power-on	Power-on	Power-on	Power-on	Power-on	
ACPI control						
Active trip point	Disabled	Disabled	Disabled	Disabled	Disabled	
Passive cooling trip point	Disabled	Disabled	Disabled	Disabled	Disabled	
Critical trip point	110°C	110°C	110°C	110°C	110°C	
APIC - I/O APIC mode	Disabled	Enabled	Disabled	Disabled	Disabled	
Native IDE support	Disabled	Disabled	Disabled	Disabled	Disabled	
Thermal management						
Auto thermal throttling	Enabled	Enabled	Enabled	Enabled	Enabled	
Temperature	100°C	100°C	100°C	100°C	100°C	
Hysteresis	5°C	5°C	5°C	5°C	5°C	
CPU performance	50%	50%	50%	50%	50%	

Table 230: 815E (ETX)- power menu - profile settings overview

## **Boot**

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Boot priority order						
1:	IDE 0	PCI BEV	IDE 0	IDE 0	IDE 0	
2:	IDE 1	IDE 0	IDE 1	IDE 1	IDE 1	
3:	IDE CD	IDE 1	IDE CD	IDE CD	IDE CD	
4:	USB FDC	IDE CD	USB FDC	USB FDC	USB FDD	
5:	USB KEY	USB FDC	USB KEY	USB KEY	USB KEY	
6:	USB CDROM	USB KEY	USB CDROM	USB CDROM	USB CDROM	
7:	-	USB CDROM	IDE 2	-	IDE 2	
8:	-	-	IDE 3	-	IDE 3	
Excluded from boot order						
:	IDE 2	IDE 2	USB HDD	IDE 2	USB HDD	
:	IDE 3	IDE 3	USB ZIP	IDE 3	USB ZIP	
:	USB HDD	USB HDD	USB LS120	USB HDD	USB LS120	
:	USB ZIP	USB ZIP	PCI BEV	USB ZIP	PCI BEV	
:	USB LS120	USB LS120	PCI SCSI	USB LS120	PCI SCSI	
:	PCI BEV	PCI SCSI	Bootable add-in cards	PCI BEV	Bootable add-in cards	
:	PCI SCSI	Bootable add-in cards		PCI SCSI		
:	Bootable add-in cards			Bootable add-in cards		

Table 231: 815E (ETX)- boot menu - profile settings overview

## 1.2 855GME (ETX) BIOS description

# Information:

- The following diagrams and BIOS menu items including descriptions refer to BIOS Version 1.26. It is therefore possible that these diagrams and BIOS descriptions do not correspond with the installed BIOS version.
- The setup defaults are the settings recommended by B&R. The setup defaults are dependant on the DIP switch configuration on the baseboard (see section 1.2.10 "Profile overview BIOS default settings 855GME (ETX)" on page 423).

#### 1.2.1 General information

BIOS stands for "Basic Input Output System." It is the most basic standardized communication between the user and the system (hardware). The BIOS system used in the Automation PC 620 systems is produced by Phoenix.

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

The CMOS data is buffered by a battery, and remains in the APC620 even when the power is turned off (no 24 VDC supply) .

#### 1.2.2 BIOS setup and boot procedure

BIOS is immediately activated when switching on the power supply of the Automation PC 620 system or pressing the power button. The system checks if the setup data from the EEPROM is "OK". If the data is "OK", then it is transferred to the CMOS. If the data is "not OK", then the CMOS data is checked for validity. An error message is output if the CMOS data contains errors and the boot procedure can be continued by pressing the <F1> key. To prevent the error message from appearing at each restart, open the BIOS setup by pressing the <F2> key and resave the settings.

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

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

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

"Press <F2> to enter SETUP"

```
PhoenixBIOS 4.0 Release 6.1
Copyright 1985-2003 Phoenix Technologies Ltd.
All Rights Reserved
<OBRIR126> Bernecker + Rainer Industrie-Elektronik B1.26

CPU = Intel(R) Pentium(R) M processor 1.80GHz
247M System RAM Passed
2048K Cache SRAM Passed
System BIOS shadowed
Video BIOS shadowed
Video BIOS shadowed
UMB upper limit segment address: E887

Press <F2> to enter SETUP
```

Figure 177: 855GME (ETX) - BIOS diagnostics screen

#### **Summary screen**

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

```
PhoenixBIOS Setup Utility

CPU Type : Intel(R) Pentium(R) M processor 1.80GHz

CPU Speed : 1800 MHz

System ROM : E887 - FFFF

System Memory : 640 KB BIOS Date : 07/10/07

Extended Memory : 251904 KB

Shadow Ram : 384 KB COM Ports : 0378 02F8

Cache Ram : 2048 KB LPT Ports : 0378

Display Type : EGA \ VGA

PS/2 Mouse : Not Installed

Hard Disk 0 : None

Hard Disk 1 : FUJITSU MHT2030AR-(PS)

Hard Disk 2 : None

Hard Disk 3 : CD-224E-(SS)
```

Figure 178: 855GME (ETX) - BIOS diagnostics screen

## 1.2.3 BIOS setup keys

The following keys are active during the POST:

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

Table 232: Keys relevant to 855GME (ETX) BIOS during POST

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

Key	Function	
Cursor↑	Moves to the previous item.	
Cursor↓	Go to the next item.	
Cursor ←	Move to the item on the left.	
Cursor →	Move to the item on the right.	
<esc></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></alt+h></f1>	Opens a help window showing the key assignments.	
<f5> or &lt;-&gt;</f5>	Scrolls to the previous option for the selected BIOS setting.	
<f6> or &lt;+&gt; or <spacebar></spacebar></f6>	Scrolls to the next option for the selected BIOS setting.	
<f9></f9>	Loads setup defaults for the current BIOS setup screen.	
<f10></f10>	Saves settings and closes BIOS setup.	
<enter></enter>	Opens submenu for a BIOS setup menu item, or displays the configurable values of a BIOS setup item.	

Table 233: 855GME (ETX) - BIOS relevant keys

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

BIOS setup menu item	Function	From page
Main	The basic system configurations (e.g. time, date, hard disk parameters) can be set in this menu.	380
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.	390
Security	For setting up the system's security functions.	415
Power	Setup of various APM (Advanced Power Management) options.	417
Boot	The boot order can be set here.	421
Exit	To end the BIOS setup.	422

Table 234: Overview of 855GME (ETX) BIOS menu items

#### 1.2.4 Main

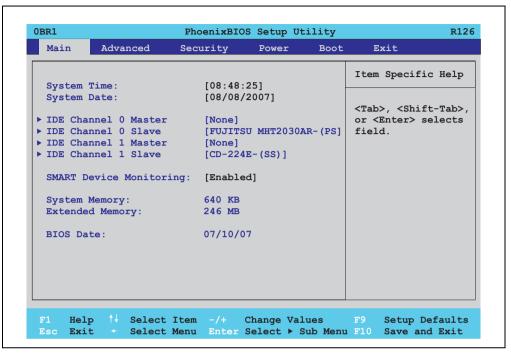


Figure 179: 855GME (ETX) main menu

BIOS setting	Meaning	Setting options	Effect
System time	This is the current system time setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Adjustment of the system time	Set the system time in the format (hh:mm:ss).
System date	This is the current system date setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Changes to the system date	Set the system date in the format (mm:dd:yyyy).
IDE channel 0 master	The drive in the system that is connected to the IDE channel 0 master (previously "primary master") port is configured here.	Enter	Opens submenu see "IDE channel 0 master" on page 382.
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 384.
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 386.

Table 235: 855GME (ETX) main menu - setting options

# Chapter 4 Software

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 388.
Smart device monitoring	S.M.A.R.T. (Self Monitoring Analysis and Reporting Technology) is implemented in	Enabled	Activates this function. In the future, a message regarding impending errors is produced.
	the today's hard drives. This technology allows you to detect reading or rotational problems with the hard drive, and much more.	Disabled	Deactivates this function.
System memory	Displays the amount of main memory installed. Between 0 and 640 KB.	None	-
Extended memory	Displays the available main memory from the first MB to the maximum memory capacity.	None	-
BIOS Date	BIOS creation date	None	-

Table 235: 855GME (ETX) main menu - setting options (cont.)

#### IDE channel 0 master

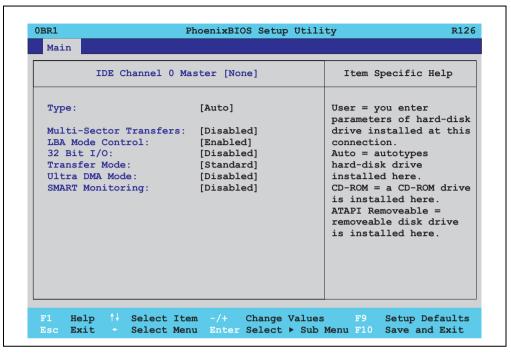


Figure 180: 855GME (ETX) IDE channel 0 master setup

BIOS setting	Meaning	Setting options	Effect
Туре	The type of drive connected to the IDE channel 0 master (previously "primary	Auto	Automatic recognition of the drive and setup of appropriate values.
	master") is configured here.	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	Disabled	Disables this function.
	sectors per block. Only possible when manually setting up the drive.	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.
SL O		Enabled	Enables this function.

Table 236: 815E (ETX) IDE Channel 0 Master - setting options

BIOS setting	Meaning	Setting options	Effect
32-bit I/O	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.
Transfer mode	The communication path between the IDE	Default	Default setting.
memory is defined here.	channel 0 master drive and the system memory is defined here. Only possible when manually setting up the drive.	Fast PIO 1 - Fast PIO 4 / DMA2	Manual configuration of PIO mode.
Ultra DMA mode	The data transfer rate to and from the IDE	Disabled	Disables this function. Do not use UDMA mode.
	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.	Mode 0 - Mode 5	Manual setting option for UDMA mode.
SMART monitoring	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 236: 815E (ETX) IDE Channel 0 Master - setting options (cont.)

#### IDE channel 0 slave

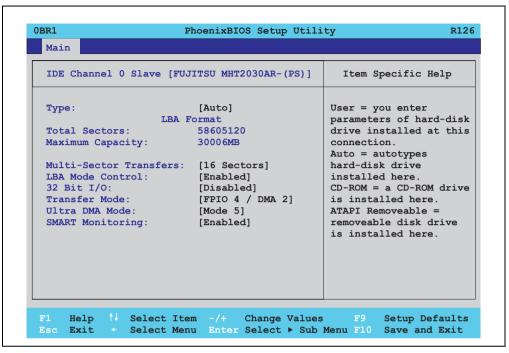


Figure 181: 855GME (ETX) IDE channel 0 slave setup

BIOS setting	Meaning	Setting options	Effect
Туре	The type of drive connected to the IDE channel 0 slave (previously "primary	Auto	Automatic recognition of the drive and setup of appropriate values.
	slave") is configured here.	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	Disabled	Disables this function.
	sectors per block. Only possible when manually setting up the drive.	2, 4, 8 or 16 sectors	Number of sectors per block.
LBA mode control	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 237: 815E (ETX) IDE Channel 0 slave - setting options

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

Table 237: 815E (ETX) IDE Channel 0 slave - setting options (cont.)

#### **IDE** channel 1 master

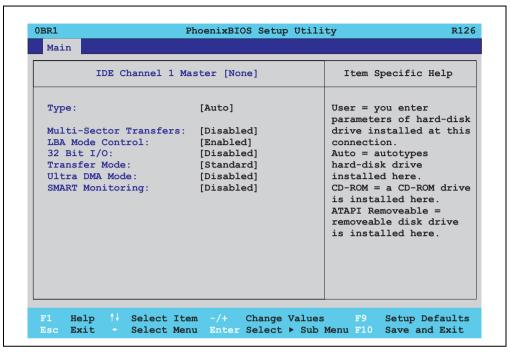


Figure 182: 855GME (ETX) IDE channel 1 master setup

BIOS setting	Meaning	Setting options	Effect
Туре	The type of drive connected to the IDE channel 1 master (previously "secondary	Auto	Automatic recognition of the drive and setup of appropriate values.
	master") is configured here.	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	Disabled	Disables this function.
	sectors per block. Only possible when manually setting up the drive.	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.
9		Enabled	Enables this function.

Table 238: 815E (ETX) IDE Channel 1 Master - setting options

# Chapter 4 Software

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	Disabled	Disables this function. Do not use UDMA mode.
	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.	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 238: 815E (ETX) IDE Channel 1 Master - setting options (cont.)

#### **IDE** channel 1 slave

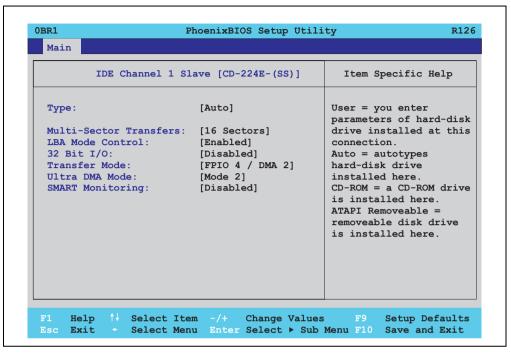


Figure 183: 855GME (ETX) IDE channel 1 slave setup

BIOS setting	Meaning	Setting options	Effect
Туре	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 239: 815E (ETX) IDE Channel 1 slave - setting options

# Chapter 4

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.
	The data transfer rate to and from the IDE	Disabled	Disables this function. Do not use UDMA mode.
	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.	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 239: 815E (ETX) IDE Channel 1 slave - setting options (cont.)

#### 1.2.5 Advanced

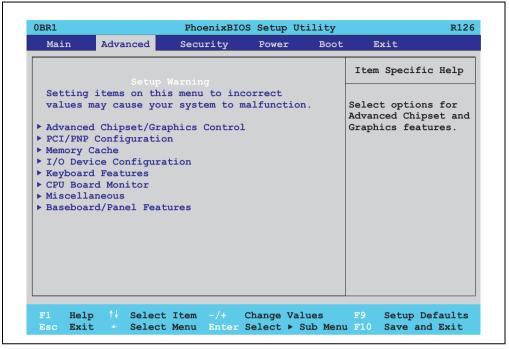


Figure 184: 855GME - advanced setup menu - overview

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 391.
PCI/PNP configuration	Configures PCI devices.	Enter	Opens submenu see "PCI/PNP configuration" on page 393.
Memory cache	Configuration of the memory cache resources.	Enter	Opens submenu see "Memory cache" on page 400.
I/O device configuration	Configuration of the I/O devices.	Enter	Opens submenu see "I/O device configuration" on page 402.
Keyboard features	Configuration of the keyboard options.	Enter	Opens submenu see "Keyboard features" on page 405.
CPU board monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens submenu see "CPU board monitor" on page 406.
Miscellaneous	Configuration of various BIOS settings (summary screen, halt on errors, etc.).	Enter	Opens submenu see "Miscellaneous" on page 407.
Baseboard/panel features	Displays device specific information and setup of device specific values.	Enter	Opens submenu see "Baseboard/panel features" on page 408.

Table 240: 855GME (ETX) - advanced menu - setting options

#### Advanced chipset/graphics control

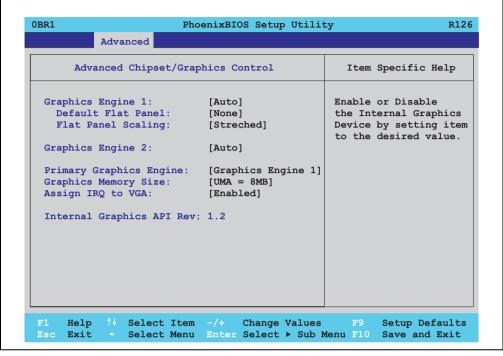


Figure 185: 855GME (ETX) - advanced chipset control

BIOS setting	Meaning	Setting options	Effect
Graphics engine 1	Settings can be made for the onboard video controller (internal graphics device).	Auto	Automatic setting of the graphics engine 1. The resolution is set using a read-out of the panel's EDID data.
			Information:
			EDID data older than V1.1 is not passed on to the VGA-BIOS.
		Disabled	Disable graphics controller.
			Important!
			The onboard video controller must be activated to make video output possible. Deactivate only for use of an external PCI graphics card.

Table 241: 855GME (ETX) - advanced chipset control - setting options

BIOS setting	Meaning	Setting options	Effect
Default flat panel	at 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	Centered	Display is centered.
	should be centered on the panel (stamp format), or fill the entire display (stretched).	Stretched	Display is stretched to fit screen.
Graphics engine 2	Settings can be made for the second onboard video controller (only with an AP Link card).	Auto	Automatic setting of the graphics engine 2. The resolution is set using a read-out of the panel's EDID data.
		Disabled	Deactivates the graphics interface.
Graphics engine	Selection of the primary video output line- depending on the system unit being used. with 5PC600.SX01-00, 5PC600.SX02-01 and 5PC600.SX05-01 - Graphics engine 1: Monitor / Panel - Graphics engine 2 : No support	Graphics engine 1	The primary video outputs are the display devices on the monitor/panel plug with system units SPC600.SX01-00, 5PC600.SX02-01 and 5PC600.SX05-01, or the AP Link output with system units 5PC600.SX02-00 and 5CP600.SX05-00.
	5CP600.SX05-00 - Graphics engine 1: AP Link output - Graphics engine 2: Monitor / Panel  Information:  The "Primary graphics engine" setting is only relevant from the booting of the system until a graphics driver is started (e.g. in Windows).	Graphics engine 2	The primary video outputs are the display devices on the monitor/panel plug with system units 5PC600.SX02-00 and 5CP600.SX05-00.
Graphics memory size	For setting how much of the main memory (in MB) the graphics controller can use.	1 MB	1 MB main memory to be used by the graphics controller.
		UMA = 8 MB	8 MB main memory to be used by the graphics controller.
		UMA = 16 MB	16 MB main memory to be used by the graphics controller.
		UMA = 32 MB	32 MB main memory to be used by the graphics controller.
Assign IRQ to VGA	This is where an IRQ is reserved and automatically assigned for the CPU board's onboard graphics.	Enabled	Enables this function.
		Disabled	Disables this function.
Internal graphics API Rev	Displays the internal graphics API version number.	-	

Table 241: 855GME (ETX) - advanced chipset control - setting options (cont.)

# **PCI/PNP** configuration

Item Specific Help
Item Specific Help
-
Select the operating system installed on your system which you will use most commonly.  Note: An incorrect setting can cause some operating systems to display unexpected behavior. elect] elect] elect] elect] elect] elect]

Figure 186: 815GME (ETX) - PCI/PNP configuration

BIOS setting	Meaning	Setting options	Effect
PNP OS installed	If the operating system is plug & play capable, then this option informs BIOS that the operating system will handle the distribution of resources in the future.	Yes	The ISA PnP resources are not assigned. The resource assignment sequence is as follows:  1. Motherboard devices 2. PCI devices
		No	The resource assignment sequence is as follows: 1. Motherboard devices 2. ISA PnP devices 3. PCI devices
Reset configuration data  During booting, the assigned 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 242: 815GME (ETX) - PCI/PNP configuration - setting options

BIOS setting	Meaning	Setting options	Effect
Secured setup configuration	This option protects the setup configuration from interference from a	Yes	Prevents a PnP operating system from changing system settings.
	PnP operating system.	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 396
PCI device, slot #2	Advanced configuration of the PCI slot number 2.	Enter	Opens submenu See "PCI device, slot #2" on page 397
PCI device, slot #3	Advanced configuration of the PCI slot number 3.	Enter	Opens submenu See "PCI device, slot #3" on page 398
PCI device, slot #4	Advanced configuration of the PCI slot number 4.	Enter	Opens submenu See "PCI device, slot #4" on page 399
PCI IRQ line 1	Under this option, the external PCI interrupt 1 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 2	Under this option, the external PCI interrupt 2 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 3	Under this option, the external PCI interrupt 3 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
PCI IRQ line 4	Under this option, the external PCI interrupt 4 is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
Onboard LAN IRQ line	Under this option, the onboard LAN interrupt is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
Onboard USB EHCI IRQ line	Under this option, the USB EHCI interrupt is assigned to an ISA interrupt.	Auto-select	The interrupt is automatically assigned according to the plug & play guidelines.
		Disabled	Disables this function. No assignment.
		3, 4, 5, 7, 9, 10, 11, 12, 14, 15	Manual configuration of the IRQ.
Default primary video adapter	This option sets the first activated graphics card (either an existing AGP or the PCI graphics card).	PCI	A PCI graphics card is set as the default display device.
		AGP	An AGP graphics card is set as the default display device.

Table 242: 815GME (ETX) - PCI/PNP configuration - setting options (cont.)

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

Table 242: 815GME (ETX) - PCI/PNP configuration - setting options (cont.)

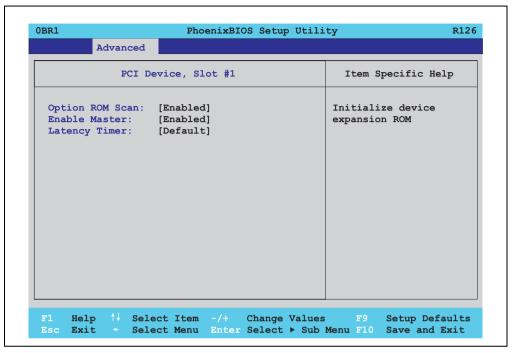


Figure 187: 855GME (ETX) - PCI device, slot #1

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's ROM.	Enabled	Enables this function.
		Disabled	Disables this function.
Enable master	Sets the PCI device to be 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	Default	Default setting. Standard.
	can continue to use the PCI bus master after another PCI card has requested access.	0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manually setting the value.

Table 243: 855GME (ETX) - PCI device, slot #1 - setting options

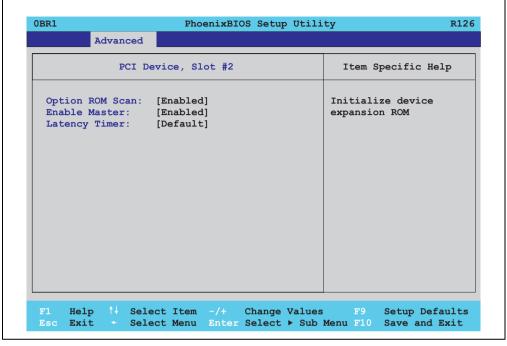


Figure 188: 855GME (ETX) - PCI device, slot #2

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

Table 244: 855GME (ETX) - PCI device, slot #2 - setting options

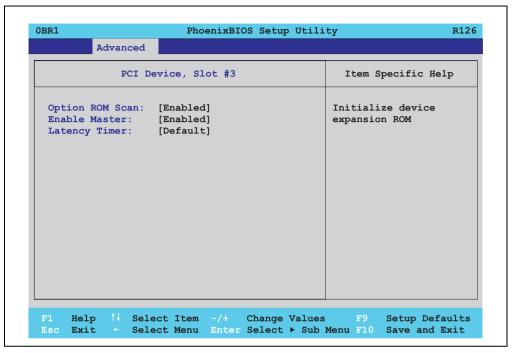


Figure 189: 855GME (ETX) - PCI device, slot #3

BIOS setting	Meaning	Setting options	Effect
ROM scan option	Setting for the initialization of a device's	Enabled	Enables this function.
	ROM.	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	Latency timer  This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	Default	Default setting. Standard.
		0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h	Manually setting the value.

Table 245: 855GME (ETX) - PCI device, slot #3 - setting options

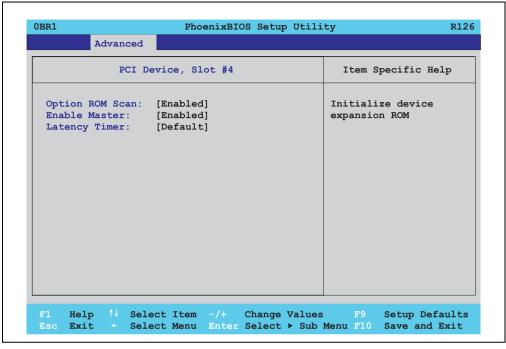


Figure 190: 855GME (ETX) - PCI device, slot #4

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

Table 246: 855GME (ETX) - PCI device, slot #4 - setting options

#### **Memory cache**

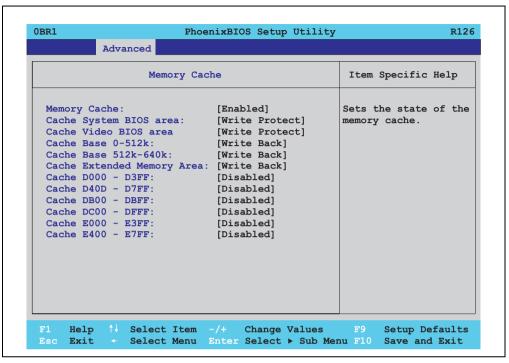


Figure 191: 855GME (ETX) - memory cache

BIOS setting	Meaning	Setting options	Effect
Memory cache	Enable/ disable utilization of the L2 cache.	Enabled	Enables this function.
		Disabled	Disables this function.
Cache system BIOS	Set whether or not the system BIOS	Write protect	System BIOS is mapped in the cache.
area	should be buffered.	Uncached	System BIOS is not mapped in the cache.
Cache video BIOS	Set whether or not the video BIOS should be buffered.	Write protect	Video BIOS is mapped in the cache.
area		Uncached	Video BIOS is not mapped in the cache.
Cache base 0-512k	Set whether the memory content should be mapped in the cache (0-512k), and when necessary, written in the main memory.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.

Table 247: 855GME (ETX) - memory cache - setting options

BIOS setting	Meaning	Setting options	Effect
Cache base 512-	Set whether the memory content should	Disabled	No mapping.
640k	be mapped in the cache (512-640k), and when necessary, written in the main memory.	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	Configure how the memory content of the	Disabled	No mapping.
memory area	system memory above 1MB should be mapped.	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	Disabled	No mapping.
	D000-D3FF should be mapped.	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	Disabled	No mapping.
	D400-D7FF should be mapped.	Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache D800 - DBFF	Configure how the memory content of D800-DBFF should be mapped.	Disabled	No mapping.
		Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache DC00 - DFFF	Configure how the memory content of	Disabled	No mapping.
	DC00-DFFF should be mapped.	Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache E000 - E3FF	Configure how the memory content of	Disabled	No mapping.
	E00-E3FF should be mapped.	Write through	Memory content is simultaneously mapped in the cache and written to the main memory.
		Write protect	Memory content is mapped in the cache.
		Write back	Memory content is mapped only when necessary.
Cache E400 - E7FF	Configure how the memory content of	Disabled	No mapping.
	E400-E7FF should be mapped.	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 247: 855GME (ETX) - memory cache - setting options (cont.)

#### I/O device configuration

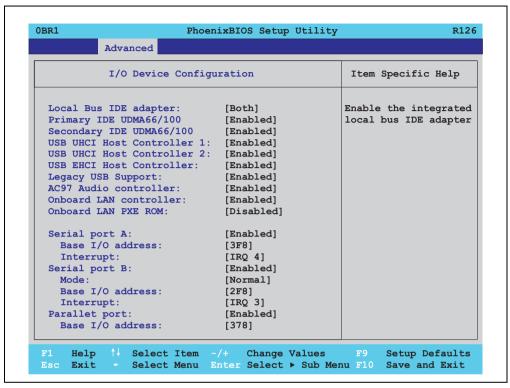


Figure 192: 855GME (ETX) - I/O device configuration

BIOS setting	Meaning	Setting options	Effect
Local bus IDE adapter	Enable or disable one or both of the PCI IDE controllers (primary and	Disabled	Deactivates both PCI IDE controllers (primary and secondary).
	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	Setup the data transfer rate for a device	Disabled	The maximum data transfer rate is UDMA33.
UDMA66/100	connected to the primary IDE channel. This option is only available when a primary IDE drive is connected.	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 248: 855GME (ETX) - I/O device configuration - setting options

BIOS setting	Meaning	Setting options	Effect
USB UHCI host	Configuration of USB UHCl controller 1 for USB port 0 und 1.	Disabled	Deactivates the USB support.
controller 1		Enabled	Activates the USB support.
USB UHCI host	Configuration of the USB UHCI controller	Disabled	Deactivates the USB support.
controller 2	1 for USB port 2 and 3. Can only be configured if the USB UHCI controller 1 is activated.	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	Disabled	No IRQ assigned.
	connections.		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	For turning the AC97 audio controller on	Disabled	AC97 sound is deactivated.
controller	and off.	Enabled	AC97 sound is activated.
Onboard LAN controller	For turning the ICH4 on-board LAN controller (for ETH1) on and off.	Disabled	Deactivates the LAN controller or the ETH1 interface.
		Enabled	Activates the LAN controller or the ETH1 interface.
Onboard LAN PXE ROM	For turning the remote boot BIOS extension for the onboard LAN controller	Disabled	Disables this function.
KOW	(ETH1) on and off.	Enabled	Enables this function.
Serial port A	For the configuration of serial port A	Disabled	Port A deactivated.
	(COM1).	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 248: 855GME (ETX) - I/O device configuration - setting options (cont.)

BIOS setting	Meaning	Setting options	Effect
Serial port B	For the configuration of serial port B	Disabled	Port B deactivated.
	(COM2).	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	Normal	Serial port B is used as a standard interface.
	as either a standard interface or as an infrared 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	Disabled	Deactivates the port.
	(dongle), which accessed internally through the parallel interface.	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 248: 855GME (ETX) - I/O device configuration - setting options (cont.)

## **Keyboard features**

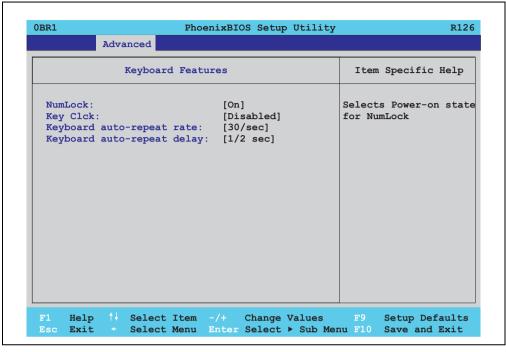


Figure 193: 855GME (ETX) - keyboard features

BIOS setting	Meaning	Setting options	Effect
NumLock	This option sets the status	On	Numeric keypad is enabled.
	of the numeric keypad when the the system is booted.	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	Disabled	Disables this function.
	can be turned on or off.	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 249: 855GME (ETX) - keyboard features - setting options

#### **CPU** board monitor

# Information:

The displayed voltage values (e.g. core voltage, battery voltage) on this BIOS Setup page represent uncalibrated information values. These cannot be used to draw any conclusions about any hardware alarms or error conditions. The hardware components used have automatic diagnostics functions that can be applied in the event of error.

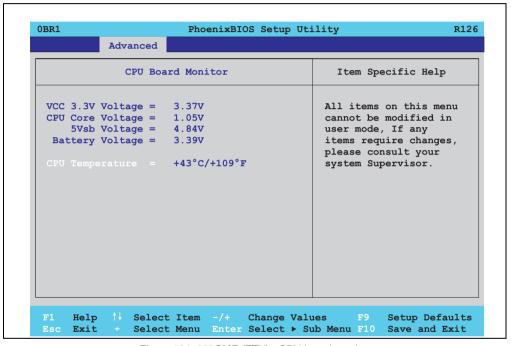


Figure 194: 855GME (ETX) - CPU board monitor

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

Table 250: 855GME (ETX) - CPU board monitor - setting options

#### **Miscellaneous**

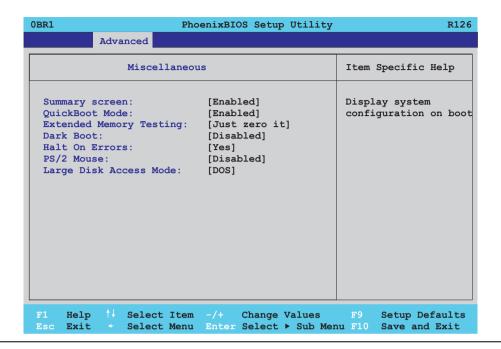


Figure 195: 855GME (ETX) miscellaneous

BIOS setting	Meaning	Setting options	Effect
Summary screen	Set whether or not the system summary	Enabled	Enables this function.
	screen should open when the system is started (see figure 178 "855GME (ETX) - BIOS diagnostics screen" on page 378).	Disabled	Disables this function.
QuickBoot mode	Speeds up the booting process by	Enabled	Enables this function.
	skipping several tests.	Disabled	Disables this function.
Extended memory	This function determines the method by which the main memory over 1 MB is tested.	Just zero it	The main memory is quickly tested.
testing		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 177 "855GME (ETX) - BIOS diagnostics screen" on page 378) 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 251: 855GME (ETX) miscellaneous - setting options

BIOS setting	Meaning	Setting options	Effect
Halt on errors	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 251: 855GME (ETX) miscellaneous - setting options

### **Baseboard/panel features**

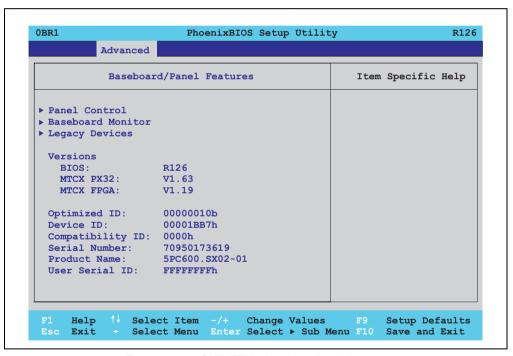


Figure 196: 855GME (ETX) - baseboard/panel features

BIOS setting	Meaning	Setting options	Effect
Panel control	For special setup of connected panels.	Enter	Opens submenu see "Panel control" on page 410.
Baseboard monitor	Display of various temperatures and fan speeds.	Enter	Opens submenu see "Baseboard monitor" on page 411.

Table 252: 855GME (ETX) - baseboard/panel features - setting options

BIOS setting	Meaning	Setting options	Effect
Legacy devices		Enter	Opens submenu see "Legacy devices" on page 413.
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 252: 855GME (ETX) - baseboard/panel features - setting options (cont.)

#### Panel control

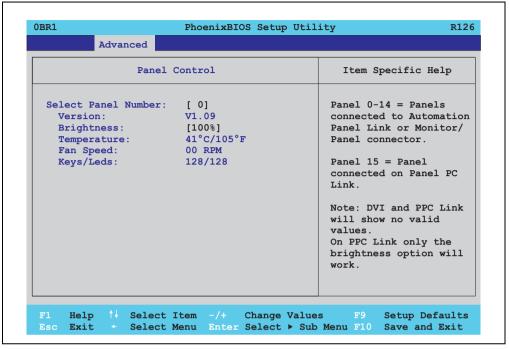


Figure 197: 855GME (ETX) - panel control

BIOS setting	Meaning	Setting options	Effect
Select panel number	Selection of the panel number for which the values should be read out and/or changed.	0 15	Selection of panel 0 15. Panel 15 is specifically intended for panel PC 700 systems.
Version	Displays the firmware version of the SDLR controller.	None	
Brightness	For setting the brightness of the selected panel.	0%, 25%, 50%, 75%, 100%	For setting the brightness (in %) of the selected panel. Changes take effect after saving and restarting the system (e.g. by pressing <f10>).</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 253: 855GME (ETX) - panel control - setting options

## **Baseboard monitor**

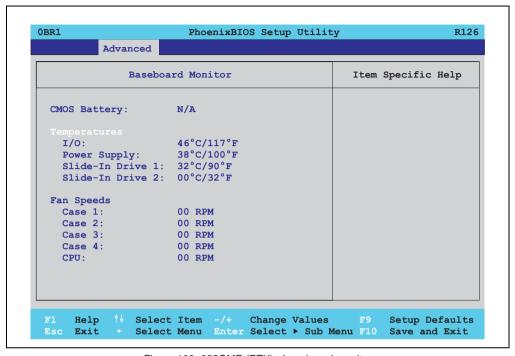


Figure 198: 855GME (ETX) - baseboard monitor

BIOS setting	Meaning	Setting options	Effect
CMOS battery	The status of the built-in CMOS battery is displayed here. Possible displays: N/A - Not Available, GOOD - Battery OK, BAD - Battery must be replaced. For additional information on when status displays are shown, see "Battery" on page 143	None	
1/0	Displays the temperature in the I/O area in degrees Celsius and Fahrenheit.	None	
Power supply	Displays the temperature in the power supply area in degrees Celsius and Fahrenheit.	None	
Slide-in drive 1	Displays the temperature of the slide-in drive 25.40 mm degrees Celsius and Fahrenheit.	None	
Slide-in drive 2	Displays the temperature of the slide-in drive 5.08 cm degrees Celsius and Fahrenheit.	None	
Case 1	Displays the fan speed of housing fan 1.	None	

Table 254: 855GME (ETX) - baseboard monitor - setting options

BIOS setting	Meaning	Setting options	Effect
Case 2	Displays the fan speed of housing fan 2.	None	
Case 3	Displays the fan speed of housing fan 3.	None	
Case 4	Displays the fan speed of housing fan 4.	None	
СРИ	Displays the fan speed of the processor fan.	None	

Table 254: 855GME (ETX) - baseboard monitor - setting options (cont.)

# Legacy devices

BR1	PhoenixBIOS Setup Utilit	cy R12
Advanced		
Legacy 1	Devices	Item Specific Help
COM C: Base I/O address:		Enable/Disable the internal COM port
Interrupt: COM D: Base I/O address:	[IRQ 11] [Enabled] [238]	for touch.  For detailed
Interrupt: COM E:	[IRQ 7] [Enabled]	description see user manual.
Base I/O address: Interrupt: CAN:	[2E8] [IRQ 10] [Enabled]	
Base I/O address: Interrupt:		
2nd LAN controller:	[Enabled]	
LAN1 MAC address: LAN2 MAC address:		
	Item -/+ Change Values Menu Enter Select ▶ Sub M	

Figure 199: 855GME (ETX) - Legacy devices

BIOS setting	Meaning	Setting options	Effect
COM C	Settings for the internal serial interfaces in	Disabled	Disables the interface.
	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.	Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the COM C port. A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM C port.  A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
	COM D  Configuration of the COM D port for the serial interface of an automation panel link slot. The interface is used to operate the touch screen on connected Automation Panel 900 units.	Disabled	Disables the interface.
		Enabled	Enables the interface.

Table 255: 855GME (ETX) - Legacy devices - setting options

BIOS setting	Meaning	Setting options	Effect
Base I/O address	Configuration of the base I/O address for the serial COM D port. A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM D port. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
COM E	Configuration of the optional COM E port	Disabled	Disables the interface.
	of a B&R add-on interface option (IF option).	Enabled	Enables the interface.
Base I/O address	Configuration of the base I/O address for the serial COM E port. A yellow star indicates a conflict with another device.	238, 2E8, 2F8, 328, 338, 3E8, 3F8	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM E port. A yellow star indicates a conflict with another device.	IRQ 3, IRQ 4, IRQ 5, IRQ 7, IRQ 10, IRQ 11, IRQ 12	Selected interrupt is assigned.
LPT	This setting is specific to B&R and should not be changed.	Disabled	Disables the interface.
		Enabled	Enables the interface.
Base I/O address	Configuration of the base I/O address for the optional LPT. A yellow star indicates a conflict with another device.	278, 378, 3BC	Selected base I/O address is assigned.
CAN	Configuration of the CAN port of a B&R	Disabled	Disables the interface.
	add-on interface card.	Enabled	Enables the interface.
Base I/O address	384/385h	None	-
Interrupt	Selection of the interrupt for the CAN port.	IRQ 10	Selected interrupt is assigned.
		NMI	NMI interrupt is assigned.
2nd LAN controller	For turning the onboard LAN controller	Disabled	Disables the controller.
	(ETH2) on and off.	Enabled	Enables the controller.
LAN1 MAC address	Displays the MAC addresses for the ETH1 network controller.	-	-
LAN2 MAC address	Displays the MAC addresses for the ETH2 network controller.	-	-

Table 255: 855GME (ETX) - Legacy devices - setting options (cont.)

### 1.2.6 Security

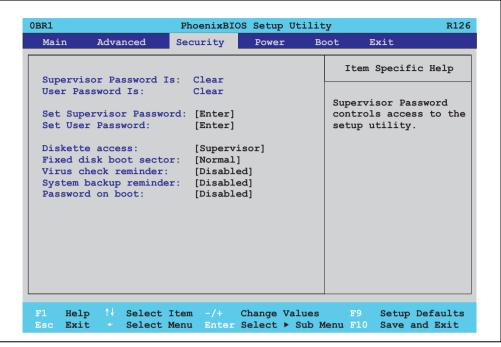


Figure 200: 855GME (ETX) - security menu

BIOS setting	Meaning	Setting options	Effect
Supervisor password is	Displays whether or not a supervisor password has been set.	None	Display <b>set</b> : A supervisor password has been set. Display <b>clear</b> : 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 256: 855GME (ETX) security - setting options

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

Table 256: 855GME (ETX) security - setting options (cont.)

#### 1.2.7 **Power**

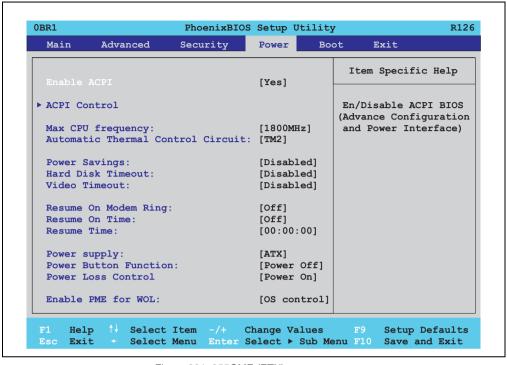


Figure 201: 855GME (ETX) - power menu

BIOS setting	Meaning	Setting options	Effect
Enable ACPI	This option turns the ACPI function (Advanced Configuration and Power Interface) on or off. This is an advanced	Yes	Enables this function.
	plug & play and power management functionality.	No	Disables this function.
ACPI control	Configuration of specific limits.	Enter	Opens submenu See "ACPI control" on page 419
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	ontrol circuit temperature. If the maximum operating	Disabled	Disables this function.
temperature. If the maximum operating temperature of the CPU is exceeded, the performance of the processor is throttled.		TM1	Operation with 50% load.
	TM2	Operation in accordance with Intel's Geyserville specifications.	

Table 257: 855GME (ETX) - power - setting options

BIOS setting	Meaning	Setting options	Effect				
Power savings	This function determines if and how the	Disabled	Deactivates the power savings function.				
	power save function is used.	Customized	Power management is configured by adjustin the individual settings.				
		Maximum power Savings	Maximum power savings function.				
		Maximum performance	Power savings function to maximize performance.				
Standby timeout	Set here when the system should enter standby mode. During standby, various devices and the display will be	Off	No standby.				
	deactivated. This option only available when "power savings" is set to customized.	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	Off	No standby.				
	savings" is set to customized.	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	Disabled	Disables this function.				
	hard disk should enter standby mode. This option only available when "power	10, 15, 30, 45 seconds	Time in seconds until standby.				
	savings" is set to customized.	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	Off	Disables this function.				
illig	system starts up.	On	Enables this function.				
Resume on time	This function enables the system to start	Off	Disables this function.				
	at the time set under "resume time."	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	ATX	An ATX compatible power supply is being used.				
	be entered here.	AT	An AT compatible power supply is being used.				
Power button Function	This option determines the function of the	Power off	Shuts down the system.				
I UHCHOH	power button.	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 257: 855GME (ETX) - power - setting options (cont.)

BIOS setting	Meaning	Setting options	Effect
Enable PME for WOL	This option enables the PME (Power Management Event) signal for controlling the WOL (Wake On LAN) function for the operating system.  This setting affects both Ethernet	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.
	interfaces (ETH1 and ETH2).	Enabled	The function, WOL and the evaluation of the PME signal is always enabled.
		Disabled	Disables the function - no WOL possible.

Table 257: 855GME (ETX) - power - setting options (cont.)

#### **ACPI** control

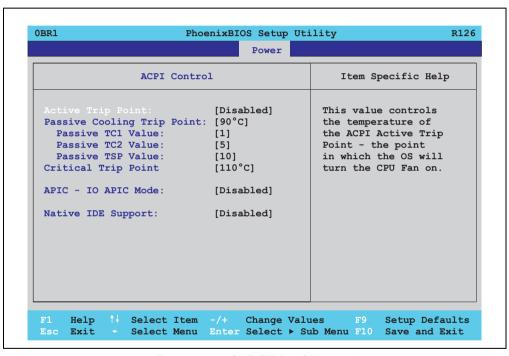


Figure 202: 855GME (ETX) - ACPI control

BIOS setting	Meaning	Setting options	Effect
Active trip point	With this function, an optional CPU fan	Disabled	Disables this function.
	above the operating system can be set to turn on when the CPU reaches the set temperature.	40°C 100°C	Temperature setting for the active trip point. Can be set in 5 degree increments.
	Information:		
	This function is not supported by MS-DOS.		

Table 258: 855GME (ETX) - ACPI control - setting options

BIOS setting	Meaning	Setting options	Effect
Passive cooling trip	With this function, a temperature can be	Disabled	Disables this function.
point	set at which the CPU automatically reduces its speed.	40°C 100°C	Temperature setting for the passive cooling trip point. Can be set in increments of 5 degrees
	Information:		Celsius.
	This function is not supported by MS-DOS.		
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.	40°C 110°C	Temperature setting for the critical trip point. Can be set in increments of 5 degrees Celsius.
	Information:		
	This function is not supported by MS-DOS.		
APIC - I/O APIC	This option controls the functionality of the	Disabled	Disables the function
mode	advanced interrupt controller in the processor.	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,	Disabled	Disables this function.
	and 2 x secondary ATA for another 2 devices) accessible through Windows XP.	Enabled	Enables this function.
	Information:		
	This function is not supported by MS-DOS.		

Table 258: 855GME (ETX) - ACPI control - setting options (cont.)

#### 1.2.8 Boot

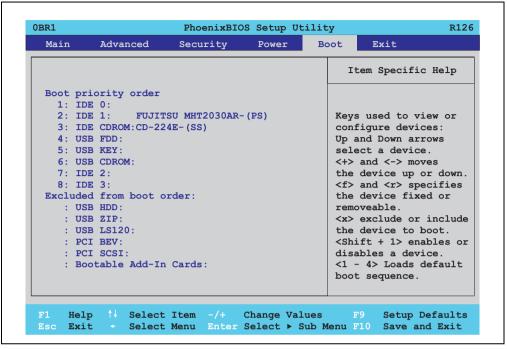


Figure 203: 855GME (ETX) - boot menu

BIOS setting	Meaning	Setting options	Effect
1: 2: 3: 4: 5: 6: 7:		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.</x></x>

Table 259: 855GME (ETX) - boot menu - setting options

#### 1.2.9 Exit

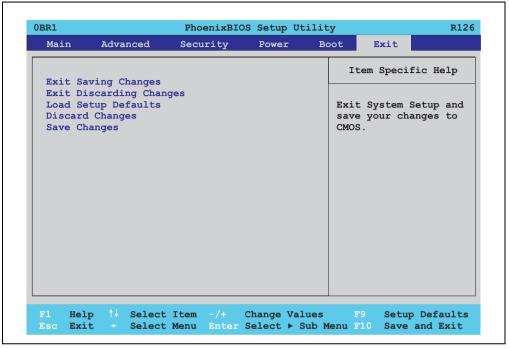


Figure 204: 855GME (ETX) - exit menu

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

Table 260: 855GME (ETX) - exit menu - setting options

### 1.2.10 Profile overview - BIOS default settings - 855GME (ETX)

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

DIP switch position see Section 1.9 "Location of the DIP switch in APC620 system units" on page 509).

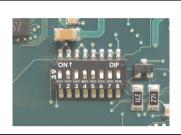


Figure 205: DIP switch on system unit

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

		DIP switch setting							
Number	Optimized for	1	2	3	4	5	6	7 <sup>1)</sup>	8 <sup>1)</sup>
Profile 0	Automation PC 620 system units 5PC600.SX01-00.	Off	Off	Off	Off	Off	Off	-	-
Profile 1	Reserved	On	Off	Off	Off	Off	Off	-	-
Profile 2	Automation PC 620 system units 5PC600.SX02-00, 5PC600.SX02- 01, 5PC600.SF03-00, 5PC600.SX05-00 and 5PC600.SX05-01.	Off	On	Off	Off	Off	Off	-	-
Profile 3	Panel PC 700 system unit 5PC720.1043-00, 5PC720.1214-00, 5PC720.1505-00, 5PC720.1706-00, 5PC720.1906-00, 5PC781.1043-00, 5PC781.1505-00 and 5PC782.1043-00.	On	On	Off	Off	Off	Off	-	-
Profile 4	Panel PC 700 system unit 5PC720.1043-01, 5PC720.1214-01, 5PC720.1505-01 and 5PC720.1505-02.	Off	Off	On	Off	Off	Off	-	-

Table 261: 855GME (ETX) - profile overview

1) Reserved

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

#### Personal settings

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

### Main

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

Table 262: 855GME (ETX) - main - profile setting overview

### **Advanced**

## Advanced chipset/graphics control

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Graphics engine 1	Auto	Auto	Auto	Auto	Auto	
Default flat panel	None	None	None	None	None	
Flat panel scaling	Stretched	Stretched	Stretched	Stretched	Stretched	
Graphics engine 2	Auto	Auto	Auto	Auto	Auto	
Graphics engine	Graphics engine 1	Graphics engine 1	Graphics engine 1	Graphics engine 1	Graphics engine 1	
Graphics memory size	UMA = 8 MB					
Assign IRQ to VGA	Enabled	Enabled	Enabled	Enabled	Enabled	
Internal graphics API Rev	-	-	-	=	-	

Table 263: 855GME (ETX) - advanced chipset/graphics control - profile settings overview

# PCI/PNP configuration

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
PNP OS installed	Yes	No	Yes	Yes	Yes	
Reset configuration data	No	No	No	No	No	
Secured setup configuration	Yes	Yes	Yes	Yes	Yes	
PCI IRQ line 1	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
PCI IRQ line 2	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
PCI IRQ line 3	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
PCI IRQ line 4	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
Onboard LAN IRQ line	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
Onboard USB EHCI IRQ line	Auto-select	Auto-select	Auto-select	Auto-select	Auto-select	
Default primary video adapter	PCI	PCI	PCI	PCI	PCI	
Assign IRQ to SMB	Enabled	Enabled	Enabled	Enabled	Enabled	

PCI device, slot #1	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Enabled	Enabled	Enabled	Enabled	Enabled	
Latency timer	Default	Default	Default	Default	Default	
PCI device, slot #2						
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Enabled	Enabled	Enabled	Enabled	Enabled	

Table 264: 815GME (ETX) - PCI/PNP configuration - profile settings overview

Latency timer	Default	Default	Default	Default	Default	
PCI device, slot #3						
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Enabled	Enabled	Enabled	Enabled	Enabled	
Latency timer	Default	Default	Default	Default	Default	
PCI device, slot #4						
ROM scan option	Enabled	Enabled	Enabled	Enabled	Enabled	
Enable master	Enabled	Enabled	Enabled	Enabled	Enabled	
Latency timer	Default	Default	Default	Default	Default	

Table 264: 815GME (ETX) - PCI/PNP configuration - profile settings overview (cont.)

# Memory cache

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Memory cache	Enabled	Enabled	Enabled	Enabled	Enabled	
Cache system BIOS area	Write protect	Write protect	Write protect	Write protect	Write protect	
Cache video BIOS area	Write protect	Write protect	Write protect	Write protect	Write protect	
Cache base 0-512k	Write back					
Cache base 512-640k	Write back					
Cache extended memory area	Write back	Write back	Write back	Write back	Write back	
Cache D000 - D3FF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache D400 - D7FF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache D800 - DBFF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache DC00 - DFFF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache E000 - E3FF	Disabled	Disabled	Disabled	Disabled	Disabled	
Cache E400 - E7FF	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 265: 855GME (ETX) - memory cache - profile settings overview

# I/O device configuration

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

Table 266: 855GME (ETX) - I/O device configuration - profile setting overview

# Keyboard features

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

Table 267: 855GME (ETX) - keyboard features - profile setting overview

## **CPU** board monitor

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

Table 268: 855GME (ETX) - CPU board monitor - profile setting overview

## Miscellaneous

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

Table 269: 855GME (ETX) - miscellaneous - profile setting overview

# Baseboard/panel features

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Versions	-	-	-	-	-	
BIOS	-	-	-	-	-	
MTCX		-	-	-	-	
FPGA		-	-	-	-	
Optimized ID		-	-	-	-	
Device ID	-	-	-	-	-	
Compatibility ID		-	-	-	-	
Serial number		-	-	-	-	
Product name	-	-	-	-	-	
User serial ID	-	-	-	-	-	

Table 270: 855GME (ETX) - baseboard/panel features -profile setting overview

Panel control	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Select panel number	0	0	0	0	0	
Version	-	-	-	-	-	
Brightness	100%	100%	100%	100%	100%	
Temperature	-	-	-	-	-	
Fan speed	-	-	-	-	-	
Keys/LEDs	-	-	-	-	-	
Baseboard monitor				•	•	
CMOS battery	-	-	-	-	-	
Temperatures	-	-	-	-	-	
I/O	-	-	-	-	-	
Power supply	-	-	-	-	-	
Slide-in drive 1	-	-	-	-	-	
Slide-in drive 2	-	-	-	-	-	
Fan speeds	-	-	-	-	-	
Case 1	-	-	-	-	-	
Case 2	-	-	-	-	-	
Case 3	-	-	-	-	-	
Case 4	-	-	-	-	-	
CPU	-	-	-	-	-	
Legacy devices						·
COM C	Disabled	Enabled	Disabled	Enabled	Enabled	
Base I/O address	-	3E8h	-	3E8h	3E8h	
Interrupt	-	11	-	11	11	
COM D	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-	-	-	
COM E	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-	-	-	
LPT	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
CAN	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address	-	-	-	-	-	
Interrupt	-	-	-	-	-	
2nd LAN controller	Enabled	Enabled	Enabled	Enabled	Enabled	
LAN1 MAC address	-	-	-	-	-	
LAN2 MAC address	-	-	-	-	-	

Table 270: 855GME (ETX) - baseboard/panel features -profile setting overview (cont.)

# Security

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

Table 271: 855GME (ETX) security - profile setting overview

## **Power**

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Enable ACPI	Yes	Yes	Yes	Yes	Yes	
Max CPU frequency	Dependant on processor	Dependant on processor	Dependant on processor	Dependant on processor	Dependant on processor	
Automatic thermal control circuit	TM2	TM2	TM2	TM2	TM2	
Power savings	Disabled	Disabled	Disabled	Disabled	Disabled	
Standby timeout	-	-	-	-	-	
Auto suspend timeout	-	-	-	-	-	
Hard disk timeout	Disabled	Disabled	Disabled	Disabled	Disabled	
Video timeout	Disabled	Disabled	Disabled	Disabled	Disabled	
Resume on modem ring	Off	Off	Off	Off	Off	
Resume on time	Off	Off	Off	Off	Off	
Resume time	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	
Power supply	ATX	ATX	ATX	ATX	ATX	
Power button function	Power off	Power off	Power off	Power off	Power off	
Power loss control	Power-on	Power-on	Power-on	Power-on	Power-on	
Enable PME for WOL	OS control	OS control	OS control	OS control	OS control	
ACPI control						
Active trip point	Disabled	Disabled	Disabled	Disabled	Disabled	
Passive cooling trip point	Disabled	Disabled	Disabled	Disabled	Disabled	
Critical trip point	110°C	110°C	110°C	110°C	110°C	
APIC - I/O APIC mode	Disabled	Enabled	Disabled	Disabled	Disabled	
Native IDE support	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 272: 855GME (ETX) - power - profile setting overview

## **Boot**

	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Personal settings
Boot priority order						
1:	IDE 0	PCI BEV	IDE 0	IDE 0	IDE 0	
2:	IDE 1	IDE 0	IDE 1	IDE 1	IDE 1	
3:	IDE CD	IDE 1	IDE CD	IDE CD	IDE CD	
4:	USB FDC	IDE CD	USB FDC	USB FDC	USB FDD	
5:	USB KEY	USB FDC	USB KEY	USB KEY	USB KEY	
6:	USB CDROM	USB KEY	USB CDROM	USB CDROM	USB CDROM	
7:	-	USB CDROM	IDE 2	-	IDE 2	
8:	-	-	IDE 3	•	IDE 3	
Excluded from boot order						
:	IDE 2	IDE 2	USB HDD	IDE 2	USB HDD	
:	IDE 3	IDE 3	USB ZIP	IDE 3	USB ZIP	
:	USB HDD	USB HDD	USB LS120	USB HDD	USB LS120	
:	USB ZIP	USB ZIP	PCI BEV	USB ZIP	PCI BEV	
:	USB LS120	USB LS120	PCI SCSI	USB LS120	PCI SCSI	
:	PCI BEV	PCI SCSI	Bootable add-in cards	PCI BEV	Bootable add-in cards	
:	PCI SCSI	Bootable add-in cards	-	PCI SCSI		
:	Bootable add-in cards		-	Bootable add-in cards		

Table 273: 855GME (ETX) - boot - profile setting overview

# 1.3 855GME (XTX) BIOS description

# Information:

- The following diagrams and BIOS menu items including descriptions refer to BIOS Version 1.16. It is therefore possible that these diagrams and BIOS descriptions do not correspond with the installed BIOS version.
- The setup defaults are the settings recommended by B&R. The setup defaults are dependent on the DIP switch configuration on the baseboard (see section 1.3.10 "Profile overview - BIOS default settings - 855GME (XTX)" on page 478).

#### 1.3.1 General information

BIOS stands for "Basic Input Output System." It is the most basic standardized communication between the user and the system (hardware). The BIOS system used in the Automation PC 620 systems is produced by American Megatrends Inc.

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

The CMOS data is buffered by a battery, and remains in the APC620 even when the power is turned off (no 24VDC supply).

#### 1.3.2 BIOS setup and boot procedure

BIOS is immediately activated when switching on the power supply of the Automation PC 620 system or pressing the power button. The system checks if the setup data from the EEPROM is "OK". If the data is "OK", then it is transferred to the CMOS. If the data is "not OK", then the CMOS data is checked for validity. An error message is output if the CMOS data contains errors and the boot procedure can be continued by pressing the <F1> key. To prevent the error message from appearing at each restart, open the BIOS setup by pressing the <Del> key and re-save the settings.

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

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

To enter BIOS Setup, the DEL key must be pressed as soon as the following message appears on the monitor (during POST):

"Press DEL to run SETUP"

```
AMIBIOS(C)2003 American Megatrends, Inc.
[APC1R114] Bernecker + Rainer Industrie-Elektronik E1.16
Serial Number : 63485
CPU: Mobile Genuine Intel(R) processor 1100MHz
Speed: 1.10 Ghz

Press DEL to run Setup
Tress F12 if you want to boot from the network
Press F11 for BBS POPUP
DDR Frequency 333 Mhz
Initializing USB Controllers ..

(C) American Megatrends, Inc.
64-0100-000001-00101111-082506-MONTARA-APC1R005-Y2KC
```

Figure 206: 855GME (XTX) - BIOS diagnostics screen

## 1.3.3 BIOS setup keys

The following keys are enabled during the POST:

Key	Function	
ESC	The system RAM check can be skipped by pressing ESC.	
Del	Enters the BIOS setup menu.	
F12	Using the F12 key, you can boot from the network.	
F11	Cues the boot menu. Lists all bootable devices that are connected to the system. With cursor ↑ and cursor ↓ and by pressing <enter>, select the device from which will be booted.</enter>	
<pause></pause>	Pressing the <pause> key stops the POST. Press any other key to resume the POST.</pause>	

Table 274: 855GME (XTX) - keys relevant to BIOS during POST

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

Key	Function	
F1	General help	
Cursor ↑	Moves to the previous item.	
Cursor↓	Go to the next item.	
Cursor ←	Moves to the previous item.	
Cursor →	Go to the next item.	
+-	Changes the setting of the selected function.	

Table 275: 855GME (XTX) - keys relevant to BIOS in the BIOS menu

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

Table 275: 855GME (XTX) - keys relevant to BIOS in the BIOS menu (cont.)

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

BIOS setup menu item	Function	From page
Main	You can configure the ground configuration time and date in this menu.	435
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.	436
Boot	The boot order can be set here.	469
Security	For setting up the system's security functions.	471
Power	Setup of various APM (Advanced Power Management) options.	474
Exit	To end the BIOS setup.	476

Table 276: Overview of 855GME (XTX) BIOS menu items

#### 1.3.4 Main

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



Figure 207: 855GME (XTX) BIOS main menu

BIOS setting	Meaning	Setting options	Effect
System time	This is the current system time setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Adjustment of the system time	Set the system time in the format (hh:mm:ss).
System date	This is the current system date setting. The time is buffered by a battery (CMOS battery) after the system has been switched off.	Changes to the system date	Set the system date in the format (mm:dd:yyyy).
BIOS ID	Displays the BIOS recognition.	None	-
Processor	Processor display.	None	-
CPU frequency	CPU frequency display.	None	-
System memory	System memory display.	None	-
Product revision	Displays the CPU board HW revision.	None	-
Serial number	Displays the CPU board serial number.	None	-
BC Firmware rev.	Displays the CPU board controller firmware revision.	None	-

Table 277: 855GME (XTX) main menu - setting options

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

Table 277: 855GME (XTX) main menu - setting options (cont.)

#### 1.3.5 Advanced

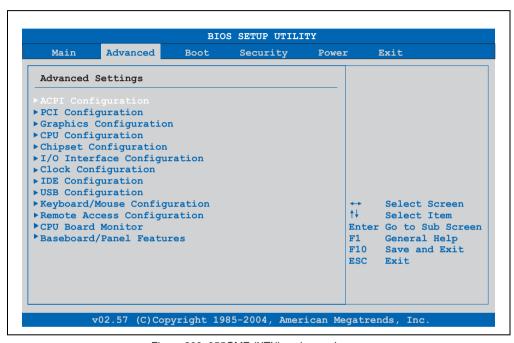


Figure 208: 855GME (XTX) - advanced menu

BIOS setting	Meaning	Setting options	Effect
ACPI configuration	Configures APCI devices.	Enter	Opens submenu See "ACPI configuration" on page 437
PCI configuration	Configures PCI devices.	Enter	Opens submenu See "PCI configuration" on page 439
Graphics configuration	Configures the graphic settings.	Enter	Opens submenu See "Graphics configuration" on page 441
CPU configuration	Configures CPU settings.	Enter	Opens submenu See "CPU configuration" on page 443
Chipset configuration	Configures the chipset functions.	Enter	Opens submenu See "Chipset configuration" on page 444

Table 278: 855GME (XTX) - advanced menu - setting options

BIOS setting	Meaning	Setting options	Effect
I/O interface configuration	Configuration of the I/O devices.	Enter	Opens submenu See "I/O interface configuration" on page 445
Clock configuration	Configures clock settings.	Enter	Opens submenu See "Clock configuration" on page 447
IDE Configuration	Configures the IDE functions.	Enter	Opens submenu See "IDE Configuration" on page 448
USB configuration	Configures USB settings	Enter	Opens submenu See "USB configuration" on page 455
Keyboard/mouse configuration	Configuration of the keyboard/mouse options.	Enter	Opens submenu See "Keyboard/mouse configuration" on page 458
Remote access configuration	Configures the remote access settings	Enter	Opens submenu See "Remote access configuration" on page 460
CPU board monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens submenu See "CPU board monitor" on page 462
Baseboard/panel features	Displays device specific information and setup of device specific values.	Enter	Opens submenu See "Baseboard/panel features" on page 463

Table 278: 855GME (XTX) - advanced menu - setting options (cont.)

## **ACPI** configuration

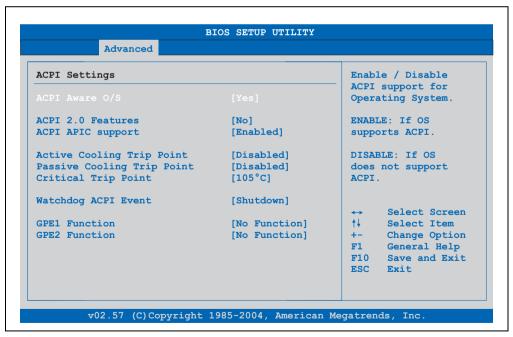


Figure 209: 855GME (XTX) - advanced ACPI configuration

BIOS setting	Meaning	Setting options	Effect
ACPI Aware O/S	This function determines if the operating	Yes	The operating system supports ACPI.
	system supports the ACPI function (Advanced Configuration and Power Interface).	No	The operating system does not support ACPI.
ACPI 2.0 features	This function determines if the operating	Yes	The operating system supports ACPI 2.0.
	system supports the ACPI 2.0 specifications.	No	The operating system does not support ACPI 2.0.
ACPI APIC support	This option controls the support	Enabled	Enables this function.
	of the advanced programmable interrupt controller in the processor.	Disabled	Disables the function
Active cooling trip	With this function, an optional	Disabled	Disables this function.
point	CPU fan is activated by the operating system when the CPU reaches the set temperature.	50°C, 60°C, 70°C, 80°C, 90°C	Temperature setting for the active trip point. Can be set in 10 degree increments.
Passive cooling trip point	With this function, a temperature can be set at which the CPU automatically reduces its speed.	Disabled	Disables this function.
		50°C, 60°C, 70°C, 80°C, 90°C	Temperature setting for the active trip point. Can be set in 10 degree increments.
Critical trip point	With this function, a temperature can be set at which the operating system automatically shuts itself down.	80°C, 85°C, 90°C, 95°C, 100°C, 105°C, 110°C	Temperature setting for the critical trip point. Can be set in 5 degree increments.
Watchdog ACPI	System monitoring of the ACPI function.	Shutdown	The system is shut down.
event		Restart	Restarts the system.
GPE1 function	Setting the GPE1 function.	No function	Not used.
		Lid switch	
GPE2 function	Setting the GPE2 function.	No function	Not used.
		Sleep button	-

Table 279: 855GME (XTX) - advanced ACPI configuration - setting options

## **PCI** configuration

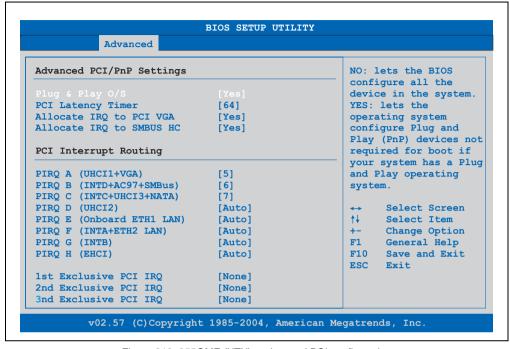


Figure 210: 855GME (XTX) - advanced PCI configuration

BIOS setting	Meaning	Setting options	Effect
Plug & Play O/S	BIOS is informed if Plug & Play is capable on the operating system.	Yes	The operating system handles the distribution of resources.
		No	The operating system handles the distribution of resources.
PCI latency timer	This option controls how long one card can continue to use the PCI bus master after another PCI card has requested access.	32, 64, 96, 128, 160, 192, 224, 248	Manually setting the value.
Allocate IRQ to PCI	This function is used to determine if an interrupt is assigned to the PCI VGA.	Yes	Automatic assignment of an interrupt.
<b>VGA</b> ir		No	No assignment of an interrupt.
Allocate IRQ to	Use this function to set	Yes	Automatic assignment of a PCI interrupt.
SMBUS HC	whether or not the SM (System Management) bus controller is assigned a PCI interrupt.	No	No assignment of an interrupt.
PIRQ A (UHCI1+VGA)	Under this option, the external PCI interrupt A is assigned to an ISA interrupt.	Auto	The interrupt is automatically assigned according to Plug & Play guidelines.
		5, 6, 7, 8, 9, 10, 11, 12	Manual configuration of the IRQ.

Table 280: 855GME (XTX) - advanced PCI configuration - setting options

BIOS setting	Meaning	Setting options	Effect
PIRQ B (INTD+AC97+SMBu s)	Under this option, the external PCI interrupt B is assigned to and ISA	Auto	The interrupt is automatically assigned according to Plug & Play guidelines.
	interrupt.	5, 6, 7, 8, 9, 10, 11, 12	Manual configuration of the IRQ.
PIRQ C (INTC+UHCI3+NAT	Under this option, the external PCI interrupt C is assigned to and ISA	Auto	The interrupt is automatically assigned according to Plug & Play guidelines.
A)	interrupt.	5, 6, 7, 8, 9, 10, 11, 12	Manual configuration of the IRQ.
PIRQ D (UHCI2)	Under this option, the external PCI interrupt D is assigned to and ISA	Auto	The interrupt is automatically assigned according to Plug & Play guidelines.
	interrupt.	5, 6, 7, 8, 9, 10, 11, 12	Manual configuration of the IRQ.
PIRQ E (Onboard ETH1 LAN)	Under this option, the external PCI interrupt E is assigned to and ISA	Auto	The interrupt is automatically assigned according to Plug & Play guidelines.
	interrupt.	5, 6, 7, 8, 9, 10, 11, 12	Manual configuration of the IRQ.
PIRQ F (INTA+ETH2 LAN)	Under this option, the external PCI interrupt F is assigned to an ISA interrupt.	Auto	The interrupt is automatically assigned according to Plug & Play guidelines.
		5, 6, 7, 8, 9, 10, 11, 12	Manual configuration of the IRQ.
PIRQ G (INTB)	Under this option, the external PCI interrupt G is assigned to an ISA interrupt.	Auto	The interrupt is automatically assigned according to Plug & Play guidelines.
		5, 6, 7, 8, 9, 10, 11, 12	Manual configuration of the IRQ.
PIRQ H (EHCI)	Under this option, the external PCI interrupt H is assigned to an ISA interrupt.	Auto	The interrupt is automatically assigned according to Plug & Play guidelines.
		5, 6, 7, 8, 9, 10, 11, 12	Manual configuration of the IRQ.
	With this option you can determine if the	None	No interrupt is assigned.
IRQ	IRQ assigned to the PIRQ x is handled exclusively (no IRQ sharing). Note: Is only displayed if a PIRQ is manually set (e.g. 5).	Х	Assigns the PIRQ as 1st exclusive PCI IRQ.
2nd exclusive PCI	With this option you can determine if the	None	No interrupt is assigned.
IRQ	IRQ assigned to the PIRQ x is handled exclusively (no IRQ sharing). Note: Only displayed when two PIRQs are set manually.	Х	Assigns the PIRQ as 2nd exclusive PCI IRQ.
3rd exclusive PCI	With this option you can determine if the	None	No interrupt is assigned.
IRQ	IRQ assigned to the PIRQ x is handled exclusively (no IRQ sharing).  Note: Only displayed in connection with  "Profile 5" and if three PIRQs are set  manually.	Х	Assigns the PIRQ as 3rd exclusive PCI IRQ.

Table 280: 855GME (XTX) - advanced PCI configuration - setting options (cont.)

## **Graphics configuration**

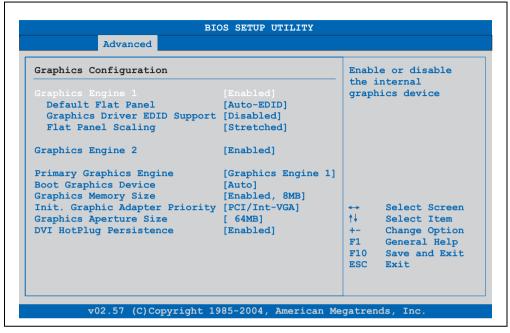


Figure 211: 855GME (XTX) - advanced graphics configuration

BIOS setting	Meaning	Setting options	Effect
Graphics engine 1	The onboard graphics controller 1 is	Enabled	Enables this function.
	activated/deactivated here.	Disabled	Disables this function.
Default flat panel	Settings can be made for the resolution.	Auto-EDID	Automatic setting of the resolution (using a read-out of the connected panel's EDID data).
		VGA 1x18 (002h) VGA 1x18 (013h) SVGA 1x18 (004h) XGA 1x18 (006h) XGA 2x18 (007h) XGA 1x24 (008h) XGA 2x24 (012h) SXGA 2x24 (00Ah) UXGA 2x24 (00Ch)	VGA = 640 x 480 resolution SVGA = 800 x 600 resolution XGA = 1024 x 768 resolution SXGA = 1280 x 1024 resolution UXGA = 1600 x 1200 resolution
		Customized EDID 1	Graphics card reads the EDID 1 data.
		Customized EDID 2	Graphics card reads the EDID 2 data.
		Customized EDID 3	Graphics card reads the EDID 3 data.
Graphics driver		Enabled	Enables this function.
EDID support	operating system graphics driver can read EDID data on its own. When disabled, the VGA data is taken over by BIOS.	Disabled	Disables this function.

Table 281: 855GME (XTX) - advanced graphics configuration - setting options

BIOS setting	Meaning	Setting options	Effect
Flat panel scaling	The screen optimization of the flat screen is determined here.	Centered	Screen output centered.
		Stretched	Screen output adjusted.
Graphics engine 2	Settings can be made for the onboard	Enabled	Enables this function.
	graphics controller 2.	Disabled	Disables this function.
Graphics engine	The primary onboard graphics controller	Graphics engine 1	Activation of graphics engine 1
	can be selected here.	Graphics engine 2	Activation of graphics engine 2
Boot graphics	You can select which display mode should	Auto	Display mode selected automatically.
device	be booted here.	CRT only	Only CRT is booted.
		Engine 2 only	Only engine 2 is booted.
		CRT + Engine 2	CRT and engine 2 are booted.
		Engine 1 only	Only engine 1 is booted.
		CRT + Engine 1	CRT and engine 1 are booted.
Graphics memory size		Enabled, 1MB	MB main memory is reserved for the onboard video controller.     Controller reserved.
	will be directed.	Enabled, 4MB	4 MB main memory is reserved for the onboard video controller. Controller reserved.
		Enabled, 8MB	8 MB main memory is reserved for the onboard video controller.     Controller reserved.
		Enabled, 16MB	16 MB main memory is reserved for the onboard video controller.
		Enabled, 32MB	32 MB main memory is reserved for the onboard video controller.
Init. Graphic	This option allows you to set which	PCI/Int-VGA	PCI/Int-VGA adapter is first installed.
adapter priority	graphics card should be initialized first.	Internal VGA	Internal VGA adapter is first installed.
Graphics aperture size	Reserves a memory location in the RAM for the graphics card.  Note: The size with the best performance is the same size as the application memory.	64MB, 128MB, 256MB	Manually setting the value.
DVI HotPlug	Affects both graphics engines. When	Enabled	Enables this function.
persistence	enabled, the operating system graphics driver attempts to restore the most recent configuration.	Disabled	Disables this function.

Table 281: 855GME (XTX) - advanced graphics configuration - setting options (cont.)

# **CPU** configuration

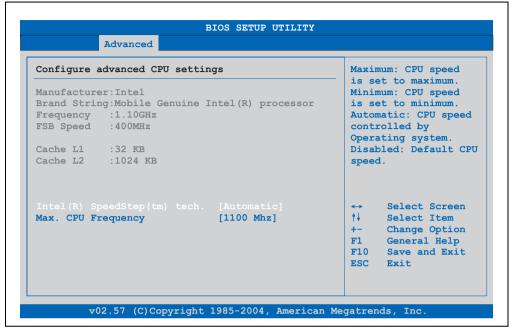


Figure 212: 855GME (XTX) - advanced CPU configuration

BIOS setting	Meaning	Setting options	Effect
Manufacturer	Manufacturer's display.	None	-
Brand string	Display of CPU values	None	-
Frequency	Processor speed display	None	-
FSB speed	Cycle display of all addressed components. (Front side bus)	None	-
L1 cache	Display of first level cache memory area.	None	-
L2 cache	Display of first level cache memory area.	None	-
Intel (R) SpeedStep	The computing capacity can be set with	Maximum speed	Maximum computing capacity
(tm) tech.	this option.	Minimum speed	Minimum computing capacity.
		Automatic	Computing capacity selected automatically.
		Disabled	Disables this function.
Max. CPU frequency	The maximum CPU speed can be set here. Note: Is only visible if the "Intel (R) SpeedStep (tm) tech." option is set to automatic or maximum speed.	1100 MHz, 1000 MHz, 900 MHz, 800 MHz, 600 MHz;	Manually setting the value.

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

## **Chipset configuration**

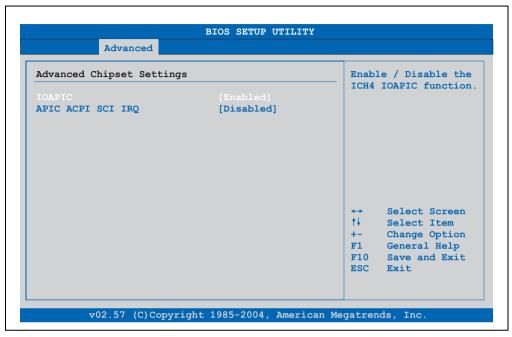


Figure 213: 855GME (XTX) - advanced chipset configuration

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

Table 283: 855GME (XTX) - advanced chipset - setting options

# I/O interface configuration

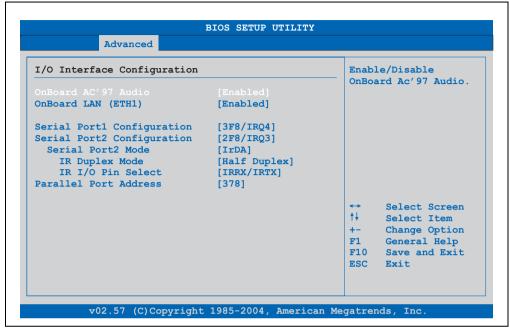


Figure 214: 855GME (XTX) - I/O interface configuration

BIOS setting	Meaning	Setting options	Effect
Onboard AC'97	For turning the Onboard AC97 audio	Enabled	Enables AC'97 sound.
Audio	controller on and off.	Disabled	Disables AC'97 sound.
OnBoard LAN (ETH1)	For turning the on-board LAN controller (for ETH1) on and off.	Disabled	Deactivates the LAN controller or the ETH1 interface. ETH1 interface.
		Enabled	Deactivates the LAN controller or the ETH1 interface. ETH1 interface.
Serial port 1	For the configuration of serial port 1	Disabled	Port 1 deactivated.
configuration	(COM1).	3F8/IRQ4	Assignment of the base I/O address and the interrupt.
		3E8 / IRQ4	Assignment of the base I/O address and the interrupt.
Serial port 2	For the configuration of serial port 2 (COM1).	Disabled	Port 1 deactivated.
configuration		2F8 / IRQ3	Assignment of the base I/O address and the interrupt.
		2E8 / IRQ3	Assignment of the base I/O address and the interrupt.

Table 284: 855GME (XTX) - I/O interface configuration - setting options

BIOS setting	Meaning	Setting options	Effect
Serial port 2 mode	This option is for setting the serial port B	Normal	Standard interface.
	as either a standard interface or as an infrared interface (not currently	IrDA	IrDA interface (compliant serial infrared port).
	supported).	ASK IR	Interface for IR devices (amplitude shift keyed infrared port).
IR duplex mode	The interface duplex drive can be	Half-duplex	Half-duplex drive.
	configured with this option.  Note:  Only visible if the "Serial Port2 Mode" function is set to IrDA or ASK IR.	Full-duplex	Full-duplex drive.
IR I/O pin select	With this option, the infrared (IR) function	IRRX/IRTX	An internal infrared device is used.
	on the on-board I/O chip can be determined.  Note: Only visible if the "Serial Port2 Mode" function is set to IrDA or ASK IR.	SINB/SOUTB	An external infrared device is used.
Parallel port	The address of the parallel interface can	Disabled	Deactivates the port.
address	be defined with this option.  Note:  Address is automatically set, even if the function is disabled.	378, 278, 3BC	Manual assignment of the port address.

Table 284: 855GME (XTX) - I/O interface configuration - setting options (cont.)

# **Clock configuration**

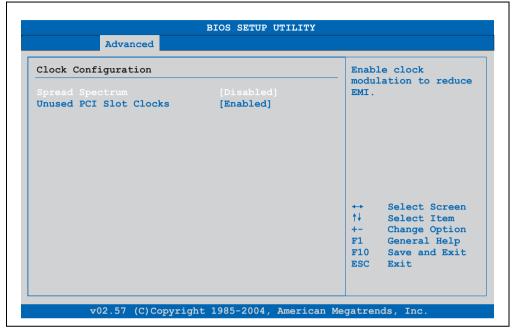


Figure 215: 855GME (XTX) - advanced clock configuration

BIOS setting	Meaning	Setting options	Effect
Spread spectrum	With this option, the cycle frequency can be modulated by reducing electromagnetic disturbances.	Disabled	Disables this function.
		Enabled	Enables this function.
Unused PCI slot	This option activates or deactivates the unused PCI slot cycle.	Disabled	Disables this function.
clocks		Enabled	Enables this function.

Table 285: 855GME (XTX) - advanced clock configuration - setting options

### **IDE Configuration**

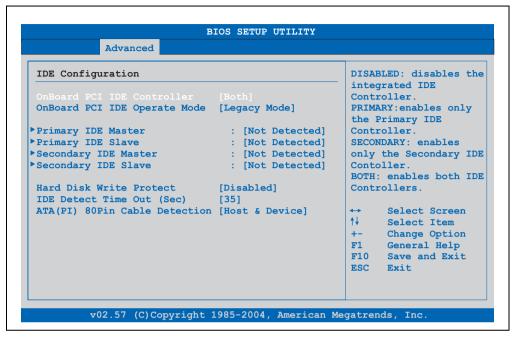


Figure 216: 855GME (XTX) - advanced IDE configuration

BIOS setting	Meaning	Setting options	Effect
OnBoard PCI IDE	Both the IDE controllers found on the	Disabled	Disables this function.
controller	board can be configured here.	Primary	Activates the primary IDE channel.
		Secondary	Activates the secondary IDE channel.
		Both	Activates both IDE channels (primary and secondary).
OnBoard PCI IDE	The PCI IDE operate mode found on the	Legacy mode	Activates legacy mode
operate mode	board is configured here.	Native mode	Activates the native mode (suited for Windows XP and Windows 2000).
Primary IDE master	The drive in the system that is connected to the IDE primary master is configured here.	Enter	Opens submenu See "Primary IDE master" on page 449
Primary IDE slave	The drive in the system that is connected to the IDE primary slave port is configured here.	Enter	Opens submenu See "Primary IDE slave" on page 451
Secondary IDE master	The drive in the system that is connected to the IDE secondary master port is configured here.	Enter	Opens submenu See "Secondary IDE master" on page 452

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

BIOS setting	Meaning	Setting options	Effect
Secondary IDE slave	The drive in the system that is connected to the IDE secondary slave port is configured here.	Enter	Opens submenu See "Secondary IDE slave" on page 454
Hard disk write	Write protection for the hard drive can be	Disabled	Disables this function.
protect	enabled/disabled here.	Enabled	Enables this function.
IDE detect time out (Sec)	Configuring the time overrun limit value for the ATA/ATAPI device identification.	0, 5, 10, 15, 20, 25, 30, 35	Manually setting the value.
ATA (PI) 80 pin cable detection	Detects whether an 80 pin cable is connected to the drive, the controller or to	Host & device	Using both IDE controllers (motherboard, disk drive).
	both. <b>Not</b> e:	Host	Using the IDE controller motherboard.
	This cable should be used whenever possible, otherwise error messages will appear.	Device	Using the IDE disk drive controller.

Table 286: 855GME (XTX) - advanced IDE configuration - setting options (cont.)

#### Primary IDE master

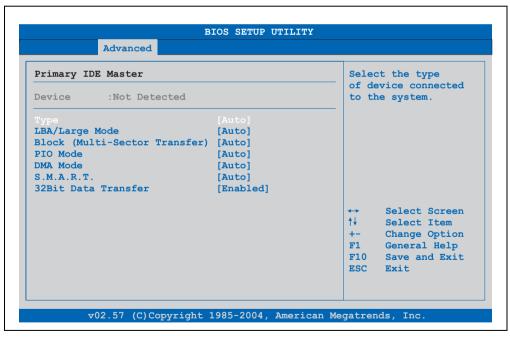


Figure 217: 855GME (XTX) - primary IDE master

BIOS setting	Meaning	Setting options	Effect
Туре	The type of drive connected to the primary	Not installed	No drive installed.
	master is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive.
		ARMD	ARMD - drive (zip drive)
LBA/Large mode	This option enables the logical block addressing/ large mode for IDE.	Disabled	Disables this function.
	addressing large mode for ib E.	Auto	Automatic enabling of this function when supported by the system.
Block (multi-sector	This option enables the block mode for	Disabled	Disables this function.
transfer)	IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Auto	Automatic enabling of this function when supported by the system.
PIO mode	The PIO mode determines the data rate of the hard drive. Note: The higher the PIO mode, the shorter the data cable must be.	Auto	Automatic configuration of PIO mode.
		0, 1, 2, 3, 4	Manual configuration of PIO mode.
DMA mode	The data transfer rate to and from	Auto	Automatic definition of the transfer rate.
	the primary master drive is defined here. The DMA mode must be enabled in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	SWDMA0, SWDMA1, SWDAM2, MWDMA0, MWDMA1, MWDMA2;	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives	Auto	Automatic detection and enabling.
	(self-monitoring, analysis and reporting technology).	Disabled	Disables this function.
		Enabled	Enables this function.
32 bit data transfer	This function enables 32-bit data transfer.	Disabled	Disables this function.
	Data transfer.	Enabled	Enables this function.

Table 287: 855GME (XTX) - primary IDE master - setting options

## Primary IDE slave

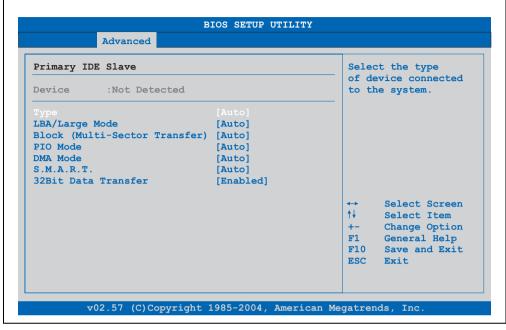


Figure 218: 855GME (XTX) - primary IDE slave

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

Table 288: 855GME (XTX) - primary IDE slave - setting options

BIOS setting	Meaning	Setting options	Effect
DMA mode		Auto	Automatic definition of the transfer rate.
	the primary slave drive is defined here. The DMA mode must be enabled in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	SWDMA0, SWDMA1, SWDAM2, MWDMA0, MWDMA1, MWDMA2;	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives (self-monitoring, analysis and reporting technology).	Auto	Automatic detection and enabling.
		Disabled	Disables this function.
		Enabled	Enables this function.
32 bit data transfer	This function enables 32-bit data transfer. Data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 288: 855GME (XTX) - primary IDE slave - setting options

## Secondary IDE master

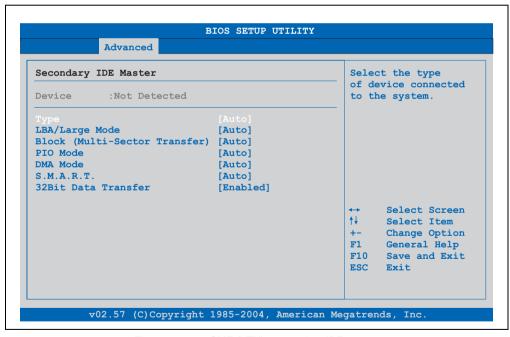


Figure 219: 855GME (XTX) - secondary IDE master

BIOS setting	Meaning	Setting options	Effect
Туре	The type of drive connected to the	Not installed	No drive installed.
	secondary master is configured here.	Auto	Automatic recognition of the drive and setup of appropriate values.
		CD/DVD	CD -/ DVD drive
		ARMD	ARMD - drive (zip drive)
LBA/Large mode	This option enables the logical block addressing/ large mode for IDE.	Disabled	Disables this function.
	addressing large mode for IDE.	Auto	Automatic enabling of this function when supported by the system.
Block (multi-sector	This option enables the block mode for	Disabled	Disables this function.
transfer)	IDE hard drives. When this option is enabled, the number of blocks per request from the configuration sector of the hard drive is read.	Auto	Automatic enabling of this function when supported by the system.
PIO mode	The PIO mode determines the data rate of	Auto	Automatic configuration of PIO mode.
	the hard drive. Note: The higher the PIO mode, the shorter the data cable must be.	0, 1, 2, 3, 4	Manual configuration of PIO mode.
DMA mode	The data transfer rate to and from	Auto	Automatic definition of the transfer rate.
	the secondary master drive is defined here. The DMA mode must be enabled in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	SWDMA0, SWDMA1, SWDAM2, MWDMA0, MWDMA1, MWDMA2;	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives	Auto	Automatic detection and enabling.
	(self-monitoring, analysis and reporting technology).	Disabled	Disables this function.
		Enabled	Enables this function.
32 bit data transfer	This function enables 32-bit data transfer.	Disabled	Disables this function.
	Data transfer.	Enabled	Enables this function.

Table 289: 855GME (XTX) - secondary IDE master - setting options

## Secondary IDE slave

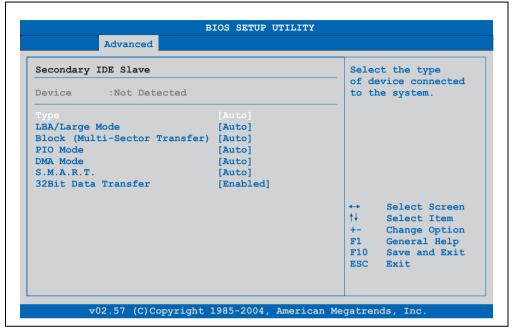


Figure 220: 855GME (XTX) - secondary IDE slave

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

Table 290: 855GME (XTX) - secondary IDE slave - setting options

BIOS setting	Meaning	Setting options	Effect
DMA mode	The data transfer rate to and from	Auto	Automatic definition of the transfer rate.
	the secondary slave drive is defined here. The DMA mode must be enabled in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	SWDMA0, SWDMA1, SWDAM2, MWDMA0, MWDMA1, MWDMA2;	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives (self-monitoring, analysis and reporting technology).	Auto	Automatic detection and enabling.
		Disabled	Disables this function.
	•••	Enabled	Enables this function.
32 bit data transfer	This function enables 32-bit data transfer. Data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 290: 855GME (XTX) - secondary IDE slave - setting options (cont.)

#### **USB** configuration

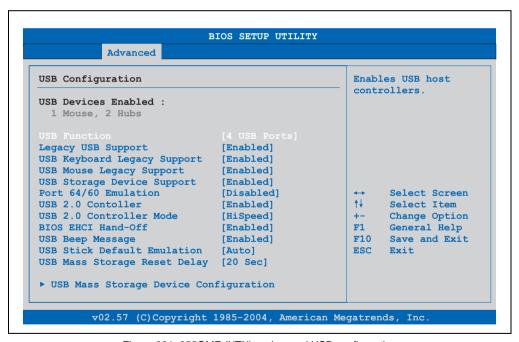


Figure 221: 855GME (XTX) - advanced USB configuration

BIOS setting	Meaning	Setting options	Effect
USB function	USB ports can be enabled/disabled here.	Disabled	Disables the USB port.
		2 USB ports, 4 USB ports, 6 USB ports (not supported by APC620 / PPC700).	Manual selection of the USB port.
Legacy USB	Legacy USB support can be	Disabled	Disables this function.
support	enabled/disabled here. USB interfaces do not function during	Enabled	Enables this function.
	startup. USB is supported again after the operating system has started. A USB keyboard is still recognized during the POST.	Auto	Automatic enabling.
USB keyboard	USB keyboard support can be	Disabled	Disables this function.
legacy support	enabled/disabled here. Note: If this function is disabled, a USB keyboard is also not supported during the POST.	Enabled	Enables this function.
USB mouse legacy support	USB mouse support can be enabled/disabled here.	Disabled	Disables this function.
Support	enableu/disableu nere.	Enabled	Enables this function.
USB storage	USB storage device support can be	Disabled	Disables this function.
device support	enabled/disabled here.	Enabled	Enables this function.
Port 64/60 emulation	Port 64/60 emulation can be enabled/disabled here.	Disabled	USB keyboard functions in all systems excluding Windows NT.
		Enabled	USB keyboard functions in Windows NT.
USB 2.0 controller	USB 2.0 mode can be activated/deactivated here.	Enabled	Enables this function.
	activated/deactivated nere.	Disabled	Disables this function.
USB 2.0 controller mode	Settings can be made for the USB controller.	Full speed	12 MBps
mode	controller.	Hi speed	480 MBps
BIOS EHCI hand- off	The support for the operating system can be set up without the fully automatic EHCI	Disabled	Disables the function
Oli	function.	Enabled	Enables this function.
USB beep message	The warning tone can be	Disabled	Disables this function.
	activated/deactivated here.	Enabled	Enables this function.
USB stick default emulation	You can set how the USB device is to be used.	Auto	USB devices with fewer than 530MB of memory are simulated as floppy disk drives and other devices with larger capacities are simulated as hard drives.
		Hard disk	An HDD-formatted drive can be used as an FDD (e.g. zip drive) for starting the system.
USB mass storage reset delay	The waiting time that the USB device POST requires after the device start command can be set.  Note: The message "No USB mass storage device detected" is displayed if no USB memory device has been installed.	10 Sec, 20 Sec, 30 Sec, 40 Sec	Manually setting the value.

Table 291: 855GME (XTX) - advanced USB configuration - setting options

BIOS setting	Meaning	Setting options	Effect
USB mass storage device configuration	This is where the USB mass memory device is configured. Note: Is only visible when the "USB stick default emulation" function is set to AUTO.	Enter	Opens submenu See "USB mass storage device configuration" on page 457

Table 291: 855GME (XTX) - advanced USB configuration - setting options (cont.)

#### USB mass storage device configuration

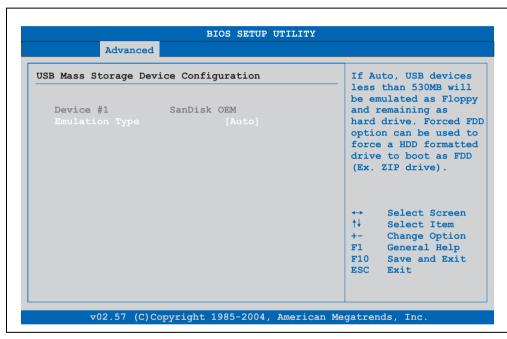


Figure 222: 855GME (XTX) USB mass storage device configuration

BIOS setting	Meaning	Setting options	Effect
Emulation type	Emulation type With this option, the device to be plugged into the USB interface can be selected.	Auto	Automatic selection of the function.
		Floppy	Using a floppy disk drive.
		Forced FDD	A hard disk image is connected as a floppy image. Functions only in the FAT12, FAT16 or FAT32 formats.
		Hard disk	Using a hard disk
		CDROM	Using a CD-ROM drive, it is assumed as 'bootable'.

Table 292: 855GME (XTX) USB mass storage device configuration

## **Keyboard/mouse configuration**

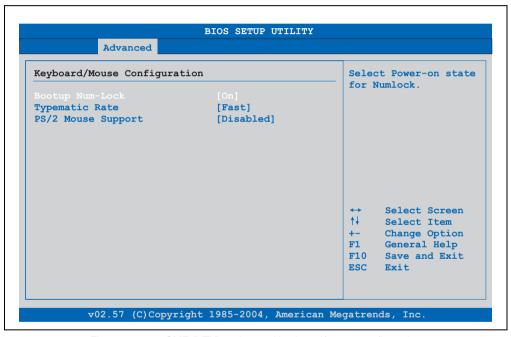


Figure 223: 855GME (XTX) - advanced keyboard/mouse configuration

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

Table 293: 855GME (XTX) - advanced keyboard/mouse configuration - setting options

# Chapter 4

# Software • Automation PC 620 with BIOS

BIOS setting	Meaning	Setting options	Effect
PS/2 mouse	Sets whether the PS/2 mouse port should be activated.	Disabled	Disables this function.
support		Enabled	Enables this function.
		Auto	Automatic activation of the function if PS/2 mouse port is supported.

Table 293: 855GME (XTX) - advanced keyboard/mouse configuration - setting options

## **Remote access configuration**

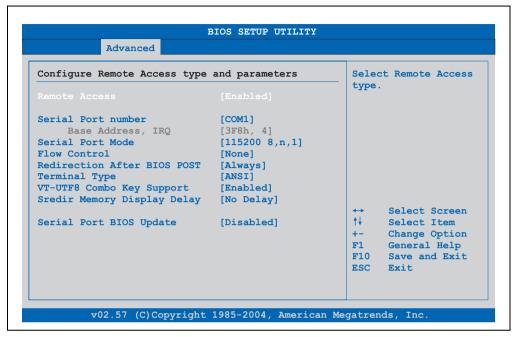


Figure 224: 855GME (XTX) - advanced remote access configuration

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

Table 294: 855GME (XTX) - advanced remote access configuration - setting options

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

Table 294: 855GME (XTX) - advanced remote access configuration - setting options (cont.)

#### **CPU** board monitor

# Information:

The displayed temperature and voltage values (e.g. CPU temperature, core voltage, battery voltage) on this BIOS Setup page represent uncalibrated information values. These cannot be used to draw any conclusions about any hardware alarms or error conditions. The hardware components used have automatic diagnostics functions that can be applied in the event of error.

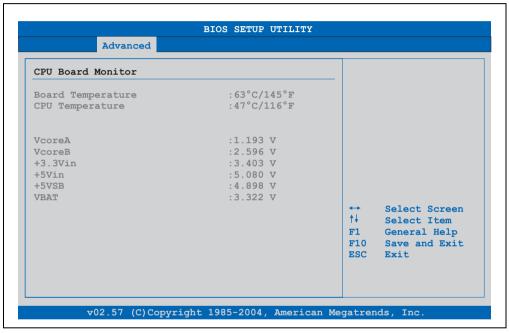


Figure 225: 855GME (XTX) - advanced CPU board monitor

BIOS setting	Meaning	Setting options	Effect
Board temperature	Displays the selected panel's temperature (in degrees Celsius and Fahrenheit).	None	-
CPU temperature	Displays the processor's temperature (in degrees Celsius and Fahrenheit).	None	-
VcoreA	Displays the processor's core voltage (in volts).	None	-
VcoreB	Displays the DDR's core voltage (in volts).	None	-

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

BIOS setting	Meaning	Setting options	Effect
+3.3Vin	Displays the current voltage of the 3.3 volt supply.	None	-
+5Vin	Displays the current voltage of the 5 volt supply.	None	-
+5VSB	Displays the current level of the jumper.	None	-
VBAT	Displays the battery voltage (in volts).	None	-

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

#### **Baseboard/panel features**

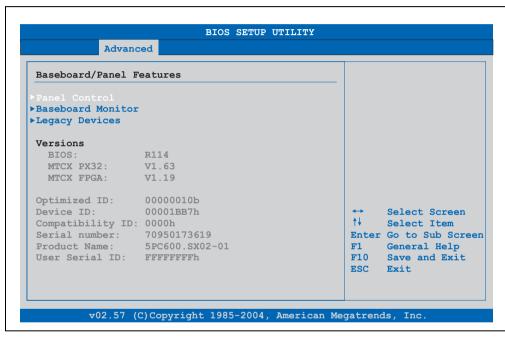


Figure 226: 855GME (XTX) - advanced baseboard/panel features

BIOS setting	Meaning	Setting options	Effect
Panel control	Special settings for connected panels (display units) can be made here.	Enter	Opens submenu See "Panel control" on page 464
Baseboard monitor	Displays different temperature values and fan speeds.	Enter	Opens submenu See "Baseboard monitor" on page 465
Legacy devices	Special settings for the interface can be changed here.	Enter	Opens submenu See "Legacy devices" on page 467
BIOS	Displays the BIOS version.	None	-

Table 296: 855GME (XTX) - advanced baseboard/panel features - setting options

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

Table 296: 855GME (XTX) - advanced baseboard/panel features - setting options (cont.)

### Panel control

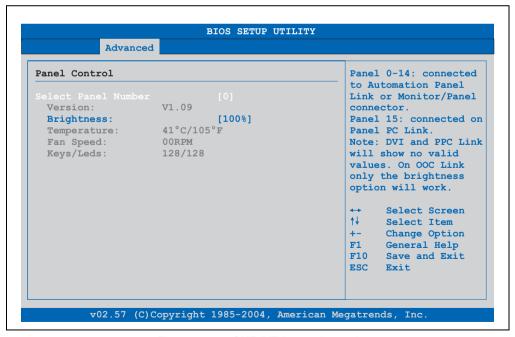


Figure 227: 855GME (XTX) - panel control

BIOS setting	Meaning	Setting options	Effect
Select panel number	Selection of the panel number for which the values should be read out and/or changed.	015	Selection of panel 0 15. Panel 15 is specifically intended for panel PC 700 systems.
Version	Display of the firmware version of the SDLR controller.	None	-
Brightness	For setting the brightness of the selected panel.	00%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%	For setting the brightness (in %) of the selected panel. Changes take effect after saving and restarting the system (e.g. by pressing <f10>).</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 297: 855GME (XTX) - panel control - setting options

## **Baseboard monitor**

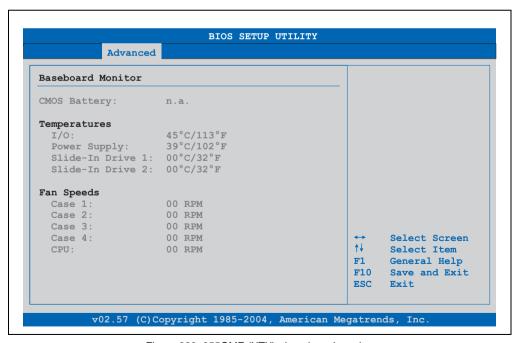


Figure 228: 855GME (XTX) - baseboard monitor

BIOS setting	Meaning	Setting options	Effect
CMOS battery	Displays the battery status.  N/A - not available, either MTCX does not support the firmware (starting with these versions "Baseboard/panel features" on page 463) or the hardware is too old.  Good - battery ok.  Bad - battery is damaged.	None	
1/0	Displays the temperature of the I/O area in degrees Celsius and Fahrenheit.	None	
Power supply	Displays the temperature in the power supply area in degrees Celsius and Fahrenheit.	None	-
Slide-in drive 1	Displays the temperature of the slide-in drive 25.40 mm degrees Celsius and Fahrenheit.	None	-
Slide-in drive 2	Displays the temperature of the slide-in drive 5.08 cm degrees Celsius and Fahrenheit.	None	
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	-
СРИ	Displays the fan speed of the processor fan.	None	-

Table 298: 855GME (XTX) - baseboard monitor setting options

## Legacy devices

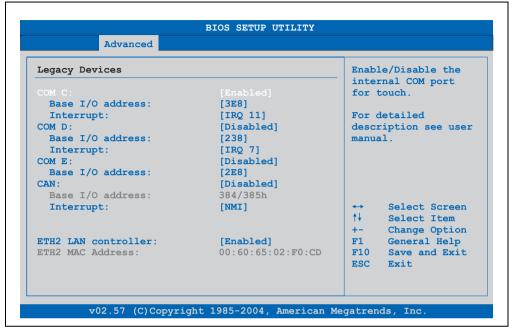


Figure 229: 855GME (XTX) - Legacy devices

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

Table 299: 855GME (XTX) - Legacy devices - setting options

BIOS setting	Meaning	Setting options	Effect
Base I/O address	Selection of the base I/O address for the COM D port. A conflict with another device is marked with a yellow "star".	238, 328, 338	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM D port. A conflict with another device is marked with a yellow "star".	IRQ 5, IRQ 6, IRQ 7, IRQ 12	Selected interrupt is assigned.
COM E	Configuration of the optional COM E port of a B&R add-on interface option	Disabled	Disables the interface.
	(IF option).	Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the COM E port. A conflict with another device is marked with a yellow "star".	2E8, 328, 338	Selected base I/O address is assigned.
Interrupt	Selection of the interrupt for the COM E port. A conflict with another device is marked with a yellow "star".	IRQ 5, IRQ 6, IRQ 10, IRQ 12	Selected interrupt is assigned.
CAN	Configuration of the CAN port of a B&R	Disabled	Disables the interface.
	add-on CAN interface card (IF option).	Enabled	Enables the interface.
Base I/O address	Selection of the base I/O address for the CAN port.	None	-
Interrupt	Selection of the interrupt for the CAN port. A conflict with another device is marked with a yellow "star".	IRQ 10 and NMI	Selected interrupt is assigned.
ETH2 LAN	For turning the onboard LAN controller	Disabled	Disables the controller.
controller	(ETH2) on and off.	Enabled	Enables the controller.
ETH2 MAC Address	Displays the Ethernet 2 controller MAC address.	None	-

Table 299: 855GME (XTX) - Legacy devices - setting options (cont.)

### 1.3.6 Boot

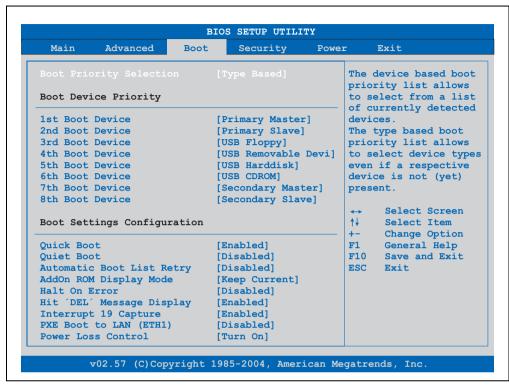


Figure 230: 855GME (XTX) - boot menu

BIOS setting	Meaning	Setting options	Effect
Boot priority	The priority for when the drives should be	Device based	Selection from a list of determined equipment.
selection	booted can be set here.	Type based	Allows the selection of unavailable equipment.
1st boot device	The boot drive can be set using this	Disabled, primary	Selecting the desired function.
2nd boot device	option.	master, primary slave, secondary master, secondary slave, Legacy floppy, USB floppy, USB	
3rd boot device			
4th boot device	1	harddisk, USB CDROM,	
5th boot device		USB removable device, onboard LAN (ETH1),	
6th boot device		external LAN, PCI mass	
7th boot device		storage PCI SCSI card, any PCI	
8th boot device		BEV device, onboard PCI SATA, third master third slave	

Table 300: 855GME (XTX) Boot menu - setting options

BIOS setting	Meaning	Setting options	Effect
Quick boot	This function reduces the boot time by	Disabled	Disables this function.
	skipping lines.	Enabled	Enables this function.
Quiet boot	Determines if POST message or OEM	Disabled	POST message display.
	logo is displayed.	Enabled	OEM logo display instead of POST message.
Automatic boot list	With this option, the operating system	Disabled	Disables this function.
retry	automatically restarts following startup failure.	Enabled	Enables this function.
AddOn ROM	Sets the display mode for the ROM	Force BIOS	An additional BIOS part can be displayed.
display mode	(during the booting procedure).	Keep current	BIOS information is displayed.
Hold on errors	This option sets whether the system should pause the Power On Self Test (POST) when it encounters an error.	Disabled	The system does not pause. All errors are ignored.
		Enabled	The system pauses. The system pauses every time an error is encountered.
Hit 'DEL' Message	Settings can be made here for the "Hit 'DEL' Message" display.  Note:  When quiet boot is activated the message is not displayed.	Disabled	The message is not displayed.
Display		Enabled	The message is displayed.
Interrupt 19	This function can be used to incorporate	Disabled	Disables this function.
capture	the BIOS interrupt.	Enabled	Enables this function.
PXE boot to LAN	Activating/Deactivating the function to	Disabled	Disables this function.
(ETH1)	boot from LAN.	Enabled	Enables this function.
Power loss control	Determines if the system is on/off following power loss.	Remain off	Remains off.
		Turn on	Powers on.
		Last state	Enables the previous state.

Table 300: 855GME (XTX) Boot menu - setting options (cont.)

### 1.3.7 Security

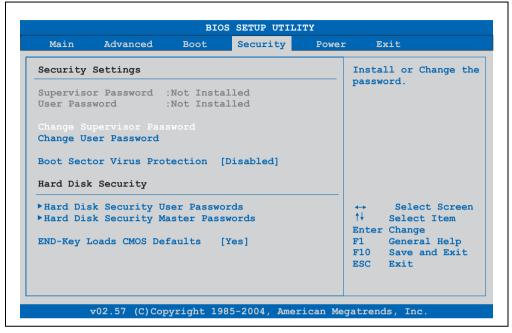


Figure 231: 855GME (XTX) - security menu

BIOS setting	Meaning	Setting options	Effect
Supervisor password	Displays whether or not a supervisor password has been set.	None	-
User password	Displays whether or not a user password has been set.	None	-
Change supervisor password	To enter/change a supervisor password. A supervisor password is necessary to edit all BIOS settings.	Enter	Enter password.
Change user password	To enter/change a user password. A user password allows the user to edit only certain BIOS settings.	Enter	Enter password.
Boot sector virus	With this option, a warning is issued when	Disabled	Disables this function.
protection	the boot sector is accessed through a program or virus. Note: With this option, only the boot sector is protected, not the entire hard drive.	Enabled	Enables this function.
Hard disk security user password	The hard disk security user password can be created here.	Enter	Opens submenu See "Hard disk security user password" on page 472

Table 301: 855GME (XTX) - security menu - setting options

BIOS setting	Meaning	Setting options	Effect
Hard disk security master password	The hard disk security master password can be created here.	Enter	Opens submenu See "Hard disk security master password" on page 473
END-key loads	Using this function, CMOS can be loaded	Yes	Enables this function.
CMOS defaults	by pressing the END key during POST.	No	Disables this function.

Table 301: 855GME (XTX) - security menu - setting options (cont.)

### Hard disk security user password

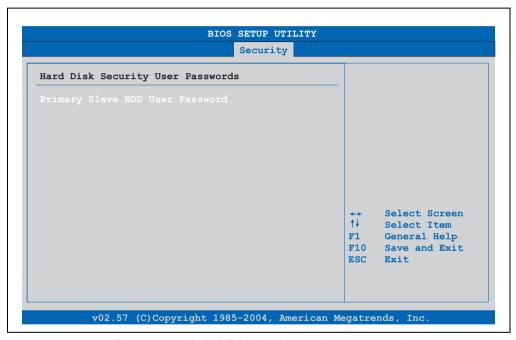


Figure 232: 855GME (XTX) Hard disk security user password

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

Table 302: 855GME (XTX) Hard disk security user password

## Hard disk security master password

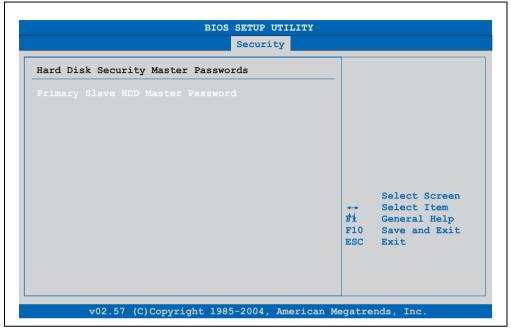


Figure 233: 855GME (XTX) Hard disk security master password

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

Table 303: 855GME (XTX) Hard disk security master password

#### 1.3.8 Power



Figure 234: 855GME (XTX) - power menu

BIOS setting	Meaning	Setting options	Effect
Power	This option switches the APM function on	Disabled	Disables this function.
management/APM	or off. This is an advanced plug & play and power management functionality.	Enabled	Enables this function.
Video power down	This option allows you to set the energy	Disabled	Do not switch off the monitor.
mode	saving mode for the monitor.	Standby	Monitor goes to standby mode.
		Suspend	Monitor goes to suspend mode.
Hard disk power	This option allows you to set the energy saving mode for the hard drive.	Disabled	Do not switch off the hard drive.
down mode		Standby	Monitor goes to standby mode.
		Suspend	Hard drive goes to suspend mode.
Standby time out	Using this option, you can configure how	Disabled	Disables this function.
	long the system stays inactive until standby mode is executed.	1 min, 2 min, 4 min, 8 min, 10 min, 20 min 30 min, 40 min;	Manually setting the value.

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

BIOS setting	Meaning	Setting options	Effect
Suspend time out	Using this option, you can configure how	Disabled	Disables this function.
	long the system stays inactive (all components but the CPU are shut off, if possible) before entering suspend mode.	1 min, 2 min, 4 min, 8 min, 10 min, 20 min 30 min, 40 min, 50 min, 60 min;	Manually setting the value.
Keyboard & PS/2 mouse	The monitoring of activities during power saving mode is determined here.	MONITOR	Keyboard or PS/2 mouse activities return the system to its normal state from a particular energy saving mode.
		IGNORE	Activities are ignored.
FDC/LPT/COM ports	The monitoring of activities during power saving mode is determined here.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Primary master IDE	This option is used to determine whether or not BIOS monitors the activities of these components.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Primary slave IDE	This option is used to determine whether or not BIOS monitors the activities of these components.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Secondary master IDE	This option is used to determine whether or not BIOS monitors the activities of these components.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Secondary slave IDE	This option is used to determine whether or not BIOS monitors the activities of these components.	MONITOR	Activities in the IRQ of specific connections or devices return the system to its normal state from power saving mode.
		IGNORE	Activities are ignored.
Power button mode	This function determines the function of	On/Off	Power button switches on/off.
	the power button.	Suspend	Power button switches power saving mode on.
Resume on ring	When the modem receives an incoming call, the PC is brought out of power saving mode.	Disabled	Disables this function.
		Enabled	Enables this function.
Resume on PME#	With this option, you can switch the PME wakeup function on or off.	Disabled	Disables this function.
		Enabled	Enables this function.
alarm and enter the date and	With this option, you can activate the alarm and enter the date and time for the	Disabled	Disables this function.
	system start.	Enabled	Enables this function.

Table 304: 855GME (XTX) power menu - setting options (cont.)

BIOS setting	Meaning	Setting options	Effect
RTC alarm date	Setting the date for the system start.  Note: Setting with "+"/"-".	Every day	System starts daily.
(days)		01-31	System start takes place on the manually set date.
System time	Setting the time for the system start.	Changing the time	Individually setting the system time in (hh:mm:ss) format. (hh:mm:ss).

Table 304: 855GME (XTX) power menu - setting options (cont.)

### 1.3.9 Exit

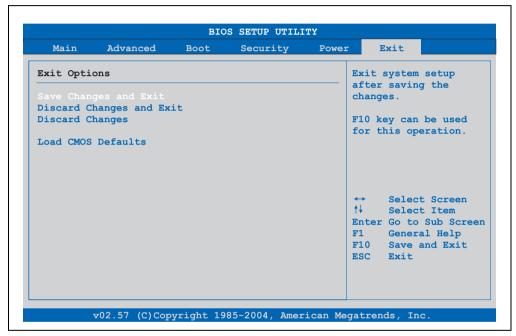


Figure 235: 855GME (XTX) - Exit menu

BIOS setting	Meaning	Setting options	Effect
Save changes and exit	This item closes BIOS setup. Changes made are saved in CMOS after confirmation, and the system is rebooted.	OK / cancel	
Discard changes and exit	This item closes BIOS setup. without saving the changes made. The system is then rebooted.	OK / cancel	

Table 305: 855GME (XTX) Exit menu - setting options

# Chapter 4 Software

# Software • Automation PC 620 with BIOS

BIOS setting	Meaning	Setting options	Effect
Discard changes	If it is not known which changes have been made, these can be restored as long as they have not been saved.	OK / cancel	
Load CMOS defaults	This item loads the CMOS default values, which are defined by the DIP switch settings. These settings are loaded for all BIOS configurations.	OK / cancel	

Table 305: 855GME (XTX) Exit menu - setting options (cont.)

### 1.3.10 Profile overview - BIOS default settings - 855GME (XTX)

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

DIP switch position see Section 1.9 "Location of the DIP switch in APC620 system units" on page 509).



Figure 236: DIP switch on system unit

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

		DIP switch setting							
Number	Optimized for	1	2	3	4	5	6	7 <sup>1)</sup>	8 <sup>1)</sup>
Profile 0	Automation PC 620 system units 5PC600.SX01-00.	Off	Off	Off	Off	Off	Off	-	-
Profile 1	Reserved	On	Off	Off	Off	Off	Off	-	-
Profile 2	Automation PC 620 system units 5PC600.SX02-00, 5PC600.SX02-01, 5PC600.SF03-00, 5PC600.SX05-00 and 5PC600.SX05-01.	Off	On	Off	Off	Off	Off	-	-
Profile 3	Panel PC 700 system unit 5PC720.1043-00, 5PC720.1214-00, 5PC720.1505-00, 5PC720.1706-00, 5PC720.1906-00, 5PC781.1043-00, 5PC781.1505-00 and 5PC782.1043-00.	On	On	Off	Off	Off	Off	-	-
Profile 4	Panel PC 700 system unit 5PC720.1043-01, 5PC720.1214-01, 5PC720.1505-01 and 5PC720.1505-02.	Off	Off	On	Off	Off	Off	-	-
Profile 5	Automation PC 620 embedded system units 5PC600.SE00-00 und 5PC600.SE00-01	On	Off	On	Off	Off	Off	-	-

Table 306: 855GME (XTX) - profile overview

### 1) Reserved

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

# Personal settings

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

### Main

Main	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
System time	-	-	-	-	-	-	
System date	-	-	-	-	-	-	
BIOS ID	-	-	-	-	-	-	
Processor	-	-	-	-	-	-	
CPU frequency	-	-	-	-	-	-	
System memory	-	-	-	-	-	-	
Product revision	-	-	-	-	-	-	
Serial number	-	-	-	-	-	-	
BC Firmware rev.	-	-	-	-	-	-	
Mac address (ETH1)	-	-	-	-	-	-	
Boot counter	-	-	-	-	-	-	
Running times	-	-	-	-	-	-	

Table 307: 855GME (XTX) - main - profile setting overview

### **Advanced**

## **ACPI** settings

ACPI settings	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
ACPI Aware O/S	Yes	Yes	Yes	Yes	Yes	Yes	
ACPI 2.0 features	No	No	No	No	No	No	
ACPI APIC support	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Active cooling trip point	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Passive cooling trip point	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Critical trip point	105	105	105	105	105	105	
Watching ACPI	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	
GPE1 function	No function	No function	No function	No function	No function	No function	
GPE2 function	No function	No function	No function	No function	No function	No function	

Table 308: 855GME (XTX) - advanced profile setting options

## PCI configuration

PCI configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Plug & Play O/S	Yes	No	Yes	Yes	Yes	Yes	
PCI latency timer	64	64	64	64	64	64	
Allocate IRQ to PCI VGA	Yes	Yes	Yes	Yes	Yes	Yes	
Allocate IRQ to SM-BUS HC	Yes	Yes	Yes	Yes	Yes	No	
PIRQ A (UHCI1+VGA)	Auto	Auto	Auto	Auto	Auto	Auto	
PIRQ B (INTD+AC97+SMBus)	Auto	Auto	Auto	Auto	Auto	7	
PIRQ C (INTC+UHCI3+NATA)	Auto	Auto	Auto	Auto	Auto	Auto	
PIRQ D (UHCI2)	Auto	Auto	Auto	Auto	Auto	Auto	
PIRQ E (Onboard ETH1 LAN)	Auto	Auto	Auto	Auto	Auto	Auto	
PIRQ F (INTA+ETH2 LAN)	Auto	Auto	Auto	Auto	Auto	5	
PIRQ G (INTB)	Auto	Auto	Auto	Auto	Auto	6	
PIRQ H (EHCI)	Auto	Auto	Auto	Auto	Auto	Auto	
1st Exclusive PCI IRQ	•	-	•	-	-	5	
2nd Exclusive PCI IRQ	-	-	-	-	-	6	
3rd exclusive PCI IRQ	-	-	-	-	-	7	

Table 309: 855GME - (XTX) PCI configuration - profile setting overview

# **Graphics configuration**

Graphics configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Graphics engine 1	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Default flat panel	Auto-EDID	Auto-EDID	Auto-EDID	Auto-EDID	Auto-EDID	Auto-EDID	
Graphics driver EDID support	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Flat panel scaling	Stretched	Stretched	Stretched	Stretched	Stretched	Stretched	
Graphics engine 2	Enabled	Enabled	Enabled	Enabled	Enabled	Disabled	
Graphics engine	Graphics engine 1	Graphics engine 1	Graphics engine 1	Graphics engine 1	Graphics engine 1	Graphics engine 1	
Boot graphics device	Auto	Auto	Auto	Auto	Auto	Auto	
Graphics memory size	Enabled, 8MB	Enabled, 8MB	Enabled, 8MB	Enabled, 8MB	Enabled, 8MB	Enabled, 8MB	
Init. Graphic adapter priority	PCI/Int-VGA	PCI/Int-VGA	PCI/Int-VGA	PCI/Int-VGA	PCI/Int-VGA	PCI/Int-VGA	
Graphics aperture size	64MB	64MB	64MB	64MB	64MB	64MB	
DVI HotPlug persistence	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	

Table 310: 855GME - (XTX) Graphics configuration - profile setting overview

## **CPU** configuration

CPU configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Manufacture:	-	-	-	-	-	-	
Brand string	-	-	-	-	-	-	
Frequency	-	-	-	-	-	-	
FSB speed		-	-	-	-	-	
L1 cache	-	-	-	-	-	-	
L2 cache	-	-	-	-	-	-	
Intel (R) SpeedStep (tm) tech	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	
Max. CPU frequency	-	-	-	-	-	-	

Table 311: 855GME - (XTX) CPU configuration - profile setting overview

### **Chipset configuration**

Chipset configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
IOAPIC	Disabled	Enabled	Disabled	Disabled	Disabled	Disabled	
APIC ACPI SCI IRQ	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 312: 855GME - (XTX) Chipset configuration - profile setting overview

# I/O interface configuration

I/O interface configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
OnBoard AC97 audio	Enabled	Enabled	Enabled	Enabled	Enabled	Disabled	
OnBoard LAN (ETH1)	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Serial port 1 configuration	3F8/IRQ4	3F8/IRQ4	3F8/IRQ4	3F8/IRQ4	3F8/IRQ4	3F8/IRQ4	
Serial port 2 configuration	2F8 / IRQ3	2F8 / IRQ3	2F8 / IRQ3	2F8 / IRQ3	2F8 / IRQ3	2F8 / IRQ3	
Serial port 2 mode	Normal	Normal	Normal	Normal	Normal	Normal	
Parallel port address	378	378	378	378	378	378	

Table 313: 855GME (XTX) - I/O interface configuration - profile settings overview

# **Clock configuration**

Clock configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Spread spectrum	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Unused PCI slot clocks	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	

Table 314: 855GME - (XTX) Clock configuration - profile setting overview

# **IDE** Configuration

IDE Configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
OnBoard PCI IDE controller	Primary	Both	Both	Primary	Both	Primary	
Onboard PCI IDE operate mode	Legacy mode	Legacy mode	Legacy mode	Legacy mode	Legacy mode	Legacy mode	
Hard disk write protect	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
IDE detect time out (Sec)	35	35	35	35	35	35	
ATA(PI) 80 pin cable detection	Host & device	Host & device	Host & device	Host & device	Host & device	Host & device	
Primary IDE master							
Туре	Auto	Auto	Auto	Auto	Auto	Auto	
LBA/Large mode	Auto	Auto	Auto	Auto	Auto	Auto	
Block (multi-sector transfer)	Auto	Auto	Auto	Auto	Auto	Auto	
PIO mode	Auto	Auto	Auto	Auto	Auto	Auto	
DMA mode	Auto	Auto	Auto	Auto	Auto	Auto	
S.M.A.R.T.	Auto	Auto	Auto	Auto	Auto	Auto	
32Bit data transfer	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Primary IDE slave							
Туре	Auto	Auto	Auto	Auto	Auto	Auto	
LBA/Large mode	Auto	Auto	Auto	Auto	Auto	Auto	
Block (multi-sector transfer)	Auto	Auto	Auto	Auto	Auto	Auto	
PIO mode	Auto	Auto	Auto	Auto	Auto	Auto	
DMA mode	Auto	Auto	Auto	Auto	Auto	Auto	
S.M.A.R.T.	Auto	Auto	Auto	Auto	Auto	Auto	
32Bit data transfer	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Secondary IDE master							
Туре	Auto	Auto	Auto	Auto	Auto	Auto	
LBA/Large mode	Auto	Auto	Auto	Auto	Auto	Auto	
Block (multi-sector transfer)	Auto	Auto	Auto	Auto	Auto	Auto	
PIO mode	Auto	Auto	Auto	Auto	Auto	Auto	
DMA mode	Auto	Auto	Auto	Auto	Auto	Auto	
S.M.A.R.T.	Auto	Auto	Auto	Auto	Auto	Auto	
32Bit data transfer	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Secondary IDE slave							
Туре	Auto	Auto	Auto	Auto	Auto	Auto	
LBA/Large mode	Auto	Auto	Auto	Auto	Auto	Auto	

Table 315: 855GME - (XTX) IDE configuration - profile setting overview

Secondary IDE slave	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Block (multi-sector transfer)	Auto	Auto	Auto	Auto	Auto	Auto	
PIO mode	Auto	Auto	Auto	Auto	Auto	Auto	
DMA mode	Auto	Auto	Auto	Auto	Auto	Auto	
S.M.A.R.T.	Auto	Auto	Auto	Auto	Auto	Auto	
32Bit data transfer	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	

Table 315: 855GME - (XTX) IDE configuration - profile setting overview

# **USB** configuration

USB configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
USB function	4 USB ports	4 USB ports	4 USB ports	4 USB ports	4 USB ports	6 USB ports	
Legacy USB support	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
USB keyboard legacy support	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
USB mouse legacy support	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
USB storage device support	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Port 64/60 emulation	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
USB 2.0 controller	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
USB 2.0 controller mode	HiSpeed	HiSpeed	HiSpeed	HiSpeed	HiSpeed	HiSpeed	
BIOS EHCI hand-off	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
USB beep message	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
USB stick default emulation	Hard disk	Hard disk	Hard disk	Hard disk	Hard disk	Hard disk	
USB mass storage reset delay	20 Sec	20 Sec	20 Sec	20 Sec	20 Sec	20 Sec	

Table 316: 855GME - (XTX) USB configuration - profile setting overview

## Keyboard/mouse configuration

Keyboard/mouse configuration	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Bootup Num-lock	On	On	On	On	On	On	
Typematic rate	Fast	Fast	Fast	Fast	Fast	Fast	
PS/2 mouse support	Disabled	Enabled	Disabled	Disabled	Disabled	Disabled	

Table 317: 855GME (XTX) - keyboard/mouse configuration - profile setting overview

# Remote access configuration

Remote access	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
configuration							

Table 318: 855GME - (XTX) remote access configuration - profile setting overview

Remote access	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Serial port BIOS update	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 318: 855GME - (XTX) remote access configuration - profile setting overview

## CPU board monitor

CPU board monitor	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Board temperature	-	-	-	-	-	-	
CPU temperature	-	-	-	-	-	-	
VcoreA	-	-		-	-	-	
VcoreB	-	-	-	-	-	-	
+3.3Vin	-	-	-	-	-	-	
+5Vin	-	-		-	-	-	
+5VSB	-	-	-	-	-	-	
VBAT	-	-	-	-	-	-	

Table 319: 855GME (XTX) - CPU board monitor - profile setting overview

# Baseboard/panel features

Baseboard/panel features	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Panel control							
Select panel number		-	-	-	-	-	
Version	-	-	-	-	-	-	
Brightness	100	100	100	100	100	100	
Temperature		-	-	-	-	-	
Fan speed		-	-	-	-	-	
Keys/LEDs	-	-	-	-	-	-	
Baseboard monitor							
CMOS battery	-	-	-	-	-	-	
I/O	-	-	-	-	-	-	
Power supply	-	-	-	-	-	-	
Slide-in drive 1	-	-	-	-	-	-	
Slide-in drive 2	-	-	-	-	-	-	
Case 1	-	-	-	-	-	-	
Case 2	-	-	-	-	-	-	
Baseboard monitor							Personal settings
Case 3	-	-	-	-	-	-	
Case 4		-	-	-	-	-	

Table 320: 855GME (XTX) - baseboard/panel features -profile setting overview

Legacy devices	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	
CPU	-	-	-	-	-	-	
COM C	Disabled	Enabled	Disabled	Enabled	Enabled	Disabled	
Base I/O address	-	3E8h	-	3E8h	3E8h	-	
Interrupt	-	11	-	11	11	-	
COM D	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address							
Interrupt							
COM E	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address							
Interrupt							
CAN	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Base I/O address							
Interrupt							
ETH2 LAN controller	Enabled	Enabled	Enabled	Enabled	Enabled	Disabled	
ETH2 MAC Address	-		-	-	-	-	
Versions							
BIOS	-		•	-	-	-	
MTCX PX32	-	ı	1	-	-	-	
MTCX FPGA	-	1	•	-	-	-	
Optimized ID	-	-	-	-	-	-	
Device ID	-	-	-	-	-	-	
Compatibility ID	-	-	-	-	-	-	
Serial number	-	-	-	-	-	-	
Product name	-	-	-	-	-	-	
User serial OD	-	-	-	-	-	-	

Table 320: 855GME (XTX) - baseboard/panel features -profile setting overview

### **Boot**

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

Table 321: 855GME (XTX) - boot - profile setting overview

# **Security**

Security	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Supervisor password	-	-	•	-	•	•	
User password	-	-	-	-	-	-	
Change supervisor password	-	-	-	-	-	-	
Change user password	-	-	-	-	-	-	
Boot sector virus protection	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Hard disk security user password	÷	÷	ē	÷	÷	ē	
Hard disk security master password	÷	÷	ē	÷	÷	ē	
END-key loads CMOS default	Yes	Yes	Yes	Yes	Yes	Yes	

Table 322: 855GME (XTX) - security - profile setting options

### **Power**

Power	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Personal settings
Power management/APM	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled	
Video power down mode	Suspend	Suspend	Suspend	Suspend	Suspend	Suspend	
Hard disk power down mode	Suspend	Suspend	Suspend	Suspend	Suspend	Suspend	
Standby time out	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Suspend time out	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Keyboard & PS/2 mouse	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	
FDC/LPT/COM ports	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	
Primary master IDE	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	
Primary slave IDE	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	
Secondary master IDE	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	
Secondary slave IDE	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	MONITOR	
Power button mode	On/Off	On/Off	On/Off	On/Off	On/Off	On/Off	
Resume on ring	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Resume on PME#	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	
Resume on RTC alarm	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	

Table 323: 855GME (XTX) - power - profile setting overview

# 1.4 BIOS Error signals (beep codes)

While the Automation PC 620 is booting, the following messages and errors can occur with BIOS. These errors are signaled by different beeping codes.

## 1.4.1 BIOS 815E (ETX) and 855GME (ETX)

Beeping code	Meaning	Necessary user action
1	Everything OK	-
1-2	1x long 2x short - checksum error in the ROM	BIOS updates
1-2-2-3	BIOS checksum error	BIOS updates.
1-3-1-1	Test DRAM refresh, DRAM module is not set properly.	Send industrial PC to B&R for checking.
1-3-1-3	Test 8742 keyboard controller, self test of the keyboard controller failed.	Send industrial PC to B&R for checking.
1-3-4-1	RAM error at address xxxx	Send industrial PC to B&R for checking.
1-3-4-3	RAM error at data bit xxxx, at the lowest bit of the memory bus	Send industrial PC to B&R for checking.
1-4-1-1	RAM error at data bit xxxx, at the highest bit of the memory bus	Send industrial PC to B&R for checking.
2-1-2-3	ROM copyright has an error	Send industrial PC to B&R for checking.
2-2-3-1	Unexpected interrupt	Check interrupt settings in BIOS.

Table 324: BIOS post code messages BIOS 815E (ETX) and 855GME (ETX)

### 1.4.2 BIOS 855GME (XTX)

Beeping code	Meaning	Necessary user action
1 x short	Memory refresh failed.	Load BIOS defaults. In the event that the error persists, send industrial PC to B&R for testing.
2 x short	Parity error: POST error (error in one of the hardware testing procedures)	Check the placement of the inserted card. In the event that the error persists, send industrial PC to B&R for testing.
3 x short	Base 64 KB memory failure: Basic memory defect, RAM error within the initial 64 KB.	Send industrial PC to B&R for checking.
4 x short	Timer not operational: System timer.	Send industrial PC to B&R for checking.
5 x short	Processor error: Processor defect.	Send industrial PC to B&R for checking.
6 x short	8042 gate A20 failure: Keyboard controller defect (block 8042/ A20 gate). Processor cannot switch to protected mode.	Send industrial PC to B&R for checking.
7 x short	Processor exception interrupt error: Virtual mode exception error (CPU generated an interrupt error.	Send industrial PC to B&R for checking.
8 x short	Display memory read/write error: Video memory not accessible; graphic card defect or not built in (no fatal error).	Check inserted graphic card position and eventually exchange. In the event that the error persists, send industrial PC to B&R for testing.
9 x short	ROM-checksum error: ROM-BIOS-checksum incorrect, EPROM, EEPROM or Flash-ROM component defect, BIOS defect or incorrectly updated.	Send industrial PC to B&R for checking.

Table 325: BIOS post code messages BIOS 855GME (XTX)

# Chapter 4

# Software • Automation PC 620 with BIOS

Beeping code	Meaning	Necessary user action
10 x short	CMOS shutdown register read/write error: CMOS cannot be read/written.	Send industrial PC to B&R for checking.
11 x short	Cache Error / external Cache bad: L2 - Cache on the mainboard is defected.	Send industrial PC to B&R for checking.

Table 325: BIOS post code messages BIOS 855GME (XTX) (cont.)

## 1.5 Distribution of resources

## 1.5.1 RAM address assignment

RAM address	Resource
000000h - 0003FFh	Interrupt vectors
000400h - 09FFFFh	MS-DOS program area
0A0000h - 0AFFFFh	VGA graphics
0B8000h - 0BBFFFh	VGA Text Mode
0C0000h - 0CFFFFh	VGA BIOS
0D0000h - 0CFFFFh	VGA BIOS freely available.
0E0000h - 0EBFFFh	USB
0E4000h - 0FFFFFh	System BIOS (Phoenix)
100000h -	SDRAM

Table 326: RAM address assignment

# 1.5.2 DMA channel assignment

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

Table 327: DMA channel assignment

<sup>1)</sup> Available if LPT is not being operated in ECP mode.

# 1.5.3 I/O address assignment

I/O address	Resource
000h - 01Fh	DMA controller 1
020h - 03Fh	Interrupt controller 1
040h - 05Fh	Timer
060h - 06Fh	Keyboard controller
070h - 071h	Real-time clock, NMI mask, CMOS
080h	Debug port (POST code)
081h - 09Fh	Page register - DMA controller
0A0h - 0BFh	Interrupt controller 2
0C0h - 0DFh	DMA controller 2
0F0h - 0FFh	FPU
170h - 177h	Secondary Hard Disk IDE channel
1F0h - 1F7h	Primary Hard Disk IDE channel
238h - 023F	COM5
278h - 27Fh	Hardware Security Key (LPT2)
2E8h - 2EFh	COM4
2F8h - 2FFh	COM2
376h - 376h	Secondary Hard Disk IDE channel
378h - 37Fh	LPT1 (printer connection)
384h - 385h	CAN controller
3B0h - 3BBh	VGA controller
3BCh - 3BFh	LPT3
3C0h - 3DFh	VGA controller
3E8h - 3EFh	COM3
3F6h - 3F6h	Primary Hard Disk IDE channel
3F0h - 3F7h	FDD controller
3F8h - 3FFh	COM1
LPT1 + 400h	ECP Port, LPT+400h
CF8h - CFBh	PCI config address register
CFCh - CFFh	PCI config data register
4100h - 417Fh	MTCX
FF00h - FF07h	IDE bus master register

Table 328: I/O address assignment

## 1.5.4 Interrupt assignments in PCI mode

IRQ		0	-	2	8	4	2	9	7	80	6	10	11	12	13	14	15	NMI	NONE
System	n timer	•																	
Keyboa	ard		•																
IRQ ca	scade			•															
COM1	(Serial port A)				0	•													
COM2	(Serial port B)				•	0													
LPT1					0	О	О	О	•		О	О	О	О		О			0
LPT2					0	О	О	О	О		О	0	О	О		О			•
LPT3					0	О	О	О	О		О	О	О	О		О			•
PS/2 m	nouse													•					
ACPI <sup>1)</sup>											•								
FDD								•											0
Real-tir	me clock									•									
Coproc	essor (FPU)														•				
Primar	y IDE channel															•			
Second	dary IDE el																•		
	COM3 (COM C)				0	0	0		О			0	0	О					•
B&R	COM4 (COM D)				0	0	0		0			0	0	0					•
	COM5 (COM E)				0	0	0		0			0	0	0					•
	CAN											О						0	•

Table 329: IRQ interrupt assignments in PCI mode

- ... Default setting
- O ... Optional setting

<sup>1)</sup> Advanced Configuration and Power Interface.

## 1.5.5 Interrupt assignments in APIC mode

A total of 23 IRQs are available in the APIC mode (Advanced Programmable Interrupt Controller). The activation of this option is only effective if it takes place before the operating system (Windows XP) is activated. There are then 23 IRQs available.

IRQ		0	-	2	3	4	2	9	7	8	6	10	11	12	13	14	15	16	17	18	19	70	21	22	23	IMN	NONE
System	timer	•																									
Keyboa	nrd		•																								
IRQ ca	scade			•																							
COM1 A)	(Serial port				0	•																					
COM2 B)	(Serial port				•	0																					
LPT1					0	0	0	0	•		О	0	О	О		О											0
LPT2					0	0	0	0	0		0	0	0	0		0											•
PS/2 m	ouse													•													
ACPI <sup>1)</sup>											•																
FDD								•																			0
Real-tir	ne clock									•																	
Coproc (FPU)	essor														•												
Primary channe																•											
Second	lary IDE I																•										
	COM3 (COM C)				0	0	0		0			0	0	О													•
B&R	COM4 (COM D)				0	0	0		0			0	0	0													•
	COM5 (COM E)				0	0	0		0			0	0	0													•
	CAN											О														О	•
PIRQ A	2)																	•									
PIRQ E																			•								
PIRQ C	; <sup>4)</sup>																			•							
PIRQ E	) <sup>5)</sup>																				•						
PIRQ E	6)																					•					
PIRQ F																							•				
PIRQ (	ì																							•			
PIRQ H	1 <sup>7)</sup>																								•		

Table 330: IRQ interrupt assignments in APIC mode

- 1) Advanced Configuration and Power Interface.
- 2) PIRQ A: for PCI; PCI IRQ line 1 + USB UHCI controller #1 + graphics controller.
- 3) PIRQ B: for PCI; PCI IRQ line 2 + AC97 Audio controller + SM Bus.
- 4) PIRQ C: for PCI; PCI RIQ line 3 + USB UHCI controller #3 + native IDE.
- 5) PIRQ D: for PCI; PCI IRQ line 4 + USB UHCI controller #2.
- 6) PIRQ E: LAN controller.
- 7) PIRQ H: USB EHCI controller.

### ... Default setting

### O ... Optional setting

The PCI resources are assigned to fixed IRQ lines when the APIC function is enabled. The following image shows the connections to the individual PCI slots.

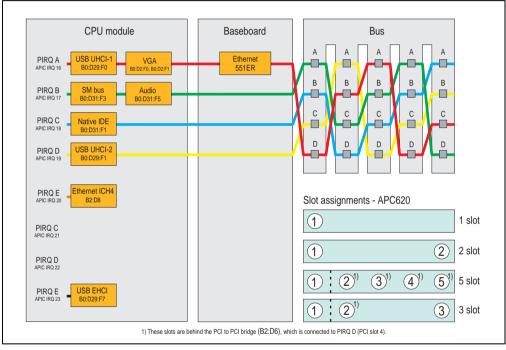


Figure 237: PCI routing with activated APIC CPU boards 815E (ETX), 855GME (ETX)

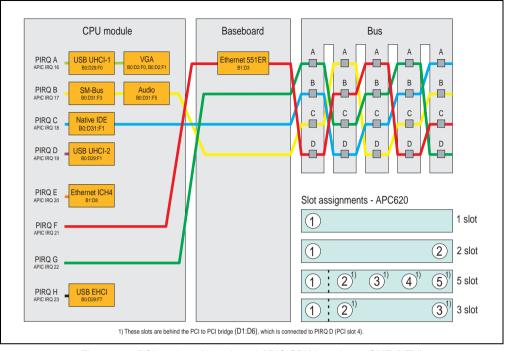


Figure 238: PCI routing with activated APIC CPU boards 855GME (XTX)

## 1.5.6 Inter-IC (I2C) bus

I <sup>2</sup> C address	Resource	Comment						
A0h	EEPROM	EEPROM for CMOS data - cannot be used						
B0h	Reserved	Cannot be used						
58h	Reserved	Cannot be used						

Table 331: Inter-IC (I2C) bus resources

## 1.5.7 System Management (SM) bus

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

Table 332: Inter-IC (I2C) bus resources

### 1.6 BIOS upgrade

# Warning!

The upgrade procedures described in the following pages must be carried out for all APC620 systems with software versions lower than those listed in the following table.

CPU board software	815E (ETX)	855GME (ETX)					
BIOS	< R017	< R007					
MTCX PX32 firmware	< V1.19	< V1.19					
MTCX FPGA firmware	< V1.06	< V1.06					

Table 333: CPU board software versions

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

Table 334: Automation panel link software versions

### 1.6.1 Requirements

The following peripheral devices are needed for a software upgrade:

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

### 1.6.2 What information do I need?

# Information:

Individually saved BIOS settings are deleted when upgrading the BIOS.

Before starting the upgrade, you should know the CPU board type (815E or 855GME) and the various software versions.

### Which CPU board do I have?

After switching on the APC620, the installed CPU board can be identified by the letters "B" and "C".

```
PhoenixBIOS 4.0 Release 6.1
Copyright 1985-2003 Phoenix Technologies Ltd.
All Rights Reserved
<IBRIR006> Bernecker + Rainer Industrie-Elektronic C1.00

FOR EVALUATION ONLY. NOT FOR RESALE.
Build Time: 09/09/04 03:15:22
CPU = Mobile Intel(R) Celeeron(TM) CPU 733MHz
59M System RAM Passed

Press <F2> to enter SETUP
```

Figure 239: Differentiating between 815E and 855GME CPU boards

Letter	CPU board	Model number
В	855GME (ETX)	5PC600.E855-00 5PC600.E855-01 5PC600.E855-02 5PC600.E855-03 5PC600.E855-04 5PC600.E855-05
С	815E (ETX)	5PC600.E815-00 5PC600.E815-02 5PC600.E815-03
E	855GME (XTX)	5PC600.X855-00 5PC600.X855-01 5PC600.X855-02 5PC600.X855-03 5PC600.X855-04 5PC600.X855-05

Table 335: Differentiating between 815E (ETX) and 855GME (ETX / XTX) CPU boards

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

This information can be found on the same BIOS setup page for both the 815E (ETX) and the 855GME (ETX / XTX)CPU boards:

- After switching on the APC620, you can get to the BIOS Setup by pressing "F2" or "DEL".
- From the BIOS main menu "advanced" (top), select "baseboard/panel features" (bottom):

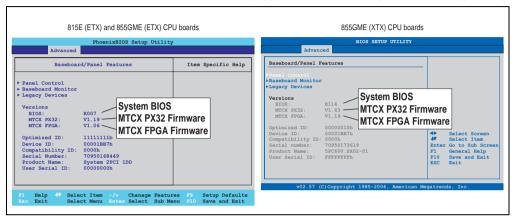


Figure 240: Software versions

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

This information can be found on the same BIOS setup page for both the 815E (ETX) and the 855GME (ETX / XTX)CPU boards:

- After switching on the APC620, you can get to the BIOS Setup by pressing "F2" or "DEL".
- From the BIOS main menu "advanced" (top), select "baseboard/panel features" (bottom) and then "panel control":

## Information:

The version can only be shown if an Automation Panel with Automation Panel Link SDL transceiver (5DLSDL.1000-01) and Automation Panel Link SDL receiver (5DLSDL.1000-00) is connected.

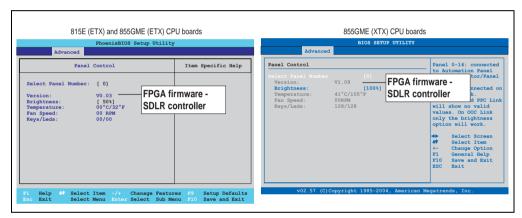


Figure 241: Firmware version of Automation Panel Link SDL transceiver/receiver

### 1.6.3 Upgrade BIOS for 815E (ETX)

- Download and unzip the zip file from the B&R homepage.
- Copy the files to an MS-DOS startup disk (information about creating a bootable disk can be found in section 1.8 "Creating a DOS boot diskette in Windows XP" on page 508).
- Place the diskette in the USB floppy drive and reboot the PPC700.
- The following boot menu will be shown after startup:
- 1. Upgrade PHOENIX BIOS for i815E (5PC600.E815-xx)
- 2. Exit to MS-DOS

### Concerning point 1:

BIOS is automatically upgraded (default after 5 seconds).

### Concerning point 2:

Return to the shell (MS-DOS).

• The system must be rebooted after a successful upgrade.

# Information:

When the system has rebooted, setup default values must be reloaded after the message, "System CMOS checksum bad" (press F1 or select "load setup defaults" in the BIOS setup "exit" menu). Afterwards, the time and date must be set again.

### 1.6.4 Upgrade BIOS for 855GME (ETX)

- Download and unzip the zip file from the B&R homepage.
- Copy the files to a MS-DOS startup disk or USB stick (see the section 1.8 "Creating a
  DOS boot diskette in Windows XP" on page 508 for information about creating a bootable
  disk or section "Creating a bootable USB flash drive" on page 620 about creating a
  bootable USB Memory stick).
- Insert the diskette in the USB floppy drive or the USB stick in the USB port and reboot the PPC700.
- The following boot menu will be shown after startup:
- 1. Upgrade PHOENIX BIOS for i855GME (5PC600.E855-xx)
- 2. Exit to MS-DOS

### Concerning point 1:

BIOS is automatically upgraded (default after 5 seconds).

### Concerning point 2:

Return to the shell (MS-DOS).

The system must be rebooted after a successful upgrade.

# Information:

When the system has rebooted, setup default values must be reloaded after the message, "System CMOS checksum bad" (press F1 or select "load setup defaults" in the BIOS setup "exit" menu).

Starting with BIOS version V1.15, the time and date no longer has to be set again after a BIOS upgrade (stays the same).

### 1.6.5 Upgrade BIOS for 855GME (XTX)

- Download and unzip the zip file from the B&R homepage.
- Copy the files to a MS-DOS startup disk or USB stick (see the section 1.8 "Creating a
  DOS boot diskette in Windows XP" on page 508 for information about creating a bootable
  disk or section "Creating a bootable USB flash drive" on page 620 about creating a
  bootable USB Memory stick).
- Insert the diskette in the USB floppy drive or the USB stick in the USB port and reboot the PPC700.
- The following boot menu will be shown after startup:
- 1. Upgrade PHOENIX BIOS for i855GME (5PC600.X855-xx)
- 2. Exit to MS-DOS

### Concerning point 1:

BIOS is automatically upgraded (default after 5 seconds).

### Concerning point 2:

Return to the shell (MS-DOS).

The system must be rebooted after a successful upgrade.

# Information:

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

### 1.6.6 Windows XP Embedded and BIOS upgrade

If the following error message appears after upgrading BIOS:

```
"Copy Error"
```

"Setup cannot copy the file Audio3d.dll"

then the audio driver must be reinstalled.

To do this, use the audio driver from the B&R Homepage (www.br-automation.com).

During the installation of the audio driver, the following 2 files must be manually selected from the following directories.

```
ksuser.dll in the directory ...\Windows\system32
```

ks.sys in the directory ...\Windows\system32\drivers

This applies to 815E and 855ME CPU boards.

In order to be able to set up all possible resolutions when using an 815E CPU board, the graphics driver must be reinstalled (see 4.2.1 "Installing the graphics driver for 815E (ETX) CPU boards").

### 1.7 Upgrading the firmware

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

### 1.7.1 Procedure

- Download and unzip the zip file from the B&R homepage.
- Copy the files to a MS-DOS startup disk (see the section 1.8 "Creating a DOS boot diskette in Windows XP" on page 508 for information about creating a bootable disk or Appendix A, section "Creating a bootable USB flash drive" on page 620 about creating a bootable USB Memory stick).
- Insert the diskette in the USB floppy drive or the USB stick in the USB port and reboot the APC620.
- The boot menu is shown after startup

## Information:

 The following boot menu options including descriptions are based on version 1.16 of the APC620 / Panel PC Firmware upgrade (MTCX, SDLR, SDLT) disk. In some cases, these descriptions might not match the version you are currently using.

### Boot menu options:

- 1. Upgrade MTCX (APC620/PPC700) PX32 and FPGA
- 2. Upgrade SDLT (APC620) only
- 3. Upgrade SDLR (AP800/AP900) on monitor/panel
  - 3.1 Upgrade SDLR on AP 0 (AP800/AP900)
  - 3.2 Upgrade SDLR on AP 1 (AP800/AP900)
  - 3.3 Upgrade SDLR on AP 2 (AP800/AP900)
  - 3.4 Upgrade SDLR on AP 3 (AP800/AP900)
  - 3.5 Upgrade all SDR (AP800/AP900)
  - 3.6 Return to main menu
- 4. Upgrade SDLR (AP800/AP900) on AP link slot
  - 4.1 Upgrade SDLR on AP 8 (AP800/AP900)
  - 4.2 Upgrade SDLR on AP 9 (AP800/AP900)

- 4.3 Upgrade SDLR on AP 10 (AP800/AP900)
- 4.4 Upgrade SDLR on AP 11 (AP800/AP900)
- 4.5 Upgrade all SDLR (AP800/AP900)
- 4.6 Return to main menu
- 5. Upgrade add-on UPS (firmware and battery settings)
  - 5.1 Upgrade add-on UPS firmware (5AC600.UPSI-00)
  - 5.2 Upgrade battery settings (5AC600.UPSB-00)
  - 5.3 Return to main menu
- 6. Exit

#### Concerning point 1:

Automatically upgrade PX32 and FPGA for MTCX (default after 5 seconds).

### Concerning point 2:

The FPGA of the SDLT controller on the AP Link slot is automatically updated.

### Concerning point 3:

A submenu is opened for upgrading the SDLR controller on the Monitor/Panel plug.

3.1. Upgrade SDLR on AP 0 (AP800/AP900)

The SDLR controller is automatically updated on Automation Panel 0.

3.2 Upgrade SDLR on AP 1 (AP800/AP900)

The SDLR controller is automatically updated on Automation Panel 1.

3.3 Upgrade SDLR on AP 2 (AP800/AP900)

The SDLR controller is automatically updated on Automation Panel 2.

3.4 Upgrade SDLR on AP 3 (AP800/AP900)

The SDLR controller is automatically updated on Automation Panel 3.

- 3.5. Upgrade all SDLR (AP800/AP900)
- All SDLR controllers are automatically updated on all Automation Panels on the Monitor/Panel.

(by default, after 5 seconds).

3.6. Return to main menu

Returns to the main menu.

### Concerning point 4:

A submenu is opened for upgrading the SDLR controller on the AP Link slot.

4.1. Upgrade SDLR on AP 8 (AP800/AP900)

The SDLR controller is automatically updated on Automation Panel 8.

#### Software • Automation PC 620 with BIOS

4.2. Upgrade SDLR on AP 9 (AP800/AP900)

The SDLR controller is automatically updated on Automation Panel 9.

4.3 Upgrade SDLR on AP 10 (AP800/AP900)

The SDLR controller is automatically updated on Automation Panel 10.

4.4 Upgrade SDLR on AP 11 (AP800/AP900)

The SDLR controller is automatically updated on Automation Panel 11.

4.5 Upgrade all SDLR (AP800/AP900)

All SDLR controllers are automatically updated on all Automation Panels on the AP Link slot (by default, after 5 seconds).

4.6 Return to main menu

Returns to the main menu.

### Concerning point 5:

The submenu for the add-on UPS firmware and upgrade and the battery settings upgrade is opened.

5.1. Upgrade add-on UPS firmware (5AC600.UPSI-00)

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

5.2. Upgrade battery settings (5AC600.UPSB-00)

The battery settings for 5AC600.UPSB-00 are automatically updated.

5.3 Return to main menu

Returns to the main menu.

Concerning point 6:

Return to the shell (MS-DOS).

# Information:

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

### 1.7.2 Possible upgrade problems and version dependencies

- 1. The SDLR firmware can only be updated if an Automation Panel with Automation Panel Link Transceiver (5DLSDL.1000-01) and Automation Panel Link Receiver (5DLSDL.1000-00) is connected. This update is only permitted in an office environment (clean environment no disturbances) because a software error in versions older than V0.03 can cause errors. This error can cause the Automation Panel to remain off after an update. If this error occurs, the Automation Panel Link Transceiver (5DLSDL.1000-01) or Automation Panel Link Receiver (5DLSDL.1000-00) must be exchanged or sent in for repair.
- 2. Daisy Chain operation of 2 Automation Panel 900 units is supported starting with SDLR version V00.08 or V01.01 and MTCX PX32 V01.33 and MTCX FPGA V01.11 (contents of the MTCX upgrade disk V01.04).

- 3. Operation of an SDLT adapter in the AP Link slot is supported starting with MTCX PX32 V01.50 and MTCX FPGA V01.12 (contents of the MTCX upgrade disk V01.07).
- 4. When using a functional SDL connection with an installed SDLR version V00.03 or lower, the SDLR must first be updated to version V00.05 or higher. Only then can the MTCX PX32 and FPGA be updated. If the MTCX PX32 and FPGA is updated first, then the SDLR firmware can no longer be updated.
- 5. Starting with SDLR version V00.05 or V01.01, the MTCX PX32 must be higher than or equal to V01.23 and the MTCX FPGA must higher than or equal to V01.09. Otherwise, full SDL functionality is not possible.
- 6. SDL with equalizer is first supported starting with SDLR version V01.04 and MTCX PX32 version V01.55 and MTCX FPGA version V01.15. An SDLT with version V00.02 is required on the AP Link slot (contents of the MTCX upgrade disk V01.10). SDL with equalizer allows longer distances (max. 40m) depending on the AP being used.
- 7. Automation Panel Link transceivers (5DLSDL.1000-01) or Automation Panel Link receivers (5DLSDL.1000-00) with a Firmware version lower than or equal to V00.10 can no longer be combined with Automation Panel Link transceivers (5DLSDL.1000-01) or Automation Panel Link receivers (5DLSDL.1000-00) with a Firmware higher than or equal to V01.04. Daisy Chain mode is not possible with such a combination.
- 8. If an APC620 add-on UPS (e.g. 5AC600.UPSI-00) + battery unit (e.g. 5AC600.UPSB-00) is connected to the system and operable, then after an upgrade of the MTCX or SDLT you must either disconnect the battery or push the Power button (to put the system in Standby mode), before executing the required power off/on. If not, the firmware upgrade will not work because the UPS buffers the system.
- 9. The menu items "3. Upgrade SDLR on Monitor/Panel" and "4. Upgrade SDLR on AP Link Slot" (starting with MTCX upgrade disk V01.13) for upgrading the Automation Panel 800 series have been expanded.
- 10. The ID AP8H was changed to SDL8 (AP800 series).
- 11. The menu item "5. Upgrade add-on UPS (firmware and battery settings)", starting with MTCX upgrade disk V01.16, has been inserted.
- 12. Starting with MTCX upgrade disk V01.16, all firmware files are equipped with an XML header; as a result, the name assignment has changed (compatible with Automation Studio and Automation Runtime).
- 13. If a UPS (e.g. 5AC600.UPSI-00) + battery unit (e.g. 5AC600.UPSB-00) is connected to the system and operable, then after an upgrade of the MTCX or SDLT you must either disconnect the battery or push the Power button (to put the system in Standby mode), before executing the required power off/on. If not, the firmware upgrade will not work because the UPS buffers the system.
- 14. Starting with UPS firmware V01.10, the APC620/PPC700 ADI driver + Control Center V01.80 should be used in order to configure the new options "configurable LowBatteryShutdownTime" and UL compliant "OverCurrentEnable".

### 1.8 Creating a DOS boot diskette in Windows XP

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

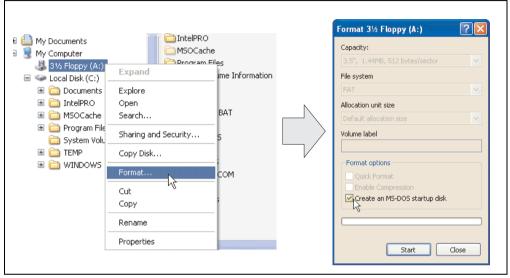


Figure 242: Creating a bootable diskette in Windows XP - step 1

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

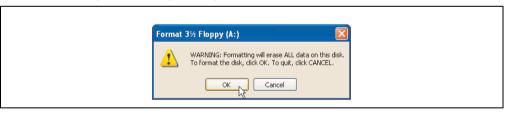


Figure 243: Creating a bootable diskette in Windows XP - step 2

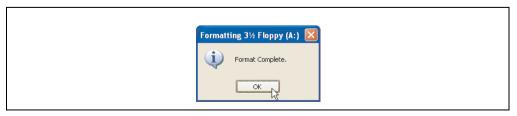


Figure 244: Creating a bootable diskette in Windows XP - step 3

After creating the startup disk, some of the files must be deleted because of the size of the update.

When doing this, all files (hidden, system files, etc.) must be shown on the diskette.

In Explorer, go to the "tools" menu, select "folder options..." and open the "view" tab - now deactivate the option "hide protected operating system files (recommended)" (activated as default) and deactivate the option "show hidden files and folders".

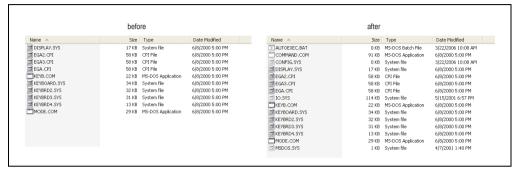


Figure 245: Creating a bootable diskette in Windows XP - step 4



Figure 246: Creating a bootable diskette in Windows XP - step 5

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

## 1.9 Location of the DIP switch in APC620 system units

# Warning!

The following procedure is only permitted with the power switched off and the supply voltage disconnected!

### Software • Automation PC 620 with BIOS

To get to the DIP switches, it is necessary to open the front cover. To do this, loosen the five Torx screws (T10) marked and pull the cover off towards the front. Then the DIP switches can be accessed at the location marked in yellow. The setting can now be made using a pointed object. If the system has a slide-in drive, it must be removed first to get to the DIP switches.

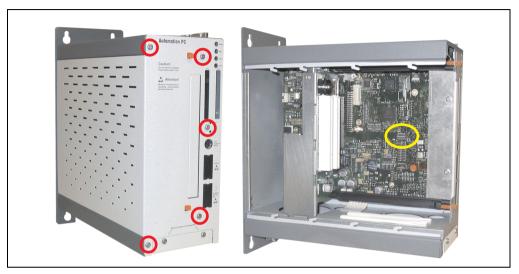


Figure 247: Location of DIP switch

### 2. Automation PC 620 with Automation Runtime

### 2.1 General information

An integral component of Automation Studio™ is Automation Runtime, the software kernel which allows applications to run on a target system. This runtime environment offers numerous important advantages:

- Guaranteed highest possible performance for the hardware being used
- Runs on all B&R target systems
- Makes the application hardware-independent
- Applications can be easily ported between B&R target systems
- Cyclic system guarantees deterministic behavior
- Configurable jitter tolerance in all task classes
- Supports all relevant programming language such as IEC 61131-3 and C
- Extensive function library conforming to IEC 61131-3 as well as the expanded B&R Automation library
- Integrated into Automation NET. Access to all networks and bus systems via function calls or the Automation Studio™ configuration

## 2.2 Support for Automation PC 620 embedded

### 2.2.1 AR010

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

### 2.2.2 AR106

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

### 2.3 Selection of devices

Power supply buffering of 10 ms is guaranteed starting with the following system unit revisions:

Model number	Description	Revision
5PC600.SX01-00	System 1 PCI	В0
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	В0
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	В0
5PC600.SF03-00	System 3 PCI, 1 disk drive slot, 1 AP Link slot	A0

Table 336: System unit support for buffering with Automation Runtime

## Software • Automation PC 620 with Automation Runtime

Model number	Description	Revision
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	A0
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	A0

Table 336: System unit support for buffering with Automation Runtime

## 3. Automation PC 620 with MS-DOS



Figure 248: Automation PC 620 with MS-DOS

Model number	Short description	Comment
9S0000.01-010	OEM MS-DOS 6.22 German (disk) OEM MS-DOS 6.22 German disks Only delivered with a new PC.	
9S0000.01-020	OEM MS-DOS 6.22 English (disk) OEM MS-DOS 6.22 English disks Only delivered with a new PC.	

Table 337: Model numbers - MS-DOS

## 3.1 Known problems

Either no drivers are available for the following hardware components or only with limitations:

- AC97 Sound no support
- USB 2.0 only USB 1.1 rates can be reached.
- Limited drive support for the slide-in drives 5AC600.DVDS-00 and 5AC600.DVRS-00 no write functions.
- "Graphics Engine 2" and therefore Extended Desktop mode also cannot be used.
- A few "ACPI control" BIOS functions cannot be used.

### Software • Automation PC 620 with MS-DOS

The following table shows the tested resolutions and color depths on the Monitor / Panel connector with 855GME CPU boards.

	Color depth		
Resolutions for DVI	8-bit	16-bit	24-bit
640 x 480	✓	/	1
800 x 600	✓	/	1
1024 x 768	✓	/	1
1280 x 1024	/	✓	/
		Color depth	
		Color depth	
Resolutions for RGB	8-bit	16-bit	24-bit
640 x 480	1	✓	✓
800 x 600	✓	✓	✓
1024 x 768	✓	1	1
1280 x 1024	✓	/	1
1600 x 1200	✓	/	1
1920 x 1440	/	/	

Table 338: Tested resolutions and color depths for DVI and RGB signals

## 4. Automation PC 620 with Windows XP Professional



Figure 249: Windows XP Professional Logo

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

Table 339: Model numbers - Windows XP Professional

### 4.1 Installation

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

### 4.1.1 FAQ

### How do I install Windows XP on systems with 815E CPU boards?

Windows XP can be installed on APC620 systems with 815E CPU boards **only** together with a connected **external monitor (RGB)**. An Automation Panel 900 is switched off in the Windows hardware recognition if connected via SDL or DVI during the installation. Video output via SDL and DVI is only supported after installing the 815E graphics driver.

### 4.2 Graphics drivers

For operation modes "extended desktop" and "dual display clone", the Intel Extreme graphics chip driver must be installed. Graphics drivers for 815E and 855GME CPU boards are available for approved operating systems in the download area (Service - Product Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (www.br-automation.com).

### 4.2.1 Installing the graphics driver for 815E (ETX) CPU boards

The following must be observed when installing the graphics chip driver for the graphics chip integrated in the 815E chip set:

- The driver available from Intel is NOT permitted to be used, only the driver available from B&R (www.br-automation.com).
- After unpacking the \*.zip file, the driver must be updated using the Windows Device Manager "Start - Control Panel - System - Hardware - Device Manager - Update Driver".
   When doing this, use the file i81xnt5.inf.
- The initial installation of the driver can only be carried out with an external monitor (RGB) connected. After successfully installing the B&R driver, an Automation Panel 900 be operated via SDL or DVI without problems.

## Caution!

Presently, this driver is only approved for the Windows XP Professional and Windows XP embedded operating systems.

## Information:

The following screenshots and descriptions refer to the graphics driver version 6.13.01.3175 for 815E CPU boards. Therefore, it is possible that the screenshots and descriptions might not correspond with the installed driver version.

After the driver is installed, it can be configured in the Control Panel (called up through the icon in the taskbar or Start - Control Panel - Display - Settings - Advanced).

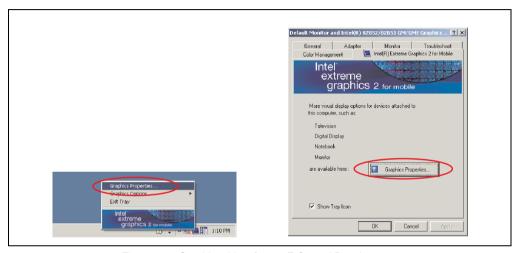


Figure 250: Graphics driver for 815E Control Panel access

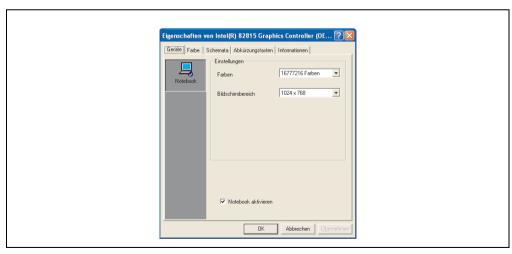


Figure 251: Graphics driver for 815E settings

### 4.2.2 Graphics driver installation - 855GME (ETX / XTX) CPU boards

# Information:

The following screenshots and descriptions refer to the graphics driver version 14.11 for 855GME CPU boards. Therefore, it is possible that the screenshots and descriptions might not correspond with the installed driver version.

After the driver is installed, it can be configured in the Control Panel (called up through the icon in the taskbar or Start - Control Panel - Display - Settings - Advanced).

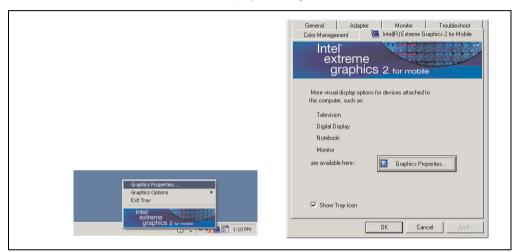


Figure 252: Accessing the graphics driver via Control Panel

# Information:

The connected Automation Panel 900 is still not activated after installing the graphics driver.

See the FAQ for information on this topic. "My Automation Panel 900 is still not activated after installing the graphics driver." on page 522.

### 4.2.3 Graphics settings for Extended Desktop

Under the "Extended desktop" settings, "Notebook" can be set as the primary device (Graphics Engine 1) and "Digital display" as secondary device (Graphics Engine 2). The contents displayed on the two lines are different (Extended Desktop).

Driver settings		Effect on APC620	
Primary device	Notebook	AP Link output	Graphics engine 1
Secondary device	Digital display	Monitor / Panel	Graphics engine 2
Primary device	Digital display	Monitor / Panel	Graphics engine 2
Secondary device	Notebook	AP Link output	Graphics engine 1

Table 340: Relationship between driver settings and graphics engine

Resolution and color depth can be configured separately for each line via the device settings for notebook and digital display.

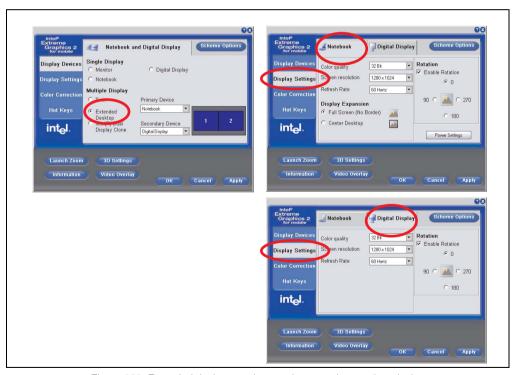


Figure 253: Extended desktop settings - primary and secondary device

### Software • Automation PC 620 with Windows XP Professional

Due to the operation of two different lines, for each line one of the internal serial interfaces COM C and COM D on the APC620 must be activated in BIOS (under Advanced - Baseboard/Panel Features - Legacy Devices) for the Automation 900 devices' touch screens. See the section 4.3.1 "Installation for Extended Desktop" on page 524 for information about installing the touch screen driver.

## 4.2.4 Graphics settings for Dual Display Clone

In "Dual display clone" mode, the same content is displayed on every connected Automation Panel 900 unit on both lines (Graphics Engine 1 and Graphics Engine 2). This enables operation of the application from every display.

Driver settings		Effect on APC620	
Primary device	Notebook	AP Link output	Graphics engine 1
Secondary device	Digital display	Monitor / Panel	Graphics engine 2
Primary device	Digital display	Monitor / Panel	Graphics engine 2
Secondary device	Notebook	AP Link output	Graphics engine 1

Table 341: Relationship between driver settings and graphics engine

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

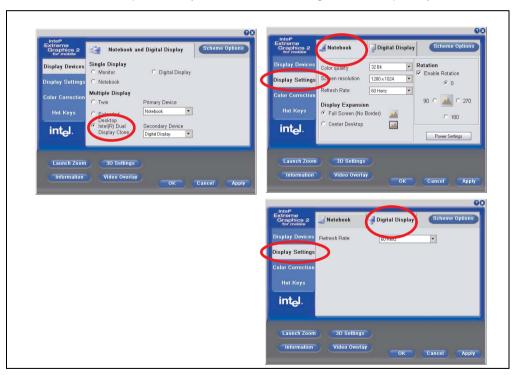


Figure 254: Dual display clone settings - primary and secondary device

The internal serial interface COM C on the APC620 must be activated in BIOS (under Advanced - Baseboard/Panel Features - Legacy Devices) for the Automation 900 devices' touch screens. See the section 4.3.2 "Installation for Dual Display Clone" on page 526 for information about installing the touch screen driver.

### Software • Automation PC 620 with Windows XP Professional

A panel locking time can be set in the B&R Control Center to prevent simultaneous operation of the Automation Panel 900 (see the .chm help file for the B&R Control Center).

# Information:

 The panel locking time is reset to the value configured in the key configuration (KCF - Key Configuration File) when the system is restarted.

#### 4.2.5 FAQ

### My Automation Panel 900 is still not activated after installing the graphics driver.

After installation, the graphics driver is automatically set to the analog output - RGB (monitor). As a result, any Automation Panel 900 connected via SDL (Smart Display Link) or DVI remains switched-off after loading the Intel graphics driver in Windows XP.

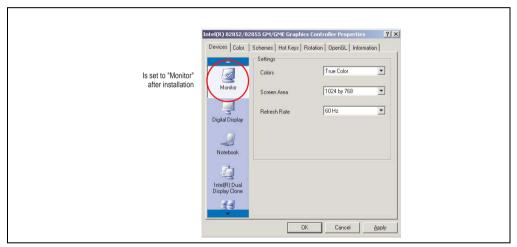


Figure 255: Settings after installing the graphics driver

### Software • Automation PC 620 with Windows XP Professional

To correct this problem, an analog monitor (RGB) must be connected to the monitor/panel, to reactivate the settings for digital output (digital display for the monitor/panel output or notebook for the AP Link output).

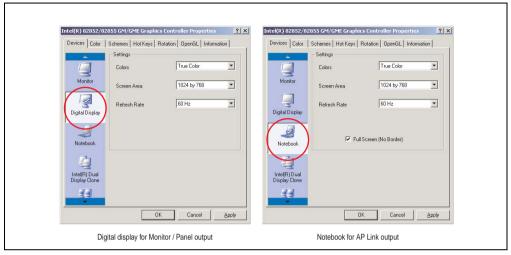


Figure 256: Settings for adjustment

### 4.3 Touch screen driver

For operation modes "extended desktop" and "dual display clone", the Elo touch screen driver must be installed. This can be found in the download area (Service - Product Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (www.br-automation.com).

## Information:

The touch screen drivers are based on the Windows mouse system. That means that either a mouse (USB or PS/2) must have been connected during the Windows installation or the mouse drivers must be installed additionally (e.g. automatically installed when later connecting a USB mouse). The BIOS function "PS/2 Mouse" must be set to "Enabled" when using a PS/2 mouse. This is located on the BIOS setup page "Advanced" - "Miscellaneous" (the default setting is "Disabled").

### 4.3.1 Installation for Extended Desktop

## Information:

- Activate COM C and COM D in BIOS.
- During installation the panel locking time must be set to 0 ms ("Auto detect" of the driver could only recognize 1 touch screen).
- Executing setup
- The Automation Panel 900 unit's touch screen is connected with the APC620 serially, so
  the serial touch screen drivers must be installed.

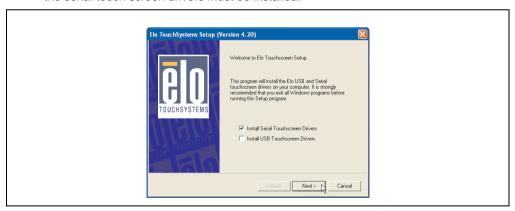


Figure 257: Touch screen driver - serial touch screen

The driver's auto-detect function sends data packets to every existing serial interface. It
then returns a list of all the ports on which an Elo touch screen is connected. The panel
locking time must be set to 0 ms (auto-detect only found 1 touch screen)

### Software • Automation PC 620 with Windows XP Professional

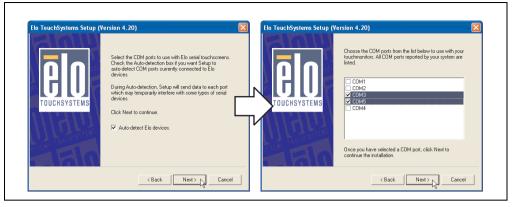


Figure 258: Touch screen driver - auto-detect

- After selecting the COM ports on which Elo touch screens are connected, the system must be rebooted.
- After restarting, each line of touch screens must be calibrated separately. This is done in the menus "Properties 1" and "Properties 2" with the "Align" button. When one touch screen is being calibrated, the others are automatically locked.

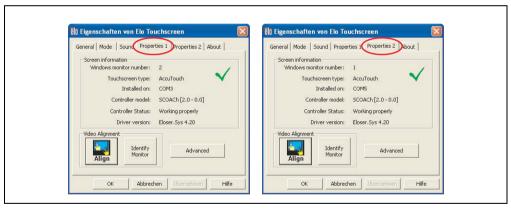


Figure 259: Touch screen calibration

### 4.3.2 Installation for Dual Display Clone

## Information:

- Activate COM C in BIOS.
- During installation the panel locking time must be set to 0 ms ("Auto detect" of the driver could only recognize 1 touch screen).
- Executing setup
- The Automation Panel 900 unit's touch screen is connected with the APC620 serially, so
  the serial touch screen drivers must be installed.



Figure 260: Touch screen driver - serial touch screen

• The driver's auto-detect function sends data packets to every existing serial interface. It then returns a list of all the ports on which an Elo touch screen is connected. The panel locking time must be set to 0 ms (auto-detect only found 1 touch screen)

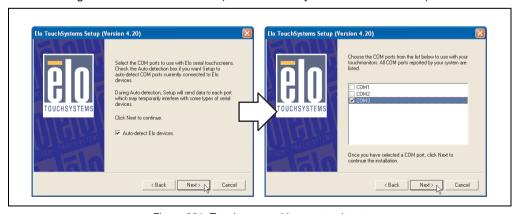


Figure 261: Touch screen driver - auto-detect

### Software • Automation PC 620 with Windows XP Professional

- After selecting the COM ports on which Elo touch screens are connected, the system must be rebooted.
- After restarting, only one touch screen must be calibrated. These settings are then
  applied to other touch screens.



Figure 262: Touch screen calibration

### 4.3.3 FAQ

### Power options and touch screen

The power options allow a few different settings (e.g. Turn off monitor, Turn off hard disks and System standby for a Windows XP system).

## Caution!

If the "Turn off monitor" function is enabled and a time has been set, then touching the dark touch display after the time has expired presents the risk of "blindly" activating one of the commands in the application and unintentionally triggering functions.

This can be avoided by activating a screen saver. As a result, the next time the touch screen is touched, the screen saver is deactivated.

### 4.4 Audio driver

An audio driver can be found in the download area (Service - Product Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (<u>www.br-automation.com</u>).

See the section "MIC, Line IN and Line OUT ports" on page 130 for information about the audio driver type.

### 4.4.1 Installation

Execute the downloaded setup.

## Information:

The option "AC97 Audio controller" must be set to "Enabled" (default setting) in BIOS under Advanced - I/O Device Configuration.

### 4.5 Network driver

The APC620 has 2 different networks controllers. Drivers for both network connections (ETH1 and ETH2) are available for approved operating systems in the download area (Service - Product Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (<a href="www.br-automation.com">www.br-automation.com</a>).

See the sections "Ethernet connection ETH1" on page 116 and "Ethernet connection ETH2" on page 118 for information about network controller types.

### 4.5.1 Installation ETH1

Execute the downloaded setup.

### 4.5.2 Installation ETH2

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

### 4.6 Automation PC 620 embedded

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

### 5. Automation PC 620 with Windows XP Embedded



Figure 263: Windows XP Embedded Logo

Model number	Short description	Comment
9S0001.19-020	OEM Microsoft Windows XP Embedded APC620 815E w/CF, English 512 MB CompactFlash card with Windows XP Embedded image for APC620 systems with a 815E CPU board. Only delivered with a new PC.	Cancelled since 10/2005 Replacement type: 5SWWXP.0412-ENG
9S0001.20-020	OEM Microsoft Windows XP Embedded APC620 855GME w/CF, English 512 MB CompactFlash card with Windows XP Embedded image for APC620 systems with a 855GME CPU board. Only delivered with a new PC.	Cancelled since 10/2007 Replacement type: 5SWWXP.0412-ENG
9S0001.27-020	OEM Microsoft Windows XP embedded (incl. SP2) APC620 815E w/CF, English 512 MB CompactFlash card with Windows XP Embedded image including SP2 for APC620 systems with a 815E CPU board. Only delivered with a new PC.	Cancelled since 10/2005 Replacement type: 5SWWXP.0412-ENG
9S0001.28-020	OEM Microsoft Windows XP embedded (incl. SP2) AC620 855GME w/CF, English 512 MB CompactFlash card with Windows XP Embedded image including SP2 for APC620 systems with a 855GME CPU board. Only delivered with a new PC.	Cancelled since 10/2007 Replacement type: 5SWWXP.0412-ENG
5SWWXP.0412-ENG	WinXPe FP2007 APC620 E855GME Order Microsoft Windows XP embedded English, Feature Pack 2007, for APC620 with CPU boards 5PC600.E855-00, 5PC600.E855-01, 5PC600.E855-02, 5PC600.E855-03, 5PC600.E855-04, 5PC600.E855-05; CompactFlash separately (at least 512 MB). Only delivered with a new PC.	
5SWWXP.0413-ENG	WinXPe FP2007 APC620 X855GME Order Microsoft Windows XP embedded English, Feature Pack 2007, for APC620 with CPU boards 5PC600.X855-00, 5PC600.X855-01, 5PC600.X855-02, 5PC600.X855-03, 5PC600.X855-04, 5PC600.X855-05; CompactFlash separately (at least 512 MB). Only delivered with a new PC.	

Table 342: Model numbers - Windows XP Embedded

### 5.1 General information

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

The Windows XP Embedded available from B&R was developed for APC620 systems with 815E and 855GME CPU board units.

## 5.2 Features with FP2007 (Feature Pack 2007)

The feature list shows the most important device functions in Windows XP embedded with Feature Pack 2007 (FP2007).

Function	present
Enhanced write filter (EWF)	✓
File Based Write Filter	✓
Page file	configurable
Administrator account	<b>√</b>
User account	configurable
Explorer shell	<b>√</b>
Registry Filter	<b>/</b>
Internet Explorer 6.0 + SP2	<b>√</b>
Internet information service (IIS)	-
Terminal service	✓
Windows Firewall	<b>√</b>
MSN-Explorer	-
Outlook Express	-
Administrative Tools	<b>√</b>
Remote Desktop	<b>√</b>
Remote Assistance	-
.NET Framework	-
ASP.NET	-
Codepages/User Locale/Keyboard	✓
Disk Management Service	<b>√</b>
Windows Installer Service	✓
Class Installer	✓
CoDevice Installer	<b>√</b>
Media Player	-
DirectX	-
Accessories	✓
Number of fonts	89

Table 343: Device functions in Windows XP embedded with FP2007

#### 5.3 Installation

Windows XP Embedded is usually preinstalled at B&R Austria on a suitable CompactFlash card (at least 512 MB). The APC620 system is then automatically configured after it has been switched on for the first time. This procedure takes approximately 30 minutes, and the device will be rebooted a number of times.

Brief instructions for creating your own Windows XP Embedded images or a suitable Target Designer export file for 815E or 855GME CPU boards can be downloaded from the download area on the B&R homepage (<a href="https://www.br-automation.com">www.br-automation.com</a>).

### 5.4 Graphics drivers

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

#### 5.5 Touch screen driver

The touch screen driver must be manually installed in order to operate Automation Panel 900 touch screen devices. The driver installation is identical to the driver installation for Windows XP Professional Systems. For more information, see 4.3 "Touch screen driver" on page 524

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

### 5.6 Audio driver

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

### 5.6.1 After a BIOS upgrade

If the following error message appears after upgrading BIOS:

```
"Copy Error"
"Setup cannot copy the file Audio3d.dll"
```

then the audio driver must be reinstalled.

To do this, use the audio driver from the B&R Homepage (<u>www.br-automation.com</u>).

During the installation of the audio driver, the following 2 files must be manually selected from the following directories.

```
ksuser.dll in the directory ...\Windows\system32
ks.sys in the directory ...\Windows\system32\drivers
```

This applies to 815E and 855ME CPU boards.

### Software • Automation PC 620 with Windows XP Embedded

The graphics driver must be re-installed to enable all possible resolutions when using an 815E CPU board (see 4.2.1 "Installing the graphics driver for 815E (ETX) CPU boards").

### 5.7 Network driver

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

### 5.8 FAQ

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

## 6. Automation PC 620 with Windows CE



Model number	Short description	Comment
5SWWCE.0512-ENG	WinCE5.0 Pro APC620 E855GME  Order Microsoft Windows CE 5.0 Professional, English, including license, for APC620 with CPU boards 5PC600.E855-00, 5PC600.E855-01, 5PC600.E855-02, 5PC600.E855-03, 5PC600.E855-04, 5PC600.E855-05; CompactFlash separately (at least 128 MB).	
5SWWCE.0513-ENG	WinCE5.0 Pro APC620 X855GME  Order Microsoft Windows CE 5.0 Professional, English, including license, for APC620 with CPU boards 5PC600.X855-00, 5PC600.X855-01, 5PC600.X855-02, 5PC600.X855-03, 5PC600.X855-04, 5PC600.X855-05; CompactFlash separately (at least 128 MB).	
5SWWCE.0612-ENG	WinCE5.0 ProPlus APC620 E855GME  Order Microsoft Windows CE 5.0 Professional Plus, English, including license, for APC620 with CPU boards 5PC600.E855-00, 5PC600.E855-01, 5PC600.E855-02, 5PC600.E855-03, 5PC600.E855-04, 5PC600.E855-05; CompactFlash separately (at least 128 MB).	
5SWWCE.0613-ENG	WinCE5.0 ProPlus APC620 X855GME  Order Microsoft Windows CE 5.0 Professional Plus, English, including license, for APC620 with CPU boards 5PC600.X855-00, 5PC600.X855-01, 5PC600.X855-02, 5PC600.X855-03, 5PC600.X855-04, 5PC600.X855-05; CompactFlash separately (at least 128 MB).	

Table 344: Model numbers - Windows CE

### 6.1 General information

Windows CE is an operating system which is optimally tailored to B&R's devices. It includes only the functions and modules which are required by each device. This makes this operating system extremely robust and stable.

### 6.1.1 Advantages

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

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

## 6.2 Properties in connection with APC620 devices

Detailed information about Windows CE for B&R devices can be downloaded in the download area on the B&R homepage (<a href="https://www.br-automation.com">www.br-automation.com</a>).

Features	Windows CE 5.0 for APC620	
Supported screen resolutions	VGA, SVGA, XGA	
Color depth	16 bit or 65536 colors	
Graphics card driver	Intel(R) embedded graphics driver	
Main memory	Automatic detection and use of up to 512 MB	
Boot time / Startup time	Approx. 39 seconds <sup>1)</sup>	
Included web browser	Internet Explorer 6 for Windows CE	
.NET	Compact Framework V2.0	
Image size	Approx. 29 MByte <sup>2)</sup> (not compressed)	
Custom keys	Supported	
PVI	Supported	

Table 345: Properties for Windows CE 5.0 and APC620

## 6.3 Requirements

The device must fulfill the following criteria to be able run the Windows CE operating system.

- At least 128 MB main memory
- At least one 128 MB CompactFlash card (size should be specified when ordered)

### 6.4 Installation

Windows CE is usually preinstalled at B&R Austria.

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

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

### Software • Automation PC 620 with Windows CE

### 6.4.1 B&R eMbedded OS Installer

The B&R eMbedded OS Installer allows you to install existing B&R Windows CE images. The four files (NK.BIN, BLDR, LOGOXRES.BMP, and LOGOQVGA.BMP) must be provided from an already functioning B&R Windows CE installation.

The B&R eMbedded OS Installer can be downloaded for free from the download area on the B&R homepage (<a href="https://www.br-automation.com">www.br-automation.com</a>). Further information is available in the online help for the B&R eMbedded OS Installer.

## 6.5 Known problems

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

# 7. Automation Device Interface (ADI) driver - Control Center

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

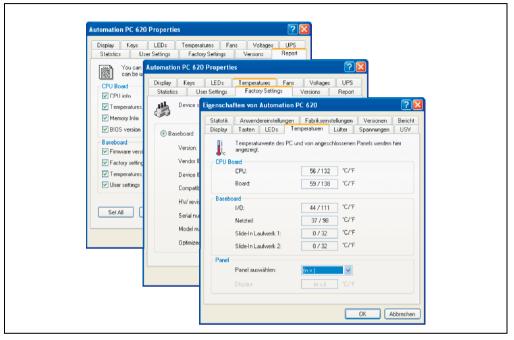


Figure 264: ADI Control Center screenshots (Version 1.61) - example

# Information:

The displayed temperature and voltage values (e.g. CPU temperature, core voltage, battery voltage) on the corresponding ADI page represent uncalibrated information values. These cannot be used to draw any conclusions about any hardware alarms or error conditions. The hardware components used have automatic diagnostics functions that can be applied in the event of error.

Features (device dependent)

- Adjusting the display brightness of connected Panels
- Reading device specific keys (in order for this to be possible, a key configuration must be installed that was created with the B&R Key Editor)
- Activation of device specific LEDs on a Mylar keypad
- Reading temperatures, fan speeds, and statistical data

### Software • Automation Device Interface (ADI) driver - Control Center

- 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
- Configuration of APC620 USV

### Supports following systems:

System	Operating system	Comment
Automation PC 620	Windows XP Professional Windows 2000	Installation using its own setup
	Windows XP Embedded	Content of B&R Windows XP Embedded image
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	Content of B&R Windows CE image
Mobile Panel BIOS devices	Windows XP Embedded	Content of B&R Windows XP Embedded image
	Windows CE	Content of B&R Windows CE image
Automation Panel 800	-	With Automation PC620 and Panel PC 700
Automation Panel 900	-	With Automation PC620 and Panel PC 700

Table 346: System support - ADI driver

A detailed description of the Control Center can be found in the integrated online help.

The B&R Automation Device Interface (ADI) driver (also contains Control Center) can be downloaded for free from the download area on the B&R homepage (<u>www.br-automation.com</u>).

## 7.1 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.

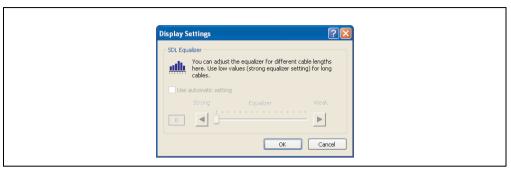


Figure 265: ADI Control Center - SDL equalizer settings

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

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

#### 7.2 UPS configuration

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

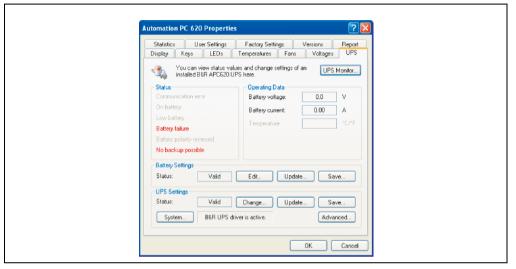


Figure 266: ADI Control Center - UPS settings

### Caution!

The installed UPS must be selected and configured in the Control Panel using the energy options in order for battery operation to be supported.

# Information for Windows XP Embedded:

The UPS service is supported starting with B&R Windows Embedded Version 2.10 or higher.

#### 7.2.1 Configuration of UPS operation for the B&R APC620 UPS

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

#### Information:

- Administrator rights are required in order to change the energy options or display the UPS status.
- In a German version of Windows XP Professional the battery status is displayed as "low" in the energy options, even if the battery is OK (Windows error). In an English version, three battery status levels are displayed: unknown, OK, replace. A low battery status is never displayed.

#### 7.2.2 Display status values for UPS

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

The displayed values are updated automatically.

# Information:

#### Notes:

The "reversed battery polarity" status is only displayed in UPS firmware version 1.08 or higher. In UPS firmware version 1.07 or smaller, a change between battery operation and normal operation can lead to communication errors.

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

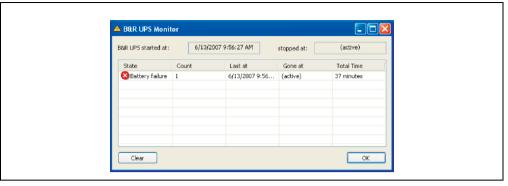


Figure 267: ADI Control Center - UPS monitor

The dialog box is updated automatically when the status changes.

To remove a status from the list, click on delete.

# Information:

The current status of the UPS is also displayed when the UPS service is started in the Windows Control Panel on the UPS page in the energy options.

#### 7.2.3 Change UPS battery settings

- 1) Open the Control Center in the Control Panel.
- 2) Select UPS tab.
- 3) Under "Battery settings", click on "Edit". Clicking on "Open" opens a dialog box.
- 4) Select and open the file containing the battery settings.

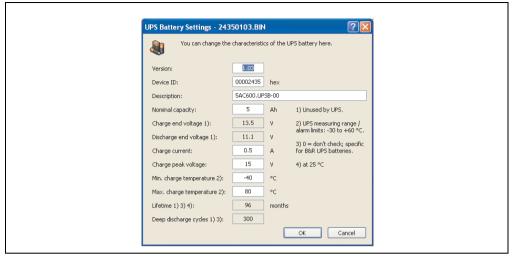


Figure 268: ADI Control Center - UPS battery settings

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

#### Information:

To make settings for batteries not from B&R, it is best to make a copy of a file with battery settings from B&R under a new name and make adjust the settings in this file for the battery being used.

Current files with settings for batteries from B&R can be found on the B&R APC620 / PPC700 firmware upgrade disk (starting with V1.16) and can also be updated using these.

# Information:

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

#### 7.2.4 Update UPS battery settings

- 1) Open the Control Center in the Control Panel.
- 2) Select UPS tab.
- 3) Under "Battery settings", click on "Update". Clicking on "Open" opens a dialog box.
- 4) Select and open the file containing the battery settings. The "Download" dialog box is opened.

The transfer can be aborted by clicking on "Cancel" in the Download dialog box. "Cancel" is disabled when the flash memory is being written to.

#### Caution!

- Battery operation is not possible during the update.
- If the transfer is interrupted, then the procedure must be repeated until the battery settings have been updated successfully. Otherwise battery operation will no longer be possible.

Deleting the data in flash memory can take several seconds depending on the memory block being used. The progress indicator is not updated during this time.

# Information:

The UPS is automatically restarted after a successful download. This can cause a brief failure in the UPS communication.

#### 7.2.5 Save UPS battery settings

- 1) Open the Control Center in the Control Panel.
- 2) Select UPS tab.
- 3) Under "Battery settings", click on "Save". Clicking on "Save under" opens a dialog box.
- 4) Enter a file name or select an existing file and click on "Save".

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

#### 7.2.6 Configure UPS system settings

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

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

### Information:

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

#### 7.2.7 Configuring the "UL compliant operation"

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

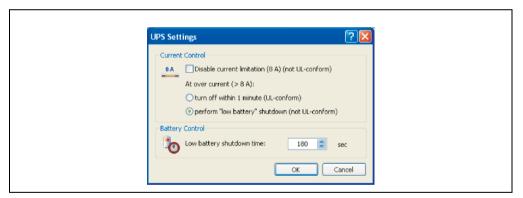


Figure 269: ADI Control Center - UPS settings

# Information:

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

If the "Low Battery" shutdown option is activated, the LowBatteryFlag is set at over-current, and a low battery shutdown is executed (for more information on low battery shutdown, see "Procedure following power failure" on page 548). If the UL compliant operation is reactivated, the following warning is displayed.

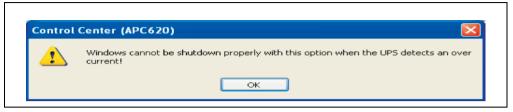


Figure 270: ADI control center warning

#### 7.2.8 Change additional UPS settings

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

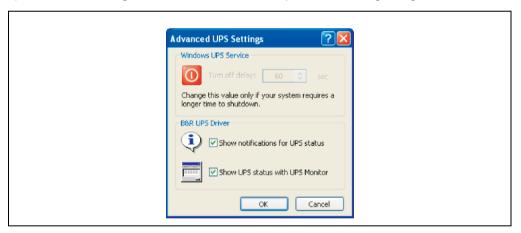


Figure 271: ADI Control Center - Advanced UPS settings

# Information:

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

#### Change delay time for UPS

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

#### Information:

This time is evaluated by the Windows UPS Service, but can not be set in the UPS system settings of the energy options. This value should only be changed if the system requires longer than the default setting of 180 seconds to shut down.

## Caution!

The time entered must be longer than the time required to shut down the operating system.

#### **Activate UPS messages**

Under "B&R UPS driver", activate the checkbox "UPS status messages". Any changes to the UPS status will then trigger a message from the B&R UPS driver.

#### Information:

Shutting down the system is only reported by the Windows UPS Service. The UPS Service also sends other messages if they are activated in the UPS system settings energy options. These messages are only displayed when the Windows Alerter and Windows Messenger<sup>1)</sup> are active and the PC is logged on to a network. Additionally, some conditions of the B&R APC620 UPS are not detected by the Windows UPS Service, and are therefore do not trigger messages (e.g. when there are no battery settings on the UPS). The Windows Services can be found in the Control Panel under Administrative Tools - Services.

1) The Windows Alerter is supported starting with B&R Windows Embedded Version 2.10 or higher.

If the checkbox "Display UPS status with UPS monitor" is also activated, a new message is not displayed for every change, but only a general message and request for you to start the B&R UPS monitor. As long as the UPS monitor is active, no new messages are displayed.

# Information:

Regardless of these options, all changes to the UPS status are logged in Windows event protocol (under "Application").

#### 7.2.9 Procedure following power failure

#### Over-current shutdown

If an over-current >8 A is present during battery operation for a duration of 16 seconds, the over-current shutdown is executed. A shut down time of one minute is available to the system.

If the supply is regenerated during this time, then the shut down process is aborted.

#### Information:

The over-current shutdown has the highest priority.

#### Low battery shutdown

If the LowBatteryFlag is set during power failure, then the "low battery" shutdown is executed, preventing the battery from dying. Once the shutdown time expires (3 minutes by default), the UPS shuts down.

If an "over-current" shutdown or "standard" shutdown is detected during the shutdown process, the "low battery" shutdown is replaced by the respective process.

#### Standard shutdown

The standard shutdown is effective when the UPS service is active, the shutdown time is 3 minutes, by default.

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

# **Chapter 5 • Standards and certifications**

# 1. Applicable European guidelines

- EMC guidelines 89/336/EWG
- Low-voltage guidelines 73/23/EWG
- Machine guidelines 98/37/EG

#### 2. Overview of standards

The Automation PC 620 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 347: Overview of standards

#### Standards and certifications • Overview of standards

Standard	Description
EN 60529	Degrees of protection provided by enclosures (IP code)
EN 60664-1	Insulation coordination for equipment within low-voltage systems - part 1: Principles, requirements and tests
EN 60721-3-2	Classification of environmental conditions - part 3: Classification of groups of environmental parameters and their severities, section 2: Transport
EN 60721-3-3	Classification of environmental conditions - part 3: Classification of groups of environmental parameters and their severities, section 3: Stationary use at weather-protected locations
EN 61000-4-2	Electromagnetic compatibility (EMC) - part 4-2: Testing and measuring techniques; electrostatic discharge immunity test
EN 61000-4-3	Electromagnetic compatibility (EMC) - part 4-3: Testing and measuring techniques; radiated radio- frequency electromagnetic field immunity test
EN 61000-4-4	Electromagnetic compatibility (EMC) - part 4-4: Testing and measuring techniques; electrical fast transient/burst immunity test
EN 61000-4-5	Electromagnetic compatibility (EMC) - part 4-5: Testing and measuring techniques; surge immunity test
EN 61000-4-6	Electromagnetic compatibility (EMC) - part 4-6: Testing and measuring techniques; immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-8	Electromagnetic compatibility (EMC) - part 4-8: Testing and measuring techniques; power frequency magnetic field immunity test
EN 61000-4-11	Electromagnetic compatibility (EMC) - part 4-11: Testing and measuring techniques; voltage dips, short interruptions and voltage variations immunity tests
EN 61000-4-12	Electromagnetic compatibility (EMC) - part 4-12: Testing and measuring techniques; oscillatory waves immunity test
EN 61000-4-17	Electromagnetic compatibility (EMC) - part 4-12: Testing and measuring techniques; ripple on DC input power port immunity test
EN 61000-4-29	Electromagnetic compatibility (EMC) - part 4-29: Testing and measuring techniques; voltage dips, short interruptions and voltage variations on DC input power port immunity tests
EN 61000-6-2 (EN 50082-2)	Electromagnetic compatibility (EMC), generic immunity standard - part 2: industrial environments (EN 50082-2 has been replaced by EN 61000-6-2)
EN 61000-6-4 (EN 50081-2)	Electromagnetic compatibility (EMC), generic emission standard - part 2: industrial environments (EN 50081-2 has been replaced by EN 61000-6-4)
EN 61131-2 IEC 61131-2	Product standard, programmable logic controllers - part 2: equipment requirements and tests
UL 508	Industrial control equipment (UL = Underwriters Laboratories)
VDE 0701-1	Service, modification, and testing of electrical devices - part 1: General requirements
47 CFR	Federal Communications Commission (FCC), 47 CFR Part 15 Subpart B Class A

Table 347: Overview of standards (cont.)

# Standards and

# 3. Requirements for emissions

Emissions	Test carried out according to	Limits according to	
Network-related emissions	EN 55011 / EN 55022 EN 61000-6-4: Generic standard (industrial areas)		
		EN 55011: Industrial, scientific, and medical (ISM) radio-frequency equipment, class A (industrial areas)	
		EN 55022: Information technology equipment (ITE devices), class A (industrial areas)	
		EN 61131-2: Programmable logic controllers	
		47 CFR Part 15 Subpart B Class A (FCC)	
Emissions, EN 55011 / EN 55022		EN 61000-6-4: Generic standard (industrial areas)	
Electromagnetic emissions		EN 55011: Industrial, scientific, and medical (ISM) radio-frequency equipment, class A (industrial areas)	
		EN 55022: Information technology equipment (ITE devices), class A (industrial areas)	
		EN 61131-2: Programmable logic controllers	
		47 CFR Part 15 Subpart B Class A (FCC)	

Table 348: Overview of limits and testing guidelines for emissions

#### Standards and certifications • Requirements 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 <sup>1)</sup> 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 349: Test requirements - Network-related emissions for industrial areas

#### Standards and certifications • Requirements for emissions

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 349: Test requirements - Network-related emissions for industrial areas (cont.)

# 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 350: : Test requirements - Electromagnetic emissions for industrial areas

<sup>1)</sup> AC network connections only with EN 61131-2

# 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	EN 61000-4-3	EN 61000-6-2: Generic standard (industrial areas)
electromagnetic fields (HF field)		EN 61131-2: Programmable logic controllers
		EN 55024: Information technology equipment (ITE devices)
Immunity to high-speed transient	EN 61000-4-4	EN 61000-6-2: Generic standard (industrial areas)
electrical disturbances (burst)		EN 61131-2: Programmable logic controllers
		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	EN 61000-4-6	EN 61000-6-2: Generic standard (industrial areas)
disturbances		EN 61131-2: Programmable logic controllers
		EN 55024: Information technology equipment (ITE devices)
Immunity against magnetic fields	EN 61000-4-8	EN 61000-6-2: Generic standard (industrial areas)
with electrical frequencies		EN 61131-2: Programmable logic controllers
		EN 55024: Information technology equipment (ITE devices)
Immunity to voltage dips, short-	EN 61000-4-11	EN 61000-6-2: Generic standard (industrial areas)
term interruptions and voltage fluctuations		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 351: Overview of limits and testing guidelines for immunity

Evaluation criteria according to EN 61000-6-2

#### Criteria A:

The operating equipment must continue to work as intended <u>during</u> the test. There should be no interference in the operating behavior and no system failures below a minimum operating quality as defined by the manufacturer.

#### Criteria B:

The operating equipment must continue to work as intended <u>after</u> the test. There should be no interference in the operating behavior and no system failures below a minimum operating quality as defined by the manufacturer.

#### Criteria C:

A temporary function failure is permitted 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	Limits according to	Limits according to
	EN 61000-6-2	EN 61131-2	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,	± 8 kV, 10 discharges,	± 8 kV, 10 discharges,
	criteria B	criteria B	criteria B

Table 352: 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 353: 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 <sup>1)</sup>	± 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 354: Test requirements - High-speed transient electrical disturbances (burst)

#### 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 355: Test requirements - Surge voltages

#### 4.5 Conducted disturbances

Test carried out according to EN 61000-4-6	Limits according to	Limits according to	Limits according to
	EN 61000-6-2	EN 61131-2	EN 55024
AC power I/O	150 kHz - 80 MHz, 10 V, 80%	150 kHz - 80 MHz, 3 V, 80%	150 kHz - 80 MHz, 3 V, 80%
	amplitude modulation with 1 kHz,	amplitude modulation with 1 kHz,	amplitude modulation with 1 kHz,
	length 3 seconds, criteria A	length 3 seconds, criteria A	criteria A

Table 356: Test requirements - Conducted disturbances

<sup>1)</sup> For EN 55024 without length limitation.

# Standards and

#### Standards and certifications • Requirements for immunity to disturbances

Test carried out according to EN 61000-4-6	Limits according to	Limits according to	Limits according to
	EN 61000-6-2	EN 61131-2	EN 55024
DC power I/O	150 kHz - 80 MHz, 10 V, 80%	150 kHz - 80 MHz, 3 V, 80%	150 kHz - 80 MHz, 3 V, 80%
	amplitude modulation with 1 kHz,	amplitude modulation with 1 kHz,	amplitude modulation with 1 kHz,
	length 3 seconds, criteria A	length 3 seconds, criteria A	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%	150 kHz - 80 MHz, 3 V, 80%	150 kHz - 80 MHz, 3 V, 80%
	amplitude modulation with 1 kHz,	amplitude modulation with 1 kHz,	amplitude modulation with 1 kHz,
	Length 3 seconds, criteria A	length 3 seconds, criteria A	criteria A

Table 356: 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 357: 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	70% (30% reduction), 0.5 periods,	
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 358: 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 359: Test requirements - Damped vibration

# 5. Mechanical conditions

Vibration	Test carried out according to	Limits according to
Vibration operation	EN 60068-2-6	EN 61131-2: Programmable logic controllers
		EN 60721-3-3 class 3M4
Vibration during transport	EN 60068-2-6	EN 60721-3-2 class 2M1
(packaged)		EN 60721-3-2 class 2M2
		EN 60721-3-2 class 2M3
Shock during operation	EN 60068-2-27	EN 61131-2: Programmable logic controllers
		EN 60721-3-3 class 3M4
Shock during transport (packaged)	EN 60068-2-27	EN 60721-3-2 class 2M1
		EN 60721-3-2 class 2M2
		EN 60721-3-2 class 2M3
Toppling (packaged)	EN 60068-2-31	EN 60721-3-2 class 2M1
		EN 60721-3-2 class 2M2
		EN 60721-3-2 class 2M3
Free fall (packaged)	EN 60068-2-32	EN 61131-2: Programmable logic controllers

Table 360: 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	10 sweeps for each axis		10 sweeps f	or each axis	
duty with moveable frequency in all 3 axes (x, y, z), 1 octave per minute	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 361: 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		10 sweeps for each axis, packaged packaged packaged			10 sweeps for each axis, packaged	
frequency in all 3 axes (x, y, z)	Frequency Limit value		Frequency	Limit value	Frequency	Limit value
	2 - 9 Hz	Amplitude 3.5 mm	2 - 9 Hz	Amplitude 3.5 mm	2 - 8 Hz	Amplitude 7.5 mm
	9 - 200 Hz	Acceleration 1 g	9 - 200 Hz	Acceleration 1 g	8 - 200 Hz	Acceleration 2 g
	200 - 500 Hz	Acceleration 1.5 g	200 - 500 Hz	Acceleration 1.5 g	200 - 500 Hz	Acceleration 4 g

Table 362: Test requirements - Vibration during transport (packaged)

## 5.3 Shock during operation

Test carried out according to EN 60068-2-27	Limits according to EN 61131-2	Limits according to EN 60721-3-3 class 3M4	
Shock operation: Pulse (half-sine) stress in all 3 axes (x, y, z)	Acceleration 15 g, length 11 ms, 18 shocks	Acceleration 15 g, length 11 ms	

Table 363: Test requirements - Shock operation

#### 5.4 Shock transport (packaged)

Test carried out according to EN 60068-2-27	Limits according to	Limits according to	Limits according to	
	EN 60721-3-2 class 2M1	EN 60721-3-2 class 2M2	EN 60721-3-2 class 2M3	
Pulse (half-sine) stress in all 3 axes (x, y, z)	Acceleration 10 g,	Acceleration 30 g,	Acceleration 100 g,	
	Length 11 ms, each 3 shocks,	Length 6 ms, each 3 shocks,	Length 6 ms, each 3 shocks,	
	packaged	packaged	packaged	

Table 364: 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 365: Test requirements - Toppling

# Chapter 5 Standards and certifications

# 5.6 Free fall (packaged)

Test carried out according to EN 60068-2-32	Limits according to EN 61131-2		EN 60721	cording to -3-2 class M1	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 <sub> </sub>	oackaged
	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
	packaging	ith product each with 5 ests						
	Weight	Height						
	< 10 kg	0.3 m						
	10 - 40 kg	0.3 m						
	> 40 kg	0.25 m						

Table 366: 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 367: 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 368: 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 369: 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 370: 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 371: 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 372: 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 373: 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 374: Test requirements - Humid heat, constant (storage)

#### Standards and certifications • Safety

# 7. Safety

Safety	Test carried out according to	Limits according to
Ground resistance	EN 61131-2	EN 60204-1: Electrical equipment of machines
		EN 61131-2: Programmable logic controllers
Insulation resistance		EN 60204-1: Electrical equipment of machines
High voltage	EN 60060-1	EN 61131-2: Programmable logic controllers
		UL 508: Industrial control equipment
Residual voltage	EN 61131-2	EN 60204-1: Electrical equipment of machines
		EN 61131-2: Programmable logic controllers
Leakage current		VDE 0701-1: Service, changes and testing of electrical devices
Overload	UL 508	EN 61131-2: Programmable logic controllers
		UL 508: Industrial control equipment
Simulation component defect	UL 508	EN 61131-2: Programmable logic controllers
		UL 508: Industrial control equipment
Voltage range		EN 61131-2: Programmable logic controllers

Table 375: Overview of limits and testing guidelines for safety

# Chapter 5 Standards and certifications

#### 7.1 Ground resistance

Test carried out according to EN 61131-2	Limits acc EN 602	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 mm <sup>2</sup> 3.3 V		
	1.5 mm²	2.6 V	
	2.5 mm <sup>2</sup> 1.9 V		
	4.0 mm² 1.4 V		
	> 6.0 mm²	1.0 V	

Table 376: Test requirements - Ground resistance

#### 7.2 Insulation resistance

Test carried out	Limits according to EN 60204-1 <sup>1)</sup>	
Insulation resistance: main circuits to protective ground conductor	> 1 MOhm at 500 VDC voltage	

Table 377: Test requirements - Insulation resistance

<sup>1)</sup> See EN 60204-1:1997 page 62, table 9.

<sup>1)</sup> See EN 60204-1:1997 page 62, table 9.

#### Standards and certifications • Safety

# 7.3 High voltage

Test carried out according to EN 60060-1		Limits according to EN 61131-2 <sup>1)</sup>			Lin	nits according UL 508	to
High voltage: Primary circuit to	Input voltage		Test voltage		Input	Test v	oltage
secondary circuit and to protective ground circuit (transformers, coils, varistors, capacitors and components used to protect		1.2/50 µs voltage surge peak	AC, 1 min	DC, 1 min	voltage	AC, 1 min	DC, 1 min
against over-voltage can be removed before the test)	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 <sub>N</sub>	(1000 V + 2 x U <sub>N</sub> ) 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 378: Test requirements - High voltage

# 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 379: Test requirements - Residual voltage

## 7.5 Leakage current

Test carried out	Limits according to VDE 0701-1	
Leakage current: Phase to ground	< 3.5 mA	

Table 380: Test requirements - Leakage current

<sup>1)</sup> See EN 61131-2:2003 page 104, table 59.

# standards and

#### 7.6 Overload

Test carried out according to UL 508	Limits according to EN 61131-2	Limits according to UL 508	
Overload of transistor outputs	50 switches, 1.5 I <sub>N</sub> , 1 sec on / 9 sec off	50 switches, 1.5 I <sub>N</sub> , 1 sec on / 9 sec off	

Table 381: Test requirements - Overload

# 7.7 Defective component

Test carried out according to UL 508	Limits according to EN 61131-2	Limits according to UL 508	
Simulation of how components in power supply became defective	Non-flammable surrounding cloth No contact with conductive parts	Non-flammable surrounding cloth No contact with conductive parts	

Table 382: Test requirements - Defective component

# 7.8 Voltage range

Test carried out according to	Limits acc EN 61	cording to 131-2	
Supply voltage	Measurement value	Tolerance min/max	
	24 VDC 48 VDC 125 VDC	-15% +20%	
	24 VAC 48 VAC 100 VAC 110 VAC 120 VAC 200 VAC 230 VAC 240 VAC 400 VAC	15% +10%	

Table 383: Test requirements - Voltage range

# 8. Other tests

Other tests	Test carried out according to	Limits according to
Protection type	-	EN 60529: Degrees of protection provided by enclosures (IP code)
Degree of pollution	-	EN 60664-1: Insulation coordination for equipment within low-voltage systems - part 1: Principles, requirements and tests

Table 384: Overview of limits and testing guidelines for other tests

#### 8.1 Protection

Test carried out according to	Limits according to EN 60529	Limits according to EN 60529	
Protection of the operating equipment	IP2. Protection against large solid foreign bodies =12.5 mm diameter	IP.6 Protection against large solid foreign bodies: dust-proof	
Protection of personnel	IP2. Protection against touching dangerous parts with finger	IP.6 Protection against touching dangerous parts with conductor	
Protection against water permeation with damaging consequences	IP.0 Not protected	IP.5 Protected against sprayed water	

Table 385: Test requirements - Protection

# 8.2 Degree of pollution

Test carried out according to	Limits according to EN 60664-1	
Definition	Degree of pollution II	

Table 386: Test requirements - Degree of pollution

# Chapter 5 Standards and

# 9. SDL flex cable - test description

#### 9.1 Torsion

#### 9.1.1 Structure of the test

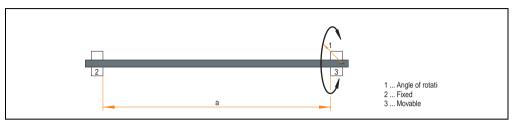


Figure 272: Test structure - torsion

#### 9.1.2 Test conditions

Distance a: 450 mm
 Rotation angle: ± 85°

Speed: 50 cycles / minute

• Special feature: The cable was clamped down twice in the machine.

#### 9.1.3 Individual tests

- Visible pixel errors: At the beginning of the test, the minimum equalizer setting was determined. This is the value between 0-15 at which no more pixel errors are visible. If the equalizer setting is changed due to the mechanical load, this is noted.
- Touch screen for function (with a 21.3" Automation Panel 5AP920.2138-01)
- USB mouse function
- Hot plug function tested by unplugging the USB plug
- After a test duration of 15000 cycles, the test was ended with a result of "OK".

#### 9.2 Cable drag chain

#### 9.2.1 Structure of the test

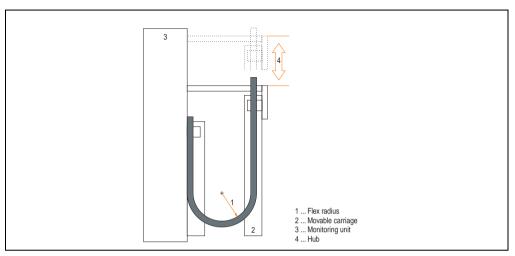


Figure 273: Test structure - Cable drag chain

#### 9.2.2 Test conditions

• Flex radius: 180 mm (= 15 x cable diameter)

Hub: 460 mm

Speed: 4800 cycles / hour

• Special feature: The cable was clamped down twice in the machine.

#### 9.2.3 Individual tests:

- Visible pixel errors: At the beginning of the test, the minimum equalizer setting is determined. This is the value between 0-15 at which no more pixel errors are visible. If the equalizer setting is changed due to the mechanical load, this is noted.
- Touch screen for function (with a 21.3" Automation Panel 5AP920.2138-01)
- USB mouse function
- Hot plug function tested by unplugging the USB plug
- After a test duration of 30000 cycles, the test was ended with a result of "OK".

#### 10. International certifications

B&R products and services comply with applicable standards. They are international standards from organizations such as ISO, IEC and CENELEC, as well as national standards from organizations such as UL, CSA, FCC, VDE, ÖVE, etc. We give special consideration to the reliability of our products in an industrial environment.

	Certifications		
USA and Canada	All important B&R products are tested and listed by Underwriters Laboratories and checked quarterly by a UL inspector.  This mark is valid for the USA and Canada and simplifies certification of your machines and systems in these areas.		
Europe	All harmonized EN standards for the applicable guidelines are met.		
CE			

Table 387: International certifications

Standards and certifications • International certifications

# **Chapter 6 • Accessories**

#### 1. Overview

Model number	Short description	Comment
0AC201.9	Lithium batteries (5x) Lithium batteries, 5 pcs., 3 V / 950 mAh, button cell	See page 579
0TB103.9	Plug 24V 5.08 3-pin screw clamps 24 VDC 3-pin connector, female. Screw clamps, 3.31 mm², protected against vibration by the screw flange	See page 577
0TB103.91	Plug 24V 5.08 3-pin cage clamps 24 VDC 3-pin connector, female. Cage clamps, 3.31 mm², protected against vibration by the screw flange	See page 577
4A0006.00-000	Lithium battery (1x) Lithium battery, 1 pc., 3 V / 950 mAh, button cell	See page 579
5A5003.03	Front cover Front cover for the USB 2.0 Media Drive 5MD900.USB2-00.	See page 607 and page 614
5AC600.ICOV-00	Interface covers Interface covers for APC620 and PPC700 devices; 5 pieces	See page 580
5AC600.UPSI-00	Add-on UPS module Uninterruptible power supply for APC620	See page 655
5AC600.UPSB-00	Battery unit 5 Ah Battery unit	See page 657
5AC900.1000-00	Adapter DVI-A/m to CRT DB15HD/f Adapter DVI (plug) to CRT (socket), for connecting a standard monitor to a DVI-I interface.	See page 581
5CADVI.0018-00	DVI-D cable 1.8 m / single Single cable, DVI-D/m:DVI-D/m; length: 1.8m	See page 624
5CADVI.0050-00	DVI-D cable 5 m / single Single cable, DVI-D/m:DVI-D/m; length: 5 m	See page 624
5CADVI.0100-00	DVI-D cable 10 m / single Single cable, DVI-D/m:DVI-D/m; length: 10 m	See page 624
5CAMSC.0001-00	APC620 internal supply cable	See page 627
5CASDL.0018-00	SDL cable 1.8 m SDL cable for a fixed type of layout; length: 1.8 m	See page 628
5CASDL.0018-01	SDL cable 1.8 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 1.8 m	See page 631
5CASDL.0018-03	SDL flex cable 1.8 m SDL cable for fixed and flexible type of layout; length: 1.8 m	See page 638
5CASDL.0050-00	SDL cable 5 m SDL cable for a fixed type of layout; length: 5 m	See page 628

Table 388: Model numbers - Accessories

#### **Accessories • Overview**

Model number	Short description	Comment
5CASDL.0050-01	SDL cable 5 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 5 m	See page 631
5CASDL.0050-03	5 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 5 m	See page 638
5CASDL.0100-00	SDL cable 10 m SDL cable for a fixed type of layout; length: 10 m	See page 628
5CASDL.0100-01	SDL cable 10 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 10 m	See page 631
5CASDL.0100-03	10 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 10 m	See page 638
5CASDL.0150-00	SDL cable 15 m SDL cable for a fixed type of layout; length: 15 m	See page 628
5CASDL.0150-01	SDL cable 15 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 15 m	See page 631
5CASDL.0150-03	15 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 15 m	See page 638
5CASDL.0200-00	SDL cable 20 m SDL cable for a fixed type of layout; length: 20 m	See page 628
5CASDL.0200-03	20 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 20 m	See page 638
5CASDL.0250-00	SDL cable 25 m SDL cable for a fixed type of layout; length: 25 m	See page 628
5CASDL.0250-03	25 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 25 m	See page 638
5CASDL.0300-00	SDL cable 30 m SDL cable for a fixed type of layout; length: 30 m	See page 628
5CASDL.0300-03	30 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 30 m	See page 638
5CASDL.0300-10	30 m SDL cable with extender SDL cable with extender for a fixed type of layout; length 30 m	Cancelled since 12/2006 Replaced by 5CASDL.0300- 13
		See page 634
5CASDL.0300-13	30 m SDL flex cable with extender SDL cable with extender for fixed and flexible type of layout; length: 30 m	See page 643
5CASDL.0400-10	40 m SDL cable with extender SDL cable with extender for a fixed type of layout; length 40 m	Cancelled since 12/2006 Replaced by 5CASDL.0400- 13
		See page 634
5CASDL.0400-13	40 m SDL flex cable with extender SDL cable with extender for fixed and flexible type of layout; length: 40 m	See page 643
5CAUPS.0005-00	APC620 UPS cable 0.5 m	See page 650
5CAUPS.0030-00	APC620 UPS cable 3 m	See page 650
5CAUSB.0018-00	USB 2.0 cable, A/m:B/m 1.8 m USB 2.0 connection cable; plug type A - type B; length 1.8 m	See page 650
5CAUSB.0050-00	USB 2.0 cable, A/m:B/m 5 m USB 2.0 connection cable; plug type A - type B; length 5 m	See page 650

Table 388: Model numbers - Accessories (cont.)

Model number	Short description	Comment
5CFCRD.0032-02	CompactFlash 32 MB SanDisk/A CompactFlash card with 32 MB flash PROM and IDE/ATA interface.	Cancelled since 12/2005 Replaced by 5CFCRD.0064- 03 See page 582
5CFCRD.0064-02	CompactFlash 64 MB SanDisk/A CompactFlash card with 64 MB flash PROM and IDE/ATA interface.	Cancelled since 12/2005 Replaced by 5CFCRD.0064- 03 See page 582
5CFCRD.0128-02	CompactFlash 128 MB SanDisk/A CompactFlash card with 128 MB flash PROM and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.0128- 03 See page 582
5CFCRD.0256-02	CompactFlash 256 MB SanDisk/A CompactFlash card with 256 MB flash PROM and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.0256- 03 See page 582
5CFCRD.0512-02	CompactFlash 512 MB SanDisk/A CompactFlash card with 512 MB flash PROM and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.0512- 03 See page 582
5CFCRD.1024-02	CompactFlash 1024 MB SanDisk/A CompactFlash card with 1024 MB flash PROM and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.1024- 03 See page 582
5CFCRD.2048-02	CompactFlash 2048 MB SanDisk/A CompactFlash card with 2048 MB flash PROM and IDE/ATA interface	Cancelled since 12/2005 Replaced by 5CFCRD.2048- 03 See page 582
5CFCRD.0064-03	CompactFlash 64 MB SSI CompactFlash card with 64 MB SLC NAND flash and IDE/ATA interface	See page 590
5CFCRD.0128-03	CompactFlash 128 MB SSI CompactFlash card with 128 MB SLC NAND flash and IDE/ATA interface	See page 590
5CFCRD.0256-03	CompactFlash 256 MB SSI CompactFlash card with 256 MB SLC NAND flash and IDE/ATA interface	See page 590
5CFCRD.0512-03	CompactFlash 512 MB SSI CompactFlash card with 512 MB SLC NAND flash and IDE/ATA interface	See page 590
5CFCRD.1024-03	CompactFlash 1024 MB SSI CompactFlash card with 1024 MB SLC NAND flash and IDE/ATA interface	See page 590
5CFCRD.2048-03	CompactFlash 2048 MB SSI CompactFlash card with 2048 MB SLC NAND flash and IDE/ATA interface	See page 590
5CFCRD.4096-03	CompactFlash 4096 MB SSI CompactFlash card with 4096 MB SLC NAND flash and IDE/ATA interface	See page 590
5CFCRD.8192-03	CompactFlash 8192 MB SSI CompactFlash card with 8192 MB SLC NAND flash and IDE/ATA interface	See page 590
5MD900.USB2-00	USB 2.0 drive DVD-ROM/CD-RW FDD CF USB USB 2.0 drive combination, consists of DVD-ROM/CD-RW, FDD, CompactFlash slot (type II), USB connection (type A front, type B back); 24 V DC.	Cancelled since 10/2006 Replacement type 5MD900.USB-01 See page 602
5MD900.USB2-01	USB 2.0 drive DVD-RW/CD-RW FDD CF USB USB 2.0 drive combination, consists of DVD-R/RW/DVD+R/RW/CD-RW, FDD, CompactFlash slot (type II), USB connection (type A front, type B back); 24 V DC.	See page 609
5MMUSB.0128-00	USB flash drive 128 MB SanDisk USB 2.0 flash drive 128 MB	Cancelled since 12/2005 Replaced by 5MMUSB.2048- 00 See page 616

Table 388: Model numbers - Accessories (cont.)

# **Accessories • Overview**

Model number	Short description	Comment
5MMUSB.0256-00	USB flash drive 256 MB SanDisk USB 2.0 flash drive 256 MB	Cancelled since 03/2007 Replaced by 5MMUSB.2048- 00 See page 616
5MMUSB.0512-00	USB flash drive 512 MB SanDisk USB 2.0 flash drive 512 MB	Cancelled since 07/2007 Replaced by 5MMUSB.2048- 00 See page 616
5MMUSB.1024-00	USB flash drive 1 GB SanDisk USB 2.0 flash drive 1 GB	Cancelled since 03/2007 Replaced by 5MMUSB.2048- 00 See page 616
5MMUSB.2048-00	USB flash drive 2 GB SanDisk USB 2.0 flash drive 2 GB	See page 616
5SWHMI.0000-00	HMI Drivers & Utilities DVD	See page 621
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 648
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 648
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 648
5AC600.FA01-00	APC620 replacement fan filter 1PCI 5 piece APC620 replacement fan filter for system unit with 1 PCI Slot (5PC600.SX01-00).	See page 662
5AC600.FA02-00	APC620 replacement fan filter 1PCI 5 piece APC620 replacement fan filter for system unit with 2 PCI slot (5PC600.SX02-00, 5PC600.SX02-01).	See page 662
5AC600.FA03-00	APC620f replacement fan filter 1PCI 5 piece APC620 replacement fan filter for system unit with 3 PCI Slots (5PC600.SF03-00).	See page 662
5AC600.FA05-00	APC620 replacement fan filter 1PCI 5 piece APC620 replacement fan filter for system units with 5 PCI slot (5PC600.SX02-00, 5PC600.SX02-01).	See page 662

Table 388: Model numbers - Accessories (cont.)

# 2. Supply voltage connector (TB103 3-pin)

# 2.1 General information

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

# 2.2 Order data

Model number	Description	Figure
0TB103.9	Plug for the 24 V supply voltage (screw clamps)	
OTB103.91	Plug for the 24 V supply voltage (cage clamps)	
		OTB103.9  OTB103.91

Table 389: Order data - TB103

# 2.3 Technical data

# Information:

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

Label	0TB103.9	0TB103.91
Number of pins		3
Type of terminal	Screw clamps	Cage clamps
Distance between contacts	5.08 mm	

Table 390: Technical data - TB103 supply plug

# Accessories • Supply voltage connector (TB103 3-pin)

Label	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 390: Technical data - TB103 supply plug (cont.)

# 3. Replacement CMOS batteries

The lithium battery is needed for buffering the BIOS CMOS data, the real-time clock, and SRAM data. The battery is subject to wear and should be replaced regularly (at least following the specified buffer duration).

### 3.1 Order data

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

Table 391: Order data - Lithium batteries

# 3.2 Technical data

# Information:

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

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

Table 392: Technical data - Lithium batteries

# 4. Interface covers 5AC600.ICOV-00

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

# 4.1 Order data

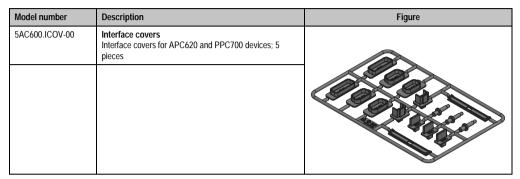


Table 393: Order data - APC620 interface cover

# 4.2 Contents of delivery

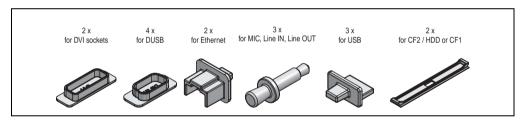


Figure 274: Contents of delivery - interface cover

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

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

# 5.1 Order data

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

Table 394: Order data - DVI - CRT adapter

# 6. CompactFlash cards 5CFCRD.xxxx-02

# 6.1 General information

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

# 6.2 Order data

Model number	Description	Figure
5CFCRD.0032-02	CompactFlash 32 MB SanDisk/A	
5CFCRD.0064-02	CompactFlash 64 MB SanDisk/A	
5CFCRD.0128-02	CompactFlash 128 MB SanDisk/A	Industrial Grade
5CFCRD.0256-02	CompactFlash 256 MB SanDisk/A	
5CFCRD.0512-02	CompactFlash 512 MB SanDisk/A	1 GB CompactFlash®
5CFCRD.1024-02	CompactFlash 1024 MB SanDisk/A	
5CFCRD.2048-02	CompactFlash 2048 MB SanDisk/A	Sanjisk 20 Company of the Company of
		NO. SPRING, STOCKS, SHORT

Table 395: Order data - CompactFlash cards 5CFCRD.xxxx-02

### 6.3 Technical data

# Information:

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

Features	5CFCRD.xxxx-02	
MTBF (@ 25°C)	> 3,000,000 hours	
Maintenance	None	
Data reliability	< 1 unrecoverable error in 10 <sup>14</sup> bit read accesses < 1 faulty correction in 10 <sup>20</sup> bit read accesses	
Features	5CFCRD.xxxx-02	
Write/erase procedures	> 2,000,000 times	

Table 396: Technical data - CompactFlash cards 5CFCRD.xxxx-02

0	eS
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≝	SS
<u>च</u>	ě
5	S
	⋖

Mechanical characteristics	
Dimensions Length Width Thickness	$36.4 \pm 0.15$ mm $42.8 \pm 0.10$ mm $3.3$ mm $\pm 0.10$ mm
Weight	11.4 g
Environmental characteristics	
Ambient temperature Operation Storage Transport	0°C to +70°C -25°C to +85°C -25°C to +85°C
Relative humidity Operation / Storage	8% to 95%, non-condensing
Vibration Operation / Storage	Maximum 30 g (point to point)
Shock Operation / Storage	Maximum 3,000 g
Altitude	24,000 meters

Table 396: Technical data - CompactFlash cards 5CFCRD.xxxx-02 (cont.)

# **6.4 Dimensions**

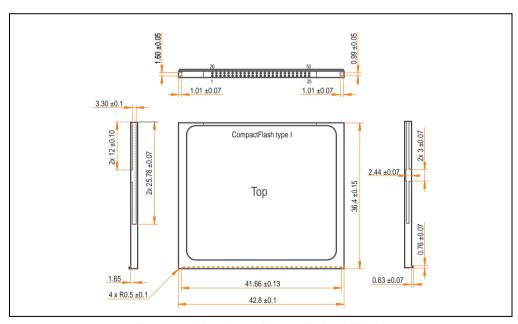


Figure 275: Dimensions - CompactFlash card Type I

# 6.5 Calculating the lifespan

SanDisk provides a 6-page "white paper" for the lifespan calculation of CompactFlash cards (see following pages). This document can also be found on the SanDisk homepage.

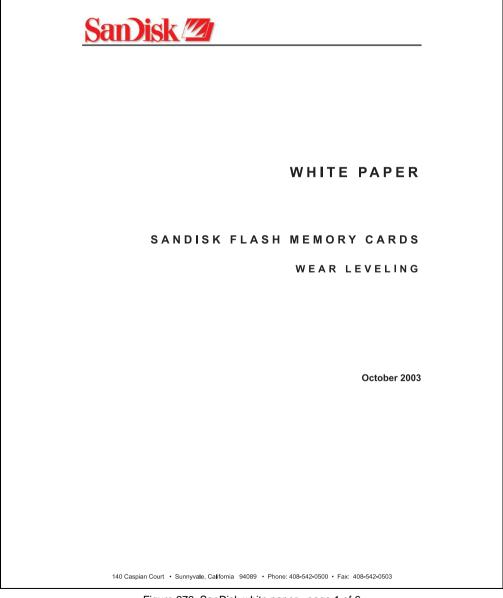


Figure 276: SanDisk white paper - page 1 of 6

Figure 277: SanDisk white paper - page 2 of 6

White Paper October 2003

### 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.

SanDisk Corporation

Doc No. 80-36-00278 SanDisk Flash Memory Cards Wear Leveling Page 3

Figure 278: SanDisk white paper - page 3 of 6

White Paper October 2003

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

SanDisk Corporation

Figure 279: SanDisk white paper - page 4 of 6

SanDisk Flash Memory Cards Wear Leveling

Chapter 6 Accessories

Doc No. 80-36-00278

Page 4

White Paper October 2003

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:

$$lifetime = 2,000,000 \times \frac{\left(C_{toone} - C_{fixed}\right) \times \left(1 - k_r \times \frac{32 - N_{cluster}}{32}\right)}{FS_{too}} \times \frac{1}{f_w}$$

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 fiv 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.

$$lifetime = 2,000,000 \times \frac{4000}{4} \times \frac{1}{1/5 \text{ sec}}$$
$$lifetime = 317 \text{ years}$$

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Doc No. 80-36-00278

SanDisk Flash Memory Cards Wear Leveling

Page 5

Figure 280: SanDisk white paper - page 5 of 6

White Paper

October 2003

### 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.

$$lifetime = 2,000,000 \times \frac{4 \times \left(1 - 1 \times \frac{32 - 8}{32}\right)}{.004} \times \frac{1}{1/5 \sec}$$

$$lifetime = 79.3 \ years$$

### 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

SanDisk Corporation

Doc No. 80-36-00278

SanDisk Flash Memory Cards Wear Leveling

Page 6

Figure 281: SanDisk white paper - page 6 of 6

# 7. CompactFlash cards 5CFCRD.xxxx-03

# 7.1 General information

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

# 7.2 Order data

Model number	Description	Figure
5CFCRD.0064-03	CompactFlash 64 MB SSI	
5CFCRD.0128-03	CompactFlash 128 MB SSI	SiliconDrive™
5CFCRD.0256-03	CompactFlash 256 MB SSI	CF
5CFCRD.0512-03	CompactFlash 512 MB SSI	8GB SSD-C08GI-3076
5CFCRD.1024-03	CompactFlash 1024 MB SSI	SSD-C08G1-3076
5CFCRD.2048-03	CompactFlash 2048 MB SSI	SILICON
5CFCRD.4096-03	CompactFlash 4096 MB SSI	STOTEMO
5CFCRD.8192-03	CompactFlash 8192 MB SSI	Example: 8 GB CompactFlash cards

Table 397: CompactFlash cards - Order data

# 7.3 Technical data

# Information:

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

Features	5CFCRD.xxxx-03
MTBF (at 25°C)	> 4000000 hours
Maintenance	None
Data reliability	< 1 unrecoverable error in 10 <sup>14</sup> bit read accesses
Write/erase procedures	> 2,000,000 times
Data retention	10 years

Table 398: Technical data - CompactFlash cards 5CFCRD.xxxx-03

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Mechanical characteristics	5CFCRD.xxxx-03
Dimensions Length Width Thickness	36.4 ± 0.15 mm 42.8 ± 0.10 mm 3.3 ± 0.10 mm
Weight	11.4 grams
Environmental characteristics	
Ambient temperature Operation Storage Transport	0°C to +70°C -50°C to +100°C -50°C to +100°C
Relative humidity Operation / Storage	8% to 95%, non-condensing
Vibration Operation Storage / Transport	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 398: Technical data - CompactFlash cards 5CFCRD.xxxx-03 (cont.)

# 7.3.1 Temperature humidity diagram - Operation and storage

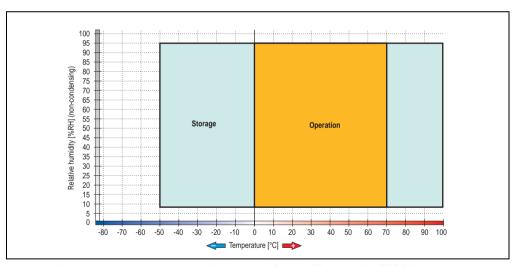


Figure 282: Temperature humidity diagram - CompactFlash cards 5CFCRD.xxxx-03

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

# 7.4 Dimensions

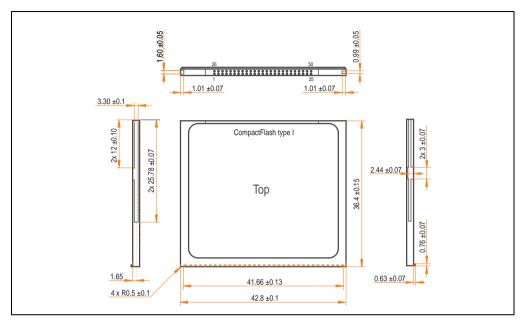


Figure 283: Dimensions - CompactFlash card Type I

# 7.5 Calculating the lifespan

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

# 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 (<a href="https://www.br-automation.com">www.br-automation.com</a>).



# SILICONDRIVETM WHITE PAPER

Advanced Storage Technology

**ENDURANCE CONSIDERATIONS** 

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> WP401 Revision D January 2006

SILICONSYSTEMS, INC.

Figure 284: Silicon Systems white paper - page 1 of 9

Chapter 6 Accessories



### 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<sup>TM</sup>

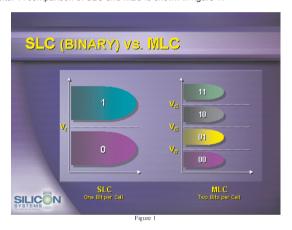
Figure 285: Silicon Systems white paper - page 2 of 9



### STORAGE MEDIA

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

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



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

PAGE 3 OF 9 SILICONSYSTEMS PROPRIETARY
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Figure 286: Silicon Systems white paper - page 3 of 9



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

Samsung: <a href="http://www.samsung.com">http://www.samsung.com</a>
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:

- 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

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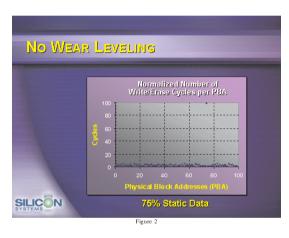
Figure 287: Silicon Systems white paper - page 4 of 9



### No Wear Leveling

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

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



PAGE 5 OF 9

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Figure 288: Silicon Systems white paper - page 5 of 9

Chapter 6 Accessories



### **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.

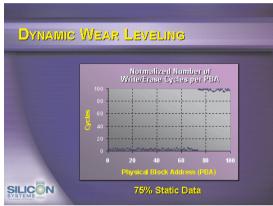


Figure 3

PAGE 6 OF 9

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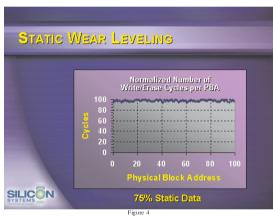
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Figure 289: Silicon Systems white paper - page 6 of 9



### Static Wear Leveling

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



PAGE 7 OF 9

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Figure 290: Silicon Systems white paper - page 7 of 9



### **ERROR CORRECTION**

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

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

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

### SUMMARY OF MEDIA, WEAR LEVELING AND ECC

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

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

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

= SiliconSystems' SiliconDrive Configuration

PAGE 8 OF 9

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Figure 291: Silicon Systems white paper - page 8 of 9



### **ENDURANCE CALCULATIONS**

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

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

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

Where:

 $\alpha$  = 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)

 $\lambda$  = Endurance Specification

φ = Safety Margin

 $\omega$  = File Size in MB (when converting from KB to MB, KB = MB x 1,024)

 $\xi$  = Number of Writes of file size  $\omega$  per minute

k = Number of minutes per year = 525,600

To calculate the number of data transactions:

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

Where:

 $\alpha$  = Capacity in MB (when converting from MB to GB, MB = GB x 1,024)

 $\beta$  = Amount of Static Data in MB (this value should be 0 for static wear leveling)

 $\lambda$  = Endurance Specification

φ = Safety Margin Percentage (usually 25%)

 $\omega$  = File Size in MB (when converting from KB to MB, KB = MB x 1,024)

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PAGE 9 OF 9

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Figure 292: Silicon Systems white paper - page 9 of 9

Chapter 6 Accessories

# 8. USB Media Drive 5MD900.USB2-00



Figure 293: USB Media Drive 5MD900.USB2-00

# 8.1 Features

- Desk-top or rack-mount operation (mounting rail brackets)
- Integrated USB diskette drive
- Integrated DVD-ROM/CD-RW drive
- Integrated CompactFlash slot IDE/ATAPI (Hot Plug capable)
- Integrated USB 2.0 connection (up to 480 MBit high speed)
- +24 VDC supply (back side)
- USB/B 2.0 connection (back side)
- Optional front cover (model number 5A5003.03 see also section 8.8 "Front cover 5A5003.03 for the USB Media Drive" on page 607)

# Information:

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

Features - entire device	5MD900.USB2-00		
Transfer rate	Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)		
Maximum cable length	5 m (not including hub)		
Power supply Rated voltage	24 VDC ± 25%		
Features - diskette drive			
Data capacity	720 KB / 1.25 MB / 1.44 MB (formatted)		
Data transfer rate	250 kbits (720 KB) or 500 kbits (1.25 MB and 1.44 MB)		
Rotation speed	Up to 360 rpm		
Diskette media	High density (2HD) or normal density (2DD) 3.5" diskettes		
MTBF	30000 POH (Power-On Hours)		
Features - DVD-ROM/CD-RW drive			
Write speed CD-R CD-RW	24x, 16x, 10x and 4x 10x and 4x		
Reading rate CD DVD	24x 8x		
Data transfer rate	Max. 33.3 MB/sec.		
Access time (average) CD DVD	85 ms 110 ms		
Revolution speed	Max. 5136 rpm ± 1%		
Starting time (0 rpm to read access)	19 seconds (maximum)		
Host interface	IDE (ATAPI)		
Readable media CD DVD	CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW DVD-ROM, DVD-R, DVD-RW, DVD-RAM		
Non-write protected media CD	CD-R, CD-RW		
Write-methods	Disk at once, session at once, packet write, track at once		
Laser class	Class 1 laser		
Data buffer capacity	2 MB		

Table 399: Technical data - USB Media Drive 5MD900.USB2-00

# Accessories • USB Media Drive 5MD900.USB2-00

Features - DVD-ROM/CD-RW drive	5MD900.USB2-00
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session) Enhanced CD, CD-text DVD-ROM, DVD-R, DVD-Video (double layer) DVD-RAM (4.7 GB, 2.6 GB)
Noise level (complete read access)	Approx. 45 dBA at 50 cm
Lifespan Opening/closing the drawer	60000 POH (Power-On Hours) > 10000 times
CompactFlash slot layout	
CompactFlash Type Amount Connection	Type I 1 slot IDE / ATAPI
CompactFlash LED	Signals read or write access to an inserted CompactFlash card
Hot Plug capable	Yes
Features - USB connections	
USB A on the front side Power supply	Connection of further peripheral devices Max. 500 mA
USB B back side	Connection to the system
Mechanical characteristics	
Outer dimensions (without slide-in) Width Length Height	70 mm 100 mm 9.5 mm
Weight	Approx. 1.1 kg (without front cover)
Environmental characteristics	
Ambient temperature Operation Storage Transport	+5°C +45°C -20°C +60°C -40°C +60°C
Environmental characteristics	
Relative humidity Operation Storage Transport	20 - 80%, non-condensing 5 - 90%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage Transport	At max. 5 - 500 Hz and 0.3 g At max. 10 - 100 Hz and 2 g At max. 10 - 100 Hz and 2 g
Shock (pulse with a sine half-wave) Operation Storage (packaged) Transport (packaged)	At max. 5 g for 11 ms At max. 60 g for 11 ms At max. 60 g for 11 ms
Altitude	Max. 3000 meters

Table 399: Technical data - USB Media Drive 5MD900.USB2-00 (cont.)

# 8.3 Dimensions

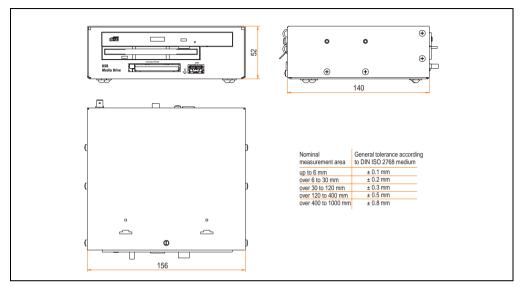


Figure 294: Dimensions for USB Media Drive 5MD900.USB2-00

# 8.4 Dimensions with front cover

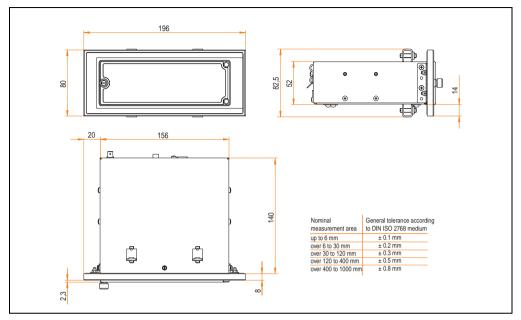


Figure 295: Dimensions - USB Media Drive with front cover

# 8.5 Contents of delivery

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

Table 400: Contents of delivery - USB Media Drive 5MD900.USB2-00

# 8.6 Interfaces

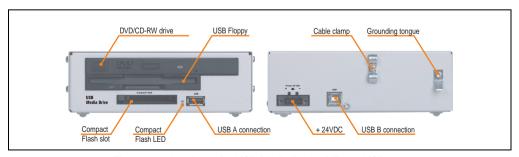


Figure 296: Interfaces for USB Media Drive 5MD900.USB2-00

### 8.7 Installation

The USB Media Drive can be operated as a desk-top device (rubber feet) or as a rack-mount device (2 mounting rail brackets included).

# 8.7.1 Mounting orientation

Because of limits to the mounting orientation with the components used (floppy, DVD-CDRW drive), the USB media drive is only permitted to be mounted and operated as shown in the following figure.

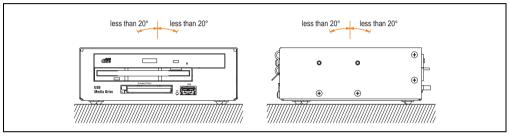


Figure 297: Mounting orientation of USB Media Drive 5MD900.USB2-00

# 8.8 Front cover 5A5003.03 for the USB Media Drive

This front cover can also be mounted on the front of the USB media drive (model number 5MD900.USB2-00 or 5MD900.USB2-01) to protect the interface.

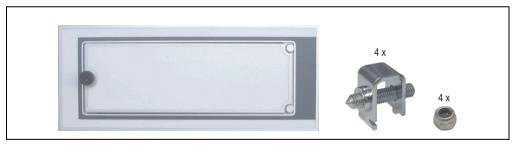


Figure 298: Front cover 5A5003.03

### 8.8.1 Technical data

Features	5A5003.03
Front cover design / colors  Dark gray border around the cover  Light gray background	Similar to Pantone432CV Similar to Pantone 427CV

Table 401: Technical data - 5A5003.03

### 8.8.2 Dimensions

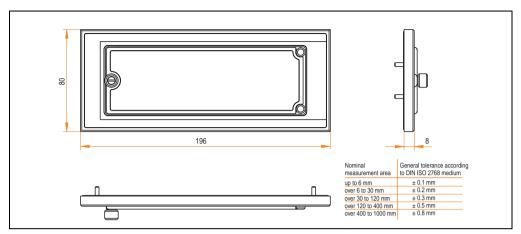


Figure 299: Dimensions - 5A5003.03

# 8.8.3 Installation

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

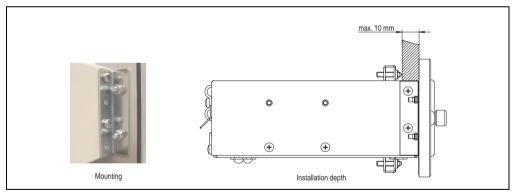


Figure 300: Front cover mounting and installation depth

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



Figure 301: USB Media Drive - 5MD900.USB2-01

## 9.1 Features

- Desk-top or rack-mount operation (mounting rail brackets)
- Integrated USB diskette drive
- Integrated DVD-RW/CD-RW drive
- Integrated CompactFlash slot IDE/ATAPI (Hot Plug capable)
- Integrated USB 2.0 connection (up to 480 MBit high speed)
- +24 VDC supply (back side)
- USB/B 2.0 connection (back side)
- Optional front cover (model number 5A5003.03 see also section 9.8 "Front cover 5A5003.03 for the USB Media Drive" on page 614)

# 9.2 Technical data

# Information:

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

Features - entire device	5MD900.USB2-01
Transfer rate	Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)
Maximum cable length	5 m (not including hub)
Power supply Rated voltage	24 VDC ± 25%
Features - diskette drive	
Data capacity	720 KB / 1.25 MB / 1.44 MB (formatted)
Data transfer rate	250 kbits (720 KB) or 500 kbits (1.25 MB and 1.44 MB)
Rotation speed	Up to 360 rpm
Diskette media	High density (2HD) or normal density (2DD) 3.5" diskettes
MTBF	30000 POH (Power-On Hours)
Features - DVD-RW/CD-RW drive	
Write speed CD-R CD-RW DVD-R DVD-RW DVD-RMM DVD-RAM <sup>1)</sup> DVD+R DVD+R DVD+R (double layer) DVD+RW	24x, 16x, 10x and 4x 10x and 4x 8x, 4x and 2x 4x and 2x 3x and 2x 8x, 4x and 2x 8x, 4x and 2x 2x, 4x 4x and 2x
Reading rate CD DVD	24x 8x
Data transfer rate	Max. 33.3 MB/sec.
Access time (average) CD DVD	130 ms (24x) 130 ms (8x)
Revolution speed	Max. 5090 rpm ± 1%
Starting time (0 rpm to read access) CD DVD	14 seconds (maximum) 15 seconds (maximum)
Host interface	IDE (ATAPI)
Laser class	Class 1 laser

Table 402: Technical data - USB Media Drive 5MD900.USB2-01

Features - DVD-ROM/CD-RW drive	5MD900.USB2-01
Readable media CD DVD	CD/CD-ROM (12 cm, 8 cm), CD-R, CD-RW DVD-ROM, DVD-R, DVD-RW. DVD-RAM, DVD+R, DVD+R (double layer), DVD+RW
Non-write protected media CD DVD	CD-R, CD-RW DVD-R/RW, DVD-RAM (4.7 GB), DVD+R/RW, DVD+R (double layer)
Compatible formats	CD-DA, CD-ROM mode 1/mode 2 CD-ROM XA mode 2 (form 1, form 2) Photo CD (single/multi-session), Enhanced CD, CD text DVD-ROM, DVD-R, DVD-RW, DVD video DVD-RAM (4.7 GB, 2.6 GB) DVD+R, DVD+R (double layer), DVD+RW
Write-methods CD DVD	Disk at once, session at once, packet write, track at once Disk at once, incremental, over-write, sequential, multi-session
Data buffer capacity	8 MB
Noise level (complete read access)	Approx. 48 dBA at 50 cm
Lifespan Opening/closing the drawer	60000 POH (Power-On Hours) > 10000 times
CompactFlash slot layout	
CompactFlash Type Amount Connection	Type I 1 slot IDE / ATAPI
CompactFlash LED	Signals read or write access to an inserted CompactFlash card
Hot Plug capable	Yes
Features - USB connections	
USB A on the front side Power supply Type Transfer rate	Connection of further peripheral devices Max. 500 mA 2.0 Low speed (1.5 MBit/s), full speed (12 MBit/s), to high speed (480 Mbit/s)
USB B back side	Connection to the system
Mechanical characteristics	
Outer dimensions (without slide-in) Width Length Height	70 mm 100 mm 9.5 mm
Weight	Approx. 1.1 kg (without front cover)
Environmental characteristics	
Ambient temperature Operation Storage Transport	+5°C +45°C -20°C +60°C -40°C +60°C

Environmental characteristics	5MD900.USB2-01

Table 402: Technical data - USB Media Drive 5MD900.USB2-01 (cont.)

### Accessories • USB Media Drive - 5MD900.USB2-01

Relative humidity Operation Storage Transport	20 - 80%, non-condensing 5 - 90%, non-condensing 5 - 95%, non-condensing
Vibration Operation Storage Transport	At max. 5 - 500 Hz and 0.3 g At max. 10 - 100 Hz and 2 g At max. 10 - 100 Hz and 2 g
Shock (pulse with a sine half-wave) Operation Storage (packaged) Transport (packaged)	At max. 5 g for 11 ms At max. 60 g for 11 ms At max. 60 g for 11 ms
Altitude	Max. 3000 meters

Table 402: Technical data - USB Media Drive 5MD900.USB2-01 (cont.)

1) RAM drivers are not provided by the manufacturer. Support of RAM function by the burning software "Nero" (model number 5SWUTI.0000-00) or other burning software packages and drivers from third party providers.

## 9.3 Dimensions

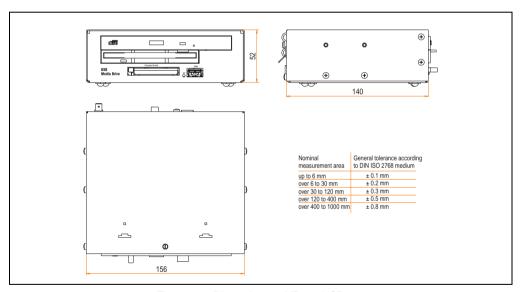


Figure 302: Dimensions - 5MD900.USB2-01

## 9.4 Dimensions with front cover

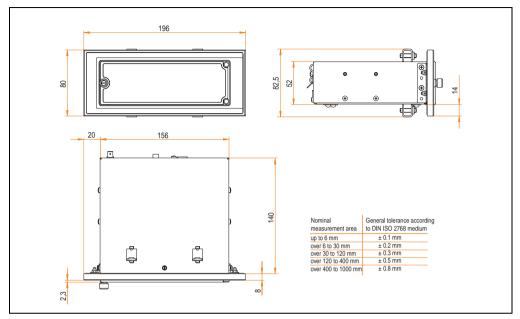


Figure 303: Dimensions - USB Media Drive with front cover

# 9.5 Contents of delivery

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

Table 403: Contents of delivery - USB Media Drive - 5MD900.USB2-01

### 9.6 Interfaces

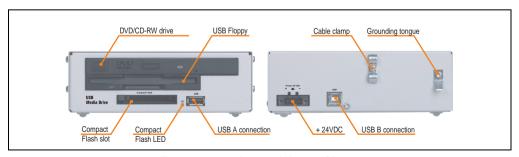


Figure 304: Interfaces - 5MD900.USB2-01

#### 9.7 Installation

The USB Media Drive can be operated as a desk-top device (rubber feet) or as a rack-mount device (2 mounting rail brackets included).

### 9.7.1 Mounting orientation

Because of limits to the mounting orientation with the components used (floppy, DVD-CDRW drive), the USB media drive is only permitted to be mounted and operated as shown in the following figure.

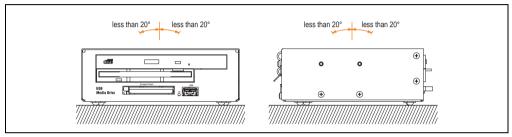


Figure 305: Mounting orientation - 5MD900.USB2-01

#### 9.8 Front cover 5A5003.03 for the USB Media Drive

This front cover can also be mounted on the front of the USB media drive (model number 5MD900.USB2-00 or 5MD900.USB2-01) to protect the interface.

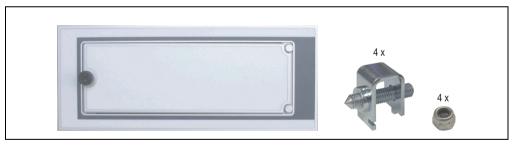


Figure 306: Front cover 5A5003.03

#### 9.8.1 Technical data

Features	5A5003.03
Front cover design / colors Dark gray border around the cover Light gray background	Similar to Pantone432CV Similar to Pantone 427CV

Table 404: Technical data - 5A5003.03

### 9.8.2 Dimensions

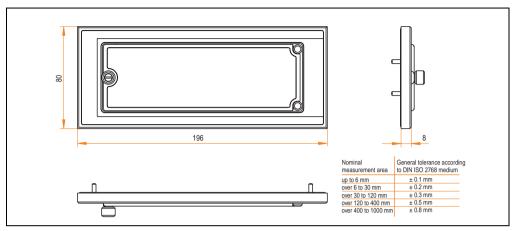


Figure 307: Dimensions - 5A5003.03

## 9.8.3 Installation

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

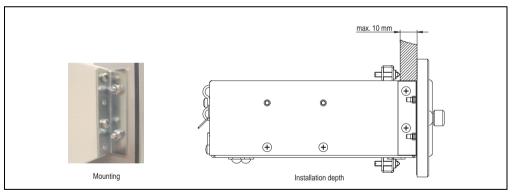


Figure 308: Front cover mounting and installation depth

### 10. USB Flash Drive 5MMUSB.0xxx-00

# Information:

We reserve the right to supply alternative products due to the vast quantity of flash drives available on the market and their corresponding short product lifecycle. As a result, it may be necessary (e.g. using the SanDisk Cruzer Micro flash drive with 512 MB) to take the following measures in order to boot from these flash drives:

- The flash drive must be reformatted or in some cases even re-partitioned (set active partition).
- The flash drive must be at the top of the BIOS boot order, or alternatively the IDE controllers can also be deactivated in the BIOS. This can be avoided in most cases if a "fdisk /mbr" command is also executed on the USB flash drive.

#### 10.1 General information

USB flash drives are easy-to-exchange storage media. Because of the fast data transfer provided by USB 2.0, USB flash drives are ideal for use as a portable memory medium. Without requiring additional drivers ("Hot Plug & Play" - except with Windows 98SE), the USB flash drive can be converted immediately into an additional drive where data can be read or written. Only USB flash drives from the memory specialists <a href="SanDisk">SanDisk</a> are used.

### 10.2 Order data

Model number	Description	Figure
5MMUSB.0128-00	USB flash drive 128 MB SanDisk Cruzer Mini	SanDisk Cruzer <sup>®</sup> Mini
5MMUSB.0256-00	USB flash drive 256 MB SanDisk Cruzer Mini	Sanuisk 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	SanDisk Cruzer® Micro
5MMUSB.2048-00	USB flash drive 2 GB SanDisk Cruzer Micro	Cruzer micro

Table 405: Order data - USB flash drives

# Information:

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

Features	5MMUSB.0128-00	5MMUSB.0256-00	5MMUSB.0512-00	5MMUSB.1024-00	5MMUSB.2048-00
LED Cruzer Mini / Cruzer Micro	1 LED (green), signals data transfer (send and receive)				
Power supply Current requirements Cruzer Mini / Cruzer Micro	Via the USB port 650 μA sleep mode, 150 mA read/write				
Interface Cruzer Mini / Cruzer Micro Type Transfer rate Sequential reading Sequential writing Connection	USB specification 2.0 high speed device, mass storage class, USB-IF and WHQL certified USB 1.1 and 2.0-compatible Up to 480 Mbit (high speed) Max. 8.7 MB/second Max. 1.7 MB/second To each USB type A interface				
MTBF (at 25°C) Cruzer Mini / Cruzer Micro			100000 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 <sup>1)</sup> , ME, 2000, XP, Mac OS 9.1.x and Mac OS X 10.1.2 Windows CE 4.2, CE 5.0, ME, 2000, XP and Mac OS 9.1.x+, OS X v10.1.2+				
Mechanical characteristics					
Dimensions Height - Cruzer Mini / Cruzer Micro Width - Cruzer Mini / Cruzer Micro Depth - Cruzer Mini / Cruzer Micro	62 mm / 52.2 mm 19 mm / 19 mm 11 mm / 7.9 mm				
Environmental characteristics					
Environmental temperature Cruzer Mini / Cruzer Micro Operation Storage Transport	0°C +45°C -20°C +60°C -20°C +60°C				
Humidity Cruzer Mini / Cruzer Micro Operation Storage Transport	10% 90%, non-condensing 5% 90%, non-condensing 5% 90%, non-condensing				
Vibration Cruzer Mini / Cruzer Micro Operation Storage Transport	At 10 - 500 Hz: 2 g (19.6 m/s <sup>2</sup> 0 peak), oscillation rate 1/minute At 10 - 500 Hz: 4 g (39.2 m/s <sup>2</sup> 0 peak), oscillation rate 1/minute At 10 - 500 Hz: 4 g (39.2 m/s <sup>2</sup> 0 peak), oscillation rate 1/minute				

Table 406: Technical data - USB flash drive 5MMUSB.xxxx-00

### Accessories • USB Flash Drive 5MMUSB.0xxx-00

Features	5MMUSB.0128-00	5MMUSB.0256-00	5MMUSB.0512-00	5MMUSB.1024-00	5MMUSB.2048-00
Shock Cruzer Mini / Cruzer Micro Operation Storage Transport		Max. 80 g (7)	92 m/s <sup>2</sup> 0-peak) and 84 m/s <sup>2</sup> 0-peak) and 84 m/s <sup>2</sup> 0-peak) and	11 ms length	
Altitude Cruzer Mini / Cruzer Micro Operation Storage Transport			3048 meters 12192 meters 12192 meters		

Table 406: Technical data - USB flash drive 5MMUSB.xxxx-00 (cont.)

### 10.3.1 Temperature humidity diagram - Operation and storage

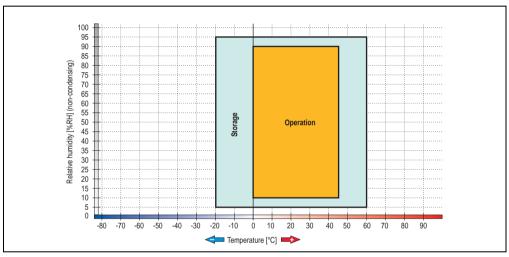


Figure 309: Temperature humidity diagram for flash drives 5MMUSB.xxxx-00

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

<sup>1)</sup> For Win 98SE, a driver can be downloaded from the SanDisk homepage.

# 10.4 Contents of delivery

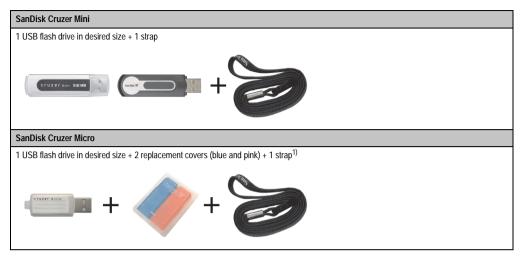


Table 407: Contents of delivery - USB flash drives 5MMUSB.xxxx-00

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

#### Accessories • USB Flash Drive 5MMUSB.0xxx-00

### 10.5 Creating a bootable USB flash drive

When used in connection with an Automation PC 620 / Panel PC 700, it is possible to boot the system from one of the flash drives available from B&R (5MMUSB.0128-00, 5MMUSB.0256-00, 5MMUSB.0512-00, 5MMUSB.1024-00, 5MMUSB.2048-00). The flash drive must be specially prepared for this.

### 10.5.1 Requirements

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

- B&R USB flash drive (see model number "USB flash drives" on page 38)
- Automation PC 620 or Panel PC 700
- USB floppy drive (external or slide-in USB floppy 5AC600.FDDS-00)
- PS/2 or USB keyboard
- A start disk created using MS-DOS 6.22 or Windows 98 1.44MB HDD (Windows Millennium, NT4.0, 2000, XP start disks cannot be used).
   The tools "format.com" and "fdisk.exe" must be located on the diskette!

### 10.5.2 Procedure

- Plug in the flash drive and boot from the start disk.
- Set active partition on the flash drive using "fdisk" and follow the further instructions.
- · Reboot the system from the start disk.
- Format and simultaneously transfer the system files to the flash drive with the command "format c: /s".

# 11. HMI Drivers & Utilities DVD 5SWHMI.0000-00



Figure 310: HMI Drivers & Utilities DVD 5SWHMI.0000-00

Model number	Short description	Comment
5SWHMI.0000-00	HMI Drivers & Utilities DVD	

Table 408: Model number - HMI Drivers & Utilities DVD

This DVD contains drivers, utilities, software upgrades and user's manuals for B&R Panel system products (see B&R homepage – Industrial PCs, Visualization and Operation). Information in detail:

## **BIOS** upgrades for the products

- Automation PC 620
- Panel PC 700
- Automation PC 680
- Provit 2000 product family IPC2000/2001/2002
- Provit 5000 product family IPC5000/5600/5000C/5600C
- Power Panel 100 BIOS devices
- Mobile Panel 100 BIOS devices
- Power Panel 100 / Mobile Panel 100 user boot logo
- Power Panel 100 / Mobile Panel 100 REMHOST utility

### Accessories • HMI Drivers & Utilities DVD 5SWHMI.0000-00

#### **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

- Thin client
- Windows CE
- · Windows NT Embedded
- · Windows XP Embedded

### **MCAD** templates for

- Industrial PCs
- Visualization and operating devices
- · Legend strip templates

#### **Documentation for**

- B&R Windows CE
- Automation PC 620
- Automation PC 680
- Automation Panel 900
- Panel PC 700
- Power Panel 15/21/35/41
- Power Panel 100/200
- Provit 2000
- Provit 3030
- Provit 4000
- Provit 5000
- Provit Benchmark
- Provit Mkey
- Windows NT Embedded application guide
- · Windows XP Embedded application guide
- Uninterruptible power supply

#### Service tools

- Acrobat Reader 5.0.5 (freeware in German, English, and French)
- Power Archiver 6.0 (freeware in German, English, and French)
- Internet Explorer 5.0 (German and English)
- Internet Explorer 6.0 (German and English)

## 12. Cables

### 12.1 DVI cable 5CADVI.0xxx-00

The DVI cables 5CADVI.0xxx-00 are designed for fixed installation.

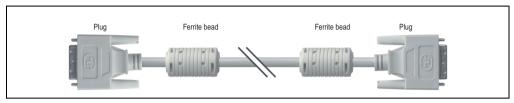


Figure 311: DVI extension cable (similar)

# Caution!

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

### 12.1.1 Order data

Model number	Description	Comment
5CADVI.0018-00	DVI-D cable 1.8 m / single Single cable, DVI-D/m:DVI-D/m; length: 1.8m	
5CADVI.0050-00	DVI-D cable 5 m / single Single cable, DVI-D/m:DVI-D/m; length: 5 m	
5CADVI.0100-00	DVI-D cable 10 m / single Single cable, DVI-D/m:DVI-D/m; length: 10 m	

Table 409: Model numbers - DVI cables

#### 12.1.2 Technical data

Features	5CADVI.0018-00	5CADVI.0050-00	5CADVI.0100-00
Length Tolerance	1.8 m ±30 mm	5 m ±50 mm	10 m ±100 mm
Cable diameter Maximum		8.5 mm	
Shielding	Individual cable pairs and entire cable		
Connector type Connection cycles	2x DVI-D (18+1), male 100		
Wire cross section		AWG 28	
Line resistance	Max. 237Ω/km		
Insulation resistance		Min. 100 MΩ/km	

Table 410: Technical data - DVI cable 5CADVI.0xxx-00

Features	5CADVI.0018-00	5CADVI.0050-00	5CADVI.0100-00
Flexibility	limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5 x cable diameter, 20 cycles / minute)		
Flex radius fixed installation	See figure "Flex radius specification" on page 625 $\geq$ 5 x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)		
Weight	Approx. 300 g	Approx. 590 g	Арргох. 2,100 g

Table 410: Technical data - DVI cable 5CADVI.0xxx-00 (cont.)

# 12.1.3 Flex radius specification

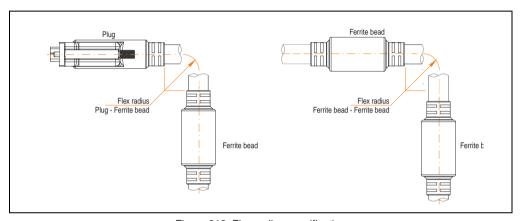


Figure 312: Flex radius specification

## 12.1.4 Cable specifications

The following figure shows the pin assignments for the DVI cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

# Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly.

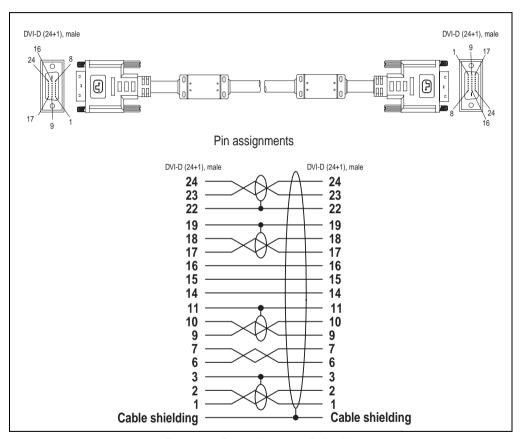


Figure 313: Pin assignments - DVI cable

# 12.2 APC620 internal supply cable 5CAMSC.0001-00

This supply cable is used internally e.g. to supply special PCI cards. It is connected to the APC620 main board. For requirements and procedures, see appendix A, section "Connection of an external device to the main board" on page 714.

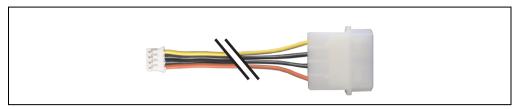


Figure 314: APC620 internal supply cable 5CAMSC.0001-00

### 12.2.1 Order data

Model number	Description	Comment
5CAMSC.0001-00	APC620 internal supply cable	

Table 411: Model number - APC620 internal supply cable

#### 12.2.2 Technical data

Features	5CAMSC.0001-00
Length	100 mm ± 5 mm
Connector type	1x disk drive power plug 4-pin male, 1x plug housing 4-pin female
Wire cross section	AWG 22
Flexibility	Flexible

Table 412: Technical data - 5CAMSC.0001-00

## 12.3 SDL cable 5CASDL.0xxx-00

The SDL cables 5CASDL.0xxx-00 are designed for fixed installation. Use of the SDL flex cable 5CASDL.0xxx-03 is required for a flexible installation (e.g. in swing arm systems).

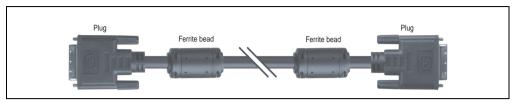


Figure 315: SDL extension cable (similar)

# Caution!

SDL cables can only be plugged in and unplugged when the device is turned off.

### 12.3.1 Order data

Model number	Description	Comment
5CASDL.0018-00	SDL cable 1.8 m SDL cable for a fixed type of layout; length: 1.8 m	
5CASDL.0050-00	SDL cable 5 m SDL cable for a fixed type of layout; length: 5 m	
5CASDL.0100-00	SDL cable 10 m SDL cable for a fixed type of layout; length: 10 m	
5CASDL.0150-00	SDL cable 15 m SDL cable for a fixed type of layout; length: 15 m	
5CASDL.0200-00	SDL cable 20 m SDL cable for a fixed type of layout; length: 20 m	
5CASDL.0250-00	SDL cable 25 m SDL cable for a fixed type of layout; length: 25 m	
5CASDL.0300-00	SDL cable 30 m SDL cable for a fixed type of layout; length: 30 m	

Table 413: Model numbers - SDL cables

## 12.3.2 Technical data

Features	5CASDL.0018- 00	5CASDL.0050- 00	5CASDL.0100- 00	5CASDL.0150- 00	5CASDL.0200- 00	5CASDL.0250- 00	5CASDL.0300- 00
Length Tolerance	1.8 m ±50 mm	5 m ±80 mm	10 m ±100 mm	15 m ±120 mm	20 m ±150 mm	25 m ±200 mm	30 m ±200 mm
Cable diameter Typical Maximum	8.6 ±0 9 n	).2 mm nm	11 ±0.2 mm 11.5 mm				
Shielding			Individual	cable pairs and e	entire cable		
Connector type Connection cycles	2x DVI-D (24+1), male 100						
Wire cross section	AWO	G 28			AWG 24		
Line resistance	Max. 23	37Ω/km			Max. 93Ω/km		
Insulation resistance				Min. 10 MΩ/km			
Flexibility	limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5 x cable diameter, 20 cycles / minute)					er, 20 cycles /	
Flex radius fixed installation	See figure "Flex radius specification" on page 629 ≥ 5 x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)						
Weight	Approx. 300 g	Approx. 590 g	Approx. 2,100 g	Approx. 3,000 g	Approx. 4,100 g	Approx. 5,100 g	Approx. 6,100 g

Table 414: Technical data - SDL cables 5CASDL.0xxx-00

# 12.3.3 Flex radius specification

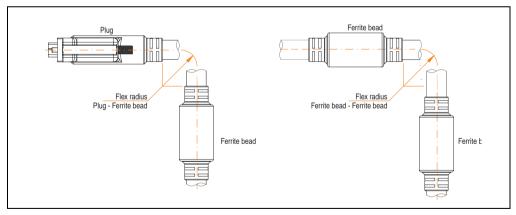


Figure 316: Flex radius specification

## 12.3.4 Cable specifications

The following figure shows the pin assignments for the SDL cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

# Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly.

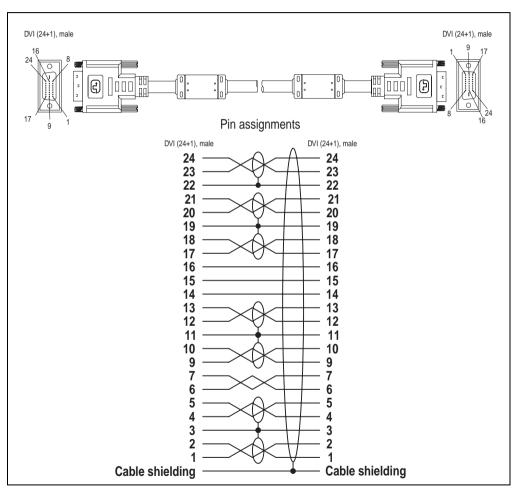


Figure 317: Pin assignments - SDL cable 5CASDL.0xxx-00

# 12.4 SDL cable with 45° plug 5CASDL.0xxx-01

The SDL cables 5CASDL.0xxx-01 are designed for fixed installation.

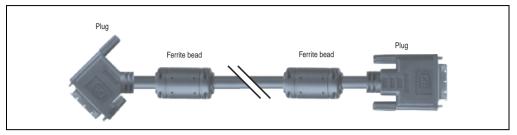


Figure 318: SDL cable with 45° plug (similar)

# Caution!

SDL cables can only be plugged in and unplugged when the device is turned off.

### 12.4.1 Order data

Model number	Description	Comment
5CASDL.0018-01	SDL cable 1.8 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 1.8 m	
5CASDL.0050-01	SDL cable 5 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 5 m	
5CASDL.0100-01	SDL cable 10 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 10 m	
5CASDL.0150-01	SDL cable 15 m 45° SDL cable for fixed type of layout with one-sided 45° plug; length: 15 m	

Table 415: Model numbers - SDL cables with 45° plug

## 12.4.2 Technical data

Features	5CASDL.0018-01	5CASDL.0050-01	5CASDL.0100-01	5CASDL.0150-01	
Length Tolerance	1.8 m ±50 mm	5 m ±80 mm	10 m ±100 mm	15 m ±120 mm	
Cable diameter Maximum	9 mm 11.5 mm				
Shielding		Individual cable pa	irs and entire cable		
Connector type Connection cycles	2x DVI-D (24+1), male 100				
Wire cross section	AWO	G 28	AW	G 24	
Line resistance	Max. 23	37Ω/km	Max. 9	3Ω/km	
Insulation resistance		Min. 10	MΩ/km		
Flexibility	limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5 x cable diameter, 20 cycles / minute)				
Flex radius fixed installation	See figure "Flex radius specification" on page 632 ≥ 5 x cable diameter (plug - ferrite magnet and ferrite magnet - ferrite magnet)				
Weight	Approx. 300 g	Approx. 590 g	Approx. 2,100 g	Approx. 3,000 g	

Table 416: Technical data - SDL cable with 45° plug 5CASDL.0xxx-01

# 12.4.3 Flex radius specification

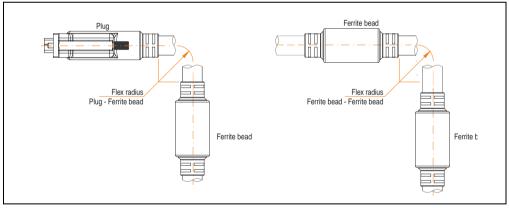


Figure 319: Flex radius specification

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.

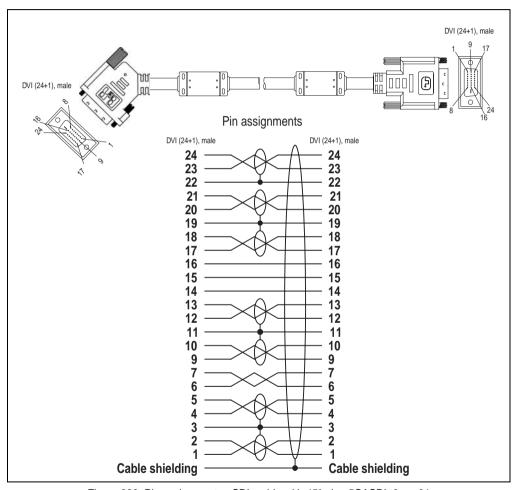


Figure 320: Pin assignments - SDL cable with 45° plug 5CASDL.0xxx-01

### 12.5 SDL cable with extender 5CASDL.0x00-10

The SDL cables (with extender) 5CASDL.0xxx-10 are designed for fixed installation. Use of the SDL flex cable (with extender) 5CASDL.0x00-13 is required for a flexible installation (e.g. in swing arm systems).

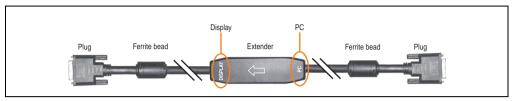


Figure 321: SDL cable with extender (similar)

# Caution!

SDL cables with extender can only be plugged in and unplugged when the device is turned off. The correct direction of connection (Display, PC) for the wiring is illustrated on the middle of the extender.

### 12.5.1 Order data

Model number	Description	Comment
5CASDL.0300-10	30 m SDL cable with extender SDL cable with extender for a fixed type of layout; length 30 m	Cancelled since 12/2006 Replaced by 5CASDL.0300- 13
5CASDL.0400-10	40 m SDL cable with extender SDL cable with extender for a fixed type of layout; length 40 m	Cancelled since 12/2006 Replaced by 5CASDL.0400- 13

Table 417: Model numbers - SDL cable with extender

## 12.5.2 Technical data

Features	5CASDL.0300-10	5CASDL.0400-10				
Length Tolerance	30 m ±200 mm	40 m ±200 mm				
Dimensions of extender box	Height 18.5 mm, width	35 mm, length 125 mm				
Cable diameter Maximum	11.5	mm				
Shielding	Individual cable pa	irs and entire cable				
Connector type Connection cycles	2x DVI-D (24+1), male 100					
Wire cross section	AWO	AWG 24				
Line resistance	Max. 9	3Ω/km				
Insulation resistance	Min. 10	MΩ/km				
Flexibility	limited flexibility; valid for ferrite magnet - ferrite magnet (tested 100 cycles with 5 x cable diameter, 20 cycles minute)					
Flex radius fixed installation	See figure "Flex radius specification" on page 635 ≥ 5 x cable diameter (from plug - ferrite magnet and ferrite magnet - extender)					
Weight	Approx. 6,100 g	Approx. 8,100 g				

Table 418: Technical data - SDL cable with extender 5CASDL.0x00-10

# 12.5.3 Flex radius specification

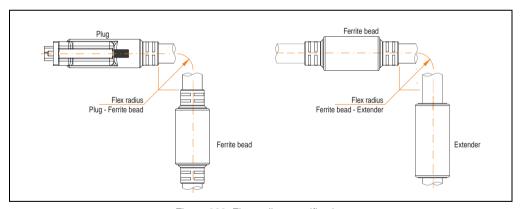


Figure 322: Flex radius specification

#### **Accessories • Cables**

#### 12.5.4 Cable connection

The SDL cable with extender must be connected between the Automation PC 620 and Automation Panel 900 display unit in the correct direction. The correct signal direction is indicated on the extender unit for this purpose:

- Connect the end labeled "PC" with the video output of the Automation PC 620.
- The "Display" end should be connected to the display unit Automation Panel 900.

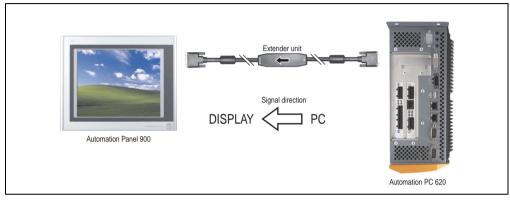


Figure 323: Example of the signal direction for the SDL cable with extender

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.

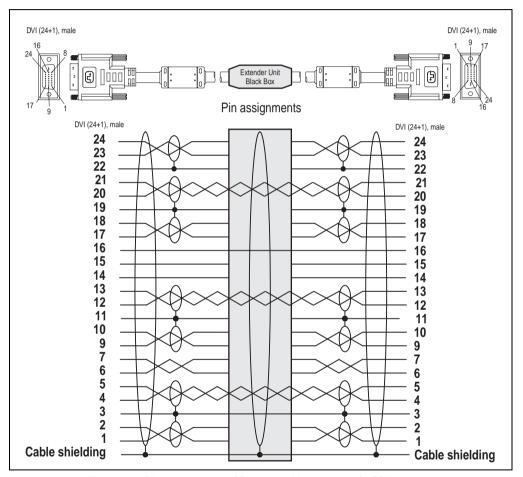


Figure 324: Pin assignments - SDL cable with extender 5CASDL.0x00-10

## 12.6 SDL flex cable 5CASDL.0xxx-03

The SDL flex cables 5CASDL.0xxx-03 are designed for both fixed and flexible installations (e.g. in swing arm systems).

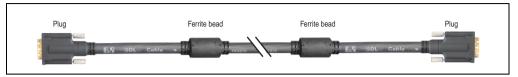


Figure 325: SDL cable 5CASDL.0xxx-03 (similar)

# Caution!

SDL cables can only be plugged in and unplugged when the device is turned off.

## 12.6.1 Order data

Model number	Description	Comment
5CASDL.0018-03	1.8 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 1.8 m	
5CASDL.0050-03	5 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 5 m	
5CASDL.0100-03	10 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 10 m	
5CASDL.0150-03	15 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 15 m	
5CASDL.0200-03	20 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 20 m	
5CASDL.0250-03	25 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 25 m	
5CASDL.0300-03	30 m flex SDL cable SDL cable for fixed and flexible type of layout; length: 30 m	

Table 419: Model numbers - SDL cable 5CASDL.0xxx-03

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Mechanical characteristics	5CASDL.0018- 03	5CASDL.0050- 03	5CASDL.0100- 03	5CASDL.0150- 03	5CASDL.0200- 03	5CASDL.0250- 03	5CASDL.0300 03
Length Tolerance	1.8 m ±20 mm	5 m ±45 mm	10 m ±90 mm	15 m ±135 mm	20 m ±180 mm	25 m ±230 mm	30 m ±280 mm
Cable diameter Maximum				12 mm			
Shielding			Individual	cable pairs and e	entire cable		
Connector type Connection cycles Contacts Mechanical protection				DVI-D (24+1), m Min. 200 Gold plated er with crimped s			
Max. tension During installation During operation				≤ 400 N ≤ 50 N			
Materials Cable shielding Color				RoHS compliant oil clad + tinned c c (similar to RAL	opper mesh		
Flexibility	flexible; valid for	r ferrite magnet	- ferrite magnet (t	ested 300000 cy	cles with 15 x cal	ole diameter, 480	0 cycles / hour
Flex radius fixed installation		See figure "Flex radius specification" on page 640 ≥ 6 x cable diameter (from plug - ferrite magnet) ≥ 10 x cable diameter (from ferrite magnet - ferrite magnet)					
flexible installation		≥ 15 x cable diameter (from ferrite magnet - ferrite magnet)					
Weight	Approx. 450 g	Approx. 1,000 g	Approx. 2,000 g	Approx. 3,000 g	Approx. 4,000 g	Approx. 5,000 g	Approx. 6,000 g
Electrical properties (at +20°C)							
Wire cross section				AWG (control wii WG (DVI, USB,			
Line resistance 24 AWG 26 AWG				≤ 95 Ω/km ≤ 145 Ω/km			
Insulation resistance				> 200 MΩ/km			
Wave impedance				$100\pm10~\Omega$			
Test voltage Wire/wire Wire/shield				1 kV <sub>eff</sub> 0.5 kV <sub>eff</sub>			
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		100000 cyc	cles (tested angle	of rotation: ± 85	°; speed: 50 cycl	es / minute)	

Table 420: Technical data - SDL cable 5CASDL.0xxx-03

### Accessories • Cables

Standards and certifications	5CASDL.0018- 03	5CASDL.0050- 03	5CASDL.0100- 03	5CASDL.0150- 03	5CASDL.0200- 03	5CASDL.0250- 03	5CASDL.0300- 03
Cable drag chain	Te	300000 cycles Tested flex radius: 180 mm;15 x cable diameter; hub: 460 mm; speed: 4800 cycles / hour					our
Approbation	UL AWM 20236 80°C 30 V						
Oil and hydrolysis resistance	According to VDE 0282-10						

Table 420: Technical data - SDL cable 5CASDL.0xxx-03 (cont.)

# 12.6.3 Flex radius specification

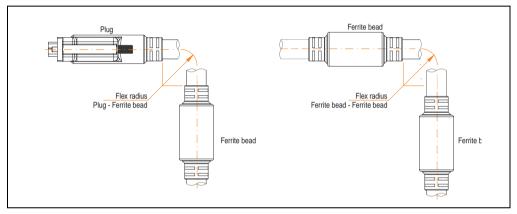


Figure 326: Flex radius specification

### 12.6.4 Dimensions

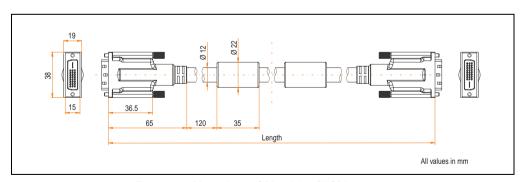


Figure 327: Dimensions - SDL cable 5CASDL.0xxx-03

# 12.6.5 Construction

Element	Assignment	Cross section	
DVI	TMDS data 0	26 AWG	
	TMDS data 1	26 AWG	
	TMDS data 2	26 AWG	
	TMDS cycle	26 AWG	
USB	XUSB0	26 AWG	
	XUSB1	26 AWG	
Data	SDL	26 AWG	
Control wires	DDC cycle	24 AWG	
	DDC data	24 AWG	
	+ 5 V	24 AWG	
	mass	24 AWG	
	Hot Plug detect	24 AWG	

Table 421: Structure - SDL cable 5CASDL.0xxx-03

### 12.6.6 Cable specifications

The following figure shows the pin assignments for the SDL cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

# Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly.

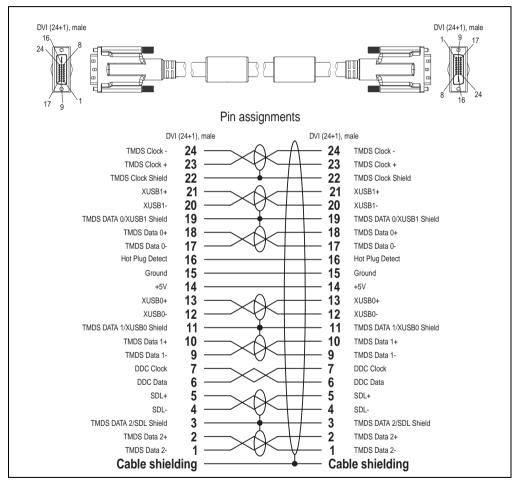


Figure 328: Pin assignments - SDL cable 5CASDL.0xxx-03

### 12.7 SDL flex cable with extender 5CASDL.0x00-13

The SDL flex cables (with extender) 5CASDL.0x00-13 are designed for both fixed and flexible installations (e.g. in swing arm systems).

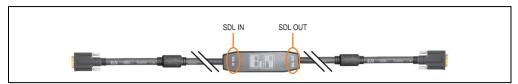


Figure 329: SDL flex cable with extender - 5CASDL.0x00-13 (similar)

# Caution!

SDL cables with extender can only be plugged in and unplugged when the device is turned off. The correct direction of connection (SDL IN, SDL OUT) for the wiring is illustrated on the middle of the extender and between the ferrite magnet and plug (with a sticker).

#### 12.7.1 Order data

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

Table 422: Model numbers - SDL flex cable with extender

#### 12.7.2 Technical data

Features	5CASDL.0300-13	5CASDL.0400-13
Length Tolerance	30 m ±200 mm	40 m ±200 mm
Dimensions of extender box	Height 18.5 mm, width 35 mm, length 125 mm	
Cable diameter Maximum	12 mm	
Shielding	Individual cable pairs and entire cable	
Connector type Connection cycles Contacts Mechanical protection	2x DVI-D (24+1), male Min. 200 Gold plated Metal cover with crimped stress relief	
Max. tension During installation During operation	≤ 400 N ≤ 50 N	

Table 423: Technical data - SDL flex cable with extender 5CASDL.0x00-13

## Accessories • Cables

Features	5CASDL.0300-13	5CASDL.0400-13
Materials Cable shielding Color	RoHS compliant Aluminum foil clad + tinned copper mesh Black (similar to RAL 9005)	
Flexibility	flexible; valid for ferrite magnet - ferrite magnet (tested 300000 cycles with 15 x cable diameter, 4800 cycles / hour)	
Flex radius fixed installation	See figure "Flex radius specification" on page 645 ≥ 6 x cable diameter (from plug - ferrite magnet) ≥ 10 x cable diameter (from ferrite magnet - extender) ≥ 15 x cable diameter (from ferrite magnet - ferrite magnet)	
Weight	Approx. 6,200 q	Approx. 8,000 q
Electrical properties (at +20°C)	. #prom 0,200 g	, Approximation of
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 $\pm$ 10 $\Omega$	
Test voltage Wire/wire Wire/shield	1 kV <sub>eff</sub> 0.5 kV <sub>eff</sub>	
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	100000 cycles (tested angle of rotation: ± 85°; speed: 50 cycles / minute)	
Cable drag chain	300000 cycles Tested flex radius: 180 mm;15 x cable diameter; hub: 460 mm; speed: 4800 cycles / hour	
Approbation	UL AWM 20236 80°C 30 V	
Oil and hydrolysis resistance	According to VDE 0282-10	

Table 423: Technical data - SDL flex cable with extender 5CASDL.0x00-13 (cont.)

## 12.7.3 Flex radius specification

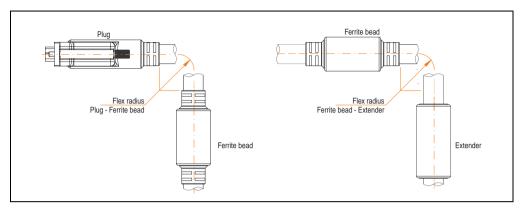


Figure 330: Flex radius specification

## 12.7.4 Dimensions

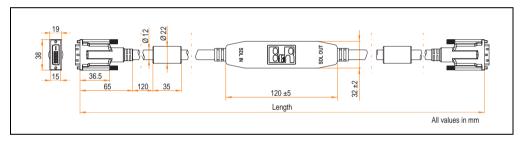


Figure 331: Dimensions - SDL flex cable with extender 5CASDL.0x00-13

#### **Accessories • Cables**

#### 12.7.5 Cable connection

The SDL flex cable with extender must be connected between the Industrial PC and Automation Panel 900 display unit in the correct direction. The signal direction is indicated on the extender unit for this purpose:

- Connect the end labeled "SDL IN" with the video output of the Automation PC 620 or Panel PC 700 (monitor/panel output) or Panel OUT of an AP900 AP Link card.
- The "SDL OUT" end should be connected to the display unit (e.g. Automation Panel 900) via the Automation Panel Link insert card (Panel IN).

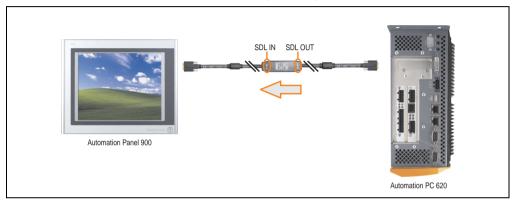


Figure 332: Example of the signal direction for the SDL flex cable with extender - APC620

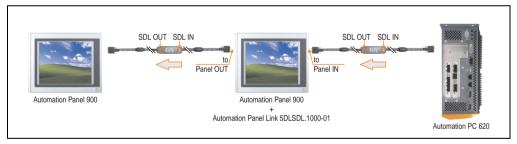


Figure 333: Example of the signal direction display - SDL flex cable with extender

The following figure shows the pin assignments for the SDL flex cable with extender available at B&R.

# Information:

Only B&R SDL flex cables with extender can be used.

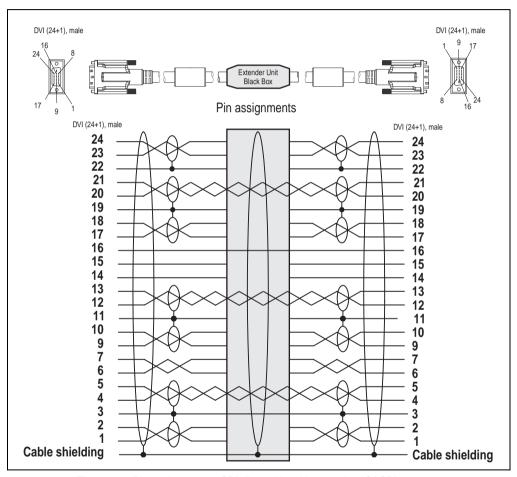


Figure 334: Pin assignments - SDL flex cable with extender 5CASDL.0x00-13

## 12.8 RS232 cable 9A0014-xx

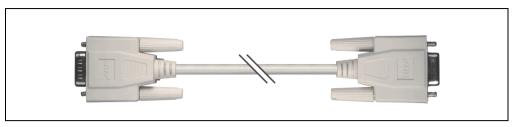


Figure 335: RS232 extension cable (similar)

#### 12.8.1 Order data

Model number	Description	Comment
9A0014.02	RS232 cable DB9/f:DB9/m 1.8 m RS232 extension cable for remote operation of a display unit with touch screen, length 1.8 m.	
9A0014.05	RS232 cable DB9/f:DB9/m 5 m RS232 extension cable for remote operation of a display unit with touch screen, length 5 m.	
9A0014.10	RS232 cable DB9/f:DB9/m 10 m RS232 extension cable for remote operation of a display unit with touch screen, length 10 m.	

Table 424: Model numbers - RS232 cables

## 12.8.2 Technical data

Features	9A0014.02	9A0014.05	9A0014.10
Length	1.8 m ± 50 mm	5 m ± 80 mm	10 m ± 100 mm
Outer diameter		Max. 5 mm	
Shielding	Entire cable		
Connector type	DSUB (9-pin), male / female		
Wire cross section	AWG 26		
Flexibility	Flexible		
Flex radius	Min. 70 mm		

Table 425: Technical data - RS232 cables

## 12.8.3 Cable specifications

The following figure shows the pin assignments for the RS232 cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

# Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly.

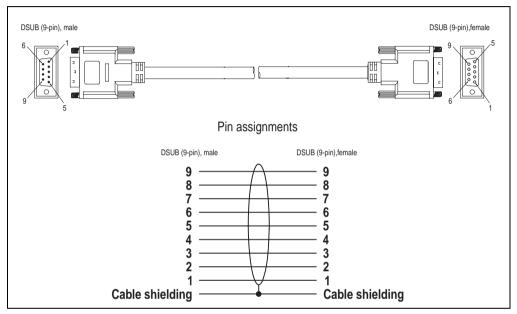


Figure 336: Pin assignments - RS232 cable

# 12.9 USB cable 5CAUSB.00xx-00



Figure 337: USB extension cable (similar)

## 12.9.1 Order data

Model number	Description	Comment
5CAUSB.0018-00	USB 2.0 cable, A/m:B/m 1.8 m USB 2.0 connection cable; plug type A - type B; length 1.8 m	
5CAUSB.0050-00	USB 2.0 cable, A/m:B/m 5 m USB 2.0 connection cable; plug type A - type B; length 5 m	

Table 426: Model numbers - USB cables

#### 12.9.2 Technical data

Features	5CAUSB.0018-00	5CAUSB.0050-00	
Length	1.8 m ± 30 mm	5 m ± 50 mm	
Outer diameter	Max.	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 427: Technical data - USB cables

## 12.9.3 Cable specifications

The following figure shows the pin assignments for the USB cable available at B&R. If you want to build a suitable cable yourself, it should be wired according to these specifications.

# Warning!

If a self-built cable is used, B&R cannot guarantee that it will function properly.

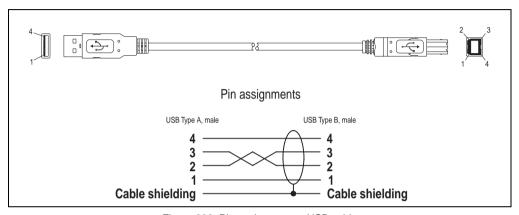


Figure 338: Pin assignments - USB cable

#### 13. APC620 UPS

With the optionally integrated UPS, the Automation PC 620 makes sure that the PC system completes write operations even after a power failure occurs. When the UPS detects a power failure, it switches to battery operation immediately without interruption. This means that all running programs will be ended properly by the UPS software. This prevents the possibility of inconsistent data (only functions if the UPC is already configured and the driver is activated).

# Information:

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

By integrating the charging circuit in the Automation PC 620 housing, the installation has been reduced to merely attaching the connection cable to the battery unit mounted next to the PC.

Special emphasis was placed on ease of maintenance when the battery unit was designed. The batteries are easily accessible from the front and can be switched in just a few moments when servicing.

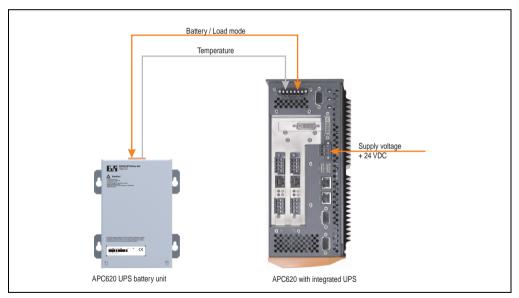


Figure 339: UPS principle

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

## 13.2 Requirements

1) An appropriate system unit.

The add-on UPS module (5AC600.UPSI-00) can only be installed with the following APC620 system unit revisions:

System unit	Revision
5PC600.SX01-00	Starting with revision H0
5PC600.SX02-00	Starting with revision G0
5PC600.SX02-01	Starting with revision H0
5PC600.SX05-00	Starting with revision F0
5PC600.SX05-01	Starting with revision F0

Table 428: System unit revisions - Add-on UPS module

- 2) Add-on UPS module 5AC600.UPSI-00 For more on installing the add-on modules, see chapter 7 "Maintenance / Servicing", section 4 "Installation of the UPS module" on page 689.
- 3) Battery unit 5AC600.UPSB-00
- 4) UPS connection cable 0.5 m (5CAUPS.0005-00) or 3 m (5CAUPS.0030-00)
- 5) APC620 firmware versions:

To read the status or make changes to the settings of the APC620 add-on UPS (5AC600.UPSI-00) and the APC620 battery unit (5AC600.UPSB-00), the following software components are necessary:

Software name	Туре	Version
MTCX PX32 <sup>1)</sup>	Firmware	1.61 or later
MTCX FPGA <sup>1)</sup>	Firmware	1.18 or higher
ADI Control Center <sup>1)</sup>	Driver / Control Center	1.60 or later

Table 429: Firmware and software required for the UPS

For info regarding upgrading the firmware, see chapter 4 "Software", section 1.7 "Upgrading the firmware" on page 504.

<sup>1)</sup> The software can be downloaded from the B&R homepage (www.br-automation.com).

#### Accessories • APC620 UPS

The APC620 firmware version can be read in BIOS under the main menu item "Advanced", submenu item "Baseboard/Panel Features", or in the B&R Control Center.

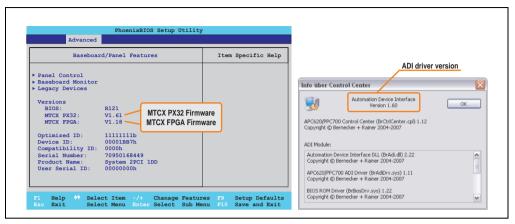


Figure 340: Firmware and software required for the UPS

The required firmware versions can be found in the APC620 / Panel PC firmware upgrade (MTCX, SDLR, SDLT)  $V1.16^{1}$ ).

 To configure: Automation Device Interface driver version 1.60 or higher (for the ADI Control Center)

For info regarding configuration of the B&R UPS using the ADI Control Center, see chapter 4 "Software", section 7.2 "UPS configuration" on page 540.

<sup>1)</sup> The software can be downloaded from the B&R homepage (www.br-automation.com).

# 13.3 Individual components

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

The add-on UPS module can easily be installed in an appropriate APC620 system unit (List of required revisions: see section "Requirements" on page 653).

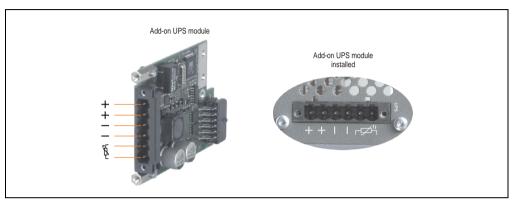


Figure 341: Add-on UPS module 5AC600.UPSI-00

#### **Technical data**

Features	5AC600.UPSI-00	
Switching threshold mains / battery operation	15 / 13 V	
Mains failure bridging	Max. 20 min at 150 W load	
Charging current	Max. 0.5 A	
Deep discharge protection	Yes, at 10 V of the battery unit	
Short circuit protection	No	
Power requirements	Max. 7.5 watts	
Status indicators	Via the ADI Control Center (see section "UPS configuration" on page 540)	
Parameter settings	Via the ADI Control Center (see section "UPS configuration" on page 540)	

Table 430: Technical data - 5AC600.UPSI-00

## **Accessories • APC620 UPS**

#### Installation

The module is installed using the materials included in the delivery. For installation instructions, see section "Installation of the UPS module" on page 689.

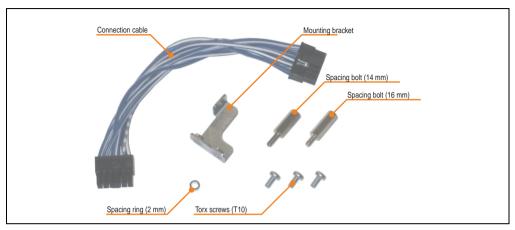


Figure 342: Add-on UPS module 5AC600.UPSI-00 - Installation materials

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

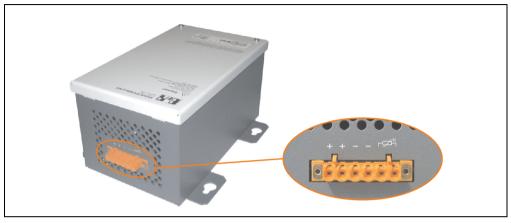


Figure 343: Battery unit 5AC600.UPSB-00

## **Technical data**

Features	5AC600.UPSB-00	
Battery Type Method	Enersys Cyclon 2 V 5 Ah; (6 connected in series) Single cell (X cell)	
Operating current	Max. 8 A	
Deep discharge voltage	10 V	
Dimensions (W x H x D)	Figure 346 "Dimensions - 5AC600.UPSB-00" on page 659	
Temperature sensor	NTC resistance	
Weight	Approx. 3.2 kg	
Ambient temperature Operation Storage Transport	-40°C +80°C -65°C +80°C -65°C +80°C	
Relative humidity Operation Storage Transport	5 - 95% (non-condensing) 5 - 95% (non-condensing) 5 - 95% (non-condensing)	
Altitude	Max. 3000 meters	
Mounting instructions	See section "Mounting instructions" on page 660.	
Lifespan	10 years at 25°C (up to 80% battery capacity)	
Maintenance interval during storage	Load once every 6 months	

Table 431: Technical data - 5AC600.UPSB-00

## Accessories • APC620 UPS

## Temperature life span diagram up to 20% battery capacity.

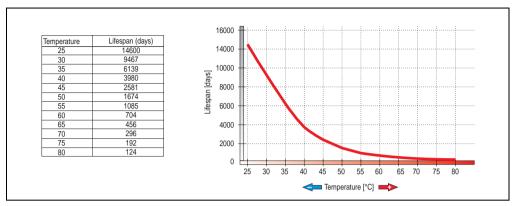


Figure 344: Temperature life span diagram

## Deep discharge cycles

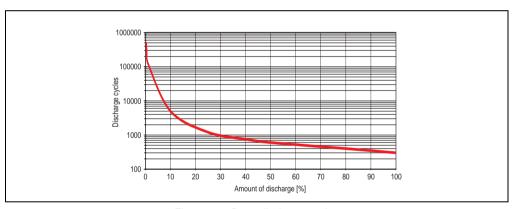


Figure 345: Deep discharge cycles

# **Dimensions**

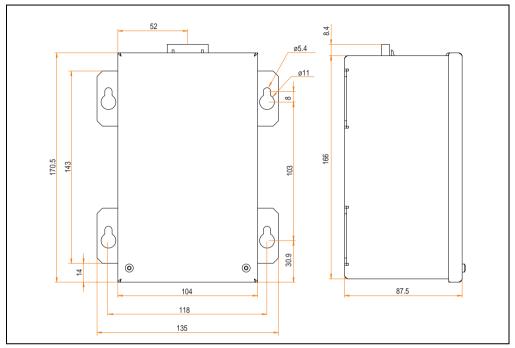


Figure 346: Dimensions - 5AC600.UPSB-00

## **Drilling template**

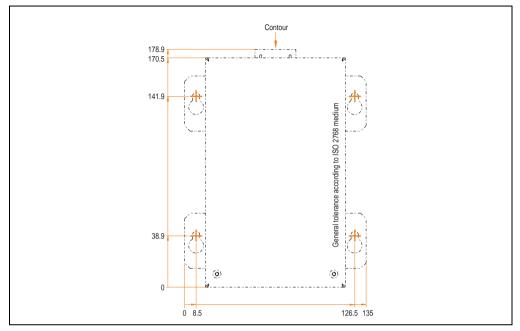


Figure 347: Drilling template for the battery unit

# **Mounting instructions**

Due to the unique construction of these batteries, they can be stored and operated in any position.

## 13.3.3 UPS connection cable



Figure 348: UPS connection cable

## **Technical data**

Features	5CAUPS.0005-00	5CAUPS.0030-00	
Length	0.5 m	3 m	
Outer diameter	8.5 mm	± 0.2mm	
Connector type	6-pin plug connectors, tension clamp connection /	6-pin socket connectors, tension clamp connection	
Wire cross section Temperature sensor wire Voltage wire	2 x 0.5 mm 4 x 2.5 mm	2 x 0.5 mm <sup>2</sup> (AWG 20) 4 x 2.5 mm <sup>2</sup> (AWG 13)	
Line resistance 0.5 mm <sup>2</sup> 2.5 mm <sup>2</sup>		9 Ω/km 98 Ω/km	
Flex radius Fixed installation Free-moving	5 x wire cross-section 10 x wire cross-section		
Temperature range Moving Non-moving	-5°C +80°C -30°C +80°C		
Weight	Approx. 143 kg/km		
Materials Cable shielding Color	Thermoplastic PVC-based material Window gray (similar to RAL 7040)		
Peak operating voltage	12 \	12 V DC	
Testing AC voltage Wire/wire	150	1500 V	
Operating voltage	Max. 300 V		
Current load	10 A at	10 A at +20°C	

Table 432: Technical data - UPS connection cable

# 14. Replacement fan filter

# Information:

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

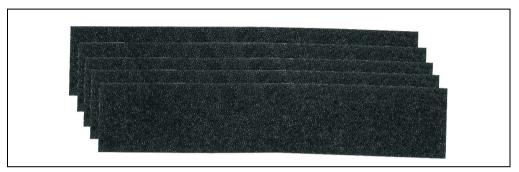


Figure 349: Replacement fan

Model number	Short description	Comment
5AC600.FA01-00	APC620 replacement fan filter 1PCI 5 piece This fan filter is an optional addition for system units with 1 PCL slot (5PC600.SX01-00).	
5AC600.FA02-00	APC620 replacement fan filter 1PCI 5 piece This fan filter is an optional addition for system units with 2 PCL slots (5PC600.SX02-00, 5PC600.SX02-01).	
5AC600.FA03-00	APC620 replacement fan filter 3PCI 5 piece This fan filter is an optional addition for system units with 3 PCL slots (5PC600.SF03-00).	
5AC600.FA05-00	APC620 replacement fan filter 1PCI 5 piece This fan filter is an optional addition for system units with 5 PCL slots (5PC600.SX05-00, 5PC600.SX05-01).	

Table 433: Model numbers - Replacement fan filters

## 15. SRAM module - 5AC600.SRAM-00

The 512 kB SRAM module increases APC620 application possibilities. It is inserted internally on the baseboard (depending on revision) and doesn't require a PCI slot. Nonvolatile data can be stored on it. The module is backed up by the APC620 battery.

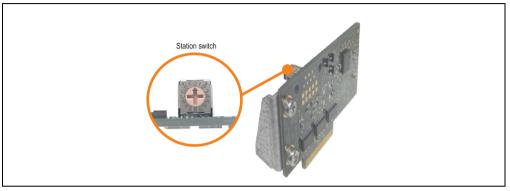


Figure 350: 5AC600.SRAM-00

The following system unit hardware revisions are required before mounting the SRAM module:

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

#### 15.1 Technical data

Features	5AC600.SRAM-00		
Connection to system	via the PCI b	via the PCI bus (PCI PnP)	
Memory Quantity Battery-buffered	SRAM 512 KB Yes		
Station switch	16 digits (0-F)		
Data rate	up to 31 MB/sec for write access up to 25 MB/sec for read access		
PCI configuration space	Value	Meaning	

Table 434: Technical data - 5AC600.SRAM-00

## Accessories • SRAM module - 5AC600.SRAM-00

Features	5AC600.SRAM-00	
Vendor ID Device ID Status HeaderType	1677h A085h 0200h 00h	B & R 5AC600.SRAM-00 DEVSEL timing medium Single function device
The card is registered in the PCI Configuration Space as Single Function Device	Value	Meaning
Device 0 Base class Sub class Command IRQ BAR0 BAR1	05h 00h 000h - 512 4	Memory controller RAM Bus master (not used) Not used kByte memory area Byte I/O area

Table 434: Technical data - 5AC600.SRAM-00

# 15.2 Driver support

The module is presently only supported in an Automation Runtime environment. Driver for other operating systems (e.g. Windows XP) are available upon request.

#### 15.3 Installation

Installation is described in the example with system unit 5PC600.SF03-00 with inserted AP Link cards and APC620 UPS module.

- Remove side cover from APC620 (see chapter 7 "Maintenance / Servicing", section 5 "Mounting the side cover" on page 706).
- Screw on the M3x5 Torx included in the delivery to the baseboard of the module.

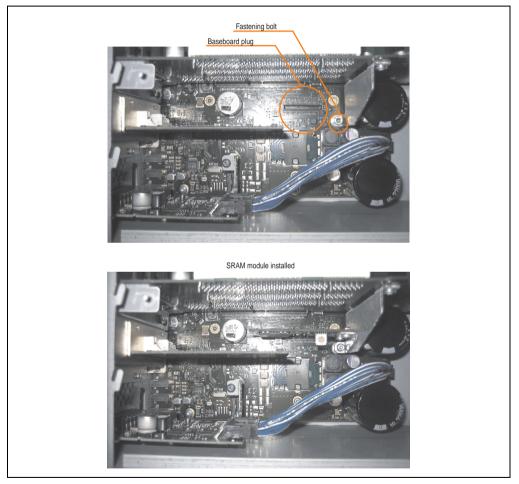
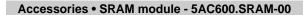


Figure 351: SRAM module installation



# 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 buffers the internal real-time clock (RTC) and the CMOS data. The buffer duration of the battery is at least 4 years (2 1/2 years with the SRAM module model number 5AC600.SRAM-00 and at 50°C, 8.5 mA current requirements of the supplied components and a self discharge of 40%).

# Information:

- The product design allows the battery to be changed with the APC620 switched either on or off. In some countries, safety regulations do not allow batteries to be changed while the module is switched on.
- Any BIOS settings that have been made will remain when the battery is changed with the power turned off (stored in non-volatile EEPROM). The date and time must be reset later because this data is lost when the battery is changed.
- The battery should only be changed by qualified personnel.

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

# 1.1 Battery status evaluation

The battery status is evaluated immediately following start-up of the device and is subsequently checked by the system every 24 hours. The battery is subjected to a brief load (1 second) during the measurement and then evaluated. The evaluated battery status is displayed in the BIOS Setup pages (under Advanced - Baseboard monitor) and in the B&R Control Center (ADI driver), but can also be read in a customer application via the ADI Library.

Battery status	Meaning
N/A	Hardware, i.e. firmware used is too old and does not support read.
GOOD	Data buffering is guaranteed

Table 435: Meaning of battery status

## Maintenance / Servicing • Changing the battery

Battery status	Meaning
BAD	Data buffering is guaranteed for approx. another 500 hours from the point in time that the battery capacity is determined to be BAD (insufficient).

Table 435: Meaning of battery status

From the point when battery capacity is recognized as insufficient, data buffering is guaranteed for approximately another 500 hours. When changing the battery, data is buffered for approximately another 10 minutes by a gold leaf capacitor.

#### 1.2 Procedure

- Disconnect the power supply to the Automation PC 620 (also see information on page 667).
- Touch the housing or ground connection (not the power supply!) in order to discharge any
  electrostatic charge from your body.
- Remove the black plastic cover from the battery compartment and carefully pull out the battery using the removal strips.



Figure 352: 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.

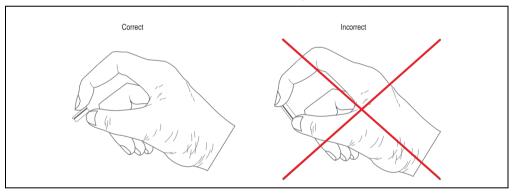


Figure 353: Battery handling



Figure 354: Battery polarity

## Maintenance / Servicing • Changing the battery

- To make the next battery change easier, be sure the removal strip is in place when inserting battery.
- Reconnect the power supply to the PC 620 by plugging the power cable back in and pressing the power button (also see information on page 667).
- Reset the data and time in BIOS (see information on page 667).

# Warning!

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

# 2. Fan kit installation and replacement

#### 2.1 Procedure for APC620 with 1 PCI slots

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 4 Torx screws (T10) that must be removed.



Figure 355: APC620 1PCI slot - Remove screws to install/ remove filter kit

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



Figure 356: APC620 1PCI slot - Remove side cover and fan kit cover

• If a PCI card is in place, it must be removed before moving on to the next step.

 There are two arrows on the fans that indicate the direction of air flow and the direction of fan rotation.

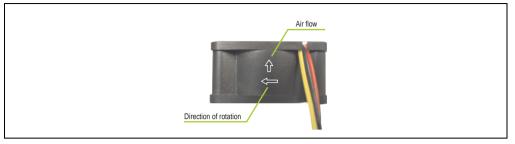


Figure 357: Markings for direction of airflow / fan rotation

# Warning!

The fans must be inserted so that the air flows toward the inside of the housing.

 Align fans over the fastening bolts (see arrows). Feed cables through the openings in the housing (see circles) into the main board of the APC620.

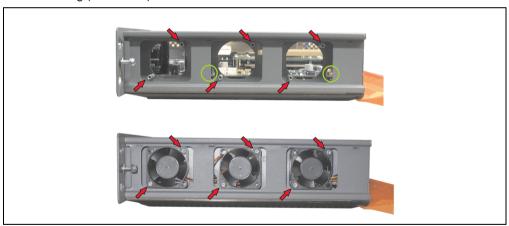


Figure 358: APC620 1PCI slot - Fan installation

Secure fans with the 6 included Torx (T10) screws.

• The fan connection cable must be connected to the main circuit board at the right position (fan 1 at position 1, fan 2 at position 2, fan 3 at position 3).

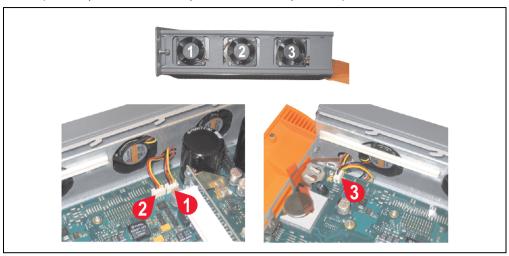


Figure 359: APC620 1PCI slot - Fan cable connection to the main board

- If a PCI card was previously in place, it can now be re-inserted.
- Place dust filter in the fan kit cover and replace removed components (filter kit cover, side cover) in reverse order.

#### 2.2 Procedure for APC620 with 2 PCI slots

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 4 Torx screws (T10) that must be removed.



Figure 360: APC620 2PCI slots - Remove screws to install/ remove filter kit

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

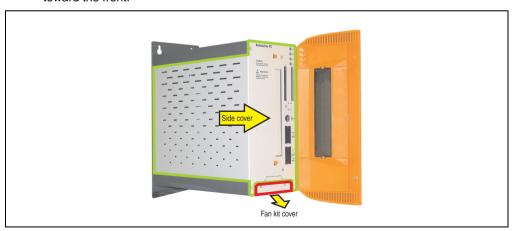


Figure 361: APC620 2PCI slots - Remove side cover and fan kit cover

- If one or more PCI cards are in place, they must be removed before moving on to the next step.
- If a slide-in drive is in place, it also must be removed before moving on to the next step.
- There are two arrows on the fans that indicate the direction of air flow and the direction
  of fan rotation.

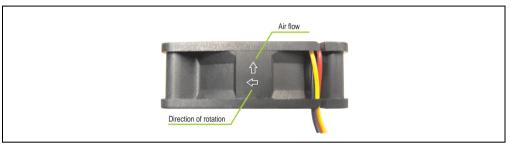


Figure 362: Markings for direction of airflow / fan rotation

# Warning!

The fans must be inserted so that the air flows toward the inside of the housing.

 Align fans over the fastening bolts (see arrows). Feed cables through the openings in the housing (see circles) into the main board of the APC620.

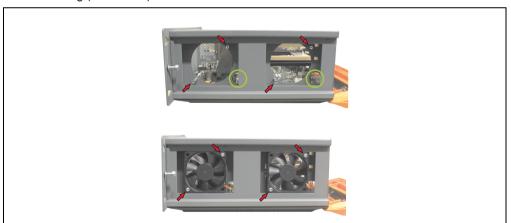


Figure 363: APC620 2PCI slots - Fan installation

Secure fans with the 4 included Torx (T10) screws.

• The fan connection cable must be connected to the main circuit board at the right position (fan 1 at position 1, fan 2 at position 2).

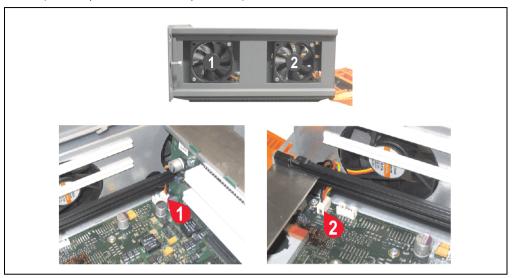


Figure 364: APC620 2PCI slots - Fan cable connection to the main board

- If one or more PCI cards were previously in place, they can now be re-inserted.
- If a slide-in drive was previously in place, it too can now be re-inserted.
- Place the dust filter in the fan kit cover and secure with the filter clasp.

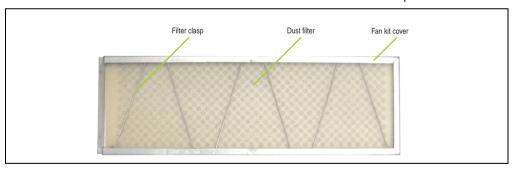


Figure 365: Dust filter in the fan kit cover and filter clasp

Replace any removed components (filter kit cover, side cover) in the reverse order.

## 2.3 Procedure for APC620 with 3 PCI slots

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 4 Torx screws (T10) that must be removed.



Figure 366: APC620 3PCI slot - Remove screws to install/ remove filter kit

 After the screws have been removed, the side cover and the fan kit cover can be removed toward the front



Figure 367: APC620 3PCI slots - Remove side cover and fan kit cover

 There are two arrows on the fans that indicate the direction of air flow and the direction of fan rotation.

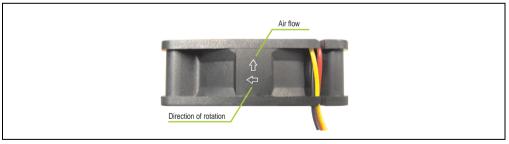


Figure 368: Markings for direction of airflow / fan rotation

# Warning!

The fans must be inserted so that the air flows toward the inside of the housing.

 Align fans over the fastening bolts (see arrows). Feed cables through the openings in the housing (see circles) into the main board of the APC620.

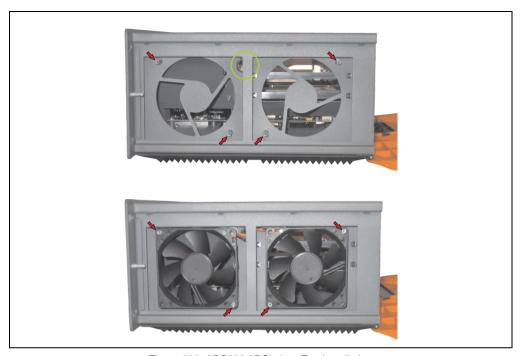


Figure 369: APC620 3PCI slot - Fan installation

Secure fans with the 4 included Torx (T10) screws.

• The fan connection cable must be connected to the main circuit board at the right position (fan 1 at position 1, fan 2 at position 2).

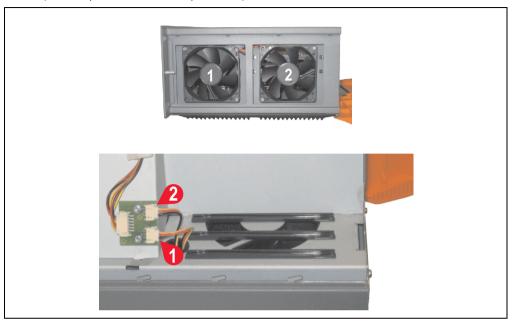


Figure 370: APC620 3PCI slot - Fan cable connection to the main board

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

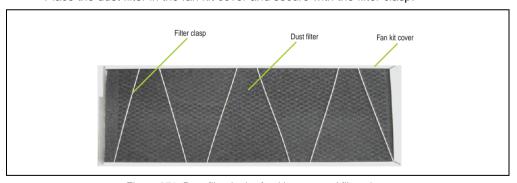


Figure 371: Dust filter in the fan kit cover and filter clasp

• Replace any removed components (filter kit cover, side cover) in the reverse order.

#### 2.4 Procedure for APC620 with 5 PCI slots

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 4 Torx screws (T10) that must be removed.

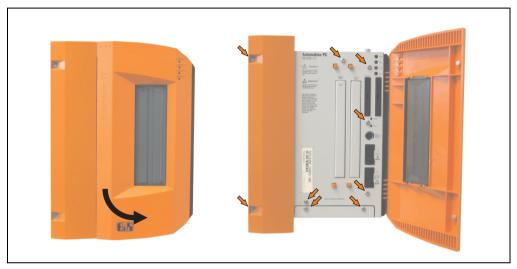


Figure 372: APC620 5PCI slot - Remove screws to install/ remove filter kit

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



Figure 373: APC620 5PCI slot - Remove side cover and fan kit cover

- If one or more PCI cards are in place, they must be removed before moving on to the next step.
- If a slide-in drive is in place, it also must be removed before moving on to the next step.
- Attach the two included cable fasteners in the appropriate holes.

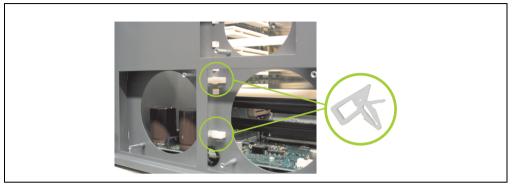


Figure 374: APC620 5PCI attach cable fasteners

• There are two arrows on the fans that indicate the direction of air flow and the direction of fan rotation.

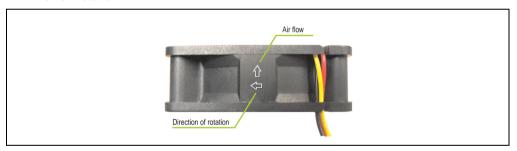


Figure 375: Markings for direction of airflow / fan rotation

# Warning!

The fans must be inserted so that the air flows toward the inside of the housing.

 Align fans over the fastening bolts (see arrows). Feed cables through the openings in the housing (see circles) into the main board of the APC620.

The fan appropriate public for the 40 mm fan about the placed in the cable factors.

The fan connector cable for the 40 mm fan should be placed in the cable fastener.

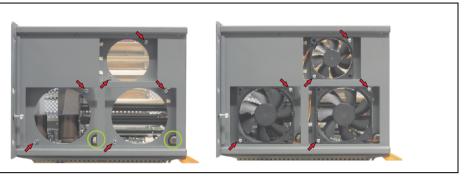


Figure 376: APC620 5PCI slot - Fan installation

• Secure fans with the 6 included Torx (T10) screws.

## Maintenance / Servicing • Fan kit installation and replacement

• The fan connection cable must be connected to the main circuit board at the right position (fan 1 at position 1, fan 2 at position 2, fan 3 at position 3).

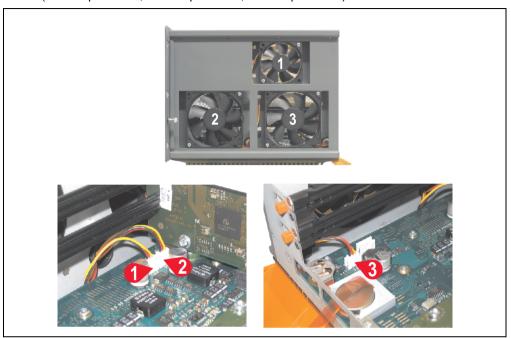


Figure 377: APC620 5PCI slot - Fan cable connection to the main board

- If one or more PCI cards were previously in place, they can now be re-inserted.
- If a slide-in drive was previously in place, it too can now be re-inserted.
- Place the dust filter in the fan kit cover and secure with the filter clasp.

# Maintenance / Servicing • Fan kit installation and replacement

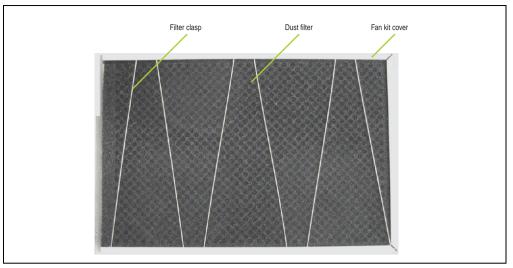


Figure 378: Dust filter in the fan kit cover and filter clasp

• Replace any removed components (filter kit cover, side cover) in the reverse order.

# 3. Slide-in drive - installation and exchange

Slide-in drives can be installed and exchanged in system units with 2 or 5 PCI slots.

# 3.1 Installation procedure

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Remove the side cover, see section 5 "Mounting the side cover" on page 706.
- · Remove the slide-in dummy module.

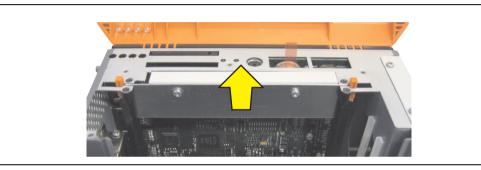


Figure 379: Removing the slide-in dummy module

Insert the slide-in drive.

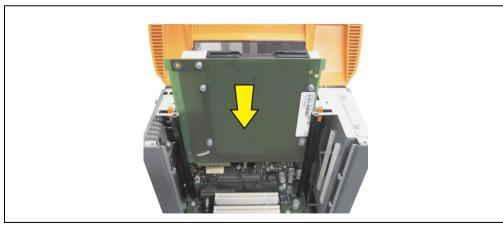


Figure 380: Installing the slide-in drive

Attach the side cover.

## 3.2 Exchange procedure

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any
  electrostatic charge from your body.
- Remove the side cover, see section 5 "Mounting the side cover" on page 706.
- Simultaneously remove both slide-in slot releasing mechanisms outwards The slide-in drive is pushed a few mm upwards for easy removal.

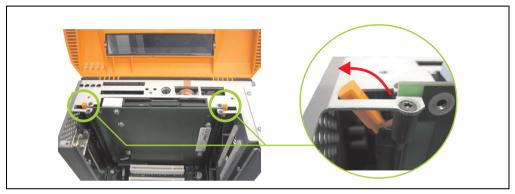


Figure 381: Release the slide-in slot releasing mechanisms

Removing the slide-in drive.

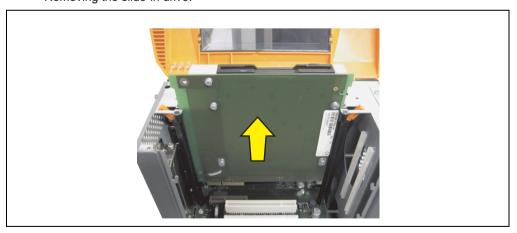


Figure 382: Removing the slide-in drive

## Maintenance / Servicing • Slide-in drive - installation and exchange

• Move the slide-in slot releasing mechanisms to the start position.



Figure 383: Slide-in slot releasing mechanism start position

• Insert the new slide-in drive or re-attach the side cover.

# 4. Installation of the UPS module

The module is installed using the materials included in the delivery. Different parts are used depending on the system unit and **installed** (description starting on page 698) or **not installed** (description follows) add-on interface module.

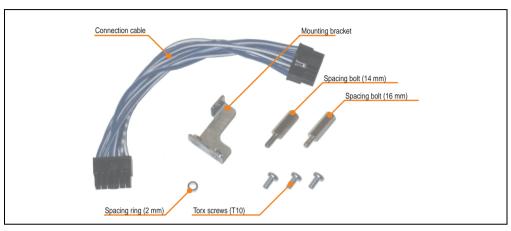


Figure 384: Add-on UPS module 5AC600.UPSI-00 - Installation materials

#### 4.1 Automation PC 620 without add-on interface module

#### 4.1.1 APC620, 1 PCI slot

- Remove side cover (see section 5 "Mounting the side cover" on page 706).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).



Figure 385: Remove UPS module cover

• Screw in spacing bolt and spacing ring (using M5 hex socket screwdriver).

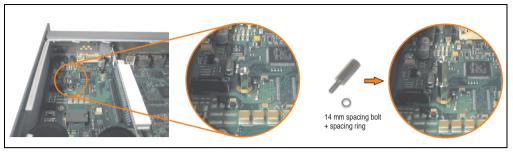


Figure 386: Screw in spacing bolt and spacing ring

• Install UPS module with 2 Torx screws (T10) and 1 Torx screw (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.



Figure 387: Install UPS module

Plug in connection cable (see marked socket).

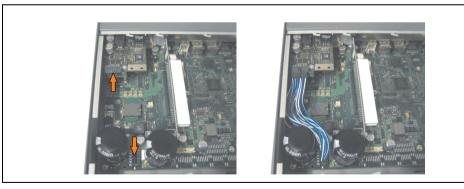


Figure 388: Plug in connection cable

# Information:

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

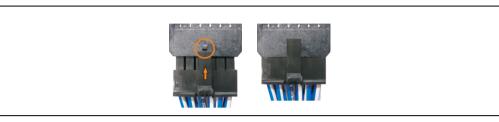


Figure 389: Connector locking mechanism

· Attach the side cover.

## 4.1.2 APC620, 2 PCI slot

- Remove side cover (see section 5 "Mounting the side cover" on page 706).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).

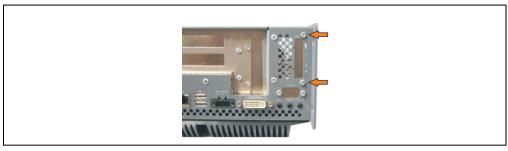


Figure 390: Remove UPS module cover

• Remove cover plate by removing the marked Torx screw (T10).



Figure 391: Remove cover plate

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

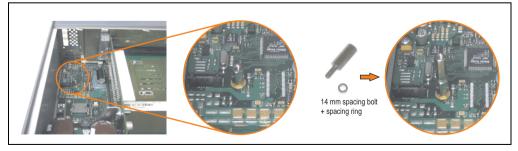


Figure 392: Screw in spacing bolt and spacing ring

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

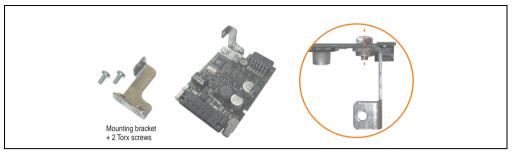


Figure 393: Install mounting bracket

 Install UPS module with 2 Torx screws (T10) and 1 Torx screw (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.

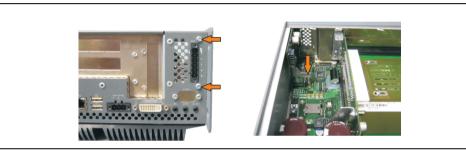


Figure 394: Install UPS module

Plug in connection cable (see marked socket).

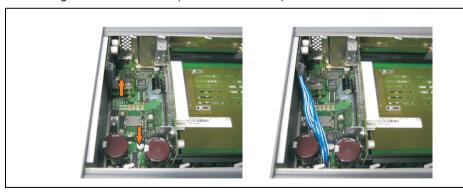


Figure 395: Plug in connection cable

# Information:

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



Figure 396: Connector locking mechanism

• Attach cover plate and side cover.

## 4.1.3 APC620, 5 PCI slot

- Remove side cover (see section 5 "Mounting the side cover" on page 706).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).

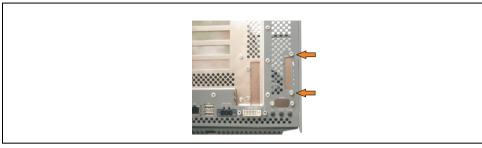


Figure 397: Remove UPS module cover

• Remove cover plate by removing the marked Torx screw (T10).

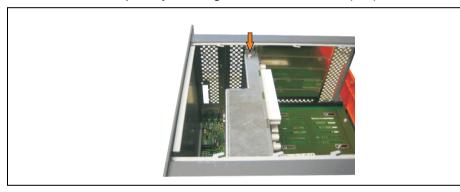


Figure 398: Remove cover plate

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

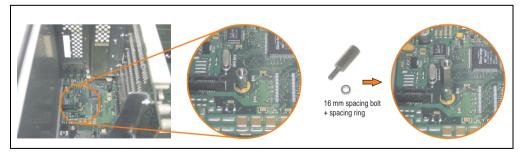


Figure 399: Screw in spacing bolt and spacing ring

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

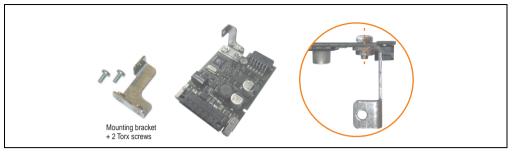


Figure 400: Install mounting bracket

 Install UPS module with 2 Torx screws (T10) and 1 Torx screw (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.

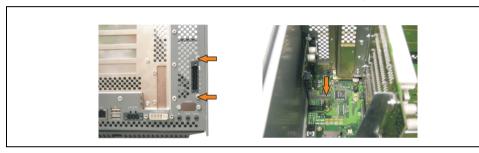


Figure 401: Install UPS module

Attach connection cable (see marked socket).

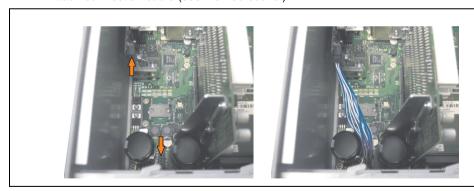


Figure 402: Plug in connection cable

# Information:

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



Figure 403: Connector locking mechanism

• Attach cover plate and side cover.

## 4.2 Automation PC 620 with add-on interface module

#### 4.2.1 APC620, 1 PCI slot

- Remove side cover (see section 5 "Mounting the side cover" on page 706).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).



Figure 404: Remove UPS module cover

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

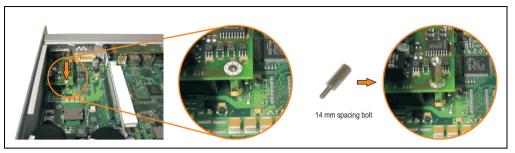


Figure 405: Screw in spacing bolt

• Install UPS module with 2 Torx screws (T10) and 1 Torx screw (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.



Figure 406: Install UPS module

Plug in connection cable (see marked socket).

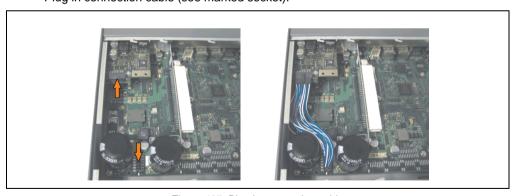


Figure 407: Plug in connection cable

# Information:

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



Figure 408: Connector locking mechanism

Attach the side cover.

#### 4.2.2 APC620, 2 PCI slot

- Remove side cover (see section 5 "Mounting the side cover" on page 706).
- Remove UPS module cover by removing the 2 marked Torx screws (T10).



Figure 409: Remove UPS module cover

Remove cover plate by removing the marked Torx screw (T10).



Figure 410: Remove cover plate

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

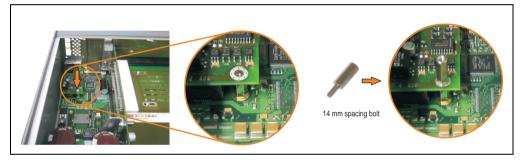


Figure 411: Screw in spacing bolt

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

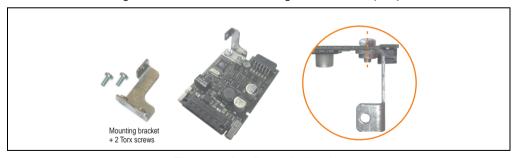


Figure 412: Install mounting bracket

 Install UPS module with 2 Torx screws (T10) and 1 Torx screw (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.

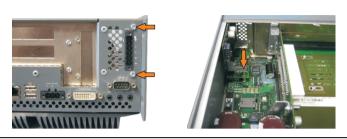


Figure 413: Install UPS module

Plug in connection cable (see marked socket).

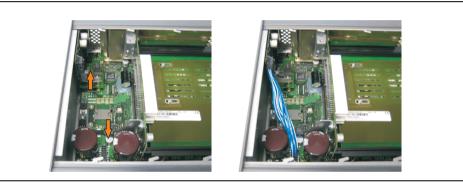


Figure 414: Plug in connection cable

# Information:

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

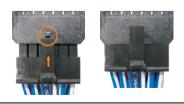


Figure 415: Connector locking mechanism

Attach cover plate and side cover.

## 4.2.3 APC620, 5 PCI slot

- Remove side cover (see section 5 "Mounting the side cover" on page 706).
- Remove UPS module cover by removing the 2 marked Torx screws (using T10 screwdriver).

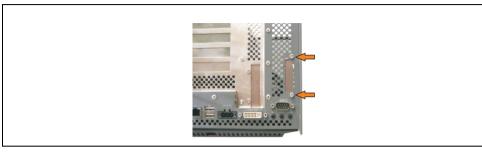


Figure 416: Remove UPS module cover

• Remove cover plate by removing the marked Torx screw (T10).

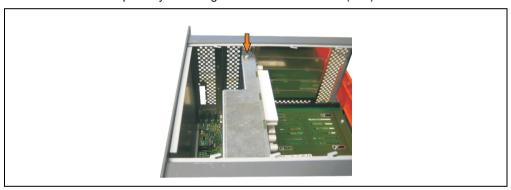


Figure 417: Remove cover plate

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

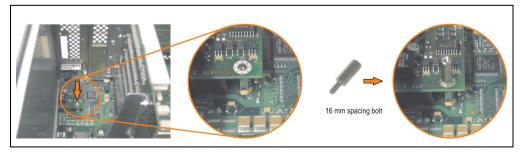


Figure 418: Screw in spacing bolt

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

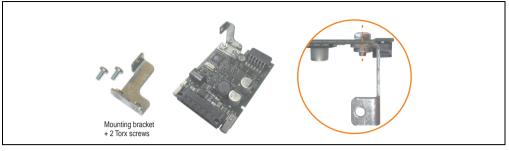


Figure 419: Install mounting bracket

 Install UPS module with 2 Torx screws (T10) and 1 Torx screw (T10). Use the previously removed Torx screws and one Torx screw from the mounting materials.

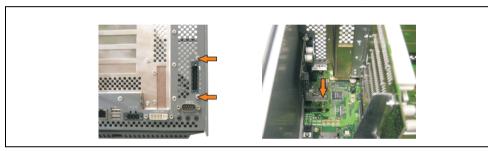


Figure 420: Install UPS module

Plug in connection cable (see marked socket).

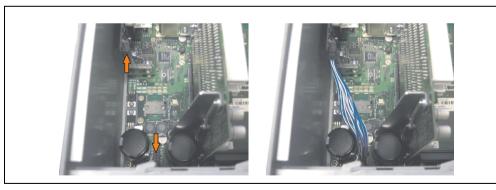


Figure 421: Plug in connection cable

# Information:

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

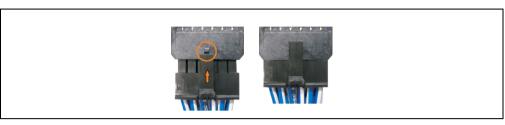


Figure 422: Connector locking mechanism

• Attach cover plate and side cover.

# 5. Mounting the side cover

The number of Torx (T10) screws varies depending on the system (1, 2, 3 or 5 PCl slots).

#### 5.1 APC620 with 1 PCI slot

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any
  electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 3 Torx screws (T10) that must be removed.



Figure 423: Mounting the side cover - APC620, 1 PCI slot

## 5.2 APC620 with 2 PCI slot

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 5 Torx screws (T10) that must be removed.



Figure 424: Mounting the side cover - APC620, 2 PCI slot

## Maintenance / Servicing • Mounting the side cover

## 5.3 APC620 with 3 PCI slot

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 7 Torx screws (T10) that must be removed.



Figure 425: Mounting the side cover - APC620, 3 PCI slot

## 5.4 APC620 with 5 PCI slot

- Disconnect the power supply to the Automation PC 620.
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Open the orange front cover. Behind the cover there are 7 Torx screws (T10) that must be removed.

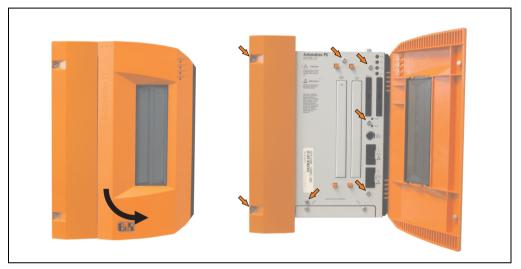


Figure 426: Mounting the side cover - APC620, 5 PCI slot

# 6. Exchanging a PCI SATA RAID hard disk

In the example, the assumption is made that the secondary hard disk (HDD1) is defective. A size 10 Torx screwdriver is needed for exchanging the hard disk.

#### Exchange procedure

- Remove the power supply to the device (Automation PC 620 / Panel PC 700).
- Touch the housing or ground connection (not the power supply!) in order to discharge any
  electrostatic charge from your body.
- Remove the side cover.
- Remove the SATA RAID insert.
- Loosen the 4 appropriate mounting screws (M3x5) see Figure 427 "Screw assignment on the back side of the SATA RAID controller" on page 710.

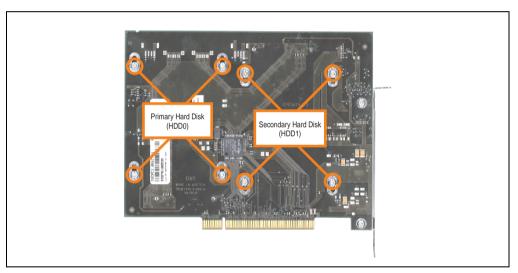


Figure 427: Screw assignment on the back side of the SATA RAID controller

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

## Maintenance / Servicing • Exchanging a PCI SATA RAID hard disk

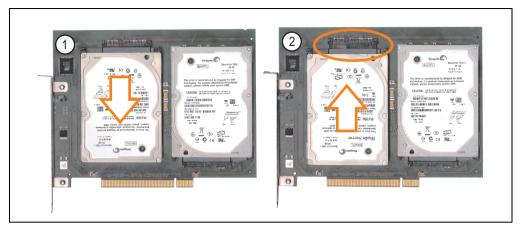


Figure 428: Hard disk exchange

- Re-secure the hard disk using the 4 fastening screws (M3x5) used earlier.
- Reassemble device in the reverse order.
- An error message is output by the RAID BIOS after starting the system "RAID1 set is in Critical status press any key to enter Configuration Utility".

A rebuild must be executed in the SATA RAID BIOS - for more information on this, see the section "Rebuild Mirrored Set" on page 318.

Maintenance / Servicing • Exchanging a PCI SATA RAID hard disk	

# **Appendix A**

# 1. Temperature sensor locations

The APC620 has temperature sensors in various places (CPU, power supply, slide-in drive 1, slide-in drive 2, I/O). The temperatures<sup>1)</sup> can be read in BIOS (menu item "advanced" - baseboard/panel features - baseboard monitor) or in Microsoft Windows XP/embedded, using B&R Control Center<sup>2)</sup>.

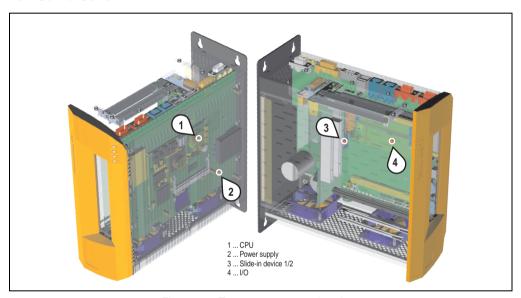


Figure 429: Temperature sensor locations

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 436: Temperature sensor locations

- 1) The measured temperature is a guideline for the immediate ambient temperature, but can be influenced by neighboring components.
- The B&R Control Center ADI driver can be downloaded for free from the download area on the B&R homepage (www.br-automation.com).

## 2. Connection of an external device to the main board

A plug on the main board enables branching of +5 VDC and +12 VDC for the internal supply of e.g. special PCI cards.

The connector is only provided starting with the following system unit revisions:

Model number	Short description	Starting with revision
5PC600.SX01-00	System 1 PCI	В7
5PC600.SX02-00	System 2 PCI, 1 disk drive slot, 1 AP Link slot	В0
5PC600.SX02-01	System 2 PCI, 1 disk drive slot	В9
5PC600.SX05-00	System 5 PCI, 2 disk drive slots, 1 AP Link slot	A0
5PC600.SX05-01	System 5 PCI, 2 disk drive slots	A0

Table 437: Revision information for connecting an external device

The voltage can be accessed using the "APC620 internal supply cable 5CAMSC.0001-00" on page 627. Depending on the system unit revision, the connector is located close to the fan connector. The APC620 side cover and possibly also the slide-in drive and PCI cards must be removed to reach the connector.

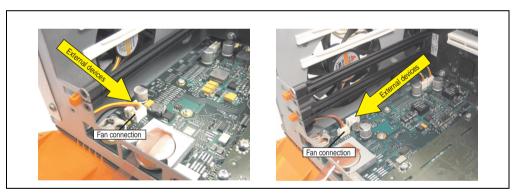


Figure 430: Connector location for external devices

Connector for the external devices					
Pin	Assignment	Power	4-pin connector, male		
1	+12 VDC	Max. 10 watts	, , , , , , , ,		
2	GND		1 2 3 4		
3	GND	Max. 5 watts			
4	+5 VDC				

Table 438: Pin assignments - Connector on main board

Connections are protected by a 1 A multi-fuse.

# 3. Maintenance Controller Extended (MTCX)

The MTCX controller (FPGA processor) is located on the main board (part of every system unit) of the APC620 device.

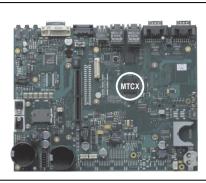


Figure 431: MTCX controller location

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<sup>1)</sup>. The version can be read in BIOS (menu item "advanced" - baseboard/panel features) or in Microsoft Windows XP/embedded, using B&R Control Center.

<sup>1)</sup> Can be downloaded from the download area on the B&R homepage (www.br-automation.com).

#### 3.1 SDL timing

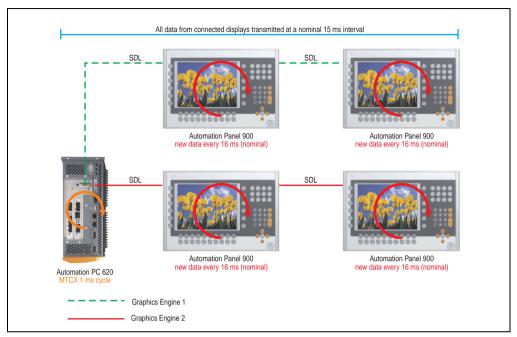


Figure 432: Sample configuration for SDL timing

#### Basic procedure:

- On every Automation Panel 900 display unit, the data (button and LED, touch screen, service data) is nominally determined asynchronously every 16 ms, saved and made available.
- 2) The MTCX in the APC620 samples one display unit after another asynchronously in 1 ms increments. The status is requested within the 15 ms nominal cycle (maximum 15 display units x 1 ms), regardless of the total number of display units connected in the system (Graphics Engine 1 + Graphics Engine 2), and the information is saved in the MTCX's Dual-Ported RAM.
- 3) An application can access the MTXC data using the programming interface (API) ADI (Automation Device Interface). Reading or writing data does not affect the asynchronous acquisition of data from the connected display units. Further information about this can be found in the "ADI Development Kit" and the "Automation PC 620 / Panel PC 700 Implementation Guide" (both available on the B&R Homepage).

# Caution!

Due to safety requirements regulated by international standards, implementing an E-stop element via SDL (using Matrix) is NOT allowed. Instead, such an element must be wired according to the safety requirements.

# Information:

Display data will not be updated and cannot be read by the MTCX while a display unit is in upgrade mode (e.g. SDL firmware upgrade).

The nominal time specifications are not guaranteed maximum lengths of time, but may be increased due to e.g. transfer disturbances and external influences.

#### Schematic display

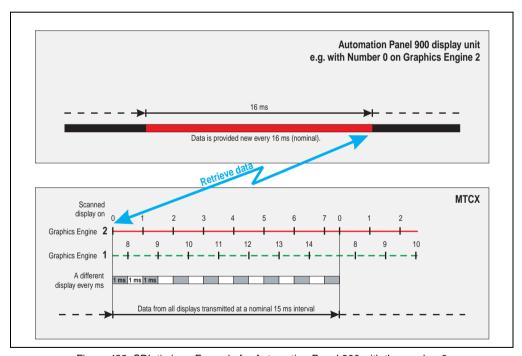


Figure 433: SDL timing - Example for Automation Panel 900 with the number 0

# 4. B&R Key Editor information

On display units, it is often necessary to adjust the function keys and LEDs for the application software being used. With the B&R Key Editor, it is possible to quickly and easily set up the application individually.

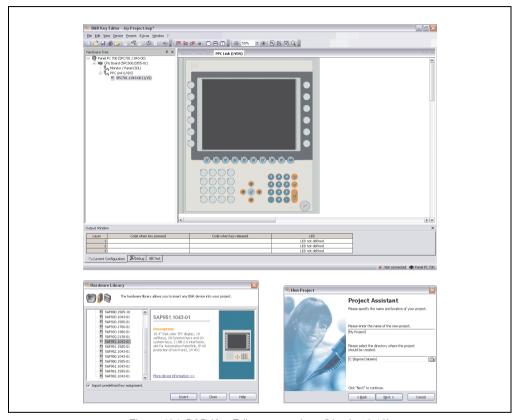


Figure 434: B&R Key Editor screenshots (Version 2.10)

#### Features:

- Configuration of normal keys like on a keyboard (A, B, C, etc.)
- Key combinations/shortcuts (CTRL+C, SHIFT+DEL, etc.) on one key
- Special key functions (change brightness, etc.)
- Assign functions to LEDs (HDD access, power, etc.)
- 4 assignments per key possible (using layer function)
- Configuration of panel locking time when multiple Automation Panel 900 devices are connected to Automation PC 620 and Panel PC 700 devices

## Supports following systems:

- Automation PC 620
- Panel PC 700
- Provit 2000
- Provit 5000
- · Power Panel BIOS devices
- Mobile Panel BIOS devices

A detailed guide for configuring keys and LEDs can be found in the B&R Key Editor's online help.

The B&R Key Editor can be downloaded for free from the download area on the B&R homepage (<a href="https://www.br-automation.com">www.br-automation.com</a>).

## 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.

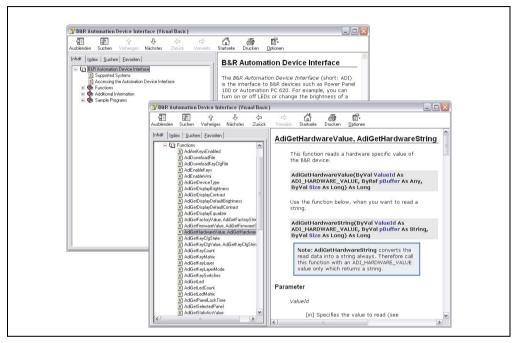


Figure 435: ADI development kit screenshots (Version 1.50)

## 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

## Appendix A • B&R Automation Device Interface (ADI) development kit

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 (<a href="https://www.br-automation.com">www.br-automation.com</a>).

## 6. Glossary

Α

## **ACPI**

Abbreviation for "Advanced Configuration and Power Interface". Configuration interface that enables the operating system to control the power supply for each device connected to the PC. With ACPI, the computer's BIOS is only responsible for the details of communication with the hardware.

APC

Abbreviation for "Automation PC".

API

Abbreviation for "Application Program Interface" The interface, which allows applications to communicate with other applications or with the operating system.

**Automation Runtime** 

A uniform runtime system for all B&R automation components.

В

## Baud rate

Measurement unit for data transfer speed. It indicates the number of states for a transferred signal per second and is measured using the baud unit of measurement. 1 baud = 1 bit/sec or 1 bps.

BIOS

An abbreviation for "Basic Input/Output System". Core software for computer systems with essential routines for controlling input and output processes on hardware components, for performing tests after system start, and for loading the operating system. Although BIOS is used to configure a system's performance, the user does not usually come into contact with it.

Bit

Binary digit > binary position, binary character, smallest discrete unit of information. A bit can have the value 0 or 1.

Bit rate

The number of bits that can be transferred within a specified time unit. 1 bit/sec = 1 baud.

## Bootstrap loader

A program that automatically runs when the computer is switched on or restarted. After some basic hardware tests have been carried out, the bootstrap loader starts a larger loader and hands over control to it, which in turn boots the operating system. The bootstrap loader is typically found in ROM on the computer.

## Byte

Data format [1 byte = 8 bits] and a unit for characterizing information amounts and memory capacity. The following units are the commonly used units of progression: KB, MB, GB.

#### **B&R** Automation Runtime

Windows-based program for creating installation disks to install B&R Automation Runtime<sup>™</sup> on the target system.

С

#### Cache

Background memory, also known as non-addressable memory or fast buffer memory. It is used to relieve the fast main memory of a computer. For example, data that should be output to slower components by the working memory (e.g. disk storage, printers) is stored temporarily in cache memory and output from there at an appropriate speed for the target devices.

#### CAN

An abbreviation for "Controller Area Network" (serial bus system). Structure according to ISO 11898. Bus medium: twisted pair. Good transfer properties in short distances less than 40 m with a 1 MBit/sec data transfer rate. Maximum number of stations: unlimited in theory, up to 64 with real-time capability in practice, i.e. defined maximum delay times for messages with high priority. High reliability using error detection, error handling, troubleshooting. Hamming distance.

## CD-ROM

Abbreviation for "Compact Disc Read-Only Memory". A removable data medium with a capacity of ~700 MB. CD-ROMs are optically scanned.

## CE mark

A CE mark for a product. It consists of the letters "CE" and indicates conformity to all EU guidelines for the labeled product. It indicates that the individual or corporate body who has performed or attached the label assures that the product conforms to all EU guidelines for complete harmonization. It also indicates that all mandatory conformity evaluation procedures have taken place.

#### **CMOS**

"CMOS" is a battery powered memory area where fundamental parameters of an IBM (or compatible) personal computer are stored. Information such as the type of hard drive, size of the working memory and the current date and time are required when booting the computer. As the name suggests, the memory is based on CMOS technology standards.

## COM

A device name used to access serial ports in MS-DOS. The first serial port can be accessed under COM1, the second under COM2, etc. A modem, mouse, or serial printer is typically connected to a serial port.

#### COM<sub>1</sub>

Device name for the first serial port in a PC system. The input/output area for COM1 is usually found at address 03F8H. Generally, the COM1 port is assigned to IRQ 4. In many systems, an RS232 serial mouse is connected to COM1.

## COM<sub>2</sub>

Device name for the second serial port in a PC system. The input/output area for COM2 is usually found at address 02F8H. Generally, the COM2 port is assigned to IRQ 3. In many systems, a modem is connected to COM2.

#### COM3

Device name for a serial port in a PC system. The input/output area for COM3 is usually found at address 03E8H. Generally, the COM3 port is assigned to IRQ 4. In many systems, COM3 is used as an alternative for COM1 or COM2 if peripheral devices are already connected to COM1 and COM2.

#### CompactFlash®

CompactFlash memory cards [CF cards] are exchangeable nonvolatile mass memory systems with very small dimensions [43 x 36 x 3.3 mm, approximately half the size of a credit card]. In addition to the flash memory chips, the controller is also present on the cards. CF cards provide complete PC card / ATA functionality and compatibility. A 50-pin CF card can be simply inserted in a passive 68-pin type II adapter card. It conforms to all electrical and mechanical PC card interface specifications. CF cards were launched by SanDisk back in 1994. Currently, memory capacities reach up to 8 GB per unit. Since 1995, CompactFlash Association [CFA] has been looking after standardization and the worldwide distribution of CF technology

## CPU

An abbreviation for "Central Processing Unit". Interprets and executes commands. It is also known as a "microprocessor" or "processor" for short. A processor is able to receive, decode and execute commands, as well as transfer information to and from other resources via the computer bus.

### CTS

An abbreviation for "Clear To Send". A signal used when transferring serial data from modem to computer, indicating its readiness to send the data. CTS is a hardware signal which is transferred via line number 5 in compliance with the RS-232-C standard.



#### DCD

An abbreviation for " Data Carrier Detected". A signal used in serial communication that is sent by the modem to the computer it is connected to, indicating that it is ready for transfer.

## Dial-up

Data is transferred over the telephone network using a modem or an ISDN adapter.

### DIMM

"Double In-line Memory Module" consisting of one or more RAM chips on a small circuit board that is connected with the motherboard of a computer.

## DMA

Direct Memory Access >. Accelerated direct access to a computer's RAM by bypassing the CPU.

## DRAM

An abbreviation for "Dynamic Random Access Memory". Dynamic RAM consists of an integrated semiconductor circuit that stores information based on the capacitor principle. Capacitors lose their charge in a relatively short time. Therefore, dynamic RAM circuit boards must contain a logic that allows continual recharging of RAM chips. Since the processor cannot access dynamic RAM while it is being recharged, one or more waiting states can occur when reading or writing data. Although it is slower, dynamic RAM is used more often than static RAM since the simple design of the circuits means that it can store four times more data than static RAM.

## **DSR**

An abbreviation for "Data Set Ready". A signal used in serial data transfer that is sent by the modem to the computer it is connected to, indicating its readiness for processing. DSR is a hardware signal which is sent via line number 6 in compliance with the RS-232-C standard.

## DTR

An abbreviation for "Data Terminal Ready". A signal used in serial data transfer that is sent by the computer to the modem it is connected to, indicating the computer's readiness to accept incoming signals.

### DVD

An abbreviation for "Digital Versatile Disc". The next generation of optical data carrier technology. Using this technology it is possible to encode video, audio and computer data on CD. DVDs can store a higher volume of data than conventional CDs. Standard DVDs, which have a single layer, can hold 4.7 GB. Dual-layer DVDs can hold 8.5 GB. Double-sided DVDs can therefore hold up to 17 GB. A special drive is needed for DVDs. Conventional CDs can also be played on DVD drives.

DVI

Abbreviation for »Digital Visual Interface « An interface for the digital transfer of video data.

DVI-A

Analog only

DVI-D

Digital only

DVI-I

Integrated, i.e. analog and digital

Ε

## EDID data

Abbreviation for "Extended Display Identification Data". EDID data contains the characteristics of monitors / TFT displays transferred as 128 KB data blocks to the graphics card via the Display Data Channel (DDC). This EDID data can be used to set the graphics card to the monitor properties.

## **EIDE**

An abbreviation for "Enhanced Integrated Drive Electronics". An expansion of the IDE standard. Enhanced IDE is considered the standard for hardware interfaces. This interface is designed for drives with an integrated drive controller.

#### **EMC**

"Electromagnetic Compatibility". The ability of a device or a system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment [IEV 161-01-07].

## **EPROM**

Erasable **PROM** >(completely with ultraviolet light).

#### Ethernet

An IEEE 802.3 standard for networks. Ethernet uses bus or star topology and controls the traffic on communication lines using the access procedure CSMA/CD (Carrier Sense Multiple Access with Collision Detection). Network nodes are connected using coaxial cables, fiber optic cables or twisted pair cabling. Data transfer on an Ethernet network takes place in frames of variable lengths that consist of supply and controller information as well as 1500 bytes of data. The Ethernet standard provides base band transfers at 10 megabit and 100 megabit per second.

#### Ethernet POWERLINK

An enhancement of standard Ethernet. It enables data exchange under strict real-time conditions with cycle times down to 200 µs and jitter under 1 µs. This makes Ethernet power available on all communication levels of automation technology – from control levels to I/O. Ethernet POWERLINK was initiated by the company B&R Industrie-Elektronik and is now managed by the open end user and vendor association, EPSG - Ethernet POWERLINK Standardization Group (www.ethernet-powerlink.org).

#### **ETX**

Abbreviation for »Embedded Technology eXtended « This established standard offers complete PC functionality on a very compact form factor of just 114 mm x 100 mm (4.5" x 4"). The flexibility offered by ETX® in the development of system specific main boards allows easy requirement fulfillment in a number of different applications.

## F

## **FDD**

Abbreviation for "Floppy Disk Drive". Reading device for removable magnetic memory from the early days of PC technology. Due to their sensitivity and moving components, FDDs have been almost completely replaced by CompactFlash memory in modern automation solutions.

## Fiber optics

Fiber optic cable

#### **FIFO**

An abbreviation for "First In First Out". A queuing organization method whereby elements are removed in the same order as they were inserted. The first element inserted is the first one removed. Such an organization method is typical for a list of documents that are waiting to be printed.

#### Firmware

Programs stored permanently in read-only memory. Firmware is software used to operate computer-controlled devices that generally stays in the device throughout its lifespan or over a long period of time. Such software includes operating systems for CPUs and application

programs for industrial PCs as well as programmable logic controllers (e.g. the software in a washing machine controller). This software is written in read-only memory (ROM, PROM, EPROM) and cannot be easily replaced.

Floppy

Also known as a diskette. A round plastic disk with an iron oxide coating that can store a magnetic field. When the floppy disk is inserted in a disk drive, it rotates so that the different areas (or sectors) of the disk's surface are moved under the read/write head. This allows the magnetic orientation of the particle to be modified and recorded. Orientation in one direction represents binary 1, while the reverse orientation represents binary 0.

**FPC** 

An abbreviation for "Flat Panel Controller".

**FPD** 

An abbreviation for "Flat Panel Display".

FTP

"File Transfer Protocol". Rules for transferring data over a network from one computer to another computer. This protocol is based on TCP/IP, which has established itself as the standard for transferring data over Ethernet networks. FTP is one of the most used protocols on the Internet. It is defined in RFC 959 in the official regulations for Internet communication.

G

GB

Gigabyte (1 GB = 230 or 1,073,741,824 Bytes)

Н

## Handshake

Method of synchronization for data transfer when data is sent at irregular intervals. The sender signals that data can be sent, and the receiver signals when new data can be received.

**HDD** 

An abbreviation for "Hard Disk Drive". Fixed magnetic mass memory with high capacities, e.g. 120 GB.

ı

IDE

An abbreviation for "Integrated Drive Electronics". A drive interface where the controller electronics are integrated in the drive.

## ISA

An abbreviation for "Industry Standard Architecture". A term given for the bus design which allows expansion of the system with plug-in cards that can be inserted in PC expansion slots.

## ISO

International Organization for Standardization > Worldwide federation of national standardization institutions from over 130 countries. ISO is not an acronym for the name of the organization; it is derived from the Greek word "isos", meaning "equal" (www.iso.ch).

J

#### **Jitter**

Jitter is a term that describes time deviations of cyclic events. If, for example, an event should take place every 200µs and it actually occurs every 198 to 203µs, then the jitter is 5µs. Jitter has many causes. It originates in the components and transfer media of networks because of noise, crosstalk, electromagnetic interference and many other random occurrences. In automation technology, jitter is a measure of the quality of synchronization and timing.

## Jumper

A small plug or wire link for adapting the hardware configuration used to connect the different points of an electronic circuit.

L

## LCD

An abbreviation for "Liquid Crystal Display". A display type, based on liquid crystals that have a polarized molecular structure and are enclosed between two transparent electrodes as a thin layer. If an electrical field is applied to the electrodes, the molecules align themselves with the field and form crystalline arrangements that polarize the light passing through. A polarization filter, which is arranged using lamellar electrodes, blocks the polarized light. In this way, a cell (pixel) containing liquid crystals can be switched on using electrode gates, thus coloring this pixel black. Some LCD displays have an electroluminescent plate behind the LCD screen for lighting. Other types of LCD displays can use color.

## **LED**

An abbreviation for "Light Emitting Diode". A semiconductor diode which converts electrical energy into light. LEDs work on the principle of electroluminescence. They are highly efficient because they do not produce much heat in spite of the amount of light they emit. For example, "operational status indicators" on floppy disk drives are LEDs.

## LPT

Logical device name for line printers. In MS-DOS, names are reserved for up to three parallel printer ports with the names LPT1, LPT2 and LPT3. The first parallel port (LPT1) is usually identical to the primary parallel output device PRN (in MS-DOS the logical device name for the printer). The abbreviation LPT stands for "Line Printer Terminal".

М

## MB

Megabyte (1 MB = 220 or 1,048,576 bytes).

## Microprocessor

Highly integrated circuit with the functionality of a CPU, normally housed on a single chip. It comprises a control unit, arithmetic and logic unit, several registers and a link system for connecting memory and peripheral components. The main performance features are the internal and external data bus and address bus widths, the command set and the clock frequency. Additionally, a choice can be made between CISC and RISC processors. The first commercially available worldwide microprocessor was the Intel 4004. It came on the market in 1971.

## **MIPS**

Million instructions per second > Measurement for the computing speed of computers.

## Motherboard

A circuit board that houses the main components of a computer such as the CPU switching circuit, co-processors, RAM, ROM for firmware, interface circuits, and expansion slots for hardware expansions.

#### **MTBF**

An abbreviation for "Mean time between failure". The average time which passes before a hardware component fails and repair is needed. This time is usually expressed in thousands or ten thousands of hours, sometimes known as power-on hours (POH).

### **MTCX**

An abbreviation for »Maintenance Controller EXtended«. The MTCX is an independent processor system that provides additional functions for a B&R industrial PC that are not available with a normal PC. The MTC communicates with the B&R industrial PC via the ISA bus (using a couple register).

## Multitasking

Multitasking is an operating mode in an operating system that allows several computer tasks to be executed virtually simultaneously.

0

## OEM

Original Equipment Manufacturer. A company that integrates third-party and in-house manufactured components into their own product range and then distributes these products under its own name.

## OPC

OLE for Process Control > A communication standard for components in the area of automation. The goal of OPC development is to provide an open interface that builds on Windows-based technologies such as OLE, COM and DCOM. It allows problem-free standardized data transfer between controllers, operating and monitoring systems, field devices and office applications from different manufacturers. This development is promoted by the OPC Foundation, which is made up of over 200 companies from around the world, including Microsoft and other leading companies. Nowadays, OPC is also interpreted as a synonym for Openness, Productivity and Connectivity, symbolizing the new possibilities that this standard opens up.

## **OPC** server

The missing link between connection modules for the Interbus and the visualization application. It communicates serially with the connection modules via the ISA or PCI bus or Ethernet.

Ρ

#### Panel

A common term for B&R display units (with or without keys).

## PCI bus

Abbreviation for \*Peripheral Component Interconnect Bus«; Developed by INTEL as an intermediary/local bus for the latest PC generation. It is basically a synchronous bus. The main clock of the CPU is used for synchronization. The PCI bus is microprocessor-independent, 32-bit and 64-bit compatible, and supports both 3.3 V and 5 V cards and devices.

### **PCMCIA**

An abbreviation for "Personal Computer Memory Card International Association". An association of manufacturers and dealers who are dedicated to the cultivation and further development of common standards for peripheral devices based on PC cards with a slot for such cards. PC cards are mainly used for laptops, palmtops (and other portable computers), and intelligent electronic devices. Version 1 of the PCMCIA standard was introduced in 1990.

#### PI C

Programmable Logic Controller; Computer-based control device that functions using an application program. The application program is relatively easy to create using standardized programming languages [IL, FBD, LAD, AS, ST]. Because of its serial functionality, reaction times are slower compared to connection-oriented control. Today, PLCs are available in device families with matched modular components for all levels of an automation hierarchy.

## PnP

An abbreviation for "Plug and Play". Specifications developed by Intel. Using Plug and Play allows a PC to automatically configure itself so that it can communicate with peripheral devices (e.g. monitors, modems, and printers). Users can connect a peripheral device (plug) and it immediately runs (play) without having to manually configure the system. A Plug and Play PC requires a BIOS that supports Plug and Play and a respective expansion card.

#### POH

An abbreviation for "Power On Hours". See MTBF.

## **POST**

An abbreviation for "Power-On Self Test". A set of routines that are stored in ROM on the computer and that test different system components, e.g. RAM, disk drive and the keyboard in order to determine that the connection is operating correctly and ready for operation. POST routines notify the user of problems that occur. This is done using several signal tones or by displaying a message that frequently accompanies a diagnosis value on the standard output or standard error devices (generally the monitor). If the POST runs successfully, control is transferred over to the system's bootstrap loader.

#### **POWERLINK**

See "Ethernet POWERLINK".

## Q

## **QVGA**

Abbreviation for Quarter Video Graphics Array. Usually a screen resolution of 320 x 240 pixels.

## QUXGA

Abbreviation for **Q**uad **U**ltra Extended **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 Quad WUXGA; Generally a screen resolution of 3840 × 2400 pixels (8:5, 16:10).

R

## **RAM**

An abbreviation for "Random Access Memory". Semiconductor memory which can be read or written to by the microprocessor or other hardware components. Memory locations can be accessed in any order. The various ROM memory types do allow random access, but they cannot be written to. The term RAM refers to a more temporary memory that can be written to as well as read.

#### Real time

A system is operating in real time or has real-time capability if the input sizes (e.g. signals, data) are received and processed in a defined time period, and the results are made available in real time for a partner system or the system environment. See also "real-time demands" and "real-time system".

## ROM

An abbreviation for "Read-Only Memory". Semiconductor memory where programs or data were permanently stored during the production process.

## RS232

Recommended Standard Number 232. Oldest and most widespread interface standard, also called a V.24 interface. All signals are referenced to ground making this an unbalanced interface. High level: -3 ... -30 V, low level: +3 ... +30 V. Cable lengths up to 15 m, transfer rates up to 20 kBit/s. For point-to-point connections between 2 participants.

## RS422

Recommended Standard Number 422. Interface standard, balanced operation, increased immunity to disturbances. High level: 2 ... -6 V, low level: +2 ... +6 V. 4-wire connection [inverted/not inverted], cable lengths up to 1200 m, transfer rates up to 10 Mbit/s, 1 sender can carry out simplex communication with up to 10 receivers.

## RS485

Recommended Standard Number 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 "Request To Send". A signal used in serial data transfer for requesting send permission. For example, it is sent from a computer to the modem connected to it. The RTS signal is assigned to pin 4 according to the hardware specifications of the RS-232-C standard.

#### RXD

An abbreviation for "Receive (RX) Data". A line for transferring serial data received from one device to another, e.g. from a modem to a computer. For connections complying with the RS-232-C standard, the RXD is connected to pin 3 of the plug.



#### SDRAM

An abbreviation for "Synchronous Dynamic Random Access Memory". A construction of dynamic semiconductor components (DRAM) that can operate with higher clock rates than conventional DRAM switching circuits. This is made possible using block access. For each access, the DRAM determines the next memory addresses to be accessed.

## **SFC**

Sequential function chart > Graphic input language for PLCs used to represent sequential control.

## Slot PLC

PC insert card that has full PLC functionality. On the PC, it is coupled via a DPR with the process using a fieldbus connection. It is programmed externally or using the host PC.

### SoftPLC

Synonym for SoftSPS.

## SRAM

An abbreviation for "Static Random Access Memory". A semiconductor memory (RAM) made up of certain logic circuits (flip-flop) that only keeps stored information while powered. In computers, static RAM is generally only used for cache memory.

## **SUXGA**

Abbreviation for **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**xtended **G**raphics **A**rray), which is 4x the pixel resolution of XGA.

## **SVGA**

Abbreviation for **Super Video Graphics Array** (Graphics standard with a resolution of at least 800×600 pixels and at least 256 colors.

### Switch

Device similar to a hub that takes data packets received in a network and, unlike a hub, passes them only to the respective addressee, not to all network nodes. Unlike a hub, a switch provides targeted communication within a network that only takes place between sender and receiver. Other network nodes are not involved.

#### SXGA

Abbreviation for Super Extended Graphics Array. Graphics standard with a screen resolution of  $1280 \times 1024$  pixels (aspect ratio 5:4).

## SXGA+

Abbreviation for SXGA Plus; Generally 1400 x 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.

## Τ

#### Task

Program unit that is assigned a specific priority by the real-time operating system. It contains a complete process and can consist of several modules.

## TCP/IP

Transmission Control Protocol/Internet Suit of Protocols. Network protocol that has become the generally accepted standard for data exchange in heterogeneous networks. TCP/IP is used both in local networks for communication between various computer and also for LAN to WAN access.

## TFT display

LCD (Liquid Crystal Display) technology where the display consists of a large grid of LCD cells. Each pixel is represented by a cell, whereby electrical fields produced in the cells are supported by thin film transistors (TFT) that result in an active matrix. In its simplest form, there is exactly one thin film transistor per cell. Displays with an active matrix are generally used in laptops and notebooks because they are thin, offer high-quality color displays and can be viewed from all angles.

## Touch screen

Screen with touch sensors for activating an item with the finger.

#### TXD

An abbreviation for "Transmit (**TX**) **D**ata". A line for the transfer of serial data sent from one device to another, e.g. from a computer to a modem. For connections complying with the RS-232-C standard, the TXD is connected to pin 2 of the plug.

U

#### UART

An abbreviation for "Universal Asynchronous Receiver-Transmitter". A module generally consisting of a single integrated circuit that combines the circuits required for asynchronous serial communication for both sending and receiving. UART represents the most common type of circuit in modems for connecting to a personal computer.

#### **UDMA**

An abbreviation for "Ultra Direct Memory Access". A special IDE data transfer mode that allows high data transfer rates for drives. There have been many variations in recent times.

UDMA33 mode transfers 33 megabytes per second.

UDMA66 mode transfers 66 megabytes per second.

UDMA100 mode transfers 100 megabytes per second.

Both the mainboard and the hard drive must support the specification to implement modifications.

## **UPS**

Abbreviation for "Uninterruptible Power Supply". See "UPS".

## USB

An abbreviation for "Universal Serial Bus". A serial bus with a bandwidth of up to 12 megabits per second (Mbit/s) for connecting a peripheral device to a microcomputer. Up to 127 devices can be connected to the system using a single multipurpose connection, the USB bus (e.g. external CD drives, printers, modems as well as the mouse and keyboard). This is done by connecting the devices in a row. USB allows devices to be changed when the power supply is switched on (hot plugging) and multi-layered data flow.

## **UPS**

An abbreviation for "Uninterruptible Power Supply". The UPS supplies power to systems that cannot be connected directly to the power mains for safety reasons because a power failure could lead to loss of data. The UPS allows the PC to be shut down securely without losing data if a power failure occurs.

#### **UXGA**

Abbreviation for »Ultra Extended Graphics Array« Generally a screen resolution of 1600 × 1200 pixels (aspect ratio 4:3, 12:9).



#### **VGA**

An abbreviation for "Video Graphics Adapter". A video adapter which can handle all EGA (Enhanced Graphics Adapter) video modes and adds several new modes.

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 x 900 pixels (16:9).

**WUXGA** 

Wide UXGA, generally 1920 x 1200 pixels (16:10).

**WXGA** 

Wide XGA, generally 1280 x 768 pixels.

Х

## XGA

An abbreviation for "EXtended Graphics Array". An expanded standard for graphics controllers and monitors that was introduced by IBM in 1990. This standard supports 640x480 resolution with 65,536 colors or 1024x768 resolution with 256 colors. This standard is generally used in workstation systems.

## XTX

Abbreviation for »eXpress Technologoy for ETX« A further development consistent with the proven ETX® standard The newest I/O technology is implemented on a reliable form factor in XTX. The ETX® interface X2 is equipped with new serial buses like PCI Express™ und Serial ATA®, instead of the unpopular ISA bus. All other signals on the X1, X3 and X4 interfaces remain completely compatible with the ETX® Standard (Rev. 2.7). However, if ISA signals are needed, a PCI-ISA can be implemented on the base board. The use of an LPC bus already in XTX™ is considerably cheaper than a bridge solution.

	Figure ind	ex
Figure 1:	Automation PC 620 system overview	43
Figure 2:	Selection guide - APC620 basic system with 1, 2, 3, and 5 PCI slots	46
Figure 3:	Selection guide - APC620 optional components with 1, 2, 3, and 5 PCI slots	47
Figure 4:	Selection guide - Basic system and optional components APC620 embedded	49
Figure 5:	Interface overview - APC620, 1 PCI slot variant (top)	50
Figure 6:	Interface overview - APC620, 1 PCI slot variant (front)	51
Figure 7:	Dimensions - APC620, 1 PCI slot variant	54
Figure 8:	Interface overview - APC620, 2 PCI slot variant (top)	55
Figure 9:	Interface overview - APC620, 2 PCI slot variant (front)	56
Figure 10:	Dimensions - APC620, 2 PCI slot variant	59
Figure 11:	Interface overview - APC620, 3 PCI slot variant (top)	60
Figure 12:	Interface overview - APC620, 3 PCI slot variant (front)	61
Figure 13:	Dimensions - APC620, 3 PCI slot variant	64
Figure 14:	Interface overview - APC620, 5 PCI slot variant (top)	65
Figure 15:	Interface overview - APC620, 5 PCI slot variant (front)	66
Figure 16:	Dimensions - APC620, 5 PCI slot variant	69
Figure 17:	APC620 embedded variant interface overview - top side	70
Figure 18:	APC620 embedded variant interface overview - front side	71
Figure 19:	APC620 embedded variant - dimensions	75
Figure 20:	Example of worst-case conditions for temperature measurement	76
Figure 21:	Environmental temperatures for systems with an 815E CPU board (ETX)	77
Figure 22:	Example of worst-case conditions for temperature measurement	80
Figure 23:	Environmental temperatures for systems with an 855GME CPU board (EXT / X 81	XTX)
Figure 24:	Supply voltage for the 5PC600.SX01-00 revision >= I0	84
Figure 25:	Supply voltage for the 5PC600.SX01-00 revision < I0	86
Figure 26:	Supply voltage for 2 PCI slots (dependent on system unit version)	88
Figure 27:	Supply voltage for 2 PCI slots (dependent on system unit version)	91
Figure 28:	Supply voltage block diagram 3 PCI slots	94
Figure 29:	Supply voltage for the 5 PCI slots (dependent on system unit version)	96
Figure 30:	Supply voltage block diagram 5 PCI slots (dependent on system unit version)	100
Figure 31:	Supply voltage for the 5PC600.SE00-00, 5PC600.SE00-01 and 5PC600.SE00-104	0-02
Figure 32:	Overview of humidity specifications for individual components	106
Figure 33:	General device interfaces example - APC620 with 5 PCI slots	107
Figure 34:	General device interfaces example - APC620 embedded	108
Figure 35:	Supply voltage connection	121
Figure 36:	Ground connection	122
Figure 37:	Monitor / Panel connection	124
Figure 38:	Monitor / Panel connection with RGB video signal	128
Figure 39:	Monitor / Panel connection with DVI video signal	128
Figure 40:	Monitor / Panel connection with SDL video signal	129
Figure 41:	Dimensions - Standard half-size PCI cards	133
Figure 42:	Dimensions - Standard full-size PCI cards	134
Figure 43:	PCI connector type: 5 volt	135
Figure 44:	Front-side status LEDs	136
Figure 45:	APC620 serial number sticker on front-side	148

Figure 46:	APC620 serial number sticker on back-side	148
Figure 47:	Example of serial number search: 70950170564	149
Figure 48:	Block diagram of entire device with system unit 5PC600.SX01-00 and 855Gl CPU board 150	ME
Figure 49:	Block diagram of entire device with system unit 5PC600.SX02-00 and 855GI CPU board 151	ME
Figure 50:	Block diagram of entire device with system unit 5PC600.SX02-01 and 855Gl	ME
	CPU board 152	
Figure 51:	Block diagram of entire device with system unit 5PC600.SF03-00 and 855Gl CPU board 153	ΜE
Figure 52:	Block diagram of entire device with system unit 5PC600.SX05-00 and 855GI CPU board 154	ME
Figure 53:	Block diagram of entire device with system unit 5PC600.SX05-01 and 855GI CPU board 155	ME
Figure 54:	Block diagram of entire device with system unit 5PC600.SE00-00 and 855GI CPU board 156	ME
Figure 55:	Block diagram of entire device with system unit 5PC600.SE00-01 and 855Gl CPU board 157	ME
Figure 56:	Block diagram of entire device with system unit 5PC600.SE00-02 and 855GI CPU board 158	ME
Figure 57:	CPU boards 815E (ETX)	163
Figure 58:	CPU boards 855GME (ETX)	165
Figure 59:	CPU boards 855GME (XTX)	167
Figure 60:	Heat sink	169
Figure 61:	Main memory module	170
Figure 62:	Add-on hard disk 30 GB 24x7 - 5AC600.HDDI-00	171
Figure 63:	Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-00	173
Figure 64:	Add-on hard disk 20 GB - 5AC600.HDDI-01	174
Figure 65:	Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-01	176
•	Add-on hard disk 40 GB - 5AC600.HDDI-05	177
Figure 66: Figure 67:		177
	Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-05 Add-on hard disk 80 GB - 5AC600.HDDI-06	180
Figure 68:		
Figure 69:	Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-06	182
Figure 70:	Add-on CompactFlash slot - 5AC600.CFSI-00	183
Figure 71:	Slide-in CD-ROM - 5AC600.CDXS-00	184
Figure 72:	Temperature humidity diagram - Slide-in CD-ROM 5AC600.CDXS-00	186
Figure 73:	Slide-in DVD-ROM/CD-RW - 5AC600.DVDS-00	187
Figure 74:	Temperature humidity diagram - Slide-in DVD-ROM/CD-RW 5AC600.DVDS-189	.00
Figure 75:	Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00	190
Figure 76:	Temperature humidity diagram - Slide-in DVD-R/RW, DVD+R/RW 5AC600.D 00 194	VRS-
Figure 77:	Slide-in CF 2-slot - 5AC600.CFSS-00	195
Figure 78:	Slide-in USB FDD - 5AC600.FDDS-00	197
Figure 79:	Temperature humidity diagram - Slide-in USB diskette drive 5AC600.FDDS-0	00
Figure 80:	Slide-in hard disk 30 GB - 5AC600.HDDS-00	200

	Figure in	dex
Figure 81:	Temperature humidity diagram - Slide-in hard disk 5AC600.HDDS-00	202
Figure 82:	Slide-in hard disk 20 GB - 5AC600.HDDS-01	202
Figure 83:	Temperature humidity diagram - Slide-in hard disk 5AC600.HDDS-01	205
Figure 84:	Slide-in hard disk 40 GB - 5AC600.HDDS-02	206
Figure 85:	Temperature humidity diagram - Slide-in hard disk 5AC600.HDDS-02	208
Figure 86:	RAID 1 system schematic	209
Figure 87:	RAID controller - 5ACPCI.RAIC-00	210
Figure 88:	PCI RAID storage - 5ACPCI.RAIS-00	212
Figure 89:	Temperature humidity diagram - RAID hard disk 5ACPCI.RAIS-00	214
Figure 90:	PCI RAID storage - 5ACPCI.RAIS-01	215
Figure 91:	Temperature humidity diagram - RAID hard disk 5ACPCI.RAIS-01	217
Figure 92:	PCI SATA RAID controller - 5ACPCI.RAIC-01	218
Figure 93:	Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-01	220
Figure 94:	PCI slot numbering on APC620 systems with 5 PCI slots	222
Figure 95:	Replacement SATA HDD 60 GB - 5ACPCI.RAIC-02	223
Figure 96:	Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-02	225
Figure 97:	PCI SATA RAID controller - 5ACPCI.RAIC-03	226
Figure 98:	Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-03	228
Figure 99:	PCI slot numbering on APC620 systems with 5 PCI slots	230
	Replacement SATA HDD 160 GB - 5ACPCI.RAIC-04	231
	Temperature humidity diagram - SATA RAID hard disk 5ACPCI.RAIC-04	233
•	Add-on CAN interface - 5AC600.CANI-00	234
	Terminating resistor - Add-on CAN interface 5AC600.CANI-00	237
•	Contents of the delivery / mounting material - 5AC600.CANI-00	237
•	Add-on RS232/422/485 interface - 5AC600.485I-00	238
•	Add-on RS232/422/485 interface - operated in RS485 mode	240
-	Contents of the delivery / mounting material - 5AC600.485I-00	241
•	Fan kit - 5PC600.FA01-00	242
-	Fan kit - 5PC600.FA02-00	243
•	Fan kit - 5PC600.FA03-00	245
	Fan kit - 5PC600.FA05-00	246
-	AP Link davise connection with PV/Lvides signal	248
	AP Link device connection with DVI video signal AP Link device connection with SDL video signal	251 252
•	Mounting plates for the APC620	252
	Mounting orientation - Standard	257
•	Air circulation spacing - Standard	258
	Mounting orientation - Optional	259
	Optional circulation spacing	260
	Mounting orientations for an APC620 with hard disk drive	261
	Mounting orientations for an APC 620 with a slide-in CD-ROM drive	262
	Mounting orientations for an APC620 with a slide-in DVD-ROM/CD-RW drive	
	Mounting orientations for an APC620 with a slide-in DVD-R/RW / DVD+R/RW	
g <b>_</b>	264	
Figure 124:	Mounting orientations for an APC620 with a slide-in USB FDD drive	265
	Flex radius - Cable connection	266
	Grounding concept	267

Figure 127:	Configuration - One Automation Panel 900 via DVI (onboard)	270
Figure 128:	Configuration - An Automation Panel 900 via SDL (onboard)	273
Figure 129:	Configuration - An Automation Panel 800 via SDL (onboard)	277
Figure 130:	Configuration - An AP900 and an AP800 via SDL (onboard)	280
Figure 131:	Configuration - Four Automation Panel 900 units via SDL (onboard)	283
Figure 132:	Configuration - One Automation Panel 900 via SDL (AP Link)	288
•	Configuration - 4 Automation Panel 900 units via SDL (AP Link)	292
	Configuration - Two Automation Panel 900 units via SDL (onboard) and SDL Link) 297	DL (AP
Figure 135:	Configuration - Eight Automation Panel 900 units via SDL (onboard) and SI Link) 302	DL (AP
Figure 136:	Configuration - Six AP900 and two AP800 devices via SDL (onboard) and SI Link) 308	DL (AP
Figure 137:	Examples - internal numbering of the extension units	312
Figure 138:	Open the RAID Configuration Utility	313
	RAID Configuration Utility - Menu	313
Figure 140:	RAID Configuration Utility - Menu	314
•	RAID Configuration Utility - Create RAID set - striped	315
Figure 142:	RAID Configuration Utility - Create RAID set - Mirrored	316
Figure 143:	RAID Configuration Utility - Delete RAID set	317
Figure 144:	RAID Configuration Utility - Rebuild Mirrored set	318
Figure 145:	RAID Configuration Utility - Resolve Conflicts	319
Figure 146:	RAID Configuration Utility - Low Level Format	320
	815E (ETX) BIOS diagnostic screen	324
Figure 148:	815E (ETX) BIOS diagnostic screen	325
Figure 149:	815E (ETX)- main menu	327
U	815E (ETX) IDE Channel 0 Master	328
•	815E (ETX) IDE Channel 0	330
U	815E (ETX) IDE Channel 1 Master	332
•	815E (ETX) IDE Channel 1 Slave	334
•	815E (ETX)- main menu	336
	815E (ETX) - advanced chipset/graphics control	337
•	815E (ETX) - PCI/PNP configuration	339
•	815E (ETX) - PCI device, slot #1	341
-	815E (ETX) - PCI device, slot #2	342
•	815E (ETX) - PCI device, slot #3	343
•	815E (ETX) - PCI device, slot #4	344
	815E (ETX) - memory cache	345
	815E (ETX) - I/O device configuration	347
U	815E (ETX) - keyboard features	350
U	815E (ETX) - CPU board monitor	351
•	815E (ETX) miscellaneous	352
-	815E (ETX) - baseboard / panel features	353
	815E (ETX) panel control	355
	815E (ETX) - baseboard monitor	356
	815E (ETX) - Legacy devices	357
Figure 170:	815E (ETX)- security menu	359

		rigure index
Figure 171:	815E (ETX)- power menu	361
-	815E (ETX) ACPI control	363
	815E (ETX) - thermal management	364
-	815E (ETX)- boot menu	365
	815E (ETX)- exit menu	366
-	DIP switch on system unit	368
-	855GME (ETX) - BIOS diagnostics screen	378
-	855GME (ETX) - BIOS diagnostics screen	378
•	855GME (ETX) main menu	380
-	855GME (ETX) IDE channel 0 master setup	382
Figure 181:	855GME (ETX) IDE channel 0 slave setup	384
-	855GME (ETX) IDE channel 1 master setup	386
Figure 183:	855GME (ETX) IDE channel 1 slave setup	388
-	855GME - advanced setup menu - overview	390
Figure 185:	855GME (ETX) - advanced chipset control	391
Figure 186:	815GME (ETX) - PCI/PNP configuration	393
	855GME (ETX) - PCI device, slot #1	396
Figure 188:	855GME (ETX) - PCI device, slot #2	397
Figure 189:	855GME (ETX) - PCI device, slot #3	398
Figure 190:	855GME (ETX) - PCI device, slot #4	399
Figure 191:	855GME (ETX) - memory cache	400
Figure 192:	855GME (ETX) - I/O device configuration	402
Figure 193:	855GME (ETX) - keyboard features	405
Figure 194:	855GME (ETX) - CPU board monitor	406
Figure 195:	855GME (ETX) miscellaneous	407
Figure 196:	855GME (ETX) - baseboard/panel features	408
Figure 197:	855GME (ETX) - panel control	410
Figure 198:	855GME (ETX) - baseboard monitor	411
Figure 199:	855GME (ETX) - Legacy devices	413
Figure 200:	855GME (ETX) - security menu	415
Figure 201:	855GME (ETX) - power menu	417
Figure 202:	855GME (ETX) - ACPI control	419
•	855GME (ETX) - boot menu	421
Figure 204:	855GME (ETX) - exit menu	422
	DIP switch on system unit	423
	855GME (XTX) - BIOS diagnostics screen	433
-	855GME (XTX) BIOS main menu	435
	855GME (XTX) - advanced menu	436
	855GME (XTX) - advanced ACPI configuration	437
	855GME (XTX) - advanced PCI configuration	439
	855GME (XTX) - advanced graphics configuration	441
	855GME (XTX) - advanced CPU configuration	443
	855GME (XTX) - advanced chipset configuration	444
	855GME (XTX) - I/O interface configuration	445
	855GME (XTX) - advanced clock configuration	447
•	855GME (XTX) - advanced IDE configuration	448
Figure 217:	855GME (XTX) - primary IDE master	449

Figure 218:	855GME (XTX) - primary IDE slave	451
Figure 219:	855GME (XTX) - secondary IDE master	452
Figure 220:	855GME (XTX) - secondary IDE slave	454
Figure 221:	855GME (XTX) - advanced USB configuration	455
Figure 222:	855GME (XTX) USB mass storage device configuration	457
Figure 223:	855GME (XTX) - advanced keyboard/mouse configuration	458
Figure 224:	855GME (XTX) - advanced remote access configuration	460
Figure 225:	855GME (XTX) - advanced CPU board monitor	462
Figure 226:	855GME (XTX) - advanced baseboard/panel features	463
Figure 227:	855GME (XTX) - panel control	464
Figure 228:	855GME (XTX) - baseboard monitor	465
Figure 229:	855GME (XTX) - Legacy devices	467
Figure 230:	855GME (XTX) - boot menu	469
Figure 231:	855GME (XTX) - security menu	471
Figure 232:	855GME (XTX) Hard disk security user password	472
Figure 233:	855GME (XTX) Hard disk security master password	473
Figure 234:	855GME (XTX) - power menu	474
Figure 235:	855GME (XTX) - Exit menu	476
Figure 236:	DIP switch on system unit	478
Figure 237:	PCI routing with activated APIC CPU boards 815E (ETX), 855GME (ETX)	494
Figure 238:	PCI routing with activated APIC CPU boards 855GME (XTX)	495
Figure 239:	Differentiating between 815E and 855GME CPU boards	497
Figure 240:	Software versions	498
Figure 241:	Firmware version of Automation Panel Link SDL transceiver/receiver	499
Figure 242:	Creating a bootable diskette in Windows XP - step 1	508
Figure 243:	Creating a bootable diskette in Windows XP - step 2	508
Figure 244:	Creating a bootable diskette in Windows XP - step 3	508
Figure 245:	Creating a bootable diskette in Windows XP - step 4	509
Figure 246:	Creating a bootable diskette in Windows XP - step 5	509
Figure 247:	Location of DIP switch	510
•	Automation PC 620 with MS-DOS	513
Figure 249:	Windows XP Professional Logo	515
Figure 250:	Graphics driver for 815E Control Panel access	517
•	Graphics driver for 815E settings	517
Figure 252:	Accessing the graphics driver via Control Panel	518
Figure 253:	Extended desktop settings - primary and secondary device	519
	Dual display clone settings - primary and secondary device	521
Figure 255:	Settings after installing the graphics driver	522
•	Settings for adjustment	523
Figure 257:	Touch screen driver - serial touch screen	524
Figure 258:	Touch screen driver - auto-detect	525
0	Touch screen calibration	525
•	Touch screen driver - serial touch screen	526
	Touch screen driver - auto-detect	526
•	Touch screen calibration	527
•	Windows XP Embedded Logo	530
Figure 264:	ADI Control Center screenshots (Version 1.61) - example	537

	rigui	re maex
Figure 265:	ADI Control Center - SDL equalizer settings	539
-	ADI Control Center - UPS settings	540
•	ADI Control Center - UPS monitor	542
•	ADI Control Center - UPS battery settings	543
	ADI Control Center - UPS settings	545
-	ADI control center warning	546
-	ADI Control Center - Advanced UPS settings	546
	Test structure - torsion	569
	Test structure - Cable drag chain	570
-	Contents of delivery - interface cover	580
•	Dimensions - CompactFlash card Type I	583
-	SanDisk white paper - page 1 of 6	584
-	SanDisk white paper - page 2 of 6	585
•	SanDisk white paper - page 3 of 6	586
-	SanDisk white paper - page 4 of 6	587
-	SanDisk white paper - page 5 of 6	588
	SanDisk white paper - page 6 of 6	589
Figure 282:	Temperature humidity diagram - CompactFlash cards 5CFCRD.xxxx-03	591
	Dimensions - CompactFlash card Type I	592
Figure 284:	Silicon Systems white paper - page 1 of 9	593
	Silicon Systems white paper - page 2 of 9	594
Figure 286:	Silicon Systems white paper - page 3 of 9	595
Figure 287:	Silicon Systems white paper - page 4 of 9	596
Figure 288:	Silicon Systems white paper - page 5 of 9	597
Figure 289:	Silicon Systems white paper - page 6 of 9	598
Figure 290:	Silicon Systems white paper - page 7 of 9	599
Figure 291:	Silicon Systems white paper - page 8 of 9	600
Figure 292:	Silicon Systems white paper - page 9 of 9	601
Figure 293:	USB Media Drive 5MD900.USB2-00	602
Figure 294:	Dimensions for USB Media Drive 5MD900.USB2-00	605
Figure 295:	Dimensions - USB Media Drive with front cover	606
Figure 296:	Interfaces for USB Media Drive 5MD900.USB2-00	606
Figure 297:	Mounting orientation of USB Media Drive 5MD900.USB2-00	607
	Front cover 5A5003.03	607
Figure 299:	Dimensions - 5A5003.03	608
•	Front cover mounting and installation depth	608
Figure 301:	USB Media Drive - 5MD900.USB2-01	609
Figure 302:	Dimensions - 5MD900.USB2-01	612
	Dimensions - USB Media Drive with front cover	613
	Interfaces - 5MD900.USB2-01	613
	Mounting orientation - 5MD900.USB2-01	614
Figure 306:	Front cover 5A5003.03	614
•	Dimensions - 5A5003.03	615
	Front cover mounting and installation depth	615
	Temperature humidity diagram for flash drives 5MMUSB.xxxx-00	618
•	HMI Drivers & Utilities DVD 5SWHMI.0000-00	621
Figure 311.	DVI extension cable (similar)	62/

Figure 312:	Flex radius specification	625
		626
Figure 314:	APC620 internal supply cable 5CAMSC.0001-00	627
Figure 315:	SDL extension cable (similar)	628
Figure 316:	Flex radius specification	629
Figure 317:	Pin assignments - SDL cable 5CASDL.0xxx-00	630
Figure 318:	SDL cable with 45° plug (similar)	631
	,	632
-	·	633
-	· ·	634
-		635
Figure 323:	Example of the signal direction for the SDL cable with extender	636
-	·	637
Figure 325:	SDL cable 5CASDL.0xxx-03 (similar)	638
Figure 326:	Flex radius specification	640
Figure 327:	Dimensions - SDL cable 5CASDL.0xxx-03	640
Figure 328:	Pin assignments - SDL cable 5CASDL.0xxx-03	642
Figure 329:	SDL flex cable with extender - 5CASDL.0x00-13 (similar)	643
Figure 330:	Flex radius specification	645
Figure 331:	Dimensions - SDL flex cable with extender 5CASDL.0x00-13	645
Figure 332:	Example of the signal direction for the SDL flex cable with extender - APC620	646
Figure 333:	Example of the signal direction display - SDL flex cable with extender	646
Figure 334:	Pin assignments - SDL flex cable with extender 5CASDL.0x00-13	647
Figure 335:	RS232 extension cable (similar)	648
Figure 336:	Pin assignments - RS232 cable	649
Figure 337:	USB extension cable (similar)	650
Figure 338:	Pin assignments - USB cable	651
Figure 339:	UPS principle	652
Figure 340:	Firmware and software required for the UPS	654
Figure 341:	Add-on UPS module 5AC600.UPSI-00	655
Figure 342:	Add-on UPS module 5AC600.UPSI-00 - Installation materials	656
Figure 343:	Battery unit 5AC600.UPSB-00	657
Figure 344:	Temperature life span diagram	658
Figure 345:	Deep discharge cycles	658
Figure 346:	Dimensions - 5AC600.UPSB-00	659
Figure 347:	Drilling template for the battery unit	660
Figure 348:	UPS connection cable	661
Figure 349:	Replacement fan	662
Figure 350:	5AC600.SRAM-00	663
Figure 351:	SRAM module installation	665
Figure 352:	Battery removal	669
Figure 353:	Battery handling	669
•	, ,	669
•		671
Figure 356:	APC620 1PCI slot - Remove side cover and fan kit cover	671
-	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	672
Figure 358:	APC620 1PCI slot - Fan installation	672

		Figure index
Figure 359	APC620 1PCI slot - Fan cable connection to the main board	673
	APC620 2PCI slots - Remove screws to install/ remove filter kit	674
•	APC620 2PCI slots - Remove side cover and fan kit cover	674
	Markings for direction of airflow / fan rotation	675
	APC620 2PCI slots - Fan installation	675
-	APC620 2PCI slots - Fan cable connection to the main board	676
Figure 365:	Dust filter in the fan kit cover and filter clasp	676
Figure 366:	APC620 3PCI slot - Remove screws to install/ remove filter kit	677
•	APC620 3PCI slots - Remove side cover and fan kit cover	678
-	Markings for direction of airflow / fan rotation	678
•	APC620 3PCI slot - Fan installation	679
•	APC620 3PCI slot - Fan cable connection to the main board	680
•	Dust filter in the fan kit cover and filter clasp	680
•	APC620 5PCI slot - Remove screws to install/ remove filter kit	681
	APC620 5PCI slot - Remove side cover and fan kit cover	681
	APC620 5PCI attach cable fasteners	682
•	Markings for direction of airflow / fan rotation	682 683
•	APC620 5PCI slot - Fan installation APC620 5PCI slot - Fan cable connection to the main board	684
•	Dust filter in the fan kit cover and filter clasp	685
	Removing the slide-in dummy module	686
•	Installing the slide-in drive	686
•	Release the slide-in slot releasing mechanisms	687
	Removing the slide-in drive	687
•	Slide-in slot releasing mechanism start position	688
•	Add-on UPS module 5AC600.UPSI-00 - Installation materials	689
Figure 385:	Remove UPS module cover	689
Figure 386:	Screw in spacing bolt and spacing ring	690
Figure 387:	Install UPS module	690
Figure 388:	Plug in connection cable	690
-	Connector locking mechanism	691
•	Remove UPS module cover	692
•	Remove cover plate	692
	Screw in spacing bolt and spacing ring	692
-	Install mounting bracket	693
•	Install UPS module	693
	Plug in connection cable	693
-	Connector locking mechanism	694
•	Remove UPS module cover Remove cover plate	695 695
	Screw in spacing bolt and spacing ring	695
	Install mounting bracket	696
•	Install UPS module	696
	Plug in connection cable	696
-	Connector locking mechanism	697
	Remove UPS module cover	698
•	Screw in spacing bolt	699

Figure 406:	Install UPS module	699
Figure 407:	Plug in connection cable	699
Figure 408:	Connector locking mechanism	700
Figure 409:	Remove UPS module cover	700
Figure 410:	Remove cover plate	701
Figure 411:	Screw in spacing bolt	701
Figure 412:	Install mounting bracket	701
Figure 413:	Install UPS module	702
Figure 414:	Plug in connection cable	702
Figure 415:	Connector locking mechanism	702
Figure 416:	Remove UPS module cover	703
Figure 417:	Remove cover plate	703
Figure 418:	Screw in spacing bolt	703
Figure 419:	Install mounting bracket	704
Figure 420:	Install UPS module	704
Figure 421:	Plug in connection cable	704
Figure 422:	Connector locking mechanism	705
Figure 423:	Mounting the side cover - APC620, 1 PCI slot	706
Figure 424:	Mounting the side cover - APC620, 2 PCI slot	707
Figure 425:	Mounting the side cover - APC620, 3 PCI slot	708
Figure 426:	Mounting the side cover - APC620, 5 PCI slot	709
Figure 427:	Screw assignment on the back side of the SATA RAID controller	710
Figure 428:	Hard disk exchange	711
Figure 429:	Temperature sensor locations	713
Figure 430:	Connector location for external devices	714
Figure 431:	MTCX controller location	715
Figure 432:	Sample configuration for SDL timing	716
Figure 433:	SDL timing - Example for Automation Panel 900 with the number 0	717
Figure 434:	B&R Key Editor screenshots (Version 2.10)	718
Figure 435:	ADI development kit screenshots (Version 1.50)	720

Table 1:	Manual history	21
Table 2:	Organization of safety notices	31
Table 3:	Model numbers - System units	32
Table 4:	Model numbers - 815E (ETX) CPU boards	33
Table 5:	Model numbers - CPU boards 855GME (ETX)	33
Table 6:	Model numbers - 855GME (XTX) CPU boards	34
Table 7:	Model numbers - Heat sinks	34
Table 8:	Model numbers - Main memory	35
Table 9:	Model numbers - Drives	35
Table 10:	Model numbers - Interfaces	36
Table 11:	Model numbers - Fan kits	
Table 12:	Model numbers - AP Link graphics adapter	
Table 13:	Model numbers - Batteries	37
Table 14:	Model numbers - Supply voltage connectors	37
Table 15:	Model numbers - CompactFlash cards	37
Table 16:	Model numbers - USB flash drives	38
Table 17:	Model numbers - Cables	
Table 18:	Model numbers - UPS module + accessories	40
Table 19:	Model numbers - Other items	40
Table 20:	Model numbers - Software	
Table 21:	Technical data - APC620, 1 PCI slot variant	52
Table 22:	Technical data - APC620, 2 PCI slot variant	
Table 23:	Technical data - APC620, 3 PCI slot variant	62
Table 24:	Technical data - APC620, 5 PCI slot variant	
Table 25:	Technical data - APC620 embedded variant	72
Table 26:	Pin assignments - COM1	109
Table 27:	COM1 - I/O address and IRQ	
Table 28:	Pin assignments - COM2	
Table 29:	COM2 - I/O address and IRQ	
Table 30:	X2X pin assignments (only APC620 embedded)	
Table 31:	CAN pin assignments (only APC620 embedded)	
Table 32:	CAN node number switch (x1, x16) - only APC620 embedded	
Table 33:	CAN terminating switch / LED (only APC620 embedded)	
Table 34:	Status LEDs CAN / X2X (only APC620 embedded)	
Table 35:	Ethernet POWERLINK (only APC620 embedded)	
Table 36:	Status / Error LED as error LED - Ethernet POWERLINK V2 operating mode	
Table 37:	Status / Error LED as status LED - Ethernet POWERLINK V2 operating mode .	
Table 38:	Ethernet POWERLINK station number (x1, x16) - only APC620 embedded	
Table 39:	Ethernet connection ETH (only APC620 embedded)	
Table 40:	Ethernet connection (ETH1)	
Table 41:	Ethernet cable length in conjunction with 5PC600.E855-xx CPU boards (ETX).	
Table 42:	Ethernet cable length in conjunction with 5PC600.E855-xx CPU boards	
Table 43:	Ethernet connection (ETH2)	
Table 44:	USB port	
Table 45:	USB connections 4 x - only APC620 embedded	
Table 46:	Power supply depending on the system unit	
Table 47:	Starting currents in the voltage supply to the system units	122

## Table index

Table 48:	System unit revisions for at least 10 seconds standby time	123
Table 49:	System unit revisions for any standby times	123
Table 50:	Pin assignments - Monitor / panel connection	
Table 51:	Segment lengths, resolutions and SDL cables	125
Table 52:	Requirements for SDL cable with automatic cable adjustment (equalizer)	
Table 53:	Requirements for SDL cable with extender and automatic cable adjustment	
	(equalizer)127	
Table 54:	Technical data - MIC, Line IN and Line OUT port	130
Table 55:	Add-on interface slot	
Table 56:	Add-on UPS module slot	132
Table 57:	Technical data - PCI bus	
Table 58:	Technical data - Status LEDs	
Table 59:	Status LEDs Power, CF, Link (only APC620 embedded)	
Table 60:	Technical data - CompactFlash slot (CF1)	138
Table 61:	Technical data - Hard disk / CompactFlash slot (HDD/CF2)	139
Table 62:	CompactFlash slots (CF1 / CF2) - APC620 embedded	140
Table 63:	Technical data - Power button	141
Table 64:	Technical data - Reset button	
Table 65:	Technical data - PS/2 keyboard/mouse (external PS/2)	142
Table 66:	Technical data - battery	143
Table 67:	Meaning of battery status	
Table 68:	Technical data - Hardware security key	
Table 69:	Hardware security key - I/O address and IRQ	
Table 70:	Technical data - Slide-in slot 1	146
Table 71:	Technical data - Slide-in slot 2	
Table 72:	Technical data - 1, 2, 3 and 5 PCI slot types	159
Table 73:	Technical data - APC620 embedded variations	
Table 74:	Technical data - 815E CPU boards (ETX)	
Table 75:	Technical data - CPU boards 855GME (ETX)	
Table 76:	Technical data - CPU boards 855GME (XTX)	
Table 77:	Technical data - Heat sink	
Table 78:	Technical data - Main memory	
Table 79:	Technical data - Add-on hard disk 5AC600.HDDI-00	
Table 80:	Technical data - Add-on hard disk 5AC600.HDDI-01	
Table 81:	Technical data - Add-on hard disk 5AC600.HDDI-05	
Table 82:	Technical data - add-on hard disk - 5AC600.HDDI-06	
Table 83:	Technical data - Add-on CompactFlash slot 5AC600.CFSI-00	
Table 84:	Technical data - Slide-in CD-ROM 5AC600.CDXS-00	
Table 85:	Technical data - Slide-in DVD-ROM/CD-RW 5AC600.DVDS-00	
Table 86:	Technical data - Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 Rev. D0 lower191	) and
Table 87:	Technical data - Slide-in DVD-R/RW, DVD+R/RW - 5AC600.DVRS-00 Rev. D0 lower192	
Table 88:	Technical data - Slide-in CF slot 2 - 5AC600.CFSS-00	
Table 89:	Technical data - Slide-in USB diskette drive - 5AC600.FDDS-00	
Table 90:	Technical data - Slide-in hard disk - 5AC600.HDDS-00	
Table 91:	Technical data - Slide-in hard disk - 5AC600.HDDS-01	204

Table 92:	Technical data - Slide-in hard disk - 5AC600.HDDS-02	207
Table 93:	Technical data - RAID controller - 5ACPCI.RAIC-00	210
Table 94:	Contents of delivery - 5ACPCI.RAIC-00	211
Table 95:	Technical data - RAID hard disk - 5ACPCI.RAIS-00	213
Table 96:	Technical data - RAID hard disk - 5ACPCI.RAIS-01	216
Table 97:	Technical data - RAID hard disk - 5ACPCI.RAIC-01	219
Table 98:	Technical data - RAID hard disk - 5ACPCI.RAIC-02	223
Table 99:	Technical data - RAID hard disk - 5ACPCI.RAIC-03	227
Table 100:	Technical data - RAID hard disk - 5ACPCI.RAIC-04	231
	Technical data - Add-on CAN interface - 5AC600.CANI-00	
	Pin assignments - CAN	
Table 103:	Add-on CAN - I/O address and IRQ	235
Table 104:	CAN address register	235
	Bus length and transfer rate - CAN	
	CAN cable requirements	
Table 107:	Pin assignments - RS232/RS422	238
	Add-on RS232/422/485 - I/O address and IRQ	
Table 109:	Bus length and transfer rate - RS232	239
Table 110:	RS232 cable requirements	239
	Bus length and transfer rate - RS422	
Table 112:	RS422 cable requirements	240
Table 113:	Bus length and transfer rate - RS485	240
	RS485 cable requirements	
	Technical data - 5PC600.FA01-00	
Table 116:	Contents of delivery - 5PC600.FA01-00	243
	Technical data - 5PC600.FA02-00	
Table 118:	Contents of delivery - 5PC600.FA02-00	244
	Technical data - 5PC600.FA03-00	
	Contents of delivery - 5PC600.FA03-00	
	Technical data - 5PC600.FA05-00	
	Contents of delivery - 5PC600.FA05-00	
	Model numbers - AP Link graphics adapter	
	AP Link slot (AP Link card inserted)	
	Pin assignment for AP Link connection	
	Segment lengths, resolutions and SDL cables	
	Requirements for SDL cable with automatic cable adjustment (equalizer)	250
	Requirements for SDL cable with extender and automatic cable adjustment (equalizer)251	
	Drilling templates - 1 and 2 PCI slots	
	Drilling templates - 3 and 5 PCI slots	
	Drilling templates - APC620 embedded	
	Selecting the display units	
Table 133:	Possible combinations of system unit and CPU board	270
	Link module for the configuration - One Automation Panel 900 via DVI	
	Cable for DVI configurations	
	Possible Automation Panel units, resolutions und segment lengths	
Table 137:	Possible combinations of system unit and CPU board	273

## Table index

Table 138:	Link module for the configuration - One Automation Panel 900 via DVI	274
Table 139:	Cables for SDL configurations	274
Table 140:	Segment lengths, resolutions and SDL cables	275
Table 141:	Requirements for SDL cable with automatic cable adjustment (equalizer)	275
Table 142:	Requirements for SDL cable with extender and automatic cable adjustment (equalizer)276	
Table 143:	Possible combinations of system unit and CPU board	277
Table 144:	Cables for SDL configurations	278
Table 145:	Segment lengths, resolutions and SDL cables	278
Table 146:	Requirements for SDL cable with automatic cable adjustment (equalizer)	279
Table 147:	Requirements for SDL cable with extender and automatic cable adjustment (equalizer)279	
Table 148:	Possible combinations of system unit and CPU board	280
	Segment lengths, resolutions and SDL cables	
	Requirements for SDL cable with automatic cable adjustment (equalizer)	281
	Requirements for SDL cable with extender and automatic cable adjustment (equalizer)282	
	Possible combinations of system unit and CPU board	
	Link modules for the configuration: 4 Automation Panel 900 via SDL on 1 line	
	Cables for SDL configurations	
	Segment lengths, resolutions and SDL cables	
	Requirements for SDL cable with automatic cable adjustment (equalizer)	286
	Requirements for SDL cable with extender and automatic cable adjustment (equalizer)286	
	Possible combinations of system unit and CPU board	
	Link modules for the configuration: 1 Automation Panel 900 via SDL (optional).	
	Cables for SDL configurations	
	Segment lengths, resolutions and SDL cables	
	Requirements for SDL cable with automatic cable adjustment (equalizer)	290
	Requirements for SDL cable with extender and automatic cable adjustment (equalizer)291	
	Possible combinations of system unit and CPU board	
	Link modules for the configuration: 4 Automation Panel 900 units via SDL (optio on 1 line293	•
	Cables for SDL configurations	
	Segment lengths, resolutions and SDL cables	
	Requirements for SDL cable with automatic cable adjustment (equalizer)	295
	Requirements for SDL cable with extender and automatic cable adjustment (equalizer)295	
	Possible combinations of system unit and CPU board	
	Link modules for the configuration: 2 Automation Panel 900 units via SDL and S (optional)298	
	Cables for SDL configurations	
	Segment lengths, resolutions and SDL cables	
	Requirements for SDL cable with automatic cable adjustment (equalizer)	299
Table 175:	Requirements for SDL cable with extender and automatic cable adjustment (equalizer)300	

Table 176:	Possible combinations of system unit and CPU board	303
Table 177:	Link modules for the configuration: 8 Automation Panel 900 units via SDL and S	SDL
	(optional)303	
Table 178	Cables for SDL configurations	304
	Segment lengths, resolutions and SDL cables	
	Requirements for SDL cable with automatic cable adjustment (equalizer)	
	Requirements for SDL cable with extender and automatic cable adjustment	500
	(equalizer)306	
Table 182:	Possible combinations of system unit and CPU board	309
Table 183:	Link modules for the configuration: 6 Automation Panel 900 units via SDL and S	SDL
	(optional)309	
Table 184:	Segment lengths, resolutions and SDL cables	310
	Requirements for SDL cable with automatic cable adjustment (equalizer)	
	Requirements for SDL cable with extender and automatic cable adjustment	
	(equalizer)311	
Table 187	BIOS-relevant keys in the RAID Configuration Utility	313
	Compatibility / improvements from 855GME (XTX) to 855GME (ETX)	
	Keys relevant to 815E (ETX) BIOS during POST	
	Keys relevant to 815E (ETX) BIOS during POST	
	Overview of 815E (ETX) BIOS menu items	
	815E (ETX)- main menu - setting options	
	815E (ETX) IDE Channel 0 Master - setting options	
	815E (ETX) IDE Channel 0 Slave - setting options	
	815E (ETX) IDE Channel 1 Master - setting options	
	815E (ETX) IDE Channel 1 Slave - setting options	
	815E (ETX)- main menu - setting options	
	815E (ETX) - advanced chipset/graphics control - setting options	
	815E (ETX) - PCI/PNP configuration - setting options	
	815E (ETX) - PCI device, slot #1 - setting options	
	815E (ETX) - PCI device, slot #2 - setting options	
	815E (ETX) - PCI device, slot #3 - setting options	
	815E (ETX) - PCI device, slot #4 - setting options	
	815E (ETX) - memory cache - setting options	
	815E (ETX) - I/O device configuration - setting options	
Table 206:	815E (ETX) - keyboard features - setting options	350
Table 207:	815E (ETX) - CPU board monitor - setting options	351
Table 208:	815E (ETX)- miscellaneous - setting options	352
Table 209:	815E (ETX) - baseboard / panel features - setting options	353
Table 210:	815E (ETX) panel control - setting options	355
	815E (ETX) - baseboard monitor - setting options	
	815E (ETX) - Legacy devices - setting options	
	815E (ETX)- security - setting options	
	815E (ETX)- power - setting options	
	815E (ETX) ACPI control - setting options	
	815E (ETX) - thermal management	
	815E (ETX)- boot menu - setting options	
	815E (ETX)- exit menu - setting options	
1 abic 2 10.	O TOL (LTA)- GAIL HIGHU - SELLING OPLIONS	300

## Table index

Table 219:	815E (ETX) profile overview	368
Table 220:	815E (ETX)- main - profile setting overview	369
Table 221:	815E (ETX) - advanced chipset/graphics control - profile settings overview	370
Table 222:	815E (ETX) - PCI/PNP configuration - profile settings overview	370
	815E (ETX) - memory cache - profile settings overview	
	815E (ETX) - I/O device configuration - profile settings overview	
Table 225:	815E (ETX) - keyboard features - profile settings overview	372
Table 226:	815E (ETX) - CPU board monitor - profile settings overview	372
	815E (ETX)- miscellaneous - profile settings overview	
	815E (ETX) - baseboard / panel features - profile settings overview	
	815E (ETX)- security menu - profile settings overview	
Table 230:	815E (ETX)- power menu - profile settings overview	375
Table 231:	815E (ETX)- boot menu - profile settings overview	376
Table 232:	Keys relevant to 855GME (ETX) BIOS during POST	379
Table 233:	855GME (ETX) - BIOS relevant keys	379
	Overview of 855GME (ETX) BIOS menu items	
Table 235:	855GME (ETX) main menu - setting options	380
Table 236:	815E (ETX) IDE Channel 0 Master - setting options	382
	815E (ETX) IDE Channel 0 slave - setting options	
	815E (ETX) IDE Channel 1 Master - setting options	
	815E (ETX) IDE Channel 1 slave - setting options	
Table 240:	855GME (ETX) - advanced menu - setting options	390
Table 241:	855GME (ETX) - advanced chipset control - setting options	391
Table 242:	815GME (ETX) - PCI/PNP configuration - setting options	393
Table 243:	855GME (ETX) - PCI device, slot #1 - setting options	396
	855GME (ETX) - PCI device, slot #2 - setting options	
Table 245:	855GME (ETX) - PCI device, slot #3 - setting options	398
	855GME (ETX) - PCI device, slot #4 - setting options	
	855GME (ETX) - memory cache - setting options	
	855GME (ETX) - I/O device configuration - setting options	
	855GME (ETX) - keyboard features - setting options	
	855GME (ETX) - CPU board monitor - setting options	
Table 251:	855GME (ETX) miscellaneous - setting options	407
	855GME (ETX) - baseboard/panel features - setting options	
	855GME (ETX) - panel control - setting options	
	855GME (ETX) - baseboard monitor - setting options	
	855GME (ETX) - Legacy devices - setting options	
	855GME (ETX) security - setting options	
Table 257:	855GME (ETX) - power - setting options	417
	855GME (ETX) - ACPI control - setting options	
	855GME (ETX) - boot menu - setting options	
	855GME (ETX) - exit menu - setting options	
	855GME (ETX) - profile overview	
	855GME (ETX) - main - profile setting overview	
	855GME (ETX) - advanced chipset/graphics control - profile settings overview.	
	815GME (ETX) - PCI/PNP configuration - profile settings overview	
Table 265:	855GME (ETX) - memory cache - profile settings overview	426

Table 266:	855GME (ETX) - I/O device configuration - profile setting overview	427
Table 267:	855GME (ETX) - keyboard features - profile setting overview	. 427
Table 268:	855GME (ETX) - CPU board monitor - profile setting overview	428
Table 269:	855GME (ETX) - miscellaneous - profile setting overview	428
Table 270:	855GME (ETX) - baseboard/panel features -profile setting overview	428
Table 271:	855GME (ETX) security - profile setting overview	430
	855GME (ETX) - power - profile setting overview	
	855GME (ETX) - boot - profile setting overview	
	855GME (XTX) - keys relevant to BIOS during POST	
	855GME (XTX) - keys relevant to BIOS in the BIOS menu	
	Overview of 855GME (XTX) BIOS menu items	
	855GME (XTX) main menu - setting options	
	855GME (XTX) - advanced menu - setting options	
	855GME (XTX) - advanced ACPI configuration - setting options	
Table 280:	855GME (XTX) - advanced PCI configuration - setting options	439
	855GME (XTX) - advanced graphics configuration - setting options	
Table 282:	855GME (XTX) - advanced CPU configuration - setting options	443
	855GME (XTX) - advanced chipset - setting options	
	855GME (XTX) - I/O interface configuration - setting options	
Table 285:	855GME (XTX) - advanced clock configuration - setting options	447
	855GME (XTX) - advanced IDE configuration - setting options	
	855GME (XTX) - primary IDE master - setting options	
	855GME (XTX) - primary IDE slave - setting options	
	855GME (XTX) - secondary IDE master - setting options	
	855GME (XTX) - secondary IDE slave - setting options	
Table 291:	855GME (XTX) - advanced USB configuration - setting options	456
Table 292:	855GME (XTX) USB mass storage device configuration	458
	855GME (XTX) - advanced keyboard/mouse configuration - setting options	
	855GME (XTX) - advanced remote access configuration - setting options	
	855GME (XTX) - advanced remote access configuration - setting options	
Table 296:	855GME (XTX) - advanced baseboard/panel features - setting options	. 463
	855GME (XTX) - panel control - setting options	
	855GME (XTX) - baseboard monitor setting options	
	855GME (XTX) - Legacy devices - setting options	
	855GME (XTX) Boot menu - setting options	
	855GME (XTX) - security menu - setting options	
	855GME (XTX) Hard disk security user password	
	855GME (XTX) Hard disk security master password	
Table 304:	855GME (XTX) power menu - setting options	4/4
	855GME (XTX) Exit menu - setting options	
	855GME (XTX) - profile overview	
	855GME (XTX) - main - profile setting overview	
	855GME (XTX) - advanced profile setting options	
	855GME - (XTX) PCI configuration - profile setting overview	
Table 310:	855GME - (XTX) Graphics configuration - profile setting overview	ا4۵) ۱۵۸
	855GME - (XTX) CPU configuration - profile setting overview	
1 able 312:	855GME - (XTX) Chipset configuration - profile setting overview	48

## Table index

Table 313:	855GME (XTX) - I/O interface configuration - profile settings overview	481
Table 314:	855GME - (XTX) Clock configuration - profile setting overview	481
Table 315:	855GME - (XTX) IDE configuration - profile setting overview	482
Table 316:	855GME - (XTX) USB configuration - profile setting overview	483
Table 317:	855GME (XTX) - keyboard/mouse configuration - profile setting overview	483
Table 318:	855GME - (XTX) remote access configuration - profile setting overview	483
	855GME (XTX) - CPU board monitor - profile setting overview	
	855GME (XTX) - baseboard/panel features -profile setting overview	
Table 321:	855GME (XTX) - boot - profile setting overview	486
	855GME (XTX) - security - profile setting options	
Table 323:	855GME (XTX) - power - profile setting overview	487
Table 324:	BIOS post code messages BIOS 815E (ETX) and 855GME (ETX)	488
Table 325:	BIOS post code messages BIOS 855GME (XTX)	488
	RAM address assignment	
	DMA channel assignment	
Table 328:	I/O address assignment	491
Table 329:	IRQ interrupt assignments in PCI mode	492
Table 330:	IRQ interrupt assignments in APIC mode	493
Table 331:	Inter-IC (I <sup>2</sup> C) bus resources	495
Table 332:	Inter-IC (I <sup>2</sup> C) bus resources	495
	CPU board software versions	
Table 334:	Automation panel link software versions	496
Table 335:	Differentiating between 815E (ETX) and 855GME (ETX / XTX) CPU boards	497
	System unit support for buffering with Automation Runtime	
	Model numbers - MS-DOS	
	Tested resolutions and color depths for DVI and RGB signals	
	Model numbers - Windows XP Professional	
	Relationship between driver settings and graphics engine	
Table 341:	Relationship between driver settings and graphics engine	521
	Model numbers - Windows XP Embedded	
	Device functions in Windows XP embedded with FP2007	
	Model numbers - Windows CE	
	Properties for Windows CE 5.0 and APC620	
Table 346:	System support - ADI driver	538
	Overview of standards	
	Overview of limits and testing guidelines for emissions	
	Test requirements - Network-related emissions for industrial areas	
	: Test requirements - Electromagnetic emissions for industrial areas	
	Overview of limits and testing guidelines for immunity	
	Test requirements - Electrostatic discharge (ESD)	
	Test requirements - High-frequency electromagnetic fields (HF field)	
Table 354:	Test requirements - High-speed transient electrical disturbances (burst)	556
	Test requirements - Surge voltages	
	Test requirements - Conducted disturbances	
	Test requirements - Magnetic fields with electrical frequencies	
	Test requirements - Voltage dips, fluctuations, and short-term interruptions  Test requirements - Damped vibration	

Table 360:	Overview of limits and testing guidelines for vibration	559
Table 361:	Test requirements - Vibration operation	559
Table 362:	Test requirements - Vibration during transport (packaged)	560
Table 363:	Test requirements - Shock operation	560
Table 364:	Test requirements - Shock transport	560
Table 365:	Test requirements - Toppling	560
Table 366:	Test requirements - Toppling	561
Table 367:	Overview of limits and testing guidelines for temperature and humidity	562
Table 368:	Test requirements - Worst case operation	562
Table 369:	Test requirements - Dry heat	562
	Test requirements - Dry cold	
	Test requirements - Large temperature fluctuations	
Table 372:	Test requirements - Temperature fluctuations in operation	563
Table 373:	Test requirements - Humid heat, cyclic	563
Table 374:	Test requirements - Humid heat, constant (storage)	563
Table 375:	Overview of limits and testing guidelines for safety	564
	Test requirements - Ground resistance	
Table 377:	Test requirements - Insulation resistance	565
Table 378:	Test requirements - High voltage	566
Table 379:	Test requirements - Residual voltage	566
	Test requirements - Leakage current	
Table 381:	Test requirements - Overload	567
Table 382:	Test requirements - Defective component	567
Table 383:	Test requirements - Voltage range	567
	Overview of limits and testing guidelines for other tests	
	Test requirements - Protection	
	Test requirements - Degree of pollution	
	International certifications	
	Model numbers - Accessories	
	Order data - TB103	
Table 390:	Technical data - TB103 supply plug	577
	Order data - Lithium batteries	
	Technical data - Lithium batteries	
	Order data - APC620 interface cover	
	Order data - DVI - CRT adapter	
	Order data - CompactFlash cards 5CFCRD.xxxx-02	
	Technical data - CompactFlash cards 5CFCRD.xxxx-02	
	CompactFlash cards - Order data	
	Technical data - CompactFlash cards 5CFCRD.xxxx-03	
	Technical data - USB Media Drive 5MD900.USB2-00	
	Contents of delivery - USB Media Drive 5MD900.USB2-00	
	Technical data - 5A5003.03	
	Technical data - USB Media Drive 5MD900.USB2-01	
	Contents of delivery - USB Media Drive - 5MD900.USB2-01	
	Technical data - 5A5003.03	
	Order data - USB flash drives	
Table 406:	Technical data - USB flash drive 5MMUSB.xxxx-00	617

# Table index

Table 407:	Contents of delivery - USB flash drives 5MMUSB.xxxx-00	619
Table 408:	Model number - HMI Drivers & Utilities DVD	621
Table 409:	Model numbers - DVI cables	624
Table 410:	Technical data - DVI cable 5CADVI.0xxx-00	624
Table 411:	Model number - APC620 internal supply cable	627
Table 412:	Technical data - 5CAMSC.0001-00	627
	Model numbers - SDL cables	
Table 414:	Technical data - SDL cables 5CASDL.0xxx-00	629
	Model numbers - SDL cables with 45° plug	
Table 416:	Technical data - SDL cable with 45° plug 5CASDL.0xxx-01	632
Table 417:	Model numbers - SDL cable with extender	634
Table 418:	Technical data - SDL cable with extender 5CASDL.0x00-10	635
Table 419:	Model numbers - SDL cable 5CASDL.0xxx-03	638
Table 420:	Technical data - SDL cable 5CASDL.0xxx-03	639
	Structure - SDL cable 5CASDL.0xxx-03	
	Model numbers - SDL flex cable with extender	
Table 423:	Technical data - SDL flex cable with extender 5CASDL.0x00-13	643
Table 424:	Model numbers - RS232 cables	648
Table 425:	Technical data - RS232 cables	648
Table 426:	Model numbers - USB cables	650
Table 427:	Technical data - USB cables	650
Table 428:	System unit revisions - Add-on UPS module	653
Table 429:	Firmware and software required for the UPS	653
Table 430:	Technical data - 5AC600.UPSI-00	655
Table 431:	Technical data - 5AC600.UPSB-00	657
Table 432:	Technical data - UPS connection cable	661
Table 433:	Model numbers - Replacement fan filters	662
Table 434:	Technical data - 5AC600.SRAM-00	663
Table 435:	Meaning of battery status	667
Table 436:	Temperature sensor locations	713
Table 437:	Revision information for connecting an external device	714
Table 128.	Pin assignments - Connector on main hoard	71/

0		36, 226, 227 36, 231, 232
0AC201.937, 143, 579		36, 231, 232
0TB103.9		
0TB103.91		36, 215, 216, 217
01B103.91		39, 624
		39, 624
4		39, 624
		39, 627
4A0006.00-00037, 143, 579		39, 628
		39, 631
5		39, 638
		39, 628
5A5003.0340, 607, 614		39, 631
5AC600.485I-0036		39, 638
5AC600.CANI-0036		39, 628
5AC600.CDXS-0035, 185		39, 631
5AC600.CFSI-00		39, 638
5AC600.CFSS-0035, 195		39, 628
5AC600.DVDS-0035, 188		39, 631
5AC600.DVRS-0035, 191, 192		39, 638
5AC600.FA01-0041, 662		39, 628
5AC600.FA02-0041, 662		39, 638
5AC600.FA03-0041, 662		39, 628
5AC600.FA05-0041, 662		39, 638
5AC600.FDDS-0035, 198		39, 628
5AC600.HDDI-0035, 171		39, 638
5AC600.HDDI-0135, 174	5CASDL.0300-10	40, 634
5AC600.HDDI-05	5CASDL.0300-13	40, 643
5AC600.HDDI-06	5CASDL.0400-10	40, 634
5AC600.HDDS-0036	5CASDL.0400-13	40, 643
5AC600.HDDS-01	5CAUPS.0005-00	40, 661
5AC600.HDDS-02	5CAUPS.0030-00	40, 661
5AC600.HS01-00	5CAUSB.0018-00	40, 650
5AC600.HS01-01	5CAUSB.0050-00	40, 650
5AC600.HS01-0234, 169	5CFCRD.0032-02	37, 582
5AC600.HS02-0134, 169	5CFCRD.0064-02	37, 582
5AC600.HS02-02	5CFCRD.0064-03 3	38, 138, 139, 140, 590
5AC600.HS03-01	5CFCRD.0128-02	37, 582
5AC600.ICOV-00	5CFCRD.0128-03 3	38, 138, 139, 140, 590
5AC600.SDL0-00		38, 582
5AC600.SRAM-00	5CFCRD.0256-03 3	38, 138, 139, 140, 590
5AC600.UPSB-0040, 653, 657		38, 582
5AC600.UPSI-0040, 653, 655		38, 138, 139, 140, 590
5AC900.1000-00		38, 582
5ACPCI.RAIC-00		38, 138, 139, 140, 590
5ACPCI.RAIC-00		38, 582
5ACPCI.RAIC-02		38, 138, 139, 140, 590
0, 10, 01, 11, 110 02		

## Model number index

5CFCRD.8192-03         38, 138, 139, 140, 590         5PC600.\$X055-01         32, 159           5MD900.USB2-00         41, 602         5PC600.\$X855-00         34, 167           5MD900.USB2-01         41, 602         5PC600.\$X855-01         34, 167           5MMDDR.0256-00         35, 170         5PC600.\$X855-02         34, 167           5MMDDR.0512-00         35, 170         5PC600.\$X855-03         34, 167           5MMDDR.1028-01         35, 170         5PC600.\$X855-04         34, 167           5MMSDR.0128-01         35, 170         5PC600.\$X855-05         34, 167           5MMSDR.0256-01         35, 170         5PC600.\$X855-05         34, 167           5MMSDR.0256-01         35, 170         5PC600.\$X855-05         34, 167           5MMSDR.0256-01         35, 170         5PC600.\$X855-05         34, 167           5MMUSB.0512-01         35, 170         5SWWCE.0513-ENG         42, 534           5MMUSB.0512-00         38, 616         5SWWCE.0613-ENG         42, 534           5MMUSB.0512-00         38, 616         5SWWCE.0613-ENG         42, 534           5MMUSB.1024-00         38, 616         5SWWXP.0412-ENG         42, 530           5PC600.E815-00         33, 163         5PC600.E815-02         33, 163 <td< th=""><th>5CFCRD.4096-0338, 138, 139, 140, 590</th><th>5PC600.SX05-0032, 159</th></td<>	5CFCRD.4096-0338, 138, 139, 140, 590	5PC600.SX05-0032, 159
5MD900.USB2-01         41, 609         5PC600.X855-01         34, 167           5MMDDR.0256-00         35, 170         5PC600.X855-02         34, 167           5MMDDR.0512-00         35, 170         5PC600.X855-03         34, 167           5MMDDR.1024-00         35, 170         5PC600.X855-04         34, 167           5MMSDR.0128-01         35, 170         5PC600.X855-05         34, 167           5MMSDR.0256-01         35, 170         5SWHMI.0000-00         41, 621           5MMSDR.0512-01         35, 170         5SWWCE.0512-ENG         42, 534           5MMUSB.0128-00         38, 616         5SWWCE.0512-ENG         42, 534           5MMUSB.0512-00         38, 616         5SWWCE.0613-ENG         42, 534           5MMUSB.0512-00         38, 616         5SWWCE.0613-ENG         42, 534           5MMUSB.1024-00         38, 616         5SWWXP.0412-ENG         42, 534           5MMUSB.2048-00         38, 616         5SWWXP.0412-ENG         42, 530           5PC600.E815-00         33, 163         5PC600.E815-02         33, 163           5PC600.E855-01         33, 163         5WWXP.0412-ENG         42, 530           5PC600.E855-02         33, 165         9A0014.02         40, 648           5PC600.E855-03	5CFCRD.8192-0338, 138, 139, 140, 590	5PC600.SX05-0132, 159
5MMDDR.0256-00         35, 170         5PC600.X855-02         34, 167           5MMDDR.0512-00         35, 170         5PC600.X855-03         34, 167           5MMDDR.1024-00         35, 170         5PC600.X855-04         34, 167           5MMSDR.0128-01         35, 170         5PC600.X855-05         34, 167           5MMSDR.0256-01         35, 170         5SWHMI.0000-00         41, 621           5MMSDR.0512-01         35, 170         5SWWCE.0512-ENG         42, 534           5MMUSB.0128-00         38, 616         5SWWCE.0513-ENG         42, 534           5MMUSB.056-00         38, 616         5SWWCE.0613-ENG         42, 534           5MMUSB.1024-00         38, 616         5SWWCE.0613-ENG         42, 534           5MMUSB.1024-00         38, 616         5SWWXP.0412-ENG         42, 534           5MMUSB.1024-00         38, 616         5SWWXP.0412-ENG         42, 530           5PC600.E815-00         33, 163         5WWXP.0413-ENG         42, 530           5PC600.E815-02         33, 163         5WWXP.0413-ENG         42, 530           5PC600.E855-03         33, 163         5PC600.E855-02         40, 648           5PC600.E855-04         33, 165         9A0014.02         40, 648           5PC600.E855-03	5MD900.USB2-0041, 602	5PC600.X855-0034, 167
5MMDDR.0512-00         35, 170         5PC600.X855-03         34, 167           5MMDDR.1024-00         35, 170         5PC600.X855-04         34, 167           5MMSDR.0128-01         35, 170         5PC600.X855-05         34, 167           5MMSDR.0256-01         35, 170         5PC600.X855-05         34, 167           5MMSDR.0512-01         35, 170         5SWMCE.0512-ENG         42, 534           5MMUSB.0128-00         38, 616         5SWWCE.0513-ENG         42, 534           5MMUSB.0256-00         38, 616         5SWWCE.0612-ENG         42, 534           5MMUSB.0512-00         38, 616         5SWWCE.0613-ENG         42, 534           5MMUSB.044-00         38, 616         5SWWXP.0412-ENG         42, 530           5PC600.E815-00         33, 163         5SWWXP.0412-ENG         42, 530           5PC600.E815-00         33, 163         5SWWXP.0413-ENG         42, 530           5PC600.E815-00         33, 163         5SWWXP.0413-ENG         42, 530           5PC600.E855-00         33, 163         5PC600.E855-00         33, 165         9A0014.02         40, 648           5PC600.E855-01         33, 165         9A0014.05         40, 648         5PC600.E855-02         33, 165         9S0000.01-010         41, 513         5PC600.E855-0	5MD900.USB2-0141, 609	5PC600.X855-0134, 167
5MMDDR.1024-00         35, 170         5PC600.X855-04         34, 167           5MMSDR.0128-01         35, 170         5PC600.X855-05         34, 167           5MMSDR.0256-01         35, 170         5SWMHII.0000-00         41, 621           5MMSDR.0512-01         35, 170         5SWWCE.0512-ENG         42, 534           5MMUSB.0128-00         38, 616         5SWWCE.0513-ENG         42, 534           5MMUSB.0256-00         38, 616         5SWWCE.0612-ENG         42, 534           5MMUSB.0512-00         38, 616         5SWWCE.0613-ENG         42, 534           5MMUSB.0512-00         38, 616         5SWWXP.0412-ENG         42, 534           5MMUSB.1024-00         38, 616         5SWWXP.0412-ENG         42, 534           5MMUSB.2048-00         38, 616         5SWWXP.0413-ENG         42, 530           5PC600.E815-00         33, 163         5PC600.E815-02         33, 163           5PC600.E855-00         33, 163         5PC600.E855-00         33, 165           5PC600.E855-01         33, 165         9A0014.02         40, 648           5PC600.E855-02         33, 165         9A0014.01         40, 648           5PC600.E855-03         33, 165         9S0000.01-010         41, 513           5PC600.E855-04 <td< td=""><td>5MMDDR.0256-0035, 170</td><td></td></td<>	5MMDDR.0256-0035, 170	
5MMSDR.0128-01         35, 170         5PC600.X855-05         34, 167           5MMSDR.0256-01         35, 170         5SWHMI.0000-00         .41, 621           5MMSDR.0512-01         35, 170         5SWWCE.0512-ENG         .42, 534           5MMUSB.0128-00         38, 616         5SWWCE.0513-ENG         .42, 534           5MMUSB.0256-00         38, 616         5SWWCE.0612-ENG         .42, 534           5MMUSB.0512-00         38, 616         5SWWCE.0613-ENG         .42, 534           5MMUSB.1024-00         38, 616         5SWWXP.0412-ENG         .42, 530           5MMUSB.2048-00         38, 616         5SWWXP.0413-ENG         .42, 530           5PC600.E815-02         33, 163         5WWXP.0413-ENG         .42, 530           5PC600.E815-03         33, 163         5WWXP.0413-ENG         .42, 530           5PC600.E855-00         33, 163         9A0014.02         .40, 648           5PC600.E855-01         33, 165         9A0014.05         .40, 648           5PC600.E855-02         33, 165         9A0014.01         .40, 648           5PC600.E855-03         33, 165         9S0000.01-010         .41, 513           5PC600.E855-04         33, 165         9S0000.08-010         .41, 513           5PC600.FA02-00		
5MMSDR.0256-01         35, 170         5SWHMI.0000-00         .41, 621           5MMSDR.0512-01         35, 170         5SWWCE.0512-ENG         .42, 534           5MMUSB.0128-00         38, 616         5SWWCE.0513-ENG         .42, 534           5MMUSB.0256-00         38, 616         5SWWCE.0612-ENG         .42, 534           5MMUSB.0512-00         38, 616         5SWWCE.0613-ENG         .42, 534           5MMUSB.1024-00         38, 616         5SWWXP.0412-ENG         .42, 530           5MMUSB.2048-00         38, 616         5SWWXP.0413-ENG         .42, 530           5PC600.E815-00         33, 163         5WWXP.0413-ENG         .42, 530           5PC600.E815-02         33, 163         5WWXP.0413-ENG         .42, 530           5PC600.E855-00         33, 163         9A0014.02         .40, 648           5PC600.E855-01         33, 165         9A0014.05         .40, 648           5PC600.E855-02         33, 165         9A0014.10         .40, 648           5PC600.E855-03         33, 165         9S0000.01-010         .41, 513           5PC600.E855-04         33, 165         9S0000.08-010         .41, 513           5PC600.FA01-00         36, 242         9S0000.08-010         .41, 515           5PC600.FA02-00		
5MMSDR.0512-01         35, 170         5SWWCE.0512-ENG         42, 534           5MMUSB.0128-00         38, 616         5SWWCE.0513-ENG         42, 534           5MMUSB.0256-00         38, 616         5SWWCE.0612-ENG         42, 534           5MMUSB.0512-00         38, 616         5SWWCE.0613-ENG         42, 534           5MMUSB.1024-00         38, 616         5SWWXP.0412-ENG         42, 530           5MMUSB.2048-00         38, 616         5SWWXP.0413-ENG         42, 530           5PC600.E815-00         33, 163         5PC600.E815-02         33, 163           5PC600.E815-03         33, 163         5PC600.E855-01         33, 165           5PC600.E855-01         33, 165         9A0014.02         40, 648           5PC600.E855-02         33, 165         9A0014.05         40, 648           5PC600.E855-03         33, 165         980000.01-010         41, 513           5PC600.E855-04         33, 165         980000.01-020         41, 513           5PC600.E855-05         33, 165         980000.01-020         41, 515           5PC600.FA02-00         36, 242         980000.08-020         41, 515           5PC600.FA02-00         36, 243         980000.09-090         41, 515           5PC600.FA05-00         37, 2	5MMSDR.0128-01 35, 170	5PC600.X855-0534, 167
5MMUSB.0128-00         38, 616         5SWWCE.0513-ENG         42, 534           5MMUSB.0256-00         38, 616         5SWWCE.0612-ENG         42, 534           5MMUSB.0512-00         38, 616         5SWWCE.0613-ENG         42, 534           5MMUSB.1024-00         38, 616         5SWWXP.0412-ENG         42, 530           5MMUSB.2048-00         38, 616         5SWWXP.0413-ENG         42, 530           5PC600.E815-00         33, 163         5PC600.E815-02         33, 163           5PC600.E815-03         33, 163         5PC600.E855-00         33, 165           5PC600.E855-01         33, 165         9A0014.02         40, 648           5PC600.E855-02         33, 165         9A0014.05         40, 648           5PC600.E855-03         33, 165         9S0000.01-010         41, 513           5PC600.E855-04         33, 165         9S0000.01-020         41, 513           5PC600.E855-05         33, 165         9S0000.08-010         41, 515           5PC600.FA01-00         36, 242         9S0000.08-020         41, 515           5PC600.FA05-00         37, 246         9S0001.20-020         41, 530           5PC600.SE00-00         32         9S0001.27-020         41, 530           5PC600.SE00-01         32	,	,
5MMUSB.0256-00         38, 616         5SWWCE.0612-ENG         42, 534           5MMUSB.0512-00         38, 616         5SWWCE.0613-ENG         42, 534           5MMUSB.1024-00         38, 616         5SWWXP.0412-ENG         42, 530           5MMUSB.2048-00         38, 616         5SWWXP.0413-ENG         42, 530           5PC600.E815-00         33, 163         5PC600.E815-02         33, 163           5PC600.E815-03         33, 163         9           5PC600.E855-00         33, 165         9A0014.02         40, 648           5PC600.E855-01         33, 165         9A0014.05         40, 648           5PC600.E855-02         33, 165         9S0000.01-010         41, 513           5PC600.E855-03         33, 165         9S0000.01-020         41, 513           5PC600.E855-04         33, 165         9S0000.08-010         41, 513           5PC600.E855-05         33, 165         9S0000.08-010         41, 515           5PC600.FA01-00         36, 242         9S0000.08-020         41, 515           5PC600.FA02-00         36, 243         9S0001.19-020         41, 515           5PC600.FA05-00         37, 246         9S0001.20-020         41, 530           5PC600.SE00-01         32         9S0001.28-020	5MMSDR.0512-01 35, 170	5SWWCE.0512-ENG42, 534
5MMUSB.0512-00         38, 616         5SWWCE.0613-ENG         42, 534           5MMUSB.1024-00         38, 616         5SWWXP.0412-ENG         42, 530           5MMUSB.2048-00         38, 616         5SWWXP.0413-ENG         42, 530           5PC600.E815-00         33, 163         5PC600.E815-02         33, 163           5PC600.E855-00         33, 163         9           5PC600.E855-01         33, 165         9A0014.02         40, 648           5PC600.E855-02         33, 165         9A0014.05         40, 648           5PC600.E855-03         33, 165         9S0000.01-010         41, 513           5PC600.E855-04         33, 165         9S0000.01-020         41, 513           5PC600.E855-05         33, 165         9S0000.08-010         41, 513           5PC600.FA01-00         36, 242         9S0000.08-020         41, 515           5PC600.FA02-00         36, 243         9S0000.19-020         41, 515           5PC600.FA03-00         36, 244         9S0001.20-020         41, 530           5PC600.SE00-01         32         9S0001.20-020         41, 530           5PC600.SE00-01         32         9S0001.20-020         41, 530           5PC600.SE00-00         32         9S0001.20-020         42, 530<		
5MMUSB.1024-00       38, 616       5SWWXP.0412-ENG       42, 530         5MMUSB.2048-00       38, 616       5SWWXP.0413-ENG       42, 530         5PC600.E815-00       33, 163       5PC600.E815-02       33, 163         5PC600.E815-03       33, 163       5PC600.E855-00       33, 165       9A0014.02       40, 648         5PC600.E855-01       33, 165       9A0014.05       40, 648         5PC600.E855-02       33, 165       9A0014.10       40, 648         5PC600.E855-03       33, 165       9S0000.01-010       41, 513         5PC600.E855-04       33, 165       9S0000.01-020       41, 513         5PC600.E855-05       33, 165       9S0000.08-010       41, 515         5PC600.FA01-00       36, 242       9S0000.08-020       41, 515         5PC600.FA02-00       36, 243       9S0001.19-020       41, 515         5PC600.FA05-00       36, 245       9S0001.20-020       41, 530         5PC600.SE00-00       32       9S0001.27-020       41, 530         5PC600.SE00-01       32       9S0001.28-020       42, 530         5PC600.SF03-00       32, 159       9S0001.32-020       42         5PC600.SX01-00       32, 159       9S0001.34-020       42         5PC60	,	
5MMUSB.2048-00       38, 616       5SWWXP.0413-ENG       42, 530         5PC600.E815-00       33, 163       5PC600.E815-02       33, 163         5PC600.E815-03       33, 163       9         5PC600.E855-00       33, 165       9A0014.02       40, 648         5PC600.E855-01       33, 165       9A0014.05       40, 648         5PC600.E855-02       33, 165       9A0014.10       40, 648         5PC600.E855-03       33, 165       9S0000.01-010       41, 513         5PC600.E855-04       33, 165       9S0000.01-020       41, 513         5PC600.E855-05       33, 165       9S0000.08-010       41, 515         5PC600.FA01-00       36, 242       9S0000.08-020       41, 515         5PC600.FA02-00       36, 243       9S0001.19-020       41, 515         5PC600.FA03-00       36, 245       9S0001.20-020       41, 530         5PC600.SE00-00       32       9S0001.27-020       41, 530         5PC600.SE00-01       32       9S0001.28-020       42, 530         5PC600.SE00-02       32       9S0001.29-020       42, 530         5PC600.SF03-00       32, 159       9S0001.34-020       42         5PC600.SX01-00       32, 159       9S0001.34-020       42     <	5MMUSB.0512-00 38, 616	
5PC600.E815-00         33, 163           5PC600.E815-02         33, 163           5PC600.E815-03         33, 163           5PC600.E855-00         33, 165         9A0014.02         40, 648           5PC600.E855-01         33, 165         9A0014.05         40, 648           5PC600.E855-02         33, 165         9A0014.10         40, 648           5PC600.E855-03         33, 165         9S0000.01-010         41, 513           5PC600.E855-04         33, 165         9S0000.01-020         41, 513           5PC600.E855-05         33, 165         9S0000.08-010         41, 515           5PC600.FA01-00         36, 242         9S0000.08-020         41, 515           5PC600.FA02-00         36, 243         9S0000.09-090         41, 515           5PC600.FA03-00         36, 245         9S0001.19-020         41, 530           5PC600.FA05-00         37, 246         9S0001.20-020         41, 530           5PC600.SE00-01         32         9S0001.27-020         41, 530           5PC600.SE00-02         32         9S0001.28-020         42, 530           5PC600.SE00-00         32         9S0001.32-020         42           5PC600.SE00-00         32, 159         9S0001.34-020         42      <		
5PC600.E815-02         33, 163           5PC600.E815-03         33, 163           5PC600.E855-00         33, 165         9A0014.02         40, 648           5PC600.E855-01         33, 165         9A0014.05         40, 648           5PC600.E855-02         33, 165         9A0014.10         40, 648           5PC600.E855-03         33, 165         9S0000.01-010         41, 513           5PC600.E855-04         33, 165         9S0000.01-020         41, 513           5PC600.E855-05         33, 165         9S0000.08-010         41, 515           5PC600.FA01-00         36, 242         9S0000.08-020         41, 515           5PC600.FA02-00         36, 243         9S0001.19-020         41, 515           5PC600.FA03-00         36, 245         9S0001.20-020         41, 530           5PC600.SE00-00         37, 246         9S0001.20-020         41, 530           5PC600.SE00-01         32         9S0001.27-020         41, 530           5PC600.SE00-02         32         9S0001.28-020         42, 530           5PC600.SF03-00         32, 159         9S0001.32-020         42           5PC600.SX01-00         32, 159         9S0001.34-020         42           5PC600.SX02-00         32, 159 <t< td=""><td></td><td>5SWWXP.0413-ENG42, 530</td></t<>		5SWWXP.0413-ENG42, 530
5PC600.E815-03         33, 163           5PC600.E855-00         33, 165         9A0014.02         40, 648           5PC600.E855-01         33, 165         9A0014.05         40, 648           5PC600.E855-02         33, 165         9A0014.10         40, 648           5PC600.E855-03         33, 165         9S0000.01-010         41, 513           5PC600.E855-04         33, 165         9S0000.01-020         41, 513           5PC600.E855-05         33, 165         9S0000.08-010         41, 515           5PC600.FA01-00         36, 242         9S0000.08-020         41, 515           5PC600.FA02-00         36, 243         9S0000.09-090         41, 515           5PC600.FA03-00         36, 245         9S0001.19-020         41, 530           5PC600.FA05-00         37, 246         9S0001.20-020         41, 530           5PC600.SE00-00         32         9S0001.27-020         41, 530           5PC600.SE00-01         32         9S0001.28-020         42, 530           5PC600.SE00-02         32         9S0001.32-020         42           5PC600.SF03-00         32, 159         9S0001.32-020         42           5PC600.SX01-00         32, 159         9S0001.34-020         42           5PC600.SX		
5PC600.E815-03       33, 163         5PC600.E855-00       33, 165       9A0014.02       40, 648         5PC600.E855-01       33, 165       9A0014.05       40, 648         5PC600.E855-02       33, 165       9A0014.10       40, 648         5PC600.E855-03       33, 165       9S0000.01-010       41, 513         5PC600.E855-04       33, 165       9S0000.01-020       41, 513         5PC600.E855-05       33, 165       9S0000.08-010       41, 515         5PC600.FA01-00       36, 242       9S0000.08-020       41, 515         5PC600.FA02-00       36, 243       9S0000.09-090       41, 515         5PC600.FA03-00       36, 245       9S0001.19-020       41, 530         5PC600.FA05-00       37, 246       9S0001.20-020       41, 530         5PC600.SE00-00       32       9S0001.27-020       41, 530         5PC600.SE00-01       32       9S0001.28-020       42, 530         5PC600.SE00-02       32       9S0001.32-020       42         5PC600.SF03-00       32, 159       9S0001.34-020       42         5PC600.SX01-00       32, 159       9S0001.34-020       42         5PC600.SX02-00       32, 159       9S0001.36-020       42		9
5PC600.E855-01         33, 165         9A0014.05         40, 648           5PC600.E855-02         33, 165         9A0014.10         40, 648           5PC600.E855-03         33, 165         9S0000.01-010         41, 513           5PC600.E855-04         33, 165         9S0000.01-020         41, 513           5PC600.E855-05         33, 165         9S0000.08-010         41, 515           5PC600.FA01-00         36, 242         9S0000.08-020         41, 515           5PC600.FA02-00         36, 243         9S0000.09-090         41, 515           5PC600.FA03-00         36, 245         9S0001.19-020         41, 530           5PC600.FA05-00         37, 246         9S0001.20-020         41, 530           5PC600.SE00-00         32         9S0001.27-020         41, 530           5PC600.SE00-01         32         9S0001.28-020         42, 530           5PC600.SE00-02         32         9S0001.29-020         42           5PC600.SF03-00         32, 159         9S0001.32-020         42           5PC600.SX01-00         32, 159         9S0001.34-020         42           5PC600.SX02-00         32, 159         9S0001.36-020         42	5PC600.E815-03	<b>V</b>
5PC600.E855-02       33, 165       9A0014.10       40, 648         5PC600.E855-03       33, 165       9S0000.01-010       41, 513         5PC600.E855-04       33, 165       9S0000.01-020       41, 513         5PC600.E855-05       33, 165       9S0000.08-010       41, 515         5PC600.FA01-00       36, 242       9S0000.08-020       41, 515         5PC600.FA02-00       36, 243       9S0000.09-090       41, 515         5PC600.FA03-00       36, 245       9S0001.19-020       41, 530         5PC600.FA05-00       37, 246       9S0001.20-020       41, 530         5PC600.SE00-00       32       9S0001.27-020       41, 530         5PC600.SE00-01       32       9S0001.28-020       42, 530         5PC600.SE00-02       32       9S0001.29-020       42         5PC600.SF03-00       32, 159       9S0001.32-020       42         5PC600.SX01-00       32, 159       9S0001.34-020       42         5PC600.SX02-00       32, 159       9S0001.36-020       42		9A0014.0240, 648
5PC600.E855-03         33, 165         9S0000.01-010         41, 513           5PC600.E855-04         33, 165         9S0000.01-020         41, 513           5PC600.E855-05         33, 165         9S0000.08-010         41, 515           5PC600.FA01-00         36, 242         9S0000.08-020         41, 515           5PC600.FA02-00         36, 243         9S0000.09-090         41, 515           5PC600.FA03-00         36, 245         9S0001.19-020         41, 530           5PC600.FA05-00         37, 246         9S0001.20-020         41, 530           5PC600.SE00-00         32         9S0001.27-020         41, 530           5PC600.SE00-01         32         9S0001.28-020         42, 530           5PC600.SE00-02         32         9S0001.29-020         42           5PC600.SF03-00         32, 159         9S0001.32-020         42           5PC600.SX01-00         32, 159         9S0001.34-020         42           5PC600.SX02-00         32, 159         9S0001.36-020         42		9A0014.0540, 648
5PC600.E855-04         33, 165         9S0000.01-020         41, 513           5PC600.E855-05         33, 165         9S0000.08-010         41, 515           5PC600.FA01-00         36, 242         9S0000.08-020         41, 515           5PC600.FA02-00         36, 243         9S0000.09-090         41, 515           5PC600.FA03-00         36, 245         9S0001.19-020         41, 530           5PC600.FA05-00         37, 246         9S0001.20-020         41, 530           5PC600.SE00-00         32         9S0001.27-020         41, 530           5PC600.SE00-01         32         9S0001.28-020         42, 530           5PC600.SE00-02         32         9S0001.29-020         42           5PC600.SF03-00         32, 159         9S0001.32-020         42           5PC600.SX01-00         32, 159         9S0001.34-020         42           5PC600.SX02-00         32, 159         9S0001.36-020         42	5PC600.E855-02	9A0014.1040, 648
5PC600.E855-05       33, 165       9S0000.08-010       41, 515         5PC600.FA01-00       36, 242       9S0000.08-020       41, 515         5PC600.FA02-00       36, 243       9S0000.09-090       41, 515         5PC600.FA03-00       36, 245       9S0001.19-020       41, 530         5PC600.FA05-00       37, 246       9S0001.20-020       41, 530         5PC600.SE00-00       32       9S0001.27-020       41, 530         5PC600.SE00-01       32       9S0001.28-020       42, 530         5PC600.SE00-02       32       9S0001.29-020       42         5PC600.SF03-00       32, 159       9S0001.32-020       42         5PC600.SX01-00       32, 159       9S0001.34-020       42         5PC600.SX02-00       32, 159       9S0001.36-020       42		9\$0000.01-01041, 513
5PC600.FA01-00       36, 242       9S0000.08-020       41, 515         5PC600.FA02-00       36, 243       9S0000.09-090       41, 515         5PC600.FA03-00       36, 245       9S0001.19-020       41, 530         5PC600.FA05-00       37, 246       9S0001.20-020       41, 530         5PC600.SE00-00       32       9S0001.27-020       41, 530         5PC600.SE00-01       32       9S0001.28-020       42, 530         5PC600.SE00-02       32       9S0001.29-020       42         5PC600.SF03-00       32, 159       9S0001.32-020       42         5PC600.SX01-00       32, 159       9S0001.34-020       42         5PC600.SX02-00       32, 159       9S0001.36-020       42		9\$0000.01-02041, 513
5PC600.FA02-00       36, 243       9S0000.09-090       41, 515         5PC600.FA03-00       36, 245       9S0001.19-020       41, 530         5PC600.FA05-00       37, 246       9S0001.20-020       41, 530         5PC600.SE00-00       32       9S0001.27-020       41, 530         5PC600.SE00-01       32       9S0001.28-020       42, 530         5PC600.SE00-02       32       9S0001.29-020       42         5PC600.SF03-00       32, 159       9S0001.32-020       42         5PC600.SX01-00       32, 159       9S0001.34-020       42         5PC600.SX02-00       32, 159       9S0001.36-020       42	· · · · · · · · · · · · · · · · · · ·	9\$0000.08-01041, 515
5PC600.FA03-00       36, 245       9S0001.19-020       41, 530         5PC600.FA05-00       37, 246       9S0001.20-020       41, 530         5PC600.SE00-00       32       9S0001.27-020       41, 530         5PC600.SE00-01       32       9S0001.28-020       42, 530         5PC600.SE00-02       32       9S0001.29-020       42         5PC600.SF03-00       32, 159       9S0001.32-020       42         5PC600.SX01-00       32, 159       9S0001.34-020       42         5PC600.SX02-00       32, 159       9S0001.36-020       42	· · · · · · · · · · · · · · · · · · ·	9\$0000.08-02041, 515
5PC600.FA05-00       37, 246       9S0001.20-020       41, 530         5PC600.SE00-00       32       9S0001.27-020       41, 530         5PC600.SE00-01       32       9S0001.28-020       42, 530         5PC600.SE00-02       32       9S0001.29-020       42         5PC600.SF03-00       32, 159       9S0001.32-020       42         5PC600.SX01-00       32, 159       9S0001.34-020       42         5PC600.SX02-00       32, 159       9S0001.36-020       42	· · · · · · · · · · · · · · · · · · ·	9\$0000.09-09041, 515
5PC600.SE00-00       32       9S0001.27-020       41, 530         5PC600.SE00-01       32       9S0001.28-020       42, 530         5PC600.SE00-02       32       9S0001.29-020       42         5PC600.SF03-00       32, 159       9S0001.32-020       42         5PC600.SX01-00       32, 159       9S0001.34-020       42         5PC600.SX02-00       32, 159       9S0001.36-020       42	,	9\$0001.19-02041, 530
5PC600.SE00-01       32       9S0001.28-020       42, 530         5PC600.SE00-02       32       9S0001.29-020       42         5PC600.SF03-00       32, 159       9S0001.32-020       42         5PC600.SX01-00       32, 159       9S0001.34-020       42         5PC600.SX02-00       32, 159       9S0001.36-020       42	· · · · · · · · · · · · · · · · · · ·	9\$0001.20-02041, 530
5PC600.SE00-01       32       9S0001.28-020       42, 530         5PC600.SE00-02       32       9S0001.29-020       42         5PC600.SF03-00       32, 159       9S0001.32-020       42         5PC600.SX01-00       32, 159       9S0001.34-020       42         5PC600.SX02-00       32, 159       9S0001.36-020       42		9\$0001.27-02041, 530
5PC600.SE00-02       32       9S0001.29-020       42         5PC600.SF03-00       32, 159       9S0001.32-020       42         5PC600.SX01-00       32, 159       9S0001.34-020       42         5PC600.SX02-00       32, 159       9S0001.36-020       42		
5PC600.SX01-00		
5PC600.SX02-0032, 159 9S0001.36-02042		9S0001.32-02042
		9S0001.34-02042
5PC600.SX02-0132, 159		9S0001.36-02042
	5PC600.SX02-0132, 159	

A	Change	
ACO7 cound 44 120 150 161 249 402 512	Battery operation	
AC97 sound 44, 130, 159, 161, 348, 403, 513	Battery settings5	
ACPI 361, 363, 417, 419, 492, 493, 513, 722 Add-on48, 52, 76, 82, 131	Battery status1	
Add-on CAN interface234	Battery unit5	
Add-on CompactFlash slot183	Lifespan	
Add-on hard disk171, 174	Maintenance interval	
Add-on RS232/422/485 interface	Baud rate	
Add-on UPS44, 132	Beep codes	
Add-on UPS module653, 655	Beeping code	
	BIOS	
Address register235 ADI537, 715, 716	BIOS 815E (ETX)	
	ACPI control	
Development kit	Advanced	
	Advanced chipset/graphics control	
Air circulation	Baseboard monitor	
Ambient temperature	Baseboard/panel features	
815E CPU board (ETX)	BIOS setup keys	
855GME CPU board (ETX)80	Boot	
855GME CPU board (XTX)80	CPU board monitor	
AP Link48, 133, 248	Exit	
AP Link cards248	I/O device configuration	
AP Link Slot	IDE channel 0 master	
APC722	IDE channel 0 slave	
APC620 embedded70, 107	IDE channel 1 master	
APC620 UPS652	IDE channel 1 slave	
APC620, 1 PCI slot variant50	Keyboard features	
APC620, 2 PCI slot variant55	Legacy devices	
APC620, 3 PCI slot variant60	Main	
APC620, 5 PCI slot variant65	Memory cache	
API722	Miscellaneous	
ATX power supply141	Panel control	
Audio driver528	PCI device, slot #1	
Installation528	PCI device, slot #2	
Automation Device Interface537	PCI device, slot #3	
Automation Runtime511, 664, 722	PCI device, slot #4	
	PCI/PNP configuration	339
В	Power	361
_	Profile overview	368
B&R Automation Device Interface537	Security	359
B&R Automation Runtime723	Summary screen	325
B&R Control Center537	Thermal management	
B&R eMbedded OS Installer536	BIOS 855GME (ETX)	377
B&R Key Editor718	ACPI control	
Backup battery143, 579	Advanced	
Barcodes148	Advanced chipset/graphics control	391
Rattery 1/3 570	Baseboard monitor	<b>411</b>

Baseboard/panel features	408	Power	
Boot	421	Primary IDE master	. 449
CPU board monitor	406	Primary IDE slave	. 451
Exit	422	Profile overview	. 478
I/O device configuration	402	Remote access configuration	
IDE channel 0 master		Secondary IDE master	
IDE channel 0 slave		Secondary IDE slave	
IDE channel 1 master		Security	
IDE channel 1 slave		USB configuration	
Keyboard features		USB mass storage device configuration	
Legacy devices		457	
Main		BIOS default settings	.368
Memory cache		BIOS Error signals	
Miscellaneous		BIOS 815E (ETX) and 855GME (ETX)	
Panel control		BIOS 855GME (XTX)	
PCI device, slot #1	_	BIOS Extension ROM222,	
PCI device, slot #2		BIOS upgrade	
PCI device, slot #3		Bit	
PCI device, slot #4		Bit rate	
PCI/PNP configuration		Block diagram	
Power		System unit 5PC600.SE00-00	
Profile overview		System unit 5PC600.SE00-01	
Security		System unit 5PC600.SE00-02	
Setup keys		System unit 5PC600.SF03-00	
Summary screen	378	System unit 5PC600.SX01-00	
BIOS 855GME (XTX)	407	System unit 5PC600.SX02-00	
ACPI configuration		System unit 5PC600.SX02-01	
Advanced		System unit 5PC600.SX05-00	
Baseboard monitor		System unit 5PC600.SX05-01	
Baseboard/panel features		Boot diskette	
BIOS setup keys		Creating with Windows XP	
Boot		Bootstrap loader	
Chipset configuration	444	Buffer duration	. 143
Clock configuration	447	Burst	. 556
CPU board monitor		Bus length	
CPU configuration	443	Bus structure	. 237
Exit	476	Button cell	. 579
Graphics configuration	441	Byte	. 723
Hard disk security master password	l473		
Hard disk security user password	472	С	
I/O interface configuration	445	O	
IDE Configuration		Cable drag chain	.570
Keyboard/mouse configuration		Cable type236, 239,	
Legacy devices		Cables	
Main		DVI	
Panel control		RS232	
PCI configuration		SDL	
		ODL	. 020

Damped vibration	558	DVI - Monitor adapter	581
D		DVI - CRT adapter	581
_		DVD44, 128, 248, 25	
CTS	725	Dual display clone 300, 516, 521, 52	
CPU board 855GME (XTX)		DTR	
CPU board 855GME (ETX)		DSR	
CPU board 815E (ETX)		DS1425	
CPU		Dry heat	
Control Center537, 547		Dry cold	
Construction		Drives	
Connection examples		Drilling templates	
Connection cycles124		DRAM	
Configure		Double layer19	
Configuration of UPS operation		DOS boot diskette	
Configuration of LIPS energian			
•		Dongle145, 34	
CompactFlash slot138, 139		DMA	
Technical data582	,	RAM address assignment48	
Order data582		Interrupt assignments49	
General information582		I/O address assignment	
Dimensions583		DMA channel assignment	
Calculating the lifespan582		Distribution of resources	
CompactFlash582, 590		Display Clone	,
COM3		Direction of air flow 672, 675, 67	
COM2110		DIP switch	
COM1109		DIMM	
COM		620 embedded variant	
CMOS battery	579	5 PCI slot variant	
CMOS	724	3 PCI slot variant	64
Climate conditions	562	2 PCI slot variant	
Chipset		1 PCI slot variant	_
Certifications		Dimensions	54
CE mark		Dimension standards	
CD-ROM		Dial-up	
CAN terminating switch		Device interfaces	
CAN Node Number		Device ID	
CAN controller		Development kit	
CAN address register		Derating	
Terminating resistors		Delay	
Cable type		Degree of pollution	
Bus length		Defective component	
CAN44, 111, 13 <sup>-</sup>		Deep discharge voltage	
cage clamps12		Deep discharge protection	
Cache163, 165, 167		Deep discharge cycles2	
USB		DCD	
SDL with 45° plug		Data register	
SDL w/ extender		Data loss 51, 56, 61, 66, 71, 14	
CDI vy/ ovtondor	624	Doto loop	11 726

DVI cable624	Fan kits242
Cable specifications626	1 PCI variant242
DVI-A726	2 PCI variant243
DVI-D726	5 PCI variant246
DVI-I726	Fastening bolts672
	FDD727
E	Features44
<b>-</b>	Fiber optic cable136
ECSD393	Fiber optics730
EDID726	FIFO727
Data337, 391, 392	Filter clasp36, 676, 680
EIDE726	Firmware504, 653, 727
Electromagnetic emissions553	Flex radius266, 570, 648, 650, 661
Electrostatic discharge555	Floating Point Unit163, 165, 167
eMbedded OS Installer536	Floppy
EMC726	FPC728
Emissions551, 553	FPD
	Free fall561
Energy options547	Front cover
Entire device50	Front side bus163
EPROM726	FTP728
Equalizer539	Full size
Error signals488	Full speed
ESD	Functional grounding122
Electrical components with housing27	Turictional grounding122
Electrical components without housing27	
Individual components28	G
Packaging27	00
Proper handling27	GB728
ETH1116, 348, 403, 414, 419, 529	Graphics
ETH2118, 358, 414, 419, 529	Graphics driver installation516
Ethernet44, 727	815E CPU board516
Ethernet cable lengths117	Graphics driver settings 272, 276, 279, 282,
Ethernet POWERLINK43, 44, 113, 727	286,291, 295, 300, 307, 311
Station number115	Graphics drivers516
Status / Error LED113	Graphics engine 1 370, 391, 392, 425, 519,
ETX727	521
European guidelines549	Graphics engine 2 392, 425, 513, 519, 521
Extended desktop48, 268, 297, 300, 302,	Ground resistance565
307,308, 311, 519, 524, 715	Grounding concept267
	Guidelines31
F	
•	Н
Fan connection cable673	••
Fan kit cover681	Half-size44
Fan kit installation671	Handshake728
Fan kit replacement671	Hard disk 139, 160, 171, 174, 200, 203
	,, ,,,

Hardware security key145	5 Jumper729
HDD136, 728	
Heat sink169	<sup>9</sup> K
Exchanging169	
Types169	622 KCF522
HF field555	
Hibernate136, 137	
High speed119, 120	Keyboard142
High voltage566	3 ´
High-frequency electromagnetic fields558	5
High-speed transient elect. disturbance value	L
556	L1 cache163, 165, 167
Hot Plug142	L2 cache
Hot surface55, 60	D LCD
Humid heat, constant563	Leakage current566
Humid heat, cyclic563	3 LED136, 729
	Lifespan
I	CompactFlash584, 593
•	Line IN
I/O address assignment49	
IDE728	
Identification148	3 Locking time522, 718
Immunity554	Low battery shutdown548
Individual components159	Low battory criataoviri iniminiminiminimi o io
AP Link cards248	
CPU boards 815E (ETX)163	
CPU boards 855GME (ÉTX)169	5
CPU boards 855GME (XTX)167	
Drives17	
Fan kits242	557
Heat sink169	
Interface options234	Maintenance Controller Extended 160, 162,
Main memory170	715
RAID System209	
System unit159	
Installation257	Manager547
Insulation resistance569	Manual history21
Interface cover580	MAXIM145
Interface options234	Maximum memory capacity
Interrupt assignments492, 493	MB730
ISA729	Mechanical conditions
ISO729	
	Messages488, 547
J	MIC
J	Microprocessor730
litter 729	Wild A Mide 730

Mkey730	PCI configuration space663
Model numbers32	PCI half-size standard133
Monitor / Panel124	PCI slot133
Motherboard730	PCMCIA731
Mounting orientation253, 257	Permanent magnet 51, 56, 61, 66, 71
Optional mounting259	PLC734
Standard mounting257	PnP732
Mounting plates253	POH732
Mounting rail brackets602, 609	POST732
Mounting screws55, 60	Post codes488
Mounting the side cover706	Power84, 88, 136, 137
APC620 with 1 PCI slot706	APC620 systems, 1 PCI slot 84
APC620 with 2 PCI slot707	APC620 systems, 2 PCI slots 88
APC620 with 3 PCI slot708	APC620 systems, 3 PCI slots94
APC620 with 5 PCI slot709	APC620 systems, 5 PCI slots96
Mouse142	Power button 84, 86, 88, 91, 94, 96, 100, 104,
MS-DOS513	141, 160, 162, 362, 418
MTBF730	Power management84, 88
MTCX141, 160, 162, 715, 730	POWERLINK43, 732
Multi-language515	Procedure following power failure 548
Multitasking730	Programs30
	Protection type568
NI.	PS/2142
N	Keyboard142
Network driver529	Mouse142
Installation	Y-cable
Network-related emissions552	1 00010
NMI234	Q
	QUXGA732
0	QVGA
OEM731	QWUXGA
OPC731	QXGA734
OPC server731	
Optional mounting orientations259	ъ
Over-current shutdown548	R
Overload121, 567	RAID218. 226
Overload121, 567	-,
	RAM
P	Real time
	Real-time clock . 44, 143, 160, 162, 163, 165,
Panel731	167
Panel locking time522, 524, 526	Removal strips
Parallel port145	Replacement fan
Part subject to wear 143, 242, 243, 244, 245,	Replacing the main memory
246,579, 657, 662	Requirements for emissions551
PCI731	

Requirements for immunity to disturbances	Self discharging	
554	Sequential Function Chart	
Reset button141, 160, 162	serial number	
Residual voltage566	Services	
Reverse polarity protection121	SFC	
RGB44, 124, 128, 248, 514, 515, 522	Shock during operation	
ROM733	Shock transport	
RS232239, 733	Short circuit protection	655
Bus length239	Short-term interruptions	558
Cable type239	Shutting down	547
RS232 cable648	Side cover	
Cable specifications649	Slide-in CD-ROM	184
RS232/422/485131	Slide-in CF 2-slot	195
RS422239, 733	Slide-in DVD-ROM/CD-RW	187
Bus length239	Slide-in hard disk	200, 203, 206
Cable type239	Slide-in slot 1	
RS485240, 733	Slide-in slot 2	147
Bus length240	Slide-in USB FDD	197
Cable type240	Slot PLC	734
RTC44, 143, 160, 162, 163, 165, 167	Smart Display Link44,	
RTS733	SO-DIMM	
RXD734	Soft-off	
	SoftPLC	
S	SRAM	
3	SRAM module	663
Safety564	Driver support	
Safety notices	Installation	
Dust, humidity, aggressive gases29	Technical data	663
Installation29	Standard keypad module	
Intended use27	Standard mounting	
Operation29	Standard shutdown	
Organization31	Standards	
Policy and procedures28	Overview	
Protection against electrostatic discharges	Standards and certifications	
27	Starting current	
Transport and storage28	Station number	
SATA209, 218, 226	Status LED	
screw clamps121, 577	CF	
SDL129, 248, 252	HDD	
SDL cable with extender634	Link	
SDL cables	Link 1	
Cable specifications630	Link 2	
	Power	
SDL equalizer539 SDL flex cable with extender643	Status LEDs	
SDRAM170, 734		
		113
•	Status LEDs CAN / X2X	
Security Key		44, 121

Surface temperature .50, 55, 60, 65, 70, 185,	UPS installation	656,	689
189	APC620, 1 PCI slot	689,	698
Surge556	APC620, 2 PCI slot	692,	700
Surge voltages556	APC620, 5 PCI slot		
Suspend-to-disk136, 137	UPS module		
SUXGA734	UPS monitor		
SVGA734	UPS status		
Switch	UPS status values		
SXGA735	UPS system settings		
SXGA+735	USB		
System units735	USB 2.0USB cable		
T	Cable specifications		
	USB flash drive		
Task735	General information		
TCP/IP735	Order data		
Temperature713	Technical data		
Temperature fluctuations563	USB Media Drive		
Operation563	Dimensions		
Temperature monitoring79, 83	Dimensions with front cover		
Temperature sensor653, 713	Installation	607,	614
Temperature sensor locations713	Interfaces		
Terminating LED112	Mounting orientation	607,	614
Terminating resistors112, 237	Technical data	603,	610
Terminating switch112	USB port	119,	120
TFT display735	UXGA		736
Toppling560			
Torsion	V		
Touch driver settings 272, 276, 279, 282, 287,	V		
291, 296, 301, 307, 311	Vendor ID		664
Touch screen	Ventilation holes		
Touch screen driver	VGA		
Dual display clone526	Vibration during transport		
Extended desktop524	Vibration operation		
Touch screen driver installation524			
TXD735	Video signals Viruses		
1AD733	Viruses Voltage dips		
U	Voltage fluctuations		
	Voltage range		567
UART736			
UDMA736	W		
UPS 40, 44, 84, 86, 88, 91, 94, 97, 101, 104,			
132,136, 504, 573, 689, 736	Wake On LAN		
UPS configuration540	White Paper		584
UPS connection cable653, 661	Windows CE	534,	737
UPS driver541	eMbedded OS Installer		536

### Index General information ......534 Graphics drivers ......516 Installation ......535 Installation ......515 Known problems ......536 Network driver ......529 Properties ......535 Touch screen driver ......524 Windows XP Embedded ......530 Worst case .......562 Audio driver ......532 WSXGA ......737 FAQ 533 WUXGA 737 General information ......530 WXGA .......737 Graphics drivers ......532 Installation ......532 X Network driver ......533 Touch screen driver ......532 X2X .......43. 44. 111 Windows XP Professional ......515 XGA ......737 Audio driver ......528 XTX .......737

FAQ ......515. 522

