Panel PC 725

User's Manual

Version: 1.00 (July 2010) Model number: MAPPC725-ENG

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Chapter 1 • General information

Information:

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

1. Manual history

Version	Date	Change
1.00	2010-07-06	- First version

Table 1: Manual history

2. Safety notices

2.1 Intended use

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

2.2 Protection against electrostatic discharges

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

2.2.1 Packaging

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

2.2.2 Guidelines for proper ESD handling

Electrical components with housing

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

Electrical components without housing

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

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

Metallic surfaces are not suitable storage surfaces!

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

Individual components

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

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

2.3 Policy and procedures

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

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

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

must be observed.

2.4 Transport and storage

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

2.5 Installation

General information • Safety notices

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

2.6 Operation

2.6.1 Protection against touching electrical parts

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

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

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

2.6.2 Environmental conditions - dust, humidity, aggressive gases

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

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

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

2.6.3 Programs, viruses, and dangerous programs

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

2.7 Environmentally-friendly disposal

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

2.7.1 Separation of materials

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

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

Table 2: Environmentally-friendly separation of materials

Disposal must comply with the respective legal regulations.

General information • Organization of safety notices

3. Organization of safety notices

The safety notices in this manual are organized as follows:

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

Table 3: Organization of safety notices

4. Directives



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

5. Model numbers

5.1 System units

Model number	Short description	Note
		11010
5PC725.1505-00	PPC725 TFT C XGA 15in T IP65, flange mounting on the top 15" XGA color TFT display with touch screen (resistive); connections for 1x RS232, 3x USB 2.0, 2x Ethernet 10/100, IP65 protection, flange mounting on the top, 24 VDC. Plug for power supply must be ordered separately (screw clamps: 0TB103.9; cage clamps: 0TB103.91).	See page 45
5PC725.1505-01	PPC725 TFT C XGA 15in T IP65, flange mounting on the bottom 15" XGA color TFT display with touch screen (resistive); connections for 1x RS232, 3x USB 2.0, 2x Ethemet 10/100, IP65 protection, flange mounting on the bottom, 24 VDC. Plug for power supply must be ordered separately (screw clamps: 0TB103.9; cage clamps: 0TB103.91).	See page 45

Table 4: Model numbers - system units

5.2 X945 CPU board

Model number	Short description	Note
5PC600.X945-00	X945 CPU board CPU board Intel Atom, 1,600 MHz, 533 MHz FSB, 512 KB L2 cache; 945GME chipset; 1 socket for an SO-DIMM DDR2 RAM module.	See page 50

Table 5: Model numbers - X945 CPU boards

5.3 Main memory

Model number	Short description	Note
5MMDDR.0512-01	SO-DIMM DDR2 512MB PC2-5300	See page 52
5MMDDR.1024-01	SO-DIMM DDR2 1024MB PC2-5300	See page 52
5MMDDR.2048-01	SO-DIMM DDR2 2048MB PC2-5300	See page 52

Table 6: Model numbers - Main memory

5.4 Flange

Model number	Short description	Note
5AC725.FLGC-00	PPC725 flange coupling	See page 53

Table 7: Model numbers - Flange

General information • Model numbers

5.5 Drives

Model number	Short description	Note
5AC600.HDDI-05	Add-on hard disk 40 GB ET, 24x7 40 GB hard disk (add-on); With extended temperature range and also ideal for 24 hour operation. For installation in an APC620 or PPC700.	See page 54
5AC600.HDDI-06	Add-on hard disk 80 GB ET, 24x7 80 GB hard disk (add-on); With extended temperature range and also ideal for 24 hour operation. For installation in an APC620 or PPC700.	See page 57
5AC600.CFSI-00	Add-on CompactFlash slot CompactFlash slot (add-on); for installation in an APC620 or PPC700.	See page 60

Table 8: Model numbers - Drives

5.6 Accessories

5.6.1 Batteries

Model number	Short description	Note
0AC201.91	Lithium batteries, 4 pcs. Lithium batteries, 4 pcs., 3 V / 950 mAh, button cell	See page 157
4A0006.00-000	Lithium battery, 1 pc. Lithium battery, 1 pc., 3 V / 950 mAh, button cell	See page 157

Table 9: Model numbers - Batteries

5.6.2 Supply voltage connectors

Model number	Short description	Note
0TB103.9	Plug 24V 5.08 3-pin screw clamps 24 VDC 3-pin connector, female. Screw clamp, 3.31 mm ² , protected against vibration by the screw flange.	See page 159
0TB103.91	Plug 24V 5.08 3-pin cage clamps 24 VDC 3-pin connector, female. Cage clamps, 3.31 mm ² , protected against vibration by the screw flange.	See page 159

Table 10: Model numbers - Supply voltage connectors

5.6.3 CompactFlash cards

Model number	Short description	Note
5CFCRD.0512-04	CompactFlash 512 MB B&R CompactFlash card with 512 MB SLC NAND flash and IDE/ATA interface	See page 161
5CFCRD.1024-04	CompactFlash 1024 MB B&R CompactFlash card with 1024 MB SLC NAND flash and IDE/ATA interface	See page 161
5CFCRD.2048-04	CompactFlash 2048 MB B&R CompactFlash card with 2048 MB SLC NAND flash and IDE/ATA interface	See page 161
5CFCRD.4096-04	CompactFlash 4096 MB B&R CompactFlash card with 4096 MB SLC NAND flash and IDE/ATA interface	See page 161

Table 11: Model numbers - CompactFlash cards

General information • Model numbers

Model number	Short description	Note
5CFCRD.8192-04	CompactFlash 8192 MB B&R CompactFlash card with 8192 MB SLC NAND flash and IDE/ATA interface	See page 161
5CFCRD.016G-04	CompactFlash 16 GB B&R CompactFlash card with 16 GB SLC NAND flash and IDE/ATA interface	See page 161
5CFCRD.0064-03	CompactFlash 64 MB SSI CompactFlash card with 64 MB SLC NAND flash and IDE/ATA interface	See page 166
5CFCRD.0128-03	CompactFlash 128 MB SSI CompactFlash card with 128 MB SLC NAND flash and IDE/ATA interface	See page 166
5CFCRD.0256-03	CompactFlash 256 MB SSI CompactFlash card with 256 MB SLC NAND flash and IDE/ATA interface	See page 166
5CFCRD.0512-03	CompactFlash 512 MB SSI CompactFlash card with 512 MB SLC NAND flash and IDE/ATA interface	See page 166
5CFCRD.1024-03	CompactFlash 1024 MB SSI CompactFlash card with 1024 MB SLC NAND flash and IDE/ATA interface	See page 166
5CFCRD.2048-03	CompactFlash 2048 MB SSI CompactFlash card with 2048 MB SLC NAND flash and IDE/ATA interface	See page 166
5CFCRD.4096-03	CompactFlash 4096 MB SSI CompactFlash card with 4096 MB SLC NAND flash and IDE/ATA interface	See page 166
5CFCRD.8192-03	CompactFlash 8192 MB SSI CompactFlash card with 8192 MB SLC NAND flash and IDE/ATA interface	See page 166

Table 11: Model numbers - CompactFlash cards (cont.)

5.6.4 USB flash drives

Model number	Short description	Note
5MMUSB.2048-00	USB flash drive 2 GB SanDisk USB 2.0 flash drive 2 GB	See page 170
5MMUSB.2048-01	USB flash drive 2 GB B&R USB 2.0 flash drive 2 GB	See page 170

Table 12: Model numbers - USB flash drives

5.7 Software

Model number	Short description	Note
5SWHMI.0000-00	HMI Drivers & Utilities DVD Contains drivers, utilities, software upgrades and user's manuals for B&R panel system products (see B&R homepage – Industrial PCs, Visualization and Operation).	See page 175
9S0000.01-010	OEM MS-DOS 6.22 German (disk) OEM MS-DOS 6.22 German disks Only delivered with a new industrial PC.	See page 142
9S0000.01-020	OEM MS-DOS 6.22 English (disk) OEM MS-DOS 6.22 English disks Only delivered with a new industrial PC.	See page 142
5SWWXP.0600-GER	WinXP Professional with SP3, GER Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a new device.	See page 143

Table 13:	Model	numbers -	Software
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General information • Model numbers

Model number	Short description	Note
5SWWXP.0600-ENG	WinXP Professional with SP3, ENG Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a new device.	See page 143
5SWWXP.0600-MUL	WinXP Professional with SP3, MUL Microsoft OEM Windows XP Professional Service Pack 3, CD, multi-language. Only available with a new device.	See page 143
5SWWXP.0500-GER	WinXP Professional with SP 2c, GER Microsoft OEM Windows XP Professional Service Pack 2c, CD, German. Only available with a new device.	See page 143
5SWWXP.0500-ENG	WinXP Professional with SP 2c, ENG Microsoft OEM Windows XP Professional Service Pack 2c, CD, English. Only available with a new device.	See page 143
5SWWXP.0500-MUL	WinXP Professional with SP 2c, MUL Microsoft OEM Windows XP Professional Service Pack 2c, CD, multi-language. Only available with a new device.	See page 143
5SWWXP.0729-ENG	WES2009 PPC700 945GME XTX Microsoft OEM Windows Embedded, Standard 2009, English; for PPC700 with CPU board, 5PC600.X945-00; order CompactFlash separately (at least 1 GB).	See page 145
5SWWCE.0829-ENG	WinCE6.0 Pro PPC700 945GME XTX Microsoft OEM Windows CE 6.0, Professional, English; for PPC700 945GME; order CompactFlash separately (at least 128 MB).	See page 148

Table 13: Model numbers - Software (cont.)

Chapter 2 • Technical data

1. Introduction

The Panel PC 725 is designed for on-site operation. Built with IP65 protection from all sides, it can easily handle splashed water, impacts and vibrations. Support arm system mounting allows flexible positioning and provides an ergonomic user interface even in cramped spaces. Panel PCs with IP65 protection usually implement all connections using expensive IP65 plugs, but the cabling for the Panel PC 725 is done via the flange. In this way, inexpensive standard cables can be used.

The Panel PC 725 offers extensive PC resources in a highly compact design. With two Ethernet interfaces, three USB 2.0 ports and a serial interface, communication is ensured both at the machine level and across the company network. The interfaces are easy to access behind the flange cover. The battery and CompactFlash card are behind a separate cover, which makes servicing easy.



1.1 Features

- 15" diagonal
- Intel® Atom™ N270 1.6 GHz processor
- CompactFlash slot (type I)
- 24 VDC supply voltage
- 3x USB 2.0
- 2 x Ethernet 10/100 MBit interfaces
- 1x RS232 interface, modem compatible
- Add-on interface operations
- Up to 2 GB main memory
- Optional built-in add-on drive
- Flange output on top or bottom
- BIOS
- Real-time clock, RTC (battery-buffered)
- Fan-free operation
- IP65 protection

1.2 System components / configuration

The PPC725 system can be assembled to meet individual requirements and operating conditions.

The following components are absolutely essential for operation:

- System unit (flange output on top or bottom)
- CPU board
- Main memory
- Drive (mass memory such as CompactFlash card or hard disk) for the operating system
- Flange
- Operating system

Configuration - Base system							
	System unit	Select 1	Select 1				
A of ma	system unit consists a housing and ain board.	5PC725.1505-00 flange mount on top	5PC725.1505-01 flange mount on bottom				
		CPU board - Main memory - Flange					
	CPU Board	Select 1	Select 1				
		5PC600.X945-00 - Atom™ N270, 1.6 GHz					
	Main memory	Select 1 (max. 2 GB can be used)					
		5MMDDR.0512-01 - 512 MB 5MMDDR.1024-01 - 1 GB 5MMDDR.2048-01 - 2 GB					
	Flange	Select 1					
		5AC725.FLGC-00					

1.2.1 Selection guide - basic system

Figure 1: Configuration - Basic system

Section 2 Technical data

1.2.2 Configuration software, accessories

	Configuration - Software, Accessories			
System unit	Select 1			
A system unit consists of a housing and main board.	5PC725.1505-00 Flange mount on top	5PC725.1505-01 Flange mount on top		
Drives				
	5AC600.HDDI-05 (40 GB HDD - 24x7 hours and extended temperature range) 5AC600.HDDI-06 (80 GB HDD - 24x7 hours and extended temperature range) 5AC600.CFSI-00 (CompactFlash Slot)			
CompactFlash	Select 1 or 2			
	5CFCRD.0512-04, 5CFCRD.1024-04, 5CFCRD.0064-03, 5CFCRD.0128 5CFCRD.2048-04, 5CFCRD.4096-04, 5CFCRD.0256-03, 5CFCRD.0512 5CFCRD.8192-04, 5CFCRD.016G-04 5CFCRD.1024-03, 5CFCRD.2048			
Supply voltage connector	Select 1			
	0TB103.9 (screw clamp) 0TB103.91 (cage clamp)			
Software	Select 1			
Microsoft Windows xp Professional	9S0000.01-010 (MS-DOS 6.22 German) 9S0000.01-020 (MS-DOS 6.22 English) 5SWWXP.0600-GER (XP Pro SP3 German) 5SWWXP.0600-ENG (XP Pro SP3 English) 5SWWXP.0600-MUL (XP Pro SP3 Multilanguage)	5SWWXP.0500-GER (XP Pro SP2c German) 5SWWXP.0500-ENG (XP Pro SP2c English) 5SWWXP.0500-MUL (XP Pro SP2c Multilangua 5SWWXP.0729-ENG (WES2009 PPC700) 5SWWCE.0829-ENG (WinCE 6.0 PPC700)		

Figure 2: Configuration - Software, accessories

2. Entire device

2.1 Ambient temperature

It is possible to combine CPU boards with various other components, such as drives, main memory, add-on insert cards, etc. dependent on the system unit. The various configurations result in varying maximum possible ambient temperatures, which can be seen in the following graphic.

Information:

The maximum specified ambient temperatures for operation with and without a fan kit were determined under worst-case conditions. Experience has shown that higher ambient temperatures can be reached under typical conditions, e.g. using Microsoft Windows. The testing and evaluation is to be done on-site by the user (temperatures can be read in BIOS or using the B&R Control Center).

Information on the worst-case conditions

- Thermal Analysis Tool (TAT V2.02) from Intel for simulating 100% processor load
- BurnIn testing tool (BurnIn V4.0 Pro from Passmark Software) to simulate a 100% load on the interface via loop-back adapters (serial interfaces, USB ports)

2.1.1 Maximum ambient temperature



Figure 3: Ambient temperature

2.1.2 How is the the maximum ambient temperature determined?

1) The lines under "Maximum ambient temperature" shows the maximum ambient temperature for the entire system (= system unit + CPU board).

2) Incorporating additional drives (add-on), main memory, additional insert cards, etc. can change the temperature limits of a Panel PC 725 system.

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

If there is a specific temperature, for example "35", next to the component, then the ambient temperature of the whole Panel PC 725 system cannot exceed this temperature.

2.1.3 Temperature monitoring

Temperature sensors monitor the temperature at different places in the PPC725 (CPU internal, CPU board, power supply, board I/O). The locations of the temperature sensors can be found in the figure "Temperature sensor locations", on page 183. The value listed in the table represents the defined maximum temperature for this measurement point¹⁾. An alarm is not triggered when this temperature is exceeded. The temperatures¹⁾ can be read in BIOS (menu item "Advanced" - Baseboard/panel features - Baseboard monitor) or in Microsoft Windows XP/Embedded or Windows Embedded Standard 2009, using the B&R Control Center.

Additionally, the hard disks for PPC725 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 and Windows Embedded Standard 2009.

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

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Technical data • Entire device

2.2 Humidity specifications

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

Component		Operation	Storage / Transport
X945 CPU boards	X945 CPU boards		5 - 95%
Main memory for CPU board		10 - 90%	5 - 95%
Add-on drives	5AC600.HDDI-05	5 - 90%	5 - 95%
	5AC600.HDDI-06	5 - 90%	5 - 95%
	CompactFlash cards 5CFCRD.xxxx-04	85%	85%
Accessories	CompactFlash cards - 5CFCRD.xxxx-03	8 - 95%	8 - 95%
	Flash drive 5MMUSB.2048-00	10 - 90%	5 - 90%

Table 14: Overview of humidity specifications for individual components

The listed specifications 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 for the individual components.

2.3 Power management



The following block diagram shows the simplified structure of the PPC725 supply voltage.

Figure 4: Block diagram - supply voltage

2.3.1 Description

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

After the system is turned on (e.g. using the power button), the voltages 3V3 and 5V are placed on the bus. An additional DC/DC converter generates +12V.

Section 2 Technical data

2.4 Device interfaces

2.4.1 +24 VDC supply voltage

The PPC725 system units have a 24 VDC ATX compatible power supply.

The 3-pin socket required for the supply voltage connection is not included in delivery. This can be ordered from B&R using the model number 0TB103.9 (screw clamps) or 0TB103.91 (cage clamps). Pin assignments can be found in the following table. The supply voltage is internally protected (10A, fast-acting), so that the device cannot be damaged if there is an overload (fuse replacement necessary) or if the voltage supply is connected incorrectly (reverse polarity protection - fuse replacement not necessary).

Supply voltage				
Protected against reverse polarity				
Pin Description		Voltage supply		
1	+	124 400		
2	Functional ground			
3	-	DE LA LA LA		
Accessories		3 2 1		
0TB103.9	Plug 24 V 5.08 3p screw clamps			
0TB103.91	Plug 24 V 5.08 3p cage clamps			

Figure 5: Supply voltage connection

Ground

Danger!

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

Next to the supply voltage plug there is a functional grounding clip. The grounding clip (functional ground) must be connected with a central grounding point on the switching cabinet using a 6.3 mm blade connector via the shortest distance and with as little resistance as possible (e.g. copper strip, but must be at least 2.5 mm²).



Figure 6: Grounding clip

2.4.2 Serial interface COM

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

Table 15: Pin assignments - COM

I/O address and IRQ

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

Table 16: 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 interface configuration" setting "Serial port 2"). Please note any potential conflicts with other resources when changing this setting.

2.4.3 Ethernet connection ETH1

Ethernet connection (ETH1 ¹⁾)				
Controller	Intel	32562	RJ45 twisted pair (10BaseT/100BaseT), female	
Cabling	S/STP	(Cat5e)		
Transfer rate	10/100	Mbit/s ²⁾		
Cable length	max. 100 m	(min. Cat5e)	Ethernet 1	
LED	On	Off		
Green	100 Mbit/s	10 Mbit/s		
Orange	Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)		

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

Table 17: Ethernet connection (ETH1)

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

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

Driver support

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

Information:

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

Section 2 Technical data

2.4.4 Ethernet connection ETH2

This Ethernet connection is integrated in the system unit.

Ethernet connection (ETH1 ¹⁾)				
Controller	Intel 82551ER		RJ45 twisted pair (10BaseT/100BaseT), female	
Cabling	S/STP (Cat5e)			
Transfer rate	10/100	Mbit/s ²⁾	-	
Cable length	max. 100 m	(min. Cat5e)	Ethernet 1 Ethernet 2	
LED	On	Off	(ETH1)	
Green	100 Mbit/s	10 Mbit/s		
Orange	Link (Ethernet network connection available)	Activity (blinking) (Data transfer in progress)		

Table 18: Ethernet connection (ETH2)

- 1) The interfaces, etc. available on the device or module were numbered accordingly for easy identification. This numbering can differ from the numbering used by the particular operating system.
- 2) Both operating modes possible. Change-over takes place automatically.

Driver support

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

Information:

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

All PPC725 devices have a USB 2.0 (Universal Serial Bus) Host Controller with multiple USB ports, 3 of which (2x back, 1x on the side) are on the outside for easy user access.

Warning!

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

Warning!

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

USB1, 2

Universal Serial Bus (USB1 and UBS2) ¹⁾		
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s)	USB type A, female
Power supply	Max. 500 mA per port ²⁾	USB1
Maximum Cable length	5 m (not including hub)	USB2

Table 19: USB port - back

- 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)

Technical data • Entire device

USB3

Universal Serial Bus (USB3) ¹⁾			
Transfer rate	Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s)	USB type A, female	
Power supply	Max. 500 mA per port ²⁾		
Maximum Cable length	5 m (not including hub)		

Table 20: USB connection on the side

- 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)

Driver support

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

USB 2.0 comes already integrated in B&R's Windows XP Embedded and Windows Embedded Standard 2009 operating system.

Information:

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

2.4.6 CompactFlash slot (CF1)

This CompactFlash slot is a fixed component of an PPC725 system, and is defined in BIOS as the primary master drive.

CompactFlash slot (CF1)			
Connection	Primary master IDE device		
CompactFlash Type	Туре I		
Accessories	Short description	•	
5CFCRD.0512-04	CompactFlash 512 MB B&R		
5CFCRD.1024-04	CompactFlash 1024 MB B&R		
5CFCRD.2048-04	CompactFlash 2048 MB B&R		
5CFCRD.4096-04	CompactFlash 4096 MB B&R	Ourse of Electronic de la constantina de	
5CFCRD.8192-04	CompactFlash 8192 MB B&R	on side	
5CFCRD.016G-04	CompactFlash 16 GB B&R		
5CFCRD.0064-03	CompactFlash 64 MB SSI		
5CFCRD.0128-03	CompactFlash 128 MB SSI		
5CFCRD.0256-03	CompactFlash 256 MB SSI		
5CFCRD.0512-03	CompactFlash 512 MB SSI		
5CFCRD.1024-03	CompactFlash 1024 MB SSI		
5CFCRD.2048-03	CompactFlash 2048 MB SSI	•	
5CFCRD.4096-03	CompactFlash 4096 MB SSI		
5CFCRD.8192-03	CompactFlash 8192 MB SSI		



Warning!

Turn off power before inserting or removing the CompactFlash card!

Section 2 Technical data

2.4.7 Hard disk / CompactFlash slot (HDD/CF2)

This slot allows for installation of a hard disk or a second CompactFlash slot as so-called addon drives. The add-on drive is referred to in BIOS as the primary slave drive.

Information:

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

Hard disk / CompactFlash slot (HDD/CF2)			
Connection	Primary slave IDE device		
Add-on hard disks	2.5" drive (internal)		
5AC600.HDDI-05	Add-on hard disk 40 GB ET, 24/7		
5AC600.HDDI-06	Add-on hard disk 80 GB ET, 24/7		
Add-on CompactFl	ash slot		
5AC600.CFSI-00	Add-on CompactFlash slot		
CompactFlash Type	Туре І		
Accessories	Short description	91	
5CFCRD.0512-04	CompactFlash 512 MB B&R		
5CFCRD.1024-04	CompactFlash 1024 MB B&R	A Star	
5CFCRD.2048-04	CompactFlash 2048 MB B&R	63	
5CFCRD.4096-04	CompactFlash 4096 MB B&R		
5CFCRD.8192-04	CompactFlash 8192 MB B&R	and the second se	
5CFCRD.016G-04	CompactFlash 16 GB B&R	a Car	
5CFCRD.0064-03	CompactFlash 64 MB SSI	A CONTRACTOR OF	
5CFCRD.0128-03	CompactFlash 128 MB SSI		
5CFCRD.0256-03	CompactFlash 256 MB SSI		
5CFCRD.0512-03	CompactFlash 512 MB SSI	•	
5CFCRD.1024-03	CompactFlash 1024 MB SSI		
5CFCRD.2048-03	CompactFlash 2048 MB SSI		
5CFCRD.4096-03	CompactFlash 4096 MB SSI		
5CFCRD.8192-03	CompactFlash 8192 MB SSI		

Table 22: Hard disk / CompactFlash slot (HDD/CF2)

2.4.8 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 CF battery cover. The buffer duration of the battery is at least 4 years (at 50°C, 8.5μ A current requirements of the supplied components and a self discharge of 40%). The battery is subject to wear and should be replaced regularly (at least following the specified buffer duration).

		Battery	
Battery Type Removable Lifespan	Renata 950 mAh Yes, accessible from the outside 4 years ¹⁾	Battery	iction 2 aicol data
Accessories	Short description		Se
0AC201.91	Lithium batteries, 4 pcs. Lithium batteries, 4 pcs., 3 V / 950 mAh, button cell		F
4A0006.00-000	Lithium batteries, 1 pcs. Lithium battery, 1 pc., 3 V / 950 mAh, button cell		

Table 23: Battery

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

For more on changing the lithium battery, see chapter 6 "Maintenance / Servicing", section 1 "Changing the battery", on page 179.

For technical information on the lithium battery, see chapter 5 "Accessories", section 2 "Replacement CMOS batteries", on page 157.

Battery status evaluation

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

Battery status	Meaning	
N/A	Hardware, i.e. firmware used is too old and does not support read.	
GOOD	Data buffering is guaranteed	
BAD	Data buffering is guaranteed for approx. another 500 hours from the point in time that the battery capacity is determined to be BAD (insufficient).	

Table 24: Meaning of battery status

Technical data • Entire device

2.4.9 Add-on interface slot

An optional add-on interface can be installed here.





Information:

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

2.5 Serial number sticker

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

The serial number for the entire device is located on the back of the device. 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 7: Serial number sticker for PPC725 assembly (back)

Section 2 Technical data

Technical data • Entire device

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

3. Individual components

3.1 System units

All components (CPU board, main memory, drive, flange) are connected together to form the system unit. The flange is not included in the system unit and must be ordered separately. The only difference between the two system units is the position of the flange output.

3.1.1 Panel PC 725



Figure 8: Front view - Panel PC 725



Figure 9: Rear view - Panel PC 725

Technical data

Technical data • Individual components

Technical data

General information	5PC725.1505-00	5PC725.1505-01
B&R ID code	\$B046	\$B0EC
Reset button	N	0
Power button	N	0
Buzzer	Yı	es
LED		
Amount	No	ne
Controller		-
Bootloader	BIG	
Processor	Component-dependent, see sectio	n "X945 CPU boards", on page 50
Main memory	Max.	2 GB
Graphics Controller	Component-dependent, see section	n "X945 CPU boards", on page 50
Power failure logic Controller Buffer time	MTCX	
Battery Type Removable Lifespan	Yes, see also "Battery", on page 41 Renata 950 mAh Yes, accessible from the outside 4 years ¹⁾	
Interfaces		
Serial interfaces Type Amount UART Transfer rate Connection	See "Serial interface COM", on page 34 RS232, modem capable 1 16550 compatible, 16 byte FIFO Max. 115 kBaud 9-nin DSUB male	
Ethernet Controller Transfer rate Connection	See "Ethernet connection ETH1", on page 35 and "Ethernet connection ETH2", on page 36 10/100 Mbit/s RJ45 twisted pair (10 Base T / 100 Base T)	
USB interfaces Type Amount Transfer rate Connection	See also "USB interfaces", on page 37 USB 2.0 3 (2x back side, 1x side) Low speed (1.5 Mbit/s), full speed (12 Mbit/s), to high speed (480 Mbit/s) Type A	
Add-on interface slot Amount	See also "Add-on interface slot", on page 42 1	
CompactFlash slot 1 (CF1) Internal organization	Yes, see also "CompactFlash slot (CF1)", on page 39 Primary master	
CompactFlash slot 2 / hard disk (HDD/CF2)	Yes, see also "Hard disk / CompactFlash slot (HDD/CF2)", on page 40	
Type Internal organization	Combined Primary slave	
SRAM internal slot options	No	

Table 26: Technical data - Panel PC 725

Display	5PC725.1505-00	5PC725.1505-01
Touch screen ²⁾ Touch screen type Technology Controller Degree of transmission	Elo Accu Touch Analog, resistive Elo, serial, 12-bit Up to 78%	
Display Type Diagonal Colors Resolution Contrast Viewing angle (see page 190) Horizontal Vertical Background lighting Brightness Half-brightness time ³) Keys	Color TFT 15 inch (381 mm) 16 million XGA, 1024 x 768 pixels 550, 1 Direction R / direction L = 60° Direction U / direction D = 45° 250 cd/m ² 50000 hours	
Function keys Soft keys Cursor keys Number block Other keys Key lifespan LED brightness		
Electrical characteristics		
Power supply Rated voltage Rated current Starting current Power consumption Electrical isolation	24 VDC 1.4 Typ. 10 A, max. 28, Yi	S ±25% A 40 A for < 300 μs 5 W 95
Mechanical characteristics		
Front Frame Design Membrane Gasket	Naturally anodi Gr Poly Meta	zed aluminum ⁴⁾ ay ester moll
Flange output	Тор	Bottom
Housing	Aluminum paint	
Outer dimensions Width Height Depth	Also see diagram "Dimensions", on page 49 426 mm 330 mm 58.7 mm	
Weight	6.27 kg (wihtout flange)	
Environmental characteristics		
Ambient temperature Operation Bearings Transport	0 to +50°C -20 to +60°C -20 to +60°C	

Table 26: Technical data - Panel PC 725 (cont.)

Section 2 Technical data

Technical data • Individual components

Environmental characteristics	5PC725.1505-00 5PC725.1505-01	
Relative humidity Operation / Storage / Transport	See "Temperature humidity diagram", on page 48	
Vibration Operation Bearings Transport	2 - 9 Hz: 3 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 Operation Bearings Transport	15 g, 11 ms 30 g, 6 ms 30 g, 6 ms	
Protection type IP65 (from all sides, only with closed housing)		ly with closed housing)
Altitude	Max. 3,000 m	

Table 26: Technical data - Panel PC 725 (cont.)

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

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

3) At 25°C ambient temperature. Reducing the brightness by 50% can result in an approximate 50% increase of the half-brightness time.

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

Temperature humidity diagram



Figure 10: Temperature humidity diagram - PPC725



Dimensions

Figure 11: Dimensions - Panel PC 725

3.2 X945 CPU boards



Figure 12: X945 CPU board

Information:

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

Technical data

Features	5PC600.X945-00	
Boot loader / Operating system	BIOS AMI (see Section 1 "BIOS options", on page 71)	
Processor Architectures Type Name Clock frequency Expanded command set L1 cache L2 cache Floating point unit (FPU)	45 nm Intel® Atom™ N270 1.6 GHz Hyper-threading technology, enhanced speed step SSE, SSE2, SSE3 (Streaming SIMD extensions) 24 KB 512 KB 512 KB Yes	
Chipset	Intel® 945GME / Intel 82801DBM (ICH7M-DH)	

Table 27: Technical data - CPU board X945

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

Table 27: Technical data - CPU board X945 (cont.)

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

2) GE = Graphics Engine

Driver support

In order for the CPU board with the Intel 945GME chipset to work properly, it is necessary to install the Intel chipset driver (e.g. special USB driver) and the graphics chip. The necessary software can be downloaded from the download area on the B&R homepage (<u>www.br-automation.com</u>).

Information:

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

Section 2 Technical data

3.3 Main memory

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



Figure 13: Main memory module

3.3.1 Technical data

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

Table 28: Technical data - Main memory

Information:

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

3.4 Flange



Figure 14: Flange 5AC725.FLGC-00

3.4.1 Technical data

Mechanical characteristics	5AC725.FLGC-00
Housing Item Color	Zink die casting RAL 7024
Outer dimensions Width Height Depth	90 mm 81 mm 71 mm
Weight	1,100 g

Table 29: Technical data - Flange 5AC725.FLGC-00

3.4.2 Dimensions



Figure 15: Dimensions - Flange 5AC725.FLGC-00

3.5 Drives

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

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

Information:

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



Figure 16: Add-on hard disk 40 GB - 5AC600.HDDI-05

Technical data

Information:

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

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

Table 30: Technical data - Add-on hard disk 5AC600.HDDI-05

Features	5AC600.HDDI-05
Access time (average)	12.5 ms
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1 ms 12.5 ms 22 ms
Starting time (0 rpm to read access)	3 seconds (typically)
Interface	ATA-6
Data transfer rate On the medium To/from host	max. 321 MBit/s Max. 100 MB/s (ultra-DMA mode 5)
Cache	8 MB
S.M.A.R.T. Support	Yes
MTBF	550000 hours ¹⁾
Mechanical characteristics	
Add-on mounting	Fixed
Outer dimensions Width Length Height	70 mm 100 mm 9.5 mm
Weight	100 g
Environmental characteristics	
Ambient temperature ²⁾ Operation - Standard / 24-hour Bearings Transport	-30 to +85°C -40 to +95°C -40 to +95°C
Relative humidity Operation Bearings Transport	5 to 90%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings	10 - 500 Hz: 1 g (9.8 m/s ² 0-peak) no non-recovered errors 5 - 500 Hz: 5 g (49 m/s ² 0-peak) no non-recovered errors
Shock (pulse with a sine half-wave) Operation Bearings	Max. 200 g (1962 m/s ² 0-peak) and 2 ms duration, no non-recovered errors Max. 110 g (1079 m/s ² 0-peak) and 11 ms duration, no non-recovered errors Max. 800 g (7848 m/s ² 0-peak) and 2 ms duration, no damage Max. 400 g (3924 m/s ² 0-peak) and 0.5 ms duration, no damage
Altitude Operation Bearings	- 300 to 4419 meters - 300 to 12192 meters

Section 2 Technical data

Table 30: Technical data - Add-on hard disk 5AC600.HDDI-05 (cont.)

1) With 8760 POH (power on hours) per year and 70 $^{\circ}\text{C}$ surface temperature.

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

Technical data • Individual components





Figure 17: Temperature humidity diagram - Add-on hard disk 5AC600.HDDI-05

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).

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

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

Information:

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



Figure 18: Add-on hard disk 80 GB - 5AC600.HDDI-06

Technical data

Information:

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

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

Table 31: Technical data - add-on hard disk - 5AC600.HDDI-06

Technical data • Individual components

Features	5AC600.HDDI-06
Positioning time (seek, typical values) Minimum (track to track) Average (read access) Maximum (read access)	1 ms 12.5 ms 22 ms
Starting time (0 rpm to read access)	4 seconds (typically)
Interface	ATA-6
Data transfer rate On the medium To/from host	Max. 450 MBit/s Max. 100 MB/s (Ultra-DMA Mode 5)
S.M.A.R.T. Support	Yes
Cache	8 MB
MTBF	750000 hours ¹⁾
Mechanical characteristics	
Add-on mounting	Fixed
Outer dimensions (without slide-in) Width Length Height	70 mm 100 mm 9.5 mm
Weight	120 g
Environmental characteristics	
Ambient temperature ²⁾ Operation - Standard / 24-hour Bearings Transport	-30 to +85°C -40 to +95°C -40 to +95°C
Relative humidity Operation Bearings Transport	5 to 90%, non-condensing 5 to 95%, non-condensing 5 to 95%, non-condensing
Vibration Operation Bearings	5 - 500 Hz: 2 g; no non-recovered errors 5 - 500 Hz: 5 g; no non-recovered errors
Shock (pulse with a sine half-wave) Operation Bearings	Max. 300 g, 2 ms; no non-recovered errors Max. 150 g, 11 ms; no non-recovered errors Max. 800 g, 2 ms; no damage Max. 400 g, 0.5 ms; no damage
Altitude Operation Bearings	- 300 to 5000 meters - 300 to 12192 meters

Table 31: Technical data - add-on hard disk - 5AC600.HDDI-06 (cont.)

1) With 8760 POH (Power On Hours) per year and 70 $^{\circ}\text{C}$ surface temperature.

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



Temperature humidity diagram - Operation and storage



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

Technical data

Section 2

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

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

Information:

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



Figure 20: 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 32: Technical data - Add-on CompactFlash slot 5AC600.CFSI-00

Warning!

Turn off power before inserting or removing the CompactFlash card!

Chapter 3 • Commissioning

1. Installation

Panel PC 725 devices are best mounted on a swing arm system using the flange output found on the housing.



Figure 21: Mounting on a swing arm system

1.1 Important mounting information

- This installation requires a swing arm system.
- The environmental conditions must be taken into consideration.
- The PPC725 is only certified for operation in closed rooms.
- The PPC725 cannot be situated in direct sunlight.
- The protective caps must be attached to the PPC725 before start-up, see section 1.2 "Mounting the protective caps", on page 62.

Commissioning • Installation

1.2 Mounting the protective caps

Panel PC 725 units are delivered with protective caps for the interfaces, which are not yet attached to the device. Therefore, these caps must be attached to the unit before start-up to ensure proper operation and IP65 protection.



Figure 22: Contents of delivery

• Attach the delivered blue rings to the Torx screws of protective caps the to help prevent them from getting lost, and should therefore not be removed.



Figure 23: Protective caps with Torx screws and the blue rings

 Attach protective caps to the PPC725. Tighten the Torx screws (TX10) with a torque of 0.7 Nm.



Figure 24: Mounting the protective caps

• Attach the delivered screws to the flange. With these screws the Panel PC 725 is attached to the swing arm system.



Figure 25: Mounting the screws to the flange

Section 3 Commissioning

2. Information regarding operation

- The seals on the Panel PC 725 must be kept clean at all times to prevent dirt and moisture from entering the device.
- Make sure to follow the information and instructions provided by the manufacturer of the swing arm system.
- Make sure that water cannot enter the PC via the swing arm system. Furthermore, air circulation must be ensured to prevent condensation.

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 PPC725 functional ground has 2 connections:

- Supply voltage
- Ground connection

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

- The device should be connected to the ground using the shortest route possible.
- Use cable with a minimum cross section of 2.5 mm² per connection.

Note the line shielding concept. All data cables connected to the device must use shielded lines.

Section 3 Commissioning

4. Touch screen calibration

B&R touch screen devices are equipped with a touch controller, which supports hardware calibration. This means that the devices are pre-calibrated from stock (pre-calibration). This feature proves advantageous in the case of a replacement part because a new calibration is no longer required when exchanging devices (identical model / type). Nevertheless, we recommend calibrating the device in order to achieve the best results and to better readjust the touch screen to the user's preferences.

Regardless of this, the touch screen driver requires calibration following installation.

4.1 Windows XP Professional

After installing Windows XP Professional, the touch screen driver must be installed in the device in order to operate the touch screen. The corresponding drivers can be downloaded from the download area on the B&R homepage (<u>www.br-automation.com</u>). The touch screen should be calibrated while installing the driver.

4.2 Windows CE

Windows CE starts the touch screen calibration sequence during its first boot in the default configuration / delivered state.

4.3 Windows XP Embedded

After first starting Windows XP Embedded (First Boot Agent), the touch screen driver must be installed in the device in order to operate the touch screen. The corresponding drivers can be downloaded from the download area on the B&R homepage (<u>www.br-automation.com</u>). The touch screen should be calibrated while installing the driver.

4.4 Windows Embedded Standard 2009

After first starting Windows Embedded Standard 2009 (First Boot Agent), the touch screen driver must be installed in the device in order to operate the touch screen. The corresponding drivers can be downloaded from the download area on the B&R homepage (<u>www.br-automation.com</u>). The touch screen should be calibrated while installing the driver.

4.5 Automation Runtime / Visual Components

The first time the touch screen is used, it must be calibrated once in the customer application for the existing device and project.

5. Connection of USB peripheral devices

Warning!

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

5.1 Local on the PPC725

Many different peripheral USB devices can be connected to the 2 or 3 USB interfaces on the Panel PC 725. These can each handle a load of 1A. The maximum transfer rate is USB 2.0.



Figure 26: Local connection of USB peripheral devices on the PPC 725

6. Known problems / issues

The following issue for the PPC725 devices is known:

- In Windows XP, the Windows Standby mode is not supported in combination with the add-on hard disk (5AC600.HDDI-05 and 5AC600.HDDI-06) in IDE Slave Only mode. A blue screen or Windows crash can occur sporadically when returning from Windows Standby mode. Windows Standby mode will function if a CompactFlash card is connected to the IDE Master in addition the HDD on the slave slot. The same problem also occurs if the hard disk is switched off under Control Panel -> Power Options.
- If the Intel GMA driver (Graphics Media Accelerator) is installed in the system (e.g. in Windows XP), then an analog RGB monitor will always be detected, regardless of whether one is connected or not.
- Using two different types of CompactFlash cards can cause problems in Automation PCs and Panel PCs. This can result in one of the two cards not being detected during system startup. This is caused by varying startup speeds. CompactFlash cards with older technology require significantly more time during system startup than CompactFlash cards with newer technology. This behavior occurs near the limits of the time frame provided for startup. The problem described above can occur because the startup time for the CompactFlash cards fluctuates due to the variance of the components being used. Depending on the CompactFlash cards being used, this error might never, sometimes or always occur.

7. User tips for increasing the display lifespan

7.1 Backlight

The lifespan of the backlight is specified in "Half Brightness Time". An operating time of 50,000 hours would mean that the display brightness would still be 50% after this time.

7.1.1 How can the lifespan of backlights be extended?

- · Set the display brightness to the lowest value that is still comfortable for the eyes
- Use dark images
- Reducing the brightness by 50% can result in an approximate 50% increase of the halfbrightness time.

7.2 Image sticking

Image sticking is the "burning in" of a static image on a display after being displayed for a prolonged period of time. However, this does not only occur with static images. Image sticking is known in technical literature as the "burn-in effect", "image retention", "memory effect", "memory sticking" or "ghost image".

There are 2 types of this:

- Area type: This is seen with a dark gray image. The effect disappears if the display is switched off for a longer period of time.
- Line type: This can cause lasting damage.

7.2.1 What causes image sticking?

- Static images
- Screensaver not enabled
- Sharp contrast transitions (e.g. black / white)
- High ambient temperatures
- Operation outside of the specifications

Section 3 Commissioning

Commissioning • User tips for increasing the display lifespan

7.2.2 How can image sticking be avoided?

- continual change between static and dynamic images
- avoiding excessive brightness contrast between foreground and background display
- use of colors with similar brightness
- use of complementary colors in subsequent images
- use of screensavers

Chapter 4 • Software

1. BIOS options

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

Information:

- The following diagrams and BIOS menu items including descriptions refer to BIOS version 1.10. It is therefore possible that these diagrams and BIOS descriptions do not correspond with the installed BIOS version.
- The setup defaults are the settings recommended by B&R. The setup defaults are dependant on the DIP switch configuration on the baseboard (see section 1.9 "BIOS default settings", on page 114).

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 Panel PC 725 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 PPC725 even when the power is turned off (no 24VDC supply).

1.2 BIOS setup and boot procedure

BIOS is immediately activated when switching on the power supply of the Panel PC 725 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 <De1> 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).

Section 4 Software

Software • BIOS options

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)2005 American Megatrends, Inc. [APC7R110] Bernecker + Rainer Industrie-Elektronik L1.10 Serial Number : 316862 CPU : Intel(R) Atom(TM) CPU N270 @ 1.16GHz Speed : 1.60 Ghz Press DEL to run Setup Press F11 for DDS FOPUP The MCH is operating with DDR2-533/CL4 in Single-Channel Mode Initializing USB Controllers .. Done. 1016MB OK USB Device(s): 2 Hubs Auto-Detecting Pri Slave...ATAPI CDROM Auto-Detecting Sec Slave...IDE Hard Disk Pri Slave : DW-224E-A V.RA Ultra DMA Mode-2 Sec Slave : ST980817AM 3.AAB Ultra DMA Mode-5, S.M.A.R.T Capable and Status OK Auto-detecting USB Mass Storage Devices ... 00 USB mass storage devices found and configured.

Figure 27: X945 - BIOS diagnostics screen

1.2.1 BIOS setup keys

The following keys are enabled during the POST:

Кеу	Function
ESC	The system RAM check can be skipped by pressing ESC.
Del	Enters the BIOS setup menu.
F12	Using the F12 key, you can boot from the network.
F11	Cues the boot menu. Lists all bootable devices that are connected to the system. With cursor \uparrow and cursor \downarrow and by pressing <enter>, select the device from which will be booted.</enter>
<pause></pause>	Pressing the <pause> key stops the POST. Press any other key to resume the POST.</pause>

Table 33: X945 bios-relevant keys at POST

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

Table 34: X945 bios-relevant keys in the BIOS menu

1.3 Main

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

System Time [15:51:0 System Date [Thu 08/ BIOS ID : APC7R110 Processor : Intel(R) Atom(TM) CPU I CPU Frequency : 1600MHZ System Memory : 1016MB	5] 13/2009] N270	Use or [S selec Use confi	[ENTER], [TAB] SHIFT-TAB] to ct a field. [+] or [-] to igure system Time
BIOS ID : APC7R110 Processor : Intel(R) Atom(TM) CPU I CPU Frequency : 1600MHZ System Memory : 1016MB	N270	Use confi	[+] or [-] to igure system Time
Processor : Intel(R) Atom(TM) CPU PU Frequency : 1600MHZ System Memory : 1016MB	N270	Use confi	<pre>[+] or [-] to igure system Time</pre>
Coard Information			Select Screen
Product Revision : Y.O			Select Item
Serial Number : 316862		+-	Change Field
3C Firmware Rev. : 904		Tab	Select Field
AC Address (ETH1): 00:13:95:05:75:C0		F1	General Help
Running Time : 381h		ESC	Exit

Figure 28: X945 BIOS Main Menu

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

Table 35: X945 Main Menu setting options

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

Table 35: X945 Main Menu setting options (cont.)

1.4 Advanced

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Main	Advanced	Boot	Security	Power	1	Exit
Advanced	Settings					
ACPI Con	figuration					
PCI Conf	iguration					
Graphics	Configuration	n				
CPU Conf:	iguration					
Chipset	Configuration					
I/O Inter	rface Configu	ration				
Clock Co	nfiguration					
IDE Conr:	iguration					
Keyboard	/Mouse Config	uration				Select Screen
Remote A	ccess Configu	ration			t⊥	Select Item
CPU Board	d Monitor				Enter	Go to Sub Screen
Baseboar	d/Panel Featu	res			F1	General Help
					F10	Save and Exit
					ESC	Exit

Figure 29: X945 Advanced Menu

BIOS setting	Meaning	Setting options	Effect
ACPI configuration	Configures the APCI devices.	Enter	Opens the submenu See "ACPI configuration", on page 76.
PCI Configuration	Configures PCI devices.	Enter	Opens the submenu See "PCI Configuration", on page 78.
Graphics configuration	Configures the graphics settings.	Enter	Opens the submenu See "Graphics configuration", on page 82.
CPU configuration	Configures the CPU settings.	Enter	Opens the submenu See "CPU configuration", on page 84.
Chipset configuration	Configures the chipset functions.	Enter	Opens the submenu See "Chipset configuration", on page 86.

Table 36: X945 Advanced Menu setting options

BIOS setting	Meaning	Setting options	Effect
I/O interface configuration	Configures the I/O devices.	Enter	Opens the submenu See "I/O interface configuration", on page 87.
Clock Configuration	Configures the clock settings.	Enter	Opens the submenu See "Clock Configuration", on page 89.
IDE Configuration	Configures the IDE functions.	Enter	Opens the submenu See "IDE Configuration", on page 90.
USB configuration	Configures the USB settings.	Enter	Opens the submenu See "USB configuration", on page 96.
Keyboard/mouse configuration	Configures the keyboard/mouse options.	Enter	Opens the submenu See "Keyboard/mouse configuration", on page 98.
Remote access configuration	Configures the remote access settings.	Enter	Opens the submenu See "Remote access configuration", on page 99.
CPU board monitor	Displays the current voltages and temperature of the processor in use.	Enter	Opens the submenu See "CPU board monitor", on page 101.
Main Board/Panel Features	Displays device specific information and setup of device specific values.	Enter	Opens the submenu See "Main Board/Panel Features", on page 102.

Table 36: X945 Advanced Menu setting options (cont.)

1.4.1 ACPI configuration

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

Figure 30: X945 Advanced ACPI configuration

BIOS setting	Meaning	Setting options	Effect
ACPI Aware O/S	This function determines if the operating	Yes	The operating system supports ACPI.
	system supports the ACPI function (Advanced Configuration and Power Interface).	No	The operating system does not support ACPI.
ACPI Version	Option for setting the power option	ACPI v1.0	ACPI functions in accordance with v1.0
Features	specifications to be supported. The ACPI functions must be supported by the drivers and operating systems being used.	ACPI v2.0	ACPI functions in accordance with v2.0
		ACPI v3.0	ACPI functions in accordance with v3.0
ACPI APIC support	This option controls the support of the advanced programmable interrupt controller in the processor.	Enabled	Enables this function.
		Disabled	Disables the function
Suspend mode	Selects the ACPI status to be used when Suspend Mode is enabled.	S1 (POS)	Sets S1 as Suspend mode. Only a few functions are disabled and are available again at the touch of a button
		S3 (STR)	Sets S3 as Suspend Mode. The current state of the operating system is written to the RAM, which is then supplied solely with power.
USB Device Wakeup	This options makes it possible for activity	Enabled	Enables this function.
from S3/S4	on a connected USB device to wake the system up from the S3/S4 standby mode.	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. Temperature reached.	50°C, 60°C, 70°C, 80°C, 90°C	Temperature setting for the active cooling trip point. Can be set in 10 degree increments.
Passive Cooling Trip	With this function, a temperature can be	Disabled	Disables this function.
Point	set at which the CPU automatically reduces its speed.	50°C, 60°C, 70°C, 80°C, 90°C	Temperature setting for the passive cooling trip point. Can be set in 10 degree increments.
Critical Trip Point	With this function, a temperature can be set at which the operating system automatically shuts the system down.	80°C, 85°C, 90°C, 95°C, 100°C, 105°C, 110°C	Temperature setting for the critical trip point. Can be set in 5 degree increments.

Table 37: X945 Advanced ACPI configuration setting options

1.4.2 PCI Configuration

Adversed DCT (DaD Catting		No. 1sts the DTOO	
Advanced PCI/PhP Settings		NO: lets the BLOS	
Plug & Plav O/S	[Yes]	devices in the svs	tem
PCI Latency Timer	[64]	YES: lets the	
Allocate IRO to PCI VGA	[Yes]	operating system	
Allocate IRQ to SMBUS HC	[Yes]	configure Plug and Play (PpP) devices	
► PCI IRQ Resource Exclusion	n	required for boot	if Plu
▶ PCI Interrupt Routing		and Play operating system.	
		↔ Select Scree	n
		↑↓ Select Item	
		+- Change Optio	n
		F1 General Help	
		F10 Save and Ex1	t
		ESC Exit	

Figure 31: X945 Advanced PCI Configuration

BIOS setting	Meaning	Setting options	Effect
Plug & Play O/S	BIOS is informed if Plug & Play is capable on the operating system.	Yes	The operating system handles the distribution of resources.
		No	BIOS handles the distribution of resources.
PCI Latency Timer	This option controls how long (in PCI ticks) one PCI bus card can continue to use the master after another PCI card has requested access.	32, 64, 96, 128, 160, 192, 224, 248	Manually sets the value in PCI ticks.
Allocate IRQ to PCI	This function is used to determine if an	Yes	Automatic assignment of an interrupt.
VGA	Interrupt is assigned to the PCI VGA.	No	No assignment of an interrupt.
Allocate IRQ	Use this function to set whether or not the SM (System Management) bus controller is assigned a PCI interrupt.	Yes	Automatic assignment of a PCI interrupt.
to SMBUS HC		No	No assignment of an interrupt.
PCI IRQ Resource Exclusion	Configures the PCI IRQ resource settings for ISA Legacy devices.	Enter	Opens the submenu See "PCI IRQ Resource Exclusion", on page 79
PCI Interrupt Routing	Configures PCI interrupt routing	Enter	Opens the submenu See "PCI Interrupt Routing", on page 80

Table 38: X945 Advanced PCI configuration setting options

PCI IRQ Resource Exclusion

PCI IRQ Resource Ex	clusion	Available: Specified
TRO3	[Allocated]	IRQ is available to b
TRO4	[Allocated]	devices
TRO5	[Available]	Reserved: Specified
IRO6	[Available]	IRO is reserved for
IRQ7	[Available]	use by Legacy ISA
IRQ9	[Allocated]	devices.
IRQ10	[Available]	
IRQ11	[Available]	
IRQ12	[Available]	
IRQ14	[Allocated]	
IRQ15	[Available]	↔ Select Screen
		T* Select Item
		+- Change Option
		FI General Help
		FIU Save and Exit
		ESC Exit

Figure 32: X945 Advanced PCI IRQ Resource Exclusion

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

Table 39: X945 Advanced PCI IRQ Resource Exclusion setting options

PCI Interrupt Routing

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

Figure 33: X945 Advanced PCI Interrupt Routing

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

Table 40: X945 Advanced PCI Interrupt Routing setting options

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

Table 40: X945 Advanced PCI Interrupt Routing setting options (cont.)

1.4.3 Graphics configuration

CI / Int. VGA]	Select adapte during	primary video r to be used	
CI / Int. VGA]	adapte	r to be used	
		adapter to be used during boot up.	
nabled, 8MB] /MT Mode] ?8MB]			
uto] 0] uto]			
mpand Text & Grap]	↓ ↓↓ +- F1 F10 ESC	Select Screen Select Item Change Option General Help Save and Exit Exit	
	MT Mode] 28MB] uto] uto] uto] mpand Text & Grap]	MT Mode] 28MB] p] pito] pand Text & Grap] ↔ ↑↓ +- F1 F10 ESC	

Figure 34: X945 Advanced Graphics configuration

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

Table 41: X945 Advanced Graphics configuration setting options

BIOS setting	Meaning	Setting options	Effect	
DVMT/FIXED	Option for setting the amount of memory	64MB	64MB of main memory can be used.	
Memory	used for the DVMT mode.	128MB	128MB of main memory can be used.	
		Maximum DVMT	The remaining available main memory can be used.	
Boot Display Device	Determines which video channel should	Auto	Automatic selection.	
	be enabled for a video device during the boot procedure.	CRT only	Only use the CRT (Cathode Ray Tube) channel.	
		LFP only	Only use the LFP (Local Flat Panel) channel.	
		CRT + LFP	Use CRT + LFP channel.	
Always Try Auto	This option first searches for EDID data in	No	Disables this function.	
Panel Detect	an external EEPROM to configure the LFP. If no EDID data is found, then the data selected under "Local Flat Panel Type" is used.	e Yes Enables this function.		
Local Flat Panel Type	This option can be used to set a pre- defined profile for the LVDS channel.	Auto	Automatic detection and setting using the EDID data.	
		VGA 1x18 (002h)	640 x 480	
		VGA 1x18 (013h)	640 x 480	
		SVGA 1x18 (01Ah)	800 x 600	
		XGA 1x18 (006h)	1024 x 768	
		XGA 2x18 (007h)	1024 x 768	
		XGA 1x24 (008h)	1024 x 768	
		XGA 2x24 (012h)	24 x 768	
		SXGA 2x24 (00Ah)	1280 x 1024	
		SXGA 2x24 (018h)	1280 x 1024	
		UXGA 2x24 (00Ch)	1600 x 1200	
		Customized EDID 1	User-defined profile	
		Customized EDID 2	User-defined profile	
		Customized EDID 3	User-defined profile	
Local flat panel scaling	Determines the screen content should be output according to the defined Local Flat	Centering	The screen content is output centered on the display.	
	Рапентуре.	Expand Text	The text is stretched across the entire surface of the display.	
		Expand Graphics	The graphics are stretched across the entire surface of the display.	
		Expand Text & Graphics	Text and graphics are stretched across the entire surface of the display.	

Table 41: X945 Advanced Graphics configuration setting options (cont.)

1.4.4 CPU configuration

Advanced				
Configure advanced CPU settings Module Version:3F.12		Seled of th	Select the revsion of the multi processo:	
Manufacturer:Intel Intel(R) Atom(TM) CPU N270 Frequency :1.60GHz FSB Speed :532MHz Cache L1 :24 KB Cache L2 :512 KB Ratio Actual Value:12	@ 1.60 GHz	suppo shou the I	ort interface than the offered by BIOS.	
		↔	Select Screen	
Max CPUID Value Limit	[Disabled]	<u>↑</u> ↓	Select Item	
Execute-Disable Bit Capabil	ity[Enabled]	+-	Change Option	
Hyper Threading Technology	[Enabled]	F1	General Help	
<pre>Intel(R) SpeedStep(tm) tech</pre>	[Enabled]	F10	Save and Exit	
Boot CPU Speed On AC	[Maximum]	ESC	Exit	
Intel(R) C-STATE tech	[Enabled]			
Enhanced C-States	[Enabled]			

Figure 35: 2	X945	Advanced	CPU	Configuration
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BIOS setting	Meaning	Setting options	Effect
Module Version	BIOS Module Version	None	-
Manufacturer	Manufacturer's display.	None	-
Frequency	Processor speed display	None	-
FSB speed	Cycle display of all addressed components. (Front side bus)	None	-
L1 cache	Displays first level cache memory area.	None	-
L2 cache	Displays first level cache memory area.	None	-
Ratio Actual Value	Displays the Ratio Actual Value.	None	-
MPS Revision	This option supports the use of multiple	1.1	Sets MPS support Revision 1.1
	CPUS (MPS=multi-processor system).	1.4	Sets MPS support Revision 1.4
Max CPUID value limit	Option for limiting the CPUID input value. This could be necessary for older operating systems.	Enabled	The processor limits the maximum CPUID input value to 03h if necessary when the the processor supports a higher value.
		Disabled	The processor returns the current maximum value upon request of the CPUID input value.

Table 42: X945 Advanced CPU Configuration setting options

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

Table 42: X945 Advanced CPU Configuration setting options

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

1.4.5 Chipset configuration

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

Figure 36: X945 Advanced Chipset Configuration

BIOS setting	Meaning	Setting options	Effect
DRAM Frequency	Option for setting the RAM frequency.	Auto	Frequency set automatically by the BIOS.
		400, 533 MHz	Desired clock frequency set manually.
Memory Hole	Option for ISA cards with frame buffer. Not	Disabled	Disables this function.
	relevant for a PPC/25.	15MB-16MB	This address area is reserved.
DIMM Thermal	Option for setting the maximum surface	Disabled	Surface temperature not limited.
Control	temperature of the DIMM module. The module is cooled by limiting the memory bandwidth if the defined surface temperature is reached.	40°C, 50°C, 60°C, 70°C, 80°C, 85°C, 90°C	Temperature limit value for the limitation.
DT in SPD	Option to determine whether the GMCH	Disabled	Disables this function.
	(Graphics and Memory Controller Hub) supports DT (Delta Temperature) in the SPD (Serial Presence Detect) Management Algorithm of the DIMM module.	Enabled	Enables this function.
TS on DIMM	Option to determine whether the GMCH	Disabled	Disables this function.
	(Graphics and Memory Controller Hub) supports TS (Thermal Sensor) in the Thermal Management Algorithm of the DIMM module.	Enabled	Enables this function.

Table 43: X945 Advanced Chipset setting options

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

Table 43: X945 Advanced Chipset setting options

1.4.6 I/O interface configuration



Figure 37: X945 Advanced I/O Interface Configuration

BIOS setting	Meaning	Setting options	Effect	
Onboard AC'97	For turning the AC97 Sound on and off.	Enabled	Enables AC'97 sound.	
Audio	Information:	Disabled	Disables AC'97 sound.	
	This setting is not relevant for the PPC725 because it does not contain an audio interface.			
Onboard LAN (ETH1)	For turning the on-board LAN controller (for ETH1) on and off.	Enabled	Activates the LAN controller or the ETH1 interface.	
		Disabled	Deactivates the LAN controller or the ETH1 interface.	
Serial port 1	For the configuration of serial port 1	Disabled	Port 1 deactivated.	
configuration	Information:	3F8/IRQ4	Assignment of the base I/O address and the interrupt.	
	This setting is not relevant for the PPC725 because it only has one serial interface.	3E8 / IRQ4	Assignment of the base I/O address and the interrupt.	
Serial port 2	For the configuration of serial port 2	Disabled	Port 1 deactivated.	
contiguration	(СОМ1).	2F8/IRQ3	Assignment of the base I/O address and the interrupt.	
		2E8 / IRQ3	Assignment of the base I/O address and the interrupt.	
Serial port 2 mode	This option is for setting the serial port B	Normal	Standard interface.	
	as either a standard interface or as an infrared interface (not currently	IrDA	IrDA interface (compliant serial infrared port).	
	supported).	ASK IR	Interface for IR devices (amplitude shift keyed infrared port).	
Parallel port address	The address of the parallel interface can	Disabled	Deactivates the port.	
	be defined with this option.	378, 278, 3BC	Manual assignment of the port address.	
	Information:			
	Address is automatically set, even if the function is disabled.			

Table 44: X945 Advanced I/O Interface Configuration setting options

1.4.7 Clock Configuration

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

Figure 38: X945 Advanced Clock Configuration

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

Table 45: X945 Advanced Clock Configuration setting options

Software

1.4.8 IDE Configuration

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

Figure 39: X945 Advanced IDE Configuration

BIOS setting	Meaning	Setting options	Effect
ATA/IDE	Option for configuring the integrated	Disabled	Both controllers disabled.
Configuration	PATA and SATA controller.	Compatible	Both controllers run in Legacy or Compatible Mode.
		Enhanced	Both controllers run in Enhanced or Native Mode.
IDE Channel	Option for configuring the IDE channels in	SATA only	Only use SATA drives.
Control	"Compatible" mode.	SATA Pri, PATA Sec	SATA drives are address primarily and PATA drive secondarily.
		PATA only ²⁾	Only use PATA drives.
Primary IDE Master	The drive in the system that is connected to the IDE primary master port is configured here.	Enter	Opens the submenu See "Primary IDE Master", on page 92
Primary IDE slave	The drive in the system that is connected to the IDE primary slave port is configured here.	Enter	Opens the submenu See "Primary IDE slave", on page 94
Secondary IDE Master	The drive in the system that is connected to the IDE secondary master port is configured here.	Enter	Opens the submenu

Table 46: X945 Advanced IDE Configuration setting options

BIOS setting	Meaning	Setting options	Effect
Secondary IDE Slave	The drive in the system that is connected to the IDE secondary slave port is configured here.	Enter	Opens the submenu
Third IDE Master ³⁾	The drive in the system that is connected to the IDE third master port is configured here.	Enter	Opens the submenu
Third IDE Slave ⁴⁾	The drive in the system that is connected to the IDE third slave port is configured here.	Enter	Opens the submenu
Hard disk write	Write protection for the hard drive can be	Disabled	Disables this function.
protect	enabled/disabled here.	Enabled	Enables this function.
PATA Detect Time Out (Sec)	Configuring the time overrun limit value for the PATA device identification.	0, 5, 10, 15, 20, 25, 30, 35	Value set manually.
SATA Detect Time Out (Sec)	Configuring the time overrun limit value for the SATA device identification.	0, 1, 2, 3, 5, 10, 15, 30	Value set manually.
ATA(PI) 80Pin Cable Detection	Detects whether an 80 pin cable is connected to the drive, the controller or to	Host & device	Using both IDE controllers (motherboard, disk drive).
	both.	Host	IDE controller motherboard used.
	Information:	Device	IDE disk drive controller used.
	This option is not available on the PPC725 CPU board. Therefore this setting is not relevant.		

Table 46: X945 Advanced IDE Configuration setting options

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

Primary IDE Master

rimary IDE Master	S	alast the turns
		erect the type
evice :Not Detected		f device connecte o the system.
PA/Large Mode	utol	
lock (Multi-Sector Transfer) [A	utol	
IO Mode [7	utol	
MA Mode [7	uto]	
.M.A.R.T. [7	uto]	
2Bit Data Transfer [H	nabled]	
		 Select Scree
	1+	Select Item
	+	- Change Optic
	E.	1 General Help
	2. R:	SC Exit
		Jo Linto

Figure 40: X945 Primary IDE Master

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

Table 47: X945 Primary IDE Master setting options

BIOS setting	Meaning	Setting options	Effect
PIO Mode	The PIO mode determines the data rate of	Auto	Automatic configuration of PIO mode.
	Information:	0, 1, 2, 3, 4	Manual configuration of PIO mode.
	This option is not available on the PPC725. Therefore this setting is not relevant.		
DMA Mode	The data transfer rate to and from the	Auto	Automatic definition of the transfer rate.
	primary master drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives	Auto	Automatic detection and enabling.
	(seir-monitoring, analysis and reporting technology).	Disabled	Disables this function.
		Enabled	Enables this function.
32 Bit Data Transfer	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 47: X945 Primary IDE Master setting options (cont.)

Primary IDE slave

Advanced			
Primary IDE Slave		Sele	ct the type
Device :Not Detected		of de to ti	evice connected he system.
Ivpe	[Auto]		
LBA/Large Mode	[Auto]		
Block (Multi-Sector Transfer)	[Auto]		
PIO Mode	[Auto]		
DMA Mode	[Auto]		
S.M.A.R.T.	[Auto]		
32Bit Data Transfer	[Enabled]		
		↔	Select Screen
		↑↓	Select Item
		+-	Change Option
		F1	General Help
		F10	Save and Exit
		ESC	Exit

Figure 41: X945 Primary IDE Slave

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

Table 48: X945 Primary IDE Slave setting options

BIOS setting	Meaning	Setting options	Effect
PIO Mode	The PIO mode determines the data rate of	Auto	Automatic configuration of PIO mode.
	Information:	0, 1, 2, 3, 4	Manual configuration of PIO mode.
	This option is not available on the PPC725. Therefore this setting is not relevant.		
DMA Mode	The data transfer rate to and from	Auto	Automatic definition of the transfer rate.
	the secondary slave drive is defined here. The DMA mode must be activated in the Windows device manager in order to guarantee maximum performance. Only possible when manually setting up the drive.	Disabled	Manual definition of the transfer rate.
S.M.A.R.T.	Monitoring function of modern hard drives	Auto	Automatic detection and enabling.
	(seir-monitoring, analysis and reporting technology).	Disabled	Disables this function.
		Enabled	Enables this function.
32 Bit Data Transfer	This function enables 32-bit data transfer.	Disabled	Disables this function.
		Enabled	Enables this function.

Table 48: X945 Primary IDE Slave setting options (cont.)

1.4.9 USB configuration

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

Figure 42: X945 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	USB1, USB3 are enabled.
		4 USB Ports	USB1, USB2, USB3, USB4 are enabled.
		6 USB Ports	USB1, USB2, USB3, USB4, USB5 are enabled.
		8 USB Ports	USB1, USB2, USB3, USB4, USB5, USB are enabled on an AP via SDL.
USB 2.0 Controller	SB 2.0 Controller Option for enabling or disabling USB 2.0 mode.	Enabled	All USB interfaces run in USB 2.0 mode.
		Disabled	All USB interfaces run in USB 1.1 mode.
Legacy USB Support	SB Support Legacy USB support can be enabled/disabled here. USB interfaces do not function during startup. USB is supported again after the operating system has started. A USB keyboard is still recognized during the POST.	Disabled	Disables this function.
		Enabled	Enables this function.
		Auto	Automatic enabling.
USB Legacy POST- Always	Option to enable Legacy USB Support during the POST (Power On Self Test) the	Enabled	The BIOS Setup can be called up during the POST using a USB keyboard.
	same as the Legacy USB Support setting.	Disabled	Disables this function.

Table 49: X945 Advanced USB Configuration setting options

BIOS setting	Meaning	Setting options	Effect
USB Keyboard	USB keyboard support can be	Disabled	Disables this function.
Legacy Support	enabled/disabled here.	Enabled	Enables this function.
USB Mouse Legacy	USB mouse support can be	Disabled	Disables this function.
oupport		Enabled	Enables this function.
USB Storage Device	USB storage device support can be	Disabled	Disables this function.
Support	enabled/disabled here.	Enabled	Enables this function.
Port 64/60 Emulation	Port 64/60 emulation can be enabled/disabled here.	Disabled	USB keyboard functions in all systems excluding Windows NT.
		Enabled	USB keyboard functions in Windows NT.
USB 2.0 Controller	Settings can be made for the USB	Full Speed	12 MBps
Mode	controller.	Hi Speed	480 MBps
BIOS EHCI Hand-	The support for the operating system can	Disabled	Disables the function
Off	be set up without the fully automatic EHCI function.	Enabled	Enables this function.
USB Beep Message	Option for outputting a tone each time a	Disabled	Disables this function.
	during the POST.	Enabled	Enables this function.
USB Stick Default Emulation	You can set how the USB device is to be used.	Auto	USB devices with fewer than 530MB of memory are simulated as floppy disk drives and devices with larger capacities are simulated as hard drives.
		Hard Disk	An HDD-formatted drive can be used as an FDD (e.g. zip drive) for starting the system.
USB Mass Storage Reset Delay	The waiting time that the USB device POST requires after the device start command can be set.	10 Sec, 20 Sec, 30 Sec, 40 Sec	Value set manually.
	Information:		
	The message "No USB mass storage device detected" is displayed if no USB memory device has been installed.		

Table 49: X945 Advanced USB Configuration setting options (cont.)

1.4.10 Keyboard/mouse configuration

Keyboard/Mouse Configuration		Select Power-on state
Bootup Num-Lock Typematic Rate PS/2 Mouse Support	[On] [Fast] [Enabled]	
		 ↔ Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit

Figure 43: X945 Advanced Keyboard/Mouse Configuration

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

Table 50: X945 Advanced Keyboard/Mouse Configuration setting options

1.4.11 Remote access configuration

Configure Remote Access type and parameters		Sele	ct Remote Access
		type	
Serial Port number	[COM1]		
Base Address, IRQ	[3F8h, 4]		
Serial Port Mode	[115200 8,n,1]		
Flow Control	[None]		
Redirection After BIOS POST	[Always]		
Terminal Type	[ANSI]		
VT-UTF8 Combo Key Support	[Enabled]		
Sredir Memory Display Delay	[No Delay]		
	151		Select Screen
Serial Port BIOS Update	[Disabled]		Select Item
		+- 171	Change Option
		F10	Save and Exit
		FIO	Save and Exit

Figure 44: X945 Advanced Remote Access Configuration

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

Table 51: X945 Advanced Remote Access Configuration setting options

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

Table 51: X945 Advanced Remote Access Configuration setting options (cont.)

1.4.12 CPU board monitor

Information:

The displayed voltage values (e.g. core voltage, battery voltage) on this BIOS Setup page represent uncalibrated information values. These cannot be used to draw any conclusions about any hardware alarms or error conditions. The hardware components used have automatic diagnostics functions that can be applied in the event of error.

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

Figure 45: X945 Advanced CPU Board Monitor

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

Table 52: X945 Advanced Remote Access Configuration setting options

BIOS setting	Meaning	Setting options	Effect
VcoreB	Displays the DDR's core voltage B in volts.	None	-
+3.3Vin	Displays the current voltage of the 3.3 volt supply.	None	-
+5Vin	Displays the current voltage of the 5 volt supply.	None	-
+5VSB	Displays the current level of the jumper.	None	-
VRTC	Displays the battery voltage (in volts).	None	-

Table 52: X945 Advanced Remote Access Configuration setting options (cont.)

1.4.13 Main Board/Panel Features

Advance	ed		
Baseboard/Panel Fe	atures		
Panel Control			
Baseboard Monitor			
Legacy Devices			
Versions	D110		
BIUS:	KIIU 371 74		
MICA PASZ:	VI.74 V1.25		
MICA FFGA.	V1.2J		
Optimized ID:	0000010b		
Device ID:	00001D13h	↔	Select Screen
Compatibility ID:	0000h	↑↓	Select Item
Serial Number:	72580168752	Enter	Go to Sub Screen
Product Name:	5PC725.1505-00	F1	General Help
User Serial ID:	11111111h	F10	Save and Exit
		ESC	Exit

Figure 46: X945 Advanced Baseboard/Panel Features

BIOS setting	Meaning	Setting options	Effect
Panel control	For special setup of connected panels (display units).	Enter	Opens the submenu See "Panel control", on page 104
Main board monitor	Display of various temperatures and fan speeds.	Enter	Opens the submenu See "Main board monitor", on page 105
Legacy devices	Special settings for the interface can be changed here.	Enter	Opens the submenu See "Legacy devices", on page 106
BIOS	Displays the BIOS version.	None	-

Table 53: X945 Advanced Baseboard/Panel Features setting options

BIOS setting	Meaning	Setting options	Effect
MTCX PX32	Displays the MTCX PX32 firmware version.	None	-
MTCX FPGA	Displays the MTCX FPGA firmware version.	None	-
Optimized ID	Displays the DIP switch setting of the configuration switch.	None	-
Device ID	Displays the hexadecimal value of the hardware device ID.	None	-
Compatibility ID	Displays the version of the device within the same B&R device code. This ID is needed for Automation Runtime.	None	-
Serial Number	Displays the B&R serial number.	None	-
Product name	Displays the B&R model number.	None	-
User serial ID	Displays the user serial ID. This 8 digit hex value can be freely assigned by the user (e.g. to give the device a unique ID) and can only be changed with using the "B&R Control Center" via the ADI driver.	None	

Table 53: X945 Advanced Baseboard/Panel Features setting options (cont.)

Panel control

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

Figure 47: X945 Panel Control

BIOS setting	Meaning	Setting options	Effect
Select panel number	Selection of the panel number for which the values should be read out and/or changed.	015	Selection of panel 0 15. Panel 15 is specifically intended for panel PC 700 systems
Version	Displays the firmware version of the SDLR controller.	None	-
Brightness	For setting the brightness of the selected panel.	0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%	For setting the brightness (in %) of the selected panel. Changes take effect after saving and restarting the system (e.g. by pressing <f10>).</f10>
Temperature	Displays the selected panel's temperature (in degrees Celsius and Fahrenheit).	None	-
Fan speed	Displays fan speed for the selected panel.	None	-
Keys/LEDs	Displays the available keys and LEDs on the selected panel.	None	-

Table 54: X945 Panel Control setting options

Main board monitor

Select Screen
[↑] Select Item
F1 General Help
F10 Save and Exit
↑↓ Select Item F1 General Help F10 Save and Exi
F10 Save and Exit

Figure 48: X945 Baseboard Monitor

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

Table 55: X945 Baseboard Monitor setting options

Legacy devices

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

Figure 49: X945 Legacy Devices

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

Table 56: X945 Legacy Devices setting options

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

Table 56: X945 Legacy Devices setting options (cont.)

1.5 Boot

Main	Advanced	Boot	Security	Power	1	Exit
Boot Prio Boot Devi	rity Selection	n	Type Based]		The d prior to se	evice based boot ity list allows lect from a list
1st Boot	Device		Primarv Masterl		devic	es.
2nd Boot	Device	i	Primary Slavel		The t	vpe based boot
3rd Boot	Device		USB Floppy]		prior	ity list allows
4th Boot	Device		USB Removable D	evil	to se	lect device types
5th Boot	Device		USB Harddisk]	- T	even	if a respective
6th Boot	Device	i i	USB CDROM]		devic	e is not (yet)
7th Boot	Device		Disabled]		prese	nt.
8th Boot	Device		Disabled]		-	
Boot Sett	ings Configura	ation			↔ ↑↓ +-	Select Screen Select Item Change Option
Quick Boo	t	1	Enabled]		F1	General Help
Quiet Boo	t	1	Disabled]		F10	Save and Exit
Automatic	Boot List Re	try	Disabled]		ESC	Exit
AddOn ROM	Display Mode	I	[Keep Current]			
Halt On E	rror	I	Disabled]			
Hit 'DEL'	Message Disp	lay	Enabled]			
Interrupt	19 Capture	-	Disabled]			
PXE Boot	to LAN (ETH1)	1	Disabled]			
Power Los	s Control	I	Turn On]			

Figure 50: X945 Boot Menu

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

Table 57: X945 Boot Menu setting options
1.6 Security

Main	Advanced	Boot	Security	Power	Ex	it	
Security	Settings				Instal	l or Change	the
Superviso	or Password	Not Insta	lled		passwo	ora.	
User Pass	sword	Not Insta	lled				
Change II	or Deceword						
change 0	Ser Password						
	ser rassword						
Boot Sect	tor Virus Prot rity Freeze Lo	tection [Disabled]				
Boot Sect	tor Virus Prof rity Freeze Lo	tection [ock	Disabled]				
Boot Sect HDD Secur Hard Disl	tor Virus Prot rity Freeze Lo k Security	tection [ock	Disabled]			Select Scree	
Boot Sect HDD Secu Hard Disl	tor Virus Prot rity Freeze Lo k Security Password on Ev	very Boot	Disabled]		↑↓	Select Scree Select Item	n
Boot Sect HDD Secu Hard Disl Ask HDD 1 Mard Dis	tor Virus Prof rity Freeze Lo k Security Password on Ev sk Security Us	very Boot[Disabled] No] ords		↓ ↓ Enter	Select Scree Select Item Change	n
Hard Disl Hard Disl Hard Disl Hard Disl Hard Disl	tor Virus Prod rity Freeze Lo k Security Password on Ev sk Security Us sk Security Ma	very Boot[ser Passwo aster Pass	Disabled] No] rds words		↓ ↓↓ Enter F1	Select Scree Select Item Change General Help	en
Boot Sect HDD Secu Hard Disl Ask HDD 1 >Hard Dis Hard Dis Hard Dis	tor Virus Prod rity Freeze Lo k Security Password on Ev sk Security Us sk Security Ma Loads CMOS Det	very Boot[ser Passwo aster Pass	Disabled] No] rds words Nol		↑↓ Enter F1 F10 ESC	Select Scree Select Item Change General Help Save and Exi Exit	en .t
Boot Sect HDD Secu Hard Disl Ask HDD 1 ≻Hard Dis ≻Hard Dis END-Key 1	tor Virus Prod rity Freeze Lo k Security Password on Ev sk Security Us sk Security Ma Loads CMOS Des	very Boot[ser Passwo aster Pass	Disabled] No] ords words No]		↑↓ Enter F1 F10 ESC	Select Scree Select Item Change General Help Save and Exi Exit	en .t

Figure 51: X945 Security Menu

BIOS setting	Meaning	Setting options	Effect
Supervisor Password	Displays whether or not a supervisor password has been set.	None	-
User Password	Displays whether or not a user password has been set.	None	-
Change Supervisor Password	To enter/change a supervisor password. A supervisor password is necessary to edit all BIOS settings.	Enter	Enter password.
Change User Password	To enter/change a user password. A user password allows the user to edit only certain BIOS settings.	Enter	Enter password.
Boot Sector Virus	With this option, a warning is issued when	Disabled	Disables this function.
Protection	the boot sector is accessed through a program or virus.	Enabled	Enables this function.
	Information:		
	With this option, only the boot sector is protected, not the entire hard drive.		

Table 58: X945 Security Menu setting options

BIOS setting	Meaning	Setting options	Effect
HDD Security	This option can be used to define whether	Disabled	Deactivates this function.
Freeze Lock	the BIOS sends the HDD Security Freeze Lock command to every connected hard disk that supports the Security command. This prevents the setting or changing of a hard disk password after the POST.	Enabled	Activates this function.
Ask HDD Password	This function can be used to select	Yes	Deactivates this function.
on Every Boot	entered each time the system boots.	No	Activates this function.
	Information:		
	Can only be used if a hard disk user password has been created.		
Hard Disk Security User Passwords	The hard disk security user password can be created here.	Enter	Opens the submenu See "Hard disk security user password", on page 110
Hard Disk Security Master Passwords	The hard disk security master password can be created here.	Enter	Opens the submenu See "Hard disk security master password", on page 111
End-Key Load	Using this function, CMOS can be loaded	No	Disables this function.
CMOS Defaults	by pressing the END key during POST.	Yes	Enables this function.

Table 58: X945 Security Menu setting options (cont.)

1.6.1 Hard disk security user password

BIOS SETUP UTILIT	Y	
Security		
Hard Disk Security User Passwords		
Primary Slave HDD User Password		
	↔	Select Screen
	↑↓ F 1	Select Item General Help
	F10	Save and Exit
	ESC	Exit



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 59: X945 Hard Disk Security User Password

1.6.2 Hard disk security master password

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

Figure 53: X945 Hard Disk Security Master Password

BIOS setting	Meaning	Setting options	Effect
Primary Slave HDD Master Password	This function makes it possible to use the user password to change or configure each hard drive without having to reboot the device.	Enter	Enter password.

	Table 60:	X945 Hard	Disk	Security	Master	Password
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1.7 Power

Main	Advanced	Boot	Security	Power		Exit
Congigure	e power manage	ment and	l control		Enabl	le or disable
Power Man	agement/APM					
Suspend T	ime Out		[Disabled]			
Video Pow	er Down Mode		[Suspend]			
Hard Disk	Power Down M	ode	[Suspend]			
Keyboard	& PS/2 Mouse		[MONITOR]			
FDC/LPT/C	COM Ports		[MONITOR]			
Primary M	laster IDE		[MONITOR]			
Primary S	lave IDE		[MONITOR]			
Secondary	Master IDE		[MONITOR]			
Secondary	v Slave IDE		[MONITOR]			
					↔	Select Screen
Resume On	Ring		[Disabled]		.↑↓	Select Item
Resume On	PME#		[Disabled]		+-	Change Option
Resume On	RTC Alarm		[Disabled]		F1	General Help
					F10	Save and Exit
Power But	ton Mode		[On/Off]		ESC	Exit

Figure 54: X945 Power Menu

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

Table 61: X945 Power Menu setting options

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

Table 61: X945 Power Menu setting options (cont.)

1.8 Exit

Main	Advanced	Boot	Security	Power	Exit	
Exit Opti	ons			Е	xit system	setup
				a	fter savin	g the
				c	hanges.	
Discard C	hanges and Ex	it				
Discard C	hanges			F	10 key can	be used
	D. C. 11.			Í	or this op	eration.
Load CMOS	Deraults					
					→ Selec	t Screen
				1	Selec	t Item
				E	nter Go to	Sub Scree
				F	1 Gener	al Help
				F	10 Save	and Exit
				E	SC Exit	

Figure 55: X945 Exit Menu

BIOS setting	Meaning	Setting options	Effect
Save Changes and Exit	BIOS setup is closed with this item. Changes made are saved in CMOS after confirmation, and the system is rebooted.	OK / Cancel	
Discard Changes and Exit	With this item you can close BIOS setup without saving the changes made.	OK / Cancel	
Discard Changes	In the event that settings were made which the user can no longer remember, changes can be reset as long as they haven't been saved.	OK / Cancel	
Load CMOS Defaults	This item loads the CMOS default values, which are defined by the DIP switch settings. These settings are loaded for all BIOS configurations.	OK / Cancel	

Table 62: X945	Exit Menu	setting	options
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1.9 BIOS default settings

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

Information:

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

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

		DIP switch setting							
Profile number	Optimized for	1	2	3	4	5	6	7 ¹⁾	8 ¹⁾
Profile 0	Automation PC 620 system units 5PC600.SX01-00.	Off	Off	Off	Off	Off	Off	-	-
Profile 1	Reserved	On	Off	Off	Off	Off	Off	-	-
Profile 2	Automation PC 620 system units 5PC600.SX02-00, 5PC600.SX02-01, 5PC600.SF03-00, 5PC600.SX05-00 and 5PC600.SX05-01.	Off	On	Off	Off	Off	Off	-	-
Profile 3	Panel PC 700 system unit 5PC720.1043-00, 5PC720.1214- 00, 5PC720.1505-00, 5PC720.1706-00, 5PC720.1906-00, 5PC781.1043-00, 5PC781.1505-00 and 5PC782.1043-00.	On	On	Off	Off	Off	Off	-	-
Profile 4	Panel PC 700 system unit 5PC720.1043-01, 5PC720.1214- 01, 5PC720.1505-01 and 5PC720.1505-02.	Off	Off	On	Off	Off	Off	-	-
Profile 5	Automation PC 620 embedded system units 5PC600.SE00-00 und 5PC600.SE00-01.	On	Off	On	Off	Off	Off	-	-
Profile 6	Panel PC 725 system unit 5PC725.1505-00, 5PC725.1505-01	Off	On	On	Off	Off	Off	-	-

Table 63: Profile overview

1) Reserved.

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

1.9.1 Main

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

Table 64: X945 - Main profile setting overview

1.9.2 Advanced

ACPI configuration

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

Table 65: X945 Advanced - ACPI Configuration Profile setting overview

PCI Configuration

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

Section 4 Software

Table 66: X945 Advanced - PCI Configuration Profile setting overview

Graphics configuration

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

Table 67: X945 Advanced - Graphics Configuration Profile setting overview

CPU configuration

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

Table 68: X945 Advanced - CPU Configuration Profile setting overview

Chipset configuration

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

Table 69: X945 Advanced - Chipset Configuration Profile setting overview

I/O interface configuration

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

Table 70: X945 Advanced - I/O Interface Configuration profile setting overview

Clock Configuration

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

Table 71: X945 Advanced - Clock Configuration Profile setting overview

IDE Configuration

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

Table 72: X945 Advanced - IDE Configuration Profile setting overview

Setting / View	Profile 0	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	My setting
SATA Detect Time Out (Sec)	3	3	3	3	3	3	3	
ATA(PI) 80Pin Cable Detection	Host & device							
Primary IDE Master								
Туре	Auto							
LBA/Large Mode	Auto							
Block (Multi-Sector Transfer)	Auto							
PIO Mode	Auto							
DMA Mode	Auto							
S.M.A.R.T.	Auto							
32Bit data transfer	Enabled							
Primary IDE slave								
Туре	Auto							
LBA/Large Mode	Auto							
Block (Multi-Sector Transfer)	Auto							
PIO Mode	Auto							
DMA Mode	Auto							
S.M.A.R.T.	Auto							
32Bit data transfer	Enabled							

Table 72: X945 Advanced - IDE Configuration Profile setting overview (cont.)

USB configuration

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

Table 73: X945 Advanced - USB Configuration Profile setting overview

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

Table 73: X945 Advanced - USB Configuration Profile setting overview (cont.)

Keyboard/mouse configuration

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

Table 74: X945 Advanced Keyboard/Mouse Configuration profile setting overview

Remote access configuration

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

Table 75: X945 Advanced Remote Access Configuration profile setting overview

CPU board monitor

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

Table 76: X945 Advanced CPU Board Monitor profile setting overview

Main Board/Panel Features

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

Table 77: X945 Advanced - Baseboard/Panel Features profile setting overview

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

Table 77: X945 Advanced - Baseboard/Panel Features profile setting overview (cont.)

1.9.3 Boot

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

Table 78: X945 Boot profile setting overview

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

Table 78: X945 Boot profile setting overview

1.9.4 Security

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

Table 79: X945 Security profile setting overview

1.9.5 Power

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

Table 80: X945 Power profile setting overview

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

Table 80: X945 Power profile setting overview

1.10 BIOS Error signals (beep codes)

While the Panel PC 725 is booting, the following messages and errors can occur with BIOS. These errors are signaled by different beeping codes.

1.10.1 BIOS X945

Beeping code	Meaning	Necessary user action
1 x short	Memory refresh failed.	Load BIOS defaults. In the event that the error persists, send industrial PC to B&R for testing.
2 x short	Parity error: POST error (error in one of the hardware testing procedures)	Load BIOS defaults. In the event that the error persists, send industrial PC to B&R for testing.
3 x short	Base 64 KB memory failure: Basic memory defect, RAM error within the initial 64 KB.	Check the placement of the inserted card. In the event that the error persists, send industrial PC to B&R for testing.
4 x short	Timer not operational: System timer.	Send industrial PC to B&R for checking.
5 x short	Processor error: Processor defect.	Send industrial PC to B&R for checking.
6 x short	8042 gate A20 failure: Keyboard controller defect (block 8042/ A20 gate). Processor cannot switch to protected mode.	Send industrial PC to B&R for checking.
7 x short	Processor exception interrupt error: Virtual mode exception error (CPU generated an interrupt error.	Send industrial PC to B&R for checking.
8 x short	Display memory read/write error: Video memory not accessible; graphic card defect or not built in (no fatal error).	Check inserted graphic card position and eventually exchange. In the event that the error persists, send industrial PC to B&R for testing.

Table 81: BIOS post code messages BIOS X945

1.11 Distribution of resources

1.11.1 RAM address assignment

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

Table 82: RAM address assignment

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

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

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

1.11.2 DMA channel assignment

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

Table 83: DMA channel assignment

1) Not available if the parallel port is not used in ECP mode.

1.11.3 I/O address assignment

I/O address	Resource
000h -01Fh	DMA controller 1
020h - 03Fh	Interrupt controller 1
040h - 05Fh	Timer
060h - 06Fh	Keyboard controller
070h - 071h	Real-time clock, NMI mask, CMOS
080h	Debug port (POST code)
081h - 09Fh	Page register - DMA controller
0A0h - 0BFh	Interrupt controller 2
0C0h - 0DFh	DMA controller 2
0F0h - 0FFh	FPU
170h - 177h	Secondary Hard Disk IDE channel
1F0h - 1F7h	Primary Hard Disk IDE channel
2E8h - 2EFh	COM4
2F8h - 2FFh	COM2
376h - 376h	Secondary Hard Disk IDE channel
384h - 385h	CAN controller
3B0h - 3BBh	VGA controller
3C0h - 3DFh	VGA controller
3E8h - 3EFh	COM3
3F6h - 3F6h	Primary Hard Disk IDE channel
3F0h - 3F7h	FDD controller
CF8h - CFBh	PCI config address register
CFCh - CFFh	PCI config data register
4100h - 417Fh	MTCX
FF00h - FF07h	IDE bus master register

Table 84: I/O address assignment

IRQ		0	-	2	3	4	5	9	7	8	6	10	4	12	13	14	15	IMN	NONE
System	n timer	٠																	
Keyboa	ard		•																
IRQ ca	scade			٠															
COM2	(Serial port B)				٠	О													
ACPI ¹⁾											٠								
FDD								0											٠
Real-tir	ne clock									٠									
Coproc	essor (FPU)														٠				
Primary	/ IDE channel															٠			
Second	lary IDE																0		
	COM3 (COM C)				0	0	0		0			0	0	0					•
B&R	COM4 (COM E)				0	0	0		0			0	0	0					•
	CAN											0						0	•

1.11.4 Interrupt assignments in PCI mode

Table 85: IRQ interrupt assignments in PCI mode 1) Advanced Configuration and Power Interface.

• ... Default setting

O ... Optional setting

1.11.5 Interrupt assignments in APIC mode

A total of 23 IRQs are available in the APIC mode (Advanced Programmable Interrupt Controller). The activation of this option is only effective if it takes place before the operating system (Windows XP) is activated. There are then 23 IRQs available.

IRQ		0	1	2	3	4	5	9	7	8	6	10	11	12	13	14	15	16	17	18	19	20	21	22	23	IMN	NONE
Systen	n timer	٠																									
Keybo	ard		٠																								
IRQ ca	iscade			٠																							
COM2 (Serial	port B)				•	0																					
ACPI ¹⁾											٠																
FDD								0																			•
Real-ti	me clock									٠																	
Coprod (FPU)	cessor														•												
Primar channe	y IDE el															•											
Secon	dary IDE el																0										
	COM3 (COM C)				0	0	0		0			0	0	0													•
B&R	COM4 (COM E)				0	0	0		0			0	0	0													•
	CAN											0														0	•
PIRQ /	A ²⁾																	٠									
PIRQ E	3 ³⁾																		٠								
PIRQ	C ⁴⁾																			٠							
PIRQ I	O ⁵⁾																				٠						
PIRQ I	= 6)																					•					
PIRQ I	_7)																						•				
PIRQ	3 ⁸⁾																							•			
PIRQ I	H ⁹⁾																								•		

Table 86: IRQ interrupt assignments in APIC mode

1) Advanced Configuration and Power Interface.

2) PIRQ A: Graphics controller

3) PIRQ B: INTD

4) PIRQ C: INTC + Native IDE

5) PIRQ D: USB UHCI controller #1 + SM bus

6) PIRQ E: LAN controller (ETH1)

7) PIRQ F: INTA + ETH2

8) PIRQ G: INTB

9) PIRQ H: USB EHCI controller + UHCI0

• ... Default setting

O ... Optional setting

The PCI resources are assigned to fixed IRQ lines when the APIC function is enabled. The following image shows the connections to the individual PCI slots.



Figure 56: PCI Routing with activated APIC CPU board X945

1.11.6 Inter-IC (I²C) bus

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

Table 87: Inter-IC (I²C) bus resources

1.11.7 System Management (SM) bus

SM Bus address	SM device	Note
12h	SMART_CHARGER	
14h	SMART_SELECTOR	

Table 88: Inter-IC (I²C) bus resources

SM Bus address	SM device	Note
16h	SMART_BATTERY	
D2h	Clock Generator	

Table 88: Inter-IC (I²C) bus resources

2. Upgrade information

Warning!

The BIOS and firmware on PPC725 systems must be kept up to date. New versions can be downloaded from the B&R homepage (<u>www.br-automation.com</u>).

2.1 BIOS upgrade

An upgrade might be necessary for the following reason:

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

2.1.1 What information do I need?

Information:

Individually saved BIOS settings are deleted when upgrading the BIOS.

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

Software • Upgrade information

Which BIOS version and firmware are already installed on the PPC725?

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

- After switching on the PPC725, you can get to the BIOS Setup by pressing "F2" or "DEL".
- From the BIOS main menu "advanced" (top), select "baseboard/panel features" (bottom):

Baseboard/Panel Fo	eatures		
Panel Control			
Baseboard Monitor			
Legacy Devices			
Versions			
BIOS:	R110 System BIOS		
MTCX PX32:	V1.74 MTCX PX32 firmware		
MTCX FPGA:	v1.25 MICX FPGA firmware		
Optimized ID:	0000010b		
Device ID:	00001BB7h	↔	Select Screen
Compatibility ID:	0000h	<u></u> +	Select Item
Serial number: Product Name:	70950173619 500725 1505-00	Enter F1	Go to Sub Scree
User Serial ID:	FFFFFFFh	F10	Save and Exit
		ESC	Exit

Figure 57: Software versions

2.1.2 Upgrade BIOS for X945

- Download ZIP file from the B&R homepage (<u>www.br-automation.com</u>)
- Create bootable media.

Information:

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

Information concerning creating a bootable diskette in Windows XP cab be found on page 136.

Information concerning creating a USB flash drive for a B&R upgrade can be found on page 138.

Information concerning creating a CompactFlash card for a B&R upgrade can be found on page 140.

- Copy the contents of the *.zip file to the bootable media. If the B&R upgrade was already
 added when the bootable media was created using the B&R Embedded OS Installer, then
 this step is not necessary.
- Connect the bootable media to the PPC725 and reboot the device.
- The following boot menu will be shown after startup:
- 1. Upgrade AMI BIOS for X945/N270 (5PC600.X945-xx)
- 2. Exit to MS-DOS

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

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

• The system must be rebooted after a successful upgrade.

Information:

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

2.2 Creating an MS-DOS boot diskette in Windows XP

- Place an empty 1.44 MB HD diskette in the disk drive.
- Open Windows Explorer.
- Right-click on the 31/2" floppy icon and select "Format...".

				Format 3½ Floppy (A:)	?×
🛙 📋 My Documents	📄 🚞 IntelPRO				
a 🧕 My Computer	📄 MSOCache	э		Capacity:	
316 Eloppy (Ar)	🗎 🦳 Drogram F	iles		3.5", 1.44MB, 512 bytes/sector	X
□ S Local Disk (C:)	Expand	ime Information		File system	
🗉 🚞 Documents	Explore			FAT	· · · ·
🗄 🚞 IntelPRO	Open		N	Allocation unit size	
🗉 🚞 MSOCache	Search	BAT		Default allocation size	
표 🧰 Program File 🗍	Sharing and Security	5		Volume label	
III 🧰 TEMP	Copy Disk		\neg	E	
🖽 🧰 WINDOWS	Format	сом		Quick Format	
	Cut			Enable Compression	
	Сору	1		Create an MS-DOS startup disk	
	Rename			[
	Properties				
					056

Figure 58: 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 59: Creating a bootable diskette in Windows XP - step 2

Formatting 3½ Floppy (A:) 🔀
Format Complete.
ОК

Figure 60: Creating a bootable diskette in Windows XP - step 3

After creating the startup disk, some of the files must be deleted because of the size of the update.

When doing this, all files (hidden, system files, etc.) must be shown on the diskette.

In Explorer, go to the **Tools** menu, select **Folder Options...** and open the **View** tab. Now deactivate the option **Hide protected operating system files (Recommended)** (activated by default) and activate the option **Show hidden files and folders**.

	Befo	re			After		
Name A	Size	Туре	Date Modified	Name 🔺	Size	Туре	Date Modified
DISPLAY.SYS	17 KB	System file	6/8/2000 5:00 PM	AUTOEXEC.BAT	0 KB	MS-DOS Batch File	3/22/2006 10:08 AM
d EGA2.CPI	58 KB	CPI File	6/8/2000 5:00 PM	COMMAND.COM	91 KB	MS-DOS Application	6/8/2000 5:00 PM
EGA3.CPI	58 KB	CPI File	6/8/2000 5:00 PM	CONFIG.5Y5	0 KB	System file	3/22/2006 10:08 AM
EGA.CPI	58 KB	CPI File	6/8/2000 5:00 PM	DISPLAY.SYS	17 KB	System file	6/8/2000 5:00 PM
KEYB.COM	22 KB	MS-DOS Application	6/8/2000 5:00 PM	EGA2.CPI	58 KB	CPI File	6/8/2000 5:00 PM
d KEYBOARD.5Y5	34 KB	System file	6/8/2000 5:00 PM	EGA3.CPI	58 KB	CPI File	6/8/2000 5:00 PM
KEYBRD2.SYS	32 KB	System file	6/8/2000 5:00 PM	EGA.CPI	58 KB	CPI File	6/8/2000 5:00 PM
d KEYBRD3.SYS	31 KB	System file	6/8/2000 5:00 PM	IO.SYS	114 KB	System file	5/15/2001 6:57 PM
KEYBRD4.SYS	13 KB	System file	6/8/2000 5:00 PM	KEYB.COM	22 KB	MS-DOS Application	6/8/2000 5:00 PM
MODE.COM	29 KB	MS-DOS Application	6/8/2000 5:00 PM	KEYBOARD.SYS	34 KB	System file	6/8/2000 5:00 PM
				KEYBRD2.5Y5	32 KB	System file	6/8/2000 5:00 PM
				KEYBRD3.SYS	31 KB	System file	6/8/2000 5:00 PM
				KEYBRD4.SYS	13 KB	System file	6/8/2000 5:00 PM
				MODE.COM	29 KB	MS-DOS Application	6/8/2000 5:00 PM
				MSDOS, SYS	1 KB	System file	4/7/2001 1:40 PM

Figure 61: Creating a bootable diskette in Windows XP - step 4

Name 🔺	Size	Туре	Date Modified
TO AUTOEXEC.BAT	0 KB	MS-DOS Batch File	3/22/2006 10:08 AM
COMMAND.COM	91 KB	MS-DOS Application	6/8/2000 5:00 PM
CONFIG.SYS	0 KB	System file	3/22/2006 10:08 AM
DISPLAY.SYS	17 KB	System file	6/8/2000 5:00 PM
EGA2.CPI	58 KB	CPI File	6/8/2000 5:00 PM
EGA3.CPI	58 KB	CPI File	6/8/2000 5:00 PM
EGA.CPI	58 KB	CPI File	6/8/2000 5:00 PM
🗟 IO.SYS	114 KB	System file	5/15/2001 6:57 PM
KEYB.COM	22 KB	MS-DOS Application	6/8/2000 5:00 PM
KEYBOARD.SYS	34 KB	System file	6/8/2000 5:00 PM
KEYBRD2.SYS	32 KB	System file	6/8/2000 5:00 PM
KEYBRD3.SYS	31 KB	System file	6/8/2000 5:00 PM
KEYBRD4.SYS	13 KB	System file	6/8/2000 5:00 PM
MODE.COM	29 KB	MS-DOS Application	6/8/2000 5:00 PM
MSDOS.SYS	1 KB	System file	4/7/2001 1:40 PM

Figure 62: Creating a bootable diskette in Windows XP - step 5

Now all files (marked) except Command.com, IO.sys and MSDOS.sys can be deleted.

Software • Upgrade information

2.3 Creating a bootable USB flash drive for B&R upgrade files

When used in connection with a B&R industrial PC, it is possible to upgrade BIOS from one of the USB flash drives available from B&R. To do this, the USB flash drive must be prepared accordingly. This is done with the B&R Embedded OS Installer, which can be downloaded for free from the B&R homepage (www.br-automation.com).

2.3.1 Requirements

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

- B&R USB flash drive
- B&R Industrial PC
- USB Media Drive
- B&R Embedded OS Installer (V3.00 or higher)

2.3.2 Procedure

- Connect the USB flash drive to the PC.
- If the drive list is not refreshed automatically, the list must be updated using the command **Drives > Refresh**.
- Mark the desired USB flash drive in the drive list.
- Change to the Action tab and select Install a B&R Update to a USB flash drive as type of action.
- Enter the path to the MS-DOS operating system files. If the files are part of a ZIP archive, then click on the button **By ZIP file...**. If the files are stored in a directory on the hard drive, then click on the button **By folder...**.
- In the **B&R Upgrade** text box, it's also possible to enter the path to the ZIP file for the B&R Upgrade Disk and select the file.
- Click on the **Start action** button in the toolbar.

B&R Embedded OS Installer				1
Elle Drives Icols ?				
C S Refresh View Run Action Open Image	Create Image Restore Image Adv	anced OS Configuration		
Computer	STORAGE DEVICE, 250 MBytes			
Action Identification File				
-Arting Type				
Select the desired action: Instal	a BBR upgrade to an USB memory stick			1
Description: Create PC. Wi	s a bootable USB-Memorystick which can ndows 95, Windows 98 or Windows ME P	i be used to upgrade any l 45-DOS is required.	38R industrial	
Use "Advanced OS Configuration" to m	odify the standard behavior of this actio	n.		
Coerating System Files				1
operating system riss				
Select the Win95/98/Me MS-DOS fil	15:	By Folder	By ZIP file	
C:(MS-DOS)			-	1
- BSR Llograde				1
Calast the 700 Ge of the RSO upper	4.			1
Seeu die 20 file of the box upgra	0000/0000 100110			1
[C10PG_APC620_PPC700_BIOS	00220MF_A0118			
				1
				1
2				1

Figure 63: Creating a USB flash drive for B&R upgrade files

2.3.3 Where do I get MS-DOS?

Г

Information concerning creating an MS-DOS boot diskette can be found in section 2.2 "Creating an MS-DOS boot diskette in Windows XP", on page 136. Then the files from the diskette are to be copied to your hard drive.

Software • Upgrade information

2.4 Creating a bootable CompactFlash card for B&R upgrade files

When used in connection with a B&R industrial PC, it is possible to upgrade BIOS from one of the CompactFlash cards available from B&R. To do this, the CompactFlash card must be prepared accordingly. This is done with the B&R Embedded OS Installer, which can be downloaded for free from the B&R homepage (<u>www.br-automation.com</u>).

2.4.1 Requirements

The following peripherals are required for creating a bootable CompactFlash card:

- CompactFlash card
- B&R Industrial PC
- B&R Embedded OS Installer (V3.10 or higher)

2.4.2 Procedure

- Insert the CompactFlash card in the CF slot on the industrial PC.
- If the drive list is not refreshed automatically, the list must be updated using the command **Drives > Refresh**.
- Select the desired CompactFlash card from the drive list.
- Change to the Action tab and select Install a B&R Update to a CompactFlash card as type of action.
- Enter the path to the MS-DOS operating system files. If the files are part of a ZIP archive, then click on the button **By ZIP file...**. If the files are stored in a directory on the hard drive, then click on the button **By folder...**.
- In the **B&R Upgrade** text box, it's also possible to enter the path to the ZIP file for the B&R Upgrade Disk and select the file.
- Click on the **Start action** button in the toolbar.

Bar Embedded Us Installer	
Fie Daves Toop 1	
Refresh Yiew Run Action Open Image Create Image Restore Image Advanced OS Configuration	
 博 Conjuster 一 (二) Hard dak (F:), Silvon Systems 4096 Mb TrueIDE SSI, 4023 Mbytes 	
Action Identification File	
Action Type	
Select the desired action: Instal a BBR upgrade to a CompactFlash card	
PC. Windows 95, Windows 98 or Windows ME MS-DOS is required.	
Operating System Files	
Select the Win95/98/Me MS-DOS files: By Folder	ay ZIP file
(CIME-DOS)	
BBR Upgrade	
Select the ZIP file of the BBR upgrade.	
CrUPG_APC620_PPC700_BIO5X855GME_V0118	

Figure 64: Creating a CompactFlash card for B&R upgrade files

2.4.3 Where do I get MS-DOS?

Г

Information concerning creating an MS-DOS boot diskette can be found in section 2.2 "Creating an MS-DOS boot diskette in Windows XP", on page 136. Then the files from the diskette are to be copied to your hard drive.

2.5 Upgrade problems

Potential upgrade problems are listed in the Liesmich.txt or Readme.txt files on the upgrade disks.

Software • Panel PC 725 with MS-DOS

3. Panel PC 725 with MS-DOS

Perfection in Automation Perfection in Automation Diskette 1- Setup Recovery Diskette	
Darf nur für Backup oder Archivierungszwecke für B&R Automatisierungsgeräte verwendet werden!	
www.br-automation.com	060000129

Figure 65: Microsoft DOS

Model number	Short description	Note
9S0000.01-010	OEM MS-DOS 6.22 German (disk) OEM MS-DOS 6.22 German disks Only delivered with a new industrial PC.	
9S0000.01-020	OEM MS-DOS 6.22 English (disk) OEM MS-DOS 6.22 English disks Only delivered with a new industrial PC.	

Table 89: Model numbers - MS-DOS

3.1 Known problems

Either no drivers are available for the following hardware components or only with limitations:

- USB 2.0 only USB 1.1 rates can be achieved.
- A few "ACPI control" BIOS functions cannot be used.

4. Panel PC 725 with Windows XP Professional



Figure 66: Windows XP Professional Logo

Model number	Short description	Note
5SWWXP.0600-GER	WinXP Professional with SP3, GER Microsoft OEM Windows XP Professional Service Pack 3, CD, German. Only available with a new device.	
5SWWXP.0600-ENG	WinXP Professional with SP3, ENG Microsoft OEM Windows XP Professional Service Pack 3, CD, English. Only available with a new device.	
5SWWXP.0600-MUL	WinXP Professional with SP3, MUL Microsoft OEM Windows XP Professional Service Pack 3, CD, multi-language. Only available with a new device.	
5SWWXP.0500-GER	WinXP Professional with SP 2c, GER Microsoft OEM Windows XP Professional Service Pack 2c, CD, German. Only available with a new device.	
5SWWXP.0500-ENG	WinXP Professional with SP 2c, ENG Microsoft OEM Windows XP Professional Service Pack 2c, CD, English. Only available with a new device.	
5SWWXP.0500-MUL	WinXP Professional with SP 2c, MUL Microsoft OEM Windows XP Professional Service Pack 2c, CD, multi-language. Only available with a new device.	

Table 90: Model numbers - Windows XP Professional

4.1 Installation

Upon request, B&R can pre-install the required Windows XP Professional version on the desired mass memory (add-on hard disk). All of the drivers required for operation (graphics, network, etc.) are also installed when doing so.

4.2 Drivers

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

Information:

Required drivers can only be downloaded from the B&R homepage, not from manufacturers' pages.
5. Panel PC 725 with Windows Embedded Standard 2009



Figure 67: Windows Embedded Standard 2009 Logo

Model number	Short description	Note
5SWWXP.0729-ENG	WES2009 PPC700 945GME XTX Microsoft OEM Windows Embedded, Standard 2009, English; for PPC700 with CPU board, 5PC600.X945-00; order CompactFlash separately (at least 1 GB).	

Table 91: Model numbers - Windows Embedded Standard 2009

5.1 General information

Windows XP Embedded Standard 2009 is the modular version of the desktop operating system Windows XP Professional with Service Pack 3. Windows XP Embedded Standard 2009 is based on the same binary files as Windows XP Professional with Service Pack 3 and is optimally tailored to the hardware being used. In other words, only the functions and modules required by the respective device are included. Windows XP Embedded Standard 2009 is also based on the same reliable code as Windows XP Professional with SP3. It provides industry with leading reliability, improvements in security and performance, and the latest technology for Web browsing and extensive device support.

Section 4 Software

5.2 Features with WES2009 (Windows Embedded Standard 2009)

The feature list shows the most important device functions in Windows Embedded Standard 2009.

Function	Present
Enhanced write filter (EWF)	<i>✓</i>
File Based Write Filter	✓ ✓
Page file	Configurable
Administrator account	<i>✓</i>
User account	Configurable
Explorer shell	✓
Registry filter	<i>✓</i>
Internet Explorer 7.0	<i>✓</i>
Internet information service (IIS)	-
Terminal service	✓
Windows Firewall	✓ ✓
MSN-Explorer	-
Outlook Express	-
Administrative Tools	<i>✓</i>
Remote Desktop	✓ ✓
Remote Assistance	-
.NET Framework	-
ASP.NET	-
Local Network Bridge	<i>✓</i>
Codepages/User Locale/Keyboard	<i>✓</i>
Disk Management Service	<i>✓</i>
Windows Installer Service	✓ ✓
Class Installer	<i>✓</i>
CoDevice Installer	✓ ✓
Media Player 6.4	✓ ✓
DirectX 9.0c	<i>✓</i>
Accessories	<i>✓</i>
Number of fonts	89

Table 92: Device functions in Windows Embedded Standard 2009

5.3 Installation

Upon request, Windows Embedded Standard 2009 can be preinstalled at B&R Austria on a suitable CompactFlash card (min. 1GB). The PPC725 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.

5.4 Drivers

All drivers required for operation are preinstalled on the operating system. If an older driver version is installed, the latest version can be downloaded from the B&R homepage (<u>www.br-automation.com</u>) and installed. A potentially activated "Enhanced Write Filter (EWF)" must be taken into consideration.

Information:

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

6. Panel PC 725 with Windows CE



Model number	Short description	Note
5SWWCE.0829-ENG	WinCE6.0 Pro PPC700 945GME XTX Microsoft OEM Windows CE 6.0, Professional, English; for PPC700 945GME; order CompactFlash separately (at least 128 MB).	

Table 93: Model numbers - Windows CE

6.1 General information

B&R Windows CE is an operating system which is optimally tailored to B&R's devices. It includes only the functions and modules which are required by each device. This makes this operating system extremely robust and stable. A further advantage of B&R Windows CE compared to other operating systems are the low licensing costs.

6.2 Windows CE 6.0 features

Detailed information about Windows CE for B&R devices can be downloaded in the download area on the B&R homepage (<u>www.br-automation.com</u>).

Features	Windows CE 6.0
Supported screen resolutions	VGA (TFT), SVGA (TFT), XGA (TFT)
Chipset	Intel 855GME
Color depth	16 bit or 65536 colors ¹⁾
Graphics card driver	Intel® embedded graphics driver
Main memory	Automatic detection and use of up to 512 MB RAM
Boot time / Startup time	Approx. 20 seconds
Screen rotation	not supported
Web browser	Internet Explorer
.NET	Compact Framework
Image size	Approx. 33 MB ²⁾ , uncompressed
Custom keys	Supported
PVI	Supported
Automation Device Interface	Supported
Remote Desktop Protocol for thin clients	Supported
B&R VNC Viewer	Supported
B&R Task Manager	Supported
B&R Picture Viewer	Supported
Compatible with zenOn	Yes
Compatible with Wonderware	No
Serial interfaces for any use	3
DirectX	No
Audio ports	"Line OUT" and "MIC" are supported. "Line IN" is not supported.

Section 4 Software

Table 94: Windows CE 6.0 features

1) The color depth depends on the display used.

2) Use the function "Compress Windows CE Image" in the B&R Embedded OS Installer to reduce the image size.

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 the B&R plant.

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 from the download area on the B&R homepage (<u>www.br-automation.com</u>). Further information is available in the online help for the B&R Embedded OS Installer.

7. B&R Automation Device Interface (ADI) driver - Control Center

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

Panel PC 70	0 Propert	ies			?⊻		
Display Statistics Y c CPU Boar	Keys User S ou can creat an be used f rd Par CPU in	LEDs iettings F te a report with s or error diagnosis nel PC 700 Pu Direter	Temperatures actory Settings elected device info by B&R. roperties	Fans Versions ormation here. This	Voltages Report report		
Show Show Baseboar	memory BIOS v d (Statistics Device	User Settings e specific paramet	Factory Setting Factory Setting ers set by B&R are	is Versions	Report	
V Show V Show V Show V Show V Show Set All	factory statistic user se DVI fac	Select µ Vendo Devic Compa HW re Serial Model Optimi	vi ce	User Setting Keys I Temperature value: and CPU: rd //D: Power supply: Slide-In drive 1: Slide-In drive 2:	Factory Set EDs Temper c of the PC and conn 36 / 96 43 / 100 29 / 84 0 / 32 29 / 84	ting: Versions alues Fans ected panels are displa : 'C/'F 'C/'F 'C/'F 'C/'F 'C/'F	Report Voltages yed here.
			Panel	Select panel: Display:	PPC Link ((none)	15) ▼ °C/"F	
						OK	Abbrookon

Figure 68: ADI Control Center screenshots (Version 1.50) - 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).

Features (device dependent):

- Adjusting the display brightness of connected Panels
- Reading of device-specific keys
- Activation of device specific LEDs on a foil keypad

Section 4 Software

Software • B&R Automation Device Interface (ADI) driver - Control Center

- Reading temperatures, fan speeds, and statistical data
- Reading user settings and factory settings
- Reading software versions
- Updating and securing firmware
- Creating reports about the current system (support assistance)
- Setting the SDL equalizer value for the SDL cable adjustment
- Change the user serial ID.

Supports following systems:

System	Operating system	Note
	Windows XP Professional	Installation using its own setup
Automation PC 820	Windows XP Embedded	Content of B&R Windows XP Embedded image
	Windows Embedded Standard 2009	Content of B&R Windows Embedded Standard 2009 image
	Windows XP Professional	Installation using its own setup
Automation PC 810	Windows XP Embedded	Content of B&R Windows XP Embedded image
	Windows Embedded Standard 2009	Content of B&R Windows Embedded Standard 2009 image
	Windows XP Professional	Installation using its own setup
Automation BC 620	Windows XP Embedded	Content of B&R Windows XP Embedded image
Automation PC 620	Windows CE	Content of B&R Windows CE image
	Windows Embedded Standard 2009	Content of B&R Windows Embedded Standard 2009 image
	Windows XP Professional	Installation using its own setup
Panel PC 700	Windows XP Embedded	Content of B&R Windows XP Embedded image
	Windows Embedded Standard 2009	Content of B&R Windows Embedded Standard 2009 image
Panel PC 725	Windows XP Professional	Installation using its own setup
	Windows Embedded Standard 2009	Content of B&R Windows Embedded Standard 2009 image
	Windows XP Professional	Installation using its own setup
Panel PC 800	Windows XP Embedded	Content of B&R Windows XP Embedded image
	Windows Embedded Standard 2009	Content of B&R Windows Embedded Standard 2009 image
	Windows XP Embedded	Content of B&R Windows XP Embedded image
Power Panel BIOS devices	Windows CE	Content of B&R Windows CE image
	Windows Embedded Standard 2009	Content of B&R Windows Embedded Standard 2009 image
Mahila Banal BIOS daviaga	Windows XP Embedded	Content of B&R Windows XP Embedded image
WODIIE Panel BIOS devices	Windows CE	Content of B&R Windows CE image
Automation Panel 800	-	Together with Automation PC 620 / Automation PC 800 and Panel PC 700
Automation Panel 900	-	Together with Automation PC 620 / Automation PC 800 and Panel PC 700

Table 95: 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>).

Section 4 Software

Chapter 5 • Accessories

1. Overview

Model number	Short description	Note
0AC201.91	Lithium batteries, 4 pcs. Lithium batteries, 4 pcs., 3 V / 950 mAh, button cell	
4A0006.00-000	Lithium battery, 1 pc. Lithium battery, 1 pc., 3 V / 950 mAh, button cell	
0TB103.9	Plug 24V 5.08 3-pin screw clamps 24 VDC 3-pin connector, female. Screw clamps, 2.5 mm ² , protected against vibration by the screw flange	
0TB103.91	Plug 24V 5.08 3-pin cage clamps 24 VDC 3-pin connector, female. Cage clamps, 2.5 mm ² , protected against vibration by the screw flange	
5CFCRD.0512-04	CompactFlash 512 MB B&R CompactFlash card with 512 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.1024-04	CompactFlash 1024 MB B&R CompactFlash card with 1024 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.2048-04	CompactFlash 2048 MB B&R CompactFlash card with 2048 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.4096-04	CompactFlash 4096 MB B&R CompactFlash card with 4096 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.8192-04	CompactFlash 8192 MB B&R CompactFlash card with 8192 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.016G-04	CompactFlash 16 GB B&R CompactFlash card with 16 GB SLC NAND flash and IDE/ATA interface	
5CFCRD.0064-03	CompactFlash 64 MB SSI CompactFlash card with 64 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.0128-03	CompactFlash 128 MB SSI CompactFlash card with 128 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.0256-03	CompactFlash 256 MB SSI CompactFlash card with 256 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.0512-03	CompactFlash 512 MB SSI CompactFlash card with 512 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.1024-03	CompactFlash 1024 MB SSI CompactFlash card with 1024 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.2048-03	CompactFlash 2048 MB SSI CompactFlash card with 2048 MB SLC NAND flash and IDE/ATA interface	
5CFCRD.4096-03	CompactFlash 4096 MB SSI CompactFlash card with 4096 MB SLC NAND flash and IDE/ATA interface	

Table 96: Model numbers - Accessories

Accessories • Overview

Model number	Short description	Note
5CFCRD.8192-03	CompactFlash 8192 MB SSI CompactFlash card with 8192 MB SLC NAND flash and IDE/ATA interface	
5MMUSB.2048-00	USB flash drive 2 GB SanDisk USB 2.0 flash drive 2 GB	
5MMUSB.2048-01	USB flash drive 2 GB B&R USB 2.0 flash drive 2 GB	
5SWHMI.0000-00	HMI Drivers & Utilities DVD	

Table 96: Model numbers - Accessories

2. Replacement CMOS batteries

The lithium battery is needed for buffering the BIOS and real-time clock.

The battery is subject to wear and must be replaced when the battery power ("Bad" status) is insufficient (see "Changing the battery", on page 179).

2.1 Order data

Model number	Description	Figure
0AC201.91	Lithium batteries, 4 pcs., 3 V / 950 mAh button cell	
4A0006.00-000	Lithium battery, 1 piece, 3 V / 950 mAh button cell	2. 24
		See of the second

Table 97: Order data - Lithium batteries

2.2 Technical data

Warning!

Replace battery with Renata, type CR2477N only. Use of another battery may present a risk of fire or explosion.

Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

Information:

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

Features	0AC201.91 4A0006.00-000		
Capacity	950 mAh		
Voltage	3 V		
Self discharge at 23°C	< 1% per year		
Storage time	Max. 3 years at 30°C		

Table 98: Technical data - Lithium batteries

Accessories • Replacement CMOS batteries

Environmental characteristics	0AC201.91	4A0006.00-000	
Storage temperature	-20 to +60°C		
Relative humidity	0 to 95%, non-condensing		

Table 98: Technical data - Lithium batteries (cont.)

3. Supply voltage connector (TB103 3-pin)

3.1 General information

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

3.2 Order data

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

Table 99: Order data - TB103

3.3 Technical data

Information:

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

Name	0TB103.9 0TB103.91				
Number of pins	:	3			
Type of terminal	Screw clamps Cage clamps				
Distance between contacts	5.08 mm				

Table 100: TB103 Technical data

Accessories • Supply voltage connector (TB103 3-pin)

Name	0TB103.9	0TB103.91		
Resistance between contacts	$\leq 5 \mathrm{m}\Omega$			
Nominal voltage according to VDE / UL,CSA	250 V / 300 V			
Current load according to VDE / UL,CSA	14.5 A / 10 A per contact			
Terminal size	0.08 mm ² - 3.31 mm ²			
Cable type	Copper wires only (no aluminum wires!)			

Table 100: TB103 Technical data (cont.)

4. CompactFlash cards 5CFCRD.xxxx-04

4.1 General information

Information:

B&R CompactFlash cards 5CFCRD.xxxx-04 and CompactFlash cards from a different manufacturer cannot be used in the same system at the same time. Due to differences in technology (older vs. newer technologies), problems can occur during system startup that are caused by the different boot times.

See chapter 3 "Commissioning", section 6 "Known problems / issues", on page 68.

Information:

The 5CFCRD.xxxx-04 CompactFlash cards are supported on B&R devices with WinCE Version 6.0 or higher.

4.2 Order data

Model number	Description	Figure
5CFCRD.0512-04	512 MB B&R CompactFlash card	
5CFCRD.1024-04	1024 MB B&R CompactFlash card	
5CFCRD.2048-04	2048 MB B&R CompactFlash card	
5CFCRD.4096-04	4096 MB B&R CompactFlash card	A GR
5CFCRD.8192-04	8192 MB B&R CompactFlash card	ALL RA
5CFCRD.016G-04	16 GB B&R CompactFlash card	(e)
		CompactFlash card

Table 101: Order data - CompactFlash cards

Section 5 Accessories

4.3 Technical data

Caution!

A sudden loss of power can cause data to be lost! In very rare cases, the mass memory may also become damaged.

To prevent damage and loss of data, it is recommended to use a UPS device.

Information:

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

Features	5CFCRD.0512- 04	5CFCRD.1024- 04	5CFCRD.2048- 04	5CFCRD.4096- 04	5CFCRD.8192- 04	5CFCRD.016G -04
MTBF (at 25°C)			> 3,000,0	000 hours		
Maintenance			No	one		
Data reliability		< 1 ui	nrecoverable error i	in 10 ¹⁴ bit read acc	esses	
Data retention			10 y	ears		
Lifetime monitoring			Y	es		
Supported operating modes		PIO Mode 0	-6, Multiword DMA	Mode 0-4, Ultra DM	MA Mode 0-4	-
Continuous reading	Typically 35 MB/s(240X) ¹⁾²⁾ Max 37 MB/s	Typically 35 MB/s (240X) ¹⁾ 2)	Typically 35 MB/s (240X) ¹⁾ 2)	Typically 33 MB/s (220X) ¹⁾ 2)	Typically 27 MB/s (180X) ¹⁾ 2)	Typically 36 MB/s (240X) ¹⁾ 2)
	(260X) ^{1) 2)}	Max. 37 MB/s (260X) ^{1) 2)}	Max. 37 MB/s (260X) ^{1) 2)}	Max. 34 MB/s (226X) ^{1) 2)}	Max. 28 MB/s (186X) ^{1) 2)}	Max. 37 MB/s (247X) ^{1) 2)}
Continuous writing	Typically 17 MB/s (110X) Max. 20 MB/s (133X)	Typically 17 MB/s (110X) Max. 20 MB/s (133X)	Typically 17 MB/s (110X) Max. 20 MB/s (133X)	Typically 16 MB/s (106X) Max. 18 MB/s (120X)	Typically 15 MB/s (100X) Max. 17 MB/s (110X)	Typically 18 MB/s (120X) Max. 19 MB/s (126X)
Endurance						
Guaranteed amount of data ³⁾ Results in 5 years ³⁾	50 TB 27.40 GB/day	100 TB 54.79 GB/day	200 TB 109.59 GB/day	400 TB 219.18 GB/day	800 TB 438.36 GB/day	1600 TB 876.72 GB/day
Clear/write cycles Guaranteed Typical ⁴⁾	100,000 2,000,000					
SLC flash		Yes				
Wear leveling		Static				
Endurance	5CFCRD.0512- 04	5CFCRD.1024- 04	5CFCRD.2048- 04	5CFCRD.4096- 04	5CFCRD.8192- 04	5CFCRD.016G -04
Error Correction Coding (ECC)	Yes					

Table 102: Technical data - CompactFlash cards 5CFCRD.xxxx-04

Accessories • CompactFlash cards 5CFCRD.xxxx-04

Support						
Hardware	F	PP300/400, PPC300, PPC700, PPC725, PPC800, APC620, APC810, APC820				
Windows XP Professional	-	-	-	Yes	Yes	Yes
Windows XP Embedded	Yes	Yes	Yes	Yes	Yes	Yes
Windows Embedded Standard 2009	No	Yes	Yes	Yes	Yes	Yes
Windows CE 6.0	Yes	Yes	Yes	Yes	Yes	Yes 5)
Windows CE 5.0	-	-	-	-	-	-
PVI Transfer Tool		V3.2.3.8 (part of F	VI Development S	etup V2.06.00.301	1)	-
B&R Embedded OS Installer			V3.10			-
Mechanical characteristics						
Dimensions Length Width Thickness	36.4 ±0.15 mm 42.8 ±0.10 mm 3.3 ±0.10 mm					
Weight		T	1	0 g	-	1
Environmental characteristics						
Ambient temperature Operation Bearings Transport	0 to +70°C -65 to +150°C -65 to +150°C					
Relative humidity Operation/Storage/Transport	Max. 85% at 85°C					
Vibration Operation/Storage/Transport	20 G peak, 20- 2000 Hz, 4 in each direction (JEDEC JESD22, method B103) 5.35 G RMS, 15 min per level (IEC 68-2-6)					
Shock Operation/Storage/Transport	1.5k G peak, 0.5 ms 5 times (JEDEC JESD22, method B110) 30 G, 11 ms 1 time (IEC 68-2-27)					
Altitude			Max. 15,000	feet (4,572 m)		

Table 102: Technical data - CompactFlash cards 5CFCRD.xxxx-04 (cont.)

1) Speed specification with 1X = 150 KB/s. All specifications refer to the Samsung Flash chips, CompactFlash cards in UDMA mode 4, 30 ns cycle time in True-IDE mode with sequential write/read test.

2) The file is written/read sequentially in True IDE mode with the DOS program Thruput.exe.

3) Endurance of B&R CF cards (linear written block size with 128 kB)

4) Depending on the average file size.

5) Not supported by B&R Embedded OS installer.

Section 5 Accessories



4.3.1 Temperature humidity diagram - Operation and storage



4.4 Dimensions



Figure 70: Dimensions - CompactFlash card Type I

4.5 Benchmark



Figure 71: ATTO disk benchmark v2.34 comparison (reading)







5. CompactFlash cards - 5CFCRD.xxxx-03

5.1 General information

Information:

Silicon Systems CompactFlash cards 5CFCRD.xxxx-03 and CompactFlash cards from a different manufacturer cannot be used in the same system at the same time. Due to differences in technology (older vs. newer technologies), problems can occur during system startup that are caused by the different boot times.

See chapter 3 "Commissioning", section 6 "Known problems / issues", on page 68.

Information:

On Windows CE 5.0 devices, 5CFCRD.xxxx-03 CompactFlash cards up to 1GB are supported.

5.2 Order data

Model number	Description	Figure
5CFCRD.0064-03	CompactFlash 64 MB SSI	
5CFCRD.0128-03	CompactFlash 128 MB SSI	
5CFCRD.0256-03	CompactFlash 256 MB SSI	
5CFCRD.0512-03	CompactFlash 512 MB SSI	SSD_CXXX.3C
5CFCRD.1024-03	CompactFlash 1024 MB SSI	Mr/jp. 00/357 6 3/6
5CFCRD.2048-03	CompactFlash 2048 MB SSI	SYSTEMS ON
5CFCRD.4096-03	CompactFlash 4096 MB SSI	
5CFCRD.8192-03	CompactFlash 8192 MB SSI	CompactFlash card

Table 103: Order data - CompactFlash cards

5.3 Technical data

Caution!

A sudden loss of power can cause data to be lost! In very rare cases, the mass memory may also become damaged.

To prevent damage and loss of data, B&R recommends that you use a UPS device.

Information:

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

Features	5CFCRD. 0064-03	5CFCRD. 0128-03	5CFCRD. 0256-03	5CFCRD. 0512-03	5CFCRD. 1024-03	5CFCRD. 2048-03	5CFCRD. 4096-03	5CFCRD. 8192-03
MTBF (at 25°C)				> 4,000,0	000 hours			
Maintenance				No	one			
Data reliability			< 1 unrecov	verable error i	in 10 ¹⁴ bit rea	ad accesses		
Data retention				10 y	ears			
Lifetime monitoring				Y	es			
Supported operating modes			PIO Mo	ode 0-4, Multi	word DMA M	ode 0-2		
Continuous reading				Typically	y 8 MB/s			
Continuous writing				Typically	y 6 MB/s			
Endurance								
Clear/write cycles Typical				> 2,00	00,000			
SLC flash				Y	es			
Wear leveling				Sta	atic			
Error Correction Coding (ECC)				Y	es			
Support								
Hardware	MP100/200, PP100/200, PP300/400, PPC300, PPC700, PPC725, PPC800 Provit 2000, Provit 5000, APC620, APC680, APC810, APC820							
Windows XP Professional	-	-	-	-	-	-	Yes	Yes
Windows XP Embedded	-	-	-	Yes	Yes	Yes	Yes	Yes
Windows Embedded Standard 2009	No	No	No	No	Yes	Yes	Yes	Yes
Windows CE 6.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 104: Technical data - CompactFlash cards 5CFCRD.xxxx-03

Section 5 Accessories

Accessories • CompactFlash cards - 5CFCRD.xxxx-03

Support	5CFCRD. 0064-03	5CFCRD. 0128-03	5CFCRD. 0256-03	5CFCRD. 0512-03	5CFCRD. 1024-03	5CFCRD. 2048-03	5CFCRD. 4096-03	5CFCRD. 8192-03
Windows CE 5.0	Yes	Yes	Yes	Yes	Yes	-	-	-
PVI Transfer Tool			V2.57 (part o	of PVI Develo	pment Setup	V2.5.3.3005)	
B&R Embedded OS Installer				V2	2.21			
Mechanical characteristics								
Dimensions Length Width Thickness				36.4 ±0 42.8 ±0 3.3 ±0).15 mm).10 mm .10 mm			
Weight				11.	.4 g			
Environmental characteristics								
Ambient temperature Operation Bearings Transport	0 to +70°C -50 to +100°C -50 to +100°C							
Relative humidity Operation/Storage/Transport	8 to 95%, non-condensing							
Vibration Operation Storage/Transport	max. 16,3 g (159 m/s ² 0-peak) max. 30 g (294 m/s ² 0-peak)							
Shock Operation Storage/Transport	Max. 1000 g (9810 m/s ² 0-peak) Max. 3000 g (29430 m/s ² 0-peak)							
Altitude			Maxin	num 80,000 f	eet (24,383 n	neters)		

Table 104: Technical data - CompactFlash cards 5CFCRD.xxxx-03 (cont.)



5.3.1 Temperature humidity diagram - Operation and storage



5.4 Dimensions



Figure 74: Dimensions - CompactFlash card Type I

6. USB flash drive

Information:

We reserve the right to supply alternative products due to the vast quantity of flash drives available on the market and their corresponding short product lifecycle. Therefore, the following measures might be necessary in order to boot from these flash drives:

- The flash drive must be reformatted or in some cases even re-partitioned (set active partition).
- The flash drive must be at the top of the BIOS boot order, or alternatively the IDE controllers can also be deactivated in the BIOS. This can be avoided in most cases if a "fdisk /mbr" command is also executed on the USB flash drive.

6.1 General information

USB flash drives are easy-to-exchange storage media. Because of the fast data transfer (USB 2.0), the USB flash drives are ideal for use as a portable memory medium. Without requiring additional drivers ("Hot Plug & Play" - except with Windows 98SE), the USB flash drive can be converted immediately into an additional drive where data can be read or written.

6.2 Order data

Model number	Description	Figure
5MMUSB.2048-00	USB flash drive 2 GB SanDisk Cruzer Micro	Cruzer micro
5MMUSB.2048-01	USB flash drive 2 GB B&R	Perfection in Automation

Table 105: Order data - USB flash drives

6.3 Technical data

Information:

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

Features	5MMUSB.2048-00
LED	1 LED (green), signals data transfer (send and receive)
Power supply Current requirements	Via the USB port max. 500 μA in sleep mode, max. 120 mA read/write
Interface Type Transfer rate Sequential reading Sequential writing Connection	USB specification 2.0 high speed device, mass storage class, USB-IF and WHQL certified USB 1.1 and 2.0 compatible Up to 480 MBit (high speed) Max. 31 MB/second Max. 30 MB/second To each USB type A interface
MTBF	> 3.000.000 hours
Data retention	> 10 years
Maintenance	None
Operating system support	Windows CE, ME, 2000, XP, Vista, Mac OS 9.0 or newer, Linux 2.4 or newer
Mechanical characteristics	
Dimensions Length Width Thickness	67.85 mm 17.97 mm 8.35 mm
Environmental characteristics	
Ambient temperature Operation Bearings Transport	0 to +70°C -50 to +100°C -50 to +100°C
Relative humidity Operation Bearings Transport	85%, non-condensing 85%, non-condensing 85%, non-condensing
Vibration Operation Bearings Transport	At 20 - 2000 Hz: 20 g (peak) At 20 - 2000 Hz: 20 g (peak) At 20 - 2000 Hz: 20 g (peak)
Shock Operation Bearings Transport	Max. 1500 g (peak) Max. 1500 g (peak) Max. 1500 g (peak)

Table 106: Technical data - USB flash drive 5MMUSB.2048-00

Accessories • USB flash drive

Features	5MMUSB.2048-00
Altitude Operation Bearings Transport	3,048 meters 12,192 meters 12,192 meters

Table 106: Technical data - USB flash drive 5MMUSB.2048-00 (cont.)

6.3.1 Temperature humidity diagram



Figure 75: Temperature humidity diagram - USB flash drive - 5MMUSB.2048-00

Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1 $^{\circ}$ C per 1000 meters (from 500 meters above sea level).

6.4 Technical data

Information:

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

Features	5MMUSB.2048-01
LED	1 LED (green), signals data transfer (send and receive)
Power supply Current requirements	Via the USB port 500 μA in sleep mode, 90 mA read/write
Interface Type Transfer rate Sequential reading Sequential writing Connection	USB specification 2.0 high speed device, mass storage class, USB-IF and WHQL certified USB 1.1 and 2.0 compatible Up to 480 MBit (high speed) Max. 31 MB/second Max. 30 MB/second To each USB type A interface
MTBF (at 25°C)	> 3.000.000 hours
Data retention	10 years
Maintenance	None
Operating system support	Windows CE 4.2, CE 5.0, ME, 2000, XP and Mac OS 9.1.x+, OS X v10.1.2+
Mechanical characteristics	
Dimensions Length Width Thickness	67.85 mm 17.97 mm 8.35 mm
Environmental characteristics	
Ambient temperature Operation Bearings Transport	0 to +70°C -50 to +100°C -50 to +100°C
Relative humidity Operation Bearings Transport	85%, non-condensing 85%, non-condensing 85%, non-condensing
Vibration Operation Bearings Transport	at 20 - 2000 Hz: 20 g at 20 - 2000 Hz: 20 g at 20 - 2000 Hz: 20 g
Shock Operation Bearings Transport	Max. 1500 g Max. 1500 g Max. 1500 g

Table 107: Technical data - USB flash drive 5MMUSB.2048-01

Accessories • USB flash drive

Features	5MMUSB.2048-01
Altitude Operation Bearings Transport	3,048 meters 12,192 meters 12,192 meters

Table 107: Technical data - USB flash drive 5MMUSB.2048-01 (cont.)

6.4.1 Temperature humidity diagram



Figure 76: Temperature humidity diagram - USB flash drive - 5MMUSB.2048-01

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

7. HMI Drivers & Utilities DVD 5SWHMI.0000-00



Figure 77: HMI Drivers & Utilities DVD 5SWHMI.0000-00

Model number	Short description	Note
5SWHMI.0000-00	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

Section 5 Accessories

Drivers for the devices

- Automation Device Interface (ADI)
- Audio
- Chipset
- CD-ROM
- LS120
- Graphics
- Network
- PCI RAID controller
- Touch screen
- Touchpad
- Interface board

Updates

• Firmware upgrades (e.g. MTCX, SMXC)

Utilities/Tools

- Automation Device Interface (ADI)
- Miscellaneous
- MTC utilities
- Key editor
- MTC & Mkey utilities
- Mkey utilities
- UPS configuration software
- ICU ISA configuration
- Intel PCI NIC boot ROM
- Diagnostics
- CompactFlash lifespan calculation for Silicon Systems CompactFlash cards 5CFCRD.xxxx-03

Windows and embedded operating systems

- Thin client
- Windows CE
- Windows NT Embedded
- Windows XP Embedded

MCAD templates for

- Industrial PCs
- · Visualization and operating devices
- Legend strip templates

Documentation for

- B&R Windows CE
- Automation PC 620
- Automation PC 680
- Automation Panel 900
- Panel PC 700
- Power Panel 15/21/35/41
- Power Panel 100/200
- Provit 2000
- Provit 3030
- Provit 4000
- Provit 5000
- Provit Benchmark
- Provit Mkey
- Windows NT Embedded application guide
- Windows XP Embedded application guide
- Uninterruptible power supply

Service tools

- Acrobat Reader 5.0.5 (freeware in German, English, and French)
- Power Archiver 6.0 (freeware in German, English, and French)
- Internet Explorer 5.0 (German and English)
- Internet Explorer 6.0 (German and English)

Chapter 6 • 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 (at 50°C, 8.5 μ A current requirements of the supplied components and a self discharge of 40%).

Information:

- The product design allows the battery to be changed with the PPC725 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.

Warning!

Replace battery with Renata, type CR2477N only. Use of another battery may present a risk of fire or explosion.

Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

1.1 Battery check

The battery status (good or bad) is checked every time the device is turned on, as well as every 24 hours. The check involves applying a load to the battery for a short time (approx. 1 second), followed by an evaluation. The evaluated battery status is displayed in the BIOS Setup pages and in the B&R Control Center (ADI driver), but can also be read in a customer application via the ADI Library.

Maintenance / Servicing • Changing the battery

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

Table 109: Meaning of battery status OK - Bad

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.

The following replacement lithium batteries are available:

- 4A0006.00-000 (1 piece)
- 0AC201.91 (4 pcs.)

1.2 Procedure

- Disconnect the power supply to the Panel PC 725 (also see information on page 179).
- Touch the housing or ground connection (not the power supply!) in order to discharge any electrostatic charge from your body.
- Remove the CF battery cover and carefully pull out the battery using removal strips.
- 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 78: Battery handling

- To make the next battery change easier, be sure the removal strip is in place when inserting battery.
- Re-attach the CF battery cover.
- Reconnect the power supply to the Panel PC 725 by plugging the power cable back in and pressing the power button (also see information on page 179).
- Reset the data and time in BIOS (see information on page 179).
Warning!

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

Appendix A

1. Temperature sensor locations

The APC620 has temperature sensors in various places (CPU internal, CPU board, power supply, board I/O) in the PPC725. The temperatures¹⁾ can be read in the BIOS (menu item; Advanced - Baseboard/Panel Features - Baseboard Monitor) or in Microsoft Windows XP/Embedded and Windows Embedded Standard 2009 using the B&R Control Center²⁾.



Figure 79: Temperature sensor locations

Position	Measurement point for	Measurement	Max. specified
1	CPU internal	Processor temperature (sensor integrated on the processor).	84°C
2	CPU board	CPU board temperature (sensor integrated in the CPU board).	91°C
3	Power supply	Power supply temperature (sensor on the power supply).	76°C
4	Board I/O	Board I/O area temperature (sensor on the baseboard, close to the ETH2 controller).	75℃

Table 110: Temperature sensor locations

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

2) The B&R Control Center - ADI driver - can be downloaded for free from the download area on the B&R homepage (www.brautomation.com).

2. Maintenance Controller Extended (MTCX)

The MTCX controller (FPGA processor) is located on the main board (part of every system unit) of Panel PC 725 devices.



Figure 80: 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 (CPU internal, CPU board, power supply, board I/O)
- Panel locking mechanism (configurable using B&R Control Center ADI driver)
- 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)

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

¹⁾ Can be downloaded from the download area on the B&R homepage (www.br-automation.com).

3. 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 81: ADI development kit screenshots (Version 2.40)

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
- Automation PC 810
- Automation PC 820
- Mobile Panel 40/50

- Mobile Panel 100/200
- Panel PC 300
- Panel PC 700
- Panel PC 800
- Power Panel 100/200
- Power Panel 300/400

A detailed description of using the ADI functions can be found in the integrated online help.

The B&R Automation Device Interface (ADI) development kit can be downloaded for free from the download area on the B&R homepage (<u>www.br-automation.com</u>).

3.1 Installation

The latest version of the B&R Automation Device Interface (ADI) Development Kit can be found in the download area (Service - Material Related Downloads - BIOS / Drivers / Updates) on the B&R homepage (<u>www.br-automation.com</u>).

Run Setup.exe to install (e.g. by double-clicking in Explorer).

4. Touch Screen - Elo Accu Touch

Information:

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

Elo Accu touch screen	Specifications
Manufacturer	Elo
Accuracy For < 18" diagonals For > 18" diagonals	Typically < than 0.080 inches (2.032 mm) Maximum error in all directions 0.180 inches (4.752 mm) Maximum 1% of the diagonal for the active area of the touch screens
Response time	< 10 ms
Release pressure	< 113 grams
Resolution	4096 x 4096 touch points
Light permeability	Up to 80% ± 5%
Temperature Operation Bearings Transport	- 10°C to + 50°C - 40°C to + 71°C - 40°C to + 71°C
Relative humidity Operation Bearings Transport	Max. 90% at max. 35°C Max. 90% at max. 35°C for 240 hours, non-condensing Max. 90% at max. 35°C for 240 hours, non-condensing
Waterproofing	IP65
Lifespan	35 million touch operations on the same point
Chemical resistance 1)	Acetone, ammonia-based glass cleaner, normal food and drinks, hexane, methylene chloride, methyl ethyl ketone, mineral spirits, turpentine, isopropyl alcohol
Activation	Finger, pointer, credit card, glove
Drivers	Touch screen drivers can be downloaded from the download area on the B&R homepage (www.br- automation.com). Additionally, they can also be found on the B&R HMI Drivers and Utilities DVD (Mod. No. 5SWHMI.0000-00).

Table 111: Technical data - Elo Accu Touch

1) The active area of the touch screen is resistant to these chemicals for a timeframe of one hour at 21° C.



4.1 Temperature humidity diagram - Operation and storage

Figure 82: Temperature humidity diagram - Elo Accu touch screen 5-wire

Temperature data is for operation at 500 meters. Derating the max. ambient temperature - typically 1 $^{\circ}$ C per 1000 meters (from 500 meters above sea level).

4.2 Cleaning

The touch screen should be cleaned with a moist lint-free cloth. When moistening the cloth, use only water with detergent, screen cleaning agent, or alcohol (ethanol). The cleaning agent should be applied to the cloth beforehand and not sprayed directly onto the touch screen itself. Never use aggressive solvents, chemicals, or scouring agents.

5. Membrane

The décor foil conforms to DIN 42115 (section 2). This means it is resistant to exposure to the following chemicals for a 24-hour period with no visible signs of damage:

Information:

The following characteristics, features, and limit values only apply to this individual component and can deviate from those specified for the entire device.

Ethanol Cyclohexanol Diacetone alcohol Glycol Isopropanol Giycerine Methanol Triacetin Dowandol DRM/PM	Formaldehyde 37 - 42% Acetaldehyde Aliphatic hydrocarbons Toluene Xylene White spirits	Trichloroethane Ethyl acetate Diethyl ether N-Butyl acetate Amyl acetate Butylcellosolve Ether
Acetone Methyl ethyl ketone Dioxan Cyclohexanone MIBK Isophorone	Formic acid <50% Acetic acid <50% Phosphoric acid <30% Hydrochloric acid <36% Nitric acid <10% Trichloracetic acid <50% Sulphuric acid <10%	Sodium hypochlorite <20% Hydrogen peroxide <25% Potassium carbonate Washing agents Fabric conditioner Ferric chloride Ferrous chloride (FeCl2)
Ammonia <40% Caustic soda <40% Potassium hydroxide Alkali carbonate Bichromate Potassium Acetonitrile Sodium bisulphate	Cutting oil Diesel oil Linseed oil Paraffin oil Blown castor oil Silicon oil Turpentine oil substitute Universal brake fluid Aviation fuel Gasoline Water Sea water Decon	Ferrous chloride (FeCl3) Dibutyl phthalate Dioctyl phthalate Sodium carbonate

Table 112: Chemical resistance of the décor foil

The décor foil conforms to DIN 42115 section 2 for exposure to glacial acetic acid for less than one hour without visible damage.

6. Viewing angles

The viewing angle information of the display types (R, L, U, D) can be seen in the technical data for the individual components.



Figure 83: Viewing angle definition

7. Glossary

A

ACPI

Abbreviation for "Advanced Configuration and Power Interface". Configuration interface that enables the operating system to control the power supply for each device connected to the PC. With ACPI, the computer's BIOS is only responsible for the details of communication with the hardware.

ADI

Abbreviation for »Automation Device Interface« The ADI interface allows access to specific functions (e.g. brightness control, firmware updates, static value read) of B&R devices. The settings can be read or changed in the Control Panel with the B&R Control Center Applet (already included in the B&R embedded operating system).

APC

An abbreviation for "Automation PC".

API

Abbreviation for "Application Program Interface" The interface, which allows applications to communicate with other applications or with the operating system.

Automation Runtime

A uniform runtime system for all B&R automation components.

В

Baud rate

Measurement unit for data transfer speed. It indicates the number of states for a transferred signal per second and is measured using the baud unit of measurement. 1 baud = 1 bit/sec or 1 bps.

BIOS

An abbreviation for "Basic Input/Output System". Core software for computer systems with essential routines for controlling input and output processes on hardware components, for performing tests after system start and for loading the operating system. Although BIOS is used to configure a system's performance, the user does not usually come into contact with it.

Bit

Binary digit > binary position, binary character, smallest discrete unit of information. A bit can have the value 0 or 1.

Bit rate

The number of bits that can be transferred within a specified time unit. 1 bit/sec = 1 baud.

Bootstrap loader

A program that automatically runs when the computer is switched on or restarted. After some basic hardware tests have been carried out, the bootstrap loader starts a larger loader and hands over control to it, which in turn boots the operating system. The bootstrap loader is typically found in ROM on the computer.

Byte

Data format [1 byte = 8 bits] and a unit for characterizing information amounts and memory capacity. The following units are the commonly used units of progression: KB, MB, GB.

B&R Automation Runtime

Windows-based program for creating installation disks to install B&R Automation Runtime[™] on the target system.

С

Cache

Background memory, also known as non-addressable memory or fast buffer memory. It is used to relieve the fast main memory of a computer. For example, data that should be output to slower components by the working memory (e.g. disk storage, printers) is stored temporarily in cache memory and output from there at an appropriate speed for the target devices.

CAN

An abbreviation for "Controller Area Network" (serial bus system). Structure according to ISO 11898; Bus medium: twisted pair. Good transfer properties in short distances less than 40 m with a 1 MBit/sec data transfer rate. Maximum number of stations: Theoretically unlimited, but practically limited up to 64. Real-time capable (i.e. defined maximum latency times for messages with high priority). High reliability using error detection, error handling, troubleshooting. Hamming distance.

CD-ROM

Abbreviation for "Compact Disc Read-Only Memory". A removable data medium with a capacity of ~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.

COM1

Device name for the first serial port in a PC system. The input/output area for COM1 is usually found at address 03F8H. Generally, the COM1 port is assigned to IRQ 4. In many systems, an RS232 serial mouse is connected to COM1.

COM2

Device name for the second serial port in a PC system. The input/output area for COM2 is usually found at address 02F8H. Generally, the COM2 port is assigned to IRQ 3. In many systems, a modem is connected to COM2.

COM3

Device name for a serial port in a PC system. The input/output area for COM3 is usually found at address 03E8H. Generally, the COM3 port is assigned to IRQ 4. In many systems, COM3 is used as an alternative for COM1 or COM2 if peripheral devices are already connected to COM1 and COM2.

CompactFlash®

CompactFlash memory cards [CF cards] are exchangeable nonvolatile mass memory systems with very small dimensions [43 x 36 x 3.3 mm, approximately half the size of a credit card]. In addition to the flash memory chips, the controller is also present on the cards. CF cards provide complete PC card / ATA functionality and compatibility. A 50-pin CF card can be simply inserted in a passive 68-pin type II adapter card. It conforms to all electrical and mechanical PC card interface specifications. CF cards were launched by SanDisk back in 1994. Currently, memory capacities reach up to 64 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.

•		
	1	
E		

DCD

An abbreviation for "Data Carrier Detected". A signal used in serial communication that is sent by the modem to the computer it is connected to, indicating that it is ready for transfer.

Dial-up

Data is transferred over the telephone network using a modem or an ISDN adapter.

DIMM

"Double In-line Memory Module" consisting of one or more RAM chips on a small circuit board that is connected with the motherboard of a computer.

DMA

Direct Memory Access > Accelerated direct access to a computer's RAM by bypassing the CPU.

DRAM

An abbreviation for "Dynamic Random Access Memory". Dynamic RAM consists of an integrated semiconductor circuit that stores information based on the capacitor principle. Capacitors lose their charge in a relatively short time. Therefore, dynamic RAM circuit boards must contain a logic that allows continual recharging of RAM chips. Since the processor cannot access dynamic RAM while it is being recharged, one or more waiting states can occur when reading or writing data. Although it is slower, dynamic RAM is used more often than static RAM since the simple design of the circuits means that it can store four times more data than static RAM.

DSR

An abbreviation for "Data Set Ready". A signal used in serial data transfer, which is sent by the modem to the computer it is connected to, indicating its readiness for processing. DSR is a hardware signal which is sent via line number 6 in compliance with the RS-232-C standard.

Appendix A

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

Е

EDID data

Abbreviation for "Extended Display Identification Data". EDID data contains the characteristics of monitors / TFT displays transferred as 128 KB data blocks to the graphics card via the Display Data Channel (DDC). This EDID data can be used to set the graphics card to the monitor properties.

EIDE

An abbreviation for "Enhanced Integrated Drive Electronics". An expansion of the IDE standard. Enhanced IDE is considered the standard for hardware interfaces. This interface is designed for drives with an integrated drive controller.

EMC

"Electromagnetic Compatibility" The ability of a device or a system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment [IEV 161-01-07].

EPROM

Erasable **PROM** > (completely with ultraviolet light).

Ethernet

An IEEE 802.3 standard for networks. Ethernet uses bus or star topology and controls the traffic on communication lines using the access procedure CSMA/CD (Carrier Sense Multiple Access with Collision Detection). Network nodes are connected using coaxial cables, fiber optic cables or twisted pair cabling. Data transfer on an Ethernet network takes place in frames of variable lengths that consist of supply and controller information as well as 1500 bytes of data. The Ethernet standard provides base band transfers at 10 megabit and 100 megabit per second.

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).

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.

Appendix A

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

GΒ

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Gigabyte (1 GB = 230 or 1,073,741,824 Bytes)
```

Н

Handshake

Method of synchronization for data transfer when data is sent at irregular intervals. The sender signals that data can be sent, and the receiver signals when new data can be received.

HDD

An abbreviation for "Hard Disk Drive". Fixed magnetic mass memory with high capacities, e.g. 120 GB.

I

IDE

An abbreviation for "Integrated Drive Electronics". A drive interface where the controller electronics are integrated in the drive.

Interface

From the hardware point of view, an interface is the connection point between two modules/devices/systems. The units on both sides of the interface are connected by the interface lines so that data, addresses, and control signals can be exchanged. The term interface includes all functional, electrical and constructive conditions [encoding, signal level, pin assignments] that characterize the connection point between the modules, devices, or systems. Depending on the type of data transfer, a differentiation is made between parallel [e.g. Centronics, IEEE 488] and serial interfaces [e.g. V.24, TTY, RS232, RS422, RS485], which are set up for different transfer speeds and transfer distances. From the point of view of software, the term "interface" describes the transfer point between program modules using specified rules for transferring the program data.

ISA

An abbreviation for "Industry Standard Architecture". A term given for the bus design which allows expansion of the system with plug-in cards that can be inserted in PC expansion slots.

ISO

International Organization for Standardization > Worldwide federation of national standardization institutions from over 130 countries. ISO is not an acronym for the name of the organization; it is derived from the Greek word "isos", meaning "equal" (<u>www.iso.ch</u>).

J

Jitter

Jitter is a term that describes time deviations of cyclic events. If, for example, an event should take place every 200is and it actually occurs every 198 to 203is, then the jitter is 5is. Jitter has many causes. It originates in the components and transfer media of networks because of noise, crosstalk, electromagnetic interference and many other random occurrences. In automation technology, jitter is a measure of the quality of synchronization and timing.

Jumper

A small plug or wire link for adapting the hardware configuration used to connect the different points of an electronic circuit.

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).

MTC

An abbreviation for "Maintenance Controller". The MTC 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).

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

Abbreviation for "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 generations. It is basically a synchronous bus. The main clock of the CPU is used for synchronization. The PCI bus is microprocessor-independent, 32-bit and 64-bit compatible, and supports both 3.3 V and 5 V cards and devices.

PCMCIA

An abbreviation for "Personal Computer Memory Card International Association". An association of manufacturers and dealers who are dedicated to the cultivation and further development of common standards for peripheral devices based on PC cards with a slot for such cards. PC cards are mainly used for laptops, palmtops (and other portable computers), and intelligent electronic devices. Version 1 of the PCMCIA standard was introduced in 1990.

PLC

Programmable Logic Controller; Computer-based control device that functions using an application program. The application program is relatively easy to create using standardized programming languages [IL, FBD, LAD, AS, ST]. Because of its serial functionality, reaction times are slower compared to connection-oriented control. Today, PLCs are available in device families with matched modular components for all levels of an automation hierarchy.

Protection type

The type of protection specifies the protection offered by a housing against touching dangerous parts, penetration of large solid foreign bodies and/or against the entrance of water, verified by standardized testing procedures. In regard to suitability for different environmental conditions, the systems are divided into corresponding types of protection, referred to as *IP* codes. The abbreviation *IP* stands for *International Protection* according to DIN, but is also also known as "Ingress Protection". All of the standards cited here use the "International Protection" definition of IP.

Component	Numbers or letters	Protection of the operating equipment	Protection of personnel
Code letters	IP	-	-
		Penetration of large solid foreign bodies	Touching dangerous parts
	0	(not protected)	(not protected)
	1	50 mm diameter	Back of hand
First number	2	12.5 mm diameter	Finger
First number	3	2.5 mm diameter	Tool
	4	1 mm diameter	Line
	5	Protected against dust	Line
	6	Dust-proof	Line

Table 113: IP code table

Component	Numbers or letters	Protection of the operating equipment	Protection of personnel
Code letters	IP	-	-
		Water permeation with damaging consequences	
	0	(not protected)	
	1	Vertical drops	
	2	Drops (15° slope)	
Second number	3	Water spray	
	4	Water splash	
	5	Water jets	
	6	Strong water jets	
	7	Temporary submersion	
	8	Continual submersion	
Additional letter			Touching dangerous parts with:
(optional)	A		Back of hand
	В		Finger
	С		Tool
	D		Line
		Supplemental information, specially for	
	н	High-voltage devices	
Supplemental letter (optional)	М	Movement during water test	
V. E. Samuel	S	Standstill during water test	
	W	Weather conditions	

Table 113: IP code table

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".

PROFIBUS-DP

PROFIBUS for "decentralized peripherals". PROFIBUS DB can be used to allow simple digital and analog I/O modules as well as intelligent signal and data processing units to be installed in the machine room, which among other things can significantly reduce cabling costs. Often used for time-critical factory automation applications.

Q

QVGA

Abbreviation for "Quarter Video Graphics Array". Usually a screen resolution of 320 × 240 pixels.

QUXGA

Abbreviation for "Quad Ultra Extended Graphics Array". Generally a screen resolution of 3200 \times 2400 pixels (4:3). Quad implies the 4x greater pixel resolution compared to the UXGA.

QWUXGA

Abbreviation for "Quad WUXGA"; Generally a screen resolution of 3840 × 2400 pixels (8:5, 16:10).

R

RAM

An abbreviation for "Random Access Memory". Semiconductor memory which can be read or written to by the microprocessor or other hardware components. Memory locations can be accessed in any order. The various ROM memory types do allow random access, but they cannot be written to. The term RAM refers to a more temporary memory that can be written to as well as read.

Real time

A system is operating in real time or has real-time capability if the input sizes (e.g. signals, data) are received and processed in a defined time period, and the results are made available in real time for a partner system or the system environment. See also "real-time demands" and "real-time system".

ROM

An abbreviation for "Read-Only Memory". Semiconductor memory where programs or data were permanently stored during the production process.

RS232

Recommended **S**tandard **N**umber **232**. Oldest and most widespread interface standard, also called a V.24 interface. All signals are referenced to ground making this an unbalanced interface. High level: -3 to -30 V, low level: +3 to +30 V; cable lengths up to 15 m, transfer rates up to 20 kbit/s; for point-to-point connections between 2 stations.

RS422

Recommended **S**tandard **N**umber **422**. Interface standard, balanced operation, increased immunity to disturbances. High level: 2 to -6 V, low level: +2 to +6 V; four-line connection [inverted/non-inverted], permissible cable length up to 1200 m, transfer rates up to 10 MBit/s, 1 sender can transfer simplex with up to 10 receivers.

RS485

Recommended **S**tandard **N**umber **485**. Interface standard upgraded from RS422. High level: 1.5 to -6 V, low level: +1.5 to +6 V; two-line connection [half-duplex mode] or four-line connection [full-duplex mode]; permissible cable length up to 1200 m, transfer rates up to 10 MBit/s. Up to 32 stations (sender/receiver) can be connected to an RS485 bus.

RTS

An abbreviation for "**R**equest **T**o **S**end". A signal used in serial data transfer for requesting send permission. For example, it is sent from a computer to the modem connected to it. The RTS signal is assigned to pin 4 according to the hardware specifications of the RS-232-C standard.

RXD

An abbreviation for "Receive (**RX**) **D**ata". A line for transferring serial data received from one device to another, e.g. from a modem to a computer. For connections complying with the RS-232-C standard, the RXD is connected to pin 3 of the plug.

2	
c	
-	-

SDRAM

An abbreviation for "Synchronous Dynamic Random Access Memory". A construction of dynamic semiconductor components (DRAM) that can operate with higher clock rates than conventional DRAM switching circuits. This is made possible using block access. For each access, the DRAM determines the next memory addresses to be accessed.

SFC

Sequential function chart > Graphic input language for PLCs used to represent sequential control.

Slot PLC

PC insert card that has full PLC functionality. On the PC, it is coupled via a DPR with the process using a fieldbus connection. It is programmed externally or using the host PC.

SoftPLC

Synonym for SoftPLC.

SUXGA

Abbreviation for Super Ultra Extended Graphics Array; Generally a screen resolution of 2048×1536 pixels (4:3). An alternative name is QXGA (Quad Extended Graphics Array), which is 4x the pixel resolution of XGA.

SVGA

Abbreviation for "Super Video Graphics Array"; Graphics standard with a resolution of at least 800×600 pixels and at least 256 colors.

Switch

Device, similar to a hub, that takes data packets received in a network and, unlike a hub, does not pass them on to all network nodes, instead only to the respective addressee. Unlike a hub, a switch provides targeted communication within a network that only takes place between sender and receiver. Other network nodes are not involved.

SXGA

Abbreviation for Super Extended Graphics Array. Graphics standard with a screen resolution of 1280×1024 pixels (aspect ratio 5:4).

SXGA+

Abbreviation for SXGA Plus; Generally 1400×1050 pixels.

System units

Provit system units consist of a mainboard (without processor), slots for RAM modules, VGA controller, serial and parallel interfaces, and connections for the FPD, monitor, PS/2 AT keyboard, PS/2 mouse, USB, Ethernet (for system units with Intel Celeron and Pentium III processors), Panelware keypad modules and external FDD.

Т

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 selecting options in a displayed menu using the tip of the finger.

TXD

An abbreviation for "Transmit (**TX**) **D**ata". A line for the transfer of serial data sent from one device to another, e.g. from a computer to a modem. For connections complying with the RS-232-C standard, the TXD is connected to pin 2 of the plug.

U

UART

An abbreviation for "Universal Asynchronous Receiver-Transmitter". A module generally consisting of a single integrated circuit that combines the circuits required for asynchronous serial communication for both sending and receiving. UART represents the most common type of circuit in modems for connecting to a personal computer.

UDMA

An abbreviation for "Ultra Direct Memory Access". A special IDE data transfer mode that allows high data transfer rates for drives. There have been many variations in recent times.

UDMA33 mode transfers 33 megabytes per second.

UDMA66 mode transfers 66 megabytes per second.

UDMA100 mode transfers 100 megabytes per second.

Both the mainboard and the hard drive must support the specification to implement modifications.

UPS

Abbreviation for "Uninterruptible Power Supply". See "UPS".

USB

An abbreviation for "**U**niversal **S**erial **B**us" A serial bus with a bandwidth of up to 12 megabits per second (Mbit/s) for connecting a peripheral device to a microcomputer. Up to 127 devices can be connected to the system using a single multipurpose connection, the USB bus (e.g. external CD drives, printer, modems as well as the mouse and keyboard). This is done by connecting the devices in a row. USB allows devices to be changed when the power supply is switched on (hot plugging) and multi-layered data flow.

Appendix A

UPS

An abbreviation for "Uninterruptible Power Supply". The UPS supplies power to systems that cannot be connected directly to the power mains for safety reasons because a power failure could lead to loss of data. The UPS allows the PC to be shut down securely without losing data if a power failure occurs.

UXGA

Abbreviation for "Ultra Extended Graphics Array" Generally a screen resolution of 1600×1200 pixels (aspect ratio 4:3, 12:9).

۷

VGA

An abbreviation for "Video Graphics Adapter". A video adapter which can handle all EGA (Enhanced Graphics Adapter) video modes and adds several new modes.

W

Windows CE

Compact 32-bit operating system with multitasking and multithreading that Microsoft developed especially for the OEM market. It can be ported for various processor types and has a high degree of real-time capability. The development environment uses proven, well-established development tools. It is an open and scalable Windows operating system platform for many different devices. Examples of such devices are handheld PCs, digital wireless receivers, intelligent mobile phones, multimedia consoles, etc. In embedded systems, Windows CE is also an excellent choice for automation technology.

WSXGA

Wide SXGA, generally 1600×900 pixels (16:9).

WUXGA

Wide UXGA, generally 1920×1200 pixels (16:10).

WXGA

Wide XGA, generally 1280×768 pixels.

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.

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