Power Panel 100/200

User's Manual

Version: **1.5 (December 2003)**

Model No.: **MAPP02-E**

PRELIMINARY

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Chapter 1 • General Information

1. Manual History

Version	Date	Comments
1.0	02.05.2002	Changes / New Features - First version
1.1	20.08.2002	Changes / New Features - Model numbers added for 24 VDC supply voltage plug - Metal housing for PP120 versions 4PP120.0571-01 and 4PP120.0571-21 added - Compact Flash cards (5CFCRD.0xxx-00) added
1.2	30.10.2002	Changes / New Features - Layout - changes
1.3	06.12.2002	Changes / New Features - Layout - changes - Restructuring of the manual - The following model numbers have either been updated or added: 4PP120.0571-01, 4PP120.0571-21, 4PP120.1043-31, 4PP120.1505-31, 4PP220.0571-45, 4PP220.0571-65, 4PP220.0571-85, 4PP220.0571-A5, 4PP220.1043-75, 4PP220.1043-B5, 4PP220.1505-75, 4PP220.1505-B5, 5PP120.0571-27, 5PP120.1043-37, 5PP120.1505-37, 0AC201.9, 0TB103.9 0TB103.91, 0TB704.9, 0TB704.91, 3IF772.9, 3IF786.9, 3IF787.9, 3IF789.9, 9A0013.01, 9S0001.13-010, 9S0001.13-02 New Chapter 3, 4, 5, 6, 7 added
1.4	27.03.2003	Changes / New Features - Description of BIOS revised (table formatting, content)
1.5	28.04.2003	Changes / New Features - Technical data for the 3-pin supply plug updated - Mounting instructions (distance) and mounting position updated - Following Power Panel devices added: 4PP210.0000-95, 4PP251.0571-65, 4PP251.0571-A5 - Battery change, battery buffer time updated - Power conspumption and operating temperatures added - BIOS update description added - REMHOST description added - CMOS backup description added - Windows CE section updated - Distribution of resources by BIOS added - Delivery scope for each Power Panel device added

Table 1: Manual history

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2. Safety Guidelines

2.1 Introduction

Programmable logic controllers (e.g. PLCs, etc.), operating and monitoring devices (e.g. industrial PCs, Power Panels, mobile panels, etc.) as well as the B&R uninterruptible power supplies have been designed, developed or manufactured for conventional use in industry. They were not designed, developed and manufactured for any use involving serious risks or hazards that without the implementation of exceptionally stringent safety precautions could lead to death, injury, serious physical damage or loss of any other kind. Such risks and hazards include in particular 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 transportation systems, medical life support systems, and the control of weapons systems.

Both when using programmable logic controllers and when using operating and monitoring devices (such as control systems) together 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 service may only be carried out by qualified personnel. Qualified personnel are persons who are familiar with the transport, mounting, installation, commissioning and operation of the product and have the appropriate qualifications (e.g. IEC 60364). National accident prevention guidelines must be followed.
The safety guidelines, connection descriptions (rating plate and documentation) and limit values listed in the technical data must be read carefully before installation and commissioning and must be observed.

2.2 Intended Use

Electronic devices are generally not fail-safe. 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, such as motors, are made safe.

2.3 Transport and Storage

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

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2.4 Installation

- The installation must take place according to the documentation using suitable equipment and tools.
- The devices are only allowed to 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).

2.5 Operation

2.5.1 Protection Against Touching Electrical Parts

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

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

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

2.6 Safety Notices

Safety notices are organized as follows:

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

Table 2: Safety guidelines

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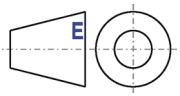

All dimension diagrams (e.g. dimension diagrams, etc.) are drawn according to European dimension standards.

3. Model Numbers

3.1 Power Panel with Automation Runtime

Model Number	Description	Note
4PP120.0571-01	**Power Panel 120 LCD B/W QVGA 5.7in T MH** Power Panel PP120; 5.7in QVGA b/w LC display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 16 MB SDRAM; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP120.0571-21	**Power Panel 120 LCD C QVGA 5.7in T MH** Power Panel PP120; 5.7in QVGA color LC display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 16 MB SDRAM; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP120.1043-31	**Power Panel 120 TFT C VGA 10.4in T MH** Power Panel PP120; 10.4in VGA TFT color display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 16 MB SDRAM; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP120.1505-31	**Power Panel 120 TFT C XGA 15in T MH** Power Panel PP120; 15in XGA TFT color display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 16 MB SDRAM; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP210.0000-95	**Power Panel 210 Controller MH 2aPCI** Power Panel PP210 controller, Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 2 aPCI slots; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91)	
4PP220.0571-45	**Power Panel 220 LCD B/W QVGA 5.7in T MH 1aPCI** Power Panel PP220; 5.7in QVGA b/w LC display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 1 aPCI Slot; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	

Table 3: Model numbers for Power Panel with Automation Runtime

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Model Number	Description	Note
4PP220.0571-65	**Power Panel 220 LCD C QVGA 5.7in T MH 1aPCI** Power Panel PP220; 5.7in QVGA color LC display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 1 aPCI slot; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP220.0571-85	**Power Panel 220 LCD B/W QVGA 5.7in T MH 2aPCI** Power Panel PP220; 5.7in QVGA b/w LC display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 2 aPCI slots; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP220.0571-A5	**Power Panel 220 LCD C QVGA 5.7in T MH 2aPCI** Power Panel PP220; 5.7in QVGA color LC display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 2 aPCI slots; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP220.1043-75	**Power Panel 220 TFT C VGA 10.4in T MH 1aPCI** Power Panel PP220; 10.4in VGA color TFT display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 1 aPCI slot; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP220.1043-B5	**Power Panel 220 TFT C VGA 10.4in T MH 2aPCI** Power Panel PP220; 10.4in VGA color TFT display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 2 aPCI slots; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
4PP220.1505-75	**Power Panel 220 TFT C XGA 15in T MH 1aPCI** Power Panel PP220; 15in XGA color TFT Display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 1 aPCI slot; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	In preparation
4PP220.1505-B5	**Power Panel 220 TFT C XGA 15in T MH 2aPCI** Power Panel PP220; 15in XGA color TFT display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 64 MB SDRAM; 2 aPCI slots; 256 kB SRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	In preparation
4PP251.0571-65	**Power Panel 251 LCD C QVGA 5.7in F MH 1aPCI** Power Panel PP251; 5.7in QVGA color LC display; 6 softkeys; 16 function keys and 20 system keys; 1 aPCI slot; 64 MB SDRAM; 256 kB SRAM Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	In preparation
4PP251.0571-A5	**Power Panel 251 LCD C QVGA 5.7in F MH 2aPCI** Power Panel PP251 5.7in QVGA color LC display; 6 softkeys; 16 function keys and 20 system keys; 2 aPCI slots; 64 MB SDRAM; 256 kB SRAM Compact Flash slot (type I); ETH 10/100; RS 232; 2xUSB; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9; cage clamps: 0TB103.91).	In preparation

Table 3: Model numbers for Power Panel with Automation Runtime (cont.)

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3.2 Power Panel with BIOS

Model Number	Description	Note
5PP120.0571-27	**Power Panel 120 LCD C QVGA 5.7in T MH** Power Panel PP120 BIOS; 5.7in QVGA color LC display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 128 MB SDRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
5PP120.1043-37	**Power Panel 120 TFT C VGA 10.4in T MH** Power Panel PP120 BIOS; 10.4in VGA TFT color display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 128 MB SDRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	
5PP120.1505-37	**Power Panel 120 TFT C XGA 15in T MH** Power Panel PP120 BIOS; 15in XGA TFT color display with touch screen (resistive), Compact Flash slot (type I), ETH 10/100, RS 232, 2xUSB; 128 MB SDRAM; battery; metal housing, IP 65 protection (from front); 24 VDC. Plug for power supply must be ordered separately (screw clamp: 0TB103.9, cage clamp: 0TB103.91).	

Table 4: Model numbers for Power Panel with BIOS

3.3 Accessories

Model Number	Description	Note
0AC201.9	**Lithium Batteries (5 pcs.)** Lithium batteries, 5 pcs., 3 V / 950 mAh	
0TB103.9	**Plug for the 24 V Supply Voltage (screw clamps)** Plug 24 V 5.08 3-pin Screw clamps	
0TB103.91	**Plug for the 24 V Supply Voltage (cage clamps)** Plug 24 V 5.08 3-pin Cage clamps	
0TB704.9	**Accessory 4-pin Screw Clamp , 5.08** Accessory, terminal block, 4-pin, screw clamps, 1.5 mm2	
0TB704.91	**Accessory 4-pin Cage Clamp , 5.08** Accessory, terminal block, 4-pin, cage clamps, 2.5 mm2	
3IF772.9	**aPCI Interface 2x CAN, 1x RS232** aPCI interface module, 1 RS232 interface, 2 CAN interfaces, max. 500 kbps, CAN: electrically isolated, network capable, object buffer in send and receive directions Order 2 x TB704 terminal blocks separately.	
3IF786.9	**aPCI interface 1x POWERLINK, 1x RS232** aPCI interface modules, 1 ETHERNET Powerlink interface, manager or controller function, 1 RS232 interface	
3IF787.9	**aPCI Interface 1x POWERLINK, 1x CAN** aPCI interface module, 1 ETHERNET Powerlink interface, manager or controller function, 1 CAN interface, max. 500 kbps, object buffer in send and receive direction, network capable, electrically isolated. Order 1 x TB704 terminal block separately.	
3IF789.9	**aPCI interface 1x POWERLINK, 1x X2X-LINK** aPCI interface interface module, 1ETHERNET Powerlink interface, manager or controller function, 1X2X Link Master interface, electrically isolated. Order TB704 terminal block separately.	

Table 5: Model numbers for accessories

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Model Number	Description	Note
5CFCRD.0032-01	**Compact Flash 32 MB ATA/True IDE** Compact Flash card with 32 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0064-01	**Compact Flash 64 MB ATA/True IDE** Compact Flash card with 64 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0128-01	**Compact Flash 128 MB ATA/True IDE** Compact Flash card with 128 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0128-01	**Compact Flash 196 MB ATA/True IDE** Compact Flash card with 196 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0256-01	**Compact Flash 256 MB ATA/True IDE** Compact Flash card with 256 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0384-01	**Compact Flash 384 MB ATA/True IDE** Compact Flash card with 384 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0512-01	**Compact Flash 512 MB ATA/True IDE** Compact Flash card with 512 MB FPROM, and true IDE/ATA interface.	
9A0013.01	**Pen for Resistive Touch Screen**	
9A0017.01	**RS232 Null Modem Cable 0.6 m** To connect the Power Panel to the remote PC (9-pin DSUB socket - 9-pin DSUB socket)	
9A0017.02	**RS232 Null Modem Cable 1.8 m** To connect the Power Panel to the remote PC (9-pin DSUB socket - 9-pin DSUB socket)	

Table 5: Model numbers for accessories (cont.)

3.4 Software

Model Number	Description	
5S0000.01-090	**HMI Drivers & Utilities CD**	
9S0001.13-010	**OEM MS-Win CE4.1 German** Only delivered with a Power Panel BIOS device	
9S0001.13-020	**OEM MS-Win CE4.1 English** Only delivered with a Power Panel BIOS device	

Table 6: Software model numbers

3.5 Documentation

Model Number	Description	
MAPP02-0	Power Panel 100 / 200 User's Manual, English	In preparation
MAPP02-E	Power Panel 100/200 User's Manual, English	In preparation

Table 7: Model numbers for documentation

PRELIMINARY

PRELIMINARY

Chapter 2 • Technical Data

1. General Information

B&R offers the B&R Power Panel 100 and Power Panel 200 product range for automation of small to midsize machines and systems.

The Power Panel 100 and Power Panel 200 product range encompasses a line of devices from operating units with QVGA, VGA or XGA display to visualization devices and machines controllers. Programmable with Automation Studio (Visual Components), these devices close the gap between Panelware and IPC based systems. Depending on the design, the devices contain the embedded operating system Automation Runtime or a BIOS based operating system such as Windows CE or Windows XP embedded. The number of onboard interfaces is reduced to a minimum and size is optimized to the smallest dimensions.

Depending on the model, the devices have a 5.7 inch QVGA touch screen available in either color or black/white, as well as a 10.4 inch VGA or a 15 inch XGA touch screen in color. Additionally, there are horizontally or vertically formatted devices available (numeric and alphanumeric keys, with or without insert strips) for all display sizes.

Figure 1: Power Panel

PRELIMINARY

1.1 Features

- 24 VDC supply voltage
- 2 USB connections
- Ethernet 10/100 MBit interface
- Compact Flash slot
- RS232 interface, modem capable, not electrically isolated
- 2 operating mode switches (2 x 16 digit)
- Touch screen (analog resistive), function keys or both
- Horizontal and vertical mounting placements, numeric and alphanumeric keys
- 2 status LEDs (User and Compact Flash)
- Software compatible with B&R 2000 PLC family
- aPCI Slots
- Fan free operation
- BIOS or Automation Runtime
- Real-time clock (battery-buffered)
- Up to 128 MB main memory

PRELIMINARY

2. Power Panel 100 with Automation Runtime

2.1 Device Interfaces

In the following section, a description is given for all interfaces and plugs available to the Power Panel.

2.1.1 Power Supply

Input Voltage: 24 VDC ± 25%, not electrically isolated

The 3-pin socket required for the supply voltage connection is not included in the delivery. This can be ordered from B&R using the model number 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp). The cable required for the connection must be supplied by the customer (see also section "Windows XP Embedded", on page 159).

The supply voltage is protected by a self-healing fuse which means that the device is not damaged if there is an overload, or if the supply voltage is incorrectly connected. Additionally, it also means that the fuse does not need to be changed.

The pin assignments can be found in the table below and are also printed on the Power Panel type plate or device label.

Supply Voltage	
Pin	**Assignment**
1	+
2	Ground
3	-
Accessories	
0TB103.9	Plug 24 V 5.08 3p screw clamps
0TB103.91	Plug 24 V 5.08 3p cage clamps

Figure 2: Supply voltage connection

Warning!

The ground connection (functional ground) should be as short as possible. If the Power Panel is installed in a switching cabinet, the connection cable should not be longer than 15 cm.

PRELIMINARY

2.1.2 Grounding Clip

The ground clip should be connected to ground using the shortest route possible.

Grounding Clip

Figure 3: Grounding clip

2.1.3 COM Interface

The Power Panel is equipped with a PC compatible serial interface with 16 bytes FIFO. This non-electrically isolated interface is primarily intended for programming the Power Panel using Automation Studio.

The RS232 can also be used as a general interface (e.g. printer, bar code reader, etc.).

Serial Interface		
RS232 Interface modem capable, not electrically isolated Up to 115 kBaud		9-pin DSUB connector
Pin	**RS232**	
1	DCD	
2	RXD	
3	TxD	
4	DTR	
5	GND	
6	DSR	
7	RTS	
8	CTS	
9	RI	

Table 8: COM pin assignment

PRELIMINARY

2.1.4 USB Port

The Power Panel is equipped with a USB host controller with two USB ports.

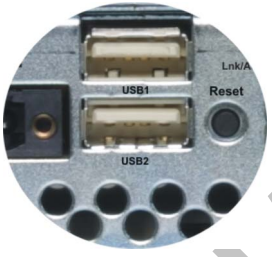
Universal Serial Bus


Figure 4: USB port

Technical Data for USB Port	
Transfer Rate	1.5 MBit/s and 12 MBit/s
Power Supply	500 mA per port
Maximum Cable Length	5 m (can possibly be extended using a USB hub)

Table 9: Technical data for USB connection

Warning!

Only USB devices tested and verified by B&R are allowed to be connected to the USB interface.

Caution!

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

2.1.5 Mode/Node Switch

The Power Panels are equipped with 2 hex switches, which are used as an operating mode switch. Switch positions 01 up to FD are available to the user in an application. The position of the switch can be evaluated by an application program.

PRELIMINARY

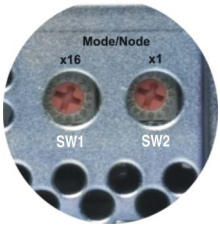
Mode/Node Switch


Figure 5: Mode/node switch

Switch Position		Function	Description
SW1 (x16)	SW2 (x1)	Operating Mode Switch	
0	0	Boot	Automation Runtime boot mode for operating system (firmware) upgrade (default Automation Runtime) A new operating system is downloaded.
0 to F	1 to D	Node	Automation Runtime run mode with node 01-FD (Compact Flash Automation Runtime or terminal operation) Freely available for use in an application e.g. setting the INA2000 station number for the Ethernet interface
F	E	Dyn. Mode	Automation Runtime run mode with node 01-FD (Compact Flash Automation Runtime or terminal operation) Device addresses can be defined by the software
F	F	Diagnosis	Automation Runtime diagnose mode (Compact Flash Automation Runtime or Terminal Operation)

Table 10: Switch settings for the mode/node switch

2.1.6 Status LEDs

Power Panels are equipped with two status LEDs which are visible on the outside.

Status LEDs

Figure 6: Status LEDs

PRELIMINARY

LED	Color	Function
User	Green	Freely available for use in an application (corresponding libraries for Automation Studio in preparation)
CF	Yellow	Indicates the access to a Compact Flash card present

Table 11: Status LEDs

2.1.7 Ethernet Connection

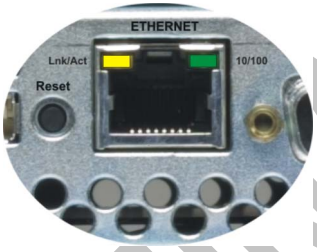
Ethernet Connection


Figure 7: Ethernet connection

Ethernet	10/100 MBit/s [1]
Connection	RJ45 twisted pair (10BaseT/100BaseT)
Controller	MacPhyter DP83815
Cabling	S/STP (category 5)

Table 12: Ethernet controller

1) Both operating modes are possible. Switching takes place automatically

The onboard Ethernet controller for Power Panel devices provides an RJ45 twisted pair connection, to which 2 LEDs are attached for status control:

LED	On	Off
Green	100 MBit/s	10 MBit/s
Yellow	Link	Activity (blinking)

Table 13: Status LEDs Ethernet controller

2.1.8 Reset Button

The reset button can be accessed through a small hole between the USB and the Ethernet connection. In order to avoid accidental activation, a reset can only be triggered with a pointed object.

PRELIMINARY

Reset Button

Figure 8: Reset button

2.1.9 Compact Flash Slot

Power Panels are equipped with a Compact Flash slot which is accessible from the side. Type I Compact Flash cards are supported.

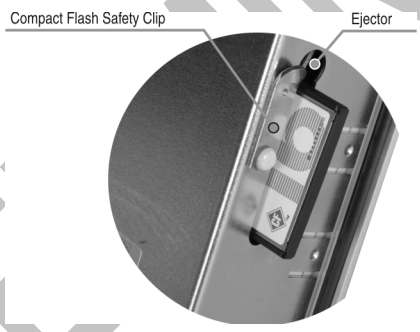


Figure 9: Compact Flash slot

It is possible to protect the Compact Flash slot using a safety clip. By pressing the ejector (using a pointed object is the best way to do this) the Compact Flash card can be changed quickly and safely.

Caution!

Changing the Compact Flash card can only take place without power applied!

PRELIMINARY

2.2 Label

2.2.1 Device Label

The following label attached in a suitable location on the Power Panel, contains short definitions for all of the interfaces:

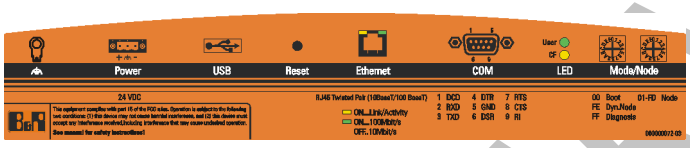


Figure 10: Device label

2.2.2 Serial Number Label

General Information

Each B&R device is assigned a unique serial number label with a bar code, allowing the device to be clearly identified.

Design and Dimensions

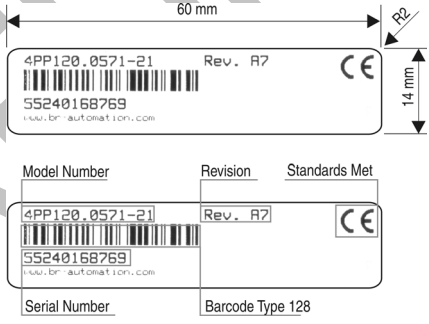


Figure 11: Design and dimensions of serial number label

PRELIMINARY

This page is only used as a place holder.

PRELIMINARY

2.3 Device 4PP120.0571-01

Figure 12: Front view 4PP120.0571-01

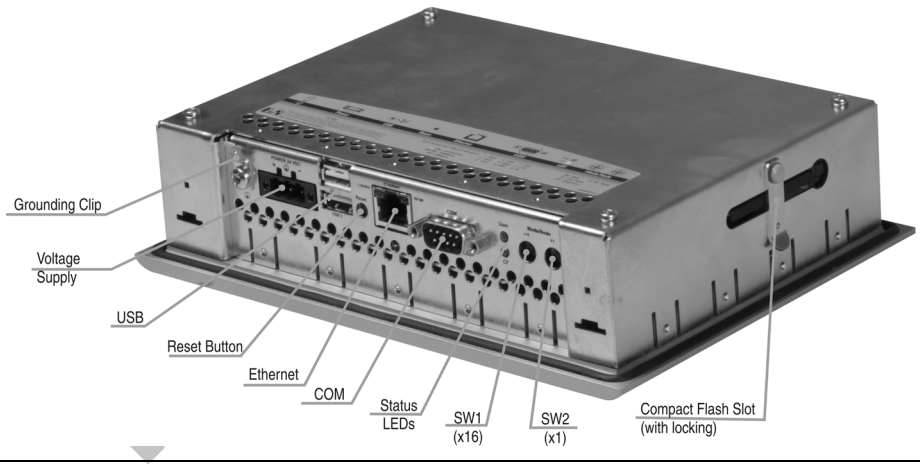


Figure 13: Rear view 4PP120.0571-01

2.3.1 Technical Data

Features	4PP120.0571-01
Bootloader	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	16 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	-
Watchdog, SMC Internal	-
Power Fail Logic, SMC 10 ms Buffer Time	-
Real-time Clock	Yes, not battery backed
Battery (Lithium, 950mAh, exchange from outside)	-
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	-
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 LCD 5.7 in 8 shades of gray QVGA, 320 x 240 pixels 140 cd/m² 20,000 hours
Touch Screen Technology Controller	 Analog, resistive (Gunze) Serial (Hampshire)
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 14: Technical data 4PP120.0571-01

PRELIMINARY

Features	4PP120.0571-01
Power Consumption	Approx. 10 Watt[1)]
Protection	IP20 back side (only with installed Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 1.4 kg
Outer Dimensions in mm (WxHxD)	212 x 156 x 55.5
Altitude	TBD
Environmental Temperature Operation Storage	 0 - 50° C TBD
Relative Humidity Operation Storage	 TBD TBD

Table 14: Technical data 4PP120.0571-01 (cont.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

2.3.2 Dimensions

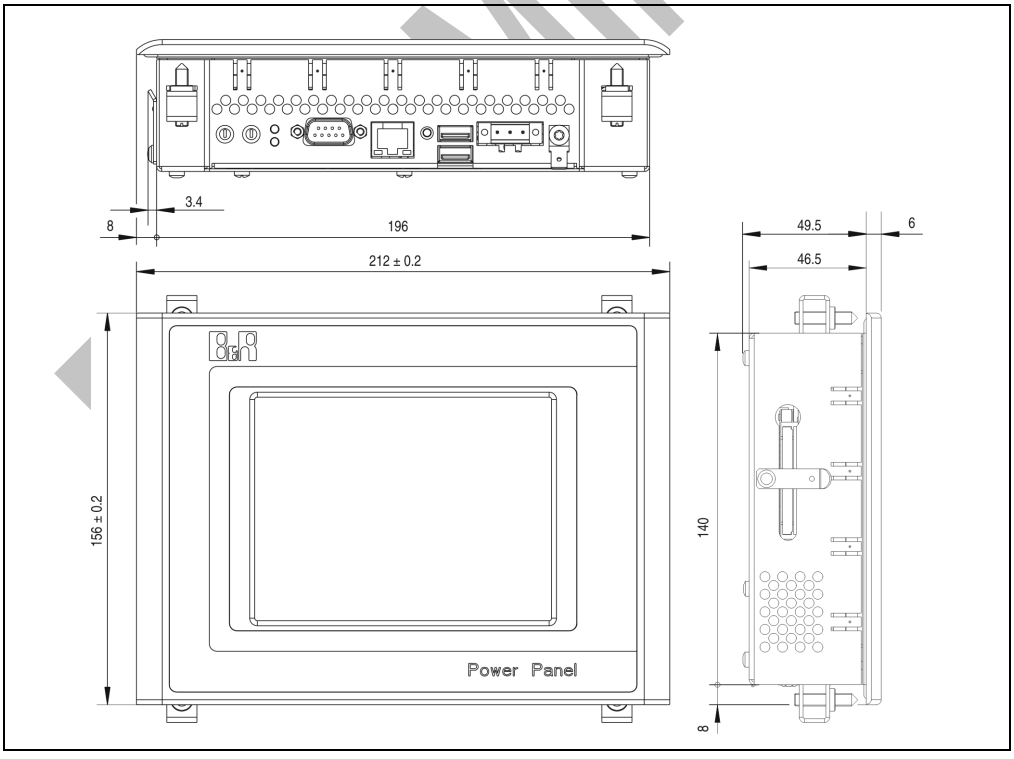


Figure 14: Dimensions 4PP120.0571-01

PRELIMINARY

2.3.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 4 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 14 "Dimensions 4PP120.0571-01" on Page 35) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

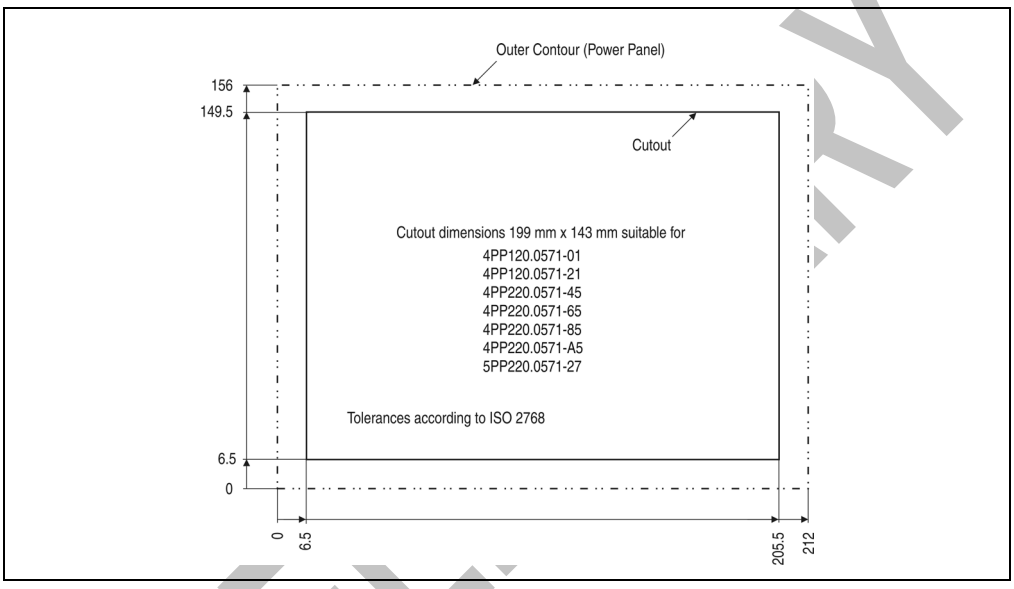


Figure 15: Cutout dimensions

2.3.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 120 LCD B/W QVGA 5.7in T MH
4	Retaining clips included

Table 15: Delivery 4PP120.0571-01

PRELIMINARY

2.4 Device 4PP120.0571-21

Figure 16: Front view 4PP120.0571-21

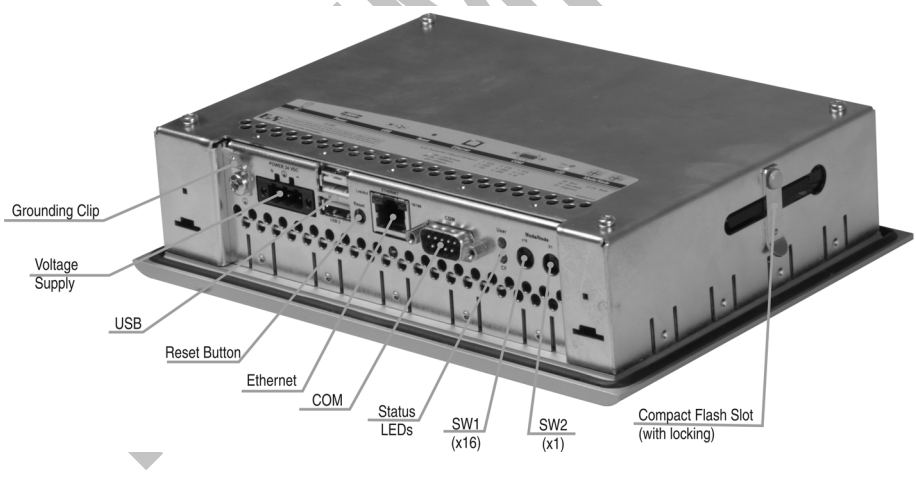


Figure 17: Rear view 4PP120.0571-21

2.4.1 Technical Data

Features	4PP120.0571-21
Bootloader	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	16 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	-
Watchdog, SMC Internal	-
Power Fail Logic, SMC 10 ms Buffer Time	-
Real-time Clock	Yes, not battery backed
Battery (Lithium, 950mAh, exchange from outside)	-
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	-
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 LCD 5,7 in 256 Colors QVGA, 320 x 240 pixels 150 cd/m² 50,000 hours
Touch Screen Technology Controller	 Analog, resistive (Gunze) Serial (Hampshire)
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 16: Technical data 4PP120.0571-21

PRELIMINARY

Features	4PP120.0571-21
Power Consumption	Approx. 10 Watt[1)]
Protection	IP20 back side (only with installed Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 1.4 kg
Outer Dimensions in mm (WxHxD)	212 x 156 x 55.5
Altitude	TBD
Environmental Temperature Operation Storage	 0 - 50° C TBD
Relative Humidity Operation Storage	 TBD TBD

Table 16: Technical data 4PP120.0571-21 (cont.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

2.4.2 Dimensions

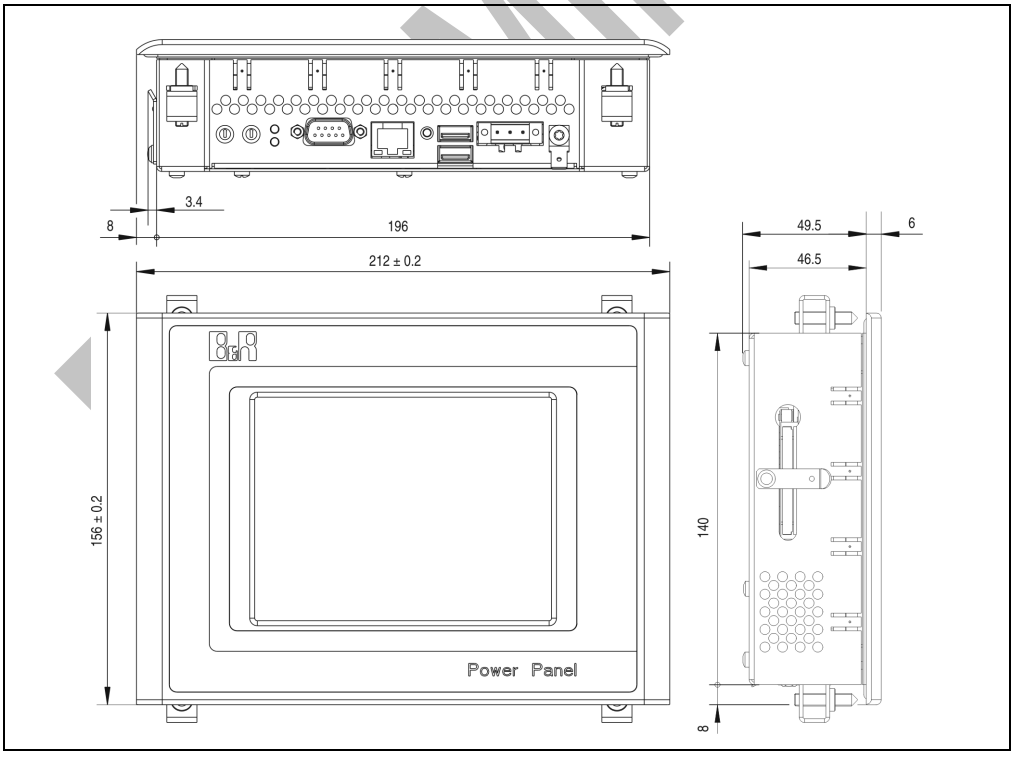


Figure 18: Dimensions 4PP120.0571-21

2.4.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 4 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 18 "Dimensions 4PP120.0571-21" on Page 39) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

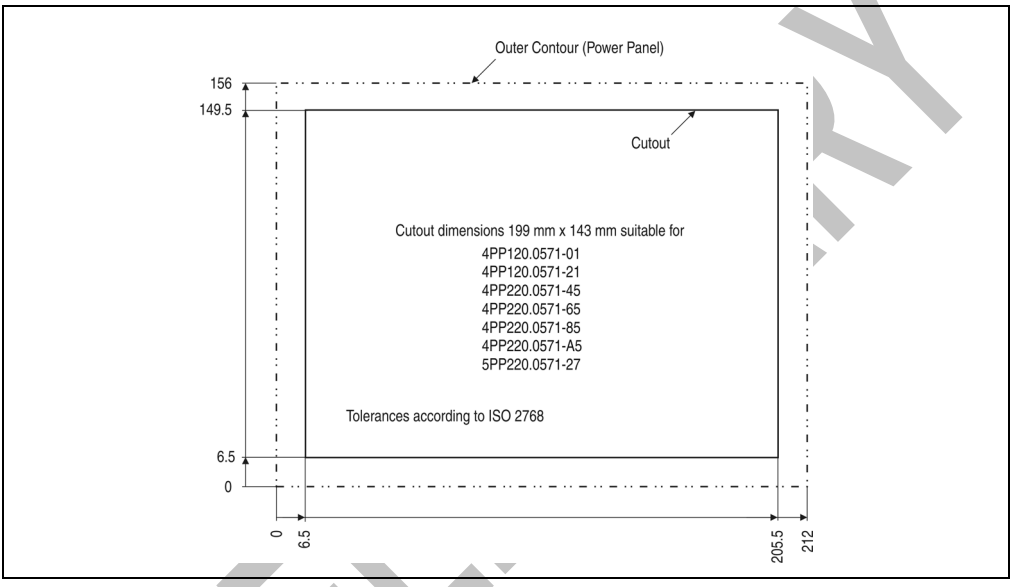


Figure 19: Cutout dimensions

2.4.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 120 LCD C QVGA 5.7in T MH
4	Retaining clips included

Table 17: Delivery 4PP120.0571-21

PRELIMINARY

2.5 Device 4PP120.1043-31

Figure 20: Front view 4PP120.1043-31

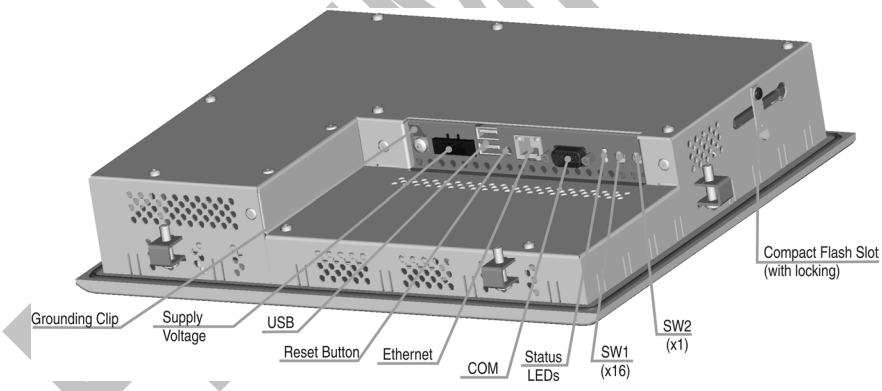


Figure 21: Rear view 4PP120.1043-31

2.5.1 Technical Data

Features	4PP120.1043-31
Bootloader	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	16 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	-
Watchdog, SMC Internal	-
Power Fail Logic, SMC 10 ms Buffer Time	-
Real-time Clock	Yes, not battery backed
Battery (Lithium, 950mAh, exchange from outside)	-
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	-
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 TFT 10,4 in 256 Colors VGA, 640 x 480 pixels 350 cd/m² 55,000 hours
Touch Screen Technology Controller	 Analog, resistive (3M) Serial (Hampshire)
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 18: Technical data 4PP120.1043-31

PRELIMINARY

Features	4PP120.1043-31
Power Consumption	Approx. 15 Watt[1)]
Protection	IP20 back side (only with installed Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 2 kg
Outer Dimensions in mm (WxHxD)	323 x 260 x 65.5
Altitude	TBD
Environmental Temperature Operation Storage	 0 - 50° C TBD
Relative Humidity Operation Storage	 TBD TBD

Table 18: Technical data 4PP120.1043-31 (cont.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

MINARY

2.5.2 Dimensions

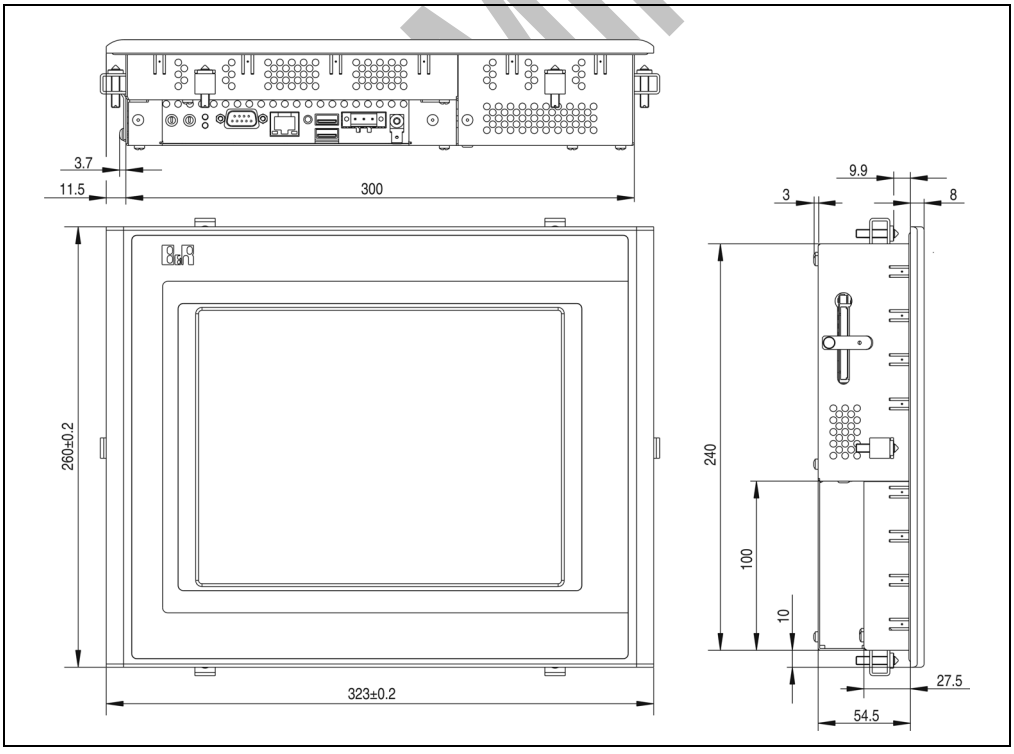


Figure 22: Dimensions 4PP120.1043-31

2.5.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 6 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 22 "Dimensions 4PP120.1043-31" on Page 43) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

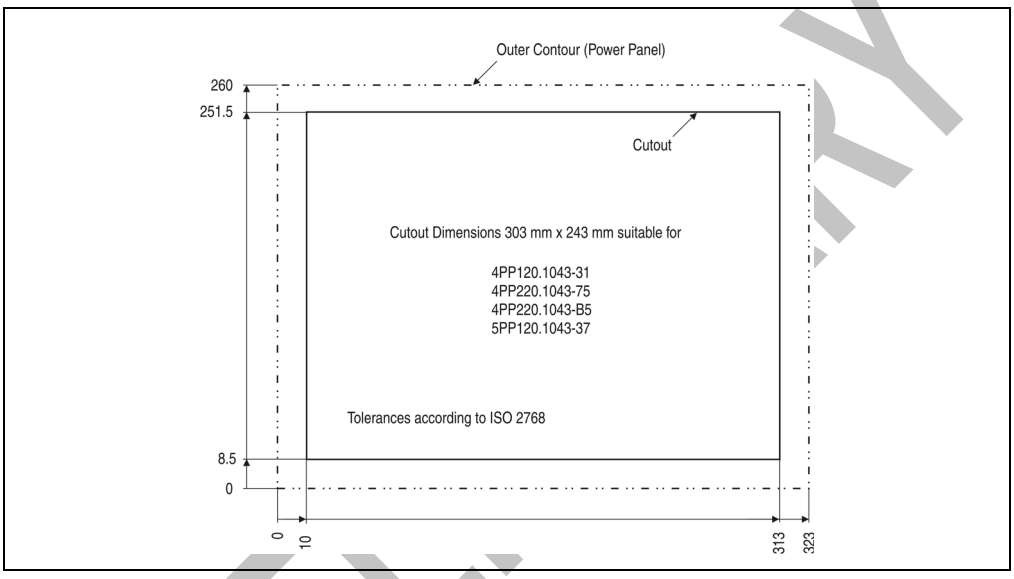


Figure 23: Cutout dimensions

2.5.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 120 TFT C VGA 10.4in T MH
6	Retaining clips included

Table 19: Delivery 4PP120.1043-31

PRELIMINARY

2.6 Device 4PP120.1505-31

Figure 24: Front view 4PP120.1505-31

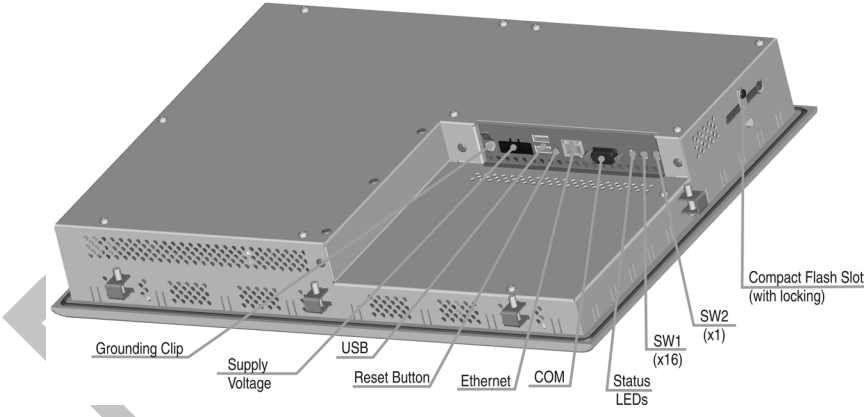


Figure 25: Rear view 4PP120.1505-31

2.6.1 Technical Data

Features	4PP120.1505-31
Bootloader	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	16 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	-
Watchdog, SMC Internal	-
Power Fail Logic, SMC 10 ms Buffer Time	-
Real-time Clock	Yes, not battery backed
Battery (Lithium, 950mAh, exchange from outside)	-
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	-
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 TFT 15 in 256 Colors XGA, 1024 x 768 pixels 330 cd/m² 35,000 hours
Touch Screen Technology Controller	 Analog, resistive (3M) Serial (Hampshire)
Front Frame Mylar Gasket	 Anodized aluminum, bright gray Polyester Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, not electrically isolated
Power Consumption	TBD

Table 20: Technical data 4PP120.1505-31

PRELIMINARY

Features	4PP120.1505-31
Protection	IP20 back side (only with installed Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	TBD
Outer Dimensions in mm (WxHxD)	435 x 330 x 71.5
Altitude	TBD
Environmental Temperature Operation Storage	 0 - 45° C TBD
Relative Humidity Operation Storage	 TBD TBD

Table 20: Technical data 4PP120.1505-31 (cont.)

2.6.2 Dimensions

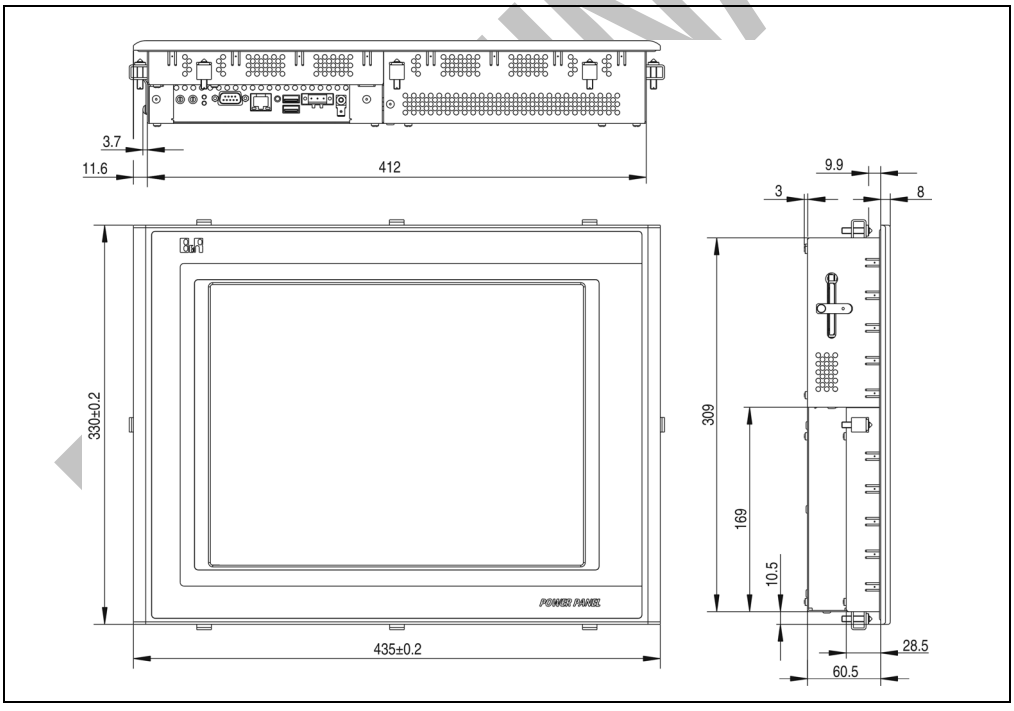


Figure 26: Dimensions 4PP120.1505-31

2.6.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 8 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 26 "Dimensions 4PP120.1505-31" on Page 47) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

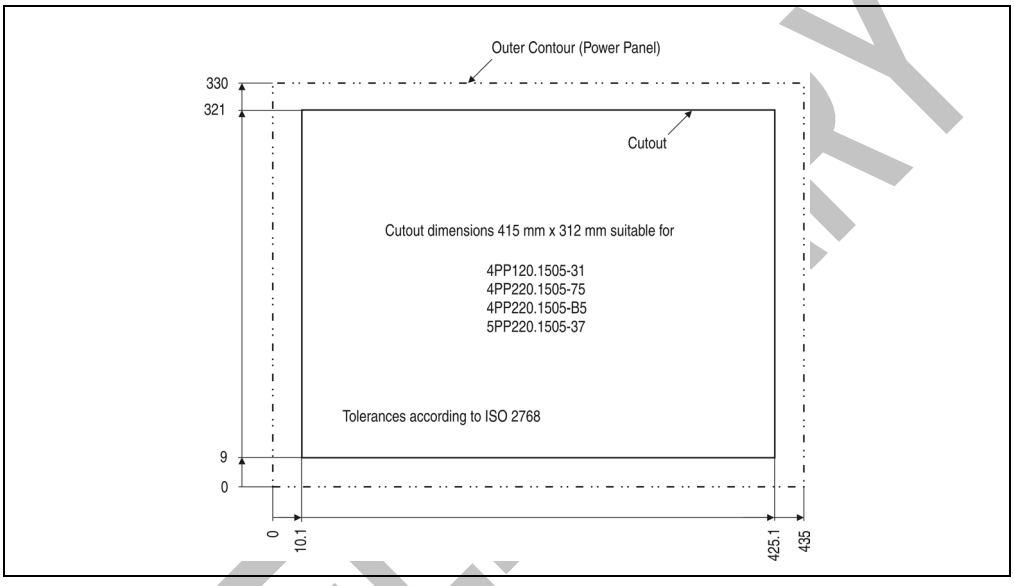


Figure 27: Cutout dimensions

2.6.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 120 TFT C XGA 15" T MH
8	Retaining clips included

Table 21: Delivery 4PP120.1505-31

PRELIMINARY

3. Power Panel 200 with Automation Runtime

3.1 Interface Descriptions

In the following section, a description is given for all interfaces and plugs available to the Power Panel.

3.1.1 Power Supply

Input Voltage: 24 VDC ± 25%; electrically isolated

The 3-pin socket required for the supply voltage connection is not included in the delivery. This can be ordered from B&R using the model number 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp). The cable (min. cross section 1.5 mm² - AWG 26 - 12) must be provided by customers themselves.

The supply voltage is protected by a self-healing fuse which means that the device is not damaged if there is an overload, or if the supply voltage is incorrectly connected. Additionally, it also means that the fuse does not need to be changed.

The pin assignments can be found in the table below and are also printed on the Power Panel type plate or device label.

Supply Voltage	
Pin	**Assignment**
1	+
2	Ground
3	-
Accessories	
0TB103.9	Plug 24 V 5.08 3p screw clamps
0TB103.91	Plug 24 V 5.08 3p cage clamps

Figure 28: Supply voltage connection

Warning!

The ground connection (functional ground) should be as short as possible. If the Power Panel is installed in a switching cabinet, the connection cable should not be longer than 15 cm.

PRELIMINARY

3.1.2 Grounding Clip

The ground clip should be connected to ground using the shortest route possible.

Grounding Clip

Figure 29: Grounding clip

3.1.3 COM Interface

The Power Panel is equipped with a PC compatible serial interface with 16 bytes FIFO. This non-electrically isolated interface is primarily intended for programming the Power Panel using Automation Studio.

The RS232 can also be used as a general interface (e.g. printer, bar code reader, etc.).

Serial Interface		
RS232 Interface modem capable, not electrically isolated Up to 115 kBaud		9-pin DSUB connector
Pin	**RS232**	
1	DCD	
2	RXD	
3	TxD	
4	DTR	
5	GND	
6	DSR	
7	RTS	
8	CTS	
9	RI	

Table 22: COM pin assignment

PRELIMINARY

3.1.4 USB Port

The Power Panel is equipped with a USB host controller with two USB ports.

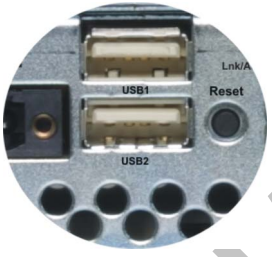
Universal Serial Bus


Figure 30: USB port

Technical Data for USB Port	
Transfer Rate	1.5 MBit/s and 12 MBit/s
Power Supply	500 mA per port
Maximum Cable Length	5 m (can possibly be extended using a USB hub)

Table 23: Technical data for USB connection

Warning!

Only USB devices tested and verified by B&R are allowed to be connected to the USB interface.

Caution!

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

PRELIMINARY

3.1.5 Mode/Node Switch

The Power Panels are equipped with 2 hex switches, which are used as an operating mode switch. Switch positions 01 up to FD are available to the user in an application. The position of the switch can be evaluated by an application program.

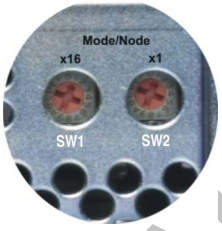
Mode/Node Switch


Figure 31: Mode/node switch

Switch Position		Function	Description
SW1 (x16)	SW2 (x1)	Operating Mode Switch	
0	0	Boot	Automation Runtime boot mode for operating system (firmware) upgrade (default Automation Runtime) A new operating system is downloaded.
0 to F	1 to D	Node	Automation Runtime run mode with node 01-FD (Compact Flash Automation Runtime or terminal operation) Freely available for use in an application e.g. setting the INA2000 station number for the Ethernet interface
F	E	Dyn. Mode	Automation Runtime run mode with node 01-FD (Compact Flash Automation Runtime or terminal operation) Device addresses can be defined by the software
F	F	Diagnosis	Automation Runtime Diagnose Mode (Compact Flash Automation Runtime or Terminal Operation)

Table 24: Switch settings for the mode/node switch

PRELIMINARY

3.1.6 Status LEDs

Power Panels are equipped with two status LEDs which are visible on the outside.

Status LEDs

LED	Color	Function
User	Green	Freely available for use in an application (corresponding libraries for Automation Studio in preparation)
CF	Yellow	Indicates the access to a Compact Flash card present

Figure 32: Status LEDs

3.1.7 Ethernet Connection

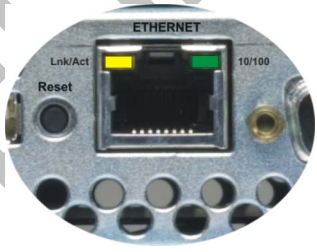
Ethernet Connection


Figure 33: Ethernet connection

Ethernet	10/100 MBit/s [1]
Connection	RJ45 twisted pair (10BaseT/100BaseT)
Controller	MacPhyter DP83815
Cabling	S/STP (category 5)

Table 25: Ethernet controller

1) Both operating modes are possible. Switching takes place automatically

PRELIMINARY

The onboard Ethernet controller for Power Panel devices provides an RJ45 twisted pair connection, to which 2 LEDs are attached for status control:

LED	On	Off
Green	100 MBit/s	10 MBit/s
Yellow	Link	Activity (blinking)

Table 26: Status LEDs Ethernet controller

3.1.8 Reset Button

The reset button can be accessed through a small hole between the USB and the Ethernet connection. In order to avoid accidental activation, a reset can only be triggered with a pointed object.

Reset Button

Figure 34: Reset button

3.1.9 Compact Flash Slot

Power Panel devices are equipped with a Compact Flash slot which is accessible from the side. Type I Compact Flash cards are supported.

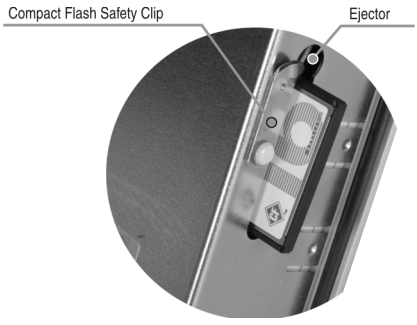


Figure 35: Compact Flash slot

PRELIMINARY

It is possible to protect the Compact Flash slot using a safety clip. By pressing the ejector (using a pointed object is the best way to do this) the Compact Flash card can be changed quickly and safely.

Caution!

Changing the Compact Flash card can only take place without power applied!

3.2 Label

3.2.1 Device Label

The following label attached in a suitable location on the Power Panel, contains short definitions for all of the interfaces:

Figure 36: Device label

3.2.2 Serial Number Label

General Information

Each B&R device is assigned a unique serial number label with a bar code, allowing the device to be clearly identified.

Design and Dimensions

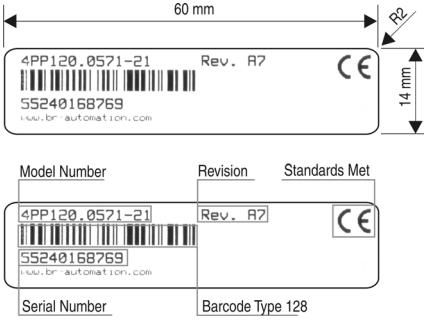


Figure 37: Design and dimensions of serial number label

PRELIMINARY

This page is only used as a place holder.

PRELIMINARY

3.3 Device 4PP210.0000-95

Figure 38: Front view 4PP210.0000-95

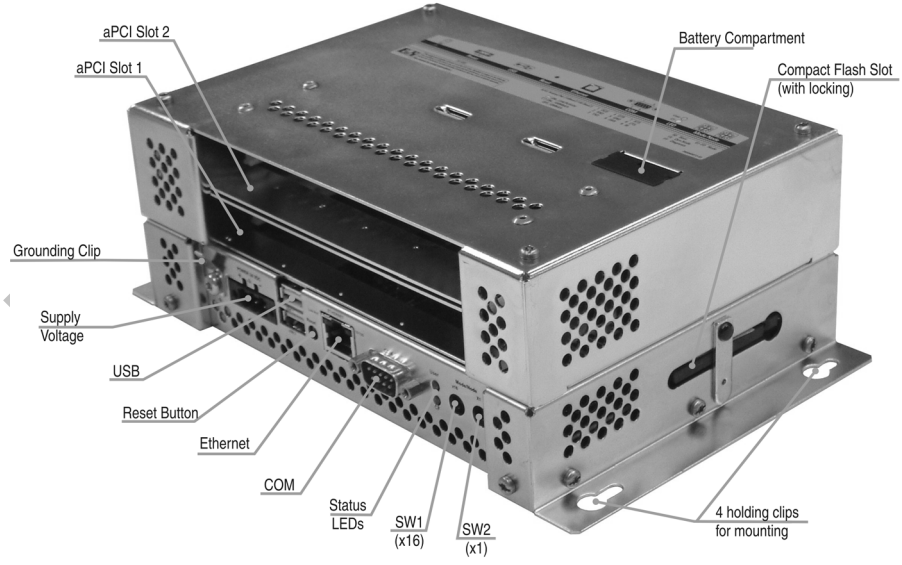


Figure 39: Rear view 4PP210.0000-95

3.3.1 Technical Data

Features	4PP210.0000-95
Bootloader	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	Yes
Watchdog, SMC Internal	Yes
Power Fail Logic, SMC 10 ms Buffer Time	Yes
Real-time Clock	Yes, battery buffered
Battery (Lithium, 950mAh, exchange from outside)	Yes
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	2 pieces
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 - - - - - -
Touch Screen Technology Controller	 - -
Front Frame Mylar Gasket	- - - -
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, electrically isolated
Power Consumption	TBD

Table 27: Technical data 4PP210.0000-95

PRELIMINARY

Features	4PP210.0000-95
Protection	IP20 back side (only with installed aPCI module and Compact Flash card)
Housing	Metal
Weight	Approx. 1 kg (without aPCI module)
Outer Dimensions in mm (WxHxD)	230 x 146 x 80.5
Altitude	TBD
Environmental Temperature Operation Storage	 TBD TBD
Relative Humidity Operation Storage	 TBD TBD

Table 27: Technical data 4PP210.0000-95 (cont.)

3.3.2 Dimensions

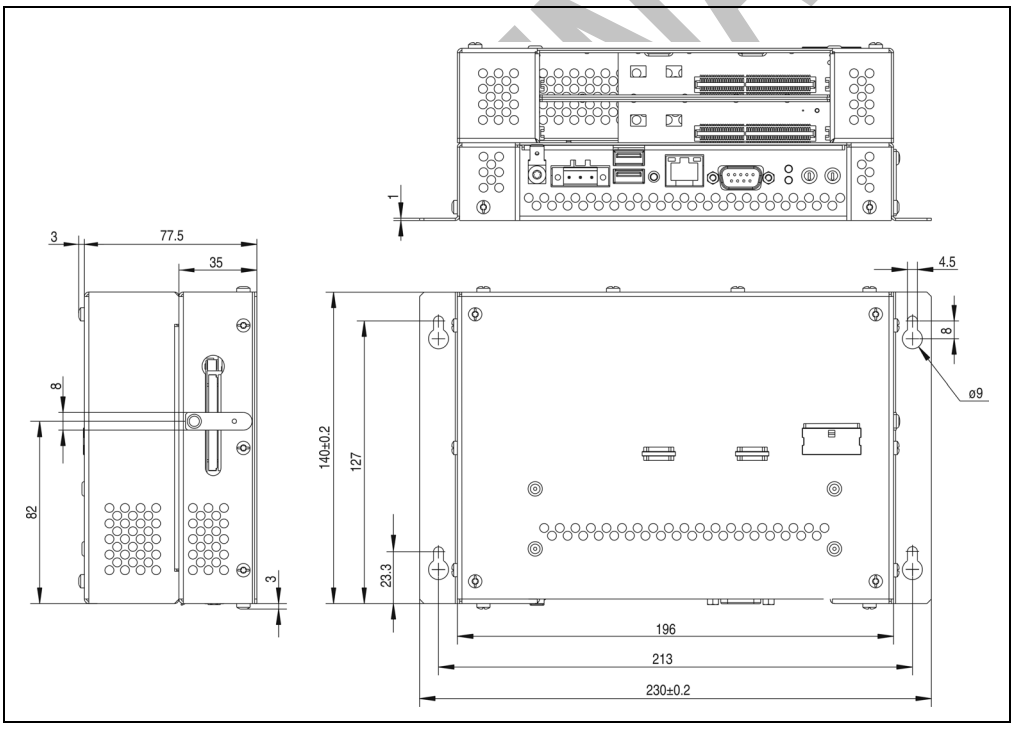


Figure 40: Dimensions 4PP210.0000-95

3.3.3 Drilling Template

For mounting, the drillings must be made according to the following diagram. For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

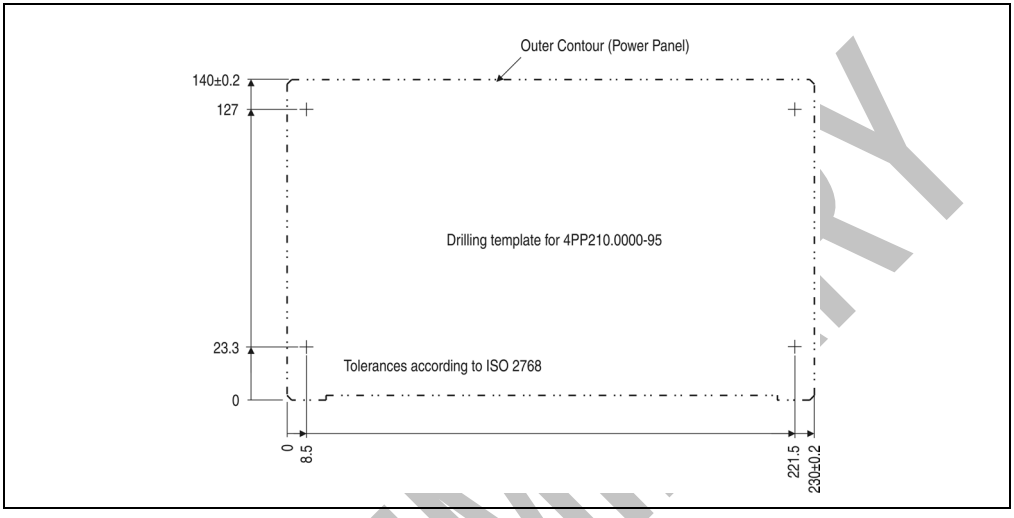


Figure 41: Cutout dimensions

3.3.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 210 Controller MH 2aPCI
1	Lithium battery 3 V / 950 mAh included

Table 28: Delivery 4PP210.0000-95

PRELIMINARY

3.4 Device 4PP220.0571-45

Figure 42: Front view 4PP220.0571-45

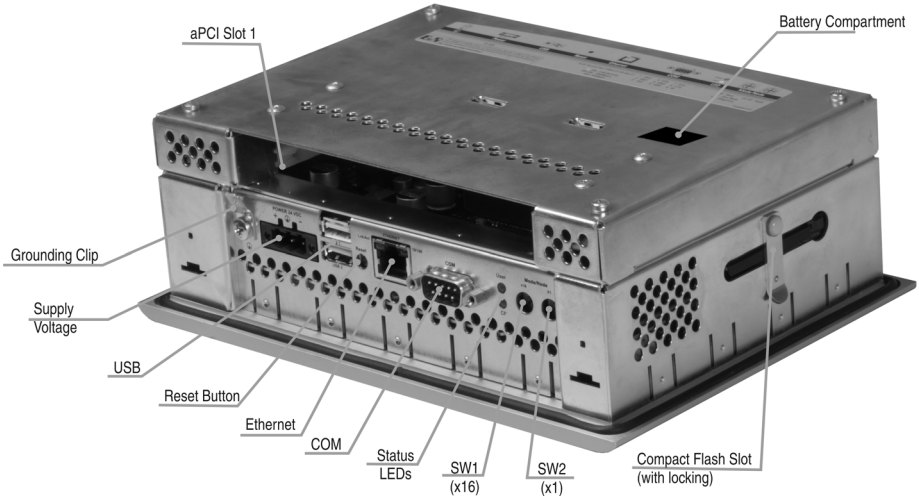


Figure 43: Rear view 4PP220.0571-45

3.4.1 Technical Data

Features	4PP220.0571-45
Bootloader	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	Yes
Watchdog, SMC Internal	Yes
Power Fail Logic, SMC 10 ms Buffer Time	Yes
Real-time Clock	Yes, battery buffered
Battery (Lithium, 950mAh, exchange from outside)	Yes
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	1 pieces
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 LCD 5.7 in 8 shades of gray QVGA, 320 x 240 pixels 140 cd/m² 20,000 hours
Touch Screen Technology Controller	 Analog, resistive (Gunze) Serial (Hampshire)
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, electrically isolated

Table 29: Technical data 4PP220.0571-45

PRELIMINARY

Features	4PP220.0571-45
Power Consumption	Approx. 17 Watt [1]
Protection	IP20 back side (only with installed aPCI module and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 1.6 kg (without aPCI module)
Outer Dimensions in mm (WxHxD)	212 x 156 x 76
Altitude	TBD
Environmental Temperature Operation Storage	 TBD TBD
Relative Humidity Operation Storage	 TBD TBD

Table 29: Technical data 4PP220.0571-45 (cont.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.4.2 Dimensions

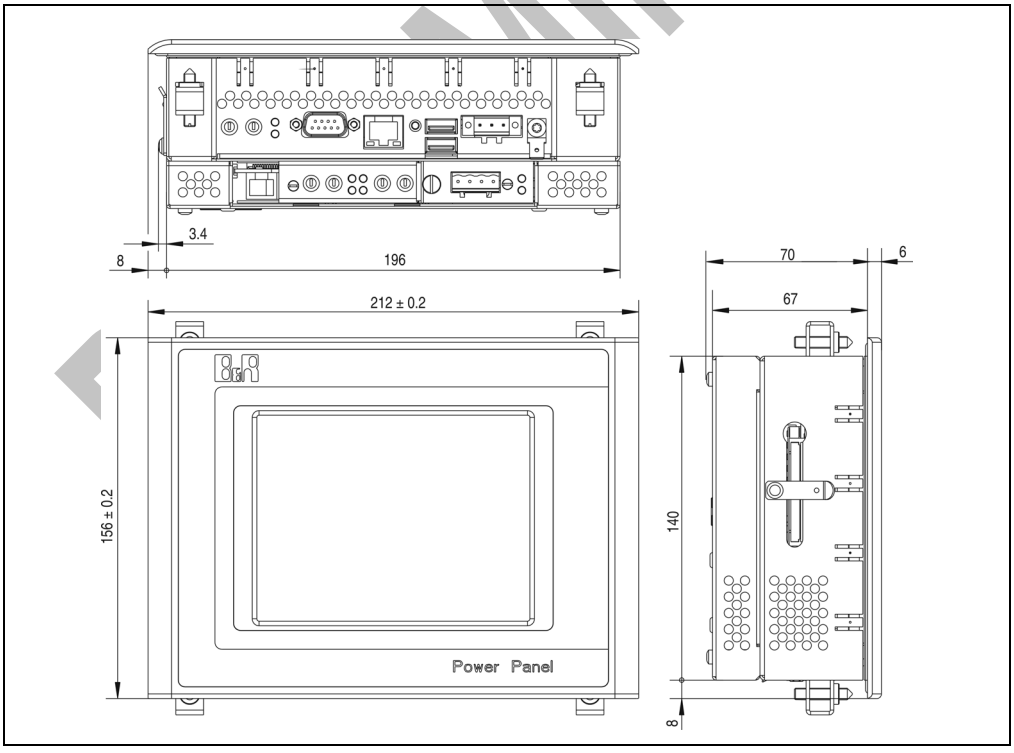


Figure 44: Dimensions 4PP220.0571-45

PRELIMINARY

3.4.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 4 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 44 "Dimensions 4PP220.0571-45" on Page 63) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

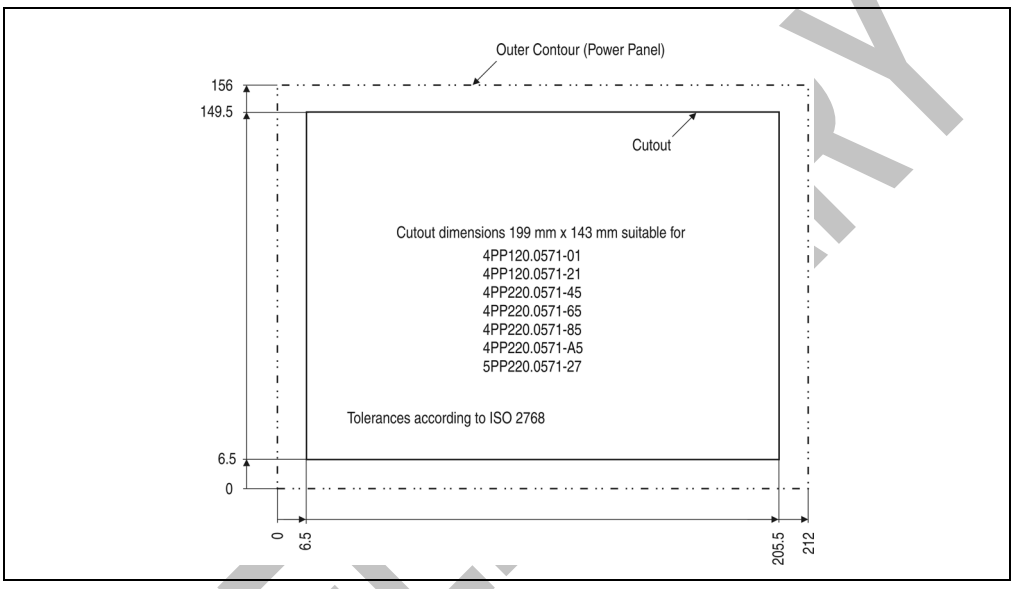


Figure 45: Cutout dimensions

3.4.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 220 LCD B/W QVGA 5.7in T MH 1aPCI
4	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 30: Delivery 4PP220.0571-45

PRELIMINARY

3.5 Device 4PP220.0571-65

Figure 46: Front view 4PP220.0571-65

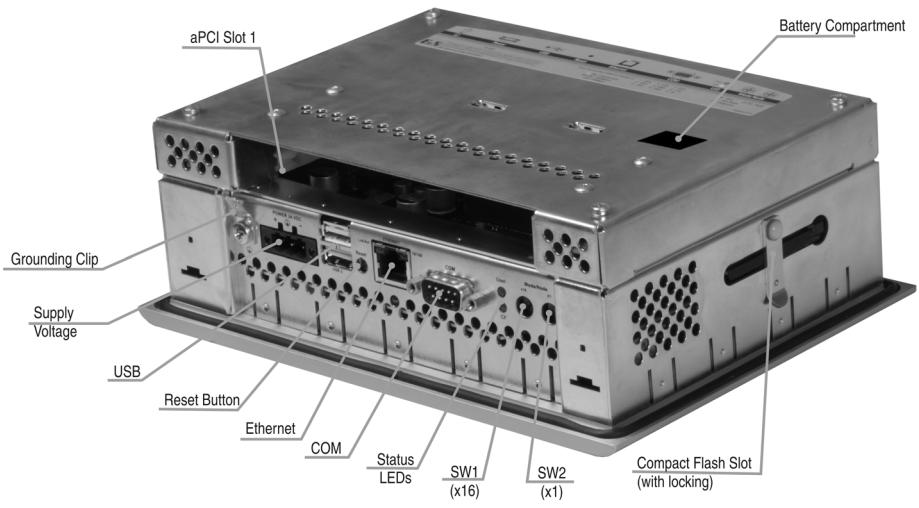


Figure 47: Rear view 4PP220.0571-65

3.5.1 Technical Data

Features	4PP220.0571-65
Bootloader	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	Yes
Watchdog, SMC Internal	Yes
Power Fail Logic, SMC 10 ms Buffer Time	Yes
Real-time Clock	Yes, battery buffered
Battery (Lithium, 950mAh, exchange from outside)	Yes
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	1 pieces
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 LCD 5,7 in 256 Colors QVGA, 320 x 240 pixels 150 cd/m² 50,000 hours
Touch Screen Technology Controller	 Analog, resistive (Gunze) Serial (Hampshire)
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, electrically isolated

Table 31: Technical data 4PP220.0571-65

PRELIMINARY

Features	4PP220.0571-65
Power Consumption	Approx. 17 Watt[1)]
Protection	IP20 back side (only with installed aPCI module and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 1.6 kg (without aPCI module)
Outer Dimensions in mm (WxHxD)	212 x 156 x 76
Altitude	TBD
Environmental Temperature Operation Storage	 TBD TBD
Relative Humidity Operation Storage	 TBD TBD

Table 31: Technical data 4PP220.0571-65 (cont.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.5.2 Dimensions

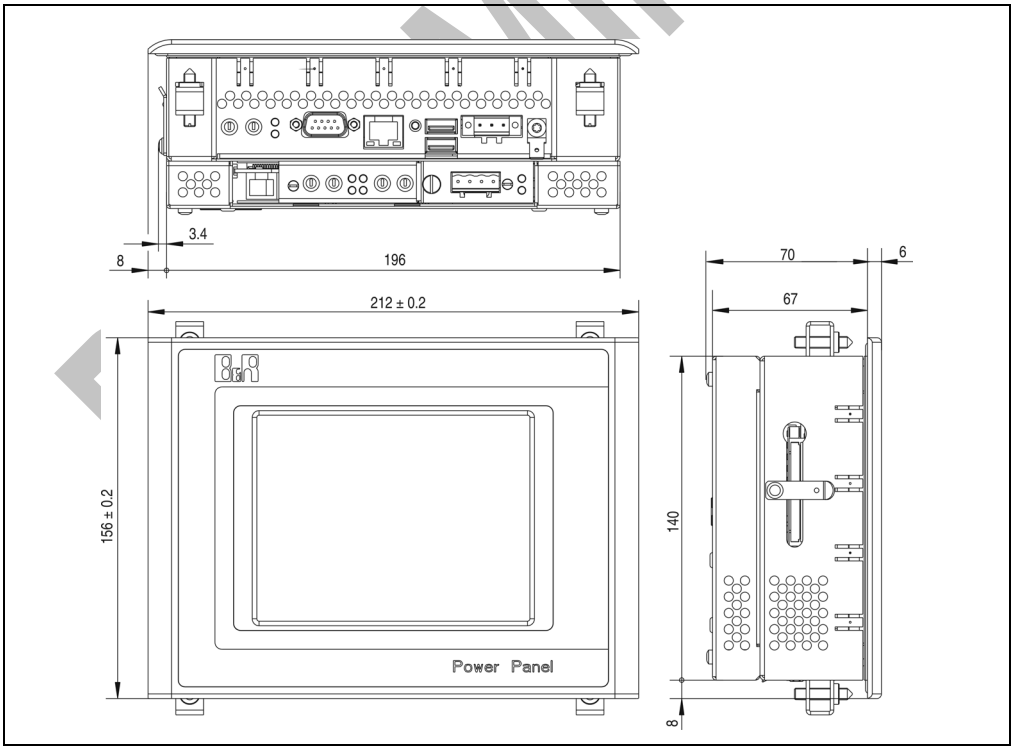


Figure 48: Dimensions 4PP220.0571-65

PRELIMINARY

3.5.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 4 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 48 "Dimensions 4PP220.0571-65" on Page 67) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

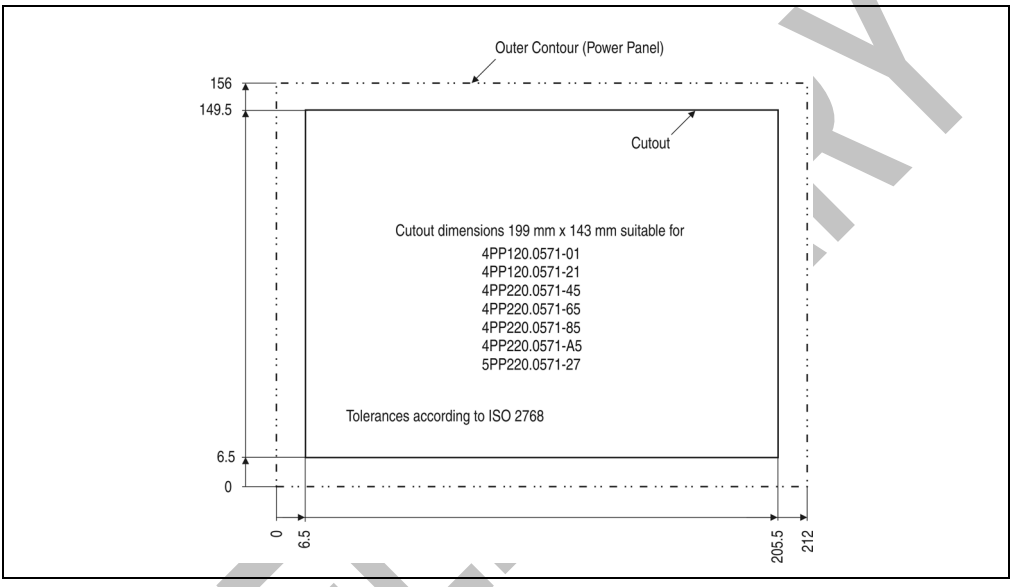


Figure 49: Cutout dimensions

3.5.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 220 LCD C QVGA 5.7in T MH 1aPCI
4	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 32: Delivery 4PP220.0571-65

PRELIMINARY

3.6 Device 4PP220.0571-85

Figure 50: Front view 4PP220.0571-85

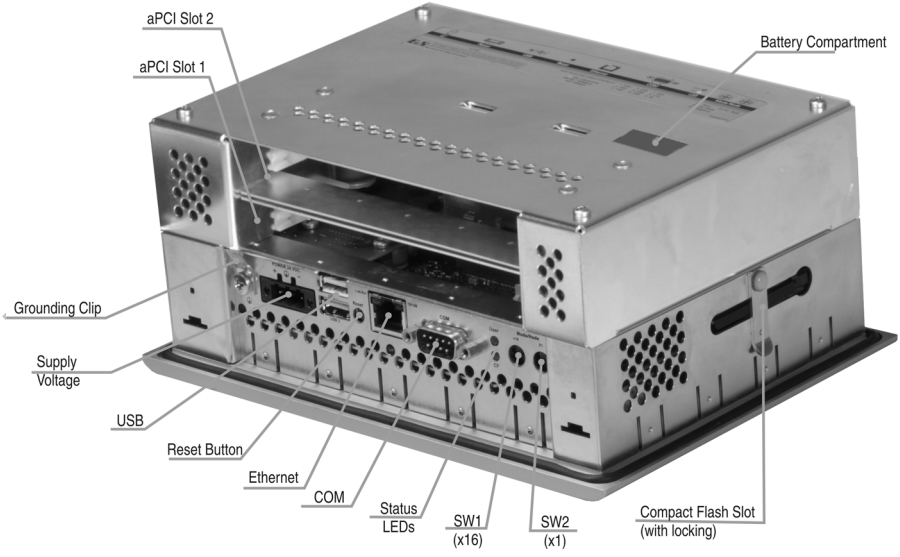


Figure 51: Rear view 4PP220.0571-85

3.6.1 Technical Data

Features	4PP220.0571-85
Bootloader	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	Yes
Watchdog, SMC Internal	Yes
Power Fail Logic, SMC 10 ms Buffer Time	Yes
Real-time Clock	Yes, battery buffered
Battery (Lithium, 950mAh, exchange from outside)	Yes
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	2 pieces
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 LCD 5,7 in 8 shades of gray QVGA, 320 x 240 pixels 140 cd/m² 20,000 hours
Touch Screen Technology Controller	 Analog, resistive (Gunze) Serial (Hampshire)
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, electrically isolated

Table 33: Technical data 4PP220.0571-85

PRELIMINARY

Features	4PP220.0571-85
Power Consumption	Approx. 22 Watt[1)]
Protection	IP20 back side (only with installed aPCI modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 1.8 kg (without aPCI modules)
Outer Dimensions in mm (WxHxD)	212 x 156 x 98
Altitude	TBD
Environmental Temperature Operation Storage	 TBD TBD
Relative Humidity Operation Storage	 TBD TBD

Table 33: Technical data 4PP220.0571-85 (cont.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.6.2 Dimensions

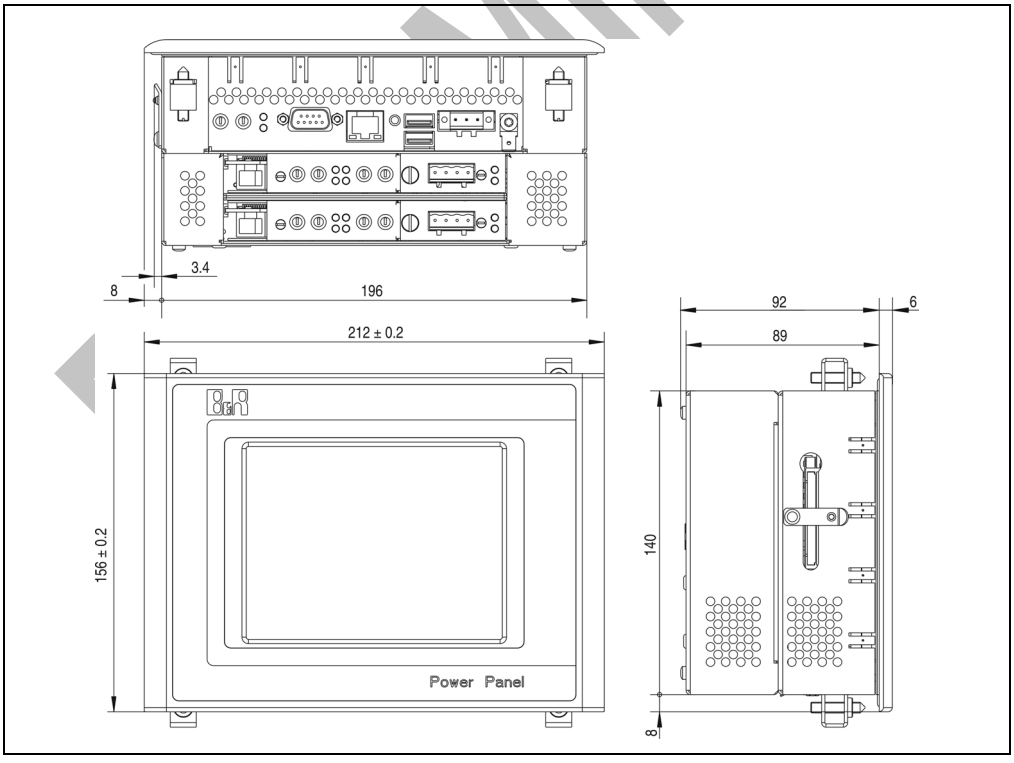


Figure 52: Dimensions 4PP220.0571-85

3.6.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 4 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 52 "Dimensions 4PP220.0571-85" on Page 71) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

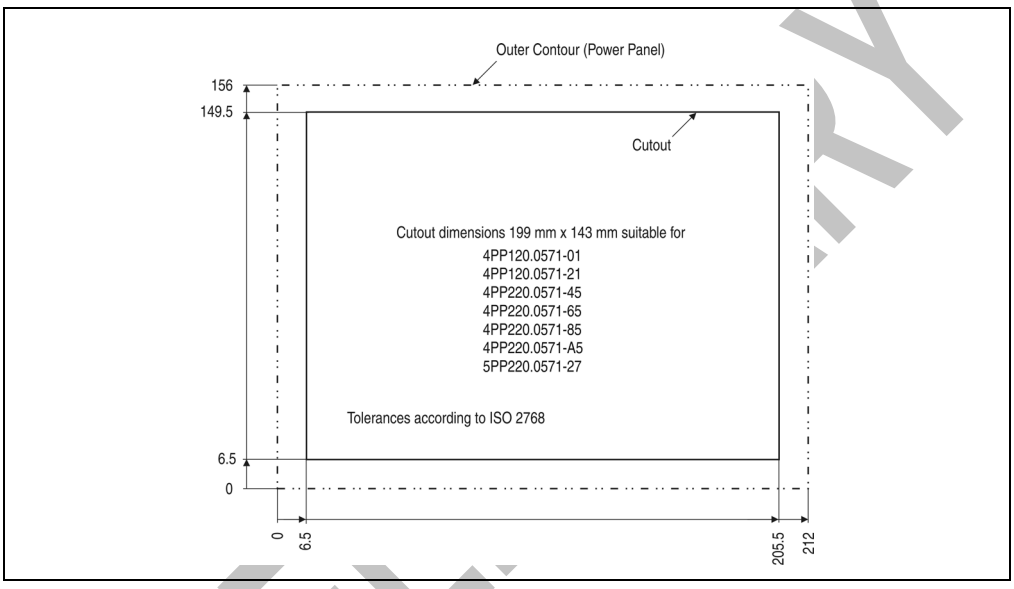


Figure 53: Cutout dimensions

3.6.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 220 LCD B/W QVGA 5.7in T MH 2aPCI
4	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 34: Delivery 4PP220.0571-85

PRELIMINARY

3.7 Device 4PP220.0571-A5

Figure 54: Front view 4PP220.0571-A5

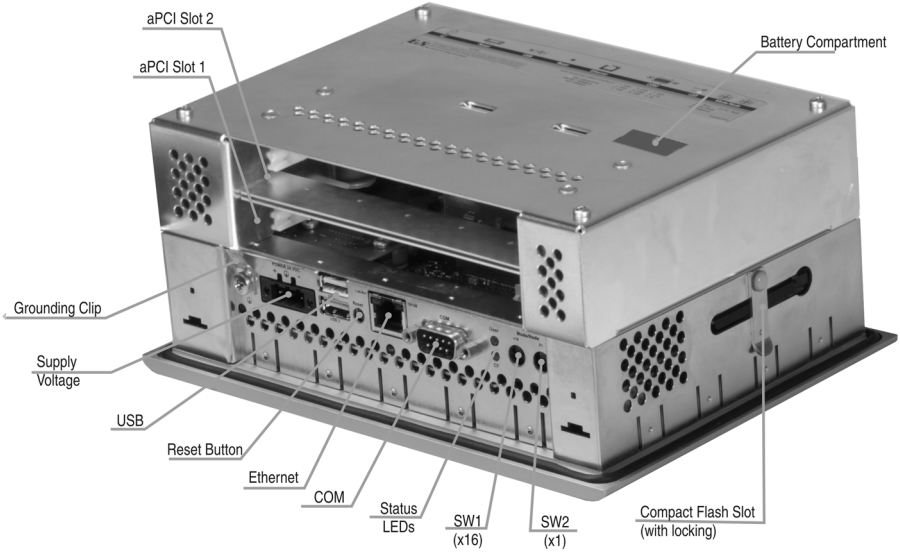


Figure 55: Rear view 4PP220.0571-A5

3.7.1 Technical Data

Features	4PP220.0571-A5
Bootloader	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	Yes
Watchdog, SMC Internal	Yes
Power Fail Logic, SMC 10 ms Buffer Time	Yes
Real-time Clock	Yes, battery buffered
Battery (Lithium, 950mAh, exchange from outside)	Yes
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	2 pieces
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 LCD 5,7 in 256 colors QVGA, 320 x 240 pixels 150 cd/m² 50,000 hours
Touch Screen Technology Controller	 Gunze analog, resistive Hampshire, serial
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, electrically isolated

Table 35: Technical data 4PP220.0571-A5

PRELIMINARY

Features	4PP220.0571-A5
Power Consumption	Approx. 22 Watt[1)]
Protection	IP20 back side (only with installed aPCI modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 1.8 kg (without aPCI modules)
Outer Dimensions in mm (WxHxD)	212 x 156 x 98
Altitude	TBD
Environmental Temperature Operation Storage	 TBD TBD
Relative Humidity Operation Storage	 TBD TBD

Table 35: Technical data 4PP220.0571-A5 (cont.)

1) The starting current can amount to around 20 A for a short period (approx.1 ms).

3.7.2 Dimensions

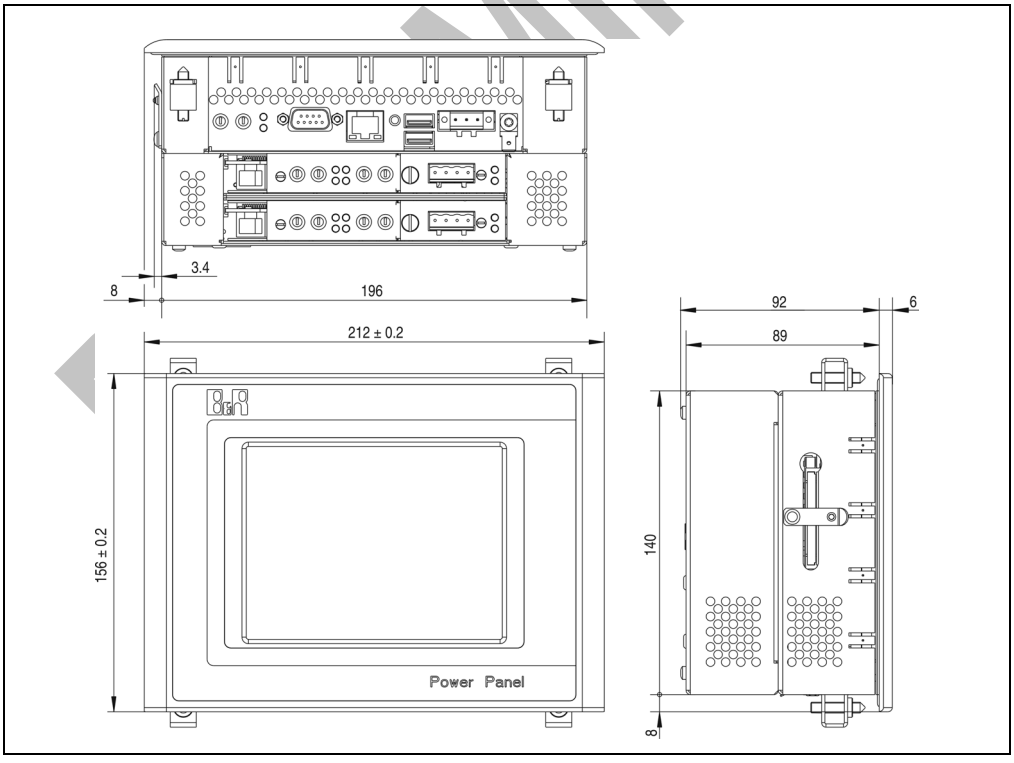


Figure 56: Dimensions 4PP220.0571-A5

3.7.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 4 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 48 "Dimensions 4PP220.0571-65" on Page 67) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

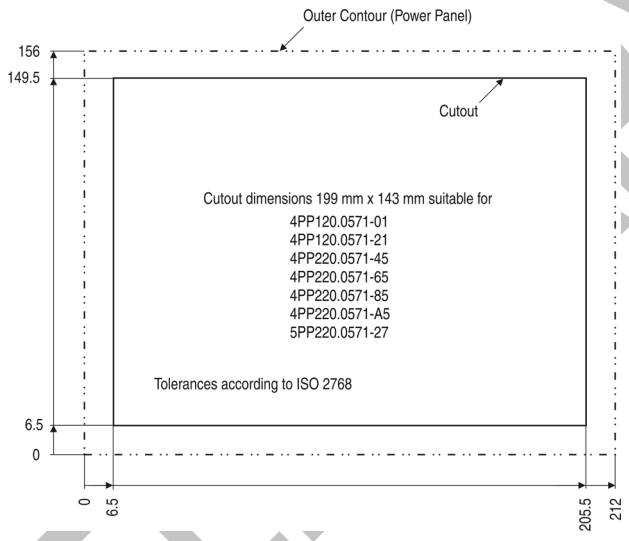


Figure 57: Cutout dimensions

3.7.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 220 LCD C QVGA 5.7in T MH 2aPCI
4	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 36: Delivery 4PP220.0571-A5

PRELIMINARY

3.8 Device 4PP220.1043-75

Figure 58: Front view 4PP220.1043-75

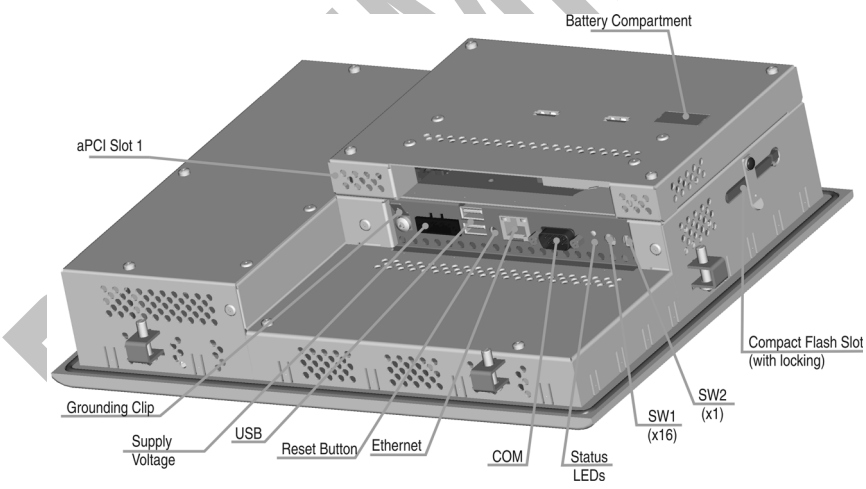


Figure 59: Rear view 4PP220.1043-75

3.8.1 Technical Data

Features	4PP220.1043-75
Bootloader	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	Yes
Watchdog, SMC Internal	Yes
Power Fail Logic, SMC 10 ms Buffer Time	Yes
Real-time Clock	Yes, battery buffered
Battery (Lithium, 950mAh, exchange from outside)	Yes
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	1 pieces
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 TFT 10,4 in 256 colors VGA, 640 x 480 pixels 350 cd/m² 55,000 hours
Touch Screen Technology Controller	 Analog, resistive (3M) Serial (Hampshire)
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, electrically isolated
Power Consumption	TBD

Table 37: Technical data 4PP220.1043-75

PRELIMINARY

Features	4PP220.1043-75
Protection	IP20 back side (only with installed aPCI module and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	TBD
Outer Dimensions in mm (WxHxD)	323 x 260 x 86
Altitude	TBD
Environmental Temperature Operation Storage	 TBD TBD
Relative Humidity Operation Storage	 TBD TBD

Table 37: Technical data 4PP220.1043-75 (cont.)

3.8.2 Dimensions

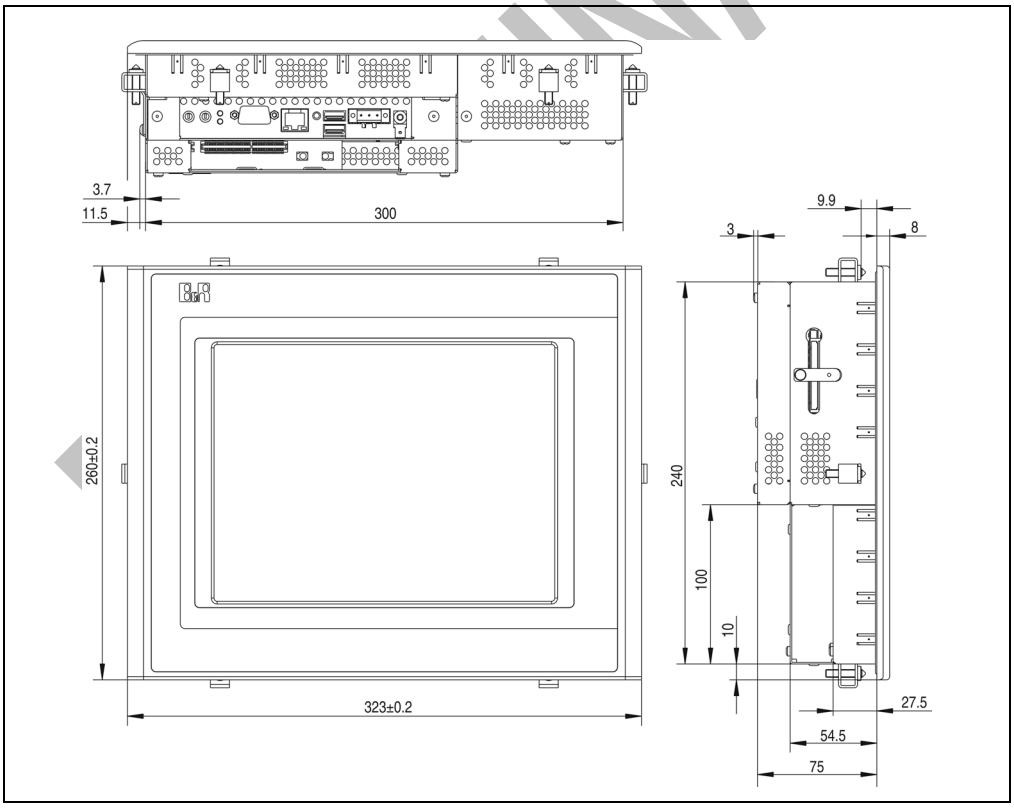


Figure 60: Dimensions 4PP220.1043-75

3.8.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 6 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 60 "Dimensions 4PP220.1043-75" on Page 79) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

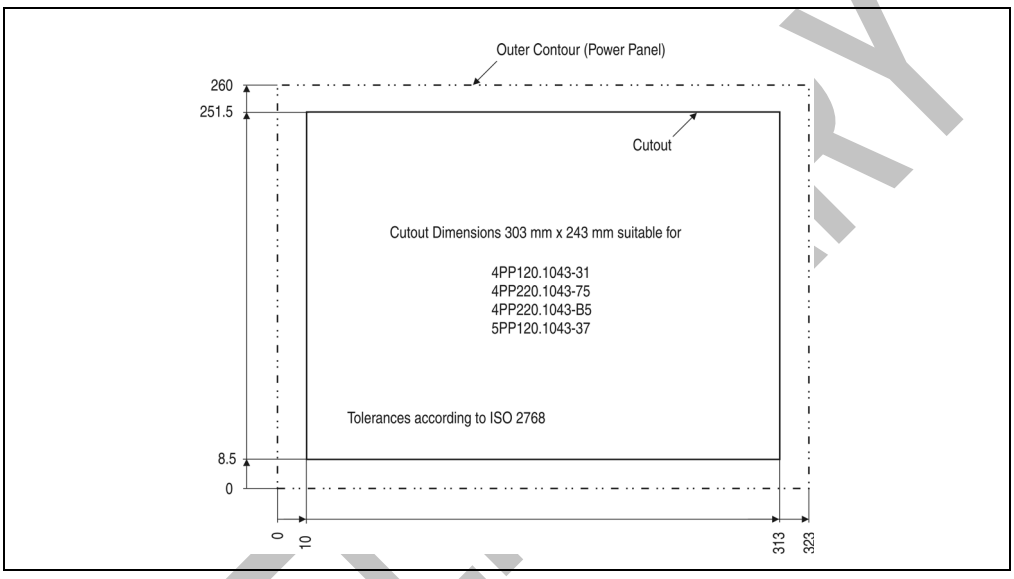


Figure 61: Cutout dimensions

3.8.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 220 TFT C VGA 10.4in T MH 1aPCI
6	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 38: Delivery 4PP220.1043-75

PRELIMINARY

3.9 Device 4PP220.1043-B5

Figure 62: Front view 4PP220.1043-B5

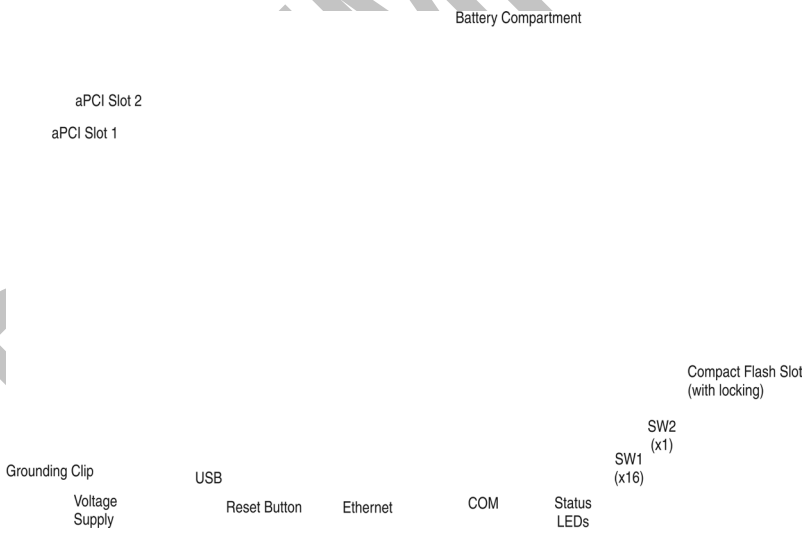


Figure 63: Rear view 4PP220.1043-B5

3.9.1 Technical Data

Features	4PP220.1043-B5
Bootloader	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	Yes
Watchdog, SMC Internal	Yes
Power Fail Logic, SMC 10 ms Buffer Time	Yes
Real-time Clock	Yes, battery buffered
Battery (Lithium, 950 mAh, exchange from outside)	Yes
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	2 pieces
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 TFT 10,4 in 256 colors VGA, 640 x 480 pixels 350 cd/m² 55,000 hours
Touch Screen Technology Controller	 Analog, resistive (3M) Serial (Hampshire)
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, electrically isolated
Power Consumption	TBD

Table 39: Technical data 4PP220.1043-B5

PRELIMINARY

Features	4PP220.1043-B5
Protection	IP20 back side (only with installed aPCI modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	TBD
Outer Dimensions in mm (WxHxD)	323 x 260 x 108
Altitude	TBD
Environmental Temperature Operation Storage	 TBD TBD
Relative Humidity Operation Storage	 TBD TBD

Table 39: Technical data 4PP220.1043-B5 (cont.)

3.9.2 Dimensions

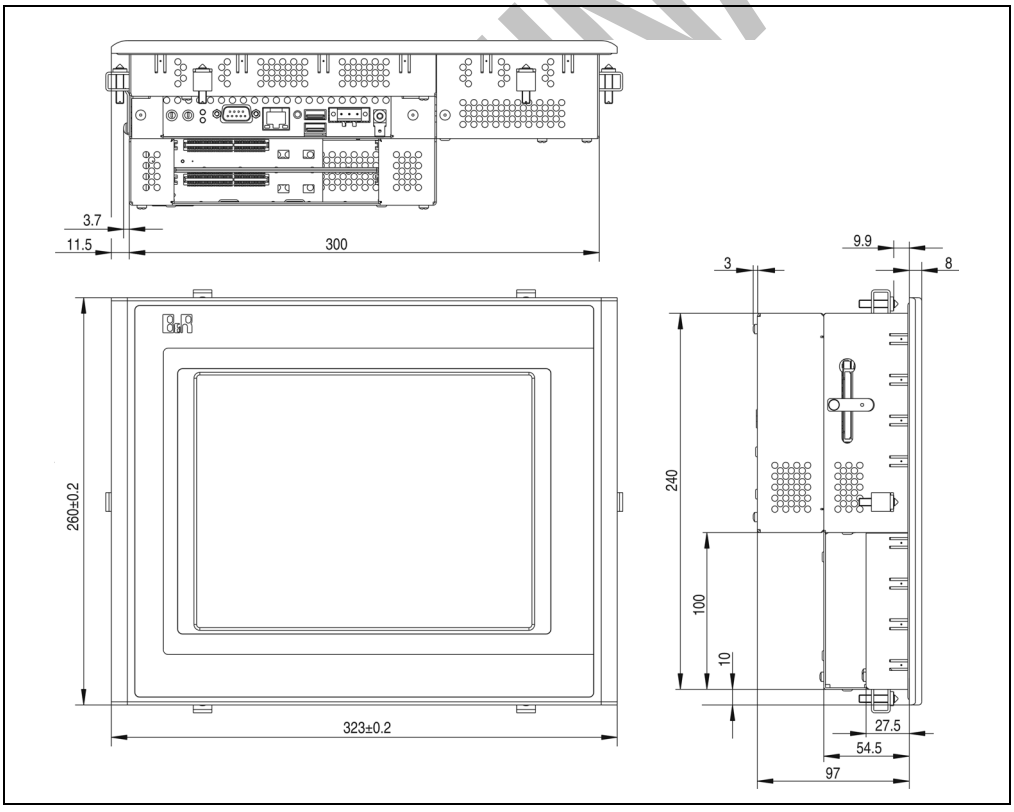


Figure 64: Dimensions 4PP220.1043-B5

3.9.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 6 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 64 "Dimensions 4PP220.1043-B5" on Page 83) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

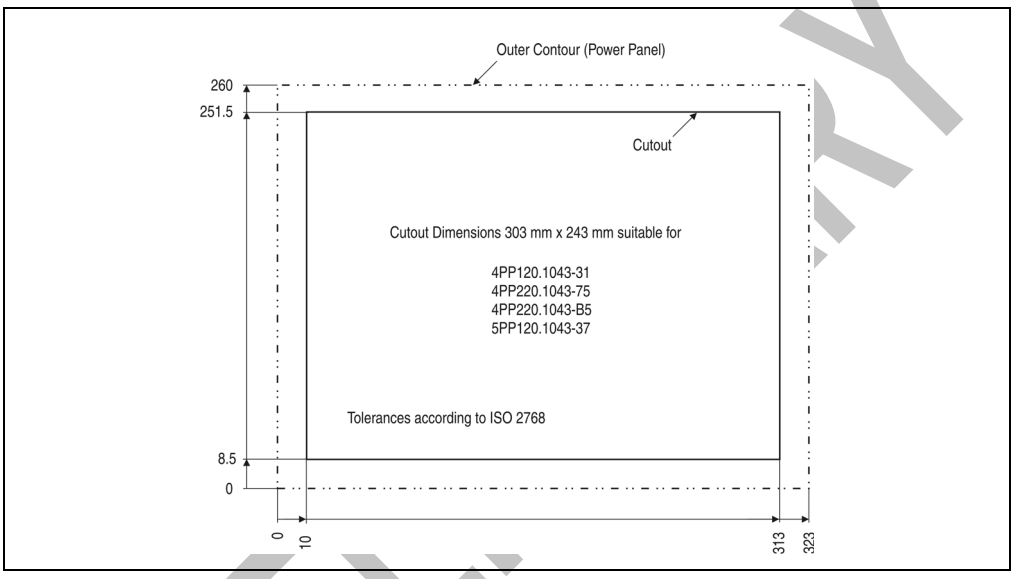


Figure 65: Cutout dimensions

3.9.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 220 TFT C VGA 10.4in T MH 2aPCI
6	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 40: Delivery 4PP220.1043-B5

PRELIMINARY

3.10 Device 4PP220.1505-75

Figure 66: Front view 4PP220.1505-75

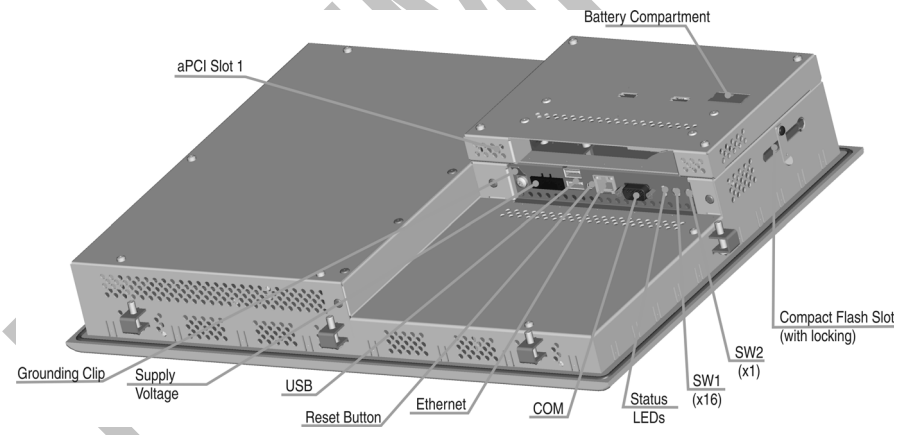


Figure 67: Rear view 4PP220.1505-75

3.10.1 Technical Data

Features	4PP220.1505-75
Bootloader	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	Yes
Watchdog, SMC Internal	Yes
Power Fail Logic, SMC 10 ms Buffer Time	Yes
Real-time Clock	Yes, battery buffered
Battery (Lithium, 950 mAh, exchange from outside)	Yes
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	1 pieces
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 TFT 15 in 256 colors XGA, 1024 x 768 pixels 330 cd/m² 35,000 hours
Touch Screen Technology Controller	 Analog, resistive (3M) Serial (Hampshire)
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, electrically isolated
Power Consumption	TBD

Table 41: Technical data 4PP220.1505-75

PRELIMINARY

Features	4PP220.1505-75
Protection	IP20 back side (only with installed aPCI module and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	TBD
Outer Dimensions in mm (WxHxD)	435 x 330 x 86
Altitude	TBD
Environmental Temperature Operation Storage	 TBD TBD
Relative Humidity Operation Storage	 TBD TBD

Table 41: Technical data 4PP220.1505-75 (cont.)

3.10.2 Dimensions

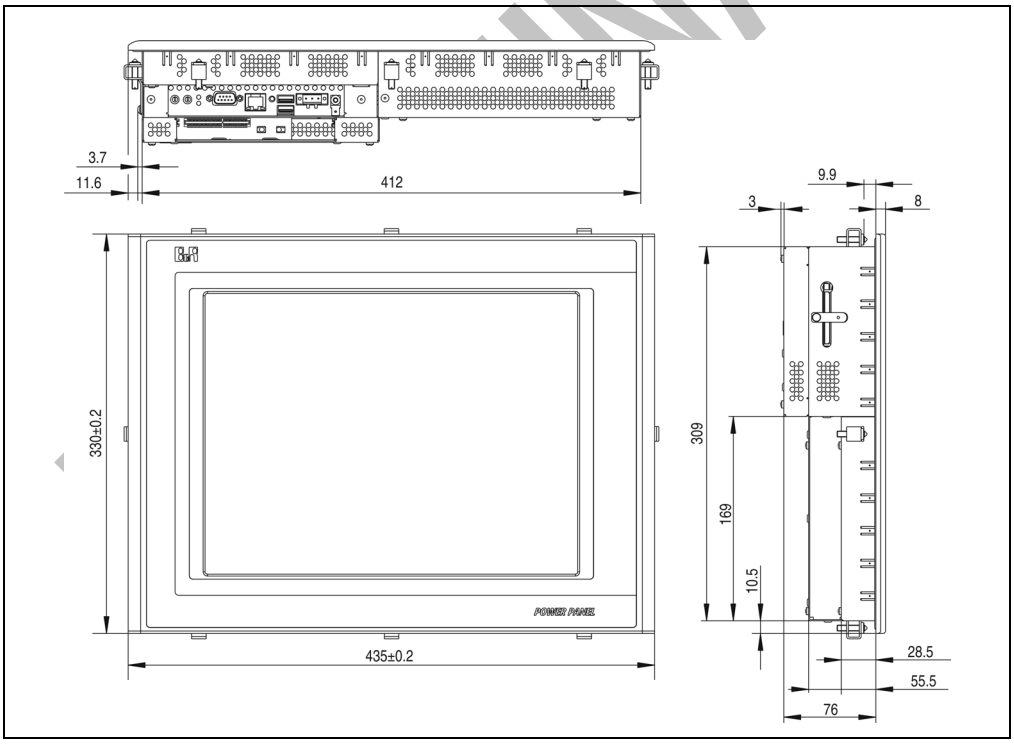


Figure 68: Dimensions 4PP220.1505-75

3.10.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 8 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 68 "Dimensions 4PP220.1505-75" on Page 87) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

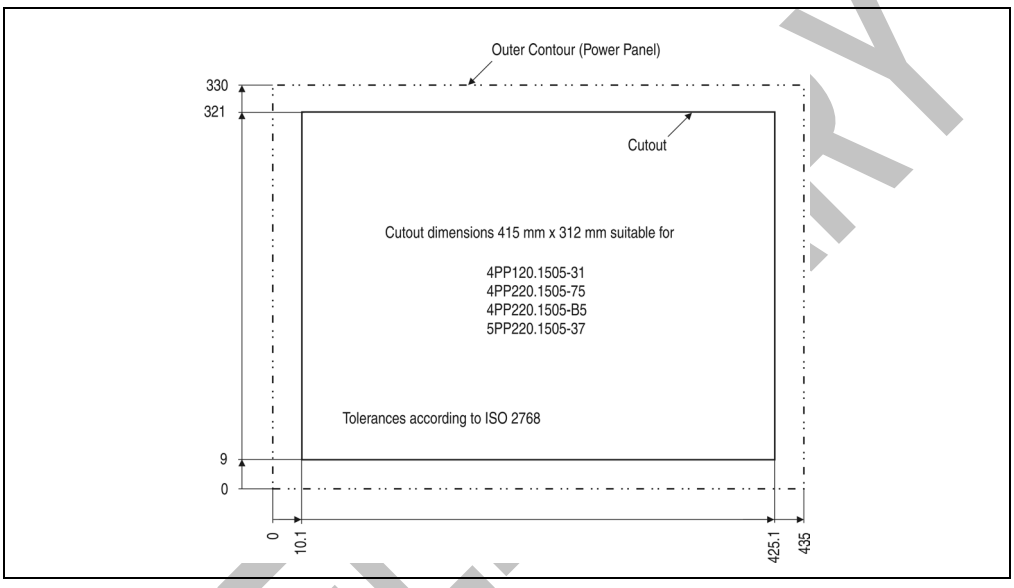


Figure 69: Cutout dimensions

3.10.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 220 TFT C XGA 15in T MH 1aPCI
8	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 42: Delivery 4PP220.1505-75

PRELIMINARY

3.11 Device 4PP220.1505-B5

Figure 70: Front view 4PP220.1505-B5

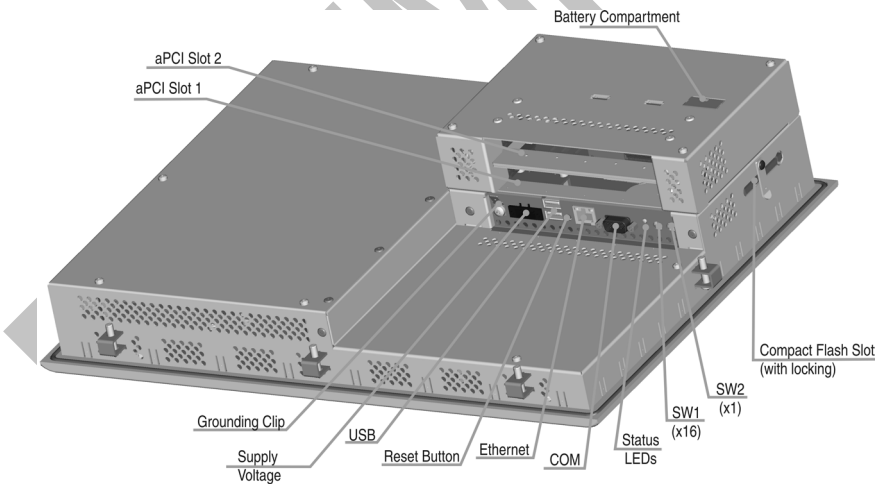


Figure 71: Rear view 4PP220.1505-B5

3.11.1 Technical Data

Features	4PP220.1505-B5
Bootloader	Automation Runtime
Processor	Geode SC2200 266MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	Yes
Watchdog, SMC Internal	Yes
Power Fail Logic, SMC 10 ms Buffer Time	Yes
Real-time Clock	Yes, battery buffered
Battery (Lithium, 950mAh, exchange from outside)	Yes
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	2 pieces
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 TFT 15 in 256 Colors XGA, 1024 x 768 pixels 330 cd/m² 35,000 hours
Touch Screen Technology Controller	 Analog, resistive (3M) Serial (Hampshire)
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, electrically isolated
Power Consumption	TBD
Protection	IP20 back side (only with installed aPCI modules and Compact Flash card) IP65, dust and sprayed water protection from front

Table 43: Technical data 4PP220.1505-B5

PRELIMINARY

Features	4PP220.1505-B5
Housing	Metal
Weight	Approx. 3 kg
Outer Dimensions in mm (WxHxD)	435 x 330 x 109
Altitude	TBD
Environmental Temperature Operation Storage	 TBD TBD
Relative Humidity Operation Storage	 TBD TBD

Table 43: Technical data 4PP220.1505-B5 (cont.)

3.11.2 Dimensions

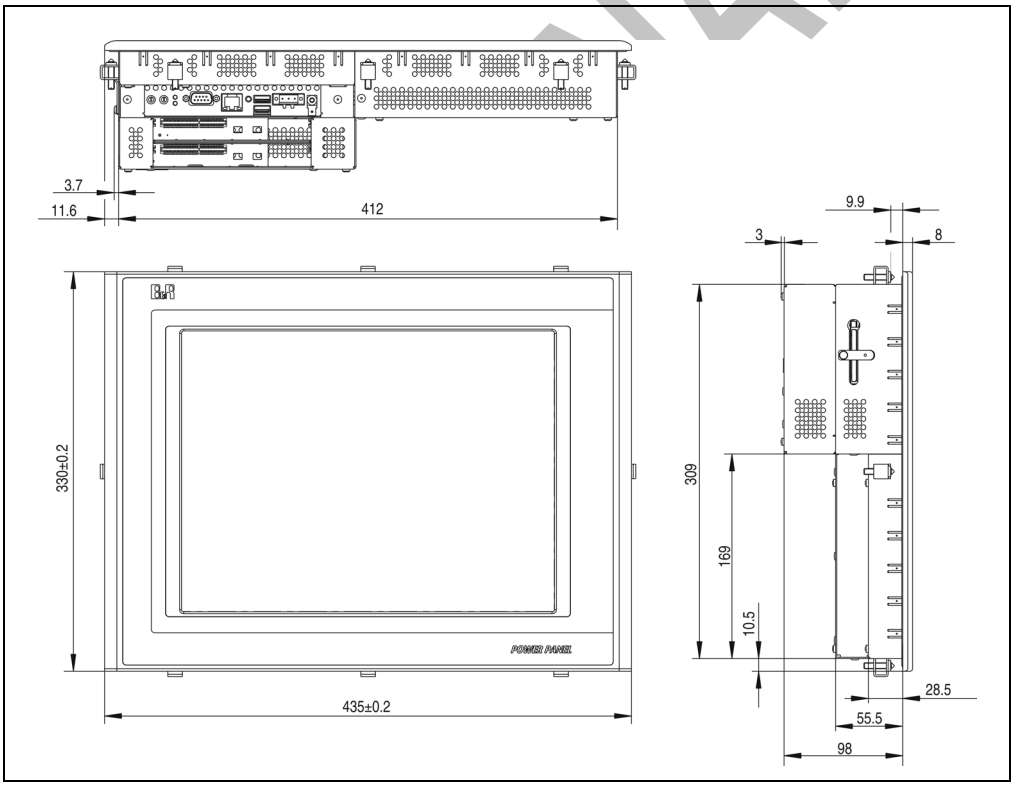


Figure 72: Dimensions 4PP220.1505-B5

3.11.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 8 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 72 "Dimensions 4PP220.1505-B5" on Page 91) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

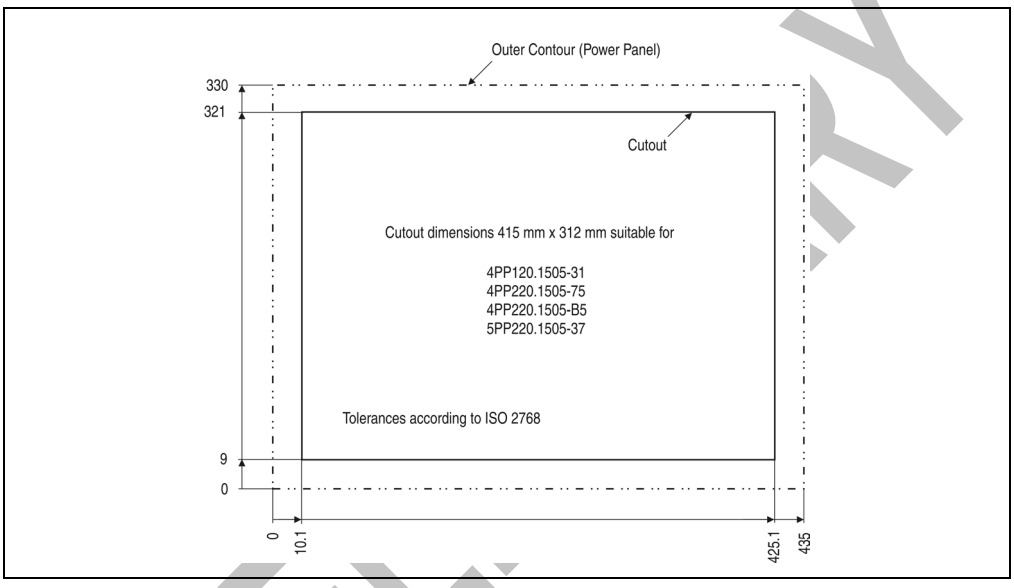


Figure 73: Cutout dimensions

3.11.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 220 TFT C XGA 15in T MH 2aPCI
8	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 44: Delivery 4PP220.1505-B5

PRELIMINARY

3.12 Device 4PP251.0571-65

Figure 74: Front view 4PP251.0571-65

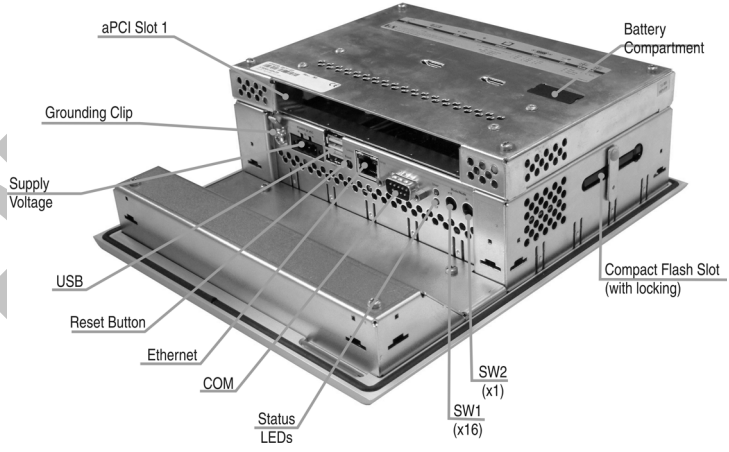


Figure 75: Rear view 4PP251.0571-65

3.12.1 Technical Data

Features	4PP251.0571-65
Bootloader	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	Yes
Watchdog, SMC Internal	Yes
Power Fail Logic, SMC 10 ms Buffer Time	Yes
Real-time Clock	Yes, battery buffered
Battery (Lithium, 950mAh, exchange from outside)	Yes
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	1 pieces
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 TFT 5,7 in 256 Colors QVGA, 320 x 240 pixels 150 cd/m² 50,000 hours
Touch Screen Technology Controller	 - -
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - 16 - 6 20 -
Supply Voltage	24 VDC ± 25%, electrically isolated

Table 45: Technical data 4PP251.0571-65

PRELIMINARY

Features	4PP251.0571-65
Power Consumption	TBD
Protection	IP20 back side (only with installed aPCI modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	TBD
Outer Dimensions in mm (WxHxD)	212 x 245 x 76.5
Altitude	TBD
Environmental Temperature Operation Storage	 TBD TBD
Relative Humidity Operation Storage	 TBD TBD

Table 45: Technical data 4PP251.0571-65 (cont.)

3.12.2 Dimensions

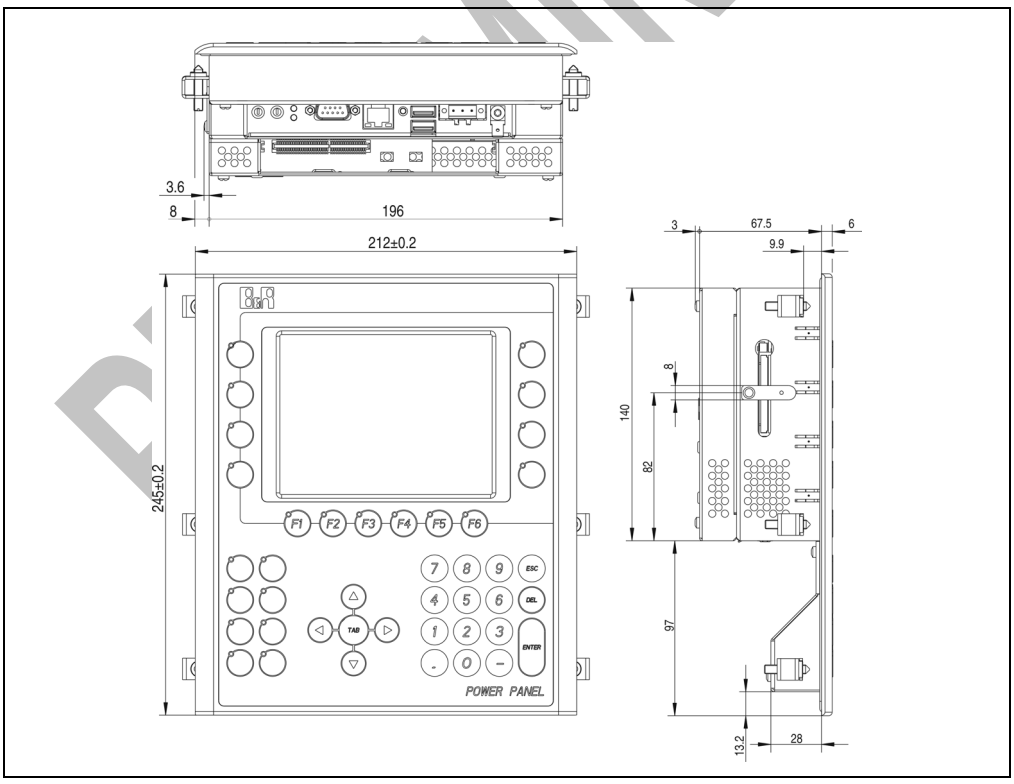


Figure 76: Dimensions 4PP251.0571-65

PRELIMINARY

3.12.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 6 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 76 "Dimensions 4PP251.0571-65" on Page 95) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

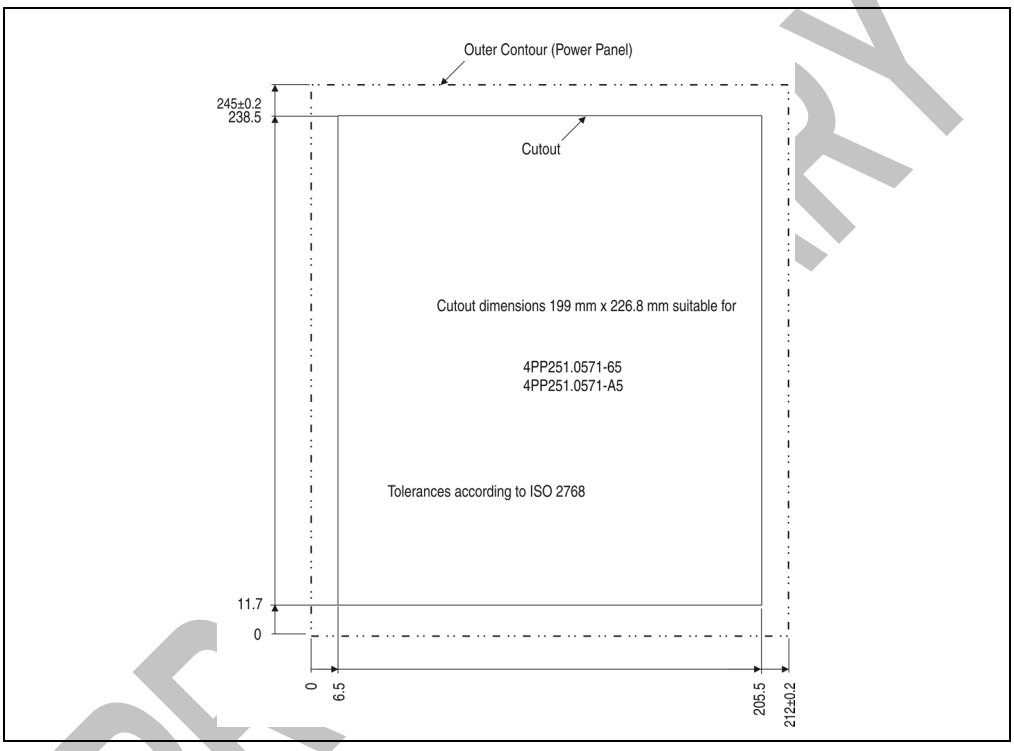


Figure 77: Cutout dimensions

3.12.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 251 LCD C QVGA 5.7in F MH 1aPCI
6	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
3	Insert strips (inserted in the front)

Table 46: Delivery 4PP251.0571-65

3.13 Device 4PP251.0571-A5

Figure 78: Front view 4PP251.0571-A5

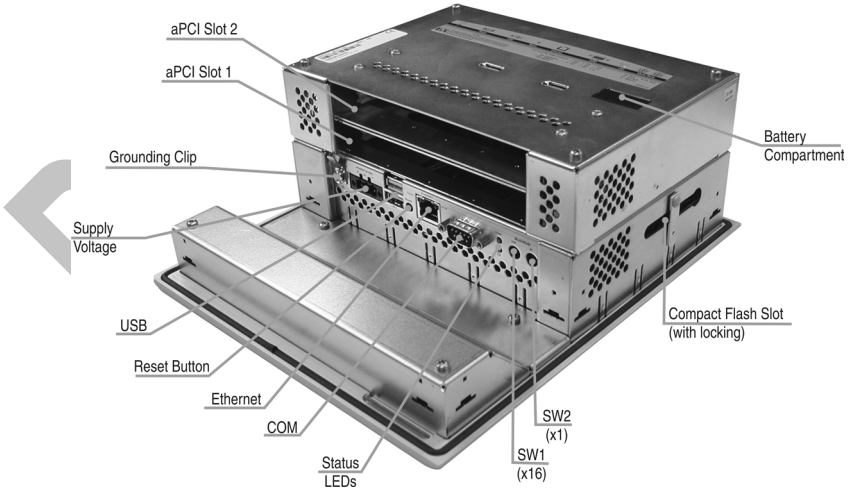


Figure 79: Rear view 4PP251.0571-A5

3.13.1 Technical Data

Features	4PP251.0571-A5
Bootloader	Automation Runtime
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	64 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	Yes
Watchdog, SMC Internal	Yes
Power Fail Logic, SMC 10 ms Buffer Time	Yes
Real-time Clock	Yes, battery buffered
Battery (Lithium, 950mAh, exchange from outside)	Yes
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	2 pieces
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 TFT 5,7 in 256 Colors QVGA, 320 x 240 pixels 150 cd/m² 50,000 hours
Touch Screen Technology Controller	 - -
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - 16 - 6 20 -
Supply Voltage	24 VDC ± 25%, electrically isolated

Table 47: Technical data 4PP251.0571-A5

PRELIMINARY

Features	4PP251.0571-A5
Power Consumption	TBD
Protection	IP20 back side (only with installed aPCI modules and Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 3.2 kg
Outer Dimensions in mm (WxHxD)	212 x 245 x 98.5
Altitude	TBD
Environmental Temperature Operation Storage	 TBD TBD
Relative Humidity Operation Storage	 TBD TBD

Table 47: Technical data 4PP251.0571-A5 (cont.)

3.13.2 Dimensions

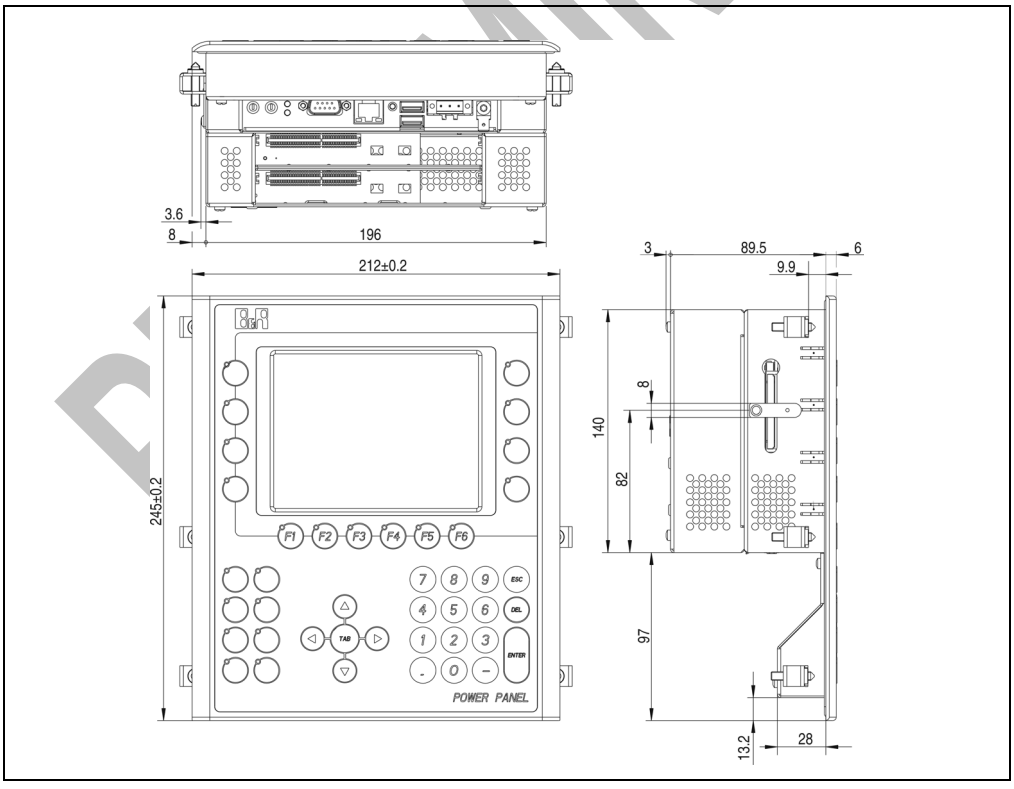


Figure 80: Dimensions 4PP220.0571-A5

PRELIMINARY

3.13.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 6 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 80 "Dimensions 4PP220.0571-A5" on Page 99) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

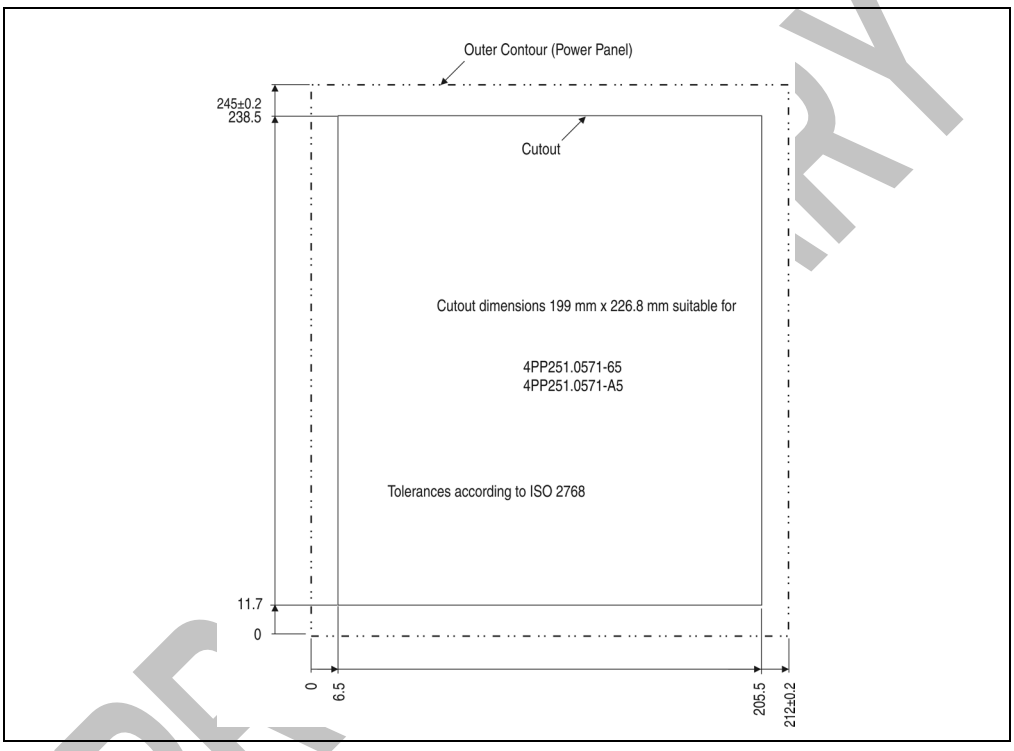


Figure 81: Cutout dimensions

3.13.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 251 LCD C QVGA 5.7in F MH 2aPCI
6	Retaining clips included
1	Lithium battery 3 V / 950 mAh included
3	Insert strips (inserted in the front)

Table 48: Delivery 4PP251.0571-A5

4. Power Panel 100 with BIOS

4.1 Interface Descriptions

In the following section, a description is given for all interfaces and plugs available to the Power Panel.

4.1.1 Power Supply

Input Voltage: 24 VDC ± 25%, not electrically isolated

The 3-pin socket required for the supply voltage connection is not included in the delivery. This can be ordered from B&R using the model number 0TB103.9 (screw clamp) or 0TB103.91 (cage clamp). The cable (min. cross section 1.5 mm² - AWG 26 - 12) must be provided by customers themselves.

The supply voltage is protected by a self-healing fuse which means that the device is not damaged if there is an overload, or if the supply voltage is incorrectly connected. Additionally, it also means that the fuse does not need to be changed.

The pin assignments can be found in the table below and are also printed on the Power Panel type plate or device label.

Supply Voltage	
Pin	**Assignment**
1	+
2	Ground
3	-
Accessories	
0TB103.9	Plug 24 V 5.08 3p screw clamps
0TB103.91	Plug 24 V 5.08 3p cage clamps

Figure 82: Supply voltage connection

Warning!

The ground connection (functional ground) should be as short as possible. If the Power Panel is installed in a switching cabinet, the connection cable should not be longer than 15 cm.

PRELIMINARY

4.1.2 Grounding Clip

The ground clip should be connected to ground using the shortest route possible.

Grounding Clip

Figure 83: Grounding clip

4.1.3 COM Interface

The Power Panel is equipped with a PC compatible serial interface with 16 bytes FIFO. This non-electrically isolated interface is primarily intended for programming the Power Panel using Automation Studio.

The RS232 can also be used as a general interface (e.g. printer, bar code reader, etc.).

Serial Interface		
RS232 Interface modem capable, not electrically isolated Up to 115 kBaud		9-pin DSUB connector
Pin	**RS232**	
1	DCD	
2	RXD	
3	TxD	
4	DTR	
5	GND	
6	DSR	
7	RTS	
8	CTS	
9	RI	

Table 49: COM pin assignment

PRELIMINARY

4.1.4 USB Port

The Power Panel is equipped with a USB host controller with two USB ports.

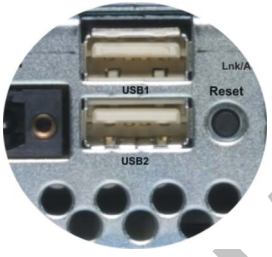
Universal Serial Bus


Figure 84: USB port connection

Technical Data for USB Port	
Transfer Rate	1.5 MBit/s and 12 MBit/s
Power Supply	500 mA per port
Maximum Cable Length	5 m (can possibly be extended using a USB hub)

Table 50: Technical data for USB connection

Warning!

Only USB devices tested and verified by B&R are allowed to be connected to the USB interface.

Warning!

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

PRELIMINARY

4.1.5 Mode/Node Switch

Power Panel devices are equipped with 2 hex switches, which are used as an operating mode switch. Switch positions 01 up to FF are available to the user in an application. The position of the switch can be evaluated by an application program.

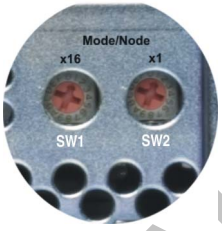
Mode/Node Switch


Figure 85: Mode/node switch

Switch Position		Function	Description
SW1 (x16)	SW2 (x1)	Operating Mode Switch	
0	0	Service Mode	• The resolution for the display used is automatically set (see also section). • Contrast and brightness settings for the display are set to default values (see also section "Video and Flat Panel Configuration", on page 135). • Legacy USB support is always set to "enabled", independent of the BIOS setting (see section "Advanced BIOS Features", on page 139). • With incorrect factory settings (e.g. if the checksum is wrong), the Power Panel boots but the display is not initialized. This error is signalized by a continuous **lighting of the user LED** . Video output is then only possible using the REMHOST utility (see section "REMHOST", on page 151). • When switching on the Power Panel, the Power Panel can be controlled by the user using a serial connection to a PC and using the REMHOST tool e.g. making changes in the BIOS. REMHOST supports only text mode for video output. This means that the output of programs, directly recorded in the video memory, are not correctly displayed. • The Power Panel attempts to establish a connection to the REMHOST utility (a "ping" is sent to the serial interface).
x	x	Other switch positions have no significance	

Table 51: Switch settings for the mode/node switch

4.1.6 Status LEDs

Power Panels are equipped with two status LEDs which are visible on the outside.

PRELIMINARY

Status LEDs

LED	Color	Function
User	Green	Freely available for use in an application
CF	Yellow	Indicates the access to a Compact Flash card present

Table 52: Status LEDs

4.1.7 Ethernet Connection

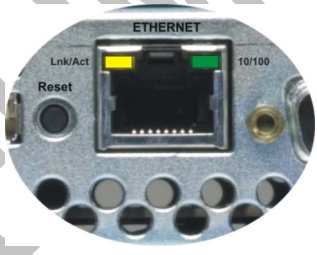
Ethernet Connection


Figure 86: Ethernet connection

Ethernet	10/100 MBit/s [1)]
Connection	RJ45 twisted pair (10BaseT/100BaseT)
Controller	MacPhyter DP83815
Cabling	S/STP (category 5)

Table 53: Ethernet controller

1) Both operating modes are possible. Switching takes place automatically

The onboard Ethernet controller for Power Panel devices provides an RJ45 twisted pair connection, to which 2 LEDs are attached for status control:

PRELIMINARY

LED	On	Off
Green	100 MBit/s	10 MBit/s
Yellow	Link	Activity (blinking)

Table 54: Status LEDs Ethernet controller

4.1.8 Reset Button

The reset button can be accessed through a small hole between the USB and the Ethernet connection. In order to avoid accidental activation, a reset can only be triggered with a pointed object.

Reset Button

Figure 87: Reset button

4.1.9 Compact Flash Slot

Power Panels are equipped with a Compact Flash slot which is accessible from the side. Type I Compact Flash cards are supported.

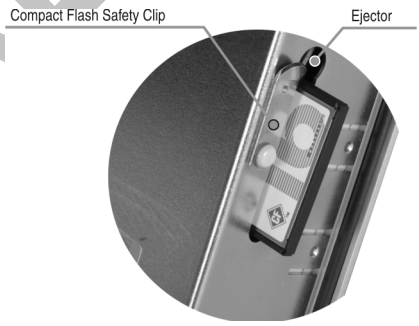


Figure 88: Compact Flash slot

It is possible to protect the Compact Flash slot using a safety clip. By pressing the ejector (using a pointed object is the best way to do this) the Compact Flash card can be changed quickly and safely.

PRELIMINARY

Caution!

Changing the Compact Flash card can only take place without power applied!

4.2 Label

4.2.1 Device Label

The following label attached in a suitable location on the Power Panel, contains short definitions for all of the interfaces:

Figure 89: Device label

4.2.2 Serial Number Label

General Information

Each B&R device is assigned a unique serial number label with a bar code, allowing the device to be clearly identified.

Design and Dimensions

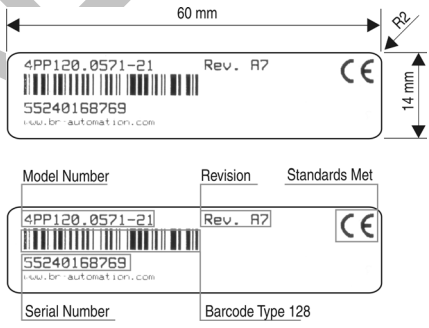


Figure 90: Design and dimensions of serial number label

PRELIMINARY

This page is only used as a place holder.

PRELIMINARY

4.3 Device 5PP120.0571-27

Figure 91: Front view 5PP120.0571-27

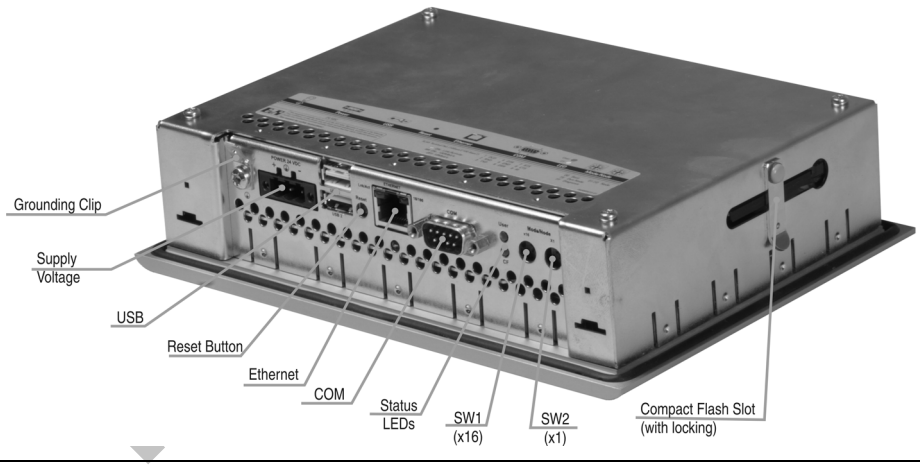


Figure 92: Rear view 5PP120.0571-27

4.3.1 Technical Data

Features	5PP120.0571-27
Bootloader	BIOS
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	128 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	-
Watchdog, SMC Internal	-
Power Fail Logic, SMC 10 ms Buffer Time	-
Real-time Clock	Yes, battery buffered
Battery (Lithium, 950mAh, exchange from outside)	Yes
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	-
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 LCD 5,7 in 512 colors 1) QVGA, 320 x 240 pixels 150 cd/m² 50,000 hours
Touch Screen Technology Controller	 Analog, resistive (Gunze) Serial (Hampshire)
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 55: Technical data 5PP120.0571-27

PRELIMINARY

Features	5PP120.0571-27
Power Consumption	Approx. 10 Watt[2)]
Protection	IP20 back side (only with installed Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Front Design	Bright gray, anodized aluminum
Weight	Approx. 1.4 kg
Outer Dimensions in mm (WxHxD)	212 x 156 x 55.5
Altitude	TBD
Environmental Temperature Operation Storage	 0 - 50° C TBD
Relative Humidity Operation Storage	 TBD TBD

Table 55: Technical data 5PP120.0571-27 (cont.)

1) The actual number of colors depends on the graphic memory, the graphics mode set and the graphic driver used.
2) The starting current can amount to around 20 A for a short period (approx.1 ms).

4.3.2 Dimensions

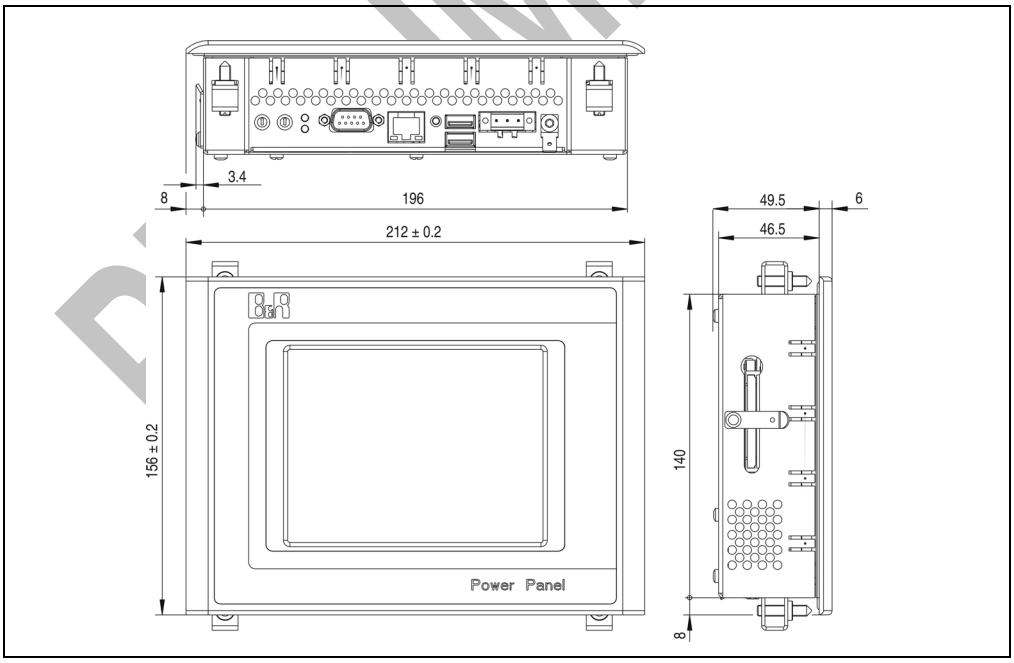


Figure 93: Dimensions 5PP120.0571-27

PRELIMINARY

4.3.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 4 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 93 "Dimensions 5PP120.0571-27" on Page 111) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

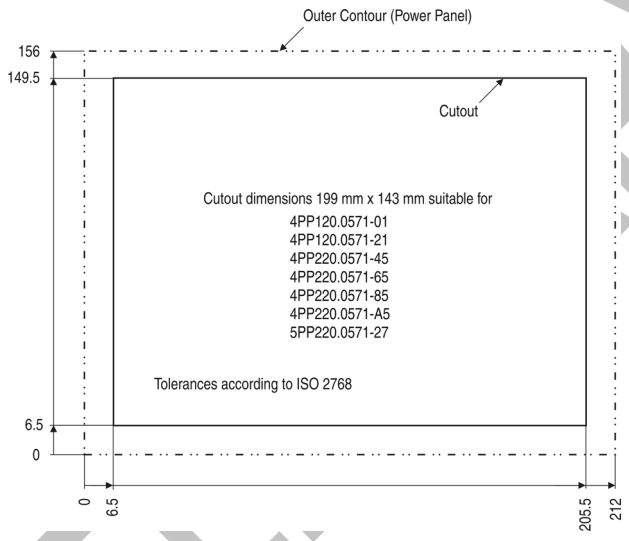


Figure 94: Cutout dimensions

4.3.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 120 LCD C QVGA 5.7in T MH
4	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 56: Delivery 5PP120.0571-27

PRELIMINARY

4.4 Device 5PP120.1043-37

Figure 95: Front view 5PP120.1043-37

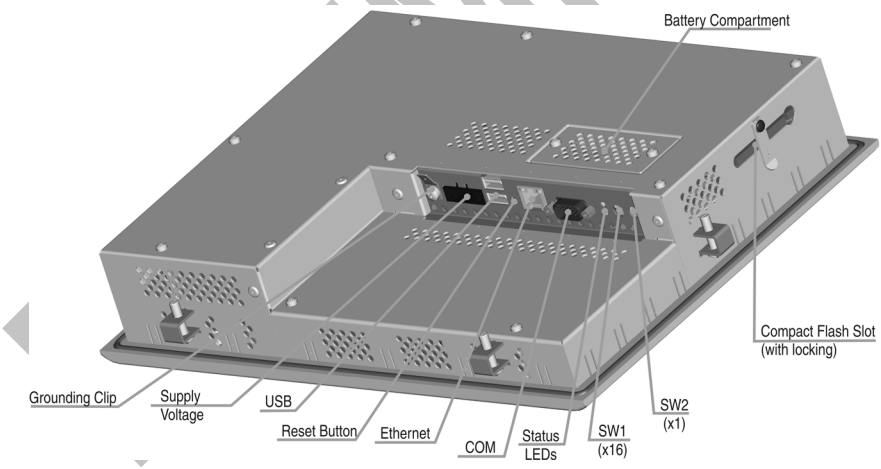


Figure 96: Rear view 5PP120.1043-37

4.4.1 Technical Data

Features	5PP120.1043-37
Bootloader	BIOS
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	128 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	-
Watchdog, SMC Internal	-
Power Fail Logic, SMC 10 ms Buffer Time	-
Real-time Clock	Yes, battery buffered
Battery (Lithium, 950 mAh, exchange from outside)	Yes
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	-
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 TFT 10,4 in 262,144 colors 1) VGA, 640 x 480 pixels 350 cd/m² 55,000 hours
Touch Screen Technology Controller	 Analog, resistive (3M) Serial (Hampshire)
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 57: Technical data 5PP120.1043-37

PRELIMINARY

Features	5PP120.1043-37
Power Consumption	Approx. 15 Watt[2)]
Protection	IP20 back side (only with installed Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	Approx. 2.5 kg
Outer Dimensions in mm (WxHxD)	323 x 260 x 65.5
Altitude	TBD
Environmental Temperature Operation Storage	 0 - 50° C TBD
Relative Humidity Operation Storage	 TBD TBD

Table 57: Technical data 5PP120.1043-37 (cont.)

1) The actual number of colors depends on the graphic memory, the graphics mode set and the graphic driver used.
2) The starting current can amount to around 20 A for a short period (approx.1 ms).

PRELIMINARY

4.4.2 Dimensions

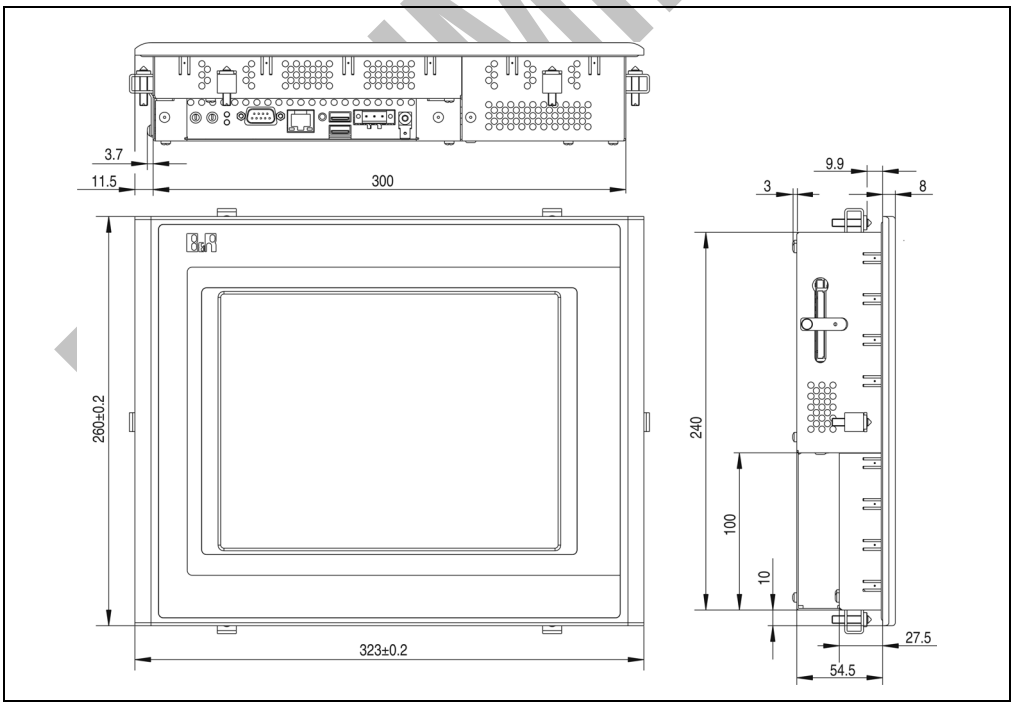


Figure 97: Dimensions 5PP120.1043-37

4.4.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 6 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 97 "Dimensions 5PP120.1043-37" on Page 115) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

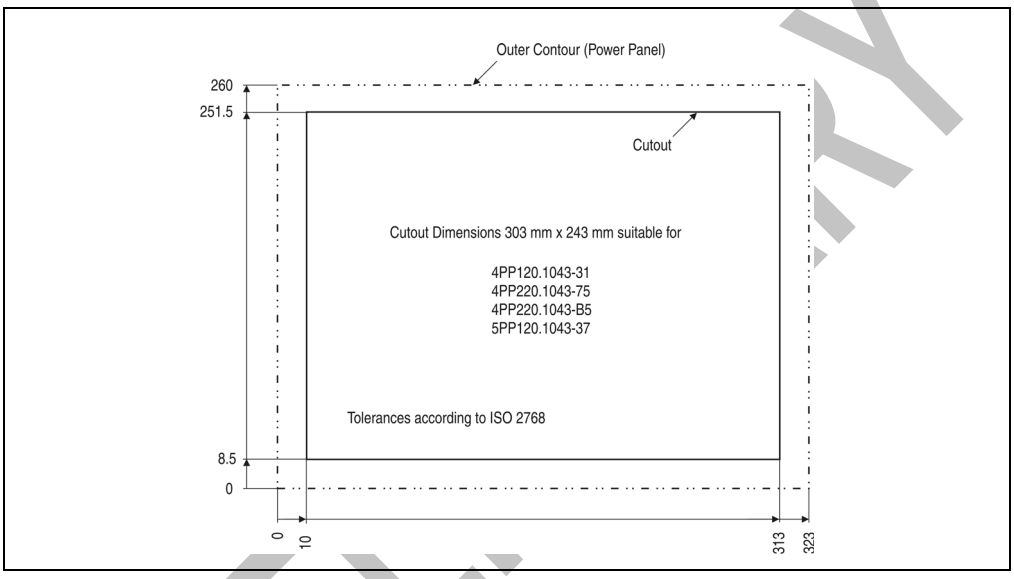


Figure 98: Cutout dimensions

4.4.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 120 TFT C VGA 10.4in T MH
6	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 58: Delivery 5PP120.1043-37

PRELIMINARY

4.5 Device 5PP120.1505-37

Figure 99: Front view 5PP120.1505-37

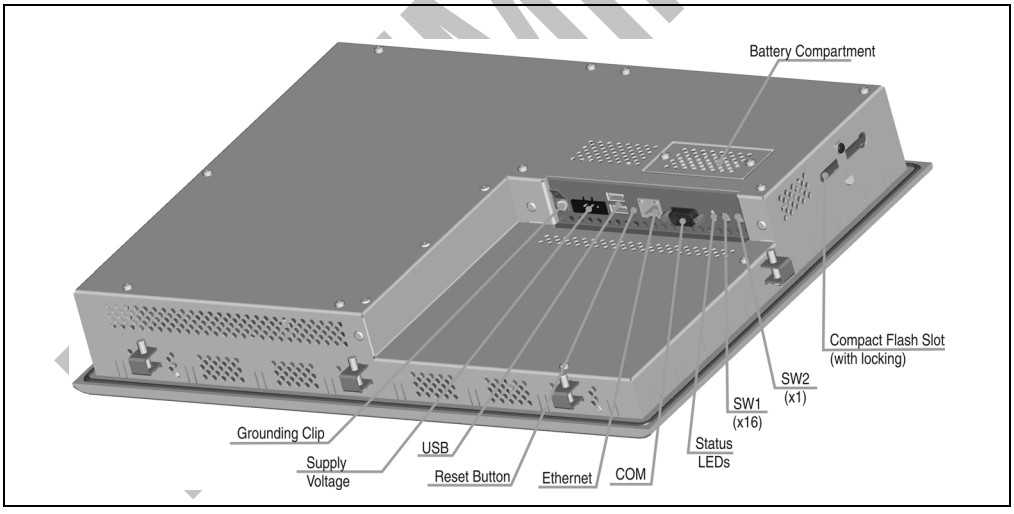


Figure 100: Rear view 5PP120.1505-37

4.5.1 Technical Data

Features	5PP120.1505-37
Bootloader	BIOS
Processor	Geode SC2200 266 MHz, MMX compatible
Flash	2 MB, onboard, for firmware
Main Memory	128 MB DRAM
Graphic Memory	4 MB shared memory (reserved by the main memory)
SRAM, 256 KB Onboard, Battery Backed	-
Watchdog, SMC Internal	-
Power Fail Logic, SMC 10 ms Buffer Time	-
Real-time Clock	Yes, battery buffered
Battery (Lithium, 950 mAh, exchange from outside)	Yes
Ethernet Controller (onboard) Connection Cabling	 MacPhyter DP83815 ; 10/100 Mbit/s RJ 45 twisted pair (10 BaseT / 100 BaseT) S/STP (category 5)
Compact Flash Slot	1 slot for type I Compact Flash cards
Serial Interface(COM)	RS232; modem capable; not electrically isolated
USB	2x USB 1.1, connection type A
LEDs	1 LED user (green), 1 LED CF (yellow)
Mode/Node Switch	2 pcs. each 16 digits
aPCI Slots	-
Display Type Diagonal Colors Resolution Background Lighting Brightness Half Brightness Time	 TFT 15 in 262,144 colors 1) XGA, 1024 x 768 pixels 330 cd/m² 35,000 hours
Touch Screen Technology Controller	 Analog, resistive (3M) Serial (Hampshire)
Front Frame Mylar Gasket	 Aluminum anodized Polyester, light gray Flat gasket around display front
Keys Function Keys Function Keys with LEDs Softkeys Softkeys with LEDs System Keys System Keys with LEDs	 - - - - - -
Supply Voltage	24 VDC ± 25%, not electrically isolated

Table 59: Technical data 5PP120.1505-37

PRELIMINARY

Features	5PP120.1505-37
Power Consumption	TBD
Protection	IP20 back side (only with installed Compact Flash card) IP65, dust and sprayed water protection from front
Housing	Metal
Weight	TBD
Outer Dimensions in mm (WxHxD)	435 x 330 x 71.5
Altitude	TBD
Environmental Temperature Operation Storage	 TBD TBD
Relative Humidity Operation Storage	 TBD TBD

Table 59: Technical data 5PP120.1505-37 (cont.)

1) The actual number of colors depends on the graphic memory, the graphics mode set and the graphic driver used.

PRELIMINARY

4.5.2 Dimensions

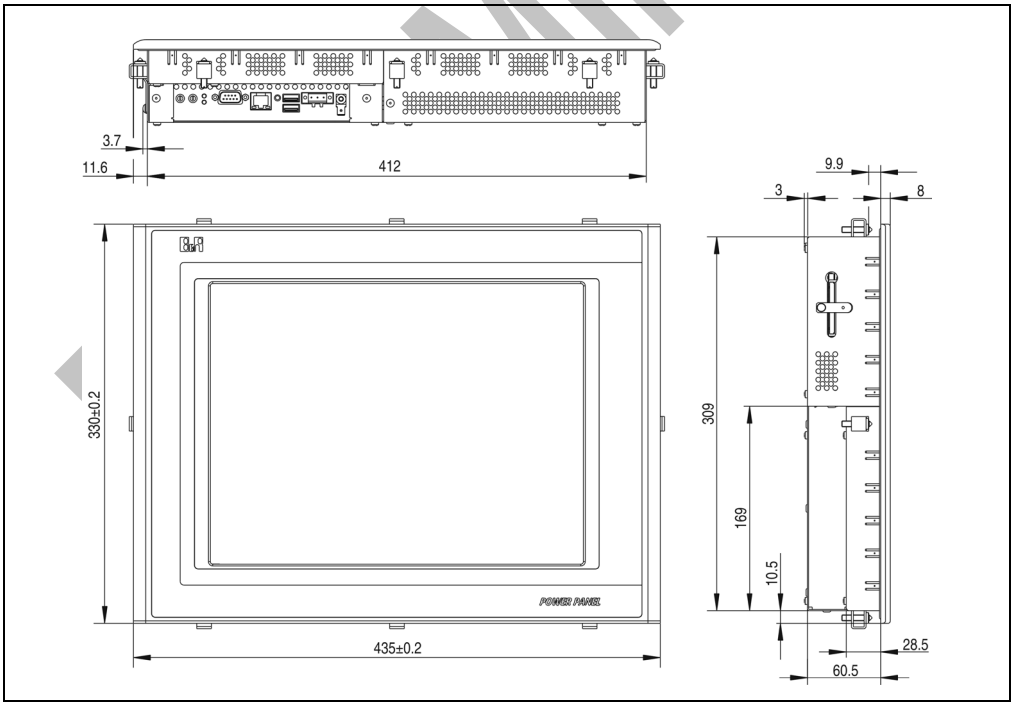


Figure 101: Dimensions 5PP120.1505-37

4.5.3 Cutout Installation

The cutout hole must be made according to the following dimensions for cutout installation. The device must be mounted with the 8 retaining clips supplied with the delivery. The defined position for mounting the retaining clips can be seen in the dimension diagram (see Figure 101 "Dimensions 5PP120.1505-37" on Page 119) For further information regarding mounting, see Chapter 3 "Installation" on Page 121.

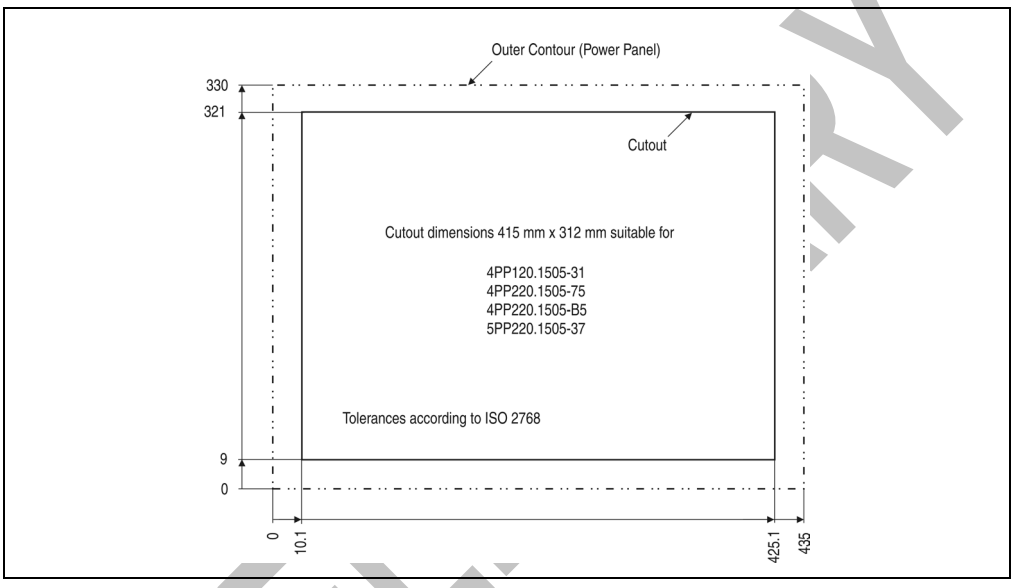


Figure 102: Cutout dimensions

4.5.4 Contents of Delivery

The following components are included in the delivery of the Power Panel device:

Amount	Component
1	Power Panel 120 TFT C XGA 15" T MH
8	Retaining clips included
1	Lithium battery 3 V / 950 mAh included

Table 60: Delivery 5PP120.1505-37

PRELIMINARY

Chapter 3 • Installation

1. Mounting Instructions

- The Power Panel must be mounted using retaining clips included in the delivery. Depending on the Power Panel version a corresponding number of retaining clips are included.

Figure 103: Retaining clip

- In order to guarantee proper air circulation, allow a sufficient amount of space above, below, to the side and behind the Power Panel device. The minimum specified free space can be found in the diagram below. The free space is applies to all Power Panel versions (with/without aPCI slots and keys).

PRELIMINARY

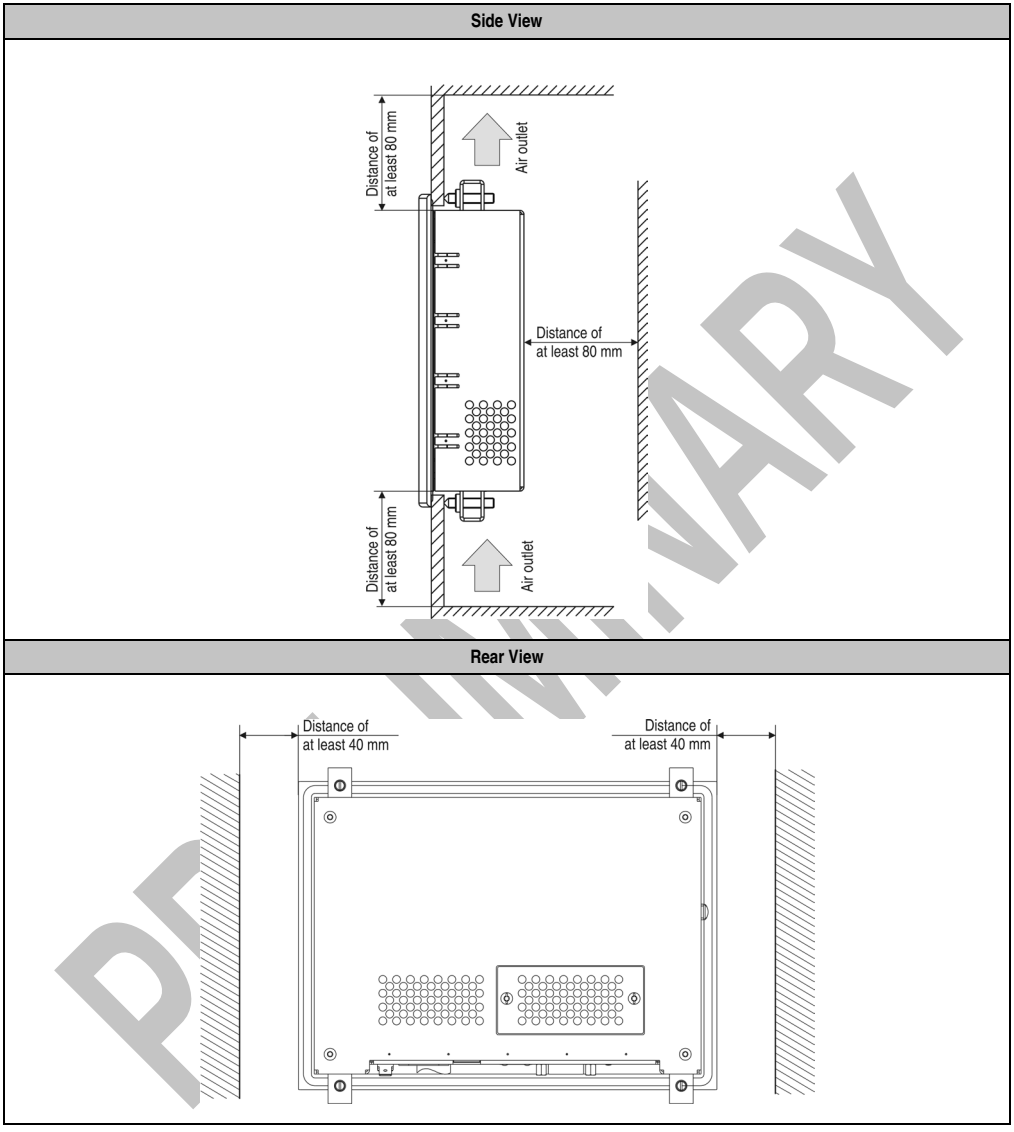


Figure 104: Distance for air circulation

PRELIMINARY

2. Mounting Orientation

The following diagram displays the specifiied mounting orientation for the Power Panel device. The mounting orientation applies to all Power Panel versions (with/without aPCI slots and keys).

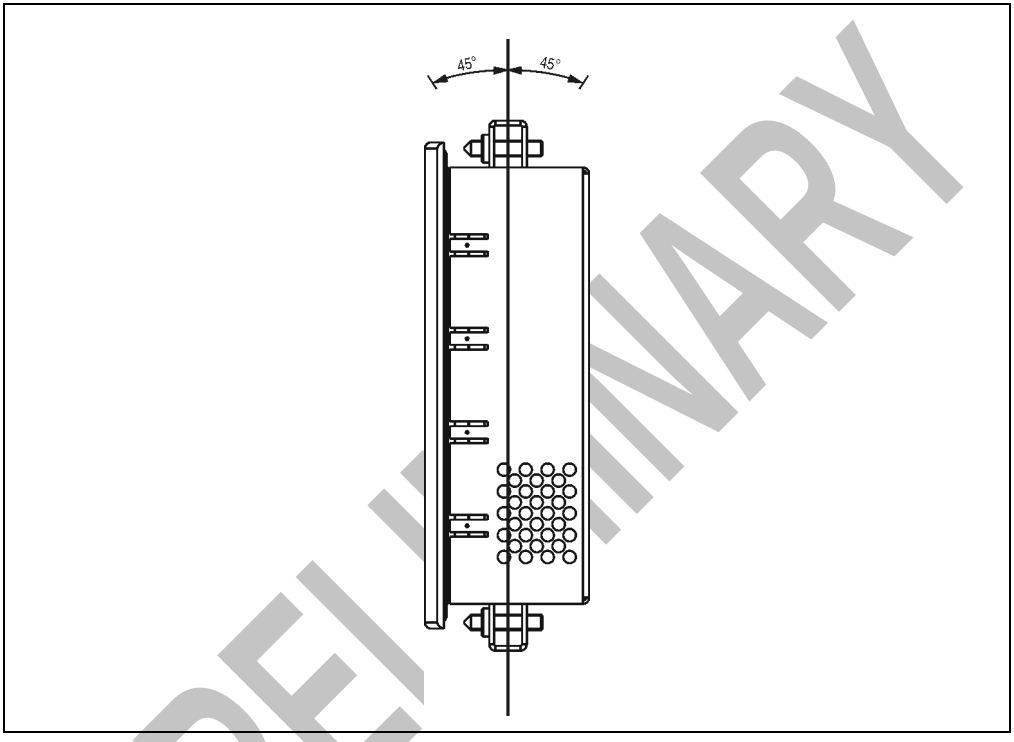


Figure 105: Mounting orientation for the Power Panel

PRELIMINARY

Caution!

The maximum permitted environmental temperature can be found in the technical data for the respective Power Panel device.

PRELIMINARY

Chapter 4 • Software

1. Power Panel with Automation Runtime

1.1 General Information

B&R Automation Runtime™ guarantees a uniform runtime environment for Automation Studio™ programs on all target systems. This assures uniform programming and operation on all devices.

Automation Runtime™ possesses a multitasking operating system adapted especially for use with control technology. The desired application cycle time can be separated into several task classes. Automation Runtime™ ensures that all application programs are processed within the defined time scale, proving itself to be an adjustable, deterministic real-time multitasking system.

A large project can be divided into small sub-projects. This procedure increases modularity and makes maintenance of projects much easier.

1.1.1 Summary Screen

When switching on a Power Panel 100 or Power Panel 200 device a short summary screen of the most important parameters of an Automation Runtime Power Panel device is output:

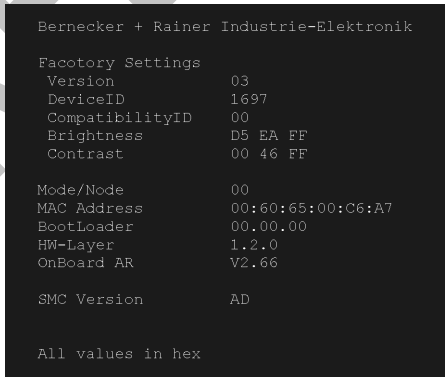


Figure 106: Automation Runtime summary screen

PRELIMINARY

Information	Sample Value	Meaning
Version	03	The version of the factory settings are displayed here. The factory settings determine, amongst other things, device identification, display identification, display specific initialization sequences, the MAC address for the Ethernet adapter and other important parameters. **Factory settings are set by B&R and cannot be changed by the user.**
DeviceID	1697	Hex value of the hardware device number. e.g. the DeviceID 1697 Hex corresponds 5783 dec. for the 4PP220.0571-A5 device.
CompatibilityID	00	The hardware device revision is displayed here.
Brightness	D5 EA FF	The minimum, default and maximum value are shown as a hexadecimal value for the brightness settings of the display.
Contrast	00 46 FF	The minimum, default and maximum value are shown as a hex value for the contrast settings of the display.
Mode/Node	00	Displays the current operating mode switch settings.
MAC Address	00:60:65:00:C6:A7	Displays the assigned Media Access Control (MAC) address.
BootLoader	00.00.00	The version of the bootloader is displayed here.
HW Layer	1.2.0	The version of the HW layer is displayed here.
Onboard AR	V2.66	Displays the current Automation Runtime version.
SMC Version	AD	Displays the current SMC (System Management Controller) software version.

Table 61: Automation Runtime summary screen

1.2 Terminal Operation

TBD

1.3 Operating System Update

TBD

PRELIMINARY

2. Power Panel with BIOS

2.1 General Information

BIOS is an abbreviation for "**B**asic **I**nput and **O**utput **S**ystem". It is the most basic standardized connection between the user and the system (hardware). A B&R modified BIOS from National Semiconductor is used in Power Panel devices.

The BIOS Setup Utility lets you modify basic system configuration settings. These settings are saved in CMOS RAM.

The CMOS RAM is a nonvolatile battery backed memory which retains information when the power is not applied on the Power Panel.

The BIOS is immediately activated when you switch on the power supply of the Power Panel.

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

Information:

After 3 unsuccessful attempts at booting the Power Panel device, using the CMOS backup, the current CMOS settings are overwritten by the BIOS. If there is no valid CMOS backup present, then CMOS settings are set to default values (as with "Load Optimized Defaults").

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

Optionally, a BIOS Summary Screen can be displayed during startup.

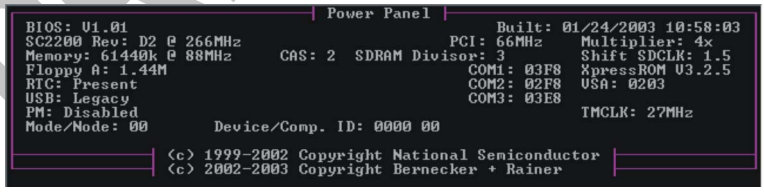


Figure 107: BIOS Summary Screen

To deactivate this summary screen, see "Advanced BIOS Features", on page 139.

To enter BIOS Setup, the DEL key must be pressed as soon as the following message appears on the upper margin of the display (during POST):

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Figure 108: Press DEL for Setup

If the message disappears before DEL was pressed, then the Power Panel must be booted again in order to enter BIOS Setup.

Warning!

Generally: The best advice is to alter only those settings that you thoroughly understand. On no account should settings be changed without a good reason. The BIOS settings have been carefully chosen by B&R to guarantee ideal performance and reliability. Even a seemingly minor change to the settings may cause the system to become unstable.

Information:

The settings recommended by B&R can be loaded with "Load Optimized Defaults".

The following keys help you navigate in BIOS Setup:

Key	Function
Cursor ↑	Move to previous item.
Cursor ↓	Move to next item.
Cursor ←	Move to previous item.
Cursor →	Move to next item.
ESC	Submenu: Exit current page and return to Main Menu.
Enter or press highlighted character shortcut	Change into the selected menu.
F1 and ALT+H	A help window pops up that describes the possible selections for the highlighted item. Press ESC to exit the help window.
Home	Jumps to the first BIOS menu point or object.
End	Jumps to the last BIOS menu point or object.
ALT+Q and ALT+X	Enters BIOS main menu.
- (Minus)	Decrease numerical value or select previous parameter value.
+ (Plus)	Increase numerical value or select next parameter value.

Table 62: BIOS relevant keys

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2.2 BIOS Settings

In the following pages, the individual BIOS setup pages will be described in more detail.

2.2.1 BIOS Setup Main Menu

The BIOS Setup main menu appears immediately by pressing the DEL button when the system is started:

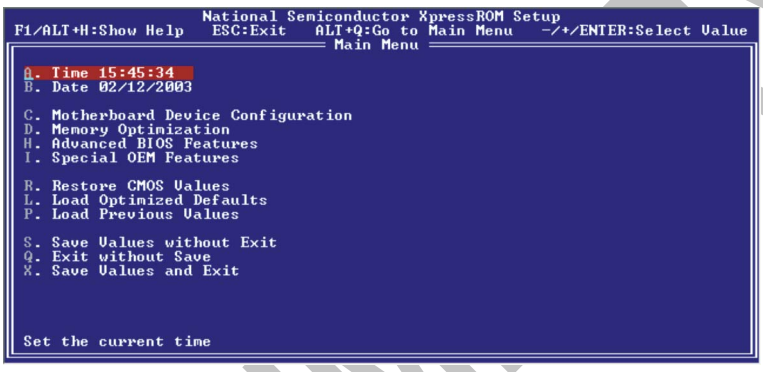

Figure 109: BIOS Setup Main Menu

The individual menu points are explained in detail in the following sections.

Shortcut	BIOS Setup Menu	Function
A	**Time 15:45:34**	The system time can be entered here.
B	**Date 02/12/2003**	The system date can be entered here.
C	**Motherboard Device Configuration**	Motherboard resources can be configured here.
D	**Memory Optimization**	The settings for memory management can be made here.
H	**Advanced BIOS Features**	Advanced BIOS options such as boot logo, summary screen, cache areas, etc. can be configured here.
I	**Special OEM Features**	B&R specific settings for integrated peripheral devices can be made here.
R	**Restore COMS Values**	With this, the last saved CMOS values can be restored in the FPROM.
L	**Load Optimized Defaults**	Load the optimal BIOS settings for best performance.
P	**Load Previous Values**	With this, set values are loaded again when the BIOS Setup is called. All changes which had been made up to that point are lost as a result.
S	**Save Values without Exit**	BIOS values are saved without exiting the BIOS Setup.
Q	**Exit without Save**	The BIOS Setup is exited, possibly without changes being saved.
X	**Save Values and Exit**	Settings are saved using this option and the BIOS Setup is exited.

Table 63: Overview of BIOS Main Menu functions

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Information:

When using a German keyboard layout, pressing the "Y" key enters the letter "Z".

Time

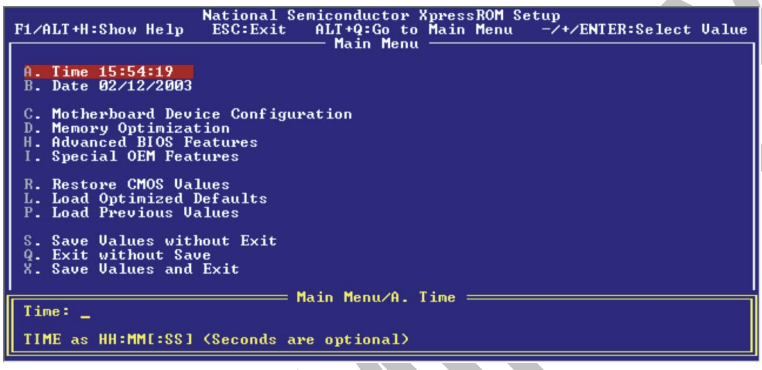

Figure 110: BIOS - Time menu

The currently configured system time is displayed here. The time is buffered by a battery (CMOS battery) after the Power Panel device has been switched off.

A new system time can be entered by selecting TIME and then confirming with RETURN or with the shortcut "A". The format HH:MM[:SS] must be entered as shown in the following example:

Example: Set time to 13:00:00.

The entry can be made in three different ways using the keyboard:

- 01:00:00 PM - confirm using RETURN
- 13:00 - confirm using RETURN
- 13: - confirm using RETURN

Information:

When using a German keyboard layout, ":" is entered by pressing the key "Shift+ö".

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Date

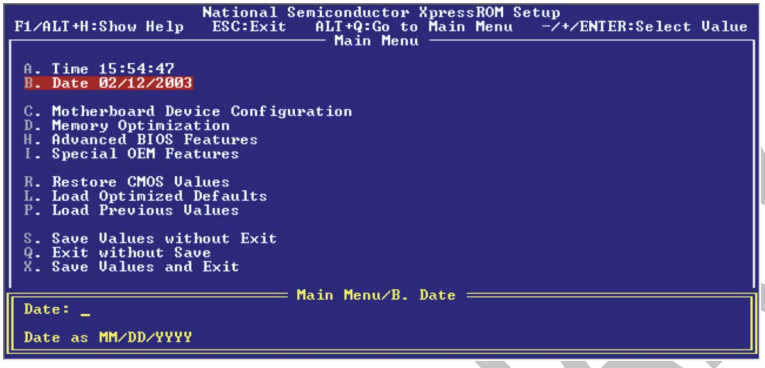

Figure 111: BIOS - Date menu

The current system date is displayed here. The date is buffered by a battery (CMOS battery) after the Power Panel device has been switched off.

A new system date can be entered by selecting DATE and then confirming with RETURN or with the shortcut "B“. The format MM:DD:YYYY must be entered as shown in the following example:

Example: Set date to 12.02.2003.

Entry using keyboard:

- 12/02/2003 - confirmed by RETURN

Information:

When using a German keyboard layout, "/" is entered by pressing the key "-" (beside the Shift key).

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2.2.2 Motherboard Device Configuration

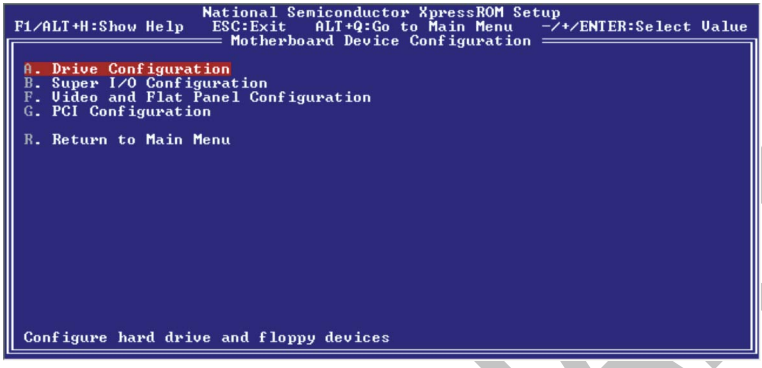

Figure 112: BIOS - Motherboard Device Configuration menu

Shortcut	BIOS Setup Menu	Function
A	**Drive Configuration**	Setting for floppy drive and Compact Flash boot order.
B	**Super I/O Configuration**	Configures the Super I/O device.
F	**Video and Flat Panel Configuration**	Displays the video settings and configuration for resolution, brightness and contrast display parameters.
G	**PCI Configuration**	Configures PCI bus settings.
R	**Return to Main Menu**	Exit current page and return to BIOS Main Menu.

Table 64: BIOS - Motherboard Device Configuration menu

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2.2.3 Drive Configuration

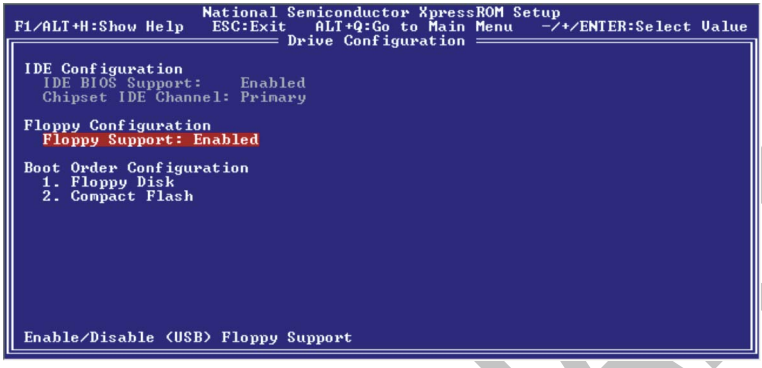

Figure 113: BIOS - Drive Configuration menu

BIOS Setting	Meaning	Configuration Possibilities		Effect
IDE Configuration	Information display for IDE configuration of the Power Panel.	None		-
Floppy Configuration	Floppy Support (USB) can be activated here. It is also possible to access a remote floppy drive using the program "Remhost" (see section "REMHOST", on page 151) and to carry out e.g. a BIOS Update.	Enabled		USB Floppy Support activated.
		Disabled		USB Floppy Support deactivated.
Boot Order Configuration	Configures the boot order for memory media. **If two identical devices are selected a conflict warning is displayed.**	1	Floppy Disk	An attempt is made to boot from this configured drive first.
			Compact Flash	
			NONE	
		2	Floppy Disk	An attempt is made to boot from this configured drive second.
			Compact Flash	
			NONE	

Table 65: BIOS - Drive Configuration menu

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Super I/O Configuration

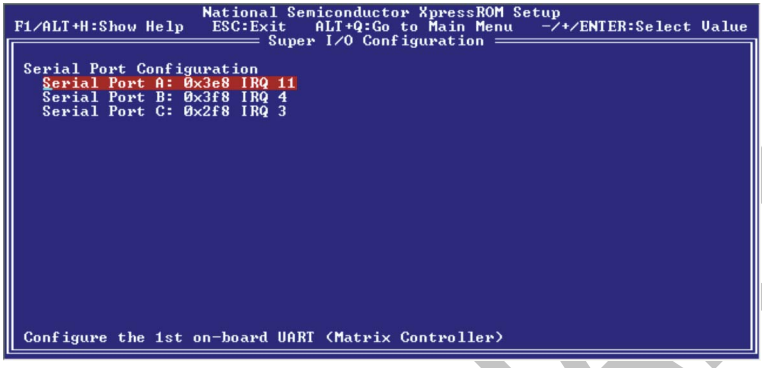

Figure 114: BIOS - Super I/O Configuration menu

BIOS Setting	Meaning	Configuration Possibilities	Effect
Serial Port A:	Configures the first UART address range and the corresponding interrupt for the matrix controller. **Note: Two ports cannot use one and the same address range and interrupt.**	Disabled	No assignment.
		0x3f8 IRQ 4	Use this address range and interrupt.
		0x2f8 IRQ 3	
		0x3e8 IRQ 4	
		0x2f8 IRQ 3	
		0x3e8 IRQ 11	
		0x2f8 IRQ 11	
Serial Port B:	Configures the second UART address range and the corresponding interrupt for the serial interface. **Note: Two ports cannot use one and the same address range and interrupt.**	Disabled	No assignment.
		0x3f8 IRQ 4	Use this address range and interrupt.
		0x2f8 IRQ 3	
		0x3e8 IRQ 4	
		0x2f8 IRQ 3	
		0x3e8 IRQ 11	
		0x2f8 IRQ 11	
Serial Port C:	Configures the third UART address range and the corresponding interrupt for the touch controller. **Note: Two ports cannot use one and the same address range and interrupt.**	Disabled	No assignment.
		0x3f8 IRQ 4	Use this address range and interrupt.
		0x2f8 IRQ 3	
		0x3e8 IRQ 4	
		0x2f8 IRQ 3	
		0x3e8 IRQ 11	
		0x2f8 IRQ 11	

Table 66: BIOS - Super I/O Configuration menu

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Video and Flat Panel Configuration

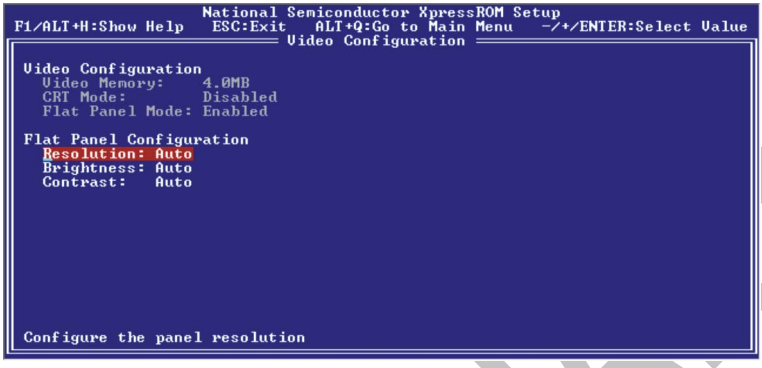

Figure 115: BIOS - Video Configuration menu

BIOS Setting	Meaning	Configuration Possibilities	Effect
Video Memory	Displays the current video memory, which is reserved by the main memory (4MB).	None	
CRT Mode	Display on an external screen.	None	
Flat Panel Mode	Display on a Power Panel display.	None	
Resolution	Configures the maximum setting of the maximum resolution for the display. **Note: The correct resolution should be configured for the Power Panel device that has been specifiied. Otherwise, the display can be damaged by incorrect timing values. If the mode/node switch is set to 0/0, then the resolution is automatically reset every time the Power Panel device restarted.**	Auto	The maximum resolution is read from the factory settings and correctly configured automatically. Manual setting for the resolution of the Power Panel device.
		QVGA(320x240) LCD	Optimal setting for a QVGA LCD Power Panel.
		QVGA(320x240) TFT	Optimal setting for a QVGA TFT Power Panel.
		VGA (640x480)	Optimal setting for a VGA Power Panel.
		SVGA (800x600)	Optimal setting for a SVGA Power Panel.
		XGA(1024x768)	Optimal setting for a XGA Power Panel.
Brightness	Setting for the background lighting of the display. **Note: If the mode/node switch is set to 0/0, then brightness settings are automatically set to 50% every time the Power Panel device restarted.**	Auto	The optimal brightness is automatically configured using factory settings. Therefore, a brightness setting between 100% and 0% is set.
		0% to 100%	Manual setting of the desired brightness within factory settings limits.
Contrast	Setting for the contrast of the display. **Note: Contrast settings can only be configured with passive displays. If the mode/node switch is set to 0/0, then contrast settings are automatically set to 50% every time the Power Panel device restarted.**	Auto	The optimal contrast is automatically configured using factory settings. Therefore, a brightness setting between 100% and 0% is set.
		0% to 100%	Manual setting of the desired contrast within factory settings limits.

Table 67: BIOS - Video Configuration menu

PRELIMINARY

PCI Configuration

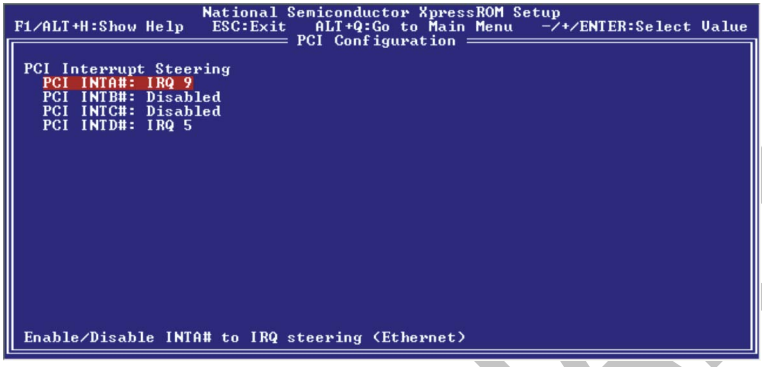

Figure 116: BIOS - PCI Configuration menu

BIOS Setting	Meaning	Configuration Possibilities	Effect
PCI INTA#	Activates the IRQ for the Ethernet controller. Default value is IRQ 9.	Disabled	No IRQ is reserved.
		3, 4, 5, 6, 7, 9, 10, 11, 12, 14 or 15	Assigns these IRQs.
PCI INTB#	Activate IRQ for the aPCI slot 1. Default value is IRQ 7.	Disabled	No IRQ is reserved.
		3, 4, 5, 6, 7, 9, 10, 11, 12, 14 or 15	Assigns these IRQs.
PCI INTC#	Activate IRQ for the aPCI slot 2. Default value is IRQ 10.	Disabled	No IRQ is reserved.
		3, 4, 5, 6, 7, 9, 10, 11, 12, 14 or 15	Assigns these IRQs.
PCI INTD#	Activate IRQ for the USB controller. Default value is IRQ 5.	Disabled	No IRQ is reserved.
		3, 4, 5, 6, 7, 9, 10, 11, 12, 14 or 15	Assigns these IRQs.

Table 68: BIOS - PCI Configuration menu

Return to Main Menu

Exit current page and return to BIOS Main Menu

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2.2.4 Memory Optimization

Warning!

The parameters in this screen are for system designers, service personnel, and technically competent users only. The best advice is to alter only those settings that you thoroughly understand.

The incorrect setting for "Memory Optimization" values can cause instability and even cause the entire system not to boot. If the Power Panel can no longer be booted, then the default values can be restored by restarting three times.

Information:

More detailed information about the meaning and effects of the settings can also be found in the relevant CPU user's manual.

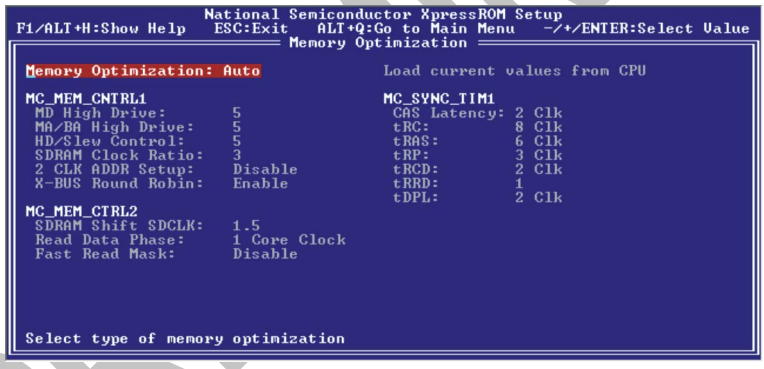

Figure 117: BIOS - Memory Optimization menu

BIOS Setting	Meaning	Configuration Possibilities	Effect
Memory Optimization	Defines the handling of memory optimization. It is recommended that using this option, the user uploads optimal base values (that the system uses) from the CPU to this BIOS page when setting the values manually for the first time.	Auto	BIOS manages and configures optimal memory settings.
		Conservative	The BIOS uses automatically PC66 timings.
		Manual	If "Manual" is selected then the remaining values on this BIOS menu page are active, in order to be able to make the changes. Values only become active when the user saves these before exiting BIOS and the Power Panel is rebooted.

Table 69: BIOS - Memory Optimization menu

PRELIMINARY

BIOS Setting	Meaning	Configuration Possibilities	Effect
Load Current Values from CPU	The specified values are opitimally configured on this BIOS Setup page automatically.	None	The memory timing values currently used are uploaded by the CPU. It is recommended that using this option, the user uploads optimal base values (that the system uses) from the CPU to this BIOS page when setting the values manually for the first time.
MD High Drive	Configures MD[63:0] drive strength.	0 - 7	
MA/BA High Drive	Configures MA[12:0] and BA[1:0] drive strength.	0 - 7	
HD/Slew Control	Configures RASA#, CASA#, WEA#, CS[1:0]#, CKEA, DQM[7:0] drive strength.	0 - 7	
SDRAM Clock Ration	Configures the SDRAM Timing.	2; 2,5; 3; 3,5; 4; 4,5; 5	Sets DRAM Clock Timings.
2 CLK ADDR Setup	Activates the function two clock address setup.	Enabled	Activates this function.
		Disabled	Deactivates this function.
X-BUS Round Robin	Configures the priority levels for processor, graphic and display controller requests.	Enabled	Processor, graphic and display controller requests are treated with the same priority level.
		Disabled	Processor requests are given a higher priority level. Display controller requests always have the highest priority.
SDRAM Shift SDCLK	This function makes switching possible for SDCLK SDRAM hold time requests.	0,5; 1; 1,5; 2; 2,5 or 3	
		No Shift	No switching.
Read Data Phase	Configures Read Data Phase Regulates whether read data is latched to one or two core clocks for the rising edges of the SDCLK.	1 Core Clock	After one core clock.
		2 Core Clocks	After two core clocks.
Fast Read Mask	Prevents the bypassing of FIFO requests using the core.	Enabled	Activates the function.
		Disabled	Deactivates the function.
CAS Latency	Column Address Strobe Latency (CAS) describes the delay between addressing in a RAM function block and preparing stored data to this address. The higher the subsequent value, the greater the delay.	2; 3; 4; 5; 6 or / Clk	Setting the desired cycle time.
tRC	Sets the minimum number of SDRAM cycles between RFSH and RFSH/ACT commands.	2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12; 13; 14; 15 or 16 Clk	Setting the desired cycle time.
tRAS	Sets the minimum number of SDRAM cycles between ACT and PRE commands.	2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12; 13; 14; 15 or 16 Clk	Setting the desired cycle time.
tRP	Sets the minimum number of SDRAM cycles between PRE and ACT commands.	1; 2; 3; 4; 5; 6 or 7 Clk	Setting the desired cycle time.
tRCD	Configures the delay between the ACT and READ/WRITE command. (tRCD) Sets the minimum number of SDRAM cycles between ACT and READ/WRITE commands.	1; 2; 3; 4; 5; 6 or 7 Clk	Setting the desired cycle time.

Table 69: BIOS - Memory Optimization menu (cont.)

PRELIMINARY

BIOS Setting	Meaning	Configuration Possibilities	Effect
tRRD	Configures the time between ACT(0) to ACT(1) command period (tRRD) Sets the minimum number of SDRAM cycles between ACT and ACT commands to two different addresses for the memory areas in the same memory area.	0-7	
tDPL	Sets the minimum number of SDRAM cycles between the time for the last record date until the memory area. is reloaded.	1; 2; 3; 4; 5; 6; 7 Clk	Setting the desired cycle time.

Table 69: BIOS - Memory Optimization menu (cont.)

2.2.5 Advanced BIOS Features

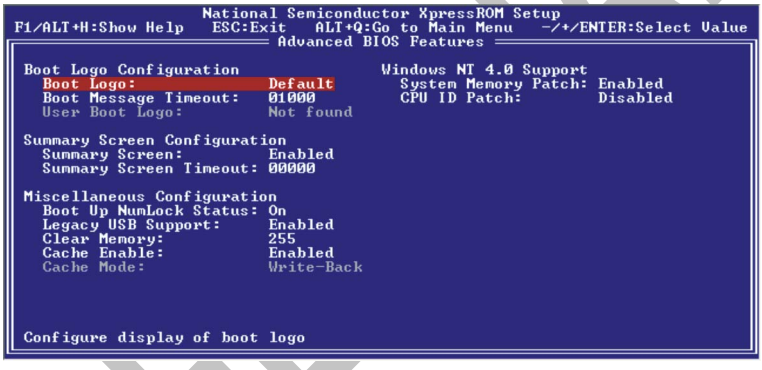

Figure 118: BIOS - Advanced BIOS Features menu

BIOS Setting	Meaning	Configuration Possibilities	Effect
Boot Logo	Displays a boot logo during the start-up of the Power Panel.	Disabled	There is no boot logo displayed during booting.
		Default	A B&R boot logo is displayed during booting.
		User	A user boot logo can be displayed. This must be stored in the FPROM for the Power Panel. If there is none present, then the B&R boot logo is displayed.
Boot Message Timeout	Time definition, how long the message "Press DEL for Setup" is shown on the display and how much time the user has to change to the BIOS configuration.	0	No waiting.
		1-65535 [milliseconds]	The manually set value is waited for in milliseconds, until the boot procedure resumes.
User Boot Logo	Displays whether a User Boot Logo is present.	None	

Table 70: BIOS - Advanced BIOS Features menu

PRELIMINARY

BIOS Setting	Meaning	Configuration Possibilities	Effect
Summary Screen	Displays information about BIOS, VGA, VSA versions, devices found, etc.	Enabled	Shows summary screen.
		Disabled	Hides summary screen.
Summary Screen Timeout	Time definition, how long the summary screen is displayed. **Can be resumed before the timeout expires by pressing any button.**	0	No waiting.
		1-65535 [milliseconds]	The manually set value in milliseconds which is waited for.
Boot Up NumLock Status	Defines the status of an existing numeric keypad when the system is booted.	On	Numeric keypad is activated
		Off	Numeric keypad is deactivated
Legacy USB Support	This function activates USB support, in order to also carry out BIOS settings before the operating system loads with USB support, e.g. using a USB keyboard. **Note: If the mode/node switch is set to 0/0, then Legacy USB support always set to "enabled".**	Enabled	Activating USB Legacy support.
		Disabled	Deactivating USB Legacy Support **Note: After deactivating this support, booting from a USB floppy drive is no longer possible.**
Clear Memory	After starting, the BIOS automatically clears the first MB main memory. This parameter specifies how much additional main memory should be cleared after the system is started. This makes sense for example when the system to be booted requires a certain number of initialized main memory when booting. Adjustable sizes depend on the main memory. Note: Clearing e.g. 256 MB RAM takes approximately 3 seconds.	0	Main memory is not cleared.
		1-255	Number in MB which should be cleared. When clearing the memory, the value entered is limited to the actual existing memory size.
Cache Enable	The processor has a 16 kB fast L1 cache. The data for fast access is provided in this memory.	Enabled	Recurring commands are processed in the fast L1 cache.
		Disabled	Deactivates the function.
Cache Mode	Using cache mode, write accesses are determined on the cache. The option is fixed on "Write Back". The information is only written in the main memory if necessary (main memory and cache do not have the same information content).	None	
System Memory Patch	When activated, the buffer address length is not returned as zero from the national specific software interrupt 15h, the system service function E8h and the subfunction 20h (Get System Memory Map). **This function should be activated only when using Windows NT4.0 operating system.**	Enabled	Activates the function.
		Disabled	Deactivates the function.

Table 70: BIOS - Advanced BIOS Features menu (cont.)

PRELIMINARY

BIOS Setting	Meaning	Configuration Possibilities	Effect
CPU ID Patch	Windows NT 4.0 checks the CPU ID and recognizes a Geode CPU and cannot be operated with this. The recognition is implemented starting from Service Pack 6. For this reason, the function must activated during installation of Windows NT 4.0, until Service Pack 6 has been installed. **This function should be activated only when using Windows NT4.0 operating system.**	Enabled	Activates the function.
		Disabled	Deactivates the function.

Table 70: BIOS - Advanced BIOS Features menu (cont.)

2.2.6 Special OEM Features

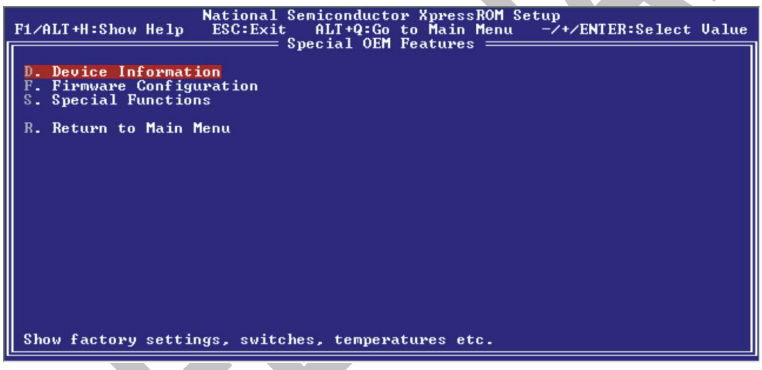

Figure 119: BIOS special OEM features menu

Shortcut	BIOS Setup Menu	Function
D	Device Information	Displays values such as factory settings, mode/node switch position, temperatures, etc.
F	Firmware Configuration	Configures the firmware for the onboard FPGA and aPCI modules (only Power Panel 200).
S	Special Functions	For configuring the user serial ID and a BIOS setup password.
R	Return to Main Menu	Exit current page and return to BIOS Main Menu.

Table 71: BIOS - Special OEM Features menu

PRELIMINARY

Device Information

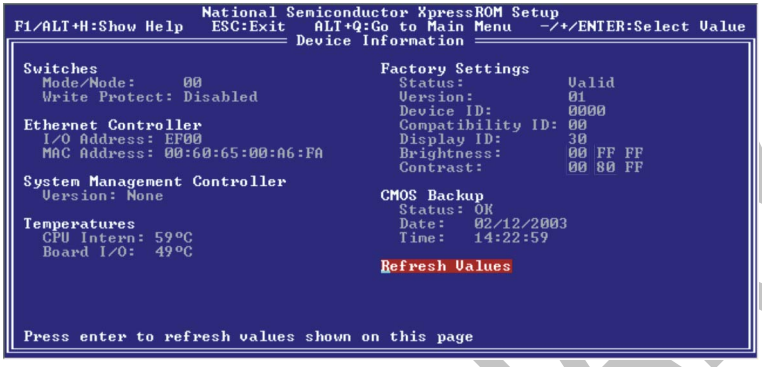

Figure 120: BIOS - Device Information menu

BIOS Setting	Meaning	Configuration Possibilities	Effect
Mode/Node	Displays the current mode/node switch position.	None	-
Write Protect	Displays the switch position for the "Write Protect" switch.	None	-
I/O Address	Displays the Ethernet I/O address.	None	-
MAC Address	Displays the assigned MAC address.	None	-
Version	Displays the software version for the SMC controller.	None	-
CPU Internal	Displays the current internal processor temperature.	None	-
Board I/O	Indicates the current board I/O temperature.	None	-
Status	Status display for factory settings.	None	-
Version	Version display for factory settings.	None	-
Device ID	Hex value for the device code of the Power Panel device.	None	-
CompatibilityID	The compatibility code of the Power Panel device is displayed here.	None	-
Display ID	Indicates the display used. Possible display IDs are: 00h - unknown 10h - Passive displays (STN) 11h - LCD B/W QVGA 12h - LCD COL QVGA 20h - Active displays (TFT) with QVGA 30h - Active displays (TFT) with VGA 40h - Active displays (TFT) with SVGA 50h - Active displays (TFT) with XVGA	None	-

Table 72: BIOS - Device Information menu

PRELIMINARY

BIOS Setting	Meaning	Configuration Possibilities	Effect
Brightness	The defined brightness values (minimum, default, maximum) for the display used are shown here as as hex values.	None	-
Contrast	The defined contrast values (minimum, default, maximum) for the display used are shown here as as hex values.	None	-
Status	The status for the last automatically saved CMOS backup is displayed here.	None	**If the boot procedure is successful, then the CMOS values are automatically saved by BIOS in the FPROM. The values therefore are only saved in the FPROM if the backup is not equal to the current CMOS, the backup is not available or the backup checksum is incorrect.**
Date	Date of the last automatically saved CMOS backup.	None	
TIme	Time of the last automatically created CMOS backup.	None	
Refresh Values	The values are refreshed.	None	By pressing ENTER, the entire values in this BIOS screen are updated.

Table 72: BIOS - Device Information menu

Firmware Configuration

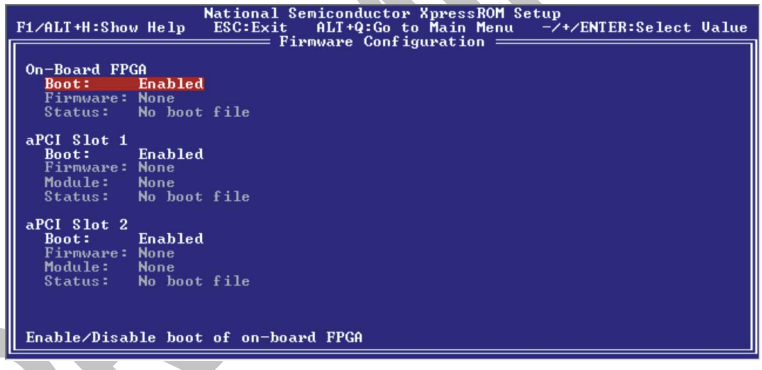

Figure 121: BIOS - Firmware Configuration menu

BIOS Setting	Meaning	Configuration Possibilities	Effect
Onboard FPGA Boot	The onboard FPGA controls the image output for Power Panel 200 devices with BIOS.	Enabled	The onboard FPGA is activated and initialized.
		Disabled	Deactivates the FPGA. If this function is deactivated, then no picture is output on Power Panel 200 devices. This function can only be reactivated by using the program "Remhost" (see section "REMHOST", on page 151).
Onboard FPGA Firmware	Information about FPGA Firmware.	None	-

Table 73: BIOS - Firmware Configuration menu

PRELIMINARY

BIOS Setting	Meaning	Configuration Possibilities	Effect
Onboard FPGA status	Status display for the onboard FPGA.	None	-
aPCI Slot 1 Boot	A connected aPCI module in the aPCI slot 1 is initialized and booted, as long as a valid firmware is available.	Enabled	The aPCI module is booted if a corresponding firmware file is burned in the FPROM of the Power Panel.
		Disabled	The aPCI module is not booted by the BIOS.
aPCI Slot 1 firmware	Information about a stored boot file for the aPCI slot 1 in the FPROM.	None	-
aPCI Slot 1 modules	Identification of connected aPCI modules in aPCI slot 1.	None	-
aPCI Slot 1 Status	Status display for aPCI slot 1 modules.	None	-
aPCI Slot 2 Boot	A connected aPCI module in the aPCI slot 2 is initialized and booted, as long as a valid firmware is available.	Enabled	The aPCI module is booted if a corresponding firmware file is burned in the FPROM of the Power Panel.
		Disabled	The aPCI module is not booted by the BIOS.
aPCI Slot 2 firmware	Information about a stored boot file for the aPCI slot 2 in the FPROM.	None	-
aPCI Slot 2 modules	Identification of connected aPCI modules in aPCI slot 2.	None	-
aPCI Slot 2 Status	Status display for aPCI slot 2 modules.	None	-

Table 73: BIOS - Firmware Configuration menu (cont.)

Special Functions

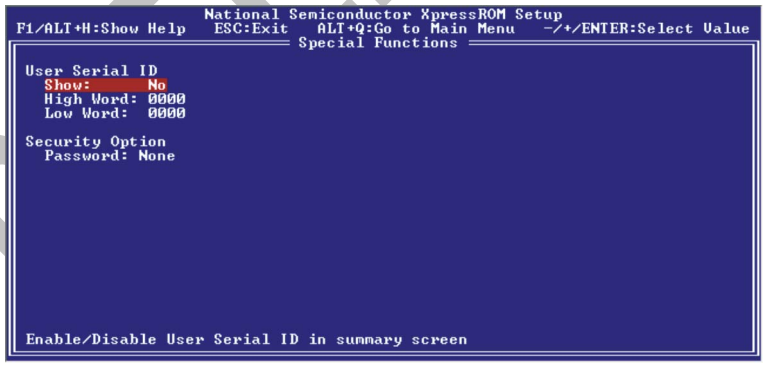

Figure 122: BIOS - Special Functions menu

PRELIMINARY

BIOS Setting	Meaning	Configuration Possibilities	Effect
User Serial ID Show	A user serial number can be displayed in the summary screen using this function when the system is started.	Yes	Displays the assigned user serial ID.
		No	Hides the assigned user serial ID.
High Word	Input possibilities for the first 4 bytes for the user serial number.	0000-FFFF	The hexadecimal value entered defines the first 4 positions of the user serial ID.
Low Word	Input possibilities for the second 4 bytes of the user serial number.	0000-FFFF	The hexadecimal value entered defines the second 4 positions of the user serial ID.
Password	A password can be defined here which must be entered by the user when the BIOS setup is called.	Max. 8 characters	The password must be confirmed by being entered for a second time. The password can be removed again by entering a blank password (just pressing RETURN). **Warning: The password entered is also saved in the CMOS Backup, and is impossible to delete.**

Table 74: BIOS - Special Functions menu

Return to Main Menu

Exit current page and return to BIOS Main Menu.

2.2.7 Restore CMOS Values

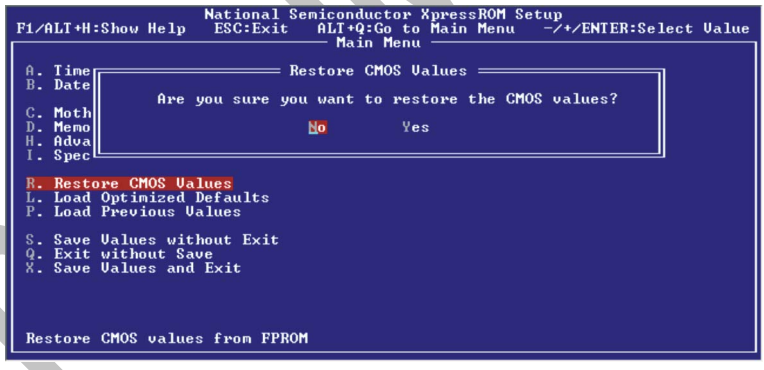

Figure 123: BIOS - Restore CMOS Values menu

The last saved CMOS values can be restored in the FPROM using this BIOS menu item (R shortcut). All configurable CMOS values (besides date and time) are restored again in the BIOS Setup.

PRELIMINARY

Information:

If the boot procedure is successful, then the CMOS values are automatically saved by BIOS in the FPROM. The values therefore are only saved in the FPROM if the backup is not equal to the current CMOS, the backup is not available or the backup checksum is incorrect.

For protecting CMOS data, a CMOS backup was built into the BIOS. If the BIOS setup was ended using "Save Values and Exit" and the Power Panel was correctly restarted, then the CMOS data is burned in the FPROM. If the CMOS checksum is incorrect during startup, (battery empty) or the Power Pabel cannot be booted correctly three times consecutively, then the salvaged data from the FPROM is copied again to the CMOS. Setup is back to its orginal state, except for the time.

2.2.8 Load Optimized Defaults

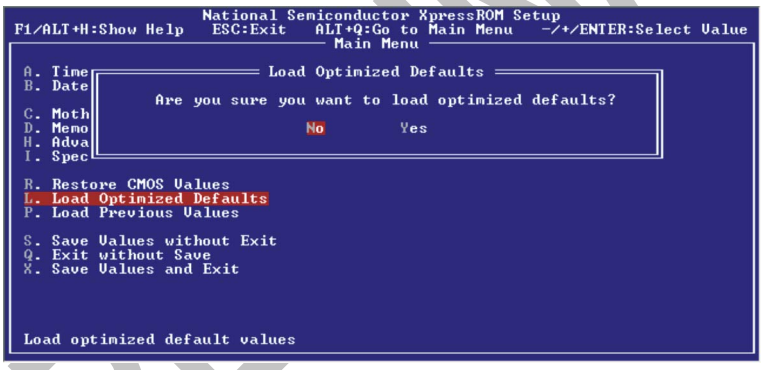

Figure 124: BIOS - Load Optimized Defaults menu

Optimal BIOS settings for best performance can be loaded using this BIOS menu item (L shortcut).

Information:

These settings are also recommended by B&R.

PRELIMINARY

2.2.9 Load Previous Values

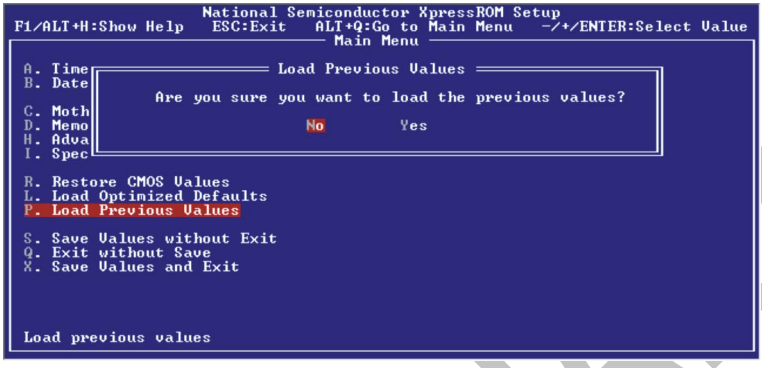

Figure 125: BIOS - Load Previous Values menu

The set values called at the BIOS Setup are loaded again using this BIOS menu item (P shortcut). All changes which had been made up to that point are lost as a result.

2.2.10 Save Values without Exit

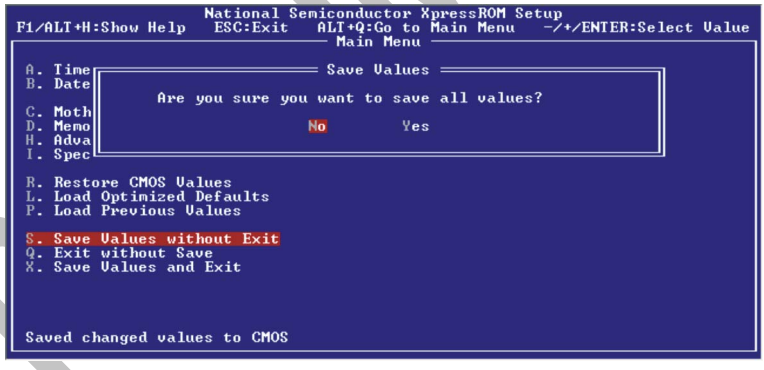

Figure 126: BIOS - Save Values without Exit menu

The BIOS values are saved using this menu item (S shortcut) by clicking "Yes". After this, the user can make further settings or exit BIOS Setup.

2.2.11 Exit without Save

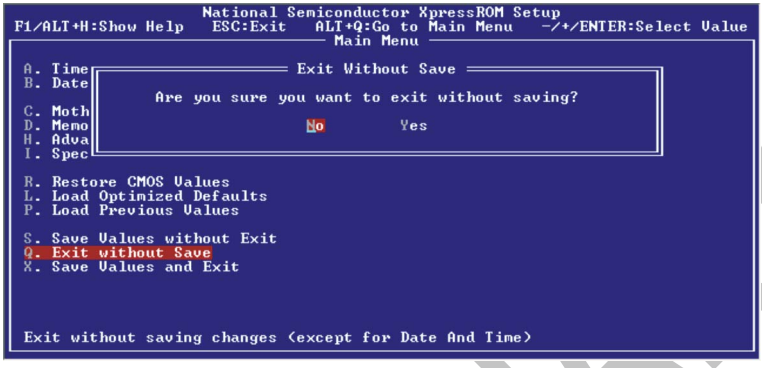

Figure 127: BIOS - Exit without Save menu

Using this BIOS menu item (Q shortcut), the user can exit the BIOS Setup by clicking "Yes", without having to save any possible changes made. Afterwards, the system is automatically rebooted.

2.2.12 Save Values and Exit

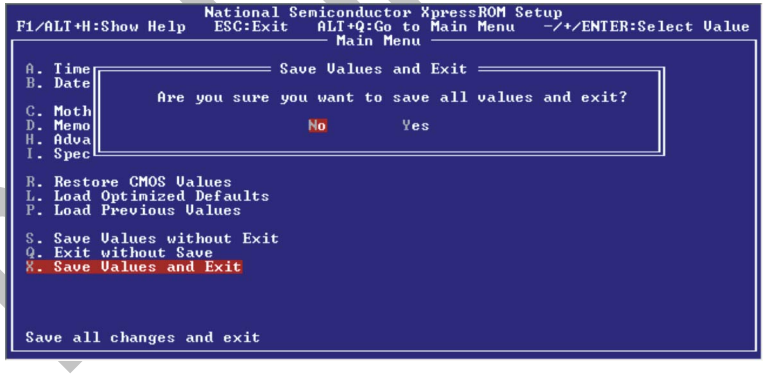

Figure 128: BIOS - Save Values and Exit menu

Using this menu item (X shortcut) settings are saved, the BIOS Setup is automatically shut down by clicking "Yes" and a reboot of the system takes place.

For more information about CMOS backup, see section 2.4 "CMOS Backup".

2.3 BIOS Update

An upgrade might be necessary for several reasons:

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

A current BIOS update can be found on the HMI Drivers & Utilities CD-ROM (model number 5S0000.01-090 starting from version 1.49) or can be directly downloaded from the support area on the B&R homepage (www.br-automation.com).

To carry out a BIOS Upgrade, the following steps should be taken:

- First, an empty diskette must be made bootable (commando line "sys a:" or "format a: /s")

Information:

For the upgrade, a boot diskette must be created with Windows ME, Windows XP or MS-DOS 6.22.

MS-DOS boot diskettes function only using REMHOST starting from BIOS version 1.02 or older BIOS versions.

- Copy the content of the *.zip file to this diskette.
- Insert diskette in the USB floppy disk drive and reboot the Power Panel device (possibly from the floppy disk drive of a remote PCs using REMHOST, see also section 2.5 "REMHOST" on Page 151). See section 2.2.3 "Drive Configuration" on Page 133 for the necessary settings for the Power Panel device when booting from a diskette.
- After booting from the diskette, you enter the following start menu:

```
Start Menu for MS-DOS 6.22
==========================

1. Upgrade complete System (BIOS, FPGA)
2. Upgrade XpressROM BIOS only
3. Upgrade FPGA Firmware only
4. Save complete System (BIOS, FPGA)
5. Save XpressROM BIOS only
6. Save FPGA Firmware only
7. Start REMHOST Utiltity
8. Exit

Choose the option you require:_
```

Figure 129: BIOS Update start menu

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Item	Menu Item	Description
1	Upgrade complete system (BIOS, FPGA)	All BIOS areas (XpressROM and FPGA firmware) are automatically updated (default after 5 sec).
2	Upgrade XpressROM BIOS only	Only the XpressROM BIOS is automatically updated.
3	Upgrade FPGA firmware only	Only the FPGA firmware is automatically updated.
4	Save complete system	All BIOS areas (XpressROM and FPGA firmware) are automatically protected.
5	Save XpressROM BIOS only	Only the XpressROM BIOS is automatically protected.
6	Save FPGA firmware only	Only the FPGA firmware is automatically protected.
7	Start REMHOST utility	The REMHOST utility (see section 2.5 "REMHOST" on Page 151) is started. With this utility, the upgrade can be made using a serial connection from a remote PC.
8	Exit	Return to the shell (MS-DOS).

Table 75: BIOS Update menu description

Information:

If you do not press a button within 5 seconds, then step 1 "Upgrade Complete System" (BIOS, FPGA) is automatically carried out and the Power Panel is independently updated.

If you want to indivdually update the XpressROM or the FPGA firmware, then these options can be selected in the start menu (2 or 3).

It is also possible to protect the existing BIOS or individual components. For this, there must be approximately 320 KB free space on the diskette. Otherwise, "Save..." functions might not be able to be executed.

- The system must be rebooted after a successful upgrade. This can also take place by calling the REBOOT.COM utilities.

2.4 CMOS Backup

For protecting CMOS data, a CMOS backup was integrated into the BIOS. If the BIOS setup was ended using "Save Values and Exit" (see Section 2.2.12 "Save Values and Exit") and the Power Panel was successfully restarted, then the CMOS data is burned in the FPROM. If the CMOS checksum is incorrect during startup, (battery empty) or the Power Pabel cannot be booted correctly three times consecutively, then the salvaged data from the FPROM is copied again to the CMOS. Setup is back to its orginal state, except for the time.

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2.5 REMHOST

2.5.1 General Information

REMHOST is a MS-DOS program (REMHOST.EXE) and can be used by a remote PC to operate a BIOS Power Panel device. The Power Panel receives keyboard entries from a remote PC using REMHOST. Screen outputs for the Power Panel device are redirected to the screen of the remote PCs. The Power Panel can acess the floppy drive (internal or external) of the remote PC or an individual floppy drive (USB) and also boot from this.

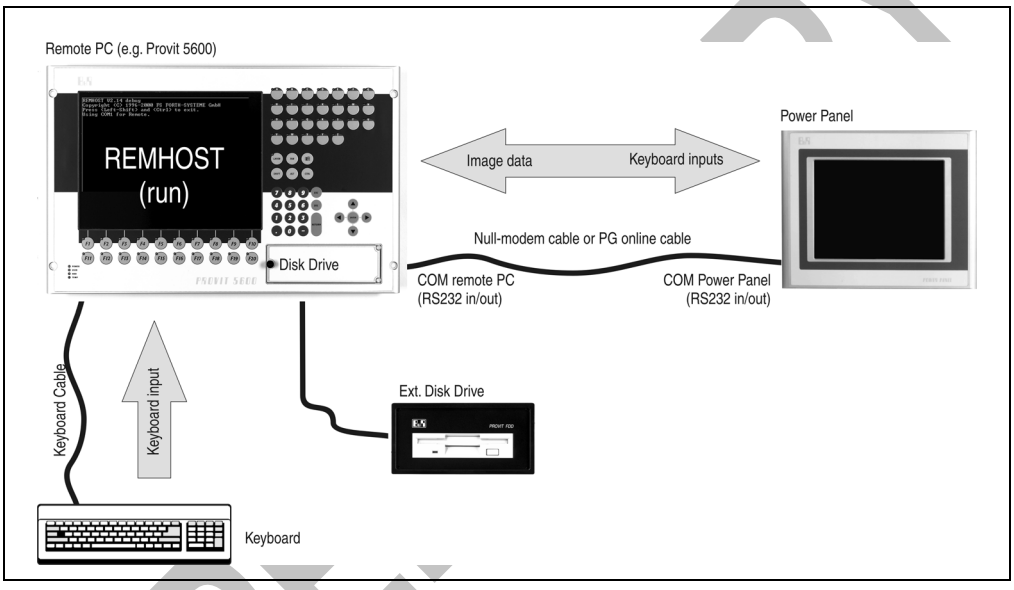

Figure 130: REMHOST communication model

REMHOST can be used if :

- the display for the Power Panel device is not functioning
- Brghtness and contrast settings for the Power Panel display are adjusted so that outputs can no longer be detected.
- BIOS setup settings must be made for a Power Panel with QVGA display.
- There is no USB floppy present and the BIOS for the Power Panel device should be updated.

2.5.2 Requirements

The Power Panel must be connected to the remote PC using a serial cable (e.g. a null-modem cable or PG online cable, see Figure 143 "REMHOST pin assignment - Power Panel connection cable", on page 154 for the necessary assignment). The serial cable must be connected to a COM interface for the remote PC and to the COM interface for the Power Panel device (see Figure 130 "REMHOST communication model"). The mode/node switch for the Power Panel device must be set to 00 (= service mode) see Figure 85 "Mode/node switch" on Page 104.

2.5.3 Important Notes

Information:

- **REMHOST only functions when the diverted functions for the Power Panel device are operated using BIOS calls. For example, that means if a program writes directly to the video memory on the Power Panel, then these outputs cannot be redirected to the screen of a remote PC. Generally, only programs which work in text mode should be used. Therefore, a MS-DOS start diskette must be used when booting the Power Panel using REMHOST. If booting is made with a Windows start diskette, illegible symbols are output on the remote screen and the user's inputs are not correctly displayed.**
- **REMHOST must be called from MS-DOS. In the MS-DOS box in Windows, the error free operation of REMHOST is not guaranteed: e.g. very slow screen outputs (in Windows NT4.0 and 2000), errors with write accesses to the remote floppy.**

Warning!

When updating the BIOS using REMHOST, it should be noted that the Power Panel, the remote PC and the serial connection are all connected to each other for the whole period while the update is taking place.

Caution!

The Power Panel can no longer be started if the BIOS update is aborted. Therefore, when updating BIOS with REMHOST, the start for REMHOST should take place in MS-DOS (not in the MS-DOS prompt from Windows).

2.5.4 Configuration of REMHOST

The function of REMHOST is controlled using a REMHOST.INI configuration file. REMHOST.INI is an ASCII text file and can be opened and edited with any text editor (e.g. notepad).

PRELIMINARY

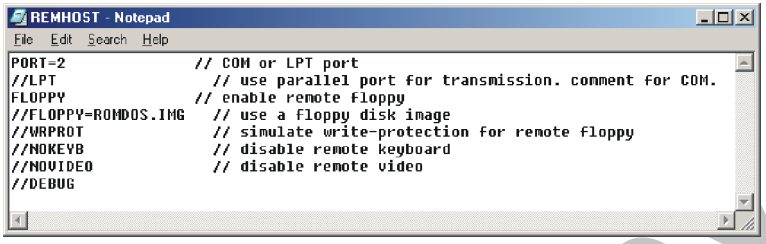

Figure 131: Example for REMHOST.INI

In the following table, all commands are listed which REMHOST supports. If the commands begin with consecutive slash symbols ("//") , then these are evaluated as a comment begin. This can be used to deactivate individual parameters.

Configuration Possibility	Description
PORT=x	Specifies the COM interface on the remote PC, which is used for the serial connection to the Power Panel. "x" stands for the COM number, e.g. COM2 is used for PORT=2.
LPT	The parallel interface is used for communication. This option can not be used with the Power Panel.
FLOPPY	The floppy disk drive for the remote PC is used as the floppy disk drive for the Power Panel. Therefore, a connected USB floppy disk drive on the Power Panel cannot be used.
FLOPPY=ROMDOS.IMG	A floppy image file can be used for the simulation of a floppy disk drive on the hard disk of the remote PC. A floppy image can be created with the program WINIMAGE (download of a shareware version is possible from www.winimage.com). In this way, several versions of BIOS updates can be easily stored on the hard disk of the remote PCs.
WRPROT	Write protection for the floppy disk drive can be simulated using this parameter.
NOKEYB	If this parameter is activated, then the keyboard of the remote PC is not used by REMHOST. Inputs must then take place on the Power Panel, e.g. using a USB keyboard.
NOVIDEO	If this parameter is activated, then the screen output is not made on the remote PC. Outputs take place on the display of the Power Panel device.
DEBUG	REMHOST outputs debug information.

Table 76: Description of REMHOST.INI configuration possibilities

2.5.5 Program Start

The name for the configuration file can be specified when starting the program. If no name is specified, then the REMHOST.INI file is used as standard.

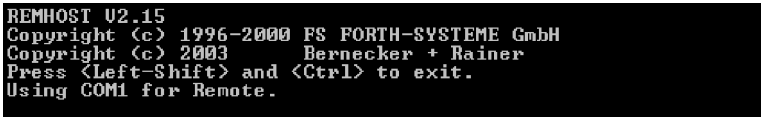

Figure 132: REMHOST Program Start

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After the program is started, REMHOST displays, amongst other things, the current version as well as the COM interface used for communication with the Power Panel of the remote PC.

The connection is established using a Power Panel device, if this is rebooted and the mode/node switch is set to 00h on the Power Panel.

Information:

If the Power Panel is already started, then NO connection can be established using a subsequent REMHOST start.

2.5.6 Program End

REMHOST can be ended again by simulatenously pressing the left SHIFT key and the CTRL key.

Information:

The Power Panel must be restarted in order to undo the redirections for keyboard, floppy disk drive and display.

2.5.7 Assignment for the Connection Cable

The connection cable required for REMHOST must have two 9-pin DSUB sockets. The appropriate cable can be ordered directly from B&R under the model number 9A0017.01 (length = 0.6 m) and 9A0017.02 (length = 1.8 m).

The cable can also be made by the user. A self made cable can have a maximum length of 15 meters. The pins must be connected as follows:

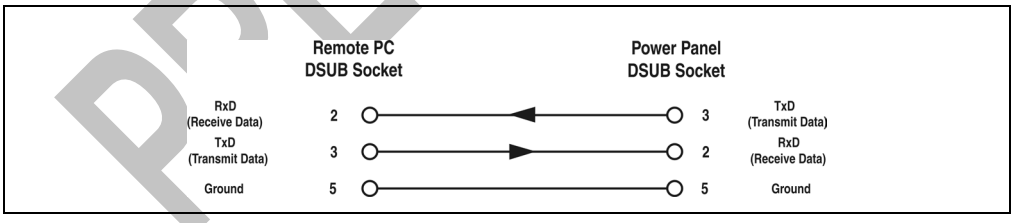

Figure 133: REMHOST pin assignment - Power Panel connection cable

2.6 Distribution of Resources

2.6.1 RAM Address Assignment

RAM Address	Resource
00000000 - 000003FF	Interrupt vectors

Table 77: RAM address assignment

PRELIMINARY

RAM Address	Resource
00000400 - 000004FF	BIOS data area
00000500 - 0009FBFF	Freely available for the operating system (MS-DOS program area)
0009FC00 - 0009FFFF	Advanced BIOS data area
000A0000 - 000BFFFF	VGA memory
000C0000 - 000C7FFF	VGA BIOS
000C8000 - 000CBFFF	Reserved
000CC000 - 000EFFFF	XpressROM expansions ROMS. Unused areas can be used for HMA.
000F0000 - 000FFFFF	XpressROM BIOS
00100000 - BC_RAM_TOP	Remaining DRAM
40000000	GX_Base register (defined by BIOS, can also be 40000000, 80000000 or C0000000)
40000000 - 40000BFF	L1 scratchpad
40008000 - 400080FF	Internal BUS IF unit registers
40008100 - 400082FF	Graphics pipeline registers
40008300 - 400083FF	Display controller registers
40008400 - 400084FF	Memory controller register
40009000 - 403FFFFF	PCI accessible
40010000 - 40010FFF	Video configuration registers
40011000 - 40011FFF	Audio configuration registers
40015000 - 40015FFF	VIP interface registers
40800000 - 40BFFFFF	VGA frame buffer
D0000000 - FBFFFFFF	PCI memory and PCI ROM (are dynamically assigned during POST)
FFE00000 - FFFFFFFF	High BIOS area (FPROM)

Table 77: RAM address assignment

2.6.2 Assignment of DMA channels

DMA Channel	Resource
0	Free
1	Free
2	Floppy drive
3	Free
4	Free
5	Free
6	Free
7	Free

Table 78: Assignment of DMA channels

2.6.3 I/O Address Assignment

PRELIMINARY

I/O Address	Resource
0000 - 000F	DMA controller channels 0-3
0020 - 0021	Master programmable interrupt controller
0022 - 0023	CPU configuration registers
0040 - 0043	Programmable interval timer
0060 - 0066	Keyboard controller (emulated by Legacy USB)
0070 - 0071	RTC (Reat-time clock)
0072 - 0073	Extended RTC (Reat-time clock)
0080	BIOS POST debug output port
0081 - 0083	DMA channel low page registers
0084	VSA debug output port
0085 - 008F	DMA channel low page registers
0092	Port A control register
00A0 - 00A1	Slave programmable interrupt controller
00C0 - 00CF	DMA controller channels 4-7
00D0 - 00DF	DMA status/control/mode registers channel 0-7
00F0 - 00F1	Coprocessor error register
015C - 015D	On-chip SIO configuration
0170 - 0177	Primary IDE
01F0 - 01F7	Primary IDE
0220 - 022F	Audio (not supported)
02F8 - 02FF	COM2
0376 - 0377	Secondary IDE channel
03B0 - 03BB	Video controller
03C0 - 03DF	Video controller
03E8 - 03EF	COM3
03F0 - 03F5	Floppy controller (emulated by Legacy USB)
03F6 - 03F7	Primary IDE
03F8 - 03FF	COM1
0480 - 048F	DMA channel high page registers
04D0 - 04D1	Interrupt edge/level registers
0CF8 - 0CFF	PCI configuration registers
5000 - 500F	IDE controller configuration registers (F2BAR4)
6000 - 60FF	SMI status and aPCI registers (F1BAR0)
6200 - 623F	X-Bus expansion support registers (F5BAR0)
6400 - 643F	GPIO runtime and configuration registers (F0BAR0)
6600 - 663F	LPC support registers (F0BAR1)
9000 - 903F	CPU configuration registers

Table 79: I/O address assignment

PRELIMINARY

I/O Address	Resource
AC00 - ACFF	aCPI registers (F1BAR1)
AD00 - AFFF	PCI assignment (dynamically assigned during POST)
B000 - BFFF	PCI assignment (dynamically assigned during POST)
C000 - CFFF	PCI assignment (dynamically assigned during POST)
D000 - DFFF	PCI assignment (dynamically assigned during POST)
E000 - EFFF	PCI assignment (dynamically assigned during POST)
F000 - FFFF	Reserved

Table 79: I/O address assignment (cont.)

2.6.4 Interrupt Assignments

Interrupts	Resource
RQ 0	System timer
IIRQ 1	Keyboard (Legacy USB emulation)
IRQ 2	2nd PIC IRQ cascade
IRQ 3	COM2 1)
IRQ 4	COM1 1)
IRQ 5	USB 1)
IRQ 6	Floppy drive
IRQ 7	aPCI slot 1 1)
IRQ 8	RTC (Reat-time clock)
IRQ 9	Ethernet (MacPhyter) 1)
IRQ 10	aPCI slot 2 1)
IRQ 11	COM3 1)
IRQ 12	PS/2 mouse (Legacy USB emulation)
IRQ 13	FPU (Coprocessor)
IRQ 14	Primary IDE (primary hard disk)
IRQ 15	Secondary IDE (secondary hard disk)

Table 80: Interrupt assignments

1) BIOS setup default setting

PRELIMINARY

3. Windows CE

3.1 General Information

Windows CE is an operating system which is optimally tailored to the hardware used. This means that only the functions and modules which are required by the respective device are included. This makes this operating system extremely robust and stable.

Advantages

- Windows CE is a 32-bit operating system with multitasking and multithreading.
- Windows CE is compact and offers high performance even for configurations with limited working memory.
- Windows CE is ideally suited for integrated automation systems in industry.
- Windows CE is cheaper than other Windows licences.

The Windows CE available from B&R (model no. see section "Software", on page 21) was developed for Power Panel BIOS devices, and is only available with a Power Panel BIOS device.

3.2 What is Required?

The Power Panel must fulfil the following criteria to be able operate the Windows CE operating system.

- Power Panel device with BIOS (see Overview "Power Panel with BIOS", on page 20)
- BIOS version >= 1.00
- At least 64 MB RAM

3.3 Installation Procedures

Generally, Windows CE is already preinstalled at B&R Austria. After switching on the device, only the touch screen needs to be calibrated.

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More detailed instructions for manual installation can be found in the Windows CE help file. This help file is found on the HMI Drivers & Utilities CD-Rom (model number 5S0000.01-090 from version 1.49) or can be downloaded directly from the download area of the B&R homepage (www.br-automation.com).

4. Windows XP Embedded

4.1 General Information

TBD

PRELIMINARY

PRELIMINARY

Chapter 5 • Standards and Certifications

1. Valid European Guidelines

2. Valid Standards

3. Environmental Limits

4. Requirements for Immunity to Disturbances (EMC)

5. Requirements for Emissions (EMC)

6. International Certifications

PRELIMINARY

PRELIMINARY

Chapter 6 • Accessories

1. Overview

Model Number	Description	Note
0AC201.9	**Lithium Batteries (5 pcs.)** Lithium batteries, 5 pcs., 3 V / 950 mAh	
0TB103.9	**Plug for the 24 V Supply Voltage (screw clamps)** Plug 24 V 5.08 3-pin Screw clamps	
0TB103.91	**Plug for the 24 V Supply Voltage (cage clamps)** Plug 24 V 5.08 3-pin Cage clamps	
0TB704.9	**Accessory 4-pin Screw Clamp , 5.08** Accessory, terminal block, 4-pin, screw clamps, 1.5 mm2	
0TB704.91	**Accessory 4-pin Cage Clamp, 5.08** Accessory, terminal block, 4-pin, cage clamps, 2.5 mm2	
3IF772.9	**aPCI Interface 2x CAN, 1x RS232** aPCI interface module, 1 RS232 interface, 2 CAN interfaces, max. 500 kbps, CAN: electrically isolated, network capable, object buffer in send and receive directions Order 2 x TB704 terminal blocks separately.	
3IF786.9	**aPCI interface 1x POWERLINK, 1x RS232** aPCI interface modules, 1 ETHERNET Powerlink interface, manager or controller function, 1 RS232 interface	
3IF787.9	**aPCI Interface 1x POWERLINK, 1x CAN** aPCI interface module, 1 ETHERNET Powerlink interface, manager or controller function, 1 CAN interface, max. 500 kbps, object buffer in send and receive direction, network capable, electrically isolated. Order 1 x TB704 terminal block separately.	
3IF789.9	**aPCI interface 1x POWERLINK, 1x X2X-LINK** aPCI interface interface module, 1ETHERNET Powerlink interface, manager or controller function, 1X2X Link Master interface, electrically isolated. Order TB704 terminal block separately.	
5CFCRD.0032-01	**Compact Flash 32 MB ATA/True IDE** Compact Flash card with 32 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0064-01	**Compact Flash 64 MB ATA/True IDE** Compact Flash card with 64 MB FPROM, and true IDE/ATA interface.	

Table 81: Model numbers for accessories

Model Number	Description	Note
5CFCRD.0128-01	**Compact Flash 128 MB ATA/True IDE** Compact Flash card with 128 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0192-01	**Compact Flash 196 MB ATA/True IDE** Compact Flash card with 196 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0256-01	**Compact Flash 256 MB ATA/True IDE** Compact Flash card with 256 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0384-01	**Compact Flash 384 MB ATA/True IDE** Compact Flash card with 384 MB FPROM, and true IDE/ATA interface.	
5CFCRD.0512-01	**Compact Flash 512 MB ATA/True IDE** Compact Flash card with 512 MB FPROM, and true IDE/ATA interface.	

Table 81: Model numbers for accessories

2. Lithium Battery 0AC201.9

2.1 General Information

The lithium battery guarantees buffering of the internal real-time clock (RTC), SRAM data and also individually saved BIOS settings. The battery status (good or bad) can be requested using software. Starting from when battery capacity is recognized as insufficient, data buffering is guaranteed for another 500 hours approximately. When changing the battery, data is buffered for another 10 hours approximately by a gold leaf capacitor.

2.2 Order Data

Model Number	Description	Image
0AC201.9	Lithium batteries, 5 pcs., 3 V / 950 mAh, button cell	

Table 82: Lithium battery order data

2.3 Technical Data

Information:

The specified limits listed here like for example, temperature, relative humidity, shock and vibration, only apply to his accessory and do not also automatically apply to the whole terminal.

Product ID	0AC201.9
Capacity	950 mAh
Voltage	3 V
Self Discharge at 23°C	< 1% per year
Storage Time	Max. 3 years at 30° C
Storage Temperature	- 20° C to +60° C
Relative Humidity	0 to 95% (non-condensing)

Table 83: Technical data for the lithium battery

3. TB103 3-pin Supply Voltage Connector

3.1 General Information

This single row 3-pin terminal block is mainly used to connect the supply voltage terminal block for all power panel 100/200 devices.

3.2 Order Data

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

Table 84: TB103 order data

3.3 Technical Data

Product ID	0TB103.9	0TB103.91
Number of Pins	3	
Type of Terminal	Screw clamps	Cage clamps
Distance between Contacts	5.08 mm	
Resistance between Contacts	≤5 mΩ	
Nominal Voltage according to VDE / UL,CSA	250 V / 300 V	
Current Load according to VDE / UL,CSA	14.5 A / 10 A per contact	
Connection Cross Section	0.08 mm² - 2.5 mm² (AWG 26 - 12)	
Cable Type	Only copper wires (no aluminum wires!)	

Table 85: TB103 technical data

4. TB704 4-pin terminal blocks

4.1 General Information

This single row 4-pin terminal block is mainly used to connect the supply voltage terminal block for aPCI modules.

4.2 Order Data

Model Number	Description	Image
0TB704.9	Accessory terminal block, 4-pin, screw clamp, 1.5 mm²	0TB704.9
0TB704.91	Accessory terminal block, 4-pin, cage clamp, 2.5 mm²	0TB704.91

Table 86: TB704 order data

4.3 Technical Data

Product ID	0TB704.9	0TB704.91
Number of Pins	4	
Type of Terminal	Screw clamps	Cage clamps
Distance between Contacts	5,08 mm	
Resistance between Contacts	≤5 mΩ	
Nominal Voltage	250 V	
Current Load [1)]	Max. 10 A / contact	
Connection cross section	0,08 mm² - 1.5 mm² (AWG 22 - 12)	0,08 mm² -2.5 mm² (AWG 26 - 12)
Cable Type	Only copper wires (no aluminum wires!)	

Table 87: TB704 technical data

1) Take the respective limit data for the I/O modules into consideration!

5. IF772

5.1 General Information

The IF772 interface module is an aPCI module and can be installed in all corresponding interface module slots e. g. in a Power Panel 200 device.

The module is equipped with a modem capable RS232 interface and two CAN interfaces, with their own object buffers in send and receive direction.

5.2 Order Data

Model Number	Description	Image
3IF772.9	2005 aPCI interface module, 1 RS232 interface, 2 CAN interfaces, max. 500 kbps, CAN: electrically isolated, network capable, object buffer in send and receive direction. Order 2 x TB704 terminal blocks separately.	
	Accessories	
0G0001.00-090	Cable PC <-> PLC/PW, RS232, online cable	
0TB704.9	Accessory, terminal block, 4-pin, screw clamps, 1.5 mm²	
0TB704.91	Accessory, terminal block, 4-pin, cage clamps, 2.5 mm²	
Additional accessories see sections "Accessories" and "Manuals". **The 4-pin terminal block TB704 is not included in the delivery.**		

Table 88: IF772 order data

5.3 Technical Data

Product ID	IF772
General Information	
C-UL-US Listed	Yes
Slot	aPCI insert
Interfaces	1 x RS232 2 x CAN

Table 89: IF772 technical data

Product ID	IF772
Power Consumption 5 V 24 V Total	 Max. 2.1 W --- Max. 2.1 W
Application interface IF1	
Type	RS232
Controller	UART Type 16C550 compatible
FIFO	16 bytes in send and receive direction
Design	9-pin DSUB plug
Electrical Isolation	No
Input Filter / Protective Circuit	Yes
Maximum Distance	15 m / 19200 Baud
Maximum Baud Rate	115.2 kBaud
Handshake Lines	RTS, CTS
Network Capable	No
Data Formats Data Bits Parity Stop Bits	 5 to 8 Yes / No / Even / Odd 1 / 2
Application Interfaces IF2 and IF3	
Type	CAN
Controller	Controller SJA 1000
Design	2 x 4-pin multipoint connector
Electrical Isolation to PLC Between Interfaces	 Yes Yes
Maximum Distance	1000 m
Maximum Baud Rate Bus Length ≤60 m Bus Length ≤200 m Bus Length ≤1000 m	 500 kBit/s 250 kBit/s 50 kBit/s
Network Capable	Yes
Bus Termination Resistor	Optional (externally wired)

Table 89: IF772 technical data

5.4 Operational and Connection Elements

Status LEDs show for the IF1 interface whether data is being received (RXD) or sent (TXD).

Both CAN interfaces have a status LED that indicates when data is being sent.

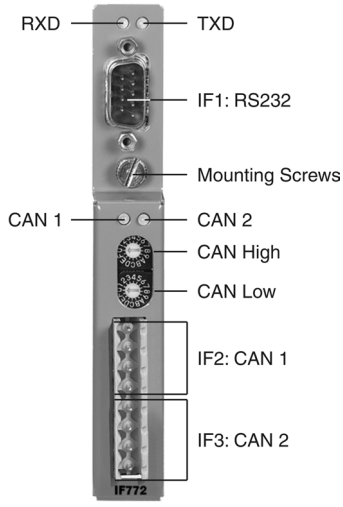


Figure 134: IF772 operational and connection elements

5.5 CAN Node Number Switch

The node numbers for the first two CAN interface (IF2) are set with the two hex switches. The following formula is used to set the second CAN interface (IF3):

Node number CAN 2 (IF3) = Node number CAN 1 (IF2) + 1

The CAN node numbers can also be set by the software (in preparation).

5.6 RS232 Interface (IF1)

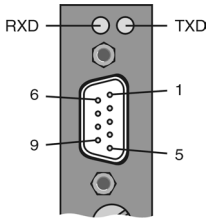
Interface	Description	Pin Assignments		
Application interface RS232  9-pin DSUB plug	The standard RS232 interface is not electrically isolated. LEDs show on the interface whether data is being received (RXD) or sent (TXD). The shield is connected to the DSUB connectors housing. Max. baud rate: 115.2 kBaud Max. cable length: 15 m	**Pin**	**RS232**	
		1	NC	
		2	RXD	Receive Signal
		3	TXD	Transmit Signal
		4	NC	
		5	GND	Ground
		6	NC	
		7	RTS	Request To Send
		8	CTS	Clear To Send
		9	NC	

Table 90: IF772 RS232 Interface (IF1)

5.7 Interfaces CAN 1 and CAN 2 (IF2 and IF3)

Two 120 Ω terminating resistors are included with delivery. The resistors can be installed between pin 1 and pin 3 or between pin 5 and pin 7.

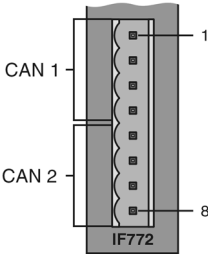
Interface	Description	Pin Assignments	
Application interface CAN 1 + CAN 2  8-pin multipoint connector	The electrically isolated CAN interfaces IF2 and IF3 are 8-pin multipoint connectors. The status LED CAN 1 or CAN 2 are lit when data is sent to the corresponding CAN interface. Max. Baud Rate: 500 kBit/s Bus Length: ≤60 m 250 kBit/s Bus Length: ≤200 m 50 kBit/s Bus Length: ≤1000 m	**Terminal**	**CAN 1 and CAN 2**
		1	CAN_H1
		2	GND1
		3	CAN_L1
		4	Shield 1
		5	CAN_H2
		6	GND2
		7	CAN_L2
		8	Shield 2

Table 91: IF772 CAN 1 and CAN 2 interfaces (IF2 and IF3)

6. IF786

6.1 General Information

The IF786 interface module is an aPCI module and can be installed in all corresponding interface module slots e. g. in a Power Panel 200 device.

The IF786 is a Powerlink interface module. It can be used as a manager or bus controller module. The connection is made via an RJ45 port.

The module is also equipped with an RS232 interface.

6.2 Order Data

Model Number	Short Description	Image
3IF786.9	aPCI interface module, 1 ETHERNET Powerlink interface, manager or controller function, 1 RS232 interface	
	Accessories	
0G0001.00-090	Cable PC <-> PLC/PW, RS232, online cable	

Table 92: IF786 order data

6.3 Technical Data

Product ID	IF786
General Information	
C-UL-US Listed	In preparation
Slot	aPCI insert
Interfaces	1 x RS232 1 x ETHERNET Powerlink
Power Consumption 5 V 24 V Total	 Max. 2.5 W --- Max. 2.5 W
Application interface IF1	
Type	RS232
Controller	UART Type 16C550 compatible
FIFO	16 bytes in send and receive direction
Design	9-pin DSUB plug
Electrical Isolation	No
Input Filter / Protective Circuit	Yes
Maximum Distance	15 m / 19200 Baud
Maximum Baud Rate	115.2 kBaud
Handshake Lines	RTS, CTS
Network Capable	No
Data Formats Data Bits Parity Stop Bits	 5 to 8 Yes / No / Even / Odd 1 / 2
Application Interface IF2	
Type	ETHERNET Powerlink interface
Standard (Compliance)	ANSI/IEEE 802.3
In/Out Buffer	20 KB [1)]
Data Rate	100 Mbps
Signal	100 Base-T
Port Design	Shielded RJ45 port
Line Length Between Two Stations (Segment Length)	Max. 100 m

Table 93: IF786 technical data

1) Beginning with firmware version V 50. Before that 11 KByte.

6.4 Operational and Connection Elements

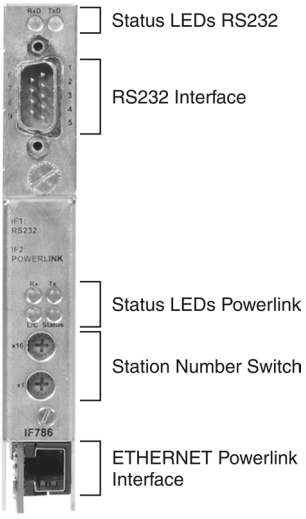


Figure 135: IF786 operational and connection elements

6.5 Status Display

6.5.1 RS232 Interface

Image	LED	Color	Description
RS232	RXD	Orange	The module receives data via the RS232 interface.
	TxD	Orange	The module sends data via the RS232 interface.

Table 94: IF786 status display RS232 interface

6.5.2 ETHERNET Powerlink Interface

Image	LED	Color	Description
ETHERNET Powerlink	Status	Red/Green	See Section "Status LED", on page 175.
	Tx	Orange	The Powerlink station is sending data.
	Rx	Orange	The Rx LED is always lit when Powerlink activity is present on the bus.
	L/C	Red/Green	Green ... Link Red ..... Collision

Table 95: IF786 status display ETHERNET Powerlink interface

Status LED

Boot Phase

The red LED is lit during booting. After the initialization routines are executed without errors, the status LED changes from red to green.

Operation

During operation, the status LED indicate the following states:

Status LED		
Green	Red	Status of the Powerlink Station
On	Off	The Powerlink station is running with no errors.
Off	On	A fatal system error has occurred. The error type can be read using the PLC log book. It concerns an irreparable problem. The system cannot properly carry out its tasks. This status can only be changed by resetting the module.
Blinking Alternately		Powerlink Manager failed. This error code can only occur in bus controller operation. i.e. the set station number lies within the range $01 - $FD.
Off	Blinking	System failure. The red blinking LED signals an error code (see Section "System Failure Error Codes", on page 176).

Table 96: IF786 status LED

System Failure Error Codes

The error is displayed via the red status LED using four switch-on phases. The switch-on phases are either 150 ms or 600 ms long. Error code outputs are repeated cyclically after 2 seconds has passed.

Legend: • ..... 150 ms
– ..... 600 ms
Pause ... 2 s delay

Error Description	Error Code Displayed by Red Status LED									
Stack Overflow	•	•	•	•	Break Time!	•	•	•	•	Break Time!
RAM Error	•	•	•	–	Break Time!	•	•	•	–	Break Time!
Undefined Address: Access to a Non-Existent Address.	•	•	–	•	Break Time!	•	•	–	•	Break Time!
Instruction Fetch Memory Abort: Invalid Memory Access During Instruction Fetch (e. g. UINT access of an uneven address).	•	•	–	–	Break Time!	•	•	–	–	Break Time!
Data Access Memory Abort: Invalid Memory Access During Data Access (e. g. UINT access of an uneven address).	•	–	•	•	Break Time!	•	–	•	•	Break Time!
Error when Programming the FPGA.	•	–	–	•	Break Time!	•	–	–	•	Break Time!
Invalid Station Number (e. g. $FE or $FF)	•	–	–	–	Break Time!	•	–	–	–	Break Time!

Table 97: IF786 system failure error codes

6.6 ETHERNET Powerlink Station Number

Figure 136: IF786 station number switch

The station number for the Powerlink station is set using both number switches. Station numbers are permitted between $00 and $FD.

Switch Position	Description
$00	Operated as manager station.
$01 - $FD	Station number for Powerlink station. Operated as controller station.
$FE	Reserved, switch position is not permitted.
$FF	Reserved, switch position is not permitted.

Table 98: IF786 station number

6.7 ETHERNET Powerlink Interface (IF2)

Figure 137: IF786 ETHERNET Powerlink interface (IF2)

Pin	Assignment
1	RXD
2	RXD\
3	TXD
4	Termination
5	Termination
6	TXD\
7	Termination
8	Termination

Table 99: IF786 pin assignment for ETHERNET Powerlink interface (IF2)

RXD ... Receive Data TXD ... Transmit Data

6.8 RS232 Interface (IF1)

Interface	Description	Pin Assignments		
Application interface RS232 9-pin DSUB plug	The standard RS232 interface is not electrically isolated. LEDs show on the interface whether data is being received (RxD) or sent (TxD). The shield is connected to the DSUB connectors housing. Max. baud rate: 115.2 kBaud Max. cable length: 15 m	**Pin**	**RS232**	
		1	NC	
		2	RXD	Receive Signal
		3	TXD	Transmit Signal
		4	NC	
		5	GND	Ground
		6	NC	
		7	RTS	Request To Send
		8	CTS	Clear To Send
		9	NC	

Table 100: IF786 RS232 interface (IF1)

6.9 Firmware Update

The firmware is loaded at every start of the SG4 target.

6.9.1 SG3

The IF786 module is not supported. The IF686 module can be used for these targets.

6.9.2 SG4

The firmware update takes place automatically. The firmware is a component of the PLC operating system B&R Automation Runtime™.

7. IF787

7.1 General Information

The IF787 interface module is an aPCI module and can be installed in all corresponding interface module slots e. g. in the CP360.

The IF787 is a Powerlink interface module. It can be used as a manager or bus controller module. The connection is made via an RJ45 port.

The module is also equipped with a CAN interface, with its own object buffers in send and receive direction.

7.2 Order Data

Model Number	Short Description	Image
3IF787.9	aPCI interface module 1 ETHERNET Powerlink interface, manager or controller function, 1 CAN interface, max. 500 kbps, object buffer in send and receive direction, network capable, electrically isolated. Order TB704 terminal blocks separately.	
0TB704.9	Accessory, terminal block, 4-pin, screw clamps, 1.5 mm²	
0TB704.91	Accessory, terminal block, 4-pin, cage clamps, 2.5 mm²	
Information: **The 4-pin terminal block TB704 is not included in the delivery.**		

Table 101: IF787 order data

7.3 Technical Data

Product ID	IF787
General Information	
C-UL-US Listed	In preparation
Slot	aPCI insert
Interfaces	1 x CAN 1 x ETHERNET Powerlink
Power Consumption 5 V 24 V Total	 Max. 3 W --- Max. 3 W
Application interface IF1	
Type	CAN
Controller	Controller SJA 1000
Design	4-pin multipoint connector
Electrical Isolation	Yes
Maximum Distance	1000 m
Maximum Baud Rate Bus Length ≤60 m Bus Length ≤200 m Bus Length ≤1000 m	 500 kBit/s 250 kBit/s 50 kBit/s
Network Capable	Yes
Bus Termination Resistor	Optional (externally wired)
Application Interface IF2	
Type	ETHERNET Powerlink interface
Standard (Compliance)	ANSI/IEEE 802.3
In/Out Buffer	20 KB [1)]
Data Rate	100 Mbps
Signal	100 Base-T
Port Design	Shielded RJ45 port
Line Length Between Two Stations (Segment Length)	Max. 100 m

Table 102: IF787 technical data

1) Beginning with firmware version V 50. Before that 11 KByte.

7.4 Operational and Connection Elements

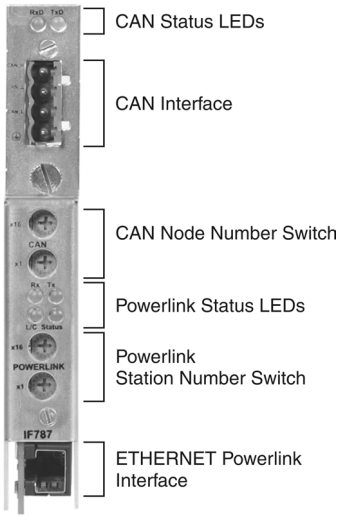


Figure 138: IF787 operational and connection elements

7.5 Status Display

7.5.1 CAN Interface

Image	LED	Color	Description
CAN	RXD	Orange	The module receives data via the CAN interface.
	TxD	Orange	The module sends data via the CAN interface.

Table 103: IF787 status display CAN interface

7.5.2 ETHERNET Powerlink Interface

Image	LED	Color	Description
ETHERNET Powerlink	Status	Red/Green	See Section "Status LED", on page 183.
	Tx	Orange	The Powerlink station is sending data.
	Rx	Orange	The Rx LED is always lit when Powerlink activity is present on the bus.
	L/C	Red/Green	Green ... Link Red ..... Collision

Table 104: IF787 status display ETHERNET Powerlink interface

Status LED

Boot Phase

The red LED is lit during booting. After the initialization routines are executed without errors, the status LED changes from red to green.

Operation

During operation, the status LED indicate the following states:

Status LED		
Green	Red	Status of the Powerlink Station
On	Off	The Powerlink station is running with no errors.
Off	On	A fatal system error has occurred. The error type can be read using the PLC log book. It concerns an irreparable problem. The system cannot properly carry out its tasks. This status can only be changed by resetting the module.
Blinking Alternately		Powerlink Manager failed. This error code can only occur in bus controller operation. i.e. the set station number lies within the range $01 - $FD.
Off	Blinking	System failure. The red blinking LED signals an error code (see Section "System Failure Error Codes", on page 184).

Table 105: IF787 status LED

System Failure Error Codes

The error is displayed via the red status LED using four switch-on phases. The switch-on phases are either 150 ms or 600 ms long. Error code outputs are repeated cyclically after 2 seconds has passed.

Legend: • ..... 150 ms
– ..... 600 ms
Pause ... 2 s delay

Error Description	Error Code Displayed by Red Status LED									
Stack Overflow	•	•	•	•	Break Time!	•	•	•	•	Break Time!
RAM Error	•	•	•	–	Break Time!	•	•	•	–	Break Time!
Undefined Address: Access to a Non-Existent Address.	•	•	–	•	Break Time!	•	•	–	•	Break Time!
Instruction Fetch Memory Abort: Invalid Memory Access During Instruction Fetch (e. g. UINT access of an uneven address).	•	•	–	–	Break Time!	•	•	–	–	Break Time!
Data Access Memory Abort: Invalid Memory Access During Data Access (e. g. UINT access of an uneven address).	•	–	•	•	Break Time!	•	–	•	•	Break Time!
Error when Programming the FPGA.	•	–	–	•	Break Time!	•	–	–	•	Break Time!
Invalid Station Number (e. g. $FE or $FF)	•	–	–	–	Break Time!	•	–	–	–	Break Time!

Table 106: IF787 system failure error codes

7.6 ETHERNET Powerlink Station Number

Figure 139: IF787 ETHERNET Powerlink station number switch

The station number for the Powerlink station is set using both number switches. Station numbers are permitted between $00 and $FD.

Switch Position	Description
$00	Operated as manager station.
$01 - $FD	Station number for Powerlink station. Operated as controller station.
$FE	Reserved, switch position is not permitted.
$FF	Reserved, switch position is not permitted.

Table 107: IF787 ETHERNET Powerlink station number

7.7 ETHERNET Powerlink Interface (IF2)

Figure 140: IF787 ETHERNET Powerlink interface (IF2)

Pin	Assignment
1	RXD
2	RXD\
3	TXD
4	Termination
5	Termination
6	TXD\
7	Termination
8	Termination

Table 108: IF787 pin assignment for ETHERNET Powerlink interface (IF2)

RXD ... Receive Data TXD ... Transmit Data

7.8 CAN Node Number

Figure 141: IF787 CAN node number switch

The node number for the CAN interface (IF1) is set with the two hex switches.

The CAN node number can also be set by the software (in preparation).

7.9 CAN Interface (IF1)

A 120 Ω bus terminating resistor is included with delivery. The resistor can be inserted between pin 1 and pin 3.

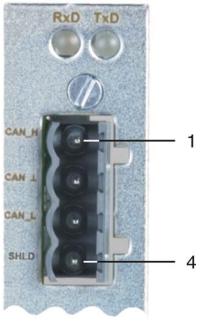
Interface	Description	Pin Assignments	
Application interface CAN  4-pin multipoint connector	The electrically isolated CAN interface is a 4-pin multipoint connector. LEDs show on the interface whether data is being received (RxD) or sent (TxD). Max. Baud Rate: 500 kBit/s Bus Length: ≤60 m 250 kBit/s Bus Length: ≤200 m 50 kBit/s Bus Length: ≤1000 m	**Terminal**	**CAN**
		1	CAN_H
		2	CAN⊥
		3	CAN_L
		4	SHLD
		CAN⊥ ... CAN Ground SHLD .... Shield	

Table 109: IF787 CAN interface (IF1)

7.10 Firmware Update

The firmware is loaded at every start of the SG4 target.

7.10.1 SG3

The IF787 module is not supported. The IF686 module can be used for these targets.

7.10.2 SG4

The firmware update takes place automatically. The firmware is a component of the PLC operating system B&R Automation Runtime™.

8. IF789

8.1 General Information

The IF789 interface module is an aPCI module and can be installed in all corresponding interface module slots e. g. in the CP360.

The IF789 is a Powerlink interface module. It can be used as a manager or bus controller module. The connection is made via an RJ45 port.

The module is also equipped with an X2X Link interface.

8.2 Order Data

Model Number	Short Description	Image
3IF789.9	aPCI interface interface module, 1 ETHERNET Powerlink Schnittstelle, manager or controller function, 1 X2X Link Master interface, electrically isolated. Order TB704 terminal block separately.	
0TB704.9	Accessory, terminal block, 4-pin, screw clamps, 1.5 mm²	
0TB704.91	Accessory, terminal block, 4-pin, cage clamps, 2.5 mm²	
Information: **The 4-pin terminal block TB704 is not included in the delivery.**		

Table 110: IF789 order data

8.3 Technical Data

Product ID	IF789
General Information	
C-UL-US Listed	In preparation
Slot	aPCI insert
Interfaces	1 x X2X Link 1 x ETHERNET Powerlink
Power Consumption 5 V 24 V Total	 Max. 2.8 W --- Max. 2.8 W
Application interface IF1	
Type	X2X Link - Master
Design	4-pin multipoint connector
Electrical Isolation	Yes
Number of Stations	Max. 253
Distance between Two Stations	Max. 100 m
Network Topology	Line
Internal Bus Supply	No
Bus Termination Resistor	Internal
Application Interface IF2	
Type	ETHERNET Powerlink interface
Standard (Compliance)	ANSI/IEEE 802.3
In/Out Buffer	20 KB [1)]
Data Rate	100 Mbps
Signal	100 Base-T
Port Design	Shielded RJ45 port
Line Length Between Two Stations (Segment Length)	Max. 100 m

Table 111: IF789 technical data

1) Beginning with firmware version V 50. Before that 11 KByte.

8.4 Operational and Connection Elements

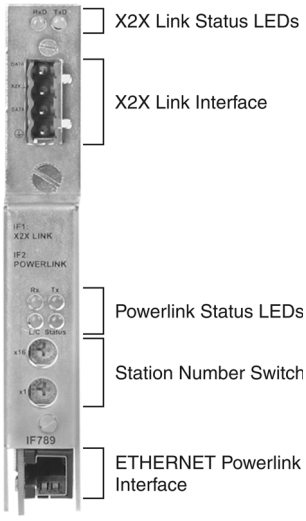


Figure 142: IF789 operational and connection elements

8.5 Status Display

8.5.1 X2X Link Interface

Image	LED	Color	Description
X2X Link	RXD	Orange	The module receives data via the X2X Link interface.
	TxD	Orange	The module sends data via the X2X Link interface.

Table 112: IF789 status display X2X Link interface

8.5.2 ETHERNET Powerlink Interface

Image	LED	Color	Description
ETHERNET Powerlink	Status	Red/Green	See Section "Status LED", on page 192.
	Tx	Orange	The Powerlink station is sending data.
	Rx	Orange	The Rx LED is always lit when Powerlink activity is present on the bus.
	L/C	Red/Green	Green ... Link Red ..... Collision

Table 113: IF789 status display ETHERNET Powerlink interface

Status LED

Boot Phase

The red LED is lit during booting. After the initialization routines are executed without errors, the status LED changes from red to green.

Operation

During operation, the status LED indicate the following states:

Status LED		
Green	Red	Status of the Powerlink Station
On	Off	The Powerlink station is running with no errors.
Off	On	A fatal system error has occurred. The error type can be read using the PLC log book. It concerns an irreparable problem. The system cannot properly carry out its tasks. This status can only be changed by resetting the module.
Blinking Alternately		Powerlink Manager failed. This error code can only occur in bus controller operation. i.e. the set station number lies within the range $01 - $FD.
Off	Blinking	System failure. The red blinking LED signals an error code (see Section "System Failure Error Codes", on page 193).

Table 114: IF789 status LED

System Failure Error Codes

The error is displayed via the red status LED using four switch-on phases. The switch-on phases are either 150 ms or 600 ms long. Error code outputs are repeated cyclically after 2 seconds has passed.

Legend: • ..... 150 ms
– ..... 600 ms
Pause ... 2 s delay

Error Description	Error Code Displayed by Red Status LED									
Stack Overflow	•	•	•	•	Break Time!	•	•	•	•	Break Time!
RAM Error	•	•	•	–	Break Time!	•	•	•	–	Break Time!
Undefined Address: Access to a Non-Existent Address.	•	•	–	•	Break Time!	•	•	–	•	Break Time!
Instruction Fetch Memory Abort: Invalid Memory Access During Instruction Fetch (e. g. UINT access of an uneven address).	•	•	–	–	Break Time!	•	•	–	–	Break Time!
Data Access Memory Abort: Invalid Memory Access During Data Access (e. g. UINT access of an uneven address).	•	–	•	•	Break Time!	•	–	•	•	Break Time!
Error when Programming the FPGA.	•	–	–	•	Break Time!	•	–	–	•	Break Time!
Invalid Station Number (e. g. $FE or $FF)	•	–	–	–	Break Time!	•	–	–	–	Break Time!

Table 115: IF789 system failure error codes

8.6 ETHERNET Powerlink Station Number

Figure 143: IF789 station number switch

The station number for the Powerlink station is set using both number switches. Station numbers are permitted between $00 and $FD.

Switch Position	Description
$00	Operated as manager station.
$01 - $FD	Station number for Powerlink station. Operated as controller station.
$FE	Reserved, switch position is not permitted.
$FF	Reserved, switch position is not permitted.

Table 116: IF789 station number

8.7 ETHERNET Powerlink Interface (IF2)

Figure 144: IF789 ETHERNET Powerlink interface (IF2)

Pin	Assignment
1	RXD
2	RXD\
3	TXD
4	Termination
5	Termination
6	TXD\
7	Termination
8	Termination

Table 117: IF789 pin assignment for ETHERNET Powerlink interface (IF2)

RXD ... Receive Data TXD ... Transmit Data

8.8 X2X Link Interface (IF1)

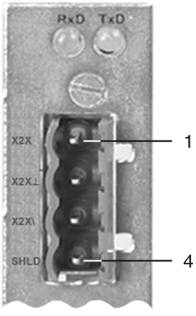
Interface	Description	Pin Assignments	
Application interface X2X Link  4-pin Multipoint connector	The electrically isolated X2X Link is a 4 pin multipoint connector. LEDs show on the interface whether data is being received (RxD) or sent (TxD).	**Terminal**	**X2X Link**
		1	X2X
		2	X2X⊥
		3	X2X\
		4	SHLD
		SHLD .... Shield	

Table 118: IF789 X2X Link interface (IF1)

8.9 Firmware Update

The firmware is loaded at every start of the SG4 target.

8.9.1 SG3

The IF789 module is not supported. The IF686 module can be used for these targets.

8.9.2 SG4

The firmware update takes place automatically. The firmware is a component of the PLC operating system B&R Automation Runtime™.

9. Compact Flash cards 5CFCRD.0xxx-01

9.1 General Information

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

9.2 Order Data

Model Number	Description	Image
5CFCRD.0032-01	Compact Flash 32 MB ATA/True IDE	
5CFCRD.0064-01	Compact Flash 64 MB ATA/True IDE	
5CFCRD.0128-01	Compact Flash 128 MB ATA/True IDE	
5CFCRD.0192-01	Compact Flash 196 MB ATA/True IDE	
5CFCRD.0256-01	Compact Flash 256 MB ATA/True IDE	
5CFCRD.0384-01	Compact Flash 384 MB ATA/True IDE	
5CFCRD.0512-01	Compact Flash 512 MB ATA/True IDE	

Table 119: Order data for Compact Flash cards

9.3 Technical Data

Information:

The specified limits listed here like for example, temperature, relative humidity, shock and vibration, only apply to his accessory and do not also automatically apply to the whole terminal.

Temperature Operation Storage	 0° C to 60° C -25° C to 85° C
Relative Humidity Operation/Storage	 8% to 95%, non-condensing
Vibration Operation/Storage	 Maximal 30 G peak to peak
Shock Operation/Storage	 Maximal 3,000 G

Table 120: Technical data for Compact Flash cards

Altitude	24,000 meters
MTBF (@ 25°C)	> 3,000,000 hours
Service	None
Data Reliability	<1 non-recoverable error in 10^{14} bits read <1 erroneous correction in 10^{20} bits read
Clear/Write Procedures	> 2.000.000
Weight	11.4 g
Dimensions Length Width Thickness	 36.4 ± 0.15 mm 42.8 ± 0.10 mm 3.3 mm ± 0.10 mm

Table 120: Technical data for Compact Flash cards (cont.)

Chapter 7 • Maintenance and Service

The following section describes service/maintenance work which can be carried out by the user.

Maintenance Work On	Maintenance Work	Change Interval
Power Panel	Cleaning the touch screen	Depends on how dirty the touch membrane is approximately once a week
	Changing the battery 1)	2 years with SRAM 2) component parts
		3 years without SRAM component parts

Table 121: Maintenance work

1) The change interval refers to the average life span and operating conditions and is recommended by B&R.
2) The existence of a 256 KB battery buffered SRAM can be found in the Chapter 2 "Technical Data" on Page 23 for each individual Power Panel version.

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1. Operating Guidelines for the Touch Screen

- Do not use pointed objects such as pens, knives, etc. A specially designed pen for the touch screen can be optionally ordered from B&R (model no. 9A0013.01).
- Do not place any heavy objects on the touch screen.

2. Cleaning the Touch Screen

The display with the touch screen should be cleaned at regular intervals.

2.1 Cleaning Agent

A damp cloth should be used for cleaning the touch screen. For dampening the cloth, use only water with detergent, screen cleaning agent or alcohol (Ethanol). Apply the cleaning agent onto a cloth beforehand and NOT sprayed directly onto the touch screen itself. Under no circumstances use aggressive solvents, chemicals or scouring agents.

Information:

Only clean the device when it has been switched off, as touching the screen will trigger unintended functions to be executed.

3. Changing the Battery

A battery change is only necessary for devices with a lithium battery (see Chapter "Technical Data", on page 23 for Power Panel devices).

The lithium battery guarantees buffering of the internal real-time clock (RTC), SRAM data and also individually saved BIOS settings. The battery status (good or bad) can be requested using software. From this point, starting from when battery capacity is recognized as insufficient, data buffering is guaranteed for another 500 hours approximately. When changing the battery, data is buffered for another 10 hours approximately by a gold leaf capacitor.

Under normal operating conditions, the battery has a typical lifespan of approximately 2 years.

Information:

Changing the battery should only be carried out by qualified personnel.

3.1 Procedure for Changing the Battery

- Disconnect the power supply to the Power Panel
- Touch the housing or earth connection (not the power supply!) in order to discharge any electrostatic charge from your body
- Remove the battery cover: The battery cover is found on the rear side of the Power Panel device.

0 aPCI Slot Power Panel Devices	1 or 2 aPCI Slot Power Panel Devices

- Remove the battery from the holder (do not use uninsulated tools, as there is a risk of short circuiting). The battery should not be held by its edges. **Insulated** tweezers may also be used for removing the battery.

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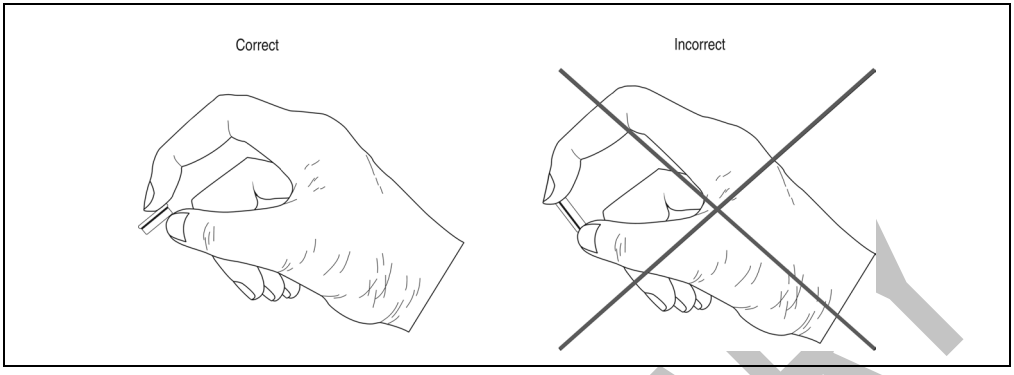

Figure 145: Handling the battery

- After removing the battery, the data is buffered for at least another 10 hours by a gold leaf capacitor, so the data is not lost.
- Insert the new battery with correct polarity.
- Put on the battery cover and fasten the screws.
- Reconnect the power supply to the Power Panel.
- Date and time in BIOS might need to be set again.

Warning!

Lithium batteries are considered hazardous waste. Used batteries should be disposed of accordingly.

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