



## Features

- **For CPC503-01, Intel Core 2nd Gen (2/4 Cores):**
  - Core i7-2715QE 6 MB 4C 2.1 GHz SV 45 W;
  - Core i7-2655LE 4 MB 2C 2.2 GHz LV 25 W;
  - Core i7-2610UE 4 MB 2C 1.5 GHz ULV 17 W.
- **For CPC503-02, Intel Core 3rd Gen (2/4 Cores):**
  - Core i7-3612QE 6 MB 4C 2.1 GHz SV 35 W;
  - Core i7-3555LE 4 MB 2C 2.5 GHz LV 25 W;
  - Core i7-3517UE 4 MB 2C 1.7 GHz ULV 17 W.
  - RAM: DDR3 SDRAM 1333 MHz with ECC up to 4 GB, dual channel, soldered (for CPC503-01);
  - DDR3L SDRAM 1600 MHz with ECC up to 8 GB, dual channel, soldered (for CPC503-02);
  - 1x XMC/PMC expansion module (x8 PCI-E GEN2/GEN3 + 64 bit/133 MHz PCI-X);
  - 4x Gigabit Ethernet controllers (2x ports switchable between P16 XMC connector and backplane
    - 2x ports are available at the front panel);
  - 10x USB 2.0 ports with HS, FS and LS support (4x on front panel, 4x via RIO, 2x on P16 XMC);
  - 4x SATA II ports (1x for 1.8" HDD, 1x at P16 XMC, 2x via RIO);
  - 2x Displayport interfaces (1x on front panel, 1x via RIO);
  - 1x DVI-I on front panel;
  - 1x DVI-D via RIO;
  - HD Audio via RIO and P16 XMC;
  - LPC is routed via RIO, P16 socket;
  - Supported OS:
    - Linux 2.6, QNX 6.5, Windows Embedded Standard 7
  - Operating temperature range:
    - Industrial: -40°C to +85°C, Commercial: 0°C to +70°C
  - MTBF: No less than 60 000

## Overview

CPC503 6U CompactPCI CPU module is an embedded computer on x86 platform for use in server or client systems for a wide range of applications. CPC503 is based on 2-nd generation Intel Core i7 (2/4 cores) processors operating at frequencies from 1.5 to 2.2 GHz and on QM67 Peripheral Controller Hub. Up to 8 GB of DDR3 SDRAM memory with ECC operating at 1600 MHz is soldered onboard the CPC503.

CPC503 graphics capabilities include VGA, Displayport, DVI, and LVDS interfaces. Four Gigabit Ethernet ports are used for networking. Interface set of CPC503 also includes 12 USB 2.0 ports, four SATA channels, audio interface and standard J1-J5 CompactPCI connectors at the rear edge of the board. Fastwel CPC503 supports one XMC/PMC expansion module mounted onboard and specially designed Fastwel RIO587 rear I/O module. CPC503 provides one 64-bit 66 MHz CompactPCI interface with hot swap capability. The module interfaces with CompactPCI bus via the built-in PCI-E <-> PCI bridge, this allows using CPC503 either as master system controller or as a slave device in one PCI bus segment. One of the features of CPC503 is support for PICMG CompactPCI Packet Switching Backplane Specification version 2.16. Being installed on a backplane supporting the packet switching mode, CPC503 can communicate with peripheral devices or with the system master board supporting this mode via two Gigabit Ethernet ports. The components of CPC503 are carefully selected according to the criteria of applicability in embedded systems and long-term availability on the market. This makes this module an ideal device, based on which the systems with long life cycle can be built.

CPC503 is compatible with Windows Embedded Standard 7, QNX 6.5.0, VxWorks 6.8 (on request), and Linux® 2.6 operating systems.



## Technical Specifications

### For CPC503-01

#### CPU Intel Core 2nd Gen ( 2/4 Cores)

- Core i7-2715QE 6 MB 4C 2.1 GHz SV 45 W
- Core i7-2655LE 4 MB 2C 2.2 GHz LV 25 W
- Core i7-2610UE 4 MB 2C 1.5 GHz ULV 17 W

### For CPC503-02

#### CPU Intel Core 3 rd Gen ( 2/4 Cores)

- Core i7-3612QE 6 MB 4C 2.1 GHz SV 35 W
- Core i7-3555LE 4 MB 2C 2.5 GHz LV 25 W
- Core i7-3517UE 4 MB 2C 1.7 GHz ULV 17 W

#### PCH QM67 chipset (QM77)

- Highly integrated interface controller including standard peripherals of IBM PC AT platform

#### RAM

- DDR3 SDRAM 1333 MHz with ECC up to 4 GB, dual channel, soldered (for CPC503-01)
- DDR3L SDRAM 1600 MHz with ECC up to 8 GB, dual channel, soldered (for CPC503-02)

#### Video-output

- DVI-connector (VGA [2048x1536@75 Hz], DVI-D[1920x1200@60 Hz] routed to the front panel
- DisplayPort interface (resolution up to 2560x1600@60 Hz) routed to the front panel
- DisplayPort interface (resolution up to 2560x1600@60 Hz) routed to RIO
- Embedded Display Port interface, routed to RIO
- Simultaneous operation of two interfaces is possible (for CPC503-01)
- Simultaneous operation of three interfaces is possible (for CPC503-02)

#### PCI bus

- Routed to Compact PCI J1/J2 connectors
- 64 bit/ 66 MHz
- Implemented on PCI-E bridge ->PCI-X PI7C9X130
- Operation in a non-system slot (Non-Transparent Bridge mode)

#### LPC bus

- Routed to P16 XMC connector
- Routed to RIO

#### PCI-E bus (for CPC503-01)

- Support of PCI-E 2.0 (up to 5 GT/s), routed to P15 XMC connector supporting up to x8 devices
- PCI-E 1.0 (up to 2.5 GT/s) routed to CPCI J3/P3 connector, supporting up to x4 devices
- XMC, compatible with ANSI/VITA 42.3 specification

#### PCI-E bus (for CPC503-02)

- PCI-E 3.0 (up to 8 GT/s) routed to P15 XMC connector, supporting up to x8 devices
- PCI-E 2.0 (up to 5 GT/s) routed to CPCI J3/P3 connector, supporting up to x4 devices
- XMC, compatible with ANSI/VITA 42.3 specification

#### SMBUS

- Compatible with 2.0 specification
- Speed up to 100 Kb/s

#### GPIO interface

- 8x lines
- Routed to RIO

#### FLASH BIOS

- 64 MB SPI-Flash

#### NAND FLASH-drive

- Integrated four channel NAND controller (up to 100 MB/s)
- NAND soldered: 4 GB (CPC503-01), 8 GB (CPC503-02)
- Connected to SATA6 interface

#### SATA interface

- Single interface routed to P16 XMC
- Single interface is used for the connection of HDD 1.8" (installed on board)

- Two interfaces, routed to RIO

#### SPI interface

- Support of FRAM
- Frequency up to 25 MHz

#### 4x LAN 10/100/1000 Mb ports on PCI-E x4 Gen2

- 2xswitchable between P16 XMC and RIO
- 2xrouted to the front panel
- Support of PICMG 2.16 standard
- Implementation of a server network adapter

#### USB ports

- Support of USB 1.1 (12 Mb/s), USB 2.0 (480 Mb/s)
- Connection of up to 4x devices via connectors on the front panel
- 2xinterfaces are routed to P16 XMC
- 2xUSB 3.0 interfaces are routed to P16 XMC (for CPC503-02)
- 6xinterfaces are routed to RIO

#### FRAM

- 32 KB: 1 KB for storing Bios Setup settings and 31 KB for saving user data
- Implemented on SPI bus

#### RTC

- Lithium battery CR2032 (3 V) power supply

#### Audio support

- HD Audio interface routed to P16 XMC and RIO connectors

#### Watchdog timer

- Internal, programmable watchdog

#### Hardware monitor

- Implemented via PECI/SMBUS interfaces;
- Monitoring of 3 supply voltages;
- Monitoring of CPU temperatures;
- Monitoring of PCB temperature.

#### Support of XMC/PMC extension boards

- Support of a single XMC/PMC extension board
- PCI bus-X 64 bit/133 MHz routed to P1-P4 PMC connectors (ANSI/VITA 39, PCI-X on PMC)
- PMC I/O P4 routed to RIO (PICMG 2.0)
- PCI-E bus x8 Gen2 routed to P15 XMC connector (ANSI/VITA 42.3, XMC PCI Express Protocol Standard) (for CPC503-01)
- PCI-E bus x8 Gen3 routed to P15 XMC connector (ANSI/VITA 42.3, XMC PCI Express Protocol Standard) (for CPC503-02)
- Additional interfaces (1xSATA, 2xUSB, LPC, HD-Audio, 2xEthernet) are routed to P16 XMC connector. For CPC503-02: 2xUSB 3.0

#### LEDs

- Board start diagnostics LED / "Hot Swap" LED
- SATA addressing LED
- Two programmable LEDs (user LEDs)

#### OS compatibility

- Linux 2.6
- QNX 6.5
- Windows Embedded Standart 7

#### Power

- Supply voltage +5 V, +3.3 V, +12 V, -12 V from CPCI bus

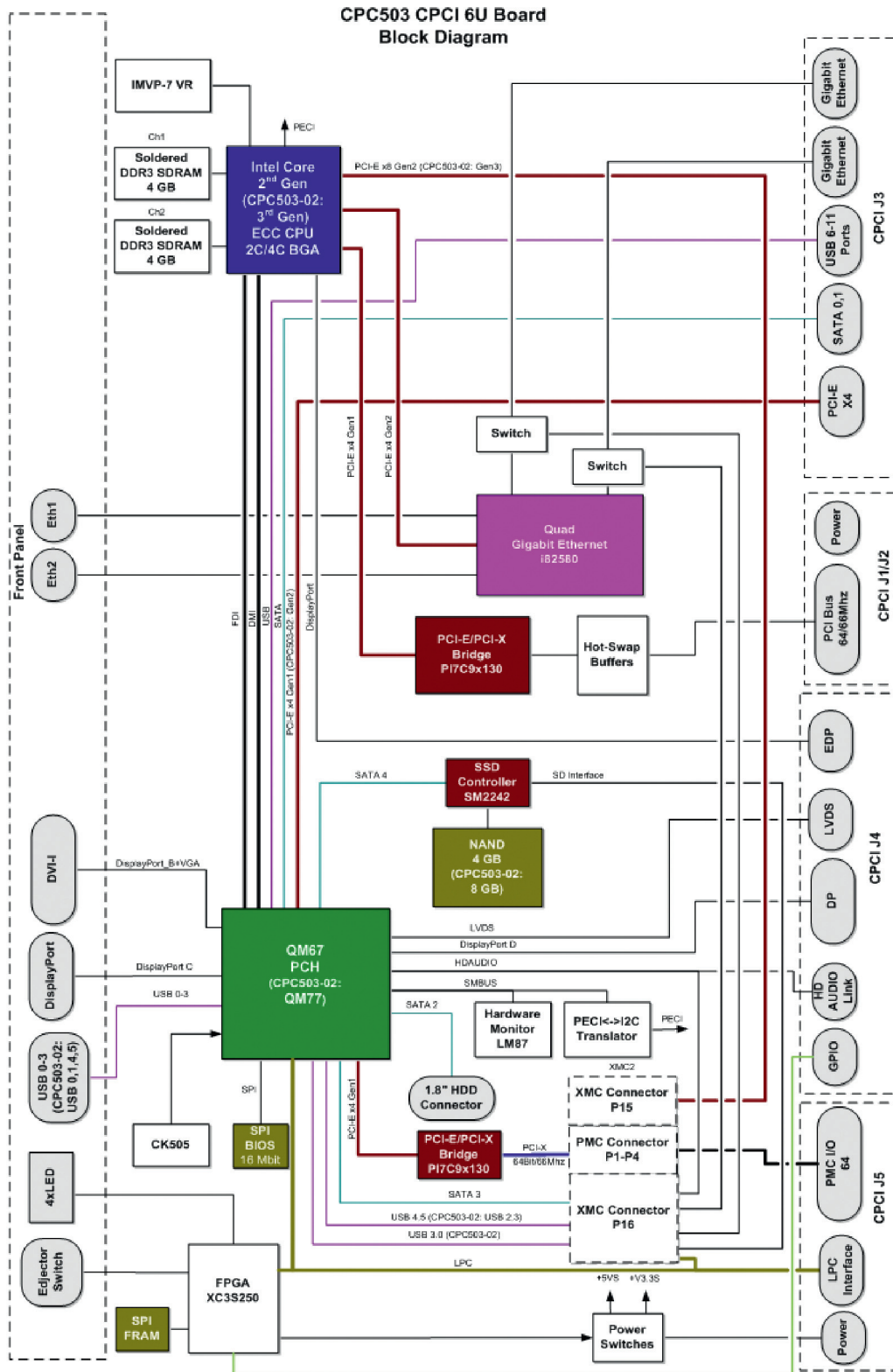
#### Mechanical

- Single shock/vibration resistance: 30g/2g
- Dimensions: 266,1 mm × 212,5 mm × 21 mm (with R1 heat-sink); 266,1 mm × 212,5 mm × 42 mm (with R2 heat-sink)
- Weight: with R1 heat-sink: no more than 0,700 kg; with R2 heat-sink: no more than 0,960 kg
- MTBF: no less than 60 000 hours

#### Environmental

- Operating temperature range  
Industrial: from -40°C to +85°C; Commercial: from 0°C to +70°C
- Resistance to cyclic damp heat in case of conformal coating: at the ambient temperature of +(55 ± 2)°C, relative humidity (93 ± 3)%

## Board Layout



## Applications



Aerospace



Transportation



Process Control



Communications

## Ordering Information

### CPC503 Configuration

CPC503 \_ 02 \_ i72C1.7 \_ RAM4G \_ R1\_C \Options

#### Device Type

CPC503 6U CompactPCI Intel Core i7 SBC Processor

#### Processor

i72C1.7 Core i7 3517UE, 2C, 1.7 GHz, 17 W, ULV  
 i72C2.5 Core i7 3555LE, 2C, 2.5 GHz, 25 W, LV  
 i74C2.1 Core i7 3612QE, 4C, 2.1 GHz, 35 W, SV

#### Soldered Memory

RAM4G 4GB  
 RAM8G 8GB

#### Temperature Range

I Industrial Range, -40...+85°C  
 C Commercial Range, 0...+70°C

#### Options

\Protective Coating

#### Delivery checklist

1. CPC503 Module
2. Fastening elements for installing HDD:
  - Fixing device ..... 1 pcs.
  - DIN7985 M2 screw 5x6 ..... 2 pcs.
  - DIN6798A washer 2,5 ..... 2 pcs.
3. Package

\*please, consult manufactures on available configurations

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# Mezzanine Module MIC1901

Interface Module for 6U Compact PCI CPC503



## Overview

MIC1901 mezzanine module is designed to be used together with CPC503 CPU board and expands the basic functionality of the specified CPU module. The front panel of the module is equipped with two 10/100/1000 Gigabit Ethernet ports, microphone input, Line-In and Line-Out channels.

The module also has a socket for CFAST storage device.

## Technical Specifications

### Audio support

- CirrusLogic audio codec CS4207
- 3.5" Line-In, Line-Out and Mic ports are routed to front panel

### 2×Ethernet 10/100/1000 Mb/s ports

- Routed to front panel with CPC503

### SATA interface

- Socket for CFAST storage devices

### OS compatibility

- Windows 7 (Windows Embedded 7)
- Linux 2.6
- QNX 6.5.0 (upon request)

### Power

- +5 V, +3.3 V from CPC503 module
- Overall power consumption – up to 1 W

### Operating temperature range

- from -40°C to +85°C

### Humidity resistance

#### (with protective coating)

- At the air temperature of  $+(55\pm 2)^{\circ}\text{C}$ , and relative humidity of  $(93\pm 3)\%$

### Multiple shock resistance

- 10g

### Vibration resistant

- 10...55 Hz, 0.4 mm; 2g

### Dimensions

- With CFAST holder 152.5×81.0×14.4
- Without CFAST holder 152.5×74.0×14.4

### Weight

- No more than 0.080 kg

### MTBF

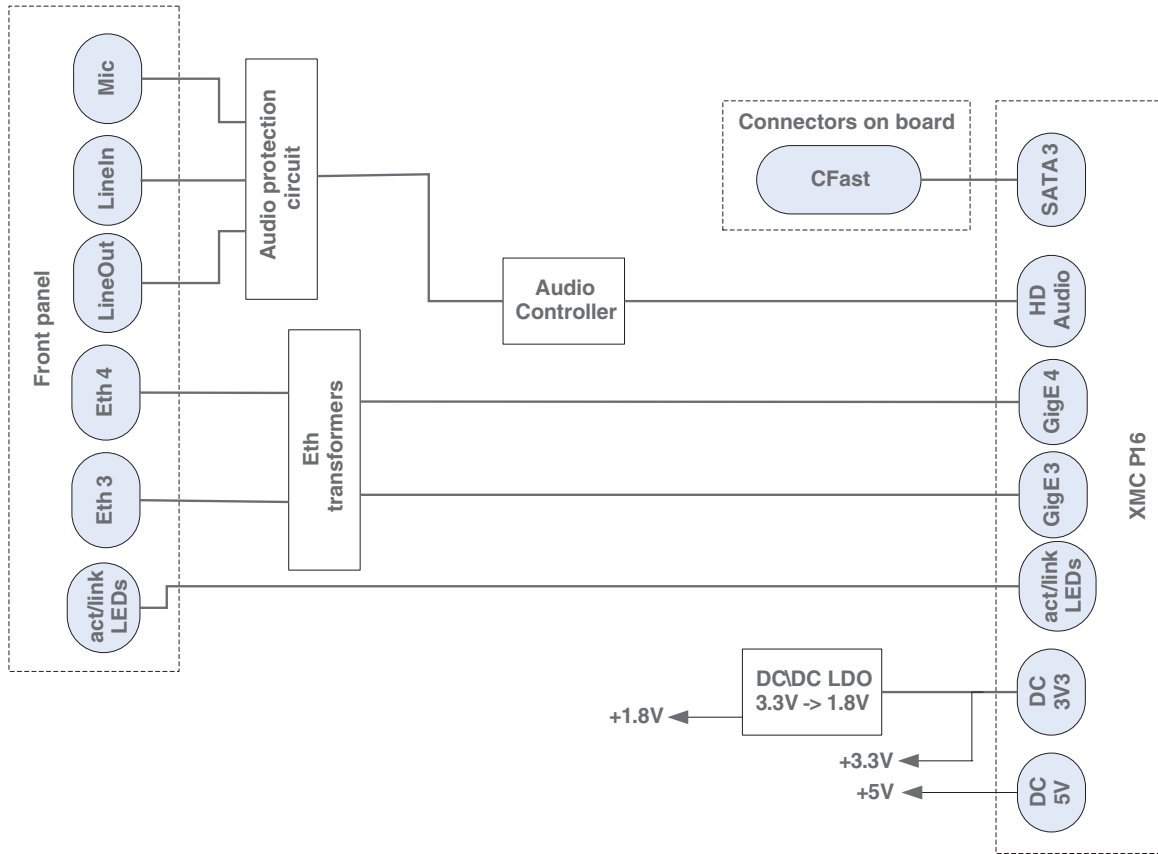
- No less than 1 900 000 hours



# Mezzanine Module MIC1901

Interface Module for 6U Compact PCI CPC503

## Board Layout



## Ordering Information

The device is supplied in a single version MIC1901-01. With a protective coating (option: Coated), the modules are resistant to the cyclic damp heat at the air temperature  $+(55\pm 2)^{\circ}\text{C}$ , relative humidity  $(93\pm 3)\%$ .

## MIC1901 Configuration

### MIC1901 \_ 01 \Options

#### Options

\Protective coating

## Delivery checklist

1. MIC1901 module
2. Mounting parts set:
  - IMEC.741522.006 Holder. . . . . 2 pcs.
  - Screw M2,5x6 DIN965 . . . . . 2 pcs.
  - Screw M2,5x6 DIN7985 . . . . . 4 pcs.
  - Washer 2,5 DIN125 . . . . . 2 pcs.
  - Lock washer 3 DIN6798J. . . . . 2 pcs.
3. Package

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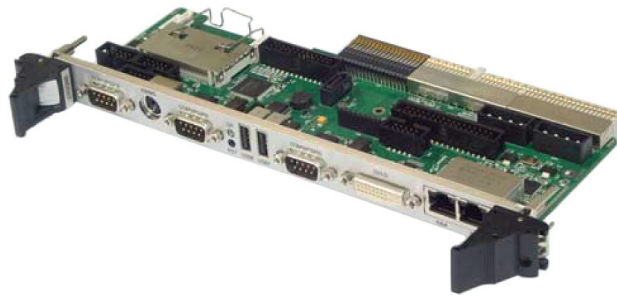
Fastwel



Fastwel



Fastwel



## Overview

RIO587 I/O Module has been designed for use with Fastwel CPC503 6U CompactPCI board. The RIO587 provides access to CPC503 Module interfaces rooted to CPCI J3 – J5 connectors when installed on the back-side of the mezzanine board.

The module has been made in CPCI 6U RIO form-factor in two hardware versions: RIO587-01 (height: 4HP) and RIO587-02 (height: 8HP). A set of interfaces, rooted to the rear interface panel, depends on the board version type.

## Technical Specifications

### 2x SATA interfaces

- One is rooted to CFast cards connector.
- The second one – to the standard SATA connector with Innodisk SATADOM power supply support

### 2x Gigabit Ethernet interfaces

- Connected via PCI-Express

### USB 2.0

- 2xUSB 2.0 channels on the rear panel.
- 4x channels are rooted to the mezzanine board and can be used in RIO587-02 version

### COM1 – COM6

- COM1 – 9-wire RS-232 interface, rooted to the standard DSUB-9 connector of the rear panel
- COM2/COM3/COM4 – 9-wire RS-232 interfaces, rooted to BH-10 type connectors at a pitch of 2.54 mm. Can be rooted to the rear panel in RIO587-02 via cable with IDC-10 connector.
- COM5/COM6 – individually galvanic isolated interfaces RS-485, isolation voltage up to 500 V. Automatic transfer control. Each port is rooted to the standard DSUB-9 connector of the rear panel.
- Galvanic isolated Reset is rooted to 4 and 9 contacts of XP7 connector. Isolation: 500 V.

### LPT

- SPP modes support (PC-compatible printer port), ECP (Extended Capabilities Port), EPP (Enhanced Parallel Port). Rooted to BH-26 connector with a pitch of 2.54 mm .

### PS/2 Keyboard & Mouse

- Rooted to PS/2 connector on the rear panel

### LVDS

- Compatible with ANSI/TIA/EIA-644 standard) with a maximum pixel frequency of 112 MP/sec in one-channel and 224 MP/sec in a two-channel mode
- Resolution up to 2560×1440@60 Hz (two-channel mode)
- Rooted to BH-34 connector

### DVI-D

- Resolution up to 1920×1200@60 Hz
- Rooted to the rear panel

### PCI-E

- PCI-E bus is rooted to the mezzanine board connector
- It enables to implement on mezzanine board up to two devices with PCI-E interface in x1 mode (2.5 Gbit/sec) in RIO587-02 version

### GPIO interface

- 8×lines
- Rooted to the connector on the board

### HD Audio

- Connector for installation of Audio-mezzanine board IDC (XS9) with HD Audio signals is located on the RIO587

### Indication

- Software controlled LED is rooted to the rear panel
- LINK/ACT indicators on each Ethernet-channel

### Power

- +5 V, +3.3 V is supplied from CPC503 Module

### Operating temperature range

- Industrial version: –40°C to +85°C
- Commercial version: 0°C to +70 °C

### Humidity resistance

- At the air temperature of + (55 ± 2)°C relative humidity (93±3)%

### Resistance to single shock/vibration

- 20g/2g

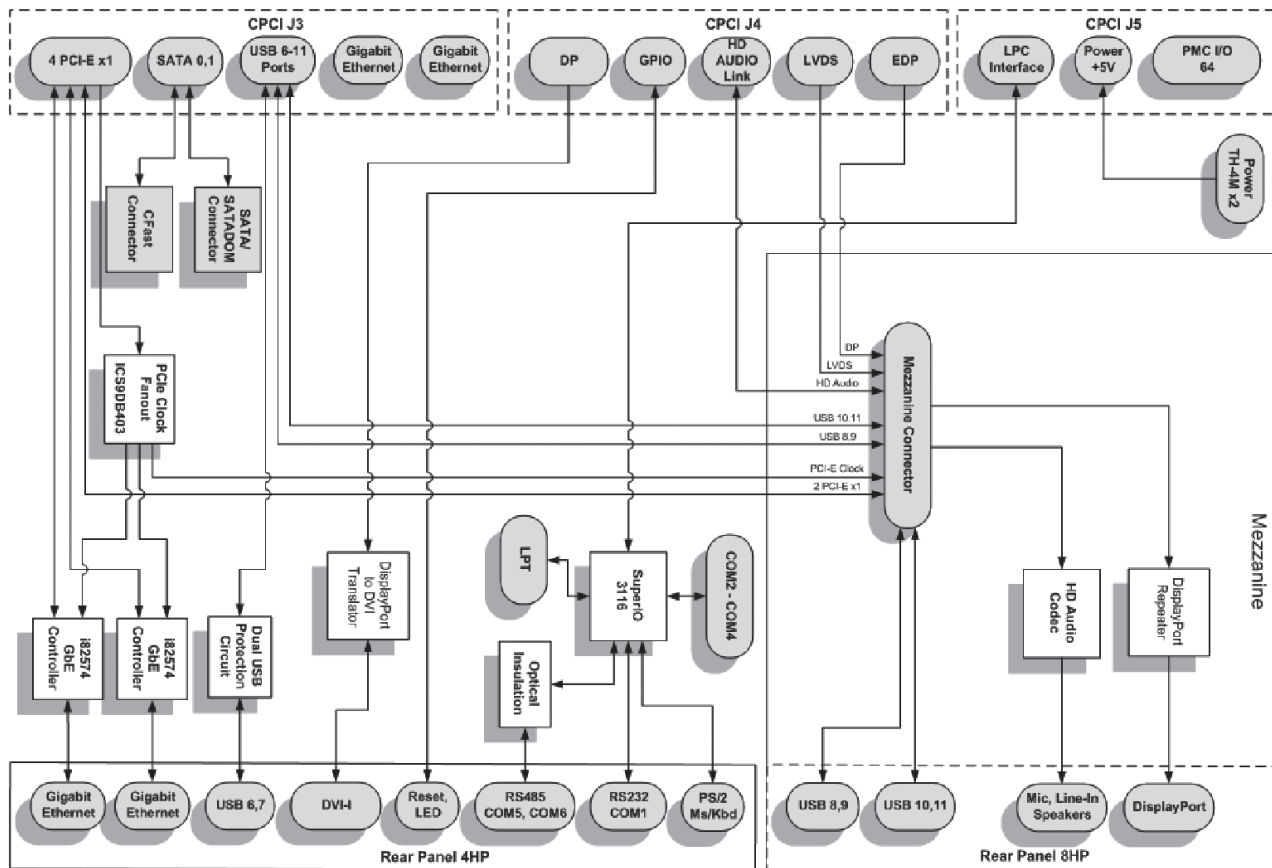
### Weight, no more than

- RIO587-01 0,300 kg
- RIO587-02 0,350 kg

### MTBF

- No less than 350 000 hours

## Board Layout



## Ordering Information

### RIO587 Configuration

#### RIO587 \_ 01 \Options

##### Versions

RIO587-01	CPCI 6U RIO Module, 4HP, with PS/2, RS-232, 2 RS-485, 2 USB2.0, 2 10/100/1000 MB Ethernet, CFast interfaces
RIO587-02	CPCI 6U RIO Module, 8HP, with PS/2, 4 RS-232, 2 RS-485, 2 USB2.0, 2 10/100/1000 MB Ethernet, CFast, HDD 2.5" SATA interfaces

##### Options

\Protective Coating

For all versions the option \Coated is available (protective coating).

#### Delivery checklist:

- RIO587 Module
- p/n MJ-0-4,5 Jumper 4.5 mm for XP13 and XP14 jumpers for the connection of compliant chains of RS-485 (independent of module version) ..... 2 pcs.
- For RIO587-01 version (for fastening of Innodisk SATA/COM flash-disc):**
- p/n RRSN-2750-12 Richco spacer ..... 1 pcs.
- DIN7985 Screw M2,5x16 ..... 1 pcs.
- DIN934 Screw Nut M2,5 ..... 1 pcs.
- DIN125 Washer 2,5 ..... 1 pcs.
- DIN6798A Lock washer 2,5 ..... 1 pcs.
- For RIO587-02 version (for fastening of HDD 2.5")::**
- IMEC.469535.129 Plane KIB587 ..... 1 pcs.
- IMEC.715131.023 spacer ..... 4 pcs.
- DIN7985 Screws M3x6 ..... 4 pcs.
- DIN125 Washers 3 ..... 4 pcs.
- DIN6798A Lock washers 3 ..... 4 pcs.

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