



# CPC508

**3U CompactPCI  
CPU Module**

## User Manual

Rev. 001 E

December 2012



*The product described in this manual is compliant  
with all related CE standards.*

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Fastwel welcomes suggestions, remarks and proposals regarding the form and the content of this Manual.

## Notation Conventions



### **Warning, ESD Sensitive Device!**

This symbol draws your attention to the information related to electro static sensitivity of your product and its components. To keep product safety and operability it is necessary to handle it with care and follow the ESD safety directions.



### **Warning!**

This sign marks warnings about hot surfaces. The surface of the heatsink and some components can get very hot during operation. Take due care when handling, avoid touching hot surfaces!



### **Caution: Electric Shock!**

This symbol warns about danger of electrical shock (> 60 V) when touching products or parts of them. Failure to observe the indicated precautions and directions may expose your life to danger and may lead to damage to your product.



### **Warning!**

Information marked by this symbol is essential for human and equipment safety. Read this information attentively, be watchful.



### **Note...**

This symbol and title marks important information to be read attentively for your own benefit.

## General Safety Precautions

This product was developed for fault-free operation. Its design provides conformance to all related safety requirements. However, the life of this product can be seriously shortened by improper handling and incorrect operation. That is why it is necessary to follow general safety and operational instructions below.



### Warning!

All operations on this device must be carried out by sufficiently skilled personnel only.



### Warning!

When handling this product, special care must be taken not to hit the heatsink (if installed) against another rigid object. Also, be careful not to drop the product, since this may cause damage to the heatsink, CPU or other sensitive components as well.

Please, keep in mind that any physical damage to this product is not covered under warranty.



### Note:

This product is guaranteed to operate within the published temperature ranges and relevant conditions. However, prolonged operation near the maximum temperature is not recommended by Fastwel or by electronic chip manufacturers due to thermal stress related failure mechanisms. These mechanisms are common to all silicon devices, they can reduce the MTBF of the product by increasing the failure probability. Prolonged operation at the lower limits of the temperature ranges has no limitations.



### Caution, Electric Shock!

Before installing this product into a system and before installing other devices on it, always ensure that your mains power is switched off.

Always disconnect external power supply cables during all handling and maintenance operations with this module to avoid serious danger of electrical shock.

## Unpacking, Inspection and Handling

Please read the manual carefully before unpacking the module or mounting the device into your system. Keep in mind the following:



### ESD Sensitive Device!

Electronic modules and their components are sensitive to static electricity. Even a non-perceptible by human being static discharge can be sufficient to destroy or degrade a component's operation! Therefore, all handling operations and inspections of this product must be performed with due care, in order to keep product integrity and operability:

- Preferably, unpack or pack this product only at EOS/ESD safe workplaces. Otherwise, it is important to be electrically discharged before touching the product. This can be done by touching a metal part of your system case with your hand or tool. It is particularly important to observe anti-static precautions when setting jumpers or replacing components.
- If the product contains batteries for RTC or memory back-up, ensure that the module is not placed on conductive surfaces, including anti-static mats or sponges. This can cause short-circuit and result in damage to the battery and other components.
- Store this product in its protective packaging while it is not used for operational purposes.

### Unpacking

The product is carefully packed in an antistatic bag and in a carton box to protect it against possible damage and harmful influence during shipping. Unpack the product indoors only at a temperature not less than +15°C and relative humidity not more than 70%. Please note, that if the product was exposed to the temperatures below 0°C for a long time, it is necessary to keep it at normal conditions for at least 24 hours before unpacking. Do not keep the product close to a heat source.

Following ESD precautions, carefully take the product out of the shipping carton box. Proper handling of the product is critical to ensure correct operation and long-term reliability. When unpacking the product, and whenever handling it thereafter, be sure to hold the module preferably by the front panel, card edges or ejector handles. Avoid touching the components and connectors.

Retain all original packaging at least until the warranty period is over. You may need it for shipments or for storage of the product.

### Initial Inspection

Although the product is carefully packaged, it is still possible that shipping damages may occur. Careful inspection of the shipping carton can reveal evidence of damage or rough handling. Should you notice that the package is damaged, please notify the shipping service and the manufacturer as soon as possible. Retain the damaged packing material for inspection.

After unpacking the product, you should inspect it for visible damage that could have occurred during shipping or unpacking. If damage is observed (usually in the form of bent component leads or loose socketed components), contact Fastwel's official distributor from which you have purchased the product for additional instructions. Depending on the severity of the damage, the product may even need to be returned to the factory for repair. DO NOT apply power to the product if it has visible damage. Doing so may cause further, possibly irreparable damage, as well as result in a fire or electric shock hazard.

If the product contains socketed components, they should be inspected to make sure they are seated fully in their sockets.



## Handling

In performing all necessary installation and application operations, please follow only the instructions supplied by the present manual.

In order to keep Fastwel's warranty, you must not change or modify this product in any way, other than specifically approved by Fastwel or described in this manual.

Technical characteristics of the systems in which this product is installed, such as operating temperature ranges and power supply parameters, should conform to the requirements stated by this document.

Retain all the original packaging, you will need it to pack the product for shipping in warranty cases or for safe storage. Please, pack the product for transportation in the way it was packed by the supplier.

When handling the product, please, remember that the module, its components and connectors require delicate care. Always keep in mind the ESD sensitivity of the product.

## Three Year Warranty

Fastwel Co. Ltd. (Fastwel), warrants that its standard hardware products will be free from defects in materials and workmanship under normal use and service for the currently established warranty period. Fastwel's only responsibility under this warranty is, at its option, to replace or repair any defective component part of such products free of charge.

Fastwel neither assumes nor authorizes any other liability in connection with the sale, installation or use of its products. Fastwel shall have no liability for direct or consequential damages of any kind arising out of sale, delay in delivery, installation, or use of its products.

If a product should fail through Fastwel's fault during the warranty period, it will be repaired free of charge. For out of warranty repairs, the customer will be invoiced for repair charges at current standard labor and materials rates.

Warranty period for Fastwel products is 36 months since the date of purchase.

### **The warranty set forth above does not extend to and shall not apply to:**

1. Products, including software, which have been repaired or altered by other than Fastwel personnel, unless Buyer has properly altered or repaired the products in accordance with procedures previously approved in writing by Fastwel.
2. Products, which have been subject to power, supply reversal, misuse, neglect, accident, or improper installation.

### **Returning a product for repair**

1. Apply to Fastwel company or to any of the Fastwel's official representatives for the Product Return Authorization.
2. Attach a failure inspection report with a product to be returned in the form, accepted by customer, with a description of the failure circumstances and symptoms.
3. Carefully package the product in the antistatic bag, in which the product had been supplied. Failure to package in antistatic material will VOID all warranties. Then package the product in a safe container for shipping.
4. The customer pays for shipping the product to Fastwel or to an official Fastwel representative or dealer.

# 1 Introduction

## 1.1 Overview

The product described in this Manual is CPC508 – a 3U CompactPCI PlusIO (PICMG 2.30) CPU module.

For high-speed data exchange CPC508 employs 32-bit PCI bus together with two Gigabit Ethernet channels, four x1 PCI Express lanes, DVI and eight USB 2.0 channels .

Modular design allows flexible system configuration, thus providing optimum price to performance ratio. To expand the functionality of CPC508, the MIC589 mezzanine interface expansion module is used.

The operational stability of CPC508 make it perfect for use in industrial applications.

## 1.2 Technical Characteristics

- Intel® processors:  
Low power Atom core, integrated memory and graphics controllers
  - Intel Pineview-M, single core (N450, for CPC508-01)
  - Intel Pineview-D, dual core (D510, for CPC508-03)
  - IA 32-bit & 64-bit technology;
  - Intel SIMD2 & 3 (SSE2 + SSE3 + SSSE3);
  - Hyperthreading Technology (2 threads);
  - Level 1 cache memory (32 KB instructions, 24 KB data);
  - Level 2 cache memory: 512 KB (N450), 1 MB (D510);
  - Intel SpeedStep Technology
- Intel chipset: ICH8M
- System memory:
  - DDR2 SDRAM 667 MHz w/o ECC
  - 1 GB, soldered, 64-bit addressing
- Integrated high performance graphics controller:
  - VGA front panel connector, CRT displays support with resolutions of up to 1400x1050 60 Hz for N450 and up to 2048x1536 60 Hz for D510;
  - LVDS interface (resolutions up to 1280x800 60 Hz for N450 and 1366x768 60 Hz for D510, single channel, 18-bit), routed to mezzanine connector, available via MIC589 module
- PCI bus:
  - Routed to CPCI J1 connector
  - Spec. v.2.3 support
  - 32-bit / 33 MHz
  - Support for up to 7 bus master devices

- LPC bus:
  - Routed to mezzanine connector
  - Spec. v1.0 compatibility
  - Support for two Master/DMA devices
- PCI Express: four x1 lanes
  - Routed to CPCI J2 connector
  - Spec 1.1 compatibility
  - Support for up to four x1 devices (up to 2.5 Gbit/s)
- Flash BIOS:
  - SPI interface, 16 Mbit
  - In-system modification
- NAND flash disk:
  - 4 GB NAND flash, dual channel, soldered
  - SATA interface (50 MB/s read, 45 MB/s write)
  - Can be used as boot device
- CompactFlash Type II socket:
  - Support for PIO & UDMA modes
  - UltraATA 100/66/33
- SATA interface:
  - Up to 300 MB/s
  - Two ports
  - Routed to CPCI J2 connector
- Gigabit Ethernet interfaces:
  - Two PCI-E controllers
  - 10/100/1000 Mbps
  - Two RJ-45 frontpanel connectors
  - Front/rear switchable
- USB:
  - 1.1 and 2.0 support,
  - Up to 8 devices: two at CPC508 front panel, two via MIC589 (mezzanine connector), four via CPCI J2 available at the backplane
- FRAM:
  - Available via SMBus
  - 64 Kbit, 256 B RAM for BIOS Setup parameters storage
- Real-time clock
  - Integrated in ICH8M
  - CR2032 battery backup (3V)
- Audio
  - Discrete HD audio
  - Routed to mezzanine connector
- Watchdog timer:
  - Fixed timeout period (1.6 s)
  - Reset source
- Hardware monitor
  - Available via SMBus
  - Power voltages monitoring
  - CPU and PCB temperatures monitoring
- Front panel LED indicators
  - Disk drives activity LED
  - Programmable user LED

- Mezzanine connector:
  - Used for connection of MIC589 interface expansion module
  - HD Audio, two USB ports, LVDS, 8-bit local bus
- Weight: 0.450 kg max
- Dimensions: 130.5 mm × 213.0 mm x 20.32 mm
- Power voltage: +5 V ± 5% from CPCI connector
- Consumption current:
  - CPC508-01: 2.8 A
  - CPC508-03: 3.1 A
- MTBF: 140000 hours
- OS compatibility:
  - FreeDOS
  - Windows XP (Embedded)
  - Linux 2.6
  - QNX 6.5

### 1.3 CPC508 Versions

CPC508 is available in two versions:

1	-	2	-	3	\	4
---	---	---	---	---	---	---

1 Basic product name:  
CPC508

2 Version:

Version	CPU
01	Intel Pineview-M (N450)
03	Intel Pineview-D (D510)

3 Operating temperature range:  
I Industrial, -40°C ... +85°C

4 Other options:

Coating

\COATED Protective coating

Operating System

\XPE Windows XP Embedded

\LNX Linux 2.6

## 1.4 Delivery Checklist

The CPC508 delivery set includes:

1. CPC508 processor module
2. MIC 23008 CompactFlash memory module with preinstalled Windows XPe (only if \XPE option is selected)
3. Antistatic bag
4. Consumer carton box (~ 230×155×45 mm, gross weight 0.650 kg max)



**Note:**

Keep the antistatic bag and the original package at least until the warranty period is over. It can be used for future storage or warranty shipments.

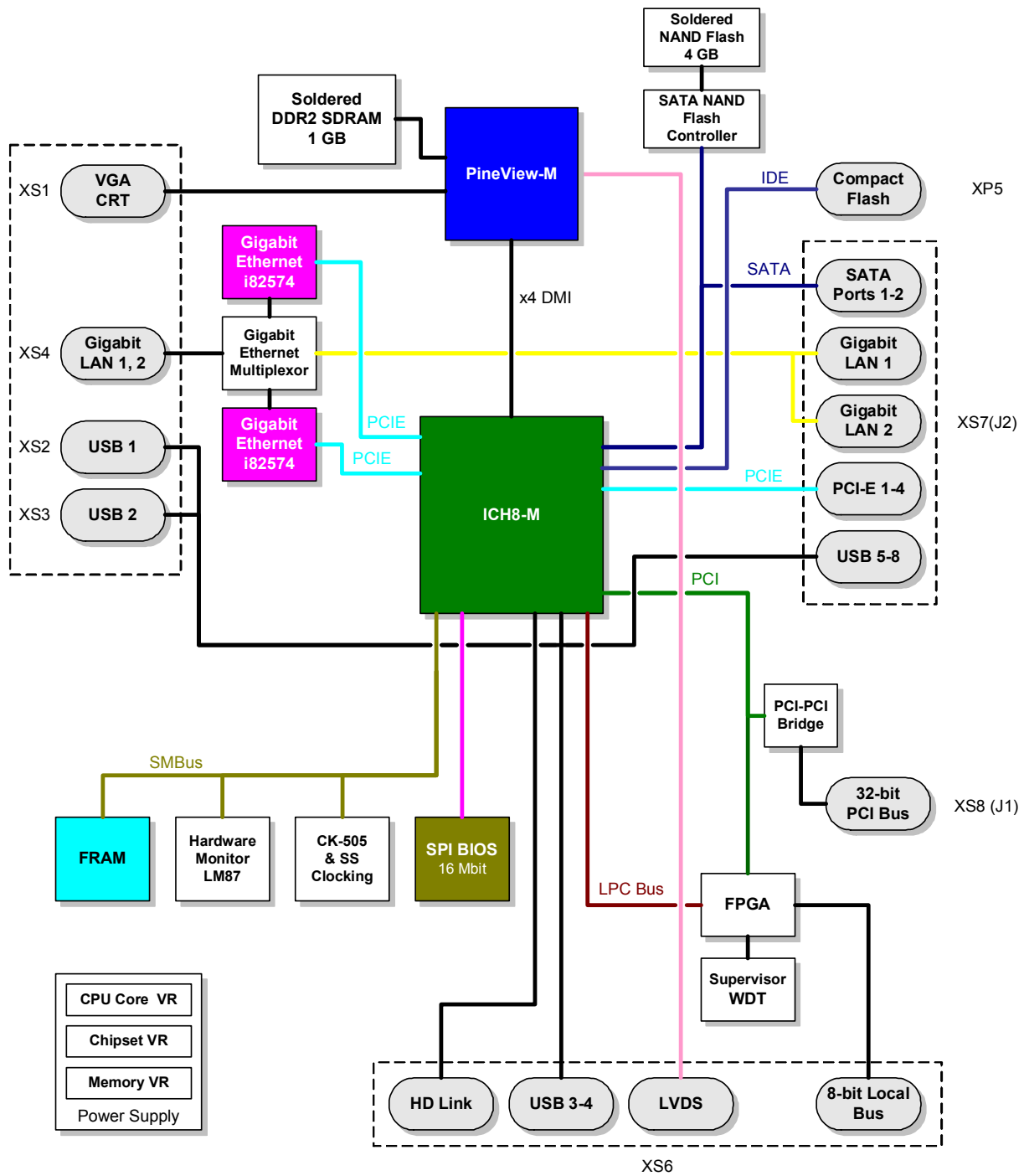
## 1.5 CPC508 Diagrams

The diagrams in this section give visual information about the CPC508 module design, connectors and components layout. The diagrams may not reflect insignificant differences between the CPC508 versions.



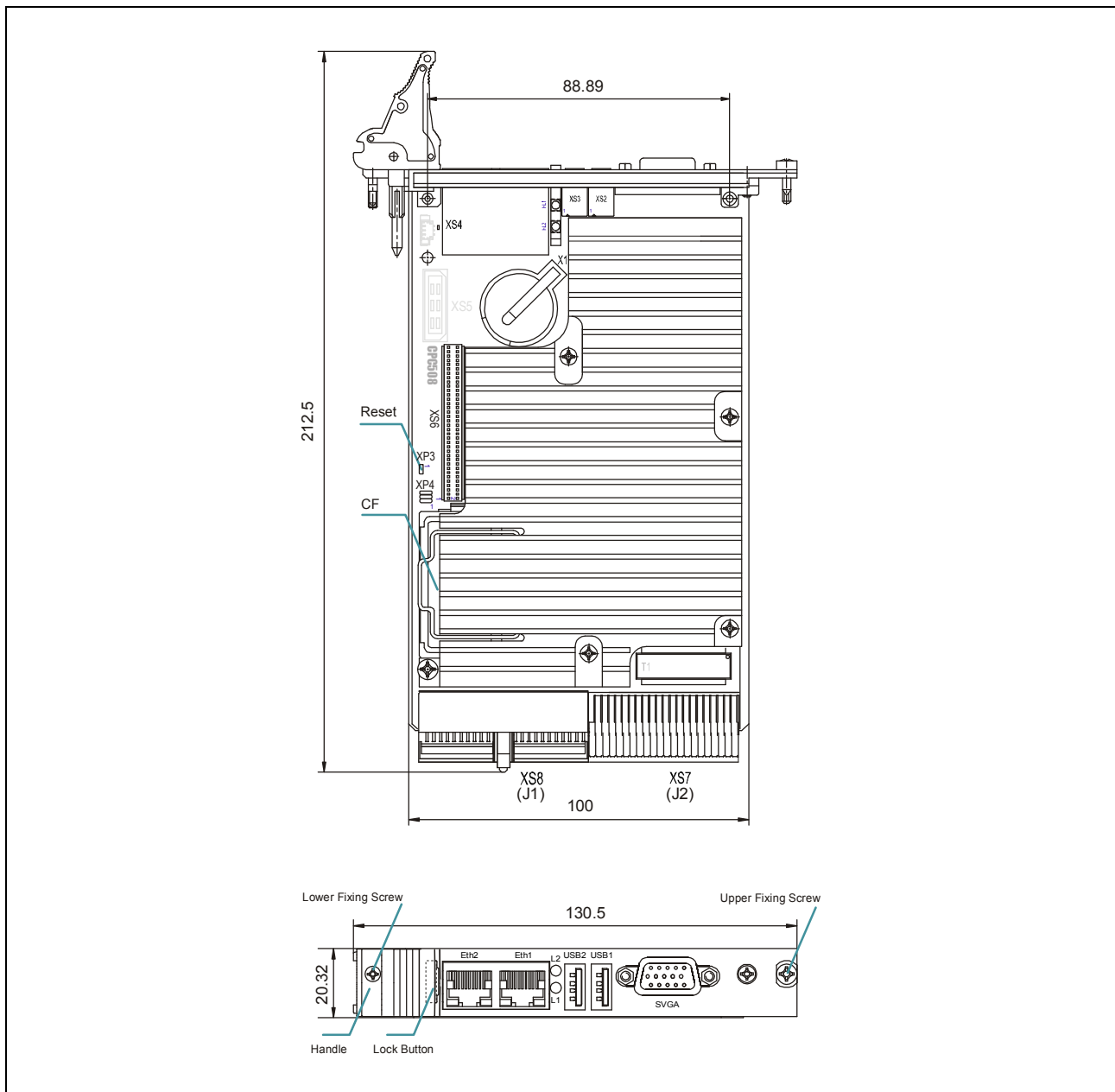
### 1.5.1 Block Diagram

Figure 1-1: CPC508 Block Diagram



## 1.5.2 Module Dimensions and Layout

Figure 1-2: CPC508 Module Dimensions and Layout



## 1.6 System Expansion Module

To expand system I/O capabilities Fastwel offers MIC589, a mezzanine interface expansion module. It is designed to be installed on the top (right) or on the bottom side (left) of CPC508 processor module and is connected via XS6 connector. MIC589 is supplied with the adaptor connector to enable connection to CPC508.

The detailed description of expansion module can be found in relevant section of this Manual.

## 2 Functional Description

### 2.1 Module Interfaces

#### 2.1.1 CompactPCI Bus Connectors

Figure 2-1: CompactPCI Connectors J1 and J2 →

The CPC508 is designed for a CompactPCI bus architecture, but it utilizes only two of standard CompactPCI connectors – J1 and J2. The CompactPCI standard is electrically identical to the PCI local bus. However, these systems are improved to support multiple slots and to operate in harsh industrial environments.

J1 standard CompactPCI connector is marked as XS8 on board, J2 (CompactPCI 2.30) is marked as XS7.

##### 2.1.1.1 CompactPCI Connector Color Coding

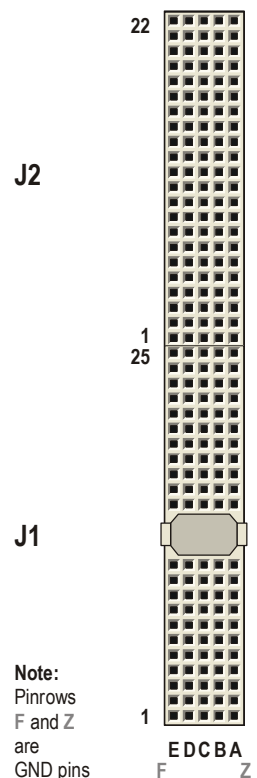
Guide lugs on CompactPCI connectors serve to ensure a correct mating of connectors. A proper mating is guaranteed also by the use of color coded keys for 3.3V and 5V operation. Color coded keys prevent accidental installation of a 5V module into a 3.3V slot. CompactPCI backplane connectors' keying depends always on the signaling (VIO) level. On universal backplanes supporting both signalling levels, VIO level is selected by a jumper on the backplane.

CPC508 is a universal module with 3.3V or 5V signalling voltage level.

Coding key colors are described below:

Table 2-1: CompactPCI Connector Coding Colors

Voltage Level	Key Color
3.3 V	Cadmium Yellow
5 V	Brilliant Blue
Universal module (5V and 3.3V)	None



CompactPCI connector pinouts appear on the following pages.



### 2.1.1.2 CompactPCI Connectors J1 and J2 Pinouts

CPC508 is equipped with two 2x2 mm pitch female CompactPCI bus connectors – J1 (XS8) and J2 (XS7).

**Table 2-2: CompactPCI Bus Connector J1 (XS8) System Slot Pinout**

Pin	Z	A	B	C	D	E	F				
25	GND	5V	REQ64#	ENUM#	3.3V	5V	GND				
24	GND	AD[1]	5V	LNG_VIO	AD[0]	ACK64#	GND				
23	GND	3.3V	AD[4]	AD[3]	LNG_5V	AD[2]	GND				
22	GND	AD[7]	GND	LNG_3.3V	AD[6]	AD[5]	GND				
21	GND	3.3V	AD[9]	AD[8]	M66EN	C/BE[0]#	GND				
20	GND	AD[12]	GND	VIO	AD[11]	AD[10]	GND				
19	GND	3.3V	AD[15]	AD[14]	LNG_GND	AD[13]	GND				
18	GND	SERR#	GND	3.3V	PAR	C/BE[1]#	GND				
17	GND	3.3V	IPMB_SCL	IPMB_SDA	LNG_GND	PERR#	GND				
16	GND	DEVSEL#	GND	VIO	STOP#	LOCK#	GND				
15	GND	3.3V	FRAME#	IRDY#	SHRT_GND	TRDY#	GND				
14	GND	Key Area						GND			
13	GND										GND
12	GND										GND
11	GND	AD[18]	AD[17]	AD[16]	LNG_GND	C/BE[2]#	GND				
10	GND	AD[21]	GND	3.3V	AD[20]	AD[19]	GND				
9	GND	C/BE[3]#	SHRT_GND	AD[23]	LNG_GND	AD[22]	GND				
8	GND	AD[26]	GND	VIO	AD[25]	AD[24]	GND				
7	GND	AD[30]	AD[29]	AD[28]	LNG_GND	AD[27]	GND				
6	GND	REQ0#	GND	LNG_3.3V	CLK0	AD[31]	GND				
5	GND	BRSVP1A5	BRSVP1B5	RST#	LNG_GND	GNT0#	GND				
4	GND	IPMB_PWR	HEALTHY#	LNG_VIO	INTP	INTS	GND				
3	GND	INTA#	INTB#	INTC#	LNG_5V	INTD#	GND				
2	GND	TCK	5V	TMS	TDO	TDI	GND				
1	GND	5V	-12V	TRST#	+12V	5V	GND				

Table 2-3: 32-bit CompactPCI Bus Connector J2 (XS7) System Slot Pinout

Pin	Z	A	B	C	D	E	F
22	GND	GA4	GA3	GA2	GA1	GA0	GND
21	GND	CLK6	GND	2_ETH_B+	1_ETH_D+	1_ETH_B+	GND
20	GND	CLK5	GND	2_ETH_B-	1_ETH_D-	1_ETH_B-	GND
19	GND	GND	GND	2_ETH_A+	1_ETH_C+	1_ETH_A+	GND
18	GND	2_ETH_D+	2_ETH_C+	2_ETH_A-	1_ETH_C-	1_ETH_A-	GND
17	GND	2_ETH_D-	2_ETH_C-	PRST#	REQ6#	GNT6#	GND
16	GND	4_PE_CLK-	2_PE_CLK+	DEG#	GND	Reserved	GND
15	GND	4_PE_CLK+	2_PE_CLK-	FAL#	REQ5#	GNT5#	GND
14	GND	3_PE_CLK-	1_PE_CLK+	4_PE_CLKE#	-	Reserved	GND
13	GND	3_PE_CLK+	1_PE_CLK-	3_PE_CLKE#	-	-	GND
12	GND	4_PE_Rx00+	1_PE_CLKE#	2_PE_CLKE#	-	-	GND
11	GND	4_PE_Rx00-	4_PE_Tx00+	4_USB2+	-	-	GND
10	GND	3_PE_Rx00+	4_PE_Tx00-	4_USB2-	-	-	GND
9	GND	3_PE_Rx00-	3_PE_Tx00+	3_USB2+	-	-	GND
8	GND	2_PE_Rx00+	3_PE_Tx00-	3_USB2-	-	2_SATA_Rx+	GND
7	GND	2_PE_Rx00-	2_PE_Tx00+	2_USB2+	2_SATA_Tx+	2_SATA_Rx-	GND
6	GND	1_PE_Rx00+	2_PE_Tx00-	2_USB2-	2_SATA_Tx-	1_SATA_Rx+	GND
5	GND	1_PE_Rx00-	1_PE_Tx00+	1_USB2+	1_SATA_Tx+	1_SATA_Rx-	GND
4	GND	VIO	1_PE_Tx00-	1_USB2-	1_SATA_Tx-	Reserved	GND
3	GND	CLK4	GND	GNT3#	REQ4#	GNT4#	GND
2	GND	CLK2	CLK3	SYSEN#	GNT2#	REQ3#	GND
1	GND	CLK1	GND	REQ1#	GNT1#	REQ2#	GND

### 2.1.2 Connector for Mezzanine Module

MIC589 mezzanine module is used to enhance I/O capabilities of CPC508. It is installed on the top side (to the right) of CPC508 processor module or on the bottom side (to the left) using adapter connector. 72-contact XS6 high speed through connector socket is used for connection of MIC589.

See description of MIC589 expansion module in the relevant section of this document.

Figure 2-2: XS6 Expansion Connector for MIC589 Mezzanine Module

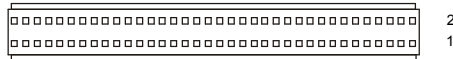


Table 2-4: Pinout of XS6 Connector for MIC589 Mezzanine Module

Contact	Signal	Contact	Signal
1	GND	2	GND
3	LED1	4	USB5-
5	USB_4_5_OC#	6	USB5+
7	USB4+	8	AD3.3V(0)
9	USB4-	10	CAN1_RESET#
11	+5V	12	+5V
13	LED2	14	CAN2_RESET#
15	AD3.3V(1)	16	AD3.3V(2)
17	AD3.3V(3)	18	AD3.3V(4)
19	AD3.3V(5)	20	AD3.3V(6)
21	AD3.3V(7)	22	DIR
23	ALE	24	IOR#
25	IOW#	26	RESET#
27	SW_COM3	28	SW_COM4
29	SW_CAN_1	30	SW_CAN2
31	CSA1#	32	CSB1#
33	CSA2#	34	CSB2#
35	CAN_CS1#	36	CAN_CS2#
37	GND	38	GND
39	INT1	40	INT2
41	INT3	42	LVDS_A(0)#
43	INT5	44	LVDS_A(0)
45	+5V	46	+5V
47	COM3_ON	48	LVDS_A(1)#
49	COM3_TE	50	LVDS_A(1)
51	GND	52	GND
53	SMBCLK	54	SMBDAT
55	INT4	56	LVDS_A(2)
57	INT6	58	LVDS_A(2)#
59	COM4_ON	60	LVDS_A_CK#
61	COM4_TE	62	LVDS_A_CK
63	GND	64	GND
65	GND	66	AC_BITCLK
67	AC_SYNC	68	AC_SDIN0
69	AC_SDOOUT	70	AC_RST#
71	GND	72	GND

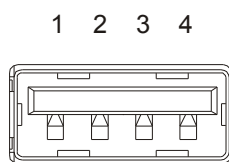
### 2.1.3 Keyboard/Mouse Interface

A keyboard and a mouse can be connected to CPC508 using front panel USB sockets. CPC508 includes 8042-compatible keyboard controller emulator realized on FPGA.

### 2.1.4 USB Interfaces

The CPC508 supports eight USB 2.0 ports. Two ports (USB1 and USB2) are available on CPC508 front panel via two Type A connectors (XS2 and XS3). Two ports (USB3 and USB4) are routed to XS6 connector and are available at MIC589 mezzanine module. Four USB ports (USB5...USB8) are routed to J2 CompactPCI connector (PICMG 2.30) of CPC508.

Figure 2-3: USB1 (XS2) and USB2 (XS3) Sockets



All ports support high-speed, full-speed, and low-speed operation. Hi-speed USB 2.0 supports data transfer rate of up to 480 Mb/s. One USB device may be connected to each port. To connect more than eight USB devices use an external hub.

The USB power supply is protected by a self-resettable 500 mA fuse.

Table 2-5: USB1 and USB2 Pinouts (CPC508 Front Panel)

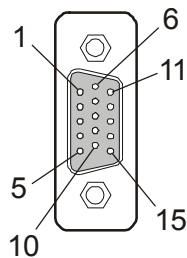
Pin Number	Signal	Function	In/Out
1	VCC	VCC signal	–
2	UV0-	Differential USB-	–
3	UV0+	Differential USB+	–
4	GND	GND signal	–

## 2.1.5 Graphics Controller

A highly integrated 2D/3D graphics accelerator is included in the CPU. The internal graphics controller provides interfaces to a standard analog monitor (VGA connector on CPC508 front panel) or/and to digital displays. Dual monitor clone/extended desktop configurations are supported.

### 2.1.5.1 VGA Interface and Connector

Figure 2-4: VGA (XS1) Front Panel Connector



The 15-pin female D-Sub connector (XS1) on CPC508 front panel is used to connect a CRT monitor to the CPC508 module.

Resolutions: CPC508-01 – up to 1400×1050, 60 Hz  
CPC508-03 – up to 2048×1536, 60 Hz

Its pinout is in the table below.

Table 2-6: VGA (XS1) Front Panel Connector Pinout

Pin Number	Signal	Function	In/Out
1	Red	Red video signal output	Out
2	Green	Green video signal output	Out
3	Blue	Blue video signal output	Out
12	DDCdata	I <sup>2</sup> C™ data	In/Out
13	Hsync	Horizontal sync.	TTL out
14	Vsync	Vertical sync.	TTL out
15	DDCclk	I <sup>2</sup> C™ clock	Out
5, 6, 7, 8, 10	GND	Signal ground	–
4, 11, 9	NC	–	–

### 2.1.5.2 LVDS Interface

LVDS is routed to XS6 mezzanine connector to be available at MIC589 expansion module. Single channel LVDS mode is supported, up to 18 bit/pixel, 25-112 MHz.

LCD panels (LVDS 18-bit) are supported with following resolutions:

CPC508-01 – 1280×800, 60 Hz,  
CPC508-03 – 1366×768, 60 Hz.

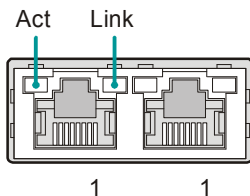
### 2.1.6 Serial Interfaces (RS232 and RS422/485)

Serial interfaces are available only if MIC589 interface expansion module is installed. There are four serial ports available via MIC589 connectors and on backplane via CPCI J2 connector of MIC589. See details in the relevant section of this document.

### 2.1.7 Gigabit Ethernet

The CPC508 board includes two 10Base-T/100Base-TX/1000Base-T Ethernet ports based on Intel® 82574L Gigabit Ethernet PCI-E bus controllers. The Intel® 82574L Gigabit Ethernet controller architecture combines high performance and low power consumption. The controller's features include independent transmit and receive queues to limit PCI-E bus traffic, and a PCI-E interface providing efficient bus utilization by increased use of bursts.

Figure 2-5: Ethernet Connectors



Two RJ45 Gigabit Ethernet connectors are located on CPC508 front panel (XS4).

The interfaces provide auto-detection and switching between 10Base-T, 100Base-TX and 1000Base-T operation modes.

Each of the two Ethernet channels are software switchable to XS7 (CPCI J2, PICMG 2.30) to provide system flexibility.

Table 2-7: Gigabit Ethernet Connectors Pinouts

Pin	10Base-T		100Base-TX		1000Base-T	
	I/O	Signal	I/O	Signal	I/O	Signal
1	O	TX+	O	TX+	I/O	BI_DA+
2	O	TX-	O	TX-	I/O	BI_DA-
3	I	RX+	I	RX+	I/O	BI_DB+
4	-	-	-	-	I/O	BI_DC+
5	-	-	-	-	I/O	BI_DC-
6	I	RX-	I	RX-	I/O	BI_DB-
7	-	-	-	-	I/O	BI_DD+
8	-	-	-	-	I/O	BI_DD-

MDI / Standard Ethernet Cable

#### Integrated Ethernet LEDs

Line (green): This LED indicates network connection. The LED lights up when the line is connected.

Act (green): This LED monitors network activity. The LED lights up when network packets are sent or received through the RJ45 port. When this LED is not lit, it means that the computer is not sending or receiving network data.

## 2.1.8 SATA Ports

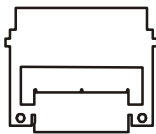
Two SATA ports are routed to CPCI J2 connector (PICMG 2.30).

## 2.1.9 HD Audio

CPC508 provides digital High Definition Audio interface routed via XS6 mezzanine connector to MIC589 module and further to the backplane via CPCI J2 connector of MIC589. The interface includes line input/output and microphone input channels.

## 2.1.10 CompactFlash Socket

Figure 2-6: CompactFlash Socket



To enable usage of CF memory cards CPC508 has a CompactFlash Type I/II socket located on the top side of the board. CF removable mass storage devices are fully compatible with 16-bit ATA/ATAPI-4 IDE interface with DMA support (CF Specification v.4.1).

CompactFlash socket is connected to the IDE port at the current version of CPC508. There is a bracket for fixing a CF card in the socket.

Table 2-1: CompactFlash Socket Pinout

Pin Number	Signal	Function	In/Out
1	GND	Ground signal	–
2	D03	Data 3	In/Out
3	D04	Data 4	In/Out
4	D05	Data 5	In/Out
5	D06	Data 6	In/Out
6	D07	Data 7	In/Out
7	IDE_CS0	Chip select 0	Out
8	GND	–	–
9	GND	–	–
10	GND	–	–
11	GND	–	–
12	GND	–	–
13	3.3 V	3.3 V power	–
14	A06	–	–
15	A05	–	–
16	A04	–	–
17	A03	–	–
18	A02	Address 2	Out
19	A01	Address 1	Out
20	A00	Address 0	Out
21	D00	Data 0	In/Out
22	D01	Data 1	In/Out
23	D02	Data 2	In/Out
24	IOCS16	–	–
25	CD2	–	–
26	CD1	–	–
27	D11	Data 11	In/Out
28	D12	Data 12	In/Out
29	D13	Data 13	In/Out
30	D14	Data 14	In/Out
31	D15	Data 15	In/Out
32	IDE_CS1	Chip select 1	Out
33	VS1	–	–
34	IORD	I/O read	Out
35	IOWR	I/O write	Out
36	3.3 V WE	3.3 V power	–

Pin Number	Signal	Function	In/Out
37	INTRQ	Interrupt	In
38	3.3 V	3.3 V power	–
39	CSEL	Master/Slave	Out
40	VS2	–	–
41	Reset	Reset	Out
42	IORDY	I/O ready	In
43	INPACK	DMA Request	Out
44	REG	DMA Acknowledge	–
45	ACTIVE	IDE Activity	–
46	PDIAG	DMA Mode Detect	–
47	D08	Data 08	In/Out
48	D09	Data 09	In/Out
49	D10	Data 10	In/Out
50	GND	–	–

### 2.1.11 LED Indicators L1 and L2

There are two LED indicators at the front panel L1 and L2 described in the table below.

**Table 2-8: L1 and L2 LEDs Functions**

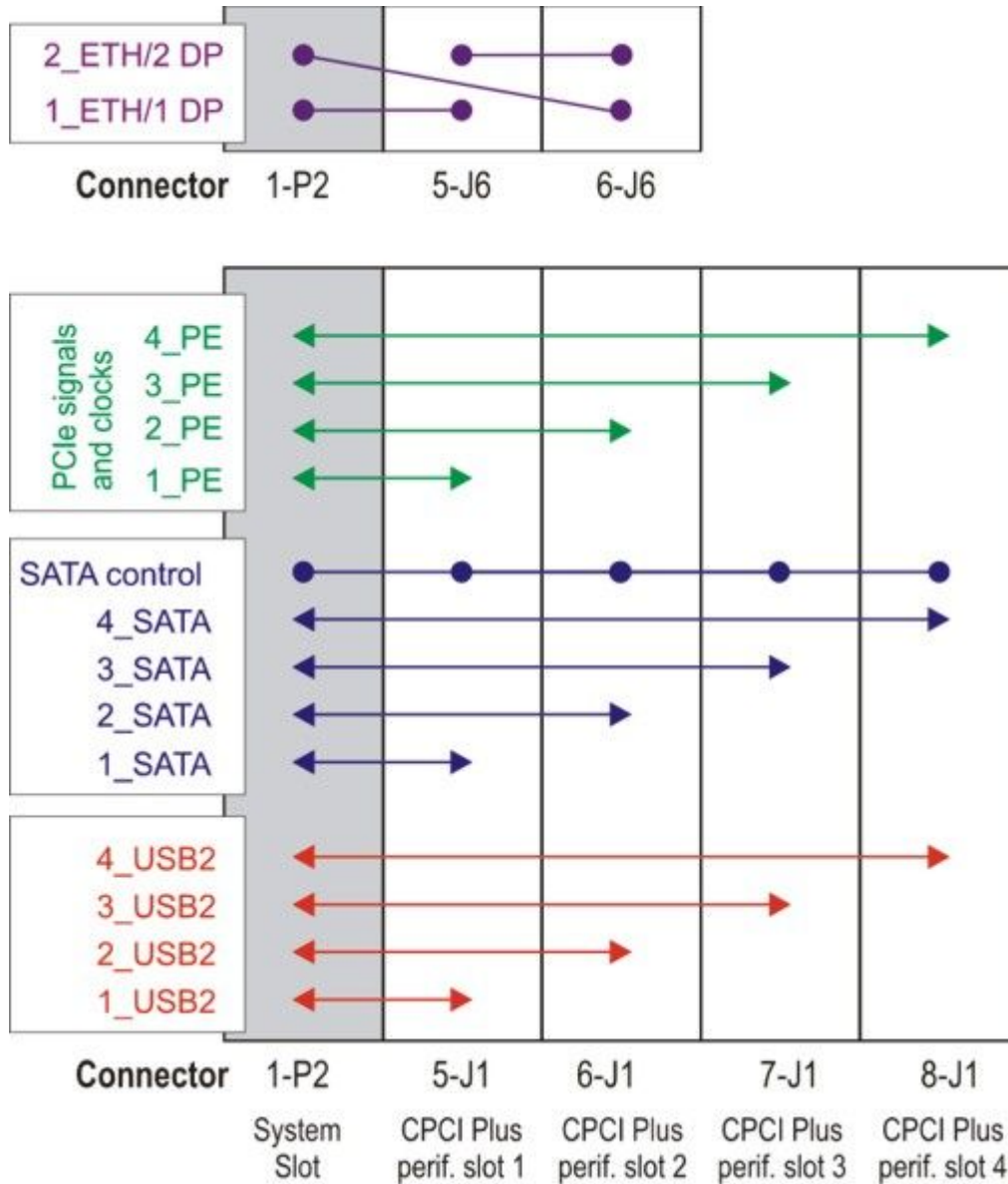
Name	Function	Color	Description
L1	Power indicator/ user LED	Green Red	After switching power on lights green. Also can be controlled via LED1_EN bit as user LED. Can be controlled via LED2_EN bit as user LED.
L2	Drives activity indicator	Green	SATA, NAND and Flash drives activity.



## 2.2 Data Storage Subsystem for CPC508

According to PICMG 2.30 specification, CPC508 supports data storage devices installed in Serial backplane slots. Slot names (1\_SATA – 4\_SATA) are shown in the figure below.

Figure 2-7: Data Storage Subsystem



CPC508 supports two SATA channels. These drives are installed in slots 1 and 2 (5-J1 и 6-J1). SATA drives operation in slots 7-J1 and 8-J1 is not supported. Fastwel KIC550 or other modules can be used as carrier boards.

## 3 Installation

The CPC508 is easy to install. However, it is necessary to follow the procedures and safety regulations below to install the module correctly without damage to the hardware, or harm to personnel.

The installation of the peripheral drivers is described in the accompanying information files. For details on installation of an operating system, please refer to the relevant software documentation.

### 3.1 Safety Regulations

The following safety regulations must be observed when installing or operating the CPC508. Fastwel assumes no responsibility for any damage resulting from infringement of these rules.



#### Warning!

When handling or operating the module, special attention should be paid to the heatsink, because it can get very hot during operation. Do not touch the heatsink when installing or removing the module.

Moreover, the module should not be placed on any surface or in any kind of package until the module and its heatsink have cooled down to ambient temperature.



#### Caution!

If your module does not allow hotswapping, switch off the system power before installing the module in a free slot. Disregarding this requirement could be harmful for your life or health and can damage the module or entire system.



#### ESD Sensitive Equipment!

This product comprises electrostatically sensitive components. Please follow the ESD safety instructions to ensure module's operability and reliability:

- Use grounding equipment, if working at an anti-static workbench. Otherwise, discharge yourself and the tools in use before touching the sensitive equipment.
- Try to avoid touching contacts, leads and components.

Extra caution should be taken in cold and dry weather.

## 3.2 Installation Procedure

To install CPC508 in a system, follow the instructions below.

1. Keep to the safety regulations of the Section 3.1 when performing the following operations.



### Warning!

Failure to accomplish the following instruction may damage the module or result in incorrect system operation.

2. Ensure that the module configuration corresponds to the application requirements before installing. For information regarding the configuration of the CPC508, refer to [Chapter 4](#). For the installation of CPC508 specific peripheral devices and I/O devices refer to the appropriate sections in [Chapter 3](#). For details on installation of expansion modules, refer to respective sections of this document.
3. If the module is intended for operation with a mezzanine module, install the mezzanine module following corresponding instructions.
4. To install the CPC508:
  1. Make sure that no power is connected to the system.
  2. Avoiding contact with other modules of the system, carefully insert the module into the chosen slot until it contacts the backplane connectors. Do not apply force pushing the module into the backplane connectors.
  3. Using the front panel ejector handle (handles), engage the module with the backplane. The module is completely engaged, when the ejector handle is locked. If the mezzanine module is installed, ensure simultaneous locking of both handles.
  4. Fix the module with the front panel retaining screws.
  5. Connect the required external interfacing cables to the module's connectors and make sure that the module and all connected cables are properly fixed.

The CPC508 is now ready for operation. Please, refer to appropriate software, application, and system manuals to get further instructions.

## 3.3 Removal Procedure

To remove the module from the system case do the following:

1. When performing the next actions, keep to safety regulations of the [Section 3.1](#). Pay special attention to the temperature of the heatsink!
2. Ensure that the system power is switched off before proceeding.
3. Disconnect all cables that may be connected to the module.
4. Unscrew the front panel retaining screws.
5. Unlock the module ejection handle(s) by pressing the integrated button(s), and then press on the handle(s) until the module connectors are disconnected from the backplane.
6. Carefully pull the module out of the slot. Do not touch the heatsink, since it can get very hot during operation.

7. Dispose of the module at your discretion. The module should not be placed on any surface or in any form of package until the board and the heatsink have cooled down to room temperature.

## 3.4 Peripheral Devices Installation

A lot of peripheral devices can be connected to the CPC508. Their installation procedures differ significantly. Therefore the following sections provide mainly general guidelines regarding installation of peripheral devices.

### 3.4.1 CompactFlash Cards Installation

CompactFlash socket of CPC508 supports CompactFlash Type I/II cards with operating voltage of 3.3 V.



#### Attention!

Installation of CompactFlash cards while the system power is on can damage the system.

Carefully slide in the correctly oriented card and gently press to engage the contacts completely. Please remember that the heatsink may be hot after operation.



#### Note:

It is recommended to use CompactFlash-cards, which has been initialized and formatted in this module. By default, CPC508 utilizes LBA mode. Utilization of CompactFlash cards, which has been initialized and formatted in another mode, may lead to errors in operation of the module.

### 3.4.2 USB Devices Installation

The CPC508 can accept Plug&Play connection of USB 2.0 computer peripheral devices (printers, keyboards, mice, etc.) All USB devices may be connected or disconnected while the host power is on.

### 3.4.3 Battery Replacement

The lithium battery must be replaced with Panasonic BR2032 or a battery with similar characteristics.

The expected life of a 190 mAh battery in case of operation for 8 hours a day at 30°C is about 5 years. However, this typical value may vary because battery life depends on the operating temperature and the shutdown time of the system in which the battery is installed.

**Note...**

It is recommended to replace the battery after approximately 4 years to be sure it is operational.

**Important:**

Replacing the battery, make sure the polarity is correct ("+" up).

Dispose of used batteries according to the local regulations.

### 3.5 Installation of MIC589 Mezzanine Expansion Module

Installation of MIC589 mezzanine expansion module on CPC508 is described in relevant section of this document.

## **4 Configuration and Programming**

### **4.1 WDT Operation**

(TBA)

### **4.2 L1 User LED Control**

(TBA)

## 5 Phoenix® BIOS Setup

The Phoenix® BIOS in your SBC is an adapted version of a standard BIOS for IBM PC AT-compatible personal computers equipped with Intel®x86 and compatible processors. The BIOS provides low-level support for the central processing, memory, and I/O system units.

### 5.1 Starting BIOS Setup

With the help of BIOS Setup program, you can modify the BIOS configuration parameters and control the special features of your module. The Setup program is started by pressing the F2 key during POST procedure and offers a convenient menu interface to modify basic system configuration settings and switching between the subsystems operation modes. These settings are stored in a dedicated battery-backed memory, CMOS RAM, that keeps the information when the power is switched off. For increased security, the CMOS data and some of the service parameters are stored also in a nonvolatile FRAM memory. This allows to restore the critical data in emergency cases after battery failure.

Figure 5-1: POST Screen Image

```
Phoenix SecureCore(tm) Embedded
Copyright 1985-2009 Phoenix Technologies Ltd.
All Rights Reserved

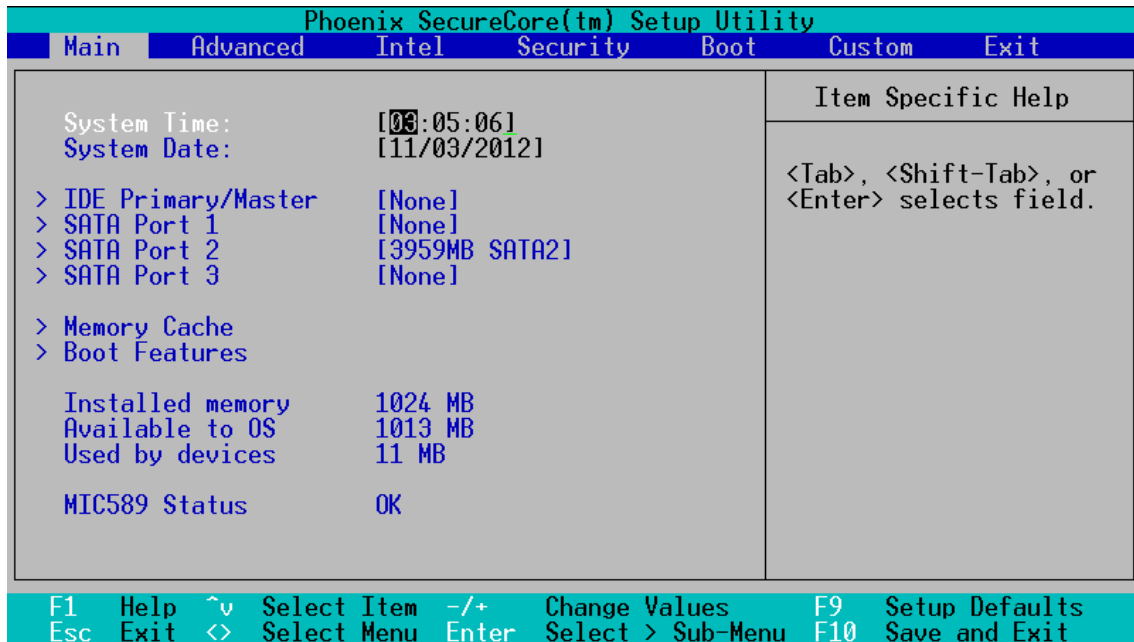
*****
*           Fastwel CPC508 Platform BIOS v1.29           *
*****
CPU = 1 Processors Detected, Cores per Processor = 2
Intel(R) Atom(TM) CPU D510 @ 1.66GHz
1014M System RAM Passed
512 KB L2 Cache per Processor Core
System BIOS shadowed
Video BIOS shadowed

Press <F2> to enter SETUP
```

## 5.2 Main Menu

After pressing F2 the Main Menu screen is shown.

Figure 5-2: Main Menu Screen



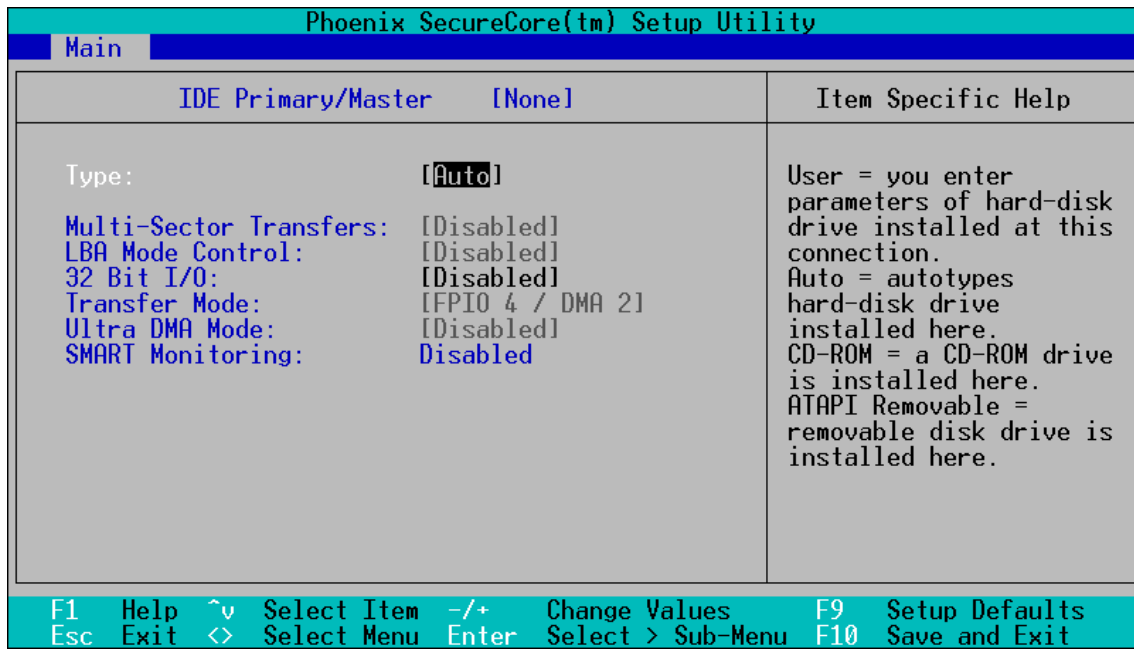
Use <Up> and <Down> cursor keys or <Tab> key to move between menu items. Use <Left> and <Right> keys to move between tabs. <Enter> selects the item and allows to proceed with the command or opens the submenu screen. Use <Esc> key to exit submenu. To change values in the selected item use <+> and <-> on the numeric keypad. This legend applies to all other tabs in BIOS Setup.



## 5.2.1 IDE Primary/Master

This submenu allows to set parameters of IDE drive. CompactFlash is IDE Primary Master device. На рисунке ниже показан вид экрана подменю «IDE Primary/Master».

Figure 5-3: IDE Primary/Master Screen



**Type:** Drive type selection:

**[Auto]** – Auto selection

**[None]** – ATA drive disabled

**[ATAPI Removable], [IDE Removable]** – removable devices

**[CD-ROM]** – CD-ROM drive selection

**[Other ATAPI]** – Other ATAPI devices

**[User]** – User selected ATA device parameters

**Multi-Sector Transfers:** Multi-sector data transfers control

**LBA Mode Control:** LBA mode control

**32 Bit I/O:** 32-bit data transfer mode control

**Transfer Mode:** Data transfer mode selection (PIO, DMA)

**Ultra DMA Mode:** Ultra DMA mode selection

**SMART Monitoring:** S.M.A.R.T. mode control

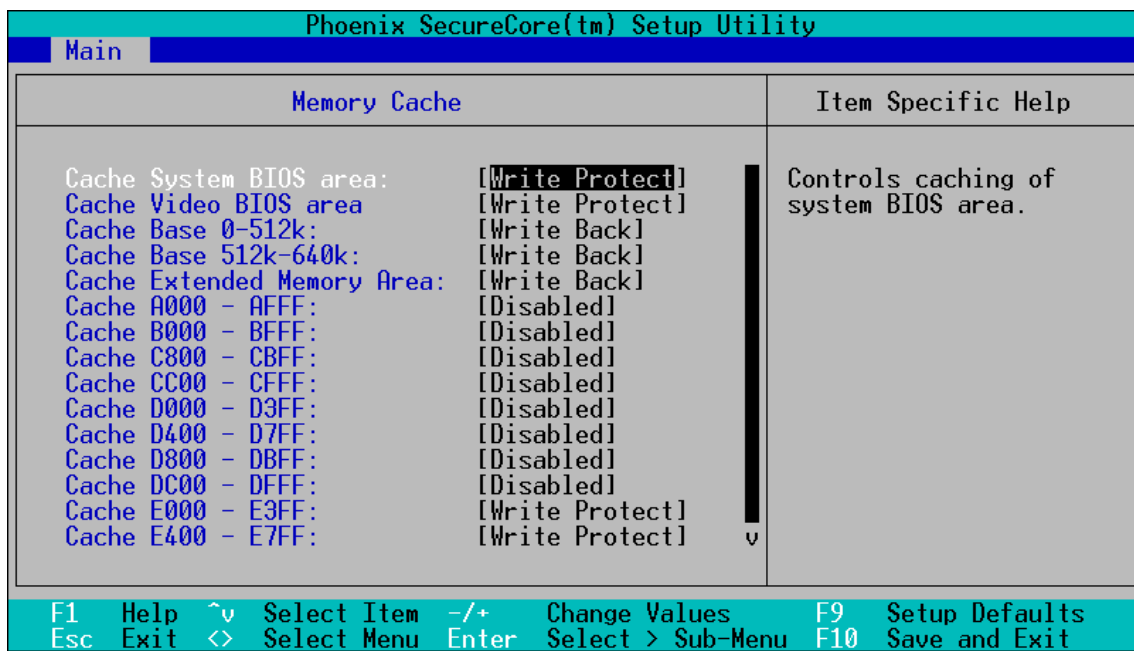
## 5.2.2 SATA Port 1 – Port 3

These submenus allow to setup SATA drives parameters. SATA Port 1 and SATA Port 3 – SATA drives installed in Serial backplane slots, SATA Port 2 – onboard Fastwel Flash Disk.

Parameters of these submenus are identical to «IDE Primary/Master» parameters.

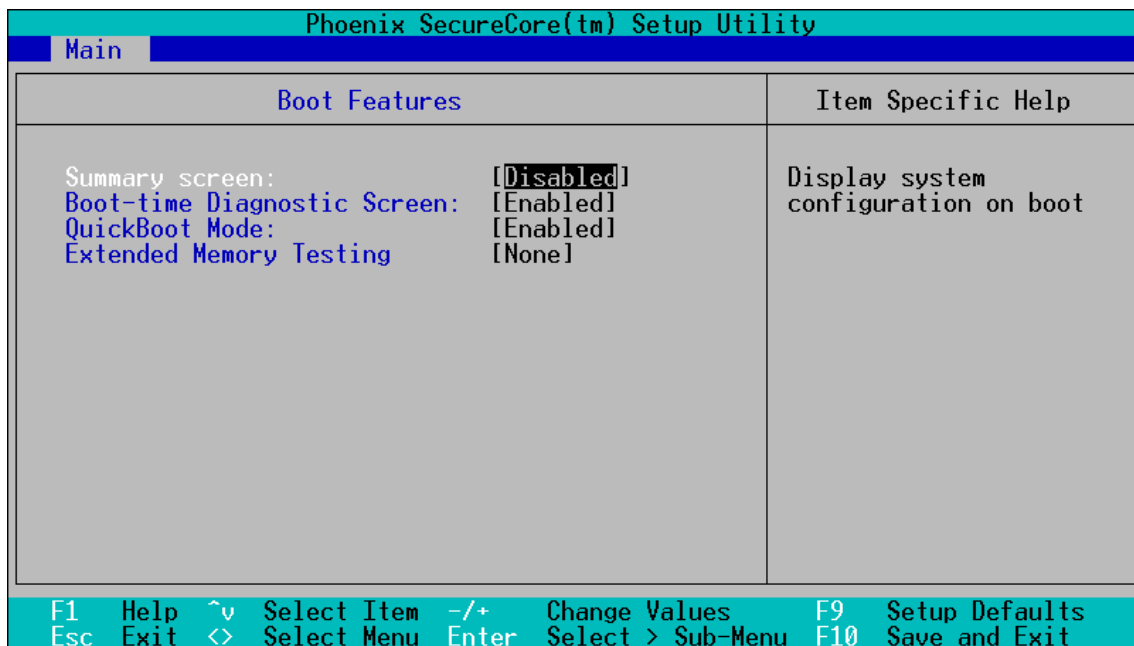
## 5.2.3 Memory Cache

Figure 5-4: Memory Cache Screen



## 5.2.4 Boot Features

Figure 5-5: Boot Features



**Summary screen:** System configuration information screen at startup

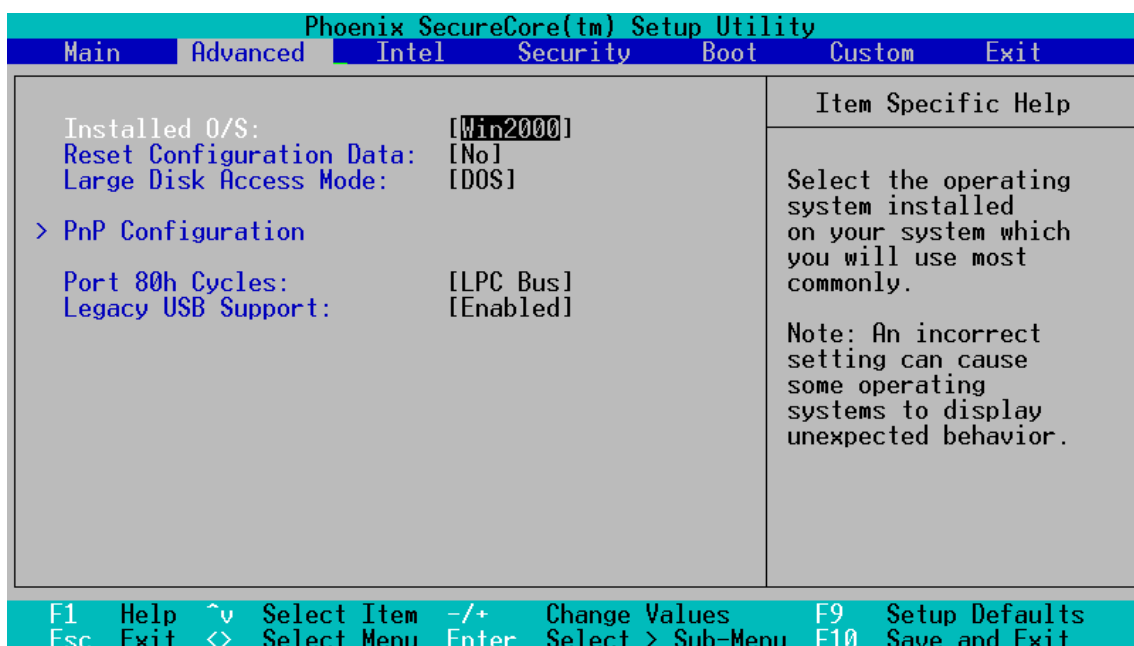
**Boot-time Diagnostic Screen:** Diagnostic screen at startup

**QuickBoot Mode:** Quick boot enable/disable (allows to skip some tests)

**Extended Memory Testing:** Extended memory check mode selection

## 5.3 Advanced Menu

Figure 5-6: Advanced Menu Screen



(TBA)



## 5.4.1 CPU Control Submenu

Figure 5-9: CPU Control Submenu Screen

Phoenix SecureCore(tm) Setup Utility	
Intel	
CPU Control Sub-Menu	Item Specific Help
Hyperthreading: [Enabled] Processor Power Management: [GV3 Only] No Execute Mode Mem Protection [Enabled] Set Max Ext CPUID = 3 [Disabled]	Enabling Hyperthreading activates additional CPU threads. These threads may appear as additional processors but will share some resources with the other threads within the physical package.
F1 Help ^v Select Item -/+ Change Values F9 Setup Defaults Esc Exit <> Select Menu Enter Select > Sub-Menu F10 Save and Exit	

(TBA)

## 5.4.2 Video (Intel IGD) Control Submenu

Figure 5-10: Video (Intel IGD) Control Submenu Screen

Phoenix SecureCore(tm) Setup Utility	
Intel	
Video (Intel IGD) Control Sub-Menu	Item Specific Help
Default Primary Video Adapter: [Auto] IGD - Device 2: [Auto] IGD - Device 2, Function 1: [Auto] DVMT 4.0 Mode: [Auto] DVMT Graphics Memory: 376MB > IGD - LCD Control Sub-Menu	These items control various LCD parameters.
F1 Help ^v Select Item -/+ Change Values F9 Setup Defaults Esc Exit <> Select Menu Enter Select > Sub-Menu F10 Save and Exit	

(TBA)

### 5.4.3 ICH Control Submenu

Figure 5-11: ICH Control Sub-Menu Screen

Phoenix SecureCore(tm) Setup Utility	
Intel	
Integrated Device Control Sub-Menu_	Item Specific Help
> PCI Express Control Sub-Menu > ICH USB Control Sub-Menu  Azalia - Device 27, Function 0: [Auto]  AHCI Configuration: [Disabled] Disable Vacant Ports: [Disabled]	These items control various ICH PCI Express Devices.
F1 Help ^v Select Item -/+ Change Values F9 Setup Defaults Esc Exit <> Select Menu Enter Select > Sub-Menu F10 Save and Exit	

(TBA)

#### 5.4.3.1 PCI Express Control Submenu

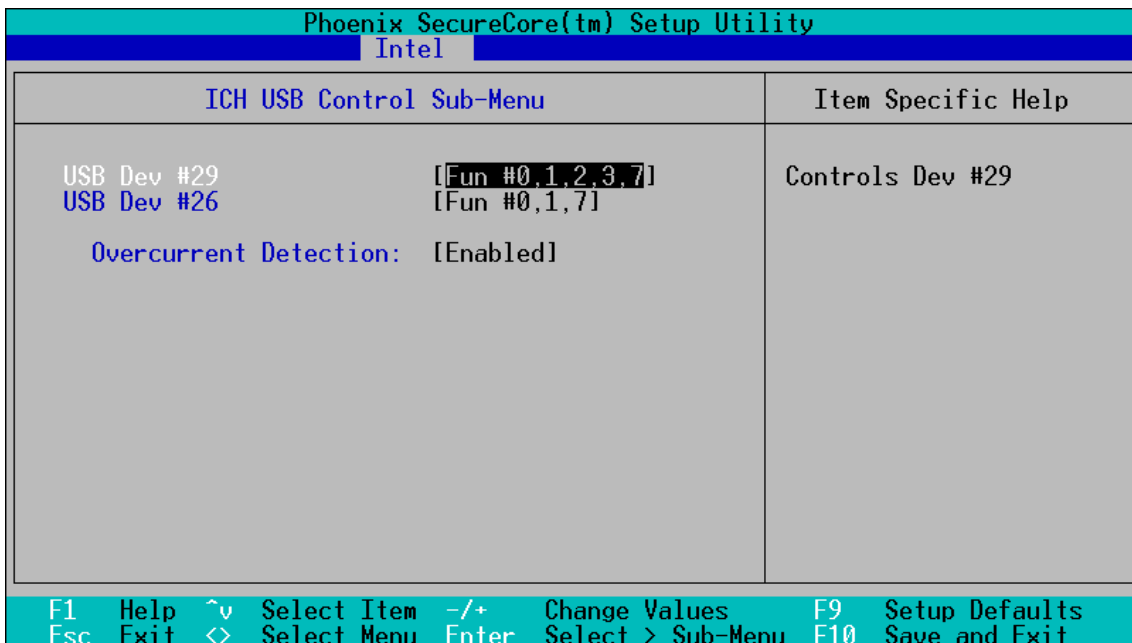
Figure 5-12: PCI Express Control Submenu Screen

Phoenix SecureCore(tm) Setup Utility	
Intel	
PCI Express Control Sub-Menu	Item Specific Help
PCI Express - Root Port 1: [Auto] PCI Express - Root Port 2: [Auto] PCI Express - Root Port 3: [Auto] PCI Express - Root Port 4: [Auto]	Control the PCI Express Port via this setup option.  Disabled - Port always disabled. Auto - Only enable if card found.  Note that if Root Port 1 is disabled, Root Ports 2-4 will be disabled as well.
F1 Help ^v Select Item -/+ Change Values F9 Setup Defaults Esc Exit <> Select Menu Enter Select > Sub-Menu F10 Save and Exit	

(TBA)

### 5.4.3.2 ICH USB Control Submenu

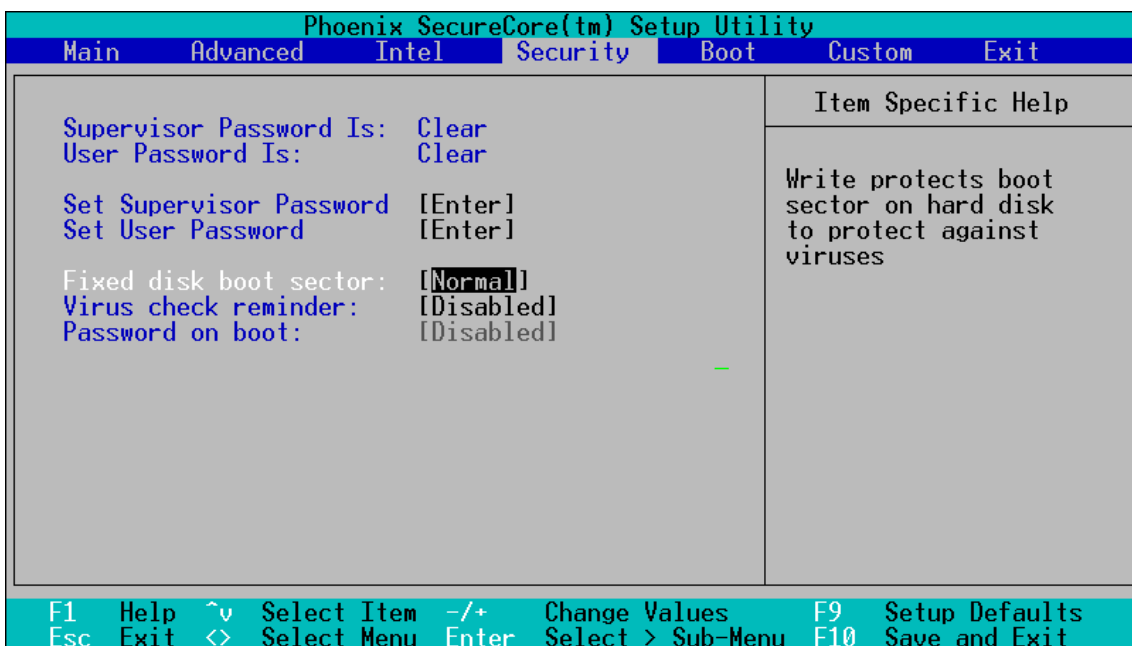
Figure 5-13: ICH USB Control Submenu Screen



(TBA)

## 5.5 Security Menu

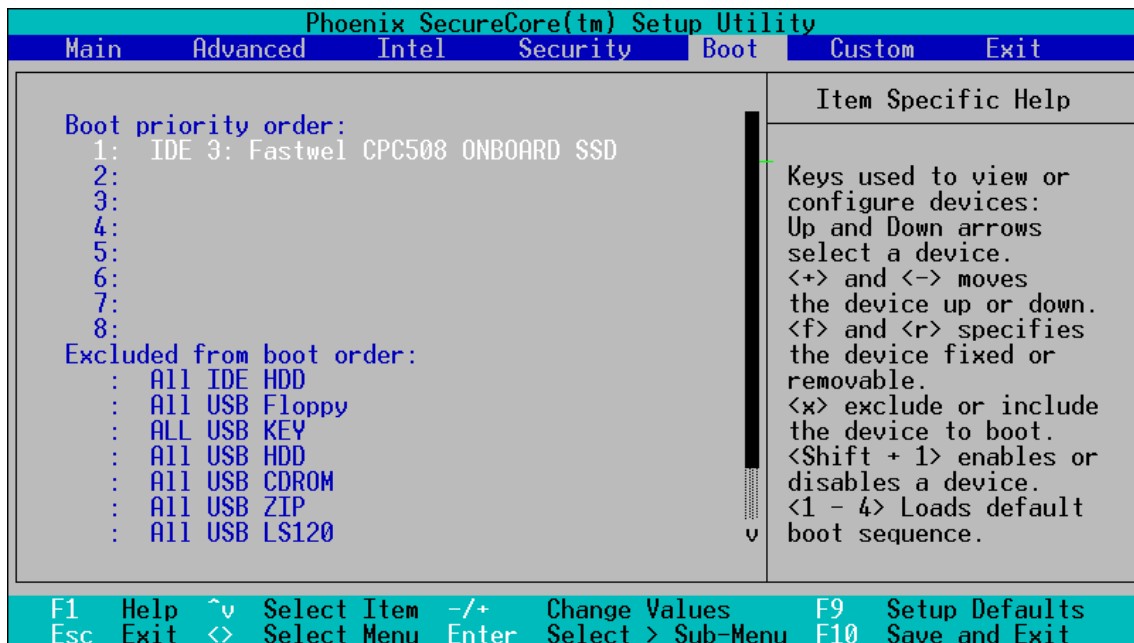
Figure 5-14: Security Menu Screen



(TBA)

## 5.6 Boot Menu

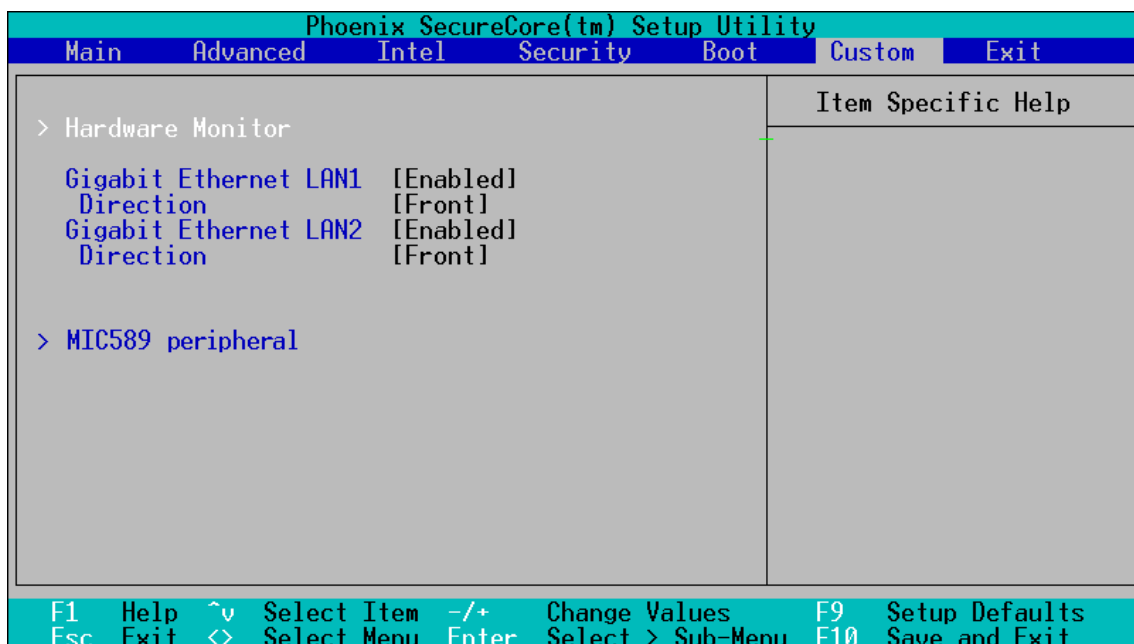
Figure 5-15: Boot Menu Screen



(TBA)

## 5.7 Custom Menu

Figure 5-16: Custom Menu Screen



(TBA)

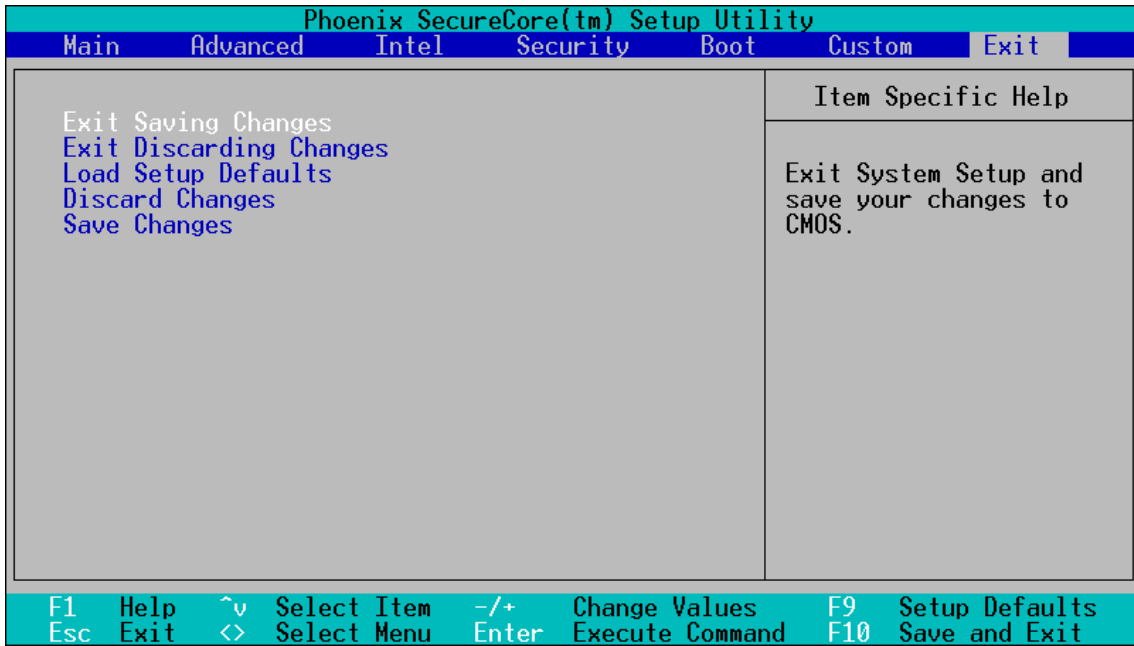


### 5.7.1 MIC589 Peripheral

Available if MIC589 is installed.

## 5.8 Exit Menu

Figure 5-17: Exit Menu Screen



(TBA)

## 6 Additional Information

### 6.1 System Power

CPC508 uses  $+5V \pm 5\%$  from CPCI backplane. The CPC508 module itself has been designed to provide best possible power supply for each system unit. However, in order to guarantee reliable and faultless operation the following requirements must be taken into account. Absolute maximum input voltages presented in the table below must not be exceeded to guarantee that the CPC508 is not damaged. The ranges for the different input power voltages, within which the module is functional, are also presented.

**Table 6-1: DC Input Voltage Ranges and Limits**

Power Voltage, V	Maximum Permitted Value, V	Recommended Range, V
+5	+5.5	4.75 to 5.25

Nominal voltage transition time of the power supply should not exceed 200 ms.

Consumption currents for CPC508 internal devices are: +5 V – 2.8 A (CPC508-01) or 3.1 A (CPC508-03).

Power supplies to be used with the CPC508 should comply with these requirements.

Input power connections to the backplane itself should provide minimum power loss. Avoid using long input lines, low carrying capacity cables, high resistance connections.

To select the appropriate system power supply, it is necessary to consider the CPC508 own power consumption, the consumption of the other system components, possible variations of power consumption during operation (e.g. due to temperature changes) and some reserve.

# 7 MIC589 Mezzanine Expansion Module

## 7.1 Introduction

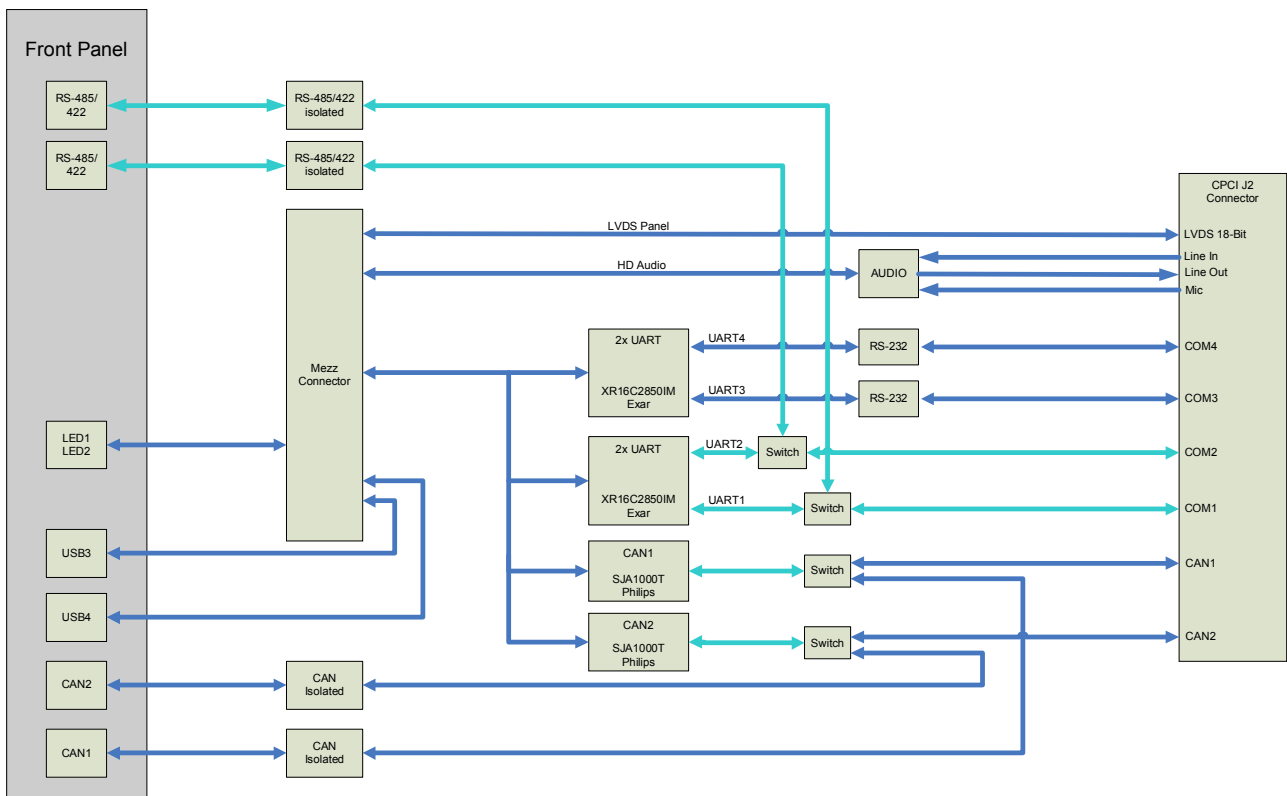
MIC589 mezzanine expansion module is designed for installation on Fastwel's CPC506 CompactPCI 3U processor module. This mezzanine I/O module expands functionality and I/O capability of the CPC506. MIC589 module is installed on the top or on bottom side of the CPC506 processor module and connected via the adapter connector.

## 7.2 MIC589 Diagrams

The figures in this section are supposed to help you to locate and identify the module's components and connectors. Our constant efforts in improving our products may result in minor differences between the real module and its depictions.

### 7.2.1 MIC589 Block Diagram

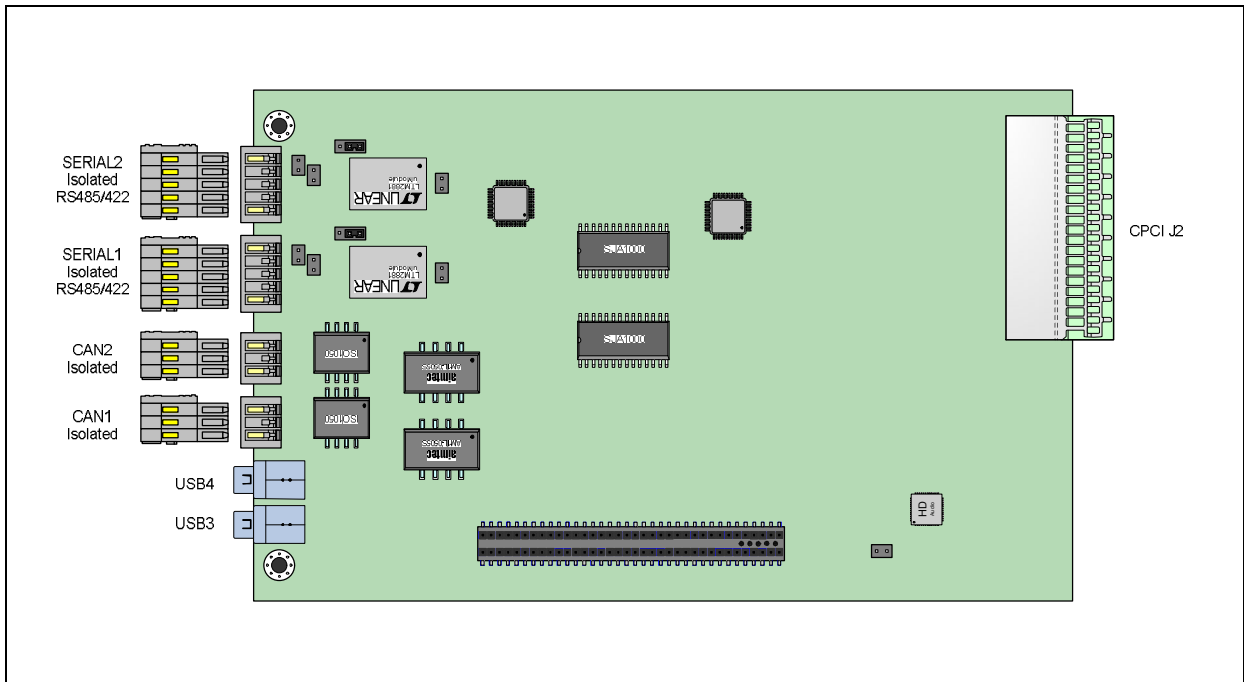
Figure 7-1: MIC589 Block Diagram



(TBA)

## 7.2.2 MIC589 Connectors Layout

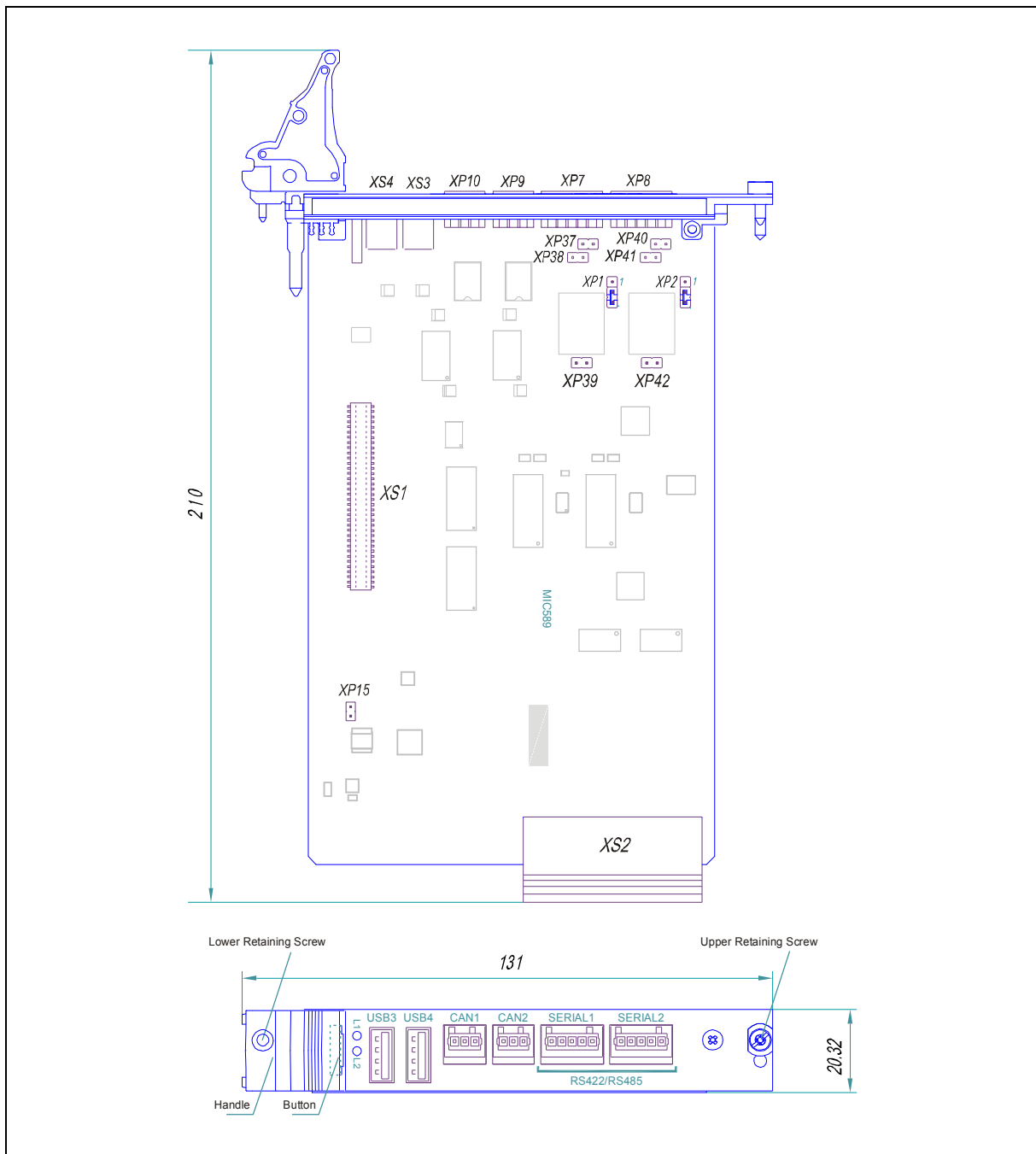
Figure 7-2: MIC589 Connectors Layout



*The module's components layout may slightly differ for various versions of the module.*

### 7.2.3 MIC589 Components Layout

Figure 7-3: MIC589 Components Layout and Dimensions (Top)



The module's components layout may slightly differ for various versions of the module.

## 7.3 Specifications

- **Audio controller: High Definition Audio compatible codec**
  - Line In, Line Out and Mic In interfaces are routed to CPCI J2
- **LVDS**
  - Routed from mezzanine connector to CPCI J2
  - 18-bit
- **Two USB ports:**
  - Conform to USB 2.0 specification;
  - Front panel connectors;
  - Routed from CPC506 via mezzanine connector.
- **Four serial ports:**
  - COM1, COM2 – 1000 V isolated RS-422/485 ports, front panel connectors; without isolation and transceivers switched to CPCI J2
  - COM3, COM4 – non-isolated RS-232 ports; CPCI J2;
- **CAN interfaces:**
  - CAN1 and CAN2 available at front panel, 1000 V isolation; without isolation and transceivers switched to CPCI J2
- **LEDs:**
  - Two programmable user LEDs at front panel;
- **Does not require forced air cooling**
- **MTBF:** not less than 730000 hours
- **Power:**
  - +5 V  $\pm$ 5%, 0.3 A
  - Powered from CPC506 mezzanine connector
- **Mechanical stability:**
  - Vibration (10-500 Hz): 5g
  - Single shock: 100g
  - Multiple shock: 50g
- **Weight:**
  - 0.160 kg
- **Dimensions:**
  - 3U cPCI: 131 mm  $\times$  210  $\times$  20.32 mm, 4HP.
- **Operating temperature range:**
  - -40°C ... +85°C

## 7.4 MIC589 Delivery Checklist

The MIC589 supplied set includes:

1. MIC589 mezzanine module
2. One jumper for MJ2-2
3. Six jumpers for MJ-0
4. A set for linking handles; Schroff p.n. 20817-672, 1 package (10 pcs.)
5. Adapter connector (for connection to CPU module) Samtec DWM-36-61-G-D-496
6. Two WAGO p.n. 733-103 connectors
7. Two WAGO p.n. 733-105 connectors
8. Antistatic bag for MIC589
9. Consumer package



**Note:**

Keep all the original packaging material (antistatic bag and consumer package) for future storage or warranty shipments.

## 7.5 MIC589 Interfaces

### 7.5.1 MIC589 Interfaces List

#### 7.5.1.1 Front Panel (4HP) Interfaces

The following interfaces are available at the MIC589 front panel:

- COM1, COM2 (RS422/485) interfaces, 1000 V isolation
- Two USB 2.0 4-contact sockets (USB3 and USB4), type A
- Two user programmable LEDs
- CAN1, CAN2 ports, 1000 V isolation

#### 7.5.1.2 Interfaces Routed to CPCI J2 Connector

The following interfaces are routed to CPCI J2 connector:

- COM1, COM2 (RS422/485) without isolation
- COM3, COM4 (RS232) interfaces without isolation
- Audio interface: Line In, Line Out, Mic In
- CAN1, CAN2 without isolation
- LVDS 18-bit

(TBA)



## 8 Supplementary Information

### 8.1 Related Standards and Specifications

The Fastwel's CompactPCI modules comply with the requirements of the following standards:

**Table 8-1: Related Standards**

Type	Standard	Test Parameters
CE: Emission	EN50081-1	–
CE: Immission	EN61000-6-2	–
CE: Electrical safety	EN60950-2002	–
Mechanical dimensions	IEEE 1101.10	–
Vibration (sinusoidal)	IEC60068-2-6-82; Fc	5 g / 10-500 Hz / 10 (acceleration / frequency range / test cycles per axis)
Permanent shock	IEC60068-2-29-87; Eb	50 g / 11 ms / 1000±10 / 1 s (peak acceleration / shock duration half sine / number of shocks / recovery time)
Single shock	IEC60068-2-27-87; Ea	100 g / 9 ms / 18 / 3 s (peak acceleration / shock duration / number of shocks / recovery time in seconds)



#### Important...

Some versions of the module may have the test results differing from the ones presented in the above table. For more information please contact Fastwel's official representatives.

Extreme vibration conditions may require additional fixing of USB devices, for example, using compound.

Information related to this product and its components can be found in the following specifications:

**Table 8-2: Related Specifications**

Product	Specification
CompactPCI Systems and Boards	CompactPCI Specification 2.0, Rev. 3.0
CompactPCI PlusIO	PICMG 2.30



## 9 Useful Abbreviations, Acronyms and Short-cuts

Abbreviation	Meaning
BMC	Baseboard Management Controller
PM	Peripheral Management Controller
IPMI	Intelligent Platform Management Interface
IPMB	Intelligent Platform Management Bus
I <sup>2</sup> C™	Inter Integrated Circuit Two-thread serial protocol, used in SMB and IPMI
KCS interface	Keyboard Controller Style interface Interface for communication between control software and BMC, similar to a keyboard controller interface
BT interface	Block Transfer interface Block transfer interface for communication between control software and BMC
DDR SDRAM	Double Data Rate Synchronous Dynamic Random Access Memory
SODIMM	Small Outline Dual In-Line Memory Module
ECC	Error Correction Code Data error correction technology used in memory modules
FWH	Firmware Hub Nonvolatile memory chip, part of Intel chipset, used for main and reserve BIOS copies in CPC508
GMCH	Graphics and Memory Controller Hub
DAC	Digital-Analog Converter
USB	Universal Serial Bus
LPC	Low Pin Count External devices communication interface
SMB	System Management Bus
UART	Universal Asynchronous Receiver-Transmitter
UHCI	Universal Host Controller Interface USB Host Controller Interface
EHCI	Enhanced Host Controller Interface (Universal Serial Bus specification)
UTP	Unshielded Twisted Pair
CRT-display	Cathode Ray Tube Display
PMC	PCI (Peripheral Component Interconnect) Mezzanine Card
CMC	Common Mezzanine Card
LVDS	Low Voltage Differential Signal Digital monitors communication specification
RTC	Real Time Clock
BIOS	Basic Input-Output System
PC	Personal Computer
PICMG	PCI Industrial Computer Manufacturers Group
AHA	Accelerated Hub Architecture GMCH and ICH communication bus specification

Abbreviation	Meaning
AGP	Accelerated Graphics Port
AGTL	Advanced Gunning Transceiver Logic PSB (Processor Side Bus) signal exchange specification
SMBus	System Management Bus
EEPROM	Electrically Erasable Programmable Read-Only Memory
NAND Flash	Not And (electronic logic gate) Flash memory specification
SSD	Solid State Disk
PLCC	Plastic Leaded Chip Carrier
RAMDAC	Random Access Memory Digital-to-Analog Converter
DAC	Digital-to-Analog Converter
DVMT	Dynamic Video Memory Technology
TTL	Transistor-Transistor Logic
ECP/EPP	Extended Capabilities Port / Enhanced Parallel Port Parallel port specifications
FDD	Floppy Disk Drive
EIDE	Enhanced Integrated Drive Electronics Mass storage devices interface
DMA	Direct Memory Access
PIO	Programmed Input/Output EIDE: Directly processor controlled data exchange
Rear I/O Board	Rear Input-Output Board Auxiliary interface board, which is connected to the cPCI backplane rear connectors
PWM output	Pulse-Width Modulation Cooling fan control technique
ESD	Electrostatically Sensitive Device Electrostatic Discharge
ACPI	Advanced Configuration and Power Interface
POST	Power On Self Test
cPCI	CompactPCI Industrial automation systems standard
EOS	Electrical Overstress
MDI	Media Dependent Interface Interface with connection type automatic detection